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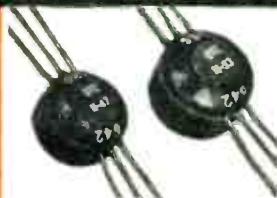
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1960 IRE DIRECTORY

Complete Data Spreads

The full spirit of the IRE DIRECTORY is to give the reader-engineer "facts" in complete detail, and specific enough to be of useful service. Our advertisers have recognized this, and many have made their copy presentation full of useful specifications and illustrations.

Actually, a Directory Publisher cannot hope to describe products adequately in standardized listings. Only the Advertiser, using display space, and with his own intimate knowledge of his service or product, can do the job right.

The advertisers listed below have done their utmost to provide the reader with engineering data in full detail, through spreads and catalogs filed in this book for easy access and permanent reference. This can prove to be the most useful part of the 1960 IRE DIRECTORY to you.

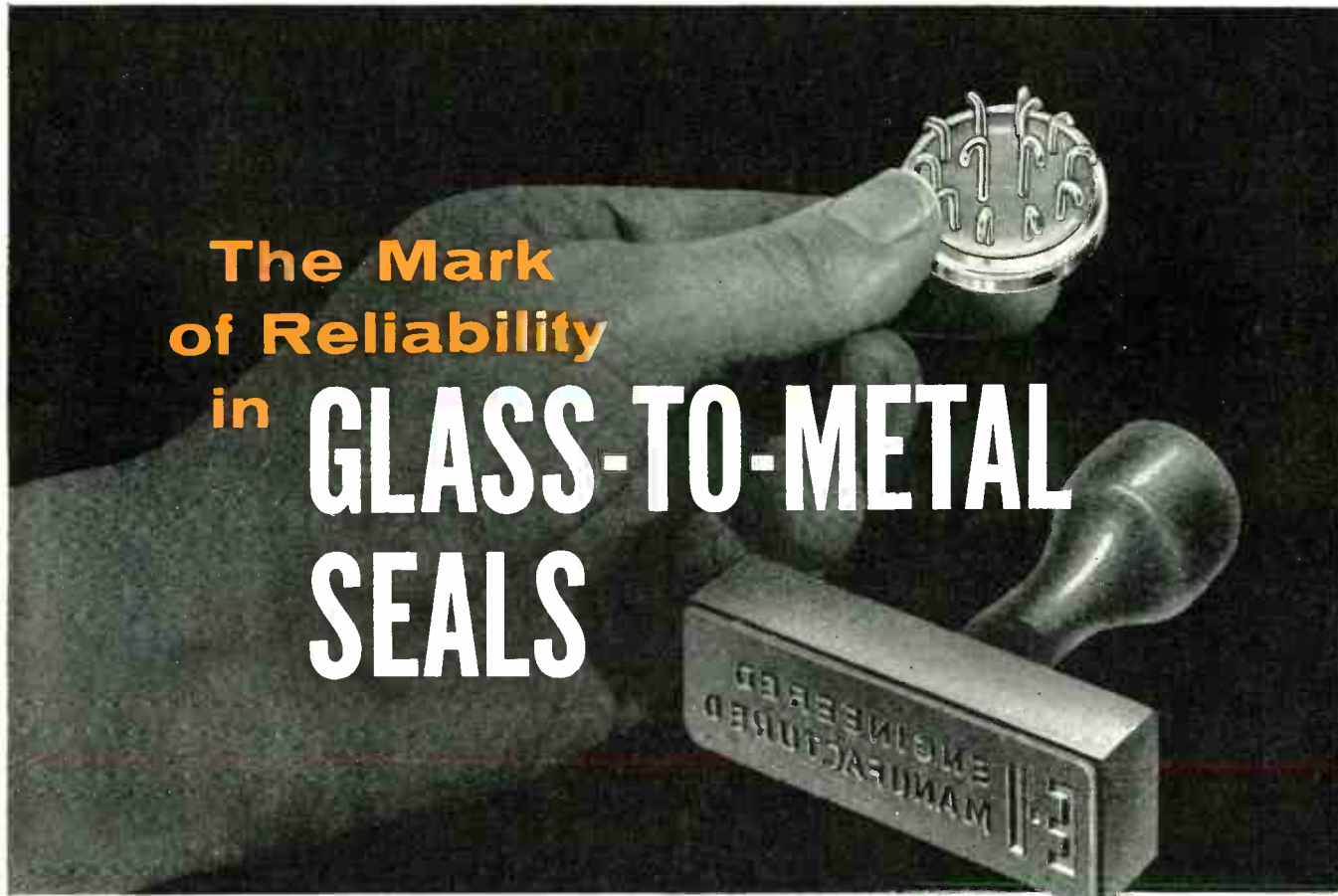
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PALO ALTO, CALIFORNIA





hp 150A/AR - DC to 10 MC

Models 150A/AR are intended as the most broadly useful, convenient high quality 10 MC scopes offered. A variety of plug-ins (see below) provide dual trace or differential input, or high amplification eliminating pre-amplifiers on input from most transducers.

Automatic Trigger

Sweep Range 0.02 $\mu\text{sec/cm}$ to 15 sec/cm; 24 sweeps 0.1 $\mu\text{sec/cm}$ to 5 sec/cm, 3% accuracy. Internal, line voltage or external triggering. pos. or neg. slopes, sensitivity 0.5 v (external). Has sweep amplifier, vernier; sensitivity 200 mv/cm to 15 v/cm. Vertical amplifier dc to 10 MC, optimum transient response and rise time less than 0.035 μsec . Calibrating voltages, 0.2 mv to 100 v peak, accuracy 3%. Approx. 1 KC square wave rise and decay time 1.0 μsec . \$1,100.00 (cabinet), \$1,200.00 (rack mount).

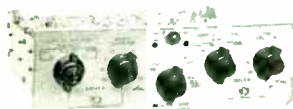
hp 130B/BR - DC to 300 KC

Termed the finest low frequency oscilloscope ever offered, -hp- 130B/BR combine big 'scope performance and positive dependability with 1 mv sensitivity and the convenience of direct reading, "universal" automatic trigger, no preamplification from most transducers and simple controls.

Similar X and Y amplifiers

Models 130B/BR have similar horizontal and vertical amplifiers with sensitivity 1 mv/cm to 125 v/cm. Input circuits are balanced on the 6 most sensitive ranges; single ended input dc or ac coupled. 21 sweep times may be directly set, instrument sweeps 1 $\mu\text{sec/cm}$ to 12.5 sec/cm, triggering is internally, by line power, or externally by 0.5 v or greater. Includes x 5 magnifier for all internal sweeps increasing fastest sweep time to 0.2 $\mu\text{sec/cm}$. -hp- 130B (cabinet) or 130BR (rack) \$650.00.

New amplifiers and accessories



-hp- 152B Dual Trace Differential Amplifier. New plug-in amplifier providing differential input and dual traces electronically switched between A and B channels at either 100 KC or on alternate sweeps. Sensitivity range 0.05 v/cm to 50 v/cm, input attenuator with 9 calibrated ranges in 1-2-5-10 sequence and vernier. \$250.00.



-hp- 153A Very High Gain Amplifier. New plug-in permitting -hp- 150A to be used for many direct measurements from transducer without preamplification. Pass band dc to 500 KC, sensitivity 1 mv/cm to 125 v/cm, balanced input on all ranges. 15 calibrated ranges in 1-2-5-10 sequence, 1 mv/cm to 50 v/cm; plus vernier. \$125.00.



-hp- 151B High Gain Amplifier. For 150A high gain unit with 5.0 mv/cm sensitivity, frequency response dc to 10 MC. 12 calibrated ranges on 1-2-5-10 sequence, 5 mv/cm to 20 v/cm; accuracy $\pm 5\%$. Vernier adjustment. 1 megohm input impedance with 31 μf shunt. Pass band rise time 0.035 μsec . Has 2 BNC terminals. \$200.00.

Data subject to change without notice. Prices f. o. b. factory.

quality oscilloscopes - DC to 10 MC!



NEW! **hp** 122A/AR - Dual Trace

Model 122A AR is a dual trace, 200 KC oscilloscope providing two separate traces for simultaneous study; single trace available when desired. Twin vertical amplifiers, alternate and chopped presentation, differential input, automatic syncing and x 5 sweep expansion. Ideal for direct comparison of filter, amplifier, output input or with vibration testing apparatus.

Sweeps 5 μ sec/cm to 200 msec/cm

15 calibrated sweeps; vernier extends slow sweep to 0.5 sec/cm, expander extends fast sweep to 1 μ sec/cm. Automatic trigger; manual override sets trigger between +10 and -10 v. Vertical amplifiers dc to 200 KC (dc coupled) or 2 cps to 200 KC (ac coupled). Sensitivity 10 mv/cm to 100 v/cm. Horizontal amplifier same bandwidth as vertical, sensitivity 0.1 v/cm to 100 v/cm. -hp- 122A (cabinet) or 122AR (rack mount), \$625.00.

hp 120A/AR - DC to 200 KC

Ideal for industrial or production line work as well as daily lab jobs, Models 120A/AR are outstanding in both value and "big 'scope" performance features. This all-new instrument covers DC to 200 KC, has the -hp- universal trigger circuit which optimizes signals automatically; also offers automatic synchronization on any internal or external voltage including line power.

Sweeps 1 μ sec/cm to 0.5 sec/cm

Features include 15 calibrated sweeps in 1-2-5 sequence, sweep speeds range 5 μ sec/cm to 0.5 sec/cm, "times-5" sweep expansion on all ranges, high sensitivity calibrated vertical amplifiers. All power supplies are regulated for steady, drift-free traces. Automatic trigger and base line can be cut out for bright, clear photography trace. Extra compact Model 120AR is only 7" high. Utmost dependability, rugged construction. -hp- 120A (cabinet) or 120AR (rack) \$435.00.

Increase convenience of your 150A/AR



-hp- 154A Voltage/Current Dual Channel Amplifier. New plug-in for 150A permits simultaneous measurement and observation of ac voltage and current. Electronic channel switching by alternate sweeps or by 100 KC chopper. Unique current probe clamps around wire under test, does not load circuit. \$430.00.



-hp- 196A Oscilloscope Camera. Most convenient recording camera available. Object-to-image size ratio 1 to 0.9 views full 10 cm graticule width. One-hand mounting and multiple picture setting. Easy access to f-stop and shutter while camera mounted. Permits viewing image with both eyes while photographing, even if wearing glasses. Employs Polaroid® Land Camera Back, Wollensak 3" f/1:9 lens. 7 shutter speeds 1/100 to 1 sec. Weight only 9 lbs. \$425.00.



-hp- AC-115A Oscilloscope Testmobile. For 150 series oscilloscopes but fits others. 4" rubber tired wheels, heavy chrome tube construction, tilts 'scope to 30° in 7½° increments, folds for storage, shipping. \$80.00. -hp- AC-116A Storage Unit fastens to -hp- AC-115A, holds 150A plug-ins or -hp- AC-117A Accessory Drawers. -hp- AC-116A, \$22.50. -hp- AC-117A, \$10.00.

hp Oscillators – 0.008 to 10,000,000 cps

Hewlett-Packard now offers 12 high quality, fast and accurate oscillators, each an exceptional value and each engineered to do a specific job best. Each incorporates the famous RC resistance capacity circuit pioneered by *-hp-*. This circuit makes possible instruments that are highly stable, wide range, compact and portable; instruments that are extremely simple to operate and require no tedious re-setting or adjustment during operation.

hp 200 Series Audio Oscillators



For audio and ultrasonic measurements, *-hp-* offers popular Models 200AB and 200CD. Both have highest stability and accurate tuning circuits. Low impedance operating levels plus superior insulation guarantee long years of trouble-free dependability. Operation is simple; just three controls; no zero setting necessary. *-hp-*

200AB, 20 cps to 40 KC, \$150.00. *-hp-* 200CD, 5 cps to 600 KC, \$170.00.

hp 207A Sweep Oscillator



This new audio oscillator provides continuous single-sweep frequency coverage from 20 cps to 20 KC. No band switching is needed; dial accuracy is 4%, and the instrument also provides a flexible 10 v/600 ohm output usable balanced or with one side grounded. Frequency response is ± 1.0 db full

range, distortion and hum are less than 1%. *-hp-* 207A may be swept by hand, motor driven, tuned remotely or coupled to a recorder. *-hp-* 207A, \$275.00.

| Instrument | Primary Uses | Frequency Range | Output | Price |
|-------------------|--|-------------------|--|-----------------|
| <i>-hp-</i> 200AB | Audio tests | 20 cps to 40 KC | 1 watt/24.5 v | \$150.00 |
| <i>-hp-</i> 200CD | Subsonic through supersonic audio and ultrasonic tests | 5 cps to 600 KC | 160 mw or 10 v/600 ohms; 20 v open circuit | 170.00 |
| <i>-hp-</i> 200J | Interpolation, frequency measurements | 6 cps to 6 KC | 160 mw/10 v | 300.00 |
| <i>-hp-</i> 200T | Telemetry, carrier current tests | 250 cps to 100 KC | 160 mw or 10 v/600 ohms; 20 v open circuit | 450.00 |
| <i>-hp-</i> 201C | High quality audio tests | 20 cps to 20 KC | 3 w or 42.5 v/600 ohms | 225.00 |
| <i>-hp-</i> 202A | Low frequency measurements | 0.008 to 1200 cps | 28 mw or 30 v p-p/4000 ohms | 525.00 Δ |
| <i>-hp-</i> 202C | Servo equipment tests, measurements | 1 cps to 100 KC | 160 mw or 10 v/600 ohms | 300.00 |
| <i>-hp-</i> 205AG | High power audio tests, gain measurements | 20 cps to 20 KC | 5 watts | 500.00 Δ |
| <i>-hp-</i> 206A | High quality, high accuracy audio tests | 20 cps to 20 KC | + 15 dbm | 750.00 Δ |
| <i>-hp-</i> 207A | Audio sweep generation | 20 cps to 20 KC | 160 mw or 10 v/600 ohms | 275.00 |
| <i>-hp-</i> 233A | Carrier oscillator—current tests | 50 cps to 500 KC | 3 w/600 ohms | 500.00 |
| <i>-hp-</i> 650A | Wide range video tests | 10 cps to 10 MC | 15 mw/3 v | 490.00 Δ |

Δ Rack mounted instruments \$15.00 less.



hp 202A Function Generator

Compact, multi-purpose source of transient-free test voltages from 0.008 cps to 1,200 cps. Continuously variable through 5 bands; offers exceptional stability (within 1%) and distortion less than 1% to 100 cps. Sine, square or triangular waves may be selected by a front panel switch; the 30 volt output peak-to-peak is constant for all wave forms and over full frequency range. *-hp-* 202A, \$525.00 Δ .



hp 650A Test Oscillator

Covering 10 cps to 10 MC, *-hp-* 650A is a highly stable, wide band instrument for audio, supersonic, video and rf measurements. Output is flat within 1 db full range; voltage range is 0.00003 to 3 v. In addition to 600 ohm impedance, voltage divider provides a 6 ohm impedance. Distortion less than 1% to 100 KC; stability $\pm 2\%$ to 100 KC. \$490.00 Δ .

hp Distortion, Wave Form Analyzers—20 cps to 50 KC

NEW! hp 302A Wave Analyzer



New, completely transistorized, this advanced instrument provides direct, accurate wave component measurement without troublesome calibration or stabilization. Measurement range 20 cps to 50

KC. The instrument is hum free, requires little power, needs no warm-up, has very sharp acceptance circuits plus an AFC. May be battery operated (18 to 28 volts). Simple operation, rugged, trouble-free. \$1,475.00 Δ

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|------------------|-----------------------------------|-----------------|--|---------------------|
| <i>-hp-</i> 302A | Wave form analysis | 20 cps to 50 KC | Direct reading, no calibration needed | \$1,475.00 Δ |
| <i>-hp-</i> 330B | Measures total audio distortion | 20 cps to 20 KC | Includes input amplifier, VTVM | 410.00 Δ |
| <i>-hp-</i> 330C | For FM broadcast measurements | 20 cps to 20 KC | Special VU meter to meet F.C.C. requirements | 440.00 Δ |
| <i>-hp-</i> 330D | For AM, FM broadcast measurements | 20 cps to 20 KC | AM detector and VU meter to meet F.C.C. requirements | 500.00 Δ |

Δ Rack mounted instruments \$15.00 less.

NEW!

hp 218AR Digital Delay Generator



- Independently adjustable time intervals or pulse delays
- $\pm 0.1 \mu\text{sec}$ time interval accuracy
- Crystal oscillator time base
- Regulated power supplies

Model 218AR Digital Delay Generator is a totally new instrument applicable to many types of timing measurements including calibrating the range determining circuits of radar receivers, etc. The generator is built to rigid standards and is suitable for military use. It provides two precision time intervals or pulse delays, either of which are independently adjustable from 1 to 10,000 microseconds in 1 microsecond steps. These time intervals are accurate to within 0.1 microsecond $\pm 0.001\%$ of the selected value, and may be initiated from an internal multivibrator, 10 cps to 10 KC, or from an external rate generator, 0 cps to 10 KC. Total jitter does not exceed 0.02 microseconds in either case. The instrument also provides a 50 volt synchronizing output pulse at the beginning or end of a time interval, and a 1 microsecond timing comb output at the front panel.

hp 219A Dual Trigger Unit

This plug-in drawer for *-hp-* 218AR supplies trigger pulses of positive polarity, 50 volts, 0.1 μsec rise time from a 50 ohm source. Pulse A occurs at T_0 or T_1 , as selected by a switch; Pulse B is triggered at T_2 . *-hp-* 219A, \$100.00.

hp 219B Dual Pulse Unit

This plug-in drawer for *-hp-* 218AR produces two high-power pulses which are continuously adjustable in width, 0.2 to 5 μsec and in amplitude from 0 to 50 volts, positive or negative polarity. The leading edge of these pulses can be set to occur at the beginning or end of the selected time interval. Both pulses are brought out to separate front panel jacks but may be switched to a common jack with no change in level or output impedance. *-hp-* 219B, \$450.00.

hp 219C Digital Pulse Duration Unit

This plug-in drawer for *-hp-* 218AR produces a high power output pulse whose delay and duration are digitally controlled. The pulse is available in both polarities simultaneously, and is continually adjustable in amplitude up to at least 15 volts from a 90 ohm source. It may also be obtained from a directly coupled 500 ohm source with an amplitude of at least 90 volts. *-hp-* 219C, \$350.00.

No count ambiguity

A unique feature of the new *-hp-* 218AR is its time base, a pulsed crystal controlled oscillator. The oscillator starts at T_0 and stops at the last output pulse. This eliminates the "plus-or-minus-1-count" ambiguity of many counter circuits in such application.

Model 218AR is a completely self-contained instrument, requiring only one or more *-hp-* 219 series plug-ins to perform a broad variety of time and delay generation measurements. Simplicity and flexibility are increased by the large variety of output signals provided by the plug-in units. The instrument is particularly compact and well-designed; etched circuits and the use of plug-ins materially increase circuit accessibility.

The instrument's power supplies are fully regulated to avoid effects of line voltage variations. It is available as *-hp-* 218AR, rack mount. \$2,000.00.

hp Square Wave and Pulse Generators

hp 212A Pulse Generator



Provides continuously variable, high power "fast pulses" of superior wave form. Combines broad general usefulness with 0.02 μsec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse length variable 0.07 to 10 μsec ; minimum

overshoot; 50 watt peak power (50 v to 50 ohms load). Low impedance means accurate pulses can be delivered at a distance from the instrument. Repetition rate variable 50 to 5,000 pps; controlled internally or externally. Synchronizing pulse available in advance of, or following output pulse. \$585.00 (cabinet), \$570.00 (rack mount).

hp 211A Square Wave Generator



Versatile, wide range instrument for testing oscilloscopes, networks, video and audio amplifier performance, modulating signal generators and measuring time constants. Offers simple control of electronic switches; is also convenient for indicating phase shift, frequency response, transient effects. Two separate outputs (a) 7 volt 75 ohm circuit for TV work; (b) 55 volt 600 ohm output for high level work. Both have full amplitude variation. Instrument operates free-running or externally synchronized

with positive going pulse or sine wave of 5 volts minimum amplitude. \$300.00 (cabinet), \$305.00 (rack mount).

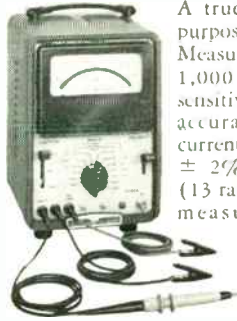
hp DC and AC Voltmeters; DC Milliammeter

NEW! hp 425A Microvolt-Ammeter



New, high sensitivity, high stability microvolt meter reading end scale voltages of 10 μ v to 1 v in 11 ranges. Also reads currents of 10 μ ma to 3 ma in 18 step, 1-3-10 sequence. Accuracy $\pm 3\%$ on all ranges. Drift less than 2 μ v referred to input terminals under all conditions; much less under lab conditions. Input impedance 1 megohm $\pm 3\%$ on all ranges. Instrument can also be used as a 100 db amplifier providing up to 1 v output from signals as small as 10 μ v. Amplifier ac rejection is at least 3 db at 0.2 cps and 60 db at 60 cps and above. \$500.00 (cabinet), \$505.00 (rack).

NEW! hp 412A Precision Volt - Ohm - Ammeter



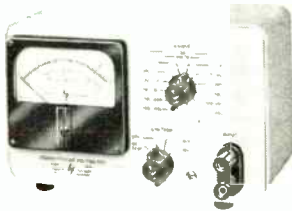
A true, precision, multi-purpose instrument at last! Measures dc voltage 1 μ v to 1,000 v (max. full scale sensitivity 1 mv, full scale accuracy 1%). Measures currents 1 μ a to 1 amp with $\pm 2\%$ accuracy, full scale (13 ranges). As ohmmeter, measures 0.02 ohms to 5,000 megohms. Low noise, drift. Recorder output provides 1 v or 1 ma. \$350.00 (cabinet), \$355.00 (rack).

NEW! hp 428A Clip-On DC Milliammeter



Radical approach to current measurements means no breaking of leads, no dc connections, no soldering, no circuit loading. "Current transformer" probe clamps around wire under test, measures by sampling magnetic field around the wire. Readily measures dc current in presence of strong ac. Covers 0.3 ma to 1 amp; accuracy $\pm 3\%$. \$475.00 (cabinet), \$480.00 (rack).

NEW! hp 403A Transistorized AC Voltmeter



Battery-operated, portable, weighs less than 5 lbs., transistorized, covers 1 cps to 1 MC and 100 μ v to 300 v rms (max. full scale sensitivity 1 mv). Also reads db direct from -12 to 2 db. 400 hours battery life (6 mos. average use) hum less than 30 μ v on all but lowest range. Average reading meter; accuracy $\pm 3\%$ to 500 KC, $\pm 5\%$ to 1 MC. Input impedance 2 megohms; high overload capacity. \$250.00.

NEW! hp 405AR Automatic DC Digital Voltmeter



Literally "touch-and-read" measuring speed. Automatic range, polarity selection, covers 0.001 v to 1,000 v (accuracy $\pm 0.2\%$ of reading ± 1 count). New novel circuitry provides a stability of readings virtually eliminating jitter in the last digit. Floating input, analog-to-digital conversion, digital recorder output and front panel switch to hold ranges. Just 7" high! \$825.00.

hp 410B Vacuum Tube Voltmeter



All-purpose test instrument, range, 20 cps to 700 MC. Also serves as dc VTVM with 122 megohms impedance, or ohmmeter for measurements 0.2 ohms to 500 megohms. Input capacity 1.5 μ f, 10 megohms input resistance. \$245.00 (cabinet), \$265.00 (rack).

hp 400L Logarithmic Voltmeter



New -hp- 400L, 10 cps to 4 MC. features a 5" true log voltage scale plus a 12 db linear decibel scale. Accuracy is a constant percentage of the reading, $\pm 2\%$ of reading or $\pm 1\%$ of full scale, whichever is more accurate, to 500 KC; $\pm 5\%$ full frequency range. Voltage range 0.3 mv to 300 v. \$325.00 (cabinet), \$330.00 (rack).

hp 400H Vacuum Tube Voltmeter



Need extreme accuracy of 1%? -hp- 400H covers 10 cps to 4 MC, has 5" meter with mirror scale, measures voltages 0.1 mv to 300 v (max. full scale sensitivity 1 mv), 10 megohm resistance minimizes circuit loading, 56 db feedback amplifier insures stability. Rugged, trouble-free precision instrument. \$325.00 (cabinet), \$330.00 (rack).

| Instrument | Primary Uses | Frequency Range | Voltage or Current Range | Input Impedance | Price |
|------------|---|---------------------------------|---|--|----------|
| -hp- 400D | Wide range ac measurements High sensitivity | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μ f shunt | \$225.00 |
| -hp- 400H | High accuracy wide range ac measurements | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μ f shunt | \$325.00 |
| -hp- 400L | Log voltages, linear db measurements | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μ f shunt | \$325.00 |
| -hp- 403A | Battery-operated portable; fast, accurate, hum-free ac measurements | 1 cps to 1 MC | 0.001 to 300 v 12 ranges | 2 megohms 40, 20 μ f shunt | 250.00 |
| -hp- 405AR | Direct, automatic voltage measurement. Recorder output, automatic polarity | Dc | 0.001 v to 1,000 v (accuracy $\pm 0.2\%$ of reading ± 1 count) | 11 megohms to dc | 825.00 |
| -hp- 410B | Audio, rf, VHF measurements; dc voltages; resistances | dc; ac—20 cps to 700 MC | 1.0 to 300 v 7 ranges | dc—122 megohms; ac—10 megohms/ 1.5 μ f | 245.00 |
| -hp- 412A | Precision voltage, current resistance measurements | Dc | 1 mv to 1,000 v 1 μ a to 1 amp | 10 to 200 megohms, depending on range | 350.00 |
| -hp- 425A | Read μ v, μ ma; 100 db amplifier; medical, biological, physical, chemical | dc voltages as 100 db amplifier | 10 μ v to 1 v 11 ranges | 1 megohm $\pm 3\%$ | 500.00 |
| -hp- 428A | Clip-on milliammeter eliminates direct connection, circuit loading | Dc | 0.3 ma to 1 amp, 6 steps, $\pm 3\%$ accuracy | — | 475.00 |

hp 400D Vacuum Tube Voltmeter



Best -hp- ac VTVM ever built! Covers all frequencies 10 cps to 4 MC. Extremely sensitive, wide range, accurate within 2% to 1 MC, measures 0.1 mv to 300 v. Direct reading in db or volts; 10 megohm input impedance with 15 μ f shunt insures negligible loading on circuits under test. \$225.00 (cabinet), \$230.00 (rack).

NEW!

hp 524C Precision Electronic Counter



- Bright, big-number readout
- New stability—3 parts in 10^8 short-term
- Direct, instantaneous, automatic readings
- Covers frequencies 10 cps to 220 MC*
- Measures time interval 1 μ sec to 100 days
- Measures period 0 cps to 10 KC
- Resolution 0.1 microseconds
- No calculation or complex setup
- Easily used by non-technical personnel
- High sensitivity, impedance, reliability

* With proper plug-ins.

5 PLUG-IN UNITS INCREASE FLEXIBILITY, USEFULNESS FOR MANY MEASUREMENTS



-hp- 525A Frequency Converter. Extends 524's direct reading range to cover 10 cps to 100 MC with no loss in accuracy. Provides additional amplification to

increase video sensitivity to 0.1 v through 524's basic 10 cps to 10.1 MC range. \$250.00.



-hp- 525B Frequency Converter. Converts -hp- 524 for direct readings 100 to 220 MC in decade steps. Maintains same high accuracy throughout range; provides high sensitivity for low level work. \$250.00.



-hp- 526A Video Amplifier. Increases 524 sensitivity to 10 mv for low power frequency measurement 10 cps to 10.1 MC. Accuracy same as counter; minimum

input 10 millivolts rms. \$175.00.



-hp- 526B Time Interval Unit. Permits 524 to measure interval 1.0 μ sec to 100 days with accuracy of 0.1 μ sec \pm 0.0001%. Reads in sec, msec or μ sec. Triggering

from separate "stop" or "start" on pos. or neg. going waves. Trigger adjustable -192 to +192 volts. \$175.00.



-hp- 526C Period Multiplier. Permits 524 to measure period over 100, 1,000 or 10,000 cycles of unknown, thus providing the greater accuracy of mid-range frequency readings. Front panel switch selects desired period. \$225.00.

New big-number readout, and new crystal oscillator stability of 5 parts in 10^8 per week—these are significant advances incorporated into new -hp- 524C Electronic Counter.

The new 524C permits you to buy only the basic counting facilities you need now—later on add inexpensive plug-ins to triple and quadruple the usefulness of your counter.

The basic -hp- 524C reads frequency 10 cps to 10.1 MC over 5 selected periods. Display time is variable, counts are automatically reset, action is repetitive, readings are direct without calculation or interpolation; an automatic illuminated decimal point is included.

The instrument is of highest quality throughout and employs a military design approach. -hp- 524C, less plug-ins, \$2,300.00 (cabinet); \$2,275.00 (rack mount). -hp- also offers Model 524D, similar but with 8 vertical readout units, at lower price.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|-------------------------------|--|---|--|--------------|
| -hp- 524B Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability about 2/1,000,000/week | \$2,150.00 ■ |
| -hp- 524C Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability about 5/10 ⁸ per wk | 2,300.00 ■ |
| -hp- 524D Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability 5/10 ⁸ per wk | 2,150.00 ■ |
| -hp- 525A Frequency Converter | Extends 524 range to 100 MC; increases basic sensitivity | 10 cps to 100 MC | Accuracy \pm 1 cps \pm stability; 0.1 v rms min. input | 250.00 |
| -hp- 525B Frequency Converter | Extends 524 range from 100 to 220 MC; high sensitivity | 100 MC to 220 MC | Accuracy \pm 1 cps \pm stability; 0.2 v rms min. input | 250.00 |
| -hp- 526A Video Amplifier | Increases 524 sensitivity to 10 millivolts | 10 cps to 10.1 MC | Accuracy same as basic counter; 10 mv rms min. input | 175.00 |
| -hp- 526B Time Interval Unit | Measures interval 1 μ sec to 100 days | 1 μ sec to 10 ² sec | Accurate 0.1 μ sec \pm 0.0001% | 175.00 |
| -hp- 526C Period Multiplier | Period measurement | Extends range of 524 to measure 10,000 periods | Greater accuracy in period measurement | 225.00 |

■ Rack mounted instrument \$25.00 less.

hp 500B/C Frequency Meters



Directly measures frequency of voltages 3 cps to 100 KC; expanded scale allows any 10% or 30% of range to be measured full scale. Sensitivity 0.2 v rms (sine waves), 1 v peak for pulses. Input impedance 1 megohm with 40 μ f shunt; accuracy independent of line voltage changes. Also available as -hp- 500C, calibrated for direct reading in rpm. -hp- 500B/C, \$285.00 (cabinet), \$290.00 (rack mount).

hp 506A Optical Tachometer Pickup



Versatile, flexible light source and pickup for use as a transducer with -hp- 521A/C, 500B/C, etc. Measures 300 to 300,000 rpm (beyond with amplified output); normal output at least 1 v rms into 1 megohm or greater impedance. Light source 21 cp 6 v bulb; Type 1P41 phototube, phototube bias 70 to 90 v dc (supplied from -hp- 500B/C, 521 A/C). -hp- 506A, \$125.00.

hp 508A-D Tachometer Generators



Rotating speed transducers used with electronic counters or frequency meters for simple, accurate measurements from 15 to 40,000 rpm (or beyond with amplifier) -hp- 508A provides 60 output pulses per shaft revolution; -hp- 508B, C, D provide 100, 120 and 360 pulses/rev respectively. Output voltage increases linearly with shaft speed to 5,000 pps. Running torque approx. 0.15 in. oz.; peak starting torque approx. 4 in. oz. -hp- 508A, B, C or D, \$100.00.

hp 521 Industrial Counters

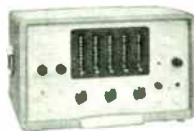


Low cost, simple operation, almost limitless uses characterize -hp- 521 Industrial Counters. -hp- 521A measures frequency, random events per unit of time; with transducers also measures rps, speed, rpm, weight, pressure, temperature, acceleration, etc. -hp- 521A reads direct in cps, rpm, and rps; display is variable 0.1 to 15 seconds or "hold." Frequency range 1 cps to 120 KC, accuracy ± 1 count \pm accuracy of power line frequency (usually $\pm 0.1\%$); input min. 0.2 v rms; input attenuator adjusts sensitivity 0.2 to 100 v rms, input impedance 1 megohm with 50 μ f shunt, gate time 0.1 and 1 sec, also Manual Gate. -hp- 521C same as 521A except has greater accuracy, crystal controlled time base and 5-place (instead of 4-place) registration with count capacity of 99,999. -hp- 521D same as 521A except has in-line readout in bright, large numerals. -hp- 521E similar to 521D but has 5-place, in-line readout. -hp- 521G similar to 521A but measures to 1.2 MC (5 places). -hp- 521A, \$475.00. -hp- 521C, \$650.00. -hp- 521D, \$675.00. -hp- 521E, \$875.00. -hp- 521G, price on request.

| Instrument | Primary Uses | Frequency Range | Characteristics Δ | Price |
|---|---|--|--|--------------------|
| -hp- 100D Secondary Standard | Frequency, time measurements | 100 KC, 10 KC, 1 KC, 100 cps, 10 cps | Stability 1/1,000,000 (short-time). Sine or rectangular output. Marker pips | \$ 750.00 Δ |
| -hp- 500B Electronic Frequency Meter | Rapid frequency measurements | 3 cps to 100 KC | 9 ranges $\pm 2\%$ accuracy. Input 0.2 to 250 volts | 285.00 |
| -hp- 500C Electronic Tachometer Indicator | Rpm measurements | 180 to 6,000,000 rpm | Similar to 500B but calibrated in rpm | 285.00 |
| -hp- 506A Optical Tachometer Pickup | Rps and rpm measurement | 300 to 300,000 rpm | Phototube and light source; output 1 v rms | 125.00 |
| -hp- 508A Tachometer Generator | Shaft speed measurement | 15 to 40,000 rpm | Output 60 cycles per revolution | 100.00 |
| -hp- 508B Tachometer Generator | Shaft speed measurement | 15 to 30,000 rpm | Output 100 cycles per revolution | 100.00 |
| -hp- 508C Tachometer Generator | Shaft speed measurement | 15 to 25,000 rpm | Output 120 cycles per revolution | 100.00 |
| -hp- 508D Tachometer Generator | Shaft speed measurement | 15 to 5,000 rpm | Output 360 cycles per revolution | 100.00 |
| -hp- 520A Nuclear Scaler | For counting high-rate pulses | Capacity 100 counts in 2 decades. 10,000,000 pps counting rate | 100:1 divider for operation of low speed scalars | 615.00 Δ |
| -hp- 521A Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Direct reading, accurate within ± 1 count $\pm 0.1\%$, 4 place registration | 475.00 |
| -hp- 521C Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Direct reading, accuracy within ± 1 count $\pm 0.01\%$, 5 place registration | 650.00 |
| -hp- 521D Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Direct in-line readout accuracy within ± 1 count $\pm 0.01\%$ | 675.00 |
| -hp- 521E | Measure frequency, speed | 1 cps to 120 KC | Same as 521C except has in-line digital readout | 875.00 |
| -hp- 521G | Measure frequency, speed, elapsed time | 1 cps to 1.2 MC | Direct reading, accuracy ± 1 count $\pm 0.1\%$, 5 place registration | on request |
| -hp- 522B Electronic Counter | Frequency, period, time interval measurements | 10 cps to 120 KC | Direct reading, accuracy ± 1 count $\pm 0.001\%$ | 915.00 Δ |
| -hp- 523B Electronic Counter | Frequency, period, time interval | 10 cps to 1.1 MC | Direct reading, accuracy ± 1 count $\pm 2/1,000,000$ | 1,245.00 |
| -hp- 523CR | Frequency, period, time interval | 10 cps to 1.2 MC | Direct reading, accuracy ± 1 count $\pm 2/1,000,000$, in-line digital readout, 10-line code arrangement | 1,485.000 |
| -hp- 523DR Electronic Counter | Frequency, period, time interval | 10 cps to 1.2 MC | Direct reading, accuracy ± 1 count $\pm 2/1,000,000$ | 1,285.00 |

Δ Rack mounted instruments \$15.00 less.

hp 522B Electronic Counter



Compact, low cost, versatile instrument for frequency, period or time measurements. Measures frequency 10 cps to 120 KC, time interval 10 μ sec to 10⁵ sec. Reads direct in cps, KC, seconds or milliseconds. Count automatically reset, action repetitive. Stability of time base 1/100,000 per week. Easily used by untrained personnel. High quality, completely self-contained, bright, clear numerals; ideal industrial as well as lab instrument. \$915.00 Δ .

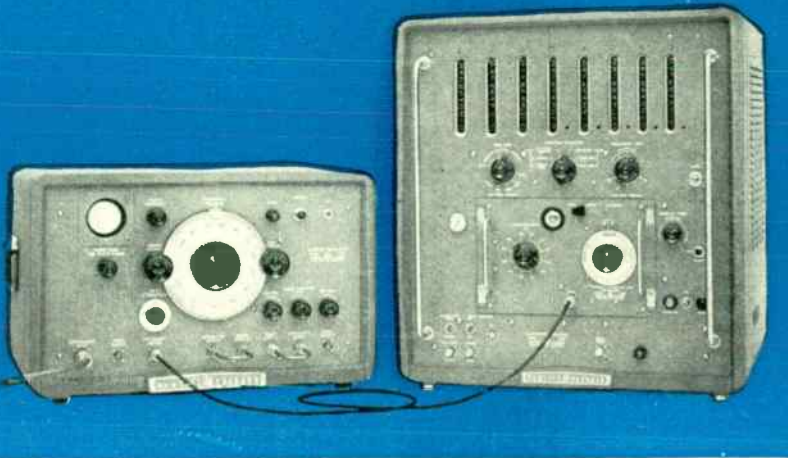
hp 523CR/DR Electronic Counters



-hp- 523CR

Model 523CR is a revolutionary all-purpose counter measuring frequency 10 cps to 1.2 MC, time interval 1 μ sec to 27.8 hours, period 0.00001 cps to 100 KC. Stability 2/1,000,000 per week. Results displayed in sec, msec, μ sec or KC; automatic decimal. Display time variable 0.1 sec to 10 sec or indefinitely. Accuracy ± 1 count plus crystal stability, 5 gate times. Usable with 100 KC primary standard. High quality; completely self-contained. Pulse output for Z-axis oscilloscope modulation. -hp- 523DR similar but has neon numeral column readout. -hp- 523CR, \$1,485.00; -hp- 523DR, \$1,285.00.

hp 540A/540B Transfer Oscillator



Just two *-hp-* instruments—Model 540B Transfer Oscillator and a 524 series electronic counter, (with plug-ins) are all the equipment you need to measure unknown frequencies up to 12.4 KMC swiftly and accurately.

This simple, two instrument setup is particularly useful for quick CW and AM frequency measurement, FM center frequency and deviation checks, and frequency of high-noise signals. Frequencies of pulsed signals can be measured using an external oscilloscope. Overall accuracy is better than 10 times that of the best microwave wavemeters; and on clean CW signals, is about 1/1,000,000.

Simple operation

When approximate frequency is known, the 540B is tuned until a harmonic beats with the unknown. The multiplying

factor is noted, and the 540B frequency measured on the 524. The 524 reading, times the multiplying factor, is the unknown.

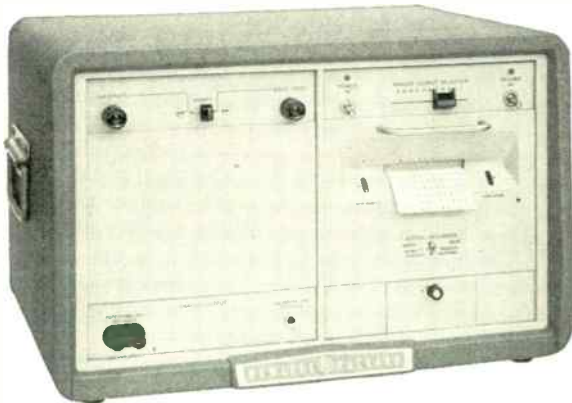
Brief Specifications, hp 540B

Oscillator Freq. Range: 100 to 220 MC
Harmonic Freq. Range: Up to 12.4 KMC
Stability: Better than 0.002%/minute
Output: 2 volts into 50 ohms
Amplifier Gain: 40 db max, 1 v output
Oscilloscope: 100 cps to 200 KC; vert. sens. 5 mv rms/inch

Price: \$750.00 Δ .

Model 540A, similar to 540B, but requires an external mixer above 5 KMC. \$615.00 Δ .

hp 560A/561A/B Digital Recorder



Brief Specifications

Accuracy: Identical to counter used
Printing Rate: 5 lines/sec maximum
Digit Capacity: Up to 11 per line
Driving Source: 560A—Parallel entry staircase voltages
561A/B—Ten-line decimal code
Analog Output: Proportional to any 3 consecutive digits;
(560A) max. amplitude 1 ma or 100 mv
Print Command Signal: 10 μ sec minimum, pos. or neg.,
15 v pulse
Price: *-hp-* 560A \$1,265.00 Δ (with six comparators).
-hp- 561A \$975.00 Δ .
-hp- 561B price on request.

Continuous digital record for counters
Direct reading, simple hookup
Five 11-digit lines/second
Analog output for pen recorder
Accuracy identical to counter used

No intermediate equipment is needed between *-hp-* 560A and an *-hp-* counter equipped with 560A digital recorder kit. In direct hookup, completely self-contained *-hp-* 560A provides a printed record of all types of test data, plus, through an analog output, a convenient graphic record of very small data variations.

The analog output is a voltage or current proportional to the number represented by any 3 consecutive digits of recorded data. The 560A permits expanded strip chart recording and the chart cannot be driven off scale since range variation for the 3-digit scale is 0 to 999. Wider variation merely causes a repetition of the 0 to 999 sequence. Print capacity is five, 11-digit lines/second; secondary or coding data may be entered simultaneously with primary data.

-hp- 561A Digital Recorder offers 10-line coded decimal entry with separate connection for each position of each wheel so that the instrument may be operated from relays, stepping switches and beam switching tubes.

-hp- 561B Digital Recorder similar to *-hp-* 561A, for use with *-hp-* 405AR Digital Voltmeter and *-hp-* frequency counters with in-line presentation.

Δ Rack mount instrument \$15.00 less.

Microwave Impedance Measuring Equipment



hp 416A Ratio Meter

Automatically combines forward and reverse signals and displays their ratio directly, irrespective of amplitude variations. Contains rf power monitor indicating proper power level. Rear terminal signal available to operate oscilloscope or recorder. Suitable for single and swept frequency operation. \$475.00Δ.



hp 415B Standing Wave Indicator

For all waveguide and coaxial slotted sections. Gives readings in SWR or db. Single frequency operation; 315 to 2020 cps. Low noise level, 0.1 μv (full scale) sensitivity, 60 db. calib. attenuator. \$200.00.



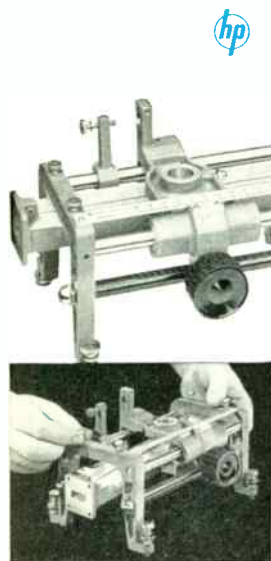
hp 803A vhf Bridge

Provides direct impedance measurements in vhf range, 2 to 2,000 ohms, -90° to +90° phase angle. Wide frequency range 52 to 500 MC; makes measurements down to 5 MC and up to 1,000 MC. Fast, simple to use. \$800.00.



hp 417A vhf Detector

Super-regenerative (AM) receiver covering all frequencies from 10 to 500 MC in 5 bands. Designed for use with -hp- 803A Bridge. 5 μv sensitivity full range. Single frequency control, reads direct in MC. \$350.00.



hp 809B/814B Universal Probe Carriages

-hp- 809B and 810B



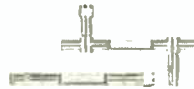
-hp- 814B, 815B, 446B

Quick, easy waveguide interchange

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|------------------------------------|---|--|---|----------|
| -hp- 360A-D Low Pass Filters | Eliminates harmonic voltages from uhf systems | Cut-off frequencies A- 700 MC C-2,200 MC B-1,200 MC D-4,100 MC | 50 db rejection at 1.25 cutoff freq. | \$ 40.00 |
| -hp- 415B Standing Wave Indicator | SWR indicator or null indicator | With external detectors, 10 to 18,000 MC | 0 to 70 db attn. Max. sensitivity 0.1 μv | 200.00 |
| -hp- 416A Ratio Meter | Reflection coefficient measurements | With external detectors, 10 to 18,000 MC | Continuous swept frequency presentation; accuracy ±3% | 475.00Δ |
| -hp- 417A vhf Detector | vhf bridge detector (for -hp- 803A) | 10 to 500 MC | Approx. 5 μv sensitivity | 350.00 |
| -hp- 803A vhf Bridge | Measurement of vhf impedance, SWR | 52 to 500 MC | 2 to 2,000 ohms impedance -90° to +90° phase angle | 800.00 |
| -hp- 805A Coaxial Slotted Section | Measurement of SWR | 500 to 4,000 MC | For Type N Connectors flexible cables | 450.00 |
| -hp- 805B Coaxial Slotted Section | Same as above | Same as above | For rigid 7/8" RG44/U line | 450.00 |
| -hp- 806B Coaxial Slotted Section | Same as above (mounts in 809B) | 3,000 to 12,000 MC | For Type N Connectors flexible cables | 200.00 |
| -hp- 809B Universal Probe Carriage | G, J, H, X and P 810 Waveguide Sections Supports 806B section, also | | Accepts 442B, 444A probes | 160.00 |
| -hp- 814B Universal Probe Carriage | Supports K and R 815B Waveguide Slotted Sections | | Accepts Untuned Probe 446B | 200.00 |

Δ Rack mounted instruments \$15.00 less.

hp 360 Low Pass Filters



Isolating filters which speed microwave measurements by eliminating harmonics, permitting transmission at single, known frequency only. Particularly necessary in slotted line, filter characteristic, receiver response, similar measurements. Table above gives cut-off frequency; insertion loss not over 3 db; nominal impedance 50 ohms. -hp- 360A, B, C or D, \$40.00.

hp 805A/B Slotted Lines



Exclusive -hp- "parallel-plane" design insures utmost mechanical rigidity, less leakage, greater accuracy, low SWR of 1.02 or 1.04 (depending on model). Range 500 MC to 4 KMC, reads in cm and mm to 0.1 mm. -hp- 805A, for 50 ohm Type N use, -hp- 805B, for 46.3 ohm RG 44/U stub supported 7/8" O.D. coax. -hp- 805A/B, \$450.00.

Models 809B and 814B are precision built mechanical assemblies operating, respectively, with -hp- 810B and 815B series slotted sections.

Combination of the 809B carriage and 810 slotted sections covers 2.6 to 18.0 KMC. Combination of 814B carriage and 815B series sections covers 18.0 to 40.0 KMC.

On either carriage, waveguides can be interchanged in seconds for real savings on engineering time. Only one probe is required for each carriage to cover full frequency range. Manufacture is of highest quality to assure positive mechanical positioning of interchangeable waveguides and precise installation of mating -hp- probes (see table, "Waveguide Test Equipment"). -hp- 809B has a vernier scale reading to 0.1 mm and is equipped for dial gauge mounting. -hp- 814B has a dial read directly to 0.1 mm and interpolated to 0.01 mm.

-hp- 810B Slotted Sections. -hp- 810B, for mounting in 809B carriage, is a flanged, waveguide section with accurately machined slot. Slot is tapered at ends to minimize reflection. Available in 5 waveguide bands, 3.95 through 18.0 KMC.*

-hp- S810A. Complete slotted section assembly including probe carriage. In 2.6 to 3.95 KMC (S-band) size only.*

-hp- 815B Slotted Sections. For mounting in 814B carriage. Available K and R bands, 18.0 to 40.0 KMC. These sections are accurately machined so that they are quickly and easily interchanged, and precisely positioned.*

*For prices, see Waveguide Test Equipment table.

Microwave Power Measuring Equipment



hp 434A Calorimetric Power Meter

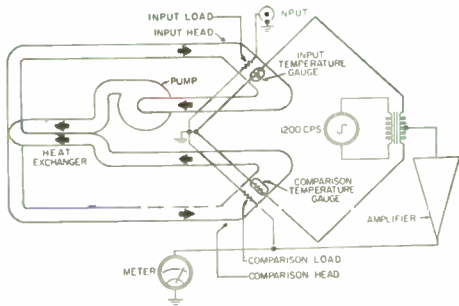
Just connect and read powers 10 mw to 10 watts! Covers dc to 12.4 KMC. No barretter or thermistor needed. No external terminations or plumbing. Measures CW or pulsed power. Two simple controls; no technical skill required.

New -hp- 434A Calorimetric Power Meter is, factually, the fastest, easiest way yet devised to measure powers accurately from 10 milliwatts to 10 watts, dc to 12.4 kilomegacycles.

With the 434A, measurement is literally as simple as connecting to the 50 ohm, type N front panel terminal and reading power directly. Thus the instrument is particularly suited for use by non-technical people.

Compact, self-contained

-hp- 434A fills the range between bolometer microwave power meters (such as the popular -hp- 430C, below) and conventional calorimeters for powers above 10 watts. But unlike previous cumbersome equipment suggested for its range, the new -hp- 434A is compact, moderate in cost, completely self-contained, and needs no detectors or external plumbing whatsoever.



Circuitry, -hp- 434A

Brief Specifications

Input Power Range: 7 ranges; full scale readings 0.01 to 10 watts

Frequency Range: dc to 12.4 KMC

dc Input Impedance: 50 ohms \pm 5 ohms at input jack

Input SWR: Less than 1.7 full range, less than 1.3 to 7 KMC

Meter Response (full scale): Less than 5 seconds

Controls: Zero Set, Meter Range

Accuracy: Within 5% of full scale

Price: \$1,115.00 (cabinet); \$1,100.00 (rack mount)

hp 430C Microwave Power Meter



No computations! Provides instantaneous, automatic power readings *direct* in dbm or mw at all frequencies for which there are suitable bolometer mounts. For CW measurements, uses either 1/100 amp. fuse or Sperry 821 barretter. Also measures CW or pulsed power with negative coefficient thermistor. Provides up to 16 ma bias current. Operates with all mounts in adjacent table. Range 0.02 to 10 mw. \$250.00.

hp 477B Coaxial Thermistor Mount



For frequency range 10 MC to 10 KMC. SWR less than 1.5. Thermistor element is 200 ohm negative. No tuning required; not susceptible to burnout. \$75.00 (including thermistor).

hp 764D-767D Dual Directional Couplers



New high directivity dual coaxial couplers make reflectometer measurements practical in vhf and uhf coax systems. Flat response, high power capacity, low insertion loss. Four models, covering 216 to 4,000 MC collectively. 764D/765D \$160.00. 766D/767D \$150.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|--------------------------------------|---|----------------------------|--|-------------------------------|
| -hp- 430C Microwave Power Meter | Measurement of rf power | Depends on Bolometer Mount | 0.02 to 10 mw \pm 5% accuracy | \$ 250.00 |
| -hp- 434A Calorimetric Power Meter | Measurement of rf power | dc to 12.4 KMC | Direct reading, no barretters, thermistors or terminations; CW, pulsed | 1,115.00 Δ |
| -hp- 475B Tunable Bolometer Mount | Measurement of rf power (with 430B/C) | 1,000 to 4,000 MC | Matches 50 ohm line to 100 or 200 ohms | 225.00 |
| -hp- 476A Universal Bolometer Mount | Measurement of rf power (with 430B/C) | 10 to 1,000 MC | No tuning required SWR less than 1.25 | 85.00 |
| -hp- 477B Coaxial Thermistor Mount | Measurement of rf power (with 430C) | 10 MC to 10 KMC | No tuning required SWR less than 1.5 | 75.00 |
| -hp- 485 Waveguide Detector Mount | Measurement of rf power | 2,600 to 12,400 MC | Full coverage of waveguide band | See Table Waveguide Equipment |
| -hp- 487B Waveguide Thermistor Mount | Measurement of rf power | 3,950 to 40,000 MC | Full coverage, no tuning, 1.5 SWR except K/R487B 2.0 | See Table Waveguide Equipment |
| -hp- 764D Dual Directional Coupler | Reflectometer and rf power measurements | 216 to 450 MC | Coupling attenuation* 20 db, directivity 30 db | 160.00 |
| -hp- 765D Dual Directional Coupler | Reflectometer and rf power measurements | 450 to 945 MC | Coupling attenuation* 20 db, directivity 30 db | 160.00 |
| -hp- 766D Dual Directional Coupler | Reflectometer and rf power measurements | 940 to 1,975 MC | Coupling attenuation* 20 db, directivity 26 db | 150.00 |
| -hp- 767D Dual Directional Coupler | Reflectometer and rf power measurements | 1,900 to 4,000 MC | Coupling attenuation* 20 db, directivity 26 db | 150.00 |

*Power handling capacity all 764/767 series couplers 50 watts CW, 10 Kw peak.

hp Waveguide Test Equipment—2.6 to 40.0 KMC

Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Careful engineering, simple, sturdy mechanical design, highest quality manufacture insures accurate, multi-purpose operation.

| Instrument | Coaxial Type N Conn. | "S" 3" x 1 1/2" 2.6 - 3.95 KMC | "G" 2" x 1" 3.95 - 5.85 KMC | "J" 1 1/2" x 3/4" 5.2 - 8.2 KMC | "H" 1 1/4" x 5/8" 7.05 - 10.0 KMC | "X" 1" x 1/2" 8.2 - 12.4 KMC | "P" .702" x .391" 12.4 - 18.0 KMC | "K" .500" x .250" 18.0 - 26.5 KMC | "R" .360" x .220" 26.5 - 40.0 KMC |
|--|--------------------------------------|---|--------------------------------------|--|--|---|--|--|--|
| Adapter, Waveguide to Coax Cover to Choke Flange | | S281A \$50 S290A \$65 | G281A \$40 G290A \$50 | J281A \$35 J290A \$35 | H281A \$30 H290A \$30 | X281A \$25 X290A \$15 | P290A \$25 | | |
| Attenuators Waveguide to Waveguide -hp- 292 Series: HX292B \$25, MX292A \$25, MP292A \$25, NP292A \$22.50, NK292A \$20 | | | | | | | | | |
| Fixed 3, 6, 10, 20 db | | S370A \$75 | G370A \$75 | J370A \$65 | H370A \$60 | X370A \$55 | P370A \$60 | K370A \$85 | R370A \$95 |
| Precision Fixed | | S372 \$375 | G372 \$250 | J372 \$140 | H372 \$120 | X372 \$100 | P372 \$115 | | |
| Flap, 25 db max. | | S375A \$120 | G375A \$110 | J375A \$100 | H375A \$90 | X375A \$90 | P375A \$100 | K375A†† \$140 | R375A†† \$180 |
| Calibrated, precision | | S380A \$260 | G382A \$500 | J382A \$350 | H382A \$350 | X382A \$275 | P382A \$275 | K382A \$425 | R382A \$450 |
| Detector Mounts | 420A \$50 420B \$75 440A† \$85 | | | | H421A \$95 | X421A \$75 | P421A \$95 | | |
| | | S485D° \$170 | G485D° \$170 | J485D° \$170 | | | | | |
| | | S485A‡ \$140 | G485B† \$95 | J485B† \$90 | H485B† \$85 | X485B† \$75 | | | |
| Thermistor Mounts (Fixed tuned) ■ | 477B \$75 | | G487B \$95 | J487B \$90 | H487B \$80 | X487B \$75 | P487B \$110 | K487B†† \$150 | R487B†† \$225 |
| Frequency Meters, Reaction Waveguide | | | | J530A/B** | H530A \$120 | X530A \$120 | P530A \$150 | | |
| Directional Coupler, Cross Guide: 20, 30 db6 | | S750 \$150 | G750 \$120 | J750 \$80 | H750 \$70 | X750 \$50 | | | |
| Directional Couplers, Multi Hole: 3, 10, 20 db | | S752 \$375 | G752 \$250 | J752 \$140 | H752 \$120 | X752 \$100 | P752 \$115 | K752 \$175 | R752 \$200 |
| Slotted Sections, Waveguide | | S810A* \$450 | G810B§ \$110 | J810B§ \$110 | H810B§ \$110 | X810B§ \$90 | P810B§ \$110 | | |
| Slotted Sections, Waveguide | | | | | | | | K815B \$265 | R815B \$265 |
| Tuners, Slide Screw E-H | | S870A \$225 | G870A \$185 | J870A \$150 | H870A \$130 | X870A \$125 | P870A \$130 | K870A†† \$140 | R870A†† \$140 |
| Waveguide Phase Shifter | | | | J885A \$450 | | X880A \$130 | P880A \$150 | | |
| Terminations, Low Power | | S910A \$60 | G910A \$50 | J910A \$35 | H910A \$30 | X910B \$25 | P910A \$30 | | |
| Terminations, High Power | | S912A \$160 | | | | X912A \$50 | | | |
| Moving Load | | S914A \$100 | G914A \$75 | J914A \$70 | H914A \$60 | X914B \$50 | P914A \$55 | K914B \$250 | R914B \$250 |
| Standard Reflections | | | | | | X916 \$100 | | | |
| Adjustable Shorts | | S920A \$100 | G920A \$70 | J920A \$60 | H920A \$50 | X920A \$40 | P920A \$55 | K920A†† \$140 | R920A†† \$150 |
| Waveguide Shorting Switch | | | | | | X930 \$100 | | | |
| Broad Band Probe | 442B§ \$40 | All frequencies | | | | | | | |
| Broad Band Probe, Untuned | | 444A \$40 2.4 to 18.0 KMC | | | | 446B \$145 18.0 to 40 KMC | | | |
| Waveguide Clamps, Stands | | Model 24 stand, \$3.00 | | | | Model 25 clamps, \$2.50 each, all bands | | | |

†For use with barretter or crystal.

‡For use with barretter only.

*Complete assembly including carriage.

§Mounts in 809B Carriage.

■ Includes Thermistor, installed.

**J530A, 5.85 to 8.2 KMC, \$120; J530B, 5.20 to 7.05 KMC, \$150.

° Includes barretter; checked for square law characteristics.

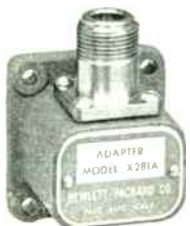
†† Available with circular flanges equivalent to UG-425/u for K bands and UG-381/u for R bands. Specify by adding suffix "C" to model number: i.e., K487BC.

NEW! hp 382A Precision Attenuators



Previously offered for frequencies 3.95 through 18.0 KMC, popular -hp- 382A series precision attenuators are now available in "K" and "R" bands, 18.0 to 40.0 KMC. "K," "R" band attenuators are of new, space-saving design (see photo). Direct reading, one-control tuning, high power handling capacity. Attenuation 0 to 50 db full range, independent of frequency. Phase shift constant with attenuation. For prices G, J, H, X and P382A, see table above. -hp- K382A, \$425.00. -hp- R382A, \$450.00

hp 281A Waveguide - Coax Adapters



For convenient transition between waveguide and coax systems. Each unit covers a full waveguide range with SWR less than 1.25. Type N coax plug, AN waveguide flange. For S, G, J, H and X bands, 2.6 to 12.4 KMC. \$25.00 to \$50.00.

hp 487B Thermistor Mounts



For fast, accurate waveguide power measurements. Each unit covers full range of its waveguide frequency. No tuning needed, SWR 1.5 max., except K and R bands. SWR 2.0 max. Max. power 10 mw. Rugged construction; high temperature coefficient thermistors virtually eliminate burnout. For G, J, H, X, P, K and R bands. 3.95 to 40.0 KMC. \$75.00 to \$225.00.



hp 870A Slide Screw Tuners

For flattening waveguide systems, matching, etc. Probe position and penetration adjusts to set up reflection canceling existing reflection. Precision lead screw or micrometer varies probe insertion; vernier adjusts probe position. Corrects SWRs of 20 with accuracy of 1.02 SWR. For S, G, J, H, X, P, K, R bands, 2.6 to 40.0 KMC. \$125.00 to \$225.00.



hp 420A/B Crystal Detectors

Employs a silicon crystal to detect rf signals in Type N coaxial lines. Covers frequencies 10 MC to 12.5 KMC, sensitivity approx. 0.01 v/0.1 mw, frequency response ± 3 db full range. Uses modified 1N26 crystal, max. SWR 3. \$50.00 each. Also available in matched pairs as -hp- 420B, \$150.00 pair.

hp 444A/446B Untuned Probes



-hp- 444A is modified crystal (1N76 or 1N26) plus small antenna in convenient housing. Probe penetration easily variable; may be locked in position. No tuning needed; sensitivity superior to most elaborate single or double tune! probes. Range 3.0 to 18 KMC; fits 3/4" bore. New -hp- 446B, for -hp- 814 Probe Carriage, similar but covers K and R bands, 18.0 to 40.0 KMC. -hp- 444A, \$40.00. -hp- 446B, \$145.00.

NEW!



Noise Measuring Equipment



340B/342A Noise Figure Meters



hp 343A vhf Noise Source

For IF and rf amplifier measurement. Temperature-limited diode broadband source operating at frequencies 10 to 600 MC. Excess noise 5.2 db, 50 ohms impedance. \$75.00.

hp 345B IF Noise Source

Operates at either 30 or 60 MC. Frequency selector switch; other frequencies between 10 and 60 MC on special order. Separate switch matching 50, 100, 200 and 400 ohm lines. Excess noise 5.2 db. Temperature limited diode instrument. \$75.00.

hp 347A Waveguide Noise Source

Argon gas discharge tubes mounted in waveguide section. Models cover all waveguide frequencies 2.6 through 18.0 KMC; S, G, J, H, X and P bands. Excess noise level approximately 15.2 db; noise level uniform even when instrument is cold. \$180.00 to \$190.00.

Receiver and component alignment jobs that once took skilled engineers a full hour are now done in 5 minutes by a semi-skilled worker. Receiver performance can often be improved over the best adjustment previously possible. Improvement in receiver performance often equals doubling transmitter output. Since accurate alignment is easy, equipment is better maintained and peak performance enjoyed regularly.

Above are some of the time-saving, cost-cutting advantages of new -hp- noise figure measuring equipment including new Models 340B and 342A Noise Figure Meters and a variety of coaxial and waveguide noise sources.

Model 340B Noise Figure Meter automatically measures and continuously displays IF or rf amplifier noise figure at either 30 or 60 MC. Other frequencies from 10 to 60 MC on special order.

Model 342A Noise Figure Meter is similar to Model 340B except that it operates on five frequencies, 30, 60, 70, 105, and 200 MC. 30 MC and four other frequencies between 38 and 200 MC on special order.

Brief Specifications

Frequency Range: Depends on noise source

Noise Figure Range: 3 to 30 db, indication to ∞ with waveguide noise source
0 to 15 db, indication to ∞ with IF noise source

Accuracy: ± 0.5 db, 10 to 25 db; ± 1 db, 3 to 10 db, and 25 to 30 db, waveguide noise source
 ± 0.5 db, 0 to 15 db, IF noise source

Required Rcvr or rf Amplifier Gain: Approx. 40 db minimum (Waveguide Noise Source)

Approx. 50 db minimum (IF Noise Source)

Input Frequency: 30 or 60 MC, selected by switch

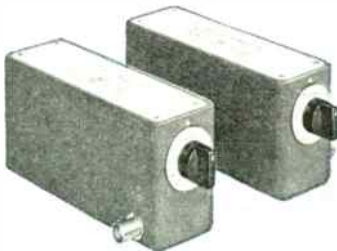
Bandwidth: 1 MC minimum

Input Impedance: 50 ohms

Price: -hp- 340B, \$715.00 Δ ; -hp- 342A, \$815.00 Δ .

(NOTE: This instrument available only in U. S. and Canada.)

hp 355A/B Attenuators - 0 to 132 db



Here are two completely new design 50 ohm attenuators providing, together, 0 to 132 db attenuation in 1 db steps from dc to 500 MC! -hp- 355A provides 0 to 12 db attenuation in 1 db steps; -hp- 355B provides 0 to 120 db attenuation in 10 db steps. One simple control for each attenuator; overall full range accuracy is ± 0.25 db for -hp- 355A. For -hp- 355B, accuracy is ± 1 db to 250 MC; ± 2 db to 500 MC. -hp- 355A or 355B, \$125.00.

hp 350 Attenuators

Basic bridged-T high accuracy attenuators (not pictured). -hp- 350A matches 500 ohm lines, -hp- 350B matches 600 ohms. Maximum 110 db attenuation in 1 db steps. 5 watts capacity, high accuracy, compact, low cost. -hp- 350A or 350B, \$85.00.

More hp equipment, available for most waveguide frequencies

hp 485 Detector Mounts



Three basic series offered; 5485A for S band (no tuning, 1.35 SWR, 821 element); 485B, for G, J, H, X bands (tunable, 1.25 SWR (with barretter) full range, 1N23, 1N21 or 821 element);

485D for S, G, J bands (factory-installed 821 barretter). \$75.00 to \$170.00.

Δ Rack mount instrument \$15.00 less.

hp 532A Waveguide Frequency Meters



precision tuning mechanism; no back-lash. Also similar model for X-band. \$150 to \$250.

New design for P, K, R bands. Wide band, direct reading, no interpolation or charts. Comprises a high Q resonant cavity tuned by choke plunger; no sliding contacts. Transmits almost full power at resonance; resonance indicated by 1.5 db dip in output. Precision tuning mechanism; no back-lash. Also similar model for X-band. \$150 to \$250.

hp 752 Multi-Hole Couplers



Precision directional couplers available in 3 models with coupling factors of 3, 10 and 20 db. Coupling accuracy ± 0.4 db except K, R bands which are ± 0.7 db. Directivity better than 40 db full range, coupling variation not over ± 0.5 db full range. Primary guide SWR less than 1.05. S, G, J, H, X, P, K, R bands, 2.6 to 40.0 KMC. \$100.00 to \$375.00.

For details, circle #15 on Reader Service Card

Wide Band Amplifiers for Fast Circuit Work

hp Traveling-Wave Tube Amplifiers



-hp- offers Traveling-Wave Tube Amplifiers for all frequencies 2 to 12.4 KMC. *-hp-* 490B, 492A and 494A are low level, high gain amplifiers with 30 and 25 db gain; they offer amplitude, pulse, phase or FM modulation. *-hp-* 491A is a high power traveling-wave tube amplifier having a rated output of 1 watt, 2 to 4 KMC. All amplifiers have exclusive *-hp-* helical coupling system, and employ encapsulated traveling-wave tubes that can be readily replaced. *-hp-* 490B/491A, \$1,400.00. *-hp-* 492A/494A, \$1,500.00.

having a rated output of 1 watt, 2 to 4 KMC. All amplifiers have exclusive *-hp-* helical coupling system, and employ encapsulated traveling-wave tubes that can be readily replaced. *-hp-* 490B/491A, \$1,400.00. *-hp-* 492A/494A, \$1,500.00.

hp 460AR/BR Fast Pulse Amplifiers



-hp- 460AR Wide Band Amplifiers, in cascade with *-hp-* 460BR Fast Pulse Amplifiers, provide up to 90 db gain, 125 v open circuit. This permits direct connection to oscilloscope deflection plates. Rise time 0.003 μ sec. Will amplify millimicrosecond pulses. Over 100 MC hand width for scopes. *-hp-* 460AR, \$185.00. *-hp-* 460BR, \$225.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|--|---|-------------------------|--|-----------|
| <i>-hp-</i> 450A Amplifier, Stabilized | General purpose lab amplifier | 10 cps to 1,000,000 cps | 20 and 40 db gain, frequency response $\pm 1/2$ db | \$ 140.00 |
| <i>-hp-</i> 460AR Amplifier, Wide Band | Wide band, pulse amplification | 100 KC to 120 MC | 20 db gain, rise time 0.003 μ sec | 185.00 |
| <i>-hp-</i> 460BR Amplifier, Fast Pulse | Pulse amplification high output | 100 KC to 120 MC | 15 db gain, 125 peak volts | 225.00 |
| <i>-hp-</i> 490B Traveling-Wave Tube Amplifier | Amplification throughout "S" band | 2 to 4 KMC | 30 db gain; Millimicrosec rise time; 10 mw output | 1,400.00 |
| <i>-hp-</i> 491A Traveling-Wave Tube Amplifier | High power "S" band amplification | 2 to 4 KMC | 30 db gain; millimicrosec rise time; 1 watt output | 1,400.00 |
| <i>-hp-</i> 492A Traveling-Wave Tube Amplifier | Amplification through most of "G" and "J" bands | 4 to 8 KMC | 30 db gain; millimicrosec rise time; 10 mw output | 1,500.00 |
| <i>-hp-</i> 494A Traveling-Wave Tube Amplifier | Amplification throughout "X" band | 7 to 12.4 KMC | 25 db gain; millimicrosec rise time; 5 mw output | 1,500.00 |

hp Regulated and Klystron Power Supplies

NEW! hp 721A Transistor Power Supply



New, completely transistorized, compact, regulated supply. Output 0 to 30 v, continuously variable. 150 ma maximum output, output impedance less than 0.2 ohms. Regulation, no load to full load, 0.3% or 30 mv whichever is greater. Line voltage change of $\pm 10\%$ causes output change of less than 0.3% or ± 15 mv, whichever is greater. Front panel switch limits maximum output current preventing damage to transistors, etc., from accidental overload. Reads ma, v direct. \$145.00.

hp 712B Power Supply



This *-hp-* instrument features high regulation of 50 mv no load to full load, 0.1 millisecond transient response, internal impedance 0.1 ohms in series with 25 μ h; full-load maximum hum less than 500 μ v, sealed transformers, chokes and condensers. 0 to 500 v, 200 ma supply and fixed -300 v tap providing a 50 ma, 300 to 800 v variable supply for klystron operation. \$365.00 Δ .

| Instrument | Primary Use | Characteristics | Price |
|--|---|--------------------------|-----------------|
| <i>-hp-</i> 711A Laboratory Power Supply | General purpose regulated dc supply for lab and field use | 0 to 500 volts @ 100 ma | \$250.00 |
| <i>-hp-</i> 712B Power Supply | Same as 711A | 0 to 500 volts @ 200 ma | 365.00 Δ |
| <i>-hp-</i> 715A Klystron Power Supply | Regulated beam, reflector source for low power klystrons | 250 to 400 volts @ 50 ma | 300.00 |
| <i>-hp-</i> 721A Transistor Power Supply | Powering transistors, similar applications | 0 to 30 v, 150 ma | 145.00 |

Δ Rack mounted instruments \$15.00 less.

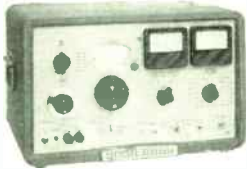
hp 711A Power Supply

High regulation, 0 to 500 volt supply with separate meters. Ideal for powering experimental setups, other basic applications, including driving low level amplifiers, constant frequency oscillators and other setups requiring highly stable voltages. Regulation 0.5% or 1.0 volt, whichever is greater, no load to full load or on line voltages 110/230 v $\pm 10\%$. Less than 1.0 mv ripple, overload relay protection. Includes two 6.3 v ac 3 amp supplies. \$250.00 (rack mount, \$255.00).



hp Signal Generators - 50 KC to 21 KMC

NEW! hp 606A Standard Signal Generator



New, ultra-modern; 50 KC to 65 MC. Output 3 v full range, continuous attenuation to 0.1 μ v. MO-PA circuit with full feedback loop insures constant out-

put full range. Low distortion, broad modulating capabilities. Typical -hp- speed, ease of operation, occupies $\frac{1}{4}$ bench space normally needed for generators of this frequency. \$1200.00 Δ .

hp 608D vhf Signal Generator



10 to 420 MC. Highest stability. No incidental FM or frequency drift. Calibrated output 0.1 μ v to 0.5 v throughout range. Built-in crystal calibrator provides frequency check accurate within 0.01% each 1 and 5 MC. Master-oscillator, intermediate and output amplifier circuit design. Premium quality performance, direct calibration, ideal for aircraft communications equipment testing. \$1,100.00.

-hp- 608C vhf Signal Generator. High power (1 v max.) stable, accurate generator for lab or field use. 10 to 480 MC. Ideal for testing receivers, amplifiers, driving bridges, slotted lines, antennas, etc. \$1000.00.

hp 626A/628A shf Signal Generators



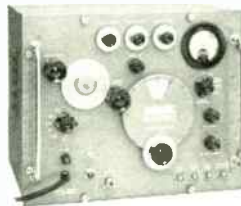
New instruments, bringing high power, wide range, convenience and accuracy to 10 to 21 KMC range. Frequencies, output voltage directly set and read. Output 10 to 20 db better than previous spot-frequency sets SWR better than 1.2 at 0 dbm and lower. Internal pulse, FM or square wave modulation; also external pulsing or FM'ing. -hp- 626A, 10 to 15.5 KMC, \$3,250.00. -hp- 628A, 15 to 21 KMC, \$3,250.00.

New instruments, bringing high power, wide range, convenience and accuracy to 10 to 21 KMC range. Frequencies, output voltage directly set and read. Output 10 to 20 db better than previous spot-frequency sets

| Instrument | Frequency Range | Characteristics | Price |
|------------|--|---|---------------------|
| -hp- 606A | 50 KC to 65 MC | Output 0.1 μ v to 3 v. Full feedback loop, low distortion | \$1,200.00 Δ |
| -hp- 608C | 10 to 480 MC | Output 0.1 μ v to 1 v into 50 ohm load. AM, pulse, or CW modulation. Direct calibration | 1,000.00 |
| -hp- 608D | 10 to 420 MC | Output 0.1 μ v to 0.5 v. Incidental FM less than 0.001% | 1,100.00 |
| -hp- 612A | 450 to 1,230 MC | Output 0.1 μ v to 0.5 v into 50 ohm load. AM, pulse, CW or square wave modulation. Direct calibration | 1,200.00 |
| -hp- 614A | 800 to 2,100 MC | Output 0.1 μ v to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration | 1,950.00 |
| -hp- 616A | 1,800 to 4,000 MC | Output 0.1 μ v to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration | 1,950.00 |
| -hp- 618B | 3,800 to 7,600 MC | Output 0.1 μ v to 0.223 v into 50 ohm load. Pulse, CW FM or square wave modulation. Direct calibration | 2,250.00 |
| -hp- 620A | 7,000 to 11,000 MC | Output 0.1 μ v to 0.223 v into 50 ohm load. Pulse, FM or square wave modulation. Direct calibration | 2,250.00 |
| -hp- 623B | 5925 - 6575 MC 6575 - 7175 MC 7175 - 7725 MC (specify) | Output 70 μ v to 0.223 v into 50 ohm load. FM or square wave modulation. Separate power meter and wave meter section | 1,900.00 |
| -hp- 624C | 8,500 to 10,000 MC | Output 2.23 μ v to 0.223 v into 50 ohm load. Pulse, FM or square wave modulation. Separate power meter and wave meter section | 2,265.00 Δ |
| -hp- 626A | 10 to 15.5 KMC | Output 10 dbm to -90 dbm. Pulse, FM, or square wave modulation. Direct calibration | 3,250.00 |
| -hp- 628A | 15 to 21 KMC | Output 10 dbm to -90 dbm. Pulse, FM, or square wave modulation. Direct calibration | 3,250.00 |

Δ Rack mounted instruments \$15.00 less.

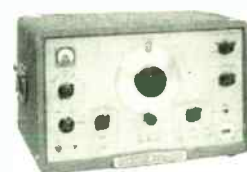
hp 614A/616A uhf Signal Generators



Among most widely used signal generators. -hp- 614A, 800 MC to 2.1 KMC, -hp- 616A, 1.8 to 4.0 KMC. Direct reading, direct frequency set, no calibration charts, wide range. -hp- 614A SWR 1.6, output accuracy \pm 1 db -10 dbm to -127 dbm. -hp- 616A, SWR 1.8, output accuracy \pm 1.5 db, -7 dbm to -127 dbm. Both have constant internal impedance 50 ohms. Modulation is internal or external pulse, or FM. -hp- 614A or -hp- 616A, \$1,950.00.

hp Swept Frequency Oscillators

hp 686A Electronic Sweep Oscillator



Totally new kind of backward-wave device eliminating sweep motors, tuning plungers, range limitations, etc. Covers all or part of X-band with flexible, quiet electronic sweep. Simple to operate, direct

reading, continuously adjustable sweep width and rate, 10 mw output minimum, frequency sweep linear with time. Has slow sweep for recorders; fast for oscilloscope; single sweep manually started or externally triggered, external FM, AM modulation. Ultimate in X-band sweep oscillators, \$2900.00 Δ .

| Instrument | Frequency Range | Characteristics | Price |
|------------|------------------|--|---------------------|
| -hp- 683A | 2.0 to 4.0 KMC | Electronically swept; variable sweep rate, width. Output 10 mw, SWR 2.1 or less. Pulse, square wave, FM, AM modulation | \$3,000.00 Δ |
| -hp- 684A | 3.7 to 5.9 KMC | | 2,900.00 Δ |
| -hp- 685A | 5.2 to 8.3 KMC | | 2,900.00 Δ |
| -hp- 686A | 8.2 to 12.4 KMC | | 2,900.00 Δ |
| -hp- 687A | 12.4 to 18.0 KMC | | 3,400.00 Δ |

Δ Rack mounted instruments \$15.00 less

Data subject to change without notice.

Prices f. o. b. factory.

Sales and Service Representatives in the United States and Canada

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Asbury Park, New Jersey
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Baltimore 15, Maryland
Horman Associates, Inc.
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MOhawk 4-8345

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Middlesex Turnpike
BRowning 2-9000

Bridgeport 8, Connecticut
Yewell Associates, Inc.
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FOrest 6-3456

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REgent 7-6791

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4024 Clairton Boulevard
TUxedo 4-5515

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LUdow 6-4940

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HEmpstead 7-8446

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ENdicott 5-0296

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941 Rollins Avenue
HAzelwood 7-7560

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Fort Myers, Florida
Lynch-Stiles, Inc.
35 West North Shore Avenue
WYandotte 5-2151

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Bivins & Caldwell, Inc.
1923 N. Main Street
Tel.: 2-6873

Huntsville, Alabama
Bivins & Caldwell, Inc.
JEfferson 2-5733
(Direct line to Atlanta)

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Crossley Associates, Inc.
2711 West Howard Street
SHeldrake 3-8500

Cleveland 24, Ohio
S. Sterling Company
5827 Mayfield Road
Hillcrest 2-8080

Dayton 19, Ohio
Crossley Associates, Inc.
2801 Far Hills Avenue
AXminster 9-3594

Detroit 35, Michigan
S. Sterling Company
15310 West McNichols Rd.
BRoadway 3-2900

Indianapolis 20, Indiana
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CLifford 1-9255

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Hilland 4-9494

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MlDway 6-7881

Dallas 9, Texas
Earl Lipscomb Associates
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EDison 2-6667

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P. O. Box 6646
MOhawk 7-2407

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1886 South Broadway
PEARl 3-3791

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CRestwood 4-5431

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1238 N. W. Glisan
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GILbert 2-8901

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ACAdemy 3-8106

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LYtell 1-2626

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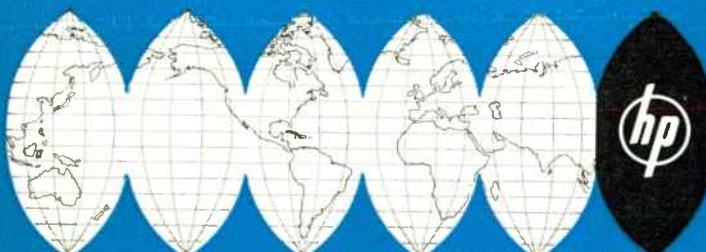
Tucson, Arizona
Neely Enterprises
232 So. Tucson Blvd.
MAIn 3-2564

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Atlas Instrument Corporation, Ltd
50 Wingold Avenue
RUssell 1-6174

Vancouver 2, British Columbia
Atlas Instrument Corporation, Ltd.
106-525 Seymour Street
MUtual 3-5848

Winnipeg, Manitoba
Atlas Instrument Corporation, Ltd.
72 Princess Street
WHitehall 3-8707



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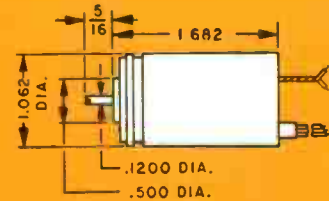
AUTOSYN[®] SYNCHROS

AY-190 SERIES SIZE 11 FRAME

FUNCTION CORROSION RESISTANT

| | |
|---------------------|------------|
| Transmitter | AY-190-A1 |
| Control Transformer | AY-191-A1 |
| Resolver | AY-192-A1 |
| Differential | AY-193-A1 |
| Receiver | AY-194-A1* |

* Receiver not normally furnished in corrosion resistant construction.

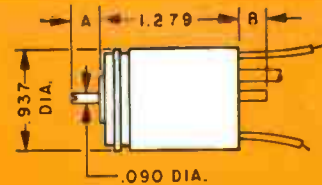


AY-500 SERIES SIZE 10 FRAME

FUNCTION STANDARD CONSTRUCTION CORROSION RESISTANT HIGH TEMPERATURE

| | | | |
|----------------------------|--------------|---------------|-------------|
| Receiver | AY-50□-2-A1 | AY-50□F-20-A1 | AY-50□-8-A1 |
| Receiver | AY-50□-3-A1 | AY-50□-25-A1 | |
| Control Transformer | AY-50□-4-A1 | AY-50□-26-A1 | |
| Transmitter | | AY-50□F-19-A1 | |
| Transmitter | | AY-50□-38-A1 | |
| Control Transformer (HI-Z) | AY-50□-5-A1 | | |
| Linear | AY-51□-10-A1 | | |
| Resolver | AY-52□-3-A1 | AY-52□-25-A1 | |
| Differential | AY-53□-3-A1 | AY-53□-25-A1 | |
| Resolver (HI-Z) | AY-54□-5-A1 | AY-54□-38-A1 | |
| Resolver (HI-Frequency) | AY-55□-24-A1 | AY-55□-39-A1 | |

Units listed can be furnished with terminal lugs.



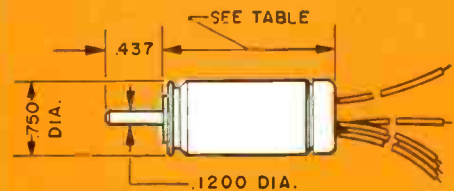
| TYPICAL NO. | DIMENSION | |
|-------------|-----------|-----|
| | A | B |
| AY-500-2 | 1/4 | 0 |
| AY-502-2 | 1/4 | 1/4 |
| AY-503-2 | 3/8 | 0 |

AY-300 SERIES SIZE 8 FRAME

FUNCTION CORROSION RESISTANT STANDARD HOUSING Length - 1.692" SHORT HOUSING Length - 1.241"

| | | |
|----------------------------|--------------|---------------|
| Receiver | AY-300-2-A1* | AY-300S-12-A1 |
| Control Transformer | AY-300-25-A1 | AY-300S-15-A1 |
| Transmitter | AY-300-26-A1 | AY-300S-16-A1 |
| Control Transformer (HI-Z) | AY-300-38-A1 | AY-300S-18-A1 |
| Resolver | AY-320-25-A1 | AY-320S-17-A1 |
| Differential | AY-330-25-A1 | AY-330S-15-A1 |

* Receiver not normally furnished in corrosion resistant construction.



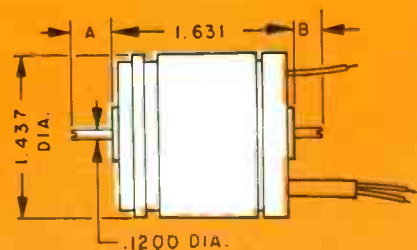
AY-200 SERIES SIZE 15 FRAME

FUNCTION STANDARD CONSTRUCTION CORROSION RESISTANT HIGH TEMPERATURE

| | | | |
|--|--------------|--------------|--------------|
| Multi-Power Transmitter | AY-20□S-1-B | AY-20□S-44-B | AY-20□S-31-B |
| Receiver | AY-20□S-2-B | AY-20□S-52-B | |
| Control Transformer | AY-20□S-3-B | AY-20□S-25-B | |
| Single-Power Transmitter | AY-20□S-4-B | AY-20□S-26-B | |
| Control Transformer (HI-Z) | AY-20□S-5-B | AY-20□S-38-B | |
| Linear | | AY-21□S-42-B | |
| Resolver (HI-Z) | AY-22□S-5-B | AY-22□S-38-B | |
| Resolver | AY-22□S-27-B | AY-22□S-25-R | |
| Resolver (HI-Accuracy) | | AY-22□S-51-B | |
| Differential (Servo Application) | AY-23□S-3-B | AY-23□S-25-B | |
| Differential (Synchronous Application) | AY-23□S-4-B | | |
| Resolver (Omni Application) | AY-24□S-5-B | AY-25□S-39-B | |
| Resolver (HI-Frequency) | AY-25□S-24-B | | |
| Resolver, Control Transformer | AY-26□S-3-B | | |
| Variable Transformer | AY-27□S-43-B | AY-27□S-46-B | AY-27□S-46-B |
| Resolver (Feedback) | | AY-910-A1 | |
| Control Transformer (HI-Z) | | AY-920-A1 | |

Units listed have loose leads. Can also be furnished with terminal boards.
AY-910 is furnished with terminal board.

For details, circle #19 on Reader Service Card

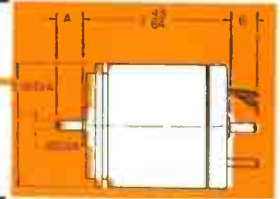


| TYPICAL NO. | DIMENSION | |
|-------------|-----------|-----|
| | A | B |
| AY-200-1 | 1/4 | 0 |
| AY-201-1 | 1/2 | 0 |
| AY-202-1 | 7/16 | 3/8 |
| AY-910 | 1 1/32 | 0 |
| AY-920 | 1/2 | 0 |

AY-400 SERIES SIZE 22 FRAME

| FUNCTION | STANDARD CONSTRUCTION | CORROSION RESISTANT | TYPE NO. | DIMENSION | |
|--------------|-----------------------|---------------------|----------|-----------|-----|
| | | | | A | B |
| Transmitter | AY-40□-1-A | AY-40□-2-A | AY-401-1 | 1/2 | 0 |
| Differential | AY-43□-1-A | AY-43□-2-A | AY-402-1 | 1/2 | 1/2 |

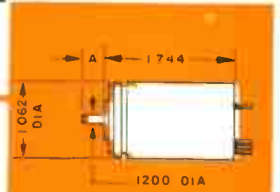
Units listed have loose leads.
Can also be furnished with terminal boards.



AY-600 SERIES SIZE 11 FRAME

| FUNCTION | STANDARD CONSTRUCTION | CORROSION RESISTANT | HIGH TEMP. AND CORROSION RESISTANT | |
|------------------------------|-----------------------|---------------------|------------------------------------|--------------|
| | | | TYPE NO. | DIMENSION A |
| Multi-Power Transmitter | AY-60□- 1-A1 | AY-60□- 6-A1 | AY-60□-12-A1 | AY-60□- 9-A1 |
| Control Transformer | AY-60□- 3-A1 | AY-60□- 5-A1 | | |
| Control Transformer (Med. Z) | | AY-60□-11-A1 | | |
| Single-Power Transmitter | AY-60□- 8-A1 | | | |
| Receiver | AY-60□-10-A1 | | | |
| Resolver | AY-62□- 3-A1 | AY-62□- 5-A1 | | |
| Resolver (HI-Z) | | AY-62□-18-A1 | | |
| Differential | | AY-63□- 5-A1 | AY-63□-12-A1 | |
| Control Transformer (HI-Z) | | AY-935-A1 | | |

Units listed have loose leads. Can also be furnished with terminal boards.



| TYPICAL NO. | DIMENSION A |
|-------------|-------------|
| AY-600-1 | 5/16 |
| AY-601-1 | 1/2 |
| AY-935-A1 | 1/2 |

MOTORS AND GENERATORS

TACHOMETER GENERATORS — DAMPING

| TYPE NUMBER | FRAME SIZE | GENERATOR EXCITATION (VOLTS) | GENERATOR OUTPUT (VOLTS) | LINEARITY | POWER INPUT (WATTS) | PHASE SHIFT | INERTIA | TEMPERATURE RANGE | REMARKS |
|-------------|------------|------------------------------|--------------------------|------------------|---------------------|---------------|------------------------|-------------------|---------|
| FT-102-4-A1 | 10 | 26 | 0.5/1000 | 0.5% to 4000 rpm | 1.75 | Less than 10° | 0.5 gm-cm ² | -55°C to +125°C | Damping |
| FT-102-5-A1 | 10 | 18 | 0.34/1000 | 0.5% to 4000 rpm | 3.5 | Less than 10° | 0.4 gm-cm ² | -55°C to +95°C | Damping |
| FT-104-6-A1 | 11 | 115 | 0.55/1000 | 0.5% to 4000 rpm | 2.4 | 20° | 0.6 gm-cm ² | -55°C to +95°C | Damping |



LOW INERTIA SERVO MOTORS

| TYPE NO. | RATED VOLTAGE | | MAX. POWER INPUT TOTAL (WATTS) | NO LOAD SPEED (RPM) | STALL TORQUE (OZ. IN.) | TORQUE TO INERTIA RATIO (RADIAN-SEC. ⁻²) | FRAME SIZE | REMARKS |
|---------------|---------------|----------|--------------------------------|---------------------|------------------------|--|------------|--|
| | PHASE 1 | PHASE 2 | | | | | | |
| CK-1066-40-A1 | 26 | 26 | 3.2 | 9,500 | 0.11 | 35,000 | 5 | Tapered Shaft |
| CK-1018-7-A1 | 18 | 18 | 5.0 | 10,000 | 0.13 | 18,400 | 10 | Tapered Shaft |
| CK-1018-16-A1 | 26 | 26 | 6.0 | 10,000 | 0.3 | 40,000 | 10 | 125°C Ambient Temp. Corrosion Resistant, Tapered Shaft |
| CK-1025-13-A1 | 115 | 115/57.5 | 12.0 | 4,800 | 1.45 | 31,000 | 15 | MK 7 Mod. 1 |
| CK-1031-18-A1 | 26 | 55 | 9.0 | 6,175 | 0.35 | 10,000 | 10 | Corrosion Resistant |
| CK-1038-17-A1 | 26 | 50 | 4.75 | 5,500 | 0.39 | 14,500 | 15 | Pinion on Tapered Shaft |
| CK-1041-19-A1 | 26 | 65 | 6.6 | 3,600 | 0.7 | 3,500 | 15 | Drag Cup |
| CK-1043-17-A1 | 26 | 50 | 4.75 | 5,500 | 0.39 | 14,500 | 15 | Tapered Shaft |
| CK-1045-16-A1 | 26 | 26 | 6.0 | 10,000 | 0.3 | 40,000 | 10 | 125°C Ambient Temp. Corrosion Resistant, Splined Shaft |
| CK-1048-24-A1 | 18 | 18 | 3.0 | 6,300 | 0.15 | 21,300 | 8 | Splined Shaft |
| CK-1048-31-A1 | 26 | 26 | 4.5 | 6,300 | 0.20 | 28,300 | 8 | Splined Shaft |
| CK-1049-25-A1 | 26 | 26 | 6.5 | 5,800 | 0.35 | 19,000 | 8 | Splined Shaft |
| CK-2006-5-A1 | 115 | 115 | 30.0 | 6,600 | 3.0 | 5,700 | 20 | |
| CK-2006-13-A1 | 115 | 115 | 26.0 | 6,000 | 2.5 | 41,500 | 20 | Corrosion Resistant, Tapered Shaft with Threaded End |
| CK-2011-13-A1 | 115 | 115 | 26.0 | 6,000 | 2.5 | 41,500 | 20 | Corrosion Resistant, Pinioned Shaft |
| CK-3004-4-A1 | 115 | 230 | 70.0 | 3,700 | 14.5 | 5,800 | 28 | |



MOTORS — CENTER TAPPED CONTROL WINDINGS

| TYPE NUMBER | FRAME SIZE | CONT. PHASE VOLT. | CENTER TAPPED CONTROL PHASE TOTAL | | | POWER CONT. PHASE | FIXED PHASE | | | POWER FIXED PHASE | EFFECTIVE RESISTANT CONTROL PHASE TORQUE | NO LOAD SPEED (RPM) |
|-------------|------------|-------------------|-----------------------------------|-----|-----|-------------------|-------------|------|------|-------------------|--|---------------------|
| | | | Z | R | X | | Z | R | X | | | |
| 1265271 | 8 | 55 | 750 | 597 | 450 | 3.19 | 26 | 170 | 142 | 93 | 3.25 | 6000 |
| 1265272 | 10 | 52 | 584 | 419 | 405 | 3.3 | 26 | 146 | 105 | 101 | 3.3 | 10000 |
| 1265273 | 11 | 40 | 263 | 151 | 215 | 3.5 | 115 | 2175 | 1250 | 1780 | 3.5 | 6000 |
| 1269605 | 8 | 26 | 268 | 200 | 178 | 2.0 | 26 | 268 | 200 | 178 | 2.0 | 6000 |
| 1269702 | 8 | 52 | 680 | 568 | 372 | 3.25 | 26 | 170 | 142 | 93 | 3.25 | 6000 |



MOTOR TACHOMETERS — TEMPERATURE COMPENSATED AND INTEGRATING TACHOMETERS

| TYPE NUMBER | FRAME SIZE | RATED MOTOR VOLTAGES | | MAX POWER (MOTOR) WATTS | NO LOAD SPEED (GEN EXCITED) | STALL TORQUE | GENERATOR EXCITATION VOLTAGE | GENERATOR OUTPUT VOLTS PER 1000 RPM | LINEARITY OVER TEMP RANGE | POWER INPUT WATTS | PHASE SHIFT OVER TEMP RANGE | INERTIA gm-cm ² | REMARKS |
|--------------|------------|----------------------|---------|-------------------------|-----------------------------|--------------|------------------------------|-------------------------------------|---------------------------|-------------------|-----------------------------|----------------------------|---|
| | | PHASE 1 | PHASE 2 | | | | | | | | | | |
| FV-124-17-A1 | 10 | 26 | 62* | 7.0 | 9500 | 0.28 | 26 | 0.25 | ±1% | 3.5 | 10±5° | 1.0 | Temp. Compensated from -40°C to +140°C, Damping Temp. Compensated from -50°C to 95°C includes permanent magnet pickup, Damping. -55° to +85° 4 poles motor, Integrating +15° to +85° 8 poles motor, Integrating +15° to +85° 4 poles motor, Integrating +15° to +70° 4 poles motor, Integrating -55° to +105° 6 poles motor, Pulse generator, Integrating +15° to +55° 6 poles motor, 2000 cps generator Integrating All corrosion resistant. |
| FV-125-16-A1 | 10 | 26 | 26 | 7.0 | 9500 | 0.28 | 26 | 0.25 | ±1% | 3.5 | 10±5° | 1.0 | |
| FV-1000-1-A1 | 15 | 115 | 115 | 8.5/3.5 | 6000 Min | 0.5 Min | 115 | 1.50 | | 6.5 | | 21 | |
| X1265278-1 | 15 | 115 | 26 | 4/3 | 4000 Min | 0.8 | 115 | 1.00 | | 6.5 | | 21 | |
| X1269710-1 | 15 | 115 | 40 | 6/6 | 7000 Min | 0.75 Min | 115 | 1.00 | | 6.5 | | 21 | |
| X1287158-1 | 15 | 52 | 26 | 2.2/3.75 | 6000 Min | 0.35 Min | 24 | 1.00 | | 3 | | 21 | |
| X1302932-1 | 11 | 30 | 30 | 3.5/3.5 | 5900 | 0.6 | 115 | 2.00 | | 6.5 | | 10 | |
| X1302965-1 | 11 | 115 | 35 | 3.5/3.5 | 5900 | 0.6 | 115 | 1.00 | | 1.5 | | 9 | |

*Center tapped phase



TACHOMETER GENERATORS — TEMPERATURE COMPENSATED AND INTEGRATING

| TYPE NUMBER | FRAME SIZE | GENERATOR EXCITATION (VOLTAGE) | GENERATOR OUTPUT VOLTS PER 1000 RPM | LINEARITY OVER TEMP. RANGE | POWER INPUT WATTS | PHASE SHIFT OVER TEMP. RAISE | INERTIA gm-cm ² | TEMP RANGE | REMARKS |
|--------------|------------|--------------------------------|-------------------------------------|----------------------------|-------------------|------------------------------|----------------------------|-----------------|---------------------|
| FT-107-7-A1 | 11 | 115 | 2.00 | 0.10% to 4000 RPM | 6.2 | | 7.5 | -55°C to +85°C | Integrating |
| FT-1003-3-A1 | 15 | 115 | 4.00 | 0.12% to 4000 RPM | 12 | | 7 | -55°C to +70°C | Integrating |
| FT-1003-4-A1 | 15 | 115 | 1.50 | 0.12% to 4000 RPM | 6.5 | | 20 | -55°C to +85°C | Integrating |
| FT-1004-5-A1 | 15 | 115 | 2.75 | 0.12% to 4000 RPM | 6.5 | | 20 | -55°C to +125°C | Integrating |
| FT-2000 | 20 | 115 | 2.00 | 0.15% to 3600 RPM | 8 | 0±0.1° | 100 | 15°C to 75°C | Integrating |
| X1261412-1 | 20 | 115 | 2.00 | 0.15% to 3600 RPM | 8 | | 100 | -55°C to +85°C | Integrating |
| X1269711-1 | 20 | 115 | 2.00 | 1% to 4000 RPM | 3.5 | 12°±10° | 0.4 | -50°C to +45°C | Damping Compensated |
| X1290426 | 10 | 26 | 0.30 | | | | | | |



MOTOR DAMPING TACHOMETERS

| TYPE NO. | RATED VOLTAGE | | MAX POWER INPUT TOTAL (WATTS) | NO LOAD SPEED (RPM) | STALL TORQUE (OZ. IN.) | TORQUE TO INERTIA RATIO (RADIANS-SEC. ²) | GEN. EXCIT. (VOLTS) | GENERATOR OUTPUT (VOLTS) | FRAME SIZE | REMARKS |
|--------------|---------------|----------|-------------------------------|---------------------|------------------------|--|---------------------|--------------------------|------------|--|
| | PHASE 1 | PHASE 2 | | | | | | | | |
| FV-10-5-A1 | 26 | 26 | 7.0 | 10,000 | 0.28 | 20,000 | 18 | 0.3/1000 | 10 | Corrosion Resistant High Temperature Corrosion Resistant |
| FV-10-7-A1 | 26 | 26 | 9.7 | 6,000 | 0.50 | 22,000 | 26 | 0.5/1000 | 11 | |
| FV-103-6-A1 | 115 | 115/57.5 | 7.0 | 6,200 | 0.60 | 25,500 | 115 | 0.5/1000 | 11 | High Inertia Rotor Includes Permanent Magnet Generator for Speed Measurement Corrosion Resistant Corrosion Resistant Corrosion Resistant |
| FV-105-15-A2 | 26 | 26 | 7.0 | 10,000 | 0.28 | 6,000 | 18 | 0.34/1000 | 10 | |
| FV-109-10-A1 | 26 | 26 | 7.0 | 10,000 | 0.28 | 14,000 | 18 | 0.3/1000 | 10 | |
| FV-110-12-A1 | 33* | 52/26 | 7.0 | 10,000 | 0.28 | 20,000 | 26 | 0.5/1000 | 10 | Corrosion Resistant High Temperature Corrosion Resistant Corrosion Resistant Two Pole Motor Corrosion Resistant Corrosion Resistant High Temperature Corrosion Resistant High Temperature |
| FV-110-9-A1 | 26 | 52/26 | 7.0 | 10,000 | 0.28 | 20,000 | 26 | 0.5/1000 | 10 | |
| FV-112-11-A1 | 18 | 18 | 3.0 | 6,000 | 0.15 | 13,000 | 18 | 0.25/1000 | 8 | |
| FV-120-14-A1 | 26 | 26 | 6.0 | 20,000 | 0.16 | 11,400 | 26 | 0.25/1000 | 10 | |
| FV-2005-5-A1 | 115 | 115/57 | 26.0 | 6,000 | 2.5 | 39,000 | 115 | 0.5/1000 | 20 | |
| FV-3005-5-A1 | 115 | 230/115 | 70.0 | 3,700 | 14.5 | 4,200 | 115 | 0.5/1000 | 28 | |
| X1269606 | 26 | 26 | 4.0 | 6,000 | 0.20 | 17,000 | 18 | 0.25/1000 | 8 | |
| X1290423 | 115 | 40* | 7.0 | 6,200 | 0.60 | 25,500 | 115 | 0.5/1000 | 11 | |
| X1295664 | 26 | 26 | 4.0 | 6,000 | 0.20 | 17,000 | 26 | 0.3/1000 | 8 | |

*Center tapped phase



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In addition to supplying catalog component items such as — synchros, motors, gyros, etc. — Eclipse-Pioneer is in an excellent position to offer a premium in the way of customer service and accommodation on component packaging.

We may have already solved a problem similar to yours — for somebody else, thus enabling our system specialists to adapt from our extensive line, existing production packages to meet your systems requirements.

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No package too intricate or too simple, no quantity too large or too small — for Eclipse-Pioneer.



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World Radio History

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Eclipse-Pioneer . . . the nation's foremost supplier of panel indicator gyros . . . offers a complete line of gyros to meet all applications. This group includes all the basic vertical, rate, free, and directional types used as reference components in complete navigation, radar, compass, automatic flight control, and guidance systems.

CAGEABLE FREE GYRO TYPE NUMBER 17224-1-A

FEATURES: Designed specifically for missile application where maximum operating temperature of 350°F allows location near missile skin. Caging time of 8 secs. achieved through solenoid-link mechanism, thus replacing standard motor-gear train caging mechanisms.

MOTOR: 115 volts, 400 cps, 3 phase with rated speed of 22,000 rpm and a rotor moment of inertia of 1260 gram-cm².

DRIFT RATE: Will not exceed 4° per hour when subjected to Scorsby test at amplitude of ±15° and rate of approximately 6 cpm (corrected for earth's rotation).

PICKOFF: Potentiometer pickoff available on inner and outer gimbal axes. May be excited by either dc or ac source potential. 360° freedom on outer axis and ±85° on inner axis.

CAGING AND UNCAGING: Can be caged and uncaged re-

motely by applying 28 volts dc. Positive mechanical locking in cage position. Dynamic caging up to roll rates of 30°/sec. Will cage consistently from any position within 8 secs. with gyro rotor at full speed. Application of 28 volts dc will uncage within 0.1 seconds.

WARM-UP TIME: 90% of rated speed in one minute.

ENVIRONMENTAL CHARACTERISTICS: Maximum operating temperature of 350°F. and a minimum of -55°F. Maximum allowable shock is 60 g. with maximum operating vibration of 7 g. (from 10 to 550 cps). Maximum excursion not to exceed 0.5 in. Positive hermetic seal.

OPERATING LIFE: Minimum of 1000 hours.

OVERALL SIZE: 4 inches x 5 inches (less connector).

WEIGHT: Approximately 4.2 lbs.



MINIATURE VERTICAL GYRO TRANSMITTER TYPE NUMBER 14128-1-A

FEATURES: Electrolytic switch detectors, hysteresis synchronous motor, completely self-contained, requires no erection amplifier, and hermetically sealed.

MOTOR: 115 volts, 400 cps, 3 phase, hysteresis synchronous with rated speed of 24,000 rpm and a rotor moment of inertia of 1200 gram-cm².

DATA TRANSMITTERS:

Type - Autosyn synchro
Output voltage - 11.8 volts (maximum)
Null - 30 mv (maximum)
Maximum error - 7 minutes
Sensitivity - 200 mv/degree

ERECTION RATE:

Normal - 2 degree per minute, nominal
Fast - 20 degree per minute

DEGREES OF FREEDOM:

Bank - 360 degrees
Pitch - Controlled tumbling at 85 degrees (approximately)

FREE DRIFT: 1/4 degree per minute

OPERATING LIFE: 1000 hours

TEMPERATURE RANGE: -55°C to +71°C

DIMENSIONS:

With shockmount - 5-1/2" wide x 4-15/16 high x 5-1/4 long
Gyro only - 3-1/2" diameter x 5" long

WEIGHT:

With shockmount - 5 lbs. 12 oz.
Gyro only - 3 lbs. 12 oz.



RADAR ANTENNA DEVICES

Vast experience in servo-mechanisms and in latest packaging techniques plus the use of lightweight castings throughout, enables Eclipse-Pioneer to manufacture radar antenna devices to meet a wide variety of exacting requirements. Airborne or ground radar antenna devices can be supplied to include the electro-mechanical drive unit only or to include the complete reflector assemblies and feed systems.

TYPICAL EXAMPLES OF ECLIPSE-PIONEER RADAR ANTENNA DEVICES

HIGH GAIN SEARCH ANTENNA

Lightweight, ground-based, air-transportable, dual reflector, multi-band, high gain search antenna and control system.

| | Specifications |
|--|--|
| Weight | 1000 lbs. |
| Data accuracy | 0.5 mil. |
| Slewing rates (in azimuth and elevation) | 2 rpm |
| Operating temperature range | -54°C to +66°C |
| Elevation and Azimuth | Two-speed 60 cps synchro data systems 1:1 and 36:1 |
| Servo drives | Induction motor coupled bidirectional hysteresis clutch |
| Wind loading | 50 mph (full operating performance). 100 mph (no structural damage). 10 to 1 |
| Frequency range | Four, remotely selected |
| Bands | Four planes remotely selected |
| Polarization | Broad and narrow remotely selected |
| Beam width | |

Available with shock-proof, water-proof transit cases.



AIRBORNE WEATHER RADAR ANTENNA TYPE NUMBER 40027-□-A

Airborne weather radar antenna with line of sight stabilization for x- or c-band, switchable wide fan (cosecant squared) beam pattern for mapping or pencil beam for storm detection.

| | Specifications |
|------------------------------|--|
| Standard frequency range | 9345 to 9405 mc/s. This permits beacon operation at 9310 mc/s. |
| Optional frequency range | 9215 to 9275 mc/s. |
| Operation | Up to 60 kw peak with a 0.001 duty cycle. |
| Reflector size | 30 in. dia. (truncated) |
| Beam width | 3.2° maximum in E and H planes |
| Side lobes | At least 18 db below main lobe peak. |
| Polarization | Horizontal for pencil beam, vertical for mapping. |
| Weight | 27 lbs. (approximate) |
| Operating temperature range* | -40°C to +55°C |
| Storage temperature range* | -65°C to +55°C |
| Humidity | 10% to 95% |

*These temperature ranges can be extended for specific application



GROUND ANTENNA PEDESTAL TYPE NUMBER 40107-1-A

Lightweight, ground-based, air or all-purpose vehicle transportable tracking antenna pedestal for mounting dual reflector.

| | Specifications |
|--|--|
| Weight | 700 lbs. approx. |
| Data accuracy* | 0.7 mil. |
| Slewing rates (in azimuth and elevation) | 4 rpm. |
| Operating temperature range | -54°C to +66°C |
| Elevation and Azimuth | Two-speed synchro data systems 1:1 and 16:1 |
| Elevation load | Counterbalanced |
| Servo drives | 3/4 hp motors (dc) for use with an amplidyne servo system. |
| Wind loading | 50 mph (full operating performance). 100 mph (no structural damage) |

*Higher accuracies available



Supermarket volume makes Eclipse-Pioneer the ideal place to shop for synchros, motors, gyros, radar antenna devices, and component packages.

Premium precision, minimum cost, and fast delivery have made Eclipse-Pioneer the "buy word" for precision components.

ECLIPSE-PIONEER DIVISION • *Bendix* AVIATION CORPORATION • TETERBORO • NEW JERSEY

SYLVANIA INDUSTRIAL & MILITARY Special-Purpose Cathode Ray Tubes

| Type | Faceplate | Focus | Deflection | Deflection Angle | Anode Volts Kv.Abs.Max. | Nominal Length (Inches) | Type | Faceplate | Focus | Deflection | Deflection Angle | Anode Volts Kv.Abs.Max. | Nominal Length (Inches) |
|-------------------------|-----------|-------|------------|------------------|-------------------------|-------------------------|---|-----------|-------|------------|------------------|-------------------------|-------------------------|
| RADAR INDICATORS | | | | | | | OSCILLOSCOPES (Continued) | | | | | | |
| 3ACP12A | C | ES | ES | .... | 6.6* | 10 | 3MP1 | C | ES | ES | .... | 2.75 | 8 |
| 3FP7A | C | ES | ES | .... | 4.4* | 10 | 3RP1 | C | ES | ES | .... | 2.75 | 9 1/2 |
| 3JP7 | C | ES | ES | .... | 4.4* | 10 | 3RP1A | C | ES | ES | .... | 2.75 | 9 1/2 |
| 3JP12 | C | ES | ES | .... | 4.4* | 10 | 3SP1 | C | ES | ES | .... | 3.0 | 9 1/2 |
| 3KP7 | C | ES | ES | .... | 2.75 | 11 1/2 | 3SP2 | C | ES | ES | .... | 3.0 | 9 1/2 |
| 5ABP7 | C | ES | ES | .... | 6.6* | 16 3/4 | 5ABP1 | C | ES | ES | .... | 6.6* | 16 3/4 |
| 5ADP7 | C | ES | ES | .... | 6.6* | 16 3/4 | 5ADP1 | C | ES | ES | .... | 6.6* | 16 3/4 |
| 5AHP7 | C | ES | MAG. | 53 | 11.0 | 11 1/2 | 5ADP2 | C | ES | ES | .... | 6.6* | 16 3/4 |
| 5AHP7A | CA | ES | MAG. | 53 | 11.0 | 11 1/2 | 5AQP1 | C | ES | ES | .... | 4.4 | 16 3/4 |
| 5AHP14 | C | ES | MAG. | 53 | 11.0 | 11 1/2 | 5AQP2 | C | ES | ES | .... | 4.4 | 16 3/4 |
| 5AHP14A | CA | ES | MAG. | 53 | 11.0 | 11 1/2 | 5BP1A | C | ES | ES | .... | 2.2 | 16 3/4 |
| 5AHP19 | C | ES | MAG. | 53 | 11.0 | 11 1/2 | 5CP1A | C | ES | ES | .... | 4.4* | 16 3/4 |
| 5AHP19A | CA | ES | MAG. | 53 | 11.0 | 11 1/2 | 5RP1A | C | ES | ES | .... | 28.0* | 16 3/4 |
| 5AQP7 | C | ES | ES | .... | 4.4* | 16 3/4 | 5RP2A | C | ES | ES | .... | 28.0* | 16 3/4 |
| 5CP7A | C | ES | ES | .... | 4.4* | 16 3/4 | 5UP1 | C | ES | ES | .... | 2.75 | 14 3/4 |
| 5CP12 | C | ES | ES | .... | 4.4* | 16 3/4 | 6DP1 | CA | ES | ES | .... | 15.0* | 20 1/2 |
| 5FP7A | C | MAG. | MAG. | 53 | 8.8 | 11 1/2 | 6DP2 | CA | ES | ES | .... | 15.0* | 20 1/2 |
| 5FP14 | C | MAG. | MAG. | 53 | 8.8 | 11 1/2 | 7JP1/7VP1 | C | ES | ES | .... | 6.6 | 14 1/2 |
| 5FP14A | C | MAG. | MAG. | 53 | 8.8 | 11 1/2 | 8CP1 | C | ES | ES | .... | 6.6 | 16 1/2 |
| 5RP7A | C | ES | ES | .... | 28.0* | 16 3/4 | 8CP2 | C | ES | ES | .... | 6.6* | 16 1/2 |
| 5UP7 | C | ES | ES | .... | 2.75 | 14 3/4 | VIDEO RECORDERS | | | | | | |
| 6DP7 | CA | ES | ES | .... | 15.0* | 20 1/2 | 3ACP11A | C | ES | ES | .... | 6.6* | 10 |
| 6DP14 | CA | ES | ES | .... | 15.0* | 20 1/2 | 3ADP11 | C | ES | ES | .... | 6.6* | 10 |
| 6DP19 | CA | ES | ES | .... | 15.0* | 20 1/2 | 3KP11 | C | ES | ES | .... | 2.75 | 11 1/2 |
| 6DP25 | CA | ES | ES | .... | 15.0* | 20 1/2 | 3SP5 | C | ES | ES | .... | 3.0 | 9 1/2 |
| 7ABP7 | C | ES | MAG. | 50 | 11.0 | 13 1/4 | 3SP11 | C | ES | ES | .... | 3.0 | 9 1/2 |
| 7ABP7A | CA | ES | MAG. | 50 | 11.0 | 13 1/4 | 5ABP11 | C | ES | ES | .... | 6.6* | 16 3/4 |
| 7ABP14 | C | ES | MAG. | 50 | 11.0 | 13 1/4 | 5ADP11 | C | ES | ES | .... | 6.6* | 16 3/4 |
| 7ABP14A | CA | ES | MAG. | 50 | 11.0 | 13 1/4 | 5AQP11 | C | ES | ES | .... | 4.4 | 16 3/4 |
| 7ABP19 | C | ES | MAG. | 50 | 11.0 | 13 1/4 | 5CP11A | C | ES | ES | .... | 4.4* | 16 3/4 |
| 7ABP19A | CA | ES | MAG. | 50 | 11.0 | 13 1/4 | 5FP11A | C | MAG. | MAG. | 53 | 8.8 | 11 1/2 |
| 7BP2A | C | MAG. | MAG. | 53 | 8.8 | 13 1/2 | 5RP5A | C | ES | ES | .... | 28.0* | 16 3/4 |
| 7BP7A | C | MAG. | MAG. | 53 | 8.8 | 13 1/2 | 5RP11A | C | ES | ES | .... | 28.0* | 16 3/4 |
| 7JP7 | C | ES | ES | .... | 6.6 | 14 1/2 | 5UP11 | C | ES | ES | .... | 2.75 | 14 3/4 |
| 7MP7 | C | MAG. | MAG. | 50 | 8.8 | 12 1/2 | 5WP11 | C | ES | MAG. | 50 | 30. | 11 1/2 |
| 7MP14 | C | MAG. | MAG. | 50 | 8.8 | 12 1/2 | 6DP11 | CA | ES | ES | .... | 15.0* | 20 1/2 |
| 8CP7 | C | ES | ES | .... | 6.6* | 16 1/2 | 8CP5 | C | ES | ES | .... | 6.6* | 16 1/2 |
| 10KP7 | T | MAG. | MAG. | 50 | 11.0 | 17 3/4 | 8CP11 | C | ES | ES | .... | 6.6* | 16 1/2 |
| 10KP7A | T | MAG. | MAG. | 50 | 11.0 | 17 3/4 | 10NP11 | A | MAG. | MAG. | 52 | 27.5 | 17 3/4 |
| 10VP7 | CA | MAG. | MAG. | 50 | 13.2 | 17 3/4 | INDUSTRIAL MONITORS | | | | | | |
| 10WP7 | T | ES | MAG. | 50 | 13.2 | 16 1/2 | 3KP4 | C | ES | ES | .... | 2.75 | 11 1/2 |
| 10WP7A | TA | ES | MAG. | 50 | 13.2 | 16 1/2 | 3RP4 | C | ES | ES | .... | 2.75 | 9 1/2 |
| 10WP14 | T | ES | MAG. | 50 | 13.2 | 16 1/2 | 3SP4 | C | ES | ES | .... | 3.0 | 9 1/2 |
| 10WP14A | TA | ES | MAG. | 50 | 13.2 | 16 1/2 | 5ABP4 | C | ES | ES | .... | 6.6* | 10 3/4 |
| 10WP19 | T | ES | MAG. | 50 | 13.2 | 16 1/2 | 5ABP4A | CA | ES | MAG. | 53 | 11.0 | 11 1/2 |
| 10WP19A | TA | ES | MAG. | 50 | 13.2 | 16 1/2 | 5FP4A | C | MAG. | MAG. | 53 | 8.8 | 11 1/2 |
| 12ABP7 | T | ES | MAG. | 55 | 13.2 | 18 | 5RP4A | C | ES | ES | .... | 28.0* | 16 3/4 |
| 12ABP7A | TA | ES | MAG. | 55 | 13.2 | 18 | 8CP4 | C | ES | ES | .... | 6.6* | 16 1/2 |
| 12ABP14 | T | ES | MAG. | 55 | 13.2 | 18 | 8FP4 | TA | MAG. | MAG. | 90 | 10.8 | 11 1/2 |
| 12ABP14A | TA | ES | MAG. | 55 | 13.2 | 18 | 10SP4 | TA | ES | MAG. | 50 | 22.0 | 16 3/4 |
| 12ABP19 | T | ES | MAG. | 55 | 13.2 | 18 | RECEIVER CHECK TUBES | | | | | | |
| 12ABP19A | TA | ES | MAG. | 55 | 13.2 | 18 | 5AXP4 | C | AUTO | MAG. | 53 | 19.8 | 10 3/4 |
| 12DP7A | T | MAG. | MAG. | 50 | 11.0 | 19 3/4 | 8XP4 | T | AUTO | MAG. | 90 | 22.0 | 11 1/2 |
| 12DP7C | TA | MAG. | MAG. | 50 | 13.2 | 19 3/4 | 8YP4 | T | AUTO | MAG. | 110 | 22.0 | 8 1/2 |
| 12SP7 | C | MAG. | MAG. | 55 | 11.0 | 18 3/4 | FLYING SPOT SCANNERS | | | | | | |
| 12SP7D | TA | MAG. | MAG. | 55 | 13.0 | 18 3/4 | 3KP16 | C | ES | ES | .... | 2.75 | 11 1/2 |
| OSCILLOSCOPES | | | | | | | 3BNP16 | CA | ES | MAG. | 53 | 19.8 | 10 3/4 |
| 2AP1A | C | ES | ES | .... | 1.1 | 7 3/4 | 5WP15 | C | ES | MAG. | 50 | 30. | 11 1/2 |
| 3ACP1A | C | ES | ES | .... | 6.6* | 10 | 5ZP15 | CA | ES | MAG. | 40 | 30.0 | 14 3/4 |
| 3ACP2A | C | ES | ES | .... | 6.6* | 10 | 5ZP16 | CA | ES | MAG. | 40 | 30.0 | 14 3/4 |
| 3ADP1 | C | ES | ES | .... | 6.6* | 10 | 5ZP24 | CA | ES | MAG. | 40 | 30.0 | 14 3/4 |
| 3ADP2 | C | ES | ES | .... | 6.6* | 10 | 10VP15 | CA | MAG. | MAG. | 50 | 13.2 | 17 3/4 |
| 3BP1A | C | ES | ES | .... | 2.2 | 10 | A = Aluminized C = Clear T = Tinted * = Post accelerator voltage | | | | | | |
| 3JP1 | C | ES | ES | .... | 4.4* | 10 | | | | | | | |
| 3JP2 | C | ES | ES | .... | 4.4* | 10 | | | | | | | |
| 3KP1 | C | ES | ES | .... | 2.75 | 11 1/2 | | | | | | | |

SYLVANIA TV PICTURE TUBES. In television picture tubes too, Sylvania stands out as a leading source for the widest variety of types. From conventional 90° tubes to the latest in 110° types, Sylvania, trendsetter in picture tube design, can supply your needs.



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1740 Broadway, New York 19, N. Y.
In Canada: Sylvania Electric (Canada) Ltd.
P. O. Box 1190, Station "O", Montreal 9



SYLVANIA GERMANIUM TRANSISTORS



| General Data | | | Maximum Ratings | | | | Typical Values | | | Circuit | |
|--|--------------------|------|----------------------------|----------|-------------|--------------|--------------------------|------------------|---------------------------------------|--------------------------------|-------------------------|
| Transistor Type | Application | Type | Max. Diss. At 25°C Ambient | Max. VCB | Max. VCE(1) | Max. IC (ma) | Max. Junction Temp. (°C) | Current Gain hFE | Cutoff Current (ua at rated VCB) ICBO | Cutoff Frequency (mc) fce (mc) | Power Gain db |
| RF-IF AMPLIFIER | | | | | | | | | | | |
| 2N94 | RF-IF Amplifier | NPN | 50 mw | — | 20 | — | 75 | 7.5 | 35 | — | 3 |
| 2N94A | RF-IF Amplifier | NPN | 50 mw | 20 | 20 | 50 | 75 | 25 | — | 25 | 6 |
| 2N216 | IF Amplifier | NPN | 50 mw | — | 18 | 10 | 75 | 7.5 | — | 25 | 3 |
| 2N233A | IF Amplifier | NPN | 50 mw | — | 18 | — | 75 | 5 | — | 25 | 3 |
| 2N247 | RF/IF Amplifier | PNP | 35 mw | — | 18 | — | 75 | 5 | — | 25 | 3 |
| 2N370 | 20 Mc Amplifier | PNP | 80 mw | —35 | VEB = -0.5 | 10 | 85 | 60 | — | 25 | 3 (1.5 mc operation) |
| 2N373 | IF Amplifier | PNP | 80 mw | —20 | VEB = -1.5 | 10 | 85 | 105 | — | 25 | 3 |
| 2N515 | IF Amplifier | NPN | 80 mw | —12 | VEB = -0.5 | 10 | 85 | 90 | — | 25 | 3 |
| 2N516 | IF Amplifier | NPN | 50 mw | — | 18 | 10 | 75 | 7.5 | — | 25 | 3 |
| 2N517 | IF Amplifier | NPN | 50 mw | — | 18 | 10 | 75 | 7.5 | — | 25 | 3 |
| 2N544 | RF/IF Amplifier | PNP | 80 mw | —18 | VEB = -1.0 | 10 | 85 | 100 | — | 25 | 3 (1.5 mc operation) |
| 2N624 | 12.5 mc Amplifier | PNP | 100 mw | —30 | —20 | — | 100 | 30 | — | 15 | 3 (12.5 mc operation) |
| OSCILLATOR | | | | | | | | | | | |
| 2N193 | Oscillator | NPN | 50 mw | — | 18 | 50 | 75 | 7.5 | — | 25 | 3 |
| 2N211 | Oscillator | NPN | 50 mw | — | 10 | 50 | 75 | 10 | — | 25 | 3 |
| 2N371 | 20 Mc Oscillator | PNP | 80 mw | —20 | VEB = -0.5 | 10 | 85 | 90 | — | 25 | 3 |
| MIXER | | | | | | | | | | | |
| 2N194 | Mixer | NPN | 50 mw | — | 18 | 50 | 75 | 8 | — | 25 | 3 |
| 2N372 | 20 Mc Mixer | PNP | 80 mw | —20 | VEB = -0.5 | 10 | 85 | 90 | — | 27 | 3 |
| 2N409 | Mixer | PNP | 80 mw | — | 20 | 15 | 85 | 48 | — | — | 3 |
| CONVERTER | | | | | | | | | | | |
| 2N140 | Converter | PNP | 35 mw | —16 | — | 15 | 85 | — | — | 5 | 5 |
| 2N194A | Converter | NPN | 50 mw | — | 18 | 5 | 75 | — | — | — | 30 |
| 2N212 | Converter | NPN | 50 mw | — | 12 | 50 | 75 | 20 | — | 25 | 2 |
| 2N374 | Converter | PNP | 80 mw | —12 | VEB = -0.5 | 10 | 85 | 105 | — | 3 | 6 |
| 2N411 | Converter | PNP | 80 mw | —13 | — | 15 | 85 | — | — | 5 | — |
| 2N1058 | Converter | NPN | 50 mw | — | 18 | — | 75 | — | — | — | 4 |
| AUDIO, DRIVER, AND MEDIUM POWER | | | | | | | | | | | |
| 2N34 | Audio | PNP | 50 mw | —40 | — | 50 | 75 | hfb = 950 min. | 75 | 400 | — |
| 2N35 | Audio-Driver | NPN | 50 mw | —40 | 25 | 100 | 75 | 75 | — | 50 | 0.10 |
| 2N68 | Audio-Power | PNP | 1.5 w | —30 | —15 | 1.5A | 75 | — | 40 | 5 ma | 400 |
| 2N95 | Audio-Power | NPN | 1.5 w | —30 | —15 | 1.5A | 75 | — | 40 | 5 ma | 400 |
| 2N101 | Audio-Power | PNP | 1 w | —30 | —15 | — | 75 | — | 40 | 5 ma | 400 |
| 2N102 | Audio-Power | NPN | 1 w | —30 | —15 | — | 75 | — | 40 | 5 ma | 400 |
| 2N109 | Audio | PNP | 50 mw | —25 | — | 800 | 75 | — | 40 | 5 ma | 400 |
| 2N141 | Audio-Power | PNP | 1.5 w | —60 | —30 | 800 | 75 | — | 40 | 5 ma | 400 |
| 2N142 | Audio-Power | NPN | 1.5 w | —60 | —30 | 800 | 75 | — | 40 | 5 ma | 400 |
| 2N143 | Audio-Power | PNP | 1 w | —60 | —30 | 800 | 75 | — | 40 | 5 ma | 400 |
| 2N144 | Audio-Power | NPN | 1 w | —60 | —30 | 800 | 75 | — | 40 | 5 ma | 400 |
| 2N213 | Audio-Driver | NPN | 50 mw | —40 | 25 | 100 | 75 | 300 | — | 50 | 0.10 |
| 2N213A | Audio-Driver | NPN | 50 mw | —40 | 0.5 | 100 | 85 | — | — | — | 10k |
| 2N214 | Audio-Matched Pair | NPN | 180 mw | —40 | 25 | 100 | 75 | — | 75 | 25 | 0.110 |
| 2N228 | Audio-Output | NPN | 50 mw | —40 | 25 | — | 75 | 60 | 70 | 50 | 600 |
| 2N270 | Audio-Power | PNP | 150 mw | —25 | — | 75 | 85 | — | 75 | — | 0.06 |
| 2N306 | Audio-Driver | NPN | 50 mw | —20 | 15 | — | 75 | 75 | — | 25 | 600 |
| 2N381 | Audio-Power | PNP | 200 mw | — | —30 | 200 | 85 | — | 35 | 10 | 10 |
| 2N382 | Audio-Power | PNP | 200 mw | — | —30 | 200 | 85 | — | 60 | 10 | 10 |
| 2N383 | Audio-Power | PNP | 200 mw | — | —30 | 200 | 85 | — | 80 | 10 | 10 |
| 2N405 | Audio-Driver | PNP | 150 mw | —20 | —18 | 35 | 85 | — | — | 250 | — |
| 2N591 | Audio-Driver | PNP | 150 mw | —40 | —25 | 100 | 85 | — | — | — | 10k |
| 2N1059 | Audio-Output | NPN | 180 mw | —40 | 15 | 100 | 75 | — | — | — | 10k |
| 2N1101 | Audio-Output | NPN | 180 mw | —20 | 15 | 100 | 75 | — | — | — | 10k |
| 2N1102 | Audio-Output | NPN | 180 mw | —40 | 25 | 100 | 75 | — | — | — | 10k |
| HIGH POWER AUDIO | | | | | | | | | | | |
| 2N176 | Audio-Power | PNP | 10 w at 80°C | — | —30 | 3A | 90 | — | — | — | 0.06 |
| 2N242 | Audio-Power | PNP | 25 w | —45 | —45 | 2A | 100 | — | — | 10 | 0.07 |
| 2N268 | Audio-Power | PNP | 25 w | —80 | — | — | 85 | — | — | 2.0 ma | 0.06 |
| 2N296 | Audio-Power | PNP | 25 w | —60 | — | 2A | 85 | — | 30 | 1.0 ma | 0.04 |
| 2N301 | Audio-Power | PNP | 12 w at 55°C | —40 | — | 1A | 85 | — | — | 0.5 ma | — |
| 2N301A | Audio-Power | PNP | 12 w at 55°C | —60 | — | 1A | 85 | — | — | 0.5 ma | — |
| 2N307A | Audio-Power | PNP | 17 w | —35 | —35 | 2A | 75 | — | 30 | 3.5 ma | 0.035 |
| 2N326 | Audio-Power | NPN | 7 w | —35 | —35 | 2A | 85 | — | 35 | 250 | 150 |
| 2N350 | Audio-Power | PNP | 10 w at 80°C | —40 | — | 3A | 90 | 30 | 40 | 1.5 ma | 0.05 |
| 2N351 | Audio-Power | PNP | 10 w at 80°C | —40 | — | 3A | 90 | 45 | 55 | 1.5 ma | 0.05 |
| 2N419 | Power Supply | PNP | 32 w (17) | — | —45 | 3A | 95 | — | — | — | — |
| 2N420 | Power Supply | PNP | 34 w (17) | — | —40 | 5A | 100 | — | — | — | — |
| COMPUTER | | | | | | | | | | | |
| 2N123 | Switching | PNP | 100 mw | —20 | —15 | 125 | 85 | — | — | 5 | — |
| 2N312 | Switching | NPN | 100 mw | —15 | —15 | 200 | 85 | — | 50 | 7 | (tr + td = 1.5 us max.) |
| 2N356 | Switching | NPN | 100 mw | —20 | —18 | 500 | 85 | — | 30 | 20 | 3 |
| 2N357 | Switching | NPN | 100 mw | —20 | —15 | 500 | 85 | — | 30 | 20 | 6 |
| 2N358 | Switching | NPN | 100 mw | —20 | —12 | 500 | 85 | — | 30 | 20 | 9 |
| 2N377 | Switching | NPN | 150 mw | —25 | —20 | 200 | 100 | — | 40 | 6 | 6 |
| 2N385 | Switching | NPN | 150 mw | —25 | —25 | 200 | 100 | — | 70 | 17 | 4 |
| 2N388 | Switching | NPN | 150 mw | —25 | —20 | 200 | 100 | — | 110 | 10 | 8 |
| 2N404 | Switching | PNP | 120 mw | —25 | —24 | 100 | 85 | — | — | 10 | 4 |
| 2N425 | Switching | PNP | 150 mw | —30 | —20 | 400 | 85 | — | 15 | 10 | 4 |
| 2N426 | Switching | PNP | 150 mw | —30 | —18 | 400 | 85 | — | 18 | 10 | 6 |
| 2N427 | Switching | PNP | 150 mw | —30 | —15 | 400 | 85 | — | 20 | 10 | 6 |
| 2N428 | Switching | PNP | 150 mw | —30 | —12 | 400 | 85 | — | 30 | 10 | 11 |
| 2N439 | Switching | NPN | 100 mw | —30 | —20 | — | 85 | — | — | 10 | 17 |
| 2N556 | Switching | NPN | 100 mw | —25 | —20 | 200 | 85 | — | 50 | 10 | 3 |
| 2N557 | Switching | NPN | 100 mw | —20 | —20 | 200 | 85 | — | 30 | 10 | 3 |
| 2N558 | Switching | NPN | 100 mw | —15 | —10 | 200 | 75 | — | 75 | 10 | 3 |
| 2N585 | Switching | NPN | 120 mw | —25 | —20 | 200 | 85 | — | — | — | 5 |
| 2N587 | Switching | NPN | 150 mw | —40 | —20 | 200 | 85 | — | 30 | 25 | 3 |
| 2N679 | Switching | NPN | 150 mw | —25 | —20 | 200 | 85 | — | — | — | 2 |
| 2N1114 | Switching | NPN | 150 mw | —25 | —15 | 200 | 100 | — | — | — | 7 |



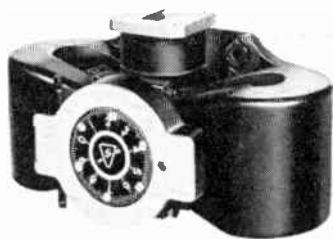
| Type | Description | Reverse Working Voltage (volts) | Avg. Anode Current (ma) | Forward Current at +1 Volt (ma min.) | Reverse Current (ua max.) |
|-----------|--|---------------------------------|-------------------------|--------------------------------------|----------------------------------|
| 1N34A | .60 volt | 60 | 50 | 5 | 30 at -10v, 500 at -50 |
| 1N35 | Matched Pair | 50 | 22.5 | 7 | 10 at -10v |
| 1N38B*** | 100 volt | 100 | 50 | 4 (25 max.) | 6 at -3v, 500 at 100v |
| 1N39B | 200 volt | 200 | 50 | 4 | 100 at -100v, 600 at 200v |
| 1N40 | Plug-in Varistor | 25 | 22.5 | 12.7 at 1.5v | 40 at 10v |
| 1N41** | Packaged Varistor | 25 | 22.5 | 12.7 at 1.5v | 40 at 10v |
| 1N42** | 100 volt Varistor | 100 | 22.5 | 12.7 at 1.5v | 750 at -100v |
| 1N48** | 70 volt | 70 | 50 | 4 | 800 ua at -50v |
| 1N52A | 50 volt | 50 | 50 | 5 (25 max.) | 100 at -50v |
| 1N54A | High Back Resistance | 50 | 50 | 5 | 7 at -10v, 100 at -50v |
| 1N55A*** | 150 volt | 150 | 50 | 4 | 500 at -150v |
| 1N56A*** | High Conduction | 40 | 60 | 15 | 300 at -30v |
| 1N58A | 100 volt | 100 | 50 | 4 | 600 at -100v |
| 1N60 | Video Detector | 25 | 50 | 4 | 50 at -50v |
| 1N63 | High Back Resistance | 100 | 50 | 4 | 50 at -50v |
| 1N64** | Video Detector | 20 | — | (45 mc) = 100 ua | — |
| 1N65 | 70 volt | 70 | 50 | 2.5 | 200 at -50v |
| 1N67A*** | Miniature—High Back | 80 | 30 | 4 | 5 at -5v, 50 at -50v |
| 1N68A | 100 volt General Purpose Miniature | 100 | 40 | 3.0 | 625 at -100v |
| 1N69A*** | 60 volt | 60 | 40 | 5 (25 max.) | 30 at 10v, 500 at -50v |
| 1N70A*** | 100 volt | 100 | 30 | 3 (25 max.) | 25 at 10v, 300 at 50v |
| 1N71 | Low Impedance Varistor | 40 | 60 | 15 | 300 at -30v |
| 1N72 | UHF Mixer | 5 | 25 | (N.F. = 14 - 19db) | — |
| 1N77A | Photodiode .093" dia. per | — | 10 | — | 8 at -10v, 30 at -50v (dark) |
| 1N77B | Photodiode .077" dia. per | — | 10 | — | 8 at -10v, 30 at -50v (dark) |
| 1N81 | Low Voltage | 40 | 30 | 3 | 10 at -10v |
| 1N81A*** | Low Voltage | 40 | 30 | 3 (25 max.) | 10 at -10v |
| 1N82 | UHF Mixer | — | — | — | — |
| 1N82A | UHF Mixer | — | — | — | — |
| 1N90 | Miniature—General Purpose | 60 | 30 | 5 | 750 at -50v |
| 1N91 | 100 volt 150 ma Germanium Rectifier | 30 | 150 | — | 2.7 ma at 100v |
| 1N92 | 200 volt 100 ma | 65 | 100 | — | 1.9 ma at 200v |
| 1N93 | 300 volt 75 ma | 100 | 75 | — | 1.2 ma at 300v |
| 1N98 | Miniature—High Back | 80 | 30 | 20 | 8 at -5v, 100 at -50v |
| 1N100 | Miniature—High Back | 80 | 30 | 20 | 5 at -5v, 50 at -50v |
| 1N115 | 60 volt Computer | 60 | 25 | 2.5 | — |
| 1N117 | 60 volt General Purpose Miniature | 60 | 30 | 10 | 100 at -50v |
| 1N118 | Miniature—High Conduction | 60 | 60 | 20 | 100 at -50v |
| 1N119 | 60 volt—Computer | 60 | 25 | 5 | — |
| 1N120 | 60 volt—Computer | 60 | 25 | 5 | — |
| 1N126A*** | Miniature—60 volt | 60 | 30 | 5 (25 max.) | 50 at -10v, 850 at -50v |
| 1N127 | Miniature—100 volt | 100 | 30 | 3 | 25 at -10v, 300 at -50v |
| 1N127A*** | Miniature—100 volt | 100 | 30 | 3 (25 max.) | 25 at -10v, 300 at -50v |
| 1N128*** | Miniature—High Back | 40 | 30 | 3 | 10 at -10v |
| 1N140 | 70 volt | 70 | 85 | 40 | 300 at -50v |
| 1N191 | Miniature—Computer | 90 | 30 | 5 | — |
| 1N192 | 70 volt—Computer | 60 | 25 | 2.5 | — |
| 1N193 | High Temperature | 50 | 30 | 1.0 at +2v | 20 at -10v, 40 at -40v |
| 1N194 | High Temperature | 40 | 30 | 1.5 at +2v | 10 at -40v |
| 1N195 | High Temperature | 40 | 30 | 2.0 at +2v | 10 at -40v |
| 1N196 | High Temperature | 50 | 30 | 1.0 at +2v | 10 at -40v |
| 1N198 | Miniature—75°C | 80 | 30 | 4 | 10 at -10v, 50 at -50v |
| 1N198A*** | Miniature—75°C | 80 | 30 | 4 (25 max.) | 10 at -10v, 50 at -50v |
| 1N253 | 65 volt 1 amp Silicon Rectifier | — | 1000 | — | 10 at -75v |
| 1N254 | 135 volt 400 ma Silicon Rectifier | — | 400 | — | 10 at -150v |
| 1N255 | 270 volt 400 ma Silicon Rectifier | — | 400 | — | 10 at -350v |
| 1N256 | 400 volt 200 ma Silicon Rectifier | — | 200 | — | — |
| 1N270 | 70 volt Miniature | 80 | 60 | 200 | 75 at -10v, 100 at -50v |
| 1N276** | 50 volt | 50 | 40 | 40 | 20 at -10v, 100 at -50v |
| 1N279*** | 30 volt | 30 | 80 | 100 | 200 at -20v |
| 1N281 | 60 volt High Conductance | 60 | 75 | 100 | 30 at -10v |
| 1N283 | Miniature—High Conductance | 20 | 100 | 200 | 80 at -10v |
| 1N294 | 60 volt | 60 | 35 | 5 (25 max.) | 10 at -10v, 800 at -50v |
| 1N295** | Video Detector | 40 | — | (50 mc) = 375 ua | — |
| 1N297 | 80 volt DC Restorer | 80 | 35 | 3.5 | 10 at -50v |
| 1N298 | OV Miniature Computer | 70 | 50 | 2.0 | 250 at -40v |
| 1N417 | Computer | 60 | 60 | 7 | — |
| 1N418 | Computer | 60 | 16 | 7 | — |
| 1N419 | Computer | 80 | 60 | 125 | — |
| 1N435 | Varistor | 40 | 60 | — | 300 at -30v |
| 1N448 | VLI | 100 | 60 | 25 | 30 at -30v, 100 at -100v |
| 1N449** | VLI | 30 | 60 | 50 | 30 ua at -30v |
| 1N450 | VLI | 100 | 60 | 50 | 30 at -30v, 100 at -100v |
| 1N451** | VLI | 30 | 60 | 50 | 150 ua at -150v |
| 1N452** | VLI | 100 | 80 | 100 | 30 ua at -30v |
| 1N453** | VLI | 100 | 80 | 100 | 100 ua at -100v |
| 1N454** | VLI | 50 | 100 | 200 | 50 ua at -50v |
| 1N455** | VLI | 30 | 100 | 300 | 30 ua at -30v |
| 1N456 | 25 volt Silicon Miniature | 25 | 90 | 40 | .025 at -25v |
| 1N457 | 70 volt Silicon Miniature | 60 | 75 | 20 | .025 at -60v |
| 1N458 | 150 volt Silicon Miniature | 125 | 55 | 7 | .025 at -125v |
| 1N459 | 200 volt Silicon Miniature | 175 | 40 | 3 | .025 at -175v |
| 1N461 | 25 volt Silicon Miniature | 25 | 60 | 15 | .05 at -25v |
| 1N462 | 70 volt Silicon Miniature | 60 | 50 | 5 | .05 at -60v |
| 1N463 | 200 volt Silicon Miniature | 175 | 30 | 1 | .05 at -175v |
| 1N464 | 125 volt Silicon Miniature | 125 | 40 | 3 | 1.0 at -125v |
| 1N482 | 30 volt Hi Conduction Silicon Miniature | 36 | 200 | 100 | .25 at -30v |
| 1N482A | 30 volt Hi Conduction Silicon Miniature | 36 | 200 | 100 | .025 at -30v |
| 1N483B | 50 volt Hi Conduction Silicon Miniature | 70 | 200 | 100 | .025 at -60v |
| 1N486A | 160 volt Hi Conduction Silicon Miniature | 225 | 200 | 100 | .05 at -225v |
| 1N571 | High Conductance | 15 | — | 200 | 100 at -10v at 55°C |
| 1N584 | 400 volt 200 ma Germanium Rectifier | — | 400 | — | — |
| 1N634 | Miniature—VLI | 60 | 100 | 50 | .35 at -30v, 115 at -100v |
| 1N636 | 60 volt | 60 | 30 | 2.5 (25 max.) | 10 at -10v, 20 at -20v |
| 1N805 | 10 volt P. C. Detector | 40 | 35 | 3.0 | 100 at -10v |
| 1N1093 | Computer | 15 | 50 | — | 25 at -5v and 75 at -14v at 55°C |
| D-660 | 5 volt VHF TV Mixer | — | — | — | — |
| SR-200 | 200 ma 300 volt (PIV) Silicon Rectifier | — | 200 | — | 1.0 at -300v |
| SR-500 | 500 ma 400 volt (PIV) Silicon Rectifier | — | 500 | — | 1.0 at -300v |

*Ratings are limiting values assigned by the manufacturer to operating or storage conditions (electrical, mechanical, or environmental) under the control of the user. If values are exceeded, permanent impairment of the device and/or performance may result.

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***Available to Military Performance Specifications



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MAGNETRONS



FERRITE DEVICES



SYLVANIA MICROWAVE COMPONENTS & TUBES

"Rocket" Planar Triodes

Sylvania Rocket Tubes are planar-electrode disc-seal triodes for use as oscillators and amplifiers at frequencies up to 3300 mc. Design permits broadband operation. Tuning is simpler and covers a greater continuous range than that of many other types of UHF tubes.

- 2C36—is a pulse-modulated oscillator for frequencies up to 3000 mc.
- 2C37—is designed for use as a c.w. oscillator up to 3300 mc. Plate disc is flat, grid disc folded.
- 5764—is a CW or pulse-modulated oscillator for use up to 3300 mc.
- 5765—is for use as a c.w. oscillator without external feedback in the range from 900 to 2900 mc.
- 5767—is a c.w. oscillator for use up to 3300 mc. Both discs are folded.
- 5768—is intended for use as a c.w. amplifier-multiplier up to 3000 mc.
- 6018—is a pulse-modulated oscillator for use up to 1750 mc.
- 6BA4—High gain, low noise, UHF television amplifier.
- 6481 (RT434)—c.w. oscillator for use up to 3300 mc.
- 6503—c.w. amplifier for use up to 3000 mc.

Microwave Crystal Diodes

Sylvania manufactures microwave crystals for radar, counter-measure and test applications.

| Type | Purpose | Frequency |
|----------------|-------------------------|----------------|
| 1N218* | Mixer | 3000 mc |
| 1N21C* | Mixer | 3000 mc |
| 1N21D* | Mixer | 3000 mc |
| 1N21E* | Mixer | 3000 mc |
| 1N21WE | Double ended mixer | 3000 mc |
| 1N23B** | Mixer | 9375 mc |
| 1N23C** | Mixer | 1000 mc |
| 1N23D** | Mixer | 9375 mc |
| 1N23E** | Mixer | 9375 mc |
| 1N23WE | Double ended mixer | 9375 mc |
| 1N149 | Mixer | 9375 mc |
| 1N25 | Mixer | 1000 mc |
| 1N25A | Mixer | 1000 mc |
| 1N26 | Mixer | 24000 mc |
| 1N26A | Mixer | 24000 mc |
| 1N53 | Mixer | 35000 mc |
| 1N538 | Mixer | 35000 mc |
| D938 | Mixer | 35000 mc |
| 1N78 | Mixer | 16000 mc |
| 1N78A | Mixer | 16000 mc |
| 1N78B | Mixer | 16000 mc |
| 1N286 | Mixer | 10000-22000 mc |
| 1N1132 | Tripolar Mixer | 3000-12000 mc |
| 1N31 | Video Detector | 9375 mc |
| 1N32 | Video Detector | 3000 mc |
| 1N76 | Video Detector | 10000 mc |
| 1N76A | Video Detector | 10000 mc |
| 1N446 | Video Detector | 26500-40000 mc |
| 1N1611 | Video Detector | 9000 mc |
| 1N358 | Tripolar Video Detector | 1000-12000 mc |
| 1N358A | Tripolar Video Detector | 1000-12000 mc |
| 1N369 | Tripolar Video Detector | 3000-12000 mc |
| 1N369A | Tripolar Video Detector | 1000-12000 mc |
| 1N630 | Tripolar Video Detector | 1000-12000 mc |
| 1N1610 | Tripolar Video Detector | 3000-12000 mc |
| 1N2127 | Tripolar Video Detector | 1000-12000 mc |
| 1N830 (D-4050) | "Micro-min" detector | 100 mc |
| 1N833 (D-4063) | "Micro-min" detector | 9375 mc |
| 1N831 (D-4064) | "Micro-min" mixer | 3060 mc |
| 1N832 (D-4065) | "Micro-min" mixer | 9375 mc |

NOTE: Reverse polarity and matched pairs are available for all mixer crystal types except 1N286 and 1N1132.
 *Double ended version: 1N416 series **Double ended version: 1N415 series

Magnetrons

Sylvania magnetrons are designed for military and commercial radar applications.

| | | |
|--------|---|--------|
| 2J42 | 9375 Mc-Fixed | 8 KW |
| 2542H | 9375 Mc-Fixed; High Alt. | 7 KW |
| 2J428 | 9375 Mc-Fixed; Ruggedized | 7 KW |
| 6027 | 9375 Mc-Fixed | 18 KW |
| 6027H | 9375 Mc-Fixed; Ruggedized | 18 KW |
| 7098 | 9300-9500 Mc Beacon Tunable; Ruggedized | 60 W |
| 7503 | Type 7098 with TNC output | 60 W |
| 6874 | 9000-9600 Mc-Tunable | 180 KW |
| 7006 | 9000-9600 Mc-Tunable; Rugged.; High RRV | 190 KW |
| M4163 | 8500-9600 Mc-Tunable | 180 KW |
| M4164 | 8500-9600 Mc-Tunable; Rugged.; High RRV | 200 KW |
| M4193 | 8500-9600 Mc-Tunable; Rugged.; High RRV | 200 KW |
| M4154 | 24000 Mc-Fixed; Ruggedized | 55 KW |
| 5789 | 34800 Mc-Fixed | 40 KW |
| M4155A | 34800 Mc-Fixed; Ruggedized | 40 KW |
| 6799 | 34800 Mc-Fixed | 100 KW |

TR and ATR Tubes

Sylvania's TR/ATR line emphasizes new developments in high power and coaxial types.

| Type | Description | Frequency, mc |
|-------|--------------|---------------|
| 6164 | Broadband TR | 8490-9578 |
| 6163 | ATR | 9050 |
| TR860 | Coaxial TR | (classified) |
| 6899 | Broadband TR | 8700-8900 |

Counter Tubes

Sylvania decade counter tubes provide visual and electrical read-out for a broad field of counting and programming applications.

| Type | Rated Speed | Outputs |
|-------|-------------|---------|
| 6476 | 4 KC | 10 |
| 6476A | 4 KC | 10 |
| 6802 | 4 KC | 4 |
| 6879 | 5 KC | 3 |
| 6909 | 100 KC | 4 |
| 6910 | 100 KC | 10 |
| 7155 | 100 KC | 3 |

Trigger Tubes

0A5—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T 5½ bulb size.

6483—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T-3 bulb size.

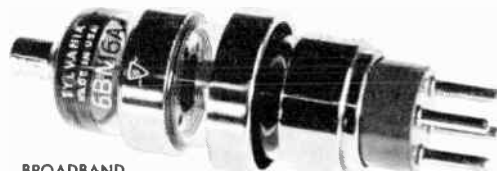
6873—Ruggedized cold cathode trigger tube with increased trigger sensitivity and higher operating voltage capabilities. T 5½ bulb.



SYLVANIA ELECTRIC PRODUCTS INC.
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TRAVELING
WAVE AMPLIFIERS



BROADBAND
REFLEX KLYSTRONS

SYLVANIA MICROWAVE COMPONENTS



Rugged, Reliable Traveling-Wave Amplifiers

Broadband amplifiers for airborne, shipboard, and ground based equipment. Fully tested to complete military-type specifications. Ideal for countermeasures, radar, communications and test equipment.

Lightweight Permanent Magnet Types

| Type | Frequency (KMC) | Power Output |
|---------|-----------------|--------------|
| TW-4006 | 1-2 | 15 mw |
| TW-4007 | 1-2 | .1 watt |
| TW-4002 | 2-4 | 10 mw |
| 7072 | 2-4 | .1 watt |

Compact Solenoid Types*

| Type | Frequency (KMC) | Power Output |
|---------|-----------------|----------------|
| 6753 | 1-2 | 15 mw |
| 6752 | 1-2 | 2 watts |
| TW-620A | 1-2 | 2 watts |
| TW-538 | 1-2 | 1 KW, pulse |
| 6493 | 2-4 | 10 mw |
| 6559 | 2-4 | 2 watts |
| TW-534 | 2-4 | 2 watts, pulse |
| 6698 | 2-4 | 1 KW, pulse |
| TW-613 | 8-11 | 5 mw |
| TW-622 | 8-11 | 2 watts |
| TW-591 | 8-10.5 | 1.0 KW, pulse |

Rugged, Reliable Backward Wave Oscillators

Compact voltage-tuned broadband oscillators for wide-range search receivers and test equipment.

| Type | Frequency (KMC) | Power Output |
|---------|-----------------|--------------|
| 6699* | 1-2 | 20-700 mw |
| 6496* | 2-4 | 20-700 mw |
| 7096 | 2-4 | 100 mw |
| BW-623* | 4-8 | 20-700 mw |
| PM-1757 | 26.5-41 | 5 mw |

*Mating Solenoid available for all types.

Long-Life Reflex Klystrons for Microwave Relays

These reliable klystrons are widely proven in microwave relay service. Fully tested to the equipment specification. Maximum frequency stability results from special tuner design.

| Type | Frequency (KMC) | Power Output |
|--------|-----------------|--------------|
| 6974* | 4.6-5.0 | 2 watts |
| K-4008 | 5.3-6.3 | 0.02-1 watt |
| K-4009 | 5.3-6.6 | 0.02-1 watt |
| K-4010 | 5.8-7.125 | 0.02-1 watt |
| K-4011 | 6.3-7.5 | 0.02-1 watt |
| 6468 | 6.125-6.425 | 1 watt |
| 6469 | 6.575-6.875 | 1 watt |
| 6470 | 7.125-7.425 | 1 watt |
| K-841B | 6.125-6.425 | 1 watt |
| K-840B | 6.575-6.875 | 1 watt |
| K-839B | 7.125-7.425 | 1 watt |
| K-4162 | 6.125-6.425 | 1 watt |
| K-4161 | 6.575-6.875 | 1 watt |
| K-4160 | 7.125-7.425 | 1 watt |

*Special Linear Tuner.

Broadband Reflex Klystrons

These versatile klystrons are ideal for search receivers, signal generators, and microwave relays.

| Type | Frequency (KMC) | Power Output |
|--------|-----------------|--------------|
| 6BM6 | 0.55-3.8 | 50-175 mw |
| 6BM6A* | 0.55-3.8 | 50-175 mw |
| 6BL6 | 1.6-6.5 | 60-250 mw |
| 5836 | 1.6-6.5 | 60-250 mw |
| 5837 | 0.55-3.8 | 50-175 mw |

*Pulse type.

Waveguide Windows

| Type | Freq. Range, mc | Waveguide |
|-------|-----------------|-----------|
| BW342 | 8730-9270 | UG-52A/U |
| BW369 | 9205-9285 | UG-40A/U |
| BW382 | 9300-9320 | RG-52/U |
| BW416 | 9365-9385 | UG-40A/U |
| BW586 | 8490-9578 | UG-40A/U |

Ferrite Devices

Sylvania Ferrite Devices are available in a wide range of frequency and power levels. The new Tee Circulators perform the same electrical function as standard phase-shift circulators, and occupy one-fourth the space.

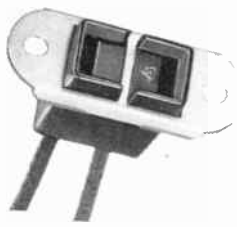
| Type | Frequency (KMC) | Isolation (db) | Insertion Loss (db) | |
|--------------------------|-----------------|----------------|---------------------|---|
| BROADBAND | FD-154 | 1.3-2.1 | 10 | 1 |
| Type N Coaxial Isolators | FD-151P | 2-4 | 15 | 1 |
| | FD-153P | 2.0-2.7 | 20 | 1 |
| | FD-155 | 2.6-3.2 | 80 | 5 |
| | FD-1517 | 4.5-5.0 | 35 | 1 |
| | FD-154 | 1.3-2.1 | 10 | 1 |
| | FD-1519 | 4-8 | 10 | 1 |
| | FD-1522 | 8-11 | 20 | 1 |

| Type | Frequency (KMC) | Isolation (db) | Insertion Loss (db) | |
|---------------------|-----------------|----------------|---------------------|---|
| BROADBAND | FD-492 | 3.95-5.85 | 18 | 1 |
| Waveguide Isolators | FD-502 | 5.85-8.2 | 20 | 1 |
| | FD-512 | 7.05-10 | 24 | 1 |
| | FD-522 | 8.2-12.4 | 30 | 1 |
| | FD-911 | 12.4-18 | 24 | 1 |
| | FD-531 | 18-26.5 | 24 | 1 |

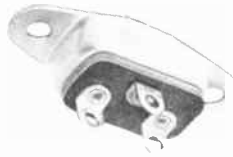
| Type | Frequency (KMC) | Power | Isolation (db) | Insertion Loss (db) | |
|---------------------|-----------------|-------------|----------------|---------------------|------|
| High Power | FD-483 | 2.8-3.6 | 3 KW, avg | 15 | 0.8 |
| Waveguide Isolators | FD-963 | 4.6-5 | 20 W, CW | 25 | 1 |
| | FD-977 | 5.37-5.43 | 120 KW, pk | 15 | 1 |
| | FD-503 | 5.925-6.425 | 20 W, CW | 40 | 0.8 |
| | FD-503A | 5.925-6.425 | 20 W, CW | 60 | 1 |
| | FD-504 | 6.575-7.125 | 20 W, CW | 60 | 1 |
| | FD-962 | 7.1-8 | 20 W, CW | 35 | 1 |
| | FD-513 | 7.1-8.4 | 20 W, CW | 40 | 1 |
| | FD-505 | 7.125-7.75 | 20 W, CW | 60 | 1 |
| | FD-525 | 8.2-10.2 | 100 KW, pk | 30 | 1 |
| | FD-524 | 8.5-9.6 | 100 KW, pk | 20 | 1 |
| | FD-1013 | 8.5-9.6 | 125 KW, pk | 15 | 0.8 |
| | FD-1037 | 8.5-9.6 | 125 KW, pk | 25 | 1 |
| | FD-527 | 9.275-9.475 | 150 KW, pk | 15 | 0.35 |
| | FD-523 | 9.5-10.5 | 100 KW, pk | 15 | 0.5 |

| Type | Frequency (KMC) | Power | Isolation (db) | Insertion Loss (db) | |
|------------------------------|-----------------|-------------|----------------|---------------------|-----|
| Ferrite Circulator Duplexers | FD-C501 | 5.925-6.425 | 150 W, avg | 25 | 0.5 |
| | FD-C502 | 6.425-6.875 | 100 W, avg | 25 | 0.5 |
| | FD-C503 | 7.125-7.75 | 100 W, avg | 25 | 0.5 |
| | FD-C521 | 8.4-10 | 100 W, avg | 25 | 0.5 |

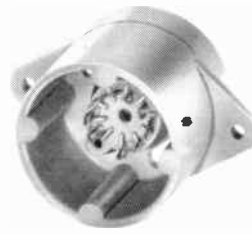
| Type | Frequency (KMC) | Power | Isolation (db) | Insertion Loss (db) | |
|-----------------|-----------------|-------------|----------------|---------------------|-----|
| Tee Circulators | FD-TC501 | 5.925-6.425 | 10 W, avg | 20 | 0.3 |
| | FD-TC522 | 8.8±.05 | 10 W, avg | 20 | 0.2 |
| | FD-TC911 | 13.5±.01 | 10 W, avg | 28 | 0.2 |
| | FD-TC531 | 23.8±.05 | 10 W, avg | 20 | 0.2 |



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—positive grounding



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—Octal, 9-pin



Printed Circuit Sockets
—Octal, 9-pin, 7-pin



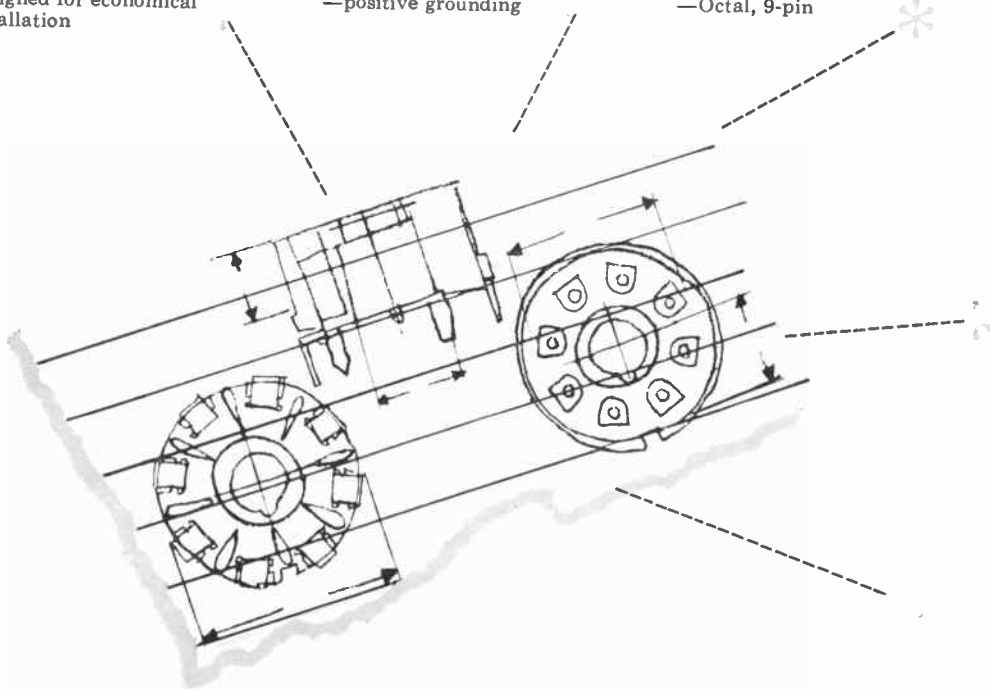
Counter Tube Socket
—with built-in
zero-adjust



**"Class 30" Transistor
Socket**—for standard
100-mil grid



**"In-line" Transistor
Socket**—with snap-in
printed circuit contacts



Any one of these sockets could have been designed for you

If you're building circuits . . . chances are you've come across at least one socketing problem. Maybe it was an entirely new problem like socketing the "class 30" transistor or perhaps a recurring bugaboo like high voltage arcing.

Either way, if you brought your problem to Sylvania it didn't take long to find an efficient, economical solution.

If you haven't been checking Sylvania for your socket requirements, why not do it next time? Sylvania has produced millions of sockets in over 150 varieties to fit every need. Many are now standard items and may offer an immediate solution to your problem. Write for specification sheets on the above sockets or let us suggest the best socket for the application you have in mind.

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NEW IN-CIRCUIT TRANSISTOR TESTER



Sierra 219A
Transistor Tester

The new Sierra Model 219A Transistor Tester provides a technical breakthrough—a means for in-circuit transistor testing, saving hours of trouble shooting and service time. Designed with a unique combination of transistor circuits, using low impedance methods, the Tester will measure the Beta parameter of a transistor while it is connected in a circuit. Beta and Collector Current parameters may be measured with the transistor removed from the circuit. Request Bulletin.

WAVE ANALYZERS

| Model | Frequency Range—kc | Selectivity | | Accuracy | | Direct Reading in dbm | |
|------------------------------|--------------------|-------------|------------|------------------|------------------|-----------------------|------------|
| | | Down 3 db | Down 45 db | Frequency | Measuring | Balanced | Unbalanced |
| 121A | 15 KC-500 KC | ± 100 cps | ± 1000 cps | ± 3 KC | ± 2 db | Note D | 600 ohms |
| 158A | 500 KC- 10 MC | ± 2000 cps | ± 5000 cps | ± 0.08 MC | ± 2 db | — | 600 ohms |
| CARRIER FREQUENCY VOLTMETERS | | | | | | | |
| 101C | 20-500 | ± 550 cps | ± 2900 cps | Note A | ± 3 db | Note D | 600 ohms |
| 103B† | 3- 40 | ± 400 cps | ± 3000 cps | ± 0.5 KC | ± 3 db | Note D | 600 ohms |
| 104A | 5-150 | ± 300 cps | ± 1500 cps | ± 1 KC | ± 3 db | Note D | 600 ohms |
| 108B | 15-500 | ± 550 cps | ± 2900 cps | ± 3 KC Note B | ± 2 db Note C | 135 ohms Note D | 600 ohms |
| 114A | 100-800 | ± 550 cps | ± 2900 cps | Note A | ± 3 db | Note D | 600 ohms |
| 121Y | 15-500 | ± 100 cps | ± 1000 cps | ± 3 KC | ± 2 db | 135,600Ω | — |

All Sierra Carrier Frequency Voltmeters feature built-in calibration oscillators and circuits for level calibration, have aural monitoring jacks, and (except 103B) are furnished with Sierra Model 149A Precision Spiral Scale Dials. New Sierra 121Y CFVM, similar to Model 121A Analyzer but has special 20-pin connectors and selector switch for rapid patching to carrier racks. †Contains carrier re-insertion oscillator for monitoring suppressed carrier systems. Furnished with planetary drive dial. Note A. Ranges from ± 2 KC at low end of dial to ± 3 KC at upper end. Note B. ± 1 KC in the 48 KC to 256 KC region. Note C. ± 1 db for + 30 db to -40 db attenuator steps on 135 ohm balanced measurements. Note D. All models may be converted for 135 and 600 ohm balanced line measurements by convenient plug-in bridging transformer, Model 130D.



Sierra 193A Ionization
Gauge and 192A Amplifier

IONIZATION GAUGE & AMPLIFIER

Model 193A Ionization Gauge and Model 192A Ionization Gauge Amplifier provide convenient, dependable and accurate monitoring of pressures during processing from 10^{-1} to 10^{-7} mm Hg. Monel encased Phillips type ion gauges operate for months without attention; amplifier includes high voltage rf power supply, VTVM, heater transformer and low voltage supply. Request Bulletin 118.



Sierra 124A Line Fault Analyzer

LINE FAULT ANALYZER

Designed for rapid location of faults on cables, transmission lines. Instantly pin-points shorts, opens, grounds; indicates nature of fault as well as exact location. Easy to use, high resolution.

Model 124A Line Fault Analyzer operates on most OPEN WIRE power, communications lines. Direct reading, range $\frac{1}{2}$ to 200 miles. Sweep marker continuously adjustable from 5 to 100 miles, locates faults with accuracy of $\frac{1}{4}$ mile. Request Bulletin 102.

WIDEBAND DIRECTIONAL COUPLERS

| Model | 10 KC | 3 MC | 10 MC | 30 MC | 100 MC | 300 MC | 1000 MC | 2000 MC | Primary Line Connectors |
|-----------|-------|------|-------|-------|--------|--------|---------|---------|-------------------------|
| 137, 137A | | | | 73 | 63 | 53 | 43 | 37 | Type N |
| 138, 138A | | | | 59 | 49 | 39 | 29 | | Type N |
| 145 | | 52 | 42 | 32 | 22 | 12 | | | Type N |
| 150 | | | | 53 | 43 | 33 | 23 | | Type N |
| 212A | | | | 50 | 40 | | | | Type LC Female |
| 213A | | | | 68 | 58 | 48 | | | Type LC Female |
| 214A | | | | | B1 | 71 | | | Type LC Female |
| 139B | 50 | 50 | | | | | | | None |

Directivity: 12 db ± 3 db greater than coupling factor at each frequency. e.g.: Model 145 at 100 MC has directivity of 34 db (22 + 12).

Impedance: Models 137 and 138 are 51.5 ohms. Models 137A, 138A, 145, 150, 212A, 213A and 214A are 50.0 ohms. Model 139B may be matched to most impedances encountered on open wire lines.

Power: Models 137, 137A, 138, 138A, 145, and 150 usable to 1000 watts. Models 212A, 213A and 214A usable to 150 KW peak. Model 139B usable to 50 KW or higher under certain conditions. See Bulletin 101.

Connectors: See table for primary line. Secondary line, type N, male, except 139B. Model 139B for open wire transmission lines.

IMPEDANCE METER

For high noise carrier measurements 30 KC to 300 KC. Measures on "hot" lines. Request Bulletin 112.

COAXIAL READOUT DEVICES

Increase Directional Coupler sensitivity, low VSWR, operates to 1,200 MC. 50 ohm impedance, filtered output. Request Bulletin

DOUBLE STUB TUNERS

Match 50 ohm line to loads having 2:1 VSWR. To 1.5 KW peak; three models covering, collectively, 155 MC to 1,750 MC. Request Bulletin 110.

LINE BRIDGING TRANSFORMER

Converts voltmeter and wave analyzer inputs from single-ended to balanced operation. Model 130D bridges both 135 and 600 ohm balanced lines. Frequency range 3 KC to 500 KC. Write for details.

THERMOPILE

Converts differential temperatures in flowing liquids to electrical energy. Output approx. 1 mv/°C. Request Bulletin 119.

LOW PASS FILTERS

Model 184 Series Low Pass Filters have an insertion loss of not more than 0.4 db in pass band, sharp cut-off, 1.5 VSWR or less, and rejection greater than 60 db from 1.25 to 10 times cut-off frequency. Five models: for cut-off frequencies of 44, 76, 135, 230, 400 MC. Power range 250 watts in pass band, 25 watts in rejection band. Request Bulletin 115. (Also higher frequency models. Request Bulletin M-23.)



Sierra 290A Calorimeter



Sierra X287A Water Load



Sierra 215A Power Source

1,000 MC. All models have an output of 50 watts \pm 1.5 db; use Type N connectors and operate from a 115 v, 60 cps input. Request Bulletin M19.

CALORIMETERS, WATER LOADS

Now Sierra offers two groups of Calorimeters and mating Water Loads for both waveguide and coaxial service.

Model 190 Calorimeter and Sierra XB187A/B Water Loads constitute a complete system for calorimetric power measurements in the SL, S, XB and X bands. Model 187 Water Loads are available with power measuring ranges of, respectively, 20 Kw, 10 Kw, 1 Kw and 2 Kw average. Request Bulletin M24. Model 190 Calorimeter has ranges of 300, 600, 1,500 and 3,000 watts max. A Coaxial Liquid Cooled Load, Sierra 186A-Z (not shown) can be used with 190 Calorimeters to measure dc to 4 MC. Request Bulletins.

New Model 290A Calorimeter includes liquid flow controls, calibration sources and metering circuits. The calorimeter is self-calibrating and permits accuracies up to 1%. A closed loop circulating system with fluid pump and heat exchanger is available as an accessory. Request Bulletin.

New Model 287 series Dual Water Loads provide balanced measurements when used with Model 290A. 287 series loads are offered in SL, S, XB and X bands and, in conjunction with Model 290A, comprise a complete power measuring system. An unusual feature of the 287 series is that the thermopile is a part of the load, resulting in materially improved accuracy. Request Bulletin.



Sierra X187B Water Load

NEW POWER SOURCES— 25 MC TO 1,000 MC

New Model 215 Power Sources permit fast, accurate calibration of Bi-Directional Power Monitors and Termination Wattmeters. Output power is adjustable from 20% to 100% of rated power, and tuning is continuous over frequency ranges. Units are self-contained including power supply, and are supplied in sturdy bench cabinets or can be rack mounted. Four models cover, respectively, 25 MC to 50 MC, 50 MC to 150 MC, 150 MC to 470 MC and 470 MC to

50 OHM COAXIAL TERMINATIONS



New compact, light weight Model 160 series coaxial terminations feature stable operation over a wide frequency range and up to high ambient temperatures. High surface to volume ratio provide a very low VSWR from dc to 4,000 MC. Model 160-1: 1 watt; Model 160-5: 5 watts; Model 160-20: 20 watts; Model 160-100: 100 watts; Model 160-500: 500 watts. Request Bulletin 114.

FIELD, LAB POWER MEASURING INSTRUMENTS TERMINATION WATTMETERS

Sierra 185A Series Average-Reading Termination Wattmeters are broadly useful, dependable instruments for terminating rf coaxial transmission systems and measuring rf powers. They are ruggedly built, conservatively rated, and ideal as dummy loads for testing and adjusting transmitters and oscillators. Three models offer, respectively, power ranges of 0 to 5/15, 0 to 30/100 and 0 to 150/500 watts. Other specifications (all models): frequency range 20 to 1,000 MC, accuracy \pm 5%, maximum VSWR 1.2, female N connectors. Request Bulletin 120. (Sierra also offers Model 195A Peak Reading Wattmeters; request Bulletin 121.)



Sierra 185A-15FN
Termination
Wattmeter

BI-DIRECTIONAL POWER MONITORS

Sierra offers Power Monitors whose collective frequency ranges provide coverage from 2 MC to 1,000 MC.

Model 164 Series (shown). Two plug-in elements cover 25 MC to 1,000 MC, measure incident and reflected power of 10, 50, 100 and 500 watts full scale. Another plug-in is similar but covers 2 MC to 30 MC. Also available are four lower power elements covering same range at 1, 5, 10 and 50 watts full scale. Power is read direct on linear scale accurate within \pm 5%. Insert-

tion VSWR less than 1.08 (Type N connectors) except on 1 watt ranges where VSWR is 1.15. 50 ohm impedance. Model 164 with Type N or UHF connectors, male or female. Request Bulletin 111.

Model 194A-A Peak-Reading Power Monitor (not shown) measures incident and reflected peak power directly, 200 MC to 1,215 MC. 1, 3, 10 and 30 Kw peak, \pm 5% full scale. From 1 μ sec, 400 pps up. Request Bulletin 122.



Sierra 164
Power Monitor

PLUG - IN ELEMENTS FOR MODEL 164

(Note: Model 164 does not include plug-ins. Order separately as needed.)

180 Series—1, 5, 10, 50 watts full scale
180-52: 25 MC to 52 MC
180-148: 50 MC to 148 MC
180-470: 144 MC to 470 MC
180-1000: 460 MC to 1,000 MC

270 Series—50, 100, 500, 1,000 Watts full scale
270-75: 10 MC to 75 MC
270-30: 2 MC to 30 MC

181 Series—10, 50, 100, 500 watts full scale

181-250: 25 MC to 250 MC
181-1000: 200 MC to 1000 MC

Accessories Available: Model 164-LS Equivalent Transmission Line Section; Model 164-CC Carrying Case.

Model 194A-A Peak-Reading Power Monitor. Model 194A-A quickly measures incident and reflected powers on radar and other pulsed systems. Measures peak power directly, independently of duty cycle. 200 MC to 1,215 MC. 1, 3, 10 and 30 Kw peak. \pm 5% full scale. From 1 μ sec pulses, 400 pps up. HN connectors. Request Bulletin 122.

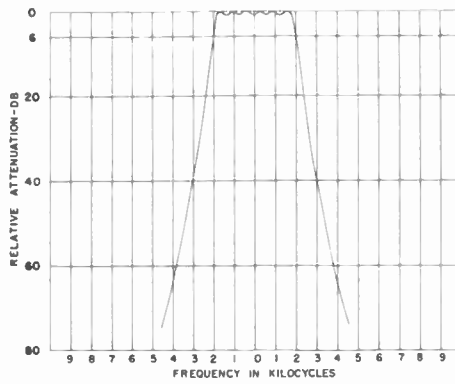
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5442D BOHANNON DRIVE, MENLO PARK, CALIFORNIA, U. S. A.

Engineering Sales Representatives in all principal areas

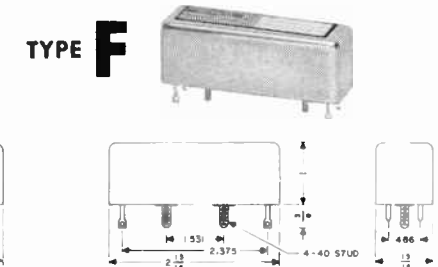
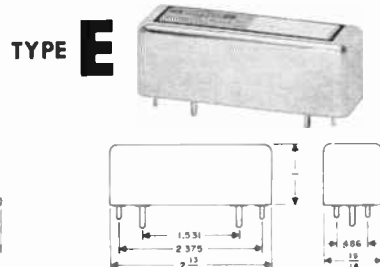
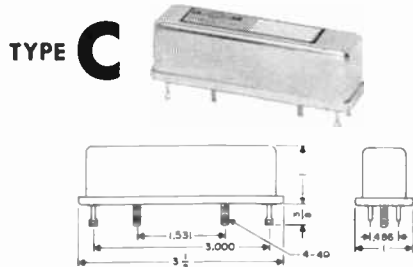
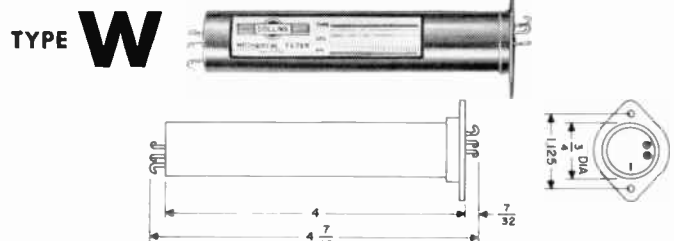
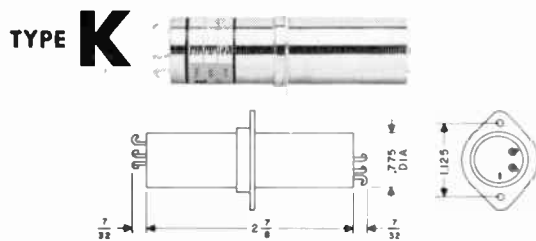
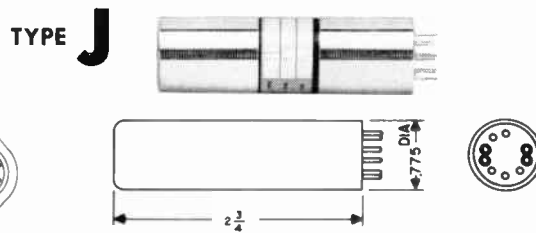
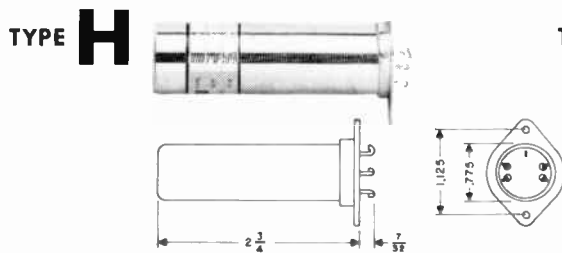
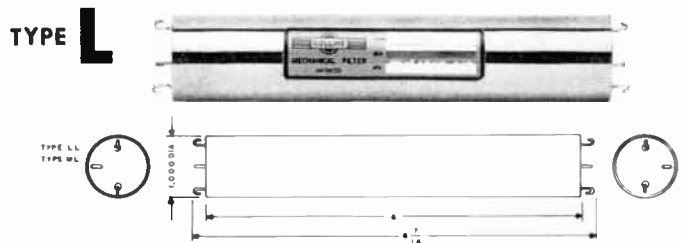
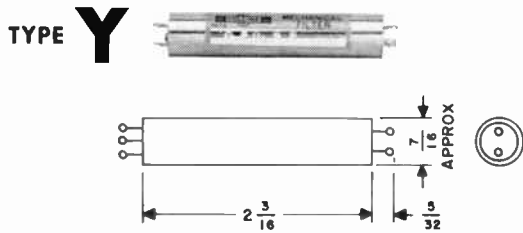
Canada: Atlas Instrument Corp., Ltd., Toronto, Montreal, Vancouver, Winnipeg • Export: Frazar & Hansen, Ltd., San Francisco

Selectivity characteristics of a standard production F455-40 Filter. The curve indicates the actual performance expected from this filter. All Collins Filters feature these steep-skirted, flat-topped selectivity characteristics.



COLLINS MECHANICAL

RELIABLE, ECONOMICAL SERVICE • COMPACT



Mechanical Filter Summary Table

This table lists the standard Mechanical Filters available. Detailed specifications are available on request.



Small size and high performance characteristics of Collins Mechanical Filters make them a natural choice of equipment designers. Collins Filters are now employed and may be designed into high performance transmitting and receiving equipment, multiplexing equipment, missile guidance systems, frequency synthesizers, doppler radar, data transmission systems, precision navigation equipment, spectrum analyzers, and other specialized equipment where reliability, compactness and economy are required.

CUSTOM DESIGN

The filters shown are standard production types. It is possible to obtain special types with a wide variety of characteristics. We are interested in discussing your requirements. For prices and delivery information call or write: Collins Radio Company, Product Line Manager, Western Division, 2700 West Olive Ave., Burbank, California.



COLLINS RADIO COMPANY
BURBANK • CEDAR RAPIDS • DALLAS

| Center Freq. | Type No. | Part No. | 6 db Bandwidth | Max. 60 db Bandwidth | Case Style |
|--------------|-----------|-------------|----------------|----------------------|---|
| 250 kc | F250A-20 | 526-9012-00 | 2.0 kc | 4.3 kc | C |
| 250 kc | F250Z-3 | 526-9080-00 | 2.7 kc | 5.5 kc | W |
| 250 kc | F250A-67 | 526-9039-00 | 6.7 kc | 14.0 kc | C |
| 250 kc | F250A-85 | 526-9049-00 | 8.5 kc | 18.0 kc | C |
| 300 kc | F300X-68 | 526-9307-00 | 6.8 kc | 13.2 kc | ($\frac{3}{8}$ " dia. x $3\frac{1}{2}$ " long) |
| 455 kc | F455E-05 | 526-9321-00 | 0.5 kc | 2.5 kc | E |
| 455 kc | F455F-05 | 526-9318-00 | 0.5 kc | 2.5 kc | F |
| 455 kc | F455H-05 | 526-9229-00 | 0.5 kc | 2.5 kc | H |
| 455 kc | F455J-05 | 526-9154-00 | 0.5 kc | 2.5 kc | J |
| 455 kc | F455K-05 | 526-9228-00 | 0.5 kc | 2.5 kc | K |
| 455 kc | F455E-15 | 526-9370-00 | 1.5 kc | 3.5 kc | E |
| 455 kc | F455F-15 | 526-9227-00 | 1.5 kc | 3.5 kc | F |
| 455 kc | F455H-15 | 526-9170-00 | 1.5 kc | 3.5 kc | H |
| 455 kc | F455J-15 | 526-9155-00 | 1.5 kc | 3.5 kc | J |
| 455 kc | F455K-15 | 526-9168-00 | 1.5 kc | 3.5 kc | K |
| 455 kc | F455E-21 | 526-9322-00 | 2.1 kc | 5.3 kc | E |
| 455 kc | F455F-21 | 526-9323-00 | 2.1 kc | 5.3 kc | F |
| 455 kc | F455H-21 | 526-9313-00 | 2.1 kc | 5.3 kc | H |
| 455 kc | F455J-21 | 526-9156-00 | 2.1 kc | 5.3 kc | J |
| 455 kc | F455K-21 | 526-9317-00 | 2.1 kc | 5.3 kc | K |
| 455 kc | F455Y-21 | 526-9337-00 | 2.1 kc | 5.3 kc | Y |
| 455 kc | F455E-31 | 526-9074-00 | 3.1 kc | 6.5 kc | E |
| 455 kc | F455F-31 | 526-9075-00 | 3.1 kc | 6.5 kc | F |
| 455 kc | F455H-31 | 526-9093-00 | 3.1 kc | 6.5 kc | H |
| 455 kc | F455J-31 | 526-9089-00 | 3.1 kc | 6.5 kc | J |
| 455 kc | F455K-31 | 526-9169-00 | 3.1 kc | 6.5 kc | K |
| 455 kc | F455Y-31 | 526-9338-00 | 3.1 kc | 6.5 kc | Y |
| 455 kc | F455E-40 | 526-9324-00 | 4.0 kc | 8.5 kc | E |
| 455 kc | F455F-40 | 526-9325-00 | 4.0 kc | 8.5 kc | F |
| 455 kc | F455H-40 | 526-9326-00 | 4.0 kc | 8.5 kc | H |
| 455 kc | F455J-40 | 526-9327-00 | 4.0 kc | 8.5 kc | J |
| 455 kc | F455K-40 | 526-9303-00 | 4.0 kc | 8.5 kc | K |
| 455 kc | F455Y-40 | 526-9339-00 | 4.0 kc | 8.5 kc | Y |
| 455 kc | F455E-60 | 526-9084-00 | 6.0 kc | 12.6 kc | E |
| 455 kc | F455F-60 | 526-9087-00 | 6.0 kc | 12.6 kc | F |
| 455 kc | F455H-60 | 526-9094-00 | 6.0 kc | 12.6 kc | H |
| 455 kc | F455J-60 | 526-9091-00 | 6.0 kc | 12.6 kc | J |
| 455 kc | F455K-60 | 526-9159-00 | 6.0 kc | 12.6 kc | K |
| 455 kc | F455Y-60 | 526-9340-00 | 6.0 kc | 12.6 kc | Y |
| 455 kc | F455E-80 | 526-9332-00 | 8.0 kc | 18.5 kc | E |
| 455 kc | F455F-80 | 526-9331-00 | 8.0 kc | 18.5 kc | F |
| 455 kc | F455H-80 | 526-9330-00 | 8.0 kc | 18.5 kc | H |
| 455 kc | F455J-80 | 526-9329-00 | 8.0 kc | 18.5 kc | J |
| 455 kc | F455K-80 | 526-9328-00 | 8.0 kc | 18.5 kc | K |
| 455 kc | F455Y-80 | 526-9341-00 | 8.0 kc | 18.5 kc | Y |
| 455 kc | F455E-120 | 526-9336-00 | 12.0 kc | 23.0 kc | E |
| 455 kc | F455F-120 | 526-9173-00 | 12.0 kc | 23.0 kc | F |
| 455 kc | F455H-120 | 526-9171-00 | 12.0 kc | 23.0 kc | H |
| 455 kc | F455J-120 | 526-9333-00 | 12.0 kc | 23.0 kc | J |
| 455 kc | F455K-120 | 526-9316-00 | 12.0 kc | 23.0 kc | K |
| 455 kc | F455Y-120 | 526-9342-00 | 12.0 kc | 23.0 kc | Y |
| 455 kc | F455E-160 | 526-9320-00 | 16.0 kc | 27.5 kc | E |
| 455 kc | F455F-160 | 526-9335-00 | 16.0 kc | 27.5 kc | F |
| 455 kc | F455H-160 | 526-9314-00 | 16.0 kc | 27.5 kc | H |
| 455 kc | F455J-160 | 526-9334-00 | 16.0 kc | 27.5 kc | J |
| 455 kc | F455K-160 | 526-9315-00 | 16.0 kc | 27.5 kc | K |
| 455 kc | F455Y-160 | 526-9343-00 | 16.0 kc | 27.5 kc | Y |
| 455 kc | F455E-350 | 526-9371-00 | 35.0 kc | 62.0 kc | E |
| 455 kc | F455F-350 | 526-9180-00 | 35.0 kc | 62.0 kc | F |
| 455 kc | F455H-350 | 526-9302-00 | 35.0 kc | 62.0 kc | H |
| 455 kc | F455J-350 | 526-9300-00 | 35.0 kc | 62.0 kc | J |
| 455 kc | F455K-350 | 526-9186-00 | 35.0 kc | 62.0 kc | K |
| 455 kc | F455Y-350 | 526-9344-00 | 35.0 kc | 62.0 kc | Y |
| 500 kc | F500B-08 | 526-9007-00 | 0.8 kc | 3.5 kc | B |
| 500 kc | F500B-14 | 526-9030-00 | 1.4 kc | 3.8 kc | B |
| 500 kc | F500F-14 | 526-9215-00 | 1.4 kc | 3.5 kc | F |
| 500 kc | F500B-31 | 526-9008-00 | 3.1 kc | 7.5 kc | B |
| 500 kc | F500B-60 | 526-9009-00 | 6.0 kc | 14.0 kc | B |
| 500 kc | F500F-60 | 526-9319-00 | 6.0 kc | 19.0 kc | F |
| 500 kc | F500F-94 | 526-9216-00 | 9.4 kc | 19.0 kc | F |

MECHANICAL FILTERS FOR SINGLE SIDEBAND

| Carrier Freq. | Type No. | Part No. | Sideband | Case Style |
|---------------|----------|-------------|----------------|---|
| 60 kc | F60Z-4 | 526-9190-00 | Upper Sideband | L |
| 64 kc | F64Z-4 | 526-9191-00 | " " | L |
| 68 kc | F68Z-4 | 526-9192-00 | " " | L |
| 72 kc | F72Z-4 | 526-9193-00 | " " | L |
| 76 kc | F76Z-4 | 526-9194-00 | " " | L |
| 80 kc | F80Z-4 | 526-9195-00 | " " | L |
| 84 kc | F84Z-4 | 526-9196-00 | " " | L |
| 88 kc | F88Z-4 | 526-9197-00 | " " | L |
| 92 kc | F92Z-4 | 526-9198-00 | " " | L |
| 96 kc | F96Z-4 | 526-9199-00 | " " | L |
| 100 kc | F100Z-4 | 526-9139-00 | " " | L |
| 104 kc | F104Z-4 | 526-9140-00 | " " | L |
| 250 kc | F250Z-4 | 526-9130-00 | " " | C |
| 250 kc | F250Z-5 | 526-9131-00 | Lower Sideband | C |
| 300 kc | F300Z-4 | 526-9312-00 | Upper Sideband | ($\frac{3}{8}$ " dia. x $3\frac{1}{2}$ " long) |
| 300 kc | F300Z-5 | 526-9311-00 | Lower Sideband | ($\frac{3}{8}$ " dia. x $3\frac{1}{2}$ " long) |
| 455 kc | F455Z-1 | 526-9095-00 | Upper Sideband | H |
| 455 kc | F455Z-2 | 526-9096-00 | Lower Sideband | H |
| 455 kc | F455Z-4 | 526-9364-00 | Upper Sideband | Y ($\frac{1}{8}$ " dia. x $2\frac{1}{2}$ " long) |
| 455 kc | F455Z-5 | 526-9365-00 | Lower Sideband | Y ($\frac{1}{8}$ " dia. x $2\frac{1}{2}$ " long) |

SPECIFY COMPONENTS FOR INHERENT DEPENDABILITY!

DALOHM gives you quality resistance products made by the most advanced techniques. DALOHM quality is constantly monitored by our environmental laboratories to assure stability and high standards of *uniformity and reliability*. DALOHM resistors and potentiometers meet applicable Military Specifications. We invite your requests for qualification samples or test reports.

Examine this resume of the DALOHM line. You'll find a wide variety of resistors, trimmer potentiometers and other electronic products from which you can select a component to meet your needs.

And, remember, DALOHM engineers stand ready to help in design, development and production of special resistance products, resistor networks and electronic equipment.

DALOHM Wire Wound Miniature Power Resistors

Carefully designed, precision made to meet all space problems and for all applications where equipment must meet the most severe environmental, shock, vibration and humidity condi-

tions. Smallest in size, completely welded from terminal to terminal, coated with special silicone material, impervious to moisture, salt spray, vapor gases. Temperature coefficient all types 0.00002/Deg. C.

TYPES RS—RLS—RSE

Resistance range from .05 ohm to 175K ohms, depending on type: tolerance range from .05% to 3%. Type RS with axial leads in six wattages—1, 2, 3, 5, 7, 10; nine sizes. Type RLS with radial leads in six wattages—1, 2, 3, 5, 7, 10; eight sizes. Type RSE ruggedized in metal housing for tremendous shock resistance; five wattages—2, 3, 5, 7, 10; seven sizes.



Ask for Bulletins R-23, R-30, R-25

TYPES NS—NLS

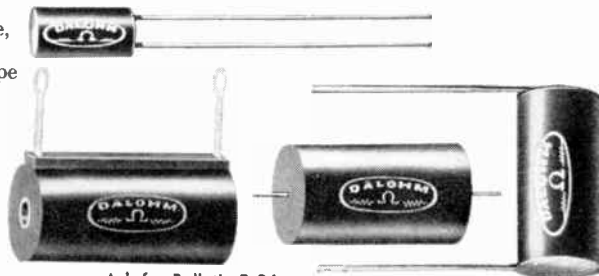
Non-inductive characteristics. Five wattages—2, 3, 5, 7, 10; six sizes. Resistance range from 1 ohm to 37K ohms; tolerance range .05% to 3%. Type NS with axial leads. Type NLS with radial leads.



Ask for Bulletin R-34

TYPES WWA—WWL—WWP—WWR—HW

Precision encapsulated, non-inductive, pi-wound. Resistance range from 1 ohm to 6 Megohms, depending on type and size; tolerances from .05% to 1%. Type WWA (axial leads) in sub-miniature and standard sizes; Type WWL (lugs) in sub-miniature and standard sizes; Type WWP (parallel leads) in sub-miniature sizes; Type WWR (radial leads) in sub-miniature sizes; HW (high temperature) in sub-miniature sizes.



Ask for Bulletin R-26

TYPE RH

Silicone sealed in die-cast, black anodized, radiator finned housing. Lugs provided for mounting to heat sink. Four wattage ranges—10, 25, 50, 250; resistance range 0.1 ohm to 100K ohms; tolerance range .05% to 3%, depending on type.



Ask for Bulletin R-21

TYPE PH

New ruggedized Powerhouse resistor designed for mounting through hole in chassis or heat sink; sealed in black anodized, finned aluminum housing. Three wattages—10, 25, 100; resistance values from 0.1 ohm to 60K ohms; tolerances from .05% to 3%.



Ask for Bulletin R-33

**DALE
PRODUCTS,
INC.**

1318 28th Ave.
COLUMBUS, NEBRASKA

DALOHM Metal Film Resistors

New molded metal film resistors combine advantages of DALOHM molding techniques with advanced high vacuum evaporated metal film procedures to provide the best characteristics of wire wound resistors, yet retain miniature size. Metal film resistors have inherently good H.F. characteristics and low noise levels. DALOHM MF resistors have other outstanding features: high stability, fully insulated, low and control-

able temperature coefficients and ability to withstand rigorous environmental conditions.

TYPE MF

Resistance range from 100 ohms to 4 Megohms, depending on size; tolerance 1%; temperature coefficient is ± 50 P.P.M. or ± 100 P.P.M. Available in five wattages—2, 1, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ watts; five sizes.



Ask for Bulletin R-43

DALOHM Deposited Carbon Resistors

Assure stable, accurate, dependable performance. Pure crystalline carbon bonded on ceramic rods of special material. Provide precision resistance values, low voltage coefficient, low capacitive

and inductive characteristics in high frequency applications, extremely high stability and economy.

TYPES DC—DCH

Resistance range from 10 ohms to 200 Megohms; tolerance 1% or higher as specified. Type DC in six wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, and 5; nine sizes. DCH hermetically sealed in non-hygroscopic ceramic envelope; seven wattages— $\frac{1}{10}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, 2 and 5; ten sizes.

TYPES MC—DCF

Type MC is a deposited carbon resistor completely insulated and protected from environmental and mechanical damage by molded housing; resistance range from 1 ohm to 50 Megohms. Available in five wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2; five sizes in standard tolerance of 1%. The DCF type has a new coating material which provides a completely insulated resistor, yet maintains sub-miniature size. Available in five wattages— $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2; eight sizes in standard tolerance of 1%.



Ask for Bulletins R-24, R-27



Ask for Bulletins R-37, R-42

DALOHM Trimmer Potentiometers

TYPE 1000 Trimmer

Miniature precision trimmer potentiometer with completely sealed case and welded construction throughout; is resistant to stringent environmental conditions. Rated at 2.5 watts; resistance range from 100 ohms to 50K ohms; tolerance 5%.

TYPE A10-W Trimmer

Rated at 1 watt; resistance range from 10 ohms to 30K ohms; tolerance 5% standard.

Ask for Bulletin R-32



Ask for Bulletin R-44

TYPE B11-W Trimmer

Identical to A10-W but with 10% tolerance and resistance range to 100K ohms.

Ask for Bulletin R-37

TYPE 750 Miniature

Identical to the Type 1000 trimmer except is smaller with 2 watts rating and resistance range from 100 ohms to 30K ohms.

TYPE C12-W Trimmer

Similar to B11-W but with 15% standard tolerance and resistance range to 20K ohms.

Ask for Bulletin R-38



Ask for Bulletin R-41

TYPE A10-C Trimmer

Superior performing deposited carbon trimmer rated at .25 watts; resistance range from 20K ohms to 1 Megohm and 10% tolerance.



DALOHM Hysteresis Motor

The DALOHM hysteresis motor is a split-capacitor type, sub-fractional horsepower from 1/20th to 1/300th. Totally enclosed, it has a new space-saving pancake design giving great rigidity. It is ideally suited for such applications as facsimile machines, Hi-Fi turntables, tape recorders, tele-metering and many other types of equipment where constant synchronous speed is essential.

An outstanding feature is the exceptionally low heat rise. This removes the basic objection common in most hysteresis motors. It also has extremely low noise and no vibration or magnetic strays.

Ask for Bulletin R-80



EXPORT DIVISION

International Standard Electrical Corporation
50 Church Street
New York 7, N.Y.

**DALE
PRODUCTS,
INC.**

1318 28th Ave.
COLUMBUS, NEBRASKA



Design, Development

DEFLECTION YOKES TRANSFORMERS

For ... Military and Commercial Avionics

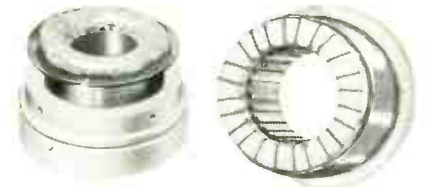
Leading system manufacturers now depend on CELCO for their difficult and critical applications on many of these components.

Our design development, production and quality control experience — combined with CELCO's highly skilled operators, production foremen and engineers — comprises a team that has proven their outstanding performance for quality components.

Apply the CELCO "know-how" to your production requirements!



We specialize in the design and manufacture of **PRECISION DEFLECTION YOKES** for military and commercial applications. CELCO can give you immediate engineering evaluation on your critical display problems.



COILS FOR TRAVELING WAVE TUBES — precision wound for minimum transverse magnetic fields. High temperature windings are a CELCO engineering development —

Unit illustrated is 12" long.



HIGH TEMPERATURE TRANSFORMERS — high temperature windings and impregnations on CELCO TRANSFORMERS permit high operating temperature with reduced size and weight.



MINIATURE TRANSFORMERS & SATURABLE REACTORS — specially produced for the Transistor and Plug-in type amplifier assembly. CELCO designs these units wherever reduction in size and weight must be made.



TOROIDAL COILS — CELCO is equipped to cover an extremely wide range of toroidal windings.

No. 50 wire on a .062" ID Toroid
No. 15 wire on 9" OD Toroid

For details, circle #36 on Reader Service Card



Constantine Engineering Laboratories Co.

ISLAND AVE. PHONE: DAVIS 7-1123 MAHWAH, N. J.

and Production of:

MAGNETIC AMPLIFIERS AIRCRAFT MOTOR COMPONENTS

...Nuclear and Computer Industries

Celco

MAGNETIC AMPLIFIERS—encapsulated with epoxy resins or silicone rubber. CELCO experience with proper treatment of Toroidal Coils assures designed performance.



Celco

TOROIDAL COMPONENTS — for use in system assemblies. Sub-assemblies of chokes, Transformers and Saturable Reactors are manufactured at CELCO for packaging into a single unit.



Celco

PRECISION TRANSFORMERS — CELCO develops Precision Transformers for such applications as Computer Components with high accuracy of turns ratio and output voltages.



Celco

HERMETICALLY SEALED MAGNETIC AMPLIFIERS & TRANSFORMERS — with various types of terminations, evacuation and inert gas pressurization give CELCO components minimum weight with high-breakdown voltage resistance.



Celco

R.F. CHOKES, TRANSFORMERS— specialized universal winding types of coils and assemblies. These CELCO windings are used when minimum distributed capacitance is required and space does not permit use of mechanical supports.



Celco

MOTOR COMPONENTS—Centrifugally cast squirrel cage rotors for low inertia motors, armatures, stators, field coils and special type rotor coils — are a CELCO production specialty.



For details, circle #37 on Reader Service Card

Call DAVIS 7-1123 in Mahwah, N.J.—for immediate engineering evaluation price and delivery quotations.

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YUkon 2-2688 Ulysses 3-3500 Wilson 5-2164

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World Radio History

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5868/AX9902



DX151



6961



6757



5551A



1N478
1N479

2N282



5894



0G3/85A2



5870



7377



5780 & DX125



6360



6939



6800



18517

18515



6977



6688



68Q5/EL84



6693



7459

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AmpereX[®]

tubes

RADIATION DETECTION

SPECIAL PURPOSE

INDUSTRIAL

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COMMUNICATION

RECTIFICATION

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SEMICONDUCTORS

FULL RANGE OF TRANSISTORS AND SEMICONDUCTOR DEVICES AVAILABLE

tailored Data Sheets on any of these tubes, and applications engineering service are yours for the asking.

the AMPEREX types 6268 and 6279 are not only improved versions but completely interchangeable in every respect with the Types 4C35 and 5C22 respectively. They have a minimum guaranteed life of 1,000 hours due to the self-contained, self-regulating sources of hydrogen. Includes sensing plate. For thermionic control, ordered separately here.

"Water Saver" Thermostat Assembly, Cat. No. S-17024, Price \$5.25.

"Overload Protection" Thermostat Assembly, Cat. No. S-17025, \$5.25.

Price on request.

Price for this tube includes 10% Federal Excise Tax.

Prices subject to change without notice.

RADIATOR CREDIT FOR FORCED AIR-COOLED TUBES

| Tube Type | Users Allowance |
|-----------|-----------------|
| 889RA | \$20.00 |
| 41R, 892R | 30.00 |
| 104 | 75.00 |
| 167 | 20.00 |
| 145 | 30.00 |
| 147 | 30.00 |
| 157 | 75.00 |
| 101 | 75.00 |

For details, circle 39 on Reader Service Card

ROGERS ELECTRONIC CORPORATION
DUFFY AVE., HICKSVILLE, L. I., N. Y.

BRANCO: ROGERS ELECTRONIC TUBES & COMPONENTS, 116 VANOVERHOOF AVENUE, MOUNTAIN VIEW, ONTARIO.

| Type No. | Price |
|-------------------------|--------|
| BEAM POWER TUBES | |
| 807 | \$2.90 |
| 6146 | 5.00 |
| 6159 | 5.00 |
| PE06/40N | 5.95 |

| Type No. | Price |
|-----------------------|---------|
| DIODE, CLIPPER | |
| 6339 | \$44.50 |

| Type No. | Price |
|-------------------------|---------|
| COUNTERS, GEIGER | |
| 75N | \$16.50 |
| 75NB3 | 16.50 |
| 80N | 45.00 |
| 85NB3 | 22.70 |
| 90CB | 27.00 |
| 90NB | 27.00 |
| 90NB4 | 27.00 |
| 100C | 54.00 |
| 100CB | 58.00 |
| 100HB | 54.00 |
| 100N | 43.50 |
| 100NB | 45.50 |
| 120C | 90.00 |
| 120CB | 95.00 |
| 120N | 90.00 |
| 120NB | 95.00 |
| 150N | 61.00 |
| 150NB | 66.00 |
| 153C | 91.00 |
| 160G | 66.00 |
| 170G | 110.00 |
| 180G | 50.00 |
| 200C | 67.00 |
| 200CB | 71.00 |
| 200HB | 67.00 |
| 200N | 56.00 |
| 200NB | 58.50 |
| 230C | 43.00 |
| 230N | 41.00 |
| 240C | 43.00 |
| 240N | 41.00 |
| 912NB | 53.00 |
| 18503 | 28.00 |
| 18508 | 127.00 |
| 18509-01 | 22.40 |
| 18510 | 127.00 |
| 18515 | 186.50 |
| 18516 | 206.25 |
| 18517 | 373.00 |
| 18518 | 412.50 |

| Type No. | Price |
|---------------------------|---------|
| CONDENSERS, VACUUM | |
| VC25/20 | \$22.00 |
| VC25/32 | 25.25 |
| VC50/20 | 26.25 |
| VC50/32 | 29.50 |
| VC100/20 | 32.00 |
| VC100/32 | 35.00 |
| VC250/32 | 75.00 |

| Type No. | Price |
|------------------------|---------|
| COUNTER, DECADE | |
| 6370/EIT | \$16.50 |

| Type No. | Price |
|----------------------|--------|
| DIODE, DAMPER | |
| #6R3/EY81 | \$2.80 |

| Type No. | Price |
|--------------------------------------|--------|
| TWIN DIODE, "PREMIUM QUALITY" | |
| #5726/E91AA | \$2.10 |

| Type No. | Price |
|-------------------|---------|
| DIODE, VTM | |
| 6923/EA52 | \$13.00 |

| Type No. | Price |
|------------------|---------|
| IGNITRONS | |
| #5551A/652 | \$65.00 |
| #5552A/651 | 99.00 |
| #5553B/655 | 245.00 |
| #5555/653B | 316.00 |
| #5822A | 116.00 |

| Type No. | Price |
|--------------------------|--------|
| TUNING INDICATORS | |
| #1M3/DM70 | \$1.95 |
| #6BR5/EM80 | 2.45 |
| #6CD7/EM34 | 3.65 |
| #6DA5/EM81 | 2.45 |
| #6FG6/EM84 | 2.95 |
| #DM71 | 2.00 |

| Type No. | Price |
|------------------|-------|
| KLYSTRONS | |
| DX122 | ** |
| DX123 | ** |
| DX124 | ** |
| DX151 | ** |

| Type No. | Price |
|-------------------------|---------|
| KLYSTRON, REFLEX | |
| 2K25 | \$39.50 |

| Type No. | Price |
|-------------------|----------|
| MAGNETRONS | |
| 2J42 | \$160.00 |
| 2J48 | 250.00 |
| 4J47 | 500.00 |
| 4J57 | 270.00 |
| 4J58 | 270.00 |
| 4J59 | 270.00 |
| 5586 | 417.00 |
| 5657 | 417.00 |
| 5780A | ** |
| 6589 | ** |
| 6972 | 325.00 |

| Type No. | Price |
|-----------------|---------|
| PENTODES | |
| #6AU6 | \$ 2.10 |
| 828 | 27.50 |
| 6083/AX9909 | 14.25 |
| EF60 | 8.75 |

| Type No. | Price |
|---------------------------|--------|
| PENTODE, DUO-DIODE | |
| #6DC8/EBF89 | \$3.25 |

| Type No. | Price |
|----------------------------|---------|
| PENTODE, FRAME GRID | |
| 5847 | \$18.21 |

| Type No. | Price |
|------------------------|--------|
| PENTODES, HI-FI | |
| #6BQ5/EL84 | \$2.35 |
| #6CA7/EL34 | 6.20 |
| #6CW5/EL86 | 3.50 |
| #8BQ5/XL84 | 2.60 |
| #6267/EF86 | 2.75 |
| #7189 | 3.60 |

| Type No. | Price |
|-------------------------------|--------|
| TRIODE-PENTODES, HI-FI | |
| #6BM8/ECL82 | \$3.00 |
| #50BM8/UCL82 | 3.00 |

| Type No. | Price |
|------------------------------------|--------|
| PENTODES, "PREMIUM QUALITY" | |
| 5654/E95F | \$3.20 |
| 6084/E80F | 3.75 |
| 6227/E80L | 3.75 |
| 6686/E81L | 5.00 |
| 6688/E180F | 8.00 |
| 6689/E83F | 4.50 |
| E90F | ** |
| E99F | ** |

| Type No. | Price |
|------------------------|--------|
| TRIODE-PENTODES | |
| #6U8 | \$3.30 |
| #6BL8/ECF80 | 3.80 |

| Type No. | Price |
|---|-------|
| TRIODE-PENTODE "PREMIUM QUALITY" | |
| E80CF | ** |

| Type No. | Price |
|-------------------------------|--------|
| PENTODES, SUBMINIATURE | |
| 6007/5913 | \$1.50 |
| 6008/5911 | 1.50 |

| Type No. | Price |
|-------------------|--------|
| RECTIFIERS | |
| #152A/DY87 | \$2.75 |
| #5AR4/GZ34 | 4.20 |
| #5R4G-Y | 1.90 |
| #6CA4/EZ81 | 2.10 |
| #6V4/EZ80 | 1.50 |
| 575A | 22.15 |
| 673 | 22.15 |
| 8020AX | 15.00 |

| Type No. | Price |
|----------------------------|----------|
| RECTIFIERS, MERCURY | |
| 857B | \$235.00 |
| 866AX | 2.65 |
| 869B | 150.00 |
| 869BL | 150.00 |
| 872AX | 9.90 |
| 6508 | 80.00 |
| 6693 | 25.00 |
| 7136 | 25.00 |
| 8008AX | 9.90 |

| Type No. | Price |
|--------------------------|---------|
| RECTIFIERS, XENON | |
| 3B28 | \$ 7.60 |
| 4B32 | 13.50 |

| Type No. | Price |
|--------------------------------|--------|
| VOLTAGE REFERENCE TUBES | |
| OE3/85A1 | \$2.50 |
| OG3/85A2 | 2.50 |

| Type No. | Price |
|---|--------|
| VOLTAGE REFERENCE TUBE "PREMIUM QUALITY" | |
| 5651 | \$2.50 |

| Type No. | Price |
|---------------------------|--------|
| VOLTAGE REGULATORS | |
| OA2 | \$1.75 |
| OB2 | 1.90 |
| 90C1 | 2.50 |
| 6354/150B2 | 3.00 |

| Type No. | Price |
|-----------------|----------|
| TETRODES | |
| 4-125A | \$ 36.00 |
| 4-250A | 46.50 |
| 4-400A | 55.00 |
| 4CX250B | 45.00 |
| 4X150A | 38.95 |
| 4X150D | 38.95 |
| 4X250B | 42.50 |
| 4X250F | 42.50 |
| 4X500A | 121.00 |
| 6075/AX9907 | 250.00 |
| 6076/AX9907R | 305.00 |
| 6079/AX9908 | 60.00 |
| 6155 | 36.00 |
| 6156 | 46.50 |
| 6979 | 42.50 |
| 7527 | 55.00 |

| Type No. | Price |
|-----------------------|---------|
| TETRODES, BEAM | |
| 813 | \$22.65 |
| 7378 | ** |

| Type No. | Price |
|----------------------|---------|
| TWIN TETRODES | |
| 829B | \$18.90 |
| 832A | 15.85 |
| 5894/AX9903 | 25.00 |
| 6252/AX9910 | 25.00 |
| 6907 | 25.00 |
| 6939 | 14.00 |
| 7377 | ** |

| Type No. | Price |
|-------------------|---------|
| THYRATRONS | |
| 2D21 | \$ 2.05 |
| 3C23 | 11.98 |
| 5560/FG95 | 33.00 |
| 5632/C3J | 15.50 |
| 5684/C3JA | 19.80 |
| 5685/C6JA | 29.30 |
| 5727/E91N | 2.70 |
| 5949/1907 | ** |
| AX260 | 150.00 |

| Type No. | Price |
|-----------------------------|---------|
| THYRATRONS, HYDROGEN | |
| #6268/AX9911 | \$32.50 |
| #6279/AX9912 | 45.00 |

| Type No. | Price |
|----------------------------|---------|
| THYRATRONS, MERCURY | |
| 5557/FG17/967/1701 | \$ 9.50 |
| 5559 | 22.00 |
| 5869/AGR9950 | 25.00 |
| 5870/AGR9951 | 100.00 |
| 6786 | 200.00 |
| AX105/FG105 | 53.33 |

| Type No. | Price |
|--------------------------|---------|
| THYRATRONS, XENON | |
| 2050 | \$ 1.85 |
| 5544 | 38.41 |
| 5545 | 29.30 |

| Type No. | Price |
|----------------|---------|
| TRIODES | |
| #6Q4/EC80 | \$ 6.00 |
| #6R4/EC81 | 2.50 |
| 450TH | 77.00 |
| 450TL | 77.00 |
| 501R/5759 | 225.00 |
| 502/5760 | 210.00 |
| 502R/5761 | 235.00 |
| 504R | 245.00 |
| 805 | 20.00 |
| 810 | 25.55 |
| 811A | 6.50 |
| 812A | 6.50 |
| 833A | 47.90 |
| 834 | 19.30 |
| 838 | 20.00 |
| 845 | 20.85 |
| 849 | 185.00 |
| 849A | 185.00 |
| 880 | 565.00 |

| Type No. | Price |
|------------------------|---------|
| TRIODES (Con't) | |
| 889A | 221.00 |
| 889RA | 347.00 |
| 891 | 275.00 |
| 891R | 430.00 |
| 892 | 270.00 |
| 892R | 425.00 |
| 5604 | 570.00 |
| 5619 | 423.00 |
| 5658 | 565.00 |
| 5666 | 280.00 |
| 5667 | 370.00 |
| 5771/356 | 600.00 |
| 5866/AX9900 | 20.00 |
| 5867/AX9901 | 30.00 |
| 5868/AX9902 | 55.00 |
| 5923/AX9904 | 165.00 |
| 5924/AX9904R | 231.00 |
| 5924A | 275.00 |
| 6077/AX9906 | 1675.00 |
| 6078/AX9906R | 1900.00 |
| 6333 | ** |
| 6445 | 420.00 |
| 6446 | 305.00 |
| 6447 | 465.00 |
| 6756 | 388.00 |
| 6757 | 535.00 |
| 6758 | 173.00 |
| 6759 | 206.00 |
| 6800 | 350.00 |
| 6801 | 505.00 |
| 6960 | 150.00 |
| 6961 | 210.00 |
| 7092 | 125.00 |
| 7459 | 230.00 |
| DX144/EC56 | ** |
| DX145/EC57 | ** |
| HF200 | 49.50 |
| HF201A/468 | 34.50 |
| HF300 | 40.50 |
| ZB3200 | 390.00 |

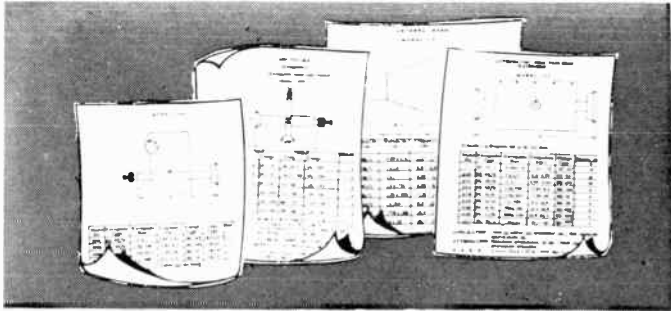
| Type No. | Price |
|----------------------------|---------|
| TRIODES, FRAME GRID | |
| #2ER5 | \$ 2.90 |
| #3ER5 | 2.90 |
| #4ER5 | 2.90 |
| #6ER5/EC95 | 2.90 |
| 5842 | 18.21 |

If it's "MICROWAVE"

Partial list of standard items

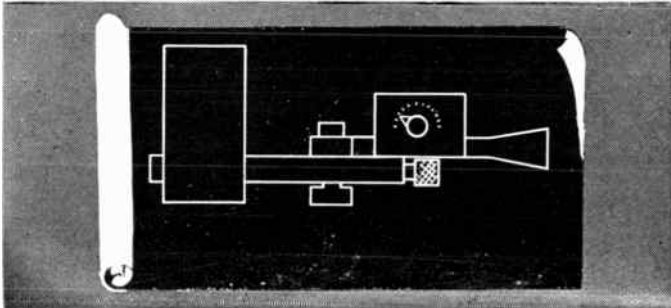
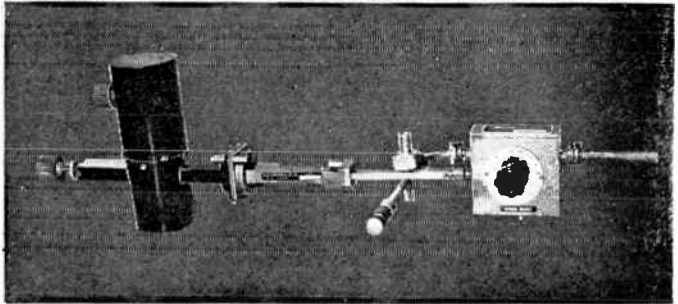
| EQUIPMENT | MODEL | L | M | S | C | A | B | X | G | K | T | V | W | Z | EQUIPMENT— | MODEL | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|
| ADAPTER—COAX. TO W.G. | 101 | L | M | S | C | A | B | X | | | | | | | High Speed 7/8" | 261 | | | | | | | | | | | | | | | | | | | |
| Choke to Choke | 102 | L | M | S | C | A | B | X | G | K | T | | | | Inline L.T. | 262 | | | | | | | | | | | | | | | | | | | |
| Cover to Cover | 103 | L | M | S | C | A | B | X | G | K | T | V | W | Z | RD*ARY JOINT WAVEGUIDE Dourknob Transition | 270 | | | S | | | | X | | | | | | | | | | | | |
| 7/8" to RG 48/U | 104 | | | S | | | | | | | | | | | Circular Transition | 271 | | | | | | | B | X | | K | | | | | | | | | |
| ANTENNA—Horn | 110 | L | M | S | C | A | B | X | G | K | T | V | W | Z | Crosst ir Transition | 272 | | | | | | | B | X | | | | | | | | | | | |
| ATTENUATOR—WAVEGUIDE Fixed High Power | 119 | L | M | S | C | A | B | X | G | K | T | V | W | Z | SHIFTER—PHASE Waveguide | 275 | L | M | S | C | A | B | X | G | K | T | | | | | | | | | |
| Fixed - Low Power | 120 | L | M | S | C | A | B | X | G | K | T | V | W | Z | SHORT—MOVABLE Waveguide - (Unhoused) | 283 | L | | S | C | A | B | X | G | K | T | V | W | | | | | | | |
| Flap | 121 | L | M | S | C | A | B | X | G | K | T | V | W | Z | SHORTS—MOVABLE (HOUSED) 3/8" Coaxial | 290 | L | | S | C | A | B | X | | | | | | | | | | | | |
| Precision | 123 | L | M | S | C | A | B | X | G | K | T | | | | 3/8" Coaxial | 291 | L | | S | C | | | | | | | | | | | | | | | |
| Fixed - Coaxial | 125 | | | | | | | | | | | | | | 7/8" Coaxial | 292 | L | | S | | | | | | | | | | | | | | | | |
| Fixed - Coaxial | 126 | | | | | | | | | | | | | | Waveguide | 293 | L | M | S | C | A | B | X | G | K | T | V | W | | | | | | | |
| Variable Coaxial | 127 | | | | | | | | | | | | | | Waveguide Precision | 294 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| Fixed Coaxial—Very High Power | 128 | | | | | | | | | | | | | | SLOTTED LINE—COAXIAL 3/8" Line | 300 | | | | | | | | | | | | | | | | | | | |
| BEND— E Plane | 130 | L | M | S | C | A | B | X | G | K | T | V | W | Z | 7/8" Line | 301 | | | | | | | | | | | | | | | | | | | |
| H Plane | 131 | L | M | S | C | A | B | X | G | K | T | V | W | Z | Waveguide | 310 | L | M | S | C | A | B | X | G | K | T | | | | | | | | | |
| Coaxial (7/8") Right Angle | 135 | | | S | | | | | | | | | | | STANO | 330 | L | | S | C | A | B | X | G | K | T | | | | | | | | | |
| CAVITY— Filter | 140 | L | M | S | C | | | | | | | | | | SWITCH—Coax | 334 | L | | | | | | | | | | | | | | | | | | |
| LMT Transmitter | 141 | L | | S | | | | | | | | | | | W.G. Rotary Type | 335 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| Reference | 142 | L | M | S | C | | | | | | | | | | W.G. Multiple Type | 336 | | | S | | | | X | | K | | | | | | | | | | |
| COUPLER— Signal Sampler Coaxial | 148 | | | | | | | | | | | | | | TEE—Coaxial 7/8" Line | 340 | L | | S | | | | | | | | | | | | | | | | |
| Waveguide | 149 | L | M | S | C | A | B | X | | | | | | | W.G. Series TEE | 350 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| CRYSTAL DETECTOR MOUNTS COAXIAL Broadband | 150 | | | | | | | | | | | | | | W.G. Shunt | 351 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| Tunable | 151 | | | | | | | | | | | | | | W.G. E H (Hybrid) | 352 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
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| Coax - 3 1/8" | 169 | | | | | | | | | | | | | | TUNER—Coaxial 3/8" Single Stub | 400 | L | | S | C | A | B | X | | | | | | | | | | | | |
| Waveguide Uni-Directional | 170 | L | M | S | C | A | B | X | G | K | T | V | W | Z | 7/8" Single Stub | 401 | L | | S | | | | | | | | | | | | | | | | |
| Bi-Directional | 171 | L | M | S | C | A | B | X | G | K | T | V | W | Z | 3/8" Double Stub | 402 | L | | S | | | | | | | | | | | | | | | | |
| Uni- Reflectometer | 172 | | | S | C | A | B | X | G | K | T | V | W | Z | 7/8" Double Stub | 403 | L | | S | | | | | | | | | | | | | | | | |
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| Broadband | 174 | | | S | C | A | B | X | G | K | T | V | W | Z | 7/8" Triple Stub | 405 | L | | S | | | | | | | | | | | | | | | | |
| FILTER—LDW PASS Coaxial | 175 | | | | | | | | | | | | | | 7/8" Slug | 407 | L | | S | | | | | | | | | | | | | | | | |
| LINE STRETCHER— Coaxial - 3/8" | 180 | | | | | | | | | | | | | | TUNER—WAVEGUIDE Single Stub | 409 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| LOAD—COAXIAL Low Power | 190 | | | | | | | | | | | | | | Double Stub | 410 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| Medium Power 7/8" Line | 191 | L | | S | | | | | | | | | | | Triple Stub | 411 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| Medium Power 1 3/8" Line | 192 | L | | | | | | | | | | | | | E/H | 412 | L | M | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| High Power 7/8" Line | 193 | L | | S | | | | | | | | | | | Glide Screw | 413 | | | S | C | A | B | X | G | K | T | V | W | Z | | | | | | |
| High Power 1 3/8" Line | 194 | L | | | | | | | | | | | | | Double Slur | 414 | | | S | C | A | B | X | G | K | T | | | | | | | | | |
| LOADS—WAVEGUIDE Low Power | 200 | L | M | S | C | A | B | X | G | K | T | V | W | Z | TWISTS | 420 | | | S | C | A | B | X | G | K | T | | | | | | | | | |
| Medium Power | 201 | L | M | S | C | A | B | X | G | K | T | V | W | Z | WAVEMETER—COAXIAL Micrometer | 430 | L | | S | C | | | | | | | | | | | | | | | |
| High Power | 202 | L | M | S | C | A | B | X | G | K | T | V | W | Z | In Case | 440 | L | M | S | C | | | | | | | | | | | | | | | |
| Tunable | 203 | | | S | C | A | B | X | G | K | T | V | W | Z | Waveguide MICROMETER Absorbtion | 450 | | | | | | | | | | | | | | | | | | | |
| Movable | 204 | | | S | C | A | B | X | G | K | T | V | W | Z | Transmission | 451 | | | | | | | | | | | | | | | | | | | |
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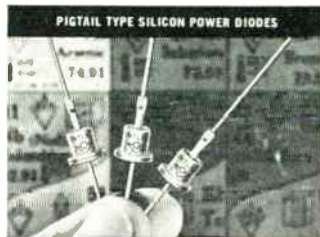
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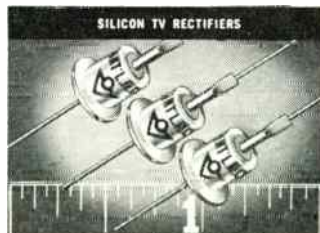
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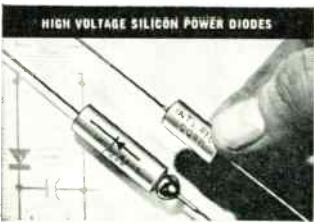


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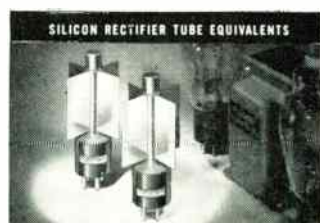
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TO 150 AMPS.

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| 6K50,000LQ | 8,250.00 | 9,000 | | 50 | 300-500 | 55,000 | 11.0 | | | | |
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| | | U.S.A. Price | Resonator Voltage Volts | Resonator Dissipation Watts | Cathode Current ma | | Heater Voltage Volts | Heater Current Amps | Frequency Range Mc | | |
| | 1K015CA ² | \$295.00 | 350 | 15 | 50 | -250 | 6.3 | 0.8 | 5400-6000 | | |
| | 1K015CG ¹ | 295.00 | 350 | 15 | 50 | -250 | 6.3 | 0.8 | 5400-6000 | | |
| | 1K125CA ¹ | 235.00 | 1000 | 125 | 110 | -285 | 6.3 | 1.2 | 3700-4400 | | |
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| 1K20XK ¹ | 475.00 | 350 | 20 | 50 | -160 | 6.3 | 0.8 | 9200-10,000 | | | |
| 1K20XS ¹ | 475.00 | 350 | 20 | 50 | -140 | 6.3 | 0.8 | 8500-9200 | | | |
| TETRODES | | | MAXIMUM RATINGS | | | | | ELECTRICAL CHARACTERISTICS | | | |
| | | U.S.A. Price | Plate Dissipation Watts | Plate Voltage Volts | Plate Current ma | Grid Dissipation Watts | Screen Voltage Volts | Screen Dissipation Watts | Filament Voltage Volts | Filament Current Amps | Amplification Factor |
| | 4-65A | \$ 25.00 | 65 | 3000 | 150 | 5 | 600 | 10 | 6.0 | 3.5 | |
| | 4-125A | 36.00 | 125 | 3000 | 225 | 5 | 600 | 20 | 5.0 | 6.5 | |
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| | 4-400A | 55.00 | 400 | 4000 | 350 | 10 | 600 | 35 | 5.0 | 14.5 | |
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| | 4CN15A | 57.65 | 15 | 2500 | | 2 | 400 | 12 | 6.0 | 3.0 | |
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| | 4CX1000A | 156.00 | 1000 | 3000 | 1000 | 0 | 400 | 12 | 6.0 | 10.5 | |
| | 4CX5000A | 450.00 | 5000 | 7500 | 3000 | 75 | 1500 | 250 | 7.5 | 75.0 | |
| | 4W300B | 42.50 | 300 | 2000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | |
| | 4W20,000A | 1,850.00 | 20,000 | 8000 | 15,000 | 60 | 1500 | 200 | 10.0 | 30.0 ⁹ | |
| | 4X150A | 38.95 | 150 | 1250 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | |
| 4X150D | 38.95 | 150 | 1250 | 250 | 2 | 400 | 12 | 26.5 | 0.57 | | |
| 4X150G | 54.00 | 150 | 1250 | 250 | 2 | 400 | 15 | 2.5 | 6.8 | | |
| 4X250B | 42.50 | 250 | 2000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | | |
| 4X250F | 42.50 | 250 | 2000 | 250 | 2 | 400 | 12 | 26.5 | 0.57 | | |
| 4X500A | 121.00 | 500 | 4000 | 350 | 10 | 500 | 30 | 5.0 | 13.5 | | |
| PENTODE | 4E27A, 5-125B | \$ 40.00 | 125 | 4000 | 200 | 5 | 750 | 20 | 5.0 | 7.50 | |
| TRIODES | 2C39A | \$ 22.50 | 100 | 1000 | 125 ⁵ | 2 | | | 6.3 | 1.0 | 100 |
| | 2C39WA | 30.00 | 100 | 1000 | 125 ⁵ | 2 | | | 6.3 | 1.0 | 100 |
| | 3C24 | 15.00 | 25 | 2000 | 75 | 7 | | | 6.3 | 3.0 | 24 |
| | 3CPN10A5 | 32.15 | 10 | | | 2 | | | 6.0 | 1.0 | 100 |
| | 3CX100A5 | 32.15 | 100 | 1000 | 125 ⁵ | 2 | | | 6.0 | 1.0 | 100 |
| | 3W5000A1 | 210.00 | 5000 | 6000 | 2500 | 50 | | | 7.5 | 51.0 | 5 |
| | 3W5000A3 | 198.00 | 5000 | 6000 | 2500 | 150 | | | 7.5 | 51.0 | 20 |
| | 3W5000F1 | 210.00 | 5000 | 6000 | 2500 | 50 | | | 7.5 | 51.0 | 5 |
| | 3W5000F3 | 198.00 | 5000 | 6000 | 2500 | 150 | | | 7.5 | 51.0 | 20 |
| | 3X100A5 | 25.00 | 100 | 1000 | 125 ⁵ | 2 | | | 6.3 | 1.0 | 100 |
| | 3X2500A3 | 198.00 | 2500 | 6000 | 2500 | 150 | | | 7.5 | 51.0 | 20 |
| | 3X2500F3 | 198.00 | 2500 | 6000 | 2500 | 150 | | | 7.5 | 51.0 | 20 |
| | 3X3000A1 | 198.00 | 3000 | 6000 | 2500 | 50 | | | 7.5 | 51.0 | 5 |
| | 3X3000F1 | 198.00 | 3000 | 6000 | 2500 | 50 | | | 7.5 | 51.0 | 5 |
| | 25T | 15.00 | 25 | 2000 | 75 | 7 | | | 6.3 | 3.0 | 24 |
| | 35T | 20.00 | 50 | 2000 | 150 | 15 | | | 5.0 | 4.0 | 39 |
| | 75TH | 28.00 | 75 | 3000 | 225 | 16 | | | 5.0 | 6.25 | 20 |
| | 75TL | 28.00 | 75 | 3000 | 225 | 13 | | | 5.0 | 6.25 | 12 |
| | 100TH | 22.00 | 100 | 3000 | 225 | 20 | | | 5.0 | 6.3 | 38 |
| | 100TL | 22.00 | 100 | 3000 | 225 | 15 | | | 5.0 | 6.3 | 14 |
| | 250TH | 33.00 | 250 | 4000 | 350 | 40 | | | 5.0 | 10.5 | 37 |
| | 250TL | 33.00 | 250 | 4000 | 350 | 35 | | | 5.0 | 10.5 | 14 |
| | 304TH | 60.50 | 300 | 3000 | 900 | 60 | | | 5 or 10 | 25 or 12.5 | 20 |
| | 304TL | 60.50 | 300 | 3000 | 900 | 50 | | | 5 or 10 | 25 or 12.5 | 12 |
| | 450TH | 77.00 | 450 | 6000 | 600 | 80 | | | 7.5 | 12.0 | 38 |
| | 450TL | 77.00 | 450 | 6000 | 600 | 65 | | | 7.5 | 12.0 | 18 |
| | 592/3-200A3 | 37.50 | 200 | 3500 | 250 | 25 | | | 10.0 | 5.0 | 25 |
| | 750TL | 137.50 | 750 | 10,000 | 1000 | 100 | | | 7.5 | 21.0 | 15 |
| 1000T | 137.50 | 1000 | 7500 | 750 | 80 | | | 7.5 | 15.5 | 35 | |
| 1500T | 245.00 | 1500 | 8000 | 1250 | 125 | | | 7.5 | 24.0 | 24 | |
| 2000T | 340.00 | 2000 | 8000 | 1750 | 150 | | | 10.0 | 23.5 | 23 | |

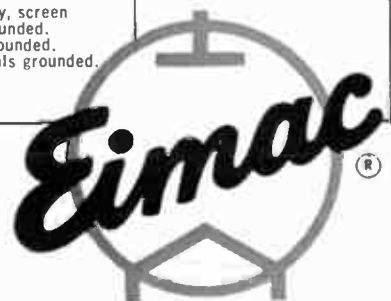
Eimac First for Reliability in Power Electron Tubes

| | U.S.A. Price | Filament Voltage Volts | Filament Current Amps | Peak Inverse Voltage Volts | Peak Plate Current Amps | Average Plate Current ma | Plate Dissipation Watts | | A prepared strip of silver-plated spring material, slotted and formed into a series of fingers designed to make sliding contact. | | | | |
|------------------------------------|---|--------------------------|---|------------------------------|---|---|-------------------------|----------------------|--|------------------------|-----------------------|----------------------|--|
| | | | | | | | | | Single Edge | Width | U.S.A. Price per Ft. | | |
| HIGH VACUUM RECTIFIERS | 2-01C | \$ 17.25 | 5.0 | 0.35 | 1,000 | 0.010 | 1 | 0.1 | PREFORMED CONTACT FINGER STOCK | CF-100 | 17/32" | \$1.65 | |
| | 2-25A | 14.00 | 6.3 | 3.0 | 25,000 | 1.0 | 50 | 15 | | CF-300 | 31/32" | 1.80 | |
| | 2-50A | 16.50 | 5.0 | 4.0 | 30,000 | 1.0 | 75 | 30 | | CF-500 | 1 1/8" | 2.00 | |
| | 2-150D | 36.00 | 5.0 | 13.0 | 30,000 | 3.0 | 250 | 90 | | CF-900 | 3 1/4" | 1.65 | |
| | 2-240A | 40.00 | 7.5 | 12.0 | 25,000 | 4.0 | 500 | 150 | | | | | |
| | 2-450A | 94.00 | 7.5 | 26.5 | 25,000 | 8.0 | 1000 | 450 | | | | | |
| | 2-2000A | 214.50 | 10.0 | 25.0 | 75,000 | 12.0 | 750 | 1200 | | | | | |
| | 250R | 30.50 | 5.0 | 10.5 | 60,000 | 2.5 | 250 | 150 | | | | | |
| | 253 | 30.00 | 5.0 | 10.0 | 15,000 | 2.5 | 350 | 100 | | | | | |
| | 8020(100R) | 15.00 | 5.0 | 6.5 | 40,000 | 1.5 | 100 | 60 | | | | | |
| | 2CL40A | 32.00 | 6.0 | 3.0 | 16,000 | 10.0 ⁶ | 120 ⁴ | 40 ⁴ | | | | | |
| | 2X1000A | 120.00 | 26.5 | 2.25 | 25,000 | 25.0 ⁶ | 1250 ⁶ | 1000 | | | | | |
| | 2X3000F | 140.00 | 7.5 | 51.0 | 25,000 | 20.0 | 3000 | 3000 | | | | | |
| | MERCURY-VAPOR RECTIFIERS | KY21A | 25.00 | 2.5 | 10.0 | 11,000 | 3.0 | 750 | | | | | |
| RX21A | | 24.00 | 2.5 | 10.0 | 11,000 | 3.0 | 750 | ..... |  |  |  |  |  |
| PULSE MODULATORS | | U.S.A. Price | | Plate Dissipation Watts | Plate Voltage Volts | Plate Current ma | Grid Dissipation Watts | Screen Voltage Volts | Screen Dissipation Watts | Filament Voltage Volts | Filament Current Amps | Amplification Factor | |
| | 4PR60A | \$90.00 | 60 | 20,000 | 18,000 ³ | ..... | 1500 | 8 | 26.0 | 2.25 | ..... |  |  |
| | 6C21 | 77.00 | 300 | 30,000 | 15,000 ³ | 50 | ..... | ..... | 8.2 | 17.00 | 30 | | |
| HEAT-DISSIPATING CONNECTORS | Type | Hole Diameter | U.S.A. Price | SK-604 TUBE EXTRACTOR | A spring-steel extractor for use with the 4X150 series, 4X250 series and 2C39 series tubes. U.S.A. Price \$.55 | | | | | | | | |
| | HR-1 | .052 | \$.60 | | VACUUM SWITCHES | Single-pole double-throw switch within a high vacuum adaptable for high-voltage switching. Contact spacing .015". Switch will handle R-F potentials as high as 20 Kv. In D-C switching will handle approximately 1.5 Amps. at 5 kv. | | | | | | | |
| HR-2 | .062 | .60 | VS-2 | \$18.00 | | 12V | \$7.50 | | | | | | |
| HR-3 | .072 | .60 | VS-6 | 32.00 | | 24V | 8.50 | | | | | | |
| HR-4 | .102 | .80 | | | | | | | | | | | |
| HR-5 | .127 | .80 | | | | | | | | | | | |
| HR-6 | .367 | .80 | | | | | | | | | | | |
| HR-7 | .127 | 1.60 | | | | | | | | | | | |
| HR-8 | .575 | 1.60 | | | | | | | | | | | |
| HR-9 | .569 | 3.00 | | | | | | | | | | | |
| HR-10 | .510 | 1.60 | | | | | | | | | | | |
| 100IG IONIZATION GAUGE | For measuring pressures from 10 ⁻³ to less than 10 ⁻⁸ mm of mercury. U.S.A. Price \$32.00 | | | | HV-1 DIFFUSION PUMP | Triple-jet, air-cooled vacuum pump of the oil-diffusion type. Capable of reaching an ultimate vacuum of 4 x 10 ⁻⁷ mm of mercury when used with suitable forepump. U.S.A. Price \$156.00 | | | | | | | |
| AIR SYSTEM SOCKETS | U.S.A. Price | Tube | | Screen By-Pass Capacitor uuf | Special Characteristics | | | | | | | | |
| | SK-100 | \$123.00 | 4KM3000LQ; 3KM3000LA; 3K3000LQ | | | Cathode socket. | | | | | | | |
| | SK-110 | 123.00 | 3K50,000LA,F,Q; 3KM50,000PA; 4K50,000LQ; 4KM50,000SG; 6K50,000LQ, 4KM50,000LA; 4KM50,000LF; 4KM50,000LQ | | | Cathode socket. | | | | | | | |
| | SK-200 | 60.00 | 3K2500SG; 3K2500LX; 3KM4000LT | | | Cathode socket. | | | | | | | |
| | SK-300 | 60.00 | 4CX5000A; 4CW10,000A | | none | | | | | | | | |
| | SK-400 | 16.50 | 4-400A; 4-250A; 4-125A | | none | | | | | | | | |
| | SK-500 | 17.00 | 4-1000A | | none | | | | | | | | |
| | SK-600 | 12.50 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | 2700 | No terminals grounded. | | | | | | | |
| | SK-602 | 12.50 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | 2700 | No terminals grounded. (Special SK-600) | | | | | | | |
| | SK-610 | 13.00 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | 2700 | Cathode terminals grounded. | | | | | | | |
| | SK-620 | 15.75 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | 1100 | No terminals grounded. Screen by-pass capacitor plastic sealed. | | | | | | | |
| | SK-630 | 17.60 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | 1100 | Cathode terminals grounded. Screen by-pass capacitor plastic sealed. | | | | | | | |
| | SK-640 | 5.00 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | none | No terminals grounded. | | | | | | | |
| | SK-650 | 8.00 | 4X150A; 4X150D; 4X250B; 4X250F; 4CX250B; 4W300B | | none | Cathode terminals grounded. | | | | | | | |
| | SK-655 | 4.00 | (Screen by-pass capacitor for use with SK-650) | | 1100 | Plastic sealed. | | | | | | | |
| | SK-700 | 20.00 | 4CX300A; 4CN15A; 4CX125C | | 1100 | No terminals grounded. | | | | | | | |
| | SK-710 | 20.00 | 4CX300A; 4CN15A; 4CX125C | | 1100 | Cathode terminals grounded. | | | | | | | |
| | SK-740 | 9.10 | 4CX300A; 4CN15A; 4CX125C | | none | No terminals grounded. | | | | | | | |
| SK-760 | 9.10 | 4CX300A; 4CN15A; 4CX125C | | none | Integral chimney. No terminals grounded. | | | | | | | | |
| SK-770 | 9.10 | 4CX300A | | none | Integral chimney, screen terminals grounded. | | | | | | | | |
| SK-800A | 40.00 | 4CX1000A | | 1500 | No terminals grounded. | | | | | | | | |
| SK-810 | 40.00 | 4CX1000A | | 1500 | Cathode terminals grounded. | | | | | | | | |
| SK-900 | 48.00 | 4X500A | | 650 | | | | | | | | | |
| SK-1000 | On Request | 4KM170,000LA |  | ..... | Cathode socket. | | | | | | | | |
| | | | | | CHIMNEYS | | | | | | | | |
| | | | | | | | U.S.A. Price | | | | | | |
| | | | | | | | SK-306 | | \$ 6.00 | | | | |
| | | | | | | | SK-406 | | 8.00 | | | | |
| | | | | | | | SK-506 | | 12.00 | | | | |
| | | | | | | | SK-606 | | .60 | | | | |
| | | | | | | | SK-626 | | .75 | | | | |
| | | | | | | | SK-636 | | 6.00 | | | | |
| | | | | | | | SK-806 | | 8.00 | | | | |
| | | | | | | | SK-906 | | 10.00 | | | | |

- 1 Waveguide Output Fitting
 - 2 Coaxial Output Fitting
 - 3 Pulse
 - 4 Convection liquid cooled
 - 5 Cathode Current
 - 6 Clipper diode service only
 - 7 TV Peak-Synchronizing Level
 - 8 Plus 250 watts bombardier power
 - 9 15 Mc Bandwidth, 3 db points.
- All prices subject to change without notice

EITEL-McCULLOUGH, INC.
S A N C A R L O S • C A L I F O R N I A
S A N B R U N O , C A L I F O R N I A • S A L T L A K E C I T Y , U T A H

For details, circle #45 on Reader Service Card



CPPPC for ANY

Servo Motors

SIZE 8 • 10 • 11
 High torque for size. Will withstand 125°C. 26 volt and 115 volt units available. Types for transistor circuitry.



Linear Transformers

(Induction Potentiometers)
 SIZE 8 • 10 • 11

These units feature low secondary impedances. Can be designed to work with wide range of load impedances. Infinite resolution. Linearity .5%. Wide variety. Can be temperature compensated.



Gearhead Motors

SIZE 10 • SIZE 10 with size 11 mounting dimensions

Available with off center shaft for more highly accurate meshing. Over size pitch diameter gears on smaller pinions for increased life and reliability. All bearings are ABEC class 5 or better.



D. C. Motors

SIZE 8

Smooth rotation at low speeds. Reversible. Speed linearly proportional to voltage. 28 or 14 volt input. Leads or terminals. Available with governor which maintains constant speed within $\pm 1\%$.

For details, circle #46 on Reader Service Card



CLIFTON PRECISION PRODUCTS

CLIFTON HEIGHTS, PA.

ROTARY COMPONENT



Synchros
 SIZE 8 • 10 • 11 • 15 • Pancake
 BuOrd • High Temp. (450°F)
 Highest accuracy in production quantities (7' max error is typical); lowest nulls; lowest phase shifts; corrosion resistant construction, stainless steel or aluminum housings. Double ended shafts available. An extremely wide variety of synchros available as Transmitters, Receivers, Control Transformers, Differentials, Resolvers.

Precision Computing Resolvers
 SIZE 8 • 10 • 15 • Pancake
 Highest accuracy (functional error .03% to .1%). Excellent nulls, low phase shift. Units to resist 450°F. Resistive, feedback winding or thermistor compensation. Types for transistor circuitry. BuOrd shafts and Mk 4 Mod 0 brush block obtainable.



Motor Generators
 SIZE 8 • 10
 Minimum length and weight. Suitable for error rate damping in servo systems for high stability. Motor rate tachometers available. Types for transistor circuitry.
 For details, circle #47 on Reader Service Card

These pages describe only partially our wide line of Precision Rotary Components. Write or telephone for CPCC's latest catalogue which gives complete electrical data and drawings. Special units are available to withstand severe vibration and shock, extremely high temperature, and radio-active environments. Most units available for immediate delivery. Two plants (Clifton Heights, Pa. and Colorado Springs, Colo.) to serve you. Home Sales Office: 9014 West Chester Pike, Upper Darby, Pa., Hilltop 9-1200 (Suburban Philadelphia).

CO., INC.

CINCH SOCKETS

PRINTED CIRCUIT SOCKETS

These sockets for the three types of receiving tubes. Miniature, Flat Press and Button.

The contacts are so spaced that they can be mounted in an incremental drill pattern. This fact together with the exact precision and uniformity of Cinch sockets make them ideal for automatic assembly.

No. 22920—7 contact miniature molded vertically mounted socket with JAN type shield base. Mica insulation. Silver plated phosphor bronze contacts drop through .062" dia. clearance holes arranged on a .1" X and Y axis.

No. 24255 — 8 contact button base subminiature molded, vertically mounted socket. Mica insulation. Silver plated beryllium copper contacts drop through .070" dia. clearance holes arranged on a .1" X and Y axis.

No. 24255A—Same as above except insulation to withstand temperatures above 200° Centigrade.

No. 22024—7 contact flat press subminiature molded, vertically mounted socket for conventional wiring. Assembled with a special shield base to accept a subminiature shield with the "J" lock. Flat sided retaining nuts and screws are provided for mounting. Mica insulation. Silver plated beryllium copper contacts.

No. 22023—Same as above except insulation to withstand temperatures above 200° Centigrade.

No. 22022 — 8 contact button base subminiature molded vertically mounted socket for conventional wiring. Assembled with special shield base to accept a subminiature shield with the "J" lock. Mica insulation. Silver plated beryllium copper contacts.

No. 22021—Same as above except insulation to withstand temperatures above 200° Centigrade.

No. 24202—7 contact miniature molded right angle mounted socket with JAN shield base. Mica insulation. Silver plated beryllium copper contacts drop through .062" dia. clearance holes arranged on a .1" X and Y axis.

No. 24257— 7 contact flat press subminiature molded right angle socket. Mica insulation. Silver plated beryllium copper contacts drop through .046" dia. clearance holes arranged on a .1" X and Y axis.

No. 24439—Similar to above except 9 contacts. Both meet Mil. Specs.

No. 24308 — 8 contact button base subminiature molded, right angle mounted socket. Mica insulation. Silver plated beryllium copper contacts drop through .046" dia. clearance holes arranged on .1" X and Y axis.

No. 24308A—Same as above except insulation to withstand temperatures above 200° Centigrade.

For details, circle #48 on Reader Service Card

POWER TRANSISTOR SOCKETS

There are three laminated type sockets; No. 22831 is elongated in shape, top and bottom plates are of chocolate colored XP Bakelite, 1/4" and 3/4" respectively; both vacuum wax impregnated. No. 24324 is rectangular in shape. Top and bottom plates are of natural XP Bakelite, vacuum wax impregnated. Formed thread for 6 — 20 screw, .104/.110 dia. hole in C R steel plate. Provides easy attachment to a heat sink. No. 24860 is identical with 24324 except it is equipped with integral eyelets for easy assembly to chassis. All contacts are of brass, cadmium plated.

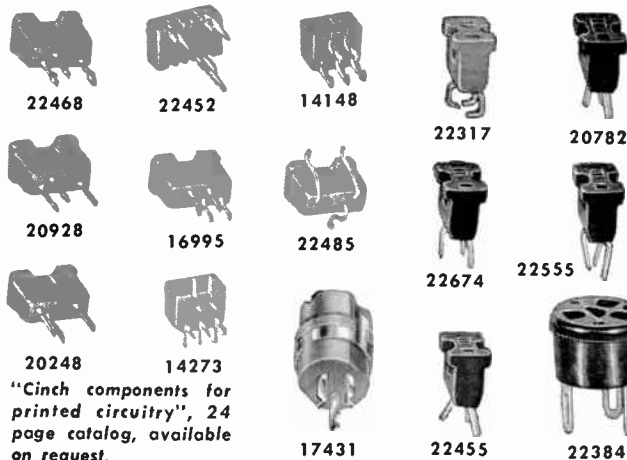
No. 24860 WITH INTEGRAL EYELETS

No. 22831

No. 24246

No. 24246 is a molded socket with General Purpose Bakelite casting. Contacts are of phosphor bronze, cadmium plated.

QUICK, EASY ASSEMBLY WITH CINCH TRANSISTOR SOCKETS:

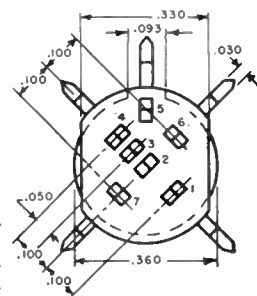


"Cinch components for printed circuitry", 24 page catalog, available on request.

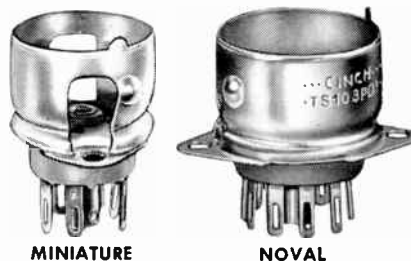
UNIVERSAL TRANSISTOR SOCKETS

Standoff type Universal Transistor Socket for use with ten transistor bases and five base types. Casting is mica-filled phenolic (MFE). Contacts are beryllium copper, gold plated. Contacts may be used with either one or two sided 1/16" p.w. boards.

STANDOFF TYPE **No. 24872** for use with transistors designed to the triangular base layout .2" x .1" (JETEC-30) contact centers, as well as the three contact in-line (.048 x .192 contact centers). Available in G. P. Black and low loss Mica-filled Phenolic.



CINCH MIL SOCKETS MEET AND SURPASS RIGID MILITARY REQUIREMENTS



MINIATURE

NOVAL

Descriptive circular on sockets, shields and shield inserts available on request.

Saddles and shield base are brass, nickel plated. All contacts are silver plated; tails are hot tin dipped. Molded castings are type MFE material; ceramic castings are grade L4B material or better.

MIL shields are made of brass, nickel plated. Springs are non-magnetic stainless steel. Heat-reducing inserts are available.

CINCH HEAT DISSIPATING TUBE SHIELDS

For Miniature, Sub-miniature, Octal and Power Tubes. The 7 and 9 pin Miniature Series, T, TR and NW Series are variously covered by Military Specifications: MIL-S-9372B (USAF), MIL-S-242A (Ships), MIL-S-19786A (Navy), SCL-6307/2 (Signal Corps). In Octal and Power Series, the shields are covered by Redstone Arsenal and Signal Corps approval.



OCTAL and POWER SHIELDS

TR5 and TR6

T5 and T6

Under license arrangement with International Electronic Research Corporation.



CINCH MANUFACTURING COMPANY

1026 South Homan Ave., Chicago 24, Illinois
Division of United-Carr Fastener Corporation, Boston, Mass.



JONES PLUGS... SOCKETS

"300" SERIES Plugs and Sockets are designed for light duty service. Two to thirty-three contacts. Plugs and sockets polarized. Phosphor bronze "knife switch" socket contact engage both sides of heavy brass plug contacts for positive connections. Molded bakelite insulation. Also can be supplied with contact tails that will take standard solderless terminals. UL approved.

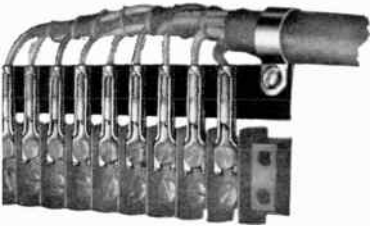
312-CCT
ONES BARRIER TERMINAL STRIP



500 SERIES . . . wider and higher barriers for increased creepage distances. Closed bottoms for complete insulation. Material between

carriers at the base adds to the strength and maintains same creepage distance between contact to contact and contact to ground. Can be imprinted. No insulating or marker strip required.

ONES FANNING STRIP
61 FANNING STRIP



Big help in terminal wiring. Connections are made through Fanning Strip, on bench or anywhere apart from barrier strip, and quickly slipped into assembly. Simplifies and facilitates soldering. Insures positive, correct connections. Saves time. Ideal for harness or cable assembly. Strong construction; brass terminals, cadmium plated. Heavy Bakelite mounting.

141 BARRIER STRIP



P-2406-CCT

2400 SERIES plugs and sockets . . . improved socket contacts. For highest electrical and mechanical efficiency. 4 individual flexing surfaces. Positive contact over practically their entire length. Cadmium plated plug and socket. Contacts mounted in recessed pockets, greatly increasing leakage distance, increasing voltage rating.

S-2406-SB



500 SERIES for heavy duty work, severest electrical services. For 5,000 Volts 25 Amperes per Contact alterable by circuit characteristics. Socket contacts phosphor bronze knife-switch type, cadmium plated. Plug contacts hard brass cadmium plated 2, 4, 6, 8, 10, and 12 contacts. Plugs and sockets polarized. Long leakage path from terminal, and terminal to ground. Caps and brackets, steel parkerized (rust-proofed). Plug and socket blocks interchangeable in caps and brackets. Terminal connections most accessible. Cap insulated with canvas bakelite.



P-506-CE

PLUG WITH CAP



S-506-DS

SOCKET WITH DEEP BRACKETS

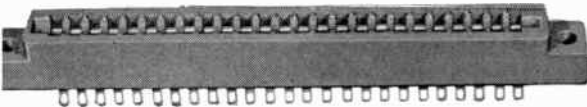
Jones catalog; plugs and sockets, barrier strips, fanning strips, terminal panels, fuse mounts. Available on request.

HOWARD B. JONES DIVISION
CINCH MANUFACTURING COMPANY



CINCH CONNECTORS

MOLDED PRINTED WIRE EDGE CONNECTOR



SINGLE CONTACT TYPE NO. 29029 A OR B*

Made in 6 through 25 contacts inclusive. Designed for nominal 1/16" printed wire board, either single or two sided copper. A polarizing contact made of brass, Sel-Rex gold plated, can be placed in any contact position. Insulation material is of glass filled Diallyl Phthalate (Type GDI-30 per Mil. M-19833). Contacts are of Beryllium Copper or Phosphor Bronze with Sel-Rex gold plate .00003 minimum. Terminals are mounted on .156" centers. Mounting holes are .128" dia.



DUAL CONTACT TYPE No. 29028 A or B*

Made in 12 through 50 contacts in multiples of two. Designed for nominal 1/16" printed wire board, copper clad on both sides. Contacts, polarizing contact, insulation and mounting holes are the same as described for No. 29029.

*A-Phosphor Bronze Contact *B-Beryllium Copper Contact

CINCH HINGE CONNECTORS

Ensure positive contact, have simple locking device, easy release. Maximum number of contacts in minimum space.

Slipping contact action keeps contacts clean at all times. Either the plug or socket body fit into the cap. Cable entrance hole can be placed at the one end, or in the top or both.

Cover is finished in black wrinkle and the cable clamps are cadmium plated. Contact tails will take either conventional solder wiring or AMP "78" series Taper Tab receptacles.



50 CONTACT ASSEMBLY With Cable Clamp

PATENT PENDING

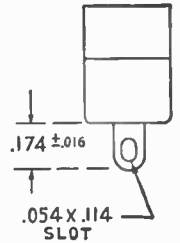
PLUG AND SOCKET showing Contact arrangement

CINCH UNIVERSAL EDGE CONNECTORS



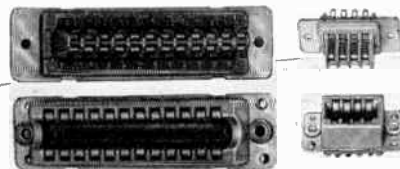
No. 24583-15-C1
G. P. BLACK

Available in four basic materials, and in any number of contacts 6 through 25. All contacts are phosphor bronze with P-92-3-03 finish (.0003 silver followed by .00003 gold flash). Pre-assembled polarizing key in any connector in any contact position when desired. Type one contact, reproduced here, which takes a standard No. 20 stranded copper wire for conventional soldering is ready for delivery.



For details, circle #49 on Reader Service Card

BLUE RIBBON CONNECTORS



24 CONTACT P & C ELIMINATES BREAKAGE IMPROVED TYPE

8-CONTACT PLUG & SOCKET

Visual alignment unnecessary—ribbon spring contacts—floating bushings. The protective barriers between ribbon contacts insure uniform spacing. The entire length of the contacts are supported by quality dielectric. Multiple mounting makes it possible to make or break any number of circuits simultaneously. Moulded in mounting plates are of corrosion resistant passivated stainless steel.

Manufactured by agreement with Amphenol Electronics Corp.

PRINTED CIRCUIT SUB-MINIATURE CONNECTOR



DC-37P (TOP) DC-37S-1

Manufactured by agreement with Cannon Electric Company

D-Sub-Miniature; Printed circuit pin and socket inserts are available in 9, 15, 25, 37 and 50 contacts. Steel with cadmium plate finish shell; contacts of copper alloy with gold over silver plate; Nylon or Diallyl-phthalate insulation. Keystone shell shape polarization.



CINCH MANUFACTURING COMPANY

1026 South Homan Ave., Chicago 24, Illinois
Division of United-Carr Fastener Corporation, Boston, Mass.

TUNG-SOL

TUNG-SOL/CHATHAM SPECIAL-PURPOSE TUBES



VACUUM SWITCH

Used in high-voltage test equipment and airborne radar units.
Types available: 1S22



RECTIFIERS

Used throughout industrial electronic equipment and broadcasting operations—AM, FM and TV.

Types available: 1Z2, 3B25, 3B28, 4B32, 5AT4, 5R4GY, 5R4WGA, 5R4WGB, 6H6WGT, 6X4W, 25Z6WGT, 26Z5W, 83, 583, 5517, 5726/6AL5W, 5726/6AL5W/6097, 5829WA, 3B29, 576A.



VOLTAGE REFERENCE TUBES

Used in radios and other electronic gear with regulated power supplies. Especially in high-accuracy units.

Types available: 5651, 5651WA, 5783, 5783WA, 5783WB.



TELEPHONE TUBES

Used in hand sets and carrier equipment.

Types available: 313C, 338A, 407A, 426A, 5842/417A, 5847/404A, 6028/408A.



TWIN TRIODES

Used widely in equipment handling frequencies from the audio level through the frequency band.

Types available: 5670, 5670WA, 6SU7GTY, 12AT7WA, 12AY7, 53, 6SC7GTY, 5687, 5687WA, 2C51, 618B/6SU7WGT, 5814, 5814WA, 5751, 5751WA, 6SN7WGTA, 6021.



HYDROGEN THYRATRONS

Used in radar modulators and missile tracking beacons. Min-latures in airborne units.

Types available: 1258, 5948, 5949, 7190, 7191, VC1257, 7192, 7240, 7454, 5948A, 5949A.



VOLTAGE REGULATORS

Used in Radio and other electronic equipment with regulated power supplies.

Types available: OB2WA, OB2, OC3W, OD3W, 6542, 6627/OB2WA, 6074, 7099.



POWER PENTODES

Used in public address systems, hi-fi amplifiers, radio transmitters and receivers.

Types available: 2E22, 3A4, 5A6, 6AR6, 6L6WGB, 5881, 26E6WGB, 609B/6AR6WA, 6146, 6550, 6883.



THYRATRONS

Used in power supplies, radio transmitters, motor controllers and spot welders.

Types available: 2A4G, 2D21W, 3C23, 6D4, 323B, 393A, 394A, 395A, 885, 2050W, 5594, 5696, 2D21, 2050, 5727/2D21W, 5643, 6012, 6901.

SEMICONDUCTORS

GERMANIUM TRANSISTORS



TO-5 Inverted Header Design Brings you these Benefits . . .

- improved thermal properties for longer life.
- superior mechanical characteristics for increased reliability.

MEDIUM POWER, MEDIUM FREQUENCY

| TYPE | MAXIMUM RATINGS (25° C) | | | | | TYPICAL VALUES (25° C) | | |
|------------------|-------------------------|-----------------------|-----------------------|-------------------|-------------------|--------------------------|-----------------|--------------------|
| | Pc mw | V _{CE} volts | V _{CB} volts | I _C ma | T _J °C | Max. I _{CB0} μa | h _{FE} | f _{αB} mc |
| 2N381 | 200 | -25 | -25 | 200 | 85 | 10 | 36 | 1.2 |
| 2N382 | 200 | -25 | -25 | 200 | 85 | 10 | 54 | 1.5 |
| 2N383 | 200 | -25 | -25 | 200 | 85 | 10 | 72 | 1.8 |
| INDUSTRIAL TYPES | | | | | | | | |
| 2N460 | 200 | — | -45 | 400 | 100 | 15 | 25 | 1.2 |
| 2N461* | 200 | — | -45 | 400 | 100 | 15 | 50 | 1.2 |

*Designed to meet MIL-T-19500/45

MEDIUM POWER, HIGH FREQUENCY

| TYPE | MAXIMUM RATINGS (25° C) | | | | | TYPICAL VALUES (25° C) | | |
|-----------------------|-------------------------|-----------------------|-----------------------|-------------------|-------------------|--------------------------|-----------------|--------------------|
| | Pc mw | V _{CE} volts | V _{CB} volts | I _C ma | T _J °C | Max. I _{CB0} μa | h _{FE} | f _{αB} mc |
| COMPUTER TYPES | | | | | | | | |
| 2N404* | 120 | -24 | -25 | 100 | 85 | 5 | 30 | 12 |
| 2N425 | 120 | -20 | -30 | 400 | 85 | 5 | 30 | 4 |
| 2N426 | 120 | -18 | -30 | 400 | 85 | 5 | 40 | 6 |
| 2N427 | 120 | -15 | -30 | 400 | 85 | 5 | 55 | 11 |
| 2N428† | 120 | -12 | -30 | 400 | 85 | 5 | 80 | 17 |
| 2N578 | 120 | -14 | -20 | 400 | 85 | 5 | 15 | 5 |
| 2N579 | 120 | -14 | -20 | 400 | 85 | 5 | 30 | 8 |
| 2N580 | 120 | -14 | -20 | 400 | 85 | 5 | 45 | 15 |
| 2N581 | 120 | -14 | -18 | 100 | 85 | 5 | 30 | 8 |
| 2N582 | 120 | -14 | -25 | 100 | 85 | 5 | 60 | 18 |
| GENERAL PURPOSE TYPES | | | | | | | | |
| 2N413 | 120 | -18 | -30 | 200 | 85 | 5 | 30▲ | 2.5 |
| 2N414 | 120 | -15 | -30 | 200 | 85 | 5 | 60▲ | 5 |
| 2N416 | 120 | -12 | -30 | 200 | 85 | 5 | 80▲ | 10 |
| 2N417 | 120 | -10 | -30 | 200 | 85 | 5 | 140▲ | 20 |

*Designed to meet MIL-T-19500/20

†Designed to meet MIL-T-19500/44



TO-3 and High Power Outlines Feature Exclusive Tung-Sol Cold Weld Seal . . .

• True hermetic, copper-to-copper seal improves thermal characteristics.

• Elimination of heat-damage, heat-caused moisture and "splash" increase reliability.

• Vacuum-tight, moisture-proof cold-weld seal lasts even through "breathing" over long-life.

For further information on available Tung-Sol products . . . to discuss specific

* SPECIAL-PURPOSE TUBES
 * SEMICONDUCTORS
 * ENTERTAINMENT TUBES
 * LAMPS



PENTODES

Used in military and other communications equipment.

Types available: 1AD4, 6AJ5, 6AK5WB, 6AS6, 6AU6WA, 5636, 5636A, 5639, 5654/6AK5W, 5654/6AK5W/6096, 5672, 5678, 5725/6AS6W, 5725/6AS6W, 6187, 5749/6BA6W, 5875.



VHF TRIODES

Used in military VHF radio and test equipment.

Types available: 5676



POWER TRIODES

Used in high current regulated power supplies and radio and industrial gear with built-in power supplies.

Types available: 6AS7G, 5998, 6080, 6080WA, 6082, 6336, 6336A, 6394A, 6520, 7105, 6528, 7241, 7242.



INDICATOR THYRATRONS

Used in relay service wherever a small, lightweight, self-indicating tube is needed.

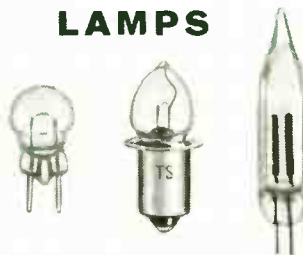
Types available: 7400, 7401, 7323.

ENTERTAINMENT TUBES



Tung-Sol Blue Chip quality tubes are available for virtually every entertainment need — cathode ray, series-string, hybrid auto radio, TV, radio and hi-fi.

LAMPS



Neon glow and miniature incandescent lamps represent two areas of Tung-Sol lamp leadership, dating from 1907 and development of the first successful electric automotive headlamp.

POWER, MEDIUM FREQUENCY

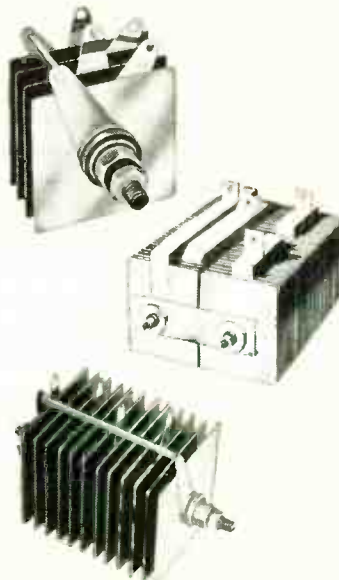
| TYPE | MAXIMUM RATINGS (25° C) | | | | | TYPICAL VALUES (25° C) | | |
|---------------------------|-------------------------|-----------------------|-----------------------|------------------|-------------------|--------------------------|-----------------|-------------------|
| | Pc W | V _{CE} volts | V _{CB} volts | I _C A | T _J °C | Max. I _{CEO} ma | h _{FE} | f _α mc |
| AUDIO TYPES | | | | | | | | |
| 2N242 | 15 | -45 | — | 2 | 85 | 1.0 | 50 | 0.4 |
| POWER SWITCH TYPES | | | | | | | | |
| 2N378 | 50 | -20 | -40 | 5 | 100 | 0.5 | 30 | 0.3 |
| 2N379 | 50 | -40 | -80 | 5 | 100 | 0.5 | 30 | 0.3 |
| 2N380 | 50 | -30 | -60 | 5 | 100 | 0.5 | 50 | 0.4 |
| 2N459 | 50 | -60 | -105 | 5 | 100 | 0.5 | 30 | 0.3 |

HIGH POWER, MEDIUM FREQUENCY

| TYPE | MAXIMUM RATINGS (25° C) | | | | TYPICAL VALUES (25° C) | | |
|-------------------------|---|-----------------------|------------------|-------------------|--------------------------|-----------------|-------------------|
| | V _{CE} volts | V _{CB} volts | I _C A | T _J °C | Max. I _{CEO} ma | h _{FE} | f _α Kc |
| MILITARY TYPE | | | | | | | |
| TS748 | Designed to meet MIL-T-19500/13A dated 8 January 1958 | | | | | | |
| INDUSTRIAL TYPES | | | | | | | |
| 2N173 | -50 | -60 | 15 | 95 | 8 | 52 | 10 |
| 2N174 | -70 | -80 | 15 | 95 | 8 | 37 | 10 |
| 2N174A | -70 | -80 | 15 | 95 | 8 | 37 | 10 |
| 2N277 | -40 | -40 | 15 | 95 | 8 | 52 | 10 |
| 2N278 | -45 | -50 | 15 | 95 | 8 | 52 | 10 |
| 2N441 | -40 | -40 | 15 | 95 | 8 | 30 | 10 |
| 2N442 | -45 | -50 | 15 | 95 | 8 | 30 | 10 |
| 2N443 | -50 | -60 | 15 | 95 | 8 | 30 | 10 |

SELENIUM RECTIFIERS

Specializing in high power units. All plate sizes . . . all power requirements.



SILICON RECTIFIERS

Wide power range for radio, television and heavy-duty industrial applications.



Small, flexible lead units for TV, radio, power supplies, blockers, DC to DC converters. Series 1N2072 to 1N2079 with Peak Inverse Voltages from 50 to 500.

Top hat, axial lead units with ratings up to 750 ma and up to 600 Peak Inverse Voltage.

High current, stud-mounted units with ratings up to 70 amperes and up to 600 Peak Inverse Voltage.

design requirements, contact: Tung-Sol Electric Inc., Newark 4, N. J.





Burnell Adjustoroids® are always new because they are always being designed for newer and broader electronic and mechanical applications.

NEW Burnell's complete line of encapsulated Adjustoroids are particularly adaptable to printed circuit use.

NEW A screw mount PC type Adjustoroid for greater durability in high acceleration, shock and vibration environments.

NEW 'Pot' mounting Adjustoroids for panel mounting and knob adjustment wherever slotted controls are difficult to reach.

NEW Continuous internal improvements including adjustment range, Q, size, etc. Burnell Adjustoroid engineers are constantly seeking solutions to space, accessibility and performance problems.

Burnell Adjustoroids and sub-miniature Adjustoroids are supplied hermetically sealed to meet government specifications MIL E 15305A or encapsulated in many sizes and shapes to meet the application. If your Adjustoroid needs can't be met from our stock catalogue, we'll be glad to manufacture to your specifications. For additional information, write for Adjustoroid bulletin.

| | Length/ Dia. | Width | Hgt. | Wt. | Useful Freq. Range | Max Q | Max l in hys |
|---------|-----------------|--------|--------|---------|--------------------|---------|-----------------|
| AT-0 | 1 1/16 | | 1" | 2 oz | 1 kc to 20 kc | 10 kc | 3 hys |
| AT-1 | 1 3/4 | 1 3/4 | 1 1/4" | 7.25 oz | 2 kc to 10 kc | 4 kc | 15 hys |
| AT-2 | 2 3/4 | 2 3/4 | 2 1/4" | 24 oz | Below 2.5 kc | 2.5 kc | 125 hys |
| AT-4 | 1 1/4 | | 1 1/4" | 4 oz | 1 kc to 16 kc | 6 kc | 15 hys |
| AT-6 | 1 1/16 | | 1" | 2 oz | 10 kc to 100 kc | 30 kc | .75 hys |
| AT-10 | 1 1/4 | | 1 1/4" | 4 oz | 3 kc to 50 kc | 20 kc | .75 hys |
| *AT-11 | 4 5/16 | 4 5/16 | 3/4" | .83 oz | 2 kc to 25 kc | 15 kc | 5 hys |
| *AT-12 | 4 5/16 | 4 5/16 | 3/4" | .83 oz | 15 kc to 150 kc | 60 kc | .5 hys |
| AT-15 | 1 31/32 | | 1 7/8" | 14 oz | Below 5 kc | 4 kc | 125 hys |
| AF-51 | 1 1/4 | | 2" | 5 oz | 30 cps to 500 cps | 120 cps | 1000 hys |
| AF-52 | 1 1/4 | | 2" | 5 oz | 50 cps to 1 kc | 250 cps | 1000 hys |
| *AF-87 | 4 5/16 | 4 5/16 | 1 1/4" | 1.7 oz | 90 cps to 2 kc | 400 cps | 80 hys |
| *AF-88 | 4 5/16 | 4 5/16 | 1 1/4" | 1.7 oz | .16 kc to 4 kc | 800 cps | 42 hys |
| †ATE-11 | 3/4 | | 3/4" | .83 oz | 2 kc to 25 kc | 15 kc | 5 hys |
| †ATE-12 | 3/4 | | 3/4" | .83 oz | 15 kc to 150 kc | 60 kc | .5 hys |

*Special "pot" type sub-miniature Adjustoroids are not available with AT-11, AT-12, AF-87, AF-88.

†Special screw mountings are available with the ATE-11 and ATE-12 in printed circuit applications for "plug in" types. Where vibration and shock are significant considerations, mounting screws serve as terminal connections.

®Trade Name Pat. #2,762,020

Burnell & Co., Inc.

PIONEERS IN TOROIDS, FILTERS AND RELATED NETWORKS

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TELETYPE PASACAL 7578

Is management asking you about **TUBE RELIABILITY?**



...asking you to predict the future performance of the tubes you specified for that new radio, phonograph, or TV-set design? Asking you to specify high-quality tubes at the lowest possible costs? There's a simple way to answer these questions. That's to design around RCA PREFERRED TUBE TYPES.

These are the types *most* designers specify *most* often, because Preferred Types have proven themselves *the most reliable, the most useful*. And because they're specified so frequently, they're in virtually continuous production. This means ready availability, no production hold-ups because of shortages. Means better-performing tubes, too (the more you work with a tube, the better you can make it). Preferred Types minimize field problems, as well. Service technicians are more familiar with them...know they're in demand, so keep them in stock.

There's no question of tube reliability if you specify PREFERRED—designer-preferred—TUBE TYPES. Ask your RCA Field Representative for the up-to-date list.



RADIO CORPORATION OF AMERICA

Electron Tube Division

Harrison, N. J.

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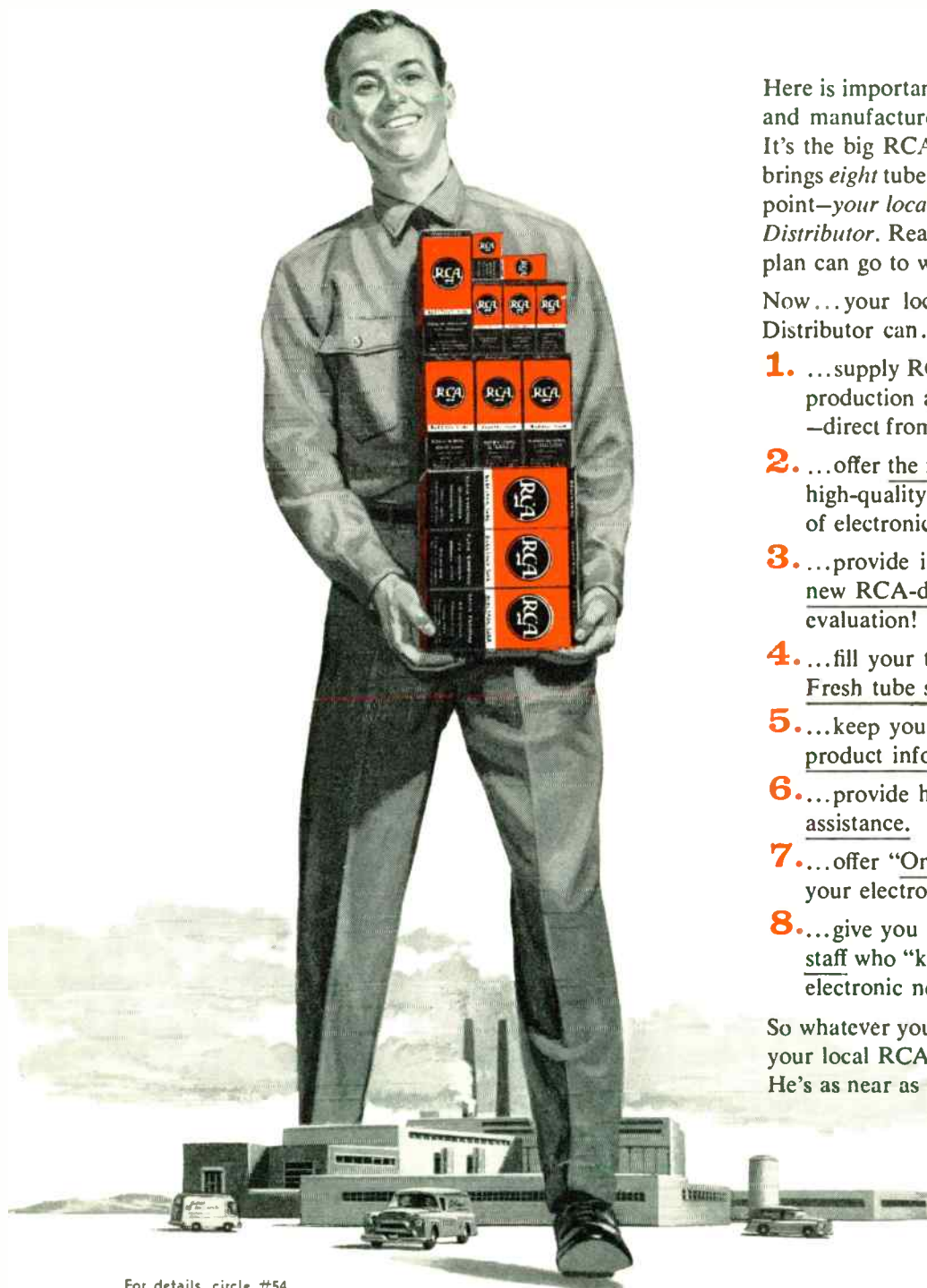
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MIDWEST: Suite 1154, Merchandise Mart Plaza
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1. ...supply RCA Tubes for your pre-production and laboratory requirements—direct from local stock at factory prices.
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8. ...give you the benefits of a specialized staff who "know" electronics and your electronic needs.

So whatever your needs in electronics, call your local RCA Industrial Tube Distributor. He's as near as your telephone.

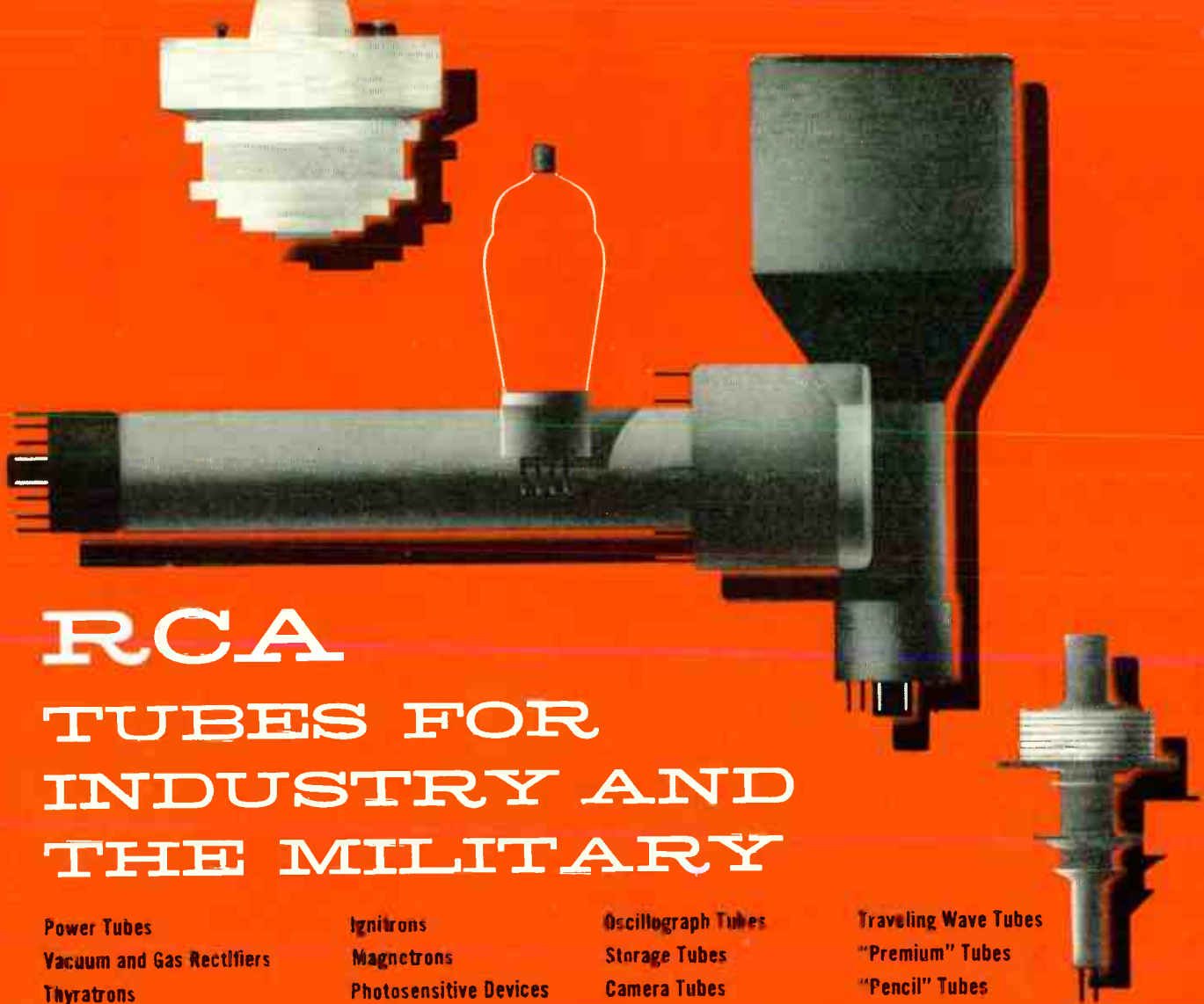


RADIO CORPORATION OF AMERICA
Electron Tube Division

Harrison, N. J.



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"Premium" Tubes

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For your electronic-equipment designs, RCA tubes for industrial and military applications offer top quality and proven dependability. No matter what your circuit requirements... for service in photoelectronics, microwaves, power rectification, video, thyratron control, RF heating, or radio communication... look to RCA for the tubes you need. Your RCA Field Representative is the man to call for complete information. For your copy of any of the publications shown, write to RCA Commercial Engineering, Section I-22-Q, Harrison, N. J., indicating the form number of the booklet desired and include remittance.



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RADIO CORPORATION OF AMERICA
Electron Tube Division
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Whatever your design needs

...INDUSTRIAL ...ENTERTAINMENT

...MILITARY ...COMPUTER

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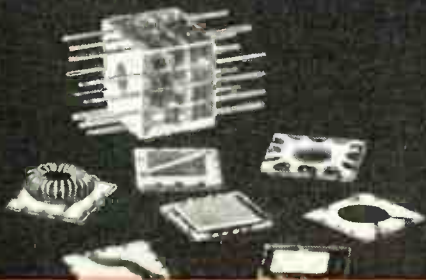
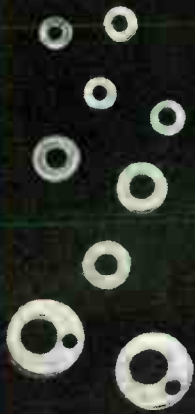
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RCA FERRITES

... a comprehensive line of memory cores, switching cores, transfluxors, memory planes, and aperture plates for computer and data processing equipment. RCA's wide experience in the manufacture and application of ferrite materials can be of valuable help to you in your computer designs.



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- Detroit 2, Mich., 714 New Center Bldg., TR 5-5600
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RCA TRANSISTORS

... RCA Transistors cover a wide range of applications from DC to VHF, for RF, IF, AF and switching functions in entertainment, industrial, military and computer applications. They are produced and controlled to meet the most critical performance requirements and have built an enviable record of electrical uniformity and long life.

RCA DIFFUSED-JUNCTION SILICON RECTIFIERS

... a wide range of types for entertainment, industrial and magnetic-amplifier service featuring rugged design, high-efficiency performance and electrical uniformity. Precision-controlled diffused-junction process provides high reliability. New types are constantly being added to this line.

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RADIO CORPORATION OF AMERICA

Semiconductor and Materials Division

Somerville, N. J.

World Radio History

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Delivered now • Guaranteed for five years



1-AMP AND 2-AMP — CONVECTION COOLED

*No internal blowers
No moving parts*

0-32 VDC

0-1 AMP 0-2 AMP

CONDENSED DATA

Voltage Bands . . . 0-8, 8-16, 16-24, 24-32 VDC
Line Regulation . . . Better than 0.15 per cent or 20 millivolts (whichever is greater). For input variations from 105-125 VAC.
Load Regulation . . . Better than 0.15 per cent or 20 millivolts (whichever is greater). For load variations from 0 to full load.
AC Input 105-125 VAC, 50-400 CPS
Electrical Overload Protection . . . Magnetic circuit breaker, front panel mounted. Unit cannot be injured by short circuit or overload.
Thermal Overload Protection . . . Thermostat, manual reset, rear of chassis. Thermal overload indicator light, front panel.
Size 3½" H x 19" W x 14⅜" D.

- Ambient 50° C at full rating.
- High efficiency radiator heat sinks.
- Silicon rectifier.
- 50-400 cycles input.
- Special, high-purity foil, long-life electrolytics.
- Compact. Only 3½" panel height.
- Short-circuit proof.
- Protected by magnetic circuit breakers.
- Hermetically-sealed transformer. Designed to MIL-T27A.
- All transistor. No tubes.
- Fast transient response.
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- Excellent regulation. Low output impedance. Low ripple.
- Remote sensing and DC vernier.

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| Model LT 1095 | \$285 |
| Model LT 1095M (metered) | \$315 |
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LAMBDA ELECTRONICS CORP.

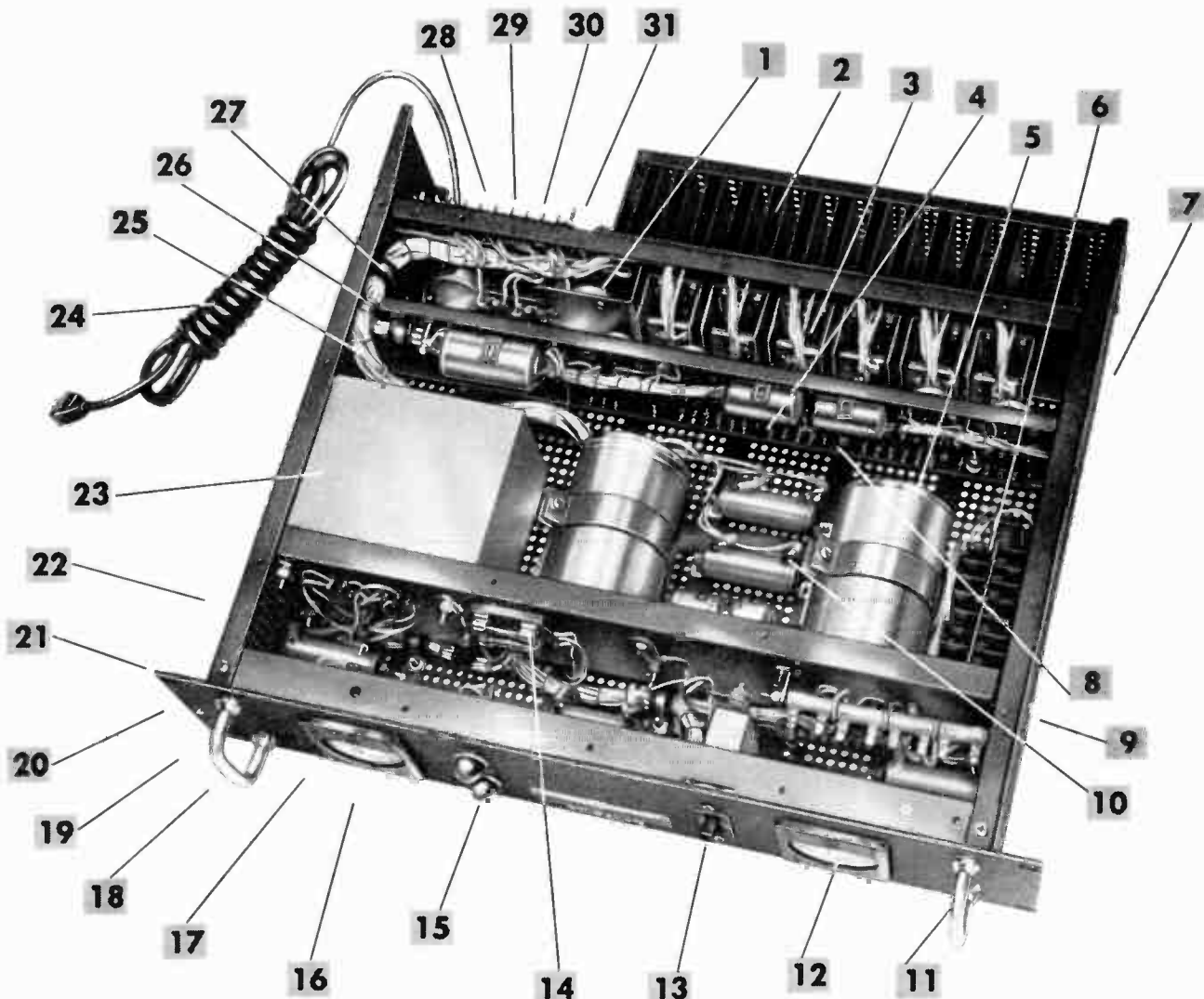
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LAMBDA L-T TRANSISTORIZED POWER SUPPLIES



DESIGN AND PERFORMANCE FEATURES

- | | | | |
|--|--|--|--|
| 1. Thermal overload breaker for excess ambient temperature protection | 8. Stable, low-noise wire-wound reference networks and multipliers | 16. Fast transient response | 23. Hermetically-sealed transformer—designed to Mil-T 27A |
| 2. High efficiency, convection heat sinks | 9. Unit welded chassis and frame | 17. Every specification lab-checked before shipment | 24. Heavy-duty extra-length industrial cord |
| 3. Industrial type power transistors inherently protected against overload | 10. Every connection and solder joint individually inspected and checked | 18. Rated for full load over entire voltage range | 25. Harness wiring |
| 4. Highly stable Zener voltage reference diode | 11. Sturdy gripping handles | 19. Advanced packaging for optimum thermal and mechanical design | 26. Nylon jacketed vinyl wire |
| 5. Special, high-purity foil, hermetically sealed, long-life electrolytic capacitors | 12. Meters on "M" models | 20. Rated for 24-hour continuous duty | 27. Sturdy cable clamp anchors |
| 6. Silicon rectifier | 13. Magnetic circuit breaker | 21. Compact—only 3½" panel height | 28. Remote DC vernier adjustment terminals |
| 7. Excellent regulation, low output, impedance, low ripple | 14. Fuses, internal failure protection | 22. Rated for operation from 50-400 cycle source | 29. Remote sensing terminals |
| | 15. Thermal overload indicator light | | 30. All controls clearly identified and marked |
| | | | 31. Heavy-duty barrier-type terminal block located for convenient rack cabling |

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LAMBDA ELECTRONICS CORP.



NEED ONLY 8 1/4" OF PANEL HEIGHT!



NEED ONLY 7" OF PANEL HEIGHT!



NEED ONLY 5 1/4" OF PANEL HEIGHT!



NEED ONLY 5 1/4" OF PANEL HEIGHT!

Three voltage ranges:
0-200, 125-325, 325-525 VDC

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- MODEL C-1580M: 0-200 VDC, 0-1500 MA. 580.00
- MODEL C-1581M: 125-325 VDC, 0-1500 MA. 605.00
- MODEL C-1582M: 325-525 VDC, 0-1500 MA. 680.00
- (unmetered)
- MODEL C-1580: 0-200 VDC, 0-1500 MA. 550.00
- MODEL C-1581: 125-325 VDC, 0-1500 MA. 575.00
- MODEL C-1582: 325-525 VDC, 0-1500 MA. 650.00

- (metered)
- MODEL C-880M: 0-200 VDC, 0-800 MA. 370.00
- MODEL C-881M: 125-325 VDC, 0-800 MA. 345.00
- MODEL C-882M: 325-525 VDC, 0-800 MA. 390.00
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- MODEL C-881: 125-325 VDC, 0-800 MA. 315.00
- MODEL C-882: 325-525 VDC, 0-800 MA. 360.00

- (metered)
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- MODEL C-481M: 125-325 VDC, 0-400 MA. 274.50
- MODEL C-482M: 325-525 VDC, 0-400 MA. 289.50
- (unmetered)
- MODEL C-480: 0-200 VDC, 0-400 MA. 259.50
- MODEL C-481: 125-325 VDC, 0-400 MA. 244.50
- MODEL C-482: 325-525 VDC, 0-400 MA. 259.50

- (metered)
- MODEL C-280M: 0-200 VDC, 0-200 MA. 214.50
- MODEL C-281M: 125-325 VDC, 0-200 MA. 189.50
- MODEL C-282M: 325-525 VDC, 0-200 MA. 199.50
- (unmetered)
- MODEL C-280: 0-200 VDC, 0-200 MA. 184.50
- MODEL C-281: 125-325 VDC, 0-200 MA. 159.50
- MODEL C-282: 325-525 VDC, 0-200 MA. 169.50

LAMBDA
COM-PAK®
POWER SUPPLIES

Less space! Improved performance!
Long, trouble-free service!
Transient free output!

Fill the need for compact, regulated DC power supplies. Economy of panel space, functional simplicity, new quick-service features.

Wiring, tubes and other components readily accessible. You can reach them easily, service them fast

400 MA, 800 MA, and 1.5 ampere models include new, high-efficiency, long-life, hermetically-sealed semi-conductor rectifiers. All Com-Pak models are constructed with hermetically-sealed magnetic components and capacitors for long trouble-free service.

Condensed Data

- LINE REGULATION Better than 0.15% or 0.3 Volt, whichever is greater.
- LOAD REGULATION Better than 0.25% or 0.5 Volt, whichever is greater.
- INTERNAL IMPEDANCE
 - C- 200 Series Less than 6 ohms.
 - C- 400 Series Less than 3 ohms.
 - C- 800 Series Less than 1.5 ohms.
 - C-1500 Series Less than 0.75 ohms.
- RIPPLE AND NOISE Less than 3 millivolts rms.
- POLARITY Either positive or negative may be grounded.
- AMBIENT TEMPERATURE Continuous duty at full load up to 50° C (122° F) ambient.
- AC OUTPUT (unregulated) 6.5 VAC (at 115 VAC Input).
 - C- 200 Series 10 AMP
 - C- 400 Series 15 AMP
 - C- 800 Series 20 AMP
 - C-1500 Series 30 AMP
- AC INPUT 105-125 VAC, 50-400 CPS
- OVERLOAD PROTECTION AC and DC fuses; built-in blown-fuse indicators.

GUARANTEED BY LAMBDA FOR FIVE FULL YEARS



LAMBDA ELECTRONICS CORP.

100 MA SERIES

Complete power supply dependability



Model 28M: 200-325 VDC, 0-100 MA, with meters, \$89.50
Model 29M: 100-200 VDC, 0-100 MA, with meters, 99.50



Model 28: 200-325 VDC, 0-100 MA, without meters, \$59.50
Model 29: 100-200 VDC, 0-100 MA, without meters, \$69.50

These long-lasting, dependable sources of power deliver "work horse" service...yet cost as little as \$59.50.

Intended primarily for fixed voltage use, they provide a convenient, low-cost power source for auxiliary equipment; also suited to production line applications.



5-Year Guarantee

We warrant each instrument manufactured by us, and sold by us or our authorized agents, to be free from defects in material and workmanship and that it will perform within specifications for a period of five years after original shipment. Our obligation under this guarantee is limited to repairing or replacing any instrument or part thereof (except tubes and fuses) which shall, within five years after delivery to the original purchaser, be returned to us with transportation charges prepaid, prove after due examination to be thus defective.

We reserve the right to discontinue instruments without notice, and to make modifications in design at any time without incurring any obligation to make such modifications to instruments previously sold.

LAMBDA GIVES FIVE-YEAR GUARANTEE



Ready for Long Dependable Service

In choosing this Lambda Power Supply you are benefiting from an outstanding record of performance measured under the most grueling field conditions. Long term, trouble-free operation in heavy-duty service, attested to by owners and users of Lambda Power Supplies, has made possible the unprecedented five-year guarantee that covers this piece of equipment.

LAMBDA ELECTRONICS CORPORATION
11-11 131 Street, College Point 56, New York

Lambda gives you the strongest proof of consistent, trouble-free power supply performance ever offered: a guarantee covering workmanship and materials (except for tubes and fuses) for *five full years*.

The guarantee, by far the most liberal one given by any power supplies manufacturer, has been made possible by an outstanding record of field performance.

This performance record proves the excellent experience which owners of Lambda power supplies have had with their equipment even under the most grueling, heavy-duty service.

Factual evidence of this kind is backed up by the results of many independent preference studies which show that of the engineers who specify power supplies, more than 50% prefer Lambda equipment.

GUARANTEED BY LAMBDA FOR FIVE FULL YEARS



LAMBDA ELECTRONICS CORP.

..... HEAVY DUTY AND PORTABLE MODELS

500 MA

Wide range power supplies
in bench and rack models



Bench Model 50: 0-500 VDC, 0-500 MA, \$440.00

Lambda Model 50 is a general purpose, heavy duty power supply for bench use. It is housed in a compact cabinet provided with a rear access door and two sturdy carrying handles.

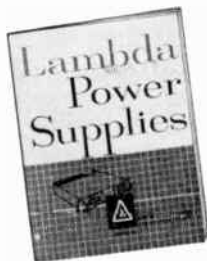
Rack Model 50R, intended for mounting in a standard 19" rack, is identical to Model 50 except that a ventilated dust cover is supplied in place of the cabinet.



Rack Model 50R: 0-500 VDC, 0-500 MA, \$420.00

NEW 36-PAGE CATALOG

Send
for your
free copy



New 36-page edition contains information and specifications on Lambda's full line of transistor-regulated and tube-regulated power supplies.

200 MA PORTABLE

Wide range de luxe portable
power supply for broad field
and laboratory applications



Model 71:
0-500 VDC,
0-200 MA,
\$310.00

Built for heavy-duty service, this versatile precision unit features maximum compactness and portability. Weight: 49 lbs. Only 13" high, 8 $\frac{3}{4}$ " wide, 14 $\frac{1}{2}$ " deep.

Model 71 is mounted on rubber bumper feet and is equipped with a sturdy fold-down leather handle.

100 MA PORTABLE



Model 25: 200-325 VDC, 0-100 MA, \$69.50

Model 26: 100-200 VDC, 0-100 MA, \$79.50

COMPACT...PORTABLE...LOW COST

Supplies both regulated voltages and unregulated AC voltage for a variety of uses. Popularly used as a power source for electronic equipment and for many other applications requiring a source of stabilized DC voltage. Weight: only 19 lbs. Size: 8"H x 14"W x 6"D.

GUARANTEED BY LAMBDA FOR FIVE FULL YEARS



LAMBDA ELECTRONICS CORP.

CHECK LIST: LAMBDA REGULATED DC POWER SUPPLIES

| Model | Style | Voltage Range (VDC) | Current Range (MA DC) | Regulation Impedance Ripple (Table I) | 6.3 VAC Output (Amps) | Meters | Output Voltage Control | Output Terminals | Size Weight (Table II) | Price (U.S. and Canada) F.O.B. Factory College Pt., N. Y. |
|---|-------|---------------------|-----------------------|---------------------------------------|-----------------------|-------------|------------------------|------------------|------------------------|---|
| REGULATED POWER SUPPLIES—RACK MOUNTING | | | | | | | | | | |
| TRANSISTORIZED | | | | | | | | | | |
| LT-1095 | Rack | 0-32 | 0-1000 | A | — | None | Rear | Rear | S-1 | 285.00 |
| LT-1095M | Rack | 0-32 | 0-1000 | A | — | 2 1/2" rect | Rear | Rear | S-1 | 315.00 |
| LT-2095 | Rack | 0-32 | 0-2000 | B | — | None | Rear | Rear | S-1 | 365.00 |
| LT-2095M | Rack | 0-32 | 0-2000 | B | — | 2 1/2" rect | Rear | Rear | S-1 | 395.00 |
| TUBE REGULATED | | | | | | | | | | |
| C-280 | Rack | 0-200 | 0-200 | C | 10A | None | Rear | Rear | S-2 | 184.50 |
| C-280M | Rack | 0-200 | 0-200 | C | 10A | 3 1/2" rect | Rear | Rear | S-2 | 214.50 |
| C-281 | Rack | 125-325 | 0-200 | C | 10A | None | Rear | Rear | S-2 | 159.50 |
| C-281M | Rack | 125-325 | 0-200 | C | 10A | 3 1/2" rect | Rear | Rear | S-2 | 189.50 |
| C-282 | Rack | 325-525 | 0-200 | C | 10A | None | Rear | Rear | S-2 | 169.50 |
| C-282M | Rack | 325-525 | 0-200 | C | 10A | 3 1/2" rect | Rear | Rear | S-2 | 199.50 |
| C-480 | Rack | 0-200 | 0-400 | D | 15A | None | Rear | Rear | S-2 | 259.50 |
| C-480M | Rack | 0-200 | 0-400 | D | 15A | 3 1/2" rect | Rear | Rear | S-2 | 289.50 |
| C-481 | Rack | 125-325 | 0-400 | D | 15A | None | Rear | Rear | S-2 | 244.50 |
| C-481M | Rack | 125-325 | 0-400 | D | 15A | 3 1/2" rect | Rear | Rear | S-2 | 274.50 |
| C-482 | Rack | 325-525 | 0-400 | D | 15A | None | Rear | Rear | S-2 | 259.50 |
| C-482M | Rack | 325-525 | 0-400 | D | 15A | 3 1/2" rect | Rear | Rear | S-2 | 289.50 |
| C-880 | Rack | 0-200 | 0-800 | E | 20A | None | Rear | Rear | S-3 | 340.00 |
| C-880M | Rack | 0-200 | 0-800 | E | 20A | 3 1/2" rect | Rear | Rear | S-3 | 370.00 |
| C-881 | Rack | 125-325 | 0-800 | E | 20A | None | Rear | Rear | S-3 | 315.00 |
| C-881M | Rack | 125-325 | 0-800 | E | 20A | 3 1/2" rect | Rear | Rear | S-3 | 345.00 |
| C-882 | Rack | 325-525 | 0-800 | E | 20A | None | Rear | Rear | S-3 | 360.00 |
| C-882M | Rack | 325-525 | 0-800 | E | 20A | 3 1/2" rect | Rear | Rear | S-3 | 390.00 |
| C-1580 | Rack | 0-200 | 0-1500 | F | 30A | None | Rear | Rear | S-4 | 550.00 |
| C-1580M | Rack | 0-200 | 0-1500 | F | 30A | 3 1/2" rect | Rear | Rear | S-4 | 580.00 |
| C-1581 | Rack | 125-325 | 0-1500 | F | 30A | None | Rear | Rear | S-4 | 575.00 |
| C-1581M | Rack | 125-325 | 0-1500 | F | 30A | 3 1/2" rect | Rear | Rear | S-4 | 605.00 |
| C-1582 | Rack | 325-525 | 0-1500 | F | 30A | None | Rear | Rear | S-4 | 650.00 |
| C-1582M | Rack | 325-525 | 0-1500 | F | 30A | 3 1/2" rect | Rear | Rear | S-4 | 680.00 |
| 28 | Rack | 200-325 | 0-100 | G | 3A | None | Rear | Rear | S-5 | 59.50 |
| 28M | Rack | 200-325 | 0-100 | G | 3A | 3 1/2" rect | Rear | Rear | S-5 | 89.50 |
| 29 | Rack | 100-200 | 0-100 | H | 3A | None | Rear | Rear | S-5 | 69.50 |
| 29M | Rack | 100-200 | 0-100 | H | 3A | 3 1/2" rect | Rear | Rear | S-5 | 99.50 |
| 32 | Rack | 200-325 | 0-300 | J | 2 @ 5A | None | Rear | Rear | S-6 | 139.50 |
| 32M | Rack | 200-325 | 0-300 | J | 2 @ 5A | 3 1/2" rect | Rear | Rear | S-6 | 169.50 |
| 33 | Rack | 100-200 | 0-300 | J | 2 @ 5A | None | Rear | Rear | S-6 | 154.50 |
| 33M | Rack | 100-200 | 0-300 | J | 2 @ 5A | 3 1/2" rect | Rear | Rear | S-6 | 184.50 |
| 50R | Rack | 0-500 | 0-500 | K | 2 @ 5A | 4 1/2" rect | Front | Fr & rear | S-7 | 420.00 |
| | | 0-50 | Bias | L | | | | | | |
| | | 0-200 | High Imped. | M | | | | | | |

| REGULATED POWER SUPPLIES—PORTABLE AND BENCH | | | | | | | | | | |
|--|----------|---------|-------------|---|--------|-------------|---------------------|-------|------|--------|
| 25 | Bench | 200-325 | 0-100 | G | 3A | None | Front | Front | S-8 | 69.50 |
| 26 | Bench | 100-200 | 0-100 | H | 3A | None | Front | Front | S-8 | 79.50 |
| 50 | Bench | | | | | | See Model 50R above | | S-9 | 440.00 |
| 71 | Portable | 0-500 | 0-200 | N | 2 @ 5A | 3 1/2" rect | Front | Front | S-10 | 310.00 |
| | | 0-50 | Bias | P | | | | | | |
| | | 0-200 | High Imped. | Q | | | | | | |

GENERAL SPECIFICATIONS

Sufficient tolerance is incorporated in the specifications to allow for normal commercial component and tube deviations. Tube replacements may be made with any equivalent tubes meeting E.I.A. specifications.

INPUT

105-125 VAC, 50-400 CPS, single phase. Exceptions: Models 50, 50R and 71—105-125 VAC, 50-60 CPS.

DC OUTPUT

Voltage Range: Continuously variable over ranges specified, except where otherwise noted.

Current Range: The current ranges given apply to the entire DC output voltage range, and for input voltages from 105 to 125 VAC. No "derating" is necessary.

Polarity: Either positive or negative terminal may be grounded.

AC OUTPUT

The AC output is unregulated, isolated and ungrounded.

It has a value of slightly higher than 6.3 V (when fully loaded) at an input of 115 VAC. This value allows for voltage drop in connecting leads. Dual outputs may be connected in series or parallel.

DUTY CYCLE

Continuous duty at full load.

METERS

Where meters are indicated, a separate voltmeter and milliammeter are provided.

OVERLOAD PROTECTION

Ample protection is provided against external overload and internal failure conditions by means of fuses.

Circuit breakers of the magnetic, "trip-free" type are employed in Models 50, 50R, 71 and LT series as protection against external overloads. And in the LT series, the transistor complement is independently protected by special transistor circuitry.

STYLE

Rack Models are designed for mounting on standard 19" relay racks.

Bench Models are provided with compact, specially-designed, ventilated cabinets equipped with carrying handles. The power supply units may be removed from their cabinets for mounting in standard relay racks (except Models 25, 26 and 71).

RATINGS AND COMPONENTS

All components used are of the highest quality and are operated well within manufacturers ratings. Hermetically sealed, oil-filled capacitors are used exclusively, except in LT series, where special high purity foil, long-life electrolytics are used. Ample safety factors are provided in the design to insure the long life, and the dependable, trouble-free operation so desirable in industrial and laboratory applications.

All specifications and prices subject to change without notice.

TABLE I
DC OUTPUT VOLTAGE REGULATION, IMPEDANCE, RIPPLE

| REGULATION | | Internal Impedance (ohms) | Ripple, rms (millivolts or %) |
|--------------------|-------------------|---------------------------|-------------------------------|
| Line (105-125 VAC) | Load (min to max) | | |
| Less than | Less than | Less than | Less than |
| A | 0.15% or 20mV | 0.15% or 20mV | 0.50 |
| B | 0.15% or 20mV | 0.15% or 20mV | 0.025 |
| C | 0.15% or 0.3V | 0.25% or 0.5V | 6 |
| D | 0.15% or 0.3V | 0.25% or 0.5V | 3 |
| E | 0.15% or 0.3V | 0.25% or 0.5V | 1.5 |
| F | 0.15% or 0.3V | 0.25% or 0.5V | 0.75 |
| G | 1% | 1% | 10 |
| H | 1% | 1% | 10 |
| J | 1% | 1% | 4 |
| K | 0.15% or 0.1V | 0.5% or 0.3V | 2 |
| L | 0.1% | unregulated | 3,300 |
| M | 0.1% | unregulated | 17,500 |
| N | 0.15% or 0.3V | 0.15% or 0.3V | 4 |
| P | 0.1% | unregulated | 5,500 |
| Q | 0.1% | unregulated | 25,000 |

TABLE II
SIZES AND WEIGHTS

| Model | Size H x W x D (inches) | WEIGHT | |
|-------|-------------------------|-----------|----------------|
| | | Net (lbs) | Shipping (lbs) |
| S-1 | 3 1/2 x 19 x 14 1/4 | 35 | 65 |
| S-2 | 5 1/4 x 19 x 14 1/4 | 53 | 80 |
| S-3 | 7 x 19 x 14 1/4 | 84 | 100 |
| S-4 | 8 3/4 x 19 x 14 1/4 | 120 | 140 |
| S-5 | 5 1/4 x 19 x 8 | 19 | 23 |
| S-6 | 10 1/2 x 19 x 9 1/4 | 42 | 52 |
| S-7 | 10 1/2 x 19 x 14 1/4 | 89 | 140 |
| S-8 | 8 x 14 x 6 | 19 | 23 |
| S-9 | 12 1/2 x 22 x 15 | 110 | 158 |
| S-10 | 13 x 8 3/4 x 14 1/2 | 49 | 85 |

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MAGNETRONS



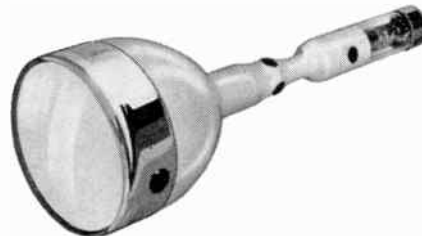
| TYPE NUMBER | FREQUENCY RANGE MEGACYCLES | PEAK POWER (MINIMUM) KILOWATTS | DUTY RATIO | REMARKS |
|-------------|----------------------------|--------------------------------|------------|--------------------------------|
| L-3204 | 8800 ±25 | 0.04 | 0.25 | Extremely high duty. |
| L-3105 | 9300 ±40 | 0.10 | 0.01 | Extreme ruggedization. |
| L-3186 | 9300 ±40 | 0.10 | 0.027 | Ruggedized. |
| L-3028B | 9280 to 9320 | 0.12 | 0.027 | Frequency stable. |
| L-3058 | 9330 to 9350 | 1.0 | 0.003 | High power beacon. |
| L-3268 | 9300 ±30 | 4.0 | 0.001 | Recommended for new systems. |
| LT-6233 | 9280 to 9345 | 7.0 | 0.003 | High duty beacon. |
| L-3103 | 8500 to 9600 | 30.0 | 0.002 | High duty version of LT-6543. |
| L-3168 | 9375 ±30 | 30.0 | 0.002 | High duty version of LT-4J52A. |
| LT-6543A | 8500 to 9600 | 65.0 | 0.001 | Tested for pulse jitter. |
| L-3211 | 8600 to 9500 | 65.0 | 0.001 | Hydraulically tuned. |
| LT-6510 | 9375 ±30 | 65.0 | 0.001 | Tested for pulse jitter. |
| LT-4J52A | 9375 ±25 | 70.0 | 0.001 | Recommended for new systems. |
| LT-4J50A | 9375 ±30 | 225.0 | 0.001 | Recommended for new systems. |

KLYSTRONS



| TYPE NUMBER | FREQUENCY RANGE MEGACYCLES | PEAK POWER (MINIMUM) MEGAWATTS | CATHODE PULSE LENGTH MICRO-SECONDS | CATHODE DUTY RATIO | REMARKS |
|-------------|----------------------------|--------------------------------|------------------------------------|--------------------|--|
| L-3283 | 1250 to 1350 | 2 | 8 | 0.003 | Broadband—(50 megacycles between 2 megawatt points). |
| L-3035 | 1240 to 1360 | 2.2 | 8 | 0.003 | Long range search radar. |
| L-3235 | 1240 to 1360 | 4 | 8 | 0.003 | For linear accelerator. |
| L-3257 | 1280 to 1330 | 4 | 30 | 0.0003 | For linear accelerator. |
| L-3227 | 1280 to 1330 | 5 | 8 | 0.002 | For linear accelerator. |
| L-3231 | 1240 to 1360 | 5 | 8 | 0.0015 | For linear accelerator. |
| L-3250 | 1250 to 1350 | 10 | 7.2 | 0.0015 | Long range search radar. |

DISPLAY TUBES



5CHP11

Dual Deflection Character Writing CRT. High speed electrostatic deflection character writing, with equal sensitivity for X and Y axis. Magnetic deflection character positioning. High definition gun (3000 TV lines). Bright, photographic screen.

5CJP11

High Definition CRT. 3000 line TV resolution. Highly actinic photographic screen. Up to 30 KV operation.

5CGP29

Single Gun Lawrence Type Color Tube. Multi-color long persistence phosphors. 80 color elements per inch. Simple retrofit for monochrome tube, using standard deflection and focus components. Magnetic deflection and focus.

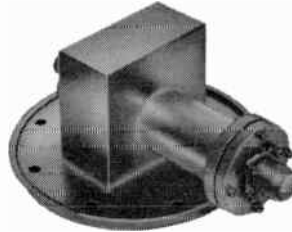
TRAVELING WAVE TUBES

BACKWARD WAVE OSCILLATORS



| TYPE NUMBER | FREQUENCY RANGE MEGACYCLES | POWER OUTPUT | FOCUSING | DUTY FACTOR | REMARKS |
|---------------|----------------------------|---------------|----------------------------|-------------|--|
| TWT L-3266 | 8000 to 12000 | 10 milliwatts | Periodic Permanent Magnet. | CW | Designed for military airborne environments. |
| L-3272 | Classified | Classified | Periodic Permanent Magnet. | Classified | |
| L-3236 | 8000 to 12000 | 2 watts | Periodic Permanent Magnet. | CW | |
| L-3190 | Classified | Classified | Permanent Magnet. | Classified | |
| L-3264 | 100 to 300 | 100 watts | Solenoid | CW | |
| BWO L-3265 | 7000 to 11000 | 10 milliwatts | Solenoid | CW | |
| L-3274 | 8200 to 12400 | 10 milliwatts | Solenoid | CW | |
| L-3279 | 15000 to 21000 | 5 milliwatts | Solenoid | CW | |

MINIATURE NOISE SOURCES



| TYPE NUMBER | FREQUENCY RANGE MEGACYCLES | EXCESS NOISE RATIO | NOMINAL OPERATING CURRENT | NOMINAL OPERATING VOLTAGE | REMARKS |
|-------------|----------------------------|--------------------|---------------------------|---------------------------|-----------|
| L-2000 | 2700 to 2900 | 18.5 ± 0.2db | 75 ma | 30 volts | Waveguide |
| L-2001 | 5400 to 5900 | 13.0 ± 0.5db | 100 ma | 70 volts | Waveguide |
| L-2002 | 7500 to 8600 | 14.5 ± 0.5db | 100 ma | 40 volts | Waveguide |
| L-2003 | 8500 to 9600 | 14.5 ± 0.5db | 100 ma | 50 volts | Waveguide |
| L-2004 | 8500 to 9600 | 18.5 ± 0.5db | 100 ma | 50 volts | Waveguide |
| L-2005 | 16000 to 17000 | 18.4 ± 0.5db | 50 ma | 60 volts | Waveguide |
| L-2006 | 1000 to 2000 | 18.5 ± 0.5db | 50 ma | 175 volts | Coaxial |
| L-2007 | 2000 to 4000 | 18.5 ± 0.5db | 85 ma | 135 volts | Coaxial |
| L-2008 | 200 to 450* | 18.5 ± 0.5db | 25 ma | 200 volts | Coaxial |

*Any 50 mc band in the stated range.

The noise sources listed are miniaturized and rugged units specifically designed for pulsed operation in conjunction with automatic noise measuring equipments. They are equally suitable for CW operation. Inquiries are requested for radar systems requirements as the above is only a representative list of various units now in production.

DUPLEXERS AND TR TUBES

Litton Industries is actively engaged in production and development of high and low power duplexers and TR tubes for the UHF frequency range. Information on these devices can be supplied on request.

Information on Litton Industries classified tubes is available on your evidence of "need to know."

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YOUR PLANNING**



LITTON INDUSTRIES
Electron Tube Division

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what is

Litton Industries has been built on a program of establishing strong proprietary product values based on advanced technologies. We have twenty-two manufacturing plants in the United States and two overseas. Engineers and scientists on our staff have the pleasure of seeing the fruition of their research and development work in the form of economically useful products. Here are our areas of exploration and manufacturing:

Military Equipments & Systems · Commercial Flight Equipment · Communications Equipment · Components · Electron Tubes · Business Machines ·

Here are some of the products we make:

| | |
|----------------------------|-------------------------|
| Accounting Machines | Guidance Systems |
| Adding Machines | Klystrons |
| Antennas | Magnetrons |
| Automatic Control Devices | Microwave Components |
| Carcinotrons | Missile Control Systems |
| Cathode Ray Tubes | Multiplexers |
| Communications Equipments | Navigation Systems |
| Computers | Potentiometers |
| Countermeasures Equipments | Print-out Tubes |
| Cross Field Devices | Rotary Joints |
| Data Processing Equipments | Serial X-ray Machines |
| Digital Computers | Solid State Devices |
| Directional Couplers | Telemetry Equipment |
| Display Tubes | Television Replacement |
| Duplexers | Components |
| Echo Boxes | Terminals |
| Etched Circuits | Toroids |
| Ferrite Load Isolators | Transducers |
| Fire Control Systems | Transformers |
| Gas Tubes | Traveling Wave Tubes |

We have staff openings of professional scope for engineers and scientists at all levels in our Maryland Division and in our Electronic Equipments Division. For the former, address Litton Industries, Maryland Division, 4900 Calvert Road, College Park, Maryland. For the latter, address Litton Industries, Electronic Equipments Division, Beverly Hills, California.

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SHORT FORM CATALOG...

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AC and DC Standardization Consoles, and related test equipment for the accurate measurement and certification of current, voltage, power, frequency and magnetic quantities.

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Model LTC—AC-DC/DC calibration console. Accuracy—.05% of actual reading. Ranges—.5 v. to 1111.5 v.; 1 ma. (2 ma. on AC) to 11.115 amps. Resolution—.01%. Frequency—DC to 25 kc. Other consoles are:

| Model | % Accuracy | Ranges |
|-------|-------------------|---|
| LTD | .05 of reading | .1 v. to 1111.1 v.; 1 ma. to 11.111 amps. DC |
| LYCA | .05 of reading | .5 v. to 1111.5 v.; 2 ma. to 11.115 amps. AC-DC |
| LTA | .05 of full scale | .3 v. to 1500 v.; 2 ma. to 30 amps. AC-DC. |
| LTHD | .05 of reading | 0-1.6 amps.; 0-1.6 v. DC. |

LABORATORY STANDARDS



Model LW—AC/DC Single Phase Wattmeter. Accuracy—.1% f.s. Multirange combinations available from 25 w. through 6 kw. f.s. at 75/150/300 v. f.s. and 80% minimum p.f. Frequency compensation to 1000 c.p.s. on special order. 12" vernier scale.



Model RFVC—Radio frequency Self-Checking RMS voltmeter for the certification of VTVM's from DC to 10 Mc. Accuracy—.3% of full scale \pm .2% frequency influence. Ranges—.01", 1/1/3 v. Checks its own accuracy against a .05% stable internal standard source.



Model DYL



Model THACH

Model DYL—AC. Accuracy—.1% f.s. 60 or 400 c.p.s. Ranges 10/20/50/100/200/500 ma.; 1/2/5/10 amps.; 20/50/100/200/500 v. f.s. 12" vernier scale. **Model THACH**—AC/DC Self-Checking Volt-Amp-Milliammeter. Accuracy—.2% f.s. to 4 kc. Ranges—10/20/50/100/200/500 ma.; 1/2/5 amps.; 1/2/5/10/20/50/100/200/500/1000v. f.s. Checks its own accuracy against an internal standard cell. Special regulated **THACH Power Supply** (optional) automatically shuts off power to the THACH when switching ranges, reducing possibility of accidental overloads. Output is DC or 60 c.p.s. (400 c.p.s. can be plugged in).

Model B5—Self-Checking DC Volt-Amp-Milliammeter. Accuracy .05% f.s. 25 ranges. .3 v. to 1.5 kv.; 1.5 ma. to 15 amps. f.s. Checks its own accuracy against an internal standard cell. **Model B**—DC Accuracy .1% f.s. Multirange I or E combinations from 30 μ a. and 50 mv. to 1000 amps. and 10 kv. f.s. **Model L**—AC/DC. Accuracy .1% f.s. Multirange I or E combinations from 50 ma. and 30 v. to 20 amps. and 1 kv. Frequency compensation to 1000 c.p.s. Models B5, B and L have 12", hand-drawn vernier mirrored scales. Diamond Pivots and shock-mounted jewels.

SENSITIVE RESEARCH INSTRUMENT CORPORATION

NEW ROCHELLE, N. Y.

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927



Permanently Precise!

**AC-DC
ELECTROSTATIC
VOLTMETERS**



Model CRV—Crest or peak voltmeter for reading true RMS, negative peaks and positive peaks. Accuracy—1% f.s. for basic 0-1 kv. instrument. 1% multipliers available up to 100 kv. for AC or pulsed DC measurements. 5.2" scale. For pulses of 20/sec. or more. High input impedance (varies according to range).



Model ESH—Accuracy—1% f.s. (.5% on special order). Single or multi-range combs. from 5 kv. to 100 kv. f.s. 6" scale. Input impedance up to 5×10^{15} ohms. Reads true RMS. Switch controlled from rear. Transit lock and brackets for panel mounting available. Adaptor for peak voltage reading. All electrostatics have a modified square law scale.



Model ESD—Accuracy—1% f.s. (.5% on special order). Single or multi-range from 120 v. to 6 kv. f.s. 5.2" scale. Reads true RMS. Input impedance 10^{15} ohms. **University Model**—Accuracy—1%; ranges from 300 v. to 5 kv. f.s. 4" scale. **Model VPA**—Peak voltage adaptor up to 30 kv. maximum inverse peak rating.

**AC-DC
POLYRANGERS**



Model U88—Accuracy—.5% DC; .75% AC/DC f.s. (thermocouple side). 88 ranges f.s. from 200 μ a. to 1.5 amps.; 20 mv. to 750 v. DC, and 10 ma. to 3 amps.; .5 v. to 750 v. AC/DC. Frequency 5 kc. on E and 15 kc. on I. 5.2" scale. Automatic Temperature Compensation. **Model USP**—similar to above but 28 ranges.



Model C—Rugged DC, .25% f.s. accurate reference standard. 14 ranges f.s. from 1.5 ma. to 3 amps.; 1 v. to 1 kv. (2 combs.) 1 sec. period. 6.3" scale. **Model WVA**—same, but 27 f.s. ranges from 1 ma. to 15 amps.; 100 mv. to 1 kv. **Model S**—Accuracy—.5%. Sensitivity to 10,000 ohms/v.; 5 mv.; 100 μ a. 13 ranges. 5.2" scale.



Model DYP—Transformer coupled dynamometer for 60 c.p.s. AC testing. Accuracy—.3% f.s. 20 f.s. ranges from 5 ma. to 10 amps.; 5 v. to 2 kv. 6.3" scale. **Polyrangers** are portable, general purpose I and E measuring instruments. Other models and range combinations available. Write for a complete listing.

**AC-DC
THERMOCOUPLE
INSTRUMENTS**



Model XT—R.F. ammeter. Accuracy—1% f.s. DC to 70 Mc. Single range from 1 amp. to 100 amps. (higher on special order). Automatic Temperature Compensation. 6.3" scale. **Model RF**—same, but ranges 1 ma. to 1 amp. f.s. Frequency—1 Mc. (4 range unit 250 kc.). **Model AU**—Accuracy—.5% (on special order) up to 20 kc.

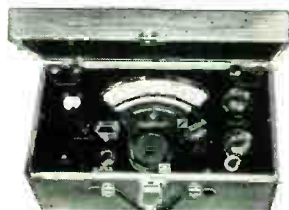


Model A—Accuracy—.75% f.s. (.5% on special order). Single or multi-range switch controlled f.s. ranges from 1 ma. to 1.5 amps.; 2 v. to 1.5 kv. Frequency—up to 7 kc. on E; 15 kc. on I. Automatic Temperature Compensation. 6.3" scale. Thermocouple instruments are available with a thermocouple replacement feature and overload protective shunt.



Model RFV—Radio frequency voltmeter. Accuracy—.5% f.s. $\pm .5\%$ max. frequency influence on switch controlled multi-range units from 1 v. (5 Mc.) to 300v. f.s. (150 kc.). Single range instruments of 1v. or 3 v. f.s. have an upper frequency limit of 10 Mc. Automatic Temperature Compensation. 6.3" scale. Can be certified on DC. Frequency influence constant.

**DC
CORROSION AND
ELECTROLYSIS
INSTRUMENTS**



Model PV—Potentiometer voltmeter—measures true potentials with zero current drain. Accuracy—.5% f.s. Multirange combs. from 2 mv. to 20 v. f.s. 5.2" scale. **Model ZR**—Zero resistance micro-milliammeter having a zero volt loss. Accuracy—.5% f.s. Multirange combs. from 10 μ a. to 300 ma.



Model HS-COR—Designed for rugged field use for A. T. & T. and Bell Tel. Labs. Accuracy—.5% f.s. Multirange combs. from 5 mv. to 100 v. Sensitivities to 1 megohm/v. 6.3" scale. Features the formica case, Diamond Pivots, and special non-slip binding posts for alligator clips.

Diamond Pivots and shock mounted jewels are included in all Laboratory Standards and ultra high sensitivity instruments (thermocouple meters, low resistance microammeters, etc.) They are many times more shock resistant than conventional pivots and jewels, and their installation assures a friction free moving element under the severest operating conditions.



For details, circle #68 on Reader Service Card



SENSITIVE RESEARCH

310 MAIN STREET • NEW ROCHELLE, N. Y.

ELECTRICAL INDICATING INSTRUMENTS



Model PDLW — Polyphase wattmeter for use down to 20% p.f. Accuracy—.75% f.s. up to 500 c.p.s. Multirange combs. from 1.5 w. to 2.4 kw. f.s. at 75/150/300 v. f.s. (frequency limits of 2.5 kc. on special order) 5.2" scale. **Model PDW** — same, but accuracy—.25% f.s. down to 50% p.f. and up to 800 c.p.s. Ranges from 15 w. f.s. at 50/100/200 v. f.s. 6.3" scale.



Model DW — Single phase reference standard wattmeter. Accuracy—.25% f.s. to 50% p.f. and up to 800 c.p.s. Multirange combs. from 5 w. to 2 kw. f.s. at 50/100/200 v. f.s. 6.3" scale. **Model DLW**—same, but accuracy .5% f.s. down to 20% p.f. and up to 500 c.p.s. Ranges from .2 w. f.s. at 75/150/300 v. **University Model**—same, but 4" scale and reduced accuracy.



Model VAW—Volt-Amp-Wattmeter. AC. Accuracy—.5% f.s. for E. and I.; .75% f.s. for w. Ranges for "50-800 c.p.s." model—50/100/200/250/500 w.; 1/2/2.5/5 kw. f.s. at 100/200/500 v. f.s. down to 50% p.f.; "50-125 c.p.s." model has additional ranges of 12.5/25 w. f.s. and 25/50 v. f.s.

AC-DC WATTMETERS



A NEW portable Field instrument

Model N — Economically priced, rugged DC and AC voltmeters and ammeters. Accuracy—.5% f.s. Switch controlled. Range combs.—50 mv. to 1.5 kv. (up to 5 k.-ohms/v.); 50 μ a. to 50 amps. DC; 5 v. to 750 v.; 10 ma. to 10 amps. AC. Long 6" scale. Moulded bakelite case with carrying strap. Can be supplied for panel mounting.

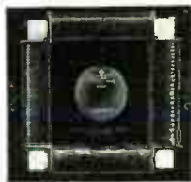
Portable double pivot—ed D'Arsonval, dynamometer,² and moving iron³ instruments. Single and multirange. Switch controlled to 5 amps. and 1 kv. Self-contained to approximately 20 amps. and 1.5 kv. (DCHI to 30 kv.)



UNIVERSITY MODEL

| Model | Accuracy | Scale | F.S. Ranges Start At |
|--------|-----------|-------|-----------------------------|
| :C | .25% f.s. | 6.3" | DC 30 μ a; 50 mv. |
| :S | .5% f.s. | 6.3" | DC 1 μ a; 1 mv. |
| :UNIV. | .5% f.s. | 4" | DC 2 μ a; 1 mv. |
| :DCHI | 1% f.s. | 4" | DC 1.5 kv. 50k Ω /v. |
| :D | .25% f.s. | 6.3" | AC/DC 5 ma; 1.5 v. |
| :UNIV. | .5% f.s. | 4" | AC/DC 10 ma; 7.5 v. |
| :MI | .5% f.s. | 6.3" | AC 10 ma; 7.5 v. |

AC-DC VOLTMETERS AND AMMETERS



EPSTEIN FRAME

Test set, designed in accordance with ASTM specifications (sec. A341-49 and A343-49), for core loss measurements, determination of hysteresis loops and magnetization curves, magnetic field and AC permeability tests. Inductors above and below 1 amp. available. Includes automatic internal power compensation circuit. Contains a DC ammeter, AC ammeter, RMS voltmeter, flux voltmeter, low p.f. wattmeter, and fluxmeter with convenient overlapping ranges. **Model COL**—core loss test set with special .25% f.s. accurate flux voltmeter (6.3" scale), RMS voltmeter, ammeter and wattmeter.



Model MAT



Model FM—a zero torque multirange fluxmeter calibrated in maxwells. Reads changes in flux linkage of a search coil as it moves in a magnetic field. Accuracy—.5% f.s. Sensitivity 1000 lines/div. using standard 10 turn search coil (1000 turn coil = 10 lines/div.). 5.2" scale. **Calibrated search coil and magnet available for certification purposes.**

MAGNETIC TESTING INSTRUMENTS

SRIC instruments have hand-drawn mirrored scales, electrostatic and magnetic shielding and temperature compensation. Portables in general conform to ASA specs C39.1-1951 for either .25% or .5% class instruments. All SRIC products are calibrated against primary standards that have National Bureau of Standards Certificates of Accuracy and are unconditionally guaranteed for materials and workmanship for a period of one year.



Model JWSP



TYPE EW CASE

All of the models described in this brochure, and in our complete catalog, are available as edgewise panel instruments with no loss in accuracy or sensitivity. Scale lengths—5" (type EW-5) and 7" (type EW-7). Switch controlled. Single or multirange. In some cases, such as polyrangers, they are supplied mounted in standard 19" rack panels. **Model JW**—Accuracy—.5% f.s. Max. of 3 DC ranges (B.P.'s only) from 2 μ a, and 1.5 mv. f.s. Scale 4". **New Model JWSP**—same, but can contain up to 10 switch controlled ranges. Rectangular DC and AC models available at accuracies from .5% to 1% f.s.

