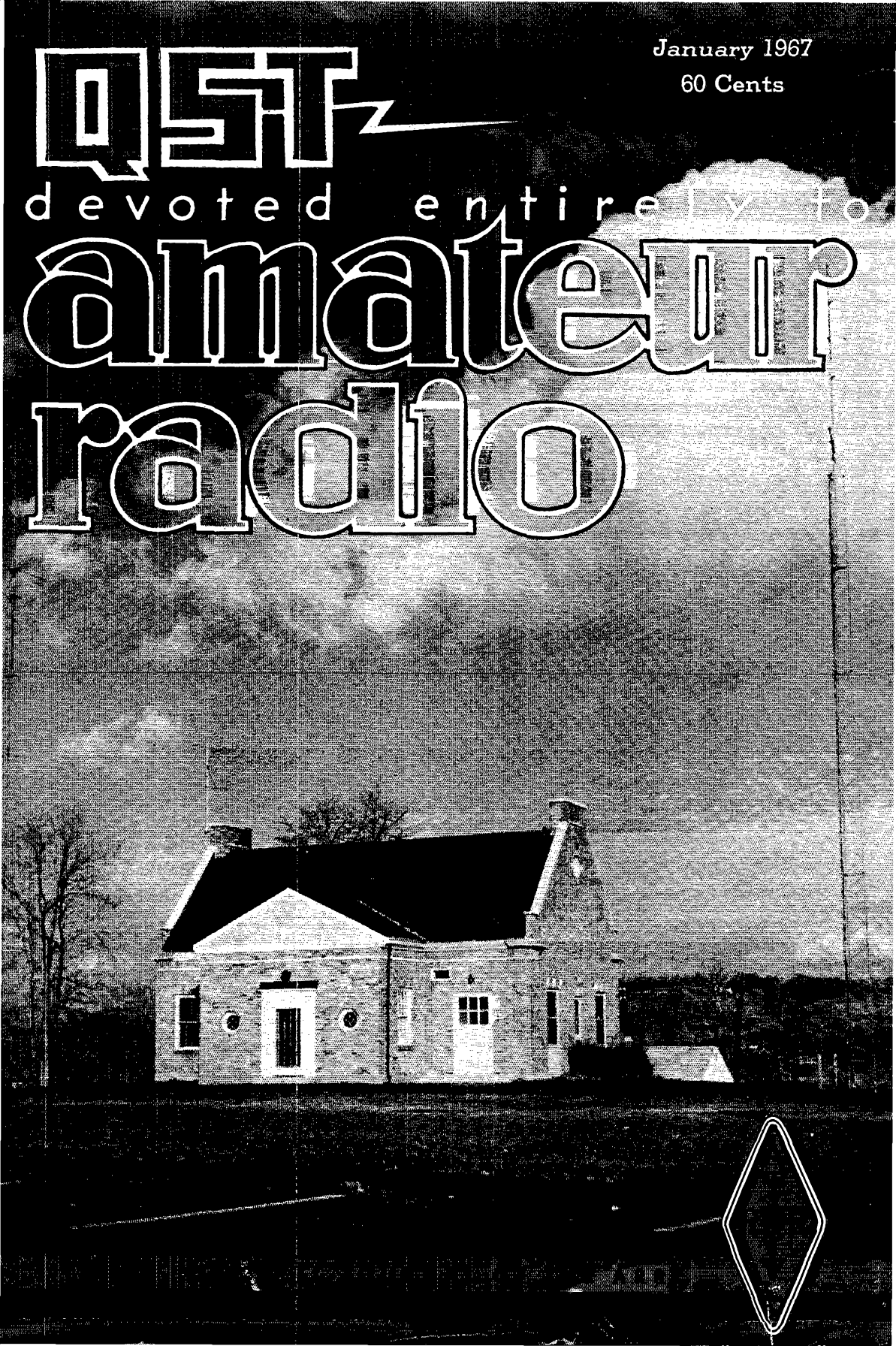
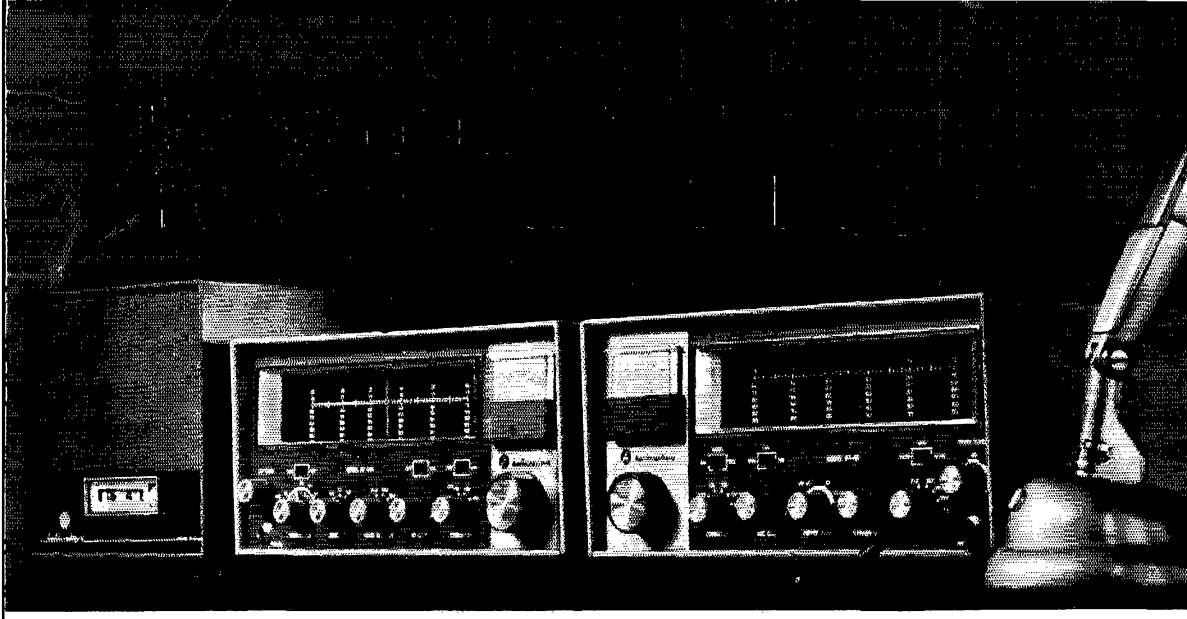
January 1967
60 Cents

QST

devoted entirely to

amateur radio





SX-146 Receiver

This is an amateur band receiver of advanced design employing a single conversion signal path and pre-mixed oscillator chain to assure high order frequency stability and freedom from adjacent channel cross-modulation products. The SX-146 employs a high frequency quartz crystal filter and has provision for installation of two more crystal filters. The receiver may also be used from 2 to 30 mc, with the exception of a narrow gap at 9.0 mc, with the connection of auxiliary oscillators. The highly stable conversion oscillator chain may be used for transceiver operation of the matching HT-46 transmitter.

FREQUENCY BANDS: 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0 mc (28.0 to 28.5, 29.0 to 30.0 requires extra crystals at users option).

SENSITIVITY: Better than 1 μv for 20 db S/N.

TUBES AND FUNCTIONS: 6JD6 RF amplifier; 12AT7 Signal mixer and cathode follower; (2) 6AU6A 9 mc IF amplifier; 12AT7 AM detector—AVC rectifier—product detector; 12AT7 USB—LSB crystal oscillators; 6GW8 Audio amplifier and audio output; 6BA6 Variable frequency oscillator; 6EA8 Crystal heterodyne oscillator and pre-mixer; Plus diode power supply rectifier, ANL diode and AVC gates diode; *6AU6A—100 kc crystal calibrator oscillator; *Harmonic generator diode.

PHYSICAL DATA: Size: 5⅞" x 13⅛" x 11". Shipping wt., 20 lbs.

FRONT PANEL CONTROLS: Frequency: Power off CW-upper-lower and AM; Audio gain; Band selector—3.5, 7.0, 14, 21.0, 28.0, 28.5, 29.0, 29.5; Selectivity—0.5, 2.1, 5.0 kc (0.5 and 5.0 kc filters optional extra); Pre-selector; RF gain; AVC on-off; Cal. on-off; ANL on-off; Phone set jack; Smiter.

REAR CHASSIS: S-meter zero adjust; Internal-External oscillator switch; Slave oscillator output; External oscillator input; Antenna socket; Speaker, ground and mute terminals; Grounding stud; AC power cord.

POWER REQ.: 105/125 volt—50/60 cycle AC—55 watts.

I-F SELECTIVITY: Uses a 6-pole crystal filter to obtain a nose-to-skirt ratio better than 1 to 1.8.

Amateur net, $269.95

Model HA-19 plug-in, 100-kc quartz calibrator available as accessory. **Amateur net, $19.95**

**Part of HA-19 calibrator.*

HT-46 5-band transmitter

All new from the ground up! Here's the "new breed" transmitter that matches your SX-146 . . . works independently or may be interconnected for transceiver operation.

FEATURES: 180 watts PEP input on SSB; 140 watts on CW; Frequency control independent or slaved to SX-146 receiver; Upper or lower sideband via 9 mc quartz filter; Built-in power supply; Press-to-talk or optional plug-in VOX; grid block for keying for CW.

FREQUENCY COVERAGE: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 mc and 28-30 mc in four 500-kc steps. Crystal supplied for 28.5-29.0 mc coverage. Other plug-in crystals at user's option.

TUBES: 6BA6 VFO; 6EA8 Heterodyne crystal oscillator and mixer; 12AT7 Carrier oscillator-third audio; 12AT7 Mic amplifier; 6EA8 9 mc I-F amplifier and AALC; 6AH6 Mixer; 12BY7 Driver; 6HF5 Power amplifier; 0A2 Reg.

FRONT PANEL CONTROLS: Frequency Tuning; Operation-Off, Standby, USB, LSB, CW-Tune, Standby LSB USB; Microphone gain; Driver tune; Carrier level; Band selector; Final tune; VFO selector—Transmitter-Receiver; Dial cal.; Calibrate Off-On; Meter MA-RFO.

REAR APRON FUNCTIONS: AC Cord; Ground lug; Fuse; Key jack; VOX accessory socket; Antenna jack; Receiver input (for transceiver); 11 pin control socket; bias adjust.

PHYSICAL DATA: Size: 5⅞" x 13⅛" x 11". Shipping wt., 26½ lbs.

HA-16 Vox Adapter, **$37.95**

Amateur net, $369.95

R-51 Speaker.

4 x 6 inch oval speaker and attractive 24 hour clock.
amateur net $34.95

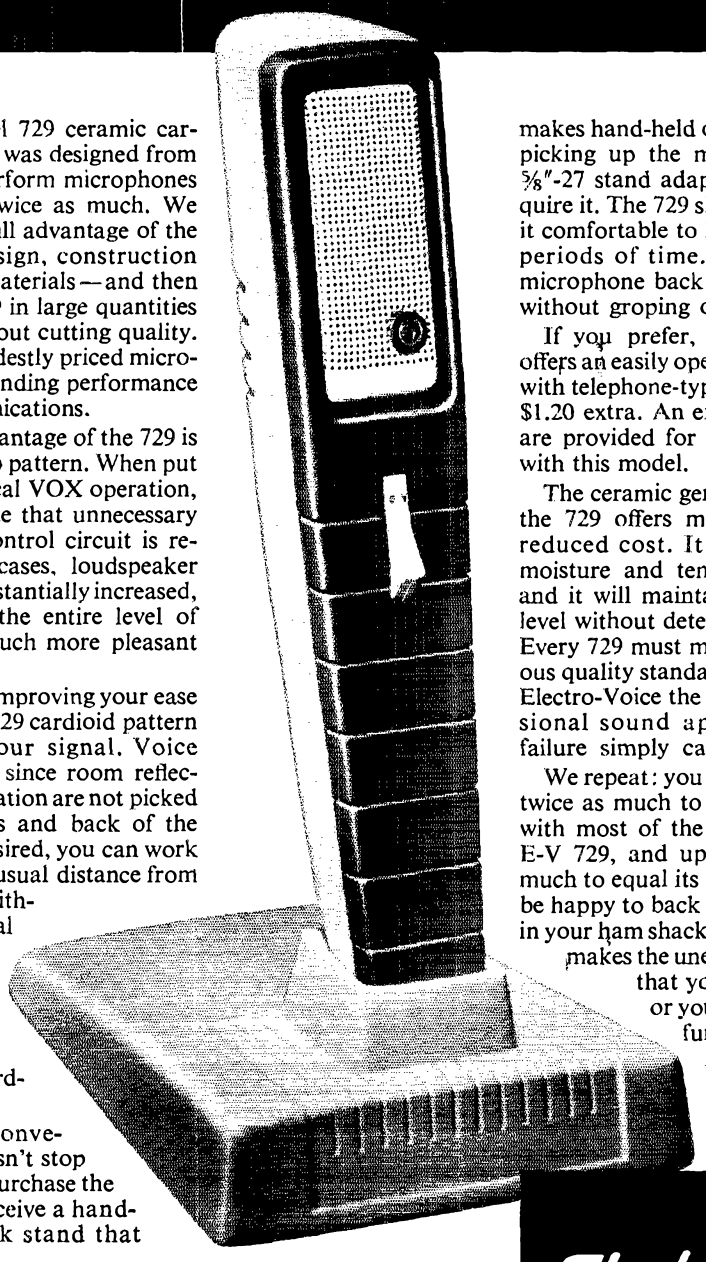
"Quality through Craftsmanship"

hallicrafters

Fifth and Kostner Aves., Chicago, Illinois 60624
Export: International Division

Available in Canada from Gould Sales Co.

Unless you pay $30.00 or more, you can't buy a microphone as good as the E-V 729...for only $14.70*!



The E-V Model 729 ceramic cardioid microphone was designed from the start to outperform microphones selling for over twice as much. We did it by taking full advantage of the most modern design, construction techniques, and materials—and then producing the 729 in large quantities that cut cost without cutting quality. The result is a modestly priced microphone with outstanding performance for voice communications.

The biggest advantage of the 729 is its cardioid pickup pattern. When put to the test of critical VOX operation, you'll quickly note that unnecessary tripping of the control circuit is reduced. In most cases, loudspeaker volume can be substantially increased, as well, making the entire level of your operation much more pleasant and effective.

But more than improving your ease of operation, the 729 cardioid pattern also improves your signal. Voice quality is crisper, since room reflections and reverberation are not picked up from the sides and back of the microphone. If desired, you can work at up to twice the usual distance from the microphone without losing essential audio clarity. This working flexibility simply cannot be matched by an omnidirectional microphone, regardless of price.

And the 729 convenience story doesn't stop there. When you purchase the Model 729 you receive a handsome slip-in desk stand that makes hand-held operation as easy as picking up the microphone, plus a 5/8"-27 stand adapter should you require it. The 729 shape and size make it comfortable to hold, even for long periods of time. And putting the microphone back in its base is done without groping or fumbling.

If you prefer, the Model 729SR offers an easily operated rocker switch with telephone-type contacts for only $1.20 extra. An extra set of contacts are provided for controlling a relay with this model.

The ceramic generating element of the 729 offers many advantages at reduced cost. It is impervious to moisture and temperature changes, and it will maintain its high output level without deterioration for years. Every 729 must meet the same rigorous quality standards that have made Electro-Voice the standard in professional sound applications where failure simply cannot be tolerated.

We repeat: you have to pay at least twice as much to find a microphone with most of the advantages of the E-V 729, and up to three times as much to equal its performance. We'll be happy to back up our claims right in your ham shack. For Electro-Voice makes the unequivocal guarantee that you must be satisfied or your money will be refunded. Write for free E-V catalog and list of the E-V distributor nearest you.

*Model 729 amateur net. Model 729SR (illustrated) $15.90 amateur net.

ELECTRO-VOICE, INC., Dept. 172 Q, 631 Cecil Street
Buchanan, Michigan 49107

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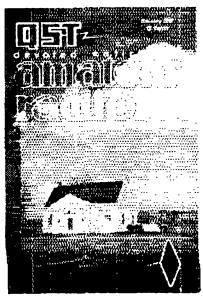

OUR COVER

W1AW has undergone modernization and a face-lifting program — expanded space, new furnishings, equipment and antennas, and an impressive master control console. See the picture story on page 58 of this issue.

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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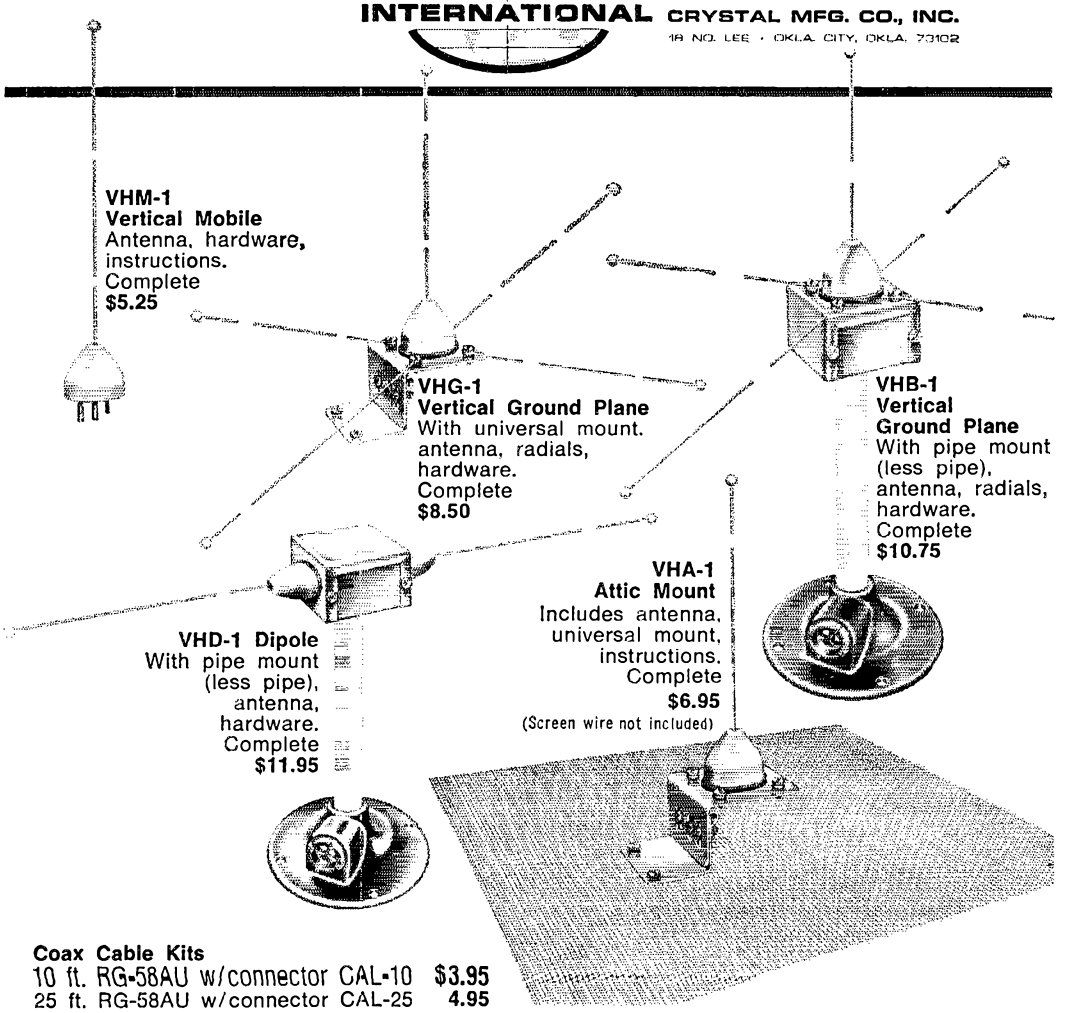

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut.

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Vice-Director:

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Vice-Director: Ronald G. Martin W6ZF
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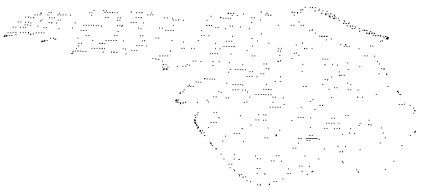
P.O. Box 1656, Corpus Christi, Texas 78401

Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 73159



"It Seems to Us..."

THE YEAR IN REVIEW

Another one has come and gone. Without being nostalgic about the bearded old man, what did 1966 offer us radio amateurs? Quite a few things!

Internationally, IARU showed its greatest growth, with 6 new member-societies bringing the worldwide total to 72. Seventeen of them met in YU-land in May for a Region I conference to discuss mainly the defense of amateur frequencies, and organizational matters. Region II will hold a similar meeting this spring, in Caracas. Region III, despite the disadvantage of wide geographical separations, moved toward organization of its own division.

WØNWX became IARU as well as ARRL president in May, and with other officers and staff helped strengthen liaison between the hemispheres with visits to various member-societies. The Intruder Watch shifted into high gear with more than 100 W/VE amateurs standing guard over the bands along with similar groups in other countries. (Domestically, more than 15,000 interference reports were processed through Hq. and sent to FCC.) To the end of fostering amateur growth in "new and developing" African and Asian nations, as a further step in preservation of our frequencies, ARRL successful pilot programs of furnishing literature and training equipment were in process of expansion to cover additional countries. Not the least of other projects to the same general end was the completion of an extensive study, by the Stanford Research Institute, of amateur radio as an international resource for technological, economic and sociological development. Copies of the report will be distributed, internationally through IARU societies as well as domestically, to telecommunications officials to provide further background on the amateur position.

The League also took an internal look at itself, with the results summarized in the Waters report in May *QST*. However ironical for a communications group, the most striking fact was failure to get the message through! One remedial step was a membership drive, launched in October, to strengthen organized amateur radio through expanded membership in both clubs and the ARRL.

Old Sol came back to life during 1966. DX conditions improved markedly on 20 and 15 meters — not to mention 10 meters, which in the autumn gave out with world-wide openings. Also welcoming the new sunspot cycle, v.h.f. DXers found the almost-forgotten buzz of the aurora returning. Six-meter fans enjoyed a good summer E season. The first transequatorial and F_2 50-Mc. DX in several years was noted beginning in the spring and then again in the early fall. Two-meter men weren't left out either; the November Leonids meteor shower was one of the best ever, and 1,300-mile contacts were made almost at will.

Looking at public service, RACES became a part of the over-all ARPSC effort, though there was no change in control or administration. Although amateur emergency communications preparation showed its mettle when called upon, Nature seemed less inclined to plague the populace with major disasters than in some earlier years. Emergency and traffic-handling information was combined in the form of a *Public Service Communications Manual;* later in the year, the League's 24th and newest publication, *The Radio Amateur's Operating Manual*, rolled off the presses. Authored by W4MLE, it is a combined guide and reference source on all phases of operating activity.

Regulationwise, the year was comparatively quiet, despite a flurry of incentive licensing discussions triggered by a national news story. Docket 15928, FCC's proposal, hopefully will receive further action before its second birthday in March. FCC did deny further appeals for reduction in licensing fees, as well as petitions by individual amateurs for power reduction, for family non-licensed operating privileges, and for an end to contests. Eight new questions were added to the Novice Class written exam. Despite still slow growth, the number of U.S. amateurs approached the 280,000 mark. New reciprocal operating agreements in 1966 brought to 21 the number of countries granting privileges to U.S. hams.

Despite modest progress in many areas, 1966 overall was something less than outstanding. The curve was level rather than upwards. Better h.f. propagation conditions may of itself spark renewed activity. But more than that we must all rededicate our personal efforts to ensure that new momentum is pointed in a positive and productive direction for our fraternity, in addition to the personal pleasure and enjoyment it will bring us all.

Put another way, a year from now in addition to the question, "what did 1967 offer us hams?", we should be prepared to answer an equally-important one: what did *we* offer 1967?". QST

League Lines . . .

FCC has amended its rules to recognize Hertz as an alternate term for c.p.s. However, we appraise the action as tongue-in-cheek, with no intention of wholesale changeover. Until that happens we expect to continue cycling.

Reports of club Hamquest '67 activity coast-to-coast show campaigns moving into high gear. Best results come from thorough planning and organization . . . building prospect lists, assigning personal, direct contacts to membership of club. One approach to get interest of non-club/League member hams: open house meetings with description of club/League programs, social periods, refreshments. Guest Night a similar idea -- every member bring a guest ham.

If you run into an odd 6-kc. buzz on 40-, 20- or 15-meter phone, it may not be a commercial intruder at all but rather one of several U.S. amateur stations with special FCC authority to transmit slow-scan pictures to the Antarctic.

Why the Morse code requirement when the applicant is interested only in phone? To that perennial query, this time from the editor of "CB Magazine," FCC Chairman Hyde provided a succinct answer: "(Code proficiency) is a requirement of international regulations . . . necessary and justifiable from the standpoint of emergency preparedness and in the interest of maintaining a balanced structure of operating qualifications, including those operators who profess the intent of restricting themselves to the use of telephony . . . Emergency conditions arise where radiotelegraphy may be the sole means of establishing communication. For these reasons alone, I believe that it is in the public interest to require all amateur operators to demonstrate their knowledge of the Morse code."

Honestly, despite what recent visitors may have seen with their own eyes, it isn't true that the Hq. crew has gone CB. The 27-Mc. transceivers in various staffers' hands have all been converted to 10 meters, as the basis for a future how-to-do-it article. An informal net of 5-watters, in operation evenings on 29.6 Mc., showed once again the utility of low-power for short-distance communication in the absence of extensive interference.

When is ARRL going to discover the transistor? A bit irritated with this outdated, unoriginal-but-often-parroted question, we made an analysis of the 1966 volume of QST. Of 58 articles involving either tubes or transistors, 26 used the latter exclusively. They covered receivers, mobile transmitters, frequency standard, speech filter, audio oscillator, u.h.f. oscillator, two-tone test generator, mobile converter, and code monitors. Sorry, no kw. linears yet!

Help us to help you. When requesting more than one type of info from Hq., place each question on a separate sheet of paper -- but in the same envelope. Otherwise, with seven departments and 70 employees, some time can elapse between first and last answers to a letter on several varied subjects.

WWV MOVES TO COLORADO

In Two Parts — Part I

BY YARDLEY BEERS*, WØEXS

If there were Nielsen ratings for the non-broadcast services, WWV would no doubt top the list — perennially. Now, after forty years in the Washington, D. C., area, the station has been moved to the West. Here is an overall description of the new facilities at Fort Collins, Colo.

At 0000 GMT on December 1, 1966, the veteran standard time and frequency station WWV at Greenbelt, Maryland, closed down forever, and at essentially the same instant a new station with the same call letters and services came on the air from Fort Collins, Colorado. The event was commemorated for amateurs and short-wave listeners by the availability of a special QSL for those who reported hearing the new station in its first hours of operation, as announced earlier.[1]

There were several reasons for the construction of the new station and for the move. In the first place, the old station was obsolescent, and maintenance was a serious problem. The difficulty of maintenance was aggravated because the station, in addition to providing a continuous service, had always had some experimental aspects to its program, and there had been frequent innovations and modifications to the equipment. Unfortunately, inadequate records of cable connections had been kept, and long ago the staff members who made them departed for retirement or for other employment. Nowadays good records are being kept so that this particular difficulty should not return. At any rate, for many years the station was kept on the air with a remarkable degree of continuity through the conscientiousness and ingenuity of the staff in the presence of serious obstacles.

In contrast, the new station, employing the latest transmitter designs, provides much more efficient operation. In addition, there is much greater flexibility, since the transmitters are comprised of identical units — except that some of the transmitters, being higher powered than the others, contain one more amplifier stage — which can be tuned to any frequency. In the old station only a few of the eight transmitters were identical. Unlike the old transmitters, in the new ones modulation is applied at low levels, and all subsequent stages are accurately linear. In this way, there is available a wide choice of modulation types: a.m. or single sideband, with either sideband, and with any arbitrary degree of carrier suppression that may be desired. Thus, the new transmitters contain the same design features which are generally considered desirable in modern amateur transmitters.

The wide flexibility of modulation is particularly advantageous with respect to coordination with WWVH in Hawaii, which uses the same carrier frequencies. This station, also obsolescent, is expected to be rebuilt a few years hence. In this event, similar features will be incorporated. Then the upper sideband can be used by one station and the lower by the other, and users who wish to distinguish between the two stations will be able to do so much easier than at present.

A survey made by the organization which was then known as the Central Radio Propagation Laboratory of NBS (now the Institute for Telecommunication Sciences and Aeronomy of ESSA) in Boulder indicated that the signal strength coverage would be better or just as good from the new site — except, of course, for the small area in the vicinity of Washington,

*Chief, Radio Standards Physics Division, National Bureau of Standards, Boulder, Colorado 80302.

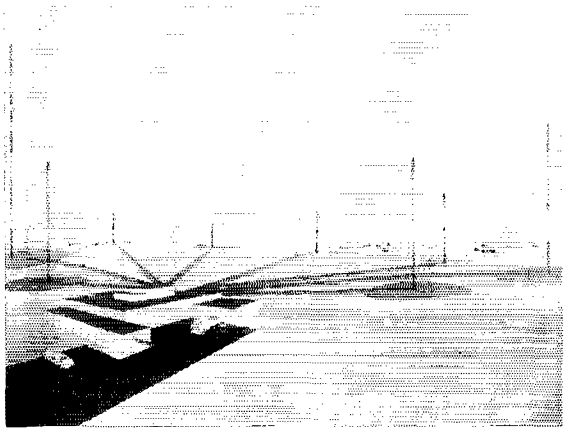
[1] *QST*, November, 1966, page 53.

Peter Viezbicke WØNXB, chief engineer for design and construction of the new station (left), and Leo Honea WA3ADB, ex-KH6MG, engineer-in-charge of WWV, stand in doorway of new transmitter building. The inscription "WWV" in the background was brought from the Greenbelt building to Fort Collins.

D. C., which has been served by ground-wave propagation. The area which should be aided notably by the relocation will be the West Coast of the U. S. A. Here the propagation time delays of signals from WWV and WWVH were nearly equal, and it was difficult to separate the time pulses. Also, reception frequently was marred by fading, resulting from the fact that the signal strengths were usually nearly equal. With the relocation, this region is pushed out into the Pacific Ocean, where there are few users.

Finally, there is the advantage of administrative efficiency. WWV is now located on the same site as two other NBS standard-frequency and time stations, WWVB (60 kHz.) and WWVL (20 kHz.). Therefore, there can be some reduction in staff since all of the transmitters can be monitored from a single point, and the staff of one station can assist or fill in at the other in case of emergency. Furthermore, communication lines with the parent organization responsible for the administration of these stations, the Radio Standards Laboratory of the National Bureau of Standards in Boulder, Colorado, are greatly simplified. Also, it is easier to synchronize the station with the NBS Atomic Standards, which are located in Boulder.

When the Greenbelt station was established, the property was under the jurisdiction of the U. S. Department of Agriculture. The radiation of standard-frequency signals did not disturb agricultural experiments that were conducted in adjacent fields. However, in time, jurisdiction passed to NASA, who constructed the laboratories of the Goddard Space Center adjacent to the transmitter site. When NASA was confronted with the problem of trying to conduct experiments under conditions where a few inches of unshielded wire would give a sizeable deflection on an oscilloscope, their management requested that when NBS replaced its obsolete transmitters they be relocated at some more remote point. This situation also encouraged the move to Fort Collins.



Artist's rendition of WWV building and the eight antenna masts which form an arc on the ridge east of the building. To the left is the 200-ft. high 2.5-MHz. dipole antenna and to the right the 100-ft. high 5.0-MHz. dipole. Between them are the dipoles for the 2.5-, 10.0-, 15.0-, and 20-MHz. signals. In the left and right foreground are the two 88-foot standby wide-band monopole antennas.

Before the final decision to rebuild and relocate WWV was made, permission was obtained to allow a special voice announcement to be made over it for one month in the summer of 1964. In it, listeners were requested to write in. The some 4,600 who did were sent a rather lengthy questionnaire, and about 3,500 of these were returned filled out. About one-quarter of the respondents were representatives of organizations. These statements in themselves indicate the need for the station. It is interesting to note that 35 percent of the respondents were licensed radio amateurs, confirming the interest of amateurs in the station. The detailed answers provided guidance in determining which of the services should be retained and which should be changed and how. They also provided assurance that the specific needs of the Washington ground-wave high-accuracy area would be met largely by other existing services. It might be noted that 10 MHz. was the most widely used carrier frequency and 25 MHz. was the least.

Layout of the Fort Collins Site

The new site is located about seven miles north of the City of Fort Collins on Colorado Route No. 1, and is about an equal distance to the east of the first foothills of the Rocky Mountains. The land is nearly flat. The soil has a high alkali content and a high electrical conductivity. Portions of three small lakes are contained within the area of the site.

The most conspicuous feature is the group of nine 400-foot towers which supports the WWVB-WWVL main and standby antennas. The building housing those transmitters is amongst these towers. These antennas are essentially top-loaded verticals with arrays of horizontal wires forming capacitive hats and with the bottom ends of the vertical radiators terminating in "helix houses" (actually two stories tall) containing loading coils. The ground conductivity has been improved by burying a network of wires.

The new WWV station was financed by a Congressional appropriation of $970,000. The largest expenditure has been for the transmitters. However, a considerable portion has been used in constructing the new building and in adding a new wing to the old building. The new building is one story high and is located in a depression in the terrain so that its roof is approximately level with the ground of the area to the north, where the WWV antennas are located. Thus, the building should cause no shadows in the antenna patterns. In the main portion of the new building, there are located eight transmitters along an area adjacent to three of the outside walls. The area adjacent to the fourth outside wall, the front, contains the main entrance and offices. The center of the building contains a laboratory and shielded enclosures for housing the frequency-control equipment. Wings of the building contain a workshop, a garage, and a diesel-powered gen-

erator for emergency power. Commercial electric power is supplied by underground cables from two different sources. The building is thoroughly air-conditioned, since dust was a major maintenance problem at the old station at Greenbelt, and it is recognized that potentially the problem is likely to be worse at the new location on open prairie.

The addition to the old building contains some offices for administration of the whole site and such much-needed amenities as a conference room and a small kitchen. The road system is such that visitors come first to the old building, and hence these central facilities are located here.