AC-DC PANEL INSTRUMENTS

For details, circle #69 on Reader Service Card

INSTRUMENT CORPORATION

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927

SPECIAL INSTRUMENTS

by SENSITIVE RESEARCH



Model INCRE



Standard Volt

Model INCRE—Differential Incrementer. A NEW .05% f.s. accurate expanded scale DC standard for rock panel mounting or portable use. Combines the high comparison accuracy of the differential instrument with a .005% stable source. Scale has an effective length of 63" or 70", and a resolution of 1000 divisions. Each 10% of any range is expanded over the instrument's actual 6.3" or 7" scale length. Direct reading! No balancing or nulling! Single or multirange combinations from 200 μ o. to 10 amps. and 200 m.v. to 1 kv. The **Standard Volt** is the internal source used, and is available separately. Input 115 v. 60c.p.s. 25 vo. Output 1.0 v. and 1.0185 v. to within .01%. (Exact E. can be certified to .001%).



Model RA measures the ratio of 2 DC currents or voltages. Accuracy — .25% max. Minimum current per coil 50 μ o. Scale reads 0 to ∞ . Special scales as required.



Model FRE—Frequency meter. Accuracy—.25% of center frequency (expanded scale), or of f.s. value (zero left). Ranges e.g.: 54 — 66 c.p.s.; 350-450 c.p.s.; or 0-100 c.p.s. f.s. Nominal input 115 v. and/or 230 v. \pm 15%. 6.3" scale.



MODEL SCAMA—SCALE DRAWING MACHINE used to manually draw and print any flat electrical indicating instrument scale where the angular deflection of the instrument's pointer is no greater than 110° (adapter available for arcs of 270°). This unit is a duplicate of those we have used in our laboratory since 1927 and is capable of drawing precision scales to all the accuracy that the resolution of an instrument will permit.

INSTRUMENT ACCESSORIES



VACUUM THERMOCOUPLES (Instrument type)—Sensitivities from 1 ma. to 1 amp. Output approximately 8-10 mv. open circuit. UHF types. Isolated or contact heaters. Special long-time constants. **AIR COUPLES** to 100 amps. (higher on special order).

LABORATORY STANDARD SHUNTS—Accuracy—.1% or .05%. Potential drop 50 mv., 100 mv., or 300 mv. Values from 1 amp. to 1000 amps. Rated for continuous duty.

MULTIPLIERS—Available to extend voltage ranges of all instruments. Accuracy — .1% or .05%.

FORMICA CASES are available for all portable instruments normally supplied in a wood case. They are structurally strong, a good dust and humidity barrier, and will look like new for the life of the instrument.

MODEL STC—Miniature Standard Cell. Accuracy — .025%. Nominal output 1.0185 v.

Specifications subject to change without notice.
Printed in U. S. A.

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SENSITIVE RESEARCH INSTRUMENT CORPORATION

NEW ROCHELLE, N. Y.

For details, circle #70
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World Radio History

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927

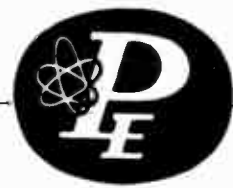


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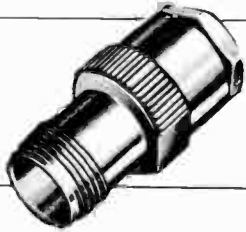


INDUSTRIAL PRODUCTS COMPANY

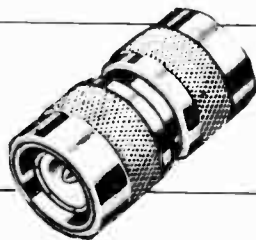
Danbury, Connecticut

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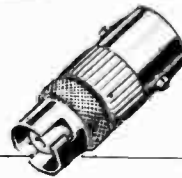
For details, circle #72 on Reader Service Card



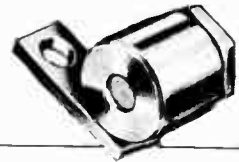
TNC Connectors



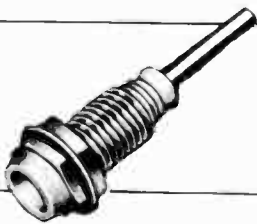
C Connectors



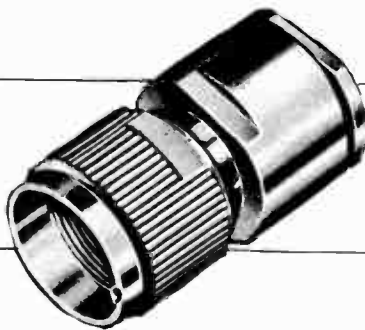
MB Connectors



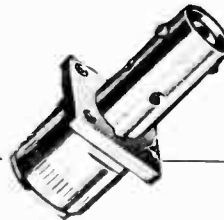
Terminations



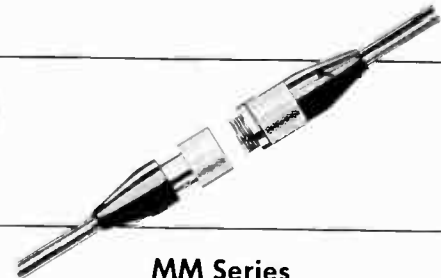
Tip Jacks



LC Connectors

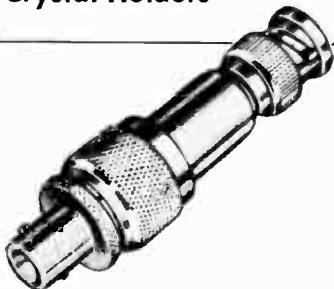


MHV Connectors

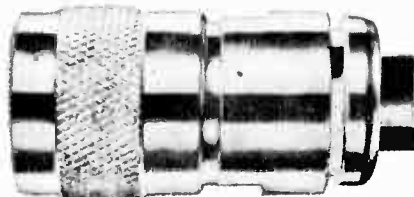


MM Series

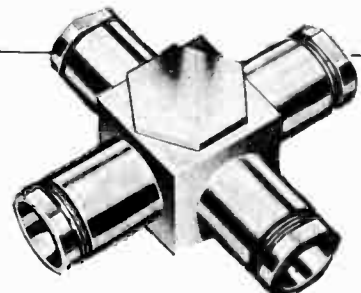
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All other standard series
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Authorized Distributor for

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MS Connector



D Sub-Miniature



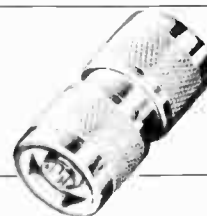
K Miniature



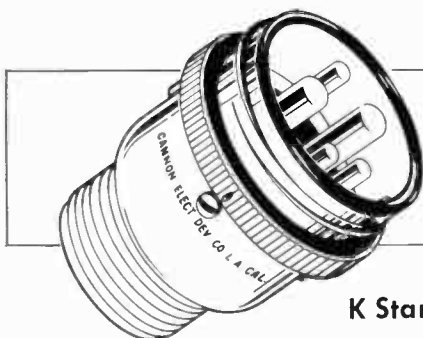
XLR Connector



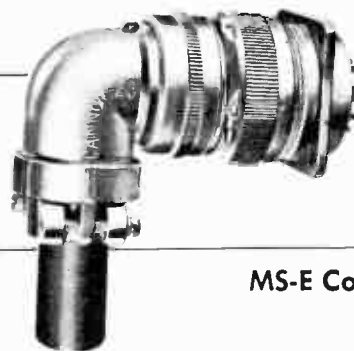
RF Connector



RF Aluminum Connector

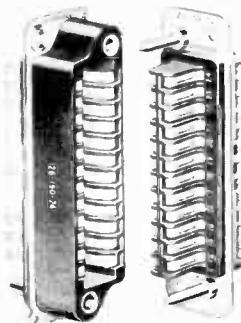


K Standard Connector



MS-E Connector

For details, circle #73 on Reader Service Card



Blue Ribbon Rack & Panel Connectors (26 Series)

Subminax (27 Series)



Miniature Blue Ribbon Connectors (Series 57)



Miniature MS (165 Series)



RF Connectors (82 & 31 Series)



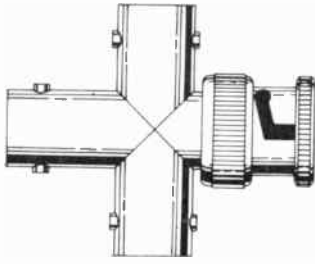
UHF Connectors (83 Series)



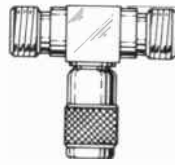
Rack & Panel Connectors (Series 126)



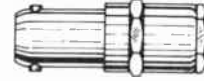
Authorized distributor for



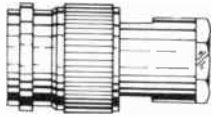
Coaxial Connectors



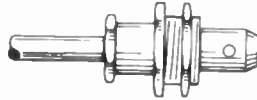
CUB Connectors



Triax Connectors



TNC Connectors



DM Connectors

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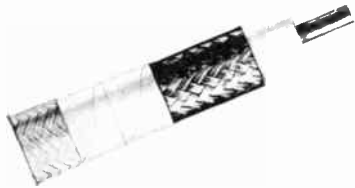
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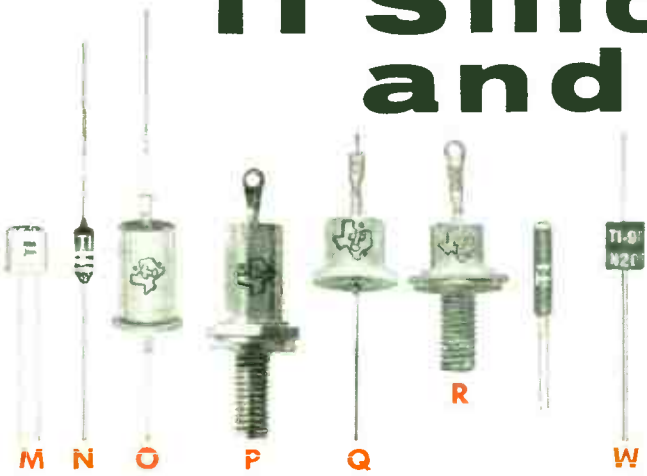
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Max at Elevated Temps (150 C)

| Type | Case Type | PIV | V _Z | Min DC Fwd I (@ 25 C) ma at 1v | Max I _{Lb} (@ 25 C) μa | P (@ 25 C) mw | Ambient Temp C | I _{Lb} ^a μa | P mw |
|---------|-----------|-----|----------------|--------------------------------------|---------------------------------------|---------------------|----------------------|------------------------------------|---------|
| 1N645 | N | 225 | 275 | 400 | 0.2 | 600 | 100 | 15 | |
| AF1N645 | N | 225 | 275 | 400 | 0.2 | 600 | 100 | 15 | |
| 1N646 | N | 300 | 360 | 400 | 0.2 | 600 | 100 | 15 | |
| 1N647 | N | 400 | 480 | 400 | 0.2 | 600 | 100 | 20 | |
| AF1N647 | N | 400 | 480 | 400 | 0.2 | 600 | 100 | 20 | |
| 1N648 | N | 500 | 600 | 400 | 0.2 | 600 | 100 | 20 | |
| AF1N648 | N | 500 | 600 | 400 | 0.2 | 600 | 100 | 20 | |
| 1N649 | N | 600 | 720 | 400 | 0.2 | 600 | 100 | 25 | |
| AF1N649 | N | 600 | 720 | 400 | 0.2 | 600 | 100 | 25 | |
| 600C | M | 27 | 30 | 3 | 1 (@ -10v) | 150 | 100 | 20 (@ -10v) | 40 |
| 601C | M | 45 | 50 | 10 | 0.025 (@ -10v) | 150 | 150 | 40 (@ -10v) | 40 |
| 604C | M | 4.7 | 5.5 | 60 | 0.1 | 150 | 150 | 40 | 40 |
| 605C | M | 6.8 | 7.5 | 35 | 0.1 | 150 | 150 | 40 | 40 |
| 608C | M | 10 | 11 | 25 | 0.1 | 150 | 150 | 40 | 40 |
| 610C | M | 15 | 17 | 20 | 0.1 | 150 | 150 | 40 | 40 |
| 612C | M | 22 | 25 | 20 | 0.1 | 150 | 150 | 40 | 40 |
| 614C | M | 33 | 37 | 20 | 0.1 | 150 | 150 | 40 | 40 |
| 616C | M | 47 | 52 | 10 | 0.2 | 150 | 150 | 40 | 40 |
| 618C | M | 68 | 75 | 10 | 0.2 | 150 | 150 | 40 | 40 |
| 620C | M | 100 | 110 | 10 | 0.2 | 150 | 150 | 40 | 40 |
| 622C | M | 150 | 170 | 7 | 0.2 | 150 | 100 | 20 | 40 |
| 624C | M | 220 | 250 | 3 | 0.2 | 150 | 100 | 20 | 40 |

^a At PIV except for types 600C and 601C

HIGH CONDUCTANCE SILICON DIODES

| Type | Case Type | Min Saturation PIV v | (@ 25 C) v | Av Rect Fwd I ma | Recurrent Peak Fwd I (@ 25 C) ma | P (@ 25 C) mw |
|--------|-----------|----------------------------|---------------|------------------------|---|---------------------|
| 1N482 | N | 30 | 40 | 125 | 400 | 500 |
| 1N482A | N | 30 | 40 | 200 | 650 | 500 |
| 1N483 | N | 60 | 80 | 125 | 400 | 500 |
| 1N483A | N | 60 | 80 | 200 | 650 | 500 |
| 1N484 | N | 125 | 150 | 125 | 400 | 500 |
| 1N484A | N | 125 | 150 | 200 | 650 | 500 |
| 1N485 | N | 175 | 200 | 125 | 400 | 500 |
| 1N485A | N | 175 | 200 | 200 | 650 | 500 |
| 1N486 | N | 225 | 250 | 125 | 400 | 500 |
| 1N486A | N | 225 | 250 | 200 | 650 | 500 |
| 1N487 | N | 300 | 330 | 125 | 400 | 500 |
| 1N487A | N | 300 | 330 | 200 | 650 | 500 |
| 1N488 | N | 380 | 420 | 125 | 400 | 500 |
| 1N488A | N | 380 | 420 | 200 | 650 | 500 |

SILICON COMPUTER DIODES

| Type | Case Type | PIV | V _Z | Max T _Q (@ 25 C) μsec | Max I _{Lb} (@ 25 C) μa | I ₀ (@ 25 C) ma | Min I _b (@ 1v) ma | Typ Cap (@ 25 C) f = 1mc VR = -12v μfd | Max I _{Lb} (@ PIV) μa |
|-------|-----------|-----|----------------|--|---------------------------------------|----------------------------------|------------------------------------|--|--------------------------------------|
| 1N659 | N | 50 | 60 | 0.3 | 5 | 100 | 6 | 2.7 | 25 |
| 1N660 | N | 100 | 120 | 0.3 | 5 | 100 | 6 | 2.7 | 50 |
| 1N661 | N | 200 | 240 | 0.3 | 10 | 100 | 6 | 2.7 | 100 |

PHOTO DEVICE

| Type | Bias Voltage v | Dark Current (@ 25 C) ±50v max μa | Dark Current (@ 100 C) ±50v max μa | *Typ Light Current (@ 25 C) (@ ±10v) μa | *Typ Sensitivity (@ 10v) μh mw/cm ² |
|--------|----------------------|--|---|--|--|
| 1N2175 | 50 | 0.5 | 100 | 200 | 22.3 |

* Light current measured in terms of radiation. Radiation = 7 m² cm² in a frequency bandwidth of .7 to 1 micron.

SILICON RECTIFIERS — ECONOMY PACKAGE

| Type | Case Type | PIV | 25 C | 100°C | Recurrent Peak Current (@ 25 C) a | Dynamic Forward Voltage Drop (@ 100°C) v (a ma) | Dynamic Reverse Current (@ 100°C) ma (a v) |
|--------|-----------|-----|------|-------|--|--|--|
| 1N2069 | W | 200 | 750 | 500 | 6 | 0.6 (@ 500) | 0.2 (@ 200) |
| 1N2070 | W | 400 | 750 | 500 | 6 | 0.6 (@ 500) | 0.2 (@ 400) |
| 1N2071 | W | 600 | 750 | 500 | 6 | 0.6 (@ 500) | 0.2 (@ 600) |

POWER REGULATORS AND DOUBLE ANODE CLIPPERS

Available with either anode or cathode to stud

| Type | Case Type | Zener Voltage (@ 25 C) | I _Z ma | Power Diss (@ 60 C) | Reverse Current I _{Lb} 25°C μa | max Z _Z (@ 25 C) | Typ Temp Coef %/C |
|--------|-----------|------------------------------|----------------------|---------------------------|--|--------------------------------|----------------------------|
| 1N1816 | R | 13 | 500 | 10 | 25 | 2 | 0.07 |
| 1N1817 | R | 15 | 500 | 10 | 15 | 2 | 0.07 |
| 1N1818 | R | 16 | 500 | 10 | 10 | 3 | 0.07 |
| 1N1819 | R | 18 | 500 | 10 | 10 | 3 | 0.07 |
| 1N1820 | R | 20 | 250 | 10 | 10 | 3 | 0.08 |
| 1N1821 | R | 22 | 250 | 10 | 10 | 3 | 0.08 |
| 1N1822 | R | 24 | 250 | 10 | 10 | 3 | 0.08 |
| 1N1823 | R | 27 | 250 | 10 | 10 | 3 | 0.08 |
| 1N1824 | R | 30 | 250 | 10 | 10 | 4 | 0.08 |
| 1N1825 | R | 33 | 150 | 10 | 10 | 4 | 0.08 |
| 1N1826 | R | 36 | 150 | 10 | 10 | 5 | 0.09 |
| 1N1827 | R | 39 | 150 | 10 | 10 | 5 | 0.09 |
| 1N1828 | R | 43 | 150 | 10 | 10 | 6 | 0.09 |
| 1N1829 | R | 47 | 150 | 10 | 10 | 7 | 0.09 |
| 1N1830 | R | 51 | 150 | 10 | 10 | 8 | 0.10 |
| 1N1831 | R | 56 | 150 | 10 | 10 | 9 | 0.10 |
| 1N1832 | R | 62 | 50 | 10 | 10 | 12 | 0.10 |
| 1N1833 | R | 68 | 50 | 10 | 10 | 14 | 0.10 |
| 1N1834 | R | 75 | 50 | 10 | 10 | 20 | 0.11 |
| 1N1835 | R | 82 | 50 | 10 | 10 | 22 | 0.11 |
| 1N1836 | R | 91 | 50 | 10 | 10 | 35 | 0.12 |

Suffix A (±5% Tolerance) Suffix C (Double Anode Clipper)

VOLTAGE REGULATOR DIODES

| Type | Case Type | Zener Voltage (@ 25 C) ^a | Max Total Power mw | Z _Z max ohms |
|--------|-----------|---|--------------------------|-------------------------------|
| 1N746† | N | 3.3 | 400 | 28 |
| 1N747† | N | 3.6 | 400 | 24 |
| 1N748† | N | 3.9 | 400 | 23 |
| 1N749† | N | 4.3 | 400 | 22 |
| 1N750† | N | 4.7 | 400 | 19 |
| 1N751† | N | 5.1 | 400 | 17 |
| 1N752† | N | 5.6 | 400 | 11 |
| 1N753† | N | 6.2 | 400 | 7 |
| 1N754† | N | 6.8 | 400 | 5 |
| 1N755† | N | 7.5 | 400 | 6 |
| 1N756† | N | 8.2 | 400 | 8 |
| 1N757† | N | 9.1 | 400 | 10 |
| 1N758† | N | 10 | 400 | 17 |
| 1N759† | N | 12 | 400 | 30 |
| 650C | M | 3.7 4.5 | 150 | 40 |
| 651C | M | 4.3 5.4 | 150 | 40 |
| 652C | M | 5.2 6.4 | 150 | 40 |
| 653C9 | M | 6.2 8.0 | 150 | 40 |
| 654C9 | M | 8.5 9.5 | 150 | 40 |
| 655C9 | M | 9.5 10.5 | 150 | 40 |

†Suffix A (±5% Tolerance)

SILICON RECTIFIERS

| Type | Case Type | Mounting | PIV | I ₀ | Recurrent Peak Current | E _b | I _{Lb} |
|---------|-----------|--------------|------|----------------|---------------------------|----------------|-----------------|
| 1N588 | O | Axial | 1500 | 1000 | 25 | 150 | 10 (@ 10ma) |
| 1N589 | O | Axial | 1500 | 1000 | 50 | 250 | 8 (@ 50ma) |
| 1N1130 | P | Cathode Stud | 1500 | 1000 | 300 | 150 | 1 a |
| 1N1131 | P | Anode Stud | 1500 | 1000 | 300 | 150 | 1 a |
| 1N538 | Q | Axial | 200 | 200 | 750 | 250 | 2.5 a (@ 25 C) |
| 1N539 | Q | Axial | 300 | 300 | 750 | 250 | 2.5 a (@ 25 C) |
| 1N540 | Q | Axial | 400 | 400 | 750 | 250 | 2.5 a (@ 25 C) |
| 1N1095 | Q | Axial | 500 | 500 | 750 | 250 | 2.5 a (@ 25 C) |
| 1N1096 | Q | Axial | 600 | 600 | 750 | 250 | 2.5 a (@ 25 C) |
| 1N1124 | R | Cathode Stud | 200 | 200 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1125 | R | Cathode Stud | 300 | 300 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1126 | R | Cathode Stud | 400 | 400 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1127 | R | Cathode Stud | 500 | 500 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1128 | R | Cathode Stud | 600 | 600 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1124R | R | Anode Stud | 200 | 200 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1125R | R | Anode Stud | 300 | 300 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1126R | R | Anode Stud | 400 | 400 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1127R | R | Anode Stud | 500 | 500 | 3 a | 1 a | 10 a (@ 50 C) |
| 1N1128R | R | Anode Stud | 600 | 600 | 3 a | 1 a | 10 a (@ 50 C) |

Write on your company letterhead describing your application for specific details on TI products.

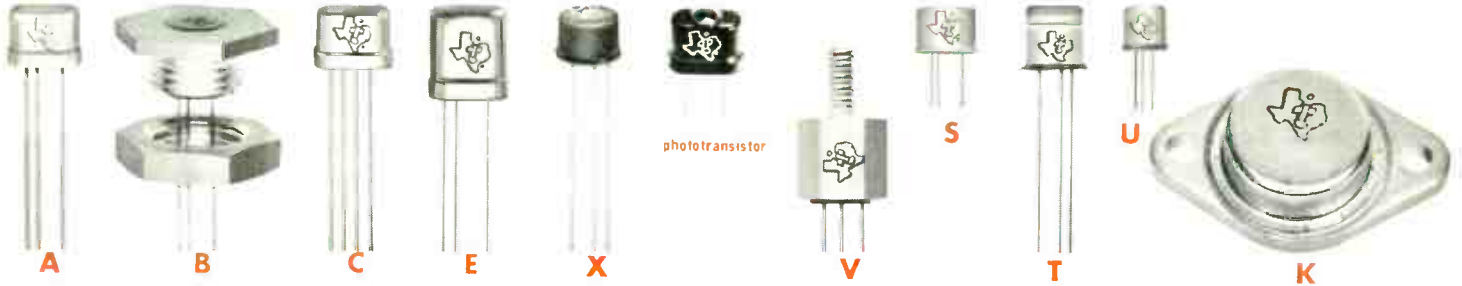
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GERMANIUM TRANSISTORS

| | Type | Case Type* | Former Designation | Dissipation at 25°C mw | Collector Voltage-v max | Collector Current ma max | Beta | | Collector Reverse Current I _{co} max | | Gain db and R _{cs} typ | Audio Gain db typ | | RF Gain db min | Alpha Cutoff Frequency mc avg | |
|---------------------------------|------|------------|--------------------|------------------------|-------------------------|--------------------------|------|---------------------|---|--------------|---------------------------------|-----------------------------|---------------------------|----------------|-------------------------------|-----|
| | | | | | | | min | max | μA | V | | min | max | | | |
| computer | pnp | 2N395 | X | 150 | -30 | -250 | 20 | 30 | 150 | -6 | -15 | | | | 4.5 | |
| | | 2N396 | X | 150 | -30 | -250 | 30 | 40 | 150 | -6 | -20 | | | | 8.0 | |
| | | 2N397 | X | 150 | -30 | -250 | 40 | 25 | 150 | -6 | -15 | | | | 12.0 | |
| | | 2N705 | U | 150 | -15 | -50 | 25 | | | -50 | | -4.5 at 65°C | | | | 250 |
| | | 2N710 | U | 300 | -15 | -50 | | | | | | | | | | |
| | | 2N1093 | X | 320 | 150 | -30 | -250 | 50 | | 200 | -6 | -20 | | | | 8.0 |
| | | 2N1195 | S | | 225 | 30 | -40 | | | | | | | | | 750 |
| | nnp | 2N1303 | Y | | 150 | 30 | 300 | 50 | 70 | 6 | 25 | | | | | 4.5 |
| | | 2N1305 | Y | | 150 | 30 | 300 | 70 | 6 | 25 | | | | | | 8 |
| | | 2N1307 | Y | | 150 | 30 | 300 | 100 | 6 | 25 | | | | | | 12 |
| | | 2N1309 | Y | | 150 | 30 | 300 | 150 | 6 | 25 | | | | | | 20 |
| | | 2N1302 | Y | | 150 | 25 | 300 | 50 | 6 | 25 | | | | | | 4.5 |
| | | 2N1304 | Y | | 150 | 25 | 300 | 70 | 6 | 25 | | | | | | 8 |
| | | 2N1306 | Y | | 150 | 25 | 300 | 100 | 6 | 25 | | | | | | 12 |
| 2N1308 | Y | | 150 | 25 | 300 | 150 | 6 | 25 | | | | | | 20 | | |
| computer | pnp | 2N1046 | K | X282 | 15W | -80 | -3a | 40 | 70 (Avg) | -1ma | -40 | | | | 12 | |
| VHF tetraode | pnp | 3N25 | C | 501 | 25 | -15 | -2 | 65 (Avg) | | -20 | -12 | | | 10 at 100mc | 200 | |
| high frequency | pnp | 2N248 | A | | 30 | -25 | -5 | 20 (Avg) | | -10 | -12 | | | 10 at 18mc | 50 | |
| | | 2N1141 | S | | 750 | -35 | -100 | 12db at 10ma, 100mc | | -5 | -6 | | | | 750 | |
| | | 2N1142 | S | | 750 | -30 | -100 | 10db at 10ma, 100mc | | -10 | -15 | | | | 600 | |
| | | 2N1143 | S | | 750 | -25 | -100 | 8db at 10ma, 100mc | | -10 | -12 | | | | 480 | |
| radio RF, converter, osc and IF | pnp | 2N1107 | A | RF | 30 | -16 | -5 | | | -10 | -12 | h _{fe} 34 at 455kc | | | | |
| | | 2N1108 | A | Conv | 30 | -16 | -5 | | | -10 | -12 | h _{fe} 33 at 455kc | | | | |
| | | 2N1109 | A | OSC | 30 | -16 | -5 | | | -10 | -12 | h _{fe} 20 at 455kc | | | | |
| | | 2N1110 | A | 1st IF | 30 | -16 | -5 | | | -10 | -12 | h _{fe} 29 at 455kc | | | | |
| | | 2N1111 | A | 2nd IF | 30 | -20 | -5 | | | -10 | -12 | h _{fe} 25 at 455kc | | | | |
| | | 2N1111A | A | Reflex | 30 | -20 | -5 | | | -10 | -12 | h _{fe} 25 at 455kc | h _{fe} 29 at 1kc | | | |
| | | 2N1111B | A | Reflex | 30 | -27 | -5 | | | -10 | -12 | h _{fe} 25 at 455kc | h _{fe} 29 at 1kc | | | |
| audio output | pnp | 2N185 | A | 352 | 150 | -20 | -150 | 35 (70 Avg) | | -15 | -20 | | | 39 26† | | |
| | | 2N238 | A | 310 | 50 | -20 | -150 | 50 (Avg) | | -20 | -20 | | | 37 | 42 | |
| | | 2N291 | E | 357 | 300 | -25 | -200 | 30 (45 Avg) | | -25 | -25 | | | 31 22† | | |
| | | 2N680 | A | | 150 | -20 | -150 | (35 Avg) | | -14 | -12 | | | | | |
| | | 2N250 | K | 356 | 25w | -30 | -3a | 30 at 0.5a | | -1ma | -30 | | | 30 | | |
| 2N251 | K | 356A | 25w | -60 | -3a | 30 at 0.5a | | -2ma | -60 | | | 30 | | | | |
| general purpose | nnp | 2N364 | A | 200A | 150 | 30 | 50 | 9 | 19 | 10 | 30 | | | | 2.5 | |
| | | 2N365 | A | 201A | 150 | 30 | 50 | 19 | 49 | 10 | 30 | | | | 3 | |
| | | 2N366 | A | 202A | 150 | 30 | 50 | 49 | 142 | 10 | 30 | | | | 3.5 | |
| | | 204A | A | | 150 | 60 | 50 | 9 | 49 | 10 | 30 | | | | 2.5 | |
| | pnp | 2N368 | A | 301 | 150 | -30 | -50 | 19 | 49 | -20 | -30 | | | | 1 | |
| | | 2N369 | A | 302 | 150 | -30 | -50 | 49 | 142 | -20 | -30 | | | | 1.3 | |
| | | 2N1038 | T | | 800 | -40 | -1a | 20 | 60 | -125 | -20 | 0.2 ohm Rcs | | | | |
| | | 2N1039 | T | | 800 | -60 | -1a | 20 | 60 | -125 | -30 | 0.2 ohm Rcs | | | | |
| 2N1040 | T | | 800 | -80 | -1a | 20 | 60 | -125 | -40 | 0.2 ohm Rcs | | | | | | |
| 2N1041 | T | | 800 | -100 | -1a | 20 | 60 | -125 | -50 | 0.2 ohm Rcs | | | | | | |
| power | pnp | 2N456 | K | | 50w | -40 | -5a | 30 at 5a avg. | | -2ma | -40 | 0.048 ohm Rcs | | | | |
| | | 2N457 | K | | 50w | -60 | -5a | 30 at 5a avg. | | -2ma | -60 | 0.048 ohm Rcs | | | | |
| | | 2N458 | K | | 50w | -80 | -5a | 30 at 5a avg. | | -2ma | -80 | 0.048 ohm Rcs | | | | |
| | | 2N511 | K‡ | | 80w | 40 | 10a | 10 at 10a | | 20-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N511A | K‡ | | 80w | 60 | 10a | 10 at 10a | | 30-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N511B | K‡ | | 80w | 80 | 10a | 10 at 10a | | 40-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N512 | K‡ | | 80w | 40 | 15a | 10 at 15a | | 20-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N512A | K‡ | | 80w | 60 | 15a | 10 at 15a | | 30-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N512B | K‡ | | 80w | 80 | 15a | 10 at 15a | | 40-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N513 | K‡ | | 80w | 40 | 20a | 10 at 20a | | 20-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N513A | K‡ | | 80w | 60 | 20a | 10 at 20a | | 30-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N513B | K‡ | | 80w | 80 | 20a | 10 at 20a | | 40-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N514 | K‡ | | 80w | 40 | 25a | 10 at 25a | | 20-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N514A | K‡ | | 80w | 60 | 25a | 10 at 25a | | 30-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N514B | K‡ | | 80w | 80 | 25a | 10 at 25a | | 40-2ma | | 0.025 ohm Rcs | | | | |
| | | 2N1021 | K | | 50w | -100 | -5a | 23 at 5a avg. | | -2ma | -100 | 0.08 ohm Rcs | | | | |
| | | 2N1022 | K | | 50w | -120 | -5a | 23 at 5a avg. | | -2ma | -120 | 0.08 ohm Rcs | | | | |
| | | 2N1042 | B§ | | 20w | -40 | -3a | 20 | 60 | -125 | -20 | 0.16 ohm Rcs | | | | |
| | | 2N1043 | B§ | | 20w | -60 | -3a | 20 | 60 | -125 | -30 | 0.16 ohm Rcs | | | | |
| | | 2N1044 | B§ | | 20w | -80 | -3a | 20 | 60 | -125 | -40 | 0.16 ohm Rcs | | | | |
| 2N1045 | B§ | | 20w | -100 | -3a | 20 | 60 | -125 | -50 | 0.16 ohm Rcs | | | | | | |
| photo transistor | nnp | 800 | | 65 | 20 | 5 | | | | | | | | | | |

‡ Except for 0.090" Emitter lead

§ Min. audio power gain—Class A Class B

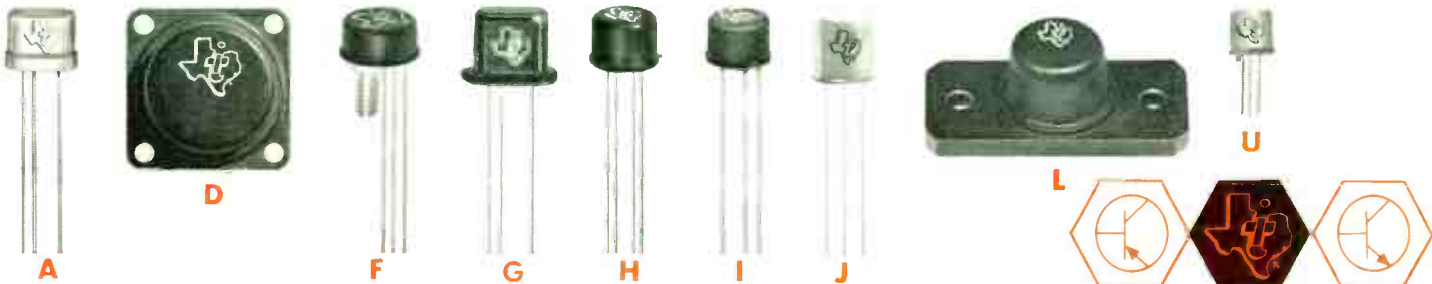
¶ To specify case type T add suffix (-2) to type number

§ To specify case type V add suffix (-1) to type number

For details, circle 76 on Reader Service Card

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TRANSISTORS



SILICON TRANSISTORS

| Type | Case Type | Dissipation at 25°C w | Small Signal Current Transfer Ratio | | Collector Current ma max | DC Current Transfer Ratio hFE | Collector Breakdown Voltage-v BV _{CEO} min | Saturation Resistance R _{CS} Ohms max | Alpha Cutoff Frequency f _{αb} mc typ | | |
|---------------------------|-------------|--------------------------|-------------------------------------|---------------------|-----------------------------|----------------------------------|--|---|--|---------|----------|
| | | | min | h _{FE} max | | | | | | | |
| small signal | 2N1149 903 | A | 0.150 | 9 | 20 | 25 | 10 (typ) | 45 | 200 | 4 | |
| | 2N1150 904 | A | 0.150 | 18 | 40 | 25 | 20 (typ) | 45 | 200 | 5 | |
| | 2N1151 904A | A | 0.150 | 18 | 90 | 25 | 25 (typ) | 45 | 200 | 8 (min) | |
| | 2N1152 905 | A | 0.150 | 36 | 90 | 25 | 40 (typ) | 45 | 200 | 6 | |
| | 2N1153 910 | A | 0.150 | 76 | 333 | 25 | 80 (typ) | 45 | 200 | 7 | |
| | 2N117 | G | 0.150 | 9 | 20 | 25 | 10 (typ) | 45 | 200 | 4 | |
| | USN2N117 | G | 0.150 | 9 | 20 | 25 | 10 (typ) | 45 | 200 | 1 (min) | |
| | 2N118 | G | 0.150 | 18 | 40 | 25 | 20 (typ) | 45 | 200 | 5 | |
| | USN2N118 | G | 0.150 | 18 | 40 | 25 | 20 (typ) | 45 | 200 | 2 (min) | |
| | 2N118A | G | 0.150 | 18 | 90 | 25 | 25 (typ) | 45 | 200 | 8 (min) | |
| | 2N119 | G | 0.150 | 36 | 90 | 25 | 40 (typ) | 45 | 200 | 6 | |
| | USN2N119 | G | 0.150 | 36 | 90 | 25 | 40 (typ) | 45 | 200 | 2 (min) | |
| | 2N120 | G | 0.150 | 76 | 333 | 25 | 80 (typ) | 45 | 200 | 7 | |
| | 2N332 | †† | 0.150 | 9 | 20 | 25 | 10 (typ) | 45 | 200 | 4 | |
| | 2N333 | †† | 0.150 | 18 | 40 | 25 | 20 (typ) | 45 | 200 | 5 | |
| | 2N334 | †† | 0.150 | 18 | 90 | 25 | 25 (typ) | 45 | 200 | 8 (min) | |
| | 2N335 | †† | 0.150 | 36 | 90 | 25 | 40 (typ) | 45 | 200 | 6 | |
| | 2N336 | †† | 0.150 | 76 | 333 | 25 | 80 (typ) | 45 | 200 | 7 | |
| switching | 2N337 | †† | 0.125 | 19 | | 20 | 20 | 55 | 45 | 150 | 10 (min) |
| | 2N338 | †† | 0.125 | 39 | | 20 | 45 | 150 | 45 | 150 | 20 (min) |
| | 2N702 | U | 0.500 | 1 at 50mc | | 20 | 15 | 45 | 20 | 60 | 100 |
| high frequency | 3N34 | H | 0.125 | 1 at 30mc | | 10 | Power Gain 22db typ at 30 mc | 30 | 300 | | |
| | 3N35 | H | 0.125 | 1 at 70mc | | 10 | Power Gain 20db typ at 70 mc | 30 | 300 | 150 | |
| medium power | 2N1154 951 | A | 0.750 | 9 | | 60 | 18 (typ) | 50 | 300 | 8 | |
| | 2N1155 952 | A | 0.750 | 9 | | 50 | 18 (typ) | 80 | 350 | 8 | |
| | 2N1156 953 | A | 0.750 | 9 | | 40 | 18 (typ) | 120 | 400 | 8 | |
| | 2N243 | A | 0.750 | 9 | 32 | 60 | 14 (typ) | 60 | 350 | 7 | |
| | 2N244 | A | 0.750 | 28 | 90 | 60 | 30 (typ) | 60 | 350 | 8 | |
| | 2N339 | J | 1 | 9 | 90 | 60 | 15 (typ) | 55 | 300 | 6 | |
| | 2N340 | J | 1 | 9 | 90 | 60 | 15 (typ) | 85 | 350 | 6 | |
| | 2N341 | J | 1 | 9 | 90 | 60 | 20 (typ) | 125 | 400 | 6 | |
| | 2N342 | J | 1 | 9 | 32 | 60 | 14 (typ) | 60 | 350 | 6 | |
| | 2N342A | J | 1 | 9 | 32 | 60 | 14 (typ) | 85 | 350 | 6 | |
| | 2N343 | J | 1 | 28 | 90 | 60 | 30 (typ) | 60 | 350 | 8 | |
| | 2N497 | ‡§ | 4 | 30 (typ) | | | 12 | 36 | 60 | 25 | 9 |
| | 2N498 | ‡§ | 4 | 30 (typ) | | | 12 | 36 | 100 | 25 | 9 |
| | 2N656 | ‡§ | 4 | 60 (typ) | | | 30 | 90 | 60 | 25 | 8 |
| | 2N657 | ‡§ | 4 | 60 (typ) | | | 30 | 90 | 100 | 25 | 8 |
| intermediate power | 2N122 | L | 8.75 | | | 140 | 3 | 120 | 200 | 1 | |
| | 2N1047 | F | 40 | 20 (typ) | | | 12 | 36 | 80 | 15 | 8 |
| | 2N1048 | F | 40 | 20 (typ) | | | 12 | 36 | 120 | 15 | 8 |
| | 2N1049 | F | 40 | 40 (typ) | | | 30 | 90 | 80 | 15 | 7 |
| | 2N1050 | F | 40 | 40 (typ) | | | 30 | 90 | 120 | 15 | 7 |
| power | 2N389 | D | 85 at 25°C 45 at 100°C | 30 (typ) | | | 12 | 60 | 60 | 5 | 7 |
| | 2N424 | D | 85 at 25°C 45 at 100°C | 30 (typ) | | | 12 | 60 | 80 | 10 | 6 |

† All connections insulated from case ‡ Collector in electrical contact with case

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2115 Prospect Avenue/SU 1-9410

DALLAS 35, Texas
ENGINEERING SUPPLY COMPANY
6000 Denton Drive/FL 7-6121

DAYTON 4, Ohio
SREPCO, INCORPORATED
314 Leo Street/BA 4-3871

DENVER 4, Colorado
DENVER ELECTRONIC SUPPLY COMPANY
1254 Arapahoe Street/AM 6-1671

DETROIT 38, Michigan
FERGUSON ELECTRONIC SUPPLY CO.
2306 Puritan Avenue/UN 1-6700

EL PASO, Texas
MIDLAND SPECIALTY COMPANY
500 W. Paisano Drive/KE 3-9555

GLENDALE 1, California
R. V. WEATHERFORD COMPANY
6921 San Fernando Road/VI 9-2471

HOUSTON 2, Texas
HARRISON EQUIPMENT COMPANY, INC.
1422 San Jacinto (Box 2514)/CA 4-9131

INDIANAPOLIS, Indiana
RADIO DISTRIBUTING COMPANY
1013 North Capitol St./ME 5-8311

JAMAICA 33, New York
LAFAYETTE RADIO
165-08 Liberty Avenue/AX 1-7000

LOS ANGELES 15, California
RADIO PRODUCTS SALES, INC.
1501 S. Hill Street/RI 9-7471

WEST LOS ANGELES 64, Calif.
CALIFORNIA ELECTRONICS SUPPLY, INC.
11801-11 W. Pico Blvd./BR 2-2124

MELBOURNE, Florida
ELECTRONIC SUPPLY
909 Morningside Drive/PA 3-1441

MIAMI 32, Florida
ELECTRONIC SUPPLY
61 N.E. Ninth Street/FR 7-2511

MINNEAPOLIS, Minnesota
STARK RADIO SUPPLY COMPANY
71 South 12th Street/FE 2-1325

NEWARK 2, New Jersey
LAFAYETTE RADIO
24 Central Avenue/MA 2-1661

NEW YORK 6, New York
MILGRAY ELECTRONICS, INCORPORATED
136 Liberty Street/RE 2-4400

NEW YORK 13, New York
LAFAYETTE RADIO
100 Sixth Avenue/WO 6-5300

OAKLAND 7, California
ELMAR ELECTRONICS
140 Eleventh Street/TE 4-3311

ORLANDO, Florida
ELECTRONIC SUPPLY
GA 5-1717

PHOENIX, Arizona
RADIO SPECIALTIES & APPLIANCE CORP.
917 North 7th Street/AL 8-6121

PITTSBURGH 5, Pennsylvania
RADIO PARTS COMPANY, INC.
6401 Penn Ave./EM 1-4600

PLAINFIELD, New Jersey
LAFAYETTE RADIO
139 W. Second Street/PL 6-4718

ROCHESTER 5, New York
ROCHESTER RADIO SUPPLY CO., INC.
600 E. Main Street/LO 2-9900

ST. PETERSBURG, Florida
ELECTRONIC SUPPLY
OR 1-5171

SALT LAKE CITY 10, Utah
STANDARD SUPPLY COMPANY
225 East Sixth South Street/EL 5-2971

SAN DIEGO 1, California
RADIO PARTS COMPANY
2060 India Street/BE 9-9361

SEATTLE 9, Washington
WESTERN ELECTRONIC SUPPLY CO.
717 Dexter Ave./AT 4-0200

SYRACUSE, New York
SYRACUSE RADIO SUPPLY CO.
620 S. Saline St./GR 4-2927

TUCSON, Arizona
STANDARD RADIO PARTS, INC.
218 N. First Ave./MR 3-2545

TULSA 10, Oklahoma
ENGINEERING SUPPLY COMPANY
1124 East 4th Street/DI 3-8121

WASHINGTON 1, D. C.
ELECTRONIC INDUSTRIAL SALES, INC.
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Your most advanced, dependable semiconductor and component products available anywhere are made by Texas Instruments—pioneer leader with the greatest semiconductor experience.

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INSTRUMENTS INCORPORATED

SEMICONDUCTOR-COMPONENTS DIVISION
POST OFFICE BOX 312
13500 N. CENTRAL EXPRESSWAY
DALLAS, TEXAS


Surprenant

Surprenant's reputation for quality products is a direct outgrowth of its unique versatility. *All manufacturing processes from testing the incoming copper rod and insulation ingredients to terminating the finished wire and cable are done at the Surprenant plant.* This permits Surprenant quality certification at every step of manufacture.

Combine these controls with the most advanced manufacturing techniques and quality materials like TEFLON — and you know why Surprenant manufactures the most reliable wire and cable that money can buy.

true

VERSATILITY



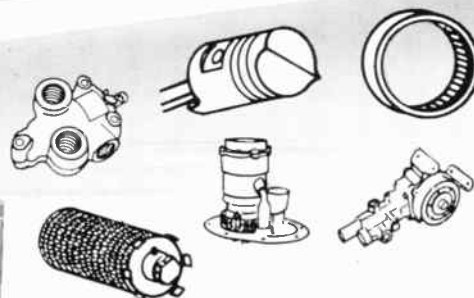
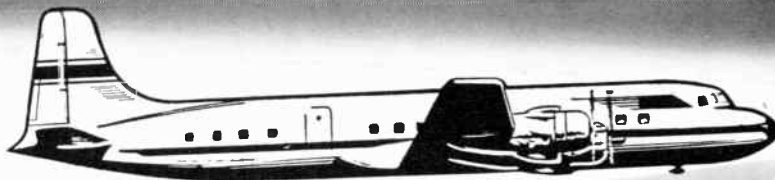

Surprenant
 MFG. CO.
 CLINTON, MASS.

- Cable Assemblies
- Multi-Conductor Cable
- Air Frame Wiring
- Power Cable
- Switchboard Wiring
- Hook-up Wire
- Heater Cable
- Ribbon Cable
- Ground Support Cable
- Missile Wiring
- Motor Lead

Complete
reliability

A complete range of types and sizes of wire and cable for electronic, aircraft, military, and non-military applications.

New! NARDA Two-Stage, Low-Cost ULTRASONIC VAPOR DEGREASER



Aircraft engine oil strainer, one of many aircraft, automotive and electronics parts cleaned and decarbonized by the new Narda Ultrasonic Vapor Degreaser — in less time and with less chemicals!

- BETTER CLEANING • UP TO **40** TIMES FASTER!
- INCREASES ENGINE and INSTRUMENT RELIABILITY!

This new production model SonBlaster Vapor Degreaser, originally designed by Narda for the U. S. Air Force, is now commercially available to operators of aircraft and automotive fleet service centers—at low cost! Pushbutton operated, this advanced design equipment thoroughly and quickly degreases and decarbonizes: oil and fuel strainers, pistons and rings, valves, spark plugs, carburetors, fuel pumps, ball bearings and hydraulic system parts, etc.

Especially recommended where manual cleaning with abrasives, strong corrosive chemicals or inflammable solvents is harmful or dangerous. Unexcelled where superior work *plus* volume production is desired. Volatile solvents for degreasing and aqueous solutions for decarbonizing can be used alternately.

The SonBlaster Vapor Degreaser is simple and economical to use. To degrease: place parts in (1) boiling sump and (2) ultrasonic sump (3) flush with power spray, using filtered and distilled pure solvent (4) condensing solvent vapor removes any residue traces—finished job is the ultimate in degreasing!

SPECIFICATIONS:

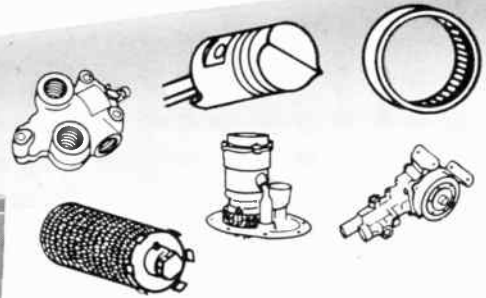
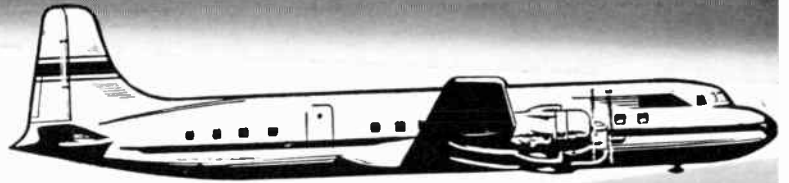
- Electrical Input: 208/230 volts, 50/60 cycles, 25/20 amps.
- Generator: Delivers 300 watts average; 600 watts peak, 40 kc.
- Transducer: Barium Titanate, 40 kc. Diaphragm, 112 sq. inches.
- Recirculation System: ½ h.p. pump, stainless steel filter; 4500-watt heater, thermostatically controlled.
- Valves: Pushbutton, solenoid operated on all drains.
- Cabinet: Cold rolled steel, baked enamel finish; 16 gauge, 302 stainless steel top. (All stainless steel cabinet optional at extra cost.) Overall dimensions, 56" long x 32" wide x 23½" wide.
- Sumps: Overall working area, 28" x 16", 14 gauge, 302 stainless steel, heliarc welded.
Boiling sump capacity, 7 gals.
Ultrasonic sump capacity, 6 gals.
Distillate reservoir capacity, 2 gals.
- Price: \$2990 for above model. Other Narda Ultrasonic Vapor Degreasers from \$1500 up.

For additional information, please write to:



the **narda** ultrasonics corporation Dept. IRED 4
 625 MAIN ST. • WESTBURY, L. I., NEW YORK • EDgewood 3-5400
 America's Volume Producer of Dependable Low Cost Ultrasonic Systems

New! NARDA Two-Stage, Low-Cost ULTRASONIC VAPOR DEGREASER



Aircraft engine oil strainer, one of many aircraft, automotive and electronics parts cleaned and decarbonized by the new Narda Ultrasonic Vapor Degreaser—in less time and with less chemicals!

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Especially recommended where manual cleaning with abrasives, strong corrosive chemicals or inflammable solvents is harmful or dangerous. Unexcelled where superior work *plus* volume production is desired. Volatile solvents for degreasing and aqueous solutions for decarbonizing can be used alternately.

The SonBlaster Vapor Degreaser is simple and economical to use. To degrease: place parts in (1) boiling sump and (2) ultrasonic sump (3) flush with power spray, using filtered and distilled pure solvent (4) condensing solvent vapor removes any residue traces—finished job is the ultimate in degreasing!

SPECIFICATIONS:

- Electrical Input: 208/230 volts, 50/60 cycles, 25/20 amps.
- Generator: Delivers 300 watts average; 600 watts peak, 40 kc.
- Transducer: Barium Titanate, 40 kc. Diaphragm, 112 sq. inches.
- Recirculation System: ½ h.p. pump, stainless steel filter; 4500-watt heater, thermostatically controlled.
- Valves: Pushbutton, solenoid operated on all drains.
- Cabinet: Cold rolled steel, baked enamel finish; 16 gauge, 302 stainless steel top. (All stainless steel cabinet optional at extra cost.) Overall dimensions, 56" long x 32" wide x 23½" wide.
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Ultrasonic sump capacity, 6 gals.
Distillate reservoir capacity, 2 gals.
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the **narda** ultrasonics corporation Dept. IRED-4
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America's Volume Producer of Dependable Low Cost Ultrasonic Systems


Surprenant

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true

VERSATILITY



Cable Assemblies

Harness

Coaxial Cable

Multi-Conductor Cable

Air Frame Wiring

Power Cable

Switchboard Wiring

Hook-up Wire

Heater Cable

Ribbon Cable

Ground Support Cable

Missile Wiring

Motor Lead

Complete
reliability

A complete range of types and sizes of wire and cable for electronic, aircraft, military, and non-military applications.

Surprenant

MFG. CO.
CLINTON, MASS.

Narda SonBlasters offer the most complete line of lowest-cost mass-produced ultrasonic cleaners!

Narda's mass-production techniques assure you the most complete line of ultrasonic cleaners at the lowest prices in the industry! From the smallest 35-watt to the amazing 2500-watt unit with a tank capacity of 75 gallons, Narda's SonBlasters are available now—off-the-shelf—for immediate delivery. And with a full 2-year warranty besides!

What do you want to clean? Transistors, semi-conductors, other electronic, automotive, missile and avionic components, instruments, timing mechanisms—Narda's SonBlasters clean

'most any mechanical, electrical or horological part or assembly you can think of—and clean faster, better and cheaper.

No matter what you need in ultrasonic cleaning equipment, you'll find Narda's complete line of production-size units have the quality, power, performance, capacity and appearance of cleaners selling up to three times their price! Write for more details now and we'll include a free questionnaire to help determine the precise model you need. Address: Dept. IRED-19.



Generator G-202 35 watts
Transducerized Tank NT-202 Capacity: 3/8 gallon

An amazingly efficient, yet inexpensive, ultrasonic cleaner. Duty cycle timer permits operator to turn the unit on, set it, and leave; the SonBlaster will turn off automatically at the end of the cycle. Four choices of timers—from 0-15 min. to 0-120 min. Also available without timer at slightly lower cost (G-201).

\$220



Generator G-601 60 watts
Transducerized Tank NT-602 Capacity: 1 gallon

A more powerful production-type unit, with a special circuit and selector switch permitting operator to alternate between two tanks, when items being cleaned require different solutions or a two-step process.

\$350



Transducerized Tank NT-1505 Capacity: 5 gallons
Generator G-1501 200 watts

The lowest price in the industry for a tank of this capacity and activity. Generator also will operate 2, 3 or 4 submersible transducers at one time, with just a turn of the load selector switch on the front panel.

\$695



Transducerized Tank NT-5001 Capacity: 10 gallons

Generator G-5001 500 watts

Generator features standby switch for longer life and load selector switch on the front panel to operate up to 8 submersible transducers or 8 NT-602 or 2 NT-1505 transducerized tanks at one time. Larger tanks available on special order.

\$1325



Submersible Transducer NT-605

Heli arc welded stainless case, hermetically sealed for safe, leak-proof immersion. Radiating face: 27 sq. in. Effective plane of radiation: 40-50 sq. in. (approximately 10" x 5"). Effective cavitation of volumes up to 1200 cu. in. at 24 in. tank height (5 gal.) and 2400 cu. in. at 48 in. tank height (10 gal.). Bulkhead electrical fitting on back allows all wiring connections to be made on outside of tank. For use in any arrangement or location in any shape tank you desire to use. Also available—model NT-604, identical with NT-605, except for pipe thread instead of bulkhead fitting, permitting electrical connections inside of tank.

\$130

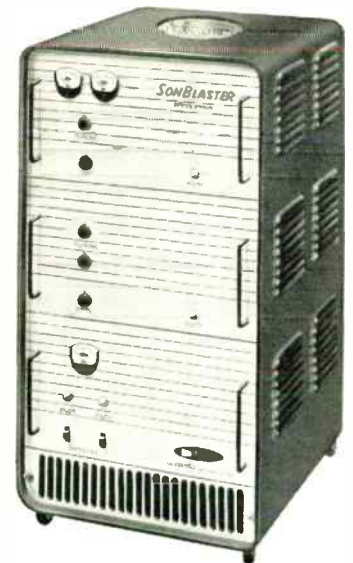


Transducerized Tank NT-25001 Capacity: 75 gallons

Powerful unit drives the largest mass-produced industrial-size transducerized ultrasonic cleaning tank made! Also energizes up to 40 Narda 60-watt submersible transducers (NT-604 or -605). Capable of energizing tanks measuring up to 15 square feet of area by 2' or 3' high.

\$4360

Generator G-25001 2500 watts



Consult with Narda for all your ultrasonic requirements. The SonBlaster catalog line of ultrasonic cleaning equipment ranges from 35 watts to 2.5 KW, and includes transducerized tanks as well as immersible transducers which can be adapted to any size or shape tank you may now be using. If ultrasonics can be applied to help improve your process, Narda will recommend the finest, most dependable equipment available—and at the lowest price in the industry!

For custom-designed cleaning systems, write to our Industrial Process Division; for information on Chemical processing applications, write to our Chemical and Physical Process Division; both at the address below.



the **narda** ultrasonics corporation

625 MAIN STREET, WESTBURY, L. I., N. Y.

Subsidiary of The Narda Microwave Corporation

AIRPAX ELECTRONICS INCORPORATED



Types 175 and 300. The sub-miniature choppers which set the standards for the chopper industry. Type 175 uses a 6.3 volt, 60 CPS drive; Type 300 requires a 6.3 volt, 400 CPS drive. Both are hermetically sealed, stable, long-life choppers.



Types 6010 and 6015. Transistor choppers. Type 6015 includes the drive transformer. It is encased in a sub-miniature can with a 7 pin header. Drive for the 6010 may be as high as 100 KC; the type 6015 drive is 6.3 volts at 50 to 2000 CPS.

Airpax produces CHOPPERS for every purpose



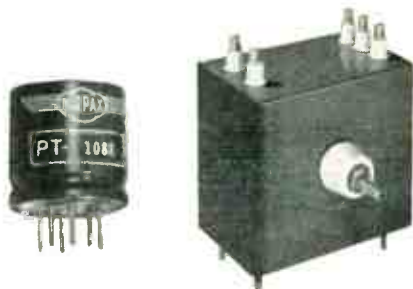
Type 371. For reliability under extreme conditions of shock and vibration Airpax provides a center pivoted type which functions during vibrations of 15 G amplitude, over a frequency range of 10 to 2500 CPS.



Type 5600. Designed for transistor drive. Drive coil is tapped at its electrical center and requires only 8.5 milliamperes of drive current from a 9 volt, 400 CPS source. Eliminates drive transformer.



Type 2300. This low noise chopper is ideal for use in null seeking servo systems, instrument amplifiers and applications where noise must be kept at 1 microvolt or less, RMS. Drive is 6.3 volts, RMS at 400 CPS.



CUSTOM TRANSFORMERS. Airpax designs and manufactures custom transformers. The Fosterite facility at Cambridge is the largest in the country. Small size or large, bring your transformer requirements to Airpax.



Magnetic inverse time delay CIRCUIT BREAKER. Only slightly larger than an "ON-OFF" switch, this circuit breaker provides power control and positive circuit protection. Available in ratings from 50 ma. to 10 amps.



CAMBRIDGE, MARYLAND

FORT LAUDERDALE, FLA.



DATA LOGGING AMPLIFIER. A three-stage high accuracy, molded magnetic amplifier designed to deliver ± 5 volts at a linearity better than 0.1%. Voltage gains from 100 to 10,000 are obtainable in this differential type magnetic amplifier.



TACH-PAK. The all new Airpax TACH-PAK is a completely self-contained, highly sensitive unit which makes possible the accurate measurement (0.25%) of the speed of any rotating, reciprocating or oscillating shaft. Also available with AN connector.



MAGMETER. Frequency to voltage converter. Output current is linear with input frequency. The MAGMETER is substantially insensitive to fluctuations in signal amplitude or waveform. Operates servo type recorders.



AIRCRAFT TEST SET. Inexpensive, portable all purpose test set measures frequency, DC and AC voltages commonly found in aircraft ground maintenance checks. Standard phase checker is a built-in feature.



VIBRATORS. Airpax pioneered high-frequency power vibrators. Type 500 is a 400 CPS interrupter for moderate continuous or heavy intermittent loads. This vibrator and variations are used in airborne transceivers, guidance equipments, and portable sets.



FERRAC Magnetic Amplifiers. Available in plug-in or molded types. Faster response—wider dynamic range—higher gains.

PREAC. Airpax PREAC amplifiers, for 60 or 400 CPS operation, have power gains of over 50 db. Unit is hermetically sealed.

**AIRPAX
ELECTRONICS**
INCORPORATED

ALLIED'S HERMETICALLY SEALED RELAYS



MECHANICAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

| ALLIED TYPE | TYPE OF TERMINAL | MAXIMUM OUTLINE DIMENSIONS | | | | WT. (OZ.) | MOUNTING DIMENSIONS | | TYPE MOUNTING | CONTACT RATING (AMPS.) | CONTACT FORM MAX. | COIL DATA | |
|--------------|------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------|---------------------|--------|--|------------------------|-------------------|----------------|----------|
| | | AA | A | B | C | | D | E | | | | MAX. D.C. OHMS | OPERT. |
| ASH | SOLDER | 2 ¹ / ₁₆ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ⁷ / ₁₆ | 3.5 | .938 | 1.187 | (3)=6-32 Studs | 5 | SPDT | 3500 | AC |
| ASHO | PLUG-IN | 3 | 2 ⁷ / ₆₄ | 1 ¹ / ₈ | 1 ⁷ / ₁₆ | 4 | | | Octal Plug-in | 5 | SPDT | 3500 3485 | AC DC |
| BJHR | SOLDER | 3 ¹ / ₃₂ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₈ | 7.5 | .875 | 1.625 | (3)=6-32 Studs | 5 | DPDT | 3700 5000 | AC DC |
| BJHRO | PLUG-IN | 3 ¹ / ₁₆ | 2 ³ / ₄ | 1 ¹ / ₈ | 1 ¹ / ₈ | 7.5 | | | Octal Plug-in | 5 | DPDT | 3700 5000 | AC DC |
| BOH | SOLDER | 3 ¹ / ₃₂ | 2 ¹ / ₆₄ | 2 ¹ / ₃₂ | 2 ¹ / ₃₂ | 7.5 | 1.856 | 1.856 | (4).206 Dia. Holes | 10 | DPDT | 2675 5000 | AC DC |
| BOHO | PLUG-IN | 3 ¹ / ₃₂ | 2 ¹ / ₃₂ | 2 ¹ / ₆₄ | DIA. | 8 | | | Octal Plug-in | 5 | DPDT | 2675 5000 | AC DC |
| BOHR | SOLDER | 3 ¹ / ₁₆ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₈ | 8.5 | 1.250 | 1.250 | (3)=8-32 Studs | 10 | DPDT | 2675 5000 | AC DC |
| BOHRO | PLUG-IN | 3 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 8.5 | | | Octal Plug-in | 10 | DPDT | 2675 5000 | AC DC |
| BOYH | SOLDER | 3 ¹ / ₃₂ | 2 ¹ / ₆₄ | 2 ¹ / ₃₂ | 2 ¹ / ₃₂ | 8.5 | 1.856 | 1.856 | (4).206 Dia. Holes | 10 | DPDT | 10,000 | DC |
| BOYHR | SOLDER | 3 ¹ / ₁₆ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₈ | 8.5 | 1.250 | 1.250 | (3)=8-32 Studs | 10 | DPDT | 10,000 | DC |
| BOYHRO | PLUG-IN | 3 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 8.5 | | | Octal Plug-in | 10 | DPDT | 10,000 | DC |
| CNAH | SCREW | 4 ¹ / ₆₄ | 3 ¹ / ₆₄ | 2 ¹ / ₃₂ | 2 ¹ / ₃₂ | 22 | 1.875 | 2.000 | (3)=10-32 Studs | 50 | SPST | 600 4460 | AC DC |
| CH | SOLDER | 2 ¹ / ₆₄ | 1 ¹ / ₄ | 1 ¹ / ₂ | 1 ¹ / ₂ | 5 | 1.187 | 1.268 | (3)=6-32 Studs | 10 | 4PDT | 525 | DC |
| JH-6D | SOLDER | 1.187 | .906 | 1.320 | .400 | 0.8 | CTR CTR | 1.078 | (2).120 dia. holes | 5 | 2PDT | 12,000 | DC |
| JH-12D | SOLDER | 1.187 | .906 | 1 ¹ / ₁₆ | .840 | 1.5 | 1.200 | .400 | (2).125 dia. holes | 2 | 4PDT | 12,000 | DC |
| JH-18D | SOLDER | 1.387 | 1.106 | 1 ¹ / ₂ | 1.240 | 2.5 | 1.200 | .600 | (2).152 dia. holes | 2 | 6PDT | 12,000 | DC |
| KH-6D | PLUG-IN | 1 ⁷ / ₆₄ | 5 ⁷ / ₆₄ | .396 | .800 | 0.33 | | | 8 Pin Plug-in | 1/2 | DPDT | 5,000 | DC |
| KHJ-6D | SOLDER | 1.062 | .781 | 1.320 | .400 | 0.5 | CTR CTR | 1.078 | (2).120 dia. holes | 3 | 2PDT | 27,800 | DC |
| KHY-6D | SOLDER | 1.096 | .759 | 1 ¹ / ₆₄ | .332 | 0.5 | 1.000 | .125 | (4).096 dia. holes | 3 | 2PDT | 8 120 | DC |
| LKH-6C | SOLDER | 2 ¹ / ₃₂ | 3 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₃₂ | 8.3 | 1.375 | 1.500 | (3)=6-32 Studs | 2 | 6PDT | 11,000 | DC |
| LKH-4C | SOLDER | 3 ¹ / ₃₂ | 2 ¹ / ₃₂ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 6 | .938 | 1.187 | (3)=6-32 Studs | 2 | 4PDT | 11,000 | DC |
| LKHO | PLUG-IN | 3 ¹ / ₆₄ | 3 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 5.5 | | | Octal Plug-in | 2 | DPDT | 11,000 | DC |
| MEH-6 | SOLDER | 2 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₈ | 1 | 3 | .672 | 1.047 | (3)=6-32 Studs | 5 | DPDT | 1330 2930 | AC DC |
| MEHG | PLUG-IN | 2 ¹ / ₃₂ | 1 ¹ / ₃₂ | 1 ¹ / ₈ | 1 | 3.5 | .762 | 1.165 | Note 1 (3)=4-40 Studs | 5 | DPDT | 1330 2930 | AC DC |
| MH-6D | SOLDER | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | .722 | 1 | CTR CTR | .875 | (2) Holes .125 Dia. | 5 | DPDT | 15,900 | DC |
| MH-12 | SOLDER | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 2.5 | CTR CTR | 1.406 | Note 3 (2)=6-32 Studs | 5 | 4PDT | 16,000 | DC |
| MH-18 | SOLDER | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 4 | CTR CTR | 1.562 | Note 3 (2)=6-32 Studs | 5 | 6PDT | 22,100 | DC |
| MHT-12 | SOLDER | 2 ¹ / ₆ | 1 ¹ / ₁₆ | 1 ¹ / ₁₆ | DIA. | 3 | CTR CTR | .625 | Note 3 (2)=6-32 Studs | 5 | 4PDT | 16,000 | DC |
| MHT-18 | SOLDER | 2 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | DIA. | 4.5 | CTR CTR | .625 | Note 3 (2)=6-32 Studs | 5 | 6PDT | 22,100 | DC |
| MHK-12 | SOLDER | 1 ¹ / ₆₄ | 1 ¹ / ₂ | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 3.5 | .938 | 1.187 | (3)=6-32 Studs | 5 | 4PDT | 16,000 | DC |
| MHUO-12 | PLUG-IN | 1 ¹ / ₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 2.5 | CTR CTR | 1.406 | Note 4 (2) .144 Dia. Holes | 5 | 4PDT | 16,000 | DC |
| MHLO-12 | PLUG-IN | 1 ¹ / ₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 2.5 | CTR CTR | 1.531 | Note 4 (2) .125 Dia. Holes | 5 | 4PDT | 16,000 | DC |
| MHUO-18 | PLUG-IN | 1 ¹ / ₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₃₂ | 4.0 | CTR CTR | 1.562 | Note 4 (2) .144 Dia. Holes | 5 | 6PDT | 22,100 | DC |
| MHLO-18 | PLUG-IN | 1 ¹ / ₄ | 1 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₃₂ | 4.0 | CTR CTR | 1.687 | Note 4 (2) .125 Dia. Holes | 5 | 6PDT | 22,100 | DC |
| MHJ-12 | SOLDER | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | | CTR CTR | 1.406 | (2)=6-32 Studs | 5 | 4PDT | 16,000 | DC |
| MHJ-18 | SOLDER | 1 ¹ / ₃₂ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₁₆ | | CTR CTR | 1.562 | (2)=6-32 Studs | 5 | 6PDT | 22,100 | DC |
| MHY-12 | SOLDER | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₃₂ | | CTR CTR | 1.562 | (2)=6-32 Studs | 10 | 4PDT | 22,100 | DC |
| PBHW-6 | SOLDER | 2 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 6 | CTR CTR | 1.468 | Note 3 (2)=6-32 Studs | 10 | DPDT | 380 4800 | AC DC |
| PBH-6 | SOLDER | 2 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 6 | 1.218 | 1.218 | (4)=6-32 Studs | 10 | DPDT | 380 4800 | AC DC |
| PBH-9 | SOLDER | 2 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 6 | 1.218 | 1.218 | (4)=6-32 Studs | 10 | 3PDT | 380 4800 | AC DC |
| PBH-12 | SOLDER | 2 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 6.5 | 1.218 | 1.218 | (4)=6-32 Studs | 10 | 4PDT | 380 4800 | AC DC |
| PBHN-9 | PLUG-IN | 3 ¹ / ₆ | 2 ¹ / ₆ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 9 | | Note 3 | "AN" CONNECTOR | 10 | 3PDT | 380 4800 | AC DC |
| PBHN-12 | PLUG-IN | 3 ¹ / ₆ | 2 ¹ / ₆ | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 9.5 | | Note 3 | "AN" CONNECTOR | 10 | 4PDT | 380 4800 | AC DC |
| PDH-9 | SOLDER | 2 ¹ / ₂ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 6 | .938 | 1.187 | (3)=6-32 Studs | 2 | 3PDT | 475 4800 | AC DC |
| PDH-12 | SOLDER | 2 ¹ / ₂ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 6.5 | .938 | 1.187 | (3)=6-32 Studs | 2 | 4PDT | 475 4800 | AC DC |
| PDHG | PLUG-IN | 2 ¹ / ₆₄ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 6.5 | | Note 1 | 14 Pin Plug (3)=6-32 Studs | 2 | 4PDT | 475 4800 | AC DC |
| POHR-9 | SOLDER | 3 ¹ / ₆ | 3 ¹ / ₆₄ | 1 ¹ / ₃₂ | 1 ¹ / ₃₂ | 12 | 1.375 | 1.437 | (3)=8-32 Studs | 10 | 3PDT | 870 5000 | AC DC |
| POHR-12 | SOLDER | 3 ¹ / ₃₂ | 3 ¹ / ₆₄ | 2 ¹ / ₃₂ | 2 ¹ / ₃₂ | 13.5 | 1.625 | 1.812 | (3)=8-32 Studs | 10 | 4PDT | 870 5000 | AC DC |
| POHRO-12 | PLUG-IN | 4 ¹ / ₁₆ | 3 ¹ / ₂ | 2 ¹ / ₃₂ | 2 ¹ / ₃₂ | 13.5 | | | 14 Pin Plug-in | 10 | 4PDT | 870 5000 | AC DC |
| PRH | SOLDER | 3 ¹ / ₆₄ | 2 ¹ / ₃₂ | 3 ¹ / ₃₂ | 1 ¹ / ₁₆ | 9.5 | CTR CTR | 2.687 | (2) .161 Dia. holes | 10 | 4PDT | 620 | DC |
| RSH-3D | SOLDER | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1.233 | .853 | 2.0 | CTR CTR | .973 | (2).125 dia. clearance holes | 2 | SPDT | 14,000 | DC |
| RSH-6D | SOLDER | 2 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1.233 | .853 | 2.0 | CTR CTR | .973 | (2).125 dia. clearance holes | 2 | DPDT | 14,000 | DC |
| RSHO-6D | 8 PIN PLUG-IN | 2 ¹ / ₁₆ | 1 ¹ / ₆₄ | 1.233 | .853 | 2.0 | CTR CTR | .973 | 8 pin plug-in - keyway (2).125 dia. clearance holes | 2 | DPDT | 14,000 | DC |
| RSH-3D | 7 PIN PLUG-IN | 2 ¹ / ₆₄ | 1 ¹ / ₆ | 3 ¹ / ₄ | DIA. | 2.0 | | | 7 Pin Plug-in | 2 | SPDT | 14,000 | DC |
| SKH | SOLDER | 2 ¹ / ₃₂ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 4.5 | .938 | 1.187 | (3)=6-32 Studs | 2 | 4PDT | 4,500 | DC |
| SKHO | PLUG-IN | 3 | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 5 | | | Octal Plug-in | 2 | DPDT | 4,500 | DC |
| SKHW | SOLDER | 2 ¹ / ₃₂ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 4.5 | .938 | 1.187 | Note 3 (3) 6-32 Studs | 3 | 4PDT | 4,500 | DC |
| SKHG | PLUG-IN | 2 ¹ / ₆₄ | 2 ¹ / ₁₆ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 5 | | Note 1 | 14 Pin Plug-in(3)=6-32 Studs | 2 | 4PDT | 4,500 | DC |
| SKHN | PLUG-IN | 3 ¹ / ₁₆ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 6.8 | | Note 3 | "AN" CONNECTOR | 2 | 4PDT | 4,500 | DC |
| SWHO | PLUG-IN | 2 ¹ / ₆₄ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 5.5 | | | Octal Plug-in | 2 | DPDT | 13,800 | DC |
| SWH | SOLDER | 2 ¹ / ₁₆ | 2 ¹ / ₆₄ | 1 ¹ / ₈ | 1 ¹ / ₁₆ | 5.5 | .938 | 1.187 | (3)=6-32 Studs | 2 | DPDT | 13,800 | DC |
| T-154H-CC-CC | SOLDE. | 1 ¹ / ₆₄ | 1 ¹ / ₆₄ | 1 ¹ / ₁₆ | 5 ¹ / ₆₄ | 1.0 | 1.000 | .500 | (3)=4-40 NC-2A Studs | 2 | 4PDT | 15,000 | DC |

NOTE 1: Use 14 pin mini-ature socket
NOTE 2: Two Relays in one enclosure
NOTE 3: Air Force approved
NOTE 4: Sockets available from Allied Control

* NOTE: MHJ type relays are available in all MH type mountings.

For details, circle #84 on Reader Service Card

TYPES OF MOUNTINGS AND TERMINALS



2 STUDS



3 STUDS



4 STUDS



"AN" PLUG-IN



2 HOLE

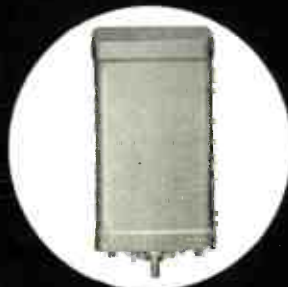


OCTAL PLUG



14 PIN PLUG-IN

TYPES OF HOUSINGS



For details, circle #85 on Reader Service Card

OUTLINE DIMENSIONS:



OCTAGON



RECTANGLE OR SQUARE



ROUND



SIDE VIEW

TYPE TERMINALS:



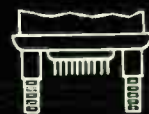
SOLDER TERMINAL



OCTAL 8 PIN PLUG

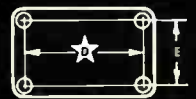


"AN" CONNECTOR



14 PIN PLUG-IN

MOUNTING DIMENSIONS:



ALLIED CONTROL

ALLIED CONTROL COMPANY, INC., 2 EAST END AVENUE, NEW YORK 21, N. Y.



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ELECTRO-MECHANICAL COMPONENTS ENGINEERED AND

low-current switches



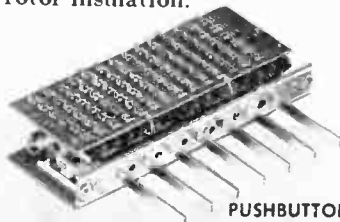
Mounts in a 1" diameter circle

Type A Miniature Rotary Switch

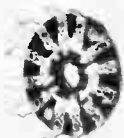
Available in three models: 45°, 36°, and 30° throw. Up to 18 contacts. Silicone glass stator insulation; KEL-F® rotor insulation.



ROTARY SWITCHES



PUSHBUTTON SWITCHES



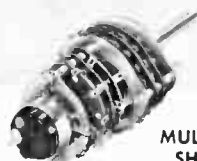
PRINTED CIRCUIT SWITCHES



ROTARY SLIDER SWITCHES



LEVER OPERATED SWITCHES



MULTIPLE SHAFT SWITCHES

The above switches represent but seven of the hundreds of basic Oak designs—already tooled for fast production. Custom variation of these designs provides a source of special switches in almost *infinite variety*. Excellence of design plus highest quality materials make Oak switches the best you can buy. Standard insulation is phenolic, steatite, and Mycalex; contacts, silver-plated spring brass or spring silver alloy.

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Low Level Inverter

Withstands 30 G vibrations from 0-500 cps and -55° to +100°C temperatures. Custom-built in an unusual variety of packages.

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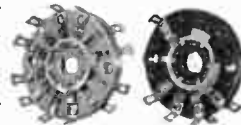


design...call on OAK engineers!

ing time. Even on seemingly simple components, Oak engineers have been able to make valuable suggestions that resulted in better performance and lower costs. Combine this thorough engineering with Oak's manufacturing skills and facilities, and you can feel assured of getting the *exact* component you need . . . and in a lot less time.

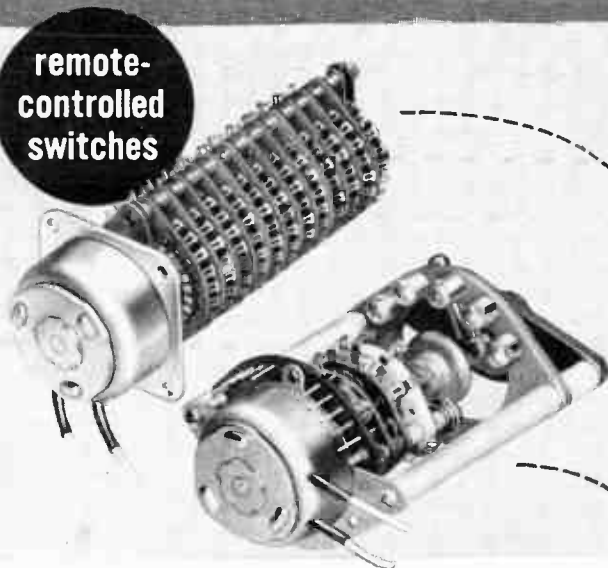
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These high-temperature, low-power wafers have demonstrated high reliability in actual operation during 800-hour tests at a continuous, ambient 150°C. Special alloy clips; ceramic or Mycalex insulation.

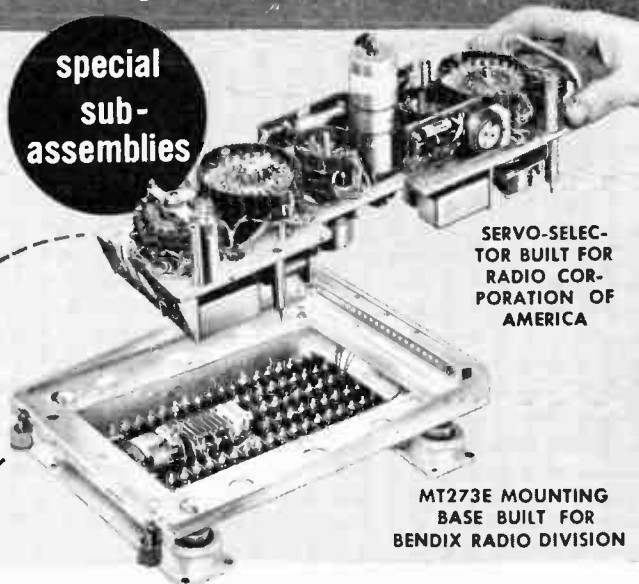


MANUFACTURED TO YOUR EXACT REQUIREMENTS!

remote-controlled switches



special sub-assemblies



SERVO-SELECTOR BUILT FOR RADIO CORPORATION OF AMERICA

MT273E MOUNTING BASE BUILT FOR BENDIX RADIO DIVISION

Thousands of Combinations

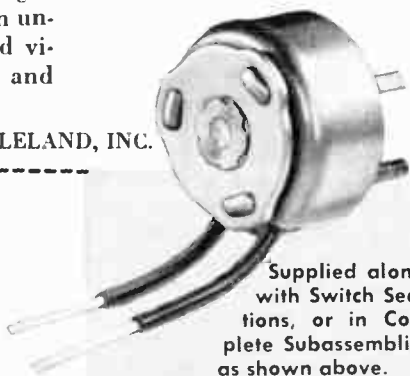
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One Responsibility . . . One Source

Turn your prototype over to Oak engineers. They will analyze it, test it, redesign for optimum performance, and convert it into a manufacturable device. Oak's modern production facilities then build your subassembly, and run any life and environment tests which may be required.

rotary solenoids*



Supplied alone, with Switch Sections, or in Complete Subassemblies as shown above.

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Oak rotary solenoids are ideal actuators for remote control of complex circuits under the severe conditions of MIL-S-4040A and similar specifications. They are compact, rugged and extremely adaptable.

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Four plants . . . 3200 employees . . . 400,000 sq. ft. equipped for economical production



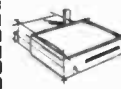
Chicago, Ill.



Crystal Lake, Ill.



Chicago, Ill.



Eikhorn, Wis.

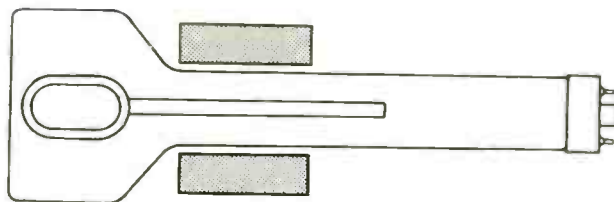
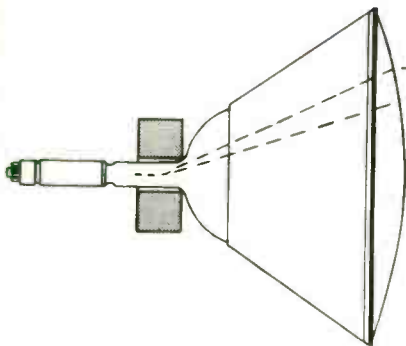
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Celco Deflection Yokes permit the rapid presentation of random character and alpha numeric displays. Low hysteresis, high accuracy and fast recovery time with emphasis on the degradation of current near zero make possible magnetic deflection in character displays.

Celco High Sensitivity Yokes minimize the deflecting currents required from the deflection drivers, resulting in high efficiency for your system.

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The construction of our yokes makes it possible to achieve **sensitivities, linearities, responses and distortion-free deflecting fields** not possible with the usual types of yoke.

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World Radio History

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Celco FOR STANDARD, COMMERCIAL & MILITARY APPLICATIONS

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TYPE BY

Transistorized encapsulated yokes for 70° 7/8" neck CRT and 1" neck image storage tubes.



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Celco ENGINEERED YOKES FOR PRECISION DISPLAYS



DP

Dual purpose yoke custom designed. Deflection system plus axial off-centering coils.



HS

Special high sensitivity deflection yoke with critical damping provisions.



PI

Plug in type encapsulated deflection yoke for rapid insertion.



ER

Encapsulated rotating, 4 axis slip ring precision deflection yoke.



MS

Miniature deflection yoke for rotating or fixed coil radar system.

For engineering information on your special display problems call your nearest Celco Plant.



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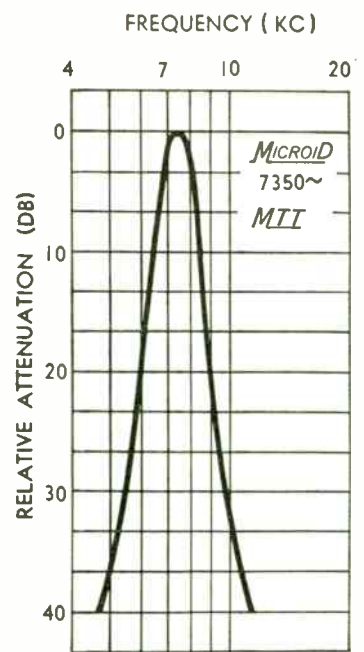
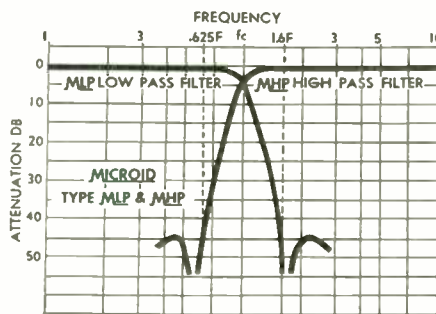
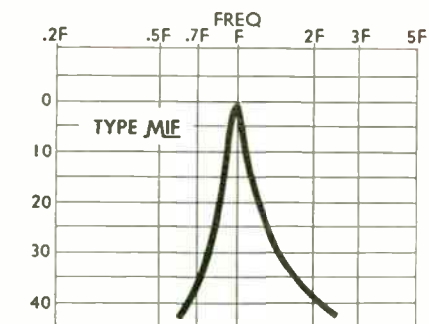


THE SHRINKING MAN'S FILTER

Although worlds apart in purpose, practitioners of the art of head shrinking and Burnell & Co. miniaturization engineers are both expert in reducing to size. For example, Burnell's new micro-miniature **MICROID** filters are particularly valuable in transistorized circuitry and only a step away from micro-module use. Range of the new Type **MTI** band pass filter is 7.35 kc to 100 kc, band width 15% at 3 db and +60% -40% at 40 db. Size is 1/2" x 19/32" x 15/16", weight .3 oz. Types **MLP** and **MHP** cover 5 kc to 100 kc with a standard impedance of 10K ohms. These are micro-miniature counterparts of the popular Burnell **TCL** and **TCH** low pass and band pass filters. The band pass filter results when cascading a **TCL** with **TCH** filter. Size is 3/4" x 1/2" x 1".

Type **MIF** micro-miniature interstage filters are designed for a wide variety of applications. Input impedance is 10K ohms, output to grid with a voltage gain of approximately 2:1. The 3 db band width is nominally 8%. Ranging from 7.5 kc to 100 kc, these interstage filters are provided in the same case as Type **MLP**.

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Use of five quick-change tuning heads avoids costly repetition of components custom to 30 frequency ranges. Built-in impulse generator serves as calibrator. Carrier and peak reading VTVM. Fully regulated power supply.



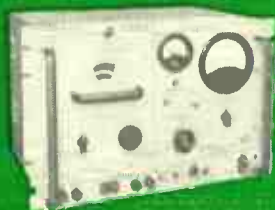
NOISE AND FIELD INTENSITY METER
Model NF-112 • 1 KMC to 10 KMC

Companion unit to NF-105. Four interchangeable tuning heads. Exceptional shielding effectiveness. Calibration by means of built-in impulse generator. Compact—simple to operate.



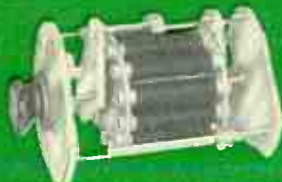
BROADBAND POWER DENSITY METER
Model NF-157
200 MC to 10 KMC

Personal safety indicator. Average power from 1 mW/cm² to 1 w/cm². Complete with 3 pickup probes. Portable. Self-contained.



AM MODULATION METER
Model MM-120 • 15 KC to 1000 MC

Indicates modulation percentage of signal generators and transmitters. RF sensitivity 0.01 volts. Two tone in tuning units.



BROADBAND COAXIAL ATTENUATORS
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Peak, 6 watt, 20 position, step attenuators. Operationally and mechanically attenuator panels. 1 watt to 2 watts. Also 50 watt power attenuators. Large range of values. Low VSWR. High accuracy. Long term stability. Conservative power ratings.



NOISE AND FIELD INTENSITY METER
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Modified version of Model NF-105.



BROADBAND CRYSTAL MIXER
Model CM-107 • 225 MC to 5600 MC

Eight lead-lined models. Low noise figure. Laboratory or production applications. Versatile.



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Five models permit accurate, accurate division of RF power. Many special versions available.



VARIABLE FREQUENCY POWER SUPPLIES
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Low distortion. Excellent regulation. Quick recovery. Wide frequency range.



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Generate high output level of impulse noise over wide frequency range. For receiver gain calibration, noise susceptibility investigations.



BROADBAND COAXIAL STUB TUNERS
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Single, double and triple stub tuners of rugged construction. Locking nuts insure stable operation.



COAXIAL TERMINATION
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AMSTERDAM, NEW YORK

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VICTOR 2-8400

Average Reading R.F. POWER METERS



These broad band R.F. Power Meters are of the absorption-type consisting of an oil filled, air cooled, coaxial load resistor and a voltmeter calibrated to read watts. The power meter is suitable for use as a field or laboratory test instrument, is completely shielded and non-radiating, permitting transmitter testing and adjustment without interference. The meter box is easily detached permitting location of the load resistor at a remote point. In cases where power measurements are not required the load resistor may be used as a dummy load. No correction curve is necessary to cover the frequency range. The spurious response usually associated with directional couplers and capacitive voltage dividers is absent in this purely resistive voltage divider. Since this is a resistive voltage divider which has the same voltage division at DC, 60 cycle AC, and at high radio frequencies, this instrument can be calibrated and its calibration can be checked frequently on 60 cycle supply voltages.

| Model | Power Ranges In Watts | Max. Power Dissipation | Price |
|-------|--------------------------|------------------------|----------|
| PM-3 | 60, 150 | 150 watts | \$220.00 |
| PM-6 | 1.5, 6 | 10 watts | 95.00 |
| PM-7 | 150, 600 | 600 watts | 285.00 |
| PM-8 | 1.5, 6, 15, 60 | 100 watts | 225.00 |
| PM-9 | 2.5, 10 | 10 watts | 105.00 |
| PM-10 | 15, 60 | 90 watts | 145.00 |
| PM-16 | 150, 600, 1500 | 1500 watts | 375.00 |
| PM-18 | 1.5, 6, 15, 60, 150, 600 | 600 watts | 485.00 |
| PM-19 | 1.5, 6, 15, 60, 120 | 100 watts | 250.00 |



PEAK READING R.F. POWER METERS

The peak reading power meters listed are designed to accurately measure the peak power of pulsed R.F. signals in the range of .2 to 700 MC with PRF of 800 to 10,000 pps and pulse duration of .5 microseconds or more, and less than specified maximum average power dissipation.

| Model | Peak Range | VSWR | Max. Average Power Dissipation | Connector | Impedance | Supply Voltage | Accuracy | Freq. Range | Price |
|--------|------------|------|--------------------------------|-----------|-----------|------------------|----------|-------------|----------|
| PM-12 | 0-50kw | 1.15 | 60 watts | Type HN | 51.5 | 115V, 60-1600cps | ±10% | .2-700Mc | \$350.00 |
| TS-305 | 0-50kw | 1.15 | 50 watts | Type HN | 51.5 | 115V, 60-1600cps | ±10% | 220-330Mc | \$350.00 |
| PM-13 | 0-100kw | 1.15 | 100 watts | Type HN | 51.5 | 115V, 60-1600cps | ±10% | .2-700Mc | \$425.00 |

NEW! HI-POWER COAXIAL

CALORIMETRIC POWER METER

DIRECT READING—5 to 50 KW

DC—1000 MC • VSWR less than 1.3



These power meters are greatly simplified Calorimeters which use water to carry the heat away, for economy of space and cost.

The instrument is fully self-contained, portable, water cooled and requires only connection to the power line and water supply. It does not use any flow meters, thermometers or any other controls. There is only the "ON" and "OFF" switch for the operator to use on the front panel, when a measurement is to be made. A sensitive thermopile and microammeter measure the power dissipated in the R.F. load. The microammeter is calibrated in watts, is direct reading and can be remotely located.

The radio frequency load has a low VSWR between DC to 1000 MC. This feature makes it possible to calibrate this instrument at 60 cps against an accurate laboratory type wattmeter, and then use it at any frequency up to 1000 MC. Thus an accuracy of 2% can be easily accomplished. This recalibration is necessary only when measurements are made at extreme temperatures or when wear is suspected.

This calorimeter is particularly recommended for field service where a rugged and yet accurate Power Meter is required for use by unskilled personnel.

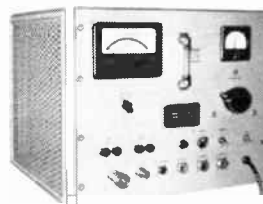
| Model | Power Rating | Connector | Max. VSWR | Water Supply | Price |
|-------|--------------|-----------|-----------|--------------|-----------|
| CX-5 | 5 KW | 1-5/8" | 1.3 | 1.5 G.P.M. | \$1050.00 |
| CX-10 | 10 KW | 3-7/8" | 1.3 | 3 G.P.M. | 1250.00 |
| CX-20 | 20 KW | 3-7/8" | 1.3 | 6 G.P.M. | 2250.00 |
| CX-50 | 50 KW | 6-1/8" | 1.3 | 15 G.P.M. | 4500.00 |

ELECTRO IMPULSE Laboratory

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DIRECT READING

CALORIMETER BRIDGE



with Self-Contained Calorimeter Loads, Cooling System & Circulating System.

This Calorimeter is completely self-contained with its own circulating system, cooling system and the radio frequency dummy load and requires only connection to the regular power line. The R.F. power is read directly on a 4 1/2" meter in watts. A single coaxial dummy load is available to cover the frequency range from DC to 10,000 Mc and for the power range from 1 to 1000 watts. The overall accuracy of this Calorimeter is 3%. However, this accuracy can be improved greatly by calibrating the Calorimeter by means of an external laboratory-type wattmeter.

| Model | Range | Frequency | Price |
|-------|------------|------------|----------|
| CB-11 | 1 watt | DC-4 KMC | \$900.00 |
| CB-12 | 5 watts | " | 900.00 |
| CB-13 | 25 watts | " | 1250.00 |
| CB-14 | 150 watts | " | 1250.00 |
| CB-15 | 300 watts | " | 1250.00 |
| CB-16 | 750 watts | " | 1450.00 |
| CBW-1 | 1 watt | 7-12 KMC | 1450.00 |
| CBW-2 | 5 watts | " | 1450.00 |
| CBW-3 | 25 watts | " | 1250.00 |
| CBW-4 | 150 watts | 2.4-12 KMC | 1100.00 |
| CBW-5 | 750 watts | 1-12 KMC | 1500.00 |
| CBW-6 | 3000 watts | " | 2400.00 |
| CBW-7 | 6000 watts | " | 3000.00 |

DIRECT READING

Calorimetric Power Meter



These power meters are greatly simplified Calorimeters, which use an accurate metering pump of the gear type driven by an over-powered synchronous motor to keep the fluid flow constant. The instrument is fully self-contained, portable, self-cooled and requires only connection to the power line. It does not use any flow meters, thermometers or any other controls. There is only the "ON" and "OFF" switch for the operator to use on the front panel, when a measurement is to be made. A sensitive thermopile and microammeter measure the power dissipated in the R.F. load. The microammeter is calibrated in watts and is direct reading. These Calorimeters are available with either a coaxial or a waveguide load.

COAXIAL CALDRIMETERS

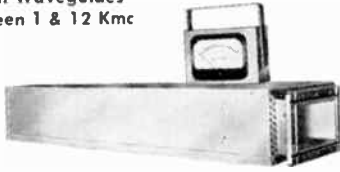
| Type | Full Scale Power | Freq. Range KMC | Price |
|-----------|------------------|-----------------|----------|
| CPM-20 | 20 | DC-10 | \$880.00 |
| CPM-50 | 50 | DC-10 | 880.00 |
| CPM-100 | 100 | DC-10 | 880.00 |
| CPM-500 | 500 | DC-10 | 880.00 |
| CPM-5000 | 5000 | DC-1 | 1400.00 |
| CPM-10000 | 10000 | DC-1 | 2000.00 |
| CPM-20000 | 20000 | DC-1 | 3250.00 |

WAVEGUIDE CALDRIMETERS

| Type | Full Scale Power | Price |
|-----------|------------------|----------|
| CPW-20 | 20 | \$850.00 |
| CPW-50 | 50 | 800.00 |
| CPW-100 | 100 | 800.00 |
| CPW-500 | 500 | 800.00 |
| CPW-5000 | 5000 | 1200.00 |
| CPW-10000 | 10000 | 1750.00 |
| CPW-20000 | 20000 | 2950.00 |

HI-POWER DIRECT READING CALORIMETER

For All Waveguides
Between 1 & 12 Kmc



This Calorimetric Power Meter consists of a Waveguide Thermopile Mount, a Microammeter and a blower to remove heat. The instrument is compact and is not much bigger than a Waveguide Waterload. It is extremely simple to operate. There are no controls, thermometers, flowmeters, heat exchanger or liquids. Reading time is approximately 1 minute and 1 minute between readings of different power levels. Accuracy is better than plus or minus 5%. The effect of ambient temperature changes between 60°F to 80°F is negligible.

| Model | Frequency Range KMC | Average Power Rating | Price |
|----------|---------------------|----------------------|----------|
| DCXS | 8.2-12.4 | 10 watts | \$550.00 |
| DCXS (B) | 8.2-12.4 | 300 watts | 750.00 |
| DCXL | 7-10 | 10 watts | 550.00 |
| DCXL (B) | 7-10 | 500 watts | 750.00 |
| DCM | 5.85-8.20 | 50 watts | 750.00 |
| DCM (B) | 5.85-8.20 | 500 watts | 850.00 |
| DCN | 3.95-5.85 | 100 watts | 850.00 |
| DCN (B) | 3.95-5.85 | 600 watts | 950.00 |
| DCS | 2.4-3.7 | 100 watts | 850.00 |
| DCS (B) | 2.4-3.7 | 1000 watts | 950.00 |
| DCH | 1.7-2.6 | 100 watts | 900.00 |
| DCH (B) | 1.7-2.6 | 2000 watts | 1050.00 |
| DCL | 1.12-1.70 | 100 watts | 900.00 |
| DCL (B) | 1.12-1.70 | 2000 watts | 1050.00 |

SEMICONDUCTOR LIFETIME MEASURING EQUIPMENT



Here is a reliable instrument for measuring lifetimes as short as one microsecond. It is so designed as to accommodate large or small samples including cylindrical ingots. The light source consists of a non-inductive capacitor charged through a resistor by the variable high voltage supply to the firing voltage of the air gap between two electrodes. The resulting light flash is focused by a lens onto the sample holder. The lens is adjustable so that the light image can be brought to focus at any point. The sample holder will accommodate ingots from 3/4 to 10-inches in length. Its adjustable fingers make pressure contact with the ends of the specimen. A trap lite and stray light shield is mounted on the bed of the sample holder. The adjustable bed has a full traveling range of 12-inches.

Semiconductor Lifetime Measuring Equipment,
Model LM-1\$1250.00

Light Source with Variable Power Supply
15,000V .04 Mfd. 15,000V, Model LS-2
.....\$1250.00

Light Source with Variable Power Supply
10,000V, Cabinet & Stand, .02 Mfd., Model
LS-1\$850.00

HI-POWER DUMMY LOADS

A. WAVEGUIDE:

These Waveguide Dummy Loads are of the lossy wall type. They are designed to change microwave energy into heat which is removed by means of cooling fins into the adjoining air. A full line of such dummy loads is listed below. Lossy wall loads are superior to inguide loads because of the more efficient removal of the heat generated, and the highly reduced tendency toward pulse power breakdown. New construction shortens the path between the inner surface of the lossy guide and the cooling fins. The lossy material used in these



loads absorbs only a minimum of moisture, is extremely durable, provides a strong adhesive bond to the metal walls and handles the thermal shock efficiently.

| Type | Frequency Range KMC | Nominal Average Power Dissipation | Peak Power Rating | Flange | * | Price |
|---|---------------------|-----------------------------------|-------------------|----------|---|---------|
| TERMINATIONS FOR 1/2-in. x 1-in. WAVEGUIDE | | | | | | |
| LPTX 1 | 8.2-12.4 | 1 | | UG39/U | | \$25.00 |
| HPTXS75 | " " | 75 | | UG135/U | P | 55.00 |
| HPTXS250 | " " | 250 | .29 | UG135/U | P | 100.00 |
| DA22/U | " " | 175 | .29 | UG39/U | | 85.00 |
| TERMINATIONS FOR 1 1/4-in. x 3/8-in. WAVEGUIDE | | | | | | |
| HPTXL100 | 7-10 | 100 | .46 | UG138/U | P | 75.00 |
| HPTXL250 | " " | 250 | .46 | UG138/U | | 100.00 |
| DA21/U | " " | 280 | .46 | UG51/U | | 105.00 |
| HPTXL500 | " " | 500 | .46 | UG51/U | P | 135.00 |
| TERMINATIONS FOR 1 1/2-in. x 3/4-in. WAVEGUIDE | | | | | | |
| HPTX600 | 5.85-8.20 | 600 | .71 | UG344/U | P | 210.00 |
| TERMINATIONS FOR 1-in. x 2-in. WAVEGUIDE | | | | | | |
| HPTX800 | 3.95-5.85 | 800 | 2.0 | UG149A/U | | 220.00 |
| TERMINATIONS FOR 1 1/2-in. x 3-in. WAVEGUIDE | | | | | | |
| DA18/U | 2.4-3.7 | 700 | 1.5 | UG51/U | | 175.00 |
| TS338 | " " | 700 | 1.5 | UG438/U | | 175.00 |
| HPTS2500 | 2.60-3.95 | 2500 | 3.2 | UG53/U | P | 225.00 |
| TERMINATIONS FOR 3.41-in. x 6.66-in. WAVEGUIDE | | | | | | |
| HPTL1000 | 1.12-1.70 | 1000 | 7.0 | UG417/U | | 370.00 |
| HPTL2500 | " " | 2500 | 10.0 | UG417/U | | 435.00 |
| HPTL4000 | " " | 4500 | 17.0 | UG417/U | | 485.00 |

* P Indicates Pressurization

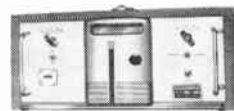
B. COAXIAL:

These R.F. Terminations are oil filled resistors, in which the oil is used as a dielectric and to carry the heat generated to cooling fins. At the rated power the heat dissipating housing is designed to keep the temperature of the oil below 250°F. No additional forced cooling is necessary up to 1500 watts. Above 1500 watts, additional cooling, such as water or forced air is necessary. These loads are housed in an expandable all metal housing. Neoprene diaphragms are not used.

| Type | Frequency Range KMC | Watts Average Power | VSWR Maximum | Price |
|--|---------------------|---------------------|--------------|----------|
| OIL FILLED, AIR COOLED (CONVECTION) | | | | |
| CPTN 50 | DC-9 | 50 | 1.1 | \$ 40.00 |
| CPTN 100 | DC-9 | 100 | 1.1 | 50.00 |
| CPTN 500 | DC-9 | 500 | 1.1 | 185.00 |
| CPTNS 500 | DC-4 | 500 | 1.25 | 245.00 |
| CPTNS 100 | DC-4 | 100 | 1.2 | 65.00 |
| CPTN 1500 | DC-6 | 1500 | 1.15 | 300.00 |
| OIL FILLED, WATER COOLED | | | | |
| CPTUGK | DC-6 | 6000 | 1.15 | 665.00 |
| CPTL10K | DC-6 | 10000 | 1.2 | 950.00 |
| CPTP10K | | | | |
| CPTP20 | DC-6 | 20000 | 1.25 | 900.00 |
| AIR COOLED (CONVECTION OR BLOWER) | | | | |
| LOW FREQUENCY DUMMY LOAD | | | | |
| DA-64 | DC-5Mc | 1200 | | 450.00 |
| I4ACN | DC-5Mc | 3000 | | 450.00 |

NEW LOW POWER R.F. CALORIMETER

From 5 milliwatts full scale (50 microwatts per mm) to 10 watts full scale. DC to 26 KMC in 4 plug in units. These Thermopile Mounts are Thermally insulated Dummy Loads with an intimately installed Thermopile which results in higher sensitivity, fast response (30 seconds or less), simplicity of construction and higher reliability. Does not use flowmeters, thermometers, vacuum tubes or transistors.



| Model | Frequency Range | Max. VSWR | Power Ranges | Reading Time | Power Indicator | Price of Complete Calorimeter |
|----------|-----------------|-----------|----------------------|--------------|-----------------|-------------------------------|
| CX-5 | DC-10 KMC | 1.5 | 5, 25, 100 & 1000 mw | | Galvanometer | |
| CX-10 | DC-10 KMC | 1.5 | 10, 100, 1000 mw | | Galvanometer | |
| CX-10K | DC-10 KMC | 1.5 | 10 watts | 40 sec. | Microammeter | \$550.00 |
| CWX-10 | 7-12 KMC | 1.2 | 10, 100, 1000 mw | 10, 30 sec. | Galvanometer | |
| CWX-10K | 7-12 KMC | 1.2 | 2, 10 watts | 30 sec. | Microammeter | \$550.00 |
| CWKU-10 | 12-18 KMC | 1.3 | 10, 100, 1000 mw | 30 sec. | Galvanometer | |
| CWKU-10K | 12-18 KMC | 1.3 | 2, 10 watts | 30 sec. | Microammeter | \$550.00 |
| CWK-10 | 18-26 KMC | 1.3 | 10, 100, 1000 mw | 30 sec. | Galvanometer | |
| CWK-10K | 18-26 KMC | 1.3 | 2, 10 watts | 30 sec. | Microammeter | \$550.00 |

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where precision counts – it's **S.E.C. first!**

PLASTIC PRECISION CAPACITORS



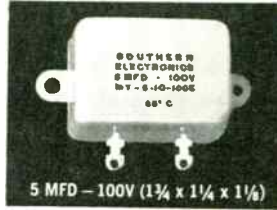
Tubular .1 MFD – 200V



.1 MFD – 200V



10 MFD ± 1% 200V
(4 7/8 x 3 1/8 x 2 1/8)



5 MFD – 100V (1 3/4 x 1 1/4 x 1 1/8)



1 MFD – 200V



Adjustable
(1 7/8 x 1 1/8 x 1 11/16)



Plug in (1 MFD – 150V)

I. POLYSTYRENE

with these outstanding properties:

- Tolerances as close as 0.1%
- Insulation Resistance as HIGH as 1×10^{12}
- Dielectric Absorption as LOW as .0001
- Dissipation Factor as LOW as .0002
- Temperature Coefficient... 100PPM per °C
- Stability as close as .05% drift in 1 yr.
- Voltage Derating... none to 170°F.
- Hermetically sealed for enduring accuracy!

also available:

- Many other case styles or mounting brackets
- Any capacitance from .001 to 50 MFD (incl. special values)
- Voltages from 50 to 5000

2. POLYESTER

with these outstanding properties:

- Tolerances as close as 1%
- Insulation Resistance as HIGH as 1×10^{11}
- Dielectric Absorption as LOW as .001
- Dissipation Factor as LOW as .003
- Temperature Coefficient... 800 PPM per °C
- Temperature range... to 150°C.
- Hermetically sealed for enduring accuracy!



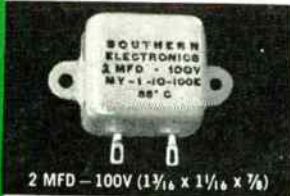
4 MFD – 300V (2 x 2 x 1)



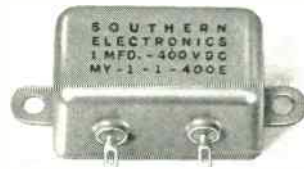
120 MFD ± 10% 50V



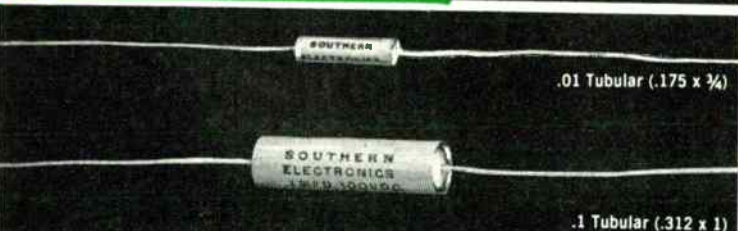
Plug in (4 MFD – 150V)



2 MFD – 100V (1 7/8 x 1 1/8 x 7/8)



1 MFD – 400V (1 3/4 x 1 1/4 x 1)

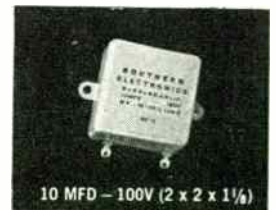


.01 Tubular (.175 x 3/4)

.1 Tubular (.312 x 1)



Printed Circuit Small .11 MFD – 50V



10 MFD – 100V (2 x 2 x 1 1/8)



3. RC NETWORKS

- Close tolerances
- Hi-grade precision resistors
- Potted units
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Many other types of precision RC Networks available!

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- Analog multipliers
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- Power meters
- Phase detectors
- Servo detectors
- A.G.C. systems
- Spectrum analyzers
- Choppers (modulators)
- Function generators
- and others —



Actual Size

Standard coils available for 15 or 30 milliampere operation. Other coils are available for operation from 6ma to over 1 ampere.

MC Series **Halltron** MAGNETIC CIRCUIT

— operates with extreme linearity and low hysteresis

The MC-1 (illustrated) contains an Indium Arsenide Halltron mounted in a small air gap of an efficient magnetic circuit. This combination results in a high output voltage which is the product of two electrical inputs.

Special magnetic design, coupled with the low temperature coefficient of InAs, provide extreme linearity for either input quantity.

The magnetic circuit is optimized for DC and audio frequencies, while the Halltron input can be used from DC into the megacycle range. The MC-1 is 1 5/8" wide (square base) and 2 3/16" high. Mumetal shielding minimizes interference.

Other MC units are available for higher outputs, greater efficiency or optimized parameters for specific applications.

MS-40 Series magnetoresistor

The FIRST magnetic field sensitive RESISTOR



Utilizes high-electron mobility indium antimonide.

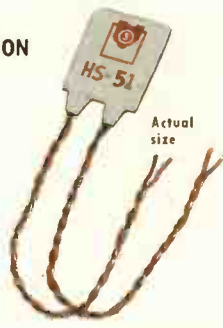
Actual size

A new SEMICONDUCTOR DEVICE in which the electrical resistance is a function of an applied MAGNETIC FIELD. Utilizes non-inductive design and "thinner-than-a-dime" construction. For use as: contactless potentiometers, amplifiers, E & I regulators, squaring devices, modulators, transducers, etc.

HS-50 Series **Halltron**

The FIRST and most widely used HALLTRON

Utilizes high efficiency indium antimonide for applications which require high levels of output power, high sensitivity and economical Hall-effect components and which do not need extreme linearities or elevated temperature operation.



Actual size

HR-30 Series **Halltron**

Wide temperature range — low T.C. types



Actual size

The HR-30 Series Halltron utilizes indium arsenide for low T.C. characteristics. For applications which require moderate output power levels, high sensitivities, good linearities with both current and magnetic field, wide temperature operating ranges and low T.C. of Hall-output voltages.

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| | | | | | |
|------|---------------------------------|--------------------|--------------------|-----------|----|
| InSb | AlSb | CdTe | Ag ₂ Se | (In,Ga)As | In |
| InAs | Bi ₂ Te ₃ | InP | Ag ₂ S | Pb | Sb |
| GaAs | Bi ₂ Se ₃ | GaP | In(P,As) | Bi | |
| GaSb | PbTe | Ag ₂ Te | (In,Ga)Sb | Te | |

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World Radio History

last minute **MEMO**

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Since 1896, CTS has had a reputation for product excellence . . . becoming the world's largest variable resistor manufacturer. Most radio & TV sets throughout the world have dependable CTS controls.

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Now . . . in 5 plants . . . with over 1600 highly skilled technical personnel . . . in 436,000 sq. ft. plant area . . . CTS expands and diversifies . . . adding many other products . . . manufactured to these same high reliability standards.

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65 BRINLOOR BLVD
SCARBOROUGH, ONTARIO
PHONE AMHERST 1-0936

NEW YORK STATE (Above Albany)

J. D. RYERSON ASSOC. INC.
111 KINNE ROAD
P. O. BOX 1400
SYRACUSE 1, NEW YDRK
PHONE GIBSON 6-1771

ARIZONA CALIFORNIA

VAN GROSS COMPANY
21051 COSTANSO STREET
P. O. BOX 425
WOODLAND HILLS, CALIFORNIA
PHONE DIAMOND 0-3131
NORTHERN OFFICE
1178 LOS ALTOS AVENUE
LOS ALTOS CALIFORNIA
PHONE WHITE CLIFF 8-7266

EXPORT

SZUCS INTERNATIONAL CORP
50 BROAD STREET
NEW YORK 4, NEW YORK
PHONE WHITEHALL 4-7959

BOSTON AREA

RESIDENT SALES ENGINEER
ROBERT L. DIAMOND
69B STRATHMORE ROAD
BROOKLINE 46, MASSACHUSETTS
PHONE BEACON 2-7996

SIGNAL SOURCES

- Model L771B 950 to 2000 MC SEC
- Model S771B 1900 to 4000 MC SEC
- Model C772A 3950 to 8200 MC SEC
- Model X772A 7000 to 11 000 MC SEC
- Power Output 10-100 MW CW MAX into matched load. Variable through level-set attenuator
- Modulation: pulse square wave both internal and external

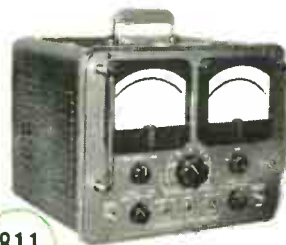


771-772

UNIVERSAL RATIO METER

RATIO METER AND STANDING WAVE AMPLIFIER IN ONE COMPACT PACKAGE

- Two-cycle Precision Logmeter VSWR reflectometer readings of 1.02 to ∞ on only two scales
- VSWR DB and reflection coefficient scales eliminate conversion tables
- Full 70 DB standing wave amplifier operation, expanded VSWR scales
- Crystal and bolometer operation



811

STANDING WAVE AMPLIFIER

- A 3-inch removable meter with 1% linearity provides high resolution and accuracy.
- A filter, tunable between 950 and 1050 CPS, aligns instrument with output frequency of signal source
- Range: 70 DB in six decade steps. Normal and expanded scales for VSWR and DB.
- Gain automatically maintained when switching from normal to expanded scales.
- Detectors: crystal or bolometer
- Full scale sensitivity, 0.1 μ V signal-to-noise ratio, 3:1.



812

TEMPERATURE COMPENSATED POWER METER

- Power Range, full Scale:
 - 20 DBM or 0.010 MW.
 - 15 DBM or 0.030 MW
 - 10 DBM or 0.10 MW
 - 5 DBM or 0.30 MW
 - 0 DBM or 1.00 MW
 - 5 DBM or 3.00 MW.
- Maximum possible accumulative error $\pm 5\%$.
- FXR Series 21B Temperature Compensated Thermistor Head a required accessory.



831

For details,
circle #97 on
Reader Service Card

UNIVERSAL KLYSTRON POWER SUPPLY

- Beam: 200 to 2000 V at 0 to 125 MA, 1800 to 3600 V, 250 W to 3600 W
- Control Grid: Pos 0 to 150 V, Neg 0 to 300 V
- Reflector: 0 to 1000 V
- Regulation: 0.03%
- Ripple: 3 MV, RMS, MAX
- Internal Modulation: pulse, sawtooth, square wave



815

UNIVERSAL MICROWAVE POWER SUPPLY

- Helix beam: 0 to 1800 V at 0 to 100 MA, 1700 to 2500 V at 0 to 100 MA, 2500 to 3500 V at 250 W MAX
- *Grid 1: 0-300 V DC at 0 to 5 MA.
- *Grid 2 reflector: 0-1200 V DC at 0 to 1 MA
- *Grid 3 focusing electrode: 0 to 750 V DC at 0-1 MA
- *Grid 4 (focusing electrode): 0 to 500 V DC at 0-1 MA
- Collector: 0-300 V DC at 0-100 MA.
- Anode: 0-600 V DC at 0-60 MA
- Filament: 0-15 V DC 0-3 AMP at 20 W MAX.



817

KLYSTRON POWER SUPPLY

- Beam: 300-1000 V at 85 MA
- Grid: 300 to 150 V at 0 to 5 MA Built-in limiting resistor
- Reflector: 0-900 V at 10-20 A
- Regulation: 1%
- Internal Modulation: pulse, sawtooth, square wave



819

FXR, Inc.

Formerly F-R MACHINE WORKS, INC.



PRECISION
MICROWAVE
EQUIPMENT

HIGH-POWER
MODULATORS

RADAR
COMPONENTS

ELECTRONIC
TEST
EQUIPMENT

26-12 BOROUGH PLACE, WOODSIDE 77, N. Y.

DESIGNED FOR OPERATION
OVER THE FULL WAVEGUIDE BANDWIDTH,
FROM 350 TO 530 MC.

WR 975 components also available. Frequency range 750 to 1120 MC.

WAVEGUIDE TEST EQUIPMENT



| FXR SERIES PREFIX WAVEGUIDE SIZE IN INCHES | J 21.00x10.50 ID | L 6½x3¼ | R 4.460x2.310 | S 3x1½ | H 2x1 | C 1½x¾ |
|--|---------------------|---------------|------------------|---------------|---------------|---------------|
| FREQUENCY RANGE IN KMC/SEC | 0.35-0.53 | 1.12-1.70 | 1.70-2.60 | 2.60-3.95 | 3.95-5.85 | 5.85-8.20 |
| SLOTTED SECTIONS | J104A † | L101A \$950 | R101A \$1340 | S101A \$445 | H101A \$385 | C101A \$335 |
| ATTENUATORS | | | | | | |
| Flap | | L150B \$170 | R150B \$225 | S151A \$100 | H151A \$ 95 | C151A \$ 90 |
| Semiprecision | | | | S155A \$120 | H155A \$105 | C155A \$ 95 |
| Precision Calibrated | | L160B \$575 | R160B \$500 | S161A \$375 | H161A \$320 | C161A \$300 |
| Precision Direct Reading | | | | S164A \$595 | H164A \$500 | C164A \$350 |
| Fixed | | L168A-E \$215 | | S168A-E \$ 73 | H168A-E \$ 63 | C168A-E \$ 55 |
| CRYSTAL DETECTOR MOUNTS | | | | | | |
| Tunable | | | | | | |
| Fixed-tuned | | | | | | |
| MATCHED BOLOMETER MOUNTS | | | | S207A \$145 | H207A \$140 | C207A \$135 |
| THERMISTOR MOUNTS | | L216A \$225 | R216A \$250 | S216A \$120 | H216A \$ 94 | C216A \$ 88 |
| THERMISTOR HEADS | | L218A \$350 | R218A \$350 | S218A \$225 | H218A \$180 | C218A \$170 |
| TUNERS | | | | | | |
| Slide screw | | L310A \$250 | R310A \$325 | S311A \$150 | H311A \$140 | C311A \$135 |
| E/H | | | | S312A \$225 | H312A \$175 | C312A \$150 |
| PRECISION PHASE SHIFTERS | | | | | | |
| DIRECT READING FREQUENCY METERS | | | | | | |
| Precision | | | | | | C402A \$1275 |
| Reaction | | | | | H410A \$250 | C410A \$180 |
| Reaction, micrometer | | | | | | |
| Transmission | | | | | | |
| TERMINATIONS | | | | | | |
| Fixed | J501A † | L501A \$210 | R501A \$180 | S501B \$ 44 | H501B \$ 34 | C501B \$ 30 |
| Sliding | | L502A \$350 | | S502A \$ 95 | H502A \$ 70 | C502A \$ 65 |
| STANDARD MISMATCHES | | | | | | |
| | | | | S510A \$500 | H510A \$420 | C510A \$390 |
| | | | | S510B \$350 | H510B \$310 | C510B \$295 |
| | | | | S510C \$290 | H510C \$250 | C510C \$235 |
| | | | | S510D \$250 | H510D \$210 | C510D \$195 |
| | | | | S510E \$350 | H510E \$310 | C510E \$295 |
| WAVEGUIDE-TO-COAX ADAPTERS | J600B † | L600B \$170 | R601B \$225 | S601B \$ 50 | H601B \$ 40 | C601B \$ 35 |
| DIRECTIONAL COUPLERS | | | | | | |
| Crossguide | | L612E \$300 | R612E \$250 | S612D \$130 | H612D \$120 | C612D \$ 85 |
| Multihole | | | | S610A-D \$350 | H610A-D \$200 | C610A-D \$135 |
| WAVEGUIDE TEES | | | | | | |
| Series | | L620A \$175 | R620A \$175 | S620A \$ 90 | H620A \$ 80 | C620A \$ 60 |
| Shunt | | L621A \$175 | R621A \$175 | S621A \$ 90 | H621A \$ 80 | C621A \$ 60 |
| Hybrid | | L622A \$220 | R622A \$220 | S622A \$110 | H622A \$ 95 | C622A \$ 75 |
| WAVEGUIDE BENDS | | | | | | |
| 90° E-plane | J623B † | L623B \$125 | R623B \$150 | S623B \$ 90 | H623B \$ 65 | C623B \$ 45 |
| 90° H-plane | J624B † | L624B \$125 | | S624B \$ 90 | H624B \$ 65 | C624B \$ 45 |
| PRECISION SLIDING SHORTS | | L630A \$275 | | S630A \$175 | H630A \$165 | C630A \$155 |
| STANDARD GAIN HORNS | | L638A \$350 | R638A \$500 | S638A \$175 | H638A \$150 | C638A \$125 |
| SHIELDED TUBE MOUNTS | | | | | H760A \$150 | |
| HARMONIC GENERATORS | | | | | | |
| WAVEGUIDE STANOS | | Z911A \$ 15 | | Z910A \$ 7 | Z910A \$ 7 | Z910A \$ 7 |



164

DIRECT READING PRECISION
VARIABLE ATTENUATORS



402

PRECISION DIRECT READING
FREQUENCY METERS



103

PRECISION SLOTTED SECTIONS

For details, circle 98 on Reader Service Card

EXCLUSIVE — FXR MICROWAVE TRAINING KIT
provides the foundational knowledge and practical experience necessary
to train a student or technician for work in the microwave field.

845

2MM and 3MM COMPONENTS

The same FXR
high standards
are inherent in all
2MM and 3MM components,
now available.



| W 1¼x¾ | | X 1x½ | | Y 0.622x 0.311 ID | | *K 0.420x 0.170 ID | | *U 0.280x 0.140 ID | | Q 0.224x 0.112 ID | | M 0.148x 0.074 ID | | E 0.122x 0.061 ID | | F 0.080 x 0.041ID | | G 0.051 x 0.0255 ID | | | |
|--|-------|------------|--------|--------------------------|-------|-----------------------|-------|-----------------------|-------|----------------------|--------|----------------------|-------|----------------------|--------|-------------------------|--------|------------------------|--------|--|--|
| 7.05-10.00 | | 8.20-12.40 | | 12.40-18.00 | | 18.00-26.50 | | 26.50-40.00 | | 33.00-50.00 | | 50.00-75.00 | | 60.00-90.00 | | 90.00 - 140.00 | | 140.00 - 220.00 | | | |
| W101A | \$300 | X101A | \$245 | Y102A | \$545 | K102A | \$545 | U102A | \$545 | Q103A | \$1100 | M103A | \$995 | E103A | \$1650 | F105A | \$1400 | G105A | \$1400 | | |
| W151A | \$ 80 | X151A | \$ 60 | Y151A | \$ 75 | K151A | \$ 59 | U151A | \$ 69 | Q151A | \$110 | M151A | \$100 | E151A | \$190 | | | | | | |
| W155A | \$ 85 | X155A | \$ 75 | Y155A | \$ 90 | K155A | \$135 | U155A | \$170 | | | | | | | | | | | | |
| W161A | \$270 | X161A | \$210 | Y161A | \$270 | K162A | \$320 | U162A | \$340 | Q162A | \$525 | M162A | \$500 | E162A | \$975 | F163A | \$975 | G163A | \$975 | | |
| W164A | \$350 | X164A | \$250 | Y164A | \$275 | K164A | \$425 | U164A | \$450 | Q164A | \$825 | M164A | \$800 | E164A | \$1200 | | | | | | |
| W168A-E | \$ 55 | X168A-E | \$ 50 | Y168A-E | \$55 | | | | | | | | | | | | | | | | |
| (Models A-30B, B-60B, C-100B, D-200B, E-300B) | | | | | | | | | | | | | | | | | | | | | |
| | | | | Y205B | \$175 | K205B | \$175 | U205B | \$200 | Q206B | \$210 | M206B | \$210 | E206B | \$350 | | | | | | |
| | | X211A | \$ 54 | Y212A | \$ 80 | K212A | \$ 80 | U212A | \$ 80 | | | M208A | \$325 | E208A | \$400 | F208A | \$400 | G208A | \$400 | | |
| W207A | \$120 | X207A | \$ 80 | | | | | | | | | | | | | | | | | | |
| W216A | \$ 79 | X216A | \$ 74 | Y216A | \$110 | K216A | \$150 | U216S | \$270 | | | | | | | | | | | | |
| W218A | \$150 | X218A | \$145 | Y218A | \$210 | K218A | \$250 | U218S | \$400 | | | | | | | | | | | | |
| W311A | \$130 | X311A | \$125 | Y311A | \$130 | | | | | | | M311A | \$195 | | | | | | | | |
| W312A | \$135 | X312A | \$130 | Y312B | \$135 | K312B | \$155 | U312B | \$170 | Q312B | \$195 | M312B | \$205 | E312B | \$350 | F313A | \$775 | G313A | \$775 | | |
| | | | | | | | | | | | | | | | | F314A | \$950 | G314A | \$950 | | |
| | | X402A | \$1275 | | | | | | | | | | | | | | | | | | |
| W410A | \$165 | X410A | \$150 | Y410A | \$210 | K410A | \$230 | U410A | \$250 | | | | | | | | | | | | |
| | | | | | | | | | | Q410X | \$325 | M410X | \$300 | E410X | \$500 | F412A | \$750 | G412A | \$750 | | |
| | | X411A | \$175 | | | | | | | | | | | | | G413A | \$800 | | | | |
| W501B | \$ 25 | X501B | \$ 24 | Y501A | \$ 24 | K501A | \$ 30 | U501A | \$ 35 | Q501A | \$ 95 | M501A | \$90 | E501A | \$150 | F501A | \$150 | G501A | \$150 | | |
| W502A | \$ 55 | X502A | \$ 45 | Y502A | \$ 50 | K502A | \$ 70 | U502A | \$ 75 | | | | | | | | | | | | |
| W510A | \$370 | X510A | \$360 | Y510A | \$450 | K510A | \$480 | U510A | \$625 | | | | | | | | | | | | |
| W510B | \$285 | X510B | \$275 | Y510B | \$325 | K510B | \$340 | U510B | \$525 | | | | | | | | | | | | |
| W510C | \$225 | X510C | \$215 | Y510C | \$275 | K510C | \$280 | U510C | \$450 | | | | | | | | | | | | |
| W510D | \$185 | X510D | \$175 | Y510D | \$225 | K510D | \$240 | U510D | \$280 | | | | | | | | | | | | |
| W510E | \$285 | X510E | \$275 | Y510E | \$325 | K510E | \$340 | U510E | \$350 | | | | | | | | | | | | |
| (Models A-1.00, B-1.05, C-1.10, D-1.20, E-1.50 VSWR available for entire 510 Series) | | | | | | | | | | | | | | | | | | | | | |
| W601B | \$ 30 | X601B | \$ 25 | | | | | | | | | | | | | | | | | | |
| W612D | \$ 75 | X612D | \$60 | | | K612D | | | | Q612D | | M612D | | E612D | | (Models D-200B, E-250B) | | | | | |
| W610A-D | \$115 | X610A-D | \$ 75 | Y610A-D | \$100 | K610A-D | \$155 | U610A-D | \$175 | | | M610A-D | \$500 | | | | | | | | |
| (Models A-30B, B-60B, C-100B, D-200B) | | | | | | | | | | | | | | | | | | | | | |
| W620A | \$ 45 | X620A | \$ 35 | Y620A | \$ 40 | K620A | \$ 45 | U620A | \$ 55 | Q620A | \$ 65 | M620A | \$ 60 | E620A | \$110 | F620A | \$275 | G620A | \$275 | | |
| W621A | \$ 45 | X621A | \$ 35 | Y621A | \$ 40 | K621A | \$ 45 | U621A | \$ 55 | Q621A | \$ 65 | M621A | \$ 60 | E621A | \$110 | F621A | \$275 | G621A | \$275 | | |
| W622A | \$ 60 | X622A | \$ 49 | Y622A | \$ 54 | K622A | \$ 65 | U622A | \$ 80 | Q622A | \$ 80 | M622A | \$ 80 | E622A | \$150 | F622A | \$325 | G622A | \$325 | | |
| W623B | \$ 35 | X623B | \$ 24 | Y623B | \$ 32 | K623B | \$ 38 | U623B | \$ 42 | Q623B | \$ 55 | M623B | \$ 50 | E623B | \$ 90 | F623A | \$275 | G623A | \$275 | | |
| W624B | \$ 35 | X624B | \$ 24 | Y624B | \$ 32 | K624B | \$ 38 | U624B | \$ 42 | Q624B | \$ 55 | M624B | \$ 50 | E624B | \$ 90 | F624A | \$275 | G624A | \$275 | | |
| W630A | \$145 | X630A | \$130 | Y630B | \$145 | K630B | \$155 | U630B | \$150 | Q630B | \$155 | M630B | \$160 | E630B | \$250 | F631A | \$275 | G631A | \$275 | | |
| W638A | \$120 | X638A | \$100 | Y638A | \$125 | K638A | \$150 | U638A | \$175 | Q638A | \$120 | M638A | \$125 | E638A | \$250 | F638A | \$200 | G638A | \$200 | | |
| W760A | \$130 | X760A | \$130 | Z762B (unshielded) \$145 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Q780A | \$165 | M780A | \$160 | E780A | \$250 | F781A | \$475 | G781A | \$475 | | |
| Z910A | \$ 7 | Z910A | \$ 7 | Z910B | \$ 7 | Z910B | \$ 7 | Z910B | \$ 7 | Z910C | \$ 7 | Z910C | \$ 7 | Z910C | \$ 7 | | | | | | |

The technical data and prices
are subject to change without notice.

Prices indicated are domestic.

For details,
circle #99
on Reader
Service Card

WorldRadioHistory

NOTE : †Price will be furnished on request.

*Specify required flanges when ordering.

BIDIRECTIONAL COUPLERS available on special order.

WAVEGUIDE FLANGES and FLANGE SCREWS available.



COAXIAL TEST EQUIPMENT

| INSTRUMENT | MODEL NO. | FREQ KMC/SEC | PRICE | COMMENT |
|--|----------------|--------------|----------|---|
| SLOTTEO SECTIONS | N101A | 1.00- 4.00 | \$470.00 | Type N or C adapter connector supplied for N101A, B |
| | N101B | 4.00-10.00 | \$440.00 | |
| | *V101A | 1.00- 4.00 | \$470.00 | |
| | *V101B | 1.00- 4.00 | \$470.00 | |
| CUTOFF ATTENUATOR | N170A | 1.00- 4.00 | \$200.00 | |
| TUNABLE PROBES | B200A | 1.00-12.40 | \$145.00 | 1N23B supplied |
| | B202A | 0.35- 1.40 | \$225.00 | 1N21B supplied |
| DETECTOR MOUNTS Tunable Untuned | N200A | 1.00-12.40 | \$145.00 | 1N23B crystal supplied |
| | N210A | 0.10-10.00 | \$ 50.00 | |
| | *N210B | 0.10-10.00 | \$ 55.00 | |
| THERMISTOR HEAD | N218A | 0.01-10.00 | \$145.00 | Used with Model B831A |
| FREQUENCY METER DIRECT READING | N410A | 1.00- 4.00 | \$495.00 | Accuracy 0.08% |
| DOUBLE STUB TUNER | N300A | 1.00-10.00 | \$ 90.00 | |
| THERMISTOR MOUNTS Broadband Temp Compensated | N215A | 0.50-10.50 | \$ 75.00 | Z215L element supplied |
| | N217A | 0.50-10.50 | \$140.00 | |
| COAX-TO-COAX ADAPTERS | N605A, B, C, D | | \$ 52.00 | |
| TEE | N626A | | \$ 60.00 | |
| KLYSTRON OSCILLATOR CAVITY | N750A | | \$280.00 | |
| KLYSTRON TUBE MOUNT | N761A | | \$ 95.00 | Z761P cable not supplied |
| KLYSTRON TUBE MOUNT | Z762B | | \$145.00 | Z762P cable supplied |

*Mating coax dim. 7/8" all others 3/8"

**Model N210B has built in DC return.

GENERAL OFFICES:
26-12 BOROUGH PLACE
WOODSIDE 77, N. Y.
PHONE: Astoria 8-2800

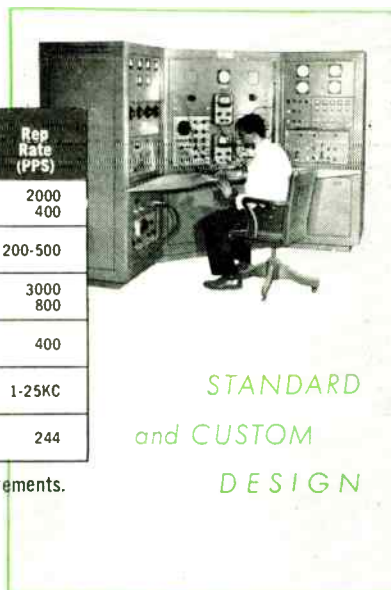
HIGH-POWER PULSE MODULATORS

THE FXR standard or custom designed high-power pulse modulators will meet your most exacting requirements . . . advanced engineering and expert craftsmanship assure this.

IMPORTANT — Send for our PRELIMINARY QUESTIONNAIRE.

| High Power Modulator Model No. | Power (peak mega-watts) | Voltage (peak kilovolts) | Current (peak amps) | Duty Cycle | Pulse Width (μ sec) | Rep Rate (PPS) |
|--------------------------------|-------------------------|--------------------------|---------------------|------------|--------------------------|----------------|
| Z820A | 1.0 | 33 | 33 | 0.001 | 0.5 2.5 | 2000 400 |
| Z821A | 14.0 | 90 | 160 | 0.001 | 2.0 | 200-500 |
| Z860A | 0.260 | 20 | 13 | 0.008 | 0.25 1.0 | 3000 800 |
| Z861A | 5.5 | 55 | 100 | 0.0024 | 6 | 400 |
| Z862A | 13 | 10 | 1.3 | 0.375 | 1.13-1.53 | 1-25KC |
| Z863A | 40 | 300 | 132 | 0.0017 | 8.5 | 244 |

*Partial listing of standard units. Custom units developed to specific requirements. Prices and deliveries of all modulators will be furnished upon request.



STANDARD
and CUSTOM
DESIGN

For details, circle #100 on Reader Service Card

HIGH-VOLTAGE REGULATED POWER SUPPLIES

- EXCEPTIONAL REGULATION—BETTER THAN 0.1% WITH A 10% FLUCTUATION OF PRIMARY POWER.
- LOW RIPPLE.
- BUILT-IN FOCUS, FILAMENT AND MAGNET SUPPLIES.
- RF INSULATION TECHNIQUES INCORPORATED TO MINIMIZE PICK-UP AND CARONA NOISE.

FXR Model Z850A

- 0 to 12 KV
- 150 MA
- Ripple, 4 MV

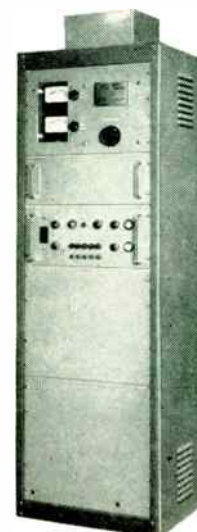
FXR Model Z851A

- 0 to 10 KV
- 250 MA
- Ripple, 5 MV

FXR Model Z852A

- 0 to 18 KV
- 1 AMP
- Ripple, 5 MV

Representatives of the commercial line of high-voltage power supplies developed and manufactured by FXR.



shown here, FXR Model 2850A



MAXIMUM TELEMETERED RESPONSE THROUGH FLAT AMPLITUDE AND CONSTANT DELAY

In keeping with its reputation as a pioneer in the field of toroids, filters and related networks, Burnell & Co. now offers a complete line of low pass and band pass constant delay filters for standard RDB telemetering channels. These Burnell constant delay filters combine accurate amplitude and phase to effectively limit intelligence distortion and false transients to a minimum. Telemetered signals from off course missiles or those in distant or terminal flight are no longer blocked by attenuation and noise.

Amplitude and Phase Necessary

For maximum performance of telemetering systems, it is recognized that filtering of sampled data requires *both* linear phase and flat amplitude in the pass band. However, until recently a combination of the two in one unit had not been available.

Combination Achieved

Existing sub carrier discriminators afford no better than a choice of flat amplitude pass band with *non-linear* phase in one filter or a constant time delay filter with *distorted amplitude*. In contrast, Burnell constant delay filters combine both—are flat within 3 db over the pass band—1½ db for the low pass filters—and possess a time delay constant within 5%.

Write for Bulletin CD 051

TECHNICAL DATA

FOR ± 7½% PASS BAND

- 1 Flat within 3 db over pass band
- 2 21 db at ± 15% of center freq.
- 3 40 db at ± 22% of center freq.
- 4 Time delay over the pass band, constant to ± 5%

FOR ± 15% PASS BAND

- 1 Flat to 3 db over pass band
- 2 23 db at ± 30% of center freq.
- 3 40 db at ± 44% of center freq.
- 4 Time delay over pass band constant to ± 7%

Input impedance — 500 ohms

*Output impedance — 500 ohms and high impedance for operation to a grid

*optional impedance available on special order.

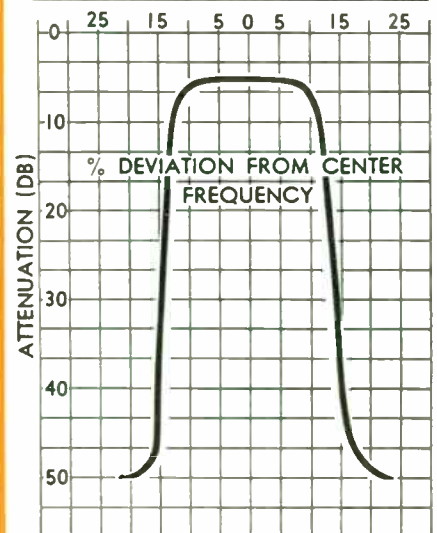
CONSTANT DELAY BAND PASS

| Channel | Frequency | Part # | Delay in ms. | .B/W |
|---------|-----------|---------|--------------|------|
| 1 | .4 KC | S-60051 | 34.00 | 15% |
| 2 | .56 KC | S-60052 | 24.30 | 15% |
| 3 | .73 KC | S-60053 | 18.60 | 15% |
| 4 | .96 KC | S-60054 | 14.20 | 15% |
| 5 | 1.3 KC | S-60055 | 10.50 | 15% |
| 6 | 1.7 KC | S-60056 | 8.00 | 15% |
| 7 | 2.3 KC | S-60057 | 5.93 | 15% |
| 8 | 3.0 KC | S-60058 | 4.40 | 15% |
| 9 | 3.9 KC | S-60059 | 3.38 | 15% |
| 10 | 5.4 KC | S-60060 | 2.44 | 15% |
| 11 | 7.35 KC | S-60061 | 1.80 | 15% |
| 12 | 10.5 KC | S-60062 | 1.26 | 15% |
| 13 | 14.5 KC | S-60063 | 0.91 | 15% |
| 14 | 22. KC | S-60064 | 0.60 | 15% |
| 15 | 30. KC | S-60065 | 0.44 | 15% |
| 16 | 40. KC | S-60066 | 0.33 | 15% |
| 17 | 52.5 KC | S-60067 | 0.252 | 15% |
| 18 | 70. KC | S-60068 | 0.189 | 15% |
| A | 22. KC | S-60069 | .305 | 30% |
| B | 30. KC | S-60070 | .224 | 30% |
| C | 40. KC | S-60071 | .168 | 30% |
| D | 52.5 KC | S-60072 | .128 | 30% |
| E | 70. KC | S-60073 | .096 | 30% |

CASE SIZE—2" x 3½" x 4½"

* INPUT IMPEDANCE = 500 ohms

* OUTPUT IMPEDANCE = 500 ohms and to grid



Burnell & Co., Inc.
PIONEERS IN TOROIDS, FILTERS AND RELATED NETWORKS

EASTERN DIVISION
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PELHAM 8-5000
TWX PELHAM 3633

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DEPT. P-11
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**Where other materials fail
our work begins . . .**

The world's most NEARLY PERFECT electronic insulation materials

Whatever your high temperature needs—to 1550°F—there is a Mycalex insulation to meet them . . . each offering a *unique combination* of special advantages for electronic design: the *plus* factors of the inorganics *and* the design latitudes of the organics!

MYCALEX® glass-bonded mica—formulations of high quality natural mica and electrical grade glasses, with high dielectric strength, total dimensional stability, high arc resistance, high temperature resistance. Depending on their formulation, they can be machined or molded to exacting tolerances, inserts can be permanently molded in or cemented in—the thermal expansion of MYCALEX being close to that of stainless steel.

SUPRAMICA® ceramoplastics—advanced formulations of synthetic mica and high temperature glasses, created for insulation applications at operating temperatures up to 1550°F. They have a thermal expansion coefficient close to that of stainless steel. They are available in moldable or machinable types . . . both offering *total* dimensional stability.

SUPRAMICA 555—Precision-molded insulation, for operating temperatures to 700°F.

SUPRAMICA 560—Precision-molded insulation, for operating temperatures to 932°F. (500°C.)

MYCALEX 410—Precision-molded insulation, for operating temperatures to 600°F.

MYCALEX 410X—Lightweight precision-molded insulation material.

SUPRAMICA 500—Machinable insulation, for operating temperatures to 850°F.

SUPRAMICA 620—Machinable insulation, for operating temperatures to 1550°F.

MYCALEX 385—Machinable insulation, for operating temperatures to 700°F.

MYCALEX 400—Machinable insulation, for operating temperatures to 800°F.

General Offices and Plant: 125-B Clifton Blvd., Clifton, N. J.
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WORLD'S LARGEST MANUFACTURER OF GLASS-BONDED MICA AND CERAMOPLASTIC PRODUCTS

FOR PRECISION-MOLDED PARTS

FOR PRECISION-MACHINED PARTS

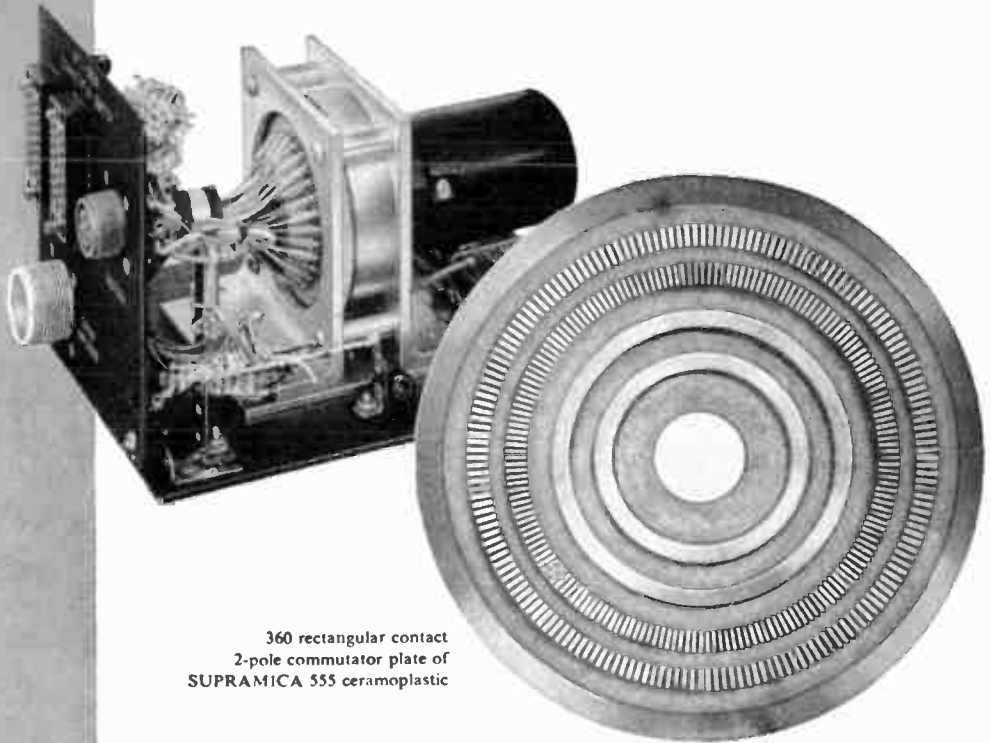
THE FIRST SYNTHAMICA SYNTHETIC MICA

SINCE 1919 MYCALEX THE INSULATOR

THE FIRST SUPRAMICA CERAMOPLASTIC

MYCALEX
CORPORATION OF AMERICA

major advance in miniaturization: **SUPRAMICA® 555** **commutator plates**



360 rectangular contact
2-pole commutator plate of
SUPRAMICA 555 ceramoplastic

on a 3 inch precision-molded plate ... up to 540 rectangular contacts!

Since 1948 . . . when Mycalex Electronics Corporation pioneered the first *precision-molded* MYCALEX® 410 glass-bonded mica, 180-contact commutator plate . . . MYCALEX switches have introduced a degree of accuracy and dependability never before approached in mechanical switching.

And now, Mycalex offers a *new* ceramoplastic commutator plate design destined to set *even higher* standards for long-life, low-noise-level multiplexing.

Typical of these new plates is the CP 427. Its specifications call for *precision-molded* SUPRAMICA 555 ceramoplastic which delivers total dimensional stability as well as superb thermal endurance (700°F.). The individual contacts of this plate have an exclusive *rectangular* form and embody tolerances within the .0005" range. They are permanently fixed in place.

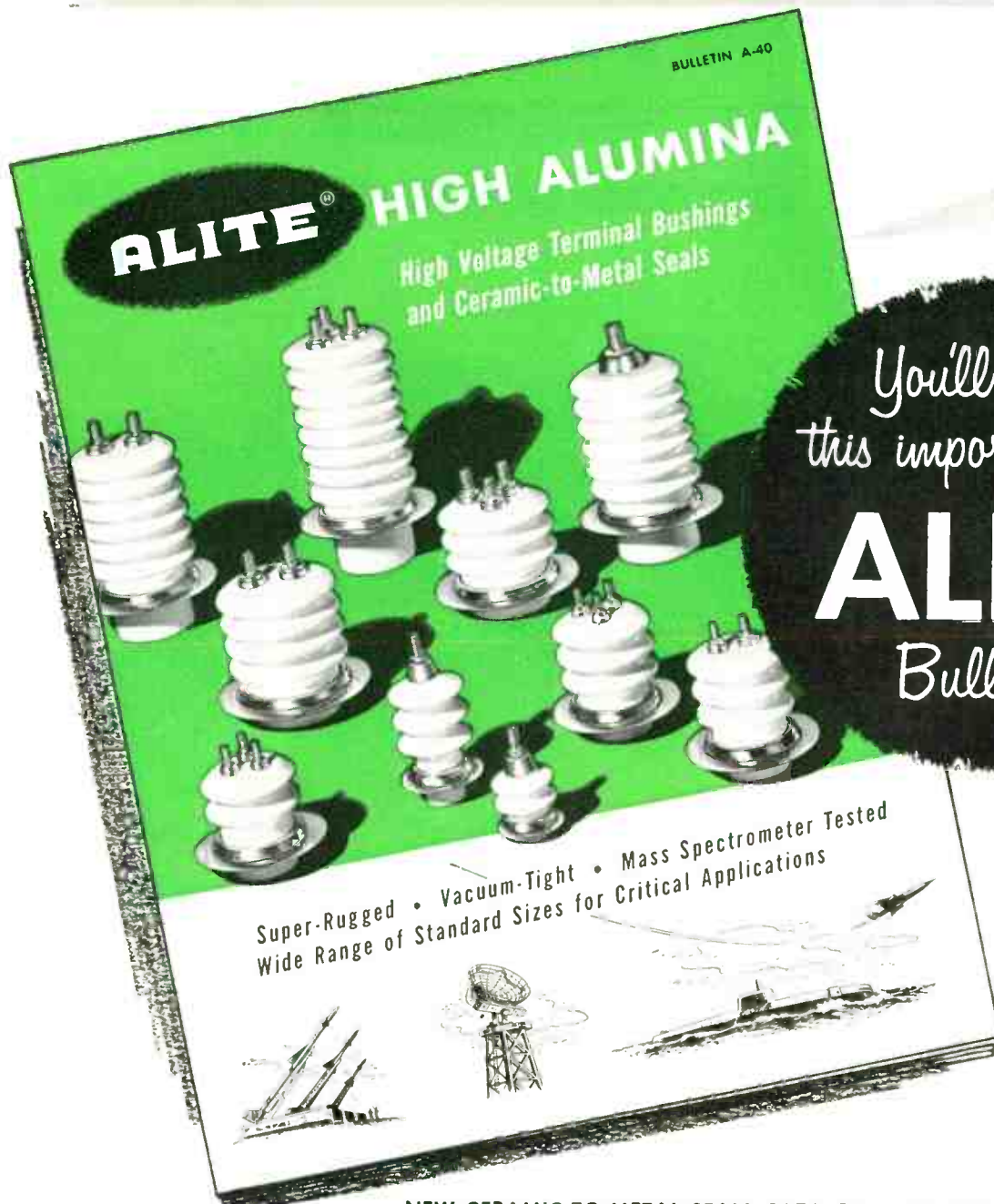
An exclusive brush-holder design permits *lower pressures* on the wipers . . . gives *lower contact resistance* with a noise level of *less than 10 microvolts*. Brush bounce is eliminated and life greatly extended. MYCALEX switches using this type of design have been tested satisfactorily for over 1000 hours at 600 RPM without maintenance.

Information on complete MYCALEX switches or matched brush assemblies and plates is available.

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Bulletin

NEW CERAMIC-TO-METAL SEALS CATALOG JUST OUT—This 16-page bulletin contains complete information and detailed specifications on the industry's broadest standard line of hermetic bushings. Gives important performance data on ALITE High Alumina Ceramic—complete details on Alite's electrical properties, mechanical strength, temperature resistance, etc. Facts on over 100 standard sizes of high voltage terminals, feed-throughs, cable end seals, plus helpful information on special applications.

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THE ULTIMATE IN PRECISION AUDIO FREQUENCY CONTROL

TUNING FORK RESONATORS

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- BINARY FREQUENCY DIVIDERS
- FORK OSCILLATOR CIRCUITS
- TUNING FORK CONTROLLED FREQUENCY GENERATORS
- SIGNAL OUTPUT AMPLIFIERS
- TUNING FORK CONTROLLED SELECTIVE SIGNAL FILTERS

High reliability, environmentally independent precision packages in miniaturized transistor and compact vacuum tube versions. Conservatively rated frequency accuracies from .05% to .001%



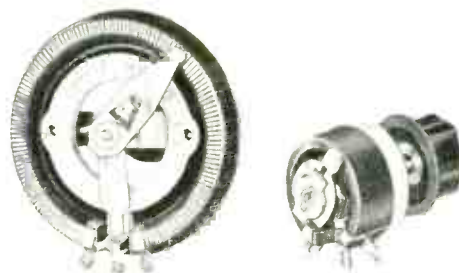
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Long life and dependability are synonymous with the name Ohmite. When you specify Ohmite components . . . you build reliability into your product. This reliability is backed by Ohmite's continuing research programs which explore new product ideas, improve present products, and develop more efficient manufacturing processes. All this plus the fact that Ohmite is the world's leading specialist in the manufacture of power-type resistance components—high quality rheostats and wire-wound resistors in the most complete range of sizes and types available to industry. Reliability is also characteristic of Ohmite tap switches, precision wire-wound resistors, metal film resistors, general-purpose relays, variable transformers, subminiature tantalum capacitors, and R. F. chokes.



RHEOSTATS Complete range of vitreous-enameled, close control, power rheostats from 12½ to 1000 watts. Single or tandem. Many additional features. Also available to meet MIL-R-22A requirements. All sizes from stock in a wide range of resistance values.



VARIABLE TRANSFORMERS Newly expanded line of six basic models with current ratings that meet a large percentage of industrial applications. Includes *enclosed units and tandem assemblies*. Two models, VT2 and V14, offer capacity greater than competitive units of comparable size and price. A sizeable "bonus", in current is given in all sizes when the overvoltage feature is not required ("N" suffix, see below).

Advanced Features—Positive current transfer achieved with direct brush to slip-ring, pigtail connection; table or panel mounting on Models VT4 and VT8 (adjustable shaft moves to brush or base side); interchangeable with other popular types both electrically and "mounting-wise"; rhodium plating on brush track for longer life.

Specials—Shafts for nonstandard panel thicknesses, auxiliary switches, taps on transformer winding for fixed intermediate voltages, and motor drives for remote control or servo-operation.

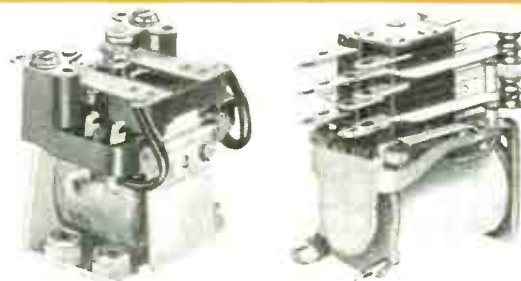
Basic Models (with overvoltage) All inputs 120 v ac*

| MODEL VT2 | MODEL VT4 | MODEL VT8 |
|-------------------------|-------------------------|-------------------------|
| Volts output: 0-120 132 | Volts output: 0-120 140 | Volts output: 0-120 140 |
| Amps output: 1.5 | Amps output: 3.5 | Amps output: 7.5 |

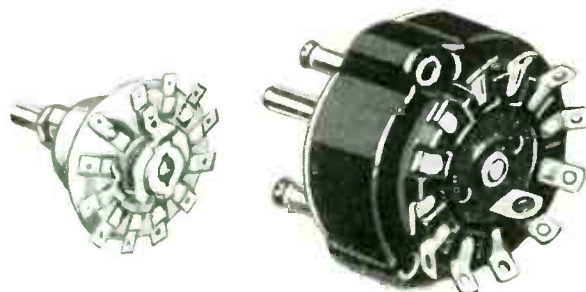
Basic Models (without overvoltage) All inputs 120 v ac*

| MODEL VT2N | MODEL VT4N | MODEL VT8N |
|---------------------|---------------------|---------------------|
| Volts output: 0-120 | Volts output: 0-120 | Volts output: 0-120 |
| Amps output: 1.8 | Amps output: 4.75 | Amps output: 10.0 |

*Units available for 240-volt input also



RELAYS Compact relays in many types. For a.c. or d.c., in a wide range of contact combinations and coil voltages. Four stock models in 65 types. Also nine standard types promptly made to order. Available in hermetically sealed or dust-protective enclosures. Models TT and TS relays, with "molded module" contact springs, are designed to meet MIL-R-5757C and MIL-R-6106C respectively.



TAP SWITCHES Ceramic insulated, rotary selector switches for a-c use. High-current, silver-to-silver contacts. Single or tandem. Five sizes: 100, 50, 25, 15, and 10 amperes available from stock.

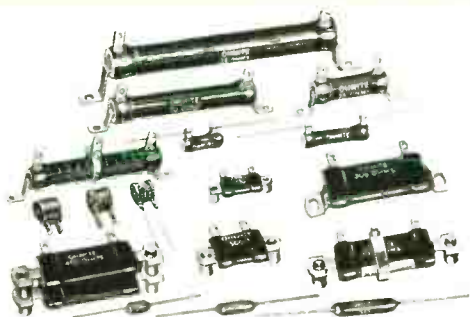
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**RHEOSTATS • RESISTORS • RELAYS
TAP SWITCHES • R. F. CHOKES
VARIABLE TRANSFORMERS
TANTALUM CAPACITORS
GERMANIUM DIODES**



INDUSTRY-PREFERRED COMPONENTS

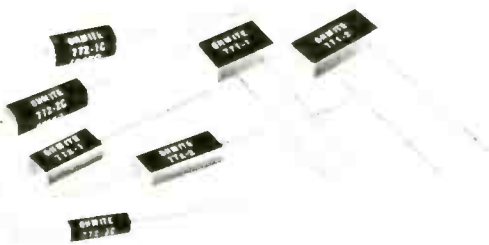
catalog and engineering manual 58



VITREOUS-ENAMELED RESISTORS Tremendous variety of types and sizes. Fixed, adjustable, tapped, noninductive, and precision resistors available in a wide range of wattages and resistances. Complete range of sizes and resistance values available from stock. Also available to meet MIL-R-26C requirements.



MOLDED PRECISION WIRE-WOUND POWER RESISTORS Insulated units with "Ohmicone" silicone-ceramic molded covering. Available in 3, 5, and 10-watt sizes. Tolerances: 0.1%, 0.25%, 0.5%, 1%, 3%. Maximum resistance: 3-watt, 10,000 ohms; 5-watt, 25,000 ohms; 10-watt, 51,100 ohms. Many 1% stock values selected from MIL Standard MS90169, MIL-R-10509 and Bell Tel. Labs.



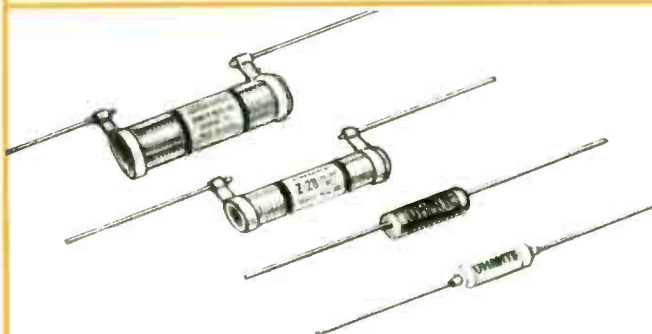
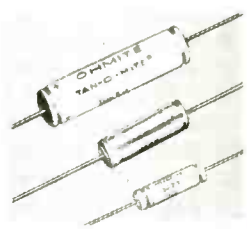
METAL FILM PRECISION RESISTORS Wattage ratings at 125°C and 150°C ambient; excellent high frequency characteristics; low temperature coefficient of resistance. Long-term load and shelf stability. Styles to meet MIL-R-10509C and MIL-R-19074B (Ships). Many 1% stock values selected from MIL Standard MS90169, MIL-R-10509 and Bell Tel. Labs.



TANTALUM CAPACITORS Series TW (tantalum wire capacitors) available in eleven subminiature sizes; .01 to 80 mfd. over-all capacitance range. Smallest size .062 x .20 inch; largest .134 x .812 inch. Insulated units standard. Working voltages to 150 volts. Wide range of stock sizes, capacitance values, and voltage ratings.

Series TF (tantalum foil capacitors) available in three sizes; .25 to 140 mfd. over-all capacitance range. Working voltage to 150 volts. For -55°C to +85°C operation. Available in polar and nonpolar units. Available for vibration ranges 0-55 and 0-2000 cps. Meets MIL-C-3965B. Styles CL-34 and CL-35. Wide range of stock units in polar type.

Series TS (tantalum, porous, slug-type capacitors) size "U" offers a range of 1.75 to 30 mfd. Working voltages to 125 are available. Design and construction meet MIL-C-3965B Grade 3. Two operating temperature ranges, -55°C to +85°C (Style UB) and -55°C to +125°C (Style UC). New Style SUB, straight side type, available in temperature range -55°C to +85°C. All styles carried in stock.




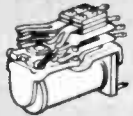
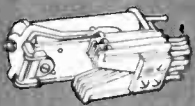


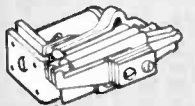
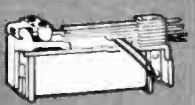
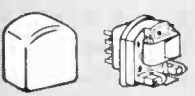
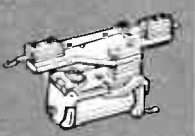
R. F. CHOKES Radio-frequency chokes in seven stock sizes for 3 to 520 megacycle applications. Single-layer wound. Other single-layer chokes and vitreous-enameled chokes can be made to order.

For details, circle #107 on Reader Service Card

OHMITE MANUFACTURING COMPANY
3692 Howard Street, Skokie, Illinois

AUTOMATIC ELECTRIC

AE RELAYS

| | | SERIES | OPERATING TIME, SECONDS | RELEASE TIME, SECONDS |
|---|---|---|---|---|
|  | <p>CLASS B When extremely long service and reliable operation are demanded, this relay meets the requirements. Life often exceeds 400 million operations. Ideal for computers, fire control, pulsing or switching functions.</p> | BQA BSO BSR BSA BFA BMS | 0.002-0.030 0.040-0.120 0.004-0.035 0.020-0.055 0.010-0.025 0.010-0.030 | 0.005-0.050 0.025-0.350 0.035-0.600 0.035-0.600 0.008-0.020 0.015-0.050 |
|  | <p>CLASS E A new telephone-type relay, designed for long-life industrial service. Based on the rugged Class B design, this is a universal relay, engineered for a variety of uses demanding compact size coupled with our usual high standard of reliability.</p> | EQA ESO ESR ESA EFA EMS | 0.002-0.030 0.015-0.050 0.005-0.030 0.015-0.030 0.005-0.025 0.010-0.030 | 0.005-0.025 0.025-0.125 0.025-0.125 0.050-0.125 0.005-0.025 0.015-0.030 |
|  | <p>CLASS A This original telephone-type relay will hold down costs, yet provide dependable operation and long life. A wide variety of coils, contacts, contact spring arrangements and mounting facilities makes this truly the "all-purpose" relay.</p> | AQA ASO ASR ASA AWS AVR AMC | 0.002-0.025 0.040-0.120 0.004-0.025 0.010-0.050 ††Up to 2 0.002-0.025 0.210-0.280 | 0.005-0.025 0.020-0.250 0.020-0.350 0.020-0.350 0.005-0.025 ††1 to 15 0.300-0.345 |
|  | <p>CLASS C This compact relay combines unusual dependability and surprisingly long service life in a space about half of the size of the average relay of equal rating. Can be used for high-speed or delayed operation.</p> | CQA CSA CMS | 0.005-0.035 0.010-0.040 0.010-0.035 | 0.005-0.025 0.015-0.200 0.010-0.050 |
|  | <p>CLASS S Specify this relay for aircraft use, where a small, light relay is required, resistant to shock and vibration. It features fast pulse response because of its small mass and slight self-inductance. Series SQPC available for printed circuits.</p> | SQA SQD SQPC S-Power | 0.002-0.016 0.002-0.030 0.002-0.030 0.005-0.016 | 0.005-0.085 0.005-0.085 0.005-0.085 0.005-0.010 |
|  | <p>CLASS Z Choose Class Z relays where a small, light relay is needed but long life or time delay is of greater importance than extremely small size. Similar to Class A relay, but smaller and less sensitive.</p> | ZQA ZSO ZSR ZSA ZMS ZFA Type 18 | 0.002-0.025 0.010-0.050 0.003-0.010 0.010-0.040 0.010-0.040 0.010-0.025 0.002-0.025 | 0.005-0.025 0.050-0.150 0.050-0.200 0.050-0.200 0.005-0.200 0.008-0.020 0.005-0.025 |
|  | <p>CLASS F An a.c. relay, for use when the number of relays doesn't justify a rectifier, and when operate and release time delays are not a factor. When operate and release timing is required, an inexpensive rectifier can be used with any of the above d.c. relays.</p> | FQA BFA EFA FMS FMC ZFA | 0.002-0.025 0.010-0.025 0.005-0.025 0.002-0.020 0.298-0.333 0.010-0.025 | 0.005-0.040 0.008-0.020 0.005-0.025 0.002-0.020 0.290-0.350 0.008-0.020 |
|  | <p>POLARIZED Series PHD and PLD offer "2-position" or "3-position" operation; Series PTW provides "2-position" only. "2-position" relays "stick" operated until current is reversed; "3-position" have neutral position in absence of current.</p> | PLD PHD PTW**** | 0.003-0.010 0.006-0.027 0.007 Minimum | 0.022-0.047 0.065-0.075 0.0002 Approx. Travel Time |
|  | <p>SPECIAL PURPOSE—We can usually make assemblies of Automatic Electric relays with modifications to suit your special applications. The Class E Video relay, illustrated here, is an example. Others are designed for power applications, electro-mechanical interlocking, marginal operation, mechanical locking, micrometer adjusting, and the simultaneous closing of up to 35 circuits (BAR relay).</p> | | | |

AE STEPPING SWITCHES

FAST STEPPING, SMOOTH RUNNING, POSITIVE STEPPING

TYPE 44

The Type 44 is a small switch with a large, flexible capacity. Use this switch in almost any d.c. application—for impulse controlled response or self-interrupted operation. Though it's only slightly larger than a pack of king-size cigarettes, the Type 44 rotary stepping switch accommodates up to six 10-point bank levels.

TYPE 45

In every feature of its design, the Type 45 rotary stepping switch provides for adaptation to varied requirements, including a.c. operation. The one-piece, open-type flat frame occupies only one side of this switch, so the 25-point contact banks can be built up level by level as needed, up to twelve.

SERIES OCS RELAY

Here's a shock-resistant relay which can be used for cam-switching...for alternate on-off operations...or as a "stepper." When you order Automatic Electric's OCS relay, you specify the programming. This compact unit simplifies engineering and wiring—cuts space, weight and maintenance costs.

RELAYS

SWITCHES

AUTOMATIC ELECTRIC

| SERIES | MAXIMUM COIL VOLTAGE | MAX. NO. OF STANDARD CONTACTS | TYPE OF CONTACTS††† | WEIGHT | DIMENSIONS (MAX.) IN. |
|---------|-----------------------|-------------------------------|------------------------------|-----------|------------------------|
| BQA | 250 dc | 24 Spgs. | Code 0—18 ga. Twin | 8-12 oz. | 4-3/32x2-5/16x1 |
| BSO | 135 dc | **24 Spgs. | | 8-14 oz. | 4-3/32x2-5/16x1 |
| BSR | 135 dc | *6 Spgs. | | 8-14 oz. | 4-3/32x1-7/8x1 |
| BSA | 250 dc | *6 Spgs. | | 8-14 oz. | 4-3/32x1-7/8x1 |
| BFA | 230 ac | 24 Spgs. | | 8-14 oz. | 4-3/32x2-5/16x1 |
| BMS | 250 dc | ***2 Form C | Snap-action | 7-11 az. | 4-3/32x2-17/32x1-23/32 |
| EQA | 150 dc | 26 Spgs. | Code 0—18 ga. Twin | 2-3 oz. | 2-1/4x1-23/32x1-1/8 |
| ESO | 110 dc | 26 Spgs. | | | |
| ESR | 110 dc | *6 Spgs. | | | |
| ESA | 110 dc | *6 Spgs. | | | |
| EFA | 220 ac | 12 Spgs. | Snap-action | | 2-1/4x1-23/32x2-3/16 |
| EMS | 150 dc | 2 Form C | | | |
| AQA | 250 dc | 26 Spgs. | Code 4—18 ga. | 8-12 oz. | 4-3/32x2-3/16x1-7/16 |
| ASO | 135 dc | 26 Spgs. | | 8-14 oz. | 4-3/32x2-3/16x1-7/16 |
| ASR | 135 dc | *6 Spgs. | | 8-12 oz. | 4-3/32x2x1-7/16 |
| ASA | 250 dc | *6 Spgs. | | 8-12 oz. | 4-3/32x2x1-7/16 |
| AWS | 250 dc | 1 Form A | | 7-11 oz. | 4-3/32x2-3/4x1-7/16 |
| AVR | 250 dc | Special | | 8-12 oz. | 4-1/4x2x1 |
| AMC | 250 dc | 2 | | Mercury | 12-16 oz. | 4-3/4x3-1/16x3 |
| CQA | 150 dc | 12 Spgs. | Code 0—18 ga. Twin | 4-oz. | 4-1/32x2-3/16x21/32 |
| CSA | 150 dc | 12 Spgs. | Code 0—18 ga. Twin | 4-oz. | 4-1/32x2-3/16x21/32 |
| CMS | 150 dc | 1 Form C | Snap-action | 6-oz. | 3-13/16x2-7/16x1 |
| SQA | †115 dc | 9 Spgs. | Code 0—20 ga. Twin | 2-oz. | 1-17/32x2x11/16 |
| SQD | †115 dc | 18 Spgs. | | 2- 3 oz. | 1-17/32x2x1 |
| SQPC | †115 dc | 18 Spgs. | | 2- 3 oz. | 1-17/32x2x1 |
| S-Power | 115 dc | 1 Make | Silver-Tungsten | 12 az. | 1-1/2x1-1/2x1-1/4 |
| ZQA | 135 dc | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZSO | 115 dc | 13 Spgs. | | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZSR | 115 dc | *6 Spgs. | | 4- 6 az. | 2-1/2x2-3/4x1-1/2 |
| ZSA | 135 dc | *6 Spgs. | | 4- 6 az. | 2-1/2x2-3/4x1-1/2 |
| ZMS | 135 dc | ***2 Form C | Snap-action | 8-10 oz. | 2-1/2x2-5/8x2-1/4 |
| ZFA | 115 ac | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-3/4x1-5/16 |
| Type 18 | 12 or 24 dc | 10 Spgs. | Code 9—18 ga. | 4- 6 oz. | 2-1/2x2-1/4x1-1/4 |
| FQA | To 230 (16-66 cycles) | 12 Spgs. | Code 4—18 ga. | 9-13 oz. | 4x1-15/16x1-1/4 |
| BFA | To 230 (20-60 cycles) | 24 Spgs. | Code 0—18 ga. | 8-14 oz. | 4-3/32x2-5/16x1 |
| EFA | To 220 ac | 12 Spgs. | Code 0—18 ga. | 2- 3 az. | 2-1/4x1-23/32x1-1/8 |
| FMS | To 240 (16-66 cycles) | 2 Form C | Snap-action | 10-14 oz. | 3-1/2x2-3/8x2-3/8 |
| FMC | To 240 (16-66 cycles) | 2 | Merc.-Glass | 14-18 oz. | 4-5/8x2-3/4x2-3/4 |
| ZFA | To 115 (20-60 cycles) | 13 Spgs. | Code 4—18 ga. | 4- 6 az. | 2-1/2x2-7/8x1-11/32 |
| PLD | 350 dc | 6 each side | Code 4—18 ga. | 28 oz. | 4x3-1/4x2 |
| PHD | 350 dc | 6 each side | Code 4—14 ga. | 27-37 oz. | 4-13/16x2-3/4x3 |
| PTW**** | | 1 Form C | TungstenCarbide or Palladium | 14 oz. | 2-7/8x2-1/4x3-5/16 |

*More contacts can be used at a sacrifice of speed.
 **Up to 0.600 sec. release time on BSO relay with 6 springs max.
 ***With 1 snap-action switch and 1 contact assembly (8 springs max.)
 ****Octal or pin-type plug (to fit WE Co. 255 applications) available.
 †Higher wattage obtainable with oversize coils.
 ††Timing value in conjunction with a Series ASO relay.
 †††Most relays can be furnished with special heavy-duty contacts.

Automatic Electric, pioneer in the use of telephone-type relays for industry, has the experience, reputation, manufacturing facilities, research staff, and down-to-earth, practical "know how" to solve your knottiest control problem. We specialize in the hermetic sealing of relays and switches, as well as in the design, circuitry and assembly of industrial control "packages" and systems. Our representative and facilities are at your command.

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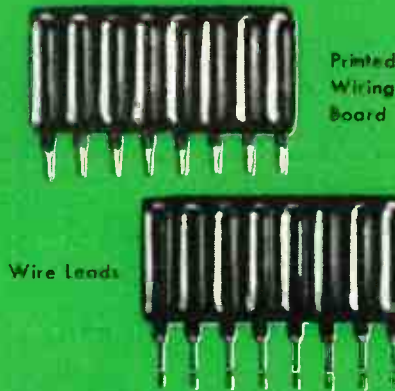
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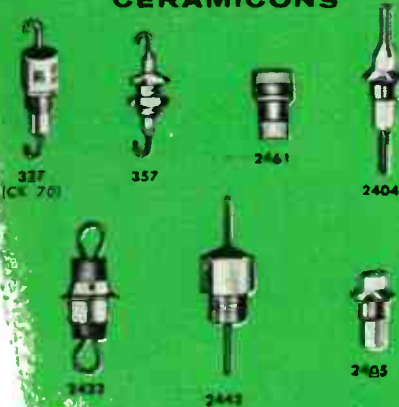


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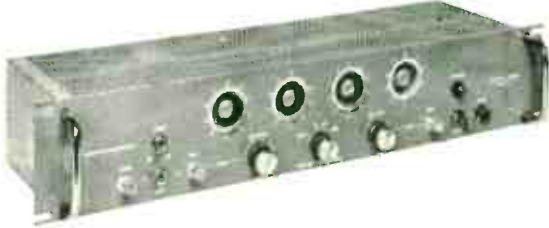
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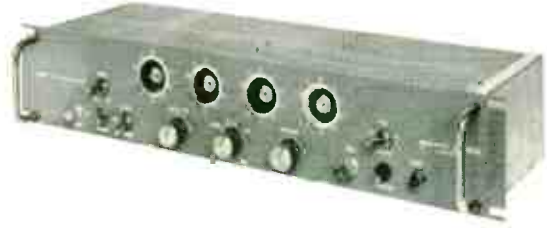
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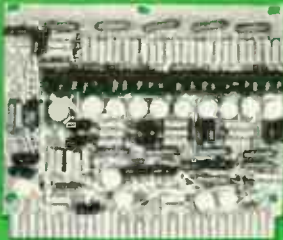


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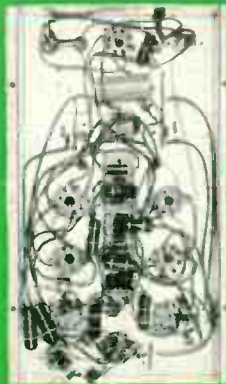
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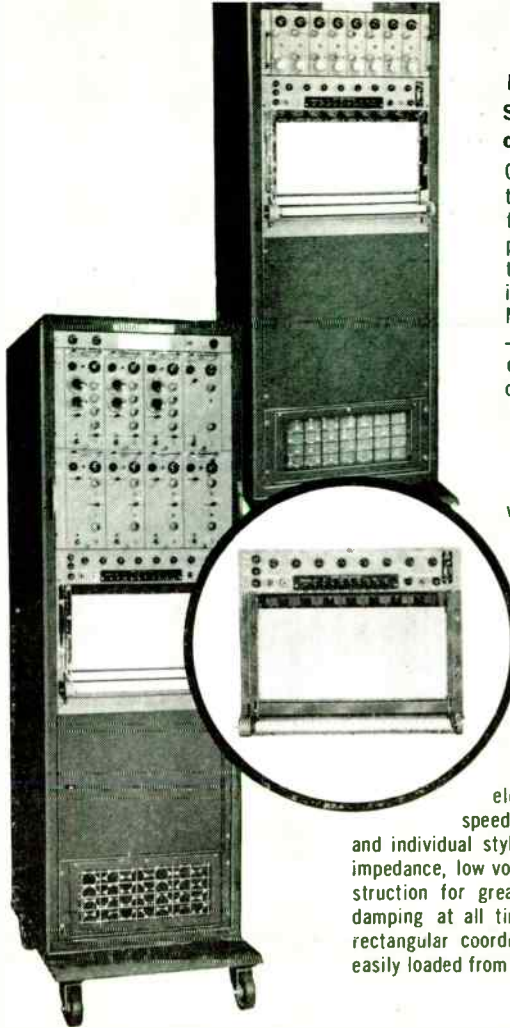
**VERSATILITY — 6 or 8 channels,
DC to 150 cps**

Linearity 0.5%, 3 db down at 150 cps (10 div peak-to-peak amplitude). Improved current feedback power amplifiers, negligible drift. Total panel space only 38½". Efficient ducted air system assures constant, adequate cooling of all circuits for reliable operation.

VERSATILE "350" SERIES PREAMPS — compact (10½" high) interchangeable units with highly developed circuitry; for use in "350" systems, or individually (see "450" unit Amplifiers) with its own power supply to drive optical recorders, tape recorders, scopes, meters, etc. Available types include

- Carrier
- DC Coupling
- Phase Sensitive Demodulator
- True Differential Wide Band DC (4 models)
- Basic Chopper

with others in development



**MINIMUM PANEL SPACE,
SIMPLER PREAMPS — 6 or 8
channels, DC to 150 cps**

Comparable performance to "350" System; uses same Recorder-Power Amplifier unit. Modules of up to 8 plug-in preamps occupy 7" of panel space; total panel space only 28" (max.); cabinet 60" high.

MINIATURIZED "850" SERIES PREAMPS — simplified, economical plug-in front ends for "850" systems; panel area only 2½" x 7". Types include
Carrier (separate MOPA required)
Phase Sensitive Demodulator
DC Coupling
Basic Chopper (MOPA required)
with others in development

**BASIC "350"/"850" 6- and
8-CHANNEL RECORDER-
AMPLIFIER UNITS**

6- or 8-channel recorder with transistorized, current feedback Power Amplifiers and voltage regulated power supply. Sensitivity 0.1 volt/chart div; panel space 17½"; nine electrically controlled pushbutton chart speeds, or remote control; automatic over-all and individual stylus heat control; time-code marker; low impedance, low voltage galvanometers with enclosed construction for greater reliability; true velocity feedback damping at all times, limiting ahead of output. Inkless, rectangular coordinate recording on Permapaper charts, easily loaded from the front.

VERSATILE, RELIABLE RECORDING INSTRUMENTATION FROM SANBORN

**VERSATILE, ECONOMICAL —
1 to 8 channels DC to 100 cps**

Twelve front ends cover the widest variety of applications. Frequency response 2 db down at 100 cps; over-all linearity better than 1%; basic sensitivity from 10 μv/div to 0.1 volt/div, depending on preamplifier. Current feedback driver amplifier and regulated power supply for each channel; amplifiers, recorder available in individual portable cases.

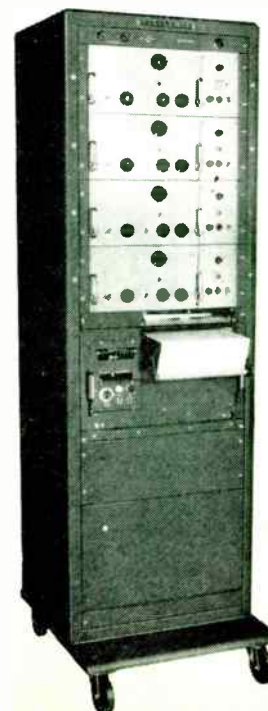
1- to 8-CHANNEL "150" SERIES RECORDERS
Nine chart speeds (multi-channel types), shifted mechanically; automatic over-all and individual stylus heat control; recorder assembly slides out for easy paper loading, better view of recording and marking

notations on record; time-code marker; paper take-up; inkless, rectangular coordinate recording on Permapaper charts.

FAMILIAR "150" SYSTEM FRONT ENDS — feature wide choice of types, plug-in design; all have attenuator ratios of 1, 2, 5, 10 . . . to 1000, many have calibrated zero suppression.

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- RMS Volt/Ammeter
- 400 Cycle Frequency Deviation
- Frequency Meter
- Triplexer 3-channel electronic switch

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when preamplification is not needed —
SIMPLIFIED 6- or 8-CHANNEL SYSTEM
 — 5 volts full-scale

Model 358-5480 system for computer readout, telemetry recording, DC voltage monitoring and similar applications requiring no preamplification. Control panel provides position, smooth gain and attenuation controls, and internal calibration signal. Sensitivity 0.1 volt/div; linearity 0.5% of full scale, gain stability better than 1%; current feedback amplifiers, velocity feedback damping; 9 electrically controlled chart speeds and all other "350" Recorder features.



SELF-CONTAINED "450" UNIT AMPLIFIERS with power supply

Versatile "350" Series preamplifiers with individual power supplies in portable cases; for driving 'scopes, optical oscillographs, tape recorders, etc. Available in "450" cases or four-unit modules in 19" frame for rack mounting. One "450" case and power supply can serve any "350" preamp.



"150" SYSTEM AND PROGRAMMER FOR COMPUTER READOUT

6- or 8-channel consoles in 46½" high mobile cabinet. Dual-Channel DC Amplifiers have sensitivities from 0.01 to 10 volts/div; internal calibration 2 volts ±1%; frequency response flat to 20 cps down 3 db at 50 cycles. Optional Programmer sequences system operation in 20 steps including recorder turn-on, calibration, computer DC level reading, recording for pre-set time, turn-off and reset.



CHART VIEWER for easier editing and study

Permits convenient viewing and interpretation of Sanborn and other strip charts up to 200 ft. long and 16" wide, at continuously variable speeds from ¼" to 7½" per second. Single control for direction and paper speed. Viewing table 18½" x 24".



HIGH SPEED OPTICAL X-Y RECORDER — flat response to 100 cps, writing speeds to 2500"/sec.

Can record such rapidly changing variables as acceleration and vibration of mechanical elements, transistor characteristics, etc. Mirror-galvanometers and a light beam produce recording traces on ultraviolet-sensitive 8" x 8" direct-print paper that develops immediately by exposure to normal room light. Interchangeable "850" system preamplifiers are used for each axis; new preamps and time base generator now in development allow a wide variety of applications.

LINEAR MOTION TRANSDUCERS

... to measure displacement

PROBE STYLE — complete, ready to connect to 150, 350 or 850 Series Carrier Amplifiers; uses differential transformer. High sensitivity, unlimited resolution, linearity 0.5%; stroke range ±0.050", sensitivity 50 chart div deflection, 0.001" displacement. Model 580 for flange mounting has plug-in cable, Model 581 for screw mounting has integral cable.

LINEARSYN — differential transformer; error due to non-linearity less than 1% of full scale, unlimited resolution. High shock, vibration resistance; hermetically sealed, immersible. Strokes from ±0.005" to ±10.000"; high sensitivities. Six Standard series (three shielded, three unshielded), five models in each series.

... to measure velocity

LVsyn — accurate, stable calibration; unlimited resolution. Single-ended or push-pull output. Strokes to 9"; output sensitivities from 35 to 650 mv/inch/sec. Twelve standard Models, with regular or unbreakable cores.

For details, circle ±115 on Reader Service Card



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For complete descriptive information and specifications, write to the Industrial Division in Waltham or contact your local Sanborn Sales-Engineering representative.

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for greater space and weight savings



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| V. A. | O D $\pm 1/32$ | Height $\pm 1/32$ | Case Style | Nominal Weight | % Regulation |
|-------|----------------|-------------------|------------|----------------|--------------|
| 1.5 | 1 | 15/32 | D & E | 3/4 oz. | 20 |
| 3.0 | 1 | 19/32 | D & E | 1 oz. | 15 |
| 6.0 | 1 | 13/16 | D & E | 1 1/2 oz. | 10 |
| 9.0 | 1 | 1-1/16 | D & E | 2 oz. | 8 |
| 16.0 | 1-3/8 | 1-1/8 | F | 4 oz. | 7 |
| 25.0 | 1-3/8 | 1-3/8 | F | 5 oz. | 6 |

STANDARD CATALOG NUMBERS

| Standard Voltage Ratings PRI/SEC | Available From Stock | | |
|----------------------------------|--|--|---|
| | 1.5-9.0 V.A. Size Terminal End Mounting Secondary Centertapped | 16 and 25 V.A. Size Terminal End Mounting Secondary Centertapped | 1.5-9.0 V.A. Size Reverse Mounting Secondary Centertapped |
| 115/6.0 | TW (VA) D6.0T | TW (VA) F6.0T | TW (VA) E6.0T |
| 115/6.3 | TW (VA) D6.3T | TW (VA) F6.3T | TW (VA) E6.3T |
| 115/10 | TW (VA) D10T | TW (VA) F10T | TW (VA) E10T |
| 115/26 | TW (VA) D26T | TW (VA) F26T | TW (VA) E26T |
| 115/115 | TW (VA) D115T | TW (VA) F115T | TW (VA) E115T |
| 115/200 | TW (VA) D200T | TW (VA) F200T | TW (VA) E200T |
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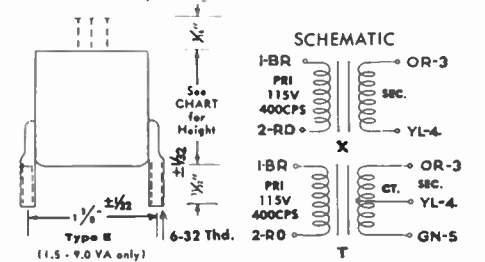
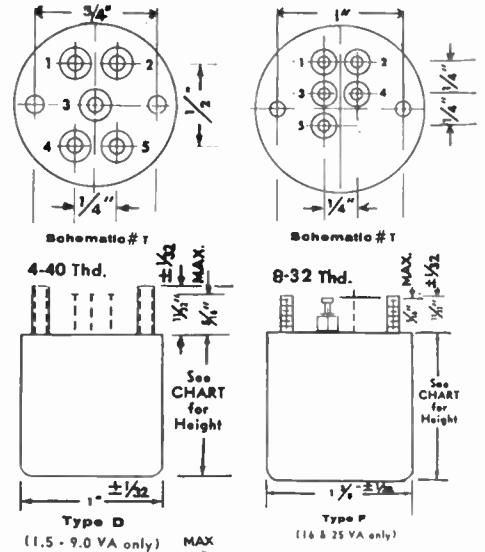
Electrostatic shields can be provided between pri and sec. Use next larger case height for a given rating. Simply add "S" to the end of the code number as shown in the example.

Other V.A. ratings, secondary voltages and constructions engineered to your specifications.

HOW TO ORDER:

Non standard ratings may be ordered by code number per the following example:

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TINYMAX INDENT. V.A. Rating Case Style Sec. Voltage Schematic Electrostatic Shield



tol. $\pm 1/64$ unless otherwise specified

All Terminals Color Coded For Permanent Identification
1—Brown 2—Red 3—Orange 4—Yellow 5—Green
In Addition To Terminal Marking As Shown

SPECIFICATIONS:

Conform with MIL-T-27A.
Grade 4, Class S.
Ambient Temperature
-55 to +85°C.
Maximum Total Operating 130°C.
Life Expectancy 10,000 Hours Minimum.
Hermetically Sealed.

Maximum Altitude 70,000 ft.
Pri. Voltage 115V $\pm 10\%$.
Pri. Frequency 400 cps $\pm 5\%$.
Sec. Voltage Tolerance $\pm 3\%$ (at 115V, in & Rated Load).

Torwico Electronics reserves the right to make changes at any time to improve design.

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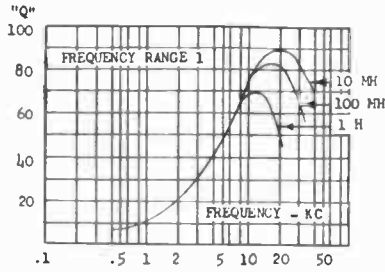
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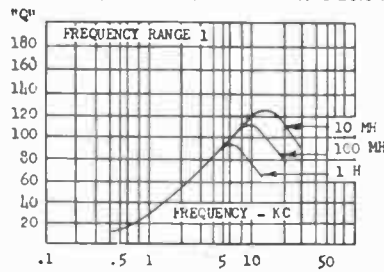
T W C SERIES

Standard Inductance values from 1.0 MH to 4.0 H



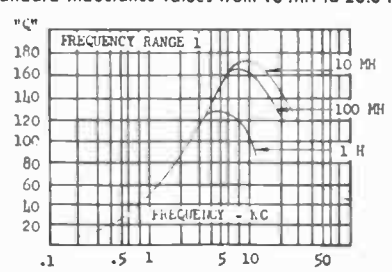
T W S SERIES

Standard Inductance values from 5 MH to 20.0 H

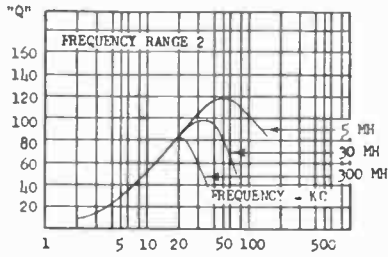


T W M SERIES

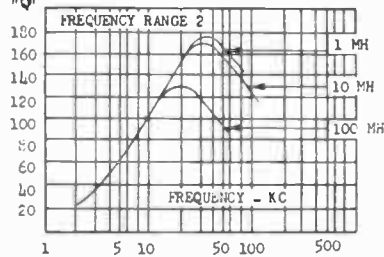
Standard Inductance values from 10 MH to 20.0 H



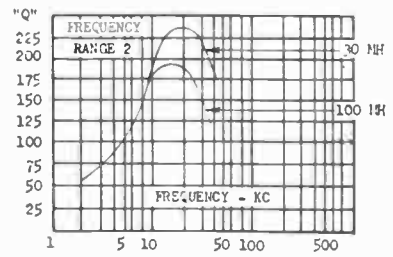
Standard Inductance values from 1.0 MH to 500 MH



Standard Inductance values from 1 MH to 500 MH

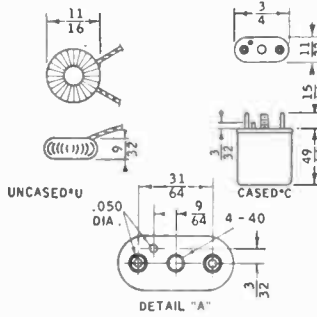


Standard Inductance values from 5 MH to 500 MH



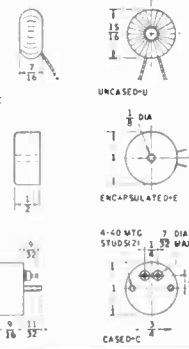
*PHYSICAL STRUCTURE

SEE DETAIL "A"



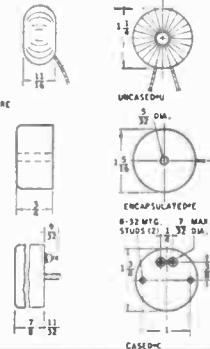
*PHYSICAL STRUCTURE

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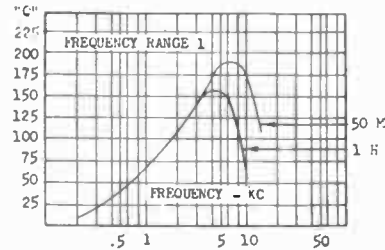
*PHYSICAL STRUCTURE

UNCASED-U



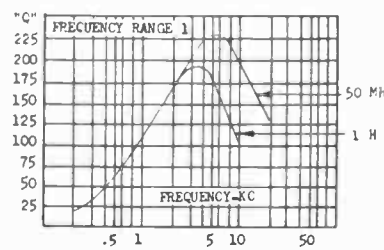
T W I SERIES

Standard Inductance values from 10 MH to 20.0 H



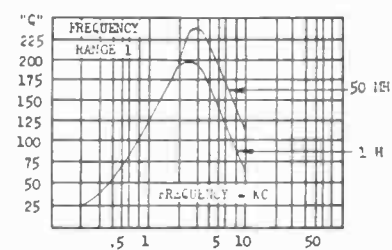
T W D SERIES

Standard Inductance values from 10 MH to 35.0 H

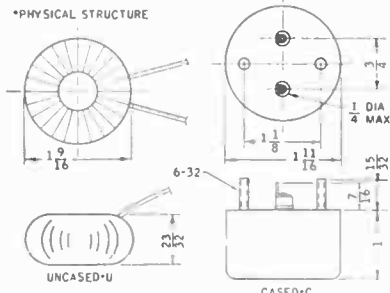


T W L SERIES

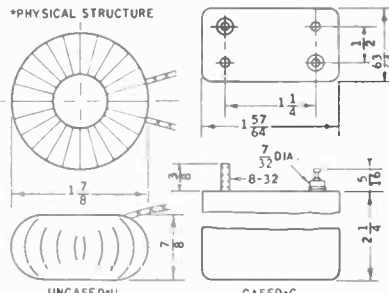
Standard Inductance values from 20 MH to 50.0 H



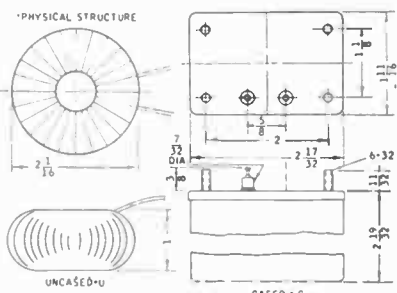
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| NUMBER | TYPE | FREQUENCY RANGE/kMc | TYPICAL OUTPUT |
|-------------|-------------|---------------------|----------------|
| X-12 | Reflex Osc. | 12.4 - 18.0 | 100 mW |
| X-13 | Reflex Osc. | 8.2 - 12.4 | 250 mW |
| X-13B | Reflex Osc. | 7.5 - 11.0 | 250 mW |
| V-23 | Oscillator | 9.1 - 11.0 | 5 watts CW |
| V-24B | Pulse Amp. | 9.2 - 9.5 | 60 kW |
| X-26 Series | Reflex Osc. | 5.3 - 7.5 | 1 watt |
| V-27 | Amplifier | 9.1 - 11.0 | 6 watts CW |
| V-27B | Amplifier | 8.5 - 10.0 | 6 watts CW |
| VA-28 | Oscillator | 13.35 - 13.65 | 14 watts CW |
| V-39B | Reflex Osc. | 10.0 - 15.5 | 50 mW |
| V-40B | Reflex Osc. | 15.0 - 21.0 | 50 mW |
| V-42B | Amplifier | 0.375 - 0.425 | 15 kW CW |
| V-45 | Multiplier | 9.0 - 10.0 | Up to 1 watt |
| V-53B | Reflex Osc. | 10.7 - 11.7 | 50 mW |
| V-54 | Reflex Osc. | 10.5 - 12.2 | 200 mW |
| V-55 | Reflex Osc. | 8.2 - 11.5 | 500 mW |
| V-55B | Reflex Osc. | 8.2 - 11.5 | 500 mW |
| V-58 | Reflex Osc. | 8.5 - 10.0 | 700 mW |
| V-63 | Oscillator | 8.5 - 10.0 | 5 watts CW |

| NUMBER | TYPE | FREQUENCY RANGE/kMc | TYPICAL OUTPUT |
|---------------|----------------|---------------------|----------------|
| VA-64F | Oscillator | 13.5 | 18 watts CW |
| VA-64G | Oscillator | 13.3 | 18 watts CW |
| VA-67B | Oscillator | 13.35 - 13.65 | 1 watt CW |
| V-82 | Pulse Amp. | 9.3 | 7 kW |
| VA-87 Series | Pulse Amp. | 2.7 - 2.9 | 1.3 MW |
| VA-92 | Reflex Osc. | 14.0 - 17.5 | 200 mW |
| VA-92B | Reflex Osc. | 12.4 - 14.5 | 380 mW |
| VA-92C | Reflex Osc. | 12.4 - 14.5 | 250 mW |
| VA-94 | Reflex Osc. | 16.0 - 17.0 | 20 mW |
| VA-94B | Reflex Osc. | 15.8 - 16.2 | 20 mW |
| VA-96 | Reflex Osc. | 22.0 - 25.0 | 40 mW |
| VA-97 | Reflex Osc. | 34.0 - 35.6 | 15 mW |
| VA-98 | Reflex Osc. | 23.6 - 24.4 | 20 mW |
| VA-113-14-15 | Reflex Osc. | 5.925 - 7.725 | 50 to 300 mW |
| VA-121B | TWT Pulse Amp. | 2.0 - 3.4 | 40 watts |
| VA-121C | TWT Pulse Amp. | 2.0 - 3.4 | 40 watts |
| VA-125 Series | TWT Pulse Amp. | 2.65 - 3.25 | 1.5 MW |
| VA-128 | TWT Pulse Amp. | 2.6 - 3.3 | 10 kW |
| V-151/6316 | Reflex Osc. | 8.5 - 10.0 | 25 mW |

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- Englewood, N.J., 391 Grand Ave., LOfwell 7-3933

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- Camp Hill, Pa., 2120 Market St., REgent 7-6791
- Asbury Park, N.J., 905 Main St., KEllog 1-3150

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M. P. ODELL COMPANY

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- Pittsburgh 21, Pa., 750 Penn Ave., FRemont 1-1231

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HORMAN ASSOCIATES, INC.

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- Baltimore, Md., 3006 W. Cold Spring Lane, MOhawk 4-8345

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S. STERLING COMPANY

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- Dayton 19, Ohio, 2801 Far Hills Ave., AXminster 9-3594
- St. Paul 14, Minn., 842 Raymond Ave., MIdway 6-7881
- Indianapolis 20, Ind., 5420 N. College Ave., CLifford 1-9255

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- High Point, N.C., 1923 Na. Main St., 2-6873
- Atlanta 5, Ga., 3133 Maple Drive, N. E., CEdar 3-7522
- Huntsville, Ala., Jefferson 2-5733 (direct line to Atlanta)

FLORIDA

LYNCH-STILES, INC.

- Fort Myers, Fla., 35 W. North Shore Ave., WYandotte 5-2151

NORTHWESTERN STATES

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- Seattle 9, Wash., 1320 Prospect St., MAIn 2-0177
- Portland, Ore., 1238 N.W. Glisan, CApitol 2-7337

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- Salt Lake City, Utah, 1332 Varden Way, AMherst 6-1721

KANSAS, MISSOURI & SOUTHERN ILLINOIS

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- Kansas City 30, Mo., 7916 Paseo Ave., Hlghland 4-9494

SOUTH CENTRAL STATES

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- Houston 5, Tex., 3825 Richmond Ave., MOhawk 7-2407

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- Sacramento 14, Calif., 1317 -15th St., GIlbert 2-8901
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- San Carlos, Calif., 501 Laurel St., LYtell 1-2626
- Albuquerque, N.M., 107 Washington St., S. E., ALpine 5-5586
- Las Cruces, N.M., 126 S. Water St., JACkson 6-2486
- Phoenix, Ariz., 641 E. Missouri Ave., CRestwood 4-5431
- Tucson, Ariz., 232 So. Tucson Blvd., MAIn 3-2564



VA-203B



VA-221H



VA-225.

For details, circle 119 on Reader Service Card

| NUMBER | TYPE | FREQUENCY RANGE/kMc | TYPICAL OUTPUT |
|---------------|-------------|---------------------|----------------|
| V-153/6315 | Reflex Osc. | 8.5 - 10.0 | 100 mW |
| V-154 | Reflex Osc. | 10.5 - 12.2 | 200 mW |
| V-157 | Reflex Osc. | 8.5 - 10.0 | 180 mW |
| VA-161 | BWO | 8.2 - 12.4 | 80 mW |
| VA-161B | BWO | 7.5 - 11.0 | 80 mW |
| VA-162 | BWO | 12.4 - 18.0 | 30 mW |
| VA-168 | BWO | 8.0 - 10.0 | 200 mW |
| VA-201B | Reflex Osc. | 8.5 - 9.6 | 60 mW |
| VA-203B/6975 | Reflex Osc. | 8.5 - 9.6 | 30 mW |
| VA-210B | Reflex Osc. | 9.6 - 10.8 | 30 mW |
| VA-217 | Reflex Osc. | 8.5 - 9.6 | 20 mW |
| VA-218 | Reflex Osc. | 10.5 - 10.55 | 70 mW |
| VA-220 A-G,Z | Reflex Osc. | 5.925 - 8.1 | 1 watt |
| VA-220J | Reflex Osc. | 4.9 - 5.2 | 1 watt |
| VA-221 Series | Reflex Osc. | 5.985 - 7.555 | 40 mW |
| VA-221H | Reflex Osc. | 5.25 - 5.56 | 40 mW |
| VA-222 A-G,Z | Reflex Osc. | 5.925 - 8.1 | 1 watt |
| VA-222R | Reflex Osc. | 5.8 - 6.0 | 2 watts |
| VA-225 Series | Reflex Osc. | 7.0 - 8.5 | 1 watt |

| NUMBER | TYPE | FREQUENCY RANGE/kMc | TYPICAL OUTPUT |
|---------------|-------------|---------------------|----------------|
| V-260/6310 | Reflex Osc. | 8.5 - 10.0 | 70 mW |
| V-262 | Reflex Osc. | 8.5 - 10.0 | 70 mW |
| V-270/6312 | Reflex Osc. | 8.5 - 10.0 | 70 mW |
| V-290/6314 | Reflex Osc. | 8.5 - 10.5 | 120 mW |
| VA-800 | CW Amp. | 1.7 - 2.4 | 10 kW |
| VA-800C | CW Amp. | 2.16 - 2.4 | 10 kW |
| VA-802 | CW Amp. | 1.7 - 2.4 | 1 kW |
| VA-804 Series | CW Amp. | 4.4 - 5.875 | 2 kW |
| VA-805 Series | CW Amp. | 5.875 - 6.425 | 2 kW |
| VA-806 Series | CW Amp. | 7.125 - 8.5 | 2 kW |
| VA-808 | Pulse Amp. | 5.3 - 5.9 | 20 kW |
| VA-816J | Pulse Amp. | 3.43 - 3.57 | 2.5 MW |
| VA-820 Series | Pulse Amp. | 2.7 - 2.9 | 5 MW |
| VA-821 | Pulse Amp. | 2.7 - 3.0 | 1.5 MW |
| VA-822 | CW Amp. | 9.9 - 10.8 | 1 kW |
| VA-833A | CW Amp. | 0.680 - 0.985 | 10 kW |
| VA-833B | CW Amp. | 0.470 - 0.680 | 10 kW |
| VA-839 | Pulse Amp. | 2.73 - 2.87 | 5 MW |
| VA-845 | Pulse Amp. | 9.3 - 9.6 | 5 kW |

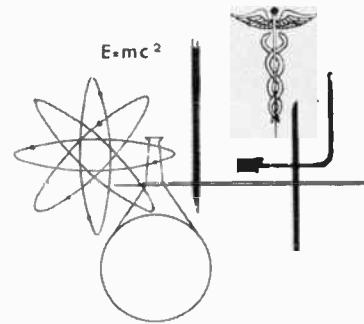
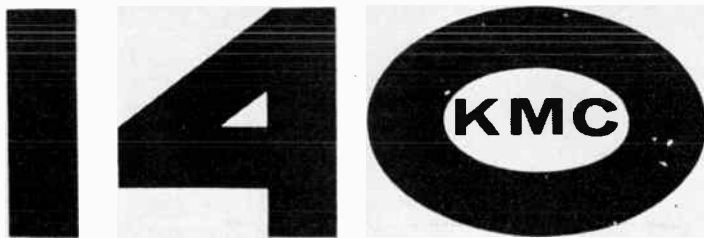
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| Size Designation Frequency Band in KMC Waveguide Nomenclature | DBA 60-90 RG-99/U | DBB 50-75 RG-98/U | DBC 35-50 RG-97/U | DBD 26.5-40 RG-96/U | DBE 18-26.5 RG-95/U | DBF 12.4-18 RG-91/U | DBG 8.2-12.4 RG-92/U | DBH 7.05-10.0 RG-91/U | DBJ 5.85-8.2 RG-90/U | DBK 3.95-5.85 RG-49/U | DBL 2.6-3.95 RG-48/U |
|--|--|--|--|--|--|--|--|--|--|--|---|
| | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No | Cat No |
| Tube Mounts Klystron Tube Mount Noise Tube Mount with Tube | | | DBC-140-T | DBD-140T | DBE-140-T | DBF-140-T | DBG-111-1 DBG-140-T | DBH-111-1 DBH-140T | DBJ-111-1 DBJ-140-T | DBK-111-1 DBK-140-T | DBL-111-1 DBL-140-T |
| Transmission Line Components Adaptors: Choke to Cover Tapered Transitions N to Waveguide Transformers *Straight Sections 90° E-Plane Elbows 90° H-Plane Elbows Rotating Joints 90-90 Rotating Joints 90-Col Rotating Joints Col-90 Rotating Joints Col-Col 90° Twisted Sections Bulkhead Flanges Bulkhead Flanges with Seals Pressurizing Units | DBAL-018 DBA-210 DBA-224 DBA-234 DBA-274 DBA-275 DBA-275-1 DBA-276 | DBBL-018 DBB-210 DBB-224 DBB-234 DBB-274 DBB-275 DBB-275-1 DBB-276 | DBCC-018 DBC-210 DBC-224 DBC-234 DBC-274 DBC-275 DBC-275-1 DBC-276 | DBD-010 DBDL-018 DBD-210 DBD-224 DBD-234 DBD-266-1 DBD-266-2 DBD-266-3 DBD-266-4 DBD-274 DBD-275 DBD-275-1 DBD-276 | DBE-010 DBEC-018 DBE-210 DBE-224 DBE-234 DBE-266-1 DBE-266-2 DBE-266-3 DBE-266-4 DBE-274 DBE-275 DBE-275-1 DBE-276 | DBF-010 DBFG-018 DBF-210 DBF-224 DBF-234 DBF-266-1 DBF-266-2 DBF-266-3 DBF-266-4 DBF-274 DBF-275 DBF-275-1 DBF-276 | DBG-010 DBGH-018 DBG-210 DBG-224 DBG-234 DBG-266-1 DBG-266-2 DBG-266-3 DBG-266-4 DBG-274 DBG-275 DBG-275-1 DBG-276 | DBH-010 DBHJ-018 DBH-057 DBH-210 DBH-224 DBH-234 DBH-266-1 DBH-266-2 DBH-266-3 DBH-266-4 DBH-274 DBH-275 DBH-276 | DBJ-018 DBJ-057 DBJ-210 DBJ-224 DBJ-234 DBJ-266-1 DBJ-266-2 DBJ-266-3 DBJ-266-4 DBJ-274 DBJ-275 DBJ-276 | DBK-010 DBKH-018 DBK-057 DBK-210 DBK-224 DBK-234 DBK-266-1 DBK-266-2 DBK-266-3 DBK-266-4 DBK-274 DBK-275 DBK-276 | DBL-010 DBLCL-018 DBL-057 DBL-210 DBL-224 DBL-234 DBL-266-1 DBL-266-2 DBL-266-3 DBL-266-4 DBL-274 DBL-275 DBL-276 |
| Crystal Mounts & Multipliers Crystal Mounts Crystal Mounts Movable Short Tunable Crystal Mounts Crystal Multipliers | DBA-310 DBA-313 DBA-319 | DBB-310 DBB-313 DBB-319 DBBW-350 | DBC-310 DBC-313 DBC-319 DBCA-350 | DBD-310 DBD-313 DBD-319 DBDC-350 | DBE-310 DBE-313 DBE-319 DBEC-350 | DBF-310 DBF-313 DBF-319 DBFC-350 | DBG-310 DBG-313 DBG-319 DBG-350 | DBH-310 DBH-313 DBH-319 DBHF-350 | DBJ-310 DBJ-313 DBJ-319 DBJF-350 | DBK-310 DBK-313 DBK-319 DBKG-350 | DBL-310 DBL-313 DBL-319 DBLJ-350 |
| Power Absorbing Units Precision Attenuators Variable Attenuators Calibrated Variable Attenuators Fixed Attenuators Low Power Terminations Movable Low Power Terminations Movable Term. with Extension Movable Term. with Ext. & Vernier Tunable Low Power Terminations High Power Terminations | DBA-410 DBA-430-1 DBA-430 DBA-440A DBA-450 DBA-456A DBA-456 DBA-456-1 DBA-459 DBA-460 | DBB-410 DBB-430-1 DBB-430 DBB-440A DBB-450 DBB-456A DBB-456 DBB-456-1 DBB-459 DBB-460 | DBC-410 DBC-430-1 DBC-430 DBC-440A DBC-450 DBC-456A DBC-456 DBC-456-1 DBC-459 DBC-460 | DBD-410 DBD-430-1 DBD-430 DBD-440A DBD-450 DBD-456A DBD-456 DBD-456-1 DBD-460 | DBE-410 DBE-430-1 DBE-430 DBE-440A DBE-450 DBE-456A DBE-456 DBE-456-1 DBE-460 | DBF-410 DBF-430 DBF-430 DBF-440A DBF-450 DBF-456A DBF-456 DBF-456-1 DBF-460 | DBG-410 DBG-430 DBG-430 DBG-440A DBG-450 DBG-456A DBG-456 DBG-456-1 DBG-460 | DBH-410 DBH-430 DBH-430 DBH-440A DBH-450 DBH-456A DBH-456 DBH-456-1 DBH-460 | DBJ-410 DBJ-430 DBJ-430 DBJ-440A DBJ-450 DBJ-456A DBJ-456 DBJ-456-1 DBJ-460 | DBK-410 DBK-430 DBK-430 DBK-440A DBK-450 DBK-456A DBK-456 DBK-456-1 DBK-460 | DBL-410 DBL-430 DBL-430 DBL-440A DBL-450 DBL-456A DBL-456 DBL-456-1 DBL-460 |
| Horns Pickup Horns Standard Gain Horns, 15 DB Standard Gain Horns, 20 DB | DBA-510 DBA-520 DBA-520 | DBB-510 DBB-520 DBB-520 | DBC-510 DBC-520 DBC-520 | DBD-510 DBD-520 DBD-520 | DBE-510 DBE-520 DBE-520 | DBF-510 DBF-520 DBF-520 | DBG-510 DBG-520 DBG-520 | DBH-510 DBH-520 DBH-520 | DBJ-510 DBJ-520 DBJ-520 | DBK-510 DBK-520 DBK-520 | DBL-510 DBL-520 DBL-520 |
| Tees, Junctions and Mixers E-Plane Tees Waveguide Switches, 2 Way Waveguide Switches, 4 Way H-Plane Tees Basic Directional Couplers Directional Couplers, Flg. to Term Directional Couplers, Coax. to Term Directional Couplers, Xtal to Flg Directional Couplers, Xtal to Term Magic Tees Balanced Crystal Mixers | DBA-610 DBA-616 DBA-617 DBA-620 DBA-630 DBA-631 DBA-633 DBA-634 DBA-650 DBA-665 | DBB-610 DBB-616 DBB-617 DBB-620 DBB-630 DBB-631 DBB-633 DBB-634 DBB-650 DBB-665 | DBC-610 DBC-616 DBC-617 DBC-620 DBC-630 DBC-631 DBC-633 DBC-634 DBC-650 DBC-665 | DBD-610 DBD-616 DBD-617 DBD-620 DBD-630 DBD-631 DBD-633 DBD-634 DBD-650 DBD-665 | DBE-610 DBE-616 DBE-617 DBE-620 DBE-630 DBE-631 DBE-633 DBE-634 DBE-650 DBE-665 | DBF-610 DBF-616 DBF-617 DBF-620 DBF-630 DBF-631 DBF-633 DBF-634 DBF-650 DBF-665 | DBG-610 DBG-616 DBG-617 DBG-620 DBG-630 DBG-631 DBG-633 DBG-634 DBG-650 DBG-665 | DBH-610 DBH-616 DBH-617 DBH-620 DBH-630 DBH-631 DBH-633 DBH-634 DBH-650 DBH-665 | DBJ-610 DBJ-616 DBJ-617 DBJ-620 DBJ-630 DBJ-631 DBJ-633 DBJ-634 DBJ-650 DBJ-665 | DBK-610 DBK-616 DBK-617 DBK-620 DBK-630 DBK-631 DBK-633 DBK-634 DBK-650 DBK-665 | DBL-610 DBL-616 DBL-617 DBL-620 DBL-630 DBL-631 DBL-633 DBL-634 DBL-650 DBL-665 |
| Frequency Meters Precision Cavity Wavemeters, Reaction Type Absorption Type Transmission Type Reference Cavity, Reaction Type Reference Cavity, Absorption Reference Cavity, Transmission | DBA-715-1 DBA-715-2 DBA-715-3 DBA-715-1A DBA-715-2A DBA-715-3A | DBB-715-1 DBB-715-2 DBB-715-3 DBB-715-1A DBB-715-2A DBB-715-3A | DBC-715-1 DBC-715-2 DBC-715-3 DBC-715-1A DBC-715-2A DBC-715-3A | DBD-715-1 DBD-715-2 DBD-715-3 DBD-715-1A DBD-715-2A DBD-715-3A | DBE-715-1 DBE-715-2 DBE-715-3 DBE-715-1A DBE-715-2A DBE-715-3A | DBF-715-1 DBF-715-2 DBF-715-3 DBF-715-1A DBF-715-2A DBF-715-3A | DBG-715-1 DBG-715-2 DBG-715-3 DBG-715-1A DBG-715-2A DBG-715-3A | DBH-715-1 DBH-715-2 DBH-715-3 DBH-715-1A DBH-715-2A DBH-715-3A | DBJ-715-1 DBJ-715-2 DBJ-715-3 DBJ-715-1A DBJ-715-2A DBJ-715-3A | DBK-715-1 DBK-715-2 DBK-715-3 DBK-715-1A DBK-715-2A DBK-715-3A | DBL-715-1 DBL-715-2 DBL-715-3 DBL-715-1A DBL-715-2A DBL-715-3A |
| Impedance Meters Precision Standing Wave Detectors Complete Carriage Units Only Waveguide Sections Broadband Probes | DBA-825 DB-820 DBA-821 DBA-822 | DBB-825 DB-820 DBB-821 DBB-822 | DBC-825 DB-820 DBC-821 DBC-822 | DBD-825 DB-820 DBD-821 DBD-822 | DBE-825 DB-820 DBE-821 DBE-822 | DBF-825 DB-820 DBF-821 DBF-822 | DBG-825 DB-820 DBG-821 DBG-822 | DBH-825 DB-820 DBH-821 DBH-822 | DBJ-825 DB-820 DBJ-821 DBJ-822 | DBK-825 DB-820 DBK-821 DBK-822 | DBL-825 DB-820 DBL-821 DBL-822 |
| Phase Shifters, Tuners & Shorts Phase Shifters Calibrated Phase Shifters Variable Stub Tuners Fixed Shorts Movable Shorts Movable Shorts with Extension Movable Shorts with Ext. & Vernier E-H Plane Tuners E-H Plane Tuners with Vernier | DBA-915 DBA-915-1 DBA-919 DBA-960 DBA-969A DBA-969 DBA-969-1 DBA-979 DBA-979-1 | DBB-915 DBB-915-1 DBB-919 DBB-960 DBB-969A DBB-969 DBB-969-1 DBB-979 DBB-979-1 | DBC-915 DBC-915-1 DBC-919 DBC-960 DBC-969A DBC-969 DBC-969-1 DBC-979 DBC-979-1 | DBD-915 DBD-915-1 DBD-919 DBD-960 DBD-969A DBD-969 DBD-969-1 DBD-979 DBD-979-1 | DBE-915 DBE-915-1 DBE-919 DBE-960 DBE-969A DBE-969 DBE-969-1 DBE-979 DBE-979-1 | DBF-915 DBF-915-1 DBF-919 DBF-960 DBF-969A DBF-969 DBF-969-1 DBF-979 DBF-979-1 | DBG-915 DBG-915-1 DBG-919 DBG-960 DBG-969A DBG-969 DBG-969-1 DBG-979 DBG-979-1 | DBH-915 DBH-915-1 DBH-919 DBH-960 DBH-969A DBH-969 DBH-969-1 DBH-979 DBH-979-1 | DBJ-915 DBJ-915-1 DBJ-919 DBJ-960 DBJ-969A DBJ-969 DBJ-969-1 DBJ-979 DBJ-979-1 | DBK-915 DBK-915-1 DBK-919 DBK-960 DBK-969A DBK-969 DBK-969-1 DBK-979 DBK-979-1 | DBL-915 DBL-915-1 DBL-919 DBL-960 DBL-969A DBL-969 DBL-969-1 DBL-979 DBL-979-1 |
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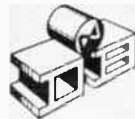
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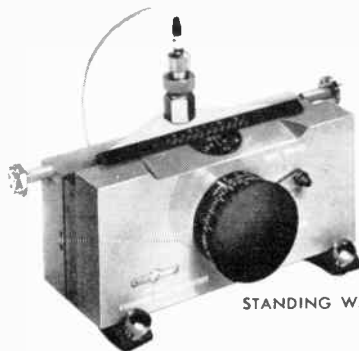
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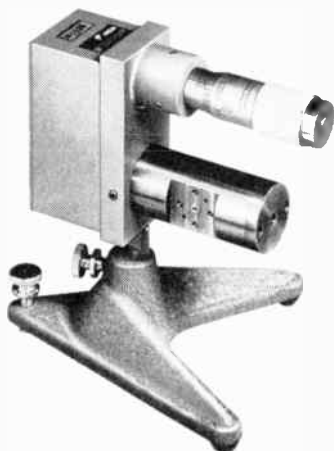
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CRYSTAL MOUNTS



CAVITY WAVEMETERS

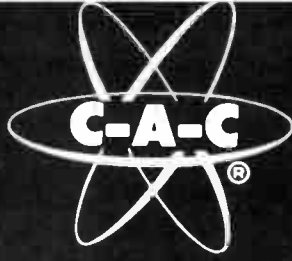


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1. To produce the best products
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3. To keep a realistic price structure

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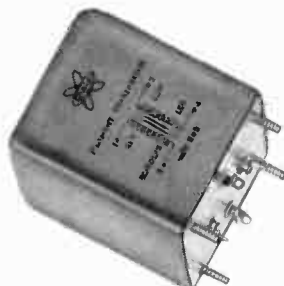
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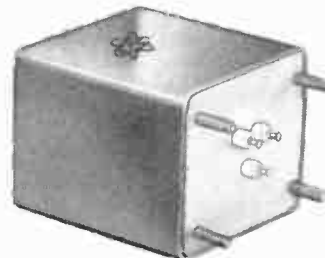
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For details, circle #122 on Reader Service Card



Communication

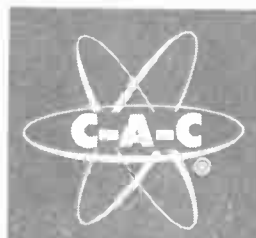
TELEGRAPH TONE FILTERS and NETWORKS



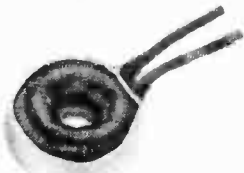
HERMETICALLY SEALED
170 Cycle Spacing

Transmit Filters, 90-0574 Series
Receive Filters, 90-0573 Series
Center Frequency from 425 CPS to 3315 CPS.

C-A-C produces many types of telegraph filters with a variety of channel spacing—120 Cycle, 150 Cycle, 85 Cycle and others. Also Oscillators, Discriminators and Translotion Filters.



SUB-MINIATURE TOROIDS



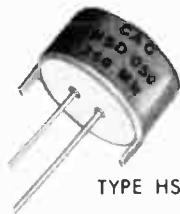
TYPE QLS

Basic Inductor Component with flex leads. Wax impregnated units standard. Plain or plastic dipped on special order. Q valves from 12 to 190 over a frequency range of 1 KC to 5 MC. Maximum 4 HY inductance.



TYPE MPF

Hi-temp polyester resin molding compound. Tinned brass terminals. 3-48 tapped center bushing easily stacked. Special versions available for 350° F. application.



TYPE HSD

CORE TYPE 050 from 5.0 MH to 3.0 HY For Freq. up to 15 KC.

CORE TYPE 051 from 1.0 MH to 500 MH For Freq. up to 100 KC.

CORE TYPE 054 from .05 MH to 10 MH For Freq. up to 5 MC.

THIS SERIES NOT AVAILABLE WITH TEMPERATURE STABILIZATION

For details, circle #123 on Reader Service Card

MAGNETIC AMPLIFIERS SATURABLE REACTORS PRECISION TRANSFORMERS



We build saturable transformers for 2-phase servo motors, missile control and other automatic control devices in a wide variety of types. Frequency, 60 CPS to 15 KC. Also complete magnetic amplifiers and Special Mag Amp devices.

Built to MIL-T-27A
Grade 4, Class R, Life X
Altitude to 50,000 Feet (or you name it!)

Accessories

Company



FILTERS



BAND PASS

100 KC BAND PASS FILTER

L-C filters utilizing high Q toroidal inductors, high quality capacitors, impedance transformations, near unity coupling and other applications of advanced network theory resulting in high performance units in small volume packages. C-A-C filters range from sub-audio to over 500 KC.



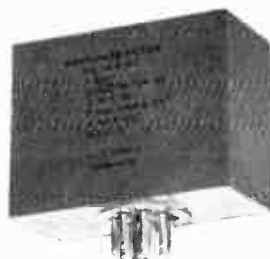
UNIVERSAL 90-0036 SERIES
40 CPS to 50 KC

BAND REJECTION AND HIGH PASS FILTERS ALSO AVAILABLE

LOW PASS

All the wide variety of C-A-C Low Pass Filters are built to military specifications. Temperature: -40° C to +85° C for a pass band tolerance of ± 1 db

SPECIAL FILTERS



TELEMETERING FILTERS

TELEMETERING CHANNEL FILTERS

Miniaturized Version of Standard RDB Series
90-0734 Series
90-0735 Series
90-0003 Series
400 CPS to 960 CPS
1,300 CPS to 2,300 CPS
3,000 CPS to 70,000 CPS

AIRCRAFT NAVIGATION FILTERS



AIRCRAFT NAVIGATION FILTERS

C-A-C has developed numerous custom designs for equipment manufacturers. Send your specifications for a prompt engineering proposal.

TACTICAL AIR NAVIGATION

15 Cycle Band Pass Filters
135 Cycle Band Pass Filters
4046 Cycle Band Pass Filters
1350 Cycle Tuned Circuits
Pulse Differentiating Transformers
Rate Coupling Transformers
Special Toroidal Coils
Pulse Delay Networks

MARKER BEACON

400 CPS Tuned Circuits
1300 CPS Tuned Circuits
3000 CPS Tuned Circuits
Audio Transformers

INSTRUMENT LANDING SYSTEM 90 and 150 Cycle Filters

VHF OMNI RANGE
30 Cycle Filters
9960 Cycle Discriminators
30 Cycle Transformers

THESE ARE TYPICAL OF MANY SPECIAL FILTERS C-A-C SUPPLIES



THE STANDARD OF QUALITY



BG7 SERIES



BH9 SERIES



BX SERIES



BG9 SERIES

QUARTZ CRYSTALS



BTC-2 SERIES



TCO-11 SERIES



TCO-141 SERIES

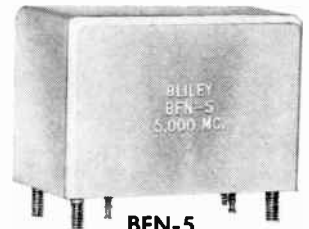


BCO-10 SERIES

OVENS



BFN-28A



BFN-5

CRYSTAL FILTERS



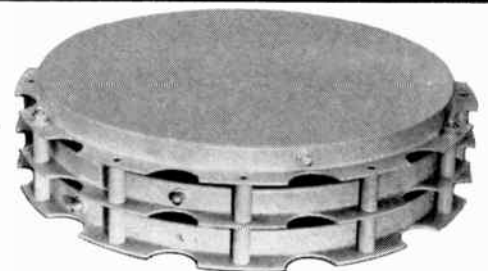
CCO-7 SERIES

PACKAGED OSCILLATORS



DOUBLE ENDED RINGING LINE

SET OF
THREE MATCHED
DELAY LINES



ULTRASONIC DELAY LINES

For details, circle #124 on Reader Service Card

For details, circle #125 on Reader Service Card

BLILEY ELECTRIC CO. UNION STATION BUILDING ERIE, PENNSYLVANIA

CRYSTALS

| SERIES | FREQUENCY RANGE | DESCRIPTION | BULLETIN |
|--------|-------------------|---|-------------------------------|
| BH6 | 200 kc to 125 mc | Holder is equivalent to MIL Type HC-6/U, can be supplied with all MIL Type crystal units, and for commercial requirements. Special models for high shock, temperature and vibration applications. Also available with wire leads. | No. 493 |
| BX | 10 mc to 125 mc | Holder is equivalent to MIL Type HC-18/U. Can be supplied with all MIL Type crystal units and for commercial requirements. Also available with plug-in pins. | No. 502 |
| BH9 | 4 kc to 200 kc | Holder is equivalent to MIL Type HC-13/U. Can be supplied with all MIL Type crystal units. Also available with wire leads. Special models for high shock, vibration and temperature applications. | No. 501 |
| BG6 | 3 mc to 100 mc | Glass mounted crystal unit has minimum ageing and high reliability. Also supplied with wire leads when part of 8TC-2 crystal oven assembly. Special model BG61A-5 at 5 mc has maximum stability for time standards. | No. 496 |
| BG7 | 4 kc to 3 mc | Advanced design in all glass mounting for plug-in or with wire leads in Bliley TCO-11C oven assembly. Exceptional stability with low ageing and low resistance. | No. 503 |
| BG9 | 100 kc or 1000 kc | Glass mounted crystal unit developed for secondary standards. Has minimum ageing and high Q for stability. | 100kc-No.492 1000kc-No.491 |
| BG12 | 100 kc | Glass mounting for GT-cut crystals at 100 KC. Supplied with wire leads in TC97 oven assembly for primary standards. | No. 498 |

OVENS

| SERIES | HEATER VOLTAGE | DESCRIPTION | BULLETIN |
|---------|-------------------|--|----------|
| TCO-14 | 6.3, 12.0 or 26.5 | High stability ($\pm 1^\circ\text{C}$.) oven for use with Bliley crystal series BH6 or BH9 (MIL-Holders HC-6/U or HC-13/U) | No. 514 |
| TCO-141 | 6.3, 12.0 or 26.5 | Crystal and component oven with stability $\pm 1.5^\circ\text{C}$. features snap-action thermostat for reliable performance and low circuit interference. For use with Bliley crystal series BH6 or BH9 (MIL-Holders HC-6/U or HC-13/U) | No. 515 |
| TC90 | 6.3, 18 or 115 | Precision crystal ovens for frequency standards. Single stage models hold $\pm 1^\circ\text{C}$; Dual stage models hold $\pm .25^\circ\text{C}$. | No. 500 |
| BTC-1 | 6.3 | An hermetically sealed crystal and oven subminiature plug-in package which maintains frequency ± 3 ppm with ambient temperature variation from -55°C . to $+70^\circ\text{C}$. Freq. range: 5 mc to 125 mc. | No. 494 |
| BTC-2 | 6.3 or 26.5 | An hermetically sealed plug-in package consisting of oven and glass mounted crystal for high reliability, high stability and low ageing. Freq. range: 4 kc to 125 mc. | No. 497 |
| BCO-10 | 12.6, 26.5 or 115 | A compact component oven providing temperature control for up to 10 diodes. Stability $\pm 1^\circ\text{C}$. with ambient temperature -10° to $+50^\circ\text{C}$. | No. 517 |
| BPCO-1 | 26.5 | High stability transistorized proportional controlled plug-in oven for crystals and components. Stability $\pm .01^\circ\text{C}$. from $+10^\circ\text{C}$. to $+50^\circ\text{C}$. For use with Bliley crystal series BG6, BG7 and BG9. | No. 518 |
| TCO-11 | 115 | Precision oven designed for use with Bliley BG6 and BG7 series glass mounted crystals. Temperature stability $\pm .1^\circ\text{C}$. | No. 508 |

CRYSTAL FILTERS

Bliley filter networks are available in three standard designs with characteristics selected for general application as shown in the following tabulation:

| MODEL | FREQ. | BW-6db | BW-60db | FORM FACTOR | IMPEDANCE |
|--------|---------|---------|---------|-------------|-----------|
| BFN-5 | 5.0 mc | 3.5 kc | 12 kc | 3.5 | 1600 ohms |
| BFN-11 | 10.7 mc | 30.0 kc | 55 kc | 1.8 | 2700 ohms |
| BFN-13 | 13.0 mc | 30.0 kc | 55 kc | 1.8 | 1500 ohms |

CUSTOM ENGINEERED FILTERS

Bliley facilities are available for analysis, design and production of crystal filter networks for specialized applications over the range from 100 kc to 40 mc. Depending upon functional requirements, bandwidths from 50 cycles to 100 kc are attainable. With an unsurpassed background in the development and manufacture of quartz crystal resonators, Bliley is in a unique position to utilize modern crystal filter synthesis techniques in combination with special quartz resonators having low spurious response characteristics. Request Bulletin No. 509.

PACKAGED OSCILLATORS

Bliley Model CCO-7 is an ultra-stable packaged oscillator that combines transistorized circuitry, temperature control and a precision quartz crystal at 1 mc, mounted in glass, for stability of 4 parts in 10 million. For applications that require stabilities in excess of 1 ppm, oscillator design

should be closely integrated with crystal parameters to obtain desired performance. Bliley has extensive experience in design and development of packaged oscillators for high stability performance. Request Bulletin No. 516.

ULTRASONIC DELAY LINES

Bliley ultrasonic delay lines for the range 2 to 4500 microseconds are custom engineered for each application. Exceptional performance characteristics such as low loss and attenuation of spurious responses result from a complete appreciation of the critical factors involved.

A new series of low loss short delay lines (2 to 50 microseconds) for carrier frequencies up to 30 mc utilizes barium titanate transducers. Loss levels of these lines, into terminations of 100 ohms, range from 6 db to 10 db compared to 35 db for quartz transducers. Bliley is completely equipped to design, produce and test ultrasonic delay lines for your application. Request Bulletins No. 48 and No. 513.

BLILEY ELECTRIC CO. UNION STATION BUILDING ERIE, PENNSYLVANIA

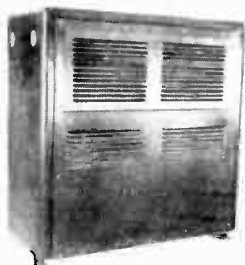
PLATE TRANSFORMERS

25 cycles to 2000 cycles

Single and polyphase for all rectifier circuits

Indoor or outdoor—submerged—airborne operation

Liquid Immersed—OIL, ASKAREL
3 KVA through 10000 KVA
Voltages through 230 KV
Air Cooled—Class A, B, H
1 KVA through 4000 KVA
Voltages through 15 KV
Compound Filled
1 KVA through 25 KVA
Voltages through 15 KV



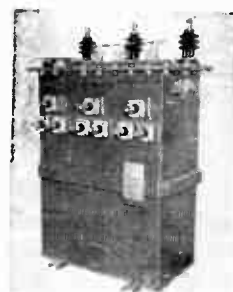
Air Cooled 75 KVA—5 KV Regulated



Air Cooled—
7 KVA—8 KV



Oil Immersed—
10 KVA—12 KV



Askarel Immersed—35 KVA—15 KV

FILAMENT TRANSFORMERS

DRY TYPE AND COMPOUND FILLED

Output 0.5 KVA through 25 KVA High Potential Test 4 KV through 31 KV

LIQUID IMMERSSED—OIL OR ASKAREL

Output 0.15 KVA through 25 KVA High Potential Test 10 KV through 140 KV



Air Cooled—
7 volts—1000 amps



Askarel Immersed—
300 VA—35 KV Test

FILTER REACTORS

Liquid Immersed—OIL or ASKAREL

LI² from 10 through 50000

Hi Potential Test 10 KV through 140 KV

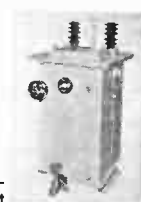
Air Cooled or Compound Filled

LI² from 1 through 5000

Hi Potential Test 4 KV through 31 KV



Air Cooled—
LI² 25—19 KV Test



Oil Immersed—
LI² 40—34 KV Test

UNIT RECTIFIERS

A complete assembly consisting of:

Plate Transformer • Filament Transformer (if required)

Filter Reactor and/or Capacitor

Tube or Semiconductor Rectifiers

Liquid Immersed—Oil or Askarel

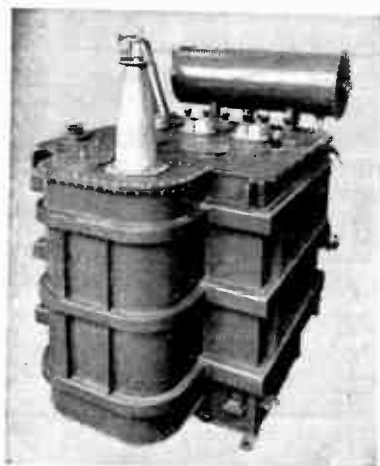
Output Power—2 KW through 10000 KW

Output Voltage—1 KV through 120 KV

Air Cooled

Output Power—1 KW through 4000 KW

Output Voltage—600 volts through 15 KV



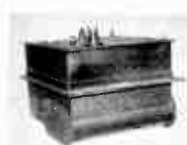
Oil Immersed—775 KW—110 KV



Askarel Immersed—
5 KW—10 KV



Oil Immersed—Silicon
Rectifiers—2 KW—15 KV



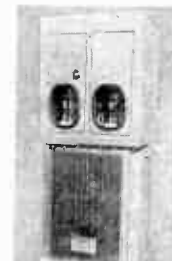
Oil Immersed—Selenium
Rectifiers—10 KW—12 KV



Oil Immersed—
17 KW—16 KV



Oil Immersed—
12 KW—13 KV



Askarel Immersed—
37 KW—17 KV



MOLONEY ELECTRIC COMPANY

ST. LOUIS, 20, MISSOURI

PULSE TRANSFORMERS

LIQUID IMMERSED

Average Power 0.5 KW through 2500 KW

Pulse Voltage Output 15 KV and above



25 KW average 100 KV peak



2 KW average
30 KV peak

20 KW average
60 KV peak



45 KW average 90 KV peak



2500 KW average 50 KV peak

MODULATION TRANSFORMERS and REACTORS

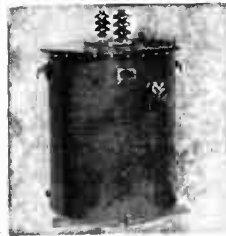
For Amplitude Modulated Transmitters with Radio Frequency
Outputs of 1 Kilowatt and Above.



Oil Immersed Transformer—25 KW



Compound Filled
Reactor—1 KW

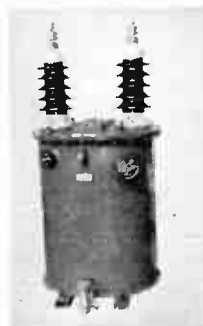


Askarel Immersed
Reactor—10 KW

CHARGING REACTORS

LIQUID IMMERSED

Peak LI^2 from 1 to 100,000—4 KV to 140 KV



2.0 hy.—3.5 amp—50 KV Test



1.0 hy.—1.0 amp—
50 KV Test



1.5 hy.—4 amp—
34 KV Test

HYPERCORES

For smaller, lighter weight magnetic components,
use Moloney HyperCores.



12 Mil



1 Mil



2 Mil



4 Mil

When you specify Moloney . . . for trans-
formers and other magnetic components
for electronics . . . you're tapping one of
the richest reservoirs of experience and
technical know-how available today to
the electrical industry. Since 1896
Moloney has designed and fabricated
transformers and related products. Now
Moloney's vast store of knowledge and
engineering ability is available to the
electronics industry.

Write for Magnetic Component Bulletin
#3815 and HyperCore Bulletin #SR-208.

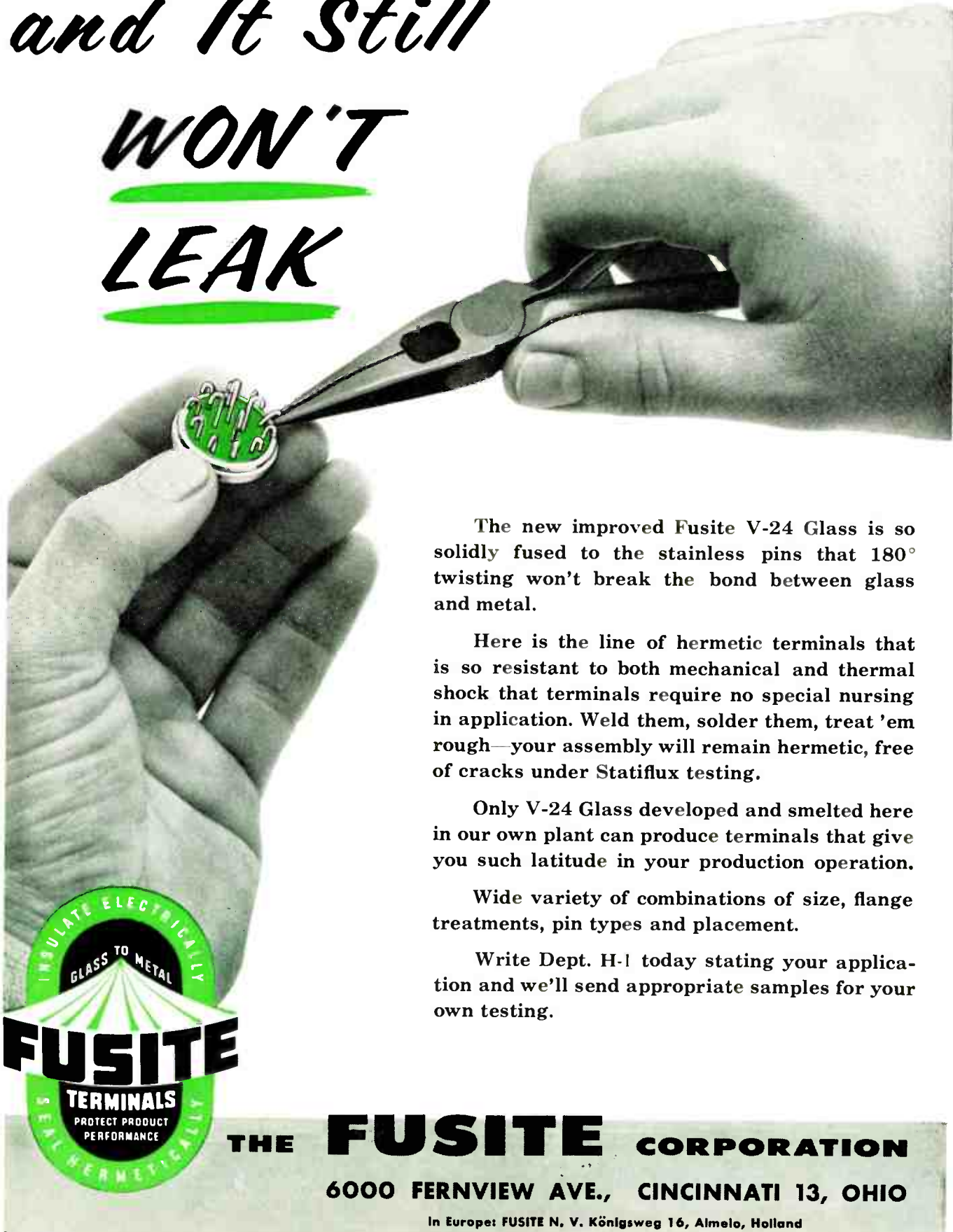


MOLONEY ELECTRIC COMPANY

ST. LOUIS, 20, MISSOURI

Twist It 'til It Snaps and It Still

WON'T LEAK



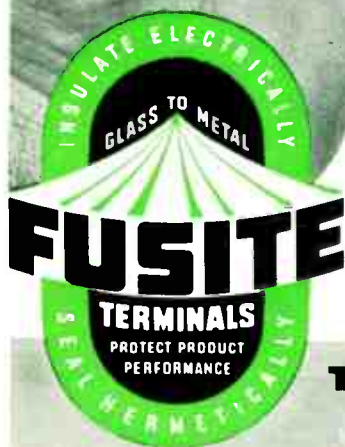
The new improved Fusite V-24 Glass is so solidly fused to the stainless pins that 180° twisting won't break the bond between glass and metal.

Here is the line of hermetic terminals that is so resistant to both mechanical and thermal shock that terminals require no special nursing in application. Weld them, solder them, treat 'em rough—your assembly will remain hermetic, free of cracks under Statiflux testing.

Only V-24 Glass developed and smelted here in our own plant can produce terminals that give you such latitude in your production operation.

Wide variety of combinations of size, flange treatments, pin types and placement.

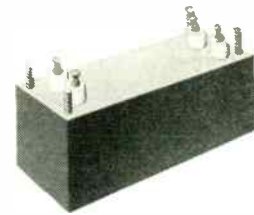
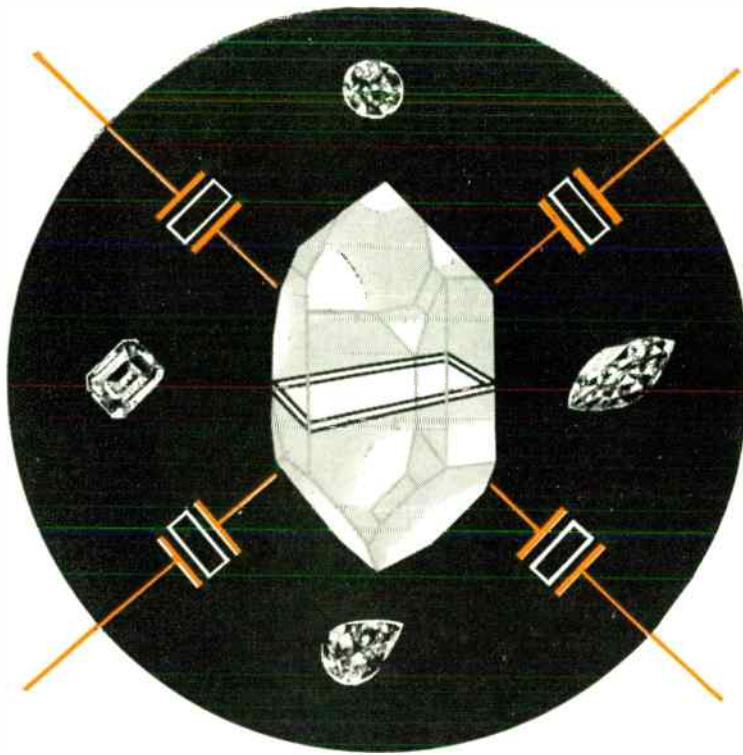
Write Dept. H-1 today stating your application and we'll send appropriate samples for your own testing.



THE **FUSITE** CORPORATION

6000 FERNVIEW AVE., CINCINNATI 13, OHIO

In Europe: FUSITE N. V. Königsweg 16, Almelo, Holland



HOW TO SIMPLIFY CIRCUIT DESIGN WITH BURNELL CRYSTAL FILTERS

Through advanced crystal filter production techniques and circuitry by Burnell & Co., it is now possible to overcome numerous design problems formerly believed insoluble with even the best individual toroidal components.

FREQUENCY RANGE EXTENDED

Depending on band width and frequency, filters may be composed entirely of crystals or in complex networks, combine quartz crystal elements with stabilized toroidal coils to produce the desired band width and shape factor. Frequency has been extended from low range up to 20 megacycles.

TRANSISTOR TO PENTODE OPERATION

Economy is achieved with standardized complex designs of lattice networks and their three terminal network derivatives. Packaging encompasses a wide range in standard, miniature and sub-miniature sizes with considerable latitude in permissive impedance range from transistor usage to pentode operation.

STANDARD DESIGN OR CUSTOM ENGINEERED

Whether you need crystal filters of standard design or custom units engineered to specifications of center frequency, band width, selectivity and impedance level, the facilities of Burnell & Co. are at your disposal. Write for new Burnell Crystal Filter Bulletin XT-455.

Burnell & Co., Inc.

PIONEERS IN TOROIDS, FILTERS AND RELATED NETWORKS

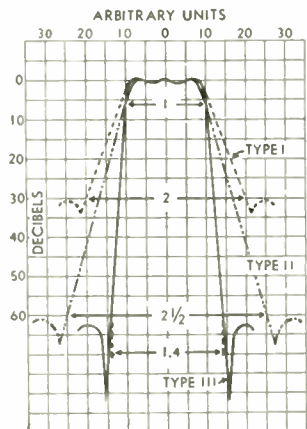


DEPT. P-12

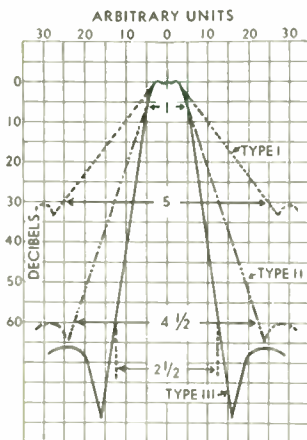
EASTERN DIVISION
10 PELHAM PARKWAY
PELHAM, N. Y.
PELHAM 8-5000
TWX PELHAM 3633

PACIFIC DIVISION
720 MISSION STREET
SOUTH PASADENA, CALIFORNIA
RYAN 1-2841
TWX PASACAL 7578

TYPICAL RESPONSE CURVES INDICATING THE VARIOUS SHAPE FACTORS AVAILABLE IN STANDARDIZED BURNELL CRYSTAL FILTERS

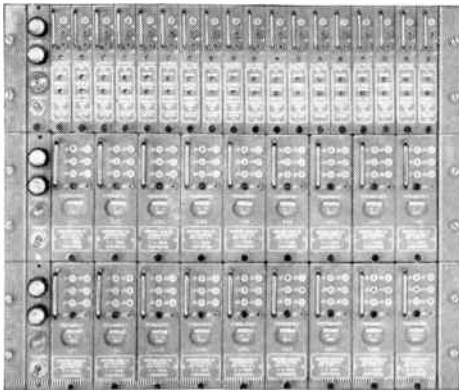


WIDE BAND CRYSTAL FILTER



NARROW BAND CRYSTAL FILTER

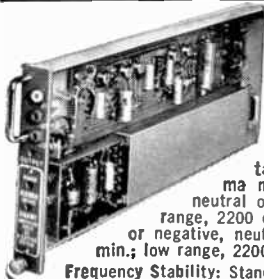
Northern Radio TRANSISTORIZED Voice Frequency Carrier Telegraph Systems



**18 CHANNELS
IN ONLY
15³/₄"
PANEL SPACE**

**Top shelf
shows 18 FS
Tone Keyers,**

**Type 211, Model 1; Next 2 shelves contain 9
each FS Tone Converters, Type 212, Model 2.**



FREQUENCY SHIFT TONE KEYS Type 211, Model 1

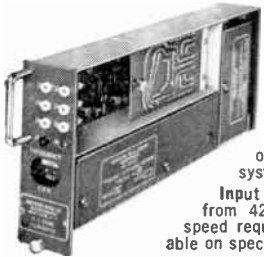
Keying inputs, levels and impedances: 1. Contact keying (internal battery to "dry" contacts) 1 ma min.; 2. DC current pulses, positive or negative, neutral or polar; high range, 220 ohms, 30 ma. min; low range, 2200 ohms, 0.5 ma. min.; 3. DC voltage pulses, positive or negative, neutral or polar; high range, 100,000 ohms, 10 volts min.; low range, 2200 ohms, 1 volt min.

Frequency Stability: Standard Networks ± 2 cps total for all causes including $\pm 10\%$ line voltage change and $\pm 25^\circ\text{C}$. from 25°C . temperature change.

Output Frequencies: All standard VF carrier channels from 425 to 3315 cps. Bandwidth dependent on keying speed requirements. Other frequencies and bandwidths available on special order.

Output Level and Impedance: 5 dbm maximum, into 600 ohms, unbalanced. May be paralleled with any number of other Keyers operating on different frequencies in the same audio system.

Power Requirements: 14 V DC, 15 MA. Two transistorized power supplies and one automatic change-over relay are mounted on the rear of each mounting shelf. Dimension: $\frac{7}{8}$ " wide x $5\frac{1}{4}$ " high x $10\frac{1}{2}$ " deep.



FREQUENCY SHIFT TONE CONVERTER Type 212, Model 2

Input Level and Impedance: -48 dbm to $+8$ dbm into 600 ohms, unbalanced. May be paralleled with any number of other converters operating on different frequencies in the same audio system.

Input Frequencies: All standard telegraph VF channels from 425 to 3315 cps.. Bandwidth dependent on keying speed requirements. Other frequencies and bandwidths available on special order.

Output: Neutral DC voltage pulses of 5 volts maximum across a 2000 ohm external load. Polar pulses ± 10 volts across a 2000 ohm external load. Output drives appropriate voltage-to-current converters, such as Northern Radio Type NRC 691 Transistor Relay which provides "Dry Contact" Keying to external battery supply.

Power Requirements: 14 V DC at 30 MA. Two transistorized power supplies and one automatic change-over relay are mounted on the rear of each mounting shelf. Dimensions: $1\frac{7}{8}$ " x $5\frac{1}{4}$ " x $11\frac{3}{4}$ " deep. For rack mounting a number of these units, a shelf assembly is available accommodating nine (9) units in a panel height of $5\frac{1}{4}$ ".

LINE BATTERY P.S. PANEL

The Northern Radio Line Battery Power Supply Panel, Type 227 Model 1, is used as a source of DC power for teleprinter, telegraph and similar circuits. It is equipped with two (2) Type 228 Model 1 Power Supplies, to provide DC requirements for a group of eighteen (18) or less teleprinter channels. The two Power Supplies are normally mounted on the Line Battery Power Supply Panel, Type 227 Model 1, with one Supply operating and the second "standing-by." An automatic transfer circuit is provided on the panel to place the "stand-by" unit in operation should the first supply fail. The Line Battery Power Supply Panel, Type 227 Model 1, is $3\frac{1}{2}$ " high x 19" long. The AC input and DC output circuits are isolated from each other and also from chassis so that either side of the circuit may be grounded, or left ungrounded as may be determined.

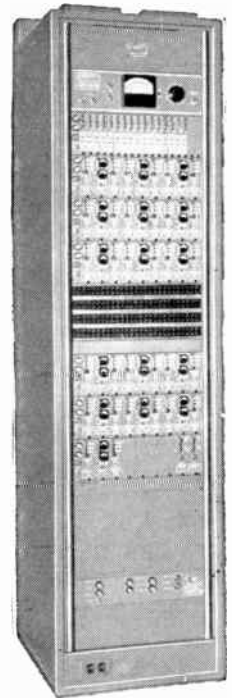
Technical Data:
AC Input: 115/230 volt. 50/60 cycles AC $\pm 10\%$. Output Voltage: 120 volts DC nominal. Maximum Output Current: 1.2 amperes. Maximum Output Ripple Voltage: 2%.



16-CHANNEL DIVERSITY SYSTEM

- Diversity switching sensitivity from -60 dbm to 0dbm

The Northern Radio Voice Frequency Telegraph Terminal, Type 235 Model 1, is a multi-channel frequency shift communications terminal used for transmission and reception of telegraph, teleprinter or telemetering signals over channels subject to fading or attenuation changes, such as long distance point-to-point radio circuits. It provides the necessary equipment for transmission of 16 intelligence channels over one (1) voice frequency circuit, and diversity reception of 16 similar channels, received through two (2) voice frequency circuits. The two (2) voice frequency receiving circuits are normally obtained from radio receivers arranged for space diversity reception. Means are provided to allow reception on a frequency diversity basis rather than space diversity. A combination of space and frequency diversity may be utilized for maximum reliability, when conditions are such as to require same. All the necessary equipment may be mounted in approximately $\frac{2}{3}$ of one standard 7-foot telegraph rack.



PRINTER RELAY Type 237, Model 1

The Northern Radio Printer Relay, Type 237 Model 1, is used as a coupling device between a DC teleprinter signal loop and the printer selector magnet. It replaces electro-mechanical signal relays and their associated local DC power supplies normally used with printers, providing the advantages of relays and improving printer performance but eliminating the maintenance problems which electro-mechanical relays introduce.

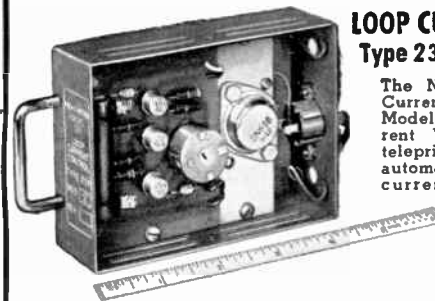


This device effectively isolates the reactance of the printer selector magnet, presenting a resistive termination to the signal loop. Several printers equipped with this device can, therefore, be connected in series with the same signal loop without harmful interaction between them. The Printer Relay may be used with either polar or neutral keyed signals. When neutral signals are supplied, the device automatically selects the proper operating level for the loop current supply, and can therefore tolerate large changes in absolute values of loop current without introducing appreciable distortion into the printer selector magnet. It normally mounts within the housing of the teleprinter.

tion to the signal loop. Several printers equipped with this device can, therefore, be connected in series with the same signal loop without harmful interaction between them. The Printer Relay may be used with either polar or neutral keyed signals. When neutral signals are supplied, the device automatically selects the proper operating level for the loop current supply, and can therefore tolerate large changes in absolute values of loop current without introducing appreciable distortion into the printer selector magnet. It normally mounts within the housing of the teleprinter.

LOOP CURRENT CONTROL Type 238 Models 1 and 2

The Northern Radio Loop Current Control, Type 238 Model 1, is used as a current "normalizer" in DC teleprinter signal loops, to automatically maintain loop current at the optimum value despite changes in loop resistance or loop supply voltage.



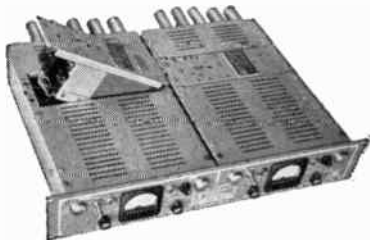
The Loop Current Control,

Type 238 Model 1, is designed for use in loops requiring a nominal 60 milliamperes operating current, while the Model 2 is designed for a nominal 20 milliamperes circuit. Both models incorporate a calibration control to allow reasonable variations from these design values.

Input Impedance: Variable. Automatically changes as necessary to maintain "constant current" in the circuit to which connected. Maximum and minimum limit of operation are specified by allowable voltage drops across the terminals of the device.
Voltage Limits: Maximum—80 volts; Minimum—5 volts.
Operating Currents: Model 1: 60 milliamperes (adjustable 55-75 milliamperes). Model 2: 20 milliamperes (adjustable 10-30 milliamperes).

MULTI-CHANNEL FREQUENCY SHIFT TONE TELEGRAPH SYSTEMS

These Multi-Channel Telegraph Systems are audio carrier systems capable of multiplexing such circuits as telephone lines, VHF, UHF, or radio frequency links—or practically any type circuit from which a two-wire audio circuit can be derived. Designed to meet any speed requirements, these systems are fully electronic, without relays or moving parts to wear. They can be used for high-speed printer, Morse or time division Multiplex circuits, as well as such application as Telemetering, Control Circuits and Servo-Mechanisms. Instantaneous and complete sending and channel control permits any binary code groups, either "Clear Text" or "Cryptographic," to be channelized without need for additional phasing or synchronizing equipment, while paralleling of channels will allow for transmission of other type codes, such as 3 element cable code. The completely independent operation of each channel, including its own power supply, localizes faults to one channel only, leaving other channels unaffected. Individual

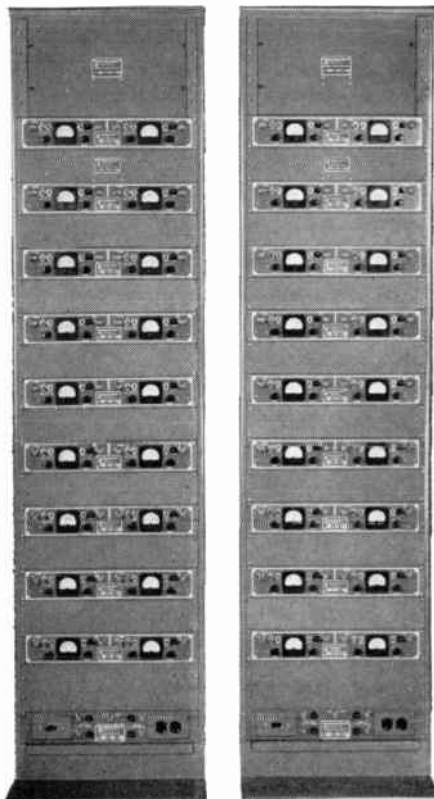


DUAL FS TONE KEYS; TYPE 153 MODEL 3:

Keying Input... Relay contacts, \pm DC current or voltage pulses, neutral or polar.

Input Level... DC voltage: \pm 10 volts min. DC current: 45 ma min., \pm or polar. Relay: contact rating 5 ma min.

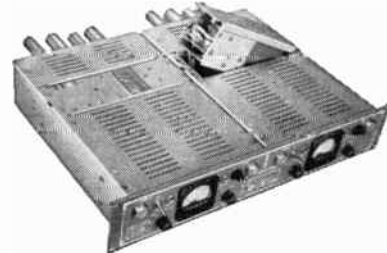
Keying Input Z... DC voltage: 100K ohms. DC current: 220 ohms.



TRANSMITTER

RECEIVER

channel separation filters are used at both transmitting and receiving ends. This arrangement allows for sending telegraph or control signals over a circuit carrying, simultaneously, other forms of intelligence; or for two-way communications on the same line. The audio frequency shift principle of transmission provides for high fidelity of signal reproduction over a wide range of signal levels as well as under severe noise or interference conditions. Circuit requirements of any speed, shift and center frequency can readily be met. The systems illustrated are for use on printer circuits up to 100 WPM channel capacity. The system arrangement is very flexible, permitting grouping of the basic units into various arrangements of Multiplex Systems. These systems can be made to accommodate a large variety of channel numbers and speeds to meet any individual requirements. The flexibility is further improved by the fact that the racks, power control units, and terminal connection panels are the same for both transmitting and receiving terminals.



DUAL FS TONE CONVERTER: TYPE 152 MODEL 3:

Input Z: 600 ohms, unbalanced.

Input Level: -40 dbm to 0 dbm.

Input Frequencies: 18 channels, 425-3315 cps, 170 cycle spacing.

Keying Speed: 45 dot cycles.

DUPLEX TELEGRAPH SYSTEM FOR MULTI-CHANNEL TONE EQUIPMENT

SEVEN NEW FEATURES in this system—simple 4-position switch selects from 12 possible duplex combinations; duplex operation between stations connected via carrier telegraph channels; all-electronic, without relays or moving parts; polar or neutral for either half duplex or full duplex; break-in now also possible for all half-duplex circuits; provided with positive feature to prevent space signal lock-out; includes individual line battery for each channel.

The Northern Radio Duplex Telegraph System consists of one each Dual Frequency Shift Tone Keyer, Type 153 Model 3; Dual Duplex Selector Panel, Type 200 Model 1; Dual Loop Switch Panel, Type 200A Model 1; and Dual Frequency Shift Tone Converter, Type 152 Model 3.



**DUAL DUPLEX SELECTOR PANEL
TYPE 200
MODEL 1**

The Dual Selector Panel provides 12 loop options, patching facilities for monitoring purposes and channel routing, including the possibility of patching-in another tele-printer loop circuit (T-junction). Any of the 12 loop options are available and may be selected for the Dual Loop Switch Panel by simple strapping arrangements. It has an individual line battery for each channel for greatest circuit flexibility. Battery and line fuses are also provided for maximum protection.



**DUAL LOOP SWITCH PANEL
TYPE 200A
MODEL 1**

The Dual Loop Switch Panel rapidly selects half-duplex and/or full duplex mode of operation for any of the 4 standard loop options by front panel switching available from the 12 loop options in the Dual Duplex Selector Panel.

REGENERATIVE REPEATER

TYPE 207
MODEL 1



This new Regenerative Repeater—the most advanced in the industry—is designed for use in telecommunication circuits to re-shape and re-time distorted signals for local use or retransmission. Special provision has also been made for its use on half-duplex where it will not only regenerate the ordinary teleprinter signals but also faithfully reproduce such special signals "break" signals and "mark restoration" information. Outstanding features include: . . . maximum acceptable signal distortion; new circuitry accepts up to 47% mark or space distortion; "floating" input & output circuits; completely electronic output, no relays; greater timing circuit stability; time base derived from highly stabilized L-C oscillator; adaptable to any speed; low-pass filter & frequency-determining elements are plug-in units; completely self-contained; includes power supply & line battery.

TECHNICAL DATA:

Input Keying Signal Requirements: (1) Neutral keying, positive or negative sense, (a) on-off 60 ma pulses, (b) on-off voltage pulses 10-100V into 100K ohms, (2) Polar keying, (3) Dry contact keying.

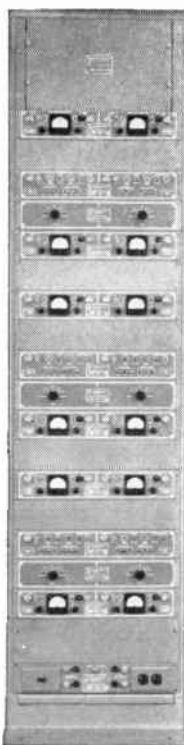
Frequency Stability of Time Base Generator: Less than 1 point range loss for \pm 10% line voltage variation or \pm 20° C ambient change from 25° C.

Sampling Time: Approximately 50 microseconds.

Output: Electronic tube outputs: (a) neutral 65 ma. max. into 2K ohms, (b) polar 33 ma (max.) into 2K ohms.

Power Requirement: 125 watts approx. 110/220V, 50/60 cps.

Mounting: Standard 19" rack mounting, 5¼" panel.



Pace-Setters in Quality Communication Equipment

NORTHERN RADIO Co. inc.
147 W. 22nd ST., NEW YORK 11, N. Y.

In Canada: Northern Radio Mfg. Co. Ltd.,
1950 Bank St., Billings Bridge, Ottawa, Ontario

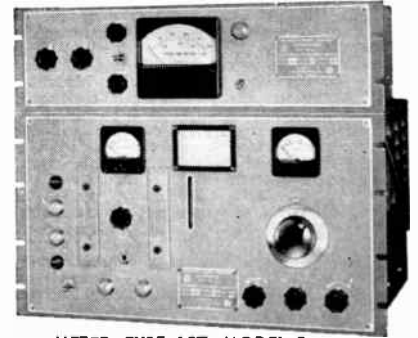
Northern Radio FREQUENCY SHIFT TERMINAL EQUIPMENT

FREQUENCY and SHIFT MONITOR SYSTEM

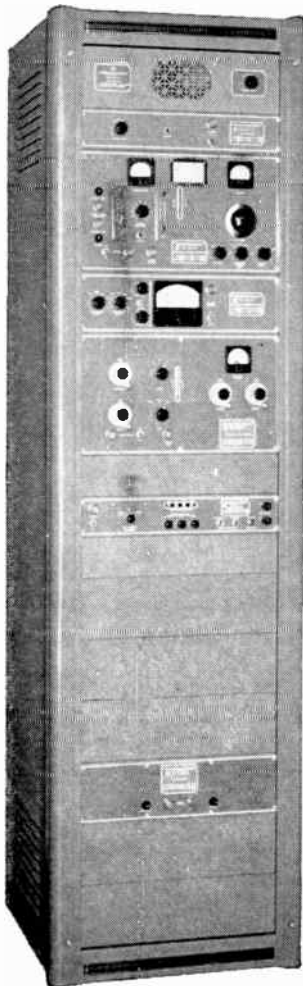
This system consists of a Type 106 Frequency and Shift Monitor and a Type 127 Frequency Meter. It is designed as a secondary standard to monitor the frequency and amount of shift of transmitter carrier output. It is particularly intended to measure the frequency shift of a mark and space (FS) signal either when setting up for traffic or under normal keying conditions.

The Monitor's stability is better than 2 cycles per megacycle over an ambient temperature range of 0-50° C—using crystals having a temperature coefficient of only 3 parts/million/degrees C. Range is 2.5-30 mc with 10 crystal-controlled frequencies (separate panel trimmers for each); use of external oscillator also provided for. Frequency Shift range is 10-10,000 cps. Less than 100 millivolts RF input needed for 2 volts audio output.

The Frequency Meter is specially designed with selectable normal and fast-acting damping factors, permitting frequency measurements of signals while keying. Its accuracy is 2% of full scale for the ranges 0-200, 500, 2000, 5000, 20,000 cps.



METER: TYPE 127, MODEL 2
MONITOR: TYPE 106, MODEL 4



TYPICAL
TRANSMITTER
TERMINAL
for TWINPLEX
OPERATION



TYPE 105, MODEL 6

FREQUENCY SHIFT KEYER

Supersedes and replaces its leader predecessor,
Type 105, Model 4.

- Highest stability achieved by any FS Keyer.
- Increased frequency range 1.0 to 7.0 mc.
- Pre-selection of proper FS for any particular transmitter frequency multiplication.
- Permits use with external oscillator without need of adapters.
- Improved accessibility for even easier maintenance.
- Direct-reading frequency calibration of shift from 0 to 1000 cps.
- FS dial adjusts "Mark" and "Space" frequencies equally above and below the carrier position.
- Direct-reading frequency calibration of mixer and output tuning dials from 1.0 to 7.0 mc.
- Direct reading calibration of output frequency vernier ± 600 cps.
- Pulse-shaping circuit permits operation within assigned band-width with no adjacent channel radiation.
- Linear carrier shift up to 1400 cps for Fax operations.



TWINPLEX COMBINER TYPE 177 MODEL 1

For twinplex operation, the transmitting terminal includes a Twinplex Combiner Type 177 Model 1.

The Twinplex communication system makes possible a 2-channel radio circuit whereby 2 non-synchronous or synchronous telegraph transmissions modulate a single radio carrier wave causing the carrier to assume one of four specific frequencies with 400 cps separations.

The Combiner converts the four possible conditions of two telegraph signals (M1-M2, M1-S2, S1-M2, S1-S2) respectively into one of four voltages related in a 0-1-2-3 manner. The Combiner output voltage modulates the Frequency Shift Keyer.

The two telegraph channels provide the same operational flexibility as that of two separate single channel FS systems. One can, for example, simultaneously use channel #1 on 60 wpm teletype and channel #2 on high-speed Morse or Time-Division Multiplex.

TECHNICAL DATA:

Keying Inputs: 1. Contacts; 2. DC current pulses, positive, negative, or polar; 3. DC voltage pulses, positive, negative, or polar.
Input Level: 1. DC Voltages: ± 10 volts minimum; 2. DC Current: ma. minimum.
Keying Speed: 240 Words per minute maximum.
Output Impedance: 10,000 ohms.
Keying Input Impedance: 1. DC Voltage: 100,000 ohms. 2. DC Current: 220 ohms.
Output Level: Neutral: 0 to 25 volts; Polar: ± 6 to -6 volts.

Output Voltage Conditions: Four output voltages are to be proportioned as follows assuming linear F.S. Keyer characteristic.
Input: M1 M2, M1 S2, S1 M2, S1 S2; Output 0, 1, 2, 3.
Individual level adjustments provided.
Power Requirements: 100/220 volts, 50/60 cycles. Approximately 50 watts. Connections at rear of chassis.
Dimensions: 3½" High x 19" Wide x 10" Deep.

For details, circle #132 on Reader Service Card

1960 IRE Director y

VARIABLE MASTER OSCILLATOR TYPE 173 MODEL 1

The Northern Radio Company Variable Master Oscillator provides a continuously variable source of radio frequency energy with a stability of approximately 1 cycle per megacycle in the range of 2 to 4 megacycles. It may be used as the basic control oscillator for diversity receivers, high frequency transmitters and other communication devices, or as a laboratory standard for test and measurement functions.

Its ease of operation and direct reading of frequency make it an outstandingly useful device where precise frequency control must be maintained by completely unskilled personnel. No curves, interpolations or calculations of any kind are required in its use. Frequency is set approximately to the desired value by rotating the oscillator dial. The last three digits of the frequency automatically pulls in to the valve pre-set on the switches and holds with an accuracy that exceeds that of most temperature-controlled crystal oscillators.

HIGH FREQUENCY OSCILLATOR

Output Frequency: 2-4 MC continuously variable.

Stability for any combination of temperature range from 0 to 50° C, and line voltage of 115 to 230 ± 10%: Approximately 1 cycle per megacycle.

Output level: ½ watt into 75 ohm load. Lever control on rear of chassis.

Readability: ± 2.5 cycles per second. Direct digital readout on mechanical and electronic counters.

Resetability: Absolute.



BEAT FREQUENCY OSCILLATOR

Output Frequency: 400-800 KC crystal controlled.

Output Level: 3.5 volts into 1000 ohm load. Level control on rear of chassis.

TIME BASE CRYSTAL OSCILLATOR

Output frequency 100 KC

Stability for 0 to 50° C and ± 10%

Line Voltage change: 0.2 part per million for any 12 hour period;

1.0 part per million for thirty days.

Output Level: Approximately 2 volts.

Output Impedance: Approximately 100,000 ohms.



**TWINPLEX CONVERTER
TYPE 178 MODEL 1**

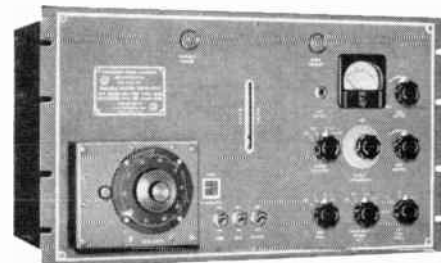
This Twinplex communication system makes possible a 2-channel radio circuit whereby 2 non-synchronous or synchronous telegraph transmissions modulate a single radio carrier wave by causing the carrier to assume one of four specific frequencies with 400 cps separations.

The receiving equipment consists of the Twinplex Converter Type 178 Model 1 and a single or diversity receiver such as the Northern Radio Type 110 Dual Diversity Receiving System. The Converter demodulates and separates the four audio tones from the radio receiver(s) into two channels each carrying the originally transmitted intelligence. The Twinplex Converter replaces the standard FS Converter for this purpose.

The two telegraph channels provide the same operational flexibility as that of two separate single channel FS systems. One can, for example, simultaneously use channel #1 or 60 wpm teletype and channel #2 on high-speed Morse or Time-Division Multiplex. It further permits the reception of channel #1 signals on all standard FS converters (tunable to 400 cps shift) without need for a Twinplex Converter: this is valuable for "Forked Circuit Operation" where the intelligence of channel #1 is intended for pick-up by other receiving stations which are not equipped for Twinplex Reception in addition to the main receiving stations which are so equipped. Reception of channel #2 (or of both channels) requires the receiving end to be equipped with a Twinplex Converter.

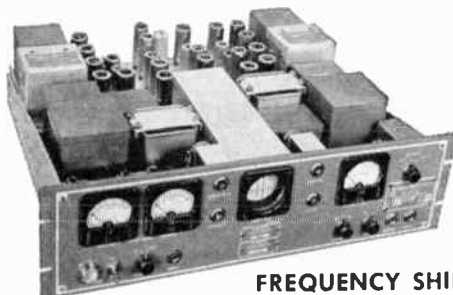


**TYPICAL RECEIVER
TERMINAL
for TWINPLEX
OPERATION**



**VARIABLE MASTER OSCILLATOR
TYPE 115, MODEL 1**

The Variable Master Oscillator Type 173 (above) may be replaced by this Variable Master Oscillator Type 115 Model 1 which is designed principally for use in diversity reception to supply variable or crystal HFO voltage to the receivers. Its variable frequency has a stability equivalent to that obtained by non-temperature-controlled crystal oscillators. It also provides 3 HFO crystals for operation of diversity receivers where fixed frequencies are required, and 2 BFO crystals.



**FREQUENCY SHIFT
DIVERSITY CONVERTER
TYPE 174, MODEL 1**

For use with either single-receiver frequency diversity systems or 2-receiver space diversity systems. By means of plug-in units, any reasonable number of channels is available between the frequencies of 425 and 3315 cps for either frequency or space diversity operation. For standard FS operation, the plug-in networks provide shift adjustments from 100 to 1000 cps shift.

Normal Input Level: -40 to +10 VU (Zero VU = 1mW into 600 ohms). (Satisfactory operation on fades to -60 VU.)

Limiter Recovery Time: Negligible for a 40 VU differential between Mark and Space frequencies.

Output: 65 ma into 2000 ohms floating (self-contained line battery).

Keying Speed: Maximum of 40 dot cycles with narrow band frequencies diversity. Up to 400 dot cycles with the wide band networks.

Monitor: 2-inch Cathode Ray tube
input phone jack
2 input volume level indicators
1 output current indicator



Pace-Setters in Quality Communication Equipment

NORTHERN RADIO COMPANY, inc.

147 WEST 22nd ST., NEW YORK 11, NEW YORK

In Canada: Northern Radio Mfg. Co., Ltd., 1950 Bank St., Billings Bridge, Ottawa, Ontario.

crystal growing with Trancoa silicon . . .

**single,
single
all
the way**

POLYCRYSTALLINE SILICON SPECIFICATIONS

| Grade | Resistivity P-Type | Max. Resistivity Ratio for 10% & 60% Points | Max. Boron Content (ppb) |
|-------|--------------------|---|--------------------------|
| IA | 500 | 3:1 | 0.5 |
| I | 100 | 3:1 | 1.0 |
| II | 50 | 3:1 | 2.0 |
| III | 25 | 3:1 | 7.0 |
| IV | 2.5 | 3:1 | — |

Consistently clean Trancoa Silicon eliminates the twins, polys, and dropped charges that can result from dirty material. This will give you a larger yield of single crystal per pound of silicon . . . saving material, saving machine time, saving labor.

We prove the cleanliness of our Silicon at Trancoa by growing test crystals with only 3/16th of an inch

between crucible and crystal . . . and they are single, single all the way! You can be confident of achieving uniform results within a lot and from one lot to another by growing crystals with Trancoa Silicon.

See table for the five grades available. Complete information is contained in "Trancoa Methods for Evaluating Silicon". Write today for a copy.

Trancoa
chemical corporation

312-326 Ash Street, Reading, Massachusetts
Tel. REading 2-3900



For details, circle #134 on Reader Service Card

World Radio History





MICROWAVE · ELECTRONICS

FOR MICROWAVE SIGNAL GENERATION 650 to 50,000 mc

All Polarad microwave signal generators and sources feature single-dial tuning control, direct reading frequency dial accurate to 1%, continuous tuning in each

range, high stability low harmonic content, and non-contacting short-type klystron cavity chokes for noiseless tuning and accurate calibration.



MICROWAVE SIGNAL GENERATORS

Model MSG-1
950 to 2,400 mc
Model MSG-2
2,150 to 4,600 mc
Power Output:
0 dbm to -127 dbm

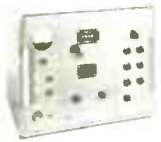
Model MSG-1



MICROWAVE SIGNAL GENERATOR

Model PMX
4,450 to 11,000 mc
Basic Unit Model GB-2
(Modulator, Keyer,
Power Supplies)
Tuning Unit G-48:
4,450 to 8,000 mc
Tuning Unit G-711:
6,950 to 11,000 mc

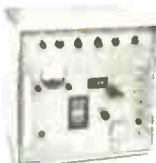
Model PMX



MICROWAVE SIGNAL GENERATOR

Model MSG-34
4,200 to 11,000 mc all
in one unit
Power Output:
0 dbm to -127 dbm

Model MSG-34



MICROWAVE SIGNAL GENERATOR

Model PMK
10,000 to 21,000 mc
Basic Unit Model GB-3
(Modulator, Keyer,
Power Supplies)
Tuning Unit G-1015:
10,000 to 15,500 mc
Tuning Unit G-1521:
15,000 to 21,000 mc

Model PMK

Model SG-121R Signal Generator and Model SS-121R Source are available to cover the frequency range 12,400 to 17,500 mc.

MICROWAVE SIGNAL SOURCE Model K55—1,050 to 11,000 mc

| Tuning Unit | Frequency Range | Power Output Range |
|-------------|--------------------|--------------------|
| S-12 | 1,050 to 2,250 mc | 80 to 400 mw |
| S-24 | 2,140 to 4,600 mc | 40 to 250 mw |
| S-48 | 4,450 to 8,000 mc | 15 to 50 mw |
| S-711 | 7,850 to 11,000 mc | 14 to 40 mw |



Basic Unit, Power Supply and Modulator, Model HU-4

EHF Generator



Model ESG



MICROWAVE SWEEP GENERATOR

Model CSG
1,000 to 16,000 mc
Basic Unit: Model E-B 1
5 interchangeable
Tuning Units

| Tuning Unit | Frequency Range | Power Output |
|-------------|--------------------|--------------|
| Model E12 | 1,000 to 2,000 mc | 70-800 mw |
| Model E24 | 2,000 to 4,000 mc | 70-750 mw |
| Model E37 | 3,600 to 7,200 mc | 15-500 mw |
| Model E611 | 6,700 to 11,400 mc | 15-200 mw |
| Model E816 | 8,500 to 16,000 mc | 3-75 mw |

Sweep Rate: 001 to 100 sweeps per second
Sweep Width: Continuously adjustable to full frequency range of tuning unit in use

PULSE CODE MODULATED MICROWAVE SIGNAL GENERATOR

With Precision Oscillators

Model B
950 to 10,750 mc

4 interchangeable
Tuning Units
Frequency Range:

Model B
4,450 to 8,000 mc
4,450 to 11,000 mc
6,950 to 11,000 mc
10,000 to 21,000 mc
15,000 to 21,000 mc

Provides 5 independent
fully adjustable pulse
channels



Model B

FOR MICROWAVE RECEPTION

EXTENDED RANGE MICROWAVE RECEIVER

Model R
400 to 46,700 mc

Four instruments in one:

- AM-FM receiver
- Field intensity receiver
- Pulse, pulse-time or pulse-position demodulator
- Sensitive power meter

Basic Unit Model R-B



8 Interchangeable Plug-in Tuning Units *

| | | | |
|------------|-----------------|-------------|------------------|
| Model RR-T | 400- 1,000 mc | Model RX-T | 7,300-11,260 mc |
| Model RL-T | 950- 2,040 mc | Model RKS-T | 9,500-15,600 mc |
| Model RS-T | 1,900- 4,340 mc | Model RKU-T | 14,700-22,000 mc |
| Model RM-T | 4,200- 7,740 mc | Model RQ-T | 20,260-46,700 mc |

*U. S. Patent 2,774,243

CALIBRATED FIELD INTENSITY METER



Power Supply

Monitor Unit

Model FIM 1,000-10,000 mc

A highly sensitive instrument for field intensity and r-f interference measurements, antenna pattern analysis. Used as null detector and r-f voltmeter. Highly accurate frequency and power calibration.



Calibrated Antennas
Supplied with
Model FIM

Four Interchangeable Tuning Units*

| | |
|-------|--------------------|
| FIM-L | 1,000 to 2,240 mc |
| FIM-S | 2,140 to 4,340 mc |
| FIM-M | 4,190 to 7,740 mc |
| FIM-X | 7,360 to 10,000 mc |

*U. S. Patent 2,774,243

Test Antennas (not calibrated): 1,000 to 39,700 mc.

MICROWAVE ACCESSORIES



MICROWAVE ATTENUATOR

Model SIJ
Covering
4,000 to 12,400 mc
Continuously variable,
stub-tuned.



SUB-MINIATURE S-BAND CAVITIES

Plate and Grid
Pulsed Models
Each Covering
2,750 to 3,000 mc



ALL CERAMIC KLYSTRON TUBES

Maximum Heat &
Shock Resistance
ZV 1012 600 to 2,000 mc
ZV 1010 900 to 3,800 mc
ZV 1009 1,600 to 6,500 mc

POLARAD ELECTRONICS CORPORATION

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FREE LIFETIME SERVICE
ON ALL POLARAD
INSTRUMENTS



MICROWAVE · ELECTRONICS

FOR MICROWAVE SPECTRUM ANALYSIS

DIRECT-READING SPECTRUM ANALYZER

Model TSA 10 to 44,000 mc

FEATURES:

- Direct-reading UNI-DIAL control
 - High accuracy, resolution and sensitivity
 - Stable, accurate frequency marker
- To test missile, radars, microwave components, telemetering, multi-pulse transmissions.

Model DU

Spectrum Display and Power Unit

Five Interchangeable Tuning Units

| | |
|--------|--------------------|
| STU-1 | 10 — 1,000 mc |
| STU-2A | 910 — 4,560 mc |
| STU-3A | 4,370 — 22,000 mc |
| STU-4 | 21,000 — 33,000 mc |
| STU-5 | 33,000 — 44,000 mc |



COMBINATION SYNCHROSCOPE SPECTRUM ANALYZER

Model TSA-S 10 to 44,000 mc



Time Display:

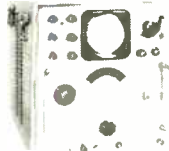
Pulsed signal as seen in synchroscope operation.



Frequency Display:

Same signal as seen in spectrum analyzer operation.

Selector switch determines function instantly. Tuning Units: Same as Model TSA above.



VERY WIDE DISPERSION SPECTRUM ANALYZER

Model TSA-W 10 to 44,000 mc

Narrow and Wide Pulse Analysis

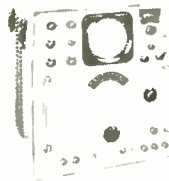


70 mc frequency dispersion displays pulses as narrow as 0.1 μ sec. For wide pulse analysis, dispersion may be adjusted to as narrow as 100 kc.



Wide dispersion permits simultaneous observation of two or more signals separated by relatively large frequency difference.

Resolution: 7 kc narrow bandwidth, 50 kc wide bandwidth. Tuning Unit Frequency Ranges: Same as Model TSA above.

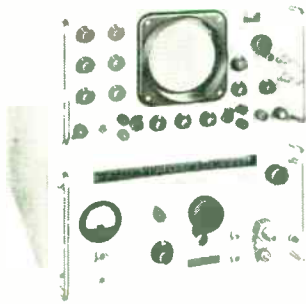


MULTI-BAND, SINGLE UNIT SPECTRUM ANALYZER

Model SA-84

Complete frequency coverage, 10 to 40,880 mc, all in one self-contained unit. No additional tuning units required.

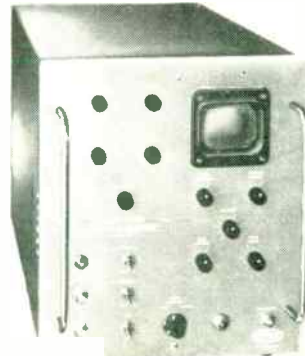
Also available: Model SA-84W 10-40880 mc in one unit, and same choice of dispersion bandwidths as Model TSA-W above.



MULTI-PULSE SPECTRUM SELECTOR

Model SD-1

Permits spectrum analysis of individual microwave pulses in a pulse group. Any pulse in a complex coded signal may be isolated and intensified for examination.



FOR GENERAL LABORATORY USE

PULSE JITTER TESTER

Model PJ-1

Measures:

- Relative jitter
- Pulse width jitter
- Repetition rate jitter

Displays:

- Jitter magnitude
- Jitter waveform



TRANSISTOR MICROWAVE POWER METER

Model P-3 10-39,000 mc

Measures absolute r.f. power level instantly without tuning. Line or internal-battery operated. Rugged, weighs only 6 pounds.



RAPID SCAN RATIO-SCOPE

Model VS-2

Used with sweep generator (ESG, opposite side). Displays ratio of two input signals, visual plot VSWR or response-frequency on 7" CRT.



KLYSTRON TUBE TESTER

Model K-200

Tests all microwave tubes as easily as ordinary vacuum tubes.



5-PULSE, CODED MULTI-PULSE GENERATOR

Model MP-1A

Generates 5 separate pulses each with independently variable width and delay for missiles, beacons, and other systems.



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ON ALL POLARAD
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World Radio History

Here's how to pick the best **DIODES** for your money

Price is no clue when diodes sell for about the same, and just looking at them tells nothing. But if you ask the right questions about the three key factors in the production of quality germanium gold bonded diodes, you have your clues to more long-term reliability for your money. Here they are:

BAKING TIME AND TEMPERATURE

bear a direct relationship to long-term stability. You get a measure of the quality of diodes by asking: "How long do you bake, and at what temperature?" (All GT diodes are baked at 140°C for at least 96 hours—the highest and longest in the industry!)

STRICT, STATISTICAL, HISTORY LOGGING

traces the progress of every single wafer made from each ingot of germanium. At GT, if a few wafers fail to pass the stringent GT quality tests along the way, then all from the ingot are suspect and can be identified and pulled out. There are no "stowaways" in a shipment of GT quality diodes.

LEVEL OF TESTING STANDARDS

reveals the level of quality. Ask about "everyday" test standards. (In the GT Seal Test, diodes are submerged in a penetrant-dye solution for 24 hours under 75 psi. This test is so sensitive that it will reveal a leak so small it would take over 300 years for 1 cc of gas to diffuse through the case.) All GT quality tests—100% electrical, 100% shock and vibration, and 100% temperature cycling—are at the highest industry level... and as a final mark of quality, the color bands on GT Germanium Gold Bonded Diodes are baked on to stay.

GT is equipped to supply diodes tested to individual customer requirements, such as JAN Qualification Inspection Tests and many others.

To get the full measure of quality in Germanium Gold Bonded Diodes, see your GT representative; or write directly to the company with know-how NOW.

GENERAL TRANSISTOR CORPORATION

91-27 138th Place, Jamaica 35, New York



FOR IMMEDIATE DELIVERY FROM STOCK, CONTACT YOUR NEAREST AUTHORIZED GENERAL TRANSISTOR DISTRIBUTOR OR GENERAL TRANSISTOR DISTRIBUTING CORP., 91-27 138TH PLACE, JAMAICA 35, NEW YORK. FOR EXPORT, GENERAL TRANSISTOR INTERNATIONAL CORP., 91-27 138TH PLACE, JAMAICA 35, NEW YORK. PRECISION MAGNETIC RECORDING HEADS AVAILABLE FROM GENERAL TRANSISTOR WESTERN CORP., 6110 VENICE BLVD., LOS ANGELES, CALIF.



Here's **HOW** General Transistor does it **NOW**

GT know-how **NOW** gives you high-quality semiconductor devices in production quantities for prompt delivery

"If it's a high-quality device and you need it—regardless of quantity—General Transistor will produce and deliver it as promised."

That's the GT policy...and here's how it was made to work:

PROCESS ENGINEERING—From the very beginning of the company, a process engineering program was devoted to the continuous improvement of high-quality, high-speed, mass-production techniques. The results were increasingly rewarding to our growing list of customers; GT became their most dependable supplier, meeting every emergency.

QUALITY CONTROL—Intensive efforts were also applied to innovating techniques for quality control during production. OUR AIM: To supply only high-quality semiconductor devices.

LARGE PRODUCTION FACILITIES—Today GT is a major producer; GT production facilities are larger than those of many suppliers in the semiconductor field. Meeting high-quality specifications, in quantity, is never a problem.

LOGISTIC RELIABILITY—GT's earned reputation for high-quality devices in production quantities is a precious one. It's worth protecting. Therefore, "wild" claims are avoided. This leads to logistic reliability. When GT says: "We will deliver"—that is a fact on which other plans may be based.

GT never announced a major research breakthrough until the result was available in production quantities. When GT publishes specifications, tolerances, etc., it is done with the full knowledge that they can be substantiated to every decimal point in production quantities... not merely in sample lots.

GT's place in the industry is that of a primary supplier of high-quality devices in production quantities for prompt delivery. This is know-how **NOW**.

That's why you can depend on General Transistor. It's the company with **NOW-HOW**.



GENERAL TRANSISTOR CORPORATION

91-27 138th Place, Jamaica 35, New York

**AT
YOUR
FINGER TIPS**

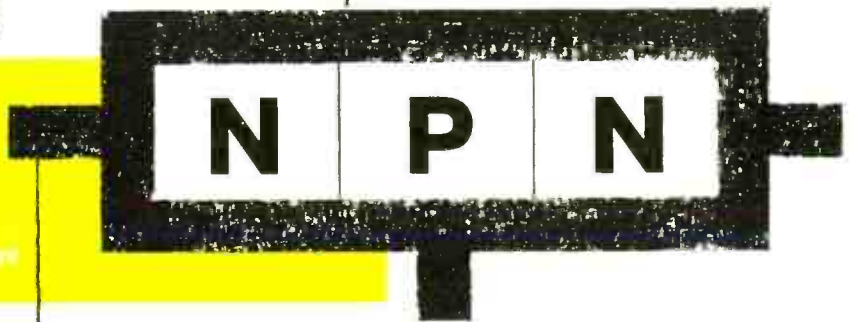


... a complete line of high-quality devices,
produced in quantity for fast delivery.

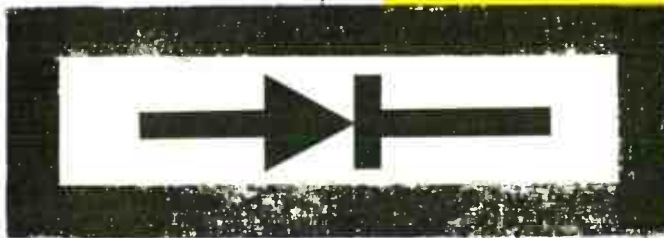


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• High Frequency • Power
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GENERAL TRANSISTOR CORPORATION

91-27 138th Place, Jamaica 35, New York



are you silicon wait-bait?



avoid unnecessary delays

GT DELIVERS SILICON TRANSISTORS IN 24 TO 48 HOURS!

No need to get hung up with delays or hooked by unkept promises! GENERAL TRANSISTOR delivers sample quantities of GT Silicon Transistors in 24 to 48 hours . . . production quantities in 2 to 4 weeks!

These are not mere claims, but firm promises on which you can base your design and production schedules.

Quality? Yes — plenty of weight here without waiting. General Transistor is today one of the largest suppliers of highly dependable devices, delivering **quality in quantity.**

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Phone: Hickory 1-1000



A Few of the GT Alloyed Junction Silicon Transistors Now Available

- HIGH SPEED SWITCHING
- MEDIUM SPEED SWITCHING
- HIGH VOLTAGE
- HIGH SPEED LINEAR AMPLIFIER
- MEDIUM SPEED LINEAR AMPLIFIER

| PNP: | 2N1219 | 2N1220 | 2N1221 | 2N1222 | 2N1223 |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| V_{CBO} | 30 v | 30 v | 30 v | 30 v | 40 v |
| V_{CEO} | 25 v | 25 v | 25 v | 25 v | 40 v |
| V_{EBO} | 20 v | 20 v | 10 v | 10 v | 10 v |
| I_{CO} | .1 μ a max. | .1 μ a max. | .1 μ a max. | .1 μ a max. | .1 μ a max. |
| h_{FE} | 18 min. | 9 min. | — | — | — |
| $f_{ab}(mc)$ | 5 min. | 2 min. | 5 min. | 2 min. | 2 typ. |
| h_{fr} | — | — | 18 min. | 9 min. | 6 min. |

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Narda—UHF and Microwave products from 200 to 90,000 Mc

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Waveguide Instruments L to E Band

| DESCRIPTION | Band B Frequency Range Wavelength (inches) | L 1.173 to 8.66 x 10 ¹¹ | LS 1.782 to 6.43 x 10 ¹¹ | T 2.60 x 10 ¹¹ 2.4 x 10 ¹¹ | C 3.96 x 10 ¹¹ 3.6 x 10 ¹¹ | 2C 3.4 x 10 ¹¹ 3.1 x 10 ¹¹ | TS 7.25 x 10 ¹¹ 7.1 x 10 ¹¹ | V 8.2 x 10 ¹¹ 7.9 x 10 ¹¹ | VS 12.4 x 10 ¹¹ 12.1 x 10 ¹¹ | W 18.0 x 10 ¹¹ 17.6 x 10 ¹¹ | X 26.5 x 10 ¹¹ 26.1 x 10 ¹¹ | Y 37.0 x 10 ¹¹ 36.6 x 10 ¹¹ | Z 50.8 x 10 ¹¹ 50.4 x 10 ¹¹ | AA 68.7 x 10 ¹¹ 68.3 x 10 ¹¹ | BB 90.0 x 10 ¹¹ 89.6 x 10 ¹¹ | |
|---|--|--|---|--|--|--|---|---|--|---|---|---|---|--|--|-----------|
| Adapter, T-type, Round to Rectangular | | | | | | | | | | | | | | | | |
| Adapter, Waveguide to Type II | | 518 1170 | 815 1170 | 416 1 30 | 813 1 30 | 412 1 75 | 811 1 30 | 409 1 30 | 807 1 30 | 405 1 30 | 803 1 30 | 401 1 30 | 799 1 30 | 797 1 30 | 795 1 30 | 793 1 30 |
| Attenuator Calibrated 0-60 db | | 1754 | 15754 | 1714 5275 | 725 5275 | 761 5300 | 731 5275 | 750 5215 | 748 5250 | 718 5100 | 717 5110 | 717 5125 | 717 5135 | 717 5145 | 717 5150 | 717 5150 |
| Attenuator, Travel 3 to 10 db | | 176 5215 | 175 5215 | 174 5 75 | 173 5 75 | 172 5 75 | 171 5 75 | 170 5 75 | 169 5 75 | 168 5 75 | 167 5 75 | 166 5 75 | 165 5 75 | 164 5 75 | 163 5 75 | 162 5 75 |
| Attenuator, Travel 0-20 db | | 176 5170 | 175 5275 | 174 5270 | 173 5110 | 172 5100 | 171 5 75 | 170 5 75 | 169 5 75 | 168 5 75 | 167 5 75 | 166 5 75 | 165 5 75 | 164 5 75 | 163 5 75 | 162 5 75 |
| Attenuator, Shorted, Short Lock | | | | | | | | | | | | | | | | |
| Band Waveguide L Plane | | | | 3548 1100 | 1534 1 75 | 3522 1 55 | 3511 1 35 | 3501 1 30 | 3491 1 35 | 3481 1 45 | 3471 1 50 | 3461 1 55 | 3451 1 60 | 3441 1 65 | 3431 1 70 | 3421 1 75 |
| Band Waveguide, H Plane | | | | 3548 1100 | 1534 1 75 | 3522 1 55 | 3511 1 35 | 3501 1 30 | 3491 1 35 | 3481 1 45 | 3471 1 50 | 3461 1 55 | 3451 1 60 | 3441 1 65 | 3431 1 70 | 3421 1 75 |
| Detector, Waveguide, Tunable | | | | | 513 1 95 | 512 1 90 | 511 1 85 | 510 1 75 | 509 1 150 | 508 1 125 | 507 1 200 | 506 1 210 | 505 1 210 | 504 1 210 | 503 1 210 | 502 1 210 |
| Detector Waveguide Bolt & Thermistor | | 536 1210 | 535 1235 | 534 1110 | 533 1 80 | | | | | | | | | | | |
| Detector Waveguide Bolometer | | | | | | 522 1170 | 521 1135 | 520 1 60 | 519 1 80 | | | | | | | |
| Detector, Waveguide, Thermistor | | | | | | 542 1 75 | 541 1 45 | 540 1 60 | 539 1 110 | | | | | | | |
| Directional Coupler, Cross Guide, 20 db | | 1018 1400 | 1015 1400 | 1014 1175 | 1013 1130 | 1012 1 90 | 1011 1 90 | 1010 1 75 | 1009 1 80 | | | | | | | |
| Dir. Cou. - Microstrip to 3 to 10 db | | | | 1014 1175 | 1013 1130 | 1012 1 90 | 1011 1 90 | 1010 1 75 | 1009 1 80 | 1008 1130 | 1007 1130 | 1006 1130 | 1005 1130 | 1004 1130 | 1003 1130 | 1002 1130 |
| Dir. Cou. - Microstrip to 10 db | | | | 1064 1450 | 1063 1375 | 1062 1340 | 1061 1300 | 1060 1165 | 1059 1180 | | | | | | | |
| Dir. Cou. - Microstrip Dual 20 db | | | | 1034 1700 | 1033 1450 | 1032 1300 | 1031 1250 | 1030 1200 | 1029 1270 | 1028 1315 | 1027 1340 | | | | | |
| E-Plane Tee | | | | 813 1970 | | | | 810 1100 | | | | | | | | |
| Frequency Meter 3 to 4 Band | | | | | | 2300-10-300 mc | 1028 1785 | | | | | | | | | |
| Frequency Meter, Waveguide | | | | 812 1120 | 811 1115 | | | 810 1110 | 809 1150 | | | | | | | |
| Harmon Generator | | | | | | | | | | | | | | | | |
| Head, Standard Gain 18.5 db | | 648 1900 | 645 1900 | 644 1175 | 643 1150 | 642 1125 | 641 1120 | 640 1100 | 639 1110 | 638 1110 | 637 1110 | 636 1110 | 635 1110 | 634 1110 | 633 1110 | 632 1110 |
| Impedance Meter, Waveguide | | 126 1950 | 125 1950 | 124 1445 | 123 1385 | 122 1335 | 121 1270 | 120 1250 | 119 1270 | 118 1270 | 117 1270 | 116 1270 | 115 1270 | 114 1270 | 113 1270 | 112 1270 |
| Impedance Meter, Coaxial | | | | 1500-17-600 mc | 2318 1360 | 2317 1360 | 2316 1360 | 2315 1360 | 2314 1360 | 2313 1360 | 2312 1360 | 2311 1360 | 2310 1360 | 2309 1360 | 2308 1360 | 2307 1360 |
| Impedance Meter, High Power | | | | | | | | | | | | | | | | |
| Microstrip Coaxial Head | | | | 152 1500 | 151 1500 | 150 1500 | 149 1500 | 148 1500 | 147 1500 | 146 1500 | 145 1500 | 144 1500 | 143 1500 | 142 1500 | 141 1500 | 140 1500 |
| Microstrip Coaxial Head | | | | 154 1500 | 153 1500 | 152 1500 | 151 1500 | 150 1500 | 149 1500 | 148 1500 | 147 1500 | 146 1500 | 145 1500 | 144 1500 | 143 1500 | 142 1500 |
| Microstrip Head | | | | 154 1500 | 153 1500 | 152 1500 | 151 1500 | 150 1500 | 149 1500 | 148 1500 | 147 1500 | 146 1500 | 145 1500 | 144 1500 | 143 1500 | 142 1500 |
| Microstrip Head | | | | 154 1500 | 153 1500 | 152 1500 | 151 1500 | 150 1500 | 149 1500 | 148 1500 | 147 1500 | 146 1500 | 145 1500 | 144 1500 | 143 1500 | 142 1500 |
| P-Cell P-T Tunable | | | | 900-1-000 mc | 229 1375 | | | | | | | | | | | |
| Repeater, Variable, High Power | | | | | 812 1275 | 811 1275 | 810 1275 | 809 1275 | 808 1275 | 807 1275 | 806 1275 | 805 1275 | 804 1275 | 803 1275 | 802 1275 | 801 1275 |
| Reflection Stop, 00, 05, 10, 15, 20* | | | | 416 1300 | 415 1275 | 414 1300 | 413 1275 | 412 1300 | 411 1275 | 410 1275 | 409 1300 | 408 1275 | 407 1300 | 406 1275 | 405 1300 | 404 1275 |
| Short, Tunable | | | | 311 1110 | 310 1110 | 309 1110 | 308 1110 | 307 1110 | 306 1110 | 305 1110 | 304 1110 | 303 1110 | 302 1110 | 301 1110 | 300 1110 | 299 1110 |
| Tap, Hybrid | | 950 1250 | 945 1250 | 944 1100 | 943 1100 | 942 1100 | 941 1100 | 940 1100 | 939 1100 | 938 1100 | 937 1100 | 936 1100 | 935 1100 | 934 1100 | 933 1100 | 932 1100 |
| Tap, Series | | 946 1175 | 945 1175 | 944 1100 | 943 1100 | 942 1100 | 941 1100 | 940 1100 | 939 1100 | 938 1100 | 937 1100 | 936 1100 | 935 1100 | 934 1100 | 933 1100 | 932 1100 |
| Tap, Shunt | | 936 1175 | 935 1175 | 934 1100 | 933 1100 | 932 1100 | 931 1100 | 930 1100 | 929 1100 | 928 1100 | 927 1100 | 926 1100 | 925 1100 | 924 1100 | 923 1100 | 922 1100 |
| Termination, 10-20 dB | | 306 1210 | 305 1180 | 304 1 60 | 303 1 50 | 302 1 35 | 301 1 30 | 300 1 25 | 299 1 25 | 298 1 25 | 297 1 25 | 296 1 25 | 295 1 25 | 294 1 25 | 293 1 25 | 292 1 25 |
| Termination, Bolometer, 1-500 dB | | 346 1150 | 345 1150 | 344 1100 | 343 1 75 | 342 1 70 | 341 1 60 | 340 1 50 | 339 1 55 | 338 1 70 | 337 1 75 | 336 1 75 | 335 1 75 | 334 1 75 | 333 1 75 | 332 1 75 |
| Termination, High Power | | 126 1150 | 125 1150 | 124 1445 | 123 1420 | 122 1360 | 121 1325 | 120 1275 | 119 1260 | | | | | | | |
| Tube Mount, Shielded | | | | | | | | | | | | | | | | |
| Tuner, Double Stub Type H-C, SC TNC | | 900-12-600 mc | 903A 1380 | 903C 1125 | 903E 1150 | 903FH 1150 | 903TH 1150 | | | | | | | | | |
| Tuner, E-H | | | | 964 1375 | 963 1375 | 962 1375 | 961 1375 | 960 1375 | 959 1375 | 958 1375 | 957 1375 | 956 1375 | 955 1375 | 954 1375 | 953 1375 | 952 1375 |
| Tuner, Waveguide, 90° | | | | 364 1175 | 363 1175 | 362 1175 | 361 1175 | 360 1175 | 359 1175 | 358 1175 | 357 1175 | 356 1175 | 355 1175 | 354 1175 | 353 1175 | 352 1175 |
| Waveguide, Straight 6" x Flanges | | 346 1150 | 345 1140 | 344 1 75 | 343 1 50 | 342 1 35 | 341 1 30 | 340 1 25 | 339 1 30 | | | | | | | |
| Waveguide, Straight 3" x Flanges | | | | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 |
| Waveguide Clamp | | | | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 | 1 1 15 |
| Waveguide Stand | | | | | | | | | | | | | | | | |

Microwave Test Instruments

Frequency Power Meter
Model 107
500-1500 mc
\$1150.

Radar Performance Checker
Model 116
All Frequencies
\$485.

VSWR Amplifier
Model 441
All Frequencies
\$200.

Tuned Pre-amp
Model 442
All Frequencies
\$200.

Laboratory Training Set
Model 117
X Band
\$1900.

Coaxial and UHF Equipment

| DESCRIPTION | DC | 225 | 300 | 1000 | 2000 | 4000 | 6000 | 8000 | 10,000 | 12,000 | Page |
|---|----|-----|-----|------|------|------|------|------|--------|--------|------|
| Attenuator Fixed 0-60 db, 10 db | | | | | | | | | | | 18 |
| Attenuator, Fixed 0-60 db, 10 db | | | | | | | | | | | 18 |
| Attenuator, Fixed 0-60 db, 10 db | | | | | | | | | | | 17 |
| Attenuator, Travel | | | | | | | | | | | 16 |
| Detector, Bolometer Traveling Mount | | | | | | | | | | | 28 |
| Detector, Bolometer Thermistor Mount | | | | | | | | | | | 29 |
| Directional Coupler 0-60 db, 10 db | | | | | | | | | | | 38 |
| Dir. Tuning Coupler, Microstrip Head | | | | | | | | | | | 36 |
| E-Plane Tee | | | | | | | | | | | 58 |
| Head, Standard Gain | | | | | | | | | | | 43 |
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| Microstrip Head | | | | | | | | | | | 30 |
| Microstrip Head | | | | | | | | | | | 31 |
| Microstrip Head | | | | | | | | | | | 60 |
| Microstrip Head | | | | | | | | | | | 52 |
| Microstrip Head | | | | | | | | | | | 65 |
| Microstrip Head | | | | | | | | | | | 66 |
| Microstrip Head | | | | | | | | | | | 67 |
| Microstrip Head | | | | | | | | | | | 71 |

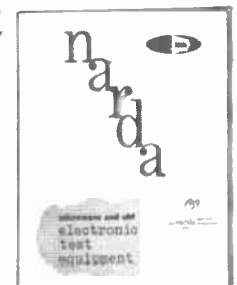
Bolometers & Thermistors

The complete line of Bolometers (barretters) and Thermistors for all frequency ranges, including cylindrical (821), crystal (610), disc (603), and miniature (604), configurations.

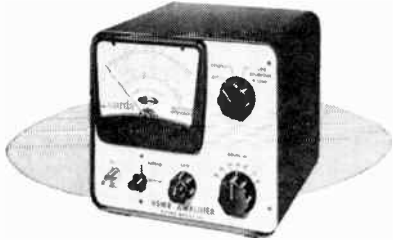
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Narda-UHF and Microwave products from 200 to 90,000 Mc



BATTERY-OPERATED VSWR AMPLIFIER

Transistorized and battery-operated for complete independence from line voltage deviations. 0.1 microvolt sensitivity at 200 ohms over both "normal" and "extended" scales. Protective circuit permits any switching operation or cable connection to be made or broken without danger to bolometer; blowouts can not occur. Covers frequency of 1,000 cps \pm 1%; plug-in frequency networks available for 315-3,000 cps. Bandwidth: 25-30 cps. Range: 70 db (60 db in 10 db steps, 10 db continuous).

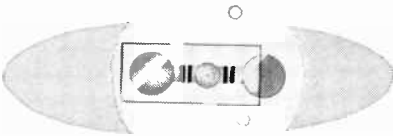
Model 441 . . . \$200



VARIABLE ATTENUATORS FIXED CALIBRATED PADS

Variable attenuators—0 to 20 db range; VSWR under 1.15; all waveguide sizes. Fixed calibrated pads available in all waveguide sizes with 3, 6, or 10 db calibration.

13 models, from \$55 to \$200.



DISC BOLOMETERS AND THERMISTORS

Coaxial bolometer elements available for 200-ohm operation at 4.5 or 8.75 ma bias. Thermistors with 200 ohms resistance at 13 ma. For power measurement and detection to 10 mw.

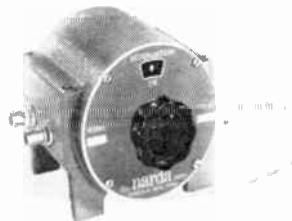
\$25.00 each.



HARMONIC AND CRYSTAL MIXERS

Mixers serve as converters in coaxial lines and waveguides with microwave receivers and spectrum analyzers. NARDA Harmonic Mixers hold a silicon crystal element with provision for the injection of a standard frequency.

Priced from \$425.



TURRET ATTENUATORS

A UHF-only attenuator, representing considerable savings in costs for this application. Each model offers a Designer or Development Engineer twelve steps of attenuation from d.c. to 1,500 mc, with a VSWR of 1.25. Model 705 provides 0 to 30 db attenuations; model 706 — 0 to 20 db; model 707 — 0 to INF db.

All models . . . \$275 each.



COAXIAL ATTENUATORS

Double pi-section attenuators for high power rating and broad frequency characteristic. Available in 6 or 10 db values, dc to 1500 mc, VSWR equals 1.2. Frequency variation is \pm 1 db; calibration frequency equals 1000 mc; calibration accuracy equals \pm 0.2 db.

6, or 10 db Models . . . \$40 each.



WAVEGUIDE DETECTORS

Designed for broad band operation with low VSWR and maximum versatility. May be used with a variety of crystal, bolometer (barretter) or thermistor elements, for absolute power measurement when used with appropriate bolometers and thermistors, as well as for detection of relative power levels. Also fixed tuned models.

13 models available from \$75 to \$125.



TRANSISTORIZED, BATTERY-OPERATED MICROWAVE POWER METER

Fully transistorized and self-balancing to provide accurate, automatic direct-reading measurements of cw or pulsed power. Provides the widest power measuring range available, with 0.001 to 0.01 mw and 0.003 to 0.03 mw scales, in addition to the five standard scales up to 10 mw. Powered by a nickel-cadmium battery, which is rechargeable overnight or during operation with built-in battery charger, it provides complete independence of filament heating errors and line voltage variations. Accuracy: 3% of full scale reading.

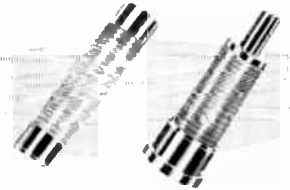
Model 440 . . . \$250



CALIBRATED VARIABLE ATTENUATORS

Precision attenuators of the parallel vane type, providing a maximum VSWR of 1.15; maximum insertion of 0.5 db; calibration accuracy — 0.3 db; calibration chart supplied. Calibration is precise and permanent, and not affected by humidity or temperature variations.

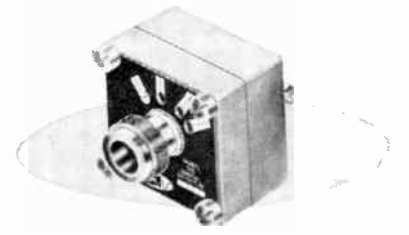
Seven models from \$200 to \$375.



BOLOMETERS AND THERMISTORS

Ruggedized construction; coin silver contacts. Barretter types available for 4.5 and 8.75 ma bias; 50, 100, 200, 400 ohm values. Thermistor types 100 or 200 ohm operation.

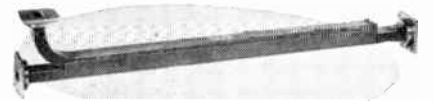
N821B & N610B, \$10.00 each.



COAXIAL DETECTORS

Mounts for both bolometers and thermistors of the mica disc type, from 500 to 10,000 mc. Usable with any of the four types of bolometers and thermistors; a unique arrangement permits rapid change of elements and shows at a glance which type is in the detector, as well as its bias current requirements.

Model 561 (not including element) \$50.



HIGH DIRECTIVITY COUPLERS

3, 6, 10, 20 and 40 db couplers, all with directivity exceeding 40 db. 40 db (high power) coupler may be used at full rated power of the waveguide size. Standard cover flanges terminate both ends of primary line; low VSWR termination and standard cover flange on secondary arm.

\$95 to \$400.



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118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y.

Narda-UHF and Microwave products from 200 to 90,000 Mc



COAXIAL DIRECTIONAL COUPLERS

Only Narda offers coaxial directional couplers in 10 and 30 db values, as well as 20 db. Flat coupling — values within 1 db of nominal over full octave frequency range. Calibration provided to ± 0.2 db accuracy. Directivity exceeding 20 db. May also be used at lower frequencies than specified, 225 to 10,000 mc.

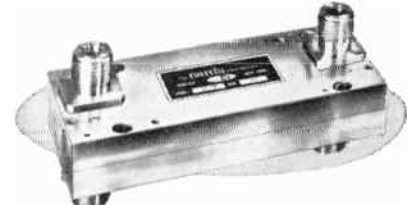
Five models, from \$100.



MAXIMALLY FLAT COAXIAL COUPLERS

A new series of coaxial directional couplers, pioneered by Narda, presenting the flattest frequency response of any coupler manufactured today. Coupling variation is only ± 0.2 db over a full octave; deviation of mean value from nominal is only ± 0.3 db. Calibration accuracy is ± 0.1 db and 5 calibration points are engraved on the nameplate of each unit. Intermediate points may be determined at a glance. Connectors are Series N Female; others available on special order. Models are available covering frequencies from 240 to 11,000 mc, most in both 10 and 20 db versions.

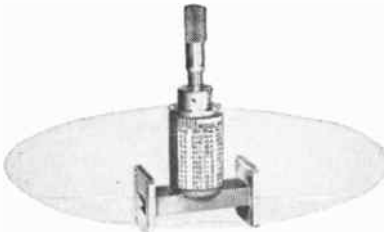
10 models . . . \$200



COAXIAL HYBRID JUNCTIONS

For use in duplexers, mixers and other circuits requiring power division into two lines. Signal into one terminal appears at two opposite terminals, equal in amplitude, but shifted 90 degrees. Features in-line terminals for operation of TR tubes between a pair of hybrids; ruggedized construction; equal power split, ± 0.25 ; VSWR: 1.2; isolation: 20 db. Three models cover frequencies of 46-950, 950-2000, 2000-4000 mc.

All models . . . \$225 each



WAVEGUIDE FREQUENCY METERS

Each consists of a section of waveguide with a resonant cavity attached symmetrically to the broad wall. Coupling is through an inductive iris, designed so unit is electrically equivalent to a straight section of waveguide. Power dip is at least 10% over the frequency range; accuracy equals 0.08%.

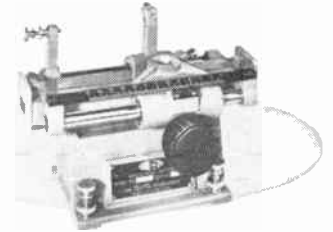
Five models from \$110 to \$150.



S to X BAND FREQUENCY METER

The only single instrument covering 2.350 to 10,500 mc., and less expensive than any combination covering same frequencies. Completely self-contained; built-in detector and indicating meter; nomograph type calibration chart converts digital counter readings to frequency in mc., to rated accuracy of 0.2%.

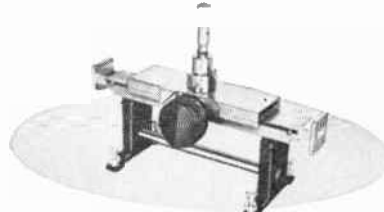
Model 802B . . . \$785.



IMPEDANCE METERS

Carriage mounting and drive mechanism are integral with the transmission line casting, for permanent accuracy and freedom from slope errors. Angle-mounted, scale and vernier. Removable supporting stand. Coverage from 2600 to 90,000 mc; coaxial models, from 1500 to 90,000 mc—all accurate for VSWR's of 1.01.

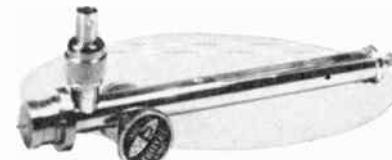
13 models from \$250 to \$425.



HIGH POWER IMPEDANCE METERS and VARIABLE REACTANCES

Meters have fixed value output coupling of 45 db, nominal. Reactances can vary magnitude of standing wave ratio from 1.02 to 2.0. Phase of standing wave is separately variable. Maximum residual VSWR: 1.02. (1.03 for 12.4-18.0 kmc Meter)

Meters: \$1375 to \$2175
Reactances: \$1975 to \$2775



RF PROBE

A precision tuneable RF Probe with optional detector (included). Fine wire probe is adjustable in depth over a wide range by a fine-pitch threaded knob. Probe pickup may be tuned over the range of 900 to 18,000 mc. Insertion loss: 25 db or less in most slotted lines.

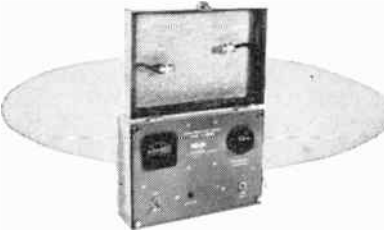
Model 229 . . . \$125.



STANDARD REFLECTIONS

Narda offers five values of reflections for each of six different waveguide sizes. Provides calibrated reflections or VSWR's for use in standardizing reflectometers or calibrating slotted line impedance meters. Five values of reflection coefficient in each waveguide size.

Six models from \$125 to \$300.



RADAR PERFORMANCE CHECKER (Transistorized)

Used with an echo box, for rapid pre-flight or production line measurement of over-all radar performance. Completely portable; no power source needed. Accuracy: 2 db. Resolution: 2 db. Range: +3 db to -12 db on panel dial.

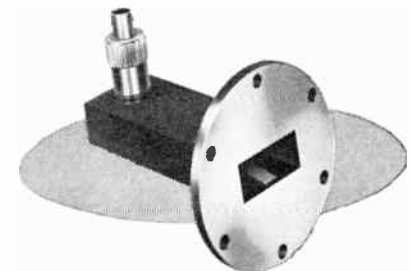
Model 116T . . . \$485.



ECHO BOXES

C Band and X Band Echo Boxes with high Q resonant cavities used for rapid testing and evaluation of radars. Frequency indication is direct reading in megacycles; resonance indicator is panel microammeter. Complete with carrying case.

C Band (Loaded Q: 50,000) . . . \$ 970
X Band (Loaded Q: 90,000) . . . \$1500



BOLOMETER AND THERMISTOR BROADBAND MOUNTS

A new series of Narda matched mounts, offering the optimum in accuracy and flexibility, with instant replacement of element. Bolometers and thermistors, available from stock, plug in without tools and without need for adjustments. VSWR is extremely low over the full waveguide band. No tuning required.

\$60 to \$210



Write for your free copy of Narda's new 1959 catalog. Address: Dept. IRED-3



the **narda** microwave corporation
118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y.

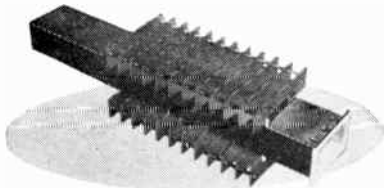
Narda-UHF and Microwave products from 200 to 90,000 Mc



WAVEGUIDE TERMINATIONS

Narda Waveguide Terminations provide an exceptionally low VSWR (less than 1.02) over the entire frequency range of the waveguide. Power is in excess of 1 kw peak, 1 watt average. Standard cover flange input.

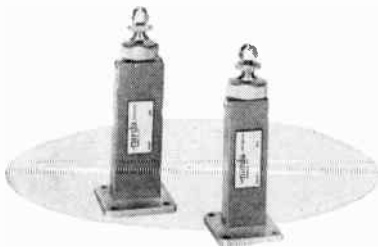
13 models from \$20 to \$45.



HI POWER TERMINATIONS

An improved type capable of handling extremely high power without deteriorating under high temperatures. Designed for operation over the entire waveguide band with average VSWR approx. 1.05. Heat dissipating fins at regions where most power is absorbed.

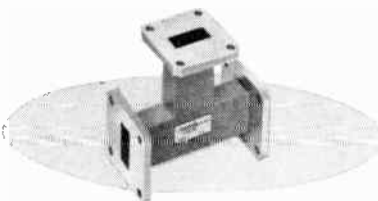
Seven models . . . \$125 to \$700.



ADJUSTABLE WAVEGUIDE SHORTS

Tunable shorts of the trap or non-contacting type for minimum r-f loss for use in many tuning and measurement applications. Tuned by a knurled lead screw with locking nut, except for model covering 12.4 to 18.0 kmc, which uses micrometer drive. Models to cover bands from 2.60 to 90.0 kmc.

13 models from \$40 to \$90.



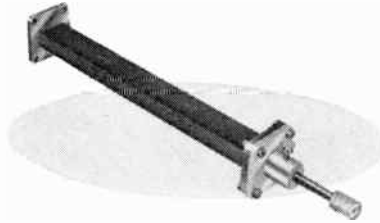
TEE SECTIONS

Waveguide tee sections for making connections in microwave circuits corresponding to series and shunt connections at lower frequencies. Very tight tolerances permit use as a power divider. Branches are terminated with standard cover flanges.

Thirty models from \$35 to \$275.



Write for your free copy of Narda's new 1959 catalog. Address: Dept. IRED-3



SLIDING TERMINATIONS

The most convenient means for evaluating the residual VSWR of slotted lines. VSWR of the element is 1.01 or less, from 1100 to 90,000 mc. The sliding feature makes these terminations particularly suitable for evaluating residual VSWR of impedance meters.

13 models from \$60 to \$90.

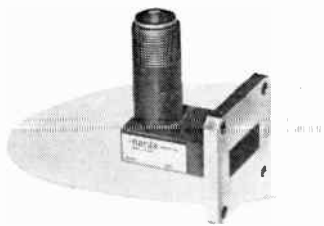


COAXIAL HI POWER TERMINATIONS

Useful over the complete frequency range from 700 to 12,400 mc, with a VSWR of 1.20 or less and under 1.1 from 1000 to 9000 mc. Designed for power levels up to 200 watts average and 50,000 watts peak. Efficient heat-dissipating fins permit withstanding temperatures in excess of 500° F.

Model 369, NF & NM . . . \$250

Model 369, CF & CM . . . \$270



ADAPTERS

These adapters provide a low VSWR, lossless transition from rectangular waveguide to type N coaxial line. Broadband design provides bilateral VSWR below 1.25 over the complete waveguide frequency range. Small but rugged, for both laboratory and field use.

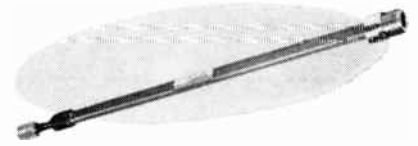
Seven models from \$25 to \$175.



TWISTS

Narda waveguide twists provide a smooth 90 degree twist in waveguide orientation. Standard models use brass waveguide and two flanges equivalent to standard cover flanges. Other flange combinations, waveguides and lengths, available on special order.

13 models from \$40 to \$175.



COAXIAL TERMINATIONS

Narda Coaxial fixed and sliding Terminations are the first and only to cover the entire frequency range S to X band; provide accurate reference for coaxial component VSWR measurements. VSWR of the terminations is 1.05 or less. Travel of sliding termination is in excess of half wavelength at lowest frequency.

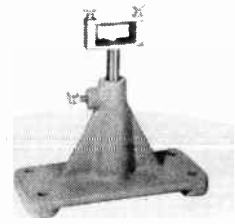
Fixed: \$55 to \$58 Sliding: \$110 to \$116



UHF FREQUENCY METER DETECTORS

The only direct reading frequency meter detectors available for the UHF range. Absorption type meters, with 0.2 db insertion loss, each includes resonant cavity, coaxial switch, crystal detector, current meter, sensitivity control, and type N input and output terminals. 200-500 mc; 500-1500 mc., 1500-2400 mc.

Three models . . . \$375 each.



STANDS AND CLAMPS

Heavy cast iron Model 3 stands for use with Model 2 Series Clamps. Rectangular base for stability and closer spacing when required. Knurled screw provided for height adjustment. Clamps are felt lined to provide secure clamping action without marring surfaces or finishes.

\$3.50 to \$5.50.



BENDS

Narda E- and H-Plane waveguide bends for use where a 90 degree angle is required with negligible reflection of the microwave signal. VSWR equals 1.05 maximum. Standard cover type flanges. Special flanges, materials and dimensions available on special order.

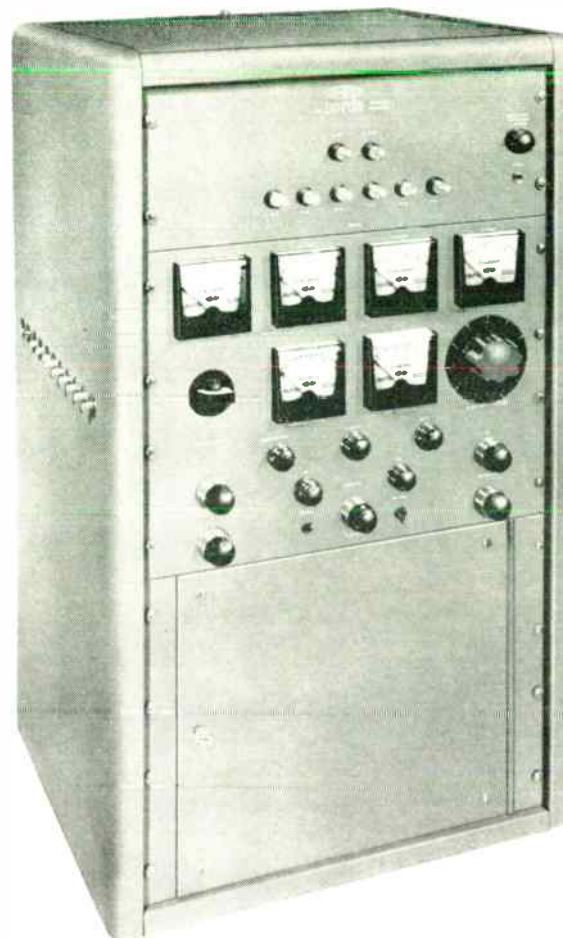
13 models from \$25 to \$100.

the **narda** microwave corporation

118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y.

NEW
FROM
NARDA

Model
10001
\$4700.



High Power

MICROWAVE MODULATOR

accepts over 40 magnetrons!

Here's the first of a series of new products from Narda's recently-established High Power Electronics Division! A high power Microwave Modulator that permits installation **inside the unit** of any of more than 40 magnetrons! Complete, compact and self-contained, it accepts magnetrons covering 3,200 mc to 35,000 mc, with peak outputs from 6 KW to 120 KW. Model 10001 features a completely interlocked circuit, with all high voltage leads and con-

nections **internal**, for maximum safety; solid state high voltage bridge rectifiers for longer life and reduced heat output (prolonging life of other components, too); and built-in meters and viewing connectors for all principal parameters.

Other features are shown below. For complete specs and a list of at least 40 magnetrons suitable for use with the 10001, write Narda's High Power Electronics Division (HPED) at Dept. IRED-9.

SPECIFICATIONS

High voltage supply: Continuously variable from 0 to 4 KV at 100 ma; **Magnetron filament supply:** Cont. variable from 0 to 13 volts at 3 A; **Rep. rate generator range:** Cont. variable from 180 to 3000 pps; **Pulse**

width: 1 microsecond at 70% points, rise time 0.15 microseconds, max. slope 5% (other pulse widths available); **Size:** 38" h, 22" w, 18" d. **Weight:** 150 lbs. *Complete 1959 catalog available on request.*





the **narda** microwave
corporation
HIGH POWER ELECTRONICS DIVISION
118-160 HERRICKS ROAD, MINEOLA, L. I., N. Y. • PIONEER 6-4650


Transitron offers...


INDUSTRY'S MOST COMPLETE LINE


SILICON TRANSISTORS

| JAN TRANSISTOR | | Minimum Current Gain (B) | Maximum Collector Voltage (Volts) | Typical Cut-off Frequency (MC) | Maximum I_{CO} @ 25°C and V_C Max. (μA) | FEATURES |
|---|-----------|--------------------------|-----------------------------------|--------------------------------|--|-------------------------------|
|  | JAN-2N118 | 10 | 30 | 10 | 1 | • Only Jan Silicon Transistor |

| SMALL SIGNAL | | Minimum Current Gain (B) | Maximum Collector Voltage (Volts) | Typical Cut-off Frequency (MC) | Maximum I_{CO} @ 25°C and V_C Max. (μA) | FEATURES |
|---|-------|--------------------------|-----------------------------------|--------------------------------|--|---|
|  | 2N333 | 18 | 45 | 7 | 50 | <ul style="list-style-type: none"> • Low I_{CO} • Operation to 175°C • 200 mw Power Dissipation |
| | 2N335 | 37 | 45 | 10 | 50 | |
| | 2N480 | 40 | 45 | 11 | .5 | |
| | 2N543 | 80 | 45 | 15 | .5 | |
| | ST905 | 36 | 30 | 10 | 10 | |

| HIGH SPEED SWITCHING | | Typical Cut-off Freq. (MC) | Maximum Collector Voltage (Volts) | Maximum Collector Saturation Resistance (ohms) | Max. Power Dissipation @ 100°C ambient (MW) | FEATURES |
|---|--------|----------------------------|-----------------------------------|--|---|--|
|  | 2N1139 | 150 | 15 | 60 | 500 | <ul style="list-style-type: none"> • High Frequency Operation • Low Saturation Resistance • Low I_{CO} |
| | 2N337 | 20 | 45 | 150 | 50 | |
| | 2N338 | 30 | 45 | 150 | 50 | |

| MEDIUM POWER | | Max. Power Dissipation @ 25°C Case (Watts) | Maximum Collector Voltage (Volts) | Minimum DC Current Gain (B) | Typical Rise Time (μsec) | Typical Fall Time (μsec) | FEATURES |
|--|--------|--|-----------------------------------|-----------------------------|---------------------------------|---------------------------------|--|
|  | 2N545 | 5 | 60 | 15 | .3 | .5 | <ul style="list-style-type: none"> • Fast Switching • High V_C • Rugged Construction |
| | 2N547 | 5 | 60 | 20 | | | |
| | 2N498 | 4 | 100 | 12 | | | |
| | 2N551 | 5 | 60 | 20 | | | |
| | 2N1140 | 3 | 40 | 20 | .2 | .1 | |

| HIGH POWER | | Maximum Power Dissipation @ 25°C Case (Watts) | Minimum DC Current Gain (B) | Typical Collector Saturation Resistance (Ohms) | Maximum Collector Voltage (Volts) | FEATURES |
|---|-------|---|-----------------------------|--|-----------------------------------|---|
|  | ST400 | 85 | 15 @ 2 Amps | 1.5 | 60 | <ul style="list-style-type: none"> • High Current Handling Ability • Low Saturation Resistance • Rugged Construction |
| | 2N389 | 85 | 12 @ 1 Amp | 3.5 | 60 | |
| | 2N424 | 85 | 12 @ 1 Amp | 6.0 | 80 | |


Write for Bulletins: TE-1353 and TE-1355

SILICON DIODES

| FEATURES | Fast Switching and High Frequency Types Ratings @ 25°C | | | | Military and High Conductance Types Ratings @ 150°C | | | |
|---|--|--------------------------------|-------------------------------------|-----|---|--------------------------------|--------------------------------------|----------|
| | Max. Inverse Voltage (Volts) | Max. Average Fwd. Current (ma) | Inverse Recovery Time (μsec) | | Max. Inverse Voltage (Volts) | Max. Average Fwd. Current (ma) | Max. Inverse Current (μA) @ V | |
| <ul style="list-style-type: none"> • Recovery Times Under 15 μsec • High Conductance Combined With Fast Switching • Subminiature Size • High Inverse Resistance | 1N808 | 100 | 100 | .3 | JAN 1N457 | 60 | 25 | 5 @ 60 |
| | 1N809 | 200 | 100 | .3 | JAN 1N458 | 125 | 25 | 5 @ 125 |
| | 1N658 | 120 | 200 | .3 | JAN 1N459 | 175 | 25 | 5 @ 175 |
| | 1N659 | 55 | 100 | .3 | 1N485B | 180 | 50 | 5 @ 175 |
| | 1N643 | 110 | 100 | .3 | 1N488A | 380 | 50 | 25 @ 380 |
| | JAN 1N251 | 30 | 75 | .15 | 1N464 | 175 | 40 | 30 @ 125 |

Write for Bulletin TE-1350

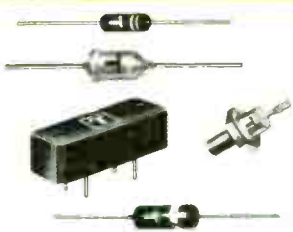
SILICON RECTIFIERS

| Ratings @ 150°C Case Temperature | | Peak Recurrent Inverse Voltage (Volts) | Maximum Average Forward Current (ma) | Maximum Inverse Current (ma) | FEATURES | |
|---|--------------------|--|--------------------------------------|------------------------------|--|----------------|
|  | Subminiature Glass | 1N689 1N649 | 150 150 | 0.2 0.2 (@ 25°C) | <ul style="list-style-type: none"> • Reliability at High Temperatures • High Efficiency • Rugged Construction • Hermetic Sealing • Low Thermal Resistance | |
| | Miniature | TJ60A TJ30A | 600 300 | 0.5 0.5 | | |
| | Axial Leads | SL715 1N547 | 1500 600 | 100 250 | | 0.2 0.3 |
| | Military | JAN 1N256 | 570 | 200 | | 0.25 (@ 135°C) |
| | Stud Mounted | TM155 TM67 | 1500 600 | 400 3000 | | 0.5 0.5 |
| | Medium Power | TR402 TR601 | 400 600 | Amps 20 10 | | 5 5 |
| | High Power | TH402B | 400 | 50 | | 15 |

For details, circle #146 on Reader Service Card

Write for Bulletin TE-1351



SILICON REGULATORS AND REFERENCES

| | | | | | | |
|--|---------------------|-----------------------|-----------------------------------|-----------------------------|------------------------------|---|
|  | | Voltage Range (Volts) | Maximum Dynamic Resistance (ohms) | Maximum Current @ 25°C (ma) | Maximum Current @ 125°C (ma) | FEATURES <ul style="list-style-type: none"> • Long-term stability • Operation up to 150°C • Small size, easy mounting • Hermetically sealed |
| | Subminiature — SV-5 | 4.3-5.4 | 55 | 50 | 10 | |
| | Miniature — SV-815 | 13.5-18 | 120 | 40 | 8 | |
| | Power — SV-924 | 20-27 | 8 | 55°C (amps)* | (ma)* | |
| | Stabistor — SG-22 | .64 | 40 | 150 | 25 | |
| | Reference — SV-3176 | 8-8.8 | 15 | Temp. Coefficient ±.001%/°C | | |
| Ref-Amp — 3N44 | 8.3-9.8 | | ±.002%/°C | | | |

*Case temperature ratings


Write for Bulletin TE-1352

SILICON CAPACITORS

| | | | | | | | |
|---|--|--------------------|-------------------------|----------------|----------------|-------------------------|--|
|  | Ultra High Frequency Types — Ratings (at 25°C) | | | | | | FEATURES <ul style="list-style-type: none"> • Subminiature Size • High Q • High Temperature Operation |
| | | Cut-off Freq. (mc) | Capacity (μμf) @ V Max. | @ -0.1V | Q @ -4V @ 50Mc | Maximum Working Voltage | |
| | SCH-51 | 5000 | 35 | 2 | 100 | 50 |  | 10 |
| SCH-52 | 5000 | .8 | 4 | 100 | 50 | 7 | |
|  | High Frequency Types | | | | | | |
| | | | | Q @ -4V At 5mc | At 50mc | | |
| | SC-1 | | 4.4 | 24 | 350 | 35 | 22 |
| | SC-5 | | 25 | 120 | 350 | 35 | 11 |
| | SC-15 | | 120 | 360 | 350 | 35 | 6 |


Write for Bulletin PB-45

GERMANIUM DIODES

| | | | | | |
|---|------------------------------------|-------------------------------|---|----------------------------|-------------|
|  | Specifications and Ratings at 25°C | Forward Current (at +1V) (ma) | Inverse Current at Specified Voltage (μa @ V) | Max. Oper. Voltage (volts) | Description |
| | JAN-1N270 | 200 | 100 @ -50 | 80 | |
| JAN-1N277 | 100 | 250 @ -50 @ 75°C | 100 | | |
| JAN-1N281 | 40 | 75 @ -10 | 60 | | |
| JAN-1N126 | 5 | 500 @ -50 | 60 | | |
| JAN-1N198 | 5 | 30 @ -50 | 50 | | |
| 1N283 | 200 | 250 @ -50 @ 75°C | 20 | | |
| T16G | 40 | 75 @ -10 | 60 | | |
| 1N278 | 20 | 100 @ -50 | 50 | | |
| T22G | 40 | 125 @ -50 @ 75°C | 15 | | |
| T9G | 100 | 20 @ -10 @ 75°C | 60 | | |
| 1N67A | 5 | 20 @ -50 | 80 | | |
| T8G | 100 | 2 @ -10 | 100 | | |
| S570G | 10 | 20 @ -100 | Recovery Time .002 (μsec) | | |
| | | 5 @ -10 | | | |

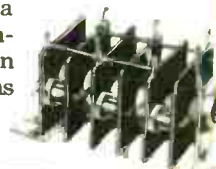
Write for Bulletin TE-1300 & TE-1319

GERMANIUM COMPUTER TRANSISTORS

| | | | | | |
|---|-------|--------------------------|-----------------------------------|---------------------------|---|
|  | | Minimum Current Gain (B) | Maximum Collector Voltage (volts) | Typical Cutoff Freq. (MC) | FEATURES <ul style="list-style-type: none"> • High Frequency Switching • Low Saturation Resistance • Uniform Input Characteristics |
| | 2N427 | 40 | 15 | 8 | |
| | 2N428 | 60 | 12 | 13 | |

Your local authorized **TRANSITRON DISTRIBUTOR** now carries in-stock inventories for immediate delivery.

Transitron's TD series of rectifier stacks offer a wide range of ratings in seven standard circuit configurations. High voltage cartridges, quads, plug-in assemblies, and many other special encapsulations are also available. Your inquiries are invited.
Write for Bulletin TE-1342.



Transitron



For details, circle #147 on Reader Service Card

electronic corporation • wakefield, massachusetts

BUYERS GUIDE FOR COMPONENTS DIVISION PRODUCTS

Compo

HIGH

A PARTIAL LISTING OF THE PRODUCTS

diffused junction silicon devices standard JEDEC packages

Dual positive hermetic sealing — maximum heat transfer — withstand high current surges — designed for highest electrical efficiency, and maximum operating reliability to meet military specifications.

LOW POWER TYPES "TOP-HAT" (SERIES R) AND "OERBY" (SERIES C) CONFIGURATIONS

Up to 1.5 amps for printed circuit or wire-in applications with voltage ratings up to 800 volts PIV

MEDIUM POWER TYPES SERIES "D", "K" AND "U"

Rated up to 30 amps at 150° C. case temperature
Voltage ratings up to 800 volts PIV

HIGH POWER TYPES SERIES "F"

Ratings up to 70 amperes at 150° C. case temperature
Voltage ratings up to 600 volts PIV

ZENER VOLTAGE REGULATOR DIODES

3.9 to 100 volts $\pm 5\%$ and $\pm 10\%$ tolerances
750 milliwatt — 1 watt 3.5 watt and 10 watt ratings
Axial lead or stud mountings

HIGH CURRENT SILICON-RECTIFIERS

Silicon rectifier assemblies to provide desired current and voltage output. Both single and three phase assemblies are available

tantalum capacitors

ITT miniature tantalum capacitors fill the ever growing need for lightweight, miniaturized high reliability components to meet military specifications. These capacitors offer greater electrical stability with rugged construction and larger capacity per unit volume.

WET ANODE TYPES

3 Case Sizes, with a non-corrosive electrolyte. Operate without derating from 55° C. to 125° C. Designed to MIL specifications. Large capacity per unit volume.

SOLID ANODE TYPES

4 Case Sizes . . . with excellent frequency stability over wide operating temperature range . . . hermetically sealed. All types designed to MIL specifications

GLASS SEALS

Compression seals, solder seals, pressure standoff and speednut terminals, condenser end seals and transistor closures, designed for uniform seal integrity and high electrical insulation under the most severe conditions. Standard types and custom designs are made to strict specifications under exhaustive quality control.

hi-density selenium rectifiers

ITT Hi-Density Selenium Rectifiers utilize maximum cell area, providing high electrical output in relation to weight, good voltage regulation within rated capacity — superior quality and performance characteristics for industrial and military applications

NEW! 45 VOLT INDUSTRIAL RECTIFIER

Smaller, lighter, more efficient selenium rectifiers can be designed with ITT's new 45 volt cells. Other features include smaller mounting dimension, long life, low temperature rise, conservative ratings and reliability at higher temperatures — plus cost reductions

NEW! DOUBLE DENSITY INDUSTRIAL RECTIFIER

Carefully controlled evaporation techniques permit ITT's Hi-Density selenium rectifier cells to carry double the current of conventional cells — 180 milliamperes per square inch. This process features rectifiers of small size, high operating efficiency at a lower cost.

CONTACT PROTECTORS

Suppresses voltage surges in inductive circuits. Extends contact life by reducing erosion due to sparking and preventing component failure. Reduces electrical noise. Available for DC or AC applications. New! Use them to protect transistors against over voltage

Components & Tubes

RELIABILITY FOR ELECTRONICS

ITT Components Division, a unit of the world-wide International Telephone and Telegraph Corporation, offers high reliability electronic components for industrial and military applications.

OF ITT COMPONENTS DIVISION

power tubes

ITT power triodes and rectifier tubes for communications, dielectric and induction heating, random noise generators and pulse operation applications are outstanding. An exceptionally wide range of tubes are available in air cooled, water cooled and vapor cooled types.

POWER TRIODES

ITT Power Triodes for CW and pulse operation are used as modulators, amplifiers and oscillators in communications and industrial service. Water cooled and air cooled types.



EVAPORATIVE COOLED POWER TRIODES

Evaporative Cooled Power Triodes feature high anode dissipation, high loading capacity and exceptional overload capability.



SUPER-POWERED TRIODES

Super-powered Triodes, developed by ITT Components Division for use as modulators, amplifiers and oscillators in communication and industrial services.



CERAMIC POWER TRIODES

Ceramic Power Triodes with rugged, coaxial design for modern requirements in high temperature, high frequency, high power applications.



special purpose tubes

Special Purpose Tubes made by ITT are available in many standard types and sizes, and custom designed types are also made for specific applications.

TRAVELING WAVE TUBES

A rugged line of traveling wave tubes with metal envelopes and ceramic seals. They are of the helix type, self-aligning in the external solenoid and are provided with either coaxial or waveguide fittings.



IATRON** TUBES

Iatron storage tubes are used in radar and electronic display systems. They feature extreme brightness for day light viewing and controlled storage time. Information can be written, stored and erased with ease. Direct view and projection types.



HYDROGEN THYRATRONS

ITT - Kuthe hydrogen thyratrons, made by Kuthe Laboratories, Inc., the world's largest manufacturer of gas-filled thyratrons and diodes, feature an extensive line of glass or ceramic types.

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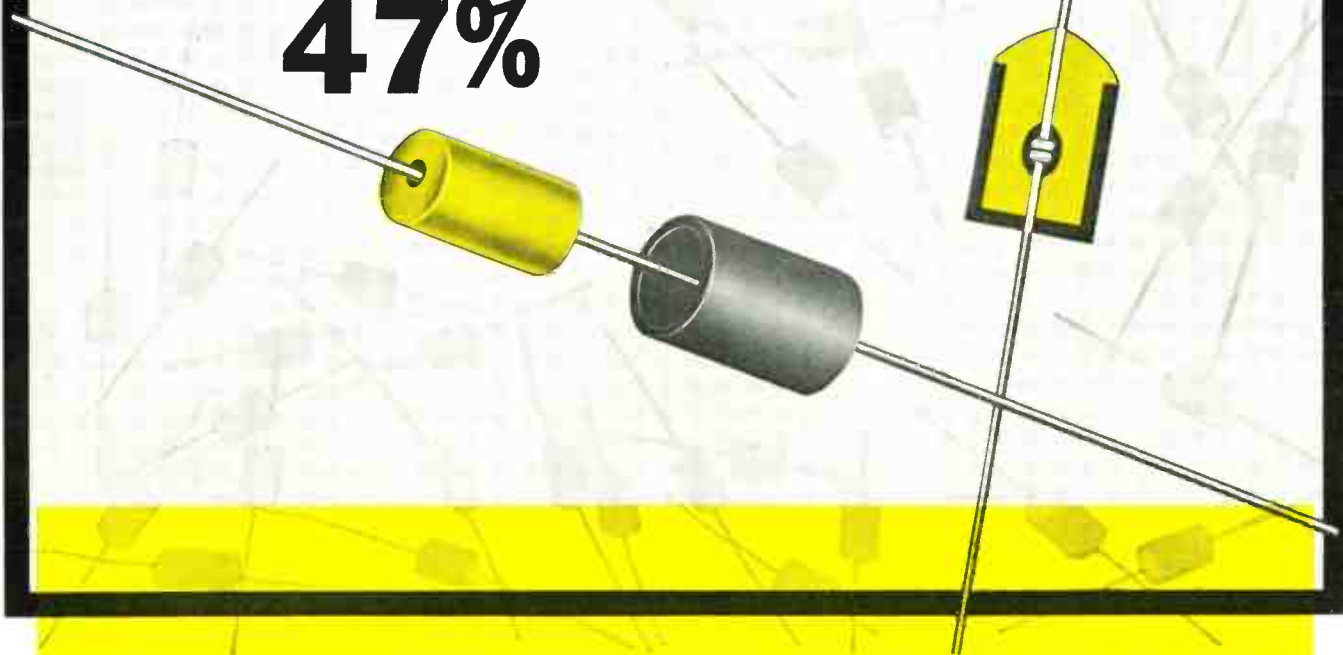
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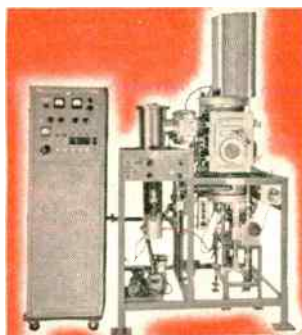
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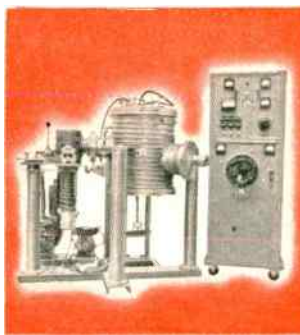
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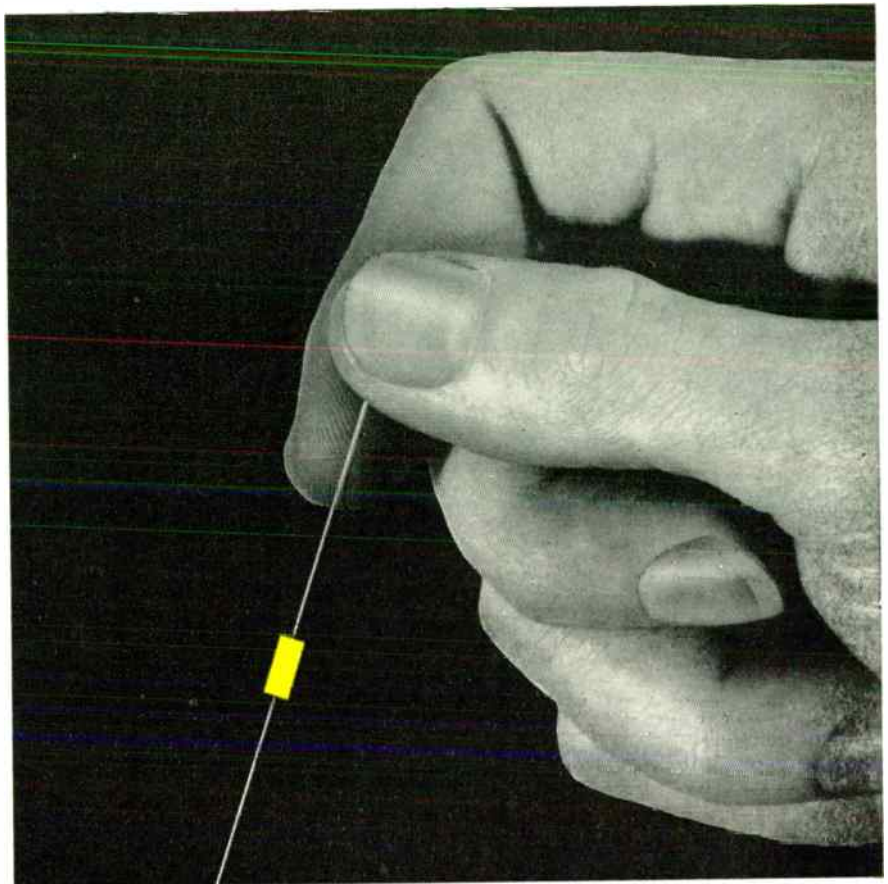
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|-------------------|--------------|--------------------|------------|-------|--------|
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| RFC-S | 0.10 - 100 | .02 - 6.0 | 4000 - 220 | 0.188 | 0.44 |
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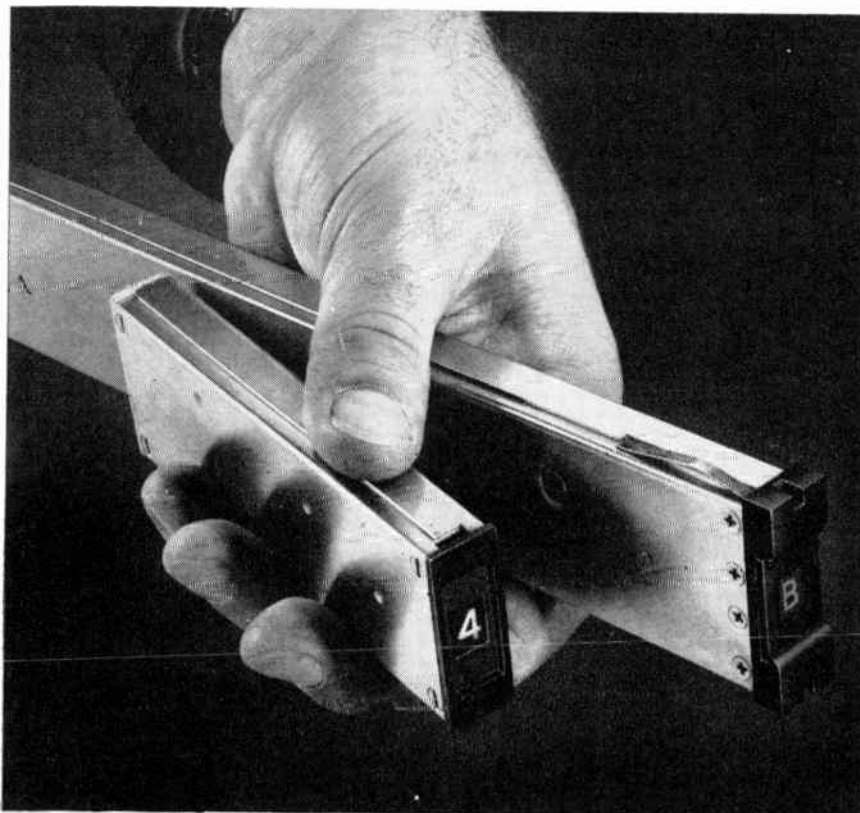
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RELIABILITY

E598A

FANSTEEL METALLURGICAL CORPORATION North Chicago, Ill., U.S.A.

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Compact! Easy to Read! Union Data Display Indicators

Union Switch & Signal makes two types of electro-mechanical, DC-operated data display indicators: digital types, displaying 10, 12, or 16 characters on a wheel; and alpha-numerical types, displaying up to 64 characters on a MYLAR* belt. Character assignments can be furnished as required.

TRANSLATION Both Digital and Alpha-Numerical Indicators operate directly on binary codes on a null-seeking basis. This eliminates the need for external equipment for translation from binary to decimal code, as required with other display devices.

VISUAL READ-OUT Indicator packages are designed for quick, easy readability, even when indicators are mounted in rows.

INFINITE RETENTIVITY The indicators require power only during the response time, because they are of the null-seeking type. Once positioned, the indicators *retain* the data visually and electrically until a new code is transmitted.

ELECTRICAL READ-OUT The design of the decoding and control portions of the indicators provides electrical read-out of data in the same form as the input. The data can be read continuously or periodically without erasing the stored information.

USES These indicators can be used in the output of digital computers, in teletype receiving equipment, in telemetering systems, or wherever data needs to be displayed. Bulletin No. 1015 gives you complete information.

**Dupont's synthetic fiber*

Bulletin No. 1015 gives you complete information.

"Pioneers in Push-Button Science"



UNION SWITCH & SIGNAL

DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY —

PITTSBURGH 18, PENNSYLVANIA

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Tops in reliability!

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Union Miniature Relays



Used in seven successful missiles. Union Miniature Relays originally were developed for air-borne and guided missile electronic equipment; they meet or exceed the requirements of MIL-R-25018, MIL-R-6106C, and MIL-R-5757C. They are now being utilized in the following missiles: The Matador, Thor, Talos, Vanguard, Atlas, Titan, and the Jupiter C.

The excellent reliability and small size of the Union Miniature Relays have led to their use in traffic control systems, computers, resistance welders, and other equipment.

OUTSTANDING FEATURES

HI-LO CONTACTS—Permit high and low load handling in same relay. Dry-circuit contacts available for extremely low-level loads.

COIL RESISTANCE—In standard case, from 0.9 to 8750 ohms; in long case, from 1.6 to 13,000 ohms.

TEMPERATURE RATING—Class A -55 to $+85^{\circ}\text{C}$; Class B -65 to $+125^{\circ}\text{C}$.

AC OR DC—Nominal operating voltages from 1.5 to 160 volts, DC; 115 volts, 60 to 400 cps, AC. Built-in rectifiers in AC relays.

TYPES AND MOUNTINGS—6PDT or 4PDT; plug-in or solder-lug connections. All usual mountings.

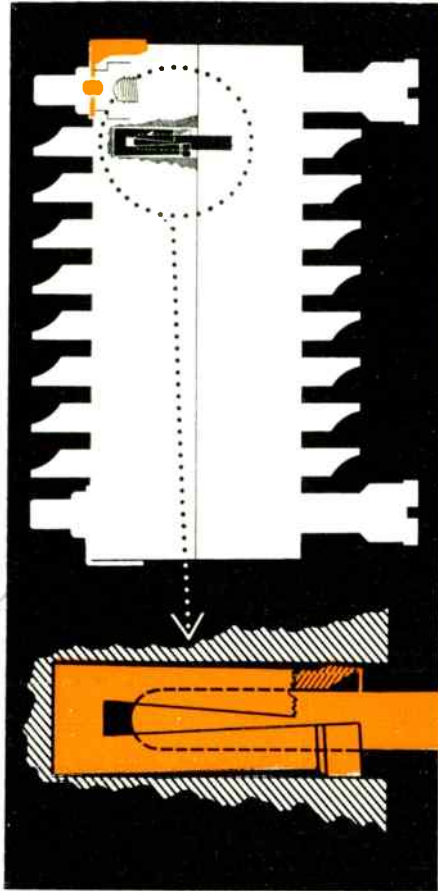
SPECIALS—Slow-acting relays if you need a differential between operating time of various relays. Plate-circuit relays—operate on less than 8 milliamperes; double-coil relays—either coil operates relay. Write for complete information.

"Pioneers in Push-Button Science"



UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY —
PITTSBURGH 18, PENNSYLVANIA

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“better than we expected!”

SMI-C Subminiature Series* Precision Connectors

When our connectors meet your specifications perfectly . . . well that's all part of our job. But when they exceed requirements, we drop all modesty and do a little shouting. This was the case with our new SMI-C Connector Series, causing one of our leading customers to exclaim "Better than we expected!" These are the newest members of the family of over 150 reliable types of U. S. COMPONENT connectors, products of a close liaison between application engineers and our design team.

- **STAINLESS STEEL REINFORCING RETAINER** provided under each screwlocking element removes all torque stresses from molded bodies, avoiding breakage.
- **POSITIVE RE-ENTRANCY OF MALE PINS** assured each time by flanged guide female contact.
- **SELF-ALIGNMENT ACTION** assisted by provision of wider countersink on upper end of contact.
- **IDEAL FOR CRITICAL ENVIRONMENTAL CONDITIONS** and extremes of military applications.
- **7-11-14-20-26-34 contacts.** Other configurations upon request.



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HELPFUL HINTS

for using the IRE DIRECTORY

A few minutes' study of the basic layout of the IRE DIRECTORY will help you to find the information for which you are looking more quickly and more accurately. At first glance, the IRE DIRECTORY may seem to be confusing, but by using the various portions of the book as listed below, you will find your way around easily, and will discover that it is actually a very simple arrangement, and a much more logical one than a purely alphabetical terminology listing.

PINK SECTION at the front of the products and firms section contains a terminology index listing every product, major and minor, for which a list of manufacturers is given. Page numbers refer you to the page on which the listings for that product begin. Following this alphabetical index is a copy of the questionnaire which is sent to the firms who have furnished us with product information. A quick look through this questionnaire will help greatly in understanding the product arrangement. At the top of the first page of the pink section is a small index referring you to the opening page of the complete-data spread section, the alphabetical directory, and each of the three product directories.

THE COMPLETE DATA SPREAD SECTION (pages 1-160) contains product advertisements of great usefulness to the reader. Most of these advertisements are two pages or more, and all of them contain complete information on the products manufactured by the advertising firms—specifications, prices, illustrations, and suggested applications.

ALPHABETICAL DIRECTORY OF MANUFACTURERS (pages 161-264) contains a list of 4,304 firms representing the majority of buying and selling power in the radio-electronic industry. Each firm listing contains the complete mailing address and telephone number for the firm. Following the state name in the firm address, a list of code numbers is given. These numbers refer to the 102 major products listed in the book (for quick reference to the meaning of the codes, use the questionnaire form in the pink section).

THE THREE DIRECTORIES OF PRODUCTS ARE:

1. Complete Equipment
2. Components
3. Materials and Services

This breakdown into three directories saves you from traveling through many products in which you are not interested at the moment, and helps you to turn immediately to the listings for the type of product you want, following a straight line to your destination. Use the Machol edge index at the top of the first page of the pink section to locate immediately the first page of the appropriate directory, then use the Machol edge index at the beginning of each directory to find the specific product you want. You don't even have to know the page number—the index will find it for you automatically!

102 MAJOR PRODUCTS are listed within these three Directories. Each product listing contains a number of sub-headings so that you may know specifically what each firm makes. To interpret the code numbers shown after each firm's listing, consult the first page of that product class, where the sub-headings are defined. You will note that advertisements are positioned throughout the book in the most appropriate listing section, so that the advertisement for a relay manufacturer will appear in the relay section, to help you with further information on his product. Every advertiser's listing shows you the page number on which his advertisement may be found, and you will derive more value from this book if you consult these advertisements for facts you cannot find in the listings.

COMPLETE ADDRESS LISTINGS are given only for advertisers in this section. If you wish to locate the address and telephone number for any other firm, it will be necessary to use the alphabetical directory.

THE DISTRIBUTION SECTION is class 102, the last class in the book. This section contains a list of 1399 manufacturers representatives, distributors and jobbers, grouped geographically. See page 702 for a more complete explanation of the use of this section.

ADVERTISER'S INDEX appears on pages 154-160 and on pages 726-728.

How to Use the Machol Edge Index

High speed reference is a major objective of the IRE DIRECTORY. To this end we have adopted the Machol Edge Index system, and these indexes:

Advertisers Index, pages 154-160 and 726-728.

Key to Products, Pink Section.

Index to Spreads, 1.

Detailed Machol edge indexes will be found on the first page of the alphabetical Directory and each of the three major product Directories, pages 161, 265, 365, and 597. The Machol system will help you find both alphabetical and product sections swiftly.

HOW TO USE

1. Bend the Directory almost double with the front cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680630

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\$1590

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The transducer
is the heart of the
ultrasonic cleaner!



An ultrasonic cleaner is no better than its transducer. Acoustica transducers have proved their superiority. The new low-frequency Multipower transducer used in the Acoustica heavy duty industrial line produces the most effective cleaning field known today. It represents a major break-through in ultrasonic technology.

All prices include tank and matching generator

Choose the correct cleaner for your purpose!

In determining which ultrasonic cleaning unit to buy, remember that all ultrasonic cleaning systems are not alike. The principle is the same, but the results are not. *The power and frequency of the transducer* are the key factors in determining the success or failure of applying ultrasonic energy for solving industry's cleaning problems. Acoustica research has developed *two* types of transducers for its ultrasonic cleaning units—the *General Purpose* 40kc barium titanate transducer and the *Multipower* heavy duty 20kc transducer. Expert Acoustica engineers are ready to advise you which type will better suit your needs. Mail the coupon below for information—there is no obligation.

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Acoustica Associates, Inc.
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Send information to help us determine the correct
ultrasonic cleaner for our purpose.

NAME _____

TITLE & COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

A

- A A Metal Products, Inc., 154 Elliot St., Brattleboro, Vt., 81, 84, 86, 87, 95
Tel: ALpine 4-4333
- ABC Sound Engrg. Co., 145 W. 47 St., New York 36, N.Y., 27, 30, 57, 81
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- A.P.M. Corp., 252 Hawthorne Ave., Yonkers, N.Y., 44, 52, 53, 86, 87
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- A.P.W. Company, 72 W. Main St., Rockaway, N.J., 43, 59
Tel: OAKwood 7-0643
- A.R.F. Products, Inc., 7627 Lake St., River Forest, Ill., 1, 4, 6, 16, 18, 20, 21, 26, 34, 36, 37, 42, 61
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- A.R. & T. Electronics, Inc., 1101 McAlmont St., Little Rock, Ark., 34, 36, 61
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- A-1 Precision Products, 3622 W. Jefferson Blvd., Los Angeles 16, Calif., 44, 70, 82, 86, 87, 94, 98
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- Abalon Precision Mfg. Corp., 540 Casanova St., New York 59, N.Y., 81, 84, 87
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- Abbot, Edward A., P.O. Box 274, Forest Hills 75, N.Y., 85
Tel: ALgonquin 4-5810
- Abrams Instruments Corp., 606 E. Shiawassee St., Lansing 1, Mich., 4, 9, 13, 28, 31, 85, 86, 90
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- Academic Press, Inc., 111 Fifth Ave., New York 3, N.Y., 101
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- Accuracy, Inc., 4 Gordon St., Waltham, Mass., 67
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- Accurate Electronics Corp., 169 Abbe Rd. S., Elyria, Ohio, 44, 51, 53, 69, 86, 94, 98
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- Accurate Instrument Co., 2418 W. Alabama St., Houston 6, Tex., 31, 45
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Tel: JACkson 3-2712
- Accurate Mfg. Co., 44 Hepworth Pl., Garfield, N.J., 89
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- Accurate Molding Corp., 35-20 48th Ave., Long Island City 1, N.Y., 86
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- Accurate Paper Tube Co., 809 N. Peoria St., Chicago 22, Ill., 87
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- Accurate Specialties Co., 37-11 57th St., Woodside 77, N.Y., 46, 86, 93, 97
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- Accurate Spring Mfg. Co., 3811 W. Lake St., Chicago 24, Ill., 70, 87
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- Ace Engineering & Machine Co., Inc., Tomlinson Road, Huntington Valley, Pa., 12
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- Ace Fabricators, 1647 N. Milwaukee Ave., Chicago 47, Ill., 86, 89, 95
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- Ace Plastic Co., 91-30 Van Wyck Expwy., Jamaica 35, N.Y., 86, 95
Tel: JAMAica 3-5500
- Ackerman Engravers, Inc., 458 Broadway, New York 13, N.Y., 86, 87
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- Acme Telectronix, Div. of NEA Service, Inc., 1200 W. Third St., Cleveland 13, Ohio, 11, 31
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- Acme Wire Co., 1255 Dixwell Ave., New Haven 14, Conn., 82, 86, 89, 91
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- Acoustica Associates, Inc., Dept. IRE, Fairchild Ct., Plainview, N.Y., 4, 12, 16, 71, 83, 86, 92
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Code Numbers TELL YOU

what each company does or makes. The numbers after each address refer you to the 102 product and service classes, in which detailed information on the firm will be found.



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gives a guide to the products and services listed in the Product Directories.

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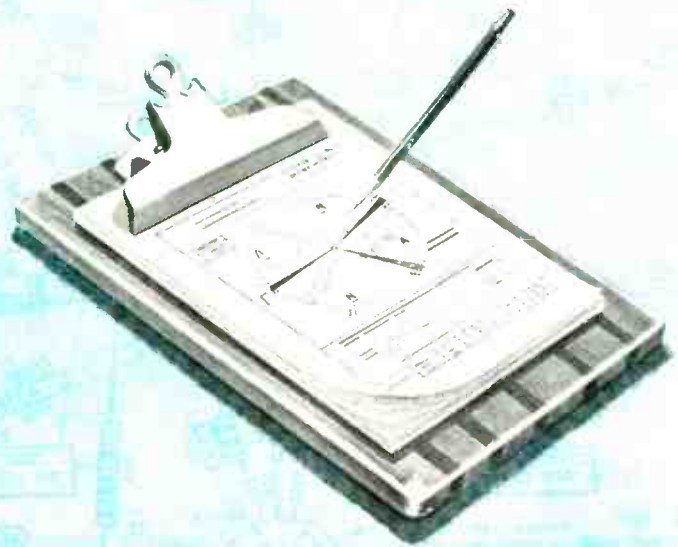
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Adage, Inc., 292 Main St., Cambridge 42, Mass., 9, 45, 56
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Adair Engrg. Co., George P., 1610 Eye St. N.W., Washington, D.C., 85, 90
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Adams-Russell Co., Inc., 200 Sixth St., Cambridge 42, Mass., 37, 50, 73, 80
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Adams & Westlake Co., Relay Div., 1025 N. Michigan St., Elkhart, Ind., 66
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Adcon, Inc., 1117 Commonwealth Ave., Boston 15, Mass., 4, 9, 36
Tel: STadium 2-1117

Addis Translations, R., P.O. Box 2887 Woodside Rd., Woodside, Calif., 101
Tel: ULmar 1-1492

Addison-Wesley Publishing Co., Reading, Mass., 101
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Adelman Co., Leon L., 25 Chittenden Ave., New York 33, N.Y., 102
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Tel: SWinburne 5-1145

Adler Electronics, Inc., 1 Le Fevre Lane, New Rochelle, N.Y., 1, 6, 7, 12, 21, 24, 26, 32, 34, 36, 37, 61, 73, 77, 81, 90
Tel: NEw Rochelle 6-1620

Admiral Corp., 3800 Cortland St., Chicago 47, Ill., 1, 4, 6, 7, 9, 10, 20, 21, 22, 23, 25, 29, 33, 45, 48, 50, 59, 61, 70
Tel: SP 2-0100

Advance Electronics Co., 8510 North End Ave., Oak Park 37, Mich., 37, 50, 63
Tel: LI 6-0248

Advance Electronics Corp., 2 Commercial St., Hicksville, L.I., N.Y., 34, 36, 50
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Advanced Electronics, Inc., 94 Silas Deane Highway, Rocky Hill 9, Conn., 4, 12, 36, 43, 66, 82, 86, 90
Tel: JAckson 9-6881

Advanced Elecs. Mfg. Corp., 2116 S. Sepulveda Blvd., Los Angeles 25, Calif., 23
Tel: GRAnite 8-9220

Advanced Vacuum Products, 430 Fairfield Ave., Stamford, Conn., 52
Tel: DAvis 4-2148

Advertising Engrg. Assoc., 1342 Bel Aire Rd., San Mateo, Calif., 101
Tel: FlReside 5-4931

Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 12, 26, 31, 36, 48, 66, 80, 85, 90
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Aemco, Inc., 12 State St., Mankato, Minn., 66, 70
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Aermotive Equipment Corp., 1632 Central St., Kansas City 8, Mo., 1, 18, 20, 33, 37
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Aero Electronics Co., 1512 N. Wells St., Chicago 10, Ill., 4, 5, 9, 12, 14, 36, 56, 81, 85, 90
Tel: WHitehall 3-0401

Aero Guidance Corp., 873 Linden Ave., Carpinteria, Calif., 1, 16, 19, 24, 26, 29, 34, 36, 37, 45, 50, 61, 80, 85, 90
Tel: CARpinteria 8-1721

Aero Instrument Co., 11423 Vanowen St., North Hollywood, Calif., 19, 31, 56, 70
Tel: POplar 5-7330

Aero Research Instrument Co., 315 N. Aberdeen St., Chicago 7, Ill., 12, 72, 82
Tel: TAYlor 9-6400

Aerocoil, Inc., 2207 Summit Ave., Union City, N.J., 36, 43, 62, 66
Tel: UNion 3-2955

Aeroconomy Agency, P.O. Box 1001, Schenectady 1, N.Y., 101
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Aeroflex Corp., 34-06 Skillman Ave., Long Island City, N.Y., 9, 12, 28, 34, 36
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Aerolab Development Co., Semiconductor Systems Div., 330 W. Holly St., Pasadena, Calif., 4, 28, 31, 36, 45, 61
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Aerolite Electronics Co., 2207 Summit Ave., Union City, N.J., 36, 37, 38, 44, 51, 53, 60, 62, 66, 69, 82
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Aerolux Lights Corp., 653 11 Ave., New York 36, N.Y., 12, 15, 32, 50, 60, 65, 75, 79, 90
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Aeronautical Communications Equipment, 3090 S.W. 37 Ave., Miami 33, Fla., 1, 24, 33
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Aeronautical Electric Co., 5656 Northwest Highway, Chicago 46, Ill., 60, 98
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Aeronautical Electric Inc., Raleigh-Durham Airport, P.O. Box 6527, Raleigh, N.C., 1, 7, 10, 20, 24, 36, 37
Tel: TE 4-6209

Aeronca Mfg. Corp., Baltimore Division, Hilltop & Frederick Rd., Baltimore 28, Md., 9, 90
Tel: RIDgeway 7-0200

Aeronutronic Systems, Inc., 13729 Victory Blvd., Van Nuys, Calif., 9
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Aeroprojects, Inc., 310 E. Rosedale, Westchester, Pa., 92
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Aerotest Lab. Inc., 129-11 18 Ave., College Point 56, N.Y., 12, 85, 90
Tel: INdependence 1-7272

Aerotron Supply Co., 8504 S. Normandie Ave., Los Angeles 44, Calif., 87
Tel: PI 3-3453

Aerotron Associates, Inc., P.O. Box 419, Concord, N.H., 4, 9, 12, 19
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Aerovox Corp., Belleville Ave., New Bedford, Mass., 5, 12, 32, 36, 38, 41, 42, 43, 44, 46, 49, 50, 53, 61, 62, 67, 69, 70, 73, 84
Tel: WY 4-9661

Aerovox Corp., Cinema Engrg. Div., 1100 Chestnut St., Burbank, Calif., 5, 36, 38, 43, 49, 50, 63, 67, 70, 73
Tel: VICToria 9-5511

Aerovox Corp., Crowley Div., 1 Central Ave., West Orange, N.J., 37, 38, 43, 46, 55, 83, 87
Tel: ORange 3-7660

Aerovox Corp., Hi-Q Division, Seneca Ave., Olean, N.Y., 41, 62, 67
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Aetna Electronics Corp., Readington Rd., North Branch, N.J., 12, 36, 72
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Aid Associates, 972 Elsinore Ct., Palo Alto, Calif., 85, 90, 100, 101
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Air Control Instl. Ltd., Victoria Rd., Ruislip, England, 40, 58
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Airborne Accessories Corp., 1414 Chestnut Ave., Hillside 5, N.J., 36, 41, 45, 50, 58
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Airborne Instrument Lab., 1345 New York Ave., Huntington, L.I., N.Y., 4, 9, 12, 19, 26, 36, 38
Tel: MYrtle 2-6100

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Aircom, Inc., 139 E. First Ave., Roselle, N.J., 19, 36, 37, 38, 47, 61, 73, 77, 80, 85
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Aircraft Armaments, Inc., P.O. Box 126, Cockeysville, Md., 9, 19, 81, 85, 90
Tel: VALley 5-8400

Aircraft Electronics, 6219 South Sears Blvd., Tucson, Ariz., 12, 15, 30, 36, 55, 61, 85, 86, 90, 92
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86, 88, 90, 92
Tel: OLive 4-1676

Airtronics International Corp., 6900
West Rd. 84, P.O. 8576, Ft. Lauderdale,
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Tel: LUdlow 3-4541

Airtronix Development Corp., 4902
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Ajax Condenser Co., Inc., 932 West
Wrightwood, Chicago 14, Ill., 41
Tel: GRaceland 7-0660

Akeley Camera, Inc., Div. Flecker,
J. W., 6592 Hamilton Ave., Pittsburgh
6, Pa., 15, 31
Tel: EM 1-7617

Alac, Inc., 365 W. Arden, Glendale,
Calif., 87, 98
Tel: CHapman 5-7383

Aladdin Electronics, Div.-Aladdin In-
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Tel: CHapel 2-3411

Albano Co., Inc., 309 East 46 St., New
York, N.Y., 81, 84
Tel: PLaza 7-5887

Alberhill Corp., Dynamics Instrumenta-
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Pasadena, Calif., 12, 36, 50
Tel: RYan 1-3318

Alcar Instruments Inc., 7 Industrial
Ave., Little Ferry, N.J., 12, 36, 92
Tel: HUbbard 9-3040

Alco Electronics Mfg. Co., 3 Wolcott
Ave., Lawrence, Mass., 12, 56
Tel: MURdock 6-3889

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Tel: FOrEst 6-4467

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Tel: JUNiper 3-0160

Alden Systems Co., 1 Washington St.,
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Tel: FOrEst 6-4467

Aldshir Mfg. Co., Inc., 111 Lake Ave.,
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Tel: SPencer 9-1297

Alectric Mfg. Co., 7842-39th Ave., Ken-
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Alert Products, Inc., 728 Market St.,
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Tel: WOODlawn 6-1150

Alfax Paper & Engr. Co., Washington
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**Alford Mfg. Co., 299 Atlantic Ave.,
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Alfred Electronics, 897 Commercial St.,
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All Channel Products Corp., 47-39 49th
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Allen-Bradley Co., 114 W. Greenfield
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Allen Co., Inc., L. B., 9329 W. Bernice,
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Allied Chemical Corp., General Chemi-
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Allied International Corp., 230 Park
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Tel: MURray Hill 9-6126

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Allies Products Corp., P.O. Box 188,
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Tel: CEDar 5-5424

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Allmetal Screw Products Co., 821 Stew-
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Allonge Products, Inc., 163 W. 23 St.,
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Alloys Unlimited, Inc., 21-01 43rd Ave.,
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All-State Welding Alloys, 249-55 Ferris
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**All-Tronics, Inc., 45 Bond St., West-
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Tel: HENDERSON 4-6778

**Alpha Wire Corp., 200 Varick St., New
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Alpine Electronic Components, Inc.,
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Tel: PLaza 7-1449

Altec Lansing Corp., Peerless Elect.
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Althor Products, 2301 Benson Ave.,
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Alto Scientific Co., Inc., 855 Commer-
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Aluminum Co. of America, 1501 Alcoa
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Amatom Elect. Hardware Co., 88 Drake
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Ambroid Co., Box 30, Weymouth 88,
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Tel: EDgewater 5-6658

**Amco Engineering Co., 7333 W. Ainslie
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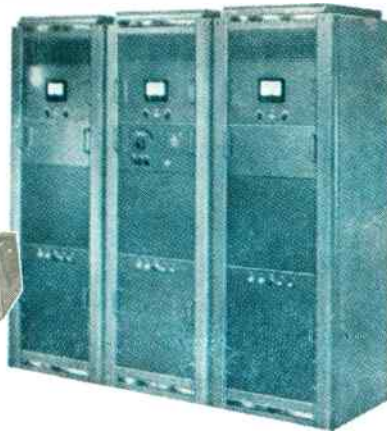
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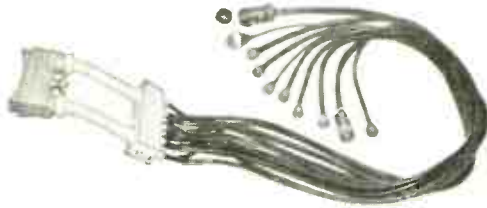
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- Audio-Master Corp., 17 East 45 St., New York 17, N.Y., 27, 30, 32
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Tel: MADison 6-6041
- Audiotex Mfg. Co., Div. of G-C Tectron, Inc., 412 S. Wyman St., Rockford, Ill., 63**
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- Audio-Video Corp., 324 Central Ave., Albany 6, N.Y., 4, 6, 9, 10, 20, 21, 26, 27, 30, 32, 36, 37, 45, 54, 57, 59, 63, 77, 81, 82, 85
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- Automatic Electric Co., Northlake, Ill., 53, 66, 70, 86, 90**
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- Automatic Electric Sales, 21 E. 40th St., New York 16, N.Y., 66
Tel: LExington 2-6226
- Automatic Management, Inc., 25 Brigham St., Westboro 80, Mass., 4, 9, 85, 86, 92, 101
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- Automatic Precision & Mfg. Corp., see A.P.M. Corp.
- Automatic Prod. Research, 19 Beechwood Ave., Mount Vernon, N.Y., 4, 67
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- Automatic Radio Mfg. Co., 122 Brookline Ave., Boston 15, Mass., 6
Tel: CO 6-1420
- Automatic Switch Co., 50-56 Hanover Rd., Florham Park, N.J., 66, 70, 92
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Tel: VICToria 9-2431
- Automation Engrg. Lab. Inc., 24 Bridge St., Greenwich, Conn., 85, 86, 90
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- Autoscrew Co., 216-222 W. 18th St., New York 11, N.Y., 87, 99
Tel: WATkins 9-3137
- Autotron Inc., Box 2278, Santa Monica, Calif., 12
Tel: GL 4-2663
- Autotron, Inc., 3629 N. Vermilion St., Danville, Ill., 4
Tel: HI 6-0650
- Autotronics, Inc., Box 812, Route 1, Florissant, Mo., 4, 28, 61**
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Tel: TEMple 7-3565
- Autron Engrg., Inc., 1254 W. 6th St., Los Angeles 17, Calif., 4, 9
Tel: MU 3237
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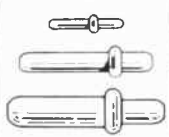
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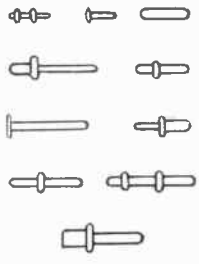


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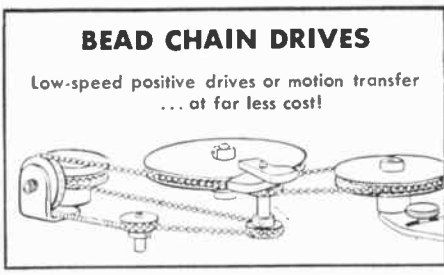
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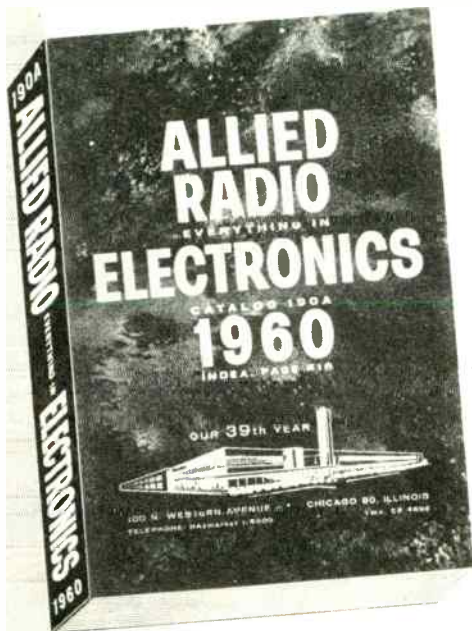
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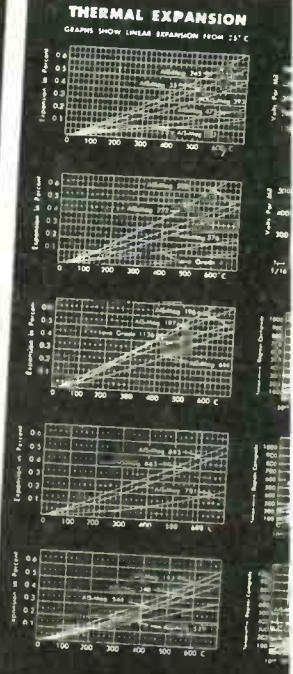
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Braun Tool & Inst. Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 47, 51, 68, 70, 86, 87, 96, 99
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Tel: **HAwthorne 7-1773**

Breeze Corp., Inc., 700 Liberty Ave., Union, N.J., 44, 82
Tel: 6-4000

Breon Labs., 1520 Evergreen Rd., Williamsport 29, Pa., 47, 85

Brevet Products Corp., 601 W. 26th St., New York 1, N.Y., 58
Tel: **WAtkins 4-4737**

Brew & Co., Inc., Richard D., 90 Airport Rd., Concord, N.H., 48
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Tel: **CApitol 5-6606**

Brick Electr. Equip. Co., 820 Blanch Ave., Norwood, N.J., 11
Tel: **CLoster 5-0409**

Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn., 82, 87, 93
Tel: **EDison 4-1182**

Briggs Assoc., Inc., 10 DeKalb St., Norristown, Pa., 4, 9, 12, 27, 85, 90
Tel: **BRoadway 9-0400**

Brilhart Plastics Sales Corp., Old Country Rd., Mincola, L.I., N.Y., 52, 86
Tel: **PI 6-0425**

Brilmayer Labs., Inc., E. W., 86 Fulton St., New York 38, N.Y., 12
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Bristol Co., P.O. Box 1790 IRD, Waterbury 20, Conn., 4, 5, 9, 12, 14, 15, 24, 28, 34, 36, 45, 56, 66, 70, 72, 87
Tel: **PLaza 6-4451**

British Industries Corp., 80 Shore Rd., Port Washington, N.Y., 54
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British Industries Corp., Genalex Div., 80 Shore Rd., Port Washington, N.Y., 74, 75, 76
Tel: **POrt Washington 7-7700**

British Industries Corp., Leak Div., 80 Shore Rd., Port Washington, N.Y., 36, 77
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British Industries Corp., Wharfedale Div., 80 Shore Rd., Port Washington, N.Y., 50, 54, 81
Tel: **PO 7-7700**

British Industries Corp., Widney-Dorlee Div., 80 Shore Rd., Port Washington, N.Y., 81, 84
Tel: **PO 7-7700**

British Thomson-Houston Co., Ltd., Rugby, Eng., 4, 9, 12, 15, 19, 25, 26, 28, 30, 36, 38, 47, 52, 61, 64, 65, 68, 70, 72, 73, 75, 76, 77, 79, 80, 88, 90, 92
Tel: **RUgby 2121**

Brocker Labs., 935 Commercial St., Palo Alto, Calif., 3, 85, 90
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Brooks & Perkins, Inc., 1950 W. Fort St., Detroit 16, Mich., 37, 81, 84, 86, 93
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Brooks Research, Inc., P.O. Box 67, Brighton Sta., Rochester 10, N.Y., 4, 9, 12, 19, 22, 23, 28, 36, 48, 55, 61, 70, 85, 90, 91
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Brush Instruments, Div. of Clevite Corp., 37th & Perkins, Cleveland 14, Ohio, 14, 23, 28, 34, 36, 61
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Tel: **TOWnsend 9-3190**

Bryant Computer Div., P.O. Box 620, Springfield, Vt., 9, 27, 63
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Buchanan Electrical Products Corp., 431 U.S. 22, Hillside, N.J., 98
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Tel: **WAverly 3-7474**

Buck Engineering Co., Inc., 37-41 Marcy St., Freehold, N.J., 61, 81, 84, 86
Tel: **FReehold 8-1111**

Buck Instrument Co., P.O. Box 357, Boulder, Colo., 4, 12, 85
Tel: **HILLcrest 2-3741**

Buckbee Mears Co., Fourth & Rosabel St., St. Paul 1, Minn., 62
Tel: **CA 7-6371**

Buckeye Bobbin Co., 12200 Sprecher Ave., Cleveland 11, Ohio, 87

Bucknell Engrg. Co., Inc., P.O. Box 3426, S. El Monte, Calif., 58, 66, 73

Bud Radio, Inc., 2118 E. 55th St., Cleveland 3, Ohio, 84, 86, 87
Tel: **HEnderson 1-7166**

Budd-Stanley Co., Inc., 43-01 22nd St., Long Island City 1, N.Y., 37, 38, 50, 73, 77, 80
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Tel: **STillwell 6-1706**

Budelman Electronics Corp., 375 Fairfield Ave., Stamford, Conn., 8, 18, 19, 21, 24, 37
Tel: **FReside 8-9231**

Building Blocks Electronic Co., 2172 East 36th St., Brooklyn 34, N.Y., 12, 23, 36, 56, 61
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Tel: **CLoverdale 3-8931**

Bulova Research & Devel. Labs, Inc., 62-10 Woodside Ave., Woodside 77, N.Y., 4, 9, 15, 25, 28, 31, 36, 47
Tel: **NE 9-5700**

Bulova Watch Co., Electronics Div., Dept. A-1376, 40-06 62 St., Woodside 77, N.Y., 19, 26, 31, 36, 47, 50, 62, 88
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Tel: **NEwtown 9-5700**

Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N.Y., 86, 92
Tel: **ULster 8-0100**

Bureau of Engravings, Inc., Industrial Div., 500 S. 4th St., Minneapolis 15, Minn., 62
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Burgess Battery Co., Dept. IRE, Foot of Exchange St., Freeport, Ill., 39
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Tel: **ADams 2-2161**

Burgoyne Testing Labs., 542 Main St., Westbury, N.Y., 90
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Burke & James, Inc., 321 S. Wabash Ave., Chicago 4, Ill., 14, 32
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Voltage Range 100 μ v — 320 v
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 Accuracy 3% 15 cps — 150 kc
 5% elsewhere
 Stability of Internal Calibrator 0.5%
 Input Impedance
 10 megs shunted by 18 μ f below 10 mv
 10 megs shunted by 8 μ f above 10 mv



AUDIO to 250 kc MODEL 300D

Voltage Range 1 mv — 1000 v
 Frequency Range 10 cps — 250 kc
 Accuracy 2% ENTIRE RANGE
 Input Impedance 2 meg shunted by 15 uuf

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Voltage Range 0-10 v RMS; Pk-to-Pk; or DC
 Frequency (Std. Model) 1 kc
 (other values on special order)
 Accuracy (long term) Better than 0.5% above 1 mv
 Distortion and Hum Less than 0.25%
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 on range setting



SUB-AUDIO to 150 kc MODEL 302C

Battery Operated

Voltage Range 100 μ v — 1000 v
 Frequency Range 2 cps — 150 kc
 Accuracy 3% 5 cps — 100 Kc
 5% elsewhere
 Input Impedance 2 meg shunted by 10 μ f*

*Shunt copcitance, 25 μ f on two most sensitive ronges



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For Measuring DC Voltages when
 combined with any AC Voltmeter

Voltage Range 1 μ v — 100 v DC
 Ratios DC Input to RMS Output 1:100 & 10:1
 Accuracy 1% 100 μ v — 100 v
 Input Resistance >10 meg for 1:100
 50 meg for 10:1



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Voltage Range 1 mv — 1000 v pk-to-pk
 Frequency Range 10 cps — 100 kc (sine wave)
 Pulse Width 3 μ sec — 250 μ sec
 Min Rep Rate 20 pulses per sec
 Accuracy 5% for pulses
 Input Impedance 2 meg shunted by 8 μ f*

*Shunt capacitance, 15 μ f on two most sensitive ronges

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For Increasing the Sensitivity of any
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Voltage Range 20 μ v — 50 mv
 Frequency Range 10 cps — 150 kc
 Accuracy 2% ENTIRE RANGE
 Input Impedance 5 meg shunted by 15 μ f



AUDIO to 2 mc MODEL 310A

Voltage Range 100 μ v — 100 v
 Down to 40 μ v of reduced accuracy
 Frequency Range 10 cps — 2 mc
 As null detector 5 cps. — 4 mc
 Accuracy 3% 15 cps — 1 mc
 5% elsewhere
 Input Impedance 2 meg shunted by 9 μ f*

*Shunt copcitance, 19 μ f on two most sensitive ronges



DIRECT READING CAPACITANCE METER MODEL 520

Capacitance Range 0.01 μ f to 12 μ f
 in 9 decade ronges covering over a billion to 1
 Accuracy 2% above 0.1 μ f
 5% below 0.1 μ f
 Capacitor Power Factor 0.15
 Test Frequency 1 kc



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Voltage Range 1 mv — 1000 v
 (100 μ v — 1 mv without probe)
 Frequency Range 15 cps — 6 mc
 Accuracy 3% 15 cps — 3 mc
 5% elsewhere
 Input Impedance 11 meg shunted by 8 μ f
 (1 meg shunted by 25 μ f without probe)



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 (Down to 0.01 cps with correction)
 Accuracy 3% ENTIRE RANGE
 Input Impedance 10 meg shunted by 17 uuf
 or 40 uuf depending on setting



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Burndy Corp., 11. H. Buggie Div., P.O. Box 817, Toledo 1, Ohio, 37, 44, 69, 98
Tel: ON 1-2461

Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn., 44, 51, 70, 87, 98
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Burnell & Co., Inc., Dept. P, 10 Pelham Pkwy., Pelham, N.Y., 43, 48, 50
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Tel: PELham 8-5000

Burnett Radio Lab., W.V.L., 4818 Idaho St., San Diego 16, Calif., 47, 85, 90
Tel: ATwater 2-2740

Burr-Brown Research Corp., Box 6444, Tucson, Ariz., 3, 12, 36, 90
Tel: AXtel 8-0722

Burroughs Corp., 6071 Second Ave., Detroit 32, Mich., 9, 46
Tel: TR 5-2260

Burroughs Corp., Electrodata Div., 460 Sierra Madre Villa, Pasadena, Calif., 9, 63
Tel: RYan 1-0471

Burroughs Corp., Electronic Tube Div., Box 1226, Plainfield, N.J., 9, 19, 46, 61
Tel: PLainfield 6-0876

Burroughs Corp., Research Center, Paoli, Pa., 9, 34, 46
Tel: NIAgara 4-4700

Burton-Rogers Co., Sales Div., Hoyt Elect., 42 Carleton St., Cambridge 42, Mass., 56
Tel: ELiot 4-1643

Bush Transformer Corp., 707 North St., Endicott, N.Y., 36, 73
Tel: PIONEER 8-3387

Buss, Clement, Doughten & Associates, Chester Springs, Chester County, Pa., 90, 100
Tel: TAlmadge 7-2081

Bussmann Mfg. Div. of McGraw-Edison Co., University at Jefferson, St. Louis 7, Mo., 51
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Tel: GARfield 1-1740

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CBS Electronics Co., 2601 N. Howard St., Philadelphia 33, Pa., 53, 73, 79, 82, 85, 86
Tel: GARfield 3-2797

CBS Electronics, Div. of Columbia Broadcasting System, Inc., 100 Endicott St., Danvers, Mass., 68, 74, 75, 76
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Tel: SPRing 4-2360

C. G. Electronics Corp., 15000 Central East, Albuquerque, N.M., 4, 9, 12, 34, 37, 43, 50, 60, 62, 73, 86
Tel: ALpine 6-9858

CGS Labs., Inc., Routes 7 & 35, Ridgefield, Conn., 1, 4, 12, 21, 36, 43, 70, 73, 80, 85, 86, 90
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C-W Mfg. Co., Box 2065, El Monte, Calif., 47

CWS Waveguide Corp., 136 Norman Ave., Amityville, L.I., N.Y., 80
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Caig Labs., 46 Stanwood Rd., New Hyde Park, L.I., N.Y., 91
Tel: PIONEER 2-0278

Calbest Electronics Co., 4801 Exposition Blvd., Los Angeles 16, Calif., 4, 6, 7, 30, 36, 43, 67, 77, 81, 82
Tel: REpublic 1-7291

Calcon Mfg. Co., 100 Oakland Ave., Washington, Pa., 82
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California Technical Industries, Div. of Textron, Inc., 1421 Old County Rd., Belmont, Calif., 9, 12, 15, 19, 37
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Caltron Products Co., 3518 W. Pico Blvd., Los Angeles 19, Calif., 70
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Cambridge Instrument Co., 73 Spring St., Ossining, N.Y., 12, 17, 22, 36, 56
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Cambridge Pattern Works, 55 First St., Cambridge 41, Mass., 81
Tel: KIRkland 7-8191

Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 41, 42, 43, 44, 47, 50, 53, 83, 98
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Tel: TROWbridge 6-2800

Camden Electronics, Inc., 30 Irvin Ave., Collingswood 7, N.J., 4, 36, 43, 61, 62, 73
Tel: COLLingswood 5-2795

Camera Equipment Co., Dept. IRE, 315 West 43 St., New York 36, N.Y., 4, 18, 32, 39, 45, 57, 81, 85
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Tel: JUDson 6-1420

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Tel: EXpress 1-4000

Camloc Fastener Corp., 57 Spring Valley Rd., Paramus, N.J., 87
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Tel: HUBbard 9-4900

Campbell Co., Inc., Miry Brook Rd., P.O. Box 529, Danbury, Conn., 73
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Campbell X-Ray Corp., 108 Cummington St., Boston 15, Mass., 17, 73
Tel: KENmore 6-1611

Canadair Ltd., Missile-Systems Div., P.O. Box 6087, Montreal, P.Q., Canada, 4, 12, 22, 34, 61, 85, 86
Tel: RI 4-1511

Canadian Aviation Electronic, Ltd., 6214 Cote De Liesse Rd., Montreal 9, Quebec, Canada, 1, 9, 12, 14, 25, 28, 36, 61, 62, 72, 73, 81, 85, 86, 90, 101
Tel: MELrose 1-6781

Canadian General Elec. Co., Elect. Equip.-Tube Dept., 830 Lansdowne Ave., Toronto 4, Ont., Canada, 1, 4, 7, 8, 9, 10, 16, 18, 20, 22, 24, 25, 29, 32, 34, 35, 85, 90
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Canadian Marconi Co., 2442 Trenton Ave., Montreal 16, Canada, 1, 3, 5, 6, 7, 12, 16, 19, 20, 21, 24, 26, 29, 31
Tel: REgent 8-9441

Canadian Radium & Uranium Corp., 630 Fifth Ave., New York 20, N.Y., 81, 86, 87, 98
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Tel: CIRCLE 6-0460

Canadian Research Institute, 46 St. George St., Toronto 5, Ont., Canada, 3, 4, 5, 9, 12, 13, 14, 17, 22, 23, 26, 36, 41, 45, 56, 61, 67, 79, 86, 88, 90, 92
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Canadian Westinghouse Co., Electronics Div., P.O. Box 510, Hamilton, Ont., Canada, 1, 4, 6, 7, 9, 18, 25, 29, 34, 46, 72, 77
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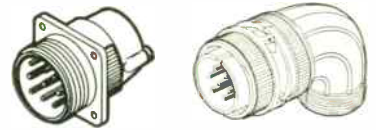
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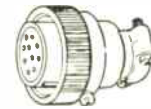
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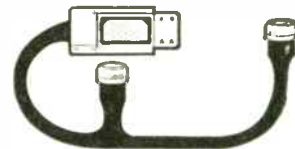
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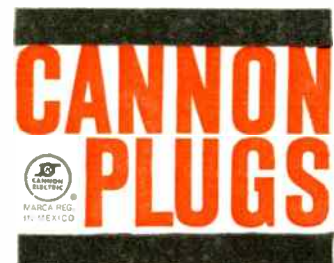
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Tel: Hillcrest 2-3380

Carborundum Metals Co., P.O. Box 32, Akron, N.Y., 93
Tel: 9454

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Cargo Packers, Inc., 88th St. & 73rd Ave., Glendale 27, N.Y., 87
Tel: TW 4-0636

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Tel: ADams 2-4461

Carman Laboratories, Inc., 328 Great Rd., Bedford, Mass., 92
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Carol Cable Co., 190 Middle St., Pawtucket, R.I., 82
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Carpenter Mfg. Co., Inc., P.O. Box 217, DeWitt 14, N.Y., 92
Tel: Gibson 6-0670

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Carter Mfg. Corp., 23 Washington St., Hudson, Mass., 67
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Celanese Corp. of America, 180 Madison Ave., New York 16, N.Y., 89, 95
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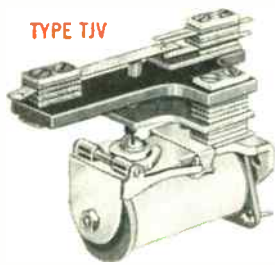
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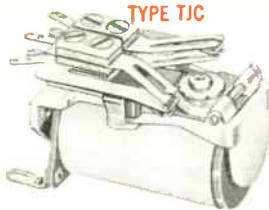
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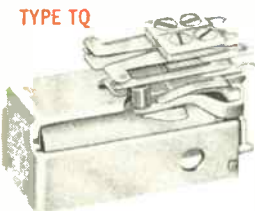
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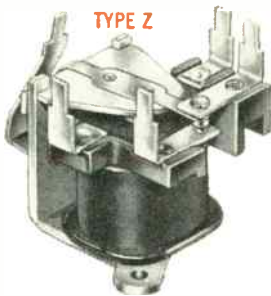
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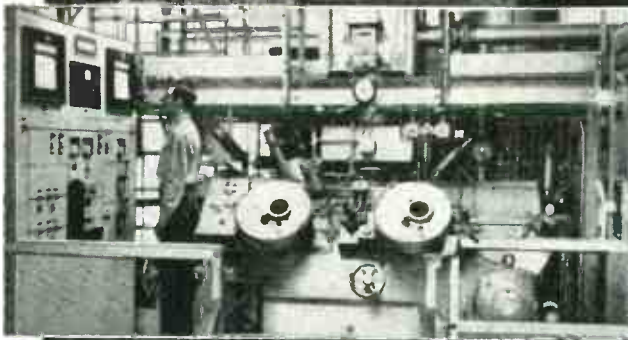
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Continental Screw Co., 459 Mt. Pleasant St., New Bedford, Mass., 87

Tel: WYman 3-2621

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Tel: COLony 9-1421

Control Corp., 718 Central Ave., Minneapolis 14, Minn., 4, 8, 9, 21, 24, 28, 34, 36, 43, 45, 61, 66, 73, 90

Tel: FEderal 5-7893

Control Data Corp., 501 Park Ave., Minneapolis 15, Minn., 4, 9, 58

Tel: FEderal 9-0947

Control Devices, Inc., 925 S. Eton Rd., Birmingham, Mich., 4, 9, 12, 36, 56, 61, 66, 72, 81, 84, 85, 86, 98

Tel: MIldwest 4-4244

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Tel: HAmilton 7-7961

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Tel: HU 2-0213

Controlled Atmosphere Enclosures, 230-11 141st Ave., Springfield Gardens 13, N.Y., 12, 81, 86, 89, 92

Tel: LAnrelton 8-7811

Controls Co. of America, 9555 Soring Ave., Schiller Park, Ill., 4, 28, 40, 58, 70

Tel: NA 5-9000

Cook Co., Frank R., 3850 Olive St., Denver 7, Colo., 39, 61

Tel: FL 5-3531

Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill., 4, 8, 9, 20, 27, 34, 45, 66, 70, 90

Tel: DI 8-6700

Cook Electric Co., Inland Lab., 6401 W. Oakton St., Morton Grove, Ill., 12, 22, 81, 84, 85, 86, 88, 90

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Cook Labs., Inc., 101 Second St., Stamford, Conn., 59

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Cooper & Sons, J. B., 180 Varick St., New York 14, N.Y., 82

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Coors Porcelain Co., 600 9th St., Golden, Colo., 83

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Copperweld Steel Co., Flexo Wire Div., 70 W. First St., Oswego, N.Y., 82

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Tel: AP 7-7676

Cordover & Co., Carl, 104 Liberty Ave., Mineola, N.Y., 63

Tel: Pioneer 7-5150

Cornell Aeronautical Labs., 4455 Gene-see St., Buffalo, N.Y., 90

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Tel: YUkon 6-9696

Cosmic Condenser Co., 853 Whittier St., New York 59, N.Y., 41

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Coto-Coil Co., Inc., 75 Pavilion Ave., Providence 5, R.I., 43

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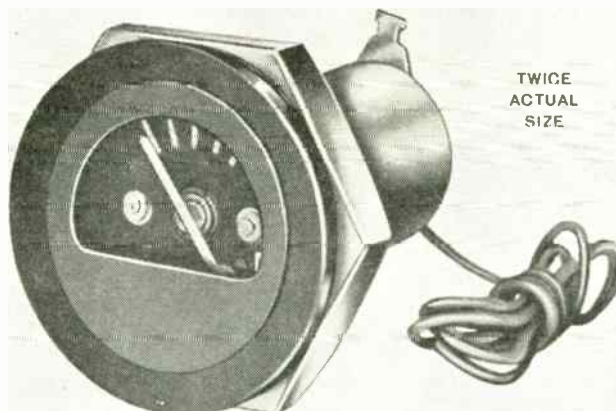
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Cowan Publishing Corp., 300 W. 43 St., New York 36, N.Y., 101
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Craig Corp., 50-58 Eastern Ave., Boston 9, Mass., 40, 45, 56
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Cramer Controls Corp., P.O. Box 22, Centerbrook, Conn., 4, 56, 58, 66, 70
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Crane Packing Co., 6400 Oakton St., Morton Grove, Ill., 86, 87, 89, 95
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Cratex Mfg. Co., 1600 Rollins Rd., Burlingame, Calif., 87
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Creative Electronics Co., 94 Lincoln Ave., Stamford, Conn., 1, 2, 7, 10, 20, 24, 26, 29, 61
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Crescent Comms. Corp., 43 Hempstead St., New London, Conn., 3, 5, 12
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Cunningham, Son & Co., Inc., James, 33 Litchfield St., Rochester 8, N.Y., 12, 21, 66, 70, 100
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Curtis Dev. & Mfg. Co., 3267 N. 33 St., Milwaukee 16, Wis., 4, 98
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Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis., 4, 28, 66, 70, 88
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Cutler Metal Prods. Co., 1025 Line St., Camden 3, N.J., 81, 84, 86
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Cyclotron Specialties Co., Moraga 9, Calif., 9
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D & R Plastic Welders, Inc., Box J, Hazardville, Conn., 86
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Dalmo Victor Co., Div. of Textron, Inc., 1515 Industrial Way, Belmont, Calif., 4, 16, 25, 28, 36, 37
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Davies Molding Co., Harry, 1428 N. Wells St., Chicago 10, Ill., 81, 86, 87, 94
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Diamond Electronics Corp., 64 White St., New York 13, N.Y., 41, 42, 64
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Diamond Power Specialty Corp., Elect. Div., Box 415, Lancaster, Ohio, 6, 7
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Diamond Tool Engrg. Co., 108 Massachusetts Ave., Boston 15, Mass., 59
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Digital Equipment Corp., 146 Main St., Maynard, Mass., 9, 62
Tel: TWinoaks 7-8822

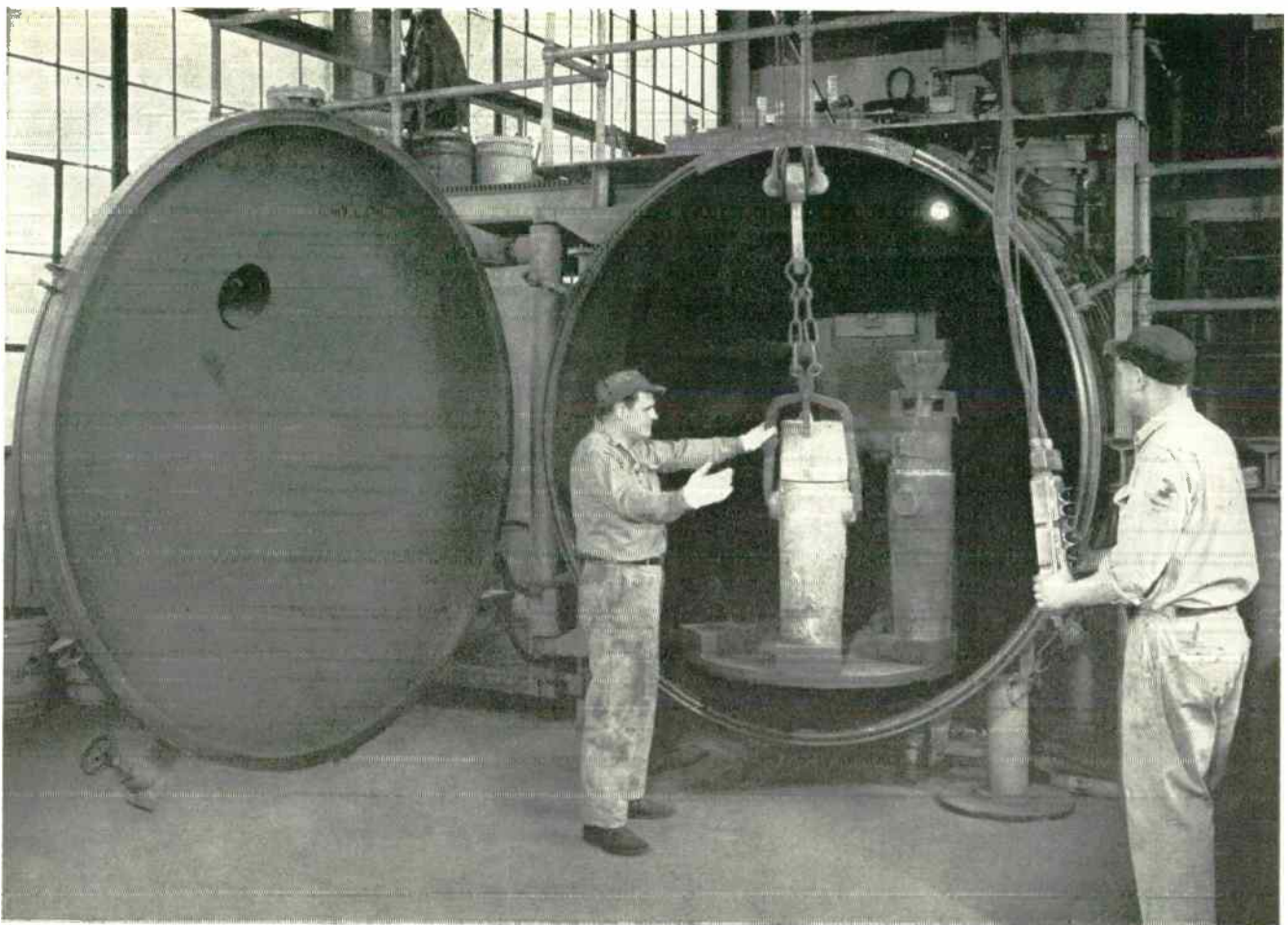
Digitronics Corp., Albertson Ave., Albertson, N.Y., 9
Tel: PioneER 7-5090

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See ad on page 651
Tel: CHapel 9-7999

Dillon & Co., Inc., W. C., 14620 Keswick St., Van Nuys, Calif., 12, 72
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Dimco-Gray Co., 212 E. Sixth St., Dayton 2, Ohio, 31, 56, 70, 86, 87, 94
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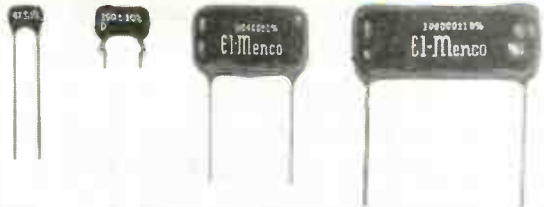
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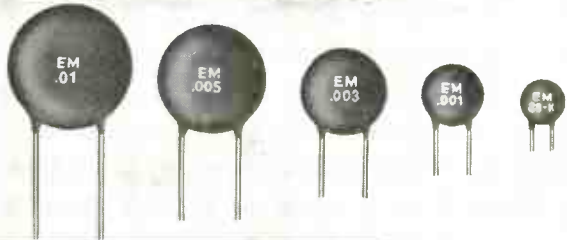
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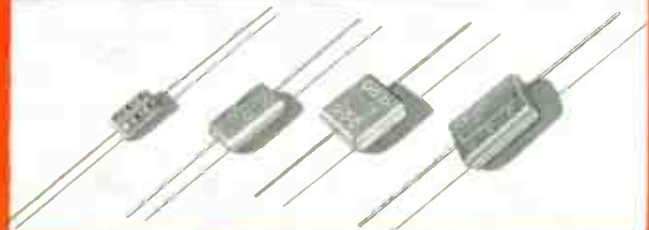


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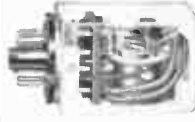
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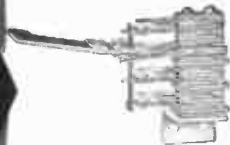


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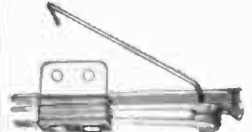
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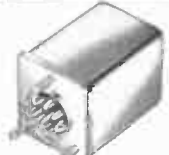


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Tel: CIRCLE 5-3840

Erdeco Engrg. Corp., Addison, Ill., 88, 92
Tel: KINGSWOOD 3-6733

Ericsson Corp., L. M. (Stockholm 32, Sweden) 649 Broadway, New York 12, N.Y., 74, 75, 76, 90
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Tel: OREGON 7-8400

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 4, 9, 21, 31, 36, 41, 42, 56, 59, 62, 64, 67, 68, 73, 77, 83, 86, 87, 89, 90, 94
See ad on pages 110-111
Tel: GLENDALE 6-8592

Erikson Specialized Tool, P.O. Box 424, Pico, Calif., 92
Tel: OXFORD 9-3719

Ernst Mfg. Co., Inc., P.O. Box 715, Rose City, Mich., 4
Tel: MURRAY 5-3311

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Tel: BI 8-0622

Espey Mfg. Co., Inc., 200 W. 57 St., New York 19, N.Y., 36, 43, 50, 61, 73
Tel: CIRCLE 6-1640

Espey Mfg. Co., Saratoga Ind. Div., Box 422, Saratoga Springs, N.Y., 36, 43, 61, 72, 73, 77, 79, 80, 90
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Ess Specialty Corp., P.O. Box 149, Bergenfield, N.J., 4, 66
Tel: DUMONT 4-3411

Essential Books, 16-00 Pollitt Dr., Fair Lawn, N.J., 101
Tel: OREGON 9-7300

Essential Electronics Co., 1011 Power Ave., Cleveland 14, Ohio, 17
Tel: SUPERIOR 1-7136

Essex Electronics, 569 Springfield Ave., Berkeley Heights, N.J., 37, 43, 48, 73, 86
See ad on page 155
Tel: CRESTVIEW 3-9300

Essex Wire Corp., Dodge St., Dekalb, Ill., 82

Essex Wire Corp., Magnetic Winding Div., Freemansburg & Hobson, Easton, Pa., 73
Tel: BL 3-2751

Essex Wire Corp., RBM Div., 131 Godfrie St., Logansport, Ind., 66, 70
Tel: LOGANSPORT 5121

Esterline-Angus Co., Inc., P.O. Box 596, Indianapolis 6, Ind., 31
Tel: CHAPEL 4-3318

Etched Products Corp., 39-01 Queens Blvd., Long Island City 4, N.Y., 44, 62, 81, 86, 87
Tel: STILLWELL 4-5900

Etching Co. of Calif., Q-Circuits Div., 1208 Howard St., San Francisco 3, Calif., 41, 62
Tel: MARKET 1-7670

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Tel: HOLBORN 6936

Eubanks Engrg. Co., 260 N. Allen Ave., Pasadena, Calif., 92
Tel: RYAN 1-5905

Eugene Engrg. Co., Inc., 1217 Hyde Park Ave., Boston, Mass., 81, 84, 86
Tel: HYDE PARK 3-4404

Evans, James, 38 Bel Aire Dr., Stamford, Conn., 9, 85
Tel: DAVIS 2-3217

Evershed & Vignoles Ltd., Acton Ln. Works, Chiswick, London, W. 4, Eng., 4, 5, 9, 12, 14, 28, 36, 56, 58, 66, 72
Tel: CHISWICK 3670

Ewald Instruments, Route 7, Kent, Conn., 4, 88, 92
See ad on page 665
Tel: WALKER 7-3278

Exact Electronics, Inc., P.O. Box 552, Portland 7, Ore., 12, 17, 19
Tel: CHERRY 4-3541

Exact Engrg. & Mfg., Inc., P.O. Box 447, Oceanside, Calif., 28, 85
Tel: SARATOGA 2-2144

Exactel Instrument Co., 185 Evelyn Ave., Mountain View, Calif., 4, 36
Tel: YORKSHIRE 8-6558

Excellex Electronics, Inc., 335 Van Siclen Ave., Brooklyn 7, N.Y., 86, 94, 98
Tel: HY 5-6208

Executone, Inc., 415 Lexington Ave., New York 17, N.Y., 16, 30
Tel: MURRAY HILL 7-7740

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Tel: HYACINTH 2-4300

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Eyelet Tool Co., Inc., 236A Broadway, Cambridge 42, Mass., 92
Tel: UNIVERSITY 4-8170

F

FXR, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 19, 25, 38, 50, 56, 61, 70, 80
See ad on pages 97-100
Tel: ASTORIA 8-2800

Fabra-Print, Inc., 801 S.E. 8 St., Minneapolis 14, Minn., 86, 87
Tel: FEDERAL 9-7701

Factory Enterprises, Inc., 3431 Butler St., Pittsburgh 1, Pa., 82, 92, 96
Tel: MUSEUM 1-1199

Fae Instrument Corp., 42-61 Hunter St., Long Island City 1, N.Y., 1, 4, 28, 85
Tel: STILLWELL 6-4959

Fair Rite Products Corp., Commercial Row, Wallkill, N.Y., 46
Tel: WALLKILL 3-2632

Fairbanks Wire Co., Inc., 2287 Hollers Ave., New York 69, N.Y., 82
Tel: FAIRBANKS 4 1266

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Tel: 6-0201

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Tel: YORKSHIRE 8-8161

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Fairmount Chemical Co., 136 Liberty St., New York 6, N.Y., 97
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Falcon Machine & Tool Co., Inc., 208 Concord Turnpike, Cambridge 40, Mass., 12, 28, 44, 87
See ad on page 349
Tel: TROWBRIDGE 6-3269

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Tel: CLIFFORD 6-1300

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Tel: PR 7-0013

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See ad on pages 156-157
Tel: DEXTER 6-4900

Farinon Electric Co., 416 D St., Redwood City, Calif., 24
Tel: EMERSON 9-2102

Farley & Loetscher Mfg., Plastics Div., 7th & White Sts., Dubuque, Iowa, 84, 95
Tel: 2-5451

Farmer Elect. Prods. Co., 2300 Washington St., Newton Lower Falls, Mass., 4, 72
Tel: DECATUR 2-8383

Farnsworth Electronics, Div. of I.T. & T., 3702 Pontiac St., Ft. Wayne, Ind., 75, 80, 90
Tel: HARRISON 7571

Farrall Instrument Co., P.O. Box 658, Grand Island, Neb., 17, 85, 86, 90
Tel: DUPONT 4-1530

Farrand Controls, Inc., 4401 Bronx Blvd., New York 70, N.Y., 4, 9, 28, 72, 90
Tel: FA 4-2200

Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 81, 84, 86
See ad on page 601
Tel: CAPITAL 4-5318

Farwest Mfg. Div., 209 First Ave., Seattle 4, Wash., 3, 12, 36, 61
Tel: 4-5656

Fasco Industries, 255 Union St., Rochester, N.Y., 4, 40, 58, 70, 71
Tel: HAMILTON 6-1800

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Fasteners, Inc., 198 Columbus Ave.,
Pittsfield, Mass., 87
Tel: Hillcrest 3-9105

Fawn Plastics Co., Inc., 2301 York Rd.,
Timonium, Md., 94
Tel: VA 3-7260

Federal A-C Switch Corp., P.O. Box 25,
Lancaster, N.Y., 70
Tel: MU 1600

Federal Electric Corp., Rt. 17 & Garden
State Pkwy., Paramus, N.J., 100, 101
Tel: Colfax 1-7200

Federal Mfg. & Eng. Corp., 1055 Stewart
Ave., Garden City, N.Y., 12, 19, 26, 80,
86
Tel: Pioneer 2-7400

Federal Pacific Elec. Co., 50 Avenue L,
Newark 1, N.J., 4, 12, 31, 56
Tel: MA 3-6500

Federal Scientific Corp., 615 West 131
St., New York 27, N.Y., 25, 36, 50, 85,
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Tel: AUdubon 6-4400

Federal Screw Products, Inc., 3917 N.
Kedzie Ave., Chicago 18, Ill., 60, 87, 98
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Tel: IRving 8-5744

Federal Shock Mount Corp., Div. Kor-
fund Co., Inc., 48-15 32nd Pl., Long
Island City 1, N.Y., 78
Tel: RAvenswood 9-7580

Federal Tool Engineering Co., 1400
Pompton Ave., Cedar Grove, N.J., 90, 92
See ad on page 665
Tel: CLifford 6-5300

Federal Tool & Mfg. Co., 3600 Alabama
Ave., Minneapolis 16, Minn., 86
Tel: WEst 9-7843

Feedback Controls, Inc., 899 Main St.,
Waltham 54, Mass., 1, 4, 8, 28, 36
Tel: TW 4-1020

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cello, Skokie, Ill., 10, 16, 30
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Tel: FAirfax 8-4704

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Tel: KEystone 9-6661

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Cormick Blvd., Skokie, Ill., 87, 89
Tel: ROgers Park 1-4500

Felters Co., 210 South St., Boston 11,
Mass., 87
Tel: LIBerty 2-7021

Fenn College, Dept. of Electrical Eng.,
1983 E. 24 St., Cleveland 25, Ohio, 100
Tel: PR 1-0250

Fentiman & Sons, Ltd., E., 335 Roose-
velt Ave., Ottawa 3, Ont., Canada, 37
Tel: PArkway 2-6581

Fen-Tone Corp., 106 Fifth Ave., New
York 11, N.Y., 57, 59
Tel: OREGon 5-1707

Fenwal Electronics, Inc., 51 Mellan St.,
Framingham, Mass., 4, 67
Tel: TRinity 3-7455

Fenwal, Inc., Pleasant St., Ashland,
Mass., 4, 56, 70, 71
Tel: TRinity 5-6111

Ferranti Electric, Inc., Electronics Div.,
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3, 4, 9, 48, 68, 74, 75, 76
Tel: IV 3-8244

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22, 24, 34, 36, 52, 61, 62, 74, 85, 90
Tel: RO 2-3661

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Park, Mich., 4, 9, 90
Tel: JORDan 6-2327

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5, N.J., 37, 46, 87, 93, 94
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way, New York 12, N.Y., 12, 28, 36,
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Tel: ALgonquim 4-5810

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46, 55, 67, 83
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531, 617
Tel: CHerry 6-2811

Fiber Glass Industries, Inc., Homestead
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Tel: VICTor 2-4000

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Tel: BiGelow 2-4110

Fidelity Instrument Corp., 1000 E. Boundary Ave., York, Pa., 4, 36, 61, 73, 79
Tel: YOrk 7675

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Tel: WAtkins 4-3245

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Tel: POrt Washington 7-8220

Filtron Co., Inc., 131-15 Fowler Ave., Flushing 55, L.I., N.Y., 41, 48, 50, 61, 62, 73, 90
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Tel: HighlAnds 5-1810

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Tel: OSborne 5-6000

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Tel: NEw Rochelle 6-1300

Fishel, Jesse, E. E., 22 Prospect Pk. W., Brooklyn 15, N.Y., 85
Tel: ULster 7-4176

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Tel: LOeust 4-5054

Fisher Engineering, Inc., 2060 U.S. 24, Box 327, Huntington, Ind., 36, 43, 73, 85, 80, 90
Tel: HUntington 315

Fisher Radio Corp., 21-21 44th Dr., Long Island City 1, N.Y., 6, 36, 77
Tel: EX 2-2500

Fisher Research Lab., Inc., 1975 University Ave., Palo Alto, Calif., 3, 4, 10, 13, 16, 20, 22, 26, 37, 56, 61
Tel: DA 2-4646

Fisher Scientific Co., 711 Forbes St., Pittsburgh 19, Pa., 4, 5, 12, 14, 39, 56, 66, 72, 78, 79, 91
Tel: EXpress 1-1330

Fleetwood Labs., Inc., 300 Victory Blvd., New Rochelle, N.Y., 12
Tel: BEverly 5-0831

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Tel: ORegon 9-1300

Flexonics Corp., 1315 South 3 Ave., Maywood, Ill., 71
Tel: FILLmore 3-8000

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Tel: BA 2-5500

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Tel: REpublic 7-4163

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Flow Corp., 85 Mystic St., Arlington 74, Mass., 3, 12, 26, 50, 56, 72
Tel: MIssion 8-3185

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Tel: VI 9-1552

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Tel: AT 2-5700

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Tel: CAldwell 6-8118

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Tel: 34-6061

Foampak Corp., 400 N. 12th St., Philadelphia 23, Pa., 86
Tel: WAlnut 2-2572

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Tel: MOhawk 4-2735

Food Mach. & Chem. Corp., 1105 Coleman Ave., San Jose, Calif., 81, 90
Tel: CYpress 4-8124

Foote Mineral Co., 18 W. Chelton Ave., Philadelphia 44, Pa., 46, 47, 82, 83, 89, 91, 93, 99
Tel: VICTor 8-4000

Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 28, 36, 43, 48, 50, 73
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Tel: YE 4-2691

Ford Radio & Mica Corp., 536-63 St., Brooklyn, N.Y., 99
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Ford Motor Co., Aeronutronic Systems, Inc., Sub., Ford Rd., Newport Beach, Calif., 1, 9, 34

Forest Electric Co., 7216 Circle Ave., Forest Park, Ill., 43, 73
Tel: FOrest Park 6-4100

Formica Metal Products Co., Corporation Way, Medford 55, Mass., 81, 84
Tel: EXport 5-5656

Forney Industries, Fort Collins, Colo., 1, 44, 58, 73, 88, 92, 97
Tel: HU 2-7271

Fort Hill Engraving Co., 40 Hanover St., Boston 8, Mass., 86, 87, 95
Tel: RICHmond 2-2570

Fort Wayne Metals, Inc., 3211 MacArthur Dr., Fort Wayne, Ind., 63, 82, 85
Tel: H-3267

Foss, Inc., William L., 927 15 St., Washington 5, D.C., 85
Tel: RE 7-3883

Foster Transformer Co., 3820 Colerain Ave., Cincinnati 23, Ohio, 43, 50, 73
Tel: MUBerry 1-2420

Fostoria Pressed Steel, N. Main St., Fostoria, Ohio, 88
Tel: HEMlock 5-7721

Foto-Video Labs., Inc., 36 Commerce Rd., Cedar Grove, N.J., 6, 7, 21, 23, 26, 32, 35, 36, 61, 64, 70, 85, 90
See ad on page 490
Tel: CEnter 9-6100

Fox Co., C. J., 236 Aborn St., Providence 1, R.I., 87
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Foxboro Co., Foxboro, Mass., 4, 34, 56
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Tel: EVergreen 6-1300

Freeland Products Co., 700 Dryades St., New Orleans 12, La., 74, 76
Tel: TULane 6381

Freedlander Res. & Dev. Lab., 3341 W. El Segundo Blvd., Hawthorne, Calif., 89, 90, 91
Tel: OS 6-0141

Frenchtown Porcelain Co., 8th & Harrison St., Frenchtown, N.J., 52, 83, 89
Tel: FRenchtown 480

Frequency Standards, Inc., P.O. Box 504 Shafta Rd., Asbury Park, N.J., 19, 25, 37, 38, 44, 50, 56, 70, 80
See ad on page 453
Tel: PRospect 4-0500

Friden, Inc., 2350 Washington Ave., San Leandro, Calif., 9
Tel: SW 8-0700

Fried, Licensed Prof. Engineer, Crescent Beach Dr., Huntington, N.Y., 4, 85, 86, 90
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Tel: HIllcrest 4-0005

Gamewell Co., 1238 Chestnut St., Newton Upper Fall, Mass., 67
Tel: BIgelow 4-1240

Gano & Associates, J. J., 1955 Mass. Ave., Cambridge 40, Mass., 85
Tel: EL 4-3633

Gap Instrument Corp., 116 E. Merrick Rd., Freeport, N.Y., 4, 28, 58
Tel: FR 8-1040

Gar Precision Parts, Inc., 190 Henry St., Stamford, Conn., 80
Tel: FI 8-2671

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Tel: PAwtucket 6-4200

Gardener Electronics, Co., 2545 E. Indian School, Phoenix, Ariz., 4
Tel: CR 4-9681

Gardner, Ben R., P.O. Box 872, State College, Pa., 85, 90
Tel: AD 8-8917

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Green Rectifier Co., 1-10 30 St., Fair Lawn, N.J., 4, 12, 15, 43, 45, 61, 62, 64, 68, 73, 79, 81, 84, 86, 90, 92
Tel: SWarhmore 7-8100

Greene Organization, Inc., Dan, P.O. Box 124, Cambridge 38, Mass., 102
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Tel: UNiversity 4-2220

Greer Stop Nut Co., 2620 W. Flournoy St., Chicago 12, Ill., 87, 99

Gregg Elec. Mfg. Co., Inc., 2 S. Broadway, Lawrence, Mass., 62, 92
Tel: MURdock 3-8974

Greibach Instruments Corp., 315 North Ave., New Rochelle, N.Y., 12, 56
See ad on page 297
Tel: NEW Rochelle 3-7900

Greibach Research & Development, 80 Pryer Ter., New Rochelle, N.Y., 56, 57, 66, 85
Tel: NEW Rochelle 6-6246

Gremer Mfg. Co., Inc., 7 North Ave., Wakefield, Mass., 44
Tel: CRYstal 9-4580

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 28, 44, 83, 87, 94
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Tel: NEW Rochelle 3-8600

Grigsby Co., Inc., 407 N. Salem Ave., Arlington Heights, Ill., 70, 86
Tel: CLearbrook 3-2180

Grimson Color, Inc., 381 4 Ave., New York 16, N.Y., 6, 7, 21, 32, 36, 61, 76
Tel: OR 9-9088

Groov-Pin Corp., 1125 Hendricks Causeway, Ridgefield, N.J., 87
Tel: WH 5-6780

Guardian Elec. Mfg. Co., 1601R W. Walnut St., Chicago 12, Ill., 4, 12, 43, 66, 70, 86
See ad on page 202
Tel: CHesapeake 3-1100

Gudebrod Bros. Silk Co., Inc., 225 W. 34 St., New York 1, N.Y., 87
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Tel: LACKawanna 4-5858

Gudeman Co., 340 W. Huron St., Chicago 10, Ill., 41, 73
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Tel: DE 7-7400

Guenther, Willy, 1138 Massachusetts Ave., Arlington 74, Mass., 70
Tel: MI 3-9286

Guidance Controls Corp., 110 Duffy Ave., Hicksville, N.Y., 28, 67
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Tel: WELLS 8-9500

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 1, 2, 5, 9, 12, 27, 28, 36, 37, 39, 41, 44, 50, 61, 62, 67, 72, 92
Tel: LIBerty 8-2800

Gulton Industries, Inc., Nuclear Instrumentation, 15000 E. Central Ave., Albuquerque, N.M., 1, 6, 7, 9, 18, 22, 34, 37, 38, 50, 62, 73, 80, 83, 96
Tel: AL 6-9858

Gunn, Ross, 4437 Lowell St., N.W., Washington 16, D.C., 85
Tel: WO 6-6467

Gurley Co. W. & L. E., 514 Fulton St., Troy, N.Y., 4, 9, 12, 72
Tel: AS 2-6300

Gyrex Corp., 3003 Pennsylvania Ave., Santa Monica, Calif., 4, 9, 13, 31, 50, 72, 90
Tel: EXbrook 3-0462

Gyro Electronics Co., 325 Canal St., New York 13, N.Y., 2, 10, 12, 20, 45, 62, 90
Tel: WO 6-1290

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H&H Machine Co., Inc., Noble & Jackson St., Norristown, Pa., 87, 92
Tel: BRoadway 2-6453

H. J. Transitions, Inc., 237 Woodlawn Ter., Collingswood 7, N.J., 66, 85
Tel: COLLingswood 5 7658

HPL Manufacturing Co., 15210 Miles Ave., Cleveland, Ohio, 86
Tel: WYoming 1-5000

HRB-Singer, Inc., Science Park, State College, Pa., 1, 9, 11, 15, 36, 37, 90
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Tel: ADams 7-7611

Hackensack Cable Corp., 116 Orchard St., Hackensack, N.J., 82
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Tel: HUBbard 7-1100

Hadfield, Bertram M., 1295 Old Worcester Rd., Framingham Center, Mass., 85, 90
Tel: TRinity 2-3452

Hadley Co., Robert M., 5112 S. Hoover St., Los Angeles 37, Calif., 36, 43, 73
Tel: ADams 4-9091

Halax Corp., 17470 Shelbourne Way, Los Gatos, Calif., 70, 87
Tel: EL Gato 4-2720

Haledy Electronics Co., 57 Williams St., New York, N.Y., 4, 66

Hal-Hen Co., 36-14 11th St., Long Island City 6, N.Y., 57, 82

Hall-Barkan Instruments, Inc., 181 Marbledale Rd., Tuckahoe 7, N.Y., 28, 86, 90
Tel: WO 1-4981

Hall Mfg. Co., 3901 Wesley Ter., Schiller Park, Ill., 73
Tel: TUXedo 9-7227

Hallmore Electronics Co., 714 N. Brookhurst St., Anaheim, Calif., 6, 21, 28, 32, 34, 36
Tel: PProspect 4-1010

Hallett Mfg. Co., 5910 Bowcroft St., Los Angeles, Calif., 12, 41, 44, 50, 53, 81, 82, 86, 87, 96, 98
Tel: TEXas 0-7094

Halliburton, Inc., Mfg. Div., 4724 S. Boyle Ave., Los Angeles 58, Calif., 81, 86
Tel: LUDlow 8-3181

Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill., 1, 2, 6, 7, 8, 9, 18, 19, 20, 24, 26, 29, 31, 33, 34, 36, 37, 38, 45, 48, 50, 61, 73, 77, 80
See ad on page 204
Tel: VAN Buren 6-6300

Hallmark, Clyde E., 2 Werling Rd., New Haven, Ind., 85, 90

Halm Instrument Co., Inc., Glen Head Rd., Glen Head, N.Y., 92
Tel: OR 6-6700

Halogen Insulator & Seal, 9960 Pacific Ave., Franklin Park, Ill., 86, 89, 95
Tel: GL 5-9000

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Tel: GL 3-9460

Hamilton Standard, Electronics Dept., Main St., Windsor Locks, Conn., 90
Tel: NAtional 3-1621

Hamilton Watch Co., Hathaway Instrument Div., 5800 E. Jewell Ave., Denver 22, Colo., 4, 12, 13, 14, 23, 28, 31, 56, 71
Tel: SK 6-8301

Hamilton Watch Co., Industrial Div., Columbia Ave., Lancaster, Pa., 12, 13, 23, 31, 56, 58, 66, 70, 87, 90, 93
Tel: EXpress 4-7161

Hamilton Watch Co., Precision Metals Div., Lancaster, Pa., 40, 93
Tel: EXpress 4-7161

Hamlin, Inc., 1316 Sherman Ave., Evanston, Ill., 66, 70
Tel: GReenleaf 5-8244

Hammond Mfg. Co., Ltd., P.O. Box 37, Guelph, Ont., Canada, 12, 42, 43, 45, 50, 55, 61, 63, 73, 79, 81, 84, 86, 87, 90
Tel: TAYlor 2-2960

Hamner Electronics Co., P.O. Box 531, Princeton, N.J., 12, 19, 22, 61, 84, 90
Tel: PE 7-1320

Hampden Mfg. Co., Inc., Bridge St., Three Rivers, Mass., 86
Tel: PALmer 353

Hampshire Engrg. Co., 2300 Washington St., Newton Lower Falls, Mass., 9, 85, 90
Tel: BIGelow 4-5937

Handee Household Products, 408 12 St., Brooklyn, N.Y., 40, 81, 84, 86, 87, 88
Tel: SOUTh 8-4112

Handley, Inc., 14758 Keswick, Van Nuys, Calif., 56, 67
Tel: ST 2-5840

Handy & Harman, 82 Fulton St., New York 38, N.Y., 91, 93, 97
Tel: BEekman 3-2460

Hansen Mfg. Co., Inc., 1001 S. Hart St., Princeton 10, Ind., 58
Tel: FULTon 5-3415

Hanson-Gorrill-Brian, Inc., 85 Hazel St., Glen Cove, N.Y., 4, 9, 15, 28, 34, 36
Tel: GLEN Cove 4-7300

Harder Co., Donald C., 3710 Midway Dr., San Diego 10, Calif., 36, 43, 73, 85, 86, 92
Tel: ACAdemy 2-5240

Hardigg Industries, 1 West Main St., So. Hadley Falls, Mass., 81, 87
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Tel: **HOLyoke** JEFFerson 3-6863

Hardman Co., Inc., H. V., 577 Cortlandt St., Belleville 9, N.J., 91, 92
Tel: PLYmouth 9-1242

Hard-N-Tuff Corp., 54 Mill Lane, Box 275, Huntington, N.Y., 88
Tel: HAmilton 7-4790

Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N.J., 67
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Tel: **MARKet** 2-8200

Harmon Electronics Co., 11431 Truman Rd., Independence, Mo., 4, 17, 33, 34, 50
Tel: CLifton 2-7334

Harmon Lichtenstein Co., 26 Broadway, New York 4, N.Y., 47
Tel: HANover 2-8395

Harper-Leader, Inc., 1046 S. Main St., Waterbury 20, Conn., 86
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Harrell, Inc., 1788 First Ave., New York 28, N.Y., 4, 28, 36, 45, 61, 66, 85, 86, 90
Tel: SAcramento 2-3683

Harris Transducer Corp., P.O. Box 247, Woodbury, Conn., 5, 12, 13, 16, 72, 86, 90
Tel: CONgress 3-2116

Harrison Laboratories, 45 Industrial Rd., Berkeley Heights, N.J., 61
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Tel: CResview 3-9123

Harrison Labs., Inc., B. M., 80 Winchester St., Newton Highlands 61, Mass., 3, 5, 12, 16, 61, 72, 73
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Hart Mfg. Co., 265 Bartholomew Ave., Hartford 1, Conn., 44, 66, 70, 71
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Tel: JAcKson 5-3491

Hartley Products Co., 521 E. 162 St., New York 51, N.Y., 54, 81
Tel: LUDlow 5-4239

Hartsall Co., Div. Allison Labs., 14185 Skyline Dr., La Puente, Calif., 70
Tel: ONford 4-4056

Hartwood Glass & Metals, P.O. Box 865, Martinsburg, W.Va., 82
Tel: AMherst 7-8411

Harvey-Wells Electronics, Res. & Dev. Div., 5168 Washington St., W. Roxbury, W. Va., 9, 12, 22, 55, 61
Tel: FAirview 7-8000

Harwood Mfg. Co., 466 W. Superior, Chicago 10, Ill., 81, 84, 86, 87
Tel: WH 3-0465

Harworth Mfg. Co., 409 El Camino Real, Menlo Park, Calif., 17
Tel: DAVenport 3-9965

Hastings-Raydist, Inc., Newcomb Ave., Hampton, Va., 1, 4, 12, 56, 72
Tel: PArk 3-6531

Hatfield Wire & Cable, Div. Continental Copper & Steel Industries, Inc., 487 Hillside Ave., Hillside 5, N.J., 82
Tel: MURdock 8-6400

Hauman Instr. Co., Inc., 70 Coolidge Hill Rd., Watertown 72, Mass., 12, 86
Tel: WATertown 4-8122

Haveg Industries, 900 Greenbank Rd., Wilmington 8, Del., 82, 86, 87, 89, 94, 95
Tel: WYman 8-2271

Hawley Products Co., 333 N. Sixth St., Saint Charles, Ill., 54
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Tel: SAInt Charles 3130

Hayden Publishing Co., 830 Third Ave., New York 22, N.Y., 101
Tel: PLaza 1-5530

Haydon Co., A. W., 240 N. Elm St., Waterbury 20, Conn., 4, 9, 31, 58, 66
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Tel: PLaza 6-4481

Haydon Instrument Co., 165 W. Liberty St., Waterbury 20, Conn., 1, 4, 9
Tel: PL 6-2211

Haydon Switch, Inc., 536 S. Leonard St., Waterbury 20, Conn., 70
Tel: PLaza 6-7441

Haydu Elec. Products, Inc., 1426 W. Front St., Plainfield, N.J., 86, 88, 99
Tel: PLainfield 7-1500

Hayes, Inc., C. I., 800 Wellington Ave., Cranston 10, R.I., 88
Tel: HOPkins 1-3400

Haynes Stellite Co., 725 S. Lindsay St., Kokomo, Ind., 93
Tel: GLadstone 2-5421

Hays Corp., 742 E. 8th St., Michigan 47, Ind., 4, 36, 56, 61

Hays Mfg. Co., 801 W. 12th St., Erie 6, Pa., 4, 87, 89, 94, 95
Tel: ERie 2-3225

Hazeltine Corp., Little Neck 62, N.Y., 1, 25, 33, 35, 48, 80, 90
Tel: FAculty 1-2300

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 2, 3, 5, 6, 9, 12, 13, 16, 20, 22, 23, 24, 26, 27, 29, 35, 36, 45, 54, 56, 57, 59, 61, 77, 81
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Tel: YUKon 3-3961

Heavy Minerals Co., 4000 N. Hawthorne St., Chattanooga 8, Tenn., 93
Tel: ONford 8-3461

Hehn-Engrg., Lester C., 30 Manorhaven Blvd., Port Washington, N.Y., 4, 61, 72, 85, 90
Tel: POrt Washington 7-2676

Heinemann Electric Co., 610 Plum St., Trenton, N.J., 66, 80
Tel: EXport 4-1191

Heinz Electric Co., 685 Lawrence St., Lowell, Mass., 40, 58
Tel: GLENview 7-7556

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Heldor Mfg. Corp., 238 Lewis St., Paterson, N.J., 44, 52, 73, 81, 86, 87, 98
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Tel: PIONEer 3-7651

Helipot Corp., Beckman Instr., Inc., Newport Beach, Calif., 28, 48, 56, 58, 67, 84, 87
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Helko Products Co., Inc., 243 W. 55th St., New York 19, N.Y., 86
Tel: PLaza 7-3050

Helwig Carbon Products, Inc., 2550 N. 30th St., Milwaukee 10, Wis., 87
Tel: HILLtop 2-7755

Heminway & Bartlett Mfg. Co., 500 Fifth Ave., New York 36, N.Y., 87
Tel: LONGacre 4-0880

Heppner Mfg. Co., Box 608, Round Lake, Ill., 54
Tel: KIMball 6-2161

Henry & Miller Ind., Inc., 675 Garfield Ave., Jersey City, N.J., 80, 81, 84, 85, 86, 87, 99
Tel: HENDERson 4-4200

Hercules Fastener Co., 2722 N. Clybourn, Chicago 14, Ill., 87
Tel: LAK 5-5940

Herman Catalog Service, 200 E. 37 St., New York 16, N.Y., 101
Tel: MURray Hill 3-0434

Hermaseal Co., Inc., 1010 N. Main, Elkhart, Ind., 52
Tel: JA 2-3734

Hermes Electronics Co., Dept. B D, 75 Cambridge Pkwy., Cambridge 2, Mass., 3, 9, 31, 37, 50
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Tel: UNiversity 4-7200

Hermes Plastics, Inc., 13-19 University Place, New York 3, N.Y., 86, 87, 89, 92, 95, 98

Tel: ALgonquin 4-6894

Hermetic Pacific Corp., 4232 Temple City Blvd., Rosemead, Calif., 44, 47, 52, 86

Tel: CU 3-7224

Hermetic Seal Corp., 21 South Sixth St., Newark 7, N.J., 44, 47, 52

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Tel: MArkEt 3-9400

Hermetic Seal Transformer Co., Div. SHE, 555 N. 5th St., Garland, Tex., 36, 43, 50, 61, 73

Tel: BR 6-5141

Hermetite Corp., 702 Beacon St., Boston 15, Mass., 44, 47, 52

Tel: COpley 7-4040

Herold Radio-Elect. Corp., 100 Electra Lane, Yonkers, N.Y., 6, 27, 36, 59

Tel: MO 4-1500

Hertner Electric Co., 12690 Elmwood Ave., Cleveland 11, Ohio, 40, 45, 58, 61

Tel: CLearwater 2-4242

Herzog Miniature Lamp Wks., 50-17 5th St., Long Island City 1, N.Y., 60, 67

Tel: STillwell 4-2270

Hesco Engineering, 322 E. Beach Ave., Inglewood 3, Calif., 45, 61, 72

Tel: OREGon 8-4178

Hetherington, Inc., 1420 Delmar Dr., Folcroft, Pa., 60, 70

Tel: LUdlow 3-2100

Hett Associates, Inc., 603 Grand Ave., Englewood, N.J., 12, 61

Tel: LowelL 9-8838

Hevi-Duty Electric Co., 2040 W. Wisconsin Ave., Milwaukee 1, Wis., 73, 88

Tel: WEst 3-9339

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 3, 5, 9, 12, 19, 21, 22, 23, 26, 31, 34, 35, 36, 38, 50, 56, 61, 72, 73, 77, 80

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Tel: DAvenport 5-4451

Hewson Co., Inc., 443 Broad St., Newark 2, N.J., 4, 12, 61

Tel: HU 3-3000

Hexacon Electric Co., 161 W. Clay Ave., Roselle Park, N.J., 92

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Tel: CHestnut 5-6200

Hexcel Products, Inc., Havre de Grace, Md., 96

Heyman Mfg. Co., 300 Michigan Ave., Kenilworth 7, N.J., 87

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Tel: CHestnut 5-2345

Hickok Elect. Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio, 3, 5, 12, 19, 23, 26, 35, 56

Tel: LIberty 1-8060

Hieatt Engrg. Co., 2228 N. Hollywood Way, Burbank, Calif., 12

Tel: THornwall 2-4825

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Tel: NAtional 3-2481

High Voltage Engrg. Corp., Burlington, Mass., 22

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High Vacuum Equipment Corp., 2 Churchill Rd., Hingham, Mass., 4, 12, 86, 88, 92

Tel: RIverview 9-2430

Highland Engineering Co., 90 Magnolia Ave., Westbury, L.I., N.Y., 43, 50, 61, 73, 86

Tel: EDgewood 3-2933

Hildebrand, John G., 45 Brighton St., Belmont, Mass., 86, 89, 90

Tel: IVanhoe 4-6240

Hilger & Watts, Ltd., 80 Shore Rd., Port Washington, N.Y., 41

Hill Assoc., Inc., James J., 344 N.E. 61st St., Miami 37, Fla., 4, 56

Tel: PL 4-7342

Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 31

Tel: PO 6-7611

Hillburn Electronic Products Co., 55 Nassau Ave., Brooklyn 22, N.Y., 43, 66

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Tel: STagg 2-3875

Hillyer Corp., 331 Centennial Ave., Cranford, N.J., 92

Tel: BRidge 6-8710

Hinde & Dauch, Div. of West Va. Pulp & Paper Co., 1407 Decatur St., Sandusky, Ohio, 86

Tel: MAin 5-6610

Hindle Transformer Co., Woods Church Rd., R.D. 3, Flemington, N.J., 43, 61, 73

Tel: FLemington 836

Hirschmann Co., Inc., Carl, 30 Park Ave., Manhasset, L.I., N.Y., 92

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Tel: MAnhasset 7-5300

Hisonic, Inc., 9700 W. 75th St., Merriam, Kan., 43, 49, 50, 73

Tel: HEdrick 2-9819

Hi-Spec Electronics Corp., 7328 Ethel Ave., N. Hollywood, Calif., 66

Tel: POplar 5-5075

Hitchiner Mfg. Co., Inc., Elm St., Milford 360, N.H., 86

Tel: MIlford 635

Hitemp Wires, Inc., 1200 Shames Dr., Westbury, L.I., N.Y., 82, 89

Tel: ED 3-4600

Hi-Test Chemical Corp., 722 64th St., Brooklyn 20, N.Y., 91

Tel: TErrace 6-5991

Hoberman, Max, 247 Crooks Ave., Clifton, N.J., 85

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Tel: GREGory 3-7800

Hobson Bros., Inc., 4940 W. Lawrence, Chicago 30, Ill., 44, 98

Tel: AVenue 3-3600

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Tel: CARlisle 1090

Hoffman Engrg. Corp., 183 R. Sound Beach Ave., Old Greenwich, Conn., 6, 7, 12, 60, 90, 99

Tel: NEptune 2-3557

Hoffman Electronics Corp., Hoffman Labs. Div., 3740 S. Grand Ave., Los Angeles 7, Calif., 1, 15, 16, 22, 25, 28, 39, 56

Tel: RIchmond 7-4488

Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 4, 9, 15, 39, 62, 64, 68, 70, 79

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Hogan Labs., Inc., 155 Perry St., New York 14, N.Y., 9, 11, 14, 34, 50, 90

Tel: CHelsea 2-7855

Hollingsworth Co., Solderless Terminal Div., P.O. Box 430, Phoenixville, Pa., 98

Tel: WEllington 3-8947

Holub Industries, Inc., 413 Dekalb Ave., Sycamore, Ill., 87, 92

Tel: 2161

Holyoke Wire & Cable Corp., 730 Main St., Holyoke, Mass., 82

Home Recording Products Co., 56 Mill Rd., Freeport, L.I., N.Y., 27

Tel: FREeport 8-7760

Homelite Div., Textron, Inc., 6807 Riverdale Ave., Portchester, N.Y., 61

Tel: WEstmore 9-3400

Hooker Chemical Corp., Durez Plastics Div., 1941 Walck Rd., N. Tonawanda, N.Y., 89, 91, 95

Tel: LUdlow 1860

Hoover Co. Ltd., P.O. Box 128, Station B, Hamilton, Ont., Canada, 34, 40, 45, 58, 61

Tel: LIberty 5-1151

Hoover Electric Co., 2100 S. Stoner Ave., Los Angeles 25, Calif., 4, 12, 28, 43, 45, 58, 61

Tel: GRANite 8-7747

Hoover Electronics Co., 110 W. Timonium Rd., Timonium, Md., 4, 9, 12, 36, 37, 62, 90

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Tel: HANcock 6-2480

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Tel: GLadstone 5-9310

Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich., 55, 82, 93

Tel: TYler 5-2860

Hosmer & Co., E. A., Clyde Ave., Kenwood, Calif., 4, 8, 9, 10, 20, 30, 33, 85, 90, 101

Tel: TEMple 3-1400

Houghton Labs., Inc., 322 Houghton Ave., Olean, N.Y., 52, 86, 89, 91, 95

Tel: 2-2175

Houston Fearless Corp., 11801 W. Olympic Blvd., Los Angeles 64, Calif., 32, 37, 81, 84, 86, 90, 94

Tel: BRadshaw 2-4331

Howard Industries, Inc., 1760 State St., Racine, Wis., 58

Tel: MELrose 2-2731

Howard Precision, Inc., 111 Roselle St., Linden, N.J., 81, 86, 87, 99

Tel: WAbash 5-4100

Howell Instrument Co., 3101 Trinity St., Ft. Worth 7, Tex., 5, 12, 67

Tel: ED 6-7243

Hoyt Electrical Insts. Works, 42 Carleton St., Cambridge 42, Mass., 56

Tel: ELiot 4-1643

Hu-Bar Terminals, Inc., 8721 Rindge Ave., Playa Del Rey, Calif., 98

Hubbard Electronic Inc., 1093 Industrial St., Pomona, Calif., 4, 67

Tel: NAtional 9-2383

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Hubbell, Inc., Harvey, State St. & Bostwick Ave., Bridgeport 2, Conn., 82, 87
Tel: ED 3-1181

Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich., 87, 92
Tel: WAlnut 1-6207

Hudson American, Div. Radio Eng. Labs., Inc., 29-01 Borden Ave., Long Island City 1, N.Y., 16, 37
Tel: SStillwell 6-2100

Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 81, 86, 87
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Tel: MArkEt 4-1802

Hudson Wire Co., 62 Water St., Ossining, N.Y., 32
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Hudson Wire Co., Winsted Div., 981 Main St., Winsted, Conn., 82
Tel: Frontier 9-3341

Huggins Labs., Inc., 999 E. Arques Ave., Sunnyvale, Calif., 76
Tel: REgent 6-9330

Hughes Aircraft Co., Hughes Products Div., Internatl. Airport Sta., Los Angeles 45, Calif., 4, 15, 17, 23, 41, 42, 50, 64, 65, 66, 68, 70, 74, 76
Tel: ORchard 0-1811

Hughes Company, Inc., Kenneth E., 48C8 Bergenline Ave., Union City, N.J., 102
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Tel: UNion 7-3204

Hughes Products, Semiconductor Div., 500 Superior Ave., Newport Beach, Calif., 42, 50, 68, 70
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Tel: LI 8-0671

Hughes-Treitler Mfg. Corp., 1045 39th St., Brooklyn 19, N.Y., 81, 84, 86
Tel: Uster 3-2950

Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 4, 37, 73
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Tel: VICToria 9-1104

Hull Corp., Hatboro, Pa., 4, 12, 86, 88, 92
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Tel: OSborne 5-5000

Humphrey, Inc., 2805 S. Canon, San Diego, Calif., 4, 67
Tel: ACademy 3-1654

Hunt Co., Philip A., Palisades Park, N.J., 91
Tel: WIndsor 4-4000

Hunt Corp., 453 Lincoln St., Carlisle, Pa., 47
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Tel: CARlisle 1486

Hunter Spring Co., 1 Spring Ave., Lansdale, Pa., 12, 28, 86, 87
Tel: UL 5-6815

Hunter Tool Co., 9851 Alburts, Santa Fe Springs, Calif., 92
Tel: ONford 2-3271

Hupp Electronics Co., 265 E. Pomfret St., Carlisle, Pa., 26, 47, 50, 72
Tel: CARlisle 1495

Huppert Co., K. H., 6830 Cottage Grove Ave., Chicago 37, Ill., 12, 56, 88
Tel: MI 3-4770

Huyck & Sons, F. C., 755 Park Ave., Huntington Sta., L.I., N.Y., 1, 4, 9, 14, 16, 21, 28, 36, 56, 72
Tel: HA 7-5800

Hycon Eastern, Inc., See: Hermes Electronics Co.

Hycon Electronics, Inc., 370 S. Fair Oaks Ave., Pasadena, Calif., 3, 12, 23, 34, 35
Tel: SYcamore 5-4241

Hydraulic Press Mfg. Co., Div., Koehring Co., Mount Gilead, Ohio, 92
Tel: MOUNT Gilead 35

Hydrawerk, Aktiengesellschaft, Drontheimer Sta. 31/34, Berlin N. 20, West Germany, 41
Tel: 46 44 81

Hydro Molding Co., Inc., 100 Sharron Ave., Plattsburgh, N.Y., 87, 94
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Tel: 2598

Hyge Machines Div., Convair, 1243 Transit Ave., Pomona, Calif., 92
Tel: NAtional 9-1109

Hymac Corp., 4625 Leahy St., Culver City, Calif., 9, 12, 23
Tel: TE 0-4991

Hyperion, Inc., 76 Coolidge Hill Rd., Watertown 72, Mass., 61
Tel: WAlnut 6-0140

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I.D.E.A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 2, 6, 20, 36, 50, 60
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Tel: LIBerty 7-3581

IE Manufacturing, 325 N. Hoyne Ave., Chicago 12, Ill., 81, 84, 86, 87, 98
Tel: HA 1-1480

ILG Electric Ventilating, 2850 W. Pulaski Rd., Chicago 41, Ill., 40, 58, 88
Tel: KI 5-1520

I.L.S. Instrument Corp., 4525 W. 160th St., Cleveland 35, Ohio, 9, 12, 72
Tel: CLearwater 2-3850

I.M.C. Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 28, 58, 70
See ad on page 476
Tel: EDgewood 4-7070

I.M.C. Magnetics Corp., Gray & Kuhn Inc., Div., 20 Railroad Ave., Roslyn Hts., N.Y., 43, 48, 50, 73
Tel: MAY 1-7575

I.T.E. Circuit Breaker Co., Special Products Div., 601 E. Erie Ave., Philadelphia 34, Pa., 4, 19, 25, 37, 38, 80
Tel: GARfield 6-5100

I.T.E. Circuit Breaker Co., Victor Insulators Div., Maple Ave., Victor, N.Y., 83
Tel: VICTor 2421

I.T.I. Electronics, Inc., 369 Lexington Ave., Clifton, N.J., 10, 12, 23, 34, 82
Tel: GREGory 3-0900

Ideal Industries, Inc., 3307 Park Ave., Sycamore, Ill., 12, 92
Tel: 2114

Ideal Precision Meter Co., 126 Greenpoint Ave., Brooklyn 22, N.Y., 56
Tel: EV 3-6904

Hex Optical Co., 690 Portland Ave., Rochester 21, N.Y., 28
Tel: HAMILton 6-0700

Hilff & Sons, Ltd., Dorset House, Stamford St., London, S.E. 1, England, 101

Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill., 41
See ad on page 228
Tel: EVerglade 4-1300

Illinois Institute of Technology, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill., 90
Tel: CALumet 5-9600

Illinois Tool Works, Fastex Div., 195 Algonquin Rd., Des Plaines, Ill., 28, 42, 86, 87, 94
Tel: VA 7-2121

Illinois Tool Works, Shakeproof Div., St. Charles Rd., Elgin, Ill., 87, 98
Tel: SHERwood 1-7900

Illumitronic Engrg. Co., 680 E. Taylor Ave., Sunnyvale, Calif., 37, 43, 50, 73, 82, 87, 89, 95
See ads on pages 412, 686
Tel: REgent 9-2395

Impact-O-Graph Corp., 1900 Euclid Ave., Cleveland 15, Ohio, 14
Tel: Cherry 1-5838

Imperial Electric Co., 9 Park Place, New York 7, N.Y., 45, 58, 61
Tel: BA 7-2460

Imra Corporation, 11 University Rd., Cambridge 38, Mass., 9, 66, 92
Tel: UN 4-4350

Independent Metal Fabricators, Inc., 320 Casanova St., Bronx 59, N.Y., 81, 84, 86
Tel: TURnbull 7-4100

Indiana Steel Products Co., 405 Elm St., Valparaiso, Ind., 55
See ad on page 469
Tel: VALparaiso 2-5601

Indikon Co., Inc., 76 Coolidge Hill Rd., Watertown 72, Mass., 5, 12, 36, 85
Tel: WAtertown 4-2198

Indium Corp. of America, 1678 Lincoln Ave., Utica 4, N.Y., 82, 93
See ad on page 679
Tel: SWift 7-1630

Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N.Y., 88, 92
Tel: EVergreen 4-3110

Induction Motors Corp., see I.M.C. Magnetics Corp.

Induction Motors Corp., P.S.P. Engineering Div., 6058 Walker Ave., Maywood, Calif., 43, 55, 70
Tel: LUDlow 3-4785

Induction Motors of Calif., 6058 Walker Ave., Maywood, Calif., 28, 58
Tel: LUDlow 3-4785

Inductor Engrg., Inc., 117 Schley Ave., Lewes, Del., 43, 50, 73
Tel: LEwes 2341

Industrial Accessories, Line Rd., Matawan, N.J., 89
Tel: LOWell 6-0300

Industrial Acoustics Co., 341 Jackson Ave., New York 54, N.Y., 81, 85
Tel: CY 2-0180

Industrial Condenser Corp., 3243-65 N. California, Chicago 18, Ill., 41
Tel: IN 3-2200

Industrial Controls Co., 805 Albin Ave., Lindenhurst, N.Y., 1, 4, 5, 9, 12, 13, 17, 28, 36, 45, 56, 85
Tel: MOhawk 1-6060

Industrial Development Labs., 982 River Rd., Edgewater 5, N.J., 5, 17
Tel: WHitney 3-4084

Industrial Devices, Inc., 982 River Rd., Edgewater 5, N.J., 60, 70, 86, 87, 94
Tel: WHitney 3-4084

Industrial Elec. Controls, 2271 E. 14th St., Brooklyn 29, N.Y., 4, 9
Tel: ESplanade 5-5259

Industrial Electronic Engineers, Inc., 3973 Lankershim Blvd., N. Hollywood, Calif., 9, 60, 85, 90
See ads on pages 285, 484
Tel: TRiangle 7-0328

Industrial Elect. Rubber, 31945 Aurora Rd., Solon, Ohio, 85, 86, 87, 89, 90, 91, 94
Tel: CHurchill 8-1388

Industrial Electronics, 8060 Wheeler, Detroit 10, Mich., 4, 36, 56
Tel: TV 8-7600

Industrial Elect. Co., Monitor Controller Div., 99 Grove St., Rockland, Mass., 4, 61, 66, 70, 88
Tel: TRiangle 7-3308

Industrial Electronics of Canada, 80 Thomas St., Streetsville, Ont., 4, 45, 58, 61, 64
Tel: ATwater 9-9001

Industrial Engravers, Inc., 2212 McDonald Ave., Brooklyn 23, N.Y., 86, 87
Tel: Hlckory 9-3200

Industrial Hardware Mfg., 109 Prince St., New York 12, N.Y., 70
Tel: ORegon 7-1881

Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, N.J., 4, 12, 67, 70
Tel: CEnter 9-6200

Industrial Nucleonics Co., 650 Ackerman Rd., Columbus 14, Ohio, 72
Tel: AMherst 7-6351

Industrial Research Prod., 9400 Belmont Ave., Franklin Park, Ill., 90
Tel: GL 1-1320

Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, N.J., 87
Tel: WAverly 6-5000

Industrial Science & Eng., 201 N. Wells St., Chicago 6, Ill., 101

Industrial Systems Co., 28 Main St., Matawan, N.J., 88, 92
Tel: MAtawan 1-4470

Industrial Tectonics, Inc., 3686 Jackson Rd., Ann Arbor, Mich., 22, 87
Tel: NOrmandy 3-2451

Industrial Tele., Inc., 369 Lexington Ave., Clifton, N.J., 4, 6, 12, 21, 23, 26, 34, 57, 82
Tel: GRegory 3-0900

Industrial Test Equipment Co., 55 E. 11 St., New York 3, N.Y., 3, 5, 12, 26, 31, 45, 61
See ad on page 339
Tel: GRamercy 3-4684

Industrial Timer Corp., 1407 McCarter Hwy., Newark 4, N.J., 4, 9, 31, 56, 66, 70
Tel: HU 4-5600

Industrial Transformer, Gouldsboro, Pa., 5, 12, 15, 61, 73
Tel: VICTOR 2-2111

Industrial Tubes, Inc., 321 Stevens St., Geneva, Ill., 65, 75, 76, 85
Tel: GEneva 806-807

Industrial Winding Machinery Corp., P.O. Box 62, New York 5, N.Y., 9, 43, 92
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Tel: WHitehall 3-1754

Industro Transistor Corp., 35-10 36th Ave., Long Island City 6, N.Y., 68
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Tel: EXeter 2-8000

Industron Corp., 55 Needham St., Newton 61, Mass., 41, 42, 73, 88, 90
Tel: DE 2-1477

Inertia Switch, Inc., 311 W. 43 St., New York 36, N.Y., 70
See ad on page 554
Tel: JUdson 6-5880

Information for Industry, 1000 Connecticut Ave., Washington 15, D.C., 101
Tel: STerling 3-4938

Ingraham Co., North Main St., Bristol, Conn., 56, 58, 86, 87
Tel: LUdlow 2-6321

Inland Electronics Corp., 500 Rathbone Ave., Aurora, Ill., 12, 86, 90
Tel: 6-7744

Inland Motor Corp., 18 Walter St., Pearl River, N.Y., 58
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Tel: PEarl River 5-4015

Insl-X Co., Inc., Water St. & Broadway, Ossining, N.Y., 89, 91
Tel: WIlson 1-1397

Inso Electronic Products, Inc., 1200 Commerce Ave., Union, N.J., 82
See ad on page 609
Tel: MURdock 6-4258

Instant Circuits, Div. Alfred W. Barber Labs., 32-44 Francis Lewis Blvd., Flushing, N.Y., 9, 62
Tel: INdependence 3-3306

Institute of Radio Engineers, Inc., 1 E. 79th St., New York 21, N.Y., 101
Tel: LEhigh 5-5100

Instron Engrg. Corp., 2500 Washington St., Canton, Mass., 4, 9, 12, 14, 36, 72, 88
Tel: CAn-ton 6-2500

Instru-Lec Corp., 520 Homestead Ave., Mount Vernon, N.Y., 28
Tel: MOUNT Vernon 8-3754

Instrument-Apparatus News, 845 Ridge Ave., Pittsburgh 12, Pa., 101
Tel: FAirfax 1-0161

Instrument Components of N.J., Inc., 312 M. Pleasant Ave., Newark 4, N.J., 58
Tel: HUmboldt 3-6300

Instrument Development Labs., Inc., 67 Mechanic St., Attleboro, Mass., 9, 15, 44, 70
See ad on page 422
Tel: ATtleboro 1-3880

Instrument Electronics Corp., P.O. Box 830, Port Washington, N.Y., 3, 12
Tel: PO 7-4242

Instrument Laboratories, 315 W. Walton Pl., Chicago 10, Ill., 3, 12, 36, 56, 85, 90
Tel: MICHigan 2-0123

Instrument Masters, Inc., 11 Hamburg Turnpike, Riverdale, N.J., 12, 56, 90
Tel: TEmple 5-7500

Instrument Resistors Co., 1306 Commerce Ave., Union, N.J., 67
Tel: MURdock 6-4363

Instrument Specialties Co., Inc., 284-A Bergen Blvd., Little Falls, N.J., 87, 96
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Tel: CLifford 6-3500

Instruments for Industry, Inc., 101 New South Rd., Hicksville, N.Y., 36, 90
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Tel: OVerbrook 1-7100.

Instruments of N.E., 108 Greenwood Lane, Waltham 54, Mass., 12, 85
Tel: TWInbrook 3-4047

Instruments Publishing Co., 845 Ridge Ave., Pittsburgh 12, Pa., 101
Tel: FAirfax 1-0161

Insul-8 Corp., 1369 Industrial Rd., San Carlos, Calif., 6, 7, 21, 32, 36, 85
Tel: LY 3-8003

Insulated Circuits, Inc., 100 8th St., Passaic, N.J., 9, 62
Tel: GRegory 2-5300

Insulating Fabricators, 150 Union Ave., East Rutherford, N.J., 86, 89, 95
Tel: WEbster 9-7392

Insulation Mfg. Corp., 565 W. Washington Blvd., Chicago 6, Ill., 86, 87, 89, 91, 94, 95
Tel: CE 6-7320

Insulation Products Co., P.O. Box 5679, Pittsburgh 8, Pa., 86
Tel: PENhurst 1-2090

Intelex Systems, Inc., 22 Thames St., New York 6, N.Y., 1, 15, 24, 29, 40, 46, 47, 54, 58, 74, 76
Tel: BOWling Green 9-3800

Intelligent Mach. Res. Co., 7019 Edsall Rd., Alexandria, Va., 9, 90
Tel: FL 4-5000

Interchemical Corp., 120 Potter St., Cambridge 42, Mass., 91
Tel: UNiversity 4-0375

Intercontinental Dynamics Corp., 170 Coolidge Ave., Englewood, N.J., 4
Tel: LOwell 7-3600

Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 3, 4, 12, 15, 30, 34, 36, 41, 45, 61, 73, 92
See ads on pages 358, 428, 492
Tel: LUdlow 4-6200

Interference Measurements Lab., 907 E. 51st St., Brooklyn 3, N.Y., 90
Tel: INgersoll 9-1765

Interference Testing & Research Lab., Inc., 150 Causeway St., Boston 14, Mass., 26, 85, 90
Tel: LAfayette 3-7826

International Business Machines Corp., 590 Madison Ave., New York, N.Y., 4, 9
Tel: PLaza 3-1900

International Business Machines Corp., 112 E. Post Rd., White Plains, N.Y., 9
Tel: WHite Plains 9-1900

International Crystal Mfg. Co., 18 N. Lee, Oklahoma City 2, Okla., 2, 26, 47, 62, 69
Tel: CE 6-3741

International Eastern Co., 801 Sixth Ave., New York 1, N.Y., 86, 92
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Tel: ALgonquin 5-3296

International Elect. Ind., 468 Grand Ave., Brooklyn 38, N.Y., 53, 69, 82
Tel: NE 8-0211

International Electronics Corp., 1551 Franklin Ave., Mineola, N.Y., 1, 4, 6, 7, 16, 18, 23, 24, 25, 29, 32, 34, 37, 85, 88
Tel: PIONEER 6-5010

International Elec. Industries, Inc., P.O. Box 1368, Nashville, Tenn., 41
Tel: CYpress 8-4411

Alphabetical Directory

- International Electronic Research Corp.**, 145 W. Magnolia Blvd., Burbank, Calif., 99
See ad on page 694
Tel: VICTORIA 9-2481
- International Instruments, Inc.**, P.O. Box 2954, New Haven 15, Conn., 12, 56, 66, 70
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Tel: FULTON 7-2515
- International Nickel Co.**, 67 Wall St., New York 5, N.Y., 93
Tel: WHITEHALL 4-1000
- Internatl. Optical Co., Inc.**, 45 Urban Ave., Westbury, L.I., N.Y., 32, 86
Tel: EDGWOOD 3-2232
- Internatl. Physical Index**, 1909 Park Ave., New York 35, N.Y., 101
Tel: LEHIGH 4-8412
- Internatl. Pump & Machine Works**, 81 Dorsa Ave., Livingston, N.J., 92
Tel: WYMAN 2-5900
- Internatl. Radiant Corp.**, 111 New York Ave., Westbury, N.Y., 12
Tel: EDGWOOD 4-8820
- International Radio-Electronics**, P.O. Box 261, Elkhart, Ind., 27
Tel: JACKSON 2-8583
- International Rectifier Corp.**, 233 Kansas St., El Segundo, Calif., 39, 42, 64, 68, 79
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Tel: OREGON 8-6281
- International Register Co.**, 2620 W. Washington Blvd., Chicago 12, Ill., 12, 70
Tel: VAN BUREN 6-4242
- International Resistance Co.**, 401 N. Broad St., Philadelphia 8, Pa., 64, 67, 72, 95
Tel: WA 2-2166
- International Telemeter Corp.**, Amplification Div., 2000 Stoner Ave., Los Angeles 25, Calif., 48, 82
Tel: GR 8-7751
- International Telephone & Telegraph Corp.**, Federal Div., 100 Kingsland Rd., Clifton, N.J., 1, 9, 11, 15, 16, 18, 24, 25, 36, 37, 38, 50, 61
Tel: NUTLEY 2-3600
- International Telephone & Telegraph Corp.**, Federal Telecommunication Labs. Div., 500 Washington Ave., Nutley, N.J., 90
Tel: NORT 1-1100
- International Telephone & Telegraph Corp.**, ITT Components Div., 100 Kingsland Rd., P.O. Box 412, Clifton, N.J., 15, 41, 52, 64, 65, 68, 70, 72, 75, 76, 79
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Tel: NUTLEY 2-3600
- International Telephone & Telegraph Corp.**, Industrial Products Div., 250 Garibaldi Ave., Lodi, N.J., 3, 5, 12, 19, 23, 26, 31, 36, 38, 56
Tel: PRescott 3-1550
- International Telephone & Telegraph Corp.**, Industrial Products Div., 15191 Bledsoe St., San Fernando, Calif., 6, 7, 9, 10, 20, 21, 24, 32, 35, 45, 61, 77
Tel: EMPIRE 7-6161
- International Telephone & Telegraph Corp.**, Kuthe Laboratories, Inc., 730 S. 13th St., Newark 3, N.J., 75
Tel: Blgelow 2-6000
- International Telephone & Telegraph Corp.**, Royal Electric Corp. Div., 95 Grand Ave., Pawtucket, R.I., 44, 51, 53, 69, 70, 82
Tel: PAwtucket 2-8600
- International Telephone & Telegraph Labs.**, 937 Commercial St., Palo Alto, Calif., 8, 24, 29, 34, 36, 49, 50, 61, 73
Tel: DA 1-0211
- International Wax Refining**, 99 E. Hawthorne Ave., Valley Stream, N.Y., 89, 91
Tel: LOcust 1-2500
- Interscience Publishers**, 250 Fifth Ave., New York 11, N.Y., 101
Tel: LEXington 2-1727
- Interstate Electronics Corp.**, 707 E. Vermont Ave., Anaheim, Calif., 1, 4, 6, 7, 9, 11, 15, 22, 31, 32
Tel: PRespect 4-6540
- Interstate Electronics, Inc.**, 227 Fulton St., New York 7, N.Y., 41, 102
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Tel: BEekman 3-8780
- Invar Electronics Co.**, 323 W. Washington Blvd., Pasadena, Calif., 31, 61
Tel: SY 4-0454
- Invengineering Inc.**, P.O. Box 360, Belmar, N.J., 85, 90
Tel: PRespect 5-6800
- Investment Casting Co.**, 60 Brown Ave., Springfield, N.J., 86, 93
Tel: DRexel 6-6260
- Iron Fireman Mfg. Co.**, Electronics Div., 2838 S.E. 9 Ave., Portland 2, Ore., 4, 44, 66
Tel: BELmont 4-6551
- Isochem Resins Corp.**, 221 Oak St., Providence 9, R.I., 89, 91, 95
Tel: JACKson 1-5769
- Isocyanate Products, Inc.**, Box 1681, Wilmington 99, Del., 87, 89
Tel: EAsT 8-5661
- Isolantite Mfg. Corp.**, Warren Ave., Stirling, N.J., 46, 52, 83, 89, 92, 99
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Tel: MILLington 7-0385
- Isomet Corp.**, P.O. Box 34, Palisades Park, N.J., 15, 22, 47
- Isotope Develop. Ltd.**, Beenham Grange, Aldermaston Wharf, Nr. Reading, Berks, Eng., 4, 22, 36, 61
Tel: WOolhampton 4514
- Itek Corp.**, 1605 Trapelo Rd., Waltham 54, Mass., 1, 3, 4, 9, 19, 28, 61, 85, 90, 92
Tel: TW 3-8700
- Itemco, Inc.**, 18 Beechwood Ave., Port Washington, L.I., N.Y., 12
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Tel: POrt Washington 7-8330
- J**
- J-B-L Instrument Co.**, Sycamore & Mill Rd., Clifton Heights, Pa., 70
Tel: MA 3-4377
- J-B-T Instrument, Inc.**, 133 Hamilton St., New Haven 8, Conn., 3, 12, 15, 31, 36, 56, 60, 70
Tel: STate 7-5825
- JFD Electronics Corp.**, 1462 62 St., Brooklyn 4, N.Y., 37, 42, 48, 77
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Tel: DEWey 1-1000
- J.S.H. Electronics Co.**, 1108 Venice Blvd., Los Angeles 15, Calif., 74, 75, 76
Tel: RIchmond 9-7644
- J-V-M Microwave Co.**, 9300 W. 47th St., Brookfield, Ill., 19, 26, 36, 37, 38, 50, 77, 80
Tel: HUNter 5-2000
- Jack & Heintz, Inc.**, 17600 Broadway Ave., Cleveland 1, Ohio, 4, 28, 58, 61, 62, 66, 70, 73, 79, 85, 86, 90, 91
Tel: MONTrose 2-1000
- Jackson Electrical Instrument Co.**, 18 S. Paterson Blvd., Dayton 2, Ohio, 3, 12, 23, 26, 35
Tel: BALdwin 4-0367
- Jacksonville Metal-Plast**, 575 Dora St., Jacksonville 4, Fla., 81, 84, 86, 90
Tel: ELgin 6-4884
- Jaidinger Mfg. Co., Inc.**, 1921 W. Hubbard St., Chicago 22, Ill., 66, 70
Tel: HA 1-1090
- James Vibrapowr Co.**, 4050 N. Rockwell St., Chicago 18, Ill., 43, 45, 66, 73
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Tel: CORnelia 7-6333
- Jamison Plastic Corp.**, 1255 Newbridge Rd., N. Bellmore, L.I., N.Y., 81, 86, 87, 94, 98
Tel: SUNset 5-3400
- Jan Hardware Mfg. Co., Inc.**, 75 N. 11th St., Brooklyn, N.Y., 12, 28, 44, 74, 81, 86, 87, 90, 94, 96, 99
Tel: EVERgreen 7-3300
- Janco Corp.**, 3111 Winona Ave., Burbank, Calif., 12, 51, 70, 94
Tel: VICTORIA 9-2107
- Jansen Electronics Mfg.**, 2285 University Ave., St. Paul 14, Minn., 4, 86
Tel: MI 6-7458
- Jansky & Bailey, Inc.**, 1339 Wisconsin Ave., Washington 7, D.C., 85, 86, 90
Tel: FEderal 3-4800
- Jarrell-Ash Co.**, 26 Farwell St., Newtonville, Mass., 12
Tel: DEcatur 2-2130
- Javex Electronics**, P.O. Box 646, Redlands, Calif., 12, 37, 38, 44, 47, 53, 69, 70, 81
Tel: PYramid 3-5752
- Jelliff Mfg. Corp.**, C. O. Pequot Rd., Southport, Conn., 82
Tel: CL 9-1615
- Jem Electronics Corp.**, 743 Circle Ave., Forest Park, Ill., 4, 72
Tel: PResident 1-8242
- Jennings Machine Corp.**, 3452 Ludlow St., Philadelphia 4, Pa., 92
Tel: EVERgreen 6-2420
- Jennings Radio Mfg. Corp.**, 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 12, 41, 42, 66, 70
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Tel: CYpress 2-4025
- Jensen Industries, Inc.**, 7333 W. Harrison St., Forest Park, Ill., 59, 63
Tel: FOrEst 6-0180
- Jensen Mfg. Co.**, 6601 S. Laramie Ave., Chicago 38, Ill., 54
Tel: POrtsmouth 7-7600
- Jerrold Electronics (Canada), Ltd.**, 50 Wingold Ave., Toronto 19, Ont., Canada, 6, 7, 21, 26, 35, 36, 37, 38, 44, 50, 70, 73, 82
Tel: RUSsell 1-6174

Jerrold Electronics Corp., Dept. TED
33, Jerrold Bldg., Philadelphia 32,
Pa., 6, 7, 26, 35, 36, 37, 38, 44, 50, 61,
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Tel: Baldwin 6-3456

Jersey Specialty Co., Inc., Burgess Pl.,
Mountainview, N.J., 82
Tel: Oxbow 4-6200

Jetronic Industries, Inc., Main & Cotton
St., Philadelphia 27, Pa., 12, 16,
19, 23
Tel: IVyridge 2-7660

Jettron Products, Inc., 56 Route 10,
Hanover, N.J., 44, 69
See ad on page 549
Tel: TUCKER 7-0571

Jobbins Electronics, 771 Hamilton Ave.,
Menlo Park, Calif., 43, 48, 55, 61, 73
See ad on page 413
Tel: Davenport 6-7110

Jodee Plastics Co., 131-29 Springfield
Blvd., Jamaica 13, N.Y., 81, 83, 86, 87,
89, 95
Tel: Ffieldstone 1-3644

Jodon, Inc., F. R., 8510 Beech Tree Rd.,
Washington 14, D.C., 3, 4, 5, 7, 9, 12,
13, 15, 23, 26, 27, 34, 36, 45, 50, 56, 61,
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Tel: EM 5-1515
Johanson Mfg. Corp., P.O. Box 329,
Boonton, N.J., 42
Tel: DEerfield 4-2676

Johns Hopkins University, Operations
Research Off., 6935 Arlington Rd.,
Bethesda, Md., 90
Tel: OL 4-4200

Johns-Manville, 22 East 40th St., New
York 16, N.Y., 52, 78, 81, 87, 89, 91, 95
Tel: LExington 2-7600

Johns-Manville, Dutch Brand Div., 7800
Woodlawn Ave., Chicago 19, Ill., 63
Tel: SAginaw 1-1000

Johnson Assoc., Walter A., 18 Norton
Ave., Endicott, N.Y., 90, 92
Tel: STillwell 8-3652

Johnson Co., E. F., 206 2nd Ave., S.W.,
Waseca, Minn., 2, 20, 29, 36, 37, 42, 50,
53, 60, 69, 94
Tel: 990

Johnson & Hoffman Mfg. Co., 31 E. 2nd
St., Mineola, N.Y., 86, 87, 99
Tel: Pioneer 2-3333

Johnson Mfg. Co., Inc., 616 1st Ave. N.,
Mt. Vernon, Iowa, 97
Tel: 3651

Johnson Research Corp., Route 107,
Bethpage, N.Y., 92
Tel: WELLS 8-4600

Johnson-Williams, Inc., 2625 Park Blvd.,
Palo Alto 30, Calif., 12
Tel: Davenport 3-4131

Jonathan Mfg. Co., 720 E. Walnut St.,
Fullerton, Calif., 84
Tel: LAmbert 6-4651

Jones Div., Howard B., Cinch Mfg. Co.,
1026 S. Homan Ave., Chicago 24, Ill.,
44, 53, 62, 69, 98
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Tel: NEvada 2-2000

Jones Elecns. Co., M. C., 185 N. Main
St., Bristol, Conn., 19, 36, 37, 80
Tel: LUdlow 2-6388

Jones & Lamson Machine, Springfield,
Vt., 92
Tel: TUrner 5-2121

Jones-Porter Instrument, Box 302, Mill-
burn, N.J., 3, 4, 9
Tel: DR 6-3550

Jonesville Paper Tube Co., 474 Beck
Rd., Jonesville, Mich., 89
Tel: VICTOR 9-7141

Jordan Co., Inc., 3235 W. Hampton
Ave., Milwaukee 9, Wis., 4, 28
Tel: UPTown 1-3200

Joy Mfg. Co., Oliver Bldg., Pittsburgh
22, Pa., 40, 44
Tel: GRant 1-2170

Joy Mfg. Co., Electrical Products Div.,
1201 Macklind Ave., St. Louis 10, Mo.,
44, 70
Tel: MIssion 5-6670

Juall Gear Co., Inc., 1108 Goffle Rd.,
Hawthorne, N.J., 28
Tel: HAwthorne 7-4220

Julie Research Labs., Inc., 556 W. 168th
St., New York 32, N.Y., 5, 9, 12, 38,
61, 67, 90
Tel: LOrraine 8-8700

K

K-C-K Corp., Texas Capacitor Co. Div.,
922 S. 75th St., Houston 23, Tex., 41
Tel: WALnut 6-5727

K-F Development Co., 2606 Spring St.,
Redwood City 1, Calif., 67
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Tel: EMerson 8-5670

K-V Transformer Corp., 20 E. Franklin
St., Danbury, Conn., 36, 50, 73
Tel: Pioneer 3-5531

K-W Engineering Works, 15920 Pin
Oak Ct., Butler, Wis., 37, 87
Tel: (Milwaukee) SUNset 1-8616

Kaar Engineering Corp., 2995 Middle-
field Rd., Palo Alto, Calif., 20, 24, 37,
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Tel: Davenport 6-5050

Kahle Engineering Co., 3322 Hudson
Ave., Union City, N.J., 85, 86, 88, 90, 92
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Tel: UNion 7-6500

Kahn, Leonard R., 22 Pine St., Free-
port, L.I., N.Y., 85
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Tel: FRReport 9-8800

Kahn Research Labs., Inc., 22 Pine St.,
Freeport, N.Y., 7, 16, 24, 29
Tel: FRReport 9-8800

Kaiser Aircraft-Electronics, Kaiser In-
dustries Corp., P.O. Box 437, Toledo
1, Ohio, 1, 2, 4, 9, 20, 24, 29, 45, 61, 86,
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Tel: RAndolph 6-1591

Kaiser Electronics, Inc., 23 Monroe St.,
Union, N.J., 15, 36, 45, 61, 79
Tel: MURdock 7-2525

Kaiser Industries Corp., West Coast
Elect. Lab., 850 San Antonio Rd.,
Palo Alto, Calif., 90
Tel: DA 1-3320

Kalite Technical Co., Inc., 715 Mattison
Ave., Asbury Park, N.J., 101
Tel: PProspect 4-2100

Kall, Albert R., 431 W. Tabor Rd.,
Philadelphia 20, Pa., 85, 90
Tel: LLivingstone 8-4100

Kaman Aircraft Corp., Nuclear Div.,
1 West Las Vegas, Colorado Springs,
Colo., 12, 15, 22, 37, 90, 96
Tel: ME 4-2826

Kanthal Corp., Amelia Place, Stamford,
Conn., 82, 88, 92
Tel: DAvis 5-2206

Kapitol Magnetic Corp., 2241 N. Knox
Ave., Chicago 39, Ill., 36, 43, 45, 50,
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Tel: DI 2-8500

Karg Labs., Inc., 30 Meadow St., S.
Norwalk, Conn., 6, 34, 77
Tel: VOLunteer 6-3200

Karlson Associates, Inc., 433 Hempstead
Ave., W. Hempstead, L.I., N.Y., 54,
81, 90

Karp, A. Lawrence, P.O. Box 266,
Ridgeway Sta., Stamford, Conn., 14
Tel: TO 9-8144

Kato Engineering Co., 1415 First Ave.,
Mankato, Minn., 45, 58, 61
Tel: 8-2941

Katolight Corp., First Ave. at Chestnut,
Mankato, Minn., 45, 48
Tel: MAnkato 7966

Kauke & Co., Inc., 1632 Euclid St.,
Santa Monica, Calif., 34
Tel: EXbrook 5-5246

Kay Electric Co., Dept. ID-9, 14 Maple
Ave., Pine Brook, N.J., 3, 7, 12, 19,
26, 35, 36, 38
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Tel: CApital 6-4000

Kaynar Mfg. Co., Inc., Box 2001, Termi-
nal Annex, Los Angeles 54, Calif., 87
Tel: SPruce 3-3070

Kearfott Co., Inc., 1500 Main Ave.,
Clinton, N.J., 1, 4, 5, 9, 12, 15, 16, 18,
19, 25, 28, 36, 37, 38, 45, 46, 50, 55, 56,
58, 73, 80, 83, 93
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Tel: GRegory 2-1000

Kearfott Co., Inc., Microwave Div.,
14844 Oxnard St., 18, 25, 36, 37, 38,
46, 50, 70, 80, 83
Tel: STate 6-1760

Keil Engrg. Prods., Inc., 4356 Duncan
Ave., St. Louis 10, Mo., 62
Tel: OLive 2-7005

Keim, Llewellyn Bates, 5324 W. 57th St.,
Los Angeles 56, Calif., 85
Tel: OREGon 8-9768

Keisers Industries, Inc., Launan St.,
P.O. 42, Mt. Holly Springs, Pa., 82
Tel: HUnter 6-3611

Keithley Instruments, Inc., 12415 Euclid
Ave., Cleveland 6, Ohio, 12, 36, 56, 61
Tel: SW 5-2666

Keller, Jr., Hugo P., 50 E. 42nd St., New
York 17, N.Y., 15, 47, 59, 87
Tel: MURray Hill 2-8450

Keller Products, Inc., 41 Union St.,
Manchester, N.H., 86
Tel: NAtional 7-7887

Kellogg Switchboard & Supply Co., 6650
S. Cicero Ave., Chicago 38, Ill., 4, 8,
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56, 57, 61, 62, 64, 66, 70, 73, 85, 100
Tel: PORTsmouth 7-6900

Kelsey-Hayes Co., Utica Drop Forge-
Tool, 2415 Whitesboro St., Utica 4,
N.Y., 92
Tel: RE 5-6411

Kerman Aircraft Corp., Nuclear Div.,
1 West Las Vegas, Colorado Springs,
Colo., 12, 15, 22, 37, 90, 96
Tel: ME 4-2826

Kanthal Corp., Amelia Place, Stamford,
Conn., 82, 88, 92
Tel: DAvis 5-2206

Kapitol Magnetic Corp., 2241 N. Knox
Ave., Chicago 39, Ill., 36, 43, 45, 50,
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Tel: DI 2-8500

Karg Labs., Inc., 30 Meadow St., S.
Norwalk, Conn., 6, 34, 77
Tel: VOLunteer 6-3200

Karlson Associates, Inc., 433 Hempstead
Ave., W. Hempstead, L.I., N.Y., 54,
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Karp, A. Lawrence, P.O. Box 266,
Ridgeway Sta., Stamford, Conn., 14
Tel: TO 9-8144

Kato Engineering Co., 1415 First Ave.,
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Tel: 8-2941

Katolight Corp., First Ave. at Chestnut,
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Tel: MAnkato 7966

Kauke & Co., Inc., 1632 Euclid St.,
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Tel: EXbrook 5-5246

Kay Electric Co., Dept. ID-9, 14 Maple
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Tel: CApital 6-4000

Kaynar Mfg. Co., Inc., Box 2001, Termi-
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Kelvin & Hughes, Ltd., 80 Shore Rd., Port Washington, N.Y., 58

Kemlite Labs., Inc., 1819 W. Grand Ave., Chicago 22, Ill., 37

Tel: **TA 9-6050**

Kemode Mfg. Co., Inc., 151 W. 18th St., New York 11, N.Y., 92

Tel: **WAtkins 4-1869**

Kemtron Electron Products, Inc., 14 Prince Pl., Newburyport, Mass., 47, 68

Tel: **HO 2-4464**

Kendall Co-Polyken Sales, 309 W. Jackson Blvd., Chicago, Ill., 89

Tel: **WE 9-7100**

Kenilworth Coupling Co., P.O. Box 75, Asheville, N.C., 28

Tel: **ALpine 3-8993**

Kennecott Copper Corp., Okonite Co., Subsidiary, 220 Passaic St., Passaic, N.J., 82

Tel: **PRescott 7-0400**

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Tel: **EVERgreen 3-1200**

Kennedy Industries, 1581 E. Charles St., Banning, Calif., 44

Tel: **Vlctor 9-4721**

Kenru Company, P.O. Box 121, Parsippany, N.J., 67, 69

Tel: **TU 7-2378**

Kenwood Engineering Co., 265 Colfax Ave., Kenilworth, N.J., 37

Tel: **CHestnut 5-0100**

Kenyon Transformer Co., 1057 Summit Ave., Jersey City 7, N.J., 36, 45, 73, 79

Kepeco, Inc., 131-38 Sanford Ave., Flushing 55, N.Y., 45, 61, 73, 79

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Tel: **INdependence 1-7000**

Kerrco Products, Box 228, Havelock Sta., Lincoln 7, Neb., 81, 94

Tel: **LIncoln 6-5105**

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Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 97

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Tel: **BElmont 5-1601**

Key Resistor Corp., 321 W. Redondo Beach Blvd., Gardena, Calif., 61, 62, 67, 86

Tel: **DA 3-5000**

Keystone Carbon Co., 1935 State St., St. Marys, Pa., 67

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Tel: **TE 4-1591**

Keystone Electronics Co., 65-67 7th Ave., Newark, N.J., 47, 50

Tel: **HUMboldt 2-0630**

Keystone Electronics Corp., 49 Bleeker St., New York 12, N.Y., 39

Tel: **GRamercy 5-4600**

Keystone Products Co., 904-23rd St., Union 2, N.J., 4, 28, 36, 50, 73

Tel: **UN 6-5400**

Kidde & Co., Inc., Walter, 577 Main St., Belleville 9, N.J., 1, 4, 9, 12, 15, 28, 36, 45, 61, 66, 79, 90

Tel: **PLymouth 9-5000**

Kidde Ultrasonic & Detection Alarms, Inc., 577 Brighton Rd., Allwood Sta., Clifton, N.J., 4

Tel: **GRegory 2-5000**

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Kimble Glass Co., P.O. Box 1035, Toledo 1, Ohio, 99

Tel: **CHerry 2-6543**

King Laboratories, Inc., 127 Solar St., Syracuse 4, N.Y., 93, 99

Tel: **GRanite 4-3359**

King Radio Corp., 9700 W. 75th St., Merriam, Kan., 1, 6, 10, 16, 20, 24, 50, 61

Tel: **HEdrick 2-8520**

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 37, 38, 44, 53, 80

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Kingsley Machine Co., 850 Cahuenga Blvd., Hollywood 38, Calif., 86, 92

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Kingston Industries, Inc., Kingston Electronics Div., North St., Medfield, Mass., 4, 12, 23

Tel: **FLeetwood 9-4347**

Kinn Electronics Corp., 4104 Pinkney Rd., Baltimore 7, Md., 1, 45, 85, 86, 88, 90, 94

Tel: **ROgers 4-7910**

Kinn, T. P., Consultant, 7007 Lancaster Rd., Baltimore 7, Md., 85

Tel: **HUinter 6-8988**

Kinney Co., Inc., Joseph, 11 Sycamore St. Carnegie, Pa., 82, 86, 93, 96

Tel: **BRowning 9-6600**

Kinney Mfg. Div., New York Air Brake Company, 3631 Washington St., Boston 30, Mass., 12, 88, 92

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Kip Electronics Corp., 29 Holly Pl., P.O. Box 562, Stamford, Conn., 74, 75, 90

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Tel: **DAvis 5-1551**

Kirchberger & Co., Inc., M., 250 Humphrey St., Englewood, N.J., 83, 89, 99

Kirkland Co., H. R., 10 King St., Morristown, N.J., 60, 69, 70

Tel: **JE 8-2777**

Kistler Instrument Corp., 15 Webster St., S. Tonawanda, N.Y., 12, 72

Tel: **JAckson 2099**

Klein Electronics Co., Leo, 2404 S. La Brea Ave., Los Angeles 16, Calif., 59

Tel: **WE 5-3119**

Klein & Sons, Inc., M., 7200 McCormick Rd., Chicago 45, Ill., 92

Tel: **JUniper 8-6820**

Kling Metal Spinning & Stamping Co., 245-247 Centre St., New York 13, N.Y., 81, 86

Tel: **CAnal 6-5580**

Klipsch & Associates, P.O. Box 96, Hope, Ark., 54

Tel: **PR 7-3395**

Knapic Electro-Physics, 936-38 Industrial Ave., Palto Alto, Calif., 47

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Knickerbocker Annunciator Co., 75 Murray St., New York 7, N.Y., 82

Tel: **BArcley 7-5306**

Knight Electronics, 210 S. DesPlaines, Chicago 6, Ill., 2, 3, 4, 6, 12, 20, 23, 26, 29, 30, 35, 36, 54, 70, 77

Tel: **FI 6-7474**

Knight Corp., Ewen, 206 A St., Needham Heights 94, Mass., 18, 24, 25, 34, 36, 37, 46, 70, 80, 83, 85, 90

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Knopow, Howard S., 7377 N. 76th St., Milwaukee 18, Wis., 85

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Koch & Sons, H., Box 127, Corte Madera, Calif., 81, 86

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Koehring Co., Hydraulic Press Mfg. Co., Marion Rd., Mount Gilead, Ohio, 92

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Kollman Case Corp., P.O. Box 180, Fort Wayne 1, Ind., 81

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Kollmorgen Optical Corp., 347 King St., Northampton, Mass., 4, 16

Tel: **JU 4-0280**

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Kolton Electric Mfg. Co., 123 New Jersey R.R. Ave., Newark 5, N.J., 73, 98

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Koppers Co., Inc., Plastics Div., Koppers Bldg., Pittsburgh 19, Pa., 89, 95

Tel: **EXpress 1-3300**

Kreckman Co., Herb, Cresco, Pa., 37

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Krengel Mfg. Co., Inc., 227 Fulton St., New York 7, N.Y., 87, 92

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Krohn-Hite Corp., 580 Massachusetts Ave., Cambridge 39, Mass., 3, 36, 50, 61

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Kruger Instruments, H., Box 164, San Gabriel, Calif., 4

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Kulite Tungsten Co., 1040 Hoyt Ave., Ridgefield, N.J., 46, 86, 93

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Kwikheat Mfg. Co., 3732 San Fernando Rd., Glendale 4, Calif., 88, 92
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L.A.B. Corp., 990 Onondaga St., Skaneateles, N.Y., 12, 92
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LEL, Inc., 384 Oak St., Copiague, L.I., N.Y., 1, 10, 18, 20, 25, 34, 36, 77
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L M B-Heeger, Inc., 2528 W. 9th St., Los Angeles 6, Calif., 52, 81, 84, 91, 97
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L & O Research & Dev. Co., 1952 E. Allegheny Ave., Philadelphia 34, Pa., 3, 11, 12, 14, 17, 36, 48, 73
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L & R Mfg. Co., 577 Elm St., Kearny, N.J., 92
Tel: **WYman** 1-5330

Labelon Tape Co., Inc., 450 Atlantic Ave., Rochester 9, N.Y., 87
Tel: **HUbbard** 2-3460

Labko Scientific, Inc., 111 W. Elm, Box 831, Stillwater, Okla., 36, 85, 86, 90
Tel: **FRontier** 2-7167

Laboratories Lambda, Aranguren St., Buenos Aires, Argentina, 12
Tel: Buenos Aires 43-3760

Laboratory Equip. Corp., Hilltop Rd., St. Joseph 2, Mich., 41, 43, 55, 61, 83

Laboratory for Electronics, 1079 Commonwealth Ave., Boston 15, Mass., 1, 4, 9, 19, 25, 26, 31, 48, 62, 73, 80, 90
Tel: **AL** 4-4235

Laboratory Furniture Co., Old Country Rd., Mineola, N.Y., 81
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Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 17, 36, 44, 53, 82, 98
Tel: **GRaceland** 7-7900

Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif., 30, 36
Tel: **TEmplebar** 2-2498

Lambda Electronics Corp., 11-11 131st St., College Point 56, N.Y., 61
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Lambda-Pacific Eng., Inc., 14725 Armita St., Van Nuys, Calif., 7, 18, 19, 26, 35, 37, 50, 62, 77, 80
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Laminated Sheet Products, 449 Neponset St., Norwood, Mass., 62, 81, 86, 89, 95, 98
Tel: **NOorwood** 7-3500

Lamkin Labs, Inc., Monitor Div., Bradenton, Fla., 21 26
Tel: 6-1906

Lamson & Sessions Co., 5000 Tiedman Rd., Cleveland 9, Ohio, 87
Tel: **CL** 2-3700

Lamtex Ind., Inc., 51 State St., Westbury, N.Y., 86, 87, 89, 94, 95
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Lancaster Glass Corp., Lancaster, Ohio, 99
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Land-Air, Inc., 7444 W. Wilson Ave., Chicago 31, Ill., 1, 4, 10, 12, 22, 31, 34, 36, 37, 58, 61, 66, 70, 72, 85, 86
Tel: **UN** 7-7550

Land-Air Inc., Instruments & Electronics Div., 2133 Adams Ave., San Leandro, Calif., 1, 9, 12, 22, 31, 34, 61, 73, 84
Tel: **LOckhaven** 9-5841

Landes Electn. Fasteners, 510 W. Broadway, New York 12, N.Y., 87, 89, 98
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Landis & Gyr, Inc., 45 W. 45 St., New York 36, N.Y., 9, 56
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Landsverk Electrometer, 641 Sonora Ave., Glendale 1, Calif., 12, 22, 62, 75, 87, 89, 90, 94
Tel: **CHapman** 5-6687

Lansky Die Cutting Corp., 473 President St., Brooklyn 15, N.Y., 54, 86
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Lansing Sound, Inc., J. B., 3249 Casitas Ave., Los Angeles 39, Calif., 72, 81
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La Pointe Industries, Inc., 155 W. Main St., Rockville, Conn., 19, 36, 37, 50, 62, 86, 87
Tel: **TR** 5-3351

Lapp Insulator Co., Inc., **Radio Specialties Div.**, 150 Sumner St., LeRoy, N.Y., 41, 42, 44, 69, 83, 89
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Lavelle Aircraft Corp., Sterling St., Newton, Bucks County, Pa., 37, 81, 86
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Lear, Inc., 110 Ionia Ave. N.W., Grand Rapids 2, Mich., 1, 4, 16, 28, 36, 50, 61, 87, 90
Tel: **GL** 1-1555

Lear, Inc., Lear Cal Div., 3171 S. Bundy Dr., Santa Monica, Calif., 1, 4, 16, 28, 37, 57, 61, 86
Tel: **EXmont** 8-6211

Lear, Inc., Lear-Romec Div., Abbe Rd., Elyria, Ohio, 4, 28, 36, 58, 92
Tel: **FAirfax** 3-3211

Leclanche, S. A., 48 Ave. De Grandson, Yverdon, Switzerland, 39, 41
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Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa., 4, 5, 9, 12, 22, 28, 36, 41, 42, 56, 61, 70
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Lehigh Engr. Associates, 62 Mulberry St., Newark, N.J., 85, 90
Tel: **MIchell** 2-3155

Lehigh Structural Steel, 17 Battery Pl., New York 4, N.Y., 37
Tel: **WHitehall** 4-1424

Lektra Laboratories, Inc., 154 11 Ave., New York 11, N.Y., 4, 56
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Leland, Inc., G. H., 123 Webster St., Dayton 2, Ohio, 66, 70
Tel: **BAldwin** 4-9891

Lelanite Corp., Box 152, Webster, Mass., 94
Tel: **WEbster** 1969

Lemert Engineering Co., 1313 Western Ave., Plymouth, Ind., 88, 92
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Lenkurt Electric Co., Inc., 1105 County Rd., San Carlos, Calif., 4, 8, 18, 20, 24, 33, 34
Tel: **LYtell** 1-8461

Lenz Electric Mfg. Co., 1759 North Western Ave., Chicago 47, Ill., 82
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Lepel High Frequency Labs., Inc., 55th St. and 37th Ave., Woodside 77, N.Y., 88
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Tel: **HAvemeyer** 6-4580

Lercro Electronics, Inc., 501 S. Varney St., Burbank, Calif., 53, 87, 94, 98
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Le Roi Engineering, P.O. Box 251, Elmhurst, Ill., 85, 90

Lesca, S. P. A., Via Bergamo 21, Milano, Italy, 8, 30, 36, 38, 40, 43, 45, 49, 50, 54, 57, 58, 59, 67, 70
Tel: **Milano** 554341

Lessells & Assoc., Inc., 916 Commonwealth Ave., Boston, Mass., 4, 36, 44, 85, 90, 101
Tel: **BEacon** 2-2380

Lettine Radio Mfg. Co., 62 Berkley St., Valley Stream, N.Y., 2, 7, 24
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Tel: BErnardsville 8-0699
- Levinthal Electronic Products, Stanford Industrial Park, Palo Alto, Calif., 7, 17, 18, 19, 22, 24, 25, 36, 61, 73
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- Leviton Mfg. Co., 236 Greenpoint Ave., Brooklyn 22, N.Y., 44, 51, 53, 60, 69, 70, 82
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- Librascope, Inc., 808 Western Ave., Glendale 1, Calif., 1, 4, 9, 14, 15, 28, 36, 48, 58
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Tel: RAymond 3-9311
- Lion Fastener Co., Inc., c/o Southco, Lester, Pa., 87
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- Lippincott Co., J. B., E. Washington Sq., Philadelphia 5, Pa., 101
- Lipps Engrg. Edwin A., 1511 Colorado Ave., Santa Monica, Calif., 63
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Tel: VANDerbilt 4-1188
- Little, Inc., Arthur D., 30 Memorial Dr., Cambridge 42, Mass., 15, 85, 90
Tel: UNiversity 4-5770
- Little Falls Alloys, Inc., 199 Caldwell Ave., Paterson 1, N.J., 82**
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- Litton Industries, Inc., Md. Div., 4900 Calvert Rd., College Park, Md., 1, 4, 14, 16, 18, 20, 21, 24, 25, 28, 34, 37, 50, 58, 61, 78
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- Litton Industries, Inc., U.S. Engineering Co. Div., 13536 Saticoy St., Van Nuys, Calif., 48, 53, 62, 83, 87, 94, 98
Tel: STAnley 3-3520
- Livingston Electronics Corp., P.O. Box 33, Livingston, N.J., 44, 66, 69, 99
Tel: CApital 6-3333
- Lockheed Aircraft Corp., California Div., Dept. 2710, 2400 N. Hollywood Way, Burbank, Calif., 15, 90**
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- Metz Refining Co., 369 Mulberry St., Newark 2, N.J., 91, 93, 97
Tel: MArket 2-0866
- Meyercord Co., 5323 W. Lake St., Chicago 44, Ill., 87
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Tel: DIgby 9-0512
- Mica Corp., 4031 Elenda St., Culver City, Calif., 89, 95
Tel: TEXas 0-6861
- Mica Insulator Co., Div., of Minnesota Mining, 797 Broadway, Schenectady 1, N.Y., 86, 87, 89, 95, 98
Tel: FRanklin 4-4191
- Mica Fabricating Co., Rochelle Park, N.J., 83, 86, 88, 89
- Micacraft Products, Inc., 703 McCarter Highway, Newark 5, N.J., 89, 99
Tel: MArket 3-4074
- Micamold Electronics Mfg. Corp., 65 Gouverneur St., Newark 4, N.J., 41, 48, 50
Tel: HUmboldt 5-2100
- Micarta Fabricators, Inc., 5324 N. Ravenwood Ave., Chicago 40, Ill., 44, 47, 51, 60, 62, 69, 81, 86, 87, 89, 95, 98
Tel: LONgbeach 1-9700
- Michigan Magnetics, Inc., 203 W. 3rd St., Vermontville, Mich., 63
Tel: CLifford 9-8911
- Mico Instrument Co., 80 Trowbridge St., Cambridge 38, Mass., 19, 73, 92, 97
Tel: KIRkland 7-8660
- Micro Balancing, Inc., 191 Herricks Rd., Garden City Park, N.Y., 4, 92
Tel: PIONEER 6-0851
- Micro-Circuits Co., Maudlin Rd., New Buffalo, Mich., 37, 91
Tel: 272 W 1
- Micro-Die Inc., 92 S. 6th St., Newark 7, N.J., 52, 86
Tel: MArket 2-0471
- Micro Gee Products, Inc., 6319 W. Slau-son Ave., Culver City, Calif., 4, 28, 36, 85
Tel: EX 1-1716
- Microdot, Inc., 220 Pasadena Ave., S. Pasadena, Calif., 44, 70, 82, 98
Tel: MURray 2-3351
- Microfect Co., Inc., 3450 25th S.E., Salem, Ore., 18, 37
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- Microlab, 71 Okner Pkwy., Livingston, N.J., 38, 50, 73**
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Tel: WYman 2-5700
- Micro-Lectric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, L.I., N.Y., 28, 44, 47, 67, 70, 86, 90**
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Tel: FREeport 8-3222
- Micromech Mfg. Corp., 1020 Commerce Ave., Union, N.J., 47, 86, 92
Tel: MU 8-6323
- Microphase Corp., P.O. Box 1166R, Greenwich, Conn., 50, 90**
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Tel: NORmandy 1-6200
- Microsonics, Inc., Hingham Industrial Center, Hingham, Mass., 48
Tel: RIVerview 9-3100
- Microtech, Inc., 2975 State St., Hamden 17, Conn., 19, 38, 50, 80
Tel: AT 8-9297
- Microtran Co., Inc., 145 E. Mineola Ave., Valley Stream, N.Y., 73, 79**
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- Microtronics, Inc., 9 Porete Ave., North Arlington, N.J., 19, 77, 84, 86, 92, 99
Tel: WYman 1-0242
- Microwave Associates, Inc., South Ave., Burlington, Mass., 19, 36, 38, 47, 50, 56, 64, 68, 76, 77, 80
Tel: BRowning 2-3000
- Microwave Chemicals Lab., Inc., Dept. 12, 282 Seventh Ave., New York 1, N.Y., 15, 37, 46, 47, 80, 83, 90**
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Tel: WATkins 4-6725
- Microwave Development Laboratories, Inc., 92 Broad St., Wellesley, Mass., 19, 29, 38, 50, 80
Tel: CEDar 5-6252
- Microwave Electronics Co., 4061 Transport St., Palo Alto, Calif., 76
Tel: DA 1-1770
- Mid-Century Instrumental Corp., 611 Broadway, New York 12, N.Y., 9, 14
Tel: SPRing 7-4016
- Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 5, 12, 15, 31, 45, 56, 61, 67, 73, 79, 90**
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- Midwest Research Institute, 425 Volker Blvd., Kansas City 10, Mo., 90
Tel: LOGan 1-0202
- Midwestern Instrum., Inc., P.O. Box 7186, Tulsa, Okla., 4, 9, 12, 13, 14, 23, 27, 28, 34, 36, 56, 58, 59, 63, 66, 85, 86
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- Milford Rivet & Machine, Penn. Div., Hatboro, Pa., 87
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- Miljan, Inc., Box 396, 15506 Vermont St., Paramount, Calif., 9, 72, 82
Tel: METcalf 3-1023
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Miller Electro-Research Labs., 5529 S. 5th St., Milwaukee 7, Wis., 67
Tel: HUmboldt 3-6303

Miller Labs., A. E., 9226 Hudson Blvd., North Bergen, N.J., 47
Tel: UNion 9-2142

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Tel: FLanders 9-6400

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Tel: 2-0488

Minitronics Corp., 328 Grand St., New York 2, N.Y., 41
Tel: ORegon 4-8250

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Tel: FEderal 2-5225

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Tel: WEbster 5-2700

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Miskella Infra-red Co., E. 73rd & Grand Ave., Cleveland 4, Ohio, 88
Tel: HE 1-2210

Missouri Research Labs., 2109 Locust St., St. Louis 3, Mo., 1, 9, 19, 36, 90
Tel: CHestnut 1-7875

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Tel: WOODbine 1-4001

Mitchell Industries, Inc., P.O. Box 17, Mineral Wells, Tex., 1
Tel: FA 5-4747

Mitchell Rand Mfg. Corp., Insulation Div., 51 Murray St., New York 7, N.Y., 89, 91, 95
Tel: COrtland 7-9264

Mitronics, Incorporated, Hi-Temp, Inc., 1290 Central Ave., Hillside, N.J., 48, 52, 61, 62, 65, 67, 68, 69, 83, 86
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Tel: WAverly 6-2250

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Model Rectifier Corp., 1675 Utica Ave., Brooklyn 34, N.Y., 4, 45, 61, 67
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Tel: CLOverdale 8-6800

Modelectric Products Co., Inc., Asbury Park, N.J., 4, 55, 73, 82, 86
Tel: PRospect 4-2519

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Molon Motor & Coil Corp., 2432 W. George St., Chicago 18, Ill., 58
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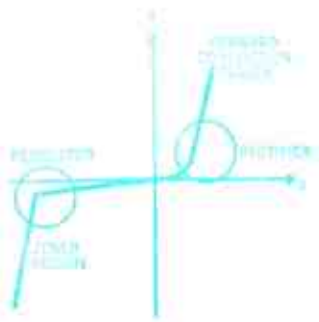
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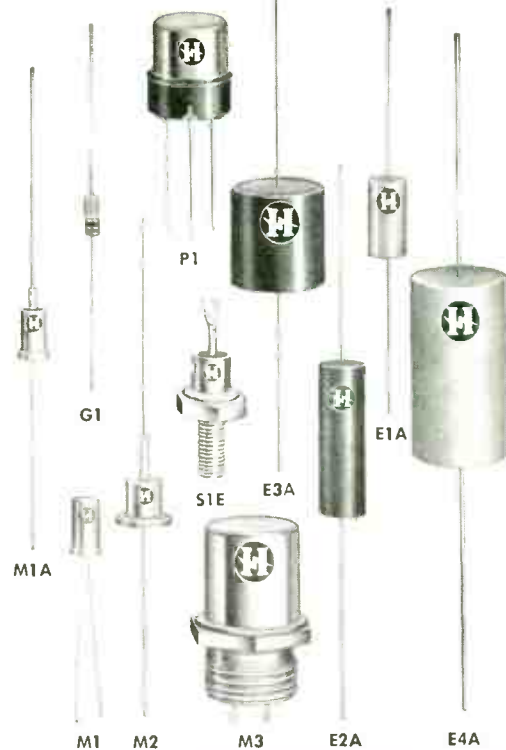
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| | <p>6</p> <p>ZENER LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 200mW • Zener Voltage Range: 2.0V — 8.0V | <p>6</p> <p>ZENER MICRO-MINIATURE GLASS LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 250mW • Zener Voltage Range: 2.0V — 8.0V | <p>5</p> <p>ZENER "DOUBLE ANODE" LOW VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 200mW • Zener Voltage Range: 3.0V — 8.0V | <p>15</p> <p>ZENER "SINGLE ANODE" MEDIUM VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V — 145V | <p>9</p> <p>ZENER "DOUBLE ANODE" MEDIUM VOLTAGE DIODES</p> <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V — 45V | <p>6</p> <p>ZENER REFERENCE DIODES & ELEMENTS</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 1N429: 6.2V ± 5% • 1N430, 1N430A, 1N430B, 1N1530, 1N1530A: 8.4V ± 5% • Dyn. Imp.: 1N429: 20 ohms Others: 15 ohms | <p>4</p> <p>ZENER REFERENCE MICRO-MINIATURE DIODES</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 5.9V to 6.5V • Dyn. Imp.: 15 ohms | <p>15</p> <p>ZENER REFERENCE STRINGS</p> <ul style="list-style-type: none"> • Operating Zener Voltage: 6.2V thru 49.6V ± 5% • Dyn. Imp.: 20 ohms to 180 ohms (over the entire line) | <p>38</p> <p>ZENER VOLTAGE REGULATORS</p> <p>10 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V ± 10% • Dyn. Imp.: 1 ohm to 140 ohms (over the entire line) | <p>38</p> <p>ZENER VOLTAGE REGULATORS</p> <p>1 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V ± 10% • Dyn. Imp.: 1.2 ohms to 1100 ohms (over the entire line) | <p>38</p> <p>ZENER VOLTAGE REGULATORS</p> <p>1/4 WATT</p> <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V ± 10% • Dyn. Imp.: 3.5 ohms to 1400 ohms |
| Case Type | M1 | G1 | M1 | M1 | M1 | M1, M3, P1 | G1 | E1A, E2A, E3A, E4A | S1E | M1A | G1 |
| | <p>26</p> <p>GENERAL PURPOSE SILICON DIODES</p> <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 470V | <p>6</p> <p>HB GENERAL PURPOSE SILICON DIODES</p> <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 270V | <p>8</p> <p>GLASS GENERAL PURPOSE DIODES</p> <ul style="list-style-type: none"> • 200mW • PIV Range: 25V to 175V | <p>5</p> <p>GLASS FAST RECOVERY SILICON DIODES</p> <ul style="list-style-type: none"> • 200mW • PIV Range: 25V to 175V | | | | | | | |
| Case Type | M1 | M1 | G1 | G1 | | | | | | | |
| | <p>11</p> <p>SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 50V to 1000V | <p>7</p> <p>SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 50V to 500V | <p>8</p> <p>SILICON DIFFUSED JUNCTION MEDIUM POWER RECTIFIERS</p> <ul style="list-style-type: none"> • PIV Range: 95V to 570V | | | | | | | | |
| Case Type | M1A | M2 | S1E | | | | | | | | |
| | <p>9</p> <p>SILICON SOLAR CELLS</p> <ul style="list-style-type: none"> • Typical Power Output Range: .072mW to 34.0mW (at 10,000 ft. candles—sunlight) • Spectral Response: Range: 4000 to 11,500 angstroms; Peak: 8500 angstroms | | <p>8</p> <p>PHOTO-VOLTAIC READOUT CELLS</p> <ul style="list-style-type: none"> • Number of readout positions: from 4 to 10 • Spectral Response: Range: 4000 to 11,500 angstroms; Peak: 8500 angstroms | | | | | | | | |

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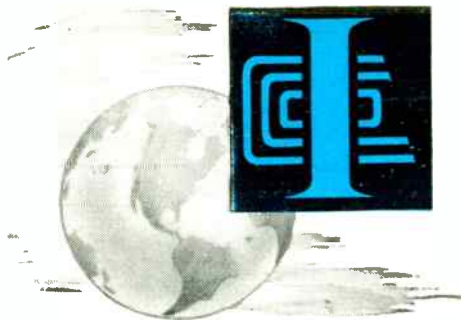
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- Multicore Solders, Ltd., Maylands Ave., Boxmoor, Herts., England, 56, 63, 92, 97
Tel: BOXmoor 3636
- Multi-Products Co., 21470 Coolidge Hwy., Oak Park 37, Mich., 2, 4, 6, 16, 20, 21, 61
Tel: JOrdan 6-2377
- Multi-Tron Lab., Inc., 9861 Derby Lane, Westchester, Ill., 4, 22, 52, 65, 74, 75, 90
Tel: FIlmore 3-7070
- Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N.J., 86, 87
Tel: DELaware 3-6200
- Munston Mtg. & Service, Inc., Beech St., Islip, L.I., N.Y., 16
Tel: JUNiper 1-3900
- Murata Mfg. Co., Ltd., Yamashima, Kyoto, Japan, 31, 41, 42, 50, 54, 57, 67, 72, 83, 89, 92
Tel: KYoto 7-0428
- Murdock Corp., 158 Carter St., Chelsea 50, Mass., 53, 54, 98
Tel: 3-0076
- Mured, Incorporated, P.O. Box 286, Danbury, Conn., 36
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- Murphy & Miller, Inc., 630 W. Taylor St., Chicago 7, Ill., 12, 92
Tel: HARRison 7-8900
- Muter Company, 1255 S. Michigan Ave., Chicago 5, Ill., 41, 42, 59, 70, 73
Tel: WAbash 2-8800
- Muter Co., Rola Co. Div., 2530 Superior Ave., Cleveland 14, Ohio, 43, 54
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- Mutron Corp., 125 Perkins Ave., Brockton, Mass., 86, 90
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- Mutual Electronic Industries Corp., 85 Beechwood Ave., New Rochelle, N.Y., 44, 51, 81, 82, 85, 94
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- Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., 52, 62, 83, 89, 94, 95, 96**
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Tel: PRescott 9-8866
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Tel: PRescott 9-8866
- Mycalex Tube Socket Corp., 125 Clifton Blvd., Clifton, N.J., 69
Tel: PRescott 9-8866
- Myers & Sons, Inc., E. A., Valley Brook Rd., Canonsburg, Pa., 36
Tel: WIlson 1-9000
- Mykroy, Inc., 645 Wheeling Rd., Wheeling, Ill., 83, 86, 89
Tel: LEhigh 7-0280
- Mystic Transformers, Inc., 114 West St., S. Wilmington, Mass., 43, 73
Tel: PArkview 9-0887
- Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill., 89, 91
Tel: SP 2-1600
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Tel: CLinton 6-4168



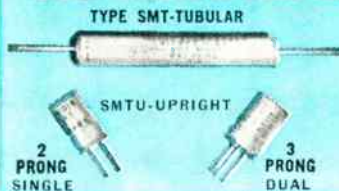
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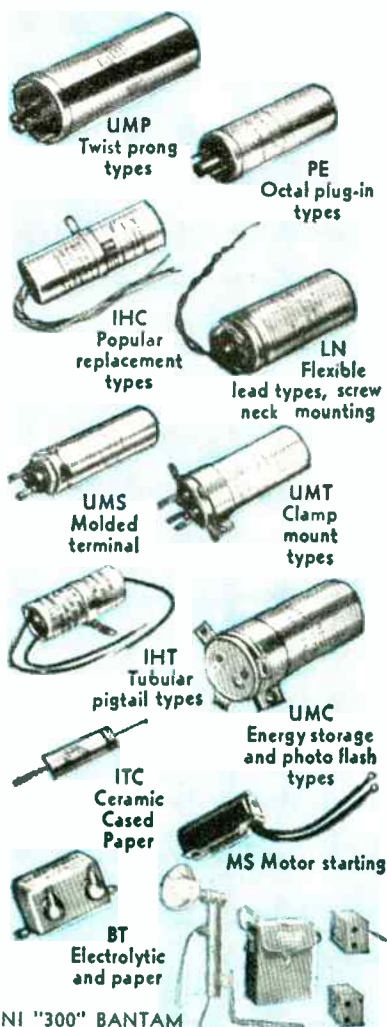
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Mytron Mfg. Co., 4522 Brazil St., Los
Angeles 39, Calif., 54, 88, 92
Tel: CHapman 5-4931

N.J.E. Corporation, 345 Carnegie Ave.,
Kenilworth, N.J., 15, 61
Tel: CHestnut 1-1500
NRC Equipment Corp., Dept. 12, 160
Charlemont St., Newton 61, Mass., 4,
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Tel: DEcatur 2-5800
NRK Mfg. & Eng. Co., 4601 W. Addison
St., Chicago 41, Ill., 18, 37, 38, 50,
70, 73, 80
Tel: SPRing 7-2970

NYT Electronics, Inc., 2979 N. Ontario
St., Burbank, Calif., 36, 38, 43, 45, 48,
50, 61, 62, 73, 81, 86
Tel: VICToria 9-5094

Nageldinger & Son, Inc., J., 366 E.
153rd St., Bronx 55, N.Y., 4, 12, 87, 88
Tel: CYpress 2-6165

Naniloa Corporation, P.O. Box 2791,
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82, 86, 90
Tel: CHerry 1-8065

Narda Microwave Corp., Dept. IRED-3,
118-160 Herricks Rd., Mineola, L.I.,
N.Y., 5, 19, 37, 38, 50, 61, 77, 80
See ad on pages 141-144
Tel: PIONEer 6-4650

Narda Microwave Corp., High Power
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160 Herricks Rd., Mineola, L.I., N.Y.,
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Tel: PIONEer 6-4650

Narda Ultrasonics Corp., Dept. IRE
D-4, 625 Main St., Westbury, L.I.,
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Tel: EDGewood 3-5400

Narrow Fabric Co., P.O. Box 742, Read-
ing, Pa., 87, 89
Tel: FRanklin 6-2891

National Aeronautical Corp., Commerce
Dr., Fort Washington, Pa., 1, 37
Tel: MI 6-2900

National Batteries, Gould-Nicad Div.,
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Tel: EAsthampton 1200

National Cash Register Co., S. Main &
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Tel: ADams 6111

National Cash Register Co., Electronics
Div., 1401 E. El Segundo Blvd.,
Hawthorne, Calif., 9
Tel: PL 7-1811

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National Cine Equip., Inc., 209 W. 48th
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Tel: CIRCLE 6-0348-9

National Electric Controller Co., 7070
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Tel: BR 4-4050

National Electronics, Inc., 628 North St.,
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Tel: HU 3-5000

National Engineering Products, Inc.,
435 Washington Building, Washing-
ton 5, D.C., 89, 91
Tel: REpublic 7-4473

National Lead Co., 111 Broadway, New
York 6, N.Y., 86, 87, 93, 97
Tel: REctor 2-9400

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Newark 5, N.J., 37, 46, 55, 83, 93, 95, 96
Tel: MITchell 2-6860

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Boston 19, Mass., 12, 28, 45
Tel: JAMAica 4-7000

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Melrose 76, Mass., 1, 2, 6, 16, 29, 31,
42, 43, 46, 69, 83, 87, 94
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Tel: NO 5-4800

National Radio Institute, 3939 Wiscon-
sin Ave., N.W., Washington 16, D.C.,
100
Tel: EM 2-9700

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68, 72
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Tel: YONkers 8-6400

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Tel: CAPital 5-5611

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Tel: FULTon 8-8800

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Naybor Laboratories, Inc., E. V., 26
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Tel: PORt Washington 7-4300

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cago 10, Ill., 36, 41, 44, 67
Tel: CHesapeake 3-1630

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Blvd., Pasadena, Calif., 36, 61
Tel: RY 1-5121

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Tel: SAint Charles 5510

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Tel: CO 9-7701

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St., Newark 2, N.J., 82, 86, 93
Tel: MITchell 2-1682-3-4

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Tel: HEMlock 6-9191

Networks Electronic Corp., 14806 Ox-
nard St., Van Nuys, Calif., 28, 36, 45,
52, 61, 70, 73
Tel: STanley 3-2191

Neutronic Associates, 93-14 101 Ave.,
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Tel: VIRginia 7-7703

Nevada Air Products Co., P.O. Box
1090, Reno, Nevada, 7, 26, 40
Tel: FAirview 2-9421

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Tel: TONopah 1826

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102
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Tel: PROspect 6-2262

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Tel: DAvis 4-4181

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Boston Post Rd., Orange, Conn., 88
Tel: SYcamore 9-2005

New England Scientific Instruments Co.,
238 Main St., Cambridge 42, Mass.,
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Tel: KIRkland 7-1997

New England Tape Co., 30 Sand St.,
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Tel: SOMerset 6-6100

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New Rochelle Tool Corp., 320 Main St., New Rochelle, N.Y., 88, 92
Tel: NE 2-5555

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Tel: JAmAica 4-3220

New York Air Brake Co., Vacuum Equipment Div., 1325 Admiral Wilson Blvd., Camden, N.J., 12, 22, 88, 92
Tel: WOOdlawn 6-0782

New York Coil Co., Inc., 144-48 Second Ave., Phoenixville, Pa., 41, 43, 73
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Tel: BOWling Green 9-6220

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Newton Co., 55 Elm St., Manchester, Conn., 4, 25, 50, 70
Tel: MITchell 3-1543

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Tel: BU 9-2717

Non-Linear Systems, Inc., Del Mar Airport, Del Mar, Calif., 9, 12, 14, 45, 56, 67
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Tel: FOrEst 8-5500

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Tel: WAtkins 4-8360

Norrman Labs., Ernst, Williams Bay, Wis., 3, 12, 13, 23, 31, 56, 90
Tel: CRele 5-5516

North American Aviation, Inc., Auto-netics Div., 9150 E. Imperial Hwy., Downey, Calif., 1, 4, 9, 25
Tel: SPruce 3-2233

North American Electronics, Inc., 212 Broad St., Lynn, Mass., 64, 68
Tel: LYnn 8-2835

North American Philips Co., Philips Labs. Div., Irvington-on-Hudson, N.Y., 46, 75, 76, 99
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North Atlantic Industries, Inc., 603 Main St., Westbury, L.I., N.Y., 4, 9, 12, 26, 28, 45
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Tel: EDgewood 4-1122

North Electric Co., 55 W. 42nd St., New York 36, N.Y., 4, 8, 20, 30, 34, 44, 50, 51, 53, 61, 66, 70, 79, 81, 84, 98
Tel: CH 4-1416

North Electric Co., 553 South Market St., Galion, Ohio, 4, 8, 9, 12, 20, 30, 32, 33, 34, 36, 43, 44, 45, 46, 53, 66, 70, 84, 85, 86, 87, 98
Tel: HOrward 8-2420

North Hills Electric Co., 402 Sagamore Ave., Mineola, L.I., N.Y., 12, 17, 26, 43, 48, 50, 61, 73, 79, 83
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Tel: PIONEer 7-0555

North Shore Nameplate, Inc., 214-27 Northern Blvd., Bayside 61, L.I., N.Y., 81, 86, 87
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Tel: BAyside 4-4000

Northam Electronics, Inc., 2420 N. Lake Ave., Altadena, Calif., 9, 27, 61, 72
Tel: RYan 1-9378

Northeast Electronics Co., P.O. Box 425, Airport Rd., Concord, N.H., 3, 4, 19, 26, 34, 38, 56, 85
Tel: CApiTol 5-6641

Northeast Scientific Corp., 30 Wetherbee St., R.F.D. #1, South Acton, Mass., 19, 61
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Tel: CColonial 3-7706

Northeastern Engineering, Inc., 25 S. Bedford St., P.O. Box 150, Manchester, N.H., 4, 9, 31, 34
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Tel: NAtional 2-6485

Northern Electric Co., Ltd., 1600 Dorchester St. W., Montreal, P.Q., Canada, 30, 32, 36, 53, 57, 82
Tel: WEllington 7-8541

Northern Electronic & Vacuum Industries, P.O. Box 105, St. Sauveur des Monts, P.Q., Canada, 9, 85
Tel: CA 7-2629

Northern Engineering Labs., Inc., 372 Wilmot Ave., Burlington, Wis., 31, 47, 72
Tel: ROKewell 3-7155

Northern Plastics Corp., 2nd & Market St., La Crosse, Wis., 36, 41, 44, 46, 62, 67, 86, 89, 95, 98, 99
Tel: LA Crosse 4-6070

Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 3, 21, 24, 33, 34
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Tel: WAtkins 9-9117

Northwest Industries Ltd., P.O. Box 517, Municipal Airport, Edmonton, Alta., Canada, 62, 81, 82, 85, 86, 90, 101
Tel: GLEndale 5-3161

Northwest Plastics, Inc., 65 E. Plato Ave., St. Paul 7, Minn., 86, 94
Tel: CA 7-6686

Norton Assoc., Inc., P.O. Box 90, Garden City, L.I., N.Y., 63
Tel: IVanhoe 3-2968

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Tel: SWift 8-2511

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Tel: FE 9-7417

Nortronics, Div. Northrop Corp., 222 N. Prairie Ave., Hawthorne, Calif., 1, 4, 9, 12, 15, 21
Tel: ORegon 8-9111

Norwood Controls Unit, Detroit Control Div., 934 Washington St., Norwood, Mass., 4, 9, 12, 24, 34, 36, 56, 71, 72
Tel: NO 7-4010

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See ad on page 242
Tel: EX 2-7117

Nuclear-Chicago Corp., 223 W. Erie St., Chicago 10, Ill., 4, 9, 14, 17, 22, 31, 47, 50, 56, 86, 90, 91, 93, 96
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Tel: OAKwood 7-4200

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Tel: WOODland 2-2162

Nuclear Development Lab., P.O. Box 7034, Kansas City, Mo., 22
Tel: DELmar 3-7692

Nuclear-Electronics Corp., 2925 N. Broad St., Philadelphia 32, Pa., 22, 26, 61
Tel: BALdwin 6-2300

Nuclear Environment Assoc., Box 3021, University Station, Columbus 10, Ohio, 22
Tel: AX 9-5335

Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Ind., 22
Tel: LIBerty 6-2415

Nuclear Research Corp., Southampton, Pa., 4, 22
Tel: EL 7-5015

Nucleonic Corp of America, 196 Degraw St., Brooklyn 31, N.Y., 13, 22, 100
Tel: MAin 4-7370

Nucleonic Products Co., 1601 Grande Vista Ave., Los Angeles 23, Calif., 67, 68
Tel: AN 2-1187

Nugent Elect. Co., Inc., 802 E. Eighth St., New Albany, Ind., 44
Tel: WHITEhall 5-0211

Numberall Stamp-Tool Co., 379 Huguenot Ave., Huguenot Pk., S.I. 12, N.Y., 92
Tel: YUkon 4-0822

Nutron Mfg. Co., Inc., 67 Monroe Ave., Staten Island 1, N.Y., 61, 85
Tel: GIBraltar 7-3229

Nutt-Shel Co., 2701 S. Harbor Blvd., Santa Ana, Calif., 87
Tel: KI 5-9311

Ny-Glass, Inc., 2501 E. 68th St., Long Beach 5, Calif., 87, 89, 94, 95
Tel: NEVada 6-8440

Nylogrip Products, 570 Pleasant St., Watertown 72, Mass., 87
Tel: WALnut 6-0100

Nylok Corp., 611 Industrial Ave., Paramus, N.J., 87
Tel: CO 1-9400



O K Electronics Corp., 7 Hunt Pl., Nutley 10, N.J., 51, 66, 70
Tel: NORth 1-1001

O & S Research Corp., 1811 Barnard St., Riverton, N.J., 60, 70, 86, 87, 90
Tel: WA 5-4331

Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 42, 45, 66, 70, 77
See ad on pages 86-87
Tel: MOhawk 4-2222

O'Brien Electric Corp., 6514 Santa Monica Blvd., Hollywood 38, Calif., 4, 30, 32, 81, 84
Tel: HOLlywood 4-1117

Oerlikon Tool & Arms Corporation of America, P.O. Box 3049, Asheville, N.C., 81, 84, 86
Tel: ALPine 3-6464

Offner Electronics, Inc., 3900 N. River Rd., Schiller Park, Ill., 12, 13, 14, 17, 36
Tel: GLadstone 1-0050

Ogden Coil & Transformer Co., 3323 W. Cermak Rd., Chicago 23, Ill., 43, 61, 72
Tel: VI 7-5356

Ohio Crankshaft Co., Tocco Div., 3800 Harvard Ave., Cleveland 5, Ohio, 58, 88
Tel: DIamond 1-2300

Ohio Semiconductors, Inc., 1035 W. Third Ave., Columbus 8, Ohio, 45, 68, 72
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Tel: AX 4-4938

Ohmart Corp., Box 67, Sta. B., Cincinnati 22, Ohio, 4, 22, 56
Tel: PArkway 1-2302

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 5, 37, 38, 41, 43, 66, 67, 68, 70, 73, 79
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Tel: ORchard 5-2600

Olsen Corp., Gunnar A., 215-11 42nd Ave., Bayside 61, L.I., N.Y., 37
Tel: BAyside 9-8092

Oltronix, Inc., 235 Underwood Dr., Atlanta 5, Ga., 9, 12, 61
Tel: BL 5-2576

Omega Instrument Co., 103 E. Altadena Dr., Altadena, Calif., 4, 9, 12, 13, 34, 36, 57, 72, 85
Tel: SY 4-8814

Omega Labs., Inc., Haverhill St., Rowley, Mass., 19, 38, 80
Tel: WHitney 8-7757

Onan & Sons, Inc., D. W., 2945 University Ave. S.E., Minneapolis 14, Minn., 61, 92
See ad on page 496
Tel: FEderal 2-1155

O'Neil-Irwin Mfg. Co., 316 8th Ave., Lake City, Minn., 92
Tel: 6301

Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 41, 62, 67
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Tel: HO 8-1681

Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 4, 12, 15, 43, 45, 61, 62, 64, 66, 79, 90, 92
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Tel: WOrth 6-0380

Oppenheimer Plastics, Inc., Wyandotte Rd., Willow Grove, Pa., 44, 53, 62, 69, 81, 86, 87, 89, 90, 94, 95, 98
Tel: OLdfield 9-6000

Optical Coating Lab., Inc., 977 Sebastopol Rd., Santa Rosa, Calif., 15, 32, 86
Tel: LIBerty 5-6440

Optimized Devices, Inc., 864 Franklin Ave., Thornwood, N.Y., 4, 5, 12
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Tel: ROgers 9-6110

Optomechanisms, Inc., 216 E. Second St., Mineola, L.I., N.Y., 4, 12, 23, 56, 72, 86, 90
Tel: PIONEER 6-5576

Optron Corp., 335 S. Salinas St., Santa Barbara, Calif., 12, 56, 72
Tel: WOODland 5-6140

Orbitran Co., Inc., 11487 Woodside Ave., Lakeside, Calif., 9, 19, 32, 48, 50, 61
Tel: HICKory 3-6832

Ordinance Research Lab., Pennsylvania State University, University Park, Pa., 90

Oregon Electronic Mfg. Co., 2105 S.E. 6th Ave., Portland 14, Ore., 61
Tel: BELmont 6-9292

Orradio Industries, Inc., Shamrock Circle, Opelika, Ala., 63
Tel: SHERwood 5-5771

Ortho Filter Corp., 7 Paterson Ave., Paterson 1, N.J., 36, 38, 43, 50, 73
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Tel: MULberry 4-5858

Oryx Sales Co., 9015 Wilshire Blvd., Beverly Hills, Calif., 92
Tel: BRadshaw 2-6635

Osborne Electronic Sales, 712 S.E. Hawthorne, Portland 14, Ore., 36, 43, 67, 73
Tel: BE 2-0161

Osborne Transformer Corp., 948 E. Lafayette Ave., Detroit 7, Mich., 43, 64, 73
Tel: WOODward 1-4290

Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis., 28, 36, 40, 45, 58
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Tel: MELrose 7-4445

Ostlund, Evert M., P.O. Box 458, Andover, N.J., 24, 36, 85, 90
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Tel: PArkway 9-6635

Otis Elevator Co., Electronics Div., 35 Ryerson St., Brooklyn 5, N.Y., 4, 9, 12, 90
Tel: ULster 5-6800

Owen Labs., Inc., 55 Beacon Pl., Pasadena, Calif., 12, 61, 90
Tel: RYan 1-6901

Owens-Corning Fiberglas Corp., 598 Madison Ave., New York 22, N.Y., 82, 89, 95
Tel: MU 8-8380

Owens-Illinois, Kimble Glass Co., P.O. Box 1035, Toledo 1, Ohio, 94, 99
Tel: CHerry 2-6543

Oxford Components, Inc., 556 W. Monroe St., Chicago 6, Ill., 54, 60, 73, 81
Oxford Electric Corp., 3911 S. Michigan Blvd., Chicago 15, Ill., 43, 54, 60, 73
Tel: ATLantic 5-6161

PAM Associates, Inc., 7315 Harford Rd., Baltimore 14, Md., 12, 90
Tel: HI 4-6195

P.B.R. Mfg. Co., H. & Luzerne St., Philadelphia 24, Pa., 12, 81, 84, 86
Tel: GARfield 6-0932

P C A Electronics, 16799 Schoenborn, Sepulveda, Calif., 19, 43, 48, 73
Tel: EMPire 2-0761

PIC Design Corp., 477 Atlantic Ave., East Rockaway, N.Y., 28, 36, 87, 98
Tel: LY 3-6470



PAM Associates, Inc., 7315 Harford Rd., Baltimore 14, Md., 12, 90
Tel: HI 4-6195

P.B.R. Mfg. Co., H. & Luzerne St., Philadelphia 24, Pa., 12, 81, 84, 86
Tel: GARfield 6-0932

P C A Electronics, 16799 Schoenborn, Sepulveda, Calif., 19, 43, 48, 73
Tel: EMPire 2-0761

PIC Design Corp., 477 Atlantic Ave., East Rockaway, N.Y., 28, 36, 87, 98
Tel: LY 3-6470

PSP Engineering Co., 6058 Walker Ave., Maywood, Calif., 14, 28, 37, 43, 58, 70, 72
Tel: LUdlow 3-4785

Pace Electrical Instrument Co., Inc., 70-31 84 St., Glendale 27, L.I., N.Y., 56
Tel: DAvenport 6-3982

Pace Engineering Co., 13035 Saticoy St., N. Hollywood, Calif., 72
Tel: POplar 5-0453

Pacific Automation Products, Inc., 1000 Airway, Glendale 1, Calif., 4, 82, 86
Tel: CItrus 6-2411

Pacific Electro Nuclear Corp., 9520 Jefferson Blvd., Culver City, Calif., 22
Tel: VErmont 7-4411

Pacific Relays, Inc., 13915 Saticoy St., Van Nuys, Calif., 66
Tel: ST 2-2360

Pacific Resistor Co., 2186 Colorado Ave., Santa Monica, Calif., 67, 82
Tel: EX 3-0531

Pacific Scientific Co., P.O. Box 22019, Los Angeles 22, Calif., 4, 44, 45, 52, 66, 67, 70, 72, 85, 86, 87, 88, 90, 93, 97
Tel: SPruce 3-2020

Pacific Semi-Conductors, Inc., 10451 W. Jefferson Blvd., Culver City, Calif., 68
Tel: OSborne 9-4561

Pacific Technical Co., 2047 Sawtelle Blvd., Los Angeles 25, Calif., 17, 61
Tel: GR 7-0455

Pacific Transducer Corp., 11836 W. Pico Blvd., Los Angeles 64, Calif., 15, 22, 26, 59, 87, 94
Tel: GR 8-1134

Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 1, 9, 12, 19, 25, 27, 31, 36, 43, 48, 49, 50, 61, 62, 73, 74
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Tel: BRadshaw 2-6141

Page Communications Engrs., Inc., 710 Fourteenth St. N.W., Washington 5, D.C., 85, 90
Tel: EExecutive 3-1523

Page-Madden Co., 76-96 E. Second St., Mineola, L.I., N.Y., 46, 83, 87, 89, 99
Tel: Pioneer 6-2660

Painton & Co., Ltd., Bembridge Dr., Kinshorpe, Northampton, England, 37, 38, 43, 44, 53, 67, 69, 70, 87, 94
Tel: NOrthampton 3-2354

Palmer Instruments, 1028 Mission St., South Pasadena, Calif., 85, 90
Tel: MU 2-1337

Palnut Co., 94A Glen Rd., Mountaine-side, N.J., 87
Tel: ADams 3-3000

Palo Alto Engrg. Co., 620 Page Mill Rd., Palo Alto, Calif., 36, 45, 73
Tel: DAvenport 6-5360

Pan American Trade and Development Corp., 2 Park Ave., New York 16, N.Y., 47
Tel: MU 6-7960

Pan-Air Electronics Corp., 1120 W. Magnolia Blvd., Burbank, Calif., 1, 9, 21, 36, 38, 43, 50, 53, 62, 81, 86, 87
Tel: VICTory 9-5411

Panduit Corp., 14461 Waverly Ave., Midlothian, Ill., 87
Tel: HIlltop 5-3134

Panellit, Inc., 7401 N. Hamlin Ave., Skokie, Ill., 4, 9, 34, 56, 70
Tel: ORchard 5-2500

Panob Corp., 49 Beech St., Port Chester, N.Y., 81, 86, 87, 94
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Tel: WEStmore 9-3066

Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., 2, 3, 12, 14, 19, 29, 31, 80
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Tel: OWens 9-4600

Panseal, Inc., 10 Main St., Little Ferry, N.J., 1, 4, 12, 15, 17, 28, 36, 52, 66, 70, 71, 72, 82, 85, 101
Tel: DIamond 3-2483

Pantek Co., Box 17121, Los Angeles 17, Calif., 85

Paragon Electric Co., 1600 12th St., Two Rivers, Wis., 57, 70
Tel: 303

Paragon-Revolute Corp., 77 South Ave., Rochester 4, N.Y., 92
Tel: BAKER 5-2480

Parameters, Inc., 195 Herricks Rd., New Hyde Park, L.I., N.Y., 36, 85, 90
Tel: Pioneer 7-8484

Paramount Paper Tube Corp., 618 S. Lafayette St., Fort Wayne 2, Ind., 87
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Tel: ANthony 4197

Paramount Products Co., 759 Ramsey Ave., Hillside, N.J., 99
Tel: MURdock 8-8150

Paraplegics Mfg. Co., Inc., 10068 Franklin Ave., Franklin Park, Ill., 62, 81, 82, 86
Tel: GLadstone 5-1697

Park Nameplate Co., Inc., 34-10 Linden Pl., Flushing 54, L.I., N.Y., 87
Tel: FLushing 9-7000

Parke Mathematical Laboratories, Inc., Bedford Rd., Carlisle, Mass., 85, 90
Tel: EMerson 9-3818

Parke, Nathan Grier, Bedford Rd., Carlisle, Mass., 85
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Tel: EMerson 9-3818

Parker-Kalon Div., General American Transportation Corp., Clifton, N.J., 87
Tel: GREGory 1-1000

Parker Seal Co., Div. of Parker-Hannifin Corp., 10567 Jefferson Blvd., Culver City, Calif., 80, 87
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Tel: TEXas 0-4618

Parks Labs., Henry Francis, P.O. Box 1665, Lake City Sta., Seattle 55, Wash., 56, 61, 90, 101
Tel: LAkeview 3-4832

Parkside Wire Co., 2535 W. Armitage Ave., Chicago 47, Ill., 82
Tel: SPaulding 2-1331

Par-Metal Products Corp., 32-42 49th St., Long Island City 3, N.Y., 81, 84
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Tel: Astoria 8-8905

Parsons Co., Ralph M., 151 S. De Lacey Ave., Pasadena, Calif., 31, 34, 48, 50, 61, 86, 90
Tel: RYan 1-0461

Partlow Corp., 216 Campion Rd., New Hartford, N.Y., 4, 14, 56, 71
Tel: UTica 2-5105

Partridge Transformers Ltd., Roebuck Rd.-Chessington, Surry, England, 43, 73
Tel: EI.mbridge 6737

Parzen Associates, 402 Sagamore Ave., Mineola, L.I., N.Y., 85
Tel: PI 7-0497

Parzen, Benjamin, 34-01 38 Ave., Long Island City 1, N.Y., 85, 90
Tel: EX 2-5200

Pass & Seymour, Inc., 50 Boyd Ave., Syracuse 9, N.Y., 60, 69, 70, 83
Tel: HOward 8-6211

Patent Button Co. of Tennessee, Inc., 2000 Centry St., Knoxville 1, Tenn., 86, 94
Tel: 2-9621

Patterson, Moos Div., Universal Wind-ing Co., 90-28 Van Wyck Expwy., Jamaica 18, N.Y., 9, 15, 22, 36, 39, 61, 62, 85, 86
Tel: AXtel 7-4400

Patton-Mac Guyer Co., 17 Virginia Ave., Providence 5, R.I., 98, 99
Tel: HOpkins 1-1550

Paul & Stein Bros., Inc., 235 5th Ave., New York 16, N.Y., 82, 89, 93
Tel: MU 4-6370

Pearce-Simpson, Inc., 2295 N.W. 14 St., Miami 35, Fla., 16, 20
Tel: NEwton 4-7695

Pearson Electronics, Inc., 707 Urban St., Palo Alto, Calif., 73
Tel: DAvenport 5-3147

Pease & Curren, Inc., 780 Allens Ave., Providence 5, R.I., 93
Tel: HOpkins 1-6340

Peck & Harvey Mfg. Corp., 5650 N. Western, Chicago 45, Ill., 92
Tel: ED 4-2200

Peck Spring Co., 313 John St., Plainville, Conn., 28, 86, 87, 98
Tel: SH 7-2767

Pecco Corporation, 2760 Whittier Blvd., Los Angeles 23, Calif., 17, 85, 88, 95
Tel: ANgelus 9-4164

Peer, Inc., 1200 Milton St., Benton Harbor, Mich., 1, 24, 92

Peerless Electric Co., 1401 W. Market St., Warren, Ohio, 40
Tel: EXpress 3-1551

Peerless Electronics, Inc., 5338 Alhambra Ave., Los Angeles 32, Calif., 99
Tel: CApital 1-5196

Peerless Products Industries, 812 N. Pulaski Rd., Chicago 51, Ill., 37, 86, 87
Tel: BElmont 5-9883

Pee-Wee Molding Corp., 1720 Atlantic Ave., Brooklyn 13, N.Y., 86, 87, 89
Tel: PR 4-3441

Pegasus Labs., Inc., 3692 Eleven Mile Rd., Berkley, Mich., 4, 12, 28, 36
Tel: LIncoln 6-3636

Peirce Dictation Systems, 5900 N. Northwest Hwy., Chicago 31, Ill., 27, 63
Tel: RO 3-3220

Pek Labs., Inc., 4024 Transport St., Palo Alto, Calif., 65, 75, 76, 85, 90
Tel: DA 1-2787

Pendar, Inc., 14744 Armita St., Van Nuys, Calif., 60, 66, 67, 70
Tel: STAnley 3-3136

Penn Engineering & Manufacturing Corp., P.O. Box 311, Doylestown, Pa., 87
Tel: ROger 6-8853

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Penn Fibre & Specialty Co., Inc., 2030 E. Westmoreland St., Philadelphia 34, Pa., 86, 87, 89, 95, 98
Tel: REgent 9-4862

Penn Keystone Corp., P.O. Box 350, Hawkins St., Derby, Conn., 56, 60, 66
Tel: REgent 4-3301

Penn Resistor Corp., 526 N. Broad St., Lansdale, Pa., 41, 50, 67
Tel: ULysses 5-9516

Penn Transformer Corp., E. Bishop St. Ext., Bellefonte, Pa., 43, 73
Tel: ELgin 5-4747

Penn-East Engineering Corp., Industrial Ave., Kutztown, Pa., 36, 50, 73
Tel: OV 3-7307

Pennsylvania Testing Lab., Doylestown, Pa., 5, 9, 12, 61, 90
Tel: FILLmore 8-5818

Penta Labs., Inc., 312 N. Nopal St., Santa Barbara, Calif., 65, 66, 75, 76
Tel: WOODland 5-4581

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 41, 46, 81, 82, 87, 89, 93, 96, 99
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Tel: EVerglade 4-2122

Performance Measurements, 15301 W. Mc Nichols Rd., Detroit 35, Mich., 4, 56
Tel: VERmont 8-7879

Perkin-Elmer Corp., Vernistat Div., 777 Main Ave., Norwalk, Conn., 15, 67, 73
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Tel: VICTor 7-2441

Perkin Engineering Corp., 345 Kansas St., El Segundo, Calif., 15, 36, 45, 61, 73, 79
Tel: EAstgate 2-1375

Perkins Machinery & Gear Co., Circuit Ave., W. Springfield, Mass., 86, 87, 92
Tel: REpublic 7-4751

Permacel, U. S. Hwy. 1, New Brunswick, N.J., 87, 89, 91, 95
Tel: CHarter 7-7900

Permag Corp., 88-06 Van Wyck Expwy., Jamaica 18, L.I., N.Y., 12, 55, 102
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Tel: OLYmpia 7-1818

Perma-Power, 3100 N. Elston, Chicago 18, Ill., 4, 79
Tel: KEystone 9-7171

Permonite Mfg. Co., 444 Lake Shore Dr., Chicago 11, Ill., 44, 51, 53, 69, 82, 86, 98
Tel: MICHigan 2-1915

Perron & Co., Inc., Ray, 1870 Centre St., Boston 32, Mass., 102
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Tel: FAirview 3-1008

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Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 4, 12, 15, 19, 45, 61, 73, 90
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Tel: TRinity 8-3251

Peter Partition Corp., 124 Boerum Pl., Brooklyn 1, N.Y., 86, 87
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Tel: TRiangle 5-4033

Petersen Radio Co., Inc., 2800 W. Broadway, Council Bluffs, Iowa, 47
Tel: 2-2760

Pettinos, Inc., Charles, 1 E. 42nd St., New York, N.Y., 91
Tel: MU 7-7337

Pfanstiehl Chemical Corp., 104 Lake View Ave., Waukegan, Ill., 59
Tel: MAJestic 3-1360

Phalo Plastics Corp., 530 Boston Turnpike, Shrewsbury, Mass., 82
Tel: VI 4-4021

Phaotron Instrument Electronics Corp., 151 Pasadena Ave., South Pasadena, Calif., 12, 56, 66, 67
Tel: CI 5-1471

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 44, 80, 82, 87, 93
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Tel: PLaza 1-3200

Phelps Dodge Copper Products Corp., Inca Mfg. Div., Fort Wayne, Ind., 82
Tel: EAStbrook 0511

Pheoll Manufacturing Co., Inc., 5700 Roosevelt Rd., Chicago, Ill., 87, 93
Tel: CO 1-0300

Philadelphia Insulated Wire Co., 200 N. 3rd St., Philadelphia 6, Pa., 82
Tel: MARket 7-0456

Philadelphia Quartz Co., 1146L Public Ledger Bldg., Philadelphia 6, Pa., 91
Tel: MARket 7-7200

Philadelphia Scientific Glass, Paletown Rd., 1, Quakertown, Pa., 4, 13, 52, 66, 70, 71, 72, 74, 88, 99
Tel: KEystone 6-4203

Philadelphia Wireless Tech. Institute, 1533 Pine St., Philadelphia 2, Pa., 100
Tel: KI 6-0745

Philamon Labs., Inc., 90 Hopper St., Westbury, L.I., N.Y., 3, 31
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Tel: EDgewood 3-1700

Philbrick Researches, George A., 230 Congress St., Boston 10, Mass., 9, 36, 61, 62, 101
Tel: HU 2-3225

Philco Corp., Govt. & Industrial Div., 4700 Wissahickon Ave., Philadelphia 44, Pa., 1, 4, 9, 10, 11, 12, 15, 16, 18, 20, 21, 23, 24, 25, 26, 28, 29, 30, 32, 33, 34, 36, 38, 73, 76, 80, 85
Tel: VICTor 3-4000

Philco Corp., Lansdale Tube Co. Div., Church Rd., Lansdale, Pa., 15, 68, 74
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Tel: ULysses 5-4681

Philco Corp., Tech. Rep. Div., 22nd & Lehigh Ave., Philadelphia 32, Pa., 85, 100, 101
Tel: Baldwin 3-1800

Philco Corp., Western Development Labs., 3875 Fabian Way, Palo Alto, Calif., 1, 7, 9, 18, 21, 25, 31, 34, 90
Tel: DAvenport 6-4350

Philips Electronics, Inc., Instrument Div., 750 S. Fulton Ave., Mt. Vernon, N.Y., 4, 22, 75, 79
Tel: MO 4-4500

Philips Electronics, Inc., 100 E. 42 St., New York 17, N.Y., 12, 17

Phillips Control Corp., 59 W. Washington St., Joliet, Ill., 43, 55, 66, 70
Tel: JOLIet 3-3431

Phillips Process Co., Inc., 192 Mill St., Rochester 14, N.Y., 92
Tel: BAKer 5-8201

Philson Manufacturing Co., Inc., 47 Bergen St., Brooklyn 1, N.Y., 37
Tel: ULster 5-0136

Photo Bell Co., 43 Vesey St., New York 7, N.Y., 4, 66, 72, 90
Tel: WORTH 2-6739

Photo Chemical Products, 999 A. Stewart Ave., Garden City, L.I., N.Y., 14, 80, 98
Tel: PI 1-6500

Photo Research Corp., 837 N. Caluenga Blvd., Hollywood 38, Calif., 12, 32
Tel: HO 2-6674

Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, L.I., N.Y., 62, 83
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Tel: ORiole 6-8000

Photocon Research Products, 421 N. Altadena Dr., Pasadena, Calif., 9, 12, 36, 57, 72
Tel: SYcamore 2-4131

Photo-Crystals, Inc., 15 S. 1st St., Geneva, Ill., 4, 36, 37, 38, 66, 70, 72
Tel: GENEva 7150

Photron Instrument Co., 6516 Detroit Ave., Cleveland 2, Ohio, 12, 13, 14, 23, 34, 36, 56
Tel: ATLantic 1-7020

Physics Research Labs., Inc., P.O. Box 555, Hempstead, L.I., N.Y., 5, 12, 56, 64, 67, 73, 90
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Tel: IVanhoe 3-8299

Pickard & Burns, Inc., 240 Highland Ave., Needham, Mass., 90
Tel: HILLcrest 4-3345

Pickering & Co., Inc., Sunnyside Blvd., Plainview, L.I., N.Y., 36, 43, 50, 54, 59, 72
Tel: OVerbrook 1-0200

Pickett & Eckel, Inc., 1109 S. Fremont Ave., Alhambra, Calif., 62, 85, 86, 87, 90, 94, 95
Tel: ATLantic 2-5151

Pierce, George C., Supvr., Product Services, 901 N. Columbus St., Alexandria, Va., 3, 12, 13, 36, 61, 72, 85
Tel: KING 9-7500

Piezo Crystal Co., 265 E. Pomfret St., Carlisle, Pa., 47, 50
Tel: CARlisle 1495

Piezo Products Co., Whitney St., Sherborn, Mass., 4, 36, 85, 90
Tel: TR 9-9497

Pilgrim Products, Inc., 277 Central St., West Acton, Mass., 80, 87, 89, 95, 98
Tel: COLonial 3-7368

Pilot Chemicals, Inc., 36 Pleasant St., Watertown 72, Mass., 22, 91
Tel: WAtertown 4-7775

Pilot Radio Corp., 37-06 36th St., Long Island City 1, N.Y., 36, 77
Tel: ST 4-5455

Pimex, Inc., 18 E. 60th St., New York 22, N.Y., 5, 12, 37, 41, 54, 56, 88
Tel: PLaza 3-3041

Pioneer Electroponents, 141 Albertson Ave., Albertson, L.I., N.Y., 87, 94, 98, 99

Pioneer Gen-E-Motor Corp., 5841 W. Dickens, Chicago 39, Ill., 58, 92

Pioneer Machine Works, Inc., 6136 Adam St., W. New York, N.J., 92
Tel: UNion 3-3838

Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 4, 12, 19, 21, 26, 28, 31, 36, 45, 50, 56, 61, 62, 72, 77, 80, 90
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Tel: CAnal 6-7250

Pittman Electrical Developments Co., P.O. Box 150, Sellersville, Pa., 58
Tel: ALpine 7-2433

Plamondon, Jr., A. D., 32 E. Scott St., Chicago 10, Ill., 85
Tel: SUperior 7-4339

Planet Manufacturing Corp., 225 Belleville Ave., Bloomfield, N.J., 41
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Tel: PIlgrim 3-2874

Plasteck, Inc., P.O. Box 551, Potcau, Okla., 60, 69, 81, 86, 87
Tel: 705

Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 41, 42, 61
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Tel: Diversey 8-3735

Plastic Mold & Engineering Co., 157 Clifford St., Providence 3, R.I., 44, 53, 54, 57, 60, 69, 72, 94, 95
Tel: GAspee 1-9260

Plastic Wire & Cable Corp., E. Main St., Jewett City, Conn., 82
Tel: DRake 6 4411

Plastics & Electronics, P.O. Box 38, Sta. J., Buffalo 8, N.Y., 9, 36, 62, 90
Tel: SUmmer 1630

Plastics Engineering Co., 1607 Geele Ave., Sheboygan, Wis., 89, 95
Tel: GLencourt 8-2121

Plastoid Corp., 42-61 24th St., Long Island City 1, N.Y., 82
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Tel: SStillwell 6-6200

Pneumafil Corp., 2516 Wilkinson Blvd., Charlotte 8, N.C., 81, 84, 86
Tel: EX 9-7441

Podgor Co., Inc., Joseph E., 16-18 S. Marshall St., Philadelphia 6, Pa., 92
Tel: WAlnut 5-7878

Poinsettia Co., Inc., 112 Cedar Ave., Pitman 6, N.J., 86, 90
Tel: LUther 9-7666

Point Consulting Co., Box 8656, Pittsburgh 21, Pa., 85
Tel: FA 7-5338

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 18, 19, 26, 37, 38, 50, 61, 76, 77
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Tel: EXeter 2-4500

Polaroid Corp., 730 Main St., Cambridge 39, Mass., 23
Tel: UN 4-6000

Pollak Corp., Joseph, Dept. B, 75-95 Freeport St., Boston 22, Mass., 66, 70
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Tel: AVenue 2-9550

Polydoroff, W. J., 927 15th St., N.W., Washington, D.C., 1, 16, 37, 46, 77
Tel: NAtional 8-6724

Polymer Corp. of Pennsylvania, Dept. RB, 2140 Fairmont Ave., Reading, Pa., 46, 55, 80, 86, 87, 89, 91, 95
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Tel: FRanklin 6-5791

Polyphase Instrument Co., E. Fourth St., Bridgeport, Pa., 12, 43, 48, 50, 56, 62, 72, 73
Tel: BRoadway 9-4660

Poly-Scientific Corp., College Ave., P.O. Box 191, Blacksburg, Va., 44, 45, 70, 98
Tel: PRescott 2-8212

Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N.Y., 19, 31, 36, 38, 50, 56, 61, 69, 77, 80
Tel: UL 2-6800

Polytron Engineering, Inc., P.O. Box 5024, Middle River 20, Md., 45, 61
Tel: SAratoga 7-6116

Pomona Electronics Co., Inc., 1126 W. 5 Ave., Pomona, Calif., 53, 69
Tel: NAtional 9-9549

Popper & Sons, Inc., 300 4th Ave., New York 10, N.Y., 92
Tel: OREGon 4-5500

Porcelain Products Co., 225 N. Patterson St., Carey, Ohio, 83
Tel: 6-2211

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Tel: HObart 1-3000

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Porter Co., Inc., H. K., National Electric Div., Porter Bldg., Pittsburgh 19, Pa., 82
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Port-O-Vox Corp., 521 W. 43rd St., New York 36, N.Y., 6, 7, 10, 20, 30, 54, 57
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Potter Aeronautical Corp., Route 22, Union, N.J., 4, 9, 43, 72
Tel: MURdock 6-3010

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Potter Co., 1950 Sheridan Rd., N. Chicago, Ill., 41, 50, 61
Tel: DEXter 6-4350

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Powell Co., Harold H., 2102 Market St., Philadelphia 3, Pa., 44
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Power Designs, Inc., 1700 Shames Dr., Westbury, L.I., N.Y., 15, 45, 61, 79
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Tel: EDgewood 3-6200

Power Industries, Inc., 2611 S. Indiana Ave., Chicago 16, Ill., 43, 45, 48, 50, 67, 73, 85, 86, 90
Tel: CALumet 5-1125

Power Sources, Inc., Northwest Industrial Pk., South Ave., Burlington, Mass., 45, 61, 79
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Tel: BRowning 2-3610

Powers Co., J. J., 818 N. 22nd, Melrose Park, Ill., 54, 81
Tel: FILLmore 5-3500

Precise Development Corp., 2 Neil Ct., Oceanside, L.I., N.Y. 3, 5, 12, 23, 26, 35
Tel: ROckville Centre 6-0171

Precise Measurements Co., Millbrook Lane, R.D. 1, Flemington, N.J., 12, 15, 45, 61, 73, 90
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Tel: FLEMington 900

Precision Apparatus Co. Inc., 70-31 84th St., Glendale 27, L.I., N.Y., 3, 12, 23, 26, 35
Tel: DAVenport 6-3982

Precision Circuits, Inc., 705 S. Fulton Ave., Mount Vernon, N.Y., 62
Tel: MOUNT Vernon 4-3737

Precision Crystal Lab., 2223 Warwick Ave., Santa Monica, Calif., 47
Tel: EXbrook 4-7004

Precision Electronic Components Ltd., 50 Wingold Ave., Toronto, Ont., Canada, 67
Tel: RU 1-6174

Precision Electronics, Inc., 48 Merrick Rd., Rockville Centre, L.I., N.Y., 37, 43, 73
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Tel: ORiole 8-4182

Precision Electroplating, 519 S. Oakley Blvd., Chicago 12, Ill., 86
Tel: SEeley 3-5855

Precision, Inc., 4748 France Ave. N., Minneapolis 22, Minn., 43, 67, 73, 81, 86
Tel: JUNiper 8-9441

Precision Instrument Co., 1011 Commercial St., San Carlos, Calif., 9, 27, 34
Tel: LYtell 1-4441

Precision Line, Inc., 63 Main St., Maynard, Mass., 67, 72
Tel: TWIN Oaks 7-2451

Precision Mechanisms Corp., 577 Newbridge Ave., East Meadow, L.I., N.Y., 4, 28
Tel: IVanhoe 3-8955

Precision Metal Products, 41 Elm St., Stoneham 80, Mass., 86, 87, 89, 95, 98
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Precision Metalsmiths, Inc., 1081 E. 200 St., Cleveland 17, Ohio, 86, 93

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Tel: ARmitage 6-5200

Precision Piezo Service, 427 Mayflower St., Baton Rouge 2, La., 47
Tel: DICKens 2-5359

Precision Radiation Instruments, Inc., 5810 S. Normandie, Los Angeles, Calif., 6, 36, 59, 77
Tel: PL 3-3501

Precision Recording Chart Co., 2430 E. Linden Ave., Linden, N.J., 14
Tel: HUNter 6-2102

Precision Resistor Co., 109 U. S. Highway 22, Hillside, N.J., 67
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Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill., 12, 88, 92
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Precision Styli Corp., 900 Nepperhan Ave., Yonkers, N.Y., 59
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Precision Tube Co., Inc., Church Rd., Wissahickon Ave., North Wales, Pa., 82, 93
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Premier Metal Products Co., 337 Manida St., New York 59, N.Y., 81, 84

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Tel: WYandotte 1-6600

Premier Research Labs., 83-89 Seventh Ave., New York 11, N.Y., 47

Tel: AL 5-0700

Prentice-Hall, Inc., Englewood Cliffs, N.J., 101

Tel: WIndsor 7-1000

Prescott Television Co., 7706 Melrose Ave., Los Angeles 46, Calif., 27

Tel: WEbster 3-7193

Preservation Packaging, 1407 Chestnut Ave., Hillside, N.J., 86

Tel: WA 6-0916

Presin Co., 2014 Broadway, Santa Monica, Calif., 9, 31, 56

Tel: EXbrook 3-9738

Press Wireless Labs., Inc., 25 Prospect Pl., West Newton 65, Mass., 12, 19, 24, 27, 33, 61, 80

Tel: LAsell 7-5600

Pressman Associates, 7803 Farnsworth St., Philadelphia 15, Pa., 61, 85

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Prestole Corp., 1345 Miami St., Toledo, Ohio, 86, 87

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Price Electric Corp., E. Church & 2nd Sts., Frederick 1, Md., 66

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Prince Rubber Co., Inc., 1675 Niagara St., Buffalo 7, N.Y., 86, 87, 89, 95

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Printloid, Inc., 44-05 10th St., Long Island City 1, N.Y., 9, 81, 86

Tel: EMpire 1-1770

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Tel: POrt Washington 7-8150

Process & Instruments, 15 Stone Ave., Brooklyn 33, N.Y., 12, 17, 55, 85, 90

Tel: GL 2-8380

Prodelin, Inc., Dept. I-8, 307 Bergen Ave., Kearny, N.J., 37, 44, 80, 82

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Product Development Corp., 61 Battery-march St., Boston 10, Mass., 47, 90

Tel: HUbbard 2-0407

Production Metals, Inc., 129 Pierrepont St., Brooklyn 1, N.Y., 93

Tel: ULster 8-0750

Production Research Corp., Thornwood, N.Y., 10, 15, 19, 24, 34, 37, 50, 56

Tel: ROgers 9-2766

Production Tool & Fixture Co., 37 W. Main St., Oyster Bay, L.I., N.Y., 92

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Tel: OYster Bay 6-0009

Products Research Co., 3126 Los Feliz Blvd., Los Angeles 39, Calif., 52, 89, 91

Tel: NO 5-5951

Profile Electronics, Inc., 6 Bridge St., Concord, N.H., 43, 48, 50

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Tel: CApital 4-1232

Progress Electronics Co., 107 Franklin St., New York 13, N.Y., 44, 70, 82, 102

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Tel: CAAnal 6-5611

Progressive Tool & Die, 530 Boston Turnpike, Shrewsbury, Mass., 92

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Tel: ESTebrook 9-4055

Pulse Engineering, Inc., 560 Robert Ave., Santa Clara, Calif., 36, 43, 50, 73

Tel: CHerry 8-6040

Pulse Techniques, Inc., 1411 Palisade Ave., W. Englewood, N.J., 36, 49, 50

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Pure Carbon Co., Inc., 441 Hall Ave., St. Marys, Pa., 87

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Tel: COrtlandt 7-4930

Pye Telecommunications, Newmarket Rd., Cambridge, England, 1, 10, 16, 18, 20, 23, 24, 30

Tel: TEversham 3131

Pyle-National Co., 1334 N. Kostner Ave., Chicago 51, Ill., 44

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Pylon Electronics Development, Ltd., 161 Clement St., LaSalle, Montreal 32, P.Q., Canada, 36, 38, 45

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Q-Line Manufacturing Corp., 1562 61st St., Brooklyn 19, N.Y., 37, 42, 50, 81, 84

Tel: BE 6-9320

Quality Components, Inc., St. Marys, Pa., 41, 46, 80, 87

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Quality Name Plate, Inc., Box 344, Ridgewood, N.J., 62, 81, 87

Tel: Gilbert 4-5392

Quam-Nichols Co., 234 E. Marquette Rd., Chicago 37, Ill., 43, 54, 73

Tel: HU 8-5800

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Tel: JEFFerson 8-6350

Quarie Controllers, P.O. Box 95, Canton, Mass., 4, 73

Tel: SUNset 4-2842

Quartzite Processing, Inc., 197 Chelsea St., Everett 49, Mass., 46, 47, 70, 83, 86, 89

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Qutronic Transformer, 525 Broadway, New York 12, N.Y., 36, 43, 73

Tel: WOrth 2-3639

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RCA Institutes, Inc., 350 W. 4th St., New York, N.Y., 100

Tel: WATkins 4-7845

RCA Service Co., MU-114, Patrick Air Force Base, Cocoa, Fla., 90

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R E F Manufacturing Corp., 393 Jericho Tpke., Mineola, L.I., N.Y., 81, 84, 86

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R-J Audio Products, Inc., 80 Shore Rd., Port Washington, L.I., N.Y., 81

Tel: PO 7-7700

R K Manufacturing Co., P.O. Box 98, Cartersville, Ill., 73

Tel: YUKon 5-2311

R M S Assoc., Inc., 112 W. Boston Post Rd., Mamaroneck, N.Y., 82, 86, 90

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R N R Metal Products, 986 Linwood St., Brooklyn 8, N.Y., 81, 84

Tel: NI 9-8200

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Tel: BRacknell 941

Racon Electric Co., 1261 Broadway, New York 1, N.Y., 54, 57, 72

Tel: MUrray Hill 4-6258

Radar Design Corp., P.O. Box 38, Pickard Dr., Syracuse 11, N.Y., 19, 37, 38, 50, 80, 96

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Radar Engineers, 4719 Brooklyn, Seattle 5, Wash., 12, 17

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Radar Relay, Inc., 2322 Michigan Ave., Santa Monica, Calif., 60, 62, 66, 69, 70, 81

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Radiation Electronics Co., 8241 N. Kimball, Skokie, Ill., 12, 15, 36, 72, 73, 90
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Radiation, Inc., Melbourne, Fla., 1, 3, 9, 25, 34, 36, 37, 80
Tel: PArkway 3-1511

Radiation Instr. Dev. Lab., 5737 S. Halsted St., Chicago 21, Ill., 9, 12, 22, 36
Tel: TRiangle 3-2345

Radiation Research Corp., 1114 First Ave., New York 21, N.Y., 39, 41, 75, 90
Tel: TEnpleton 8-2513

Radiatronics, Inc., 5956 Kester Ave., Van Nuys, Calif., 18, 28, 37, 50, 61, 70, 80, 81, 84, 86
Tel: SState 2-1461

Radio City Prods. Co., Inc., Centre & Glendale Sts., Easton, Pa., 1, 3, 12, 19, 26, 36, 61, 86, 90
Tel: BLackburn 8-9122

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Tel: WALnut 4-2700

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Tel: WOODlawn 3-8000

Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 3, 12, 23, 26, 35, 39, 56, 63, 65, 68, 72, 74, 75, 76, 92, 99
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Radio Craftsmen, Inc., 4223 W. Jefferson Blvd., Los Angeles 16, Calif., 22, 36, 59
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Radio Development & Research, Inc., 100 Pennsylvania Ave., Paterson 3, N.J., 4, 28, 36, 40, 43, 45, 58, 61, 64, 68, 72, 73, 79
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Radio Engineering Co., 8 State St., New York 4, N.Y., 36, 62, 85, 86
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Radio Engineering Labs., 29-01 Borden Ave., Long Island City 1, N.Y., 2, 7, 18, 24, 29, 36, 61
Tel: STillwell 6-2100

Radio Engrg. Labs., Inc., Standard Electronics Div., 29-01 Borden Ave., Long Island City 1, N.Y., 2, 7, 8, 29, 32, 36, 50, 53, 61, 73, 79
Tel: STillwell 6-2100

Radio Eng. Prod., Ltd., 1080 University St., Montreal 3, Que., Canada, 3, 8, 33, 36, 49, 50, 53, 66
Tel: UNiversity 6-6887

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Radio Industries, Inc., 666 Garland Pl., Des Plaines, Ill., 41, 43, 73
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Radio Music Corp., 84 S. Water St., Port Chester, N.Y., 32, 36, 50, 59
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Radio Receptor Co., Inc., Eng. Products Div., 81 N. 4th St., Brooklyn 11, N.Y., 1, 6, 16, 18, 20, 21, 24, 25, 29, 34, 61
Tel: EV 8-6000

Radio Receptor Co., Inc., Selenium Div., 240 Wythe Ave., Brooklyn 11, N.Y., 64
Tel: EVergreen 8-6000

Radiometer Co., 72 Emdrupvej, Copenhagen, N.V., Denmark, 3, 5, 12, 13, 23, 26, 35, 36, 56, 61
Tel: SO 5000

Radion Corp., 345 E. Terra Cotta Ave., Crystal Lake, Ill., 37
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Rae Motor Corp., 2009 Kewaunee, Racine, Wis., 58
Tel: ME 3-1196

Railroad Electronic Labs. of Omaha, Inc., 6614 Blondo St., Omaha 4, Neb., 30, 43, 50, 54, 61, 73
Tel: REgent 1513

Railway Communications, 9351 E. 59 St., Raytown 33, Mo., 3, 8, 12, 23, 43, 49, 50, 73, 85, 90
Tel: FLeming 3-2100

Ram Chemicals, Inc., 210 E. Olive St., Gardena, Calif., 90, 91
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Ramo-Woolldridge Corp., P.O. Box 45215 Airport Sta., Los Angeles 45, Calif., 1, 9, 12, 19, 34, 45, 61, 90
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- Reed Research, Inc., 1048 Potomac St. N.W., Washington 7, D.C., 14, 27, 70
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- Reliance Automatic Lighting Co., 1919 Mead St., Racine, Wis., 4, 70
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- Remanco, Inc., 1630 Euclid, Santa Monica, Calif., 1, 15, 18, 25, 26, 29, 36, 38, 90
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- Remler Co., 2101 Bryant, San Francisco 10, Calif., 1, 16, 30, 44, 57, 69, 78, 84, 86, 87, 94, 99
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- Reon Resistor Corp., 117 Stanley Ave., Yonkers, N.Y., 67**
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- Republic Aviation Corp., Special Prods. & Services, Conklin St., Farmingdale, N.Y., 3, 12, 15, 25, 37, 61, 86, 92, 95
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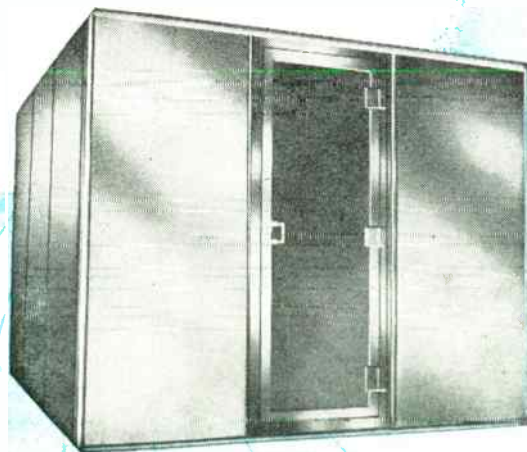
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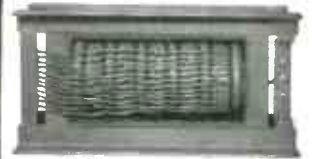
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Sensory, Inc., 10 New St., Morristown, N.J., 4, 9, 90
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Sequoia Wire & Cable Co., see: Anaconda Wire & Cable Co.

Ser Company, 543 Lexington St., Waltham, Mass., 85, 90, 100, 101
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Service Instruments Corp., 426 S. Westgate Dr., Addison, Ill., 3, 12
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Servo Corp. of America, 111 New South Rd., Hicksville, L.I., N.Y., 1, 4, 9, 12, 15, 16, 19, 21, 28, 34, 36, 58
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Servomechanisms, Inc., 12500 Aviation Blvd., Hawthorne, Calif., 1, 4, 9, 15, 28, 36, 58, 72, 73
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Servomechanisms, Inc., Mechatrol Div., 1200 Prospect Ave., Westbury, N.Y., 4, 28, 36, 58
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Servonic Instruments, Inc., 640 Terminal Way, Costa Mesa, Calif., 4, 12, 44, 67, 70, 72
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Servonics, Inc., 822 N. Henry St., Alexandria, Va., 4, 9, 12, 28, 36, 50, 56
Tel: TEmple 6-6800

Servo-Tek Products Co., Inc., 1086 Goffle Rd., Hawthorne, N.J., 12, 13, 28, 36, 45, 58, 72, 79
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Servotrol Co., 114 W. Illinois St., Chicago 10, Ill., 67
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Setchell-Carlson, Inc., New Brighton, St. Paul 12, Minn., 6, 21, 36
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Tel: WOODlawn 5-2341

Shallite, Inc., 128 W. 1st Ave., Roselle, N.J., 67
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Shamp Scientific Supply, Sponge Products Div., 1500 Massachusetts Ave., N.W., Washington 5, D.C., 38, 85, 90, 96
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Shand & Jurs Co., 2600 8th St., Berkeley 10, Calif., 4, 34
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Shanda Lab., Inc., 96 Harrison Ave., Jersey City 4, N.J., 97
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Shaw Insulator Co., 160 Coit St., Irvington 11, N.J., 86
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Shell Chemical Corp., 50 W. 50th St., New York 20, N.Y., 87, 89, 95
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Shepard Labs., Inc., Broad St. at Park Ave., Summit, N.J., 9, 63
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Sheppard Co., Inc., R. H., 101 Philadelphia St., Hanover, Pa., 61
Tel: ME 7 3751

Sherman Industrial Electronics, Box 813, 601 W. College Ave., State College, Pa., 88

Sherman Mfg. Co. H. B., 22 Barney St., Battle Creek, Mich., 44, 92, 98
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Sherold Crystals, Inc., Truman Rd. & McGee Trafficway, Kansas City 8, Mo., 47
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Shielding, Inc., 66 N. Read Ave., River-ton, N.J., 12, 81, 87, 96
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Shibley Co., Inc., 71 Vista Ave., Newton 66, Mass., 86, 91
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Siegler Corp., P.O. Box 500, Paramus, N.J., 6, 27, 30, 31, 32, 36, 49, 59, 63, 77
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Sieman Manufacturing Corp., P.O. Box 275, Wayne, Ill., 4, 58, 67
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Sierra Electronic Corp., 5442D Bohannon Dr., Menlo Park, Calif., 7, 8, 12, 18, 19, 23, 24, 25, 26, 34, 36, 38, 50, 56, 61, 80
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Sierra Research Corp., P.O. Box 22, Buffalo 25, N.Y., 1, 9, 28, 34, 36
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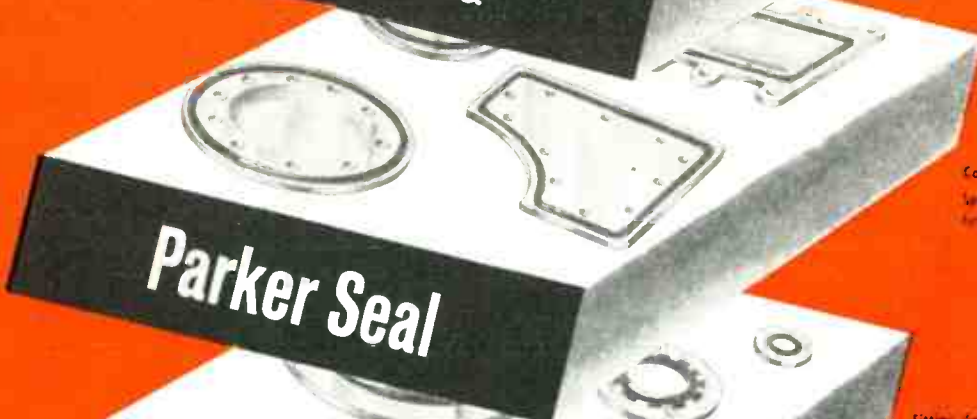
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Tel: ESplanade 6-0615

Signalite, Inc., 37-41 Neptune Hwy., Neptune, N.J., 60, 75
Tel: PRospect 5-2490

Sikorsky Aircraft, N. Main St., Stratford, Conn., 15, 90
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Silicon Transistor Corp., 150 Glen Cove Rd., Carle Place, L.I., N.Y., 68
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Silicone Seals, Inc., 3694 Milwaukee Ave., Chicago 41, Ill., 44, 52
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Simmonds Aeroccessories, 105 White Plains Rd., Tarrytown, N.Y., 1, 3, 4, 10, 37, 61, 85
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Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass., 82
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Simpson Manufacturing Co., Inc., M., 32-28 49th St., Long Island City 3, N.Y., 6, 10, 27, 30, 36, 45
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Sims Casting Corporation, 2174 E. Erie Blvd., Syracuse 3, N.Y., 80

Sinclair Radio Associates, Laboratories, Ltd., Box 179, Downsview, P.O., 70 Sheffield St., Toronto 15, Canada, 12, 15, 19, 26, 37, 38, 50, 73, 80, 85, 90
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Tel: CHerry 4-5519

Singer Mfg. Co., 915 Pembroke St., Bridgeport 8, Conn., 4, 15, 36, 70
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Single Crystal Corp. of America, Saxonburg Blvd., Saxonburg, Pa., 22, 68
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Sioux Radio Products, 100 Douglas Ave., Yankton, S.D., 37, 43, 73
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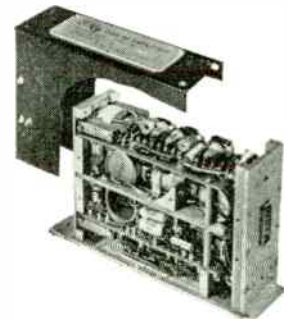
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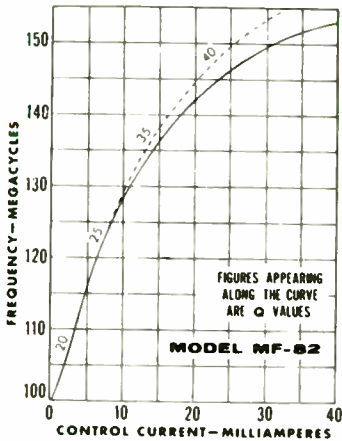
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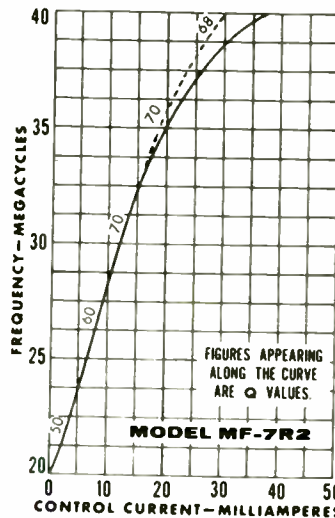
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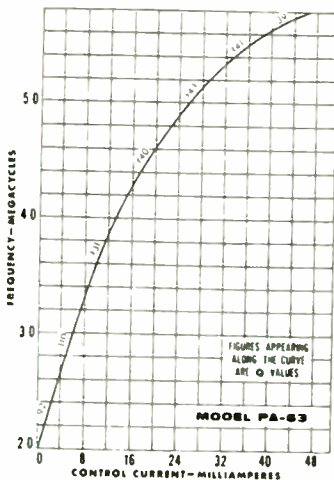


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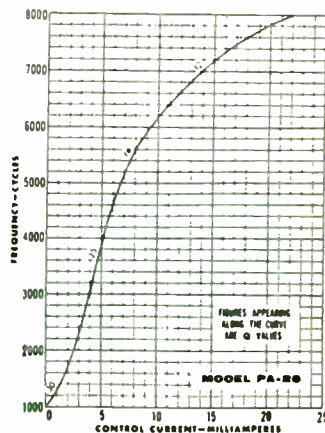


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Telecontrol Corp., 20 Diller Ave., Newton, N.J., 90
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Telectro Industries Corp., 35-16 37th St., Long Island City 1, N.Y., 1, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15, 16, 18, 19, 21, 23, 25, 26, 27, 28, 30, 32, 33, 34, 36, 37, 38, 39, 43, 45, 50, 55, 56, 61, 62, 63, 70, 73, 77, 79, 80, 81, 83, 85, 86, 95, 96
Tel: YE 2-8600

Telectron Co., 3991 S.W. 12th Ter., Ft. Lauderdale, Fla., 24, 43
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Telegraph Condenser Co., Wales Farm Rd., Acton, London, W3, England, 41, 42, 46, 48, 50, 52, 62, 72, 83, 89
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Telemeter Magnetics, Inc., 2245 Pontius Ave., Los Angeles 64, Calif., 9, 34, 46, 70, 83
Tel: BRadshaw 2-0991

Telephonics Corp., Park Ave., Huntington, L.I., N.Y., 10, 15, 16, 18, 20, 24, 25, 29, 30, 36, 53, 54, 57, 61
Tel: HA 3-6200

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Teleradio Engineering Co., 99 Wall St., New York 5, N.Y., 37, 42, 43, 73
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Teletest Instrument Corp., 120-20 Roosevelt Ave., Flushing 68, N.Y., 12
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Teletronic Labs., Inc., 1835 W. Rosecrans Ave., Gardena, Calif., 86
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Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 12, 19, 24, 26, 29, 56, 70, 81, 90
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Teletype Corp., 4100 Fullerton Ave., Chicago 39, Ill., 9, 33
Tel: SP 2-1040

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Televiso Corp., 1415 Golf Rd., Des Plaines, Ill., 50
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Telewave Labs., Inc., 43-20 34th St., Long Island City 1, N.Y., 67
Tel: EXeter 2-4500

Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 5, 9, 36, 43, 45, 49, 50, 53, 54, 57, 61, 62, 72, 73, 86
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Tel: MIDway 6-7211

Tel-Instrument Electronics Corp., 728 Garden St., Carlstadt, N.J., 7, 12, 21, 23, 26, 35, 36, 61, 79
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Telonic Engrg. Corp., 773 Broadway, Laguna Beach, Calif., 90
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Telonic Industries, Inc., 75 N. Second Ave., Beech Grove, Ind., 19, 26, 35, 38, 50
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Temco Aircraft Corp., Electronics Div., P.O. Box 6191, Dallas 22, Texas, 1, 4, 9, 24, 25, 28, 34, 36, 37, 45, 61, 62, 72, 73, 86, 90, 93
Tel: BR 6-7111

Temperature Engrg. Corp., 1800 Union Landing Rd., Riverton, N.J., 4, 12, 71, 81, 88, 92
Tel: TALmadge 9-3880

Tempil Corp., 132 W. 22 St., New York 11, N.Y., 51, 56, 70, 91
Tel: OREGon 5-6610

Tempo Instrument, Inc., Commercial St., P.O. Box 338, Hicksville, L.I., N.Y., 4, 56, 66, 70, 90
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Ten Bosch, Inc., M., 80 Wheeler Ave., Pleasantville, N.Y., 9, 36
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Teveo Insulated Wire, 108 E. Prospect, Burbank, Calif., 53, 89, 95
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Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expway, Dallas, Tex., 4, 9, 12, 13, 14, 15, 16, 25, 30, 31, 34, 36, 41, 56, 61, 64, 66, 67, 68, 70, 71, 80, 82, 87, 93, 99
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Theta Instrument Corp., 48 Pine St., East Paterson, N.J., 4, 12
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Thomas & Betts Co., Inc., 36 Butler St., Elizabeth 1, N.J., 44, 98
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Thomas & Sons, Inc., Wm., 1063 Slocum Ave., Ridgefield, N.J., 86
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Tel: FRanklin 2-6858

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Tel: FEderal 7-4200

Thompson Fiber Glass Co., 1733 Cordova St., Los Angeles 7, Calif., 86, 89, 95
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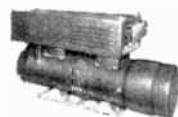


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Tel: OSborne 5-4651

Thompson-Ramo-Wooldridge, Tapco Group, 23555 Euclid Ave., Cleveland 17, Ohio, 4, 28, 36, 37, 38, 44, 45, 58, 61, 66, 70, 80
Tel: IV 1-7500

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 46, 52, 83, 87, 89, 91, 95

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Tel: PIlgrim 3-7797

Thordarson-Meissner, 7th & Bellmont Sts., Mt. Carmel, Ill., 45, 50, 61, 73, 79, 90

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Three Point One Four Corp., 24 Woodworth Ave., Yonkers, N.Y., 39, 70

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Tinnerman Products, Inc., P.O. Box 6688, Brookpark Rd., Cleveland 1, Ohio, 87

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Tippett & Co., 1492 Highland Ave., Needham, Mass., 101

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Titan Metal Mfg. Co., Bellefonte, Pa., 82, 93, 94

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Topic, Inc., Natick Industrial Centre, Natick, Mass., 11, 12, 41, 42, 50, 80, 85, 86

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Topper Mfg. Co., Inc., 147-12 Liberty Ave., Jamaica, N.Y., 9, 12, 15, 28, 36, 43, 62, 73, 82, 83, 86, 87, 89, 90, 91, 94

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Topping Electronics, Ltd., 94 Laird Dr., Toronto 17, Ont., Canada, 1, 12, 16, 24, 26, 31, 36, 45, 61, 73, 79, 85, 90

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Tork Time Controls, Inc., 38 Grove St., Mt. Vernon, N.Y., 70
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Transistor Devices, Inc., Instrument Masters Div., 11 Hamburg Turnpike, Riverdale, N.J., 3, 4, 12, 36, 45, 61, 86, 90
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Tel: MUNroe 6-2665

Unit Process Assemblies, 61 E. 4th St.,
New York 3, N.Y., 12
Tel: SPRing 7-1398

United Aircraft Corp., Ketay Dept. Nor-
den Div., Jericho Turnpike, Commack,
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Tel: FOrest 8-5500

United Aircraft Corp., Norden Div., 58
Commerce Rd., Stamford, Conn., 4, 9,
25, 28, 58, 67, 72

Tel: DAvis 5-2611

United Aircraft Corp., Norden Div.,
Norden Labs., 121 Westmoreland Ave.,
White Plains, N.Y., 1, 4, 9, 25, 28

Tel: WHite Plains 6-4300

United Aircraft Products, Inc., 1116 Bo-
lander Ave., Dayton, Ohio, 4, 40, 71,
81, 84, 86

Tel: BAldwin 4-3841

United Audio Products, 202-4 E. 19th
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Tel: GR 3-6522

United Carbon Products Co., 1300-R N.
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Tel: TW 3-4575

United Catalog Publishing, Inc., 60
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Tel: IVanhoe 6-7755

United Components, Inc., 360 Henry St.,
Orange, N.J., 52, 68

Tel: ORange 3-6422

United Control Corp., 4540 Union Bay
Pl., Seattle, Wash., 1, 4, 28, 34, 36, 50,
70, 71, 72

Tel: LA 5-9200

United Electric Controls Corp., 85
School St., Watertown 72, Mass., 4, 13,
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Tel: WAlnut 6-1000

United Electrodynamics, Inc., 200 Allen-
dale Rd., Pasadena, Calif., 36, 45, 61, 70
Tel: SYcamore 9-7161

United Electronic Manufacturing Corp.,
542 39th St., Union City, N.J., 41
Tel: UNion 5-4452

United Electronics Co., 42 Spring St.,
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Tel: HUmboldt 4-6300

United International Dynamics Corp.,
243 Lexington St., Waltham, Mass., 69,
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Tel: TWInbrook 4-7271

United Microwave Co., 8 Columbus Ave.,
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Tel: ROKwell 1-3059

**United Mineral & Chemical Corp., 16
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Tel: BEekman 3-8870

United Packaging Co., Inc., 4511 Wayne
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Tel: HArrison 7-4805

United Shoe Machinery Corp., 140 Fed-
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United Shoe Machinery Corp., Research
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Tel: WAlker 2-0160

U. S. Burke Machine Tool Div., Brother-
ton Rd., Cincinnati 27, Ohio, 92
Tel: BR 1-5000

U. S. Ceramic Tile Co., 1232 Cleveland
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U. S. Chemical Milling Corp., 1700
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Calif., 44, 62, 81, 82, 84, 86, 87

Tel: OR 8-4041

**U. S. Components, Inc., 454 E. 148th St.,
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Tel: CYpress 2-6525

U. S. Dynamics Corp., 1258 Columbus
Ave., Boston 20, Mass., 4, 12, 45, 47, 61,
64, 68, 85, 88, 92

Tel: HIGHLands 5-3850

U. S. Electrical Motors, Inc., 200 E.
Slauson Ave., Los Angeles 54, Calif.,
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Tel: ADAms 3-3131

U. S. Electrical Tool Co., 3640 Llewellyn
St., Cincinnati 23, Ohio, 92
Tel: MU 1-3410

U. S. Electronics Corp., 280 Warren St.,
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Tel: GENEva 8-2400

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U. S. Gear Corp., 81 Bay State Rd.,
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Tel: CRystal 6-4900

U. S. Instrument Corp., P.O. Box 1191,
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Tel: CHarlottesville 3-5153

U. S. Motors Corp., 102 W. 5th Ave.,
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Tel: BEverly 1-4560

U. S. Radium Corp., P.O. Box 246, Morristown, N.J., 22, 81, 86, 87, 99
Tel: JETterson 9-4000

U. S. Recording Co., 1121 Vermont Ave., N.W., Washington 5, D.C., 11, 27, 30, 32, 36, 63
Tel: LIncoln 3-2705

U. S. Relay Co., 717 N. Coney Ave., Azusa, Calif., 43, 66
Tel: CUMberland 3-8241

U. S. Rubber Co., 1230 Avenue of the Americas, New York 20, N.Y., 87, 91, 95
Tel: Circle 7-5000

U. S. Science Corp., Sub. Topp Industries, 5221 W. 102nd St., Los Angeles 45, Calif., 1, 3, 4, 9, 12, 18, 21, 22, 24, 26, 28, 34, 36, 37, 45, 48, 56, 61, 67, 72, 73, 80, 90
Tel: SPring 6-0450

U. S. Semiconductor Products, Inc., 3540 W. Osborn Rd., Phoenix, Ariz., 15, 41, 47, 64, 68
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Tel: APplegate 8-5591

U. S. Sonics Corp., 625 McGrath H'way, Somerville, Mass., 72
Tel: MOnument 6-5100

U. S. Steel Corporation, 525 William Penn Pl., Pittsburgh 30, Pa., 82, 87, 93
Tel: EXpress 1-2345

U. S. Steel Corp., American Steel & Wire Div., Rockefeller Bldg., Cleveland 13, Ohio, 82
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U. S. Steel Corp., Applied Research Lab., Monroeville, Pa., 90, 93
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U. S. Stoneware Co., Alite Div., P.O. Box 119, Orrville, Ohio, 52, 83, 86, 89
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U. S. Testing Co., Inc., 1415 Park Ave., Hoboken, N.J., 90
Tel: SWArthmore 2-2400

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Tel: PLaza 8-2444

U. S. Time Corporation, Gyroscope Div., 375 Park Ave., New York 22, N.Y., 4, 72
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U. S. Tool Co., Inc., 255 N. 18 St., East Orange, N.J., 92
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United Transformer Corp., 150 Varick St., New York 13, N.Y., 43, 48, 49, 50, 73
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Tel: ALgonquin 5-3500

Unitex Corporation, Weldmatic Div., 380 N. Halstead Ave., Pasadena, Calif., 92
Tel: SYeamore 5-5995

Universal Can & Condenser Co., 3435 N. Kimball Ave., Chicago 18, Ill., 41
Tel: CORnelia 7-3933

Universal Circuit Controls Corp., 3610 Oakton St., Skokie, Ill., 70
Tel: ORchard 5-2620

Universal Drafting Machine Co., 7960 Lorain Ave., Cleveland 2, Ohio, 92
Tel: OL 1-4747

Universal Electric Co., 300 E. Main St., Owosso, Mich., 58
Tel: SARatoga 5-7174

Universal Electronics Company, 1720 22nd St., Santa Monica, Calif., 61
Tel: EXbrook 3-7707

Universal Manufacturing Co., Inc., 1168 Grove St., Irvington, N.J., 5, 92
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Tel: ESsex 4-9800

Universal Match Corp., Armament Division, 472 Paul Ave., St. Louis 21, Mo., 36
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Universal Winding Co., Dept. 165, P.O. Box 1605, Providence 1, R.I., 92
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Tel: WILLiams 1-5200

Universal X-ray Products, Inc., 1140 N. Western Ave., Chicago 22, Ill., 73, 75
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University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y., 38, 50, 54, 81, 85
Tel: WHite Plains 6-7700

University of California, 405 Hilgard Ave., W. Los Angeles 24, Calif., 9, 27, 34
Tel: GRANite 2-6161 X439

University of California Press, Berkeley 4, Calif., 101
Tel: TH 8-9010

University of Southern California, Psychology Dept., Los Angeles 7, Calif., 85
Tel: RI 8-2311 X352

Univox Corp., 102 Warren St., New York 7, N.Y., 4, 82, 86
Tel: WOrth 2-5630

Uniwave, Inc., 109 Marine St., Farmingdale L.I., N.Y., 4, 19, 36, 38, 45, 50, 77, 80
Tel: CHapel 9-8180

Uptegraff Manufacturing Co., R. E., P.O. Box 182, Scottdale, Pa., 73
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Utica Drop Forge & Tool, Div. of Kelsey-Hayes Co., 2415 Whitesboro St., Utica 4, N.Y., 92
Tel: RE 5-6411

Utrad Corp., 305 N. Briant St., Huntington, Ind., 73
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V-M Corp., 4th & Park Sts., Benton Harbor 1, Mich., 27, 59
Tel: WALnut 5-8841

Vacap Corp., 1905 Summit Ave., Union City, N.J., 42
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Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill., 92, 98
Tel: WH 4-2340

Vacuum Specialties Co., 34 Linden St., Somerville 43, Mass., 4, 88, 92
Tel: MOnument 6-5450

Vacuum Tube Products Co., Inc., 2020 Short St., Oceanside, Calif., 4, 12, 22, 52, 56, 65, 74, 75, 86, 92
Tel: SARatoga 2-6567

Valco Manufacturing Co., 4700 W. Walton, Chicago 51, Ill., 36
Tel: MAnsfield 6-7574

Valor Electronics Inc., 13214 Crenshaw Blvd., Gardena, Calif., 9, 12, 43, 45, 48, 61, 73
Tel: FAculty 1-2280

Valpey Crystal Corp., 1244 Highland St., Holliston, Mass., 15, 47, 72, 90
Tel: GARden 9-4851

Valtronic Corp., 123 West 64th St., New York 23, N.Y., 81, 86
Tel: SU 7-1422

Valverde Laboratories, 252 Lafayette St., New York 12, N.Y., 71
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Tel: WALKer 5-6742

Van Norman Industries, Inc., Electronic Div., 186 Granite St., Manchester, N.H., 9, 12, 19, 26, 31, 35, 72
Tel: NAtional 5-9701

Van Nostrand Co., Inc., D., 120 Alexander St., Princeton, N.J., 101
Tel: WALnut 1-6000

Vandercok & Sons, Inc., 3601 W. Touhy Ave., Chicago 45, Ill., 92
Tel: ORchard 5-2100

Vanguard Electronics Co., 3384 Motor Ave., Los Angeles 34, Calif., 43, 48, 50, 73
Tel: VE 8-6628

Varflex Corp., 512 West Court St., Rome, N.Y., 89
Tel: ROME 7200

Varian Associates, Inc., Instrument Div., 611 Hansen Way, Palo Alto, Calif., 12, 13, 14, 19, 22, 55, 61, 92
Tel: DAVenport 6-4000

Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2-BG-59, Calif., 36, 76, 80
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Vari-L Co., Inc., 432 Fairfield Ave., Stamford, Conn., 36, 43, 73
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Varo Manufacturing Co., Inc., 2201 Walnut St., Garland, Texas, 1, 4, 15, 28, 31, 43, 45, 50, 56, 61, 66, 73
Tel: BRoadway 6-6141

Vector Associates, 139-30 34th Rd., Flushing 54, L.I., N.Y., 12, 36, 50, 61, 62, 82, 84, 86, 90
Tel: LENOx 9-3800

Vector Electronic Co., 1100 Flower St., Glendale 1, Calif., 53, 69, 81, 87, 98
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Tel: CHapman 5-1076

Vectrol Engineering, Inc., P.O. Box 1089, Stamford, Conn., 4, 61, 65
Tel: DAVIS 4-4602

Vectron, Inc., 1607 Trapelo Rd., Waltham, 54, Mass., 12, 19, 61
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Veeder-Root, Inc., 70 Sargeant St., Hartford 2, Conn., 9
Tel: **JA** 7-7201

Vemaline Products Co., P.O. Box 222, Hawthorne, N.J., 70, 87
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Vesto Co., Inc., 20th & Clay, N. Kansas City 16, Mo., 37
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Vickers, Inc., Detroit 32, Mich., 4
Tel: **LI** 9-1122

Vickers, Inc., Electronic Products Div., 1815 Locust St., St. Louis 3, Mo., 1, 4, 28, 36, 61, 64, 79
Tel: **CE**ntral 1-5830

Vicon Corp., 1369 Industrial Rd., San Carlos, Calif., 6, 7, 32, 36
Tel: **LY**tell 3-8003

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 39, Ill., 9, 34
Tel: **KE** 9-8210

Victor Electric Wire & Cable Corp., 618 Main St., West Warwick, R. I., 44, 82, 95
Tel: **VA**lley 1-1700

Victor Gloves, Inc., 49 E. 21st St., New York 10, N.Y., 92
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Tel: **AL**gonquin 4-7842

Victor R. F. & Microwave Co., 36 W. Water St., Wakefield, Mass., 19, 25, 26, 37, 38, 44, 47, 50, 77, 80, 86
Tel: **CR**ystal 9-4472

Victoreen Instrument Co., 3025 W. Mission Rd., Alhambra, Calif., 4, 22, 36, 61, 66, 70

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Victorlite Industries, 4117 W. Jefferson Blvd., Los Angeles 16, Calif., 32, 86
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Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 4, 45, 56, 66, 67, 70, 79
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Victory Mica Manufacturing Co., Inc., 1329 39th St., Brooklyn 18, N.Y., 86, 89, 99
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Vidaire Electronics Manufacturing Corp., 44 Church St., Baldwin, L.I., N.Y., 38, 50
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Video Instrument Co., Inc., 3002 Pennsylvania Ave., Santa Monica, Calif., 36, 61, 66
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Videocraft Manufacturing Co., 5720 Armitage Ave., Chicago 39, Ill., 43
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Videon Electronic Corp., 902 E. Michigan St., Indianapolis 2, Ind., 85
Tel: **ME**lrose 6-1590

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Vinco Electronics Corp., 65 Wallace St., New Haven 11, Conn., 6, 30, 36, 61, 90
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Vinson Co., E. R., 1401 Middle Harbor Rd., Oakland 20, Calif., 62, 86
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Visual Electronics Corp., 356 W. 40th St., New York 18, N.Y., 7, 18, 19, 20, 21, 24, 26, 32, 35, 36, 37, 38, 61, 85
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Vocaline Co. of America, Inc., Coulter St., Old Saybrook, Conn., 2, 10, 20, 30
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Vokar Products, Inc., 201 E. Catherine, Ann Arbor, Mich., 37, 45
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Volkert Stampings, Inc., 222-34 96th Ave., Queens Village 29, L.I., N.Y., 86, 99
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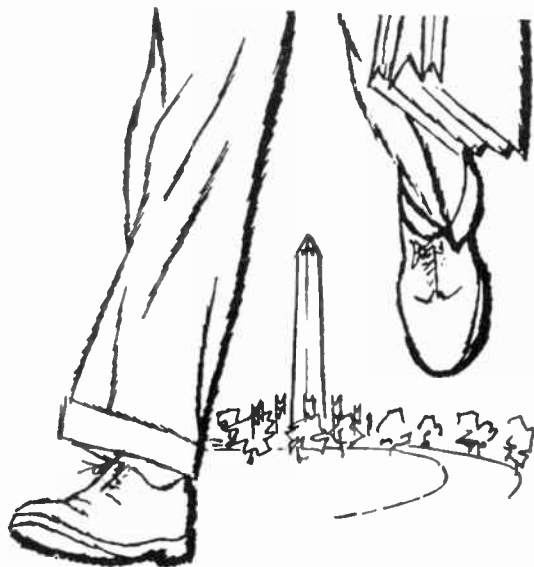
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W & M Manufacturing Corporation, 187 Lafayette St., New York 13, N.Y., 53, 98
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Waage Electric Inc., 720 Colfax Ave., Kenilworth, N.J., 88
Tel: **CH**estnut 5-9363

Wac Line, Inc., 35 S. St. Clair St., Dayton 2, Ohio, 4, 12, 38, 56, 58, 66, 80
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- Waldorf Instrument Co., Huntington Station, L.I., N.Y., 4, 9, 14, 19, 21, 25, 26, 28, 34, 36, 45, 56, 58, 61, 72, 90
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- Wave Particle Corp., P.O. Box 252, Menlo Park, Menlo Park, Calif., 19, 22, 26, 36, 37, 61, 73, 76, 86, 90
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- Waveforms, Inc., 333 Sixth Ave., New York, 14, N.Y., 3, 12, 56
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- Welch Manufacturing Co., Inc., A. W., 509 East 29th St., Indianapolis 5, Ind., 73
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West Va. Pulp & Paper Co., Hinde & Dauch Div., 407 Decatur St., Sandusky, Ohio, 87

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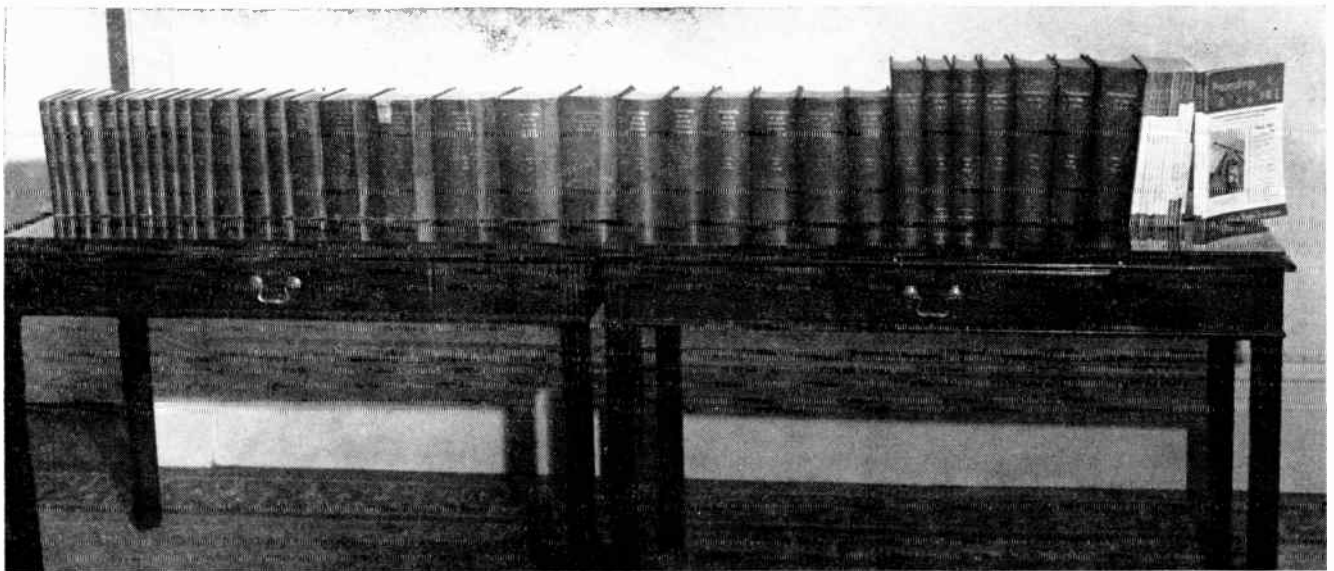
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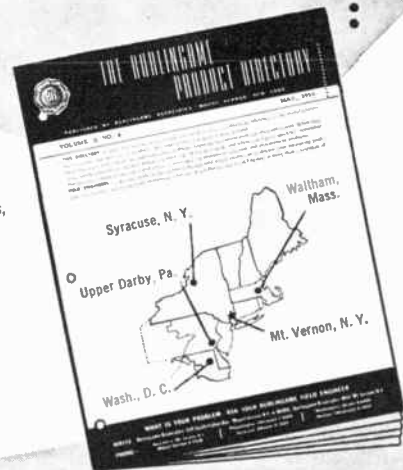
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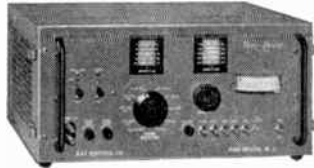
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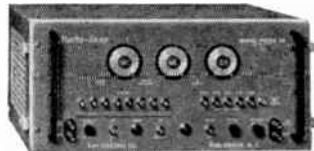
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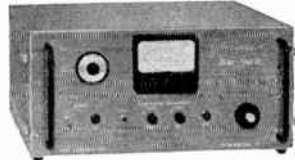
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|---------------------|-------------|------------|------------------|---------------|-------------|---------------|
| MARKA-SWEEP | 50kc-20mc | 3 ranges | complete | 6 crystals | 0.2V rms | \$525. |
| MODEL VIDEO | | 50kc-20mc | range | | 70 ohms | |
| MARKA-SWEEP | 50kc-8mc | | 0-8mc | 5 crystals | 1.5V rms | 745. |
| MODEL VIDEO TIV .. | | | | 1 variable | 70 ohms | |
| MARKA-SWEEP | 50kc-50mc | contin. | 4-50mc | 8 crystals | 1.0V P.-P. | 745. |
| MODEL VIDEO 50 | | | contin. variable | | | |
| VARI-SWEEP | 10-145mc | contin. | 30mc+ | 11 crystals | 1.0V rms | 985. |
| MODEL RADAR | Fund | | | 1 variable | 70 ohms | |
| VARI-SWEEP | 4-120mc | contin. | 30mc+ | 11 crystals | 1.0V rms | 985. |
| MODEL IF | Fund | | | 1 variable | 70 ohms | |
| RADA-SWEEP SR | 1-260mc | 6 switched | 60-70mc | 24 crystals | 0.5V rms | 595. |
| | Fund | bonds | | | 70 ohms | plus crystals |
| KILO-SWEEP | 50kc-2mc | contin. | contin. to 100kc | 6 crystals | 0.25V rms | 575.-895. |
| | -5mc | | | | 70 ohms | |
| | -10mc | | | | 70 ohms | |
| SONA-SWEEP | 5kc-200kc | contin. | 0-20kc | 6 crystals | 0.25V rms | 575. |
| | | | | | 70 ohms | |
| RADA-SWEEP | 20-40mc | | 20mc or 2mc | 9 crystals | .25V rms | 425. |
| | 50-70mc | | | | 70 ohms | |
| LIGNA-SWEEP CP | 100kc-220mc | 6 switched | 10-60mc | 18 crystals | 1.0V rms | 675. |
| | | bonds | contin. variable | | 70 ohms | plus crystals |
| LIGNA-SWEEP SKV .. | 200cps-11mc | 4 switched | 2kc-10mc | uses variable | 1.0V rms | 600 ohms |
| | | bonds | | marker | and 70 ohms | 895. |



Marka-Sweep
Model Video 50

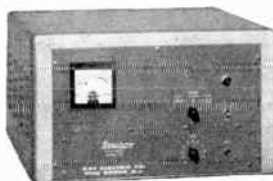
NOISE FIGURE MEASUREMENT . . . NOISE GENERATORS



Mega-Node Sr.

| INST. | RANGE | NOISE FIG. RANGE | PRICE |
|-----------------------|---------------|--------------------------------|------------------------|
| MEGA-NODE | 5-220mc | 0-16db @ 50 ohms | \$345. |
| | | 0-23.8db @ 300 ohms | |
| MEGA-NODE SR | 10-3000mc | 0.20db @ 50 ohms | 790. |
| MICROWAVE | 1120-26,500mc | Fluorescent Tubes 15.8 ± .25db | 270.-690. |
| MEGA-NODES | | Inert Gas Tubes 15.28 ± .1db | (with power supply) |
| RADA-NODE | 5-26,500mc | 0-23.8 ± .25 db | \$1495. covering range |
| | | IF strips @ 30 and 60mc | 5mc to 400mc |
| MEGA-NODE 175-A | 50-500mc | 0-19db, 300 ohms | 345. |
| MEGA-NODE 403-A | 3-500mc | 0-19db, 50 ohms | 345. |

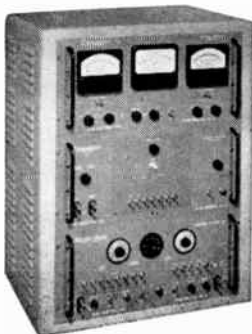
SPECTRUM ANALYSIS



Sonalyzer
Model 30

| INST. | DESCRIPTION | FREQ. RANGE | FEATURES | PRICE |
|-----------------------------|--|--------------|---|---------|
| VIBRALYZER | Vibration Frequency Analyzer | 5-4400cps | Displays amplitude vs frequency vs time. Provides permanent record. | \$2445. |
| SONA-GRAPH | Sound spectrograph for frequency analysis of audio energy | 85-8000cps | Records frequency and intensity to time | 2195. |
| ECHO-VOX SR | Provides variable periods of time delay of audio frequencies | 40-12,000cps | 20 to 1600 millisecond delay range | 1695. |
| SONA-STRETCHER | Speech stretcher for slowing speech to 1/2 normal tempo | 100-4000cps | Has phono & tape recorder inputs | 950. |
| SONALYZER | A 30-Channel all-electronic spectrum analyzer providing immediate visible display of complex waveforms up to 20,000 cps | | | 1995. |
| MODEL 30 | Accessory for use with Sonalyzer to provide a 3-dimensional-frequency vs intensity vs time—display on long persistence scope | | | 495. |
| SONAGRAM DISPLAY UNIT | A compressor and expander for audio signals; slows to 1/3 or doubles normal tempo with no loss of intelligibility | | | 1495. |
| VARI-VOX | | | | |

OTHER INSTRUMENTS



Transalyzer

| INST. | RANGE | RANGE OF MEASUREMENT | FEATURES | PRICE |
|-------------------------|--|--|--|---------|
| DRD METERS | 1.1-18Kmc | Direct reading digital frequency meters with coupling elements for waveguide or coaxial line. Accuracy ±0.1% | | \$325.- |
| | 9 Models | | | 550. |
| MICROLTER 50 VTVM | 100cps-50mc | Full Scale: 1mv-1V in 7 ranges. May be used as 50mc video amp. | | 545. |
| TRANSALYZER | 50kc-50mc | Measures Alpha and Alpha Cutoff—Collector and Emitter Current, 3 Voltages—Emitter to Base, Emitter to Collector, and Base to Collector | | 1695. |
| MEGA-MATCH | 10mc-1000mc | Contin. tuned sweeping oscillator | Displays reflected energy. Checks matching impedance | 895. |
| UTILATOR | 4.5-220mc | Fundamental Freq. Utility Oscillator | 0.7V rms into 70 ohms metered AGC'd | 325. |
| GAIN SET | Complete Equipment for Making Precision Measurements of Gain or Loss in Components and Systems | | | 2195. |
| MEGA-PIX | TV Sound-Picture | Color or Black and White Transmitter | .25 output into 70 ohms | 925. |
| RADA-PULSER SR. | Pulsed-Carrier Generator, 12-80mc. Continuously variable carrier frequency and pulse width | | | 795. |
| AUDIOLATOR | 15cps-15kc | Transistorized audio oscillator, battery operated. Flat to ±0.5 db over range. Output 1.0V rms at 600 ohms. | | 175. |
| TRANSIFIER | 15cps-15mc | Transistorized battery operated amplifier giving 10db and 20db gain | | 95. |

WRITE FOR 1959-A CATALOG

KAY ELECTRIC COMPANY

DESIGNERS & MANUFACTURERS OF PRECISION ELECTRONIC TEST AND MEASURING EQUIPMENT

Dept. ID-9

MAPLE AVE., PINE BROOK, NEW JERSEY

Capital 6-4000

Directory I. Complete Equipment

2. Amateur Equipment.

Corbin Corporation, Md., 5, 10
Creative Electronics Corp., Conn., 5, 10
Dynamic Electronics-New York, Inc., N.Y., 5, 10
Eldico Electronics, Radio Eng. Labs., Inc. Div., N.Y., 10
Electro-Voice, Inc., E. V. Instrument Div., Mich., 5
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Tel: V**A**n Buren 6-6300

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Tel: Y**U**kon 3-3961

I. D. E. A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 5

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Tel: N**O** 5-4800

Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., 2

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Tel: O**W**ens 9-4600

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Tapetone, Inc., Mass., 5

Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5, 10

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Telechrome Mfg. Corp., N.Y., 5, 10

Tenna Mfg. Co., Ohio, 5

Vocaline Co. of America, Inc., Conn., Transceiver

Young Spring & Wire Corp., Gosnet Div., Calif., 5, 10

Ammeters: See class 56

Amplifiers: See class 56

Attenuators: See class 38

**Atmospheric test chambers:
See class 12**

3. Audio Frequency Test Equipment.

- | | |
|----------------------------------|--------------------------------|
| 3. AF signal | 20. Output power meters |
| 5. Beat frequency oscillators | 25. Sound level |
| 10. Distortion & noise analyzers | 30. Spectrum analyzers |
| 15. Intermodulation meters | 35. Square wave generators |
| 17. Harmonic frequency | 40. Telegraph test |
| | 45. Voltmeters-audio frequency |

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Airpax Electronics, Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla., Cambridge Div., Jacktown Rd., Cambridge, Md., 45

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General Radio Co., West Concord, Mass., 3, 5, 10, 17, 20, 25, 35, 45

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Tel: E**M**erson 9-4400

3. Audio Frequency Test Equipment.

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Hickok Electrical Instrument Co., Ohio,
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Hycon Electronics, Inc., Calif., 45

Industrial Test Equipment Co., 55 East
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 meters and shifters
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 Intensity Sound Generators
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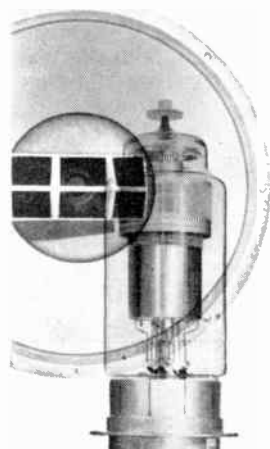
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Towaco Electronics, N.J., 40

Transistor Devices, Inc., N.J., 45



High intensity SOUND

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For details, circle #205 on Reader Service Card

Directory I. Complete Equipment

3. Audio Frequency Test Equipment.

- Triplett Electrical Instrument Co., Harmon Road, Bluffton, Ohio, 25
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- U.S. Science Corp., Sub. Topp Indust., Inc., Calif., 3
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4. Automatic Control Equipment.

- | | |
|---|---|
| 5. Burglar-alarm & protective systems | 27. Pressure |
| 10. Combustion & smoke- nuisance controls | 30. Production controls, counting & sorting equipment |
| 15. Electronic remote controls | 35. Servo type |
| 16. Fluid flow | 40. Temperature, electronic |
| 17. Gyroscopes | 45. Timing |
| 18. Liquid level | 50. Vacuum controls |
| 20. Photo electric | 55. Variable speed controls |
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- Bendix Aviation Corp., Pioneer Central Div., Iowa, 16, 17, 18
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- Berneco Engrg. Corp., Ind., 10, 45
- Bill Jack Scientific Instrument Co., Calif., 30
- Biophysical Electronics, Inc., N.Y., 45
- Borg-Warner Corp., Pesco Prods. Div., Ohio, 35
- Bowmar Instrument Corp., 8000 Bluffton Rd., P.O. Box 2835, Fort Wayne, Ind., 16, 18, 25, 35, 55
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- Briggs Assoc., Inc., Pa., 30
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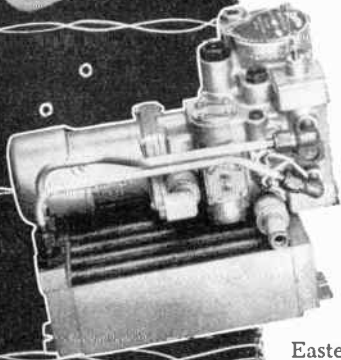
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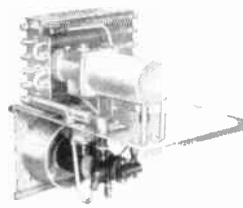
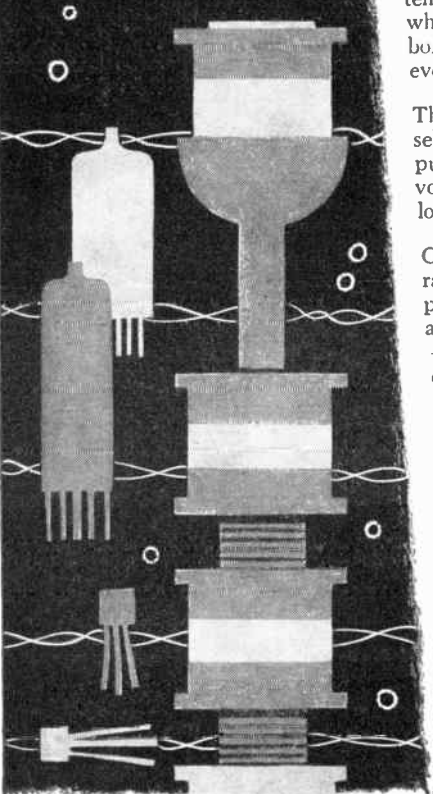
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- British Thomson-Houston Co., Ltd., England, 5, 10, 15, 18, 20, 25, 30, 35, 40, 45, 55
- Brooks Research, Inc., N.Y., 15, 20, 25, 30, 35, 40, 45, 50
- Brown Brockmeyer Co., Ohio, 15, Garage Door Type
- Buck Instrument Co., Colo., 27
- Bulova Research & Development Labs., Inc., N.Y., 15, 27, 35, 45
- CG Electronics Corp., New Mex., 5, 15
- CGS Labs., Inc., Conn., 55
- Calbest Electronics Co., Calif., 15
- Camden Electronics, Inc., N.J., 5, 20, 30
- Camera Equipment Co., Inc., Dept. IRE, 315 W. 43rd St., New York 36, N.Y., 25

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- Canadian G.E. Co., Ltd., Electrn. Equip. Tube Dept., Canada, 5, 15, 30
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- Canadian Westinghouse Co., Ltd., Elect. Div., Canada, 15, 20, 25, 30, 35
- Cardinal Instrumentation Corp., Calif., 40
- Centronix, Inc., Fla., 5, 15, 16, 45
- Chapin Electronics, Inc., Mass., 5
- Chicago Aerial Industries, Inc., Ill., 20, 55
- Clark Controller Co., Ohio, 5, 10, 15, 18, 20, 25, 30, 40, 55
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- Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 15, 20, 25, 30, 35, 45

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- Fisher Research Lab., Inc., Calif., 18
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- Fried, Licensed Prof. Eng., Walter, N.Y., 20, 25, 40
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- Gurley Co., N.Y., 25
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- International Business Machines Corp., N.Y., 15
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- Kellogg Switchboard & Supply Co., Ill., 5
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 Solatron, Inc., Mass., 5
Southwestern Industrial Electronics Co.,
 10201 Westheimer Rd., P.O. Box
 22187, Houston 27, Tex., 15
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 Tel: HO 5-3471
 Specialties, Inc., N.Y., 20, 27, 50
 Sperry Gyroscope Co., Calif., 17, 25, 35, 55
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 Canada, 17, 35, 45
 Sperry Products, Inc., Conn., 30
 Sperry Rand Corp., Ford Instrument
 Co. Div., N.Y., 35
 Sperry Rand Corp., Sperry Gyroscope
 Co. Div., N.Y., 15, 17, 25, 35
 Sperry Rand Corp., Sperry Gyroscope
 Div., Aeron. Equip. Div., N.Y., 15, 17, 35
 Sperry Rand Corp., Sperry Gyroscope
 Div., Countermeasures Div., N.Y., 17
 Sperry Rand Corp., Sperry Gyroscope
 Div., Surface Armament Div., N.Y., 17
 Sperry Rand Corp., Sperry Phoenix
 Co. Div., Ariz., 15, 17
 Spivey, Inc., James S., D.C., 15
 Square D Co., Wis., 15, 27, 30, 45, 50, 55
 Standard Electronics Research Corp.,
 N.Y., 30, 35, 40
**Sterling Precision Corp., 17 Matinecock
 Ave., Port Washington, N.Y., 20, 25,
 27, 30, 35, 40, 45, 55**
 See ads on pages 306, 351
 Tel: POrt Washington 7-7200
 Stewart-Warner Electronics, Ill., 15, 30
 Strand Engineering Co., Mich., 30
 Strempel Instrument Corp., N.Y., 20
 Stromberg-Carlson Co., Electronics
 Control Systems Div., Calif., 25, 30,
 35, Numerical Controls
 Summers Gyroscope Co., Calif., 17, 25,
 35
 Sunshine Scientific Instrument, Pa., 15,
 20, 25, 27, 45
 Sunvic Controls, Ltd., England, 18, 27
**Superior Electric Co., 590 Tripp Ave.,
 Bristol, Conn., 25**
 See ads on pages 422, 424, 426, 481,
 502, 562, 570, 588
 Tel: LUdlow 2-9561
 Ta-Mar, Inc., Calif., 15
 Taft-Pierce Mfg. Co., R.I., 30
 Taller & Cooper, Inc., Div. of American
 Electronics, N.Y., 5, 10, 15, 25, 30
**Tech Laboratories, Inc., Bergen & Ed-
 salls Blvds., Palisades Park, N.J., 15,
 30**
 See ad on page 556
 Tel: WIndsor 4-2221
**Technical Apparatus Builders, 109 G B
 Liberty St., New York 6, N.Y., 15, 20,
 40, 45, 55**
 See ad on page 502
 Tel: REctor 2-6249

**Technical Appliance Corp., N. Main
 St., Sherburne, N.Y., 25**
 See ad on page 382
 Tel: SHerburne 7-2211
**Technology Instrument Corp., 535 Main
 St., Acton, Mass., 50**
 See ad on page 539
 Tel: COLonial 3-7711
 Telechrome Mfg. Corp., N.Y., 15, 18, 20,
 27, 45
 Telecomputing Corp., Data Instru-
 ments Div., Calif., 15, 20, 25, 30
 Telecomputing Corp., Whittaker Gyro
 Div., Calif., 17
 Telectro Industries Corp., N.Y., 15
 Temco Aircraft Corp., Electronics Div.,
 Texas, 15, 35
 Tempo Instrument, Inc., N.Y., 45
 Tesla Electric Co., Ill., 15, 20, 25, 30, 40,
 45
**Texas Instruments, Incorporated, Semi-
 conductor—Components Div., P.O.
 Box 312, 13500 N. Central Expressway,
 Dallas, Tex., 15, 18**
 See ad on pages 75-78
 Tel: FLeeewood 7-5411
 Texas Instruments, Incorporated, Hous-
 ton, Tex., 15, 16, 18, 27
 Theta Instrument Corp., N.J., 25
 Thomas Electronics, Inc., N.J., 15, 30
 Thompson-Ramo-Wooldridge, Inc.,
 Tapco Group, Ohio, 15, 18, 25, 27, 35,
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 Tracerlab, Inc., Mass., 16, 18, 30
 Transistor Devices, Inc., N.J., 15, 18
 Trepac Corp. of America, N.J., 15, 45
 Trimount Instrument Co., Ill., 18, 25
 Twin City Metal Seal Corp., Minn., 10
 Ultradyne, Inc., N.M., 27
 Underwood Corp., Canoga Div., Calif.,
 35
**Union Switch & Signal, Division of
 Westinghouse Air Brake Co., Brad-
 dock Ave., Pittsburgh 18, Pa., 15**
 See ad on pages 158-159
 Tel: CHurhill 2-5000
 United Aircraft Corp., Ketay Dept.,
 Norden Div., N.Y., 17
 United Aircraft Corp., Norden Div.,
 Conn., 17
 United Aircraft Corp., Norden Div.,
 Norden Labs., N.Y., 17, 25, 35
 United Aircraft Prods., Inc., Ohio, 16,
 40
 United Control Corp., Wash., 15, 18, 25,
 27, 35, 40
 United Electric Controls Co., Mass., 5,
 18, 27, 50
 United States Dynamic Corp., Mass., 40
 U. S. Science Corp., Sub., Topp Indust.,
 Inc., Calif., 15, 25, 27, 35, 40, 45
 U. S. Time Corp., Conn., 17
 U. S. Time Corp., N.Y., 17
 Univox Corp., N.Y., 15
 Uniwave, Inc., N.Y., 5, 15, 20, 27, 30, 55
 Vacuum Specialties Co., Inc., Mass., 50
 Vacuum Tube Products Co., Inc., Calif.,
 50
 Varo Mfg. Co., Inc., Tex., 35
 VccTrol Engineering, Inc., Conn., 20, 35,
 40, 55
**Veeco Vacuum Corp., 86-E Denton Ave.,
 New Hyde Park, L.I., N.Y., 50**
 See ad on page 674
 Tel: Pioneer 6-1161

Vickers, Inc., Mich., 16, 25, 27, 35, 55
 Vickers, Inc., Electric Products Div.,
 Mo., 30, 55
 Victoreen Instrument Co., Calif., 45
**Victory Engineering Corp., 114 Spring-
 field Rd., Union, N.J., 18, 40**
 See ad on page 541
 Tel: MURdock 8-7150
 Viking Instrument, Inc., Conn., 27, 40
 Vitro Laboratories, N.J., 5, 15, 45
 Wac Line, Inc., Ohio, 15, 55
 Waldorf Instrument Co., Div. of Huyck
 Sons, N.Y., 15, 20, 25, 35, 40
 Wallace & Tiernan, Inc., N.J., 27, 50
**Wallson Assoc., Inc., 35 E. Runyon St.,
 Newark 8, N.J., 15, 25, 35**
 See ad on page 311
 Tel: TALbot 4-2600
 Waltham Precision Inst. Co., Thermal
 Dynamic Prods. Div., N.Y., 25, 35
 Wang Labs., Inc., Mass., 15, 25, 35, 45
 Warrick Co., Charles F., Mich., 17, 18,
 20
 Waugh Engrg. Co., Calif., 15, 16, 30, 35,
 45, 55
 Webster Electric Co., Wis., 5, 18, 45
 Welch Scientific Co., W. M., Ill., 20
 Westgate Lab., Inc., Ohio, 15, 16, 20, 25,
 45
 Westinghouse Electric Corp., Pa., 55
 Westport Electric, Calif., 30
 Wheaton Engineering Corp., Ill., 45
**Wiancko Engineering Co., 255 N. Hal-
 stead Ave., Pasadena, Calif., 27**
 See ad on page 560
 Tel: ELgin 5-7186
 Wilson & Co., G. C., Ohio, 40, 45
 Wintronics, Calif., Electronic Safety
 Devices
 Worner Electronic Devices, Ill., 5, 10,
 15, 18, 20, 25, 30, 45
 Yellow Springs Instrument Co., Ohio,
 40
 Z & W Mfg. Corp., Ohio, 15
 Zenith Electric Co., Ill., 45

Beat frequency oscillators:
 See class 3

Bolometers: See class 19

5. Bridges & Decades.

| | |
|------------------------------|-------------------------------|
| 5. Bridges, capaci- tance | 25. Decades, capaci- tance |
| 10. Bridges, imped- ance | 30. Decades, imped- ance |
| 15. Bridges, induct- ance | 35. Decades, induct- ance |
| 20. Bridges, resistance | 40. Decades, resist- ance |

**Acton Laboratories, Inc., 536 Main St.,
 Acton, Mass., 10**
 See ad on page 292
 Tel: COLonial 3-7756
 Aero Electronics Co., Ill., 35
 Aerovox Corp., Mass., 25, 35, 40
 Aerovox Corp., Cinema Engrn. Div.,
 Calif., 40
 Allegany Instrument Co., Inc., Md., 20
**Arco Electronics, Inc., 64 White St.,
 New York 13, N.Y., 25**
 See ad on page 399
 Tel: WOrth 6-0530

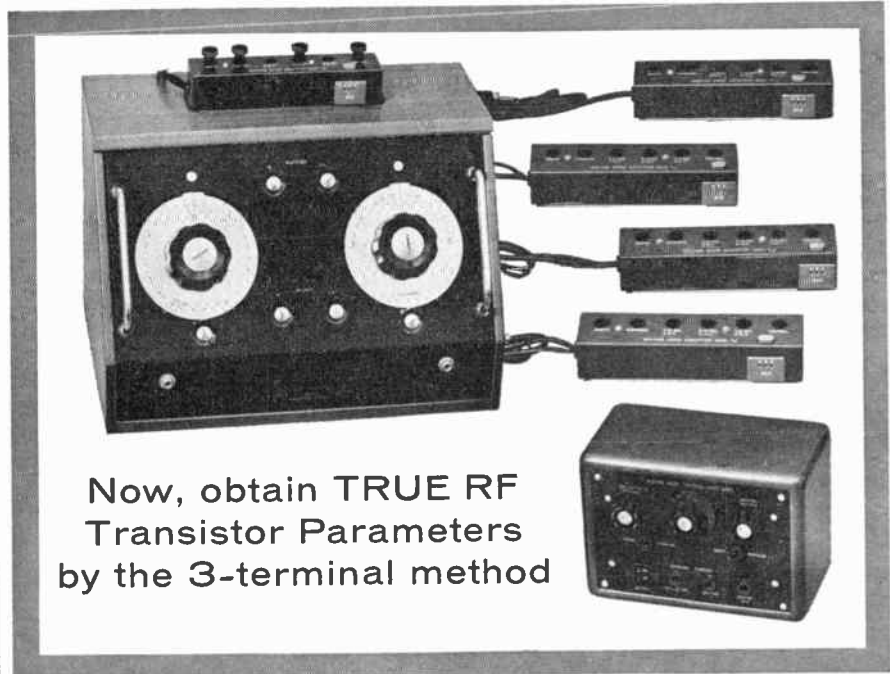
Directory I. Complete Equipment

5. Bridges & Decades.

Avo, Ltd., N.Y., 10
 B & F Instruments, Inc., Pa., 20
 B & K Instruments, Inc., Ohio, 5, 15, 20
 Barker & Williamson, Inc., Pa., 35
 Barnes Development Co., Pa., 5, 10, 20, 40
 Bendix Aviation Corp., Cincinnati Div., Ohio, 20
Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 5, 15
 See ad on page 278
 Tel: JEFFerson 9-4210
 Borden Engrg. Co., N.J., 20
 Bristol Co., Conn., 5, 10, 15, 20
 Bruel & Kjaer, Denmark, 5, 10, 15, 20
 Brunswick Instruments, N.J., 20
 Cal-Tronics Corporation, Calif., 5, 10, 15, 20, 25
 Canadian Marconi Co., Canada, 5, 10, 15, 20
 Canadian Research Institute, Canada, 5, 10, 20, 25, 40
 Cardinal Instrumentation Corp., Calif., 5, 10, 15, 20
 Chesapeake Instrument Corp., Md., 10
 Clarostat Mfg. Co., Inc., N.H., 40
 Clippard Instrument Lab., Inc., Ohio, 5, 20
 Coast Coil Co., Calif., 35
 Cohu Electronics, Inc., Millivac Instruments Div., N.Y., 20
Communication Measurements Lab., Inc., 350 Leland Ave., Plainfield, N.J., 20
 See ad on page 491
 Tel: PLainfield 4-5502
 Compagnie Generale De Metrologie, France, 10
 Computer Engineering Associates, Inc., Calif., 35
 Consolidated Airborne Systems, Inc., N.Y., 5
 Consolidated Resistance Co. of America, N.Y., 20, 40
 Corbett Science Labs., Calif., 5, 10, 15, 20, 25, 30, 35, 40
Cornell-Dubilier Electric Corp., Dept. IRE, 333 Hamilton Blvd., South Plainfield, N.J., 5, 15, 20, 25, 40
 See ad on Cover 3
 Tel: PLainfield 6-9000
 Crescent Communications Corp., Conn., 5, 10, 15, 20
Curtiss-Wright Corp., Electronics Div., West Caldwell, N.J., 20
 See ad on page 514
 Tel: GENEva 8-4000
 Datascan, Inc., N.J., 5
 Daven Co., N.J., 40
 Dawe Instruments, Ltd., England, 25
 Dmeter Mfg. Co., Inc., N.Y., 40
 Dytronics Co., Ohio, 5, 10, 15, 20
 Electro Instruments, Inc., Calif., 5, 10, 15, 20, 40
 Electro-Measurements, Inc., Ore., 5, 10, 15, 20, 25, 30, 35, 40
 Electromatic Equipment Co., N.Y., 5, 15, 20

Electronic Applications, Inc., Conn., 5, 25
Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N.Y., 5, 20, 25, 40
 See ad on page 295
 Tel: STillwell 6-8700
 Electronic Plastics Co., Calif., 5, 20
 Engineering Associates, Ohio, 10, 15, 20
 Epic, Inc., N.Y., 5, 15, 20, 25, 40
 Evershed & Vignoles, Ltd., England, 20

Fidelity Amplifier Co., Ill., 40
 Fisher Scientific Co., Pa., 20, 40
Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5, 15, 25, 35
 See ad on page 410
 Tel: EVergreen 6-1300
General Radio Co., West Concord, Mass., 5, 10, 15, 20, 25, 30, 35, 40
 See ad on Cover 4
 Tel: EMerson 9-4400



You can now measure alpha and admittance parameters of transistors accurately (within 2%) and easily under small signal conditions.

a two or three terminal transformer ratio arm bridge. makes these measurements possible. The direct currents and voltages required are furnished by a separate Wayne Kerr Control Unit which also provides for monitoring. Write for technical information.

The addition of 5 special transistor adapters to the revolutionary Wayne Kerr RF Bridge,

- FOR TRANSISTOR MEASUREMENTS Measure input, output admittance and current gain in grounded base configuration, and input and transfer admittance in grounded emitter configuration.
- FOR GENERAL MEASUREMENTS Measure complex impedance, balanced and unbalanced, or balanced with the center point grounded and the impedance between any pair of terminals in a 3-terminal network.
- Measure resistance, capacitance and inductance over 15 kc to 5 mc.
- Capacitance range: 0.01 μf to 20,000 μf in 6 ranges
- Resistance range: 10 ohms to 10 megohms in 6 ranges
- Inductance range: 0.5 μH to 50 mH in 6 ranges
- Extreme stability due to fact that impedance looking back into the terminals and impedance to ground at balance are both exceedingly low.
- Accuracy of bridge: 1% over most of range; with adapters—within 2%.
- RF Bridge B-601 \$640.00
- Transistor Adapters Q-601 A to E \$300.00
- OTHER INSTRUMENTS: AF, VHF Bridges; AF, UHF Oscillators; Microwave Equipment; Attenuators; Wave Analyzer; Distance and Vibration Meters.
- Send for complete W-K catalog showing other instruments

WAYNE KERR

Electronics for Measurement and Control



CORPORATION

1633 Race Street
Philadelphia 3, Pa.

Sales, Stock and Service Facilities

For details, circle #208 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

VOLTMETERS

SENSITIVE RF VOLTMETERS

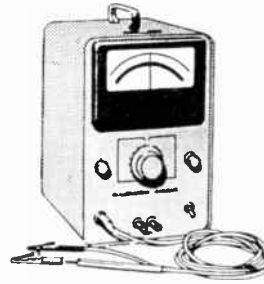
- RANGE:
Model 91-C: 1 mv to 3 v.
Model 91-CA: 0.3 mv to 3 v.
- FREQ. RANGE: 10 kc to 600 mc.
- ACCURACY: 5% to 200 mc.
10% to 600 mc.
- High impedance probe and 52 ohm adapter.
- Special adapters and voltage divider available.



MODEL 91-C Price \$395
MODEL 91-CA Price \$495

DIFFERENTIAL DC VOLTMETER-AMPLIFIER

- RANGE: 10 μ v to 1000 v.
- ACCURACY: 3% full scale.
- COMMON MODE REJECTION: 80 db.
- INPUT RESISTANCE: 10 megohms to 100 megohms.
- Zero center meter.
- OUTPUT CAPABILITY: 0.5 ma into 1500 Ω .



MODEL 98-A Price \$395

NULL DETECTORS

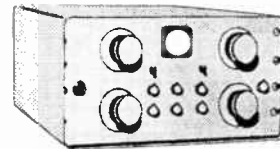
NEW DC NULL DETECTOR

- For use with bridges. Provides compression for hunting or linearity for close tolerance work.
- HUNTING RANGE: 60 db.
- FULL SCALE SENSITIVITY:
VOLTAGE: 10 μ v to 100 v.
CURRENT: 1 μ ma to 10 μ a.
POWER: 10⁻¹⁷ watts to 10⁻³ watts.
- INPUT RESISTANCE: 10 meg.
- OUTPUT RATING: 1.0 v across 500 Ω .
- MAX. AMPLIFIER GAIN: 100 db.



MODEL 56-A
Price \$450

NEW AC NULL DETECTOR



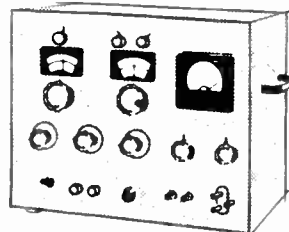
MODEL 51-A Price \$1900

- TUNING RANGE: 20 cycles to 200 kc.
- SENSITIVITY: 10 μ v for 1/4 inch CRT deflection or 100 μ a dc output.
- PHASE SENSITIVE.
- HUNTING RANGE: 75 db with AVC on; 25 db with AVC off.
- INPUT IMPEDANCE: 1 megohm shunted by 100 μ f.
- Discrimination of 2nd harmonic of tuned freq. is 35 to 40 db.
- Useful as a low frequency impedance bridge detector, tuned voltmeter, or in wave analysis.

BRIDGES

THREE TERMINAL CAPACITANCE BRIDGE

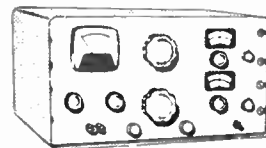
- CAP. RANGE: .0002 μ mf to 11,000 μ mf.
- APPROX. ACCURACY:
 $\pm 0.25\%$ + range factor.
- Measures direct or grounded capacitance and conductance.
- Self-contained 100 kc oscillator and detector.
- Special models available at 1000 \sim , 465 kc and with built-in dc bias for diode testing.



MODEL 74-C Price \$935

NEW INDUCTANCE BRIDGE

(Tentative Specifications)

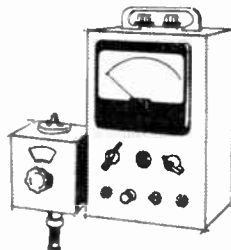


MODEL 63-A

- INDUCTANCE RANGE: .002 μ h to 1.1 henry.
- INDUCTANCE ACCURACY:
 $\pm 0.25\%$ + range factor.
- RESOLUTION: .01%.
- TEST FREQUENCIES: Continuously variable from 1 kc to 100 kc with internal oscillator and detector.
- EFFECTIVE SERIES RESISTANCE RANGE: .01 to 110,000 ohms.
- Non-interacting inductance and resistance balance controls.

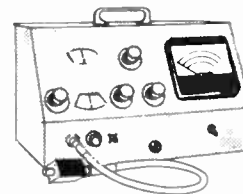
UHF GRID DIP METER

- FREQ. RANGE: 300 to 1000 mc.
- Small, lightweight probe.
- High sensitivity for both capacitive and inductive coupling.
- Internal 120 \sim modulation or external modulation.
- May be operated as a diode detector.



MODEL 101-B Price \$275

RF DISTORTION METERS



MODEL 85 Price \$740

- FREQ. RANGE:
Model 85-B: 1 to 100 mc.
Model 85-C: 0.1 to 6 mc.
- SENSITIVITY: 60 db below 1 v.
- INPUT IMPEDANCE:
Approximately 50 ohms.
- Rapid measurement of total distortion.
- Same voltmeter features as model 91-C above.

HERE ARE OUR REPRESENTATIVES

NEW ENGLAND: George Gregory Assoc., West Newton, Mass. • NEW YORK: S. B. M. Assoc., Rochester, N. Y. • N. J., N. Y. C., L. I., WESTCHESTER: N. L. R. Assoc., W. Orange, N. J. • E. PENNA., MD., WASH., D. C.: C. F. Paddock, Silver Springs, Md. • SOUTH EAST: J. L. Highsmith & Co., Charlotte, N. C. • FLORIDA: A. H. Lynch & Assoc., Inc., Ft. Myers, Fla. • MICHIGAN: Anderson Electronics Co., Roseville, Mich. • W. PENNA., OHIO: Dayton Assoc., Dayton, O. • IDWA, WIS., MINN.: Arthur Engineering Sales Co., Milwaukee, Wisc. • CDL., UTAH, N. M.: Parrish Electronics, Denver, Col. • CALIF., ARIZ., NEV.: J. F. O'Halloran & Assoc., N. Hollywood, Calif. • CANADA: Mel Sales Ltd., Arnprior, Ontario • EXPORT: A. V. Marano & Co., N. Y. C.



Boonton ELECTRONICS Corp.

Morris Plains, N. J.
Phone: Jefferson 9-4210

Directory I. Complete Equipment

5. Bridges & Decades.

General Resistance, Inc., 577 E. 156th St., New York 55, N.Y., 20, 40
See ad on page 533
Tel: CYpress 2-1500

Gertsch Products, Inc., Calif., 10, 40
Gray Instrument Co., Pa., 20
Gulton Industries, Inc., N.J., 5
Harris Transducer Corp., Conn., 10
Harrison Labs., Inc., B. M., Mass., 20

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10, 15, 20, 25, 40
See ad on page 328
Tel: YUlkon 3-3961

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 10
See ad on pages 3-18
Tel: DAvenport 5-4451

Hickok Electrical Instrument Co., Ohio, 5, 10
Howell Instrument Co., Tex., 20
Indikon Co., Inc., Mass., 5
Industrial Control Co., N.Y., 5
Industrial Development Labs., Inc., N.J., 5, 20
Industrial Instruments, Inc., N.J., 5, 10, 20, 25, 40

Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 5, 10, 15, 20
See ad on page 339
Tel: GRamercy 3-4684

Industrial Transformer Corp., Pa., 10, 15
I. T. & T. Corp., Indust. Prods. Div., N.J., 5, 10, 15, 20, 25, 40
Jodon, Inc., F. R., D.C., 20
Julie Research Labs., Inc., N.Y., 20

Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 5, 10, 15, 20, 25, 30, 35, 40
See ad on page 348
Tel: GRegory 2-1000

Kurtz, John, N.Y., 40
Leeds & Northrup Co., Pa., 5, 10, 15, 20, 25, 40

Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5, 15, 20, 25
See ad on page 318
Tel: LOwell 7-0607

Marma Electronic Co., Ill., 40

Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 20
See ad on page 494
Tel: DRexel 6-7130

Minneapolis-Honeywell Regulator Co., Pa., 5, 10, 15, 20, 25, 30, 35, 40
Minneapolis-Honeywell Regulator Co., Rubicon Instrument Div., Pa., 20, 40
Muirhead & Co., Ltd., England, 5, 10, 15, 20, 25, 35, 40
Muirhead Instruments, Inc., N.Y., 5, 10, 15, 20, 25, 35, 40

Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, N.Y., 10
See ad on pages 141-144
Tel: PLioneer 6-4650

New England Scientific Instruments Co., 238 Main St., Cambridge 42, Mass., 5, 10, 15, 20, 25, 30, 35, 40
See ad on page 331
Tel: KIRkland 7-1997

Nichols Ltd., R. H., Canada, 5, 10, 20, 25, 40

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 40
See ad on pages 106-107
Tel: ORchard 5-2600

Optimized Devices, Inc., 864 Franklin Ave., Thornwood, N.Y., 20
See ad on page 301
Tel: ROgers 9-6110

Pennsylvania Testing Lab., Inc., Pa., 5, 10, 15, 25, 35

Physics Research Labs., Inc., P.O. Box 555, Hempstead, N.Y., 20, 40
See ad on page 306
Tel: IVanhoe 3-8299

Pimex, Inc., N.Y., 20, 40
Precise Development Corp., N.Y., 5, 15, 20, 25, 35

Pyramid Electric Co., 507 26th St., Union City, N.J., 5, 20
See ad on page 404
Tel: UNion 5-1776

Radex Corp., Ill., 10

Radiometer, Denmark, 5, 10, 15, 20, 25

Rank Cintel, Ltd., England, 5, 10, 15, 20

Rinco, Inc., Ore., 5, 10, 15, 20, 25, 40

Rohde & Schwarz Sales Co., Inc., N.J., 5, 10, 15, 20, 25, 35, 40

Ruge Assoc., Inc., Arthur C., N.H., 20

Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 20
See ad on page 538
Tel: WOODlawn 5-2341

Siemens & Halske, A. G., Germany, 5, 10, 15, 20, 25, 30, 35, 40

Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 25
See ad on page 94
Tel: VICToria 9-3193

Southwestern Industrial Electronics Co., 10201 Westheimer Rd., P.O. Box 22187, Houston 27, Tex., 5
See ad on page 248
Tel: HO 5-3471

Spivey, Inc., James S., D.C., 5, 10, 15, 20, 25

Sprague Electric Co., Mass., 5, 35

Standard Telephones & Cables, Ltd., England, 10

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5
See ads on pages 306, 351
Tel: PORT Washington 7-7200

Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 20
See ad on page 475
Tel: REctor 2-8163

Sullivan, Ltd., H. W., N.Y., 5, 10, 15, 20, 25, 30, 35, 40

Taffet Radio & Television Co., N.Y., 5, 10, 15, 20

Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N.J., 5, 10, 15, 20, 40
See ad on page 556
Tel: WINDsor 4-2221

Technical Electronics Corp., Calif., 10
Telectro Industries Corp., N.Y., 5, 10, 15, 20, 25

Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 40
See ads on pages 466, 569
Tel: MIDway 6-7211

Torocoil Co., Ohio, 35

Transformers, Inc., N.Y., 15

Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., 35
See ad on page 675
Tel: ESsex 4-9800

Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5, 10, 15
See ad on page 277
Tel: GARfield 5-2844

Whitney Blake Co., Conn., 5, 20
Winslow Co., Inc., N.J., 5, 10, 15, 20, 25, 30, 35, 40

Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 20
See ad on page 310
Tel: BEekman 3-6720

6. Broadcast Receivers.

| | |
|-------------------|-----------------------|
| 5. AM broadcast | 25. TV broadcast— |
| 10. AM shortwave | Color |
| 15. FM broadcast | 30. TV closed circuit |
| 20. TV broadcast— | 35. UHF-VHF |
| B & W | |

A.R.F. Products, Inc., Ill., 35
Adler Electronics, Inc., N.Y., 35
Admiral Corp., Ill., 5, 10, 15, 20, 30, 35
Airtronix Dev. Corp., N.Y., 5
American Communications Corp., N.Y., 5
American Elite, Inc., N.Y., 5, 10
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5, 20, 35
See ad on page 426
Tel: CAPital 2-3791

Ampex Audio, Inc., Calif., 5, 15
Andrea Radio Corp., N.Y., 5, 10, 20, 35
Arvin Industries, Inc., Ind., 5, 15
Audicon Electronics, Inc., N.J., 5, 10, 15
Audio-Video Corp., N.Y., 15, 30
Automatic Radio Mfg. Co., Inc., Mass., 5
Automation Elecnec., Inc., Calif., 10
Autometric Corp., N.Y., 20, 25, 30
Avco Corp., Crosley Div., Ohio, 35
Beam-Echo, Ltd., England, 5, 10, 15
Belock Instrument Corp., N.Y., 5, Transistor
Bendix Aviation Corp., Mich., 30
Bendix Aviation Corp., Freiz Instrument Div., Md., 30
Blonder-Tongue Labs., Inc., N.J., 5, 15, 30, 35

PIPELINE TO PRECISION



Model WWVT RECEIVER transistorized and rugged

A portable receiver for utilizing transmissions of WWV and WWVH. It is battery operated, small (9"x12"x5"), light weight (6 lbs.), rugged-sealed metal case and encapsulated components, and designed especially for remote operations under extreme environmental conditions: meets MIL-8189B Specifications. It features instantaneous crystal controlled frequency selectivity, self-contained antenna and 2 microvolt sensitivity.

Model WWVC STANDARD FREQUENCY COMPARATOR

A highly sensitive (better than 1 uv on all frequencies) crystal controlled receiver for utilizing transmissions of the National Bureau of Standards stations WWV and WWVH. Used for precise audio and radio frequency standards work as well as accurate time interval measurements. Available in cabinet or for rack mounting using a 5 1/4" panel.

Model SR-7 WWV RECEIVER

This receiver is the dual conversion type. Dimensions: 3-15/16" x 11" x 8 1/2" deep. Available in upright or vertical models, or as rack mounted model. Noise limiter, antenna trimmer and provision for an oscilloscope or head phone are incorporated.

Model AK-8 ANTENNA KIT

This special antenna is designed to provide optimum response to signals from WWV and WWVH on 2.5, 5, 10, 15 and 20 mc. Includes modification kit for receiver with all wire, 50' of coaxial cable and suitable fittings to provide outstanding performance. Antenna is completely assembled; needs only one support for satisfactory operation.

Benchpak Model BP 200A Adjustable POWER SUPPLY

Hi range 150V to 300V; Lo range 0 to 150V. 150 MA available throughout (200 MA at high end of each range) plus a fixed 150V 50 MA at all times. 4" wide x 8" deep x 7 1/2" high; weight 14 lbs.



CHANGEABLE CHASSIS



SPEED-CHASSIS

The Speed-Chassis is a flexible breadboard assembly with interchangeable socket arrangements which can be mounted on a relay rack if desired. Shield cover and panel are available to make successful breadboard assemblies both permanent and neat.

Send for specifications, prices and delivery



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Brooks Radio & TV Corp., N.Y., 20, Kits
 Browning Labs., Inc., N.H., 15
 Calbest Electronics Co., Calif., 5, 15
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15. Relay broadcast & STL equipment
20. TV broadcast
25. TV closed circuit
35. UHF-VHF

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Grimson Color, Inc., N.Y., 25
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Cabinets & Consoles: See class 81

Calibrators, TV: See class 35

**Cameras: Oscilloscope:
See class 23**

Cameras: Television: See class 32

Cathode-Ray Tubes: See class 74

Cardiographs: See class 17

B SUBMINIATURE 13-DIGIT ENCODER for airborne or other limited space applications. Detailed specifications in Bulletin 0858. **SIZE:** 2 $\frac{3}{16}$ " dia. x 3 $\frac{3}{4}$ " long; $\frac{1}{4}$ " dia. shaft, $\frac{1}{8}$ " long. **WEIGHT:** 1 $\frac{1}{4}$ lbs. **OVERALL ACCURACY:** $\pm 1\frac{1}{4}$ quanta in 8192. **READOUT RATE:** Model A, nominally 10KC (50 microsecond pulse), max. of 100KC (5 microsecond pulse). Model B, max. of 200KC for element, 10KC for sequence. **MAXIMUM ANGULAR SPEED OF ROTATION AT FULL ACCURACY:** 2 rpm (6 rpm at 12-digit accuracy). 10 rpm with temperature control.

B 4" DIA. 13-DIGIT ENCODER for general purpose applications. Detailed specifications in Bulletin 0958. **SIZE:** 4" OD with protrusions on one side x 7" long; $\frac{1}{4}$ " dia. shaft, 0.67" long. **WEIGHT:** 9 $\frac{1}{4}$ lbs. **OVERALL ACCURACY:** ± 1 quanta in 8192. **READOUT RATE:** 100 cps, max. **MAXIMUM ANGULAR SPEED OF ROTATION AT FULL ACCURACY:** 720 rpm; maximum rotation rate, 600 rpm.

B 6" DIA. 13-DIGIT ENCODER for general purpose applications. Specifications in Bulletin 1058. **SIZE:** 6 $\frac{3}{16}$ " dia. with protrusions x 7 $\frac{3}{4}$ " long; $\frac{1}{2}$ " dia. shaft, 1" long. **WEIGHT:** 14 lbs. **OVERALL ACCURACY:** ± 1 quanta in 8192. **READOUT RATE:** 100 cps, max. **MAXIMUM ANGULAR SPEED OF ROTATION AT FULL ACCURACY:** 720 rpm (10 microsecond pulse).



Model A2.6SS13
(Parallel readout)
Model B2.6SS13
(Sequential readout)



Model A4DP13



Model A6DP13

Now from

Baldwin®

precision shaft angle analog-to-digital encoders in 5 standard models:

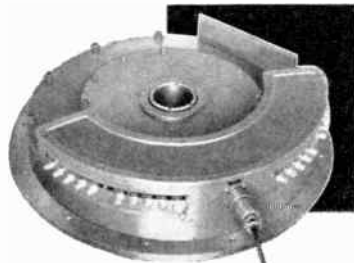
13, 16 and 18 digit /
photoelectric readout / reflected binary code*.

B 9" DIA. 16-DIGIT ENCODER precision unit for radar applications. Detailed specifications in Bulletin 1158. **SIZE:** 9 $\frac{1}{16}$ " dia. with protrusions x 4 $\frac{3}{8}$ " high; $\frac{1}{2}$ " dia. shaft, 1 $\frac{1}{4}$ " long. **WEIGHT:** 17 $\frac{1}{2}$ lbs. **OVERALL ACCURACY:** ± 1 quanta in 65,536. **READOUT RATE:** 100 cps, max. **MAXIMUM ANGULAR SPEED OF ROTATION AT FULL ACCURACY:** 90 rpm (10 microsecond pulse)



Model A9SP16

B HIGH PRECISION 18-DIGIT ENCODER for radar or theodolite applications. Detailed specifications in Bulletin 1258. **SIZE:** 21" max. dia. x 8 $\frac{1}{16}$ " high. **WEIGHT:** 169 lbs. **OVERALL ACCURACY:** ± 1 quanta in 262,144. **READOUT RATE:** 100 cps, max. **MAXIMUM ANGULAR SPEED OF ROTATION AT FULL ACCURACY:** 25 rpm (10 microsecond pulse).



Model A21SP18

*Encoders with decimal, trigonometric functions and other nonlinear codes are also available. All disks are made on a special divided circle machine designed and built by Baldwin. Write for descriptive bulletins.

Industrial Products Division

THE BALDWIN PIANO COMPANY

1807 Gilbert Avenue, Cincinnati 2, Ohio

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8. Carrier Current Equipment.

5. Complete terminal equipment 10. Repeat & relay equipment

Avtron Mfg. Co., Ohio, 10

Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., Comparators, Q Comparators

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Tel: DEerfield 4-3200

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Sierra Electronic Corp., 5442D Bohannon Dr., Menlo Park, Calif., 5, Terminal Equipment

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Tel: DAVenport 6-2060

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Combustion controls: See class 4

9. Computers & Counters.

- | | |
|---------------------------------|--|
| 5. Analog to digital converters | 32. Digital to analog converters |
| 7. Card to tape converters | 35. Electronic calculators |
| 10. Computers, analog | 40. Memory & storage devices |
| 15. Computers, digital | 45. Packaged circuits |
| 20. Counters, continuous | 50. Printers |
| 22. Counters, mechanical | 55. Tape to card converter |
| 25. Counters, pre-set | 60. Tape recording & play back equipment |
| 30. Data reduction equipment | |

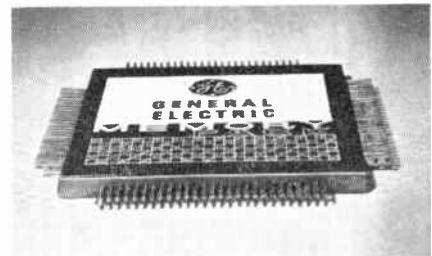
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Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, P.O. Box 125, Westboro 1, Mass., 30, 50
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Tel: FOrrest 6-4467

GUIDEPOSTS

to help you find your way around in the IRE DIRECTORY:
Pink section contains a complete description of each of the various parts of the DIRECTORY, plus a terminology index to all products listed, and a copy of the complete questionnaire form.
Machol Edge Indexes on pages 265, 365, and 597 guide you directly to the major product headings.