Incidentally, visitors *who make advance arrangements* through either the Boulder or Fort Collins offices are most welcome. In such cases we can be sure to have someone on hand to receive them. However, unannounced visitors are to be discouraged, as the staff is small and often there is no one who can leave his duties to receive them.

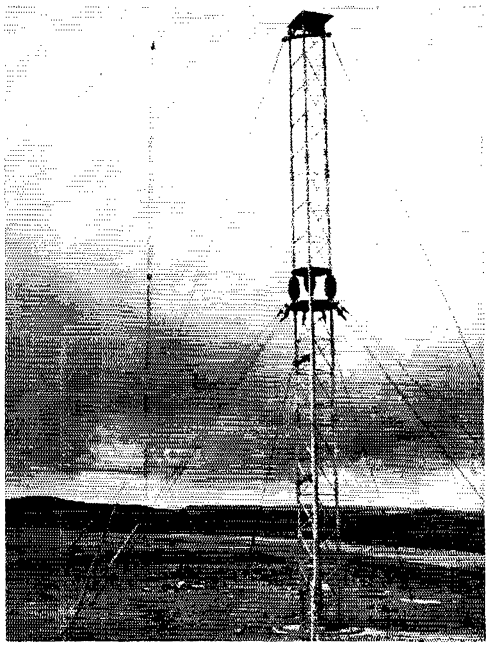
TABLE I
LOCATIONS OF WWV ANTENNAS

Frequency	*Latitude*	*Longitude*
2.5 MHz	40°40′55.2″N	105°02′31.3″W
5 MHz	40°40′42.1″N	105°02′24.9″W
10 MHz	40°40′47.8″N	105°02′25.1″W
15 MHz	40°40′45.0″N	105°02′24.5″W
20 MHz	40°40′53.1″N	105°02′28.5″W
25 MHz	40°40′50.5″N	105°02′26.6″W
Average	40°40′49″N	105°02′27″W

The WWV Antenna System

The transmitter power levels are slightly increased, but the transmission frequencies at the new station are the same as at the old: 2.5 kw. on 2.5, 20, and 25 MHz., and 10 kw. on 5, 10, and 15 MHz. At both the old and new stations it was considered necessary to have eight transmitters: six in operation and two as standby.

In the old WWV there was a schedule for the rotation of transmitters so that in turn each transmitter was taken out of action for a while for cleaning and other maintenance, the switchover taking place during one of the scheduled silent periods so that the transmission schedule was uninterrupted. Also, at the old WWV the antennas were fed by open-wire lines which were switched between transmitters. However, at the new WWV in Fort Collins, antennas are fed by rigid coaxial line, and each one is connected permanently to a single transmitter, the layout being such that no two coaxial lines cross. Altogether there are eight antennas at the site. Six are half-wave modified "sleeve" vertical dipoles, one for each of the above frequencies. The remaining two are broad-band h.f. monopole antennas for the two standby transmitters. These eight are located approximately at equal intervals on a semicircle, with the two wide-band standby antennas at the opposite ends of the semicircle, and the others placed in such a way



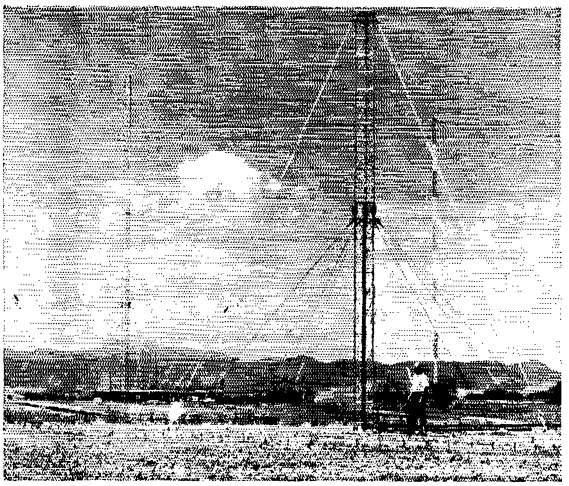
A view of the 20- and 2.5-MHz. dipole antennas.

to make interaction a minimum. The exact locations are given in Table I.

The half-wave vertical antennas, with heights compensated for end effects, employ standard commercial tower sections and are designed to withstand winds up to 112 m.p.h. The antennas are center-fed with rigid coaxial cable and are mounted on hinged bases fastened to concrete foundations. The upper one-quarter wavelength section, supported on insulators from the lower one quarter wavelength section, constitutes the upper half of the radiating system. The sleeve consists of nine equally-spaced quarter-wave-long wires connected from the center of the tower (one-quarter wavelength above ground) that slope downwards to the ground at an angle of 45 degrees. This sloping skirt, each wire appropriately insulated from ground, not only functions as the lower half of the radiating system, but also serves to guy the antenna.

With this design the driving point impedance is approximately equal to the 50-ohm coaxial line, and the current developed at the junction of the base and ground plane is minimized. This permits connecting the coaxial shield and the tower base directly to ground. In addition, tests made on the antenna indicated that a radial ground screen did not make any detectable change in the input impedance; thus it was not incorporated into the system.

This design, readily adaptable to a coaxial feed line, provides low angle omnidirectional radiation and yields a gain of approximately 1.7 db. over its one-quarter-wavelength monopole counterpart. By employing a double-stub adjustable tuner, it can be matched precisely to 50 ohms. Finally, with the shorted stubs connected into the feed line at the antenna base, each is at d.c.



One of the monopole standby antennas and one of the dipole single-band antennas. The striped tower in the background is one of the four supporting the WWVL main antenna. The building is the WWVB-WWVL Transmitter Building before the addition of the new wing.

ground potential, thus protecting the transmitters from possible lightning damage.

The wide-band standby antennas, also fed by 50-ohm rigid coaxial line, are series-excited, base-fed, vertically-polarized, omnidirectional radiators. The antennas operate over a radial ground screen and cover a frequency range of 2.5 to 25 MHz.[2] The antennas are capable of handling 50 kw. of power with a nominal standing wave ratio of less than 2.5 to 1 when connected to a 50-ohm line. Continuous coverage is accomplished without switching.

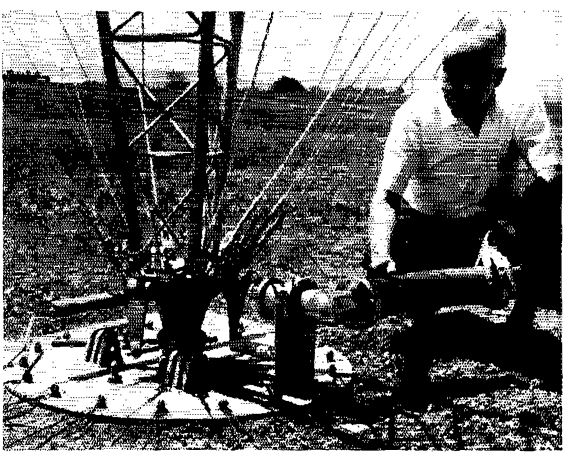
Transmitters

The eight transmitters contain bandswitching units which are identical except for the obvious difference that four of them have high-powered amplifiers. Thus, although the single-band antennas cannot be switched between transmitters, in case of breakdowns units may be interchanged.

As stated earlier, modulation is introduced at very low levels, and s.s.b. or a.m. may be used with any degree of carrier suppression which may be desired. Provision is included even for applying different modulations on the two sidebands, although there is no contemplation of the use of this feature in the near future. The s.s.b. generator uses a crystal filter at 5 MHz., and provision is made for synthesizing all oscillator frequencies from the local cesium atomic standards. A great deal of attention has been paid to obtaining frequencies of high spectral purity.

The modulation is controlled by an elaborate device called "the time code generator-programmer", and two spares are on hand in case of breakdown. This device, in conjunction with an announcing machine and two code keyers, provides the complete WWV audio modulation program. Such features of the program as propagation forecasts, geoalerts, and UT2 corrections[3] are readily changed as necessary by manual switches on the announcing machine or by replacing code wheels on the keyers.

The bulk of the transmitters is composed of linear amplifiers, which are standard commercial stock items, identical with some which are in wide use by military, commercial, and amateur stations. However, because of the severe requirements for reliability with twenty-four hour daily operation, the power amplifiers are derated to fifty percent of their normal levels: for example, the amplifiers which are used at 10 kw. output are ones which in standard commercial service would be rated at 20 kw. (Such derating had also been in practice at the old station.) The building layout is such that the power of each transmitter can be raised from its present level by the addition of at least one more stage, should it be desired at a later time.



Hugh Stewart, Information Officer, views the base of one of the broad-band monopole standby antennas.

Participation of Amateurs

The engineers in charge of all three stations are amateurs: Leo Honea WA3ADB, ex-KH6MG (WWV); Richard F. Carle KØLYM (WWVB-WWVL); and Sadami Katahara KH6DK (WWVH). Also, the engineer in charge of the design and construction of the new WWV is an amateur: Peter P. Viezbicke WØNXB. Other amateurs on the staff of the stations are John A. Duffield KØKHZ, Howard E. Michel, Jr. KØBPY, and George Tam KH6EM.

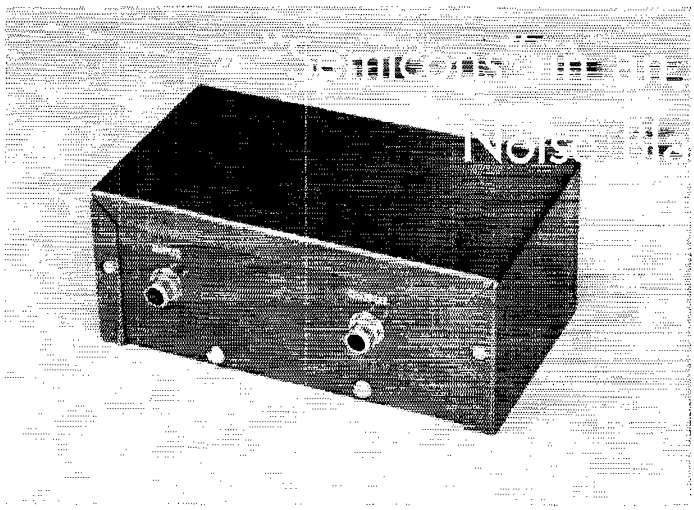
Amateurs participating in other parts of the NBS Time and Frequency Program include: Miss Kay Barclay KØBTV, Don Halford WØJVD, Don Hilliard WØEYE, Edward Rogers KØGKB, J. E. Gray, WØGNV, and the author.

(Part II, describing the frequency-controlling equipment, will appear in a subsequent issue.)

QST

[2] This antenna was described in detail in November 1966 *QST* (Pappenfus, "The Conical Monopole Antenna"). — *Editor.*

[3] Information on these services is contained in NBS Miscellaneous Publication 236, "NBS Standard Frequency and Time Services," 1966 edition; for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20102, price 15 cents.



Experimental Noise Blanker

BY DOUG DeMAW,* W1CER

With ignition noise being somewhat troublesome during 10- and 6-meter mobile reception, and at times a problem on 2 meters, there is a need for a noise-silencing system that will permit using the standard car radio as an i.f. unit while solid-state h.f. and v.h.f. converters are connected ahead of it. In bygone days, cutting into the second-detector stage of the car radio was easy to do, enabling most hams to add their own a.n.l. circuit. But since printed-circuit boards have become standard bill of fare in car radios, only the bravest possess the daring that is required to cut into the circuit board and add a noise limiter. Perhaps the best approach to the noise-reduction problem is to add an outboard circuit of some kind that will eliminate any need for tampering with the car radio.

Having used vacuum-tube versions of noise blankers in v.h.f. and u.h.f. reception with 14 and 28 Mc. as the converter i.f.,[1] it seemed reasonable to assume that the same system would perform well in the 0.5- to 1.6-Mc. i.f. range. However, to eliminate the need for plate and screen grid voltages, which would be required if a tube model were used, a transistorized version was worked out, the description of which follows.

Conventional Design Methods

Low-cost transistors and ordinary circuit design have been combined to produce the circuit of Fig. 1. The output from the converter is fed into J_1. The signal is amplified by a high-beta transistor, Q_1, and then passed on to Q_2, another high-beta transistor, for further amplification. The overall gain of the blanker is established by R_1 and C_1, a subject that will be discussed later. The amplified signal is applied to CR_1 and CR_2 where positive and negative noise-pulse peaks are clipped. Output to the car radio is taken from J_2 and is of a uniform level across the entire broadcast band.

Because broad-band response was desired from the noise blanker, low-Q tuned circuits were used in the collector circuits of Q_1 and Q_2. Allowing for approximately 10 pf. of stray circuit capacitance, it was determined that a 2.5-mh. r.f. choke would establish resonance at 1000 kc., the center of the i.f. tuning range. Chokes of that value were used at RFC_1, RFC_2, and RFC_3. Despite the low Q of the resonant circuits, ample gain was available from the 2-stage blanker to deliver satisfactory performance. The 1000-ohm resistor in parallel with RFC_1 was added when a tendency toward instability was noted, undoubtedly brought about by the light output coupling used in the circuit, and because of the high beta of the transistors.

Physical Layout

The breadboard model of the blanker was built in a rather haywire manner, but despite the helter-skelter layout, instability did not occur and the performance of the unit was as good as that of the model shown in Fig. 2, an etched-circuit version.[2]

The main consideration in wiring up the circuit is to isolate J_1 from J_2 as much as possible so that stray coupling between the input and output terminals of the blanker will be minimized. Straight-line layout is recommended for the entire circuit.

This model is housed in a $5\frac{1}{4} \times 3 \times 2\frac{1}{8}$ inch Minibox. There is a considerable amount of unused space, as shown in Fig. 2. However, should the builder desire to operate the unit from a small 9-volt battery, the unused space

* Asst. Technical Editor, *QST*.

[1] *The Radio Amateur's V.H.F. Manual*, page 81. *The Radio Amateur's Handbook*, 43rd edition, page 427.

[2] No template is available for the etched circuit board. It was made from a Vector 27X-A etched-circuit kit.

will be handy for housing the battery. An on-off switch can be added to one wall of the case if this is done.

Because nothing is particularly critical about the way the blanker is put together, ordinary "perfboard" can be used as a foundation for the circuit. Or, if the builder wishes, a metal chassis and insulated terminal strips can be used in lieu of the etched-circuit board.

Checkout and Use

Either plus 12 or plus 9 volts can be applied to the collectors of Q_1 and Q_2. The negative battery terminal is common to the chassis of the unit. Normal drain for the circuit is about 2 ma. when 9 volts is applied. With a 12-volt supply the current is approximately 3.5 ma.

To test the completed unit, connect a shielded lead between J_2 of the blanker and the antenna terminals of a communications receiver that tunes the broadcast band. The receiver should have an S meter.[3] Next, connect a signal generator to the input of the blanker at J_1. Set the communications receiver to 1000 kc. Turn the blanker on and apply a 1000-kc. signal to it. Adjust the generator output so the signal is S9. Vary the settings of R_1 and C_1. Adjustment of either control should cause a change in reading of the signal level on the S meter, offering proof that the circuit is performing satisfactorily.

The next step is to connect the signal generator directly to the communications receiver. Adjust again for an S9 reading at 1000 kc., using the attenuator on the generator to establish the desired level. *Do not change the generator output level after this is done.* Reconnect the blanker in the circuit and with C_1 at minimum capacitance adjust R_1 for an S9 reading on the meter. This procedure establishes unity gain through the blanker — a desired condition. If an S9 reading cannot be reached, set R_1 for maximum sensitivity and adjust C_1 until such a reading is obtained.[4] The noise reduction is best when C_1 is set near minimum capacitance.

If a signal generator is not available, a rough adjustment of the blanker can be achieved by tuning in a moderately strong signal in the broadcast band (blanker disconnected) and observing the S-meter reading. The antenna can then be attached to J_1 and the blanker adjusted to give the same signal-strength reading, using the procedure outlined in the previous paragraph. Once the blanker has been properly adjusted, noise pulses will be heavily clipped by CR_1 and CR_2. The r.f. output signal from J_2 will be as strong as ever but the noise level will be reduced approximately 25 or 30 decibels.

Possible Improvements

As the title states, this is an experimental circuit. The blanker is subject to one of the same limitations that the vacuum-tube models are — overload on strong signals. Without a.g.c. of some type, a potent signal can cause cross-modulation. Transistors are particularly subject to this condition, hence the solid-state adaptation of the *Handbook* models is a bit touchy in this regard. Nevertheless, the rewards in noise reduction are well worth the side effects mentioned. The substitution of FETs at Q_1 and Q_2 might do much to resolve the overload problem. The experimenter should not overlook this possibility when building a blanker.

There is no reason why the circuit of Fig. 1

[3] If the receiver has no S meter the a.g.c. voltage of the receiver can be measured with a v.t.v.m. and used for setting up the gain of the system. Set the signal generator output level so that an a.g.c. voltage of 2 or 3 volts is available, then continue with the blanker tests.

[4] Once the proper setting is found for R_1, the resistance can be measured and the control replaced by a ½-watt fixed resistor of the same value. The author used a 1500-ohm resistor. The value will depend upon the beta of the transistors used.

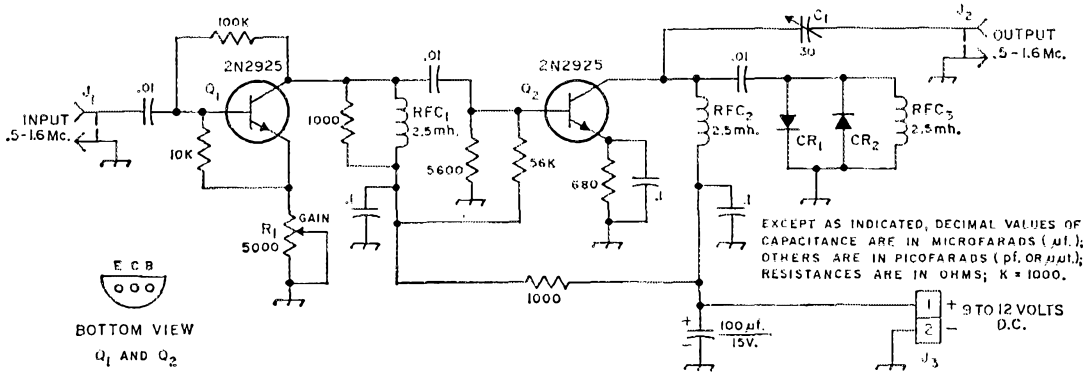


Fig. 1—Schematic of the noise blanker. Fixed-value capacitors are disk ceramic. The polarized capacitor is electrolytic. Resistors are ½-watt composition.

C_1—3-30 pf. trimmer.
CR_1, CR_2—Germanium diode (IN64 or similar).
J_1, J_2—Phono connector.
J_3—2-terminal connector (Millen E-302 suitable).
R_1—5000-ohm ½-watt linear-taper control (printed-circuit type. Lafayette 99R6143 suitable. See text).
RFC_1-RFC_3, inc.—Miniature 2.5-Mh. r.f. choke (Miller 70F253A1).

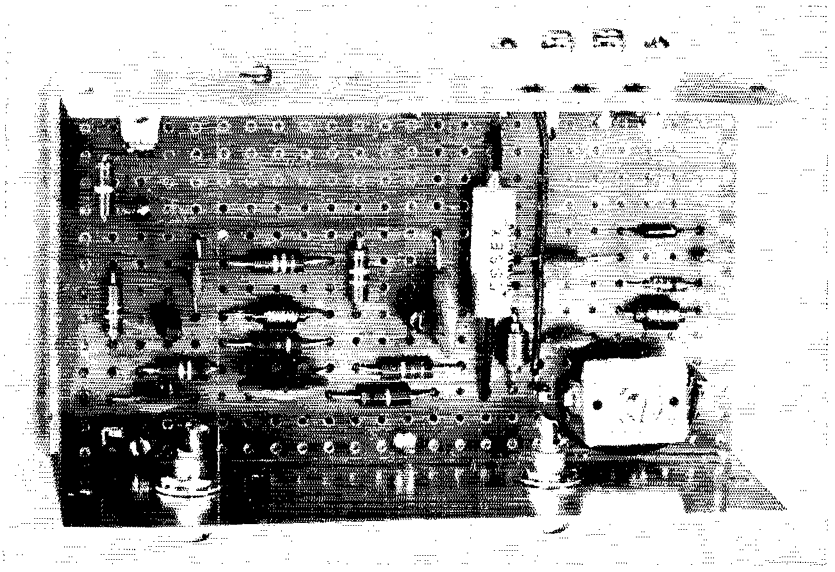


Fig. 2—Inside view of the blanker. C_1 is at the lower right. If a 5000-ohm control is used for R_1, it will mount at upper left corner of circuit board. Space is available at the top center of the chassis for a 9-volt battery. J_1 is at the lower left. J_2 is at the lower right of the box, near C_1.

could not be used as a basis for blankers at other intermediate frequencies such as 14 Mc., 21 Mc., or 28 Mc. At the higher i.f.s it is recommended that slug-tuned inductors of reasonable Q be substituted for the r.f. chokes used in this circuit. They should be resonant at the chosen i.f. and stagger-tuned to provide a fairly broad response across the i.f. range. Also, transistors with a higher F_T rating should be used. If low-beta transistors are employed, it may be necessary to add a third stage of amplification to the blanker to assure adequate gain ahead of the blanking diodes.

Although it wasn't tried, this unit might help the 160-meter operator to eliminate much of the Loran pulse noise. The circuit of Fig. 1 provided good output at 2 Mc. and might be useful between the antenna and the 160-meter receiver. If this is done, and a transmitter is used, it would be wise to bridge a pair of small-signal silicon diodes reverse-connected between J_1 and chassis ground. This will protect Q_1 from burnout while transmitting.

Whether you're interested in v.h.f. or 10-meter mobile operation, this gadget will save you from the chore of cutting into the car radio. Used between the converter and the car radio, the blanker will rid you of the worst of your ignition noise — and that of nearby automobiles. QST

1967

Tentative dates for major ARRL operating activities.

January	*February*	*March*	*April*
7–8 VHF SS 14–16 CD (c.w.) 21–23 CD (phone)	4–5 DX Test (phone) 4–19 Novice Roundup 18–19 DX Test (c.w.)	4–5 DX Test (phone) 18–19 DX Test (c.w.)	15–17 CD (c.w.) 22–24 CD (phone)
May	*June*	*July*	*August*
	10–11 VHF QSO Party 24–25 Field Day	8–10 CD (c.w.) 15–17 CD (phone)	
September	*October*	*November*	*December*
9–10 VHF QSO Party	7–8 Simulated Emergency Test 14–16 CD (phone) 21–23 CD (c.w.)	11–13 SS (phone) 18–20 SS (c.w.)	

The "Iambimatic" Concept

Unique Feature for Relay-Type Electronic Keyer

BY HARRY GENSLER, JR.,* K8OCO

CONVENTIONAL electronic keying has greatly improved the ease and precision of c.w. operation for a great many amateurs. The standard "el" key makes it very easy to send letters consisting of strings of dots or dashes. Letters which contain dots alternated with dashes (requiring a back-and-forth motion) have encouraged the use of memories in more complex keyers, such as the Ultimatic[1] and Penultimatic.[2] The latter keyer recognizes the problem of dropping dots in letters like *k*; the dot memory provides greater reliability, and also eases the timing requirements of the operator. The former keyer adds a dual lever, a dash memory, and automatic spacing.

The "Iambimatic" concept is somewhat different. It works entirely like the conventional electronic keyer when used with a single paddle keying lever; it is self-completing and uses no memories.

The Iambimatic feature comes to light when used with double-paddle keying levers. If both levers are closed for a time (a long "squeeze"), dots alternated with dashes come forth from the keyer (. – . – . –).[3] This feature greatly reduces the effort required to send certain letters. A *CQ*, for example, is sent as follows:

C: one long squeeze. A little "English" is used to close the dash lever slightly ahead of the dot lever; the squeeze must be released at the end of the letter.

Q: the same as above, except that the dot lever is not actuated until after the first dash has been sent.

Other characters are also simplified (A, L, X, R, AR, SK, etc.). Sending these or a *CQ* on the Iambimatic gives one the funny feeling that the key is sending the letters on its own.

Dot/dash selection is simple. If only one lever is closed, then the dot or dash corresponding to that lever will be sent. If both levers are squeezed at roughly the same time, the first lever closed will determine the dot/dash selection. If both levers are closed from the time of the end of the last dot or dash, then the next dot or dash will be the opposite of the last one sent.

The Iambimatic concept may be applied to practically any keyer. Three examples will be given: Iambimatic modification of the HA-1 ("TO") keyer, a home-brew Iambimatic keyer, and a universal Iambimatic modification design.

HA-1 Adapter

Fig. 1 shows the very simple modification for the Hallicrafters HA-1 keyer; the circuit has performed perfectly at K8OCO for the last two years. Basically the circuit consists of a flip-flop, formed by neon bulbs V_1 and V_2, and a transistor gate, Q_1. One neon bulb will light if the dot contact only is grounded and the other will light if the dash contact only is grounded. If both levers are closed, the bulb corresponding to the lever closed first will light and the other will

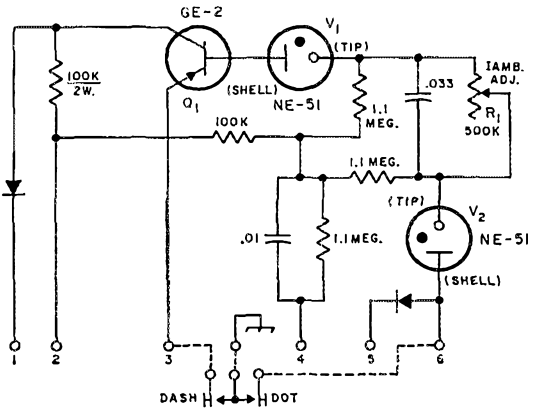


Fig. 1—Circuit of the Iambimatic adapter for the Hallicrafters HA-1 ("TO") keyer. Capacitances are in microfarads; unless indicated otherwise, resistances are in ohms (K = 1000), and fixed resistors are ½-watt. Capacitors are ceramic. Diodes are any silicon. Transistor Q_1 is a G.E. type. See author's note at end of article.

R_1—Linear-taper control.

V_1, V_2—Matched pair of NE-51 neon bulbs (see text). (Note that connections should be made to the tips and shells of the neon bulbs as indicated.)

Connections to numbered terminals are as follows:

1—Remove original connections from Pin 8, SO_1, of HA-1 keyer, and shift these connections to Terminal 1 of adapter.

2—To −105 volts regulated at Pin 7 of V_6 in HA-1.

3—Connect to Pin 8, SO_1, of HA-1.

4—Connect to Pin 3 or 4, SO_1, of HA-1.

5—Remove original connections from Pin 5, SO_1, of HA-1, and shift these connections to Terminal 5 of adapter.

6—Connect to Pin 5, SO_1, of HA-1.

Connect dash contact of keying lever to Pin 8, SO_1, of HA-1. Connect dot contact of lever to Pin 5, SQ_1, of HA-1. Connect lever to Pin 1, SO_1, of HA-1.

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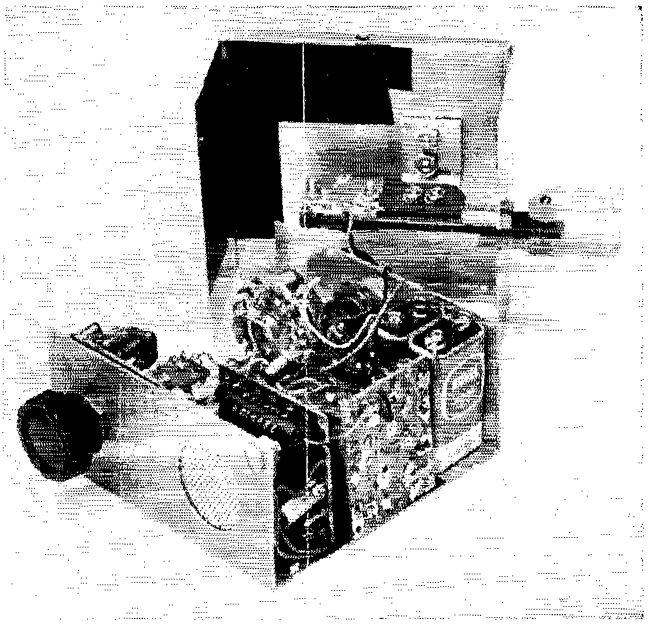
[1] Kanda, "The 'Ultimatic'—Transistorized," *QST*, Sept., Oct., 1960.

[2] Muir, "The Penultimatic Electronic Keyer," *QST*, March, 1962.

[3] Like the iambic meter of classical Latin poetry, in which the bards would alternate short and long syllables.



Front view of K8OCO's keyer, showing the speaker grille, and some details of the monitor and lambimatic circuit boards. The tape strips in the cover are to avoid grounding some of the exposed circuitry.

remain off; a pulse from the closing of the relay in the HA-1 at the end of the dot or dash will trip the flip-flop and the other lamp will be lighted. Thus the bulbs will alternate at the end of every dot or dash. The gate, Q_1, is designed to close the dash contact of the HA-1 whenever the dash bulb is lit. Thus a . – . – . – sequence follows when both levers are squeezed.

The components were assembled on a small board which was mounted in the HA-1 keyer next to the relay. Be careful not to place the neon bulbs too close to anything else, or the transistor too close to a heat source. The neon bulbs have to be closely matched; buy a boxful and try various combinations. With both levers closed, plug in a pair of bulbs and rock the 500K variable until the circuit "iambimates" (goes . – . – . –). When you find a pair of bulbs that "iambimate," mark the maximum and minimum settings of R_1 that give reliable "iambimation" across the entire speed range; then leave the resistor set between these two points. Use the bulb combination that gives the greatest difference between the maximum and minimum marks.

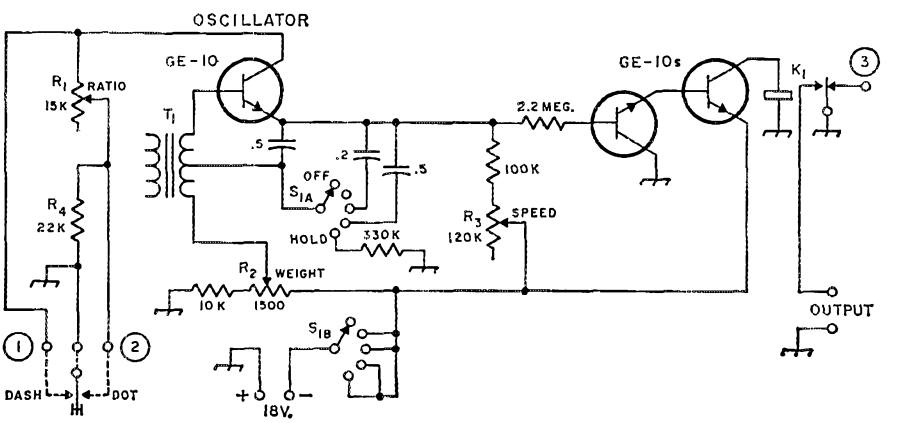


Fig. 2—Basic keyer circuit. If side-tone-monitor and/or lambimatic feature of Figs. 3 and 4 are to be added, connect similarly-numbered terminals together. Capacitances are in microfarads and, unless indicated otherwise, resistances are in ohms (K = 1000). Capacitors are 10-volt ceramic; fixed resistors are ½-watt. Transistors are G.E. types.

K_1—10-mw. 5000-ohm s.p.d.t. miniature d.c. relay (Lafayette 99C6091).
R_1, R_2, R_3—Linear-taper control.
R_4—22,000 ohms, ½-watt.
S_1—Miniature rotary switch, 1 section, 2 poles, 5 positions Centralab PA1003, PA2003, or similar).
T_1—Transistor input transformer: 2000-ohm c.t. primary (d.c. resistance 150 ohms) (Argonne AR-115, or similar). Use primary only.

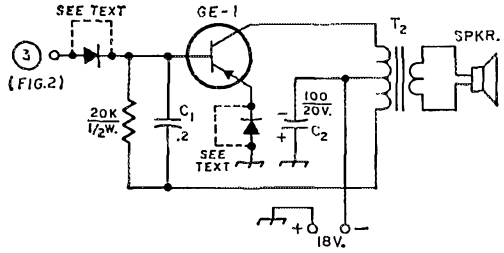


Fig. 3—Sidetone monitor circuit. Connect Terminal 3 to Terminal 3 of Fig. 2. Capacitances are in microfarads; resistances are in ohms (K = 1000). C_1 is 10-volt ceramic; C_2 is miniature electrolytic. Diodes are any silicon; they may be omitted if the circuit of Fig. 4 is not used. Transistor is a G.E. type. T_2 is a transistor output transformer, 500 ohms c.t. to voice coil. Speaker used in original unit is 2-inch.

A Complete Iambimatic Keyer

The circuit of the home-brew Iambimatic keyer in the photographs is shown in Figs. 2, 3, and 4. These represent the basic keying unit, monitor, and Iambimatic feature. Fig. 2 represents a fully satisfactory conventional keyer which can be used alone or with the other two options. It is basically a transistor version of the "POO-Key, Jr."[4] The very-low-leakage silicon transistors used (GE-10) make this circuit possible, and render the performance independent of temperature and individual transistor characteristics. In the oscillator circuit (at the left in Fig. 2) the transistor gets a positive bias from R_2 which also serves as a weight control. Different capacitors (exact values depend on the characteristics of T_1) are switched in for speed ranges of 10–20 w.p.m., 15–30 w.p.m., and 20–40 w.p.m.; other switch positions are OFF and HOLD. R_4 is used to suppress an occasional short dash; its resistance should be as low as possible without disturbing normal operation.

Fig. 3 is the circuit of the monitor, which was stolen from W5LAN.[5] The resistor-capacitor combination may be modified to change the tone. The volume level is not overpowering, but is quite acceptable. The two diodes are to isolate the monitor from the Iambimatic feature (these two sections share the n.c. contact of K_1 to ground); the diodes may be omitted if the latter circuit is not used.