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Tel: PLeasant 4-6616



MEMORY PACKS

General Electric's *Memory Pack* is a completely encapsulated memory storage plane for computer systems. Built to withstand considerable shock and vibration and extreme variations in humidity, altitude and temperature, the enclosed construction of the Memory Pack allows it to be easily stacked into multiples of the basic number of bits. Tested packs are available in virtually any size, usually at no increase in cost over open planes. 227-21

GENERAL ELECTRIC

DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

For details, circle #212 on Reader Service Card

9. Computers & Counters.

Bowmar Instrument Corp., 8000 Bluffton Rd., P.O. Box 2835, Fort Wayne, Ind., 15, 20, 22, 25

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Tel: **SHERwood** 3121

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Canadian Research Institute, Canada, 10, 15, 35, 40

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Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 45

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Tel: **WOODruff** 2-9200

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Computer Control Co., Inc., 983 Concord St., Framingham, Mass., 15, 30, 40, 45

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Tel: **CEdAR** 5-6220

Computer Engineering Associates, Inc., Calif., 10

Computer Equipment Corp., Calif., 5, 30, 40

Computer Systems, Inc., N.Y., 10, 32

Computer-Measurements Co., Calif., 5, 25, 32, 50

Computing Devices of Canada, Ltd., Ont., 40

Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 5, 10, 15, 30, 45, 60

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Tel: **ALgonquin** 4-5106

Consolidated Avionics Corp., N.Y., 7, 30, 45

Consolidated Controls Corp., Conn., 5

Consolidated Electrodynamics Corp., Calif., 5, 30, 40, 60

Control Corp., Minn., 5, 30, 32

Control Data Corp., Minn., 15, 30

Control Devices, Inc., Mich., 22

Cook Electric Co., Ill., 60

Counting Instruments Ltd., England, 20, 22, 25, 50

Cubic Corp., Calif., 5, 10, 15, 30, 32

Cyclotron Specialties Co., Calif., 22

Datex, California, 5, 30, 32

Daystrom, Inc., Daystrom Systems Div., Calif., 5, 15, 30, 40

Daystrom, Inc., Weston Instruments Div., N.J., 15, 32

Delaware Products Co., N.J., 5

Deltime, Inc., N.Y., 35, 40

Denominator Co., N.Y., 22

Designers for Industry, Inc., Ohio, 5, 7, 30, 32, 40, 55

Devol Research Co., Conn., 5, 32, 40

Di/An Controls, Inc., Mass., 7, 15, 20, 25, 30, 35, 40, 45, 55, Shift Registers

Dian Labs., Inc., N.Y., 10

Digitac, Inc., Calif., 20, 22, 25

Digital Equip. Corp., Mass., 15, 25, 32, 45

Digitronics Corp., N.Y., 7, 15, 30, 45, 55

Donner Scientific Co., Calif., 10, 35

Dorsett Labs., Inc., Okla., 10

Dumont Airplane Marine Instruments, Inc., Pa., 40

DuMont Labs., Inc., Allen B. N.J., 15, 40

Durant Mfg. Co., Wis., 5, 20, 22, 25, 32

Dwyer Engineering Co., Inc., Airport Rd., Nashua, N.H., 45

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Tel: **TUXedo** 3-3206

Dychro Corp., Mass., 5

Dymec, Inc., Calif., 20, 25, 30

Dynamics Corp. of Am., Reeve Instrument Corp., N.Y., 10

Dynapar Corp., Ill., 20, 25, 40, 45

E H Research Labs., Inc., 1922 Park Blvd., Oakland 6, Calif., 20

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Tel: **GLencourt** 2-1314

E.M.I. Electronics Ltd., England, 5, 7, 10, 15, 30, 32, 40, 60

Eagle Signal Co., Ill., 25

Edison Industries, Thomas A., Instrument Div., 61 Lakeside Ave., W. Orange, N.J., 40, 45

See ad on page 345

Tel: **ORange** 3-6800

Ehrenpreis, Consulting Engrg., David, N.Y., 5, 7, 10, 15, 30, 40

Eldorado Electronics, Calif., 10, 20, 25

Electrical & Physical Instrument Corp., N.Y., 20

Electro Instruments, Inc., Calif., 5, 30, 32

Electro-Measurements, Inc., Oregon, 10

Electro-Mec Lab., Inc., 47-51 33rd St., Long Island City 1, N.Y., 5

See ad on page 529

Tel: **STillwell** 6-3402

Electro-Mechanical Research, Inc., Fla., 5

Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 25

See ad on page 321

Tel: **TEXas** 0-9193

Electrol, Inc., Calif., 10, 30, 32, 35, 40, 45, Diode Function Generator

Electromation Co., Calif., 60

Electronic Applications, Inc., Conn., 60

Electronic Associates, Inc., N.J., 10, 32

Electronic Communications, Inc., Fla., 5, 10

Electronic Computer Co., Pa., 5, 30

Electronic Engrg. Co. of Calif., Calif., 5, 7

Electronic Specialty Co., Calif., 5, 32

El-Tronics, Inc., Alvac Computer Div., Calif., 5, 7, 15, 30, 40, 60

Emerson Electric Mfg. Co., Mo., 5, 10, 15, 32

Emerson Radio & Phonograph Corp., Md., 10, 30, 60

Endevco Corp., Digitran Co. Div., Calif., 5, 20, 22

Engineered Electronics Co., Calif., 25, 45

Engineering Associates, Ohio, 20

Enesco, Inc., Utah, 10

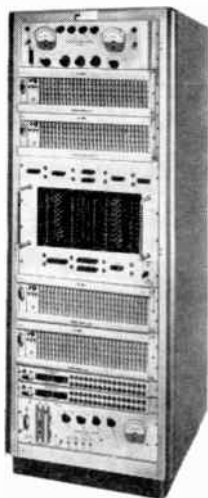
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Directory I. Complete Equipment

9. Computers & Counters.

Eric Resistor Corp., 644 W. 12th St., Erie 6, Pa., 20, 25, 45
See ad on pages 110-111
Tel: **GLendale 6-8592**

Etelco, Ltd., England, 7, 10, 20, 30, 35, 40

Evans, James, Conn., 30

Evershed & Vignoles Ltd., England, 10

Fairchild Camera & Instrument Corp., Defence Prods. Div., N.Y., 30, 40, 55

Farrand Controls, Inc., N.Y., 5, 10, 32

Ferranti Electric, Inc., Electronics Div., N.Y., 15, 40

Ferranti-Packard Electric Ltd., Canada, 10, 15, 40, 45, Tape Reader

Ferrara, Inc., Mich., 25

Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 40
See ads on pages 285, 361, 433, 467, 531, 617
Tel: **CHerry 6-2811**

Fischer & Porter Co., Pa., 5, 7, 20, 22, 30, 55

Ford Motor Co., Sub.-Aeronutronic Systems, Inc., Calif., 15, 40, 45

Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 20, 25
See ad on page 410
Tel: **EVERgreen 6-1300**

Friden, Inc., Calif., 7, 22, 30, 45

GPE Controls, Inc., Ill., 10, 15

G P S Instrument Co., Mass., 10, Specialized Data Types

Garrett Corp., Air Research Mfg. Div., Calif., 10

General Applied Science Labs., Inc., N.Y., 5, 30, 32, 45

General Automatics, Inc., Calif., 5

General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 40
See ad on page 618
Tel: **VALley 6-5100**

General Controls Co., Calif., 15, 20, 22, 25

General Electric Co., Apparatus Sales Div., N.Y., 5, 7, 10, 15

General Electric Co., Computer Dept., Ariz., 5, 10, 15, 30, 45

General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 10, 15, 20, 30, 40, 45
See ads on pages 283, 288, 445, 447, 505, 617
Tel: **GRanite 6-4411**

General Electric Co., Light Military Elect. Dept., N.Y., 10, 15, 40

General Electric Co., Specialty Electronic Components Dept., N.Y., 20, 45, Shift Registers

General Electric Co., Ltd., of England, England, 5, 10, 15

General Kinetics, Inc., Va., 60

General Mills, Inc., Mechanical Div., Minn., 10, 15

General Time Corp., 355 Lexington Ave., New York 17, N.Y., 20, 22, 25
See ad on page 470
Tel: **MURray Hill 7-9292**

Genesys Corporation, Calif., 5, 7, 15, 30, 32, 35, 40, 45, 50

Geotechnical Corp., Tex., 30

Gerber Scientific Instrument Co., Conn., 5, 10, 30

Gertsch Products, Inc., Calif., 32

Giannini Controls Corp., Calif., 5

Globe Electrical Mfg. Co., Calif., 45

Good Electronic Corp., Fla., 45

Gulton Industries, Inc., N.J., 5, 45

Gulton Industries, Inc., N.M., 45

Gurley Co., N.Y., 20

Gyrex Corp., Calif., 30, High Speed Units

HRB—Singer, Inc., Science Park, State College, Pa., 15, 30, 32
See ad on page 366
Tel: **ADams 7-7611**

Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 5, 7, 10, 15, 30, 32
See ad on page 204
Tel: **VAN Buren 6-6300**

Haloid Xerox, Inc., N.Y., 50

Hampshire Engrg. Co., Mass., 15, 32, 60

Hanson-Gorrill-Brian, Inc., N.Y., 5, 30

Harvey-Wells Elect., Mass., 15, 20, 30

Haydon Co., A. W., 240 N. Elm St., Waterbury 20, Conn., 20, 40
See ad on page 518
Tel: **PLaza 6-4481**

Haydon Instrument Co., Conn., 15, 20, 22, 25

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 10
See ad on page 328
Tel: **YUKon 3-3961**

Hermes Electronics Co., Dept. BD, 75 Cambridge Pkwy., Cambridge 42, Mass., 30, 40
See ad on page 452
Tel: **UNiversity 4-7200**

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 20, 30, 32, 50
See ad on pages 3-18
Tel: **DAvenport 5-4451**

Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 45
See ad on page 226
Tel: **UNiversity 9-9850**

Hogan Labs., Inc., N.Y., 50

Hoover Electronics Co., Md., 5, 32, 45

Hosmer & Co., E. A., Calif., 50

Huyck & Sons, F. C., Waldorf Electronics Div., N.Y., 5, 10, 15, 32

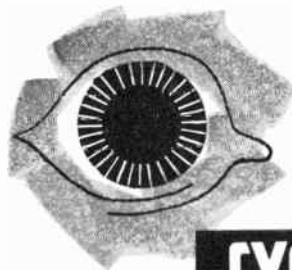
Hycon Eastern, Inc., See Hermes Electronics Co.

Hymac Corp., Calif., 22

I-L-S Instrument Corp., Ohio, 20, 25, Counters, Frequency

Imra Corporation, Mass., 40

Industrial Cont. Co., N.Y., 5, 10, 40, 45



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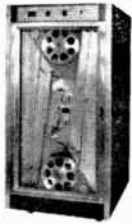
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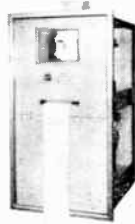
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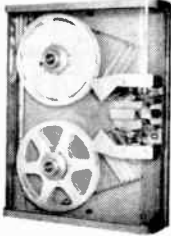


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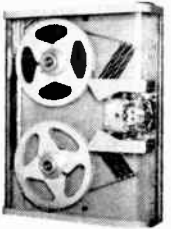


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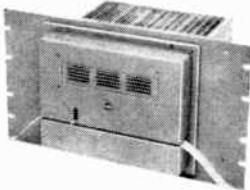
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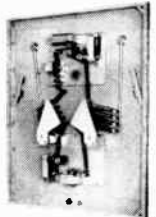
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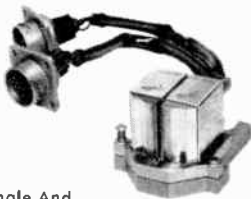
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Industrial Electronic Controls Co., N.Y., 20, 25

Industrial Electronic Engineers, Inc., 3973 Lankershim Blvd., North Hollywood, Calif., 5

See ads on pages 285, 484
Tel: TRiangle 7-0328

Industrial Timer Corp., N.J., Programmers

Industrial Winding Machinery Corp., P.O. Box 62, New York 5, N.Y., 22, 25

See ad on page 667
Tel: Whitehall 3-1754

Instant Circuits Div. of Alfred W. Barber Labs., N.Y., 45

Instron Engrg. Corp., Mass., 10

Instrument Development Laboratories, Inc., 67 Mechanic St., Attleboro, Mass., 5

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Tel: ATtleboro 1-3880

Insulated Circuits, Inc., N.J., 45
Intelligent Machines Research Corp., Va., 30

International Business Machines Corp., N.Y., 15

International Business Machines Corp., N.Y., 7, 15, 35, 40, 50, 55

I. T. & T. Corp., ITT Federal Div., N.J., 5, 10, 15

I.T. & T. Corp., Industrial Prods. Div., Calif., 5

Interstate Electronics Corp., Calif., 30
Itek Corp., Mass., 10, 15, 30, 40

Jodon, Inc., F. R., D.C., 32, 35, 40, 60
Jones-Porter Instrument Co., Inc., N.J., 5

Julie Research Labs., Inc., N.Y., 5, 10
Kaiser Industries, Kaiser Aircraft-Elect. Div., Ohio, 10

Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 5, 7, 10, 15, 20, 22, 30, 32

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Tel: GRegory 2-1000

Kellogg Switchboard & Supply Co., Ill., 5, 10

Kidde & Co., Inc., Walter, N.J., 10, 15
Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 10, 15, 22

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Tel: TWining 9-5600

Laboratory for Electronics, Inc., Mass., 15, 40

Land-Air, Inc., Instrument & Electronic Div., Calif., 30, 55

Landis & Gyr, Inc., N.Y., 15, 20, 25

Leeds & Northrup Co., Pa., 10

Leupold & Stevens Instruments, Inc., Ore., 5

Lewyt Mfg. Corporation, N.Y., 30

Librascope, Inc., Calif., 5, 7, 10, 15, 20, 22, 30, 32, 35, 40, 55

Link Aviation, Inc., N.Y., 5, 10, 15, 20, 30, 32

Litton Industries, Inc., Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., 15

See ad on pages 64-65
Tel: LYtell 1-8411

Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 15, 35

See ad on page 66
Tel: CRestview 4-7411

Directory I. Complete Equipment

9. Computers & Counters.

Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, P.O. Box 504, 962 W. El Camino Real, Sunnyvale, Calif., 5, 10, 15, 30, 32, 40, 50, 60

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Tel: REgent 9-4321

Lumatron Electronics, Inc., Dept. IR-60, 68 Urban Ave., Westbury, L.I., N.Y., 5

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Tel: EDgewood 4-3100

M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 20

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Tel: GRamercy 3-5899

Machinery Electrification, Inc., Mass., 25, 40

MacLaren & Co., F. B., N.Y., 10, 30, 32

MacLeod & Hanopol, Inc., Mass., 5

Magnasyn Mfg. Co., Ltd., Calif., 60

Magnovox Research Labs., Calif., 5, 15, 30, 40

Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 10

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Tel: CYpress 2-6610

Magnetics Research Co., 255 Grove St., White Plains, N.Y., 20, 30, 40, 45

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Tel: WHite Plains 9-9588

Maico Electronics, Inc., Minn., 5, 10, 15, 32, 40

Marquardt Aircraft Co., Pomona Div., Calif., 5, 10, 30, 32, 45

Martin Co., Baltimore Div., Md., 5, 7, 10, 15, 20, 30, 32, 40, 45, 55

Mayberry Electronics Co., Calif., 10, 45

Measurement Engrg., Ltd., Canada, 25
Medical-Electronics Development Co., N.Y., 30

Mid-Century Instrumatic Corp., N.Y., 10

Midwestern Instruments, Inc., Okla., 40, 60

Milgo Electronic Corp., Fla., 5, 10, 30, 32, 45

Miljan, Inc., Omohundro Co., P., Calif., Rate of Change Computer

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 22

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Tel: DAVenport 4-4108

Milman Engineering Co., Calif., Digital Readout

Minneapolis Honeywell Regulator Co., Md., 7, 30, 60

Minneapolis Honeywell Regulator Co., Aeronautical Div., Minn., 5, 10, 15, 32

Minneapolis Honeywell Regulator Co., Boston Div., Mass., 30

Minneapolis Honeywell Regulator Co., Brown Instrument Div., Pa., 5, 15, 20, 22, 30, 35, 40, 45, 60

Minneapolis Honeywell Regulator Co., Datamatic Div., Mass., 15

Minnesota Mining & Mfg. Co., Minn., 60

Missouri Research Labs., Inc., Mo., 30

Monroe Calcul. Mach. Co., Inc., Electr. Components Div., Calif., 7, 22, 50, 55

Montek Associates, Inc., Utah, 20, 30

Moseley Co., F. L., Calif., 5, 7, 30, 55

Motorola, Inc., Ariz., 10

Naniloa Corp., Ohio, 5, 30, 32

National Cash Register Co., Electronics Div., Calif., 15, 30, 40, 50, 55

Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 15, 25, 30, 32, 40, 45

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Tel: HOward 5-7700

New London Instrument Co., Conn., 10, 15

Non-Linear Systems, Inc., Del Mar Airport, Del Mar, San Diego, Calif., 5, 30

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Tel: SKYline 5-1134

North American Aviation, Inc., Auto-netics Div., Calif., 10, 15

North Atlantic Industries, Inc., 603 Main St., Westbury, L.I., N.Y., 5, Servo

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Tel: EDgewood 4-1122

North Electric Co., Ohio, 5, 15, 20, 22, 25, 30, 40, 45

Northam Electronics Inc., Calif., 30

Northeastern Engineering, Inc., 25 S. Bedford St., P.O. Box 150, Manchester, N.H., 5, 20, 25, 32, 50, Frequency Counters

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Tel: NAtional 2-6485

Northern Electronic Vacuum Indust., P.Q., Canada, 10, 35

Northrop Corp., Nortronics Div., Calif., 5, 10, 15, 20, 30, 32, 35, 40

Nortronics Co., Inc., Minn., 60

Norwood Controls Unit, Detroit Controls Div., Mass., 5

Nuclear-Chicago Corp., Ill., 50

Oltronix Inc., Ga., 30

Omega Instrument Co., Calif., 10

Orbitran Co., Inc., Calif., 5

Otis Elevator Co., Electronics Div., N.Y., 10

Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 5, 15, 32, 40, 45, 50

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Tel: BRadshaw 2-6141

Pan-Air Electronics Corp., Calif., 45

Panellite, Inc., Ill., 5, 30

Patterson Moos, Div. of Universal Winding Co., N.Y., 5, 10, 15, 20, 22, 25, 30

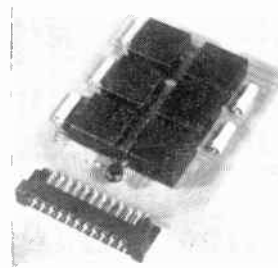
Pennsylvania Testing Lab., Inc., Pa., 10

Philbrick Researches, Inc., George A., Mass., 10

Philco Corp., Govt. & Indl. Div., Pa., 5, 7, 10, 15, 20, 25, 30, 32, 40, 50, 55

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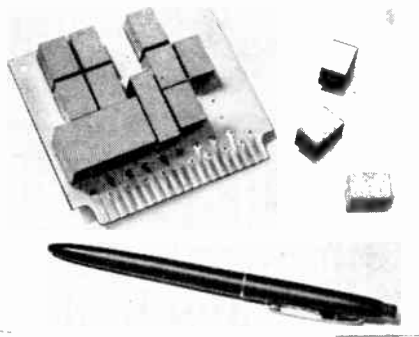
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Photocon Research Products, Calif., 22
Plastics & Electronics Corp., N.Y., 45
Potter Aeronautical Corp., N.J., 5, 20, 25, 32
Potter Instrument Co., Inc., Sunnyside Blvd., Plainview, L.I., N.Y., 15, 25, 30, 40, 50, 60

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Tel: OVerbrook 1-3200

Precision Instrument Co., Calif., 60
Presin Co., Calif., 20, 22, 25, 50
Printloid, Inc., N.Y., 50
Racal Engrg., Ltd., England, 5, 25, 50
Radiation, Inc., Fla., 5, 30, 32, 50
Radiation Instrument Dev. Lab., Inc., Ill., 5

Radio Corp. of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 40

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Tel: RAndolph 5-4500

Rank Cintel Ltd., England, 20, 25, 45
Ranson Research, Calif., 5, 15, 20, 25, 30, 32, 40, 45
Raymond Engrg. Lab., Inc., Conn., 60
Raytheon Co., Mass., 5, 10, 40
Raytheon Co., Semiconductor Div., Mass., 45

Redford Corp., N.Y., 20, 25
Reeves Instrument Corp., N.Y., 5, 10, 32
Reflectone Corp., Conn., 10

Remington Rand, Univac, Sperry Rand Div., N.Y., 7, 15, 50, 55

Rese Engrg., Inc., Pa., 7, 40, 45
Rixon Electronics, Inc., 2414 Reddie Dr., Silver Spring, Md., 40

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Tel: LOkwood 5-4578

Ross Metals Co., Milton, Pa., 45
Rotary Devices Corp., N.J., 5, 40
Royal McBee Corp., N.Y., 15
Ryan Aeronautical Co., Ryan Electronics Div., Calif., 5, 10
Scantlin Electronics, Inc., Calif., 15, 45
Sciaky Bros., Inc., Ill., 25
Sensory, Inc., N.J., 20, 25

Servo Corp. of America, N.Y., 35
Servomechanisms, Inc., Calif., 10, 15, 40
Servonics, Inc., Va., 5, 10

Shamban & Co., W. S., Calif., 45
Shepard Labs., Inc., N.J., 50, 60, Variable Speed-Servo Controlled

Sierra Research Corp., N.Y., 5, 32
Skiatron Elect-Television Corp., N.Y., 5, 10, 15, 30, 32

Solartron Electronic Group, Ltd., England, 5, 10, 30, 60

Solartron, Inc., Calif., 5, 10, 40
Soroban Engineering, Inc., Fla., 15, 30, 40, 50, Perforators

Southwestern Industrial Electronics Co., 10201 Westheimer Rd., P.O. Box 22187, Houston 27, Texas, 5, 10, 30, 60

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Tel: HO 5-3471

Specialties, Inc., N.Y., 30
Specialty Engrn. & Electr. Co., N.Y., 5, 20, 32, 45

Speer Carbon Co., Jeffers Electronics Div., Pa., 45

Spellman High Voltage Co., 3029 Webster Ave., New York 67, N.Y., 5, 15, 20, 25, 30, 32

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Tel: KIngsbridge 7-0306

Spencer Mfg. Co., Ill., 20, 25
Sperry Gyroscope Co., Calif., 10
Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 10, 15, 30, 32, 35, 45

Sperry Rand Corp., Ford Instrument Co. Div., N.Y., 5, 10, 15, 32
Sperry Rand Corp., Remington Rand Univac Div., N.Y., 7, 15, 30, 35, 40, 50, 55

Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 10, 15, 20, 30

Sperry Rand Corp., Sperry Gyroscope Co., Div., N.Y., 10, 15, 30

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Stancil-Hoffman Corp., Calif., 40, 60

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Standard Telephones & Cables, Ltd., England, 15, 30, 35, 40

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Stereatronics, Inc., Mass., 20, 45, Shift Registers

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 10, 20, 22, 35, 45

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Tel: POrt Washington 7-7200

Stevens Mfg. Co., Inc., George, Pulaski Rd. at Peterson, Chicago 30, Ill., 22

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Tel: JUniper 8-1300

Stewart-Warner Electronics, Ill., 15
Strand Engineering Co., Mich., 15, 32

Stromberg-Carlson-San Diego, Calif., 32, 45, 50, Printers

Sturup, Inc., Conn., 40
Summers Gyroscope Co., Calif., 10

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Sunshine Scientific Instrument, Pa., 20, 45

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Sylvania Electric Products, Inc., Sylvania Electronic Systems Div., Mass., 10

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Systems, Inc., Fla., 32

Systems Laboratories Corp., 14852 Ventura Blvd., Sherman Oaks, Calif., 32

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Tel: STate 9-0501

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Tally Register Corp., Wash., 30, Digital N-Y Plotter

Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 40

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Tel: WIndsor 4-2221

Technical Measurement Corp., Conn., 5, 15, 20, 25, 32, 40, 45

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Techniques, Inc., N.J., 5

Telechrome Mfg. Corp., N.Y., 5, 10, 15, 32, 50

Telecomputing Corp., Data Instruments Div., Calif., 5, 20, 22, 25, 30, 55, 60

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 Telectrosonic Corp., N.Y., 60
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 Temco Aircraft Corp., Electronics Div., Texas, 5, 10, 15
 Temperature Engineering Corp., N.J., 40, 50
 Ten Bosch, Inc., M., N.Y., Electronic Rotor Balancer, Mechanical & Electro Mechanical Computer Components, Computer, Air Data
Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 10, 15
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Tel: FLeetwood 7-5411
 Texas Instruments, Incorporated, Houston, Tex., 5, 10, 15, 30, 40
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Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 25
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Tel: ENdicott 1-6200
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Consoles, studio: See class 32

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Couplings: See class 80

Crystal testers: See class 12

Cutting heads & styli: See class 63

Data recorders: See class 34

Data storage mechanisms:
See class 34

Decades: See class 5

Delay lines: See class 48

Detectors, radiation: See class 22

Diode testers: See class 12

Disk recorders: See class 27

Disks, blank: See class 63

Distortion analyzers: See class 3

Dosimeters: See class 22

Embossing recorders: See class 27

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5. Despatching equipment
 10. Walkie-talkies equipment

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 Aeronautical Electronics, Inc., N.C., 5
Alden Electronic & Impulse Recording Equipment Co., Inc., P.O. Box 125, Alden Research Center, Westboro 1, Mass., 5
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Tel: FOrrest 6-4467

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 Audio-Video Corp., N.Y., 5, 10
 Bendix Aviation Corp., Ind., 5, 10
 Bendix Aviation Corp., Bendix Radio Div., Md., 10
 Bendix Aviation Corp., Mich., 10
 Bendix Radio, Indust. Commun. & Electronic Prods., Md., 5, 10
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 Cleveland Electron., Inc., Ohio, 10
 Communications, Co., Fla., 5
 Creative Electronics Corp., Conn., 10
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 Dynamic Electronics-New York, Inc., N.Y., 5

EMI—Cossor Electronics Ltd., 301 Windsor St., Woodside, Halifax, N.S., Canada, 10
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Tel: HALifax 6-7491

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 Electronic Engrg. Co., Md., 5, 10
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 Madigan Corp., N.Y., 5, 10
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 10
 Morrow Radio Mfg. Co., Ore., 10
 Motorola, Communications & Electronics, Inc., Ill., 5, 10
 Muirhead Instruments, Inc., N.Y., 5, 10
 Philco Corp., Govt. & Indl. Div., Pa., 5, 10
 Port-O-Vox Corp., N.Y., 10
 Production Research Corp., N.Y., 10
 Pye Telecommunications, Ltd., England, 10

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"ELECTRICITY IS THE INK"

ALFAX PAPER AND ALDEN ADJUSTERLESS RECORDING TECHNIQUES MAKE POSSIBLE—

• New Accuracies and Resolution in Direct Graphic Recording!

Record full range of your electronic signal outputs—monitor processes and operations directly and instantaneously on Alfax Paper—no pens or ink—up to 17 step permanent tone shades.



Magazine Fact Finder—2 Channels Plus Timing

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Record thirty channels of on-off data by merely supplying current to writing stylus—no pens or inks—simple motion switches are easily installed to make or break writing current to Alfax Paper. Ideal for monitoring production operations and processes, this compact, rugged recorder is portable for lab, factory and field use.



Alden "Flying Spot" Component Recorders

Get hi-resolution tone shade recordings on Alfax Paper of detecting instruments using scanning or sweep methods to collect data. Synchronize Alden "Flying Spot" with sweep or rep rate of your equipment—use direct signal outputs to mark Alfax with tone shades proportional to signal variations. Ideal for sonar, radar, facsimile, ultrasonic and magnetic field detection etc.



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New high and low speed Alden facsimile recording systems using Alfax Paper are the most accurate means of communication today—are simple to install and operate virtually unattended.



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Specially designed to permit selection of pertinent data from any copy—letters, dispatches, reports, etc.—for instant transmission to wherever needed—yet complete reproductions can also be sent. 72 square inches of copy, 1800 words of newspaper type, or 900 words of typewriter text can be transmitted and received per minute.



Continuous Reproduction Facsimile System

Extremely high quality reproduction of large copy: such as newspapers, weather maps, blueprints, finished advertising layout, drawings, photographs, etc., can be transmitted easily with this equipment. Copy is scanned flat and reproduction automatically on remote continuous recorder.



Alden Giant Bulletin System

Fastest, accurate means of disseminating information to large groups of people. Automatically provides changing "up to the minute" bulletins 4 feet wide and up to 10 feet high and as much as 12 square feet of copy per minute, enlarged 10 times from remote flat-copy scanner as sent either by wire or a microwave system.

WRITE FOR LITERATURE on Alfax or Alden Recorders to:

ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT CO.

Alden Research Center, Westboro, Mass.

For details, circle #220 on Reader Service Card

290

Headquarters for HIGH POTENTIAL Testing

INSULATION BREAKDOWN DIELECTRIC STRENGTH

Every over-potential test need from the generator to the appliance motor... is met by a HYPOT*



150 KV Testing Mobile HYPOT*

Non destructive testing of power cables, generators, and insulators with AC or DC test potentials to 150 KV. New DC Mobile HYPOT* is easier to handle, cuts costs. Write for bulletin "Mobile HYPOT"

Model 5500

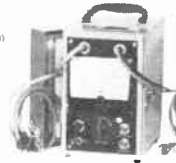
Typical Mobile HYPOT* provides 0 to 120 kv d.c. at 5 ma. More compact and easier to use than equivalent a-c test sets. Lower in cost, too.

30 KV Testing Bench HYPOT*

Models available with AC or DC test potentials from 5 to 30 KV. Widely used for insulation testing of cables, distribution equipment and heavy duty motors.

10 KV Testing Portable HYPOT Jr.*

The advanced over-potential tester that enables anyone to make high potential breakdown tests. Separate lights indicate excess leakage current and insulation breakdown. Available with test voltages from 1500 v a-c to 10000 v a-c.

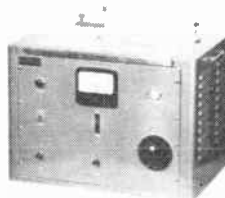


Model 412

INSULATION Materials Tester

Model 4501

Materials Tester



New materials testing AC HYPOT* meets ASTM dielectric strength test requirements. Features automatic rate of test voltage rise, transparent test cage that is safety interlocked and complete line of plug-in materials testing fixtures. Write for new bulletin... "HYPOT" Insulation Tester

VIBROTEST® measures FIVE MILLION Megs

Direct reading a.c. operated megohmmeter for resistance measurement to five million megohms. Drift free, stable and accurate on all ranges.

VIBROTEST® Model 2570 has six megohm ranges: 1 50, 10, 500, 100-5000, 1,000 50,000, 10,000 500,000 and 100,000 5,000,000 mngohms. Write for bulletin.



Write for Bulletins 10-35.16

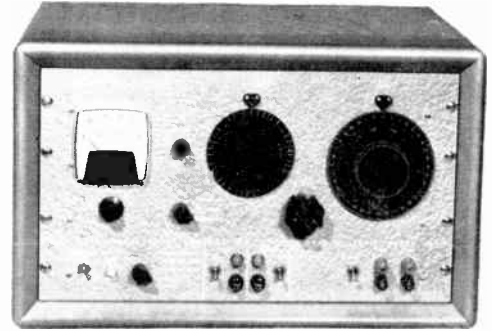
ASSOCIATED RESEARCH, Incorporated

"Electrical Testing Instruments Since 1936"

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THE AETNA SERVO ANALYZER



APPLICATIONS

Aetna's LOW COST Servo Analyzer can be used to measure amplitude response, phase response, open or closed loop transfer functions, transient response, computer response etc. It is particularly useful in evaluating AC and DC servo systems.

TECHNICAL DATA

FREQUENCY RANGE

Model 100-A

0.25 to 100 cycles per second

Model 100-B

0.0008 to 100 cycles per second

Frequency stability 1.0%

OUTPUT WAVE FORMS

Sine wave 20 volts peak to peak

Modulated sine wave 30 volts

Square wave 20 volts peak to peak

Synchronized sweep over the entire frequency range

Cathode follower output system with a 100 to 1 attenuator

PHASE MEASUREMENT

Zero to ± 180 degrees

INPUT CARRIER

50 to 5000 cycles per second, 115 volts

POWER REQUIRED

150 watts, 117 volts, 60 cycles

RACK MOUNTING

19" wide x 10 1/2" high x 14" deep

CABINET MOUNTING

21 1/2" wide x 13" high x 14 3/4" deep

NET WEIGHT

65 pounds

AETNA

ELECTRONIC CORPORATION

Readington Road, North Branch, New Jersey

RANDOLPH 5-1000

For details, circle #222 on Reader Service Card

1960 IRE Directory

Directory I. Complete Equipment

10. Emergency Communications Equipment.

Radio Corp. of America, Defense Elec. Prod., N.J., 10
 Raytheon Co., Mass., 10
 Republic Electronic Indust. Corp., N.Y., 10
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Environmental test chambers:
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Equalizers: See class 49

FM/FM modulators: See class 34

11. Facsimile Equipment.

- | | |
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| 5. Receiving equipment | 15. Transmitting equipment |
| 10. Sensitized paper | |

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 Alden Electronic & Impulse Recording Equipment Co., Inc., P.O. Box 125, Alden Research Center, Westboro 1, Mass., 5, 10, 15
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 Tel: FOrEst 6-4467
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 Designers for Industry, Inc., Ohio, 5, 15
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 Hogan Labs., Inc., N.Y., 5, 10, 15
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 Interstate Electronics Corp., Calif., 5, 15
 L & O Research & Development Corp., Pa., 5, 15
 Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10, 15
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 Tel: CRestview 4-7411
 Metox, France, 5, 15
 Muirhead & Co., Ltd., England, 5, 10, 15
 Philco Corp., Govt. & Indl. Div., Pa., 5, 15
 Siemens & Halske, A. G., Germany, 15
 Skiatron Elect. & Television Corp., N.Y., 15
 Stewart-Warner Electronics, Ill., 5, 10, 15
 Stromberg-Carlson-San Diego, Calif., 5
 Sunshine Scientific Instrument, Pa., 10
 Technitrol Engineering Co., Pa., 5, 15
 Telectro Industries Corp., N.Y., 5, 15
 Times Facsimile Corp., 540 West 58th St., New York 19, N.Y., 5, 10, 15
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Filters: See class 50

Frequency meters: See class 56

Frequency meters, microwave:
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Frequency shift converters & keyers: See class 33

Frequency standards: See class 31

GCA equipment: See class 1

Galvanometers: See class 56

Galvanometers, recording:
 See class 13

Gears: See class 28

12. General Test Equipment.

- | | |
|---------------------------------|----------------------------|
| 5. Calibrators, instrument | 67. Pressure gages |
| 10. Capacitor testers | 70. Pyrometers |
| 12. Circuit testers | 72. Racks—aging |
| 15. Crystal testers | 73. Resistor testers |
| 20. Detectors—flaw | 74. Shielded enclosures |
| 22. Digital voltmeters | 76. Spectrometers |
| 25. Diode testers | 78. Stroboscopes |
| 30. Dynamometers | 80. Transistor testers |
| 35. Electrometers | 82. Ultrasonic generators |
| 37. Environmental test chambers | 84. Ultrasonic testers |
| 40. Galvanometers | 85. Vacuum gages |
| 45. Insulation testers | 86. Vacuum tube testers |
| 50. Mass spectrometer | 88. Vacuum tube voltmeters |
| 55. Multi-testers | 90. Vibration analyzers |
| 60. Null indicators | |
| 65. Ohm & megohm meters | |

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 Acoustica Associates, Inc., Dept. IRE, Fairchild Court, Plainview, N.Y., 82
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 Tel: OVerbrook 1-2100
 Acton Laboratories, Inc., 536 Main Street, Acton, Mass., 88
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 Tel: COLonial 3-7756
 Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 60
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Acton Laboratories, Inc.

LABORATORY INSTRUMENTS OF EXCEPTIONAL PRECISION

VOLTAGE MEASUREMENT



TYPE 810-A VTVM — Balanced circuits and liberal inverse feedback to insure long-time stability and accuracy. 7 full scale DC ranges: 1-1000 volts; 6 AC ranges; 1-300 V (rms); 7 resistance ranges 0.2 to 500 with multipliers of x1-x1 meg. DC accuracy $\pm 2\%$; AC accuracy $\pm 3\%$. Frequency response ± 1 db, 10 cps to 700 mc. 100 meg input impedance for DC measurement. High input impedance to 700 mc maintained by 1.2 mmf input capacitance of AC probe.

TYPE 815-A VTVM — Has wide ranges. 9 full scale DC ranges; 0.1-1,000 volts; 8 AC ranges: 0.1-300 volts (rms); 9 DC current ranges: 0.001 ua to 100 ma; 9 resistance ranges: 0.2 to 500 with multipliers x0.1 to x10 meg. DC accuracy $\pm 2\%$, AC $\pm 3\%$, both 1 V range and higher. Frequency response 15 cps to 100 MC. DC input impedance 100 meg; AC 5 mmf and 10 meg. Also available as 815-AR (rack mount — gray panel).



IMPEDANCE MEASUREMENT



TYPE 310-B Z-ANGLE[®] METER — Measures in polar form the impedance, phase angle, dissipation factor, and storage coefficient of any RLC combination. One balancing control permits accurate analyses to be made more quickly and easily than with conventional AC bridges. Measures impedances from 0.5 to 100 k. Frequency range: 30 cps to 40 kc. Accuracy of impedance magnitude is $\pm 1\%$ to 20 kc and ± 2 degrees for phase angle. Unit has internal 400 cps and 60 cps signals.

TYPE 314-A LOW-IMPEDANCE Z-ANGLE[®] METER — Measures low values of complex impedances in polar form. Direct readings of impedance in ohms, phase angle in degrees, and dissipation factor. Freq. range of 30-1000 cps, impedance-magnitude range of 0.005-1000 ohms accurate to $\pm 1\%$, and dissipation-factor range of 0 to infinity. Phase angles measured from -90° to 0° to $+90^\circ$, with accuracy of $\pm 1^\circ$. 4-terminal arrangement nullifies effect of lead impedance and insures accurate measurements. Also available as 314-AR (rack mount).



PHASE MEASUREMENT AND GENERATION



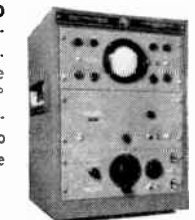
TYPE 320-AB PHASE METER — Measures phase difference between 2 signals (1 cps to 100 kc) of any wave shape and indicates phase angle on large meter with separate ranges of 360° , 180° , 90° , and 36° . Accuracy is $\pm 1\%$ of full scale + 3 degrees). Requires no adjustments, corrections, or balancing operations. Amplitude range is .7 to 120 volts rms. Input impedance of 10 meg and 13 mmf. Also available as 320-ABR (rack mount).

TYPE 709-A BROADBAND SECONDARY PHASE STANDARD — Calibrates phase measuring instruments and measures phase when used with oscilloscope. Develops 2 sinusoidal signals variable from 0° to 360° with respect to each other. Range is 20 cps to 20 kc. Accuracy of $\pm 1^\circ$ from 20 cps to 10 kc. High input impedance, low output impedance. Inherent distortion less than 1%. 0.5 to 5-volt output varies less than $\pm 2\%$ with phase shift. Also available as 709-AR (rack mount).



TYPE 328-A TRANSISTORIZED PHASE METER — Frequency range 10 cps to 50 kc. Direct reading from 0 to 360° in 6 ranges of 60° each on large 5" meter scale. Absolute accuracy of 1° from 10 cps to 10 kc. Amplitude range .25 to 170 volts peak except at low frequencies. Input impedance: one megohm shunted by 20 mmf. Internal output impedance is approx. 100,000 ohms. Recorder connector provided. Power: 105-125 volts, 60 cycle AC, 20 watts. Terminals provided for operating from an external 45 volt battery, 50 mil drain. Also available as 328-AR (rack mount).

TYPE 7000-B AUDIO PRIMARY PHASE STANDARD — Calibrates phase detectors and phase shifting devices but can also be used to measure phase shift. Supplies 2 sinusoidal signals of same frequency whose phase relationship is continuously variable from 0° to 360° with $\pm 0.05^\circ$ accuracy, set by Lissajous pattern. Any single frequency available from 30 cps to 20 kc. Output of 1 to 10 volts rms from impedance of approximately 200 ohms.



TYPE 706-A ULTRA-SONIC PRIMARY PHASE STANDARD — Calibrates high frequency phase meters, phase detectors, and phase-shifting devices. Generates 2 sine-wave signals having variable phase difference 0° to 360° at any specified single frequency 20 to 200 kc. Phase angle accuracy of ± 0.1 degree set by observation of multiple frequency Lissajous pattern on built-in scope. Also available as 706-AR.

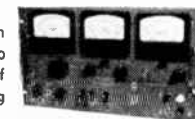
TYPE 511-A POWER AMPLIFIER — Low distortion, low noise and phase shift compensated amplifier for 50 cps to 50 kc range. Output load characteristics: 5 ohms 12.8 watts, 25 ohms 13 watts, 200 ohms 15 watts, 1200 ohms 12 watts, down 1 db at 50 kc. Phase compensation permits application as drive source for Type 7000-B. Also available as 511-AR (rack mount).

TRANSMISSION AND DELAY MEASURING SETS



Measures the absolute amplitude and relative delay characteristics of 600 ohm transmission circuits in the frequency range from 200 cycles to 24 kc. The instrument consists of two basic units: the 451-A Transmitter and the 452-A Receiver.

The instruments will operate 32°F to 130°F and with normal 60 cycle line voltages ranging from 105 to 125 volts. It has an overall precision and accuracy of ± 50 microseconds and a drift rate not exceeding ± 50 microseconds per 30 minutes.



POTENTIOMETER TESTING EQUIPMENT

TYPE 394-A PONOGOMETER[®] STANDARD — Measures equivalent noise resistance (ENR) of single or multi-turn precision potentiometers. Provides for establishing threshold level of ENR from 10-2000 ohms. ENR's above threshold level established produce both visual and audio indication. 100 kc frequency response flat to 50 kc. Accuracy is $\pm 3\%$ of threshold value + 3 ohms). Recovery time is 1.5 seconds maximum. Also available as 394-AR (rack mount). Ideal for incoming inspection or laboratory analysis.

TYPE 395-C PONOGOMETER[®] STANDARD — Calibrates Ponogometer[®]. Accuracy 1%. Also available as 395-CR (rack mount).

TYPE 396-B PONOGOMETER[®] ATTENUATOR — Extends range of threshold resistance of Ponogometer[®]. Permits direct measurement of ENR's from 10 ohms to 100 k. Frequency response is ± 3 db from 12 cps to 1.5 mc. Available as 396-BR (rack mount).

RESEARCH AND DEVELOPMENT

Acton Laboratories, Inc., also has complete facilities and experienced engineering staff to provide specialized research in and development of electronic components and instruments.

DUAL SPEED DRIVES, Types DSD-1 or DSD-2, are manually operated speed reducers for high or medium velocity ratios. Features — spring loaded gears and bearings, aluminum dials (3" or 5" diameter available), complete

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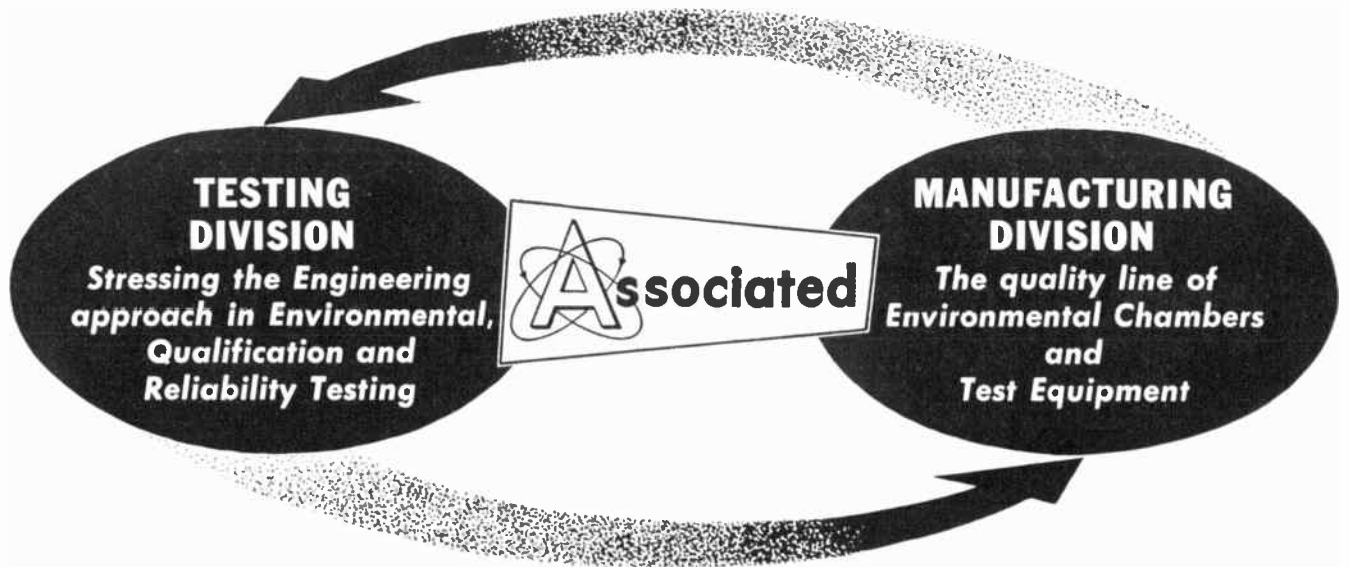
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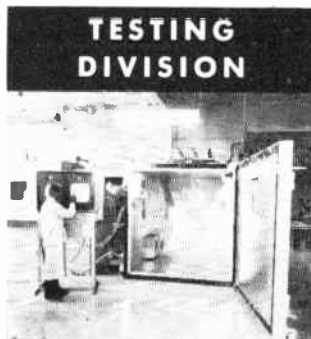
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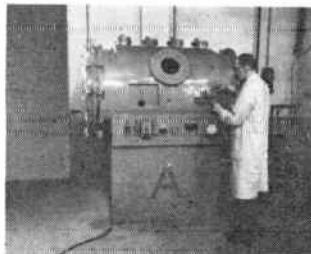
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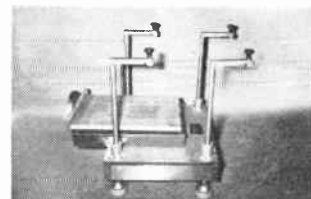


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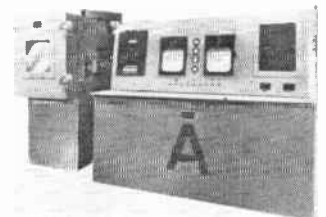


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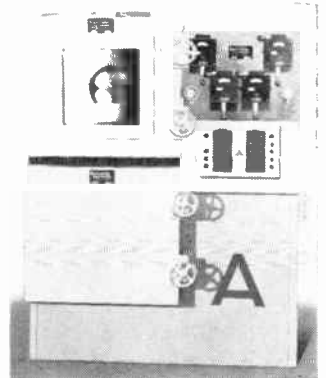
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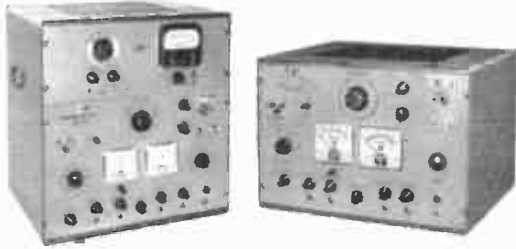


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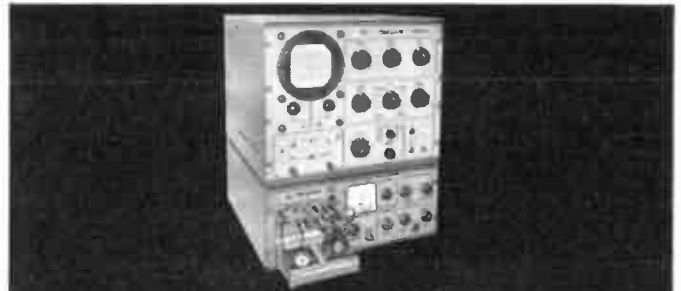
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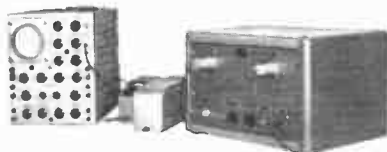
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| 130 | Pulse Generator | Fast general purpose pulse circuitry. Pulse widths 100 millimicroseconds to 1 second. Rise time < 10 millimicroseconds. Pulse amplitude: 50 volts. | 203 series | Constant Impedance Micromicroammeter | Constant impedance instrument for automatically measuring very low currents. Measures transistor I_{co} , diode back current, capacitor leakage current. Fast response time, even with large overloads. Provisions for remote control. |
| 140 | Transistor Rise, Storage, and Fall Time Meter | Semi-automatic measurement of rise, storage and fall time of NPN and PNP transistors. 10 millimicroseconds to 10 microseconds full scale, each channel. Readout time: less than 50 milliseconds. Linearity: $\pm 7\%$, ± 5 millimicroseconds. | 213 | Microvoltmeter | Measures potentials below 1 microvolt. Response time < 50 milliseconds. Chopper stabilized; ultra-low drift. Accuracy: 3% of full scale. |
| 161 | Binary | 50 Mc scale of 2 unit. Element for fast pulse systems. Extends ranges of present cycle counters. | 215 series | Multimeter • Millivoltmeter • Micromicroammeter • Megmegohmmeter • Current Integrator | Basically a very stable millivoltmeter, the E H 215 series offers easy conversion to micromicroammeter, megmegohmmeter, and current integrator. As millivoltmeter, range is 10 millivolts to 10 volts full scale with fast response. Measures current to $< 10^{-11}$ ampere. Measures resistance to $> 10^{16}$ ohms. Measures integrated current $< 10^{-13}$ coulomb. |
| 301B | Analytical Balance | Automatic analytical balance. Measurement time: 1 second. Accuracy: 0.2%. Range: 1 milligram to 200 grams. | 401 | Microwave Signal Generator | Precision microwave signal generator for frequencies from 500 to 11,000 megacycles. Readout to 7 significant figures. 1 watt power output, 1 to 11 kMc. Extremely stable 1 part in 10^7 short term. |

| E H Model Number | Item | Description |
|------------------|-------------------|--|
| ZT | Pulse Transformer | Impedance matching pulse transformer for pulse inversion or straight reproduction. Features 0.5 millimicrosecond rise time. For various impedances and connector matching. Extremely compact small size. |



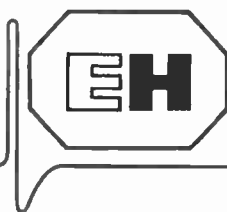
Model 120B



Model 201C

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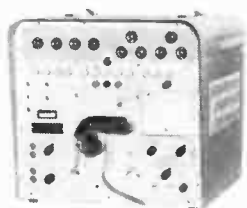
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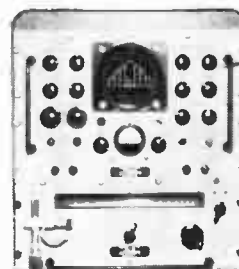
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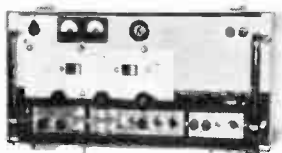
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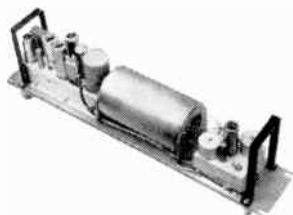
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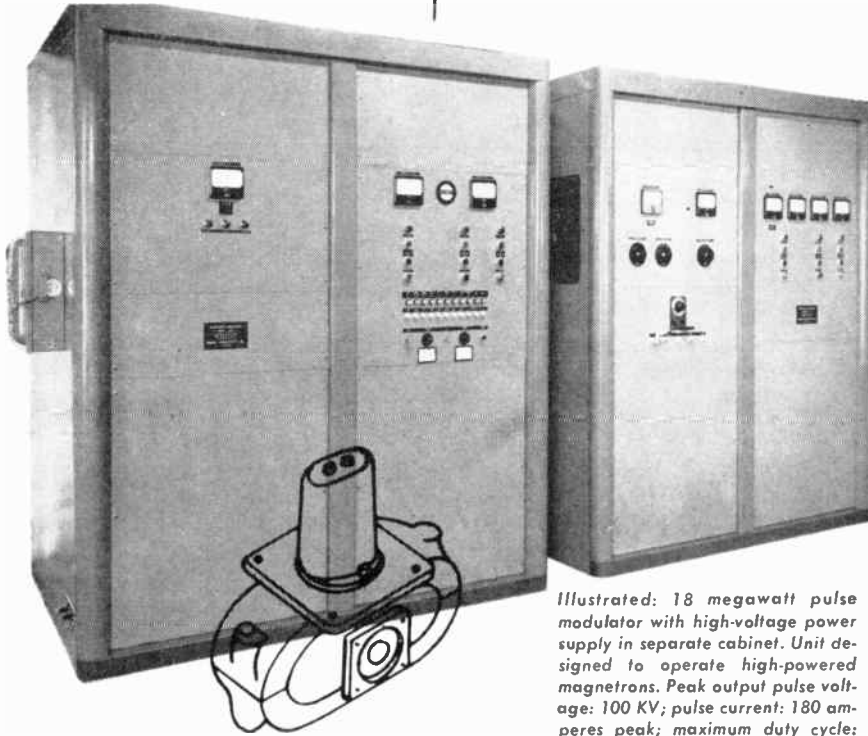


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MODEL 107A is a versatile, condenser discharge magnetizer for most medium size magnets of either simple or complex pole configuration. It provides ranges of 12,000 and 24,000 ampere-turns and is capable of saturating most instrument magnets, including the core type mechanisms, using the standard flat bar, adapters or wire-wound fixtures. Can be used for continuous duty production magnetizing; average charging cycle is under 5 sec. Weight is 75 lbs. Size 12 x 7 x 17. Operates from 115-volt, 60-cycle line. Price \$530.

MODEL 1500 is designed for production, research and instrument repair work. It will magnetize the new cobalt platinum and barium ferrite materials as well as all the Alnicos. It will saturate large switch-board meter assemblies and all panel type instruments and uses most existing adapters designed for the Model 107A. Wire-wound fixtures are plugged into the front panel through a safety interlock system providing maximum operator protection. Operates from 115-volt, 60-cycle line. Size 11 x 20 x 15; weight 125 lbs. Price \$945.



MODEL 942 will saturate Alnico magnets weighing up to 34 lbs. and high flux ceramic magnets of any shape or pole configuration. Operates on condenser discharge principle from regular 115-volt, 60-cycle line. Produces charging outputs (depending on number of 100 μ f condensers employed) from 100,000 to 200,000 ampere-turns through plug-in transformers, up to 3600 watt-seconds using wire-wound fixtures. Adapters for multi-pole rotors, rod, bar, ring and various other shapes available. Equipped with extensive system of safety interlocks for complete operator protection. Designed for continuous production use with low power consumption. Price of basic unit is less than \$2100.

MODEL 889A de-magnetizes saturated magnets to any desired level of flux. Provides a precision method for rapidly treating permanent magnets, including the new core type instrument mechanisms. Used with Model 206A Booster or Model 107A Charger. Price \$247.



MODEL 1295A is a stable, all transistorized Gaussmeter which measures magnetic fields to $\pm 3\%$ accuracy over 9 full-scale ranges: 0-100, 200, 500, 1K, 2K, 5K, 10K, 20K, and 20K+ gauss, using a single probe. A 1000-gauss, $\pm 1/4\%$ reference magnet is also supplied. Operates from 115-volt, 50-400 cps line, or 5 mercury cells (not supplied). Price complete \$420.

For ELECTRICAL INSTRUMENT CALIBRATION

A Model for Every Purpose and Price Range



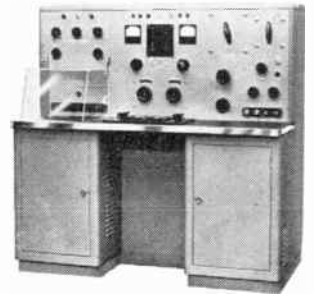
MODEL 829 checks AC and DC meters of all types and ranges. Compact cabinet contains power supply, special Weston standard meters, Wheatstone Bridge and all circuits for quick, convenient instrument calibration to 0.5% accuracy by non-technical personnel. Automatic protection for both operator and instrument under test is provided by interlocks and high voltage discharge circuits. Net price \$2650.

DUAL POTENTIOMETER DC STANDARD

MODEL 262B Dual Potentiometer Standards for calibrating meters to 0.1% through a range of 1 millivolt to 1500 volts and 1 microampere to 150 amperes. Uses L & N Brooks Mod. 7 pot. and Weston Mod. 5 standard cells. Voltage and current ranges are separate for the calibration of wattmeters. Operates on 105/125 volts, 50/1600 cycles, 350 watts, with internal voltage regulator. Operator is protected by interlocks. Price \$15,600.

Also available are MODELS 261B and 454 Standards for calibrating AC meters to 0.5% through ranges of 10 millivolts to 1500 volts and 1 microampere to 200 amperes; MODEL 260C Standards for DC meters to 0.5% over ranges of 1 millivolt to 1500 volts and 1 microampere to 150 amperes. Accuracy of 0.25% using charts. These standards have been used for 8 years by the government services and leading industrial organizations.

MODEL 262B



For CRYSTAL TESTING

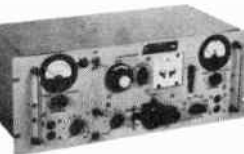
FOUR MODELS developed for Signal Corps under national crystal testing standardization program to measure resonance and anti-resonance resistance of quartz crystals including those covered by MIL-C-3098B. Capacitance, inductance and PI of crystal can be determined.

MODEL 459A (Improved TS-330/TSM) covers 800 kc to 15 mc. for 0.002% crystals, 0-9900 ohms. Operates from 115/230 v, 50-1000 cps. Price \$1125.

MODEL 531 (TS-683/TSM) Crystal Impedance Meter covers range of 10-140 mc for 10-150 ohm crystals. Twelve fixed calibrating resistors of 10, 22, 30, 40, 51, 60, 68, 82, 91, 100, 120 and 150 ohms, plus a 100-ohm var.resistor for determining crystal resistance. Anti-resonance adapter also provided. Operates from 115/230 v, 50-1000 cps source. Price \$590.

MODEL 541A (TS-710/TSM) for 10-1100 kc range crystals with resistances from 200 ohms to 0.5 megohms. An internal load capacitance is calibrated from 15 to 105 mmf with accuracy better than ± 0.5 mmf. Power dissipated in crystal measured by built-in VTVM and ohmmeter. For 115/230 v, 50-1000 cps operation. Price \$860.

MODEL 1207 (AN/TSM-15) covers range of 75-200 mc for 10-125 ohm crystals. Crystal voltage at series resonance is measured within 10%, effective resistance within ± 5 ohms, and the power calculated. 18 C₀ cancellation inductances and 1 uncompensated var. resistor supplied; 5 compensated var. resistors available. 115/230 v, 50-1000 cps. Price \$1245.



VARIABLE FREQUENCY POWER SUPPLY

MODEL 150 is a stable, single phase, 150 VA power source of laboratory quality. Output frequency is continuously adjustable between 380 and 2400 cps with stability of 0.1% ± 2 cycles. Price \$575.



MODEL 150

Portable Cart provides Versatile Use and Storage Facility for Owners of Models 150 and 829.

Heavy gauge steel cart is mounted on free rolling, swivel casters. Interior shelf adjustable full height. Inside measures 33" wide x 16 1/2" deep x 26" high. Opening one side accommodates standard 19" wide panels; other side 24" wide for equipment in cabinets. Drop leaf work shelf attaches either side.



PORTABLE CALIBRATION SYSTEM

Prices are FOB Boonton, N. J. & subject to change without notice.

Send for product literature.

Radio Frequency Laboratories, Inc. BOONTON N. J., U.S.A.

Designers and Manufacturers of Electronic Equipment since 1922

READ PHASE NULL VOLTS DIRECTLY



MODEL 301 Broadband Phase Angle Voltmeter is designed for laboratory use, features 10 cps to 100 kc operation, 12 voltage ranges covering 1 mv to 300 volts.

NORTH ATLANTIC PHASE ANGLE VOLTMETERS For Production Line, Laboratory, Ground Checkout

Now, combined in one compact package, all the functions required for precise measurement of voltage, phase angle, quadrature, impedance and power factor. Measurement of AC signals which previously required extensive equipment—or which could not be made at all—can be accomplished simply and accurately in the laboratory, on the production line or in the field. For broadband or single frequency operation,

**READ
DIRECTLY**

- Total Voltage
- Phase Angle
- In-phase Voltage
- Quadrature Voltage
- Null

Specifications: Abridged specifications of the Model 301 Broadband Phase Angle Voltmeter are shown below. Specifications of other models on request.

- Frequency range 10 cps to 100 kc
- 1 mv to 300 volts full scale
- Accuracy $1/2^\circ$ absolute; special technique $.01^\circ$
- 0—360° phase angle without ambiguity
- Nulling sensitivity 5 microvolts
- Signal and/or reference isolation
- Optional filters plug in from front
- Bench or rack mounting



Model 202. For production line or checkout applications. Characteristics similar to Model 301 but designed for single frequency operation.



Model 401 AC To DC Phase Sensitive Converter permits conventional DC instrumentation to be used for AC measurements. Single- or double-ended DC output proportional to rms, fundamental, in-phase or quadrature component of AC signal.



Plug-In Accessories for Phase Angle Voltmeters include reference isolation, resistance summing, and bridging transformer modules for eliminating ground loops and adapting voltmeter to ratiometer applications.

TECHNICAL DATA



Write for detailed specifications and application information



NORTH ATLANTIC
industries, inc.

603 Main Street, Westbury, New York
Edgewood 4-1122

For details, circle #237 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

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12. General Test Equipment.

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Scientific Wood Cabinet Co., N.J., 72

Sel-Rex Corp., N.J., Relay Testers

PE

HIGH VOLTAGE TEST EQUIPMENT

DC OVERPOTENTIAL TESTERS

MODEL S50 DC 0-50 KV, 5 ma.

MODEL S100 DC 0-100 KV, 5 ma.

MODEL S120 DC 0-120 KV, 5 ma.

MODEL S150 DC 0-150 KV, 5 ma.

MODEL S200 DC 0-200 KV, 5 ma.

Features:

- Non-destructive testing
- Small, light weight units
- Rugged design for industrial use
- Use of selenium rectifiers
- Plug-in type HV output shielded cable
- Control cabinet stacks on top of HV tank (May be separated for remote control)

— Also available in heavier current models —



SENSITIVE HIPOT TESTERS, DELUXE SERIES "H"

H2 AC/DC 0-2 KV Peak AC/DC, 1 ma.

H5 AC/DC 0-5 KV Peak AC/DC, 1 ma.



Features:

- 5 microamp circuit breaker (adjustable to 1000) deenergizes HV
- Non-destructive testing
- Dual output, AC and DC
- Dual scale KV meter, directly at output
- Portable, safe
- Guarded or straight ground return

Also available in larger cabinets with 19" panel in 10 KV, 20 KV, and 30 KV models, with two meters, plus other extra features. (See general catalog.)

Send for catalog of complete line, including: low-cost S & D hipot testers, high power HV test sets, cable fault locators, and wire sparkers.

HIGH VOLTAGE TEST SETS, SERIES "K" HIGH CAPACITY AC, or DC

Many sizes: 2 KV to 200 KV and 1 to 100 KVA or KW

For dielectric tests on: Insulating materials, motors and generators, transformers, wire and cable, HV bushings and other apparatus.



FEATURES:

- High current capacity to meet ASTM, IPCEA Standards
- Metering at output for greatest accuracy
- Complete safety and convenience controls, including external interlock
- 4" meters with dual scales
- Motorized output control optionally available
- Separate control section for remote control



PE

PESCHEL ELECTRONICS, INC.

Towners, R.F.D. 1, Patterson, New York, TRinity 8-3251

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GOERZ

FOR INSTRUMENT CALIBRATION TO...

±0.05%



PHYSICS RESEARCH LABORATORIES, Inc. proudly announces the availability of the famed C. P. Goerz AC/DC Comparator. The Goerz Comparator is a basic standardizing instrument offering accuracies in the ±0.05% class. The accuracy of ±0.05% is referred to true value, not full scale. It holds for current, voltage and power in the following ranges up to and including 1000 c. p. s.:

CURRENT: 0-50 ma; 0.2/0.5/1/2/5/10/20/50/100/125 amperes;

VOLTAGE: 0-15; up to 600 volts in 5-volt steps;

POWER: Up to 600 volts; up to 100 amperes.

All quoted accuracies are based on the accessories supplied with the instrument. Higher current and voltage available with special accessories.

For Optical Equipment: Write To
Goerz American Optical Co.
Inwood, L.I., N.Y.

Further details are available upon request in PRL technical note 319 ADC.

Physics Research LABORATORIES

House of Fine Instruments

P.O. Box #555

Hempstead, L. I., N. Y.

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STERLING GYRO TEST COMPONENTS



Rate Tables
Precision Test Tables
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STERLING PRECISION CORPORATION

17 MATINECOCK AVE.
PORT WASHINGTON, L.I., N.Y. PO 7-7200

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1960 IRF Directory

You can **DEPEND** on --

Standard TEST CABINETS



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DEPENDABLE
ENVIRONMENTAL
TESTS**

self-contained units
to meet every condition

**HIGH and LOW TEMPERATURES, AL-
TITUDE, HUMIDITY, FUNGUS, SAND
and DUST, SALT SPRAY, RAIN and
SUNSHINE, EXPLOSION and SPECIAL
APPLICATIONS.**



Every Standard test cabinet is designed for reliable and accurate testing, along with years of care-free durable operation. Whatever the simulated condition is desired to test your product accurately . . . correctly, there is a Standard cabinet to do the job. All guaranteed to give high level performance — the result of a decade of engineering skill and experience in designing and fabricating test equipment. Why not look into the many outstanding features offered by Standard today . . . send for our illustrated Catalog No. 59.



COMPLETE ENVIRONMENTAL
TESTING LABORATORY SERVICES
FOR QUALIFICATION AND
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WALK-IN EQUIPMENT DESIGNED
AND FABRICATED TO ORDER

MEMBER OF ENVIRONMENTAL EQUIPMENT INSTITUTE

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CARLSTADT, NEW JERSEY
DESIGNERS-MANUFACTURERS OF TEST EQUIPMENT

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- Sigma Instruments, Inc., 31 Pearl St.,
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- Sinclair Radio Laboratories, Ltd., Box
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- Tel-Instrument Electronics Corp., N.J.,
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Precision Electronic Test Equipment

LABORATORY INSTRUMENTS



PULSE TIMER

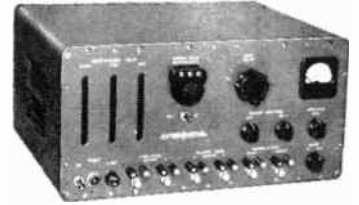
MODEL PT-244

The TLI Model PT-244 is a paired trigger generator which provides a fixed and a delayed pulse. Delays up to 10,000 microseconds are provided with an accuracy of ± 0.01 microseconds read directly from a combination of decade counters and a digital dial. Mechanically, the instrument is a full size module of the TLI Modular Instrumentation System and therefore may be used with modular system Stark Pedestal for bench mounting or may be rack-mounted with the Modular Rack Adapter.

SPECIFICATIONS

| | |
|-------------------------|----------------------------------|
| Accuracy | ± 0.01 microseconds |
| Delay Range | 0-10,000 microseconds |
| Marker Output | 10, 1 and 0.1 microseconds |
| Jitter | Less than .001 microseconds |
| PRF | 30-2500 PPS |
| Fixed Pulse Amplitude | ± 25 volts open circuit |
| Delayed Pulse Amplitude | ± 25 volts open circuit |
| Output Impedance | 1500 ohms minus 700 ohms plus |

PRICE Model PT-244 Pulse Timer—\$1,895.00



TEST OSCILLATOR

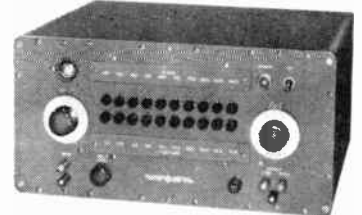
MODEL TO-258

Model TO-258 Test Oscillator furnishes twenty pre-determined frequencies selected by means of push-buttons. A calibrated control permits any selected frequency to be varied $\pm 15\%$ of its nominal value in the telemetering model. It features low distortion and excellent frequency stability over wide ranges of temperature and power input. Features a full sized modular cabinet.

SPECIFICATIONS

Telemetering model furnishes standard FM/FM frequencies from 400 C to 70 KC. Special Models for any 20 frequencies from 20 to 100,000 cycles per second.

Model TO-258 Test Oscillator (FM/FM) \$425.00



DIODE TESTER

MODEL DT-257

Model DT-257 Diode Tester measures the static characteristics of germanium, silicon and low-power selenium diodes. Separate forward and reverse power supplies, having continuously variable outputs or pre-set regulated reverse potentials permit either complete measurements or checks at selected operating points. Features a 2/3 modular cabinet.

SPECIFICATIONS

Pre-set regulated reverse voltages:
-10, -50, -100, 0-150 volts at 5 ma.
Forward current to 500 ma. at 1.0 volt.
Reversed or shorod diode indications.
Internal meter overload protection.
Test fixture allows quick connections.
Provisions for accessory diode tester.

Model DT-257 Diode Tester \$295.00
Model OV-120 Diode Oven \$150.00



MILLIMICROAMMETER

MODEL MA-259

As an accessory to the Model DT-257 Diode Tester, this instrument will measure the low reverse currents of silicon diodes. The minimum full scale range of 50 microamperes for the Diode Tester is extended to 0.01 microamperes by use of the millimicroammeter.

As a millimicroammeter, this instrument covers the range from 0.01 microamperes to 1,000 microamperes and is completely self contained and battery powered.

SPECIFICATIONS

6 Ranges 0.01; 0.1; 1.0; 100; 1,000 μ a full scale
Input Impedance ... 0.01 μ a Range—50 megohms
0.1 μ a Range—5 megohms
1.0 μ a Range—0.5 megohms
10 μ a Range—50,000 ohms
100 μ a Range—5,000 ohms
1,000 μ a Range—500 ohms

Accuracy $\pm 5\%$ of full scale
Voltage Drop All ranges 0.5 volts
Model DT-257 less batteries \$125.00



PULSE GENERATOR

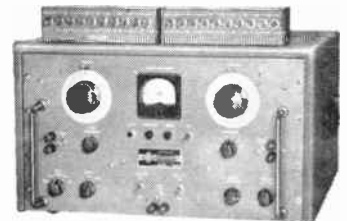
MODEL PG-200AA

Model PG-200AA Pulse Generator features wide ranges of pulse duration, amplitude, and positioning. It may be operated self-synchronous or driven by an external signal of almost any wave-form. In both cases, it furnishes a fast trigger for synchronizing auxiliary equipment.

SPECIFICATIONS

Duration and position .05 to 50 μ s, 1000 μ s with range extenders.
Rise and decay times constant .03 μ s.
Single pulses to 20,000 per second.
100 volts, 50 ohms driving impedance.
Trigger or sine wave synchronization.
Calibrated width, position and rate.
May be cascaded for dual pulse output.

Model PG-200AA Pulse Generator \$850.00
Model PGA-210 Range Extender \$80.00



ELECTRONIC SWITCH

MODEL ES 180A

Model ES-180A Wide-Band Electronic Switch provides presentation of two waveforms on almost any conventional oscilloscope. It also furnishes a movable horizontal index trace for making rapid and accurate amplitude and time measurements without parallax error. The control dial is calibrated both in volts and percentage amplitude and a connector is provided for introducing external time markers.

SPECIFICATIONS

Unity DC gain down 3 db at 15 MC, 6 db at 21 MC; Rise-time .023 microseconds.
Identical stable feedback amplifiers; both DC and heater supplies regulated
93 ohms output impedance minimizes effect of cable length and load on bandwidth.
Input impedances 1 megohm and 40 mfd; attenuator divisions 1, 3, 10, 30, 100.
Alternate-sweep or alternate-sample displays, switching rates to 400 KC.

Model ES-180A Electronic Switch \$595.00



TELETRONICS LABORATORY, INC. 54 KINKEL STREET WESTBURY, L. I., N. Y.

A wholly owned subsidiary of Crosby Teletronics Corporation

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the industry's pioneer
& complete line of
**MINIATURIZED
ELECTRONIC
INSTRUMENTS**

MILITARY
for MIL-E-5400A &
MIL-T-945A applications.



**B Series—ruggedized
single-range,
AC VTVMs \$160.**

COMMERCIAL



**E Series
Single-range
AC VTVMs \$99.50**



**D Series—ruggedized
multi-range
AC VTVMs \$272.**



**Model 109-1
low-level multi-range
AC VTVM \$199.**



**G Series—ruggedized
single or multi-range
DC VTVMs \$136.**



**F Series
single-range
DC VTVMs \$84.50**



**J Series—ruggedized
low-level multi-range
DC VTVMs \$450.**



**Model 125-1
Null Meter \$125.**

By building-in trio labs' panel-mounting instruments you . . . customize test systems, set-ups and instruments; save space (average model is 4" x 4" x 4"); save time with at-a-glance monitoring; save money; make monitoring foolproof (go-no go); improve system reliability; increase overall design freedom. Choose from many "standard" or "special" models—or consult us for new designs for your needs. Write for free "how-to" Engineering Guide to Dept. [RE-60.]

**CUSTOMIZE EFFICIENCY & ACCURACY
WITH TRIO LABS' BUILD-IN INSTRUMENTS**



BEFORE . . . 3 external instruments were used to measure AC and DC voltages . . . cluttered, tedious, wasteful, subject to error.



AFTER . . . 3 trio labs' miniature VTVMs integrally built-in now are always on hand to measure just the parameters you designate.

trio

Trio Laboratories, Inc. Plainview, L. I., N. Y.

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Trans Electronics, Inc., Calif., 25, 80

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Trio Laboratories, Inc., Dept. IRE-60, Expressway Industrial Park, Plainview, L.I., N.Y., 55, 60, 65, 88

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Tel: OVerbrook 1-0400

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Vacuum Tube Products Co., Inc., Calif., 85

Valor Electronics, Inc., Calif., 80

Van Norman Industries, Inc., Electronic Div., N.H., 40, 45

The New Model 77

VACUUM TUBE VOLTMETER WITH NEW 6" FULL-VIEW METER



Compare it to any peak-to-peak V. T. V. M. made by any other manufacturer at any price!

- ✓ Model 77 completely wired and calibrated with accessories (including probe, test leads and portable carrying case) sells for only \$42.50.
- ✓ Model 77 employs a sensitive six inch meter. Extra large meter scale enables us to print all calibrations in large easy-to-read type.
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Specifications

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Measures RMS values if sine wave, and peak-to-peak value if complex wave. Pedestal voltages that determine the "black" level in TV receivers are easily read.

Model 77 comes complete with operating instructions, probe and test leads. Use it on the bench—use it on calls. A streamlined carrying case, included at no extra charge, accommodates the tester, instruction book, probe and leads. Operates on 110-120 volt 60 cycle. Only

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- Silent Generator
- CORE MAGNETIC SYSTEM indicator
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12. General Test Equipment.

Varian Associates, Inc., Instrument Div.,
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Vectron, Inc., Mass., Capacitance Volt-
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Tel: PIONEER 6-1161

Victoreen Instrument Co., 5806 Hough
Ave., Cleveland 3, Ohio, 35

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Tel: ENdicott 1-6200

Wac Line, Inc., Ohio, 35

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Wallson Associates, Inc., 35 E. Runyon
St., Newark 8, N.J., 25

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Tel: TALbot 4-2600

Walsco Electronics Mfg. Co., Div. of
Textron, Inc., 100 W. Green St., Rock-
ford, Ill., 78

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Tel: ROKckford 8-9661

Waltham Precision Inst. Co., Thermal
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Ward Leonard Electric Co., 83 South St.,
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Tel: MOUNT Vernon 4-1000

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Generators, marker (radio fre-
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Generators, pulse: See class 19

Generators, signal (AM & FM):
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Generators, signal (TV):
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Generators, sweep (radio frequency): See class 26

Generators, sweep (TV):
See class 35

Generators, synchronizing:
See class 35

Generators, time delay:
See class 19

Generators, ultrasonic:
See class 12

13. Geophysical Apparatus.

5. Complete exploration equipment
10. Control equipment
15. Microphones
20. Recording galvanometers

Abrams Instruments Corp., Mich., 10
Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 5

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Edin Co., Inc., Mass., 20

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Etelco, Ltd., England, 10

Evershed & Vignoles, Ltd., England, 5

Fisher Research Lab., Inc., Calif., 5

General Automatics, Inc., Calif., 10

General Devices, Inc., P.O. Box 253, Princeton, N.J., 10

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Geotronic Labs., Inc., Tex., 5

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Photron Instrument Co., Ohio, 20

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Tel: TWInbrook 4-6300

Scientific Service Labs., Tex., 5

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Tel: HAWthorne 7-3100

FOR INCOMING INSPECTION

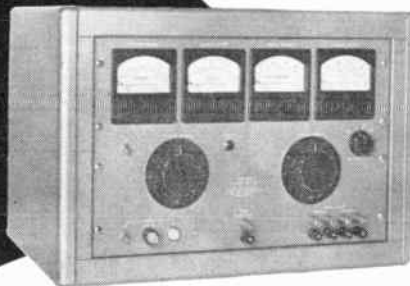
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13. Geophysical Apparatus.

Southwestern Industrial Electronics Co., 10201 Westheimer Rd., P.O. Box 22187, Houston 27, Tex., 5, 10, 15, 20

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Tel: HO 5-3471

Standard Telephones & Cables, Ltd., England, 15

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Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 5, 10, 15, 20

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Texas Instruments, Incorporated, Houston, Tex., 5, 20

Twenty-First Century Electronics, Inc., Calif., 5

Ultra-Violet Products, Inc., Calif., 5

United Electric Controls Co., Mass., 10

Varian Associates, Instrument Div., Calif., 5

Virginia Electronics Co., Inc., D.C., 10

Wang Labs., Inc., Mass., 10

Consult the advertisements in this issue for complete data on prices, specifications, product availability, and other information. Every advertiser's listing shows the page number of the advertisement.

14. Graphic Recorders.

3. Boards—plotting
5. Charts & papers
10. Ink writing

15. Inkless types
20. Fixed speed types
25. Variable speed types

Acton Laboratories, Inc., 536 Main St., Acton, Mass., 15

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Tel: COlonial 3-7756

Aero Electronics Co., Ill., 3

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Mullard Overseas, Ltd., England, 5, 10, 25

New England Scientific Instruments Co., 238 Main St., Cambridge 42, Mass., 10, 15, 20, 25

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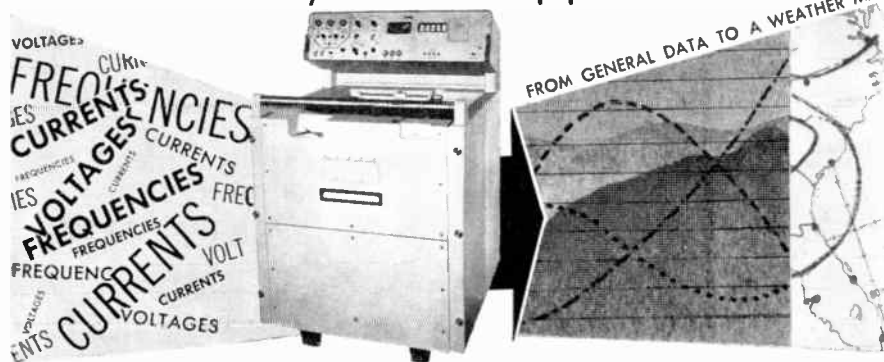
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Nichols, Ltd., R. H., Toronto, Ontario, Canada, 10, 15, 25

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Hughes Aircraft Co.,
 Div., Calif., 15, 20, 25

Hughes Aircraft Co., N
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 Instrument Development
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International Telephone
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 Space Div., Dept. J-93,
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Microwave Chemicals Lal
 12, 282 7th Ave., New Yc
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Sound Apparatus Co., N.J., 10, 15, 25

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15. Infrared Equipment.

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|---|---------------------|
| 5. Amplifiers | 25. Optical filters |
| 10. Black body sources | 30. Power supplies |
| 15. Detectors | 35. Pyrometers |
| 20. Optical trans- mitting materials | 40. Radiometers |
| | 45. Systems |

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Tel: BIGelow 3-0030

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General Electroynamics Corp., Tex.,
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General Mills, Mechanical Div., Minn.,
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Tel: ADams 7-7611

Hanson-Gorrill-Brian, Inc., N.Y., View-
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Hoffman Electronics Corp., Semicon-
 ductor Div., 930 Pitner Ave., Evans-
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Tel: UNiversity 9-9850



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Insulating materials: See class 89

Insulation testers: See class 12

**Integrators, pulse count:
See class 22**

**Intermodulation meters:
See class 3**

Ionization chambers: See class 22

Jacks: See class 53

Klystrons: See class 76

**Lighting equipment, television
studio: See class 32**

**Lighting equipment, tower:
See class 37**

Loudspeakers: See class 54

Magnetic tape & wire: See class 63

**Magnetic tape & wire recorders:
See class 27**

Magnetrons: See class 76

16. Marine Equipment.

5. Direction finders
10. Radiotelephones

15. Shipborne communications equip.
20. Sonar

ACF Industries Inc., Nuclear Prods.
Erco Div., Md., 20

A.R.F. Products, Inc., Ill., 15

Acoustica Associates, Inc., Dept. IRE,
Fairchild Ct., Plainview, N.Y., 20

See ad on page 162

Tel: OVerbrook 1-2100

Aero Guidance Corp., Calif., 15

Alert Products, Inc., N.J., 10

Allied International Corp., N.Y., 10

Amelco, Inc., Calif., 5, 10, 15

American Elite Inc., N.Y., 5, 10, 15

American Mach. & Foundry Co.,
Conn., 20

American Mach. & Foundry Co., D.C.,
20

Andersen Labs., Inc., Conn., 5

Atlantic Research Corp., Va., 20

Avco Corp., Crosley Div., Ohio, 5, 20

Avionics Corp. of America, Pa., 5

Barker & Williamson, Inc., Pa., 10

Bassett Inc., Rex, Fla., 10

Belock Instrument Corp., N.Y., Navigation

Bendix Aviation Corp., Bendix Pacific
Div., Calif., 5, 10, 15, 20

Bendix Aviation Corp., Ind., 5, 10, 15, 20

Bendix Aviation Corp., Mich., 5, 10, 15,
20

Blaine Electronics, Inc., Calif., An-
tenna Lab. Equip.

Canadian G.E. Co. Ltd., Electr. Equip-
Tube Dept., Canada, 20

Canadian Marconi Co., Canada, 5, 10,
15, 20

Cavitron Electron Oscillator Co., Calif.,
5

Centronix, Inc., Fla., 10, 15, 20

Chesapeake Instrument Corp., Md., 20

Chisholm Industries Ltd., Canada, 10,
15

Continental Elecn., Mfg., Co., Tex., 20

Dalmo Victor Co., Div. of Textron Inc.,
Calif., 15, 20

Designers for Industry, Inc., Ohio, 5,
15, 20

Dumont Airplane-Marine Instrument,
Inc., Pa., 5

Dynamic Electronics-New York, Inc.,
N.Y., 5, 10

EMI—Cossor Electronics Ltd., 301
Windsor St., Woodside, Halifax,
N.S., Canada, 20

See ad on page 412

Tel: HALifax 6-7491

Edo Corp., N.Y., 20

Eldico Electronics, Radio Eng. Labs.,
Inc. Div., N.Y., 15

Electronic Assistance Corp., N.J., 5, 10,
15, 20

Electronic Communications, Inc., Fla.,
15

Electronic Research Associates, Inc.,
N.J., 20

Erco Radio Labs., Inc., N.Y., 10, 15

Executone, Inc., N.Y., 15

Feller Engineering & Mfg. Co., Ill., 15

Fisher Research Lab., Inc., Calif., 5, 10

Gates Radio Co., Ill., 15

General Electric Co., Communication
Prods. Dept., Va., 15

General Electric Co., Heavy Military
Electronics Dept., Defense Electronics
Div., Court Street Plant, Bldg. 3-50,
Syracuse, N.Y., 15, 20

See ads on pages 283, 288, 445, 447,
505, 617

Tel: GRanite 6-4411

Gray Radio Co., Inc., Fla., 10

Harris Transducer Corp., Conn., 15, 20

Harrison Labs., Inc., B. M., Mass., 20

Heath Co., Subsidiary of Daystrom, Inc.,
305 Territorial Rd., Benton Harbor 4,
Mich., 5

See ad on page 328

Tel: Yukon 3-3961

Hoffman Electronics Corp., Calif., 15

Hudson American, Radio Eng. Labs.,
Inc., Div., N.Y., 10, 15

Huyck & Sons, F. C., Waldorf Elec-
tronics Div., N.Y., 5

International Electronics Corp., N.Y., 5,
10, 15

Internatl. Tel. & Tel. Corp., ITT Fed-
eral Div., N.J., 5, 15

Jetronic Industries, Inc., Pa., 20

Kahn Research Labs., Inc., N.Y., 15

Kearfott Co., Inc., 1500 Main Ave.,
Clifton, N.J., 5, 10, 15, 20

See ad on page 348

Tel: GRegory 2-1000

King Radio Corp., Kansas, 10

Kollmorgen Optical Corp., Mass., Optics

16. Marine Equipment.

Lear, Inc., Mich., 5

Lear, Inc., Lear Cal Div., Calif., 5

Litton Industries, Inc., Electronic Equip-
ments Div., 336 N. Foothill Rd. Beverly
Hills, Calif., 20

See ad on page 66

Tel: CRestview 4-7411

Litton Industries, Md. Div., Md., 5, 15

Manson Laboratories, Inc., 375 Fairfield
Ave., Stamford, Conn., 15

See ad on pages 302-303

Tel: DAVIS 5-1391

Marconi's Wireless Telegraph Co., Ltd.,
N.Y., 5, 10, 15

Marstan Electronics Corp., N.Y., 15

Measurement Engrg., Ltd., Canada, 15

Motorola Communications & Electronics,
Inc., Ill., 10, 15

Mullard Overseas, Ltd., England, 15

Multi-Products Co., Mich., 10

Munston Mfg. & Service, Inc., N.Y., 5,
10, 15

National Radio Co., Inc., Subsidiary of
National Co., Inc., 37 Washington St.,
Melrose 76, Mass., 5

See ad on page 642

Tel: NO 5-4800

Pearce-Simpson, Inc., Fla., 10, Depth
Indicators

Philco Corp., Govt. & Indl. Div., Pa., 5,
10, 15, 20

Polydoroff & Assoc., D.C., 5

Pye Corporation of America, N.J., 20

Pye Telecommunications Ltd., England,
5, 10

Racal Engrg. Ltd., England, 10

Radio Corp. of America, Defense Elec.
Prod., N.J., 10, 15

Radio Receptor Co., Eng. Prods. Div.,
N.Y., 15

Raytheon Co., Mass., 5, 10, 15, 20

Remler Co., Calif., 15

Republic Electronic Indust. Corp., N.Y.,
10, 15

Rich Electronics, Inc., Fla., 5, 15

Rowe Industries, Ohio, 10

Sangamo Electric Co., Ill., 20

Servo Corp. of America, N.Y., 5

Siemens & Halske, A. G., Germany, 15

Skiatron Elect.-Television Corp., N.Y.,
20

Sonar Radio Corp., N.Y., 10, 15

Specialty Engrg. & Electr. Co., N.Y.,
20

Sperry Gyroscope Co. of Canada, Ltd.,
Canada, 5, 10

Sperry Rand Corp., Sperry Piedmont
Co. Div., Va., 5, 10, 15

Spilsbury & Tindall Ltd., Canada, 10, 15

Superior Marine Radio Co., Fla., 5, 10,
15

Technical Materiel Corp., 700 Fenimore
Rd., Mamaroneck, N.Y., 15

See ad on page 352

Tel: OWens 8-4800

Telectro Industries Corp., N.Y., 5, 15,
20

Telephonics Corp., N.Y., 20

Tele-Signal Corp., N.Y., 15

Texas Instruments, Incorporated, Semi-
conductor-Components Div., P.O. Box
312, 13500 N. Central Expressway,
Dallas, Texas, 20

See ad on pages 75-78

Tel: FLeetwood 7-5411

Directory I. Complete Equipment

16. Marine Equipment.

Topping Electronics, Ltd., Canada, 10
 Twin Lock Inc., Calif., 15
 United States Instrument Corp., Va., 15
 Vitro Labs., Silver Spring Lab. Md., 20
 Westinghouse Electric Corp., Md., 15
 Westrex Corp., N.Y., 15
 Wheeler Elect. Corp. Div.-Sperry Corp.,
 Conn., 15
 Young Spring & Wire Corp., Gosnet
 Div., Calif., 10

Marker generators, microwave:

See class 19

Marker generators-RF: See class 26

Marker generators, TV:

See class 35

17. Medical Equipment.

| | |
|---------------------------------|----------------------------------|
| 5. Electrocardio- graphs | 20. Electro-encephalo- graphs |
| 10. Diathermy | 25. Stimulators |
| 15. Electronic cauter- izing | |

American Electronic Labs., Inc., Pa., 25
 Applegate & Co., C. J., 1840 24th St.,
 Boulder, Colo., 25
 See ad on page 487
 Tel: Hillcrest 2-8750

Atronics Products, Inc., Pa., 25
 Aviation Electronic Service, Ill., 25
 B & K Instruments, Inc., Ohio, Acousti-
 cal Meas. Equip.
 Berman Laboratories, N.Y., Metal De-
 tector
 Bracke-Seib X-Ray Co., Inc., N.Y.,
 X-Ray Equip.
 Cambridge Instrument Co., Inc., N.Y.,
 5, 20
 Campbell X-Ray Corp., Mass., X-Ray
 Canadian Research Institute, Canada,
 5, 25
 Crescent Eng. & Research Co., Calif.,
 5, 20
 Dallons Labs., Inc., Calif., 5, 10, 15, 20,
 25
 E A K Research Lab., N.Y., 10
 Electro-Medical Lab., Inc., Vt., 20, 25
 Electronic Assistance Corp., N.J., 10,
 15, 25
 Enso, Inc., Utah, 5, 20, 25
 Epsco Worcester, Mass., 5, 20
 Essential Electronics Corp., Ohio, 5, 20,
 Oscilloscope Presentation
 Exact Electronics, Inc., Oreg., 25
 Farrall Instrument Co., Neb., 25
 General Electric Co., X-Ray Depart.,
 Wisc., 5
 Good Electronic Corp., Fla., 25
 Grass Instrument Co., Mass., 20, 25

17. Medical Equipment.

Harmon Electronics Co., Mo., 5
 Harworth Mfg. Co., Calif., Electric
 Metal Detector
 Horwitron Electro-Medical Co., Pa., 25
 Hughes Aircraft Co., Hughes Prod. Div.,
 Calif., 5, 20
 Industrial Control Co., N.Y., 25
 Industrial Development Labs., Inc.,
 N.J., 5
 L & O Research & Development Corp.,
 Pa., 5
 Lab-Tronics, Inc., Ill., 25
 Levinthal Electronics Prods., Inc.,
 Calif., 25
 Ludlow Papers Inc., Mass., 5, Paper
 Measurement Engrg., Ltd., Canada, 25
 Medical-Electronics Development Co.,
 N.Y., Blood Pressure Apparatus
 Merit Short Wave Diathermy Co.,
 Calif., 10
 Mooradian High Freqcy. Labs., N.J.,
 10, 15, 25
 Nichols Ltd., R. H., Canada, 5
 North Hills Electric Co., Inc., 402 Saga-
 more Ave., Mineola, L.I., N.Y., 25
 See ads on pages 415, 455, 591
 Tel: Pioneer 7-0555

Nuclear-Chicago Corp., Ill., Nuclear
 Electronic
 Offner Electronics, Inc., Ill., 5, 20
 Pacific Technical Co., Calif., 5, 20
 Pansel, Inc., N.J., 5
 Pecco Corporation, Calif., 10
 Process & Instruments, N.Y., 25
 Radar Engineers, Wash., 25
 Raytheon Co., Mass., 10
 Sanborn Co., 175 Wyman St., Waltham
 54, Mass., 5
 See ad on pages 114-115
 Tel: TWinbrook 4-6300
 Sonotone Corp., Dept. X00-109, P.O. Box
 200, Elmsford, N.Y., Audiometers
 See ad on page 482
 Tel: LYric 2-6400
 Standard Electronics Research Corp.,
 N.Y., 25
 Taber Instrument Corp., N.Y., 5
 Teca Corp., N.Y., 5, 10, 15, 20, 25
 Twenty First Century Electronics, Inc.,
 Calif., 20

Meghom meters: See class 12

Meters: See class 56

Micro-ammeters: See class 56

Microphones: See class 57

Microphones, geophysical: See class 13

Microwave amplifiers: See class 36

Microwave antennas: See class 37

Microwave attenuators: See class 38

18. Microwave Communi- cations.

| | |
|---------------------|------------------|
| 5. Receivers | 15. Transmitters |
| 10. Relay equipment | |

A.R.F. Products, Inc., Ill., 5
 Aermotive Equipment Corp., Mo., 15
 Aircorn, Inc., 48 Cummington St., Boston,
 Mass., 5, 15
 See ad on page 590
 Tel: COpley 7-9115
 Airtronics, Inc., D.C., 5, 15
 American Elite Inc., N.Y., 5, 10, 15
 Applied Technology, Inc., Calif., 5
 Assembly Products, Inc., Ohio, 10
 Avco Corp., Crosley Div., Ohio, 5, 15
 Bell Aircraft Corp., Avionics Div., N.Y.,
 5, 15
 Bell Aircraft Corp., Niagara Frontier
 Div., N.Y., 5, 15
 Bendix Aviation Corp., Ind., 5, 15
 Budelman Electronics Corp., Conn., 5,
 10, 15
 Camera Equipment Co., Inc., Dept. IRE,
 315 W. 43rd St., New York 36, N.Y.,
 10

See ad on page 357
 Tel: JUdson 6-1420
 Canadian G.E. Co. Ltd., Electr. Equip-
 Tube Dept., Canada, 5, 10, 15
 Canadian Westinghouse Co. Ltd., Elect.
 Div., Canada, 5, 10, 15
 Canoga Corp. of California, Calif., 15
 Centronix, Inc., Fla., 5, 15
 Collins Radio Co., 855 35th St., N.E.,
 Cedar Rapids, Iowa, 5, 10, 15
 See ad on pages 32-33
 Tel: EMpire 3-0281
 Communication Equip. & Engineering
 Co., Ill., 10
 Defiance Engrg. & Microwave Corp.,
 Mass., 10
 Designers for Industry, Inc., Ohio, 5, 10,
 15
 E.M.I. Electronics Ltd., England, 5, 10,
 15
 Electro Development Corp., Wash., 10
 Electronic Communications, Inc., Fla.,
 5, 10, 15
 Electronic Development Co., Inc., Calif.,
 5, 10, 15
 Emerson Electric Mfg. Co., Mo., 5
 Emerson Radio & Phonograph Corp.,
 Md., 5, 10, 15
 Engineering Associates, Ohio, 5, 15
 Gates Radio Co., Ill., 15
 General Communication Co., Mass., 10
 General Electric Co., Communication
 Prods. Dept., Va., 5, 10, 15

117 DIFFERENT EQUIPMENTS

for Electronic Measurement



CARRIER DEVIATION METER Model 791D

Measures Deviation: 200 cps to 125 kc in four ranges; extended down to 10 cps using external readout.

Carrier Frequency Range: 4 to 1,024 mc, directly calibrated.

Modulation Frequency Range: 50 cps to 35 kc.

Crystal Locking: ensures freedom from microphony, allows measurement of FM hum and noise in VHF and UHF communication and broadcast transmitters.

STANDARD SIGNAL GENERATOR Model 867

Frequency Range: 15 kc to 30 mc on 15-ft high-discrimination full-vision scale.

Crystal Accuracy: 0.01% with in-built 1-mc harmonic source.

Output Range: 4 μ v to 4 volts at 75 ohms. 0.4 μ v to 0.4 volt at 13 ohms. Automatic level control for good stability.

Amplitude Modulation: Monitored and variable up to 100%; high quality assured by envelope negative feedback. Modulation frequencies, 400 and 1,000 cps. Less than 200 cps spurious FM.

FM SIGNAL GENERATOR Model 1066A

Frequency Range: 10 to 470 mc, on fundamentals throughout. 0.0025% short-term stability.

Direct-Reading Incremental Tuning: Stepped control up to ± 15 kc; continuously variable from 0 to ± 20 and 0 to ± 100 kc.

Output Range: 0.2 μ v to 200 mv at 50 ohms.

Modulation: FM deviation continuously variable and monitored from 0 to 20 and 0 to 100 kc. Also AM up to 40%. Modulation frequencies, 1 and 5 kc.

Marconi Instruments market 117 different equipments of importance to electronic engineers, from voltmeters to test equipment for guided missile projects and multi-channel links. Representative of the types of equipment that American industry has relied on for many years, the three Marconi instruments above are outstanding for quality and the advanced nature of their designs. Altogether, the range of equipments provided is an impressive guide to the achievements of Marconi Instruments in every essential branch of instrumentation.

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MONITORS · DEVIATION METERS · OSCILLOSCOPES, SPECTRUM &
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Directory I. Complete Equipment

18. Microwave Communications.

General Electric Co., Technical Prods. Operation, N.Y., 5, 10, 15
 General Electric Co., Ltd. of England, England, 5, 10, 15
 General Electronic Labs., Inc., Mass., 10
 Gulton Industries, Inc., New Mexico, 5, 15
 Hallicrafters Co., Ill., 4401 W. 5th Ave., Chicago 24, Ill., 5, 15
 See ad on page 204
 Tel: VAn Buren 6-6300
 International Electronics Corp., N.Y., 5, 10, 15
 Internatl. Tel. & Tel. Corp., ITT Federal Div., N.J., 5, 10, 15
 Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 10
 See ad on page 348
 Tel: GRegory 2-1000
 Kearfott Co., Inc., Microwave Div., Calif., 5, 15
 Kellogg Switchboard & Supply Co., Ill., 5, 10, 15
 Knight Corp., Ewen, Mass., 5, 15
 LEL, Inc., 384 Oak St., Copiague, L.I., N.Y., 5
 See ad on page 372
 Tel: AMityville 4-2200
 Lambda-Pacific Engr. Inc., Calif., 5, 10, 15
 Lenkurt Electric Co. Inc., Calif., 5, 10, 15
 Levinthal Electronics Prods., Inc., Calif., 15
 Ling Systems Inc., Calif., 10
 Litton Industries, Airtron Inc., Div., N.J., 5, 10
 Litton Industries Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10, 15
 See ad on page 66
 Tel: Crestview 4-7411
 Litton Industries, Md. Div., Md., 5, 10, 15
 M E Labs., Calif., 5, 10, 15
 Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 15
 See ad on pages 302-303
 Tel: DAvis 5-1391
 Marconi's Wireless Telegraph Co. Ltd., N.Y., 5, 10, 15
 Martin Co., Baltimore Div., Md., 5, 15
 Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 10
 See ad on page 373
 Tel: DAvenport 6-9080
 Microflect Co., Inc., Oregon, Passive Repeaters
 Motorola Communications & Electronics, Inc., Ill., 5, 10, 15
 N.R.K. Mfg. & Eng. Co., Ill., 5, 15
 Narda Microwave Corp., High Power Electronics Div., Dept. IRED-9, 118-160 Herricks Rd., Mineola, N.Y., 15
 See ad on page 145
 Tel: PIONEER 6-4650
 Philco Corp., Govt. & Indl. Div., Pa., 5, 10, 15

Philco Corp. Western Development Labs., Calif., 10
 Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 5
 See ad on pages 135-136
 Tel: EXeter 2-4500
 Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 10
 See ad on page 594
 Tel: WEstmore 9-4092
 Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 5, 10, 15
 See ad on page 390
 Tel: WEstmore 9-8900
 Pye Telecommunications Ltd., England, 5, 10, 15
 Radiatronics, Inc., Calif., 15
 Radio Corp. of America, Defense Elec. Prod., N.J., 10
 Radio Engrg. Labs., Inc., N.Y., 5, 10, 15
 Radio Receptor Co., Eng. Prods. Div., N.Y., 5, 10, 15
 Raytheon Co., Mass., 5, 10, 15
 Remanco, Inc., Calif., 5
 Resdel Engrg. Corp., Calif., 15
 Sierra Electronic Corp., 5442D Bohannon Drive, Menlo Park, Calif., 15
 See ad on pages 30-31
 Tel: DAvenport 6-2060
 Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 5
 Standard Telephones & Cables, Ltd., England, 5, 10, 15
 Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5, 10, 15
 See ads on pages 306, 351
 Tel: POrt Washington 7-7200
 Summers Gyroscope Co., Calif., 5
 Systems Inc., Fla., 5, 15
 Telectro Industries Corp., N.Y., 5, 15
 Telephonics Corp., N.Y., 5, 15
 Texas Instruments, Incorporated, Houston, Texas, 5, 15
 Thompson - Ramo - Wooldridge, Inc., Calif., 5, 10, 15
 Transco Products, Inc., Calif., 10
 Underwood Corp., Canoga Div., Calif., 5
 U.S. Science Corp., Sub. Topp Indust., Inc., Calif., 15
 Visual Electronics Corp., N.Y., 5, 10, 15
 Westinghouse Electric Corp., Md., 5, 10
 Westinghouse Electric Corp., Pa., 5, 10, 15
 Wunderlich Radio Co., Ill., 5, 10, 15

Microwave filters: See class 50

**Microwave power supplies:
See class 61**

Microwave receivers: See class 18

19. Microwave Test Equipment.

| | |
|-----------------------|---|
| 5. Bolometers | 30. Slotted lines & measuring accessories |
| 7. Calorimeters | 35. SWR meters |
| 10. Frequency meters | 40. Time delay generators |
| 15. Marker generators | 45. Wavemeters |
| 17. Mixers | |
| 20. Oscillators | |
| 25. Pulse generators | |

ACF Industries, Inc., Avion Div., N.J., 17, 20, 25, 30
 Aero Guidance Corp., Calif., 15
 Aero Instrument Co., Calif., 10
 Aerotronic Associates, Inc., N.H., 35
 Airborne Instrument Lab., N.Y., 20
 Aircom, Inc., 48 Cummington St., Boston, Mass., 5, 7, 10, 15, 17, 20, 25, 30, 35, 45
 See ad on page 590
 Tel: COpley 7-9115
 Aircom, Inc., N.J., 10, 17, 20, 30, 35, 45
 Aircraft Armaments, Inc., Md., 45
 Airtronics, Inc., D.C., 20, 25
 Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 30
 See ad on page 590
 Tel: HANcock 6-2150
 Alfred Electronics, Calif., 20
 American Electronic Labs., Inc., Pa., 17, 25
 Arra Corp., Antenna & Radome Research Assoc., 1 Bond St., Westbury, N.Y., 17, 30
 See ad on page 389
 Tel: EDgewood 4-8770
 Avionics Ltd., Canada, 30, 35, 45
 Avtron Mfg. Co., Ohio, 10
 B.J. Electronics, Borg-Warner Corp., Calif., 30
 Beckman, Berkeley Div., Calif., 10
 Bendix Aviation Corp., Jones Elect. Co., M. C., Conn., 35
 Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 7, 35
 See ad on page 170
 Tel: LOwell 3-9511
 Biddle Co., James G., Pa., 10, 20
 Bird Electronic Corp., 30303 Aurora Rd., Solon, Ohio, 35
 See ad on page 334
 Tel: CHURchill 8-1200
 Blaine Electronics, Inc., Calif., Microwave Antenna Test Equip.
 British Thomson-Houston Co., Ltd., England, 5, 10, 17, 20, 25, 30, 35, 45
 Brooks Research, Inc., N.Y., 15, 20, 25
 Browning Labs., Inc., N.H., 35
 Bruno-New York Industries Corp., N.Y., 5
 Budelman Electronics Corp., Conn., 10
 Bulova Watch Co., Electronics Div., Dept. A-1376, 40-06 62nd St., Woodside 77, N.Y., 20, 25
 See ad on page 440
 Tel: NEWtown 9-5700
 Burroughs Corp., N.J., 17, 25, 40
 Calif. Tech. Indust. Div.-Textron Inc., Calif., 20, 30, 35, Radome Test Equip.

for spectrum analyzers...

for frequency response tracers...

for telemetering test instruments...

dependable
CERTIFIED
SPECIFICATIONS
for accurate
data

**LOOK FIRST TO THE
COMPANY THAT IS FIRST...**



LF-2a



SB-15



SSB-3



SPA-4



Panoramic

RADIO PRODUCTS, INC.

PANORAMIC BROADBAND SPECTRUM ANALYZERS—0.5 cps to 25 mc.

A matchless series of 5 easy-to-operate direct reading instruments plot amplitude vs frequency of inputs with display on 5" CRT or chart. Features include: "quick look" broadband plus highly selective narrow band analysis with adjustable center frequency, sweep width, and selectivity (resolution). Linear and 40-db log calibrated amplitude scales.

Applications: vibration-noise analysis, distortion measurements and Fourier analysis.

Model LF-2a. 0.5 cps to 2,250 cps. Exceptional stability, to 0.05 cps/hr, for narrow-band analysis with 0.1 cps resolution. Built-in recorder gives 12" x 4 1/2" chart.

Model LP-1a. 20 cps to 22,500 cps. "Quick look", 1 sec, 40 cps-20 kc lag sweep plus linear sweeps. Resolution range 10 cps to 1 kc. Famous for noise and vibration analysis.

Model SB-7bz. 1 kc-300 kc. Features discriminator linearized sweep for accurate analysis. Resolution capability to 100 cps. Noted for ease of use and reliability.

Model SB-15. 100 cps-525 kc. Complete yet only 8 3/4" high. Many advanced features. 100 cps resolution capability.

Models SPA-3. 200 cps-15 mc; and SPA-3/25, 200 cps-25 mc. Resolution capability is 200 cps. For applications where broad frequency coverage is a must.

ACCESSORIES for PANORAMIC Broadband Analyzers: Increase Applications Areas

Spectral Density Analyzer, Model PDA-1 for random waveform analysis.

Synchronous Frequency Analyzer, Model SF-2, for dynamic balance analysis.

Time-Frequency Analyzer, Model TFA-1, for transient studies.

Recorder and Sawtooth Wave Generator, Model RC-3a, for unattended graphic spectrum plots.

also **Signal Alternator, Model SW-1; Triangular Wave Generator TW-1** IF filters, CF-1. Oscilloscope Camera F-296, and many others.

Automatic FREQUENCY RESPONSE TRACING SYSTEMS 0.5 cps to 15 mc

Automatically plot amplitude response vs. frequency. Consist of Panoramic Spectrum Analyzer and a companion sweep frequency generator. Unique advantages: single-line display, unlimited dynamic range, responds to fundamental frequency only, discriminates against spurious and noise. Use **Model G-5** with LF-2a, **G-2** with LP-1a, **G-3a** with SB-7bz, **G-15** with SB-15, **G-6** with SPA-3. Invaluable for plotting response of amplifiers, transducers, filters, etc.

For details, circle 250 on Reader Service Card

See PANORAMIC'S catalog for full technical data and ordering information. PANORAMIC'S engineers will be glad to assist you in determining the model best suited to your needs, write or call PANORAMIC.

PANALYZERS—for wide range RF Spectrum Analysis. **Three models; SB-3, SB-8b, and SB-12a** (in various types) cover the frequency range up to 1000 mc, supplying broad choice of sweep widths up to 10 mc, sensitivity, resolution capabilities up to 10 cps, and other factors. Widely used for analysis of locally generated AM, Single Sideband, FM, and pulsed transmissions, for general RF spectrum study, and spotting spurious frequency components.

SPECIAL for Single Sideband Spectrum Analysis, the new Model SSB-3a incorporates a highly selective Analyzer with a 2-40 mc tuning head, two-tone audio source, and unique self-checking features to cover a 60-db dynamic range.

PANADAPTORS—Basic Models SA-8b and SA-3 (in over 20 types). For operation with Communications and Special Purpose Receivers. Main use is in monitoring jammed communication channels for detection of interference, spurious, off-frequency transmitters, etc. Also adaptable to receivers with non-standard IF. Specify companion receiver when inquiring.

PANORAMIC MICROWAVE SPECTRUM ANALYZERS 10 mc to 44 kmc

Direct-reading instruments for pulsed AM, FM and CW signal analysis, with $\pm 1\%$ frequency accuracy. Features: continuously adjustable IF filter bandwidths and sweep speeds; linear, log, and power amplitude scales; calibrated frequency markers, and others.

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Model SPA-1, 50 mc-4 kmc. Two plug-in tuning heads. 0-10 mc dispersion. Sensitivity to -100 dbm. IF bandwidth range is 9 kc to 100 kc.

PANORAMIC TELEMETERING TEST INSTRUMENTS (for IRIG FM/FM Systems)

Model TMI-1a, Telemetering Indicator, analyzes 350 cps-85 kc band. Used for subcarrier spectrum analysis, pre-emphasis, distortion measurement.

Model TMC-1, Telemetering Subcarrier Deviation and 3-Point Calibrator. Used with TMI-1a for precise analysis of individual channel deviation; also provides 3 frequencies per channel for accuracy in discriminator calibration—to 0.02%, (0.002% optional).

Model TMC-307a, Seven-Point Calibrator. Provides 7 frequencies for each $\pm 7\frac{1}{2}\%$ and 15% IRIG channel. Accuracy to 0.02% (0.002% optional). Calibration of 18-channel discriminator completed in 45 seconds when an automatic operation.



Panoramic

RADIO PRODUCTS, INC.

THE PANORAMIC ANALYZER features interesting application information. Let us put you on the mailing list, no charge, of course.

528 So. Fulton Ave. • Mount Vernon, N.Y. • Telephone OWens 9-4600
Cables: Panoramic, Mount Vernon, New York State

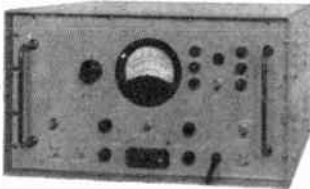
World Radio History



Precision Instruments



Model 120



Phase Angle Meter and Monitor

• Direct Reading Without Ambiguity:

Phase angle is read directly on a large $4\frac{1}{2}''$ meter. The Coarse Meter Scale is graduated from 0° to 360° in 5° divisions. A selector switch cancels out all but the last 30° of any measured phase angle, providing a vernier reading on a 0° to 30° scale which is graduated in 0.5° divisions.

• High Accuracy Over a Wide Frequency and Amplitude Range:

An accuracy of ± 1 degree is obtained over the frequency range of 20 cps to 20,000 cps and from 2 to 30 volt peak input. At frequencies of 20,000 to 100,000 cps phase measurements can be made at slightly reduced accuracy.

• Accepts Sinusoidal or Complex Wave Forms:

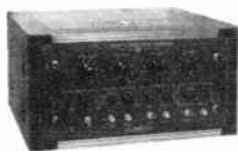
Since the method of phase detection is based on the point of zero cross-over, any type of wave form is acceptable which does not cross the zero axis more than once in a given direction per cycle.

• Recorder Output:

An output is available which is suitable for use with recording equipment. It provides 0 to 10 volts DC corresponding to a phase angle of 0 to 360° .

• Rugged:

Originally designed for Military use, as Monitor, Phase AN/URM-67



Precision Pulse Delay Generator Model 131

- Ranges: 100 to 999,900 yards in 100 yard steps.
- Accuracy: ± 5 yards or 0.01%.
- Input Trigger: 50 to 5,000 P.P.S. random source accepts up to 10% jitter.
- Pulse Widths: 0.1, 0.6, and 4.0 μ secs.
- Rise Time: 0.05 μ secs.
- Amplitude: Up to ± 50 volts into 75 Ω .
- Output: Strobe and Trains—Train spacing 1,000, 10,000 or 100,000 yds.
- Internal Trigger Generator: 50 to 500 and 500 to 5,000 P.P.S.
- Power Requirements: 115 volts $\pm 10\%$; 50 to 450 cycles, 300 watts.
- Also available: Model 130 with range of 1 to 10,000 μ secs. in 0.1 μ sec. step.

VHF-UHF Frequency Calibrator

Model 121



• Wide Frequency Range:

Covers entire spectrum from 50 mc to 11,000 mc without the use of tuning controls.

• Ease of Operation:

A flick of the switch delivers the full spectrum. A switch provides a choice of 50 mc or 100 mc spacing. The amplitudes of the marker signals are adjusted by an output level control.

• Accurate:

(\pm) 0.005% at any frequency, unaffected by temperature or input power variations.

• Compact; Rugged; Light Weight:

Built to the same specifications as its Military equivalent of Test Set AN/USM-45.



CONTROL ELECTRONICS CO., INC.

10 Stepar Place
Huntington Station, New York

For details, circle #251 on Reader Service Card

PULSE GENERATORS

2120A Pulse Generator—fully calibrated pulse width & delay, 10 cps—100 kc, 80 v from 93 ohms, .02 μ s rise time.

2125B Pulse Generator—general purpose unit, 10 cps—100 kc, 50 v into 50 ohms.

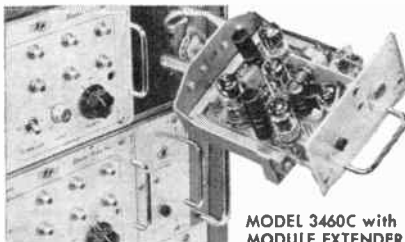
3450B Megacycle Pulse Generator—200 cps to 2 mc, ± 50 v output.

4120A Variable Pulse Generator—economical compact unit, 33 cps to 330 kc, ± 50 v output.

4550A 10 MC Pulse Generator—fully transistorized unit providing ± 10 v into 180 ohms at 20 μ sec rise time. 100 cps to 10 mc rep. rate.

2140A Double Pulse Generator—high power independently controlled outputs, separate or mixed. 10 cps—100 kc.

3460C Megacycle Double Pulse Generator—0-100 μ s separation, 130 cps to 1.3 mc, ± 40 v into 93 ohms separate or mixed.



MODEL 3460C with MODULE EXTENDER

New Electro-Pulse instruments feature plug-in modular printed board construction for ease of use and maintenance.

2150A Pulse Burst Generator—5 pulse output, on-off coding, independent delay, width, and provision for delay modulation.

5621A Digital Code Group Generator—provides 2 digitally positioned triggers, with 1 μ sec resolution, either or both of which may be connected to initiate a 3-pulse group. Also available digitally controlled variable width Single and Double Pulse Generators.

2200 Series Time Delay Generators—1 to 4 channels of 1-10,000 μ s delay from external triggers. Trigger outputs.

5720A Time Mark Generator—Separate or mixed markers 10 sec to 1 μ sec in decades. Each output 12 v at 10% duty cycle.

5100A Series Pulse Code Generators—for core testing and word generation, clock rates to 1 mc, multichannel 10 bit code with interval repeat, current output 50 ma to 5 amp per channel.

6020B Voltage and Current Calibrator—.5% accuracy measurements of DC, sine wave, or pulse voltages.

ELECTRONIC COUNTERS

7100 Series Totalizers—1 to 6 glow transfer counter decades.

7200 Series Preset Counters—2 to 5 preset decades, optional batch counter.

7300 Series Frequency Indicators—Read 0.1 to 10,000 events per second.

7440B Time Interval Meter—measures time intervals or periods from 10 μ s to 99 sec.

7550B Time Interval & Frequency Meter—measures frequency, period, interval, etc. Counting rate to 100 kc.

7600 Series Dual Preset Counters—2-4 decade presets with warning preset selection.

Write for Complete Data

All data subject to change without notice



Representatives in Major Cities

Electro-Pulse, Inc.

11861 TEALE ST., CULVER CITY, CALIF.

Phone: EXmont 8-6764 or TEXas 0-9193

For details, circle #252 on Reader Service Card

Microwave Test Equipment
—Class 19

Directory I. Complete Equipment

19. Microwave Test Equipment.

Canadian Marconi Co., Canada, 5, 7, 10, 25, 30, 35, 45

Canoga Corp. of California, Calif., 17, 20

Carad Corp., Calif., 25

Caswell Electronic Corp., Calif., 10, 17, 30, 45

Centronix, Inc., Fla., 20, 25, 40

Chemalloy Electronics Corp., Calif., 7, RF Water Load

Coaxial Connector Co., N.Y., 17

Columbus Electronics Corp., 1010 Saw Mill River Rd., Yonkers, N.Y., 20

See ads on page 511, 543

Tel: YONkers 8-1221

Compagnie Generale de Metrologie, France, 15, 25

Control Electronics Co., 10 Stepar Pl., Huntington Station, L.I., N.Y., 15, 40

See ads on pages 321, 451

Tel: HAMilton 7-7961

Crosby Laboratories, Inc., N.Y., 25, 40

Cubic Corp., Calif., 7, 35

Daystrom Inc., Weston Instruments Div., N.J., 5, 10

Decade Instrument Co., N.J., 20

Defiance Engrg. & Microwave Corp., Mass., 10, 17, 30

DeMornay-Bonardi, 780 So. Arroyo P'kway, Pasadena, Calif., 10, 17, 30, 45

See ad on pages 120-121

Tel: SYcamore 2-4142

Diamond Antenna & Microwave Corp., Mass., 10, 17, 30

Divco Wayne Electronics, Ohio, 10, 25

Douglas Microwave Co., Inc., Dept. R-9, 252 E. 3rd St., Mt. Vernon, N.Y., 10, 30, 45

See ad on pages 40-41

Tel: MOUNT Vernon 8-6900

DuMont Labs., Inc., Allen B., Scientific Instrument Div., N.J., 25

Dymec, Inc., Calif., 20

E.M.I. Electronics Ltd., England, 20, 30

EPR Special Products Corp., N.Y., 17, 20, 25

Electrical & Physical Instrument Corp., N.Y., 25

Electro Impulse Laboratory, 208 River St., Red Bank, N.J., 5, 7, 10

See ad on pages 92-93

Tel: SHAdyside 1-0404

Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 20, 25, 40

See ad on this page

Tel: TEXas 0-9193

Electronic Applications, Inc., Conn., 10

Electronic Tube Corp., Pa., 25

Elsin Electronics Corp., N.Y., 10, 17, 20, 30, 45

Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 17, 25

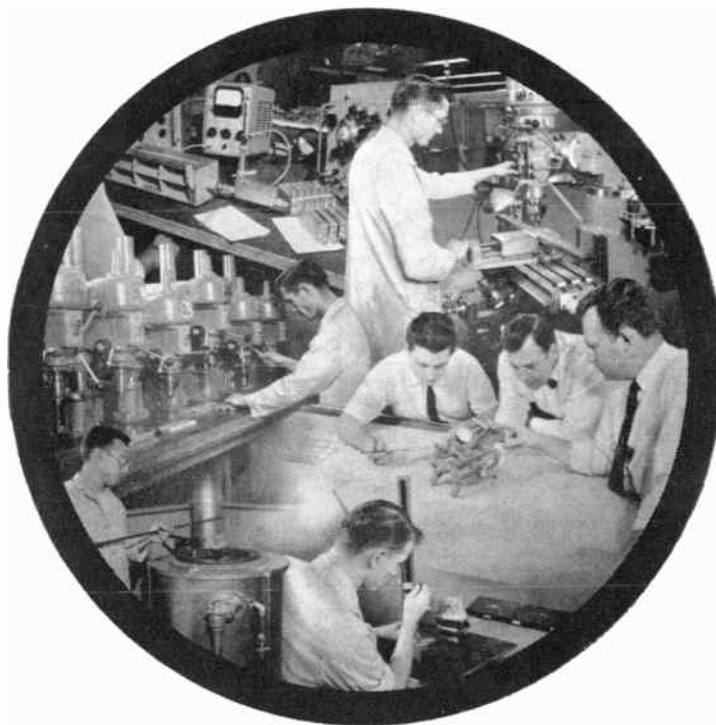
See ad on page 91

Tel: VICTor 2-8400

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

RAMCOR

*Creating
Advanced Concepts
In Microwave
And Electronic
Instrumentation*



Ramcor makes available to government and industry a specialized combination of creative engineering, proven development techniques and precision production abilities.

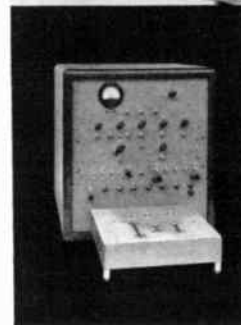
Ramcor is a dynamic merger of a mature manufacturing organization with a first rank engineering team—both rigorously schooled in design, development and production of electronic instruments, systems and system support equipment.

Organized, staffed and equipped to meet the most critical requirements of government and industrial programs, Ramcor offers the scientific knowledge, engineering experience and production capabilities needed to produce next generation concepts—today.



RADAR MEASUREMENTS CORPORATION

190 DUFFY AVENUE, HICKSVILLE, N. Y.



Microwave Equipment

- Adapters
- Attenuators, Calibrated 20 db
- Attenuators, precision rotary calibrated
- Attenuators, variable
- Attenuators, fixed
- Bends "E"
- Bends "H"
- Detectors—shorts, adjustable
- Detectors, fixed
- Directional Couplers, bi-directional, 10 db
- Directional Couplers, cross guide, 20, 30 db
- Directional Couplers, multi-hole, 10 db
- Horns
- Mixers
- Switches
- Slotted lines
- Tees, series
- Tees, shunt
- Tees, hybrid
- Terminations, high-power
- Terminations, low-power
- Terminations, sliding
- Tuners, E-H
- Tuners, slide screw
- Universal probe carriages

Coaxial Equipment

- Attenuators, variable
- Directional couplers, type N
- Adapters, type N to $\frac{1}{8}$
- Detectors, type N
- Tuners, double stub type N
- Slotted lines
- Terminations, type N
- Thermistor mounts
- Terminations, sliding, type N

Complete data on equipment, available on request

Directory I. Complete Equipment

19. Microwave Test Equipment.

Engineering Associates, Ohio, 5, 10, 20, 25, 30, 35, 45
 Exact Electronics, Inc., Ore., 25, 40
FXR, Inc., 26-12 Borough Place, Woodside 77, N.Y., 5, 10, 17, 20, 25, 30, 35, 45
 See ad on pages 97-100
 Tel: **AStoria 8-2800**
 Federal Mfg. & Eng. Corp., N.Y., 15, 25
 Filmohm Corp., N.Y., 5
Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J., 10, 20, 45
 See ad on page 453
 Tel: **PRospect 4-0500**
 General Applied Science Labs., Inc., N.Y., 25
 General Bronze Corp., GB Elec. Corp. Subsid., N.Y., 30
 General Communication Co., Mass., 10, 25, 45
General Devices, Inc., P.O. Box 253, Princeton, N.J., 17, 20
 See ad on page 360
 Tel: **DAvis 9-2323**
 General Electric Co. Apparatus Sales Div., N.Y., 10
 General Electronic Labs., Inc., Mass., 10, 35
 General Mills, Inc., Mechanical Div., Minn., Radar Test Sets
General Radio Co., West Concord, Mass., 20, 25, 30, 40
 See ad on Cover 4
 Tel: **EMerson 9-4400**
 Gertsch Products, Inc., Calif., 10
 Gombos Co., Inc., John, N.J., 10, 30, 45
 Gordon Co., Herbert W., Mass., 10, 20, 25, 30, 35, 45
Halicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 7, 15, 20, 25
 See ad on page 204
 Tel: **VAn Buren 6-6300**
 Hammer Electronics Co., Inc., N.J., 25, Pulse Analyzer
Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 7, 10, 20, 25, 30, 35, 40, 45
 See ad on pages 3-18
 Tel: **DAvenport 5-4451**
 Hickok Electrical Instrument Co., Ohio, 10, 15, 20, 25
 I-T-E Circuit Breaker Co. Special Prods., Div., Pa., 30
 I.T.&T. Corp., Indust. Prods. Div., N.J., 10, 20, 30, 35
 Itek Corp., Mass., Microwave Spectrum Analyzers
 J-V-M Microwave Co., Ill., 5, 10, 15, 17, 20, 25, 30, 45
 Jetronic Industries, Inc., Pa., 15, 25
 Jones Electronics Co., Inc., M.C., Conn., 35
Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 45, Random Noise Generator
 See ad on page 268
 Tel: **CApital 6-4000**
Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 17, 20, 25, 30, 35, 40, 45
 See ad on page 348
 Tel: **GRegory 2-1000**

Laboratory for Electronics, Inc., Mass., 10, 20
 Lambda-Pacific Engr. Inc., Calif., 10, 45
Lavoie Labs., Inc., Matawan-Freehold Rd., Morganville, N.J., 10, 25
 See ad on page 300
 Tel: **LOWell 6-2600**
 Levinthal Electronic Products, Inc., Calif., 25
 Lieco Inc., N.Y., 17, 30
 Ling Systems Inc., Calif., 45
 Litton Industries, Airtron Inc., Div., N.J., 17
Lumatron Electronics, Inc., Dept. IR-60, 68 Urban Ave., Westbury, L.I., N.Y., 25
 See ad on page 331
 Tel: **EDgewood 4-3100**
 M E Labs., Calif., 7, 10, 17, 20
Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 20, 25
 See ad on pages 302-303
 Tel: **DAvis 5-1391**
Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 10, 30, 45
 See ad on page 318
 Tel: **LOWell 7-0607**
 Marconi's Wireless Telegraph Co. Ltd., N.Y., 17
 Marstan Electronics Corp., N.Y., 40
 Maxson Corp., W. L., Instruments Div., N.Y., 20

Menlo Park Engineering, 711 Hamilton, Menlo Park, Calif., 20
 See ad on page 373
 Tel: **DAvenport 6-9080**
 Metco, Inc., Mass., 17, 20, 35, 45
 Metropolitan Electronics & Instruments Co., N.Y., 20
 Mico Instrument Co., Mass., 45
 Microtech, Inc., Conn., 30
 Microtronics, Inc., N.J., 10, 45
 Microwave Assoc., Inc., Mass., 5, 7, 10, 17, 20, 30, 45
 Microwave Development Labs., Inc., Mass., 17
 Miller Associates, Conn., Radar Monitor
 Missouri Research Labs., Inc., Mo., Radar Analyzer
 Monitor Products Co., Calif., 20
 Mu Beta Products, Calif., 20
Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, L.I., N.Y., 5, 10, 17, 30, 35, 45
 See ad on pages 141-144
 Tel: **Pioneer 6-4650**
Narda Microwave Corp., High Power Electronics Div., Dept. IRED-9, 118-160 Herricks Rd., Mineola, L.I., N.Y., 25
 See ad on page 145
 Tel: **Pioneer 6-4650**

From PITLOG—

STALO STABILITY TESTER

Accurate to 1 part in 10⁹



A VERSATILE MICROWAVE STABILITY TESTER... DESIGNED FOR ANY APPLICATION REQUIRING PRECISE MEASUREMENT OF FREQUENCY STABILITY.



SERIES 800

Measures short term deviation and long term drift from UHF to 10,000 mc. Checks stability of radar systems' components — stalos, cohos, IF's, klystrons and other stable signal sources — either on production line or in the field. Particularly useful in design, test and maintenance of MTI radars.



Other PITLOG components — Tunable Stalos — stable local oscillators covering UHF, L.S.C., or X-Band frequencies.

PITOMETER LOG CORP.

237 Lafayette Street New York 12, N. Y. Canal 6-7250
Advanced Instrumentation Since 1927

Write for Bulletin A-1

For details, circle #254 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

for

PRECISION MEASUREMENTS

from 50 to 10,500 MCS

WEINSCHEL

100% Square Wave MODULATED RF SOURCES Offer High Amplitude and Frequency Stability



Model MS-6

Output Amplitude Independent of Load

Feedback circuit maintains constant incident power, allowing use of full generator output without power consuming impedance masking.

Amplitude Stability

After one hour warm-up and without feedback circuit: ± 0.1 db/hr. With regulator and external directional coupler, the incident power will change less than 0.2 db for a change in load of from 25 to 150 ohms. With a voltage probe, the voltage variation is reduced by 10:1 by feedback.

| Model No. | Frequency MCS | Minimum Peak Power Output (100% Sq. Wave Modulated) |
|-----------|---------------|---|
| MS-1 | 50-250 | 80MW |
| MS-2 | 250-920 | 200MW |
| MS-3 | 900-2000 | 100MW |
| MS-4 | 2000-4200 | 60MW |
| MS-5 | 4000-7300 | 40MW |
| MS-6 | 7200-10,500 | 30MW |

Write for complete specifications.

Weinschel Fixed Coaxial Attenuators cover the frequency range of DC to 12 KMC.



Weinschel Engineering KENSINGTON, MARYLAND

For details, circle #255 on Reader Service Card

19. Microwave Test Equipment.

- Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 25, 40
See ad on page 506
Tel: HOWard 5-7700
- Northeast Electronics Corp., N.H., 35
Northeast Scientific Corp., 30 Wetherbee St., RFD 1, South Acton, Mass., 20, 25
See ad on page 497
Tel: COLonial 3-7706
- Omega Laboratories, Inc., Mass., 17, 30, 45
- Orbitran Co., Inc., Calif., 40
- Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 25
See ad on page 246
Tel: BRAdshaw 2-6141
- Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 10, 15, 25, Spectrum Analyzer
See ad on page 320
Tel: OWens 9-4600
- Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 25
See ad on page 306
Tel: TRinity 8-3251
- Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 17, 20
See ad on page 323
Tel: CANal 6-7250
- Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 20, 25, 35
See ad on pages 135-136
Tel: EXeter 2-4500
- Polytechnic Research & Dev. Co., Inc., N.Y., 5, 7, 10, 20, 30, 35
- Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 17, 45
See ad on page 594
Tel: WEStmore 9-4092
- Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 10, 17, 20, 45
See ad on page 390
Tel: WEStmore 9-8900
- Press Wireless Labs., Inc., Mass., 30
- Probescope Co., Inc., 8 Sagamore Hill Dr., Port Washington, L.I., N.Y., 15
See ad on page 340
Tel: POrt Washington 7-8150
- Production Research Corp., N.Y., 10
- Radar Design Corp., N.Y., 30, 45
- Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 10, 25, 30, 35, 45
See ad on page 322
Tel: OVerbrook 1-5600
- Radio City Products Co., Inc., Pa., 25
- Ramo-Wooldridge Corp., Calif., 35
- Rantec Corp., 23999 Ventura Blvd., Calabasas, Calif., Modulators
See ad on page 385
Tel: DIAMond 7-5446
- Resdel Engrg. Corp., Calif., 20, 25
- Rohde & Schwarz Sales Co., Inc., N.J., 20, 30
- Rutherford Electronics Co., Calif., 25, 40, Pulse Systems
- Sage Labs., Inc., Mass., 10, 17, 30, 45
- Saratoga Industries, N.Y., 10, 17, 20, 25, 45
- Scientific-Atlanta, Inc., Ga., 17, 20
- Servo Corp. of America, N.Y., 5
- Siemens & Halske, A. G., Germany, 10, 20, 30, 45

- Sierra Electronic Corp., 5442D Bohannon Drive, Menlo Park, Calif., 7, 20, 25, 35, wave analyzers
See ad on pages 30-31
Tel: DAVenport 6-2060
- Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 25
See ad on page 475
Tel: ESTebrook 9-1121
- Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 5, 7, 10, 17, 20, 30, 35, 45
See ad on page 595
Tel: CHerry 4-5519
- Sivers Lab., Sweden, 10, 17, 20, 30, 35, 45
- Solartron Electronic Group, Ltd., England, 35
- Specialty Electronics Development Corp., N.Y., 10, 17, 20, 25, 45
- Specialty Engrn. & Electr. Co., N.Y., 25
- Spectralab Instruments, Calif., 20
- Spencer-Kennedy Labs., Inc., Mass., 25
- Sperry Rand Corp., Sperry Microwave Elect. Co. Div., Fla., 5, 10, 17, 25, 30, 35, 45
- Standard Telephones & Cables, Ltd., England, 25, 45
- Stewart Engineering Co., Calif., 20
- Strand Labs., Inc., Mass., Signal Generators & Spectrometers
- Sun Electric Corp., Ill., 10
- Sunvic Controls, Ltd., England, 25
- Systron Corp., Calif., 40
- Ta-Mar, Inc., Calif., 30
- Technicraft Labs., Inc., Conn., 30
- Telectro Industries Corp., N.Y., 10, 15, 25, 35, 40
- Telerad Mfg. Corp., N.Y., 10, 17, 20, 45
- Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 25, 40, Telemeter Test Oscillator
See ad on page 308
Tel: EDgewood 3-1027
- Telonic Industries, Inc., Ind., 20
- Triplett Electrical Instrument Co., Harmon Road, Bluffton, Ohio, 15
See ad on page 472
Tel: 323-W
- United Microwave Co., N.Y., 5, 10, 17, 20, 30, 45
- United Shoe Machinery Corp., Research Div., Mass., 10, 17, 30, 45
- Uniwave, Inc., N.Y., 5, 7, 17, 30, 35, 45
- Van Norman Industries, Inc., N.H., 10
- Varian Associates, Instrument Div., Calif., 20
- Vectron, Inc., Mass., 15, Microwave, Spectr. Analy. Multip. Gating Unit
- Victor R. F. & Microwave Co., Mass., 5, 20, 30, 35, 45
- Visual Electronics Corp., N.Y., 10
- Waldorf Instrument Co., Huyck Sons Div., N.Y., 15, 35
- Wave Particle Corp., Calif., 20
- Waveline, Inc., N.J., 10, 20, 30, 35, 40
- Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 45
See ad on page 277
Tel: GARfield 5-2844
- Weinschel Engrg. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 20
See ads on pages 324, 390
Tel: LOKwood 4-0121

Directory I. Complete Equipment

Microwave transmitters:
 See class 18

Microwave tuners: See class 77

Microwave, waveguides:
 See class 80

Milli-ammeters: See class 56

20. Mobile Equipment.

- | | |
|----------------------------------|---------------------------------|
| 5. Central station receivers | 20. Mobile receivers |
| 10. Central station transmitters | 25. Mobile transmitters |
| 15. Citizen radio | 30. Selective calling equipment |
- A.R.F. Products, Inc., Ill., 20, 25
 Admiral Corp., Ill., 20, 25
 Aermotive Equipment Corp., Mo., 20, 25
 Aeronautical Electronics, Inc., N.C., 5, 10, 20, 25, 30
Aircraft Radio Corp., Boonton, N.J., 20, 25
 See ad on page 164
 Tel: DEerfield 4-1800
 Allied International Corp., N.Y., 5, 10, 20, 25
 Amelco, Inc., Calif., 5, 10, 20, 25
American Television & Radio Co., 300 E. Fourth St., St. Paul 1, Minn., 20
 See ad on page 426
 Tel: CApital 2-3791
 Antrex Corp., Ill., 25, 30
 Arkay, Inc., New York, 15, 20, 25
 Audio-Video Corp., N.Y., 20, 25
 Avco Corp., Crosley Div., Ohio, 20, 25, 30
 Barker & Williamson, Inc., Pa., 15, 20, 25
 Beam Instruments Corp., N.Y., 20, 25
 Bendix Aviation Corp., Ind., 5, 10, 20, 25, 25
 Bendix Aviation Corp., Mich., 15, 20, 25, 30
 Bendix Aviation Corp., Bendix Radio Div., Md., 5, 10, 15, 20, 25, 30
 Bendix Radio Indust. Commun.-Electronic Prods., Md., 5, 10, 15, 20, 25, 30
 Canadian G.E. Co. Ltd., Electr. Equip.-Tube Dept., Canada, 5, 10, 15, 20, 25, 30
 Canadian Marconi Co., Canada, 5, 10, 20, 25, 30
 Centronix, Inc., Fla., 20, 25, 30
 Chisholm Industries Ltd., Canada, 20, 25

Use the Reader Service Card at the back of this issue for further information on advertised products.

20. Mobile Equipment.

- Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
 See ad on pages 32-33
 Tel: EMpire 3-0281
 Communications Co., Fla., 5, 10, 20, 25
 Cook Electric Co., Ill., 5, 10, 20, 25
 Corbin Corporation, Md., 5, 15
Craig Systems, Inc., Dept. H-1, 361 Merrimack St., Lawrence, Mass., 20, 25
 See ad on page 598
 Tel: MURdock 8-6961
 Creative Electronics Corp., Conn., 5, 10, 15, 20, 25
 Designers for Industry, Inc., Ohio, 20, 25
 DuMont Labs., Inc., Allen B., N.J., 5, 10, 15, 20, 25, 30
 DuMont Labs. Inc., Allen B., Scientific Instrument Div., N.J., 5, 20, 25
 Dynamic Electronics-New York, Inc., N.Y., 15, 20, 25
 EPR Special Products Corp., N.Y., 20, 25
 Electrical Communications, Calif., 30
 Electronic Engrg. Co., Md., 5, 10, 15, 20, 25
 Fisher Research Lab., Inc., Calif., 15
 Gates Radio Co., Ill., 10
 General Electric Co., Communication Prods. Dept., Va., 5, 10, 15, 20, 25, 30
 General Electric Co., Ltd. of England, England, 5, 10, 15, 20, 25, 30
 Gyro Electronics Co., N.Y., 15
Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 15, 20, 25
 See ad on page 204
 Tel: VAn Buren 6-6300
Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10, 15, 20, 25
 See ad on page 328
 Tel: YUKon 3-3961
 Hosmer & Co., E. A., Calif., 30
I.D.E.A. Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 20
 See ad on page 485
 Tel: LIBerty 7-3581
 I.T.&T. Corp., Industrial Prods. Div., Calif., 5, 10, 15, 20, 25, 30
 Johnson Co., E. F., Minn., 15, 25
 Kaar Engrg. Corp., 5, 10, 15, 20, 25
 Kaiser Industries, Kaiser Aircraft-Elect. Div., Ohio, 5, 10, 20, 25
 King Radio Corp., Kansas, 5, 10, 15, 20, 25
 Knight Electronics, Ill., 15
LEL, Inc., 384 Oak St., Copiague, L.I., N.Y., 15
 See ad on page 372
 Tel: AMityville 4-2200
 Lenkurt Electric Co., Inc., Calif., 5, 10, 20, 25, 30
 Litton Industries, Md. Div., Md., 20, 25
 Madigan Corp., N.Y., 5, 10, 15, 20, 25, 30
 Marconi's Wireless Telegraph Co. Ltd., N.Y., 5, 10, 20, 25, 30
 Marine View Electronics Inc., N.Y., 30
 Metox, France, 20, 25
 Morrow Radio Mfg. Co., Oregon, 20, 25
 Motorola Communications & Electronics, Inc., Ill., 5, 10, 15, 20, 25
 Mullard Overseas, Ltd., England, 5, 10, 20, 25
 Multi-Products Co., Mich., 15
 North Electric Co., N.Y., 30
 North Electric Co., Ohio, 30
 Pearce-Simpson, Inc., Fla., 20, 25
 Philco Corp., Govt. & Indl. Div., Pa., 5, 10, 20, 25, 30
 Port-O-Vox Corp., N.Y., 20, 25
 Pye Corporation of America, N.J., 5, 10, 20, 25
 Pye Telecommunications Ltd., England, 5, 10, 15, 20, 25, 30
 Radio Corp. of America, Defense Elec. Prod., N.J., 10, 20, 25
 Radio Receptor Co., Eng. Prods. Div., N.Y., 5, 10, 20
 Rycorn Instruments, Mo., 20, 25
Sargent & Greenleaf, Inc., Security Devices Laboratory Div., 24 Seneca Ave., Rochester 21, N.Y., 30
 See ad on page 393
 Tel: HOPkins 7-3200
 Scantlin Electronics, Inc., Calif., 30
 Secode Corp., Calif., 30
 Seeley Electronics, Calif., 5, 20
 Specialty Engrn. & Electr. Co., N.Y., 20, 25, 30
 Sperry Products, Inc., Conn., 20, 25, 30
 Spilsbury & Tindall Ltd., Canada, 5, 10, 20, 25, 30
 Stromberg-Carlson Div., General Dynamics Corp., N.Y., 20, 25, 30
 Techniflex Mfg. Co., Inc., N.Y., 30
 Telephonics Corp., N.Y., 20, 25
 Tenna Mfg. Co., Ohio, 20
 Visual Electronics Corp., N.Y., 5, 10, 20, 25
 Vocaline Co. of America, Inc., Conn., 15
 Westrex Corp., N.Y., 5, 10, 20, 25
 Wunderlich Radio Co., Ill., 5, 10, 20, 25
 Young Spring & Wire Corp., Gosnet Div., Calif., 15, 20, 25
 Z & W Mfg. Corp., Ohio, 15

21. Monitor Equipment.

- | | |
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| 5. Frequency | 15. Remote control |
| 10. Modulation | monitors |
| | 20. Video monitors |
- A.R.F. Products, Inc., Ill., 10
 Adler Electronics, Inc., N.Y., 20
 Admiral Corp., Ill., 15, 20
 Airmec Limited, England, 5, 10
Airpax Electronics, Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla., Cambridge Div., Jacktown Rd., Cambridge, Md., 5
 See ad on pages 82-83
 Tel: LUDlow 3-6160

21. Monitor Equipment.

Amelco, Inc., Calif., 5
 American Electronics, Inc., American Data Div., N.Y., 15
 American Mach. & Foundry Co., D.C., 5, 10, 15
 Audio-Video Corp., N.Y., 20
 Avtron Mfg. Co., Ohio, 5, 10
 Babcock Radio Engrg., Inc., Calif., 15
 Beckman, Berkeley Div., Calif., 5
 Beckman Instruments, Inc., Helipot Div., Calif., 5
Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 10, 15, 20
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 Tel: **LO**well 3-9511
 Biddle Co., James G., Pa., 5
 Blonder-Tongue Labs., Inc., N.J., 20
 Budelman Electronics Corp., Conn., 5, 10
 CGS Labs., Inc., Conn., 5
 Canadian Marconi Co., Canada, 5, 10
 Canoga Corp. of California, Calif., 20
 Cohu Electronics, Inc., Kin. Tel., Div., Calif., 20
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
 See ad on pages 32-33
 Tel: **EM**pire 3-0281
 Computer-Measurements, Co., Calif., 5
 Conrac, Inc., Calif., 20
 Control Corp., Minn., 15
 Cunningham, Son & Co., Inc., James, N.Y., 15, 20
 Decade Instrument Co., N.J., 5
 DuMont Labs., Inc., Allen B., N.J., 20
 DuMont Labs., Inc., Allen B., Scientific Instrument Div., N.J., 20
 Dynapar Corp., Ill., 5
 E.M.I. Electronics Ltd., England, 20
 Eidson Electronic Co., Texas, 10
 Electric Regulator Corp., Conn., 5, 15
 Electronic Applications, Inc., Conn., 5
Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 10
 See ad on page 91
 Tel: **VI**ctor 2-8400
 Erco Radio Labs., Inc., N.Y., 10, FM
Erie Resistor Corp., 644 West 12th St., Erie 6, Pa., 5
 See ad on pages 110-111
 Tel: **GL**endale 6-8592
Foto-Video Labs., Inc., Dept. I-1, 36 Commerce Rd., Cedar Grove, N.J., 15, 20
 See ad on page 490
 Tel: **CE**nter 9-6100
 Gates Radio Co., Ill., 5, 10
 General Automatics, Inc., Calif., 15
 General Communications, Inc., Wisc., 20
 General Electric Co., Computer Dept., Ariz., 15
 General Electric Co., Technical Prods., Operation, N.Y., 20
 General Precision Lab., Inc., N.Y., 20
General Radio Co., West Concord Mass., 5, 10
 See ad on Cover 4
 Tel: **EM**erson 9-4400
 Grimson Color Inc., N.Y., 20
 Hallamore Electronics Co., Calif., 20

See the pink section preceding page 1 for a complete explanation of how to get the most out of this Directory.

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 5
 See ad on pages 3-18
 Tel: **DA**venport 5-4451
 Huyck Sons, F. C., Waldorf Electronics Div., N.Y., 15, 20
 Industrial Television Inc., N.J., 20
 Insul-8-Corp., Calif., 20
 I.T.&T. Corp., Industrial Prods. Div., Calif., 20
 Jerrold Electronics (Canada) Ltd., Canada, 20
Knights Co., James, 101 E. Church St., Sandwich, Ill., 5
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 Tel: 2141
 Lampkin Labs., Inc., Fla., 5, 10
 Litton Industries, Md. Div., Md., 10
 Magnetic Research Corp., Calif., 5
 Maico Electronics, Inc., Minn., 20
Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 10
 See ad on page 318
 Tel: **LO**well 7-0607
 Marconi's Wireless Telegraph Co. Ltd., N.Y., 20
 Marine View Electronics Inc., N.Y., 15
 Maxson Corp., Langevin Div., N.Y., 20
 Minneapolis Honeywell Regulator Co., Md., 10, Voice Communications
 Minneapolis-Honeywell Regulator Co., Brown Instrument Div., Pa., 15
 Motorola Communications & Electronics, Inc., Ill., 10
 Multi-Products Co., Mich., 15
 New London Instrument Co., Conn., 5, 10
Northern Radio Co., Inc., 147 West 22nd St., New York 11, N.Y., 5
 See ad on pages 130-133
 Tel: **WA**tkins 9-9117
 Northrop Corp., Nortronics Div., Calif., 5, 10, 15
 Pan-Air Electronics Corp., Calif., 15
 Philco Corp., Govt. & Indl. Div., Pa., 15, 20
 Philco Corp., Western Development Labs., Calif., 5
Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 10
 See ad on page 323
 Tel: **CA**nal 6-7250
Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 5
 See ad on page 390
 Tel: **WE**stmore 9-8900
Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 5
 See ad on page 322
 Tel: **OV**erbrook 1-5600
 Radio Corp. of America, Defense Elec. Prod., N.J., 15, 20
 Radio Receptor Co., Eng. Prods. Div., N.Y., 5, 10, 15, 20
 Rank Cintel Ltd., England, 5, 15, 20
 Rohde & Schwarz Sales Co., Inc., N.J., 5
 Rowe Industries, Ohio, 5
 Scientific-Atlanta, Inc., Ga., 5, 10
 Servo Corp. of America, N.Y., 5
 Setchell-Carlson, Inc., Minn., 20
 Skiatron Elect.-Television Corp., N.Y., 20
 Systron Corp., Calif., 5

Taller & Cooper, Inc., Div. of American Electronics, N.Y., 15
 Tektronix, Inc., Ore., 20
 Tel-Instrument Electronics Corp., N.J., 20
 Telechrome Mfg. Corp., N.Y., 20
 Telectro Industries Corp., N.Y., 10, 20
 Television Utilities Corp., N.Y., 15, 20
 Texas Instruments Incorporated, Houston, Texas, 5
 Thompson Ramo Wooldridge, Inc., Calif., 20
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5
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 Tel: **EL**izabeth 4-5650
 Towaco Electronics, N.J., 5
 U.S. Science Corp., Sub. Topp Indust. Inc., Calif., 5, 10
 Visual Electronics Corp., N.Y., 5, 10, 15, 20
 Waldorf Instrument Co., Huyck Sons Div., N.Y., 20
Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 10, 20
 See ad on page 330
 Tel: **GA**rfield 6-8600
 Waugh Engrg. Co., Calif., 5

Multimeters: See class 12

Multi-vibrators: See class 26

Noise analyzers: See class 3

22. Nuclear Equipment.

| | |
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| 5. Beta gauges | 35. Pulse count integrators |
| 10. Crystals | 40. Radiation detectors |
| 15. Dosimeters | 45. Scalers |
| 20. Ionization chambers | 50. Survey meters |
| 25. Ionization gauges | |
| 30. Particle accelerators | |

Admiral Corp., Ill., 15, 40
 Airmec Limited, England, 40, 45
 American Electronics, Inc., Calif., 40
 American Mach. & Foundry Co., D.C., 15
 American Tradair Corp., N.Y., 5, 10, 20, 35, 40, 45, 50
Anton Electronic Labs., Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 5, 20, 40, 50, air particle monitor
 See ads on pages 327, 418, 579
 Tel: **EV**ergreen 6-5715
 Applied Physics Corp., Calif., 20
 Applied Radiation Corp., Calif., 30, 35
 Atomic Labs., Inc., Calif., 30, 40
 Avo, Ltd., N.Y., 15
 B.J. Electronics, Borg-Warner Corp., Calif., 15, 40, 45
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 5, 10, 15, 20, 25, 35, 40, 45, 50
 See ad on page 296
 Tel: **UN**iversity 4-7520
 Bausch & Lomb Optical Co., N.Y., 15
 Bendix Aviation Corp., Ind., 15
 Bendix Aviation Corp., Mich., 15, 40

Directory I. Complete Equipment

22. Nuclear Equipment.

Bendix Aviation Corp., Cincinnati Div., Ohio, 15, 20, 40, 50, Pulse Hgt. Analyz.

Bon-De Electronic Labs., Inc., Mass., 25

Bram Metallurgical-Chemical Co., Pa., 10

Brooks Research, Inc., N.Y., 30, 35, 40, 45, 50

Cambridge Instrument Co., Inc., N.Y., 15

Canadair Ltd., Missile & Systems Div., Canada, Res.-Type Nuclear Reactors

Canadian G.E. Co., Ltd., Electr. Equip.-Tube Dept., Canada, 40

Canadian Research Institute, Canada, 40

Central Electronic Mfg. Inc., N.J., 25

Components Corp., N.J., 50

Computing Devices of Canada, Ltd., Canada, 15, 35

Cook Electric Co., Inland Test. Labs. Div., Ill., 20

Curtiss-Wright Corp., Electronics Div., West Caldwell, N.J., 5
See ad on page 514
Tel: GENEVA 8-4000

Daystrom Inc., Weston Instruments Div., N.J., 40

Designers for Industry, Inc., Ohio, 5

Douglas Radio Labs., Mass., 45

E A K Research Lab., N.Y., 20, 40, 45, 50

E H Research Labs., 1922 Park Blvd., Oakland 6, Calif., 45
See ad on page 298
Tel: GLENCOURT 2-1314

E.M.I. Electronics Ltd., England, 15, 40

Eastman Kodak Co., 343 State Street, Rochester 4, N.Y., 15, 40
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Tel: LOCUST 2-6000

Eberline Instrument Corp., New Mexico, 40, 50

Edgerton, Germeshausen & Grier, Inc., Mass., 15

Edwards High Vacuum Ltd., Canada, 25

Ekco Electronics Ltd., England, 5, 10, 20, 35, 40, 45, 50

Eldorado Electronics, Calif., 35, 45

Electric Regulator Corp., Conn., 50

Electrical & Physical Instrument Corp., N.Y., 45

Electronic Products Co., N.Y., 25, 40, 50

Electronic Research Labs., Mass., 25

Emerson Radio & Phonograph Corp., Md., 35, 40

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5
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Tel: BIGELOW 3-0030

Engineered Electronics Co., Calif., 45

Engineering Associates, Ohio, 20, 45

Engineering Specialties, Ohio, 20

Eteleo, Ltd., England, 35, 40, 45

Fairchild Camera & Instrument Corp., Defence Prods. Div., N.Y., 40

Ferranti-Packard Electric Ltd., Canada, 5, 15

Fisher Research Lab., Inc., Calif., 15, 40, 45, 50

Franklin Electronics, Inc., Pa., 45

General Electric Co., Instrument Dept., Mass., 20, 40

General Electric Co., X-Ray Dept., Wis., 5, 20, 30, 40

General Electric Co., Ltd. of England, England, 15, 40

Gulton Industries, Inc., N.M., 30, 35

Hamner Electronics Co., Inc., N.J., 35, 45, Scintillation Counters

Harvey-Wells Elect., Mass., 45

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 40
See ad on page 328
Tel: YUKON 3-3961

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 45
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Tel: DAVENPORT 5-4451

High Voltage Engineering Corp., Mass., 30, Neutron Sources

Hoffman Electronics Corp., Calif., 40

Industrial Teconics, Inc., Mich., Nuclear Shielding

Interstate Electronics Corp., Calif., 10, 15, 20, 35, 45

Isomet Corporation, N.J., 10, 40, Isotopes

Isotope Develop., Ltd., England, 5, 15, 35, 40, 45, 50

Kaman Aircraft Corp., Nuclear Div., Colo., 30, 40

Land-Air, Inc., Ill., 20, 35, 50

Land-Air, Inc., Instrument & Electronic Div., Calif., 20, 40, 50

Landsverk Electrometer Co., Calif., 15, 20, 40, 50

Leeds & Northrup Co., Pa., 35

Levinthal Electronics Prods., Inc., Calif., 10, 40

Magnetic Instruments Co., Inc., 546 Commerce St., Thornwood, N.Y., 40
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Tel: ROGERS 9-5312

Maico Electronics, Inc., Minn., 40, 50

Measurement Engrg., Ltd., Canada, 40

Menlo Research Lab., Calif., 40, 50

Montek Associates, Inc., Utah, Scram Amplifiers

Moran Instrument Corp., Calif., 40

Multi-Tron Lab., Inc., Ill., 30

N R C Equipment Corp., Dept. 12, 160 Charlemont St., Newton 61, Mass., 25
See ad on page 670
Tel: DECATUR 2-5800

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- Nichols, Ltd., R. H., Canada, 50
- Norbute Corp., Metalab Equipment Co., Div., N.Y., Fume Hoods for Radioactive Materials
- Nuclear-Chicago Corp., Ill., 5, 10, 15, 20, 25, 35, 40, 45, 50
- Nuclear Corp. of America, N.J., 10, 15, 20, 25, 35, 40, 45, 50
- Nuclear Corp. of America, Inc., Mo., 5, 10, 15, 20, 25, 40, 45, 50
- Nuclear Development Lab., Mo., 40
- Nuclear-Electronics Corp., Pa., 20, 35, 40, 45, 50
- Nuclear Environments Assoc., Ohio, 40
- Nuclear Measurements Corp., Ind., 40, 45, 50, Gamma Alarm System
- Nuclear Research Corp., Pa., 40
- Nucleonic Corp. of America, N.Y., 15, 20, 35, 40, 45, 50
- Ohmart Corp., Ohio, 5, 20, 40, Gamma Gages
- Pacific Electro-Nuclear Corp., Calif., Pulse Height Analyzer
- Pacific Transducer Corp., Calif., 15, 40
- Patterson Moos Div., Universal Winding Co., N.Y., 5, 10, 15, 40
- Philips Electronics, Inc., N.Y., 40, 45, 50
- Pilot Chemicals, Inc., Mass., 10, 40
- Radiation Counter Labs., Inc., Ill., 5, 10, 15, 20, 35, 40, 45, 50
- Radiation Dynamics, Inc., N.Y., 30
- Radiation Instrument Dev. Lab., Inc., Ill., 10, 15, 40, 45
- Radio Craftmen, Calif., 40
- Rank Cintel, Ltd., England, 15
- Resitron Labs., Inc., Calif., 20, 25
- St. John X-Ray Lab., N.J., 15, 40
- Saratoga Industries, N.Y., 20, 40, 50
- Schlumberger Well Surveying Corp., Conn., Neutron Generators & Moisture Analyzers
- Scientific Engrg. Labs., Inc., 1510 Sixth St., Berkeley 10, Calif., 25, 30, 45
See ad on page 673
Tel: Landscape 6-2772
- Single Crystal Corp.-Amer., Pa., 10
- Specialty Electronics Development Corp., N.Y., 15, 40, 50
- Specialty Engrn. & Electr. Co., N.Y., 15, 40, 50
- Sperry Gyroscope Co. of Canada, Ltd., Canada, 15
- Strand Engineering Co., Mich., 40, 50
- Summers and Mills, Inc., Tex., 40
- Systems, Inc., Fla., 35, 40, 50
- Syston Corp., Calif., 45
- Technical Associates, Calif., 20, 40, 45, 50
- Technical Measurement Corp., Conn., 40, 45
- Tracerlab, Inc., Mass., 5, 10, 15, 20, 25, 35, 40, 45, 50
- Tullamore Electronics Co., Ill., 35, 45
- Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 15, 40, 50
See ad on pages 50-51
Tel: HUmboldt 2-4200
- U. S. Radium Corp., N.J., Radiation Sources
- U. S. Science Corp., Sub. Topp Indust., Inc., Calif., 15
- Universal Transistor Prods., N.Y., 5, 10, 15, 20, 35, 40, 45, 50

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22. Nuclear Equipment.

Vacuum Tube Products Co., Inc., Calif., 25
 Varian Associates, Instrument Div., Calif., 30
 Victoreen Instrument Co., Calif., 15, 20, 40, 50
 Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 15, 20, 35, 40, 45, 50
See ad on page 578
Tel: ENdicott 1-6200
 Wave Particle Corp., Calif., 30
 Welch Scientific Co., W. M., Ill., 25
 Western Radiation Lab., Calif., 5, 40, Radioisotopes
 Westinghouse Electric Corp., Pa., 40
 Wood Counter Lab., N., Ill., 40, Neutron Counters

Null indicators: See class 12

Ohm meters: See class 12

Oscillators, beat frequency:
See class 3

Oscillators, microwave:
See class 19

Oscillators, radio frequency:
See class 26

23. Oscilloscopes—Cathode-Ray.

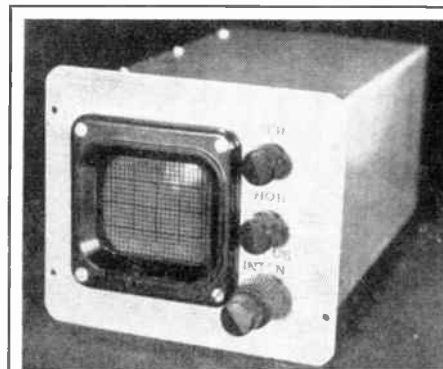
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 Advanced Electronics Mfg. Corp., Calif., 5
 Airmec Limited, England, 5
 Airtronics, Inc., D.C., 25
 Allegany Instrument Co., Inc., Md., 20, 30
 American Electronic Labs., Inc., Pa., 5
 Analab Instrument Corp., N.J., 5, 15
 Applied Science Corp. of Princeton, N.J., 20
 Arkay, Inc., N.Y., 5
 Armstrong Whitworth Aircraft Ltd., Sir W. G., A.W.E. Electronics Div., Hucclecote, Gloucester, England, 10, 20
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Tel: TOil Bar 2261
 Artronic Instrument Co., Md., 30
 Avionics Corp. of America, Pa., 5
 Beam Instruments Corp., N.Y., 5, 10

23. Oscilloscopes—Cathode-Ray.

Beattie-Coleman, Inc., Calif., 10
 Beva Lab., Inc., N.J., 25
 Brooks Research, Inc., N.Y., 25
 Brush Instruments, Div. of Clevite Corp., Ohio, 20
Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 5
See ad on this page
Tel: CLOverdale 3-8931
 Canadian Research Institute, Canada, 20
 Central Research Labs., Inc., Minn., 20
 Centronix, Inc., Fla., 20
 Century Electronics & Instruments, Inc., Okla., 20
 Chadwick-Helmuth Co., Calif., Pulse Camera & Synchrometer
 Cohu Electronics, Inc., Massa Div., Mass., 20
 Compagnie Generale de Metrologie, France, 5
 Computer Equipment Corp., Calif., 30
 Consolidated Electrodynamics Corp., Calif., 20
 Dallons Labs., Inc., Calif., Cardioscopes
 Designers for Industry, Inc., Ohio, 5, 20, 25, 30
 DuMont Labs., Inc., Allen B., N.J., 5, 10
 DuMont Labs., Inc., Allen B., N.J., Scientific Instrument Div., 5, 10
 Dynamic Electronics-New York, Inc., N.Y., 5, 15, 30
EMI—Cossor Electronics, Ltd., 301 Windsor St., Woodside, Halifax, N. S., Canada, 5, 10
See ad on page 412
Tel: HALifax 6-7491
 E.M.I. Electronics, Ltd., England, 5, 10
 EPR Special Products Corp., N.Y., 5, 25
 Edgerton, Germeshausen & Grier, Inc., Mass., High Speed
 Edin Co., Inc., Mass., 20
 Electro Instruments, Inc., Calif., 5
 Electro-Medical Lab., Inc., Vt., 10
 Electro Precision Corp., Ark., 15, 25
 Electronic Tube Corp., Pa., 5, 10, 15, 20, 25
 Engineering Associates, Ohio, 5

Epic, Inc., N.Y., 20
 Epsco Worcester, Mass., 20
 Fairchild Camera & Instrument Corp., Defense Prods. Div., N.Y., 10
 Fairchild Camera & Instrument Corp., Indust. Prods. Div., N.Y., 5, 15
Foto-Video Labs., Inc., Dept. I-1, 36 Commerce Rd., Cedar Grove, N.J., 5
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Tel: CENter 9-6100
 Garfield Associates, E., Pa., 5, 10, 20
 General Electric Co., Apparatus Sales Div., N.Y., 20
 General Electric Co., Instrument Dept., Mass., 20
 Geotechnical Corp., Tex., 20
 Grass Instrument Co., Mass., 10
 Hamilton Watch Co., Hathaway Instrument Div., Colo., 10, 20
 Hamilton Watch Co., Industrial Div., Pa., 20
Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 30
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Tel: YUKon 3-3961
 Heitz, Inc., Karl, N.Y., 10
Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 5, 10, 15
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Tel: DAVenport 5-4451
 Hickok Electrical Instrument Co., Ohio, 5, 15
 Hughes Aircraft Co., Hughes Prod. Div., Calif., 5, 20
 Hycon Electronics, Inc., Calif., 5
 Hymac Corp., Calif., 5
 ITI Electronics, Inc., N.J., 5
 Industrial Television, Inc., N.J., 5
 International Electronics Corp., N.Y., 5, 20
 I. T. & T. Corp., Indust. Prods. Div., N.J., 5
 Jackson Elec. Instrument Co., Ohio, 5
 Jetronic Industries, Inc., Pa., 5
 Jodon, Inc., F. R., D.C., 5, 20
 Kingston Industries, Inc., Kingston Electronics Div., Mass., 5



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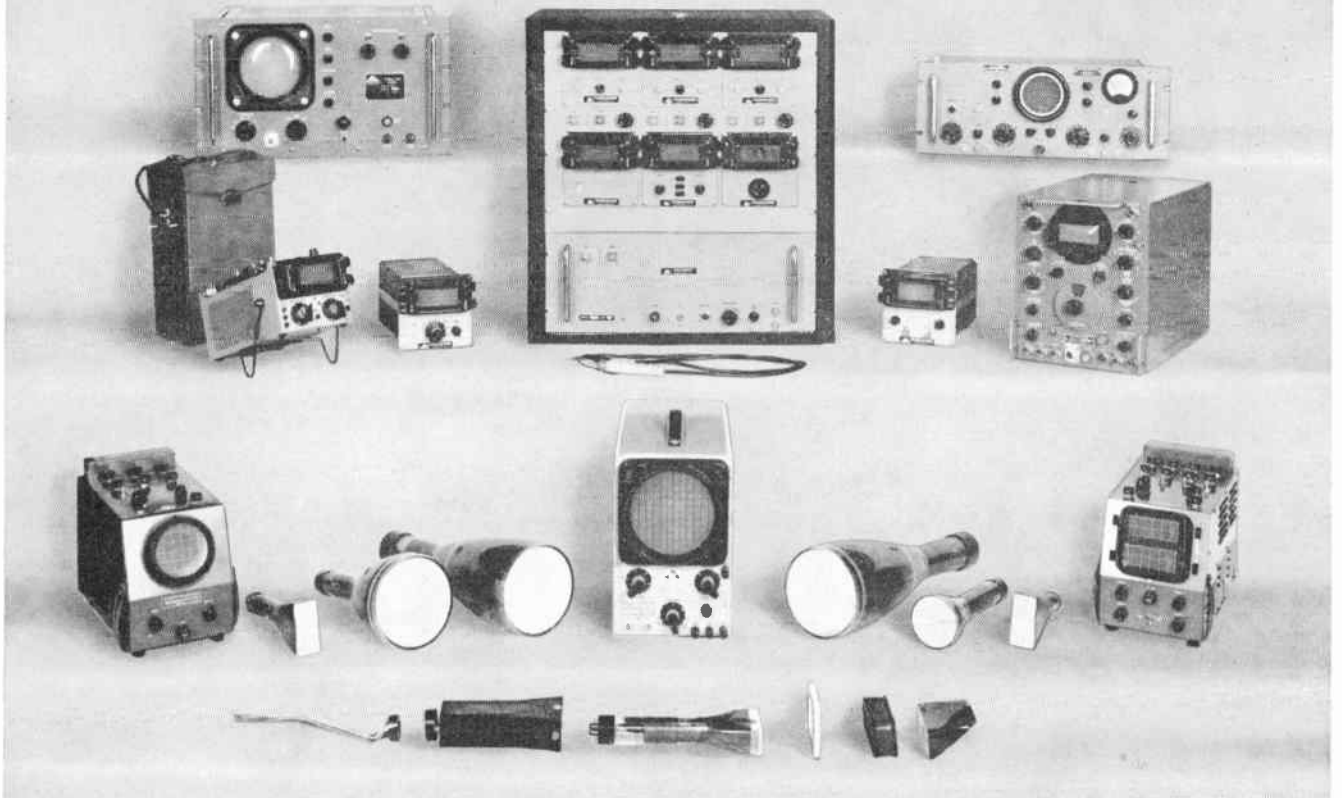
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PANELSCOPES[®]—Standard and custom designed panel mounted oscilloscopes in modular form of 5 $\frac{1}{4}$ " x 5 $\frac{1}{4}$ ". Amplifiers from 2 $\frac{1}{2}$ mv/inch, up to 10 mc; triggered, repetitive or expanded sweeps; and automatic portrayal available. Rugged and military construction.

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PULSESCOPES[®]—A series of versatile pulse synchrosopes for Laboratory, Field and Airborne use.

CRAFTSCOPES[®]—A series of direct reading portable industrial oscilloscopes featuring 5-inch displays, small size ($\frac{1}{2}$ to $\frac{3}{4}$ cu. ft.) and weights as low as 18 lbs.

POCKETSCOPES[®]—A series of extremely portable time-tested industrial oscilloscopes less than $\frac{1}{4}$ cu. ft. and weight as low as 8 lbs. with wide performance specifications.

RAYONIC[®] **CATHODE RAY TUBES**—A complete line of 3-inch and 5-inch tubes made to EIA or MIL specs. with rectangular and round cross sections. Tube lengths: from 7 inches. P1, P2, P7, P11 and special phosphors available.

ACCESSORIES

Probes—Amplifier, Attenuator, Crystal, Cathode Follower
Carrying Cases
Tube Mounting and Shielding Kits

WATERMAN PRODUCTS CO., INC.

2445 Emerald Street, Philadelphia 25, Pa.
GARfield 6-8600 • CABLE ADDRESS—Poketscope



Write for Engineering Data or contact your nearest Waterman representative or authorized industrial distributor.

Directory I. Complete Equipment

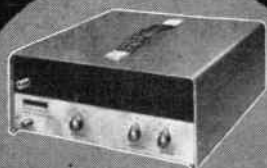
23. Oscilloscopes—Cathode-Ray.

MILLIMICROSECOND
INSTRUMENTS



MODEL 12

Fastest, most sensitive
Milli-Microsecond Oscilloscope.
Risettime: 0.4 milli-microseconds.
Sensitivity: 5 mv/cm.



MODEL 22

Advanced transistorized
milli-microsecond sampling
attachment converts conventional
oscilloscope to fractional
milli-microsecond operation.



MODEL PG3

Transistorized
milli-microsecond pulse
generator.
Risettime: better than
3 milli-microseconds.

FIRST IN MILLIMICROSECOND INSTRUMENTS
write for specifications to dept IR-60

LUMATRON ELECTRONICS

88 URBAN AVE., WESTBURY, L. I., N. Y.

For details, circle #260 on Reader Service Card

Knight Electronics, Ill., 5
Lavoie Labs., Inc., Matawan-Freehold
Rd., Morganville, N.J., 5, 25

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Tel: LOwell 6-2600

Lumatron Electronics, Inc., Dept. IR-60,
68 Urban Ave., Westbury, L.I., N.Y.,
5, 10, 15, 25, 30

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Tel: EDgewood 4-3100

M E Labs., Calif., 25

Mandrel Industries, Inc., Calif., 20

Midwestern Instruments, Inc., Okla., 20

Millen Mfg. Co., Inc., James, 150 Ex-
change St., Malden 48, Mass., 5, 15

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Tel: DAvenport 4-4108

Minneapolis-Honeywell Reg. Co., Brown
Instrument Div., Pa., 20

Minneapolis-Honeywell Reg. Co., Hei-
land Div., Colo., 20

National Scientific Labs., Inc., D.C., 20,
25

New England Scientific Instruments Co.,
238 Main St., Cambridge 42, Mass.,
20, 25

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Tel: KIRkland 7-1997

Norrman Labs., Ernst, Wis., 30

Optomechanisms, Inc., N.Y., 10

Philco Corp., Govt. & Indl. Div., Pa., 5

Photron Instrument Co., Ohio, 5

Polaroid Corporation, Mass., 10

Precise Development Corp., N.Y., 5, 15

Precision Apparatus Co., Inc., N.Y., 5

Probescope Co., Inc., 8 Sagamore Hill
Dr., Port Washington, L.I., N.Y., 5

See ad on page 340

Tel: POrt Washington 7-8150

Radio Corp. of America, Electron Tube
Div., Sect. I-22-Q, 415 S. Fifth St.,
Harrison, N.J., 5

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Tel: HUmboldt 5-3900

Radiometer, Denmark, 5

Railway Communications, Inc., Mo., 5,
Multi-Channel

Rank Cintel, Ltd., England, 5

Raytheon Co., Mass., 25

Republic Electronic Indust. Corp., N.Y.,
5, 15

Rycom Instruments, Mo., 5

Sanborn Co., 175 Wyman St., Waltham
54, Mass., 20

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Tel: TWinbrook 4-6300

Scopes Co., Inc., N.Y., 5, 15, 25

Sierra Electronic Corp., 5442D Bohan-
non Dr., Menlo Park, Calif., 5

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Tel: DAvenport 6-2060

Simpson Electric Co., 5218 W. Kinzie
St., Chicago 44, Ill., 5

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Tel: ESTebrook 9-1121

Sivers Lab., Sweden, 25

Solartron Electronic Group, Ltd., Eng-
land, 5, 20

Solartron, Inc., Calif., 5

Southwestern Industrial Electronics Co.,
10201 Westheimer Rd., P.O. Box
22187, Houston 27, Tex., 5, 20

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Tel: HO 5-3471

Specialty Electronics Development
Corp., N.Y., 5

Specialty Engrn. & Electr. Co., N.Y., 5

Spivey, Inc., James S., D.C., 5

Stark Electronic Instruments, Ltd.,
Canada, 5

Sterling Precision Corp., 17 Matinecock
Ave., Port Washington, N.Y., 5, 30

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Tel: POrt Washington 7-7200

Strand Engineering Co., Mich., 20

Sunshine Scientific Instrument, Pa., 30

Tektronix, Inc., Ore., 5

Tel-Instrument Electronics Corp., N.J.,
5

Telectro Industries Corp., N.Y., 5

Thomas Electronics, Inc., N.J., 5

Trad Electronics Corp., 1001 First Ave.,
Asbury Park, N.J., 15

See ad on page 341

Tel: PProspect 6-7445

(Continued on page 332)

Now available from Switzerland-

The world-renowned TRUEB,
TAEUBER line of scientific in-
struments, including:

- Secondary emission micro-
scopes
- Electron microscopes
- Electron diffractographs
- Nuclear induction spectro-
graphs
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ments
- Recording instruments
- Portable test and sub-standard
laboratory instruments of all
kinds

for bulletins write:

NEW ENGLAND SCIENTIFIC
INSTRUMENTS CO.

238 Main Street

Cambridge 42, Mass.

For details, circle #261 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

23. Oscilloscopes— Cathode-Ray.

Triplett Electrical Inst. Co., Harmon
Rd., Bluffton, Ohio, 5

See ad on page 472
Tel: 323-W

Underwood Corp., Canoga Div., Calif.,
25

Waterman Products Co., 2445 Emerald
St., Philadelphia 25, Pa., 5, 15, 25, 30
See ad on page 330

Tel: GARfield 6-8600

Waters Mfg., Inc., Mass., 5

Phase meters: See class 26

Phonographs: See class 59

Photo electric controls:
See class 4

Pick-ups: See class 59

Picture tubes: See class 74

Plugs: See class 53

24. Point to Point Equip- ment.

5. Receivers

10. Transmitters

Adler Electronics, Inc., N.Y., 5, 10
Aero Guidance Corp., Calif., 5, 10
Aeronautical Comm. Equip., Inc., Fla.,
5, 10
Aeronautical Electronics, Inc., N.C., 5,
10
Allied International Corp., N.Y., 5, 10
Ameleo, Inc., Calif., 5, 10
American Electronics, Inc., American
Data Div., N.Y., 5, 10
American Mach. & Foundry Co., D.C.,
5, 10
Antrex Corp., Ill., 5, 10
Applied Technology, Inc., Calif., 5
Automatic Timing & Controls, Inc.,
Pa., 5, 10
Aveo Corp., Crosley Div., Ohio, 5, 10
Babcock Radio Engrg., Inc., Calif., 5,
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Bailey Meter Co., Ohio, 5, 10
Barker & Williamson, Inc., Pa., 5, 10
Bassett Inc., Rex, Fla., 5, 10
Bendix Aviation Corp., Ind., 5, 10
Bendix Aviation Corp., Bendix Radio
Div., Md., 5, 10
Bristol Co., Conn., 5, 10
Browning Labs., Inc., N.H., 5
Budelman Electronics Corp., Conn., 5,
10
Canadian G.E. Co. Ltd., Electronic
Equip.-Tube Dept., Canada, 5, 10
Canadian Marconi Co., Canada, 5, 10
Central Electronics, Inc., Ill., 10
Centronix, Inc., Fla., 5, 10
Chisholm Industries Ltd., Canada, 5, 10

24. Point to Point Equipment.

Collins Radio Co., 855 35th St. N.E.,
Cedar Rapids, Iowa, 5, 10

See ad on pages 32-33

Tel: EMpire 3-0281

Communications Co., Fla., 5, 10
Continental Elecons., Mfg., Co., Texas,
10

Control Corp., Minn., 5, 10
Corbin Corporation, Md., 5, 10
Creative Electronics Corp., Conn., 5, 10
Crosby Laboratories Inc., N.Y., 5, 10
Designers for Industry, Inc., Ohio, 5,
10

Dollar Co., Robert, Comm. Equip. Div.,
Calif., 5, 10

DuMont Labs., Inc., Allen B., Scientific
Instrument Div., N.J., 5, 10
E.M.I. Electronics Ltd., England, 5, 10
EPR Special Products Corp., N.Y., 5,
10

Ekco Electronics Ltd., England, 5, 10
Eldico Electronics, Radio Eng. Labs.
Inc., Div., N.Y., 10

Electronic Communications, Inc., Fla.,
5, 10

Elliott-Evans, Inc., Telectron Co., Div.,
Fla., 5, 10

Emerson Radio & Phonograph Corp.,
Md., 5, 10

Erco Radio Labs., Inc., N.Y., 5, 10
Farinon Electric Co., Calif., 5, 10
Ferranti-Packard Electric Ltd., Canada,
5, 10

GNV, N.Y., 5
Gates Radio Co., Ill., 10
General Electric Co., Communication
Prods. Dept., Va., 5, 10

General Electric Co., Ltd. of England,
England, 5, 10

Hallicrafters Co., 4401 W. 5th Ave.,
Chicago 24, Ill., 5, 10

See ad on page 204

Tel: VAn Buren 6-6300

Heath Co., Subsidiary of Daystrom, Inc.,
305 Territorial Rd., Benton Harbor 4,
Mich., 5, 10

See ad on page 328

Tel: YUkon 3-3961

Intelec Systems Inc., N.Y., 5, 10
International Electronics Corp., N.Y., 5,
10

Internatl. Tel. & Tel. Corp., ITT Fed-
eral Div., N.J., 5, 10

I.T.&T. Corp., Industrial Prods. Div.,
Calif., 5, 10

Internatl. Telephone & Telegraph Labs.,
Calif., 5, 10

Kaar Engrg. Corp., Calif., 5, 10
Kahn Research Labs. Inc., N.Y., 5, 10

Kaiser Industries, Kaiser Aircraft-
Elect. Div., Ohio, 10

Kellogg Switchboard & Supply Co., Ill.,
5, 10

King Radio Corp., Kansas, 5, 10
Knight Corp., Ewen, Mass., 5, 10

Kuss Industries, Inc., Pa., 5, 10
Lenkurt Electric Co. Inc., Calif., 5, 10

Lettine Radio Mfg., Co., N.Y., 10
Levinthal Electronics Prods., Inc.,
Calif., 10

Ling Systems Inc., Calif., 5, 10

Litton Industries, Inc., Electronic Equip-
ments Div., 336 N. Foothill Rd., Bev-
erly Hills, Calif., 5, 10

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Tel: CRestview 4-7411

Litton Industries, Md. Div., Md., 5, 10
M E Labs., Calif., 5, 10

Manning, Maxwell & Moore, Inc.,
Conn., 5, 10

Marconi's Wireless Telegraph Co. Ltd.,
N.Y., 5, 10

Marstan Electronics Corp., N.Y., 5, 10
Measurement Engrg., Ltd., Canada, 5,
10

Metox, France, 5, 10

Motorola Communications & Electronics,
Inc., Ill., 5, 10

Northern Radio Co., Inc., 147 West 22nd
St., New York 11, N.Y., 5

See ad on pages 130-133

Tel: WATkins 9-9117

Norwood Controls, Unit Detroit Con-
trols Div., Mass., 5, 10

Ostlund, Evert M., P.O. Box 458, An-
dover, N.J., 5

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Tel: PArkway 9-6635

Peer, Inc., Mich., 10
Phileo Corp., Govt. & Indl. Div., Pa.,
5, 10

Premier Instrument Corp., 33 New
Broad St., Port Chester, N.Y., 5, 10

See ad on page 390

Tel: WEstmore 9-8900

Press Wireless Labs., Inc., Mass., 5, 10
Production Research Corp., N.Y., 10

Pye Corporation of America, N.J., 5, 10
Pye Telecommunications Ltd., England,
5, 10

Racal Engrg. Ltd., England, 5, 10
Radio Engrg. Labs., Inc., N.Y., 5, 10

Tropo Scatter FM
Radio Receptor Co., Eng. Prods. Div.,
N.Y., 5, 10

Raytheon Co., Mass., 5, 10
Rollan Co., Mass., 5, 10

Scatter Communications, Inc., Md., Sys-
tem Design, Installation

Sierra Electronic Corp., 5442D Bo-
hannon Drive, Menlo Park, Calif., 10

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Tel: DAVenport 6-2060

Space Electronics Corp., Calif., 5, 10
Specialty Electronics Development
Corp., N.Y., 5, 10

Spilsbury & Tindall Ltd., Canada, 5, 10
Standard Telephones & Cables, Ltd.,
England, 5, 10

Stromberg-Carlson—San Diego, Calif.,
5

Summers Gyroscope Co., Calif., 5
Superior Marine Radio Co., Fla., 5,
10

Tabet Mfg. Co., Inc., Va., 5, 10
Taller & Cooper, Inc., Div. of American
Electronics, N.Y., 5, 10

Ta-Mar, Inc., Calif., 5, 10

Technical Materiel Corp., 700 Fenimore
Rd., Mamaroneck, N.Y., 5, 10

See ad on page 352

Tel: OWens 8-4800

Telechrome Mfg. Corp., N.Y., 5, 10
Telectron Company, Fla., 5, 10

Telephonics Corp., N.Y., 5, 10
Tele-Signal Corp., N.Y., 5, 10

Teletronics Laboratory, Inc., 54 Kinkel
St., Westbury, L.I., N.Y., 5, 10

See ad on page 308

Tel: EDgewood 3-1027

Television Utilities Corp., N.Y., 5

Directory I. Complete Equipment

24. Point to Point Equipment.

Temco Aircraft Corp., Electronics Div., Texas, 5, 10
 Topping Electronics, Ltd., Canada, 5, 10
 Transline Associates, N.J., 5, 10
 U.S. Science Corp., Sub. Topp Indust. Inc., Calif., 5, 10
 Virginia Electronics Co., Inc., D.C., 5, 10
 Visual Electronics Corp., N.Y., 5, 10
 Westinghouse Electric Corp., Md., 10
 Westrex Corp., N.Y., 5, 10
 Wilcox Electric Co., Inc., Mo., 5, 10
 Wunderlich Radio Co., Ill., 5, 10
 Young Spring & Wire Corp., Gosnet Div., Calif., 5, 10

Power supplies: See class 61

Pre-amplifiers: See class 36

**Production control equipment:
 See class 4**

**Projectors, television film:
 See class 32**

**Pulse count integrators:
 See class 22**

Pyrometers: See class 12

"Q" meters: See class 26

25. Radar Equipment.

5. Airborne 15. Marine
 10. Ground Based

ACF Industries Inc., Avion Div., N.J., 5
 Admiral Corp., Ill., 5, 10, 15
 American Mach. & Foundry Co., Conn., 5, 10, 15
 American Mach. & Foundry Co., D.C., 5, 10, 15
 American Tradair Corp., N.Y., 5
 Applied Technology, Inc., Calif., 5, 10
 Austin Co., N.Y., 10
 Autometric Corp., N.Y., 10
 Avco Corp., Crosley Div., Ohio, 5, 10, 15
 B. J. Electronics, Borg-Warner Corp., Calif., 10
 Bell Aircraft Corp., Avionics Div., N.Y., 5, 10

25. Radar Equipment.

Bell Aircraft Corp., Niagara Frontier Div., N.Y., 5, 10
 Bendix Aviation Corp., Bendix Pacific Div., Calif., 5, 10
 Bendix Aviation Corp., Bendix Products Div., Ind., 5, 10, 15
 Bendix Aviation Corp., Bendix Radio Div., Md., 5
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 5, 10
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Tel: ATlas 8-2000
 Bendix Aviation Corp., Research Lab Div., Mich., 5, 10, 15
 Bendix Aviation Corp., York Div., Pa., Simulators
 British Thomson-Houston Co., Ltd., England, 15
 Bulova Research & Development Labs. Inc., N.Y., 5, 10
 Canadian Aviation Electronics, Ltd., P.Q., Canada, 5, 10
 Canadian G.E. Co. Ltd. Electronic Equip.-Tube Dept., Canada, 5, 10, 15
 Canadian Westinghouse Co. Ltd., Elect. Div., Canada, 5, 10, 15
 Canoga Corp. of California, Calif., 10
 Centronix, Inc., Fla., 10, 15
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5
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Tel: EMpire 3-0281
 Continental Elecons. Mfg., Co., Texas, 10
Craig Systems, Inc., Dept. H-1, 361 Merrimack St., Lawrence, Mass., 10
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Tel: MURdock 8-6961
 Cubic Corp., Calif., 10
 Dalmo Victor Co., Div. of Textron Inc., Calif., 5, 10, 15
 Daystrom Instrument, Div. of Daystrom, Inc., Pa., 5, 10, 15
 Dayton Aircraft Products, Inc., Fla., 10, 15
 Designers for Industry, Inc., Ohio, 5, 10, 15
 DuMont Labs., Inc., Allen B., N.J., 5, 10
 Dynamic Electronics-N.Y. Inc., N.Y., 5, 10
 Dynamics Corp. of Am., Reeves Instrument Corp., N.Y., 10, 15
 E.M.I. Electronics Ltd., England, 5, 10, 15
 Edo Corp., N.Y., 15
 Ehrenpreis, Consulting Engrg., David, N.Y., 5, 10, 15
 Ekco Electronics Ltd., England, 5, 10
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 Electronic Communications, Inc., Fla., 5, 10, 15
 Emerson Radio & Phonograph Corp., Md., 5
Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 10
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Tel: VICTor 2-8400

Engineering Associates, Ohio, 5
FXR, Inc., 26-12 Borough Place, Woodside 77, N.Y., 10
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Tel: AStoria 8-2800
 Fairchild Eng. & Airplane Corp., Astronics, Div., N.Y., 5, 10, 15
 Federal Scientific Corp., N.Y., Simulator Equipment
Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J. Beacons
See ad on page 453
Tel: PROspect 4-0500
 General Applied Science Labs. Inc., N.Y., Simulators
 General Communication Co., Mass., 5, 10, 15
General Electric Co., Heavy Military Electronics Dept., Defense Electronics Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 10, 15
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Tel: GRANite 6-4411
 General Electric Co., Light Military Elect. Dept., N.Y., 5
 General Electric Co., Ltd. of England, England, 10
 General Mills, Inc., Mechanical Div., Minn., 5
 Gilfillan Bros. Inc., Calif., 10
 Goodyear Aircraft Corp., Ariz., 5
Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 5, 10, 15
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Tel: WILLiams 1-1000
 Granger Associates, Calif., 5, 10, 15
 Granite State Mach. Co., Inc., N.H., 10
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 Hazeltine Corp., N.Y., 5, 10
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 International Electronics Corp., N.Y., 5, 10, 15
 Internatl. Tel. & Tel. Corp., ITT Federal Div., N.J., 5, 10, 15
Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 15
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Tel: GREgory 2-1000
 Kearfott Co., Inc., Microwave Div., Calif., 5, 10, 15
 Knight Corp., Ewen, Mass., 10, 15
LEL, Inc., 384 Oak St., Copiague, N.Y., 5, 10
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Tel: AMityville 4-2000
 Laboratory for Electronics, Inc., Mass., 5, 10
Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 5, 15
See ad on page 300
Tel: LOWell 6-2600

when rf power must be absorbed or accurately measured...



"ThruLine"

DIRECTIONAL RF WATTMETERS

Direct reading... "thru" type... for measuring forward or reflected power in complete systems under operating conditions... inserted between transmitter and antenna or load... full scale power and frequency range determined by plug-in elements.

| Model | Line | Impedance | Frequency | ELEMENTS | Power | Connector |
|-------|-------------|-----------|--|-----------------------------|---------------|-----------|
| 43 | RG-8/U etc. | 50 ohms | 25-60; 50-125; 100-250; 250-500; 400-1000 mc | 10; 25; 50; 100; 250; 500 W | N, C; HW; UHF | |
| 4712 | 1 1/2" | 50 ohms | 200-500; 400-1000 mc | .5; 1.0; 1.5; 2.5; 5.0 KW | Flange Std. | |
| 460 | 3 1/8" | 50 ohms | 200-500 mc | 1; 2.5; 5; 10 | Sleeve | |
| 480 | 3 1/8" | 51.5 ohms | 400-1000 mc | 25; 50 KW | Bullet | |
| 490 | 6 1/8" | 51.5 ohms | 200-500 mc | 25; 50 and 100 KW | | |

COAXIAL RF FILTERS



Designs utilize both distributed and lumped constant... insertion loss and VSWR are very low in pass band... high attenuation in stop band... new miniature filters as light as 5 ounces. Will produce in quantity to your specs.

| | Low Pass | Low Pass | Low Pass | Low Pass | High Pass | Band Pass |
|-----------------------|------------|------------|---------------|--------------|------------|-----------------------------|
| Models | 5310 | 5311 | 522 | 819-1200 | 530 | 5131 |
| Cut Off | 90 mc | 160 mc | 400 mc | 1200 mc | 420 mc | 45 mc & 105 mc |
| Stop Band | 100-180 mc | 180-320 mc | 500-1200 mc | 1900-4000 mc | 100-375 mc | 33.7-39.7 mc 120-1000 mc |
| Max. Power | 100W | 100W | 150W | 3.5KW | 50W | 25W |
| Min. Stop Band Atten. | 55db | 55db | 55db | 40db | 60db | 25db 40db |
| VSWR in p.b. | 1.5 | 1.5 | 1.35 | 2 to 1 | 2.5 | 1.6 |
| Connectors | Female N | | Male-Female N | | Female BNC | |

Chart shows characteristics of typical filters

50 OHM NOMINAL

You will find dependable coaxial line instruments and accessories at Bird Electronic. Specialization in this field, backed by a constantly growing engineering staff and enlarged physical facilities, has resulted in the continuous development of new designs to meet specific requirements. If you are searching for more than a standard product for field or laboratory use, turn to Bird Electronic. Our years of experience in this field may assist you in the solution of your problem.

"Termaline" RF ABSORPTION WATTMETERS

Portable... direct reading... non-radiating "load" type wattmeter... used in field or laboratory to measure and absorb power... accuracy $\pm 5\%$ of full scale... VSWR 1.1 to 1 maximum over operating range.

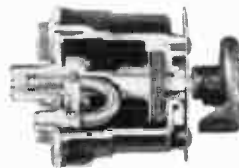
| Model | Freq. Range | Max. Power | Power Range Scales | Input Connector |
|-------|-------------|------------|----------------------|--|
| 611 | 30-500 mc | 60W | 0-15; 0-60 | Female N |
| 612 | 30-500 mc | 80W | 0-20; 0-80 | |
| 67 | 30-500 mc | 500W | 0-25; 0-100; 0-500 | Coplonor with Adapter to UG-21/U. (optional) RG-17 & RG-19 cable assemblies; adapters to rigid lines |
| 67C* | 30-500 mc | 2500W | 0-100; 0-500; 0-2500 | |
| 824* | 30-220 mc | 5000W | 0-5000 | |

*Water cooled (other available models described in specification sheets)



COAXIAL SWITCHES

Small compact design permits the "Coaxwitch" selector to be incorporated into many electronic units where repeated channel switching is required. Finger-tip operation: pull knob, rotate and push in to make contact.



| Model | 74 | 718 | 72R | 62-2 |
|------------------|--|-------|------------------|------|
| Positions | Six | Eight | Reversing Switch | Two |
| Coaxial Circuits | One | One | Two | Two |
| Connector | Type N female connectors are standard on all models to receive UG-21/U series plug. Use adapters with other cables and connectors. | | | |

"Termaline" RF LOAD RESISTORS

Reflection-free terminations for 50 ohm coaxial lines... low VSWR... non-radiating... water cooled ratings 2500 W to 50 KW... air cooled rating to 1500 W.



| Model | Max. Power | Freq. Range | Max. VSWR* | Connector |
|-------|------------|-------------|------------|----------------------------------|
| 80 | 5W | 0-1KMC | 1.1 | "N", "C", "BNC" |
| 80A | 20W | 0-500MC | 1.1 | N Female |
| 81 | 50W | 0-1KMC | 1.1 | |
| 81B | 80W | 0-1KMC | 1.1 | Coplonor with Adapter to UG-21/U |
| 82A | 500W | 0-1KMC | 1.1 | |
| 883 | 1.2KW | 0-1KMC | 1.1 | LC |
| 888 | 1.5KW | 0-1KMC | 1.1 | 3/8" Flanged |

*Other VSWR requirements can usually be met by special selection.

turn to...



BIRD

ELECTRONIC CORP.

Churchill 8-1200

30303 Aurora Road • Solon, Ohio

Western Representative:
VAN GROOS COMPANY, Woodland Hills, Calif.

Directory I. Complete Equipment

25. Radar Equipment.

Levinthal Electronic Products, Inc., Calif., 5, 10
Litton Industries Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10
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 Tel: CRestview 4-7411
 Litton Industries, Md. Div., Md., 5, 10, 15
Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, P.O. Box 504, 962 W. El Camino Real, Sunnyvale, Calif., 5
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Manson Laboratories Inc., 375 Fairfield Ave., Stamford, Conn., 10
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 Martin Co., Baltimore Div., Md., 5, 10
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Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 5, 10
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 Radio Receptor Co., Eng. Prods. Div., N.Y., 5
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 Raytheon Co., Mass., 5, 10, 15
 Reeves Instrument Corp., N.Y., 10
 Remanco, Inc., Calif., 5, 10, Simulators
 Republic Aviation Corp., N.Y., 5, 10, 15
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 Sanders Assoc., Inc., N.H., 5, 10
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 Space Electronics Corp., Calif., 5, 10
 Specialty Engrn. & Electr. Co., N.Y., 5

Sperry Gyroscope Co., Calif., 5
 Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 15
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 Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 10
 Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 10
 Sperry Rand Corp., Sperry Gyros. Div., Surface Armament Div., N.Y., 10
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 Spilsbury & Tindall Ltd., Canada, 15
 Standard Telephones & Cables, Ltd., England, 5, 10
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Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5, 10
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 Tel: POrt Washington 7-7200
 Strand Engineering Co., Mich., 5, 10
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 Temco Aircraft Corp., Electronics Div., Texas, 5, 10, 15
Texas Instruments Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Texas, 5, 10, 15
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 United Aircraft Corp., Norden Div., Conn., 5
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 Waldorf Instrument Co., Huyek & Sons Div., N.Y., 10
 Westinghouse Electric Corp., Md., 10
 Westinghouse Electric Corp., Pa., 5
 Wilcox Electric Co., Inc., Mo., 5
 Wunderlich Radio Co., Ill., 10

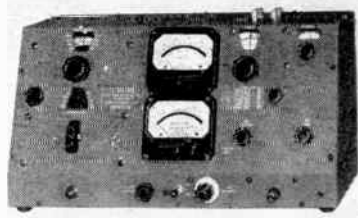
Radar reflectors: See class 37

Radiation detectors: See class 22

26. Radio Frequency Test Equipment.

- | | |
|-----------------------------------|----------------------------|
| 5. Field strength meters | 42. RF signal generators |
| 10. Impedance & admittance meters | 45. Signal generators, AM |
| 15. Marker generators | 50. Signal generators, FM |
| 20. Multi-vibrators | 52. Signal generators, SSB |
| 25. Oscillators | 55. Sweep generators |
| 30. Phase meters | |
| 35. "Q" meters | |
| 40. RF power output meters | |

A.R.F. Products, Inc., Ill., 42, 50
Acton Laboratories, Inc., 536 Main St., Acton, Mass., 30
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 Tel: COlonial 3-7756
Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 30
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 Tel: GRegory 3-7800

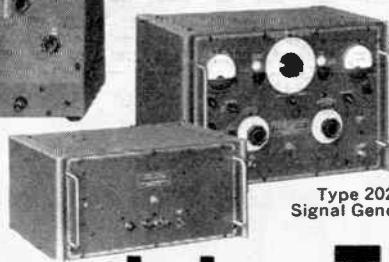


Type 260-A
Q Meter

Type 225-A
Signal Generator



Type 265-A
Q Comparator



Type 202-E
Signal Generator



Type 245-C/D
Signal Generator
Calibrators

BRC Precision Test and Measuring Instruments

— Specified World-wide for Quality and Dependability



Type 250-A RX Meter

| Q Meters | TYPE | FREQ. RANGE | Q RANGE | TUNING CAP. RANGE | Q ACCURACY | PRICE |
|----------|-------|--------------|-----------|-----------------------------|-------------|----------|
| | 260-A | 50KC to 50MC | 10 to 625 | 30 to 460 $\mu\mu\text{f}$ | 5% to 30MC | \$850.00 |
| | 190-A | 20 to 260MC | 5 to 1200 | 7.5 to 100 $\mu\mu\text{f}$ | 7% to 100MC | \$875.00 |

| Q Comparators | TYPE | FREQ. RANGE | Q RANGE | L RANGE | C RANGE | R RANGE | PRICE |
|---------------|-------|---------------|-----------|---------------------------|---|------------------------------|----------|
| | 265-A | 200KC to 70MC | 30 to 500 | .15 μh to 15mh | 5 $\mu\mu\text{f}$ to .01 μf | 500 Ω to 20M Ω | \$795.00 |

| FM-AM Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | PRICE |
|-------------------------|-------|--------------|-----------------------------|------------|-----------|-----------|
| | 202-E | 54 to 216MC | 0.1 μv to 0.2 v. | 0 to 240KC | 0 to 50% | \$1125.00 |
| | 202-G | 195 to 270MC | 0.1 μv to 0.2 v. | 0 to 240KC | 0 to 100% | \$1100.00 |
| | 225-A | 10 to 500MC | 0.1 μv to 0.1 v. | 0 to 60KC | 0 to 30% | \$ 945.00 |

| Sweep Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | MARKERS | PRICE |
|-------------------------|-------|--------------|--|--|---------|---------------------|-----------|
| | 240-A | 4.5 to 120MC | 1 μv to 0.3v. Sweep 1 μv to 0.1v. CW & AM | $\pm 1\%$ to $\pm 30\%$ of center freq. | 30% | crystal and pip. | \$1820.00 |

| Aircraft VOR/ILS Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | MODULATION | MODULATING FREQ. | PRICE |
|------------------------------------|-------|----------------|----------------------------|------------|-------------------|-----------|
| | 211-A | 88 to 140MC | 0.1 μv to 0.2v. | 0-100% AM | 400 & 1000 cps | \$1890.00 |
| | 232-A | 329.3 to 335MC | 1 μv to 0.2v. | 0-100% AM | 90/150 & 1000 cps | \$1990.00 |

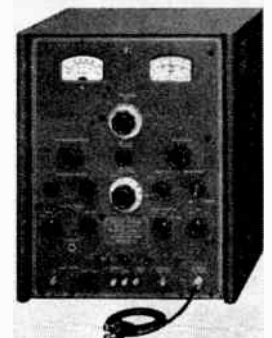
| RX Meters | TYPE | FREQ. RANGE | R RANGE | C RANGE | L RANGE | PRICE |
|-----------|-------|----------------|---------------------------------|--------------------------|------------------------------|-----------|
| | 250-A | 500KC to 250MC | 15 Ω to 100.000 Ω | 0 to 20 $\mu\mu\text{f}$ | 0.001 μh to 100mh | \$1525.00 |

| Signal Generator Calibrators | TYPE | FREQ. RANGE | CALIBRATED INPUT | CALIBRATED OUTPUT | % AM RANGE | PRICE |
|------------------------------|-------|-----------------|-------------------|--------------------------------|------------|----------|
| | 245-C | 500KC to 1000MC | 0.025, 0.05, 0.1v | 5, 10 or 20 μv | 10-100% | \$390.00 |
| | 245-D | 500KC to 1000MC | 0.025, 0.05, 0.1v | 0.5, 1.0, or 2.0 μv | 10-100% | \$385.00 |

| Univerters | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | ACCESSORY TO: | PRICE |
|------------|-------|---------------|--------------------------|-------------|----------|---------------|----------|
| | 207-E | 100KC to 55MC | 1 μv to 0.1v. | 0-240KC | 0 to 50% | 202-E | \$430.00 |
| | 203-B | 100KC to 25MC | 1 μv to 0.1v. | 1.5 to 30MC | 30% | 240-A | \$420.00 |

| Film Gauge | TYPE | MEASURES | THICKNESSES | PRICE |
|------------|-------|---------------------|----------------------|----------|
| | 255-A | Non-magnetic Metals | 0.000004" to 0.0002" | \$575.00 |

BRC Precision Test Equipment is engineered and manufactured to the highest standards of the industry—standards that have made the BRC trademark a recognized symbol of precision and dependability throughout the world. Highly qualified field representatives—specialists in electronic test equipment—stand ready to solve customer problems in every major foreign and domestic area. For the complete facts write today for the new BRC catalog.



Type 240-A
Sweep
Signal
Generator

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Boonton Radio Corporation
BOONTON, NEW JERSEY, U.S.A.



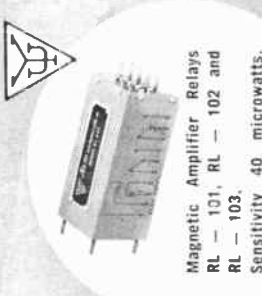
Directory I. Complete Equipment

26. Radio Frequency Test Equipment.

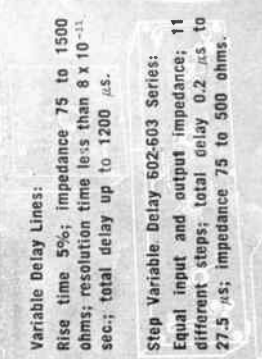
- Bird Electronic Corp., 30303 Aurora Rd., Solon, Ohio, 40, RF Wattmeters
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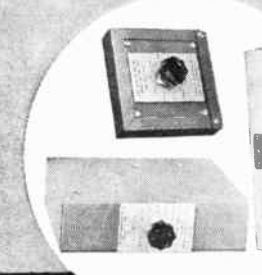
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RL — 101, RL — 102 and
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Sensitivity 40 microwatts.



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Equal input and output impedance; 11 different steps; total delay 0.2 μ s to 27.5 μ s; impedance 75 to 500 ohms.

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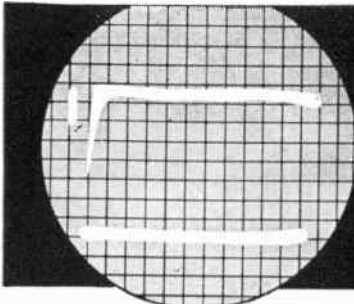


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Direct reading in degrees

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0.0001 CPS TO 500 MEGACYCLES
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SWEEP WIDTHS—AS WIDE AS 400 MC . . . FROM 0.5 MC TO 1200 MC. The JERROLD Model 900-A, Wide Band Sweep Frequency Generator is an instrument of unusual versatility. In two ranges—0.5 MC to 400 MC and 275 MC to 1200 MC—the instrument supplies sweep signal with center at any frequency from 500 KC to 1000 MC and with sweep widths as broad as 400 MC and as narrow as 100 KC. The RF output—carefully monitored by matched, crystal diodes feeding a two stage, push-pull AGC amplifier—is flat within ± 0.5 db at full sweep width up to 800 mcs. and ± 1.5 db from 800 mcs. to 1200 mcs. When using sweep widths as narrow as 20 mcs. flatness at any center frequency is approximately ± 0.15 db. The output voltage is 0.5 volts RMS across a 50 ohm load at the upper range and 0.25 volts at the lower range.

The instrument features provisions for external markers, employing "birdie bypass" circuitry, and a plug-in R.F. detector that can be used in remote applications.

\$1260.00



A HIGH SPEED COAXIAL SWITCH — MODEL FD-30

For the simultaneous display of two channels or voltages on an oscilloscope.

Frequency range of coaxial circuit is from DC to 250 MC with a VSWR of less than 1.1 at 50 or 75 ohms impedance. Switch contacts "Mercury-Wetted" with an adjustable switch rate of 30, 15 or 10 cps.

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Wide Band Sweep Generators—Models 601 and 602

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12 MC to 225 MC in eleven overlapping ranges. RF output of 1.0 volt RMS. Output flat $\pm 1/2$ db over widest sweep width and as flat as $1/5$ db of sweep widths at 40 mc or lower.

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4 MC to 112 MC in eleven overlapping ranges. RF output of 2.5 volts RMS. Output flat within $\pm 1/2$ db.

Other Generators available on special order to cover any portion of the frequency range from 15 KC to 225 MC.



\$395.00

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Variable, switch-type attenuators from DC to 500 MC. The attenuators feature: 0 to 62.5 db attenuation, in 0.5 db steps; low insertion loss of $1/4$ db at 250 MC, and $1/2$ db at 500 MC; VSWR of less than 1.15 at 250 MC, and less than 1.4 at 500 MC; newly developed rotary, coaxial switches that utilize a floating rotor with dual wiping, self aligning contacts mounted in a "Tel-F" dielectric; completely shielded switch sections; and rugged, compact design. Model AV-50 is 50 ohms with BNC connectors, and Model AV-75 is 75 ohms with Jerrold "F" Series connectors.

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Directory I. Complete Equipment

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HI-POT

•
Other Electronic
Test Equipment



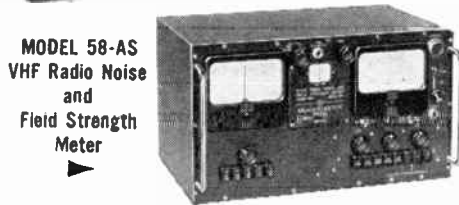
MODEL 65-B
Standard
Signal Generator



MODELS 80 and 80-R
Standard
Signal Generators



MODEL 210 Series
FM Standard
Signal Generators



MODEL 58-AS
VHF Radio Noise
and
Field Strength
Meter



MODEL 72
Square Wave
Generator



MODEL 202-C
Standard Barretter
Bridge



MODEL 59
Megacycle
Meter



MODEL 179
Standard
Pulse
Generator



MODEL 162
Vacuum
Tube
Voltmeter

MEASUREMENTS' Electronic Instruments for Research, Development and Design

STANDARD SIGNAL GENERATORS

| MODEL | FREQUENCY RANGE | PRICE |
|------------|------------------------------------|---------------------|
| 65-B | 75 Kc to 30 Mc | \$875.00 |
| 80 | 2 Mc to 400 Mc | 590.00 |
| 80-R | 5 Mc to 475 Mc | 625.00 |
| 82 | 20 cps to 200 Kc 80 Kc to 50 Mc | 660.00 |
| 84-TVR | 400 Mc to 1000 Mc | 785.00 |
| 95 | 50 Mc to 400 Mc | 1800.00 |
| 210 Series | 25 Mc to 480 Mc | 450.00 to 475.00 |

VHF RADIO NOISE AND FIELD STRENGTH METER

| MODEL | FREQUENCY RANGE | PRICE |
|-------|-----------------|----------|
| 58-AS | 15 Mc to 150 Mc | \$925.00 |

SQUARE WAVE GENERATORS

| MODEL | FREQUENCY RANGE | PRICE |
|-------|----------------------|----------|
| 71 | 6 cps to 100,000 cps | \$195.00 |
| 72 | 5 cps to 5 Mc | 248.00 |

MEGACYCLE "GRID-DIP" METERS

| MODEL | FREQUENCY RANGE | PRICE |
|--------|------------------|----------|
| 59-LF | 100 Kc to 4.5 Mc | \$168.00 |
| 59 | 2.2 Mc to 420 Mc | 168.00 |
| 59-UHF | 420 Mc to 940 Mc | 198.00 |

VACUUM TUBE VOLTMETERS

| MODEL | FREQUENCY RANGE | PRICE |
|-------|----------------------------|----------|
| 67 | 5 to 100,000 sine-wave cps | \$235.00 |
| 162 | 27 cps to over 150 Mc | 210.00 |

CRYSTAL CALIBRATORS

| MODEL | FREQUENCY RANGE | PRICE |
|-------|-------------------|----------|
| 111 | 250 Kc to 1000 Mc | \$ 97.50 |
| 111-B | 100 Kc to 1000 Mc | 110.00 |

STANDARD BARRETTOR BRIDGE

| MODEL | FREQUENCY RANGE | PRICE |
|-------|-----------------|----------|
| 202-C | 2 Mc to 1000 Mc | \$375.00 |

STANDARD PULSE GENERATOR

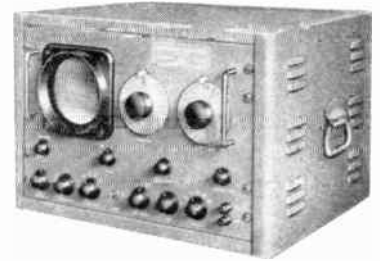
| MODEL | FREQUENCY RANGE | PRICE |
|-------|-----------------------|----------|
| 179 | 60 cps to 100,000 cps | \$365.00 |

This is only a partial listing of Measurements' products.
Write for our complete Catalog.

Laboratory Standards  **MEASUREMENTS**
A McGraw-Edison Division
BOONTON, NEW JERSEY

For details, circle #267 on Reader Service Card

SPECTRUM ANALYZERS TELEMETERING CALIBRATORS



Model SS-100

SPECTRUM ANALYZERS

- MODEL SS-5 1 cycle to 5 KC
Resolution to
2 cycles
- MODEL SS-100 13.5 cycles to 110 KC
Resolution to
27 cycles.
- MODEL SS-500 75 cycles to 500 KC
Resolution to
150 cycles.
- MODEL UR-10 100 KC to 10 MC
Resolution to
500 cycles.

Synchronous Sweep Generators and
Variable Rate Attachments available
for all Spectrum Analyzers.

SINGLE SIDEBAND SPECTRUM MONITOR MODEL MD-500

500 kc center frequency
0-100 kc sweep width
Resolution to 10 cycles.
The MD-500 has a built-in frequency
converter for operation to over 500 mc.

TELEMETERING CALIBRATORS

Telemetry calibrators designed to give
separate crystal controlled calibrating
frequencies for the 23 telemetry sub-
carrier channels.

Calibrators available with 11, 9, 7, 5,
or 3 points with crystal oscillators ac-
curate to $\pm .005\%$, $\pm .001\%$, or
 $\pm .00025\%$.

PROBESCOPE calibrators ex-
ceed all Inter-range Instrument
Group Specifications.

PROBESCOPE CO., Inc.
8 Sagamore Hill Drive
Port Washington, N.Y.
Phone: Port Washington 7-8150

For details, circle #218 on Reader Service Card

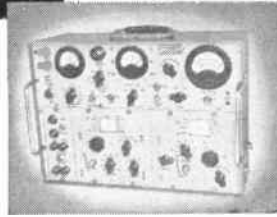
1960 IRE Directory

**QUALITY INSTRUMENTS
FOR PRECISION TESTING OF
*Tomorrow's Circuitry***

RT-500 RECEIVER-TRANSMITTER TESTER

Equivalent to AN/TRM-1. Laboratory-quality portable instrument, designed to measure performance on transmitting and receiving equipment.

- Frequency Range: 190 KC to 400 MC
- Signal Generator Output: 2.5 to 100,000 microvolts into 50 ohms
- Transmitter Tester Power Range: 3 to 100 watts
- Volt/Milliwatt Meter: multi-range meter measures AC, DC volts and milliwatts



SG-25 STANDARD SIGNAL GENERATOR

Equivalent to AN/URM-25D. For alignment of radio receivers, measurements of receiver sensitivity and selectivity, and in all radio frequency voltage measurement work.

- Frequency Range: 10 KC to 50 MC in 8 bands
- Calibrated Output: 0.1 to 100,000 microvolts into 50 ohms
- High Output: 2.0 volts, 500 ohms impedance



SG-26 STANDARD SIGNAL GENERATOR

Equivalent to AN/URM-26B. For alignment of radio receivers, measurements of receiver sensitivity and selectivity, and in all radio frequency voltage measurement work.

- Frequency Range: 4 to 405 MC in 6 bands
- Calibrated Output: 0.1 to 100,000 microvolts into 50 ohms
- Output Impedance: 50 ohms nominal



PO-400 PULSE OSCILLOSCOPE

Equivalent to AN/USM-38. Precision portable oscilloscope for analyzing amplitude and time characteristics of complex electrical waveforms.

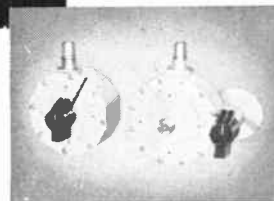
- Transient Response: 0.06 microseconds (rise time)
- Square Wave Response: less than 5% drop at 50 cycles
- Deflection Sensitivity: 0.1V RMS per inch
- Sweep: 1 to 100,000 microseconds per inch, triggered or recurrent



AT-120 R. F. STEP ATTENUATOR

Designed for use in output systems of signal generators, precision microvolters, IF strips of microwave receivers, etc.

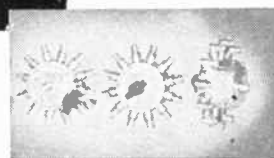
- Frequency Range: 0 to 1000 MC
- Attenuation Range: up to 120 db in ten steps
- Output Impedance: 50 ohms standard, 75 ohms optional
- VSWR: 1.1 up to 500 MC, 1.2 up to 1000 MC



CS-200 SERIES COAXIAL SWITCHES

For all types of coaxial switching.

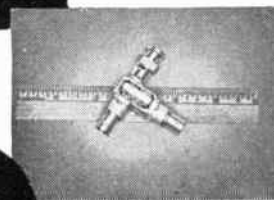
- Positions: up to 12
- Nominal Impedance: 5 ohms
- VSWR: 1.2 up to 500 MC, 1.3 up to 1000 MC
- Cross-talk for 12 Position: greater than 75 db down at 1000 MC



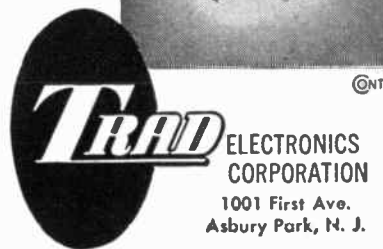
CM-300 CRYSTAL DETECTOR MOUNT

For general purpose in RF monitoring 50 or 75 ohm coaxial systems. Can be used with Trad Attenuator AT-120.

- Frequency Range: 10 to 1000 MC
- Accuracy: 1/2 db
- Impedance: available in 50, 75, 100, 150 and 225 ohms
- Maximum Signal Output: 2.5 V RMS



Trad has a complete, diversified line of electronic products, some of which are listed here. All products are available for speedy delivery. Trad's national representative organization is now being expanded. Interested reps may write or call George Trad at Prospect 6-7445 for appointment.



For details, circle #269 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

**Directory I.
Complete
Equipment**

**26. Radio Frequency
Test Equipment.**

- Robde & Schwarz Sales Co., Inc., N.J., 5, 10, 25, 30, 35, 40, 42, 45, 50, 55
Saratoga Industries, N.Y., 5
Schaevitz Engrg., N.J., 5, 45
Scientific-Atlanta, Inc., Ga., 40, 42
Siemens & Halske, A. G., Germany, 25, 30, 35, 40, 45, 50, 52, 55
Sierra Electronic Corp., 5442D Bohannon Drive, Menlo Park, Calif., 25, 40, 42

See ad on pages 30-31
Tel: Davenport 6-2060

- Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 5, 15, 42, 45, 50, 55
See ad on page 475

Tel: EStebrook 9-1121

- Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 25, 40, 42

See ad on page 595
Tel: CHerry 4-5519

- Specialty Engrn. & Electr. Co., N.Y., 45, 50

- Spectralab Instruments, Calif., 42, 45, 50

- Sprague Electric Co., Mass., Interference Locator

- Stark Electronic Instruments Ltd., Canada, 15, 40, 42, 45, 50, 55

- Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 42, 45, 50

See ads on pages 306, 351
Tel: POrt Washington 7-7200

- Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 5

See ad on page 342
Tel: HOLlywood 4-9292

- Sullivan, Ltd., H. W., N.Y., 25
Systems Inc., Fla., 45, 50, 52

- Taffet Radio & Television Co., N.Y., 25, 42, 45

- Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 42

See ad on page 352
Tel: OWens 8-4800

- Technitrol Engineering Co., Pa., 25, 42, 45

- Tektronix, Inc., Ore., 15, 55

- Telectro Industries Corp., N.Y., 5, 15, 45, 50, 52

- Telerad Mfg. Corp., N.Y., 5, 25, 42

- Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 52

See ad on page 308
Tel: EDgewood 3-1027

- Tel-Instrument Electronics Corp., N.J., 25, 42, 45, 50, 55

- Telonic Industries, Inc., Ind., 15, 25, 42, 55

- Thomas Electronics, Inc., N.J., 35

STODDART RADIO INTERFERENCE

AND FIELD INTENSITY MEASURING EQUIPMENT

covering a frequency range of 30 cps to 1000 mc



NM-20B (AN/PRM-1A)
150 kc to 25 mc

GENERAL SPECIFICATIONS:

Sensitivity: As a two-terminal voltmeter, either balanced or unbalanced, one μv to one volt. Electrostatic pick-up using rod antenna, 2 μv /meter to 2 volts-per-meter. Electro-magnetic pick-up using shielded loop antenna, 2 μv /meter min. to 10,000 to 30,000 μv /meter max.; LARGE LOOP, 2 to 6 μv /meter min. to 20,000 to 60,000 μv /meter max.

Image Rejection: Better than 50 db.

I.F. Rejection: > 45 db.

BFO is provided for C. W. reception.



NM-10A (AN/URM-6B)
14 kc to 250 kc

GENERAL SPECIFICATIONS:

Sensitivity: Electrostatic pickup using rod antennas, one microvolt-per-meter to 2 volts-per-meter. Electro-magnetic pickup using shielded loop antennas, 10 microvolts-per-meter to 100 volts-per-meter. As a two-terminal voltmeter, either balanced or unbalanced, one microvolt to one volt.

Effective Random Noise Bandwidth: Varies from approximately 55 cps to 400 cps over the frequency range. Calibration charts give exact figures for each frequency.

Image Rejection: Better than 50 db.

I.F. Rejection: Greater than 60 db.

The equipment is of sturdy drip-proof construction and may be operated for prolonged periods in driving rain or snow with no deleterious effects.



NM-40A (AN/URM-41)

30 cps to 15 kc

SELECTIVE OPERATION/Specifications

Sensitivity: For a one-to-one signal-to-noise ratio, the sensitivity of the NM-40A is better than 0.15 microvolt from 1000 to 15,000 cps, 0.25 microvolt from 300 to 1000 cps and 1.0 microvolt from 30 to 300 cps, when used as a selective two-terminal voltmeter with its narrowest bandwidth and an input impedance of 100,000 ohms.

Spurious Responses:

2 F_0 > 60db down from F_0
3 F_0 > 55db down from F_0 } where F_0 is any input signal using selective operation
All others > 75 db down

WIDEBAND OPERATION/Specifications

Frequency Response: 30 cps to 15 kcs, ± 0.5 db.

Sensitivity: 15 microvolts sensitivity at input impedance of 100,000 ohms.

Input Impedance: 50, 600, 10,000 and 100,000 ohms.

The NM-40A may also be used as an ultra-sensitive AUDIO frequency WAVE ANALYZER.



NM-30A (AN-URM-47)

20 mc to 400 mc

Sensitivity: Radiated pick-up using a calibrated, tuned dipole (without reflector), 0.6 to 60 μv /meter, depending on frequency. Conducted pick-up via 50-ohm matched coaxial line, 0.5 to 1 μv from 20 to 240 mc, less than 6 μv from 240 to 400 mc.

Spurious Response Rejection: Better than 40 db.

I.F. Rejection: > 60 db.



NM-50A (AN/URM-17)

375 mc to 1000 mc

Sensitivity: Radiated pick-up using a calibrated, tuned dipole (without reflector) 35 to 160 μv /meter, depending on frequency. Conducted pick-up via 50-ohm matched coaxial line, 2 to 5 μv .

Impulse Bandwidth: Approximately 600 kc over frequency range.

Image Rejection: Better than 40 db.

Spurious Response Rejection: Better than 40 db.

I.F. Rejection: > 80 db.

APPROVAL DATA CHART

| STODDART & MILITARY TYPE | FREQUENCY | MIL-I-16910A (Ships) Amend. #2 | MIL-I-26600* (U.S.A.F.) & MIL-I-6181B | MIL-I-11748B (E/C. C.) | S.A.E. | A.S.A. | C.I.S.P.R. |
|--------------------------|--------------|--------------------------------|---------------------------------------|------------------------|-----------|------------------|------------|
| NM 40A (AN URM-41) | 30cps-15Kc | CLASS 'I' | Not Req'd | Not Req'd | Not Req'd | Not Req'd | Not Req'd |
| NM-10A (AN/URM-6B) | 14Kc-250Kc | CLASS 'I' | Not Req'd | APPROVED | Not Req'd | C63.2 (Proposed) | Not Req'd |
| NM-20B (AN PRM-1A) | 150Kc-25Mc | CLASS 'I' | CLASS 'I' CATEGORY 'A' | | Not Req'd | C63.2 (Proposed) | ** |
| NM-30A (AN/URM-47) | 20Mc-400Mc | CLASS 'I' | CLASS 'I' CATEGORY 'A' | APPROVED | APPROVED | C63.3 (Proposed) | APPROVED |
| NM 50A (AN URM-17) | 375Mc-1000Mc | CLASS 'I' | CLASS 'I' CATEGORY 'A' | APPROVED | Not Req'd | C63.3 (Proposed) | Not Req'd |

** Can be supplied with C.I.S.P.R. Recommended detector time constants.

S.A.E. (Society of Automotive Engineers)

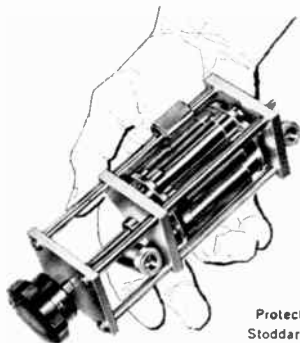
A.S.A. (American Standards Association)

C.I.S.P.R. (Comite International Special des Perturbations Radioelectriques) (International Special Committee on Radio Interference)

All items immediately available from stock

STODDART COAXIAL ATTENUATORS AND TERMINATIONS

made with exclusive Stoddart Filmistors for highly accurate and stable resistive values from dc to 3000 mc.



Protected under Stoddart Patents

2, 6 AND 10-POSITION TURRET ATTENUATORS

WITH SIMPLE

"PULL-TURN-PUSH" OPERATION,

SMALL AND RUGGED

ATTENUATOR PADS



Available in any conceivable combination of male and female Type C and Type N connectors. Maximum length of 3" for any attenuation value.

GENERAL SPECIFICATIONS:

VSWR: < 1.2 to 3000 mc for values from 10 to 60 db; as value decreases below 10 db, VSWR increases to not over 1.5.

Characteristic Impedance: 50 ohms.

Attenuation Value: Any value from 0 db to 60 db including fractional values.

Accuracy: ± 0.5 db; values above 50 db have rated accuracy of attenuation through 1000 mc only.

Power Rating: 1.0 watt sine wave.

COAXIAL TERMINATIONS

Small-stable-50 or 70 ohms

1/2-Watt: 50 ohms impedance, TNC or BNC connectors, dc to 1000 mc, VSWR less than 1.2.

1-Watt: 50 ohms impedance, dc to 3000 mc or dc to 7000 mc, Type N or Type C connectors, male or female; VSWR less than 1.2, 70 ohm, Type N, male or female terminations available.



Fast delivery on all items/Send for complete literature

STODDART AIRCRAFT RADIO CO., INC.

6644 Santa Monica Blvd., Hollywood 38, Calif. HO 4-9292

Directory I. Complete Equipment

26. Radio Frequency Test Equipment.

- Topping Electronics, Ltd., Canada, 25
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Asbury Park, N.J., 42, 45
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- Trepac Corp. of America, N.J., 40
Triplett Electrical Inst. Co., Harmon
Road, Bluffton, Ohio, 15, 42, 45, 50,
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Tel: 323-W
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Calif., 42, 45, 55
United Microwave Co., N.Y., 10
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Wayne Kerr Corp., 1633 Race St., Phila-
delphia 3, Pa., 25, 35
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- Weinschel Engrg. & Mfg. Corp., 10503
Metropolitan Ave., Kensington, Md.,
5, 25, 42
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- Westinghouse Electric Corp., Pa., 40
Wintronics, Calif., 30, Indicators

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Receivers, amateur: See class 2

Receivers, broadcast:
See class 6

Receivers, facsimile: See class 11

Receivers, microwave:
See class 18

Receivers, mobile: See class 20

Receivers, point-to-point:
See class 24

Receivers, radar: See class 25

Receivers, telegraph & teleprinter:
See class 33

Receivers, telemeter: See class 34

Receivers, television: See class 6

Record changers & players:
See class 59

Recorders, graphic: See class 14

Recording accessories: See class 63

27. Recording Equipment.

- | | |
|-------------------------------------|--------------------------------|
| 3. Dictation Equip- ment | 15. Magnetic tape recorders |
| 5. Disk recorders | 20. Magnetic wire recorders |
| 10. Embossing types of recorders | 25. Video tape |

- ABC Sound Engrg. Co., N.Y., 3, 15, 20
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American Elite Inc., N.Y., 15
Ampex Audio, Inc., Calif., 15
Ampex Corp., Professional Products
Div., Calif., 15
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Audio-Master, Corp., N.Y., 15
Audio-Video Corp., N.Y., 3, 5, 15
Avionics Ltd., Canada, 15
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Calif., 15
Beam-Echo Ltd., England, 15
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tion Cameras
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Gates Radio Co., Ill., 15
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General Kinetics Inc., Va., 15
General Precision Lab., Inc., N.Y., 25
Gotham Audio Dev. Corp., N.Y., 5
Gray Mfg. Co., Conn., 3, 5
Gulton Industries, Inc., N.J., 15

27. Recording Equipment.

- Heath Co., Subsidiary of Daystrom, Inc.,
305 Territorial Rd., Benton Harbor 4,
Mich., 15
See ad on page 328
Tel: YUkon 3-3961
- Herold Radio & Electronics Corp., N.Y.,
15
Home Recording Prod. Co., N.Y., Blank
Recording Discs
International Radio & Electronics Corp.,
Ind., 15
Jodon, Inc., F. R., D.C., 15
L.F.E. Inc., D.C., 15
Leach Corp., Relay & Inet Div., 18435
Susana Rd., Compton, Calif., 15
See ad on page 521
Tel: NEvada 6-1061
- Litton Industries, Inc., Electronic Equip-
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erly Hills, Calif., 15
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- Magnasync Mfg. Co., Ltd., Calif., 15,
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Instrument Div., Pa., 15
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Minnesota Mining & Mfg. Co., Mincom
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Newcomb Audio Products Co., Calif.,
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Northam Electronics, Inc., Calif., 15
Nortronics Co., Inc., Minn., 15
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W. Olympic Blvd., Los Angeles 64,
Calif., 15
See ad on page 246
Tel: BRadshaw 2-6141
- Peirce Dictation Systems, Ill., 3, 15, 20
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Blvd., Plainview, L.I., N.Y., 15
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Tel: OVerbrook 1-3200
- Precision Instrument Co., Calif., 15
Prescott Television Co., Calif., Video
Film Recorders
Press Wireless Labs., Inc., Mass., 15
Radio Corp. of America, Defense Elec.
Prod., N.J., 15
Rank Cintel Ltd., England, 15, 25
Reed Research Inc., D.C., Tape Tran-
scriber
Reeves Equipment Corp., N.Y., 5, 15
Reeves Soundcraft Corp., Conn., 25
Rek-O-Kut Co., Inc., N.Y., 5

SUB-MINIATURE CLUTCH-BRAKE ELECTRO-MAGNETIC

RELIABILITY • HIGH PERFORMANCE • VERSATILITY
 • 9 Models • 5 Sizes • 3 Shaft Alternates • Equals 135 Standard Configuration Selection • Available on Prompt Delivery

Model B



Model B-Brake
 Normally free — Energized to brake

- .500 thru 1.562 servo mounting dia.
- 4 thru 120 oz. in. min. brake torque.
- .8 to 16 oz. weight

Model BF



Model BF-Brake
 Normally braked — Energized to free.

- .500 thru 1.562 servo mounting dia.
- 2 thru 60 oz. in. min. brake torque.
- .8 to 16 oz. weight.

Model MBC



Model MBC-Duplex Clutch
 Output shaft normally clutched to one input flange — Energized same output shaft clutched to other input flange

- .500 thru 1.562 servo mounting dia.
- 2 thru 60 oz. in. min. clutch torque
- 1 to 20 oz. weight

Model CF



Model CF-Clutch
 Normally clutched — Energized to free

- .500 thru 1.562 servo mounting dia.
- 2 thru 60 oz. in. min. clutch torque
- .9 to 18 oz. weight.

Model C



Model C-Clutch
 Normally free — Energized to clutch.

- .500 thru 1.562 servo mounting dia.
- 4 thru 120 oz. in. min. clutch torque
- .8 to 16 oz. weight.

Model MC



Model MC-Brake Clutch
 Normally braked — Energized to clutch

- .500 thru 1.562 servo mounting dia.
- 2 thru 60 oz. in. min. clutch or brake torque
- 1 to 16 oz. weight

Model MB-Clutch Brake

Normally clutched — Energized to brake.

- .500 thru 1.562 servo mounting dia.
- 2 thru 60 oz. in. min. clutch or brake torque
- 1 to 16 oz. weight

Model MB

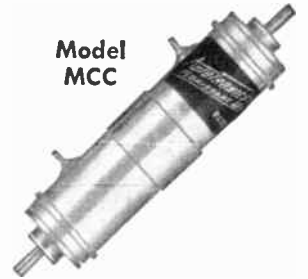


Model MCC-Duplex Clutch

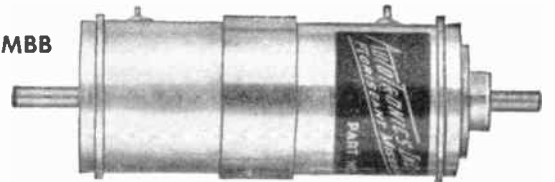
Normally both input flanges and output shaft free — Energize one or the other coil

- .500 thru 1.562 servo mounting dia.
- 3.5 thru 120 oz. in. min. clutch torque either side.
- 1.6 to 30 oz. weight

Model MCC



Model MBB



Model MBB-Clutch Brake

Normally input flange and output shaft free — Energize one coil to clutch input flange to output shaft or Engage other coil to brake output allowing input flange to free.

- .500 thru 1.562 servo mounting dia.
- 3.5 thru 120 oz. in. min. clutch or brake torque
- 1.6 to 30 oz. weight.

Autotronics Industrial Miniatures are available in 4 models with a pilot mounting dia. of 1.125 — torque rating 20 thru 40 oz. in. min.

C-125-Clutch. Normally free — Energize to clutch.
 B-125-Brake. Normally free — Energized to brake.
 BF-125-Brake. Normally braked — Energize to free.
 MC-125-Brake Clutch. Normally braked — Energize to clutch.

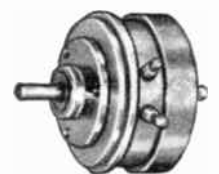


PANCAKE CLUTCH-BRAKE

The Newest addition to the precision line is the Pancake unit — in 4 models featuring a 1.000 in. servo mounting dia. — length .500 in. from servo flange to end of cap — torque rated 6 thru 12 oz. in. min.

Available Models:

PC-8-Clutch. Normally free — Energized to clutch.
 PMC-8-Brake Clutch. Normally braked — Energized to clutch.
 PB-8-Brake. Normally free — Energized to brake.
 PBF-8-Brake. Normally braked — Energized to free.



All standard units operate at 28 v.d.c. Other voltages can be supplied.

AUTOTRONICS, INC., Box 812, Route 1, Florissant, Mo.

Directory I. Complete Equipment

27. Recording Equipment.

Roberts Electronics, Inc., Calif., 15
 Rye Sound Corp., N.Y., 3
 Schloer, Inc., Modern Design Div., N.Y., 3, 15
 Schroeter, A. R., N.J., 15
 Scully, Inc., Conn., 5
 Siegler Corp., Bogen-Presto Co. Div., N.J., 5, 10, 15
 Simpson Mfg. Co., Inc., Mark, N.Y., 15
 Soroban Engineering, Inc., Fla., Paper Tape Recorders
 Soundscriber Corp., Conn., 3, 5, 15
Southwestern Industrial Electronics Co., 10201 Westheimer Rd., P.O. Box 22187, Houston 27, Texas, 15
 See ad on page 248
 Tel: HO 5-3471
 Stancil-Hoffman Corp., Calif., 15
 Taller & Cooper, Inc., Div. of American Electronics, N.Y., 15
 Tandberg of America, Inc., N.Y., 5, 15
 Technisonic Studios, Inc., Mo., 5
 Telectro Industries Corp., N.Y., 5, 15, 20, 25
 Thompson Ramo Wooldridge, Inc., Calif., 15
 U.S. Recording Co., D.C., 10, 15
 University of California, Calif., 3
 Webster Electric Co., Wisc., 15
 Wells-Gardner & Co., Ill., 15

Recording galvanometers:
 See class 13

Recording tape & wire:
 See class 63

Reflectors, radar: See class 37

Relay broadcast equipment:
 See class 7

Rotators: See class 37

STL equipment: See class 7

SWR meters: See class 19

Scalars: See class 22

Selective calling equipment:
 See class 20

28. Servo-Mechanisms.

3. Brakes
 5. Controls
 7. Couplings
 10. Gears, gear-trains, etc.
 11. Magnetic clutches
 12. Repeaters
 13. Resolvers
 15. Servo amplifiers
 17. Servo multipliers
 20. Servo motors & generators
 ACF Industries, Inc., Avion Div., N.J., 15
 Abrams Instruments Corp., Mich., 12
 Actuator Products Corp., Mass., 11
 Aeroflex Corp., N.Y., 15
 Aerolab Devel. Co., Semiconductor Systems Div., Calif., 5, 15
Airpax Electronics, Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla., Cambridge Div., Jacktown Rd., Cambridge, Md., 5, 15
 See ad on pages 82-83
 Tel: LUDlow 3-6160
 Amelco, Inc., Calif., 15
 American Bosch Corp., Arma Div., N.Y., 5, 20
 American Electronics, Inc., Calif., 11, 13, 20
 American Mach. & Foundry Co., Conn., 3, 5, 7, 10, 11, 12, 13, 15, 17
 American Mach. & Foundry Co., D.C., 5, 7, 15, 17
 American Measurements & Control, Inc., Mass., 5, 15, 20
 American Research & Mfg. Corp., Md., 15
 Analogue Controls, Inc., N.Y., 5, 10, 11, 17
 Andersen Labs., Inc., Conn., 15
 Arch Works, Inc., Mass., 10, Differentials
 Automatic Timing & Controls, Inc., Pa., 15
Autotronics, Inc., Box 812, Route 1, Florissant, Mo., 3, 11
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 Tel: TEMple 7-3565
 Avien, Inc., N.Y., 15
 Barry Controls, Inc., Insko Co. Div., Mass., 10, Speed Reducers
 Basler Electric Co., Ill., 20
 Beaver Gear Works, Inc., Ill., 10, Fine Pitch
 Beckman Instruments, Inc., Berkeley Div., Calif., 13, 17

Beckman Instruments, Inc., Helipot Div., Calif., 7, 10, 11, 20
 Belock Instrument Corp., N.Y., 15
 Bendix Aviation Corp., Bendix Pacific Div., Calif., 10, 11, 20
 Bendix Aviation Corp., Bendix Products Div., Ind., 13, 15, 20
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 10, 12, 13, 15, 20
 See ad on pages 19-22
 Tel: ATlas 8-2000
 Bendix Aviation Corp., Research Labs. Div., Mich., 13, 15, 20
Bowmar Instrument Corp., 8000 Bluffton Rd., P.O. Box 2835, Fort Wayne, Ind., 3, 5, 10, 11
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 Tel: SHerwood 3121
 Bristol Co., Conn., 5, 15
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Clifton Precision Products Co., Inc., Marple & Broadway, Clifton Hts., Pa., 13, 20
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 Tel: MADison 6-2101
 Clipper Gear & Machine Co., Mich., 5, 10
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 Colorado Research Corp., Colo., 5
 Components Corp., Ill., 15
 Comptron Corporation, Mass., 17
Computer Instrument Corp., 90 Madison Ave., Hempstead, N.Y., 13
 See ad on page 532
 Tel: IVanhoe 3-8200
 Computer Systems, Inc., N.Y., 13, 17
 Computing Devices of Canada, Ltd., Ont., Canada, 15
 Consolidated Airborne Systems, Inc., N.Y., 15

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DAYSTROM TRANSICOIL designs and manufactures a wide variety of precision servo components and complete assemblies for both industry and the military. The precision that goes into these products is the result of many years of specialized experience in the servo field. You're getting a head-start on quality when you specify Daystrom Transicoil . . .

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Frame Size: 5, 6, 8, 9, 11, 15, and 18 for 60 and 400* cycle operation

Standard Operation: -55 C to +120 C

*400 cycle units may be wound for operation with transistor drive

GEAR TRAINS

Mounted on the motor or generator

Maximum backlash will not exceed 30 minutes as measured with a 1 in.-oz. load on the output shaft

Ratios from 7:1 to 2187:1. Other ratios available to suit customer specifications

SYNCHROS—Transmitters, Control Transformers, Differentials

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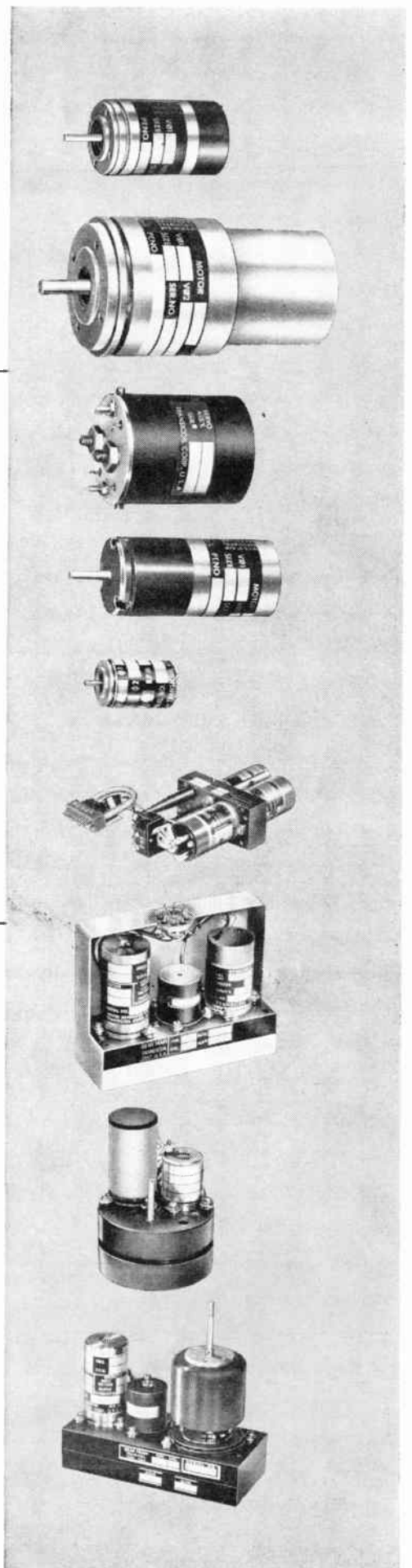
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Miniaturized amplifiers to drive a combination of Daystrom Transicoil rotating components and assemblies

Designed to meet industrial and military requirements

COMPLETE ASSEMBLIES

Design and manufacture of complete servo assemblies to customer specifications



Complete specifications, mechanical data, dimensions, etc., are included in the Daystrom Transicoil Catalog. This is available at no cost through Daystrom Sales Representatives in principal cities throughout the United States, or by letterhead request to the plant.



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Directory I. Complete Equipment

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

28. Servo-Mechanisms.

- Consolidated Controls Corp., Conn., 5, 15
Control Corp., Minn., 15
Controls Co. of America, Ill., 5
Crescent Eng. & Research Co., Calif., 5
Curtis Universal Joint Co., Inc., Mass., Universal Joints
Custom Gear Co., Ind., 10, 20
Cutler-Hammer, Inc., Wis., 3, 5, 11
Daco Instrument Co., N.Y., 10, 11, 20
Dalmo Victor Co., Div. of Textron, Inc., Calif., 5, 10, 15
Datran-Electronics, Calif., 15
Daystrom, Inc., Weston Instruments Div., N.J., 20
Daystrom Transicoil Corp., Div. of Daystrom, Inc., Worcester, Montgomery County, Pa., 20
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Tel: JUnio 4-2421
- Decker Corp., Pa., 20
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Dynamic Instrument Co., Inc., Mass., 3, 12, 20
Dynamic Electronics-New York, Inc., N.Y., 15
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Dynamics Corp. of America, Reeves Instrument Corp. Div., N.Y., 3, 5, 7, 10, 11, 13, 15, 17
E.M.I. Electronics Ltd., England, 13, 15, 20
Eastern Air Devices Inc., N.H., 20
Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn., 15
See ad on page 272
Tel: CH 8-3841
- Edison Industries, Thomas A., Instrument Div., 61 Lakeside Ave., West Orange, N.J., 5, 15, 17, 20
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- Electro Instruments, Inc., Calif., 15
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Evershed & Vignoles Ltd., England, 5, 13, 15, 17, 20
Exact Engrg. & Mfg., Inc., Calif., 5, 7, 10
Fae Instrument Corp., N.Y., 3, 5, 7, 10, 11
Fairchild Engineering Corp., Conn., 15

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Synchros—Size 25—20 sec. max. error



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- Tachometers—Damping, Rate, Integrating
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For hi-performance hydraulic or pneumatic missile control.

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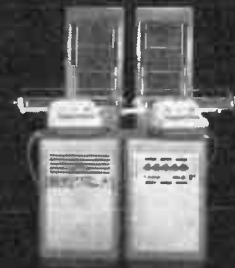


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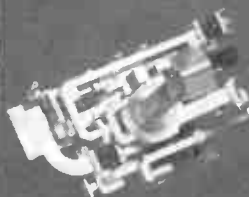


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West Coast Office: 253 N. Vineta Avenue, Pasadena, California

Directory I. Complete Equipment

28. Servo-Mechanisms.

Falcon Machine & Tool Co., Inc., 208 Concord Tnpk., Cambridge 40, Mass., 7

See ad on this page

Tel: TRowbridge 6-3269

Farrand Controls, Inc., N.Y., 5, 15

Feedback Controls, Inc., Mass., 5, 10, 12, 15, 17

Ferrotran Electronics Co., N.Y., 15

Forbes and Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 3

See ads on pages 349, 369, 413, 444, 453, 565

Tel: YE 4-2691

Franke Gear Works, Inc., Ill., 10

Fuchs Impulse Motor Servomechanisms, N.Y., 5, 20

G-M Labs., Inc., Ill., 20

GPE Controls, Inc., Ill., 5

Gap Instrument Corp., N.Y., 7, 10

Garrett Corp., Air Research Mfg. Div., Calif., 15

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General Controls Co., Calif., 5, 15, 17

General Electro Mechanical Corp., N.Y., 3, 5, 11

General Electronic Labs., Inc., Mass., 15

General Instrument Corp., F. W. Sickles Div., Mass., 5, 15

Globe Industries, Inc., Ohio, 3, 5, 10, 11, 20

Granite State Mach. Co., Inc., N.H., 7, 10

Grant Gear Works, Inc., Mass., 10

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 10

See ad on page 639

Tel: NEw Rochelle 3-8600

Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 3, 5, 11

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Tel: WELLS 8-9500

Gulton Industries, Inc., N.J., 15

Hall-Barkan Instruments, Inc., N.Y., 10

Hallamore Electronics Co., Calif., 15

Hamilton Watch Co., Hathaway Instrument Div., Colo., 10

Hanson-Gorrill-Brian, Inc., N.Y., 5, 15

Harrel, Inc., N.Y., 15

Helipot Corp., Calif., 7, 10, 12, 13, 20

Hoffman Electronics Corp., Calif., 10

Hoover Electric Co., Calif., 20, Drives

Hunter Spring Co., Pa., Mechanical Servos

Huyck & Sons, F. C., Waldorf Electronics Div., N.Y., 5, 12, 15, Test Boards

I.M.C. Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 13, 20

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Tel: EDgewood 4-7070

Hex Optical Co., N.Y., 10

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Industrial Control Co., N.Y., 5, 10, 12, 15, 17

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Jack & Heintz, Inc., Ohio, 3, 5, 10, 12, 20

Jan Hardware Mfg. Co., Inc., N.Y., Drives, Angle Gear & Ball Bearing Ratio

Jordan Co., Inc., Wis., 5, 15

Juall Gear Co., Inc., N.J., 10

Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 3, 5, 7, 10, 11, 12, 13, 15, 17, 20

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Tel: GRegory 2-1000

Kenilworth Coupling Co., N.C., 7

Keystone Products Co., N.J., 15

Kidde & Co., Inc., Walter, N. J., 5, 15

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 3, 5, 7, 15

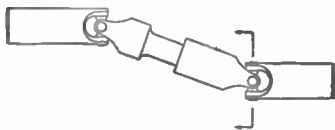
See ad on page 370

Tel: TWining 9-5600

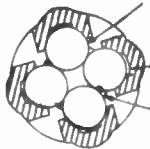
Lear, Inc., Mich., 5, 7, 11, 15, 20

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Now available with preloaded ball spline as telescoping double universal joint



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Sealed in lubricant

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Features

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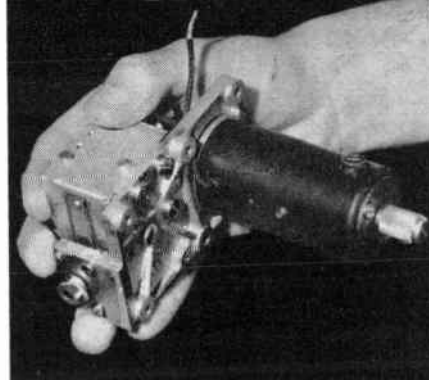
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A complete line of linear and non-linear potentiometers.

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Low torque, low noise, excellent stability.
Exceeds MIL 5272 and NAS 710.

MAGNETIC CLUTCHES

Unique electro-magnetic design provides for extreme torque to inertia ratio ... over 1,000,000 rad./sec².

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- Zero backlash and .0005" max. end play
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- Exceeds MIL-5272, 4158, and 8189 specs.



MICRO & SUB-MINIATURE CLUTCH BRAKES

- Most advantageous for critical size/critical weight applications
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- **SPEED** Excellent service life at 12,000 rpm. Higherspeeds possible.
- **OUTPUT** Various models up to 20 volts per 1,000 rpm.
- **RIPPLE** The rms value will not exceed 3% of the d-c value at any speed in excess of 100 rpm.
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IMMEDIATE DELIVERY

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28. Servo-Mechanisms.

- Lear, Inc., Lear Cal Div., Calif., 11, 15, 20
 Lear, Inc., Lear-Romec Div., Ohio, 17, 20
 Leeds & Northrup Co., Pa., 15, 20
 Librascope, Inc., Calif., 10, 15, 20, Differentials
 Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 15
 See ads on pages 270, 301
 Tel: **TEXas 0-7711**
- Link Aviation, Inc., N.Y., 15, 17
 Liquidometer Corp., N.Y., 15
 Litton Industries, Md. Div., Md., 3, 5, 7, 10, 12, 13, 15, 17, 20
 Luther Manufacturing Co., Calif., 13, 20
 MacLaren & Co., F. B., N.Y., 5, 10, 15, 17
 Magnasync Mfg. Co., Ltd., Calif., 20
Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 5, 15
 See ad on page 496
 Tel: **CYpress 2-6610**
- Magnetic Instruments Co., Inc.**, 546 Commerce St., Thornwood, N.Y., 15, 17
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 Tel: **ROgers 9-5312**
- Magneto, Inc., N.Y., 15
 Magtrol, Inc., N.Y., 3, 5, 11
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 Mandrel Industries, Inc., Calif., 10, 20
 Mandrel Ind., Inc., Greenleaf Mfg. Div., Mo., 20
 Marquardt Aircraft Co., Pomona Div., Calif., 15, 17
 Marsland Engrg., Ltd., Canada, 10, 11, 15
 Marstan Electronics Corp., N.Y., 15, 17
 Martin Co., Baltimore Div., Md., 10, 15, 17
 Massachusetts Gear-Tool Co., Geartronics Div., Mass., 10, 11
 Mayberry Electronics Co., Calif., 15
 Metron Instrument Co., Colo., 7, 10
 Micro Gee Products, Inc., Calif., 15
Micro-Lectric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, N.Y., 10
 See ad on page 533
 Tel: **FReeport 8-3222**
- Midwestern Instruments, Inc., Okla., 5, 12, 15
 Milgo Electronic Corp., Fla., 13, 15
 Minneapolis-Honeywell Reg. Co., Aeronautical Div., Minn., 5
 Minneapolis-Honeywell Reg. Co., Brown Instrument Div., Pa., 15, 20
 Montek Associates, Inc., Utah, 5, 11, 15
 Moran Instrument Corp., Calif., 15, 17
 Motordyne, Inc., Calif., 20
 Muirhead & Co., Ltd., England, 10, 13, 15, 20
 Muirhead Instruments, Inc., N.Y., 13, 15, 20
 National Pneumatic Co., Inc., Mass., 20
 Networks Electronic Corp., Calif., 15
 Nixon Gear & Machine Co., Inc., N.Y., 10
 Norden-Ketay Corp., Precision Components Div., N.Y., 13, 15, 20
- Norrich Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 7
 See ad on page 152
 Tel: **WATkins 4-8360**
- North Atlantic Industries, Inc.**, 603 Main St., Westbury, L.I., N.Y., 12, 13, 15, 17
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 Tel: **EDgewood 4-1122**
- Oster Mfg. Co., Avionic Div.**, 1 Main St., Racine, Wis., 13, 15, 20, Indicators
 See ad on page 480
 Tel: **MELrose 7-4445**
- PIC Design Corp.**, N.Y., 7, 10, 11, Breadboard Kits
 P.S.P. Engineering Co., Calif., 13
 Pansal, Inc., N.J., 11, 15
 Peck Spring Co., Conn., 10
 Pegasus Laboratories, Inc., Mich., Valves & Actuators
 Philco Corp., Govt. & Indl. Div., Pa., 5, 12, 15
Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 5, 15
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 Tel: **CANal 6-7250**
- Precision Mechanisms Corp., N.Y., 5, 7, 10, 12
 Radiatronics, Inc., Calif., 10
 Radio Development & Research Corp., N.J., 3, 5, 7, 10, 11, 12, 13, 15, 17, 20
 Raymond Engrg. Lab., Inc., Conn., 11
 Redford Corp., N.Y., 5, 15
 Reeves Instrument Corp., N.Y., 3, 5, 7, 10, 12, 13, 15, 17, 20
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 Research Development Mfg., Inc., Pa., 10
 Robinette Co., W. C., Calif., 5, 15
 Rockwell Engrg. Co., Ind., 15
 Rotary Devices Corp., N.J., 15
 Ryan Aeronautical Co., Ryan Electronics Div., Calif., 15
 Sanders Associates, Inc., N.H., 15
 Sangamo Electric Co., Ill., 20
 Schaevitz Engrg., N.J., 15
 Servo Corp. of America, N.Y., 5, 10, 15
 Servo Dynamics Corp., N.H., 3, 10, 11, 15, 20
 Servomechanisms, Inc., Calif., 5, 10, 11, 15, 20
 Servomechanisms, Inc., N.Y., 3, 5, 7, 10, 11, 15, 20
 Servonics, Inc., Va., 10, 15, 17
Servo-Tek Products Co., Inc., 1086 Goffle Rd., Hawthorne, N.J., 5, 10, 15, 20
 See ad on this page
 Tel: **HAWthorne 7-3100**
- Sierra Research Corp., N.Y., 15
 Small Motors, Inc., Ill., 20
 Specialties, Inc., N.Y., 15
 Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 10, 15
 Sperry Rand Corp., Ford Instrument Co. Div., N.Y., 5, 7, 10, 13, 20
 Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 15
 Sperry Rand Corp., Sperry Gyroscope Div., Aeronautical Equip. Div., N.Y., 15

Directory I. Complete Equipment

28. Servo-Mechanisms.

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 3, 5, 7, 10, 11, 15, 20
See ads on pages 306, 351
Tel: POrt Washington 7-7200

Suffolk Products Corp., N.Y., 10
Summers Gyroscope Co., Calif., 15, 20
Sun Electric Corp., Ill., 15, 20
Syntorque, Inc., N.Y., 20
Systems, Inc., Fla., 5, 15
Taber Instrument Corp., N.Y., 15
Techniflex Mfg. Co., Inc., N.Y., 15, 17
Technology Instrument Corp., Calif., 11
Technology Instrument Corp., 535 Main St., Acton, Mass, 3, 11
See ad on page 539
Tel: COlonial 3-7711

Telectro Industries Corp., N.Y., 5, 17, 20
Temco Aircraft Corp., Electronics Div., Texas, 15, 17
Thompson-Ramo-Wooldridge, Inc., Tapco Group, Ohio, 5, 15, 20
Topper Mfg. Co., Inc., N.Y., 15
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 15
See ad on pages 116-117
Tel: ELizabeth 4-5650

United Aircraft Corp., Ketay Dept., Norden Div., N.Y., 13, 15, 20

United Aircraft Corp., Norden Div., Conn., 13, 20
United Aircraft Corp., Norden Div., Norden Labs., N.Y., 15, 17
United Control Corp., Wash., 15
United Electric Controls Co., Mass., 5
U. S. Electrical Motors, Inc., Calif., 5, 10, Variable Speed Drives, AC Drives
U. S. Gear Corp., Mass., 10
U. S. Science Corp., Sub. Topp Indust., Inc., Calif., 5, 11, 15
Varo Mfg. Co., Inc., Tex., 5
Vickers, Inc., Electric Products Div., Mo., 5, 11, 15
Vitro Labs., Silver Spring Lab., Md., 15
Waldorf Instrument Co., Huyck & Sons Div., N.Y., 5, 10, 15, 17, 20
Waltham Precision Inst. Co., Thermal Dynamic Prods. Div., N.Y., 15
Warner Electric Brake & Clutch Co., Wis., 3, 7, 11
Warren Mfg. Co., Inc., Mass., 15
Washington Machine & Tool Works, Minn., 3, 10, 11
Waugh Engrg. Co., Calif., 15
Western Gear Corp., Electro Parts Div., Calif., 20
Winzeler Mfg. & Tool Co., Ill., 10
Wright Machinery Co., N.C., 10, 20
Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 20
See ad on page 310
Tel: BEekman 3-6720

29. Single Sideband.

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
See ad on pages 32-33
Tel: EMpire 3-0281

Communications Co., Fla., 5, 10
Continental Electronics Mfg. Co., Tex., 10
Corbin Corporation, Md., 5, 10
Creative Electronics Corp., Conn., 5, 10
Crosby Laboratories, Inc., N.Y., 5, 10
Dynamic Electronics-New York, Inc., N.Y., 5
Eldico Electronics, Radio Eng. Labs., Inc., Div., N.Y., 10
Electro-Voice, Inc., E. V. Instrument Div., Mich., 5
Electronic Communications, Inc., Fla., 5, 10
Erco Radio Labs., Inc., N.Y., 5, 10
Gates Radio Co., Ill., 5, 10
General Electric Co., Technical Prods. Operation, N.Y., 5, 10
Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill., 5, 10
See ad on page 204
Tel: VAn Buren 6-6300

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10
See ad on page 328
Tel: YUkon 3-3961

Intelx Systems, Inc., N.Y., 5, 10, Airborne
Internatl. Electronics Corp., N.Y., 5, 10
Internatl. Telephone & Telegraph Labs., Calif., 5, 10
Johnson Co., E. F., Minn., 10
Kalm Research Labs., Inc., N.Y., 5, 10
Kaiser Industries, Kaiser Aircraft & Elect. Div., Ohio, 5, 10
Kellogg Switchboard & Supply Co., Ill., 5, 10
Knight Electronics, Ill., 10
Litton Industries, Airtron, Inc., Div., N.J., 5
Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10
See ad on page 66
Tel: CRestview 4-7411

Loge Sound Engineers, Calif., 5, 10
M E Labs., Calif., 5, 10
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5, 10
Microwave Development Labs., Inc., Mass., Generators
National Radio Co., Inc., 37 Washington St., Melrose 76, Mass., 5
See ad on page 642
Tel: NO 5-4800

Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., Analyzers
See ad on page 320
Tel: OWens 9-4600

Philco Corp., Govt. & Indl. Div., Pa., 5, 10
Racal Engrg., Ltd., England, 5, 10

Shielding material, RF:
See class 96

Shipborne communications equipment: See class 16

Signal generators, AM&FM:
See class 26

Signal generators, TV: See class 35

29. Single Sideband.

| | |
|--------------|------------------|
| 5. Receivers | 10. Transmitters |
|--------------|------------------|

Admiral Corp., Ill., 5, 10
Aero Guidance Corp., Calif., 5, 10
Amelco, Inc., Calif., 5, 10
Automation Elecnics, Inc., Calif., 5
Avco Corp., Crosley Div., Ohio, 5
Barber Labs., A. W., N.Y., 5, 10
Barker & Williamson, Inc., Pa., 5, 10
Bendix Aviation Corp., Mich., 5, 10
Canadian G. E. Co., Ltd., Electronic Equip.-Tube Dept., Canada, 5, 10
Canadian Marconi Co., Canada, 5, 10
Canadian Westinghouse Co., Ltd., Elect. Div., Canada, 5, 10
Central Electronics, Inc., Ill., 10

STERLING

BRAKES
CLUTCHES
GEAR HEADS, DIFFERENTIALS
SPEED REDUCERS, SHAFTING
PREC. I, II & III GEARS

PRECISION
COMPONENTS

Write for our New 512 Page
COMPLETE CATALOG

S

TERLING

PRECISION
CORPORATION

17 Matinecock Ave., Port Washington, N.Y.

For details, circle #280 on Reader Service Card

Accurate



*These tolerances are from absolute frequency under any combination of the conditions within operating specifications. For specific operating conditions much closer frequency tolerances may be maintained.

TRANSISTORIZED TUNING FORK FREQUENCY STANDARDS

TYPE MAFC — Frequency Standard

- Frequency Range Available: 360 cps to 4 kc
- Tolerances % \pm : 0.2, 0.05, 0.02, 0.01, 0.005*
- Temperature Ranges: —20 to +71°C
—55 to +100°C
—55 to +125°C
- Power Supply Voltage: 12 or 28 vdc \pm 15%
- Size: 1 $\frac{3}{8}$ " x 1 $\frac{5}{8}$ " x 2 $\frac{1}{4}$ " • Weight: 8 oz.

TYPE AFC — Frequency Standard

- Frequency Range Available: 360 cps to 4 kc
- Tolerances % \pm : 0.2, 0.05, 0.02, 0.01, 0.005*
- Temperature Ranges: —20 to +71°C
—55 to +100°C
—55 to +125°C
- Power Supply Voltage: 12 or 28 vdc \pm 15%
- Size: 2 $\frac{1}{8}$ " x 2 $\frac{1}{8}$ " x 3 $\frac{1}{4}$ " • Weight: 13 oz.

TYPE MAFCD — Frequency Standard

- Frequency: 60 cps
- Tolerances % \pm : 0.2, 0.05, 0.02, 0.01, 0.005*
- Temperature Range: —55 to +71°C
- Wave Shape: Sine w/less than 1% harmonic distortion
- Power Supply Voltage: 10 to 14 vdc
- Size: 4 $\frac{1}{8}$ " x 4 $\frac{1}{8}$ " x 4 $\frac{1}{8}$ " • Weight: 4 lbs.

TYPE MFB — Frequency Divider

- Ratios Available: 2:1, 4:1, 5:1, 8:1, 10:1, 16:1
- Temperature Ranges: —20 to +71°C
—55 to +100°C
- Power Supply Voltage: 12 or 28 vdc \pm 15%
- Size: 1 $\frac{3}{8}$ " x 1 $\frac{3}{8}$ " x 2 $\frac{1}{4}$ " • Weight: 6 oz.

TYPE MFS — Frequency Standard for Laboratory or Field

Type MFS is a small, lightweight frequency standard that can replace units many times its size without sacrificing frequency stability. Internal batteries and provisions for external power supply make the unit ideal for either laboratory or field applications.

- Frequency Ranges Available: 50 cps to 4 kc
- Frequency Stability: 2 parts in 10⁷/per month
- Temperature Range: —20 to +71°C
- Size: 3 $\frac{7}{8}$ " x 5 $\frac{3}{8}$ " x 5 $\frac{3}{8}$ " • Weight: 2 lbs.

TYPE MLS — Laboratory — Frequency Standard

Type MLS is an extremely high stability laboratory frequency standard. The clock on the panel facilitates easy checking of stability.

- Frequency Ranges Available: 50 cps to 4 kc (Multiple Taps Optional)
- Frequency Stability Available: 5 parts in 10⁷
- Output: 10 watts at specified frequency
- Input: 115 v, 50 cycles to 400 cycles
- Size: 9" x 10" x 7" • Weight: 15 lbs.

A wide variety of units are designed to comply with the most severe military specifications.

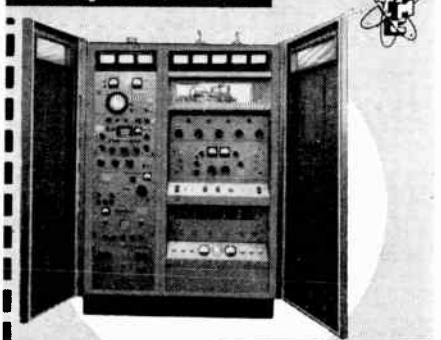
Manufactured by
ACCURATE INSTRUMENT CO.

2418 W. ALABAMA
HOUSTON 6, TEXAS
JA 3-2712

29. Single Sideband.

- Radio Corp. of America, Defense Elec. Prod., N.J., 5, 10
Radio Engrg. Labs., Inc., N.Y., 5, 10
Radio Engrg. Labs., Inc., Standard Electronics Div., N.Y., 5, 10
Radio Receptor Co., Eng. Prods. Div., N.Y., 5, 10
Remanco, Inc., Calif., 5
Rohde & Schwarz Sales Co., Inc., N.J., 5, 10
Siemens & Halske, A. G., Germany, 5, 10
Specialty Engrn. & Electr. Co., N.Y., 5, 10
Standard Telephones & Cables, Ltd., England, 5, 10
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 10
Systems, Inc., Fla., 5
Tapetone, Inc., Mass., 5
Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5, 10
See ad on this page
Tel: OWens 8-4800
Telchrome Mfg. Corp., N.Y., 5, 10
Telephonics Corp., N.Y., 5, 10
Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 5, 10
See ad on page 308
Tel: EDgewood 3-1027
Westinghouse Electric Corp., Md., 5, 10
Westrex Corp., N.Y., 5, 10
Wilcox Electric Co., Inc., Mo., 5, 10
Wunderlich Radio Co., Ill., 5, 10
Young Spring & Wire Corp., Gosnet Div., Calif., 5, 10

AN/FRT-39



BULLETIN
207B

GPT-10K

SINGLE SIDEBAND HI-POWER TRANSMITTER

The TMC Model GPT-10K, Radio Transmitter, is a conservatively rated, general purpose unit capable of providing 10 kw PEP output throughout the range of 4 to 28 megacycles. Containing all components within a single attractive enclosure, the GPT-10K includes exciter, spectrum analyzer, F.S. Exciter, and complete "on the air" testing circuitry.



The TECHNICAL
MATERIEL CORP.
MAMARONECK, NEW YORK

For details, circle #282 on Reader Service Card

For details, circle #281 on Reader Service Card

Directory I. Complete Equipment

Slotted lines: See class 19

Smoke nuisance controls:
 See class 4

Sorting equipment: See class 4

30. Sound Systems.

5. Inter-com's 10. Public Address

ABC Sound Engrg. Co., N.Y., 5, 10
 Aircraft Electronics, Ariz., 5, 10
 Airtronix Dev. Corp., N.Y., 5, 10
Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., 10
 See ad on page 178
 Tel: HAYmarket 1-6800

American Communications Corp., N.Y., 5, 10
 American Elite, Inc., N.Y., 10
 Antrex Corp., Ill., 5, 10
 Audio-Master Corp., N.Y., 10
 Audio-Video Corp., N.Y., 5, 10
 Beam-Echo, Ltd., England, 10
 Bliss Electronic Corp., N.J., 5, 10
 British Thomson-Houston Co., Ltd., England, 5, 10
 Bruno-New York Industries Corp., N.Y., 5
 Calbest Electronics Co., Calif., 5
 Califone Corporation, Calif., 10, Portable
 Communication Equip. & Engineering Co., Ill., 5, 10
 Dalmotron Co., Calif., 5
 Dictograph Products, Inc., N.Y., 5, 10
 Du Kane Corp., Ill., 5, 10
 Dynamic Electronics-New York, Inc., N.Y., 5, 10
 Electro-Voice, Inc., E. V. Instrument Div., Mich., 10
 Electronic Assistance Corp., N.J., 5, 10
 Electronic Engrg. Co., Md., 5, 10
 Electronic Systems Engrg. Co., Okla., 10
 Engineered Sound Systems, Ltd., Canada, 5, 10
 Etelco, Ltd., England, 5, 10
 Executone, Inc., N.Y., 5, 10
 Feiler Engineering & Mfg. Co., Ill., 10
 Flush Wall Radio Co., Fla., 5, Radio
 General Communications, Inc., Wis., 5, 10
 General Electric Co., Ltd of England, England, 5, 10
 Godfrey Mfg. Co., Ill., 5
 Gray Mfg. Co., Conn., 5, Airborne
 Hosmer & Co., E. A., Calif., 5
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 10
 See ads on pages 358, 428, 492
 Tel: LUDlow 4-6200

Kellogg Switchboard & Supply Co., Ill., 5

Kierulff Electronics, Inc., Calif., 5, 10
 Knight Electronics, Ill., 5
 Lake Mfg. Co., Calif., 5
 Lesa, S. P. A., Italy, 5, 10
Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 5, 10
 See ads on pages 270, 301
 Tel: TEXas 0-7711

Loge Sound Engineers, Calif., 5, 10
 M P Engineering Co., Conn., 5, 10
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 5, 10
 Marine Electric Corp., Galbraith-Pilot Marine Div., N.Y., 5, 10
 Marine View Electronics, Inc., N.Y., 5
 Maxson Corp., Langevin Div., N.Y., 5, 10
 Newcomb Audio Products Co., Calif., 10
 North Electric Co., N.Y., 5
 North Electric Co., Ohio, 5
 Northern Electric Co., Ltd., Canada, 5, 10
 O'Brien Electric Corp., Calif., 10
 Philco Corp., Govt. & Industrial Div., Pa., 5
 Port-O-Vox Corp., N.Y., 5, 10
 Pye Telecommunications, Ltd., England, 5, 10
 Radio Corp. of America, Defense Elec. Products, N.J., 5
 Railroad Electronic Labs. of Omaha, Inc., Neb., 5, 10
 Reeves Equipment Corp., N.Y., 5
 Remler Co., Calif., 5, 10, Marine, Airborne
 Republic Electronic Industries Corp., N.Y., 5, 10
 Rhein Sound System, Inc., Conn., 5
 Scott, Inc., H. H., Mass., 10
 Seeburg Corp., Ill., 10
 Siegler Corp., Bogen-Presto Co. Div., N.J., 5, 10
 Simpson Mfg. Co., Inc., Mark, N.Y., 5, 10
 Specialty Engrn. & Electron. Co., N.Y., 10
 Spivey, Inc., James S., D.C., 5
 Taffet Radio & Television Co., N.Y., 10
 Talk-A-Phone Co., Ill., 5
 Tandberg of America, Inc., N.Y., 5
 Telectro Industries Corp., N.Y., 5
 Telephonics Corp., N.Y., 5, 10
 Tesla Electric Co., Ill., 5
Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 5
 See ad on pages 75-78
 Tel: FLEetwood 7-5411

See the pink section preceding page 1 for complete instructions on how to get the most out of this Directory.

30. Sound Systems.

Thompson-Ramo-Wooldridge, Inc., Calif., 5, 10
 Translite Electronics Corp., Ill., 5
 Trutone Electronics, Inc., Calif., 10
 U. S. Recording Co., D.C., 5, 10
 Vinco Electronics Corp., Conn., 5, 10
 Vocaline Co. of America, Inc., Conn., 5, 10
 Webster Electric Co., Wis., 5, 10
 Westlab Electronics, Inc., N.Y., 5, 10

Spectrometers: See class 12

Spectrum analyzers: See class 3

Speed controls: See class 4

Square wave generators:
 See class 3

31. Standards of Frequency & Time.

| | |
|------------------------------------|--------------------------------------|
| 5. Elapsed time measuring equip. | 20. Secondary standards of frequency |
| 10. Primary standards of frequency | 25. Secondary standards of time |
| 15. Primary standards of time | 30. Tuning forks |


Abrams Instruments Corp., Mich., 25
Accurate Instrument Co., 2418 W. Alabama St., Houston 6, Tex., 10, 15, 20, 25, 30
 See ad on page 352
 Tel: JACKson 3-2712

Acme Electronix, Div. of NEA Service, Inc., Ohio, 20, 25, 30
Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 5
 See ad on page 337
 Tel: GREGory 2-5622

Aero Instrument Co., Calif., 5, 20
 Aerolab Devel. Co., Semiconductor Systems Div., Calif., 5
 Airmec, Limited, England, 10, 15, 20, 25
 Akeley Camera, Inc., Div. Flecker, J. W., Pa., 20, 25
 Allegany Instrument Co., Inc., Md., 5
American Time Products, Inc., 580 5th Ave., New York 36, N.Y., 20, 25, 30
 See ad on page 354
 Tel: PLaza 7-1430

Artronic Instrument Co., Md., 20, 25
 Bassett, Inc., Rex, Fla., 20
 Beckman/Berkeley Div., Calif., 5, 20, 25
 Bergen Labs Inc., 247 Crooks Ave., Clifton, N.J., 5
 See ad on page 471
 Tel: GREGory 3-7800

FREQUENCY STANDARDS



PRECISION FORK UNIT
TYPE 50

Size 1" dia. x 3 3/4" H.* Wght., 4 oz.

Frequencies: 240 to 1000 cycles


Accuracies:—

Type 50 ($\pm .02\%$ at -65° to 85°C)
Type R50 ($\pm .002\%$ at 15° to 35°C)

Double triode and 5 pigtail parts required

Input, Tube heater voltage and B voltage
Output, approx. 5V into 200,000 ohms

*3 1/8" high
400 - 1000 cy.



FREQUENCY STANDARD
TYPE 50L


Size 3 3/4" x 4 1/2" x 5 1/2" High
Weight, 2 lbs.

Frequencies: 50, 60, 75 or 100 cycles

Accuracies:—

Type 50L ($\pm .02\%$ at -65° to 85°C)
Type R50L ($\pm .002\%$ at 15° to 35°C)

Output, 3V into 200,000 ohms
Input, 150 to 300V, B (6V at .6 amps.)



PRECISION FORK UNIT
TYPE 2003

Size 1 1/2" dia. x 4 1/2" H.* Wght. 8 oz.

Frequencies: 200 to 4000 cycles


Accuracies:—

Type 2003 ($\pm .02\%$ at -65° to 85°C)
Type R2003 ($\pm .002\%$ at 15° to 35°C)
Type W2003 ($\pm .005\%$ at -65° to 85°C)

Double triode and 5 pigtail parts required

Input and output same as Type 50, above

*3 1/2" high
400 to 500 cy.
optional




FREQUENCY STANDARD
TYPE 2005

Size, 8" x 8" x 7 1/4" High
Weight, 14 lbs.

Frequencies: 50 to 400 cycles
(Specify)

Accuracy: $\pm .001\%$ from 20° to 30°C

Output, 10 Watts at 115 Volts
Input, 115V. (50 to 400 cycles)



FREQUENCY STANDARD
TYPE 2007-6 **NEW**

TRANSISTORIZED, Silicon Type

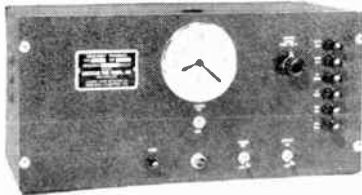
Size 1 1/2" dia. x 3 1/2" H. Wght. 7 ozs.

Frequencies: 400 — 500 or 1000 cycles

Accuracies:

2007-6 ($\pm .02\%$ at -50° to $+85^{\circ}\text{C}$)
R2007-6 ($\pm .002\%$ at $+15^{\circ}$ to $+35^{\circ}\text{C}$)
W2007-6 ($\pm .005\%$ at -65° to $+125^{\circ}\text{C}$)

Input: 10 to 30 Volts, D. C., at 6 ma.
Output: Multitap, 75 to 100,000 ohms




FREQUENCY STANDARD
TYPE 2121A

Size
8 3/4" x 19" panel
Weight, 25 lbs.

Output: 115V
60 cycles, 10 Watt

Accuracy:
 $\pm .001\%$ from 20° to 30°C

Input, 115V (50 to 400 cycles)



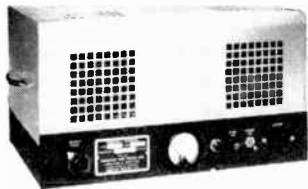
FREQUENCY STANDARD
TYPE 2001-2

Size 3 3/4" x 4 1/2" x 6" H., Wght. 26 oz.

Frequencies: 200 to 3000 cycles

Accuracy: $\pm .001\%$ at 20° to 30°C

Output: 5V. at 250,000 ohms
Input: Heater voltage, 6.3 - 12 - 28
B voltage, 100 to 300 V., at 5 to 10 ma.




FREQUENCY STANDARD
TYPE 2111C

Size, with cover
10" x 17" x 9" H.
Panel model
10" x 19" x 8 3/4" H.
Weight, 25 lbs.

Frequencies: 50 to 1000 cycles

Accuracy: ($\pm .002\%$ at 15° to 35°C)

Output: 115V, 75W. Input: 115V, 50 to 75 cycles.



ACCESSORY UNITS
for TYPE 2001-2

L—For low frequencies
multi-vibrator type, 40-200 cy.

D—For low frequencies
counter type, 40-200 cy.

H—For high freqs, up to 20 KC.

M—Power Amplifier, 2W output.

P—Power supply.

This organization makes frequency standards within a range of 30 to 30,000 cycles. They are used extensively by aviation, industry, government departments, armed forces—where maximum accuracy and durability are required.

WHEN REQUESTING INFORMATION
PLEASE SPECIFY TYPE NUMBER

American Time Products, Inc.

Watch  Master
Timing Systems

Telephone: PLaza 7-1430

580 Fifth Ave., New York 36, N. Y.

Directory I. Complete Equipment

31. Standards of Frequency & Time.

- Boonton Radio Corp.**, 50 Intervale Rd., Boonton, N.J., Standards of Q
See ad on page 336
Tel: DEerfield 4-3200
- Borg Equipment Div., Amphenol-Borg Electronics Corp.**, 120 S. Main St., Janesville, Wis., 10, 15, 20, 25
See ad on page 530
Tel: PLeasant 4-6616
- Bulova Research & Development Labs., Inc.**, N.Y., 5, 20, 25, 30
- Bulova Watch Co., Electronics Div.**, Dept. A-1376, 40-06 62nd St., Woodside 77, N.Y., 10, 15, 20, 25
See ad on page 440
Tel: NEwtown 9-5700
- Canadian Marconi Co.**, Canada, 10
- Colortone Electronics, Inc.**, N.Y., 20
- Computer Equipment Corp.**, Calif., 5
- Computer-Measurements Co.**, Calif., 5
- Control Electronics Co., Inc.**, 10 Stepar Pl., Huntington Station, L.I., N.Y., 20, 25
See ads on pages 321, 451
Tel: HAmilton 7-7961
- Crystal Research Labs., Inc.**, Conn., 25
- Decade Instrument Co.**, N.J., 20
- Delta-F, Inc.**, Ill., 10, 15, 20, 25, 30
- Deltime, Inc.**, N.Y., 5
- De Mornay-Bonardi**, 780 S. Arroyo Pkwy., Pasadena, Calif., 15, 20
See ad on pages 120-121
Tel: SYcamore 2-4142
- Designers for Industry, Inc.**, Ohio, 5, 10, 15, 20, 25
- Dimco-Gray Co.**, 212 E. Sixth St., Dayton 2, Ohio, 5
See ad on page 639
Tel: BAldwin 2-6703
- Dymec, Inc.**, Calif., 5
- Dynapar Corp.**, Ill., 20, 25
- E H Research Laboratories, Inc.**, 1922 Park Blvd., Oakland 6, Calif., 20
See ad on page 298
Tel: GLencourt 2-1314
- Eldorado Electronics**, Calif., 5
- Electric Regulator Corp.**, Conn., 5
- Electro Instruments, Inc.**, Calif., 25
- Electro-Pulse, Inc.**, 11861 Teale St., Culver City, Calif., 5
See ad on page 321
Tel: TEexas 0-9193
- Electronic Applications, Inc.**, Conn., 20
- Electronic Engrg. Co. of Calif.**, Calif., 15, 20, 25
- Electronics International Co.**, Calif., 20
- Engineering Associates**, Ohio, 10, 20
- Erie Resistor Corp.**, 644 W. 12th St., Erie 6, Pa., 5, 20, 25
See ad on pages 110-111
Tel: GLendale 6-8592
- Erwood, Inc.**, Ill., 30
- Esterline-Angus Co., Inc.**, Ind., 5, 10, 20, 25
- Federal Pacific Elec. Co. Inc.**, N.J., 5
- Ferris Instrument Co.**, N.J., 20
- General Radio Co.**, West Concord, Mass., 5, 10, 15, 20, 30
See ad on Cover 4
Tel: EMerson 9-4400
- Geotechnical Corp.**, Tex., 10, 20, 25
- Gertsch Products, Inc.**, Calif., 20
- Gyrex Corp.**, Calif., 20, 25, 30
- Hallicrafters Co.**, 4401 W. 5th Ave., Chicago 24, Ill., 15
See ad on page 204
Tel: VAn Buren 6-6300
- Hamilton Watch Co.**, Hathaway Instrument Div., Colo., 10, 30
- Hamilton Watch Co., Industrial Div.**, Pa., 5, 10, 15, 30
- Haydon Co., A. W.**, 240 N. Elm St., Waterbury 20, Conn., 5
See ad on page 518
Tel: PLaza 6-4481
- Hermes Electronics Co.**, Dept. BD, 75 Cambridge Pkwy., Cambridge 42, Mass., 10, 15, 20, 25
See ad on page 452
Tel: UNiversity 4-7200
- Hewlett-Packard Co.**, 275 Page Mill Rd., Palo Alto, Calif., 15, 20
See ad on pages 3-18
Tel: DAvenport 5-4451
- Hill Electronics, Inc.**, Pa., 10, 20
- Ilycon Eastern, Inc.**, See: I Hermes Electronics Co.
- Industrial Test Equipment Co.**, 55 E. 11th St., New York 3, N.Y., 20
See ad on page 339
Tel: GRamercy 3-4684
- Industrial Timer Corp.**, N.J., 5
- I. T. & T. Corp.**, Industrial Products Div., N.J., 10, 15, 20, 25
- Interstate Electronics Corp.**, Calif., 25
- Invar Electronics Co.**, Calif., 20
- J-B-T Instruments, Inc.**, Conn., 5
- Knights Co., James**, 101 E. Church St., Sandwich, Ill., 20
See ad on page 439
Tel: 2141
- Laboratory for Electronics, Inc.**, Mass., 20
- Land-Air, Inc.**, Ill., 15
- Land-Air, Inc.**, Instrument & Electronic Div., Calif., 25, Alpha Counter
- Lavoie Labs., Inc.**, Matawan-Freehold Rd., Morganville, N.J., 10, 20
See ad on page 300
Tel: LOwell 6-2600
- Litton Industries, Electronic Equipments Div.**, 336 N. Foothill Rd., Beverly Hills, Calif., 5
See ad on page 66
Tel: CRestview 4-7411
- Lytle Corporation**, N.M., 5
- Manson Laboratories, Inc.**, 375 Fairfield Ave., Stamford, Conn., 20
See ad on pages 302-303
Tel: DAvis 5-1391
- Marconi Instruments**, 111 Cedar Lane, Englewood, N.J., 10, 20
See ad on page 318
Tel: LOwell 7-0607
- Mid-Eastern Electronics, Inc.**, 32 Commerce St., Springfield, N.J., Resistance Standards
See ad on page 494
Tel: DRexel 6-7130
- Milgo Electronic Corp.**, Fla., 5
- Monitor Products Co.**, Calif., 20
- Muirhead & Co., Ltd.**, England, 30
- Muirhead Instruments, Inc.**, N.Y., 20, 30
- Murata Mfg. Co., Ltd.**, Japan, 30
- National Radio Co., Inc.**, Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 10
See ad on page 642
Tel: NO 5-4800
- New London Instrument Co.**, Conn., 20
- Norrman Labs.**, Ernst, Wis., 5, 10, 15, 20, 25
- Northeastern Engineering, Inc.**, 25 S. Bedford St., P.O. Box 150, Manchester, N.H., 20
See ad on page 356
Tel: NAtional 2-6485
- Northern Engrg. Labs., Inc.**, Wis., 20
- Nuclear-Chicago Corp.**, Ill., Radioactivity
- Packard Bell Electronics Corp.**, 12333 W. Olympic Blvd., Los Angeles 64, Calif., 25
See ad on page 246
Tel: BRadshaw 2-6141
- Panoramic Radio Products, Inc.**, 528 S. Fulton Ave., Mt. Vernon, N.Y., 20
See ad on page 320
Tel: OWens 9-4600
- Parsons Co.**, Ralph M., Electronics Div., Calif., 5, 25
- Philamon Laboratories, Inc.**, 90 Hopper St., Westbury, L.I., N.Y., 20, 30
See ad on page 105
Tel: EDgewood 3-1700
- Philco Corp.**, Western Development Labs., Calif., 25
- Pitometer Log Corp.**, 237 Lafayette St., New York 12, N.Y., 20, 25
See ad on page 323
Tel: CAnal 6-7250
- Polytechnic Research & Dev. Co., Inc.**, N.Y., 20
- Presin Co.**, Calif., 5
- Probescope Co., Inc.**, 8 Sagamore Hill Dr., Port Washington, L.I., N.Y., 20
See ad on page 340
Tel: POrt Washington 7-8150
- Racal Engrg., Ltd.**, England, 5
- Rank Cintel, Ltd.**, England, 20, 25
- Redford Corp.**, N.Y., 5
- Reeves-Hoffman Div.**, Pa., 10, 20
- Resdel Engrg. Corp.**, Calif., 5
- Rohde & Schwarz Sales Co., Inc.**, N.J., 10, 15, 20, 25
- Siegler Corp.**, Bogen-Presto Co. Div., N.J., 20
- Solid State Electronics Co.**, Calif., 20
- Specific Products**, 21051 Costanzo, P.O. Box 425, Woodland Hills, Calif., 10, 15
See ad on page 280
Tel: DI 0-3131
- Standard Electric Time Co.**, Mass., 5
- Sticht Co., Inc.**, Herman H., 27 Park Pl., New York 7, N.Y., 5
See ad on page 475
Tel: REctor 2-8163
- Sullivan, Ltd.**, H. W., N.Y., 10, 20, 30



SPECIAL

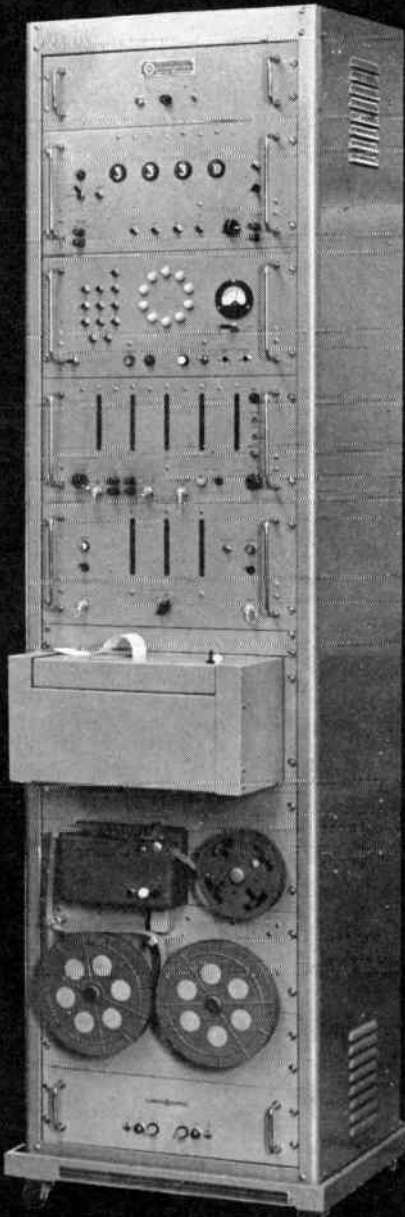
TIMING and COUNTING

INSTRUMENTS

THE Series 70 System measures **CONTINUOUS** time intervals by means of an electronic memory or storage. Time increments as well as continuous time intervals are measured by the Series 70 System, and recorded on tape punch and printer readout.

ELECTRONIC time averaging of two inputs to this system averages out errors due to eccentricities.

THIS System was developed for testing inertial gyros — but the general approach may be the solution to your problems! Write today to the **SPECIALIST IN FREQUENCY COUNTERS.**



NORTHEASTERN ENGINEERING, INC.

MANCHESTER, N. H. • 25 So. Bedford St.

P. O. Box 150 • NATIONAL 2-6485

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31. Standards of Frequency & Time.

- Sunshine Scientific Instrument, Pa., 5, 15, 25, 30
- Systron Corp., Calif., 5, 20, 25
- Technical Research Group, N.Y., 10
- Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 10, 15
See ad on pages 75-78
Tel: FLEETWOOD 7-5411
- Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y., 10, 15, 30
See ad on page 312
Tel: JUDSON 2-3030
- Topping Electronics, Ltd., Canada, 20, 25
- Van Norman Industries, Inc., Electronic Div., N.H., 20
- Varo Mfg. Co., Inc., Tex., 20, 30
- Walkirt Co., Calif., 20, 25
- Westinghouse Electric Corp., Pa., 5
- Westport Electric, Calif., 5

Strain gages: See class 12

Stroboscopes: See class 12

Styli: See class 59

32. Studio Equipment.

- | | |
|-----------------------------------|----------------------------------|
| 5. Consoles & speech input equip. | 17. TV camera lenses |
| 10. TV cameras | 20. TV film projectors |
| 15. TV camera control equipment | 25. TV studio lighting equipment |
| | 30. Turntables |

- Adler Electronics, Inc., N.Y., 5
- Aerolux Lights Corp., N.Y., 25
- Aerovox Corp., Mass., 5
- Audio-Master Corp., N.Y., 30
- Audio-Video Corp., N.Y., 5, 10, 15, 30
- Bache & Co., Semon, N.Y., Copper Back & Front Surface Mirrors
- Baughman Co., E. J., Calif., Camera Pedestals, Pan & Tilts
- Bausch & Lomb Optical Co., N.Y., 17
- Blonder-Tongue Labs., Inc., N.J., 10, 15
- Burke & James, Inc., Ill., 17
- Camera Equipment Co., Inc., Dept. IRE, 315 W. 43rd St., New York 36, N.Y., 17
See ad on page 357
Tel: JUDSON 6-1420

Canadian G. E. Co., Ltd., Electrical Equip.—Tube Dept., Canada, 5, 10, 15, 17, 20, 25, 30

Canadian Marconi Co., Canada, 5, 10, 15, 17, 30

Cohu Electronics, Inc., KinTel Div., Calif., 10, 15

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5

See ad on pages 32-33
Tel: EMPIRE 3-0281

Colorado Research Corp., Colo., 15

Dage TV Div., Thompson Products, Inc., Ind., 5, 10, 15, 20

Directory I. Complete Equipment

32. Studio Equipment.

Daven Co., N.J., 5
DuMont Labs., Inc., Allen B., N.J., 10
E.M.I. Electronics, Ltd., England, 5, 10, 15, 20
Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 17, 20
See ad on page 545
Tel: LOcust 2-6000
Electromation Co., Calif., 15
Electronic Applications, Inc., Conn., 5, 30
Electronic Assistance Corp., N.J., 5
Engineered Sound Systems, Ltd., Canada, 5
Fairchild Recording Equip. Corp., N.Y., 30
Foto-Video Labs., Inc., Dept. I-1, 36 Commerce Rd., Cedar Grove, N.J., 10, 15
See ad on page 490
Tel: CEnter 9-6100
Garrard Sales Corp., N.Y., 30
Gates Radio Co., Ill., 5, 10
General Communications, Inc., Wis., 5, 15
General Electric Co., Technical Products Operation, N.Y., 5, 10
General Precision Lab., Inc., N.Y., 10, 15, 20
Gotham Audio Dev. Corp., N.Y., 30
Grimson Color, Inc., N.Y., 15, 17, Anamorphic
Hallamore Electronics Co., Calif., 10, 15
Heitz, Inc., Karl, N.Y., 17
Houston Fearless Corp., Calif., 15
Insul-8-Corp., Calif., 10, 15, 17, 20
International Electronics Corp., N.Y., 10
International Optical Co., Inc., N.Y., 17
I. T. & T. Corp., Industrial Products Div., Calif., 10, 15
Interstate Electronics Corp., Calif., 10, 15
Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 5, 10
See ads on page 270, 301
Tel: TEXas 0-7711
Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5
See ad on page 66
Tel: CRestview 4-7411
Madigan Corp., N.Y., 10, 15, 17
Magnasync Mfg. Co., Ltd., Calif., 5
Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 25
See ad on page 496
Tel: CYpress 2-6610
Magne-Tronics, Inc., N.Y., Wired music
Marantz Co., N.Y., 5
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5, 10, 15, 17, 20
Mastertone Recording Studios, Inc., N.Y., 5
Maxson Corp., Langevin Div., N.Y., 5

McAlister, Inc., J. G., Calif., 25, Camera Dollies
McCurdy Radio Industries, Ltd., Canada, 5, 30
Mole-Richardson Co., Calif., 25
National Cine Equipment, Inc., N.Y., 17, 25
North Electric Co., Ohio, 15, 25
Northern Electric Co., Ltd., Canada, 5

O'Brien Electric Corporation, Calif., 5
Optical Coating Laboratory, Inc., Calif., Dichroic-Mirrors
Orbitran Co., Inc., Calif., 10
Philco Corp., Government & Indl. Div., Pa., 5, 10, 15
Photo Research Corp., Calif., 10
Radio Corp. of America, Defense Electronics Products, N.J., 5, 10, 15, 30

CECO offers you a
variety of dependable
equipment for
IMAGE ORTHICON
VIDICON
MICRO RELAY

IMAGE ORTHICON



TH-2 BALANCED TV HEAD MODEL C with adjustable center of gravity for Image Orth Cameras weighing up to 135 lbs. \$425.00

MICRO RELAY



TH-3 MICRO RELAY TILT HEAD for mounting Parabola Beam Reflectors. \$285.00

VIDICON



X-140 REMOTE CONTROL PAN & TILT HEAD with "Dial-stop" for remotely panning and tilting Vidicon Cameras weighing up to 20 lbs. \$400.00

X-141 CONTROL BOX for REMOTE HEAD \$40.00



TH-6 PRO JR. SPRING BALANCED PAN & TILT HEAD for Vidicon Cameras weighing up to 35 lbs. (With Tripod) \$200.00

TRIPODS



TR-19 PROFESSIONAL TYPE TRIPOD with wooden tripod legs for BALANCED TV Head and LARGE VIDICON HEAD \$150.00



TR-3 METAL TRIPOD for mounting MICRO RELAY TILT HEAD, LARGE VIDICON and BALANCED TV HEAD. \$260.00



D-3 PROFESSIONAL SENIOR DOLLY for PRO JR., METAL and Professional Type Tripods. \$150.00



TH-3-V LARGE VIDICON SPRING BALANCED PAN & TILT HEAD for Vidicon Cameras weighing up to 100 lbs. \$310.00

CAMERA EQUIPMENT CO., INC.

Dept. IRE 315 West 43rd St. New York 36, N.Y. JUdson 6-1420

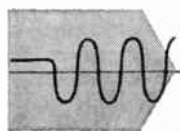
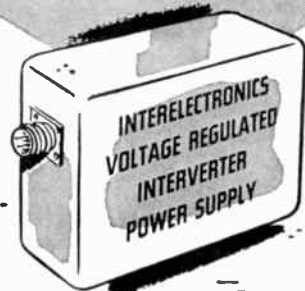
*Dealer and quantity price inquiries invited.

Write today for information on the equipment you need

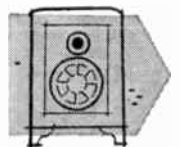
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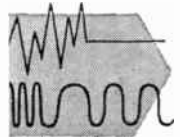
**DC to DC and DC to AC
solid-state power converters
voltage regulated, frequency
controlled, for missiles,
telemetry, gyros, servos**



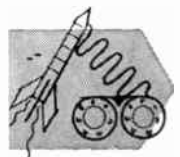
Interelectronics Inverter solid-state thyra-tron-like elements and magnetic components convert DC to any number of voltage regulated or controlled frequency AC or filtered DC outputs from 1 to 1800 watts. Light weight, compact, 90% or better conversion efficiency.



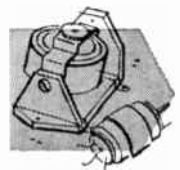
Ultra-reliable in operation, no moving parts, unharmed by shorting output or reversing input polarity. Complies with MIL specs for shock, acceleration, vibration, temperature, RF noise.



Now in use in major missiles, powering telemetry transmitters, radar beacons, electronic equipment. Single and polyphase AC output units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.



Interelectronics — first and most experienced in the DC input solid-state power supply field, produces its own solid-state gating elements, all magnetic components, has the most complete facilities and know-how—has designed and delivered more working KVA than any other firm!



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INTERELECTRONICS CORPORATION

2432 GR. CONCOURSE, N. Y. 58, N. Y.

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32. Studio Equipment.

Radio Engrg. Labs., Inc., N.Y., 5
Radio Music Corp., N.Y., 30
Rangertone, Inc., N.J., Tape to Film, Synchronizing
Rank Cintel, Ltd., England, 5, 10, 20
Rek-O-Kut Co., Inc., N.Y., 30
Republic Electronic Indust. Corp., N.Y., 5
Republic Lens Co., Inc., N.Y., 17
Rhein Sound System, Inc., Conn., 5
Rimak, Inc., Calif., 5
Robinson Recording Labs., Pa., 30
Schafer Custom Engrg. Div., Textron, Inc., Calif., Control Equip.
Siegler Corp., Bogen-Presto Co., Div., N.J., 5, 30
Standard Telephones & Cables, Ltd., England, 5
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 30
See ads on pages 306, 351
Tel: PORT Washington 7-7200
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5
Telectro Industries Corp., N.Y., 5
Television Zoomar Corp., N.Y., 17
Tesla Electric Co., Ill., 5
Thompson-Ramo-Wooldridge, Inc., Calif., 10, 15
Trans-Lux Corp., N.Y., Rear Projection Screen
U. S. Recording Co., D.C., 5, 10, 30
Vicon Corporation, Calif., 10, 15
Victorlite Industries, Inc., Calif., Day-light Overhead Projectors
Visual Electronics Corp., N.Y., 5, 10, 15, 17, 20, 25, 30
Westlab Electronics, Inc., N.Y., 5
Zoomar, Inc., N.Y., 17

Survey meters: See class 22

Sweep generators, radio frequency: See class 26

Sweep generators, TV: See class 35

Tape, magnetic recording: See class 63

Tape phonographs: See class 59

Tape recorders: See class 27

Telegraph test equipment: See class 3

33. Telegraph & Teleprinter Equipment.

5. Frequency shift converters
10. Frequency shift keyers
15. Receivers
20. Transmitters

Admiral Corp., Ill., 15, 20
Aermotive Equipment Corp., Mo., 15, 20
Aeronautical Comm. Equip., Inc., Fla., 10, 15, 20
American Electronics Co., N.Y., 15, 20
Barker & Williamson, Inc., Pa., 5, 10, 15, 20
Boehne, Inc., H. O., N.Y., 5, 10
Canadian Marconi Co., Canada, 5, 10, 15, 20
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10, 15
See ad on pages 32-33
Tel: EMpire 3-0281
Communication Equip. & Engineering Co., Ill., 10, 15, 20
Continental Elecons. Mfg. Co., Tex., 20
Dollar Co., Robert, Comm. Equip. Div., Calif., 5, 10, 15, 20
Electrical Communications, Calif., Tone Decoders & Senders
Erco Radio Labs., Inc., N.Y., 5, 10, 15, 20
Gates Radio Co., Ill., 20
General Electric Co., Ltd., of England, England, 5, 10, 15, 20
General Precision Lab., Inc., N.Y., 5, 10, 15, 20
Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 15, 20
See ad on page 204
Tel: VAn Buren 6-6300
Haloid Xerox, Inc., N.Y., 15
Harmon Electronics Co., Mo., 5, 10, 15, 20
Hazeltine Corp., N.Y., 15, 20
Hosmer & Co., E. A., Calif., 15, 20
Kellogg Switchboard & Supply Co., Ill., 5, 10, 15, 20
Lenkurt Electric Co., Inc., Calif., 5, 10, 15, 20
Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 10
See ad on pages 302-303
Tel: DAVis 5-1391
Marconi's Wireless Telegraph Co., Ltd., N.Y., 10, 15, 20
Marine View Electronics, Inc., N.Y., 10
Monroe Calcul. Mach. Co., Inc., Electron. Components Div., Calif., 15, 20
Moore Associates, Inc., Calif., 5, 10
Motorola, Inc., Ariz., 15, 20
North Electric Co., Ohio, 5
Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5, 10, 15
See ad on pages 130-133
Tel: WATkins 9-9117
Philco Corp., Govt. & Indl. Div., Pa., 15, 20
Press Wireless Labs., Inc., Mass., 5, 10, 15, 20
Racal Engrg., Ltd., England, 15
Radio Engrg. Products, Ltd., Canada, 5, 10, 15, 20
Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 5
See ad on page 304
Tel: DEerfield 4-3100
Republic Electronic Indust. Corp., N.Y., 5, 10

Directory I. Complete Equipment

33. Telegraph & Teleprinter Equipment.

Rohde & Schwarz Sales Co., Inc., N.J., 15, 20
 Secode Corp., Calif., Tone Decoders
 Stelma, Inc., Conn., 5, 10
 Stromberg-Carlson—San Diego, Calif., 15
 Taffet Radio & Television Co., N.Y., 10
 Taller & Cooper, Inc., Div. of American Electronics, N.Y., 5
Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5, 10, 15, 20
 See ad on page 352
 Tel: OWens 8-4800
 Techniflex Mfg. Co., Inc., N.Y., 5, 10, 15, 20
 Telechrome Mfg. Corp., N.Y., 5, 10, 15, 20
 Telectro Industries Corp., N.Y., 10, 15, 20
 Tele-Signal Corp., N.Y., 5, 10
 Teletype Corp., Ill., 15, 20, Readers & Punchers
Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y.
 See ad on page 312
 Tel: JUDson 2-3030
 Towaco Electronics, N.J., 20
 Trepac Corp. of America, N.J., Repeaters & Relays
 Warren Mfg. Co., Inc., Mass., 15, 20
 Western Union Telegraph Co., N.Y., 15, 20
 Westinghouse Electric Corp., Md., 10, 20
 Westrex Corp., N.Y., 5, 10, 15, 20
 Wilcox Electric Co., Inc., Mo., 15, 20

34. Telemetering Equipment.

| | |
|-----------------------------|----------------------|
| 5. Data recorders | 15. FM/FM modulators |
| 10. Data storage mechanisms | 20. Receivers |
| | 25. Transmitters |

A.R.F. Products, Inc., Ill., 20, 25
 A.R.&T. Electronics, Inc., Ark., 15, 25
 Adler Electronics, Inc., N.Y., 20, 25
 Advance Electronics Corp., N.Y., 25
 Aero Guidance Corp., Calif., 20, 25
Aircon, Inc., 48 Cummington St., Boston, Mass., 20, 25
 See ad on page 590
 Tel: COpley 7-9115
Alden Electronic & Impulse Recording Equip. Co., Inc., P.O. Box 125, Alden Research Center, Westboro 1, Mass., 5
 See ad on page 290
 Tel: FOrest 6-4467
 Alto Scientific Co., Inc., Calif., 20
 Amelco, Inc., Calif., 15, 20, 25
 American Electronics, Inc., American Data Div., N.Y., 5, 10, 20, 25
 American Missile Products, Calif., 5, 15, 25
 Amtron Corp., Mass., 20, 25

34. Telemetering Equipment.

Applied Science Corp. of Princeton, N.J., 5, 10, 20, 25
Armstrong Whitworth Aircraft, Ltd., Sir W. G., A. W. E. Electronics Div., Hucclecote, Gloucester, England, 5, 20, 25
 See ad on this page
 Tel: TOll Bar 2261
 Arnoux Corp., Calif., Decommutation Systems
 Austin Co., N.Y., 5, 10
 Avco Corp., Crosley Div., Ohio, 20, 25
 Avien, Inc., N.Y., 25
 B. J. Electronics, Borg-Warner Corp., Calif., 5
 Bailey Meter Co., Ohio, 5, 20, 25
 Barker & Williamson, Inc., Pa., 15, 20, 25
 Beckman Instruments, Inc., Systems Div., Calif., 5
 Beckman & Whitley, Inc., Calif., 5
 Bendix Aviation Corp., Bendix Pacific Div., Calif., 5, 15, 25
 Bendix Aviation Corp., Friez Instrument Div., Md., 5, 25
Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., Telemetering Sig. Gen.
 See ad on page 336
 Tel: DEerfield 4-3200
 Borden Engrg. Co., N.J., 25
 Bristol Co., Conn., 20, 25
 Brush Instruments, Div. of Clevite Corp., Ohio, 5
 Burroughs Corp., Pa., 10, 15
 CG Electronics Corp., N.M., 10
 Cal-Tronics Corporation, Calif., 5
 Canadair, Ltd., Missile & Systems Div., Canada, 15, 25
 Canadian G. E. Co., Ltd., Electronic Equip. & Tube Dept., Canada, 5, 10, 15, 20, 25
 Canadian Westinghouse Co., Ltd., Elect. Div., Canada, 20, 25
 Centronix, Inc., Fla., 5, 10, 15, 20, 25
 Century Electronics & Instruments, Inc., Okla., 5
 Consolidated Avionics Corp., N.Y., 5, 20, 25
 Consolidated Electrodynamics Corp., Calif., 5, 10
 Continental Electronics Mfg. Co., Tex., 25
 Control Corp., Minn., 5, 20, 25
 Cook Electric Co., Ill., 5
 Corbin Corporation, Md., 20, 25
 Crosby Laboratories, Inc., N.Y., Test Oscillator
Curtiss-Wright Corp., Electronics Div., West Caldwell, N.J., 20, 25
 See ad on page 514
 Tel: GEneva 8-4000
 Data-Control Systems, Inc., Conn., 5, 10, 15, 20, 25
 Deltime, Inc., N.Y., 10
 Di/An Controls, Inc., Mass., 10
 Dorsett Labs., Inc., Okla., 15
 Dynamics Corp. of Am. Reeves Instrument Corp., N.Y., 20, 25

E.M.I. Electronics, Ltd., England, 5, 10, 15, 20, 25
 Electro Instruments, Inc., Calif., 5, 10
 Electro-Mechanical Research, Inc., Fla., 5, 10, 15
 Electromation Co., Calif., 5
 Electronic Development Co., Inc., Calif., 20, 25
 Engineering Associates, Ohio, 20, 25
 Epic, Inc., N.Y., 25
 Erco Radio Labs., Inc., N.Y., 20, 25
 Etelco, Ltd., England, 5, 10, 15, 20, 25
 Ferranti-Packard Electric, Ltd., Canada, 10
Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 10
 See ads on pages 285, 361, 433, 467, 531, 617
 Tel: CHerry 6-2811
 Fischer & Porter Co., Pa., 5, 25
 Ford Motor Co., Sub.—Aeronutronic Systems, Inc., Calif., 10, 20, 25
 Foxboro Co., Mass., 5, 20, 25
 Gates Radio Co., Ill., 15, 25
General Devices, Inc., P.O. Box 253, Princeton, N.J., 5, 10, 15, 20, 25
 See ad on page 360
 Tel: DAVis 9-2323

A.W.E. INSTRUMENTS FOR ASTRONAUTICS TO AUTOMATION

Front-line participators in everything aero- or astro-nautical, A.W.E. are constantly exploring scientific fields beyond the capabilities of standard electronic recording equipment.

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MOST ADVANCED LINE OF STANDARD AND SPECIAL MULTICHANNEL PRODUCTS FOR TELEMETRY

THE LARGEST SPECIAL PURPOSE FACILITIES FOR ENGINEERING AND PRODUCTION,
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Subminiature all electronic 45 channel multicoder with both PDM and PAM outputs.



Standard low level and mixed high and low level PDM multicoder for IRIG channel configurations ML and MX series.



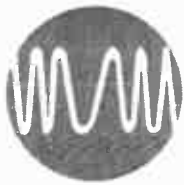
RLH series PDM multicoders for rack and panel installation in fixed ground equipment.



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COMPLETE PDM DATA ACQUISITION SYSTEMS.
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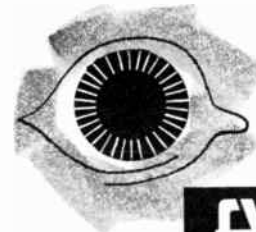
Directory I. Complete Equipment

34. Telemetry Equipment.

General Electric Co., Instrument Dept., Mass., Telemetry Equipment
 General Electronic Labs., Inc., Mass., 20, 25
 General Kinetics, Inc., Va., 5
 Genesys Corporation, Calif., 10
 Geotechnical Corp., Tex., 5, 10, 15, 20, 25
 Giannini Controls Corp., Calif., 5
 Gulton Industries, Inc., N.M., 20, 25
 Hallamore Electronics Co., Calif., 5, 10, 15
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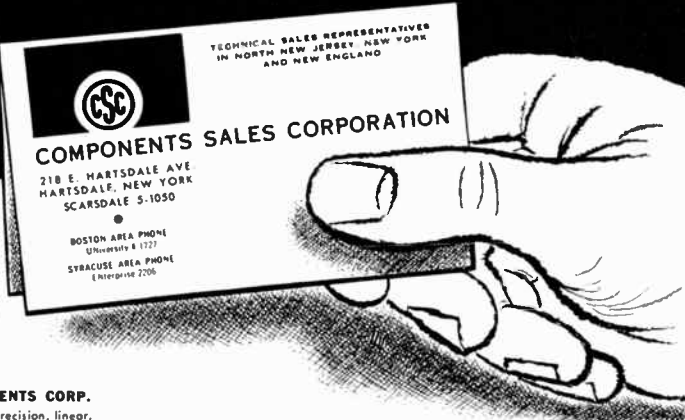
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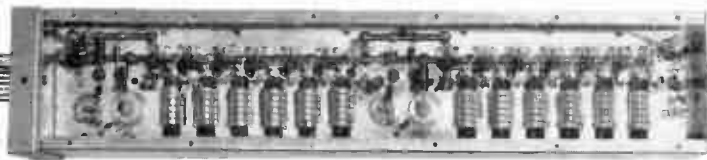
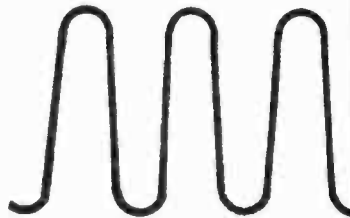
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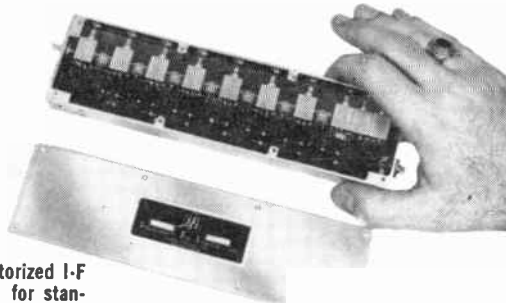
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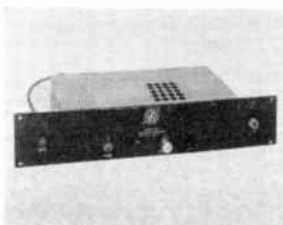
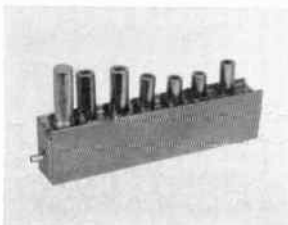
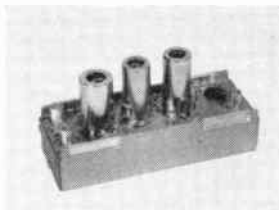
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|----------|------------|
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| | T-330B | 30 mc |
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| | T-330B | 3 mc |
| | T-330A | 80 db min. |
| Gain | T-330B | 100 db min. |
| | T-330A | + 5 DBM |
| Output (max) | T-330B | +10 DBM |
| | T-330A | 50 ohm |
| Input Impedance | T-330B | 50 ohm |
| | T-330A | 10 db |
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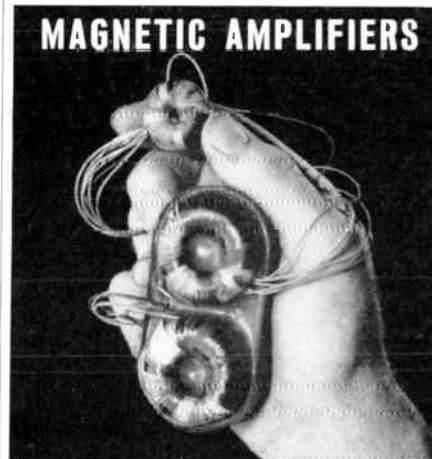
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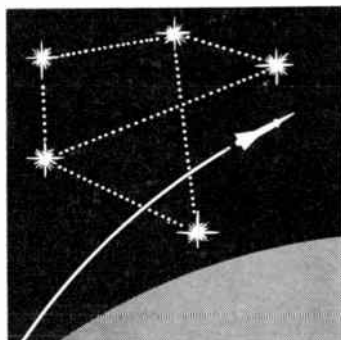
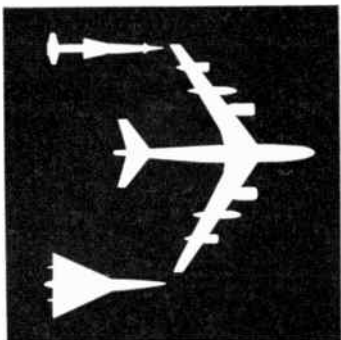
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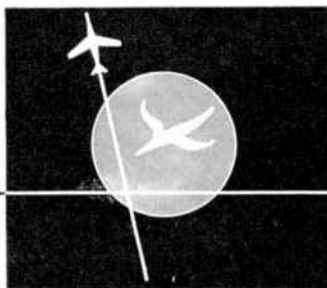


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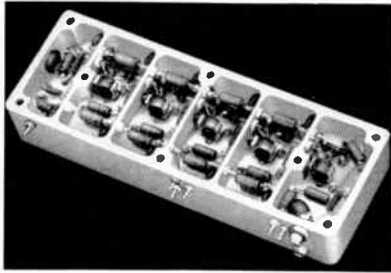
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Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 45
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Tel: TWining 9-5600
Krohn-Hite Corp., Mass., 5, 7, 60, 94, 96
Kurtz, John, N.Y., 92

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LEL, Inc., 384 Oak St., Copiague, L.I., N.Y., 5, 7, 35, 50, 54, 62, 67, 70, 92, 96
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Tel: AMityville 4-2200

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Maclaren & Co., F. B., N.Y., 5, 12, 42, 45, 52, 57, 60, 62, 80, 85, 92

Madigan Corp., N.Y., 7, 35, 70

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Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 45, 80, 92
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Micro Gee Products, Inc., Calif., 5, 12, 57, 60, 80, 92

Microwave Associates, Inc., Mass., 50, Parametric, 70

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This amplifier is small and completely self-contained. A matched earpiece is included for audio use.

Input Impedance—150 kilohms
Voltage Gain—1000 or greater
Power Gain—85 DB
100 microvolts input for full output

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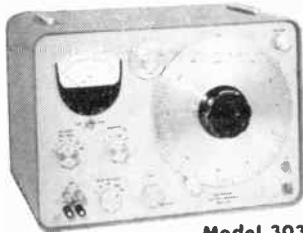
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Provides constant output current, variable over a wide range, and independent of the voltage drop across the load. Extremely useful for transistor applications, potentiometer noise measurements, strain gage applications, etc.

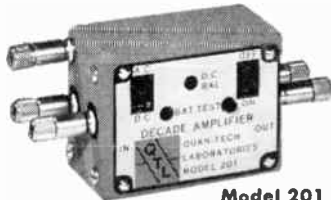


Model 151

New! Constant Current Supply

Output: 0.5 to 500 ma. DC in three ranges: 0.5 to 5 ma; 5 to 50 ma; and 50 to 500 ma. 20 volts maximum output voltage.
 Power input: 105-125 volts, 50-60 cycles, 25 watts
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DC-Coupled Decade Amplifier

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| Model 103: | 0-30 volts DC, 0- $\frac{1}{2}$ amp. | Price \$175.00 |
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INSTRUMENTS



Model 301

AC Microammeter

Enables rapid, accurate AC current measurements and observations of wave forms in transistors, magnetic amplifiers, small servo systems, etc. A clamp-on probe and an insertion probe are provided with each instrument.

Sensitivity: 3 uv to 100 ma full scale (300 uv to 100 ma—clamp on probe).
 Frequency: $\pm 2\%$ 50 ~ to 100 KC ($\pm 5\%$ 100 ~ to 100 KC—clamp on probe).
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 Price: \$290.00

Also available is Model 202 Isolation Amplifier, custom-built power supplies, and amplifiers to your specifications.

We welcome any requests for information regarding specific applications of Quan-Tech instruments.

Prices and specifications subject to change without notice.



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36. Amplifiers.

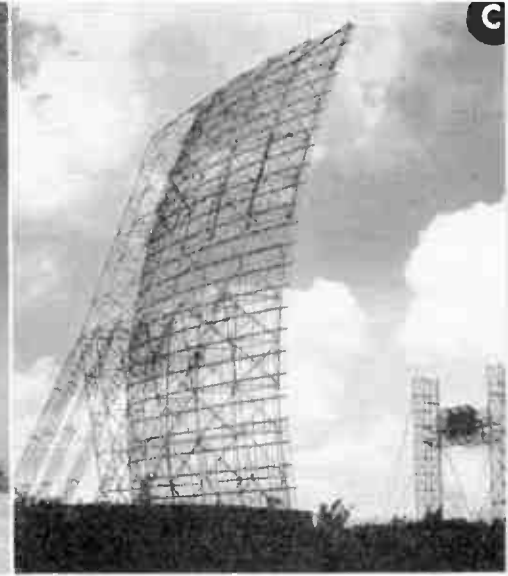
- Quan-Tech Labs., 236 Mt. Kemble Ave., Morristown, N.J., 5, 10, 12, 85, 92, Isolation
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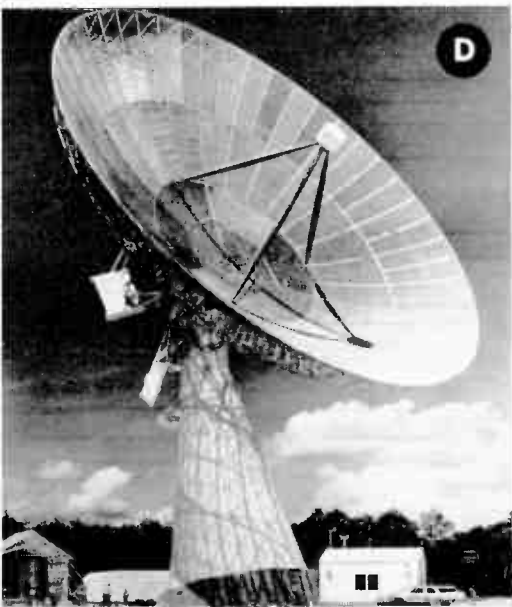
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C

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D



E



F

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Directory II. Components

36. Amplifiers.

Texas Instruments, Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Texas, 5
See ad on pages 75-78
Tel: FLettwood 7-5411

Texas Instruments, Incorporated, Houston, Texas, 5

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Topper Mfg. Co., Inc., N.Y., 5, 80, 94

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Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5, 45, 60, 80
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Tel: ELizabeth 4-5650

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Transonic, Inc., Calif., 45

Transvision, Inc., N.Y., 30

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Trepac Corp. of America, N.J., 5, 12, 92

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United Aircraft Corp., Ketay Dept. Norden Div., N.Y., 80

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United Electrodynamics, Inc., Calif., 5, 60, 85, 92

U.S. Recording Co., D.C., 7, 30, 42, 60

U.S. Science Corp., Sub. Topp Indust. Inc., Calif., 5, 7, 45

Universal Match Corp., Armament Div., Mo., 5

Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 45
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Tel: ESsex 4-9800

Universal Transistor Prods., N.Y., 5, 7, 62, 67, 92

Uniwave, Inc., N.Y., 50

Valco Mfg. Co., Ill., Musical Instrument Type

Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2-BG-59, Calif., 50
See ad on pages 118-119
Tel: DAvenport 6-4000

Vari-L Co., Inc., 432 Fairfield Ave., Stamford, Conn., 45
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Tel: FLeside 8-0091

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Vickers, Inc., Electric Products Div., Mo., 42, 45, 57, 60, 80

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Tel: ENdicott 1-6200

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Vinco Electronics Corp., Conn., 7, 30, 60, 62, 95

Virginia Electronics Co., Inc., D.C., 5, 7, 35, 70

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Tel: TALbot 4-2600

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Warren Transformer Co., Inc., Pa., 45

Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 85, 95
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Tel: GARfield 6-8600

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37. Antennas & Accessories.

| | |
|--|--|
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| 7. Aircraft | 35. Mobile |
| 10. All-wave receiving | 40. Radar reflectors |
| 15. Amateur antennas, accessories & rotators | 45. Rotators |
| 17. Automobile | 50. Supporting towers |
| 20. Dummy | 55. TV broadcast transmitting systems |
| 22. FM broadcast transmitting | 60. TV multiple systems |
| 23. Ferrite Rod | 63. TV receiver |
| 24. Fixed station antenna system | 65. Tower erection & maintenance service |
| 25. Ground plane | 70. Tower lighting equipment |
| 26. Marine | 75. UHF-VHF |

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Advance Electronics Co., Mass., 63, 75

Aermotive Equipment Corp., Mo., 30

Aero Guidance Corp., Calif., 7, 25, 30, 75

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Tel: GRANite 2-8747

Aircorn, Inc., 48 Cummington St., Boston, Mass., 20, 30
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Tel: COpley 7-9115

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Tel: DEerfield 4-1800

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Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 55, 75
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Tel: HANcock 6-2150

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Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 7, 15, 26, 30, 63
See ad on page 166
Tel: BISHop 2-1000

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Andrew Antenna Corp., Ltd., Canada, 5, 7, 17, 22, 24, 25, 30, 35, 40, 55, 75

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Antenna Specialists Co., Ohio, 7, 10, 15, 17, 22, 24, 25, 26, 35, 75

Antlab, Inc., Ohio, 45

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Arra Corp. (Antenna & Radome Research Assoc.), 1 Bond St., Westbury, L.I., N.Y., 30, 40
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Tel: EDgewood 4-8770

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Tel: HILLtop 3-8822

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Babcock Radio Engrg., Inc., Calif., 7

Babcock Relays, Inc., Calif., 7, 10, 15, 24, 25, 26, 30, 35, 40, 63, 65, 75

INTEGRATED ANTENNA PROGRAMS

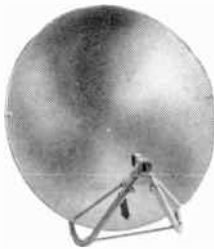
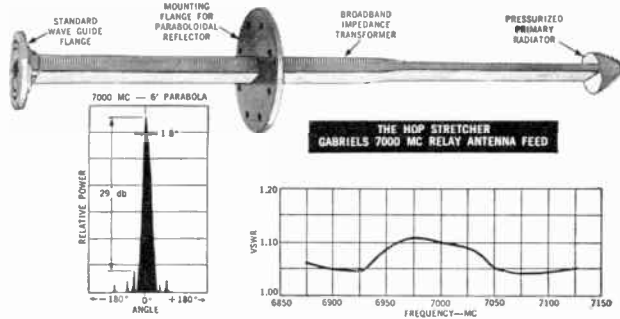
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33,000 mc

25 mc

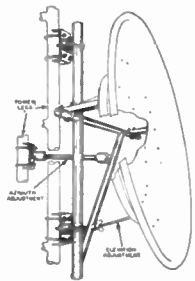
New Products

The HOP-STRETCHER feeds offer higher gain, lower sidelobe levels and more desirable beam-widths for center-fed parabolic antennas. This feed was developed for S, X, K_u and K_a bands. **Technical features of X-band antenna** • Sidelobes at least 24 db down on 4, 6, 8 and 10 ft. reflectors • High gain efficiency, 65-70%



The new hi gain 3 kmc Cylindrical Coaxial Feed provides similar E and H-plane patterns, minimum side and backlobes, and negligible squint. Rear-mounted, with easy polarization adjustment to any angle.

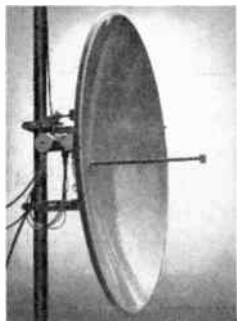
7000 mc Offset Antenna. Ideal for installations where passive reflectors are utilized — VSWR less than 1.10:1 over 5900-8500 mc — Sidelobes at least 24 db down — gain is 41 db at 7000 mc. Elliptically shaped reinforced fiberglass reflector.



The new universal 3-point suspension mounting bracket for 2, 4, 6, 8 and 10 ft. parabolic reflectors.

Features • Independent azimuth adjustment. • Independent elevation adjustment. • Adaptable for mounting in all locations.

The new X-band parabolic antenna with standard feed. Features variable polarizing adjustment, 0 to 90°. Manually locked in position.

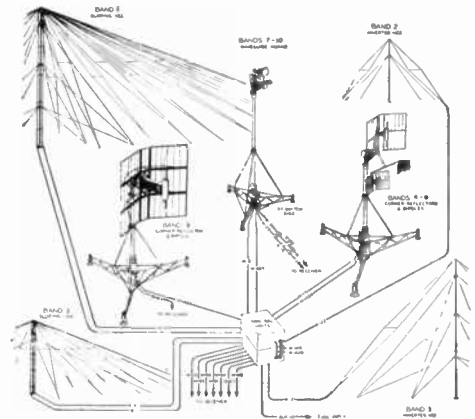


GABRIEL'S STANDARD MICROWAVE PARABOLIC ANTENNAS

... Contributing millions of trouble-free operational hours for industry and the military.

- 7000 mc — Broadband (5925-7425 mc) high gain > 40 db low sidelobes — low VSWR < 1.13:1 over band.
- 4000 mc — Narrow-beam broadband (3700-4200 mc) — low VSWR < 1.2:1 — gain > 37 db.
- 2000 mc — Available in offset and center-fed feeds. Narrow-beam broadband (1750-2110 mc) — high gain > 28 db low VSWR < 1.3:1 over band
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Broadband, HF-to-SHF, Directional Antenna Group — Remotely controlled.



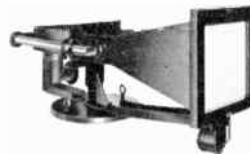
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Missile Antennas — Telemetry, Destruct, Guidance ICBM, Surface-to-Air, Air-to-Air, and Surface-to-Surface.

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- Harbor Control
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Designed, developed, and constructed to military specifications with improved strength-to-weight ratio and component reliability.



Alutian Line—Dew Line Low loss, heavy duty duplex feed horns for Tropospheric Scatter Radio Communication Systems.



Motorized Passive Reflector For maximum point-to-point transmission in microwave relay links. Fast, accurate, easy adjustment from remote location. Manually adjusted reflectors also available.

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Call or write to GABRIEL ELECTRONICS DIVISION for counsel on your antenna needs.

Gabriel

Directory II. Components

37. Antennas & Accessories.

Barker & Williamson, Inc., Pa., 15, 20, 23, 70
 Bassett Inc., Rex, Fla., 15, 17, 24, 26, 35
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 Tel: L OWell 3-9511
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 Electronic Specialty Co., Calif., 7, 30, 40, 75
 Elsin Electronics Corp., N.Y., 30
 Emerson & Cuming, Inc., Mass., 30, 40
 Emerson Electric Mfg. Co., Mo., 30, 40



FROM DESIGN TO PRODUCTION

Stock Reflectors — solid spun, 4 in. to 10 ft. in diameter • mesh, 4 ft. to 18 ft. in diameter • larger sizes or special shapes on request.

Antennas — up to 10,000 mc
Large Waveguide Components

*Prompt Delivery of any type antenna or reflector
 — precision built to your specifications.
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CORPORATION

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Studying results of antenna pattern measurements — part of the activity of the Space Communications laboratory.



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Laboratory studies in antennas and electromagnetic propagation include the application of solid state materials to microwave transmission line components; the design of antennas to survive the rigors of space flight; the effects of space on radio signals and radar detection; and the scattering from missile shapes and space vehicles. Research is also being conducted in the application of ferrites and MASERS; on problems of radio transmission between space vehicles and Earth, re-entry scattering and diffraction by man-made objects and ionized gases; and development of antennas for data link systems between satellites and ground stations.

Telemetering has been brought to a high degree of successful application in the integration of circuits and components into high-performance systems. A completely sub-miniaturized FM-FM system has been developed, along with a complete PAM-FM system characterized by highly efficient band-width utilization, low power consumption and economy of size and weight. This represents a significant achievement in the field of high capacity telemetry.

Engineers and Scientists — Lockheed Missiles and Space Division programs reach far into the future and deal with unknown and challenging environments. If you are experienced in one or more of the above areas, or have background in related work, we invite you to share in the future of a company that has an outstanding record of achievement and make an important individual contribution to your nation's progress in space technology. Write: Research and Development Staff, Dept. J-93, 9621 W. El Camino Real, Sunnyvale, California. U.S. citizenship required.

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Directory II. Components

37. Antennas & Accessories.

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*Specialists
in Obstruction Lighting
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BEACON and OBSTRUCTION LIGHTS, designed to meet specifications of CAA, FCC, and Canadian DOT.



300MM Beacon



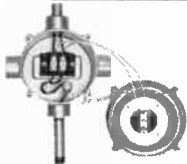
Single Obstruction Light



Double Obstruction Light

You'll find Hughey & Phillips have obstruction lights for every job. The engineering of each light offers maximum efficiency and simplified installation and maintenance. Whether you need bottom or side entrance conduit fitting types, there is a model to meet your requirements.

SPECIAL CAST ALUMINUM WATERTIGHT JUNCTION BOXES, offering a wide choice in types of terminals, cable support, and factory installed screw cap receptacles.



Box with terminals, cable support, and receptacle in cover.



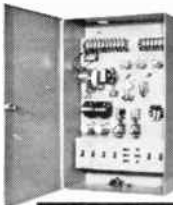
Box with factory installed screw cap receptacles.



Box with special terminals and cable support.

Hughey & Phillips have pioneered in the use of adequate junction boxes with proper terminals, and built-in cable support to meet NEC requirements.

SPECIAL CONTROL UNITS, designed for both indoor and outdoor installation.



- Photo-Electric Control Units
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Photo control, flasher and Lamp Failure Alarm

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THREE SIZES . . . 750, 1750, 3500 WATTS

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MANUFACTURERS OF

300MM Beacons, Obstruction Lights, Photo-Electric Controls, Beacon Flashers, Special Junction Boxes, Microwave Tower Light Control and alarm Systems, Tower Isolation Transformers, and Complete Kits for: Tower Lighting, Sleetmelter Power and Control.

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Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 30, 75

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Tel: VICTOR 2-8400

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General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 23

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Gombos Co. Inc., John, N.J., 30

Goodyear Aircraft Corp., Ariz., 7, 26, 30, 40

Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 7, 20

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Tel: ADams 7-7611

Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 7, 30, 75

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Tel: VAN Buren 6-6300

Hermes Electronics Co., Dept. BD, 75 Cambridge Parkway, Cambridge 42, Mass., 30

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Tel: UNiversity 4-7200

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Hudson American, Radio Eng. Labs. Inc., Div., N.Y., 26

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Tel: VICTORIA 9-1104

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Illumitronic Engineering Co., 680 E. Taylor Ave., Sunnyvale, Calif., 24

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Tel: REgent 9-2395

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International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 30

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Tel: OREGON 8-6281

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JFD Electronics Corp., 1462 62nd St., Brooklyn 4, N.Y., 7, 17, 35, 63, 75

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Tel: DEWey 1-1000

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Tel: BALDwin 6-3456

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Kaar Engrg. Corp., Calif., 17, 26, 35

Kaman Aircraft Corp., Nuclear Div., Colo., Telemeter

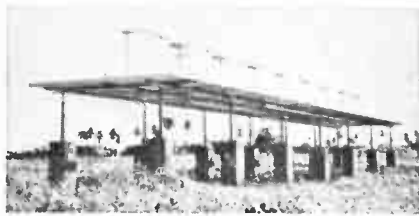
Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 23, 30

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Tel: GREgory 2-1000

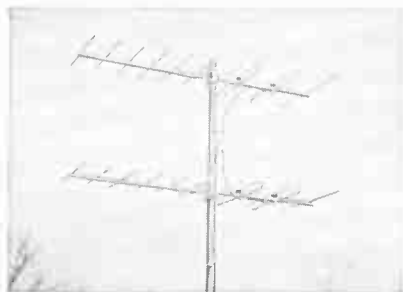
Kearfott Co., Inc., Microwave Div., Calif., 30, 75

Antennas



MINITRACK ANTENNAS

Horizontally or vertically mounted arrays similar to this MINITRACK antenna can be designed for individual beam requirements or you can select from a number of existing designs.



RUGGEDIZED YAGI

From 30 MC to 500 MC. Available as individual units or stacked systems.



WAVE GUIDE COMPONENTS

Large Wave Guide Components for 10½" and 21" in the form of wave guide bends, feed horns, are available. Certified welders assure quality units fully tested to meet the most stringent electrical and mechanical requirements.

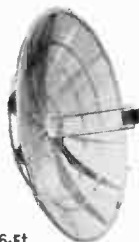


AIRBORNE ANTENNAS

← Antenna AT-256-A/ARC Type and Construction: Streamlined blade type antenna. Heat treated permanent mold aluminum castings with Teflon insulators.

Antenna G-833 →

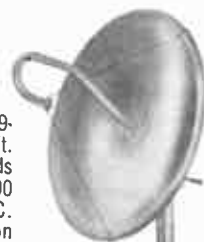
Type and Construction: Flush mounted annular slot antenna for communication band. Sheet aluminum, spot welded construction per Air Force specifications. Fibreglas insulators.



6-Ft. Expanded Aluminum Mesh

PARABOLIC ANTENNAS

Mesh sizes from 4-ft. to 19-ft. and spun sizes from 4-ft. to 6-ft. Frequency bands from 806-960 MC, 1700-2400 MC and 5925-7450 MC. Other bands available on special order. Variety of mountings.

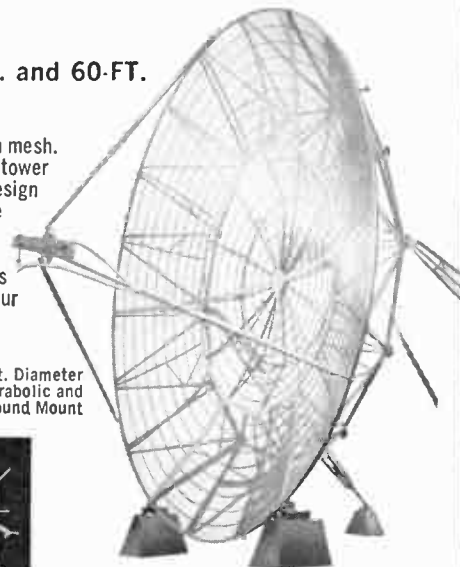


4-Ft. Spun Aluminum

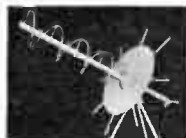
28-FT., 32-FT. and 60-FT. PARABOLICS

Expanded aluminum mesh. Ground mounted or tower mounted. Unique design allows rapid, simple erection.

Dual polarized horns supplied to meet your requirements at reasonable cost.



28-Ft. Diameter Parabolic and Ground Mount



HELICAL ANTENNAS and MOUNTS

Mechanical mount for azimuth and elevation. Electromechanical remote mounts also available. Helicals available in 4, 6, or 8 turns from 215-265 MC. Other frequencies on special order. Mount illustrated is H-M-1.

and the best TV antennas in the world...



TACO

TECHNICAL APPLIANCE CORP.
SHERBURNE, N. Y.

In Canada: Hackbusch Electronics, Ltd., Toronto 4, Ont.

Directory II. Components

37. Antennas & Accessories.

Kemlite Labs., Inc., Ill., 70
Kennedy & Co., D. S., 155 King St.,
Cohasset, Mass., 30, 35, 40, tropo scatter

See ad on page 376

Tel: EVergreen 3-1200

Kenwood Engineering Co., Inc., N.J.,
63

Kings Electronics Co., Inc., 40 Marble-
dale Rd., Tuckahoe 7, N.Y., 7, 30

See ad on page 425

Tel: SWiftwater 3-5000

Knight Corp., Ewen, Mass., 20

Kreckman Co., Herb, Pa., 15, 24, 25, 75

Krystinel Corp., Fox Island Rd., Port
Chester, N.Y., 23

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Tel: WEstmore 9-2261

Lambda-Pacific Engr., Inc., Calif., 30,
75

Land Air, Inc., Ill., 7

La Pointe Industries, Inc., Conn., 10, 15,
40, 75

Lavelle Aircraft Corp., Pa., 40

Lear, Inc., Lear Cal Div., Calif., 7

Lehigh Structural Steel Co., N.Y., 50, 65

Lieco, Inc., N.Y., 20, 30

Ling Systems Inc., Calif., 30, 40

Lingo & Son, Inc., John E., N.J., 55

Litton Industries, Airtron, Inc. Div.,
N.J., 20, 23, 25, 30, 45

Litton Industries, Electronic Equipments
Div., 336 N. Foothill Rd., Beverly
Hills, Calif., 30, 40

See ad on page 66

Tel: CRestview 4-7411

Litton Industries, Md. Div., Md., 7, 24,
25, 26, 30, 35, 40, 45, 50

Lockheed Aircraft Corp., Missiles &
Space Div., Dept J-93, P.O. Box 504,
962 W. El Camino Real, Sunnyvale,
Calif., 7, 23, 30

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Tel: REgent 9-4321

Lynmar Engineers, Inc., Pa., 60

M E Labs., Calif., 30

Madigan Corp., N.Y., 35

Marconi's Wireless Telegraph Co.,
Ltd., N.Y., 5, 7, 22, 24, 26, 30, 35, 40,
50, 55, 60, 65, 75

Mark Products Co., 5439 Fargo Ave.,
Skokie, Ill., 7, 15, 17

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Tel: ORchard 5-1500

Martin Co., Baltimore Div., Md., 7, 40

Master Mobile Mounts, Inc., Calif., 15,
17, 24, 25, 26, 35

McMillan Industrial Corp., Mass., 40,
Radomes

Medal Mfg. Co., Inc., Pa., 63, 75

Meridian Metalcraft, Inc., Cal., 30, 40

Metaplast Corp., Pa., Radomes

Micro-Circuits Co., Mich., 7, 26

Microflect Co., Inc., Oregon, 30, 50

Microwave Chemicals Laboratory Inc.,
Dept. 12, 282 Seventh Ave., New York
1, N.Y., 23

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Tel: WAtkins 4-6725

Miller Co., J. W., Calif., 23

Monogram Industries Inc., Cascade Re-
search Div., Calif., 7, 23, 30, 40, 45
Mosley Electronics Inc., Mo., 15, 24, 25,
35

Motorola Communications & Elec-
tronics, Inc., Ill., 24, 50

Motorola, Inc., Ariz., 7, 10, 23, 24, 25,
30, 35, 40, 75

Mytron, Inc., Mass., 30

N.R.K. Mfg. & Eng. Co., Ill., 30

Narda Microwave Corp., Dept. IRED-3,
118-160 Herricks Rd., Mineola, L.I.,
N.Y., 30

See ad on pages 141-144

Tel: PIONEER 6-4650

National Aeronautical Corp., Pa., 75

National Moldite Co., N.J., 23

National Wire & Cable Corp., Calif.,
15

Nevada Antenna Co., Nevada, 24, 75

Ohmite Mfg. Co., 3692 Howard St.,
Skokie, Ill., 20

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Tel: ORchard 5-2600

Olsen Corp., Gunnar A., N.Y., 65

P.S.P. Engineering Co., Calif., 80

Painton & Co. Ltd., England, 5

Peerless Products Industries, Ill., 63

Philson Mfg. Co., Inc., N.Y., 63

Photo-Crystals, Inc., Ill., 30

Pimex, Inc., N.Y., 35

Polarad Electronics Corp., 43-20 34th
St., Long Island City 1, N.Y., 30

See ad on pages 135-136

Tel: EXeter 2-4500

Polydoroff & Assoc., D.C., 17, 23, 26, 75

Precision Electronics, Inc., 48 Merrick
Rd., Rockville Centre, L.I., N.Y., 23

See ad on page 415

Tel: ORiole 8-4182

Premier Instrument Corp., 33 New
Broad St., Port Chester, N.Y., 30

See ad on page 390

Tel: WEstmore 9-8900

Prodelin, Inc., Dept. I-8, 307 Bergen
Ave., Kearny, N.J., 5, 22, 23, 24, 25,
26, 30, 35, 40, 50, 55, 75

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Tel: WYman 1-8600

Production Research Corp., N.Y., 7
Q-Line Mfg. Corp., N.Y., 15, 26, 40, 60,
63, 75

Racal Engrg. Ltd., England, 24, 25, 75

Radar Design Corp., N.Y., 30

Radar Measurements Corp., 190 Duffy
Ave., Hicksville, L.I., N.Y., 30

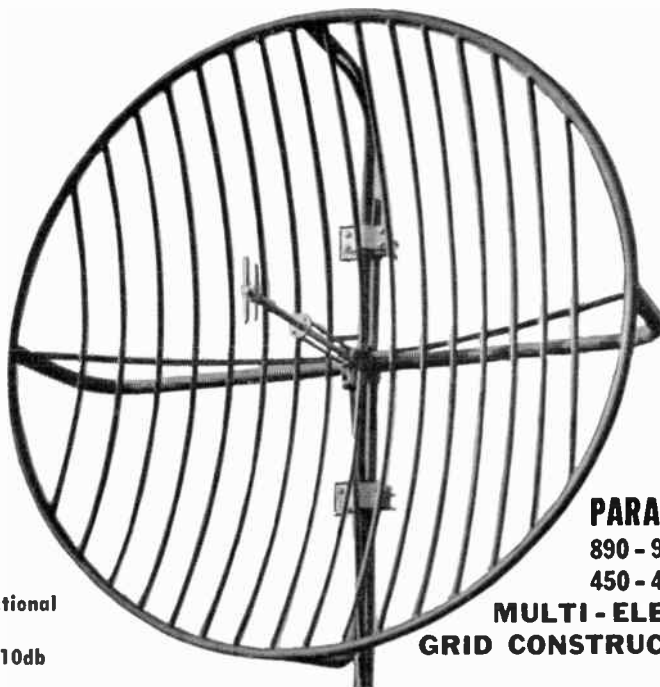
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Tel: OVerbrook 1-5600

Radiart Corp., Ohio, 7, 15, 17, 45, 63, 75

Radiation, Inc., Fla., 7, 24, 25

Radiotronics, Inc., Calif., 5, 7, 10, 24, 25,
26, 30, 40, 45, 75



also
150 &
450 MC
Omnidirectional
Arrays—
gains to 10db

PARABOLAS
890-960 MC
450-470 MC
**MULTI-ELEMENT
GRID CONSTRUCTION***

*light weight, low windage, rugged HELIARC welded aluminum
open construction permits lighter, lower cost towers
Parabolas up to 15' diameter
retain electrical properties of solid spun dish up to 1000 MC*

MARK PRODUCTS

5439 FARGO AVE.

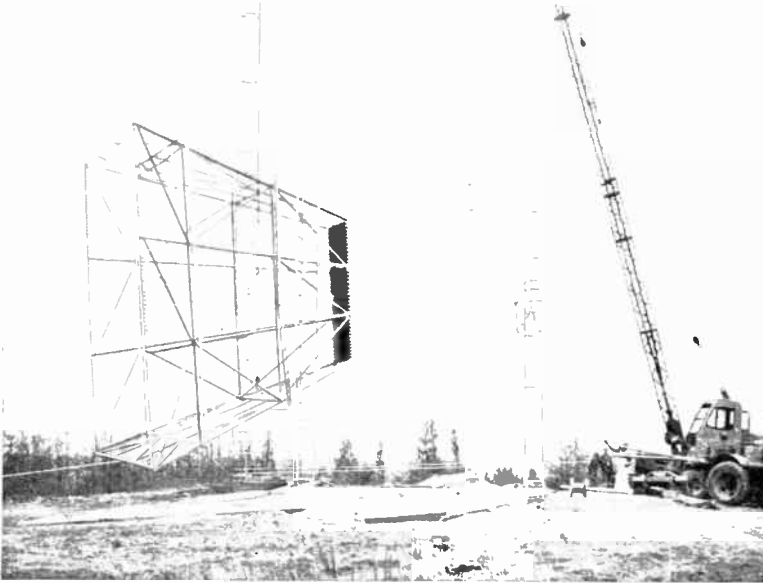
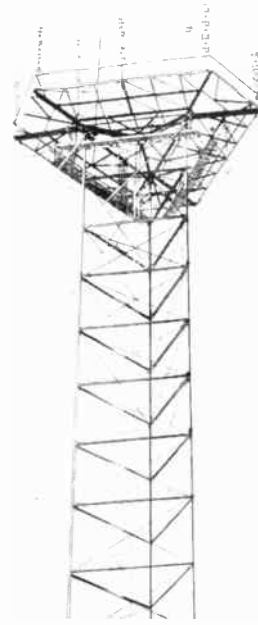
SKOKIE, ILLINOIS

ORchard 5-1500

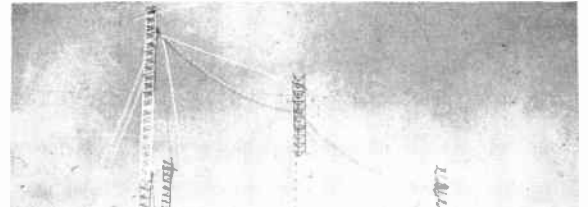
For details, circle #307 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Special-design tower supporting Air Force antennas for test purposes.



Horn-type receiving antenna and support towers for signal amplification.



Towers supporting large curtain type antenna for scatter communication.

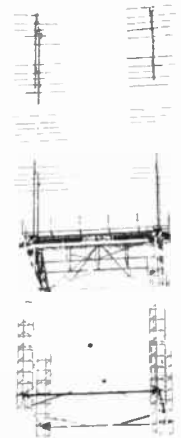
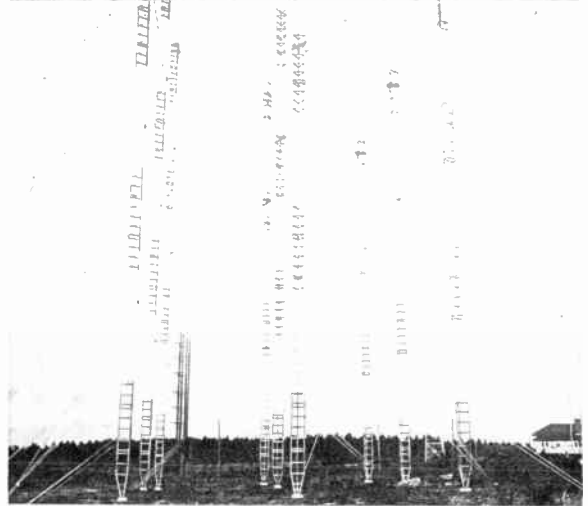
STAINLESS TOWER DESIGNS OFFER UNUSUAL VERSATILITY FOR SPECIAL APPLICATIONS

“Custom” design utilizing Stainless stock tower sections is the answer to many special tower requirements. Standard stock tower sections may be modified and adapted to special specifications at minimum cost.

A wide variety of self-supporting or guyed structures are available to support all types of top or antenna loads and withstand all types of wind, ice and rigidity conditions.

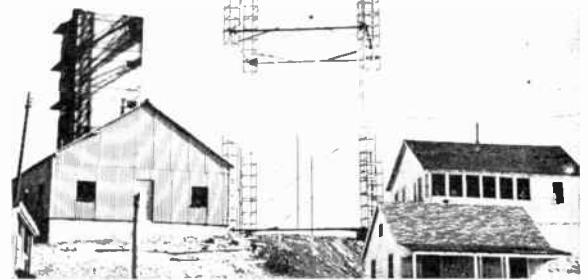
Let Stainless’ Design Staff advise and assist you with your structural problems.

Special design self-supporting test structure having very rigid deflection and ice load specification.



STAINLESS, INC. • NORTH WALES • PENNSYLVANIA

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Rantec's long line of proprietary products, results of many original research and development projects, are now in use in major missile and satellite programs, tracking range installations and instrumentation laboratories throughout the world. These are "flight proven," "range proven" products with a history of *tested* reliability.

RF & MICRO WAVE

ANTENNAS

Rantec antennas — helical arrays, antenna feeds, slot arrays and other special designs — are widely known for their efficient, dependable operation in telemetry systems, radar tracking and augmentation, command guidance and ECM systems. Rantec helix installations have been used in many major missile and satellite projects including the long-range Pioneer series.

TELEMETRY MULTIPLEXERS



When quantity of information, weight, space and optimum antenna location are problems, Rantec telemetering multiplexers provide an easy, efficient solution. With Rantec multiplexers, two, three, four (illustrated) or six telemetry signals can be coupled to a single antenna system. Isolation between r-f inputs is extremely high while transmission loss of signals to the antenna is extremely low. Rantec multiplexers (high Q coaxial band pass filters) cover the telemetry band and are optimized for indicated frequency ranges. They are now in production for use in nine major missile programs.

In addition to the above products, Rantec also designs and manufactures VHF remote attenuators, non-contacting antenna lobe switches, high-speed logarithmic pattern recorders and automatic radome boresight measurement equipment.

Complete information on Rantec products and a brochure describing Rantec research and development capabilities are available free of charge on request.



calabasas, california

For details, circle #309 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory II. Components

37. Antennas & Accessories.

Radio Corp. of America, Defense Elec. Prod., N.J., 5, 22, 30, 55, 60, 65, 75

Radion Corp., Ill., 63, 75

Rantec Corp., 23999 Ventura Blvd., Calabasas, Calif., 7, 24, 30, 75

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Tel: DIamond 7-5446

Reeves Instrument Corp., N.Y., 30, 45

Rego Insulated Wire Co., N.J., 63, 75

Republic Aviation Corp., N.Y., 30, 40

Rich Electronics, Inc., Fla., 25, 26, 75

Rixon Electronics, Inc., 2414 Reddie Dr., Silver Spring, Md., 20, 24, 75

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Tel: LOKwood 5-4578

Roflan Co., Mass., 7, 20

Rohde & Schwarz Sales Co., Inc., N.J., 45

Rohn Mfg. Co., Ill., 50

Rollan Electric Co., Ill., 23

Rostan Corp., N.Y., 50, Telescopic Masts

Rotary Devices Corp., N.J., 45

Rowe Industries, Ohio, 26

Rucker Co., Calif., 45

Ryan Aeronautical Co., Ryan Electronics Div., Calif., 7

Sage Labs., Inc., Mass., 30

Sanders Assoc., Inc., N.H., 7, 30, 40

Scala Radio Co., Calif., 24, 25, 26, 60, 63, 75

Scatter Communications, Inc., Md., 24, 65

Siemens & Halske, A. G., Germany, 5, 10, 22, 30, 35, 55, 70, 75

Simmonds Aerocessories, Inc., N.Y., 7, 26

Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 5, 7, 10, 15, 17, 20, 22, 23, 24, 25, 26, 30, 35, 40, 45, 50, 55, 60, 63, 65

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Tel: CHerry 4-5519

Sioux Radio Products, S.D., 23

Smith Mfg. Co., J. & H, N.Y., 7, 10, 30, 35, 45, 50, 75

Snyder Mfg. Co., Pa., 17, 20, 63, 75

South River Metal Products Co., Inc., N.J., 15, 50 Bantam Only

Specialty Engrn. & Electr. Co., N.Y., Radomes

Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 26

Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 24

Sperry Rand Corp., Sperry Microwave Elect. Co. Div., Fla., 7, 20, 23, 30, 45

Spincraft, Inc., Wis., 30

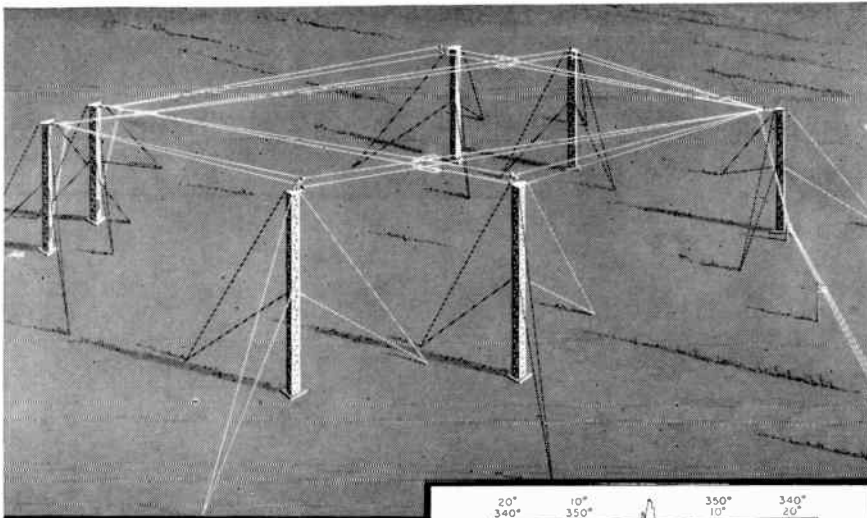
Spirling Products Co., Inc., N.Y., 17, 63

Stainless, Inc., North Wales, Pa., 50, 65

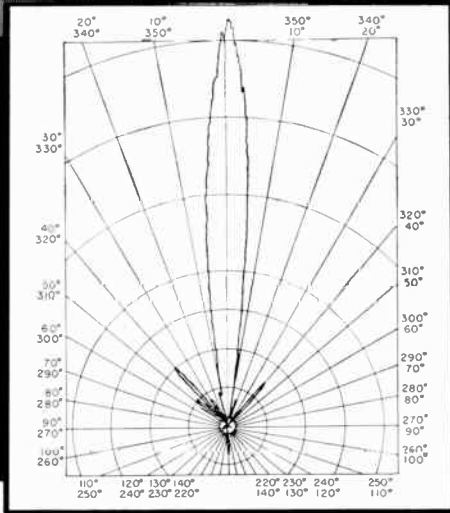
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Tel: OXBow 9-4871

Standard Telephones & Cables, Ltd., England, 5, 7, 10, 22, 24, 30, 55, 75



THE NEW
Trylon / Laport
Rhombic
 a low-interference
 antenna
 for long distance
 communications



The history making concept by E. A. Laport of the unique Rhomboid Antenna illustrated above, has been developed, engineered, installed and tested by the facilities of The Wind Turbine Company. An 8.5 mc installation realizes such significant improvement, as: Sidelobes at least 14 db below the main beam over a two to one frequency range. Gain at least 10 db more than comparable conventional Rhombics, twice the power handling capacity – and with lower transmission line loss, too!

The meticulous model testing and careful attention to electrical and structural details inherent in this installation, are typical of Trylon engineering. The Wind Turbine Company welcomes the opportunity to apply this sound approach to the planning, design, fabrication, and installation of your next antenna system – whether for AM, FM, TV, Microwave, Mobile, or Long-distance communications.



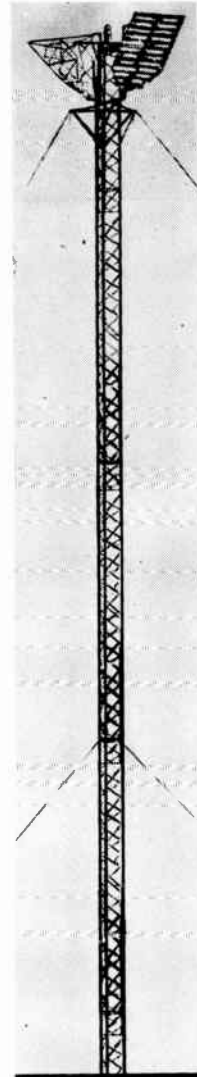
**ANTENNA DESIGN, FABRICATION,
 INSTALLATION**

GALVANIZED STEEL TOWERS

**TRANSMISSION LINES, SWITCHES
 & RELATED EQUIPMENT**

WIND TURBINE COMPANY, West Chester, Pa.

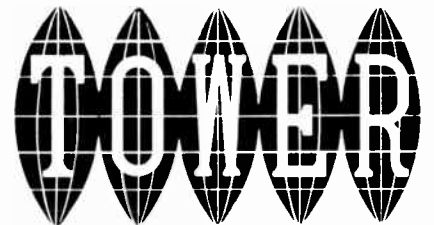
*In Canada: The Wind Turbine Company of Canada, Ltd., Waterloo, Ontario
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**Towers
 Reflectors
 Buildings**

- FIXED
- PORTABLE

*Complete
 installations
 for all
 communications
 purposes*



CONSTRUCTION CO.
 2733 HAWKEYE DRIVE
 SIOUX CITY, IOWA

*Tower Erectors
 and Fabricators
 the World Over!*

MAIL TODAY! FOR 1959 CATALOG!
 TOWER CONSTRUCTION CO.
 2733 HAWKEYE DRIVE
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 ADDRESS: _____
 CITY: _____ ST: _____

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1960 IRE Directory

Directory II. Components

37. Antennas & Accessories.

Stanwyck Coil Co., E., 75 Carson Ave., Newburgh, N.Y., 23
See ad on page 417
Tel: JOhn 1-3030

Stanwyck Winding Co., Inc., N.Y., 23
States Co., Conn., 20

Stavid Engineering, Inc., N.J., 30, 40, 75

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5, 7, 22, 24, 30, 40, 50
See ads on pages 306, 351
Tel: POrt Washington 7-7200

Strand Engineering Co., Mich., 7, 30, 40

Summers Gyroscope Co., Calif., 75

Superex Electronics Corp., N.Y., 23

Swan Electronics Co., Ill., 20, 23, 63

Sylvania Electric Products Inc., Electronic Systems Div., Mass., 3, 75

Systems, Inc., Fla., 30

Tabet Mfg. Co., Inc., Va., 50, 70

Ta-Mar, Inc., Calif., 7, 25, 30, 75

Technical Appliance Corp., N. Main St., Sherburne, N.Y., 7, 15, 24, 25, 26, 30, 40, 45, 60, 63, 75
See ad on page 382
Tel: SHerburne 7-2211

Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 20, 70
See ad on page 352
Tel: OWens 8-4800

Telectro Industries Corp., N.Y., 5, 7, 20, 22, 24, 30, 40

Telerad Mfg. Corp., N.Y., 30

Teleradio Engineering Corp., N.Y., 23

Telrex Laboratories, Dept. SC, Rt. 35, Asbury Park 25, N.J., 5, 10, 15, 22, 24, 25, 45, 63, 75
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Tel: PProspect 5-7252

Temeo Aircraft Corp., Electronics Div., Texas, 7, 24, 25, 30, 40

Tenna Mfg. Co., Ohio, 10, 15, 17, 20, 22

Tennalab, Ill., 15, 24, 60

Thomas Mold & Die Co., Ohio, 35, 50

Thompson-Ramo-Wooldridge, Inc., Tapco Group, Ohio, 7, 30

Torngren Co., Inc., C. W., Mass., 30, 40

Tower Construction Co., 2733 Hawkeye Dr., Sioux City 2, Iowa, 30, 50, 65
See ad on page 386
Tel: 5-7653

Transeo Products, Inc., Calif., 7, 10, 75

Tricraft Products Corp., Ill., 63, 75

Trio Mfg. Co., Ill., 63, 75

Underwood Corp., Canoga Div., Calif., 7, 30

United Microwave Co., N.Y., 30

United Shoe Machinery Corp., Research Div., Mass., 7, 24, 25, 26

U. S. Science Corp., Sub. Topp Indust., Inc., Calif., 7, 75

Vesto Co., Inc., Mo., 50

Victor R. F. & Microwave Co., Mass., 30

Visual Electronics Corp., N.Y., 5, 22, 30, 55, 60, 63, 65

Vokar Products, Inc., Mich., 50

Walsco Electronics Mfg. Co., Div. of Textron, Inc., 100 W. Green St., Rockford, Ill., 63
See ad on page 474
Tel: ROKckford 8-9661

Waltham Precision Inst. Co., Thermal Dynamic Prods. Div., N.Y., 45

Washington Aluminum Co., Inc., Md., 24, 40, 45, 50, Radar Pedestals

Wave Particle Corp., Calif., 30, 75

Webster Mfg. Co., Calif., 15, 26

Westbury Electronics, Inc., N.Y., 20

Westinghouse Electric Corp., Md., 40

Westrex Corp., N.Y., 24

White Aircraft Corp., Mass., 40

Whiting & Davis Co., Mass., 30

Wilcox Electric Co., Inc., Mo., 7

Wiley Electronic Co., Ariz., 30

Wind Turbine Co., 248 E. Market St., West Chester, Pa., 5, 15, 20, 24, 45, 50, 65
See ad on page 386
Tel: OWen 6-3110

Winegard Co., Iowa, 75, FM Broadcast Receiving, TV Receiving

Wunderlich Radio Co., Ill., 5, 24, 30, 50, 65, 70, 75

Z & W Mfg. Corp., Ohio, 7, 25

38. Attenuators.

2. IF
4. RF
5. Decade
10. Impedance Matching

15. Microwave
18. Fixed microwave step
20. Volume controlling

ACDC Electronics, Inc., Calif., 2, 4

Aerolite Electronics Co., N.J., 10

Aerovox Corp., Mass., 20

Aerovox Corp., Cinema Engrn. Div., Calif., 20

Aerovox Corp., Crowley Div., N.J., 15

Airborne Instrument Lab., N.Y., 2

Aircorn, Inc., 48 Cummington St., Boston, Mass., 4, 15
See ad on page 590
Tel: COpley 7-9115

Aircorn Inc., N.J., 15, 18

Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 4, 15
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Tel: HANcock 6-2150

Allen-Bradley Co., Wis., 10

Amphenol-Borg Electronics Corp., Industrial Products—Danbury Knudsen Div., Conn., 4

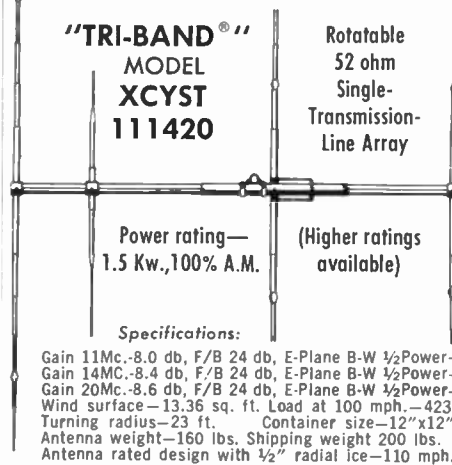
Andersen Labs., Inc., Conn., 2

Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 4, 10
See ad on page 448
Tel: POrt Washington 7-8707

TELREX LABORATORIES

Designers and Manufacturers of

COMMUNICATION ARRAYS
FOR THE ARMED FORCES
and Commercial Service



Calibrated for easy assembly to specifications and center frequency of your choice. Custom Quality construction throughout. Suggested rotator for above — Telrex Model 500-RIS.

Also available: Over 172 off-the-shelf fixed or rotatable high-performance arrays. 7Mc. to 600Mc. Mono, Duo, Tri and Multi-band individually fed or single line feed, and medium to extra heavy duty rotator-indicator control systems, rotated masts, and towers.

• Telrex is equipped to design and supply to our specifications or yours, Broad-band or single frequency, fixed or rotary arrays for communications, FM, TV, scatter-propagation, etc.

• Consultants and suppliers to communication firms, universities, propagation laboratories and the Armed Forces.

For information or to order, phone PProspect 5-7252 or write Department SC.

ANTENNAS
SINCE 1921

Communication and TV Antennas
telrex LABORATORIES

ASBURY PARK 25, NEW JERSEY, U.S.A.

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New High Power Pulsed Oscillator PG-650-C



The successful introduction of the PG-650 pulsed oscillator to many test applications has led to an improved model of interest to workers in ultrasonics, r.f. transient analysis, nuclear magnetic resonance, etc. The following characteristics and features are available only with the PG-650-C.

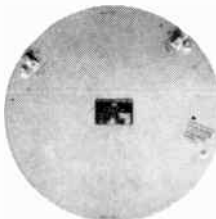
Frequency Coverage 5-90 MC in 7 ranges*
R.F. output Voltage (Min.) into 93 ohms 0-300 p to p
Pulse length continuously variable 1/2-15 μ sec
Rise and Fall times (Max.) 0.3 μ sec
Pulse Droop 5% Max.
Noise Output between Pulses Thermal Noise from Termination
Harmonic Content (Max.) mostly 3rd 10%
R.F. Leakage Negligible
Trigger to Pulse Jitter 0.005 μ sec

SPECIAL FEATURES

Internal Delay Ranges available from calibrated Helipot 200, 1100, 11,000 μ sec
Gate Pulse output available for intensifying and blanking purposes.
External modulation of r.f. oscillator using varying pulse lengths and p.r.f.'s for Carr-Purcell Method.
Fine controls of P.R.F., Pulse length, and delay times.

* Use of special coils will extend the coverage from 0.5 to 150 MC

ULTRASONIC DELAY LINES



Advanced designs in solid delay lines has been the feature of ARULAB products. This organization has always been the leader in a highly competitive field in improving the performance in all respects. The model shown has the lowest secondary level and widest bandwidth in history and was designed especially for integration applications.

SPECIFICATIONS:

Delay time 900 μ sec
Average Max. Secondary level 70 db
Triple Travel level 60 db
Bandwidth for Operation 10 MC
Center Frequency 40 MC
3 db Bandwidth 20 MC
Size 14 1/4" diam. x 1"

Model "C" Miniturized Line



The Model "C" series delay lines were developed to reduce the weight and cost of the longer delays needed for radar applications. These units represent a 20% reduction in diameter and 40% in weight over older models. Typical Specifications:

Delay time 1500 μ sec
Center Frequency 32 MC
Bandwidth 3 db 20 MC
Insertion Loss (50 ohms) 60 db
Capacity 100 μ fd
Max. Secondary level-5 MC-BW 43 db
Max. Secondary level-20 MC-BW 40 db
Aluminum Case 8 1/2" diam. x 7/8"
Weight 2 lbs.-14 oz.

Please write for our bulletins on other test equipment: Wide Band Amplifiers, Preamplifiers, and Precision Attenuators.

ARENBERG ULTRASONIC LABORATORY, INC.

94 Green Street, Jamaica Plain 30, Mass.
Phone—Jamaica 2-8640

For details, circle #187 on Reader Service Card

388

MICROLAB

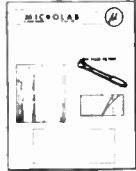
coaxial components FROM STOCK

ATTENUATORS

Fixed and variable
D.C. to 13,000 mc.
0 to 80 db.
2, 20, 200 watts
Write for catalog #9B



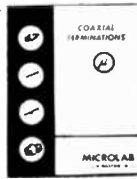
FILTERS



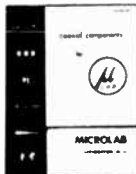
High pass & low pass
100 to 13,000 mc.
10 and 500 watts
1.2 Max. VSWR
Write for catalog #7A

TERMINATIONS

Fixed and sliding
D.C. to 13,000 mc.
2, 10 and 150 watts
1.1 Max. VSWR
Write for catalog #9A



POWER DIVIDERS



Resistive—wide band
Reactive—min. loss
D.C. to 13,000 mc.
2 to 6 outputs
Write for catalog #7

TUNERS

Single, double, triple stub
Rotary, E-H and Slug
Line stretchers
250 to 10,000 mc.
Write for catalog #7B



CRYSTAL MOUNTS



Untuned, fixed tuned
Padded, tripolar
D.C. to 13,000 mc.
High sensitivity
Write for catalog #7

- All MICROLAB products are available FROM STOCK with Type N, C, HN, BNC or TNC male or female connectors.
- Special values, connector combinations and other special design features at same low cost and quick delivery.
- Prototype or production quantities at lowest cost.



An Affiliate of T.E.M., Inc.

MICROLAB

Livingston, New Jersey WYman 2-5700

For details, circle #313 on Reader Service Card

38. Attenuators.

Arenberg Ultrasonic Laboratory, Inc.,
94 Green St., Jamaica Plain (Boston)
30, Mass., 2

See ad on this page

Tel: Jamaica 8-8640

Argonne Electronics Mfg. Corp., N.Y., 20
Arra Corp. (Antenna & Radome Research Assoc.), 1 Bond St., Westbury, L.I., N.Y., 15, 18, Continuously Variable

See ad on page 389

Tel: Edgewood 4-8770

Atomitron, Inc., N.Y., 15, 18
Babcock Relays, Inc., Calif., TV Receivers

Bellaire Electronics, Inc., N.J., 15
Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 4

See ad on page 418

Tel: Enfield 3322

Bendix Aviation Corp., Jones Electronics Co., M. C., Div., Conn., 4

Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 4

See ad on page 170

Tel: Lowell 3-9511

Bird Electronic Corp., 30303 Aurora Rd., Solon, Ohio, Directional & Coax RF

See ad on page 334

Tel: Churchill 8-1200

Blonder-Tongue Labs., Inc., N.J., 4, 10
Bogart Mfg. Co., N.Y., 4, 15

Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 15

See ad on page 172

Tel: Walker 2-6000

British Thomson-Houston Co., Ltd., England, 15

Budd-Stanley Co., Inc., 43-01 22nd St., Long Island City 1, N.Y., 15, 18

See ad on page 592

Tel: Stillwell 6-1706

Canadian Marconi Co., Canada, 2, 4, 5
Charmalloy Electronics Corp., Calif., 15

Clarostat Mfg. Co., Inc., N.H., 20
Corning Glass Works, 550 High St., Bradford, Pa., 15

See ads on pages 400, 527

Tel: 2-4571

Custom Components, Inc., N.J., 15, 18
Dallons Labs., Inc., Calif., 10

Daven Co., N.J., 2, 4, 5, 10, 20
Defiance Engrg. & Microwave Corp., Mass., 4, 15, 18

DeMornay-Bonardi, 780 S. Arroyo Parkway, Pasadena, Calif., 15

See ad on pages 120-121

Tel: SYcamore 2-4142

Diamond Antenna & Microwave Corp., Mass., 4, 15

Douglas Microwave Co., Inc., Dept. R-9, 252 E. 3rd St., Mt. Vernon, N.Y., 15

See ad on pages 40-41

Tel: MOUNT Vernon 8-6900

Dymec, Inc., Calif., 15
Dynamic Electronics-New York, Inc., 2, 4

E.M.I. Electronics, Ltd., England, 15
Ecco Electronic Components Corp., N.Y., 4, 15

Electrical & Physical Instrument Corp., N.Y., 4, 5, 10

Electro Impulse Laboratory, 208 River St., Red Bank, N.J., 15

See ad on pages 92-93

Tel: SHadyside 1-0404

Directory II. Components

38. Attenuators.

Electronic Applications, Inc., Conn., 20
Elsin Electronics Corp., N.Y., 15, 18
Emerson & Cuming, Inc., Mass., 15
Empire Devices Products Corp., 37
Prospect St., Amsterdam, N.Y., 2, 4,
5, 10, 15, 18

See ad on page 91

Tel: VICTOR 2-8400

Entron, Inc., Md., 4

FXR, Inc., 26-12 Borough Pl., Woodside
77, N.Y., 4, 15

See ads on pages 97-100

Tel: AStoria 8-2800

Ferris Instrument Co., N.J., 4

Filmohm Corp., N.Y., 15, 18

Frequency Standards, Inc., P.O. Box 504,
Shafto Rd., Asbury Park, N.J., 4, 15

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Tel: PROspect 4-0500

General Communication Co., Mass., 15

General Radio Co., West Concord,
Mass., 4, 5

See ad on Cover 4

Tel: EMerson 9-4400

Gertsch Products, Inc., Calif., 5

Goodmans Industries, Ltd., England, 20

Goodrich Co., B. F., Sponge Products
Div., Conn., 15

Gulton Industries, Inc., N.M., 4, 15, 18

Hallcrafters Co., 4401 W. 5th Ave., Chi-
cago 24, Ill., 15

See ad on page 204

Tel: VAN Buren 6-6300

Hewlett-Packard Co., 275 Page Mill Rd.,
Palo Alto, Calif., 2, 4, 5, 15, 18

See ads on pages 3-18

Tel: DAVenport 5-4451

I-T-E Circuit Breaker Co., Special
Products Div., Pa., 15

International Tel. & Tel. Corp., ITT
Federal Div., N.J., 15

I. T. & T. Corp., Industrial Products
Div., N.J., 2, 4, 5

J-V-M Microwave Co., Ill., 4, 15, 18

Javex Electronics, Calif., 20

Jerrold Electronics (Canada) Ltd., Can-
ada, 4

Jerrold Electronics Corp., Dept TED
33, The Jerrold Bldg., Philadelphia 32,
Pa., 4

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Tel: BALDwin 6-3456

Julie Research Labs, Inc., N.Y., 5

Kay Electric Co., Dept. ID-9, 14 Maple
Ave., Pine Brook, N.J., 2, 4, 5

See ad on page 268

Tel: CApital 6-4000

Kearfott Co., Inc., 1500 Main Ave., Clif-
ton, N.J., 15

See ad on page 348

Tel: GREGory 2-1000

Kearfott Co., Inc., Microwave Div.,
Calif., 15

Kelvin Electric Co., 5907 Noble Ave.,
Van Nuys, Calif., 10

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Tel: STate 2-6662

Kings Electronics Co., Inc., 40 Marble-
dale Rd., Tuckahoe 7, N.Y., 4, 15

See ad on page 425

Tel: SWiftwater 3-5000

Lesa, S.P.A., Italy, 20

Lieco, Inc., N.Y., 15

Ling Systems, Inc., Calif., 15, 18

Litton Industries, Airtron, Inc., Div.,
N.J., 15, 18

Lumatron Electronics, Inc., Dept. IR-60,
68 Urban Ave., Westbury, L.I., N.Y., 15

See ad on page 331

Tel: EDgewood 4-3100

Lynmar Engineers, Inc., Pa., 10

M E Labs., Calif., 4, 10, 15, 18

Marconi Instruments, 111 Cedar Lane,
Englewood, N.J., 4

See ad on page 318

Tel: LOwell 7-0607

Martin Co., Baltimore Div., Md., 2, 4,
10, 15

McMillan Industrial Corp., Mass., 15

Meridian Metalcraft, Inc., Calif., 10, 15,
18

Metavac, Inc., N.Y., 10, 15, 18

Metco, Inc., Mass., 15

Microlab, 71 Okner Parkway, Living-
ton, N.J., 4, 10, 15, 18

See ad on page 388

Tel: WYman 2-5700

Microtech, Inc., Conn., 15, 18

Microwave Assoc., Inc., Mass., 15

Microwave Development Labs., Inc.,
Mass., 15

Monogram Industries, Inc., Cascade Re-
search Div., Calif., 10, 15

Motorola, Inc., Ariz., 15, 18

Muirhead & Co., Ltd., England 2, 4

Muirhead Instruments, Inc., N.Y., 4, 5

Mytron, Inc., Mass., 15

N.R.K. Mfg. & Eng. Co., Ill., 15

N Y T Electronics, Inc., Calif., 2, 4

Narda Microwave Corp., Dept. IRED-3,
118-160 Herricks Rd., Mineola, L.I.,
N.Y., 15

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Tel: PIONEER 6-4650

New London Instrument Co., Conn., 4

Northeast Electronics Corp., N.H., 2, 20

Ohmite Mfg. Co., 3692 Howard St.,
Skokie, Ill., 20

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Tel: ORchard 5-2600

Omega Laboratories, Inc., Mass., 15

Ortho Filter Corp., 7 Paterson Ave.,
Paterson 1, N.J., 4, 5

See ad on page 456

Tel: MULberry 4-5858

Painton & Co., Ltd., England, 2, 4, 5, 10,
20

Pan-Air Electronics Corp., Calif., 2, 4

Philco Corp., Govt. & Industrial Div.,
Pa., 2, 4, 15

Photo-Crystals, Inc., Ill., 15

ARRA LINE CONTINUOUSLY VARIABLE ATTENUATORS



Exclusive Features:

- Broadband Impedance Match
- Min. VSWR for all values of attenuation over band
- Insertion Loss: 0.2 db max.
- Calibration Accuracy: ± 0.2 db
- Drive: Micrometer for general use. Piston & Shaft drives for systems & power level applications.
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- Power Rating: 10 watts average min.
- Calibration freq.: midband
- Continuously variable for all values of attenuation

| Model No. | Freq. KMC | Max. Atten. | Max. VSWR | Unit Price |
|-----------|-----------|-------------|-----------|------------|
| 1414-10 | .25-.50 | 10 | 1.5 | \$290. |
| 2414-20 | .50-1.0 | 20 | 1.5 | \$290. |
| 2-3414-30 | .8-2.5 | 30 | 1.5 | \$290. |
| 3414-30 | 1.0-2.0 | 30 | 1.4 | \$270. |
| 4414-30 | 2.0-4.0 | 30 | 1.3 | \$250. |
| 4-5414-30 | 2.0-6.0 | 30 | 1.3 | \$260. |
| 5414-30 | 4.0-7.0 | 30 | 1.3 | \$270. |
| 6414-30 | 7.0-11.0 | 30 | 1.3 | \$280. |

Upon Special Request:

—Other frequency bands between 250Mc. and 11 KMC.

—Other ranges of continuously variable attenuation from a minimum of .2 db to a maximum of 60 db.

Write for complete specifications and outline drawings.

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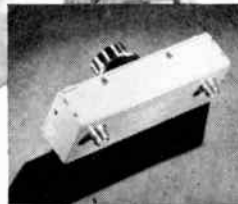


PREMIER INSTRUMENT CORP.

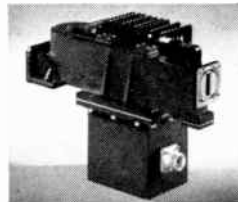
33 New Broad Street, Port Chester, N. Y.

THE WAVEGUIDE HOUSE

For details, circle #315 on Reader Service Card



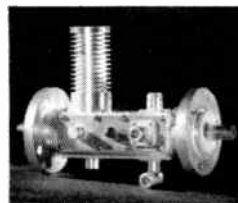
COAXIAL VARIABLE ATTENUATOR
Frequency Range—2670-2930 mc
Attenuation—25 db at 1.75 VSWR



HIGH POWER VARIABLE ATTENUATOR
Power Level—300 kw peak for
8.5-9.6 Kmc
Attenuation—1-40 db at
1.15 VSWR



WAVEGUIDE SWITCH
VSWR—1.06 maximum
Isolation—100 db minimum



COAXIAL DIRECTIONAL COUPLER
Coupling Values—20 to 50 db
Directivity—greater than 30 db

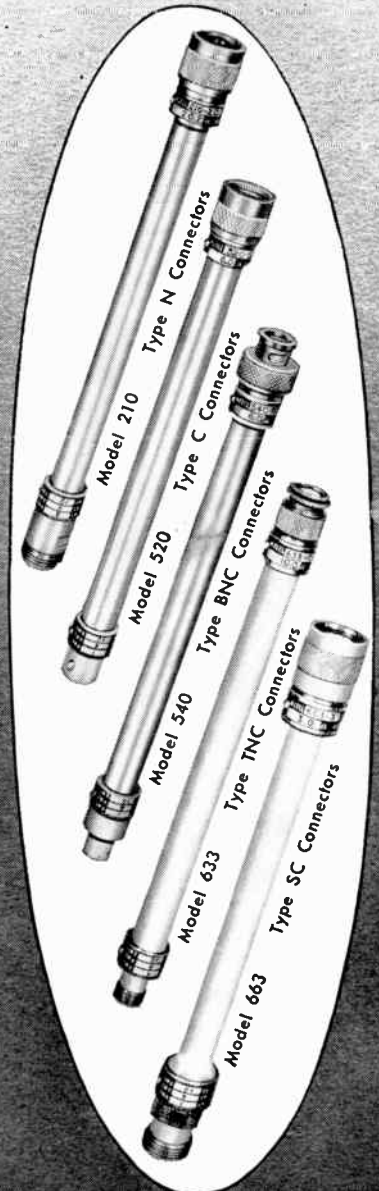
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FIXED COAXIAL ATTENUATORS

1 to 12.4 KMC

50 Ohms 1 to 20 db

Connectors: Type N, C, BNC, TNC or SC. Each type with mole/female, double mole or double female connectors. Made with Weinschel Film Resistors for maximum stability.



Write for complete catalog, specifying frequency range of interest.

Weinschel Engineering
KENSINGTON, MARYLAND

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1960 IRE Directory

Directory II. Components

38. Attenuators.

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 15
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Tel: EXeter 2-4500

Polytechnic Resch. & Dev. Co., N.Y., 15

Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 15
See ad on page 390
Tel: WESTmore 9-8900

Pylon Electronic Development Co., Ltd., Canada, 4, 15

Radar Design Corp., N.Y., 4, 10, 15, 18

Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 15, 18
See ad on page 322
Tel: OVerbrook 1-5600

Rantec Corp., 23999 Ventura Blvd., Calabasas, Calif., 15
See ad on page 385
Tel: DIAMOND 7-5446

Raytheon Co., Mass., 15

Remanco, Inc., Calif., 4

Rho Engrg. Co., Calif., 10

Rixon Electronics, Inc., 2414 Reddie Dr., Silver Spring, Md., 4, 10
See ad on page 525
Tel: LOKWOOD 5-4578

Rohde & Schwarz Sales Co., N.J., 4, 10

Sage Labs., Inc., Mass., 4, 15, 18

Sanders Associates, Inc., N.H., 15

Saratoga Industries, N.Y., 15, 18

Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 4, 5, 20
See ad on page 538
Tel: WOODLAWN 5-2341

Shamp Scientific Supply Co., D.C., 15

Sierra Electronic Corp., 5442D Bohannon Dr., Menlo Park, Calif., 15
See ad on pages 30-31
Tel: DAVENPORT 6-2060

Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 10, 15, 18
See ad on page 595
CHerry 4-5519

Sivers Lab., Sweden, 15

Solartron Electronic Group, Ltd., England, 2, 4

Specialty Electr. Dev. Corp., N.Y., 15

Spencer-Kennedy Labs., Inc., Mass., 4

Sperry Rand Corp., Sperry Microwave Elect. Div., Fla., 15, 18

Standard Telephones & Cables, Ltd., England, 4, 5

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 15
See ads on pages 306, 351
Tel: PORT WASHINGTON 7-7200

Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 4, 15, 18
See ad on page 342
Tel: HOLLYWOOD 4-9292

Sullivan, Ltd., H. W., N.Y., 5, 10

Sylvania Electric Products, Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 15
See ad on pages 26-27
Tel: YORKSHIRE 8-6211

Systems, Inc., Fla., 2, 4, 5, 15

Taffet Radio & Television Co., N.Y., 4, 10

Tech Laboratories, Inc., Bergen & Edsall Bldvs., Palisades Park, N.J., 2, 4, 5, 10, 15, 18, 20
See ad on page 556
Tel: WINDSOR 4-2221

Telectro Industries Corp., N.Y., 2, 4

Telerad Mfg. Corp., N.Y., 15, 18

Telonic Industries, Inc., 2, 4, 5, 10

Thompson-Ramo-Wooldridge, Inc., Tapco Group, Ohio, 15

Trad Electronics Corp., 1001 First Ave., Asbury Park, N.J., 18
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Tel: PROSPECT 6-7445

Transline Associates, N.J., 15

Underwood Corp., Canoga Div., Calif., 15

United Microwave Co., N.Y., 15

United Shoe Machinery Corp., Research Div., Mass., 15, 18

University Loudspeakers, Inc., N.Y., 10, 20

Uniwave, Inc., N.Y., 15, 18

Victor RF & Microwave Co., Mass., 4, 15

Vidaire Electronics Mfg. Corp., N.Y., 4

Visual Electronics Corp., N.Y., 15

Wac Line, Inc., Ohio, 15

Waveline, Inc., N.J., Ohio, 15

Weinschel Engrg. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 2, 4, 15, 18
See ads on pages 324, 390
Tel: LOCKWOOD 4-0121

Welwyn Electrical Labs., Ltd., England, 2, 4, 10

Westbury Electronics, Inc., N.Y., 4

Whiting & Davis Co., Inc., Mass., 15, 18

Wunderlich Radio Co., Ill., 2, 4, 15

Zenith Optical Lab., N.Y., 15

Ballasts and voltage regulators:
See class 75

39. Batteries.

- | | |
|--------------------------------------|-------------------------------------|
| 5. Dry batteries | 20. Storage batteries—nickel-alkali |
| 10. Mercury batteries | 25. Storage batteries—silver-zinc |
| 15. Storage batteries—lead-acid | 30. Solar batteries |
| 18. Storage batteries—nickel-cadmium | |

Allied International Corp., N.Y., 5, 15, 18

Brown Co., Irv., N.Y., 30

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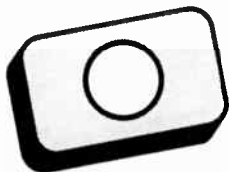
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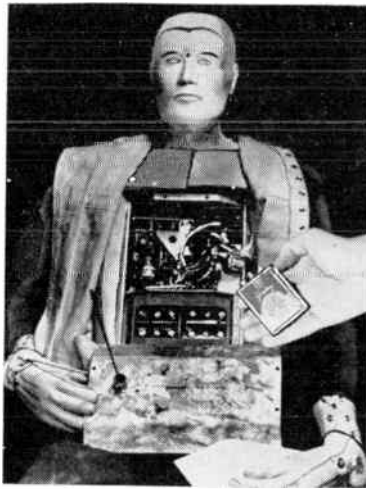
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1960 IRE Directory



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B Series Shown
F Series available
with spring behind cap.

No. 300 • No. 400 • No. 500 SERIES

BF Series Transistor Battery Holder accommodates batteries and cells with diameters up to 1 3/8" and lengths from 1 1/4" to 7 3/16" making it possible to use different battery combinations to obtain a wide selection of DC voltages. Batteries can be exchanged simply by unscrewing the holder cap. Designed for mounting up to a 1 5/8" diameter hole and 3/8" thick panel.

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- ★ RF PICK-UP

Security Devices Laboratory

ELECTRONICS DIVISION OF SARGENT & GREENLEAF, INC.

ROCHESTER 21, NEW YORK

For details, circle #319 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory II. Components

39. Batteries.

Burgess Battery Co., Dept. IRE, Foot of Exchange St., Freeport, Ill., 5, 10, 18
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Tel: ADams 2-2161

Camera Equipment Co., Inc., Dept. IRE, 315 W. 43rd St., New York 36, N.Y., 18

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Tel: JUDson 6-1420

Channel Master Corp., N.Y., 5

Cook Co., Frank R., Colo., 5, 25

DeWitt Development Co., Ill., 15

DonMar Products, Inc., Colo., 5, 20

Electric Auto-Lite Co., Ohio, 15

Electric Storage Battery Co., Exide Automotive Div., Ohio, 15

Electric Storage Battery Co., Exide Industrial Div., Pa., 15

Electric Storage Battery Co., Ray-O-Vac Co., Wis., 5

Electronic Batteries, Inc., N.Y., 15

Fisher Scientific Co., Pa., 5

Gould-National Batteries, Inc., Nicad Div., Mass., 18

Gulton Industries, Inc., N.J., 18

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Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 30

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Tel: UNiversity 9-9850

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Tel: OREGon 8-6281

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Radio Corp. of America, Defense Elec. Prod., N.J., 5

Radio Corp. of America, Electron Tube Division, Section I-22-Q, 415 S. Fifth St., Harrison, N.J., 5, 10

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Tel: HUMBoldt 5-3900

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Sargent & Greenleaf, Inc., Security Devices Laboratory Div., 24 Seneca Ave., Rochester 21, N.Y., Battery Holders

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Tel: HOPkins 7-3200

Sonotone Corp., Dept. X00-109, P.O. Box 200, Elmsford, N.Y., 18

See ad on page 482

Tel: LYric 2-6400



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. . . application engineered and proven by environmental laboratory testing, to customer or MIL specifications.

Air-Marine manufactures electric motors for the following general performance ranges:

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24,000 rpm max. at 400 cps
Dual and Variable Speed Units
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Variable . . . 50 to 450 cps,
and 320 to 1,000 cps
Special . . . as required
- **VOLTAGE** Standard 115V and 230V
Special . . . as required
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- **SIZE** 1" O.D. to 4 3/4" O.D.
- **BLOWER CAPACITY** To 1,000 CFM air delivery for blowers and fans depending on Static Pressure encountered.

TYPES OF SUB-FRACTIONAL MOTORS MANUFACTURED

Induction, Hysteresis Synchronous, Reluctance, Synchronous, Servo, Gear, and High Slip Induction.

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Centrifugal and Vane Axial Blowers, Blower Housings, Axial Flow Fans.

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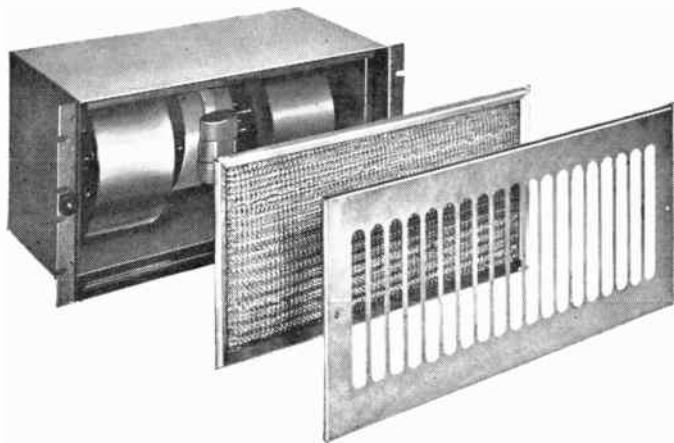
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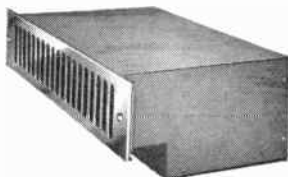


STANDARD RACK MOUNTED FANS & BLOWERS

Over 15 models available in panel heights of 3 1/2" to 12 1/4" in increments of 1/4". Range, 80 to 1200 cfm. All units feature quiet operation, no electrical noise and maximum air delivery. Blower units provide better air delivery against

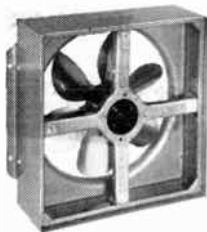
pressure and higher velocity for faster cooling. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Also Mil. Spec. and DC motors available. Permanent filters. Smart, heavy gauge, stainless steel grilles.

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Provide higher performance with minimum panel height. Filter and blower are recessed into the unused portion of the open base commercial type rack. Fit 3 1/2", 5 1/4", 7", 8 3/4" and 10 1/2" panel heights and deliver 150 cfm to 1200 cfm. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent filters.

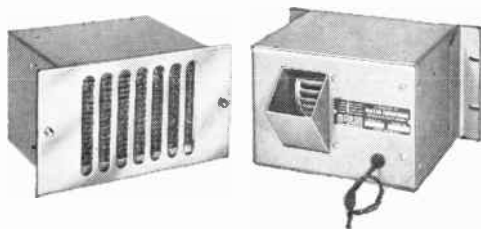
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Easy-to-install Filter Box Propeller Fan gives wide choice of cfm's and great mounting flexibility. Operates as blow or suck without rework. Compact, low-cost. Long, service-free life. Operates from various power sources.

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For narrow racks or where space is a problem. Fit half the width of standard 19" racks leaving balance of space for other components. Blower model (5 1/4" high) delivers 100 cfm. Fan model (7" high) delivers 225 cfm. Powered by highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent type filter.

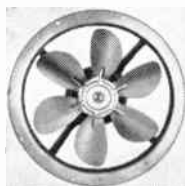


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Meet most rigid specifications. Mount in any position. Deliver 10 cfm. Fit 3 3/4" cube. Continuous duty, totally enclosed motor, 1/300 hp. 115 volts, 60 cycle, 3400 rpm.



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Engineering Booklet on Forced Air Cooling. Describes air convection methods. Includes design data, tables, charts, etc.

FREE!

34 page catalog loaded with helpful data. Shows complete line of fans, blowers.

Batteries—Class 39
Blowers & Cooling Fans—Class 40

Directory II. Components

39. Batteries.

Telecomputing Corp., Cook Batteries Div., Colo., 18, 20, 25

Telectro Industries Corp., N.Y., 15, 18, 20, 25

Three Point One Four Corp., 24 Woodworth Ave., Yonkers, N.Y., 18, 20, 25, 30

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Tel: Greenleaf 6-4440

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Tel: Worth 6-3100

Bearings: See class 87

40. Blowers & Cooling Fans.

5. Air wheels & housings

10. Complete blower assemblies
15. Fan blades

Air Control Installations, Ltd., England, 5, 10, 15

Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 5, 10

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Motor Blower Assemblies!

Compact, rugged construction. In stock from 4 to 150 CFM. Designed for applications where space and weight are prime factors. Blowers available without motors.

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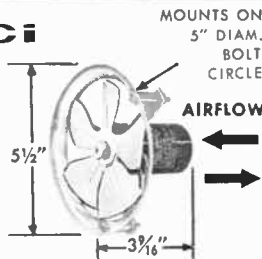
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- 1/2000 to 1 HP
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- Size 1" to 3 3/8" O.D.
- High ambient temperature
- Totally enclosed or open frame

A TYPICAL RCi AXIAL FAN

- Air delivery to 300 CFM
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- Available for 50 thru 1000 CPS operation — no switching
- Quick delivery



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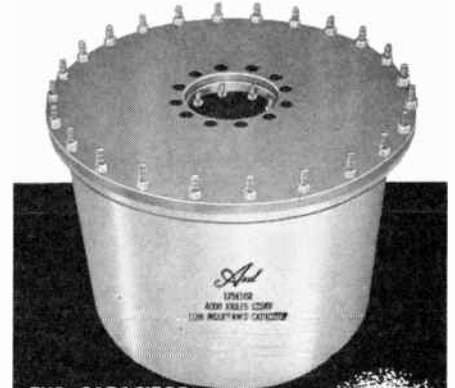
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FEATURES

- Voltage Ratings up to 150KV.
- High energy content up to 4000 joules.
- Ringing frequency as high as 1.25 mcs.
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1960 IRE Directory

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Tel: REctor 2-6249
Torrington Mfg. Co., Conn., 5, 10, 15
United Aircraft Products, Inc., Ohio, 5, 10
Western Gear Corp., Electro Parts Div., Calif., 10



CENTRIFUGAL BLOWERS—LOOSE SCROLL
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N_s = 50,000 - 125,000



PROPELLER FANS
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Engineered to $\frac{NV\sqrt{Q}}{\Delta P^{0.75}} = L_s$

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Broadcast equipment: See Dir. I

Brushes, Motor: See class 87

Bushings: See class 87

Bridges: See class 5

Cabinets: See class 81

Cable clips: See class 87

Cable & wire: See class 82

Cans: See class 87

41. Capacitors: Fixed.

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| 10. Decade | 60. Paper |
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ACF Electronics, Va., 65, 80
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Aerovox Corp., Mass., 5, 10, 15, 17, 20, 25, 40, 45, 50, 55, 60, 65, 70, 80, 85, 90, 95



The wide range of ROTRON FAN types enables our Application Engineers to match accurately the SPECIFIC SPEED (N_s) of our air movers with the LOAD-SPEED (L_s) characteristics of your equipment for ultimate cooling efficiency. Send for CATALOG SHEET #20201-S.

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INDUSTRIAL — for computers, printed circuits and critical electronic equipment
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Subminiature, (1/8" x 1/4") hermetically sealed metal case . . .
 Temperature range -80° to +85° C
 Maximum capacity variation averages less than ±5%
 Indefinite shelf life, meets environmental requirements MIL-C-3965



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METALLIZED MYLAR*

Type RQL in a hermetically sealed case is designed to meet electrical and environmental requirements of MIL-C-18312 (U.S.N.)
 Type RLR is an uncased unit . . . tough protective mylar* wrap and epoxy end seal
 Both have a temperature range of -55° C to +125° C without derating



TYPE RQL



TYPE XPR

MYLAR* DIELECTRIC

Round (XPR) and flat (XPF) miniature capacitors
 Temperature range of -55° to +125° C
 Units employ an outer mylar* polyester tape wrap and ends sealed with a plastic thermosetting resin to afford excellent protection against moisture.



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TYPES AQ-TQ — CP04 THRU CP11

MIL-C-25A PAPER — CP04 through CP70

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With self healing characteristics
 Miniature glass-to-metal sealed tubulars
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 Conform to MIL tests for moisture resistance, thermocycle immersion and vibration . . .
 To +125° C operation.



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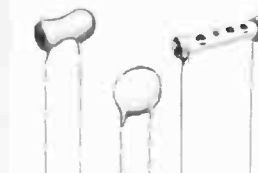


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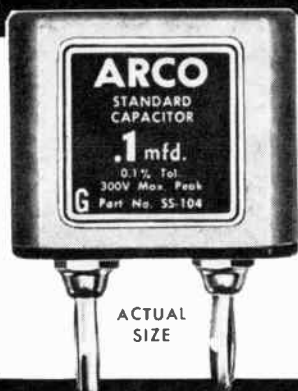
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Complete set of 32 precision standards ranging from .0001 to .5 mfd. Includes handsome durable carrying case (11 3/8 x 9 3/8 h x 3 3/8 d) plus a 4-position adapter.



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COEFFICIENT
.0001 to .1 mfd.
+40 ±15 ppm/°C.
0.2 to 0.5 mfd.
-130 ±10 ppm/°C.

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500 volts peak.
.05 to 0.5 mfd.
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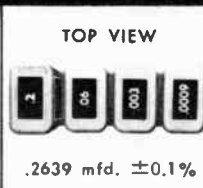
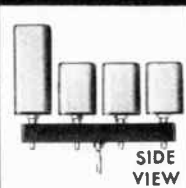
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CAPACITORS MAY BE
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VALUES OF ANY
QUANTITY.**

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For Complete Information

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MINIATURIZED**

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Capacitors: Fixed—Class 41

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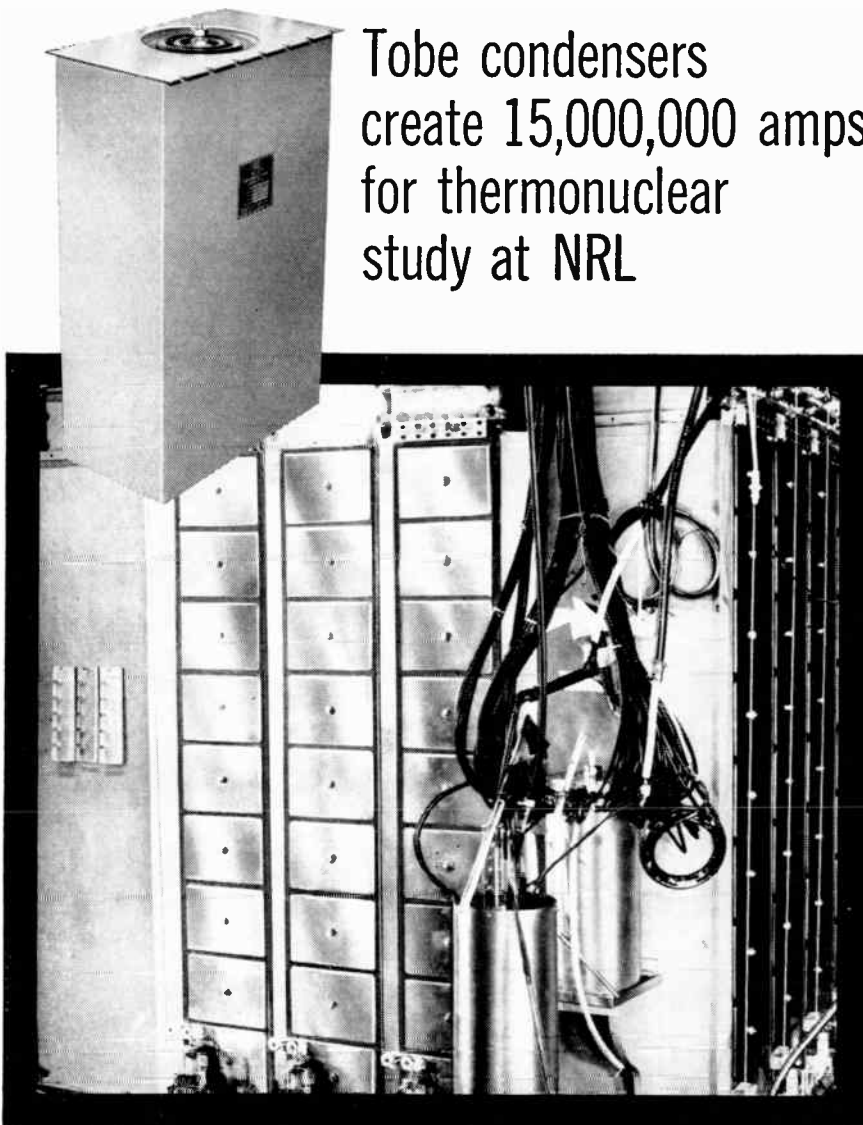
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Allen-Bradley Co., Wis., 5, 20
American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 5, 20
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Tel: AMherst 5-3411
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Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 17, 40, 50, 70, 85
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Bestran Corp., Dilectron Div., Calif., 5, 40, 70, 80
Blackhawk Engrg. Co., Wis., 17, 20, 25, 40, 65, 80, 98
Bradford Components, Inc., N.Y., 5
Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5
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GLASS CAPACITORS by CORNING

Fixed Glass Capacitors

Rugged, reliable, extreme miniaturization

Only complete mechanical destruction will alter their values. Temperature coefficient is plus 140 ± 25 ppm/°C. from -55°C . to $+85^{\circ}\text{C}$. Absolute retrace. TC variation is less than 15 ppm between units. Capacitance drift is negligible.

Medium-Power Transmitting Capacitors

Small, light, strong

Ideal for mobile RF transmitters. Most ratings take less space than mica types. Heavy metal lugs provide minimum contact resistance plus heat dissipation for higher power handling ability.

High-Capacitance Canned Capacitors

Custom-built, compact, potted units for special requirements.

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Up to 90% volume reductions possible when wire leads are not required. Made to your specifications.

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Direct-traverse: for applications of great ruggedness plus thermal stability and smooth tuning characteristics. Practically zero TC in VHF range. Negligible capacity shift with widely variable ambient temperatures. Invar core. Four standard ratings: 0.5 to 3.0 mmfd; 1.0 to 7.5 mmfd; 1.0 to 8.0 mmfd; 1.0 to 12.0 mmfd.

Midget-rotary: for superior performance and economy. Three capacity ranges at 50 mc. Four terminations. Also custom design.

For more complete information and prices, just write to us. Corning Glass Works, 550 High Street, Bradford, Pa.



CORNING ELECTRONIC COMPONENTS

For details, circle #329 on Reader Service Card

1960 IRE Directory

Directory II. Components

41. Capacitors: Fixed.

Cornell-Dubilier Electric Corp., Dept. IRE, 333 Hamilton Blvd., South Plainfield, N.J., 5, 10, 15, 17, 20, 25, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95
 See ad on Cover 3
 Tel: PLainfield 6-9000

Corning Glass Works, 550 High St., Bradford, Pa., 35, 80
 See ads on pages 400, 527
 Tel: 2-4571

Corson Electric Mfg. Corp., N.J., 17, 40, 55, 60, 65, 85

Cosmic Condenser Corp., 853 Whittier St., New York 59, N.Y., 15, 60, 80
 See ad on this page
 Tel: LUdlow 9-3360

Crystal-X Corp., Pa., 65

Daly Condenser Co., c/o British Radio, D.C., 15

Dearborn Electronics Labs., Ill., 17, 40, 55, 60, 65, 70

Derf Radio Co., N.Y., 5, 10, 15, 17, 20, 25, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 95, 98

Deutschmann Corp., Tobe, 921 Providence Highway, Norwood, Mass., 17, 20, 25, 40, 45, 55, 60, 65, 70, 80, 85
 See ad on page 400
 Tel: NOrwood 7-2620

Diamond Electronics Corp., N.Y., 5, 15, 17, 20, 25, 40, 50, 65, 90

Dolinko & Wilkins, Inc., N.J., 98

Double E Prod. Co., Calif., 20, 40, 60, 85, Teflon Dielectric 500°F Hi-Temp.

Dumont Airplane & Marine Instruments, Inc., Pa., 15, 55, 60, 65

ESC Corp., 534 Bergen Blvd., Palisades Park, N.J., 85
 See ad on page 446
 Tel: WIndsor 7-0400

Eclipse Electronics Co., Canada, 55, 60, 65

Electra Mfg. Co., 4051 Broadway, Kansas City, Mo., 5, 80
 See ad on page 534
 Tel: WEStport 1-6864

Electric Machinery Mfg. Co., Mullenbach Div., Calif., 5

Electrical Utilities Co., Ill., 17, 20, 40, 45, 55, 60, 65, 70, 80, 85

Electro-Capacitors Co., Calif., 15

Electro-Measurements, Inc., Ore., 10

Electro Motive Mfg. Co., Inc., S. Park & John Sts., Willimantic, Conn., 5, 20, 50, 55, 60, 90
 See ad on page 196
 Tel: HArrison 3-4551

Electron Products Co., Calif., 10, 20, 40, 45, 55, 60, 65, 70, 80

Electronic Fabricators, Inc., N.Y., 40, 65, 95

Electronic Plastics Co., Calif., 65

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5, 17, 20, 25, 40, 50, 65, 80, 90, 95
 See ad on pages 110-111
 Tel: GLendale 6-8592

Etching Co. of Calif., Calif., 80

Fansteel Metallurgical Corp., North Chicago, Ill., 15, 95
 See ad on pages 156-157
 Tel: DExter 6-4900

Film Capacitors, Inc., N.Y., 10, 40, 45, 55, 65

Filtron Co., Inc., N.Y., 17, 20, 40, 45, 55, 60, 65, 85

Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 10
 See ad on page 410
 Tel: EVergreen 6-1300

General Electric Co., Apparatus Sales Div., N.Y., 15, 17, 20, 40, 55, 60, 65, 70, 85, 95

Gen. Electric Co., Capacitor Dept., N.Y., 15, 17, 25, 40, 55, 60, 65, 70, 80, 85, 95

General Electric Co., Capacitor Div., S.C., 15, 95

General Electric Co., Ltd. of England, England, 60, 65

General Products Corp., N.Y., 60, 65

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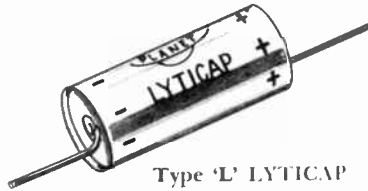
For details, circle #331 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

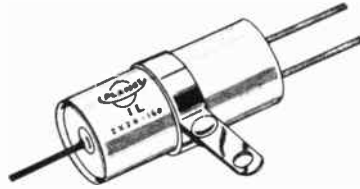
PLANET CAPACITORS ARE

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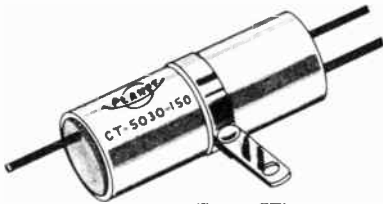
Whether you are a distributor, design engineer or industrial purchasing agent, you will find that our product is good, our service friendly and dependable, and our prices reasonable.



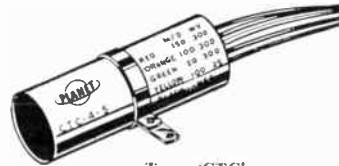
Type 'L' LYTICAP



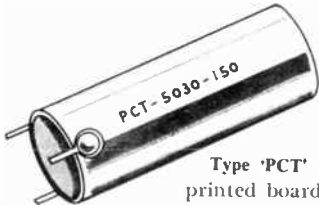
Type 'IL' dual LYTICAP



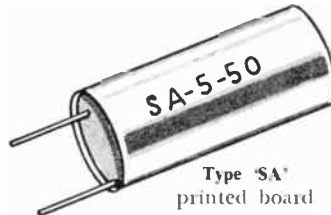
Type 'CT'
cardboard tubes



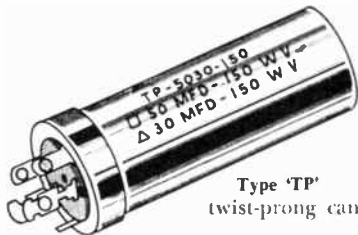
Type 'CTC'



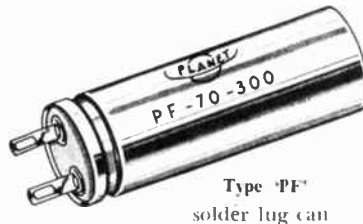
Type 'PCT'
printed board



Type 'SA'
printed board



Type 'TP'
twist-prong can



Type 'PF'
solder lug can

PLANET MANUFACTURING CORP.

BLOOMFIELD, NEW JERSEY

Pilgrim 3-2874

For details, circle #332 on Reader Service Card

Packs A Lot Of Capacity

Into A Little Space

NEW KSR* TANTALYTIC® CAPACITORS

For Example: 3500 MFD
at 15 volts.

Size 1.31" x .75" x 2.5"
high.

The new designs provide up to 40% reduction in weight, and 30% reduction in required space, when compared to other foil tantalum units. They also cost less per volt-microfarad.

* Registered Trade-mark of General Electric Co.

YOUR SAME-DAY, FACTORY-PRICE SOURCE

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Schweber ELECTRONICS

60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520. TWX G-CY-NY-5800

For details, circle #333 on Reader Service Card

assignment:

TOTAL RELIABILITY

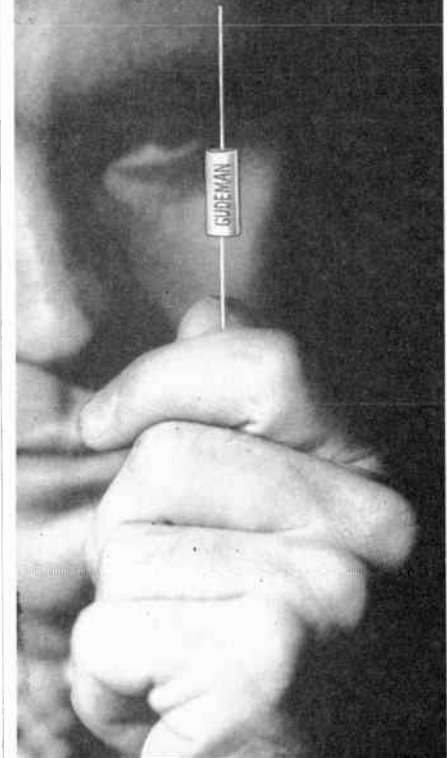
A concept to spark the imagination . . . total reliability. Unreachable, perhaps—but not unapproachable!

And all progress* on high reliability capacitors means ever higher confidence levels, unprecedented reliability.

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THE GUDEMAN COMPANY
340 W. HURON ST., CHICAGO 10
MFG. BRANCHES: Chelsea, Mich.; Terryville, Conn.;
Sunnyvale & Monrovia, Calif.

For details, circle #334 on Reader Service Card

1960 IRE Directory

Directory II. Components

41. Capacitors: Fixed.

General Radio Co., West Concord, Mass., 10, 50, 65, 75, 90
See ad on Cover 4
Tel: EMerson 9-4400

Geotronic Labs., Inc., Tex., 45, 55, 65
Girard-Hopkins, Calif., 55, 60, 70
Good-All Electric Mfg. Co., Neb., 5, 15, 40, 60, 65, 80

Gudeman Co., 340 W. Huron St., Chicago 10, Ill., 15, 17, 20, 40, 45, 55, 60, 65, 70, 80
See ad on page 402
Tel: DE 7-7400

Gulton Industries, Inc., N.J., 5
Hallett Mfg. Co., Calif., 20
Hilger & Watts, Ltd., N.Y., 5, 20, 50, 90
Hughes Aircraft Co., Hughes Prod. Div., Calif., 75, 80, 98

Hydrawerk Aktiengesellschaft, Germany, 15, 17, 20, 35, 40, 45, 55, 60, 65, 70, 80, 85, 95

Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill., 5, 15, 17
See ad on page 228
Tel: EVerglade 4-1300

Industrial Condenser Corp., Ill., 15, 40, 45, 55, 60, 65, 70, 80

Industron Corp., Mass., 40

Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 17, 25, 40, 65, 70
See ads on pages 358, 428, 492
Tel: LUdlow 4-6200

International Electronic Industries, Inc., Tenn., 15, 80, 95

International Telephone & Telegraph Corp., ITT Components Div., 100 Kingsland Rd., P.O. Box 412, Clifton, N.J., 15, 80, 95
See ad on pages 148-149
Tel: NUtley 2-3600

Interstate Electronics, Inc., 227 Fulton St., New York 7, N.Y., distributor
See ad on this page
Tel: BEekman 3-8780

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 40, 98
See ad on page 408
Tel: CYpress 2-4025

K-C-K Corp., Texas Capacitor Co. Div., Tex., 65, 80

Kellogg Switchboard & Supply Co., Ill., 45, 55

Laboratory Equipment Corp., Mich., 40

Lapp Insulator Co., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 30, 40
See ad on pages 112-113
Tel: LE Roy 385

Leclanche, S. A., Switzerland, 5, 10, 15, 25, 40, 45, 55, 60, 65, 70, 95

Leeds & Northrup Co., Pa., 75, 90

Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 98
See ads on pages 270, 301
Tel: TEXas 0-7711

Luther Electronic Mfg. Co., Calif., 85

M.E.C., Inc., Tenn., 15
Maida Development Co., Va., 5, 20, 40, 80

Mallory & Co., Inc., P. R., Ind., 5, 15, 17, 20, 55, 60, 65, 80, 95

Metavac, Inc., N.Y., 50, 90

Mica Condensers Corp., N.Y., 50

Micamold Electronics Mfg. Corp., N.J., 15, 17, 20, 40, 45, 50, 55, 60, 65, 70, 80, 85, 90, 95

Minitronics Corp., N.Y., 15, 80, 95

Mucon Corp., 9 St. Francis St., Newark 5, N.J., 5
See ad on page 405
Tel: MITchell 2-1476

Muirhead & Co., Ltd., England, 10, 50, 60

Muirhead Instruments, Inc., N.Y., 10, 50, 60

Murata Mfg. Co., Ltd., Japan, 5, 20, 40, 80

Muter Co., Ill., 5, 20
Naz-Dar Co., Ill., 80

New England Scientific Instruments Co., 238 Main St., Cambridge 42, Mass., 30
See ad on page 331
Tel: KIRkland 7-1997

New York Coil Co., Inc., Pa., 45, 60, 65

Northern Plastics Corp., Wis., 80

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 15, 95
See ad on pages 106-107
Tel: ORchard 5-2600

Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 5, 80
See ad on page 507
Tel: HO 8-1681

Penn Resistor Corp., Pa., Noise Reduction

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 50
See ad on page 687
Tel: EVerglade 4-2122

Pimex, Inc., N.Y., 65

Planet Mfg. Corp., 225 Belleville Ave., Bloomfield, N.J., 15, 80
See ad on page 402
Tel: PILgrim 3-2874

Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 17, 40, 45, 55, 60, 65, 70, 80, 85
See ad on page 405
Tel: DIversey 8-3735

Potter Co., Ill., 20, 25, 35, 40, 45, Metallized Mylar, Metallized Teflon, 55, 60, 65, 70, 80

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A NEW CONCEPT OF SUPPLY FOR THE ELECTRONICS INDUSTRY!

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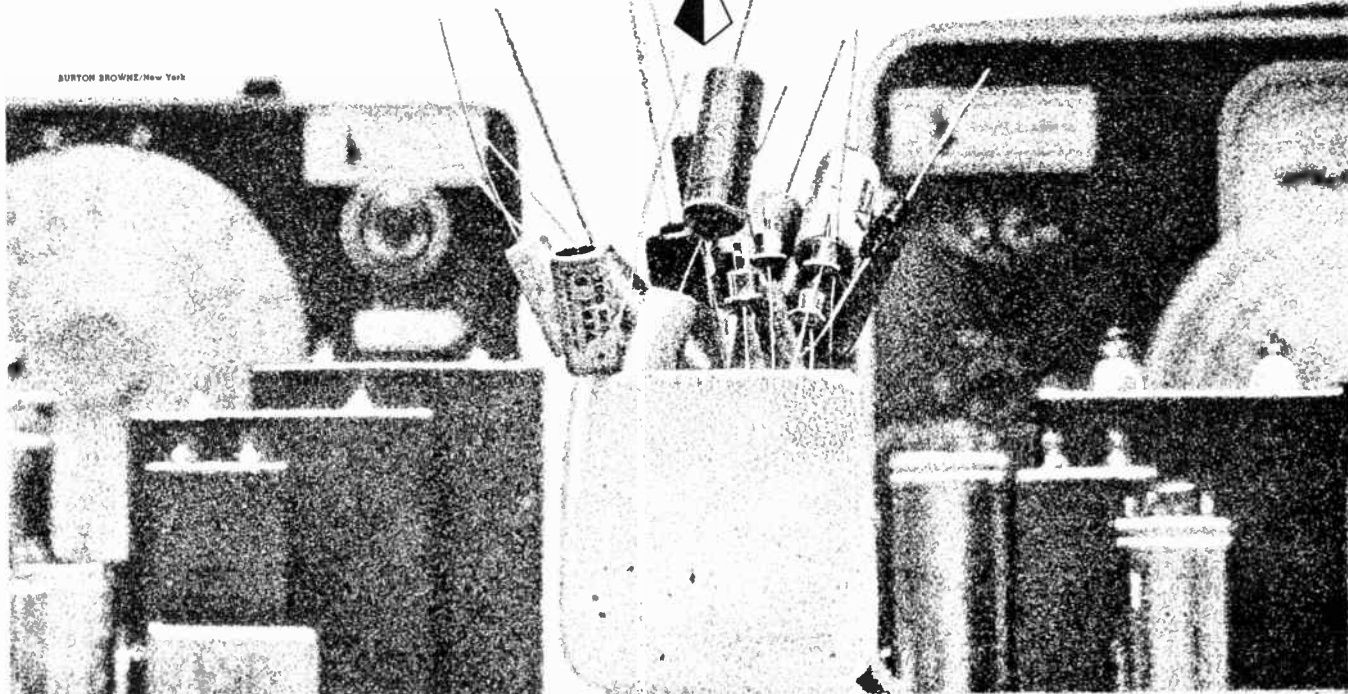
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SPECIFY PYRAMID

for every application of modern electronic circuitry! New and available from Pyramid: Capacitors—New type TAK Tantalum, New Mylar® dielectric types 101, 103, 106, 107, 109, 111 featuring the “Gold Standard,” a line of $\pm 10\%$ tolerance capacitors made specifically for the replacement market. New high reliability types TQ and CQM for telephone and computer applications. New silicon rectifiers exclusively for radio and TV replacement market, sold only thru Radio-Electronics Parts Distributors. Model RC-1, New Resistance-Capacity-Ratio Bridge Tester, with special 3 volt amplifier for checking electrolytics used in miniaturized equipment. Pyramid continues to supply a line of dry electrolytics and paper dielectric capacitors in standard and miniature types for today's most critical requirements. All are made to exact standards which meet or exceed rigid requirements of military specifications MIL-C-25, MIL-C-62 and MIL-C-3965. For information or engineering data pertaining to your specific applications, write to: Research and Development Division, Pyramid Electric Company, Darlington, S. C. or Sales Office: Union City, N. J. EXPORT: 458 Broadway, N.Y. 13, N.Y. CANADA: Wm. Cohen, Ltd., 7000 Park Ave., Montreal. Capacitors—Rectifiers—for original equipment . . . for military applications . . . for replacement.



BURTON BROWNE/New York



5-WAY RELIABILITY

IN YOUR CIRCUIT DESIGN

WITH
Vitramon[®]
CAPACITORS

The latest additions to the growing line of "Vitramon" Capacitors feature smaller mounting area, lower inductance, and more versatility of application — plus all the phenomenal electrical characteristics for which "Vitramon" Capacitors are noted — fine silver electrodes fused to pure porcelain enamel, perfectly bonded to provide stability, wide temperature range, humidity immunity, low loss, low noise.

RADIAL SERIES

- Thin design — 5/64" to 7/64"
- Versatile mounting — can be used axially, radially, or on edge
- Ideal for minute circuit assemblies
- 0.5 to 1200 mmf; 500 to 50 vdc



PARALLEL SERIES

- Tiny mounting area — 11/64" x 9/32"
- Designed for automatic insertion
- Packed for cartridge feeding
- Capacitance through 1000 mmf. at 100 vdc



CO-AXIAL SERIES

- Compatible with MIL-C-10950B
- Very low inductance
- Flexible leads
- Maximum height from mounting surface 1/4"
- To 1000 mmf at 300 vdc



AXIAL SERIES

- Extremely rugged
- 4 case sizes from 3/8" to 29/32"
- 0.5 to 6800 mmf; 500 to 300 vdc



AXIAL-RADIAL SERIES

- Mounted axially or radially
- 4 case sizes from 3/8" to 27/32"
- 0.5 to 5600 mmf; 500 to 300 vdc



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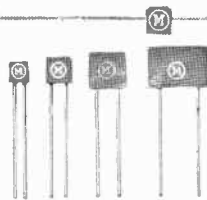
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1960 IRE Directory

MUCON

SUBminiature CERAMIC CAPACITORS

micro-size



"thinline"



ribbon leads

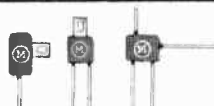
OVERALL VERSATILITY

The unlimited variety of MICRO-SMALL shapes and lead arrangements available in custom-made MUCON SUBminiature Ceramic Capacitors immediately result in space-saving assemblies. Almost any capacitance value, obtainable in any one of 12 different ceramic dielectric materials gives you the specific capacitor needed for your ideal REDUCED package.

shapes



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MUCON's custom facilities are geared to a policy of IMMEDIATE SERVICE no matter the quantity.
Mitchell 2-1476-7-8

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CORPORATION
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For details, circle #338 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory II. Components

41. Capacitors: Fixed.

Pyramid Electric Co., 507 26th St., Union City, N.J., 15, 40, 45, 60, 65, 80, 95

See ad on page 404

Tel: UNION 5-1776

Quality Components, Inc., Pa., 25
Radiation Research Corp., N.Y., 17, 40, 65

Radio Components, Ltd., Canada, 5, 20
Radio Industries, Inc., Ill., 5, 20, 25, 40, 80

Radio Materials Co., Ill., 5
Resitron Labs., Inc., Calif., 5, 20, 30, 40, 98

Rogers Electronic Tubes—Components, Canada, 5, 15, 25, 45, 55, 60, 65

Rohde & Schwarz Sales Co., Inc., N.J., 10, Frequency Synthesizers, Standard Attenuators

San Fernando Electric Mfg. Co., Calif., 20, 45, 60

Sangamo Electric Co., Ill., 15, 17, 20, 25, 40, 45, 50, 55, 60, 65, 70, 90, 95

Saxonburg Ceramics, Inc., Pa., 5
Schweber Electronics, 60 Herricks Rd., Mineola, L.I., N.Y., distributor

See ad on page 402

Tel: Pioneer 6-6520



Your finest

Source for . . .

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In Polystyrene, Mylar,* Teflon, and other plastic and Paper dielectrics . . .
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60 and 400 CPS and other frequency inputs, 0-75 KV.
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*Du Pont trademark for Polyester film

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Phone: Diversey 8-3735

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VARIABLE TRIMMER PISTON CAPACITORS

for subminiaturization of printed and conventional circuitry



Are obsolescent oversized capacitors cramping your style? Let JFD Precision Trimmers help you save time and space... upgrade performance reliability in critical network design.

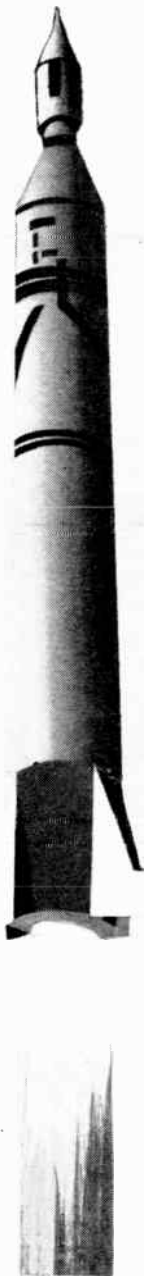
Miniature and subminiature JFD Piston Capacitors give you maximum tuning range in absolute minimum physical size... precise tuning resolution and stability... ultra low loss operation... rugged shock, vibration and corrosion resistance... approximately zero temperature coefficient. These are some of the reasons

why they are specified in almost all of today's critical systems.

If you're looking for new design freedom, new performance highs under severe environmental conditions, why not investigate the many advantages of JFD Trimmers? If your requirements can't be met from our current models, we'll be glad to produce according to your specifications. Write for the new JFD Piston Capacitor File Folder for detailed electrical and mechanical data.



PRECISION ELECTRONIC COMPONENTS for Space-Challenging Demands!



SEALCAPS

New JFD air-tight, water-tight Miniature Quartz Sealcaps seal out moisture, seal in reliability and accuracy, regardless of atmosphere. Combine characteristics of new Sealcap construction and miniature quartz capacitor design. Eliminates corona and voltage breakdown at high altitude. Sealcap design prevents formation of moisture inside unit. Quartz design provides high Q, ultra-low loss high frequency operation, greater stability and approximately zero temperature coefficient. Available unpotted or encapsulated for higher dielectric strength. For complete data write for Bulletin No. 215A. Also available in glass dielectric (bulletin 207B)



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Combine variable inductor and capacitor in one compact unit. Affords more circuit in less space, better reliability, greater economy, faster assembly, smaller size and weight. Use of glass or quartz dielectric assures a low temperature coefficient. Flexibility in design to suit circuit requirements. The number of turns, types of windings, size and type of capacitor plates, Q and other parameters can be designed to suit individual circuit requirements.

Write for Bulletin No. 216 listing standard and panel circuit mounting types now available.



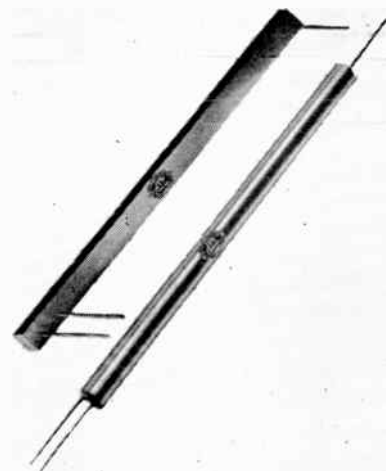
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Designed for applications calling for short delay intervals, the new lines offer a high ratio of delay to pulse rise time, in minimum space. Available for printed circuit assembly or for conventional mounting, JFD distributed-constant Delay Lines meet all military requirements. They can also be modified or custom-designed to meet your most rigid specifications. JFD lumped constant Delay Lines can also be designed to suit your requirements.

Characteristics: Precise pulse fidelity; operating temperature range of -55°C to $+125^{\circ}\text{C}$; excellent temperature stability; rugged encapsulated construction resists environmental moisture, humidity, shock and vibration; linear phase shift; 0.1 inch grid spacing for printed board types; attenuation of approximately 1 db per μsec .

Write for Bulletin 213A providing complete electrical and mechanical data. Also—lumped constant Delay Lines to your specifications.

These are a few examples of JFD creative engineering to solve today's problems and tomorrow's applications. For information or engineering assistance on specific tuning or pulse circuitry needs, call or write today.



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Pioneers in Electronics since 1929

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(PATENTS PENDING)

Directory II. Components

41. Capacitors: Fixed.

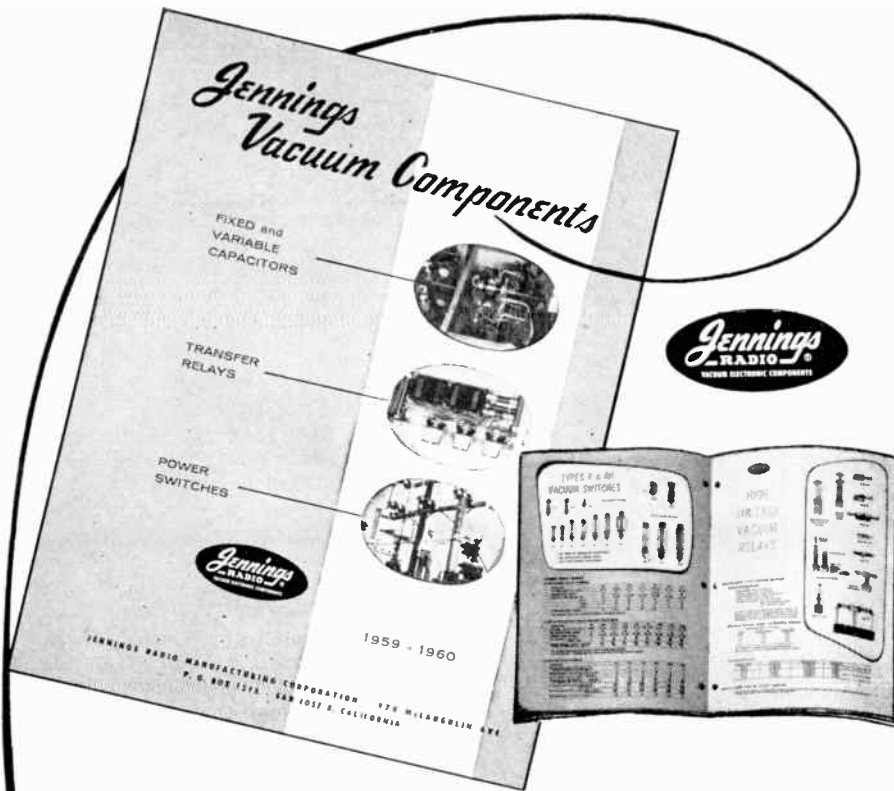
- Shamban & Co., W. S., Calif., 65, 80
Siemens & Halske, A. G., Germany, 45, 50
Skottie Electronics, Inc., 5, 20, 40, 80
Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 10, 17, 20, 40, 55, 65, 80
See ad on page 94
Tel: VICTORIA 9-3193
Speer Carbon Co., Jeffers Electronics Div., Pa., 25
Sprague Electric Co., Mass., 5, 15, 17, 20, 40, 45, 50, 55, 60, 65, 70, 80, 85, 90, 95
Stackpole Carbon Co., Pa., 25
Standard Condenser Co., Ill., 5, 17, 55, 60, 65, 70, 80
Standard Telephones & Cables, Ltd., England, 15, 45, 55, 60, 65, 70
Sullivan, Ltd., H. W., N.Y., 10, 75
Symphony Electronics Corp., Calif., 5, 50
Tansitor Electronics, Inc., Vt., 95
Technical Apparatus Builders, 109 GB Liberty St., New York 6, N.Y., 15, 17
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Telegraph Condenser Co., England, 5, 15, 17, 20, 40, 50, 55, 60, 65, 70, 80, 90, 95
Texas Instruments Incorporated, Semiconductor—Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 15, 80, 95
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Topic, Inc., Mass., 15, 17, 20, 45, 80
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Tel: BEEKMAN 3-8870
U. S. Semiconductor Products, Inc., 3540 W. Osborn Rd., Phoenix, Ariz., 95
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Tel: AMHERST 8-1656
Westinghouse Electric Corp., Pa., 70

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42. Capacitors: Variable.

5. Neutralizing
10. Precision variable
15. Temperature compensating
20. Trimmers, air
25. Trimmers, ceramic
30. Trimmers, glass
35. Trimmers, vacuum
40. Tuning
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Garlock Packing Co., Garlock Electronic Products, Camden 1, N.J., Trimmers, Teflon
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Tel: EMERSON 9-4400
Gombos Co., Inc., John, N. J., 10
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Oak Mfg. Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 10, 40
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Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 10
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Tel: DIVERSEY 8-3735
Q-Line Mfg. Corp., N.Y., 10, 30
Rogers Electronic Tubes—Components, Canada, 20, 25



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- Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 10
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- Sullivan, Ltd., H. W., N.Y., 10
 Symphony Electronics Corp., Calif., 20, 25
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 Tel: ARMory 1-0163
- Telegraph Condenser Co., England, 25
- Teleradio Engineering Corp., N.Y., 5, 10, 20
- Thompson-Ramo-Wooldridge, Inc., Calif., 10, Voltage
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Coaxial cables: See class 82

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Coil forms, ceramic: See class 83

Coil forms, paper & plastic:
 See class 87

Coil winding machines:
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43. Coils.

- | | |
|---------------------------|------------------|
| 5. Audio frequency chokes | 28. Magnet |
| 10. Deflection yokes | 30. Power chokes |
| 15. Filter | 35. RF chokes |
| 20. Flyback | 36. Relay |
| 25. Focusing coils | 38. Solenoid |
| 26. IF chokes | 40. Toroids |
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- ACDC Electronics, Inc., Calif., 5, 15, 26, 30, 35, 40, 45
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- Ace Coil & Electronics Co., N.J., 26, 28, 35, 36, 40

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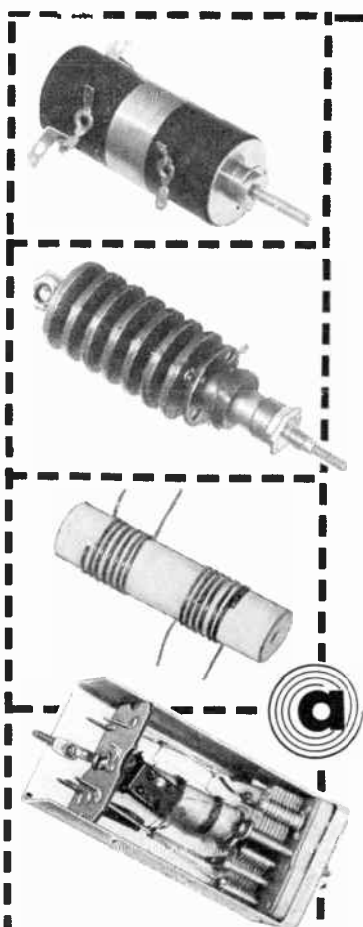
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Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 35, 36, 38, 45
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Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5, 26, 30, 35, 45
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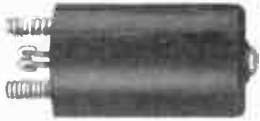
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| VHI-6 | 5.5 | 7.5 | 100 | 1. |
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| EPT-3 | Matching | 3:1 |
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| EPT-5 | and | 4:1 |
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| EPT-7 | Interstage | 7:1:1 |
| EPT-8 | Coupling | 5:1 |
| EPT-9 | | 3:1 |
| EPT-11 | | 1:1 |
| EPT-12 | Blocking | 1:1 |
| EPT-13 | Oscillator | 2:1 |
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| EPT-15 | Memory core & | 5.5:1PP |
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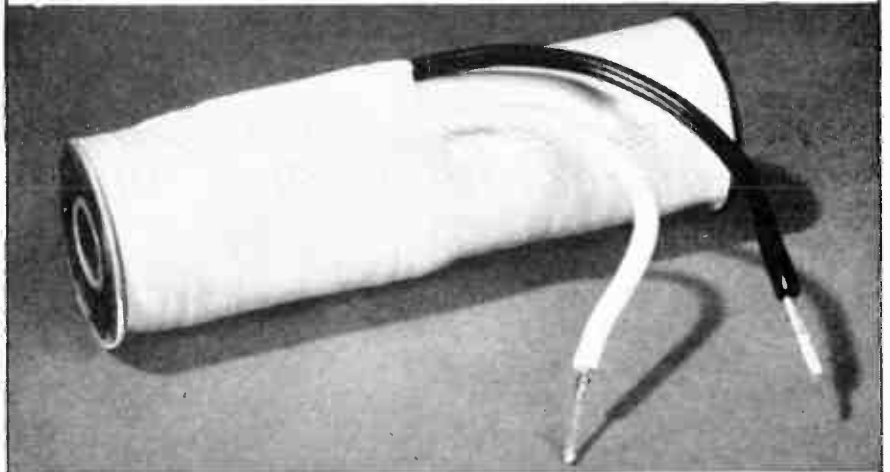
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43. Coils.

Del Electronics Corp., Dept. IR, 521 Homestead Ave., Mt. Vernon, N.Y., 28, 30

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Tel: OWens 9-2000

Delevan Electronics Corp., N.Y., 35, 38, 45

Delta Radio Co., N.Y., 26, 35, 45

Deluxe Coils, Inc., First & Webster Sts., P.O. Box 318, Wabash, Ind., 28, 36, 38

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Tel: WAbash 1720

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DuMont Labs., Allen B., Special Yoke Dept., N.J., 5, 10, 15, 20, 25, 28, 30, 35, 40, 45

EMI—Cossor Electronics Ltd., 301 Windsor St., Woodside, Halifax, N. S., Canada, 10, 25

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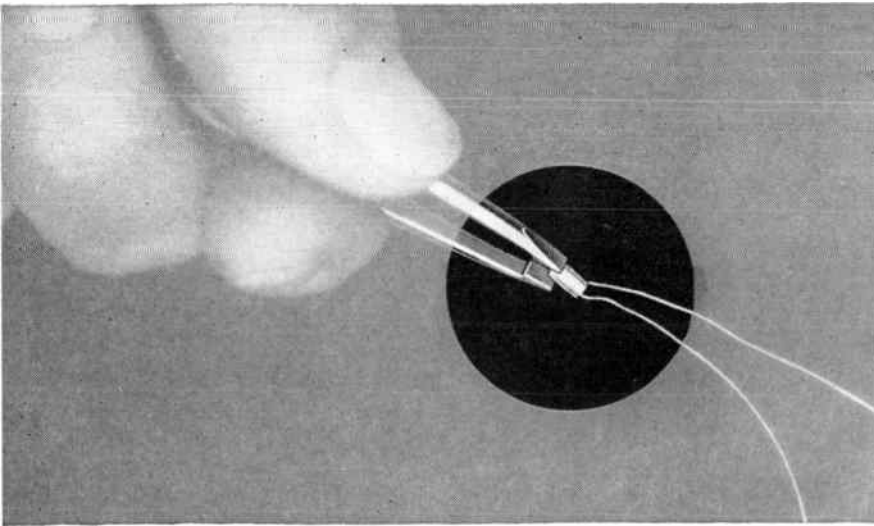
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Ensign Coil Co., Ill., 5, 15, 28, 36



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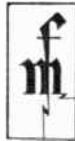
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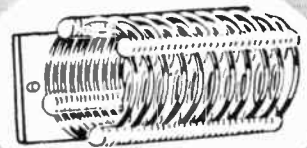
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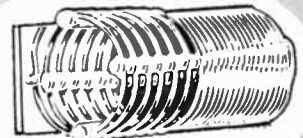
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1960 IRE Directory

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Epco Products, Inc., 2500 Atlantic Ave., Brooklyn 7, N.Y., 5, 15
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Tel: DICKens 5-7531

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Tel: YE 4-2691

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Tel: EVergreen 6-1300

Fugle-Miller Laboratories, Inc., 301 Central Ave., Clark, N.J., 15, 26, 28, 30, 35, 36, 38, 40, 45
See ad on page 412
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IF and RF CHOKES, COILS AND TRANSFORMERS*

Designed and built to your requirements by our Western Coil Products Division. One of our 300 stock designs may meet your requirements.

* All products are designed and built to customer requirements in accordance with applicable military or customer specifications.

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TWX: PALO ALTO, CALIFORNIA 131

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General Automatics, Inc., Calif., 5, 15, 40

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Gorman Machine Co., Dept. D, 480 S. Main St., Randolph, Mass., 40
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Tel: WOODlawn 3-4440

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Tel: STAgg 2-3875

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Hoover Electric Co., Calif., 38

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Illumitronic Engineering, 680 E. Taylor Ave., Sunnyvale, Calif., 35, Balun Coils
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Tel: REgent 9-2395

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Industrial Winding Machinery Corp., P.O. Box 62, New York 5, N.Y., 28, 36, 38, 40
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Tel: WHitehall 3-1754

James Vibrapowr Co., 4050 N. Rockwell St., Chicago 18, Ill., 5, 36, 38
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Tel: CORnelia 7-6333

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Kellogg Switchboard & Supply Co., Ill., 5, 36, 38, 40

Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 5, 15, 28, 30, 36, 38, 40
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Tel: STAtE 2-6662

Laboratory Equipment Corp., Mich., 40

Lesca, S.P.A., Italy, 15

Life Instrument Co., Inc., Mass., 28, 36, 38

Litton Industries, Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10, 15, 20, 30, 35, 40
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Tel: CRestview 4-7411

Magnético, Inc., N.Y., 5, 40

Magnetics Research Co., Inc., 255 Grove St., White Plains, N.Y., 40
See ad on page 287
Tel: WHite Plains 9-9588

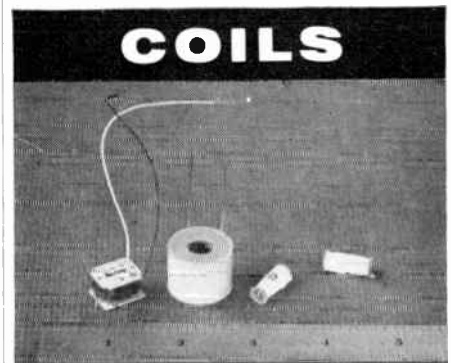
Marine View Electronics, Inc., N.Y., 5, 15, 26, 35, 38, 40

Maxson Corp., Langevin Div., N.Y., 5, 40

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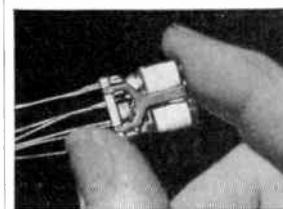
McKay Electric Co., Mich., 38, 40

Merit Coil & Transformer Corp., Fla., 10, 25, 26, 35



Designed and Produced by Forbes and Wagner
The F & W specially designed coils shown above have solved specific problems. We will be glad to put our coil experience to work for you.

Typical F & W Coils: Relay
IF RF Saturable Reactor
Antenna Choke Solenoid
Color Purity Toroidal Magnet
Inductor TV—All Types Variable



The F & W sub-miniature coils in this sub-miniature relay were designed and built in cooperation with a large electrical manufacturer.

Write for illustrated brochure.



forbes and wagner, inc.

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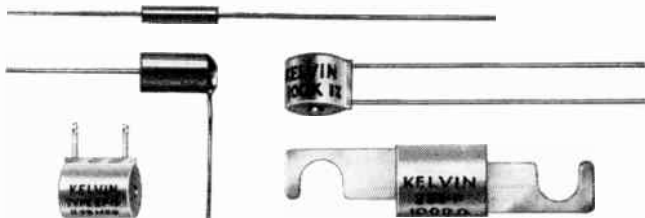
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KELVIN

Precision Electrical Components

RESISTORS



WIRE WOUND precision, encapsulated

Newly developed Kelvin winding techniques produce tension-free ("RELAXED") resistor windings, practically eliminating resistance drift with age and "shorts" or "opens" due to thermal shock.

Specifications: Shock, moisture and temperature proof; exceeds military specifications.

Size Range: from micro-miniature, .080 dia. x .375 length to 1.0 dia. x 2.125 length.

Wattage, Resistance and Voltage Range: from .05 watt, 100K max. resistance, 100 volts max., to 2.5 watts, 25.0 Meg. max. resistance, 1200 volts max.

Temperature Range: -65°C to +125°C.

Standard resistance tolerances are 1%, 0.5%, 0.25% and 0.1%. Special tolerances upon request.

Temperature coefficient: ±.002% per degree C within operating temperature ranges.

Microscopic techniques are used for precision welding of all terminations.

WIRE WOUND power, precision

Available from 20 watts, 5/8" dia. x 2" length to 200 watts, 1 1/4" dia. x 10 1/2" length.

Specifications:

Maximum Resistance Ranges: up to 15K

Tolerances: up to .01%

Temperature Coefficient: ±.002%/°C, closer upon request.

Temperature Range: -55°C to +100°C.

Coating: Silicone varnish

TOROIDS



INDUCTORS

Uncased: impregnated with a special plastic compound for high Q factors and maximum temperature stability. Coils are coated with an inert wax having a melting point of approximately 125°C. to provide moisture resistance and mechanical protection. Insulated flexible lead wires with Hi-temp insulation are provided.

Cased: hermetically sealed in conformance with MIL-T-27A specifications. A variety of standard sizes and shapes are available. Special case configurations available to customer's specifications.

Encapsulated: easily mounted or stacked on a single screw through the center holes. The sturdy turret lugs may be used as tie points to mount other components. Will withstand temperatures of -55°C to +125°C under conditions of high humidity and severe mechanical shock.

Specifications: Kelvin now offers higher Q factors and inductances at lower frequencies in miniature coils than heretofore available due to the application of advanced winding techniques. Excellent stability vs. temperature and current, and self-shielding effects are also main features of Kelvin toroids wound on molybdenum permalloy dust cores.

Size Range: Encapsulated; 3/4" O.D. x 3/8" height, to 2 3/8" O.D. x 1 1/8" height. Uncased; 5/8" O.D. x 9/32" height, to 2 1/4" O.D. x 1" height.

Inductance Range: from .00002 HY. to 200 HY.

Temperature Coefficient: 100 PPM/degree F.

Tolerance: within 1% of nominal inductance values. Stabilized coils available upon request. These units will remain within 0.1% tolerance from +30°F to +130°F.

TRANSFORMERS power, miniature

400 cycle, in the power range under 15 V. A.

Specifications:

Frequency Range: 375 cps to 525 cps.

Ambient Temperature (for full rating): -55°C to +90°C.

Encapsulation: Epoxy; moisture, temperature, shock-proof.

Windings: Toroidal, no external fields.

Specials up to 100 V. A., 400 cycle.

RATIO precision

For precise voltage division or multiplication over wide range of load fluctuations, frequency and ambient temperature... with low insertion loss.

Specifications:

Ratio: Two secondary windings, choice of any ratio from 1:1 to 1000:1 on both windings; choice of 115, 28, 12 or 6.3 volt primary windings.

Tolerance: 0.1% standard; accuracies to .005% available.

Case: Hermetically sealed.

MAGNETIC AMPLIFIERS

Toroidal construction, maintenance free, rugged and highly reliable. Designed to fulfill the most exacting requirements. When inquiring, specify power supply frequency, voltage, output, input and output impedance, signal power for full output, response time, temperature requirements, maximum case size and weight.

POWER TRANSFORMERS AND FILTER CHOKES

Available in all standard case sizes and hermetically sealed in conformance with MIL-T-27A.

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Cases hermetically sealed to MIL-T-27A. Low-pass, band-pass, high-pass and band suppression types available in the audio and low RF ranges.

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Available in standard RDB frequencies.

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Directory II. Components

43. Coils.

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 26, 35
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N Y T Electronics, Inc., Calif., 5, 15, 26, 30, 35, 40, 45

National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 5, 15, 26, 35, 40

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North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 26, 35, 40, 45

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Tel: PIONEER 7-0555

Nothelfer Winding Labs., Inc., P.O. Box IRE, Ewingville Rd., Trenton, N.J., 5

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Tel: EX 2-7117

Ogden Coil & Transformer Co., Ill., 5, 15, 28, 30, 38

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Tel: ORchard 5-2600

Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 15, 28, 30, 38

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Tel: WOrth 6-0380

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Tel: MUIbury 4-5858

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Qutronic Transformer Corp., N.Y., 40

R-S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 26, 35

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Tel: DAvenport 1-1130

Radio Components Ltd., Canada, 10, 20, 26, 35, 38, 45

OVER 100,000,000

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CONCORD, NEW HAMPSHIRE

custom coil winding



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COILS

WOUND TO YOUR SPECIFICATIONS



Whether for quality commercial or military—when you want the finest in precision and the most dependable in delivery—specify coils by North Hills Electric...specialists in custom production of universal, solenoid and bobbin coils.

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Where specifications are not supplied, take advantage of North Hills' efficient and courteous design service.

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Standard coils and coil forms available from stock.

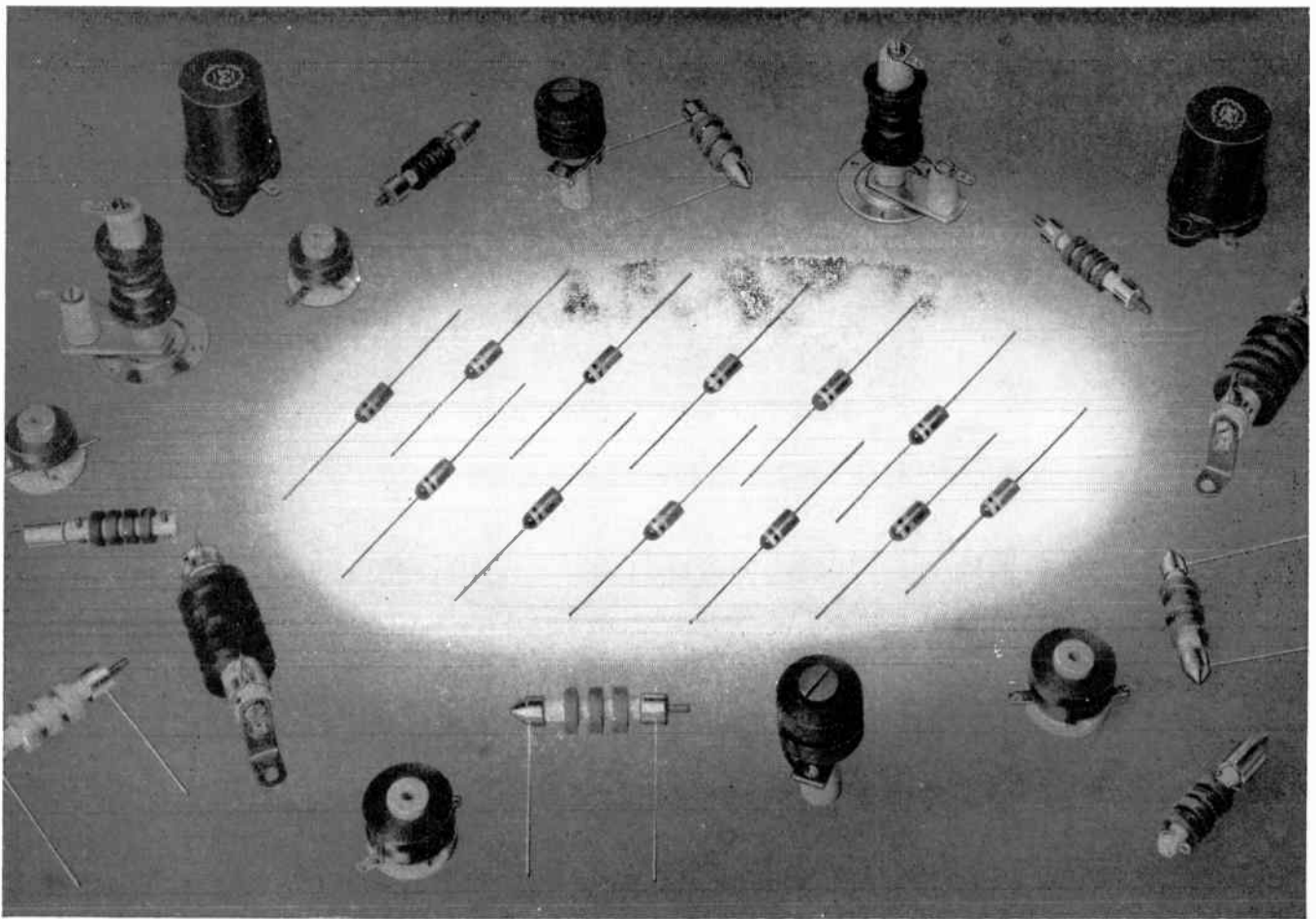
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Encapsulated Inductances

Millen DESIGNED for APPLICATION encapsulated coils provide another advance in the r-f inductor field. Modern application requires miniature, heat and cold resistant, hermetically sealed, and abrasion resistant r-f inductor assemblies. The James Millen Manufacturing Company has pioneered many advances in the r-f inductor field, including the now standard 4 pi r-f choke, the axial lead r-f choke, and the miniature r-f choke. Developments have now made possible another advance, the No. 34301 and No. J301 encapsulated inductors—hermetically sealed—miniature size. Ambient temperature minus 55 degrees to plus 100 degrees C.

NO. J301 MINIATURE ENCAPSULATED INDUCTANCES

DESIGNED for APPLICATION miniature inductances are: extremely small (see table at right)—hermetically sealed—wound on axial lead Carbonyl cores—color coded. Coils are available in RETMA standard values plus 25, 50, 150, 250, 350, 500, and 2500 microhenries. Coils are three layer solenoids up to 350 microhenries. From 360 to 2500 microhenries coils are pi-wound. Current rating 50 to 600 milliamperes depending on coil size. Inductance \pm 5%. Special coils on order.

NO. 34301 STANDARD ENCAPSULATED INDUCTANCES

Encapsulated DESIGNED for APPLICATION axial lead phenolic form r-f inductances. Hermetically sealed—heat resistant—abrasion proof—color coded. 1 to 350 microhenries available in RETMA standard values plus 25, 50, 150, 250, and 350 microhenries. Inductance \pm 5%. Values available in same progression as J301 coils listed in the table at the right. Solenoid winding for 1 to 15 microhenries. Universal pi winding from 20 microhenries to 350 microhenries. Current rating 250 to 1500 milliamperes, depending on coil size. Ambient temperature range—minus 55 degrees to plus 100 degrees Centigrade. Size: $\frac{3}{8}$ inches diameter \times $\frac{1}{2}$ inches long. Special coils on order.

| COIL NUMBER | INDUCTANCE MICROHENRIES | DIAMETER INCHES | LENGTH INCHES |
|-------------|-------------------------|-----------------|-----------------|
| J301-25 | 25 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-33 | 33 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-47 | 47 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-50 | 50 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-82 | 82 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-100 | 100 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-120 | 120 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-150 | 150 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-200 | 200 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-220 | 220 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-250 | 250 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-300 | 300 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-330 | 330 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-350 | 350 | $\frac{3}{16}$ | $\frac{9}{16}$ |
| J301-360 | 360 | $\frac{7}{32}$ | $\frac{5}{8}$ |
| J301-390 | 390 | $\frac{7}{32}$ | $\frac{5}{8}$ |
| J301-430 | 430 | $\frac{7}{32}$ | $\frac{5}{8}$ |
| J301-470 | 470 | $\frac{1}{4}$ | $\frac{11}{16}$ |
| J301-500 | 500 | $\frac{1}{4}$ | $\frac{11}{16}$ |
| J301-510 | 510 | $\frac{1}{4}$ | $\frac{11}{16}$ |
| J301-560 | 560 | $\frac{1}{4}$ | $\frac{11}{16}$ |
| J301-620 | 620 | $\frac{1}{4}$ | $\frac{11}{16}$ |
| J301-680 | 680 | $\frac{9}{32}$ | $\frac{3}{4}$ |
| J301-750 | 750 | $\frac{9}{32}$ | $\frac{3}{4}$ |
| J301-820 | 820 | $\frac{9}{32}$ | $\frac{3}{4}$ |
| J301-910 | 910 | $\frac{9}{32}$ | $\frac{3}{4}$ |
| J301-1000 | 1000 | $\frac{9}{32}$ | $\frac{3}{4}$ |
| J301-1200 | 1200 | $\frac{3}{8}$ | $\frac{13}{16}$ |
| J301-1300 | 1300 | $\frac{3}{8}$ | $\frac{13}{16}$ |
| J301-1500 | 1500 | $\frac{3}{8}$ | $\frac{13}{16}$ |
| J301-1800 | 1800 | $\frac{3}{8}$ | $\frac{13}{16}$ |
| J301-2000 | 2000 | $\frac{3}{8}$ | $\frac{7}{8}$ |
| J301-2200 | 2200 | $\frac{3}{8}$ | $\frac{7}{8}$ |
| J301-2400 | 2400 | $\frac{3}{8}$ | $\frac{7}{8}$ |
| J301-2500 | 2500 | $\frac{3}{8}$ | $\frac{7}{8}$ |

JAMES MILLEN  **MFG. CO., INC.**
 MAIN OFFICE AND FACTORY
 MALDEN, MASSACHUSETTS, U. S. A.

Directory II. Components

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 Railway Communications, Inc., Mo., 40
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 Tel: ESplanade 6-0615
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 Tel: MIDway 6-7211
 Television Laboratories, Inc., Ill., 10, 25, 38, 40
 Tensor Electric Dev. Co., Inc., N.Y., 5, 10, 15, 20, 26, 28, 35, 45

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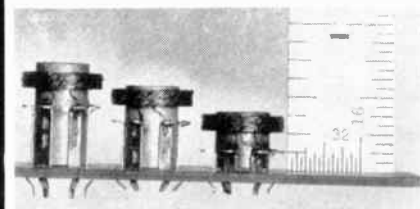
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100 Industrial Road, Addison, Ill., Phone Kingswood 3-6444

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Standard Terminal Length Coil 13/32" above chassis.

Current Terminal Length Coil 5/16" above chassis.

NEW MIDGET TERMINAL LENGTH COIL 1/8" above chassis.

1/8 Inch High—On Stanwyck Printed Circuit Coils!

- These shorter terminals—available only on STANWYCK COILS—save needed space and "Q"!
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E. STANWYCK COIL COMPANY

75 Carson Ave., Newburgh, N.Y.—John 1-3030

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Transistorized Converter Transformer



Open Construction Filter Choke



Epoxy, Encapsulated Toroidal Inductor

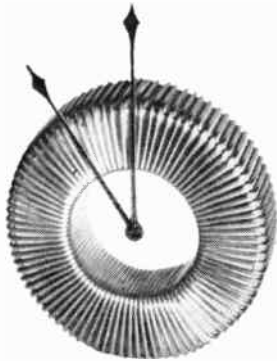


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Variable Inductor



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Wire Size—AWG

| | |
|------|----|
| MAX. | 5 |
| MIN. | 44 |

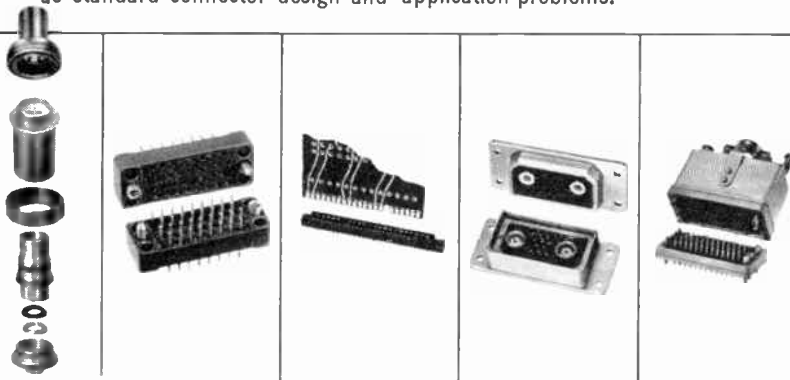
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ERCONA

(electronics div.) dept. L-1

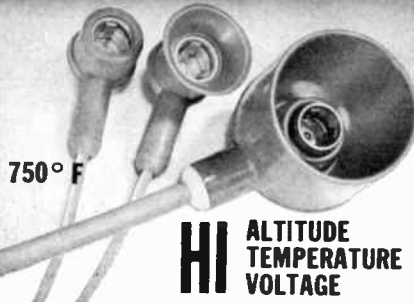
16 West 46th St., New York 36 | World's Finest

For details, circle #361 on Reader Service Card

1960 IRE Directory

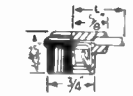
Directory II. Components

SILICONE INSULATED TUBE CAP CONNECTORS

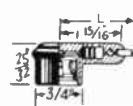


This is a new series of Tube Cap Connectors using special silicone components for high reliability applications. They provide the highest degree of resistance to temperature extremes and are virtually unaffected by ozone and corona. The excellent dielectric characteristics make them ideal for high voltage. Skirts and sealed-in leads guard against flashover at high altitudes. Additional features include anti-corona cup and long-life spring contacts.

Clip this out — keep handy for part numbers and specs on connectors below for either 1/4" or 3/8" top caps. Prefix 90 for 1/4"; 91 for 3/8". Lead wire 18" long from center of cap or length to your specs.



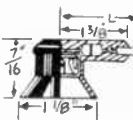
#90 or 91SCCSL beryllium copper contact, cadmium plated nests in anti-corona cup. Silicone rubber insulation throughout.



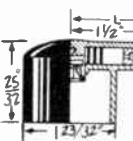
#90 or 91SCCRSL beryllium copper contact, cadmium plated nests in anti-corona cup. Silicone rubber insulation throughout. Takes up to one watt resistor — specify value and tolerance.



#90 or 91SCCDSL beryllium copper contact, cadmium plated nests in anti-corona cup. Skirt clings to tube — guards against flash-over. Silicone rubber insulation throughout.



#90 or 91SCCDL beryllium copper contact, cadmium plated enclosed in anti-corona cup. Skirt clings to tube — helps suppress corona — guards against arc-over. Takes up to one watt resistor. Specify value and tolerance.



#90 or 91CCSTLRL beryllium copper contact, cadmium plated nests in anti-corona cup. Glass-filled silicone insulation on cap; silicone rubber on lead. Long skirt for arc-over. Takes up to 2 watt resistor. Specify value and tolerance.

Besides new silicone types — Alden provides a complete series of connectors for 1/4", 3/8" and 1/2" cap in your choice of phenolic, mica, polyethylene, nylon and Kel-F. Complete hi-voltage cable assemblies are available using Alden hi-voltage disconnects and tube cap connectors.

TELL US ABOUT YOUR CONNECTING PROBLEM. FOR PROMPT RECOMMENDATIONS — WRITE OR PHONE JACK POLLARO NOW.

ALDEN PRODUCTS CO.

121D NORTH MAIN STREET
BROCKTON 64, MASS.

For details, circle #362 on Reader Service Card

43. Coils.

Topper Mfg. Co., Inc., N.Y., 28, 36, 40
Torocoil Co., Ohio, 40
Torotel, Inc., Mo., 5, 15, 40
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5, 15, 30, 40
See ad on pages 116-117
Tel: ELizabeth 4-5650

Transformer Engineers, Calif., 5, 15, 30, 40

Transformer Technicians, Inc., Ill., 5, 15, 30, 40

Transformers, Inc., N.Y., 5, 15, 30, 40

Tronic Coil Winding Co., Inc., Conn., 15, 30, 36, 40

Turbo Jet Products Co., Calif., 28, 36, 38

United States Electronics Corp., N.J., 5, 15, 25, 26, 28, 30, 35, 36, 38

United States Instrument Corp., Va., 36

U.S. Relay Co., Calif., 5, 15, 36, 38, 45

United Transformer Corp., 150 Varick St., New York 13, N.Y., 5, 15, 30, 35, 40
See ad on Cover 2
Tel: ALgonquin 5-3500

Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 5, 15, 26, 35, 40
See ad on page 418
Tel: ESsex 4-9800

Valor Electronics, Inc., Calif., 26, 35, 40

Vanguard Electronics Co., Calif., 15, 26, 35, 45

Vari-L Co., Inc., 432 Fairfield Ave., Stamford, Conn., 40
See ad on page 254
Tel: FIreside 8-0091

Varo Mfg. Co., Inc., Tex., 5, 35, 40

Videocraft Mfg. Co., Ill., 10

Virginia Electronics Co., Inc., D.C., 5, 26, 35

Warren Mfg. Co., Inc., Mass., 40

Warren Transformer Co., Inc., Pa., 28, 30, 35, 38, 40

Warsaw Coil Co., Ind., 5, 10, 15, 20, 26, 35, 36, 38, 45

Waters Mfg., Inc., Mass., 35, 38, 40, 45

Waugh Engrg. Co., Calif., 28

West Coast Electrical Mfg. Corp., Calif., 38

Western Coil Products Co., Calif., 26, 28, 35, 36, 38, 45

Westinghouse Electric Corp., Pa., 40

Wheeler Elect. Corp. Div.-Sperry Corp., Conn., 5, 15, 28, 30, 35, 36, 38, 40

Whitewater Electronics, Inc., Wis., 15, 26, 28, 30, 35, 38, 45

Winatic Corp., N.Y., 28, 36, 38

Wirco Electronics Inc., Calif., 15, 26, 28, 30, 35, 36, 38, 45

Wright-Zimmerman, Inc., Minn., 20, 26, 35, 45

Commutators: See class 44

Computers: See class 9

Condensers: See class 41

44. Connectors.

- | | |
|---------------------------------|----------------------------|
| 5. AN & MIL standard types | 28. Phono |
| 7. Anode | 30. Power |
| 10. Co-axial | 32. Printed circuit |
| 15. Hermetically sealed | 34. RF type |
| 17. Interlock | 35. Slip rings |
| 20. Microphone | 37. Commutating connectors |
| 25. Multiple circuit connectors | 40. Sub-miniature |
| | 45. Waterproof |

A.P.M. Corporation, 252 Hawthorne Ave., Yonkers, N.Y., 5, 30
See ads on pages 462, 634
Tel: YONkers 8-2010

A-I Precision Products, Calif., 32, 35, 40

Accurate Electronics Corp., Ohio 7, 17, 25, 28, 30, 32

Aerolite Electronics Co., N.J., 7, 10, 17, 28

Aerovox Corp., Mass., 25

Airflyte Electronics Co., 540 Ave. A, Bayonne, N.J., 35, 37, 40
See ad on page 550
Tel: HEMlock 6-2230

Alden Products Co., 121D N. Main St., Brockton 64, Mass., 7, 25, 28, 30, 40
See ads on pages 419, 691
Tel: JUNiper 3-0160

Alpine Electronic Comp., Inc., Conn., 32, 40

American Communications Corp., N.Y., 10, 34

American Electronics Co., N.Y., 10, 28, 34

American Radar Components, Inc., N.J., 5

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5, 10, 15, 20, 25, 30, 32, 34, 40, 45
See ad on page 166
Tel: BISHop 2-1000

Amphenol-Borg Electronics Corp., Amphenol Western Div., Calif., 5, 10, 15, 25, 30, 32, 34, 40, 45

Amphenol-Borg Electronics Corp., Industrial Prods.-Danbury Knudsen Div., Conn., 10, 15, 25, 34, 40, 45

Anderson Electric Co., Ala., 15, 45

Andrew Corp., Ill., 10, 34

Anton Electronic Labs., Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 5, 7, 10, 15, 17, 25, 30, 32, 34, 40, 45
See ads on pages 327, 418, 579
Tel: EVergreen 6-5715

Arden Acoustic Labs. Ltd., England, 40

Ark-Les Switch Corp., Mass., 40

Armel Electronics, Inc., N.Y., 5, 25, 30, 32

Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5, 10, 32, 34, 40

See ad on page 421
Tel: EVergreen 8-6057

Automation Electronics, Inc., Calif., 32, 40

Avnet Corp., Calif., 5, 10, 17, 34

Avnet Electronics Corp., N.Y., 5, 10, 17, 25, 30, 31, 40, 45

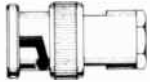


COAXIAL CABLE CONNECTORS

67 NORTH SECOND STREET • BEECH GROVE, INDIANA



BNC SERIES



CABLE PLUG

| DAGE NO. | AN NO. | CABLE RG (1) U |
|----------|-----------|----------------|
| 056-1 | UG-88/U | 55,58 |
| 073-1 | UG-260 U | 59,62,71 |
| 359-1 | UG-88B U | 55,58 |
| 416-1 | UG-260A/U | 59,62,71 |
| 813-1 | UG-88C U | 55,58 |
| 815-1 | UG-260B/U | 59,62,71 |
| 2030-1 | UG-88A U | 55,58 |
| 3421-1 | UG-260C U | 59,62,71 |

CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 124-1 | UG-261/U | 59,62,71 |
| 130-1 | UG-89 U | 55,58 |
| 415-1 | UG-89B/U | 55,58 |
| 417-1 | UG-261A U | 59,62,71 |
| 814-1 | UG-89A U | 55,58 |
| 816-1 | UG-261B/U | 59,62,71 |
| 3420-1 | UG-89C U | 55,58 |
| 3422-1 | UG-261C/U | 59,62,71 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 2225-1 | UG-910 U | 59,62,71 |
| 2230-1 | UG-909 U | 55,58 |
| 2461-1 | UG-624 U | 59,62,71 |
| 3441-1 | UG-909A/U | 55,58 |
| 3442-1 | UG-910A U | 59,62,71 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 121-1 | UG-262 U | 59,62,71 |
| 122-1 | UG-291 U | 55,58 |
| 371-1 | UG-262A U | 59,62,71 |
| 413-1 | UG-291A U | 55,58 |
| 817-1 | UG-291B U | 55,58 |
| 1-110-1 | UG-262B U | 59,62,71 |
| 3423-1 | UG-262C U | 59,62,71 |
| 3425-1 | UG-291C U | 55,58 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 081-1 | UG-625 U |
| 667-1 | UG-625A/U |
| 667-2 | UG-1094 U |
| 1-400-1 | UG-911 U |
| 1-408-1 | UG-625B/U |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 055-1 | UG-290 U |
| 671-1 | UG-290A/U |

ADAPTER STRAIGHT SINGLE HOLE BULKHEAD FEED THRU (JACK-JACK)

| DAGE NO. | AN NO. |
|----------|-----------|
| 547-1 | UG-492 U |
| 1-190-1 | UG-492A U |
| 2201-1 | UG-492B/U |

PLUG RECEPTACLE RIGHT ANGLE SINGLE HOLE MOUNT

| DAGE NO. | AN NO. |
|----------|-----------|
| 618-1 | UG-535A U |
| 818-2 | UG-1098 U |
| 255A-1 | UG-1174 U |

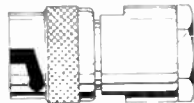
ADAPTER TEE (2 JACK, 1 PLUG ENDS)

| DAGE NO. | AN NO. |
|----------|-----------|
| 134-1 | UG-274 U |
| 1-010-1 | UG-274A U |
| 3424-1 | UG-274B U |

BINDING POST

| DAGE NO. | AN NO. |
|----------|----------|
| 501-1 | UG-924 U |

C SERIES



CABLE PLUG

| DAGE NO. | AN NO. | CABLE RG (1) U |
|----------|-----------|----------------|
| 288-1 | UG-573A U | 8,9 |
| 1-121-1 | UG-709A U | 58 |
| 1-200-1 | UG-943A U | 10,12 |
| 1-262-1 | UG-626A U | 5,6 |
| 3433-1 | UG-573B U | 8,9 |
| 3434-1 | UG-626B U | 5,6 |

CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 310-1 | UG-572 U | 8,9 |
| 1-604-1 | UG-633 U | 5,6 |
| 3432-1 | UG-572A U | 8,9 |
| 3439-1 | UG-633A U | 5,6 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 308-1 | UG-570 U | 8,9 |
| 585-1 | UG-939 U | 8,9 |
| 1-605-1 | UG-704 U | 55,58 |
| 3430-1 | UG-570A U | 8,9 |

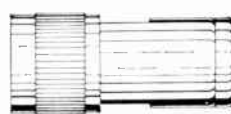
FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 804-1 | UG-629 U | 5,6 |
| 3431-1 | UG-571A/U | 8,9 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 2377-1 | UG-634/U |
| 3429-1 | UG-569A/U |

N SERIES



PLUG

| DAGE NO. | AN NO. | CABLE RG (1) U |
|----------|-----------|----------------|
| 037-1 | UG-21B U | 8,9 |
| 131-1 | UG-18B U | 5,6,21 |
| 400-1 | UG-21C U | 8,9 |
| 1-111-1 | UG-21D U | 8,9 |
| 1-243-1 | UG-18A U | 5,6,21 |
| 1-244-1 | UG-21A U | 8,9 |
| 1-624-1 | UG-18C U | 5,6,21 |
| 2799-1 | UG-204C U | 14 |

JACK

| DAGE NO. | AN NO. | CABLE RG (1) U |
|----------|----------|----------------|
| 062-1 | UG-23B U | 8,9 |
| 140-1 | UG-20B U | 5,6,21 |
| 1-242-1 | UG-20A U | 5,6,21 |
| 1-246-1 | UG-23A U | 8,9 |
| 1-247-1 | UG-23D U | 8,9 |
| 1-490-1 | UG-23C U | 8,9 |
| 1-527-1 | UG-20C U | 5,6,21 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|------------|--------|
| 047-1 | UG-22B U | 8,9 |
| 132-1 | UG-19B U | 5,6,21 |
| 345-1 | UG-1052 U | 58 |
| 1-258-1 | UG-22D U | 8,9 |
| 1-480-1 | UG-22C U | 8,9 |
| 1-526-1 | UG-19C U | 5,6,21 |
| 2328-1 | UG-1187 U | 8,9 |
| 3195-1 | UG-1187A U | 8,9 |
| 3456-1 | UG-1095A U | 55,58 |
| 3457-1 | UG-1095B U | 55,58 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE RG (1) U |
|----------|-----------|----------------|
| 2146-1 | UG-160C U | 8,9 |
| 2413-1 | UG-936A U | 10,12 |
| 3039-1 | UG-160B U | 8,9 |

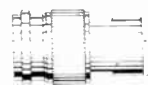
RIGHT ANGLE FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 2466-1 | UG-997A U |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|----------|
| 019-1 | UG-58A U |

TNC SERIES



CABLE PLUG

| DAGE NO. | CABLE RG (1) U |
|----------|----------------|
| 8000-1 | 55,58 |
| 8001-1 | 59,62,71 |

CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8005-1 | 55,58 |
| 8006-1 | 59,62,71 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8009-1 | 55,58 |
| 8010-1 | 59,62,71 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8007-1 | 55,58 |
| 8008-1 | 59,62,71 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8001-1 | Herm. Seal |
| 8012-1 | |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------|
| 8011-1 | |

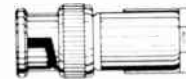
RIGHT ANGLE SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8016-1 | Solder pot |

RIGHT ANGLE FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8015-1 | Solder pot |

TRIAxIAL SERIES



CABLE PLUG

| DAGE NO. | DATA |
|----------|-----------|
| 2677-1 | Polarized |
| 2743-1 | Standard |

CABLE JACK

| DAGE NO. | DATA |
|----------|-----------|
| 2741-1 | Standard |
| 2742-1 | Polarized |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | DATA |
|----------|-----------|
| 3107-1 | Standard |
| 3197-1 | Polarized |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|-----------------|
| 2677-1 | Not pressurized |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|-----------|
| 2677 | Polarized |

CABLE JACK (MIN.)

| DAGE NO. | DATA | DATA |
|----------|------|------------|
| 5922-1 | P | Cook cable |

SINGLE HOLE MOUNT JACK RECEPTACLE (MIN.)

| DAGE NO. | DATA | DATA |
|----------|------|------------|
| 5923-1 | P | Herm. seal |

ADAPTER STRAIGHT SINGLE HOLE BULKHEAD FEED THRU (JACK to JACK) (MIN.)

| DAGE NO. | DATA | DATA |
|----------|------|------------|
| 5924-1 | P | Herm. seal |

DM SERIES



CABLE PLUG

| DAGE NO. | POLARITY | DAGE JACKET DIA. MAX. MIN. |
|----------|----------|----------------------------|
| 1-300-1 | A | .135 .115 |
| 1-317-1 | B | .135 .115 |
| 1-818-1 | E | .135 .115 |
| 1-940-1 | J | .135 .115 |
| 1-941-1 | L | .135 .115 |
| 5149-1 | F | .135 .115 |
| 5152-1 | M | .135 .115 |
| 5312-1 | K | .135 .115 |

CABLE JACK

| DAGE NO. | POLARITY | OUTER JACKET DIA. MAX. MIN. |
|----------|----------|-----------------------------|
| 1-350-1 | A | .135 .115 |
| 1-352-1 | B | .135 .115 |
| 5165-1 | E | .135 .115 |
| 5166-1 | F | .135 .115 |
| 5167-1 | J | .135 .115 |
| 5168-1 | K | .135 .115 |
| 5169-1 | L | .135 .115 |
| 5170-1 | M | .135 .115 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | POLARITY | MT. DIM. Hole DIM. | Panel TH'K. |
|----------|----------|--------------------|-------------|
| 1-310-1 | B | 1 | 1 8 |
| 1-311-1 | A | 1 | 1 8 |
| 1-707-1 | E | 2 | 1 8 |
| 1-875-1 | F | 1 | 1 8 |
| 1-945-1 | J | 1 | 1 8 |
| 1-946-1 | K | 1 | 1 8 |
| 5231-1 | L | 1 | 1 8 |
| 5232-1 | M | 1 | 1 8 |

SOLDER MOUNTED JACK RECEPTACLE

| DAGE NO. | POLARITY | HERM. SEAL |
|----------|----------|------------|
| 1-771-1 | B | Yes |
| 1-772-1 | F | Yes |
| 1-774-1 | A | Yes |
| 1-778-1 | E | Yes |
| 1-954-1 | J | Yes |
| 1-955-1 | L | Yes |
| 5061-1 | K | Yes |
| 5062-1 | M | Yes |

JACK BULK HEAD FEED THRU'S

| DAGE NO. | POLARITY | HERM. SEAL |
|----------|----------|------------|
| 1-699-1 | E | Yes |
| 1-957-1 | K | Yes |
| 5059-1 | L | Yes |
| 5060-1 | M | Yes |
| 5208-1 | F | Yes |
| 5209-1 | J | Yes |
| 5210-1 | A | Yes |
| 5211-1 | B | Yes |

OTHER FITTINGS AVAILABLE. WRITE FOR FREE CATALOG.

Today's requirements call
for miniaturization,

but...



HOW



SMALL



IS



MINIATURE?

Automatic
MAKES THEM ALL!

Unit engineered to fit all available sub-miniature cables, **AUTOMATIC'S** Sub-Miniature Connectors are available in three types; **BAYONET, PUSH-ON AND THREADED COUPLING.**

Special receptacles available for printed circuit applications.

CHECK THESE FEATURES:

No special tools required for assembly. Foolproof clamping insures accurate alignment . . . positive contact . . . extra strong grip. Exclusive internal-parts design allows outside dimensions of connectors to remain constant regardless of cable dimensions.

For BAYONET, PUSH-ON and THREADED SUB-MINIATURE and MICRO-MINIATURE COAXIAL CABLE CONNECTORS, always specify AUTOMATIC. Our engineers are always ready to discuss your special requirements.

Write, wire or phone for free technical information.

Automatic
METAL PRODUCTS CORP.

323 Berry St., B'klyn 11. N. Y. • EVERgreen 8-6057

For details, circle #364 on Reader Service Card

Directory II. Components

44. Connectors.

- B&M Electric Corp., N.Y., 28
Babcock Relays, Inc., Calif., 10
Barker & Williamson, Inc., Pa., 10, 34
Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 10, 17, 20, 25, 28, 30, 32, 34, 40, 45
See ad on page 418
Tel: ENfield 3322
- Bendix Aviation Corp., Jones Elect. Co., M.C., Conn., 34
Bendix Aviation Corp., Ind., 5, 10, 15, 17, 30, 35, 40, 45
Bendix Aviation Corp., Mich., 10, 15
Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 15, 25, 30, 40, 45
See ad on page 170
Tel: LOwell 3-9511
- Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 7, 17, 20, 28, 32, 40
See ad on page 603
Tel: WALKer 5-6980
- Blonder-Tongue Labs., Inc., N.J., 10
Breeze Corp., Inc., N.J., 35
Burndy Corp., H. H. Buggie Div., Ohio, 5, 10, 15, 25, 30, 32, 34, 35, 40, 45, Tri-Axial
Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn., 5, 10, 15, 17, 25, 30, 32, 34, 45
See ad on this page
Tel: TEmple 8-4711
- Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 32
See ad on page 693
Tel: TRowbridge 6-2800
- Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 5, 10, 15, 17, 20, 25, 30, 32, 34, 40, 45
See ad on page 184
Tel: CApital 5-1251
- Carborundum Co., Refractories Div., N.J., 15
Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 15
See ad on page 463
Tel: WEst Lebanon 3-5851
- Chicago Dynamic Industries, Inc., 1725 Diversey Blvd., Chicago 14, Ill., 32
See ad on page 553
Tel: WE 5-4600
- Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 20, 25, 28, 30, 32, 40
See ad on pages 48-49
Tel: NEvada 2-2000
- Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 7, 17, 25, 30, 32, 40
See ad on page 484
Tel: WOODland 7-1113
- Coaxial Connector Co., Inc., N.Y., 10, 15, 28, 30, 34, 40, 45
Collectronix Corp., N.Y., 35
Component Mfg. Service, Inc., Mass., 10, 20, 28, 45
Components for Research, Inc., Calif., H.V. Terminations
Connector Corp. of America, Calif., 10
Consolidated Electrodynamics Corp., Calif., 5
Constantin & Co., L. L., N.J., 15
Continental Connector Corp., 34-63 56th St., Woodside 77, N.Y., 5, 15, 25, 30, 32, 40, 45
See ad on page 423
Tel: TWining 9-4422
- Cooper Hewitt Elec. Co., N.J., 15
Dage Electric Co., Inc., 67 N. Second St., Beech Grove, Ind., 10, 15, 34, 40
See ad on page 420
Tel: STate 6-0458
- Defiance Engrg. & Microwave Corp., Mass., 34-Special
DeJUR-Amsco Corp., Electronics Sales Div., 45-01 Northern Blvd., Long Island City 1, N.Y., 5, 10, 15, 25, 30, 32, 40
See ads on pages 190, 423
Tel: RAVenswood 1-4009
- Derf Radio Co., N.Y., 5, 17, 20, 25, 28, 30, 34, 40, 45
Deutsch Co.-Electronic Components Div., Calif., 5, 10, 15, 25, 40, 45
Eagle Electric Mfg. Co., Inc., N.Y., 30
Ecco Electronic Components Corp., N.Y., 10, 15, 17, 20, 28, 32, 34, 40
Elco Corp., Pa., 5, 10, 15, 17, 20, 25, 28, 30, 32, 40, 45

crimp type, snap locked contacts

Modular
HYFEN[®]
connector

feed-thru, multiple insert

Makes possible the design of lighter and more compact equipment. Each insert holds 35 contacts. Frames available for 5 or 8 Inserts.

BURNDY

For complete information, write: OMATON DIVISION, BURNDY—Norwalk, Connect.

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For details, circle #365 on Reader Service Card

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Long Life **FLIGHT APPROVED**
COMMUTATORS AND INERTIAL VELOCITY METERS



Part No.
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PAM or FM/FM Commutator
3 Pole 30x10 — AC or DC Motor

This unit continued operating from pre-flight through recovery in the nose cone of a Jupiter missile.

Part No. 500416 (DC Motor)
500417 (AC Motor)
MIL-E-5272A, MIL-I-6181B, IRIG



Part No.
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PDM Miniature Commutator
3^{11/64}" x 3^{19/32}" x 3^{3/4}"
for 3 (45x20) Poles with pulser

Motor is completely contained within the commutator rings and reduces volume to provide an ideal unit for missile and other airborne applications.

MIL-E-5272A, MIL-I-6181B, IRIG (MOD.)



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2 Poles 30x5 plus 2 poles 60x5

A flexible PAM commutator with 28V DC motor and all switch contacts available at connectors for interwiring per flight requirements. Useful for systems checkout due to long life capabilities.

Missile and aircraft environments.



Part No.
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(includes temperature control equipment)

Inertial Velocity Meter
1^{1/2}" dia. x 3^{1/2}" — weight 15 oz.

This unit reacts to acceleration forces and yields an output signal which is the time integral of that acceleration to an accuracy of 50 feet at 100 miles.

MIL-E-5400

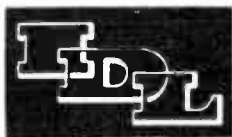


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Analog to Digital Converter
(Gray, Binary Coded Decimal)

These converters, with a multi-turn input, provide bi-directional read-out of 20,000 bits per minute for 500 hours or more. Standard models have 1000, 3600 and 216,000 bits capacity.

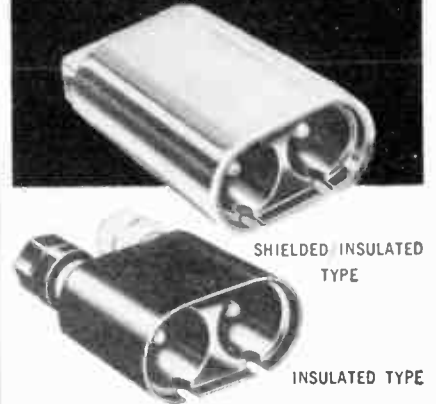
MIL-E-5272B



Write for Technical Bulletins on these units by part number or send your specifications.
INSTRUMENT DEVELOPMENT LABORATORIES, INC.
Subsidiary of Royal McBee Corporation
67 Mechanic Street • Attleboro, Mass., U.S.A.

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DUB-L-PLUG
DUAL ELECTRICAL CONNECTORS



SHIELDED INSULATED TYPE

INSULATED TYPE

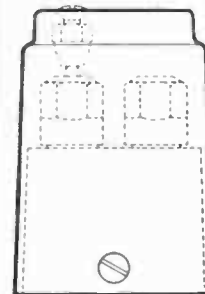
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ALL CONDUCTING METAL PARTS GOLD-PLATED

NYLON BODIES ON INSULATED TYPES AVAILABLE IN 6 COLORS

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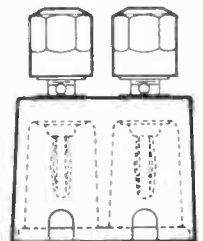
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THE SUPERIOR ELECTRIC COMPANY
590 Tripp Avenue, Bristol, Connecticut

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1960 IRE Director's

Directory II. Components

44. Connectors.

Electrical Industries, Div. of Philips Electronics, Inc., 691 Central Ave., Murray Hill, N.J., 15

See ad on page 2

Tel: CRestview 7-4300

Electro Tec Corp., N.J., 25, 35, 37, 40

Electrocraft, Inc., Ill., 20, 28

Electronic Mechanics, Inc., N.J., 5, 7, 25, 32, 35, 37

Electronic Techniques, Inc., Calif., 5

Elsin Electronics Corp., N.Y., 15

El-Tronics, Inc., Warren Components Div., Pa., 15

Enflo Corp., N.J., 15, 17, 30, 34, 40, 45, Teflon Only

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 35

See ad on page 198

Tel: BIdelow 3-0030

Entron, Inc., Md., 34

Equipment & Service Co., Tex., 30, 45

Ercona Corp., See Belling and Lee, Ltd.

Etched Products Corp., N.Y., 32

Falcon Machine & Tool Co., Inc., 208 Concord Tnpk., Cambridge 40, Mass., mechanical

See ad on page 349

Tel: TRowbridge 6-3269

Forney Industries, Aviation Div., Colo., 30

Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J., 34

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Tel: PRespect 4-0500

Fuji Communication Apparatus Mfg. Co., Ltd., c/o The Nissho American Corp., N.Y., 25

Garde Mfg. Co., R.I., 15, 32

Garlock Packing Co., Garlock Electronics Products, Camden 1, N.J., 25, 30, 40

See ad on page 682

Tel: WOODlawn 4-0370

Garrett Corp., Air Research Mfg. Div., Calif., 30, Squib

General Cement Mfg. Co., Div. of Textron, Inc., 400 S. Wyman St., Rockford, Ill., 28

See ad on page 474

Tel: ROKford 8-9661

General Devices, Inc., P.O. Box 253, Princeton, N.J., 37

See ad on page 360

Tel: DAVis 9-2323

General RF Fittings, Inc., Mass., 5, 10, 15, 34, 40

General Radio Co., West Concord, Mass., 10

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Tel: EMERson 9-4400

Gibson Electric Co., Pa., 35

Glass Products Co., See: Scientific Components, Inc.

Glasseal Prods. Co., Inc., N.J., 5, 15

Glass-Tite Industries, Inc., R.I., 5, 15, 25, 37

Good Electronic Corp., Fla., 32

Gorham Mfg. Co., Electronics Div., 333

Adelaide Ave., Providence 7, R.I., 35

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Tel: WILliams 1-1000

Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 35, 37, Telemeter

See ad on page 424

Tel: YONkers 8-8400

Gremar Mfg. Co., Mass., 10, 15, 17, 34, 40, 45

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 40

See ad on page 639

Tel: N EW Rochelle 3-8600

Gulton Industries, Inc., N.J., 40

Hallett Mfg. Co., Calif., 10, 34, 45

Hart Mfg. Co., 265 Bartholomew Ave., Hartford 1, Conn., 5, 15

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Tel: J ACKSON 5-3491

Heldor Mfg. Corp., N.J., 15

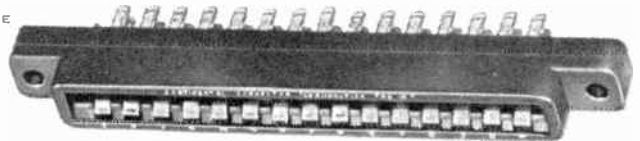
Hermetic Pacific Corp., Calif., 5, 15

Hermetic Seal Corp., 31 S. Sixth St., Newark 7, N.J., 5, 15, 40

See ad on page 460

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ACTUAL SIZE



PRINTED CIRCUIT SERIES

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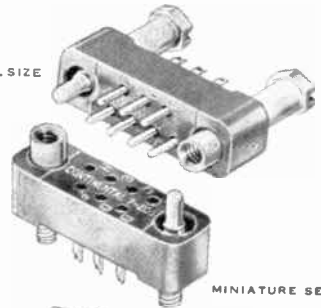
The same engineering ingenuity that Continental Connector incorporates in printed circuit connectors is available to you in numerous micro-miniature, miniature, right-angle, power and hermetically sealed types, many with polarizing screwlocks, hoods and protective shells.



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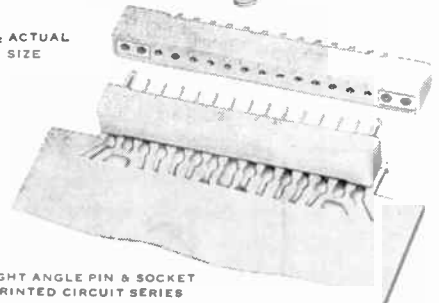
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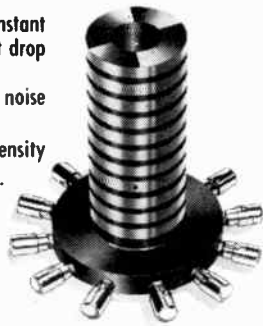
*PAT. NO. 2,878,429

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 LONG life...



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PRODUCTS: Unique (oil-free) self-lubricating Bushings and Bearings (applicable -450° to +700°F.; with expansion coefficient half that of steel will not seize shaft at low temperature); Oil-free Piston Rings, Seal Rings, Thrust and Friction Washers, Pump Vanes.



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STREET _____

CITY _____

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STATE _____

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incorporating the first really all-new design in single conductor plugs and receptacles!

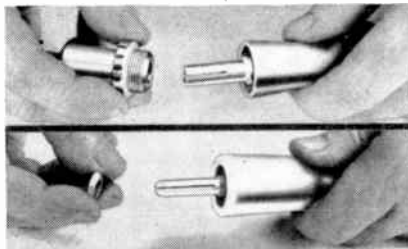


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 GOLD-PLATED BRASS PARTS

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590 Tripp Avenue, Bristol, Connecticut

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44. Connectors.

Hermetite Corp., Mass., 15
 Hobson Bros., Inc., Ill., 7
 I.T. & T. Royal Elect. Corp. Div., R.I., 17
 Instrument Development Laboratories, Inc., 67 Mechanic St., Attleboro, Mass., 37

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Tel: ATTleboro 1-3880

Iron Fireman Mfg. Co., Electronics Div., Ore., 35

Jan Hardware Mfg. Co., Inc., N.Y., 5, High Voltage

Javex Electronics, Calif., 10, 25, 30, 40
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Jerrold Electronics Corp., Dept. TED 33, The Jerrold Bldg., Philadelphia 32, Pa., 10, 34

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Tel: BALdwin 6-3456

Jettron Products, Inc., 56 Route 10, Hanover, N.J., 7

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Tel: TUCKer 7-0571

Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 20, 25, 28, 30, 32, 40

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Tel: NEVada 2-2000

Joy Mfg. Co., Pa., 30, 45

Joy Mfg. Co., Electrical Prod. Div., Mo., 5, 15, 25, 30, 45

Kellogg Switchboard & Supply Co., Ill., 32, 34

Kennedy Industries, Calif., 32

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 5, 7, 10, 15, 17, 20, 25, 28, 30, 32, 34, 40, 45

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Tel: SWIfTwater 3-5000

Kulka Electric Corp., 633 S. Fulton Ave., Mt. Vernon, N.Y., 25, 28, 30, 32

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Tel: MOUNT Vernon 4-4024

Lab-Tronics, Inc., Ill., 20, 28

Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 25

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Tel: Le Roy 385

Lectrocon Co., Pa., 25

Lessels & Associates, Inc., Mass., Strain Gage

Leviton Mfg. Co., Inc., N.Y., 17, 25

Liquidometer Corp., N.Y., 10, 15, 40

Litton Industries, Airtron Inc., Div., N.J., 34

Litton Industries, Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 15, 32, 40

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Tel: CRESTview 4-7411

Livingston Electronic Corp., N.J., 15

Lumatron Electronics, Inc., Dept. IR-60, 68 Urban Ave., Westbury, L.I., N.Y., 5, 34

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Tel: EDgewood 4-3100

Magnovox Research Labs., Calif., 37

Makepeace Div., D.E., Engelhard Industries, Inc., Attleboro, Mass., 35

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Tel: ATTleboro 1-0089

Directory II. Components

44. Connectors.

Malco Tool & Mfg. Co., Ill., 17, 32, 40
 Mandex Mfg. Co., Inc., Ill., 7
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 10
 Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 5, 25, 30, 32, 34, 37, 40
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 Tel: UNDerhill 7-9600
 Metox, France, 5, 10, 25, 40
 Micarta Fabricators, Inc., Ill., 7, 17, 28, 32
 Microdot, Inc., Calif., 10, 15, 32, 34, 40
 Micro-Lectric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, L.I., N.Y., 40
 See ad on page 533
 Tel: F^{RE}eport 8-3222
 Midwest Molding & Mfg. Co., Ill., 35, 37
 Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 30
 See ad on page 416
 Tel: D^{AV}enport 4-4108
 Molded Insulation Co., Pa., 5, 10, 15, 25, 32, 40, 45
 Molding Corp. of America, R.I., 15, 40
 Molex Products Co., Ill., 25, 30, 32
 Morse Co., Frank W., Mass., Pin Type Cord
 Mutual Electronic Industries Corp., N.Y., 5, 10, 15, 17, 34, 35

Mycalex Electronics Corp., 125-B Clifton Blvd., Clifton, N.J., 37
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 Tel: P^{RE}scott 9-8866
 National Tel-Tronics Corp., 52 St. Casimer Ave., Yonkers, N.Y., 20, 28
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 Tel: Y^{ON}kers 8-6400
 Naz-Dar Co., Ill., 32
 Norrich Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 35, 40
 See ad on page 152
 Tel: W^{AT}kins 4-8360
 North Electric Co., N.Y., 25
 North Electric Co., Ohio, 17, 25
 Northern Plastics Corp., Wis., 32
 Nugent Electronics Co., Inc., Ind., 10, 15, 32, 34, 40, 45
 Oppenheimer Plastics, Inc., Pa., 32
 Pacific Scientific Co., Calif., 35
 Painton & Co., Ltd., England, 10, 15, 20, 30, 32
 Permonite Mfg. Co., Ill., 7, 17, 28
 Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 10, 34
 See ad on page 612
 Tel: P^{LA}za 1-3200
 Plastics Mold & Engineering Co., R.I., 28, 40

Poly-Scientific Corp., Va., 35, 37
 Powell Co., Pa., 5, 15, 25, 40, 45
 Prodelin, Inc., Dept. I-8, 307 Bergen Ave., Kearny, N.J., 10, 15, 34, 45
 See ad on page 613
 Tel: W^Yman 1-8600
 Progress Electronics Co., 107 Franklin St., New York 13, N.Y., 5, 10, 15, 17, 20, 25, 28, 30, 34, 35, 40, 45
 See ad on pages 71-74
 Tel: C^{AN}al 6-5611
 Pyle-National Co., Ill., 5, 10, 25, 30, 45
 Remler Co., Calif., 45
 Richards Electrocraft, Inc., Ill., 20, 28, 40
 Robertson Electric Co., Inc., 124 S. Elmwood Ave., Buffalo 2, N.Y., Connector Splice Cases
 See ads on pages 425, 615
 Tel: M^{AD}ison 6658
 Rodale Mfg. Co., Inc., Pa., 45
 Roflan Co., Mass., 20, 40
 Ross Metals Co., Milton, Pa., 5, 10, 15, 20, 25, 28, 32, 35, 40
 Rotary Devices Corp., N.J., 35, 37
 Royal Electric Corp., R.I., 17
 Russell & Stoll Co., Inc., N.Y., 17, 30
 Rye Sound Corp., N.Y., 40
 Schaevitz Engrg., N.J., 35

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- designed for fast, convenient splicing, saving hours of time and labor.
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CONNECTOR CASES—maximum protection for connectors used in field equipment.

- fit any size or type of connector.
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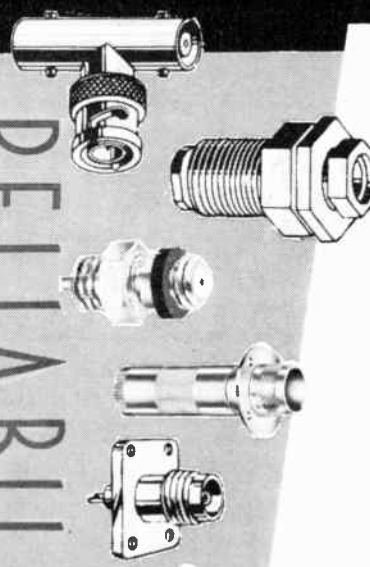


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1960 IRE Directory

KINGS **ELECTRONICS**
 Radio Frequency Connectors

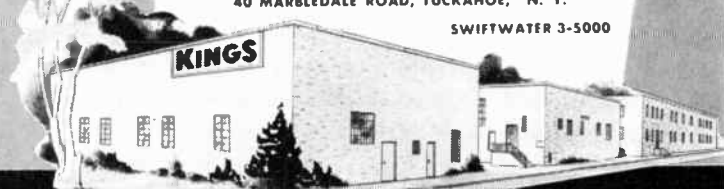


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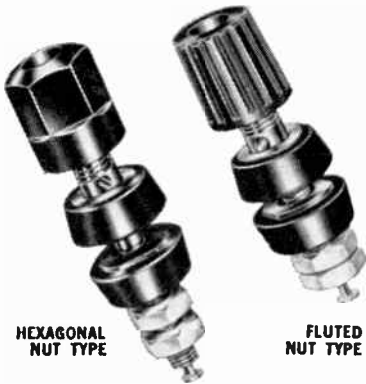
KINGS ELECTRONICS CO., INC.
 40 MARLBLEDALE ROAD, TUCKAHOE, N. Y.
 SWIFTWATER 3-5000



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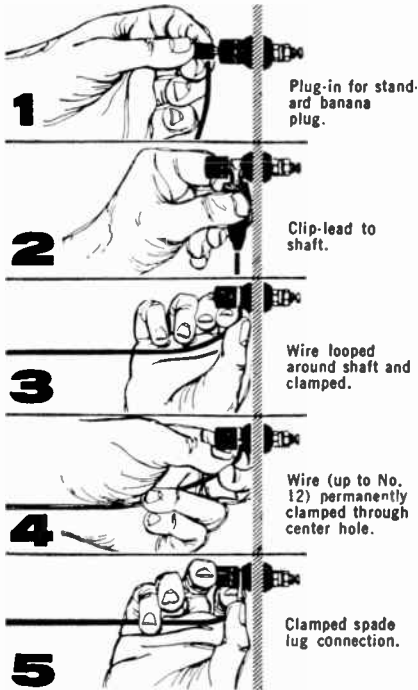
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- **GOLD-PLATED**
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Current capacity of 30 amperes, working voltage of 1000 volts. All current-carrying metal parts are gold-plated for long life, resistance to corrosion, stable electrical contact and faster soldering. Offered with either hexagonal or fluted type thumbnut. Available in red, white, blue, yellow, black or green durable nylon for more attractive panels and easier circuit identification. Can be mounted and securely locked in any panel from 1/6" to 1/4" thick. Adapter spacers are available for thinner panels. Complete insulation from the panel is provided. Write for bulletin on SUPERIOR 5-WAY Binding Posts.

THE SUPERIOR ELECTRIC COMPANY
590 Tripp Avenue, Bristol, Connecticut
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OPERATES
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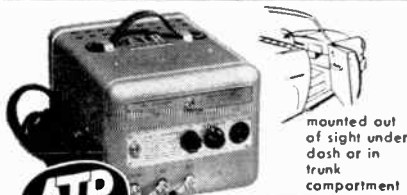
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MAKE YOUR CAR, BOAT OR PLANE
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44. Connectors.

- Scientific Components, Inc., 30 S. Salsipuedes St., Santa Barbara, Calif., 35, Printed Circuit
See ad on page 509
Tel: WOODland 6-1585
- Sealectro Corp., 610 Fayette Ave., Mararoneck, N.Y., 10, 32, 40
See ad on page 692
Tel: OWens 8-5600
- Sealtron Corp., Ohio, 5, 15, 40
- Servonic Instruments, Inc., Calif., 35
- Sherman Mfg. Co., H. B., Mich., 5
- Siemens & Halske, A.G., Germany, 10
- Silicone Seals, Inc., Ill., 15
- Slip Ring Co. of America, Calif., 35
- Smith, Inc., H. H., N.Y., 10, 20, 28
- Specialty Electronics Development Corp., N.Y., 5, 45
- Specialty Engrn. & Electr. Co., N.Y., 5, 25, 32, 45
- Standard Metals Corp., Mass., 35
- Stanwyck Coil Co., E., 75 Carson Ave., Newburgh, N.Y., 32, 40
See ad on page 417
Tel: JOhn 1-3030
- Superex Electronics Corp., N.Y., 20, 28, 40
- Superior Carbon Products, Inc., Ohio, 35, 37
- Superior Electric Co., 590 Tripp Ave., Bristol, Conn., 30
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Tel: LUdlow 2-9561
- Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 20, 28
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Tel: SPRing 4-1515
- Taffet Radio & Television Co., N.Y., 30
- Ta-Mar, Inc., Calif., 10, 34
- Tap-A-Line Mfg. Co., P.O. Box 563, Pompano Beach, Fla., 25
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Tel: WEBster 3-3262
- Technical Appliance Corp., N. Main St., Sherburne, N.Y., 10, 34
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Tel: SHERburne 7-2211
- Telcon, Inc., Dept. E61, P.O. Box 216, Pacific Palisades, Calif., 10, 34
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- Tenna Mfg. Co., Ohio, 10, 37
- Thomas & Betts Co., Inc., N.J., 17
- Thompson-Ramo-Wooldridge, Inc., Tapco Group, Ohio, 10
- Tranco Products, Inc., Calif., 10, 15, 34
- Transline Associates, N.J., 15
- Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 10
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Tel: LIBertyville 2-3700
- Tru-Connector Corp., Mass., 10, 15, 17, 34, 40, 45
- Twin Lock, Inc., Calif., 17, 25
- Ucinite Co., Div. of United-Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 7, 10, 32
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Tel: LASall 7-8400
- Union Electronics & Machine Corp., 71 Broadway, Wakefield, Mass., 10, 34, 40
See ad on page 427
Tel: CRystal 6-5000

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U.S. Components, Inc., 454 E. 148th St., New York 55, N.Y., 5, 15, 17, 25, 30, 32, 40

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United States Instrument Corp., Va., 45
Victor Electric Wire & Cable Corp., R.I., 17, 28

Victor R.F. & Microwave Co., Mass., 10, 34

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Winchester Electronics, Inc., Conn., 5, 10, 15, 17, 20, 25, 30, 32, 34, 37, 40, 45

Workman TV, Inc., N.J., 28

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Consoles & cabinets: See class 81

Consoles, studio: See class 32

Contacts: See class 70

**Converters, analog to digital:
See class 9**

**Converters, frequency shift:
See class 33**

45. Converters.

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ACF Industries, Inc., Avion Div., N.J., 15

Accurate Instrument Co., 2418 W. Alabama St., Houston 6, Tex., 15

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Tel: JACKSON 3-2712

Acme Electric Corp., 44 Water St., Cuba, N.Y., 5, 10, 15

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Admiral Corp., Ill., 5, 10

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Airflyte Electronics Co., 540 Ave. A, Bayonne, N.J., 12

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American Electronics, Inc., Calif., 5, 15, 20

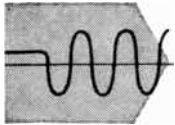
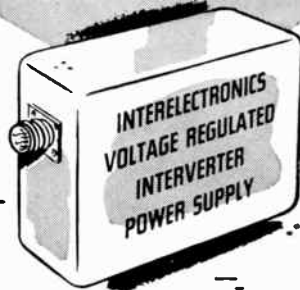
American Machine and Foundry Co., Leland Airborne Products Div., Ohio, 10, 15, 20

American Missile Products, Calif., 5, 10, 12, 15, 30

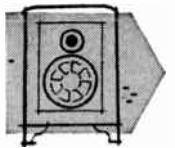
American Research & Mfg. Corp., Md., 5, 10, 15, 30

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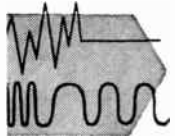
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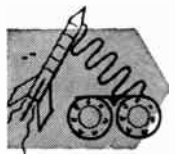
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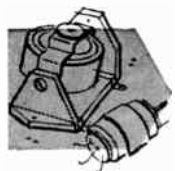
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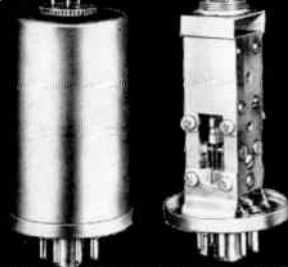
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45. Converters.

American Television and Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5, 10, 15, 25

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Tel: CApital 2-3791

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Bergen Labs., Inc., 247 Crooks Ave., Clifton, N.J., 10

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Celco-Constantine Eng. Labs. Co., 70 Island Ave., Mahwah, N.J., 10

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Chicago Standard Transformer Corp., 3501 W. Addison St., Chicago 18, Ill., 5, 10

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Co-Engineering Co., N.J., 10, 15, 25

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Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5, 10, 15
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- Gates Electronic Co., 1705 Taylor Ave., New York 60, N.Y., 5
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- Hammond Mfg. Co., Ltd., Canada, 28, 30
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Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 15
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- Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5, 10, 15, 28, 30
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- Leach Corp., Relay & Inet Div., 18435 Susana Rd., Compton, Calif., 5, 10, 15, 20**
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 Mallory & Co., Inc., P. R., Ind., 12, 25
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 Mayberry Electronics Co., Calif., 5, 10, 12, 15, 30
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- Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 5**
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 Minneapolis-Honeywell Reg. Co., Brown Instrument Div., Pa., 12
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- Modern Industries, Inc., Calif., 5, 10, 15, 30
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 National Pneumatic Co., Inc., Mass., 20
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- Non-Linear Systems, Inc., Del Mar Airport, Del Mar, San Diego, Calif., 5**
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- Ohio Semiconductors, Inc., 1035 W. Third Ave., Columbus 8, Ohio, 5, 10, 12, 15, 28
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- Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5, 10, 15, 28
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- Pacific Scientific Co., Calif., 12, 20
 Palo Alto Engineering Co., Calif., 5, 10

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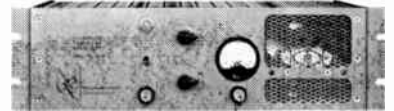
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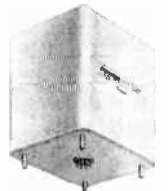
Military reliability in SEMI-CONDUCTOR POWER CONVERTERS



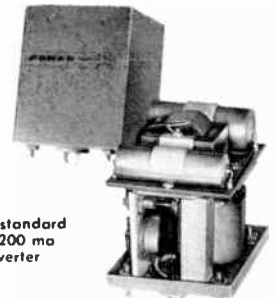
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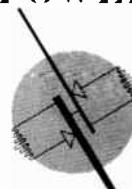
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1960 IRE Directory

Directory II. Components

45. Converters.

Perkin Engineering Corp., Calif., 5, 10, 15, 30
Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 5
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Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 10
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 Poly-Scientific Corp., Va., 12
 Polytron Engineering, Inc., Md., 10
Power Designs, Inc., 1700 Shames Dr., Westbury, L.I., N.Y., 5, 10
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Power Industries Co., Inc., Ill., 5, 10, 25
Power Sources, Inc., Northwest Industrial Park, South Ave., Burlington, Mass., 5, 10, 15, 30
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Precise Measurements Co., Millbrook Lane, R.D. 1, Flemington, N.J., 30
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Pylon Electronic Development Co., Ltd., Canada, 10, 15, 30
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Radio Development & Research Corp., N.J., 5, 10, 12, 15, 20, 30
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Raypar, Inc., Ill., 10
Raytheon Co., Mass., 5
Redmond Co., Inc., Mich., 10, 15
Rho Engrg. Co., Calif., 5, 10
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Simpson Mfg. Co., Inc., Mark, N.Y., 5, 10
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Specialty Engrg. & Electr. Co., N.Y., 5, 30

Spectrol Electronics Corp., Calif., 5, 10, 15, 30
Standard Electric Time Co., Mass., 5
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 12
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Telectro Industries Corp., N.Y., 5, 10, 20, 30
Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 5, 10
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Thordarson-Meissner, Ill., 10
Topping Electronics, Ltd., Canada, 5, 10, 15, DC-DC
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5, 10, 15, 30
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 Tel: ELizabeth 4-5650
Trans Electronics, Inc., Calif., 5, 10, 15
Transistor Applications, Inc., Mass., 10
Transistor Devices, Inc., N.J., 5, 30
Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 5, 10, 15
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 Tel: HUmboldt 2-4200
United Electrodynamics, Inc., Calif., 5, 10, 30
United States Dynamic Corp., Mass., 5
U.S. Science Corp., Sub. Topp Indust., Inc., Calif., 10, 15
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Varo Mfg. Co., Inc., Tex., 5, 10, 15, 20
Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 12
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 Tel: MURdock 8-7150
Vokar Products, Inc., Mich., 25, 27
Waldorf Instrument Co., Huyck & Sons Div., N.Y., 5, 10, 30

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Wincharger Corp., E. Seventh & Division St., Sioux City 2, Iowa 5, 10, 15, 20
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 Tel: 2-1844

Cord. lacing: See class 87

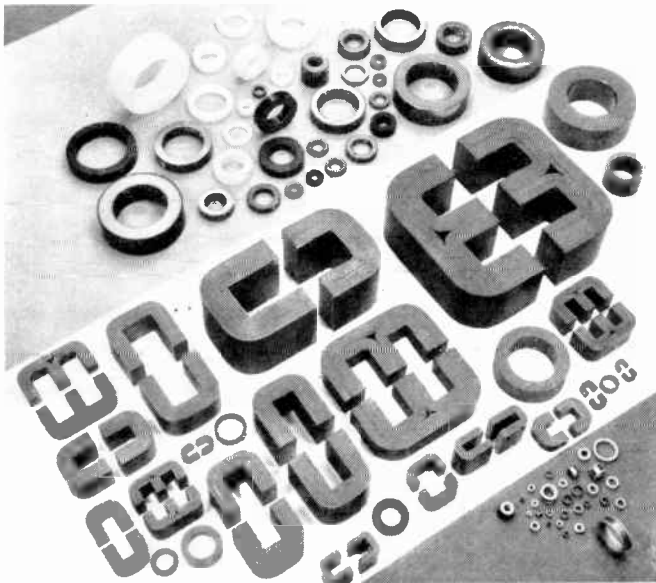
46. Cores & Core Materials.

| | |
|-----------------|----------------------|
| 5. Ceramic | 20. Metallic powders |
| 10. Ferrite | 25. Powdered metal |
| 15. Laminations | 30. Tape wound |
| 17. Magnetic | 35. Toroid |

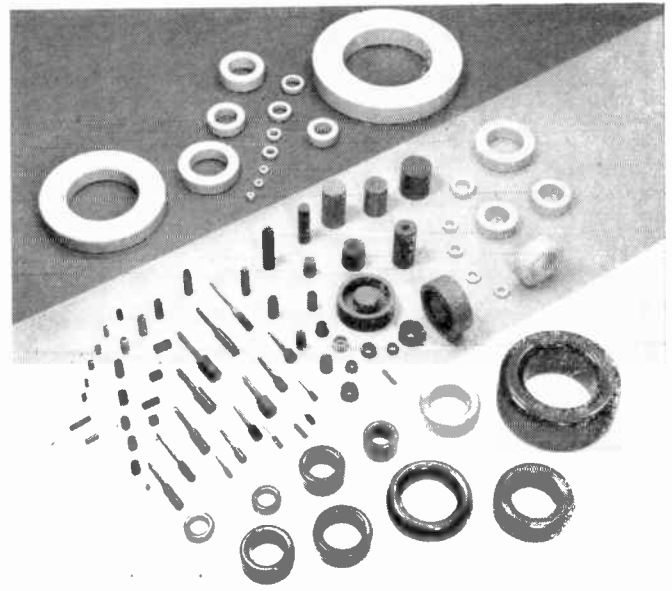
Accurate Specialties Co., Inc., N.Y., 20
Aerovox Corp., Mass., 10, 17, 35
Aerovox Corp., Crowley Div., N. J., 10, 17, 25, 35
Airpax Electronics, Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla., Cambridge Div., Jacktown Rd., Cambridge, Md., 35
 See ad on pages 82-83
 Tel: LUdlow 3-6160
Airtronics, Inc., D.C., 10, 17, 35
Alden Products Co., 121D N. Main St., Brockton 64, Mass., 35
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 Tel: JUNiper 3-0160
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American Cyanamid, Formica Corp., Subsid., Ohio, 15
American Feldmuehle Corp., 11 W. 42nd St., New York 36, N.Y., 5
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 Tel: PENnsylvania 6-9751
American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 5
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 Tel: AMherst 5-3411
American Silver Co., Inc., N.Y., 15
Arnold Engineering Co., P.O. Box G, Marengo, Ill., 17, 25, 30, 35
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 Tel: (Chicago) ANdover 3-6300
Barium & Chemicals, Inc., Ohio, 5, 10
Beemer Engrg. Co., Pa., 25
Bram Metallurgical & Chemical Co., Pa., 20, 25
Burroughs Corp., Mich., 17, 30
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Canadian Westinghouse Co., Ltd., Elect. Div., Canada, 5, 10, 17, 20, 30, 35
Carborundum Co., Refractories Div., N.J., 5
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Carstedt Research, Inc., Calif., 30, 35
Centralab, Div. Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 5
 See ad on page 174
 Tel: WOODruff 2-9200

Specify "ARNOLD"

for your MAGNETIC CORE requirements



Top to bottom: Tape wound cores, Silectron C, E and O cores, and bobbin cores.



Top to bottom: Mo-Permalloy powder cores, iron powder cores, and Sendust cores.

SILECTRON C-CORES, E-CORES and TOROIDS Arnold C and E cores are made from precision-rolled Silectron strip in 1, 2, 4 and 12 mil thicknesses.

They are supplied in a wide variety of shapes, and in sizes from a fraction of an ounce to several hundred pounds. In addition to standard transformer applications, they may also be supplied for special applications such as saturable reactors, instrument transformers and pulse transformers.

Over 1,000 stock cores are listed in the Arnold Silectron catalog. A wide selection of preferred sizes are carried in stock for immediate shipment. For complete data on C and E cores and Silectron toroids, write for Bulletin SC-107A.

TAPE WOUND CORES of High Permeability Materials Arnold tape wound cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, Silectron, or the new rectangular-loop material, Supermendur. All except Supermendur cores are available in standard tape thicknesses of 1, 2 and 4 mils; also in special tape thicknesses of 1/2 mil, 12 mil or other, as required or feasible. Supermendur is presently available in 4 mil cores.

Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes of toroidal cores are produced to individual requirements. Write for Bulletin TC-101A. (TC-113A for Supermendur Cores.)

BOBBIN CORES Arnold bobbin cores are available in a wide range of sizes, tape thicknesses, widths and number of wraps to suit the ultimate use of the core in electronic computer assemblies. Magnetic materials usually employed are Deltamax and Square Permalloy in standard thicknesses of 1, 1/2, 3/4 and 1/8 mil. Bobbins are supplied in ceramic or stainless steel. Write for Bulletin TC-108A.

SPECIAL MATERIALS

2V PERMENDUR . . . a ferromagnetic alloy of cobalt, vanadium and iron that possesses high flux density saturation properties. Its magnetostrictive properties are useful in many transducer applications. Write for Bulletin EM-23.

VIBRALLOY . . . a ferromagnetic alloy of nickel, molybdenum and iron whose temperature coefficient of elastic modulus is controllable over a wide range. It has high ferromagnetic permeability, and a rather high coefficient of magnetostriction. Used in applications where a zero or controlled thermo-elastic coefficient is desired.

BARIUM TITANATE . . . A piezoelectric ceramic widely used in ac-

MO-PERMALLOY POWDER CORES Available in a wide range of sizes, from .260" OD to 5.218" OD. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

These powder cores are supplied in four standard permeabilities: 125, 60, 26 and 14 Mu. They provide constant permeability over a wide range of flux density, and in many cases may be furnished stabilized to provide essentially constant permeability over a specific temperature range. Large warehouse stocks of preferred sizes are carried for immediate shipment. Write for Bulletin PC-104C.

IRON POWDER CORES A wide selection of cores is available, from simple cylinders to special cores of complicated design. The line includes all standard types of threaded cores, cup, sleeve, slug and cylindrical insert cores: for use in antenna and RF coils, oscillator coils, IF coils, perm tuning, FM coils, television coils, noise filter coils, induction heating and bombarder coils, and other low frequency applications. Preferred sizes are carried in warehouse stock for quick shipment. A standard series of iron powder toroids is also manufactured, conforming to the standard sizes proposed by the Metal Powder Industries. Write for Bulletin PC-109.

SENDUST POWDER CORES Available in a wide selection of sizes, ranging from .800" OD to 3.346" OD, and in permeabilities of 10, 13, 25, 30, 50 and 80, although not all sizes are available in all permeabilities. They possess magnetic properties generally superior to iron powder cores, but inferior to Mo-Permalloy powder cores in the audio and carrier frequency range. Write for Bulletin SDC-110.

celerometers, phono pickups, microphones, ultrasonic grinding and cleaning devices and underwater signaling devices. For more information, write for Bulletin CM-116.

7807 A



ARNOLD

SPECIALISTS in MAGNETIC MATERIALS

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

Directory II. Components

46. Cores & Core Materials.

Connolly Co., Wallace E., Calif., 10, 17, 25, 35
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 Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 10, 17, 35
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 Tel: CHerry 6-2811
 Foote Mineral Co., Pa., 5, 10, 20, 25
 Furane Plastics, Calif., 15
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 General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 5, 10, 17
 See ad on page 618
 Tel: VALley 6-5100

General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 5, 10
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 Tel: WESTmore 9-2261

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 Magnetic Core Corp., John & Lawrence Sts., P.O. Box 368, Newburgh, N.Y., 10, 17, 25, 35
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 Tel: JOhn 1-5116
 Magnetic Metals Co., Hayes Ave. at 21st St., Camden 1, N.J., 15, 17, 30, 35
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 Tel: WOODlawn 4-7842
 Magnetics, Inc., Dept. P-69, P.O. Box 391, Butler, Pa., 15, 17, 25, 30, 35
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 Tel: BUTler 7-3787
 Materials for Electronics, Inc., N.Y., 5, 20, 25
 Metal Hydrides, Inc., Mass., 20, 25
 Metals & Controls Div. of Texas Instruments, Inc., 51 Forest St., Attleboro, Mass., 15
 See ad on page 676
 Tel: ATTleboro 1-2800



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 for a complete
 line of
 ferrite cores

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CORPORATION OF AMERICA
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 HI TEMPERATURE
 HI STABILITY
 RAD-A-COR
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MAGNETIC CORES TO MATCH ANY
 Electrical and Mechanical Specifications

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Manufacturers of Electronic Powder Metallurgy

John & Lawrence Streets, New Windsor,
 Newburgh, New York
 Telephone: JOhn 1-5116

For details, circle #383 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Performance-Guaranteed Products by MAGNETICS, inc.

TAPE WOUND CORES

Magnetics, Inc. offers guaranteed maximum and minimum performance limits for high permeability tape wound cores. Available immediately from stock made from Hy Mu-80 (square and round), or Orthonol®. Cores are dry hydrogen annealed to meet performance specifications.

Inside Diameters 0.375-in. to 4.000-in.
 Outside Diameters 0.500-in. to 6.000-in.
 Tape thickness001, .002, .004, .006
 Heights 0.125-in. to 2.000-in.

Note: All AIEE standard sizes are included. Special sizes on request.

TAPE WOUND SILICON (Magnesil) CORES are available in 2, 4 or 12 mil gauges for use typically in current transformer, magnetic amplifier and saturable reactor applications. Core sizes

TAPE WOUND BOBBIN CORES are made of 4-79 Mo Permalloy or Orthonol® tapes. Stainless steel and ceramic bobbin cores with exclusive "Poly-Cap" do not distort with temperature—allow normal potting techniques. Ultra-small stainless steel

Magnetics, Inc. offers tape wound cores in both phenolic and aluminum core boxes, in standard paint finish or with GVB (Guaranteed Voltage Breakdown limits) finish. GVB cores can be vacuum impregnated and will withstand 1,000 volts at 60 cycles before breakdown. The aluminum boxed cores will withstand temperatures to at least 450°F. All core tests are in accordance with accepted standards of the AIEE Working Group on Core Matching and Grading.

For Complete Details: Write for Tape Wound Core Catalog TWC-200

meet all standard size criteria. Cores are available cased or uncased.

bobbin cores are available for miniaturization (0.047" diameter). A broad range of diameters and tape widths are also available.

For Complete Details: Write for Bobbin Core Catalog BC-203

MOLYBDENUM PERMALLOY POWDER CORES

Only Magnetics, Inc. guarantees realistic inductance limits for both temperature stabilized and non-stabilized molybdenum permalloy powder cores. Linear inductance cores are also available. Performance-Guaranteed, all cores may be ordered in a variety of standard sizes, and can be numerically coded within the guaranteed inductance limits at slight extra cost.

Inside Diameters . . . 0.225 to 0.950-in. Heights 0.140 to 0.570-in.
 Outside Diameters .0.375 to 1.570-in. Permeabilities Minimum 60

Standard baked enamel and wax-tight varnish finishes, or no finish. Cores with finishes which will sustain 500 or more volts may be wound directly with heavy Formex-coated wire.

For Complete Details: Write for Powder Core Bulletin PC-203

MAGNETIC LAMINATIONS

"Performance-Guaranteed" laminations are available in Hy Mu-80, 48 Alloy and Orthonol®. Standard shapes include DU-1, DU-37, DU-50, EE-24-25, EE-26-27, EE-28-29, EE-186-187, EI-11, EI-12, EI-21, EI-75, EI-187, EI-375, EI-625, F-12, F-12 (Modified), F-13, F-20, F-21, F-187, Ring, UBE, UI-312 and UI-375. Standard gauges are 0.014-in. and

0.006-in. Laminations are dry-hydrogen annealed to meet specifications. Special shapes produced to fit your specifications. These include rotor, stator, and recording head laminations using customer-owned dies.

For Complete Details: Write for Magnetics, Inc. Applications Engr. Dept.

MAGNETIC SHIELDS

"Performance-Guaranteed" shields are used in the protection of electronic measuring devices from moderate or high flux external fields. Shields are usually made from Mu Metal or 48 Alloy, respectively, but they can be made from a number of other commercially available magnetic and non-magnetic materials when your specifications require it. Shields are normally .025-in. thick, but other thicknesses such as .014, .020, .031 and .062 can be readily supplied. Shields are fabricated and can be painted, lacquered or unfinished to meet your requirements. They are dry-hydrogen annealed for highest field attenuations.

For Complete Details: Write Magnetics, Inc. Applications Engr. Dept.



DEPT. P-69, BUTLER, PENNSYLVANIA

These MAGNETICS Representatives are at your service:

| | | |
|---|---|--|
| ARIZ.—Scottsdale Carol Hower 369 N. Craftsman's Ct. | IND.—Fl. Wayne James W. Green (H. G. Pretat, Inc.) 2511 W. Drexel | N.J.—North Plainfield (Includes Philadelphia) Magnetics, Inc. W. J. Irvine 172 Dahlia Terrace |
| CALIF.—Pasadena 1 Magnetics, Inc. G. B. Mulvin 3841 E. Colorado Blvd. | MICHIGAN R. C. Warner P.O. Box 338 South Whitley, Ind. | N.Y.—Rochester 18 Fowler-Beach Corp. 3700 East Ave., Room 3 |
| CALIF.—Redwood City Magnetics, Inc. W. C. Maes 1743 Maryland Ave. | KAN.—Mission C. L. Omer 6047 Howe Drive | OHIO—Cleveland 7 R. G. Sidne II 1229 Westlake Ave. |
| COLO.—Lakewood W. Keith Kidder 1480 Hoyt Street | MASS.—Marshfield Magnetics, Inc. R. C. Woodward Tupelo Rd., Holly Ridges | TEXAS—Dallas 20 J. H. Lawrence P.O. Box 13026 |
| CONN.—New Canaan (Includes N. Y. City) Magnetics, Inc. W. S. Spring 15 Elm Place | MINN.—Minneapolis Fred Peterson 2431 Hennepin Ave. | CANADA—Toronto 7 George M. Fraser George M. Fraser, Ltd. 1554 Yonge St. |
| FLA.—Orlando C. B. Small P. O. Box 1346 | ILL.—Chicago 44 H. G. Pretat, Inc. 4 North Cicero Ave. | EXPORT B. Freudenberg, Inc. 240 West 98th St. New York 25, N. Y. |
| | N.C.—Winston-Salem A. H. Hilker P.O. Box 5211 | |

Directory II. Components

46. Cores & Core Materials.

Microwave Chemicals Laboratory, Inc., Dept. 12, 282 Seventh Ave., New York 1, N.Y., 10

See ad on page 441

Tel: WAtkins 4-6725

Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo., 30

See ad on pages 126-127

Tel: EVergreen 3-3300

Motorola, Inc., Ariz., 5, 10, 17, 35

Mullard Overseas, Ltd., England, 10

National Cash Register Co., Ohio, 10

National Ceramic Co., N.J., 5

National Moldite Co., N.J., 10, 20, 25, 35

National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 5, 35

See ad on page 642

Tel: NO 5-4800

Norrich Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 5, 15, 17

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Tel: WAtkins 4-8360

North American Philips Co., Inc., Philips Labs. Div., N.Y., 10

North Electric Co., Ohio, 17

Northern Plastics Corp., Wis., 15

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Page-Madden Co., N.Y., 5

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 15, 20, 25

See ad on page 687

Tel: EVerglade 4-2122

Polydoroff & Assoc., D.C., 10, 20, 25, 35

Polymer Corp. of Pa., Dept. RB, 2140 Fairmont Ave., Reading, Pa., 25, 35

See ad on page 684

Tel: FRanklin 6-5791

Pyroferic Co., Inc., N.Y., 25

Quality Components, Inc., Pa., 25

Quartzite Processing, Inc., Mass., 10

Radio Cores, Inc., 9540 S. Tulley Ave., Oak Lawn, Ill., 17, 20, 25, 35

See ad on this page

Tel: GArden 2-3353

Radio Corp. of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 10, Memory Planes, Aperture Plates

See ad on page 56

Tel: RANdolph 5-4500

Raytheon Co., Mass., 10

Research Development Mfg., Inc., Pa., 17

Rogers Electronic Tubes & Components, Canada, 10, 15

Ross Metals Co., Milton, Pa., 30, 35

Sangamo Electric Co., Ill., 35

Siemens & Halske, A.G., Germany, 10

Stackpole Carbon Co., Pa., 10

Standard Telephones & Cables, Ltd., England, 10, 15, 20, 30, 35

Star Porcelain Co., N.J., 5

Steward Mfg. Co., D. M., Tenn., 5, 10

Superex Electronics Corp., N.Y., 10

Superior Carbon Products, Inc., Ohio, 20, 25

Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 5

See ad on page 620

Tel: LOWell 8-4555

Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 17

See ad on page 556

Tel: WIndsor 4-2221

Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 5

See ad on page 621

Tel: ARmory 1-0163

Telegraph Condenser Co., England, 5

Telegraph Condenser Co., Ltd., United Insulator Div., England, 5

Telemeter Magnetics, Inc., Calif., 5, 10, 17

Thermo Materials, Inc., Calif., 5, 10

Thomas & Skinner, Inc., 1125 E. 23rd St., Indianapolis 7, Ind., 15, 30, 35

See ads on pages 435, 469

Tel: WAbash 3-2448

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 5

See ad on page 620

Tel: PIlgrim 3-7797

New Exclusive
IRON CORE Development

Saves: Production Costs

Reduces: Breakage Loss

Corrects: for Non-uniformity of torque in phenolic impregnated coil forms



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RADIO CORES, INC.
Originators of

ENGINEERED ECONOMY IRON CORES

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| ★ Covers all thread form | ★ Uniform running torque |
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Operational tested and now being used by leading television, radio and coil manufacturers.
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- **WOUND CORES** - ORTHOSIL, 1ϕ, 3ϕ, TOROIDS

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INDIANAPOLIS 7, INDIANA

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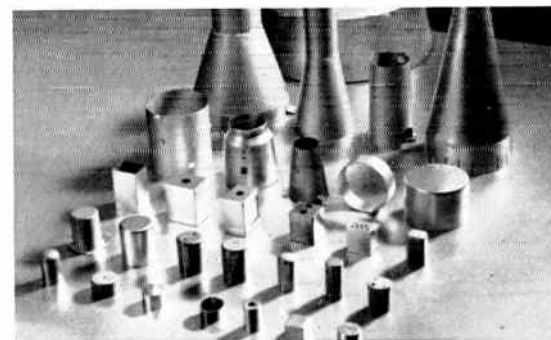
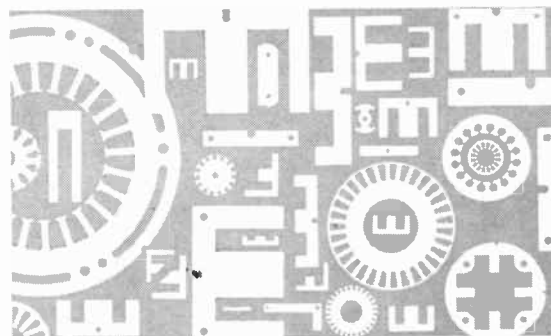
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

1960 IRE Directory

435

World Radio History

Magnetic Metals Company designs and produces stamped and tape wound cores and shields for the electrical and electronic industries.



Powdered Permalloy

FILTROID CORES

have characteristically high permeability combined with low core loss. Nine standard sizes of Filtroid cores are available. Several types of core stabilization and finish are offered to achieve special application requirements.

• Send for Bulletin G-1.

The Ultimate in Tape-Wound Cores

CENTRICORES

Precision manufacturing methods are used to obtain closely matched magnetic characteristics, including high thermal stability. Centricores matched at room temperature will remain matched over wide temperature ranges.

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Mass-Produced . . . Precision-Made

MAGNETIC CORE LAMINATIONS

Motor laminations are produced to close specifications from customer-owned dies. Our representative will discuss your needs. Transformer laminations in a wide variety of shapes and sizes are made from standard dies.

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Drawn or Formed

MAGNETIC SHIELDS

Provide efficient protection of sensitive electrical equipment against stray magnetic fields, and effect a high ratio of field strength reduction. A wide range of single and multiple shield structures are available from existing tools.

• Send for Bulletin F-1.

MAGNETIC METALS

MAGNETIC METALS COMPANY • Hayes Avenue at 21st Street, Camden 1, N.J.

transformer laminations
motor laminations
tape-wound cores
powdered molybdenum
permalloy cores
electromagnetic shields

Directory II. Components

46. Cores & Core Materials.

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5
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Tel: BEEKMAN 3-8870

Vitro Laboratories, N.J., 5, 10, 17, 20, 25
Waters Mfg. Inc., Mass., 5, 10, 35
Western Gold & Platinum Co., Calif., 5, 20
Westinghouse Electric Corp., Pa., 15, 17, 20, 25, 30, 35
Williams Gold Refining Co., 2978 Main St., Buffalo 14, N.Y., 20
See ad on page 681
Tel: UNIVERSITY 7204

Counters: See class 9

Couplings: See class 80

Crystal testers: See class 12

47. Crystals & Accessories.

5. Crystal holders 20. Quartz
10. Crystal ovens 30. Raw quartz
15. Germanium 35. Silicon

Aircom, Inc., N.J., 5
Allegheny Electronic Chemicals Co., 207 Hooker-Fulton Bldg., Bradford, Pa., 35, Single Crystal Slices, Crystal Seeds, Custom Dopes, Special Cast Shapes
See ad on page 438
Tel: BRADFORD 2-3588

American Electronic Labs., Inc., Pa., 5
American Quartz Labs., N.Y., 20
Amersil Quartz Div., Engelhard Industries, Inc., 685 Ramsey Ave., Hillside, N.J., 30, fused quartz and silica
See ad on page 198
Tel: MURDOCK 8-4500

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5
See ad on page 166
Tel: BISHOP 2-1000

Augat Brothers, Inc., 33 Perry Ave., Attleboro, Mass., 5
See ad on page 696
Tel: ATTLEBORO 1-2202

Bassett, Inc., Rex, Fla., 5, 10, 20
Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 10, 20
See ad on pages 124-125
Tel: GLENDALE 6-7561

Bram Metallurgical-Chemical Co., Pa., 15, 20, 30, 35
Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 5
See ads on pages 459, 543, 551
Tel: HAWTHORNE 7-1773

47. Crystals & Accessories.

Breon Labs., Pa., 5, 10, 20, 30
British Thomson-Houston Co., Ltd., England, 15, 35
Bulova Research & Development Labs., Inc., N.Y., 5, 10, 20
Bulova Watch Co., Electronics Div., Dept. A-1376, 40-06 62nd St., Woodside 77, N.Y., 5, 10, 20
See ad on page 440
Tel: NEWTOWN 9-5700

Burnett Radio Lab., Calif., 5, 20
C-W Mfg. Co., Calif., 20
Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 20
See ad on page 693
Tel: TROWBRIDGE 6-2800

Clark Crystal Co., Inc., Mass., 10, 20
Coaxial Connector Co., Inc., N.Y., 5
Component Mfg. Service, Inc., Mass., 5
Constantin & Co., L. L., N.J., 5
Cox & Co., N.Y., 10
Dallons Labs., Inc., Calif., 20, 30
Delta-F, Inc., Ill., 5, 10
Diamond Antenna & Microwave Corp., Mass., 5

Diamond Drill Carbon Co., N.Y., 30
Downing Crystal Co., Md., 10, 20
Edwards High Vacuum, Ltd., Canada, 10
Eidson Electronic Co., Tex., 5, 15, 20
El-Tronics, Inc., Warren Components Div., Pa., 5
Enflo Corp., N.J., 5, Teflon
Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 20, 35
See ad on page 198
Tel: BIGELOW 3-0030

Foote Mineral Co., Pa., 35
General Crystal Co., Inc., Wis., 20
General Electric Co., Ltd. of England, England, 15, 20, 35
Gibbs Mfg. & Research Corp., Wis., 10
Glass-Tite Industries, Inc., R.I., 5
Grace Electronic Chemicals, Inc., 101 North Charles St., Baltimore 1, Md., 35
See ad on page 442
Tel: PLAZA 2-7699

Harmon Lichtenstein & Co., N.Y., 15, 35
Hermetic Pacific Corp., Calif., 5

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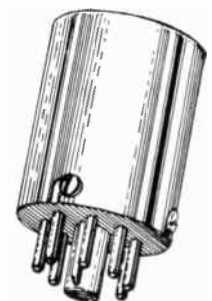
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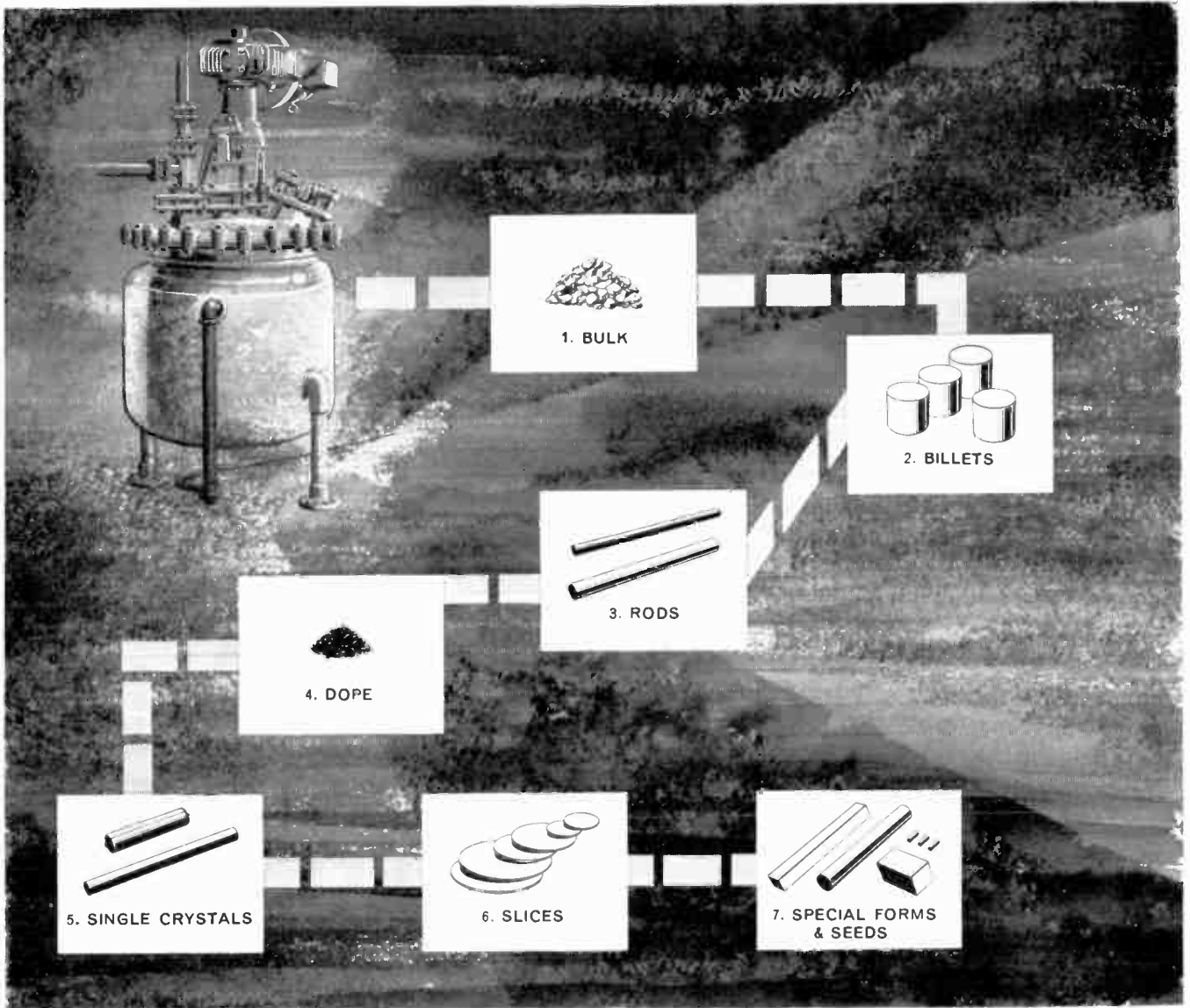
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1. **BULK** — The bulk polycrystalline silicon you get from Allegheny comes in four grades, three semiconductor, one solar. Each requires a minimum of doping, exhibits a high degree of uniformity and shows a significantly low boron level.
2. **CAST BILLETS** — Cut to charge size for Czochralski furnaces and in standard sizes up to 2" in diameter.
3. **CAST RODS** — For float zoning, you get uniformly dense cast rods in standard sizes up to 1", with lengths entirely dependent on your requirements.
4. **MASTER DOPING ALLOYS** — These are made from extremely pure silicon, using 99.999% or better elemental dope. They are alloyed in different ranges, and in homogeneous lots of sufficient size to allow for long term standardization in your production doping procedures.

5. **SINGLE CRYSTALS** — Custom processing of single crystals is a basic service from Allegheny. We will dope to your specifications and grow in Czochralski or float zone furnaces, again depending on application.

6. **SLICES** — You can get slices to meet any surface requirement since Allegheny has both the know-how and facilities for slicing, lapping, and finishing. And 100% testing is your assurance that the slices completely meet your specifications.

7. **SEEDS & SPECIAL FORMS** — You tell us your mounting and other physical requirements and we will provide the shapes and forms, cut ultrasonically. All seeds are oriented optically to $\frac{1}{2}^\circ$ (or better) to the (111), (110), or (100) plane.

Analyze your current silicon supply arrangements. Consider that *only* Allegheny provides every form of silicon you need. Doesn't it look like now is a good time for you to get all the facts from the people at Allegheny? Write, wire, or phone.

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ELECTRONIC CHEMICALS CO.

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252 NORTH LEMON STREET, ANAHEIM, CAL.

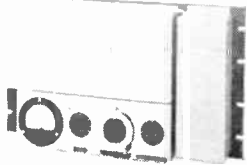
*producers of semiconducting materials
for the electronics industry*



PACKAGED FREQUENCY MANAGEMENT



New JKFS-1100T Precision Frequency Standard: Most advanced-design frequency standard available today, fully transistorized, with double proportional control oven. **Stability:** 5×10^{-10} /Day. **Input:** 24 to 32V DC. **Output:** 1 V into 50 ohms at 1 MC and 100 KC. **Dimensions:** 6.0" H, x $4\frac{3}{16}$ " W x $12\frac{1}{2}$ " D.



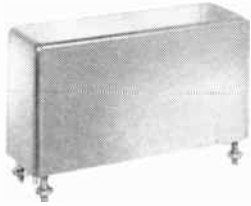
New JKFS-1100TP Companion Power Supply: Companion power supply available to operate from 115V AC, with self-contained stand-by batteries good for up to 20 hours operation. Fully automatic switchover. Weight of combined units: 9 lbs. max. **Dimensions:** 6.0" H x $3\frac{3}{16}$ " W x $12\frac{1}{2}$ " D. Units can be furnished with 7" x 19" panel for rack mounting.

Time-Proven JKFS-1000 Frequency Standard: **Stability:** 1×10^{-9} /Day. **Output:** 5V into 5000 ohms at 1 MC; 500 KC and 100 KC. Pulse output for measurements up to 20 MC. 115 Volt A.C. $15\frac{3}{4}$ " high, 19" wide, for standard rack mounting.

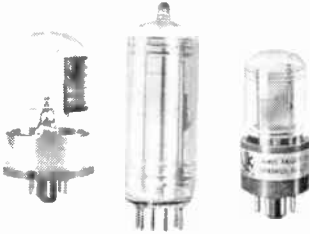


JK Thermystals: Advanced-design frequency control units combining plug-in simplicity with extreme precision. **Frequency stability:** 30 to 900 kc, $\pm 0.001\%$; 1000 kc to 30 mc, $\pm 0.0005\%$. Higher frequencies available.

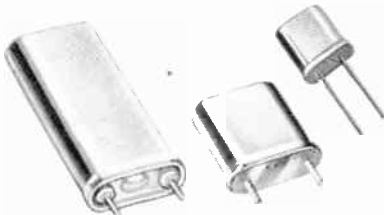
JK Transistor Oscillators: Complete, compact, precise plug-in signal sources providing fixed temperature and humidity environment for transistor and circuitry elements. **Frequency Range:** 100 Cycles to 75 m.c. **Frequency Stabilities:** (24-hr. period) Up to 1×18^8 . Fully transistorized and temperature controlled.



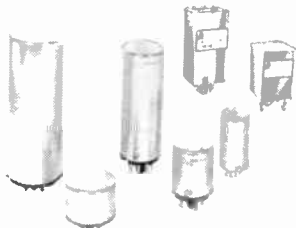
JK Crystal Filters: Compact, rugged, hermetically-sealed and stable, JK CRYSTAL FILTERS (band pass filters) have a **Frequency Range:** 1 kc to 40 mc., and are available for special filtering purposes to 150 mc. **Band Width** at 6 db: 0.01% to 4% of nominal on most frequencies, and up to 10% for certain frequencies.



JK Glasline Crystals: For ultra stable frequency control, JK GLASLINE CRYSTALS provide unprecedented stability and reliability. Compact, evacuated and hermetically-sealed against moisture, contamination, shock, and barometric pressure. Over a complete range at 1000 cycles to 5 mc. and up. High shock and vibration performance.



JK Military Types: Hermetically-sealed, JK MILITARY TYPE CRYSTALS are metal-cased and in **Frequency Ranges:** 8 kc to 100 mc. High shock and vibration performance.



JK Ovens: Capable of maintaining set temperatures around components or circuitry with less than $\pm 1^\circ$ C. variation over the range of -55° to $+100^\circ$ C., JK OVENS are light, compact, inexpensive, uniform and reliable.

THE JAMES KNIGHTS COMPANY—SANDWICH, ILLINOIS

For details, circle #391 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory II. Components

47. Crystals & Accessories.

Hermetic Seal Corp., 31 S. Sixth St., Newark 7, N.J., 5

See ad on page 460

Tel: MARKET 3-9400

Hermetite Corp., Mass., 5

Hoffman Co., P. R., 321 Cherry St., Carlisle, Pa., 20, 30

See ad on page 437

Tel: CARLISLE 1090

Hunt Corp., 453 Lincoln St., Carlisle, Pa., 5, 10, 20

See ad on page 437

Tel: CARLISLE 1486

Hupp Electronics Co., Pa., 10, 20

Intelix Systems, Inc., N.Y., 5, 20

International Crystal Mfg. Co., Inc., Okla., 5, 10, 20

Isomet Corporation, N.J., 15, 35

Javex Electronics, Calif., 5

Keller, Jr., Hugo P., N.Y., Sapphire & Ruby

Kemtron Electron Products, Inc., Mass., 15, 35

Keystone Electronics Co., N.J., 10, 20

Knopic Electro-Physics, Inc., Calif., 15, 35, Silicon Ingots

Knights Co., James, 101 E. Church St., Sandwich, Ill., 5, 10, 20, 30

See ad on this page

Tel: 2141

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 10

See ad on page 300

Tel: LOWELL 6-2600

Lewis Co., Inc., E. B., Conn., 20

Lindberg Engineering Co., Ill., 10

Litton Industries, Airtron, Inc., Div., N.J., 5

Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 10

See ad on pages 302-303

Tel: DAVIS 5-1391

Marconi's Wireless Telegraph Co., Ltd., N.Y., 20

Master Mobile Mounts, Inc., Calif., 20

Materials for Electronics, Inc., N.Y., 15

McCoy Electronics Co., Watts & Chestnut Sts., Mount Holly Springs, Pa., 10, 20

See ad on page 441

Tel: HUNTER 6-3411

Merck & Co., Inc., Electronic Chemicals Div., Dept. IR-109, Lincoln Ave., Rahway, N.J., 35

See ad on page 208

Tel: FULTON 1-5000

Meridian Metalcraft, Inc., Calif., 5

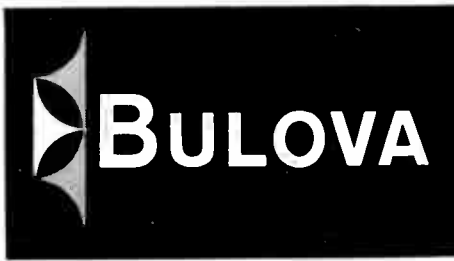
Metox, France, 5

Micarta Fabricators, Inc., Ill., 5

Micro-Lectric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, L.I., N.Y., Crystal Holder Assemblies

See ad on page 533

Tel: FREeport 8-3222



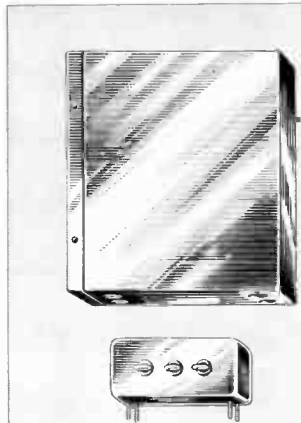
SYNONYM FOR QUALITY, RELIABILITY AND STABILITY!

Frequency control SYSTEMS AND OSCILLATORS .3 cps to 100 mc

Bulova frequency control systems and oscillators are custom-engineered for the most exacting military and industrial applications.

Bulova systems and oscillators span the frequency range from .3 cps to 100 mc and in stability ± 15 pp million without oven to ± 1 pp 10^6 with proportional oven control ... are available in either tube type or transistor construction.

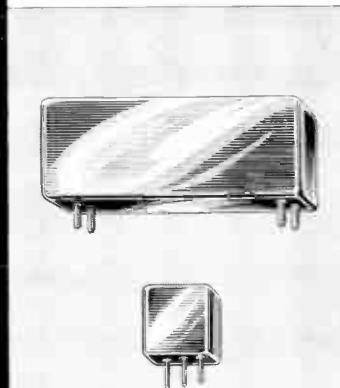
They graduate in size from the MB-100 (1" x 1" x 2") to complete systems. The MB-100 compensated crystal oscillator assures single frequency output with a stability of ± 15 pp million from -50°C . to $+90^\circ\text{C}$. without oven control. Complete systems may include power supply, oscillator, gated and resetting circuitry, binary stage, voltage regulator and pulse or power amplifiers



Crystal FILTERS 7 kc to 20 mc

Bulova crystal filters are designed to solve filtering problems at center frequencies with bandwidths of 0.01% to 8% and slope factors of 60/6 db as steep as 1.4 to 1.

Bulova filters shave the frequency range from 7 kc to 20 mc, inclusive ... are available as bandpass, reject and single side band. They graduate in size from the 2E2 SM ($1\frac{1}{8}$ " x $1\frac{1}{2}$ " x $1\frac{1}{8}$ "") for frequencies of 175 kc through 20 mc to the OE6 ($5\frac{1}{2}$ " x $3\frac{1}{8}$ " x $3\frac{3}{4}$ "") a single side band for frequencies of 7 kc through 500 kc.

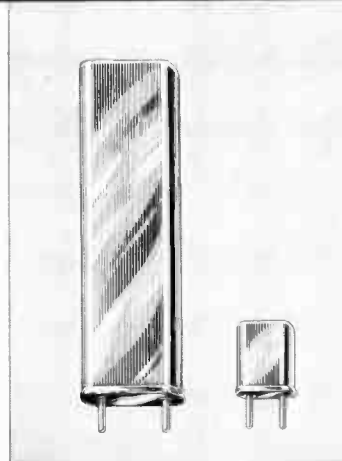


CRYSTALS 2 kc to 100 mc

Bulova crystals are designed and produced for use wherever reliable, close-frequency control is essential.

Bulova crystals assure exacting control from 2 kc through 100 mc with 100 g shock resistance and 30 g to 2000 cps vibration resistance in most frequencies. They graduate in size from the HC-13/U ($1\frac{1}{2}$ " x $2\frac{3}{2}$ " x 3") for 2 kc to the HC-18/U (.50" x .400" x .510") for 100 mc. The HC-18/U is now available to cover 450 kc through 1100 kc and 2 mc through 100 mc.

The majority of Bulova MIL Type crystals may be obtained in miniature holders.



OVENS

Bulova ovens are engineered to maintain $\pm .1^\circ\text{C}$. of operating temperatures so as to assure superior results in electrical stability of crystals, components and circuitry.

Bulova ovens graduate from the AM-100ED (external measurements: 3" diameter with a 7" maximum height; internal: 1.96" diameter with a 6" height) to the BHC-18-1 (external: $1\frac{1}{2}$ " x $1\frac{3}{2}$ " x $1\frac{1}{4}$ "; internal: $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $1\frac{1}{2}$ ""). The AM-100 maintains a

temperature stability of $\pm .1^\circ\text{C}$. and is used for Bulova Type 74 glass crystal holders (Military Type HC-15/U), or complete systems. The BHC-18-1 holds temperature to $\pm 2^\circ\text{C}$. (-55° to $+90^\circ\text{C}$. ambient) and has a capacity for a single HC-18/U plug-in type crystal holder or four crystal diodes, such as the IN658.



Complete information on all Bulova components and systems is available from your nearest Sales Representative, or by writing—*Department A-1376, Electronics Division, Bulova, 40-06 62nd Street, Woodside 77, New York.*



Actual Size

SINGLE CRYSTALS

for MICROWAVE APPLICATIONS

FERRIMAGNETIC SINGLE CRYSTAL YIG IS NOW AVAILABLE FOR MICROWAVE DEVELOPMENT.

LOW-LOSS YIG NOW ALLOWS GREATER FLEXIBILITY IN THE DESIGN OF

Pass or rejection band tunable filters

Compact circulators, isolators and gyrators

Ferrite parametric amplifiers

VHF and UHF components

Magneto-optical devices

Call or Write Department 12 for Data.

**MICROWAVE
CHEMICALS LABORATORY, INC.**
282 SEVENTH AVE. - NEW YORK 1, N. Y.

For details, circle #393 on Reader Service Card
1960 IRE Directory

Directory II. Components

47. Crystals & Accessories.

Micromech Mfg. Corp., N.J., 5
Microwave Associates, Inc., Mass., 5, 35
Microwave Chemicals Laboratory, Inc.,
Dept. 12, 282 Seventh Ave., New York
1, N.Y., Yttrium Iron Garnet
See ad on this page

Tel: WAtkins 4-6725

Midland Mfg. Co., Inc., Kan., 10, 20
Miller Labs., August E., N.J., 10, 20
Monitor Products Co., Calif., 5, 10, 20,
30

Motorola, Inc., Ariz., 5, 10, 15, 20, 30, 35
Nebel Lab., R. E., N.Y., 5, 20
Northern Engrg. Labs., Inc., Wis., 5,
10, 20

Nuclear-Chicago Corp., Ill., 5
Pan American Trade Development
Corp., N.Y., 30

Peterson Radio Co., Inc., Iowa, 20
Piezo Crystal Co., Pa., 5, 10, 20
Precision Crystal Laboratory, Calif., 10,
20

Precision Piezo Service, La., 20
**Premier Instrument Corp., 33 New
Broad St., Port Chester, N.Y., 5**

See ad on page 390

Tel: WEstmore 9-8900

Premier Research Labs., Inc., N.Y., 5,
10, 20, Tourmaline

Product Development Corp., Mass., 35
Quartzite Processing, Inc., Mass., 20
Raytheon Co., Mass., 15, 35

Reeves-Hoffman Div., Pa., 10, 20
Republic Lens Co., Inc., N.Y., 15, 20
Robertshaw-Fulton Controls Co., Aero-
nautical-Instrument Div., Calif., 10
Roller Mike, Inc., N.Y., 20
Sage Labs., Inc., Mass., 5
Sanders Assoc., Inc., N.H., 5
Scientific Radio Products, Inc., Neb.,
10, 20

Scientific Radio Service, Md., 20

Semi-Elements, Inc., Pa., 15, 20, 35

Semicon, Inc., Mass., 35

Semimetals, Inc., N.Y., 15

**Sherold Crystals, Inc., Truman Road &
McGee Trafficway, Kansas City 8, Mo.,
5, 10, 20, 30**

See ad on this page

Tel: VICTOR 2-9792

Standard Telephones & Cables, Ltd.,
England, 15, 20, 35

Staver Co., Inc., N.Y., 5

Thermal American Fused Quartz Co.,
N.J., 20

Trancoa Chemical Corp., 312-326 Ash
St., Reading, Mass., 35, Silicon—
Semiconductor and Solar Grades

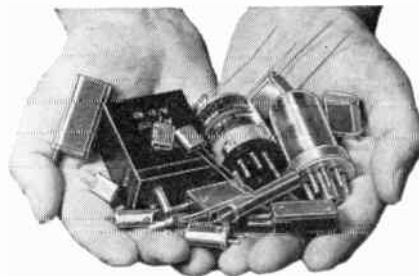
See ad on page 134

Tel: READING 2-3900

United Mineral & Chemical Corp., 16
Hudson St., New York 13, N.Y., 15

See ads on pages 541, 681

Tel: BEEKMAN 3-8870



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Write for complete data on your requirements.



Phone VICTOR 2-9792
Truman Road & McGee Trafficway
Kansas City, Mo.

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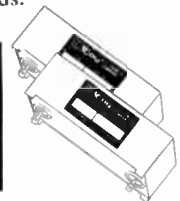
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QUARTZ
CRYSTALS



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Quality
CRYSTAL
FILTERS



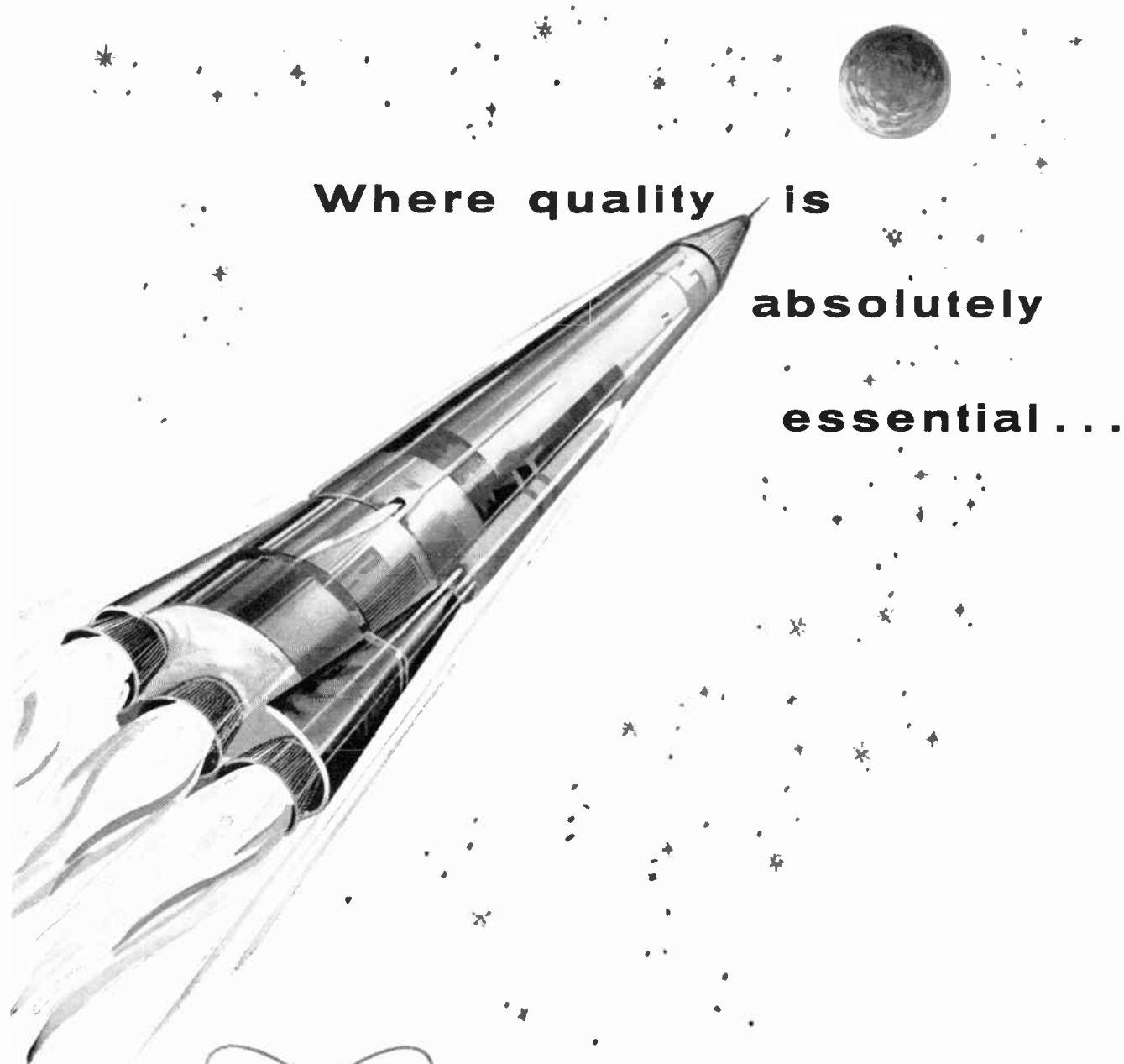
from 1 m.c. to 30 m.c. with band width of 0.1% to 0.8% of center frequency.

For additional information on your specific needs, write, wire or phone us. Our research section will be glad to assist you.

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COMPANY**
Mt. Holly Springs, Pa.
Phone: HUNTER 63411

For details, circle #395 on Reader Service Card

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Where quality is
absolutely
essential . . .

GRACE SILICON

(ultra-high-purity)

Minute instruments in the nose cones of American space explorers record vital phenomena beyond the pull of earth's gravity. The phenomena: the unknowns of outer space including bands of radiation, cosmic rays, temperatures, etc. The data recorders: complex electronic devices packed with transistors, diodes, rectifiers and other subminiature signal transmitters.

It wasn't possible ten years ago. It wouldn't be

possible today if it weren't for ultra-high-purity silicon. Purity such as is produced by the Pechiney process used in the manufacture of Grace Silicon.

May we suggest that wherever silicon of top quality is required—for semiconductor devices in research, military, industrial and entertainment uses—call or write GRACE ELECTRONIC CHEMICALS, INC., PL 2-7699, 101 N. Charles Street in Baltimore.

GRACE ELECTRONIC CHEMICALS, INC.



101 N. Charles St., Baltimore, Maryland

Subsidiary of W. R. Grace & Co.

BREW DELAY LINES

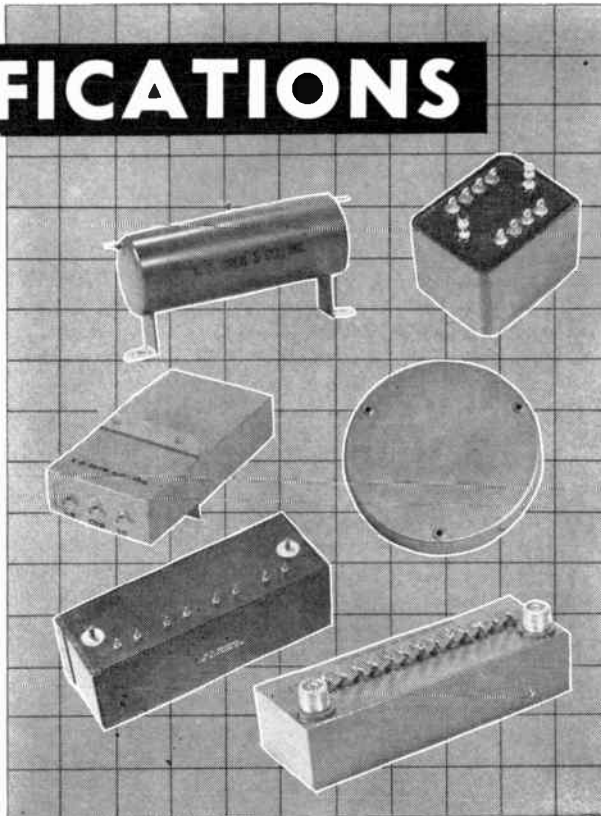
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BREW'S experienced personnel can solve your Delay Line Problems.

- Competent Engineers
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Founded in 1946 for design, development and manufacture of delay lines.

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Richard D. Brew and Company, Inc.

design

development

manufacture

Concord, New Hampshire

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Crystals & Accessories—Class 47
Delay Lines—Class 48

Directory II. Components

47. Crystals & Accessories.

United States Dynamic Corp., Mass., 15, 35
U.S. Semiconductor Products, Inc., 3540 W. Osborn Rd., Phoenix, Ariz., 35
See ad on page 252
Tel: APplegate 8-5591
Valpey Crystal Corp., Mass., 10, 20
Victor R. F. & Microwave Co., Mass., 5
Waldom Electronics, Inc., Ill., 5
Westronix Corp., Texas Crystals Div., Fla., 5, 10, 20
Wright Electronics, Inc., Mo., 10, 20

Cutting Heads & styli: See class 63

Decades: See class 5

Deflection yokes: See class 43

48. Delay Lines.

- | | |
|-----------------------------------|------------------------------|
| 5. Decade | 20. Lumped constant fixed |
| 10. Distributed constant fixed | 22. Lumped constant variable |
| 15. Distributed constant variable | 25. Ultrasonic |

ACDC Electronics Inc., Calif., 10, 20
AMP, Inc., Capatron Div., Pa., 10, 20
Admiral Corp., Ill., 10, 15

Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 5, 10, 15, 20, 22

See ad on page 337
Tel: GRegory 2-5622

Airtronics International Corp., Fla., 10, 20

Andersen Labs., Inc., Conn., 25

Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain (Boston), 30, Mass., 25

See ad on page 388
Tel: JAMAica 2-8640

Artronic Instrument Co., Md., 5, 20, 22
Barker & Williamson, Inc., Pa., 20

Beckman Berkeley Div., Calif., 22

Beckman Instruments, Inc., Helipot Div., Calif., 15

Bel Fuse, Inc., 197 Van Vorst St., Jersey City, N.J., 10

See ad on page 445
Tel: HENDERSON 2-0463

Bell Aircraft Corp., Avionics Div., N.Y., 20

Biley Electric Co., 200 Union Station Bldg., Erie, Pa., 25

See ad on pages 124-125
Tel: GLendale 6-7561

Brew & Co., Inc., Richard D., 90 Airport Rd., Concord, N.H., 5, 10, 15, 20, 22, 25

See ad on this page
Tel: CAPitol 5-6606

**high impedance
MAGNETIC-CORE
DELAY LINES**

Excellent transmis-
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**LUMPED CONSTANT
DELAY LINES**

Custom built to
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Our Delay Lines are being used by leading manufac-
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48. Delay Lines.

- Brubaker Electronics, Inc., Calif., 20
Burnell & Co., Inc., Dept. P-11, 10 Pel-
ham Parkway, Pelham, N.Y., 20
See ads on pages 52, 90, 101, 129
Tel: PELham 8-5000
- Caddell-Burns Mfg. Co., N.Y., 20
Carad Corp., Calif., 20
Celco—Constantine Engineering Labo-
ratories Co., 70 Island Ave., Mahwah,
N.J., 10, 15, 20
See ads on pages 36-37, 88-89
Tel: DAVis 7-1123
- Circo Ultrasonic Corp., 51 Terminal
Ave., Clark, N.J., 25
See ad on page 663
Tel: FULTon 8-8600
- Coil Winders, Inc., 100 New York Ave.,
Westbury, L.I., N.Y., 10, 20, 22
See ad on page 410
Tel: EDgewood 4-3170
- Columbia Technical Corp., 61-02 31st
Ave., Woodside 77, L.I., N.Y., 10, 20
See ads on pages 444, 659
Tel: AStoria 8-7401
- Communication Accessories Co., U.S.
Highway 50 & 71 Bypass, Lee's
Summit, Mo., 20
See ad on pages 122-123
Tel: BRoadway 1-1700
- Control Electronics Co., Inc., 10 Stepar
Pl., Huntington Station, L.I., N.Y., 5,
10, 15, 20, 22, 25
See ads on pages 321, 451
Tel: HAMILton 7-7961


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Fixed. Lumped; Constant, Fixed.
Pulse Forming, Networks**

Nearly all of our production is on special
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plant for the tooling and fabrication
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1960 IRE Directory

Directory II. Components

48. Delay Lines.

Corning Glass Works, 550 High St.,
Bradford, Pa., 25
See ads on pages 400, 527
Tel: 2-4571

Dallons Lab., Inc., Calif., 25

Deltime, Inc., N.Y., 10, 15

Deutschmann Corp., Tobe, 921 Providence Highway, Norwood, Mass., 20
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Tel: NOrwood 7-2620

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Dietz Design & Mfg. Co., Mo., 5, 10, 15, 20, 22, 25

Double E Prod. Co., Calif., 20

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ESC Corp., 534 Bergen Blvd., Palisades Park, N.J., 5, 10, 15, 20, 22

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Tel: WIndsor 7-0400

Electronic Assistance Corp., N.J., 25

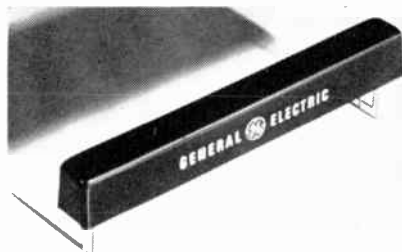
El-Rad Mfg. Co., Ill., 5, 10, 15, 20, 22

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Essex Electronics, 569 Springfield Ave., Berkeley Heights, N.J., 10, 15, 20, 22

See ad on page 155

Tel: CRestview 3-9300



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A unique General Electric product, *Electrically Variable Delay Lines* are suitable for general signal processing applications and as modulating devices for FM communications equipment. Highly adaptable to transistorized circuitry, EVDL's can be produced within a wide range of operating characteristics to give delays up to 12 microseconds. Tailored to defense electronics equipment, the EVDL will withstand extreme humidity, shock and vibration.

227-24

GENERAL ELECTRIC

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HEAVY MILITARY ELECTRONICS DEPARTMENT
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Ferranti Electric, Inc., Electronics Div., N.Y., 25

Filtron Co. Inc., N.Y., 5, 10, 15, 20, 22

Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 10, 20

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Tel: YE 4-2691

Fugle-Miller Labs., Inc., 301 Central Ave., Clark, N.J., 20

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Tel: FULton 1-2727

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General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 10, 15, 25

See ads on pages 283, 288, 445, 447, 505, 617

Tel: GRanite 6-4411

General Electric Co., Specialty Electronic Components Dept., N.Y., 10, 15, 20, 22, Wire Sonic

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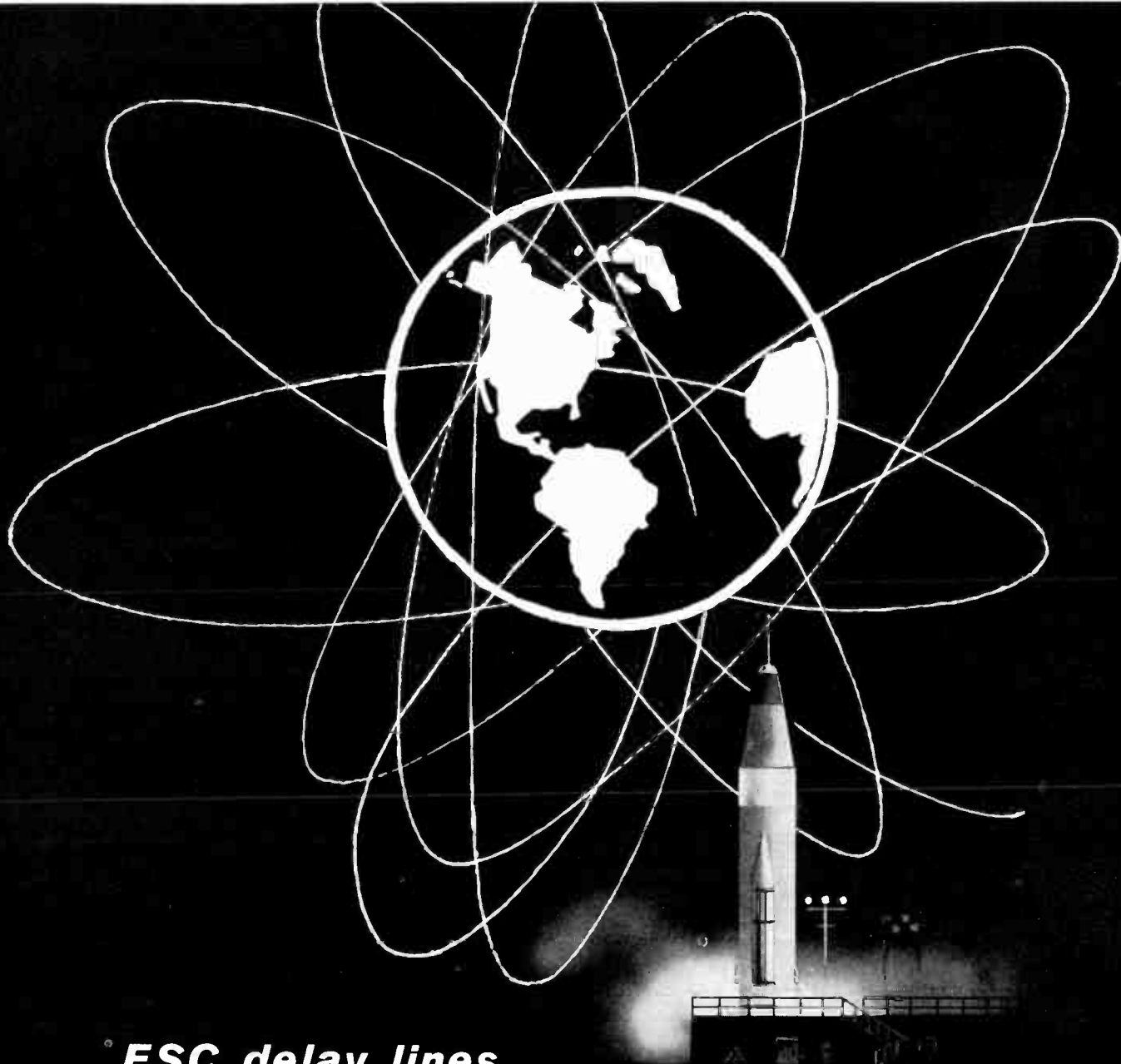
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PHONE: HEnderson 2-0463

| Part # | Delay ± 5% | Impedance ± 10% | Rise Time (Maximum) | Length inch. | O.D. inch. |
|--------|------------|-----------------|---------------------------------|--------------|------------|
| 2-05 | .05 usec | 200 ohms | .05 usec for delay of .3 usec | 1 1/2" | .375" |
| 2-1 | .1 | | | 2 1/2" | |
| 2-15 | .15 | | | 3 1/2" | |
| 2-2 | .2 | | | 4 3/4" | |
| 2-25 | .25 | | | 5 3/4" | |
| 2-3 | .3 | | | 6" | |
| 3-1 | .1 usec | 300 ohms | .055 usec for delay of .45 usec | 1 3/4" | .325" |
| 3-2 | .2 | | | 3 3/4" | |
| 3-3 | .3 | | | 4" | |
| 3-4 | .4 | | | 5 3/8" | |
| 3-45 | .45 | | | 6" | |
| 5-1 | .1 usec | 500 ohms | .09 usec for delay of 1.0 usec | 1 1/8" | .325" |
| 5-2 | .2 | | | 1 3/4" | |
| 5-3 | .3 | | | 2 1/4" | |
| 5-4 | .4 | | | 3" | |
| 5-5 | .5 | | | 3 1/4" | |
| 5-6 | .6 | | | 3 3/4" | |
| 5-7 | .7 | | | 4 1/4" | |
| 5-8 | .8 | | | 5" | |
| 5-9 | .9 | | | 5 3/4" | |
| 5-10 | 1.0 | | | 5 7/8" | |
| 10-1 | .1 usec | 1000 ohms | .09 usec for delay of 1.0 usec | 1 1/8" | .325" |
| 10-2 | .2 | | | 1 3/4" | |
| 10-3 | .3 | | | 2 1/4" | |
| 10-4 | .4 | | | 3" | |
| 10-5 | .5 | | | 3 1/4" | |
| 10-6 | .6 | | | 3 3/4" | |
| 10-7 | .7 | | | 4 1/4" | |
| 10-8 | .8 | | | 5" | |
| 10-9 | .9 | | | 5 3/4" | |
| 10-10 | 1.0 | | | 5 7/8" | |
| 10-11 | 1.1 | | | 6" | |
| 12-1 | .1 usec | 1200 ohms | .09 usec for delay of 1.0 usec | 1 1/4" | .325" |
| 12-2 | .2 | | | 1 3/4" | |
| 12-3 | .3 | | | 2 1/2" | |
| 12-4 | .4 | | | 3" | |
| 12-5 | .5 | | | 3 3/4" | |
| 12-6 | .6 | | | 4 1/4" | |
| 12-7 | .7 | | | 4 3/4" | |
| 12-8 | .8 | | | 5 1/2" | |
| 12-9 | .9 | | | 6" | |
| 12-10 | 1.0 | | | 6 1/4" | |
| 18-1 | .1 usec | 1800 ohms | .09 usec for delay of 1.0 usec | 1 1/4" | .325" |
| 18-2 | .2 | | | 1 3/4" | |
| 18-3 | .3 | | | 2 1/2" | |
| 18-4 | .4 | | | 3" | |
| 18-5 | .5 | | | 3 3/4" | |
| 18-6 | .6 | | | 4 1/4" | |
| 18-7 | .7 | | | 4 3/4" | |
| 18-8 | .8 | | | 5 1/2" | |
| 18-9 | .9 | | | 6 1/4" | |
| 18-95 | .95 | | | 6 1/4" | |
| 25-1 | .1 usec | 2500 ohms | .07 usec for delay of .7 usec | 1 1/4" | .325" |
| 25-2 | .2 | | | 2 1/4" | |
| 25-3 | .3 | | | 3 1/4" | |
| 25-4 | .4 | | | 4" | |
| 25-5 | .5 | | | 4 3/4" | |
| 25-6 | .6 | | | 5 1/2" | |
| 25-7 | .7 | | | 6 1/4" | |
| 25-75 | .75 | | | 6 1/4" | |

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ESC delay lines take off with America's talking satellite

On December 18, 1958, the world entered a new era of communications with the successful orbiting of an Atlas ICBM—the Talking Satellite that broadcast President Dwight D. Eisenhower's Christmas message to the world. Circling the earth at a speed of more than 17,000 mph, the Talking Satellite repeated the President's message, erased it, and received and rebroadcast new messages in both voice and code.

ESC Corporation is justifiably proud that its delay lines were selected to aid in this electrifying triumph for America and her electronics industry. Especially designed by ESC, these delay lines were used in the timing sequence for propulsion, the guidance system and the telemetering system.

As America's largest manufacturer of custom-built and stock delay lines, ESC has continually met the responsibility of leadership by providing virtually every type of delay line needed by defense and industry. If you have a delay line problem, let ESC's design staff suggest a custom-built answer.



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World Radio History

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49. Equalizers.

| | |
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WIRE SONIC DELAY LINES

New in the field of delay devices, *Wire Sonic Delay Lines* employ a special alloy wire as the delay medium. WSDL provides long delay per unit volume (up to 10,000 μ sec) and adjustable or fixed delay. Plus values such as shock and vibration resistance, stability over wide temperature ranges and the availability of output taps give this advanced type of delay device unlimited applications at relatively low cost. 227-23

GENERAL ELECTRIC

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BROADBAND RF AMPLIFIERS



40-1000 mcs

Model HFW Amplifiers cover an octave of frequency. Their truly exceptional performance features low noise, high gain with low power drain. Units are available in weather-proof cases for antenna mounting or other outdoor installation.

SPECIFICATIONS (condensed)

Model HFW-302

| | |
|-----------------------|---------------------------|
| Input freq. | 300 to 600 mcs |
| Input, output VSWR | Less than 1.5 in passband |
| Noise figure, average | 7 db |
| Gain | 20 db |

BANDPASS FILTERS



30-2000 mcs

Model HFF and HFF-T Bandpass Filters are rugged, reversible in operation, remarkable in performance (which approximates theoretical expectations). Advanced filter designs are also available for antenna couplers and diplexers.

SPECIFICATIONS (Condensed)

Model HFF-T3

| | |
|----------------|------------------|
| Center freq. | 425 mcs |
| Bandwidth | 50 mcs |
| Insertion loss | 0.15 db |
| VSWR | 1.03 in passband |

UHF CONVERTERS

300-900 mcs

Model UHC-R Converters provide the ultimate in sensitivity and performance, featuring low noise, high image and spurious rejection, minimum adjacent channel interference.

TYPICAL SPECIFICATIONS (condensed)

(Model UHC-R-4.5)

| | |
|------------------|----------------------|
| Input freq. | 400-525 mcs |
| RF bandwidth | 10 mcs |
| Noise figure | 5.5 db |
| Output bandwidth | 5 mcs |
| Converter gain | 50 db (min.) overall |

FIXED PAD Attenuators & Terminations

(Patents Pending)



For Type

BNC Connectors

DC to 1000 mcs

HFA-50 and HFA-75 Attenuators; HFT-50 and HFT-75 Terminations have impedances of 52.5 and 75 ohms; VSWR is 1.2 maximum up to 1000 mcs; attenuation values 1 to 20 db.

For Type

TNC Connectors

DC to 2000 mcs

HFA/T-50 and HFA/T-75 Attenuators; HFT/T-50 and HFT/T-75 Terminations have impedances of 52.5 and 75 ohms; VSWR is 1.2 maximum up to 2000 mcs; attenuations values 1 to 20 db.



For Type

N Connectors

DC to 2500 mcs

HFA/N-50 Attenuators and HFT/N-50 Terminations have impedances of 52.5 ohms; VSWR is 1.2 maximum up to 2500 mcs; attenuation values 1 to 20 db.



Impedance Transformers

For Type

BNC Connectors

DC to 1000 mcs

Type HFAM Impedance Matching Transformers match any pair of 50, 75, 93 ohms with minimum loss over a broad band of frequencies; VSWR is 1.2 maximum at 1000 mcs



Literature is available on all ARI systems and equipments.

Applied Research inc.

76 S. Bayles Avenue, Port Washington, N.Y., Port Wash. 7-8707

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49. Equalizers.

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50. Filters.

- | | |
|-----------------------------------|---------------------|
| 5. Antenna | 22. Low pass |
| 10. Band pass & band rejection | 25. Mechanical |
| 12. Crystal | 30. Microwave |
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| 15. High pass | 37. SSB |
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WHERE SHARING PAYS OFF

SOME YEARS AGO we pointed out in "Proceedings of the IRE" that an amazing and unique characteristic of scientific men is their sense of responsibility to the past and to the future, expressed in their sharing with one another the new findings and discoveries of their science. The fact that engineers share information is a major contribution to the amazing growth of industrial progress and to our high standard of living.

Design Engineers seem to have an impelling need to publish. It is important and fortunate that they have had magazines in which to publish. Of course, their articles make these magazines possible, just as the publishing organization's faith and courage gives them the vehicle for communication. A magazine is a three-way team of author, medium, and reader—mutually dependent.

Such a contribution of one to the other is the vital service of the periodical. The thundering pace of radio-electronics and its expression in communications; glorious hi-fi music; the brilliant, full-color picture; and that same radio principle bringing in a new era in industrial controls which makes automation practical; the amazing time-and-effort-saving electronic computer; and new fabulous developments already being discovered in research which will be made practical by the radio engineer—all these *could not have been possible* without the publication as a means of collating and organizing information, and distributing it to those who needed it and *knew how to work with it*.

These are generalities! But "Proceedings of the IRE" is *specific*. The Superheterodyne circuit, FM, TV, radar, the computer, color TV, the transistor, scatter propagation, solid state electronics (stereotronics) all were presented and developed *article by article* in the history-making issues of "Proceedings of the IRE." The impact on industry of this broad exchange of information among engineers has been enormous, creating new markets and even new ways of life.

FM is an excellent illustration of this "sharing." Consider particularly the "lead out time" needed in FM. In December 1935, an article by Armstrong (an IRE Member) in "Proceedings of the IRE" proved conclusively to the engineering world that frequency modulation was an improvement *and practical*. (Today, FM is the audio side of every TV receiver.) This was the fourteenth article on frequency modu-

lation that had appeared in "Proceedings of the IRE," eight of them by Armstrong. It is now known that some of these articles which defined the weakness that had to be corrected, as well as some that amplified the discovery by further independent research, all helped make the final perfection possible.

At that time, in all the world, only four other articles on the subject had appeared. These were condensations of the "discussion" in "Proceedings of the IRE." Yet the final "Proceedings" article was published six years before the first FM broadcasting station went on the air. Engineers needed every bit of this "lead-out time" to do their work. The early publication in "Proceedings of the IRE" gave them just that; and thousands of engineers, who had followed this series, knew in December, 1935 that a great change had come and that they must design and tool up for it. Armstrong shared, "Proceedings" published, and an industry profited!

This is the traditional service of the "old-line" magazine. The author "shared"—the magazine "published"—the reader "studied" and industry progressed mightily through the three-way contribution. Truly, the reader contributes attention! This kind of publishing wins such attention, more than any other kind! It does the ground-work and sales-conviction building that comes years ahead of the final product news.

Advertising shares! The informative "ad" follows exactly the same pattern with exactly the same results. Again and again, display copy in "Proceedings of the IRE" has announced new developments or highlighted the engineering usage of a staple item. Year-after-year, we have seen tiny businesses start sharing their helpful information with readers in "Proceedings of the IRE" and as a result reap orders, prosper and grow. Today in aggregate, they are the giant industry identified as "Electronics."

It is said that the fundamental result of a magazine is to define a market. Since 1913, "Proceedings of the IRE" has defined an unfolding technical radio and electronic market by articles that stimulated the use of new products, and by presenting the manufacturers' stories of these new components, instruments and systems to engineers eager for as many new devices as would serve them well.

Proceedings of the IRE

Editorial Department:
1 East 79th St., New York 21, N.Y.
LEhigh 5-5100

Advertising Department:
72 West 45th St., New York 36, N.Y.
MUrray Hill 2-6606



DELAY LINES FILTERS

AUDIO AND HIGH FREQ.
MINIATURIZED

Control Electronics Co. Inc. specializes in the design and production of electromagnetic and magnetostrictive delay lines and miniaturized filters. A sample grouping is shown here. Further information is available from our Engineering Dept.

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CEC DISTRIBUTED CONSTANT DELAY LINE FEATURES

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- Bandwidths to 20 mcs
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Multi-tapped Lumped Constants available in many configurations

DELAYS TO 20,000 MICROSECONDS
BANDWIDTHS TO 500 MCS
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Over 275 standard Lumped Constant Delay Lines available

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Complete delay and pulse systems designed to your needs.

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- Null "T"
- Ultra Stable
- Band Suppression
- Constant Delay



**SPECIAL FILTERS AND TOROIDS
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QUICK DELIVERY**



CONTROL ELECTRONICS Co., INC.
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NOTE: Data Sheets on request

Directory II. Components

50. Filters.

- Devol Research Co., Conn., 10
Diamond Antenna & Microwave Corp.,
Mass., 5, 10, 12, 15, 22, 30
Dietz Design & Mfg. Co., Mo., 5, 10, 12,
14, 15, 20, 22, 35, 37, 45
Donner Scientific Co., Calif., 15, 22
Double E Products Co., Calif., 10, 15,
22, 35

Douglas Microwave Co., Inc., Dept. R-9,
252 E. 3rd St., Mt. Vernon, N.Y., 22,
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Tel: MOUNT VERNON 8-6900

- Downing Crystal Co., Md., 12
Dresser Inds., Hermetic Seal Trans-
former Co. Div., Tex., 10, 12, 15, 22, 37
Dynamic Electronics-New York, Inc.,
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Dytronics Co., Ohio, 10

EMI—Cossor Electronics, Ltd., 301
Windsor St., Woodside, Halifax, N.S.,
Canada, 10, 45

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Tel: HALIFAX 6-7491

E.M.I. Electronics Ltd., England, 5
ESC Corp., 534 Bergen Blvd., Palisades
Park, N.J., 10, 15, 20

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Tel: WINDSOR 7-0400

Eagle Electronics Corp., Conn., 10, 15,
22, 35

Eclipse Electronics Co., Canada, 35
Electron Products Co., Calif., 35
Electronic Research Associates, Inc.,
N.J., 22

Electronic Specialty Co., Calif., 5, 30, 45
Electronic Transformer Co., Inc., N.Y.,
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El-Rad Mfg. Co., Ill., 5, 10, 14, 15, 20,
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Empire Devices Products Corp., 37
Prospect St., Amsterdam, N.Y., 10, 22,
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Tel: VICTOR 2-8400

Entron, Inc., Md., 10, 14, 15, 22, 45
Espey Mfg. Co., Inc., N.Y., 10, 15, 22

FXR, Inc., 26-12 Borough Place, Wood-
side 77, N.Y., 30

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Tel: ASTORIA 8-2800

Federal Scientific Corp., N.Y., High
Resolution

Ferrotran Electronics Co., N.Y., 10, 15,
22

Filtron Co., Inc., N.Y., 5, 10, 15, 22, 35,
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Flow Corp., Mass., 22

Forbes & Wagner, Inc., 350 Central
Ave., Silver Creek, N.Y., 10, 15, 22

See ads on pages 349, 369, 413, 444,
453, 565

Tel: YE 4-2691

Foster Transformer Co., Ohio, 10, 15, 22,
35

For details, circle #406 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.



10 Mc
Crystal Filter
shown approx. 3/4 size

The accompanying table shows a partial list of standard Hermes Filters. Custom units may be engineered to your particular specifications of center frequency, bandwidth, selectivity, and impedance level. Write for *Crystal Filter Technical Bulletin*.

CRYSTAL FILTERS in the 10 Kc to 30 Mc range

SYMMETRICAL BANDPASS

| Model No. | Center Freq. | Bandwidth (6-db) | Bandwidth (60-db) | Maximum Insertion Loss | Maximum Passband Variation | Impedance Ohms (Nominal) | Case Size | | |
|-----------|--------------|------------------|-------------------|------------------------|----------------------------|--------------------------|-----------|----------|----------|
| | | | | | | | L | W | H |
| 100 KPA | 100 Kc | 50 cps | 200 cps | 3 db | ± 1/2 db | 8200 | 3 15/16" | 2 13/16" | 2" |
| 2215 KA | 2215 Kc | 2.8 Kc | 12 Kc | 3 db | ± 1/2 db | 4000 | 2 9/16" | 1 5/16" | 1 47/64" |
| 2215 KB | 2215 Kc | 250 cps | 1000 cps | 3 db | ± 1/2 db | 4000 | 2 9/16" | 1 5/16" | 1 47/64" |
| 9 MA | 9 Mc | 3 Kc | 12 Kc | 3 db | ± 1/2 db | 1000 | 1 61/64" | 19/32" | 15/16" |
| 10 MA | 10.7 Mc | 30 Kc | 60 Kc | 3 db | ± 1/2 db | 2000 | 2 3/8" | 1" | 1 1/32" |
| 10 MB | 10.7 Mc | 15 Kc | 30 Kc | 3 db | ± 1/2 db | 1000 | 2 3/8" | 1" | 1 1/32" |
| 10 ME | 10.7 Mc | 6 Kc | 15 Kc | 3 db | ± 1/2 db | 500 | 2 3/8" | 1" | 1 1/32" |
| 10 MF | 10.7 Mc | 3.5 Kc | 10 Kc | 3 db | ± 1/2 db | 300 | 2 3/8" | 1" | 1 1/32" |
| 13 MA | 13 Mc | 30 Kc | 54 Kc | 6 db | ± 1 db | 1500 | 3 9/16" | 1" | 1 1/2" |
| 13 MB | 13 Mc | 15 Kc | 27 Kc | 6 db | ± 1 db | 750 | 3 9/16" | 1" | 1 1/2" |
| 30 MK | 30 Mc | 25 Kc | 62 Kc | 3 db | ± 1/2 db | 820 | 2 3/8" | 1" | 1 1/32" |
| 30 MP | 30 Mc | 5 Kc | 15 Kc | 3 db | ± 1/2 db | 750 | 2 3/8" | 1" | 1 1/32" |

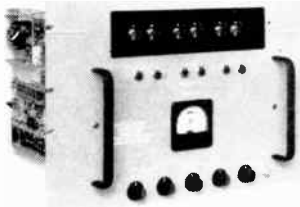
SINGLE SIDEBAND

| Model No. | Center Freq. | Sideband | Passband (2 db except as noted) | Minimum Attenuation (Unwanted) | Maximum Insertion Loss | Maximum Passband Variation | Impedance Ohms (Nominal) | Case Size | | |
|-----------|--------------|----------|---------------------------------|--------------------------------|------------------------|----------------------------|--------------------------|-----------|---------|----------|
| | | | | | | | | L | W | H |
| 100 KUC | 100 Kc | upper | 300 to 6000 cps | 60 db | 10 db | ± 1/2 db | 8200 | 5 3/8" | 3" | 2 3/8" |
| 100 KLC | 100 Kc | lower | 300 to 6000 cps | 60 db | 10 db | ± 1/2 db | 8200 | 5 3/8" | 3" | 2 3/8" |
| 3 MUA | 3.2 Mc | upper | 300 to 3000 cps (3 db) | 40 db | 3 db | ± 1 db | 1600 | 2 9/16" | 1 5/16" | 1 47/64" |
| 2 MUA | 2 Mc | upper | 300 to 6000 cps | 60 db | 3 db | ± 1/2 db | 3900 | 4 3/8" | 2 3/8" | 1 7/8" |
| 2 MLA | 2 Mc | lower | 300 to 6000 cps | 60 db | 3 db | ± 1/2 db | 3900 | 4 3/8" | 2 3/8" | 1 7/8" |

RAPID ACCESS in Analog Data Reduction Systems

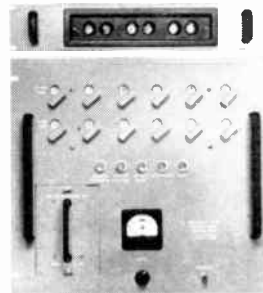
DIGITAL TIMING GENERATOR

MAGNETIC TAPE SEARCH UNIT



MODEL 201 for Tape Indexing generates numerically coded timing signals which are recorded on the magnetic tape throughout the data recording periods, providing a precise digital index in terms of elapsed time.

Write for *Technical Bulletin TSG*



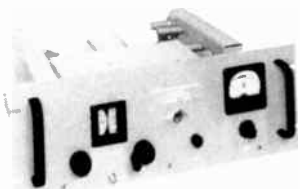
MODEL 202 for Tape Searching operates during data reduction periods. This instrument automatically locates and selects for controlled playback the tape data included between a "sequence start time" and a "sequence end time" specified by panel dial settings. Model 202 may be modified to search for timing formats other than those originated by Model 201.

MODEL 206A IS A MILITARIZED AIRBORNE VERSION OF MODEL 201.

ULTRA STABLE OSCILLATOR

One Megacycle Signal Source

STABILITY: 1 PART IN 10⁹ PER DAY



For precise time measurements or frequency control, Model 101C features include: A crystal oven without moving parts that is stabilized to better than 0.01°C. by temperature-sensitive resistance bridge, and dissipation in oscillator crystal which is stabilized at a power level of less than one microwatt.

MULTIPLIERS and DIVIDERS are available for other frequency values with corresponding stability. Write for *Bulletin USO*.

MAGNETIC CORE LOGIC EQUIPMENTS

1. DIGITAL FORMAT CONVERTERS FOR
Gray Code to Binary Coded Decimal
Straight Binary to Binary Coded Decimal
2. TIME PROGRAMMERS FOR
precise elapsed time interval pulses
3. MAGNETIC CORE STORAGE REGISTERS

Write for *Technical Information*

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Directory II. Components

50. Filters.

- Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 10, 14, 15, 20, 22
See ad on page 410
Tel: EVergreen 6-1300
- Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J., 10, 15, 20, 30
See ad on this page
Tel: PProspect 4-0500
- Fugle-Miller Laboratories, Inc., 301 Central Ave., Clark, N.J., 5, 10, 15, 22
See ad on page 412
Tel: FULTon 1-2727
- Gabriel Co., Gabriel Electronics Div., 135 Crescent Rd., Needham Heights 94, Mass., 5, 10, 15, 22, 30
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Tel: HILLcrest 4-0005
- Garrett Corp., Air Research Mfg. Div., Calif., 35
- Gates Radio Co., Ill., 5, 10, 15, 22
- General Automatics, Inc., Calif., 10, 15, 20
- General Bronze Corp., GB Elec. Corp. Subsid., N.Y., 22
- General Communication Co., Mass., 30
- General Electric Co., Specialty Electronic Components Dept., N.Y., 20
- General Electric Co., Ltd., England, 15, 22
- General Instrument Corp., F. W. Sickles Div., Mass., 10, 15, 22, 45
- General Radio Co., West Concord, Mass., 10, 15, 22, 45
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Tel: EMERson 9-4400
- Genistron, Inc., Calif., 15, 22, 35
- Gertsch Products, Inc., Calif., 10
- Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 30
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Tel: WILLIams 1-1000
- Gulton Industries, Inc., N.J., 22
- Gulton Industries, Inc., N.M., 5, 10, 30, 45
- Gyrex Corp., Calif., 10, 25
- Hallett Mfg. Co., Calif., 35
- Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 12, 30, 37, 45
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Tel: VAn Buren 6-6300
- Hammond Mfg. Co., Ltd., Canada, 10, 22
- Harmon Electronics Co., Mo., 10
- Hermes Electronics Co., Dept. BD, 75 Cambridge Parkway, Cambridge 42, Mass., 12
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Tel: UNiversity 4-7200
- Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 22, 30
See ad on pages 3-18
Tel: DAVenport 5-4451
- Highland Engineering Co., N.Y., 10, 14, 15, 22, 35
- Hisonic, Inc., Kan., 10, 15, 20, 22
- Hogan Labs., Inc., N.Y., 37
- Hughes Aircraft Co., Hughes Prod. Div., Calif., 10, 12, 14, 15, 22, 30, 35, 37, 45
- Hughes Products, Semiconductor Div., 500 Superior Ave., Newport Beach, Calif., 12
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Tel: LI 8-0671
- Hupp Electronics Co., Pa., 12, 37
- Hycon Eastern, Inc., See: Hermes Electronics Co.
- I. D. E. A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 15
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Tel: LIBerty 7-3581
- I.M.C. Magnetics Corp., Gray & Kuhn Div., N.Y., 10
- Illumitronic Engineering Co., 680 E. Taylor Ave., Sunnyvale, Calif., 5
See ads on pages 412, 686
Tel: REgent 9-2395
- Inductor Engrg., Inc., Del., 10, 15, 22
- International Tel. & Tel. Corp., ITT Federal Div., N.J., 5, 30
- International Telephone & Telegraph Labs., Calif., 12, 14, 15, 22, 37
- J-V-M Microwave Co., Ill., 5, 10, 30, 45
- Jerrold Electronics (Canada) Ltd., Canada, 5, 10, 35, 45
- Jerrold Electronics Corp., Dept. TED 33, The Jerrold Bldg., Philadelphia 32, Pa., 10
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Tel: BAIDwin 6-3456
- Jodon, Inc., F. R., D.C., 12
- Johnson Co., E. F., Minn., 22
- K-V Transformer Corp., Conn., 15, 22
- Kapitol Magnetic Corp., Ill., 10, 14, 15, 20, 22
- Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 25, 30
See ad on page 348
Tel: GREGory 2-1000
- Kearfott Co., Inc., Microwave Div., Calif., 30
- Kellogg Switchboard & Supply Co., Ill., 10, 14, 15, 22, 30
- Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 10, 14, 15, 22, 37
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Tel: STATE 2-6662
- Kennedy & Co., D.S., 155 King St., Cohasset, Mass., 5, 10, 15, 22, 30
See ad on page 376
Tel: EVergreen 3-1200
- Keystone Electronics Co., N.J., 12
- Keystone Products Co., N.J., 10, 15, 22
- King Radio Corp., Kan., 5

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Over 400 microwave frequency meter and tunable band pass filter designs are available. If you require a unit not in stock it can be produced readily by adapting an existing unit.

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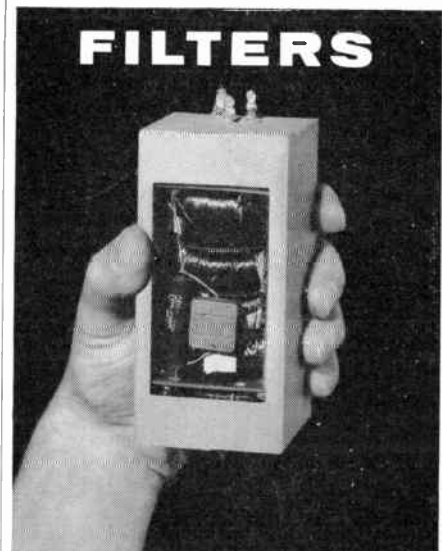
Division of Harvard Industries, Inc.

Phone: PProspect 4-0500



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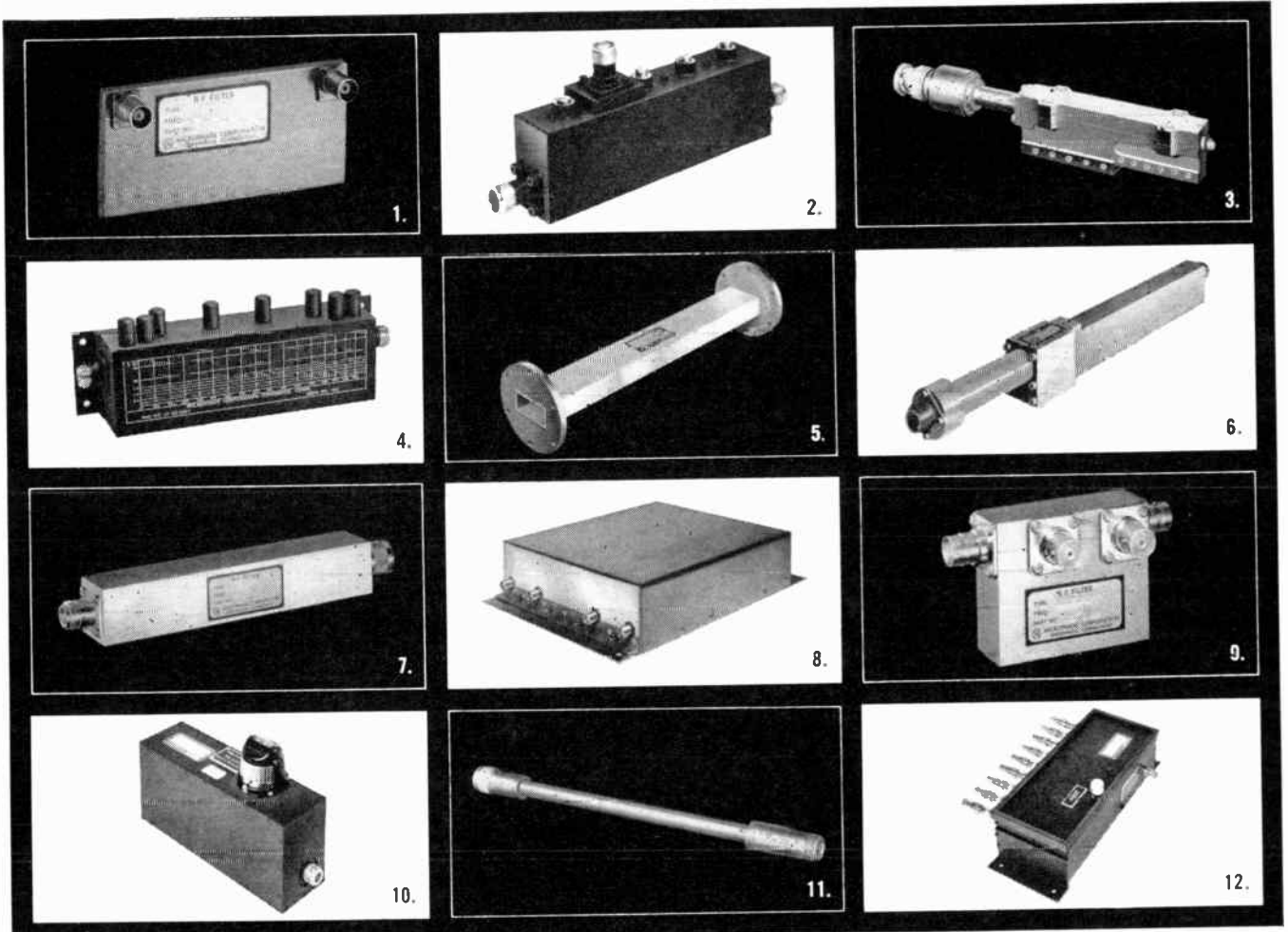
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MC μ/ϕ **RF**

Filters



1. Miniature Tacan Bandpass Filter. Maximum passband insertion loss, 1.5-db. Unit has sharp skirt characteristics.
2. Miniature L-Band Preselector-Mixer Assembly for 30- or 60-mc IF operation. Efficient miniature unit for airborne application.
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6. L-Band Low-Pass Filter. Handles 20 kw peak power, 1 kw average. VSWR in passband, 1.2:1.
7. Narrow-Band Pass Filter in the S-Band. Unit is adjusted and calibrated to give exact effective band width; can be used in microwave-noise measurements.
8. Airborne Telemetry Quadruplexer. 1.0-db passband insertion loss; 6-mc channel separation; 20-db isolation with harmonic suppression to 20 kmc.
9. Miniature Broadband Triplexer. Crossover frequencies 300- and 600-mc. The unit couples three channels with only 3-db power-split at crossover frequencies.
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12. Eleven-Channel Crystal-Video Output L-Band Multicoupler. Unit is equipped with RF power monitor at the input.

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Knights Co., James, 101 E. Church St., Sandwich, Ill., 12, 37
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Tel: 2141

Krohn-Hite Corp., Mass., 10, 15, 22
Lambda-Pacific Engr., Inc., Calif., 30
La Pointe Industries Inc., Conn., 5, 10, 15, 22
Lear, Inc., Mich., 35, 45
Lesca, S.P.A., Italy, 10, 14, 15, 20, 22
Lewis Co., Inc., E. B., Conn., 12
Lieco, Inc., N.Y., 30
Ling Systems, Inc., Calif., 30
Litton Industries, Inc., Airtron, Inc. Div., N.J., 5, 10, 30
Litton Industries, Inc., Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., 5, 10, 30, 35
See ad on pages 64-65
Tel: LYtell 1-8411

Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 10, 15, 22
See ad on page 66
Tel: CRestview 4-7411

Litton Industries, Inc., Md. Div., Md., 5, 10
Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, P.O. Box 504, 962 W. El Camino Real, Sunnyvale, Calif., 30
See ad on page 380
Tel: REgent 9-4321

Lynch Carrier Systems, Inc., Calif., 10, 14, 15, 22
M E Labs., Calif., 22, 30, 45
Marconi's Wireless Telegraph Co., Ltd., N.Y., 12, 25
Marine View Electronics, Inc., N.Y., 10
Maxson Corp., Langevin Div., N.Y., 15, 22
McCoy Electronics Co., Watts & Chestnut Sts., Mount Holly Springs, Pa., 10, 12, 15, 22, 37, 45
See ad on page 441
Tel: HUNter 6-3411

McCurdy Radio Industries Ltd., Canada, 14
McMillan Industrial Corp., Mass., 30, 45
Meridian Metalcraft, Inc., Calif., 5, 10, 15, 22, 30, 45
Micamold Electronics Mfg. Corp., N.J., 22, 35
Microlab, 71 Okner Parkway, Livingston, N.J., 10, 15, 22, 30, 45
See ad on page 388
Tel: WYman 2-5700

Microphase Corp., P.O. Box 1166R, Greenwich, Conn., 5, 10, 15, 22, 30, 45
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Tel: NORmandy 1-6200

Microtech, Inc., Conn., 30
Microwave Assoc., Inc., Mass., 10, 22, 30
Microwave Development Labs., Inc., Mass., 30
Midland Mfg. Co., Inc., Kan., 10, 12, 15, 20
Miller Co., J. W., Calif., 5, 10, 22, 45
Monogram Industries Inc., Cascade Research Div., Calif., 5, 30

Motorola, Inc., Ariz., 10, 12, 22, 25, 30, 37
Mu Beta Products, Calif., 45
Murata Mfg. Co., Ltd., Japan, 25
N.R.K. Mfg. & Eng. Co., Ill., 30
N Y T Electronics, Inc., Calif., 10, 15, 20, 22
Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, L.I., N.Y., 15, 22, 30
See ad on pages 141-144
Tel: PIONEER 6-4650

National Scientific Labs., Inc., D.C., 35
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Newton Co., Conn., 10
North Electric Co., N.Y., 10
North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 5, 10, 14, 15, 20, 22, 37, 45
See ads on pages 415, 455, 591
Tel: PIONEER 7-0555

Nuclear-Chicago Corp., Ill., 35
Orbitran Co., Inc., Calif., 22
Ortho Filter Corp., 7 Paterson Ave., Paterson 1, N.J., 5, 10, 12, 14, 15, 22, 37, 45
See ad on page 456
Tel: MULberry 4-5858

Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 10, 15, 22
See ad on page 246
Tel: BRAdshaw 2-6141

Pan-Air Electronics Corp., Calif., 5, 45
Parsons Co., Ralph M., Electronics Div., Calif., 10, 45
Penn-East Engineering Corp., Pa., 10, 15, 22
Penn Resistor Corp., Pa., 35
Pickering & Co., Inc., N.Y., 14, 20
Piezo Crystal Co., Pa., 12
Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 10, 15, 22, 30, 35, 45
See ad on page 323
Tel: CANal 6-7250

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 30
See ad on pages 135-136
Tel: EXeter 2-4500

Polyphase Instrument Co., Pa., 10, 15, 22
Polytechnic Research & Dev. Co., Inc., N.Y., 30
Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 30
See ad on page 594
Tel: WESTmore 9-4092

Potter Co., Ill., 15, 22, 35
Power Industries Co., Inc., Ill., 5, 10, 35
Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 5, 10, 12, 15, 22, 30
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Tel: WESTmore 9-8900

Production Research Corp., N.Y., 5
Profile Electronics, Inc., 6 Bridge St., Concord, N.H., 10, 35
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Tel: CAPital 4-1232

Pulse Engineering, Inc., Calif., 10, 14, 15, 22

Pulse Techniques, Inc., N.J., 14, 15, 22
Q-Line Mfg. Corp., N.Y., 5
Racal Engr. Ltd., England, 37
Radar Design Corp., N.Y., 5, 10, 15, 22, 30
Radar Measurements Corp., 190 Duffy Ave., Hicksville, N.Y., 30
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Tel: OVerbrook 1-5600

Radiatronics, Inc., Calif., 5, 10, 25, 30
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Railway Communications, Inc., Mo., 10, 15, 22, 37
Ram Electronics, Inc., N.J., 10, 14, 15, 22
Rantec Corp., 23999 Ventura Blvd., Calabasas, Calif., 5, 10, 30, 45
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Tel: DIAMond 7-5446

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Reeves-Hoffman Div., Pa., 12, 37
Rixon Electronics, Inc., 2414 Reddie Dr., Silver Spring, Md., 5, 10, 14, 15, 20, 22, 30, 35, 37, 45
See ad on page 525
Tel: LOCKwood 5-4578

FILTERS DESIGNED TO YOUR SPECIFICATIONS

Whether for quality commercial or military—when you want the finest in precision and the most dependable in delivery—specify filters by North Hills Electric... specialists in custom production of toroids, filters and wideband transformers.

ENGINEERING AND DESIGN CONSULTATION

Where specifications are not supplied, take advantage of North Hills' efficient and courteous design service.

FREE BULLETIN

Standard toroids and wide-band transformers available.

Write or call for free Bulletin W-BG

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

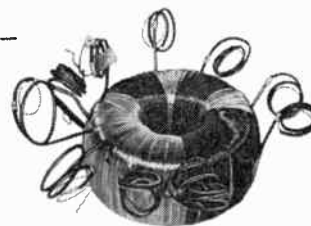
O F C

components

for defense and industry!

TOROIDS In addition to standard toroid features, O.F.C. units have—

- Winding to minimize distributed capacity. Coil may be used at higher frequencies with higher "Q" factors.
- Winding to inductance value on self-calibrating winding equipment yielding 1% units as standard tolerance at no cost premium for core calibrating, etc.
- Availability of waxed, encapsulated, encased or taped units
- Complete line of stock core sizes. Fast delivery on special orders
- Facilities for winding from #44 to #10 AWG wire.



HIGH TEMPERATURE TRANSFORMERS

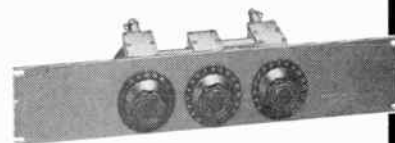
In addition to meeting requirements of MIL-T-27A, grade 4, Class T, O. F. C. high temperature transformers feature—

- Reduced iron losses
- Large heat-radiating surface area
- Very small height dimension
- Negligible radiation of power frequency components
- Reduced copper loss
- Ability to use higher ambients because of smaller unit temperature rise
- High reliability, simple construction, excellent shape factor
- Excellent regulation and reduced weight.



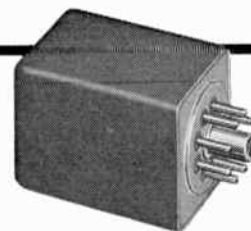
VARIABLE RF ATTENUATORS These rotary adjustable variable attenuators are extremely accurate over wide frequency range. Available as individual unmounted units or in various combinations on rack-mounted panels, featuring—

- Gold contacts
- Resistive networks that function from D. C. to maximum operating frequency
- Each resistor mounted in cavity. This eliminates reactive components over the unit's useful frequency range
- Highly stable. Installed to prevent any element value shift due to heat
- Fully tested for insertion loss and voltage standing wave ratio.
- Conservatively rated. Guaranteed for full year under normal conditions.



PLUG-IN FILTERS

- Standard octal socket makes interchange simple
- Low distortion
- Toroid coil construction provides 70 db min rejection hum pickup
- Available, from stock, in wide range of frequencies
- Hermetically sealed.



ANTENNA FILTERS

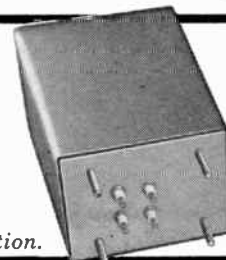
- Cutoff frequency range up to 450 MC
- Attenuation of 40 to 90 db over stop band
- Insertion loss less than 1.0 db over entire pass band
- VSWR less than 1.5 over entire pass band
- Designed to your size, weight, termination, power and impedance specifications
- Slope of cutoff 60 db at 1.2 of cutoff frequency.



MAGNETIC AMPLIFIERS Built to customer specifications, Ortho Filter's high voltage and high temperature units feature—

- Use from milliwatt to kilowatt ratings
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- Tape wound toroids and cut cores to facilitate low cost prototypes promptly
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Write for complete information.



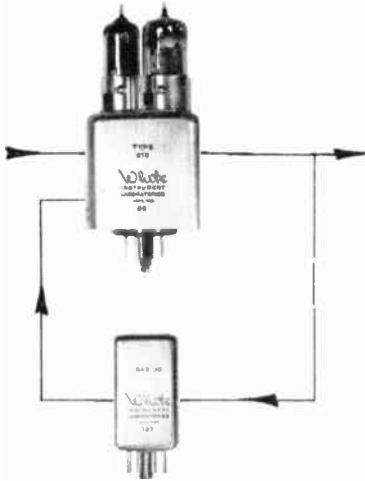
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Directory II. Components

50. Filters.



ACTIVE FILTERS Plug-in amplifier-feedback network pairs for use as mixers or bandpass amplifiers. Widely used where LC filter sections are impractical. Available with tuned circuit response Q to 40, center frequency, 1 cps to 500 cps, bandpass response with center frequency, 5 to 500 cps. Ask for bulletin 212, 572.

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Sierra Electronic Corp., 5442D Bohannon Dr., Menlo Park, Calif., 15, 22, 30, 45

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Tel: DAVenport 6-2060

Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 5, 10, 15, 22, 30, 45

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Stanwyck Coil Co., E., 75 Carson Ave., Newburgh, N.Y., 5, 10, 15, 22

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Tel: JOhn 1-3030

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 30

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Televiso Corporation, Ill., 10, 15, 22, 35

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Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 10, 15, 22

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Tel: ELizabeth 4-5650

Transco Products, Inc., Calif., 5, 45

Transformer Engineers, Calif., 10, 15, 22

Transformer Technicians, Inc., Ill., 10, 14, 15, 22

Transformers, Inc., N.Y., 10, 15, 22

Transonic, Inc., Calif., 10, 14, 15, 22

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Tel: EXmont 7-2145

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United States Electronics Corp., N.J., 22

United Transformer Corp., 150 Varick St., New York 13, N.Y., 5, 10, 12, 14, 15, 22, 35, 37

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Tel: ALgonquin 5-3500

Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 10, 15, 22

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Tel: ESsex 4-9800

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White Instrument Lab., 5500 Balcones Trail, P.O. Box 9006, Allendale Station, Austin 17, Tex., 10, 15, 22, Active filters

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Wiley Electronic Co., Ariz., 30

Wright Electronics, Inc., Mo., 12

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Frequency meters: See class 56

Frequency meters, microwave: See class 19

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The following is only a representative selection. The complete BUSS line of fuses includes: single-element, quick-blowing type; single-element for normal circuit protection type; dual-element, slow blowing type and signal or visual indicating types . . . ranging in size from 1/500 ampere up — plus a companion line of fuse clips, blocks and holders.

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1/4 x 1 in. Glass tube 1/500 to 2 amp.



BUSS GLD SIGNAL ACTIVATING FUSES

1/4 x 1 1/4 inch Silverplated pin pops out when fuse is blown and activates signal or alarm.



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1/4 x 1 1/4 inch. Dual-element — slow blowing type 1/100 to 30 amp.



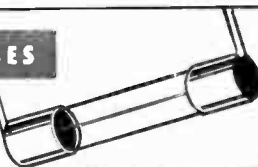
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1/4 x 1 1/4 inch. High interrupting capacity fuses 1/4 to 30 amp.



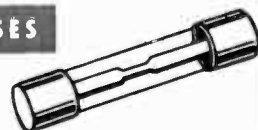
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1/8 to 6 amp. Solder into circuit wires.



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Fuses of different amperages are different lengths — to make it impossible to insert too large a size.



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1 3/32 x 1 1/2 inch. Dual-element — slow blowing type.



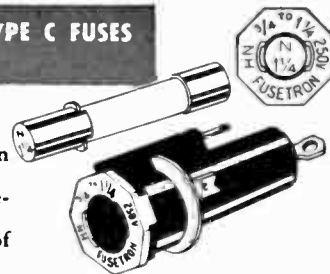
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Especially suitable for protection of TV

Ears on fuses match slots in holder.

Marking on fuse and fuseholder in direct view.

Safeguard against use of wrong size and type of fuse.



BUSS KTK HIGH INTERRUPTING CAPACITY FUSES

1 3/32 x 1 1/2 inch. Capable of safely interrupting 68,000 amps.



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20 to 300 amp., Dual-element type.



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Mechanical Indicating Limiter type 1 to 75 amp.



BUSS Series HJ and HK Non-Indicating FUSEHOLDERS

Panel mounted for 1/4 x 1 inch and 1/4 x 1 1/4 inch fuses.



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Panel mounted for 1/4 x 1 inch and 1/4 x 1 1/4 in. fuses.



BUSS No. 4051 ONE-PIECE CLIP and TERMINAL

Solder type terminal for 1/4 inch fuses.



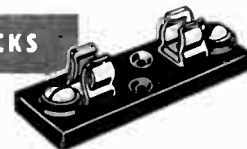
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Small Base, solder type Side Terminals.



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Full Base, Screw type Terminals.



For more detailed information to help you select fuses and fuseholders to meet your electrical protection needs . . . Write for BUSS bulletin SFB.

Or tell us your problem and let our Fuse Engineers assist you in getting the protection you require.

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51. Fuses and Fuse Holders.

5. Fuses

10. Fuse holders

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Aerolite Electronics Co., N.J., 10
Alden Products Co., 121D N. Main St.,
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Tel: JUniper 3-0160
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F Mfg. Co., N.J., 10
Eby, Inc., Hugh II., Pa., 10
Electronic Mechanics, Inc., N.J., 10
Garde Mfg. Co., R.I., 10
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**Generators, square wave:
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**Generators, synchronizing:
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**Generators, time delay:
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Germanium diodes: See class 68

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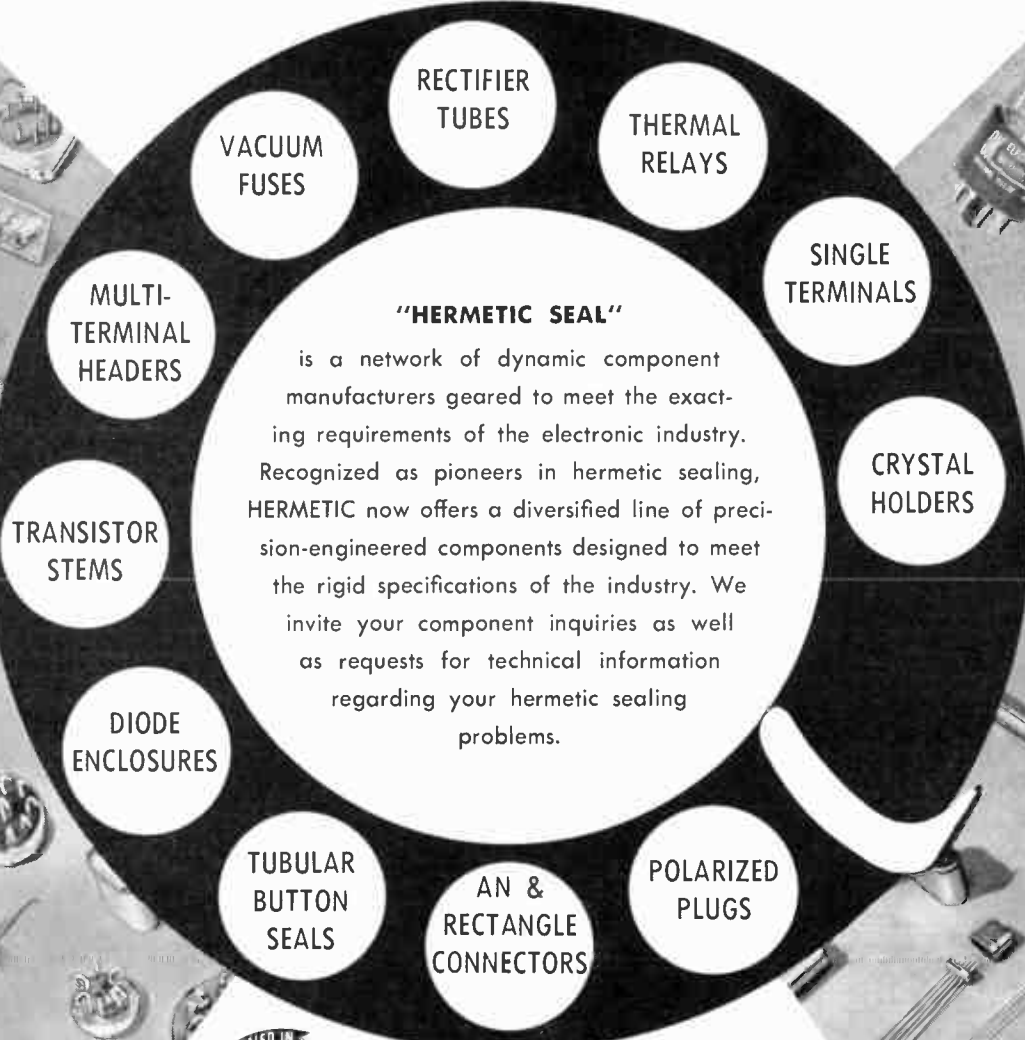
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Tel: WOODruff 2-9200

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Tel: WESt Lebanon 3-5851

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Tel: MILLington 7-0385

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Kulka Electric Corp., 633 S. Fulton Ave., Mt. Vernon, N.Y., 20

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Tel: MOUNT Vernon 4-4024

LMB-Heeger, Inc., Calif., 5, 15

Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 10

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Tel: CRestview 4-7411

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252 Hawthorne Ave., Yonkers, N.Y.
Yonkers 8-2010

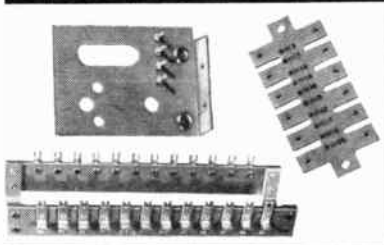
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For details, circle #418 on Reader Service Card

52. Hermetic Seals.

Metaplast Co., Inc., N.Y., 5, 15
Micro Die, Inc., N.J., 10
Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5, 10, 15
See ad on page 619
Tel: WAverly 6-2250
Molding Corp. of America, R.I., 10
Multi-Tron Lab., Inc., Ill., 15
Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., 5
See ad on page 102
Tel: PRescott 9-8866
Network Industries, Inc., N.J., 20
Networks Electronic Corp., Calif., 10, 15
Pacific Scientific Co., Calif., 15
Panseal, Inc., N.J., 20
Philadelphia Scientific Glass Co., Pa., 15, 20
Products Research Co., Calif., 5, 15, 20
Radian Labs., Inc., N.Y., 5, 10
Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 20
See ad on page 304
Tel: DEerfield 4-3100
Ross Metals Co., Milton, Pa., 10, 15
Scientific Electronic Laboratories, 866 Bergen St., Newark 8, N.J., 5, 10, 15
See ad on page 697
Tel: BIgelow 3-8675
Sealol Corp., R.I., 20
Sealtron Corp., Ohio, 10, 15
Silicone Seals, Inc., Ill., Silicone Rubber
Specialty Electronics Development Corp., N.Y., 5, 10, 15

Sperti Faraday Inc., Cooper Hewitt Elec. Co. Div., N.J., 5, 10, 15
Sphere Co., Inc., N.J., 5, 10, Silicone Rubber
Standard Telephones & Cables, Ltd., England, 15
Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 15
See ad on pages 23-25
Tel: JUdson 6-2424
Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 5
See ad on page 621
Tel: ARmory 1-0163
Telegraph Condenser Co., England, 5
Telegraph Condenser Co. Ltd., United Insulator Div., England, 5
Thermo Materials, Inc., Calif., 5, 10
Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 5
See ad on page 620
Tel: PILgrim 3-7797
Torwico Electronics, 1090 Morris Ave., Union, N.J., 5, 10
See ad on pages 116-117
Tel: ELizabeth 4-5650
Transline Associates, N.J., 15
Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif., 10
See ad on page 63
Tel: EXmont 7-2145
United Components, Inc., N.J., 10, 15
U.S. Stoneware Co., Alite Div., P.O. Box 119, Orrville, Ohio, 5
See ad on page 104
Tel: (Smithville, Ohio) MOnica 9-2271

HI RELIABILITY TERMINAL BOARDS AND SUB-ASSEMBLIES TO MILITARY SPECIFICATIONS



CUSTOM fabrication of all insulating materials to Government specs. Send us your requirements for an immediate quote.

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52 ST. CASIMIR AVENUE
YONKERS, N.Y.

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Directory II. Components

52. Hermetic Seals.

Vacuum Tube Products Co., Inc., Calif., 15
Vitroseal Corp., Pa., 15
Zell Products Corp., Conn., 10, 15

Hybrid Junctions: See class 80

Iconoscopes: See class 76

Image orthicons: See class 76

Inductors: See class 43

Insulating materials: See class 89

Insulators, ceramic: See class 83

Insulators, plastic: See class 94

**Insulators & spacers, vacuum tube:
See class 99**

Inverters: See class 45

53. Jacks, Jack Fields & Plugs.

| | |
|-----------------|----------------|
| 5. Jacks | 25. Test clips |
| 10. Jack fields | 30. Test jacks |
| 15. Patch cords | 35. Test leads |
| 20. Plugs | |

A.P.M. Corporation, 252 Hawthorne Ave., Yonkers, N.Y., 20
See ads on pages 462, 634
Tel: YONkers 8-2010

Accurate Electronics Corp., Ohio, 5, 10, 20

Aerolite Electronics Co., N.J., 5, 15, 20

Aerovox Corp., Mass., 5, 15, 20

Air-O-Tronics Engrg. Co., Calif., 5, 15, 20, 25, 30, 35

Alden Products Co., 121D N. Main St., Brockton 64, Mass., 30

See ads on pages 419, 691

Tel: JUNiper 3-0160

Alden Systems Co., Mass., 5, 10, 15, 20, 30

Alpine Electronic Comp., Inc., Conn., 5, 20, 30

Amatom Electronic Hardware Co., Inc., N.Y., 5, 15, 20, 25, 30, 55

American Microphone Mfg. Co., 412 S. Wyman St., Rockford, Ill., 15

See ad on page 474

Tel: WOODland 8-9661

53. Jacks, Jack Fields & Plugs.

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5, 20
See ad on page 166
Tel: BISHop 2-1000

Anchor Specialty Mfg. Co., Inc., N.J., 25
Associated Engrg. Corp., Mass., 15, 20, 25, 35

Audio Development Co., Minn., 5, 10, 15, 20

Automatic Electric, Sub. of Gen. Telephone & Electronics, Northlake, Ill., 5, 15, 20

See ad on pages 108-109

Tel: FILLmore 5-7111

Avnet Corp., Calif., 5, 20

Bayly Engrg. Ltd., Canada, 5

Belling & Lee Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 30
See ad on page 418

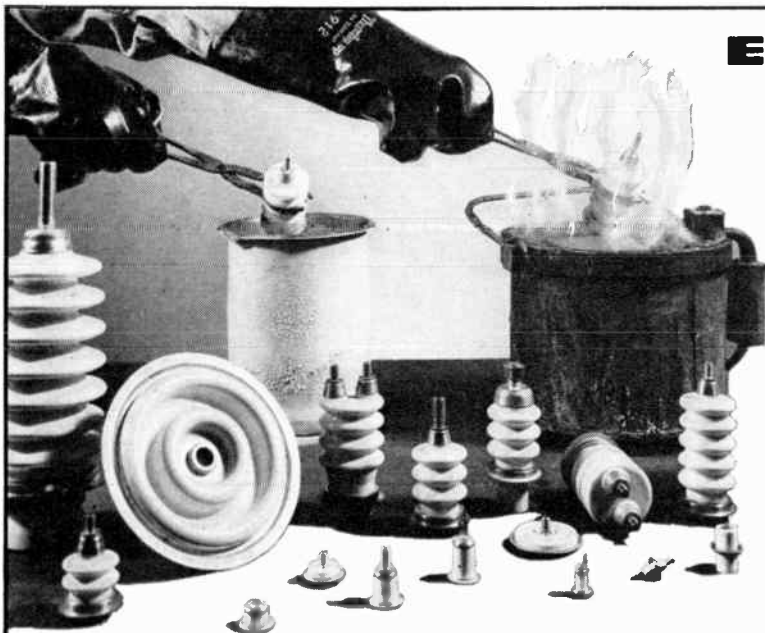
Tel: ENfield 3322

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5, 15, 20, 25, 30, 35

See ad on page 603

Tel: WALKer 5-6980

CBC Electronics Co., Pa., 35



EXTREME THERMAL SHOCK

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**CERAMASEAL
HERMETIC TERMINALS**

SOME HAVE EVEN WITHSTOOD
A SUDDEN 460°C CHANGE

With an alumina content up to 99%, CERAMASEAL terminals are not only mechanically strong, but some have even been transferred directly from liquid nitrogen into hot solder without cracking!

The CERAMASEAL molecular bond between the ceramic and metal flanges, caps or tubes is stronger than the high alumina ceramic.

Easy to install too, by conventional brazing, heli-arc welding or soldering techniques.

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Hermetic Ceramic Terminals, Magnetron Wells, Sapphire-to-Metal Seals

CERAMASEAL, inc.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Ucinite Electrical Assemblies



PRINTED CIRCUIT TEST JACKS

For permanent assembly to ptd. circuit bds. Accessible to std. .080 probes without adaptors. Gold-over-silver beryllco contacts . . . color coded nylon bodies.



TEST JACKS

Ucinite's quality jack for .080 probes. Beryllium copper contacts. Nylon insulation in colors. Metal shell for firm, dependable mounting. MS16108 types available.

STAMPED CIRCUITS

"Printed circuitry" by a stamping process free of electrolytic contamination. Injection and thermoset molded housings simplify miniaturization of intricate packages and permit complete flexibility of basic raw materials.



PRINTED CIRCUIT CONNECTORS

Unique torsion-bar contacts, provide consistent performance unaffected by repeated insertions of maximum and minimum tolerance boards. Available in various multiples of contacts.



SPECIAL ASSEMBLIES

Stamped circuits, molded housings, special contacts custom-designed in a complete package to fit the application.



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Four sizes of plugs with one-piece beryllium-copper springs. Adaptable mounting ends in threaded, staking or solder lug types. Mating jacks also available.

"PK" MOLDED SWITCH

Single wafer rotary switches in rugged, molded construction. Economical, durable. Single pole, two or three position types available.



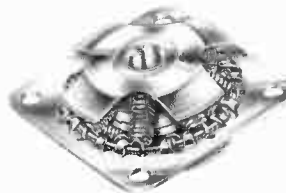
AIRCRAFT SNAP SWITCHES

Precision, momentary contact, push-button types made to MS25089. Small and dependable. Hermetically sealed and other special versions are available.



AIRCRAFT COMMUNICATION PLUGS AND JACKS

4-conductor type made to rigid Mil. Specs . . . U92A/U Jack . . . U93A/U Plug . . . U94A/U Switch-Jack combination.



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Equiflex (1:1 ratio) metal mounts ensure long life, fit small spaces; can be used in any direction. A range of sizes, cup or plate mountings.

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parts and assemblies . . . designed, assembled, wired and marked to your specifications.

* * *

For complete design, engineering and production service, call your nearest Ucinite field engineer.



Manufactured by
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Division of United-Carr Fastener Corporation, Newtonville, Mass.

Directory II. Components

53. Jacks, Jack Fields & Plugs.

Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5, 15, 30

See ad on page 693

Tel: TRowbridge 6-2800

Cannon Electric Co., Dept. 425, 3268 Humboldt St., Los Angeles 31, Calif., 5, 15, 20, 30, 35

See ad on page 184

Tel: CApital 5-1251

Carter Parts Co., Ill., 5, 20

Chester-Morton Electronics Corp., Pa., 15, 25, 35

Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5, 20

See ad on pages 48-49

Tel: NEVada 2-2000

Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 5, 20

See ad on page 484

Tel: WOODland 7-1113

Clover Industries, Inc., N.Y., 20

Coaxial Connector Co., Inc., N.Y., 5, 10, 15, 20

Component Mfg. Service, Inc., Mass., 15, 20

Derf Radio Co., N.Y., 5, 20, 25, 30, 35

Donmar Products, Inc., Colo., 25, 30

E-Z-Hook Test Products, Ky., 25

Eastern Specialty Co., Pa., 25, 30, 35

Eby, Inc., Hugh H., Pa., 5, 20

Ecco Electronic Components Corp., N.Y., 5, 10, 15, 20

Electrocraft, Inc., Ill., 5, 20

Electronic Techniques, Inc., Calif., 20

Electronics, Inc. of Pa., Pa., 35

Empire Electronics Co., Inc., N.J., 15, 35

Enflo Corp., N.J., 30

Engineered Electronics Co., Calif., 10

First Electronics Corp., Mass., 15, 35

Garde Mfg. Co., R.I., 20

General Cement Mfg. Co., Div. of Textron, Inc., 400 S. Wyman St., Rockford, Ill., 25, 35

See ad on page 474

Tel: ROKckford 8-9661

General Electric Co., Ltd. of England, England, 15, 20, 30, 35

General Radio Co., West Concord, Mass., 5, 15, 20

See ad on Cover 4

Tel: EMerson 9-4400

Grayhill, Inc., 505 Hillgrove Ave., La Grange, Ill., 25, 30

See ad on page 552

Tel: FLEetwood 4-1040

Hallett Mfg. Co., Calif., 35

International Electric Ind., Inc., N.Y., 15, 35

I. T. & T. Royal Elect. Corp. Div., R.I., 20

Javex Electronics, Calif., 5, 15, 20, 25, 30, 35

Johnson Co., E. F., Minn., 5, 20

Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5, 20

See ad on pages 48-49

Tel: NEVada 2-2000

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 5, 10, 15, 20

See ad on page 425

Tel: SWIFTwater 3-5000

Kurtz, John, N.Y., 25, 35, Jumper Leads Lab-Tronics, Inc., Ill., 5, 15, 20, 25, 30, 35

Lerco Electronics, Inc., Calif., 5, 20

Leviton Mfg. Co., Inc., N.Y., 20

Litton Industries, U.S. Engineering Co., Div., Calif., 5, 20, 30

Mallory & Co., Inc., P.R., Ind., 20

Mandex Mfg. Co., Inc., Ill., 5, 30

Marine View Electronics, Inc., N.Y., 25

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, 20

See ad on page 416

Tel: DAVenport 4-4108

Morse Co., Frank W., Mass., 20

Introducing **PERFECT "ALLIGATOR"**



Full-size 'gator... great new insulator!



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START USING MUELLER'S BRAND-NEW, LOW-COST, NO. 72 SKIN-TIGHT, THIN, HIGH-DIELECTRIC VINYL INSULATOR ON FULL-SIZE, LOW-COST 70-SERIES ALLIGATOR CLIPS! Covers right down to the nose. Covers teeth when jaws open. Allows full jaw spread. Full color range.

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... for speed-clipped leads
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PERFECTION... FOR QUICK CONNECTION!



Mueller Electric Co.
1558Y East 31st Street Cleveland 14, Ohio

For details, circle #422 on Reader Service Card
1960 IRE Directory

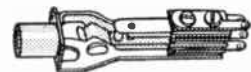


JACK PANELS and PATCH CORDS

Standard broadcast (audio and video) as well as custom built jack panels as used in a wide range of instrumentation and control applications requiring either regular switchboard or coaxial types of jacks. A complete selection of patch cords to fill all types of applications. Size range of special panels from two up to jumbo sizes with about one thousand jacks per panel.

JACK — PLUGS — KEYS

A complete selection of standard types of jacks and plugs plus an extensive line of coaxial types suitable for pulse circuitry, microwave, and video applications. Push button and turn type keys with a very wide variety of circuit combinations using well established telephone switchboard designs are available.



HEADSETS

Thirty-five years of continuous production has produced fourteen basic types ranging from substantially all military types to specialized low cost units suitable for incorporating in toys as a sound generating device. All basic types produced in a wide assortment of variations.

Write for bulletins on these and the many additional standard stock items as well as an almost unlimited variety of manufactured-to-order products falling within the product classifications shown above.

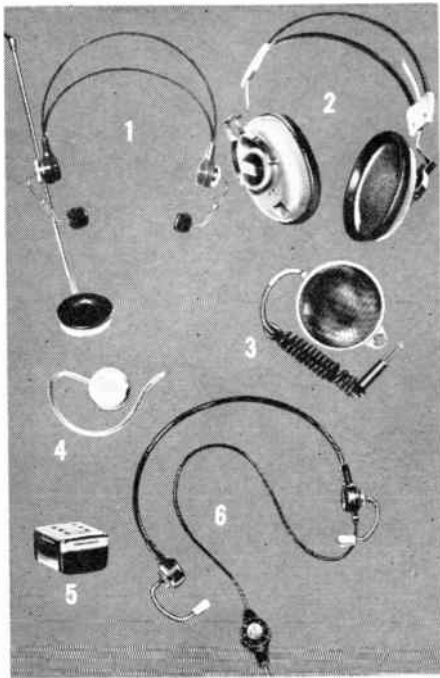


TRIMM INC.
LIBERTYVILLE ILLINOIS

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WORLD'S FINEST LISTENING DEVICES by **TELEX**[®]



... including

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3. PILLOW SPEAKER: For private audio listening, for sleep learning and in hospitals, hotels, railroads, airlines, and busses. Two types: *Dynamic* has stainless steel housing with a hanger; *Magnetic* is unit molded. Hermetically sealed diaphragm can be sterilized by submerging in alcohol.

4. MINIATURE RECEIVER: For hearing aid, transistor radio, and group hearing uses. Available as a cartridge unit in earsets, hearing aids, headsets, etc. Weight 2.5 grams; dimensions (cased), .26" thick, .51" diameter—(uncased), .13" thick, .49" diameter.

5. MINI-MIKE[®]: Dynamic speaker and mike—only 1 x 1 x ¾ inches. For uses requiring miniature electro-acoustic transducers—dictation machines, trans-receivers, etc. Can be made in variable response.

6. TWINSET[®]: For amateur, commercial, and industrial uses. CAA approved—standard on many airplanes. Light and comfortable. Less background noise, less signal loss—signal is piped directly into ears. Weighs just 1.6 oz.

For complete information on these and other Telex listening devices and accessories, write



TELEX[®]

Electro-Acoustic Division

Telex Park, St. Paul 1, Minn., Dept. 102

See Telex ad in Class. "Transformers"

For details, circle #424 on Reader Service Card

53. Jacks, Jack Fields & Plugs.

Mueller Electric Co., 1558Y E. 31st St.,
Cleveland 14, Ohio, 25

See ad on page 465

Tel: P^Rospect 1-5225

Murdock Corp., Mass., 20

National Tel-Tronics Corp., 52 St. Casimir Ave.,
Yonkers, N.Y., 5, 20

See ad on page 462

Tel: Y^Onkers 8-6400

Nems-Clarke Co., Md., 5, 10, 15, 20

North Electric Co., N.Y., 5, 10, 15, 20, 25,
30, 35

North Electric Co., Ohio, 5, 10, 15, 20

Northern Electric Co., Ltd., Canada, 5,
10, 15, 20

Oppenheimer Plastics Inc., Pa., 20

Painton & Co., Ltd., England, 20

Pan-Air Electronics Corp., Calif., 5, 15,
30

Permonite Mfg. Co., Ill., 5, 20

Plastic Mold & Engineering Co., R.I.,
20

Pomona Electronics Co., Inc., Calif., 15,
35

Radio Engrg. Labs., Inc., N.Y., 10

Radio Engrg. Products Ltd., Canada, 10

Raytheon Co., Mass., 30

Richards Electrocraft, Inc., Ill., 5, 15, 20

Roflan Co., Mass., 5, 10, 15, 20

Ross Metals Co., Milton, Pa., 5, 15, 20,
25, 30

Royal Electric Corp., R.I., 20

Rye Sound Corp., N.Y., 5, 15, 20

Seaelectro Corp., N.Y., 610 Lafayette
Ave., Mamaroneck, N.Y., 5, 20, 30

See ad on page 692

Tel: O^Wens 8-5600

Smith, Inc., H. H., N.Y., 5, 15, 20, 25,
30, 35

Standard Electric Time Co., Mass., 5,
15, 20, 25, 30, 35

Standard Telephones & Cables, Ltd.,
England, 5, 20

Star Expansion Industries Corp., N.Y.,
20

Stromberg-Carlson Div., General Dy-
namics Corp., N.Y., 5, 15, 20

Superex Electronics Corp., N.Y., 5, 20,
25

Switchcraft, Inc., 5561 N. Elston Ave.,
Chicago 30, Ill., 5, 10, 15, 20

See ad on page 556

Tel: S^Pring 4-1515

Symphony Electronics Corp., Calif., 5,
20, 25, 30, 35

Taurus Corporation, 8 Coryell St., Lam-
bertville, N.J., 30

See ad on page 693

Tel: E^Xport 7-1570

Telephonics Corp., N.Y., 5, 20

Telex, Inc., 1633 Eustis St., St. Paul 1,
Minn., 5, 15, 20

See ads on pages 466, 569

Tel: M^Idway 6-7211

Tevco Insulated Wire, Calif., 5, 20

Trico Fuse Mfg. Co., Wisc., 25

Trimm, Inc., 400 W. Lake St., Liberty-
ville, Ill., 5, 10, 15, 20

See ad on page 465

Tel: L^Ibertyville 2-3700

Ucinite Co., Div. of United-Carr Fas-
tener Corp., 459 Watertown St., New-
tonville 60, Mass., 5, 20, 30

See ad on page 464

Tel: L^Asall 7-8400

United States Instrument Corp., Va., 5,
10, 15, 20, 30

Vector Electronic Co., 1100 Flower St.,
Glendale 1, Calif., Patch boards

See ad on page 549

C^Hapman 5-1076

W & M Mfg. Corp., N.Y., 5, 20

Walsco Electronics Mfg. Co., Div. of
Textron, Inc., 100 W. Green St., Rock-
ford, Ill., 5, 15, 20

See ad on page 474

Tel: R^Ockford 8-9661

Waltham Horological Corp., Mass., 5,
15, 20

Whitso, Inc., Ill., 5, 30

Junctions, Hybrid: See class 80

Klystrons: See class 76

Knobs: See class 94

Labels, adhesive: See class 87

Lacing cord & tape: See class 87

Lights, pilot: See class 60

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Radio—TV—Phonos—Communications & Hi-Fi
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HAWLEY PRODUCTS COMPANY

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Directory II. Components

54. Loudspeakers.

5. Commercial grade loudspeakers
 7. Cones
 10. Headphones
 15. High-frequency
 20. Low-frequency
 25. Wide-range, 2 & 3 way systems

A.L.A. Industries, Inc., N.Y., Baffles
 Acoustical Mfg. Co., Ltd., England, 25
 Alert Products, Inc., N.J., 25
 Ampex Audio, Inc., Calif., 5, 10
 Argonne Electronics Mfg. Corp., N.Y., 5, 10
 Argos Products Co., Ill., Speaker Baffles
 Arnhold Ceramics, Inc., N.Y., 5, 15, 20, 25
 Atlas Sound Corp., N.Y., 5, 15, 25
 Audio-Video Corp., N.Y., 5, 25
 Beam-Echo Ltd., England, 15, 20
 Becker Electronics Mfg. Corp., N.Y., 5
 British Industries Corp., N.Y., 10
 British Industries Corp., Wharfedale Div., N.Y., 15, 20, 25
 Brown Co., Irv., N.Y., 5, 15, 20, 25
 Cannon Co., C. F., N.Y., 10
 Channel Master Corp., N.Y., 25
 Cleveland Electrn., Inc., Ohio, 5, 15, 20, 25
 Dictograph Products, Inc., N.Y., 5, 7, 10, 15, 20, 25
 Du Kane Corp., Ill., 15
 Duotone Co., Inc., N.J., 15, 20, 25
 Electro-Voice, Inc., E. V. Instrument Div., Mich., 10, 15, 20, 25
 Electronic Applications, Inc., Conn., 25
 General Ceramics Corp., Arnhold Ceramics, Inc., Sub., N.Y., 5, 15, 20, 25
 General Electric Co., Radio Receiver Dept., Conn., 15, 20, 25
 General Electric Co., Specialty Electronic Components Dept., N.Y., 15, 20, 25
 Goodmans Industries, Ltd., England, 5, 7, 15, 20, 25
 Hartley Products Co., N.Y., 25
 Hawley Products Co., 333 N. 6th St., St. Charles, Ill., 7
 See ad on page 466
 Tel: SAint Charles 3130
 Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 25
 See ad on page 328
 Tel: YUkon 3-3961
 Heppner Mfg. Co., Ill., 5, 15, 20
 Intelx Systems, Inc., N.Y., 15, 20, 25
 Jensen Mfg. Co., Ill., 5, 15, 20, 25
 Karlson Assoc., Inc., N.Y., Enclosure
 Klipsch & Associates, Ark., 15, 20, 25
 Knight Electronics, Ill., 25
 L.E.E., Inc., D.C., 25
 Lansky Die Cutting Corp., N.Y., Baffles
 Lesa, S.P.A., Italy, 10, 25
 Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 5, 7, 15, 20, 25
 See ads on pages 270, 301
 Tel: TEXas 0-7711
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 5
 Marine Electric Corp., Galbraith-Pilot Marine Corp. Div., N.Y., 5

Marsland Engrg., Ltd., Canada, 5
 Melody Master Mfg. Co., Ill., 10
 Millitest Corp., N.Y., 20, Deviation
 Motorola, Inc., Ariz., 15, 20, 25
 Murata Mfg. Co., Ltd., Japan, 10, 15
 Murdock Corp., Mass., 10
 Muter Co., Rola Co., Div., Ohio, 5
 Mytron Mfg. Co., Calif., 10
 Oxford Components, Inc., Ill., 5, 15, 20, 25
 Oxford Electric Corporation, Ill., 5, 15, 20, 25
 Pickering & Co., Inc., N.Y., Electrostatic
 Pimex, Inc., N.Y., 15
 Plastic Mold & Engineering Co., R.I., 10
 Port-O-Vox Corp., N.Y., 5, 25
 Powers Co., J. J., Ill., Baffles
 Quam Nichols Co., Ill., 5, 15, 20
 Racon Electric Co., Inc., N.Y., 5, 7, 15, 20, 25
 Radio Corp. of America, Defense Elec. Prod., N.J., 5, 15, 20
 Railroad Electronic Labs. of Omaha, Inc., Neb., 5, 25
 Reeves Equipment Corp., N.Y., 5
 Rockbar Corp., N.Y., 5, 15, 20, 25
 Roflan Co., Mass., 10
 Rogers Electronic Tubes & Components, Canada, 5, 15, 20
 Rola Co., Muter Co., Div., Ohio, 5, 15, 20
 Rye Sound Corp., N.Y., 10
 Sonotone Corp., Dept. X00-109, P.O. Box 200, Elmsford, N.Y., 10, 25
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 Tel: LYric 2-6400
 Standard Telephones & Cables, Ltd., England, 10
 Stevens Products, Inc., N.J., 7
 Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5, 10, 15, 20, 25
 Symphony Electronic Corp., Calif., 5, 10
 Telephonics Corp., N.Y., 10
 Telex, Inc., Dept. 102, 1633 Eustis St., St. Paul 1, Minn., 5, 10
 See ads on pages 466, 569
 Tel: MIDway 6-7211
 Thompson-Ramo-Wooldridge, Inc., Calif., 5
 Transvision, Inc., N.Y., 25
 Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 10
 See ad on page 465
 Tel: LIBertyville 2-3700
 Trutone Electronics, Inc., Calif., 25
 United Audio Prods., Inc., N.Y., 5, 7, 15, 20, 25
 University Loudspeakers, Inc., N.Y., 5, 15, 20, 25
 Waldom Electronics, Inc., Ill., 7
 Weathers Industries, N.J., 20, 25
 Wells Co., Inc., Gary, N.Y., 10
 Wright-Zimmerman, Inc., Minn., 15, 20

Magnet wire: See class 82

55. Magnets.

5. Electro
 10. Permanent

Aerovox Corp., Crowley Div., N.J., 10
 Allen-Bradley Co., Wis., 10
 Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 5
 See ad on pages 84-85
 Tel: BUTterfield 8-7403
 Applied Radiation Corp., Calif., 5
 Arnold Engineering Co., P.O. Box G, Marengo, Ill., 10
 See ads on pages 432, 468
 Tel: (Chicago) ANdover 3-6300
 Aircraft Electronics, Ariz., 5
 Crucible Steel Co. of America, Pa., 10
 Device Development Corp., Mass., 5
 Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 10
 See ads on pages 285, 361, 433, 467, 531, 617
 Tel: CHerry 6-2811
 General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 10
 See ad on page 618
 Tel: VALley 6-5100
 General Electric Co., Magnetic Material Section, Mich., 10



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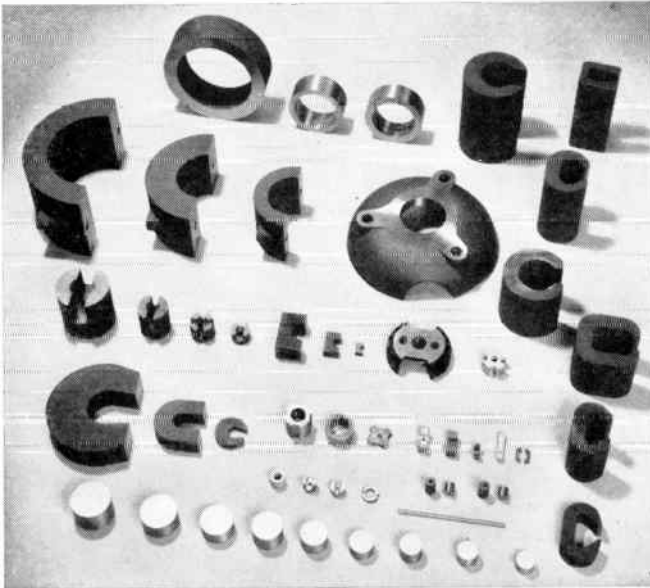
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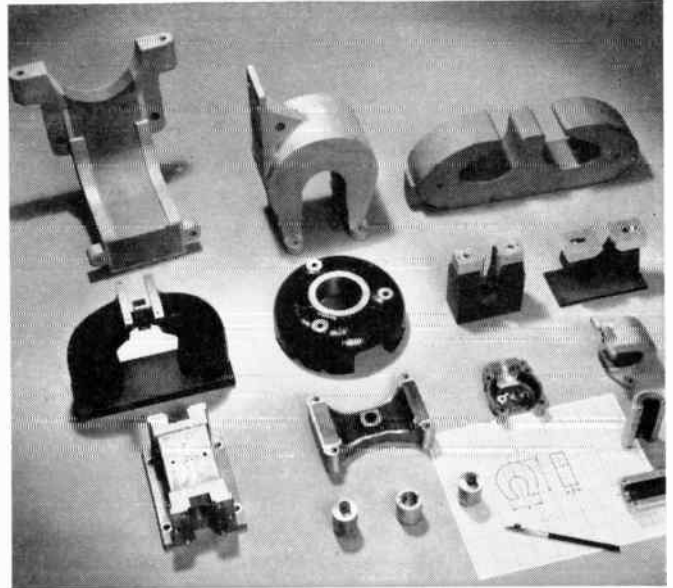
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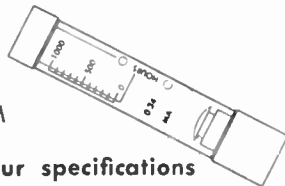
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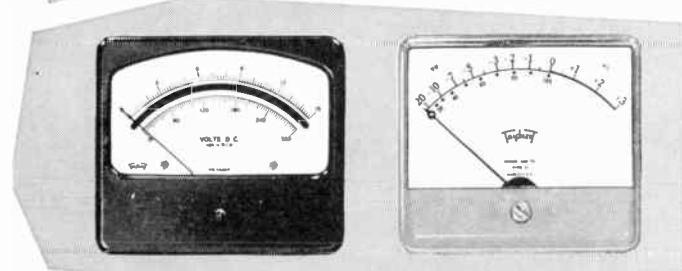
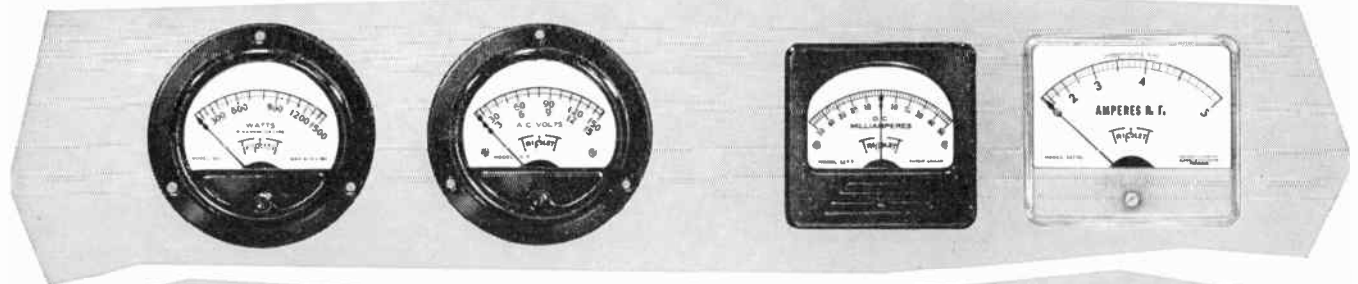
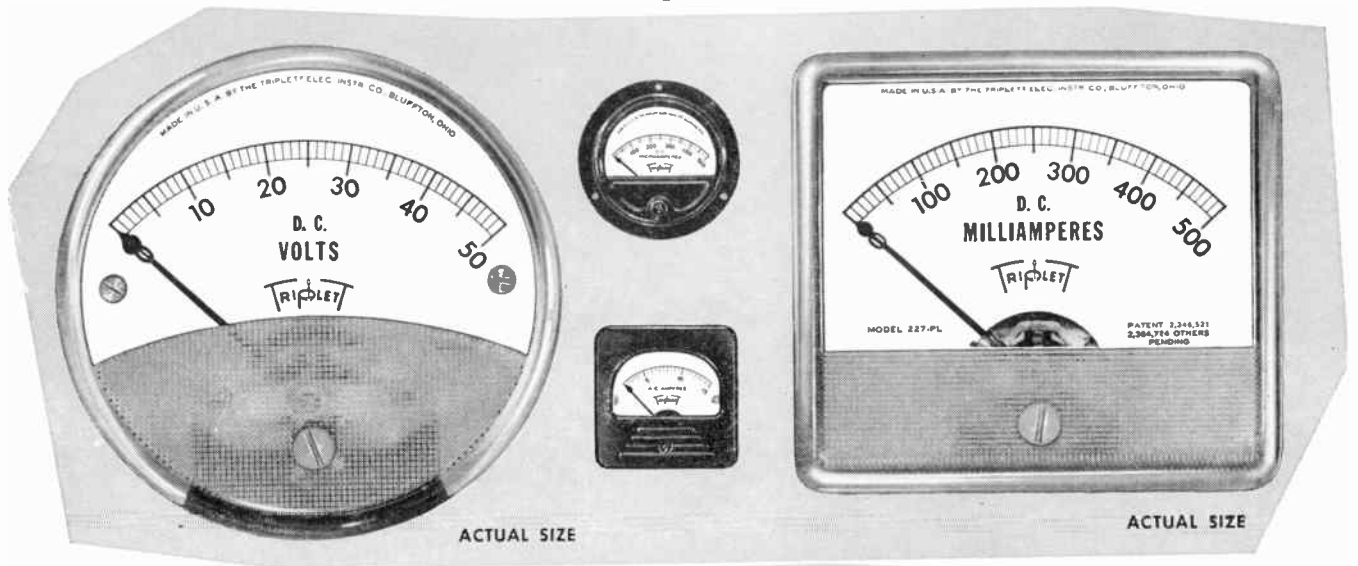
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Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 5, 15, 20, 25, 30, 50, 60

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Tel: BEVerly 5-2300

Servonics, Inc., Va., 50

Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 20, 30

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Tel: WOODlawn 5-2341

Shurite Meters, Conn., 5, 30, 50

Siemens & Halske, A. G., Germany, 5

Sierra Electronic Corp., 5442D Bohannon Dr., Menlo Park, Calif., 50, 60

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Tel: DAVenport 6-2060

Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 5, 20, 25, 30, 34, 45, 50, 55, 60

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Tel: ESTEbrook 9-1121

Societe Industrielle de Sonceboz, Switzerland, 35, 40, 45

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Southwestern Industrial Electronics Co., 10201 Westheimer Rd., P.O. Box 22187, Houston 27, Tex., 30, 50

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Tel: HO 5-3471

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Sperry Rand Corp., Sperry Microwave Elect. Co. Div., Fla., 15, 60

Standard Electric Time Co., Mass., 45



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MULTIMETERS® and REGULAR METERS

AC and DC types, multiple ranges, accuracy — 1/2 of 1%. 2 microamperes to 1 ampere DC. 2 milliamperes to 3 amperes AC.