Fig. 4 is the diagram of the Iambimatic feature. The circuit is similar in principle to Fig. 1. However, a transistor flip-flop is used here; transistor gates are used to key the flip-flop. The GE-2 transistor and the relay K_2 form the dash gate. Diodes CR_1 and CR_2 may be omitted (replace with a short) if the circuit of Fig. 4 is to be used with the circuit of Fig. 2. Omit CR_3 if the circuit of Fig. 4 is *not* to be used with the circuit of Fig. 3. The combination of 470K resistor and 0.02-μf. capacitor may have to be changed for extremely fast speeds.

The keyer in the photographs contains the circuitry of Figs. 2, 3, and 4 in a 2 × 2 × 4-inch Minibox. Each of the three sections is built on a 2 × 2-inch circuit board. Two 9-volt transistor radio batteries power the unit; battery drain is 50 mw. key-up and 160 mw. key-down. Voltages between 13 and 22 have been used successfully.

The keying levers are homebrew. Each lever consists of half the length of a thin jig- or coping-

[4] Livingston, "The Poo-Key, Jr.," *QST*, Sept., 1961.

[5] Old, "Transistorized Electronic Key and Monitor," *QST*, May, 1959.

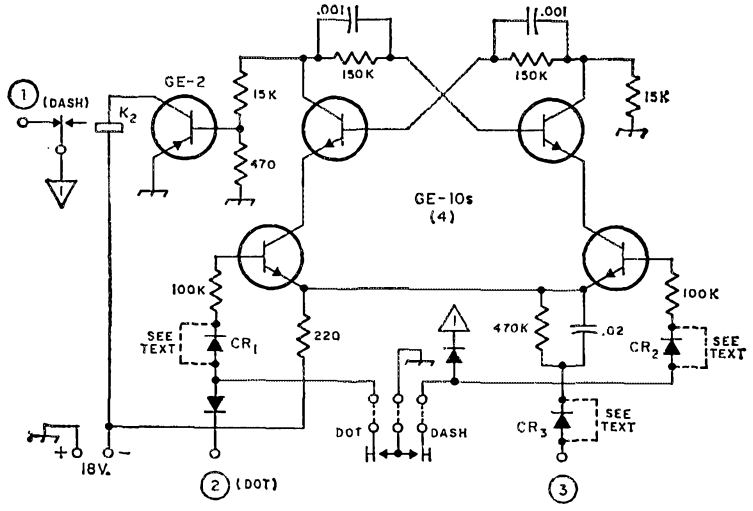
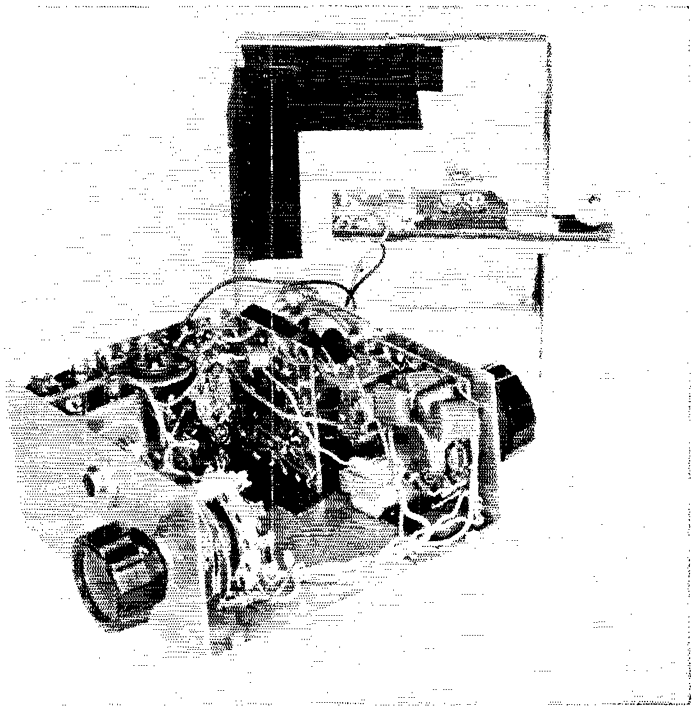


Fig. 4—Circuit of the Iambimatic feature for the keyer circuit of Fig. 2, or for other relay-type keyers with negative voltage at the key-lever terminals. When used with the circuits of Figs. 2 and/or 3, similarly-numbered terminals should be connected together. Diodes CR_1 and CR_2 may be omitted when this circuit is combined with that of Fig. 2. CR_3 need be used only when this circuit is combined with that of Fig. 3. When used with other relay-type keyers, Terminals 1 and 2 should be connected, respectively, to the dash- and dot-lever terminals of the keyer. Terminal 3 should be connected to ground through a spare set of normally-closed contacts on the output relay of the keyer.
Capacitances are in microfarads; resistances are in ohms (K = 1000). Capacitors are 10-volt ceramic; resistors are ½-watt. Transistors are G.E. types. Diodes are any silicon. K_2 is similar to K_1, Fig. 2.



Rear view of the Iambimatic keyer. The circuit board at the right contains most of the components of the basic keyer, including the speed control. Immediately to the left is the sidetone monitor unit. The third board to the right of the batteries contains the circuitry of the Iambimatic feature. The speed-range switch is in the foreground.

saw blade. Small pieces of foam rubber are used for spacing and to remove contact bounce. The saw blades are soldered to part of a copper-clad circuit board which is bolted (copper removed around bolts to preserve insulation from ground) to a solid piece of steel. This is firmly secured to the bottom of the Minibox.

Iambimatic Feature for Other Keyers

The circuit of either Fig. 4 or Fig. 5 may be used to convert any keyer *with a relay* to an Iambimatic keyer. It is easy to determine which circuit to use: Simply place a voltmeter from ground to either the dot or dash terminal of your present keyer. If a negative voltage is registered, use the circuit of Fig. 4; if a positive voltage, use the circuit of Fig. 5.

In either case connect Terminal 1 to the former dash terminal of your keyer and Terminal 2 to the former dot terminal. Use a dual-paddle keying lever and connect it to the new key-lever terminals in either Fig. 4 or Fig. 5. Connect Terminal 3 to a spare normally-closed contact to ground on the keying relay. Then connect up the 18 volts (batteries or a voltage doubler from the filament supply). Close both paddles and listen for the "iambimation.

Once the Iambimatic keyer has been completed, it will take a short time to get used to it. Start with *CQ*, and then practice your way down the alphabet. After a while you will wonder how you ever managed to get along with a conventional electronic keyer. QST

[AUTHOR'S NOTE: Heat from the HA-1 keyer may cause excessive leakage in Q_1, making iambimation impossible. To avoid this, it may be advisable to place Q_1 apart from the main circuit, toward the cooler back end of the HA-1. Also, the lack of light may cause V_1 and V_2 to become unstable. This trouble may be cured by wiring in a small pilot lamp, placing it close to V_1 and V_2 to provide illumination.]

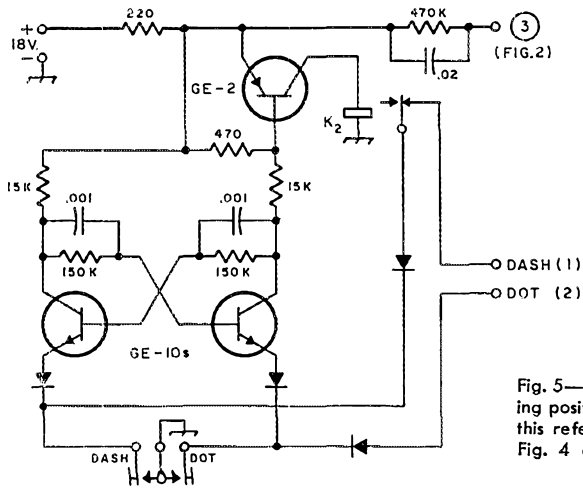


Fig. 5—Circuit equivalent to that of Fig. 4 for keyers having positive voltage at the key-lever terminals. Except for this reference to polarity, the content of the caption of Fig. 4 applies here. This version cannot be used with the circuit of Fig. 2.

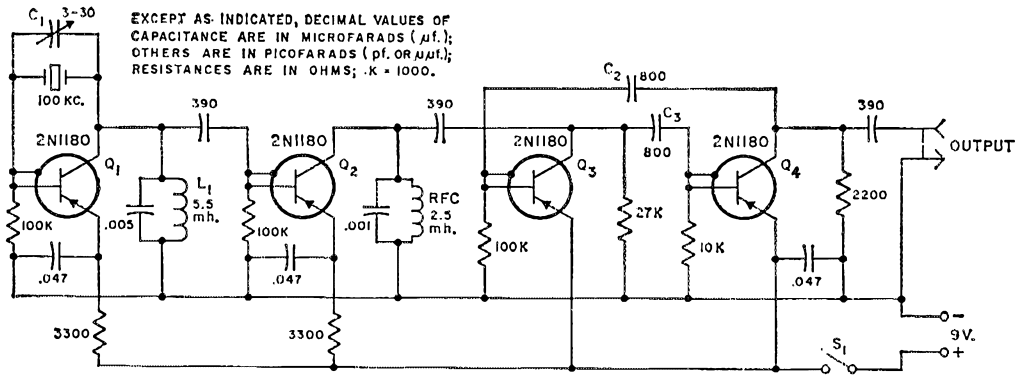


Fig. 1—Circuit of the 50-kc. frequency standard. Resistors are ½ watt, 10% tolerance; 0.047-μf. capacitors are Mylar, other fixed capacitors are ceramic.

C_1—3-30-μf. mica trimmer.
C_2, C_3—800-pf. disk ceramic (Centralab CE-801).
L_1—Iron-slug adjustable, 0.5-5 millihenrys (Miller 6313).
S_1—S.p.s.t. toggle.

A Novice Frequency Standard

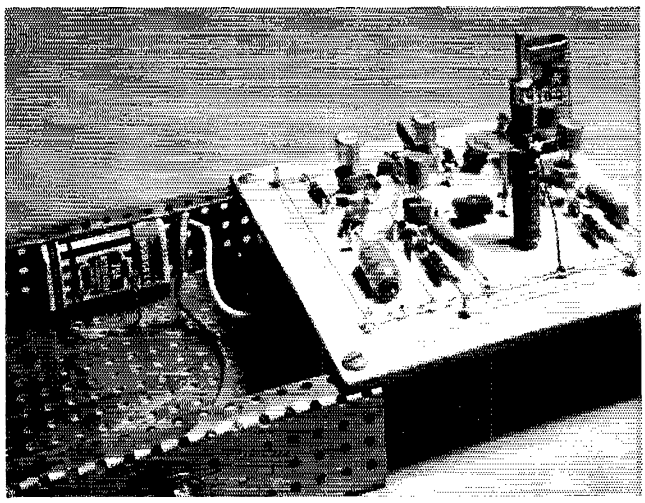
50-Kc. Markers from a 100-Kc. Crystal

BY SAMUEL C. CREASON,* K6DQB

A COMMON method of preventing out-of-band operation is the use of a 100-kc. marker oscillator. Harmonics of the oscillator spot the band edges in the station receiver, which is then used as a frequency meter. However, for the Novice this is only half the answer, since one edge of each of his h.f. bands lies at a harmonic of 50 rather than 100 kc. Since 50-kc. crystals are hard to come by, a practical solution in this case is to use a 100-kc. crystal oscillator to stabilize the output of a 50-kc. multivibrator. Harmonics of the multivibrator output will then spot both edges of each h.f. novice band.

The schematic of such a unit is shown in Fig. 1. Q_1 is the oscillator, while Q_2 is an amplifier which provides pulses of sufficient amplitude to properly trigger the multivibrator formed by Q_3 and Q_4.

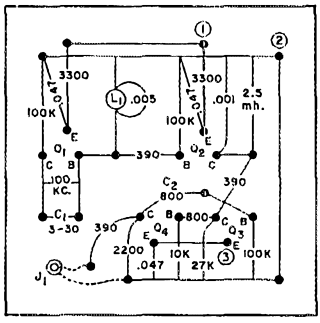
* 4140 Diego Way, Rocklin, Calif. 95677



With this easily-built frequency standard you have markers at 50-kc. intervals for spotting the edges of band subdivisions. In use, the circuit board mounts over the chassis containing the battery and on-off switch. (*Photo by Chuck Marshall.*)

Most of the component values may be varied somewhat without affecting the performance of the unit. However, C_2, C_3 and the four multivibrator resistors should be within 10 per cent of the specified values or the multivibrator may either fail to synchronize with the oscillator or may operate on a subharmonic other than 50 kc.

Construction of the unit involves a "homebrew Vectorboard" technique as shown in the photograph. A piece of ⅛-inch Masonite is drilled with a No. 42 drill to accept Vector T9.4 connectors[1]. A layout and drilling template is shown in Fig. 2.



● DRILL FOR CONNECTOR
CONNECT 1 AND 3 UNDER BOARD
----CONNECT UNDER BOARD
CONNECT 1 TO BATTERY, 2 TO S_1

Fig. 2—Scale layout of circuit board. Outside dimensions are 5 by 5 inches. J_1 the output connector, is a phone jack.

The connecting wires which provide mechanical support for the crystal socket and oscillator tank coil, L_1, should be No. 12 or No. 14 gauge. The remaining connections may be made with smaller wire.

After the wiring is completed, the unit is placed in operation as follows: Turn S_1 off, insert the crystal and transistors into their sockets and connect the battery. Turn the slug in L_1 full in and set the capacitor, C_1, to minimum capacitance. Connect the multivibrator output to the station receiver input and tune the receiver to approximately a 100-kc. multiple. Now turn S_1 on and screw the slug in L_1 out just far enough to start the oscillator. Tune the receiver to approximately a 50-kc. multiple and screw the slug in L_1 out just far enough so that the multivibrator will start every time S_1 is turned on.

To adjust the oscillator to exactly 100 kc., tune WWV on the station receiver and adjust C_1 to bring the oscillator to zero beat. This is most easily done when the WWV carrier is unmodulated. If WWV cannot be received, a check of the local broadcast station listings should reveal a station having a carrier which is a harmonic of 50 or 100 kc. QST

[1] These connectors are available from Lafayette Radio Electronics, 111 Jericho Turnpike, Syosset, L. I., N. Y.

Strays

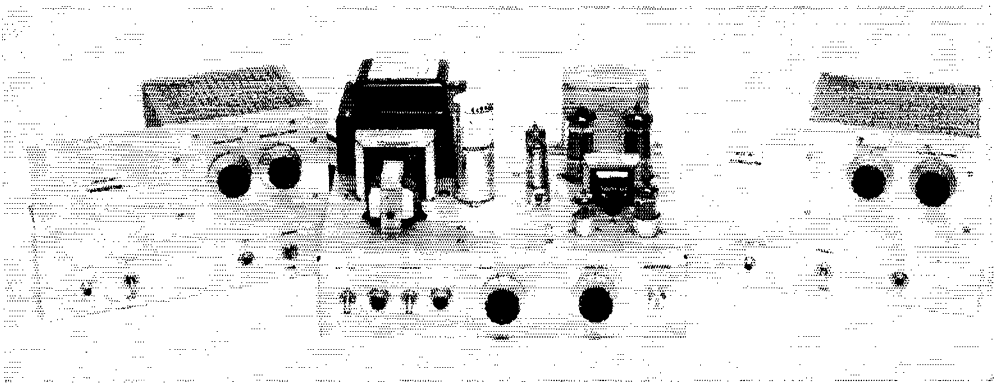
ARRL FLORIDA STATE CONVENTION TROPICAL HAMBOREE

Miami **January 21 & 22**

The Florida State Convention/eighth annual Tropical Hamboree will be held Saturday and Sunday, January 21 & 22, at the Miami Bayfront Park Auditorium. Activities have been planned to interest the ham and his XYL. Manufacturers will exhibit the latest in radio equipment. Tech talks and meetings are scheduled for DX, VHF, SSB, MARS, QCWA and the many other phases of the amateur radio field. The ARRL meeting will be led off by S.E. Div. Director Bolvin and Vice-Director Hamel. Representatives of Army, Navy and Air Force MARS will address the group. Another speaker is George Grammer WIDF, Technical Director of ARRL and Technical Editor of *QST*. For the rag-chewers and bargain hunters there will be a station on the air manned by the Dade County ARPSC, auction and swap shop. For the ladies we have two days of programs and demonstrations on home beautification.

Festivities will include a banquet Saturday evening at the headquarters hotel. In order to satisfy the multiple wishes of you convention goers the banquet will be served "buffet style" with a varied menu selection to titillate your taste buds and the after-dinner program will be for general interest.

Headquarters hotel is The Everglades at 244 Biscayne Boulevard; special rates are $9.00 single, $14.00 double, no deposit required. Convention registration is $1.50; banquet tickets $6.00. For tickets and hotel reservations write to Dade Radio Club, P.O. Box 73, Biscayne Annex, Miami, Florida 33152. QST



50 Watts on Six and Two

An Easy-to-build A.M./C.W. Transmitter

BY NORM BRADSHAW,* W1DJV-W8EEF AND DOUG DE MAW,** W1CER

With the emphasis today on the use of high-cost v.h.f. transmitting tubes, their expensive sockets, and the special hardware that goes with them, it seems appropriate to take a few steps in the opposite direction. The v.h.f. transmitter described in this article uses a 6146B final and features low-cost tubes in the exciter. Most of the power-supply parts can be garnered from a junked TV set and many of the other components are stock items in the v.h.f. experimenter's "goodie" trove.

Although it is not always true that the cheapest way is the easiest way, or vice versa, examination of the transmitter described here will show that both conditions are reflected in its design. At best, the terms "cheapest" and "easiest" are nebulous: they must be related to personal finances and individual craftsmanship. The best we can do is to work toward a compromise that best suits our individual needs. Such a compromise is reached in this two-band v.h.f. rig.

The transmitter has a common power-supply modulator chassis and uses separate r.f. assemblies for the 6- and 2-meter bands. The key-shaping network is built in a Minibox so that it can be used with either r.f. unit during c.w. operation. Low-cost, readily-available tubes are used. This feature and the use of power-supply components that can be taken from an old TV set help to reduce the overall cost. The complexity of the project is lessened by the omission of unnecessary gewgaws - often used for window dressing, although of no practical value.

In designing the equipment, emphasis was placed on features that are often lacking in v.h.f. transmitting gear. An abundance of audio is available — 30 watts — offering more power than is needed to obtain 100-percent modulation. The speech stages are designed to provide good response in the most useful range for voice communication, 300 to 3000 c.p.s. A clean, chirp-free c.w. note is assured because of voltage-regulated oscillator operation in both r.f. units, and because of the shaping network that is connected in the keying lead. Ample grid drive is available in both r.f. units, through use of tubes that are capable of giving good performance at their respective operating frequencies. Neutralization has been included in the design of both final stages, greatly reducing the possibility of instability and its attendant TVI. Each r.f. chassis has a v.f.o. jack so that external frequency control can be used, if desired.

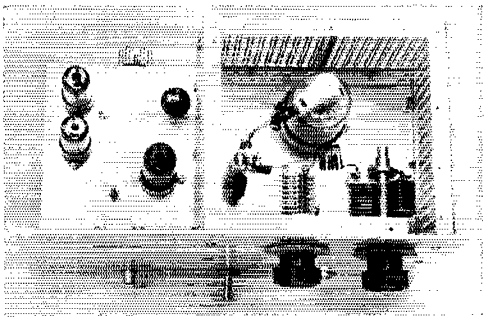


Figure 1—Top view of the 6-meter r.f. deck. The VR tubes are at the upper left, V_1 is to the right of them, and the tuning knob for C_1 is just above V_1. The 6146B and its plate tank are enclosed in the shielded area at the right.

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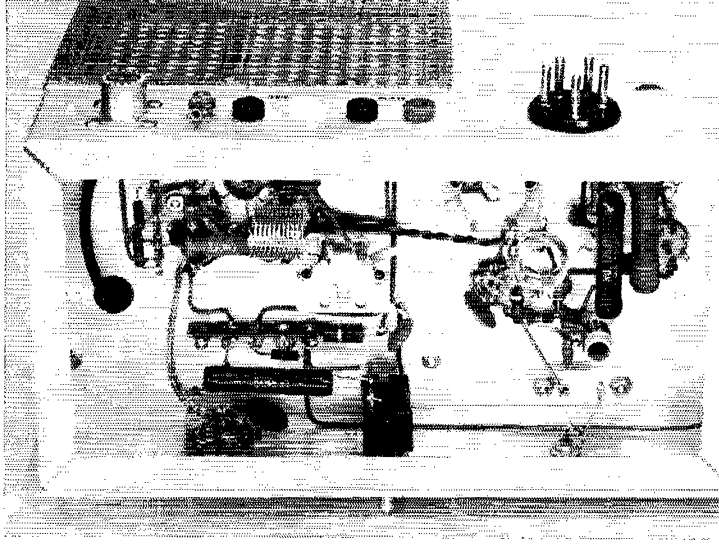


Fig. 2—A look at the underside of the 6-meter chassis. V_1 is at the right and the power amplifier, V_2, is on the left. Banana jacks for metering the grid and plate currents are located on the rear apron of the chassis.

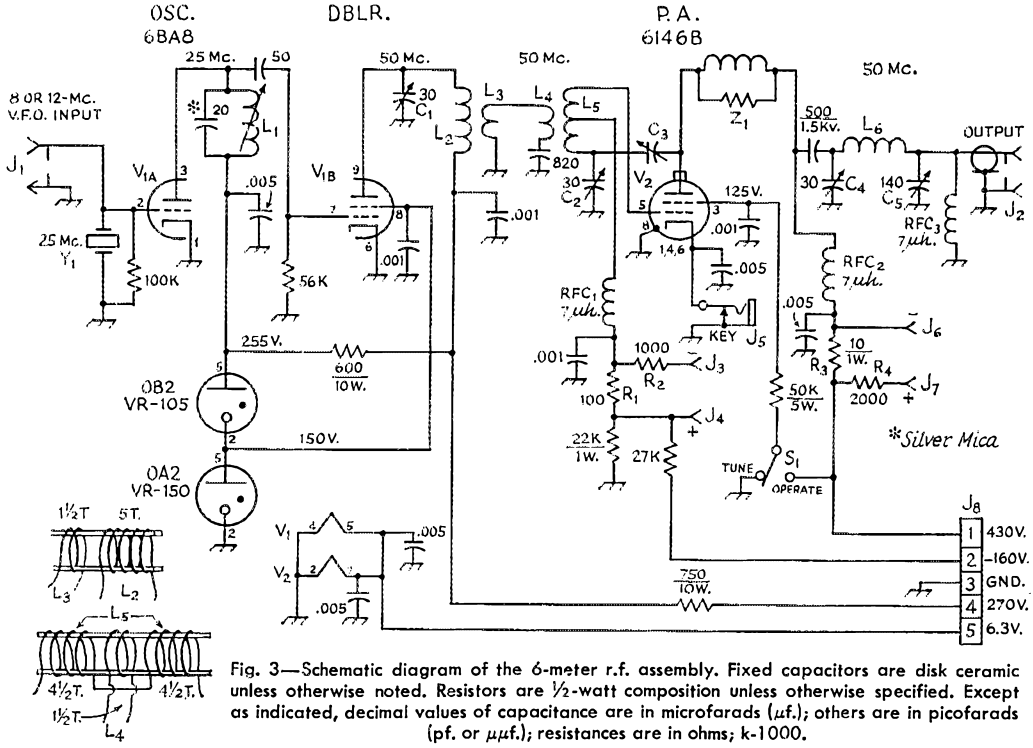


Fig. 3—Schematic diagram of the 6-meter r.f. assembly. Fixed capacitors are disk ceramic unless otherwise noted. Resistors are ½-watt composition unless otherwise specified. Except as indicated, decimal values of capacitance are in microfarads (μf.); others are in picofarads (pf. or μμf.); resistances are in ohms; k-1000.

C_1, C_2—30-pf. miniature variable (Millen 20025).
C_3—Neutralizing stub (see text).
C_4—30-pf. double-spaced miniature variable (Hammarlund HF-30X).
C_5—140-pf. miniature variable (Millen 19140).
J_1—Phono connector.
J_2—SO-239 coax fitting.
J_3, J_4, J_6, J_7—Insulated banana jack.
J_5—Closed-circuit jack.
J_8—5-pin male connector (Amphenol 86CP5 suitable).
L_1—8 turns No. 22 enam. close-wound on ⅜-inch dia. ceramic slug-tuned form (Miller 4400 form.)
L_2—5 turns No. 20 tinned, 16 t.p.i., ⅝-inch dia. (5 turns of Polycoil 1736 or B&W 3007 stock. See L_3 data before preparing.)
L_3—1½ turns No. 20 bus wire, 16 t.p.i., ⅝-inch dia. (Part of L_2 stock at cold end of L_2. See inset.)
L_4—1½ turns No. 20 bus, 16 t.p.i., ⅝-inch dia (1½ turns of same type coil stock as used for L_2. See inset).
L_5—9 turns No. 20 bus wire, 16 t.p.i., ⅝-inch dia., center tapped. (Length of same type coil stock used for L_2. See inset.)
L_6—6 turns No. 14 enam. wire, ⅝-inch dia., 9/16 inch long.
R_1-R_4, inc.—5 per cent tolerance, or better.
RFC_1-RFC_3, inc.—7-μh. r.f. choke. (Millen J300-8.2 suitable.)
S_1—S.p.d.t. toggle.
Y_1—25-Mc. overtone crystal.
Z_1—6 turns No. 14 enam. wire wound on 56-ohm, 1-watt resistor. Solder ends of coil to resistor pigtails.

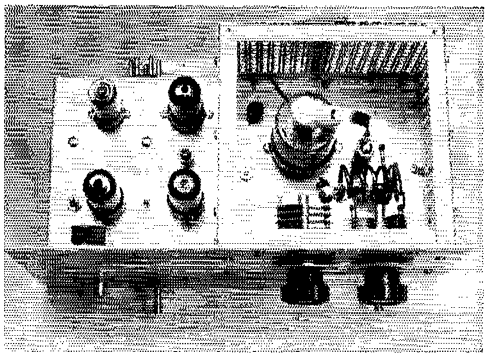


Fig. 4—Top-chassis view of the 2-meter r.f. assembly. The amplifier compartment is at the right. Copper strapping is used to connect the 6146B plate cap to the plate coil. The neutralizing stub is adjacent to the 6146B tube envelope. The oscillator stage is at the lower left of the photo, the VR tube is directly above it, and the buffer and doubler are at the center of the chassis.

6-Meter R.F. Section

A 5 × 9½ × 2-inch chassis is used for the 6-meter section of this transmitter. The area around the 6146B is enclosed by a perforated-aluminum box which is 5⅝ inches wide, 5 inches deep, and 4 inches high. Angle stock, ½ inch in width, is used to form the top and bottom supports for the perforated stock. The angles were formed in a vise and are visible in the photographs. The top of the cage is enclosed by a perforated-stock cover which is held in place with No. 6 sheet-metal screws. The aluminum front panel is 10 inches wide and 6½ inches high.

The oscillator, V_{1A} of Fig. 3, uses 25-Mc. overtone crystals, but a v.f.o. whose output frequency is 8.3 or 12.5 Mc. can be connected to J_1 if variable-frequency control is desired. A double-tuned circuit is used between V_{1B} and V_2 to provide additional 50-Mc. selectivity. This helps to prevent 25-Mc. energy from reaching the p.a. stage and being passed on to the antenna system. A parasitic choke, Z_1, installed in the plate lead of V_2 aids in preventing spurious frequencies from being generated. The final plate tank, $L_6C_4C_5$, is a pi network which is designed to work into low-impedance loads in the 50- to 75-ohm range.

A tune-operate switch, S_1, enables the operator to adjust the transmitter's grid drive without having the final stage operating. Cathode keying is employed at V_2. The key is plugged in at J_5, a closed-circuit jack. Grid and plate current metering is made possible by connecting a 1-ma. meter to a set of jacks on the rear apron of the chassis. For grid-current tests, the meter is plugged into J_3 and J_4 where the voltage drop across R_1 is measured. The resultant current range is 0 to 10 milliamperes. A similar arrangement is used to meter the plate current; the meter is plugged in at J_6 and J_7 and reads the voltage drop across R_3, providing a plate-current range of 0 to 200 milliamperes. A similar metering system is used in the 2-meter r.f. assembly.

The neutralizing capacitor, C_8, is a piece of No. 14 enameled wire protruding approximately 2½ inches above the chassis. A small feedthrough bushing is used to bring the wire through the chassis.

The 2-Meter Assembly

The 2-meter r.f. deck is also built on a 5 × 9½ × 2-inch chassis. The amplifier shield cage is 5¼ inches wide, 5 inches deep, and 4 inches high. Its construction is similar to that of the 6-meter unit.

The oscillator, V_{3A} of Fig. 6, is designed to use 8-Mc. fundamental crystals, or can be controlled by a v.f.o. whose output is in the 8, 12, or 24-Mc. range. In v.f.o. operation S_2 shorts out RFC_4. This is necessary to prevent self-oscillation in V_{3A}.

The 24-Mc. output from V_{3A} is fed to V_{3B} where it is tripled to 72 Mc. Buffer stage V_4,

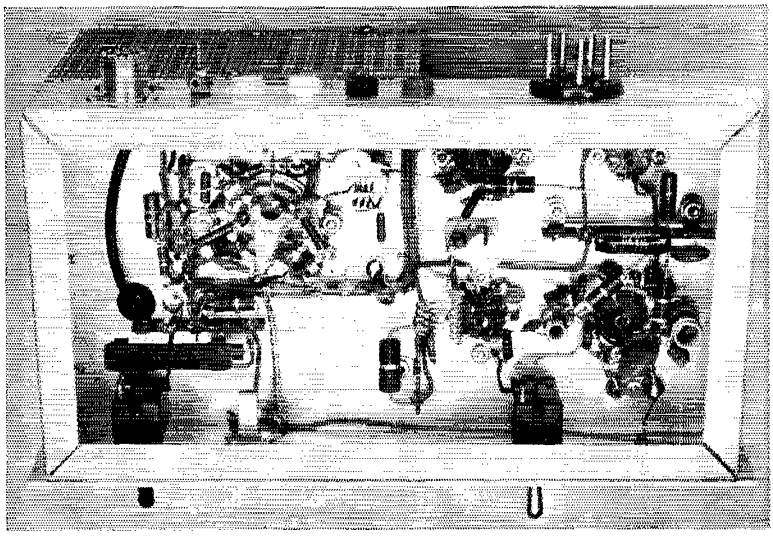
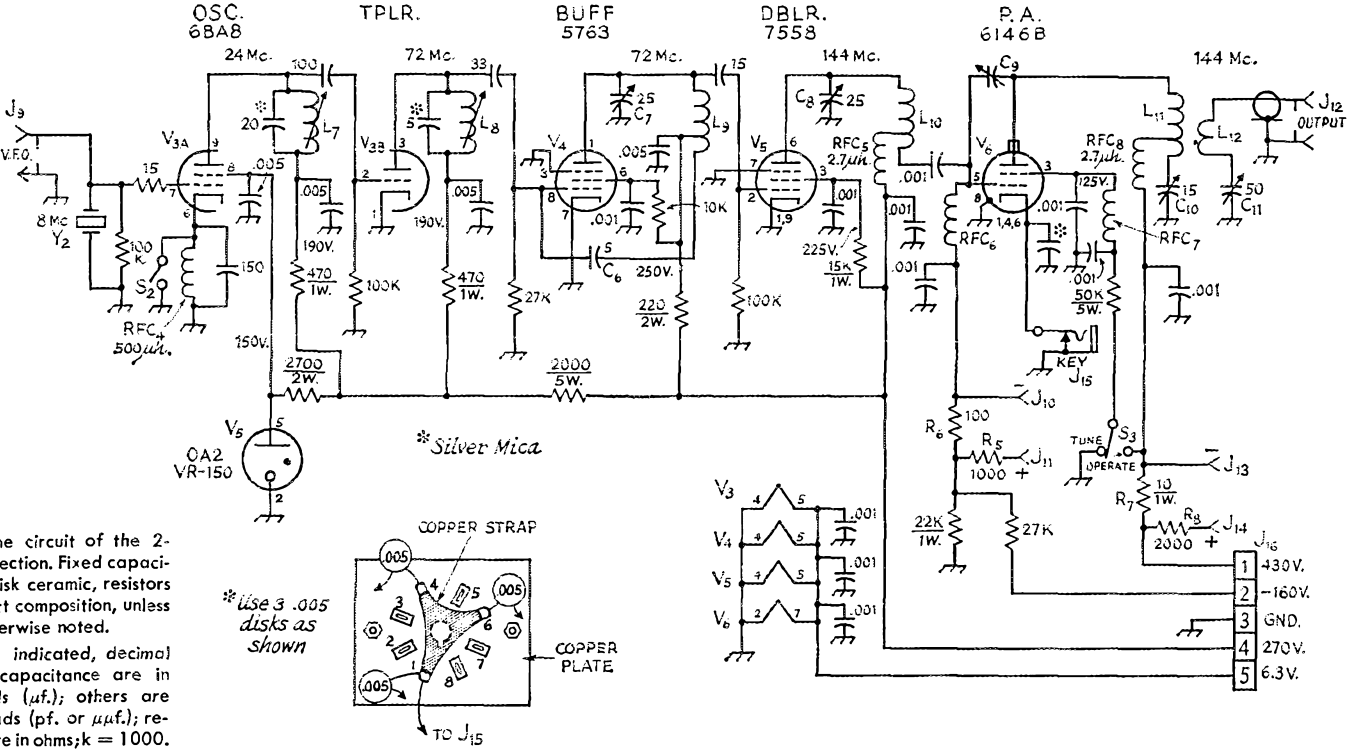


Fig. 5—The underside of the 2-meter r.f. unit. The oscillator tripler is at the lower right and the buffer is just to the left of it. Doubler stage V_5 is at the upper center. A brass ring surrounds the socket of V_5 and is used as a ground bus. The 6146B p.a. is at the left of the chassis.



*Use 3 .005 disks as shown

Fig. 6—The circuit of the 2-meter r.f. section. Fixed capacitors are disk ceramic, resistors are ½-watt composition, unless otherwise noted.