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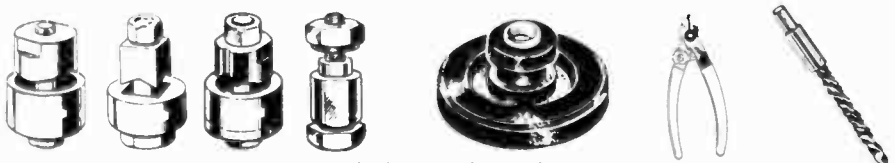


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MFG. CO.**

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56. Meters (Indicating Instruments).

Stark Electronic Instruments, Ltd., Canada, 5, 25, 30, 50, 55
State Testing Laboratory, Inc., Conn., 33
Sterling Mfg. Co., Ohio, 5, 25, 30, 50
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 32
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Tel: PORT Washington 7-7200
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Sullivan, Ltd., H. W., N.Y., 20, 25, 30
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Telectro Industries Corp., N.Y., 5
Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 15
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Texas Instruments Incorporated, Semiconductor—Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 23
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Tel: FLEetwood 7-5411
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Tel: BEekman 3-6720

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57. Microphones & Stands.

| | |
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| 3. Aircraft | 25. Dynamic |
| 5. Carbon | 30. Velocity |
| 10. Ceramic | 32. Magnetic |
| 15. Condenser | 35. Microphone stands |
| 20. Crystal | |

ABC Sound Engrg. Co., N.Y., 10, 20, 25, 32
American Microphone Mfg. Co., Div. of GC-Textron, Inc., 412 S. Wyman St., Rockford, Ill., 3, 5, 10, 20, 25, 30, 32, 35
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General Radio Co., West Concord, Mass., 15, 20, 25
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Tel: EMERSON 9-4400
Gotham Audio Dev. Corp., N.Y., 15

"STANDCO" VIBRATING REED FREQUENCY METERS



**HERMETICALLY SEALED
and Ruggedized
3 1/2" and 2 1/2" Sizes
Meeting all MIL Specs**

Normal Frequencies
25, 50, 60 or 400 Cycles
Special Ranges
from 15-1500 cycles

ALSO IN OTHER TYPES

PANEL MOUNTING: 3 1/2" Flush Bakelite.

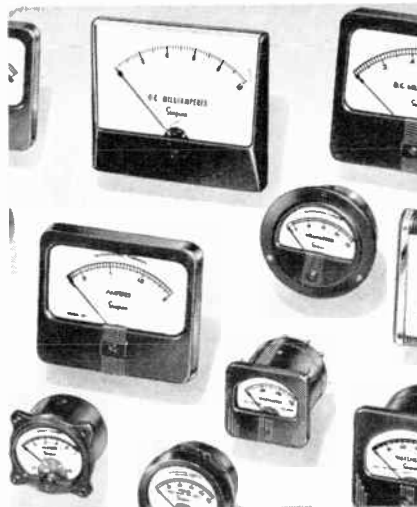
SWITCHBOARD MOUNTING: 7 1/4" round surface, or 4 1/2" square semi-flush cases.

PORTABLES: In large or small cases.

Write for Bulletin 805

HERMAN H. STICHT CO., INC.
27 PARK PLACE, NEW YORK 7, N.Y.

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panel instruments . . .
engineered and built
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available from stock
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Phone: EStebrook 9-1121
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For details, circle #438 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

INDUCTION MOTORS CORP. ACQUIRES NEW DIVISION, ANNOUNCES LARGE EXPANSION PROGRAM

Company Changes Name to IMC Magnetics Corp.

WESTBURY, NEW YORK, AUGUST 3, 1959—Induction Motors Corporation, one of America's leading manufacturers of electro-mechanical components for the electronics, aircraft and missile industries, is launching a large-scale expansion program, it was announced by Charles Wohlstetter, Board Chairman, and Simon Saretsky, President.

It was also announced that the company has acquired an important new division and is changing its name to one more indicative of the expanding line of products it is offering in the electronic components field.

As of May 1, Induction Motors became IMC Magnetics Corporation, a name designed to make it clear that the company has moved beyond the area of manufacturing motors alone, Mr. Wohlstetter said. Shortly thereafter, construction will begin to double the size of IMC's plant in Westbury, Long Island, from 30,000 to 60,000 sq. ft.

The new IMC division is Gray & Kuhn, Inc., of Roslyn Heights, Long Island. Established by John E. Gray and John J. Kuhn in 1956, it designs and manufactures delay lines, pulse and blocking oscillator transformers, and filters—all of which have constantly widening applications in modern electronic equipment. Its delay lines—of the phase corrected, lumped constant and magnetostriction types—are being used in radar systems, color television, electronic computers, pulse generators, telemetering equipment, and broadband oscilloscopes.

Its blocking oscillator transformers—of the low current miniature variety, encapsulated in epoxy resin—are being used for the generation of rectangular pulses in electronic computers, pulse generators, television transmitters and telemetering equipment.

Its filters—of the band-pass and low-pass types—are being used in communication receivers, telemetering devices, and multi-plexing systems.

The Gray & Kuhn line, Mr. Wohlstetter said, fits logically into the IMC family of products and expands the number of components IMC produces for the data processing field. To date, the major percentage of Gray & Kuhn's volume has been for commercial use. Mr. Gray, formerly President of the Harnett Electric Division of Hazeltine Electronics Corp., will continue as President of the new IMC division. Mr. Kuhn, former Executive Vice President of Electro-Mechanical Products, Inc., will remain as Vice President.

The new division represents IMC's second acquisition. The first, in 1956, was PSP Engineering Company of Maywood, California, the nation's largest designer and manufacturer of aircraft quality solenoids, and also a large producer of high precision synchros, resolvers, and stepping motors. PSP products are in use in speed control systems, launching devices, and general control systems on many of the major missile projects currently in work in the U.S.

Mr. Wohlstetter said the new addition in Westbury will house dust-controlled and air-conditioned manufacturing space and laboratories for the production of servo motors and servo tachometers. He added that the expansion stems from the company's continuous program of broadening its product lines.

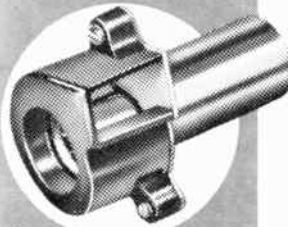
IMC PRECISIONEERED MOTORS



700 FRAME SERVO MOTOR

INPUT: 6-57 volts; 2 phase at 400 cps
FREQUENCY RANGE: 400-1000 cps
NUMBER OF POLES: 2, 4 and 6 poles
TYPICAL PERFORMANCE: 26/26 at 400 cps; No Load Speed: 6,200 rpm; Stall Torque: 0.30 oz. in.; Power: 3 watts/ø; Inertia: 0.65 gm cm²; Acceleration: 33,000 rad/sec²; Impedance: 133 + j17 ohms
WEIGHT: 1.6 ounces
DIMENSIONS: 0.750 Dia. x 1.062 Length

Bulletin 7F3

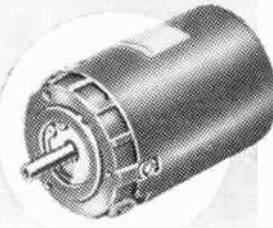


900 FRAME AC MOTOR

FREQUENCY: 320-1000 cps
AIR DELIVERY: (1½" Blower)*; 10 cfm @ 0"sp; 8 cfm @ 0.2"sp
RPM: 7000 @ 400 cps
WEIGHT OZ.: 7
WEIGHT OF MOTOR OZ.: 4½

*Also available in 1" blower size

Bulletin 9F4



1600 FRAME MOTOR

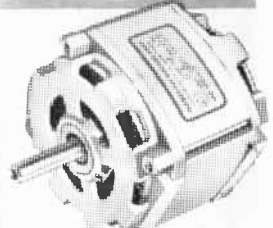
HORSEPOWER: 1/300-1/10
FREQUENCY: 25-1000 cycles—var. 50-1000 cycles
VOLTAGE: 26-208
POLES: 2, 4, and 6 poles
PHASES: 1, 2, or 3
TYPES: Induction or Synchronous
BEARINGS: Ball or Sleeve
Available non-cooled or self-cooled
APPLICATIONS: Blower, Fan, Gear, Recording and Control



2000 FRAME DC MOTOR

INPUT: 6-115 volts DC
OUTPUT POWER: 1/75 to 1/10 hp depending on speed, duty cycle and cooling
LIFE: 1000 hr brush life; 250 hrs at high altitude.
Available with gear speed reducer and/or speed governor, shunt, series, or compound wound.

Bulletin 20F2



2900 FRAME HYSTERESIS MOTOR

| | | | |
|------------------|-------|------------------|-------|
| VOLTS: | 115 | T.P.I. (oz.in.): | 4.5 |
| CPS: | 60 | T.P.O. (oz.in.): | 5.0 |
| WATTS INPUT: | 24 | T.St. (oz.in.): | 4.0 |
| AMPERES: | .22 | CAPACITOR (mfd): | 2.5 |
| NUMBER OF POLES: | 4 | 220 VOLTS A.C.: | |
| RPM: | 1800 | WEIGHT: | 1 lb. |
| H.P.: | 1/125 | | |

Hysteresis Catalog



3800 FRAME AC MOTOR

INPUT: 26-230 volts AC; 1, 2 and 3 phase
INPUT FREQUENCY: 25-400 cycles
NUMBER OF POLES: 2, 4, 6, 8 and 12 poles
OUTPUT POWER: Induction motors—1 hp; Torque motors—10 to 200 oz. in. stall torque; Hysteresis synchronous motors—1 200 to 3/4 hp (can be wound for single, dual or three speed.)
BEARINGS: Ball or Sleeve
WEIGHT: 8-11 lbs.
MOUNTING: Round or square flange and/or base

Bulletin 38F6

IMC's versatile engineering staff is available to meet your specific design requirements

imc Magnetics Corp. 
Formerly: Induction Motors Corp.
570 MAIN STREET/WESTBURY, L.I., N.Y./EDGEWOOD 4-7070 • 6058 WALKER AVE./MAYWOOD/CALIF.

Directory II. Components

57. Microphones & Stands.

Greibach Research & Development Labs., N.Y., 3, Magnetic Throat Hal-Hen Co., N.Y., Earphones

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 20

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Tel: YUkon 3-3961

Industrial Television, Inc., N.J., Megaphones

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Tel: TEXas 0-7711

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Tel: LYric 2-6400

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Telephonics Corp., N.Y., 3, 5, 25, 32

Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 3, 25, 32

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Tel: MIDway 6-7211

Tibbetts Industries, Inc., Me., 20, 32

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Universal Microphone Co., Calif., 3, 5, 10, 15, 20, 25, 30, 32, 35

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**Microwave attenuators:
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Microwave filters: See class 50

**Microwave power supplies:
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Microwave receivers: See class 18

**Microwave transmitters:
See class 18**

Microwave tuners: See class 77

**Microwave waveguides:
See class 80**

Monoscope tubes: See class 76

58. Motors & Synchros.

- | | |
|------------------------|------------------------|
| 5. Blower & fan | 25. Phonograph |
| 7. Clock radio | 30. Servo |
| 10. Dynamotors | 32. Speed regulating |
| 12. Fractional HP | 34. Synchros |
| 15. Frequency changers | 35. Synchronous motors |
| 20. Motor-generators | 40. Timing |

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Airborne Accessories Corp., N.J., 12

Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 5, 12, 25, 35

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Tel: AMityville 4-3700

Allard Instrument Corp., N.Y., 5, 12, 30

American Electronics, Inc., Calif., 5, 12, 15, 20, 30, 34

American Machine & Foundry Co., LeLand Airborne Prods. Div., Ohio, 20, 35

American Measurements & Control, Inc., Mass., 30

Anglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 12, 35, 40

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Tel: BUckingham 1-2727

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58. Motors & Synchros.

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Tel: ATlas 8-2000

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Tel: PLeasant 4-6616

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Brevet Prods. Corp., N.Y., 12

Bucknell Engrg. Co., Inc., Calif., 15, 20

Carter Motor Co., Ill., 10, 12, 15, 20

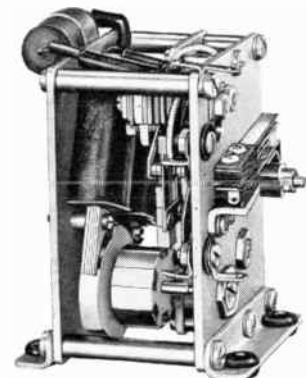
Celco—Constantine Engineering Laboratories Co., 70 Island Ave., Mahwah, N.J., 5, 12, 20, 30, 34, 35

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Tel: DAvis 7-1123

Christian-Dunker Co. of Germany, Conn., 12, 25, 35

AMGLO Constant Speed DC Motors



Reed controlled, DC Motors offer constant speed from 900 RPM to 1 Rev. Per Day.

- 3 to 110 V. DC operating voltage.
- 0.1 to 2 Watt Input.
- Built to specifications for use in timing, signalling and missile control.

Write for

Quotation and Recommendations

AMGLO CORPORATION

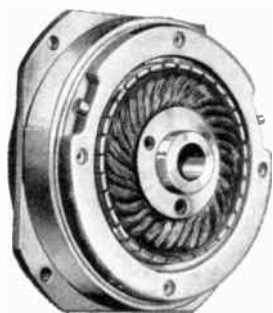
4333 No. Ravenswood Ave.,
Chicago 13, Ill.

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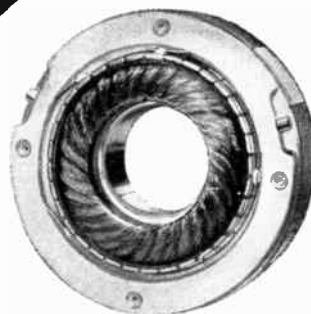
**Microwave amplifiers:
See class 36**

a Complete line of D. C. TORQUE MOTORS

FOR DIRECT DRIVE SERVO APPLICATIONS



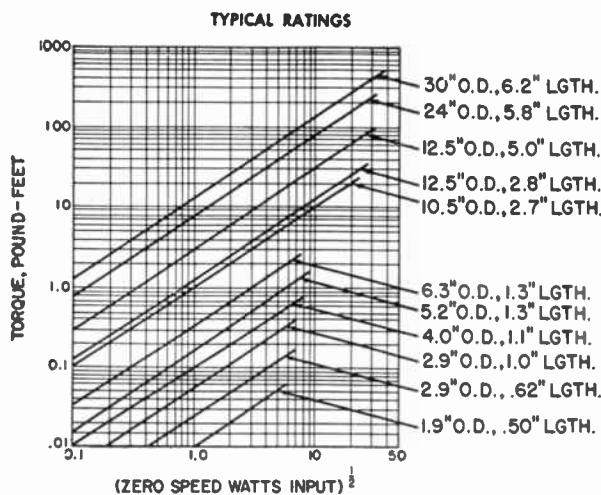
IN TYPICAL HOUSING



WITHOUT HOUSING

- High angular acceleration by utilizing direct drive (4,000 rad./sec.²)
- High peak torque per unit volume
- Minimum control and total power input
- Rapid electrical response
- Optimum shape for compact systems

THIS DESIGN TAKES MAXIMUM ADVANTAGE OF THE PROPERTIES OF DC CONTROL POWER AND PERMANENT MAGNET FIELDS.



Matching Rotary Amplifiers Also Available

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MANUFACTURERS OF ELECTRICAL MACHINERY
18 WALTER STREET
PEARL RIVER • NEW YORK

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THE MARK OF QUALITY

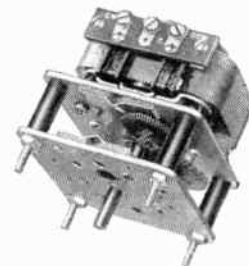


quick solutions
to various
electronic
problems



Ultra-Sensitive Relays

Operating on input powers of 40 to more than 1,000 microwatts, the Barber-Colman Micropositioner polarized relay is ideal as a differential relay in electronic plate circuits, as a null detector in resistance bridge circuits, or as an amplifier in photoelectric circuits. Resonant relays also available from Barber-Colman



Reversible Small Motors

Shaded pole a-c type, up to 1/25 hp . . . adaptable to a variety of control circuits, including transistor and vacuum tube types. Ideal for use with servo mechanisms and other follow-up and positioning units. Available with or without gear-heads. A wide range of gear ratios for gear motors . . . open or enclosed.



Small Motors with Blowers

In both a-c and d-c types with cooling fans or blowers for quick, dependable dissipation of heat from tubes, circuit components and other equipment mounted in confined enclosures.

BARBER-COLMAN COMPANY
Dept. 60D, 1211-9 Rock Street, Rockford, Illinois

For details, circle #442 on Reader Service Card

1960 IRE Directory

Directory II. Components

58. Motors & Synchros.

- Clifton Precision Products Co., Inc.**, Marple & Broadway, Clifton Heights, Pa., 20, 30, 34
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- Continental Electric Co.**, N.J., 5, 15, 20
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Cramer Controls Corp., Conn., 35, 40
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Daco Instrument Co., N.Y., 30, 34, 35, 40
Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 12, 25, 35
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- Daystrom Transcoil Corp.**, Div. of Daystrom, Inc., Worcester, Montgomery County, Pa., 30
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Edison Industries, Thomas A., Instrument Div., 61 Lakeside Ave., West Orange, N.J., 20, 30
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Tel: **OR**ange 3-6800
- Edwards Eng. Co.**, N.Y., 10, 12, 20
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Electric Indicator, Inc., Conn., 5, 12, 20, 30, 32, 34, 35
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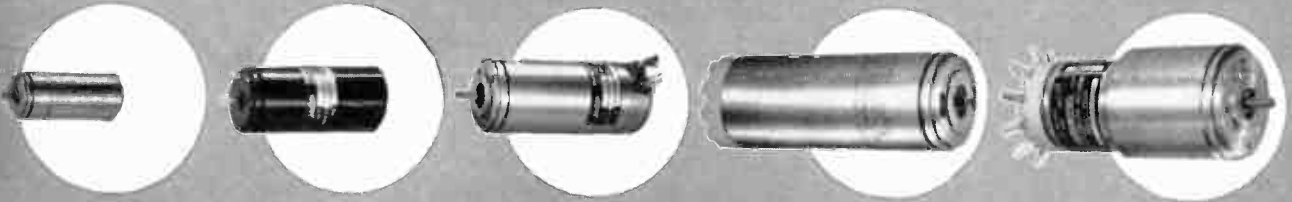
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|----------------|------|---------------|---------|----------------------------------|---------------|----------|-------------------|-------------------------|----------------------|--------------|---------------------------|-------------------|---------|--------------------|
| | | | | | Rated Voltage | | No load speed RPM | Watts per phase @ Stall | Stall Torque OZ. IN. | Excit. Volt. | Output Volts per 1000 RPM | Lin % to 3600 RPM | Null MV | Phase Shift @ 25°C |
| | | | | | Ø 1 | Ø 2 | | | | | | | | |
| 8MTG-6201-01 | 8 | 1.850 | 2.3 | 0.77 | 26 | 40/20 | 6,500 | 2.2 | 0.16 | 26 | 0.25 | 0.5 | 15 | ± 5° |
| *10MTG-6228-02 | 10 | 2.157 | 4.2 | 0.72 | 115 | 115/57.5 | 9,500 | 2.8 | 0.26 | 115 | 0.45 | 1.5 | 19 | ± 10° |
| 10MTG-6229-12 | 10 | 2.100 | 2.9 | 1.09 | 33/16.5 | 52/26 | 9,500 | 3.0 | 0.28 | 26 | 0.45 | 1.5 | 13 | ± 10° |
| *10MTG-6229-03 | 10 | 2.100 | 2.9 | 1.09 | 26 | 26 | 10,500 | 3.0 | 0.26 | 18 | 0.3 | 1.5 | 12 | ± 10° |
| 10MTG-6229-15 | 10 | 2.100 | 2.9 | 1.09 | 26 | 26 | 10,500 | 3.0 | 0.26 | 26 | 0.3 | 1.5 | 12 | ± 10° |
| *10MTG-6232-05 | 10 | 2.104 | 4.2 | 1.1 | 115 | 36/18 | 6,500 | 3.5 | 0.26 | 115 | 0.30 | 1.5 | 15 | ± 10° |
| 11MTG-6251-13 | 11 | 2.531 | 7.0 | 1.3 | 115 | 115/57.5 | 6,500 | 3.5 | 0.63 | 115 | 0.55 | 0.5 | 19 | ± 10° |
| 11MTG-6251-00 | 11 | 2.531 | 7.0 | 1.1 | 115 | 40/20 | 6,500 | 3.5 | 0.63 | 115 | 0.55 | 1.5 | 19 | ± 10° |
| 11MTG-6254-01 | 11 | 2.200 | 6.0 | 1.1 | 115 | 115/57.5 | 6,500 | 3.5 | 0.63 | 115 | 0.55 | 1.5 | 19 | ± 10° |
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| 18MTG-6302-02 | 18 | 3.680 | 20.0 | 5.7 | 115 | 115/57.5 | 9,000 | 16.0 | 2.7 | 115 | 3.0 | 0.2 | 13 | ± 5° |
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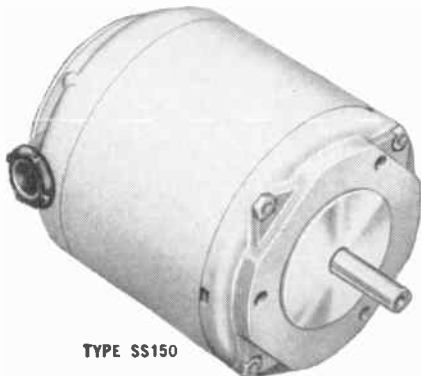
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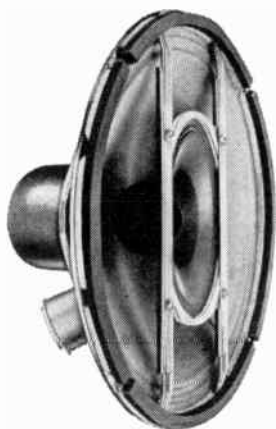
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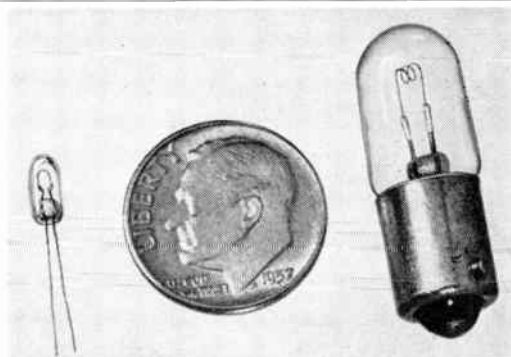
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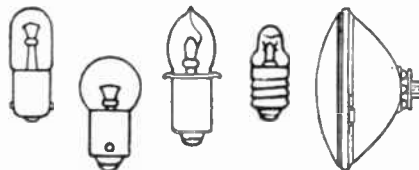
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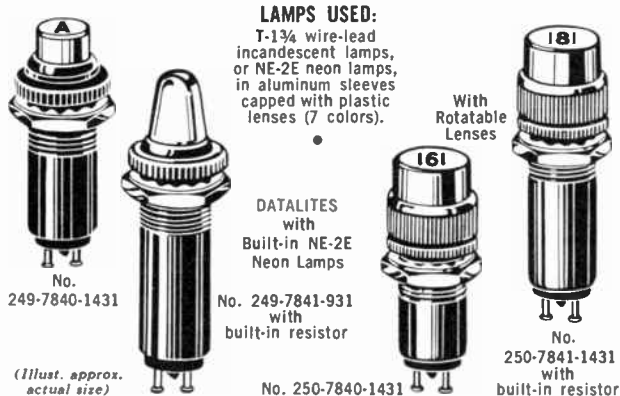
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Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 5, 10, 15

See ad on page 484

Tel: WOODland 7-1113

Dorf Radio Co., N.Y., 5, 10, 15

Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 5, 10, 15

See ad on page 484

Tel: HYacinth 7-7600

Drake Mfg. Co., 4622 N. Olcott Ave., Chicago 31, Ill., 5, 10, 15

See ad on this page

Tel: CHesapeake 3-4462

Eagle Elec. Mfg. Co., N.Y., 5, 10, 15

Eastern Ins. Wire Corp., N.J., 10, 15

Eldema Corp., Calif., 10, 15

Electrosnap Corp., Ill., 10

Electro-Snap Switch Co., Ill., Lighted Pushbuttons

Engineered Electronics Co., Calif., 15, High Sensitivity

Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 5

See ad on page 637

Tel: IRving 8-5744

Fidelity Amplifier Co., Ill., 10

General Cement Mfg. Co., Div. of Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5, 10, 15

See ad on page 474

Tel: ROKckford 8-9661

General Electric Co., Large Lamp Div., Ohio, 10

General Electric Co., Miniature Lamp Dept., Ohio, 10, 15

General Electric Co., Wiring Device Dept., R.I., 5

Godfrey Mfg. Co., Ill., 10

Herzog Miniature Lamp Works, Inc., N.Y., 10, Lamps

Hetherington, Inc., Pa., 5, 10, 15

Hoffman Engrg. Corp., Conn., 10, 15

I.D.E.A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., Digital Readouts

See ad on this page

Tel: LIBerty 7-3581

Industrial Devices, Inc., N.J., 15

Industrial Electronic Engineers, Inc., 3973 Lankershim Blvd., No. Hollywood, Calif., In-Line Display

See ads on pages 285, 484

Tel: TRIangle 7-0328

Johnson Co., E. F., Minn., 5



The BEST way to fill your

MINIATURE LIGHTING NEEDS

This quick-reference, illustrated catalog is packed with information about pilot—dial—signal—indicator—illuminating lighting units and lampholders of all types. In the big DRAKE line you'll find practical answers to virtually any Miniature Lighting requirement. And of course, our decades of specialized experience are at your service to help with unusual problems—our engineers will gladly discuss them with you!



SEND FOR YOUR COPY TODAY!

DRAKE MANUFACTURING COMPANY
4622 N. OLCOTT AVE. • CHICAGO 31, ILL.

MINIATURE LIGHTING SPECIALISTS

For details, circle #450 on Reader Service Card

with selective group switching

features: Clearly defined characters $\frac{1}{2}'' \times \frac{7}{8}''$ easy to read even with high ambient light & viewing angles up to 150° . In-plane construction eliminates confusing depth to figures.

Multiple units may be arranged in-line occupying only $1\frac{1}{8}'' \times 1\frac{1}{2}''$ panel area per digit. For limited space applications matrix and indicator may be separated.

Selective group switching eliminates complicated relay trees commonly employed for segmented displays.

Input range 150 to 300 volts. Power Consumption only 1 watt max. per digit at 150V.

Cost as low as \$5.00 per digit in production quantities.

ELECTRONIC EQUIPMENT DIVISION | I.D.E.A., Inc.
7900 Pendleton Pike—Indianapolis 26, Indiana

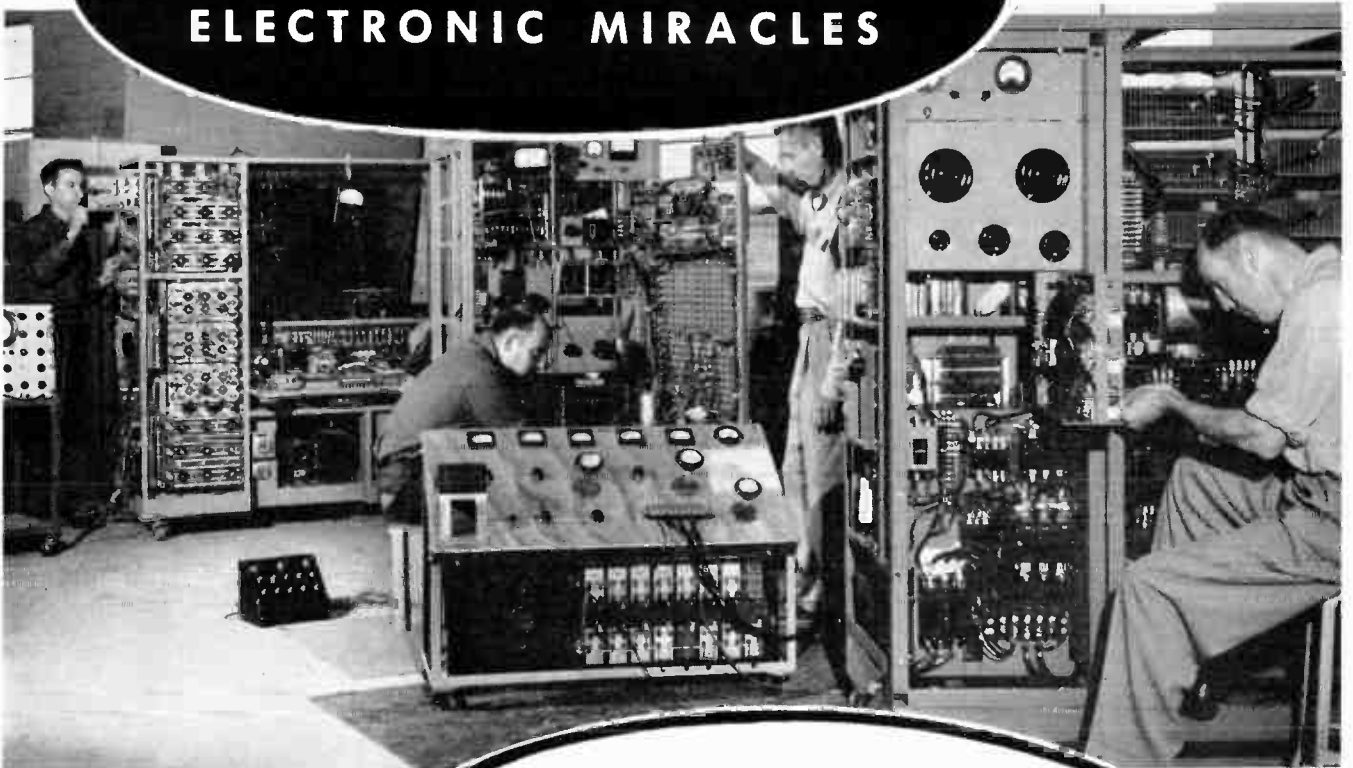
Applications include use in digital voltmeters, counters, status boards, missile check-out and countdown equipment, timers, target range units, air route and terminal area traffic control systems, aircraft and control instrumentation.



For details, circle #451 on Reader Service Card

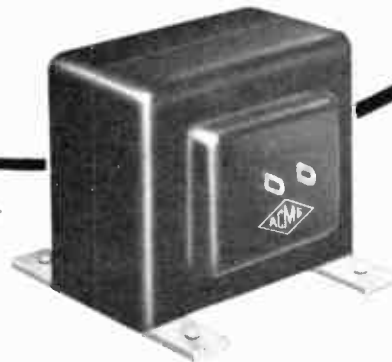
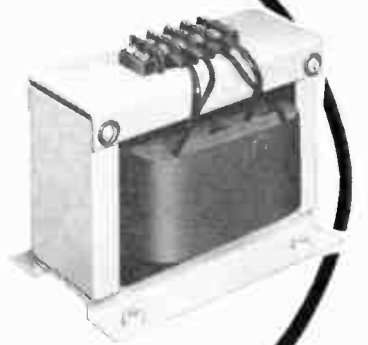
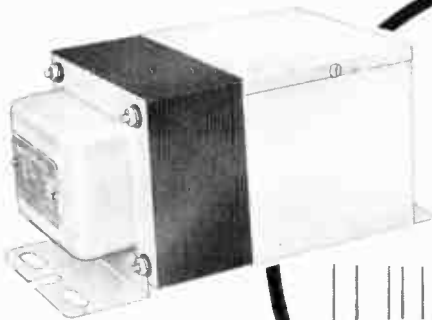
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

ACME ELECTRIC HELPS CREATE ELECTRONIC MIRACLES



Acme Electric offers the Electronic Industry the invaluable asset of engineering know-how, plant production facilities, skilled craftsmen and comprehensive testing equipment to produce components or complete assemblies for a wide variety of electronic equipment. Picture above shows a view of assembly section producing DC regulated power supplies for computer service. We produce Power Supplies in sizes ranging from one m.a. DC single circuit to multiple circuit units as shown above.

ACME ELECTRIC CORPORATION
44 WATER STREET • CUBA, NEW YORK
WEST COAST: 12822 YUKON AVE. • HAWTHORNE, CALIF.



Directory II. Components

60. Pilot Lights & Assemblies.

Kirkland Co., H. R., N.J., 5, 10, 15
Kulka Electric Corp., 633 S. Fulton Ave., Mt. Vernon, N.Y., 10
See ad on page 690

Tel: MOUNT Vernon 4-4024

Leecraft Mfg. Co., Inc., N.Y., 5, 10, 15
Leviton Mfg. Co., Inc., N.Y., 5, 10, 15
Marco Industries Co., Calif., 5, 10, 15
McDermott Corp., Julian A., N.Y., 10, 15

Metox, France, 5

Micarta Fabricators, Inc., Ill., 5

O & S Research Inc., N.J., 5

Oxford Components, Inc., Ill., 10, 15

Oxford Electric Corp., Ill., 10

Pass & Seymour, Inc., N.Y., 5, 15

Pendar, Inc., Calif., 10

Penn Keystone Corp., Conn., 10

Plasteck, Inc., Okla., 10

Plastic Mold & Engineering Co., R.I., 5, 15

Radar Relay, Inc., Calif., 5

Signalite, Inc., N.J., 15

Sloan Co., Calif., 5, 10, 15

Smith, Inc., H. H., N.Y., 5

Smith Mfg. Co., J & H, N.Y., 5

Symphony Electronics Corp., Calif., 5, 10, 15

Tingstol Co., Ill., 5

Transistor Electronics Corp., Minn., 15, Indicators

Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 10, 15

See ad on pages 50-51

Tel: HUMBOLDT 2-4200

Ucinite Co., Div. of United-Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 15

See ad on page 464

Tel: LASALL 7-8400

Westgate Lab., Inc., Ohio, 10

Westinghouse Electric Corp., Lamp Div., N.J., 10

Pins & Prongs: See class 99

Potentiometers: See class 67

61. Power Supplies

2. AC type

4. DC type

5. High voltage (kilovolt)

15. Low voltage

17. Magnetic

20. Medium voltage

25. Microwave

30. Primary power sources, fuel

engine driven

35. Transistor

37. Variable

40. Voltage regulated

power sources

ACDC Electronics, Inc., Calif., 2, 4, 5, 15, 20, 35, 40

ACF Industries, Inc., Avion Div., N.J., 17, 35

AMP Inc., Capatron Div., Pa., 5, 20

A.R.F. Products, Inc., Ill., 4, 35

A.R.&T. Electronics, Inc., Ark., 4

Acme Electric Corp., 44 Water St., Cuba, N.Y., 2, 4, 15, 17, 30, 35, 37, 40

See ad on page 486

Tel: CUBA 4

61. Power Supplies.

Adler Electronics, Inc., N.Y., 4, 17

Admiral Corp., Ill., 35

Aero Guidance Corp., Calif., 35

Aerolab Devel. Co. Semiconductor Systems Div., Calif., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40

Aerovox Corp., Mass., 2, 15, 40

Aircon, Inc., 48 Cummington St., Boston, Mass., 25

See ad on page 590

Tel: COPLEY 7-9115

Aircon, Inc., N.J., 25

Aircraft Electronics, Ariz., 2, 4, 5, 15, 20, 35, 37, 40

Airdesign Corp., Pa., 2, 4, 5, 15, 40

Airpax Electronics Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla.; Cambridge Div., Jacktown Rd., Cambridge, Md., 2, 4

See ad on pages 82-83

Tel: LUDLOW 3-6160

Airtronics, Inc., D.C., 40

Airtronics International Corp., Fla., 20, 40

Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, P.O. Box 125, Westboro 1, Mass., 4

See ad on page 290

Tel: FOREST 6-4467

Alfred Electronics, Calif., 4, 5, 25, 37

Alto Scientific Co., Inc., Calif., 4, 35

Amelco, Inc., Calif., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40

American Communications Corp., N.Y., 2, 4, 15

American Electronics, Inc., Calif., 2, 4, 17, 35, 37, 40

American Machine & Foundry Co., Leland Airborne Product Div., Ohio, 2, 4, 5, 15, 20, 30, 35, 40

American Missile Products, Calif., 2, 4, 15, 20, 35, 40

American Research & Mfg. Corp., Md., 2, 4, 5, 15, 17, 20, 35, 37, 40

American Television and Radio Co., 300 E. 4th St., St. Paul 1, Minn., 2, 4, 15

See ad on page 426

Tel: CAPITAL 2-3791

Anglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 4, 15, 35

See ads on pages 477, 577

Tel: BUCKINGHAM 1-2727

Amplifier Corp. of America, N.Y., 2, 4, 15, 20, 35, 40

Applegate & Co., C. J., 1840 24th St., Boulder, Colo., 2, 4, 5, 15, 20, 25, 35, 37

See ad on this page

Tel: HILLCREST 2-8750

UNIPLUGS

Model 119—12.6 VDC @ 0.9 amps
DC Filament Supply \$43.50

Model 125B—6.3 VDC @ 1.5 amps
DC Filament Supply \$47.00

Model 227—28.0 VDC @ 1.2 amps
DC Filament Supply \$59.00

Model 123A—800 VDC @ 1.5 ma.
Reg. Photomult. Supply \$98.00

Model 123A—1000 VDC @ 1.5
ma. Reg. Photomult. Supply
\$98.00

Model 223—1500 VDC @ 1.5 ma.
Reg. Photomult. Supply \$159.00

Model 224—2650 VDC @ 1.5 ma.
Reg. Photomult. Supply \$495.00

Model 212—200 to 300 VDC 150
ma. max. Voltage Regulator
\$46.50

Model 214—200 to 300 VDC 250 ma. max. Voltage Regulator \$58.00

Model 215—150 VDC @ 12 ma., 6.3 VAC @ 0.9 amps Power Supply \$44.00

These "Uniplugs" are the most popular for general lab-stock. Delivery is usually from stock. Quantity prices on 10 or more of a kind.

C. J. APPLGATE & COMPANY

1840 24th Street

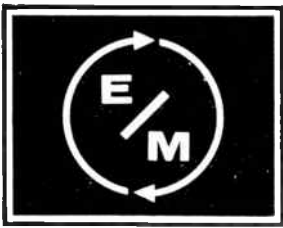
Phone: Hillcrest 2-8750

Boulder, Colorado



For details, circle #453 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.



ELECTRONIC POWER SUPPLIES

For Transistors • Strain Gauges • Bridges
For Research • Production • O.E.M.

DESIGNED FOR APPLICATION

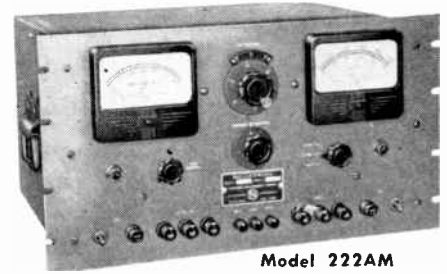
Every Electronic Measurements Power Supply gives the user a carefully selected combination of features . . . the features most sought after in each particular voltage and current range. When desired, these features can be modified to meet unusual applications. For example, the Regatron Programmable models can be converted to constant current operation by means of a few simple external connections. A plug-in chopper stabilization unit is also available.

To aid the purchaser in his selection, Electronic Measurements has various specification sheets and bulletins which will be furnished on request. A partial list includes:

Bulletin 765AM . . . the use of programmable power supplies in automatic test and process equipment.

Bulletin 422AM . . . the use and selection of power supplies for laboratory application.

Bulletin 350AM . . . a brief summary of E/M power supplies.



Model 222AM

ENGINEERING SPECIFICATION CHART

| TYPE | MODEL NUMBER | OUTPUT | | REGULATION | | | MAX. RIPPLE IN MV | MOUNTING | DIMENSIONS | | | PRICE | | |
|---|--|--|-----------------------------|-------------------|------------------------|---------------------|----------------------|----------|---|--------|--------|--------|--------|----------|
| | | Voltage | Current | LINE 105-125 V AC | NO LOAD TO FULL LOAD % | 50-60 CPS V | | | H | W | D | | | |
| REGATRON PROGRAMMABLE TRANSISTOR POWER PACKS | 212A ¹ | 0-100 V DC | 0-100 MA | 0.15 | 0.05 | 0.1 | 0.05 | 1/2 | MAY BE USED IN RACK OR ON TABLE. | 3 1/2 | 19 | 9 1/2 | 14 | \$129.00 |
| | 2-212A ¹ | Equivalent to two model 212A's. Outputs may be used in series, parallel, or independently. | | | | | | | | 5 1/2 | 19 | 9 1/2 | 27 | 258.00 |
| | 213A | 0-50 V DC | 0-1 AMP | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 7 | 19 | 11 | 35 | 345.00 |
| | 214A | 0-100 V DC | 0-1 AMP | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 7 | 19 | 11 | 35 | 379.00 |
| | 215A | 0-50 V DC | 0-3 AMP | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 10 1/2 | 19 | 16 | 75 | 670.00 |
| | 218A | 0-100 V DC | 0-3 AMP | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 10 1/2 | 19 | 16 | 75 | 720.00 |
| | 220A | 0-50 V DC | 0-500 MA | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 5 1/2 | 19 | 12 1/2 | 30 | 299.00 |
| 221A | 0-100 V DC | 0-500 MA | 0.1 | 0.05 | 0.1 | 0.05 | 1 | | 5 1/2 | 19 | 12 1/2 | 30 | 329.00 | |
| 224A ¹ | 0-100 V DC | 0-200 MA | 0.15 | 0.05 | 0.1 | 0.05 | 1 | | 3 1/2 | 19 | 9 1/2 | 16 | 189.00 | |
| REGATRON PROGRAMMABLE GENERAL PURPOSE POWER PACKS | 229A | 0-150 V DC | 0-300 MA | 0.1 | 0.1 | 0.1 | 0.1 | 1 | RACK OR TABLE. | 5 1/2 | 19 | 12 1/2 | 30 | \$234.00 |
| | 231A | 0-300 V DC | 0-100 MA | 0.1 | 0.1 | 0.1 | 0.1 | 1 | RACK OR TABLE. | 7 | 19 | 11 1/2 | 30 | 214.00 |
| | | 0-150 V DC | 0-5 MA | 0.5 | — | — | 0.5% AT MAX. SET. 3 | 3 | AS REQUESTED. ⁶ | | | | | |
| | 232A | SAME AS MODEL 231A EXCEPT | 0-300 V DC OUTPUT IS 200 MA | | | | | | | | | | | 234.00 |
| | 233A | SAME AS MODEL 231A EXCEPT | 0-300 V DC OUTPUT IS 300 MA | | | | | | | | | | | 254.00 |
| | 234A | 0-300 V DC | 0-500 MA | 0.1 | 0.1 | 0.05 | 0.05 | 1 | MAY BE USED IN RACK OR ON TABLE. | 7 | 19 | 11 1/2 | 30 | 325.00 |
| 235A | 0-600 V DC | 0-500 MA | 0.05 | 0.05 | 0.025 | 0.03 | 1 | | 10 1/2 | 19 | 16 | 78 | 625.00 | |
| 236A | 0-600 V DC | 0-200 MA | 0.05 | 0.05 | 0.02 | 0.03 | 1 | | 8 3/4 | 19 | 14 1/2 | 58 | 325.00 | |
| | 0-150 V DC | 0-5 MA | 0.5 | — | — | 0.5% AT MAX. SET. 3 | 3 | | | | | | | |
| REGATRON NON-PROGRAMMABLE GENERAL PURPOSE POWER PACKS | 209B ^{1,2} | 0-600 V DC | 0-600 MA | 0.02 | 0.05 | 0.01 | 0.02 | 1/2 | MAY BE USED IN RACK OR ON TABLE. | 10 1/4 | 19 | 15 | 75 | \$525.00 |
| | 219B ^{1,2} | 0-150 V DC | 0-5 MA | 0.5 | — | — | 0.5% AT MAX. SET. 3 | 3 | | | | | | |
| | 222A ³ | 0-1000 V DC | 0-500 MA | 0.02 | 0.05 | 0.01 | 0.02 | 1 | | 10 1/2 | 19 | 15 | 80 | 675.00 |
| | 2300 ⁴ | 0-300 V DC | 0-1.5 AMP | 0.02 | 0.05 | 0.015 | 0.02 | 1 | | 10 1/2 | 19 | 15 | 80 | 675.00 |
| | 6.3 V AC | 10 AMP | | | | | | | | | | | | |
| REGATRON CALIBRATORS | 2601 ⁵ | 0-300 V DC | 0-100 MA | 0.03 | 0.03 | 0.02 | 0.02 | 1 | CABINET MODEL IS STANDARD. ALSO AVAILABLE FOR STANDARD 19-INCH RACK MOUNTING. | 7 | 11 | 15 | 33 | \$234.00 |
| | 2602 ⁵ | SAME AS MODEL 2601 EXCEPT OUTPUT CURRENT IS 200 MA | | | | | | | | | | | | 254.00 |
| | 2603 ⁵ | SAME AS MODEL 2601 EXCEPT OUTPUT IS 300 MA | | | | | | | | | | | | 374.00 |
| EM GENERAL UTILITY POWER PACKS | 205A | 100-325 V DC | 0-150 MA | 1 | — | 1 | — | 10 | MAY BE USED IN RACK OR ON TABLE. | 7 | 19 | 11 | 40 | \$150.00 |
| | | 0-150 V DC | 0-5 MA | 1 | — | — | 0.5% AT MAX. SET. 10 | 10 | | | | | | |
| | | 6.3 V AC | 6 AMP | | | | | | | | | | | |
| | 200B | 0-325 V DC | 0-125 MA | 1 | — | 1 | 0.2 | 5 | | 7 | 19 | 11 | 40 | 185.00 |
| | 6.3 V DC | 6 AMP | | | | | | | | | | | | |
| 204AB | 0-500 V DC | 0-500 MA | 1/2 | 0.2 | 1 | 0.2 | 5 | | 10 1/2 | 19 | 15 | 71 | 375.00 | |
| | 0-150 V DC | 0-5 MA | — | — | — | 0.5% AT MAX. SET. 5 | 5 | | | | | | | |
| | 6.3 V AC | 10 AMP | | | | | | | | | | | | |
| 204A | SAME AS MODEL 204AB EXCEPT WITHOUT 0-150 V DC SUPPLY | | | | | | | | | | | | | 360.00 |

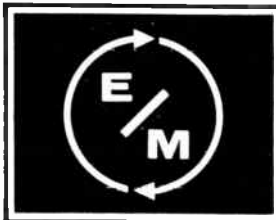
NOTES:

- ¹ HAS MODULATION INPUT
- ² DIAL CALIBRATION GUARANTEED ACCURATE TO 0.25% OR 0.3 V.
- ³ DIGITAL-TYPE PRESENTATION WITH A GUARANTEED CALIBRATION ACCURACY OF 0.25% OR 0.5V.

- ⁴ DIAL CALIBRATION GUARANTEED ACCURATE TO 0.3% OR 0.4 V.
- ⁵ DIAL SETTINGS ARE ACCURATE WITHIN 0.1% AND/OR 0.025 V, WHICHEVER IS GREATER. TOLERANCE OF 1-VOLT CONTROL IS ±5% CORRESPONDING TO 0.05 V.
- ⁶ ADD SUFFIX R FOR RACK MOUNTING.
- ADD SUFFIX T FOR ENCLOSED TABLE MOUNTING.

GENERAL NOTES: FOR PANEL VOLTMETER AND AMMETER ADD LETTER "M" TO MODEL NUMBER. FOR CHOPPER STABILIZATION ADD LETTER "K" TO MODEL NUMBER.

(R) Registered U. S. Patent Office. Patents Issued and Pending.



ELECTRONIC MEASUREMENTS COMPANY, INCORPORATED
EATONTOWN • NEW JERSEY

Directory II. Components

61. Power Supplies.

- Applied Radiation Corp., Calif., 4, 5, 25, 40
 Armour Electronics, Calif., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40
 Arnold Magnetics Corp., Calif., 2, 4
 Arnoux Corp., Calif., 2, 4, 15, 17, 20, 35, 40
 Arrow-Hart & Hegeman Elect. Co., Conn., 17
 Associated Specialties Co., 1751 Main St., Orefield, Pa., 40
 See ad on this page
 Tel: **EX**press 5-1275
 Astronetics, Inc., N.J., 37, 40
 Atlantic Research Corp., Va., 4
 Atlantis Engrg. Corp., Texas, 4, 35, 40
 Atlas Engrg., Co., Mass., 2, 4, 5, 15, 17, 20, 25, 30, 35, 37, 40
 Atomic Labs., Inc., Calif., 5
 Audicon Electronics, Inc., N.J., 2, 4, 15, 17, 20, 35, 40
 Autotronics, Inc., Box 812, Route 1, Florissant, Mo., 4
 See ad on page 344
 Tel: **TE**mple 7-3565
 Avionics, Ltd., Canada, 35
 Bailey Electronics Lab., P.A., Conn., 2, 4, 15, 20, 35, 37, 40
 Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 5, 15, 20
 See ad on page 296
 Tel: **UN**iversity 4-7420
 Barker & Williamson, Inc., Pa., 35
 Barwood Electronics, Inc., Cal., 2, 40
 Basler Electric Co., Ill., 2, 4, 5, 15, 17, 20, 35, 37, 40
 Bassett Inc., Rex, Fla., 2, 5
 Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif., 2, 37
 See ad on page 168
 Tel: **VI**ctoria 9-5733
 Bellaire Electronics, Inc., N.J., 40
 Bendix Aviation Corp., Bendix Pacific Div., Calif., 35
 Bendix Aviation Corp., Ind., 2, 4, 30, 35, 40
- Bergen Laboratories, Inc., 247 Crooks Ave., Clifton, N.J., 2, 4, 35, 40
 See ad on page 471
 Tel: **GR**egory 3-7800
 Beva Lab., Inc., N.J., 4, 5, 40
 Bogue Electric Mfg. Co., N.J., 5, 15, 17, 20
 Bone Engrg. Co., Calif., 2, 4, 5, 15, 37
 Booth Co., Arthur E., Calif., 2, 4, 20, 37
 Borg-Warner Corp., Pesco Prods. Div., Ohio, 2
 Bracke-Seib X-Ray Co., Inc., N.Y., 5
 British Thomson-Houston Co., Ltd., England, 25
 Brush Instruments, Div. of Clevite Corp., Ohio, 40
 Buck Engrg. Co., Inc., N.J., 2, 15
Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 4, 15, 20, 25, 35, 37, 40
 See ad on page 329
 Tel: **CL**overdale 3-8931
 Burroughs Corp., N.J., 4
 California Computer Products, Inc., Calif., 4, 15, 35, 37, 40
 California Magnetic Control Corp., Calif., 2, 4, 5, 15, 17, 20, 35, 37, 40
 Cal-Tronics Corp., Calif., 2, 4, 15, 35, 37, 40
 Camden Electronics, Inc., N.J., 2, 4
 Canadair Ltd., Missile & Systems Div., Canada, 35
 Canadian Aviation Electronics, Ltd., Quebec, 2, 4, 15, 20, 35, 40
 Canadian Marconi Co., Canada, 2, 40
 Canadian Research Institute, Canada, 2, 4, 5, 15, 20, 37, 40
 Carad Corp., Calif., 5
Celco-Constantine Engineering Laboratories Co., 70 Island Ave., Mahwah, N.J., 2, 4, 5, 15, 17, 20, 35, 37, 40
 See ads on pages 36-37, 88-89
 Tel: **DA**vis 7-1123
 Central Transformer Co., Ill., 5, 40
 Centronix, Inc., Fla., 35, 37
Chicago Condenser Corp., Dept. A, 3255 W. Armitage Ave., Chicago 47, Ill., 4
 See ad on this page
 Tel: **CA**pitol 7-7070

Use the Reader Service Card at the back of this issue for further information on advertised products.

ELECTRONICALLY REGULATED D. C. CONSTANT VOLTAGE POWER SUPPLIES



The output voltage is continuously variable from 200 to 325 volts D.C. for load currents of 0 to 100 M.A. with an input voltage of 105 to 125 volts 60 cycle. Regulation is better than 1%. An isolated A.C. voltage of 6.3 volts at 3 amperes is available at the output terminal connections.

- MODEL 3 ILLUSTRATED**
MODEL 3 CAB. MTG., VOLTMETER \$69.50
MODEL 1 RELAY RACK MTG. \$52.50
MODEL 2 SUB-CHASSIS MTG. \$49.50
DUAL RACK MOUNT FOR MODEL 2 \$9.00
 Mounts Two Model 2 Units in 8 1/4"

ASSOCIATED SPECIALTIES CO.
 1751 MAIN STREET
 OREFIELD, PENNSYLVANIA

For details, circle #456 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.



*POWER SUPPLY FOR DC MINIATURIZED!



The 5 KVDC/5ma unit occupies only 2 1/2 x 3 3/4 x 3 3/4 inches, weighs 3 3/4 LBS. Hermetically sealed, highest quality selenium rectifiers. Long-life, quality capacitors . . . **LOW RIPPLE OF 1%!** Lightweight, compact. Positive or negative terminal can be grounded to case. Stand-off high voltage terminals for safety.

Also complete line of quality film capacitors. **POLYETHYLENE, ACETATE, TEFLON®, POLYSTYRENE, and MYLAR®.**

® DU PONT TRADE MARK



Write Dept. A
**CHICAGO
CONDENSER
CORPORATION**

3255 WEST ARMITAGE AVENUE, CHICAGO 47, ILL.

For details, circle #455 on Reader Service Card

FOTO-VIDEO LABORATORIES, INC.

ELECTRONICS • ENGINEERING AND MANUFACTURING

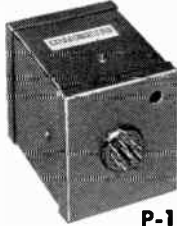


P-37

ALL TRANSISTOR POWER SUPPLIES

Silicon Rectifiers
Large Power Handling Ability
Compactness
Completely Transistorized
High Efficiency
Regulation Against Both Line and Load

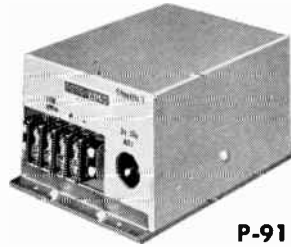
Zero Warmup Time
Short Recovery Time
Short-Circuit Protected
Conservative Design
Continuous Rating
Stable Over Long Periods



P-172



P-158



P-91



P-41

| Model | Input | Current in Amps | Voltage | Regulation in % | Ripple in mv. | Max. Source Imped. in Ohms | Price |
|--------|------------------------------|------------------|------------------------|-----------------|---------------|----------------------------|----------|
| P-37A | 22-30 VDC | 2.0 | 21 | 0.5 | 3 | 0.5 | \$ 95.00 |
| P-37B | 22-30 VDC | 2.0 | 16-21 | 2.0 | 10 | 2.0 | 59.00 |
| P-41A | 22-30 VDC | 2.0 | 28 | 0.5 | 3 | 0.5 | 125.00 |
| P-58A | 115V-125V 50 to 400 Cycle | { 0.250 0.005 | and { 150 -150 } | 0.5 | 3 | 0.5 | 343.00 |
| P-60A | 115V-125V 50 to 400 Cycle | 3 | 28 | 1.0 | 10 | 0.5 | 250.00 |
| P-91A | 115V-125V 50 to 400 Cycle | 1 | 24-32 | 1.0 | 1 | 0.5 | 295.00 |
| P-291A | 115V-125V 50 to 400 Cycle | 0.250 | 50-60 | 0.5 | 1 | 0.5 | 350.00 |
| P-158A | Two P-58's + one P-41 | | | 0.5 | 3 | 0.5 | 595.00 |

Note 1: All the above except P-158 are compact modules.

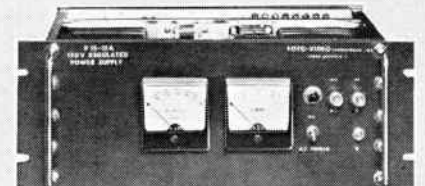
Note 2: P-158 has 3 modules in 19" rack mount frame 5 1/4" high.

Note 3: Many other models available, write for catalogue information.

HIGH POWER, HIGH VOLTAGE AND SUPER REGULATED POWER SUPPLIES

Silicon Rectifiers
Excellent Regulation
Extremely Low Ripple
Regulation Against Both Line and Load Variation
Economical In Rack Height
Conservative Design

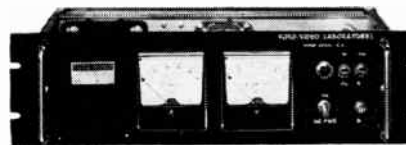
Continuous Duty
50 to 400 Cycle Operation
Excellent Mechanical Design
Out-Swinging Chassis
All Parts Readily Accessible
6.3 V and 5 V. AC Outputs
Provided on Most Models



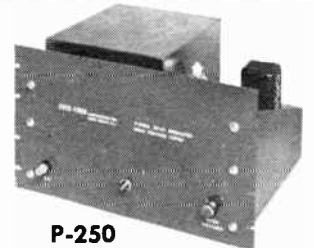
P-15-15



P-20-05



P-62



P-250

INPUT FOR ALL MODELS: 115-125V 50-400 CYCLE

| Model | Current in ma | Voltage See Note #2 | Regulation in % | Ripple in mv | Max. Source Imped. in Ohms | Rack Height in Inches | Price See Note #1 |
|----------|---------------|---------------------|-----------------|--------------|----------------------------|-----------------------|-------------------|
| P-68A | 100 | 150 | 0.1 | 1 | 0.5 | 3 1/4 | \$185.00 |
| P-46A | 200 | 150 | 0.1 | 1 | 0.5 | 5 1/4 | 270.00 |
| P 8-15A | 800 | 150 | 0.1 | 1 | 0.5 | 7 | 395.00 |
| P 15-15A | 1500 | 150 | 0.1 | 1 | 0.5 | 7 | 595.00 |
| P 73A | 200 | 300 | 0.1 | 1 | 0.5 | 5 1/4 | 225.00 |
| P-65A | 800 | 300 | 0.1 | 1 | 0.5 | 5 1/4 | 395.00 |
| P 15-30 | 1500 | 300 | 0.1 | 1 | 0.5 | 7 | 595.00 |
| P-250 | 1 | 15-30 kv | 0.5 | 10 | 2 | 10 1/2 | 325.00 |
| P-20-05 | 10 | 300 to 1610 | 0.005 | 1 | 0.1 | 5 1/4 | 485.00 |

Note 1: All models furnished with meters for current and voltage at \$30.00 additional charge.

Note 2: Voltage adjustable $\pm 10\%$ unless otherwise indicated.

Note 3: Many other models available, write for catalogue information.

Complete line of
Television Terminal
and Test Equipment.
Write for Catalog

FOTO-VIDEO® LABORATORIES, INC.
36 Commerce Rd. • Dept. I-1 • Cedar Grove, N. J. • CEnter 9-6100

Directory II. Components

61. Power Supplies.

Chicago Standard Transformer Corp.,
3501 W. Addison St., Chicago 18, Ill.,
2, 4, 35, 40

See ad on page 563

Tel: INdependence 3-7400

Christie Electric Corp., Calif., 4, 15, 17,
20, 37, 40

Cohu Electronics, Inc., KinTel Div.,
Calif., 4, 40

Colorado Research Corp., Colo., 4, 15,
37, 40

Communication Measurements Lab.,
Inc., 350 Leland Ave., Plainfield, N.J.,
2, 40

See ad on this page

Tel: PLainfield 4-5502

Compagnie Generale de Metrologie,
France, 40

Components Corp., N.J., 5, 35, 37, 40

Comptron Corp., Mass., 2

Computer Engineering Associates, Inc.,
Calif., 4, 15, 35, 37

Condenser Products Co., Conn., 15, 20, 37

Consolidated Avionics Corp., N.Y., 2, 4,
15, 35, 37, 40

Consolidated Diesel Electric Corp.,
Conn., 30

Consolidated Electrodynamics Corp.,
Calif., 2, 4

Consolidated Resistance Co. of Amer-
ica, N.Y., 2, 4, 15, 20, 37, 40

Constanta Co. of Canada, Ltd., Canada,
5, 15, 25

Control Corp., Minn., 2, 4, 15, 35

Control Devices, Inc., Mich., 2, 4

Control Electronics Co., Inc., 10 Stepar
Pl., Huntington Station, L.I., N.Y., 2,
4, 25, 35, 40

See ads on pages 321, 451

Tel: HAmilton 7-7961

Cook Co., Frank R., Colo., 4

Cornell-Dubilier Electric Corp., Dept.
IRE, 333 Hamilton Blvd., So. Plain-
field, N.J., 2, 40

See ad on Cover 3

Tel: PLainfield 6-9000

Creative Electronics Corp., Conn., 2, 4,
5, 15, 20, 35, 40

Cubic Corp., Calif., 25

D & R Ltd., Calif., 4, 17, 35, 40

Datascan, Inc., N.J., 2, 4, 15, 35, 37, 40

Daven Co., N.J., 2, 4, 5, 15, 20, 35

Daystrom Systems, Div. of Daystrom,
Inc., Calif., 35, 40

Dayton Aircraft Products, Inc., Fla.,
4, 5

De Coursey Eng. Lab., Calif., 35

Del Electronics Corp., Dept. IR, 521
Homestead Ave., Mount Vernon, N.Y.,
2, 4, 5, 20, 37, 40

See ad on this page

Tel: OWens 9-2000

Deltron, Inc., Pa., 2, 4, 5, 17, 20, 25, 35,
37, 40

Deluxe Coils, Inc., First and Webster
Sts., P.O. Box 318, Wabash, Ind., 4, 5,
40

See ad on page 411

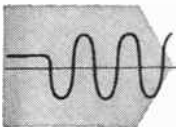
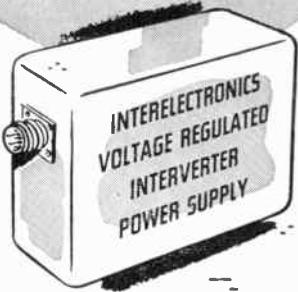
Tel: WABash 1720

For details, circle #458 on Reader Service Card

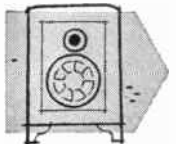
For details, circle #459 on Reader Service Card

NEW!

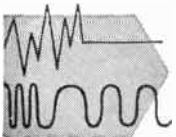
**DC to DC and DC to AC
solid-state power converters
voltage regulated, frequency
controlled, for missiles,
telemetry, gyros, servos**



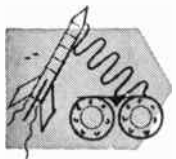
InterElectronics Inverter solid-state thyra-tron-like elements and magnetic components convert DC to any number of voltage regulated or controlled frequency AC or filtered DC outputs from 1 to 1800 watts. Light weight, compact, 90% or better conversion efficiency.



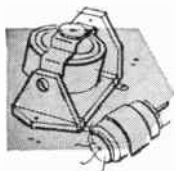
Ultra-reliable in operation, no moving parts, unharmed by shorting output or reversing input polarity. Complies with MIL specs for shock, acceleration, vibration, temperature, RF noise.



Now in use in major missiles, powering telemetry transmitters, radar beacons, electronic equipment. Single and polyphase AC output units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.



InterElectronics — first and most experienced in the DC input solid-state power supply field, produces its own solid-state gating elements, all magnetic components, has the most complete facilities and know-how—has designed and delivered more working KVA than any other firm!



For complete engineering data write InterElectronics today, or call LUDlow 4-6200 in N. Y.

INTERELECTRONICS CORPORATION

2432 GR. CONCOURSE, N. Y. 58, N. Y.

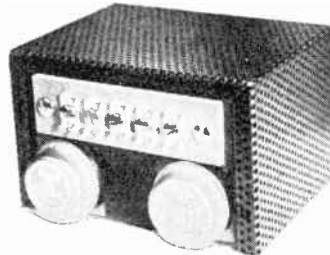
For details, circle #460 on Reader Service Card

CUSTOM BUILT Power Supplies

- D.C. to D.C.
- A.C. to D.C.
- D.C. to A.C.
- Regulated or Unregulated

SEND DETAILS FOR OUR QUOTATION

ALSO STOCK MODELS FOR 5V., 12.6., 28V. BATTERIES



CA-1252-10
TRANSISTORIZED
MOBILE SUPPLY

\$54.00
NET

INPUT = 12.6V. D.C., DELIVERS
100 WATTS at 250/500V. D.C.

WRITE FOR BULLETIN 5974

KUPFRIAN MFG. CORP.

157 PROSPECT AVE.
BINGHAMTON, N.Y.

For details, circle #461 on Reader Service Card

HIGH POWER at Transistor Voltages!



\$145⁰⁰

NEW MRC DV-III TRANSISTOR POWER SUPPLY

The DV-III offers unparalleled performance at an unbelievably low price! SAVES MONEY—Replaces several high-priced power sources! One versatile DV-III features all these outputs: either 0-60 V., D.C. or 0-30V., D.C. or 0-115 V., A.C. SAVES TIME—Ends annoying battery and meter hook-up! The portable, rugged MRC DV-III provides continuously variable output voltage control; 2-range voltmeter; 2-range milliammeter; magnetic circuit breaker; pilot lights.

SPECIFICATIONS—D.C. Range #1: 0-60 V. @ 0-1 Ampere; .05% Ripple at max. output. D.C. Range #2: 0-30 V. @ 0-2 Amperes; .10% Ripple at max. output. A.C. Range: 0-115 V. @ 1.2 Amperes. DIM.: 7" x 11" x 8 1/2". WT.: 24 1/2 lbs.

For Complete Data Write for Bulletin IRE9

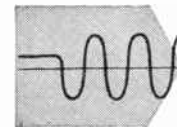
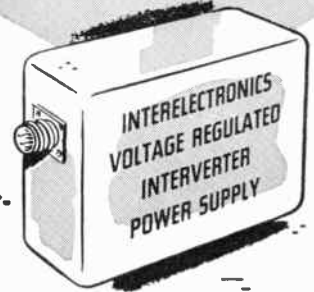
MODEL RECTIFIER CORP.

1675 UTICA AVE. • BROOKLYN 34, N. Y.

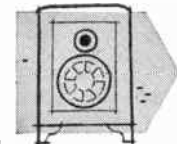
For details, circle #462 on Reader Service Card

NEW!

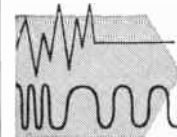
**DC to DC and DC to AC
solid-state power converters
voltage regulated, frequency
controlled, for missiles,
telemetry, gyros, servos**



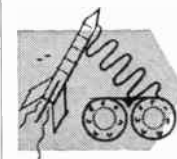
InterElectronics Inverter solid-state thyra-tron-like elements and magnetic components convert DC to any number of voltage regulated or controlled frequency AC or filtered DC outputs from 1 to 1800 watts. Light weight, compact, 90% or better conversion efficiency.



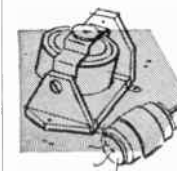
Ultra-reliable in operation, no moving parts, unharmed by shorting output or reversing input polarity. Complies with MIL specs for shock, acceleration, vibration, temperature, RF noise.



Now in use in major missiles, powering telemetry transmitters, radar beacons, electronic equipment. Single and polyphase AC output units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.



InterElectronics — first and most experienced in the DC input solid-state power supply field, produces its own solid-state gating elements, all magnetic components, has the most complete facilities and know-how—has designed and delivered more working KVA than any other firm!



For complete engineering data write InterElectronics today, or call LUDlow 4-6200 in N. Y.

INTERELECTRONICS CORPORATION

2432 GR. CONCOURSE, N. Y. 58, N. Y.

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Directory II. Components

61. Power Supplies.

Dictograph Products, Inc., N.Y., 2, 4
 Donner Scientific Co., Calif., 4, 15, 37, 40
 Dormitzer Electric & Mfg. Co., Inc., Mass., 2, 5, 15, 30, 35
 Dressen-Barnes Corp., Calif., 4, 5, 15, 17, 20, 35, 37, 40
 Dresser Electric Co., Mich., 4, 15
 Dresser Inds., Hermetic Seal Transformer Co. Div., Texas, 2, 4, 5, 15, 20, 35, 40
 Du Kane Corp., Ill., 2, 4, 15, 20
 Dynamic Controls Co., Mass., 4, 15, 17, 20, 35, 37
 Dynamic Electronics-New York, Inc., N.Y., 4, 15, 35, 40
 E A K Research Lab., N.Y., 5, 15
 E H Research Laboratories, Inc., 1922 Park Blvd., Oakland 6, Calif., 4
 See ad on page 298
 Tel: GLencourt 2-1314
 EPR Special Products Corp., N.Y., 2, 4, 5, 15, 20, 35, 37, 40
 Eder Engrg. Co., Inc., Wis., 4, 37, 40
 Edin Co., Inc., Mass., 2, 4
 Eicor Div., Ill., 2, 4, 15, 20, 35, 40
 Ekco Electronics, Ltd., England, 5
 Elcor, Inc., Va., 4, 15, 35, 37, 40
 Electric Eye Equipment Co., Ill., 4
 Electric Regulator Corp., Conn., 15, 35, 40
 Electrical Communications, Calif., 4, 15, 20
 Electro Development Corp., Wash., 2, 4, 5, 15, 25, 35, 40
 Electro Engrg. Works, Calif., 2, 4, 5
 Electro Products Labs, Inc., Ill., 4, 15
 Electromotion Co., Calif., 4, 35, 40
 Electronic Assembly Co., Inc., Mass., 2, 4, 5, 15, 17, 20, 35, 37, 40
 Electronic Assistance Corp., N.J., 2, 4, 5, 15, 20, 25, 35, 37, 40
 Electronic Communications, Inc., Fla., 2, 4, 5, 15, 17, 20, 25, 35, 40
 Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N.Y., 4
 See ad on page 295
 Tel: SStillwell 6-8700
 Electronic Measurements Co., Inc., Lewis St. & Maple Ave., Eatontown, N.J., 4, 5, 15, 20, 35, 37, 40
 See ad on page 488
 Tel: LLiberty 2-0300
 Electronic Plastics Co., Calif., 35
 Electronic Production & Development, Inc., Calif., 4, 15, 40
 Electronic Research Associates, Inc., N.J., 2, 4, 5, 15, 20, 35, 40
 Electronic Specialty Co., Calif., 17, 35, 40
 Electronic Tube Corp., Pa., 2, 4
 Electronics International Co., Calif., 2, 15, 20, 40
 Elsin Electronics Corp., N.Y., 25, 35
 El-Tronics, Inc., Alwac Computer Div., Calif., 4, 17, 40
 Embassy Engrg. Co., N.Y., 5
 Emerson Electric Mfg. Co., Mo., 4, 5, 15, 25, 35, 37, 40

Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 2, 37
 See ad on page 91
 Tel: VVictor 2-8400
 Engineered Sound Systems Ltd., Canada, 4, 15, 20
 Engineering Associates, Ohio, 2, 4, 5, 15, 20, 25, 30, 37, 40
 Ensco, Inc., Utah, 4, 5, 35, 40
 Entron, Inc., Md., 4, 15, 20, 40
 Era Pacific, Inc., Calif., 4, 5, 35, 37, 40

Espey Mfg. Co., Inc., N.Y., 2, 4, 5, 15, 20, 25, 35, 37, 40
 Espey Mfg. Co., Saratoga Industries Div., N.Y., 2, 4, 5, 15, 17, 20, 25, 30, 35, 37, 40
 FXR, Inc., 26-12 Borough Place, Woodside 77, N.Y., 25, 40
 See ad on pages 97-100
 Tel: AStoria 8-2800
 Fairfield Engineering Corp., Conn., 2, 4, 17, 37, 40

GATES Power Supplies Unlimited

SILICON POWER SUPPLY

Model GX30-20

INPUT: 115 Volts, 1 Phase, 60 Cycles.
 OUTPUT: 0-34 Volts D.C. 0-20 Amperes, Continuous Duty.
 REGULATION: No Load to Full Load: 18%
 RIPPLE: Below 1%
 Silicon Rectifiers, High Efficiency
 Dimensions: 10"x17"x3"
 PRICE: \$185.00 NET



SELENIUM POWER SUPPLY

Model G48-6FM

INPUT: 115 Volts A.C. 60 Cycles—Single Phase
 OUTPUT: 0-48 Volts D.C., 0-6 Amperes
 CONTROL: Continuously Variable over Entire Range
 REGULATION: 15% No Load to Full Load
 RIPPLE: 1% R.M.S.
 DIMENSIONS: 18" Wide, 19" Deep x 10 1/2" High. Fits BETMA, Western Electric Racks
 PRICE: \$180.00 NET



SILICON RACK MOUNT SUPPLY

Model GX30-10

INPUT: 115 Volts A.C. 60 Cycles, Single Phase
 OUTPUT: 30 Volts D.C. 0-10 Amperes Continuous Duty
 REGULATION: 10% No Load to Full Load
 RIPPLE: Below 0.5% R.M.S.
 DIMENSIONS: 8 1/2" H x 19" W x 10" D
 PRICE: \$125.00 NET

AIRCRAFT BATTERY ELIMINATOR

Model G101F May be used for Rack or Bench

INPUT: 115 Volts A.C., 60 Cycles, Single Phase
 OUTPUT: 0-28 Volts D.C., 0-20 Amperes, Continuous Duty
 RIPPLE: 1% R.M.S.
 Unique overload device prevents needle slam and shows overload condition.
 REGULATION:
 D.C.V. at full load: 28
 D.C.V. at 1/10 load: 23
 METERS: 2% Accuracy
 PRICE: \$200.00 NET



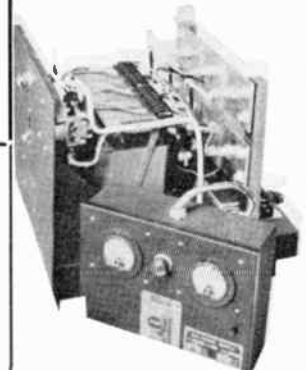
SELENIUM POWER SUPPLY

Model GX30-5

INPUT: 115 Volts A.C. 60 cycles, single phase
 OUTPUT: 30 Volts D.C. 5 Amperes D.C. Continuous Duty
 REGULATION: 12% No Load to full load
 RIPPLE: Below 1% R.M.S.
 DIMENSIONS: 7" Wide x 15" Long & Overall Height 10"
 PRICE: \$70.00 NET



SILICON REMOTE CONTROL

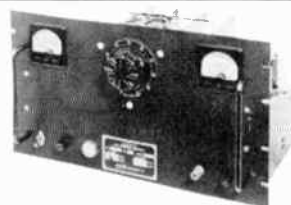


INPUT: 208/220 3 Phase, 4 Wire, 60 Cycles, AC
 OUTPUT: 30 Volts D.C. 0-100 Amperes DC Continuous Duty
 REGULATION: No Load to Full Load 8%
 RIPPLE: 4% RMS
 DIMENSIONS: Main Unit Supplied with Grilled Cover 19" Wide 17 1/2" High 21" Deep

SILICON POWER RECTIFIER

Model G30-10FR

INPUT: 115 Volts A.C. 60 Cycles, Single Phase
 OUTPUT: 0-30 Volts D.C., 0-10 Amperes, continuous duty
 CONTROL: Continuously Variable over entire range.
 REGULATION: 6% No load to full load



RIPPLE: 0.2% R.M.S.
 METERS: 2% Accuracy
 DIMENSIONS: 19" Wide x 13" Deep x 10 1/2" high
 PRICE: \$175.00 NET

All Prices Subject to Change Without Notice

GATES ELECTRONIC COMPANY

1705 Taylor Avenue

New York 60, New York

TYrone 2-6490

For details, circle #464 on Reader Service Card

MID-EASTERN ELECTRONICS, INC.



Transistorized Power Supplies ME Series

- Both Magnetic and Transistorized Regulation
- Short circuit Proof
- Sixty-four Basic Models provide complete flexibility.

SPECIFICATIONS

Input: 105-125 VAC, 60 cps. Single Phase.
Output Voltage: Continuously variable over entire range specified with vernier control at all settings.
Output Current: Current specified applies to entire DC voltage range and for entire input range.
Duty Cycle: Continuous duty at full load.
Polarity: Output completely floating; either positive or negative side may be grounded. Units can be series connected.
Regulation: *Line 0.05% for changes from 105-125 VAC.
 *Load: 0.1% for changes from zero to full load.
Ripple: Less than 0.01% or 1 mv whichever is greater.
Recovery Time: Less than 50 microseconds.
Overshoot: Less than 1% of the voltage setting.
Regulated AC Output: 120 VAC, 60 cps, $\pm 2\%$ regulation at rear receptacle. Power equals DC power rating of supply.
Electrical Design: Completely solid state. Only 2.5 amperes per transistor (rated at 15 amperes continuous) permitted; maximum junction temperature at maximum ambient limited to 80°C. Extreme reliability has resulted from these and similar conservative measures. Modular design permits rapid servicing.
Mechanical Design: All components completely accessible. All wiring harness and located on the outer surfaces of the sides and back of "U" shaped chassis. Removing dust cover exposes all wiring and components.

Overload Protection: Automatic protection afforded by magnetic line voltage regulation circuit. No fuses necessary; automatic overload circuit cuts off supply when output current exceeds a preselected point, which is continuously variable from 20 to 120% of rated current by front panel control. Overload circuit can be defeated for charging large banks of capacitors. Continuous operation into short circuit will not damage unit in any way.
External Sensing: All Mid-Eastern supplies are equipped for remote load change sensing to maintain regulation at the load.
Ambient Temperature: 0 to 50 Degrees C, continuous duty at full load.
Cooling: High volume axial flow fan with air intake at front panel grill.
Style: 19" rack panel, engraved. Gray baked enamel finish. Black anodized dust cover, irradiated chassis 17" deep.
Terminations: 5 way binding posts at front, screw terminals at rear. 6" heavy duty line cord.
Metering: 3 1/2" 2% precision meters supplied on "M" models. Add \$30.00.
 * Or 10 mv whichever is greater. Regulation specs. applicable down to 5V.

STANDARD MODELS

| *†Model | DC Output | | Panel Height | Price | |
|------------|-----------|-------|--------------|---------------------|------------------|
| | Volts | Amps. | | Standard Regulation | 0.01% Regulation |
| ME18-2.5 | 0-18 | 0-2.5 | 5 1/2 | \$ 350 | \$ 595 |
| ME18-5 | 0-18 | 0-5 | 5 1/2 | 475 | 695 |
| ME18-10 | 0-18 | 0-10 | 7 | 595 | 895 |
| ME18-15 | 0-18 | 0-15 | 8 1/2 | 785 | 1095 |
| ME18-20 | 0-18 | 0-20 | 10 1/2 | 895 | 1395 |
| ME18-30 | 0-18 | 0-30 | 7+8 1/2 | 995 | 1495 |
| ME36-1 | 0-36 | 0-1 | 5 1/2 | 325 | 510 |
| ME36-2.5 | 0-36 | 0-2.5 | 5 1/2 | 465 | 615 |
| ME36-5 | 0-36 | 0-5 | 7 | 535 | 795 |
| ME36-10 | 0-36 | 0-10 | 8 1/2 | 650 | 915 |
| ME36-15 | 0-36 | 0-15 | 7+8 1/2 | 815 | 1075 |
| ME36-20 | 0-36 | 0-20 | 2-8 1/2 | 965 | 1475 |
| ME36-25 | 0-36 | 0-25 | 8 1/2+10 1/2 | 1095 | 1595 |
| ME60-1 | 0-60 | 0-1 | 5 1/2 | 625 | 745 |
| ME60-3 | 0-60 | 0-3 | 7 | 695 | 895 |
| ME60-5 | 0-60 | 0-5 | 8 1/2 | 795 | 1145 |
| ME60-10 | 0-60 | 0-10 | 7+8 1/2 | 965 | 1175 |
| ME60-15 | 0-60 | 0-15 | 2-8 1/2 | 1095 | 1595 |
| ME100-1 | 0-100 | 0-1 | 7 | 725 | 1095 |
| ME100-2.5 | 0-100 | 0-2.5 | 8 1/2 | 965 | 1295 |
| ME100-5 | 0-100 | 0-5 | 10 1/2 | 1295 | 1695 |
| ME100-10 | 0-100 | 0-10 | 2-8 1/2 | 1595 | 1995 |
| ME150-1 | 0-150 | 0-1 | 7 | 665 | 755 |
| ME150-2 | 0-150 | 0-2 | 10 1/2 | 965 | 1395 |
| ME150-5 | 0-150 | 0-5 | 2-8 1/2 | 1395 | 1895 |
| ME300-.5 | 150-300 | 0-0.5 | 7 | 695 | 995 |
| ME300-1 | 150-300 | 0-1 | 8 1/2 | 795 | 895 |
| ME300-1 | 0-18 | 0-2.5 | 8 1/2 | 695 | 995 |
| DME18-2.5 | 0-18 | 0-2.5 | 5 1/2 | 895 | 1195 |
| DME36-2.5 | 0-36 | 0-2.5 | 8 1/2 | 1095 | 1395 |
| DME60-1 | 0-60 | 0-1 | 8 1/2 | 1395 | 1695 |
| DME100-1 | 0-100 | 0-1 | 10 1/2 | 1095 | 1595 |
| DME136-2.5 | 0-100 | 0-1 | 10 1/2 | 1095 | 1595 |
| DME136-2.5 | 0-36 | 0-2.5 | 8 1/2 | 1095 | 1595 |

* Narrow range and fixed voltage completely programmable models available within all of above voltage and current ranges. Please write for quotation.

† All models remotely programmable over a narrow voltage range.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TERMS: Net 30 days—F.O.B. Springfield, N.J.
DELIVERY: Models listed are normally available for prompt delivery.

32 COMMERCE ST., SPRINGFIELD, N.J.
 DR 6-7130

For details, circle #465 on Reader Service Card

61. Power Supplies.

- Fansteel Metallurgical Corp., North Chicago, Ill., 4, 40
 See ad on pages 156-157
 Tel: DEXter 6-4900
- Farwest Mfg. Div., Wash., 4, 5
 Ferranti-Packard Electric, Ltd., Canada, 40
 Ferrotran Electronics, Co., N.Y., 2, 4, 15, 20, 25, 35, 37, 40
 Fidelity Amplifier, Co., Ill., 2, 4
 Fidelity Instrument Corp., Pa., 2, 4, 5, 15, 17, 20, 37, 40
 Film Capacitors, Inc., N.Y., 2, 5, 37
 Filtron Co., Inc., N.Y., 5
 First Electronics Corp., Mass., 2, 4, 5, 15, 20, 37, 40
 Fisher Research Lab., Inc., Calif., 35
 Flite-Tronics, Inc., Calif., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40
 Fluke Mfg. Co., Inc., John, Wash., 4, 5, 15, 20, 35, 37, 40
- Foto-Video Laboratories, Inc., Dept. I-1, 36 Commerce Rd., Cedar Grove, N.J., 2, 4, 5, 15, 20, 35, 37, 40**
 See ad on page 490
 Tel: CENTER 9-6100
- Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 2, 4, 17, 37, 40**
 See ad on page 410
 EVergreen 6-1300
- Gates Electronic Co., 1705 Taylor Ave., New York 60, N.Y., 4, 15, 17, 20, 37, 40**
 See ad on page 493
 Tel: TYrone 2-6490
- Gates Radio Co., Ill., 2, 5, 15
 General Communications, Inc., Wisc., 35, 40
- General Devices, Inc., P.O. Box 253, Princeton, N.J., 2, 4, 35, 40**
 See ad on page 360
 Tel: DAVIS 9-2323
- General Electric Co., Inc., 2, 4, 5, 17, 40
 General Electric Co. Apparatus Sales Div., N.Y., 2, 4, 5, 15, 20, 35, 37, 40
 General Electric Co., Technical Prods. Operation, N.Y., 4, 5, 15, 25, 35, 40
 General Electric Co., Pa., 2, 4, 5, 15, 17, 20, 35, 37, 40
 General Electric Co., Ltd. of England, England, 35, 40
 General Electronics Co., Inc., Ala., 2, 4, 15, 20, 35, 40
 General Instrument Corp., F. W. Sickles Div., Mass., 17, 35
General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N. J., 17
 See ad on page 176
 Tel: PILgrim 8-2400
- General Nuclear Corp., N.Y., 15, 37, 40
 General Precision Lab., Inc., N.Y., 40
General Radio Co., West Concord, Mass., 2, 4, 15, 20, 37, 40
 See ad on Cover 4
 Tel: EMerson 9-4400
- Georator Corp., Va., 30
 Geotronic Labs., Inc., Texas, 2, 4, 35
 Glentronics, Inc., Calif., 2, 4, 5, 15, 20, 35, 37, 40
 Goslin Electric & Mfg. Co., Calif., 35, 40
 Green Rectifier Co., N.J., 2, 4, 5, 15, 17, 20, 37, 40
 Grimson Color, Inc., N.Y., 2, 40

REPRESENTATIVES

- So. River, N.J.
 R. E. Weber Co. CL 7-5243
 Hartford, Conn.
 Michael S. Coldwell, Inc. JA 2-5832
 Needham, Mass.
 Michael S. Coldwell, Inc. HI 4-1142
 Chicago, Ill.
 Kenneth W. Meyers SP 4-6440
 Detroit, Mich.
 J. L. Pierce Co. UN 2-2571
 Pittsburgh, Pa.
 Lowry Dietrich Co. WA 1-2959
 Cleveland, Ohio
 Lowry Dietrich Co. SU 1-1855
 Dayton, Ohio
 Lowry Dietrich Co. BA 3-6042
 St. Louis, Mo.
 Zak.Cowen & Associates, Inc. PA 7-8559
 Denver, Colo.
 Longstreet Smith Associates, Inc. KE 4-5091
 Dallas, Texas
 The Kantenberger Co. WH 8-9535
 San Antonio, Texas
 The Kantenberger Co. PE 2-2151
 Pasadena, Calif.
 George H. Vaughan Co. SR 5-4420
 Sunnyvale, Calif.
 William Theisner Co. RE 9-6460
 Seattle, Wash.
 Eicher & Co. AT 4-1811
 36 W. 40 St., N.Y.C.
 Export Department PE 6-2165

OTHER MID-EASTERN TRANSISTORIZED POWER SUPPLY SERIES:



Plug-In Series
 Portable Series
 Sub-Chassis Series



Magnetically Regulated Series
 High Voltage Series
 Bias Supply Series

Please contact us or our representatives for prompt quotations on multioutput, 400 CPS and other power supplies to meet your special requirements.

Directory II. Components

61. Power Supplies.

Gulton Industries, Inc., N.J., 17, 35, 40
Hallicrafters Co., 4401 W. Fifth Ave.,
Chicago 24, Ill., 2, 4, 25, 35

See ad on page 204

Tel: VAn Buren 6-6300

Hammond Mfg. Co., Ltd., Canada, 35
Hammer Electronics Co., Inc., N.J., 4,
5, 15, 20, 37

Harrel, Inc., N.Y., 2, 35

Harrison Laboratories, Inc., 45 Indus-
trial Rd., Berkeley Heights, N.J., 4, 15,
20, 35, 37, 40

See ad on page 206

Tel: CRestview 3-9123

Harrison Labs., Inc., B.M., Mass., 2,
20

Harvey-Wells Elect., Mass., 17, 35, 37,
40, Current Regulated Power Sources

Hays Corp., Ind., 4, 15

Heath Co., Subsidiary of Daystrom, Inc.,
305 Territorial Rd., Benton Harbor 4,
Mich., 37, 40

See ad on page 328

Tel: YUkon 3-3961

Hehn Engrg., Lester Co., N.Y., 2, 40

Hertner Electric Co., Ohio, 2, 4, 15

Hesco Engrg., Calif., 4, 15, 35, 40

Hett Associates, Inc., N.J., 4, 5, 40

Hewlett-Packard Co., 275 Page Mill
Rd., Palo Alto, Calif., 4, 5, 15, 25, 35,
37, 40

See ad on pages 3-18

Tel: DAvenport 5-4451

Hewson Co., Inc., N.J., 4, 5, 37

Highland Engineering Co., N.Y., 2, 4, 5,
15, 20

Hindle Transformer Co., Inc., N.J., 2,
4, 15, 20, 37

Homelite Div., Textron, Inc., N.Y., 2,
4, 20, 30, 40

Hoover Co., Ltd., Canada, 4, 5, 15, 35,
40

Hoover Electric Co., Calif., 2, 4

Horlick Co., Inc., William I., Mass., 37,
40

Hyperion, Inc., Mass., 2, 4, 5, 15, 17, 20,
35, 37, 40

Imperial Electric Co., N.Y., 30

Industrial Elect. Co., Monitor Control-
ler Div., Mass., 2, 4, 5

Industrial Electronics of Canada, Can-
ada, 4, 37, 40

Industrial Test Equipment Co., 55 East
11th St., New York 3, N.Y., 2, 37

See ad on page 339

Tel: GRamercy 3-4684

Industrial Transformer Corp., Pa., 2, 4,
5, 15, 17, 40

Interelectronics Corp., 2432 Grand Con-
course, New York 58, N.Y., 2, 4, 5,
15, 17, 20, 35, 37, 40

See ads on pages 358, 428, 492

Tel: LUdlow 4-6200

Internat. Tel. & Tel. Corp., ITT Fed-
eral Div., N.J., 2, 4, 5, 15, 17, 25, 35,
37

I.T.&T. Corp., Industrial Prods. Div.,
Calif., 2, 4, 5, 15, 17, 20, 35, 37, 40

International Telephone & Telegraph
Labs., Calif., 15, 37, 40

Invar Electronics Co., Calif., 4, 5, 15,
17, 35, 37, 40

Isotope Develop., Ltd., England, 5

Itek Corp., Mass., Special Power Sup-
plies

Jack & Heintz, Inc., Ohio, 2, 4

Jerrold Electronics Corp., Dept. TED
33, Jerrold Bldg., Philadelphia 32, Pa.,
40

See ad on page 338

Tel: BAldwin 6-3456

Jobbins Electronics, 771 Hamilton Ave.,
Menlo Park, Calif., 2, 4, 15, 20, 37, 40

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Tel: DAvenport 6-7110

Jodon, Inc., F. R., D.C., 4, 37, 40

Julie Research Labs., Inc., N.Y., 40

Kaar Engrg. Corp., Calif., 2, 4, 15, 35

Kaiser Electronics, Inc., N.J., 2, 4, 15,
17, 20, 25, 35, 37, 40

Kaiser Industries, Kaiser Aircraft-
Elect. Div., Ohio, 17, 35

Kato Engineering Co., Minn., 2, 4, 5,
15, 37

Keithley Instruments, Inc., Ohio, 4, 5, 40
Kellogg Switchboard & Supply Co., Ill.,
4, 40

Kepeco, Inc., 131-38 Sanford Ave., Flush-
ing 55, N.Y., 4, 5, 15, 17, 20, 25, 35,
37, 40

See ad on this page

Tel: INdependence 1-7000

Key Resistor Corp., Calif., 2, 4, 5, 15, 17,
20, 35, 40

Kidde & Co., Inc., Walter, N.J., 2, 4,
40

King Radio Corp., Kansas, 35

Krohn-Hite Corp., Mass., 4, 15, 20, 37, 40

Kupfrian Mfg. Corp., 157 Prospect Ave.,
Binghamton, N.Y., 2, 4, 5, 15, 20, 35, 40

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Tel: RA 3-6426

L.E.E., Inc., D.C., 4, 40

Laboratory Equipment Corp., Mich., 4,
5, 15

Lambda Electronics Corp., 11-11 131st
St., College Point 56, N.Y., 4, 15, 20,
35, 37, 40

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Tel: INdependence 1-8500

Land-Air, Inc., Ill., 4

Land-Air, Inc., Instrument & Electronic
Div., Calif., 2, 15

Lawn Electronics Co., Inc., N.J., 4, 5,
15, 20, 37, 40

Leach Corp., Relay & Inet Div., 18435
Susana Rd., Compton, Calif., 2, 4, 15,
17, 30, 35, 40

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Tel: NEvada 6-1061

Lear, Inc., Mich., 17, 30

Lear, Inc., Lear Cal Div., Calif., 35

Lee Electric & Mfg. Co., Calif., 4, 5, 17,
20, 37, 40

Leeds & Northrup Co., Pa., 40

Levinthal Electronics Prods., Inc.,
Calif., 5, 25

Ling Electronics, Inc., 1515 S. Manches-
ter Ave., Anaheim, Calif., 2, 4, 5

See ads on pages 270, 301

Tel: TEexas 0-7711

Litton Industries, Airtron, Inc. Div.,
N.J., 25

Litton Industries, Md. Div., Md., 15, 35,
40

Lyons Ltd., Claude, N.Y., 40

M E Labs., Calif., 25

Macarr, Inc., N.Y., 2, 4, 15, 17, 20, 37,
40

MacLaren & Co., F. B., N.Y., 40

Madigan Corp., N.Y., 4, 15, 17

Magnatran, Inc., N.J., 4, 5

Magnetic Amplifiers, Inc., 632 Tinton
Ave., New York 55, N.Y., 2, 4, 15, 17,
20, 35, 37, 40

See ad on page 496

Tel: CYpress 2-6610

Magnetic Controls Co., Minn., 2, 4, 5, 15,
17, 20, 35, 40

Magnetic Research Corp., Calif., 4

Magnetico, Inc., N.Y., 35

Magnetics, Inc., Control Div., Pa., 17

Mallory & Co., Inc., P.R., Ind., 2, 35

Mandrel Industries, Inc., Calif., 2, 4, 35

Manson Laboratories, Inc., 375 Fairfield
Ave., Stamford, Conn., 2, 4, 5, 20, 25,
37, 40

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Tel: DAvis 5-1391

Marconi's Wireless Telegraph Co., Ltd.,
N.Y., 2, 35

Marine Electric Corp., Galbraith-Pilot
Marine Corp. Div., N.Y., 40



the most complete line of
POWER SUPPLIES

TRANSISTORIZED
MAGNETIC TUBELESS
VACUUM TUBE TYPE

*VOLTAGE
REGULATED
POWER
SUPPLIES



KEPCO
INC.

131-38 SANFORD AVENUE
FLUSHING 55, N.Y.
INDEPENDENCE 1-7000

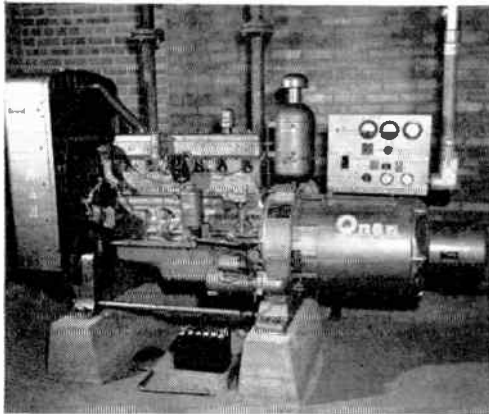
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ELECTRIC PLANTS

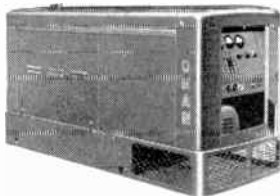


Emergency standby models *for*

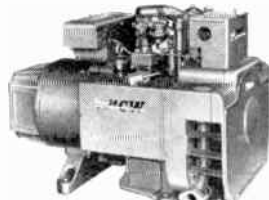


- RADIO STATIONS
- TV STATIONS
- MICRO-WAVE RELAY
- MUNICIPAL SIGNALS

Provide electric power for communications and other uses when utility service is interrupted. Driven by gas or gasoline engines. Start automatically when power is interrupted, stop automatically when it is restored. Sizes from 1,000 to 150,000 watts in all standard voltages, 50 or 60-cycle . . . for any emergency power need.



WATER-COOLED
10 to 230KW. Housed models to 80KW. Unhoused models available in all sizes. Powered by heavy-duty gasoline or Diesel engines.



AIR-COOLED
1 to 10KW. Powered by one or two-cylinder Onan engines. Vacu-Flo cooling permits enclosed installations.



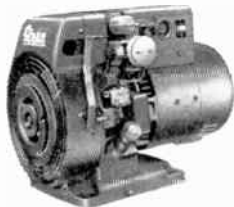
AUTOMATIC CONTROLS
Start and stop the electric plant automatically as needed. Models for all Onan plants. Instantaneous or timed cranking.

Portable and mobile models *for*

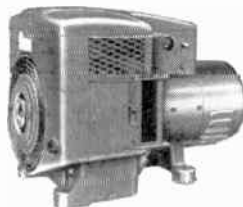


- MOBILE RADIO AND TV UNITS
- MARINE RADIO, RADAR
- FIELD RECORDING
- CHARGING 2-WAY RADIO BATTERIES

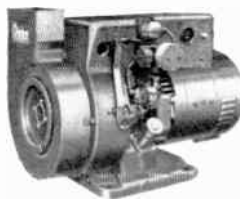
Lightweight, air-cooled types, 500 to 10,000 watts. All standard voltages A.C. Also D.C., battery charging and combination A.C.-D.C. models. Smaller units can be hand carried. Vacu-Flo cooling for enclosed installations.



SINGLE-CYLINDER, A.C.
500 to 2,500 watts. Lightweight. Can be equipped with aluminum tube frame for hand carrying.



TWO-CYLINDER, A.C.
3,500 to 10,000 watts. Smooth-running, high capacity. High speed trailers available.



BATTERY CHARGERS
D.C. output only, or one and two KW, A.C. with 30 amps D.C. for battery charging.

See your Onan distributor or write for information

D. W. ONAN & SONS INC.

ELECTRIC PLANTS GENERATORS ENGINES ENGINE-COMPRESSORS
2945 University Avenue S.E. • Minneapolis 14, Minnesota

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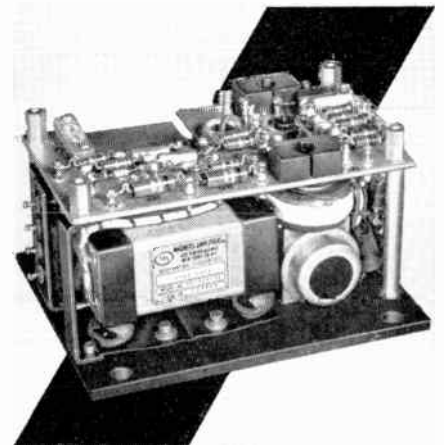
New PRECISION FREQUENCY

STATIC INVERTER SUPPLY

INPUT 28V D.C. \pm 10%
OUTPUT *Nam.* 115V \pm 2%
400 CPS \pm 0.01%
1 ϕ (2- or 3-phase output available)
RATINGS: 30VA 50VA 100VA
Higher ratings available.

APPLICATION:

For gyro wheel supplies and where precise 400 cycle voltages are required in aircraft, radar and missile computers.



FEATURES:

- PRECISION OUTPUT FREQUENCY
 - RUGGED
 - EXCELLENT WAVEFORM
 - SIMPLICITY OF CIRCUITRY
 - FAST STARTING TIME
 - GOOD VOLTAGE REGULATION throughout an adjustable range
 - ISOLATED CASE DESIGN
 - HIGH RELIABILITY
 - VIBRATION ISOLATED
 - COMPACT
 - LIGHTWEIGHT
 - MILITARY SPECIFICATIONS
- (Send for Bulletin S-864)



MAGNETIC AMPLIFIERS, INC.

632 TINTON AVENUE • NEW YORK 55, N. Y. • CYPRESS 2-6610

West Coast Division

136 WASHINGTON ST. • EL SEGUNDO, CAL. • OREGON 8-2665

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1960 IRE Directory

Portable Pattern



| Model | Voltage | Current |
|---------|----------|---------|
| RE-1601 | 200-1600 | 0-25 Ma |
| RE-1602 | 300-1600 | 0-10 Ma |
| RE-1902 | 300-1900 | 0-25 Ma |

Rack Pattern



| Model | Voltage | Current |
|----------|------------|----------|
| RE-1603 | 300-1600 | 0-10 Ma |
| RE-1610 | 300-1600 | 0-100 Ma |
| RE-2003 | 500-2000 | 0-25 Ma |
| RE-2006 | 500-2000 | 0-50 Ma |
| RE-3002 | 500-3000 | 0-20 Ma |
| RE-3004 | 500-3000 | 0-40 Ma |
| RE-3006 | 500-3000 | 0-60 Ma |
| RE-5001 | 500-5000 | 0-10 Ma |
| RE-5002 | 500-5000 | 0-20 Ma |
| RE-5003 | 500-5000 | 0-30 Ma |
| RE-5502 | 1000-5500 | 0-25 Ma |
| RE-10010 | 1000-10000 | 0-10 Ma |

Features

Either positive or negative of any supply may be grounded.
 Regulation: .01 to .001%
 Line Stability: .05 to .005%
 Long-term Stability: .01-.05% per hour, about 0.1% per day
 Impedance: 1 to 5 Ohms
 Ripple: 0.5 to 3 Mv P-P
 Standard tubes used

Constant Current Supplies

| | | |
|--------|------------|--------|
| RI-233 | .01-230 Ma | 0-365V |
|--------|------------|--------|

Millimeter Wave Generators

| | | |
|---------|---------------|------------|
| KSG-291 | 36.2-33.5 kmc | 8.3-8.9 mm |
| KSG-290 | 33.5-29.7 kmc | 8.9-10. mm |
| KSG-289 | 30-27.3 kmc | 10-11. mm |
| KSG-33 | 25-22 kmc | 12-13.6 mm |

Any of these supplies can be modified or special designs built to meet specialized requirements.

Northeast Scientific Corp.

30 WETHERBEE STREET
 RFD 1, SOUTH ACTON, MASS.

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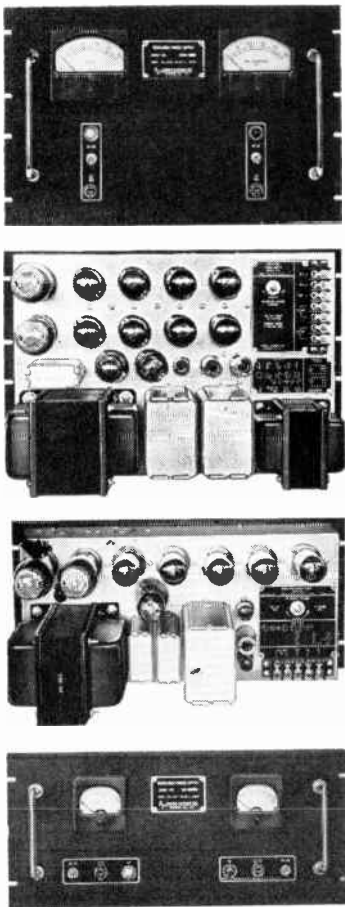
Directory II. Components

61. Power Supplies.

Marine View Electronics Inc., N.Y., 2, 4, 40
 Marstan Electronics Corp., N.Y., 35
 Martin Co., Baltimore Div., Md., Radio-isotope Heat Sources, Reactor
 Master Specialties, Calif., 4, 35
 Matthew Labs., N.Y., 4, 15, 20, 35, 37, 40
 Maxson Corp., Langevin Div., N.Y., 4, 15, 17, 20
 Mayberry Electronics Co., Calif., 2, 4, 15, 20, 35, 40
 McCurdy Radio Industries Ltd., Canada, 2, 4, 20, 35, 40
 McKay Electric Co., Mich., 17, 35, 40
 Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 4, 25, 40
 See ad on page 373
 Tel: DAvenport 6-9080
 Menlo Research Lab., Calif., 5
 Mercury Electronic Co., N.J., 2, 4, 15, 17, 20, 35, 37, 40
 Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 2, 4, 5, 15, 17, 20, 35, 37, 40
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 Tel: DRexel 6-7130
 Milgo Electronic Corp., Fla., 35, 40
 Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 15
 See ad on page 416
 Tel: DAvenport 4-4108
 Miller Co., Sanford, N.Y., 4, 15
 Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 35
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 WAverly 6-2250
 Model Rectifier Corp., 1675 Utica Ave., Brooklyn 34, N.Y., 4, 15, 35, 37, 40
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 Tel: CLoverdale 8-6800
 Modern Industries, Inc., Calif., 2, 4, 5, 15, 20, 35, 37, 40
 Moeller Instrument Co., Inc., Electronics Div., N.Y., 4, 15, 35, 37
 Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo., 5
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 Tel: EVergreen 3-3300
 Monitor Controller, Mass., 2, 4
 Moran Instrument Corp., Calif., 4, 5, 40
 Morrow Radio Mfg. Co., Oregon, 2, 4
 Motorsearch Co., Wis., 2, 4, 15, 20, 30, 40
 Motorola, Inc., Ariz., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40
 Moulic Specialties Co., Ill., 40
 Mullard Overseas, Ltd., England, 40
 Multi-Products Co., Mich., 2, 4, 35
 N J E Corp., N.J., 2, 4, 5, 15, 17, 20, 25, 30, 35, 37, 40
 N Y T Electronics, Inc., Calif., 2, 4, 5, 15, 17, 40
 Naniloa Corp., Ohio, 2, 4, 5, 15, 35
 Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, L.I., N.Y., 25
 See ad on pages 141-144
 Tel: PIONEER 6-4650

Narda Microwave Corp., High Power Electronics Div., Dept. IRED-9, 118-160 Herricks Rd., Mineola, L.I., N.Y., 5, 25
 See ad on page 145
 Tel: PIONEER 6-4650
 National Scientific Labs., Inc., D.C., 35
 Neff Instrument Corp., Calif., 4, 15, 20, 35, 40
 Networks Electronic Corp., Calif., 2, 4, 5, 15, 17, 20, 35, 37
 Neutronic Associates, N.Y., 4, 5, 20, 37, 40
 New York Transformer Co., Inc., N.J., 2, 4, 15, 17, 20
 Nichols Ltd., R. H., Canada, 4, 5, 40
 North Electric Co., N.Y., 40
 North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 4, 5, 15, 20, 35, 37, 40, Current Regulated Power Sources
 See ads on pages 415, 455, 591
 Tel: PIONEER 7-0555
 Northam Electronics, Inc., Calif., 4, 40
 Northeast Scientific Corp., 30 Wetherbee St., RFD #1, South Acton, Mass., 4, 3, 15, 20, 25, 37, 40, Constant Current
 See ad on this page
 Tel: COLonial 3-7706
 Nuclear-Electronics Corp., Pa., 5
 Nutron Mfg. Co., Inc., N.Y., 2, 4, 15, 17, 20, 35, 37, 40
 Ogden Coil & Transformer Co., Ill., 4
 Oltronix, Inc., Ga., 4, 5, 15, 20, 35, 40
 Onan & Sons, Inc., D. W., 2945 University Ave. S.E., Minneapolis 14, Minn., 30, Transfer
 See ad on page 496
 Tel: FEDERAL 2-1155
 Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 2, 4, 5, 15, 17, 20, 25, 35, 37, 40
 See ad on page 499
 Tel: WORTH 6-0380
 Orbitran Co., Inc., Calif., 40
 Owen Laboratories, Inc., Calif., 4, 15, 35, 40
 Pacific Technical Co., Calif., 2, 37
 Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 4, 15, 35
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 Tel: BRadshaw 2-6141
 Parks Lab., Henry Francis, Wash., 35
 Parsons Co., Ralph M., Electronics Div., Calif., 4, 40
 Patterson, Moos Div. of Universal Winding Co., N.Y., 4, 35
 Pennsylvania Testing Lab., Inc., Pa., 5, 15, 25, 37
 Perkins Engineering Corp., Calif., 2, 4, 5, 15, 17, 20, 25, 30, 35, 37, 40
 Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 2, 4, 5, 15, 20, 25, 37, 40
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 Tel: TRinity 8-3251
 Philbrick Researches, Inc., George A., Mass., 4, 40
 Pierce, George C., Va., 40

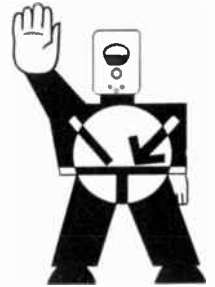
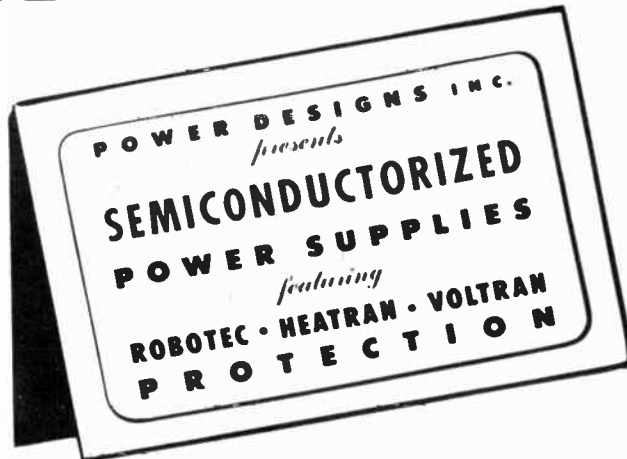
POWER SUPPLIES



VOLTAGE REGULATED POWER SUPPLIES

Featuring

- .05% regulation for load or line variations
- 500 microvolts ripple
- 50 microseconds response time
- 10-turn voltage controls for minimum noise
- Karma (20-PPM) wire wound, low t.c. error sensing resistors
- 50 hour pre-aging
- Meters included in feed back loop for low low output impedance
- Separately fused line and load circuits
- Separate AC and DC switches
- JAN quality components
- Input: 105-125 v. 55-65 cy. single phase
- 28 Models available from stock



Power Designs' Semiconductorized Power Supplies utilize the unique properties of semiconductor devices to create new circuit concepts achieving performance, efficiency and reliability hitherto unattainable. These instruments are NOT the conventional transistorized versions of vacuum tube regulators.

ROBOTEC*

is an inherent electronic circuit producing simultaneous voltage and current cutoff upon external short circuit. The "ROBOTEC" circuit operates in 30 microseconds holding the power supply cut off until manually reset and reducing line input power to a negligible value. If an external short circuit exists the power supply cannot be turned on.

HEATRAN

is a transistorized circuit continuously monitoring dissipation in the series power transistors of the regulator system. Dissipation above a preset maximum value is automatically transferred into external vitreous enamel resistors extending from the rear of the equipment in a perforated metal cage. "HEATRAN" thus permits fewer transistors for a given power supply capacity, more compact equipment with increased reliability and practical convection cooling.

VOLTRAN

is a transistorized circuit continuously monitoring the voltage drop in the series power transistors of the regulator system. Voltages above a preset maximum are instantaneously absorbed thus protecting these transistors against line and load transients and permitting more conservative voltage derating.

* U.S. PATENT PENDING

MODEL 1515
1-15VDC • 0-1.5A
\$159⁵⁰

MODEL 1515A
1-15VDC • 0-1.5A
\$174⁵⁰

MODEL 3206
1-32VDC •
0-600MA
\$174⁵⁰

MODEL 2050
1-20VDC • 5A
\$289⁵⁰

MODEL 1210
1-12VDC • 0-10A
\$349⁵⁰

MODEL 1010T
1-100VDC • 0-1A
\$374⁵⁰

MODEL 3240
1-32VDC • 0-4A
\$349⁵⁰

MODEL 105TA
1-100VDC •
0-500MA
\$239⁵⁰

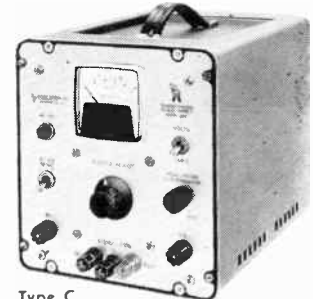
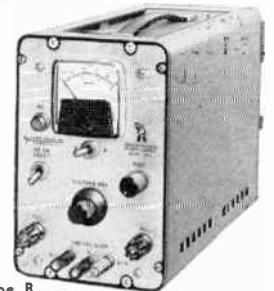
MODEL 5015
1-50VDC • 0-1.5A
\$249⁵⁰

Dual Volt-
ammeter on
all models
except model
1515

Type A

Type B

Type C



INPUT: 105-125VAC 55-440 Cy
REGULATION: .05%
RIPPLE: Model 1515, 1515A:
250 Microvolts
All Others—1.0 Millivolt
Internal Imp: Model 2050, 1210,
1010T, 3240, .005 ohms
All Others—.01 ohms

Rack Panel Adapters for Types A and B: Single Model RRA-15 \$15.50, Dual Model RRB-15 \$15.50. Rack Panel Adapters for Type C: Single Model RRA-20 \$17.50, Dual Model RRB-20 \$17.50. **F.O.B. Westbury, N. Y. Terms, 1/2% 10. Net 30 days. Prices subject to change without notice. Input: 105-125 v. 55-440-1φ

Recognized Reliability  Power Designs inc.

1700 Shames Drive, Westbury, N.Y.
Phone: EDgewood 3-6200

Directory II. Components

61. Power Supplies.

Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 35

See ad on page 323
Tel: CAnal 6-7250

Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 4, 5, 15, 20, 25, 37, 40

See ad on page 405
Tel: Diversey 8-3735

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 25

See ad on pages 135-136
Tel: EXeter 2-4500

Polytechnic Research & Dev. Co., Inc., N.Y., 25

Polytron Engineering, Inc., Md., 35
Potter Co., Ill., 4, 5, 37, 40

Power Designs, Inc., 1700 Shames Dr., Westbury, N.Y., 4, 15, 17, 20, 35, 37, 40

See ad on page 498
Tel: EDgewood 3-6200

Power Sources, Inc., Northwest Industrial Park, South Ave., Burlington, Mass., 2, 4, 15, 17, 20, 25, 35, 40

See ad on page 430
Tel: BRowning 2-3610

Precise Measurements Co., Millbrook Lane, R.D. 1, Flemington, N.J., 2, 4, 5, 15, 20, 37, 40

See ads on pages 500, 583
Tel: FLemington 900

Press Wireless Labs., Inc., Mass., 5
Pressman Associates, Inc., Pa., 4, 15, 35, 37, 40

Pyroferic Co., Inc., N.Y., Horizontal High Voltage

Q.O.S. Corp., N.Y., 5, 35

Quan-Tech Labs., 236 Mt. Kemble Ave., Morristown, N.J., 4, 15, 35, 37, 40

See ad on page 374
Tel: JEFFerson 8-6350

R-S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5

See ad on page 267
Tel: DAvenport 1-1130

Racal Engrg., Ltd., England, 40

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Radio City Products Co., Inc., Pa., 2, 4, 20

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Radio Engrg. Labs., Inc., Standard Electronics Div., N.Y., 2, 4, 5, 15, 35, 40

Radio Frequency Labs., Inc., Powerville Rd., Boonton, N.J., 2, 37

See ad on page 304
Tel: DEerfield 4-3100

Radio Receptor Co., Eng. Prods. Div., N.Y., 2, 4, 15, 20, 25, 35, 37

Radiometer, Denmark, 2, 4

Railroad Electronic Labs. of Omaha, Inc., Nebraska, 2, 4, 20

Ram Electronics, Inc., N.J., 5, 15, 37, 40



POWER SUPPLIES

IMMEDIATE DELIVERY

0-32 V.D.C. 1/2 % Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

| Amps. | Model | Style | H | W | D | Fig. |
|-------|-------|-------|---------|-----|--------|------|
| 5 | KM75 | Rack | 8 3/4" | 19" | 9 1/2" | D |
| | KM75 | Bench | 9" | 17" | 9" | E |
| 10 | KM81 | Rack | 8 3/4" | 19" | 9 1/2" | D |
| | KM81B | Bench | 9" | 17" | 9" | E |
| 20 | KM87 | Rack | 8 3/4" | 19" | 9 1/2" | D |
| | KM87B | Bench | 10 1/2" | 22" | 12" | F |
| 40 | KM93 | Rack | 12 1/4" | 19" | 13" | — |
| | KM93B | Bench | 14" | 22" | 15" | B |

FEATURES

- Vacuum Varnish Impregnated Magnetic Components.
- 4 1/2" Rectangular 2% Accuracy, D.C. Panel Meters (3 1/2" on small units).
- Controls include power switch, line and load fuses, pilot light, voltage control knob, output binding posts.
- Voltage Regulation: 1/10 Load 36 Volts Full Load 32 Volts
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 102

0-32 V.D.C. 4 % Ripple

Input: 208 V.A.C. 60 Cycles, 3 Phase

| Amps. | Model | Style | H | W | D | Fig. |
|-------|-------|-------|-----|-----|-----|------|
| 100 | FR100 | Floor | 46" | 22" | 18" | A |
| | FR200 | Floor | 46" | 22" | 24" | A |

FEATURES

- Fully Self-Protecting Circuit.
- Pushbutton Operated Magnetic Contactor.
- Indicating Type AC Input Fuses.
- Adjustable Overcurrent Control in D.C. Circuit.
- Thermal Overload Device on Rectifier.
- Overload Warning Light and Reset Button.
- 4 1/2" Rectangular, 2% Accuracy Panel Meters.
- Low Voltage Regulation: Approx. 8%
- Ball Bearing Type Casters.
- Input Receptacle and Mating Plug.
- All receptacles, terminals and controls clearly designated.
- Budget Priced.

Bulletin No. 155

0-110 V.D.C. 1 % Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

| Amps. | Model | Style | H | W | D | Fig. |
|-------|-------|-------|---------|-----|--------|------|
| 2.5 | RS10 | Rack | 8 3/4" | 19" | 9 1/2" | D |
| | RS10B | Bench | 10 1/2" | 22" | 12" | F |
| 5 | RS20 | Rack | 10 1/2" | 19" | 13" | D |
| | RS20B | Bench | 12 1/4" | 22" | 15" | F |
| 10 | RS30 | Rack | 12 1/4" | 19" | 13" | — |
| | RS30B | Bench | 14" | 22" | 15" | B |
| 20 | RS40 | Rack | 17 1/2" | 19" | 13" | — |
| | RS40B | Bench | 19 1/4" | 19" | 15" | C |

FEATURES

- Vacuum Varnish Impregnated Magnetic Components.
- Non-Aging Rectifiers (Germanium or Silicon).
- 4 1/2" Rectangular 2% Accuracy D.C. Panel Meters (3 1/2" on small units).
- Controls include Power Switch, Line and Load Fuses, Pilot Light, Voltage Control Knob and Output Binding Posts.
- Both D.C. Terminals above ground and isolated from A.C. Line.
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 204

TRANSISTOR REGULATED POWER SUPPLIES

3-32 Volts D.C. ± 1/2% Regulation*

Input: 105-125 volts A.C., 60-400 cycles, Single phase

| Amps. | Model | Style | Amps. | Model | Style |
|-------|-------|-------|-------|-------|-------|
| 1 | TR10 | Rack | 10 | TR30 | Rack |
| 1 | TR10B | Bench | 10 | TR30B | Bench |
| 5 | TR20 | Rack | 15 | TR40 | Rack |
| 5 | TR20B | Bench | 15 | TR40B | Bench |

FEATURES

- Zener Diode Reference.
- Ripple less than 5 M.V.
- Vacuum varnish impregnated magnetic components.
- Short Circuit Protection.
- Controls include power switch, fuses, pilot light, voltage control knob and output binding posts.
- 2% Accuracy Panel Meters.
- Both output terminals above ground and isolated from A.C. line.
- Panel type carrying handles.
- Continuous duty ratings.
- High efficiency.

* Line and Load



GENERAL PURPOSE UNITS

OUTPUT: 0-30 Volts D.C. Unfiltered Full Wave.
INPUT: 115 V.A.C., 60 Cy., 1 φ.
Model GM72 5 Amperes
Model GM78 10 Amperes
Model GM84 20 Amperes
Model GM90 50 Amperes
FEATURES: 2% accuracy Panel Meters, Line and Load Fuses, Switch, Pilot Light, Binding Posts.

Bulletin No. 179



AIRCRAFT BATTERY SUBSTITUTE

OUTPUT: 0-30 V.D.C., 20 Amperes.
RIPPLE: Less than 1%.
INPUT: 115 V.A.C., 60 Cy., 1 φ.
REGULATION: 1/10 Load 35 Volts Full Load 30 Volts
FEATURES: Ammeter overcurrent protection circuit prevents needle 'slam' when starting inverters & motors.
MODEL KM88 ... Rack Mount
MODEL KM88B ... Bench

Bulletin No. 100



DUAL RANGE POWER SUPPLY

OUTPUT: 0-32/64 V.D.C., 40/20 Amps.
RIPPLE: Within 1% of aver. DC.
INPUT: 115 V.A.C., 60 Cy., 1 φ.
FEATURES: Thermal overload protection, indicating line and load fuses, overload warning light, dual range voltmeter.
MODEL KM95 ... Rack Mount
MODEL KM95B ... Bench

Bulletin No. 103

OPAD ELECTRIC COMPANY

43-8 WALKER STREET • NEW YORK 13, N. Y.
Telephone: WOrth 6-0380

For details, circle #471 on Reader Service Card

HIGH VOLTAGE POWER SUPPLIES AND EQUIPMENT

We have sold quantities of these power supplies to laboratories, industrial concerns, the government and universities. Only the best available selected material goes into these units, so that you will have many years of dependable service. Only a few of our standard models are shown below. Quotations on special supplies cheerfully given.

PRECISE MEASUREMENTS COMPANY

HIGH VOLTAGE POWER SUPPLIES



One of the most popular power supplies on the market. Completely redesigned for greater ruggedness and convenience of operation. Widely used for powering electronic equipment and for routine breakdown and insulation testing. Output voltage is well filtered D.C. which is adjustable with convenient front panel control. Input is 115 Volt, 60 cycle A.C. Equipment is available without meter, with one meter (4 1/2"), with two meters, or with larger 6" precision 1% mirror scale movement. Regulated models offer closely stabilized output voltage regardless of line or load changes.

| Model | | Maximum Voltage | Price | Price Regulated Model |
|--------|---------------------|-----------------|----------|-----------------------|
| 6001 | With Kilovolt Meter | 1,000 | \$ 75.00 | |
| 6000 | | 2,500 | 60.00 | |
| 6000-A | With Kilovolt Meter | 2,500 | 80.00 | \$120.00 |
| 6005 | | 5,000 | 75.00 | |
| 6005-A | With Kilovolt Meter | 5,000 | 95.00 | 135.00 |
| 6010 | | 10,000 | 85.00 | |
| 6010-A | With Kilovolt Meter | 10,000 | 105.00 | 145.00 |
| 6015 | | 15,000 | 95.00 | |
| 6015-A | With Kilovolt Meter | 15,000 | 115.00 | 155.00 |
| 6025-A | With Kilovolt Meter | 25,000 | 175.00 | 205.00 |

MIRROR SCALE HIGHER ACCURACY METERS: Recommended where more exact settings or measurements are needed. Meter size has been increased to 6 inches for easier reading. Price \$35.00 additional on any meter equipped model.
TWO METER MODEL ADD \$35.00

INDUSTRIAL POWER SUPPLIES



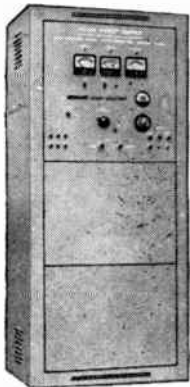
These industrial type power supplies are built for service and efficiency. All are of the transformer type and employ husky components that have been selected for their power handling capacity. Controls are arranged so that operation is greatly simplified and a number of safety features are built in for maximum protection of personnel and equipment. Output is continuously variable from zero to full rated value. Polarity reversing models (as illustrated) can be had at additional cost.

| Model | Voltage | Current | Price |
|-------------|-----------|---------|----------|
| F-500V | 0-5000 | 3 Amp | \$800.00 |
| F-6001 | 0-1000 | 2 Amp | 975.00 |
| F-6002 | 0-2000 | 1 Amp | 985.00 |
| F-6003-A1 | 0-3000 | 100 MA | 375.00 |
| F-6003-AV | 0-3000 | 500 MA | 550.00 |
| F-6003-AK | 0-3000 | 1 Amp | 1100.00 |
| F-6005-A1-H | 0-5000 | 100 MA | 550.00 |
| F-6005-AV | 0-5000 | 500 MA | 750.00 |
| F-6005-A1K | 0-5000 | 1 Amp | 1200.00 |
| F-6010-A1 | 0-10,000 | 100 MA | 800.00 |
| F-6020-A05 | 0-20,000 | 50 MA | 975.00 |
| F-6050-T | 0-50,000 | 1/2 MA | 600.00 |
| F-6100-T | 0-100,000 | 1/2 MA | 1100.00 |

Regulated Types Available

Standard hum level 5% or less. .01% to 1% ripple available. All power supplies have automatic overload cutout control circuits. Regulated models available.

HEAVY DUTY POWER SUPPLIES

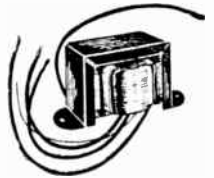


For use in applications where high voltages at extra high currents are required. Illustrated is our 100 KW Model, rated for 0 to 7,000 Volts at 14 Amperes DC. This unit is housed in a single convenient cabinet. Output voltage is regulated against line and load changes. Voltage is smoothly adjustable from zero to full output. Automatic circuits protect against overvoltage or over current conditions, turning off main power in a split second. Use of special transformer construction allows constant load drain at full rated output. All power supplies in this series are available with fixed or adjustable output and with or without regulation.

| Model | Voltage | Current |
|-------|----------|------------|
| A-10 | 0-1000 | 5 amperes |
| A-30 | 0-3000 | 5 amperes |
| A-31 | 0-3000 | 10 amperes |
| A-32 | 0-3000 | 20 amperes |
| A-50 | 0-5000 | 5 amperes |
| A-51 | 0-5000 | 10 amperes |
| A-72 | 0-7000 | 15 amperes |
| A-100 | 0-10,000 | 5 amperes |
| A-110 | 0-10,000 | 10 amperes |
| A-300 | 0-30,000 | 5 amperes |

TRANSFORMERS, HIGH VOLTAGE

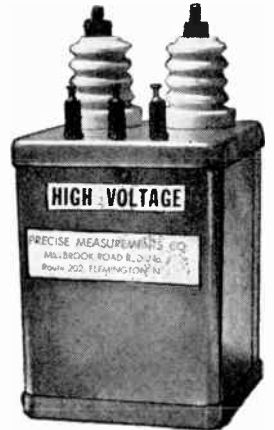
For experimental, industrial or production applications. These units are small and compact and rated for constant service. Primary designed for 105/115/125 Volts 60 Cycle. Secondary winding has half voltage tap. Only standard models are listed, other voltages and currents available on order.



| Model | Voltage | Model | Voltage |
|-------|---------|--------|---------|
| 1 KVT | 1 KV | 10 KVT | 10 KV |
| 2 KVT | 2 KV | 15 KVT | 15 KV |
| 3 KVT | 3 KV | 25 KVT | 25 KV |
| 5 KVT | 5 KV | 50 KVT | 50 KV |

PACKAGED POWER SUPPLIES

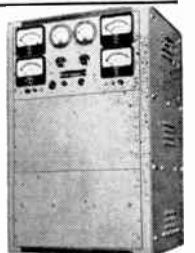
These conveniently packaged power units will be found ideal for applications requiring minimum size and weight. Features isolated high voltage terminals permitting either the positive or negative side to be grounded. Rectifier tubes are operated from separate filament transformers so that DC output voltage can be varied from zero to full rated value. Selenium rectifier types have extra cells to assure operation under high line voltage or light loading. All standard units have well filtered DC output. Power packs with AC output available on order.



| Model | Output Voltage | Current | Model | Output Voltage | Current |
|-----------|----------------|---------|------------|----------------|---------|
| 05-KV-5MA | 500 Volts DC | 5 Ma. | 20-KV-1MA | 20 KV DC | 1 Ma. |
| 1-KV-5MA | 1 KV DC | 5 Ma. | 20-KV-5MA | 20 KV DC | 5 Ma. |
| 2-KV-5MA | 2 KV DC | 5 Ma. | 30-KV-1MA | 30 KV DC | 1 Ma. |
| 5-KV-1MA | 5 KV DC | 1 Ma. | 30-KV-5MA | 30 KV DC | 5 Ma. |
| 5-KV-5MA | 5 KV DC | 5 Ma. | 50-KV-1MA | 50 KV DC | 1 Ma. |
| 10-KV-1MA | 10 KV DC | 1 Ma. | 50-KV-5MA | 50 KV DC | 5 Ma. |
| 10-KV-5MA | 10 KV DC | 5 Ma. | 75-KV-1MA | 75 KV DC | 1 Ma. |
| 15-KV-1MA | 15 KV DC | 1 Ma. | 100-KV-1MA | 100 KV DC | 1 Ma. |
| 15-KV-5MA | 15 KV DC | 5 Ma. | | | |

CONSTANT CURRENT POWER SUPPLIES

Designed for application where output current must remain constant regardless of loading resistance changes. Used for magnet fields, plating applications, gaseous lamps. Dependable magnetic current stabilizer has no moving parts, no tubes, no transistors to replace. Simply set current to desired level, no balancing or other adjustments needed. Ideal for lamp operation since operating state ionizing voltage in no way affects lamp current. Standard hum level 5%. Lower hum levels available on order.



| Model | Maximum Voltage | Maximum Current |
|---------------|--------------------|------------------|
| C-25-700 | 25 Volts | 700 Amperes |
| C-70-70 | 70 Volts | 70 Amperes |
| C-500-10 | 500 Volts | 10 Amperes |
| C-Duel 500-10 | 500 or 1,000 Volts | 10 or 20 Amperes |
| C-800-2 | 800 Volts | 2 Amperes |
| C-1000-100 | 1000 Volts | 100 Amperes |

Duel 500 V - 500 V, 10 Ampere Power Supply. Isolated outputs may be series or paralleled.

AC INSULATION AND BREAKDOWN TESTERS

Used in testing insulation where AC voltages are desired. Dual instruments are also available which provide choice of AC or DC output with simple toggle switch selection. Units include kilovoltmeter, current meter and automatic overload cutout circuits.



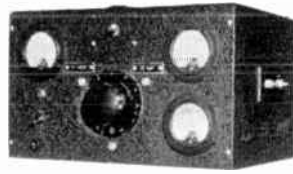
| Model | Voltage | VA | AC | AC and DC Price |
|-------|-------------|-------|----------|-----------------|
| 3000 | 0 to 3,000 | 75 | \$150.00 | \$ 250.00 |
| 3010 | 0 to 3,000 | 300 | 250.00 | 400.00 |
| 3050 | 0 to 3,000 | 1,500 | 500.00 | 650.00 |
| 3100 | 0 to 6,000 | 3,000 | 700.00 | 1,100.00 |
| 5000 | 0 to 5,000 | 75 | 175.00 | 300.00 |
| 10K | 0 to 10,000 | 75 | 200.00 | 350.00 |

PRECISE MEASUREMENTS COMPANY

MILLBROOK LANE • R. D. 1 • FLEMINGTON, NEW JERSEY • TEL. FLEMINGTON 900

For other power supplies, see our ad on page 583.
For details, circle #472 on Reader Service Card

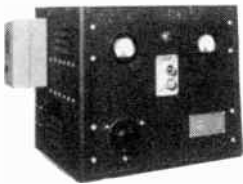
REGULATED DC POWER SUPPLIES



Silicon-Germanium-Selenium

MAGNETIC AMPLIFIER ± 1% Voltage Regulation

- Greater reliability
- Fast response time
- Greater stability
- Operable under extreme environmental conditions
- No tubes—no warm-up
- Highly efficient



Models available: from 5 amperes to 1500 amperes, 6 volts to 250 volts.

4 Page Brochure MA-1 Available

RAPID ELECTRIC COMPANY

2881 Middletown Road, New York 61, New York • TA-8-2200

For details, circle #473 on Reader Service Card

Directory II. Components

61. Power Supplies.

- Ramage & Miller Enterprises, Calif., 5, 25, 40
 Ramo-Wooldridge Corp., Calif., 35
 Rank Cintel, Ltd., England, 40
 Rapid Electric Co., 2881 Middletown Rd., New York 61, N.Y., 4
 See ad on this page
 Tel: TAlmadge 8-2200
 Raytheon Co., Mass., 4, 15, 20, 40
 Reeves Instrument Corp., N.Y., 4, 40
 Reflectone Corp., Conn., 4, 35, 37, 40
 Republic Aviation Corp., N.Y., 4, 15, 17, 20, 40
 Republic Electronic Indust. Corp., N.Y., 2, 4, 20, 35
 Resdel Engrg. Corp., Calif., 2, 4, 5, 15, 25
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 Rho Engrg. Co., Calif., 2, 4, 35
 Richardson-Allen Corp., N.Y., 15, 17, 20, 37, 40
 Riverbank Labs., Dept. of Engrg., Ill., 2
 Rixon Electronics, Inc., 2414 Reddie Drive, Silver Spring, Md., 4, 15, 20, 35, 37, 40
 See ad on page 525
 Tel: LOkwood 5-4578

- Ryan Aeronautical Co., Ryan Electronics Div., Calif., 5, 25
 Sangamo Electric Co., Ill., 2, 4, 5, 15, 30
 Saratoga Industries, N.Y., 2, 4, 15, 17, 20, 35, 37, 40
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 Schauer Mfg. Corp., Ohio, 4, 15
 Schoene Electronics Lab., Ind., 40
 Scientific Electric, Inc., N.J., 2, 4, 5, 15, 20, 37, 40
 Scientific Engineering Laboratories, 1510 Sixth St., Berkeley 10, Calif., 5, 40
 See ad on page 673
 Tel: LAndscape 6-2772
 Scranton Corp., Elcor Div., Ill., 2, 4, 35
 Secode Corp., Calif., 4, 15, 20, 35
 Sel-Rex Corp., N.J., 4, 15, 17, 20, 37, 40
 Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 4
 See ad on page 538
 Tel: WOODlawn 5-2341
 Sheppard Co., Inc., R. H., Pa., 30
 Sierra Electronic Corp., 5442D Bohannon Drive, Menlo Park, Calif., 5, 20, 25
 See ad on pages 30-31
 Tel: DAVenport 6-2060
 Signal Equipment Co., Inc., Wash., 2, 37
 Simmonds Aerocessories, Inc., N.Y., 35
 Sivers Lab., Sweden, 25, 40
 Skiatron Elect. Television Corp., N.Y., 2, 4
 Slaughter Co., Ohio, 2, 4, 5, 15
 Small Motors, Inc., Ill., 4, 15
 Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 40
 See ad on page 568
 Tel: BISHop 2-1414

HIGH VOLTAGE

MODEL PN-30R REVERSIBLE POLARITY
 Continuously Variable 1-30KV Unregulated DC Power Supply
 A light, compact unit in wide use for insulation testing, precipitators and laboratory research. Polarity reversible from front panel. Current output: approx. 2 ma. at 20KV; 250 microamperes at 30KV. Input: 110V AC 60 cycles. Dimensions: 19" x 10 1/2" x 13"\$225 Net
 With meter installed on front panel\$275 Net

MODEL LAB-90 RF TYPE CONTINUOUSLY VARIABLE 0-90KV REGULATED DC POWER SUPPLY
 Output current .7 ma. at 90KV; 2 ma. at 80KV; 2 ma. from 40KV down. Regulations better than 1% throughout entire range. Dimensions in cabinet: 28" high; 21 3/4" wide, 18" deep. LAB-90 Complete with meter\$900 Net
 Specify polarity output—positive or negative

MODEL RG-5 5KV DC REGULATED POWER SUPPLY
 Output current 2 ma. Regulated against line and load 1%. Variable 12 to 7KV. Complete with Current and Volt Meters\$250 Net

MODEL 4575 5KV-1 ma. DC POWER SUPPLY
 For an output voltage of 5KV DC at 1 ma., the low voltage input requirement is 250V at 50 ma. By varying the DC input the output voltage can be varied from approximately 1KV to 7 1/2KV. Dimensions: 5 3/4" high x 5" deep x 4 1/4" wide. In completely enclosed metal housing.
 MODEL 4575\$32.50 Net
 MODEL 4575-2 Same as above with 2 ma. output at 5KV\$42.50 Net
 MODEL 4575PN—Same as 4575 except reversible polarity. Either positive or negative output may be grounded or left floating\$42.50 Net
 MODEL 4575-2 PN—Same as 4575-2 except reversible polarity. Either positive or negative output may be grounded or left floating\$52.50 Net

COMPLETE LINE OF HIGH VOLTAGE COILS—Send for complete catalog R

HIGH VOLTAGE CO.

3029 WEBSTER AVE.
 BRONX, 67, N. Y.
 Kingsbridge 7-0306

FORMERLY SPELLMAN TELEVISION CO., INC.

For details, circle #474 on Reader Service Card



VARICELL
adjustable
A-C/D-C power supply

- VERSATILE... EITHER A-C OR D-C OUTPUT
- SMALL, COMPACT
- LOW COST PER KVA
- GOOD REGULATION
- LOW PERCENTAGE RIPPLE
- FULL CURRENT RATING AT ANY VOLTAGE SETTING

Here is a small, compact unit designed to provide a source of adjustable low a-c or d-c voltages from a-c power lines. Features greater equipment utilization and flexibility... a single unit does the job of several! Can be used independently or as a component. Essentially consists of a 3-phase, low voltage POWERSTAT variable transformer combined with a static d-c power supply. The power supply uses highly efficient silicon rectifier cells connected for full-wave 3-phase operation. Filtering is usually not required because the low ripple content is approximately 4.2% and ripple frequency 360 cycles at a supply frequency of 60 cycles. The a-c or d-c regulation is approximately 10% at the maximum voltage setting.

VARICELL TYPE V4050-3 RATINGS

A-C INPUT: { 240 volts, 50/60 cycles, 3-phase
(Primary delta connected)

A-C OUTPUT: { 0-30 volts, 40 amperes, 3-phase
(Secondary delta connected)
0-50 volts, 25 amperes, 3-phase
(Secondary wye connected)

D-C OUTPUT: { 0-35 volts, 50 amperes
(Secondary delta connected)
0-60 volts, 30 amperes
(Secondary wye connected)

The a-c and d-c outputs cannot be simultaneously loaded or externally interconnected. The a-c output can be used either single or three phase.

WRITE FOR VARICELL BULLETIN



590 Tripp Avenue, Bristol, Connecticut

For details, circle #475 on Reader Service Card

"TECHNICAL APPARATUS BUILDERS"

AC & DC POWER HEADQUARTERS!
TABTRON®-TABPAK®-TABTRAN®-TABSTAT®
High Current Power Supplies
Five Year Guarantee**

Variable Stepless from Zero to Full Voltage DC
Full Wave Selenium or Silicon Rectifier
Isolation Power Transformer, Variac, Meters

**Per Factory Warrantee Write Details

| Stock # | Volts & Amps | Continuous Rating | With Meters |
|---------------|-------------------------------|-------------------|-------------|
| T9V500A3eSj | 0-9 VDC @ 500 Amp/4% Rip | | \$630 |
| T12V12A | 0-12 V @ 12 A 1% Rip @ 5 A | | \$37 |
| T12V12ACC | 0-12 V @ 12 A 1/2% Rip @ 5 A | | \$47 |
| T12V25AC | 0-12 V @ 25 A 1/2% Rip | | \$130 |
| T28V50ACsSj | 0-28 V @ 50 A 1% Rip/5% Reg | | \$225 |
| T28V5A | 0-28 WDC @ 5 Amp | | \$57 |
| T28V5ACC | Filtered (1% Ripple) | | \$84 |
| T28V12A | 0-28 WDC @ 12 Amp | | \$115 |
| T28V12ACC | Filtered (1% Ripple) | | \$168 |
| T28V12AZCC | Filtered (0.1% Ripple) | | \$223 |
| T28V24A | 0-28 WDC @ 24 Amp | | \$165 |
| T28V24ACC | Filtered (1% Ripple) | | \$224 |
| T28V50A | 0-28 WDC @ 50 Amp | | \$306 |
| T28V50ACC | Filtered (2% Ripple) | | \$409 |
| RT35V5ACCSj | 0-35 V @ 5 A 1/2% Rip/5% Reg | | \$160 |
| RT35V12ACCSj | 0-35 V @ 12 A 1/2% Rip/5% Reg | | \$250 |
| RT35V50ACCSj | 0-35 V @ 50 A 1/2% Rip/5% Reg | | \$395 |
| RT35V50A3eSj | 0-35 V @ 50 A 1/2% Rip/5% Reg | | \$540 |
| RT35V100A3eSj | 0-35 V @ 100 A 1/2% R/5% Reg | | \$756 |
| T130V5A | 0-130 VDC @ 5 Amp | | \$225 |
| T130V5ACC | Filtered (1% Ripple) | | \$275 |
| T220V2ACC | 0-220 V @ 2 Amp/2% Rip | | \$270 |

2 Meters: 83/SILICON RECT; 84/200-250 VAC/34 I.M.T.R.

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|--------|-------------------|---------|
| B24V4R | 24-28 VDC @ 4 Amp | \$7.00 |
| B24V8R | 24-28 VDC @ 8 Amp | \$12.00 |
| B24V1R | 24-28 VDC @ 8 Amp | \$23.00 |

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|-----------|-------|-----------|-------|
| B9V500A3e | \$22 | B28V24A | \$139 |
| B12V24A | \$97 | B28V50A | \$409 |
| B12V50A | \$140 | B220V2A | \$405 |
| B28V5A | \$45 | B115V2.5A | \$81 |
| B28V12A | \$90 | B220V2A | \$110 |

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| MAX DC AMP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 25 | 30 | 35 | 40 | 50 | 60 | 75 | 100 | 150 | 200 | 250 | 300 | 400 | 500 | 600 | 800 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 70VAC | \$4.20 | \$5.45 | \$6.15 | \$7.90 | \$9.30 | \$10.90 | \$12.40 | \$14.90 | \$17.40 | \$19.90 | \$22.40 | \$24.90 | \$27.40 | \$30.90 | \$33.40 | \$35.90 | \$38.40 | \$41.90 | \$44.40 | \$47.90 | \$51.40 | \$54.90 | \$58.40 | \$61.90 | \$65.40 | \$68.90 | \$72.40 | \$75.90 | \$79.40 | \$82.90 | \$86.40 | \$89.90 | \$93.40 | \$96.90 | \$100.40 | \$103.90 | \$107.40 | \$110.90 | \$114.40 | \$117.90 | \$121.40 | \$124.90 | \$128.40 | \$131.90 | \$135.40 | \$138.90 | \$142.40 | \$145.90 | \$149.40 | \$152.90 | \$156.40 | \$159.90 | \$163.40 | \$166.90 | \$170.40 | \$173.90 | \$177.40 | \$180.90 | \$184.40 | \$187.90 | \$191.40 | \$194.90 | \$198.40 | \$201.90 | \$205.40 | \$208.90 | \$212.40 | \$215.90 | \$219.40 | \$222.90 | \$226.40 | \$229.90 | \$233.40 | \$236.90 | \$240.40 | \$243.90 | \$247.40 | \$250.90 | \$254.40 | \$257.90 | \$261.40 | \$264.90 | \$268.40 | \$271.90 | \$275.40 | \$278.90 | \$282.40 | \$285.90 | \$289.40 | \$292.90 | \$296.40 | \$299.90 | \$303.40 | \$306.90 | \$310.40 | \$313.90 | \$317.40 | \$320.90 | \$324.40 | \$327.90 | \$331.40 | \$334.90 | \$338.40 | \$341.90 | \$345.40 | \$348.90 | \$352.40 | \$355.90 | \$359.40 | \$362.90 | \$366.40 | \$369.90 | \$373.40 | \$376.90 | \$380.40 | \$383.90 | \$387.40 | \$390.90 | \$394.40 | \$397.90 | \$401.40 | \$404.90 | \$408.40 | \$411.90 | \$415.40 | \$418.90 | \$422.40 | \$425.90 | \$429.40 | \$432.90 | \$436.40 | \$439.90 | \$443.40 | \$446.90 | \$450.40 | \$453.90 | \$457.40 | \$460.90 | \$464.40 | \$467.90 | \$471.40 | \$474.90 | \$478.40 | \$481.90 | \$485.40 | \$488.90 | \$492.40 | \$495.90 | \$499.40 | \$502.90 | \$506.40 | \$509.90 | \$513.40 | \$516.90 | \$520.40 | \$523.90 | \$527.40 | \$530.90 | \$534.40 | \$537.90 | \$541.40 | \$544.90 | \$548.40 | \$551.90 | \$555.40 | \$558.90 | \$562.40 | \$565.90 | \$569.40 | \$572.90 | \$576.40 | \$579.90 | \$583.40 | \$586.90 | \$590.40 | \$593.90 | \$597.40 | \$600.90 | \$604.40 | \$607.90 | \$611.40 | \$614.90 | \$618.40 | \$621.90 | \$625.40 | \$628.90 | \$632.40 | \$635.90 | \$639.40 | \$642.90 | \$646.40 | \$649.90 | \$653.40 | \$656.90 | \$660.40 | \$663.90 | \$667.40 | \$670.90 | \$674.40 | \$677.90 | \$681.40 | \$684.90 | \$688.40 | \$691.90 | \$695.40 | \$698.90 | \$702.40 | \$705.90 | \$709.40 | \$712.90 | \$716.40 | \$719.90 | \$723.40 | \$726.90 | \$730.40 | \$733.90 | \$737.40 | \$740.90 | \$744.40 | \$747.90 | \$751.40 | \$754.90 | \$758.40 | \$761.90 | \$765.40 | \$768.90 | \$772.40 | \$775.90 | \$779.40 | \$782.90 | \$786.40 | \$789.90 | \$793.40 | \$796.90 | \$800.40 | \$803.90 | \$807.40 | \$810.90 | \$814.40 | \$817.90 | \$821.40 | \$824.90 | \$828.40 | \$831.90 | \$835.40 | \$838.90 | \$842.40 | \$845.90 | \$849.40 | \$852.90 | \$856.40 | \$859.90 | \$863.40 | \$866.90 | \$870.40 | \$873.90 | \$877.40 | \$880.90 | \$884.40 | \$887.90 | \$891.40 | \$894.90 | \$898.40 | \$901.90 | \$905.40 | \$908.90 | \$912.40 | \$915.90 | \$919.40 | \$922.90 | \$926.40 | \$929.90 | \$933.40 | \$936.90 | \$940.40 | \$943.90 | \$947.40 | \$950.90 | \$954.40 | \$957.90 | \$961.40 | \$964.90 | \$968.40 | \$971.90 | \$975.40 | \$978.90 | \$982.40 | \$985.90 | \$989.40 | \$992.90 | \$996.40 | \$999.90 |

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England, 4, 15, 20, 25, 35, 37, 40
Solartron, Inc., Mass., 4
Sonotone Corp., Dept. X00-109, P.O. Box 200, Elmsford, N.Y., 35

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Tel: LYric 2-6400

Sorensen & Co., Inc., Conn., 2, 4, 5, 15, 17, 20, 35, 37, 40

Specialties, Inc., N.Y., 2, 17

Specialty Electronics Development Corp., N.Y., 2, 4, 5, 15, 35, 40

Specialty Engrn. & Electr. Co., N.Y., 2, 5, 37, 40

Specific Products, 21051 Costanzo, P.O. Box 425, Woodland Hills, Calif., 4

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Tel: DI 0-3131

Spectral Electronics Corp., Calif., 2, 4, 5, 15, 20, 35, 40

Spellman High Voltage Co., 3029 Webster Ave., New York 67, N.Y., 4, 5, 35, 37

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Tel: Kingsbridge 7-0306

Stancil-Hoffman Corp., Calif., 40

Standard Telephones & Cables, Ltd. England, 4, 20, 40

Stelma, Inc., Conn., 40

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 2, 4, 5, 15, 25, 37, 40

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Tel: POrt Washington 7-7200

Stewart & Stevenson Services, Inc., Texas, 30

Strand Labs., Inc., Mass., 10, 25

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 4

Sunshine Scientific Instrument, Pa., 37, 40

Superior Electric Co., 590 Tripp Ave., Bristol, Conn., 2, 4, 37, 40

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Tel: LUDlow 2-9561

Synton Co., 83 Lexington Ave., Homer City, Pa., 4, 37, 40

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Tel: GR 9-8011

Systems Development, Inc., N.Y., 5

Systems Inc., Fla., 2, 4, 35

Taffet Radio & Television Co., N.Y., 20

Tapetone, Inc., Mass., 4, 20, 40

Technical Apparatus Builders, 109GB Liberty St., New York 6, N.Y., 2, 4, 5, 15, 17, 20, 35, 37, 40

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Tel: RECTOR 2-6249

Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 4

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Tel: OWens 8-4800

Telectro Industries Corp., N.Y., 2, 4, 5, 15, 17, 20, 25, 30, 35, 37, 40

Telephonics Corp., N.Y., 35

Television Utilities Corp., N.Y., 2, 4

Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 2, 4, 17, 20, 35, 40

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Tel: MIDway 6-7211

Tel-Instrument Electronics Corp., N.J., 2, 20, 37

Temco Aircraft Corp., Electronics Div., Texas, 2, 4, 5, 15, 35

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61. Power Supplies.

Terado Company, 1065 Raymond Ave., St. Paul 8, Minn., 4, 15
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Tel: MIDway 6-2514

Tesla Electric Co., Ill., 2, 4, 5, 15, 20, 37, 40

Texas Instruments, Incorporated, Semiconductor—Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Texas, 35
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Tel: FLEetwood 7-5411

Texas Instruments, Incorporated, Houston, Texas, 4, 15

Thermador Electrical Mfg. Co., Calif., 2, 4, 5, 15, 17, 20, 35, 37, 40

Thompson-Ramo-Wooldridge, Inc., Tapco Group, Ohio, 2

Thordarson-Meissner, Ill., 2, 4, 35, 40

Topping Electronics, Ltd., Canada, 2, 4, 35

Torotel, Inc., Mo., 35, 40

Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 2, 4, 15, 17, 37, 40
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Tel: ELizabeth 4-5650

Trans Electronics, Inc., Calif., 2, 4, 5, 15, 20, 35, 37, 40

Transformer Technicians, Inc., Ill., 2, 4, 15, 17, 20

Transformers, Inc., N.Y., 17

Transistor Devices, Inc., N.J., 2, 4, 5, 15, 20, 35, 37, 40

Transonic, Inc., Calif., 2, 4

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Turner & Co., Calif., 2, 4, 15, 40

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Universal Electronics Company, Calif., 4, 15, 20, 35, 40

Universal Transistor Products Corp., N.Y., 2, 4, 5, 15, 17, 20, 35, 37, 40

Valor Electronics, Inc., Calif., 4, 20, 35, 37, 40

Varian Associates, Instrument Div., Calif., 4, 25, 40

Varo Mfg. Co., Inc., Texas, 2, 4, 5, 15, 17, 35, 40

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Vickers, Inc., Electric Products Div., Mo., 2, 4, 17, 40

Victoreen Instrument Co., Calif., 2, 4, 15, 20, 35, 40

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 2, 5, 37, 40
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Tel: ENDicott 1-6200

Video Instruments Co., Inc., Calif., 7, 15, 35, 37, 40

Vinco Electronics Corp., Conn., 4, 15, 20, 37, 40

Virginia Electronics Co., Inc., D.C., 2, 4, 5, 15, 20, 37

Visual Electronics Corp., N.Y., 4, 40

Vitro Labs., Silver Spring Lab., Md., 35, 40

Waldorf Instrument Co., Huyck-Sons Div., N.Y., 2, 4, 15, 35, 40

Wallson Assoc., Inc., 35 E. Runyon St., Newark 8, N.J., 2, 4, 5, 15, 17, 35, 40
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Tel: TALbot 4-2600

Warren Mfg. Co., Inc., Mass., 2, 4, 15, 17, 35

Wave Particle Corp., Calif., 5, 25

Weinschel Engrg. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 25
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Tel: LOKwood 4-0121

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Westinghouse Corp., Pa., 2, 4, 35

Wheeler Elect. Corp. Div.-Sperry Corp., Conn., 2, 15, 17, 20, 35

Wickes Engineering & Construction Co., N.J., 2, 4, 15, 17, 35, 40

Wincharger Corp., E. Seventh & Division Sts., Sioux City 2, Iowa, 2, 4, 15, 30, 35
See ad on page 256
Tel: 2-1844

Power tubes: See class 76

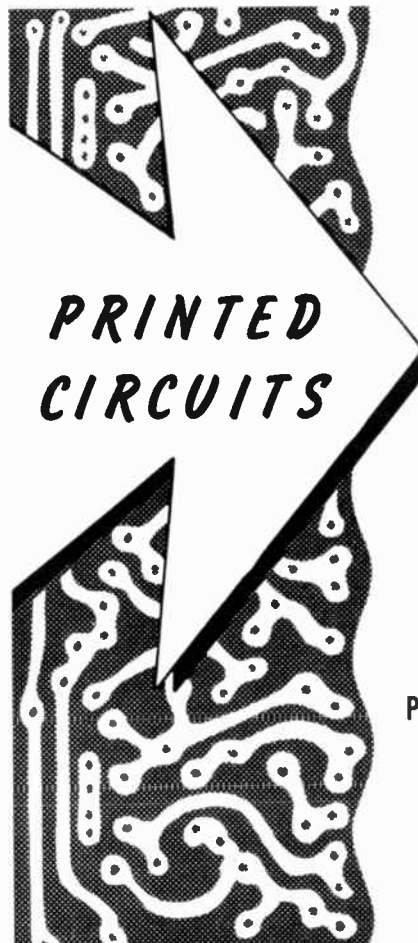
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ACF Electronics, Va., 5
A.R.F. Products, Inc., Ill., 3, 5, 8
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Aerolite Electronics, Co., N.J., 8, 10
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Bayonne, N.J., 8

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Tel: HEmlock 6-2230

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Amelco, Inc., Calif., 3, 5, 7, 10

Amerace Corp. Gavitt Wire & Cable

Co., Div., Mass., 3, 7, 8, 10

American Missile Products, Calif., 3, 5,
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American Printed Circuits Co., N.J., 3

Anchor Specialty Mfg. Co., Inc., N.J.,
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Ansley Mfg. Co., Arthur, New Hope,
Pa., 3, 5, 7, 8, 10, 15

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Tel: AXtel 7-2711

Applegate & Co., C. J., 1840 24th St.,
Boulder, Colo., 7, 8, 10

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Tel: HILLcrest 2-8750

Artronic Instrument Co., Md., 7, 8

Avionics Ltd., Canada, 3, 7, 10, 15

B. J. Electronics, Borg-Warner Corp.,
Calif., 5, 7, 8, 15

Becks, Inc., Minn., 3, 5, 7, 10

Bel Fuse, Inc., 197 Van Vorst St., Jer-
sey City, N.J., 5

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Tel: HEnderson 2-0463

Bendix Aviation Corp., Bendix Radio
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Buckbee Mears Co., Minn., 3

Bulova Watch Co., Electronics Div.,
Dept. A-1376, 40-06 62nd St., Woodside
77, N.Y., 5

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Tel: NEwtown 9-5700

Bureau of Engraving Inc., Industrial
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CG Electronics Corp., N.M., 3, 7, 8

C & K Components, Inc., Mass., 5, 8

Camden Electronics, Inc., N.J., 3, 10, 15

Canadian Aviation Electronics, Ltd.,
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Centralab, Div. of Globe-Union Inc., 920
E. Keefe Ave., Milwaukee 1, Wis., 5, 7,
8, 10

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Tel: WOOdruff 2-9200

Consult the advertisements in this
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Chicago Dynamic Industries, Inc., 1725
Diversey Blvd., Chicago 14, Ill., 10

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Tel: WE 5-4500

Cinch Mfg. Co., 1026 S. Homan Ave.,
Chicago 24, Ill., 3, 7

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Tel: NEvada 2-2000

Cinch Mfg. Co., Graphic Circuits Div.,
Calif., 3, 5, 7, 8, 10, 15

Circon Component Corp., Santa Barbara
Municipal Airport, Goleta, Calif., 3,
10

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Tel: WOODland 7-1113

Comptron Corporation, Mass., 7

Concord Control, Inc., 1282 Soldiers
Field Rd., Boston 35, Mass., 5, 7, 10

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Tel: ALgonguin 4-5106

Corning Glass Works, 550 High St.,
Bradford, Pa., 3, 5

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Tel: 2-4571

Croname Inc., Ill., 3

Cudren & O'Connor Co., Ill., Silk
Screen Inks

Dale Products, Inc., 1318 28th Ave., Co-
lumbus, Neb., 3, 10

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Tel: LOfust 4-3131

Danly Machine Specialties, Inc., Ill., 3,
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Daven Co., N.J., 3, 5, 7, 8, 10, 15

Defiance Printed Circuit Corp., 81 Al-
bion St., Wakefield, Mass., 3

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Tel: CRYstal 6-5311

Delta-F, Inc., Ill., 7, 8

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Digital Equip. Corp., Mass., 5, 7, 10

Double E Prod. Co., Calif., 8

Dwyer Engrg. Co., Inc., Airport Rd.,
Nashua, N.H., 3, 10

See ad on this page

Tel: TUXedo 3-3206

EPR Special Products Corp., N.Y., 10

Eaton Electronics Corp., Conn., 3, 7, 8,
10, 15

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DWYER ENGINEERING COMPANY, INC.
Airport Road Nashua, New Hampshire TUXedo 3-3206

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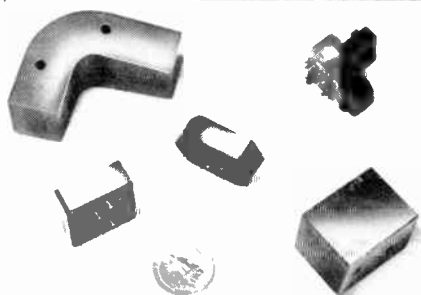
Directory II. Components

62. Printed & Packaged Circuits.

Eby, Inc., Hugh H., Pa., 10
 Ehrenpreis, Consulting Engrg., David, N.Y., 5
 Elco Corp., Pa., Card Cage
Electralab Printed Electronics Corp., 9 North Ave., Natick, Mass., 3
 See ad on page 504
 Tel: **OLympic 5-0070**
 Electro-Chemical Engraving Co., Inc., N.Y., 3, 15
 Electro Precision Corp., Ark., 3
 Electro Tec Corp., N.J., 8
 Electrol, Inc., Calif., 5, 7
 Electromation Co., Calif., 7
 Electronic Assembly Co., Inc., Mass., 10, 15
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Electronic Cable Corp., 126 Jackson St., Cambridge 40, Mass., 5, 8
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 Tel: **TRowbridge 6-7250**
 Electronic Plastics Co., Calif., 3, 5, 7, 8, 10, 15
 Electronic Techniques, Inc., Calif., 5
 Electronics, Inc., Pa., 3, 10, 15
 Emerson & Cuming, Inc., Mass., 8
 Emerson Electric Mfg. Co., Mo., 7, 8, 10
 Engineered Electronics Co., Calif., 7, Diode Plug-In
 Epsco, Inc., Mass., 5, 7, 8, 10

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 3, 5, 7, 8, 10, 15
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 Tel: **GLendale 6-8592**
 Etched Products Corp., N.Y., 3
 Etching Co. of Calif., Calif., 3, 5, 7, 8, 10, 15
 Fabra-Print, Inc., Minn., 3
 Ferranti-Packard Electric Ltd., Canada, 5, 7
 Ferrotran Electronics Co., N.Y., 7, 8, 10
 Filtron Co., Inc., N.Y., 8
 First Electronics Corp., Mass., 8
 Gates Radio Co., Ill., 3
 Gayitt Wire & Cable Co., Amerace Corp., Div., Mass., 3, 7, 8, 10
 General Applied Science Labs., Inc., N.Y., 3, 5, 7
 General Automatics, Inc., Calif., 5, 7, 10
General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50, Syracuse, N.Y., 5, 7, 8
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 Tel: **GRanite 6-4411**
 General Electric Co., Ltd. of England, England, 3, 8, 10
 General Electronics Co., Inc., Ala., 3, 10
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Glass Products Co., See: Scientific Components, Inc.
 Globe Electrical Mfg. Co., Calif., 3, 7, 10
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 Gregg Electric Mfg. Co., Inc., Mass., PC Solder Tip Kit
 Gulton Industries, Inc., N.J., 3, 5
 Gulton Industries, Inc., N.M., 5, 7, 8, 10
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Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 5, 7
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 Tel: **UNiversity 9-9850**
 Hoover Electronics Co., Md., 3, 8, 10
 Instant Circuits Div. of Alfred W. Barber Labs., N.Y., 7
 Insulated Circuits, Inc., N.J., 3, 7, 8, 10, 15
 International Crystal Mfg. Co., Inc., Okla., 10
 Jack & Heintz, Inc., Ohio, 8, 10
 Jodon, Inc., F. R., D.C., 5, 7, 8, 10
Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 3, 7
 See ad on pages 48-49
 Tel: **NEvada 2-2000**
 Keil Engrg. Prods., Inc., Mo., 3



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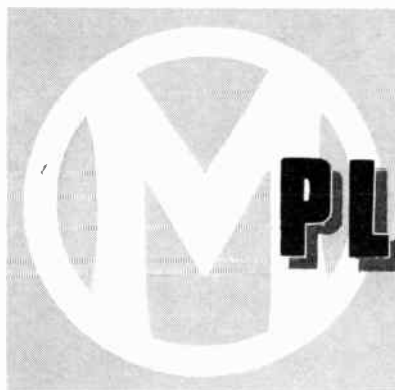
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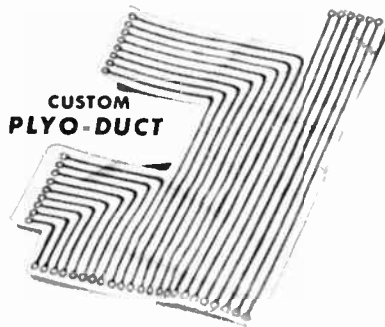


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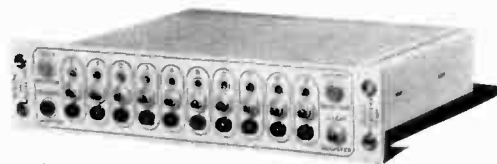
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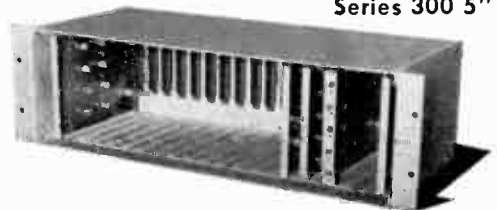
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Series 100



19" Relay Rack Housing
with new
Series 300 5" x 6" modules



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Now — utilizing these system blocks, the pulse generating and programming demands of all projects involving switching transistor circuits up to 200KC are quickly satisfied. Creative engineering by NAVCOR has produced units that can be readily interconnected by back panel patch-board plugs to build-up complete data handling systems.

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Directory II. Components

62. Printed & Packaged Circuits.

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 Key Resistor Corp., Calif., 5, 8
 La Pointe Industries, Inc., Conn., 3, 5, 7, 8, 10, 15
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 Lambda-Pacific Engr., Inc., Calif., 3, 10, 15
 Laminated Sheet Products Corp., Mass., 10
 Landsverk Electrometer Co., Calif., 8, 10
 Life Instrument Co., Inc., Mass., 7, 8
 Link Aviation, Inc., N.Y., 7, 10
Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 10
 See ad on page 66
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M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 3, 8, 10
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 Tel: GRamercy 3-5899
 MacLaren & Co., F. B., N.Y., 7, 8
 Magnasync Mfg. Co., Ltd., Calif., 3, 7
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Magnetics Research Co., Inc., 255 Grove St., White Plains, N.Y., 5, 7, 8, 10
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 Manger Electric Co., Conn., 8
 Marquardt Aircraft Co., Pomona Div., Calif., 5, 7, 8, 10
 Martin Co., Baltimore Div., Md., 3, 5, 7, 8, 10, 15
 Mayberry Electronics Co., Calif., 5, 7, 8
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 Tel: UUnderhill 7-9600
 Micarta Fabricators, Inc., Ill., 5, 7, 10
 Milgo Electronic Corp., Fla., 7
Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5
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 Molded Insulation Co., Pa., 3, 5, 10
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Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., 3
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 Tel: PRescott 9-8866
 N Y T Electronics, Inc., Calif., 5, 7, 8
 Northern Plastics Corp., Wis., 3, 7
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Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 7, 10
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 Tel: HO 8-1681
 Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 7, 8
 See ad on page 499
 Tel: WOrth 6-0380

Oppenheimer Plastics, Inc., Pa., 3, 5, 7, 8, 10
Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 3, 5, 7, 8
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 Tel: BRadshaw 2-6141
 Pan-Air Electronics Corp., Calif., 3, 5, 7, 8, 10, 15
 Paraplegics Mfg. Co., Inc., Ill., 10, 15
 Patterson Moos Div. of Universal Winding Co., N.Y., 3
 Philbrick Researches, Inc., George A., Mass., 3, 7
Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, L.I., N.Y., 3, 5, 10, 15
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 Tel: ORiole 6-8000
 Pickett & Eckel, Inc., Calif., 3, 5, 7
Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 10
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 Tel: CANal 6-7250
 Plastics & Electronics Corp., N.Y., 5, 7, 8, 10
 Polyphase Instrument Co., Pa., 5, 8
 Precision Circuits, Inc., N.Y., 3, 5, 7, 8, 10, 15
Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 10
 See ad on page 390
 Tel: WESTmore 9-8900

Printed Electronics Corp., Mass., 3, 7, 10, 15
 Quality Name Plate, Inc., N.J., 3, 10
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Radio Corp. of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 5
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 Reeves Instrument Corp., N.Y., 7
 Regent Controls, Inc., Conn., 7, 8
 Republic Electronic Indust. Corp., N.Y., 10
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 Rho Engr. Co., Calif., 3, 8, 10
Rixon Electronics, Inc., 2414 Reddie Dr., Silver Spring, Md., 3, 5, 7, 8, 10
 See ad on page 525
 Tel: LOKwood 5-4578
 Rogers Corp., Conn., Molded
 Ross Metals Co., Milton, Pa., 5, 7, 8, 10
 Rowe Engraver, N.J., 3
 Sanders Assoc., Inc., N.H., 3, 5, 7, 8

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 7385 St. Lawrence Boulevard
 Montreal 16, Quebec, Canada

SOUTHEAST
 Don J. Phelps
 1401 Ceylon Drive
 Orlando, Florida

SOUTHWEST
 Packard Associates
 404 Lovefield Air Terminal Bldg.
 Dallas 35, Texas

CHICAGOLAND
 Ringland M. Krueger
 5306 West Lawrence Avenue
 Chicago 30, Illinois

NEW YORK
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 Williston Park, N.Y.

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You can have the world's largest and most flexible printed-circuit manufacturer at your serv-

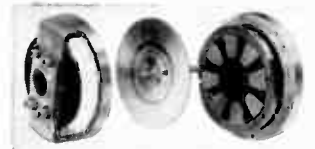
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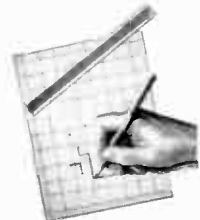
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From penciled sketch to finished board, PC's Master Circuit System is a production short-cut . . . a one-step method for faster delivery and lower costs. You pencil the configuration you want, select the "catalogued" tolerances, plating and base materials from the prepared list and PC does the rest . . . without tool charges . . . without costly art work.

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printed circuits without costly art



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mass-produced precision resistors



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fast service on prototypes



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See ad on this page
Tel: WOODLAND 6-1585

Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 7, 8
See ad on page 538
Tel: WOODLAWN 5-2341

Sibley Co., Conn., 3, 10

Solatron, Inc., Mass., 5, 7, 8, 10

Sound Devices, Inc., N.Y., 10

Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 7, 8, 10

Sprague Electric Co., Mass., 5, 7, 8, 10

Stelma, Inc., Conn., 3, 7, 15

Stereotronics, Inc., Mass., 3, 7, 8

Sylvania Electric Products, Inc., Sylvania Electronic Systems Div., Mass., 3, 10, 15

Systems, Inc., Fla., 5, 7

Techniques, Inc., N.J., 3, 10

Technitrol Engineering Co., Pa., 7, 10

Technology Instrument Corp., 535 Main St., Acton, Mass., 5
See ad on page 539
Tel: COLONIAL 3-7711

Techron Corp., Mass., 3

Teledrome Mfg. Corp., N.Y., 5, 7, 8

Telectro Industries Corp., N.Y., 3, 5, 7, 8, 10, 15

Telegraph Condenser Co., England, 3, 15

Telex, Inc., 1633 Eustis St., St. Paul 1, Minn., 5, 7, 8
See ads on pages 466, 569
Tel: MIDWAY 6-7211

Temco Aircraft Corp., Electronics Div., Texas, 3, 5, 7, 10

Tingstol Company, Ill., 3, 7

Topper Mfg. Co., Inc., N.Y., 7, 8

Trepac Corp. of America, N.J., 5, 7, 10

Tri-Point Plastics, Inc., N.Y., 10

Twin City Metal Seal Corp., Minn., 3

Twin Lock, Inc., Calif., 7

Ucinite Co., Div. of United-Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 10
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Tel: LASALL 7-8400

Ultradyn, Inc., N.M., 5

United States Chemical Milling Corp., Calif., 3, 7, 10

Vector Associates, Inc., N.Y., 15

Vinson Co., E. R., Calif., 3, 10

Vitro Laboratories, N.J., 5, 7

Walkirt Co., Calif., 5, 7, 8

Wheeler Elect. Corp. Div.-Sperry Corp., Conn., 5, 7, 8, 10, 15

Zephyr Products Co., N.Y., 10

Prongs, vacuum tube: See class 99

Pulse transformers: See class 73

Rack panels, relay: See class 81

Racks: See class 84

Radar receivers: See class 25

Radar transmitters: See class 25

Receivers, airborne & airport: See class 1

Receivers, amateur: See class 2

Receivers, broadcast: See class 6

Receivers, facsimile: See class 11

Receivers, microwave: See class 18

Receivers, mobile: See class 20

Receivers, point-to-point: See class 24

Receivers, radar: See class 25

Receivers, single sideband: See class 29

Receivers, telemeter: See class 34

Receivers, television: See class 6

Recording equipment: See class 27

63. Recording Accessories.

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| 5. Blank disks | 30. Magnetic recording tape-paper base |
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| 15. Cutting styl | 50. Tape splicing equipment |
| 17. Demagnetizers | |
| 20. Magnetic recording, playback & erase heads | |
| 25. Magnetic recording tape-acetate base | |

Advance Electronics Co., Mass., 17

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Ampex Audio, Inc., Calif., 17

Annis Co., R. B., Ind., 17, Magnetizer

Astatic Corp., Ohio, 20, 25

Audio Devices, Inc., N.Y., 5, 15, 17, 25, 30

Audiotex Mfg. Co., Div. of G-C Textron, Inc., 412 S. Wyman St., Rockford, Ill., 50
See ad on page 474
Tel: WOODLAND 8-9661

Audio-Video Corp., N.Y., 5, 15, 17, 20, 25, 50

Bingham Magnetic Industries, Inc., N.Y., 20

Bryant Computer Products Div., Vt., 20

Burroughs Corp., Electrodata Div., Calif., 25

Components Corp., N.J., 10

Cordover & Co., Carl, N.Y., Cleaning Cloths, Tone Arm Brushes, Covers

Cousino Inc., Ohio, 25, 50

Duotone Co., Inc., N.J., 5, 10, 15, 25

Dyna—Empire, Inc., 1075 Stewart Ave., Garden City, L.I., N.Y., 17
See ad on page 295
Tel: PIONEER 1-2700

Electromation Co., Calif., 17, 50

Electrovox Co., Inc., N.J., 15

Engineered Sound Systems Ltd., Canada, 20

Fairchild Recording Equip. Corp., N.Y., 10

Fidelitone, Inc., Ill., 15, 25, 35

Fort Wayne Metals Inc., Ind., 35

General Aniline & Film Corp., Ansoco Div., N.Y., Recording Film

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| | Audio | Push-Pull | Switch | Power Supply | Collector Voltage Vce (a) | Collector Current Ic | Thermal Resistance (b) | Junction Temp. Tj | Current Gain | | Circuit Gain db | Power Output W |
| | | | | | | | | | hFE | Ic Adc | | |
| High Power Transistors (g) | | | | | | | | | | | | |
| 2N155 | X | | | | 30 Vcb | 3 Adc | 3° C/W | 85°C | 40 (c) | 0.5 | 33 | 2 |
| 2N176 | X | | | | 40 Vcb | 3 | — | 90 | 45 (c) | 0.5 | 35 | 2 |
| 2N234A | X | | | | 30 | 3 | 2 | 90 | 25 (c) | 0.5 | 30 | 2 |
| 2N235A, B | X | | | | 40 | 3 | 2 | 90 | 40, 60 (c) | 0.5 | 33, 36 | 2 |
| 2N236A, B | X | | | X | 40 | 3 | 2 | 95 | 40, 60 (c) | 0.75 | 33, 36 | 4 |
| 2N242 | X | | | | 45 Vcb | 2 | 3 | 100 | — | — | 35 | 1 |
| 2N255 | X | X | | | 15 Vcb | 3 | 3 | 85 | 40 | 0.5 | 22 | 1 |
| 2N256 | X | X | | | 30 Vcb | 3 | 3 | 85 | 40 | 0.5 | 25 | 2 |
| 2N257 | X | | | | 40 | — | — | 85 | 55 (c) | 0.5 | 35 | 1 |
| 2N268, A | X | | X | | 80 Vcb | — | — | 85, 90 | —, 40 | —, 2.0 | 31, — | 1, — |
| 2N285A | X | | | X | 40 | 3 | 2 | 95 | 150 (c) | 0.5 | 40 | 2 |
| 2N297 | | | X | | 60 Vcb | 5 | 2 | 95 | 70 | 0.5 | — | 50 (d) |
| 2N301, A | X | | | | 40, 60 Vcb | 3 | — | — | 63 (c) | 0.7 | 33 | 3 |
| 2N307, A | X | | | | 35 Vcb | 1, 2 | 5, 3 | 75 | 80 | 0.2 | —, 27 | —, 1 |
| 2N399 | X | X | | | 40 | 3 | 2 | 90 | 40 (c) | 0.75 | 33 | 8 (e) |
| 2N400 | X | | | X | 40 | 3 | 2 | 95 | 50 (c) | 1.0 | 36 | 6 |
| 2N401 | X | X | | | 40 | 3 | 2 | 90 | 40 (c) | 0.5 | 30 | 5 (e) |
| 2N418 | | | X | X | 80 | 5 | 2 | 100 | 50 | 4.0 | — | 100 (d) |
| 2N419 | | | X | X | 45 | 3 | 2 | 95 | 60 (c) | 0.5 | — | 5 |
| 2N420, A | | | X | X | 40, 70 | 5 | 2 | 100 | 50 | 4.0 | — | — |
| 2N637, A, B | X | | X | X | 40, 70, 80 | 5 | 2 | 100 | 45 | 3.0 | — | 35, 70 (d) |
| 2N638, A, B | X | | X | X | 40, 70, 80 | 5 | 2 | 100 | 30 | 3.0 | — | 35, 70 (d) |
| 2N639, A, B | X | | X | X | 40, 70, 80 | 5 | 2 | 100 | 23 | 3.0 | — | 35, 70 (d) |
| 2N677, A, B, C and 2N1029, A, B, C replaced by 2N1031, A, B, C | | | | | | | | | | | | |
| 2N678, A, B, C and 2N1030, A, B, C replaced by 2N1032, A, B, C | | | | | | | | | | | | |
| 2N1031, A, B, C | X | | X | X | 30, 40, 70, 80 | 15 | 1.5 | 100 | 40 | 10.0 | — | 75, 125, 250 (d) |
| 2N1032, A, B, C | X | | X | X | 30, 40, 70, 80 | 15 | 1.5 | 100 | 75 | 10.0 | — | 75, 125, 250 (d) |
| 2N1073, A, B (i) | X | | X | | 40, 80, 120 | 10 | 2.0 | 100 | 40 | 5.0 | — | 100, 150, 200 (d) |
| 2N1136, A, B | X | | X | X | 40, 70, 80 | 5 | 2.0 | 100 | 75 | 3.0 | — | 35, 70 (d) |
| 2N1137, A, B | X | | X | X | 40, 70, 80 | 5 | 2.0 | 100 | 115 | 3.0 | — | 35, 70 (d) |
| 2N1138, A, B | X | | X | X | 40, 70, 80 | 5 | 2.0 | 100 | 150 | 3.0 | — | 35, 70 (d) |
| B-177 | X | | | X | 30 | 3 | 2.2 | 90 | 150 (c) | 0.5 | 39 | 2 |
| B-178 | X | | | | 30 | 3 | 2.2 | 90 | 40 (c) | 0.5 | 33 | 2 |
| B-179 | X | | | | 40 | 3 | 2.2 | 90 | 25 (c) | 0.5 | 28 | 2 |
| Medium Power Transistors (h) | | | | | | | | | | | | |
| 2N1008, A, B | X | X | X | | 20, 40, 60 | 300mA | 0.15°C/mW | 85 | 95 (c) | 10mA | — | 400mW (f) |
| 2N1176, A, B | X | | X | | 20, 40, 60 | 300mA | 0.20°C/mW | 85 | 50 (c) | 10mA | — | 300mW (f) |
| Military Types | | | | | | | | | | | | |
| 2N297A (g) | X | | X | X | 50 | 5 | 2.0 | 95 | 70 | 0.5 | — | 35 (f) |
| 2N331 (h) | X | | X | | 30 Vcb | 200mA | 0.15°C/mW | 85 | 50 (c) | 1.0mA | — | 400mW (f) |
| 2N1011 (g) | X | | X | X | 70 | 5 | 2.0 | 95 | 55 | 3.0 | — | 70 (d) |
| 2N1120 (g) | X | | X | X | 70 | 15 | 1.5 | 95 | 35 | 10.0 | — | 250 (d) |

(a) Vce except where noted. Equivalent Vcb's are 20-50% higher. (b) Collector dissipation is the difference between the maximum junction temperature and the mounting base temperature divided by the thermal resistance. (c) hfe, AC current gain. (d) Square wave output power. (e) Push-pull output. (f) P_c—Maximum collector dissipation 25°C. (g) TO-3 package. (h) TO-9 package. (i) Diffused-Alloy-Power DAP transistor.

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|-------------|--------------------|---------|-------------------|-------------|--------------------|---------|-------------------|-------------|--------------------|---------|-------------------|
| 1N536 | 0.75 | 50 | 10 uAdc (At 25°C) | 1N1434 | 30 | 50 | 5 mAdc (At 150°C) | 1N1612 | 5 | 50 | 1 mAdc (At 150°C) |
| 1N537 | 0.75 | 100 | 10 uAdc | 1N1435 | 30 | 100 | 5 mAdc | 1N1613 | 5 | 100 | 1 mAdc |
| 1N538 | 0.75 | 200 | 10 uAdc | 1N1436 | 30 | 200 | 5 mAdc | 1N1614 | 5 | 200 | 1 mAdc |
| 1N539 | 0.75 | 300 | 10 uAdc | 1N1437 | 30 | 400 | 5 mAdc | 1N1615 | 5 | 400 | 1 mAdc |
| 1N540 | 0.75 | 400 | 10 uAdc | 1N1438 | 30 | 600 | 5 mAdc | 1N1616 | 5 | 600 | 1 mAdc |
| 1N547 | 0.75 | 600 | 10 uAdc | | | | | | | | |

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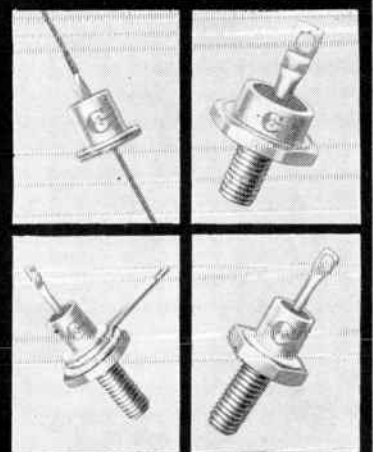
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7. Copper sulfide
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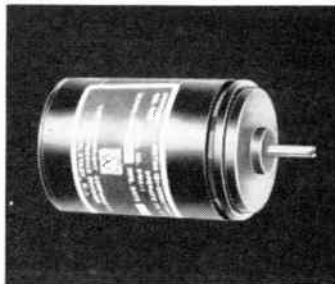
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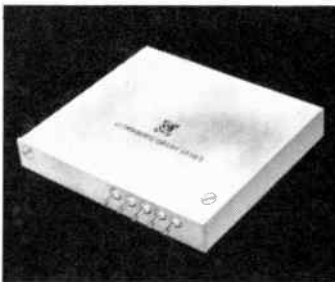
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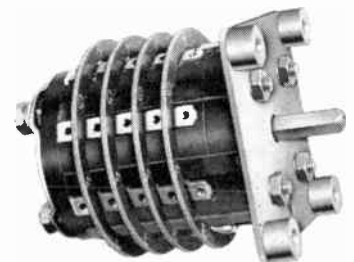
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Dietz Co., Inc., Henry G., N.Y., 65
Dominion Electrohome Industries, Ltd., Canada, 80
Durakool, Inc., Ind., 45

FILTORS, INC.

LEADING MANUFACTURERS OF HERMETICALLY SEALED ROTARY MICRO AND SUB-MINIATURE RELAYS

NEW!

Filtors is first with a crystal can relay for AC operation! The new Powrmite[®] micro-miniature relay for AC operation is the smallest, lightest AC relay made today.



NEW!

Filtors is first with relays with a built-in arc suppressed coil. In the same micro-miniature size Filtors' Powrmite is also made with a built-in arc-suppressed coil to cut radio interference a minimum of ten to one. Available also in four and six-pole sub-miniature relays. Filtors arc suppressed relays increase life and reliability of associated circuitry.



NEW!

Filtors now manufactures the smallest, lightest four and six-pole sub-miniature relays for AC operation.



POWRMITE[®]

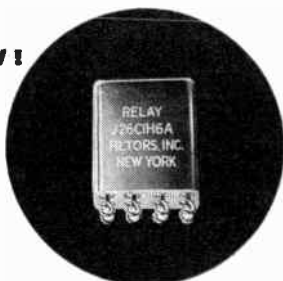
new MICRO MINIATURE relay by Filtors, leading specialists in development and manufacture of micro miniature relays.

SPECIFICATIONS:

| | |
|---------------------------|--|
| AMBIENT TEMPERATURE RANGE | -65°C. TO +125°C. |
| DIELECTRIC STRENGTH | 1000 VOLTS (750 VOLTS BETWEEN OPEN CONTACTS). |
| INSULATION RESISTANCE | 10,000 MEGOHMS MINIMUM AT 25°C. |
| CONTACT ARRANGEMENT | 2C (2 POLE DOUBLE THROW). |
| CONTACT RATING | 2 AMPS RESISTIVE AT 28 VOLTS DC OR DRY CIRCUITS. |
| SHOCK | 100 Gs 11 MILLISECONDS. |
| VIBRATION | 10-55 CPS AT .06 AMPLITUDE. 55-2000 CPS AT 30 G. |
| PICK-UP TIME | 5 MILLISECONDS MAXIMUM AT NOMINAL COIL VOLTAGE, 25°C. TEMPERATURE. |
| RELEASE TIME | 5 MILLISECONDS MAXIMUM. |
| NOMINAL COIL VOLTAGE | 26.5 VOLTS DC. |
| COIL RESISTANCE | 550 OHMS ± 10% AT 25°C. |
| ALTITUDE | 70,000 FEET |
| DUTY | CONTINUOUS. |
| PICK-UP | RELAY SHALL PICK-UP WHEN COIL VOLTAGE IS 18 VOLTS DC MAX. |

NEW!

All types of Filtors Powrmite micro-miniature relays are now available in .2 grid space in all mounting styles; .2 grid space relays feature Filtors' new "Sensitork" motor, a Filtors development for greatest reliability and sensitivity.



GENERAL PURPOSE

precision manufactured under rigid quality control. Offers light-weight, rugged, compact construction for high environmental conditions. Applicable to instrument, geophysical, aircraft controls and many other circuits where high reliability and multiple switching are required. Available in 2 DPDT, 4 DPDT and 6 DPDT.



LATCHING

relay remains in "energized" position indefinitely without consuming power. As an overload relay it can be electrically reset from a remote position. Contacts can be closed by one circuit and opened by another. It has many applications in fail-safe circuits. Its small size, light weight and hermetically sealed enclosure make possible its use in airborne and other equipment. Either coil may be energized continuously without damage to the relay.

It affords the designer great latitude in circuitry, particularly in "lock-up" circuits, e.g., where the contacts of one conventional relay are used to lock-up the coil of another relay. Thus it avoids redundancy. Available in 2 DPDT, 4 DPDT and 6 DPDT.



5/8 INCH STYLE

A rugged 2 pole double throw relay of small size and weight designed for high reliability under extreme conditions. Available with either 2 amp or dry circuit contacts.

Write for complete catalog

FILTORS, INC.

MAIN OFFICE AND PLANT: Port Washington, N. Y., PORT WASHINGTON 7-8220, WEST COAST OFFICE: 13273 Ventura Blvd., Studio City, Cal., STANLEY 3-2770

Directory II. Components

66. Relays.

EMI—Cossor Electronics Ltd., 301 Windsor St., Woodside, Halifax, N.S., Canada, 5

See ad on page 412
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See ad on page 345
Tel: ORange 3-6800

Elastic Stop Nut Corp. of America, AGA Div., Dept. A33-86, 1027 Newark Ave., Elizabeth 3, N.J., 80

See ad on this page
Tel: ELizabeth 2-2900

when every second counts ...
... count on
THERMAL
time delay
RELAYS



by **DIALCO**



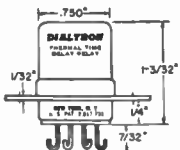
ACTUAL SIZE

Hermetically Sealed

Rugged—built to meet conditions of
high altitude
high vibration
high temperature

DIALCO RELAYS exhibit no resonance from 5 to 1,000 CPS at 10 G's; are not damaged by 50 G's shock; are fully compensated for temperatures from -65° C to +125° C.

Available in delays from 1 to 300 seconds; heater voltages up to 150 V. interchangeable on DC or AC of any frequency with a power drain of 4 watts. SPST normally open or normally closed contacts are rated at 6 amps at 115 V. AC or 3 amps at 28 V. DC resistive.



SUB-MINIATURE

Lightweight (3/4 oz.)
Standard 7-pin plug-in or solder terminals with mounting flange

Dialtron Corp., 203 Harrison Pl., Brooklyn 37, N. Y.

Send data on Thermal Time Delay Relays to:

Name _____
Position _____
Company _____
Address _____

DIALTRON
CORP.
203 Harrison Pl., Brooklyn 37, N. Y.
HYacinth 7-7600

For details, circle #494 on Reader Service Card

ELGIN-ADVANCE RELAYS

—for aircraft, missile and industrial use

ELGIN-ADVANCE is the relay source you can depend on to meet your manufacturing requirements now and to help you keep ahead in new product development for tomorrow.

New and expanded research programs assure constantly improved performance and reliability in the design of high performance, precision type relays.



ADVANCE RELAYS



A PRODUCT OF ELECTRONICS DIVISION
ELGIN NATIONAL WATCH COMPANY
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Now!

get complete data on

MINIATURE AGASTAT® time / delay / relays



This free folder contains complete specs on 24 models of the miniature AGASTAT Time Delay Relay for missile, aircraft, computer, electronic and industrial applications. They're small as 1-13/16" x 4-7/16" x 1 1/2", with adjustable timing ranges starting at .030 and as high as 120 seconds.

The folder gives operating and environmental specs, coil data, contact capacities, dimensions, diagrams of contact and wiring arrangements. *Write:* Dept. A33-86.



ELASTIC STOP NUT CORPORATION OF AMERICA

Elizabeth, New Jersey

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

For All
ELECTRONIC SYSTEMS,
APPLICATIONS: AIRBORNE
or GROUND-BASED

the A. W. HAYDON COMPANY

offers a complete line of
TIMING DEVICES

ALTERNATING AND DIRECT CURRENT
ELECTRO MECHANICAL AND ELECTRONIC TIMING DEVICES

Tough & Tiny
Sub-Miniatures
Rugged & Reliable
Electronics
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PRECISION TIMING MOTORS

Repeat Cycle Timers
Time Delay Relays
Stop Clocks
Intervalometers
Coding Devices

REPEAT CYCLE TIMERS

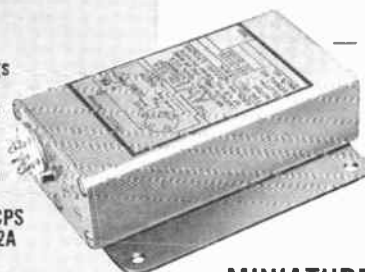
- 3" long (Typical)
- 6½ ounces basic
- 1-8 switches (Standard)
- Cycle Time 5 sec to 90 Min.
- Loads to 5 Amperes

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AWH RC-301



SUB-MINIATURE ELECTRO-MECHANICAL TIMING DEVICES

- Features
Hermetically
Sealed Housings
¼ Size
— ½ Weight
of Standard
Designs
1 x 2
Cross-Section
DC, 60 or 400 CPS
Meet MIL-E-5272A



TIME DELAY RELAYS

- 3" long (Typical)
- 7½ ounces basic
- 1-3 switches (Standard)
- Time Delays
- 25 Sec. to 3 Hours
- Loads to 5 Amperes

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AWH TD-502

ELAPSED TIME INDICATORS

- Sub-Miniature — Hermetically Sealed
- 1¼" Diameter — 2¾" Long (max.)
- 3 Watts maximum power
- Digital or Dial Type
- 60 cps & 400 cps models cataloged
- DC Models Available
- Meet MIL-E-5272A
MIL-M-7793B

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400 cps models
AWH ET-603 describes
60 cps models



MINIATURE TIMING MOTORS

- Compact — High Performance
- 60 or 400 Cycle AC
- 15/16" Diameter — 1 7/32" long
- Direct Current
- 13/16" Diameter — 1 11/32" long
- Submit problem statement with motor requirements for recommendations

ELECTRONIC TIME DELAY RELAYS

- Features
Hermetically Sealed
Housings
Variety of Circuits
Temperature to 250°F
Vibration to
2000 cps, 15 g
Meet MIL-E-5272A
Unique Transistorized
RC Time Constant
network
Time Delays 50
MS to 120 sec.

Miniature Series

- 1 7/16" x 1 21/32" x 2½" long
- 1-4 SPDT contacts
- Loads to 10 Amperes
- Weight — only 6 ounces
- 5½ Watts maximum power

Write for Bulletin
AWH TD-503



Sub-Miniature Series

- 31/32" x 1 3/16" x 2" long (max.)
- 1-2 SPDT contacts
- Loads to 8 Amperes
- Weight only 3 ounces
- 4 Watts maximum power

Write for Bulletin
AWH TD-504



ALSO AVAILABLE

A Complete Line of timing devices and instruments for Military, Commercial & Industrial Applications.

Write for specific literature or complete catalog.



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A. W. HAYDON Company

240 NORTH ELM STREET, WATERBURY 20, CONNECTICUT

CUSTOM DESIGN & MANUFACTURE OF ELECTRONIC AND ELECTRO-MECHANICAL TIMING DEVICES

'DIAMOND H' RELAYS



NEW . . . High Speed Polarized Relays

Fast action with freedom from bounce, plus high sensitivity and consistent operation with low distortion, are provided by small, rugged Series P Polarized Relays. SPDT, with two independent coils, they will handle over 1,000 pulses per second. Various coil resistances up to 5,000 ohms each coil. Contact ratings vary with switching speed but range from 60 MA to 2A with voltages to 120 AC or DC, dependent upon amperages employed.



Aircraft-Missile Series R & S Relays

Miniature, hermetically sealed 4PDT, Series R & S relays provide excellent reliability over their long service life. Electrically and physically interchangeable, the two series differ only in that Series S coils are separately sealed within the sealed cases, with organic matter eliminated from the switch mechanism for greatest reliability in dry circuits. Contacts MA to 10 A.



Special Mountings

Series R/S Relays are available with 10 standard mounting arrangements, plus a ceramic plug-in socket. MS-AN type connector mounting, illustrated at right, makes assembly, installation and field service extremely simple, while the connector provides a seal against moisture.



"Diamond H" engineers are prepared to work with you to develop variations on these relays to meet your specific requirements. Tell us your needs . . . by phone or letter.

THE HART MANUFACTURING COMPANY

265 Bartholomew Ave., Hartford 1, Conn.

Phone JACKson 5-3491

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66. Relays.

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Tel: VICTORIA 9-1446

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Tel: VALLEY Stream 5-6363

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KURMAN RELAYS

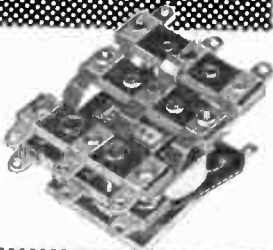
SUB-MINIATURE SENSITIVE RELAY

Series T



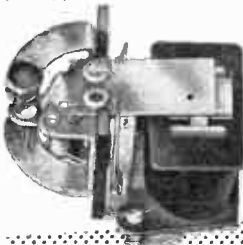
POWER RELAY

Series 26



POWERFUL SENSITIVE RELAY

Series 300



MIDGET SENSITIVE RELAY

Series 23



TELEPHONE RELAY

Series A

Immediate Delivery from Leading Distributors—
Kurman Sales Agencies

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Kurman Relays . . . hermetically sealed, dust covered and open . . . meet military specifications . . . interchangeable with other leading makes.

KURMAN ELECTRIC CO.

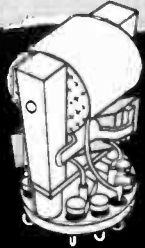
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relays designed especially for

VIBRATION and SHOCK

The rotary-balanced armature design of Hi-G relays assures efficient operation of these important components even under severe vibration and shock — up to 20 or 30G out to 2000 cps. By design, very little momentum is built up in moving parts. For more complete information on the complete line of Hi-G relays, send for New 1959 Hi-G CATALOG.



HI-G THE ONLY COMPLETE LINE OF ROTARY BALANCED RELAYS

Hi-G offers complete engineering and production facilities to manufacture relays for specific applications. Your inquiries are invited.



S & R TYPES



SL TYPES



SM TYPES



HI-G INC.,

BRADLEY FIELD/WINDSOR LOCKS, CONN.

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HILLBURN RELAYS

for Reliability—

Hillburn relays are the result of careful design, evaluation, and the thorough inspection, adjustment and testing of every completed product.

Your order for Hillburn relays assures you of a quality product, "on-time" delivery and reliable performance.

Hillburn manufactures relays to your special requirements plus a complete line, including:

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- Plate Circuit
- Industrial Control
- Printed Circuit
- Latching—Mechanical
- Latching—Magnetic
- Telephone
- Sensitive
- Stepping
- Antenna
- Power
- Plug-in

More than 25 types—over 500 variations to meet specific applications.

Write Dept. RE for catalog covering all relay types.

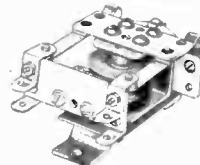
Since 1945



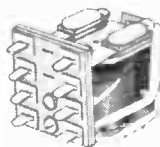
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Tel: STagg 2-3875, 6, 7



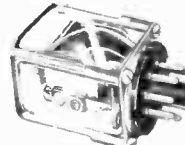
Series 500—Stepping Relay—Counter



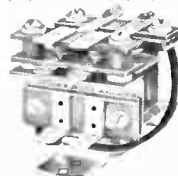
Series AM—Antenna



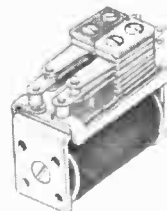
Series PC—Printed Circuit



Series GMP—Plug-In



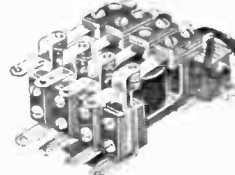
Series BG—Control



Series TA—Telephone



Series PS—Sensitive



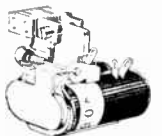
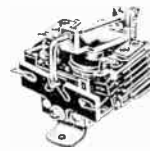
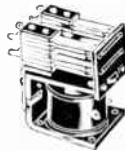
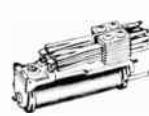
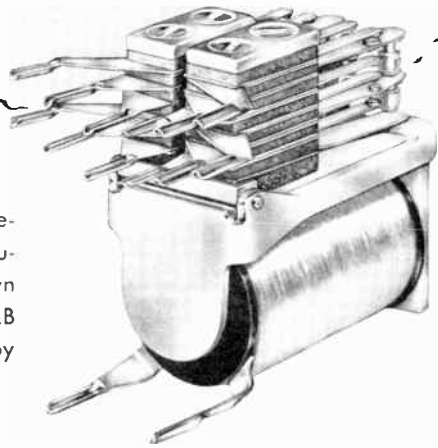
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PRODUCING SPECIAL RELAYS FOR
SPECIFIC NEEDS IS A P&B FORTE-
IN 26 YEARS WE HAVE DESIGNED
MORE THAN 20,000 VARIATIONS OF
57 BASIC RELAY TYPES- CHANCES
ARE, WE CAN SAVE YOU BOTH
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Let us have your toughest relay problems. Remember, designing, engineering and manufacturing relays is our sole business. Shown here are just a few of the broad line of P&B quality relays . . . the relays preferred by most engineers.



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Special and Standard

POLLAK CONTROLS

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- MINIATURE
- PLUNGERS FOR PUSH OR PULL

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OUR ENGINEERS CAN HELP SOLVE YOUR PROBLEMS

Take advantage of POLLAK engineering design service. Our factory-trained engineers are available to help you solve difficult relay, switching and electrical control problems.

WE INVITE YOUR INQUIRY

"50 Years of Progress"

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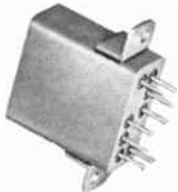
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75-95 Freeport Street
Boston 22, Mass.

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PRICE ELECTRIC

... Reliable Relays for Industrial and Military Use



MICRO-MINIATURE Style 6

Lightweight, crystal can type relay is simple, reliable and versatile. Ideal for miniaturized assemblies. Termination can be provided to meet most requirements.



SUB-MINIATURE Style 506

For Low Level Circuits and General Purpose use. Meets requirements of MIL-R-25018. Available with solder or plug type termination.



MINIATURE Style 520

A 6 PDT general purpose relay of simple design and high reliability. Available with isolated contact chamber for low level circuitry use. Meets the following MIL specifications and drawings: MIL-R-5757C, MIL-R-25018 (USAF), MS 24115-6 (USAF) Class B; Type II; Grade 3.



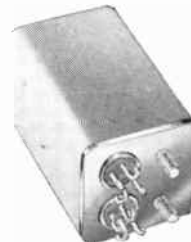
MULTIPOLE Series 2100

For military and commercial applications. Available in 2 frame sizes providing up to 6 PDT contact combinations. Available hermetically sealed.



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For communications and other circuit control applications. Available in any standard voltage to 115 VDC. Resists 15 G vibration through 500 cycles. Available hermetically sealed.



SENSITIVE Series 5340

1-inch square, hermetically sealed 1 or 2 Form C Contacts, 2 amps., 20 milli-watts per contact pole, 500-cycle vibration for military applications Temperature —65° C to 125° C.

Price Electric has a complete line of relays to meet your requirements. Write for literature and specifications.



Price Electric CORPORATION

For Immediate Service

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Relays—Class 66

Directory II. Components

66. Relays.

Marstan Electronics Corp., N.Y., 65, 70, 80

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Tel: ATtleboro 1-2800

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Oak Mfg. Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 25, 57, 65

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Tel: MOhawk 4-2222

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 25, 40, 55, 60, 75, 80

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Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 55

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Tel: WOrth 6-0380

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Panscal, Inc., N.J., 80

Pendar, Inc., Calif., 20, 60, 80

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Photobell Co., Inc., N.Y., 80

Photo-Crystals, Inc., Ill., 25, 45, 55, 80

Pollak Corp., Dept. B, 75-95 Freeport St., Boston 22, Mass., 5, 25, 55, 60, 70, 75

See ad on this page

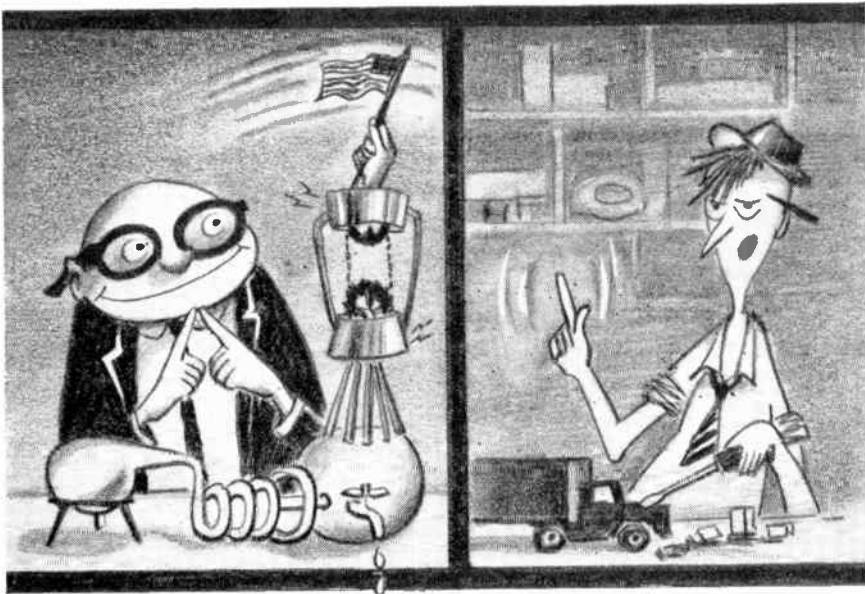
Tel: AVenue 2-9550

Potter & Brumfield Div. of American Machine & Foundry Co., Princeton, Ind., 25, 30, 35, 40, 50, 55, 60, 65, 70, 75

See ad on page 522

Tel: FUlton 5-5251

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.



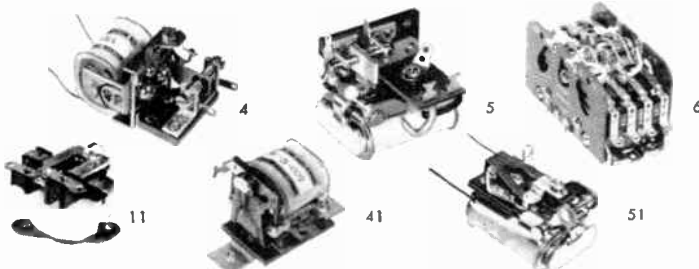
SIGMA TYPES AT YOUR SERVICE

On the left, Hardwicke J. von Cumulus exemplifies scientific inquiry in the best tradition, pondering problems of the highest order concerning interrelation of theoretical factors in sensitive relay design. His is an 0.6^{-13} world, beyond the ken of most, deaf to the Cry of the Coliseum. He's the gentleman to see if you're just wondering about the characteristics of a relay for use somewhere out of this world.

At right is Sigma's General Purpose Application Man of the Year, Mackinaw L. Mundane. Although Mackinaw will never quite understand what all the Hardwicke's are muttering about, he doesn't care; he's closing in fast on some good unsophisticated jobs for Sigma relays. He's heard all about Progress, Improvement and Doing the Difficult Jobs Well, but he knows *his bread is buttered*

by the guy who wants a relay that will work well, on the ground, under everyday circumstances. He will enthusiastically tell you, point blank, which Sigma type to pick for speed, quietness, price, life or some combination thereof. His customers make toys, burglar alarms, electric blanket controls, machinery controls, UL-approved items and such, and some of his favorite relays are shown below.

Actually, there's a whole crew of Mundanes here ready to jump when you speak — not at you, but up with answers. Or from a distance you can get some useful data on which to judge and select, in the form of specific relay Bulletins, or assembled within elegant covers as the NEW Sigma Catalog. Communication with H. J. von C. and other Scientists, however, is restricted to 8:30-5:00, Monday through Friday.



AMONG MUNDANE-TYPE REQUIREMENTS . . .

LOW PRICE: Series 11 sells at less than a dollar in quantity, with mechanical life of 100,000,000 operations. DC and shaded pole AC.

RANGE OF ADJUSTMENT: Series 4 and 5 can be adjusted and specified as to both drop-out and pull-on. Standard sensitivities from 1 to 200 mw.

HIGH CONTACT RATING: Series 51 switches 10 amperes of incandescent lamp load yet operates on 100 mw.

HIGH SPEED: Series 41 can be operated in less than 2 milliseconds and will switch loads up to 1 ampere 100,000,000 times.

AC OPERATED: Shaded pole 41 with no rectifiers. Extremely quiet, reliable operation with switch ratings up to 5 amperes, or operating sensitivity as low as 0.06 v-a.

MAGNETIC LATCHING: Series 6 (Form Z) polar relay provides an exceptionally reliable latching contactor. Up to 4-pole double throw with no mechanical catches to wear.

SIGMA

SIGMA INSTRUMENTS, INC.
31 Pearl Street, So. Braintree 85, Massachusetts
For details, circle #507 on Reader Service Card

Relays

From
One
Source

Relay
Sales

Advance Relays 

 Automatic Electric

C. P. Clare 

 Elgin Neomite

Guardian Electric 

 Leach Relays

Phillips Control 

 Potter & Brumfield

Struthers Dunn 

Monitor
Relays

Besson & Robinson 

 And Others

Order Large or Small Quantities

| | |
|------------------|-----------------------|
| Telephone Relays | Latching Relays |
| Midget Relays | Stepping Relays |
| Keying Relays | Delay Relays |
| Rotary Relays | Timers |
| Sealed Relays | Contactors |
| Sensitive Relays | Motor Starting Relays |
| Mercury Wetted | Differential Relays |

Write for
New
Relay Sales
Bulletins

For 24 Hour
Delivery Call

West Chicago 1100

RELAY SALES, INC.

P.O. Box 186-1R—TWX 3464-U
West Chicago, Illinois

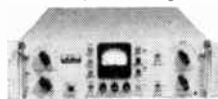
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1960 IRE Directory

RIXON CUSTOM DESIGNS FOR: COMMUNICATORS

DATA TRANSCEIVER

For wireline and other voice communications circuits—500 to 2500 bits/second in a 3-kc bandwidth. A fully transistorized transmitter and receiver plus a high stability clock system and a self-contained delay equalizer in a single unit—requiring 5½ in. of standard rack space. Automatically synchronized clock for detecting and regenerating received data pulses. Data input and output is serial, ground-referenced. Features low error rate and reliable performance under wide range of adverse transmission conditions. Write for Bulletin No. 62.



Sebit—25

DELAY EQUALIZER

Improves data transmission accuracy by compensating for envelope delay distortion introduced by voice communications circuits. Relative delay: max. at midband, min. at bandedges—frequency of max. delay 1000, 1250, 1500, 1750, or 2000 c/s—delay range 0.8 ms to 3.5 ms in 10 steps. Input and output—600 ohms. Size—19 x 3½ x 8-in.



Model EN-766

Bulletin No. 64.

SEMICONDUCTOR RELAYS

Transistorized. Size 2½ x 4½ in. Useful for interconnecting different portions of data transmission systems—also for reliable high-speed (up to 2500 bits/sec) switching of d-c circuits to 200 ma—300 volts. Polar or neutral input and/or output. No a-c line power required. Control power less than 1 watt derived from key system. Interchangeable with WE 255A or similar types. Input sensitivity to 3 ma. Bulletin No. 65.

Relay
without
case
Model
SCR-60



FILTERS — NETWORKS



Custom-tailored for your application. Design capability and a stock of components equal ability to meet your requirements without lost time. Linear phase designs for data systems is a specialty. Bulletin No. 61.

Filters—All Types

FREQUENCY DIVIDERS

Useful for dividing output from frequency standards in timing and clock circuits. Unit delivers one output pulse for every two input pulses. Can be directly cascaded for large division ratios. Feedback taps provided to make any ratio possible. Requires 20 to 30 volts d-c at less than 15 ma per unit. Bulletin No. 56.



MXFD—100

DEVELOPMENT ENGINEERING

The engineering talent responsible for the equipment in this column is available for special developments either on fixed price or CPFF basis. Other significant Rixon developments and areas of experience include: 50-KW VHF Transmitter, 16-Channel Transistorized TTY Multiplex Equipment, Low Noise Preamplifier, High Power Dummy Antenna, Antenna Matching Equipment, etc.

RIXON ELECTRONICS, INC.

DATA TRANSMISSION SPECIALISTS
DESIGN • DEVELOPMENT • MANUFACTURE
2414 Reedie Dr., Silver Spring, Md. • LO 5-4578

For details, circle #509 on Reader Service Card

Directory II. Components

Relays—Class 66

66. Relays.

Price Electric Corp., East Church & 2nd Sts., Frederick 1, Md., 5, 25, 40, 50, 55, 57, 60, 65, 70, 75, 80

See ad on page 523

Tel: MOnument 3-5141

Radar Relay, Inc., Calif., 60
Radio Engrg. Products Ltd., Canada, 50
Regulator Equipment Corp., N.J., 55
Relay Sales, Inc., P.O. Box 186-IR,
West Chicago, Ill., distributor

See ad on page 524

Tel: WEst Chicago 1100

Relays, Inc., N.Y., 15, 25, 35, 55, 60, 70, 75

Revere Corp. of America, Conn., 25, 60
Rhodes, Inc. M. H., Conn., 80

Rixon Electronics, Inc., 2414 Reedie Dr.,
Silver Spring, Md., Transistorized

See ad on this page

Tel: LOKwood 5-4578

Robertshaw-Fulton Controls Co., Acro
Div., 2040 E. Main St., Columbus 16,
Ohio, 40 General Purpose

See ad on page 555

Tel: CLearbrook 3-8531

Rowan Controller Co., Md., 5, 80

Sargent & Greenleaf, Inc., Security De-
vices Laboratory Div., 24 Seneca Ave.,
Rochester 21, N.Y., 20

See ad on page 393

Tel: HOPkins 7-3200

Sigma Instruments, Inc., 31 Pearl St.,
South Braintree 85, Mass., 15, 25, 30,
35, 40, 50, 55, 60, 65, 70

See ad on page 524

Tel: VICTor 3-5000

Simpson Electric Co., 5218 W. Kinzie
St., Chicago 44, Ill., 10

See ad on page 475

Tel: ESTebrook 9-1121

Sivers Lab., Sweden, 5

Societe Industrielle De Sonceboz, Swit-
zerland, 10, 80

Square D Co., Wis., 40, 55, 60, 80
Standard Electromagnetics, Inc., Md., 5,
25, 30, 60, 65, 70, 75

Standard Telephones & Cables, Ltd.,
England, 25, 40, 50, 65, 70, 75

Stepper Motors Corp., Calif., 57, 65

Stevens-Arnold, Inc., 7 Elkins St.,
South Boston 27, Mass., 15, 20, 25, 35,
50

See ad on page 430

Tel: Andrew 8-1170

Stromberg-Carlson Div., General Dy-
namics Corp., N.Y., 40, 65, 75

Struthers-Dunn, Inc., N.J., 15, 25, 30, 35,
40, 45, 55, 60, 65, 70, 75, 80

Sunvic Controls, Ltd., England, 80

Tech Laboratories, Inc., Bergen & Ed-
sall Blvds., Palisades Park, N.J., 5, 57,
65

See ad on page 556

Tel: WINDsor 4-2221

Technical Apparatus Builders, 109GB
Liberty St., New York 6, N.Y., 55

See ad on page 502

Tel: REctor 2-6249

Telecomputing Corp., Calif., 25, 57, 60

Tempo Instrument, Inc., N.Y., 80
Terado Company, 1065 Raymond Ave.,
St. Paul 8, Minn., 25, 30, 60

See ad on this page

Tel: MIDway 6-2514

Texas Instruments, Incorporated, Semi-
conductor-Components Div., P.O. Box
312, 13500 N. Central Expressway,
Dallas, Tex., 55

See ad on pages 75-78

Tel: FLeeewood 7-5411

Thompson-Ramo-Wooldridge, Inc.,
Tapco Group, Ohio, 5

Torwico Electronics, Inc., 1090 Morris
Ave., Union, N.J., 15, 20, 40, 50, 55, 60,
80

See ad on pages 116-117

Tel: ELizabeth 4-5650

Transco Products, Inc., Calif., 5, 25, 70
Trepac Corp. of America, N.J., 20, 35,
50, 60

Trimount Instrument Co., Ill., Prox-
imity

Triplett Electrical Instrument Co., Har-
mon Rd., Bluffton, Ohio, 10

See ad on page 472

Tel: 323-W

Tung-Sol Electric, Inc., 1 Summer Ave.,
Newark 4, N.J., 25, 55, 60, 80

See ad on pages 50-51

Tel: HUMBoldt 2-4200

10 TO 60 MILLIWATT SENSITIVITY!
SERIES 6000

terado MICRO RELAY

For Tube or Transistor Circuits.
Hermetic Seal
Plug In or Terminals

(ACTUAL SIZE) SPECIFICATIONS

- S.P.D.T. Switch
- 60 Milliwatt Nominal (Special to 10 Milliwatt)
- Rating—1 Amp., 24 V. Non-Inductive
- 24 to 10,000 Ohm Coils
- Vibration Characteristics Excellent
- Built to Match Your Circuit

TERADO COMPANY
1065 RAYMOND AVE. • ST. PAUL 8, MINN.

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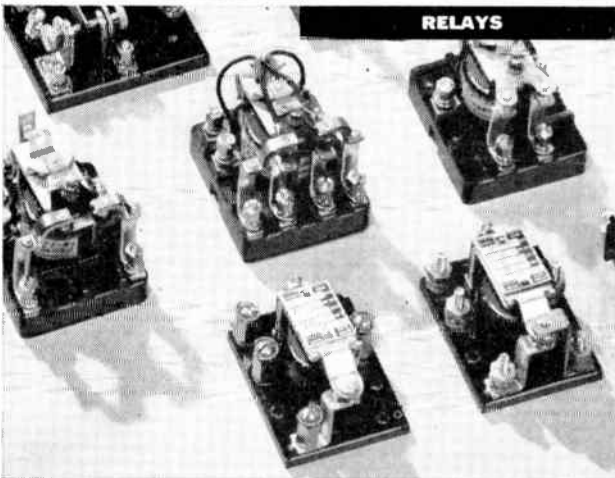
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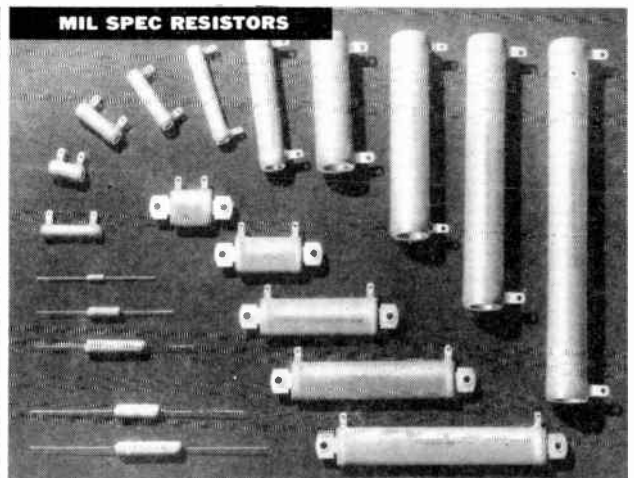
VITROHM RESISTORS



VITROHM RING RHEOSTATS



RELAYS



MIL SPEC RESISTORS

4 tips for design engineers

VITROHM® Resistors, stock and made to order

| FORM | WATTS | | RESISTANCE VALUES (ohms) | |
|----------------|---------------|---------------|--------------------------|------------------|
| | Stock | Made to Order | Stock | Made to Order |
| VITROHM: Fixed | 5 to 200 | 5 to 218 | 1 to 250,000 | 0.2 to 1,750,000 |
| Adjustohm | 10 to 200 | 10 to 218 | 1 to 150,000 | 0.3 to 525,000 |
| STRIPOHM | 20 to 75 | 20 to 75 | 1 to 65,000 | 0.1 to 115,000 |
| AXIOHM | 3, 5, 10 | 3, 5, 10 | 1 to 50,000 | 0.25 to 50,000 |
| NON-INDUCTIVE | 35 to 160 | 10 to 160 | 1 to 1,000 | 0.86 to 14,100 |
| PLAQOHM | 25 to 150 | 25 to 150 | 1 to 10,000 | 0.5 to 86,400 |
| DISCOHM | 24 | 24 | 1 to 4,000 | 1 to 5,760 |
| RIBFLEX | Not Available | 75 to 550 | Not Available | 0.04 to 66 |

VITROHM Ring Rheostats

- 25 W, 1 min to 5,000 max ohms
- 50 W, 1 min to 10,000 max ohms
- 100 W, 1 min to 10,000 max ohms
- 150 W, 1 min to 10,000 max ohms
- 300 W, 1 min to 2,500 max ohms

Relays

- Sensitive—2 amp, 125v, a.c. max
- Midget—6 amp, 125v, a.c. max
- Heavy duty midget—15 amp, 125v, a.c. max
- Multi-pole—10 amp, 125v, a.c. max
- Heavy duty—25 amp, 125v, a.c. max

Mil Spec Resistors

All styles, all sizes, all characteristics and all resistance values listed in Military Specification MIL-R-26C. Ask for BULLETIN 12

7 46

Write for a complete listing of stocking Electronic Distributors.

Ward Leonard Electric Co., 83 South Street, Mount Vernon, N.Y. (In Canada: Ward Leonard of Canada, Ltd., Toronto.)



**WARD LEONARD
ELECTRIC COMPANY**
MOUNT VERNON, NEW YORK



RESISTORS



RHEOSTATS



RELAYS



CONTROLS



DIMMERS

Result - Engineered Controls Since 1892

For details, circle #511 on Reader Service Card

METALLIC FILM RESISTORS by CORNING

Type N

MIL-R-10509B— $\frac{1}{2}$, 1, 2W at 40°C. Derating to 140°C. Up to 4.2 megohms.

MIL-R-10509C New fusion-sealed resistor. $\frac{1}{4}$ -watt. Can be boiled in water without failing moisture specs. 10 ohm to 360 Kohm at 70°C., derating to 160°C.

New epoxy-coated resistors. $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ -watt at 70°C. Exceptional moisture resistance.

Low-Power

Highest resistance range of any low-power resistors. LPI-3: 3W, 125-40 K. LPI-4: 4W, 125-90 K. LPI-5: 5W, 180-110 K. LPI-7: 7W, 180-90 K. LPI-10: 10W, 180-70 K.

Also C-42 resistor: a low-cost, 2W, 70°C. resistor to meet MIL-R-11B; 130 to 1.5 K.

High-Power

Type R 7 to 115W at 40°C., derate to $\frac{1}{2}$ -power at 120°C.; 10 ohms to 1 megohm. To MIL-R-11804B.

Type S High-temperature to MIL-R-11804B. $\frac{1}{2}$, 1, and 2W at 120°C. Up to 4.2 megohms.

Type WC-5 Water-cooled HF. Can mount direct on coax line and at RF ground potential. 35 to 200 ohms with $\pm 15\%$ standard; 10 and 5% also available. Dissipates up to 5 KW.

Type H High-frequency for dummy antennas, circuit loading, damping, and terminating. 10 ohms to 1 megohm. 5 to 140W.

Type ST for highest wattage to volume ratio of any metallic oxide resistor. 2 $\frac{1}{2}$, 5, and 10 W at 25°C., derating to 350°C. 2% and 5% tolerances.

For more information on any or all of these resistors, write for data sheets. Corning Glass Works, 550 High St., Bradford, Pa.



**CORNING
ELECTRONIC
COMPONENTS**

For details, circle #512 on Reader Service Card

Directory II. Components

Relays—Class 66
Resistors—Class 67

66. Relays.

Union Switch & Signal, Div. of Westinghouse Air Brake Co., Braddock Ave., Pittsburgh 18, Pa., 25, 57, 60, 70
See ad on pages 158-159
Tel: CHurchill 2-5000

United States Instrument Corp., Va., 30, 40, 65, 75

U.S. Relay Co., Calif., 15, 20, 25, 40, 50, 55, 60, 70, 75, 80

Universal Relay Corp., 42 White St., New York 13, N.Y., distributor
See ad on this page
Tel: WAlker 5-9257

Varo Mfg. Co., Inc., Tex., 20

Victoreen Instrument Co., Calif., 20, 25, 30, 35, 40, 60, 65, 70, 80

Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 60, 70, 80
See ad on page 541
Tel: MURdock 8-7150

Video Instruments Co., Inc., Calif., 45
Wac Line, Inc., Ohio, 10

Ward Leonard Electric Co., 83 South St., Mt. Vernon, N.Y., 55, 60
See ad on page 526
Tel: MOUNT Vernon 4-1000

Waugh Engrg. Co., Calif., 80

Wheaton Engineering Corp., Ill., 65, 80

Wilson & Co., G. C., Ohio, 80

Winatic Corp., N.Y., 55

Zenith Electric Co., Ill., 55, 80

67. Resistors.

- | | |
|-------------------------------|--------------------------|
| 5. Carbon fixed, molded | 40. Thermistors |
| 10. Carbon, variable | 45. Vacuum sealed |
| 15. Deposited carbon | 50. Very high megohm |
| 20. Potentiometers | 55. Wirewound, fixed |
| 22. Potentiometers, precision | 60. Wirewound, variable |
| 25. Precision film | 65. Wirewound, precision |
| 30. Printed circuit | |
| 35. Rheostats | |

Accuracy, Inc., Mass., 20, 22, 60

Ace Electronics Associates, Inc., Dept. A3, 99 Dover St., Somerville 44, Mass., 20, 22, 60, 65
See ad on page 528
Tel: SOMerset 6-5130

Aerovox Corp., Mass., 5, 15, 20, 22, 50, 55, 65

Aerovox Corp., Cinema Engrn. Div., Calif., 20, 65

Aerovox Corp., Hi-Q Div., N.Y., 15, 25, 30

Allen-Bradley Co., Wis., 5, 10, 20, 25, 35

Allies Products Corp., Fla., 15, Precision

Analogue Controls, Inc., N.Y., 20, 22, 35, 60, 65

Argonne Electronics Mfg. Corp., N.Y., 20

Arnhold Ceramics, Inc., N.Y., 15, 25, 45, 50

Atohm Electronics, Calif., 22, 60

Automatic Products Research, N.Y., 30

Avnet Corp., Calif., 22, 25

Axel Brothers Inc., 134-20 Jamaica Ave., Jamaica 18, N.Y., 65
See ad on page 396
Tel: REPUBLIC 9-1700

Beckman Instruments, Inc., Helipot Div., Calif., 22

Bendix Aviation Corp., Ind., 40

Biddle Co., James G., Pa., 35

Bird Electronic Corp., 30303 Aurora Rd., Solon, Ohio, RF Power & Coax
See ad on page 334
Tel: CHURCHILL 8-1200

Bond Electronics Corp., N.J., 30, 55, 65

Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 S. Main St., Janesville, Wis., 22

See ad on page 530
Tel: PLEasant 4-6616

Bourns, Inc., Calif., 10, 20, 22, 35, 60, 65

Bradford Components, Inc., N.Y., 55, 60, 65

Brys Instrument Co., N.Y., 22, 65

Calbest Electronics Co., Calif., 20, 22, 65

Canadian Research Institute, Canada, 10, 55, 65

Carborundum Co., Gload Plant, N.Y., 5, 40

Carborundum Co., Refractories Div., N.J., 5, 40

Carter Mfg. Corp., Mass., 22

Carter Parts Co., Ill., 20, 35, 60

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**LARGEST
STOCK
OF
RELAYS
IN THE
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**PRODUCTION
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WARD LEONARD • ADVANCE
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Formerly Universal General Corp.
42 White St., New York 13, N.Y. • WAlker 5-9257
For details, circle #513 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

ACEPOT[®]-500 ACEPOT X-500*



actual size

Sub-miniature, linear and non-linear potentiometers. Single turn unit, 1/2" size, ±2% resistance tolerance and ±0.3% ind. linearity.

| | |
|----------------------|---|
| Size | 1/2" x 1/2" |
| Weight | 0.25 ounce |
| Resistance Range | 2Ω to 500K |
| Resistance Tolerance | ±2% |
| Linearity | ±0.3% Ind. standard |
| Temperature* | -55°C to 125°C* |
| Mechanical Rotation | Continuous or with stops |
| Electrical Angle | 325° std. > available |
| Resolution | 0.12% for 50 K Others comparable |
| Torque** | .05 oz./in. at 20°C (Bronze) .035 oz./in. (Ball bearing) |
| Power | 2W for 60°C rise or 2.5W for 65°C (X-500) |
| Mounting | Threaded bushing, servo, flush or flanged. Ganged up to 6 cups. |

* X-500 standard high temperature potentiometer. Range: -55°C to 150°C.
**Jewel bearing Acepot torque of .014 ounce/inch.

ACEOHM[®]



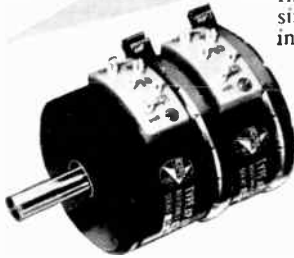
actual size

Sub-miniature trimmers . . . high temperature, humidity proof for severe environment.

| | |
|---------------------|--|
| Size | 1 1/4" x 1/4" x 5/16" |
| Weight | 0.2 ounce |
| Resistance Range | 10Ω to 75K — Special to 150K |
| Mechanical Rotation | 25 Turns on lead screw, adjustable over 100% of winding |
| Power Rating | 1.6W at 40°C Derates to 0 at 225°C |
| Temperature Range | -55 to 225°C |
| Resolution | .13% for 75K. Other resistances comparable |
| Dielectric Strength | 1000 volt DC for 60 sec. |
| Load Life | 1000 hours at 180°C |
| Capacitance | Extremely low distributed capacity (moulded hitemp. phenolic case & cover) |

Completely sealed element. Meets and surpasses all applicable requirements of MIL-E-5272A and MIL STD. 202A.

ACEPOT[®]



Submit your design requirements to our Engineering Group for evaluation and quotations.

Standard non-linear and linear potentiometers. 0.25% terminal conformity with out padding resistors. Immediately available in sine, cosine, square law and log functions in AIA sizes.

Typical Specs:

| | Sine-cosine | Double Sided Square-law |
|----------------|-----------------|-------------------------|
| Size | 3" | 3" |
| Resistance | 20K ±5% driving | 25K ±5% driving |
| Conformity | 1/2% pk-pk | ±0.25% |
| Function angle | 360° | ±180° |
| Power | 4 watts | 3 watts |
| Mounting | Servo | Servo |

ACESET[®]



actual size

Sub-miniature Trimmers. Heat dissipation . . . 2 watts at 60°C. Immediate delivery in resistances of 50Ω to 50 K.

| | |
|---------------------|---|
| Size | 1/2" x 3/8" |
| Weight | 1/2 ounce, including lock washer and nuts |
| Resistance Range | 50Ω to 100K ±10% std. tol |
| Linearity | ±5% |
| Temperature Range | -55°C to +125°C |
| Mechanical Rotation | 330° Nominal |
| Electrical Angle | 320° Nominal |
| Power | 2 watts for 60°C rise |
| Mounting | 1/4"-32 threaded bushing |

ACEMHO*



Conductive plastic element. Infinite resolution. Extremely long life. No sudden open-circuit failure possible. Low, low noise. Meets JAN & MIL specs. Patents pending.

| | |
|------------|----------------------|
| Size | 1 1/8" |
| Weight | 1.6 ounce |
| Resistance | to 5 megohm |
| Linearity | .5% Independent |
| Resolution | essentially infinite |
| Power | 2W at 20°C |
| Mounting | Bushing |

*Reg. applied for

ACETRIM*



actual size

Sub-miniature trimmers . . . A wide range of resistances are available in this low-cost, space and weight saving unit.

| | |
|---------------------|--|
| Size | 1/2" x 1/2" |
| Weight | 0.25 ounce |
| Resistance Range | 2Ω to 250K ±5% std. tol. |
| Linearity | ±3% |
| Temperature | -55°C to 125°C (to 150°C (X-500) |
| Mechanical Rotation | continuous or with stops |
| Electrical Angle | 325° std. > available |
| Power | 2W for 60°C rise or 2.5W for 65°C |
| Mounting | Threaded bushing, printed circuit, flush, flanged, ganged. |

*Trade Mark applied for

Exact requirements for your particular applications, can be custom designed and mass produced with short lead time. All units are anti-fungus treated and fully sealed against dust, moisture and humidity. Meets applicable JAN-MIL specs including shock and vibration. Send us your specifications for engineering assistance on designs and applications. Complete Fact File and Application Data Sheets available on request. CALL, wire or teletype Dept. A3 at Ace Electronics Associates, Inc., 99 Dover Street, Somerville, Mass. SOMerset 6-5130, TWX SMVL 181.

How to assure reliability in a precision pot

Precious Metal Resistance Wires and Contacts

by H. E. HALE
Vice-President & General Manager

The reliability of precision potentiometers is directly proportional to retained accuracy over storage, rotational life, and environmental exposure; and inversely proportional to their electrical noise characteristics. Corrosion, oxidation, and foreign deposits are some of the conditions which adversely affect these factors.

Base metal resistance wires and contacts are particularly susceptible. For this reason, precious metal alloys should be specified wherever possible. Their high tensile strength and ability to remain inert to oxidizing and corrosive atmospheres are especially desirable. Electrical noise is kept at a minimum, and storage and rotational life are greatly extended. In addition, resolution and conformity are improved. These advantages more than offset the metals' higher initial costs.

Three general ranges of preferred temperature coefficients can be considered in choosing a precious metal: (a) ± 20 ppm; (b) ± 200 ppm; and ± 600 ppm. Choice will be governed by specific design requirements.

Fairchild has pioneered the use of precious metals in potentiometer applications, and has included these materials in designs even when they have not been specified by customers as a necessary requirement. An outstanding example is the one-piece precious metal wiper found in all Fairchild linear and non-linear, high-reliability pots. In addition to the advantages outlined above, the unique wiper design provides high-deflection sensitivity and natural frequencies. Wire and contact diameters are matched to assure optimum conformity and incremental voltage steps; hardnesses are also matched for minimum degradation. These pots are available in $\frac{7}{8}$ -inch to 3-inch diameters, single- and multi-turn, in standard and high-temperature models. Accuracies are as high as .009%.

Precious metal resistance wires and contacts are examples of the many Safety Factors built in by Fairchild beyond specifications to assure reliability in performance.

You are invited to write to Dept. 31P for more information.

RELIABILITY INSIDE THE BLACK BOX

FAIRCHILD
CONTROLS CORPORATION
COMPONENTS DIVISION

GYROS
PRESSURE TRANSDUCERS
POTENTIOMETERS
ACCELEROMETERS

225 Pork Ave., Hicksville, L. I., N. Y.
6111 E. Washington Blvd., Los Angeles, Cal.

A Subsidiary of Fairchild Camera and Instrument Corporation

For details, circle #515 on Reader Service Card

Directory II. Components

67. Resistors.

Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 10, 15, 20, 30, 60
See ad on page 174
Tel: WOODruff 2-9200

Chicago Aerial Industries, Kintronic Div., Ill., 20, 22, 50, 60, 65

Chicago Telephone Supply Corp., 1142 West Beardsley Ave., Elkhart, Ind., 10, 20, 35, 55, 60, 65
See ad on page 96
Tel: JACKson 3-0210

Chicago Tel. of Calif., Inc., Calif., 10, 20, 35, 60

Circuit Instruments, Inc., Fla., 22

Clark Electronic Labs., Box 165, Palm Springs, Calif., Pressure Type
See ad on page 559
Tel: FAIRview 8-2210

Clarostat Mfg. Co., Inc., N.H., 10, 15, 20, 22, 30, 35, 55, 60, 65

Computer Instrument Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 10, 15, 20, 22, 25, 35
See ad on page 532
Tel: IVANhoe 3-8200

Consolidated Resistance Co. of America, N.Y., 55, 65

Continental Carbon-Div. of Wirt Co., Pa., 15, 20, 25, 30, 35, 55, 60

Corbett Science Labs., Calif., 22, 55, 65

Corning Glass Works, 550 High St., Bradford, Pa., 25, 30
See ads on pages 400, 527
Tel: 2-4571

Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 15, 20, 25, 30, 50, 55, 65
See ad on pages 34-35
Tel: LOcust 4-3131

Daven Co., N.J., 20, 25, 30, 35, 50, 55, 60, 65

Daystrom, Inc., Weston Instruments Div., N.J., 25

Daystrom Pacific, Div. of Daystrom, Inc., Calif., 20, 22, 60

DeJUR-Amsco Corp., Electronics Sales Div., 45-01 Northern Blvd., Long Island City 1, N.Y., 20, 35
See ads on pages 190, 423
Tel: RAVenswood 1-4009

Derf Radio Co., N.Y., 5, 10, 15, 20, 25, 30, 35, 50, 55, 60, 65

DeWitt Development Co., Ill., 55

Dmeter Mfg. Co., Inc., N.Y., 55, 60

Eastern Precision Resistor Corp., N.Y., 22, 30, 55, 60, 65

Edeliff Instruments, Calif., 20, 22

Egen Electric Co., D.C., 5

Electra Manufacturing Co., 4051 Broadway, Kansas City, Mo., 15, 25, 30
See ad on page 534
Tel: WESTport 1-6864

Predict performance!

Cut costs!

The key to dependable system performance is

RELIABILITY!



TYPE 14 (1.437" dia.)
Low inertia, compatible
with other servo components.

Designers everywhere insist on the rugged reliability of precision potentiometers by Electro-Mec.

- 100% inspection of all vital characteristics.
- Glass insulated terminals.
- 18K gold slip rings.
- Ultra-dependable resistance elements artificially aged to insure stability.
- Exclusive long life wiper design incorporates precious metal contacts.
- Built-in safety factors.

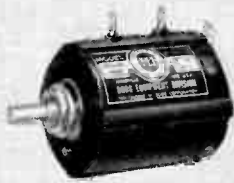
ELECTRO-MEC
Laboratory, Inc.

47-51 33 Street
Long Island City 1, N. Y.

All AIA Sizes .875" to 3.00" Dia.
For complete technical data write to our engineering department.

For details, circle #516 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.



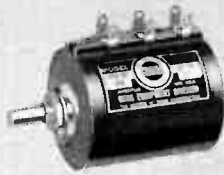
205 SERIES, 10-TURN MICROPOTS

SIZE: 1 3/4" dia.; 2 1/8" long; shaft extension 7/8" or special to order.

LINEARITY ACCURACY: ±0.1% and 0.05% (independent or zero based).

RESISTANCES: 50 ohms to 100,000 ohms, tolerance ±5%.

POWER DISSIPATION: 5 watts at 40° C.



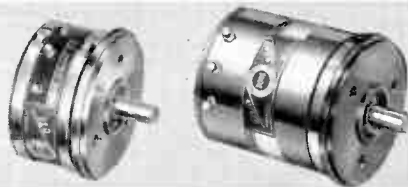
1100 SERIES, 10-TURN MICROPOTS

SIZE: 1 7/8" dia.; 2 1/8" long; shaft extension 7/8" or special to order.

LINEARITY ACCURACY: 0.5% to 0.1% (independent linearity).

RESISTANCES: 50 to 100,000 ohms, tolerance ±5%.

POWER DISSIPATION: 3 watts at 40° C.



900 SERIES MICROPOTS

Borg 900 Series Micropots are available in single-turn, 3-turn and 10-turn models.

SIZE: Single-turn — 2" dia.; 1 5/16" long
3-Turn — 2" dia.; 1 3/8" long
10-Turn — 2" dia.; 2 1/16" long
Shafts — 1/4" dia.
Bushing Mount — 7/8" long
Servo Mount — 5/8" long

LINEARITY ACCURACY: Single-turn — ±.5% (independent)

3-Turn — ±0.1% (independent, zero based, or absolute reference).

10-Turn — .05% (independent, zero based, or absolute reference).

RESISTANCES: Single-Turn — 50 to 50,000 ohms

3-Turn — 15 to 60,000 ohms

10-Turn — 50 to 300,000 ohms

TEMPERATURE LIMITS: Tested to 350° F.

STANDARD COMPONENTS

built by



FIT MANY SPECIAL DESIGN NEEDS

Design flexibility of standard Borg components often eliminates the need for expensive, specially designed units. Borg offers a complete line of precision potentiometers, turn-counting dials and fractional horsepower motors. Many of these standard Borg components are currently on duty in missile launching platforms and firing control stations, radar and sonar equipment, computers and similar electronic apparatus. Production of standard Borg components assures quick delivery. A partial selection is shown on this page. Write for complete data on all Borg components. Ask for catalog BED-A90.



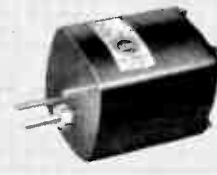
990 SERIES TRIMMING MICROPOTS

SIZE: 1 1/4" x 5 1/16" x 1 7/16"
RESISTANCES: 10 to 30,000 ohms standard. Other values on special order.

Tolerances — ±5% 100 ohms and over
±10% below 100 ohms

ADJUSTMENT: Screw driver slot provides adjustment of complete range in 40 turns.

TERMINALS: Printed circuit, soldered lug, insulated wire leads.



PRECISION INSTRUMENT MOTORS

Borg-Motors offer you fractional horsepower motors in synchronous or induction models with or without gear-trains in 2-pole or 4-pole models for your precision equipment. Borg-Motors are totally enclosed, using precision machined die cast alloys for end bells and gear train cases. Die cast rotors, mounted on two ball bearings, assure long life, continued accuracy.



DIRECT READING MICRODIALS

Borg Direct-Reading Microdials provide the highest accuracy of perception when forced-fast-reading and setting is required because of their inline digital presentation. Borg Direct-Reading Microdials are available in 3-digit 10-turn models, 4-digit 100-turn models and 5-digit 1,000 turn models. Also available are Borg Concentric Scale Microdials which indicate the position of any multi-turn device of 10 turns or less.

WRITE FOR COMPLETE DATA ON ALL BORG COMPONENTS — CATALOG BED A90



BORG EQUIPMENT DIVISION

Amphenol-Borg Electronics Corporation

JANESVILLE, WISCONSIN

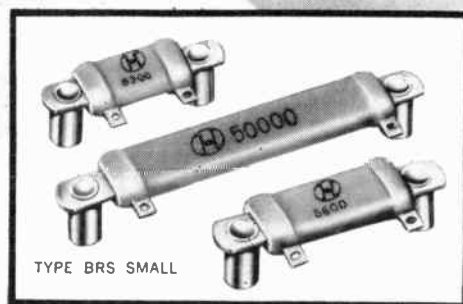


- MICROPOTS
- MICRODIALS
- MOTORS

Space Problem?

SPECIFY *Blue Ribbon* PRECISION SPACE-SAVER RESISTORS

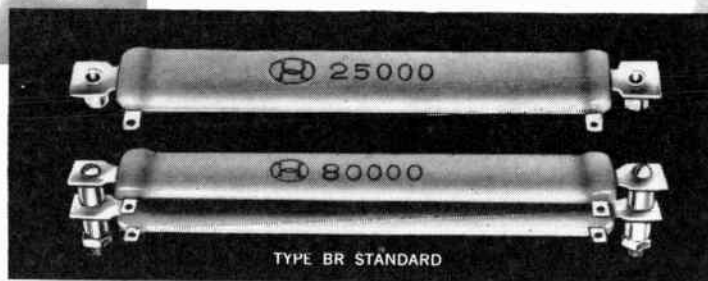
... the Complete
Line of Flat and
Stack Mounting
Wire Wound,
Power Resistors



TYPE BRS SMALL

Available in Wattage Ratings
from 10 to 75 W
Resistance Range from .10 to
100,000 Ohms

TYPE BRM MEDIUM



TYPE BR STANDARD

These High Reliability Space-savers feature matched coefficient of expansion with gray vitreous enamel covering for complete protection from overloads and environmental conditions. Aluminum thru-bracket improves heat dissipation, minimizes hot spots, allows a higher wattage rating per unit of space. Bracket construction facilitates stacking and saves additional space.



For Complete Specifications and illustrated bulletin on H-H Blue Ribbon Resistors, call or write, today!

"Gray Line" RHEOSTATS

Complete range from 25 to 1000 watts. Shock resistant construction. High temperature enamel bonding withstands greater overload.



"Gray Line" RESISTORS

Fixed, adjustable, ferrule and axial lead types for all commercial and military applications. Super-ruggedized for complete reliability.



The Mark of Quality since 1924



HARDWICK, HINDLE · INC
40 HERMON ST., NEWARK 5, NEW JERSEY

For details, circle #518 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory II. Components

67. Resistors.

Electro-Chemical Engraving Co., Inc.,
N.Y., 30

Electro-Flex Heat, Inc., Conn., 55

Electro-Measurements, Inc., Ore., 20, 22,
35, 55, 60, 65

Electro-Mec Lab., Inc., 47-51 33rd St.,
Long Island City 1, N.Y., 20, 22, 60, 65

See ad on page 529

Tel: STillwell 6-3402

Electromath Corp., N.Y., 20, 22, 55, 60,
65

Electronic Applications, Inc., Conn., 15,
50

Electronic Plastics Co., Calif., 25, Com-
puter Plug-in Resistors

Elektro-Serv Co., N.Y., 20, 22, 25

El-Rad Mfg. Co., Ill., 55

Erie Resistor Corp., 644 W. 12th St.,
Erie 6, Pa., 15, 25, 30

See ad on pages 110-111

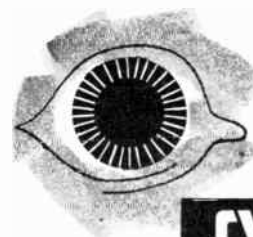
Tel: GLendale 6-8592

Fairchild Controls Corp., Dept. 31P,
Components Div., 225 Park Ave.,
Hicksville, L.I., N.Y., 22, 25

See ad on page 529

Tel: WElls 8-5600

Fenwal Electronics, Inc., Mass., 40



FXC

Look to **FXC**
for the best
in thermistors,
varistors and light
dependent resistors

Complete details, including sam-
ple kit information, furnished on
request.



FXC

Say
ferroxcube
when you
need ferrite.

FERROXCUBE

CORPORATION OF AMERICA

50 East Bridge Street, Saugerties, N. Y.

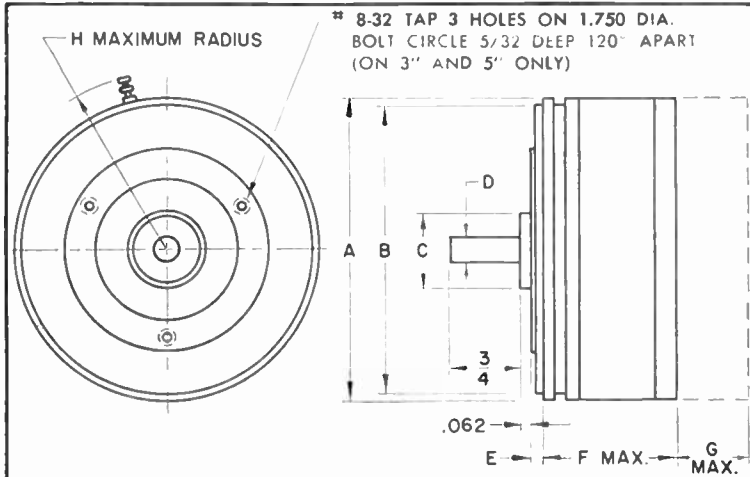
For details, circle #519 on Reader Service Card

PRECISION

CARBON FILM • POTENTIOMETERS

Infinite Resolution • Long Life • High Accuracy • Low Noise • Low Torque

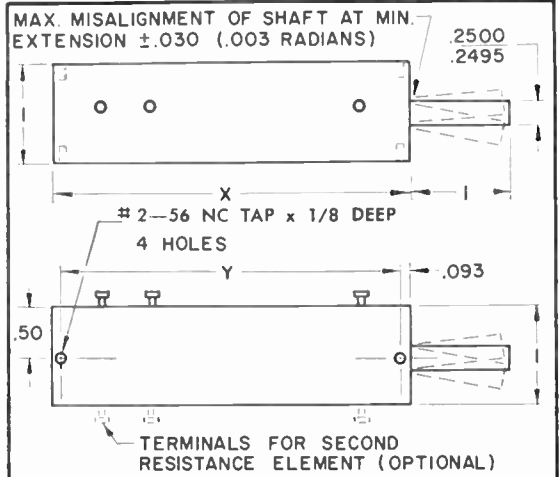
ROTARY



| DIMENSIONS | | | | | |
|------------|-------|-----------|-----------|-----------|-----------|
| MODEL | 78 | 105 E 106 | 205 E 206 | 305 E 306 | 505 E 506 |
| A | 7/8 | 1 3/32 | 2 | 3 | 5 |
| B | .7500 | 1.0300 | 1.8750 | 2.8750 | 4.8750 |
| C | | | .7500 | .7500 | .7500 |
| D | .1250 | .1250 | .2500 | .2500 | .2500 |
| E | .040 | .040 | .060 | .060 | .060 |
| F | .635 | .635 | .985 | 1.350 | 1.870 |
| G | .635 | .635 | .985 | 1.350 | 1.870 |
| H | .570 | .670 | 1.125 | 1.800 | 2.800 |

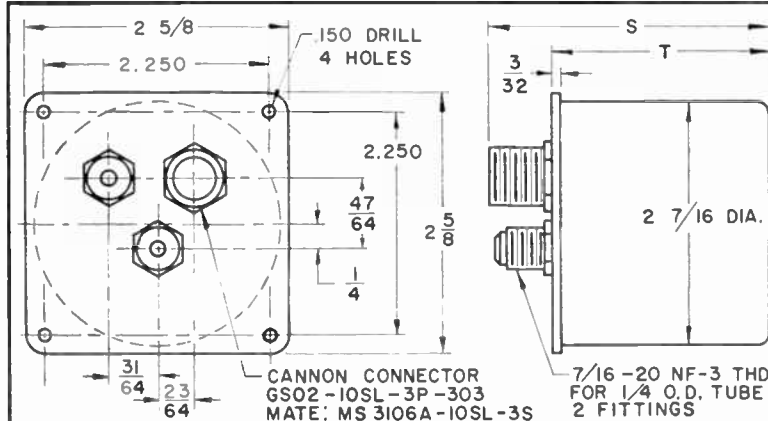
| SPECIFICATIONS | | |
|------------------------------|-----------------------------|----------------------|
| MODEL | LINEAR | SINE-COSINE |
| MECHANICAL ROTATION | 360° CONTINUOUS | |
| ELECTRICAL FUNCTION ANGLE | 350° NOMINAL | 360° |
| RESISTANCE RANGE | 1K-250K | 500Ω-50K QUAD |
| BEST LINEARITY OR CONFORMITY | .1% ÷ INCH OF DIA | .3% p-p ÷ inch of di |
| VIRTUAL RESOLUTION | 1/75,000 ÷ INCH OF DIAMETER | |
| WATTAGE | DIAMETER x 2 | |
| TEMPERATURE RANGE | -55°C TO 150°C | |
| TAPS, MAXIMUM NO. | DIAMETER x 6 | |
| STARTING TORQUE (IN.-OZ.) | DIAMETER x .15 | DIAMETER x .2 |
| GUARANTEED LIFE | TO 30 MILLION CYCLES | |

LINEAR MOTION



| DIMENSIONS | | | TYPE B |
|------------|----------------|---------------|--|
| STROKE | X | Y | HEIM UNIBAL HF-3 SPHERICAL ROD END BEARING |
| 1/4" TO 1" | 2.125 | 1.937 | |
| 1" TO 2" | 3.125 | 2.937 | |
| 2" TO 3" | 4.125 | 3.937 | |
| | | | TYPE C |
| 3" TO 4" | 5.125 | 4.937 | |
| 4" TO 5" | 6.125 | 5.937 | |
| OVER 5" | 1.125 + STROKE | .937 + STROKE | |

| SPECIFICATIONS | |
|--------------------|--|
| RESISTANCE RANGE | 250 MIN TO 125K MAX. PER INCH OF STROKE |
| BEST LINEARITY | .2% ÷ LENGTH OF STROKE |
| VIRTUAL RESOLUTION | 1/35,000 ÷ INCH OF STROKE |
| WATTAGE | 1 WATT PER INCH OF STROKE |
| TEMPERATURE RANGE | -55°C TO 150°C |
| TAPS, MAXIMUM NO. | 4 PER INCH OF STROKE |
| STARTING FORCE | .5 LB. MAX. AT 25°C |
| LIFE | TO 30x10 ⁶ STROKES DEPENDING ON CIRCUITRY |



PRESSURE

SERIES 6000

| | | |
|------------|--|--------------|
| 1 | INFINITE RESOLUTION POTENTIOMETER OUTPUT | |
| 2 | PRESSURE RANGE 0-5 TO 0-5000 P.S.I. GAGE, DIFFERENTIAL, ABSOLUTE | |
| 3 | LINEARITY ±0.3% | |
| 4 | DIRECT COUPLED PRESSURE CAPSULE ELIMINATES BACKLASH, FRICTION AND REPEATABILITY ERRORS | |
| 5 | TEMPERATURE SENSITIVITY LESS THAN .005% °C | |
| 6 | HIGH OUTPUT VOLTAGE (50 VOLTS MAX. AC OR DC) | |
| 7 | RUGGEDIZED FOR WORST ENVIRONMENTAL CONDITIONS | |
| DIMENSIONS | | |
| | 0-100 PSI | 100-5000 PSI |
| S | 3 3/8 | 2 3/8 |
| T | 2 19/32 | 1 19/32 |

FIRST IN FILM POTS



WRITE FOR COMPLETE CATALOG

COMPUTER INSTRUMENT CORPORATION

90 Madison Avenue, Hempstead, L. I., N. Y.

Directory II. Components

67. Resistors.

Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 40

See ads on pages 285, 361, 433, 467, 531, 617

Tel: CHerry 6-2811

Filmohm Corp., N.Y., 25, 30

First Electronics Corp., Mass., 65

Fugle-Miller Labs., Inc., 301 Central Ave., Clark, N.J., 55, 65

See ad on page 412

Tel: FULTon 1-2727

Fuji Communication Apparatus Mfg. Co., Ltd., c/o The Nissho American Corp., N.Y., 5

G-C Electronics Mfg. Co., 400 S. Wyman St., Rockford, Ill., 5, 40, 55

See ad on page 474

Tel: ROCKford 2-6695

Gamewell Co., Mass., 22

General Controls Co., Calif., 20, 22, 35, 60

General Electric Co., Apparatus Sales Div., N.Y., 20, 35, 55, 60

General Electric Co., Industry Control Dept., Va., 55, 60, 65

General Electric Co., Magnetic Materials Section, Mich., 40

General Radio Co., West Concord, Mass., 20, 22, 35, 55, 60, 65

See ad on Cover 4

Tel: EMerson 9-4400

General Resistance, Inc., 577 E. 156th St., New York 55, N.Y., 55, 65

See ad on this page

Tel: CYpress 2-1500

General Transistor Corp., 91-27 138th Pl., Jamaica 35, N.Y., 30, 65

See ads on pages 137-140

Tel: HICKory 1-1000

Giannini Controls Corp., Calif., 22

Giannini Controls Co., N.J. Div., N.J., 22

Gray Instrument Co., Pa., 22, 55, 65

Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 20, 22

See ad on page 349

Tel: WELLS 8-9500

Gulton Industries, Inc., N.J., 40

Handley, Inc., Calif., 20, 22, 60, 65

Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N.J., 20, 35, 55, 60

See ad on page 531

Tel: MARKET 2-8200

Helipot Corp., Calif., 22

Herzog Miniature Lamp Works, Inc., N.Y., 45

Howell Instrument Co., Tex., 20, 22, 35, 60

Hubbard Electronics, Inc., Calif., 20

Humphrey, Inc., Calif., 22

Industrial Instruments, Inc., N.J., 65

Instrument Resistors Co., N.J., 55, 65

International Resistance Co., Pa., 5, 10, 15, 20, 22, 25, 55, 60, 65

Julie Research Labs., Inc., N.Y., 55, 65

K-F Development Co., 2606 Spring St., Redwood City 1, Calif., 20, 22, 50, 65, High Voltage

See ad on page 535

Tel: EMerson 8-5670

Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 65

See ad on page 414

Tel: STATE 2-6662

Kenru Co., N.J., 30, 55

Key Resistor Corp., Calif., 15, 25, 55, 65

Keystone Carbon Co., 1935 State St., St. Mary's, Pa., 40

See ad on page 153

Tel: TE 4-1591

Lectrohm, Inc., Ill., 30, 55, 60

Lesa, S.P.A., Italy, 10, 20, 60

Lewis Engineering Co., 339 Church St., Naugatuck, Conn., 40

See ad on page 610

Tel: PARK 9-5253

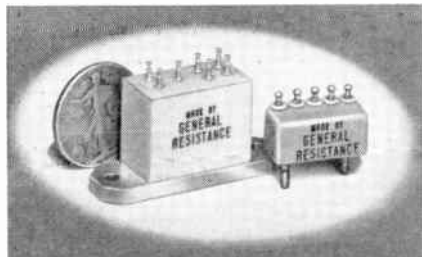
Mallory & Co., Inc., P. R., Ind., 5, 10, 20, 30, 35, 55, 60, 65

Markite Corp., N.Y., 22

Marsland Engrg., Ltd., Canada, 55

Maury Instrument Corp., Ill., 22

ULTRA-HIGH PRECISION



RESISTOR NETWORKS

If it can be made, GenRes will make it! GenRes, for instance, can supply 400-cycle Resistor Networks with accuracies as high as $\pm .005\%$ for such critical applications as summing circuits, voltage dividers and binary networks. Custom-engineered and mass-produced GenRes Resistor Networks, made to meet the most stringent electrical and mechanical specifications, can save you time and money!

WIREWOUND RESISTORS

GenRes application-engineered, ultra-high reliability Precision Wirewound Resistors, accurate to .01% over a wide temperature range, include axial, lug, printed circuit and radial lead encapsulated types to meet any requirement. For complete data on rugged, proven GenRes standard, ceramic or temperature-compensating Wirewound Resistors write for complete catalog.

WHEATSTONE BRIDGE

New, novel GenRes "Go-No-Go" Wheatstone Bridge offers a guaranteed accuracy of .0035%. This precision-engineered instrument also features: .0005% sensitivity; a six-dial decade; up to $\pm .01\%$ for full scale deflection. Operates as go, no-go Limit or Wheatstone Bridge from 10 to 111,111,100 ohms. Write for Bulletin P-100.



**GENERAL
RESISTANCE, INC.**

577 East 156th Street
NEW YORK 55, NEW YORK

For details, circle #521 on Reader Service Card

WHY WAIT?



If you need a
2" SINE-COSINE POTENTIOMETER

that delivers
0.5%—OR EVEN .25%—PEAK-TO-PEAK ACCURACY

with a
RESISTANCE RANGE OF 70K OHMS PER QUADRANT

YOU CAN HAVE IT TODAY

For more than a year, we've been supplying this 2" unit in servo, 3 hole mount, and modular design (for stacking flexibility), to the simulator and computer fields. If you'd like to see it, just give us a call or drop us a line. We'll take one from a production run and send it right over. We'll be happy to discuss your drawings with you, design prototype models to your specifications, or simply send you literature and data sheets on our line of precision potentiometers which we design and manufacture in sine-cosine, square law, single sided squares and secant functions that meet applicable sections of MIL specifications.



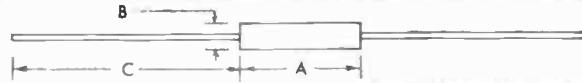
MICRO-ELECTRIC DIVISION of MICRO MACHINE WORKS
19 Debevoise Avenue, Roosevelt, L. I., N.Y. • FReport 8-3222

For details, circle #522 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

now, one source **ELECTRA** offers you all of these precision resistors

All Electra resistors are designed to meet or exceed Mil-R-10509C. Your request will bring complete specifications and characteristics on any or all types by return mail. In addition to resistors, Electra manufactures a complete line of Ceramic Disc and Plate Capacitors. For complete details, see your local representative, or write for catalog and price schedules.



DEPOSITED CARBON

| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±1/32 | Dia. B ±1/32 | Leads Dia. | Lead Length C ±1/8 |
|------------------|-----------|---------|----------------------|-------------------------------|-----------------------|----------------|--------------|-------------|--------------------|
| DC1 8 | | 1/8 | | 10 ohms 350 K | 250 | 5/16 | 3/32 | ±22 | 1-1/2 |
| DC1/8X | | 1/8 | | 100 ohms 1 meg | 250 | 5/16 | 3/32 | ±22 capless | 1-1/2 |
| DC1 4A | RN10X | 1/4 | 10 ohms 750 K | 10 ohms 1 meg | 300 | 15/32 | 3/32 | ±22 | 1-1/2 |
| DC1/4X | | 1/4 | | 100 ohms 2 meg | 300 | 7/16 | 1/8 | ±22 capless | 1-1/2 |
| DC1/2C | | 1/2 | | 10 ohms 2 meg | 350 | 1/2 | 11/64 | ±20 | 1-1/2 |
| DC1/2A | RN20X | 1/2 | 10 ohms 2.0 meg | 10 ohms 2.5 meg | 350 | 5/8 | 11/64 | ±20 | 1-1/2 |
| DC1/2B | RN70B | 1/2 | 100 ohms 2.5 meg | 10 ohms 5 meg | 350 | 23/32 | 7/32 | ±20 | 1-1/2 |
| DC1 2 | | 1/2 | | 10 ohms 5 meg | 350 | 13/16 | 11/64 | ±20 | 1-1/2 |
| DC1 | RN25X | 1 | 10 ohms 4.99 meg | 10 ohms 10 meg | 500 | *15/16 | 19/64 | ±20 | 1-1/2 |
| DC2 | RN30X | 2 | 30 ohms 10 meg | 15 ohms 50 meg | 750 | *2-1/16 | 19/64 | ±20 | 1-1/2 |

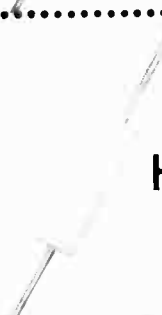
*Tol. ± 1/16



DEPOSITED CARBON PLASTIC ENCAPSULATED

| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±.010 | Dia. B ±.010 | Leads Dia. | Lead Length C ±1/8 |
|------------------|-----------|---------|----------------------|-------------------------------|-----------------------|----------------|--------------|------------|--------------------|
| DCM1/8 | RN60B | 1/8 | 100 ohms 1 meg | 10 ohms 1 meg | 250 | .410 | 1.42 | ±22 | 1-1/2 |
| DCM1/4 | RN65B | 1/4 | 10 ohms 2 meg | 10 ohms 2 meg | 300 | .600 | .225 | ±22 | 1-1/2 |
| DCM1/2 | RN70B | 1/2 | 10 ohms 2.5 meg | 10 ohms 5 meg | 350 | .755 | .270 | ±20 | 1-1/2 |
| DCM1 | RN75B | 1 | 10 ohms 5 meg | 10 ohms 10 meg | 500 | 1.115 | .400 | ±20 | 1-1/2 |
| DCM2 | RN80B | 2 | 30 ohms 10 meg | 15 ohms 50 meg | 750 | *2.240 | .400 | ±20 | 1-1/2 |

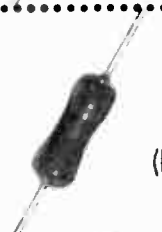
*Tol. ± .030



DEPOSITED CARBON HERMETICALLY SEALED

| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±.010 | Dia. B ±.010 | Leads Dia. | Lead Length C ±1/8 |
|------------------|-----------|---------|----------------------|-------------------------------|-----------------------|----------------|--------------|------------|--------------------|
| HC40 | | 1/8 | | 10 ohms 350 K | 150 | *.281 | .160 | ±22 | 1-1/2 |
| HC10 | RN60B | 1/8 | 100 ohms 499 K | 10 ohms 1 meg | 250 | .427 | .155 | ±22 | 1-1/2 |
| HC8 | RN65B | 1/4 | 10 ohms 2 meg | 10 ohms 2.5 meg | 300 | .646 | .240 | ±20 | 1-1/2 |
| HC12 | RN70B | 1/2 | 10 ohms 3.5 meg | 10 ohms 5 meg | 350 | .833 | .250 | ±20 | 1-1/2 |
| HC6 | RN75B | 1 | 10 ohms 5 meg | 10 ohms 10 meg | 500 | 1.115 | .400 | ±20 | 1-1/2 |
| HC7 | RN80B | 2 | 30 ohms 10 meg | 15 ohms 50 meg | 750 | *2.240 | .400 | ±20 | 1-1/2 |

*Tol. ± 1/32



PRECISION CARBON FILM (HIGH TEMPERATURE)

| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±.010 | Dia. B ±.010 | Leads Dia. | Lead Length C ±1/8 |
|------------------|-----------|---------|----------------------|-------------------------------|-----------------------|------------------------|--------------------------|------------|--------------------|
| CF1/8 | RN60B | 1/8 | 10 ohms 1 meg | 10 ohms 1 meg | 250 | .375 +1/16 -1/32 | .125 +0.040 -0.010 | ±20 | 1-1/2 ±1/8 |
| CF1/4 | RN65B | 1/4 | 10 ohms 2 meg | 10 ohms 2 meg | 300 | .625 +1/32 -1/16 | .1875 +1/16 -1/32 | ±20 | 1-1/2 ±1/8 |
| CF1/2 | RN70B | 1/2 | 10 ohms 2.5 meg | 10 ohms 5 meg | 350 | .750 +1/32 -1/16 | .250 +1/32 | ±20 | 1-1/2 ±1/8 |



PRECISION MOLDED METAL FILM

| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±.015 | Dia. B ±.010 | Leads Dia. | Lead Length C ±1/8 |
|------------------|-----------|---------|----------------------|-------------------------------|-----------------------|-----------------|----------------|------------|--------------------|
| MF 1/8 | RN60C | 1/8 | 30 ohms 500 K | 30 ohms 500 K | 250 | .406 ±.015 | .135 + .010 | ±22 | 1-1/2 ±1/8 |
| MF 1/4 | RN65C | 1/4 | 50 ohms 1 meg | 50 ohms 1 meg | 300 | .594 ±.015 | .210 + .015 | ±22 | 1-1/2 ±1/8 |
| MF 1/2 | RN70C | 1/2 | 50 ohms 1.5 meg | 50 ohms 1.5 meg | 350 | .750 + .020 | .265 + .015 | ±20 | 1-1/2 ±1/8 |
| MF 1 | RN75C | 1 | 50 ohms 4 meg | 50 ohms 4 meg | 500 | 1.110 + .020 | .395 + .020 | ±20 | 1-1/2 ±1/8 |
| MF 2 | RN80C | 2 | 100 ohms 10 meg | 100 ohms 10 meg | 750 | 2.239 ±.020 | .400 + .020 | ±20 | 1-1/2 ±1/8 |



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Precision Potentiometers

by RATTRAY



— including

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- SUB-MINIATURES
- MULTI-GANG UNITS
- STANDARD TYPES

— featuring

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RICHMOND HILL 18, N. Y.

For details, circle #524 on Reader Service Card

Directory II. Components

67. Resistors.

Mepco, Inc., 37 Abnett Ave., Morristown, N.J., 5, 15, 25, 55, 65

See ad on page 154

Tel: JEFFerson 9-2000

Metavac, Inc., N.Y., 25, 50, Coaxial

Micro-Letric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, L.I., N.Y., 20, 22, 60

See ad on page 533

Tel: FREeport 8-3222

Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 50

See ad on page 494

Tel: DRExel 6-7130

Miller Electro-Research Labs., Wis., 65

Miller Research Labs., Wis., 65

Milwaukee Resistor Co., Wis., 30, 55, 60, 65

Minco Products, Inc., Minn., 22

Minneapolis-Honeywell Reg. Co., Rubicon Instruments Div., Pa., 65

Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 45

See ad on page 619

Tel: WAverly 6-2250

Model Rectifier Corp., 1675 Utica Ave., Brooklyn 34, N.Y., 35

See ad on page 492

Tel: CLOverdale 8-6800

Montek Associates, Inc., Utah, 65

Muirhead & Co., Ltd., England, 55, 65

Muirhead Instruments, Inc., N.Y., 55, 65

Mullard Overseas, Ltd., England, 40

Murata Mfg. Co., Ltd., Japan, 30

National Electric Controller Co., Ill., 35, 60

Naz-Dar Co., Ill., 30

Non-Linear Systems, Inc., Del Mar Airport, Del Mar, San Diego, Calif., 65

See ad on page 230

Tel: SKYline 5-1134

Norden-Ketay Corp., Precision Components Div., N.Y., 20, 22

Northern Plastics Corp., Wis., 30

Nucleonic Products Co., Inc., Calif., 40

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 20, 25, 35, 45, 55, 60, 65

See ad on pages 106-107

Tel: ORchard 5-2600

Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 30

See ad on page 507

Tel: HO 8-1681

Osborne Electronic Sales Corp., Ore., 20, 22, 60, 65

Pacific Resistor Co., Calif., 30, 55, 60, 65

Pacific Science Co., Calif., 22, 65

Painton & Co., Ltd., England, 15, 20, 35, 50, 55, 60, 65

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RESISTORS, PRECISION, WIRE-WOUND

General purpose, steatite forms

Encapsulated to MIL-R-93-A

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High voltage to 1000 kv

Air- or oil-immersion applications

Matched pairs to 0.01%

Zero-temperature-coefficient sampling resistors

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Balco, and copper

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a.c. potentiometers
(linear and non-linear)

adjustable function

generators

(adjustable non-linear potentiometers)

variable ratio

transformers

- Low output impedance (as low as 40 ohms) with high input impedance (as high as 200,000 ohms)
- High resolution (up to 0.004%)
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- High linearity (as low as 0.01%)

*Vernistat (R)—A new design concept that unites in one compact device the best features of both the precision autotransformer and the multiturn potentiometer.

write for data



Perkin-Elmer Corporation
777 Main Avenue, Norwalk, Conn.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

"SILICOHM" POWER RESISTORS

(WIRE WOUND)

OFFER THESE UNIQUE FEATURES:

- **PRECISION** (tolerances to $\pm .05\%$)
- **LOW T.C. OF RESISTANCE** (± 20 ppm/ $^{\circ}\text{C}$)
- **INSULATED** (1000 V-RMS Dielectric Strength *MIN.*)
- **HIGH TEMPERATURE** (derated to 275 $^{\circ}\text{C}$)
- **STABILITY** (.5% *MAX.* lifetime drift)

PROMPT DELIVERY

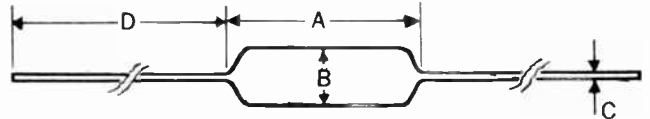
Order direct or through your distributor. A special department for prototype quantities insures shipment within one week of receipt of order.



TYPE "S" AXIAL LEAD UNITS SILICONE-COATED



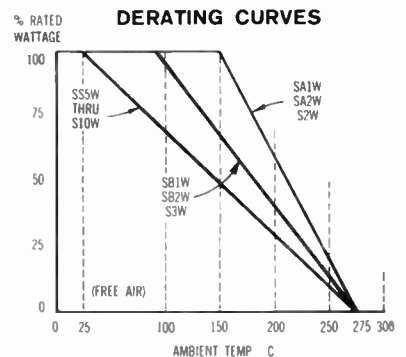
TYPE "CS" AXIAL LEAD UNITS SILICONE-COATED METAL-SHEATHED (for clip-mounting)



DIMENSIONS (Tabulated below)

| DESIGNATION | | RATING (Watts) | | NOMINAL DIMENSIONS | | | | MIN.-MAX. RESISTANCES | |
|-------------|-----------|----------------|------|--------------------|-------|-------|----|-----------------------|---------------|
| SAGE | MIL-R-26* | SAGE | MIL* | A | B | C | D | INDUCTIVE | NON-INDUCTIVE |
| SA1W | --- | 1 | --- | 1/2" | 5/32" | .032" | 2" | .05-12,000 | 3-2,500 |
| SB1W | --- | 1 | --- | 1 1/16" | 5/32" | .032" | 2" | .05-20,000 | 5-5,000 |
| SA2W | RW59 | 2 | 2.5 | 1/2" | 3/16" | .032" | 2" | .05-15,000 | 3-3,000 |
| SB2W | --- | 2 | --- | 1 3/16" | 3/16" | .032" | 2" | .05-25,000 | 6-6,000 |
| S2W | --- | 2 | --- | 5/8" | 1/4" | .040" | 2" | .05-20,000 | 5-5,000 |
| S3W | --- | 3 | --- | 3/4" | 1/4" | .040" | 2" | .05-30,000 | 8-7,500 |
| SS5W | --- | 5 | --- | 7/8" | 5/16" | .040" | 2" | .05-50,000 | 13-12,500 |
| SR5W | RW57 | 5 | 5 | 1" | 5/16" | .040" | 2" | .05-60,000 | 15-15,000 |
| SL5W | --- | 5 | --- | 1 1/8" | 5/16" | .040" | 2" | .05-70,000 | 17-17,500 |
| SS7W | --- | 7 | --- | 1 1/4" | 5/16" | .040" | 2" | .05-80,000 | 20-20,000 |
| SR7W | RW55 | 8 | 5 | 1 3/8" | 3/8" | .040" | 2" | .05-125,000 | 30-30,000 |
| SS10W | RW58 | 10 | 8 | 1 13/16" | 3/8" | .040" | 2" | .05-175,000 | 40-40,000 |
| S10W | RW56 | 10 | 10 | 1 15/16" | 3/8" | .040" | 2" | .05-200,000 | 50-50,000 |

*MIL Standard Resistors to Characteristic "G"

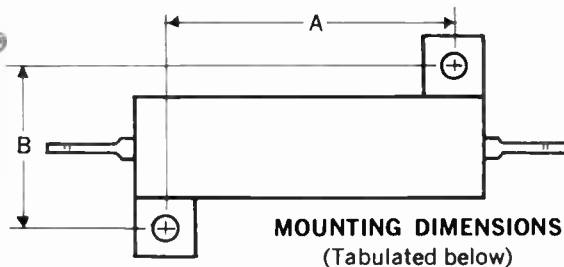


How to Use Dimension Charts in Ordering:

EXAMPLE: The order is for
850 SR5W 1000 1
 Quantity Designation Resistance Tolerance (\pm %)



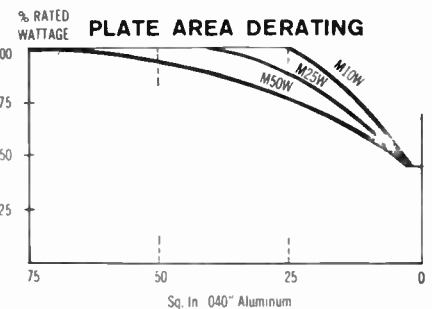
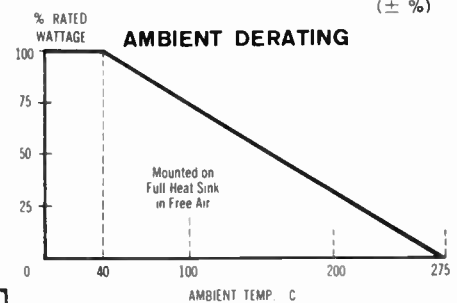
TYPE "M" CHASSIS-MOUNTED UNITS



| DESIGNATION | | RATINGS (WATTS) | | MOUNTING DIMENSIONS | | RESISTANCES | |
|-------------|--------------|-----------------|------|---------------------|-------------------|-------------|---------|
| SAGE | MIL-R-18546* | SAGE | MIL* | A ($\pm .005"$) | B ($\pm .005"$) | MIN. | MAX. |
| M10W | --- | 10 | --- | .562" | .625" | .05 | 25,000 |
| M25W | RH25 | 20 | 15 | .719" | .781" | .05 | 50,000 |
| M50W | RH50 | 40 | 30 | 1.562" | .844" | .05 | 175,000 |

*MIL Standard Resistors to Characteristic "G"

NOTE: "N" prefix to any given designation denotes non-inductive winding; example, 850 NSR5W1000-1.



Directory II. Components

67. Resistors.

- Pendar, Inc., Calif., 55
Penn Resistor Corp., Pa., 15, 25
Perkin-Elmer Corp., Vernistat Div.,
777 Main St., Norwalk, Conn., 22, AC
See ad on page 535
Tel: Victor 7-2441
- Phaotron Instrument & Electronic Co.,
Calif., 5, 15, 55, 60
- Physics Research Labs., Inc., P.O. Box
555, Hempstead, N.Y., 22
See ad on page 306
Tel: IVanhoe 3-8299
- Power Industries Co., Inc., Ill., 55, 60,
65
- Precision Electronic Components, Ltd.,
Canada, 10, 15, 20, 55, 65
- Precision, Inc., Minn., 55, 65
- Precision Line, Inc., Mass., 20, 22, 35,
60, 65
- Precision Resistor Co., Inc., N.J., 55, 65
- Pyrofilm Resistor Co., Inc., N.J., 15, 25,
45
- Ratray & Co., Inc., George, Div. of
Hardwick, Hindle, Inc., 116-08 Myrtle
Ave., Richmond Hill 18, N.Y., 20, 22,
60, 65
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Tel: Virginia 6-8250
- Raytheon Co., Mass., 22
- Reon Resistor Corp., 117 Stanley Ave.,
Yonkers, N.Y., 20, 30, 55, 65
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Tel: YOnkers 5-9850
- Resistance Products Co., Pa., 25, 30, 45,
50, 55, 65
- Resistors, Inc., Ill., 55, 60
- Rex Rheostat Co., N.Y., 35, 55, 60
- Rho Engrg. Co., Calif., 30, 55, 65, Hi
Temperature
- Rinco, Inc., Ore., 22, 35, 55, 60, 65
- Rogers Electronic Tubes & Components,
Canada, 15, 40, 65, Voltage Dependent
- Ruckelshaus Labs., Inc., John G., N.J.,
25, 30, 45
- Ruge Assoc., Inc., Arthur C., N.H., 40
- Sage Electronics Corp., 2 Country Club
Rd., East Rochester, N.Y., 55, 65
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Tel: LU 6-8010
- San Fernando Electric Mfg. Co., Calif.,
20, 22
- Servonic Instruments, Inc., Calif., 20, 22,
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- Servotrol Co., Ill., 20, 22, 60, 65
- Shallcross Mfg. Co., 20 Preston St.,
Selma, N.C., 20, 22, 55, 65
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Tel: WOODLAWN 5-2341
- Shallite, Inc., N.J., 55, 65
- Siemens & Halske, A.G., Germany, 40
- Siemon Mfg. Co., Ill., 22
- Specialties, Inc., N.Y., 20, 22, 65
- Spectrol Electronics Corp., Calif., 20, 22,
60, 65
- Speer Carbon Co., Speer Resistor Div.,
Pa., 5

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per MIL-R-94B



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2 Watt
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TYPE RV6
1/2 Watt
1/2" Diameter
MINIATURE

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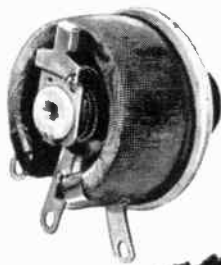
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FACTORY:
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Shallcross

PRECISION WIREWOUND RESISTORS

Small, Shallcross "P-Type" encapsulated resistors offer unmatched stability and reliability for critical applications. All are reverse-pi wound on multiple-section epoxy resin bobbins then hermetically-sealed in a tough epoxy coating.

"P-Type" resistors are offered in a complete range of commercial and military

types with radial leads, axial leads, or lug terminals. Military types meet or exceed MIL-R-93A (85°C ambient) and MIL-R-9444 (125°C ambient) requirements—including salt water immersion tests. Standard tolerances—1%, 0.5%, 0.25%, 0.1%, and 0.05%. Close tolerances and matched pairs a specialty. Write for Bulletin L-30.



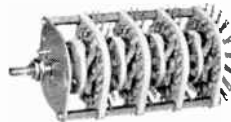
ROTARY SELECTOR SWITCHES

STANDARD SWITCHES



Single-Pole, instrument-type switches using silicone-impregnated steatite or phenolic decks. 3/4" laminated silver or solid brass contacts and multiple-leaf wiper arms. Positive, long-life ball-bearing detent. Up to 4 decks. Many optional special features. *Bulletin L-31.*

OVAL CERAMIC SWITCHES



Assembled by Shallcross from stock, interchangeable parts, the "12,000" Series offers custom-built quality without the delay and cost of specials. Solid silver contacts and collector rings on steatite decks. 0.0025 Ω contact resistance. 1 to 3 poles per deck, up to 10 decks. Adjustable stop. Optional detent. *Bulletin L-32.*

MINIATURE SWITCHES

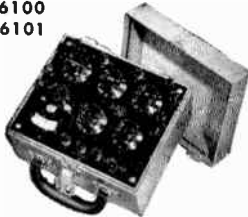


Only 1 3/4" square by 1" deep for first deck, 5/8" for additional decks. Silver alloy button contacts and multi-leaf wipers maintain low contact resistance. Glass fibre Silicone-laminate decks for outstanding humidity, moisture and salt-spray resistance. 1 to 4 poles per deck. 1 or 2 hole mounting. Easily-positioned, adjustable stops. *Bulletin L-45A.*

BRIDGES

Field & Lab Types for Precise DC Resistance Measurements . . . 1 micro-ohm to 10⁹ megohms. *Bulletin L-19B*

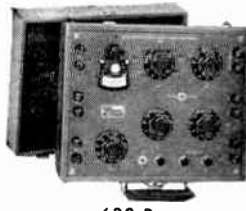
6100
6101



617 series



6320



638-R

| Model Number | Measurement Accuracy | Maximum Setting | Minimum Setting | Circuit | Special Features |
|--------------|--|---------------------------------------|--------------------|-------------------------------|--|
| 6100 | ±0.1% +0.01Ω (1Ω to 1.011 MegΩ) | 1.011 MegΩ | 0.001Ω | Fault Location—Wheatstone | Fault Location by Murray, Varley, Hiborn & Fisher Loop Tests. |
| 6101 | ±0.1% +0.01Ω (1Ω to 11.11 MegΩ) | 11.11 MegΩ | 0.001Ω | Wheatstone | Four dial rheostat usable as decade box. |
| 6320 | ±0.02% +0.01Ω (1Ω to 11.11 MegΩ) | 111.11 MegΩ | 0.00001Ω | Wheatstone | Most accurate five dial Shallcross bridge for direct resistance measurement. |
| | ±0.05% to ±20% on separate "1" and "10" percent selectors. (1Ω to 10 MegΩ) | 11.111 MegΩ | 0.0001Ω | Percent Limit | Rapid "GO-NO GO" percent limit testing. Built-in adjustable comparison standard. |
| 638-R | ±0.75% or better (.001Ω to 1Ω) | 11.11Ω | 0.000001Ω | Kelvin | Overlapping Kelvin and Wheatstone ranges selected with single ratio dial. |
| | ±0.2% +0.01Ω (1Ω to 11.11 MegΩ) | 11.11 MegΩ | .001Ω | Wheatstone | |
| 6350 | ±1%, (10Ω to 10 MegΩ) ±2%, (10 MegΩ to 10,000 MegΩ) ±5%, (above 10,000 MegΩ) | 1.111 x 10 ⁹ MegΩ | 0.01Ω | Wheatstone with d-c Amplifier | Modular construction dual range power supply, null indicator-amplifier, for 115V. 60 cycle operation. |
| 617 Series | ±0.1% to ±20% on separate "1" and "10" selectors from a minimum resistance consistent with number of dials in use to the maximum settings. | 111,111Ω 1,111,110Ω 11,111,100Ω | 0.1Ω *1Ω 10Ω | Percent Limit | For rapid "GO-NO GO" percent limit testing. Hand or foot operated for production testing. All models also usable for direct resistance measurements. Binding post for external d-c power supply. |
| | ±0.2% +0.01Ω from a minimum consistent with number of dials in use to the maximum setting. | 111,111Ω 1,111,110Ω 11,111,100Ω | 0.1Ω *1Ω 10Ω | Wheatstone | |

† Except 617B and 617J ±0.1% ±0.01Ω.

* Except 617G, 0.01Ω.

DECADE RESISTANCES

Available as single unmounted decades or as complete decade resistance boxes with 1 to 6 dials. Steps as low as 0.01 ohm; total resistance as high as 11,111,100 ohms.

Remarkably rugged and accurately-calibrated for maintained stability in rough lab, classroom and production line work. Uses impregnated Shallcross precision wirewound resistors mounted on steatite switch decks. Large button contacts of silver or brass. Write for *Bulletin L-17A.*



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Laboratory-type voltage dividers used in bridge circuits, for measuring rotary potentiometer linearity, in synchro-test delta bridge circuits, and in other uses requiring maintained accuracy and high resolution. Kelvin-Varley or Potentiometer circuits available in eight 4 and 5 dial models.

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Single turn and multiturn.
Wide range of resistance values.
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Temperature range to 225°C.
Wirewound and film resistance elements.
Metal casings and hermetically

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Threaded bushing mountings, except box types that offer printed current lugs, tinned leads or standard 3 wire lead mountings.

● PRECISION PANEL CONTROLS

High accuracy of terminal conformity.
Wide range of standard resistance values in pots ranging in size from 1/2" diam. to 3" diam.

Commercial types available in addition to those manufactured to meet military specifications.

● PRECISION SERVO TYPE POTS

Linear and non-linear single and multiturn wirewound pots in a range of sizes from 7/8" diameter to 3" diameter.
Sine-Cosine pots from 7/8" diam. to 3" diam. in addition to many special designs.
Unique, new film resistance in hermetically sealed

moisture-proof units provide operation up to 225°C. assuring extreme accuracy and reliability under the most severe environmental conditions.
High accuracy, ultra reliable, long life precision provide incomparable performance characteristics.

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Basic Electro-Mechanical components for Systems Designers.
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Measure absolute, gage or differential pressures in extreme environmental conditions with a high degree of accuracy.
Film type or wirewound resistances available.

Designed for use with non-corrosive fluids.
Output is either one or two potentiometers whose functions are linear with pressure.
Full details upon request.

● TRANSLATORY POTS

For lineal motion with both linear and non-linear resistance functions.

Range of stroke lengths from 2 1/2" to 12".

● Accelerometers ● Dials and Knobs ● Precision Drives

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Call COLonial 3-7711

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67. Resistors.

Sprague Electric Co., Mass., 15, 25, 30
Square D Co., Wis., 55, 60, 65
Stackpole Carbon Co., Pa., 5, 10
Standard Telephones & Cables, Ltd.,
England, 25

Superior Electric Co., 590 Tripp Ave.,
Bristol, Conn., 35

See ads on pages 422, 424, 426, 481,
502, 562, 570, 588

Tel: LUDlow 2-9561

Symphony Electronics Corp., Calif., 5
Tech Laboratories, Inc., Bergen & Ed-
sall Bldvs., Palisades Park, N.J., 20,
35, 55

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Tel: WINDsor 4-2221

Technical Apparatus Builders, 109 GB
Liberty St., New York 6, N.Y., 35, 40,
45

See ad on page 502

Tel: REctor 2-6249

Technology Instrument Corp., Calif., 20,
22, 25

Technology Instrument Corp., 535 Main
St., Acton, Mass., 20, 22, 25, 30, 35, 60,
65

See ad on this page

Tel: COLonial 3-7711

Tech-Ohm Resistor Corp., N.Y., 15, 25,
30, 55, 60, 65

Telewave Laboratories, Inc., N.Y., 25
Texas Instruments Incorporated, Semi-
conductor-Components Div., P.O. Box
312, 13500 N. Central Expressway,
Dallas, Tex., 5, 15, 25, 30

See ads on pages 75-78

Tel: FLEetwood 7-5411

Transformers, Inc., N.Y., 65

Tru-Ohm Products, Div. of Model Eng.
& Mfg. Co., Inc., 2800 N. Milwaukee
Ave., Chicago 18, Ill., 20, 30, 35, 55, 60

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Tel: EVerglade 4-2645

Ultronix, Inc., Calif., 30, 55, 60, 65

United Aircraft Corp., Ketay Dept.,
Norden Div., N.Y., 20, 22

United Aircraft Corp., Norden Div.,
Conn., 20

United Mineral & Chemical Corp., 18
Hudson St., New York 13, N.Y., 10,
15, 20, 30, 50, 55

See ads on pages 541, 681

Tel: BEEkman 3-8870

U.S. Science Corp., Sub. Topp Indust.,
Inc., Calif., 20, 22, 55, 60, 65

Victoreen Instrument Co., 5806 Hough
Ave., Cleveland 3, Ohio, 15, 45, 50

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Tel: ENdicott 1-6200

Victory Engineering Corp., 114 Spring-
field Rd., Union, N.J., 40

See ad on page 541

Tel: MURdock 8-7150

Voak Engineering Co., Calif., 22

Ward Leonard Electric Co., 83 South
St., Mt. Vernon, N.Y., 35, 55

See ad on page 526

Tel: MOUNT Vernon 4-1000

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Phone: TURNER 7-3955

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Phone: FEDERAL 2-5457

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Directory II. Components

67. Resistors.

- Waters Mfg., Inc., Mass., 20, 22, 60, 65
- Welch Scientific Co., W. M., Ill., 35
- Wells Co., Inc., Gary, N.Y., 15
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- Welwyn International, Inc., Ohio, 15, 20, 25, 35, 45, 50, 55, 60, 65
- White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 5, 50

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Tel: MURray Hill 3-3015

- Winslow Co., Inc., N.J., 22, 50
- Workman TV, Inc., N.J., 40, 55
- Wuerth Tube-Saver Corp., Mich., Surge-istor Overload Device

Retaining rings: See class 87

Rheostats: See class 67

Rivets: See class 87

Screws: See class 87

**Selenium diodes and stacks:
See class 64**

68. Semi-Conductors.

- 5. Germanium diodes
- 6. Photoconductors
- 7. Silicon diodes
- 10. Transistors, junction
- 15. Transistors, point contact
- 20. Transistors, alloy junction
- 25. Transistors, diffused base
- 30. Transistors, surface barrier

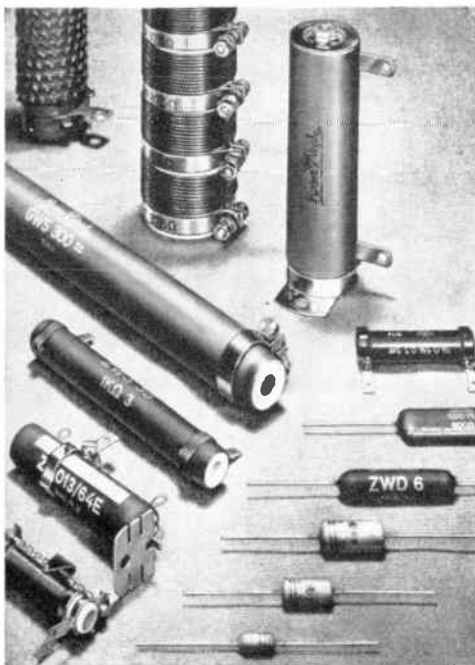
American Elite, Inc., N.Y., 5
Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 5, 7, 10, 20
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Tel: WELLS 1-6200
Audio Devices, Inc., Rectifier Division, Calif., 7

Bendix Aviation Corp., Red Bank Div., Semiconductor Products, 201 Westwood Ave., Long Branch, N.J., 7, 10, 20
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Tel: CAPital 2-6220
Bendix Aviation Corp., Research Laboratories Div., Mich., 5, 7, 10, 15, 20, 25, 30

Bomac Labs., Inc., Salem Rd., Beverly, Mass., 7
See ad on page 172
Tel: WALKer 2-6000



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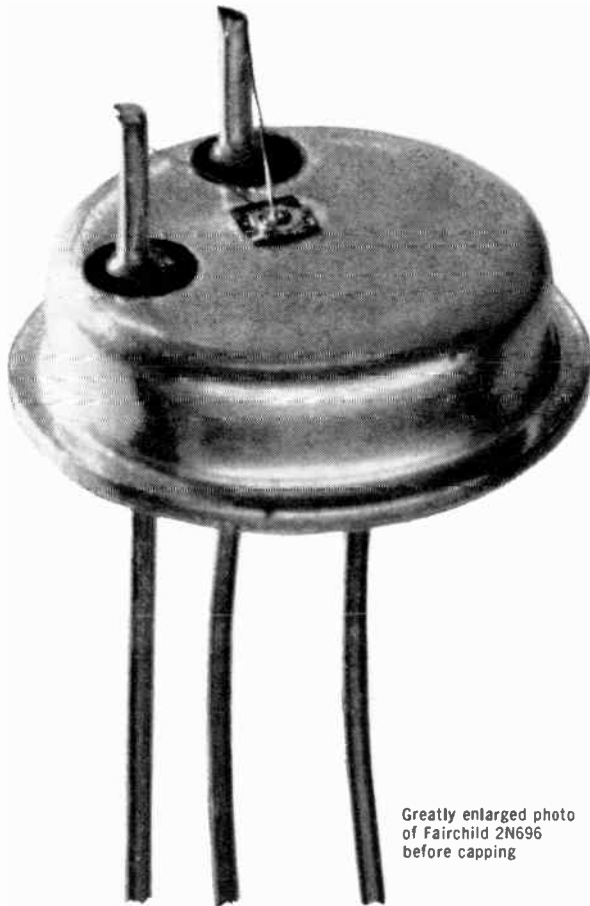
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FAIRCHILD SILICON MESA TRANSISTORS

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Greatly enlarged photo of Fairchild 2N696 before capping

PNP

| ABSOLUTE MAXIMUM RATINGS (25° C.) | | | | | |
|--|---|--------------|---------------|---------------|--------------------------------|
| V_{CE} | Collector to emitter voltage | | | | 30v |
| V_{CB} | Collector to base voltage | | | | 40v |
| V_{EB} | Emitter to base voltage | | | | 5v |
| Total dissipation at case temperature 25° C. | | | | | 2 watts |
| at case temperature 100° C. | | | | | 1 watt |
| ELECTRICAL CHARACTERISTICS (25° C.) | | | | | |
| SYMBOL | CHARACTERISTIC | MIN. | TYPICAL | MAX. | TEST CONDITIONS |
| h_{FE} | O. C. pulse current gain | 2N1131 15 | 45 | 90 | $I_C = 150mA$ $V_C = 10V$ |
| | | 2N1132 30 | | | |
| $V_{BE SAT.}$ | Base saturation voltage | | 1.0V | 1.5V | $I_C = 150mA$ $I_B = 15mA$ |
| $V_{CE SAT.}$ | Collector saturation voltage | | 0.9V | 1.5V | $I_C = 150mA$ $I_B = 15mA$ |
| h_{FE} | Small signal current gain at $f = 20mc$ | | 2.5 | | $I_C = 50mA$ $V_C = 10V$ |
| C_{cb} | Collector capacitance | | 35 $\mu\mu f$ | 45 $\mu\mu f$ | $I_E = 0mA$ $V_C = 10V$ |
| I_{CBO} | Collector cutoff current | | .01 μA | 1.0 μA | $V_C = 30V$ $T = 25^\circ C.$ |
| | | | 5.0 μA | 100 μA | $V_C = 30V$ $T = 150^\circ C.$ |

NPN

| ABSOLUTE MAXIMUM RATINGS (25° C.) | | | | | |
|--|---|-------------|---------------|---------------|--------------------------------|
| V_{CE} | Collector to emitter voltage | | | | 40v |
| V_{CB} | Collector to base voltage | | | | 60v |
| V_{EB} | Emitter to base voltage | | | | 5v |
| Total dissipation at case temperature 25° C. | | | | | 2 watts |
| at case temperature 100° C. | | | | | 1 watt |
| ELECTRICAL CHARACTERISTICS (25° C.) | | | | | |
| SYMBOL | CHARACTERISTIC | MIN. | TYPICAL | MAX. | TEST CONDITIONS |
| h_{FE} | O. C. pulse current gain | 2N696 20 | 60 | 120 | $I_C = 150mA$ $V_C = 10V$ |
| | | 2N697 40 | | | |
| $V_{BE SAT.}$ | Base saturation voltage | | 1.0V | 1.3V | $I_C = 150mA$ $I_B = 15mA$ |
| $V_{CE SAT.}$ | Collector saturation voltage | | 0.5V | 1.5V | $I_C = 150mA$ $I_B = 15mA$ |
| h_{FE} | Small signal current gain at $f = 20mc$ | | 5 | | $I_C = 50mA$ $V_C = 10V$ |
| C_{cb} | Collector capacitance | | 20 $\mu\mu f$ | 35 $\mu\mu f$ | $I_E = 0mA$ $V_C = 10V$ |
| I_{CBO} | Collector cutoff current | | .01 μA | 1.0 μA | $V_C = 30V$ $T = 25^\circ C.$ |
| | | | 5.0 μA | 100 μA | $V_C = 30V$ $T = 150^\circ C.$ |

For specification sheets, write Dept. E-59

545 WHISMAN ROAD • MOUNTAIN VIEW, CALIFORNIA • YO 8-8161



Directory II. Components

68. Semi-Conductors.

Bradley Semiconductor Corp., Conn. 7
Braun Tool & Instrument Co., Inc., 141
Fifth Ave., Hawthorne, N.J., transis-
tor clips

See ads on pages 459, 543, 551

Tel: HAWthorne 7-1773

British Thomson-Houston Co., Ltd.
England, 5, 7, 10, 15

Brown Co., Irv., N.Y., 7

CBS Electronics Div., CBS, Inc., 100
Endicott St., Danvers, Mass., 5, 7, 10,
20, 25

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Tel: SPring 4-2360

Clairex Corp., 19 W. 26th St., New York
10, N.Y., 6

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Tel: MURray Hill 4-0940

Clevite Corp., M.B.H. Div., Germany,
5, 7, 10

Clevite Transistor Prods., Mass., 5, 7, 10

Columbus Electronics Corp., 1010 Saw
Mill River Rd., Yonkers, N.Y., 7

See ads on pages 511, 543

Tel: YOnkers 8-1221

Continental Device Corp., Calif., 7

Continental Electric Co., Ill., Lead
Sulphide

Delco Radio, Div. Gen. Motors Corp.,
Ind., 20, Power

Eastman Kodak Co., Apparatus & Opti-
cal Div., 343 State St., Rochester 4,
N.Y., 6

See ad on page 545

Tel: LOcust 2-6000

Ebauches, S. A., Dep. Semiconducteurs,
Switzerland, 10, 20

Erie Resistor Corp., 644 W. 12th St.,
Erie 6, Pa., 5

See ad on pages 110-111

Tel: GLendale 6-8592

Fairchild Semiconductor Corp., Dept.
E-59, 545 Whisman Rd., Mountain
View, Calif., 25

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Tel: YOrkshire 8-8161

Ferranti Electric, Inc., Electronics Div.,
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Finney Co., Ohio, 5, 7

Fuji Communication Apparatus Mfg.
Co., Ltd., c/o The Nissho American
Corp., N.Y., 5

General Electric Co., Semiconductor
Prods. Dept., N.Y., 10, 20, 25

General Electric Co., Ltd., of England,
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General Instrument Corp., Automatic
Div., N.J., 5, 7

General Instrument Corp., Semiconduc-
tor Div., N.J., 5, 7

General Motors Corp., Delco Radio
Div., Ind., 20

General Transistor Corp., 91-27 138th
Pl., Jamaica 35, N.Y., 5, 10, 20, 25

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Tel: HICKory 1-1000

Grace Electronic Chemicals, Inc., 101
N. Charles St., Baltimore 1, Md., Sili-
con

See ad on page 442

Tel: PLaza 2-7699

Green Rectifier Co., N.J., 5, 7

Hoffman Electronics Corp., Semicon-
ductor Div., 930 Pitner Ave., Evans-
ton, Ill., 7

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Tel: UNiversity 9-9850

Hughes Aircraft Co., Hughes Prod.
Div., Calif., 5, 7, 10, 15, 20, 25, 30

Hughes Products, Semiconductor Div.,
500 Superior Ave., Newport Beach,
Calif., 5, 7, 10, 20, 25

See ad on page 544

Tel: LI 8-0671

Industro Transistor Corp., 35-10 36th
Ave., Long Island City 6, N.Y., 20

See ad on page 545

Tel: EXeter 2-8000

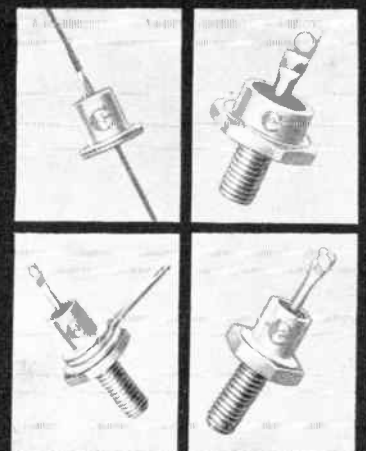
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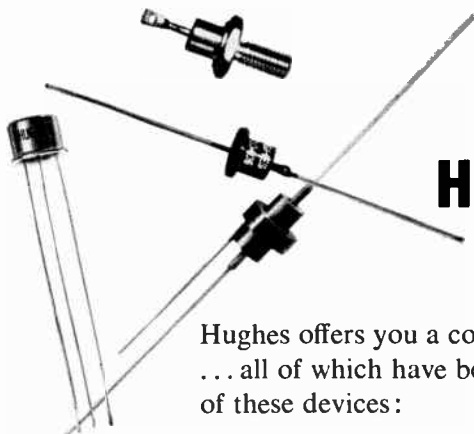
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Hughes offers you a complete line of high performance semiconductor devices . . . all of which have been engineered for extreme reliability. Here is a sample of these devices:

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All the popular EIA type numbers are available on both glass and metal packages.

TRANSISTORS—*Germanium NPN and PNP* alloy junction transistors for high-speed switching applications at low and medium current levels.

Silicon PNP alloy junction transistors for switching and amplifying applications at low to medium current levels.

Silicon PNP Double-Diffused Mesa (DDMT) high frequency transistor switches and IF amplifiers operable at low to medium current levels.

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San Francisco, 535 Middlefield Road; Palo Alto, Calif.; DA 6-7780
Syracuse, 224 Harrison Street; Syracuse 2, N. Y.; GRanite 1-0163
Chicago, 6120 West North Ave.; Chicago 39, Ill.; NAtional 2-0283
Philadelphia, 1 Bala Avenue; Bala-Cynwyd, Penn.; MOhawk 4-8363
Los Angeles, 690 N. Sepulveda; El Segundo, Calif.; OR 8-6125*

Or write Hughes Products, Marketing Department,
SEMICONDUCTOR DIVISION, NEWPORT BEACH, CALIFORNIA.
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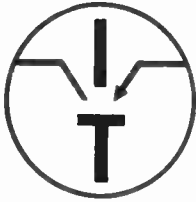
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Directory II. Components

68. Semi-Conductors.

International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 7

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Tel: ORegon 8-6281

International Telephone & Telegraph Corp., ITT Components Div., 100 Kingsland Rd., P.O. Box 412, Clifton, N.J., 7

See ad on pages 148-149

Tel: NUTley 2-3600

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Microwave Assoc., Inc., Mass., 7

Miller Co., Sanford, N.Y., 7

Minneapolis-Honeywell Regulator Co., Semiconductor Products Div., Minn., 20

Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 15

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Tel: WAverly 6-2250

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Ohio Semiconductors, Inc., 1035 W. Third Ave., Columbus 8, Ohio, Hall Effect Devices

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Tel: AX 4-4938

Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 5

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Tel: ORchard 5-2600

Pacific Semiconductors, Inc., Calif., 7, 25

Philco Corp., Lansdale Tube Co. Div., Church Rd., Lansdale, Pa., 5, 7, 10, 20, 25, 30

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Tel: ULysses 5-4681

Radio Corp. of America, Defense Elec. Prod., N.J., 5, 7, 10, 15, 20

Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. Fifth St., Harrison, N.J., 6

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Tel: HUMBoldt 5-3900

Radio Corp. of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 5, 7, 10, 20, 25

See ad on page 56

Tel: RAndolph 5-4500

Radio Development & Research Corp., N.J., 7, 10

Raytheon Co., Mass., 5, 7, 10, 20

Q: What is a Kodak Ektron Detector?

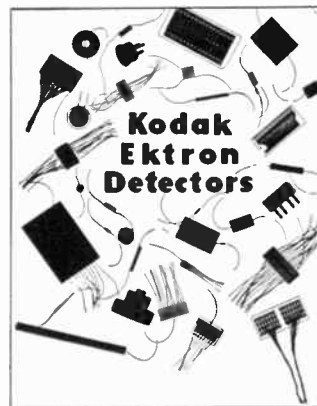
A: It is a semi-conductive resistor. The photosensitive area can be laid down in any pattern. Response extends to 3.5 microns in the infrared. Unaffected by vibration; high signal-to-noise ratio.

Q: What can it be used for?

A: For such applications as an infrared sensor in weapons systems, and in instrumentation for process control, analysis, and safety.

Q: How can I get the facts about spectral response, types, availabilities, and the like?

A: By writing for a new brochure called "Kodak Ektron Detectors."



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**Apparatus and Optical Division
EASTMAN KODAK COMPANY, Rochester 4, N. Y.**

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PHILCO TRANSISTORS

SURFACE BARRIER TRANSISTORS (SBT)

| TYPE | GAIN h_{fe} | FREQUENCY f_{max} in mc | APPLICATIONS |
|-------|------------------|------------------------------|---|
| 2N128 | 40 | 60 | General communications; MIL specifications |
| 2N240 | 30 | Switching rates 20mc | High-speed switch; controlled hole storage and saturation characteristics; MIL specifications |
| 2N299 | 22db @ 10mc | 110 | Tuned amplifier; MIL specifications |
| 2N300 | 18 | 95 | Video amplifier; MIL specifications |
| 2N344 | 22 | 50 | General purpose; narrow beta spread (11-33) |
| 2N345 | 35 | 50 | General purpose; similar to 2N344 with higher beta; MIL specifications |
| 2N346 | 20 | 75 | General purpose; like 2N344 and 2N345 but higher frequency |

*Philco Corp. for Surface Barrier Transistor

MICRO ALLOY TRANSISTORS (MAT*)

| TYPE | GAIN h_{FE} | FREQUENCY f_{max} in mc | APPLICATIONS |
|---------|------------------|------------------------------|--|
| 2N393 | 95 | 60 | High-speed, high-gain switch; MIL specifications |
| 2N1122 | 95 | 60 | High-speed, high-voltage level switch |
| 2N1122A | 95 | 60 | Higher voltage level operation |

*Trademark Philco Corp. for Micro Alloy Transistor

MICRO ALLOY DIFFUSED-BASE TRANSISTORS (MADT*)

| TYPE | GAIN | FREQUENCY f_{max} in mc | APPLICATIONS |
|--------|----------------|------------------------------|--|
| 2N499 | 10db @ 100mc | 320 | VHF amplifier; MIL specifications |
| 2N501 | h_{FE} 35 | Switching rates 40mc | Ultra-fast switch; typical t_r 9 μ sec; t_s 9 μ sec; t_f 7 μ sec; MIL specifications |
| 2N501A | h_{FE} 35 | Switching rates 40mc | Rated at 100°C; MIL specifications |
| 2N502 | 10db @ 200 mc | 700 | VHF amplifier; MIL specifications |
| 2N502A | 10db @ 200 mc | 700 | Rated at 100°C; MIL specifications |
| 2N503 | 12.5db @ 100mc | 420 | VHF amplifier |
| 2N504 | 46db @ 455kc | Minimum 50 | IF amplifier; high level logic switch |
| 2N588 | 14db @ 50mc | 250 | General purpose RF-IF amplifier |

*Trademark Philco Corp. for Micro Alloy Diffused-base Transistor

MICRO-MINIATURE TRANSISTORS

| TYPE | GAIN h_{fe} | FREQUENCY f_{cb} in mc | APPLICATIONS |
|--------|------------------|-----------------------------|--|
| 2N207 | 100 | 2 | Low level amplifier; particularly suited for hearing aid use; N.F.* 15db max |
| 2N207A | 100 | 2 | Low level amplifier; particularly suited for hearing aid use; N.F.* 10db max |
| 2N207B | 100 | 2 | Hearing aid input stage; other extremely low noise applications; N.F.* 5db max |
| 2N534 | 150 | | High voltage amplifier switch |
| 2N535 | 100 | 2 | General purpose; 85°C max temperature rating; N.F.* 10db max |
| 2N535A | 100 | 2 | General purpose; 85°C max temperature rating; N.F.* 5db max |
| 2N535B | 100 | 2 | General purpose; 85°C max temperature rating; N.F.* 0db max |
| 2N536 | h_{FE} 100 | 2 | Low level switch at pulse rates up to 150kc |

*Noise Factor at 1 μ v reference level across 1000 ohms

SILICON SURFACE ALLOY TRANSISTORS (SAT*)

| TYPE | GAIN h_{fe} | FREQUENCY f_{max} 15mc | APPLICATIONS |
|-------|------------------|-----------------------------|---------------------------------|
| 2N495 | 15 | | General purpose; MIL specs |
| 2N496 | h_{FE} 10 | f_T 11mc** | High-speed switching; MIL specs |

*Trademark Philco Corp. for Surface Alloy Transistor **Frequency for $\beta=1$

BILATERAL TRANSISTOR

| TYPE | GAIN h_{FE}^* | FREQUENCY f_{cb} 500kc | APPLICATIONS |
|-------|--------------------|-----------------------------|---|
| 2N462 | 45 | | Controlled pulse response (max t_{on} and t_{off} 12 μ sec) |

*Forward and inverse

MEDIUM FREQUENCY TRANSISTORS

| TYPE | GAIN h_{FE} | FREQUENCY f_{cb} in mc | APPLICATIONS |
|--------|------------------|-----------------------------|---|
| 2N597 | 70 | 4.5 | High-voltage general purpose amplifier and switch; TO-9 case 500kc logic switching; TO-9 case Logic switching rates up to 1mc; core driver; TO-9 case |
| 2N598 | 85 | 7.5 | 500kc switching; 1 watt peak power dissipation for 0.1 sec; stud mount |
| 2N599 | 105 | 18 | High-power core driver; typical rise time 0.1 μ sec; stud mount |
| 2N600 | 85 | 7.5 | High-voltage power amplifier and switch; stud mount |
| 2N601 | 105 | 18 | High-voltage power amplifier and switch; stud mount |
| 2N1123 | 70 | 4.5 | High-voltage power amplifier and switch; stud mount |

PULSE AMPLIFIER TRANSISTORS

| TYPE | GAIN h_{FE} | FREQUENCY | APPLICATIONS |
|-------|------------------|-------------------------|---|
| 2N670 | h_{FE} 100 | f_{cb} 700kc | High peak current pulse amplifier; relay driver |
| 2N671 | 100 | f_{cb} 650kc | High power version of 2N670; stud mount |
| 2N672 | 20 (Sat.) | 0.5 μ sec max t_r | High-current switching core driver; controlled rise, fall and store times |
| 2N673 | 20 (Sat.) | 0.5 μ sec max t_r | High power version of 2N672; stud mount |

MEDIUM POWER TRANSISTORS

| TYPE | GAIN h_{FE} | FREQUENCY f_{cb} in mc | APPLICATIONS |
|--------|--------------------|-----------------------------|---|
| 2N223 | h_{FE} 110 | 0.6 | Audio driver; exceptional beta lin. |
| 2N224 | 90 | 0.51 | Audio output; exceptional beta linearity; available as matched pair (2N225) |
| 2N226 | 60 | 0.4 | Audio output; exceptional beta linearity; available as matched pair (2N227) |
| 2N1124 | Min h_{fe} 40 | Minimum 0.4 | E3-51 based high-voltage, general purpose industrial amplifier |
| 2N1125 | h_{fe} 100 | Minimum 1 | E3-51 based high-voltage, medium frequency amplifier and switch |
| 2N1126 | Min h_{fe} 40 | Minimum 0.4 | E3-51 based high-power, high-voltage, general purpose industrial amplifier; stud mount |
| 2N1127 | 100 | Minimum 1 | E3-51 based high-power, high-voltage, medium frequency amplifier and switch; stud mount |
| 2N1128 | h_{fe} 100 | 1 | E3-51 based audio driver |
| 2N1129 | 165 | 0.75 | E3-51 based high-gain transistor for amplifier and switching |
| 2N1130 | 125 | 0.75 | E3-51 based general purpose audio transistor |

POWER TRANSISTORS

| TYPE | GAIN | FREQUENCY f_{ce} in kc | APPLICATIONS |
|-------|---------------|-----------------------------|---|
| 2N386 | 33db @ 5w PO | Minimum 7 | High-voltage general purpose amplifiers; relay actuators and power converters |
| 2N387 | 33 db @ 5w PO | Minimum 6 | High-voltage general purpose amplifiers; relay actuators and power converters |

PHILCO
LANSDALE TUBE COMPANY DIVISION
 LANSDALE, PENNSYLVANIA



Directory II. Components

68. Semi-Conductors.

- Raytheon Co., Semiconductor Div., Mass., 5, 7, 10, 20, 25
Rheem Semiconductor Corp., Dept. P 13, 327 Moffett Blvd., Mountain View, Calif., 7, 10, 25
 See ad on page 512
 Tel: YOrkshire 8-8391
 Rogers Electronic Tubes & Components, Canada, 5, 7, 10, 20
 Semicon, Inc., Mass., 7
 Semi-Elements, Inc., Pa., 5, 7
 Shockley Transistor Corp., Calif., 7, Four-Layer
Silicon Transistor Corp., 150 Glen Cove Rd., Carle Place, L.I., N.Y., 7, 25
 See ad on page 548
 Tel: PIONEER 2-4100
 Single Crystal Corp. of Amer., Pa., 5, 7, 10, 15, 20, 25, 30
 Solid State Products, Inc., Mass., 25
 Sonex, Inc., Pa., Transistor Curve Tracer
 Sperry Gyroscope Co. of Canada, Ltd., Canada, 7, 15
 Sperry Rand Corp., Sperry Semiconductor Div., Conn., 7, 10, 20, 25
 Sprague Electric Co., Mass., 30
 Standard Telephones & Cables, Ltd., England, 5, 7, 10, 20, 25, 30
State Laboratories, Inc., 649 Broadway, New York 12, N.Y., 5, 10, 20
 See ad on page 581
 Tel: OREGON 7-8400
 Sylvania Electric Products, Inc., Semiconductor Div., Mass., 5, 7, 10, 20, 25
 Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 5, 7, 10, 20, 25
 See ad on page 23-25
 Tel: JUDSON 6-2424
 Syntron Co., 83 Lexington Ave., Homer City, Pa., 7
 See ad on page 513
 Tel: GR 9-8011
 Tarzian, Inc., Sarkes, Ind., 7
 Technical Apparatus Builders, 109GB Liberty St., New York 6, N.Y., 5, 7, 10, 15, 20
 See ad on page 502
 Tel: RECTOR 2-6249
 Texas Instruments Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 7, 10, 20, 25, Transistors, Silicon, Germanium
 See ad on pages 75-78
 Tel: FLEETWOOD 7-5411

Be sure to consult the advertisements in this issue for complete information on products. Directory listings cannot tell you everything you want to know about a company's products. For example, the Silicon Transistor Corporation advertisement on page 548 gives complete specifications on their entire line of semiconductors.

- Thermosen, Inc., Conn., 7
 Thompson-Ramo-Wooldridge, Inc., Calif., 5, 7, 30
 Transatron Electronic Corp., 168-182 Albion St., Wakefield, Mass., 5, 7, 10, 20, 25
 See ad on pages 146-147
 Tel: CRYSTAL 9-4500
 Trans-Sil Corp., N.J., 7
Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 20
 See ad on pages 50-51
 Tel: HUMBOLDT 2-4200
 United Components, Inc., N.J., 7
 United States Dynamic Corp., Mass., 5, 7, 10, 15, 20, 25, 30
U.S. Semiconductor Prods., Inc., 3540 W. Osborn Rd., Phoenix, Ariz., 7
 See ad on page 252
 Tel: APPLGATE 8-5591
 Westinghouse Electric Corp., Pa., 5, 7, 10, 15, 20, 25, 30
 Westinghouse Electric Corp., Semiconductor Dept., Pa., 5, 7, 10, 20, 25

Servo-Mechanisms: See class 28

Shafts, flexible: See class 87

Signal generators, AM & FM: See class 26

Signal generators, TV: See class 35

Silicon crystals: See class 47

Silicon diodes: See class 68

Silicon rectifiers: See class 64

Slides, chassis: See class 84

Slip rings: See class 44

69. Sockets.

- | | |
|-------------------------------|----------------------------------|
| 5. Capacitor, plug-in sockets | 20. Receiving tube |
| 10. Crystal | 25. Transistor |
| 15. Diode | 30. Transmitting tube |
| 17. Pilot light | 35. UL approved industrial types |
| 18. Printed circuit | |
- Accurate Electronics Corp., Ohio, 5, 15, 17, 18, 25
 Aerolite Electronics Co., N.J., 10, 17
 Aerovox Corp., Mass., 20
 Alden Products Co., 121D N. Main St., Brockton 64, Mass., 17
 See ads on pages 419, 691
 Tel: JUNIPER 3-0160

69. Sockets.

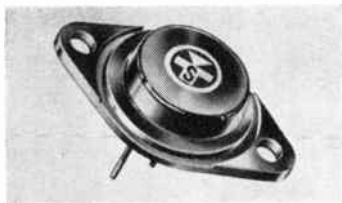
- Amatom Electronic Hardware Co., Inc., N.Y., 17
 American Electronics Co., N.Y., 10
Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 10, 20, 35
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 Tel: BISHOP 2-1000
 Bassett, Inc., Rex, Fla., 10
Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 18
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 Tel: ENFIELD 3322
 Blinn Co., Delbert, Calif., 15
 Burndy Corp., H. H. Buggie Div., Ohio, 18
 Cerberus, GMBH, Switzerland, 30
Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 10, 18, 20, 25, 30, 35
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 Tel: NEVADA 2-2000
Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 10, 15, 17, 18
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 Cleveland Metal Spec. Co., Ohio, 18
 Component Mfg. Service, Inc., Mass., 10, 35
 Derf Radio Co., N.Y., 5, 10, 15, 17, 18, 20, 25, 30, 35
Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 17, 35
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 Tel: HYACINTH 7-7600
 Eagle Electric Mfg. Co., Inc., N.Y., 17, 35
 Eastern Ins. Wire Corp. & Circle F Mfg. Co., N.J., 17, 35
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 Enfo Corp., N.J., 10
Garlock Packing Co., Garlock Electronic Products, Camden 1, N.J., 10, 20, 25
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 Tel: WOODLAWN 4-0370
General Cement Mfg. Co., Div. of Textron Inc., 400 S. Wyman St., Rockford, Ill., 17
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 Tel: ROCKFORD 8-9661
Grayhill, Inc., 505 Hillgrove Ave., La Grange, Ill., 25
 See ad on page 552
 Tel: FLEETWOOD 4-1040
 International Crystal Mfg. Co., Inc., Okla., 10
 International Electric Ind., Inc., N.Y., 35
 I. T. & T. Royal Elect. Corp. Div., R.I., 35



semiconductors

SILICON TRANSISTOR CORP.

All semiconductor products, manufactured by Silicon Transistor Corp., are made to rigid quality control standards emphasizing comprehensive environmental and life testing to the most severe military specifications.



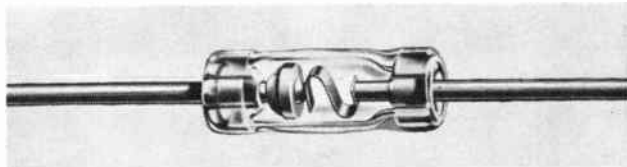
TRANSISTORS

STC Diffused silicon NPN high power transistor: 60 V, 4 amp, 50 Watts.
Low saturation resistance: 0.7 ohms typical.

Hermetically sealed in TO-3 package. Typical applications: Class A and Class B amplifiers, power converters; relay replacement and controls; power switches; high level D. C. amplifiers and power supply regulators.

HIGH RELIABILITY DIODES

General purpose, high conductance, fast recovery, high temperature silicon circuit diodes in a hermetically sealed subminiature glass package. **Typical applications:** Commercial and industrial computer and military circuitry. Inquiries invited for special purpose types.



SILICON DIODES—FAST SWITCHING TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. | | MAX. REV. WKG. VOLT. | MIN. REV. VOLT. @ 100 μA & 25°C | REVERSE RECOVERY |
|---------|--------------------------------|---|----------------|----------------------|---------------------------------|----------------------------|
| | | μA @ 25°C | μA @ 100°C | | | |
| 1N625 | 1.5 @ 4 | 1.0 | 30 | 20 | 30 | 400k Ω min. in 1 μ sec. † |
| 1N626 | 1.5 @ 4 | 1.0 | 30 | 35 | 50 | 400k Ω min. in 1 μ sec. † |
| 1N627 | 1.5 @ 4 | 1.0 | 30 | 75 | 100 | 400k Ω min. in 1 μ sec. † |
| 1N628 | 1.5 @ 4 | 1.0 | 30 | 125 | 150 | 400k Ω min. in 1 μ sec. † |
| 1N629 | 1.5 @ 4 | 1.0 | 30 | 175 | 200 | 400k Ω min. in 1 μ sec. † |
| 1N658** | 1.0 @ 100 | 0.05 @ 50V | 25 @ 50V+150°C | 100 | 120 | 80k Ω min. in 0.3 μ sec. ‡ |

† Switching from 30 mA to 35 volts. Modified IBM "Y" circuit.
‡ Switching from 5 mA to 40 volts. JAN 256 Circuit.
Operating temperature range -80°C to +150°C. Maximum power dissipation, 200 mW @ 25° C. Derate at 1.6 mW/°C above 25° C.

SILICON DIODES—GENERAL PURPOSE TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. | | MAX. REV. WKG. VOLT. | MIN. REV. VOLT @ 100 μA & 25°C | MAX. AV. FORWARD CURR. | |
|--------|--------------------------------|---|------------|----------------------|--------------------------------|------------------------|------------|
| | | μA @ 25°C | μA @ 150°C | | | @ 25°C mA | @ 150°C mA |
| 1N456 | 1.0 @ 40 | 0.025 | 5 | 25 | 30 | 90 | |
| 1N457 | 1.0 @ 20 | 0.025 | 5 | 60 | 70 | 75 | |
| 1N458 | 1.0 @ 7 | 0.025 | 5 | 125 | 150 | 55 | |
| 1N459 | 1.0 @ 3 | 0.025 | 5 | 175 | 200 | 40 | |
| 1N461 | 1.0 @ 15 | 0.5 | 30 | 25 | 30 | 60 | |
| 1N462 | 1.0 @ 5 | 0.5 | 30 | 60 | 70 | 50 | |
| 1N463 | 1.0 @ 1 | 0.5 | 30 | 175 | 200 | 30 | |
| 1N464 | 1.0 @ 3 | 0.5 | 30 | 125 | 150 | 40 | |
| 1N482 | 1.1 @ 100 | 0.25 | 30 | 36 | 40 | 100 | 25 |
| 1N482A | 1.0 @ 100 | 0.025 | 15 | 36 | 40 | 200 | 50 |
| 1N482B | 1.0 @ 100 | 0.025 | 5 | 36 | 40 | 200 | 50 |
| 1N483 | 1.1 @ 100 | 0.25 | 30 | 70 | 80 | 100 | 25 |
| 1N483A | 1.0 @ 100 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| 1N483B | 1.0 @ 100 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| 1N484 | 1.1 @ 100 | 0.25 | 30 | 130 | 150 | 100 | 25 |
| 1N484A | 1.0 @ 100 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| 1N484B | 1.0 @ 100 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| 1N485 | 1.1 @ 100 | 0.25 | 30 | 180 | 200 | 100 | 25 |
| 1N485A | 1.0 @ 100 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| 1N485B | 1.0 @ 100 | 0.025 | 5 | 180 | 200 | 200 | 50 |
| 1N486 | 1.1 @ 100 | 0.25 | 50 | 225 | 250 | 100 | 25 |
| 1N486A | 1.0 @ 100 | 0.05 | 25 | 225 | 250 | 200 | 50 |
| 1N487 | 1.1 @ 100 | 0.25 | 50 | 300 | 330 | 100 | 25 |
| 1N487A | 1.0 @ 100 | 0.1 | 25 | 300 | 330 | 200 | 50 |

Operating Temperature Range -80°C to 200° C
Maximum power dissipation 250 mW @ 25° C

SILICON DIODES CONTROLLED FORWARD TYPES

| TYPE | FORWARD VOLT DROP @ 10 mA VOLTS | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLTS | | MAX. REV. WKG. VOLT. | MIN. REV. V. @ 100 μA & 25°C | MAX. AV. FORWARD CURR. | |
|---------|---------------------------------|---|------------|----------------------|------------------------------|------------------------|------------|
| | | μA @ 25°C | μA @ 150°C | | | @ 25°C mA | @ 150°C mA |
| STC 101 | .7 to .74 | 0.025 | 15 | 35 | 40 | 200 | 50 |
| STC 102 | .7 to .74 | 0.025 | 5 | 35 | 40 | 200 | 50 |
| STC 103 | .7 to .74 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| STC 104 | .7 to .74 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| STC 105 | .7 to .74 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| STC 106 | .7 to .74 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| STC 107 | .7 to .74 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| STC 108 | .7 to .74 | 0.025 | 5 | 180 | 200 | 200 | 50 |

SILICON TRANSISTOR CORPORATION

Carle Place, Long Island, New York • Pioneer 2-4100

Special Sockets and Connectors

by
jettron

...FROM DESIGN TO PRODUCTION

Jettron is fully-equipped to design and manufacture your precision electronic components including connectors, sockets and cable assemblies. Call or write Jettron for quotations on "specials" for all commercial and military applications.



Ultra High Frequency Socket Type CO-7620

For the 2C39 family of tubes, including the General Electric GL-6897 and the Eimac 3CX100A5, features very low capacitance from cathode or anode to ground.



Input Connector Type CO-7700

For the Western Electric 6280/416B planar type triode. Has 18 spring fingers making contact with the RF cathode; specially designed beryllium copper contacts.



Ultra High Frequency Socket Type CO-8210

Designed by Jettron for use with the General Electric GL-6442 and similar lighthouse tubes. Features very low capacitance from cathode or anode to ground.

JETTRON PRODUCTS • INC

56 Route 10, Hanover, New Jersey
Telephones: TUCKER 7-0571-0572

Sales Engineers in Principal Cities

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Directory II. Components

69. Sockets.

Javex Electronics, Calif., 10, 35
Jettron Products, Inc., 56 Route 10,
Hanover, N.J., 18, 20
See ad on this page
Tel: TUCKER 7-0571

Johnson Co., E. F., Minn., 10, 20, 30, 35
Jones Div., Howard B., Cinch Mfg. Co.,
1026 S. Homan Ave., Chicago 24, Ill.,
10, 18, 20, 25, 30, 35
See ad on pages 48-49
Tel: NEVADA 2-2000

Kenru Co., N.J., 35
Kirkland Co., H. R., N.J., 17
Kulka Electric Corp., 633 S. Fulton
Ave., Mt. Vernon, N.Y., 17, 35
See ad on page 690
Tel: MOUNT VERNON 4-4024

Lapp Insulator Co., Radio Specialties
Div., 150 Sumner St., Le Roy, N.Y., 30
See ad on pages 112-113
Tel: LE ROY 385

Leecraft Mfg. Co., Inc., N.Y., 17
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Livingston Electronic Corp., N.J., 20,
Hermetic
Mandex Mfg. Co., Inc., Ill., 5, 10, 18, 20,
25, 30

Methode Mfg. Corp., 7447 W. Wilson
Ave., Chicago 31, Ill., 10, 15, 18, 20, 25,
35
See ad on page 505
Tel: UNDERHILL 7-9600

Metox, France, 10, 15, 17, 18, 20, 25, 30
Micarta Fabricators, Inc., Ill., 17, 18
Millen Mfg. Co., Inc., James, 150 Exchange
St., Malden 48, Mass., 10, 20,
30

See ad on page 416
Tel: DAVENPORT 4-4108

Mitronics, Inc., 1291 Central Ave., Hill-
side, N.J., 18, 20, 25
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Tel: WAVERLY 6-2250

Morse Co., Frank W., Mass., 17, Amp
Socket Adapters
Mosley Electronics, Inc., Mo., 10
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National Radio Co., Inc., Subsidiary of
National Co., Inc., 37 Washington St.,
Melrose 76, Mass., 10, 20, 30, 35
See ad on page 642
Tel: NO 5-4800

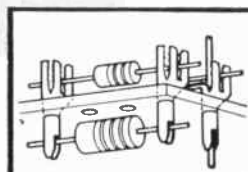
National Tel-Tronics Corp., 52 St. Casi-
mir Ave., Yonkers, N.Y., 17
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Tel: YONKERS 8-6400

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Pass & Seymour, Inc., N.Y., 17, 35
Permonite Mfg. Co., Ill., 10, 17, 18, 20,
30, 35
Plasteck, Inc., Okla., 17, 18

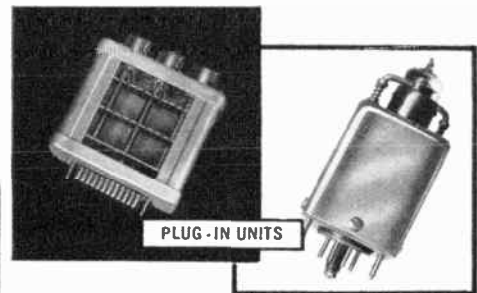
Vector Electronics manufactures a complete line of structures for mounting circuitry easily, compactly and with good accessibility.

Vector experience and facilities guarantee delivery, performance and economical prices.

Vector
STRUCTURES
FOR
CIRCUITRY



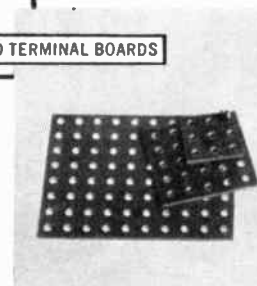
TERMINALS AND TERMINAL BOARDS



PLUG-IN UNITS



SOCKET TURRETS,
TERMINAL TURRETS,
TRANSISTOR TURRETS.



SOCKET TEST ADAPTOR,
CHANGE ADAPTORS,
EXTENDERS, ROTOPROBES
AND TUBE BASE PLUGS.

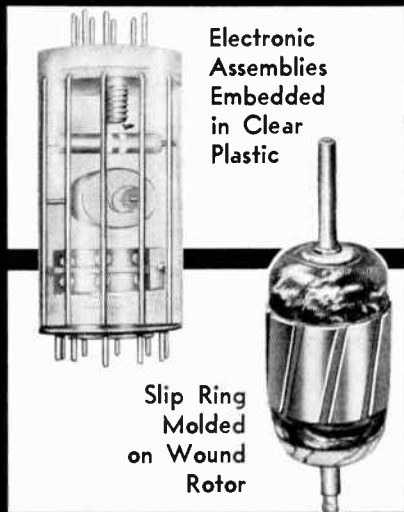
Write for catalog to:

VECTOR ELECTRONIC COMPANY
1100 FLOWER STREET, GLENDALE 1, CALIFORNIA
TELEPHONE: CHAPMAN 5-1076

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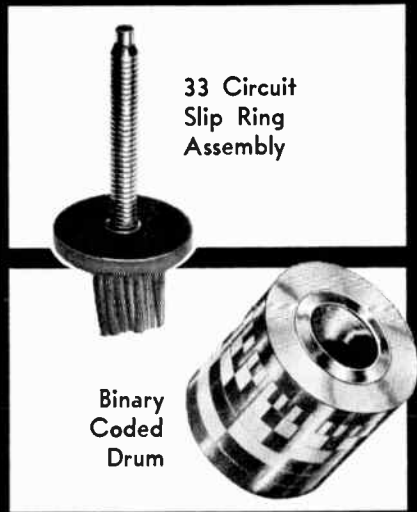
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Airflyte SLIP RING ASSEMBLIES and COMMUTATING SWITCHES



Electronic Assemblies Embedded in Clear Plastic

Slip Ring Molded on Wound Rotor

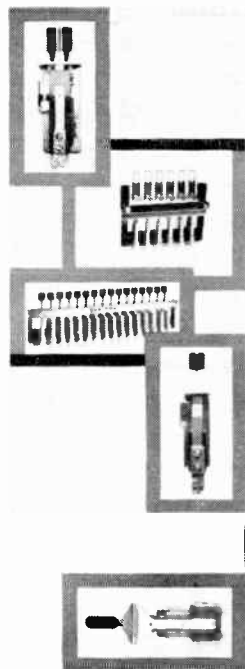


33 Circuit Slip Ring Assembly

Binary Coded Drum

Airflyte **ELECTRONICS CO.**
540 Ave. A, Bayonne, New Jersey

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CAPITOL SWITCHES

For information, call or write:

THE CAPITOL MACHINE CO.
SWITCH DIVISION

36 BALMFORTH AVENUE DANBURY, CONNECTICUT

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CAPITOL SWITCHES

are adapted to many variations of switching requirements and mechanical arrangements. They are manually operated units, featuring selective control of one or more groups of circuit combinations.

Capitol switches are a finely finished product, offering maximum reliability, with smooth mechanical action. All parts are noncorrosive. Paladium contacts are rated at 3 amp.

Capitol Switches Include:

- Illuminated single and multiple position switches
- Interlocking push-button switches
- Push-lock, push-release switches
- Telephone lever switches

Typical Applications

- Test equipment control panels
- Intercommunication systems
- Computer systems
- TV and radio control systems
- Missile control systems

69. Sockets.

- Plastic Mold & Engineering Co., R.I., 25
- Polytechnic Research & Dev. Co., Inc., N.Y., Thermistor Mounts
- Pomona Electronics Co., Inc., Calif., Breadboard Type
- Radar Relay, Inc., Calif., 17
- Raypar, Inc., Ill., Duodecal, H.V. Molded
- Remler Co., Calif., 20, 30
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- Rogers Electronic Tubes & Components, Canada, 20, 25, 30
- Ross Metals Co., Milton, Pa., 15, 18, 25, 30
- Rye Sound Corp., N.Y., 25
- Sloan Co., Calif., 17
- Smith, Inc., H. H., N.Y., 10, 17
- Superex Electronics Corp., N.Y., 35
- Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 15, 20, 25

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Tel: JUDson 6-2424

- Sylvania Electric Products, Inc., Parts Division, Warren, Pa., 10, 15, 17, 18, 20, 25, 30

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Tel: WARren 3220

- Symphony Electronics Corp., Calif., 5, 10, 15, 17, 18, 20, 25, 35

- Techron Corp., Mass., 15, 25

- Tingstol Company, Ill., 17

- United International Dynamics Corp., Mass., 18

- Vector Electronic Co., 1100 Flower St., Glendale 1, Calif., 20, 25

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Tel: CHApman 5-1076

- Waldom Electronics, Inc., Ill., 10, 15, 18, 20, 25

- Winchester Electronics, Inc., Conn., 20, Relay Sockets

Solenoids: See class 70

Spacers & Insulators, vacuum tube: See class 99

Springs: See class 87

Square wave generators: See class 3

Storage batteries: See class 39

Strain reliefs: See class 87

Sweep generators, radio frequency: See class 26

Sweep generators, TV: See class 35

Directory II. Components

70. Switches & Contacts.

- 5. Band
- 10. Coaxial
- 15. Contacts
- 16. Control
- 17. Crossbar
- 18. Electronic
- 19. Ferrite
- 20. Foot
- 25. Key
- 27. Limit
- 30. Mercury
- 35. Momentary contact

- 40. Power
- 45. Precision snapping
- 50. Rotary
- 55. Slide
- 60. Solenoids
- 65. Spring-return
- 70. Tap
- 75. Thermally operated
- 77. Time
- 80. Toggle & push button

A-1 Precision Products, Calif., 50, High Speed
 Accurate Spring Mfg. Co., Ill., 65
 Admiral Corp., Ill., 18
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 Aero Instrument Co., Calif., Pressure Switches
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 Aerovox Corp., Cinema Engr. Div., Calif., 50, 70
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 Tel: HEMlock 6-2230
 Airpax Electronics, Inc., Seminole Div., P.O. Box 8488, Ft. Lauderdale, Fla., Cambridge Div., Jacktown Rd., Cambridge, Md., 10
 See ad on pages 82-83
 Tel: LUDlow 3-6160
 Airtronics, Inc., D.C., 10



BRAININ ELECTRICAL CONTACTS

Contacts in BRALOY*

(Silver-Cadmium Oxide)

Resistance to sticking under high current and high inductive circuit conditions. Effective arc quenching properties. Can be supplied in the form of contact rivets, welding type contacts, etc. Whether you are seeking advice on new applications, redesign, or wish your own designs executed, send us your requirements, and they will receive our most careful attention.

Extra KNOW-HOW

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Specific design problems

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LAMINATED AND INLAID METALS
 PRECIOUS METAL PRODUCTS FOR
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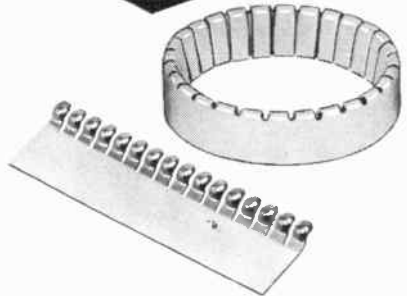
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Alden Products Co., 121D N. Main St., Brockton 64, Mass., 35
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 Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 10
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 Tel: EVERgreen 8-6057
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 Automatic Timing & Controls, Inc., Pa., 18
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 Capitol Machine Co., 36 Balmforth Ave., Danbury, Conn., 25, 35, 80
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 Carling Electric, Inc., Conn., 16, 18, 20, 35, 40, 50, 55, 65
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 Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 5, 16, 18, 40, 50, 55, 65, 70
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Chicago Dynamic Industries, Inc., 1725 Diversey Blvd., Chicago 14, Ill., 25, 50
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 Cleveland Metal Spec. Co., Ohio, 18
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Foto-Video Labs., Inc., Dept. I-1, 36 Commerce Rd., Cedar Grove, N.J., 15, 18

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Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J., 10, 50

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General Devices, Inc., P.O. Box 253, Princeton, N.J., 5, 10, 15, 16, 18, 19, 25, 35, 40, 50, 77

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General Electric Co., Apparatus Sales Div., N.Y., 16, 20, 27, 35, 40, 45, 50, 60, 75, 77, 80

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Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 15, 50

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Grayhill, Inc., 505 Hillgrove Ave., La Grange, Ill., 50, 65, 80

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Hughes Products, Semiconductor Div., 500 Superior Ave., Newport Beach, Calif., 50

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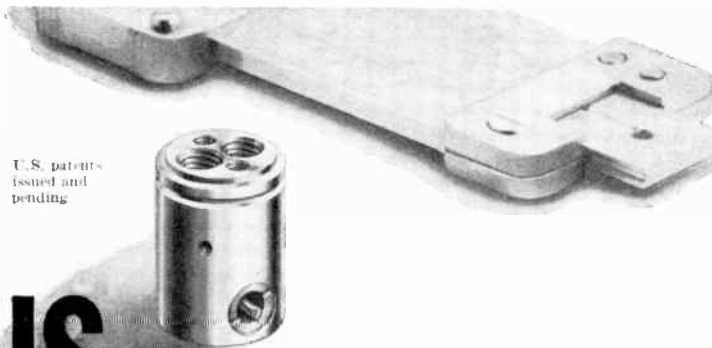
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Tel: MOhawk 4-2222

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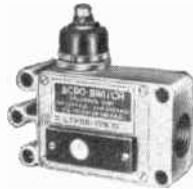
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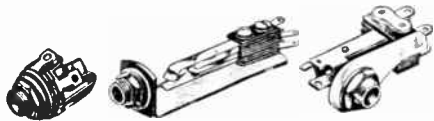
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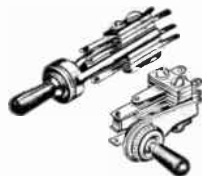
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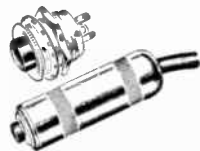
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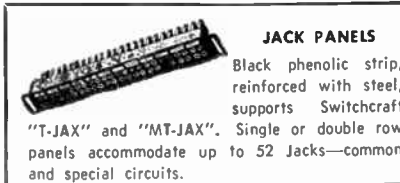
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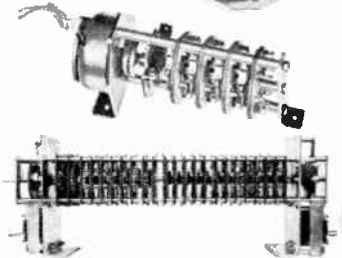
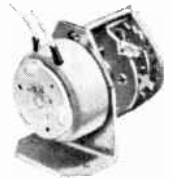
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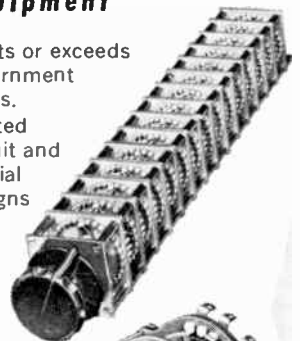
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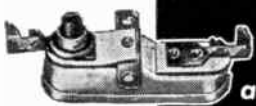
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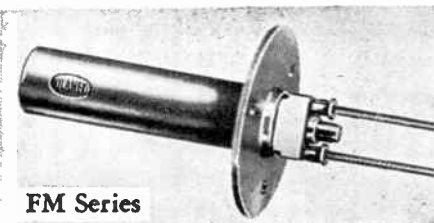
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70. Switches & Contacts.

Wilson Div., H. A., Engelhard Industries, Inc., U.S. Highway 22, Union, N.J., 15, 16, 17, 45, 75

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71. Thermostats.

- 5. Bellows
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- 15. Hermetically sealed

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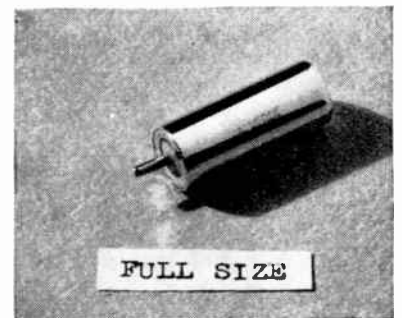
Tel: JACKson 5-3491

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Metals & Controls Div. of Texas Instruments, Incorporated, 51 Forest St., Attleboro, Mass., 10, 15

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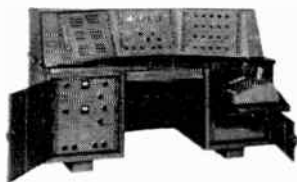
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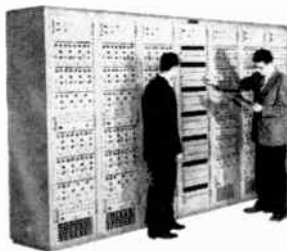
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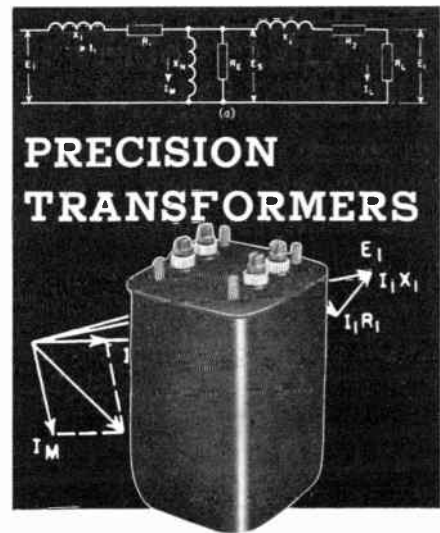
73. Transformers.

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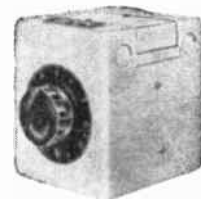
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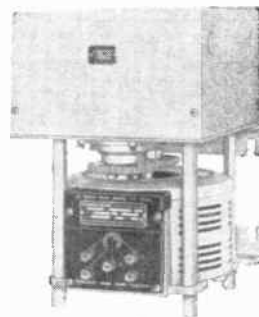
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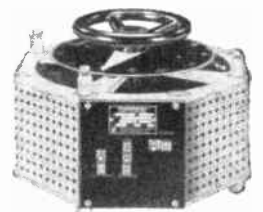
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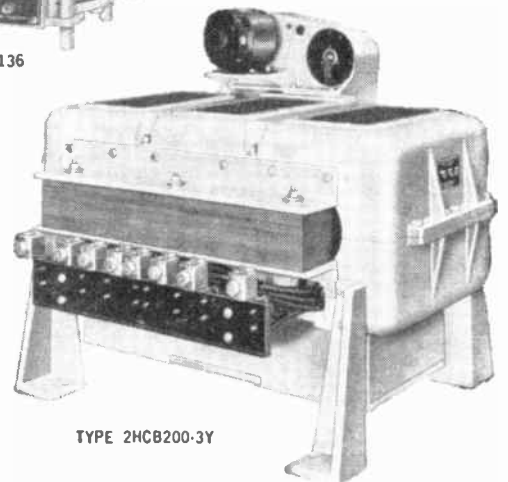
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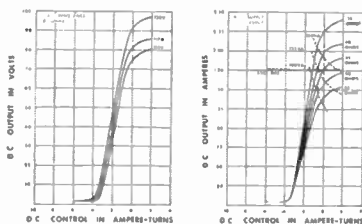
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Harder Co., Donald C., Calif., 5, 10, 15, 25, 27, 40, 42, 45, 60, 65, 80

Harrison Labs., Inc., B. M., Mass., 85

Heldor Mfg Corp., N.J., 25

Hevi-Duty Electric Co., Wis., 15, 25, 27, 40, 45, 55, 65, 95

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 5, 42, 60

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Tel: DAVenport 5-4451

Highland Engineering Co., N.Y., 5, 15, 25, 27, 40, 42, 45, 50, 52, 87, 90

Hindle Transformer Co., Inc., N.J., 15, 25, 27, 35, 40, 42, 45, 65, 85

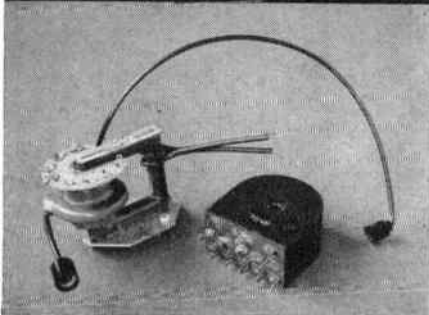
Hisonic, Inc., Kan., 25, 80

Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 40

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Tel: VICTORIA 9-1104

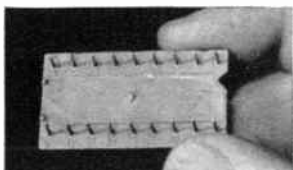
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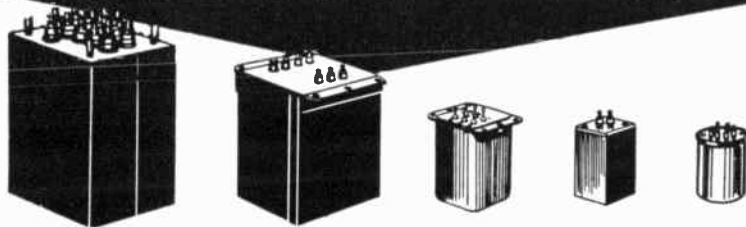


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CUSTOM DESIGNED TRANSFORMERS for RELIABILITY



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Ceramic compression terminals. Stud type mounting. Schematic. Baked enamel finish, MIL-T-27A.

ENCAPSULATED HIPERSIL

Bracket mounting. Epoxy impregnation and coating. Resists environmental extremes.



SUB-MINIATURE MIL CASE

Hermetic. Ceramic compression terminals. $\frac{3}{4}$ " x $\frac{3}{4}$ " x $1\frac{1}{8}$ " H. Wt. $1\frac{1}{2}$ oz. MIL-T-27A Grade 4, class R.

MINIATURE MOLDED

Epoxy cast. Resists environmental extremes. For plug-in printed circuits. .040 pins $\frac{1}{8}$ " x $1\frac{1}{32}$ " x $\frac{7}{8}$ " H. Wt. $1\frac{3}{4}$ oz.



ENCAPSULATED POWER

Bracket mounting. Used in portable equipment where terminals must be brought out from Transformer.

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For Airborne Applications. Teflon, Mylar, and Silicone insulations used. Flat bracket mounting.



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High compression glass bead terminals. Rectangular flange mounting. Full schematic information.

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73. Transformers.

I.M.C. Magnetics Corp., Gray & Kuhn Div., N.Y., 55, Blocking Oscillator
Illumitronic Engineering, 680 E. Taylor Ave., Sunnyvale, Calif., 60

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Tel: REgent 9-2395

Inductor Engrg., Inc., Del., 80

Industrial Transformer Corp., Pa., 5, 10, 15, 25, 27, 40, 42, 43, 50, 52, 55, 65, 75, 80, 85, 87, 90, 95

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Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5, 10, 15, 25, 27, 35, 40, 42, 45, 50, 52, 55, 60, 65, 80, 85, 95

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Tel: LUdlow 4-6200

International Telephone & Telegraph Labs., Calif., 5, 15, 25, 35, 50, 60, 65, 80
Jack & Heintz, Inc., Ohio, 10, 15, 25, 40, 45, 80

James Vibrapowr Co. 4050 N. Rockwell St., Chicago 18, Ill., 5, 10, 15, 25, 27, 45, 50, 65, 87

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Tel: CORnelia 7-6333

Jerrold Electronics (Canada) Ltd., Canada, 75

Jobbins Electronics, 771 Hamilton Ave., Menlo Park, Calif., 10, 15, 25, 35, 52, 55, 60, 65, 90, 95

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Tel: DAVenport 6-7110

K-V Transformer Corp., Conn., 5, 15, 25, 27, 40, 42, 43, 45, 50, 52, 55, 65, 80, 85, 87, 95

Kapitol Magnetic Corp., Ill., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 80, 85, 87
Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 15, 25

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Tel: GREGory 2-1000

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Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 10, 15, 25, 42, 45, 50, 65, 80, 85, 95

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Tel: STate 2-6662

Kenyon Transformer Co., Inc., N.J., 5, 10, 15, 25, 27, 40, 42, 45, 50, 55, 65, 80, 85, 87

Kepeco, Inc., 131-38 Sanford Ave., Flushing 55, N.Y., 95

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Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 5, 10, 15, 25, 27, 30, 35, 40, 42, 45, 50, 52, 55, 65

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Tel: TEXas 0-7111

Ling Systems, Inc., Calif., 43

Litton Industries, Airtron, Inc., Div., N.J., 43

Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 15, 25, 30, 35, 40, 42, 43, 45, 50, 55, 60, 65, 70, 75, 80, 87, 95

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Tel: CRestview 4-7411

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Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 65, 95

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Tel: CYpress 2-6610

Magnifico, Inc., N.Y., 65, 80

Magnetics, Inc., Control Div., Pa., 65

Magnetics Research Co., 255 Grove St., White Plains, N.Y., 80

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Mara Electronics, Inc., N.Y., 15, 25, 27, 40, 45, 87

Marconi's Wireless Telegraph Co., Ltd., N.Y., 95

Marine Electric Corp., Galbraith-Pilot Marine Corp. Div., N.Y., 5, 10, 15, 25, 27, 35, 40, 45

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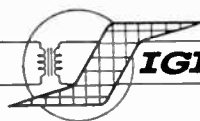
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- Reactors and associated magnetic core components
- Quality coil winding

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Directory II. Components

73. Transformers.

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Martin Co., Baltimore Div., Md., 5, 15,
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Maxson Corp., Langevin Div., N.Y., 5,
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McGregor Electronic Industries, Inc.,
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Melco Products, Inc., Minn., 25, 30, 40,
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Microlab, 71 Okner Parkway, Living-
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Tel: WYman 2-5700

Microtran Co., Inc., 145 E. Mineola
Ave., Valley Stream, N.Y., 5, 15, 25,
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Tel: LOcust 1-6050

Mid-Eastern Electronics, Inc., 32 Com-
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Tel: DRexel 6-7130

Millen Mfg. Co., Inc., James, 150 Ex-
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Minatron Corp., N.J., 90, Differential, &
Linear

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Modelectric Products Co., Inc., N.J., 27

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Networks Electronic Corp., Calif., 10,
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New England Scientific Instruments Co.,
238 Main St., Cambridge 42, Mass., 80

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Tel: KIRkland 7-1997

New England Transformer Co., Inc.,
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New York Coil Co., Inc., Pa., 5, 10, 15,
25, 27, 45, 50, 55, 60, 65, 95

New York Transformer Co., Inc., N.J.,
5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55,
65, 80, 85, 87

North Hills Electric Co., Inc., 402 Saga-
more Ave., Mineola, L.I., N.Y., 35, 55,
60, 80, 85

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Tel: PIONEER 7-0555

Nothelfer Winding Labs., Inc., P.O. Box
IRE, Ewingville Rd., Trenton, N.J.,
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Tel: EX 2-7117

Ogden Coil & Transformer Co., Ill., 5,
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Ohmite Mfg. Co., 3692 Howard St.,
Skokie, Ill., 90

See ad on pages 106-107

Tel: ORchard 5-2600

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THE IRE Directory Product Classifications have both a pattern and a purpose. They differ widely from most product indexes, deliberately. They aim to organize the hundreds of products and services of a complex technical industry according to the way engineers think. The result is a division of all products and services into three fundamental indexes into which 102 basic classifications have been organized.

For detailed identification, these 102 products and services, grouped in the 3 indexes, are further defined into 857 named products. We have tried to avoid oversimplification, and a tremendous amount of information is given by our product number system. But, the basic indexing adds speed. Purely alphabetical directories are as slow and cumbersome as a telephone book. IRE engineers have liked our system better!

YOU will note that we here differ from most directory compilers, for we do not mix meters with motors simply for alphabetical reasons. Products which are in the form of "Complete Equipment" form the first fundamental group. Yet, the same manufacturer may also appear in the "Component Parts" section. This system gives subject grouping for speed and convenience. A directory should aid a man who has forgotten some detail, or product name. Ours helps by grouping products as one would think.

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SOLA AC and DC voltage regulation

Continuous, automatic, maintenance-free

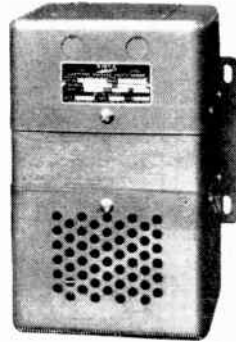
Sola Constant Voltage Transformers and Regulated DC Power Supplies provide dependable, regulated output voltage. Their output regulation is unaffected by wide variations in input voltage.

Sola CV Transformers are static-magnetic regulators with completely automatic, continuous regulating action. Their response to variations in input voltage is usually 1.5 cycles or less. They have no moving or renewable parts

and require no maintenance.

Each Sola Regulated DC Power Supply incorporates a constant voltage transformer in combination with a semi-conductor rectifier and a high-capacitance filter section. This combination makes the power supply compact, dependable, and efficient; and assures sustained output voltage in the face of pulse or intermittent loads, or heavy, short-time overloads.

Sola Constant Voltage Transformers



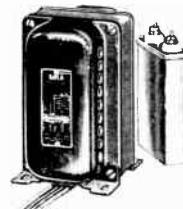
Standard Sinusoidal Type provides voltage regulation of $\pm 1\%$ with primary voltage variations as great as $\pm 15\%$. With less than 3% total rms harmonic content in their output voltage wave, these units are desirable for use with equipment having elements sensitive to power frequencies harmonically related to the fundamental. Available in nine ratings, 60va to 7.5kva.



Normal-Harmonic Type also provides $\pm 1\%$ regulation at somewhat less cost. This group has an average of 14% total rms harmonic content in its output voltages and is suited to equipment not extremely sensitive to voltage wave shape. The series includes those mechanical designs specially engineered for use as built-in components. Nineteen stock ratings range from 15va to 10kva.



Adjustable Sinusoidal Type provides $\pm 1\%$ regulated voltage output—one output adjustable from 0-130 volts and one fixed at 115 volts. Has less than 3% total rms harmonic content in output voltage. Portable for use in shop or laboratory, or mount on standard relay rack.



Electronic Power Type regulators provide $\pm 1\%$ regulated filament voltage at 6.0 and 6.3-volt levels; or a combination of plate and filament voltages regulated $\pm 3\%$ for $\pm 15\%$ input variations. Filament regulators are available in ratings from 2.3 to 25 amps. One model is specially designed for portable lab or shop bench use; it has a 30va rating. Combination plate/filament regulators, in three stock sizes, are designed to operate with commonly-used rectifier tubes.



Custom-designed units can be supplied in production quantities in ratings from 1va to 25kva to suit individual specifications. Custom designs can include special mechanical structures, various voltage ratios, special frequencies, compensation for frequency variations, multiple output voltages, three-phase service. Units can be manufactured to military specifications.

Write for Circular 11-CV for additional information on Sola Constant Voltage Transformers

Sola Constant Voltage DC Power Supplies

For intermittent...variable
... pulse ... or high-current loads



Fixed-output-voltage designs are available in six stock models with ratings from 24v @ 6a to 250v @ 1a. They are extremely compact, light-weight, and moderately priced in proportion to their power output and performance.



Adjustable-output designs provide a considerable range of regulated dc test voltages. Accessory handles offer portability and permit self-stacking. Six models are available with outputs ranging from 5v @ 7a to 400v @ 0.6a.

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REGULATED DC POWER SUPPLIES



MERCURY LAMP TRANSFORMERS



FLUORESCENT LAMP BALLASTS

A DIVISION OF BASIC PRODUCTS CORPORATION

Directory II. Components

73. Transformers.

Ortho Filter Corp., Paterson Ave., Paterson 1, N.J., 5, 10, 15, 25, 40, 45, 55, 65, 80

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Tel: MUIberry 4-5858

Osborne Electronic Sales Corp., Ore., 5, 10, 15, 25, 27, 35, 40, 42, 43, 45, 50, 52, 55, 60, 65, 80, 85, 90, 95

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Oxford Components, Inc., Ill., 5, 10, 40, 42, 45, 50, 52, 75, 87, 90

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Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 55, 80

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Pearce-Simpson, Inc., Fla., 55, High Voltage

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Perkin-Elmer Corp., Vernistat Div., 777 Main Ave., Norwalk, Conn., Variable Ratio

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Tel: VICTor 7-2441

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Tel: TRinity 8-3251

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Physics Research Labs., Inc., P.O. Box 555, Hempstead, N.Y., 10, 52, 95

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Power Industries Co., Inc., Ill., 5, 25, 27, 30, 35, 40, 42, 43, 45, 50, 52, 55, 65, 80, 85, 87

Precise Measurements Co., Millbrook Lane, R.D. 1, Flemington, N.J., 27, 45, 65

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Tel: FLemington 900

Precision Electronics, Inc., 48 Merrick Rd., Rockville Centre, L.I., N.Y., 5, 10, 15, 25, 27, 30, 35, 40, 42, 43, 45, 50, 52, 55, 60, 70, 75, 80, 85, 87, 90

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Tel: DAVenport 1-1130

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Tel: LOKwood 5-4578

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Scala Radio Co., Calif., 75

Sciaky Bros., Inc., Ill., 45

Servomechanisms, Inc., Calif., 15, 80

Signal Transformer Co., 1661 McDonald Ave., Brooklyn 30, N.Y., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 80, 85, 87, 95

See ad on page 566

Tel: ESplanade 6-0615

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TOROIDAL COILS

SUBMINIATURE AUDIO TRANSFORMERS

INDUCTORS

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Telex production and testing facilities are geared to the specialized requirements of miniaturization—of close tolerance production including Mil-T-27A specifications—and of special packaging techniques including encapsulation.

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TELEX® Electro-Acoustic Division

Telex Park, St. Paul 1, Minnesota, Dept. 101

See Telex ad in Class, "Loudspeakers and Headphones"

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

FLEXIFORMER

PACKAGED TRANSFORMER PRIMARY

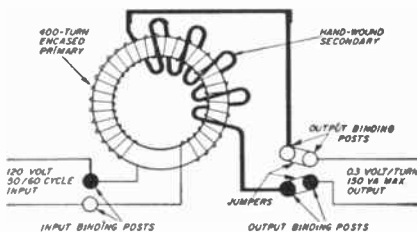


"Do-it-yourself"

TRANSFORMER

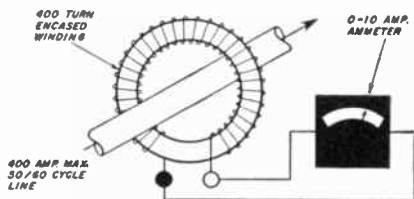
Here is the original "do-it-yourself" transformer. This portable, self-contained toroidal primary coil eliminates the task of obtaining the right transformer for each new job . . . simply wind your own! Especially useful when high amperage at low voltage is required. Used to demonstrate basic transformer principles . . . serve as working lab equipment. The primary consists of a silicon steel core having a coil of 400 turns of copper wire. Completely enclosed in durable, high-impact plastic with integral SUPERIOR 5-WAY binding posts for making connections. Versatile laboratory, shop, classroom and inspection aid.

A SOURCE OF A-C VOLTAGE



FLEXIFORMER type TP150 has an input rating of 120 volts, 50/60 cycles single phase and an output rating of 150 VA. The voltage of the secondary is proportional to the number of turns hand wound through the center opening. The correct number of turns is determined by dividing the desired output voltage (plus approximately 25%) by 0.3 which is the volt/turn ratio of the FLEXIFORMER.

A CURRENT TRANSFORMER



FLEXIFORMER type TP150 becomes the secondary winding when used as a current transformer. A current carrying conductor passing through the center opening serves as the primary. When used with a 0-1 ampere ammeter, currents up to 400 amperes can be measured with an accuracy of 1% at 60 cycles. Can be used as portable units or fastened permanently in place.

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73. Transformers.

- Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70 Sheffield St., Toronto 15, Canada, 43, 60
See ad on page 595
Tel: CHerry 4-5519
- Sioux Radio Products, S.D., 35, 60, 80
Sivers Lab., Sweden, 43
Skysweeper, Inc., Ill., 5, 10, 15, 25, 27, 40, 45, 87
Smallwood Ltd., S. G., Canada, 30, 35, 60, 75
Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 95
See ad on page 568
Tel: BISHop 2-1414
- Specialties, Inc., N.Y., 15, 25, 40
Spellman High Voltage Co., 3029 Webster Ave., New York 67, N.Y., 27, 60
See ad on page 501
Tel: KINGSbridge 7-0306
- Spencer-Kennedy Labs., Inc., Mass., 75
Sperry Rand Corp., Sperry Microwave Electronics Co. Div., Fla., 43
Spivey Inc., James S., D.C., 55
Sprague Electric Co., Mass., 15, 55, 80
Square D Co., Wis., 45
Standard Electrical Products Co., Ohio, 5, 10, 15, 25, 27, 30, 40, 45, 50, 55, 85, 95
Standard Telephones & Cables, Ltd., England, 45
Stanley Transformer Co., N.Y., 5, 10, 15, 25, 27, 40, 42, 45, 55, 65, 85, 87, 90, 95
Stanwyck Coil Co., E., 75 Carson Ave., Newburgh, N.Y., 35, 42, 60, 80, 90
See ad on page 417
Tel: JOHN 1-3030
- Stanwyck Winding Co., Inc., N.Y., 35, 60, 80
Stavid Engineering, Inc., N.J., 5, 15, 27, 45, 55
Sterling Transformer Corp., 297 N. 7th St., Brooklyn 11, N.Y., 5, 10, 15, 25, 27, 40, 42, 45, 65, 85, 87, 95
See ad on page 571
Tel: STAgg 2-4200
- Summit Coil Co., N.J., 27, 35, 60, 75
Superex Electronics Corp., N.Y., 5, 35, 60
Superior Electric Co., 590 Tripp Ave., Bristol, Conn., 90
See ads on pages 422, 424, 426, 481, 502, 562, 570, 588
Tel: LUDlow 2-9561
- Sylvania Electric Products Inc., Mass., 5, 10, 15, 25, 40, 45, 50, 52, 55, 80
Technical Apparatus Builders, 109GB Liberty St., New York 6, N.Y., 10, 15, 25, 27, 40, 45
See ad on page 502
Tel: REctor 2-6249
- Technical Appliance Corp., N. Main St., Sherburne, N.Y., 43, 60
See ad on page 382
Tel: SHerburne 7-2211
- Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 60
See ad on page 352
Tel: OWens 8-4800
- Technitrol Engineering Co., Pa., 55
Tele Coil Co., N.J., 25, 30, 60
Telecomputing Corp., Calif., 15, 25, 52, 55, 65
Telectro Industries Corp., N.Y., 5, 15, 27, 45, 55, 60, 70, 90, 95

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73. Transformers.

Teleradio Engineering Corp., N.Y., 30, 35, 50, 60, 70

Telex, Inc., Dept. 101, 1633 Eustis St., St. Paul 1, Minn., 5, 10, 15, 25, 27, 40, 42, 45, 55, 65, 80, 85, 87, 95
See ad on pages 466, 569
Tel: MIDway 6-7211

Temco Aircraft Corp., Electronics Div., Texas, 40, 43, 45, 55, 95

Tensor Electric Dev. Co., Inc., N.Y., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 85, 87, 90, 95

Thermador Electrical Mfg. Co., Calif., 5, 15, 25, 27, 35, 40, 42, 45, 50, 52, 55, 65, 80, 87, 90, 95

Thordarson-Meissner, Ill., 5, 10, 15, 25, 27, 30, 40, 42, 43, 45, 50, 52, 55, 60, 65, 70, 75, 80, 85, 87, 90, 95

Topper Mfg. Co., Inc., N.Y., 25, 85

Topping Electronics, Ltd., Canada, 60, Ferrite

Torocoil Co., Ohio, 80

Torotel, Inc., Mo., 5, 10, 15, 25, 42, 50, 52, 65, 80

Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5, 15, 25, 35, 40, 45, 65, 80

See ad on pages 116-117
Tel: ELizabeth 4-5650

Transformer Design, Inc. of Milwaukee, Wis., 5, 10, 15, 25, 27, 40, 42, 43, 45, 50, 52, 55, 65, 75, 85, 87

Transformer Engineers, Calif., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 80

Transformer Specialty Co., Pa., 15, 25, 40, 45

Transformer Technicians, Inc., Ill., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 87, 95

Transformers, Inc., N.Y., 5, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 80, 85, 87

Translite Electronics Corp., Ill., 70

Transonic, Inc., Calif., 5, 10, 15, 25, 27, 40, 43, 45, 50, 52, 55, 65, 80, 87, 90, 95

Trenton Transformer Corp., N.J., 15, 25, 27, 40, 42, 45

Tresco, Inc., 3824-28 Terrace St., Philadelphia 28, Pa., 5, 15, 25, 27, 35, 40, 42, 45, 55, 65, 87

See ad on page 570
Tel: IVyridge 3-1383

Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif., 5, 15, 25, 30, 35, 40, 42, 43, 45, 50, 55, 60, 65, 70, 75, 80, 87, 95

See ad on page 63
Tel: EXmont 7-2145

Trivec Transformer Co., Ill., 5, 15, 25, 27, 35, 42, 43, 45, 55, 65, 75, 80, 87, 90

Tronic Coil Winding Co., Inc., Conn., 25, 27, 45, 55, 65, 80

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United Microwave Co., N.Y., 43

United States Electronics Corp., N.J., 5, 15, 25, 35, 40, 45, 60

U.S. Science Corp., Sub. Topp Indust., Inc., Calif., 80

Universal Transformer Corp., 150 Varick St., New York 13, N.Y., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 65, 80, 85, 87, 90, 95

See ad on Cover 2
Tel: ALgonquin 5-3500

Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 5, 15, 35, 40, 42, 45, 55, 60, 65, 80, 85

See ad on page 418
Tel: ESsex 4-9800

Universal Transistor Prods., N.Y., 15, 25, 27, 80, 95

Universal X-Ray Products, Inc., Ill., 27

Uptegraff Mfg. Co., Pa., 45

Utrad Corp., Ind., 5, 10, 15, 25, 27, 40, 42, 45, 50, 52, 55, 80, 87

FILAMENT

POWER

| Cat. No. | Secondary Voilts | Secondary Amos. | Prim. V Insulation | Primary Voilts | Mold Size | Maximum Operating Ambient | List Price |
|----------|------------------|-----------------|--------------------|----------------|-----------|---------------------------|------------|
| 4C1 | 6.3 CT | 8 | 1500 | 115 | SM3 | 100 C | 16.50 |
| 4C2 | 6.3 CT | 1.2 | 1500 | 115 | SM2 | 100 C | 16.50 |
| 4C3 | 6.3 CT | 6.75 | 1500 | 110/115/120 | 2 | 100 C | 26.50 |
| 4C4 | 6.3 | 4.9 | 1500 | 115 | 3 | 90 C | 23.70 |
| 4C5 | 6.3 CT | 7.2 | 1500 | 115 | 3A | 120 C | 27.50 |
| 4C6 | 6.3 | 7 | 1500 | 120 | 3S | 80 C | 26.80 |
| 4C7 | 6.3 CT | 7 | 1500 | 120 | 4 | 100 C | 31.90 |
| 4C8 | 6.3 | 13.7 | 1500 | 115 | 4 | 90 C | 31.90 |
| 4C9 | 6.3 CT | 12.3 | 1500 | 115 | 5 | 100 C | 29.50 |
| 4C10 | 20 CT | 0.6 | 1500 | 115 | SM1 | 100 C | 21.00 |
| 4C11 | 6.3 | 2.4 | 1500 | 115 | 3 | 100 C | 29.50 |
| 4C26 | 6.3 CT | 2 | 1500 | 115 | SM1 | 100 C | 21.00 |
| 4C27 | 6.3 CT | 3 | 1500 | 115 | 1A | 100 C | 21.80 |
| 4C28 | 6.3 CT | 5 | 1500 | 115 | 2 | 100 C | 22.60 |
| 4C29 | 5.0 CT | 3 | 2500 | 115 | SM1 | 100 C | 21.00 |
| 4C30 | 5.0 CT | 6 | 2500 | 115 | 2 | 100 C | 22.60 |
| 4C12 | 14.1 | 3 | 1500 | 115 | 3 | 100 C | 22.50 |
| 4C13 | 21 | 9 | 1500 | 115 | 4 | 65 C | 25.00 |
| 4C14 | 26 | 0.5 | 1500 | 115 | SM1 | 55 C | 20.50 |
| 4C15 | 26 CT | 1.5 | 1500 | 115 | 3 | 65 C | 21.20 |
| 4C16 | 28 CT | 0.75 | 1500 | 115 | 2 | 65 C | 31.80 |
| 4C17 | 52 CT | .192 | 1500 | 115 | SM1 | 100 C | 22.75 |
| 4C18 | 90 CT | 4.5 | 1500 | 115 | 9 | 100 C | 43.00 |
| 4C19 | 115 | 0.5 | 1500 | 115 | SM2 | 100 C | 16.80 |
| 4C20 | 105/115/125 | 0.4 | 1500 | 105/115/125 | 2 | 90 C | 24.30 |
| 4C21 | 115 | 2.63 | 1500 | 115 | 8 | 100 C | 35.00 |
| 4C22 | 334 | 0.25 | 1500 | 115 | SM1 | 120 C | 19.30 |
| 4C23 | 26 CT | 3 | 1500 | 115 | 4 | 100 C | 25.50 |
| 4C24 | 26 CT | 5 | 1500 | 115 | 6 | 100 C | 29.40 |
| 4C25 | 52 CT | 2 | 2500 | 115 | 5 | 100 C | 28.10 |

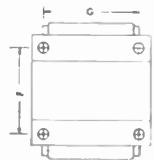
- Dielectric test voltages: PRIMARIES 1000 Volts RMS SECONDARIES 1500 Volts RMS
- All primaries 380-1000 cps
- Epoxy resin used as encapsulant
- Prices subject to change without notice

ENCAPSULATED 400 CPS TRANSFORMER CLIPPER SERIES For Minimum Size and Minimum Weight

● Contour Molded ● Hipsersil Cores

| MOLD NO. | OVERALL DIMENSIONS | | | MTG. DIMENSIONS | | APP. WT. (LBS.) | MTG. METH. |
|----------|--------------------|---------|---------|-----------------|---------|-----------------|------------|
| | L | W | H | F | G | | |
| SM3 | 1 | 1-1/4 | 1-3/16 | 1 | Note 1 | 0.06 | Note 1 |
| SM2 | 1-1/2 | 1-1/4 | 1-11/16 | 1 | Note 1 | 0.10 | Note 1 |
| SM1 | 1-1/2 | 1-1/2 | 1-11/16 | 1-1/8 | Note 1 | 0.16 | Note 1 |
| 1 | 1-13/16 | 1-7/8 | 1-13/16 | 1-1/4 | 1-7/16 | 0.25 | Note 2 |
| 1A | 1-11/16 | 1-17/32 | 1-13/16 | 1-5/32 | 1-1/8 | 0.25 | Note 2 |
| 2 | 2 | 1-15/16 | 2-1/8 | 1-9/32 | 1-1/4 | 0.40 | Note 2 |
| 3 | 2-5/16 | 1-13/16 | 2-1/8 | 1-9/32 | 1-7/16 | 0.45 | Note 2 |
| 3S | 2-1/16 | 2-3/8 | 2-3/16 | 1-17/32 | 1-11/16 | 0.70 | Note 2 |
| 4 | 2-5/16 | 2-3/8 | 2-9/16 | 1-17/32 | 1-11/16 | 0.90 | Note 2 |
| 5 | 2-3/4 | 2-3/8 | 2-7/8 | 1-17/32 | 2-3/16 | 1.20 | Note 2 |
| 6 | 2-3/4 | 2-5/8 | 3-1/8 | 1-17/32 | 2-3/16 | 1.50 | Note 2 |
| 7 | 3 | 2-7/8 | 3-3/8 | 1-25/32 | 2-1/2 | 2.00 | Note 2 |
| 8 | 3-3/8 | 2-7/8 | 3-3/8 | 1-25/32 | 2-1/2 | 2.50 | Note 2 |
| 83 | 3-3/4 | 3-1/4 | 3-3/8 | 2-1/4 | 3 | 3.25 | Note 3 |
| 86 | 3-3/4 | 3-3/4 | 3-3/8 | 2-3/4 | 3-1/8 | 4.25 | Note 3 |
| 9 | 4-1/16 | 3-3/8 | 3-7/8 | 2-3/16 | 3-1/2 | 5.00 | Note 3 |
| 10 | 4-1/2 | 3-15/16 | 3-15/16 | 2-3/4 | 3-1/8 | 6.00 | Note 3 |

Note 1—SM series are two hole mounting with holes on center line. #4-40 Pem nuts are fastened to the bracket.
Note 2—#6-32 Pem nuts on bracket are standard.
Note 3—#8-32 Pem nuts on bracket are standard.



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STagg 2-4200

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GROUP I—RECEIVING TUBES

HY-G-200®

| EIA Type No. | JAN Type No. | PROTO-TYPE | BENDIX Type No. | DESCRIPTION |
|--------------|--------------|---------------|-----------------|-----------------------|
| 5838 | | 6X5 | TE-3 | RECTIFIER. Full-wave |
| 5839 | 5839 | 6X5 | TE-2 | RECTIFIER. Full-wave |
| 5852 | 5852 | 6X5 | TE-5 | RECTIFIER. Full-wave |
| 5992 | 5992 | 6V6 | TE-8 | AMPLIFIER. Beam power |
| 5993 | 5993 | 6X4 | TE-10 | RECTIFIER |
| 6106 | 6106 | 5Y3 | TE-22 | RECTIFIER |
| 6385 | | 2C51/ 5670 | TE-21 | MINIATURE TWIN TRIODE |
| 6486 | | 6AS6 | TE-11 | MINIATURE PENTODE |
| 6582 | | 6AK5 | TE-35 | MINIATURE PENTODE |

HY-G-300®

(Reliable, hard glass, ceramic spacers, 300°C Bulb Temperature Rating)

| | | | | |
|--------|------|------------------------|-------|-----------------------------|
| 6080WB | | 6AS7 | TE-46 | TWIN TRIODE |
| 6082A | | 6082 | TE-55 | TWIN TRIODE |
| 6094 | 6094 | 6AQ5/ 6005/ 6095 | TE-18 | MINIATURE AMPLIFIER |
| 6384 | 6384 | 6AR6/ 6098 | TE-27 | AMPLIFIER Beam power |
| 6486A | | 6AS6 | TE-43 | MINIATURE RF PENTODE |
| 6582A | | 6AK5 | TE-44 | MINIATURE RF PENTODE |
| 6754 | | 412A | TE-36 | RECTIFIER. Full-wave |
| 6851 | | 5751 | TE-42 | MINIATURE TWIN TRIODE |
| 6853 | | 5Y3 | TE-45 | BANTAM RECTIFIER. Full-wave |
| 6854 | | 2C51/ 5670 | TE-47 | MINIATURE TWIN TRIODE |
| 6877 | | ½ 6080 | TE-48 | MINIATURE TRIODE |
| 6889 | | Top Cap 6384 | TE-52 | AMPLIFIER. Beam power |
| 6900 | | 5687 | TE-54 | MINIATURE TWIN TRIODE |
| | | 3D21B | TE-74 | AMPLIFIER |
| 6888 | | 7AK7 | TE-40 | GATED PENTODE |

COMPUTER TUBES

GROUP II—MICROWAVE TUBES

| EIA Type No. | JAN Type No. | BAND | BENDIX Type No. | DESCRIPTION |
|--------------|-------------------|------|-----------------|--------------------------------|
| 2K50 | 2K50 | K | TE-4 | REFLEX KLYSTRON |
| 6116 | 6116 | X | TE-62 | REFLEX KLYSTRON |
| 6541 | | K | TE-30 | REFLEX KLYSTRON |
| 6584 | | C | TE-38 | REFLEX KLYSTRON |
| | | Ka | TE-37 | REFLEX KLYSTRON |
| | | Ka | TE-53 | REFLEX KLYSTRON |
| 6845 | 6845 (US Navy) | X | TE-59 | REFLEX KLYSTRON |
| 6940 | | X | TE-58 | REFLEX KLYSTRON |
| | | K | TE-60 | REFLEX KLYSTRON |
| | | X | TE-61 | REFLEX KLYSTRON |
| | | V | TE-67 | BACKWARD-WAVE OSCILLATOR |
| | | C | RXB-103401 | TRAVELLING-WAVE TUBE AMPLIFIER |
| | | V | TE-66 | BACKWARD-WAVE OSCILLATOR |
| | | V | TE-71 | BACKWARD-WAVE OSCILLATOR |
| | | V | TE-75 | BACKWARD-WAVE OSCILLATOR |

GROUP III—GAS AND SPECIAL TUBES

SPECIAL PURPOSE GAS TUBES

| EIA Type No. | JAN Type No. | BENDIX Type No. | DESCRIPTION |
|--------------|--------------|-----------------|--|
| 5643 | 5643 | TD-17 | SUBMINIATURE XENON THYRATRON (MIL SPEC) |
| 5643 | | TD-37 | SUBMINIATURE XENON THYRATRON (COMMERCIAL SPEC) |
| 5947 | | TT-2 | TEMPERATURE LIMITED DIODE |
| 5960 | | TD-1 | COLD CATHODE DISCHARGE |
| | | TD-45 | COLD CATHODE DISCHARGE |
| | | TD-28 | COLD CATHODE TETRODE THYRATRON |
| 6142 | | TD-9A | GAS DIODE VOLTAGE REGULATOR |
| | | TD-19 | GAS DIODE VOLTAGE REGULATOR |
| 6144 | | TT-1 | NOISE DIODE |
| 6352 | | TT-29 | SUBMINIATURE TEMP LIMITED DUAL-DIODE |
| 6361 | | TT-25 | SINGLE CONVECTRON |
| 5845 | | TT-30 | MINIATURE TEMPERATURE-LIMITED DIODE |
| 7414 | | TD-60 | TIME TOTALIZER |
| 7416 | | TD-36 | CONSTANT FIRING DIODE |

GROUP IV—GAS NOISE SOURCE TUBES

| Frequency Range KMC | Band | Waveguide Number | Bendix Type Number | EIA Type Number | Mount Type | Recommended Mode of Operation | Anode Current MA | Tube Drop Volts | Tube Excess Noise Ratio DB |
|---------------------|------|------------------|--------------------|-----------------|------------|-------------------------------|------------------|-----------------|----------------------------|
| 1.12-1.70 | L | RG-69/U | TD-21 | 6881 | 90°H | D.C. | 250 | 65 | 15.2 |
| | | | TD-29 | 7101 | 90°H | A.C. & D.C. | 250 | 130 | 18.0 |
| 2.6-3.95 | S | RG-48/U | TD-12 | 6358 | 10°E | D.C. | 250 | 80 | 15.2 |
| | | | TD-22 | 6782 | 90°H | A.C. & D.C. | 250 | 45 | 15.2 |
| 2.6-3.95 | S | RG-48/U | TD-34 | 7148 | 10°E | D.C. | 250 | 165 | 18.0 |
| 3.30-4.90 | S | WR-229 | TD-24 | 6852 | 10°E | A.C. & D.C. | 250 | 65 | 15.2 |
| 5.85-8.20 | X | RG-50/U | TD-10 | 6356 | 10°E | D.C. | 250 | 70 | 15.2 |
| 8.20-12.40 | X | RG-52/U | TD-11 | 6357 | 10°E | D.C. | 200 | 75 | 15.2 |
| | | | TD-23 | 6882 | 10°E | D.C. | 200 | 115 | 18.0 |
| 8.20-12.40 | X | RG-52/U | TD-40 | — | 10°E | Pulse | 200 | 85 | 15.2 |
| 12.4-18.00 | KU | RG-91/U | TD-18 | 6684 | 10°E | D.C. | 200 | 70 | 15.2 |
| 18.0-26.5 | K | RG-53/U | TD-13 | 6359 | 10°E | D.C. | 200 | 65 | 15.2 |

GROUP V—SPARK GAPS

| Type No. | DC Break-down KV | Initial Pulse Break-down KV | Repetitive Pulse Break-down KV | Watts Maximum Dissipation | Peak Discharge Watt-Second | Fault Surge Current Amps | Isotope Stabilization | Initial Equipment Usage | Configuration |
|----------|------------------|-----------------------------|--------------------------------|---------------------------|----------------------------|--------------------------|-----------------------|-------------------------|---------------|
| TG-25 | 0.400 | | | 3 | 2 | | Yes | Safety | 1 |
| TG-26 | 0.75 | | | 5 | 2 | 1000 | Yes | Safety | 2 |
| TG-27 | 1.0 | | | 5 | 5 | 1000 | Yes | Safety | 2 |
| TG-30 | 2.0 | 3.0 | 2.7 | 5 | 14 | 2000 | Yes | Safety | 2 |
| TG-34 | 5.0 | 8.5 | 5.5 | 5 | 19 | 3000 | Yes | Safety | 2 |
| TG-37 | 10.0 | 20.0 | 15.0 | 5 | 22 | 4000 | Yes | Safety | 2 |
| TG-56 | 20.0 | 23.0 | | 7.5 | 30 | 5000 | Yes | Safety | 4 |
| TG-60 | 50.0 | | | 7.5 | 50 | 6000 | Yes | Safety | 4 |

Many other models of Bendix gas noise source and spark gap tubes besides those shown here are available. There is also a HY-G-500 line of metal ceramic receiving tubes. For a completely up-to-date list, write BENDIX AVIATION CORPORATION, EATONTOWN, NEW JERSEY.

West Coast Sales & Service: 117 E. Providencia Ave., Burbank, Calif.
Export Sales & Service: Bendix International Division,
205 E. 42nd St., New York 17, N.Y.

Canadian Distributor: Computing Devices of Canada, Ltd., P.O. Box 508, Ottawa 4, Ontario

 Red Bank Division



Directory II. Components

73. Transformers.

Valor Electronics, Inc., Calif., 55
Vanguard Electronics Co., Calif., 35, 60
Vari-L Co., Inc., 432 Fairfield Ave.,
Stamford, Conn., 65, 80
See ad on page 254
Tel: F Ireside 8-0091
Varo Mfg. Co., Inc., Tex., 5, 10, 15, 25,
27, 35, 40, 42, 45, 52, 55, 60, 65, 80, 95
Virginia Electronics Co., Inc., D.C., 5,
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Transistors: See class 68

**Transmitters, airborne & airport:
See class 1**

Transmitters, amateur: See class 2

**Transmitters, broadcast:
See class 7**

**Transmitters, facsimile:
See class 11**

**Transmitters, microwave:
See class 18**

Transmitters, mobile: See class 20

**Transmitters, point-to-point:
See class 24**

Transmitters, radar: See class 25

**Transmitters, single sideband:
See class 29**

**Transmitters, telegraph & tele-
printer: See class 33**

**Transmitters, telemeter:
See class 34**

**Transmitters, television:
See class 7**

**Traveling wave tubes:
See class 76**

Trimmers: See class 42

Tube parts, vacuum: See class 99

Tubes, paper: See class 87

74. Tubes, Receiving.

| | |
|--------------------------------------|----------------------|
| 5. Cathode-ray | 20. Sub-miniature |
| 7. Ceramic | 25. TV Picture-color |
| 10. Miniature | 30. TV Picture- |
| 15. Standard types, glass & metal | monochrome |

American Elite, Inc., N.Y., 5, 10, 15, 20
American Radio Co., Inc., N.Y., 10, 15,
20

Amperex Electronic Corp., 230 Duffy
Ave., Hicksville, L.I., N.Y., 10, 20, 25
See ad on pages 38-39
Tel: WELLS 1-6200

Autometric Corp., N.Y., 25
Bendix Aviation Corp., Ind., 5, 7, 10, 15
Bendix Aviation Corp., Mich., 7, 10, 20
Bendix Aviation Corp., Red Bank Div.,
Electron Tube Section, Route 35,
Eatontown, N.J., 7, 10, 15, 20
See ad on page 572
Tel: LIBerty 2-2000

British Indust. Corp., Genalex Div.,
N.Y., 5, 10, 15

CBS Electronics Div., Columbia Broad-
casting System, Inc., 100 Endicott St.,
Danvers, Mass., 5, 10, 15
See ad on page 576
Tel: SPring 4-2360

Calvert Electronics, Inc., N.Y., 5, 7, 10,
15, 20, 25, 30

Carborundum Co., Refractories Div.,
N.J., 7, 10

Channel Master Corp., N.Y., 5, 15

74. Tubes, Receiving.

Claremont Tube Corp., N.Y., 30

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DuMont Labs., Inc., Allen B., N.J., 5, 15,
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Electronica Industrial Ltd., Brazil, 30

Ericsson Corp., L. M. (Stockholm 32,
Sweden), 649 Broadway, New York
12, N.Y., 5, 10, 15, 20, 25

See ad on page 581

Tel: ORegon 7-8400

Ferranti Electric, Inc., Electronics Div.,
N.Y., 5

Ferranti-Packard Electric, Ltd., Can-
ada, 5

Freeland Products Co., La., 5

General Electric Co., Cathode Ray Tube
Dept., Electronics Park, Syracuse,
N.Y., 5

See ad on page 574

Tel: GRAnite 6-4411

General Electric Co., Receiving Tube
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General Electrodynamics Corp., Tex., 5

General Electronics, Inc., N.J., 5, 25

Hughes Aircraft Co., Hughes Products
Div., Calif., 5, 25

Intelx Systems, Inc., N.Y., 10, 15

J.S.H. Electronics Co., Calif., 5, 7, 10,
15, 20

Jan Hardware Mfg. Co., Inc., N.Y., 5, 25

Kip Electronics Corp., 29 Holly Place,
P.O. Box 562, Stamford, Conn., 10, 20,
25, 30

See ad on page 579

Tel: DAvis 5-1551

Litton Industries, Inc., Electron Tube
Div., 960 Industrial Rd., San Carlos,
Calif., 5, 10, 15

See ad on pages 64-65

Tel: LYtell 1-8411

Litton Industries, Inc., Electronic Equip-
ments Div., 336 N. Foothill Rd., Bever-
ly Hills, Calif., 5

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Tel: CRestview 4-7411

Mackay Research Labs., Ariz., 5

Marconi's Wireless Telegraph Co., Ltd.,
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Marquardt Aircraft Co., Pomona Div.,
Calif., Display

Minicord Corp. of America, N.J., 20

Mullard Overseas, Ltd., England, 5, 10,
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Multi-Tron Lab., Inc., Ill., 5, 25, 30

National Union Electric Corp., Ill., 5

National Video Corp., Ill., 5, 30

Packard Bell Electronics Corp., 12333
W. Olympic Blvd., Los Angeles 64,
Calif., 5

See ad on page 246

Tel: BRAdshaw 2-6141

Philadelphia Scientific Glass Co., Pa.,
15

Custom-designed General Electric Cathode Ray Tubes Improve Display-equipment Performance

Today's industrial and military display applications require the finest in cathode-ray-tube technology.

At General Electric, each customer requirement is analyzed to help the customer determine the tube design best suited to it. Should a new or improved type be needed, a veteran G-E engineering-manufacturing task force researches, custom-designs, and produces the appropriate tube.

General Electric's fully integrated Cathode Ray Tube Department includes research-and-development engineering and laboratories, design engineering, and manufacturing and marketing engineering facilities. Also available is the experience gained through company-wide work in virtually every engineering and scientific field.

For immediate answers to your display problems, call or write Regional Sales Managers R. E. McBride, M. B. Lees, or A. N. Reagan—General Electric Company, Cathode Ray Tube Department, Electronics Park, Syracuse, N. Y.

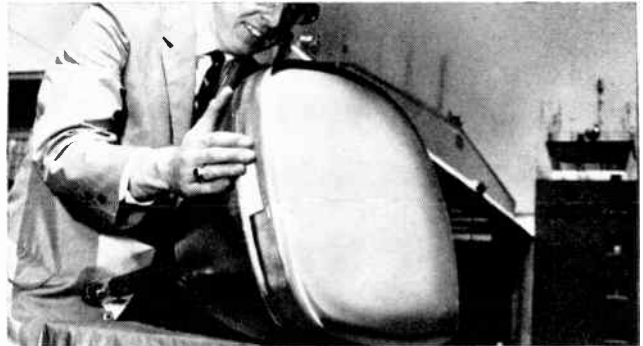
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Progress Is Our Most Important Product

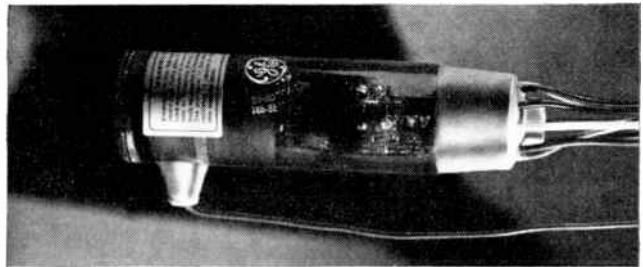
GENERAL  ELECTRIC



Large (16") GL-4623 electrostatic deflection tube was custom designed for critical processed-video use . . . can be furnished to meet specific pattern-distortion requirements.



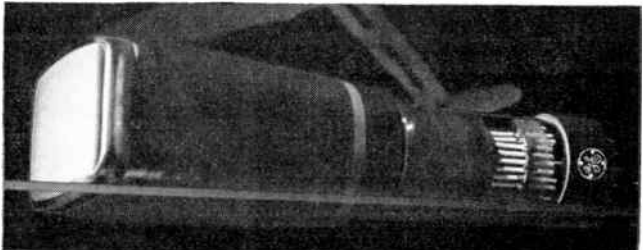
From G.E.'s CRT Development Laboratory came the GL-4619 21-inch, closed-circuit TV monitor tube, which provides more than 1000-line resolution in critical airport operations.



Tiny (1½") GL-4580 electrostatic deflection tube, developed by G-E manufacturing-engineering task force, performs as vital remote indicator tube at high altitude.



Thoroughly researched and job-tailored, Z-4448 transparent phosphor tube offers ultra-high resolution for specialized photographic applications.



Designed for use under severe conditions of vibration and humidity, two-gun GL-4386 4 x 6" electrostatic deflection tube meets all design specs, is successfully job proven.

Directory II. Components

74. Tubes, Receiving.

Philco Corp., Lansdale Tube Co. Div.,
Church Rd., Lansdale, Pa., 5, 10, 15,
30

See ad on page 546

Tel: ULysses 5-4681

Radio Corporation of America, Electron
Tube Div., Section I-22-Q, 415 S. Fifth
St., Harrison, N.J., 5, 7, 10, 15, 20, 25,
30

See ad on pages 53-55

Tel: HUmboldt 5-3900

Rank Cintel, Ltd., England, 5, 25, 30

Rauland Corp., Ill., 5, 15, 25

Raytheon Co., Mass., 5, 7, 10, 15, 20

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Rogers Electronic Tubes & Components,
Canada, 5, 7, 10, 15, 20, 25, 30

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Saxonburg Ceramics, Inc., Pa., 7

Sonotone Corp., Dept. X00-109, P.O. Box
200, Elmsford, N.Y., 10, 20

See ad on page 482

Tel: LYric 2-6400

Standard Telephones & Cables, Ltd.,
England, 5, 10, 15, 20, 30

State Laboratories, Inc., 649 Broadway,
New York 12, N.Y., 5, 10, 15, 20

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Tel: ORegon 7-8400

Stromberg-Carlson-San Diego, Calif., 5

Sylvania Electric Products, Inc., 1740
Broadway, New York 19, N.Y., 5, 7,
10, 15, 20, 25, 30

See ad on page 23-25

Tel: JUdson 6-2424

Technical Ceramics & Lava Corp., 85
Fifth Ave., Paterson 4, N.J., 7

See ad on page 621

Tel: ARmory 1-0163

Thomas Electronics, Inc., N.J., 5, 25

Tung-Sol Electric, Inc., 1 Summer Ave.,
Newark 4, N.J., 5, 10, 15, 20, 30

See ad on pages 50-51

Tel: HUmboldt 2-4200

Vacuum Tube Products Co., Inc., Calif.,
5, 25

Waterman Products Co., Inc., 2445 Em-
erald St., Philadelphia 25, Pa., 5

See ad on page 330

Tel: GARfield 6-8600

Wells Co., Inc., Gary, N.Y., 15

Westinghouse Electric Corp., Electronic
Tube Div., P.O. Box 284, Elmira,
N.Y., 5, 10, 15, 20

See ad on page 580

Tel: REgent 9-3611

Wiltec Electronics, Inc., Conn., 10, 20

For more information on any of the
products advertised in this issue,
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side the back cover.

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It's a "thinga-ma-jig that"*

How often have you struggled to remember the
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Just could not think quickly what it is called?

YOU CAN FIND IT IN THE IRE DIRECTORY!

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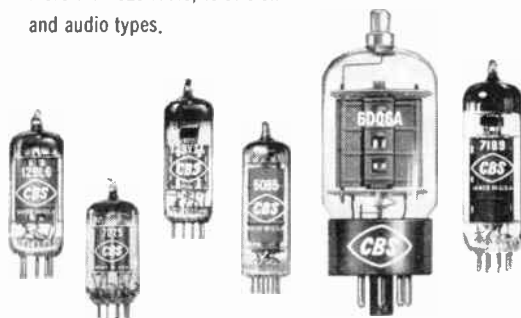
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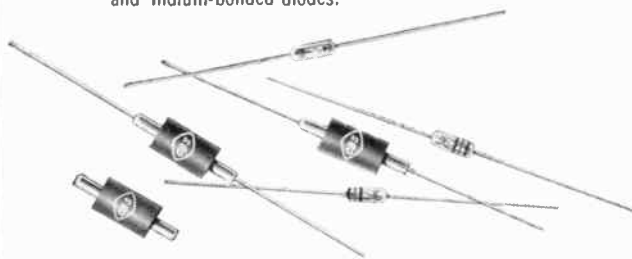
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Comprehensive lines of reliable general-purpose and indium-bonded diodes.



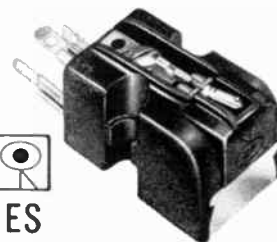
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by design engineers—because they're
MOST COMPACT • SIMPLEST • MOST ECONOMICAL
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Thermostatic DELAY RELAYS

2 to 180 Seconds

Actuated by a heater, they operate on A.C., D.C., or Pulsating Current.

Hermetically sealed. Not affected by altitude, moisture, or climate changes.

SPST only—normally open or closed.

Compensated for ambient temperature changes from -55° to $+70^{\circ}$ C. Heaters consume approximately 2 W. and may be operated continuously. The units are rugged, explosion-proof, long-lived, and—inexpensive!

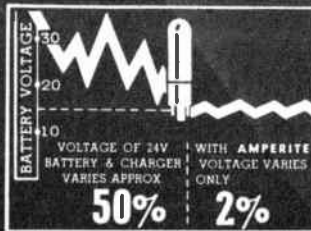
TYPES: Standard Radio Octal, and 9-Pin Miniature . . . List Price, \$4.00, Standard Delays

Also — Amperite Differential Relays: Used for automatic overload, under-voltage or under-current protection.

PROBLEM? Send for Bulletin No. TR-81

BALLAST REGULATORS

Amperite Regulators are designed to keep the current in a circuit automatically regulated at a definite value (for example, 0.5 amp.) . . . For currents of 60 ma. to 5 amps. Operate on A.C., D.C., or Pulsating Current.



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Write for 4-page Technical Bulletin No. AB-51



AMPERITE CO. Inc., 561 Broadway, New York 12, N. Y.

Telephone: CAnal 6-1446

In Canada: Atlas Radio Corp., Ltd., 50 Wingold Ave., Toronto 10

For details, circle #578 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Tubes, Special Purpose—Class 75

Directory II. Components

75. Tubes, Special Purpose.

- | | |
|-----------------------|------------------------|
| 5. Electrometer tubes | 30. Voltage regulators |
| 10. Geiger-Mueller | & ballasts |
| 15. Photo multiplier | 35. X-Ray |
| 25. Thyratrons | |

Aerolux Light Corp., N.Y., 10, 25, 30

Alectric Mfg. Co., Wis., 25

Anglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., Flash Tubes

See ad on pages 477, 577

Tel: BUckingham 1-2727

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 10, 15, 25, 30, 35

See ad on pages 38-39

Tel: WElls 1-6200

Amperite Co., Inc., 561 Broadway, New York 12, N.Y., ballast

See ad on this page

Tel: CAnal 6-1446

Anton Electronic Labs., Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 10, 30

See ads on pages 327, 418, 579

Tel: EVergreen 6-5715

AMGLO

Grid Controlled Flashtubes



- Used extensively for automotive timing, wheel balancing and other stroboscopic applications.
- Capable of flashing at rates up to several thousand per minute when operated at 400—600 volts.
- Can be used with electrolytic or oil capacitors, 1 to 2 Mfd at high flash rates, 2 to 4 Mfd at rates to 1800 per min.
- Non-polarized, may be accidentally or purposely (to increase life) reversed without harm.
- Special tubes of all kinds promptly made.

Write for
Descriptive Literature

AMGLO CORPORATION

Pioneers in Flashtubes

4333 N. Ravenswood,
Chicago 13, Ill.

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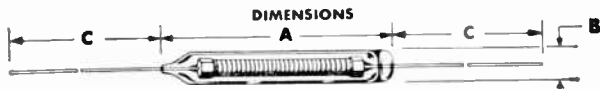
THE VICTREEN INSTRUMENT COMPANY
5806 HOUGH AVENUE • CLEVELAND 3, OHIO

GLASS-SEALED DEPOSITED CARBON RESISTORS

RESISTOR DATA CHART

| TYPE | RESISTANCE | TOLERANCE | VOLTAGE COEF. % / V | TEMP. COEF. % / °C | MAX. W.V. | WATTAGE | MAX. TEMP. °C | DIMENSIONS | | |
|------|--------------------|-----------------------|---------------------|--------------------|-----------|---------|---------------|------------|---------|---------|
| | | | | | | | | A (MAX) | B (MAX) | C (MIN) |
| RX2 | 1 Meg to 50 Meg | 1,2.5,10,20 Note 1 | -.0002 | -0.08 | 3000 | 1 | 125 | 2 | .413 | 1 1/2 |
| RX3 | 1 Meg to 200 Meg | 1,2.5,10,20 Note 2 | -.0002 | -0.08 | 10,000 | 3 | 125 | 3 1/4 | .413 | 1 1/2 |
| RX4 | 200 ohm to 50 Meg | 1,2.5 | -.0002 | -0.06 | 800 | 5 | 200 | 2 | .413 | 1 1/2 |
| RX5 | 200 ohm to 200 Meg | 1,2.5 Note 3 | -.0002 | -0.05 | 2000 | 10 | 200 | 3 1/4 | .413 | 1 1/2 |
| RX8 | 100 ohm to 10 Meg | 1,2.5 | -.0002 | -0.05 | 750 | 2 | 200 | 1 1/2 | .240 | 1 1/2 |

NOTE: 1: 1% and 2% tolerance available only below 20 meg.
2: 1%, 2% and 5% tolerance available only below 100 meg.
3: 1% and 2% tolerance available only below 100 meg.



HI-MEG RESISTORS

GLASS SEAL: HI-MEGS are vacuum sealed in a glass envelope which is treated with a special silicone varnish which keeps the resistor relatively free from the effects of moisture.

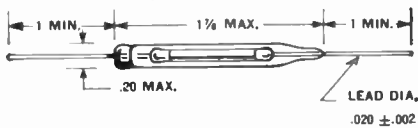
RESISTANCE: HI-MEG resistors are available in values from 10^8 to 10^{14} ohms.

TOLERANCE: HI-MEG resistors can be supplied in the following tolerances: 1% below 10^{12} ohms, 2% and 5% below 10^{13} ohms, and 10% over the entire range.

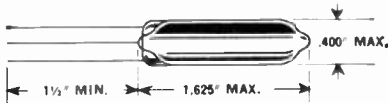
MAXIMUM WORKING VOLTAGE: 1000 volts.

MAXIMUM OPERATING AMBIENT TEMPERATURE: 100°C.

POWER RATING: The power rating for any HI-MEG resistor is equal to one divided by the resistance in megohms.



**ELECTROMETER TRIODE
VX-55**



TYPICAL OPERATION AND TEST CONDITIONS

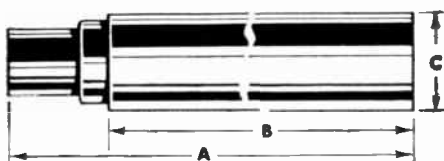
| | | | | | |
|-----------------|------|-------|-----------------|---------------------|-----------|
| E_f | 1.25 | Volts | I_p | 95 | μ a |
| I_f | 10.0 | ma | G_m | 110 | μ mho |
| E_p | 7.5 | Volts | I_g | 5×10^{-14} | amp |
| E_g | -2.2 | Volts | M_u | 2.1 | |

**ELECTROMETER TETRODE
5800/VX-41A**

AS A TETRODE ELECTROMETER

| | | | | | |
|--|------|-------|------------------------------------|------------|------------|
| Plate Voltage | +4.5 | Volts | Transconductance | 15 | μ mhos |
| Accelerator Grid Voltage (g_1) | +3.4 | Volts | Plate Current | 12 | μ a |
| Control Grid Voltage (g_2) | -3 | Volts | Accelerator Grid Current | 300 | μ a |
| Amplification Factor | 1 | | Control Grid Current | 10^{-11} | Amp |

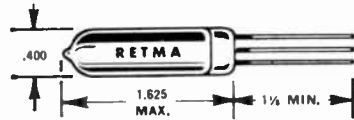
CORONA TYPE VOLTAGE REGULATORS



Commonly Used Metal Regulators*

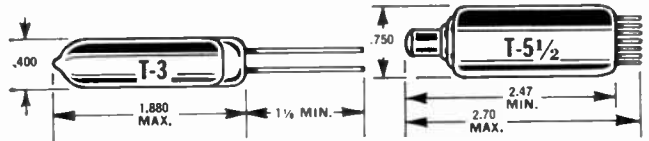
| TYPE | VOLTAGE RANGE | TOLERANCE | NOM. TEST POINT | CURRENT | | | REGULATION 100-1000 μ a | DIMENSIONS | | |
|-------|---------------|------------|-----------------|--------------|-------------|---------|-----------------------------|------------|-------|---|
| | | | | MAX. | MIN. | | | A | B | C |
| M105B | 6 KV-10 KV | $\pm 500V$ | 500 μ a | 1000 μ a | 50 μ a | 7 1/2 % | 8 1/2 | 5 | 1 1/2 | |
| M105 | 10 KV-20 KV | $\pm 500V$ | 500 μ a | 1000 μ a | 100 μ a | 10 % | 8 1/2 | 5 | 1 1/4 | |
| M106 | 10 KV-20 KV | $\pm 500V$ | 500 μ a | 1000 μ a | 100 μ a | 7 % | 9 1/2 | 8 | 1 1/4 | |
| M126 | 20 KV-25 KV | $\pm 500V$ | 500 μ a | 1000 μ a | 100 μ a | 10 % | 7 7/8 | 6 | 1 1/2 | |
| M128 | 20 KV-27 KV | $\pm 500V$ | 500 μ a | 1000 μ a | 100 μ a | 7 % | 9 1/2 | 8 | 1 1/2 | |

CORONA TYPE VOLTAGE REGULATORS



R. E. T. M. A. Types

| TYPE | NOM. | TOLERANCE | NOM. TEST PT. | CURRENT IN μ a | | | REGULATION | |
|------|-------|------------|---------------|--------------------|------|------|------------|---------------|
| | | | | MIN. | MAX. | PEAK | VOLTS | CURRENT RANGE |
| 5950 | 700V | $\pm 15V$ | 25 μ a | 5 | 100 | 150 | 14V | 5-100 μ a |
| 5841 | 900V | $\pm 18V$ | 25 μ a | 5 | 100 | 150 | 18V | 5-100 μ a |
| 8143 | 1200V | $\pm 24V$ | 25 μ a | 10 | 100 | 150 | 24V | 5-100 μ a |
| 6119 | 2000V | $\pm 100V$ | 25 μ a | 15 | 100 | 150 | 40V | 5-100 μ a |

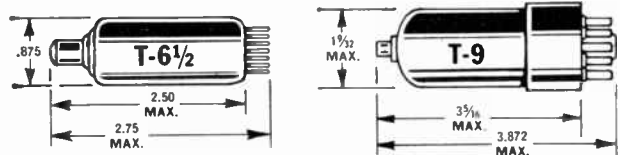


Commonly Used Models in T-3 Size*

| TYPE | NOM. TEST PT. | TOLERANCE | NOM. | CURRENT IN μ a | | | REGULATION | |
|-----------|---------------|-----------|-------|--------------------|-----|------|------------|----------------|
| | | | | MIN | MAX | PEAK | VOLTS | CURRENT RANGE |
| GV3B-400 | 50 μ a | $\pm 10V$ | 400V | 5 | 150 | 300 | 15V | 5-150 μ a |
| GV3B-600 | 50 μ a | $\pm 10V$ | 600V | 5 | 150 | 300 | 20V | 5-150 μ a |
| GV3A-900 | 50 μ a | $\pm 15V$ | 900V | 10 | 250 | 350 | 25V | 10-250 μ a |
| GV3A-1200 | 50 μ a | $\pm 30V$ | 1200V | 10 | 250 | 400 | 40V | 10-250 μ a |
| GV3A-1500 | 50 μ a | $\pm 30V$ | 1500V | 15 | 300 | 500 | 50V | 15-300 μ a |
| GV3A-2000 | 50 μ a | $\pm 50V$ | 2000V | 15 | 300 | 500 | 75V | 15-300 μ a |

Commonly Used Models in T-5 1/2 Size*

| TYPE | NOM. | TOLERANCE | NOM. TEST PT. | CURRENT IN μ a | | | REGULATION | |
|-----------|-------|-----------|---------------|--------------------|------|------|------------|-----------------|
| | | | | MIN | MAX | PEAK | VOLTS | CURRENT RANGE |
| GV5B-700 | 700V | $\pm 20V$ | 100 μ a | 10 | 250 | 350 | 25V | 10-250 μ a |
| GV5B-900 | 900V | $\pm 25V$ | 100 μ a | 10 | 300 | 500 | 30V | 10-300 μ a |
| GV5B-1000 | 1000V | $\pm 30V$ | 100 μ a | 10 | 300 | 500 | 35V | 10-300 μ a |
| GV5A-1200 | 1200V | $\pm 36V$ | 100 μ a | 10 | 400 | 600 | 40V | 10-400 μ a |
| GV5A-2200 | 2200V | $\pm 65V$ | 100 μ a | 20 | 800 | 1000 | 50V | 20-800 μ a |
| GV5A-3000 | 3000V | $\pm 90V$ | 100 μ a | 30 | 1000 | 1200 | 75V | 30-1000 μ a |



Commonly Used Models in T-6 1/2 Size

| TYPE | NOM. VOLTAGE | TOLERANCE | NOM. TEST PT. | CURRENT IN μ a | | | REGULATION** |
|-----------|--------------|-----------|---------------|--------------------|------|------|--------------|
| | | | | MIN | MAX | PEAK | |
| GV6A-450 | 450 | $\pm 11V$ | 500 μ a | 20 | 1000 | 1300 | 30V |
| GV6A-1000 | 1000 | $\pm 25V$ | 500 μ a | 30 | 1000 | 1500 | 42V |
| GV6A-2500 | 2500 | $\pm 65V$ | 500 μ a | 50 | 1500 | 3500 | 100V |
| GV6A-3000 | 3000 | $\pm 75V$ | 500 μ a | 50 | 1000 | 3500 | 70V |

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

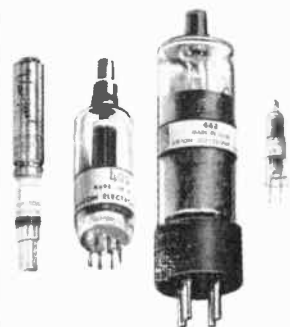
Commonly Used Models in T-9 Size

| TYPE | NOM. VOLTAGE | TOLERANCE | NOM. TEST PT. | CURRENT IN μ a | | | REGULATION** |
|-----------|--------------|-----------|---------------|--------------------|------|------|--------------|
| | | | | MIN | MAX | PEAK | |
| GV9A-600 | 600 | $\pm 15V$ | 1000 μ a | 50 | 1500 | 2000 | 25V |
| GV9A-1000 | 1000 | $\pm 25V$ | 1000 μ a | 50 | 1750 | 2200 | 45V |
| GV9A-2000 | 2000 | $\pm 50V$ | 1000 μ a | 50 | 3500 | 4200 | 80V |
| GV9A-3000 | 3000 | $\pm 75V$ | 1000 μ a | 50 | 2700 | 7000 | 110V |

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

*T-3 size voltage regulators are available in any desired nominal voltage $\pm 2\%$ from 400 volts to 2000 volts at the customary test point of 50 μ a. T-5 1/2 size voltage regulators are available in any desired nominal voltage $\pm 3\%$ from 400 volts to 6000 volts at the nominal test point at 100 μ a. Metal regulators are available in any desired voltage ± 500 volts from 7 1/2 KV. to 27 1/2 KV. at the customary test point of 500 μ a. All other characteristics such as maximum and minimum currents, regulation, etc., may be interpolated from the table.

SOLVE YOUR REGULATED HIGH VOLTAGE PROBLEMS NOW WITH RELIABLE ANTON CORONA DISCHARGE V-R TUBES



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have been found to be extremely reliable over the wide range of military shock, temperature, current and voltage requirements. Fixed and adjustable tubes are available to stabilize voltages from 300 V—30 KV at currents below several milliamperes with voltage tolerances within $\pm 1\%$. MIL approved types available. Well suited for use as voltage reference tubes, stabilizing all high voltage-low current power supplies and for control of high voltage, accelerating potentials of cathode ray devices (radar scopes, TV, etc.). Send for valuable FREE application and design notes.



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- Transistor Indicators
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- Binary Counters
- Trigger Tubes

These tubes are made in many sizes with various ratings. If you have any tube problem, KIP will solve it... in fact, they may have already done so.

For information, write:

KIP ELECTRONICS CORP.
STAMFORD, CONN.



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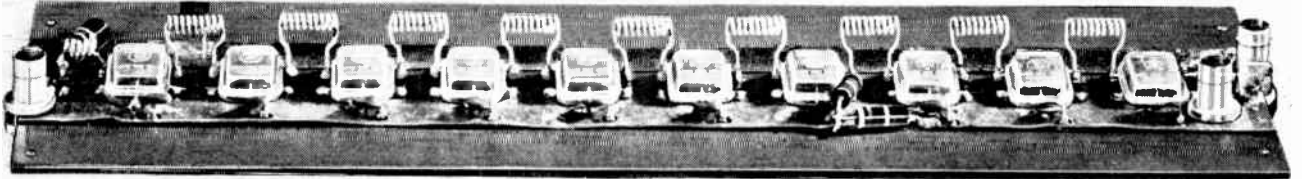
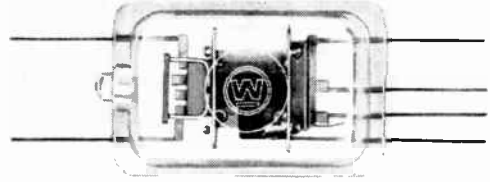
Tubes, Special Purpose—Class 75

Directory II. Components

75. Tubes, Special Purpose.

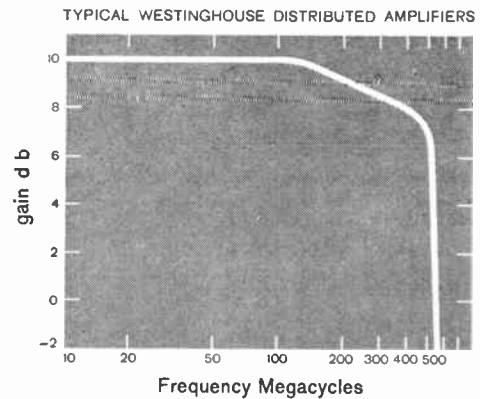
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 Tel: LIBerty 2-2000
- British Industries Corp., Genalex Div., N.Y., 10, 15, 25
 British Thomson-Houston Co., Ltd., England, 25
- CBS Electronics Div., Columbia Broadcasting System, Inc., 100 Endicott St., Danvers, Mass., 25, 30
 See ad on page 576
 Tel: SPring 4-2360
- Calvert Electronics, Inc., N.Y., 5, 10, 15, 25, 30, 35
 Central Electronic Mfg., Inc., N.J., 5
 Comet. Ltd., Switzerland, 35
 Continental Electric Co., Ill., 10, 15, 25
 DuMont Labs., Inc., Allen B., N.J., 15
 E A K Research Lab., N.Y., 10, 35
 E. M. I. Electronics Ltd., England, 15
 Edgerton, Germeshausen & Grier, Inc., Mass., 25, Ceramic
 Ekco Electronics Ltd., England, 10
 Electronic Enterprises, Inc., N.J., 25
 Electronic Products Co., N.Y., 10, 30
 Electrons, Inc., N.J., 25
- Ericsson Corp., L. M. (Stockholm 32, Sweden), 649 Broadway, New York 12, N.Y., 15, 25, 30
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 Tel: ORegon 7-8400
- Farnsworth Electronics Co., Div. of I. T. & T., Ind., 15
 Fenwal, Inc., Mass., 75
 Ferranti Electric, Inc., Electronics Div., N.Y., 5, 35
- General Electric Co., Power Tube Dept., 1 River Rd., Bldg. 267, Schenectady 5, N.Y., 25
 See ad on page 584
 Tel: FRanklin 4-2211
- General Electric Co., X-Ray Dept., Wis., 35
 General Electrodynamics Corp., Tex., 15, Storage
 General Electronics, Inc., N.J., 25
 Industrial Tubes, Inc., Ill., 25
- International Telephone & Telegraph Co., ITT Components Div., 100 Kingsland Rd., P.O. Box 412, Clifton, N.J., 25
 See ad on pages 148-149
 Tel: NUTley 2-3600
- I. T. & T., Kuthe Labs. Div., Inc., N.J., 25
 J. S. H. Electronics Co., Calif., 5, 10, 15, 25, 30, 35
- Kip Electronics Corp., 29 Holly Place, P.O. Box 562, Stamford, Conn., 25, 30, cold cathode
 See ad on this page
 Tel: DAVis 5-1551

Westinghouse tube engineering...
serving the nation through imagination



GAIN AT HIGHER FREQUENCIES

with Westinghouse distributed amplifiers



The new Westinghouse Match Box Tubes provide distributed amplifiers with response to 550 MC.

Match Box tubes surpass conventional tubes in high frequency performance and resistance to vibration. Tubes lie flat . . . no height problem . . . eliminates sockets, fits printed circuits.

Westinghouse Distributed Amplifiers can be designed with various frequency pass bands. They're especially suited for electronic coun-

ter-measure circuits and for high-speed, high-frequency oscilloscopes. We'd welcome the opportunity to design and build your Distributed Amplifiers.

CHARACTERISTICS WX3683

| | |
|------------------|----------------|
| Heater 6.3 Volts | 0.2 amperes |
| Plate current | 8 milliamperes |
| Transconductance | 5100 micromhos |
| Plate Voltage | 180 volts |

Write for complete information.

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Electronic Tube Division Elmira, N. Y.

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 Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 25
 See ads on pages 270, 301
 Tel: TExas 0-7711
 Litton Industries, Inc., Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., 35
 See ad on pages 64-65
 Tel: LYtell 1-8411
 Litton Industries, Inc., Electron Tube Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 25
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 Tel: CRestview 4-7411
 Machlett Labs., Inc., Conn., 35
 Mackay Research Labs., Ariz., 15, 25, 35
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 25, 30
 Mullard Overseas, Ltd., England, 5, 10, 15, 25, 30
 Multi-Tron Lab., Inc., Ill., 10, 30, 35
 National Electronics, Inc., 628 North St., Geneva, Ill., 25, Ignitrons
 See ad on page 586
 Tel: GENEVA 7000
 National Union Electric Corp., Ill., 30
 North American Philips Co., Inc., Philips Labs., Div., N.Y., 10
 Nuclear Corp. of America, Inc., Mo., 10, 15
 Pek Labs., Inc., Calif., 35
 Penta Laboratories, Inc., Calif., 25
 Philips Electronics, Inc., N.Y., 10, 35
 Radiation Research Corp., N.Y., 30
 Radio Corporation of America, Electron Tube Div., Section I-22-Q, 415 S. Fifth St., Harrison, N.J., 15, 25, 30
 See ad on pages 53-55
 Tel: HUmboldt 5-3900
 Rank Cintel, Ltd., England, 5, 10, 15
 Rauland Corp., Ill., 25, 35
 Raytheon Co., Mass., 5, 10, 25, 30, 35
 Resitron Labs., Inc., Calif., 35
 Rogers Electronic Tubes & Components, Canada, 5, 10, 15, 25, 30, 35
 Signalite, Inc., N.J., 30
 Standard Telephones & Cables, Ltd., England, 25, 30
 State Laboratories, Inc., 649 Broadway, New York 12, N.Y., 5, 15, 25, 30
 See ad on this page
 Tel: OREGON 7-8400
 Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 25
 See ad on pages 23-25
 Tel: JUDson 6-2424
 Technical Apparatus Builders, 109GB Liberty St., New York 6, N.Y., 30
 See ad on page 502
 Tel: REctor 2-6249
 Thermosen, Inc., Conn., 30

Tracerlab, Inc., Mass., 5, 10
 Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 25, 30
 See ad on pages 50-51
 Tel: HUmboldt 2-4200
 United Electronics Co., N.J., 25, 30
 Universal Transistor Products, N.Y., 10, 15
 Universal X-Ray Products, Inc., Ill., 35
 Vacuum Tube Products Co., Inc., Calif., 25
 Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 5, 10, 30
 See ad on page 578
 Tel: ENdicott 1-6200
 Western Radiation Lab., Calif., 10, 15
 Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 15, 25, 30
 See ad on page 580
 Tel: REgent 9-3611
 Westinghouse Electric Corp., Pa., 35
 Wiltec Electronics, Inc., Conn., 25, 30

76. Tubes, Transmitting.

5. ATR & TR types
 10. Air-cooled power tubes
 15. Iconoscopes
 20. Image orbitrons
 25. Klystrons
 30. Magnetrons
 35. Monoscope tubes
 40. Traveling wave
 45. Water-cooled power tubes
 American Elite, Inc., N.Y., 10, 40
 American Radio Co., Inc., N.Y., 40. Carcinotron
 Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 10, 25, 30, 40, 45
 See ad on pages 38-39
 Tel: WELLS 1-6200
 Applied Radiation Corp., Calif., 25
 Bendix Aviation Corp., Ind., 25, 40
 Bendix Aviation Corp., Mich., 25, 30, 40
 Bendix Aviation Corp., Red Bank Div., Electron Tube Section, Route 35, Eatontown, N.J., 25, 30, 40
 See ad on page 572
 Tel: LIBerty 2-2000

76. Tubes, Transmitting.

Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 5, 25, 30
 See ad on page 172
 Tel: WALKER 2-6000
 British Industrial Corp., Genalex Div., N.Y., 5, 10, 25, 30, 35, 40
 British Thomson-Houston Co., Ltd., England, 25, 30, 45
 CBS Electronics Div., Columbia Broadcasting System, Inc., 100 Endicott St., Danvers, Mass., 10
 See ad on page 576
 Tel: SPring 4-2360
 Calvert Electronics, Inc., N.Y., 5, 10, 15, 20, 25, 30, 35, 40, 45
 Canadian Marconi Co., Canada, 10, 30, 40
 Cathodeon Ltd., Meadowcroft Labs., England, 15, 20, 35, Vidicons
 Central Electronic Mfg., Inc., N.J., 5, 10, 45
 DuMont Labs., Inc., Allen B., N.J., 35
 E.M.I. Electronics Ltd., England, 20, 25, 30
 Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 10, 25, 40, 45
 See ad on pages 44-45
 Tel: LYtell 1-1451
 Electronic Enterprises, Inc., N.J., 10
 Electrons, Inc., N.J., 10
 Engineering Associates, Ohio, 25, 30
 Ericsson Corp., L. M. (Stockholm 32, Sweden), 649 Broadway, New York 12, N.Y., 10, 25, 30, 40, 45
 See ad on this page
 Tel: OREGON 7-8400
 Ferranti Electric, Inc., Electronics Div., N.Y., 5, 25, 30
 Freeland Products Co., La., 10, 45
 General Electric Co., Power Tube Dept., 1 River Rd., Bldg. 267, Schenectady 5, N.Y., 10, 20, 25, 30, 40, 45, Voltage-tunable Magnetrons
 See ad on page 584
 Tel: FRanklin 4-2211



L M ERICSSON
SPECIAL PURPOSE TUBES

WRITE TO THE
 AUTHORIZED
 U. S. AGENTS:

STATE LABS, INC.
 649 Broadway, New York 12, N. Y.
 OREGON 7-8400

For details, circle #584 on Reader Service Card



A LEADER IN CREATIVE MICROWAVE TECHNOLOGY

REFLEX KLYSTRON OSCILLATORS Self-Contained and External Cavity

| Type No. | Max. Freq. Range Megs. | Power Output Milliwatts | | Reso. Poten. D.C. Volts | Focus Poten. D.C. Volts | Maximum Temperature Coefficient Mc/C | Filament Current at 6.3V Amps | † |
|----------|---------------------------|----------------------------|------|----------------------------|----------------------------|---|----------------------------------|-------|
| | | Av. | Min. | | | | | |
| 5837 | 750-3000 | 160 | 50 | 325 | 10 | | 0.675 | 1A |
| RK-5777 | 600-2350 | 160 | 100 | 400 | 0 to 5 | .15 | 0.985 | 1A |
| 6BM6 | 750-3000 | 160 | 50 | 325 | 300 | | 0.650 | 1A |
| 2K28A | 1500-3750 | 40 | 10 | 300 | 10 | | 0.650 | 1A |
| 5981 | 1245-1460 | 140 | 95 | 300 | 300 | ±.15 | 0.650 | 1A |
| RK-5778 | 1800-4620 | 100 | 40 | 225 | | ±.05 | 0.455 | 2C |
| | | 150 | 100 | 300 | -5 to 5 | .15 | 0.985 | 3A |
| 6BL6 | 1600-5500 | 121 | 300 | 300 | | | 0.675 | 1A |
| | { 1600-4000 | 45 | 25 | 300 | 0 | | | |
| | { 2000-4500 | 72 | 25 | 300 | | | | |
| | { 3600-5500 | 121 | 300 | 300 | | | 0.675 | 1A |
| 5836 | 1600-5500 | 45 | 25 | 300 | 10 | | | |
| | | 150 | 50 | 1000 | | ±.040 | | 1A |
| 5721 | 2000-12,000 | 125 | 100 | 1000 | 4 to 18 | ±.025 | 0.580 | 3A |
| | | 40 | 20 | 1250 | | ±.040 | | |
| 726B | 2883-3173 | 150 | 110 | 300 | | -0.1 to +0.1 | 0.440 | 2C |
| 6236 | 3800-7600 | 125 | 90 | 1000 | 4 to 18 | ±.1 | 0.580 | 1A-3A |
| 726-C | 2700-2960 | 100 | 85 | 300 | | -1 to +0.05 | 0.440 | 2C |
| 6043 | 2950-3275 | 175 | 150 | 300 | 300 | ±.15 | 0.650 | 1A |
| | | 50 | 25 | 250 | 250 | | | 2C |
| 2K29 | 3400-3960 | 106 | 85 | 300 | | -1 to +0.05 | 0.440 | 2C |
| 2K56 | 3840-4460 | 100 | 80 | 300 | | -1 to +0.05 | 0.440 | 2C |
| QK-381 | 4100-4450 | 4.5 | 3.0 | 250 | | -1.0 to +0.05 | 0.440 | 2C |
| 2K22 | 4240-4910 | 115 | 75 | 300 | | -1 to +0.05 | 0.440 | 2C |
| 2K48 | 4000-11,000 | 5 | 1250 | | | | 0.575 | 1A |
| | | 20 | 1250 | | | | | 3A |
| | | 20 | 1250 | | | | | |
| 6115A | 5100-5900 | 100 | 70 | 300 | | -1.0 to +0.05 | 0.440 | 2C |
| QK-412 | 5100-5900 | 100 | 70 | 300 | | -1.0 to +0.10 | 0.440 | 2C |
| RK-6037 | 5120-5430 | 30 | 20 | 300 | 0 to -200 | | | 4C |
| QK-754 | 5925-6425 | 1400 | 1000 | 750 | | -0.2 to +0.2 | 0.650 | 2A |
| QK-549 | 5925-6450 | 120 | 100 | 300 | | -1 to +.1 | 0.440 | 2C |
| QK-461 | 5925-6450 | 120 | 100 | 300 | | ±0.1 | 0.440 | 2C |
| QK-404 | 5925-6450 | 120 | 100 | 300 | | -1.0 to +0.10 | 0.440 | 2C |
| 5976 | 6200-7425 | 110 | 85 | 300 | | -1.0 to +0.10 | 0.440 | 2C |
| QK-531 | 6575-6875 | 110 | 85 | 300 | | -1 to +.1 | 0.440 | 2C |
| QK-755 | 6575-7125 | 1400 | 1000 | 750 | | -0.2 to +0.2 | 0.650 | 2A |
| 2K26 | 6250-7060 | 100 | 80 | 300 | | ±0.1 | 0.440 | 2C |
| QK-422 | 7125-8125 | 150 | 100 | 300 | | 0 to -20 | 0.440 | 2B |
| RK-6390 | 6870-10,750 | 80 | 55 | 1250 | 2 to 16 | ±.025 | 0.580 | 1A |
| | | 80 | 55 | | | | | 3A |
| QK-532 | 6875-7125 | 110 | 85 | 300 | | -1 to +.1 | 0.440 | 2C |
| QK-623 | 7125-7650 | 110 | 85 | 300 | | -1 to +.1 | 0.440 | 2C |
| QK-758 | 7125-7750 | 1400 | 1000 | 750 | | -0.2 to -0.2 | 0.650 | 2A |
| QK-645 | 7125-8500 | 250 | 120 | 375 | | 0.440 | 0.440 | 2B |
| QK-661 | 7125-8500 | 1400 | 1000 | 750 | | -0.1 to +0.1 | 0.675 | 2B |
| QK-752 | 7125-7750 | 110 | 90 | 300 | | -0.1 to +0.1 | 0.440 | 2A |
| QK-759 | 7750-7750 | 1400 | 1000 | 750 | | -0.2 to +0.2 | 0.650 | 2A |
| QK-753 | 7750-8400 | 110 | 90 | 300 | | -0.1 to +0.1 | 0.440 | 2A |
| QK-742 | 8500-9600 | 35 | 12 | 250 | | 0.0 to -0.1 | 1.200 | 5B |
| 2K25 | 8500-9660 | 32 | 20 | 300 | | 0 to -20 | 0.440 | 2C |
| 2K45 | 8500-9660 | 22 | 15 | 300 | | | | |
| 6116 | 8500-9660 | 32 | 20 | 300 | -35 to +15 | | 0.762 | 4C |
| 6940 | 8500-9660 | 32 | 20 | 300 | 0 to -280 | | | 4C |
| RK6310 | 8500-10,000 | 70 | 50 | 300 | 0 to -20 | | 1.20 | 2B |
| RK6312 | 8500-10,000 | 70 | 50 | 300 | 0 to -20 | | 1.20 | 2B |
| RK6316 | 8500-10,000 | 70 | 50 | 300 | 0 to -20 | | 1.20 | 2B |
| QK-414 | 9660-10,250 | 20 | 15 | 300 | -1.0 to +.10 | 0.440 | 0.440 | 2C |
| QK-448 | 12,000-13,800 | 85 | 50 | 300 | | ±.05 | 0.675 | 2B |
| RK-6178 | 15,750-16,250 | 25 | 20 | 300 | | -20 to -60 | 0.675 | 2B |
| RK-6573 | 15,500-17,000 | 25 | 20 | 300 | | -20 to -60 | 0.675 | 2B |
| QK-306 | 18,000-22,000 | 40 | 10 | 1800 | -20 to -100 | -1.0 | 0.580 | 2B |
| *RK6253 | 18,000-22,000 | 40 | 10 | 1800 | -20 to -100 | -1.0 | 0.580 | 2B |
| 2K13 | 22,000-25,000 | 40 | 10 | 1800 | -20 to -100 | -1.0 | 0.580 | 2B |
| *RK6254 | 22,000-25,000 | 40 | 10 | 1800 | -20 to -100 | -1.0 | 0.580 | 2B |
| QK-463 | 24,500-27,500 | 40 | 10 | 1800 | -20 to -125 | -1.0 | 0.580 | 2B |
| QK-289 | §27,270-30,000 | 20 | 10 | 2250 | To be Specified | To be Specified | 0.580 | 2B |
| QK-290 | §29,700-33,520 | 20 | 10 | 2250 | To be Specified | To be Specified | 0.580 | 2B |
| QK-291 | §33,520-36,250 | 18 | 5 | 2250 | To be Specified | To be Specified | 0.580 | 2B |
| QK-292 | §35,100-39,700 | 10 | 5 | 2250 | To be Specified | To be Specified | 0.580 | 2B |
| QK-293 | 34,900-42,800 | 5 | | 2500 | To be Specified | To be Specified | 0.580 | 2B |
| QK-294 | 40,000-51,800 | 5 | | 3000 | To be Specified | To be Specified | 0.580 | 2B |
| QK-295 | • | To be Spec. | 3500 | | To be Specified | To be Specified | 0.580 | 2B |

- †1 = Mechanical Inductive
- 2 = Mechanical Capacitive
- 3 = Non-Contacting Plunger
- 4 = Thermal Capacitive
- 5 = External Cavity

- 2 Tubes Necessary to Cover From 50,000 to 60,000 Mc

- A = Coaxial Cable
- B = Waveguide
- C = Coaxial to Waveguide
- * With UG 425 U Output Flange
- § Typical Operating Range

- Klystron .470 Tuner .825

MAGNETRON OSCILLATORS

| Type No. | Heater | | Range | Class | Typical Operation | | | |
|----------|--------|------|-------------|-------|-------------------|------------|------------|-----------------|
| | V | A | | | Anode Kv | Anode Amps | Duty Cycle | Min. Po. Pk. Kw |
| RK4J30 | 23.5 | 2.2 | 1220-1232 | 2 | 27.0 | 46.0 | .0009 | 600.0 |
| RK5J26 | 23.5 | 2.2 | 1220-1350 | 3 | 27.5 | 46.0 | .0009 | 400.0 |
| RK6517 | 2.5 | 85.0 | 1250-1350 | 3 | 53.0 | 50.0 | .0025 | 1000.0 |
| QK327 | 8.25 | 78.0 | 2700-2850 | 3 | 61 | 115 | .00072 | 3500 |
| RK5586 | 16.0 | 3.1 | 2700-2900 | 3 | 28.0 | 55.0 | .0005 | 700.0 |
| RK6518 | 13.0 | 40.0 | 2700-3010 | 2 | 41.0 | 87.5 | .0006 | 1500.0 |
| RK6410A | 8.2 | 79.0 | 2750-2860 | 2 | 71.0 | 130.0 | .0007 | 4500.0 |
| RK6406A | 8.8 | 79.0 | 2850-2910 | 2 | 52.0 | 85.0 | .0006 | 1750.0 |
| RK2J67 | 6.3 | 1.5 | 2795-2855 | 3 | 18.0 | 25.0 | .001 | 150.0 |
| RK2J66 | 6.3 | 1.5 | 2845-2905 | 3 | 18.0 | 25.0 | .001 | 150.0 |
| RK2J34 | 6.3 | 1.5 | 2700-2740 | 2 | 20.0 | 30.0 | .001 | 285.0 |
| RK2J33 | 6.3 | 1.5 | 2740-2780 | 2 | 20.0 | 30.0 | .001 | 285.0 |
| RK2J30 | 6.3 | 1.5 | 2860-2900 | 2 | 20.0 | 30.0 | .001 | 285.0 |
| RK4J35 | 16.0 | 3.1 | 2700-2740 | 2 | 28.0 | 70.0 | .0005 | 900.0 |
| RK4J34 | 16.0 | 3.1 | 2740-2780 | 2 | 28.0 | 70.0 | .0005 | 900.0 |
| RK4J33 | 16.0 | 3.1 | 2780-2820 | 2 | 28.0 | 70.0 | .0005 | 900.0 |
| RK4J32 | 16.0 | 3.1 | 2820-2860 | 2 | 28.0 | 70.0 | .0005 | 900.0 |
| RK4J31 | 16.0 | 3.1 | 2860-2900 | 2 | 28.0 | 70.0 | .0005 | 900.0 |
| RK5657 | 16.0 | 3.1 | 2900-3100 | 3 | 30.0 | 55.0 | .0005 | 700.0 |
| RK2J70 | 6.3 | 1.25 | 3030-3110 | 2 | 7.0 | 8.0 | .001 | 20.0 |
| RK2J71 | 6.3 | 1.25 | 3190-3201 | 2 | 5.0 | 5.0 | .002 | 6.0 |
| RK6402 | 8.3 | 43.0 | 3430-3570 | 3 | 47.0 | 50.0 | .0014 | 700.0 |
| RK6695 | 16.0 | 3.1 | 3430-3570 | 3 | 31.0 | 60.0 | .001 | 650.0 |
| RK6177 | 6.3 | 0.6 | 4268-4350 | 4 | .30 | .03 | CW | .011 |
| QK632 | 5.0 | 19.0 | 5250-5310 | 2 | 36 | 60 | .001 | 1000 |
| QK456 | 6.3 | 1.50 | 5360-5400 | 2 | 14.0 | 14.0 | .001 | 75.0 |
| QK682 | 5.0 | 1.5 | 5400-5900 | 3 | 2.75 | 2.0 | .002 | 800 |
| QK735 | 5.0 | 1.0 | 5400-5900 | 3 | 2.0 | 1.5 | .003 | 400 |
| RK6344 | 11.0 | 11.0 | 5450-5825 | 3 | 21.5 | 22.0 | .001 | 175.0 |
| QK662 | 5.0 | 5.0 | 5450-5825 | 3 | 24.5 | 24.0 | .001 | 250.0 |
| QK539 | 5.0 | 19.0 | 5450-5510 | 2 | 36 | 60 | .001 | 1000 |
| RK2J51A | 6.3 | 1.0 | 8500-9600 | 3 | 14.0 | 14.0 | .001 | 45.0 |
| RK6249A | 9.0 | 14.4 | 8500-9600 | 3 | 28.0 | 25.0 | .0008 | 200 |
| RK6248 | 6.3 | 5.0 | 8700-8900 | 3 | 3.5 | 0.91 | .045 | 1220 |
| RK2J50 | 6.3 | 1.0 | 8750-8900 | 2 | 12.0 | 12.0 | .001 | 40.0 |
| RK6229J | 5.0 | .45 | 8900-9400 | 3 | 4.1 | 0.5 | .0005 | 0.40 |
| RK2J49 | 6.3 | 1.0 | 9000-9160 | 2 | 12.0 | 12.0 | .001 | 40.0 |
| QK367 | 6.3 | 1.0 | 9015-9075 | 2 | 12.8 | 12.0 | .001 | 40.0 |
| RK6967A | 6.3 | 2.9 | 9205-9285 | 2 | 15.0 | 13.5 | .001 | 75.0 |
| RK2J56A | 6.3 | 1.0 | 9215-9275 | 2 | 12.8 | 12.0 | .001 | 40.0 |
| QK362A | 5.0 | .60 | 9300-9500 | 3 | 1.4 | 0.9 | .002 | .06 |
| QK172 | 6.0 | 30.0 | 9330-9420 | 2 | 35 | 40 | .00105 | 430 |
| RK2J55 | 6.3 | 1.0 | 9345-9405 | 2 | 12.8 | 12.0 | .001 | 40.0 |
| RK6002 | 4.0 | 40.0 | 9230-9404 | 2 | 27.5 | 30.0 | .002 | 225.0 |
| QK624 | 3.6 | 36.0 | 9340-9440 | 2 | 40 | 70 | .000875 | 1000 |
| RK2J42 | 6.3 | 0.5 | 9345-9405 | 2 | 5.5 | 4.5 | .002 | 7.0 |
| RK2J42H | 6.3 | 0.5 | 9345-9405 | 2 | 5.5 | 4.5 | .002 | 7.0 |
| RK730A | 6.3 | 1.0 | 9345-9405 | 2 | 12.0 | 12.0 | .001 | 40.0 |
| RK725A | 6.3 | 1.0 | 9345-9405 | 2 | 12.0 | 12.0 | .001 | 40.0 |
| QK124 | 4.8 | 12.0 | 15850-16160 | 2 | 24.0 | 12.0 | .0025 | 70.0 |
| QK702 | 4.8 | 12.0 | 15840-16160 | 3 | 24.0 | 12.0 | .0025 | 70.0 |
| RK6841 | 4.0 | 10.5 | 16410-16625 | 2 | 16.5 | 14.0 | .0009 | 45.0 |

STORAGE TUBES

| Type No. | Function | Output Form | Deflection | Focus | Resol. of lines 50% Mod. | Elec. Gun |
|---------------|--------------|-------------|---------------|---------------------------|--------------------------|--------------|
| RK6835/QK464A | Storage Tube | Electric | Magnetic | Magnetic | 600 | Single |
| QK411A | Storage Tube | Electric | Electrostatic | Electrostatic | 400 | Single |
| QK703 | Storage Tube | Electric | Magnetic | Magnetic or Electrostatic | 1000 | Coaxial Dual |
| QK685 | Storage Tube | Electric | Magnetic | Magnetic or Electrostatic | 1000 | Single |
| QK545 | Simulator | Visual | Magnetic | Magnetic | | Single |
| QK767 | Simulator | Visual | Magnetic | Magnetic or Electrostatic | | Single |

BACKWARD WAVE OSCILLATORS

| Type No. | Frequency Range Megs. | Delay Line Voltage Volts | Control Grid Voltage Neg. V | Delay Line Current mA | Anode Ratings | | Power Output mW | Filament Ratings | |
|----------|--------------------------|-----------------------------|--------------------------------|--------------------------|---------------|----|--------------------|------------------|-----|
| | | | | | V | mA | | V | A |
| QK691 | 2000-4000 | 150-1400 | 0-100 | 20-45 | 100 | 0 | 80-1000 | 6.3 | 1.3 |
| QK528 | 3600-7200 | 170-1400 | 0-100 | 15-40 | 250 | 10 | 20-300 | 6.3 | 1.0 |
| QK61 | | | | | | | | | |

Directory II. Components

76. Tubes, Transmitting.

- General Electrodynamics Corp., Tex., Vidicon
 General Electronics, Inc., N.J., 10
 Grimson Color, Inc., N.Y., Vidicon
 Huggins Labs., Inc., Calif., 40
 Hughes Aircraft Co., Hughes Products Div., Calif., 40
 Industrial Tubes, Inc., Ill., 10
 Intelix Systems, Inc., N.Y., 40
International Telephone & Telegraph Corp., ITT Components Division, 100 Kingsland Road, P.O. Box 412, Clifton, N.J., 10, 20, 40, 45
 See ad on pages 148-149
 Tel: NUTley 2-3600
 J.S.H. Electronics Co., Calif., 5, 10, 15, 20, 25, 30, 35, 40, 45
 Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 10
 See ads on pages 270, 301
 Tel: TEXas 0-7711
 Litton Industries, Inc., Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., 5, 10, 25, 30, 35, 40, 45
 See ad on pages 64-65
 Tel: LYtell 1-8411
 Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 5, 25, 30, 40
 See ad on page 66
 Tel: CRESTview 4-7411
 Machlett Labs., Inc., Conn., 10, 20, 45
 Mackay Research Labs., Ariz., 30
 Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 40
 See ad on page 318
 Tel: LOWell 7-0607
 Marconi's Wireless Telegraph Co., Ltd., N.Y., 10, 20, 25, 30, 35, 40, 45
 Metco, Inc., Mass., 5, 25, 30, 40
 Microwave Assoc., Inc., Mass., 5, 30
 Microwave Electronics Corp., Calif., 40
 Mullard Overseas Ltd., England, 10, 25, 30, 40, 45
 National Electronics, Inc., 628 North St., Geneva, Ill., 45
 See ad on page 586
 Tel: GENEva 7000
 North American Philips Co., Inc., Philips Labs., Div., N.Y., 25, 30, 40
 Nuclear Corp., Central Electronic Mfg. Div., N.J., 5, 10, 45
 Pek Labs., Inc., Calif., 10, 40, 45
 Penta Laboratories, Inc., Calif., 10
 Philco Corp., Govt. & Indl. Div., Pa., 25
 Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 25
 See ad on pages 135-136
 Tel: EXeter 2-4500
 Radio Corp. of America, Defense Elec. Prods., N.J., 5, 10, 20, 30, 40, 45
 Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. Fifth St., Harrison, N.J., 10, 15, 20, 30, 35, 40, 45
 See ad on pages 53-55
 Tel: HUMBoldt 5-3900
 Rauland Corp., Ill., 20, 40
 Raytheon Co., Mass., 10, 25, 30, 40, 45

INDUSTRIAL SERVICE PACKAGED POWER SUPPLIES



For use in applications where large amounts of DC output power is required. Input is usually 220 V. or 460 V., three phase (single phase types also available). Output is rectified DC which is completely isolated so that either side can be grounded. All units use new type WIDE AREA silicon rectifiers. No tubes or other delicate parts to replace or wear out. Forward resistance is very low, resulting in excellent voltage regulation. Special cell balance precautions guard against surge damage. Simply connect one of these units to the power lines and obtain direct current output. Variable voltage output is obtainable by adjusting input voltage. Standard models are listed below. Good delivery on other voltages and currents.

| Model | Output Voltage | DC Current |
|----------|----------------|------------|
| 100-100 | 100 Volts | 100 Amps |
| 100-1000 | 100 Volts | 1000 Amps |
| 500-50 | 500 Volts | 50 Amps |
| 500-500 | 500 Volts | 500 Amps |
| 1000-50 | 1000 Volts | 50 Amps |
| 1000-100 | 1000 Volts | 100 Amps |
| 3000-10 | 3000 Volts | 10 Amps |
| 3000-50 | 3000 Volts | 50 Amps |
| 5000-10 | 5000 Volts | 10 Amps |
| 5000-25 | 5000 Volts | 25 Amps |
| 10,000-2 | 10,000 Volts | 2 Amps |
| 10,000-5 | 10,000 Volts | 5 Amps |
| 20,000-2 | 20,000 Volts | 2 Amps |
| 20,000-5 | 20,000 Volts | 5 Amps |
| 30,000-2 | 30,000 Volts | 2 Amps |
| 30,000-5 | 30,000 Volts | 5 Amps |

PRECISE MEASUREMENTS COMPANY

Millbrook Lane • R.D. 1
 Flemington, New Jersey
 Tel: STate 2-2100
 For other power supplies see our ad on page 500

For details, circle #774 on Reader Service Card

There are

3 SPECIFIC WAYS

in which "Proceedings of the I R E" serves the advertiser differently and more effectively than other publications.

1. Pre-Specification Selling

Because "Proceedings of the I R E" publishes basic research and engineering application articles it is closely studied by those design engineers who must "keep ahead of the market." Often, the research published leads the industry production by from two to six years! The alert engineer, who needs this amount of time for his own design applications and for tooling up and changing the production in his own factory, studies the "Proceedings of the I R E" carefully. Its articles keep him abreast with the changes that will inevitably come and make it possible for him to be ready for them. This is the time for you to sell the unknown engineer designing the never-dreamed-of-product "before it happens!" It is an insurance that you will be ahead of the market instead of behind it.

2. Personal Connection to the Individual

The Institute of Radio Engineers is an engineering society for individual engineers who must qualify on their own education, experience and engineering work. Thus, the magazine follows the reader as his private possession, wherever he goes. Wherever new engineering progress is developing, the work is done by individual engineers—and it is these men that must be sold! Only the engineer knows enough to specify and buy in a highly technical industry. Selling is a matter of reaching the minds of men because a company cannot sign a purchase order. Wherever radio engineering activity is the greatest, companies employ I R E members. An engineer moves into a new job in advance of production and with him goes "Proceedings of the I R E," with all the advertising you so urgently need to place where engineering activity is the greatest.

3. Economy

It is a specific purpose of the Institute of Radio Engineers that its advertising rates should benefit and help the industry grow, by being economical. Part of the economy of a tax-free organization is thus passed on to advertisers in the form of low-cost advertising to a high-quality audience. The page rate per thousand engineers of "Proceedings of the I R E" is the lowest in the radio-electronic industry by deliberate intent. Thus, the Institute finds an extra way that it can help the firms that hire its engineers to gain new business at lower costs.

THE INSTITUTE OF RADIO
 ENGINEERS
 ADVERTISING DEPARTMENT
 72 W. 45th St.
 New York 36, N.Y.



**Power
TUBES**

First Choice

FOR MILITARY AND COMMERCIAL APPLICATIONS

Pioneering research, precision manufacture and advanced testing, combined with forty years' design and application experience . . . these are the reasons why you should make General Electric Power Tubes your first choice for military and commercial applications.

- **Klystrons**
- **Thyratrons**
- **Ignitrons**
- **Magnetrons**
- **Voltage-Tunable Magnetrons**
- **Metal-Ceramic Tetrodes**
- **Camera Pick-up Tubes**
- **Traveling-Wave Tubes**
- **Parallel-Plane Microwave Tubes**
- **High-Power Duplexers**
- **High-Power Waveguide Filters**
- **Special Purpose Tubes**

Contact your nearest General Electric power tube representative for availability, delivery and technical information on any of the above products. *Power Tube Department, General Electric Company, Schenectady 5, New York.*

EASTERN REGION

General Electric Company—Power Tube Sales
200 Main Avenue—Clifton, New Jersey
Phones: (Clifton) GREGory 3-6387
(In N.Y.C.) WISconsin 7-4065, 6, 7, 8

CENTRAL REGION

General Electric Company—Power Tube Sales
3800 North Milwaukee Ave.—Chicago 41, Ill.
Phone: SPRing 7-1600

WESTERN REGION

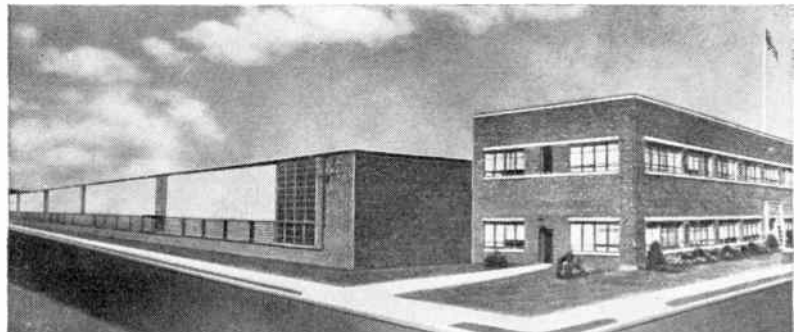
General Electric Company—Power Tube Sales
11840 West Olympic Boulevard
Los Angeles 64, California
Phones: GRANite 9-7765; BRadshaw 2-8566

GOVERNMENT SALES

General Electric Company—Power Tube Sales
Building 267—Schenectady, New York
Phone: FRanklin 4-2211



G-E MICROWAVE LABORATORY AT PALO ALTO, CALIF. Extensive developmental programs covering microwave tubes and techniques are carried out in these modern facilities.



G-E POWER TUBE PLANT AT SCHENECTADY, N. Y. Here, tube design leading to factory production is accomplished; here, also, are produced the larger, more complex products.



G-E POWER TUBE PLANT AT SCRANTON, PA. High-volume tubes such as thyratrons and parallel-plane tubes are precision-manufactured here in this 213,000-square-foot plant.

Progress Is Our Most Important Product

GENERAL  ELECTRIC

9545-8481-21

Directory II. Components

76. Tubes, Transmitting.

Raytheon Co., Microwave and Power Tube Div., Waltham 54, Mass., 10, 25, 30, 40, 45, Amplitrons, Backward Wave Oscillators

See ad on page 582

Tel: TWinbrook 9-8400

Resitron Labs., Inc., Calif., 10, 45, Vidicon Camera

Rogers Electronic Tubes & Components, Canada, 5, 10, 15, 20, 25, 30, 35, 40, 45

Sperry Gyroscope Co. of Canada, Ltd., Canada, 25, 40

Sperry Rand Corp., Sperry Elect. Tube Div., Fla., 25, 40

Sperry Rand Corp., Sperry Gyroscope Div., Electron Tube Div., N.Y., 25, 40

Standard Telephones & Cables, Ltd., England, 10, 40, 45

State Laboratories, Inc., 649 Broadway, New York 12, N.Y., 10, 25, 30, 45

See ad on page 581

Tel: ORegon 7-8400

Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 5, 10, 20, 25, 30, 40

See ad on pages 23-25

Tel: JUDson 6-2424

Sylvania Electric Products, Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 5, 25, 30, 40

See ad on pages 26-27

Tel: YORkshire 8-6211

Sylvania Electric Products, Inc., Sylvania Electronic Systems Div., Mass., 5, 30, 40

Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 10

See ad on pages 50-51

Tel: HUmboldt 2-4200

United Electronics Co., N.J., 10, 45

Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2-BG-59, Calif., 10, 25, 40, 45

See ad on pages 118-119

Tel: DAVenport 6-4000

Wave Particle Corp., Calif., 30, 40

Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 20, 25, 30, 40, 45

See ad on page 580

Tel: REgent 9-3611

Westrex Corp., N.Y., 10, 45

Tuning Coils: See class 43

Tuning forks: See class 31

77. Tuners.

5. AM tuners
10. FM tuners
15. Klystron

20. Microwave
25. TV tuners
30. UHF & VHF

Acoustical Mfg. Co., Ltd., England, 5, 10

Aircom, Inc., 48 Cummington St., Boston, Mass., 15, 20

See ad on page 590

Tel: COpley 7-9115

Aircom, Inc., N.J., 15, 20

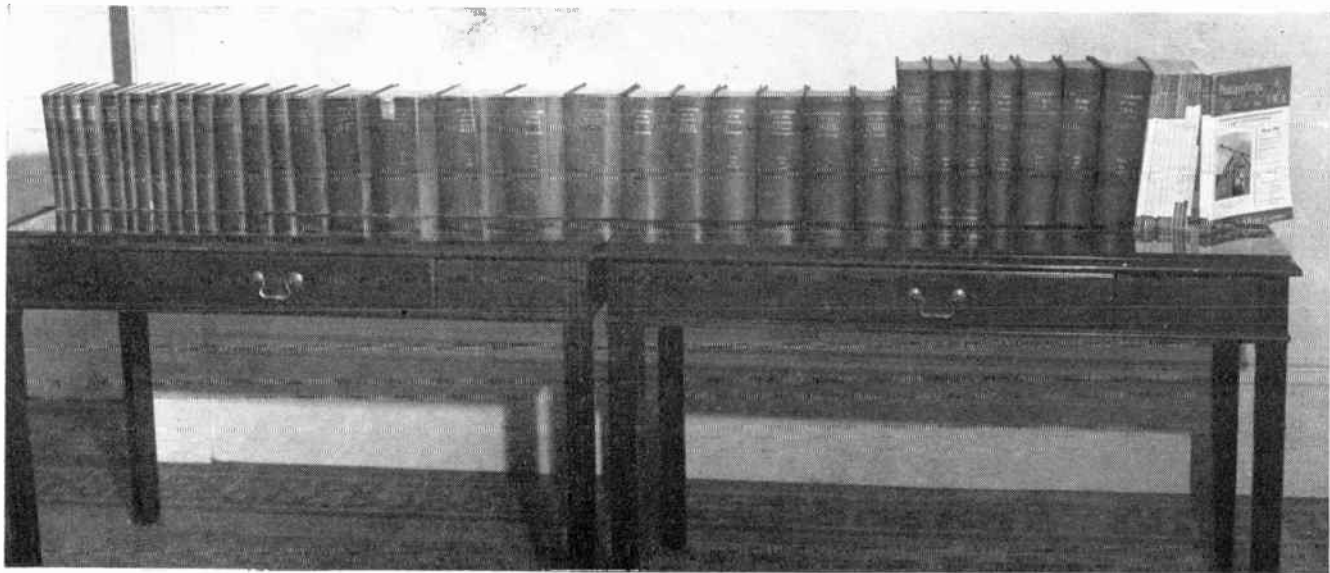
Airtronix Dev. Corp., N.Y., 5, 10

Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 20, 30

See ad on page 590

Tel: HANcock 6-2150

Be sure to consult the advertisements in this issue for complete information on products. Directory listings cannot tell you everything you want to know about a company's products. For example, the National Electronics, Inc., advertisement on page 586 gives complete specifications on their entire line of electron tubes.



FORTY-SEVEN YEARS OF RADIO-ELECTRONIC HISTORY

are recorded in "Proceedings of the IRE." The photo above shows the issues from 1912 through 1947—twelve years of rapid advances and earth-shaking accomplishments are not even included in this panorama of progress! Since publication of its first issue, "Proceedings of the IRE" has paced and pioneered in every field of radio from the first vacuum tube through today's giant computers and tiny transistors. The engineers who write, read and use this magazine have transformed the world in forty-seven short years! Is it any wonder that so many advertisers believe these engineers must learn about their products in the fact-packed advertising pages of "Proceedings of the IRE"?

ELECTRONIC TUBES FOR INDUSTRY



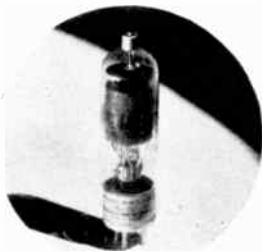
NL-1051 IGNITRON



NL-1052 IGNITRON



NL-3C23 THYATRON



NL-740 THYATRON



NL-635 RECTIFIER

WRITE FOR INDIVIDUAL TUBE DATA SHEETS FOR FULL DETAILS.

IGNITRONS

| TYPE NUMBER | VOLTS | MAXIMUM RATINGS | | | | TYPE OF COOLING |
|-------------|-----------|-----------------|-------------------------------|-------------------------|----------------------|-----------------|
| | | Maximum Demand | Corresponding Current DC-Amps | Maximum Current DC-Amps | Corresponding Demand | |
| NL-1001 | 250-600 | 150 Kva | 4.9 | 9.0 | 50 Kva | Convection |
| NL-1005 | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Forced air |
| NL-1011 | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Water |
| NL-1012 | 250-600 | 1200 Kva | 75.6 | 140 | 400 Kva | Water |
| NL-1013 | 250-600 | 2400 Kva | 192 | 355 | 800 Kva | Water |
| NL-1014 | 250-600 | 4800 Kva | 486 | 900 | 1600 Kva | Water |
| NL-1022 | 1500 peak | 1200 peak | 16 | 56 | 336 peak | Water |
| NL-1051 | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Water |
| NL-1052 | 250-600 | 1200 Kva | 75.6 | 140 | 400 Kva | Water |
| NL-1053 | 250-600 | 2400 Kva | 192 | 355 | 800 Kva | Water |
| NL-1054 | 250-900 | 4800 Kva | 486 | 900 | 1600 Kva | Water |
| NL-5550 | 250-600 | 300 Kva | 12.1 | 22.4 | 100 Kva | Water clamp |

THYATRONS

| TYPE NUMBER | GAS FILLING | DC OUTPUT AMPS. | PEAK RATING AMPS. | PEAK INVERSE VOLTS | FILAMENT VOLTS | FILAMENT AMPS | TYPE OF COOLING |
|---------------|-------------|-----------------|-------------------|--------------------|----------------|---------------|-----------------|
| NL-3C23 | Arg & Merc. | 1.5 | 6 | 1250 | 2.5 | 7 | Convection |
| NL-393A | Arg & Merc. | 1.5 | 6 | 1250 | 2.5 | 7 | Convection |
| NL-632B | Mercury | 2.5 | 30 | 1500 | 5.0 | 5 | Convection |
| NL-710L | Arg & Merc. | 2.5 | 30 | 1500 | 2.5 | 9 | Convection |
| NL-710/6011 | Arg & Merc. | 2.5 | 30 | 1500 | 2.5 | 9 | Convection |
| NL-714 | Arg & Merc. | 1 | 3 | 1250 | 2.5 | 5 | Convection |
| NL-715/5557 | Mercury | 1 | 3 | 5000 | 2.5 | 5 | Convection |
| NL-716 | Arg & Merc. | 1 | 8 | 1250 | 2.5 | 6.3 | Convection |
| NL-720,L | Arg & Merc. | 2.5 | 30 | 1500 | 2.5 | 9 | Convection |
| NL-732 | Arg & Merc. | 30 | 225 | 1500 | 2.5 | 55 | Convection |
| NL-740,L,P | Arg & Merc. | 4 | 50 | 1500 | 2.5 | 16 | Convection |
| NL-760,L,P | Arg & Merc. | 6.4 | 77 | 1500 | 2.5 | 21 | Convection |
| NL-5559/FG57 | Mercury | 2.5 | 15 | 1000 | 5.0 | 4.6 | Convection |
| NL-5560/FG95 | Mercury | 2.5 | 15 | 1000 | 5.0 | 4.6 | Convection |
| NL-5632/C3J | Xenon | 2.5 | 30 | 1250 | 2.5 | 9 | Convection |
| NL-5665/C16J | Xenon | 18.0 | 160 | 1250 | 2.5 | 31 | Convection |
| NL-5684/C3J/1 | Xenon | 2.5 | 30 | 1250 | 2.5 | 9 | Convection |
| NL-6014/C1K | Xenon | 1 | 8 | 1250 | 2.5 | 6.3 | Convection |

HALF WAVE RECTIFIERS

| | | | | | | | |
|--------------|-------------|-----|----|------|-----|-----|------------|
| NL-615 | Mercury | 2.5 | 10 | 2000 | 2.5 | 7 | Convection |
| NL-617 | Mercury | 5 | 20 | 1000 | 2 | 12 | Convection |
| NL-618,L,P | Xenon | 6.4 | 40 | 900 | 2.5 | 18 | Convection |
| NL-619 | Mercury | 6 | 20 | 300 | 2 | 12 | Convection |
| NL-623 | Mercury | 15 | 45 | 500 | 2.5 | 20 | Convection |
| NL-635,L,P | Arg & Merc. | 6.4 | 77 | 1000 | 2.5 | 18 | Convection |
| NL-643 | Mercury | 15 | 90 | 700 | 2.5 | 23 | Convection |
| NL-649/5834 | Mercury | 2 | 10 | 900 | 2.5 | 7 | Convection |
| NL-653/5835 | Mercury | 3 | 12 | 900 | 2.5 | 10 | Convection |
| NL-5558/FG32 | Mercury | 2.5 | 15 | 5000 | 5 | 4.5 | Convection |

FULL WAVE RECTIFIERS

| | | | | | | | |
|----------|-------------|-----|------|-----|-----|------|------------|
| NL-604,L | Arg & Merc. | 2.5 | 10 | 900 | 2.5 | 11.5 | Convection |
| NL-606,L | Arg & Merc. | 6.4 | 25.6 | 900 | 2.5 | 17 | Convection |

Directory II. Components

77. Tuners.

Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., 10
See ad on page 178
Tel: HAYmarket 1-6800

Alto Scientific Co., Inc., Calif., 10, 30

Amelco, Inc., Calif., 5, 10, 20, 30

American Communications Corp., N.Y., 5

American Electronics Co., N.Y., 5

American Elite, Inc., N.Y., 10

Ampex Audio, Inc., Calif., 5, 10

Arkay, Inc., N.Y., 5, 10

Arra Corp., (Antenna & Radome Research Assoc.), 1 Bond St., Westbury, L.I., N.Y., 20
See ad on page 389
Tel: EDgewood 4-8770

Audio-Video Corp., N.Y., 5, 10

Beam-Echo, Ltd., England, 5, 10

Bendix Aviation Corp., Jones Elect. Co., M. C., Conn., 30

Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 20
See ad on page 170
Tel: LOwells 3-9511

Blonder-Tongue Labs., Inc., N.J., 5, 10, 30

British Industries Corp., Leak Div., N.Y., 10

British Thomson-Houston Co., Ltd., England, 20

Browning Labs., Inc., N.H., 10

Budd-Stanley Co., Inc., 43-01 22nd St., Long Island City 1, N.Y., 20
See ad on page 592
Tel: STillwell 6-1706

Calbest Electronics Co., Calif., 5, 10

Canadian Westinghouse Co., Ltd., Elect. Div., Canada, 30

Channel Master Corp., N.Y., 5, 10

Conrac, Inc., Calif., 25

Corning Glass Works, 550 High St., Bradford, Pa., 10, 30
See ads on pages 400, 527
Tel: 2-4571

Demornay-Bonardi, 780 S. Arroyo Parkway, Pasadena, Calif., 20
See ad on pages 120-121
Tel: SYcamore 2-4142

Diamond Antenna & Microwave Corp., Mass., 15, 20

Dictograph Products, Inc., N.Y., 5, 10

Dominion Electrohome Industries, Ltd., Canada, 5, 10

Douglas Microwave Co., Inc., Dept. R-9, 252 E. Third St., Mt. Vernon, N.Y., 20
See ad on pages 40-41
Tel: MOUNT Vernon 8-6900

Dunn Engrg. Assoc., Inc., Mass., 20

Dynamic Electronics-New York, Inc., N.Y., 5, 10, 25, 30

E.M.I. Electronics, Ltd., England, 15

Electro-Voice, Inc., Radio Mfg. Engrg. Div., Ill., 10, 30

Electronic Applications, Inc., Conn., 10

Electronic Communications, Inc., Fla., 20, 30

Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N.Y., 5, 10
See ad on page 295
Tel: STillwell 6-8700

Emerson Radio & Phonograph Corp., Md., 30

Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 15, 20, 30
See ad on page 91
Tel: VICTOR 2-8400

Engineering Associates, Ohio, 15, 20, 25, 30

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5, 10
See ad on pages 110-111
Tel: GLendale 6-8592

Espey Mfg. Co., Saratoga Industries Div., N.Y., 5, 10, 20

Ferrotran Electronics Co., N.Y., 5

Fisher Radio Corp., N.Y., 5, 10

General Electric Co., Radio Receiver Dept., Conn., 5, 10

General Electronic Labs., Inc., Mass., 30

General Instrument Corp., F. W. Sickles Div., Mass., 5, 10, 25, 30

Gombos Co., Inc., John, N.J., 20

Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 15, 20, 30
See ad on page 593
Tel: WILLIAMS 1-1000

Granco Products, Inc., N.Y., 10

Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill., 20
See ad on page 204
Tel: VAN Buren 6-6300

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10
See ad on page 328
Tel: YUKON 3-3961

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 20
See ad on pages 3-18
Tel: DAVENPORT 5-4451

I. T. & T. Corp., Industrial Prods. Div., Calif., 25

JFD Electronics Corp., 1462 62nd St., Brooklyn 4, N.Y., 30
See ad on page 406
Tel: DEWey 1-1000

J-V-M Microwave Co., Ill., 20, 30

Karg Labs., Inc., Conn., 10

Knight Electronics, Ill., 5, 10

LEL, Inc., 384 Oak St., Copiague, L.I., N.Y., 30
See ad on page 372
Tel: AMityville 4-2200

Lambda-Pacific Engr., Inc., Calif., 20

Ling Systems, Inc., Calif., 20

Litton Industries, Airtron, Inc. Div., N.J., 20

Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 15, 20
See ad on page 66
Tel: CRestwood 4-7411

M P Engineering Co., Conn., 5, 10

Mallory & Co., Inc., P. R., Ind., 25, 30

Marsland Engrg., Ltd., Canada, 25

McIntosh Laboratory, Inc., N.Y., 5, 10

Meridian Metalcraft, Inc., Calif., 20

Metco, Inc., Mass., 15, 20

Microtronics, Inc., N.J., 30

Microwave Assoc., Inc., Mass., 20

Miller Co., J. W., Calif., 5, 10

Motorola, Inc., Ariz., 20, 30

Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, L.I., N.Y., 20
See ad on pages 141-144
Tel: PIONEER 6-4650

Newcomb Audio Products Co., Calif., 5, 10

Oak Mfg. Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 25, 30
See ad on pages 86-87
Tel: MOhawk 4-2222

Pilot Radio Corp., N.Y., 5, 10

Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 20, 30
See ad on page 323
Tel: CANal 6-7250

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 15, 20
See ad on pages 135-136
Tel: EXeter 2-4500

Polydoroff & Assoc., D.C., 5, 10, 25, 30

Polytechnic Research & Dev. Co., Inc., N.Y., 15, 20

Precision Radiation Instruments, Inc., Calif., 5, 10

Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 20
See ad on page 390
Tel: WESTmore 9-8900

Radar Measurements Corp., 190 Duffy Ave., Hicksville, N.Y., 20
See ad on page 322
Tel: OVerbrook 1-5600

Radio Components, Ltd., Canada, 25

Rhein Sound System, Inc., Conn., 5, 10

Saratoga Industries, N.Y., 5, 10

Sargent-Rayment Co., Calif., 5, 10

Siegler Corp., Bogen-Presto Co. Div., N.J., 5, 10

Sivers Lab., Sweden, 20

Specialty Engrn. & Electr. Co., N.Y., 30

Sperry Rand Corp., Sperry Elect. Tube Div., Fla., 20

Sperry Rand Corp., Sperry Gyroscope Div., Electr. Tube Div., N.Y., 15

Sperry Rand Corp., Sperry Microwave Electronics Co. Div., Fla., 20

Standard Coil Products Co., Inc., Calif., 25, 30

Standard Coil Products Co., Inc., Ill., 25, 30

Standard Coil Products, Ltd., Canada, 10, 25, 30

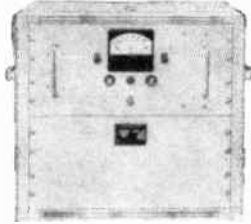
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 20
See ads on pages 306, 351
Tel: PORT Washington 7-7200

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5, 10

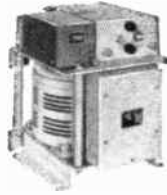
Systems, Inc., Fla., 15, 20

STABILINE[®]

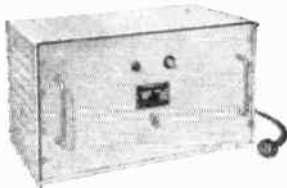
Automatic
VOLTAGE REGULATORS
with rated outputs from
0.25 to 100 KVA



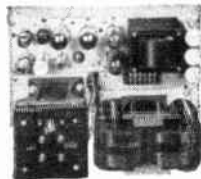
TYPE EMT4115



TYPE EMT4104UT



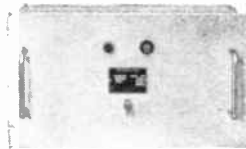
TYPE IE5101



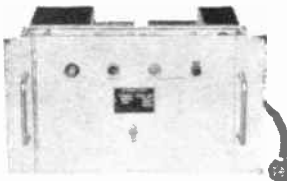
TYPE IE5102R



TYPE IET51002



TYPE IET5101R



TYPE TM7101R



TYPE TM7105



TYPES IEH5101 and TMH7101



TYPE IEH5101R

STABILINE automatic voltage regulators deliver a constant output voltage regardless of variations in input voltage or changes in load current. Each is a precision built unit subject to the most rigid manufacturing specifications, inspected at every stage of manufacture, checked and rechecked to assure published performance characteristics. Several series are available to meet the particular requirements of any application.

EMT SERIES

Electro Mechanical Transistorized

Consist of POWERSTAT variable transformer, detector circuit, auxiliary transformer. Highly efficient, correct faster than most automatic voltage regulators. Maintain constant voltage to loads up to 100 KVA without waveform distortion. Control circuit is completely transistorized.

IE SERIES

Instantaneous Electronic

Completely electronic with no moving parts. Hold output voltage to within ± 0.1 percent for wide line variations and within ± 0.15 percent for any load current change or load power factor change from .5 lagging to unity. Waveform distortion never exceeds 3%.

IET SERIES

Instantaneous Electronic Transistorized

Feature a transistorized circuit. Output voltage remains within a 0.5 volt bandwidth for any and all variations in line voltage, load current and load power factor (0.25 volt bandwidth for input voltage changes only; 0.25 volt bandwidth for load current and power factor changes from lagging 0.5 to unity).

TM SERIES

Tubeless Magnetic

Have no tubes, transistors or moving parts. For unattended locations or where maintenance is impossible over long time periods. Response time for ordinary line and/or load changes is within $\frac{1}{2}$ second; accuracy is within a 1.0 volt bandwidth.

STABILINES

for High Frequency Applications

Meet the light weight and small size requirements for 400 cycle use. Built to meet military specifications.



THE
SUPERIOR ELECTRIC
 COMPANY

590 Tripp Avenue, Bristol, Connecticut

Write for
 complete
 STABILINE
 Bulletin file



Directory II. Components

77. Tuners.

Tapetone, Inc., Mass., 30
 Tarzian, Inc., Sarkes, Ind., 25, 30
 Tech-Master Corp., N.Y., 5, 10
 Telectro Industries Corp., N.Y., 5, 10, 15
 Telerad Mfg. Corp., N.Y., 15, 20
 Thompson-Ramo-Wooldridge, Inc., Calif., 5, 10
 Trutone Electronics, Inc., Calif., 5, 10
 United Microwave Co., N.Y., 20
 Uniwave, Inc., N.Y., 20
 Victor R.F. & Microwave Co., Mass., 15, 20
 Warren Mfg. Co., Inc., Mass., 20
 Warwick Mfg. Corp., Ill., 5, 10

Turntables: See class 32

Vacuum tube parts: See class 99

**Vacuum tube rectifiers:
 See class 65**

**Vacuum tube voltmeters:
 See class 12**

**Vacuum tubes, receiving:
 See class 74**

**Vacuum tubes, special purpose:
 See class 75**

**Vacuum tubes, transmitting:
 See class 76**

78. Vibration Controls.

5. Vibration & shock mounts 10. Isolation pads

American Latex Products Corp., Calif., 5
 Barry Controls, Inc., Mass., 5, 10
 Boston Felt Co., Mass., 5, 10
 Ehrenpreis, Consulting Engrg., David, N.Y., 5, 10
 Federal Shock Mount Corp., Div. Korfund Co., Inc., N.Y., 5, 10
 Finn & Co., Inc., T. R., N.J., 5, 10
 Fisher Scientific Co., N.Y., 10
 General Cable Corp., Metal Textile Corp. Div., N.J., 10
 Geotechnical Corp., Tex., 10
 Johns-Manville, N.Y., 10
 Litton Industries, Md. Div., Md., 5, 10
 Lord Manufacturing Co., Pa., 5
 MB Mfg. Co., Conn., 5, 10

78. Vibration Controls.

Remler Co., Calif., 5
 Robinson Technical Prods., Inc., N.J., 5, 10
 Technical Wire Products, Inc., N.J., 10
 Ucinite Co., Div. of United-Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 5
 See ad on page 464
 Tel: LAsall 7-8400
 Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5
 See ad on page 277
 Tel: GARfield 5-2844

Vibrators: See class 45

Voltage converters: See class 45

**Voltage regulated power supplies:
 See class 61**

**Voltage regulating vacuum tubes:
 See class 75**

79. Voltage Regulators.

5. Automatic 15. Varistors
 10. Manually operated

ACF Industries, Inc., Avion Div., N.J., 5
 Acme Electric Corp., 44 Water St., Cuba, N.Y., 5, 10
 See ad on page 486
 Tel: CUba 4
 Aerolux Light Corp., N.Y., 5
 Amelco, Inc., Calif., 5
 Amplifier Corp. of America, N.Y., 5
 Applegate & Co., C. J., 1840 24th St., Boulder, Colo., 5
 See ad on page 487
 Tel: HILLcrest 2-8750
 Armour Electronics, Calif., 5, 10
 Beckman Instruments, Inc., Systems Div., Calif., 5
 Bendix Aviation Corp., Ind., 5
 Bergen Laboratories, Inc., 247 Crooks Ave., Clifton, N.J., 5
 See ad on page 471
 Tel: GREGory 3-7800
 British Thomson-Houston Co., Ltd., England, 5
 CBC Electronics Co., Pa., 5
 Canadian Research Institute, Canada, 5, 15
 Carborundum Co., Global Plant, N.Y., 15
 Carborundum Co., Refractories Div., N.J., 15
 Central Transformer Co., Ill., 5
 Chicago Standard Transformer Corp., 3501 W. Addison St., Chicago 18, Ill., 5, 10
 See ad on page 563
 Tel: INdependence 3-7400

79. Voltage Regulators.

Curtiss-Wright Corp., Electronics Div., West Caldwell, N.J., 5
 See ad on page 514
 Tel: GENEva 8-4000
 Deltron, Inc., Pa., 5, 10
 Donner Scientific Co., Calif., 5
 Electric Auto Lite Co., Ohio, 5
 Electric Machinery Mfg. Co., Minn., 5
 Electric Regulator Corp., Conn., 5, 15
 Espey Mfg. Co., Saratoga Industries Div., N.Y., 5
 Ferrotran Electronics Co., N.Y., 5
 Fidelity Instrument Corp., Pa., 5
 Fisher Scientific Co., Pa., 10
 Gates Radio Co., Ill., 5
 General Electric Co., Ind., 5
 General Electric Co., Apparatus Sales Div., N.Y., 5, 10
 General Electric Co., Magnetic Materials Section, Mich., 15
 General Radio Co., West Concord, Mass., 5, 10
 See ad on Cover 4
 Tel: EMerson 9-4400
 Green Rectifier Co., N.J., 5
 Hammond Mfg. Co., Ltd., Canada, 10
 Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 5, 15
 See ad on page 226
 Tel: UNiversity 9-9850
 International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 5, Zener Diode
 See ad on pages 42-43
 Tel: OREGon 8-6281
 International Telephone & Telegraph Corp., ITT Components Division, 100 Kingsland Rd., P.O. Box 412, Clifton, N.J., 15
 See ad on pages 148-149
 Tel: NUTley 2-3600
 Jack & Heintz, Inc., Ohio, 5
 Kaiser Electronics, Inc., N.J., 5
 Kenyon Transformer Co., Inc., N.J., 5
 Kepco, Inc., 131-38 Sanford Ave., Flushing 55, N.Y., 5
 See ad on page 495
 Tel: INdependence 1-7000
 Kidde & Co., Inc., Walter, N.J., 5
 Lindberg Engineering Co., Ill., 5
 Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 5, 10
 See ad on page 496
 Tel: CYPRESS 2-6610
 Magnetic Controls Co., Minn., 5
 Marstan Electronics Corp., N.Y., 5
 Matthew Labs., N.Y., 5
 Microtran Co., Inc., 145 E. Mineola Ave., Valley Stream, N.Y., 10
 See ad on page 566
 Tel: LOcust 1-6050
 Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 5
 See ad on page 494
 Tel: DRExel 6-7130
 National Electric Controller Co., Ill., 10

From the AMCI Catalogue

AUTOMATIC IMPEDANCE PLOTTERS



- Continuous impedance display with frequency
- Available in portable and rack-mounted units

| Type | Frequency Range (mc) | Line Size |
|-------|----------------------|-----------|
| 12 | 2.5-250 | Type N |
| 11-Q | 30-400 | Type N |
| 11-PS | 180-1100 | Type N |

SLOTTED LINES



TYPE 1026-4

- Residual swr under 1.010
- Rated error in detected signal under 1.005
- Available with a wide variety of tapered reducers

| Type | Frequency Range (mc) | Impedance (ohms) |
|---------|----------------------|------------------|
| 1026-13 | 50-3000 | 50 or 75 |
| 1026-8 | 75-3000 | 50 or 75 |
| 1026-6 | 100-3000 | 50 or 75 |
| 1026-4 | 150-3000 | 50 or 75 |
| 1026-2 | 300-3000 | 50 or 75 |

COAXIAL SWITCHES



TYPE 1038

- High power ratings; swr under 1.06
- Pressurized
- Motor-driven and manually operated models

| Type | Frequency Range (mc) | Line Size |
|------|----------------------|-----------|
| 1038 | 0-450 | 6 1/8" |
| 1136 | 0-500 | 3 1/8" |

Very high peak power models for radar applications

| | | |
|---------|-------|--------|
| 1038-HV | 0-450 | 6 1/8" |
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INSTRUMENT LOADS



TYPE 1108B

- High stability; very low swr
- Nearly all transmission line sizes

| Type | Frequency Range (mc) | Line Size | Max SWR |
|-------|----------------------|-----------|---------|
| 1108B | 0-1100 | Type N | 1.02 |
| 2120 | 0-1000 | 1/2" | 1.03 |
| 1112 | 0-1000 | 1 1/8" | 1.03 |
| 1110 | 0-650 | 3 1/8" | 1.03 |

HYBRIDS



TYPE 1104

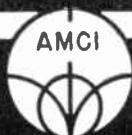
- Very broad band
- Very low residual unbalance

| Type | Frequency Range (mc) | Max. SWR | Residual Unbalance (db) |
|--------|----------------------|----------|-------------------------|
| 1027-K | 60-120 | 1.4 | -50 |
| 1027-L | 120-240 | 1.4 | -50 |
| 1027-M | 240-480 | 1.5 | -50 |
| 1027-N | 480-960 | 1.6 | -50 |
| 1098 | 960-1600 | 1.6 | -40 |
| 1102 | 1600-2400 | 1.5 | -40 |
| 1104 | 2400-3600 | 1.5 | -34 |
| 1100-K | 60-120 | 1.4 | -55 |
| 1100-L | 120-240 | 1.4 | -55 |
| 1100-M | 240-480 | 1.5 | -55 |
| 1100-N | 480-960 | 1.6 | -55 |
| 1099-N | 800-960 | 1.2 | -50 |
| 1099-O | 975-1175 | 1.2 | -50 |
| 1024 | TV Channels 2-13 | 1.05 | -50 |

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LINE STRETCHERS
DIPLEXING FILTERS
VOR ANTENNAS

TV BROADCASTING ANTENNAS —
directional and omnidirectional
ADJUSTABLE MATCHING NETWORKS
IMPEDANCE STANDARD LINES



ANTENNA SYSTEMS — COMPONENTS — AIR NAVIGATION AIDS — INSTRUMENTS

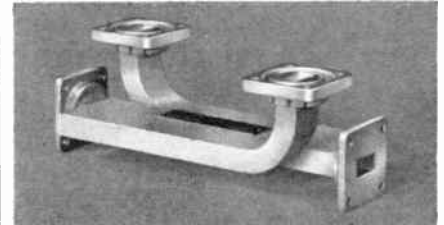
ALFORD Manufacturing Company
299 ATLANTIC AVE., BOSTON, MASS.

For details, circle #589 on Reader Service Card

MICROWAVE COMPONENTS

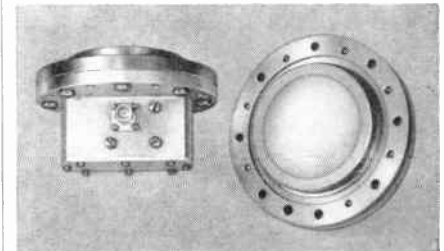
Series and Shunt Tees
Hybrid Tees
Precision Bends
Coax-Waveguide Adapters
Straight Sections
Twists
Tapered Transitions
Waveguide Stands

MICROWAVE TEST EQUIPMENT



Cross-Guide Couplers
High-directivity Couplers
Crystal Mounts
Bolometer Mounts
Attenuators
Fixed Loads
Sliding Loads
Sliding-screw Tuners
Sliding Shorts
E-H Tuners
Double Stub Tuners
Sliding-line Phase Shifters
Hybrid Phase Shifters
Dielectric Phase Shifters

ANTENNAS



Missile Beacon Antennas
Missile Telemetry Antennas
Gain Standard Horns
Gain Standard Dipoles
Helix Antennas
Horns

MICROWAVE INSTRUMENTS

Klystron Supplies
VSWR Amplifier
Power Meter
Crystal Calibrator



48 CUMMINGTON ST., BOSTON, MASS.

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1960 IRE Directory

Directory II. Components

79. Voltage Regulators.

- Nichols, Ltd., R. H., Canada, 5
North Electric Co., N.Y., 5, 15
North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 5
See ads on pages 415, 455, 591
Tel: PIONEER 7-0555
- Ohmite Mfg. Co., 3692 Howard St., Skokie, Ill., 10
See ad on pages 106-107
Tel: ORchard 5-2600
- Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5, 10
See ad on page 499
Tel: WOrth 6-0380
- Perkin Engineering Corp., Calif., 5, 10, 15
Perma-Power, Ill., 5, 10
Philips Electronics, Inc., N.Y., 5
Power Designs, Inc., 1700 Shames Dr., Westbury, N.Y., 5
See ad on page 498
Tel: EDgewood 3-6200
- Power Sources, Inc., Northwest Industrial Park, South Ave., Burlington, Mass., 5
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Tel: BRowning 2-3610
- Radio Development & Research Corp., N.J., 5, 10, 15
Radio Engrg. Labs., Inc., N.Y., 5, 10
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Raytheon Co., Mass., 5
Regulator Equipment Corp., N.J., 5
Saratoga Industries, N.Y., 5
Sel-Rex Corp., N.J., 5, 10
Servo-Tek Products Co., Inc., 1086 Goffe Rd., Hawthorne, N.J., 5
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Tel: HAWthorne 7-3100
- Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 5
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Tel: BISHop 2-1414
- Specialty Engrn. & Electron. Co., N.Y., 5
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 10
See ads on pages 306, 351
Tel: POrt Washington 7-7200
- Superior Electric Co., 590 Tripp Ave., Bristol, Conn., 5
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Tel: LUdlow 2-9561
- Technical Apparatus Builders, 109 GB Liberty St., New York 6, N.Y., 5, 10, 15
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Tel: REctor 2-6249
- Telectro Industries Corp., N.Y., 5, 10, 15
Tel-Instrument Electronics Corp., N.J., 5
Thordarson-Meissner, Ill., 5
Topping Electronics, Ltd., Canada, 5, Transistor
- Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5
See ad on pages 116-117
Tel: ELizabeth 4-5650

- Transitron Electronic Corp., 168-182 Albion St., Wakefield, Mass., Silicon
See ad on pages 146-147
Tel: CRystal 9-4500
- Universal Transistor Prods., N.Y., 5, 10
Vickers, Inc., Electric Products Div., Mo., 5
Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 15
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Tel: MURdock 8-7150
- Warren Mfg. Co., Inc., Mass., 5
Wickes Engineering & Construction Co., N.J., 5

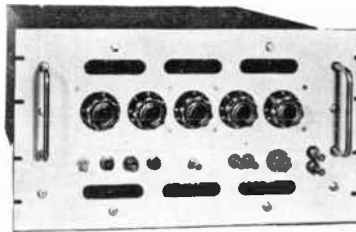
Voltmeters: See class 56

**Voltmeters, vacuum tube:
See class 12**

Washers: See class 87

Wattmeters: See class 56

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for **Constant Current**

- Precision Current Source
- Gyro Torquer Supply
- Transistor and Diode Tester

- ▶ High Accuracy
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For testing and measurement of gyros, transistors, diodes, clutches, solenoids, meters, other current sensitive devices.

- Current Range is 1 μ a to 100 ma with 5 decades — digital in-line readout —
- Regulation and stability 0.002% —
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In use by leading companies for gyro torquer supply, transistor avalanche test, diode PIV test, clutch testing, calibration.

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| 3. Cavities | 47. Phase Shifters |
| 5. Couplings | 50. Probes |
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| 35. Horns | 80. Transmission lines |
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| 45. Multipliers | |

- ACF Industries, Inc., Avion Div., N.J., 25
Adams-Russell Co., Inc., Mass., 3, 15
Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 47
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Tel: GREGory 2-5622
- Aero Guidance Corp., Calif., 10, 15, 20, 35, 40
Ainslie Corp., 312 Quincy Ave., Quincy 69, Mass., 35, 40, 55
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Tel: GRANite 2-8747
- Aircorn, Inc., 48 Cummington St., Boston, Mass., 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
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Tel: COpley 7-9115
- Aircorn, Inc., N.J., 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
Airflyte Electronics Co., 540 Ave. A, Bayonne, N.J., 60, 70
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Tel: HEMlock 6-2230
- Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 40
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Tel: HANcock 6-2150
- Allied Research & Engr. Div., Allied Record, Calif., 3, 5, 20, 35, 40, 55
American Electronic Labs., Inc., Pa., 15, 35
American Mach. & Foundry Co., Conn., 3, 5, 20, 25, 30, 35, 47, 50, 55, 60, 65, 70, 75, 80
American Mach. & Foundry Co., D.C., 47, 55, 60
American Radar Components, Inc., N.J., Waveguide Choke & Cover Flanges
Amphenol-Borg Electronics Corp., Industrial Products—Danbury Knudsen Div., Conn., 15, 20, 40, 55
Andrew Antenna Corp., Ltd., Canada, 25, 35, 55, 80
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Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 75, Multicouplers
See ad on page 448
Tel: POrt Washington 7-8707
- Arra Corp., (Antenna & Radome Research Assoc.), 1 Bond St., Westbury, L.I., N.Y., 5, 10, 15, 20, 25, 35, 40, 43, 47, 55, 65, 75, 80
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Tel: EDgewood 4-8770
- Atomitron, Inc., N.Y., 3, 5, 10, 15, 20, 25, 30, 35, 40, 43, 45, 50, 55, 60, 65, 70, 75, 80

SUPPOSE YOU DREAMED UP ONE LIKE THIS?

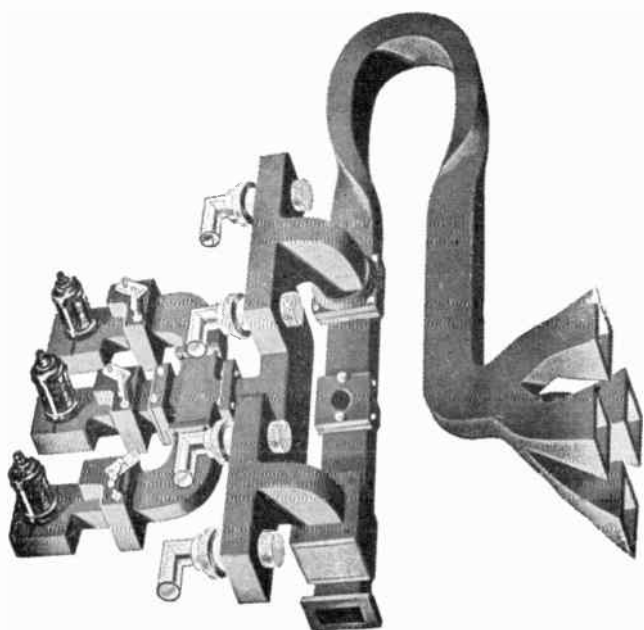
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specialists in microwave application

Directory II. Components

80. Waveguides & Accessories.

Avionics, Ltd., Canada, 10, 20, 25, 75
 B. J. Electronics, Borg-Warner Corp., Calif., 40
 Babcock Relays, Inc., Calif., 3, 25, 35, 40, 55, 80
 Bean & Co., Morris, Ohio, 82
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Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 3, 25, 40
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 Tel: **W**ALKER 2-6000
 British Thomson-Houston Co., Ltd., England, 3, 5, 10, 15, 20, 35, 40, 43, 47, 50, 55, 60, 70, 75
Budd-Stanley Co., Inc., 43-01 22nd St., Long Island City 1, N.Y., 3, 5, 10, 15, 20, 25, 30, 35, 40, 43, 47, 50, 55, 60, 65, 70, 75, 80
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 Tel: **S**Tillwell 6-1706
 CGS Labs., Inc., Conn., 3
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 Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 43, 70
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 Tel: **W**OODRUFF 2-9200
 Chase Brass & Copper Co., Sub. of Kennecott Copper Corp., Conn., 55
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 Tel: **H**AMILTON 7-7961
 Co-Operative Industries, Inc., N.J., 30, 55, 80
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De Mornay-Bonardi, 780 So. Arroyo Pkwy., Pasadena, Calif., 3, 5, 10, 15, 20, 35, 40, 45, 47, 50, 55, 60, 70, 75
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 Tel: **S**YCAMORE 2-4142
 Diamond Antenna & Microwave Corp., Mass., 3, 5, 10, 15, 20, 25, 35, 40, 47, 50, 55, 60, 65, 70, 75, 80
Douglas Microwave Co., Inc., Dept. R-9, 252 E. Third St., Mt. Vernon, N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 45, 47, 50, 55, 60, 70, 75, 80
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 Tel: **M**OUNT VERNON 8-6900
 Dynamics Corp. of America, Reeves Instrument Corp., N.Y., 60
EMI—Cossor Electronics, Ltd., 301 Windsor St., Woodside, Halifax, N.S., Canada, 10, 15, 70
 See ad on page 412
 Tel: **H**ALIFAX 6-7491
 E.M.I. Electronics, Ltd., England, 3, 20, 25

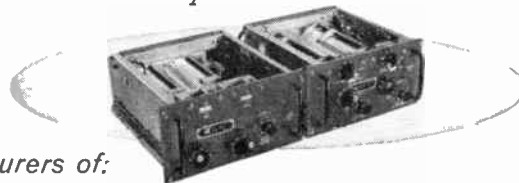
Eastern Insulated Wire Corp. & Circle F Mfg. Co., N.J., 70
 Ecco Electronic Components Corp., N.Y., 5, 35, 55, 75
Electro Impulse Laboratory, 208 River St., Red Bank, N.J., 75
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 Tel: **S**HADYSIDE 1-0404
 Electronic Specialty Co., Calif., 3, 20, 25, 30, 35, 40, 43, 70, 80
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 Enflo Corp., N.J., 5, 15, 30, 35, 55
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 Espey Mfg. Co., Saratoga Industries Div., N.Y., 3, 10, 15
FXR, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 3, 10, 15, 20, 25, 35, 40, 45, 50, 60, 70, 75, 82
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 Tel: **A**STORIA 8-2800
 Farnsworth Electronics Co., Div. of I. F. & T., Ind., 15
 Federal Mfg. & Eng. Corp., N.Y., 3, 55
Frequency Standards, Inc., P.O. Box 504, Shafto Rd., Asbury Park, N.J., 3, 20, 25, 40
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 Tel: **P**ROSPER 4-0500

Gabriel Co., Gabriel Electronics Division, 135 Crescent Rd., Needham Heights 94, Mass., 15, 20, 35, 40, 60
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 Tel: **H**ILLCREST 4-0005
 Gar Precision Parts, Inc., Conn., 3, 5, 35, 40, 60
 General Bronze Corp., GB Electric Corp. Subsid., N.Y., 20, 25, 35, 55, 60
 General Communication Co., Mass., 60, 70, 82
 General Electronic Labs., Inc., Mass., 3, 35
 Gillfillan Brothers, Inc., Calif., 35, 40, 47, 50, 55, 60, 65
 Gombos Co., Inc., John, N.J., 3, 5, 10, 15, 20, 25, 35, 40, 55, 60
Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 3, 5, 10, 15, 20, 25, 30, 35, 40, 47, 55, 60, 70, 75, 82
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 Tel: **W**ILLIAMS 1-1000
Graphite Metallizing Corp., 1057 Neperhan Ave., Yonkers, N.Y., 60
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 Tel: **Y**ONKERS 8-8400
 Gulton Industries, Inc., N.M., 10, 35, 80
 Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill., 3, 20, 43
 See ad on page 204
 Tel: **V**AN BUREN 6-6300

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MANUFACTURING CO.

Electronics Division
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MICROWAVE



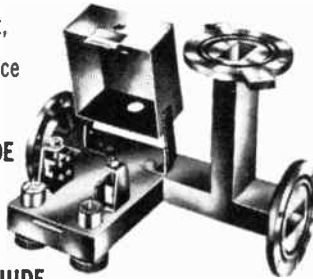
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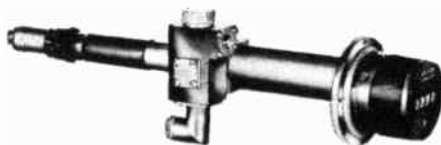
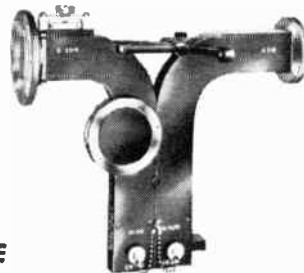
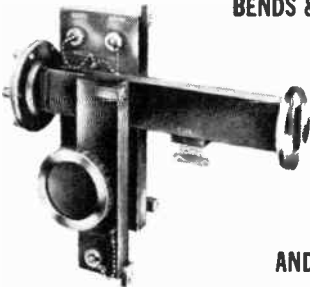
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80. Waveguides & Accessories.

Hazeltine Corp., N.Y., 60
Heineman Electric Co., N.J., 70
Henry & Miller Industries, Inc., N.J., 5
Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif., 10, 15, 20, 47, 75
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Tel: Davenport 5-4451

I-T-E Circuit Breaker Co., Special Prods. Div., Pa., 35, 47, 50, 55, 60, 65, 70, 75, 80, 82

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Mark Products Co., 5439 Fargo Ave., Skokie 2, Ill., 35, 65, 80

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Martin Co., Baltimore Div., Md., 3, 10, 20, 25, 35, 40, 47, 60, 75, 80

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Narda Microwave Corp., Dept. IRED-3, 118-160 Herricks Rd., Mineola, L.I., N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 47, 50, 55, 65, 75, 80

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Omega Laboratories, Inc., Mass., 3, 10, 15, 20, 35, 40, 50, 55

Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., 55

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Tel: OWens 9-4600

Parker Seal Co., Div. of Parker-Hannifin Corp., 10567 Jefferson Blvd., Culver City, Calif., Wave Guide Flange Seals

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Tel: TExas 0-4618

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Tel: PLaza 1-3200

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Tel: CAnal 6-7250

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Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 5, 10, 15, 20

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Tel: WEstmore 9-4092

Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 3, 5, 10, 15, 20, 25, 30, 35, 40, 43, 45, 47, 50, 55, 60, 65, 70, 75

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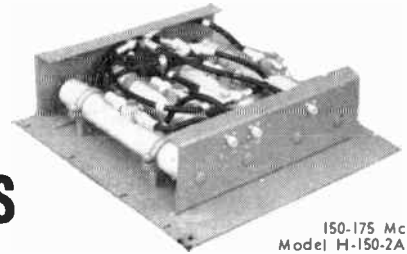
Tel: WellingtOn 3-6400

Scala Radio Co., Calif., Baluns

Schutter Microwave Corp., Carl W., N.Y., 5, 10, 20, 35, 40, 55, 60, 75

Scientific-Atlanta, Inc., Ga., 10, 15, 35, 55

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Selma, N.C., 70

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Tel: WOODLAWN 5-2341

Sierra Electronic Corp., 5442D Bohannon Dr.,
Menlo Park, Calif., 3, 20, 75

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Tel: DAVENPORT 6-2060

Sims Castings Corp., N.Y., 82

Sinclair Radio Laboratories, Ltd., Box
179, Downsview P.O., 70 Sheffield St.,
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25, 35, 40, 55, 65, 70, 75, Multipliers

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Sterling Precision Corp., 17 Matinecock
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Sylvania Electric Products, Inc., 1740
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Technical Appliance Corp., N. Main St.,
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Tel: SHERBURNE 7-2211

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312, 13500 N. Central Expressway,
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Weinschel Engrg. & Mfg. Corp., 10503
Metropolitan Ave., Kensington, Md.,
75

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Tel: LOCKWOOD 4-0121

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Whiting & Davis Co., Mass., 3, 20, 25,
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in the product sections of this direc-
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placed advertisements in this is-
sue. For addresses and phone
numbers of non-advertisers, see
the Alphabetical Directory, pages
161-264.

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Wire & Cables: See class 82

Wire harnesses & wire mesh:
See class 82

Wire, magnetic recording:
See class 63

Wire recorders: See class 27

X-Ray tubes: See class 75

Yokes, deflection: See class 43



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- II. Components
- III. Materials & Services

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For a terminology cross-index listing the 857 sub-products in alphabetical order, consult the pink section preceding page 1.

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For complete list of products and services, arranged alphabetically for fast reference, see the pink section preceding page 1.

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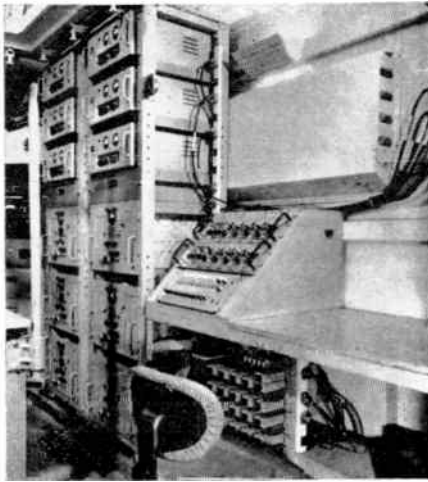
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Los Angeles 45, California, 6214 W. Manchester
Ave. SPring 6-0025

Haddonfield, New Jersey, 1016 Berlin Road
HAzel 8-2400

Washington, D. C., The LaSalle, Suite 815,
1028 Connecticut Ave., N.W., District 7-1575

For details, circle #597 on Reader Service Card

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Bushings: See class 87

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| 5. Assembly enclosures | 12. Metal cabinets |
| 7. Boxes, Metal | 15. Metal relay rack panels |
| 8. Boxes, plastic | 20. Molded plastic cabinets |
| 10. Instrument & meter panels | 22. Transit cases |
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AA Metal Products, Inc., Vt., 7, 10, 12
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Tel: ADams 3-3500

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Argos Products Co., Ill., 11, 25, Speaker Enclosures

Arkay, Inc., N.Y., 20

Artisan Metal Works Co., Ohio, 5, 7, 10, 11, 15, 22

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Directory III. Materials & Services

81. Cabinets, Consoles, Boxes, Enclosures & Panels.

Atkins & Merrill, Inc., Post Rd., Sudbury, Mass., 20, Consoles, Housings
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Tel: Hilltop 3-8822

Audio-Video Corp., N.Y., 7, 12, 15
Automatic Control Co., Minn., 5, 7, 12
Aveco Corp., Nashville Div., Tenn., 5, 12
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Corry-Jamestown Mfg. Corp., Pa., 7, 10, 12, 15

Craig Systems, Inc., Dept. H-1, 361 Merrimack St., Lawrence, Mass., 5, 7, 12, 15, 22, Mobile Shelters and Trailers

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Tel: MURdock 8-6961

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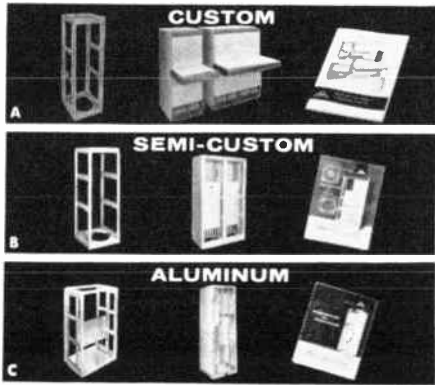
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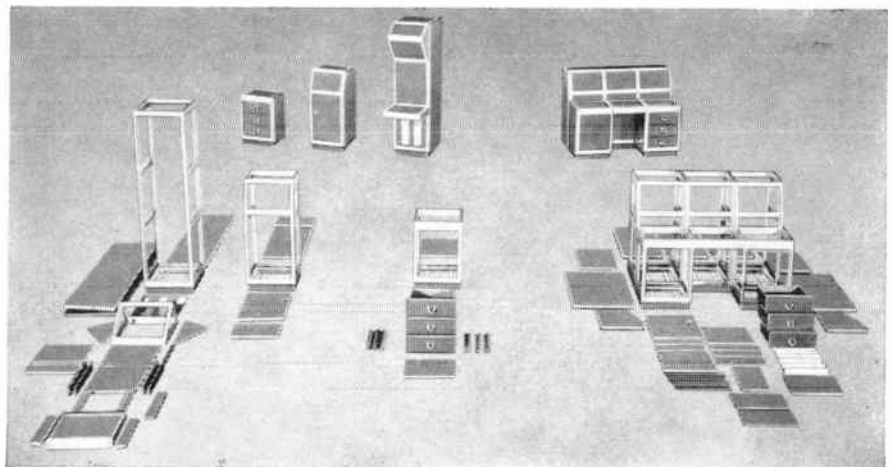
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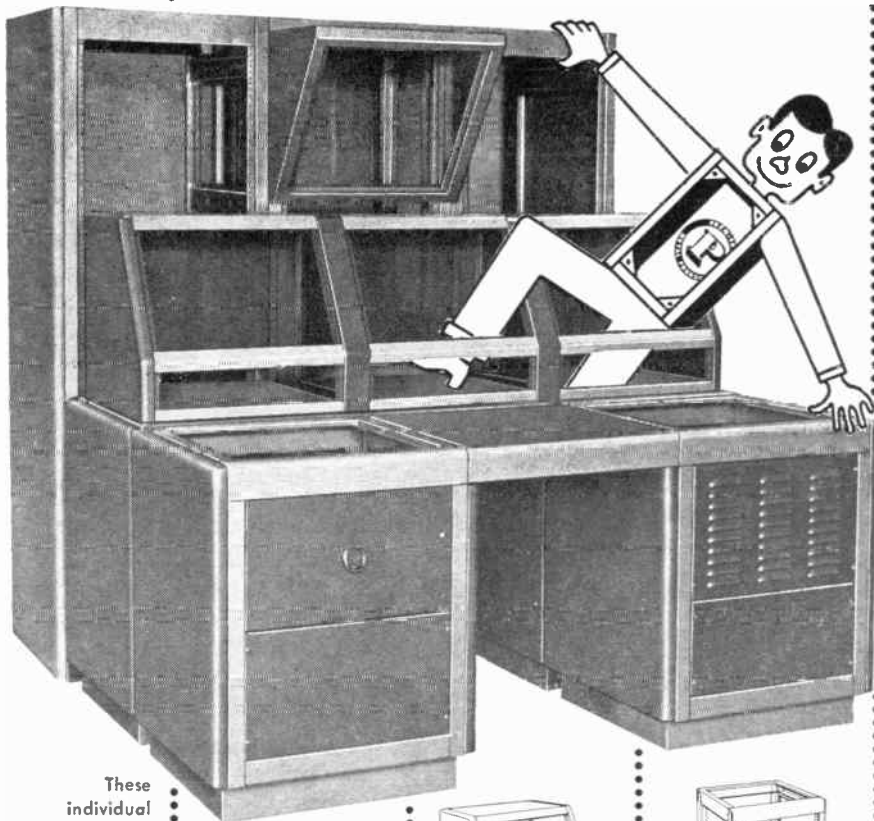


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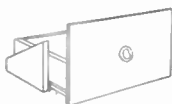
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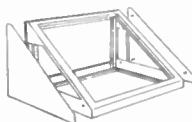
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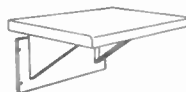
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81. Cabinets, Consoles, Boxes, Enclosures, and Panels.

- Donnelly Mfg. Co., Mass., 5, 7, 10, 11, 12, 15, 22
 Dow Chemical, Magnesium Div., Mich., 5, 7, 10, 11, 12, 15, 22
 Dumont Airplane & Marine Instrument, Inc., Pa., 5, 7, 10, 11, 12, 15
 Dura Plastics of N.Y., Inc., N.Y., 8, 10
 Dynawood Corp., Calif., 25
 EPM Corp., N.Y., 5
 Eastern Foical Nameplate Corp., N.J., 10
 Edo Corp., N.Y., 12
 Ehrenpreis, Consulting Engrg., David, N.Y., 5, 7, 8, 10, 11, 12, 15, 20, 22, 25
 Ehrick Co., Fred, N.Y., Canvas Bags & Covers
 Electric Auto Lite Co., Ohio, 10
 Electro-Chemical Engraving Co., Inc., N.Y., 5, 7, 10, 11, 12
 Electro-Voice, Inc., E.V. Instrument Div., Mich., 5, 25
 Electronic Plastics Corp., N.Y., 8
 Electronic Techniques, Inc., Calif., 5, 7
 Elgin Metalformers Corp., Dept. 1227, 630 Congdon Ave., Elgin, Ill., 5, 12, 15
 See ad on page 599
 Tel: SHerwood 1-3490
 Elzee Metal Products Co., Inc., N.Y., 5, 7, 10, 11, 12, 15, 22
 Erwood, Inc., Ill., 7, 10, 11, 12, 15
 Etched Products Corp., N.Y., 10
 Eugene Engrg. Co., Mass., 5, 7, 10, 11, 12
 Falls Metal Works, N.J., 7, 10, 11, 12
 Falstrom Co., N.J., 5, 7, 10, 11, 12, 15, 22
 Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 7, 8, 12, 15
 See ad on page 601
 Tel: CAPital 4-5318
 Fischer & Porter Co., Pa., 10, 11
 Fisher & Crome, Pa., 10
 Food Mach & Chem Corp., Calif., 22
 Formica Metal Products Co., Mass., 5, 7, 12, Tables & Benches
 Furane Plastics, Calif., 8, 20, 25
 Gables Engrg., Inc., Fla., 10, Lighted
 General Aviation & Electronics Mfg. Co., N.J., 5, 7, 10, 11, 12, 15, 22
 General Electric Co., Distrib. Assemblies Dept., Conn., 7, 12
 General Electric Co., Specialty Electronic Components Dept., N.Y., 25
 Goldsman Co., Pa., 5, 7, 10, 11, 12, 22, 25
 Gramm Trailer Corp., Ohio, Trailers & Aluminum Shelters
 Granite State Mach. Co., Inc., N.H., 5, 7, 10, 12, 15
 Great Eastern Metal Products Co., Division of Gemp Manufacturing Corp., 22 Woodworth Ave., Yonkers 2, N.Y., 7
 See ad on page 601
 Tel: GRenleaf 6-7300
 Green Rectifier Co., N.J., 5, 7, 12
 Hallett Mfg. Co., Calif., 5
 Halliburton, Inc., Mfg. Div., Calif., 5, 7, 11, 12, 22
 Hammond Mfg. Co., Ltd., Canada, 5, 7, 10, 11, 12, 15
 Handee Household Products, Inc., N.Y., 5, 7, 12

Directory III. Materials & Services

81. Cabinets, Consoles, Boxes, Enclosures & Panels.

Hardigg Industries, 1 W. Main St., South Hadley Falls, Mass., 22, Cushioning

See ad on this page

Tel: JEFFerson 3-6863

Hartley Products Co., N.Y., 25
Harwood Mfg. Co., Ill., 5, 7, 12

Heath Co., Subsidiary of Daystrom, Inc., 305 Territorial Rd., Benton Harbor 4, Mich., 25

See ad on page 328

Tel: YUkon 3-3961

Heldor Mfg. Corp., N.J., 5, 7, 10, 11, 12, 15, 22

Henry & Miller Industries, Inc., N.J., 5, 7, 10, 11, 15

Houston Fearless Corp., Calif., 12, 15

Howard Precision, Inc., N.J., 5

Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 7

See ad on page 29

Tel: MArket 4-1802

Hughes-Treitler Mfg. Corp., N.Y., 5, 10, 11, 12, 15

IE Manufacturing, Ill., 5, 7, 8, 10, 11, 12, 15, 20, 22

Independent Metal Fabricators, Inc., N.Y., 5, 7, 10, 11, 12, 15

Industrial Acoustics Co., Inc., N.Y., Soundproof Rooms

Jacksonville Metal & Plastics Co., Fla., 5, 7, 8, 10, 11, 12, 15, 20

Jamison Plastic Corp., N.Y., 8, 20

Jan Hardware Mfg. Co., Inc., N.Y., 5, 7, 12

Javex Electronics, Calif., 8

Jodee Plastics Co., N.Y., 8, 10, 11, 20

Johns-Manville, N.Y., 10

Karlson Assoc., Inc., N.Y., 25

Kerreo Products, Neb., 10, 20

Kling Metal Spinning & Stamping Co., N.Y., 7

Koch & Sons, H., Calif., 8

Kollman Case Corp., Ind., 22, 25

Kurz-Kasch, Inc., Ohio, 20

Kuss Industries, Inc., Pa., 5, 7, 12, 15, 22

LMB-Heeger, Inc., Calif., 7, 12, 15

Laboratory Furniture Co., Inc., N.Y., Test & Work Benches

Laminated Sheet Products Corp., Mass., 8

Lansing Sound, Inc., J. B., Calif., Loudspeaker Enclosures

Lavelle Aircraft Corp., Pa., 5

Leach Corp., Relay & Inet Div., 18435 Susana Rd., Compton, Calif., 10, 12, 15

See ad on page 521

Tel: NEdada 6-1061

Life Instrument Co., Inc., Mass., 8, 11

Lowell Mfg. Co., Mo., 12, For Loud Speakers

Lyman Electronic Corp., Mass., 10, 15, 20

Lynch Mfg. Co., R. H., Calif., 5, 7, 10, 11, 12, 15

Lytle Corporation, N.M., 10

MM Enclosures, Inc., N.Y., 5, 7, 10, 11, 12, 15, 22

Machinery Electrification, Inc., Mass., 5, 7, 10, 11, 12

Malkin-Illion Co., N.J., 5, 7, 10, 11, 12, 15, 22

Marine View Electronics, Inc., N.Y., 12, 15

Masonite Corp., Ill., Hardboard Panels

Maxson Corp., W. L., United Mfg. Co., Conn., 5, 10, 12

McMillan Industrial Corp., Mass., 8, 20

Measurement Engrg., Ltd., Canada, 5, 7, 10, 11, 12, 15, 22

Meridian Metalcraft, Inc., Calif., 5, 7

Metal Fabricators Corp., Mass., 5, 7, 10, 11, 12, 15, 22

Metalcraft, Inc., N.Y., 5, 7, 10, 11, 15, 22

Metallic Arts of New England, Inc., Mass., 5, 7, 10, 11, 12, 15

Metalphoto Corp., Ohio, 10

Micarta Fabricators, Inc., Ill., 10

Middletown Mfg. Co., Conn., 5, 7, 10, 11, 12, 15

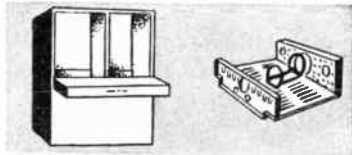
Midget Louver Co., Conn., Louvers

Mid-West Metal Products, Inc., Kansas, 5, 7, 10, 11, 12, 15, 22

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

81. Cabinets, Consoles, Boxes, Enclosures & Panels.

Molded Insulation Co., Pa., 8, 20
 Motson & Co., Walter, N.J., 5, 11, 22, 25
 Muckle Mfg., Co., Minn., 7, 11, 12, 22
 Mutual Electronic Industries Corp., N.Y., 10
 N Y T Electronics, Inc., Calif., 10
 Norhute Corp., Metalab Equipment Co., N.Y., Lab. Cabinets, Metal or Wood
 North Electric Co., N.Y., 15
North Shore Nameplate, Inc., 214-27 Northern Blvd., Bayside 61, N.Y., 10
 See ad on page 645
 Tel: **BAyside 4-4000**
 Northwest Indust., Ltd., Canada, 8, 10, 11
 O'Brien Electric Corp., Calif., 12, 15
 Oerlikon Tool & Arms Corp. of America, N.C., 5, 7, 10, 11
 Oppenheimer Plastics, Inc., Pa., 5, 7, 8, 10, 20
 Oxford Components, Inc., Ill., 25
 P.B.R. Mfg. Co., Pa., Dollies
 Pan-Air Electronics Corp., Calif., 7, 8, 10
Panob Corp., 49 Beech St., Port Chester, N.Y., 10, Edgelighted
 See ad on page 683
 Tel: **WEStmore 9-3066**
 Paraplegics Mfg., Co. Inc., Ill., 5
Par-Metal Products Corp., 32-42 49th St., Long Island City 3, N.Y., 5, 7, 12, 15
 See ad on page 621
 Tel: **AStoria 8-8905**

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 5, 7, 10, 11, 12, 22
 See ad on page 687
 Tel: **EVerglade 4-2122**
 Plasteck, Inc., Okla., 10, Edge Lighted Panels, Dials & Knobs
 Pneumafil Corp., N.C., 5, 12, 15
 Powers Co., J. J., Ill., 7
 Precision, Inc., Minn., 5, 7, 12
Premier Metal Products Co., 337 Manida St., New York 59, N.Y., 5, 7, 10, 11, 12, 15, Modular Console
 See ad on page 600
 Tel: **WYandotte 1-6600**
 Printloid, Inc., N.Y., 8
 Q-Line Mfg. Corp., N.Y., 5, 7, 11, 12, 15, 22
 Quality Name Plate, Inc., N.J., 10, 11
 REF Mfg. Corp., N.Y., 5, 7, 8, 10, 11, 12, 15, 20, 22
 R. J. Audio Products, Inc., N.Y., 25
 R. N. R. Metal Products, Inc., N.Y., 7
 Radar Relay, Inc., Calif., Annunciator Panels
 Radiatronics, Inc., Calif., 5, 7, 12, 22
 Reiner Electronics Co., Inc., Pa., 5, 7, 10, 11, 12, 15, 22
 Richardson Co., Ill., 8, 20
 Riester & Thesmacher Co., Ohio, 7, 11, 12
 Rimak, Inc., Calif., 5, 7, 10, 11, 12, 15
 Ross Metals Co., Milton, Pa., 5, 7, 8, 11, 20

Rumple, Inc., Calif., 25
Saxton Products, Inc., Wire and Cable Div., 4320 Park Ave., New York 57, N.Y., 8, 20
 See ad on page 615
 Tel: **WELlington 3-8400**
 Scientific Wood Cabinet Co., N.J., 5, 10, 11, 25
 Seismograph Service Corp., Seiscor Mfg. Co., Div., Okla., 5, 12, 22
 Sessions & Son, J. H., Conn., 22
 Shamban & Co., W. S., Calif., 8, 20
 Sheltered Workshops, Inc., Calif., 25
Shielding, Inc., 66 N. Read Ave., River-ton, N.J., 5
 See ad on page 240
 Tel: **TALmadge 9-1433**
Skydyne, Inc., River Rd., P.O. Box 1106, Port Jervis, N.Y., 7, 8, 11, 12, 20, 22
 See ads on pages 245, 602
 Tel: **POrt Jervis 3-2241**
 Sloan Co., Calif., Annunciator Panels
 Smith Inc., H. H., N.Y., 11
 Spaulding Fibre Co., Inc., N.Y., 8, 11, 22
 Specialty Engrn. & Electr. Co., N.Y., 5, 7, 12, 22, 25
 Spincraft, Inc., Wis., 5, 11
 Standard Electric Time Co., Mass., 10, 12
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5, 7, 8, 10, 11, 12, 15, 20, 22, 25
 See ads on pages 306, 351
 Tel: **POrt Washington 7-7200**
 Stevens Wadden, Inc., Mass., 7, 12
Sun Dial Corp., P.O. Box 326, Caldwell, N.J., 10
 See ad on page 647
 Tel: **CApital 6-4334**
 Sun Electric Corp., Ill., 5, 10, 11
 Supreme Process Co., N.Y., 10, 15
 Swenson Co., Inc., V. H., N.J., 8, 10, 11, 20
 T. A. Mfg. Corp., Calif., 11
 Tabet Mfg. Co., Inc., Va., 7, 10, 12, 15
 Taffet Radio & Television Co., N.Y., 5, 7, 10, 11, 12, 15
 Tech Art Plastics Co., N.J., 8, 10, 20
Technical Apparatus Builders, 109 GB Liberty St., New York 6, N.Y., 7, 12, 15
 See ad on page 502
 Tel: **REctor 2-6249**
 Technical Service Corp., Ky., Scope and Lab Dolly
 Teimer Co., Roland, Mass., 7, 11
 Telectro Industries Corp., N.Y., 5, 22
Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 10, 11, 12
 See ad on page 308
 Tel: **EDgewood 3-1027**
 Temperature Engineering Corp., N.J., 5
 Toeco Metal Products, Inc., N.Y., 5, 7, 10, 11, 12, 15
 Transformer Metal Products Corp., N.Y., 7, 12
Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 10
 See ad on page 465
 Tel: **LIbertyville 2-3700**
 Trump, Walter N., Kan., 10
 United Aircraft Prods., Inc., Ohio, 5, 7, 12, 15

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- United States Chemical Milling Corp., Calif., 5, 7, 8, 12, 15
U.S. Radium Corp., N.J., 10
University Loudspeakers, Inc., N.Y., 25
Valtronic Corp., N.Y., 5, 8, 20, 25, Formica
Vector Electronic Co., 1100 Flower St., Glendale 1, Calif., 5, 7
See ad on page 549
Tel: CHapman 5-1076
Waldom Electronics, Inc., Ill., 8, 10, 11, 20
Warminster Fiberglass Co., Pa., 20
Warren Mfg. Co., Inc., Mass., 7, 12, 15, 25
Washington Aluminum Co., Inc., Md., 5, 7, 8, 10, 11, 12, 15, 22
Waterbury Companies, Inc., Conn., 8, 20
Wells Co., Inc., Gary, N.Y., 15
Western Devices, Inc., 600 W. Florence Ave., Inglewood, Calif., 12, 15
See ad on page 624
Tel: ORegon 8-7827
Westgate Lab., Inc., Ohio, 10, 11
White Aircraft Corp., Mass., 5, 7, 10, 11, 12, 15, 22, 25
Whitman Saddle Mfg. Co., Leather Instrument Case Div., Ohio, 11 (leather)
Wyco Metal Products, Calif., 5, 7, 12, 15
Zero Mfg. Co., Calif., 5, 7, 11, 12, 22
Zenith Plastics Co., Calif., 8, 20, Radomes

Cable Clips: See class 87

82. Cable & Wire.

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- A K Mfg. Co., Inc., Ill., 10, 17, 25, 32, 40, 50, 55, 65
A-1 Precision Products, Calif., 7
Acme Wire Company, Conn., 20, 30, 55
Advanced Electronics Inc., Conn., 40
Aero Research Instrument Co., Inc., Ill., 3, 35, 40, 50
Aerolite Electronics Co., N.J., 17, 40
Alden Products Co., 121D N. Main St., Brockton 64, Mass., 17, 40
See ads on pages 419, 691
Tel: JUNiper 3-0160
Allied Allegri Co., N.J., 40
Alloys Unlimited, Inc., N.Y., 3, 7, 20, 30, 34, 35
Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 10, 15, 17, 20, 25, 30, 32, 40, 45, 50, 55, 65
See ad on page 604
Tel: ALgonquin 5-5400

82. Cable & Wire.

- Aluminum Co. of America, Pa., 3, 30, 45
Amelco, Inc., Calif., 40
American Brass Co., Conn., 15
American Electric Cable Co., Mass., 7, 10, 15, 17, 25, 32, 40, 50, 55, 65
American Leonie Mfg. Co., Pa., 3, 7, 15, 34, 35
American Silver Co. Inc., N.Y., 7, 35
American Super Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 10, 30, 50, 55
See ad on page 605
Tel: UNiversity 2-9636
Amphenol-Borg Electronics Corp., Amphenol Cable & Wire Div., Ill., 5, 10, 25, 32, 50, 55
Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 40
See ad on page 166
Tel: BISHop 2-1000
Anaconda Wire & Cable Co., N.Y., 3, 10, 15, 20, 25, 30, 32, 45, 50, 55
Anaconda Wire & Cable Co., Sequoia Wire & Cable Co., Calif., 7, 10, 25, 32, 34, 35, 50, 55, 65
Andrew Antenna Corp., Ltd., Canada, 10
Andrew Corp., Ill., 5, 10
Ansonia Wire & Cable Co., R.I., 5, 7, 10, 25, 32, 50, 55
Anthony & Co., J. L., R.I., 15, 35
Apex Wire & Cable Corp., N.Y., 10, 17, 55
Asco Wire & Cable Co., Conn., 20, 30, 55
Associated American Winding Machinery, Lab., Inc., N.Y., 20, 30
Associated Engrg. Corp., Mass., 17
Associated Engrg. & Mfg., N.J., 7
Atlantic & Pacific Wire & Cable, N.Y., 3, 5, 7, 10, 15, 17, 20, 25, 30, 32, 34, 40, 45, 50, 55
Audio-Video Corp., N.Y., 10, 32, 45, 50
Avionics Corp. of America, Pa., 17, 40
B&M Electric Corp., N.Y., 17
Baker Platinum Div., Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 7, 35, 60
See ad on page 198
Tel: BiGelow 3-0030
Beam Instruments Corp., N.Y., 3, 5, 7, 10, 17, 25, 32, 45, 50, 55
Belden Mfg. Co., Ill., 3, 7, 10, 15, 17, 20, 25, 30, 32, 45, 50, 55, 65
Bendix Aviation Corp., Ind., 40, 50
Bendix Aviation Corp., Scintilla Div., Delaware Ave., Sidney, N.Y., 45, 50, 65
See ad on page 170
Tel: LOWell 3-9511
Berkshire Electric Cable Co., Mass., 10, 32, 50, 55

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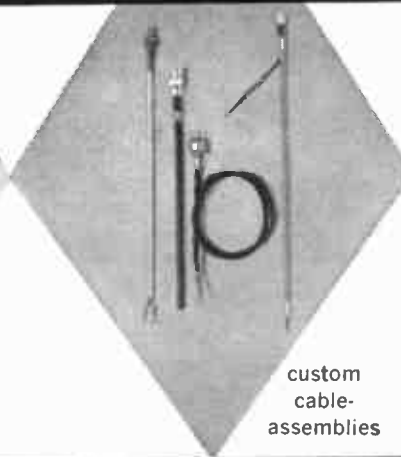
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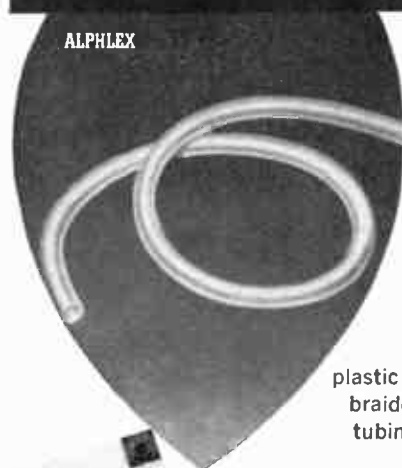


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cable-
assemblies



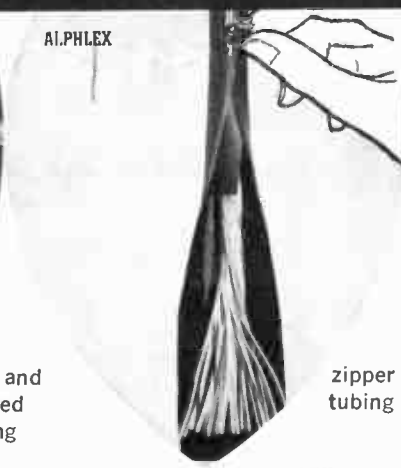
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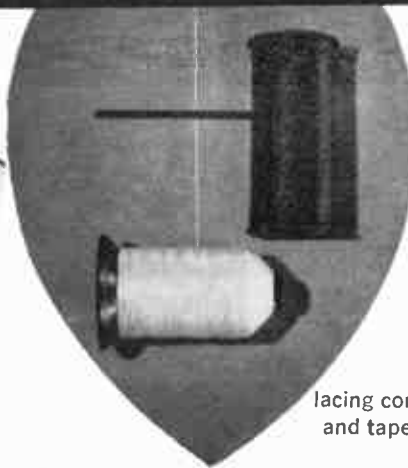
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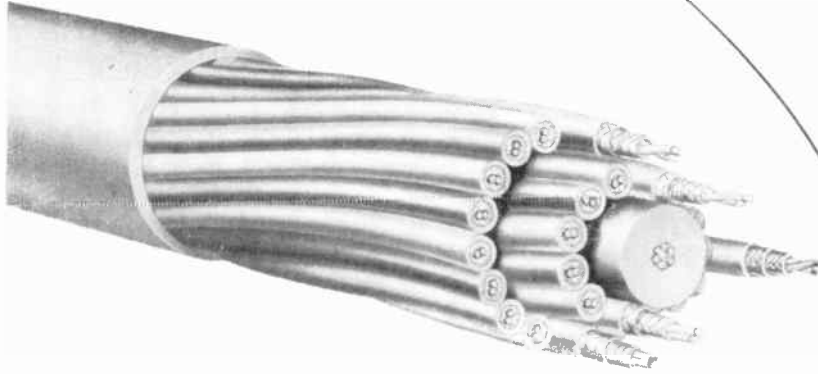


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Super-Temp

MAGNET WIRE • LEAD WIRE • MINIATURE CABLES • JUMBO CABLES
LACING CORDS • TUBING • SPECIALTY WIRE • TEFLON TAPES

| Wire or Cable | Primary Insulation | Colors MIL-Std-104 | Operating Temperature | Jackets | Remarks |
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| Cables-Class H | Teflon, Extruded or Tape Wrapped | Solid & Striped | -90°C - +260°C | 1. Teflon 2. Impregnated Glass | Any combinations of conductors and shielding required. |
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| Cables-Coaxial | Teflon, Extruded | Jackets Only Solid & Striped | -90°C - +260°C | Teflon, Kel-F, Impregnated Glass | Conforms to MIL-C-17B and MIL-C-8721. |
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| | Silicone or Isonel Film | Natural | to 155°C | _____ | Conforms to MIL-W-19583, Type II. |
| High Temperature Hook-up Wire | Teflon, Extruded or Tape Wrapped | Solid & Striped | -90°C - +260°C | _____ | Conforms to MIL-W-16878, Types E & EE or other special specifications as required. |
| | Extruded Silicone Rubber | Solid | -55°C - +200°C | Teflon Impregnated Glass, Nylon, Dacron | Conforms to MIL-W-16878 Types F & FF. |
| Thin Wall Hook-up Wire | Teflon, Extruded or Tape Wrapped | Solid & Striped | -90°C - +260°C | _____ | Operating voltage 300 v rms |
| Airframe Wire | Teflon Tape Plus Impregnated Glass | Solid Only | -60°C - +205°C | _____ | Conforms to MIL-W-7139A. |
| Sub Miniature Hook-up Wire | Teflon Film | Solid Only | -90°C - +260°C | _____ | Double quad coating for small diameter at 300 v rms |
| Hook-up Wire | Polyvinyl Chloride | Solid & Striped | -55°C - +105°C | _____ | MIL-W-16878, Types B, C & D. Plain or with Nylon coating |
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Agents in principal electronic manufacturing areas

For details, circle #408 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory III. Materials & Services

82. Cable & Wire.

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 3, 7, 10, 15, 17, 20, 25, 30, 34, 40, 45, 50, 55, 60, 65

See ad on page 603

Tel: WALKER 5-6980

Bliss Electronic Corp., N.J., 40

Boston Insulated Wire & Cable Co., Mass., 10, 25, 45, 50

Bram Metallurgical & Chemical Co., Pa., 15, 20, 30, 34, 35

Brand & Co., Inc., William, Conn., 5, 10, 25, 32, 40, 50, 55

Breeze Corp., Inc., N.J., 65

Bridgeport Brass Co., Conn., 3, 15

CBC Electronics Co., Pa., 40

Cable Designs Inc., N.Y., 10, 17, 20, 30, 40, 45, 50, 55, 65

Calbest Electronics, Co., Calif., 40

Calcon Mfg. Co., Inc., Pa., 3, 5, 10, 17, 30, 32

Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 40

See ad on page 184

Tel: CAPITAL 5-1251

Carol Cable Co., R.I., 10, 17, 32, 45, 50

Cerro de Pasco Corp. Sub-Rockbestos Prod. Corp., Conn., 10, 25, 30, 45, 50, 55

Channel Master Corp., N.Y., 5

Chase Brass & Copper Co., Sub. Kennecott Copper Corp., Conn., 3, 15, 20, 30, 35, 50, 60

Chester Cable Corp., N.Y., 5, 10, 15, 17, 25, 32, 50, 55

Chester-Morton Electronics Corp., Pa., 17, 40

Chicago Dynamic Industries, Inc., 1725

Diversey Blvd., Chicago 14, Ill., 40

See ad on page 553

Tel: WE 5-4600

Cico Corp., Calif., 40

Cohn Corp., Sigmund, 121 S. Columbus

Ave., Mt. Vernon, N.Y., 3, 20, 34, 35

See ad on page 607

Tel: MOUNT VERNON 4-5300

Columbia Wire & Supply Co., Ill., 3, 7, 10, 15, 17, 25, 32, 40, 45, 50, 55, 65

Communication Products Co., N.J., 10

Conray Corporation, Ohio, 40, Inter-Connecting Cables

Consolidated Wire & Assoc. Co., Ill., 3, 5, 7, 10, 15, 17, 20, 25, 30, 32, 45, 50, 55, 65

Continental Wire Corp., Conn., 10, 25, 32, 50, 55

Cooper & Sons Inc., Joseph B., N.Y., 3, 35

Co-Operative Industries, Inc., N.J., 10, 50, 65

Copperweld Steel Co., Pa., 5, 7, 10, 15, 45, 50, Copper Covered Steel

Copperweld Steel Co., Flexo Wire Div., N.Y., 3, 7, 15, 34, 65

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HIGH TEMPERATURE TEFLON* INSULATED MAGNET WIRES (-90°C to +250°C)

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THERMO-PLASTIC INSULATED HOOK-UP & ELECTRONIC WIRES (105°C, 90°C, 80°C)

Conductors: Tin Plated Copper and other metals. Constructions: Solid, Stranded or Multi-Harness. Insulations: Polyvinyl and Polyethylene. Colors: All solid. Sizes AWG 16 to 26.



SPECIAL INSULATED WIRES

High Frequency Litzendraht. Voice Coil. Bifilar & Trifilar Formvar. Pig-Tail Leads. Braided Wires. Loop Wires. Silver Plated Nickel. Aluminum. Special Servings of Nylon & Celanese in colors.



STRANDED & BUNCHED WIRES

Conductors: Bare wires in a wide choice of non-ferrous metals. Coated and Clad wires in Silver Plated, Tin Plated, Nickel Plated and Copperclad. Concentric stranding, Bunched stranding, Rope stranding in finished Sizes AWG 6 to 32.

Hudson also manufactures a full line of Solid Round Bare Wires, Silver Plated Wires, Fuse Wires and Flat Wires, Electrical and Mechanical

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Directory III. Materials & Services

82. Cable & Wire.

Cornish Wire Co., Inc., 50 Church St., New York 7, N.Y., 17, 32, 40, 45, 50, 55

See ad on this page
Tel: BARclay 7-5140

Crescent Co., Inc., R.I., 17, 32, 45, 50
Crucible Steel Co., of America, Pa., 30
Dalweld Co., Inc., N.Y., 3, 35
Dayton Aircraft Products, Inc., Fla., 5, 7
Dictograph Products, Inc., N.Y., 7, 32
Dielectric Materials Co., Ill., 10, 25, 32, 50, 55, 65

Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 20
See ad on page 188
Tel: HUMBoldt 2-5550

Driver-Harris Co., 201 Middlesex St., Harrison, N.J., 20
See ad on page 194
Tel: HUMBoldt 3-4800

Eagle Electric Mfg. Co., Inc., N.Y., 17, 55

Eagle Electronics Corp., Conn., 50, 55

Eastern Insulated Wire Corp. & Circle F Mfg. Co., N.J., 17, 40, 55

Eastern Smelting & Refining Corp., Mass., 35

Ecco Electronic Components Corp., N.Y., 17, 40

Edison Industries, Thomas A., Instrument Div., 61 Lakeside Ave., West Orange, N.J., 10, 25

See ad on page 345
Tel: ORange 3-6800

Electric Auto Lite Co., Ohio, 15, 20, 30, 35, 40, 45, 50, 55, 65

Electric Cords & Supply Co., Calif., 10, 17, 40, 45, Power Supply Cord

Electrical & Physical Instrument Corp., N.Y., 10

Electro-Minatures Corp., N.J., 40

Electronic Applications, Inc., Conn., 32, 50

Electronic Assembly Co., Inc., Mass., 40

Electronic Cable Corp., 126 Jackson St., Cambridge 40, Mass., 40

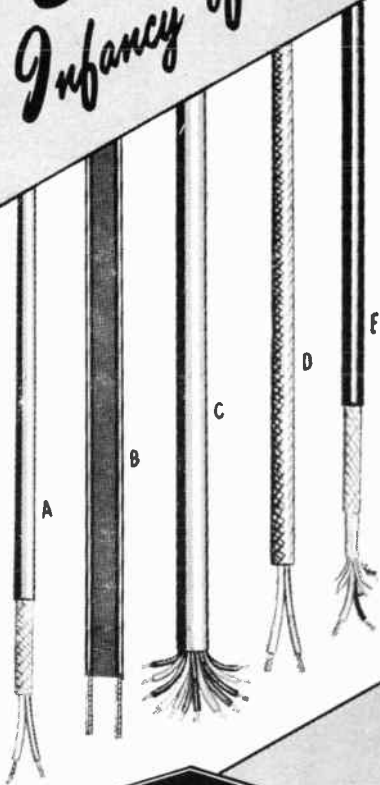
See ad on page 609
Tel: TRowbridge 6-7250

Electronic Parts Mfg. Co., Inc., N.J., 7

Emerson Radio & Phonograph Corp., Md., 40, 45, 50, 55

Empire Electronics Co., Inc., N.J., 17, 40, RF & Power

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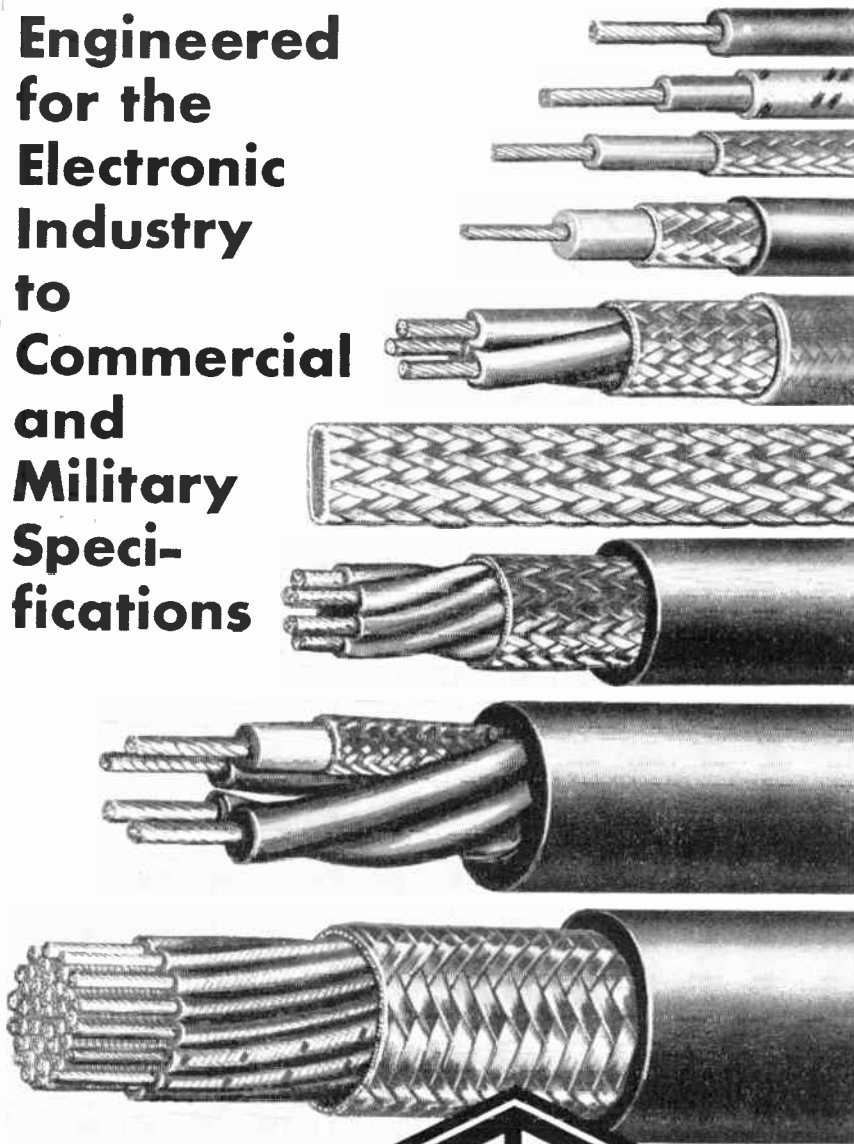
SIGMUND COHN CORP. 121 So. Columbus Ave. • Mt. Vernon, N. Y.

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Electronic
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to
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Write for your Sample, specifying whether you want Wire or Braid Board, or both.

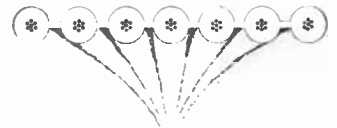
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116 Orchard Street  Hackensack, N.J.

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1969 IRE Directory

Directory III. Materials & Services

82. Cable & Wire.

Enflo Corp., N.J., 7

Engelhard Industries, Inc., 113 Astor St.,
Newark 2, N.J., 7, 20, 35, 65

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Tel: Bielow 3-0030

Entron, Inc., Md., 10

Essex Wire Corp., Ill., 17, 40, 45

Factory Enterprises, Inc., Pa., 60

Fairbanks Wire Co., Inc., N.Y., 30, 55

First Electronics Corp., Mass., 17, 40

Foot Mineral Co., Pa., 35

Fort Wayne Metals Inc., Ind., Stainless
Steel Wire

Garron Aircraft Supply, Inc., N.Y., 3

Gavitt Wire & Cable Co., Amerace
Corp., Div., Mass., 10, 15, 40, 45, 50,
55

General Cable Corp., N.Y., 3, 5, 10, 15,
17, 20, 25, 30, 32, 40, 45, 50, 55, 60

General Cable Corp., Metal Textile
Corp., Div., N.Y., 60

General Insulated Wire Works, Inc.,
R.I., 10, 15, 17, 45, 50, 55

General Lab. Assoc., Inc., N.Y., 40, 50

Goldsmith Bros. S&R Co., Ill., 35

Gore & Assoc., Inc., W. L., 487 Papermill
Rd., Newark, Del., 3, 5, 7, 10, 15, 25,
34, 40, 50, 55, 60, 65, Multiple Conductor

See ad on page 608

Tel: ENdicott 8-8325

Hackensack Cable Corp., 116 Orchard
St., Hackensack, N.J., Guy, Dial &
Antenna Cable

See ad on page 608

Tel: HUBbard 7-1100

Hal-Hen Co., N.Y., 17

Hallett Mfg. Co., Calif., 10, 17, 40, 50,
65

Hartwood Glass & Metals Co., W.Va.,
Glass Tipped Actuator Wires

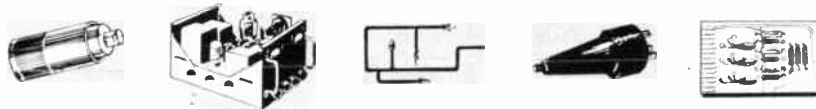
Hatfield Wire & Cable, Continental
Copper-Steel Indust. Div., N.J., 3, 5,
7, 10, 15, 25, 32, 45, 50, 55

Haveg Industries, Inc., Delaware, 7, 10,
25, 30, 50, 55

Hitemp Wires, Inc., N.Y., 7, 10, 20, 30,
40, 50, 55

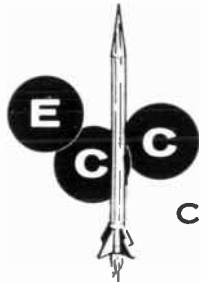
Holyoke Wire & Cable Corp., Mass.,
10, 15, 17, 40, 50, 55, 65

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Insulation: 6 mil (0.006") wall Fused-Film TEFLON
600 Volts RMS service; dielectric strength 2.2 KV;
AC spark test 3.0 KV

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| 6E-20 | 20 (19 x 32) | 0.0527" | 5.10 |
| 6E-18 | 18 (19 x 30) | 0.063" | 7.40 |
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All colors, solid and striped

- FUSE-FLEX, a highly flexible Teflon tubing with a thin wall of 6 mils.
- 6 mil wall Type "E" (MIL-W-16878C) . . . passes ALL spec. requirements (with a thinner wall).
600 volt RMS, 2.2 KV test.
- 8 mil wall Type "EE" (MIL-W-16878C) . . . passes ALL spec. requirements (with a thinner wall).
1,000 volt RMS, 3.0 KV test.
- Shielded and jacketed construction with no embedment of braid.
- Special cables engineered to your specific environmental and space requirements.

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INSO Electronic Products, Inc. WIRE & CABLE DIVISION

A Subsidiary of

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1200 Commerce Avenue, Union, N. J.

MURdock 6-4258-9, TWX: UNVL45

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**TEFLON* INSULATED HOOKUP WIRE, -90°C to +250°C
MIL-W-16878B, TYPES E and EE**

For Missiles, Computers and Electronic Assemblies

Miniaturization and complex electronic assemblies are simplified with the use of Teflon insulated wire. It is unaffected by soldering-iron temperatures, has a low coefficient of friction and will not heat-age as it contains no plasticizers to cause failure due to brittleness. Resistant to chemicals and solvents, Teflon insulated wire provides superior dielectric strength with minimum wall thickness. Manufactured with silver coated copper conductor in 600 volt and 1000 volt ratings in A. W. G. sizes from 32 thru 10.



600 VOLT AIRCRAFT WIRE TO MIL-W-7139A

A qualified product for high temperature applications requiring superior solvent resistance, high insulation resistance and circuit reliability.

Silver coated copper conductor, insulated with Teflon and Teflon-glass tapes, covered with a Teflon-glass braid having a Teflon finish. Manufactured in A. W. G. sizes 22 thru 4/0, also available in sizes 6 thru 22 with a type 302 stainless steel braid applied over all.

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The LEWIS ENGINEERING CO
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WIRE DIVISION

Specialists
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| NICKEL ALLOY WIRE | MANGANIN WIRE |
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| COPPERWELD WIRE | BRONZE WIRE |

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NOT ALL SIZES IN ALL INSULATIONS! BUT ENOUGH TO GET
THE WHEELS ROLLING IN A HURRY.

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82. Cable & Wire.

Hoskins Mfg. Co., Mich., 25, 34
Hubbell, Inc., Harvey, Conn., 40
Hudson Wire Co., 62 Water St., Ossining, N.Y., 3, 15, 20, 30, 34, 55, 60, 65

See ad on page 606
Tel: Wilson 1-8500

Hudson Wire Co., Winsted Div., Conn., 3, 15, 20, 25, 30, 34
ITI Electronics, Inc., N.J., 40

Illumitronic Engrg. Co., 680 E. Taylor Ave., Sunnyvale, Calif., 5, 7, 15, 20, 30, 34

See ads on pages 412, 686
Tel: REgent 9-2395

Indium Corp of America, 1678 Lincoln Ave., Utica 4, N.Y., Indium

See ad on page 679
Tel: SWift 7-1630

Industrial Television, Inc., N.J., 40

Inso Electronic Products, Inc., 1200 Commerce St., Union, N.J., 25, 30, 50, 55

See ad on page 609
Tel: MURdock 6-4258

International Electric Ind., Inc., N.Y., 5, 10, 17, 32, 40, 45, 55

International Telemeter Corp., Amptown Div., Calif., 10, 25

I. T. & T. Royal Elect. Corp. Div., R.I., 10, 17, 25, 32, 45, 50, 55

Jelliff Mfg. Corp., C. O., Conn., 20, 60, 65, Resistance Wire

Jerrold Electronics (Canada), Ltd., Canada, 10

Jersey Specialty Co., Inc., N.J., 5, 17
Kanthal Corp., Conn., 20

Keisers Industries, Inc., Pa., 40
Kennecott Copper, Okonite Co., Subsidiary, N.J., 3, 5, 10, 25, 32, 45, 50, 55, 65

Kinney Co., Inc., Joseph, Pa., 7
Knickerbocker Annunciator Co., N.Y., 10, 15, 17, 20, 25, 30, 32, 45, 50, 55, 60, 65

Kupfrian Mfg. Corp., 157 Prospect Ave., Binghamton, N.Y., 40

See ad on page 492
Tel: RA 3-6426

Lab-Tronics, Inc., Ill., 10, 17, 32, 50
Leach & Garner Co., Ind. Div., Mass., 7, 34, 35

Lenz Electric Mfg. Co., 1759 N. Western Ave., Chicago 47, Ill., 10, 32, 50, 55, 65, hookup wire

See ad on page 608
Tel: ARmitage 6-4454

Leviton Mfg., Co. Inc., N.Y., 17, 20, 45, 50, 55

Lewis Engineering Co., 339 Church St., Naugatuck, Conn., 7, 10, 50, 55, high temp. resistant

See ad on this page
Tel: PARK 9-5253

Ling Systems, Inc., Calif., 40

Little Falls Alloys, Inc., 199 Caldwell Ave., Paterson 1, N.J., 3, 7, 34, 35

See ad on page 611
Tel: LAMbert 5-1014

Loyola Laboratories, Calif., 15
MacKay, Inc., A. D., N.Y., 3, Rare to Order, 15, 35, 60

MacLeod & Hanopol, Inc., Mass., 40

Directory III. Materials & Services

82. Cable & Wire.

Magnet Wire, Inc., 25 Walker St., New York 13, N.Y., 15, 20, 30, 34, 55, Resistance, Litz Wire, Tinned Copper
See ad on page 610
Tel: CANal 6-0900

Mandex Mfg. Co., Inc., Ill., 40
Mandrel Industries, Inc., Calif., 40, 55
Manger Electric Co., Conn., 40
Mark Products Co., 5439 Fargo Ave., Skokie, Ill., 5
See ad on page 383
Tel: ORchard 5-1500

Markel & Sons, L. Frank, School Lane, Norristown, Pa., 25, 50, 55, Teflon & Silicone Rubber
See ad on page 652
Tel: BRoadway 2-8960

Metal Textile Corp., N.J., 60
Metals & Controls Div. of Texas Instruments, Incorporated, 51 Forest St., Attleboro, Mass., 34, 35
See ad on page 676
Tel: ATtleboro 1-2800

Microdot, Inc., Calif., 10
Miljan, Inc., Calif., 40, 50, Flat Teflon Cable

Modelectric Products Co., Inc., N.J., 40
Modern Adhesives & Elect., Inc., N.Y., 20, 25, 30, 55, Aluminum Foils, Copper
Mohawk Wire & Cable Corp., Mass., 10, 25, 32, 50, 55

Molec-Wire Corp., N.J., 3, 15, 20, 35, Resistance
Montrose Products Co. Inc., Mass., 10, 25, 32, 50, 55, 65

Mutual Electronic Industries Corp., N.Y., 10, 32, 45, 50, 60, 65, All are Elastic

Naniloa Corp., Ohio, 5
National Wire & Cable Corp., Calif., 3, 5, 7, 10, 15, 17, 20, 25, 30, 32, 34, 35, 40, 45, 50, 55, 60, 65, Systems Control Cables

Neptune Meter Co., Revere Corp. of America Sub., Conn., 40, 45, 50, 55
Nesor Alloy Products Co., N.J., 3, 7, 15, 34, 35, 65

New England Electrical Works, Inc., N.H., 15, 20, 25, 34, 65, Litz
New England Tape Co., Mass., 55
Ney Co., J. M., Maplewood Ave., Bloomfield 1, Conn., 20, 35
See ad on page 678
Tel: (Hartford) CHapel 2-2281

Nonotuck Mfg. Co., Mass., 15
Northern Electric Co., Ltd., Canada, 3, 10, 15, 32, 45, 50, 55

Northwest Indust., Ltd., Canada, 40
Owens-Corning Fiberglass Corp., N.Y., Insulation Reinforcement

Pacific Automation Products, Inc., Calif., 17, 45, 50, 55
Pacific Resistor Co., Calif., 55
Panseal, Inc., N.J., 40
Paraplegics Mfg. Co. Inc., Ill., 17, 40
Parkside Wire Co., Ill., 10, 15, 17, 20, 30, 32, 34, 45, 50, 55, 65

Paul & Stein Bros., Inc., F. H., N.Y., 3, 60

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 50
See ad on page 687
Tel: EVerglade 4-2122

Permonite Mfg. Co., Ill., 40
Phalo Plastics Corp., Mass., 5, 10, 17, 25, 32, 40, 50, 55

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 5, 10, 15, 20, 25, 30, 34, 45, 50, 55
See ad on page 612
Tel: PLaza 1-3200

Phelps Dodge Copper Prods. Corp., Inca Mfg. Div., Ind., 20, 30
Philadelphia Insulated Wire Co., Pa., 10, 30, 32, 50, 55
Plastic Wire & Cable Corp., Conn., 15, 17, 32, 40, 50, 55, 65



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TV twin-leads, coaxial cable, hook-up wire, rotor antenna cable, custom-engineered multi-conductor cable. For prices, samples and technical data, contact your nearest Plastoid representative. (See list in manufacturers' section).

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MIL-W-76A (superseding JAN-C-76)
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Underwriters Laboratory — 80°, 90°, 105°
(PVC insulation, nominal walls of .008, .015, .031, .047 & with braided outercovering or extruded nylon jacket)

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NICKEL CLAD (not plated) TITANIUM WIRE

FOR CERAMIC-TO-METAL BRAZING

round • flat — square ■ half-round —

Consider WIRE and the importance of its function in your product. Whether a highly engineered application or a simple stapling purpose, your choice of the proper alloy or composition, temper and type of wire could mean success or failure during crucial test.

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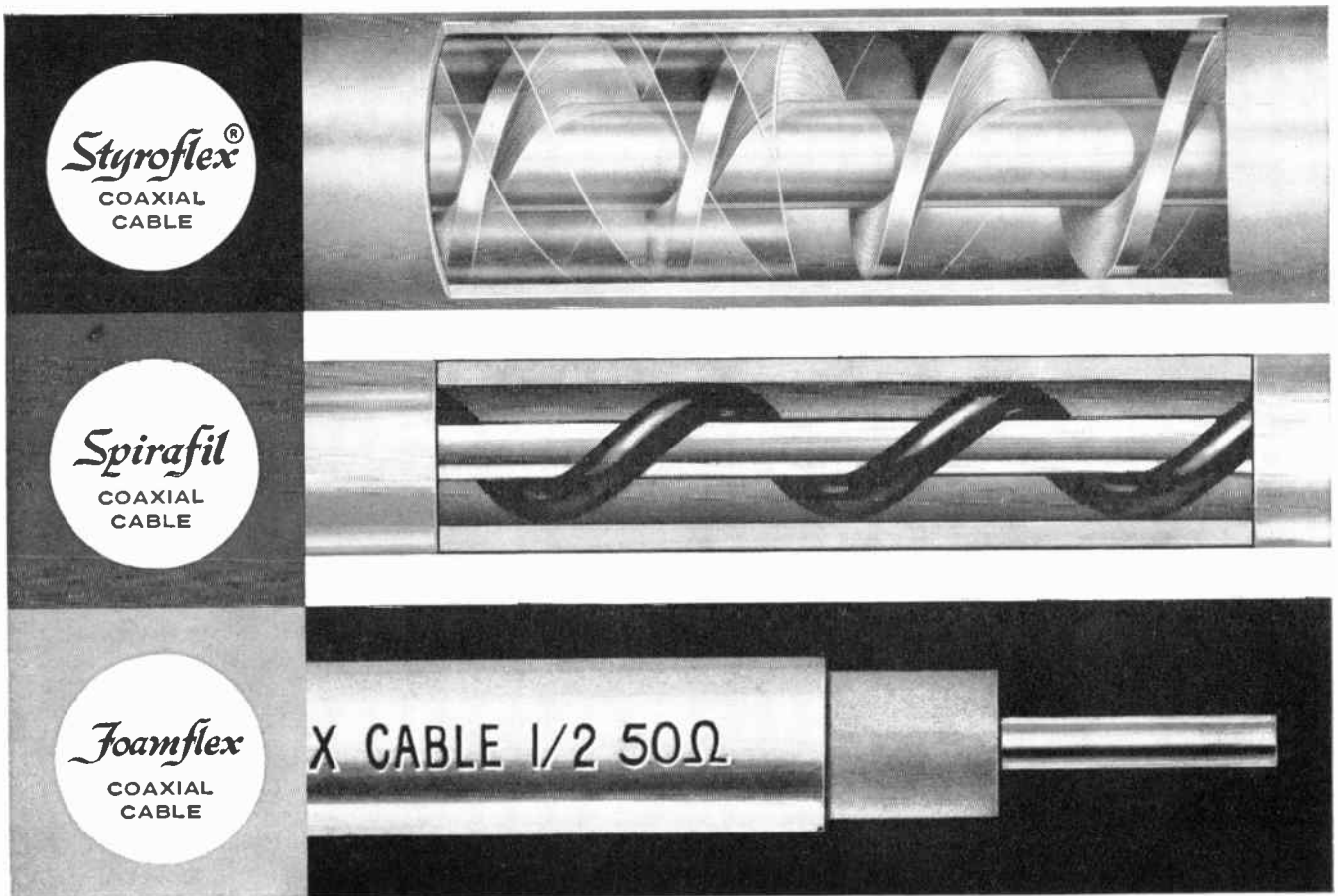
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Finest line of High Frequency Cables in the communications field!

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Matching fittings for all cables are available from several sources.



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These unique connectors for Spir-O-line coaxial cable form the world's fastest, strongest joint. Spir-O-lok* eliminates the use of special tools, welding, soldering, and special assembly techniques . . . and a Spir-O-lok connection can be re-made repeatedly without redressing the cable end or replacing connector parts.

All cable sizes, connectors, adapters, and couplings in stock and available now.

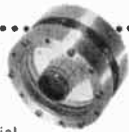


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MANUFACTURER OF THE WORLD'S FINEST TRANSMISSION LINES

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82. Cable & Wire.

Plastoid Corp., 42-61 24th St., Long Island City 1, N.Y., 5, 10, 25, 32, 50, 55

See ad on page 611

Tel: STillwell 6-6200

Porter Co., Inc., H. K., Pa., 3, 40, 45, 50, 55, 60, 65

Precision Tube Co., Inc., Pa., 10, 50

Prodelin, Inc., Dept. I-8, 307 Bergen Ave., Kearny, N.J., 3, 5, 10, 25

See ad on this page

Tel: WYman 1-8600

Progress Electronics Co., 107 Franklin St., New York 13, N.Y., 10, 15

See ad on pages 71-74

Tel: CAnal 6-5611

R.M.S. Assoc., N.Y., 40

Raytherm Corp., Calif., 10, 25, 50, 55

Rea Magnet Wire Co., Inc., Ind., 3, 15, 20, 30

Rego Insulated Wire Co., N.J., 5, 10, 17, 32, 55, 65

Revere Corp. of America, Conn., 25, 40, 50, 55

Rex Corp., Mass., 10, 25, 50, 55

Rhode Island Insulated Wire Co., Inc., R.I., 10, 17, 32, 45, 50

Robertshaw-Fulton Controls Co., Aeronautical Instrument Div., Calif., 40

Robertson Electric Co., Inc., 124 S. Elmwood Ave., Buffalo 2, N.Y., 17, 40, cable, molded; multi-conductor and coaxial cable splice cases

See ads on pages 425, 615

Tel: MADison 6658

Rockbestos Products Corp., Conn., 10, 30, 50, 55, 57

Rockland Insulated Wire & Cable Co., Inc., N.Y., 10, 32, 35, 40, 50, 55

Roehlings Sons Corp., John A., N.J., 15, 20, 30, 45, 50, 55

Rome Cable Corp., N.Y., 3, 15, 17, 20, 30, 45, 50

Ross Metals Co., Milton, Pa., 40

Royal Electric Corp., R.I., 10, 17, 25, 32, 45, 50, 55

Runzel Cord & Wire Co., Ill., 15, 17, 40, 45, 50, 55, 65, Instrument-Patch Cords

Sag Harbor Indust., Inc., N.Y., 40

Sanders Assoc., Inc., N.H., 40, 50

Saxton Products, Inc., Wire and Cable Div., 4320 Park Ave., New York 57, N.Y., 3, 5, 7, 10, 15, 20, 25, 30, 32, 34, 45, 50, 55, 65

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Tel: WEllington 3-6400

Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 3, 20, 30, 34, 35

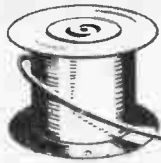
See ad on page 616

Tel: WHITE Plains 9-4757

Siemens & Halske, A. G., Germany, 10

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Tensolite

RELIABLE HIGH TEMPERATURE WIRE & CABLE

Tensolite facilities are devoted exclusively to the engineering and manufacturing of miniature plastic insulated wire and cable —featuring Teflon insulation for high temperature (—90 deg. C. to +250 deg. C.) applications. 100 percent inspections before, during and after manufacture, part of the most rigid quality control program in the industry, assures reliability of the finished product.

"TEFLON" INSULATED CABLE

From large sizes using 6 AWG wire, down to sub-miniature cables with 36 AWG single conductors, Tensolite makes multi-conductor cables to your specifications. Tensolite cables utilize the maximum number of conductors in a minimum of area — saving weight and space. They're available as ribbon cable or in standard round configurations. For demanding applications, we recommend individual conductors of our FLEXOLON wire.

HOOK-UP WIRE

TYPE E-EE TO MIL-W-16878

FLEXOLON WIRE

A new concept in high temperature insulation developed by Tensolite's research and development laboratories. **FLEXOLON** wire provides the best properties of wrapped and extruded fluorocarbon insulation. Important features of this versatile hook-up and lead wire are:

- Solid colors and striped combinations.
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- High temperature range of —90 deg. C. to +250 deg. C.
- Greatest miniaturization in MIL-SPEC hook-up wire (smallest hook-up wire in the world).
- High dielectric strength (far exceeds required 600 V and 1000 V ratings).
- Consistent concentricity.
- Superior cut-through resistance.

TENSON WIRE

Insulated with TFE fluorocarbon high temperature resin.

Choose from:

Spiral wrapped... with special cross-lapped construction and unlimited color coding; striping that meets commercial and military specifications.

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Insulated with extruded vinyl plastic.

Types B and C meet MIL-W-16878. They are high temperature hook-up wires rated for continuous use from —55 deg. C. to +105 deg. C. with or without nylon jackets.

TENSOLEX WIRE

Types WL and SRIR are manufactured in accordance with the joint Army-Navy specification **JAN-C-76** (Qualification approval Certificates Nos. 13725 and 13606A).

Types LW and MW are general purpose hook-up wires specifically designed for radio, instrument, and military electronic applications. Designed to meet **MIL-W-76A**, they are recommended for use at temperatures up to 80 deg. C. in the internal wiring of electrical and electronic equipment.

TENSOLITE WRAPPED VINYL WIRE

Super-flexible wire designed for miniaturization applications at operating temperatures from —40 deg. C. to +60 deg. C.

AIRFRAME WIRE

TENSON AIRFRAME WIRE

Insulated with high-temperature resin, it is manufactured in compliance with **MIL-W-7139A**. Important features are:

- —90 deg. C. to +250 deg. C. temp. range.
- 600 Volt and prescribed overload operation.
- Rugged, abrasion resistant construction.
- Short-time operation in event of fire.
- High resistance to chemicals.
- Excellent flexibility.

COAXIAL CABLE

TENSON MINIATURE COAXIAL CABLE

Designed to meet **MIL-C-17B**, it is ideal for high frequency operation from —90 deg. C. to +250 deg. C. Insulation assures extremely low loss, high dielectric strength, and complete resistance to moisture and chemicals. A great variety of outer jackets permits the selection of cable well suited for many application requirements.

MAGNET WIRE

TUFFLON MAGNET WIRE

High temperature Teflon insulated magnet wire — designed to meet **MIL-W-19583** — is ideal for coils and windings requiring high temperature application. It is supplied in wall thicknesses ST, HT, TT and QT and AWG sizes 18 through 44.

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Asbestos Wire
to MIL-C-25038

Antenna Wire

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Low Noise Cable

Tempered Magnet Wire

Double Quad Lead Wire

Wire Coated with Teflon
100X FEP Resin

100% Shielded Wire

Ribbon Cable Shielded
and Unshielded

Teflon Inks

Bondable Wire

Etched Wire

High Flex Wire and Cable

Nickel Plated Conductor



Tensolite

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Directory III. Materials & Services

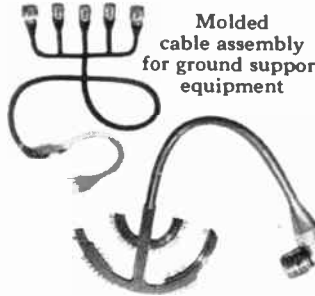
82. Cable & Wire.

Simplex Wire & Cable Co., Mass., 3, 10, 32, 45, 50, 55
 Skysweeper, Inc., Ill., 40
 Slepian & Co., Arthur, Conn., 20, 30
 Smith, Inc., H. H., N.Y., 17, 45
 South River Metal Products Co., Inc., N.J., 3
 Spargo Wire Co., Inc., N.Y., 15, 34
 Spectra-Strip Wire & Cable Corp., Calif., 40
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 Standard Metals Corp., Mass., 15, 34, 35
 Standard Telephones & Cables, Ltd., England, 10, 32, 45, 50, 55
 Stretch Wire Corp., N.Y., 10, 17, 50
 Sunshine Scientific Instrument, Pa., 40
 Supa Insulations, Inc., N.C., 10, 30
 Superior Cable Corp., N.C., 10, 32, 50, 55
 Surface Conduction Inc., N.Y., 5, 10, 25
 Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 3, 10, 25, 34, 40, 45, 50
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 Tel: EM 5-6331
 Sylvania Electric Products Inc., 1740 Broadway, New York 19, N.Y., 7, 34
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 Tel: JUDson 6-2424
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Sylvania Electric Products Inc., Parts Division, Warren, Pa., 3, 7, 34
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 Tel: WARren 3220
 Tape Cable Corp., N.Y., 50, 55
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 Telcon, Inc., Dept. E61, P.O. Box 216, Pacific Palisades, Calif., 5, 10, 25, 50, 55
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 Tel: GL 4-4043

Tenna Mfg. Co., Ohio, 3, 10, 17, 50, 65
 Tensolite Insulated Wire Co., Inc., West Main St., Tarrytown, N.Y., 5, 7, 10, 25, 30, 32, 50, 55, 65
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 Tel: MEDford 1-2300
 Texas Instruments Incorporated, S-C Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Texas, 7, 35
 See ad on pages 75-78
 Tel: FLEetwood 7-5411

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Molded cable assembly for ground support equipment

Molded harness for underwater devices

MEAN PROTECTION

- ▶ against deterioration caused by acids, oils, fuels, flame, ozone, water or moisture.
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Robertson molded cable assemblies have been painstakingly engineered and built to the same standards of military precision and dependability as the underwater devices, missile control systems, and mobile electronic equipment for which they are designed.

Robertson Electric Co., Inc.
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 Established in 1895

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With Certificate of Compliance and Source Inspection

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 All are available with Certificate of Analysis and Certificate of Compliance.
- We also specialize in long and short runs of special items with excellent delivery.
- We also have facilities to cut, strip, lug, notch, slot or perform other operations on various types of wire and cable. Write today for more information . . .
- In stock also; Phelps Dodge Spirafil, Styroflex, and Foamflex.
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**SEMI-FLEXIBLE
ALUMINUM SHEATHED
HELICAL MEMBRANE
COAXIAL CABLE**

Low attenuation and VSWR...

High efficiency and power handling capacity...

Specifically designed for all RF uses...

50 ohm and 75 ohm characteristic impedances...

Inner copper conductor separated from an aluminum outer sheath by a helical polyethylene membrane...

1/2 inch to 3 1/2 inch diameter...

Bare aluminum sheath or vinyl protective sheath over the aluminum...

Complete Range of matched fittings...

Warehouse facilities on the East and West coast for immediate delivery...

Competent engineering service...

For complete information write to department E61

TELCON, INC.

PACIFIC PALISADES, CALIFORNIA
QUALITY CABLES AND FITTINGS SINCE 1864

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82. Cable & Wire.

Thermax Wire Corp., N.Y., 10, 25, 32, 50, 55
 Time Wire & Cable Co., Inc., Conn., 5, 10, 25, 32, 34, 50, 55
 Titan Metal Mfg. Co., Pa., Brass Wire
 Topper Mfg. Co., Inc., N.Y., 25, 30, 40
 Transradio, Ltd., England, 10
 Tricon Mfg. Co., Ill., 35
 Trimm Inc., 400 W. Lake St., Libertyville, Ill., 17
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 Tel: L**ibertyville** 2-3700
 Twin Lock Inc., Calif., 17
 United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 3
 See ads on pages 541, 681
 Tel: B**EEKMAN** 3-8870
 United States Chemical Milling Corp., Calif., 7, 17, 40, 50
 U.S. Steel, American Steel & Wire Div., Ohio, 10, 15, 20, 25, 30, 32, 50, 55
 U.S. Steel Corp., Pa., 15, 60
 Univox Corp., N.Y., 10
 Vector Associates, Inc., N.Y., 40
 Victor Electric Wire & Cable Corp., R.I., 3, 5, 7, 10, 15, 17, 25, 32, 40, 50
 Wah Chang Corp., 233 Broadway, New York 7, N.Y., 35, 65
 See ad on page 680
 Tel: C**ORTLANDT** 7-0887
 Walsco Electronics Mfg. Co., Div. of Textron, Inc., 100 W. Green St., Rockford, Ill., 50
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 Tel: R**OCKFORD** 8-9661
 Warren Wire Co., Vt., 10, 15, 20, 30, 34, 50, 55

Waters Conley Co., Inc., Minn., 40
 Welcraft Prods. Co., Inc., Ind., 10, 40, 55
 Western Gold & Platinum Co., Calif., 3, 35
 Western Insulated Wire Co., Calif., 32, 45, 50, 55, High Temperature Teflon
 Wheeler Elect. Corp., Div.-Sperry Corp., Conn., 40
 White Industrial Div., S. S., Dept. PR, 10 East 40th St., New York 16, N.Y., 35
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 Tel: M**URRAY HILL** 3-3015
 Whitney Blake Co., Conn., 17, 30, 32, 45, 50, 55
 Wildberg Bros. Smelting & Refining Co., Calif., 35
 Wilkinson Co., Calif., 3, 35
 Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 35
 See ad on page 681
 Tel: U**NIVERSITY** 7204
 Wind Turbine Co., 248 E. Market St., West Chester, Pa., 5, 15
 See ad on page 386
 Tel: O**WEN** 6-3110
 Wirecraft Products Inc., Mass., 10, 25, 50, 55
 Wirekraft, Inc., Ind., 10, 17, 50, 55, 65
 York Co., Inc., Otto H., N.J., 60
 Zippertubing Co., Calif., 50

Cans: See class 87

Caps, vacuum tube: See class 99

WIRE
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YOUR COMPONENT

Wire drawn to your specifications (down to .00025") in base and precious metals and alloys... supplied bare, enameled, ceramic insulated for use at 1000° F., or electroplated... to close tolerances.

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White Plains 9-4757

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83. Ceramics.

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10. Custom fabrication
12. Ferrites
15. Insulators
17. Metallized
20. Proprietary forms
25. Yttrium iron garnet

ACF Electronics, Va., 10
 Acoustica Associates, Inc., Dept. IRE, Fairchild Court, Plainview, N.Y., 12, 17, 20

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Tel: O**VERBROOK** 1-2100

Aerovox Corp., Crowley Div., N.J., 5, 12
 Allen-Bradley Co., Wis., 12

American Feldmuehle Corp., 11 W. 42nd St., New York 36, N.Y., 5, 10, 15, 17, 20
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Tel: P**ENNSYLVANIA** 6-9751

American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 5, 10, 15, 17
 See ad on page 180

Tel: A**MHERST** 5-3411

Arnold Engineering Co., P.O. Box G, Marengo, Ill., 12
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Tel: (Chicago) A**NDOVER** 3-6300

Avco Research & Advanced Development Div., Mass., 10
 B G Corp., N.J., 5, 10, 15, 17, 20

Bel Fuse, Inc., 197 Van Vorst St., Jersey City, N.J., 17
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Tel: H**ENDERSON** 2-0463

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 15
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Tel: W**ALKER** 5-6980

Directory III. Materials & Services

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Caddell-Burns Mfg. Co., N.Y., 5
Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5

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Tel: TRowbridge 6-2800

Carborundum Co., Refractories Div., N.J., 5, 10, 15, 17

Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 5, 10, 15, 17

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Tel: WOODruff 2-9200

Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 17

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Tel: WEst Lebanon 3-5851

Ceramet Corporation, N.Y., 17

Ceramic Specialties Co., Inc., Ohio, 5, 10, 15, 20

Components for Research, Inc., 15, Stand-offs

Connecticut Instrument Corp., Conn., 10

Coors Porcelain Co., Colo., 5, 10, 15, 17

Corning Glass Works, 550 High Street, Bradford, Pa., 5, 17

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Tel: 2-4571

Crucible Steel Co. of America, Pa., 12
Custom Components, Inc., N.J., 12

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Diamonite Products Mfg. Co., Ohio, 5, 10, 15, 17

Duramic Products, Inc., N.Y., 5, 10, 15

E A K Research Lab., N.Y., 10, 25

EPM Corp., N.Y., 5, 20

Electric Auto Lite Co., Ohio, 10, 15

Electrical Refractories Co., Ohio, 5, 10, 15

Electro Assemblies, Inc., Ill., 5

Electronic Applications, Inc., Conn., 15, 17

Electronic Mechanics, Inc., N.J., 5, 10, 15

Electronica Industrial Ltda., Brazil, 12

Elna Ferrite Lab., Inc., N.Y., 12

Emerson & Cuming, Inc., Mass., 10, 20

Englehard, Inc., Charles, N.J., 15

Erie Resistor Corp., 644 West 12th St., Erie 6, Pa., 10, 17

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Tel: GLendale 6-8592

Ferroxcube Corp. of America, 50 East Bridge St., Saugerties, N.Y., 12

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531, 617

Tel: CHerry 6-2811

Filmohm Corp., N.Y., 17

Foot Mineral Co., Pa., 20

Frenchtown Porcelain Co., N.J., 10, 15,

17, Metallized Ceramic Coating

GOE Engineering Co., Calif., 15

General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 5, 10,

12, 15, 17, 20

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Tel: VALley 6-5100

General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court Street Plant, Bldg. 3-50,

Syracuse, N.Y., 10, 12

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Tel: GRanite 6-4411

General Electric Co., Insulator Dept., Md., 15

General Electric Co., Specialty Electronic Components Dept., N.Y., 10, 12

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 5, 15

See ad on page 639

Tel: New Rochelle 3-8600

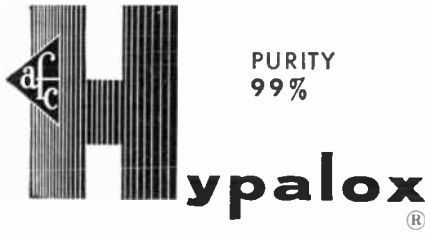
Gulton Industries, Inc., N.M., 10, 20

ITE Circuit Breaker Co., Victor Insulators Div., N.Y., 15

Isolantite Mfg. Corp., Warren Ave., Stirling, N.J., 5, 10, 15, 17, 20

See ad on page 619

Tel: MILLington 7-0385



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99%

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for exacting applications...

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high mechanical strength...

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for all your
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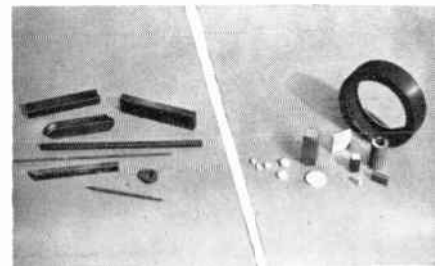


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CORPORATION OF AMERICA

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General Electric ceramic and ferrite materials are specifically designed for special applications. Four distinctive compositions of *Barium Titanate* are complemented by three bodies of a new piezoelectric ceramic, *Lead Metaniobate*, for applications requiring high Curie temperature and broad bandwidths. *Delay Line Ferrite* for phase modulators and separate *Micro-wave Ferrites* for C, S and X bands provide tailored electrical properties.

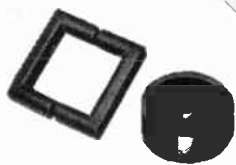
227-22

GENERAL ELECTRIC

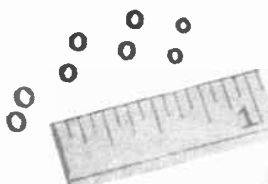
DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

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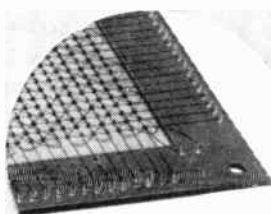
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11 WEST 42nd STREET, NEW YORK 36, NEW YORK
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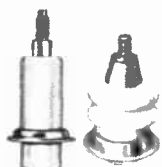
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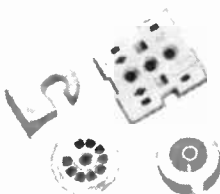
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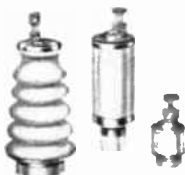
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Directory III. Materials & Services

83. Ceramics.

Jodee Plastics Co., N.Y., 10
Kearfott Co., Inc., 1500 Main Ave., Clif-
ton, N.J., 10, 12, 20, 25

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Tel: GRegory 2-1000

Kearfott Co., Inc., Microwave Div.,
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Knight Corp., Ewen, Mass., 10, 12, 25

Krystinel Corp., Fox Island Rd., Port
Chester, N.Y., 10, 12

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Tel: Westmore 9-2261

Laboratory Equipment Corp., Mich., 20

Lapp Insulator Co., Radio Specialties
Div., 150 Sumner St., Le Roy, N.Y.,
10, 15, 17

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Tel: LE Roy 385

Litton Engineering Labs., P.O. Box 949,
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Tel: GRass Valley 1730

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Mica Fabricating Co., N.J., 15

Microwave Chemicals Laboratory, Inc.,
Dept. 12, 282 Seventh Ave., New York
1, N.Y., 10, 12, 20, 25

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Tel: WAtkins 4-6725

Millen Mfg. Co., Inc., James, 150 Ex-
change St., Malden 48, Mass., 5, 15

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Tel: DAvenport 4-4108

Minnesota Mining & Mfg. Co., Minn.,
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Tel: WAverly 6-2250

Motorola, Inc., Ariz., 5, 15, 25

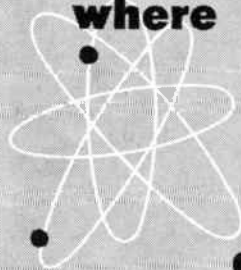
Murata Mfg. Co. Ltd., Japan, 15

Mycalex Corporation of America, 125-B
Clifton Blvd., Clifton, N.J., 5, 10, 15,
20

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Tel: PRescott 9-8866

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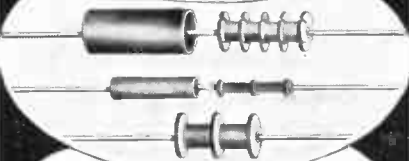
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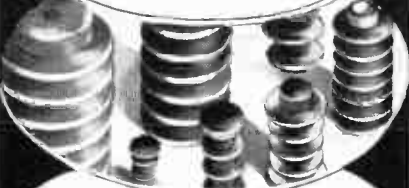
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83. Ceramics.

Mykroy, Inc., Ill., 5, 10, 15
National Ceramic Co., N.J., 5, 15, 17
National Moldite Co., N.J., 5, 12
National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 5, 15
See ad on page 642
Tel: NO 5-4800

Norrich Plastics Corp., 107-109 West 18th St., New York 11, N.Y., 5, 10, 15
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Tel: WAtkins 4-8360

North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 5
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Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, L.I., N.Y., 17
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Raytheon Co., Mass., 12

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Ross Metals Co., Milton, Pa., 5

Saxonburg Ceramics, Inc., Pa., 5, 15

Scientific Electronic Laboratories, 866 Bergen St., Newark 8, N.J., 17
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Tel: Bigelow 3-8675

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Superior Porcelain Co., W.Va., 15

Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 5, 10, 15
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Tel: LOWell 8-4555

Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 5, 10, 15, 17
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Tel: ARMoRY 1-0163

Telectro Industries Corp., N.Y., 5

Telegraph Condenser Co., England, 5, 10, 15, 17, 20

Telegraph Condenser Co., Ltd., United Insulator Div., England, 5, 10, 15, 17, 20

Telemeter Magnetics, Inc., Calif., 12

Thermo Materials, Inc., Calif., 10, 12, 15, 17, 20

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 5, 10, 15, 17, 20
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Tel: PIlgrim 3-7797

Topper Mfg. Co., Inc., N.Y., 5, 10, 15

Twin Lock, Inc., Calif., 5

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5, 10, 17
See ads on pages 541, 681
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Directory III. Materials & Services

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U.S. Ceramic Tile Co., Ohio, 17
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Tel: (Smithville, Ohio) MOnica

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Tel: (Smithville, Ohio) MOnica
9-2271

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Western Gold & Platinum Co., Calif.,
10, 15

Wind Turbine Co., 248 E. Market St.,
West Chester, Pa., 15

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Tel: OWen 6-3110

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20. Steel chassis

AA Metal Products, Inc., Vt., 5, 15, 20

A & P Metal Prods. Mfg. Corp., N.Y., 5,
10, 15, 20

Abalon Precision Mfg. Corp., N.Y., 5,
10, 15, 20

Acro Tool & Die Works, Ill., Chassis
Cradles

Aerovox Corp., Mass., 20

Airtronics, Inc., D.C., 5, 20

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Albano Co., Inc., N.Y., 5

Alden Products Co., 121D N. Main St.,
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Tel: JUniper 3-0160

Amco Engineering Co., 7333 W. Ainslie
St., Chicago 31, Ill., 5, 10, 15, 20

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Tel: UUnderhill 7-8500

American Aluminum Co., 230 Sheffield
St.-D, Mountainside, N.J., 5, 10, 15

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Tel: ADams 3-3500

Anchor Specialty Mfg. Co., Inc., N.J., 5,
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Arrow Machinists & Fabricators, 154 E.
3rd St., Mt. Vernon, N.Y., 5, 10, 15, 20

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Tel: OWens 9-4000

Artisan Metal Works Co., Ohio, 5, 15,
20

Avionics Corp. of America, Pa., 20

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Chassis-Trak, Inc., 525 S. Webster St.,
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Communication Equip. & Engineering
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Conrad & Moser, N.Y., 5, 15, 20

Conrad Devices, Inc., Mich., 5, 10, 15, 20

Cook Electric Co., Inland Test. Labs.
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Corry-Jamestown Mfg. Corp., Pa., 15, 20

Craig Systems, Inc., Dept. H-1, 361 Mer-
rimack St., Lawrence, Mass., 15

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Tel: MURdock 8-6961

Cutler Metal Products Co., N.J., 5, 15,
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Dahlstrom Metallic Door Co., N.Y., 5,
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Devco Engrg., Inc., N.J., 15, 20

Dumont Airplane & Marine Instrument
Inc., Pa., 5, 15, 20

E.M.I. Electronics Ltd., England, 15, 20

Eagle Metalcraft, Inc., N.Y., 5, 10, 15,
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Ehrenpreis, Consulting Engrg., David,
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Elgin Metalformers Corp., Dept. 1227,
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Tel: SHERwood 1-3490

Elzee Metal Products Co., Inc., N.Y., 5,
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Farwell Metal Fabricating, 73 W. Fair-
field Ave., St. Paul 7, Minn., 5, 15, 20

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Tel: CApital 4-5318

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Grant Pulley & Hardware Corp., 43
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Tel: NYack 7-4400

Green Rectifier Co., N.J., 5, 20

Hammond Mfg. Co., Ltd., Canada, 5,
10, 15, 20

Hammer Electronics Co., Inc., N.J., 20

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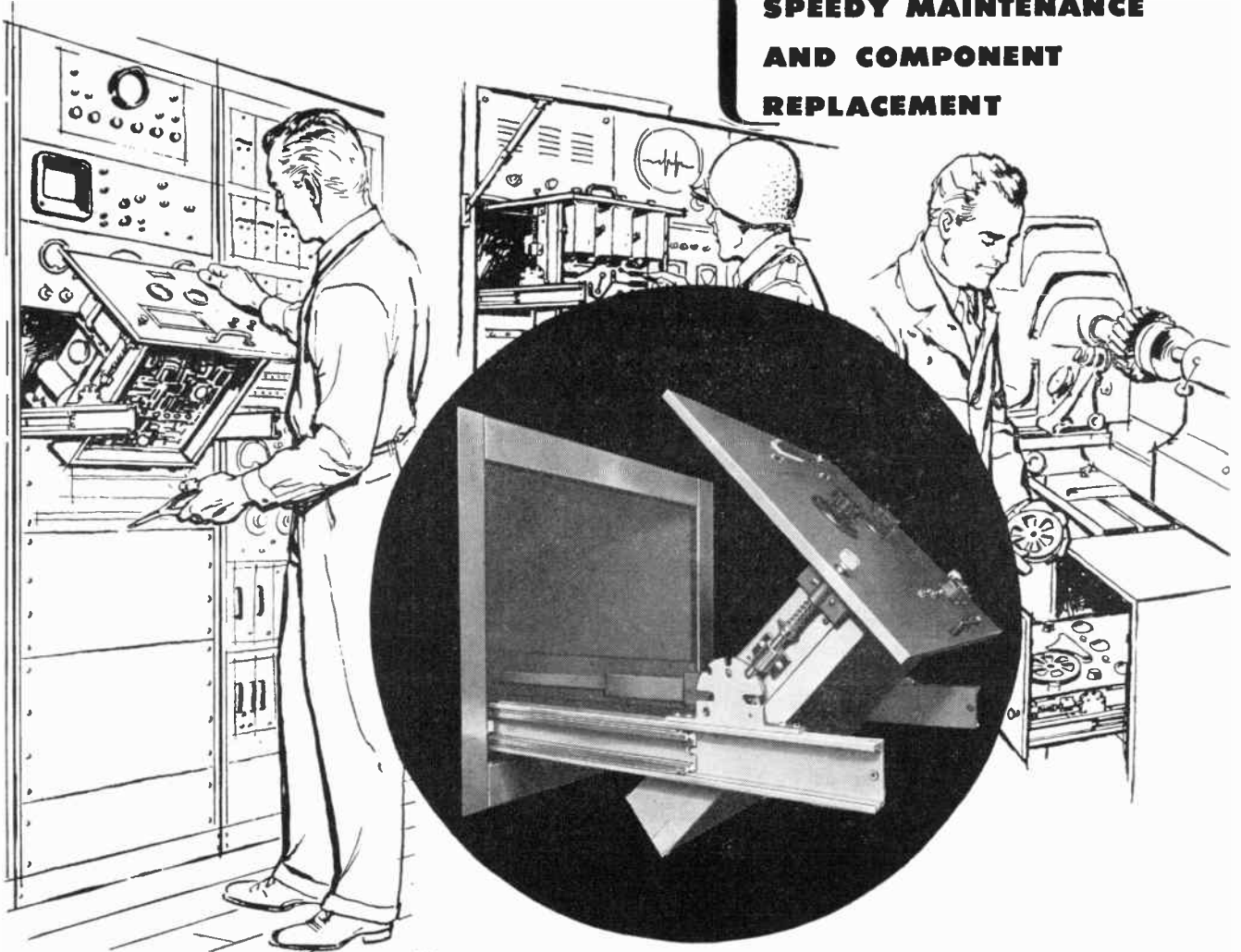
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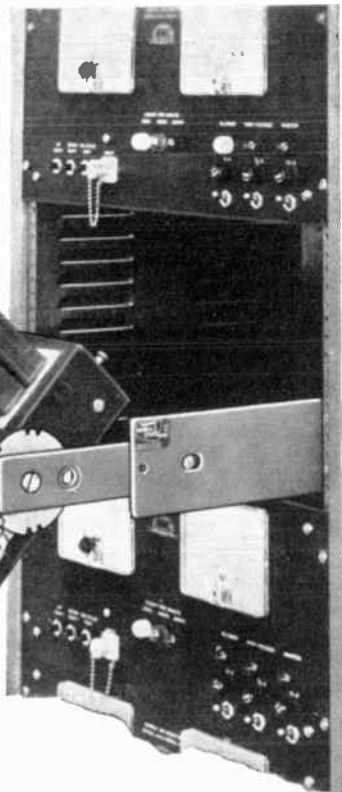
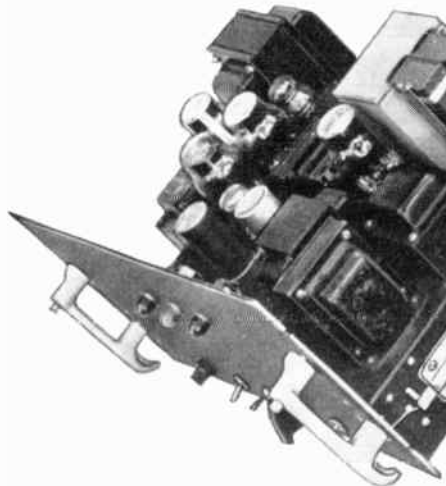
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|-----------------------|-------|--------------|----|----|----|----|----|----|----|----|---|----------------|
| | | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | | |
| Basic | CTRB | X | X | X | X | X | X | X | X | X | X | 175 |
| Detent | CTRD | | | X | X | X | X | X | X | X | X | 175 |
| Cradle Track | CTEZ | | | | X | X | X | X | X | X | X | 125 |
| Heavy Duty Basic | CTHRB | | | | X | X | X | X | X | X | X | 275 |
| Heavy Duty Detent | CTHRD | | | | X | X | X | X | X | X | X | 275 |

| SOLID BEARING SLIDES | MODEL | SLIDE LENGTH | | | | | | | | | | LBS. MAX. LOAD |
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| Basic | CTB | X | X | X | X | X | X | X | X | X | X | 175 |
| Detent | CTD | | | X | X | X | X | X | X | X | X | 175 |
| Light Weight | CTL | | | | X | X | X | X | X | X | X | 100 |
| Heavy Duty Basic | CTHB | | | | X | X | X | X | X | X | X | 250 |
| Heavy Duty Detent | CTHD | | | | X | X | X | X | X | X | X | 250 |



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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

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84. Chassis, Racks & Slides.

- Harwood Mfg. Co., Ill., 5, 20
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- Land-Air, Inc., Instrument & Electronic Div., Calif., 5, 20
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- MM Enclosures, Inc., N.Y., 5, 15, 20
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84. Chassis, Racks & Slides.

Radio Frequency Labs, Inc., Powerville Rd., Boonton, N.J., 10

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Tel: DEerfield 4-3100

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Remler Co., Calif., 10

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S & B Machine & Tool Co., Inc., N.J., 5

Specialty Engrn. & Electr. Co., N.Y., 5, 20

Specific Products, 21051 Costanzo, P.O. Box 425, Woodland Hills, Calif., 20

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Tel: DI 0-3131

Sperry Products, Inc., Conn., 5, 15, 20

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Tel: Port Washington 7-7200

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Tel: ORegon 8-7827

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Coil forms, paper: See class 87

Coil winding machines: See class 92

85. Consulting Engineers.

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10. Electrical
15. Electronic

20. Mechanical
25. Radio
30. Television

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Aero Electronics Co., Ill., 10, 15, 20

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Atwood, Consulting & Mfg. Eng., W. L., Ohio, 10, 15, 20

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Austin Co., N.Y., 15, 25, 30

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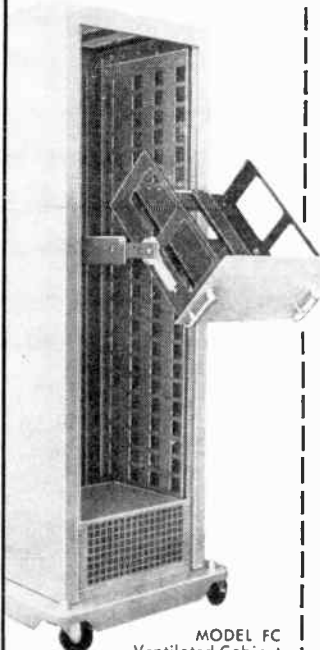
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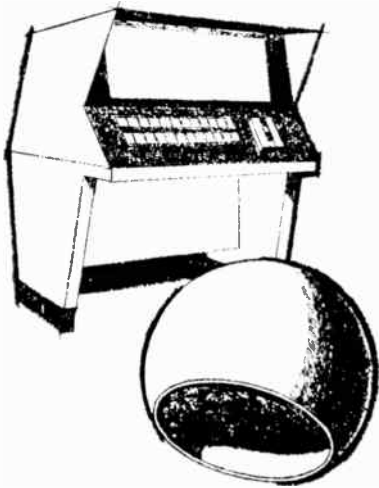
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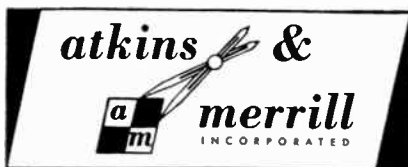


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85. Consulting Engineers.

Wheeler Automation Co., N.Y., 20
Wheeler, Harold A., 122 Cutter Mill
Rd., Great Neck, L.I., N.Y., 15, 25
See ad on this page
Tel: HUnter 2-7876

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Antenna Laboratory: Smithtown, N. Y.

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Wheeler Laboratories, Inc., 122 Cutter
Mill Rd., Great Neck, L.I., N.Y., 15,
25, 30

See ad on page 657

Tel: HUnter 2-7876

Winkler Laboratories, Ariz., 15
Winner, Lewis, 152 W. 42nd St., New
York 36, N.Y., 15, 25, 30

See ad on this page

Tel: BRyant 9-3125

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Wintronics, Calif., 15
Wunderlich Radio Co., Ill., 25

Crystals: See class 47

Custom Builders: See class 90

Custom fabrication, ceramics:
See class 83

Custom fabrication, plastics:
See class 86

Development laboratoric
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Dials: See class 87

Distribution: See class 102

Education: See class 100

Electro-plating: See class 86

Embedment: See class 86

Engraving machines: See class 92

Envelopes, vacuum tube:
See class: 99

Export & Import: See class 102

86. Fabricators & Services.

- | | |
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| 5. Contract fabrica- tion & assembly | 30. Hermetic sealing service |
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AA Metal Products, Inc., Vt., 5
AMP, Inc., Capatron Div., Pa., 12
A & P Metal Prods. Mfg Corp., N.Y.,
5, 35

A.P.M. Corporation, 252 Hawthorne
Ave., Yonkers, N.Y., 30

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Tel: YOnkers 8-2010

A-1 Precision Products, Calif., 10, 12,
45, 50

Abalon Precision Mfg. Corp., N.Y., 5, 35

Abrams Instruments Corp., Mich., 5

Accurate Electronics Corp., Ohio, 5, 35,
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Accurate Molding Corp., N.Y., 50

Accurate Specialties Co., Inc., N.Y., 35

Ace Fabricators, Ill., 45

Ace Plastic Co., N.Y., 5, 45

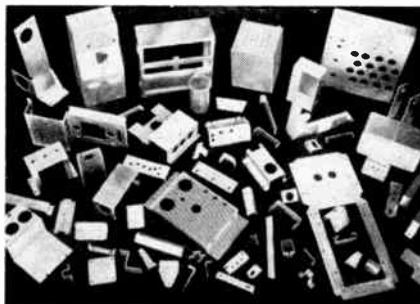
Ackerman Engravers, Inc., N.Y., 15

Ackerman-Gould Co., 10 Neal Ct., P.O.

Box 188, Oceanside, L.I., N.Y., 32

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86. Fabricators & Services.

Acme Wire Company, Conn., 12, 20, 30
Acoustica Associates, Inc., Dept. IRE, Fairchild Ct., Plainview, N.Y., 5
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Tel: OVerbrook 1-2100

Acro Tool & Die Works, Ill., 15

Acromark Co., N.J., 15, 32, 35

Advanced Electronics, Inc., Conn., 5, 12

Ainslie Corp., 312 Quincy Ave., Quincy 69, Mass., 5
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Tel: GRanite 2-8747

Aircraft Electronics, Ariz., 5

Airflyte Electronics Co., 540 Ave. A, Bayonne, N.J., 12
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Tel: HEMlock 6-2230

Airtronics, Inc., D.C., 5, 10, 12, 15, 40

Airtronix Dev. Corp., N.Y., 5

Alden Products Co., 121D N. Main St., Brockton 64, Mass., 50
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Tel: JUniper 3-0160

Alert Products, Inc., N.J., 5

Allied Research & Engr. Div., Allied Record, Calif., 10

Alloys Unlimited, Inc., N.Y., 35

Alpha Metals, Inc., N.J., 10, 35

Aluminum Co. of America, Pa., 35

Amatom Electronic Hardware Co., Inc., N.Y., 10, 20, 35

American Aluminum Co., 230 Sheffield St.-D, Mountainside, N.J., 5, 35
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Tel: ADams 3-3500

American Cyanamid, Formica Corp. Subsid., Ohio, 45, 50

American Gas Furnace Co., N.J., 25

American Insulator Corp., Pa., 50

American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 30
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Tel: AMherst 5-3411

American Latex Fibre Corp., Mass., 40

American Latex Products Corp., Calif., 12, 40

American Molded Products, Ill., 50

American Plastics Corp., N.Y., 45, 50

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American Quartz Labs., Inc., Plastics Div., N.Y., 45

American Research & Mfg. Corp., Md., 5

Anchor Plastics Co., Inc., N.Y., 45, 50

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Ansley Mfg. Co., Arthur, New Hope, Pa., 5, 12
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Tel: AXtel 7-2711

Anti-Corrosive Metal Products Co., N.Y., 45

Aremac Associates, Calif., 5

Aries Labs., Inc., Conn., 12, 20, 40, 45, 50

Armstrong Cork Co., Pa., 50

Arrow Machinists & Fabricators, 154 E. 3rd St., Mt. Vernon, N.Y., 5, 10, 25, 35, 40
See ad on page 628
Tel: OWens 9-4000

Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 5, 35
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Tel: IUmboldt 4-2100

Artronic Instrument Co., Md., 12

Associated Engrg. Corp., Mass., 50

Associated Spring Corp., Mich., 25, 40

Atkins & Merrill, Inc., Post Rd., Sudbury, Mass., 45, 50
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Tel: Hilltop 3-8822

Atlantic Research Corp., Va., 5

Atlantis Engrg. Corp., Tex., 5

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Audicon Electronics, Inc., N.J., 5, 20

Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 35, 45
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Tel: ULster 2-5454

Automatic Electric, Subsid. of Gen. Telephone & Electronics, Northlake, Ill., 5
See ad on pages 108-109
Tel: Fillmore 5-7111

Automatic Management, Inc., Mass., 5

Automation Engrg. Lab., Inc., Conn., 5, 40

Avco Corp., Nashville Div., Tenn., 25

Avionics Corp. of America, Pa., 5

Avionics, Ltd., Canada, 5, 10

Babeock Relays, Inc., Calif., Anodizing

Bacon Industries, Inc., Mass., 12

Baer Co., N. S., N.J., 45

Barker & Williamson, Inc., Pa., 5, 12

Basler Electric Co., Ill., 12

Becks, Inc., Minn., 5

Beemer Engrg. Co., Pa., 45, 50

Bell Aircraft Corp., Niagara Frontier Div., N.Y., 5

Bendix Aviation Corp., Bendix Radio Div., Md., 5

Biggs Co., Carl H., Calif., 12, 20

Bill Jack Scientific Instrument Co., Calif., 5

Bingham Mfg. Co., J. F., Mass., 5

Bingham Mfg. Co., Florida Metal Fabrication Co., Fla., 5

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Blaw-Knox Co., Blaw Knox Equip. Div., Pa., 5
 Bliss Electronic Corp., N.J., 5, 15
 Boehme, Inc., H. O., N.Y., 5
 Boesch Mfg. Co., Inc., Conn., 5
 Bolling Industries, Inc., Pa., 5, 15, 32, 40, 45
 Bomyte Co., Pa., 45
 Bon-De Electronic Labs., Inc., Mass., 30
 Bonny Mfg. Corp., Mass., 45, 50
 Boonton Molding Co., N.J., 10, 12, 50
 Boots Aircraft Nut Corp., Conn., 35
 Brand & Co., Inc., William, Conn., 32

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Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 35
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 Tel: HAWthorne 7-1773

Brillhart Plastics Sales Corp., N.Y., 12, 45, 50
 Brooks & Perkins, Inc., Mich., 5, 10, 35
 Buck Engrg. Co., Inc., N.J., 5
 Bud Radio, Inc., Ohio, 5, 35
 Bunnell & Co., J. H., N.Y., 5
 CBC Electronics Co., Pa., 5
 CG Electronics Corp., N.M., 12
 CGS Labs., Inc., Conn., 5
 C&K Components, Inc., Mass., 12
 Cable Designs, Inc., N.Y., 5, 12, 32, 50
 Cadre Industries Corp., N.Y., 5
 Cal-Tronics Corporation, Calif., 5
 Canadair, Ltd., Missile & Systems Div., Canada, 5
 Canadian Aviation Electronics, Ltd., P.O., Canada, 5, 10, 15, 35
 Canadian Radium & Uranium Corp., 630 Fifth Ave., New York 20, N.Y., 15, 32
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 Tel: Circle 6-0460

Canadian Research Institute, Canada, 5, 15
 Carborundum Co., Refractories Div., N.J., 30
 Carroll Pressed Metal, Inc., Mass., 35
 Centronix, Inc., Fla., 5, 12, 40
Century Plating Co., 229 Ferris Ave., White Plains, N.Y., 10 Mil. Spec.
 See ad on this page
 Tel: WHite Plains 8-3777

Chemplast, Inc., N.J., 45, 50
 Cico Corporation, Calif., 12, 20, 45
 Clear Beam Antenna Co., Calif., 5
 Cleveland Fabricating Co., Ohio, Die-Cutting of Fiberglass
 Cleveland Metal Spec. Co., Ohio, 5, 15, 40
 Coast Coil Co., Calif., Coil Winding-Toroidal

Cohan-Epner Co., Inc., Dept. I.R.E., 142 West 14th St., New York 11, N.Y., 10
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 Tel: CHelsea 3-3411

Collectronix Corp., N.Y., 50
 Comco Plastics, Inc., N.Y., 45
 Conn-Craft Co., Conn., 15, 32, 45
 Connecticut Instrument Corp., Conn., 15
 Conray Corporation, Ohio, 5
 Consolidated Avionics Corp., N.Y., 5

Consolidated Molded Prods. Corp., Pa., 50
 Continental-Diamond Fibre Corp., Del., 15, 45, 50
 Control Devices, Inc., Mich., 5, 12, 32
 Controlled Atmosphere Enclosure Corp., N.Y., 45, 50
 Cook Electric Co., Inland Test. Labs. Div., Ill., 5, 12
 Cortland Industries, Inc., Ill., 15, 45
Craig Systems, Inc., Dept. H-1, 361 Merrimack St., Lawrence, Mass., 5
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 Tel: MURdock 8-6961

Crane Packing Co., Ill., 45, 50
 Croname, Inc., Ill., 5, 10, 35
 Crystal-X Corp., Pa., 12, 15, 40, 45, 50
 Cutler Metal Products Co., N.J., 5, 35, 40
 D&R Plastic Welders, Inc., Conn., 45, 50
 Daco Instrument Co., N.Y., 5
Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 5, 10, 12
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 Tel: LOCust 4-3131

Dallons Labs., Inc., Calif., 30
 Davies Molding Co., Harry, Ill., 50
 Daystrom Instrument, Div. of Daystrom, Inc., Pa., 5
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 Defiance Mach. & Tool Co., Automark Equip. Div., Mo., 15, 32
 Design Tool Corp., Electro-Machinery Div., N.Y., 5
 Designers for Industry, Inc., Ohio, 40
 Devilbiss Metal Fabricators Co., Mich., 5

Dimco-Gray Co., 212 E. Sixth St., Dayton 2, Ohio, 50
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 Tel: BALDwin 2-6703

Division Lead Co., Ill., 35
 Dixon Corp., R.I., 45, 50
 Dolin Metal Products, Inc., N.Y., 5, 35
 Donnelly Mfg. Co., Mass., Metal Fabricators

Double E Products Co., Calif., 12
 Dow Chemical Corp., Magnesium Div., Mich., 5, 35
 Dubrow Development Co., N.J., 5
 Dumont Airplane & Marine Instrument, Inc., Pa., 5, 35
 Dura Plastics of N.Y., Inc., N.Y., 5, 45
 Duralith Corp., Pa., 15, 32, 45
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 Dynamic Instrument Corp., N.Y., 5

EMI-Cossor Electronics, Ltd., 301 Windsor St., Woodside, Halifax, N.S., Canada, 12
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 Tel: HALifax 6-7491

E.M.I. Electronics, Ltd., England, 12
 EPAM Corp., N.Y., 45, 50
 Eagle Signal Co., Ill., 5
 Eastern Foilcal Nameplate Corp., N.J., 15, 32
 Eastern Specialty Co., Pa., 15, 35
 Eby, Inc., Hugh H., Pa., 35, 45, 50
 Eder Engrg. Co., Inc., Wis., 5
 Ehrenpreis, Consulting Engrg., David, N.Y., 5, 12, 20, 40, 45, 50
 Electric Auto Lite Co., Ohio, 10, 50
 Electrical Insulation Co., Inc., N.Y., 15, 45

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- Electro-Minatures Corp., N.J., 12
- Electro-Physics Co., N.Y., 5
- Electron Products Co., Calif., 5, 12
- Electronic Mechanics, Inc., N.J., 5, 45, 50
- Electronic Parts Mfg. Co., Inc., N.J., 5
- Electronic Plastics Co., Calif., 5, 12, 30, 40
- Electronic Plastics Corp., Mass., 5, 20, 45
- Electronic Plastics Corp., N.Y., 12, 20, 30, 40, 45, 50
- Electronic Techniques, Inc., Calif., 12, 35
- Electronics Design Co., Okla., 5
- Elk Electronic Labs., Inc., N.Y., 5
- Ellis & Sons, Inc., George D., Pa., 35
- El-Rad Mfg. Co., Ill., 5, 12
- El-Tronics, Inc., Warren Components Div., Pa., 10, 30, 50
- Elzee Metal Products Co., Inc., N.Y., 5, 15, 35, 40
- Emeloid Co., Inc., N.J., 45, 50
- Emerson & Cuming, Inc., Mass., 12, 45
- Emerson Plastics Corp., N.Y., 5, 12, 45, 50
- Emmco Plastics Fabricators, Mass., 45
- Empire Precision Metal Parts, Inc., N.Y., 5, 35
- Enflo Corp., N.J., 5, 45, 50
- Englehard, Inc., Charles, N.J., 5
- Engineered Electronics Co., Calif., 5, 40
- Engineering Associates, Ohio, 5
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- Ensco, Inc., Utah, 5
- Epoxy Products, Inc., 137 Coit St., Irvington 11, N.J., 12**
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Tel: ESsex 5-6000
- Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5, 35, 50**
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- Erwood, Inc., Ill., 35
- Essex Electronics, 569 Springfield Ave., Berkeley Heights, N.J., 5, 12**
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- Etched Products Corp., N.Y., 32
- Eugene Engrg. Co., Mass., 5, 15, 32
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- Export Packing & Crating Co., Inc., N.Y., 40
- Fabra-Print, Inc., Minn., 12, 20, 45
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- Farrall Instrument Co., Neb., 5
- Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 5, 35**
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Tel: CAPITAL 4-5318
- Federal Mfg. & Eng. Corp., N.Y., 5
- Federal Tool & Mfg. Co., Minn., 35
- Felsenthal & Sons, Inc., Ill., 45, 50
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- Fidelity Amplifier Co., Ill., 5
- First Electronics Corp., Mass., 12
- Fisher & Crome, Pa., 5, 15, 20, 32, 45
- Fisher Engineering, Inc., Ind., 12, 30
- Flexrock Co., Pa., 45, 50
- Flock Process Co., Inc., Conn., 20
- Fluorulon Labs., Inc., N.J., 12, 45, 50
- Foam-Pak Corp., Pa., 40
- Fort Hill Engraving Co., Inc., Mass., 15, 32, 45
- Fried, Licensed Prof. Eng., Walter, N.Y., 5
- Gabriel Co., Gabriel Electronics Division, 135 Crescent Rd., Needham Heights 94, Mass., 5**
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Tel: Hillcrest 4-0005
- Garlock Packing Co., Garlock Electronic Products, Camden 1, N.J., 45, 50**
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Tel: Woodlawn 4-0370
- General American Transportation Corp., Ill., 10, 50
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- General Electric Co., Specialty Electronic Components Dept., N.Y. 12
- General Electric Co., Ltd. of England, England, 5, 12
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- General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, N.Y., 5, 30**
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Tel: Valley Stream 5-6363
- General Metal Products Co., Pa., 5
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- Gibbs Mfg. & Research Corp., Wis., 5
- Gibson Electric Co., Pa., 5
- Gillies Co., Inc., Duncan M., Mass., 15, 32
- Glaspoly Corp., N.Y., 12, 45, 50
- Glasseal Prods. Co., Inc., N.J., 30
- Glastic Corp., Ohio, 50
- Globe Electrical Mfg. Co., Calif., 10, 15, 45, 50
- Godfrey Mfg. Co., Ill., 5
- Gombos Co., Inc., John, N.J., 5, Dip Brazing
- Good Electronic Corp., Fla., 5, 12, 20, 40
- Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 5, 10**
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Tel: Williams 1-1000
- Green Rectifier Co., N.J., 5, 12
- Grigsby Co., Inc., Ill., 5
- Guardian Electric Mfg. Co., 1601R W. Walnut St., Chicago 12, Ill., 30**
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Tel: CHesapeake 3-1100
- HPL Mfg. Co., Ohio, 35
- Hall-Barkan Instruments, Inc., N.Y., 5, 15
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- Hammond Mfg. Co., Ltd., Canada, 12, 20
- Hampden Mfg. Co., Inc., Mass., 5, 15, 45
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- Harder Co., Donald C., Calif., 12
- Harper-Leader, Inc., Conn., 10
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- Howard Precision, Inc., N.J., 35
- Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 35**
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- Hughes-Treitler Mfg. Corp., N.Y., 5, 35
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- International Optical Co., Inc., N.Y., 15, Glass
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- Jack & Heintz, Inc., Ohio, 5, 10, 12, 25, 40
- Jacksonville Metal & Plastics Co., Fla., 5, 15, 40, 45, 50
- Jamison Plastic Corp., N.Y., 5, 40, 50
- Jan Hardware Mfg. Co., Inc., N.Y., 5, 25, 35
- Jansen Electronics Mfg., Inc., Minn., 5

86. Fabricators & Services.

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 Jodee Plastics Co., N.Y., 5, 12, 15, 20, 32, 40, 45, 50
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 Kaiser Industries, Kaiser Aircraft & Elect. Div., Ohio, 5
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 La Pointe Industries, Inc., Conn., 5, 10, 12, 20, 35
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 Lear, Inc., LearCal Div., Calif., 5
 Lee Chemical Corp., Walter, N.Y., 5, 12, 45, 50
 Leyse Aluminum Co., Wis., 35
 Lindberg Engineering Co., Ill., 25
Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 5
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 Ling Systems, Inc., Calif., 5
 Link Aviation, Inc., N.Y., 5, 10
 Loewy Associates, Raymond, N.Y., 40
 Long, Inc., Thomas J., N.Y., 45
 Luther Electronic Mfg. Co., Calif., Brazing
 Luzerne Rubber Co., N.J., 45, 50
 Lyman Electronic Corp., Mass., 5
M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 5
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 Tel: GRamercy 3-5899
 M & G Metal Products Co., Ill., Welding & Brazing Service
 MM Enclosures, Inc., N.Y., 5, 35
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 Maas & Waldstein Co., N.J., 20
 Machinery Electrification, Inc., Mass., 5
 MacLeod & Hanopol, Inc., Mass., 5, 12
 Maico Electronics, Inc., Minn., 5
 Malkin-Illion Co., N.J., 5
 Mandex Mfg. Co., Ill., 5, 10, 20, 25, 45, 50
 Mandrel Industries, Inc., Calif., 5
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Masonite Corp., Ill., Hardboard
 Matthews & Co., Jas., Pa., 32
 Mayberry Electronics Co., Calif., 5
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 Meter-Mix Corp., Mass., 12, 45, 50
 Metpro, Inc., R.I., 35
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 Mica Fabricating Co., N.J., 45, 50
 Micarta Fabricators, Inc., Ill., 15, 45
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Micro-Lectric Div., Micro Machine Works, 19 Debevoise Ave., Roosevelt, L.I., N.Y., 5
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 Midwest Molding & Mfg. Co., Ill., 50
 Midwestern Instruments, Inc., Okla., 5, 10
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 Republic Aviation Corp., N.Y., 45, 50
 Resdel Engrg. Corp., Calif., 5
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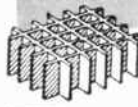
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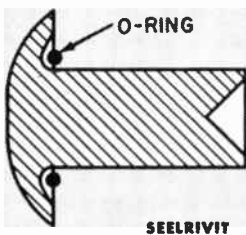
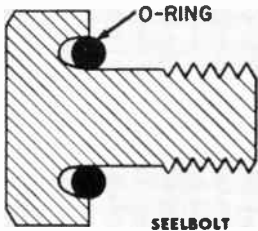
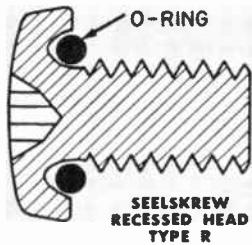
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Telex, Inc., 1633 Eustis St., St. Paul 1,
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Tel: MIDway 6-7211

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| 14. Bushings & bearings | 54. Rivets |
| 15. Cable clips | 55. Screw machine products |
| 16. Cans | 57. Screws, nuts & washers |
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AA Metal Products, Inc., Vt., 55
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Tel: YOnkers 8-2010

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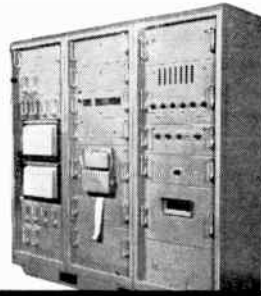
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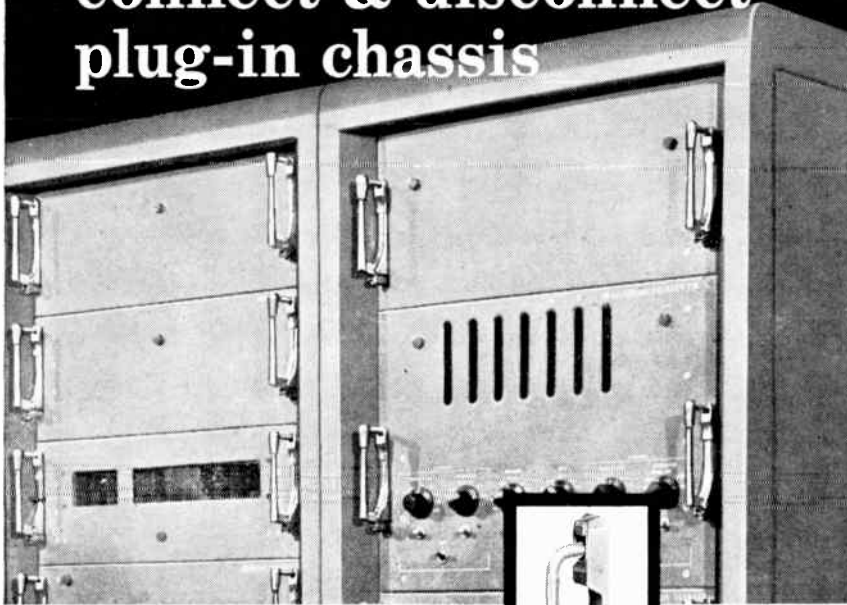
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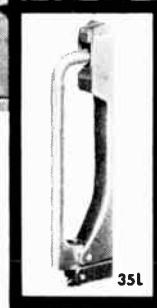


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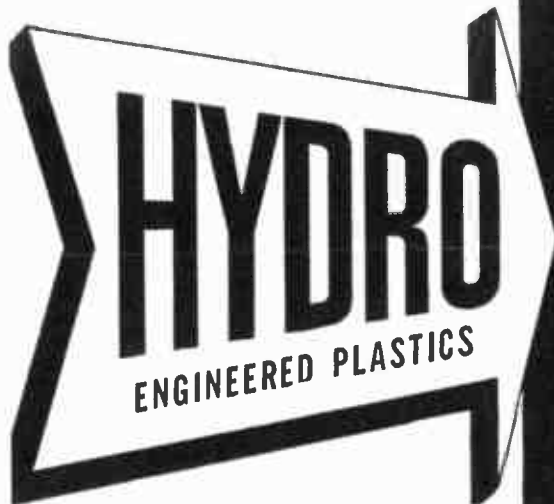
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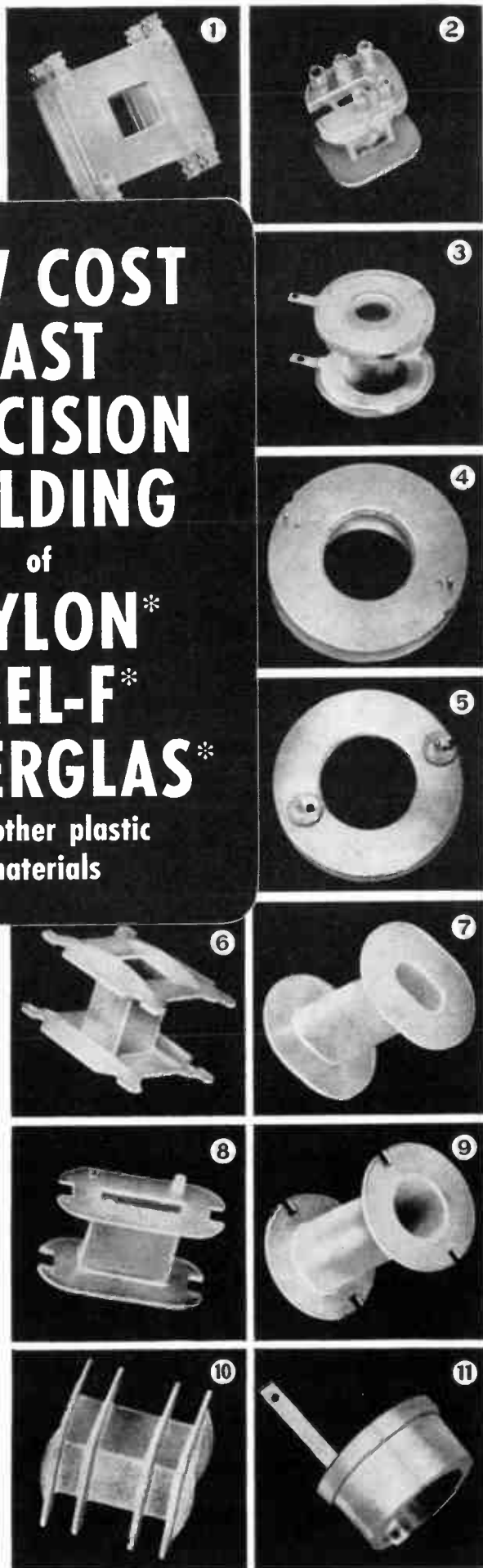
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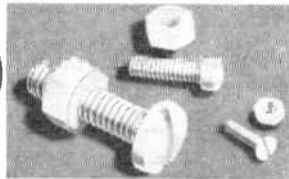
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Groov-Pin Corp., N.J., 21

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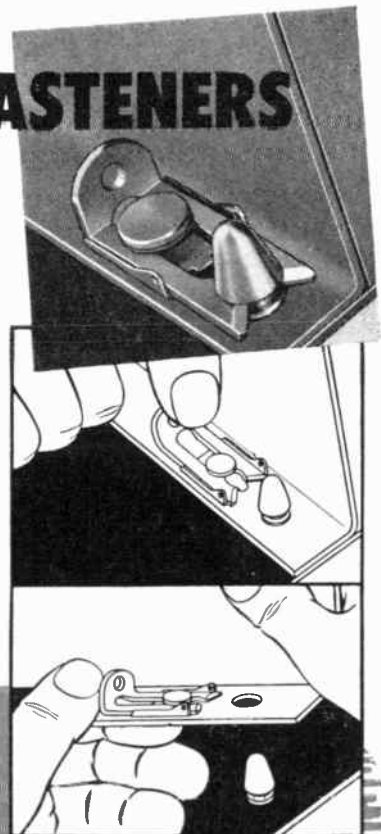
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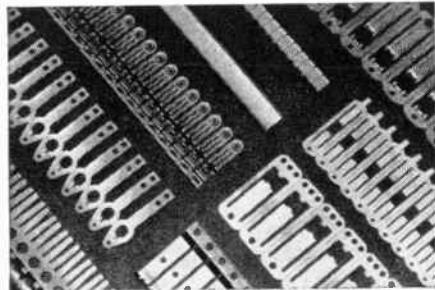
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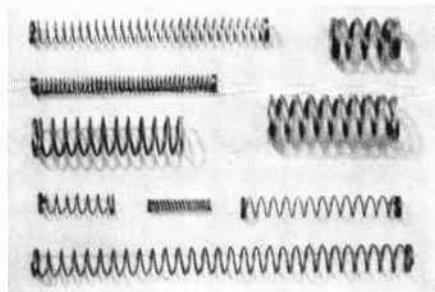


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STRIP SPRINGS

Fabricated from beryllium copper. Easily handled, readily broken apart by hand or used in automatic or semi-automatic assembling devices and contact riveting machines. Individual pieces may be broken off without trace of burr. Eliminate sorting, untangling and handling of loose pieces. Springs may be produced in strips to various shapes; formed angles may be held within plus or minus one degree. Heat treated in multiple fixtures to insure uniformity, close tolerances and elimination of variations in spring-back.



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Made from laboratory tested beryllium copper wire. Special coiling and heat treating equipment insures 100% uniformity. Guaranteed rigid tolerances held on diameter and load tests at specified deflection. These factors combine to assure increased service life through higher endurance strength — make products perform more consistently by eliminating drift, set or fatigue. Furthermore, they eliminate expensive hand adjustment and reduce inspection costs of finished product.

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For those who need quick delivery of parts in pilot quantities or require a low-cost proving ground for spring designs. I-S methods eliminate expensive tooling. Laboratory controlled, precision produced—yet at lower cost than is possible with permanent, high-activity tools.

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INSTRUMENT SPECIALTIES CO., INC.

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Little Falls, New Jersey

Telephone: CLifford 6-3500

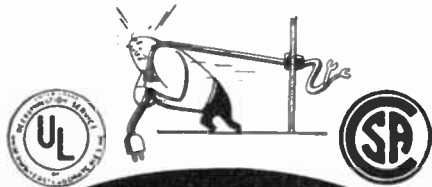
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When your product is in the design stage, let us show you how I-S springs of beryllium copper may be designed to fit your needs. Ample stock, flexible facilities, short set-up time speed production of sample lots and trial orders.



The Approved Standard for Insulating and Anchoring **ELECTRICAL CORDS & CABLES**

FREE TEST SAMPLES will be sent on the receipt of the sizes of the wires you are using.



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ENGINEERED for
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by GUDEBROD

375°C GUDE-GLASS

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*Du Pont's trade mark for its TFP fluorocarbon fiber

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Hardware & Findings—Class 87

Directory III.
Materials & Services

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In stock! For immediate delivery! And produced by National! . . . a complete line of standard plastic control knobs made in conformance with MS-91528. There are four basic types: round, pointer, spinner (each with or without skirts) and dial skirted round . . . available in three different shaft sizes. Finishes are gloss, matte, or to your color specifications . . . in all Mil-Spec sizes.



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R-25

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Flush fit on both sides of aluminum sheet to provide permanent tapped holes.

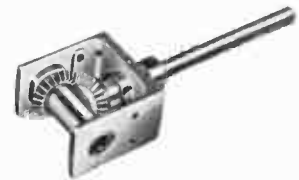
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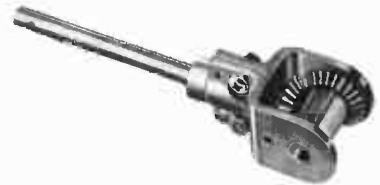
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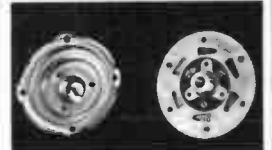
PRECISION RIGHT ANGLE AND VERNIER DRIVES



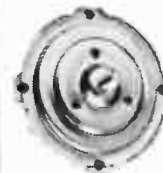
Type PRAD: Right angle drive for remote operation of low torque units. Designed for continuous low-speed operation (loads up to 50" ounces), and intermittent high speed operation (up to 500 RPM) with loads up to 100" ounces. Less than 1½° backlash; drives and shafts of various lengths; various size output hubs; brass gears; stainless steel shafts, bushings and sleeves; die cast zinc housings.



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NATIONAL RADIO COMPANY, INC.

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Directory III. Materials & Services

87. Hardware & Findings.

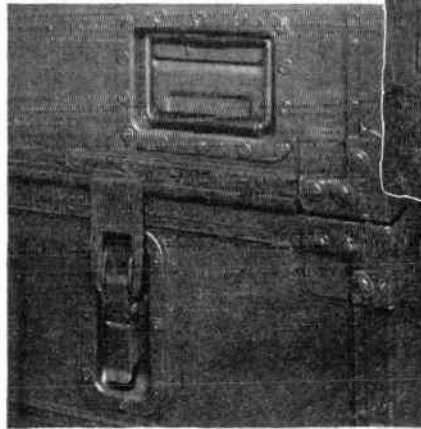
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Designed to function at 500 lbs.
Stress strength to 3000 lbs.

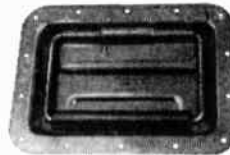
Above illustrated case, 30" x 30" x 36", with eight Nielsen 250-45 catches passed armed forces drop test of 4 feet on all corners, protecting 236 lbs. of instruments, also meeting requirements for waterproof seal and screening from elements.

A VARIED LINE OF CATCHES AND HANDLES

Descriptive literature on request. Design features to meet your specific requirements. Inquiries invited on application problems.



COMPRESSION SPRING DRAW PULL CATCH No. SC-B-83314-42 with springs concealed. Provides 70 lbs. holding tension on standard specification.



RECESSED HANDLE No. H560 shown mounted on case above. Available in steel or aluminum.



SURFACE HANDLE No. H945 to meet Armed Forces Specification MIL-T-945.

NIELSEN HARDWARE CORPORATION
770 WETHERSFIELD AVE., HARTFORD 1, CONN.

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The Only COMPLETE COIL FORM SERVICE

Available...

- SQUARE TUBES
- ROUND TUBES
- RESINITE COIL FORMS
- BOBBINS
- MANDRIL SERVICE
- FABRICATING SERVICE

SQUARE AND RECTANGULAR TUBES

Produced in any length, shape or size from $\frac{1}{16}$ " to 8", wall thickness from .010 to .125. Fabricated from dielectric kraft, fish paper, acetate, other patented materials or combinations. Bowed sidewall or Di-Formed construction.

ROUND TUBES

Produced in any decimal size up to 8" I.D. Fabricated from kraft, fish paper, cellulose acetate, mylar, polystyrene, quintrera, fibre glass and other dielectric materials.

RESINITE COIL FORMS

These coil forms have the highest resistivity of any resinated product. Furnished plain, embossed, internally threaded or triangular shape . . . also flyback transformer forms.

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Supplied round, square or rectangular. Cores fabricated from any of the above materials. Metal, asbestos, plastic or fibre flanges. Constructed to fit smaller spaces and permit multiple winding.

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Accurately ground steel and aluminum coil mandrils at cost economy comparable to commonly used undependable wood or undersized steel mandrils.

FABRICATING SERVICE

We have modern high speed equipment to provide you with any special shape or form . . . rolled, spun, flared, punched or formed to your particular requirement.

Ask about Precision's complete coil form service.
Request informative bulletin.



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2062 West Charleston Street, Chicago 47, Illinois

Plant No. 2: 1 Flower Street, Hartford, Conn.

Representatives throughout United States and Canada

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87. Hardware & Findings.

- Modern Adhesives & Elect., Inc., N.Y.,
Foil Adhesive Labels & Tapes
Molded Insulation Co., Pa., 55
Molding Corp. of America, R.I., 12
Moody Machine Prods. Co., Inc., R.I., 55
Moore Corp., Irving B., Mass., 27, Rubber, O-Rings
Morris Co., J. L. Mass., 21, 54, 55, 57
Muckle Mfg. Co., Minn., 47
Mundt & Sons, Charles, N.J., 30
Mystik Tape Products of Calif., Calif., 3
Nageldinger & Son, Inc., N.Y., 55
Narrow Fabric Co., Pa., 36
National Lead Co., N.Y., 57
National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 18, 55, Captive Nuts & Studs
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Tel: NO 5-4800
New England Etching & Plating Co., Mass., 42, 45
Newman Corp., M. M., Mass., 36
Ney Co., J. M., Maplewood Ave., Bloomfield 1, Conn., 54, 55
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Tel: (Hartford) CHapel 2-2281
Nielsen Hardware Corp., 770 Wethersfield Ave., Hartford 1, Conn., 21, Catches, Bolts, Handles
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Tel: JACKson 2-8145
Norrich Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 6, 9, 12, 14, 33, 51, 54, 55, 57, 70
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Tel: WATkins 4-8360
North Electric Co., Ohio, 18
North Shore Nameplate, Inc., 214-27 Northern Blvd., Bayside 61, N.Y., 3, 42, 45
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Tel: BAyside 4-4000
Nutt-Shel Co., Calif., 21, 57, 58
Ny-Glass, Inc., Calif., 12
Nylogrip Products, Mass., 21, 54, 55, 57, Nylon
Nylok Corp., N.J., 57, Self Locking
O & S Research, Inc., N.J., 18, 55
Oppenheimer Plastics, Inc., Pa., 18, 45
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Page-Madden Co., N.Y., 6
Painton & Co., Ltd., England, 18
Palnut Co., N.J., 21, 51, 57
Pan-Air Electronics Corp., Calif., 18
Panduit Corp., Ill., 15
Panob Corp., 49 Beech St., Port Chester, N.Y., 18
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Tel: WESTmore 9-3066
Paramount Paper Tube Corp., 618 S. Lafayette St., Ft. Wayne 2, Ind., 9
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Tel: ANthony 4197
Park Nameplate Co., Inc., N.Y., 3, 18, 45, Aluminium Foil
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Parker Seal Co., Div. of Parker Hannifin Corp., 10567 Jefferson Blvd., Culver City, Calif., 27, 51, Seals
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Tel: TEXas 0-4518

Directory III. Materials & Services

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Peck Spring Co., Conn., 51, 54, 55, 57, 60

Peerless Products Industries, Ill., 12, 14, 18, 27, 30, 55, 70

Pee-Wee Molding Corp., N.Y., 12, 33

Penn Fibre & Specialty Co., Inc., Pa., 9, 27, 33, 42, 55, 57, 63

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 70

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Tel: EVerglade 4-2122

Perkins Machine & Gear Co., Mass., 55
Permaccel, N.J., 3, 47

Peter Partition Corp., 124 Boerum Pl., Brooklyn 1, N.Y., 47

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Tel: TRiangle 5-4033

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 70

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Tel: PLaza 1-3200

Pheoll Mfg. Co., Inc., Ill., 21, 54, 55, 57
Pickett & Eckel, Inc., Calif., Hand Tool

Pilgrim Products, Inc., Mass., 9, 12, 47
Pioneer Electroponents Corp., N.Y., 55

Plasteck, Inc., Okla., 18
Polymer Corp. of Pa., Dept. RB, 2140

Fairmont Ave., Reading, Pa., 21

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Tel: FRanklin 6-5791

Precision Metal Products Co., Mass., 55, Handles

Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 9, 12

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Tel: ARmitage 6-5200

Prestole Corporation, Ohio, 15, 21

Prince Rubber Co., Inc., N.Y., 27, 33

Pure Carbon Co., Inc., Pa., 13, 14

Quality Components, Inc., Pa., 12, Coil Forms, Powdered Iron

Quality Name Plate, Inc., N.J., 3, 18, 42, 45, 55, 60

Radio Frequency Labs., Inc., Powerville Rd., Boonton, N.J., 64

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Tel: DEerfield 4-3100

Rapid Specialties Co., Ill., Test Clips
Raway Bearing Co., N.Y., 14, Gyro Shafts

Raybestos-Manhattan, Inc., Pa., 27

Red Devil Mfg. Co., Ill., 55

Reed & Prince Mfg. Co., Mass., 21, 54, 57

Reese, Inc., J. Ramsey, N.Y., 14, 21, 27, 51, 54, 55, 57, 58, 60

Reeves Instrument Corp., N.Y., 18, 24, 55

Remler Co., Calif., 55
Research Development Mfg., Inc., Pa., 55

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Robins Industries Corp., N.Y., 3

Rodale Mfg. Co., Inc., Pa., 14, 33

Rogers Corp., Conn., 27

Rosan, Inc., Calif., 21, 55, 57

Ross Metals Co., Milton, Pa., 12, 15, 16, 18, 30, 45, 55, 63

Rotor Clip Co., N.Y., 51

Russell Gasket Co., Ohio, 27

Sag Harbor Industries, Inc., N.Y., 12

Semrow Products Co., Inc., Ill., Speaker Grills

Sessions & Son, J. H., Conn., 21

Set Screw & Mfg. Co., Ill., 58

Shamban & Co., W. S., Calif., 3, 12, 14, 27, 47

Shell Chemical Corp., N.Y., 3

Shielding, Inc., 66 N. Read Ave., River-
ton, N.J., 27

See ad on page 240

Tel: TALmadge 9-1433

Silicone Insulation, Inc., N.Y., 9, 12, 14, 18, 27, 33, 45, 55

Simmons Fastener Corp., N.Y., 21

Slip Ring Co. of America, Calif., 12

Smith, Inc., H. H., N.Y., 15, 18, 21, 24, 33, 36, 45, 55, 57, 63

South Chester Corp., Pa., 21, 54, Thumb
Screws

Spartan Marking Corp., Ill., 18

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how to instruct, label or identify?

A...use *North Shore* pressure sensitive, etched and anodized ALUMINUM FOIL NAMEPLATES

THERMA-MARK®...Peel backing and press onto any surface without fasteners. No water...no heat...no chemical solvents needed.

THERMA-CAL®...For problem surfaces such as curved, painted or crinkle finishes. May be heat or solvent activated in seconds to form a permanent bond.

SPEEDY-CAL®...For non-critical applications like smooth or flat surfaces. Simply immerse in water at room temperature, remove backing and press into place.

North Shore nameplates can be obtained in any color or color combination, with matte or shiny finishes. No limitation on style of type face or design. Can be etched and anodized permanently into the metal surface, will not wear off. Widely used for insignia, trade marks, installation and assembly instructions, schematics and instructions. North Shore nameplates meet the most exacting abrasive and temperature requirements of your application.

Contact your local General Electric representative for complete information, or wire, write

NORTH SHORE
214-27 Northern Blvd., Bayside 61, N. Y. • Bay

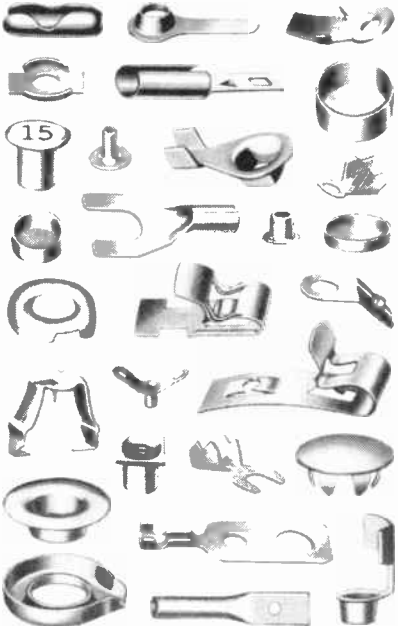
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STIMPSON METAL GOODS

EYELETS, RIVETS,
GROMMETS, TERMINALS,
STAMPINGS, HOLE PLUGS,
CARBON CAPS, ETC.



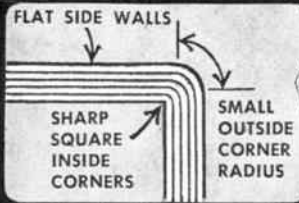
MADE FROM MOST ANY
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SEND FOR SAMPLES AND
PRICES. WE ALSO MAKE A
COMPLETE LINE OF
MACHINES FOR
ATTACHING EYELETS,
RIVETS, ETC.

SEND FOR
THIS FREE
CATALOG
- SHOWS
OVER
1000
METAL
ARTICLES



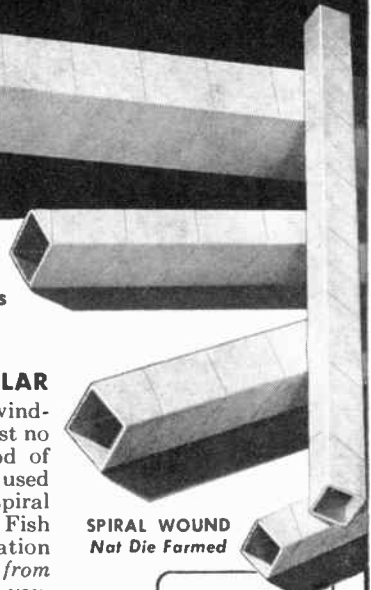
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For
\$46
U.S.A.

Better Coils begin with PARAFORMED PAPER TUBES



- No sharp outside edges to cut wire
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- Permits winding coils to closer tolerances
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- Has full rigidity and physical strength

ANY SIZE—SQUARE OR RECTANGULAR
PARAFORMED paper tubes simplify coil winding operations and speed production, yet cost no more. In the exclusive PARAFORM method of tube making, no artificial heat or pressure is used—*Paraforming* takes place at the time of spiral winding. Hi-Dielectric. Hi-Strength. Kraft, Fish Paper, Acetate, Red Rope or any combination wound on automatic machines. *Produced from stock arbors or special sizes engineered for you.* Can also be supplied in regular or with slight bow.



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Not Die Formed

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Circle Ess Adapters are lightweight, compact, durable and offer a number of varied uses. The Dual Drive Adapter pictured here measures only 2-27/32" x 1-61/64" and weighs only 4 oz. For complete adapter specifications send for Flexible Shaft Adapters Catalog.



Circle Ess Flexible shafts are compact, lightweight, strong, durable. They transfer power efficiently and economically regardless of obstructions in the path of installation, while insuring the most accurate alignment. For complete flexible shaft specifications send for our Flexible Shaft Bulletin 539.

F.W. STEWART CORP.

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1960 IRE Directory

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Peck Spring Co., Conn., 51, 54, 55, 57, 60

Peerless Products Industries, Ill., 12, 14, 18, 27, 30, 55, 70

Pee-Wee Molding Corp., N.Y., 12, 33

Penn Fibre & Specialty Co., Inc., Pa., 9, 27, 33, 42, 55, 57, 63

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 70

See ad on page 687

Tel: EVerglade 4-2122

Perkins Machine & Gear Co., Mass., 55

Permacel, N.J., 3, 47

Peter Partition Corp., 124 Boerum Pl., Brooklyn 1, N.Y., 47

See ad on page 633

Tel: TRiangle 5-4033

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 70

See ad on page 612

Tel: PLaza 1-3200

Pheoll Mfg. Co., Inc., Ill., 21, 54, 55, 57

Pickett & Eckel, Inc., Calif., Hand Tool Pilgrim Products, Inc., Mass., 9, 12, 47

Pioneer Electropoints Corp., N.Y., 55

Plasteck, Inc., Okla., 18

Polymer Corp. of Pa., Dept. RB, 2140 Fairmont Ave., Reading, Pa., 21

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Tel: FRanklin 6-5791

Precision Metal Products Co., Mass., 55, Handles

Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 9, 12

See ad on page 644

Tel: ARmitage 6-5200

Prestole Corporation, Ohio, 15, 21

Prince Rubber Co., Inc., N.Y., 27, 33

Pure Carbon Co., Inc., Pa., 13, 14

Quality Components, Inc., Pa., 12, Coil Forms, Powdered Iron

Quality Name Plate, Inc., N.J., 3, 18, 42, 45, 55, 60

Radio Frequency Labs., Inc., Powerville Rd., Boonton, N.J., 64

See ad on page 304

Tel: DEerfield 4-3100

Rapid Specialties Co., Ill., Test Clips

Raway Bearing Co., N.Y., 14, Gyro Shafts

Raybestos-Manhattan, Inc., Pa., 27

Red Devil Mfg. Co., Ill., 55

Reed & Prince Mfg. Co., Mass., 21, 54, 57

Reese, Inc., J. Ramsey, N.Y., 14, 21, 27, 51, 54, 55, 57, 58, 60

Reeves Instrument Corp., N.Y., 18, 24, 55

Remler Co., Calif., 55

Research Development Mfg., Inc., Pa., 55

Rimak, Inc., Calif., 45

Robins Industries Corp., N.Y., 3

Rodale Mfg. Co., Inc., Pa., 14, 33

Rogers Corp., Conn., 27

Rosan, Inc., Calif., 21, 55, 57

Ross Metals Co., Milton, Pa., 12, 15, 16, 18, 30, 45, 55, 63

Rotor Clip Co., N.Y., 51

Russell Gasket Co., Ohio, 27

Sag Harbor Industries, Inc., N.Y., 12

Semrow Products Co., Inc., Ill., Speaker Grills

Sessions & Son, J. H., Conn., 21

Set Screw & Mfg. Co., Ill., 58

Shamban & Co., W. S., Calif., 3, 12, 14, 27, 47

Shell Chemical Corp., N.Y., 3

Shielding, Inc., 66 N. Read Ave., River- ton, N.J., 27

See ad on page 240

Tel: TALmadge 9-1433

Silicone Insulation, Inc., N.Y., 9, 12, 14, 18, 27, 33, 45, 55

Simmons Fastener Corp., N.Y., 21

Slip Ring Co. of America, Calif., 12

Smith, Inc., H. H., N.Y., 15, 18, 21, 24, 33, 36, 45, 55, 57, 63

South Chester Corp., Pa., 21, 54, Thumb Screws

Spartan Marking Corp., Ill., 18

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how to instruct, label or identify?

A... use *North Shore* pressure sensitive, etched and anodized **ALUMINUM FOIL NAMEPLATES**

THERMA-MARK®... Peel backing and press onto any surface without fasteners. No water ...no heat...no chemical solvents needed.

THERMA-CAL®... For problem surfaces such as curved, painted or crinkle finishes. May be heat or solvent activated in seconds to form a permanent bond.

SPEEDY-CAL®... For non-critical applications like smooth or flat surfaces. Simply immerse in water at room temperature, remove backing and press into place.

North Shore nameplates can be obtained in any color or color combination, with matte or shiny finishes. No limitation on style of type face or design. Colors are etched and anodized permanently into the metal surface, will not fade or run. Widely used for insignia, trade marks, installation and operating plates, dials, schematics and instructions. North Shore nameplates meet weather, salt-spray, abrasive and temperature requirements of Mil Specs.

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STIMPSON METAL GOODS

EYELETS, RIVETS,
GROMMETS, TERMINALS,
STAMPINGS, HOLE PLUGS,
CARBON CAPS, ETC.



MADE FROM MOST ANY
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MACHINES FOR
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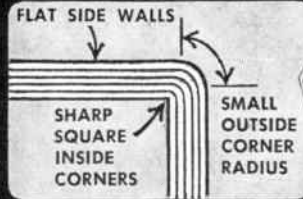
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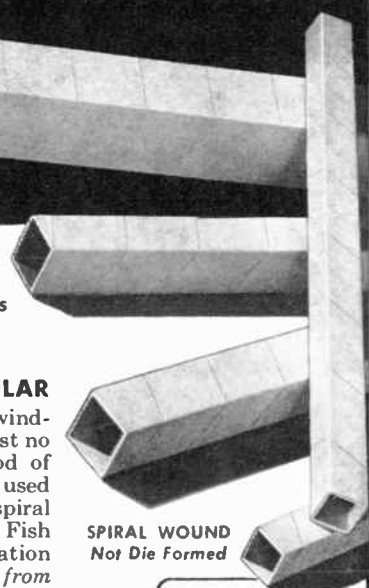
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Better Coils begin with PARAFORMED PAPER TUBES



- No sharp outside edges to cut wire
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- Permits winding coils to closer tolerances
- Allows faster stacking of wound coils
- Has full rigidity and physical strength

ANY SIZE—SQUARE OR RECTANGULAR
PARAFORMED paper tubes simplify coil winding operations and speed production, yet cost no more. In the exclusive PARAFORM method of tube making, no artificial heat or pressure is used—*Paraforming* takes place at the time of spiral winding. Hi-Dielectric. Hi-Strength. Kraft, Fish Paper, Acetate, Red Rope or any combination wound on automatic machines. *Produced from stock arbors or special sizes engineered for you.* Can also be supplied in regular or with slight bow.



SPIRAL WOUND
Not Die Formed

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618 LAFAYETTE STREET, FORT WAYNE 2, INDIANA
Manufacturers of Paper Tubing for the Electrical Industry Since 1931

Write on company
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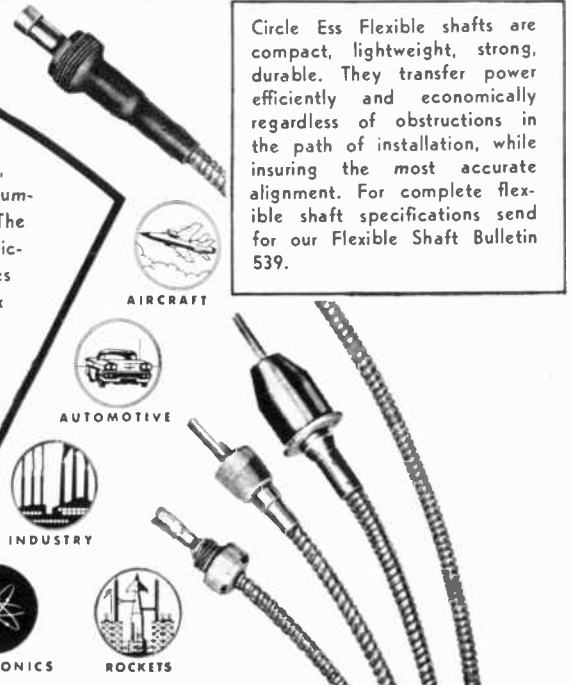
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Flexible Shafts

FOR MANY FIELDS



Circle Ess Adapters are lightweight, compact, durable and offer a number of varied uses. The Dual Drive Adapter pictured here measures only 2-27/32" x 1-61/64" and weighs only 4 oz. For complete adapter specifications send for Flexible Shaft Adapters Catalog.



Circle Ess Flexible shafts are compact, lightweight, strong, durable. They transfer power efficiently and economically regardless of obstructions in the path of installation, while insuring the most accurate alignment. For complete flexible shaft specifications send for our Flexible Shaft Bulletin 539.

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Directory III. Materials & Services

87. Hardware & Findings.

- Spaulding Fibre Co., Inc., N.Y., 12, 27, 33
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 Standard Pressed Steel Co., Pa., 21, 55, 57
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 Stevens Products, Inc., N.J., 12
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 Stewart Corp., F. W., 4311-13 Ravenswood Ave., Chicago 13, Ill., 24
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 Stewart Stamping Co., N.Y., 15, 51
 Stimpson Co., Inc., Edwin B., 77 Franklin Ave., Brooklyn 5, N.Y., 21, 33, 54, 55
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 Superior Carbon Products, Inc., Ohio, 13
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 Supreme Process Co., N.Y., 18, 45, Edgelit Panels
 Sweet Mfg. Co., Mass., 16, 21, 51, 55, 60
 Swenson Co., Inc., V. H., N.J., 12, 18, 30, 33, 45
 T A Mfg. Corp., Calif., 15
 Tablet & Ticket Co., Ill., 18
 Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 6
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 Tel: ARmory 1-0163
 Technical Tape Corp., N.Y., 3
 Technical Wire Products, Inc., N.J., 27
 Technicraft Co., Mass., 18
 Texas Instruments Incorporated, Semiconductor-Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Texas, 70
 See ads on pages 75-78
 Tel: FL eetwood 7-5411
 Textile Thread Co., Mass., 36
 Thompson-Bremer & Co., Ill., 21, 57
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 See ad on page 620
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Dials • Panels • Scales
Made to the Highest Degree of Accuracy
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Equip your instruments with sharp, easy to read Lackon dials, panels, etc. . . . made to any size . . . any shape . . . any quantity . . . accurate to your most critical tolerances . . . uniform and highly durable. Printed on metal, plastic, glass, etc., in black and white or multi-color. Passes all government tests. Send for illustrated brochure or contact:

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4 WAYS TO END ALL CORD AND CABLE SERVICE FAILURES



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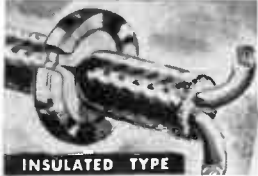
at point of strain

Protect product saleability too — by insuring long life for cords, cables and conductors. Genuine "GRIPMASTER" Strain Reliefs provide these vital features—

- ★ Anchor cords to housing
- ★ Eliminate taping or threading
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- ★ All sizes and styles
- ★ Easy to apply
- ★ Inexpensive

Gripmaster Strain Reliefs are "tremendous trifles" that make good products better!

Ask for samples.



WIRE BINDING SLEEVES—Preventing fraying of cord ends, these specially-treated rubber tubes are available in five sizes to fit wires to .790

Economically

GRIPMASTER STRAIN RELIEFS

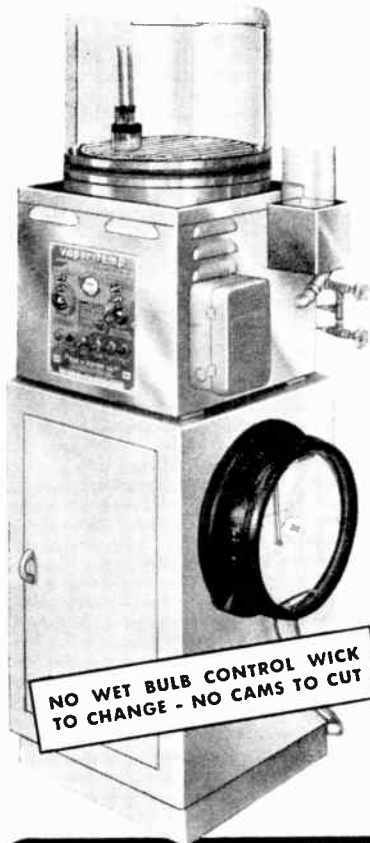
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CONTROLLED HUMIDITY CHAMBER

AUTOMATIC OPERATION

with 2-POINT PROGRAMMING and RECORDING

MEETS MIL STD-202A
METHOD 106A, STEP 1 thru 7

Model VP-200
Humidity Chamber
115 V/60 C./A.C.

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Complete

NO WET BULB CONTROL WICK
TO CHANGE - NO CAMS TO CUT

ULTRA-TEMP CON-WATE OVENS... 1200° F.

with *Exclusive*

*PROPORTIONING ELECTRONIC
CONTROL SYSTEM

*patented

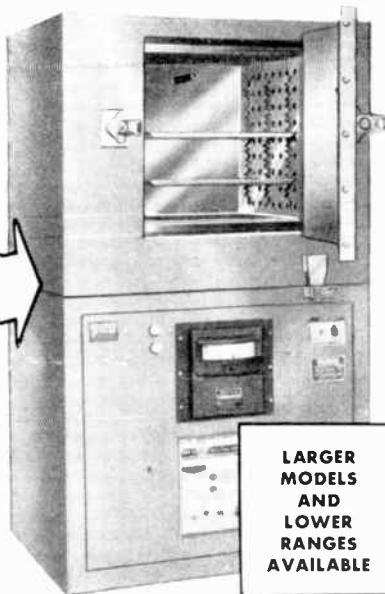
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HORIZONTAL AIR FLOW

ACTUAL CONTROL POINT $\pm 2^\circ\text{F}$.

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87. Hardware & Findings.

- Tinnerman Products, Inc., Ohio, 15, 21, 51, 57, 63
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Topper Mfg. Co., Inc., N.Y., 6, 9, 12
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Tel: BEEKMAN 3-8870
United Shoe Machinery Corp., Mass., 21, 36, 54
United States Chemical Milling Corp., Calif., 21
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Waldes Kohinoor, Inc., N.Y., 21
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Walker Co., George, 118 Amsterdam Ave., Passaic, N.J., 63
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Tel: PRESCOTT 7-3337
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Waltham Screw Co., Mass., 55
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Weckesser Co., 5713-17 Northwest Highway, Chicago 46, Ill., 15, 55, 57
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Tel: RODNEY 3-6688
Wenco Mfg. Co., Ill., 21
West Point Mfg. Co., Mich., Clamps, Leaf Jigs
West Virginia Pulp & Paper Co., Hinde & Dauch Div., Ohio, 47
Westfield Metal Products Co., Inc., Mass., 21
Westline Products Division, Calif., 42, 45
White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 24
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Tel: MURRAY Hill 3-3015
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Z & W Mfg. Corp., Ohio, 55

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Airtronics, Inc., D.C., 20

Allen Co., Inc., L. B., Ill., 5

Allis-Chalmers Mfg. Co., Wis., 10, 15

Alloyd Research Corp., Mass., Electron Beam

American Gas Furnace Co., N.J., 5, 20

88. Heating Equipment.

American Instrument Co., Inc., Maryland, 20

Associated Testing Laboratories, Inc., 115 Clinton Rd., Caldwell, N.J., 20

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Tel: CAPITAL 6-7407

Atwood Consulting & Mfg. Eng., W. L., Ohio, 5, 10, 15, Heat Exchangers

Avco Corp., Nashville Div., Tenn., 5, 20

B T U Engrg. Corp., Mass., Hydrozent Vacuum Furnaces

Blue M Electric Co., 138th & Chatham St., Blue Island, Ill., 12, 20

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Tel: FULton 5-9000

British Thomson-Houston Co., Ltd., England, 5, 10, 15

Bulova Watch Co., Electronics Div., Dept. A-1376, 40-06 62nd St., Woodside 77, N.Y., 20

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Tel: NEWtown 9-5700

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Canadian Research Institute, Canada, 10, 15

Cavitron Electron Oscillator Co., Calif., 10, Wood Joiners

Cico Corporation, Calif., 12

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Connectronics Co., Mass., 5

Cook Electric Co., Inland Test. Labs. Div., Ill., 20

Cox & Co., Inc., N.Y., 12

Cutler-Hammer, Inc., Wis., 12

Dalweld Co., Inc., N.Y., 5

Damp-Chaser, Inc., N.C., 12

Dee Electric Co., 1648 W. Haddon St., Chicago 22, Ill., 5

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Tel: BELmont 5-5151

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Dominion Electrohome Industries, Ltd., Canada, 5, 10, 15

Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 12

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Tel: HUMBoldt 2-5550

Eisler Engrg. Co., Inc., N.J., 5, 15, 20

Eisler Engrg. Co., Inc., N.J., 5, 15, 20

Electric Hotpack Co., Inc., Pa., 12, 20

Electrofilm, Inc., Calif., 5, 12

Electronica Industrial Ltda., Brazil, 5, 10, 15

Emerson Apparatus Co., Mass., 20, Textile Conditioning

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5

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Tel: BIGelow 3-0030

Erldco Engrg. Corp., Ill., 10, 15



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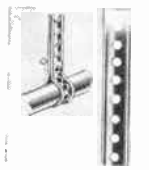
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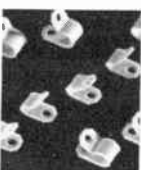
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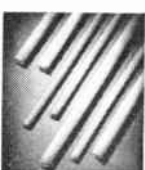
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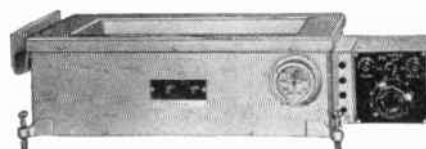


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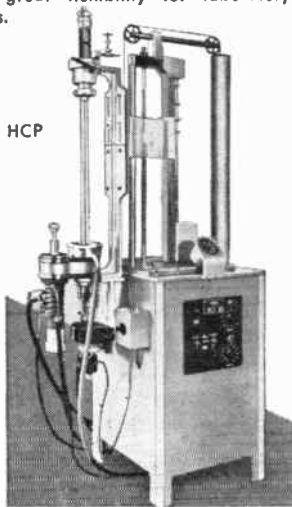
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88. Heating Equipment.