Except as indicated, decimal values of capacitance are in microfarads (μf.); others are in picofarads (pf. or μμf.); resistances are in ohms; k = 1000.

C_6—Neutralizing capacitor.
C_7, C_8—25-pf. miniature variable (Millen 25025E).
C_9—Neutralizing stub. See text.
C_{10}—15-pf. double-spaced variable (Millen 22910 suitable).
C_{11}—50-pf. miniature variable (Millen 22050).
J_9—Phono connector.
J_{10}, J_{11}, J_{13}, J_{14}—Insulated banana jack.
J_{12}—SO-239 type chassis connector.
J_{15}—Closed-circuit jack.
J_{16}—5-pin male connector (Amphenol 86CP5).
L_7—10 turns No. 22 enam. wire, close-wound on ⅜-inch dia. ceramic slug-tuned form. (Miller 4400 form used.)
L_8—7 turns No. 22 enam. wire, close-wound on ¼-inch dia. ceramic slug-tuned form. (Miller 4500-4 used.)
L_9—4 turns No. 20 tinned, ⅝-inch dia., ⅝ inch long. Tap 1 turn from cold end. 4 turns from 10-turns-per-inch, ⅝-inch dia. coil stock (Airdux 510T or Polycoil 1735 suitable).
L_{10}—4 turns No. 20 tinned, ⅝-inch dia., ½ inch long. Tap 1 turn from grid end.
L_{11}—4 turns No. 10 tinned, ⅝-inch dia., 1 inch long. Tap 1 turn from C_{10} end.
L_{12}—2 turns No. 20 insulated wire, ⅝-inch dia. Space approximately ¼ inch away from C_{10} end of L_{11}. (See text.)
R_5-R_8, inc.—5 per cent tolerance, or better.
RFC_4—500-μh. choke (Millen 34300-500).
RFC_5—2.7 μh. choke.
RFC_6—7-μh. choke (Millen J300-8.2 suitable).
RFC_7—0.82-μh. choke (Millen 34300-0.82 suitable).
RFC_8—2.7-μ. choke (Millen 34300-2.7).
S_2—S.p.d.t. toggle. (Xtal-v.f.o. switch shown in xtal. position.)
S_3—S.p.d.t. toggle.
Y_2—8-Mc. fundamental type crystal.

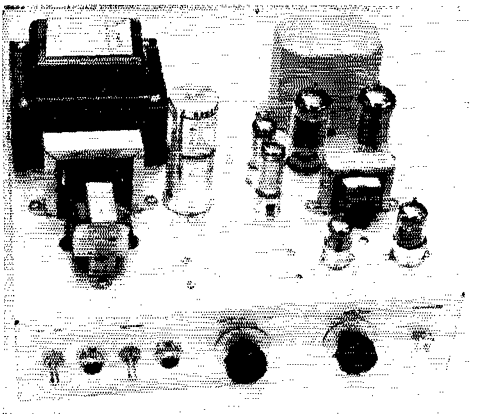


Fig. 7—Top-chassis view of the modulator/power supply. The audio section is at the right side of the chassis and the power supply is at the left.

a 5763, amplifies the signal before it is passed on to V_5, where it is doubled to 144 Mc. V_5 is the driver for V_6, the 6146B output amplifier. C_9, the neutralizing wire, is arranged in the same way as is C_3 in the 6-meter unit. It also projects 2½ inches above the chassis.

This 6146B cathode is keyed at J_{15}, and the circuit is the same as that used in the 6-meter unit. The keying characteristics of both r.f. assemblies are determined by the shaping network of Fig. 10. Its use is discussed later.

A series-tuned tank is used in the plate circuit of V_6. Because of the rather high value of output capacitance of 6146Bs, this technique is desirable if a reasonable LC ratio is to be had on 144 Mc. Capacitor C_{10} is used to tune L_{11} to resonance. L_{12} couples the output to the load and C_{11} is used to help tune out any reactance that L_{12} and the line may show.

Special care has been taken to bond the cathode pins of the 6146Bs as shown in the insert sketch of Fig. 6. This helps to reduce inductance in that part of the circuit, contributing to better stability. The Y-shaped strap can be made from flashing copper or brass shim stock. Pins 8 and 2 of the 6146B should be returned to chassis ground by soldering short lengths of ¼-inch-wide copper strap between the tube socket pins and ground. In the 2-meter model, a 2-inch square brass plate is mounted under the chassis at V_6 so the tube socket protrudes through it. It is held in place by the 6-32 socket hardware. A similar plate is used at the socket of V_5, but is circular in shape. Such plates are handy for making solder connections in v.h.f. gear when short leads are desired — a thing that is hard to achieve when aluminum chassis are used.

Power Supply and Modulator

It is unnecessary to give a detailed description of the power-supply and audio circuits shown in Fig. 9, since conventional designs have been used. There is nothing tricky to adjust. There is also nothing critical about the layout of the parts, and the available space in the 10 × 12 × 3-inch aluminum chassis eliminates any need to crowd the circuit. The main consideration is that the audio components be kept as far away from the power supply section as possible, thus reducing the possibility of hum in the audio. The recommended layout is given in Figs. 7 and 8.

R.f. filtering is used at the input of the speech channel to prevent squeals and howls, a malady common to some v.h.f. modulators. Additional r.f. filtering is used in the grid circuit of V_{7B}. The modulator operates in AB_1, using RCA 7868s to produce 30 watts of audio output. These tubes are designed for hi-fi work and are reasonably priced.

The power supply is designed around many of the component values found in a transformer-powered TV set.[1] This was done in an effort to minimize the cost of the transmitter. Silicon rectifiers are used in the high-voltage circuit, and in both bias supplies.

Receiver muting and control of the antenna relay are features made possible by the use of K_1, a d.p.d.t. 115-volt a.c. relay. External connections to the relay contacts are made at J_{19}. A phone-c.w. switch, S_6, disconnects the secondary of T_2 from the B-plus line during c.w. operation. An extra set of contacts on S_6 is used to disable V_9 and V_{10} at the same time.

Checkout

A three-foot-long power cable is used between the modulator/power-supply chassis and the r.f. strips. The cable should have a male connector to mate with J_{18}, and a female connector for connection to J_8 or J_{16}.

Plug the power cable into J_8 of the 6-meter assembly. Connect a 1-ma. meter to J_3 and J_4. Place S_1 in the TUNE position and connect a 50- or 75-ohm dummy load to J_2. Apply power and

[1] The power transformer filter choke, and filter capacitors can often be taken from a junked TV set.

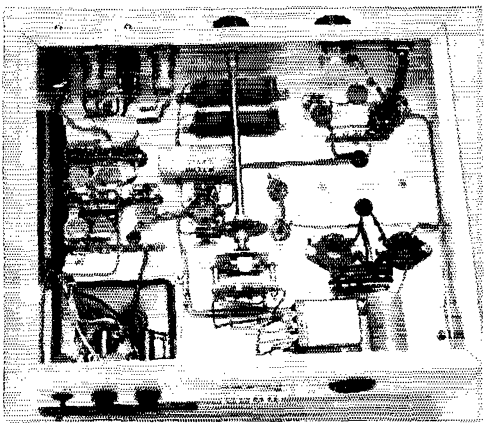


Fig. 8—Layout of the underside of the power supply and modulator deck. The audio section is at the right, and the power supply is at the left. The phone-c.w. switch is at the lower-center of the photo. Relay K_1 is just below and to the right of the switch.

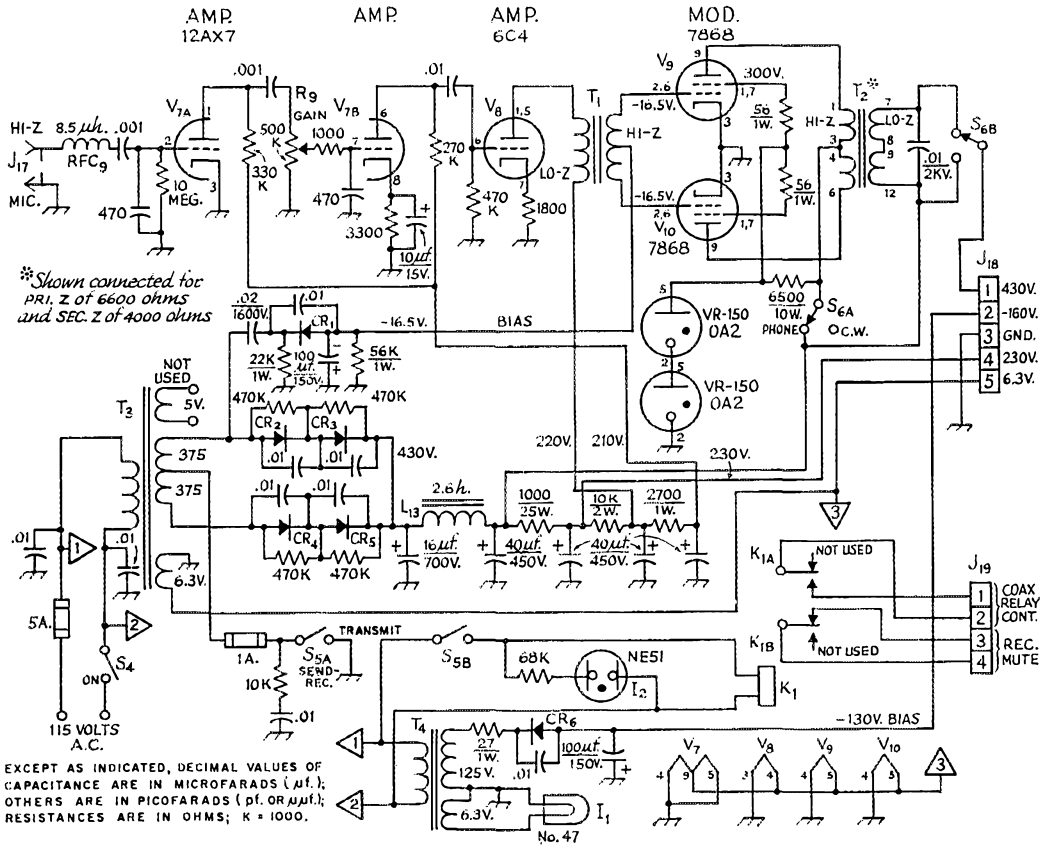


Fig. 9—Schematic diagram of the power supply and 30-watt modulator. Capacitors are disk ceramic. Those bearing polarity marking are electrolytic. Resistors are ½-watt composition unless noted otherwise.

CR_1-CR_5 inc.—1000 p.r.v., 750-ma. silicon diode.
CR_6—600 p.r.v., 250-ma. silicon diode.
I_1—No. 47 lamp or equal.
I_2—NE-51 neon lamp.
J_{17}—Two-terminal microphone connector.
J_{18}—5-pin female connector (Amphenol 77MIP5).
J_{19}—4-terminal barrier strip (Millen E-304A).
K_1—D.p.d.t. 115-volt a.c. relay. Two contacts not used. (Guardian IR-1220-2C-115A.)
L_{13}—2.6-h., 300-ma. filter choke (Stancor C-2706 suitable).
R_9—0.5-megohm control, audio taper.
RFC_9—8.5-μh. choke (Millen J300-8.2).
S_4—S.p.s.t. toggle.
S_5—D.p.s.t. toggle.
S_6—Ceramic rotary, 1 section, 2 poles, 5 positions. 2 positions used. (Centralab 2505).
T_1—Interstage transformer, 1:3 step-up ratio. (Stancor A-63-C.)
T_2—Varimatch modulation transformer, 30 watts. (UTC-S19.)
T_3—Power transformer; 370 volts, 275 ma.; 6.3 volts, 7 amp.; 5 volts, 3 amp. (not used). Stancor P-6315 or equivalent type from old TV set.
T_4—Power transformer (bias); 125 volts, 15 ma. (Stancor PS-8415).

adjust L_1, C_1, and C_2 for maximum grid current as indicated on the meter. It may be necessary to detune L_1 slightly from the peak setting in order to assure quick starting of the oscillator each time the transmitter is turned on. Use C_2 to adjust the grid current to approximately 3 ma.

Turn off the transmitter and plug the 1-ma. meter into J_6 and J_7. Place S_1 in the OPERATE position and turn the transmitter on. With C_5 adjusted for maximum capacitance, quickly tune C_4 for a dip in plate current. Turn C_5 toward minimum capacitance until the plate-current reads 100 ma. at resonance. It will be necessary to readjust C_4 for a dip in plate current as C_5 is tuned. The off-resonance plate current should go as high as 150 ma. if the circuit is operating properly.

The 6- and 2-meter sections are both neutralized by the same method, as described later under "Neutralization."

Tuneup for the 2-meter assembly is similar to that of the 6-meter section. With the meter plugged into J_{10} and J_{11}, and with S_3 in the TUNE position, apply power to the transmitter and peak L_7, L_8, C_7, and C_8 for maximum grid-current reading on the meter. Should it be impossible to get a reading on the meter, initially, "rough tune" the low-level stages to resonance by peaking them, one at a time, with a wavemeter. Alternatively, a grid-dip meter can be

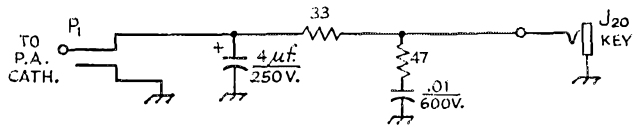


Fig. 10—Schematic diagram of the key-shaping network. The unit is housed in a small-size Minibox and is installed between the key and the key jack of the r.f. deck in use during c.w. operation. The shaper is removed from the circuit during phone operation. P_1 is a PL-55 style plug and J_{20} is an open circuit jack. The 4-μf. capacitor is electrolytic. Resistors are ½-watt composition. Resistance is in ohms. The 0.01 capacitor is in μf. and is disk ceramic.

employed to get the tuned circuits close to their desired resonant frequencies. The transmitter will deliver plenty of output with as little as 1 milliampere of grid current, but it is better to use the 3 ma. recommended by the tube manufacturer. C_8 can be used as a drive control to set the grid current at the desired value.

With a 50-ohm dummy load connected to J_{12}, place S_3 in the OPERATE position and quickly adjust C_{10} for a dip in plate current (1-ma meter connected at J_{13} and J_{14}). C_{11} can be used to establish a loaded plate current of 100 ma.

Neutralization

Since both the 6- and 2-meter assemblies use a stiff piece of wire (adjacent to the tube envelope and parallel to the anode) as a neutralization capacitor, the procedure is the same on both bands.[2] First, adjust the transmitter for normal grid and plate currents. With a dummy load connected, and with the tune-operate switch in the TUNE position, rotate the plate-tuning capacitor through its range while observing the grid current. If the grid current drops when the plate tank is tuned through resonance, move the neutralizing wire toward or away from the tube envelope and repeat. Position the wire so there is least effect on the grid-current reading when the plate tank is tuned through resonance.

An alternate method of neutralizing the 6- and 2-meter units is to connect a sensitive wavemeter to the output jack of the unit being tested and adjust the neutralizing wire for minimum output with the tune-operate switch in the tune position. *Caution:* When adjusting the neutralizing wire, be careful to avoid contact with 6146B plate voltage. Turn the transmitter off each time the wire is adjusted.

Operation

Because the 6146Bs are operated well below their maximum ratings, tube life should be excellent. Both units can be run at 50 watts input on phone and 60 watts input on c.w. A plate current of 120 ma. is recommended for voice operation, and 140 ma. is satisfactory for c.w.

When the transmitters are placed in operation, the lid should be screwed into place on the shield cage. A metal plate encloses the bottom of each r.f. chassis to help confine the r.f. from the low-level stages. Rubber feet are attached to the bottom plates to prevent damage to the operating table. A good earth ground should be connected to the chassis of the equipment to lessen shock hazard.

Adjustment of C_8 in the 2-meter assembly, and of C_2 in the 6-meter unit, can be done by inserting an insulated screwdriver through a hole in the cover of the shield cage.

If the loading control, C_{11}, on the 2-meter unit does not seem to have any effect on the plate current of V_6, try moving L_{12} away from, or closer to, the end of L_{11}. Then readjust C_{11}. A setting should be possible where C_{11} will have considerable effect on the loading of V_6.

For operation on c.w., S_6 in the modulator deck is turned to the c.w. position, automatically disabling the output stage of the audio section. The shaping network of Fig. 10 is plugged into the key jack of the r.f. assembly being used, and the key is connected to the shaping-network box. The c.w. note should be chirp-free and without clicks.

Tests made with a calibrated wattmeter indicate an efficiency of approximately 60 percent with both r.f. units. With 50 watts input, the output power is 30 watts.

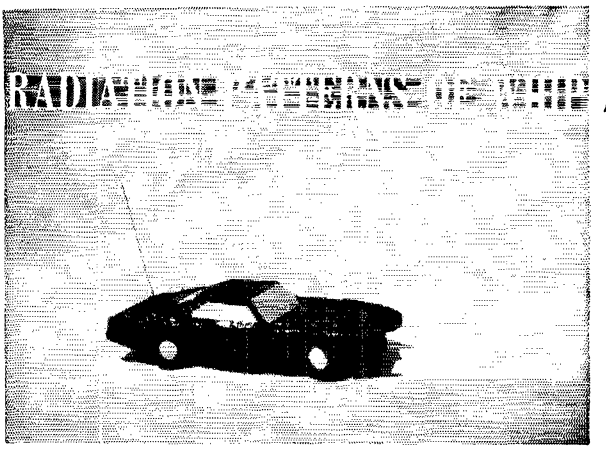
Some Closing Remarks

There is no reason why the entire transmitter could not be built in a single enclosure if the constructor so desired. For convenience, the metering might be done with a panel-mounted instrument. A switch could be used to select the various metering points in the circuit.

Used individually, the r.f. strips of this transmitter can be made to serve as exciters for high-power amplifiers. Also, the 2-meter assembly is ideal for use as a driver for a 432-Mc. varactor-diode tripler of the type described in March 1966 *QST*, page 14. QST

[2] On 2 meters, conventional neutralization cannot be used because the natural self-neutralizing frequency of the 6146B lies below 144 Mc. C_9 is used to add capacitance between the grid and plate elements as shown in Fig. 6.

MODELING RADIATING ELEMENTS OF MOBILE ANTENNAS



Scale-model car used for obtaining data plotted in Fig. 3B.

BY DALE W. COVINGTON,* K4GSX

THE rapid development of efficient transceivers and power supplies has solved many of the problems of going mobile. Furthermore, old Sol is playing a strong supporting role by improving propagation conditions on the very bands for which the mobile antenna is most efficient. While the bandwidth and efficiency of the whip antenna have been extensively studied and improved, any description of the resulting radiation patterns has received only light treatment. Such patterns would be useful guides, for example, in calling DX or in beginning to conclude a contact before making a major change of route direction. Therefore the intent of the following note is to call on stage yet another actor portraying a simplified picture of mobile whip radiation.

Actually it is a complicated matter to describe this radiation precisely as a function of the total elliptical polarization of the radiated *E*-field, the distorted currents flowing on sculptured car bodies and loaded whips, the frequency dependence of the ground conductivity, and so on. On the other hand, the principal features can be exhibited by using a model of a vertical element over an incomplete ground plane.

The Model

Employing a model for a complicated analysis usually implies a certain degree of approximation. The case in point is no exception. Cars are about ¼ wavelength long at 20 meters and almost ¼ wavelength wide at 10 meters. As the whip itself is a ¼ wavelength at 10 meters, it seemed appropriate to restrict the analysis primarily to this 10- to 20-meter range. Fig. 1 shows the general shape and the coordinate position of the model, which had ten ¼-wave ground radials from 0 to 90 degrees beneath a vertical ¼-wave element fixed in the normal-180-degree plane. The ground plane was spaced 1/10 wave above ground. Crudely speaking, the model thus represented a car with a whip mounted on the left rear deck. The driver's side is along the 0-degree direction, and the rear bumper is along the 90-degree direction.

Patterns

The actual calculation of the patterns consisted of computing the far *E*-field from cosinusoidal currents flowing on ¼ wave elements[1] as arranged in Fig. 1. All of the resulting vector fields were then added to yield a polar plot of the radiation patterns as a function of the angle of elevation. Since an actual whip does not remain truly vertical once the car starts moving, the equations for the model were solved for the vertical element normal to and tilted away from the ground radials.

The close spacing between the model and ground requires that ground effects be included in the analysis. A review of the interrelations between frequency, antenna height above ground,

[1] King, *Theory of Linear Antennas*, University Press, Cambridge, Massachusetts, 1956, p. 395, 421, 687.

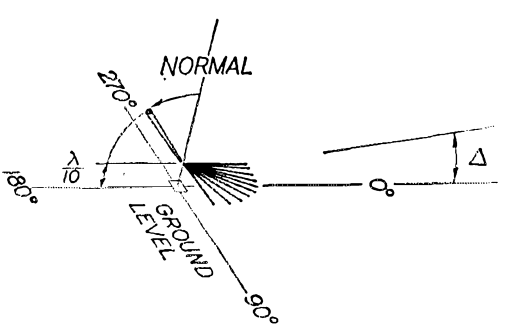


Fig. 1—Coordinate system for the model. Ground-plane radials and vertical element are ¼ wavelength long.

* 119 Vance Circle, Marietta, Ga. 30060.

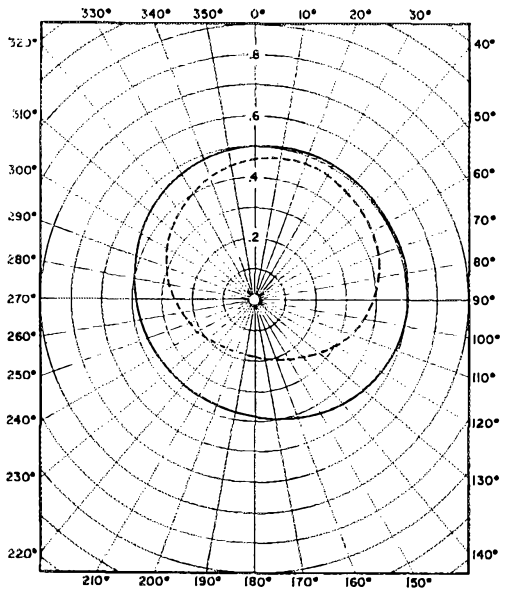
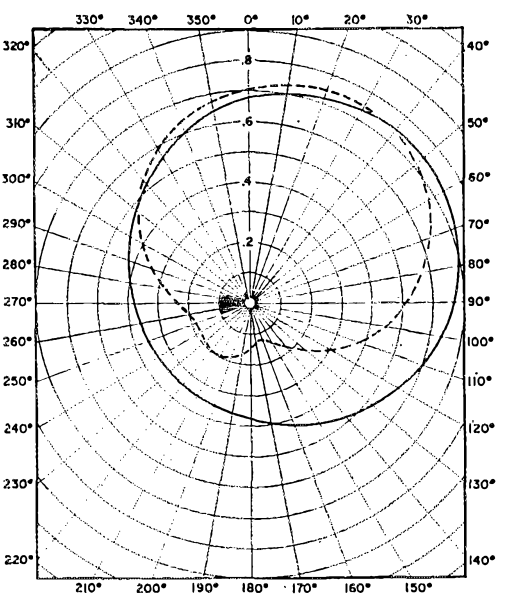


Fig. 2—A: Calculated patterns of relative E-field strength for a radiation angle of 15 degrees above the horizon; dry soil. Solid curve, whip vertical; dashed line, whip tilted 45 degrees.



B: Same for a radiation angle of 30 degrees.

angle of elevation, and ground constants has been given by G3HRH[2]. Using standard techniques[3] the *E*-field expressions were corrected by the ground factors for 28 Mc. and angles of elevation, Δ, of 15 and 30 degrees. Higher wave angles are less useful for contacts from 14 to 28 Mc.[4] These ground factors revealed that, at their maximum point, the horizontally polarized *E*-fields from the model over dry soil were 11.7 and 5.9 db. below the corresponding vertically polarized fields for Δ of 15 and 30 degrees respectively. As the conductivity approached seawater values, the horizontal terms were even smaller; namely, 14.2 and 8.3 db. For simplicity only vertical terms were retained in the patterns.

The patterns of the calculated *E*-fields are presented in Fig. 2 for the 15- and 30-degree wave angles. Solid lines show the fields from the vertical element normal to ground while the dotted lines denote a rather extreme element tilt of 45 degrees. The relative field strengths can be directly compared from one wave angle to the other; however, directly comparing field values of the normal and tilted configurations automatically implies a constant input current. It is immediately noted in Fig. 2 that the quadrant containing the ground plane also contains the strongest fields. Moreover, these fields generally change only slightly from 0 to 90 degrees.

When the vertical element is perpendicular to the radials, the field pattern is symmetric about the 45-225 degree directions. Here orientation is more important at the high elevation angle where the pattern undergoes a maximum/minimum variation of 6.4 db. compared to a 3.3-db. variation at the lower angle. As mentioned before, the attractive increase in field strength at the higher angle usually cannot be advantageously employed on the higher-frequency bands.

Pattern symmetry becomes lost as the vertical element tilts back from the normal. Not only does the direction of maximum field shift from 45 degrees toward 20 degrees, but also the field strength from the rear of the model is particularly reduced. Numerically the fields in front of the model are 8.3 and 13 db. stronger at the 15 and 30 degree elevations.

Low-Frequency Considerations

Mobile operation on 40 and 80 meters is more difficult to analyze. Even in Texas cars and whips don't come equipped with ¼-wavelength dimensions. Instead, the sizes of both the car body and the whip approach small fractions of a wavelength. Also, in this range the loading coil becomes increasingly important in relation to the current distribution on the whip. Finally, contacts can be made on these bands by radiation at fairly high angles of elevation, which complicates the previous polarization argument by filling in certain parts of the pattern with a significant combination of vertically- and horizontally-polarized fields.

The relative directivity pattern for a very small dipole has only a slightly greater beamwidth than the similar figure-8 pattern for a half-wave dipole having ¼-wave elements[4]. Thus it would be reasonable to expect that the character of

[2] Hills, "The Ground Beneath Us," *R.S.G.B. Bulletin*, June 1966, p. 375.

[3] Schelkunoff and Friis, Chapter Seven, *Antennas/Theory and Practice*, John Wiley and Sons, Inc., New York, 1952.

[4] Chapter Two, *The A.R.R.L. Antenna Book*.

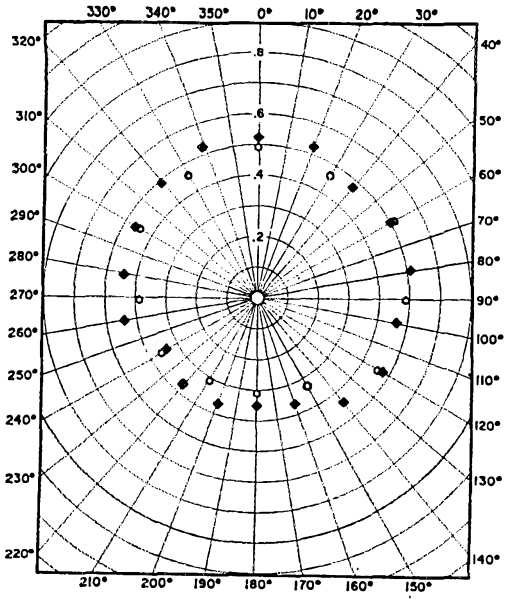
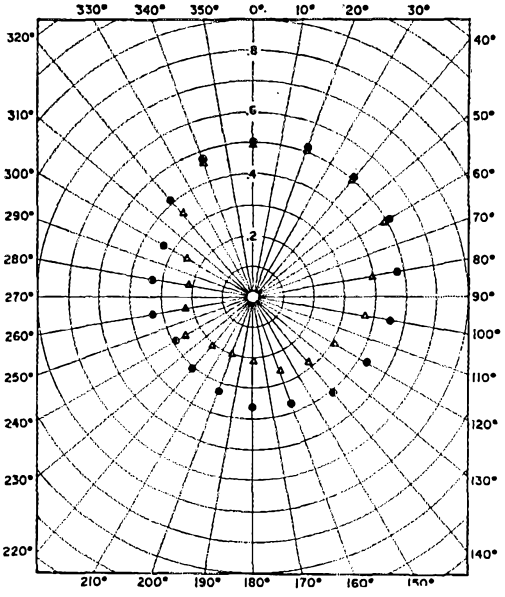


Fig. 3—A: Solid points, experimental data taken on model antenna system shown in Fig. 1, at a frequency of 430 Mc. Open points, 14-Mc. data taken on actual automobile installation.



B: Solid points, experimental data on scale-model car shown in photograph, at 430 Mc., whip vertical. Open points, same with whip tilted 45 degrees.

the patterns of Fig. 2 would be more nearly omnidirectional because of the short length of the radiating elements. Consequently this factor along with the increased usefulness of the higher angles of elevation would reduce any directivity effects for 80- and 40-meter mobile contacts.

It is interesting to speculate about the patterns predicted by the model for an incomplete ground plane installation at a fixed station. On the lower bands, particularly, it is not always practical to extend the long ground radials in a symmetric shape about the base of a vertical antenna. The model should be useful in understanding such cases if the obstruction limiting the ground plane to less than a circle does not likewise prevent the vertical element from being installed in the clear. For example, the patterns for a vertical installed at one corner of a garden would probably differ from those for a vertical next to the corner of a house, even though both conditions might have a 90-degree area that was unavailable for ground radials. Basically, the model suggests that a hole or depression exists in the radiation pattern centered in the area having no radials. Directly opposite the hole is centered a broad field maximum over the ground radials. The hole is a function of the angle of elevation, and its maximum depth is of the order of 6 db. or so below the field in the opposite direction at elevations near 40 degrees. Naturally the hole width could be greatly reduced as the area about the base is more evenly covered with radials.

Experimental Results

The computed patterns were subjected to several checks. One check utilized an experimental model of Fig. 1 at 430 Mc. The wire model was located about three wavelengths from a two-element beam fed by a 6J6 rig from an old *Handbook* design. The detector was a 1N23 crystal operating in the square-law region. The measured *E*-field pattern is given in Fig. 3A for the vertical element perpendicular to ground and an angle of elevation of 15 degrees. There is good general agreement with the calculated pattern of Fig. 2A. Tilting by 45 degrees produced a maximum/minimum gain of 5 db. An increase of radiation in the forward directions was noted at higher elevations.

Of course the primary reason for examining the incomplete ground plane model lay in the degree that it approximated 10–20 meter mobile radiation. Included in Fig. 3A is a mirror image (whip mounted on right rear fender) of some 20-meter *E*-field data taken on the mobile installation of WA4KQO. While the receiving antenna was higher than the whip-Hillman combination, the angle of elevation unfortunately was not measured. It was less than 5 degrees. The experimental points are characteristic of the low-angle radiation from the model.

To further confirm the effects of tilting the whip away from the normal, a 1/15.4 scale model of a Toronado was constructed. At this scale, the 430-Mc. whip was equivalent to a ¼ wave whip on 10 meters. An aluminum foil skin 0.00125 inches thick covered the balsa stringer shell. Fig. 3B presents the measured field strengths at a 15-degree wave angle. Input power remained constant as the whip was tilted. Again comparing the experimental data with the curves of Fig. 2A, it is apparent that the ground-

(*Continued on page 142*)

• *Beginner and Novice*

A Two-Tube 75-Watt Transmitter

Using Parts from an Old TV Set To Keep Costs Down

BY LEWIS G. McCOY,* W1ICP

THIS article describes a crystal-controlled oscillator-amplifier transmitter, capable of 75 watts input, constructed from old TV parts and readily-available materials. One of the problems in building gear these days is obtaining the necessary parts. We have made an effort to make this job as easy as possible while still keeping the cost down.

Every ham should do *some* construction work in order to get a working knowledge of how a transmitter operates. Such construction will prove very valuable in answering many of the questions asked by the FCC when you're seeking a higher-grade license. You'll learn while building and have the nice feeling of having built a piece of gear you can be proud of. Let's take a look at the circuit details of the transmitter.

The Circuit

A 6BQ5 is used as a grid-plate oscillator with either 80- or 40-meter crystals. The plate circuit of the oscillator can be tuned to twice or three times the crystal frequency to provide the proper driving frequency to the 6HF5 amplifier stage, as required for output on the 80- through 10-meter bands. The amplifier can be run with as much as 100 watts input, depending on the power supply and the tank circuit loading.

One feature of this rig is the incorporation of a reflectometer between the pi-network tank circuit and the output terminal. The tank circuit is designed to work into a 50-ohm load, and the reflectometer will show when such a load is obtained. Also, the reflectometer will provide a tune-up output indicator showing when r.f. energy is flowing to the antenna system.

In order to keep construction costs down, an old TV power transformer is used to power the transmitter. We have found that old TV chassis usually can be had for a dollar or two — or even for nothing — from TV servicemen. Such units make an excellent start on a junk box. Most TV transformers are in the 600- to 700-volt range, center-tapped, and will provide about 400 volts d.c. out of the type of filter circuit used in this transmitter. They have plenty of current capability and it is an easy matter to get 75 watts or more power.

Also, many of the fixed resistors and capacitors used in this unit can be found in the old sets.

* Beginner and Novice Editor.

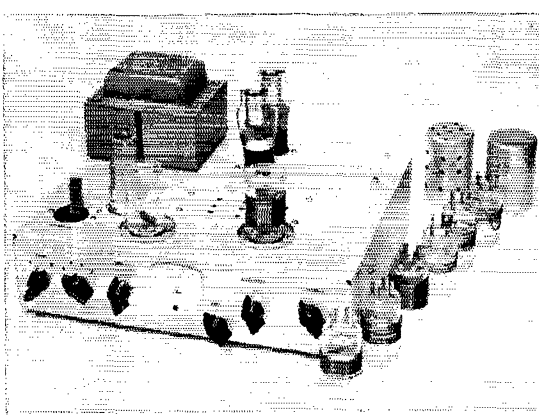
The silicon diodes, CR_3 and CR_4, used in the power-supply circuit rectify the a.c., which is then filtered by two 60-μf. electrolytic capacitors in series across the output terminals of the supply.

Amplifier grid and plate currents are measured by a 0-1 milliammeter connected as a voltmeter. Full scale for grid current is 8 ma. and for plate current is 400 ma. In addition, the same meter can be switched to read the rectified forward and reflected currents for the reflectometer.

Cathode keying is employed in the rig, and by use of S_1 either the amplifier alone or both stages together can be keyed.

In order to simplify construction, plug-in coils are used in both the grid and plate circuits of the amplifier. This type of construction eliminates the complicated switch wiring necessary for a completely bandswitching rig. In addition, it has the advantage that only those coils really desired need be made up.

One of the problems in using plug-in coils is that of providing adequate shielding for TVI. This was taken care of by using coil shields



The controls across the chassis front from the left are: tune-up switch, meter switch, grid tuning, meter sensitivity control, amplifier tuning and loading control. The two coil shields are Millen type 80011. Note that the amplifier shield is perforated with ¼-inch diameter holes. This is done to permit ventilation of the amplifier coil as there is some heat dissipated from this coil.

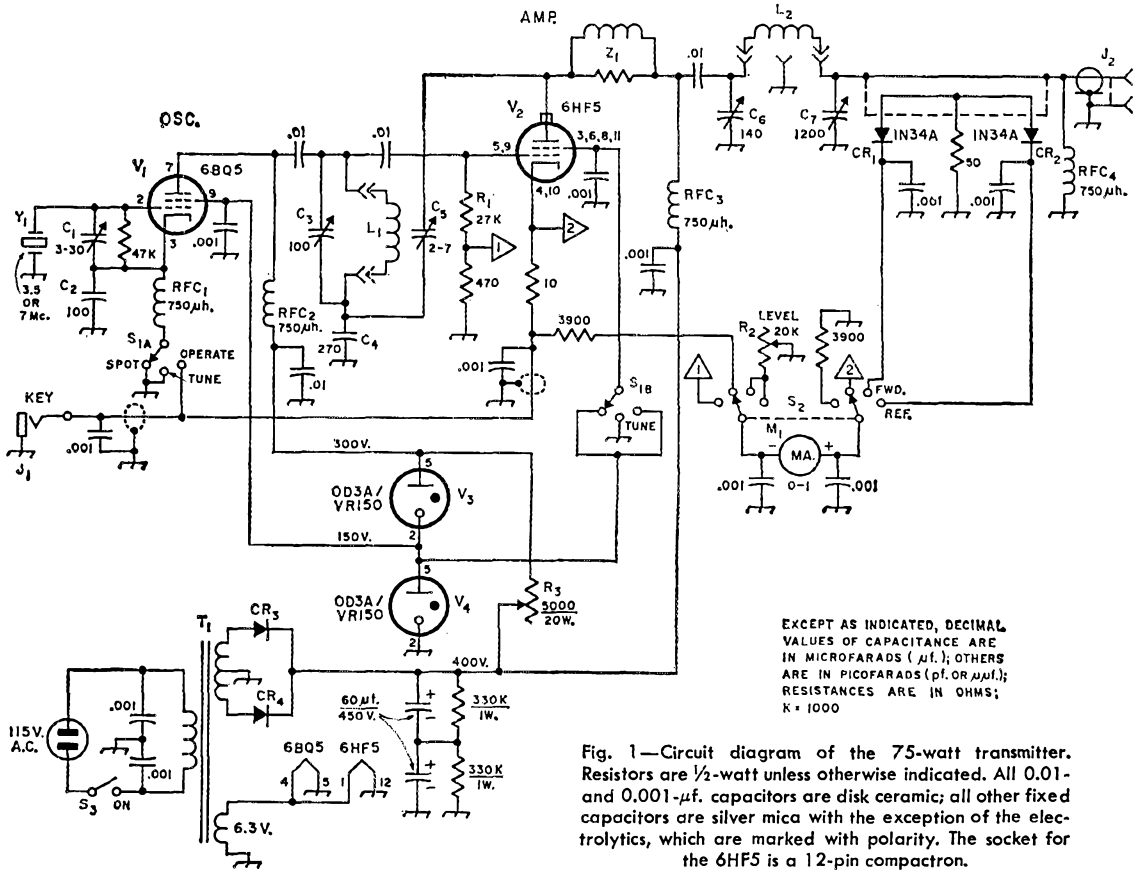


Fig. 1—Circuit diagram of the 75-watt transmitter. Resistors are ½-watt unless otherwise indicated. All 0.01- and 0.001-μf. capacitors are disk ceramic; all other fixed capacitors are silver mica with the exception of the electrolytics, which are marked with polarity. The socket for the 6HF5 is a 12-pin compactron.

C_1—3-30-pf. trimmer.
C_2—100-pf. silver mica.
C_3—100-pf. variable (Millen 26100 or similar).
C_4—270-pf. silver mica.
C_5—1.5-7-pf. trimmer (Centralab 825-EZ, Erie COPO-10R or similar).
C_6—140-pf. variable (Millen 22140 or similar).
C_7—3-section variable, 365-400 pf. per section (broadcast t.r.f. type), with sections in parallel.
CR_1, CR_2—1N34A germanium diodes.
CR_3, CR_4—1400-volt p.i.v., 600-ma. silicon diodes.
J_1—Open-circuit key jack.
J_2—Coax chassis connector, type SO-239.
L_1, L_2—See coil table.
M_1—0-1-d.c. milliammeter.
R_1—27,000 ohms, ½ watt.
R_2—20,000-ohm control.
R_3—5000 ohms, 20 watts, with slider.
RFC_1—RFC_4, inc.—750-μh. r.f. choke (Millen 34300-750).
S_1—Two-pole, five-position rotary, three positions used (Centralab PA1003, Mallory 3226J).
S_2—Same type as S_1, four positions used.
S_3—Single-pole, single-throw toggle.
T_1—TV power.
Y_1—3.5- or 7-Mc. crystal.
Z_1—9 turns No. 20 space-wound on a 100-ohm, 1-watt resistor.

which can easily be removed for bandchanging. TVI, while not the problem it was in the early days of television, must still be reckoned with, particularly if the amateur lives in a fringe area and has harmonically-related TV channels to cope with. This rig has adequate shielding in that the critical points are taken care of.

Construction Method

A 3 × 10 × 12-inch aluminum chassis is used to house the rig. In order to obtain adequate shielding, the amplifier tube, V_2, is mounted on a 2 × 2½-inch bracket below the chassis top. As mentioned before, the plug-in coils are covered by coil shields, and the oscillator tube, V_1, mounted above deck also has a tube shield. In addition, the keying lead which runs from S_1 on the front of the chassis to the key jack on the back is run in shielded line and by-passed at both ends with 0.001-μf. disk ceramic capacitors. With a bottom plate on the chassis, the r.f. shielding is tight. Also, a terminal strip is mounted as close as possible to where the a.c. line enters the chassis and both sides of the a.c. line are bypassed with 0.001-μf. disk ceramic capacitors. This reduces any chances of harmonics escaping via the a.c. line. Reynolds perforated aluminum is used for the bottom plate

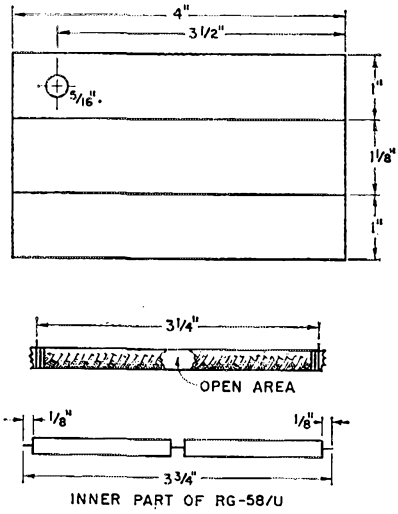


Fig. 2—Construction details of the elements of the reflectometer.

and is screwed with self-tapping screws to the bottom, with the screws spaced no more than three inches apart around the bottom.

The panel meter should also be shielded, particularly if you live in a weak signal area and have harmonically-related TV channels to deal with (Channels 2, 3, 4 and 6). The simplest way to shield the meter is to cut a piece of copper roofing flashing to fit around the meter and another piece to make the back shield where the meter terminals are. Make the holes in the back shield for the meter terminals large enough to clear the terminals. These copper-flashing pieces are easy to solder together, so it is a simple matter to make an effective shield. The shield is soldered to lugs mounted under the meter mounting screws. The meter leads should be bypassed at the meter terminals with 0.001-μf. disk ceramics. Connect the capacitors between the terminal lugs and the copper flashing, keeping the capacitor leads as short as possible.

When mounting C_3 on the chassis front, be sure the shaft of the rotor doesn't touch the chassis, because both the rotor and stator must be insulated from the chassis. The type of capacitor used for C_3 has mounting studs on either side of the rotor, so it is simply a matter of making the rotor hole large enough to clear the rotor. We used an octal socket for the crystal, as these are easy to get from your old TV set. However, if you have a regular crystal socket it can be mounted in the same area as the octal.

In order to provide ventilation for the amplifier tube, ¼-inch holes are drilled in the chassis top, directly over the tube, as is apparent in the top-view photograph. The chassis bottom plate is made from Reynolds perforated aluminum stock. If a solid sheet of metal is used, there won't be adequate ventilation, which in turn would shorten the life of the tube and other components. Also, rubber feet are used to permit flow of air through the bottom.

Reflectometer Details

Fig. 2 shows the essential construction details of the reflectometer. It is similar in construction to the Varimatch[1] except that RG-58/U is used instead of copper tubing. A piece of copper flashing or other solid metal is cut to the dimensions specified, a 5/16-inch-diameter hole is drilled as shown, and the piece is then bent into the form of a U. The end of the U is mounted in the corner of the chassis, as shown in the bottom-view photograph, so that it is flush with the chassis back and is centered around J_2. The outer braid of the coaxial cable is soldered at one end to the inner-conductor pin of J_2 and at the other end to a short piece of solid wire connected to the terminal point mounted on top of the U at the 5/16-inch hole. Make sure that the short length of wire connected to the outer shield doesn't short to the edge of the hole. A length of solid wire, sufficiently rigid to support itself, is connected from the tie point to the stators of C_7, the pi-network loading capacitor. C_7 is a three-section, 365-pf.-per-section variable with the three sections connected in parallel to give a total capacitance of about 1200 pf.

When soldering the 50-ohm resistor to the inner conductor of the reflectometer pick-up sections be sure that none of the hair-like wires of the outer braid short to the connection. Also, make the resistor leads as short as possible. In our case, the other end of the resistor is soldered directly to the copper flashing, with lead lengths held to less than ¼ inch.

The 1N34A diodes can easily be ruined by too much heat when soldering their leads, so a heat sink (pliers or a metal clip) should be attached to the lead between the body of the diode and the soldering point.

Coil Information

The coil table gives all the essential information about the coils. While it may seem a little ridiculous to use wire as large as No. 16 for the grid coils, the builder only needs to get *one* kind and size of wire for all the coils, which makes the shopping chore that much easier. Four-prong coil forms are used for the grid coils and five-prong forms for the amplifier tank.

Fig. 3 shows the wiring of the 80- and 40-meter amplifier plug-in coils. These coils require

[1] De Maw, "The Varimatcher," *QST*, May, 1966.

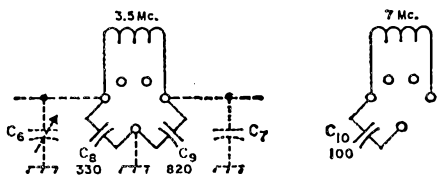


Fig. 3—Connections for the 3.5- and 7-Mc. plug-in coils with their respective capacitors.

C_8, C_9, C_{10}—See coil table.

Coil and Crystal Table

	Crystal	*Grid, L_1*	*Pi Network, L_2*
3.5 Mc.	3.5 Mc	25 μh.[1]	17 turns, close-wound [2, 3]
7 Mc.	3.5 or 7 Mc.	16 turns, close-wound	20 turns, close-wound[4]
14 Mc.	7 Mc.	9 turns spaced over 1-inch winding length	7 turns spaced over 1-inch winding length
21 Mc.	7 Mc.	4 turns spaced over 1-inch winding length	6 turns spaced over 1-inch winding length
28 Mc.	7 Mc.	Use 14-Mc. coil	3½ turns spaced over 1-inch winding length

All coils wound with No. 16 enamel or Nylclad copper wire. Coil forms are 1¼-inch diameter, Allied Radio type 24-4P (four-prong), and 24-5P (five-prong).

[1] 25-μh. r.f. choke (Millen 34300-25).
[2] C_8 — 330-pf. silver mica.
[3] C_9 — 820-pf. silver mica.
[4] C_{10} — 100-pf. silver mica.

additional capacitors, as C_6 and C_7 do not have sufficient capacitance for working into a 50-ohm impedance on these bands. The additional capacitors should be silver mica and should be mounted inside the plug-in forms.

Be sure to scrape the enamel off the coil ends before soldering them to the coil pins. Also, file the ends of the coil pins slightly as they have a nickel covering and the solder doesn't "take" easily to the nickel.

If you are a newcomer or are winding coils for the first time, you'll note that in some of the coils the number of turns is to be spaced over a one-inch length. This means that the turns should be as equally spaced as possible throughout a total length of one inch.

The only coil that isn't wound with No. 16 wire is the 80-meter grid coil. A 25-μh. r.f. choke is used for this band, as it would be difficult to wind a coil of this much inductance on one of the plug-in forms, even with wire smaller than No. 16.

Neutralizing the Amplifier

When you wire the rig, don't make the d.c. plate- and screen-voltage connections to the amplifier tubes until you have completed neutralizing the final. However, all other connections can be made. An absorption wavemeter[2] will make it easy to neutralize the amplifier, so if you don't have a wavemeter try to borrow or build one.

The first step is to tune up the rig on whichever band you have completed coils for. Using the appropriate crystal, turn on the rig and let the heaters warm up. (*Caution:* Check all your wiring before applying power or the "smoke" test.) With the heaters warmed up, close the key and switch the meter to read amplifier grid current. Tune C_3 for maximum grid current. Next, couple the wavemeter to the amplifier tank coil — be sure to remove the shield! — and set C_7 at maximum capacitance (plates fully meshed). Tune C_6 for an indication on the wavemeter. The object in neutralizing is to have the *least* amount of r.f. in the tank coil with C_6 resonated. First, get the maximum reading with the wavemeter and then, using an insulated screwdriver, adjust C_5 to reduce the reading as much as possible. After each adjustment of C_5 you should retune C_6 for maximum, but keep shooting for the setting of C_5 that gives the least reading when C_6 is peaked. It is a good idea to set the wavemeter on a prop or box so that it doesn't have to be moved in relation to the tank coil while you're neutralizing.

Another method of neutralizing, but not quite as accurate, is to adjust C_5 so that there is the least amount of change in the grid current reading on M_1 when the tank capacitor C_6 is tuned through resonance.

[2] *The Radio Amateur's Handbook*, Measurements chapter, or *Understanding Amateur Radio*.

Final Tune-Up and Adjustments

After you have neutralized the amplifier, connect up the screen and plate voltages to V_2. Be sure to turn off the voltages when making these or any other adjustments inside the transmitter. The voltages can be lethal so *always* think twice before you dig into a piece of gear. Make sure all voltages are off and short the power-supply electrolytics to chassis to discharge them.

When you first turn on the rig, observe the VR tubes to see if they are lit. Initially, the complete resistance of R_3 should be in the circuit. If the tubes are not lit, turn off the transmitter and use an insulated screwdriver to short the plus-B line to chassis. This is a safety precaution because the electrolytic capacitors in the supply are slow to discharge and you are liable to get a nasty, or dangerous, shock if you touch the plus-B line. Next, reduce the amount of resistance by moving the slider on R_3, then turn on the rig and see if the VR tubes light. If not, turn off the rig, short the capacitors again (every time you work on the rig, in fact), and move the slider again. The object is to have the VR tubes lit both with the key up, and with the key down and the rig running full input. It may take a few adjustments of R_3 to accomplish this.

With everything connected up you are ready to try the rig on a dummy load. A 100-watt light bulb can be used as a load. We bought one of those dime-store light sockets, connected a piece of coax to the socket terminals — outer braid to one side and inner conductor to the other — and put a coax fitting on the other end. The fitting connects to J_2.

Set S_1 in the tune-up position, which grounds the screen of the amplifier tube, switch S_2 to read grid current, and tune C_3 for maximum grid current. The current should be 5 ma. or more. Next, switch the meter to read plate current, open your key, and set S_1 to either position 1 or 3. C_7 should be set at maximum capacitance. Close the key and tune C_6 for a dip (minimum) in plate current. You'll find that the bulb will light dimly. Next, start decreasing the capacitance of C_7, continually reresonating C_6 and watching the bulb. You should be able to get the bulb almost to the same brilliance as when it is screwed into a regular light socket.

Next, detune C_3 while watching the bulb and you'll notice the bulb will first brighten and then dim. If you detune C_3 far enough the bulb will go out: don't hold this condition long because the amplifier tube will be drawing too much plate current. Adjust C_3 to the point where the lamp is brightest and then check your grid current. You'll find that slightly more than 1 ma. of drive is all that is required for maximum output from the transmitter.

Next, switch the meter to read forward power and set R_2 so the reading is full scale. Then switch the meter to read reflected power and note the reading. A 100-watt lamp bulb is not a perfect 50-ohm load so there should be some reading on the meter. (If it were a perfect load the meter would read zero, indicating a 1-to-1 standing-wave ratio.) In our case, with the bulb at nearly the same brilliance as when plugged into the 115-volt a.c. line, the reflected reading was about 3 on the meter, which was calibrated from 0 to 10.

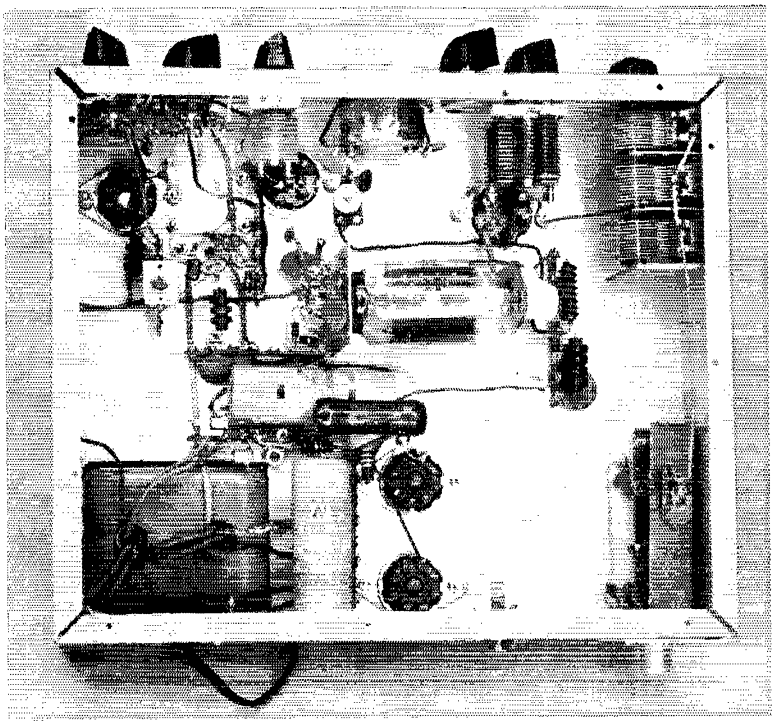
In the grid circuit of V_1, C_1 is an adjustable feedback capacitor. Tune up the transmitter on the highest frequency band you have made coils for, and with the rig running into the dummy load, set the meter to read grid current and adjust C_1 for maximum drive.

Using the Rig with an Antenna

We have no way of knowing what type of antenna the builder will use, but a couple of points are worth passing on. First, we highly recommend the use of a transmatch between the transmitter and antenna system, particularly for Novice use. A transmatch used in conjunction with the antenna system will provide the proper load for the rig and will reduce or eliminate harmonics. This last is very important to the Novice operating on 80 meters. A suitable transmatch was described in a recent issue of *QST*.[3] This unit was designed to be used with either tuned lines, such as open wire or Twin-Lead feeders, or with coax-fed antennas. Regardless of the antenna system used, the transmitter should be connected to the transmatch via a

(Continued on page 138)

[3] McCoy, "A Transmatch for Balanced and Unbalanced Lines," *QST*, October, 1966.



The oscillator components are grouped in the upper left hand corner in this view. At the lower left hand corner are the power supply parts. The trimmer just to the rear of the meter is C_5, the neutralizing capacitor. At the lower right hand corner is the reflectometer.

THE KIT CHECKER

A Simple Tester for New and Old Gear

BY BOLESLAW A. SKURNOWICZ,* W3OSJ

THERE is always a need for checking out a piece of equipment after it has been assembled from a commercial kit. Homemade equipment is deserving of the same treatment. One way to be sure that the gear won't go up in smoke when it is first turned on is to go over all of the wiring, completely and carefully, checking resistance readings from B plus to ground, across the transformer windings, and in other parts of the circuit where resistance readings can be compared against those given in the instruction manual.

A more certain way to avoid smoking components when you first turn the switch to ON, is to install the simple tester described in this article, between the equipment and the 115-volt line. The kit checker protects the gear being tested, even if a dead short is present in the circuit. The checker places an ordinary 115-volt incandescent lamp in series with the a.c. input to the piece being tested, thus causing the bulb to consume power from the line when a shorted, or partially shorted circuit exists. The checker also includes a means for measuring the a.c. current being drawn by the equipment.

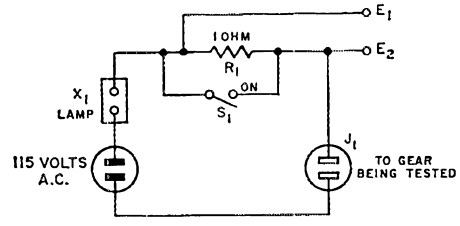


Fig. 1—Schematic diagram of the kit checker. X_1 is an incandescent lamp socket, test points E_1 and E_2 can be insulated pin jacks, and S_1 can be any s.p.s.t. switch that will handle the current being drawn through the circuit. R_1 is discussed in the text. J_1 is a female a.c. receptacle.

Inexpensive Construction

Ordinary household electrical hardware can be used to build the checker of Fig. 1. The layout used should insure against accidental contact with the 115-volt line. A wooden box can be used to house the unit, or a metal utility cabinet will work nicely. The lamp socket, X_1, can be the porcelain variety used for surface-type house wiring. All components can be purchased for less than two dollars.

Using the Checker

As mentioned earlier, the equipment should be given a careful inspection, visually, then checked for proper resistance readings as specified in the instruction book. Once this has been done, the line cord from the equipment can be plugged into J_1 of the tester. Next, plug a 25-watt, 115-volt lamp into socket X_1. Place S_1 in the ON position. When the equipment under test is turned on, the bulb should light to approximately half of normal brilliance if no serious shorts exist. If the bulb becomes *very* bright, this indicates that an abnormally heavy load is being drawn by the equipment and that a short or partial short is present. The larger the lamp used, the greater will be the amount of current that can flow to the load. A 25-watt bulb will allow up to 0.25 ampere to flow. A 50-watt bulb will permit a flow of up to roughly 0.5 ampere. A voltage reading can be taken across the lamp at any time and if this reading approaches that of the line voltage itself, there is trouble in the equipment under test.

If the equipment is working normally, its voltages (bias, B plus, and filament) will be lower than specified by the manufacturer when the tester is in series with the line. The larger the bulb used at X_1, the higher the circuit voltages will be.

Once it is determined that the equipment is working properly, the light bulb can be replaced by a fuse of appropriate value for the equipment being tested. Generally, a 5-ampere fuse will suffice for all but the largest of equipment. Next, the voltage across R_1 can be measured, with S_1 open, to determine how much current is being drawn by the equipment. A voltmeter is connected between E_1 and E_2. A reading of one volt, for example, equals one ampere of current. Five volts equals five amperes, and so on. CAUTION: Resistor R_1 will handle a maximum of five amperes, only, so make the tests short in duration. Combinations of paralleled 25-watt resistors can be used to permit measurements on larger equipment, if desired.[1] Although R_1 will not be a precision unit, the results of the tests will be accurate enough to permit a comparison between the manufacturer's stated current figures and those that are calculated from the voltage drop across R_1.

The checker can be used to trouble shoot appliances, also, such as toasters, electric irons, motors, and the like. It is useful for working on all types of electrical equipment. QST

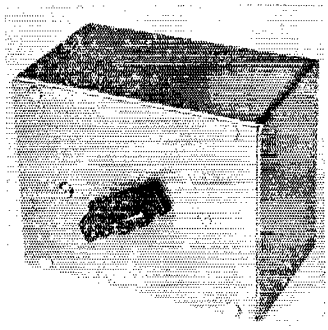
* R.D. 1, Gouldsboro, Pa. 18424.

[1] If size and cost are not of great importance to the builder, larger resistors can be used at R_1. One-ohm resistors are available in 100-, 175-, and 225-watt ratings. — *Editor*

A *Really* Rugged Coaxial Switch

One application of the new Millen high-power r.f. switch[1] that particularly interests us is for switching separate coaxial lines. As the switch is rated for 13,000 volts (!) and has silver-plated 20-amp. contacts, it should more than handle any amateur transmitter, even with a high s.w.r. in the line.

Before constructing the coaxial assembly shown in the photographs there was some apprehension that because of the size of the switch and the wide spacing between contacts, the completed unit might cause an appreciable mismatch in the line. However, with the construction method shown in the photographs it turned out that there was no need to worry. Testing the switch into a flat 50-ohm load showed that no observable mismatch was introduced, at least not at frequencies up through 30 Mc.



A 3 × 4 × 5-inch Bud aluminum utility cabinet is used to house the coaxial assembly. Special care must be taken in lining up the holes in the front and back covers of the box because the switch is mounted between these two covers. The switch that we had came with six contacts, but only five were used. There is adequate room for the coaxial connectors on the back of the box if the number of lines to be switched is held to five.

Drill the front and back panels as shown in Fig. 1. The switch shaft extends about ⅛ inch out the back, so a clearance hole is required. Also, make sure that the edges of the coax fittings are ½ inch in from the edge of the cover, otherwise

[1] New Apparatus, *QST*, July, 1936, page 29.

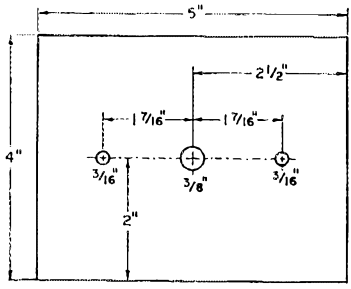
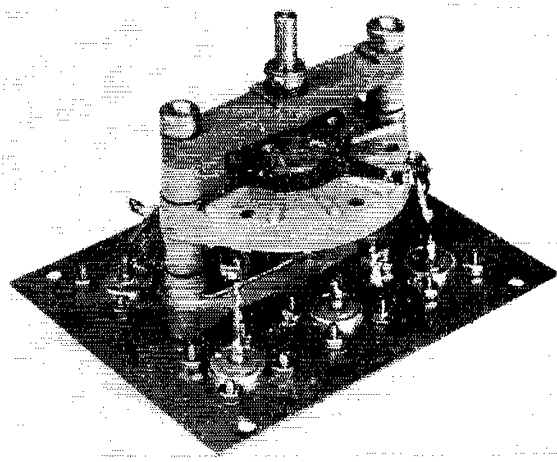


Fig. 1—The front and back panels of the utility box are both drilled as shown above.

the mounting screws won't clear the lip around the inside of the cabinet. If you use a painted utility box, remove the paint from under the coax fittings in order to get good ground connections. An unpainted box will save trouble.

No. 12 solid copper wire is used to make the connections from the switch terminals to the coax fittings. Keep the leads as short as possible.



The leads from each of the SO-239 coax fittings are kept short to reduce any impedance mismatch. As can be seen from this and the other photograph, the switch is supported on both the front and back box panels.

All soldering and wiring can be done with the switch mounted on the back panel, and when the connections are completed install the assembly in the box and mount the front panel. Don't forget to mark or letter the various sockets, because it is easy to make a mistake as to which is the common terminal.

As with other switches, don't change feeders with power going through the lines. With a switch as rugged as this one you probably could, but it isn't recommended.

Total cost of the complete assembly is about $15 — less than that if you use surplus coax connectors. — *W1ICP*

QST ——— QST ——— QST

Image Dipper

BY DAN UMBERGER,* W8ZCQ

While listening for intruders in the amateur bands, I began to wonder if I was actually hearing intruders or some combination of beats and signals cooked up by my receiver. An idea came to mind for a gadget that would indicate if a signal was in an amateur band or elsewhere. Over a period of years, I had used series-tuned traps to get rid of a lot of things I didn't want to hear. Now a calibrated series-tuned circuit would help me to identify the frequency of an interfering signal.

The gadget is pictured in Fig. 1 and its circuit in Fig. 2. All of the parts came from my junk box. By using plug-in coils, I was able to cover the two ranges I was most interested in, 6.2 to 14 Mc. and 13.8 to 23 Mc. Old octal tube bases made good no-cost coil forms. Phono connectors were used to mate with existing fittings on my receiving equipment. The tuning capacitor was from an old f.m. tuner and the scale was just a sheet of heavy white paper pasted on the front of an old utility box. The words "image dipper" on the face of the unit point out the fact that many of the signals that I thought were intruders turned out to be images.

* 2753 Elliott Ave., Columbus, Ohio.

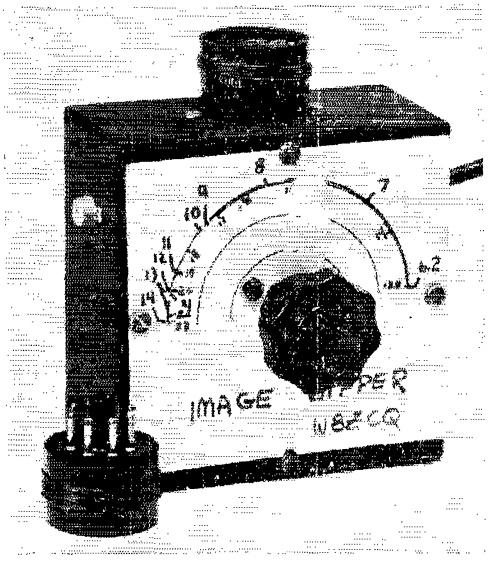


Fig. 1—W8ZCQ's image dipper. The cable at the right is part of a two foot length of RG-58/U that terminates in a phono plug.

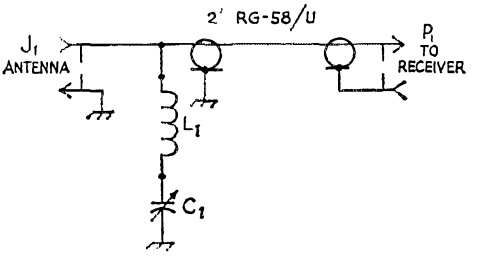


Fig. 2—Circuit diagram of the image dipper. J_1 is a phono jack and P_1 is a phono plug. The component values given below may have to be changed to obtain the designated ranges, depending upon the receiver input circuit.

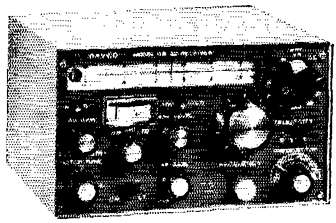
C_1—140-pf. variable.
L_1—6.2-14 Mc.: 8 turns No. 22 enamel, 1¼-inch diam., closewound on octal tube base.
13.8-23 Mc.: 5 turns No. 22 enamel, 1¼-inch diam., closewound on octal tube base.

Calibration of the image dipper is simple if a grid-dip oscillator is available. Connect the series wave trap to the antenna-input terminals of the receiver and attach the receiving antenna to the image dipper. With the g.d.o. loosely coupled to the trap, mark as many calibration points as desired on the dial scale. Note, however, that switching the receiver to another band or varying the input circuit may effect the accuracy of the calibration. To use the image dipper, simply tune the gadget through its range while listening to a suspected intruder. If the signal doesn't disappear or become greatly reduced in strength when the dipper and the receiver are tuned to the same frequency, the "intruder" is not an intruder at all, but is some sort of receiver product. QST

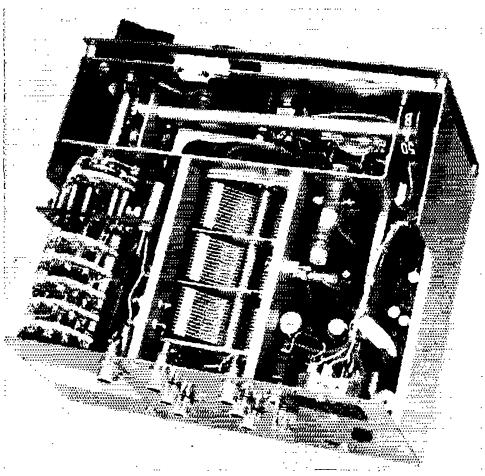
Recent Equipment

To acquaint you with the technical features of current amateur gear.

Davco DR-30 Receiver



THE DR-30 is a miniature solid-state receiver that employs 25 transistors and 13 diodes in a modern-day circuit. It tunes all of the ham bands from 3.5 through 50.5 Mc. There are three additional bandswitch positions, one for monitoring WWV and two blank positions that can be used to tune additional 540-kc. sections of the h.f. spectrum. The receiver was designed with portability and compactness in mind and it is small enough to be held, easily, in one hand. Included in the design are such features as upper and lower sideband selection, variable selectivity, notch filtering, and a blanker-type noise limiter. A further reflection of Davco's state-of-the-art approach is seen in panel-controlled variable a.g.c. attack times, fast, medium, and slow. The likelihood of front-end overload, cross-modulation, and poor image rejection has been greatly reduced by the use of field-effect transistors (FETs) at the r.f. and first-mixer points in the circuit. The early-model Davco receivers used conventional transistors in that part of the circuit and strong-signal difficulty was experienced in certain areas of the country.



Topside view of the Davco DR-30. The three-section variable at the center is the main tuning control. Bandswitching is done with the 6-section ceramic rotary switch at the left of the chassis.