- Ewald Instruments, Route 7, Kent, Conn., 5
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- Falls Metal Works, Inc., N.J., 20
- Forney Industries, Aviation Div., Colo., 5
- Fostoria Pressed Steel Corp., Ohio, 12, 20
- Fusion Engineering Co., Ohio, 5
- Gates Radio Co., Ill., 10, 15
- General Electric Co., Apparatus Sales Div., N.Y., 12, 15
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- General Electrodynamics Corp., Texas, 10, 15
- General Findings & Supply Co., Industrial Div., Mass., 5
- Girdler Process Equip. Div., Ky., 10
- Glassco Products Co., Inc., N.J., 5
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- Hard-n-Tuff Corp., N.Y., Steel Hardening Compounds
- Haydu Electronic Products, Inc., N.J., Gas Burners & Tips
- Hayes, Inc., C. I., R.I., 5, 15, 20
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- Huppert Co., K. H., Ill., 12, 20, Vacuum Induction Heating Corp., N.Y., 5, 10, 15
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- Industrial Systems Co., N.J., 20
- Industron Corp., Mass., 5, 10, 15
- Instron Engrg. Corp., Mass., 20
- International Electronics Corp., N.Y., 10, 15, 20
- Kahle Engineering Co., 3322 Hudson Ave., Union City, N.J., 5, 10, 12, 15, 20**
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Tel: UNion 7-6500
- Kanthal Corp., Conn., 12
- Kinn Electronics Corp., Md., 10, 15
- Kinney Mfg. Div., New York Air Brake Co., 3631 Washington St., Boston 30, Mass., Vacuum Furnaces**
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- Lemert Engineering Co., Inc., Ind., 15
- Lepel High Frequency Labs., Inc., 55th St. and 37th Ave., Woodside 77, N.Y., 5, 15**
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Tel: HAVemeyer 6-4580
- Lindberg Engineering Co., Ill., 5, 15, 20
- Litton Engineering Labs., P.O. Box 949, Grass Valley, Calif., 15, 20**
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- Marine Electric Corp., Galbraith-Pilot Marine Corp. Div., N.Y., 12
- Materials for Electronics, Inc., N.Y., 20
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- Merit Short Wave Diathermy Co., Calif., 10, 12
- Mica Fabricating Co., N.J., 12

- Minco Products, Inc., Minn., 12
- Minneapolis-Honeywell Regulator Co., Marion Instrument Div., N.H., 15
- Miskella Infra-Red Co., Ohio, 12, 20
- Mytron Mfg. Co., Calif., 10
- N R C Equipment Corp., Dept. 12, 160 Charlemont St., Newton 61, Mass., Crystal Furnaces, Impregnators**
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Tel: DEcatur 2-5800
- Nageldinger & Son, Inc., N.Y., 5
- New England Oven & Furnace Co., Conn., 20
- New Rochelle Tool Corp., N.Y., 5, 10, 15
- New York Air Brake Co., Kinney Mfg. Div., 3631 Washington St., Boston 30, Mass., Vacuum Furnaces**
See ad on page 151
Tel: JAMAica 4-3220
- New York Air Brake Co., Vacuum Equip. Div., N.J., Crystal Furnaces
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- Ohio Crankshaft Co., Tocco Div., Ohio, 5, 15
- Pacific Scientific Co., Calif., 10, 12, 15, 20
- Peeco Corporation, Calif., 10, 12, 20
- Philadelphia Scientific Glass Co., Pa., 12
- Pimex, Inc., N.Y., High Temp. Furnaces
- Precision Scientific Co., Ill., 12, 20
- Reeve Electronics, Inc., Ill., 5, 10, 15
- Resdel Engrg. Corp., Calif., 10
- Research, Inc., Minn., 5, 20
- Rimak, Inc., Calif., 5
- Robotron Corp., Mich., 10, 15
- Safeway Heat Element, Inc., Conn., 12
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- Scientific Electric, Inc., N.J., 10, 15
- Scientific Engineering Labs., 1510 Sixth St., Berkeley 10, Calif., 20**
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Tel: LANDscape 6-2772
- Sherman Industrial Electronics, Pa., 5, 15, 20
- Standard Telephones & Cables, Ltd., England, 5, 15
- Sta-Warm Electric Co., Ohio, 12
- Steiner Ives Co., N.J., 20
- Stewart Engineering Co., Calif., 20
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- Sweet Mfg. Co., Mass., 5
- Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., Tungsten & Molybdenum Electrodes**
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- Temperature Engineering Corp., N.J., 12, 20
- Tenney Engineering, Inc., N.J., 20
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- Tricraft Products Corp., Ill., 5
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- Watlow Electric Mfg. Co., Mo., 12

Directory III. Materials & Services

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 Welcraft Prods. Co., Inc., Ind., 12
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 Westinghouse Electric Corp., Pa., 15
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Import & Export: See class 102

Instruction, technical:
 See class 100

Insulation, plastic: See class 89

Insulators, ceramic: See class 83

Insulators & spacers, vacuum tube: See class 99

89. Insulating Materials.

Arlin Mfg. Co., Mass., 40, 55
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 B&C Insulation Products, Inc., N.J., 10, 30
 Bacon Industries, Inc., Mass., 50, 60
 Beemer Engrg. Co., Pa., 40, 50, 55, 60
 Bentley-Harris Mfg. Co., Pa., 30
 Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 15, 30, 40, 50, 55, 60

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 Tel: WALKER 5-6980

Bishop Mfg. Corp., N.J., 40, 50, 55
 Bombyte Co., Pa., 40
 Bonny Mfg. Corp., Mass., 25, 40
 Boonton Molding Co., N.J., 40
 Borden Chemical Co., Calif., 40
 Boston Felt Co., Mass., Felt & Felt Parts
 Brand & Co., Inc., William, Conn., 10, 30, 40, Silicone Tubing
 Brush Beryllium Co., Ohio, 15
 Carbondum Co., Refractories Div., N.J., 15

Celanese Corp. of America, N.Y., 40
 Celanese Corp. of America, Plastics Div., N.J., 40
 Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 15
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 Chemical Products Corp., R.I., 40
 Chemplast Inc., N.J., 40
 Ciba Products Corp., N.J., 40
 Cico Corporation, Calif., 40, 60
 Cleveland Container Co., Ohio, 38, 40
 Columbia Technical Corp., 61-02 31st Ave., Woodside 77, L.I., N.Y., 55
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 Tel: ASTORIA 8-7401
 Comco Plastics, Inc., N.Y., 40
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 Connecticut Hard Rubber Co., Conn., 25, 50, 60, Silicon Sponge Rubber
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 Accurate Mfg. Co., N.J., 40, 50
 Ace Fabricators, Ill., 38, 40, 55
 Acme Wire Company, Conn., 5, 25
 Actioncraft Products, 2 Yennicoek Ave., Port Washington, N.Y., 10, 30, 40
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Tel: PORT WASHINGTON 7-4500

Allied Chemical Corp., Plastics & Coal Chemicals, Div., N.Y., 40

Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 5, 30

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Tel: ALGONQUIN 5-5400

American Cyanamid, Formica Corp. Subsid., Ohio, 40

American Latex Products Corp., Calif., 40, 55

American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 15

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Tel: AMHERST 5-3411

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 American Quartz Labs., Inc., Plastics Div., N.Y., 40, 60

Anaconda Wire & Cable Co., Sequoia Wire & Cable Co., Calif., 55

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 Dennison Mfg. Co., Mass., 38
 Diamonite Products Mfg. Co., Ohio, 15
 Dielectric Materials Co., Ill., 10, 30
Dilectrix Corp., Allen Blvd. & Grand Ave., Farmingdale, L.I., N.Y., 40, Teflon Tape
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 Tel: CHapel 9-7999
 Dixon Corp., R.I., 40
 Dow Corning Corp., Mich., 40, 50, 55, 60
 Duramic Products, Inc., N.Y., 15
 Electric Auto Lite Co., Ohio, 15
 Electrical Refractories Co., Ohio, 15
 Electronic Mechanics, Inc., N.J., 35, 40, 55, Mica Flakes
 Electronic Plastics Corp., N.Y., 40, 60
 Emerson & Cuming, Inc., Mass., 15, 35, 40, 50, 55, 60
 Emerson Plastics Corp., N.Y., 30, 35, 40, 60
Epoxy Products, Inc., 137 Coit St., Irvington 11, N.J., 40
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 Tel: ESsex 5-6000

Erie Resistor Corp., 644 West 12th St., Erie 6, Pa., 15
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 Tel: GLendale 6-8592
 Farley & Loetscher Mfg. Co., Iowa, 40
 Felt Prods. Mfg. Co., Ill., 50, 55, 60
 Fiber Glass Industries Inc., 25, 40, 55
 Fisher & Crome, Pa., 40
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 Fluorulon Labs., Inc., N.J., 40
 Foote Mineral Co., Pa., 15
 Freedlander Research & Development Lab., Calif., 40, 55
 Frenchtown Porcelain Co., N.J., 15
 Furane Plastics, Calif., 25, 40, 55, 60
Garlock Packing Co., Garlock Electronic Products, Camden 1, N.J., 40, 50, 55, 60, Teflon Tubing
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 Tel: WOODlawn 4-0370
General Cement Mfg. Co., Div. of Textron, Inc., 400 S. Wyman St., Rockford, Ill., 60
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General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 15
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Gore & Associates, Inc., W. L., 487 Papermill Rd., Newark, Del., 55
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 Great American Industries, Inc., Rubatex Div., Va., 50
 Halogen Insulator & Seal Corp., Ill., 40
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 Hays Mfg. Co., Pa., 40
 Hermes Plastics, Inc., N.Y., 40
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 Industrial Accessories, Inc., N.J., 60
 Industrial Elect. Rubber Co., Ohio, 50, 55, 60
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 Insulating Fabricators, Inc., N.J., 30, 35, 40, 60
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 Koppers Co., Inc., Plastics Div., Pa., 40
 Laminated Sheet Products Corp., Mass., 40, 60
 Lamtex Industries, Inc., N.Y., 30, 40
 Landes Electronic Fasteners, N.Y., 10, 30
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 Lee Chemical Corp., Walter, N.Y., 30, 35, 40, 60, Teflon Tape
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 McGraw-Edison Co., National Electric Coil, Ohio, 5, 20, 25, 30, 35, 38, 40, 50, 55, 60
 Mesa Plastics Corp., Calif., 40
 Mica Corp., Calif., 40

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 Mica Insulator Co., Minn. Mining & Mfg. Co. Div., N.Y., 40
 Micacraft Products, Inc., N.J., Mica Micarta Fabricators, Inc., Ill., 40
 Middlesex Paper Tube Co., Inc., Mass., 38
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 15
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 Minnesota Mining & Mfg. Co., Chemical Div., Minn., 40, 50, 55
 Minnesota Mining & Mfg. Co., Electrical Products Div., Minn., 20, 25, Plastic Tapes
 Minnesota Rubber Co., Minn., 50, 60
 Minor Rubber Co., Inc., N.J., 40, 50, 55, 60
 Mitchell Rand Mfg. Corp., Insulation Div., N.Y., 5, 20, 25, 40, 55
 Molded Insulation Co., Pa., 30
 Molex Products Co., Ill., 40
 Mosinee Paper Mills Co., Wis., 38
 Murata Mfg. Co. Ltd., Japan, 15
Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., 15, 35, 40, 55, 60
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 Tel: **P**Rescott 9-8866
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 Mystik Adhesive Products, Inc., Ill., 25, 60
 Narrow Fabric Co., Pa., 30
 National Ceramic Co., N.J., 15
 National Engr. Prod., Inc., D.C., 40
National Tel-Tronics Corp., 52 St. Casimir Ave., Yonkers, N.Y., 40
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 Tel: **Y**Onkers 8-6400
 National Vulcanized Fibre Co., Del., 40
 National Wire & Cable Corp., Calif., 40
 Natvar Corp., N.J., 5, 10, 25, 30, 40, 55, 60
 New England Laminates Co., Inc., Conn., 40, PC Laminates
 New England Tape Co., Mass., 40, 55, 60
 Newman Corp., M. M., Mass., 40, Cable Binding
 Newth Rubber Co., R.I., 50
 Nopco Chemical Co., Plastics Div., N.J., 40, Foamed
Norrich Plastics Corp., 107-109 West 18th St., New York 11, N.Y., 10, 15, 30, 38, 40, 50
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 Tel: **W**atkins 4-8360
 Northern Plastics Corp., Wis., 40
 Norton Co., Mass., 15
 Ny-Glass, Inc., Calif., 30
 Oppenheimer Plastics Inc., Pa., 40
 Owens-Corning Fiberglass Corp., N.Y., 25, 30, 35, 38, Fiberglass
 Page-Madden Co., N.Y., 15
 Paul & Stein Bros., Inc., F. H., N.Y., 40
 Pee-Wee Molding Corp., N.Y., 40
 Penn Fibre & Specialty Co., Inc., Pa., 38, 40, 55
 Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 35
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 Tel: **E**Verglade 4-2122
 Permacel, N.J., 20, 25, 38, 40, 55, 60
 Pilgrim Products Inc., Mass., 38, 40
 Plastics Engineering Co., Wis., 40
Polymer Corp. of Pa., Dept. RB, 2140 Fairmont Ave., Reading, Pa., 40, 55
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 Tel: **F**Ranklin 6-5791
 Porter Co., H. K., Delta Star Elec. Div., Thomas Works, Ohio, 15
 Precision Metal Products Co., Mass., 40
Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 38, 40, 55
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 Tel: **A**Rmitage 6-5200
 Prince Rubber Co., Inc., N.Y., 40, 50, 55
 Products Research Co., Calif., 40, 50, 55, 60
 Quartzite Processing Inc., Mass., 15
 Raybestos-Manhattan, Inc., Pa., 40, 50, 55, 60, Asbestos Tapes
 Resin Consultants & Mfg. Co., Inc., N.Y., 40
 Rex Corp., Mass., 40, UHF
 Richardson Co., Ill., 40
Robertson Electric Co., Inc., 124 S. Elmwood Ave., Buffalo 2, N.Y., 40, 50, 60
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 Tel: **M**Adison 6658
 Rogers Corp., Conn., 38, 40, 50, 55, 60
 Ross Metals Co., Milton, Pa., 40
 St. Regis Paper Co., N.Y., 40
 Saxonburg Ceramics, Inc., Pa., 15
 Schweitzer, Inc., Peter J., Mass., 38
 Shamban & Co., W. S., Calif., 25, 40
 Shell Chemical Corp., N.Y., 40
 Silicone Insulation, Inc., N.Y., 30, 35, 40, 60
 Sparta Mfg. Co., Ohio, 40
 Spartan Marking Corp., Ill., 40
 Spaulding Fibre Co., Inc., N.Y., 38, 40
 Star Porcelain Co., N.J., 15
 Stevens Products, Inc., N.J., 30, 40, 60
 Steward Mfg. Co., D. M., Tenn., 15
 Styroformics, Mass., 40
 Suflex Corp., N.Y., 10, 30, 40
 Sun Chemical Corp., Electro-Technical Products Div., N.J., 5, 25, 38, 40, 60
 Superior Porcelain Co., W.Va., 15
Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 15
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 Tel: **L**Owell 8-4555
 Synthane Corp., Pa., 30, 38, 40, 60
 Taylor Electric, Inc., Mich., 40
 Taylor Fibre Co., Pa., 40, 60
 Tech Art Plastics Co., N.J., 15, 30, 40, 50, 55, 60
Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 15
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 Tel: **A**RMory 1-0163
 Technical Tape Corp., N.Y., 20, 25, 40, 55
 Technicraft Co., Mass., 40, 55
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 Telegraph Condenser Co., Ltd., United Insulator Div., England, 15
 Tetrafluor, Inc., Calif., 40
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 Thompson Fiber Glass Co., H. I., Calif., 25, 30, 55
Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 15, 40
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 Tel: **P**ILgrim 3-7797
 Topper Mfg. Co., Inc., N.Y., 15, 40, 60
 Trimount Plastic Co., Inc., Mass., 25, 40
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United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 15, 35
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 Tel: **B**Eekman 3-8870
U.S. Stoneware Co., Alite Div., P.O. Box 119, Orrville, Ohio, 15
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 Tel: (Smithville, Ohio) **M**Onica 9-2271
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 See ad on this page
 Tel: **G**EDney 5-3427

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

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- Walsco Electronics Mfg. Co., Div. of
Textron, Inc., 100 W. Green St.,
Rockford, Ill., 40, 50
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- Warren Wire Co., Vt., 25
Waterbury Companies, Inc., Conn., 40
Western Gold & Platinum Co., Calif., 15
Westinghouse Electric Corp., Pa., 5,
20, 25, 38, 40, 60

Labels, adhesive: See class 87

90. Laboratories & Custom Builders.

- | | |
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| 10. Pilot run plants | 20. Testing & certify- ing organizations |
| 15. Research & devel- opment labs | |
- ACF Electronics, Va., 5, 10, 17
ACF Industries Inc., Nuclear Prods.,
Ereco Div., 5, 15, Military
Abrams Instruments Corp., Mich., 5, 15,
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**Acton Laboratories, Inc., 536 Main St.,
Acton, Mass., 15, 20**
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Tel: C**O**lonial 3-7756
- Adair Engrg. Co., George P., D.C., 5,
15, 20
Adler Electronics, Inc., N.Y., 5, 15
Advanced Electronics, Inc., Conn., 5
**Ad-Yu Electronics Lab., Inc., 249 Ter-
hune Ave., Passaic, N.J., 15**
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Tel: G**R**egory 2-5622
- Aero Electronics Co., Ill., 5, 10, 15, 17
Aero Guidance Corp., Calif., 5, 10, 15,
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Aerolux Light Corp., N.Y., 15
Aeronca Mfg. Corp., Baltimore Div.,
Md., 5, 15
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Aid Associates, Calif., 5, 15, 17
**Aircom, Inc., 48 Cummington St., Bos-
ton, Mass., 15**
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Tel: C**O**pley 7-9115
- Aircraft Armaments, Inc., Md., 5, 10,
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Alert Products, Inc., N.J., 5
All Products Co., Communication Prods.
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Anchor Specialty Mfg. Co., Inc., N.J., 5

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Tel: A**X**tel 7-2711
- Applegate & Co., C. J., 1840 24th St.,
Boulder, Colo., 5, 15**
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Tel: H**I**llcrest 2-8750
- Applied Technology, Inc., Calif., 15
Aries Labs., Inc., Conn., 5, 10, 15
Ark Engineering Co., Pa., 15, 20
Armour Electronics, Calif., 5, 10
Artronic Instrument Co., Md., 5, 15, 17
**Associated Testing Laboratories, Inc.,
115 Clinton Rd., Caldwell, N.J., 5, 20**
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Tel: C**A**pital 6-7407
- Atkins & Merrill, Inc., Post Road, Sud-
bury, Mass., Industrial Scale Models**
See ad on page 628
Tel: H**I**lltop 3-8822
- Atlantic Design Co., N.J., 15
Atlantic Research Corp., Va., 5, 10, 15,
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Atlantis Engrg. Corp., Texas, 5
Atomics International, Calif., 15
Audicon Electronics, Inc., N.J., 5, 10,
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Auerbach Electronics Corp., Pa., 5, 15
Austin Co., N.Y., 5, 10, 15
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Telephone & Electronics, Northlake,
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Tel: F**I**llmore 5-7111
- Automation Engrg. Lab., Inc., Conn., 5,
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Avco Corp., Crosley Div., Ohio, 5, 15
Avco Corp., Research & Advanced De-
velopment Div., Mass., 20
Aviation Electronic Service, Ill., 5, 15
Avionics, Ltd., Canada, 5
Babcock Relays, Inc., Calif., 15
Bacon Industries, Inc., Mass., 15
Bailey Electronics Lab., P. A., Conn., 5
**Baird-Atomic, Inc., 33 University Rd.,
Cambridge 38, Mass., 15**
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Tel: U**N**iversity 4-7420
- Barker & Williamson, Inc., Pa., 5, 15,
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Barnes Development Co., Pa., 5, 15
Barton Electronics, Inc., Conn., 5
Baruch Labs., N.Y., 15
Battelle Memorial Institute, Ohio, 15
Baughman Co., E. J., Calif., 5
Becks, Inc., Minn., 5, 10, 15, 17
Bell Aircraft Corp., Niagara Frontier
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Bell Telephone Labs., N.Y., 15
Bendix Aviation Corp., Bendix Products
Div., Ind., Missiles, Missile Systems
Bendix Aviation Corp., Mich., 15
Bendix Aviation Corp., Sheffield Corp.
Sub., Ohio, 15
**Bergen Labs., Inc., 247 Crooks Ave.,
Clifton, N.J., 15**
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Tel: G**R**egory 3-7800
- Biophysical Electronics, Inc., N.Y., 5,
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Bishop & Co., J. Platinum Works, Pa.,
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Bjorksten Research Labs., Wis., 5, 10,
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- Bliss Electronic Corp., N.J., 5, 10, 15,
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Boehme, Inc., H. O., N.Y., 5, 10
Boeing Airplane Co., Pilotless Aircraft
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Booth Co., Arthur E., Calif., 20
Bracke-Seib X-Ray Co., Inc., N.Y., 5
Briggs Assoc., Inc., Pa., 5, 15
British Thomson-Houston Co., Ltd.,
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Brocker Labs., Calif., 5
Brown, Inc., Dayton T., N.Y., 15, 20
Bruno-New York Industries Corp.,
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Burnett Radio Lab., Calif., 5, 15, 20
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CGS Labs., Inc., Conn., 15
C.M. Mfg. & Machine Co., N.J., 5
Cadre Industries, Corp., N.Y., 5
California Computer Products, Inc.,
Calif., 15
Canadian Institute of Technology, Jet
Propulsion Lab., Calif., 15, Rockets &
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Canada, 5, 10, 15, 20
Canadian Aviation Electronics, Ltd.,
P.Q., Canada, 5, 15
Canadian G.E. Co., Ltd., Electr. Equip.
& Tube Dept., Canada, 5, 10, 15
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Chance Vought Aircraft, Inc., Texas, 15
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N. Ogden Ave., Chicago, 10, Ill., 17**
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Tel: M**O**hawk 4-1741
- Clegg Labs., Div. of Clegg, Inc., N.J.,
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Cleveland Metal Spec. Co., Ohio, 5, 17
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Co-Engineering Co., N.J., 5, 15
Communication Engineering Co., Mich.,
Construction, Maintenance, Design &
Installation of Radio Broadcast &
Communication Equipment
Communication Equip. & Engineering
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Components Corp., N.J., 15
Computing Devices of Canada, Ltd.,
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**Concord Control, Inc., 1282 Soldiers
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Tel: A**L**gonquin 4-5106
- Conray Corporation, Ohio, 5
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Decker Corp., Pa., 15
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Dewey & Co., Inc., G. C., 202 E. 44th St., New York 17, N.Y., 15, Operations Research
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Tel: MUrray Hill 2-7369
Dian Labs., Inc., N.Y., Computing Service
Dorsett Labs., Inc., Okla., 5, 15
Double E Prod. Co., Calif., 20, Radio Interference to Mil. Specs.
Douglas Aircraft Co., Inc., Calif., 15
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Tel: TUxedo 3-3206
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Eder Engrg. Co., Inc., Wis., 5, 15
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Engineering Associates, Ohio, 5
Engineering Model Lab., Inc., Mass., 5, 15
Engineering Specialties, Ohio, 5
Enscoc, Inc., Utah, 5, 15
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Ericsson Corp., L. M. (Stockholm 32, Sweden), 649 Broadway, New York 12, N.Y., 20
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Tel: ORegon 7-8400

Erie Resistor Corp., 644 West 12th St., Erie 6, Pa., 15, 17
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Tel: GLendale 6-8592
Espy Mfg. Co., Saratoga Industries Div., N.Y., 5, 10, 15, 17, 20
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Federal Tool Engineering Co., 1400 Pompton Ave., Cedar Grove, N.J., 17
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Tel: CLifford 6-5300
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Ferrara, Inc., Mich., 5, 10
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Fidelity Amplifier Co., Ill., 10
Filtron Co., Inc., N.Y., 15, 20
Fisher Engineering, Inc., Ind., 15
Flite-Tronics, Inc., Calif., 5, 17
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Tel: CEnter 9-6100
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Fried, Licensed Prof. Eng., Walter, N.Y., 5, 15
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Gabriel Co., Gabriel Electronics Division, 135 Crescent Rd., Needham Heights 94, Mass., 5, 10, 15
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General Dynamics Corp., Convair Div., Calif., 15, Guided Missiles
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General Electric Co., Defense Systems Dept., N.Y., 5, 15, Military Systems
General Electric Co., Missile & Space Vehicle Dept., Pa., 15, Military
General Electric Co., Specialty Electronic Components Dept., N.Y., 10, 17
General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, N.Y., 20
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Tel: VAlley Stream 5-6363
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General Time Corp., 355 Lexington Ave., New York 17, N.Y., 15
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Tel: MUrray Hill 7-9292

Geotechnical Corp., Tex., 5, 15
Geotronic Labs., Inc., Tex., 5, 15
Gibbs Mfg. & Research Corp., Wis., 5, 15
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Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R.I., 5, 15
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Tel: WIlleams 1-1000
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Industrial Electronic Engineers, Inc., 3973 Lankershim Blvd., North Hollywood, Calif., 5, 15
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Tel: TRiangle 7-0328
Industrial Elect. Rubber Co., Ohio, 15, 17
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Instrument Masters, Inc., N.J., 20
Instruments for Industry, Inc., 101 New South Rd., Hicksville, L.I., N.Y., 5, 15, Video Amplifier
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Tel: OVerbrook 1-7100
Intelligent Machines Research Corp., Va., Optical Sensing
Interference Measurement Lab., N.Y., 15, 20
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90. Laboratories & Custom Builders.

- Invengineering, Inc., N.J., 5, 15
 Itek Corp., Mass., 5, 15, 20
 Jack & Heintz, Inc., Ohio, 15, 20
 Jacksonville Metal & Plastics Co., Fla., 5
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 Jansky & Bailey, Inc., D.C., 5, 10, 15, 20
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 Julie Research Labs., N.Y., 15
Kahle Engineering Co., 3322 Hudson Ave., Union City, N.J., 5, 10, 15
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- Kaiser Industries, Kaiser Aircraft & Elect. Div., Ohio, 5, 10, 15, 17, Aircraft Systems Test
 Kaiser Industries Corp., W. Coast Elect. Lab., Calif., 15
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 Kaman Aircraft Corp., Nuclear Div., Colo., 5, 15
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 Tel: **EVergreen 3-1200**
- Kidde & Co., Inc., Walter, N.J., 15, 17
 Kimm Electronics Corp., Md., 5, 10
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 Tel: **DAvis 5-1551**
- Knight Corp., Ewen, Mass., 10, 15
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Lavoie Labs., Inc., Matawan-Freehold Rd., Morganville, N.J., 15
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 Tel: **LOWell 6-2600**
- Lear, Inc., Mich., 5
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 Little, Inc., Arthur D., Mass., 10, 15
Litton Industries, Inc., Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 15, Navigation and Computation
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- Lockheed Aircraft Corp., California Div., Dept. 2710, 2400 N. Hollywood Way, Burbank, Calif., Aircraft Electronics**
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- Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, P.O. Box 504, 962 W. El Camino Real, Sunnyvale, Calif., 15, Military**
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 Tel: **REgent 9-4321**
- Los Alamos Scientific Lab., N.M., 15, Nuclear Propulsion, Nuclear Reactors
 Loyola Laboratories, Calif., 15
Lumatron Electronics, Inc., Dept. IR-60, 68 Urban Ave., Westbury, L.I., N.Y., 5, 10, 15
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 Tel: **EDgewood 4-3100**
- Lyman Electronic Corp., Mass., 5, 10
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- MSI Telecommunications, Consulting Engrs., 1475 Broadway, New York 36, N.Y., 15, 20**
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- Machinery Electrification, Inc., Mass., 5
 MacLaren & Co., F. B., N.Y., 5, 17
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Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 5, 15
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 Tel: **DAvis 5-1391**
- Marantz Co., N.Y., 10
 Marine Electric Corp., Galbraith-Pilot Marine Corp., Div., N.Y., 15
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 Marstan Electronics Corp., N.Y., 15
 Martin Co., Denver Div., Colo., Missiles & Missile Guidance
 Massachusetts Institute of Tech., Mass., 15
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 McDonnell Aircraft Corp., Mo., 15, Aircraft
 McLaughlin Research Corp., N.Y., 15, Design Drafting
 Medical-Electronics Development Co., N.Y., 5, 15
 Melpar, Inc., Va., 5, 10, 15
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 Tel: **FReport 8-3222**
- Microphase Corp., P.O. Box 1166R, Greenwich, Conn., 15**
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 Tel: **NOrmandy 1-6200**
- Microwave Chemicals Laboratory Inc., Dept. 12, 282 Seventh Ave., New York 1, N.Y., 15**
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 Tel: **WATkins 4-6725**
- Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 5, 10, 15**
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- Midwest Research Institute, Mo., 15
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- Missouri Research Labs., Inc., Mo., 5, 15
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 Morecroft Design Engrs., J. H., Calif., 5
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- Naniloa Corp., Ohio, 5, 15
 National Cine Equipment, Inc., N.Y., 5
 National Scientific Labs., Inc., D.C., 5, 15, 17, 20
 New London Instrument Co., Conn., 15
 New York Testing Labs., Inc., N.Y., 5, 10, 15, 20
 Nexon, Wolf, Westheimer, N.Y., 15, 20
 Nichols Ltd., R.H., Canada 5
 Nilsson Electrical Lab., Inc., N.Y., 20
 Norbute Corp., Metalab Equipment Co., N.Y., Equipment for Labs.
 Norrman Labs., Ernst, Wis., 5
 Northwest Indust., Ltd., Canada, 5
 Nortronics Co., Inc., Minn., 5
 Nuclear-Chicago Corp., Ill., 15
 O & S Research, Inc., N.J., 10
Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5, 10
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 Tel: **WORTH 6-0380**
- Oppenheimer Plastics, Inc., Pa., 5, 10, 15, 17
 Optomechanisms, Inc., N.Y., 5, 10, 15
 Ordnance Research Lab., Pa., 15
Ostlund, Evert M., P.O. Box 458, Andover, N.J., 5, 10, 15
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 Tel: **PARKway 9-6635**
- Otis Elevator Co., Electronic Div., N.Y., 15
 Owen Laboratories, Inc., Calif., 5
 PAM Associates, Inc., Md., 15
 Pacific Scientific Co., Calif., 15
 Page Communications Engineers, Inc., D.C., Telecommunications
 Palmer Instruments, Calif., 5
 Parameters, Inc., N.Y., 20
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Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 5, 10, 15
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 Tel: **TRinity 8-3251**
- Philco Corp., Western Development Labs., Calif., 15
 Photobell Co., Inc., N.Y., 5
Physics Research Labs., Inc., P.O. Box 555, Hempstead, N.Y., 15, 20
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 Tel: **IVanhoe 3-8299**
- Pickard & Burns, Inc., Mass., 5, 15
 Pickett & Eckel, Inc., Calif., 15
 Piezo Products Co., Mass., 5
Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 15, 17
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- Plastics Electronics Corp., N.Y., 5, 17
 Poinsettia Co., Inc., N.J., 5
 Power Industries Co., Inc., Ill., 5, 10, 15
Precise Measurements Co., Millbrook Lane, R.D. 1, Flemington, N.J., 5, 15
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 Tel: **STate 2-2100**
- Process & Instruments, N.Y., 5, 15
 Product Development Corp., Mass., 15
 R.M.S. Assoc., N.Y., 5

Directory III. Materials & Services

90. Laboratories & Custom Builders.

R-S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 15, 17
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Tel: **DA**Venport 1-1130

Racal Engrg. Ltd., England, 5, 10, 15
Radiation Electronics Co., Ill., 15
Radiation Research Corp., N.Y., 15
Radio City Products Co., Inc., Pa., 5, 10, 15

Radio Corp. of America, RCA Labs., N.J., 15, 20

Radio Corp. of America, RCA Service Co., Fla., 15

Radionic Labs., Inc., Ind., 15
Railway Communications, Inc., Mo., 5, 10, 15

Ram Chemicals, Inc., Calif., 20

Ram Meter, Inc., Mich., 5, 20

Ramo Wooldridge Corp., Calif., 15

Rand Corp., Calif., 15

Raymond Engrg. Lab., Inc., Conn., 15

Raytheon Co., Mass., 15

Reeves Instrument Corp., N.Y., 15

Reiner Electronics Co., Inc., Pa., 5, 10

Remanco, Inc., Calif., 5, 15

Resdel Engrg. Corp., Calif., 5, 10, 15

Research Industrial Labs., Pa., 5, 15

Rho Engrg. Co., Calif., 17

Rich Electronics, Inc., Fla., 5, 10, 15, 20

Rockefeller Institute, N.Y., 15

Rockwell Engrg. Co., Ind., 20

Rogers Corp., Conn., 10

Rosenberg Assoc., Paul, N.Y., 5, 15

Rototest Labs., Inc., Calif., 20

Ruckelshaus Labs., Inc., John G., N.J., 15

Ryan Aeronautical Co., Ryan Electronics Div., Calif., 15

St. John X-Ray Lab., N.J., 15, 20

Sandia Corp., N.M., 15

Saratoga Industries, N.Y., 5

Satellite-Kennedy, Inc., of Calif., Calif., 15, Antennas

Scatter Communications, Inc., Md., 15

Schaffer Air Industries, Inc., N.Y., 5

Schloer, Inc., Modern Design Div., N.Y., 5, 10

Schmit Engrg. Co., Calif., 15

Schoene Electronics Lab., Ind., 5

Schroeter, A. R., N.J., 5, 10

Scripps Institute of Oceanography, Calif., 15

Sealol Corp., R.I., 15

Seismograph Service Corp., Seiscor Mfg. Co. Div., Okla., 5, 10, 15

Sel-Rex Corp., N.J., 5, 10, 15

Sensory, Inc., N.J., 5

Ser Co., Mass., 15

Shamp Scientific Supply Co., D.C., 15

Shores Labs., N.Y., 15

Signal Equipment Co., Inc., Wash., 5

Sikorsky Aircraft, Conn., 15, Avionic Equipment

Sinclair Radio Laboratories, Ltd., Box 179, Downsview P.O., 70, Sheffield St., Toronto 15, Canada

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Tel: **CH**erry 4-5519

Slaughter Co., Ohio, 5

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Solatron, Inc., Mass., 5, 15, 17

Sonex, Inc., Pa., 5, 10, 15

Sonotone Corp., Dept. X00-109, P.O. Box 200, Elmsford, N.Y., 15, 17

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Tel: **LY**ric 2-6400

Space Electronics Corp., Calif., 5, 15, 17

Specialty Engrn. & Electrn. Co., N.Y., 5, 10, 17

Sperry Products, Inc., Conn., 15

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Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 15

Sperry Rand Corp., Sperry Gyroscope Co. Div., N.Y., 15

Sperry Rand Corp., Sperry Gyroscope Div., Aeron. Equip. Div., N.Y., 15

Sperry Rand Corp., Sperry Gyroscope Div., Countermeasures Div., N.Y., 15

Sperry Rand Corp., Sperry Gyroscope Div., Surface Armament Div., N.Y., 15

Sperry Rand Corp., Sperry Microwave Elect. Co., Div., Fla., 15

Standard Cabinet Co., 53 Washington Ave., Carlstadt, N.J., 20

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Tel: **GE**neva 8-1500

Standard Coil Products Co., Inc., Calif., 5, 15

Standard Electric Time Co., Mass., 5

Standard Electronics Research Corp., N.Y., 15, 20

State Testing Laboratory, Inc., Conn., 5, 15, 20

States Co., Conn., 5

Stereatronics, Inc., Mass., 5, 15, 17

Sterling Precision Corp., 17 Matinecock Ave., Port Washington, N.Y., 5, 15, 17

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Tel: **PO**rt Washington 7-7200

Stone Laboratories, Mass., 5, 10

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Stromberg-Carlson Div., General Dynamics Corp., N.Y., 15

Sturrip, Inc., Conn., 5, 10, 15

Summers and Mills, Inc., Tex., 5

Sunshine Scientific Instrument, Pa., 5, 10, 15, 20

Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 15

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Tel: **YO**rksire 8-6211

Synthetic Mica Co., N.J., 15

Systems Development, Inc., N.Y., 5, 15

Systems, Inc., Fla., 5, 10, 15, 17

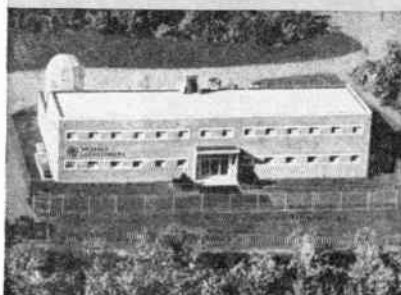


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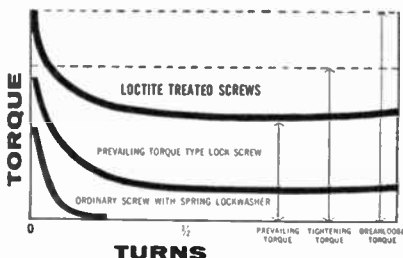
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 See ad on page 288
 Tel: STate 9-0501

Technical Apparatus Builders, 109GB Liberty St., New York 6, N.Y., 5, 15, 20
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 Tel: REctor 2-6249

Technical Design & Development Co., Mass., 5, 10, 15

Technicraft Co., Mass., 5

Technograph Printed Electronics, Inc., N.C., 15, Printed Circuits

Tele Coil Co., N.J., 5, 17

Telecomptrol Corp., N.J., 5, 10, 15

Telerad Mfg. Corp., N.Y., 5, 10, 15

Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 5, 10, 15
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 Tel: EDgewood 3-1027

Telonic Engineering Corp., Calif., 5, 15

Temco Aircraft Corp., Electronics Div., Texas, 5, 15

Tempo Instrument, Inc., N.Y., 15

Texas Instruments, Incorporated, Houston, Tex., 5

Thomas Electronics, Inc., N.J., 5, 15

Thompson & Co., John I., D.C., 5, 15, 20

Thompson-Ramo-Woodbridge, Inc., Calif., 15

Thordarson-Meissner, Ill., 15, 17

Tomberg, Victor T., N.Y., 15, Biophysical

Topper Mfg. Co., Inc., N.Y., 5, 15, 17

Topping Electronics, Ltd., Canada, 5, 15

Transistor Devices, Inc., N.J., 5

Trepac Corporation of America, N.J., 10, 15, 17

Tri-Dex Co., Calif., 5, 10

Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 5
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Twenty First Century Electronics, Inc., Calif., 5, 10, 15

Underwood Corp., Canoga Div., Calif., 5, 10, 15

United Shoe Machinery Corp., Research Div., Mass., 15

U.S. Science Corp., Sub. Topp Indust., Inc., Calif., 5, 15

U.S. Steel Corp., Pa., 15

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Valpey Crystal Corp., Mass., 5

Vector Associates, Inc., N.Y., 5, 10, 17

Vineo Electronics Corp., Conn., 5, 10

Virginia Electronics Co., Inc., D.C., 15

Vitro Labs., Silver Spring Lab., Md., 15

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Watkins-Johnson Co., Calif., 15

Wave Particle Corp., Calif., 15, 17

Weedfall Engrg. Co., Tex., 5, 15, 17

Westlab Electronics, Inc., N.Y., 5, 15

Wheeler Automation Co., N.Y., 5, 15

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Wintronics, Calif., 5, 15
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Allied Chem. Corp., Gen. Chem. Div., N.Y., 3
Allied Chemical Corp., Plastics & Coal Chemicals Div., N.Y., 3, 30
Ambroid Co., Mass., 5, 10, 15, 20, 24, 25, 27, 30
American Products Mfg. Co., La., 3, 15, 24, 25

American Sealants Co., 517 Woodbine St., Hartford 6, Conn., 27, 30
See ad on page 658
Tel: JAcKson 2-1188

American Smelting & Refining Co., N.Y., 3, 5, 10, 20
Aries Labs., Inc., Conn., 3, 24, 25, 27, 30
Bacon Industries, Inc., Mass., 30
Baker & Adamson Prods., Gen. Chem. Div. Allied Chemical Corp., N.Y., 3, 30

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Barco Chemical Prods. Co., Ill., 3
Barrett Varnish Co., Ill., 15
Bel Fuse, Inc., 197 Van Vorst St., Jersey City, N.J., 10
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Tel: HEnderson 2-0463

Biggs Co., Carl H., Calif., 20, 25, 27, 30
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Biwax Corp., 3441 Howard St., Skokie, Ill., 30, Epoxies, Waxes & Asphalts
See ad on page 658
Tel: ORchard 3-1050

Borthig Co., Inc., N.J., 5, 15, 20, 24, 25, 27, 30
Caig Labs., N.Y., 3
Carborundum Co., Refractories Div., N.J., 30
Chemical Products Corp., R.I., 15, 30
Ciba Products, Corp., N.J., 25, 30
Cico Corporation, Calif., 10, 27

Clark Electronic Laboratories, Box 165, Palm Springs, Calif., Pressure Sensitive Paint
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Tel: FAirview 8-2210

Cobehn, Inc., N.J., Automatic Precision Parts Cleaners

91. Lacquers, Paints & Chemicals.

Columbia Technical Corp., 61-12 31st Ave., Woodside 77, L.I., N.Y., 5, 10, 15, 20, 25, 27, 30

See ads on pages 444, 659
Tel: AStoria 8-7401

Communication Prods., Co., N.J., 5, 25
Division Lead Co., Ill., 3
Dixon Crucible Co., Joseph, N.J., 23
Dolph Co., John Co., N.J., 10, 15, 20, 24, 25, 27, 30

Dow Corning Corp., Mich., 3, 25, 27, 30

DuPont de Nemours & Co., Inc., Div. 56, Wilmington 98, Del., Cleaning Solvents

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Tel: PRespect 4-1000

Ed-Berl Products, Inc., N.Y., 3, 20, 25, 27, Silicone Resins & Lubricants

Electrofilm, Inc., Calif., 10, 23, 24, 27
Electronic Chemical Corp., N.J., 3, Rheostat Cleaner

Electronic Plastics Corp., N.Y., 3, 5, 10, 25, 27, 30

Emerson & Cuming, Inc., Mass., 5, 10, 15, 30

Engelhard Industries, Inc., N.Y., Rhodium Plating Solutions

Fidelity Chemical Products Corp., N.J., 3, 10, 20, 24

Fisher Scientific Co., N.Y., 3
Foote Mineral Co., Pa., 3, 30
Freedlander Research & Development Lab., Calif., 3, 25

Furane Plastics, Calif., 24, 25, 27, 30
General Cement Mfg. Co., Div. of Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5, 10, 20, 24, 27

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Tel: ROCkford 8-9661

General Plastics Corp., N.J., 10, Teflon Coating

Gering Products, Inc., N.J., 25
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Hardman Co., Inc., H. V., N.J., 30
Hi-Test Chemical Corp., N.Y., 25, 30

Hooker Chem. Corp., Durez Plastics Div., N.Y., 25, 30
Houghton Labs., Inc., N.Y., 10, 24, 30, Adhesives

Hunt Co., Philip A., N.J., 3, Etchants
Industrial Elect. Rubber Co., Ohio, 10, 30

Insl-X Co., Inc., N.Y., 5, 15, 20, 24, 25, 27, 30

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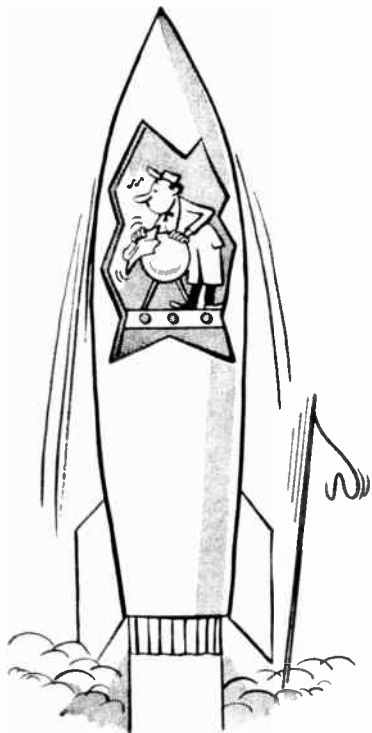
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 London Chemical Co., Inc., Ill., 3, 15, 25, 27
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 Metal & Thermit Corp., N.J., 3, 10, 15
 Metaplast Co., Inc., N.Y., 10
 Metz Refining Co., N.J., 10
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 Midland Paint & Varnish Co., Ohio, 15, 24, 25, 27
 Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5
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 Tel: DAVenport 4-4108
 Minnesota Mining & Mfg. Co., Minn., 3, 5, 10, 25, 27, 30
 Minnesota Mining & Mfg. Co., Chemical Div., Minn., 3, 15, 20, 25, 27
 Minnesota Mining & Mfg. Co., Electrical Products Div., Minn., 30
 Mitchell Rand Mfg. Corp., Insulation Div., N.Y., 5, 25, 30
 Mona Industries, Inc., N.J., 3, 24

Monsanto Chemical Co., Mo., 3, Coolant-Dielectrics
 Morningstar-Paisley, Inc., Ill., Adhesives & Resins
 Moyon Co., C. P., Ill., 5, 15, Cement & Thinner
 Mystik Adhesive Products, Inc., Ill., Adhesives
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 New York Testing Labs., Inc., N.Y., 25, 27
 Norrich Plastics Corp., 107-109 W. 18th St. New York 11, N.Y., 30
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 Tel: WATkins 4-8360
 Nuclear-Chicago Corp., Ill., Radiochemicals
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 Pilot Chemicals, Inc., Mass., 3
 Polymer Corp. of Pa., Dept. RB, 2140 Fairmont Ave., Reading, Pa., 15, 27
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 Tel: FRanklin 6-5791
 Products Research Co., Calif., 10, 25, 27, 30
 Ram Chemicals, Inc., Calif., 15, 24, 25
 Raybestos-Manhattan, Inc., Pa., 5, 15, 25
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Spectra-Strip Wire & Cable Corp., Calif., 25, 27
Superex Electronics Corp., N.Y., 3
Superior Graphite Co., Ill., 23
Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 3
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Tel: JUDson 6-2424
- Technic, Inc., R.I., 3, 10
Technic, Inc., Ill., 3, 10
Technicraft Co., Mass., 30
Tempil Corp., N.Y., Temperature Indicating Paints & Coatings
Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 30
See ad on page 620
Tel: PILgrim 3-7797
- Topper Mfg. Co., Inc., N.Y., 10, 25, 30
Ultra-Violet Products, Inc., Calif., 15, 20
Union Carbide Corp., Silicones Div., N.Y., 3, 10, 25, 30
U.S. Rubber Co., N.Y., 3
Vorac Co., N.J., 3, 10, 15
Waldes-Kohinoor, Inc., N.Y., 20
Waldom Electronics, Inc., Ill., 15
Walsco Electronics Mfg. Co., Div. of Textron, Inc., 100 W. Green St., Rockford, Ill., 3, 15, 24, 25
See ad on page 474
Tel: ROKford 8-9661
- Wye Industries, Mass., 24
Zophar Mills, Inc., 112-130 26th St., Brooklyn 32, N.Y., 20, 25, 27, 30, Wax Impregnants and Coatings
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- Ackerman-Gould Co., 10 Neil Ct., P.O. Box 188, Oceanside, L.I., N.Y., 25
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Tel: ORIole 8-4110
- Acme Electric Corp., 44 Water St., Cuba, N.Y., 7
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- Acme Precision Products, Inc., Ohio, 10, 28
Acoustica Associates, Inc., Dept. IRE, Fairchild Ct., Plainview, N.Y., 33, 34
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Tel: OVerbrook 1-2100

92. Machinery & Tools.

- Aero Tool & Die Works, Ill., 25
Acromark Co., N.J., 25
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Airtronics, Inc., D.C., 10, 25, 28
Alcar Instruments, Inc., N.J., 30, 33, 34
All American Tool & Mfg. Co., Ill., 45
American Electrical Heater Co., Mich., 30
American Machine & Foundry Co., Leland Airborne Products Div., Ohio, 7
American Time Products, Inc., 580 5th Ave., New York 36, N.Y., 33
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Tel: PLaza 7-1430
- Annis Co., R. B., Ind., 25, Balancing Machines
Apex Machine Co., N.Y., 25
Applied Dynamics Corp., Mass., 15, 40, Compressors
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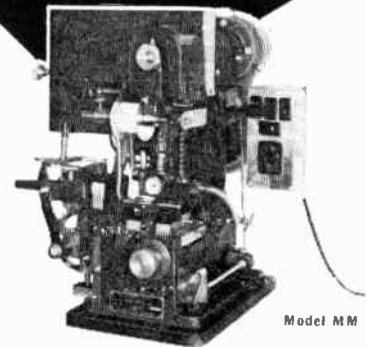
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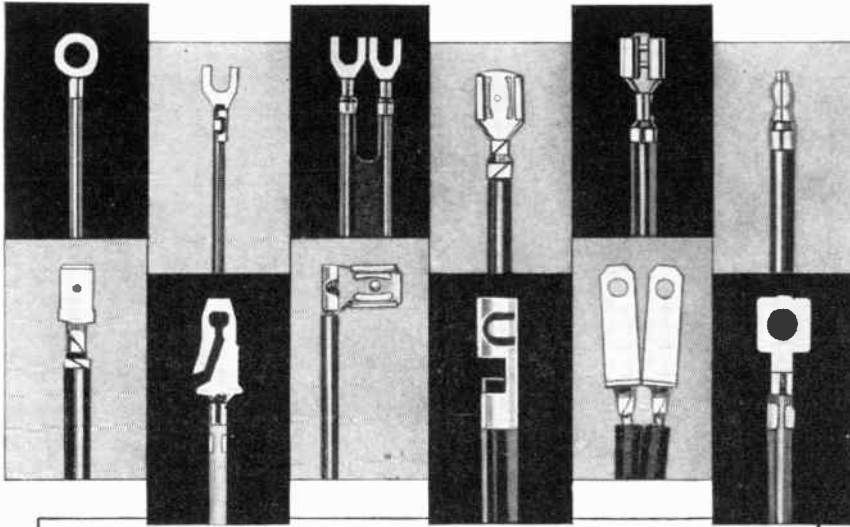
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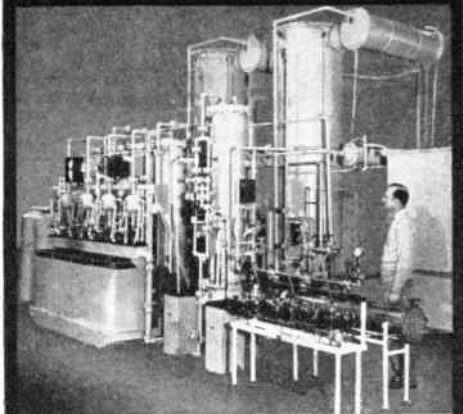
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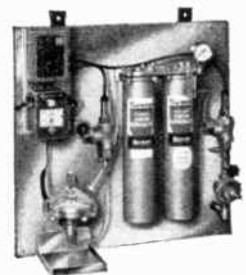
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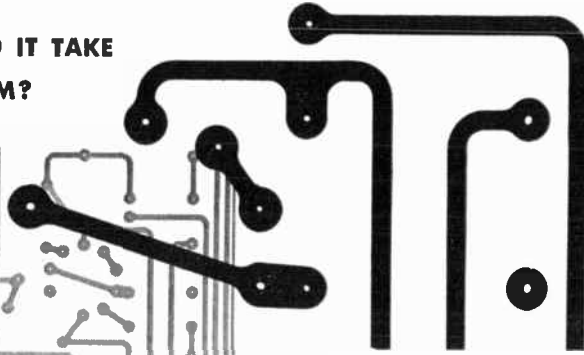
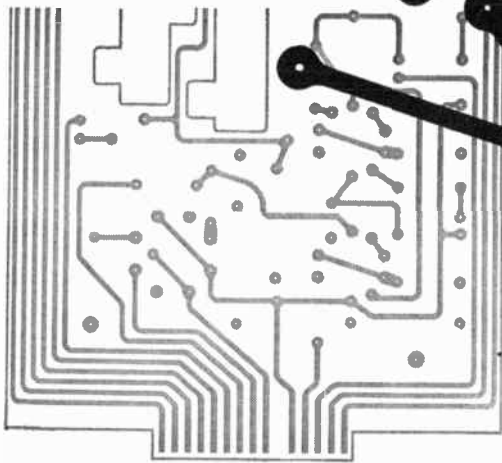


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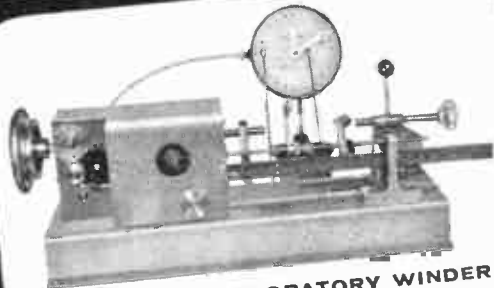
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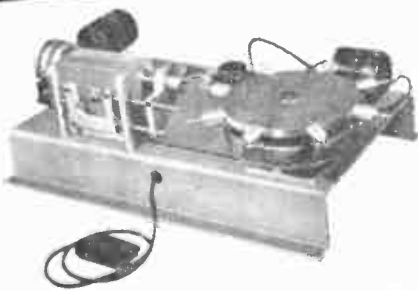
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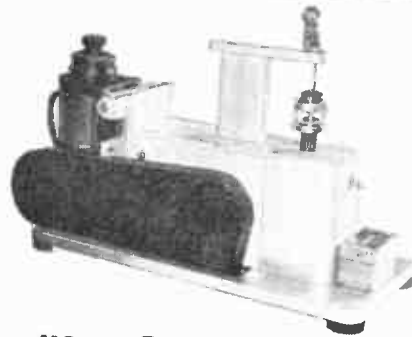
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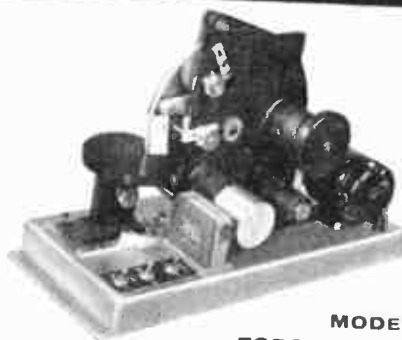
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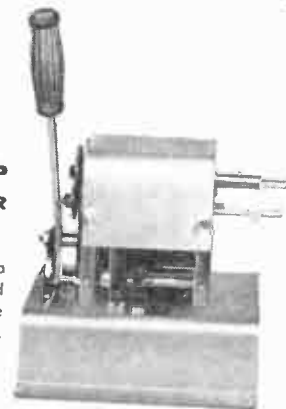


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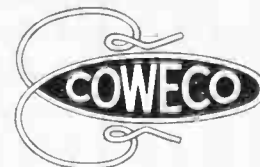
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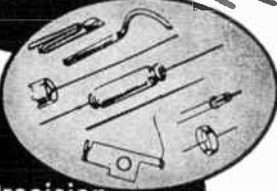
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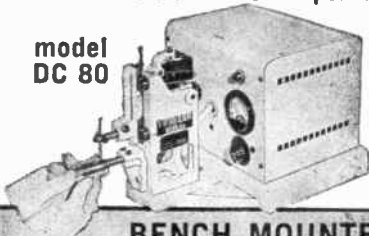
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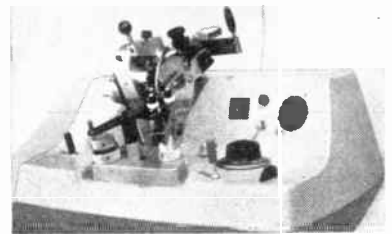
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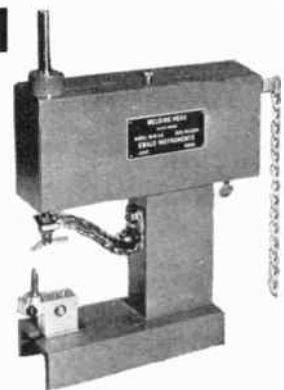
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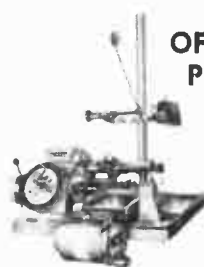
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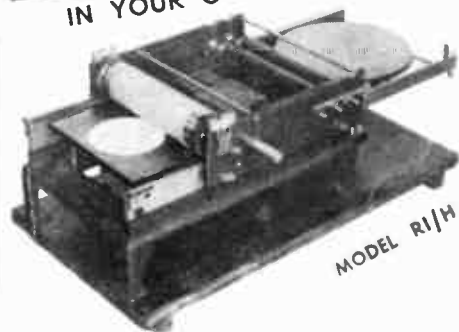


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GORMAN MACHINE CORP.

Dept. D

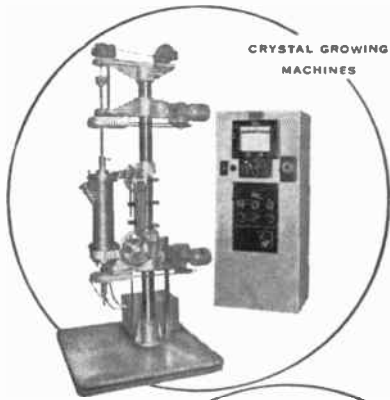
480 S. Main St. Randolph, Mass.
 W**OOD**lawn 3-4440

For details, circle #709 on Reader Service Card

For details, circle #710 on Reader Service Card

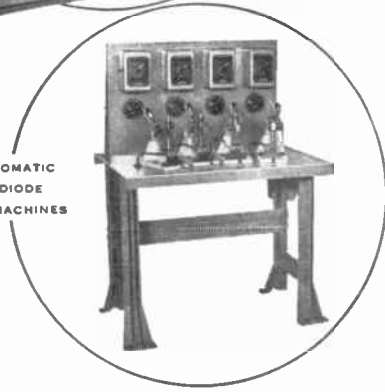
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

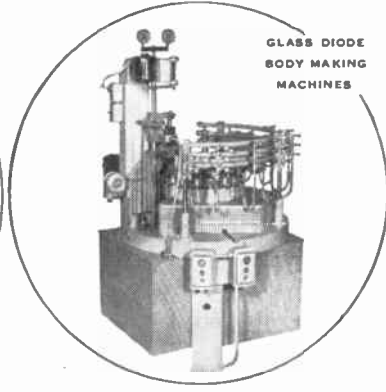


CRYSTAL GROWING
MACHINES

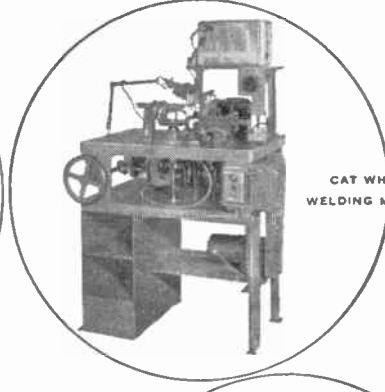
*We have created over
one thousand DIFFERENT KINDS
of electronic production machines!*



SEMI-AUTOMATIC
GLASS DIODE
SEALING MACHINES

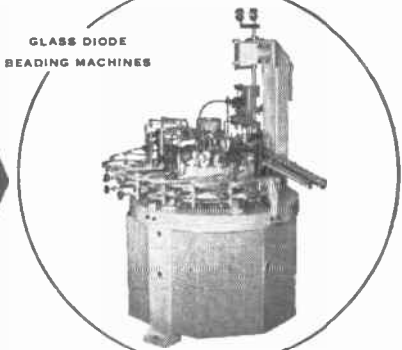


GLASS DIODE
BODY MAKING
MACHINES

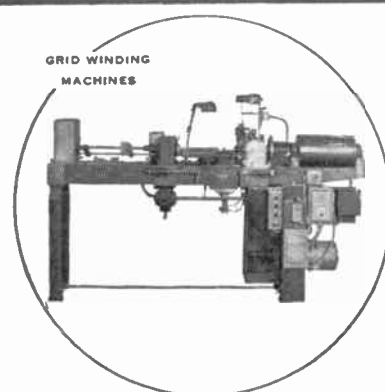


CAT WHISKER
WELDING MACHINES

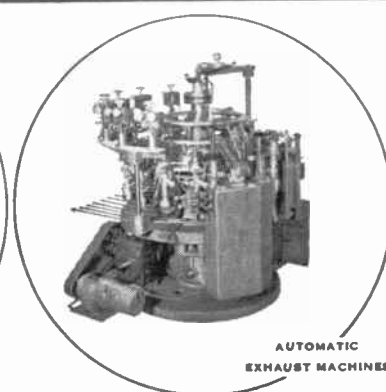
*Whether for semiconductor or electronic tube
production, each has exceeded customers'
specifications. And each was tested under
actual operating conditions before shipment.*



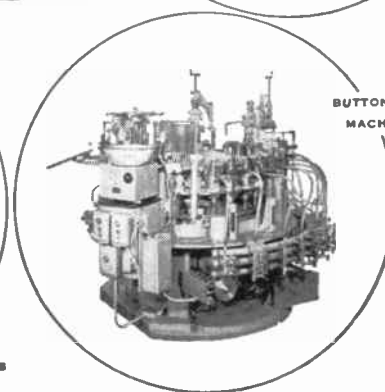
GLASS DIODE
BEADING MACHINES



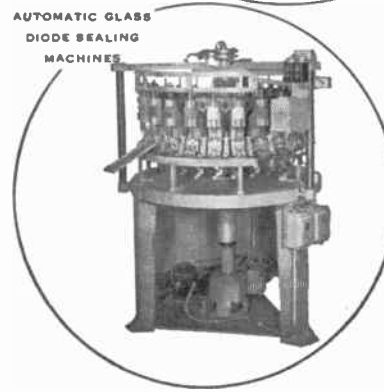
GRID WINDING
MACHINES



AUTOMATIC
EXHAUST MACHINES



BUTTON STEM
MACHINES



AUTOMATIC GLASS
DIODE SEALING
MACHINES

*Can you use this kind of engineering service and cost saving
automation in YOUR business? CALL OR WRITE US.*

KÄHLE
ENGINEERING COMPANY

WORLD'S LARGEST EXCLUSIVE BUILDER
OF MACHINERY FOR THE ELECTRONIC INDUSTRY

GENERAL OFFICES: 3322 Hudson Ave., Union City, New Jersey

Directory III. Materials & Services

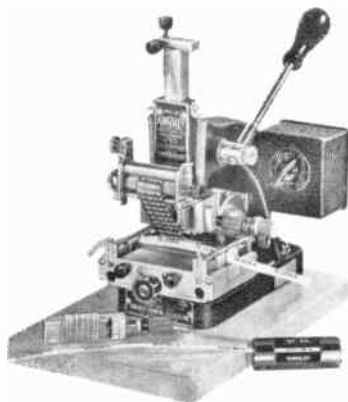
92. Machinery & Tools.

Johnson Assoc., Walter A., N.Y., 45
 Johnson Research Corp., N.Y., Drafting Aids
 Jones & Lamson Machine Co., Vt., Optical Comparators
Kahle Engineering Co., 3322 Hudson Ave., Union City, N.J., 10, 20, 25, 28, 30, 35, 50, Semiconductor Machinery
 See ad on page 668
 Tel: UNion 7-6500
 Kanthal Corp., Conn., 5, 10, 15
 Kalsey-Hayes Co., Utica Drop Forge Tool Div., N.Y., 55, Pliers & Wire Wrapping Tools
 Kemode Mfg. Co., Inc., N.Y., 30, Non-Electric Cartridge Heated
Kingsley Machine Co., 850 Cahuenga Blvd., Hollywood 38, Calif., 25, Wire
 See ad on this page
 Tel: HOLlywood 9-7243
 Kinney Mfg. Div., New York Air Brake Co., 3631 Washington St., Boston 30, Mass., Vacuum Valves
 See ad on page 151
 Tel: JAMAica 4-3220
 Klein & Sons, Inc., Mathias, Ill., 20, 55, Pliers & Cutters
 Kochring Co., Hydraulic Press Mfg. Co., Div., Ohio, 20, 27, Injection Molder
 Krengel Mfg. Co., Inc., N.Y., 25

Kwikheat Mfg. Co., Calif., 30
 L.A.B. Corp., N.Y., 45
 L & R Mfg. Co., N.J., 33
 Lear, Inc., Lear-Romec Div., Ohio, 40
 Lemert Engineering Co., Inc., Ind., 20, 28, Riveters
 Levin & Son, Louis, Inc., Calif., 20
 Lewyt Mfg. Corporation, N.Y., 15, Air Conditioners
 Lignacraft, N.Y., 28

Ling Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 45
 See ads on pages 270, 301
 Tel: TEXas 0-7711
Litton Engineering Labs., P.O. Box 949, Grass Valley, Calif., 20, 35, 40
 See ad on this page
 Tel: GRass Valley 1730
 Luma Electric Equipment Co., Ohio, 25, 30

ELIMINATE COSTLY COLOR CODING



CODE MARK YOUR OWN WIRE WITH A KINGSLEY WIRE-MARKING MACHINE

Now you can permanently mark each wire with its own individual circuit number, at any desired spacing. You can reduce wire inventories because only one color of wire is necessary for as many codes as desired.

Simplify your assembly methods and speed production with the same machine that has proved so successful in the aircraft industry. Special machines are available for marking flexible vinyl sleeves.

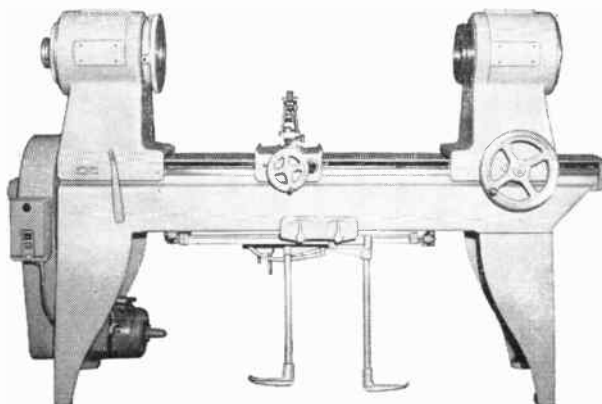
Write for complete information.

KINGSLEY MACHINE CO.
 850 Cahuenga, Hollywood 38, Calif.

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GLASS WORKING LATHES



NEW MODEL ESA \$3200.00 NEW

Price f.o.b. Grass Valley

STANDARD EQUIPMENT

- Two face plates
- One collet draw-in bar
- One 6-fire seven jet burner assembly
- Hand carburetion control
- Foot pedal control of air or nitrogen supply and of oxygen-gas volume

- Main air valve controlling air in either or both spindles
- 1/2 h.p. Motor, 230 volt, three phase, single speed, 60 cycle, AC
- Face plate wrench
- One motor belt
- One motor pulley

General Specifications

Variable Speed Drive — Electronic Control (As shown) Available at extra cost

| | | | |
|---|-----|--|---------------------|
| Maximum length overall | 84" | Spindle hole diameter | 7 1/4" |
| Maximum width overall | 24" | Radial clearance above apron | 13 3/4" |
| Maximum length spindle nose to spindle nose | 47" | Net weight | Approx. 1250 pounds |
| | | Approx. shipping weight | 1500 pounds |



Litton Engineering Laboratories

Grass Valley, California • P. O. Box 949

For details, circle #714 on Reader Service Card

5173

ONE CONVENIENT SOURCE for ALL Your High and Ultra-High Vacuum Needs

Now that you've decided that you can make a better product cheaper by using high or ultra-high vacuum processing, why not do it the easy way? Save time, money, and frustration by taking advantage of the "one stop" service offered by NRC. This is your one convenient source of a complete line of high and ultra-high vacuum components, equipment, and systems, PLUS a wealth of practical information on how to use them profitably.

VACUUM PUMPS, GAUGES, VALVES

VACUUM PUMPS



NEW DIFFUSION PUMPS

Up to 50% more speed and less height. Permit more compact construction of furnaces, coaters, or other high-vacuum equipment. Can double capacity of your present installation.

MECHANICAL

Single and two stage from 1.25 to 400 CFM. Gas Ballast keeps pump oil uncontaminated by condensables.

BOOSTER AND DIFFUSION

Oil and mercury. Capacities 10 to 60,000 CFM. Pressures below 10^{-7} mm Hg. Special low backstreaming models available.

MECHANICAL BOOSTER

Provides "clean" vacuum to below 10^{-3} mm Hg. Capacities 250 to 4,500 CFM.

ULTRA-HIGH VACUUM PUMPS

Molecular drag, titanium adsorber, and ion pumps for very clean vacua to 10^{-12} mm Hg.

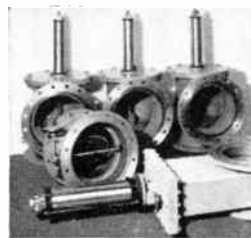
VACUUM GAUGES



Model 520 Alphatron® Ionization Gauge. Range 1000 — 0.0001 mm Hg.

Wide line of direct reading, total pressure gauges for accurate measurement from atmosphere to less than 10^{-12} mm Hg. Thermocouple, Pirani, and ionization gauges, including Alphatron®, burn-out proof, ultra-high vacuum, and conventional types.

VACUUM VALVES AND HARDWARE



Air release, ball, throttling, high conductance, angle, wye, globe, and slide valves. Manual and air operation. Bronze, mild and stainless steel, aluminum. Bellows and O-ring sealed. Sizes from $\frac{1}{8}$ " to 36". ALSO seals, flexible connectors, cold traps, and accessories.

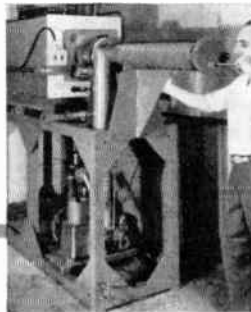
SEMI-CONDUCTOR PRODUCTION EQUIPMENT



Low-cost standard furnace for growing single crystals of silicon, germanium, and intermetallic compounds.



Belljar and tank vacuum metallizers, diameters 12" to 66", for depositing thin films to precisely controlled thicknesses of from one molecule to several mils.



Two-zone 5" diameter muffle vacuum heat treating furnace.

TANTALUM SINTERING AND OTHER VACUUM FURNACES



High temperature resistance furnace Model 2915. 4400°F in three minutes. Pressures to 1×10^{-3} mm Hg. Large 6" I.D. x 10", three phase, long life heating element.

NRC has built and operated more high vacuum furnaces than any other organization in the world. Among these are batch and semi-continuous, resistance and induction, tantalum sintering furnaces. Other induction and resistance furnaces with capacities from 2 to 5000 lbs. Cold mold and skull arc furnaces with capacities from 2 to 10,000 lbs.

LEAK DETECTORS AND SYSTEMS



Inexpensive Model 4902 finds leaks as small as 10^{-6} cc/sec. Rugged, convenient, simple, fast recovering, it guarantees repetitive results.

Bench, rotary, in-line, etc., systems for production line quality control of relay cases, transistor housings, hermetic and glass to metal seals, wave guides, etc. Halogen and helium sensitive detectors for leak locating in manufactured products and in vacuum and other process equipment.

VACUUM IMPREGNATING AND DRYING



Pilot plant or production line drying, degassing, and impregnating systems for improving the dependability and electrical characteristics of capacitors, transformers, cables, and other components.

HIGH ALTITUDE TEST CHAMBERS

Standard chambers with diameters, 12" to 66" for simulating altitudes to 100 miles. Special chambers for altitudes to 400 miles.

ULTRA-HIGH VACUUM SYSTEMS

Standard and special systems for pressures to 10^{-12} mm Hg. incorporating improved ultra-high vacuum components.



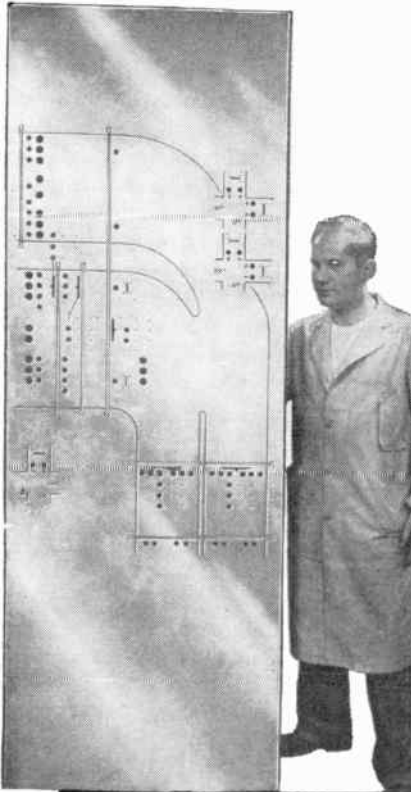
DEPT. 12, CHARLEMONT ST., NEWTON 61, MASS.
A Subsidiary of National Research Corporation

Now—

NO plate too small—

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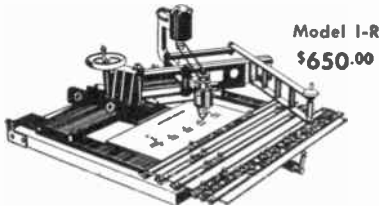
NO panel too big



**NO
size limits
on engraving**

**ENGRAVES 18"x6" RECTANGLE
IN ONE SET-UP**

- Takes up only 2 feet of bench space
- Engraving chassis can be detached from base and placed directly on workpiece of any dimension
- Self-centering workholder cuts down set-up time
- Heavy duty cutter spindle

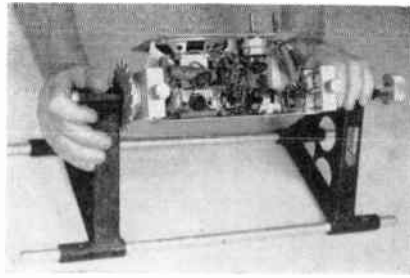


Request our 28-page illustrated catalog YR-3 on your business letterhead.

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154 West 14th Street, New York 11, N. Y.

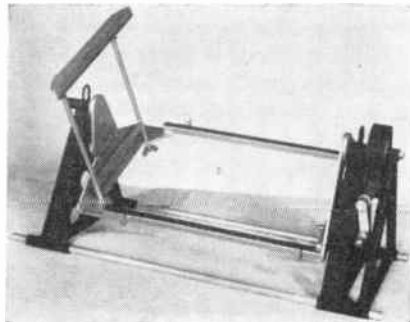
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PRODUCTION FIXTURES

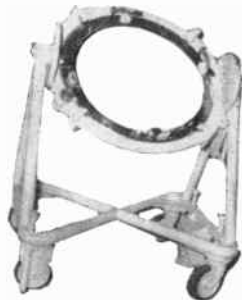


Attention Methods Engineers

Production Tool and Fixture assemblies save you time and money in your wiring and assembly departments. "Tiny-Fix," your third hand, positions miniature chassis, terminal boards and connectors in proper alignment which results in quicker and more efficient work.



The S-12-W above differs from our standard friction and index models in that it offers worm drive that gives positive positioning even under heavy stress. The PF-20-C floor model precision fixture is designed to level and rigidly support the bulky but delicate chassis assemblies required by recent developments in the missile and related industries. 36 inch height at pivotal centers permits the rotation of assemblies as wide as 50 inches through 360 degrees in two planes.



Adapters similar to those shown in the assembly fixtures above are designed by our engineering staff to meet your specific requirements.

Write us for our catalog and current list of firms now using our equipment in the electronic industry.

PRODUCTION TOOL AND FIXTURE CO.

37 WEST MAIN STREET
OYSTER BAY, N.Y.

Telephone: OYster Bay 6-0009

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Machinery & Tools—Class 92

Directory III. Materials & Services

92. Machinery & Tools.

Luxo Lamp Corp., N.Y., Work Lamps
MacDonald & Co., Calif., 20
Markem Machine Co., N.H., 25
Martindale Electric Co., Ohio, 10, 55
Matthews & Co., Jas., Pa., 25
McGraw-Edison Co., Pittsburgh Lec-
trodryer Div., Pa., 15
McKenna Labs., Calif., 33
Merit Short Wave Diathermy Co.,
Calif., 50

Metal & Thermit Corp., N.J., 50
Meter-Mix Corp., Mass., 20

Methode Mfg. Corp., 7447 W. Wilson
Ave., Chicago 31, Ill., 28

See ad on page 505

Tel: UNderhill 7-9600

Mico Instrument Co., Mass., 10, 25
Micro Balancing, Inc., N.Y., Dynamic
Balancing Machine
Micromech Mfg. Corp., N.J., Wafering
Machine
Microtronics, Inc., N.J., 20
Milford Rivet & Machine Co., Conn.,
Rivet Setters

Miller Electric Mfg. Co., Inc., Wis., 50
Millers Falls Co., Mass., 20

Milman Engineering Co., Calif., 20,
Leadscrew Mach. & Drill Presses

Montek Associates, Inc., Utah, 55

Moody Machine Prods. Co., Inc., R.I.,
Tools

Morris Co., J. I., Mass., Taps & Dies

Multicore Solders, Ltd., England, 55

Murata Mfg. Co., Ltd., Japan, 33

Murphy & Miller, Inc., Ill., 15

Mytron Mfg. Co., Calif., 27

N R C Equipment Corp., Dept. 12, 160
Charlemont St., Newton 61, Mass., 5,
40

See ad on page 670

Tel: DEcatur 2-5800

Narda Ultrasonics Corp., Dept. IRED-4,
625 Main St., Westbury, L.I., N.Y., 33

See ad on pages 80-81

Tel: EDgewood 3-5400

National Ultrasonic Corp., N.J., 33

Nelson Vacuum Pump Co., Calif., 40

New Hermes Engraving Machine Corp.,
154 W. 14th St., New York 11, N.Y.,
25

See ad on this page

Tel: WATkins 4-7373

New Rochelle Tool Corp., N.Y., 50

New York Air Brake Co., Kinney Mfg.

Div., 3631 Washington St., Boston 30,
Mass., 40, Vacuum Values

See ad on page 151

Tel: JAMAica 4-3220

New York Air Brake Co., Vacuum
Equip. Div., N.J., 5, 40

Newman Corp., M. M., Mass., 30

Nichols, Ltd., R. H., Canada, 7

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THE *S.S. White* INDUSTRIAL AIRBRASIVE® UNIT

...cool, shockless, precise way to
cut...abrade...debur...clean
hard, brittle materials

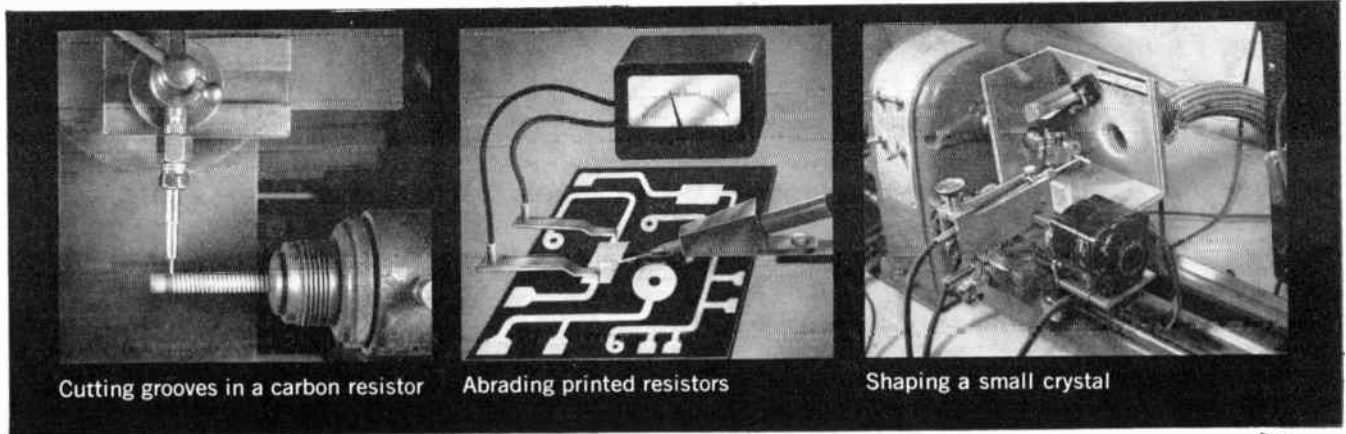
The Industrial Airbrasive is doing jobs that were previously thought impossible! By gas-propelling a precise stream of fine particles it gives a *fast, cool, shockless* cutting or abrading action. It is equally useful as a laboratory instrument or a mass-production tool. Every day new applications in the electronics field are being found.



DIODES • CAPACITORS
STRIPPING POTENTIOMETERS
COATED RESISTORS
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OXIDES
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FROSTING
... AND MANY OTHERS!

Send us samples of your most difficult cutting problems
and let us test them for you at no cost!

1074



Cutting grooves in a carbon resistor

Abrading printed resistors

Shaping a small crystal

New Dual Model D
...greater flexibility
than ever!



Send for bulletin 5705A
...complete information
or—call collect!



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Directory III. Materials & Services

92. Machinery & Tools.

Noble & Westbrook Mfg. Co., Conn., 25
Norton Co., Mass., 20, Ultrasonic Abrasives

Numberall Stamp & Tool Co., N.Y., 25
Onan & Sons, Inc., D. W., 2945 University Ave., S.E., Minneapolis 14, Minn., 7

See ad on page 496

Tel: FEderal 2-1155

O'Neil-Irwin Mfg. Co., Minn., 20, Precision Metal Working Mach.

Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 7

See ad on page 499

Tel: WOrth 6-0380

Oryx Sales Co., Calif., 30, Miniature Paragon-Revolute Corp., N.Y., 20, Automatic Blueprinting Machine

Peck & Harvey Mfg. Corp., Ill., White Print Copier

Peer, Inc., Mach., 7, 50

Perkins Machine & Gear Co., Mass., 10

Phillips Process Co., Inc., N.Y., 25, Inks Only

Pioneer Gen-E-Motor Corp., Ill., 7

Pioneer Machine Works, Inc., N.Y., 35, CRT Sealers

Podgor Co., Inc., Joseph E., Pa., Silk Screen Material

Popper & Sons, Inc., N.Y., 25

Precision Scientific Co., Ill., 40

Preis Engraving Machine Co., N.J., 25
Production Tool & Fixture Co., 37 W. Main St., Oyster Bay, L.I., N.Y., 20

See ad on page 671

Tel: OYster Bay 6-0009

Progressive Tool & Die Co., Mass., 20, 27, 55

Radex Corp., Ill., Electrostatic Precipitator

Radial Cutter Mfg. Corp., N.J., Carbide Tipped Saws & Cutters

Radio Corp. of America, Electron Tube Division, Section I-22-Q, 415 S. Fifth St., Harrison, N.J., 35

See ad on pages 53-55

Tel HUmoldt 5-3900

Raytheon Co., Mass., 7, 32, 50

Red Point Corp., Calif., 40, Impregnating Machine

Reeve Electronics, Inc., Ill., Wire Pre-tinning Machine

Republic Aviation Corp., N.Y., 7

Richmont, Inc., Calif., Torque Screw-drivers, Wrenches & Testers

Robinson Machine Co., Inc., N.J., Metering Pumps

Rollan Electric Co., Ill., Tension Controls

S & B Machine & Tool Co., Inc., N.J., 20, 35, Carbon Boats & Jigs

Schauer Manufacturing Corp., Ohio, 7

Schloer, Modern Design Div., N.Y., 45
Schmit Engrg. Co., Calif., 20, 25, 28

Sciaky Bros., Inc., Ill., 50

Scientific Electric, Inc., N.J., 50

Scientific Engineering Laboratories, 1510 Sixth St., Berkeley 10, Calif., 40

See ad on this page

Tel: LAndscape 6-2772

Segal, Edward, N.Y., 20, 28, Tube Pin Staking Machine

Sel-Rex Corp., N.J., 7

Sheffield Corp., Ohio, 20, 32

Sherman Mfg. Co., H. B., Mich., Crimping Tools

Sonotone Corp., Dept. X00-109, P.O. Box 200, Elmsford, N.Y., 7

See ad on page 482

Tel: LYric 2-6400

Standard Gage Co., Inc., N.Y., Dimensional Gages

Standard Tool & Mfg. Co., N.J., 20, 35

Stanley Tools, Conn., Screw Drivers, Other Hand Tools

Star Expansion Industries Corp., N.Y., Pin Aligners and Wiring Plugs

Sta-Warm Electric Co., Ohio, Glue & Solder Pots

Stevens Mfg. Co., Inc., George, Pulaski Rd. at Peterson, Chicago 30, Ill., 10, 55

See ad on this page

Tel: JUNiper 8-1300

Advanced High Vacuum Aids Important Programs



- Deposition Systems
- Altitude Systems
- Vacuum Furnaces

And other applications requiring the ultimate in high vacuum apparatus



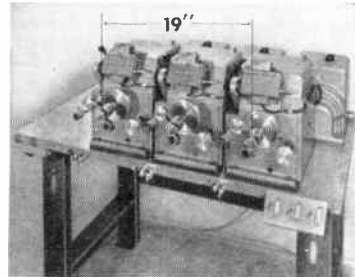
SEL 410
Vacuum Deposition
System

**SCIENTIFIC ENGINEERING
LABORATORIES**
1510 Sixth Street
Berkeley 10, California

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FRONT LOADING MULTIPLE HEADER BOBBIN WINDER Adjustable Length

Up to 4 heads easily handled by operator without shifting position. Each head winds random wound Bobbin Coils, Solenoids, Repeater Coils or Resistors up to 2½" long and up to 4" OD. Each head individually motorized and easily portable.



Note extreme compactness

Exclusive time-saving convenient front loading—spindle faces operator. Winding traverse infinitely adjustable—no cam changing.

Up to 7000 RPM winding speed. Exclusive features: 1) Slow-start eliminates wire breakage. 2) Extra economy positive stopping magnetic brake. 3) Instant automatic brake release.

Other time-saving features: 1) Instant re-setting automatic counter. 2) Faster gear changing—gear box handily located on top of head. 3) One motion by operator re-sets counter and starts machine—starting switch located directly opposite counter re-set lever. 4) No oiling necessary—all parts automatically lubricated. 5) Tension conveniently mounted below spindle.

Increase production, lower costs, lessen down time with Model 314-AM.

GEO. STEVENS MANUFACTURING CO., INC.
Pulaski Rd. at Peterson, Chicago 30, Ill.

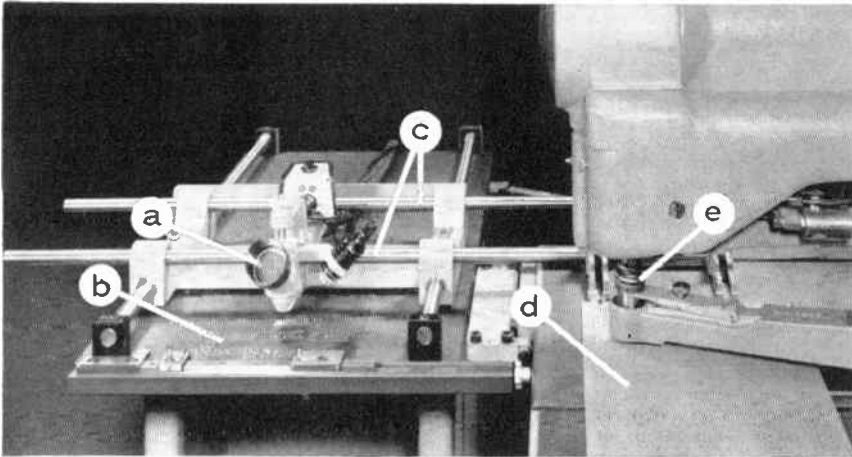
The most complete line of coil winding equipment made

For details, circle #720 on Reader Service Card

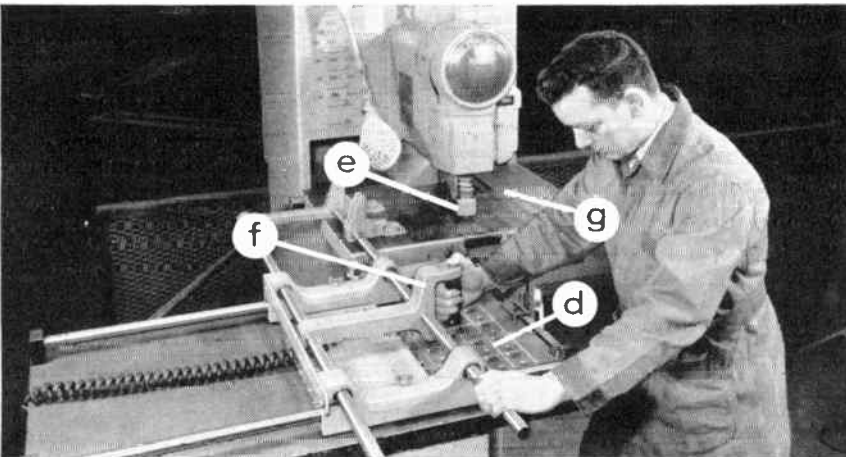
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COLD-PUNCH PRINTED CIRCUITS

...this profitable STRIPPIT way!



- 1. PUNCH THE TEMPLATE.** The Strippit Dupl-O-Scope (a), precision 4-power optical locator is mounted on Strippit pantograph-like Duplicator. As the Dupl-O-Scope is "sighted-in" on drawing or sample (b), the Duplicator arms (c) position template blank (d) under Strippit Fabricator punch (e) to accurately locate and punch pilot holes in a fraction of conventional layout and template making time.



- 2. RAPID-FIRE DUPLICATION FROM TEMPLATE.** Duplicator with Stylus (f) replaces Dupl-O-Scope. As Stylus enters each pilot hole in template (d), it automatically positions work (g) under the punch (e) and trips the punch to produce a hole of desired shape and size in the proper location. Tool changes in the Fabricator punch holder are made in seconds, and anyone can learn to operate the Duplicator in a few minutes. For small to medium runs, there is no easier, faster or more economical method of making clean, accurate perforations in laminates or in chassis up to 1/4" mild steel.

WRITE FOR DEMONSTRATION AT YOUR PLANT! At no obligation, a Strippit Mobile Unit will demonstrate the cost-cutting Strippit Fabricator, Duplicator and Dupl-O-Scope. Write today!

WALES STRIPPIT INC.
246 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario
For details, circle #721 on Reader Service Card



Here's how to wind
cross-wound coils

**FASTER,
BETTER**



The new Leeson No. 111 Coil Winder is today's most efficient machine for cross-wound coils -- specially designed for automatic production and fast, accurate setup to cut your costs and raise your profits.

Read the new bulletin about No. 111's *exclusive* features -- automatic programming attachment -- automatic pie-winding attachment -- change gears that drop onto fixed centers without use of tools -- and many more.

Cash in on coil windings' latest cost cutter. Send now for bulletin No. 111.

**UNIVERSAL WINDING
COMPANY**

P. O. Box 1605, Providence 1, R. I., Dept. 165
For details, circle #722 on Reader Service Card

Veeco

**HIGH VACUUM
EQUIPMENT**



Helium Mass Spectrometer
LEAK DETECTORS
Constant Sensitivity: 10⁻¹⁰cc/sec.
1 part/10 million

High Vacuum
**PUMPING
STATIONS**

2" and Modular 4"... Buy
as you need



High Vacuum
VALVES:

1/8" to 4", Bellows sealed.
Brass and Stainless Steel.
pneumatic, manual and solenoid

High Vacuum
**DIFFUSION
PUMPS:**

2" and 4" Air-Cooled and Water-
Cooled • Highest Speed • Lowest
Backstreaming • Highest Fore-
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High Vacuum
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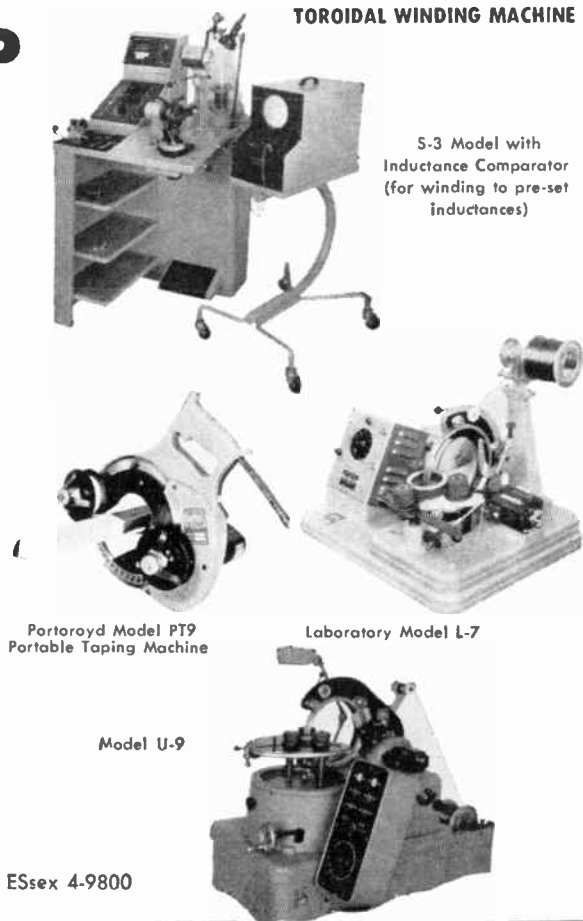
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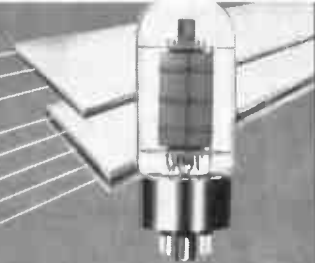
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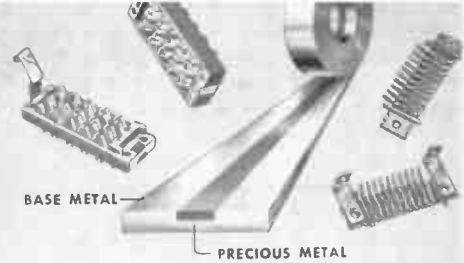
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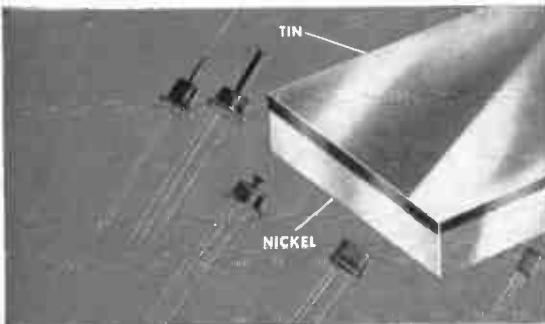
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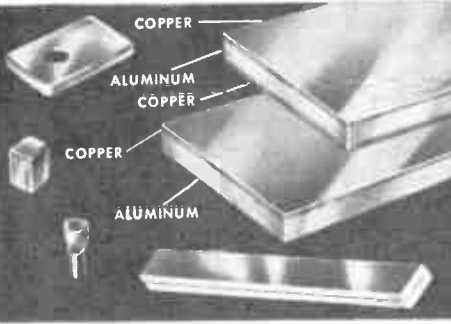
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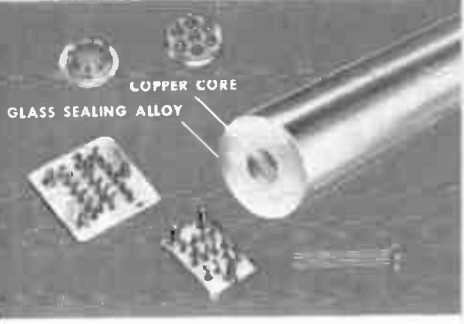
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A number of combinations of clad metals are available for use on base tabs, lead wires, whisker wires, base materials and enclosures in silicon and germanium diodes, transistors and germanium power transistors.



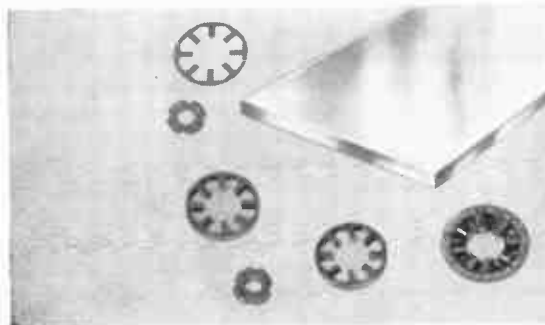
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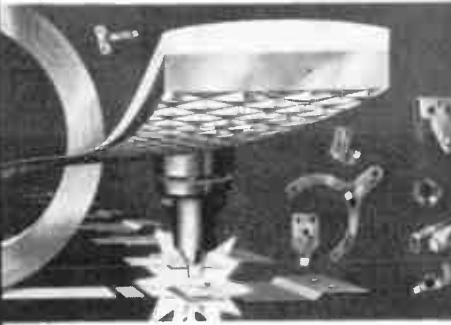
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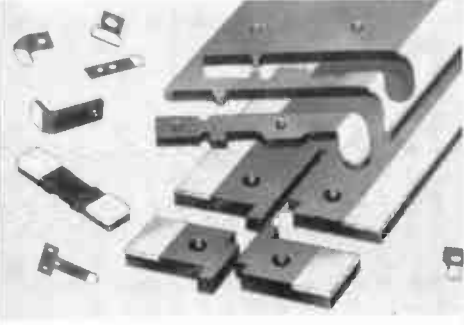
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92. Machinery & Tools.

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10 E. 40th St., New York 16, N.Y.,
Abrasive Unit
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93. Metals.

- | | |
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| 10. Copper | cluding copper |
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10, 20, 30
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N.Y., Brazing Alloys
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Alloys Unlimited, Inc., N.Y., 5, 20, 25,
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Alpha Metals, Inc., N.J., 5, 20, 25, 30,
High Purity
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30
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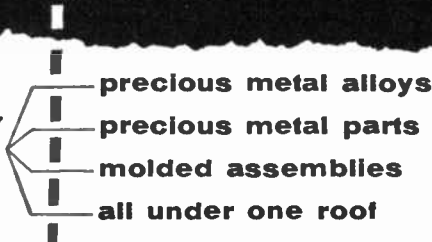
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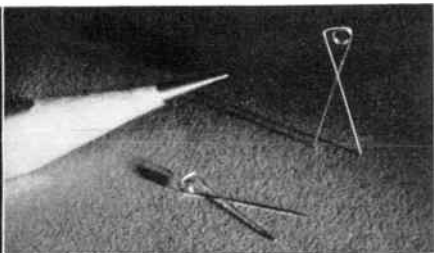
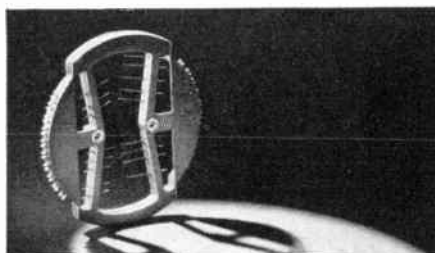


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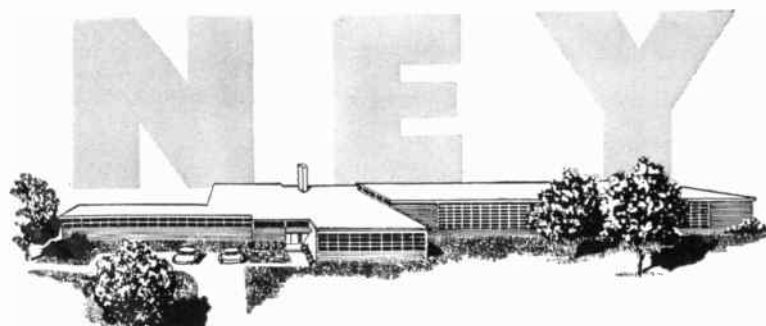
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 Tel: **WOrth 2-2044**
- Crucible Steel Co. of America, Pa., 5, 15
 Crucible Steel Co. of America, Vacuum Metals Div., N.Y., 5, 10, 15, 20
 Dalweld Co., Inc., N.Y., 5, 10, 30
 Davis-K Products Co., N.Y., 30
 Deringer Metallurgical Corp., Ill., 5, 30
 Division Lead Co., Ill., 5, 20, 25
Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 5, 20
 See ad on page 188
 Tel: **HUmboldt 2-5550**
- Driver-Harris Co., 201 Middlesex St., Harrison, N.J., 5, 20
 See ad on page 194
 Tel: **HUmboldt 3-4800**
- Electro Tec Corp., N.J., 30
 Electronic Parts Mfg. Co., Inc., N.J., 5, 20
- Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5, 10, 30
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 Tel: **BIgelow 3-0030**
- Englehard, Inc., Charles, N.J., 30
Fansteel Metallurgical Corp., North Chicago, Ill., 5, 20
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 Fusion Engineering Co., Ohio, 25
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 Hamilton Watch Co., Pa., 5, 10, 15
 Handy & Harman, N.Y., 25, 30
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 Heavy Minerals Co., Tenn., 17
 Hoskins Mfg. Co., Mich., 5, 20
Indium Corp. of America, 1678 Lincoln Ave., Utica 4, N.Y., 5, 20, 30, Indium
 See ad on page 679
 Tel: **SWift 7-1630**
- International Nickel Co., Inc., N.Y., 5, 20
 Investment Casting Co., N.J., 15, 20
Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 17, 25
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- King Laboratories, Inc., N.Y., 5, 30
 Kinney Co., Inc., Joseph, Pa., Clad Wire, Steel & Copper Invar
 Kulite Tungsten Co., N.J., 20, 25, Cobalt, Tungsten & Molybdenum
 Leach & Garrier Co., Ind. Div., Mass., 5, 30
 MacKay, Inc., A. D., N.Y., 5, 10, 15, 17, 20, 25, 30
 Magnetic Powders, Inc., Pa., 25
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Directory III. Materials & Services

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Tel: ATtleboro 1-2800

Metz Refining Co., N.J., 5, 25, 30
 National Lead Co., N.Y., 5, 20, 25
 National Moldite Co., N.J., 15, 17, 25
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 Nesor Alloy Products Co., N.J., 5, 10, 15, 30

New Jersey Zinc Co., N.Y., 5, 20, 25
 New Process Metals, Inc., N.J., 5, Rare Earth Metals

Ney Co., J. M., Maplewood Ave., Bloomfield 1, Conn., 5, 30

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 Pacific Scientific Co., Calif., 30
 Paul & Stein Bros., Inc., F. H., N.Y., 30, Aluminum Foil

Pease & Curren, Inc., R.I., 30

Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 5, 15, 25, 30

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Tel: EVerglade 4-2122

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 5, 10

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Tel: PLaza 1-3200

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 Porter Co., Inc., H. K., N.J., 5, 10, 15, 20
 Precision Metalsmiths, Inc., Ohio, 5, 10, 15, 20

Precision Tube Co., Inc., Pa., 5, 10, 20
 Production Metals, Inc., N.Y., 20
 Republic Foil, Inc., Conn., Aluminum Foil

Research Chemicals, Calif., 5, 17, 30

Revere Copper & Brass, Inc., N.Y., 5, 10, 20

Rubber & Asbestos Corp., N.J., Adhesive-Coated Copper
 St. Eloi Corp., Ohio, 30

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 Stieh Chemicals, Inc., N.Y., 17, 20
 Superior Carbon Products, Inc., Ohio, 5, 25

Sylvania Electric Products, Inc., Chemical & Metallurgical Div., Pa., 20, 25
 Techalloy Co., Inc., Pa., 5, 15

Technic, Inc., R.I., 30

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Temco Aircraft Corp., Electronics Div., Tex., Titanium

Texas Instruments Incorporated, Semiconductor—Components Div., P.O. Box 312, 13500 N. Central Expressway, Dallas, Tex., 5, 10, 30

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Tel: FLeeewood 7-5411

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Trancoa Chemical Corp., 312-326 Ash St., Reading, Mass., 20

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Tricon Mfg. Co., Ill., 30

Tri-State Plastic Molding, Ky., 20

Union Carbide Corp., Haynes Stellite Co. Div., Ind., 5, 25

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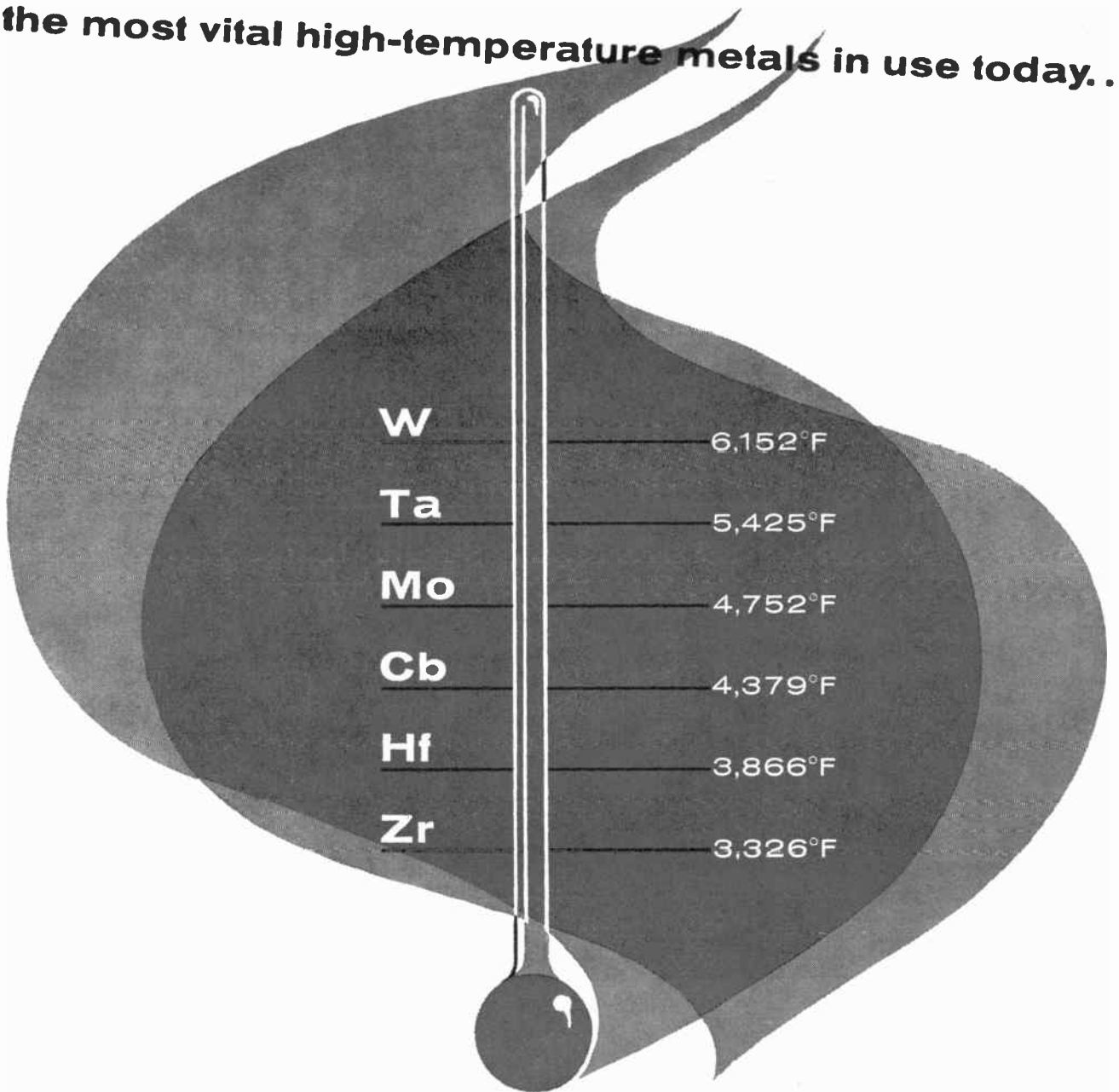
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Directory III. Materials & Services

93. Metals.

- Union Carbide Corp., Union Carbide Metals Co., N.Y., 5, 15, 17, 20, 25
- United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5, 30**
See ads on pages 541, 681
Tel: BEEKMAN 3-8870
- U.S. Steel Corp., Pa., 5, 15
- Wah Chang Corp., 233 Broadway, New York 7, N.Y., 17, 20, 25, 30**
See ad on page 680
Tel: CORTLANDT 7-0887
- Waterbury Rolling Mills, Inc., Conn., 5, 10
- Western Gold & Platinum Co., Calif., 30
- Westinghouse Elect. Corp., Lamp Div., N.J., 20
- Wildberg Bros. Smelting & Refining Co., Calif., 30
- Wilkinson Co., Calif., 30
- Williams & Co., Pa., 17, 25, Magnetic Iron Oxides
- Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 5, 20, 25, 30**
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Tel: UNIVERSITY 7204
- Wilson Div., H. A., Engelhard Industries, Inc., U. S. Highway 22, Union, N.J., 5, 10, 15, 17, 20, 25, 30
See ad on page 198
Tel: MURDOCK 6-6600


Moisture-proofing: See class 86

94. Molded Products.

5. Insulators
10. Knobs & parts
15. Proprietary moldings
- A-1 Precision Products, Calif., 10, 15
- Accurate Electronics Corp., Ohio, 5, 10, 15
- Airflyte Electronics Co., 540 Ave. A, Bayonne, N.J., 15**
See ad on page 550
Tel: HEMLOCK 6-2230
- Amatom Electronic Hardware Co., Inc., N.Y., 10
- American Lava Corp., Cherokee Blvd. & Manufacturers Rd., Chattanooga 5, Tenn., 5**
See ad on page 180
Tel: AMHERST 5-3411
- American Molded Products Co., Ill., 5, 15, Magnetic Tape Reels, Wire Spools—Plastic, TV Yoke Cases, Covers & Insulators
- Anti-Corrosive Metal Products Co., N.Y., 15
- Aries Labs., Inc., Conn., 15
- Armel Electronics, Inc., N.Y., 5
- Atkins & Merrill, Inc., Post Rd., Sudbury, Mass., 15**
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Tel: HILLTOP 3-8822
- Bastian Bros. Co., N.Y., 5
- Beemer Engrg. Co., Pa., 5
- Blinn Co., Delbert, Calif., 10, 15
- Bodnar Industries, Inc., N.Y., 10

94. Molded Products.

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- Boonton Molding Co., N.J., 5, 10
- Borolite Corp., Pa., 15
- Centralab, Div. of Globe-Union, Inc., 920 E. Keefe Ave., Milwaukee 1, Wis., 5**
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- Ceramic Spec. Co., Inc., Ohio, 5
- Chemplast, Inc., N.J., 5
- Chester-Morton Electronics Corp., Pa., 15
- Collectronix Corp., N.Y., 15
- Colman Electronic Prods., Inc., Tex., 10
- Consolidated Molded Prods. Corp., Pa., 10, 15
- Continental-Diamond Fibre Corp., Del., 5
- Crystal-X Corp., Pa., 5, 10, 15



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| Cesium | Lead | Rhenium | Oxides and salts | |

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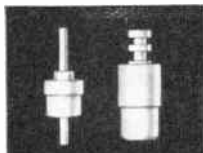
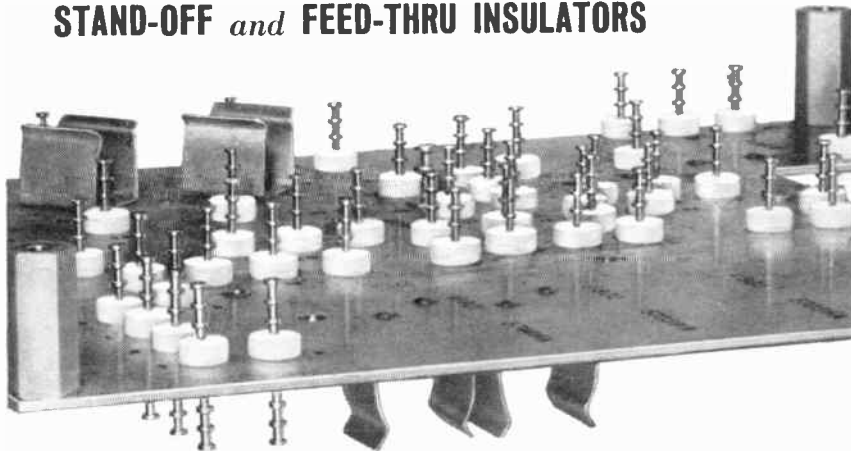
16 Hudson Street; New York 13, New York
Beekman 3-8870

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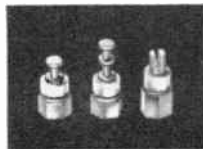
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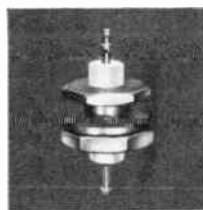
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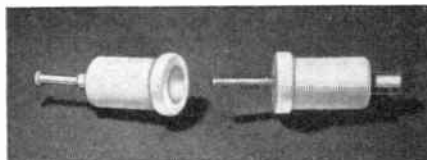
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94. Molded Products.

Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 10

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Tel: LOcust 4-3131

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Davis Plastics Co., Joseph, N.J., 15

Dayton Aircraft Products, Inc., Fla., 15

Deutsch Co., Electronic Components Div., Calif., 15

Dimco-Gray Co., 212 E. Sixth St., Dayton 2, Ohio, 10

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Tel: BAldwin 2-6703

Dixon Corp., R.I., 5

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Eby, Inc., Hugh H., Pa., 5, 10

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Electronic Techniques, Inc., Calif., 15

Emerson & Cuming, Inc., Mass., 15

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Tel: ESsex 5-6000

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 10

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Tel: GLendale 6-8592

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Excellex Electronics, Inc., N.Y., 10, 15

Fawn Plastics Co., Inc., Md., 10

Ferricore, Inc., N.J., 15

First Electronics Corp., Mass., 15

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Tel: ROckford 2-6695

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Tel: WOODlawn 4-0370

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Glastic Corp., Ohio, 5

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 5, 10, 15

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Tel: NEw Rochelle 3-8600

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Hydro Molding Co., 100 Sharron Ave., Plattsburgh, N.Y., 5, 10, Molded Nylon

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Tel: 2598

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 Martin Co., Baltimore Div., Md., 15
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 Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, 10
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 Motorola, Inc., Ariz., 5
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 Tel: PRescott 9-8866

National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 5, 10
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Norrich Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 5, 10
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 Tel: WATkins 4-8360

Northwest Plastics, Inc., Minn., 15
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 Tel: WEstmore 9-3066

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Robertson Electric Co., Inc., 124 S. Elmwood Ave., Buffalo 2, N.Y., 15
 See ads on pages 425, 615
 Tel: MAdison 6658
 Rogan Brothers, 8009 N. Monticello Ave., Skokie, Ill., 5, 10, 15
 See ad on this page
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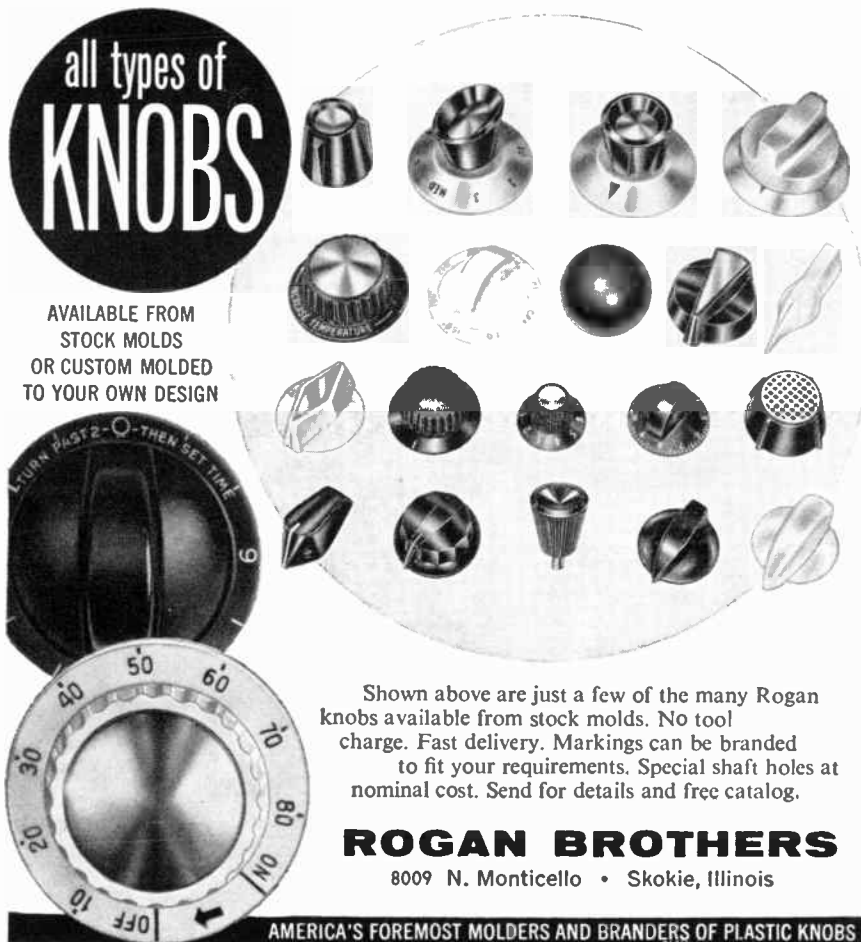


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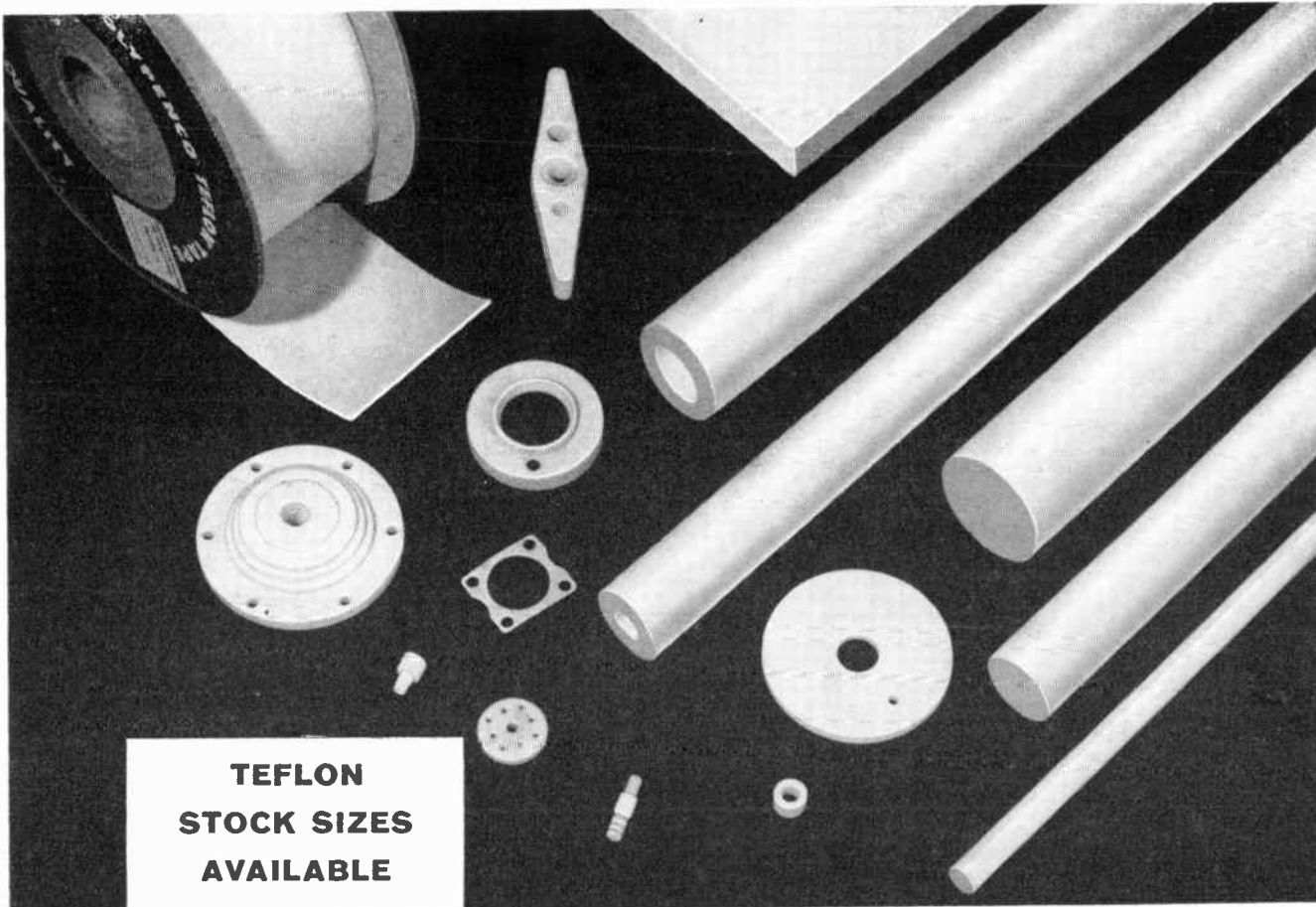
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94. Molded Products.

- Ross Metals Co., Milton, Pa., 5, 10, 15
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Saxton Products, Inc., 4320 Park Ave.,
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Silicone Insulation, Inc., N.Y., 5
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Smith, Inc., H. H., N.Y., 5, 10, 15
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Tel: LOWell 8-4555
- Swenson Co., Inc., V. H., N.J., 5, 10, 15
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Tel: JUdson 6-2424
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- Tech Art Plastics Co., N.J., 5, 10, 15
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- Titan Metal Mfg. Co., Pa., Pressure Die
Castings, Forgings, Brass Rods, Spe-
cial Shapes
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Packaging: See class 86

Packaging materials:

See class 87

Paints: See class 91

Permanent magnets: See class 55

Phosphors: See class 99

Pins & prongs: See class 99

Plastic fabrication & molding: See class 86

95. Plastics.

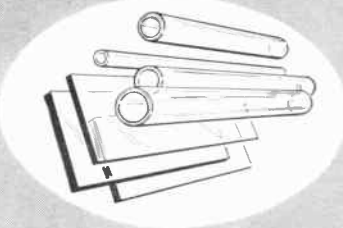
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Chemicals Div., N.Y., 5, 7, 10
Alpha Wire Corp., 200 Varick St., New
York 14, N.Y., 25
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- American Cyanamid, Formica Corp.,
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Arlin Mfg. Co., Mass., 7
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- Auburn Mfg. Co., Conn., 5, 15, 20, 25
Beemer Engrg. Co., Pa., 5, 7, 15, 20, 25
Blinn Co., Delbert, Calif., 5
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sols
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Cleveland Container Co., Ohio, 25
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Commercial Plastic Co., Ill., 5, 15, 20, 25
Commercial Plastics & Supply Corp.,
N.Y., 5, 7, 15, 20, 25
Continental Can Co., Inc., 7
Continental-Diamond Fibre Corp., Del.,
5, 7, 15, 20, 25
Cortland Industries, Inc., Ill., 7, 15, 20,
25

95. Plastics.

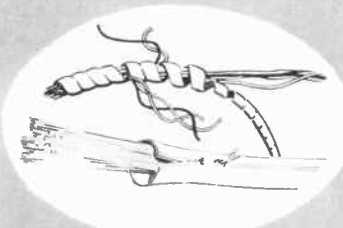
- Crane Packing Co., Ill., 5, 15, 20, 25
Crystal-X Corp., Pa., 5, 15, 20, 25
Davis Plastics Co., Joseph, N.J., 5, 7, 15,
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- Dixon Corp., R.I., 5, 15, 20, 25
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Epoxy Products, Inc., 137 Coit St., Irv-
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Tel: ESsex 5-6000
- Enflo Corp., N.J., 5, 7, 15, 20, 25
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tronic Products, Camden 1, N.J., 5, 7,
15, 20, 25
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Tel: WOODlawn 4-0370
- General Electric Co., Laminated Prods.
Dept., Ohio, 7, 15, 20, 25
Gering Products, Inc., N.J., 5, 10, 15, 20,
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Tel: ENdicott 8-8325
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Hays Mfg. Co., Pa., 7, 20

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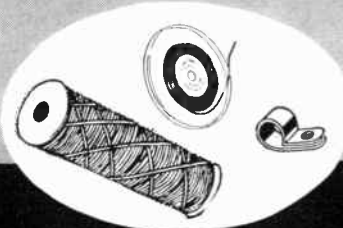
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95. Plastics.

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Hooker Chem. Corp., Durez Plastics Div., N.Y., 10
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Tel: REgent 9-2395

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Lamtex Industries, Inc., N.Y., 7, 15, 25

Lee Chemical Corp., Walter, N.Y., 5, 7, 15, 20, 25

Luzerne Rubber Co., N.J., 5, 15, 20, 25
Marbette Corp., N.Y., 15, 20, 25

Markel & Sons, L. Frank, School Lane, Norristown, Pa., 5, 25

See ad on page 652

Tel: BRoadway 2-8960

Mesa Plastics Corp., Calif., 10, 15, 20

Meter-Mix Corp., Mass., 5

Mica Corp., Calif., 7, 20

Mica Insulator Co., Minn. Mining & Mfg. Co. Div., N.Y., 7, 15, 20, 25

Micarta Fabricators, Inc., Ill., 7

Midwest Plastic Products Co., Ill., 20

Minnesota Mining & Mfg. Co., Minn., 5, 7, 10, 15, 20, 25

Minnesota Mining & Mfg. Co., Chemical Div., Minn., 10

Minor Rubber Co., Inc., N.J., 5, 15, 20, 25

Mitchell Rand Mfg. Corp., Insulation Div., N.Y., 10

Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., 15, 20

See ad on page 102

Tel: PRescott 9-8866

National Moldite Co., N.J., 25

National Tel-Tronics Corp., 52 St. Casimir Ave., Yonkers, N.Y., 15, 20, 25

See ad on page 462

Tel: YOnkers 8-6400

National Vulcanized Fibre Co., Del., 5, 15, 20, 25

New England Laminates Co., Inc., Conn., 7, 20

New England Tape Co., Mass., 5, 25

New Hermes Engraving Machine Corp., 154 W. 14th St., New York 11, N.Y., 7

See ad on page 671

Tel: WATkins 4-7373

Nopco Chemical Co., Plastics Div., N.J., Foamed

Norrish Plastics Corp., 107-109 W. 18th St., New York 11, N.Y., 15, 20, 25

See ad on page 152

Tel: WATkins 4-8360

Northern Plastics Corp., Wis., 7, 20

Ny-Glass, Inc., Calif., 7, 25

Oppenheimer Plastics, Inc., Pa., 7

Owens-Corning Fiberglass Corp., N.Y., Reinforcements

Peeco Corporation, Calif., 7

Penn Fibre & Specialty Co., Inc., Pa., 7, 15, 20, 25

Permacel, N.J., 20, 25

Pickett & Eckel, Inc., Calif., 10

Pilgrim Products, Inc., Mass., 7, 15, 20, 25

Plastic Mold & Engineering Co., R.I., 5
Plastics Engineering Co., Wis., 10

Polymer Corp. of Pa., Dept. RB, 2140 Fairmont Ave., Reading, Pa., 5, 10, 15, 20, 25

See ad on page 684

Tel: FRanklin 6-5791

Precision Metal Products Co., Mass., 15, 20, 25

Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 25

See ad on page 644

Tel: ARmitage 6-5200

Prince Rubber Co., Inc., N.Y., 15, 20, 25
Raybestos-Manhattan, Inc., Pa., 5, 7, 15, 20, 25

Republic Aviation Corp., N.Y., 7
Rex Corp., Mass., 5, 15, 20, 25

Richardson Co., Ill., 7, Copper Clad, 15, 20, 25

Rogers Corp., Conn., 7, 10, 15, 20, 25
Ross Metals Co., Milton, Pa., 5, 7

St. Regis Paper Co., N.Y., 7, 15, 20, 25

Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., 5, 15, 25

See ad on page 615

Tel: WELlington 3-6400

Shamban & Co., W. S., Calif., 5, 7, 15, 20, 25, Kel-F, Teflon, Nylon Film

Shell Chemical Corp., N.Y., Epoxy Resins

Silicone Insulation, Inc., N.Y., 5, 7, 15, 20, 25

Sparta Mfg. Co., Ohio, 5, 7, 15, 20, 25

Spaulding Fibre Co., Inc., N.Y., 7, 15, 20, 25

Stanpat Co., N.Y., 7

Stevens Products, Inc., N.J., 7, 25

Suflex Corp., N.Y., 5

Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y., 5

See ad on pages 23-25

Tel: JUdson 6-2424

Synthane Corp., Pa., 7, 15, 20, 25

Taylor Electric, Inc., Mich., 5, 20, 25

Taylor Fibre Co., Pa., 7, 15, 20, 25

Tech Art Plastics Co., N.J., 7, 15, 20, 25

Technical Tape Corp., N.Y., 5

Telectro Industries Corp., N.Y., 7, 20

Tetrafluor, Inc., Calif., 5, 7, 10, 15, 20, 25

Teveco Insulated Wire, Calif., 5

Thompson Fiber Glass Co., H. I., Calif., 7

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 15, 20

See ad on page 620

Tel: PILgrim 3-7797

Trimount Plastic Co., Inc., Mass., 7, 20

Tri-Point Plastics, Inc., N.Y., 5, 15, 25

U. S. Rubber Co., N.Y., 5, 7, 20

Victor Electric Wire & Cable Corp., R.I., 5

Warminster Fiberglass Co., Pa., 7

Weleraft Prods. Co., Inc., Ind., 5

Westlake Plastics Co., Pa., 5, 7, 15, 20, 25

Willson Camera Co., Inc., Pa., 7

Wirekraft, Inc., Ind., 5, 25

Zenith Plastics Co., Calif., 7

Zippertubing Co., Calif., 25

Directory III. Materials & Services

Precious metals: See class 93

Prongs, vacuum tube:
See class 99

Proprietary forms, ceramic:
See class 83

Proprietary molding, plastic:
See class 94

Publishing: See class 101

Pumps, vacuum: See class 92

Racks: See class 84

Representatives, manufacturers:
See class 102

Research laboratories:
See class 90

Retaining rings: See class 87

Rivets: See class 87

Sales & service: See class 102

Screen Rooms: See class 12

Screws: See class 87

Shaft locks: See class 99

Shafts, flexible: See class 87

Shielded enclosures:
See class 12

96. Shielding Materials.

5. Microwave 10. Radio frequency

Air-Maze Corp., Ohio, 10
Auburn Mfg. Co., Conn., 5, 10
Bar-Ray Products, Inc., N.Y., X-Ray
Bogart Mfg. Co., N.Y., 5
Braun Tool & Instrument Co., Inc., 141
Fifth Ave., Hawthorne, N.J., 5, 10
See ads on pages 459, 543, 551
Tel: Hawthorne 7-1773

Cico Corp., Calif., 10
Cook Electric Co., Inland Test. Labs.
Div., Ill., 5, 10

Co-operative Industries, Inc., N.J., 10
Emerson & Cuming, Inc., Mass., 5, 10
Epoxy Products, Inc., 137 Coit St., Irvington 11, N.J., Environmental
See ad on page 150
Tel: ESsex 5-6000

Factory Enterprises, Inc., Pa., 10
Filmohm Corp., N.Y., 5
General Cable Corp., Metal Textile
Corp. Div., N.J., 5, 10

Goodrich Co., B. F., Sponge Products
Div., Conn., 5, Absorbers
Gore & Associates, Inc., W. L., 487
Papermill Rd., Newark, Del., 5, 10

See ad on page 608
Tel: ENdicott 8-8325
Gulton Industries, Inc., N.M., 5, 10
Hallett Mfg. Co., Calif., 5, 10

NETIC CO-NETIC TAPE DATA PRESERVERS

Keep Data Clear, Distinct, Without Distortion

Permanently maintain original fidelity of recorded data on automation programming tapes, telemetering, broadcast, video and hi-fi tapes by diverting all damaging magnetic fields. Magnetic shielding qualities not affected if sturdy Netic Co-Netic containers are dropped or vibrated. Containers do not retain residual magnetism nor require periodic annealing.



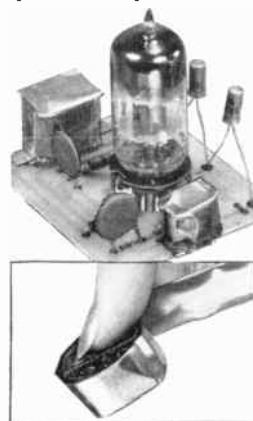
Successfully provide simultaneous high and low intensity shielding plus high and low frequency shielding from all damaging extraneous fields produced by generators, power supplies, transformers, magnetic tables on surface grinders, magnetic chucks, de-gaussers, soldering irons, motors, power lines, welding machines, solenoids, etc. around factories, laboratories, military installations, and radio and TV stations. Available in many convenient round or rectangular shapes. Write for sizes and prices today.

MAGNETIC SHIELD DIVISION PERFECTION MICA CO.
1322 No. Elston Avenue • Chicago 22, Illinois

LOWER COST MAGNETIC SHIELDING

Co-Netic & Netic Foils Permit Max. Miniaturization, Improved Performance ... Extremely Versatile—Readily Cut to Any Shape, Wrap Like Tape

How Co-Netic & Netic foils lower your magnetic shielding costs: 1) You use less shielding material because (a) foils are only .004" thick and (b) foils cut easily to exact shape required, minimizing waste. 2) Permit simple shielding of odd shapes and hard-to-get-at components, saving valuable time and eliminating tooling costs and inflexibility of rigid metals. These advantages make possible much smaller and less costly systems, as components may be positioned in close proximity without interference from damaging magnetic fields.



These foils are non-shock sensitive, non-retentive, require no periodic annealing. They effectively shield electrostatic and magnetic fields over a wide range of intensities. Both foils available from stock in any desired length in various widths.

Co-Netic & Netic foils are successfully solving many types of magnetic shielding problems in numerous critical satellite, missile, magnetic tape and other military, airborne, electronic and laboratory applications. These foils can help you solve your magnetic shielding problems.

MAGNETIC SHIELD DIVISION PERFECTION MICA CO.
1322 No. Elston Avenue • Chicago 22, Illinois
Originators of Permanently Effective Netic Co-Netic Magnetic Shielding

For details, circle #739 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

KESTER SOLDER

FIRST CHOICE FOR EVERY APPLICATION...



Kester "44" Resin-Core Solder

The Solder that's widely used in the electronic industry for TV, radio and similar applications. Has a new activated resin flux that permits the fastest soldering operation. Absolutely non-corrosive and non-conductive. Supplied on 1-, 5- and 20-lb. spools.



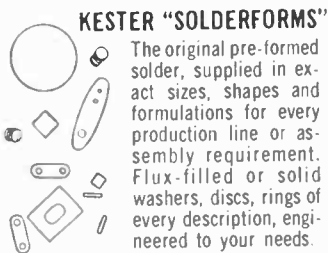
Kester "Resin-Five" Core Solder

Standard "accelerated" resin flux for easy soldering of such metals as copper, zinc, brass, nickel-plate and others. Ideal for printed circuit work. Available in all tin and lead combinations. Non-corrosive and non-conductive. In 1-, 5- and 20-lb. spools.



Kester Plastic Rosin-Core Solder

Time-proved "standard" in the electrical-electronic industry. Kester's Plastic Rosin is plasticized, preventing decomposition and permanently preserving the full fluxing quality of the original resin; it's completely non-corrosive, non-conductive and fungus resistant. Available in wide range of tin-lead combinations, core sizes. In 1-, 5- and 20-lb. spools.



KESTER "SOLDERFORMS"

The original pre-formed solder, supplied in exact sizes, shapes and formulations for every production line or assembly requirement. Flux-filled or solid washers, discs, rings of every description, engineered to your needs.

KESTER SPECIALIZED FLUX-CORE SOLDERS

The formulation and production of special flux-core solders for any specific application is a famous Kester feature . . . the logical outgrowth of over 60 years' experience in serving the soldering needs of all types of industry.



KESTER SOLDERING FLUXES

Scientifically compounded to make all soldering operations easier, faster, more economical, the four basic types of Kester Fluxes include 160 different formulations.

FREE: WRITE today for 78-page Kester technical manual, "Solder . . . its Fundamentals and Usage."

CALL ON KESTER FOR ENGINEERING ASSISTANCE

Since 1899, Kester's business has been SOLDER. With this background, your particular soldering problem is quickly solved to your entire satisfaction. There's no obligation of any kind . . . ever! Call—write—wire for the details.



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Newark 5, New Jersey • Anaheim, California • Brantford, Canada
OVER 60 YEARS' EXPERIENCE IN SOLDER AND FLUX MANUFACTURING

Directory III. Materials & Services

96. Shielding Materials.

Hexcel Products, Inc., Md., 10, Honeycomb Core Materials
Instrument Specialties Co., Inc., 284-A Bergen Blvd., Little Falls, N.J., 5, 10
See ad on page 640
Tel: CLifford 6-3500
Jan Hardware Mfg. Co., Inc., N.Y., 5
Kaman Aircraft Corp., Nuclear Div., Colo., 5
Kinney Co., Inc., Joseph, Pa., 10
McMillan Industrial Corp., Mass., 5, 10
Metal Textile Corp., N.J., 10
Metavac, Inc., N.Y., 5, 10
Mycalex Corp. of America, 125-B Clifton Blvd., Clifton, N.J., Nuclear
See ad on page 102
Tel: PRescott 9-8866
National Moldite Co., N.J., 10
National Wire & Cable Corp., Calif., 10
Nuclear-Chicago Corp., Ill., Lead
Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 5, 10
See ad on page 687
Tel: EVerglade 4-2122
Radar Design Corp., N.Y., 5 Absorbers
Shamp Scientific Supply Co., D.C., 5
Shielding, Inc., 66 N. Read Ave., Riverton, N.J., 5, 10
See ad on page 240
Tel: TAlmadge 9-1433
Sterling Precision Corp., 17 Matinecock Ave., Port Washington, L.I., N.Y., 5
See ads on pages 306, 351
Tel: POrt Washington 7-7200
Swift Textile Metalizing & Laminating Corp., Conn., 5, 10
Technical Wire Products, Inc., N.J., 5, 10
Telectro Industries Corp., N.Y., 5, 10
York Co., Inc., Otto H., N.J., 10
Zippertubing Co., Calif., 10

Shields, tube: See class 99

Sockets: See class 69

**Soldering Irons & Guns:
See class 92**

97. Solder.

| | |
|--------------|--------------------|
| 5. Acid core | 20. Precious metal |
| 10. Fluxes | 25. Pre-forms |
| 15. Plain | 30. Rosin core |

Accurate Specialties Co., Inc., N.Y., 5, 10, 15, 20, 25, 30
Allen Co., Inc., L. B., Ill., 10
Alloys Unlimited, Inc., N.Y., 15, 20, 25
All-State Welding Alloys Co., Inc., N.Y., 10, 20, Aluminum
Alpha Metals, Inc., N.J., 5, 10, 15, 20, 25, 30

97. Solder.

Aluminum Co. of America, Pa., 15
Ambroid Co., Mass., 10
American Platinum & Silver Div., Engelhard Industries, Inc., 231 New Jersey Railroad Ave., Newark 5, N.J., 20, 25
See ad on page 198
Tel: MArket 2-8025
American Silver Co., Inc., N.Y., 10, 20
American Smelting & Refining Co., N.Y., 5, 15, 30
Anchor Metal Co., Inc., N.Y., 5, 10
Anthony & Co., J. L., R.I., 15, 20
Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 25
See ad on page 695
Tel: HUmiboldt 4-2100
Bigelow Mfg. Corp., N.J., 32
Bow Solder Products Co., Inc., N.Y., 5, 10
Chase Brass & Copper Co., Sub-Kennecott Copper Corp., Conn., 15, 20
Chemalloy Electronics Corp., Calif., 15, Aluminum-Fluxless
Dalweld Co., Inc., N.Y., 10, 20
Decimeter Products Co., Colo., 10
Division Lead Co., Ill., 5, 10, 15, 25, 30
Drake Electric Works, Inc., Ill., 5, 30
Drakenfeld & Co., Inc., B. F., N.Y., 20
Electrovert, Inc., N.Y., 10, 15, 30
Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10
See ad on page 198
Tel: BIdelow 3-0030
Fairmount Chemical Co., Inc., N.Y., 10
Forney Industries, Aviation Div., Colo., 10
Fusion Engineering Co., Ohio, 10, 25
General Findings & Supply Co., Industrial Div., Mass., 25
Glaser Lead Co., Inc., N.Y., 5, 10, 15, 20, 25, 30
Goldsmith Bros. S&R Co., Ill., 10, 20
Handy & Harman, N.Y., 10, 20, 25
Johnson Mfg. Co., Inc., Iowa, 5, 10, 15, 25, 30
Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 5, 10, 15, 20, 25, 30
See ad on page 688
Tel: BElmont 5-1601
LMB-Heeger, Inc., Calif., 10
Leach & Garner Co., Ind. Div., Mass., 20
London Chemical Co., Inc., Ill., 10, 15, 20, 30
Metals & Controls Div. of Texas Instruments Incorporated, 51 Forest St., Attleboro, Mass., 20
See ad on page 676
Tel: ATtleboro 1-2800
Metz Refining Co., N.J., 20
Mico Instrument Co., Mass., 10, 30
Multicore Sales Corp., N.Y., 10, 30
Multicore Solders, Ltd., England, 5, 10, 15, 25, 30
National Lead Co., N.Y., 5, 10, 15, 20, 25, 30
National Wire & Cable Corp., Calif., 30

New York Solder Co., Inc., N.Y., 5, 15, 30
Pacific Scientific Co., Calif., 20
Ruby Chemical Co., Ohio, 5, 10, 30
Sargeant & Wilbur Heat Treating Corp., R.I., 10, 20
Shanda Lab., Inc., N.J., 10
Standard Metals Corp., Mass., 20
Superior Flux & Mfg. Co., Ohio, 10
Tricon Mfg. Co., Ill., 5, 10, 15, 20, 25, 30, Silver
Union Carbide Corp., Linde Co. Div., N.Y., 10
Union Elect-Sonics Corp., Mass., 10
Western Gold & Platinum Co., Calif., 20, 25
Wildberg Bros. Smelting & Refining Co., Calif., 20
Wilkinson Co., Calif., 20
Williams Gold Refining Co., 2978 Main St., Buffalo 14, N.Y., 15, 20, 25
See ad on page 681
Tel: UNiversity 7204
Wilson Div., H. A., Engelhard Industries, Inc., U. S. Highway 22, Union, N.J., 20
See ad on page 198
Tel: MURdock 6-6600

Spacers & insulators, vacuum tube: See class 99

Spinning, metal: See class 86

Springs: See class 87

Stamping, metal: See class 86

Strain reliefs: See class 87

Surplus dealers: See class 102

Tags & Markers: See class 87

Tape, adhesive: See class 87

Tape, insulating: See class 89

Tape, lacing: See class 87

**Tape, magnetic recording:
See class 63**

KULKA

TERMINAL BLOCKS

MOLDED BARRIER CONSTRUCTION

Kulka terminal blocks, used extensively in electrical and electronic assemblies, eliminate splicing, increase insulation, stop leakages and shorts, and generally simplify wiring work.

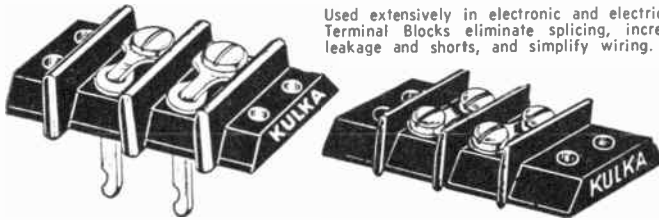
Molded of high tensile strength bakelite for general commercial use, they are available in other materials made in full compliance with latest military specifications, MIL-M-14E, covering CFG, MFE, MME,

MDG, MAI-60, GDI-30, PM14, and other types of special plastics.

Kulka terminal blocks are made in many styles and sizes for varied applications. With 1 to 26 terminals, depending on size. Supplied with or without marker strips which may be printed or plain, or blocks can be engraved.

Write for Latest Kulka Terminal Block Catalog!

WIDEST SELECTION OF TYPES AND SIZES



Used extensively in electronic and electrical assemblies, Kulka Terminal Blocks eliminate splicing, increase insulation, stop leakage and shorts, and simplify wiring. In widest range of types, sizes, insulating materials, terminals, etc. Here shown are two types of popular 600 Series. There's a Kulka Terminal Block for every need!

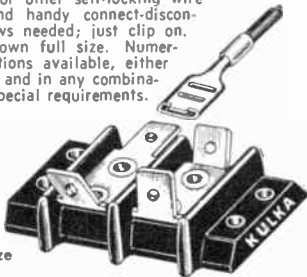
MINIATURE BLOCKS



409 Series is ideal for miniaturization. Shown full size. Only 4 3/8" long for 21 terminals. 5/16" wide with barrier. Also available with one-sided and two-sided soldering lug. Also with threaded holes taking 4-40 screws for mounting through chassis, if desired.

"KILPTITE" BLOCKS

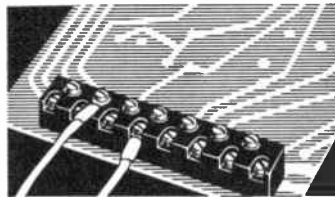
Available with vari-angled tabs. Made to take AMP, Burndy or other self-locking wire lugs. Fast and handy connect-disconnect; no screws needed; just clip on. 800 Series shown full size. Numerous tab variations available, either flat or angled, and in any combination to meet special requirements.



SERIES 800

Shown full size

PRINTED-CIRCUIT TERMINALS

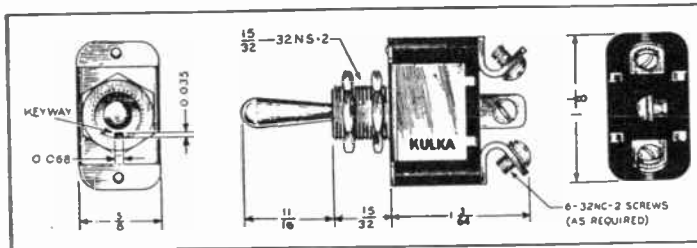


Simplify those external connections to printed-circuit boards, no matter how jammed up. Kulka 520 Series miniature terminal blocks mount on board. Terminal pins below slip into standard mounting holes for dip-soldering. Screw terminals. Readily connected or disconnected. 2 to 24 terminals. Entire assembly can be encapsulated.

NAVY BOARDS



Heavy-duty terminal blocks in the widest range of types, materials, sizes. Here shown one-quarter size is a Navy Terminal Board made to drawing 9000, Series S6505 B, 73214, Rev. H. Supplied in MAI-60 glass-filled Alkyd as per MIL-M-14 with latest revision. Threaded studs of manganese-bronze, molded in plastic. Slotted brass nuts. Typical of the "specials" developed and produced by Kulka.



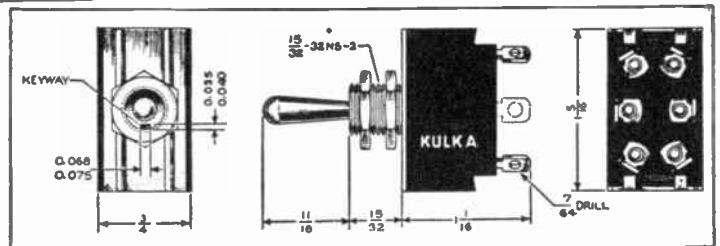
ELECTRONIC SWITCHES

Made to Joint Army-Navy specifications—JAN-S-23, MIL-S-21195, MIL-S-6745 and MIL-S-3950A, for electronic, aircraft and communication uses. Designed for quick, easy, one-hole mounting. Ruggedly built for long, trouble-free service. Operating cycles are above minimum required by specifications.

All metal parts treated against corrosion. Switches come with mounting nuts and sleeve lock-washer. All switches made to MIL-S-3950A and MIL-S-6745 are supplied with toggle seal. Units are tested regularly by quality control in production procedure, insuring top performance.

Single-Pole Switches: Series ST 40, with screw terminals, shown at left. Widest choice of types in concise tabular form presented in Kulka literature available on request.

Double-Pole Switches: Series ST 52 with solder lugs, shown below. Wide choice of types in concise tabular form presented in Kulka literature available on request.



KULKA ELECTRIC CORP.

633-643 SO. FULTON AVENUE • MOUNT VERNON, N. Y.

Telephone: MOUNT VERNON 4-4024 — 4025 — 4026 — 4027

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Detailed information on the Kulka Line of Wiring Devices, sent on request. Let us collaborate on your problems and requirements.



Be sure your Engineers are working with the Alden Handbook of plug-in unit design. Presents complete line of basic components of tremendous flexibility for adapting your equipment to plug-in construction.

REQUEST FREE 250-PAGE "ALDEN HANDBOOK"

1. Utilize your circuitry in compact vertical planes using Alden Terminal Card Mounting System.



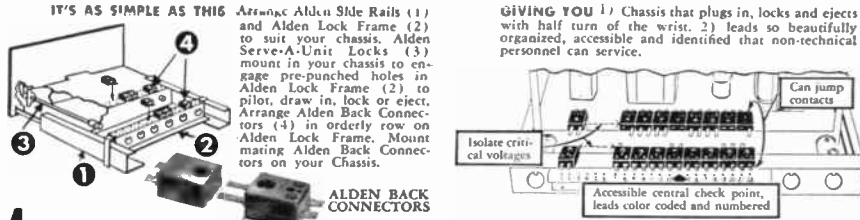
You can use Alden Terminal Mounting Card with Alden Miniature Terminals, Jumper Strip and Sockets staked to accommodate any circuitry—making complete units ready for housing. Components snap into unique Alden Terminals, are held ready for soldering.

2. To mount this vertical circuitry, ALDEN PLUG-IN PACKAGES AND CHASSIS give tremendous variety with standard components



Alden components provide standard plug-in or slide-in housings—with spares, your circuits become units replaceable in 30 seconds.

3. Give chassis easily traceable interconnects and 30-second replacement with ALDEN SERVE-A-UNIT KIT



4. Assign to each unit ALDEN SENSING ELEMENTS — to spot trouble instantly:



121D N. Main St., Brockton 64, Mass. From Alden's Line of Ready-made Components for Unitized Plug-in Unit Construction.

For details, circle #742 on Reader Service Card

No other terminal block — sectional or one-piece gives you all the advantages of

BUCHANAN MD sectional pres-SURE-blocks

NO WASTE CIRCUITS—Reduce material costs, save space. Supplied assembled in 20 snap-fit section lengths. Pull off or add groups for any length block.

SMALLER INVENTORY—Only 2 different parts (contact and end sections). No running out of needed items.

MORE CIRCUITS IN AVAILABLE SPACE—Increase contact capacity, decrease jumpering. Group common wires (equivalent to 1 #22 thru 1 #8) in tubular contacts. Contacts on 7/16" centers. 10 circuits 4 1/16", plus 2 1/2" for each complete block.

NO TERMINALS OR LUGS—Eliminate lugging costs. Tubular contacts provide secure, efficient connections.

NO HIDDEN CIRCUIT MARKINGS—Unobscured top marking area minimizes errors. Integral or separable strips.

QUICKER TO INSTALL AND CHANGE—Hand assembled, no fixtures or hardware. Mount only every 12 sections. Add circuits without removing mounting screws.

LOW INSTALLED COST—Competitive with conventional blocks of similar rating.

Separate Sections or Factory-Assembled Blocks
Flat Base or Channel Mounting • Tubular or Strap-Screw Contacts
Fanning Strips • Conservative 750-volt A.I.E.E. rating



Write for Bulletin RD-60.

In Canada
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100 E. 42nd ST., NEW YORK, N. Y.



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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. Complete addresses will be found in the Alphabetical Directory, pages 161-264.

Directory III. Materials & Services

98. Terminals.

- 5. Terminal blocks & strips
- 10. Terminals, rivet or stud
- 15. Terminals, wire end
- A-1 Precision Products, Calif., 5
- Accurate Electronics Corp., Ohio, 5, 10, Flexible Shaft Couplers
- Aeronautical Electric Co., 5656 Northwest Highway, Chicago 46, Ill., 5
See ad on page 483
Tel: SPring 4-5200
- Alac, Inc., Calif., 5, 10, 15
- Alden Products Co., 121D N. Main St., Brockton 64, Mass., 10, 15
See ads on page 419, 691
Tel: JUniper 3-0160
- Allen-Bradley Co., Wis., 5
- Allied Allegri Co., N.J., 5
- Alpine Electronic Co., Inc., Conn., 10
- Amaton Electronic Hardware Co., Inc., N.Y., 5, 10
- American Brass Co., Conn., 15
- American Printed Circuits Co., N.J., 5
- Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5
See ad on page 166
Tel: BISHop 2-1000
- Anderson Electric Co., Ala., 15
- Armel Electronics, Inc., N.Y., 5, 10, Sockets, Relays
- Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport 5, Conn., 10
See ad on page 177
Tel: EDison 4-4124
- Beckman Instruments, Inc., Helipot Div., Calif., 5
- Berg Mfg. Corp., Pa., 5, 10, 15
- Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5, 15
See ad on page 603
Tel: WAlker 5-6980
- Buchanan Electrical Products Corp., 431 U.S. 22, Hillside, N.J., 5, 15
See ad on this page
Tel: WAvery 3-7474
- Burdy Corp., H. H. Buggie Div., Ohio, 5
- Burdy Corp. Omaton Div., Richards Ave., Norwalk, Conn., 5, 15
See ad on page 421
Tel: TEmple 8-4711
- Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5, 10
See ad on page 693
Tel: TRowbridge 6-2800
- Canadian Radium & Uranium Corp., 630 Fifth Ave., New York 20, N.Y., 5
See ad on page 637
Tel: CIRcle 6-0460
- Carroll Pressed Metal, Inc., Mass., 5

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ONE-PIECE Sealectro Teflon Terminals (eliminating hardware, such as screws, nuts, washers, lockwashers, sealing) save material, labor, time, trouble.

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Wide selection of miniature sizes in voltage ratings up to 4000. For components stressing higher voltages rather than space-saving. Choice of lug styles and platings. In nine RETMA code colors.

Also in subminiature sizes for miniaturization programs. Operating voltages up to 750. Choice of lugs, platings, colors.



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In miniature sizes and choice of lugs including hollow-tube style, facilitating connections through metal chassis or casing. Voltage ratings up to 5500 in larger sizes. Subminiature sizes for ultra space-saving, in voltage ratings up to 750. Choice of lug styles, platings, code colors.



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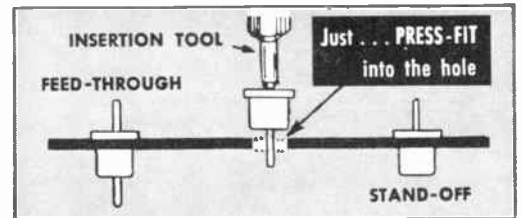


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TO LAST!**



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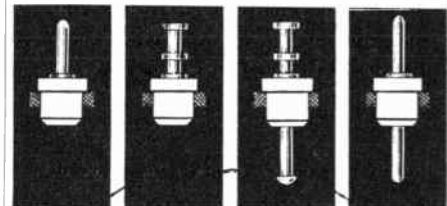
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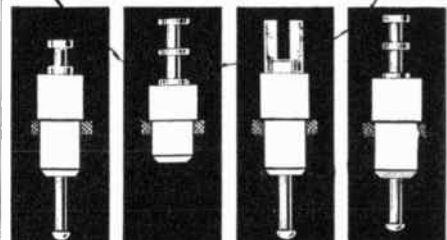
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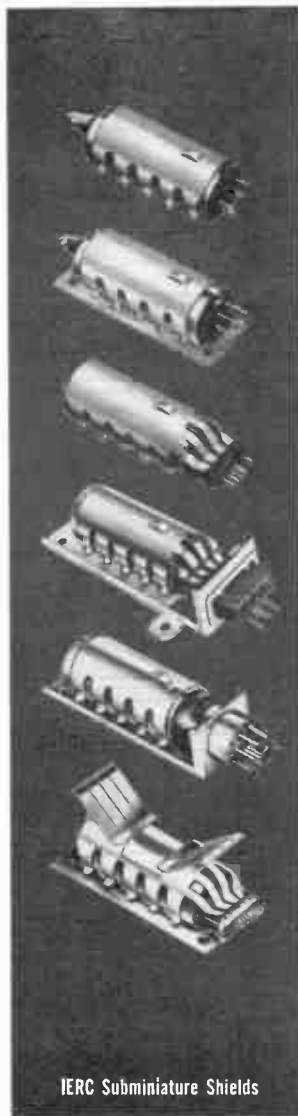
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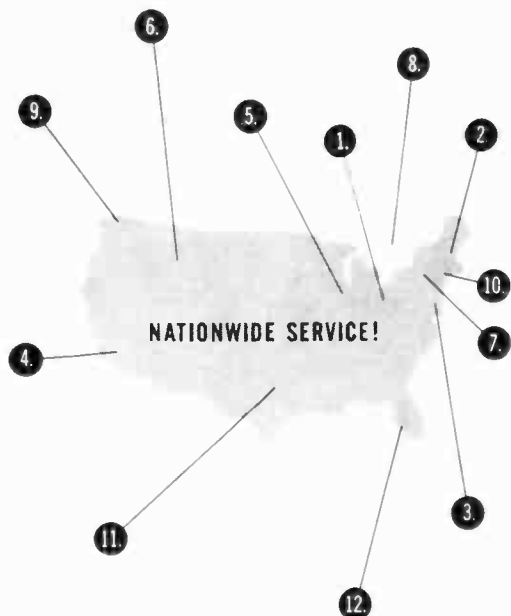


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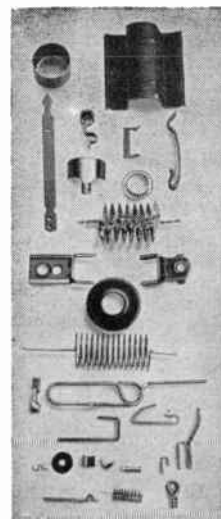
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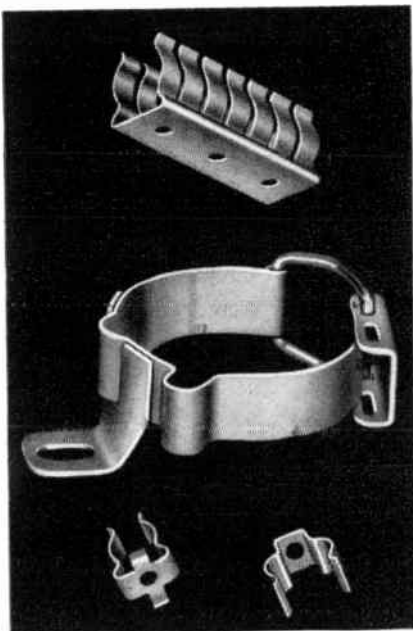
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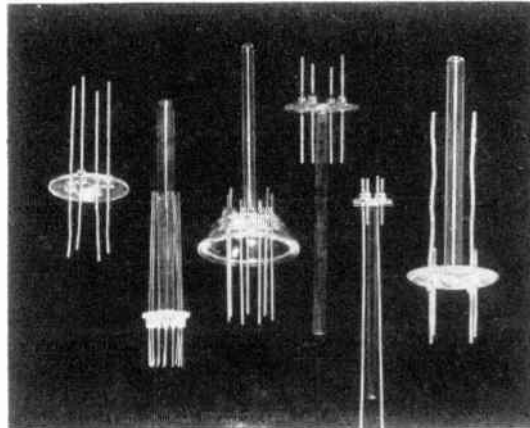
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 Technical Communications, Inc., Calif.,
 10
 Technical Information Corp., N.Y., 5
 Technical Manuals, Inc., N.J., 10
 Technical Publishing House, Mass., 10
 Technology Press, Mass., 5
 Tel Electro Consulting Service, Calif., 10
 Television Digest, Pa., 5, 15
 Tenna Mfg. Co., Ohio, 5, 10, 15
 Thompson & Co., John I., D.C., 10
 Tippet & Co., Inc., Mass., 10
 Transistor Applications, Inc., Mass., 5
 United Catalog Publishers, Inc., N.Y., 5,
 10
 University of California Press, Calif., 5
 Van Nostrand Co., Inc., D., N.J., 5
 Warner, Inc., N.Y., 5, 10
**Wiley & Sons, Inc., John, 440 Fourth
 Ave., New York 16, N.Y., 5**
See ad on page 700
Tel: MUrray Hill 9-7630
 Winner, Lewis, Consultant, 152 West
 42nd St., New York 36, N.Y., 5, 10
See ad on page 628
Tel: BRyant 9-3125
 Zeus Engineering Co., Inc., 635 S. Ken-
 more Ave., Los Angeles 5, Calif., 10
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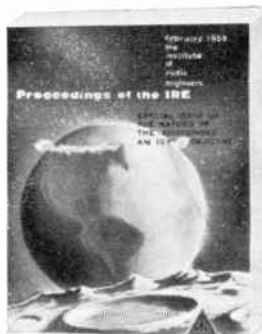
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Directory III. Materials & Services

102. Distribution

5. Export & Import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales and service
25. Surplus dealers

The final section of the IRE DIRECTORY is the complement to manufacturing, which is distribution. It has proved to be a real service to IRE member engineers and executives to put into this book a list of annually checked jobbers, wholesalers, manufacturers representatives, and distributors. Many of these firms are identified further by the initials ERA, as members of the Electronic Representatives Association, NEDA as members of the National Electronic Distributors Association. Permission from these organizations to

use their membership lists in order to make this section of the IRE DIRECTORY as complete as possible is gratefully acknowledged. For convenience in location and distributional firms, the listings are arranged geographically under individual state names, the listings within each state being grouped by city names in alphabetical order, so that all firms located in any one city may be grouped together for quicker reference. Listings for foreign firms follow the listings for the United States.

ALABAMA

Radio Dist. & Supply Co., 125-27 W. 10th St., Anniston, Ala., 10 (NEDA)
Jesse Assoc., George O., 1108 Fern Ave., Birmingham 9, Ala., 15 (ERA)
Carmichael Wholesale Supply, 140 S. Foster St., Dothan, Ala., 10 (NEDA)
Electronic Distributors, 103 W. Tom Bigbee St., Florence, Ala., 10 (NEDA)

ALASKA

Yukon Radio Supply, Inc., 645 First St., Anchorage, Alaska, 10 (NEDA)

ARIZONA

Radio Parts of Arizona, 214 S. 11th Ave., Phoenix, Ariz., 10 (NEDA)
Southwest Wholesale Radio, P.O. Box 3647, Phoenix, Ariz., 10 (NEDA)
Foley & Assoc., E. J., 3840 N. Jokake Dr., Scottsdale, Ariz., 15
Elliott Electronics, Inc., 418 N. 4th Ave., Tucson, Ariz., 10 (NEDA)
Standard Radio Parts, Inc., 218 N. 1st Ave., Tucson, Ariz., 10 (NEDA)

ARKANSAS

Teague Electronics, South Highway 61, Blytheville, Ark., 10 (NEDA)
White Radio Supply Co., D., 1222 Main St., Little Rock, Ark., 10 (NEDA)
Martin Wholesale Radio Supply, 1207 W. Kingshighway, Paragould, Ark., 10 (NEDA)
Lavender Radio & TV Supply, 520 E. 4th St., Texarkana, Ark., 10 (NEDA)

CALIFORNIA

Moye Co., Robert G., 116 S. Stoneman Ave., Alhambra, Calif., 15
Wood Co., Ash M., P.O. Box 1031, Arcadia, Calif., 15 (ERA)

Valley Radio Supply Co., 716 Baker St., Bakersfield, Calif., 10 (NEDA)
Kruedick-Folcar Elect., 2428 Shattuck Ave., Berkeley, Calif., 10 (NEDA)
Pacific Rad. Supply, Inc., 2801 Shattuck Ave., Berkeley, Calif., 10 (NEDA)
Harmon Co., W. S., 121 N. Roberston Blvd., Beverly Hills, Calif., 15 (ERA)
Mitchell Co., C. H., 9015 Wilshire Blvd., Beverly Hills, Calif., 15
Moxon Sales, G. E., 489 S. Robertson, Beverly Hills, Calif., 15
Stern & Co., I. R., 4109 Burbank Blvd., Burbank, Calif., 15 (ERA)
Weightman & Associates, 4029 Burbank Blvd., Burbank, Calif., 15 (ERA)
Sodara Co., 9400 Culver Blvd., Culver City, Calif., 15
Stevens Co., Thomas L., 5444 S. Sepulveda Blvd., Culver City, Calif., 15 (ERA)
Dealers Elect. Supply Co., 800 Broadway St., Eureka, Calif., 10 (NEDA)
DeJarnatt Radio Wholesale, 223 Fulton St., Fresno, Calif., 10 (NEDA)
Inland Elect. Suppliers, 843 Divisadero, Fresno, Calif., 10 (NEDA)
Gates Co., Howard A., 1819 Harmon Pl., Glendale, Calif., 15, 20
Weatherford Co., R. V., 6921 San Fernando Rd., Glendale, Calif., 10 (NEDA)
Western Electronic Supply, 1214 South Brand Blvd., Glendale, Calif., 10 (NEDA)
Grant Snyder Co., Lee, 1418 N. Highland, Hollywood, Calif., 15 (ERA)
Hollywood Radio Supply, 5606 Hollywood Blvd., Hollywood, Calif., 10 (NEDA)
Instruments for Measure, 3455 Cahuenga Blvd., Hollywood, Calif., 15 (ERA)
Key Electronics, Inc., 8533 Sunset Blvd., Hollywood, Calif., 15 (ERA)
Miller Co., Gerald B., P.O. Box 1471, Hollywood, Calif., 15 (ERA)

Cook Electronics, Inc., 210 E. Hardy St., Inglewood, Calif., 10 (NEDA)
Gilbert Co., M. B., 1608 Centinela Ave., Inglewood, Calif., 15 (ERA)
Newark Electric Co., 4747 W. Century Blvd., Inglewood, Calif., 10 (NEDA)
Universal Dist., Inc., 4642 W. Century Blvd., Inglewood, Calif., 10 (NEDA)
Scott Radio Supply, Inc., 266 Alamitos Ave., Long Beach, Calif., 10 (NEDA)
Whitehead Radio Co., 4686 Long Beach Blvd., Long Beach, Calif., 10 (NEDA)
Alderson Co., Wes., 3050 Overland Ave., Los Angeles, Calif., 15 (ERA)
Appleton Co., Inc., Harry, 36 San Fernando Rd., Los Angeles, Calif., 15 (ERA)
Avnet Corp., 5877 Rodeo Rd., Los Angeles, Calif., 10 (NEDA)
Barron Co., W. J., 1406 S. Grand Ave., Los Angeles, Calif., 15 (ERA)
Barstow & Doran, Inc., 1408 S. Grand Ave., Los Angeles, Calif., 15 (ERA)
Becker Co., Herbert, 1140 Crenshaw, Los Angeles, Calif., 15 (ERA)
Berman Co., Jack, 1141 S. La Cienega Blvd., Los Angeles, Calif., 15 (ERA)
California Elect. Supply, 11801-11 W. Pico Blvd., Los Angeles, Calif., 10 (NEDA)
Caltron Products Co., 3518 W. Pico Blvd., Los Angeles, Calif., 15
Cochrane-Barron Co., 544 S. Mariposa, Los Angeles, Calif., 15 (ERA)
Costello & Co., 2740 S. Lacienga Blvd., Los Angeles, Calif., 15 (ERA)
Davis Sales Co., George, 5632 E. Beverly Blvd., Los Angeles, Calif., 15 (ERA)
Emmet Co., Frank A., 2837 W. Pico Blvd., Los Angeles, Calif., 15 (ERA)
Erlanger Sales Co., 4217 W. Jefferson Blvd., Los Angeles, Calif., 15 (ERA)
Federated Purchaser, Inc., 11275 W. Olympic Blvd., Los Angeles, Calif., 10 (NEDA)

102. Distribution.

Feldman Co., Henry, 1244 S. Grand Ave., Los Angeles, Calif., 15 (ERA)
 Geist Co., W. K., 3177 Glendale Blvd., Los Angeles, Calif., 15 (ERA)
 Heeger, Inc., 1011 Venice Blvd., Los Angeles, Calif., 15 (ERA)
 Holmes Co., Carl E., 107 N. Ave. 64, Los Angeles 42, Calif., 15 (ERA)
 Jurin Co., Syd, 1628 S. Bentley Ave., Los Angeles, Calif., 15 (ERA)
 Kierulff Electronics, Inc., 820 W. Olympic Blvd., Los Angeles, Calif., 10 (NEDA)
 Kittleson Co., H. A., 416 N. Iabrea Ave., Los Angeles, Calif., 15 (ERA)
 Knight Co., W. Bert, 10377 West Pico Blvd., Los Angeles, Calif., 15 (ERA)
 Koessler Sales Co., 818 N. Fairfax Ave., Los Angeles, Calif., 15 (ERA)
 Landis Associates, 1531 S. Robertson Blvd., Los Angeles, Calif., 15 (ERA)
 Lynch & Son, C. R., 3307 Glendale Blvd., Los Angeles, Calif., 15 (ERA)
 Marsh Co., J. W., 4216 West Jefferson Blvd., Los Angeles, Calif., 15 (ERA)
 Marshank Sales Co., 7422 Melrose Ave., Los Angeles, Calif., 15 (ERA)
 Mueller Electronic Sales, 3225 Exposition Pl., Los Angeles, Calif., 15 (ERA)
 Olander & Co., Roland, 6313 Santa Monica Blvd., Los Angeles, Calif., 15 (ERA)
 Owens Co., Lee H., 1102 S. Western, Los Angeles, Calif., 15 (ERA)
 Pacific Electro-Sales, 6053½ Whittier Blvd., Los Angeles, Calif., 15 (ERA)
 Permutt Electronic Assoc., 5057 W. Washington Blvd., Los Angeles, Calif., 15 (ERA)
 Radio Equipment Dist., 1340 S. Olive, Los Angeles, Calif., 10 (NEDA)
 Radio Prods. Sales, Inc., 1501 S. Hill St., Los Angeles, Calif., 10 (NEDA)
 Roberts & Assoc., E. V., 5068 W. Washington Blvd., Los Angeles, Calif., 15 (ERA)
 Ross & Co., Malcolm, 1623 S. LaCienega, Los Angeles, Calif., 15 (ERA)
 Rupp Co., V. T., 307 Parkman Ave., Los Angeles, Calif., 15 (ERA)
 Rush Co., Earl, 4216 W. Jefferson Blvd., Los Angeles, Calif., 15 (ERA)

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 Shephard-Winters Co., 7407½ Melrose Ave., Los Angeles, Calif., 15 (ERA)
 Slolaroff Co., M.A., 4622 W. Slauson Ave., Los Angeles, Calif., 15 (ERA)
 Snitzer Co., T., 5354 W. Pico Blvd., Los Angeles, Calif., 15 (ERA)
 Spraggins Co., S. L., 914 S. Robertson, Los Angeles, Calif., 15 (ERA)
 Stone Assoc., Carl A., 8971 National Blvd., Los Angeles, Calif., 15 (ERA)
 Stone Sales Co., R. L., 8971 National Blvd., Los Angeles, Calif., 15 (ERA)
 Strassner Co., Ellard E., 1865 N. Western Ave., Los Angeles, Calif., 15 (ERA)
 Strassner Co., Richard A., 1557 N. Western, Los Angeles, Calif., 15 (ERA)
 Ungar Sales Assoc., 9925 Venice Blvd., Los Angeles, Calif., 15 (ERA)
 Wallace & Wallace, Inc., 1206 Maple Ave., Los Angeles, Calif., 15 (ERA)
 Wedge Weber Co., 1217 Venice Blvd., Los Angeles, Calif., 15 (ERA)
Wesrep Corporation, 2022 South Sepulveda Blvd., Los Angeles 25, Calif., 15 (ERA)
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 Western Fibrous Glass, 4423 Fruitland Ave., Los Angeles, Calif., 10
 Westron Sales & Engr. 7407 Melrose Ave., Los Angeles, Calif., 15 (ERA)
 Wiley Co., Paul F., 1632 Silverlake Blvd., Los Angeles, Calif., 15 (ERA)
 Ault Assoc., 906 Willow Rd., Menlo Park, Calif., 15 (ERA)
 Edwards Co., Jackson, 4101 Lankershim Blvd., N. Hollywood, Calif., 15 (ERA)
 Gordon Enterprises, 5362 N. Cahuenga Blvd., N. Hollywood, Calif., 5, 20
 Neely Enterprises, 3939 Lankershim Blvd., N. Hollywood, Calif., 15 (ERA)
 Calif. Radio & TV Supply Co., 2454 Del Paso Blvd., N. Sacramento, Calif., 10 (NEDA)
 Elmar Electronics, Inc., 140 11th St., Oakland, Calif., 10 (NEDA)
 Relco, Inc., 6625 Foothill Blvd., Oakland, Calif., 10 (NEDA)
 Wenger Co., E. C., 1450 Harrison St., Oakland, Calif., 1, (NEDA)
 Brainard, William V., 535 Middlefield Rd., Palo Alto, Calif., 15 (ERA)
 Ellis Sales Co., G. B., 850 A. Hansen Way, Palo Alto, Calif., 15 (ERA)
 Mauldin Co., C. W., 441 W. California, Palo Alto, Calif., 15 (ERA)
 Nickerson-Gray & Assoc., 2434 Park Blvd., Palo Alto, Calif., 15 (ERA)
 Rudat & Ewing, 1477 Dana, Palo Alto, Calif., 15 (ERA)
 Shallenberger, John B., 1450 University Ave., Palo Alto, Calif., 5, 10, 20
 Tomkins & Co., Win W., 2363 Birch St., Palo Alto, Calif., 15 (ERA)
 White & Co., 788 Mayview Ave., Palo Alto, Calif., 15 (ERA)

A-F Associates, 385 E. Green St., Pasadena, Calif., 15 (ERA)
 Electronic Supply Corp., 2085 E. Foothill Blvd., Pasadena, Calif., 5, 10, 15
 Empire Elect. Dist., Inc., 37 East Union St., Pasadena, Calif., 10
 Luscombe Engrn. of L.A. 1129 S. Fair Oaks Ave., Pasadena, Calif., 15 (ERA)
 McCarthy Assoc., 1055 E. Walnut, Pasadena, Calif., 15 (ERA)
 Vaughan Co., G. H., 2366 E. Foothill Blvd., Pasadena, Calif., 15 (ERA)
 Wesco Electronics, 1244 E. Colorado St., Pasadena, Calif., 10 (NEDA)
 Heaton Co., James S., 413 Lathrop St., Redwood City, Calif., 15 (ERA)
 Long & Associates, Brewster-Warren Bldg., Redwood City, Calif., 15 (ERA)
 Peninsula Assoc., 3150 Bayshore Highway, Redwood City, Calif., 15
 Dalton Assoc., C. R., 132 El Camino Real, San Carlos, Calif., 15 (ERA)
 Pflieger Co., Robert L., 1652 Laurel St., San Carlos, Calif., 15 (ERA)
 Ross Co., David H., 534 El Camino Real, San Carlos, Calif., 15 (ERA)
 Nystrom Brothers Co., 2426 Fourth Ave., San Diego, Calif., 10 (NEDA)
 Radio Parts Co., 2060 India, San Diego, Calif., 10 (NEDA)
 Belchamber & French, 1485 Bayshore Blvd., San Francisco, Calif., 15 (ERA)
 Berman Co., E. L., 450 Ninth St., San Francisco, Calif., 15 (ERA)
 Brandt Co., E. W. 1122 Folsom St., San Francisco, Calif., 15 (ERA)
 Eber Electronics, 160 10th St., San Francisco, Calif., 10 (NEDA)
 Edisco-Elect. Dist. Co., 5901 Mission St., San Francisco, Calif., 10 (NEDA)
 Eichorn & Melchior, Inc., 749 Bryant St., San Francisco, Calif., 15
 Fortune Electronics, Inc., 1321 Mission St., San Francisco, Calif., 10 (NEDA)
 Howard & Assoc., G. M., 1301 6 St., San Francisco, Calif., 15 (ERA)
 Lehell-Warren Assoc., 1485 Bayshore Blvd., San Francisco, Calif., 15 (ERA)
 Logan Sales Co., 150 8th St., San Francisco, Calif., 15 (ERA)
 Meyer & Ross, 113 10th St., San Francisco, Calif., 15 (ERA)
 Moulthrop Co., F. W., 575 Tenth St., San Francisco, Calif., 15 (ERA)
 Moulthrop & Hunter, 165 11th St., San Francisco, Calif., 15 (ERA)
 Nott & Co., L.A., 1061 Howard St., San Francisco, Calif., 15 (ERA)
 Pacific Wholesale Co., 1850 Mission St., San Francisco, Calif., 10 (NEDA)
 Prudy Co., William J., 312 Seventh St., San Francisco, Calif., 15
 Radio Parts Supply Co., 281 Ninth St., San Francisco, Calif., 10 (NEDA)
 San Francisco Rad. & Supply, 1282-84 Market St., San Francisco, Calif., 10 (NEDA)
 Sinai-Johnson Co., 65 Ninth St., San Francisco, Calif., 15 (ERA)
 Smith & Co. Inc., Harold G. 789 Stevenson St., San Francisco, Calif., 10 (NEDA)

Directory III. Materials & Services

Distribution—Class 102

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Connecticut
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Florida

Vermilya Co., R. H., 1258 Fitzgerald Ave., San Francisco, Calif., 15 (ERA)
Wresco, 140 Ninth St., San Francisco, Calif., 10 (NEDA)
Zack Electronics, 1424 Market St., San Francisco, Calif., 10 (NEDA)
Hill Co., J. T., 420 S. Pine St., San Gabriel, Calif., 15 (ERA)
Rissi, Al J., 8417 E. Las Tunas Dr., San Gabriel, Calif., 15 (ERA)
Peninsula Elect. Supply, 656 So. First St., San Jose, Calif., 10 (NEDA)
Quement Dealers Elect., Box 527, San Jose, Calif., 10 (NEDA)
Schad Elect. Supply, Inc., 1180 Denise Way, San Jose, Calif., 10 (NEDA)
Marshall Co., G. S., 2065 Huntington Dr., San Marino, Calif., 15 (ERA)
Yarbrough Sales Co., 2636 Mission St., San Marino, Calif., 15 (ERA)
Harruss-Koetke Sales Co., 204 E. Hillsdale Blvd., San Mateo, Calif., 15 (ERA)
Newnan Co., H. L., 56 41st Ave., San Mateo, Calif., 15 (ERA)
Abbett Co., E. B., 345 Francisco Blvd., San Rafael, Calif., 10 (NEDA)
Biggs Co., Carl H., 1547 14th St., Santa Monica, Calif., 20
Wesco Sales Co., 2837 Wilshire Blvd., Santa Monica, Calif., 15 (ERA)
Components Sales Calif., 4626 Van Nuys Blvd., Sherman Oaks, Calif., 15
Jewett Co., Samuel O., 13537 Addison St., Sherman Oaks, Calif., 15 (ERA)
Macs Radio Supply, 8320-22 Long Beach Blvd., South Gate, Calif., 10 (NEDA)
Dunlap Radio & TV Supply, 27 North Grant St., Stockton, Calif., 10 (NEDA)
Atolm Electronics, 7648 San Fernando Rd., Sun Valley, Calif., 5, 10, 15
Mann Assoc., Martin, 14751 Keswick St., Van Nuys, Calif., 15 (ERA)
Podolece Sales Co., W. M., 315 N. Leland Ave., W. Covina, Calif., 15 (ERA)

COLORADO

Gollifer, W. B., 1003 Grandview Ave., Boulder, Colo., 15 (ERA)
D&M Electronic Supply, 717 N. Weber St., Colorado Springs, Colo., 10 (NEDA)
Peysers & Co., 1501 N. Weber, Colorado Springs, Colo., 15
Bowen Co., R. G., 721 S. Broadway, Denver 9, Colo., 15 (ERA)
Cluphf & Assoc., Stan., 75 S. Cody Court, Denver 15, Colo., 15 (ERA)
Connors Co., W. H., 375 Birch St., Denver 20, Colo., 15 (ERA)
Electronic Parts Co., 20 W. 13th Ave., Denver, Colo., 10 (NEDA)
Fistells Elect. Supply Co., 1001 Bannock St., Denver, Colo., 10 (NEDA)
Hytronic Measurements, 2240 So. Adams St., Denver, Colo., 15
Hyde Electronics Co., 888 S. Lipan St., Denver, Colo., 15 (ERA)

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Koether-Cox Co., 110 W. 13 Ave., Denver 4, Colo., 15 (ERA)
Longstreet-Smith Assoc., 1013 15 St., Denver 22, Colo., 15 (ERA)
McLoud & Raymond Co., 5403 E. Evans Ave., Denver 22, Colo., 15 (ERA)
Nelson Co., P.O. Box 5502, Denver, Colo., 15 (ERA)
Pearson & Co., Mel, 1860 S. Acoma St., Denver, Colo., 15 (ERA)
Walker Radio Co., L. B., 620 Broadway, Denver, Colo., 10 (NEDA)
Ward Terry & Co., 70 Rio Grande Blvd., Denver, Colo., 10 (NEDA)
Williams Co., Allen I., 2261 S. Albion St., Denver 22, Colo., 15 (NEDA)
Moss Sales Co., Box 428, 1530 13 Ave., Greeley, Colo., 15 (ERA)
Walker Radio Co., L. B., 100 N. Victoria Ave., Pueblo, Colo., 10 (NEDA)

CONNECTICUT

Middle Assoc., John V., Branford, Conn., 15 (ERA)
Westconn Electronics, Inc., 195 Colorado Ave., Bridgeport, Conn., 10 (NEDA)
Bahr Sales Co., 183 North Rd., Colebrook, Conn., 15 (ERA)
Bozak Sales Co., P.O. Box 1166, Darien, Conn., 10
Bevin-Wilcox Line Co., East Hampton, Conn., 10
Whitehead Co., John F., P.O. Box 177, Guilford, Conn., 15 (ERA)
Coldwell, Inc., Michael S., 289 Fairfield Ave., Hartford 6, Conn., 15 (ERA)
Electrical Supplies, Inc., 225 Walnut St., Hartford, Conn., 10
Kahn & Co., Inc., 541 Windsor St., Hartford, Conn., 10
Modern Radio Supply Co., 1224 Farmington, Kensington, Conn., 10 (NEDA)
Lavin Assoc., Henry, P.O. Box 196, Meriden, Conn., 15 (ERA)
United Electronic Supply, 49 E. Main St., New Britain, Conn., 10 (NEDA)
Ammrad Co., 843 Grand Ave., New Haven, Conn., 10
Electrical Mfrs. Services, 265 Church St., New Haven, Conn., 20
Equipment Sales Co., Inc., P.O. Box 6098, New Haven, Conn., 15
Aikins Electronic Supply, 1531 Broad St., New London, Conn., 10 (NEDA)
Aikins Electronic Supply, 198 Water St., Norwich, Conn., 10 (NEDA)

Perron & Co., Inc., Ray, 36 Louis St., Trumbull, Conn., 15 (ERA)

See ad on page 710

Tel: AMherst 8-9631

New England Area Representatives, P.O. Box 184, Yalesville, Wallingford, Conn., 15 (ERA)

See ad on page 711

Bond Radio Supply, 439 W. Main St., Waterbury, Conn., 10 (NEDA)

Hatton & Co., Arthur T., 1000 Farmington Ave., W. Hartford, Conn., 15 (ERA)

Nief Assoc., Paul W., 15 Oak St., Westport, Conn., 15 (ERA)

DELAWARE

Carmine Co., Ferrell S., 14 Knickerbocker Dr., Newark, Del., 15 (ERA)

Delaware Electronic Supply, 220 W. 4 St., Wilmington, Del., 10

Radio Electric Ser. Co., 3rd & Tatnall Sts., Wilmington, Del., 10 (NEDA)

DISTRICT OF COLUMBIA

A & M Assoc., Inc., 1145 19th St., N.W., Washington, D.C., 15

Electronic Wholesalers, 2345 Sherman Ave., Washington, D.C., 10 (NEDA)

Gallant, Inc., 261 Constitution Ave., Washington, D.C., 20

Shamp Scientific Supply, 1500 Massachusetts Ave., Washington, D.C., 15

Silberne Radio & Elec. Co., 3400 Georgia Ave., Washington, D.C., 10 (NEDA)

FLORIDA

Sanders Electronics Co., 1002 E. 24th St., Hialeah, Fla., 10 (NEDA)

Barnhart Co., L. E., 1003 Gunka Rd., Jacksonville, Fla., 15 (ERA)

Tel: RA 4-0987

Wallace Assoc., Inc., S. K., P.O. Box 67, Lutz, Fla., 15 (ERA)

Tel: WEBster 9-3241

Electronic Supply, P.O. Drawer 1655, Melbourne, Fla., 10 (NEDA)

Baldwin, Inc., Vance, 494-6 N.W. 54th St., Miami, Fla., 10 (NEDA)

Certified Radio TV Supply, 675 N.W. 11th St., Miami 36, Fla., 10 (NEDA)

Cooper Radio Co., 675 N.W. 11th St., Miami, Fla., 10 (NEDA)

East Coast Radio-TV Co., 1900 N.W. Miami Ct., Miami, Fla., 10 (NEDA)

Herman Radio Supply Co., 1365 N.W. 23rd St., Miami 36, Fla., 10 (NEDA)

Miami Elect. Dist., Inc., 419 N.W. 79th St., Miami, Fla., 10 (NEDA)

Radio TV Parts Dist., Inc., 2611 N.W. 21st Ter., Miami, Fla., 10 (NEDA)

Walder Radio & Appliance, 1809 N.E. Second Ave., Miami 32, Fla., 10 (NEDA)

102. Distribution.

Geartner Co., Jack, 823 86 St., Miami Beach, Fla., 15
Lee Assoc., R. F., 711 Magnolia Ave., Orlando, Fla., 15
Grice Electronics, Inc., 300 E. Wright St., Pensacola, Fla., 10 (NEDA)
Radio Accessories Co., P.O. Box 3590, Sarasota, Fla., 10 (NEDA)
Kinkade Radio Supply Co., 1707 Grand Central, Tampa, Fla., 10 (NEDA)
Leader Elect. Dist., Inc., 3411 S. Dale Mabry Hwy., Tampa, Fla., 10 (NEDA)
Radio Accessories Co., P.O. Box 372, Tampa, Fla., 10 (NEDA)
Thurrow Dist., Inc., P.O. Box 1529, Tampa, Fla., 10 (NEDA)
Godlard Distributors, Inc., 1309 W. Dixie, West Palm Beach, Fla., 10 (NEDA)
Taylor Co., Inc., Morris F., 940 Lake Elbert Dr., Winter Haven, Fla., 15 (ERA)
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GEORGIA

Adair Co., Clark, 1426 High Point Pl., N.E., Atlanta 6, Ga., 15 (ERA)
Tel: TRinity 5-3979
Burwell Co., Henry W., 422 Ponce De Leon Ave., Atlanta 1, Ga., 15 (ERA)
Tel: TRinity 4-2127
Chapman & Co., Cary, 672 Whitehall, S.W., Atlanta 10, Ga., 15 (ERA)
Tel: JACKson 4-7388
Duckett Sales Co., Grady, P.O. Box 11657, Atlanta, Ga., 15 (ERA)
Tel: CE 3-5308
Fausett Co., Floyd, 77 Pinelhurst Ter., S.W., Atlanta 10, Ga., 15 (ERA)
Tel: PLaza 3-3104
Hollingsworth & Still, 508 Whitehead Bldg., Atlanta, Ga., 15 (ERA)
Tel: MURray 8-5878
Jackson Electronic Supply, 840 Marietta St., N.W., Atlanta, Ga., 10 (NEDA)
Kennon Co., W. N., 7 Camden Rd., N.E., Atlanta 9, Ga., 15 (ERA)
Tel: TRinity 4-5566
Nickerson Co., Frank C., 1202 Zonolite Rd., N.E., Atlanta 6, Ga., 15 (ERA)
Tel: TRinity 5-8908
Smith Co., Maitland K., 208-14 St., N.W., Atlanta, Ga., 15 (ERA)
Tel: TRinity 5-8031
Southeastern Radio Parts, 442 W. Peachtree St., N.W., Atlanta, Ga., 10 (NEDA)
Specialty Dist. Co., Inc., 763 Juniper St., N.E., Atlanta, Ga., 10 (NEDA)
Prestwood Electronics Co., 1445 Greene St., Augusta, Ga., 10 (NEDA)
Radio Sales & Service Co., 2000-12th Ave., Columbus, Ga., 10 (NEDA)
McCorvey Co., V. Avis, 215 Church St., Decatur, Ga., 15 (ERA)
Tel: DRake 7-6167
Hayden Assoc., Paul, P.O. Box 331, East Point, Ga., 15 (ERA)
Tel: POplar 6-0261
Electronic Dist., Inc., 995 Riverside Dr., Macon, Ga., 10 (NEDA)

HAWAII

Electrical Equip. Co., Ltd., 656 S. Queen St., Honolulu, Hawaii, 10 (NEDA)
Hastin & Browne, 2663 Terrace Dr., Honolulu, Hawaii, 15 (ERA)
Nylen Bros. & Co., Ltd., 820 S. Beretania St., Honolulu, Hawaii, 10 (NEDA)
Peity Factors, Inc., Gene, 2030 Home Rule St., Honolulu 17, Hawaii, 15
Precision Radio, Ltd., 1160 S. King St., Honolulu, Hawaii, 10 (NEDA)
Radio-TV Corp., Ltd., 777 Ala Moana, P.O. 3920, Honolulu, Hawaii, 10 (NEDA)
Radio Wholesale & Supply, 610 Ward Ave., P.O. 3768, Honolulu, Hawaii, 10 (NEDA)
Service Motor Co., Ltd., 91 S. King St., Honolulu, Hawaii, 10 (NEDA)

IDAHO

Kopke Electronics Co., Box 4236, Boise, Idaho, 10 (NEDA)
Schwendiman Distributing, 380 E. St., Idaho Falls, Idaho, 10 (NEDA)
A&J Distributing Co., 0119-9th St., Lewiston, Idaho, 10 (NEDA)
United Elect. Wholesale, 328 Third St., East, Twin Falls, Idaho, 10 (NEDA)

ILLINOIS

Smith & Assoc., Dwight, 9 South River St., Aurora, Ill., 15 (ERA)
Tel: TWinoaks 7-5752
Knaggs Co., H. W., 7503 Melba Lane, Belleville, Ill., 15 (ERA)
Tel: CENTral 1-1853
Chicago Rivet & Mach. Co., 950 S. 25th Ave., Bellwood, Ill., 15
Lampley Radio Co., 810 N. McLeansboro St., Benton, Ill., 10 (NEDA)
Lurtz Electric Co., 219-221 N. Illinois St., Benton, Ill., 10 (NEDA)
B-B & W, Inc., 6634 W. Cermak Dr., Berwyn, Ill., 10 (NEDA)
Alverson Sales Co., 217 E. Front St., Bloomington, Ill., 10 (NEDA)
Suter TV Supply, Inc., 1009 North Park St., Bloomington, Ill., 10 (NEDA)
Delta Distributing, 2357 York St., Blue Island, Ill., 10 (NEDA)
Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill., 10 (NEDA)
See ad on page 178
Tel: HAYmarket 1-6800
Anderson & Assoc., Inc., B., 6835 W. Higgins, Chicago 31, Ill., 15 (ERA)
Tel: SPRing 4-4174
Angel & Co., Jay C., 2743 W. Peterson Ave., Chicago, Ill., 15 (ERA)
Tel: UPtown 8-0653
Arpio Sales, Inc., 4305 N. Lincoln Ave., Chicago, Ill., 10 (NEDA)
Bacher & Assoc., Louis G., 4216 W. Division St., Chicago, Ill., 15 (ERA)
Tel: BELmont 5-6601
Beier Co., Leroy W., 6518 W. North, Chicago 35, Ill., 15 (ERA)
Tel: BERkshire 7-2420

Bierhaus-Balhorn Sales, 5967 W. Madison St., Chicago 44, Ill., 15 (ERA)
Tel: AUstin 7-2089
Blaker Co., S. C., 2353 N. California, Chicago 47, Ill., 15 (ERA)
Tel: BR 8-1220
Bluzat Co., Rene, 6322 N. Milwaukee, Chicago 46, Ill., 15 (ERA)
Tel: SPRing 4-1500
Booth & Assoc., Claude, 4000 W. North Ave., Chicago, Ill., 15 (ERA)
Tel: OL 7-2810
Bowman & Co., J. G., 513 E. 75th St., Chicago, Ill., 10 (NEDA)
Bruning Co., A. H., 1758 Lawrence Ave., Chicago 40, Ill., 15 (ERA)
Tel: EDgewater 4-0989
Burgoyne Co., William, 7001 N. Clark St., Chicago 26, Ill., 15 (ERA)
Tel: HOLlycourt 5-2112
Chaunceys, Inc., 4740 W. Chicago Ave., Chicago, Ill., 10 (NEDA)
Cole Co., McL., 6514 W. Higgins, Chicago 31, Ill., 15 (ERA)
Tel: SPRing 4-3535
Cumming & Assoc., Bruce, 6029 W. Belmont Ave., Chicago 34, Ill., 15 (ERA)
Tel: MErrimac 7-3770
Devonshire Electronics, 15 E. 111th St., Chicago, Ill., 10 (NEDA)
Diethert Co., Inc., Russ., 2030 W. Montrose Ave., Chicago 18, Ill., 15 (ERA)
Tel: LOngbeach 1-7627
Dolin Sales, D., 3553 W. Peterson, Chicago 45, Ill., 15 (ERA)
Tel: JUNiper 8-3738
Doyle Co., William J., 7002 N. Western Ave., Chicago, Ill., 15 (ERA)
Tel: ROgers Park 1-3130
Electronic Sales Co., C., 3020 N. Cicero Ave., Chicago 41, Ill., 15
Ellinger Sales Co., W. H., 6571 N. Olmsted Ave., Chicago 31, Ill., 15 (ERA)
Tel: RODney 3-4154
Ellinger Sales Corp., 6540 Northwest Highway, Chicago 31, Ill., 15 (ERA)
Tel: RODney 3-1570
Engineered Sales Co., Inc., 3592 Milwaukee Ave., Chicago 41, Ill., 15 (ERA)
Tel: PENsacola 6-0555
Engle Co., Karl D., 4742 N. Sheridan Rd., Chicago 40, Ill., 15 (ERA)
Tel: UPtown 8-6363
Felleisen Co., Theodore, 5841 W. Montrose Ave., Chicago 34, Ill., 15 (ERA)
Tel: SPRing 7-1060
Fitzsimmons Assoc., Inc., 6124 Milwaukee Ave., Chicago 30, Ill., 15 (ERA)
Tel: NEwcastle 1-7660
Friedman Co., Morton L., 2814 W. Balmoral Ave., Chicago 15, Ill., 15 (ERA)
Tel: LOngbeach 1-4257
Gassner & Clark Co., 6644 N. Western Ave., Chicago, Ill., 15 (ERA)
Tel: ROgers Park 4-6121
Gebhard Co., Harry W., 5129 W. Devon Ave., Chicago, Ill., 15 (ERA)
Tel: RODney 3-3636

Directory III. Materials & Services

Distribution—Class 102

Florida
Georgia
Hawaii
Idaho
Illinois

Gianaras Sales Co., 5435 N.W. Highway, Chicago 30, Ill., 15 (ERA)
Tel: SPring 4-4600

Gormak Co., 7001 N. Clark St., Chicago 26, Ill., 15 (ERA)
Tel: ROgers Park 4-6366

Green & Assoc., Loren F., 5218 W. Diversey Ave., Chicago, Ill., 15 (ERA)
Tel: PALisade 5-6824

Grove Electronic Supply, 4103 W. Belmont Ave., Chicago, Ill., 10 (NEDA)

Halinton, Harry, 6400 N. Leoti Ave., Chicago 46, Ill., 15 (ERA)
Tel: RODney 3-2132

Higgins Co., Royal J., 10105 S. Western Ave., Chicago 43, Ill., 15 (ERA)
Tel: CEDarcrest 3-7388

Howard Electronic Sales, 4140 Archer Ave., Chicago, Ill., 10 (NEDA)

Hunter Assoc., Thomas B., 4441 W. Irving Park Rd., Chicago, Ill., 15 (ERA)
Tel: SPring 7-2500

Hutmacher Assoc., Inc., R. R., 6647 N. Oliphant Ave., Chicago 31, Ill., 15 (ERA)
Tel: NEwcastle 1-3248

Joseph, Inc., Irving, 5959 W. Fullerton Ave., Chicago, Ill., 10 (NEDA)

Kadell Sales Assoc., Inc., 5875 N. Lincoln Ave., Chicago 45, Ill., 15 (ERA)
Tel: LONgbeach 1-3042

Karet-Margolin, Inc., 13 W. Hubbard St., Chicago 10, Ill., 15 (ERA)
Tel: WHitehall 4-6345

Key-Men Sales, Inc., 5500 N. Menard, Chicago 30, Ill., 15 (ERA)
Tel: SPring 4-1444

Knoblock & Malone, Inc., 1603 N. Newland, Chicago 35, Ill., 15 (ERA)
Tel: NAtional 2-4005

Krueger Co., Ringland M., 5306 W. Lawrence Ave., Chicago 30, Ill., 15 (ERA)
Tel: PEusacola 6-3107

Langhaus-Levy Assoc., 5317 Cottage Grove Ave., Chicago 15, Ill., 15 (ERA)
Tel: DO 3-5344

Levin-Sacks & Assoc., 2639 Peterson, Chicago 45, Ill., 15 (ERA)
Tel: ROgers Park 4-7082

Linz & Assoc., William M., 6322 N. Cicero Ave., Chicago 46, Ill., 15 (ERA)
Tel: MUlberry 5-2022

Lukko Sales Corp., 4900 N. Elston Ave., Chicago, Ill., 10 (NEDA)

Magnuson Co., Edward, 3349 W. Irving Park Rd., Chicago, Ill., 15 (ERA)
Tel: JUNiper 8-2613

McCarthy Co., L. C., 7117 Addison St., Chicago 34, Ill., 15 (ERA)
Tel: KILDare 5-7976

Merquip Co., 5904 W. Roosevelt Rd., Chicago, Ill., 10 (NEDA)

Midwest Electronics, 6907 N. Western Ave., Chicago, Ill., 10 (NEDA)

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Mulay Co., Sam J., 1717 W. 74 St., Chicago 36, Ill., 15 (ERA)
Tel: GROvehill 6-4000

Nagel, Inc., Arthur, 918-925 E. 55th St., Chicago, Ill., 10 (NEDA)

Nation Wide Radio Co., 572 W. Randolph St., Chicago, Ill., 10 (NEDA)

National Elect. Dist. Assoc., 343 S. Dearborn St., Chicago, Ill., 10

Newark Electric Co., 223 W. Madison St., Chicago, Ill., 10 (NEDA)

Olson Radio Warehouse, 4101 Milwaukee Ave., Chicago, Ill., 10 (NEDA)

Pilgrim Distributing Co., 1230 E. 53rd St., Chicago, Ill., 10 (NEDA)

Pivan Engineering Co., 2820 Peterson Ave., Chicago 45, Ill., 15 (ERA)
Tel: BRiargate 4-9135

Radio TV Supply Co., 4343 W. Armitage Ave., Chicago, Ill., 10 (NEDA)

Ridley Assoc., 1551 N. Austin Blvd., Chicago 51, Ill., 15 (ERA)
Tel: TUxedo 9-2940

Sarkis & Co., Henry, 5608 N. Western Ave., Chicago 45, Ill., 15 (ERA)
Tel: ARdmore 1-3774

Schubert, Arthur J., 6335 N. California Ave., Chicago 45, Ill., 15 (ERA)
Tel: ROgers Park 1-6251

Sittler Corp., 18 N. Ada St., Chicago, Ill., 10, 15

Smith Co., Oren H., 221 W. Huron St., Chicago 10, Ill., 15 (ERA)
Tel: SUperior 7-7919

Star Electronics Dist., 7734 S. Halsted St., Chicago, Ill., 10 (NEDA)

Stemm, R. Edward, 5681 W. Lake St., Chicago 44, Ill., 15 (ERA)
Tel: ESTerbrook 9-2700

Stemm, Royal A., 21 E. Van Buren St., Chicago 5, Ill., 15 (ERA)
Tel: WEbster 9-4840

Stolz-Wicks, Inc., 8110 South Western Ave., Chicago, Ill., 10 (NEDA)

Swinke & Co., W. F., 541 Diversey Pkwy., Chicago 14, Ill., 15 (ERA)
Tel: BITtersweet 8-4343

Tatro & Assoc., Frank B., 6022 N. Rogers Ave., Chicago 46, Ill., 15 (ERA)
Tel: KEystone 9-4535

Taylor Co., Robert F., 308 W. Washington St., Chicago 6, Ill., 15 (ERA)
Tel: ANdover 3-1808

U.S. Radio-TV Supply, 6346 S. Ashland Ave., Chicago, Ill., 10 (NEDA)

Walker-Jimieson, Inc., 311 S. Western Ave., Chicago, Ill., 10 (NEDA)

Whitmore & Assoc., R. C., 605 N. Michigan Ave., Chicago 11, Ill., 15 (ERA)
Tel: MOhawk 4-1904

Withers & Ropek, Engrs., 5439 W. Division St., Chicago 51, Ill., 15 (ERA)
Tel: AUstin 7-7292

Warner Co., Dayton L., 815 MacArthur Dr., Chicago Heights, Ill., 15 (ERA)
Tel: SKYline 4-0028

Bud Electronic Supply Co., 114 E. North Ave., Danville, Ill., 10 (NEDA)

York Radio & TV Corp., 518 E. Prairie, Decatur, Ill., 10 (NEDA)

Ritter Sales Co., P.O. Box 64, Deerfield, Ill., 15 (ERA)
Tel: WIndsor 5-1400

Kleker Co., Jerome H., 177 Sunset Ave., Glen Ellyn, Ill., 15 (ERA)
Tel: GLEn Ellyn 2297

Rose & Co., J. K., 1116 Linden Ave., Highland Park, Ill., 15 (ERA)
Tel: AMbassador 2-5584

Radio Doctors Supply House, 892 W. Station St., Kankakee, Ill., 10 (NEDA)

Bauman Sales Co., R. H., 210 S. Lodge Lane, Lombard, Ill., 15 (ERA)
Tel: [Chi.] KEystone 9-3108

Hamilton Co., W. F., 8728 N. Olcott, Niles 31, Ill., 15 (ERA)
Tel: CEntal 6-5005

Haskell Assoc., 202 N. Marian, Oak Park, Ill., 15 (ERA)
Tel: EUclid 6-5741

Hill-Gray, Inc., 42½ Harrison, Oak Park, Ill., 15 (ERA)
Tel: ES 8-7050

Marsh & Assoc., Walter F., 308 N. Scoville Ave., Oak Park, Ill., 15 (ERA)
Tel: EUclid 6-1782

Melvin Electronics, Inc., 541 Madison St., Oak Park, Ill., 10 (NEDA)

Herberger Radio Supply, 136 First Ave., Peoria, Ill., 10 (NEDA)

Petitt Co., Inc., George, 349 N. Ashland, River Forest, Ill., 15 (ERA)
Tel: FOrEst 9-8940

Rockford Controls Co., 7423 W. North Ave., River Forest, Ill., 25 (ERA)
Tel: PResident 1-8430

Roussey & Assoc., Inc., R. F., 426 Edgewood Pl., River Forest, Ill., 15 (ERA)
Tel: FOrEst 9-6523

McBride Sales Co., J. J., 328 E. Burlington St., Riverside, Ill., 15 (ERA)
Tel: RIVERSide 7-8131

Tri-City Radio Supply Co., 1919 Fourth Ave., Rock Island, Ill., 10 (NEDA)

Sisson Sales Co., D. L., Box 226, 113 Bradley, Roselle, Ill., 15 (ERA)
Tel: TWInbrook 4-3837

102. Distribution.

Wilton Tool Mfg. Co., Inc., 9525 Irving Park Rd., Schiller Park, Ill., 10
Bruce Harold, 1120 E. Capitol, Springfield, Ill., 10 (NEDA)
Suter TV Supply, Inc., P.O. Box 1148, Springfield, Ill., 10 (NEDA)
Relay Sales, Inc., P.O. Box 186-IR, West Chicago, Ill., 10

See ad on page 524

Tel: **West Chicago 1100**

Brouillette & Assoc., W. G., 1558 Newcastle Ave., Westchester, Ill., 15 (ERA)

Tel: **Elmhurst 5-6500**

Hausten Co., Dave., 607 E. Willow Ave., Wheaton, Ill., 15 (ERA)

Tel: **MOntrose 8-7312**

Mykroy, Inc., Wheeling & Hintz Rds., Wheeling, Ill., 10 (NEDA)

INDIANA

Clancy & Co., Joe, P.O. Box 269, Angola, Ind., 15 (ERA)

Southern Sales Co., Box 105, Lakeshore Dr., Angola, Ind., 15 (ERA)

Electronic Parts, Inc., 1003 S. Main St., Elkhart, Ind., 10 (NEDA)

Components Engrg. Corp., 508 Old Nat'l. Bank Bldg., Evansville, Ind., 15

Bieberich & Sons, W. W., 2817 Plaza Dr., Fort Wayne, Ind., 15 (ERA)

Hoemig Sales Co., 3405 Butler Ct., Fort Wayne, Ind., 15 (ERA)

Homsber Co., Burton B., 2018 Jessie Ave., Fort Wayne, Ind., 15 (ERA)

Meily Co., William A., 4017 S. Harrison, Fort Wayne, Ind., 15 (ERA)

Midwest Electronics Supply, 2016 Webster St., Fort Wayne, Ind., 10 (ERA)

Needler Co., E. S., Box 2407, Fort Wayne 6, Ind., 15 (ERA)

Paul Sales Co., 2609 Broadway, Fort Wayne, Ind., 15

Valentine, Inc., F. C., 511 Ft. Wayne Bank Bldg., Fort Wayne, Ind., 15 (ERA)

Blind Assoc., Inc., 4920 West 16 St., Indianapolis, Ind., 15 (ERA)

Brown Distributing Co., 3746 College Ave., Indianapolis, Ind., 10 (NEDA)

Devoe Co., Leslie M., 4010 Washington Blvd., Indianapolis, Ind., 15 (ERA)

Fishman Assoc., Paul B., 4440 N. Campbell Ave., Indianapolis, Ind., 15 (ERA)

Keith Co., Jack, 1719 E. 52 St., Indianapolis, Ind., 15 (ERA)

MacNabb, Schroeder & Loomis, 820 E. 64 St., Indianapolis, Ind., 15 (ERA)

Morris, Cunningham Assoc., 6208 N. College Ave., Indianapolis, Ind., 15 (ERA)

Reinhardt Co., Kenneth G., 1719 E. 52 St., Indianapolis, Ind., 15 (ERA)

Scheffler Co., Charles, 1133 Navajo Trail, Indianapolis, Ind., 15 (ERA)

Schulz Co., Edwin A., 721 Sherwood Dr., Indianapolis, Ind., 15 (ERA)

Thomas & Sukup, Inc., 5226 N. Keystone Ave., Indianapolis, Ind., 15 (ERA)

Whitesell & Assoc., R. O., 6620 E. Washington St., Indianapolis, Ind., 5 (ERA)

Kirsch Sales Co., 107 Wabash, LaFontaine, Ind., 15 (ERA)

Moakler Electronic Supply, 500 E. Chestnut, Jeffersonville, Ind., 10

Bowman & Assoc., Jess, 257 Lincolnway, Valparaiso, Ind., 10 (NEDA)

IOWA

Deeco, Inc., 618 First St., N.W., Cedar Rapids, Iowa, 10

Gifford-Brown, Inc., 618-1st St., N.W., Cedar Rapids, Iowa, 10

Iowa Rad. & Supply Co., Inc., 719 Center Point Rd., Cedar Rapids, Iowa, 10 (NEDA)

Vrbik Co., Jerry, 625 Guaranty Bldg., Cedar Rapids, Iowa, 15

World Radio Labs., 3415 W. Broadway, Council Bluffs, Iowa, 10

Dunlap Electronics, Inc., 764 9th St., Des Moines, Iowa, 10, 15

Gifford-Brown, Inc., 1400 Walnut St., Des Moines, Iowa, 10 (NEDA)

Iowa Radio Corp., 1212 Grand Ave., Des Moines, Iowa, 10 (NEDA)

Mid-State Dist. Co., 1201 Grand Ave., Des Moines, Iowa, 10 (NEDA)

Radio Trade Supply Co., 1224 Grand Ave., Des Moines, Iowa, 10 (NEDA)

Boe Distributing Co., 1605 Rockdale Rd., Dubuque, Iowa, 10 (NEDA)

Mid-State Dist. Co., 429 W. Second St., Ottumwa, Iowa, 10 (NEDA)

Burghardt Radio Supply, 701 5th St., Sioux City, Iowa, 10 (NEDA)

Dukes Radio Co., 209-6th St., P.O. 1227, Sioux City, Iowa, 10 (NEDA)

KANSAS

Acme Radio & TV, Inc., 327 W. 4th St., Hutchinson, Kan., 10 (NEDA)

Roes & Co., H. A., 2601 Cherry, Kansas City, Kan., 15 (ERA)

Scholz Co., Paul G., 8402 Longview Rd., Kansas City, Kan., 15 (ERA)

Video Supply, 731 Central Ave., Kansas City, Kan., 10 (NEDA)

Walters Radio Supply, 3645 Main, Kansas City, Kan., 10 (NEDA)

Sutton & Co., Fred E., 928 Massachusetts Ave., Lawrence, Kan., 10 (NEDA)

Zimmer Sales Co., 5620 Woodward, Merriam, Kan., 15 (ERA)

Inland Associates, 6047 Howe Dr., Mission, Kan., 15

Terwilliger Sales Co., 7133 W. 80 St., Overland Park, Kan., 15 (ERA)

Radio Supply Co., 736 N. Santa Fe, Salina, Kan., 10 (NEDA)

Acme Radio Supply, 412 E. 10th St., Topeka, Kan., 10 (NEDA)

Carroll Radio & TV Supply, 1123 W. 6th St., Topeka, Kan., 10 (NEDA)

Signal Radio Supply, 115 Kansas, Topeka, Kan., 10 (NEDA)

Excel Distributors, 118 W. Second St., Wichita, Kan., 10 (NEDA)

Interstate Elect. Supply, 230 Ida St., Box 2018, Wichita, Kan., 10 (NEDA)

Radio Supply Co., Inc., 115 Laura, Wichita, Kan., 10 (NEDA)

Standard Products, Inc., 650 E. Gilbert, Wichita, Kan., 15, 20

KENTUCKY

Ashland Rad. Supply Co., 2125 Winchester Ave., Ashland, Ky., 10 (NEDA)

Crescent Radio Supply, 212 W. 10th St., Bowling Green, Ky., 10 (NEDA)

Saville Ra-Tele-Nics Lab, 1125 Russell St., Covington, Ky., 15 (ERA)

Randolph & Hale, Inc., 729 E. 4th St., Hopkinsville, Ky., 10 (NEDA)

Radio Equip. Co., Inc., 480 Skain St., Lexington, Ky., 10 (NEDA)

Tel-Rad Electronics, Inc., 1401 Delaware Ave., Lexington, Ky., 10 (NEDA)

Arby Electronics, 540 E. Gray St., Louisville, Ky., 10 (NEDA)

Cobb Sales Co., 220 W. Breckinridge St., Louisville, Ky., 15 (ERA)

Peerless Elect. Equip. Co., 2210 South 7th St., Louisville, Ky., 10 (NEDA)

Warren Radio Co., 455 S. 31st St., Paducah, Ky., 10 (NEDA)

Southern Distributors, 3802 Lexington Rd., St. Mathews, Ky., 10 (NEDA)

LOUISIANA

Central Radio Supply, P.O. Box 1688, 601 N. Third St., Alexandria, La., 10 (NEDA)

Electronic Supply Co., Inc., 1753 N. 21st St., Baton Rouge, La., 10 (NEDA)

Louisiana Radio & TV Dist., 1645 Plank Rd., Baton Rouge, La., 10 (NEDA)

Lafayette Rad. Equip., Inc., 1023 Simcoe St., Lafayette, La., 10 (NEDA)

Ralph's Radio Elect. Supply, 3004 Cameron St., Lafayette, La., 10 (NEDA)

Wholesale Radio Equip., Inc., 1722 Common St., Lake Charles, La., 10 (NEDA)

Hale & McNeil, P.O. Box 23, 421 Walnut St., Monroe, La., 10 (NEDA)

Bell Radio Supply Co., 2627 Tulane Ave., New Orleans, La., 10 (NEDA)

Columbia Radio & Supply Co., P.O. Box 13127, 3940 3rd St., New Orleans, La., 10 (NEDA)

Crescent Radio & Supply, P.O. Box 2408, 537 S. Claiborne, New Orleans, La., 10 (NEDA)

Electronic Parts Corp., 223-225 N. Broad St., New Orleans, La., 10 (NEDA)

Southern Radio Supply Co., 1909 Tulane Ave., New Orleans, La., 10 (NEDA)

Opelousas Radio Equip. Co., 240 N. Court St., Opelousas, La., 10 (NEDA)

Koelmay Sales Co., Inc., 2530 Linwood Ave., Shreveport, La., 10 (NEDA)

Ports Electronics Parts, 2423 Southern, Shreveport, La., 10 (NEDA)

Directory III. Materials & Services

Distribution—Class 102

Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts

MAINE

Radio Supply Co., Inc., 26 Cross St., Auburn, Me., 10 (NEDA)
Maine Elect. Supply Corp., 494 Broadway, Bangor, Me., 10 (NEDA)
Powell Radio Supply, 115 Water St., Hallowell, Me., 10 (NEDA)
Maine Elect. Supply Corp., 148 Anderson St., Portland, Me., 10 (NEDA)

MARYLAND

American Dist. Co., 1200 N. Fulton Ave., Baltimore, Md., 10 (NEDA)
Berman Co., Inc., Henry O., 10-12 E. Lombard St., Baltimore, Md., 10 (NEDA)
Daniels, Inc., L. J., P.O. Box 6864, Baltimore, Md., 15
Edgerly Instrument Labs., 2022 St. Paul St., Baltimore, Md., 20
Kann-Ellert Elect., Inc., 9 S. Howard St., Baltimore, Md., 10 (NEDA)
Lee Assoc., Inc., S. S., 2419 Old Frederick Rd., Baltimore, Md., 15
Olin Electronic Supply, 6009 Eastern Ave., Baltimore, Md., 10 (NEDA)
Radio Electric Service, 5 N. Howard St., Baltimore, Md., 10 (NEDA)
Spartana Co., Inc., A. R., 239 N. Gay St., Baltimore, Md., 10 (NEDA)
Wholesale Radio Parts Co., 308 W. Redwood St., Baltimore, Md., 10 (NEDA)
Rosen & Assoc., Gene, 9501 Wadsworth Dr., Bethesda, Md., 15 (ERA)
Zimmerman Wholesalers, 162 Bedford St., Cumberland, Md., 10 (NEDA)
Stoddard Supply Co., 354 S. Cannon Ave., Hagerstown, Md., 10 (NEDA)
Zimmerman Wholesalers, 114 E. Washington St., Hagerstown, Md., 10 (NEDA)
Standard Electronics, 301 Snow Hill Rd., Salisbury, Md., 10 (NEDA)
Leinaw Co., Charles, 9427 Georgia Ave., Silver Spring, Md., 15 (ERA)
Taylor Co., Morris F., 9431 Georgia Ave., Silver Spring, Md., 15 (ERA)
Barnhill & Assoc., R. B., P.O. Box 6892, Towson, Md., 15 (ERA)
J-H Electronic Sales Co., Box 6844, Towson, Md., 15 (ERA)
Wilkinson, Inc., Robert L., 707 Stevenson Lane, Towson 4, Md., 15 (ERA)

MASSACHUSETTS

Muddle Assoc., John V., 74 Union St., Ashland, Mass., 15 (ERA)
Tel: TRinity 3-7091
Chamberlin Co., Harold A., Bedford Airport, Bedford, Mass., 15 (ERA)
Tel: CRestview 4-0044
Drew Assoc., Inc., 56 The Great Rd., P.O. Box 467, Bedford, Mass., 15 (ERA)
See ad on this page
Tel: CRestview 4-7232

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Kelly Co., Wm. T., 77 Lovett St., Beverly, Mass., 15 (ERA)
Tel: WA 2-0065

Akeroyd Co., Arthur E., 2311 John Hancock Bldg., Boston 16, Mass., 15 (ERA)
Tel: HANcock 6-2433

Anderson Sales Co., 177 State St., Boston, Mass., 15 (ERA)
Tel: CApitol 7-2980

Bernard Thal, 791 Tremont St., Boston, Mass., 15, 20

Cramer Electronics, Inc., 811 Boylston St., Boston, Mass., 10 (NEDA)

Demambro Radio Supply Co., 1095 Commonwealth Ave., Boston, Mass., 10 (NEDA)

Gerber Radio Supply Co., 1900 Columbus Ave., Boston, Mass., 10 (NEDA)

MacDonald-Wadman Co., 459 Stuart St., Boston, Mass., 15 (ERA)
Tel: COmmonwealth 6-2336

Mayer Co., A. W., 895 Boylston St., Boston, Mass., 10 (NEDA)

Perron & Co., Inc., Ray, 1870 Centre St., Boston 32, Mass., 15 (ERA)
See ad on page 710
Tel: FAirview 3-1008

Radio Shack Corp., 730 Commonwealth Ave., Boston, Mass., 5, 10


Representatives Corp., 10 High St., Boston, Mass., 15 (ERA)
Tel: HANcock 6-0541

Segel Co., Charles, 1262 Commonwealth Ave., Boston 34, Mass., 15 (ERA)
Tel: BEacon 2-4334

Sturgeon, Inc., Paul R., 25 Huntington Ave., Boston 16, Mass., 15 (ERA)
Tel: CO 6-7705

Ware Radio Supply Co., 913 Centre St., Brockton, Mass., 10 (NEDA)

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Electronic Components for Industry



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"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 161-264.

102. Distribution.

Broger Instru. Sales Co., 48 Pearl St.,
Brookline, Mass., 15 (ERA)
Tel: BE 2-4804

Brown Co., Kenneth L., 54 Atherton Rd.,
Brookline, Mass., 15 (ERA)
Tel: BEacon 2-3969

Eastern Electronic Sales, 145 University
Rd., Brookline, Mass., 15 (ERA)
Tel: ASpinwall 7-5675

Gerber Sales Co., Inc., 48 Pearl St.,
Brookline, Mass., 15 (ERA)
Tel: BEacon 2-2425

Segel Co., Inc., Henry P., 386 Washing-
ton St., Brookline 46, Mass., 15 (ERA)
Tel: BEacon 2-7525

Sturdy Co., Inc., R. H., 32 Kennard Rd.,
Brookline, Mass., 15

Yewell Assoc., Middlesex Turnpike, Bur-
lington, Mass., 15 (ERA)
Tel: BRowning 2-9000

Bridge Co., Ray, 100 Memorial Dr., Cam-
bridge, Mass., 15

Electrical Supply Corp., 205 Alewife
Brook Pkwy., Cambridge, Mass., 10
(NEDA)

**Greene Organization, Inc., Dan, P.O.
Box 124, Cambridge 38, Mass., 15
(ERA)**

See ad on this page

Tel: **UNiversity 4-2220**

Hathaway Electr., Inc., G. M., 238 Main
St., Cambridge, Mass., 15 (ERA)
Tel: KI 7-0380

Rodgers Assoc., Chapin Rd., Hampden,
Mass., 15 (ERA)
Tel: REpublic 3-8428

Boeing Co., John E., P.O. Box 235,
Lexington, Mass., 15 (ERA)
Tel: VOLunteer 2-2500

Purinton, Inc., Richard, 11 Muzzey St.,
Lexington, Mass., 15 (ERA)
Tel: VOLunteer 2-8300

Willson Sales Co., 60 Beach St., Marble-
head, Mass., 15 (ERA)
Tel: NEptune 8-4016

Durrell Distributors, 222 Mystic Ave.,
Medford, Mass., 10 (NEDA)

Deveer Co., Robert L., 1492 Highland
Ave., Needham, Mass., 15 (ERA)
Tel: Hillcrest 4-4200

Harris Co., Stanley A., 1241 Highland
Ave., Needham, Mass., 15 (ERA)
Tel: Hillcrest 4-4780

Mosher & Peysor Co., 945 Great Plain
Ave., Needham, Mass., 15 (ERA)
Tel: Hillcrest 4-1400

White Sales Co., Inc., 945 Great Plain
Ave., Needham 92, Mass., 15 (ERA)
Tel: Hillcrest 4-3676

Smith & Purdy Assoc., 21 Kearney Rd.,
Needham Hgts., Mass., 15

Greene-Shaw Co., Inc., 341-347 Water-
town St., Newton, Mass., 10 (NEDA)

Friedman Assoc., M. W., 98 Osborne
Path, Newton Center, Mass., 15

Oakley, Inc., Tim, 148 Needham St., New-
ton Heights, Mass., 15 (ERA)

Schuff Co., Howard J., 815 Washington
St., Newtonville, Mass., 15 (ERA)
Tel: LAsell 7-5304

C & I Distributors, Inc., 228 Pleasant St.,
Northampton, Mass., 10 (NEDA)

Pilgrim Elect. Supply Co., 26-30 School
St., Quincy, Mass., 10 (NEDA)

Goss Co., Jack, 99 Highland Ave., Somer-
ville, Mass., 15 (ERA)
Tel: PROspect 6-2262

**New England Area Representatives,
Inc., 99 Highland Ave., Somerville 43,
Mass., 10**

See ad on page 711

Tel: **PROspect 6-2262**

Cushing, Inc., T. F., 1026 Bay St., Spring-
field, Mass., 10 (NEDA)

Soundco Electronic Supply, 147 Dwight
St., Springfield, Mass., 10 (NEDA)

Sydlee Electronic Supply, 453 Worthing-
ton St., Springfield, Mass., 10 (NEDA)

Young & Young of Springfield, 169
Spring St., Springfield, Mass., 10

Instrument Dynamics, Inc., 11 Albion St.,
Wakefield, Mass., 15 (ERA)
Tel: CRYstal 6-5100

Saunders & Co., 375 Moody St., Waltham
54, Mass., 15 (ERA)
Tel: TWInbrook 4-6071

Schley Co., L. L., 70 Coolidge Hill Rd.,
Watertown, Mass., 15 (ERA)
Tel: WALnut 6-0235

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THERMISTORS, VARISTORS

BEEDE INSTRUMENT
CINCH, JONES
GEMCOR
GOULD-NATIONAL
HUMPHREY
INDUSTRIAL CONDENSOR
INTERNATIONAL RESISTANCE
KEPCO
MAGNECRAFT
MAGNETIC WINDINGS
MEASUREMENTS CORP.
MOSSMAN
PESCHEL
VICTORY ENGINEERING

Ray Perron Bill Connors Frank Raftery Al Maude
John Ferrari Les Creaser Bob McKelvey

For details circle #761 on Reader Service Card

Directory III. Materials & Services

Distribution—Class 102

Massachusetts
Michigan
Minnesota

Gray Co., Robert W., 572 Washington St., Wellesley, Mass., 15 (ERA)
Tel: CEDar 5-5296

Pray Sales, W. B., 44 Washington St., Wellesley Hills, Mass., 15

Scott Co., Michael, 90 Edmunds Rd., Wellesley Hills, Mass., 15

Gysan Co., Richard L., 12 Foster St., Wenham, Mass., 15 (ERA)
Tel: WAlker 2-5770

Ingeber Co., L. K., 41 Cross St., W. Newton, Mass., 15

Hooker Co., Samuel C., 397 Highland Ave., Winchester, Mass., 15 (ERA)

Technical Impex Corp., 750 Main St., Winchester, Mass., 5

Radio Maintenance Supply, 80 Thomas St., Worcester, Mass., 10 (NEDA)

Worcester Pressed Steel, 100 Barber Ave., Worcester, Mass., 15

MICHIGAN

Wedemeyer Elect. Supply, 213-217 N. Fourth Ave., Ann Arbor, Mich., 10 (NEDA)

Warren Radio Co., 93 W. Bidwell St., Battle Creek, Mich., 10 (NEDA)

Nordstrom & Co., R. C., 580 N. Woodward Ave., Birmingham, Mich., 15 (ERA)

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Straits Distributors, Inc., 412 N. Main St., Cheboygan, Mich., 10 (NEDA)

Anger Associates, 13126 Michigan Ave., Dearborn, Mich., 15

West Side Radio & TV Supply, 7521 Wyoming Ave., Dearborn, Mich., 10 (NEDA)

Amb Sales Co., 10116 Puritan, Detroit 38, Mich., 15 (ERA)

Beitel Co., Wayne, 13209 Fenkell, Detroit 27, Mich., 15 (ERA)

Burcaw-Cowan & Co., 22128 Grand River Ave., Detroit 19, Mich., 15 (ERA)

Butchart Co., Rod, 16637 Warren, Detroit 24, Mich., 15 (ERA)

Central Electronic Sales, 19303 Fairport St., Detroit 5, Mich., 15 (ERA)

Henchen, Jensen & Co., 2842 W. Grand Blvd., Detroit 2, Mich., 15 (ERA)

Ferguson Electronic Supply, 2306 Puritan Ave., Detroit, Mich., 10 (NEDA)

Glendale Electronic Supply, 12866 Woodward Ave., Detroit, Mich., 10 (NEDA)

Holton Sales Co., 17534 W. Seven Mile Rd., Detroit 35, Mich., 15 (ERA)

K.L.A. Labs., Inc., 7422 Woodward Ave., Detroit, Mich., 10 (NEDA)

Koehler-Pasmore Co., 11833 Hamilton Ave., Detroit 3, Mich., 15 (ERA)

Kurtz Co., Paul, 17181 Appoline Ave., Detroit 35, Mich., 15 (ERA)

Lee Co., William S., 13215 Fenkell Ave., Detroit 27, Mich., 15 (ERA)

Liddle Co., Edwin F., 18925 Grand River Ave., Detroit 23, Mich., 15 (ERA)

Lohmann Co., R. S., 12730 Fenkell, Detroit 27, Mich., 15 (ERA)

Merchant & Co., Inc., 18411 W. McNichols, Detroit 19, Mich., 15 (ERA)

Milsh Co., Robert, 19371 James Couzens Hwy., Detroit 35, Mich., 15 (ERA)

Nor-West TV & Radio Supply, 20926 Schoolcraft, Detroit, Mich., 10 (NEDA)

Radio Specialties Co., Inc., 456 Charlotte Ave., Detroit, Mich., 10 (NEDA)

Radio Supply & Engrg. Co., 90 Selden Ave., Detroit, Mich., 10 (NEDA)

Reno Radio Co., 1314 Broadway, Detroit, Mich., 10, 20

Rathsburg Assoc., Jack., 4140 Van Dyke Ave., Detroit 14, Mich., 15 (ERA)

Rubin, Ben Z., 16222 Cheyenne Ave., Detroit, Mich., 15

Shaffer Co., Grant, 14241 Fenkell Ave., Detroit, Mich., 15 (ERA)

Thorpe, Jack M., 640 Hidden Lane, Detroit 36, Mich., 15 (ERA)

Zaffina Co., Lawrence F., 7351 Gratiot Ave., Detroit 13, Mich., 15 (ERA)

Erickson Elect. Wholesale, 1201 Woodward Heights, Ferndale, Mich., 10 (NEDA)

Shalco, Inc., 23525 Woodward Ave., Ferndale 20, Mich., 15 (ERA)

Lifsey Distributing Co., 1409 N. Saginaw, Flint, Mich., 10 (NEDA)

Shand Radio Specialties, 2608 Leith St., Flint, Mich., 10 (NEDA)

Radio Electronic Supply, 505 Jefferson, S.E., Grand Rapids, Mich., 10 (NEDA)

Morrow Sales, Jim, 76 Louise Ave., Highland Park, Mich., 15 (ERA)

Fulton Radio Supply Co., 1208 Greenwood Ave., Jackson, Mich., 10 (NEDA)

Matteson Electronics, Inc., 1617 E. Michigan Ave., Jackson, Mich., 10 (NEDA)

Warren Radio Co., 1710 S. Westnedge Ave., Kalamazoo, Mich., 10 (NEDA)

Electric Products Sales, 427 E. Michigan Ave., Lansing, Mich., 10 (NEDA)

Fulton Radio Supply Co., 2710 Alpha St., Lansing, Mich., 10 (NEDA)

Offenhauer Co., 1719 W. Hillside St., Lansing, Mich., 10 (NEDA)

F.G.S. Elect Supply Co., Inc., 1142 S. Gratiot, Mount Clemens, Mich., 10 (NEDA)

Western Elect. Supply Co., 1781 5th St., Muskegon, Mich., 10 (NEDA)

Elect. Supply Co., 248 E. Pike St., Pontiac, Mich., 10 (NEDA)

Orem Distributing Co., 401 S. Franklin St., Saginaw, Mich., 10 (NEDA)

Radio Parts Co., 803 S. Washington St., Saginaw, Mich., 10 (NEDA)

Electro Mec Associates, 4012 E. Nine Mile Rd., Warren, Mich., 15

MINNESOTA

Northwest Radio, 123 E. First St., Duluth, Minn., 10 (NEDA)

Hammond Co., 3540 Shady Oak Rd., Hopkins, Minn., 15 (ERA)

Anderson & Associates, 3825 York Ave. N., Minneapolis, Minn., 15 (ERA)

Bartleson Co., Bill, 3390 Oak Grove, Suite 502, Minneapolis, Minn., 15 (ERA)

Bauman Co., 3033-35 Lyndale Ave., S., Minneapolis, Minn., 10 (NEDA)

Bonament Heyda Co., 6101 Auto Clive Rd., Minneapolis, Minn., 15 (ERA)

Electronic Center, Inc., 107 Third Ave. N., Minneapolis, Minn., 10 (NEDA)

Foster Co., Mel, 2402 Hennepin Ave., Minneapolis, Minn., 15 (ERA)

Franklin Co., Merrill, 338 E. Franklin Ave., Minneapolis, Minn., 15 (ERA)

Gibb Co., Clark R., 2400 Hennepin, Minneapolis, Minn., 15 (ERA)



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102. Distribution.

Hagestad & Assoc., E. O., 4519 Laguna Dr., Minneapolis, Minn., 15 (ERA)
Hamilton & Bale Assoc., 3359 Republic Ave., Minneapolis, Minn., 15 (ERA)
Hill Co., Fred B., 6110 Excelsior Blvd., Minneapolis, Minn., 15 (ERA)
Oszman Co., Elmer W., 12 E. 25 St., Minneapolis, Minn., 15 (ERA)
Kirkeby Co., Marvin H., 204 Sunnyridge Ave., Minneapolis, Minn., 15 (ERA)
Northern State Sales Co., 1400 Park Ave., Minneapolis, Minn., 15 (ERA)
Northwest Radio-Elect. Supply, 52 S. 12th St., Minneapolis, Minn., 10 (NEDA)
Richardson & Co., H. M., 9 E. 22 St., Minneapolis, Minn., 15 (ERA)
Ripley, Ray, 7222 James Ave. S., Minneapolis, Minn., 15 (ERA)
Stan Clothier Co., Inc., 12 W. 58 St., Minneapolis, Minn., 15 (ERA)
Stark Radio Supply Co., 71 S. 12th St., Minneapolis, Minn., 10 (NEDA)
Warner Co., A. J., 5322 29 Ave., S., Minneapolis, Minn., 15 (ERA)
Elliott & Hanson Co., 119 First Ave., N.W., Rochester, Minn., 10 (NEDA)
Crossley Associates, Inc., 842 Raymond Ave., St. Paul, Minn., 15, 20
Electronic Distributing, 891 Vandalia, St. Paul, Minn., 10 (NEDA)
Engelbretson Co., Wm., 906 Ottawa Ave., St. Paul 18, Minn., 15 (ERA)
Northport Engrn., Inc., 1729 Selby Ave., St. Paul 4, Minn., 15 (ERA)

MISSISSIPPI

Parham Electronics Co., 511 Larner St., Greenwood, Miss., 10 (NEDA)
Helwick Radio & Tel. Supply, 1516 30th Ave., Gulfport, Miss., 10 (NEDA)
Ellington Radio, Inc., 824 S. Gallatin, Jackson, Miss., 10 (NEDA)
May & Jackson, 930 Bailey Ave., Jackson, Miss., 10 (NEDA)
Swan Distributing Co., Inc., 342 N. Gallatin St., Jackson, Miss., 10 (NEDA)
Teague Electronics, 714 S. Gallatin St., Jackson, Miss., 10 (NEDA)
Parham & Pate Co., Hi-Way 45, S., Tupelo, Miss., 10 (NEDA)

MISSOURI

Snedekum Elect. Supply Co., 2215 Broadway, Cape Girardeau, Mo., 10 (NEDA)
Maynard Co., L. W., 139 N. Central Ave., Clayton 5, Mo., 15 (ERA)
McCune Co., John N., P.O. Box 216, Florissant, Mo., 15 (ERA)
McDowell-Redlingshafer, 140 Pomano, Florissant, Mo., 15 (ERA)
Central Mo. Distributing, 324 E. Capitol Ave., Jefferson, Mo., 10 (NEDA)
Vignola Assoc., Carmine A., 1202 Peyton Dr., Box 569, Jefferson City, Mo., 15 (ERA)
Brothers Co., M., 515 N. Byers Ave., Joplin, Mo., 10 (NEDA)
Four-State Radio & Supply, 402 Wall St., Joplin, Mo., 10 (NEDA)
Assoc. Elect. Supply Co., 5423 Troost Ave., Kansas City, Mo., 10 (NEDA)

Bettis Co., Maury E., 406 W. 34 St., Kansas City, Mo., 15 (ERA)
Burststein-Applebee Co., 1012 McGee St., Kansas City, Mo., 10 (NEDA)
Clemenson-Larrabee Co., 436 E. 79 St., Kansas City, Mo., 15 (ERA)
Collins-Havercamp Assoc., 6825 N. Baltimore, Kansas City 16, Mo., 15 (ERA)
Elliott Co., Arthur K., 211 Westport Rd., Kansas City, Mo., 15 (ERA)
Farris Co., Inc., R. W., 406 W. 34 St., Kansas City, Mo., 15 (ERA)
Florence Co., L. F., 406 W. 34 St., Kansas City, Mo., 15 (ERA)
Forristal-Young Sales Co., 405 Broadway, Kansas City, Mo., 15 (ERA)
Fry & Co., W. E., 406 W. 34 St., Kansas City, Mo., 15 (ERA)
Henshaw Radio Supply, 3617-19 Troost, Kansas City, Mo., 10 (NEDA)
Hoenig-Myers Assoc., 4538 Main, Kansas City, Mo., 15 (ERA)
Jones Electronic Sales, 3627 S. Main St., Kansas City, Mo., 10 (NEDA)
Kay Sales Co., 2600 Grand Ave., Kansas City 8, Mo., 15 (ERA)
Kelly-Schmitz-Winkeler, 7449 Broadway, Kansas City, Mo., 15 (ERA)
Leemark Assoc., P.O. Box 8467, Kansas City, Mo., 15
Manhattan Radio & Equip., 2538 Grand Ave., Kansas City, Mo., 10 (NEDA)
McDowell-Redlingshafer, 1103 E. Armour, Kansas City, Mo., 15 (ERA)
McGrade Co., E. W., Box 8876, Kansas City, Mo., 15 (ERA)
Radiolab, Inc., 1612 Grand Ave., Kansas City, Mo., 10 (NEDA)
Somers & Co., F. C., 17 & Main Sts., Kansas City, Mo., 15 (ERA)
Thibau Co., A. R., 210 W. 8 St., Kansas City, Mo., 15 (ERA)
Kelly Sales Co., Jack, 972 N. Geyer Rd., Kirkwood 22, Mo., 15 (ERA)
Tri-State Electronics, P.O. 218, 536 E. Pine Blvd., Poplar Bluff, Mo., 10 (NEDA)
Acme Radio Supply, Inc., 829 S. 10th St., St. Joseph, Mo., 10 (NEDA)
St. Joseph Radio & Supply, 720 S. 9th St., St. Joseph, Mo., 10 (NEDA)
Ashe Radio Co., Walter, 1125 Pine, St. Louis, Mo., 10 (NEDA)
Brown Radio Co., Tom, 3924 Washington Ave., St. Louis, Mo., 10 (NEDA)
Crown Elect. Dists., Inc., 2300 N. Union Blvd., St. Louis, Mo., 10 (NEDA)
Deltronics Distributing, 5239 Delmar St., St. Louis, Mo., 10 (NEDA)
Ebinger Electronics, Inc., 2501-03 S. Jefferson, St. Louis, Mo., 10 (NEDA)
Fixman Engrg. Co., Gordon, 8160 Stanford Ave., St. Louis, Mo., 15
Forristal-Young Sales Co., 8147 Delmar, St. Louis 24, Mo., 15 (ERA)
Interstate Supply Co., 4445 Gustine Ave., St. Louis, Mo., 10 (NEDA)
Kathrinus & Co., Norman W., 4356 Duncan Ave., St. Louis 10, Mo., 15 (ERA)
Kelly-Schmitz-Winkeler, 3938 Lindell Blvd., St. Louis 8, Mo., 15 (ERA)

Lowell Co., Theodore B., P.O. Box 21, Normandy Beach, St. Louis 21, Mo., 15 (ERA)
Radonics, 5040 Easton Ave., St. Louis, Mo., 10 (NEDA)
Sebright & Co., Russ D., 7120 W. Florissant St., St. Louis 20, Mo., 15 (ERA)
Van Sickle Radio Co., 1113 Pine St., St. Louis, Mo., 10 (NEDA)
Radio & TV Supply, Inc., 810 W. 16th St., Sedalia, Mo., 10 (NEDA)
Reed Radio & Supply Co., Main P.O. Box 149, Springfield, Mo., 10 (NEDA)

MONTANA

Parts House, Inc., 106 11th St. W., Billings, Mont., 10 (NEDA)
Radio Electronics Supply, 110 Tenth St. S., Great Falls, Mont., 10 (NEDA)

NEBRASKA

Central Radio Supply, Inc., 518 W. First St., Hastings, Neb., 10 (NEDA)
General Radio & TV Co., 322 S. 12th Ave., Lincoln, Neb., 10 (NEDA)
Hicks Radio Co., 1422 "O" St., Lincoln, Neb., 10 (NEDA)
Leuck Radio Supply, 243 S. 11th St., Lincoln, Neb., 10 (NEDA)
Valley Electronic Supply, Rt. 2, 2015 Beverly Blvd., North Platte, Neb., 10 (NEDA)
J-B Distributing Co., 1616 Cass St., Omaha, Neb., 10 (NEDA)
Omaha Appliance Co., 2222 Leavenworth, Omaha, Neb., 10 (NEDA)
Radio Equip Co., 2852 Douglas St., Omaha, Neb., 10 (NEDA)
Sidles Co., 7302 Pacific St., Omaha, Neb., 10 (NEDA)

NEVADA

Radio & Sound Supply, 25 E. California St., Las Vegas, Nev., 10 (NEDA)
Radio Supply Co., Nevada, 720 Tahoe St., Reno, Nev., 10 (NEDA)

NEW HAMPSHIRE

Evans Radio, P.O. Box 312, Concord, N.H., 10 (NEDA)

NEW JERSEY

Kearns Elect. Products Co., 300 N. Mississippi Ave., Atlantic City, N.J., 10 (NEDA)
Dixon Co., Samuel A., 208 Russell Ave., Barrington, N.J., 15 (ERA)
Midstate Radio Supply Co., 157 W. White Horse Pike, Berlin, N.J., 10 (NEDA)
Berger Electronics Supply, 241 Bloomfield Ave., Bloomfield, N.J., 10 (NEDA)
Dickison Sales Co., Inc., 300 Broadway, Camden, N.J., 15 (ERA)
Magnire & Co., J. A., 116 N. 7 St., Camden 2, N.J., 15 (ERA)
Radio Electric Service Co., 513 Cooper St., Camden, N.J., 10 (NEDA)
Bright Star Industries, 600 Getty Ave., Clifton, N.J., 10

Directory III. Materials & Services

Distribution—Class 102

Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

- Eastern Radio Corp., 1074 Main Ave., Clifton, N.J., 10 (NEDA)
- Production Engrg. Corp., 173 Sargeant Ave., Clifton, N.J., 15
- Bancroft & Co., H. S., 209 Cooper St., Westmont, Collingswood, N.J., 15 (ERA)
- Columbia Distributors, Columbia Heights, Columbia, N.J., 10 (NEDA)
- International Dist. Co., 185 Central Ave., East Orange, N.J., 10 (NEDA)
- Leader Elect. Supply Co., 72 Prince St., Elizabeth, N.J., 10 (NEDA)
- Central Associates, 44 N. Dean St., Englewood, N.J., 15
- Schwartz Co., Mel, 39-16 Tierney Pl., Fair Lawn, N.J., 15
- Ringer Co., R. L., P.O. Box 114, 14 Glen Ave., Glen Rock, N.J., 15
- Braddock, Edward, P.O. Box 305, Haddonfield, N.J., 15
- Feeffe Electronic Sales, 228 E. Kings Hwy., Haddonfield, N.J., 15 (ERA)
- Moyer Co., Harold A., P.O. Box 14, Haddonfield, N.J., 15 (ERA)
- Sherwood Distributors, 1255 Liberty Ave., Hillside, N.J., 10 (NEDA)
- Simberkoff Sales Co., 68 Hudson St., Hoboken, N.J., 15 (ERA)
- Munsell & Co., Eugene, 34 Exchange Pl., Jersey City, N.J., 5
- Nidisco, Jersey City, Inc., 713 Newark Ave., Jersey City, N.J., 10
- Schwartz Co., Adolph, 15 Exchange Pl., Jersey City, N.J., 15 (ERA)
- Shulan & Co., Wally, 880 Bergen Ave., Jersey City, N.J., 15 (ERA)
- Steinberg Co., H. A., 880 Bergen Ave., Jersey City, N.J., 15 (ERA)
- Electronic Associates, Long Branch Ave., Long Branch, N.J., 15, 20
- Nelson-Platt Sales Co., 312 Cherry Hill Blvd., Merchantville, N.J., 15 (ERA)
- Trinkle Sales Co., 7675 Maple Ave., Merchantville, N.J., 15 (ERA)
- Brennan Co., F. X., 180 Glenridge Ave., Montclair, N.J., 15 (ERA)
- Fields & Simon Sales Co., 109 Valley Rd., Montclair, N.J., 15 (ERA)
- Freeman-Assoc., L. C., 24 Stephen St., Montclair, N.J., 15
- Foley Assoc., Andrew A., P.O. Box 155, Moorestown, N.J., 15 (ERA)
- Federated Purchaser, Inc., 1021 U.S. Rt. 22, Mountainside, N.J., 10 (NEDA)
- William Radio Supply Co., 265 Woodbridge Ave., New Brunswick, N.J., 10 (NEDA)
- Cerf & Co., Art 744 Broad St., Newark N.J., 15 (ERA)
- Electronic Marketers, Inc., 25-27 Hoyt St., Newark, N.J., 10 (NEDA)
- Krich-New Jersey, Inc., 428 Elizabeth Ave., Newark, N.J., 10 (NEDA)

- Lippman & Co., Aaron, 99-107 Newark St., Newark, N.J., 10 (NEDA)
- Galasso Co., David P., 382 Franklin Ave., Nutley 10, N.J., 15 (ERA)
- Williams & Assoc., V. W., 1100 White Horse Pike, Oaklyn, N.J., 15 (ERA)
- Federal Electric Corp., Industrial Park, Paramus, N.J., 20
- Jersey Elect. Dist. Co., 524 21st Ave., Paterson, N.J., 10 (NEDA)
- Boenecke Assoc., 5505 Westfield Ave., Pennsauken, N.J., 15 (ERA)
- Houser Assoc., 188 Water St., Perth Amboy, N.J., 15 (ERA)
- Williams Co., Carl B., 154 S. Main St., Phillipsburg, N.J., 10 (NEDA)
- Richardt Co., John W., Rt. 46, Pine Brook, N.J., 15 (ERA)

- Union TV Parts Co., 800 South Ave., Plainfield, N.J., 10 (NEDA)
- Miller Co., Harry, Red Bank, N.J., 15 (ERA)
- Barker Sales Co., 339 S. Broad Ave., Ridgefield, N.J., 5
- Unisco, Inc., 1061 Linden Ave., Ridgefield, N.J., 10, 15
- Finley Co., Robert, 307 Lincoln Bldg., Ridgewood, N.J., 15 (ERA)
- Gawler-Knoop Co., 178 Eagle Rock Ave., Roseland, N.J., 15
- Banfield Assoc., C. S., P.O. 292, Rutherford, N.J., 15
- Gentry Co., Richard L., 15 Park Ave., Rutherford, N.J., 15 (ERA)
- Masters TV Supply Co., 96 N. Caston Ave., Somerville, N.J., 10 (NEDA)
- Barrett Border & Co., 121 Oak St., Tenafly, N.J., 15 (ERA)
- Gray Assoc., Harold, 46 Tenafly Rd., Tenafly, N.J., 15

ELECTRONIC EQUIPMENT and COMPONENTS



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"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 161-264.

102. Distribution.

Allen & Hurley, 23 S. Warren St., Trenton, N.J., 10, 20
 Fineburgs, 533 S. Broad St., Trenton, N.J., 10 (NEDA)
Snyder Co., Inc., V. A., 2165 Morris Ave., P.O. Box 184, Union, N.J., 15
See ad on this page
Tel: MURdock 8-6100
 Bressler Co., Jules J., 4808 Bergenline Ave., Union City, N.J., 15 (ERA)
 Dealers Electronics Co., 817 13th St., Union City, N.J., 10 (NEDA)
Hughes Co., Kenneth E., 4808 Bergenline Ave., Union City, N.J., 15
See ad on page 713
Tel: UNion 7-3204
 Pyramid Supply Co., 1707 New York Ave., Union City, N.J., 10 (NEDA)
 Hinc Sales Co., Edwin B., N. Mountain Ave., Upper Montclair, N.J., 15
 Garten-Assoc., L. A., 645 Eagle Rock Ave., W. Orange, N.J., 15

NEW MEXICO

Electronic Parts Co., Inc., 222 Truman St., N.E., Albuquerque, N.M., 10 (NEDA)
 Kittleson Co., 210 Cagua Dr., Albuquerque, N.M., 15
 Valley Engineering Co., 601 Cedar St., P.O. Box 2, Los Alamos, N.M., 10 (NEDA)

NEW YORK

Fort Orange Radio Dist., 904 Broadway, Albany, N.Y., 10 (NEDA)
 Reagan Co., J. A., 45 N. Lake Ave., Albany, N.Y., 15 (ERA)
Tel: ALbany 6-9649
 Taylor Co., E. E., 465 Central Ave., Albany 5, N.Y., 10 (NEDA)
 Adirondack Radio Supply, 185 W. Main St., Amsterdam, N.Y., 10 (NEDA)
 Berliant Assoc., 96 S. Grand Ave., Baldwin, L.I., N.Y., 15 (ERA)
Tel: BALdwin 3-1636
 Taylor Corp., B. B., 2270 Grand Ave., Baldwin, L.I., N.Y., 15, (ERA)
Tel: BALdwin 3-8000
 Tylinsky Co., Frank, 73-63 Bell Blvd., Bayside 64, N.Y., 15 (ERA)
Tel: HOLLis 4-8927

Federal Electronics, Inc., 188 State St., Binghamton, N.Y., 10 (NEDA)
 Stack Electronics, 25 State St., Binghamton, N.Y., 10 (NEDA)
 Bay Electronics Dis., Inc., 1736 Jerome Ave., Bronx, N.Y., 10 (NEDA)
 Bronx Wholesale Radio, 472 E. Fordham Rd., Bronx, N.Y., 10 (NEDA)
 Haas Electronics Co., 862 Southern Blvd., Bronx, N.Y., 10 (NEDA)
 National Radio Dist. Corp., 1165 Southern Blvd., Bronx, N.Y., 10 (NEDA)
 Post Electronics, 3445 Boston Rd., Bronx, N.Y., 10 (NEDA)
 Saxton Products, Inc., 4320 Park Ave., Bronx, N.Y., 5, 10, 15
 Tri-Par Distributing Co., 1558-1558A White Plains, Bronx, N.Y., 10 (NEDA)
 Wescon Electronics, Inc., 580 E. Fordham Rd., Bronx, N.Y., 10 (NEDA)
 Wilco Radio Distributors, 383 E. 138th St., Bronx, N.Y., 10 (NEDA)
 AMA Electronics Corp., 1635 Bedford Ave., Brooklyn, N.Y., 10 (NEDA)
 Bay Electronic Corp., 3480 Nostrand Ave., Brooklyn, N.Y., 10 (NEDA)
 Benray Electronics Corp., 485 Coney Island Ave., Brooklyn, N.Y., 10 (NEDA)
 Brown Co., Inc., Irv., 1500 Carroll St., Brooklyn 13, N.Y., 15 (ERA)
Tel: HYacinth 3-1379
 Buchman, Sam, 860-2 Atlantic Ave., Brooklyn, N.Y., 10 (NEDA)
 Fishel Assoc., J. C., 22 Prospect Pk., Brooklyn, N.Y., 15, 20, 25
 Green-Tele-Radio Dist., 472 Sutter Ave., Brooklyn, N.Y., 10 (NEDA)
 Hy-Grade Electronics, Inc., 9216 Church Ave., Brooklyn, N.Y., 10 (NEDA)
 Laco Electronics Co., Inc., 4924 4th St., Brooklyn, N.Y., 10 (NEDA)
 National Radio Parts Dist., 572-4 Albany Ave., Brooklyn, N.Y., 10 (NEDA)
 Quad Electronics, Inc., 555 Union Ave., Brooklyn, N.Y., 10 (NEDA)
 Siclari, Vincent, 979 40th St., Brooklyn, N.Y., 15, 20
 Tallen Co., Inc., 159 Carlton Ave., Brooklyn 5, N.Y., 25

TV Parts, Inc., 2169 Coney Island Ave., Brooklyn, N.Y., 10 (NEDA)
 Dymac, Inc., 2329 Main St., Buffalo, N.Y., 10 (NEDA)
 Farber Assoc., Maury, 417 Root Bldg., Buffalo 2, N.Y., 15 (ERA)
Tel: MOhawk 3543
 Genesee Radio & Parts Co., 2550 Delaware Ave., Buffalo 16, N.Y., 10 (NEDA)
 Huron Electronics Supply, 324-326 N. Oak St., Buffalo, N.Y., 10 (NEDA)
 Jackson Co., Robert W., 833 Ellicott St. Bldg., Buffalo 3, N.Y., 15 (ERA)
Tel: MADison 3306
 Lamb Co., Robert F., 1807 Elmwood Ave., Buffalo, N.Y., 15
 Radio Electric Products, 186 E. Genesee St., Buffalo, N.Y., 10 (NEDA)
 Radio Equipment Corp., 147 Genesee St., Buffalo, N.Y., 10 (NEDA)
 Scheller Electronics Corp., 929 Kensington Ave., Buffalo 15, N.Y., 10 (NEDA)
 Summit Distributors, Inc., 916 Main St., Buffalo, N.Y., 10 (NEDA)
 Sunset Electronics, Inc., 3670 Sheridan, Buffalo 26, N.Y., 10 (NEDA)
 Peet & Co., D. R., 545 N. Main St., Canandaigua, N.Y., 15
 Manfred Electronics Corp., 102-09 Northern Blvd., Corona, N.Y., 10 (NEDA)
 Quartin, Murray, 1425 Eric Lane, East Meadow, N.Y., 15
 Director Assoc., Murray, 115-62 237 St., Elmont, N.Y., 15 (ERA)
Tel: CURtis 3-6823
Hughes Co., Kenneth E., P.O. Box 54, Fayetteville, N.Y., 15
See ad on page 713
Tel: NEptune 7-9531
 Bettan Sales, Marty, 167-16 73 Ave., Flushing, N.Y., 15 (ERA)
Tel: OLYmpia 7-6659
 British Elect. Sales Co., Oakland Gardens, Flushing, N.Y., 15
 Ellis & Assoc., Harold R., Oakland Gardens, Flushing 64, N.Y., 15 (ERA)
Tel: FLushing 7-5220
 Harris, Inc., Arthur M., 42-34 195 St., Flushing, N.Y., 15 (ERA)
Tel: FLushing 7-7350
 Technical Representative, 137-21 70th Ave., Flushing, N.Y., 15
 Weiland Co., George H., 76-49 168 St., Flushing, N.Y., 15 (ERA)
Tel: OLYmpia 8-4061
 Baum Co., Sydney H., 70-15 Fleet St., Forest Hills, N.Y., 15 (ERA)
Tel: BOulevard 3-8101
 Dynamic Elect., N.Y., Inc., 73-39 Woodhaven Blvd., Forest Hills, N.Y., 20
 Jefferson, Inc., Ray, 40 E. Merrick Rd., Freeport, N.Y., 20
 Scott Co., George G., 6 Stuart Dr., W., Glen Cove, N.Y., 15
 Fulton County Distr. Co., 16 Bleeker St., Gloversville, N.Y., 10
 E.R.A., Inc., 340 Great Neck Rd., Great Neck, N.Y., 15 (ERA)
Tel: HUnter 2-9320

V. A. SNYDER CO., INC.

P.O. Box 184, Union, N.J.
 Union, N.J.—MURdock 8-6100
 Phila., Pa.—WALnut 2-0634

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Directory III. Materials & Services

Distribution—Class 102

New Jersey
New Mexico
New York

Joseph Assoc., Ben, 43 S. Middle Neck Rd., Great Neck, N.Y., 15 (ERA)
Tel: HUnter 7-9395

Leeds Co., Inc., Gerard G., 12 Crampton Lane, Great Neck, N.Y., 15 (ERA)
Tel: HUnter 2-7784

Pacent Engrg. Corp., 310 Northern Blvd., Great Neck, N.Y., 15, 20

Components Sales Corp., 218 E. Hartsdale Ave., Hartsdale, N.Y., 15
See ad on page 364
Tel: SCarsdale 5-1050

Davis Electronics Corp., 204 Main St., Hempstead, N.Y., 10 (NEDA)

Kubrick & Yurman, 475 S. Franklin St., Hempstead, N.Y., 15 (ERA)
Tel: IVanhoe 3-7230

R & S Electronic Sales, P.O. Box 217, Hempstead, N.Y., 10, 15, 20

Standard Parts Corp., 277 N. Franklin St., Hempstead, N.Y., 10 (NEDA)

Hunter & Salisbury, Inc., 87 Broadway, Hicksville, N.Y., 15 (ERA)
Tel: WFls 8-1080

Associated TV Service Corp., 86-06 37th Ave., Jackson Heights, N.Y., 20

Argonne Electronics Mfg., 165-11 South Rd., Jamaica, N.Y., 5, 10, 15

Lafayette Radio Corp., 165-08 Liberty Ave., Jamaica, N.Y., 5, 10, 20

Peerless Radio Dist., Inc., 92-32 Merrick Rd., Jamaica, N.Y., 10 (NEDA)

Permag Corp., 88-06 Van Wyck Expressway, Jamaica 18, L.I., N.Y., 10
See ad on page 469
Tel: Olymphia 7-1818

Travco Associates, 148-03 Hillside Ave., Jamaica 35, N.Y., 15
See ad on this page
Tel: Olymphia 7-8630

Miller Assoc., Gilbert E., 47 Birchwood Park Dr., Jericho, N.Y., 15 (ERA)
Tel: OVerbrook 1-6335

Arace Electronic Dist., 16 Van Dusen St., Kingston, N.Y., 10 (NEDA)

Miller Co., Ben, P.O. Box 72, Little Neck, N.Y., 15 (ERA)
Tel: BAyside 4-4673

102. Distribution.

- 5. Export & import
- 10. Jobbers & wholesalers
- 15. Manufacturers representatives
- 20. Sales & service
- 25. Surplus dealers

Wadsworth Mfg., Assoc., 509 Balsam St., Liverpool, N.Y., 15 (ERA)
Tel: OLdfield 2-7043

Dalis, Inc., H. L., 35-35 24th St., Long Island City, N.Y., 10 (NEDA)

Electronic Supply Corp., 41-08 Greenpoint Ave., Long Island City, N.Y., 10 (NEDA)

Gray Assoc., Harold, 21-10 33rd Rd., Long Island City, N.Y., 15

Kaelber & Mack, 1 Park Ave., Manhasset, N.Y., 15 (ERA)
Tel: MA 7-1459

Spellman Co., Fred, 200 Plandome Rd., Manhasset, N.Y., 15 (ERA)
Tel: MA 7-3399

Adelphi Electronics, Inc., 142 Mineola Blvd., Mineola, N.Y., 10 (NEDA)

Arrow Electronics, Inc., 525 Jericho Turnpike, Mineola, N.Y., 10 (NEDA)

Schweber Electronics, 60 Herricks Rd., Mineola, L.I., N.Y., 10
See ad on page 402
Tel: PIONEER 6-6520

Burlingame Associates, 510 S. Fulton Ave., Mount Vernon, N.Y., 15
See ad on page 264
Tel: MOUNT Vernon 4-7530

Kopple Assoc., John J., 9 W. Prospect Ave., Mt. Vernon, N.Y., 15 (ERA)
Tel: MO 4-5577

Radelco, Inc., 246 W. First St., Mt. Vernon, N.Y., 10 (NEDA)

Sonkin Assoc., David, 10 Fiske Pl., Mt. Vernon, N.Y., 15 (ERA)
Tel: MO 9-9809

Amatom Elect. Hardware Co., 88 Drake Ave., New Rochelle, N.Y., 15

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"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 161-264.

102. Distribution.

Ad. Auriema, Inc., 85 Broad St., New York, N.Y., 5, Export, 15

Adelman Co., Leon L., 25 Chittenden Ave., New York 33, N.Y., 15

See ad on page 715

Tel: SWinburne 5-1145

Adson Radio & Electric Co., 189 Greenwich St., New York, N.Y., 10 (NEDA)

Allen Communications, Inc., 1845 Broadway, New York, N.Y., 10, 20

Allied Plastic Supply Corp., 75 Cliff St., New York, N.Y., 10

Altec Service Co., 161 6th Ave., New York, N.Y., 20

American Advancement Corp., 50 Broadway, New York, N.Y., 5, 15

American Laubscher Corp., 250 W. 57th St., New York, N.Y., 5

Atlas Electronics Corp., 1317 First Ave., New York, N.Y., 10 (NEDA)

B & B Distributors, 221 Greenwich St., New York, N.Y., 5, 10, 20, 25

Barry Electronics Corp., 512 Broadway, New York 12, N.Y., 10

See ad on page 715

Tel: WAlker 5-7000

Beam-Echo International, 23 Park Pl., New York, N.Y., 5

Breuer Co., Inc., R. E., 10 Columbus Cir., New York 19, N.Y., 15 (ERA)

Tel: COLUMBUS 5-0440

Camber Co., Marty, 1700 York Ave., New York 28, N.Y., 15 (ERA)

Tel: ENdicott 9-4222

Center Industrial Elect., 74 Cortlandt St., New York, N.Y., 10 (NEDA)

Communications Equip. Co., 343 Canal St., New York, N.Y., 25

Cooper-Simon & Co., 400 E. 79 St., New York, N.Y., 15 (ERA)

Tel: LE 5-2900

Coronet Electronic, Inc., 120 Liberty St., New York, N.Y., 10

Cosmic Instruments, Inc., 50 Broadway, New York, N.Y., 5, 15

Crane & Egert Corp., 97 Reade St., New York 13, N.Y., 15 (ERA)

Tel: WOrth 4-0996

Dale Electronic Co., 319 W. 14th St., New York, N.Y., 10 (NEDA)

Dana-Beach Co., 101 Park Ave., New York 17, N.Y., 15, 20

Delsam Radio-TV, 2665 Grand Concourse, New York, N.Y., 20

Diamond Drill Carbon Co., 244 Madison Ave., New York, N.Y., 5, 10, 20

Dietrich Co., Earl, 110 E. End Ave., New York 28, N.Y., 15 (ERA)

Tel: LEhigh 5-6590

Egert Co., Samuel S., 97 Reade St., New York 13, N.Y., 15 (ERA)

Tel: WOrth 4-0996

Electronic Surplus Brok., 148 Chambers St., New York, N.Y., 25

Electronic Tube Sales, 74 Cortlandt St., New York 7, N.Y., 10

See ad on this page

Tel: BArclay 7-4140

Electronic Wholesalers, 5047 Broadway, New York, N.Y., 10 (NEDA)

Electronics Center, Inc., 211 W. 19th St., New York, N.Y., 10 (NEDA)

Emelton Electronics Co., 71 W. Broadway, New York, N.Y., 10

Empire Electronics Co., 74 Cortlandt St., New York, N.Y., 25

Ercona Corp., Dept. L-1, 16 W. 46th St., New York 36, N.Y., 5, 15

See ad on page 418

Tel: CIRCLE 5-3840

Filnor Products, Inc., 101 W. 31 St., New York, N.Y., 5, 15

Fischer Dist., Inc., C., 211 W. 19th St., New York, N.Y., 10 (NEDA)

Fordham Radio Supply Co., 265 E. 149th St., New York, N.Y., 10 (NEDA)

Forrest Co., Bernard J., 102 Warren St., New York, N.Y., 15 (ERA)

Tel: CO 7-1711

Freed & Co., Leo, 420 Lexington Ave., New York 17, N.Y., 15 (ERA)

Tel: LEXington 2-4771

Gancher Co., Louis, 468 W. Broadway, New York, N.Y., 25

Glass Assoc., Ed., 250 W. 57 St., New York, N.Y., 15 (ERA)

Tel: JUdson 6-8440

Graybar Electric Co., Inc., 420 Lexington Ave., New York, N.Y., 10

Greylock Elect., Supply Co., 554 W. 168th St., New York, N.Y., 10 (NEDA)

Greenberg Assoc., Jerry, 514 Broadway, New York 12, N.Y., 15 (ERA)

Tel: WAlker 5-4433

Greenwich Sales Co., 84 Cortlandt St., New York, N.Y., 10, 25

Harrison Radio Corp., 225 Greenwich St., New York, N.Y., 10 (NEDA)

Hartley Products Co., 521 E. 162nd St., New York, N.Y., 5, 15

Harvey Radio Co., Inc., 103 W. 43rd St., New York, N.Y., 10 (NEDA)

Heller Assoc., Joseph L., 250 W. 57 St., New York 19, N.Y., 15 (ERA)

Tel: JUdson 6-8898

Instrument Center, 55 Reade St., New York, N.Y., 5, 15

Interstate Electronics, Inc., 227 Fulton St., New York 7, N.Y., 10

See ad on page 403

Tel: BEEkman 3-8780

Kahant Associates, 11 Park Pl., New York, N.Y., 15

Kahgan Sales Corp., 1261 Broadway, New York 1, N.Y., 15 (ERA)

Tel: MU 4-7727

Lafayette Radio, 100 Sixth Ave., New York, N.Y., 10

Landsberger Plastics Co., 550 Fifth Ave., New York, N.Y., 15

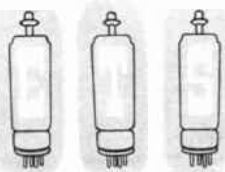
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Directory III. Materials & Services

Distribution—Class 102

New York

Levison Sales Co., Inc., 545 Fifth Ave.,
New York 17, N.Y., 15 (ERA)
Tel: MU 2-2995

Lohkemper, Otto A., 46 Stanwood Rd.,
New Hyde Pk., N.Y., 15

Marcy Assoc., Robert J., 1776 Broadway,
New York, N.Y., 15 (ERA)
Tel.: Circle 5-3880

Metropolitan Overseas Supply Corp., 1133
Broadway, New York, N.Y., 5, 10, 15, 25

Milgray Electronics, Inc., 136 Liberty St.,
New York, N.Y., 10 (NEDA)

Milo Electronic Corp., 530 Canal St.,
New York, N.Y., 10 (NEDA)

Morse Sales, Irv., 150 Broadway, New
York 38, N.Y., 15 (ERA)
Tel: COrtlandt 7-2913

National Radio Dist., 1799 First Ave.,
New York, N.Y., 10 (NEDA)

Newhope Corporation, 6 E. 39 St., New
York 16, N.Y., 15 (ERA)
Tel: LExington 2-7372

New Yorker Elects. Co., Inc., 40 E. 21
St., New York, N.Y., 10, 15

Pickett, James M., 205 E. 66 St., New
York 21, N.Y., 15 (ERA)
Tel: TRafalgar 9-9520

**Progress Electronics Co., 107 Franklin
St., New York 13, N.Y., 10**
See ad on pages 71-74
Tel: CAnal 6-5611

R M C Assoc., 236 E. 75th St., New York,
N.Y., 15

Radio Merchandise Sales, Inc., 2016
Bronxdale Ave., New York, N.Y., 10,
20

Radio Research Instrument Co., 550 Fifth
Ave., New York 36, N.Y., 25
Tel: JUdson 6-4691

Radio Wire & TV, Inc., 165-08 Liberty
Ave., Jamaica, N.Y., 10

Radiophon Corp., 509 Madison Ave.,
New York, N.Y., 5, 15

Resistor Wholesaler Corp., 71 Murray
St., New York, N.Y., 10

Roanwell Corp., 180 Varick St., New
York, N.Y., 15, 20

Saftler Assoc., Inc., P., 157 W. 57th St.,
New York 19, N.Y., 15 (ERA)
Tel: Circle 7-3855

Sanford Electronics Corp., 157 Chambers
St., New York, N.Y., 10 (NEDA)

Siemens N. Y., Inc., 350 Fifth Ave., New
York, 15

Slate & Co., 2755 Webster Ave., New
York, N.Y. 10 (NEDA)

Smith C., Howard F., 259 W. 14 St.,
New York, N.Y., 15 (ERA)
Tel: CHelsea 2-2398

Sprung Assoc., Joseph, 254 W. 31 St.,
New York 1, N.Y., 15 (ERA)
Tel: LONgacre 5-1820

Sun Radio & Elect. Co., Inc., 650 Sixth
Ave., New York, N.Y., 10

Sussman & Co., Ira, 130 Lafayette St.,
New York 13, N.Y., 15 (ERA)
Tel: WOrth 2-7766

102. Distribution.

- 5. Export & import
- 10. Jobbers & wholesalers
- 15. Manufacturers representatives
- 20. Sales & service
- 25. Surplus dealers

Sylvan-Wellington Co., 269 Canal St.,
New York, N.Y., 10 (NEDA)

Sylvania International, 1740 Broadway,
New York, N.Y., 5

Tab, 111 Liberty St., New York, N.Y.,
5, 10, 25

Terminal Radio Corp., 85 Cortlandt St.,
New York, N.Y., 10 (ERA)

Tobias & Co., D. F., 30 Church St., N.Y.
17, N.Y., 15 (ERA)
Tel: COrtlandt 7-4349

United Elect. Supply Co., 1991 Broadway,
New York, N.Y., 10 (NEDA)

**Universal Relay Corp., 42 White St.,
New York 13, N.Y., 10**
See ad on page 527
Tel: WAlker 5-9257

Weber Assoc., Jack, 63 E. 9 St., New
York, N.Y., 15 (ERA)
Tel: GRAnarcy 3-7813

Western International Co., 45 Vesey St.,
New York, N.Y., 10, 15

Westrex Corp., 111 8th Ave., New York,
N.Y., 5, 15, 20

Wolf Co., O. C., Box 32, Onondaga,
N.Y., 15 (ERA)
Tel: HOward 9-0649

Masin Co., O. F., 1 Wolfs Lane, Pelham,
N.Y., 15 (ERA)
Tel: PELham 8-4510

Aaron, Paul D., Professional Bldg., Port
Washington, N.Y., 15 (ERA)
Tel: PO 7-8480

Cardner Sales Corp., 80 Shore Rd., Port
Washington N.Y., 15 (ERA)
Tel: PO 7-7700

Colvern Limited, 80 Shore Rd., Port
Washington, N.Y., 5, 15

Cooper-Dibiasi, 90 Main St., Port Wash-
ington, N.Y., 15 (ERA)
Tel: PO 7-0470

American Electronics, Inc., 482 St. Paul
St., Rochester, N.Y., 10 (NEDA)

Case Electronic Supply, 82 St. Paul St.,
Rochester, N.Y., 10 (NEDA)

Hi-C Radio Electronics, 109 State St.,
Rochester, N.Y., 10 (NEDA)

Masline Electronics, Inc., 192-196 Clinton
Ave., Rochester, N.Y., 10 (NEDA)

Richter Corp., William, 790 Linden Ave.,
Rochester, N.Y., 15

Rochester Radio Supply, 600 E. Main St.,
Rochester, N.Y., 10 (NEDA)

Wolfe-Marsey Sales Co., 74 Park Ave.,
Rochester 7, N.Y., 15 (ERA)
Tel: GRGreenfield 3-9088

Rywel Sales, Inc., 100 N. Village Ave.,
Rockville Centre, N.Y., 15

Fishner, Stanley, 120 Colonel Dr., Rome,
N.Y., 10, 15

Rome Electronics, Inc., 108 Spring St.,
Rome, N.Y., 10 (NEDA)

B & D Distributing Co., 639 Tompkins
Ave., Rosebank, N.Y., 10 (NEDA)

Aaron P. E., Bertram D., P.O. Box 186,
Roslyn, N.Y., 15 (ERA)
Tel: MAyfair 1-0630

Hicks, W. M., 4 Spruce St., Roslyn,
N.Y., 15 (ERA)
Tel: MAnhasset 7-6150

Lichter Co., William, 26 Teakwood Lane,
Roslyn, N.Y., 15 (ERA)
Tel: MAyfair 1-2636

Aeronomy Agency, P.O. Box 1001,
Schenectady, N.Y., 15, 20

Electric City Radio Supply, 2469 Albany
St., Schenectady, N.Y., 10 (NEDA)

Grimmers Elect. Parts Supply, 41 No.
Brandywine Ave., Schenectady, N.Y.,
10 (NEDA)

Schenectady Electronic Dist., 1708 Alta-
mont Ave., Schenectady, N.Y., 10
(NEDA)

Drexler Co., Chester, 3 Lee Dr., S. Farm-
ingdale, L.I., N.Y., 15

Allen, Inc., Leonard D., P.O. Box 32,
Salina Stat., Syracuse 8, N.Y., 15
(ERA)
Tel: GRAnite 8-4195

Berndt Radio Co., W. E., 655 S. Warren
St., Syracuse, N.Y., 10 (NEDA)

Franklin Co., W. A., 2 Standish Ter.,
Syracuse 3, N.Y., 15 (ERA)
Tel: GIbson 6-1120

Lanzendorf, Oren G., 513 Cumberland
Ave., Syracuse, N.Y., 15

Roberts & O'Brien, P.O. Box 1076,
Syracuse 1, N.Y., 10 (NEDA)

Ryerson Assoc., Inc., J. D., P.O. Box
1400, Syracuse, N.Y., 15

Swank Inc., Wally B., 2310 Bellevue Ave.,
Syracuse 4, N.Y., 15 (ERA)
Tel: GRAnite 8-2141

Zimmerman, Inc., Wilson., 112 Dewitt
St., Syracuse 3, N.Y., 15 (ERA)
Tel: GRAnite 4-4889

Trojan Elect. Supply Co., 15 Middle-
burgh St., Troy, N.Y., 10 (NEDA)

Troy Television, 85 5th Ave., Troy, N.Y.,
10 (NEDA)

Land-C-Air Sales Co., 140 Marbledale
Rd., Tuckahoe, N.Y., 15 (ERA)
Tel: WOODbine 1-4700

Stang Sales Co., 271 Columbus Ave.,
Tuckahoe, N.Y., 15 (ERA)
Tel: SPencer 9-6868

Valley Elect. Labs., Inc., 1415 Oriskany
St., W., Utica 4, N.Y., 10 (NEDA)

Bittan Co., D. R., 104 S. Central Ave.,
Valley Stream, N.Y., 15 (ERA)
Tel: LOcust 1-2444

Avnet Electronic Corp., 70 State St.,
Westbury, N.Y., 10 (NEDA)

Hassall, Inc., John, P.O. Box 2242, West-
bury, N.Y., 15

102. Distribution.

Hoffman Co., Howard Louis, 804 New-
bridge Ave., Westbury, N.Y., 15
(ERA)

Tel: EDgewood 4-5600

All-State Welding Alloys, 249-55 Ferris
Ave., White Plains, N.Y., 5, 10, 15, 20

Westchester Elect. Supply, 602-610 Mam-
aroneck Ave., White Plains, N.Y., 10
(NEDA)

Wapler, Bert, P.O. Box 18, Whitestone,
N.Y., 10

Boro Electronics, Inc., 69-18 Roosevelt
Ave., Woodside, N.Y., 10 (NEDA)

**Blair Sales Co., Inc., 45 S. Broadway,
Yonkers, N.Y., 15 (ERA)**

See ad on this page

Tel: YOnkers 3-0150

Brown Assoc., Jack, 207 Rosedale Rd.,
Yonkers, N.Y., 15 (ERA)

Tel: SP 9-7330

Shaw Co., Samuel A., 361 Central Park
Ave., Yonkers, N.Y., 15 (ERA)

Tel: YOnkers 3-5700

Yonkers Elect. Supply, Inc., 541 Nep-
perhan Ave., Yonkers, N.Y., 10
(NEDA)

NORTH CAROLINA

Freck Radio & Supply Co., 38 Biltmore
Ave., Asheville, N.C., 10 (NEDA)

Longs Distributing Co., 260 Biltmore
Ave., Asheville, N.C., 10 (NEDA)

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| Less Changers | University Loudspeakers |

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Murphy & Cota, 2036 Norton Rd.,
Charlotte, N.C., 15 (ERA)

Tel: EDison 2-7356

Radiotronic Dist., Inc., 208 N. College
St., Charlotte, N.C., 10 (NEDA)

MacVictor Elect. Supply, 318 N. Church
St., P.O. Box 3236, Concord, N.C., 10
(NEDA)

Atcheson & Adams., 601 N. Elm St.,
Greensboro, N.C., 15 (ERA)

Tel: BRoadway 2-6838

Johannesen Elect. Co., Inc., 312-314 N.
Eugene St., Greensboro, N.C., 10
(NEDA)

Tonkin & Schiffer Co., 1013 Huffman St.,
Greensboro, N.C., 15 (ERA)

Tel: BRoadway 3-5578

Victor Radio-TV Supply, 1058 3rd Ave.,
Dr., N.W., Hickory, N.C., 10 (NEDA)

Southeastern Radio Supply, 411-15 Hills-
boro St., Raleigh, N.C., 10 (NEDA)

Steen-Taylor Electronics, 217 E. Council
St., Salisbury, N.C., 10 (NEDA)

Buthan Inc., 4924 Oleander Dr., Wilming-
ton, N.C., 15 (ERA)

Tel: ROger 2-5749

Dalton-Hege Radio Supply, 924 W. 4th
St., Winston-Salem, N.C., 10 (NEDA)

Electronic Distributors, P.O. Box 4657,
Winston-Salem, N.C., 10 (NEDA)

Lee Assoc., Inc., S. S., P.O. Box 906,
Winston-Salem, N.C., 15

NORTH DAKOTA

Bristol Distributing Co., 419 N. Pacific
Ave., Fargo, N.D., 10 (NEDA)

Radio Equipment Co., 624-2nd Ave., N.,
Fargo, N.D., 10 (NEDA)

OHIO

Olson Radio Warehouse, 260 S. Forge St.,
Akron, Ohio, 10 (NEDA)

Sun Radio Co., 110 E. Market St., Akron
Ohio, 10 (NEDA)

Warren Radio Co., 71 S. Broadway,
Akron, Ohio, 10 (NEDA)

Morrisons Radio Supply, 331 Center St.,
Ashtabula, Ohio, 10 (NEDA)

Nace Co., Allen, Box 146, Brecksville,
Ohio, 15 (ERA)

Tel: CRestview 7-8215

Burroughs Radio, Inc., 2705 Fulton Rd.,
N.W., Canton, Ohio, 10 (NEDA)

Herrlinger Distributing, 15th & Vine Sts.,
Cincinnati, Ohio, 10 (NEDA)

Holub & Hogg Co., 1400 Sycamore St.,
Cincinnati, Ohio, 10 (NEDA)

Mytronic Co., 2145 Florence Ave., Cin-
cinnati, Ohio, 10 (NEDA)

Sheridan Assoc., Inc., Roselawn Center
Bldg., Cincinnati, Ohio, 15

Steinbergs, Inc., 633 Walnut St., Cincin-
nati, Ohio, 10 (NEDA)

United Radio, Inc., 1314 Vine St., Cin-
cinnati, Ohio, 10 (NEDA)

Warren Radio Co., 1669 Central Parkway,
Cincinnati, Ohio, 10 (NEDA)

Baehr, Greenleaf Assoc., 14700 Detroit,
Cleveland 7, Ohio, 15 (ERA)

Tel: LA 1-8468

Baier Co., Arthur H., 12417 Cedar Rd.,
Cleveland 6, Ohio, 15 (ERA)

Tel: FA 1-5644

Brauer & Assoc., Walter J., 15631 Lake-
wood Hgts. Blvd., Cleveland 7, Ohio,
15 (ERA)

Tel: LAkewood 1-7268

Dannemiller Assoc., J. R., 3955 Lee Rd.,
Cleveland 28, Ohio, 15 (ERA)

Tel: LOngacre 1-4567

Daugherty Co., F. A., 6025 Mayfield Rd.,
Cleveland 24, Ohio, 15 (ERA)

Tel: HILLerest 9-1122

Dolfuss, Jr. & Co., Chas. H., 2108 Payne
Ave., Cleveland 14, Ohio, 15 (ERA)

Tel: PRospect 1-1270

Edwards Lohse & Co., 2123 E. 9 St.,
Cleveland 15, Ohio, 15 (ERA)

Tel: TOWER 1-5753

Landfear Co., J. M., 12429 Cedar Rd.,
Cleveland, Ohio, 15 (ERA)

Tel: FA 1-4533

Levin & Assoc., Sid., 6252 Mayfield Rd.,
Cleveland 24, Ohio, 15 (ERA)

Tel: HILLerest 2-8340

Midwest Sales Co., 3219 W. 117 St.,
Cleveland 11, Ohio, 15 (ERA)

Tel: Wlnton 1-2700

Morrow Co., Les A., 3123 W. 117 St.,
Cleveland 11, Ohio, 15 (ERA)

Tel: CL 1-5700

Olsen Co., John O., 16201 Shaker Blvd.,
Cleveland 20, Ohio, 15 (ERA)

Tel: SKYline 2-5444

Peters Co., Robert W., 350 E. 215 St.,
Cleveland 23, Ohio, 15 (ERA)

Tel: ANDrews 1-2330

Pioneer Electronic Supply, 2115 Prospect
Ave., Cleveland, Ohio, 10 (NEDA)

Radio-Electronic Parts, 3235 Prospect
Ave., Cleveland, Ohio, 10 (NEDA)

Rauer Co., Frank W., 4144 Marvin Ave.,
Cleveland 9, Ohio, 15 (ERA)

Tel: MELrose 1-8350

Roth Sales Co., Mike, 13947 Cedar Rd.,
Cleveland 18, Ohio, 15 (ERA)

Tel: YE 2-4262

Schroeder Sales Co., 2309 Prospect
Ave., Cleveland 15, Ohio, 15 (ERA)

Tel: MAIn 1-5075

Scott & Steffen, Inc., 1836 Euclid Ave.,
Cleveland 15, Ohio, 15 (ERA)

Tel: TOWER 1-2626

Seaway Electronic Supply, 10014 Carnegie
Ave., Cleveland, Ohio, 10 (NEDA)

Warren Radio Co., 5403 Prospect, Cleve-
land, Ohio, 10 (NEDA)

Buckeye Elect. Dist., Inc., 242-246 E.
Long St., Columbus, Ohio, 10 (NEDA)

Electronic Supply Corp., 134 East Long
St., Columbus, Ohio, 10 (NEDA)

Hughes-Peters, Inc., 111-117 E. Long St.,
Columbus, Ohio, 10 (NEDA)

Lehner Co., J. W., 367 Brynhild Rd.,
Columbus 2, Ohio, 15 (ERA)

Tel: AMHerst 8-5260

McFadden Sales Co., 150 E. Broad St.,
Columbus 15, Ohio, 15 (ERA)

Tel: CAPItol 1-3363

Pugh Co., C. L., 2144 Riverside Dr.,
Columbus 21, Ohio, 15 (ERA)

Tel: HUDson 8-4855

Directory III. Materials & Services

Distribution—Class 102

New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania

Seay Co., H. H., 3850 Fairlington Dr., Columbus 21, Ohio, 15 (ERA)
Tel: BElmont 1-3043

Whitehead Radio Co., 124 E. Long St., Columbus, Ohio, 10 (NEDA)

Allied Supply Co., Inc., 359 W. Monument Ave., Dayton, Ohio, 10 (NEDA)

Kohler Assoc., Ernie, 2600 Far Hills Ave., Dayton, Ohio, 15

Srepco, Inc., Box 7, N. Dayton Sta., Dayton, Ohio, 10 (NEDA)

Stotts Friedman Co., 108 N. Jefferson St., Dayton, Ohio, 10 (NEDA)

Fair Radio Sales, 132 S. Main St., Lima, Ohio, 25

Lima Radio Parts Co., 600 N. Main St., Lima, Ohio, 10 (NEDA)

Burroughs Radio, Inc., 218 Second St., Marietta, Ohio, 10 (NEDA)

Marietta Rad. & TV Supply, 221 Second St., Marietta, Ohio, 10 (NEDA)

Hausfeld Radio Supply, 116 N. Third St., Steubenville, Ohio, 10 (NEDA)

Blocki Assoc., Bill, 2280 Liberty Rd., Stow, Ohio, 15 (ERA)
Tel: OVerdale 8-4277

Chilcote Sales Co., Jim, 636 Nesselwood, Toledo, Ohio, 15 (ERA)
Tel: CHerry 1-3826

Howards Electronic Supply, 135-17th St., Toledo, Ohio, 10 (NEDA)

Lifetime Electronics, 1501 Adams St., Toledo, Ohio, 10 (NEDA)

Warren Radio Co., 1002 Adams St., Toledo, Ohio, 10 (NEDA)

Atkind, Irving, 821 Burman Ave., Trotwood, Ohio, 15

Radio Specialties, 136 Pine Ave., S.E., Warren, Ohio, 10 (NEDA)

Bear Corp., Neal, 3435 Streetsboro Rd., W. Richfield, Ohio, 15 (ERA)
Tel: OLiiver 9-3331

Weller-Rahe Co., P.O. Box 212, Worthington, Ohio, 15 (ERA)
Tel: TUXedo 5-7819

Armies Electronics, 320 W. Federal St., Youngstown, Ohio, 10 (NEDA)

Thompson Radio Supplies, 110 S. Sixth St., Zanesville, Ohio, 10 (NEDA)

OKLAHOMA

Dulaney's Distg. Co., 100 N.W. 44th St., Oklahoma City, Okla, 10 (NEDA)

Electronic Supply Co., 212 N.W. Tenth St., Oklahoma City, Okla., 10 (NEDA)

Johnson Wholesale Electronics, 927 N.W. First St., Oklahoma City, Okla., 10 (NEDA)

Radio Supply Inc., 724 N. Hudson, Oklahoma City, Okla., 10 (NEDA)

Trice Wholesale Elect., 800 N. Hudson St., Oklahoma City, Okla., 10 (NEDA)

Oil Capital Elect. Corp., 708 South Sheridan, Tulsa, Okla., 10 (NEDA)

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

OREGON

Hay & Carman, Inc., 768 Lincoln St., Eugene, Ore., 10 (NEDA)

Walker Co., Verl G., P.O. Box 1586, Medford, Ore., 10 (NEDA)

Burcham Co., Don H., P.O. Box 4098, Portland, Ore., 15 (ERA)
Tel: CApital 7-3830

Central Distributors, 1331 N.W. Couch St., Portland, Ore., 10 (NEDA)

Lee Co., Inc., Dave M., 3527 N.E. Union Ave., Portland, Ore., 15 (ERA)
Tel: ATlantic 8-5796

Minthorne Co., Roger M., 0673 S.W. Taylors Rd., Portland 29, Ore., 15 (ERA)
Tel: CH 6-4556

Portland Radio Supply Co., 1234 S.W. Stark, Portland, Ore., 10 (NEDA)

Saelens Radio Co., Inc., 1605 N.W. Everett, Portland, Ore., 10 (NEDA)

TV & Radio Supply Co., 1327 S.E. Grand Ave., Portland, Ore., 10 (NEDA)

Weber Co., Dale G., 8 S.E. Clay St., Portland, Ore., 15 (ERA)
Tel: BElmont 4-7671

Willamette Radio Supply, 2460 State St., Salem, Ore., 10 (NEDA)

PENNSYLVANIA

Pearson Sales Co., R. T., 1125 York Rd., Abington, Pa., 15 (ERA)
Tel: TUrner 7-0186

Peters, Inc., A. A., 231 No. 7th St., Allentown, Pa., 10 (NEDA)

Steedle Co., Norman D., 1005 N. 19th St., Allentown, Pa., 10 (NEDA)

Quinlan Co., D. G., National Bank Bldg., Ambler, Pa., 15 (ERA)
Tel: MIchell 6-7250

Rothenheber & Co., 53 Cricket Avt., Ardmore, Pa., 15 (ERA)
Tel: TRinity 7-9090

Friedman, Martin, 7 Heather Rd., Bala-Cynwyd, Pa., 15 (ERA)
Tel: MOhawk 4-6090

Beil & Whitaker, Inc., 504 Hickory St., Bethlehem, Pa., 15 (ERA)
Tel: UN 6-4424

Buss Radio Elec. Supply, 431 W. Broad St., Bethlehem, Pa., 10 (NEDA)

Marks Parts Co., 317 Braddock Ave., Braddock, Pa., 10 (NEDA)

Powell Electronics Sales, 457 Mill St., Bristol, Pa., 10 (NEDA)

Humes Sales, David, 124 Lee Circle, Bryn Mawr, Pa., 15 (ERA)
Tel: LAwrence 5-6469

Barrons Radio Supply, 333 E. Jefferson St., Butler, Pa., 10 (NEDA)

Delaware Valley Elect. Supply, W. Baltimore Pike, Clifton Heights, Pa., 10 (NEDA)

Biggs & Co., J. Alan, P.O. Box 450, Doylestown, Pa., 15 (ERA)
Tel: FILLmore 8-9457

Kellar & Co., Hal, 653 Ferne Blvd., Drexel Hill, Pa., 15 (ERA)
Tel: CLearbrook 9-6758

Stobart Co., Arthur J., 56-14 Revere Rd., Drexel Hill, Pa., 15 (ERA)
Tel: CLearbrook 9-3881

Feagley, Charles W., P.O. Box 111, Easton, Pa., 10, 15

A. G. Radio Parts Co., 939 Township Lane, Elkins Park, Pa., 10 (NEDA)

Duncombe Co., J. V., 1011 W. Eighth St., Erie, Pa., 10 (NEDA)

Jordan Electronic Co., 1130 German St., Erie, Pa., 10 (NEDA)

Warren Radio, Inc., 1315 Peach St., Erie, Pa., 10 (NEDA)

Hevner Co., Donald S., 1528 Spring Mill Rd., Gladwyne, Pa., 15 (ERA)
Tel: LAwrence 5-9727

Technical Representation, 220 S. Easton Rd., Glenside, Pa., 15 (ERA)
Tel: TUrner 7-1325

Elect. Wholesalers, Inc., 1922 A Paxton St., Harrisburg, Pa., 10 (NEDA)

Radio Distributing Co., 915 South 13th St., Harrisburg, Pa., 10 (NEDA)

Fairbanks Co., Howard J., 1615 Darby Rd., Havertown, Pa., 15 (ERA)
Tel: GRanite 2-2467

Satterthwaite Co., W. F., P.O. Box 664, Havertown, Pa., 15 (ERA)
Tel: SUNset 9-9600

Stinson-Mustico Co., 2124 Darby Rd., Havertown, Pa., 15 (ERA)
Tel: Hilltop 7-0922

Laird Equipment Co., P.O. Box 108, Jenkintown, Pa., 15

Barno Radio Co., 927 Walnut St., McKeesport, Pa., 10 (NEDA)

McKeesport Electronics, 1661 Fifth Ave., McKeesport, Pa., 10 (NEDA)

Jeffries, Inc., Samuel A., 105 Forrest Ave., Narberth, Pa., 15 (ERA)
Tel: MOhawk 4-8500

Television Parts Co., 509 5th Ave., New Brighton, Pa., 10 (NEDA)

Frederick Jr. Co., C. William, 800 W. Washington St., Norristown, Pa., 15 (ERA)
Tel: BRoadway 9-7560

A. C. Radio Parts Co., 1539 W. Passyunk Ave., Philadelphia, Pa., 10 (NEDA)

"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 161-264.

102. Distribution.

Allied Elec. App. Parts, 1320 W. Erie Ave., Philadelphia, Pa., 10 (NEDA)
 Almo Radio Co., 913 Arch St., Philadelphia, Pa., 10 (NEDA)
 Tel: Victor 4-9100
 Andco Sales-Engr., Inc., 5823 Green St., Philadelphia, Pa., 15 (ERA)
 Arlen Supply Co., 6026 Market St., Philadelphia, Pa., 10 (NEDA)
 Barnett Bros. Radio Co., 622 Arch St., Philadelphia, Pa., 10 (NEDA)
 Baron Associates, The Presidential A-710, Philadelphia, Pa., 15
 Blumenstein Co., Hal, 14 Trent Dr., Philadelphia, Pa., 15 (ERA)
 Tel: Midway 9-9523
 CRT Dist. Co. of Penn., 13 South 21st St., Philadelphia, Pa., 10 (NEDA)
 Cooper Co., Richard J., 3507 Wellington, Philadelphia, Pa., 15 (ERA)
 Tel: M-Ayfair 4-5486
 Danby Radio Corp., 19 S. 21st St., Philadelphia, Pa., 20
 Duncan & Assoc., W. I., 5452 Charles St., Philadelphia, Pa., 15
 Edmunds Co., Edmund J., 101 N. Lexington Ave., Philadelphia, Pa., 15 (ERA)
 Tel: Hilltop 6-6472
 Erdman Co., Kenneth B., 7908 High School Rd., Philadelphia, Pa., 15 (ERA)
 Tel: C-Apital 5-5099

Estersohn, Harry, 5727 Wister St., Philadelphia, Pa., 15 (ERA)
 Tel: Victor 8-8484
 Hautenchild Co., George, 949 E. Godfrey Ave., Philadelphia, Pa., 15 (ERA)
 Tel: Pioneer 4-0847
 Herbach & Rademan, Inc., 1204 Arch St., Philadelphia, Pa., 10 (NED)
Hughes Co., Kenneth E., 101 N. 33rd St., Philadelphia 4, Pa., 15
See ad on page 713
Tel: EVergreen 6-3130
 Lazar Radio Co., Nathan, 4231 Lancaster Ave., Philadelphia, Pa., 10 (NED)
 Leban Assoc., Albert D., 218 Lloyd Lane, Philadelphia, Pa., 15 (ERA)
 Tel: Midway 2-9047
 Lectronic Distributors, 727 Arch St., Philadelphia, Pa., 10 (NED)
 Lectronic Research Labs., 715 Arch St., Philadelphia, Pa., 5, 10, 15
 Lewis Co., Herman, 1622 68 Ave., Philadelphia, Pa., 15 (ERA)
 Tel: Livingston 8-1281
 MacDonald, Inc., Samuel K., 1531 Spruce St., Philadelphia, Pa., 15 (ERA)
 Tel: Kingsley 5-1205
 Naudain-Bohaker Co., 846 Suburban Stat. Bldg., Philadelphia, Pa., 15 (ERA)
 Tel: Rittenhouse 6-3185
 Newson & Assoc., C. H., 150 Terminal Ave., Philadelphia, Pa., 15 (ERA)
 Tel: CH 8-0282

Nolan & Assoc., John J., 314 W. Sparks St., Philadelphia, Pa., 15 (ERA)
 Tel: W-Averly 4-1595
 O'Hara Co., Brendan C., 5040 City Line Ave., Philadelphia, Pa., 15 (ERA)
 Tel: G-Renwood 3-3654
 Paragon Sales Co., 111 S. 22 St., Philadelphia, Pa., 15 (ERA)
 Tel: R-Iittenhouse 6-7060
 Penn Electronic Parts Co., 5303 Frankford Ave., Philadelphia, Pa., 10 (NED)
 Powell Co., Harold H., 2102 Market St., Philadelphia, Pa., 10 (NEDA)
 Radio Elec. Service Co., North-West 7th & Arch St., Philadelphia, Pa., 10 (NEDA)
 Radio Electric Shop, 631 S. 60th St., Philadelphia, Pa., 20
 Randall Co., Ken, 121 N. Broad St., Philadelphia, Pa., 15 (ERA)
 Tel: L-OCust 4-2151
 Rosen & Co., Raymond, Parkside Ave. & 51st St., Philadelphia, Pa., 10 (NEDA)
 Shelps Co., George A., 1625 Spruce St., Philadelphia, Pa., 15 (ERA)
 Tel: K-Iingsley 6-1066
 Sidney Wagner Elec. Supply, 4632 N. 5th St., Philadelphia, Pa., 10 (NEDA)
 Steinberg & Co., Albert, 2520 N. Broad St., Philadelphia, Pa., 10 (NEDA)
 Stratton Co., C. H., 514 E. Wadsworth Ave., Philadelphia, Pa., 15 (ERA)
 Tel: CH 7-7869
 White Co., Harry J., 1839 W. Albanus St., Philadelphia, Pa., 15 (ERA)
 Tel: DA 9-1880
Cameradio Co., 1121 Penn Ave., Pittsburgh 22, Pa., 10 (NEDA)
See ad on this page
Tel: EXpress 1-4000
 Electronics Parts Co., 5744 Baum Blvd., Pittsburgh, Pa., 10 (NEDA)
 Keps Elec. Co., Elec. Div., 5000 Baum Blvd., Pittsburgh, Pa., 10 (NEDA)
 Levine, Albert, 11 Jonquil Pl., Pittsburgh, Pa., 15 (ERA)
 Tel: L-OCust 1-7027
 Lowry Dietrich Co., 1404 Swantek St., Pittsburgh 4, Pa., 15 (ERA)
 Mates Hy, 5510 Hobart St., Pittsburgh, Pa., 15 (ERA)
 Tel: HA 1-8998
 Podolny Co., James H., 4716 Coleridge St., Pittsburgh 1, Pa., 15 (ERA)
 Radio Parts Co., 6401 Penn Ave., Pittsburgh, Pa., 10 (NEDA)
 Rogers Corp., C. R., 5210 Liberty Ave., Pittsburgh, Pa., 10 (NEDA)
 Root & Co., Gene S., 733 Vallevista Ave., Pittsburgh, Pa., 15 (ERA)
 Tel: Hilland 1-0800
 Tanner & Covert Assoc., 300 Mt. Lebanon Blvd., Pittsburgh, Pa., 15 (ERA)
 Tel: LO 1-5067
 Tydings Co., 933 Liberty Ave., Pittsburgh, Pa., 10 (NEDA)
 Yarussi Co., F. P., 312 Spring Valley Rd., Pittsburgh 16, Pa., 15 (ERA)
 Tel: C-Anal 1-4676
 Barbey Co., Inc., George D., Second & Penn Sts., Reading, Pa., 10 (NEDA)

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Directory III. Materials & Services

Distribution—Class 102

Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas

B. & R. Electric Co., 26 Railroad St., St. Marys, Pa., 10 (NEDA)
General Radio & Refrigeration, 1129 Wyoming Ave., Scranton, Pa., 10 (NEDA)
Sharon Electronics Supply, 1336 E. State St., Sharon, Pa., 10 (NEDA)
Park, E. L., 651 Paddock Rd., Southampton, Pa., 15 (ERA)
Tel: Elmwood 7-7805

Penn Industrial Elect. Co., P.O. Box 661, State College, Pa., 10, 20

Wholesale Electronics, 503 N. Chester Rd., Swarthmore, Pa., 10 (NEDA)

Zimmerman Wholesalers, 104 W. Peter St., Uniontown, Pa., 10 (NEDA)

Robinson Co., I. E., 7404 W. Chester Pike, Upper Darby, Pa., 15

Leff Radio Parts Co., M., 247 W. 8th Ave., W. Homestead, Pa., 10 (NEDA)

General Radio-Refrige. Co., 396 S. Main St., Wilkes Barre, Pa., 10 (NEDA)

Graham Assoc., Wilfrid, 610 Latham Dr., Wynnwood, Pa., 15 (ERA)

Tel: Midway 9-3027

Lowery, Inc., L. D., 50 E. Wynnwood Rd., Wynnwood, Pa., 15 (ERA)

Tel: Midway 2-9100

RHODE ISLAND

Adams-McGregor Assoc., 66 Lakeview Rd., Lincoln, R.I., 15 (ERA)

Tel: CO 9-5816

SOUTH CAROLINA

Wholesale Radio Supply Co., 515 E. Bay St., Charleston, S.C., 10 (NEDA)

Dixie Radio Supply Co., 1700 Laurel St., Columbia, S.C., 10 (NEDA)

Horlacher & Barrett, 1740 Blanding St., Columbia, S.C., 10 (NEDA)

Southern Electronics, Inc., 355-65 N. Irby St., Florence, S.C., 10 (NEDA)

Hemcor, Inc., 481 Union St., Spartanburg, S.C., 10 (NEDA)

SOUTH DAKOTA

McKenzie Distributors, Inc., 209 S. First Ave., Sioux Falls, S.D., 10 (NEDA)

Burghardt Radio Supply, 621 Fourth St., S.E., Watertown, S.D., 10 (NEDA)

TENNESSEE

Roden Electric Supply Co., 104 E. State St., Bristol, Tenn., 10 (NEDA)

Curl Radio Supply Co., 439 Broad St., Chattanooga, Tenn., 10 (NEDA)

Randolph & Williams, 204 Carter St., Columbia, Tenn., 10 (NEDA)

Randolph & Parks, Inc., 36 W. 2nd St., Cookeville, Tenn., 10 (NEDA)

Warren Radio Co., 1216 St. John Ave., Dyersburg, Tenn., 10 (NEDA)

Rush Co., L. K., 425-29 N. Royal St., Jackson, Tenn., 10 (NEDA)

Radio Electric Supply Co., 961 E. Sullivan St., Kingsport, Tenn., 10 (NEDA)

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Chemcity Radio-Elec. Co., 2211 Dutch Valley Rd., Knoxville, Tenn., 10 (NEDA)

Roden Electrical Supply, 708 Central St., N.W., Knoxville, Tenn., 10 (NEDA)

Smith Electronic Supply, 301 E. Magnolia Ave., Knoxville, Tenn., 10 (NEDA)

Bluff City Distributing, Box 418, Memphis, Tenn., 10 (NEDA)

Cartwright & Bean, 560 S. Cooper St., Memphis, Tenn., 15 (ERA)

Electronic Supply, Inc., 1100 Union, Memphis, Tenn., 10 (NEDA)

Engelman Co., 3205 Crump Ave., Memphis 12, Tenn., 15 (ERA)

Uffer & Co., Frank G., 1318 Madison Ave., Memphis, Tenn., 10 (NEDA)

Electra Distributing Co., 1914 W. End Ave., Nashville, Tenn., 10 (NEDA)

Randolph & Rice, 1213 McGavock St., Nashville, Tenn., 10 (NEDA)

Randolph & Holt, 212 E. Coffee St., Tullahoma, Tenn., 10 (NEDA)

TEXAS

R & R Electronic Co., 802 N. Walnut, Abilene, Tex., 10 (NEDA)

Alltronics Supply, Inc., 1401 W. Seventh Ave., Amarillo, Tex., 10 (NEDA)

R & R Electronic Co., 707 Adams St., Amarillo, Tex., 10 (NEDA)

West Texas Elect. Co., 401 Adams St., Amarillo, Tex., 10 (NEDA)

Electronic Headquarters, 310 Willow St., Austin, Tex., 10 (NEDA)

Hargis-Austin, Inc., 410 Baylor, Austin, Tex., 10 (NEDA)

Standard Radio Supply, Inc., 309 Lavaca, Austin, Tex., 10 (NEDA)

Montague Radio Dist. Co., 760 Laurel St., Beaumont, Tex., 10 (NEDA)

Sterling Radio, 1160 Laurel, Station A, Beaumont, Tex., 10 (NEDA)

Electronic Equip. & Eng., 805 S. Staples St., Corpus Christi, Tex., 10

Leader Electronic Supply, 1701 Morgan Ave., Corpus Christi, Tex., 10

Wicks Radio Equip. Co., 513-15 S. Staples St., Corpus Christi, Tex., 10

Airep Engrg. Co., P.O. Box 4843, Dallas, Tex., 15

Allied Components, Inc., 2517 Converse St., Dallas 7, Tex., 15 (ERA)

All-State Distg. Co., 2411 Ross Ave., Dallas, Tex., 10 (NEDA)

Ammon & Woods Assoc., 5602 E. Mockingbird Lane, Dallas, Tex., 15 (ERA)

Anderson Co., Geo. E., 1901 Griffin, Dallas 2, Tex., 15 (ERA)

Aymond Co., Edward F., 4312 Maple Ave., Dallas 19, Tex., 15 (ERA)

Barnes Co., Arnold, Dallas 19, Tex., 15 (ERA)

Berthold Sales Co., 4411 Maple Ave., Dallas 19, Tex., 15 (ERA)

Branum Co., P.O. Box 14348, Dallas 34, Tex., 15 (ERA)

Campion Sales Co., 9002 Chancellor Row, Dallas 35, Tex., 15 (ERA)

Central Electronics, 4117 Maple Ave., Dallas, Tex., 10 (NEDA)

Crabtrees Wholesale Elec., 2608 Ross Ave., Dallas, Tex., 10 (NEDA)

Corry Co., Hal F., 6314 Hillcrest Ave., Dallas 5, Tex., 15 (ERA)

Crockett-Lund & Co., 2204 Griffin St., Dallas 2, Tex., 15 (ERA)

Dansby Co., Robert W., 2517 Cedar Springs Rd., Dallas, Tex., 15 (ERA)

Delzell-Maynard Sales Co., 2013 Cedar Springs, Dallas 1, Tex., 15 (ERA)

Equipment & Service Co., 7118 Envoy Ct., Dallas, Tex., 15, 20

Gross & Co., Fred, 14025 Denton Dr., Dallas, Tex., 15 (ERA)

Guenther, John B., P.O. Box 1926, Dallas 21, Tex., 15 (ERA)

Hart Co., Sam, 1210 Old Gate Lane, Dallas 18, Tex., 15 (ERA)

Hays Co., W. R., 3416 Rosedale St., Dallas, Tex., 15 (ERA)

Kantenberger Co., 711 Reverchon Dr., Dallas, Tex., 15

Lawrence Sales Co., P.O. Box 13026, Dallas, Tex., 15

Lieberman & Assoc., Hank, 6005 Northwood Rd., Dallas, Tex., 15 (ERA)

Lucas Sales Co., Chas., 2004 S. Beckley, Dallas 16, Tex., 15 (ERA)

McKinney Sales Co., J. F., 1330 N. Industrial Blvd., Dallas, Tex., 15 (ERA)

Nesbitt Co., Robert E., 1925 Cedar Springs, Dallas 1, Tex., 15 (ERA)

Packard Assoc., 404 Love Field Air Term., Dallas 35, Tex., 15 (ERA)

Schoonmaker Co., J. Y., 5328 Redfield Ave., Dallas 35, Tex., 15 (ERA)

Sinks Co., R. M., P.O. Box 11726, Dallas 18, Tex., 15 (ERA)

Smith Co., J. Earl, P.O. Box 35331, Dallas 35, Tex., 15 (ERA)

Southern Rad. Supply, Inc., 3137 Ross Ave., Dallas, Tex., 10 (NEDA)

Southwest Elect. Indust., 4515 Prentice, Dallas, Tex., 15 (ERA)

Texport Co., 2147 Farrington, Dallas 7, Tex., 15 (ERA)

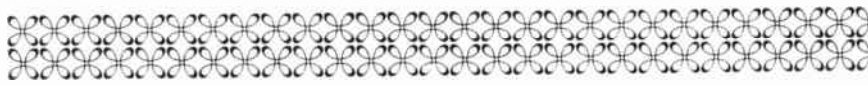
Thomson Engrg. Service, 2712 W. Mockingbird Lane, Dallas, Tex., 15

Wholesale Elect. Supply, 2800 Ross Ave., Dallas, Tex., 10 (NEDA)

Wilkinson Brothers Co., P.O. Box 1169, Dallas, Tex., 10 (NEDA)

Wyborny & Yount Co., 408 Merchandise Mart, Dallas 1, Tex., 15 (ERA)

"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 161-264.



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THE IRE DIRECTORY

Advertising Dept., 72 W. 45th St., New York 36, N.Y.
Murray Hill 2-6606



102. Distribution.

Denison Radio Supply, 310 W. Woodard, Denison, Tex., 10 (NEDA)
McNicol, C. C., 811 N. Estrella St., El Paso, Tex., 10 (NEDA)
R & R Supply Co., Inc., 2531 E. Yandell, El Paso, Tex., 10 (NEDA)
Engineering Assoc., Inc., 2912 Stanley, Ft. Worth, Tex., 15 (ERA)
Scooters Rad. Supply Co., S. Freeway & Vickery, Ft. Worth, Tex., 10 (NEDA)
Spears Co., Mitchell, 3801 Westcliff Rd., S. Ft. Worth, Tex., 15, 20
Swieco, Inc., 1518 E. Lancaster, Ft. Worth, Tex., 10 (NEDA)
Angie Radio & TV Supply, 2005 Crawford St., Houston, Tex., 10 (NEDA)
Beyer & Co., A. R., 1318 Polk Ave., Houston, Tex., 10 (NEDA)
Hall, Inc., R. C. & L. F., 1901 Chenevert, Houston, Tex., 10 (NEDA)
Kliepera Co., M. F., P.O. Box 3113, Houston, Tex., 15 (ERA)
Sterling Radio Prods., Inc., P.O. Box 1746, Houston, Tex., 10 (NEDA)
Wofford Electronics Parts, 3808 Crawford St., Houston, Tex., 10 (NEDA)
B & L Radio-TV Supply, Inc., 2424 Texas Ave., Lubbock, Tex., 10 (NEDA)
R & R Supply Co., Inc., P.O. Box 1360, Lubbock, Tex., 10 (NEDA)
Rio Radio Supply Co., 608-10 S. Broadway, McAllen, Tex., 10 (NEDA)
Greater Texas Elect., Inc., 30 Industrial Loop, Midland, Tex., 10 (NEDA)
Diehl Radio & TV Supply, 2120 Seventh St., Port Arthur, Tex., 10 (NEDA)
Modern Electronic Co., 2000 Broadway, San Antonio, Tex., 10 (NEDA)
Radio & TV Parts Co., 1828 N. St. Marys St., San Antonio, Tex., 10 (NEDA)
Sherman Electronics Supply, 720 San Pedro, San Antonio, Tex., 10 (NEDA)
South Texas Rad. Sup. Co., 647 S. Presa St., San Antonio, Tex., 10 (NEDA)
McCulloch Wholesale TV, 811 W. 13th St., Texarkana, Tex., 10 (NEDA)
Best Electronics, 324 N. 18th St., Waco, Tex., 10 (NEDA)
Hargis Co., Inc., 1205 Washington Ave., Waco, Tex., 10 (NEDA)

UTAH

Ballard Supply Co., 3109 Washington Blvd., Ogden, Utah, 10 (NEDA)
Tri-State Electronic Supply, 2217 Liesel Ave., Ogden, Utah, 10 (NEDA)
Gates Co., F. Y., 200 S. Main St., Salt Lake City, Utah, 15
O'Loughlins Radio Supply, 113 E. 3rd South St., Salt Lake City, Utah, 10 (NEDA)
Stevenson Co., Ralph, 2045 Walker Lane, Salt Lake City, Utah, 15

VERMONT

North Radio, 211 North St., Bennington, Vt., 10 (NEDA)

VIRGINIA

Industry Services, Inc., 122-126 S. Wayne St., Arlington, Va., 10 (NEDA)
Jay Company, 2420 Wilson Blvd., Arlington, Va., 15
Rucker Elect. Prods., Co., 1213 Wilson Blvd., Arlington, Va., 10 (NEDA)

Directory III. Materials & Services

Distribution—Class 102

Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
Canada
Japan
Mexico

Virginia Radio Supply Co., 715 Henry Ave., Charlottesville, Va., 10
Womack Electronics Corp., P.O. Box 521, Danville, Va., 10 (NEDA)
Lee Assoc., Inc., 1107C W. Broad St., Falls Church, Va., 15
Cain Electronics Co., 14th & Monticello Ave., Norfolk, Va., 10 (NEDA)
Priest Electronics, Inc., 6431 Tidewater Dr., Norfolk, Va., 10 (NEDA)
Radio Parts Dist. Co., 128 W. Olney Rd., Norfolk, Va., 10 (NEDA)
Radio Supply Co., 711 Granby St., Norfolk, Va., 10 (NEDA)
Banner Electronics, Inc., 2224 Chamberlayne Ave., Richmond, Va., 10 (NEDA)
Johnston-Gasser Co., Inc., 3023 W. Marshall St., Richmond, Va., 10 (NEDA)
Meridian Electronics, Inc., 1001 W. Broad St., Richmond, Va., 10 (NEDA)
Radio Supply Co., Inc., 3302 W. Broad St., Richmond, Va., 10 (NEDA)
Richmond Electronic Supply, 800 W. Cary St., Richmond, Va., 10 (NEDA)
Dixie Appliance Co., P.O. Box 601, Roanoke, Va., 10 (NEDA)
McKnight Electronics, Inc., 405 Shenandoah Ave., N.W., Roanoke, Va., 10
Peoples Radio & TV Sup., 1015 Moorman Rd., N.W., Roanoke, Va., 10 (NEDA) (NEDA)
Radio Supply Co., Inc., 2009 Williamson Rd., Roanoke, Va., 10 (NEDA)
Roanoke Elect. Supply, Inc., 1322 Williamson Rd., Roanoke, Va., 10 (NEDA)
Southern Elect. Co., 818 Greenville Ave., Staunton, Va., 10 (NEDA)

WASHINGTON

Geiger Radio, W. A., 1101 Columbia, Elensburg, Wash., 10 (NEDA)
Pringle Radio Wholesale, 2101 Colby Ave., Everett, Wash., 10 (NEDA)
Arva, Inc., 1320 Prospect, Seattle, Wash., 15 (ERA)
Tel: MAine 2-0177
Backer Co., James J., 221 W. Galer St., Seattle 99, Wash., 15 (ERA)
Tel: ATwater 3-6470
Forland-Drake Assoc., 1806 Bush Pl., Seattle 44, Wash., 15 (ERA)
Tel: EAst 3-8545
Garretson Rad., Supply, Inc., 2416-Second Ave., Seattle, Wash., 10 (NEDA)
Haight Co., Fred H., 3212 Eastlake Ave., Seattle 2, Wash., 15 (ERA)
Tel: EAst 2-1818
Levinson Co., Harry, 1117 Second Ave., Seattle, Wash., 15 (ERA)
MAine 2-5433
Johnston Co., Ray, 1011 E. 69 St., Seattle 15, Wash., 15 (ERA)
Tel: LAkeview 4-5170
Marsh Agencies, Inc., 2601 First Ave., Seattle 1, Wash., 15 (ERA)
Tel: MAin 2-8761
Merritt Co., Ron, 1320 Prospect, Seattle, Wash., 15 (ERA)
Tel: MU 2-7337
Northwestern Agcys., Inc., 4130 1st Ave., S., Seattle 4, Wash., 15 (ERA)
Tel: MAin 3-8882

102. Distribution.

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Pacific Elect. Sales Co., 1209 First Ave., Seattle, Wash., 10 (NEDA)
Paramount Agencies, 3131 Western Ave., Seattle, Wash., 15 (ERA)
Tel: ATwater 4-1840
Parsons & Co., C. B., 3028 First Ave., Seattle 1, Wash., 15 (ERA)
Tel: MUlton 2-6780
Porter Co., Burt C., 1209 Poplar Pl., Seattle, Wash., 15 (ERA)
Tel: EAst 3-8330
Schultz Co., N. R., 4227 Airport Way, Seattle 8, Wash., 15 (ERA)
Tel: MAin 4-8550
Seatronics, Inc., Forland, 1806 Bush Pl., Seattle, Wash., 15
Seattle Radio Supply, Inc., 2117 Second Ave., Seattle, Wash., 10 (NEDA)
Smith Sales Co., Don, 2320 N. 45th St., Seattle 3, Wash., 15 (ERA)
Tel: MElrose 3-3160
Strum Co., Samuel, 1612 Broadway, Seattle 22, Wash., 15 (ERA)
Tel: EAst 3-6177
Western Elect. Supply Co., 717 Dexter Ave., Seattle, Wash., 10 (NEDA)
Widdekind Co., M. K., 222 First St., Seattle, Wash., 15 (ERA)
Tel: ATwater 4-4869
Columbia Elect. & Mfg. Co., 3420 E. Ferry Ave., Spokane, Wash., 10 (NEDA)
Northwest Electronics, E. 730 First Ave., Spokane, Wash., 10 (NEDA)
Taylor Distributing Co., E., 206 Augusta, Spokane, Wash., 10 (NEDA)
Tel-Electric Dist., Inc., 734 N. Division, Spokane, Wash., 10 (NEDA)
C. & G. Radio Supply Co., 2502-6 Jefferson Ave., Tacoma, Wash., 10 (NEDA)
Wible Radio Supply, Inc., 2360 S. Fawcett Ave., Tacoma, Wash., 10 (NEDA)
Palmer, Inc., M. V., 4108 N.W. Fruit Valley Rd., Vancouver, Wash., 5, 10, 15, 20
Mid-State Rad. Supply, Inc., 611½ N. Wenatchee Ave., Wenatchee, Wash., 10 (NEDA)

WEST VIRGINIA

Meyers Electronics, Inc., 813 Bluefield Ave., Bluefield, W.Va., 10 (NEDA)
Chemcity Rad. & Elect. Co., 103 Clendenin St., Box 2066, Charleston, W.Va., 10 (NEDA)
Mountain Elect., Inc., 708 Ibgley Ave., Charleston, W.Va., 10 (NEDA)
Electronic Supply, Inc., 422 Eleventh St., Huntington, W.Va., 10 (NEDA)
Gen. Electronics Dist., Inc., 735 Main St., Wheeling, W.Va., 10 (NEDA)

WISCONSIN

Bushland Radio Specialty, 19 W. Spring St., Chippewa Falls, Wis., 10
Fond du Lac Distributors, 152 S. Macey St., Fond du Lac, Wis., 10 (NEDA)
Harris Radio Supply, 289 N. Main St., Fond du Lac, Wis., 10 (NEDA)
Neslo, Inc., 715-14th Ave., Green Bay, Wis., 10 (NEDA)
Northern Radio-TV Supply, 1585 Main St., Green Bay, Wis., 10 (NEDA)
Stark Radio Supply Co., 131 S. 6th St., La Crosse, Wis., 10 (NEDA)
Radio Distributors, 418 Oak St., Madison, Wis., 10 (NEDA)
Millers Electronic Supply, 1329 N. Broadway, Menomonie, Wis., 10 (NEDA)
Ackerman Radio Sales, 3861 N. 35th, Milwaukee, Wis., 10 (NEDA)
Barco, Inc., Box 1222, Milwaukee, Wis., 15
Central Radio Parts Co., 1723 W. Fond du Lac Ave., Milwaukee, Wis., 10 (NEDA)
Marsh Radio Supply Co., 838 N. 4th St., Milwaukee, Wis., 10 (NEDA)
Radio Parts Co., Inc., 940 N. 27th St., Milwaukee, Wis., 10 (NEDA)
Taylor Electric Co., 4080 N. Port Washington Rd., Milwaukee, Wis., 10 (NEDA)
Standard Radio Parts Co., 1244 State St., Racine, Wis., 10 (NEDA)

WYOMING

Houge Radio & Supply Co., 4012 Central Ave., Cheyenne, Wyo., 10 (NEDA)

CANADA

Lomas Co., E. G., 227 Laurier Ave., W., Ottawa, Canada, 5, 15, 20
A. T. R. Armstrong, Ltd., 700 Western Rd., Toronto, Canada, 15 (ERA)
Burke Electric-X-Ray Co., 63 Yorkville Ave., Toronto, Canada, 20
Electro Sonic Supply Co., 543 Yonge St., Toronto, Canada, 10 (NEDA)
Pointon Co., Charles G., 6 Alcina Ave., Toronto 23, Canada, 15
McLennan, Ltd., D. Eldon, 1624 W. 3 Ave., Vancouver 9, Canada, 15
S & T Sales, Ltd., 120 E. Cordova St., Vancouver, Canada, 5, 10, 20

JAPAN

Technical Factors, Ltd., 1, Nishi-Nanachome, Ginza, Tokyo, Japan, 15

MEXICO

Brena & Cia, Jones, Apartado 2250, Mexico, D.F. Mex., 15 (ERA)
Oskam Representaciones, William L., Charles Ave., Mexico L.D.F. Mex., 15 (ERA)

28 Fields of Special Interest-

The 28 Professional Groups are listed below, together with a brief definition of each, the name of

| | | |
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| <p>Aeronautical and Navigational Electronics Annual fee: \$2.</p> <p><i>The application of electronics to operation and traffic control of aircraft and to navigation of all craft.</i></p> <p>Mr. Lewis M. Sherer, Chairman, RTCA, Washington, D.C.</p> <p>31 Transactions, *5, *6, *8, & *9, and *Vol. ANE-1, Nos. 2 and 3; Vol. 2, No. 1-3; Vol. 3, No. 2; Vol. 4, No. 1, 2, 3; Vol. 5, No. 2, 3, 4; Vol. 6, No. 1, 2.</p> | <p>Antennas and Propagation Annual fee: \$4.</p> <p><i>Technical advances in antennas and wave propagation theory and the utilization of techniques or products of this field.</i></p> <p>Mr. Arthur Dorne, Chairman, Dorne & Margolin, Westbury, L.I., N.Y.</p> <p>26 Transactions, *Vol. AP-2, No. 1-3; AP-4, No. 4; AP-5, No. 1-4; AP-6, No. 1, 2, 3, 4; AP-7, No. 1, 2, 3.</p> | <p>Audio Annual fee: \$2.</p> <p><i>Technology of communication at audio frequencies and of the audio portion of radio frequency systems, including acoustic terminations, recording and reproduction.</i></p> <p>Dr. A. B. Bereskin, Chairman, EE Dept., Univ. of Cincinnati, Cincinnati 21, Ohio</p> <p>48 Transactions, *Vol. AU-1, No. 6; *Vol. AU-2, No. 1, 4-6; Vol. AU-3, No. 1, 3, 5; Vol. AU-4, No. 1, 5-6; Vol. AU-5, No. 1, 2, 3, 4, 5, 6; AU-6, No. 1, 2, 3, 4, 5, 6; AU-7, No. 1, 2, 3, 4.</p> |
| <p>Automatic Control Annual fee: \$2.</p> <p><i>The theory and application of automatic control techniques including feedback control systems.</i></p> <p>Mr. John E. Ward, Chairman, Servomechanisms Lab., MIT, Cambridge 39, Mass.</p> <p>7 Transactions, PGAC-3-4-5-6, AC-4, No. 1.</p> | <p>Broadcast & Television Receivers Annual fee: \$2.</p> <p><i>The design and manufacture of broadcast and television receivers and components and activities related thereto.</i></p> <p>Mr. Gilbert C. Larson, Chairman, Raytheon Mfg. Co., River Road, Waltham, Mass.</p> <p>23 Transactions, *7, 8; BTR-1, No. 1-4; BTR-2, No. 1-2-3; BTR-3, No. 1-2; BTR-4, No. 2, 3-4; BTR-5, No. 1, 2.</p> | <p>Broadcasting Annual fee: \$2.</p> <p><i>Broadcast transmission systems engineering, including the design and utilization of broadcast equipment.</i></p> <p>Mr. George E. Hagerty, chairman, Westinghouse, 122 E. 42nd St., New York 17, N.Y.</p> <p>13 Transactions, No. 2, 4, 6, 7, 8, 9, 10, 11, 12, 13.</p> |
| <p>Circuit Theory Annual fee: \$3.</p> <p><i>Design and theory of operation of circuits for use in radio and electronic equipment.</i></p> <p>Mr. Sidney Darlington, Chairman, Bell Tel. Labs., Murray Hill, N.J.</p> <p>24 Transactions, CT-2, No. 4; CT-3, No. 2; CT-4, No. 2-4; CT-5, No. 1, 2, 3, 4, CT-6, No. 1, 2.</p> | <p>Communications Systems Annual fee: \$2.</p> <p><i>Radio and wire telephone, telegraph and facsimile in marine, aeronautical, radio-relay, coaxial cable and fixed station services.</i></p> <p>Mr. J. E. Schlijker, Chairman, IT&T, 67 Broad St., New York 4, N.Y.</p> <p>14 Transactions, CS-2, No. 1; CS-5, No. 2, 3; CS-6, No. 1, 2; CS-7, No. 1, 2.</p> | <p>Component Parts Annual fee: \$3.</p> <p><i>The characteristics, limitation, applications, development, performance and reliability of component parts.</i></p> <p>Mr. J. J. Drvostep, Chairman, Sperry Gyroscope Co., Great Neck, N.Y.</p> <p>16 Transactions, Vol. CP-3, No. 2; CP-4, No. 1, 2, 3-4; CP-5, No. 1, 2, 3, 4; CP-6, No. 1, 2.</p> |
| <p>Education Annual fee: \$3.</p> <p><i>To foster improved relations between the electronic and affiliated industries and schools, colleges, and universities.</i></p> <p>Dr. R. L. McFarlan, Chairman, 20 Circuit Rd., Chestnut Hill 67, Mass.</p> <p>7 Transactions, Vol. E-1, No. 3, 4; E-2, No. 1, 2, 3.</p> | <p>Electron Devices Annual fee: \$3.</p> <p><i>Electron devices, including particularly electron tubes and solid state devices.</i></p> <p>Dr. W. M. Webster, Chairman, RCA Labs., Princeton, N.J.</p> <p>25 Transactions, *Vol. ED-1, No. 3-4; ED-3, No. 2-3-4; ED-4, No. 2-3, 4; ED-5, No. 1, 2, 3, 4; ED-6, No. 1, 2.</p> | <p>Electronic Computers Annual fee: \$2.</p> <p><i>Design and operation of electronic computers.</i></p> <p>Mr. Richard O. Endres, Rese Engineering Co., 731 Arch St., Philadelphia, Pa.</p> <p>30 Transactions, EC-4, No. 4; EC-6, No. 2, 3; EC-7, No. 1, 2, 3, 4; EC-8, No. 1, 2.</p> |
| <p>Engineering Management Annual fee: \$3.</p> <p><i>Engineering management and administration as applied to technical, industrial and educational activities in the field of electronics.</i></p> <p>Dr. Henry M. O'Bryan, Sylvania Elec. Products, 730 3rd Ave., New York 17, N.Y.</p> <p>15 Transactions, EM-3, No. 2, 3; EM-4, No. 1, 3, 4; EM-5, No. 1-4; EM-6, No. 1, 2.</p> | <p>Engineering Writing and Speech Annual fee: \$2.</p> <p><i>The promotion, study, development, and improvement of the techniques of preparation, organization, processing, editing, and delivery of any form of information in the electronic-engineering and related fields by and to individuals and groups by means of direct or derived methods of communication.</i></p> <p>Mr. T. T. Patterson, Jr., Chairman, RCA Bldg. 13-2, Camden, N.J.</p> <p>4 Transactions, Vol. EWS-1, No. 2; EWS-2, No. 1, 2.</p> | <p>Human Factors in Electronics Annual fee: \$2.</p> <p><i>Development and application of human factors and knowledge germane to the design of electronic equipment.</i></p> <p>Mr. Curtis M. Jansky, Chairman, Royal McBee Corp., Port Chester, N.Y.</p> |

THE INSTITUTE OF RADIO

-IRE's 28 Professional Groups

the group chairman, and publications to date.

* Indicates publications still available

| | | |
|---|--|---|
| <p>Industrial Electronics Annual fee: \$3. <i>Electronics pertaining to control, treatment and measurement, specifically, in industrial processes.</i> Mr. J. E. Eiselein, Chairman, RCA Victor Dev., Camden, N.J. 10 Transactions, *PGIE-1-3-5-6-7-8, 9, 10.</p> | <p>Information Theory Annual fee: \$3. <i>Information theory and its application in radio circuitry and systems.</i> Dr. Peter Elias, Chairman, MIT, Cambridge 39, Mass. 17 Transactions, PGIT-4, IT-1, No. 2-3; IT-2, No. 2, 3; IT-3, No. 1, 2, 3, 4; IT-4, No. 1, 2, 3, 4; IT-5, No. 1, 2.</p> | <p>Instrumentation Annual fee: \$2. <i>Measurements and instrumentation utilizing electronic techniques.</i> Mr. L. C. Smith, Chairman, Image Electronics Inc., 2300 Washington St., Newton Lower Falls 62, Mass. 14 Transactions, 4; Vol. 1-6, No. 2, 3, 4; Vol. 1-7, No. 1, 2, 3, 4; Vol. 1-8, No. 1.</p> |
| <p>Medical Electronics Annual fee: \$3. <i>The use of electronic theory and techniques in problems of medicine and biology.</i> Mr. W. E. Tolles, Chairman, Airborne Instruments Lab., Mineola, N.Y. 14 Transactions, 8, 9, 11, 12, ME-6, No. 1, 2.</p> | <p>Microwave Theory and Techniques Annual fee: \$3. <i>Microwave theory, microwave circuitry and techniques, microwave measurements and the generation and amplification of microwaves.</i> Dr. A. A. Oliner, Microwave Research Institute, 55 Johnson St., Brooklyn 1, N.Y. 26 Transactions, MTT-4, No. 3-4; MTT-5, No. 2, 3, 4; MTT-6, No. 1, 2, 3, 4; MTT-7, No. 2, 3.</p> | <p>Military Electronics Annual fee: \$2. <i>The electronics sciences, systems, activities and services germane to the requirements of the military. Aids other Professional Groups in liaison with the military.</i> Mr. Henry Randall, Chairman, Office of Asst. Secy. Defense, Pentagon, Washington, D.C. 6 Transactions, MIL-1, No. 1; MIL-2, No. 1; MIL-3, No. 2, 3.</p> |
| <p>Nuclear Science Annual fee: \$3. <i>Application of electronic techniques and devices to the nuclear field.</i> Dr. A. B. Van Rennes, Chairman, Bendix Aviation Corp., Detroit 35, Mich. 13 Transactions, NS-1, No. 1; NS-3, No. 2, 3; NS-4, No. 2; NS-5, No. 1, 2, 3, NS-6, No. 1, 2.</p> | <p>Production Techniques Annual fee: \$2. <i>New advances and materials applications for the improvement of production techniques, including automation techniques.</i> Mr. L. M. Ewing, Chairman, General Electric Co., Syracuse, N.Y. 6 Transactions, No. 2-3, 4, 5, 6.</p> | <p>Radio Frequency Techniques Annual fee: \$2. <i>Origin, effect, control and measurement of radio frequency interference.</i> Mr. J. P. McNaull, Chairman, Signal Corps, USA's RDL, Ft. Monmouth, N.J. 1 Transaction, RF-1, No. 1.</p> |
| <p>Reliability and Quality Control Annual fee: \$3. <i>Techniques of determining and controlling the quality of electronic parts and equipment during their manufacture.</i> Mr. P. K. McElroy, Chairman General Radio Co., West Concord, Mass. 16 Transactions, *3, 4-5-6, 10, 11, 12, 13, 14, 15, 16.</p> | <p>Space Electronics and Telemetry Annual fee: \$2. <i>The control of devices and the measurement and recording of data from a remote point by radio.</i> Mr. C. H. Hoepfner, Chairman, Radiation, Inc., Melbourne, Fla. 12 Transactions, TRC-1, No. 2-3; TRC-2, No. 1; TRC-3, No. 2, 3; TRC-4, No. 1; SET-5, No. 1, 2.</p> | <p>Ultrasonics Engineering Annual fee: \$2. <i>Ultrasonic measurements and communications, including underwater sound, ultrasonic delay lines, and various chemical and industrial ultrasonic devices.</i> Dr. Wilfred Roth, Chairman, Roth Lab., Hartford, Conn. 7 Transactions, PGUE, 1, 5, 6, 7.</p> |
| <p>Vehicular Communications Annual fee: \$2. <i>Communications problems in the field of land and mobile radio services, such as public safety, public utilities, railroads, commercial and transportation, etc.</i> Mr. A. A. MacDonald, Chairman, Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill. 12 Transactions, 5, 8, 9, 10, 11, 12.</p> | <p style="text-align: center;">USE THIS COUPON</p> <p>Miss Emily Sirjane IRE—1 East 79th St., New York 21, N.Y. PG-11-59</p> <p>Please enroll me for these IRE Professional Groups</p> <p>..... \$</p> <p>..... \$</p> <p>Name</p> <p>Address</p> <p>Place</p> <p>Please enclose remittance with this order.</p> | |

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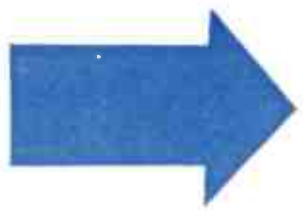


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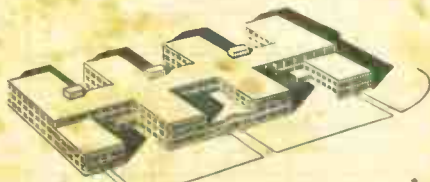
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