The good frequency stability of the receiver is due, in part, to the use of a crystal-controlled first-conversion oscillator, Q_2 of Fig. 1. Because crystal oscillators of good design are innately stable, the receiver's overall stability is determined to a greater degree by the v.f.o., Q_9, which tunes from 1960 to 2500 kc. The latter is the second-conversion oscillator in the double-conversion lineup.

Returning to the input section of the receiver, Fig. 1, front-end transistor Q_1 is protected from strong-signal burnout by two back-to-back connected diodes, CR_1 and CR_2. The diodes are bridged between the antenna tap on the input inductor and ground. When an incoming r.f. signal reaches approximately 0.5 volt, the diodes short circuit the input signal to ground, protecting the input transistor. The use of FETs at Q_1 and Q_3 helps to eliminate the overload problems mentioned earlier. When compared to ordinary transistors, FETs offer the advantages of near square-law operation. This feature is particularly beneficial in reducing cross modulation. Also, FETs are voltage-operated like vacuum tubes, permitting the use of high-impedance tuned circuits. Since no compromise between power transfer and Q is required, as would be the case if conventional transistors were used, the selectivity of the tuned circuits can be made better. This means that the image rejection should be comparable to that of a vacuum-tube front end of similar design. Further, FETs are far less noisy than conventional transistors, offering a better signal-to-noise ratio.

The first i.f. is produced at the mixer stage, Q_3, and covers the range from 2405 to 2955 kc. The signal is amplified by Q_{4A} before reaching the second mixer, Q_5. The v.f.o. output, 1960-2500 kc., is amplified by Q_{10} and is then heterodyned with the first i.f. energy to produce the second i.f. of 455 kc. at Q_5. The 455-kc. signal is ampli-

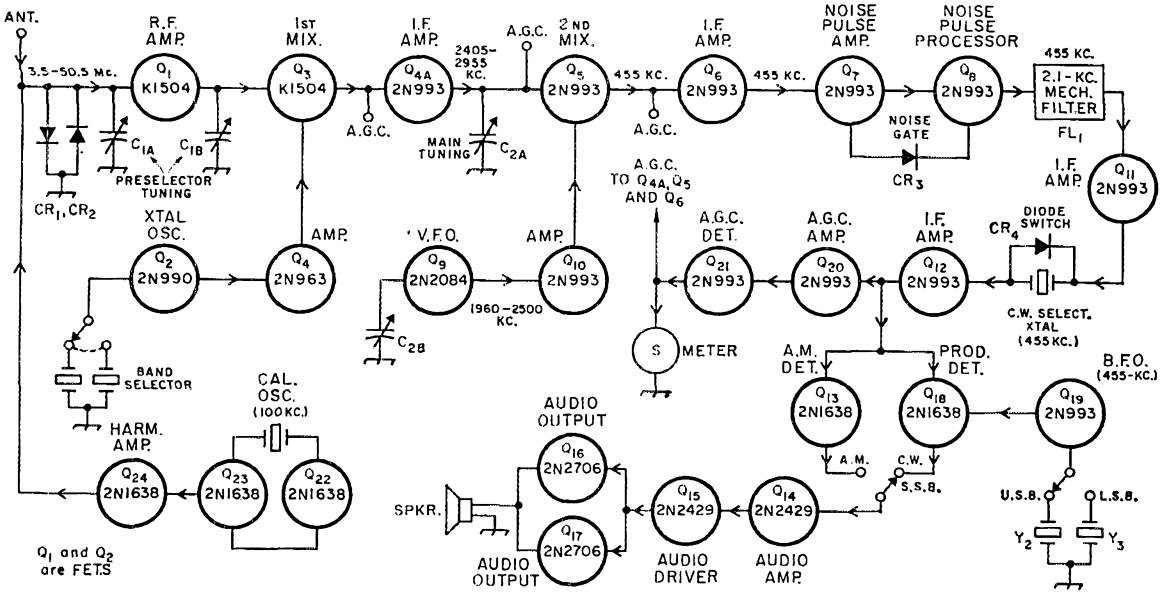
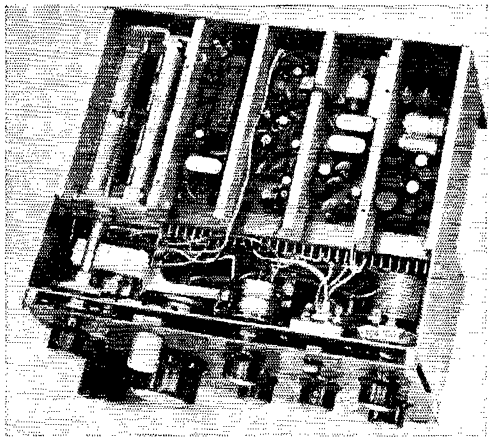


Fig. 1—Block diagram of the Davco DR-30 receiver.

fied by Q_6 and is then fed to the noise-pulse amplifier/processor circuit which consists of Q_7 and Q_8. At Q_7 the noise pulses are amplified and their rise time is increased. The noise pulses are not significantly lengthened, however, as would be the case if they were removed *after* the highly selective i.f. filters. Further processing of the noise energy is effected by Q_8 which produces a pulse that operates the diode gate, CR_3. This diode acts as a switch and mutes the receiver when it is turned off by a noise pulse that is riding through the i.f. channel. The philosophy behind locating the noise-limiting circuitry in the early stages of the i.f. system is to prevent the reduction in receiver sensitivity brought about by high values of noise-derived a.g.c. voltage. Receivers that use conventional a.n.l. circuits at the second detector are not protected in this way. The degree of noise limiting is set by a front-panel control (A.N.L. LEVEL) which adjusts the bias on CR_3, establishing the level at which noise pulses will trigger the diode switch.

Additional diodes (not shown in the block diagram of Fig. 1) following the circuit of Q_8 are used as switches to establish any one of three degrees of selectivity available in the DR-30. The diodes are made to switch by applying d.c. bias to them from a front-panel selectivity control. In the broad-selectivity position three ceramic filters are used to establish a 5-kc. bandwidth. This setting is used for a.m. reception. The medium-selectivity position results in a bandwidth of 2.1 kc. which is set up by the mechanical filter, FL_1, placed in the i.f.-signal path by one of the switching diodes. This setting is useful for a.m., s.s.b., and c.w. reception. In the 0.5-kc. selectivity condition, the width of the i.f. passband is determined by a 455-kc. crystal, Y_1, Fig. 2, through which the signal must travel. Diode switch CR_4 acts as a short circuit across Y_1 when biased into conduction by an external d.c. voltage, thereby removing Y_1 from the circuit. When the bias is removed from CR_4, the switch opens and the 455-kc. crystal is in the circuit.

The i.f. signal is given additional amplification by Q_{12} after which it is routed to the a.g.c. amplifier, Q_{20}, to the a.m. detector, Q_{13}, and to the product detector, Q_{18}. Output voltage from the a.g.c. detector, Q_{21}, is used to operate the S



An under-chassis look at the DR-30. The two-section variable at the upper left is the preselector peaking control. A planetary drive is used with it to slow down the tuning rate. The Collins mechanical filter and the 455-kc. c.w. selectivity crystal are mounted in the chassis compartment to the right of the variable. The tuning capacitor at the lower right of the photo is used to tune the rejection notch across the i.f. passband.

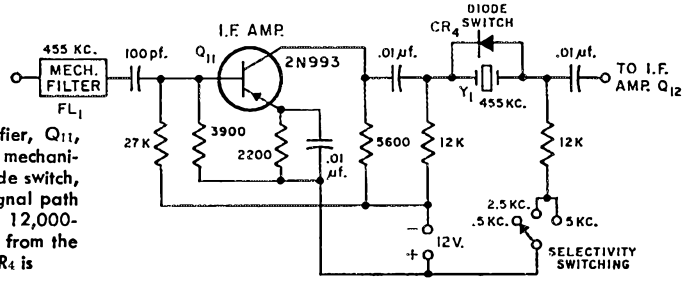


Fig. 2—Schematic of the i.f. amplifier, Q_{11}, showing the relationship between the mechanical filter and the crystal filter. A diode switch, CR_4, places the crystal, Y_1, in the signal path when the d.c. bias is changed. Two 12,000-ohm resistors serve to isolate the r.f. from the d.c. supply. The operation of CR_4 is discussed in the text.

meter and to control the gain of stages Q_{4A}, Q_5, and Q_6. A front-panel switch selects the proper detector for s.s.b./c.w. reception (Q_{18}), or for a.m. (Q_{13}). When Q_{18} is switched into the circuit, the b.f.o. is activated by the mode switch and furnishes the necessary injection signal for upper- or lower-sideband reception. The b.f.o., Q_{19}, is crystal-controlled by Y_2 for upper-sideband. When Y_3 is switched into the circuit, the lower sideband can be received. Audio output from the detector in use is amplified to loudspeaker level by the audio-channel transistors Q_{14}, Q_{15}, Q_{16}, and Q_{17}.

A bonus feature in the DR-30 is a variable notch filter which follows i.f. amplifier Q_{12}. The depth of the rejection notch is factory-set by means of a rear-panel adjustment. The notch is tunable across the i.f. passband by using a front-panel control, labeled NOTCH TUNE. The manufacturer states that up to 60 decibels of rejection is possible with the circuit. Another feature of the Davco receiver is its built-in 100-kc. crystal calibrator. Transistors Q_{22} and Q_{23} function as the oscillator. Output from this circuit is fed into the harmonic amplifier, Q_{24}, which builds up the strength of the marker signals to a satisfactory level for use in the upper h.f. range of the receiver.

Mechanically, the DR-30 resembles the Rock of Gibraltar. An aluminum extrusion, 3/16 of an inch thick, serves as the main chassis for the receiver. The printed-circuit boards are securely attached to the heavy chassis, contributing to better-than-average mechanical stability. As a test, the writer tuned in a weak c.w. signal with the selectivity at 0.5 kc., then dropped the receiver from a height of approximately 10 inches. There was no significant shift in the pitch of the c.w. note when the DR-30 hit the desk. It would seem that this type of construction would be ideal for mobile work. The tuning capacitor is gear driven and the drive assembly is mounted on another heavy-gauge aluminum extrusion, a further aid to the mechanical stability of the receiver.

The power requirements call for a well-filtered d.c. supply that is capable of delivering between 11.5 and 16 volts. The maximum current drain will be approximately 300 milliamperes with the panel lights switched on. If the lamps are turned off, the drain will drop to about 150 milliamperes. The critical voltages in the receiver are regulated by Zener diodes; therefore there can be some latitude in the value of supply voltage to the receiver without impairing its performance. The DR-30 can be operated from a dry-battery pack, from wet cells, or from an a.c.-operated d.c. supply. The instruction book gives a circuit for the latter, should the owner wish to build one.

The slide-rule dial is calibrated in 5-kc. steps,

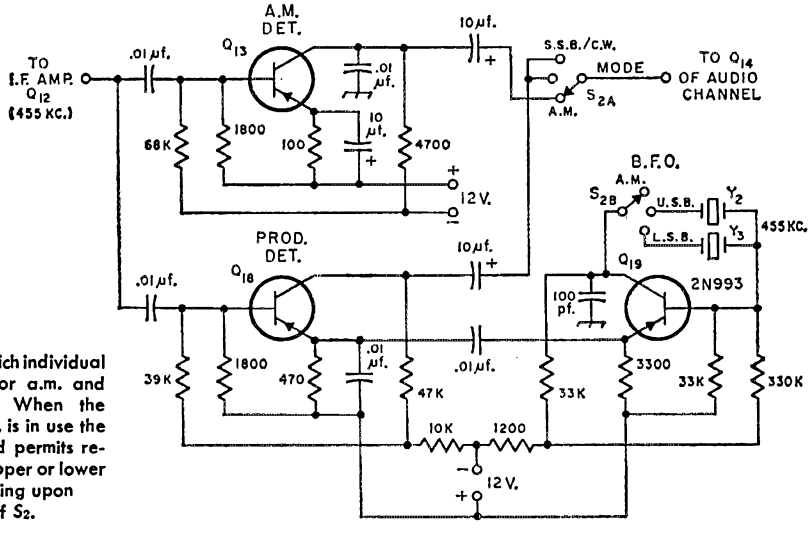


Fig. 3—Method by which individual detectors are used for a.m. and s.s.b./c.w. reception. When the product detector, Q_{18}, is in use the b.f.o. is activated and permits reception of either the upper or lower sideband, depending upon the position of S_2.

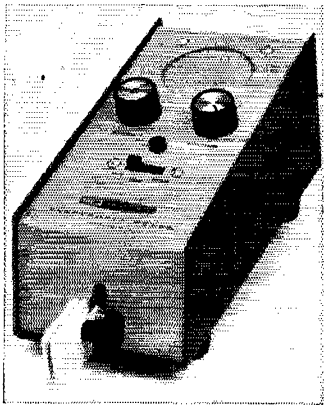
with the skirt on the main tuning marked off in 2-kc. increments. It took a bit of "getting used to" when operating so small a receiver, but after an hour or so of tuning the DR-30, we grew accustomed to handling the controls and the operation felt quite comfortable.

Two-tone cabinetry is used on the DR-30. The outer case is finished in light gray and the panel is painted a darker gray and has a gloss finish. Black knobs with chrome satin inserts are used on the various controls, contrasting nicely with the color of the front panel. — *WICER*

Davco DR-30

Height: 4 inches.
Width: 7⅛ inches.
Depth: 6 inches
Weight: 7 pounds.
Power Requirements:
11.5 to 16 volts d.c. at 300 ma. maximum.
Price Class: $100.
Manufacturer: Davco Electronics, Inc., P.O. Box 2677, Tallahassee, Florida 32304

Heath HD-10 Keyer



C.w. buffs haven't been forgotten as far as the Heath Company is concerned. Proof of this can be seen in the Model HD-10 transistorized keyer. Complete with power supply and paddle, the keyer features its own built-in monitor, permitting the operator to listen to side tone with headphones, or by monitoring with the miniature built-in speaker on the top panel of the HD-10.

Making the keyer even more flexible, a terminal block is mounted on the rear apron of the cabinet, permitting external connections for various functions. An outboard paddle can be connected to the terminals, allowing the operator to select between the built-in key or the externally-connected unit. Some other terminals make possible the addition of dry batteries for powering the keyer during emergency or portable operation. A straight hand key can be connected to the rear terminals too, making the HD-10 useful for that type of c.w. operation.

Assembly time is minimized because the greater part of the circuit is on a printed-circuit board. Since there is little mechanical work to be done, the keyer goes together rapidly and without some of the head-scratching episodes experienced when wiring up the more complex kits. Actually, it was a pleasurable experience in kit building for this writer.

One of the most emotion-mixed moments for a kit builder comes when the project has been completed and it is time to turn the equipment

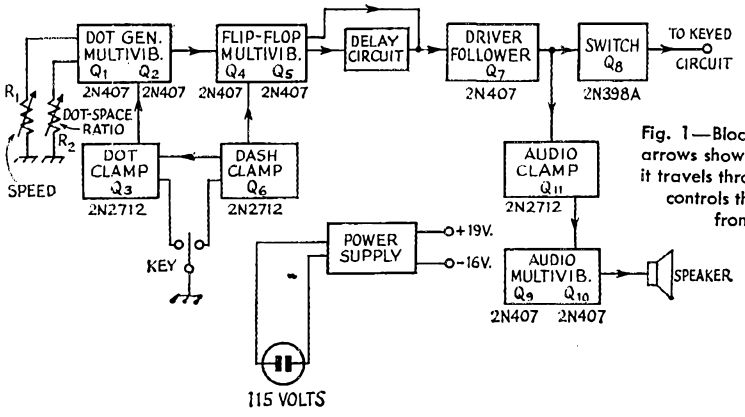
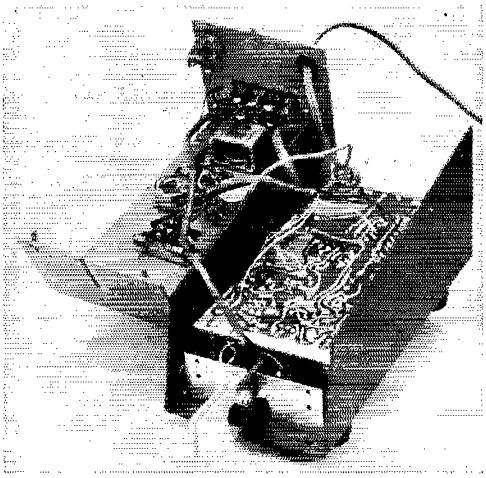


Fig. 1—Block diagram of the keyer. The arrows show the direction of the signal as it travels through the circuit. R1 and R2 are controls that are accessible from the front panel of the keyer.



Inside view of the keyer. The top half of the case is removed to show the circuit board, at the right, and the parts which are mounted on the top cover, shown at the left. Multi-conductor cable is used to interconnect the two parts of the assembly.

on to see if it will play. Happily, when the HD-10 was plugged into the wall outlet and the function switch placed in the OPERATE position, the neon panel lamp lit up and no smoke poured forth from the cabinet. An experimental test with the paddle produced dots and dashes. The speed control varied the words-per-minute output of the keyer, and the monitor speaker provided sufficient output for comfortable room volume.

Because this writer is not a c.w. demon, the keyer was set up for the optional 10 to 20 w.p.m. speed. The usual choice, for the seasoned c.w. man, would no doubt be the 15 to 60 w.p.m. range. The desired speed must be determined prior to assembling the kit so that the proper resistors can be soldered into the circuit board. Resistors for both speed ranges are furnished by the manufacturer.

The Keyer Circuit

A total of 11 transistors and 7 diodes comprise the solid-state complement of the HD-10. The block diagram of Fig. 1 shows how the various circuits are integrated. (Basically, the circuit is similar to the one described by W5LAN in May 1959 *QST*,[1] although there are of course considerable differences in detail.) The dot generator, consisting of Q_1 and Q_2, is a free-running multivibrator. This stage is turned on and off by the dot-clamp circuit of Q_3. The key's dot contacts control Q_3 which in turn biases the dot generator in and out of conduction by applying a positive voltage to, or removing it from, the base of Q_2. The switching speed of the dot generator is varied by the setting of R_1. The dot-space ratio is controlled by R_2, a screw-driver adjust control, whose shaft is concentric with that of R_1. The clutch-coupled shafts turn together as R_1 is adjusted, maintaining the dot-space ratio as the speed is increased.

A flip-flop multivibrator, Q_4Q_5, is controlled by the dash-clamp circuit of Q_6. The dash contact of the keying paddle controls Q_6, which in turn changes the bias on Q_4, turning it on or off. A delay circuit, consisting of several capacitors and resistors, is connected between the output of Q_5 and the input of the driver follower, Q_7. This circuit insures that the output switching caused by the flip-flop multivibrator slightly overlaps that of the dot generator when the dashes are formed. If the overlap did not take place, there would be holes in the dashes, not unlike those caused by contact bounce with bug keys, or relays.

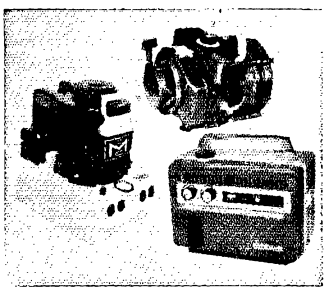
The driver-follower transistor, Q_7, receives dot and dash signals from the multivibrators. In turn, Q_7 operates the audio-clamp stage, Q_{11}, and triggers the switch transistor, Q_8. The audio clamp controls Q_9 and Q_{10}, which work together in a multivibrator which oscillates at audio rate. The latter produces the monitoring signal which is heard in the speaker. As Q_8 is driven in and out of conduction by the pulses from Q_7, the transmitter is keyed through the collector-emitter junction of Q_8. Because of the ratings of the switch transistor, the keying-line current is limited to a maximum of 35 milliamperes. The maximum permissible voltage, open-circuit or spike value, is −105 volts. These limits make the keyer most useful with transmitters that employ grid-block keying. For other types of transmitter keying where either the voltage or

(*Continued on page 140*)

Heath HD-10 Keyer

Height: 4¼ inches.
Width: 3¾ inches.
Depth: 10½ inches.
Weight: 5 pounds.
Price Class: $10.00.
Manufacturer: Heath Company, Benton Harbor, Michigan. 49022

Next Month



Lightweight Portable A.C. Generators

[1] — Old, "Transistorized Electronic Key and Monitor," *QST*, May, 1959.

Technical Correspondence

PSEUDO-RANDOM SCANNING

Technical Editor, *QST*:

For a number of years now, Professor Deutsch's work on pseudo-random scan has been watched by those of us interested in furthering the cause of narrow-band TV, and I read the latest report by WA2PYX ("Technical Correspondence," October 1966 *QST*) with interest.

If we had perfect image storage devices, the question of scanning patterns would be unimportant; but since the only storage device most hams can afford is the lowly long-persistence cathode-ray tube, the best utilization of the characteristics of this device is vital, and the points raised by WA2-PYX deserve further discussion.

P7 is a long-persistence phosphor representative of types readily available to hams. Typically, its brightness drops from 100 percent at excitation, to 10 percent after 1 second, to 1 percent after 12 seconds.[1] This is not ideal for any scanning pattern, and the question resolves itself into one of the subjective effect on the viewer. In a several-second linear scan system, the effect is one of a picture slowly "wiping" on, with the inevitable brightness variations occurring smoothly as the distance from the "writing line" increases. (With frame times of one second or longer, this effect is *not* a physiological "flicker" as was pointed out in one of Bell Lab's picture-phone patents; U.S. 2,922,843.) Phosphor decay in a pseudo-random scan system produces a random brightness modulation in the fine detail structure of the picture.

Pseudo-random scan has an undeniable advantage over linear scan at frame times less than one second where (1) true "flicker" exists, and (2) adjacent picture element brightness modulation or "noise" does not reach unacceptable proportions. The basic question is, however, whether any ½-second frame time slow-scan system represents an optimum for amateur use in the h.f. bands. Regardless of scanning pattern, we are faced with the basic time-resolution-bandwidth trade-off: Fixing any two parameters fixes the third also. Thus, for any given bandwidth, the longest possible frame time will give the greatest picture detail.

Eight-second frame time linear scan gives a picture in which the last frame's brightness fades to a marginally useful level just as new picture information is "wiped" over the old — a desirable situation when information changes from frame to frame. At long frame times (several seconds) pseudo-random scan loses its advantage over linear scan because phosphor decay causes a large pseudo-random brightness difference between adjacent elements that appears as noise modulation of an otherwise noise-free picture.

No ½-second frame-time system, linear or pseudo-random, represents an optimum solution for the h.f. bands because it does not make full use of the maximum storage time capability of available CRT phosphors. This results in a requirement for unnecessarily high bandwidth or produces unnecessarily low resolution. Practical bandwidth on long-distance paths is generally less than the 2 to 8 kc. suggested by WA2PYX. QRM considerations, multipath effects, fading, and utilization of existing station gear all point to adoption of a frequency-modulation system similar to that used successfully for many years in long-distance facsimile transmission [2, 3, 4]. This requires 2.5 kc. of "on-the-air" bandwidth with s.s.b. equipment and 5 kc. with a.m. It provides about 1 kc. of "useful" video bandwidth. This would give a very low resolution ½-second picture. Even if wider bandwidth techniques were used (such as bandwidth-limited 6-kc. vestigal sideband f.m. on "good" ionospheric paths) I think most of us with appreciable on-the-air slow-scan experience would rather see the additional bandwidth used to buy more resolution than reduced frame time.

Where pseudo-random scan seems to me of great value is in a 50- or 100-kc. system for the v.h.f. bands where its flicker-reduction capability would permit a reasonably high-resolution system capable of transmitting some motion. It is possible that the FCC might favorably consider a system of this type on frequencies where wide-band f.m. is now permitted, since the bandwidths are similar. *Copthorne Macdonald, W1ONLQ, 5596 Old Stage Road, Boulder, Colorado 80302*

[1] RCA data on R7 phosphor

FIRE HAZARD

Technical Editor, *QST*:

An incident happened to me recently, which, in the interest of safety, it might be well to report.

I was awakened by a sputtering sound and a flicker of light from the radio shack, in an adjoining room. Rushing into the shack I found the control box of my TR-44 rotator ablaze with a noisy arc. After pulling the plug and assuring myself that no further danger existed, I returned to bed. Post mortem was held the next morning.

Apparently the small wire spring which holds the switch lever in contact position had rubbed against the primary contacts on the wafer. That side of the switch was completely burned away. What remained of the spring was fused to the shaft bushing, with a little ball of metal on the end to show where the arc had flared.

The 3-amp fuse in the line was still intact — with the odds being 50-50, it was in the grounded side of the line! My rig draws power from a separate 220-volt circuit, with No. 6 wire from a 100-amp. entrance. The 30-amp breakers in that circuit will stand up under considerable load. I was fortunate to come out with nothing more serious than a charred wafer switch and a badly-singed control box.

After this incident I checked into my Ham-M rotator. I find that it is fused in both sides of the primary circuit. Needless to say, when the TR-44 is repaired, it will be also. — *Frank Greene, K5IQL, 303 South C Street, Yale, Oklahoma 74085.*

[EDITOR'S NOTE: Accidental grounds can be a real hazard, as too many amateurs have found out, to their sorrow. Fusing both sides of the line, and using a double-pole switch to break both sides when the equipment is not actually in use, is the only really safe procedure.]

[2] Mathes, et al, "Radio Facsimile by Subcarrier Frequency Modulation," *RCA Review*, Vol. 3, 42f, 1938.

[3] Atwood, "Diversity Receiving System for Radio Frequency Carrier Shift Radio-Photo Signals." *RCA Review*, Vol. 12, 177f, 1951.

[4] Macdonald, "SCFM — An Improved System for Slow-Scan Image Transmission," *QST*, January 1961.

MOS CAUTION

Technical Editor, *QST:*

In reference to the v.f.o. article that appeared in December *QST:* There should be a warning about handling of the 3N128 FET. This is an MOS FET, and as such has a gate capacitance of a few pf., with a gate resistance (ohmic) of thousands of megohms. Thus, a small static charge built up on the gate will develop enough voltage to pop the transistor. There *is* a warning about this on the data sheet, but many people will probably get the unit and not bother sending for the sheet. The following is from an MOS data sheet:

1. The leads of the device should remain wrapped in the shipping foil except when being tested or in operation, to prevent the build up of static charge.

2. Avoid unnecessary handling; when handled, the device should be picked up by the can instead of the leads.

3. The devices should not be inserted or removed from circuits with the power on, as transient voltages may cause permanent damage to the devices.

The above is from a Motorola data sheet, but of course, it still holds for the RCA transistor. They aren't kidding about this — I lost several by pushing the leads into a polystyrene block when they first came out with MOS FET's a few years ago. — *Marvin Norman, W1CSP, 137 Robbins St., Waltham, Mass.*

SIMPLE SUPER SELECTIVITY

Technical Editor, *QST:*

The human ear is an ingenious device and together with the brain forms a marvelous audio receiving system. The system is basically broad-band encompassing a frequency range of some eight octaves. And yet it may be made extremely narrow-band at the will of the operator without even turning a knob. Most c.w. operators make use of this capability without understanding it, but some simply are not disciplined enough to use it.

In the crowded amateur bands our ears are almost always subjected to more than one signal at a time; however, by concentrating on one of them it is possible to copy that signal provided that the QRM is not intolerable. The ear-brain system bandwidth may be reduced to the order of 50 cycles per second by concentration. You hear what you want to hear!!

In order to improve on the human sound-detecting system a filter with bandwidth less than 50 c.p.s. must precede the ear — possible, but difficult to use with the average transmitter-receiver frequency stability, not to mention "ringing" of the filter. We can probably do better by leaving our receiver bandwidth set at one or two kilocycles and using our own built-in filter. Adjusting the b.f.o. for single-signal detection or making use of the single-sideband selectivity available in modern receivers is highly desirable since this reduces the QRM probability by one-half.

The 50-c.p.s. bandwidth of the ear-brain system seems incredible but is documented and may be easily demonstrated for a single tone in the presence of white noise.[1] Typically, for a signal-to-noise ratio of unity, a pure tone in 3-kc. band-limited noise would indicate a signal report of 569. A signal-to-noise ratio of −20 db. (100 times less signal power) is barely discernable to a trained ear. In addition to being extremely narrow band, the ear-brain system is tunable over a range of about 200 to 1000 cycles with essentially the same bandwidth. Above and below this range the bandwidth increases. The system is therefore able to track a signal which is slowly drifting in frequency. It is interesting to note in connection with ear-brain bandwidth that a musician easily can distinguish half-tones in the musical scale. A half-tone at 500 c.p.s. is about 30 c.p.s.

The amplitude response of the ear is somewhat logarithmic, and consequently will tolerate a wide dynamic range without overloading. The non linear response, however, gives rise to distortion products which are invaluable to a piano tuner but a nuisance to a c.w. operator. Fortunately, these distortion products are much weaker than the weaker of any two original signals, the only one of any consequence being the difference frequency.

Another point worth mentioning is the insipid habit of most operators to tune their receivers so that the desired signal is heterodyned to a frequency of 1000 c.p.s. or higher. Nothing could be worse, for two reasons: First, the ear-brain bandwidth increases above 1000 c.p.s.; and second, it is far easier to separate signals which differ in frequency by heterodyning the signals to as low a frequency as possible. Indeed, if the undesired signal is set to zero beat there will be little difficulty in copying the desired signal. And this can be most desirably accomplished by careful tuning of the receiver and *not* by fiddling with receiver selectivity or mistuning the b.f.o., keeping in mind that the receiver r.f. gain be kept low and the a.f. gain up to minimize overload distortion within the receiver.

The next time you are thinking of buying a more selective receiver, put a little of the thought concentration on the signal you wish to copy and you will save the money — and become a better operator. — *Dick Turrin, W2IMU, Box 45, RR. 2, Colts Neck, N. J.*

[1] Beranek, *Acoustics*, p. 394.

Strays

The Royal City ARA, New Westminster, B.C., Canada, is sponsoring a certificate to honor Canada's Centennial Year 1967. The certificate is available to any amateur in the world who submits proof of contact with 100 Canadian amateur radio stations, any band, any mode, during the Centennial year, Jan. 1, 1967, Dec. 31, 1967. A copy of log information, verified by another amateur, will be accepted as proof of contacts. All certificates will be issued free of charge. Apply to: Royal City ARA, VE7FY, 7386 East Grandview Douglas Hy., New Westminster, B.C., Canada.

—•••—

For the eighth year, Santa Claus will visit the 8-Ball Traffic Net (Los Angeles area) on 50.5 Mc. on Christmas eve, at 6:30 P.M. PST. To those v.h.f. people whose small children would like to hear Santa, get in touch with Net Secretary WA6KWV giving the child's name and the toy he has said he would like to have.

—•••—

"Miser's Dream" Coil Data

"The Miser's Dream" receiver (*QST*, May, 1965) oscillator circuit has been revised slightly, to give better stability and ease of adjustment of the tuning range. *This* time notes were kept on the coil dimensions, and they can be had, together with the circuit revisions, for 25 cents. Address your request to Technical Department, ARRL, 225 Main Street, Newington, Conn. 06111

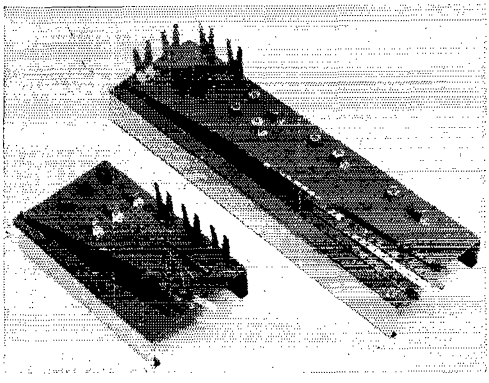
• New Apparatus

Aladin Breadboarding Kits

THE Aladin Kits Company has recently introduced a line of inexpensive breadboarding kits, two models of which are shown in the photograph. For illustrative purposes, both kits are shown partially assembled; normally each breadboard is supplied "knocked down" in a plastic bag.

The kits have several features not usually found in the home-constructed breadboard. Included with each model are several universal "Z" brackets that permit the no-hole mounting of components that normally require the drilling or punching of holes for their installation. The brackets are especially helpful in supporting transformers and chokes that have leads coming out their undersides, as well as tube and transistor sockets. Also supplied with the breadboarding kits are mounting brackets for switches and potentiometers. Each bracket has a ¼-, a ⅜- and a ½-inch hole for accommodating various controls with different mounting dimensions. Brass bus straps are provided for making convenient ground connections as is a tool for the easy insertion of push-in terminals in the perforated board. The ⅛-inch thickness of the phenolic deck makes the board suitable for handling good-sized loads with little warping.

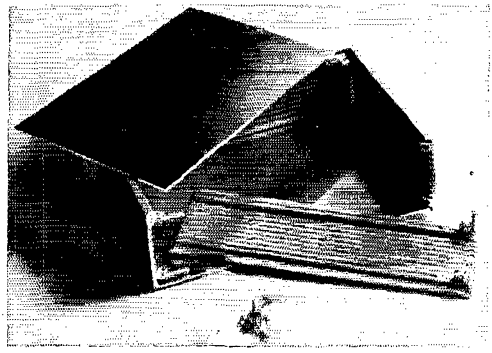
The smaller breadboarding kit, model XP48, is in the $3.00 price class and includes one 4¾ × 8⅞-inch



perforated board, two aluminum base plates, 25 silver plated push-in terminals, one terminal insertion tool, six universal mounting brackets, three switch and potentiometer brackets, four 8-inch long bus bars and one package of hardware. The larger model, No. XP417, is similar except that it uses a phenolic board about twice as long and contains greater quantities of many of the items. Kit XP417 sells for under $5.00. Both models are available from the Aladin Kits Company, 21011 Dequindre Road, Hazel Park, Michigan. — *WIYDS*

Vector Frame-Loc Cases

MOST metal chassis and boxes on the market were designed many years ago, long before printed circuit boards and transistors. These structures must be drilled, cut or modified in one way or another in order to accommodate modern circuit cards. The Vector Electronics Company has introduced a line of aluminum case parts, known as Frame-Loc parts, which require no metal work to support circuit boards. Frame-Loc sides, or rails as they are commonly called, have the necessary grooves in which to mount one or more circuit boards, when the rails are assembled in the form of a case or chassis as shown in the photograph.



In order to construct a typical Frame-Loc case, it is necessary to purchase two rails, since rails are sold only in pairs, and two cover panels. The required corner brackets and screws are included with the rails. Assembly is initiated by inserting two corner brackets in each rail. Then three sides of the box are fitted together and the bottom plate slid in place. At this stage, one or more boards can be inserted in the box. If complete shielding isn't necessary, a circuit board can be installed on top, and the top cover omitted. The box is completed by pushing the remaining side rail in place. This method of assembly results in a very rugged container. However, if more security is desired, the "jam" screws provided can be used to lock the rails together.

Frame-Loc rails are 2 inches wide and come in an assortment of lengths from 3 to 17 inches. Parts are available to extend the rails both in width and length, making possible a multitude of box sizes. Boxes need not be rectangular; they can be built in the shape of an L or otherwise.

The box shown in the photograph measures 6.6 by 4.6 by 2 inches and sells in the $3.00 price class. Frame-Loc parts are manufactured by Vector Electronics Co., Inc., 1100 Flower Street, Glendale, California 91201. — *WIYDS*

Terminal Board Kit

APPARENTLY nowadays there are simple transistor projects in every book or magazine on electronics. Most of the less complicated circuits are suited to a terminal-board type of construction. Prepunched boards eliminate much of the drilling required of metal chassis and they permit component and circuit changes with little difficulty. With no boxes to squeeze parts into, wiring is more readily accomplished.

General Electric has introduced a new experimenter's kit, model ETR-4288, which should serve as a good foundation for most simple electronic circuits. The kit consists of a 3½ × 4½-inch sheet of prepunched terminal board, four rubber feet with self-tapping screws and 15 push-in terminals. Two serrated slots in the upper half of each terminal permit the temporary insertion of component leads without soldering, a most useful feature to an impatient amateur modifying a circuit. If desired, the board can be readily cut to a smaller size with a fine-toothed saw.

(*Continued on page 138*)

Hints and Kinks For the Experimenter

FINAL TUNING KNOB FOR THE HEATH "SIXER"

THE final-amplifier tuning capacitor in the Heath Twoer and Sixer happens to be a ceramic trimmer not normally accessible from the outside of the cabinet. In order to dip the final, one of two methods is usually used to reach the trimmer; either the unit is removed from the case or a screwdriver is inserted in a hole drilled in the side of the cabinet. However, this is not always so easily done, especially if one is working mobile. The author solved this problem by making a built-in self-retracting knob which is always handy, but which is not in the way during removal of the unit from the case. As shown in Fig. 1, the knob is not fastened to the trimmer and thus will not put any strain on the capacitor or its associated wiring.

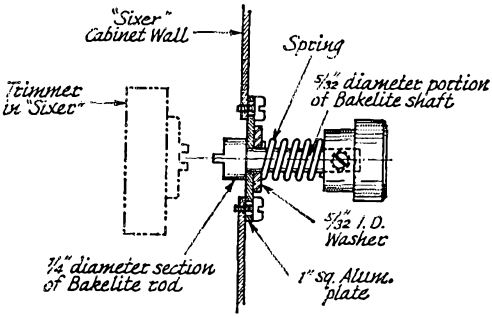


Fig. 1—Details for assembling a final-amplifier tuning control for a Heath Sixer or Twoer.

Begin the modification by drilling a 1/2-inch diameter hole in the case directly in line with the trimmer adjusting slot. Make a 1-inch square plate from 16 gauge aluminum stock and drill a 11/64-inch hole in the center of the square. Drill two 1/8-inch holes in the plate for mounting the plate to the case. These holes should be a little bit on the sloppy side for the screws that will be inserted in them, since the trimmer does not always return to the exact same spot each time the unit is put back in the cabinet. I used screws from an old Command receiver to fasten the plate to the case. Drill two holes in the cabinet to mate with the mounting holes on the plate, being careful to make the holes small enough to allow the screws to self-tap.

Chuck 1/4 inch of a 1 1/4-inch length of 1/4-inch diameter bakelite rod in an electric drill. Use a file to turn down the diameter of the remaining 1-inch length of rod to 5/32 inch. File a screwdriver bit on the face of the 1/4-inch diameter portion, as shown in Fig. 1. Mount the plate on the case and insert the bakelite rod through the plate. Slip a 5/32-inch i.d. washer over the shaft, along with a small 5/8-inch long coil spring and a suitable knob, such as the antenna trimmer knob from a Command receiver. Make sure there is enough compression on the spring to keep the rod retracted. After all the parts are assembled and the unit is installed in the cabinet, it is only necessary to push in the knob and rotate it until the shaft bit engages the slot of the trimmer. — *Frank M. Wing, W4TUO*

THUMB-GROOVE INDEXING THE *HANDBOOK*

SECTIONS of the *Handbook* that are frequently used by the reader can be located quickly by filing thumb grooves in the *Handbook* pages as shown in Fig. 3 and labeling these grooves as pictured in Fig. 2. As illustrated in the second sketch, I filed thumb grooves for only three subjects: the wire-size table, the tube index and the general index. These items seem to fill 99 percent of my general requirements. Other grooves can be added at any time, but usually the sections of the book they indicate are only of short-term use. — *Norm Cucuel, K1LFH*

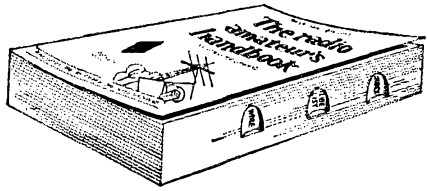


Fig. 2—K1LFH's method of thumb-groove indexing the Handbook.

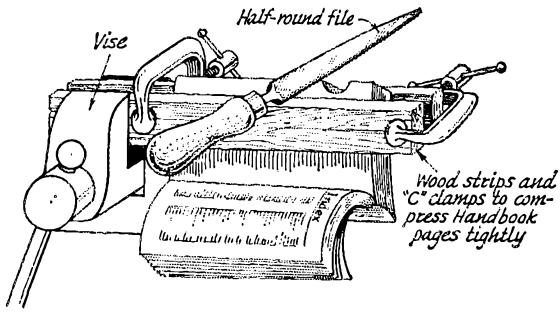


Fig. 3—One method of labeling the thumb grooves.

ADHESIVE-BACKED TERMINAL BOARD ELIMINATES MOUNTING SCREWS

THE low-profile terminal board shown in Fig. 4 is especially useful in dense electronic circuits where mounting space and working space are limited, and where it may be undesirable or impractical to use mounting screws or other hardware fasteners. The terminal board consists of 0.012-inch-thick copper terminal strips cemented between 0.032-inch-thick fiberglas sheets which have a thin layer of pressure-sensitive adhesive backing. Scoring between terminal pairs facilitates detachment of the required number of terminals for specific applications. For soldering connections, the copper terminals are bent outward. The boards are mounted by pressing the adhesive backing onto a mounting surface in the equipment package. — *NASA Tech Brief 65-10396*

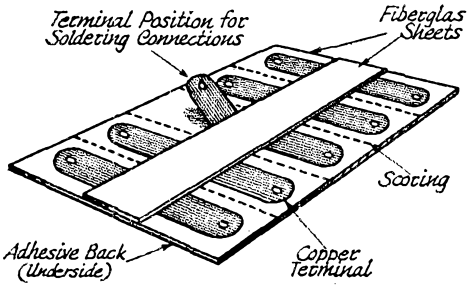


Fig. 4—Details of the adhesive-backed terminal board.

EQUIPMENT FEET

FOOTBALL shoe cleats come in many varieties. The hard rubber and nylon types that are threaded make good standoffs or feet for electronic equipment. Cleats are available from most sporting-goods stores. — *Karl Hatfield, W6BXR*

GROMMET CABLE HOLDER

ONE way I have found to make a chassis wiring job neater is to use rubber grommets as wire bundle holders as shown in Fig. 5. If the approximate number of wires that will pass through each bundling point can be predetermined, it will be easy to pick out the proper size grommets to secure a tight fit.

— *Phil MacDonald, WA1CTQ*

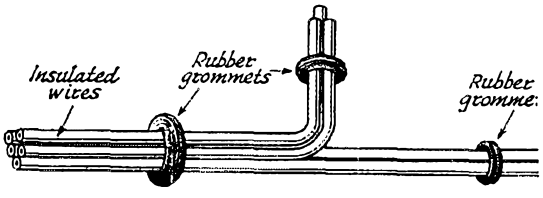


Fig. 5—The rubber grommets, shown here as cable holders, should be chosen to firmly secure the wires in neat bundles.

PHONE-JACK PANEL BEARING

AS shown in Fig. 6, a panel bearing can be made from an extra phone jack by filing away the flange on the inside of the jack and removing the excess contacts, soldering lugs and phenolic insulation. The bearing will be suitable for a ¼-inch shaft if a standard phone jack is used for the modification. — *John Wallace, WA5NPE*

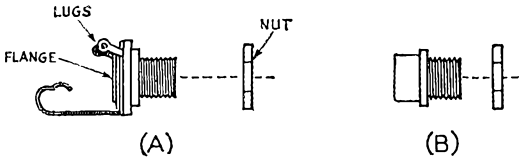


Fig. 6—By filing away the flange and removing the excess parts, a phone jack (A) becomes a panel bearing (B).

CABLE RACKS

I have found that hose racks, ordinarily used for the storage of garden hose on the side of a house, are ideal for keeping accumulated wire and coaxial cable in order. Aluminum racks, which sell for about 75 cents each, make excellent spools for lightweight wires and cables. Steel models cost approximately a dollar apiece and are useful for storing heavy cable such as RG-8/U. Garden-hose racks are sold by most hardware stores. — *Julian Lovejoy, W1BT*

CALIBRATING INEXPENSIVE SIGNAL GENERATORS

INEXPENSIVE wide-range signal generators that use air-core coils can be calibrated exactly, even though they don't have an individual calibration adjustment for each band. Stuff a length of spaghetti tubing with aluminum foil and insert it into the coil to be adjusted. Slide the tubing in and out of the coil until zero beat is achieved on a calibrated receiver. For best mechanical stability, the tubing should fit snugly in the coil. — *Lou Fuentes, WB2MYN*

(Since an aluminum core lowers the inductance of a coil, the above method of alignment will not work on those bands where the coils employed have too little inductance. This situation can be corrected by the following technique: Switch the generator to the band which is in error on the high-frequency side by the greatest percentage and fix the position of the tuning capacitor at some convenient frequency. Unloosen the pointer and reattach it at the correct calibration mark. Proceed to calibrate the other bands as suggested by WB2MYN. Observe, however, that the calibration points may or may not be true across the entire scale. Also note that inserting aluminum foil in an air-core coil will lower the Q of the inductor; in some cases, the reduction in Q of an oscillator coil might cause the circuit to cease functioning. — *Editor.*)

HOW TO DELIVER A MESSAGE

BY GEORGE HART,* W1NJM

Some Do's and Don'ts in the End Object of All Traffic Handling

The amateur traffic-handler comes in contact with the public at two points: origination and delivery. There are certain hard and fast rules concerning both, but most of it is a matter of judgment and diplomacy. This article attempts to deal with both in the all-important message-delivery function.

ONE of the most important functions in message handling, if not *the* most important, is the ultimate delivery. Without it, the message might as well never have been originated. In fact, it would have been *better* never originated, because a message originated and never delivered is very bad public relations.

Yet there are many amateurs, even those who pride themselves on their message-handling ability, who procrastinate on delivery, or who fail to deliver messages in the most effective manner. We won't even mention those who don't deliver them at all; they aren't worth mentioning. Besides, they are a very small minority.

What's So Tough About It?

So what's tough about delivering a message, you might ask? You receive the message for delivery, you call the party on the telephone and you give him the message. If you can't get him on the phone, you write it on a postcard and drop it in the mail. This is tough? This needs an article in *QST*?

Well, it isn't always quite so easy as all that. All kinds of difficulties arise in trying to locate the party, and, when you do, in trying properly to explain what it's all about. John Q. Public isn't used to getting messages delivered by someone he never heard of via a service he never knew existed. He is going to want to ask questions, some of which may sound pretty silly to you. But don't laugh! This is a good opportunity to do some salesmanship for amateur radio.

Then there is the other extreme, the type who couldn't care less, who mumbles something and hangs up. Or the one who tells you he received the same message a couple of days ago from someone else. Or the party sending the message wrote a letter at the same time, the letter beating the message by three days. Or the person who originated the message answers the telephone. There are all sorts of embarrassing situations, many of them avoidable.

Precedences

When receiving a message for delivery, the first thing you have to consider is its precedence. There are three precedences: Emergency, Priority and Routine[1]. If the message has an Emergency precedence (this will be *very* rare), you deliver it immediately, if you can, by collect telephone, no matter how far away the addressee might be. Emergency precedence is a matter of life and

* National Emergency Coordinator, ARRL.

[1] See Operating Aid 9A, free on request.

death. This message was put on the amateur circuit in the first place only because no regular means of communication was available. But we won't worry much about this, because it isn't very likely.

Still unlikely but more probable is receipt of a "priority" precedence message. This is worth a collect phone call if the addressee is not located too far away; otherwise, it should be relayed to some amateur station nearer the destination. You should be able to accomplish this on one of the National Calling and Emergency Frequencies.[2]

But most likely, if you get a message at all, it will be when some station calls you and mentions that he just happens to have a message for your town and would you mind delivering it? Being a good guy who wants to be helpful, you say sure. It's easy to say. But once said, you have committed yourself; and whether you are a non-traffic type or an occasional message handler or a regular traffic net member, you'll want to rise to the occasion to put your best foot forward in representing the amateur service to a member of the general public.

How Not *to Deliver a Message*

Introducing yourself and stating your purpose to a stranger, to whom you are also a stranger, may seem like a simple thing, but once you get off on the wrong foot you're in trouble. Let's take a horrible example. You receive a message and call the addressee on the telephone. A feminine voice answers.

"Uh—," you say, winningly, "I'm calling Mrs. Dora Jones."

"This is Mrs. Jones," comes the spritely answer.

"Uh — I'm an amateur radio operator," you stammer, not having thought about what you would say. "I have a message for you from Vietnam, signed Dan."

Silence at the other end.

"Mrs. Jones?"

"Has something happened to Dan?" quavers Mrs. Jones.

"Oh, no — that is, not that I know of. I mean — why don't you get a pencil and write this down?"

"Who did you say you are?"

"An amateur radio operator."

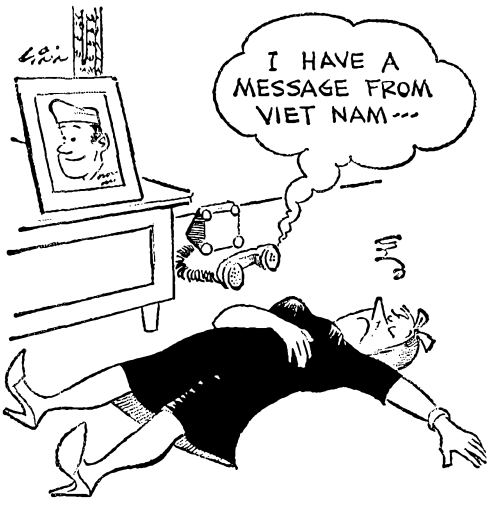
"And you know my son Dan?"

"No, no. I never heard of him before. I didn't even know he was your son."

"I don't understand." The voice at the other end sounds very agitated. "Where *is* Dan? What have they done to him? I haven't heard from him in months!"

So now, by inept handling of the situation, you have gotten Dan's mother all worked up and you have to try to calm her down before you can deliver the message. Even if this works out all right and Mrs. Jones winds up being eternally grateful to you and the amateur fraternity, there

[2] See Operating Aid 12, also free on request.



BE TACTFUL!

were still those few uncomfortable and embarrassing moments. If she'd had a weak heart, your opening statement "I have a message . . ." to an anxious mother could have had disastrous or tragic consequences. In any case, you don't want to go around frightening old ladies, do you?

Try It This *Way*

The best approach is an informal but well-thought-out one. The first thing you do is identify yourself, by name. This makes you a person, whereas calling yourself just "an amateur radio operator" may leave some doubt about it. The first thing a called party wants to know is, who is calling.

"Good evening," you might say, just to be original. "My name is John Hamm. I'm an amateur radio operator over in (identify yourself in terms that will be best understood)." There will usually be a "So what?" silence from the other end at this point, so you might as well keep right on going. "Some of us amateurs handle messages free of charge (getting something free always goes over big) for the general public, just for the fun of it. I received one addressed to you a little while ago, so I thought I'd call you on the telephone. It's a greeting from Vietnam and is signed Dan. Would you like to write it down, or shall I just read it off?"

Chances are Mrs. Jones will bubble all over you, maybe get Mr. Jones on the extension.

"This message is dated Oct. 5," you go on, "and was handled apparently by military radio to Camp Pendleton, Calif., where it was put on amateur radio circuits. It says 'Hello Mom and Dad. I am OK and being treated well. Will write soon. Signed, Dan.'"

There will probably be a small silence while Mrs. Jones scribbles, then she will express her gratitude and appreciation and ask a few questions about how you came to get the message.

You might, at this point, offer to send her a copy of it, as a memento — or you might send such a copy anyway. Also, get an answer.

Of course the situations can vary widely. It depends largely on what kind of a character you run into at the other end of the line. As an example, assume you have just made your delivery pitch as above and the answer is a casual "Oh, just read it." So you read it, also as above.

"About time he let us hear from him," says the lady. "Zat all?"

"That's all," you say.

"Okay." Click!

What If . . .

There are all kinds of people, and all kinds of messages. Not many of them are from Vietnam, of course. Some arrive late, some are garbled, some are inane or nonsensical. You have to use your judgment about how to deliver them. But whatever your judgment, don't forget that in accepting the message you have undertaken the responsibility to deliver it or relay it onward. *You don't throw it in the wastebasket*! Not for one year, anyway. It's unethical — and illegal, too!

We have always said that the contents of a message are none of the handling operator's business, and we still say this. However, there is no gainsaying the fact that the contents can affect your judgment in delivery — not in *whether* or not to deliver, but in the *method* used to deliver. Sometimes the contents themselves can be embarrassing, and none of us likes to be embarrassed. Here are the answers to a few "what ifs":

(1) What if the message is setting up a date and that date is past? Mail it. You have to deliver the darn thing, but you don't have to listen to the horse laugh of the recipient.

(2) What if the message is garbled and it is returned by the post office? Send a service message to the originating station asking for a better address.

(3) What if the message asks for money or seems to have some unpleasant implication? Use your own judgment. The writer mails 'em.

(4) What if the message obviously is from one teenager to another and contains a lot of juvenile inanities? Again, use your own judgment, depending on the exact situation. If you're a teenager yourself, you won't mind. If you are an adult, you may feel you are putting yourself in a ridiculous position and decide to mail it.

(5) What if the message is "mushy" — that is, contains a lot of sickening endearments? We delivered one like this once and were greeted by a lop of simpering and giggling from the other end. Since then, we've mailed them. However, it depends on the exact content, and some amateurs consider it "fun" to deliver such traffic.

(6) What if the addressee refuses to take you seriously, insists on knowing the gag and who you *really* are. Well, you tried. Mail a copy of the message, to let the addressee know you were for real.

The Undeliverables

Some messages just can't be delivered, no matter how hard you try — and some originators will not answer service messages, especially those stations which originate them in great quantities, such as "fair" stations and stations at military posts. When you have exhausted all possibilities, and you can't get anything out of the originating station, what then? Do you cancel? You do *not*. Only the originating station can do this. If you do not hear from him, you *file undelivered*. Same thing? Almost, but not quite. It preserves the inviolability of the originating station's prerogative, keeps things in their proper perspective. If we gave delivering stations the right to cancel messages, this would happen every time the operator felt he *shouldn't* deliver.

Confirmation Copies

The final act in message delivery is to mail the confirmation copy. This is optional if you have succeeded in delivering by telephone, but always a good thing to do, especially if delivery was made through some person other than the addressee. It is also an opportunity to make another good impression on the general public. ARRL prints message blanks and message delivery cards, either of which can be used to send confirmation copies or make delivery. Personally, we prefer the printed paper blank, because it is both more impressive and more complete. The card has the advantage of being somewhat more convenient.

Type the message on the blank if you can, otherwise write it carefully so it will be legible. Be sure to add your own name and telephone in the space provided.

And that's all there is to it. Once the message is delivered, mark it and the date on the original copy before you file it away for the one year period required by FCC.

Now, don't you feel good? You should, you've just performed a public service. QST

Annual ARRL Novice Roundup

NOVICES, this is your one and only opportunity to participate *as a Novice* in your own operating activity, the Sixteenth ARRL Novice Roundup Competition. Don't miss this chance to operate in this contest specially for Novices. The Novice Roundup begins on Saturday, Feb. 4, 1967, *at* 1800 *local* time, and runs *through* Feb. 19, Sunday, 1800 local time. Operating, listening, and logging time must not exceed 40 hours.

ROUNDUP PERIOD

Starts	*Ends*
Feb. 4	Feb. 19
6:00 P.M.	6:00 P.M.
Local Time	Local Time

How to Participate

Just get on the air any time during the two-week period and contact as many Novices and non-Novices as possible, exchanging QSO number and ARRL section. Non-Novices work only Novices, of course. "CQ NR" means CQ Novice Roundup and you can either answer such a call or call "CQ NR" yourself to get contacts. Here's an example. KNØBPO in Minnesota hears KN1QFC in the Western Massachusetts section calling CQ NR.

CQ NR CQ NR CQ NR DE KN1QFC KN1QFC KN1QFC K

KN1QFC KN1QFC DE KNØBPO KNØBPO KNØBPO AR

KNØBPO DE KN1QFC R HR NR 3 WMASS BK

KN1QFC DE KNØBPO R HR NR 1 MINN BK

KNØBPO DE KN1QFC R TNX ES 73 SK DE KN1QFC

On his next contact KNØBPO would send NR2 (meaning contact number 2) then NR 3, NR 4, etc.

Scoring

A certificate is awarded to the highest Novice scorer in each ARRL section. Complete results will be in *QST* including the scores of those non-Novices that enter as well. To obtain your final score simply add the total of your NR QSOs to the highest w.p.m. from your Code Proficiency certificate. Multiply the sum by the number of *different* ARRL sections (see page 6, this *QST*) worked during the contest. That CP certificate really helps out your score, and you still have time to qualify, so don't miss out. Full details on the Code Proficiency Program are on page 92, this *QST*.

Novices should keep a look out just above and below the Novice frequencies (3700–3750 kc.; 7150–7200 kc.; 21,100–21,250 kc.; 145–147 Mc.) for the higher-power Generals.

Log forms like the one in the sample are yours for the asking simply by writing to: ARRL Communications Dept., 225 Main St., Newington, Conn. 06111. Study the following rules, and then stand by for the fun of your Novice career, the ARRL Novice Roundup Competition! But don't forget to send in a copy of your log to make your entry official: logs must be postmarked by March 3, 1967.

SUMMARY OF EXCHANGES ARRL NOVICE ROUNDUP

Call. KNØBPO.. Section...MINN..... (See page 6 QST)

BAND	TIMES ON OR OFF AIR	DATE, TIME OF CONTACT	MY NR SENT	MY SECTION	HIS NR RCVD	HIS CALL	HIS SECTION	NUMBER EACH NEW SECTION AS WORKED
80	1800	FEB. 3						
		1803	1	MINN.	1	KNØAKM	MINN	1
		1815	2	"	3	KN9WRX	ILL	2
	1835	1820	3	"	2	KN9ZDL	ILL	
15	1400	FEB. 6						
		1412	4	"	15	KN7MNL	NEV	3
	1425	1418	5	"	7	KN1QFC	WMASS	4

Summary: (Enter below on last sheet used)

Bands used.....80,15.....; Nr. diff. stns. wkd..5.....; Nr. diff. sections...4.....
Total hours operation....1:00.....; Code Proficiency award credit.....10.....w.p.m.
Type transmitter (tube line-up if home-built).....
Receiver.....; Antenna.....

SCORING:

....5....QSOs plus....10.....c.p. points times....4.....sections equals 60

I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is true and correct to the best of my knowledge.

Signature and call.....
Address.....
.....

This is a sample log form that must be used by all contestants and also shows how to score. You can obtain these forms free by writing to ARRL.

Rules

1) *Eligibility:* The contest is open to all radio amateurs in the ARRL sections listed on page 6 of this *QST*.

2) *Time:* All contacts must be made during the contest time indicated elsewhere in this announcement. Time may be divided as desired but must not exceed 40 hours total.

(*Continued on page 138*)

1967 ARRL International DX Competition

Major Rules Changes Point to Increased Participation
Phone: Feb. and Mar. 4-5; C.W. Feb. and Mar. 18-19

Who will be the first single-operator DX stations to earn this handsome trophy?

THE ARRL International DX Competition 1967 style, will be a brand new one, in every sense: no c.w. quotas, KH6 and KL7 to revert to DX status, a change in multipliers for the DX from call areas to the 48 continental U. S. states and Canadian call areas and plaque awards to top foreign single operators! With a little bit of cooperation from the guy in charge of sun spots, it should be a smash!

Newly styled log forms will keep the paperwork to a minimum. All W/VE stations will be required to keep and submit some form of record of DX stations worked, to avoid duplicating contacts on each band. Our form CD-175 should do the trick for most entrants but if your own system is more convenient, go ahead and use it but please send it in with your entry! Every contestant must keep a consecutive log, and submit it along with the appropriate summary and check list. Your logs must be postmarked by April 22, 1967 to be eligible for awards and *QST* listing. All reports, regardless of size of score are welcomed. Remember to enclose your operating/antenna photos for consideration.

CONTEST PERIODS

Phone

Starts	Ends
Feb. 4, 0001 GMT	Feb. 5, 2359 GMT
Mar. 4, 0001 GMT	Mar. 5, 2359 GMT

C.W.

Starts	Ends
Feb. 18, 0001 GMT	Feb. 19, 2359 GMT
Mar. 18, 0001 GMT	Mar. 19, 2359 GMT

Rules

1) *Eligibility:* Amateurs operating fixed amateur stations in any and all parts of the world are invited to participate.

2) *Object:* Amateurs in the 48 continental United States and Canada will try to work as many amateur stations in other parts of the world as possible under the rules and during the contest periods.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

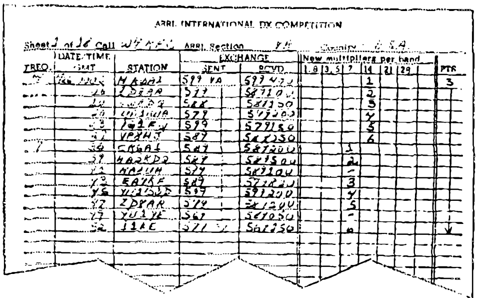
4) *Entry Classifications:* Entry may be made in either or both the phone or c.w. sections: c.w. scores are independent of phone scores. Entries will be further classified as single- or multiple-operator stations. Single-operator stations are those at which one person performs all the operating functions. Multiple-operator stations are those obtaining assistance, such as from "spotting" or relief operators, or in keeping the station log and records.

5) *Contest Periods:* There are four weekends, each 48 hours long; two for phone work and two for c.w.

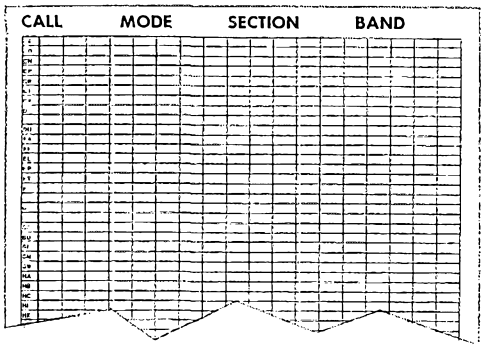
6) *Valid Contacts:* In the phone section, all claimed credits must be made voice-to-voice. In the telegraph section, only c.w.-c.w. contacts count. Crossband contacts may not be counted.

7) *Exchanges:*

a) *Amateurs in the 48 continental U.S. and Canada* will transmit a three-figure number, representing the RST re-



This recopy of the first portion of W4KFC's 1966 DX c.w log, on the new forms for 1967, illustrates the desired method of keeping a consecutive contest log. In addition, you must also submit a summary and checklist of stations worked.



The newly designed check list CD-175 (or your own version) will help in avoiding duplicate contacts on each band. It is fairly flexible to cover prefix changes, etc.

port, plus their state or province. (The latter may consist of an appropriate abbreviation.) Phone participants will transmit a two-figure number consisting of the readability-strength report plus the state or province. *Example:* W6LDD, might transmit "579CAL" on c.w., "57 California" on phone.

b) *Amateurs outside* the 48 Continental U.S. and Canada will transmit six-figure numbers, each consisting of the RST report plus three "power" numbers; the power indicator will represent the approximate transmitter power input. Phone contestants will transmit five-figure numbers, each consisting of a readability-strength report and the three "power" numbers. *Example:* KH6IJ, with 150 watts input, might transmit "569150" on c.w., "58150" on phone. If the input power varies considerably on different bands, the "power" number should be changed accordingly. (Note, KH6 and KL7 are considered as DX).

8) *Scoring:*

a) *Points:* One point is earned by a W(K) or VE/VO station upon receiving acknowledgment of a contest exchange sent, and two points upon acknowledging an exchange received. Two points are earned by any other station upon receiving acknowledgment of a contest exchange sent, and one point upon acknowledging an exchange received.

b) *Final Score:* W(K) and VE/VO stations multiply total points earned under Rule 8(a) by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 8(a) by the sum of the number of continental states and VE/VO licensing areas worked on one band plus the number of states and VE/VO licensing areas worked on each other band.

There are 48 continental states plus VO and VE1–VE8, a possible total of 57 multipliers per band.

9) *Repeat Contacts:* The same station may be worked again for additional points if the contact is made on a different frequency band. The same station may be worked again on the same band if the complete exchange for a total of three points was not made during the original contact on that band.

10) *Reporting:* Contest work must be reported as shown in the sample forms. Each entry must include the signed statement. Contest reports must be mailed no later than April 22, 1967 to be eligible for *QST* listings and awards. All DX Competition logs become the property of the American Radio Relay League and none can be returned.

Banned Countries

U.S. amateurs may not work amateurs in *Cambodia* (XU), *Vietnam* (3W8), *Indonesia* (JZØ, 8F) and *Thailand* (HS).

Canadian amateurs may not work *Cambodia* (XU), *Vietnam* (3W8), *Indonesia* (JZØ, 8F), *Laos* (XW8) and *Jordan* (JY).

11) *Awards:* To document the performance of participants in the 33rd ARRL International DX Competition, a full report will be carried in *QST*. In addition, special recognition will be made as follows:

a) A certificate will be awarded to the high-scoring single-operator phone and to the high-scoring single-operator c.w. entrants in each country, in Alaska and Hawaii, and in each of the continental U.S. and Canadian ARRL sections (see page 6, *QST*) from which valid entries are received. In addition, a certificate will be awarded to the high-scoring mutliple-operator station in each section or country from which three or more valid mutliple-operator entries are received.

b) A suitable certificate will be awarded to the operator making the highest single-operator phone score in each ARRL-affiliated club, provided the club secretary submits a listing of a minimum of three phone entries by members of the club and that these scores are confirmed by receipt at ARRL of the individual contest logs from such members. The highest-single-operator c.w. scorer in each club will be awarded a certificate under the same condition. Only a bona fide resident member, operating a station (his or another club member's) in local club territory, may compete for club certificates.

c) A personalized plaque will be awarded to the highest-single-operator DX phone and c.w. station (non-W/VE) in Africa, Asia, Europe, North America, Oceania and Asia.

d) ARRL will award a gavel to the affiliated club submitting the greatest aggregate phone and c.w. score by its members, whether single- or multiple-operator entries, provided such scores are confirmed by receipt at ARRL of the individual contest logs from such members. Only scores of bona fide resident members, operating a station (his or another club member's) in local club territory, may be included in club totals.

12) *Judges:* All entries will be passed upon the ARRL Awards Committee, whose decisions will be final. The Committee will void or adjust entries as its interpretation of these rules may require.

13) *Disqualifications:* Each participant agrees to observe the contest rules as well as all regulations established for amateur radio in his country. Violation of any regulation, as confirmed by a single FCC citation or advisory notice or two ARRL accredited Official Observer reports, may constitute grounds for disqualification. Some examples of practices which can result in disqualification: off-frequency (out-of-band) operation, harmonics, spurious emissions, low tone reports in logs, key clicks, splatter, excessive sidebands, W(K) stations working banned countries, interfering with channels handling amateur emergency communication.

QST

SUMMARY, ARRL INTERNATIONAL DX COMPETITION

Call..... ARRL Section..... Country.....

☐ C.W. ☐ PHONE ☐ Single Operator ☐ Multioperator Single Xmtr.☐ Multi. Xmtr.☐

Name..... Address.....

Transmitting Equipment .....

Input Power..... Receiver(s).....

Antennae.....

MULTIPLIERS: W/VE stations show number of countries per band, use CD-175. Non-W/VEs show number of continental U.S. states and Canadian call areas per band. Non-W/VEs use the check sheet on the reverse side of this summary.

	1.8 Mc.	3.5 Mc.	7 Mc.	14 Mc.	21 Mc.	28 Mc.	TOTALS
Multiplier							
Contacts							

Multioperator stations show all calls: .....

Number of different countries worked overall ..... Total time on.....

Participating for ARRL-Affiliated club award in the.....

as a .....

..... x ..... = ...
(Points) (Multiplier) CLAIMED SCORE

+ Total number of multipliers on all bands.
** Count 3 points per completed QSO; See contest rule 8a in January QST.

I certify, on my honor, that I have observed all competition rules as well as all regulations established for amateur radio in my country, and that my report is correct and true to the best of my belief. I agree to be bound by the decisions of the ARRL Awards Committee.

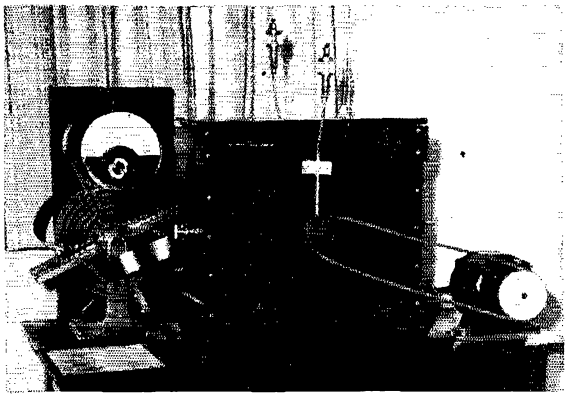
.....
Operator's Signature and Call

Use the space below for comments on new countries or new states, score improvement, conditions, interesting experiences, etc. Be sure to enclose your operating and antenna system for QST consideration. Mail summary, log sheets and check lists (CD-175) to ARRL Communications Department, 225 Main Street, Newington, Connecticut, U.S.A. 06111.

Sample summary sheet that must accompany all reports.

New Look at W1AW

THE Maxim Memorial Station, W1AW, faces the new Headquarters Building at 225 Main St. in Newington, Conn. Recently, the station was given an overhaul with new equipment, furnishings, and antennas. You've seen a picture of the exterior on this month's cover. Here are a few shots taken inside the building, to show you some of the "new look."

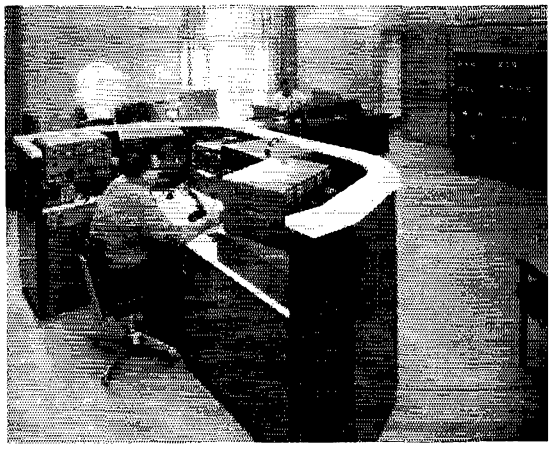


"Old Betsy," 1AW's 1920 spark transmitter, is on display in the foyer.

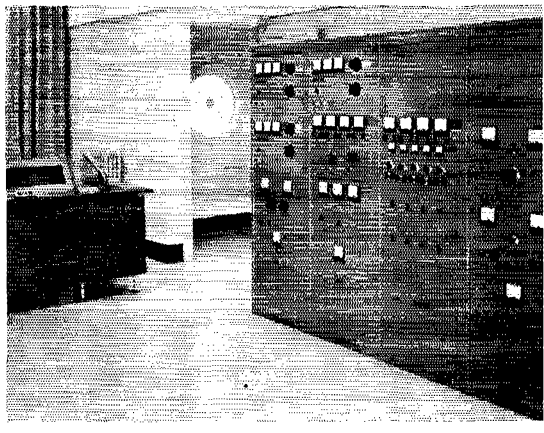
The master control console contains several receivers, signal monitors, transmitter exciters, punched-tape keyer (for code practice and bulletins) and operating accessories. Against the wall at the left is the RTTY position. The rack at the right is a back-up transmitter and RTTY transmitter.

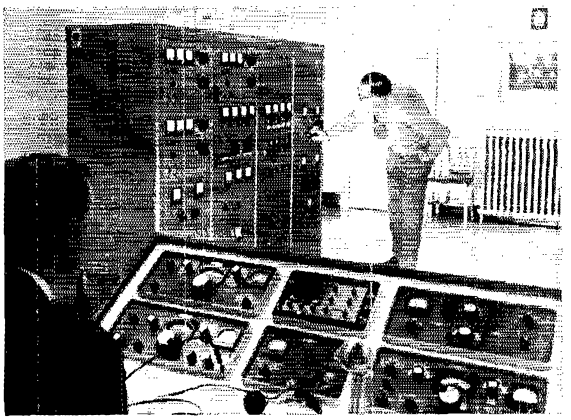
Close-up view of the transmitter racks. In the top two rows are some of the 1-kw. finals for 80 through 10 meters (two more to be added). Other equipment includes a 50-watt 160-meter transmitter, 200-watt 2-meter transmitter, 200-watt 6-meter transmitter, antenna patch panel, and converter to change the 3 Mc. signal from the console exciter to the various amateur bands, 80 through 10 meters.

Visitors are always welcome at the station and upon entering are requested to sign the guest log.

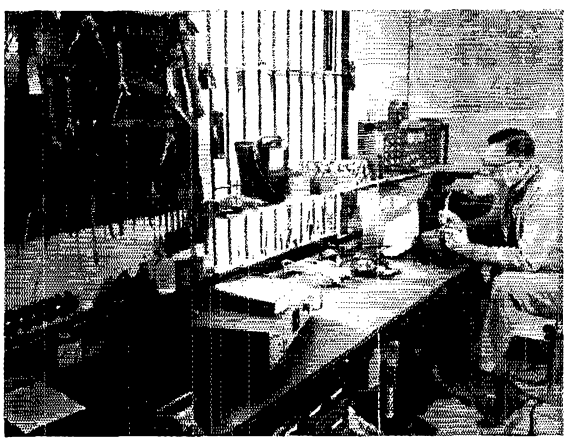


Another view of the console which faces the transmitter racks (right) and the visitor's operating position.

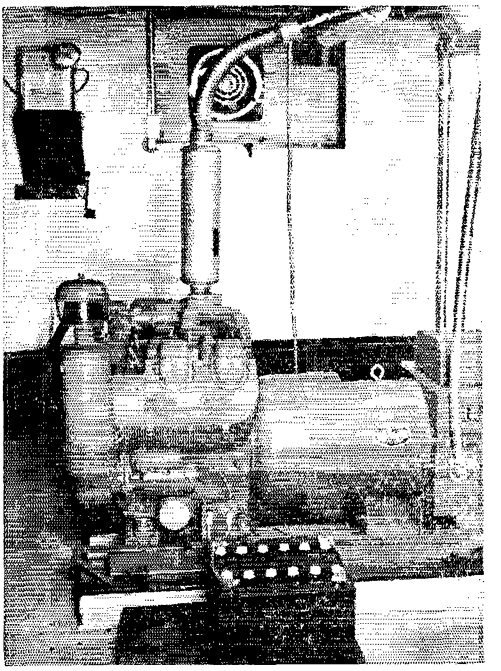




Another view of the transmitter racks taken from behind the visitor's operating position.



The W1AW workshop is well equipped for emergency repairs or general maintenance.



In case of a power failure, this 20-kw. 220-volt emergency generator located in W1AW's basement can handle the entire load at W1AW including light, heat and communications. The unit is electrically started and the engine is fueled by propane gas. Notice the emergency lighting on the wall at the upper left. This light (and others located throughout the building) come on automatically with loss of power.

Now that you have had a chance to browse around the interior of W1AW, here are a few additional details about the station. The operating center of the station is the master console. Located here, along with the usual operating position accessories, are auxiliary receivers and signal monitors. The station v.f.o./exciter is positioned here and generates a basic 3-Mc. s.s.b., c.w., a.m., or RTTY signal, which is then fed to the transmitter racks. A series of converters heterodynes the 3-Mc. signal to the desired amateur band (80 through 10 meters) where it is amplified in the appropriate 1-kw. linear amplifier. The racks also contain s.w.r. bridges and indicators for each antenna system, along with controls for remotely tuning antenna couplers where applicable. There is an antenna patch panel for switching the various transmitters and receivers in the station to the desired antenna.

For code practice or bulletins, an RTTY tape, which has been previously cut at the station, is fed into an RTTY-to-Morse converter, which transforms the RTTY characters on the tape to dots and dashes and then keys the transmitters. Of course, this same tape is used to key the RTTY equipment, too.

W1AW and the Hq. building are situated on a 7-acre site with plenty of room for antennas. Three self-standing 60-foot steel towers (two are visible on the front cover) support 3-element Yagi beams for 20, 15, and 10 meters. A 6-meter omnidirectional antenna shares one tower with the 15-meter beam and a 2-meter omnidirectional antenna is on another tower with the 10-meter beam. For 40, 80, and 160 meters, half-wave horizontal wires are used. The 80 and 40 meter doublets are center fed; the 160-meter doublet is end fed. Feed lines for all the antennas are situated underground and, on 40, and 160 meters, the underground coax terminate at remotely controlled antenna couplers located on the ground directly below the antenna feed points. Open-wire feeders connect the antennas to the tuners.

Page 92 shows the station schedule, and visitors are always welcome. Meanwhile, make use of the varied services provided by the Maxim Memorial Station — daily sessions of code practice, news bulletins, frequency-measuring tests, and general operation.

There's a lot more to see here at W1AW. Why don't you drop in and see it for yourself? QST

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

Requirements for Being EC

Under this heading in November *QST*, we presented some material on the "why" of being an EC. Gratifying enough, it brought some inquiries about what one has to do to be an EC. This is all explained in *Operating an Amateur Radio Station*, but a few reflections on the subject seem to be called for, so here goes.

The basic requirement is a sincere interest in amateur radio emergency communication. If you have this, then the rest is merely a matter of achievement that goes along with it. We use the word "merely" advisedly. It's a matter of motivation. If the motivation is strong enough, the achievement is almost automatic. If the motivation is weak, the obstacle of achievement seems insurmountable.

But no matter how you look at it, the first achievement is easy: full ARRL membership. We realize five bucks is five bucks, but anyone, we don't care what his status, can salt away that much a year. It's less than a dime a week. It's not an expense, either, it's an investment.

The second requirement may need a little effort — acquiring a General (Conditional) class license or better. The EC is a leader for all kinds of emergency communication within his area of jurisdiction; generally speaking, he cannot acquire the know-how nor the respect of the AREC membership if he himself is restricted in his operating environment. We have gone 'round and 'round about this with some of our officials, but the majority still appear to feel that this is a reasonable and progressive requirement.

The requirements from here on become a little less tangible. One of them is the possession of leadership qualities. Some of us have them, some of us haven't. But this is a matter of opinion — your SEC's and your SCM's opinions, not yours. If you have the willingness (another requirement), let *them* decide whether or not you possess the requisite leadership qualities. Get a copy of Form 34, fill it out, send it to your SEC, who will forward it to the SCM with his (the SEC's) recommendation, and let the chips fall where they may.

Of course there has to be a vacancy, too. Sometimes, if the present EC isn't doing his job and there is enough interest locally, he can be prevailed upon to give up the post so somebody else can have a crack at it. Or perhaps the SCM can be prevailed upon to cancel him out. There is no reason for the AREC membership to put up with an inadequate EC when someone else in the organization is willing to step in — someone qualified and able. Put your best foot forward. If that foot boots out a non-performing EC, that's progress.

* National Emergency Coordinator.

On June 17-19, The Eastern Suffolk (NY) Radio Club was invited to participate in the Sag Harbor Whaler's Festival. A station was set up by club members and handled over 170 messages, using New York Section Nets for outlets. Shown here are WB2FHP and WB2CRN operating the club station.

(Photo by Joseph Adams)

New Operating Manual

In case anybody hasn't noticed, the ARRL now offers a complete *Radio Amateur's Operating Manual* for sale, for one buck. This isn't a sales pitch, but merely to point out that the existence of the new manual is something we have needed for many years, and we hope all ARPSCers will have a copy in their shacks. It puts under one cover an accumulation of information on all operating phases of amateur radio, with special emphasis on the public service aspects. Even if you have the booklet *Operating an Amateur Radio Station* and the *Public Service Communications Manual*, you will find the new "OpMan" contains much useful additional material for you to read and digest. Once you have done so, you will still want it around for reference purposes. It's an operating "must" in every ham shack, but especially in those whose owners take part in one or more of the three ARPSC divisions. — *W1NJM*.

National Traffic System

Every once in a while someone comes up with a suggestion for a new operating wrinkle that is so logical that the immediate reaction is "Now, why didn't we think of this long ago?" There is something to be said for adhering to old practices as long as any new ones proposed don't improve anything; but new practices that effect improvements should be seriously considered.

One such that we can remember offhand is the practice of "who calls first" when two stations are sent off frequency by the NCS to clear some traffic. For many years this matter was unresolved, and practices varied from net to net, sometimes even within nets. Then someone rationalized the matter as follows: the station to *receive* the traffic should call first, so he can select a frequency near to the designated spot on which he can copy adequately, the station to transmit then zero-beating him exactly. Simple and logical. Why didn't we think of it years ago?

Another practice, common to nets, which has gone unresolved for a long time is how to list traffic being reported into the net. The *Public Service Manual* and the new "OpMan" show examples of such reporting giving the number of messages first and the destination afterward, thus: "QTC 1 ILL 3 WIS 7 MINN," or, by voice, "I have one for Illinois, three for Wisconsin and seven for Minnesota." Now one of our NTSers points out that it would make things a little easier for NCSes, especially when a number of different precedences are involved, to give the *destination* first, then the number of messages. Reason for this is that often the NCS has the destinations, or destination areas, already on his sheet. If the reporting station says something like "1 P 3 P2 4 R ILL," NCS has to wait until the destination is stated before he knows which column to put the traffic in, then while he's doing it the reporting station is starting on a list for another destination.

Make sense? It sure does. So much so, that we're inclined to accept it as standard procedure. However, for a time at least, it will have to be just a recommendation. We therefore recommend that in NTS nets, the destination designation be sent *first*, followed by the number of messages for that destination, and further we recommend that the entire unit be separated from the next unit by the procedural sign AA on c.w. To wit: On phone, "I have for Illinois, one; for Wisconsin, three; for Minnesota, 7." On c.w., "QTC ILL 1 AA WIS 3 AA MINN 7 AR."

Net managers may, of course, use their discretion about making this standard procedure in their nets. — *W1NJM.*

October report:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	58	604	.355	10.4	87.4
2RN[1]	58	430	.552	7.6	98.6
3RN	58	631	.479	10.9	98.9
4RN	58	1079	.452	18.6	90.5
RN5	58	1160	.531	20.0	92.7
RN6	58	1557	.904	26.8	100
RN7	29	476	.503	16.4	89.1[1]
8RN	59	516	.324	8.9	92.1
9RN	29	549	.770	18.9	97.4[1]
TEN	62	1234	.777	19.7	70.4
ECN	28	123	.218	4.4	73.8[1]
TWN	27	273	.457	10.1	65.5[1]
EAN	29	1983	1.408	68.4	96.6
CAN	29	1545	1.237	53.2	100
PAN	29	1820	1.125	62.8	97.6
Sections[2]	1795	13,933		7.8	
TCC Eastern	116[3]	882			
RCC Central	84[3]	849			
TCC Pacific	116[3]	1091			
Summary	2464	30,735	EAN	11.4	90.9
Records	2016	24,452	.928	12.3	—

[1] Representation based on one or less sessions per day.

[2] Section/Local nets reporting (57): VN VSBNE VSBNL VSN (Va.) PHD MOTTN MOSSB (Mo.); PTN (Maine); OLN BN OSSBN (Ohio); GN QFN FMTN WFPN (Fla.); EPA WPA PTTN (Pa.); NTTN (Tex.); NCNE NCNL NCSSB (N.C.); Mich. 6 Wolverine QMN(2) (Mich.); RISPN (R.I.); SCN NCN (Cal.); BUN (Utah); QIN (Ind.); Alta. SSB; GBN (Ont.); WMN EMNN (Mass.); Iowa 75; OZK (Ark.); CPN (Conn.); LAN (La.); OQN (Ont.-Que.); AENB AEND AENH AENM AENO AENT (Ala.); KTN (Ky.); MTN (Man.); TN TSSBN TPN ETPN (Tenn.); WSN (Wash.); GSN (Ga.); NJEPTN (N.J.); ILN (Ill.).

[3] TCC functions not counted as net sessions.

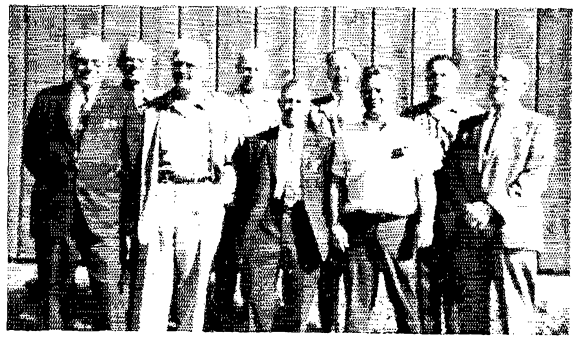
October was a good month even when we didn't count the SET, so with the SET reports included, we would have probably broken every record in the book. Speaking of the SET, it appears at this point that NTS out performed last years top job. We'll have the full details in an early issue of *QST*.

Since we have decided not to count the SET as part of the regular October functions, we are going to throw out all the records set while NTS participated in the SET. This goes back to 1962, when the non-SET records were set. As you can see, we broke 'em all except the average and we came pretty darned close to this one.

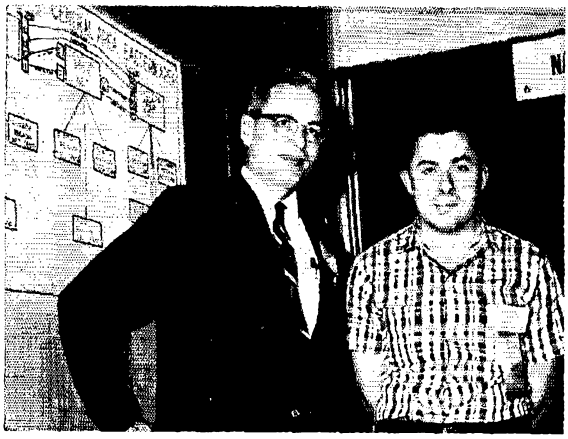
At this writing, the winter skip conditions don't seem to be as bad as they have been in the past few years. While it's still easy for the fellows on the east coast to work Europe and Africa on 80 and the boys on the west coast to work Japan and into the Pacific, all levels of the system seem to be functioning normally at night. We're keeping our fingers crossed in hopes that this will continue.

W1EFW has just published the third 1RN bulletin, and comments that someone said we needed a bit more traffic, so look what happened . . . up 22%. WA2GQZ comments that after watching the Princeton-Yale football game, he has come to the conclusion that a good New Jersey team can beat a good Connecticut team. (Yeah, only if they're lucky. — Ed.). K3MVO has a few comments on the SET which we will save for the detailed report on that operation. Silent W4SHJ has issued 4RN certificates to W4s CZN SZT TFL K4CWZ and W1BGL (that's right, a WB4). Representation from Texas on RN5 has improved considerably, comments K5IBZ, but he can't understand why one section's representation increases when another's decreases. This month, old reliable Alabama tumbled to last place. WB6BBO has issued RN6 certificates to W6ECP, K6AJU, WA6KZI and WB6NXK. K7JHA reports that the net time of 0245z held up through October, but it appears inevitable that they will have to move to 0145z within the next few weeks. With the improved representation from Alberta, traffic headed in their direction has also increased. W8CHT remarks that the Michigan and Ohio Section nets are attempting to hold late net meetings, to conform with the general operating time schedule as outlined in the Public Service Communications Manual (which is available free upon request to Hq.). W9QLW has issued 9RN certificates to WA4UAZ, W9s KQB RTP NXG, K9RLW, WA9s OYI NDV. VE3CYR submitted the ECN report this month for VE3BZB who was in Arizona on business. K1WJD comments that W2ZVW and W2ZRC have swapped nights as NCS. W9DYG isn't sure where all the traffic came from this month, but he's not looking a gift horse in the mouth. W6VNQ has issued PAN certificates to K6LRN, WA6CVU, K7IWD, K7JHA, K7NHL and W7DZX and hopes to take care of the rest of the crew who have earned them shortly.

Transcontinental Corps: W3EML is looking for some one to take the Station D schedule on Thursday and Friday (GMT) anyone interested should get in touch with Bill pronto. W9JUK sends comments on the SET operation



Northwestern Division Director W7PGY called a meeting of League Officials within his Division on Sept. 24, to discuss, among other things, public service in the Division. During a break in the meeting, this photo of (l. to r.); W7PGY, K7JHA, RN7 Mgr.; W7GMC, Asst. Dir.; W7HMQ, SCM Wash.; W7AJN, SCM Ore.; call unknown; W7UWT, SEC Wash.; W7OEB, RM Wash.; W7CPY, V. Dir., Northwestern Division.



California is loaded with prominant traffic men, so here's two more to add to the collection. On the left, Ed Eklund, K6IME, Manager of the Southern California Net and on the right, Jerry VerDuft, WA6ROF, a familiar call on PAN, RN6 and in TCC circles.

(Photo by WA6YWN)

which we will also hold for a later report. W7DZX has things pretty well in hand in the Pacific Area, but is most unhappy with the lack of reports he's getting. How about it men, get your reports in regularly and on time.

October report:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	116	83.6	2410	882
Central	87	80.5	1770	849
Pacific	116	75.0	2181	1091
Summary	319	81.5	6361	2882

The TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EFW EMG NJM, *W2s* GVH SEI ZVW, *K2s* RYH SSX, *WA2s* BLV UFI/4 UPC WBA/5, *WB2s* AEJ OHK, *W3s* EML NEM, K3MVO, *W4s* DVT HJS ZM, WA4EUL, *W8s* CHT, IBB, K8KMQ. *WA8s* CFJ GYT. Central Area (W9JUK, Dir.) — WA2WBA/5, W4OGG, K4DZM, *WA4s* TPB/4 WWT, *W5s* GHP KRX, WA5JOL, *W9s* YT CXY DYG JUK KQB QLW VAY ZYK, WA9NFS, *WØs* YC LCX, KØAEM, WAØMLE. Pacific Area (W7DZX, Dir.) — *W6s* VNQ EOT IDY BGF HC TYM, WA6ROF, WB6HVA, *K6s* AJU DYX LRN, *W7s* DZX ZIW HMA GMC, VE7BDJ.

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Net	*Sessions*	*Check-ins*	*Traffic*
20 Meter SSB	19	346	1356
7290	42	1502	891
North American SSB	26	733	908
Mike Farad	27	403	470
Hit and Bounce	31	423	735
CNEN	26	1126	14

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Diary of the AREC

Monroe County, Ind., amateurs turned in a convincing performance on an unscheduled workout just one week before the annual SET. The staff of the Bloomington, Ind., hospital had planned a barbecue in the hilly country eight miles south of Bloomington on Oct. 1. With no telephones available at the site, the doctors turned to local hams for communications. Upon short notice, K9CGT and WA9CLT set up a six meter transceiver at the barbecue, while K9JJX and K9BNE manned K91U at Indiana University, and received messages from the hospital for relay to the barbecue site. Throughout the day, numerous messages of routine and emergency precedences were handled. The two operators at the barbecue reported the food was excellent but slightly cool by the time they got around to eating it at 2000 CST. — *W9YYX.*

On Oct. 13, an explosion rocked the Monsanto Chemical Company plant in Lasalle, Que., less than a mile from the scene of the apartment block explosion of April, 1965. VE2BMS was apparently the first amateur to learn of the disaster and he called VE2ANH, Montreal area EC, to inform him of what had just happened. Shortly after receiving VE2BMS's call, VE2ANH received another call from VE2XO who had the same information. A check of the local radio station's news cast gave the possible cause of the explosion as an airplane crash, while another version had an apartment building blowing up. By the time VE2ANH got on 2 meters, VE2BXW had started the emergency net and was acting as NCS. He was in contact with VE2DCF who was in the vicinity of the explosion. Many other stations were on standby waiting for more information on the location and gravity of the emergency.

Meanwhile, VE2BMS and VE2AYD were at the scene of the explosion where they quickly set up emergency communication links via 2 meter f.m. from VE2BWS and VE2BNL who were operating from a portable station within 300 yards of the explosion. Traffic was relayed to VE2ANH and VE2AYD who in turn either delivered the messages or relayed them further. One example of the type of traffic that was handled was a request for a locomotive to push a tank car full of high explosives away from the fire. Official word has it that had this car exploded, it would have flattened everything within a four mile radius. In the midst of all the fires and traffic jams, telephone service to the local hospital had been disrupted so VE2ANH fought his way through the traffic jams to the hospital to provide emergency communication to the disaster scene. Other stations known to have participated were: *VE2s* BQP BOQ SH RM. — *VE2ANH/VE2BMS.*

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When a rather severe snow storm parked itself over Northwestern Nebraska on Oct. 14, and started dumping white, fluffy snow all over the place, KØOAL, EC, called an emergency session of the AREC net to provide emergency communications. The storm had caused considerable damage to the power lines and disrupted telephone service. The Pine Ridge Amateur Radio Club station, WØFLO, was designated NCS with WØTZW, *KOs* OAL ODF ODH and WAØKAQ operating and delivering messages alternately. KØOAL and WAØKAQ had mobile equipment parked in front should the need arise. Message handling comprised railroad schedules and load reports, road conditions, reporting the location of broken power lines and poles, current weather information and the cancellation of various meetings, police information concerning road conditions and personal inquiries and the relaying of public interest information to the local radio station. By late in the day of Oct. 15, the weather had improved considerably and normal power and communications links were well on their way to being restored and the net was closed down. Other stations known to have participated were: *WØs* MGV SWG ZWL BSC RIH, KØUOK, *WAØs* BIL IJY, K7MGM. — *KØOAL, SEC Nebraska.*

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On the evening of Oct. 14, two students from Ferris Institute in Big Rapids, Mich., were traveling south on U.S. 131 about six miles north of Morley, Mich. It was cold and raining, so visibility was poor and the driver misinterpreted a turn sign and began making a turn on the highway prematurely. The outcome of this manouver was that the car rolled over four times and finally came to rest upside down. About this time, WA1DAG and a friend were driving north on U.S. 131 and passed the accident shortly after it occurred. WA1DAG, a regular member of the Interstate Single Sideband Net, grabbed his mike and broke into the net. Although his signal was extremely weak, W8QZK was able to catch enough of the emergency call to call the attention of the net to the situation. All members stood by while each station strained his ears to copy the emergency message. W8IWF and W8QZK were the only two who could get any information at all and after trying to piece the bits of information together, were able to get an acknowledgement from WA1DAG that they had the information correctly. W8IWF immediately called the Rockford State Police Post and told the dispatcher of the accident. The dispatcher contacted the Reed City post and a cruiser was dispatched to the scene of the accident. — *W8IWF.*

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

FULL TIME

3550	7100	50,550
3875	29,640	145,350

PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Full time frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for *any* purpose (except calling for emergency help) the first five minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in an FCC-requested or FCC-declared emergency, at which times they become *full time* frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require us all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

On Oct. 15, the snow storm that had clobbered the northern part of Nebraska moved south and plagued residents in five counties. About fifty amateurs participated in the emergency operation which involved the relaying of messages of both emergency and Priority precedence. The Nebraska State Civil Defense headquarters station was activated from Lincoln and handled c.d. messages. — *WØHYD.*

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On Oct. 20, Utah State University and the U.S. Forest Service joint mountain top effort fell heir to disaster. At 1310 local time, a member of the Forest Service team suffered a heart attack on top of a 9700 ft. mountain. Minutes prior to this, a backhoe cut the coax cable connecting the mountain top repeater system, thus disabling the Forest Service radio system. W7DMD at the site had a 2 meter f.m. handitalkie and relayed information to W7RQT regarding the incident. At 1315 local time, an ambulance and hiking party were set out with W7RQT who was now using a handitalkie also. The ambulance met the crew half way down the mountain and thanks to the quick relaying, the man lived. — *W7RQT.*

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On May 17, Ky, SEC W4OYI, scheduled a surprise statewide alert, to test the facilities of the new communication center. The drill was planned as a complete surprise to all but the SCM, RM and PAM. The local alert was set for 1900 local time, just thirty minutes before the time of the regular club meeting. This insured maximum availability with no pre-alerting. The calling net went into action and fifteen minutes later, they broke both KYN and KTN with a "test-emergency" QNC. In Owensboro, an abbreviated "envelope drill" (see page 27, October 1964, *QST*) simulating a plane crash in a remote area and manning the hospitals. The crash unit mobiles were directed, by envelope, to remote points about five miles apart via circuitous routes. One of them "found" the crash, reported it and guided the other to him. It was a pretty fair test of map reading in the dark.

High precedence "test" traffic was originated to many key cities in the state and to Evansville, Ind. After the long silence as the respective NCSs swallowed the enormity of it all, traffic moved quickly. Fifteen non-local messages were originated. Thirteen were delivered and answers received, in thirty minutes, which isn't bad considering that in each case the addresses were unknown to the delivering station and had to be located. One was at a bowling alley and another was interrupted while making a speech before a civic club.

All told, sixteen AREC members showed up on this surprise drill and thanks to announcements on local radio, four non-members participated and subsequently joined the AREC. — *W4OYI, SEC Kentucky.*

The Englewood, N.J., AREC provided communications for the Englewood Memorial Track Meet held on May 21. Four portables and two walkie talkies were used to help coordinate the all day meet and provide results to the press. Six amateurs participated in the operation. — *WA2CCF, EC Englewood, N.J.*

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Forty-nine SEC reports were received for September, representing 20,118 AREC members. This is three fewer SEC reports and 1,000 fewer AREC members than we had last year. On occasion, we have sent letters to some of the SEC's from whom we have not received any reports in the past year or so, urging them please to forward the reports regularly. In one case, the SEC replied that he had been sending the reports to the SCM and that the SCM wasn't forwarding the copies along to us. The SCM became somewhat unhappy and said that he had never received a report from his SEC. This whole problem would never have arisen if the SEC had bothered to send the original copy of his report to the SCM and a copy to us, or vice versa. How about the rest of you fellows who haven't reported in some time? If you need forms, we'll send 'em. Even if you have nothing to report at all, just fill out the form and sent it in, so we can be sure that you're still alive and interested in the post. Those Sections heard from this month are: Conn., E. Mass., Maine, N.H., N.Y.C.-L.I., N.N.J., S.N.J., E. Pa., W. Pa., Del., Ala., E. Fla., Ga., Ky., N.C., W. Fla., Ark., N. Mex., Okla., S. Tex., Los A., Orange, S. Bar., S.C.V., S.V., Mont., Nev., Ore., Utah, Wash., Wyo., Mich., Ohio, W. Va., Ill., Ind., Wis., Colo., Kans., Mo., Nebr., S. Dak., Que., Man., Sask., Alta., B.C. QST

Strays

The above photograph is one received by Aubrey T. Burton, W4TNT, from the Nimbus II weather satellite on October 7, 1966. Receiving equipment was that described by Anderson, K2RNF in the November 1966 issue of *QST*. With north at the top of the photograph, the eastern coast of the United States is on the left; the Great Lakes on the upper left. The telltale marking along the right edge of the picture is the data code which when converted will give date, time and location of the photograph along with orbital parameters for future tracking plots.

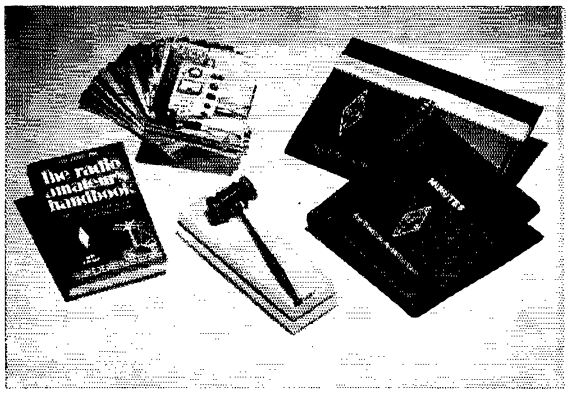
HamQUEST '67

As THIS issue of *QST* reaches you, the holiday season is upon us and the New Year is just around the corner. One New Year's resolution you might make is to help your club. How? By taking part in HamQuest 67. There are two months left for you to help your club earn a handsome gavel, or a hard-covered '67 *Handbook* for the club files, or a secretary's minute book, or an engraved briefcase, or 12 issues of *QST*.

There are two months left for you to earn for yourself an ARRL Booster pin, or a 1966 *Handbook* for yourself, or one of the new ARRL *Operating Manuals*, or a one-year extension of your own League membership.

All you have to do is sign up some new members in your local club and in ARRL.

Why should all of those non-members join ARRL? What's in it for *them?* VE2KO of the Montreal Amateur Radio Club *Marcogram* put it this way:



These are the awards that are going out to members and clubs for their participation in HamQuest 67

HamQuest '67

Or, Why We Need the ARRL

One common characteristic shared by all hams is a keen self interest. In this aspect we are not so different from people in general. However, one would like to believe that our self interest is somewhat enlightened. This is difficult when one realizes that all hams are not ARRL members. It is impossible when we learn that more than half of the hams interviewed in an ARRL survey are neither ARRL members, nor club members. This in spite of the fact that all these non-joiners felt the League to be serving a useful purpose and realized the importance of a strong organization in amateur radio.

Every ham benefits by the mere existence of the ARRL; but each ham who is *not* a member weakens the voice of the League.

You think you don't need the ARRL?

Who speaks for us when our frequencies are looked at with beedy, greedy eyes? At international conferences, the League is heard with respect — an esteem *not* shared by fringe groups who support fanatic leaders who twist and bend the truth to suit their own purposes (personal power, usually).

Who is responsible for the organization of public service communications by which our usefulness can be constantly demonstrated and proven? The ARRL. Each AREC member, each traffic man, is helping *you* to keep the amateur frequencies. What are *you* doing to justify your use of valuable spectrum space? Are you even an ARRL member?

Who will go to bat for you if you are unfairly put on restricted operating privileges as a result of interfering with the first TV set made in Canada? The ARRL. And non-members who ask for help are moochers.

How did you get your ticket? Don't tell me you never copied W1AW code practice? And that dandy little f.s. meter you use to adjust your mobile antenna to resonance? A *Handbook* circuit, I'll bet. Who has published the most comprehensive handbooks on every phase of our hobby? The ARRL.

You have just invested in real estate — a hill overlooking a lake — and you want the best plan for layout of your rhombics, V-beams, and perhaps a rotatable 80-meter phased array. Who do you ask for help? The ARRL.

Who is behind the effort to get intruders off the amateur bands? The ARRL.

You travel around the world. Once a year. You want to pack up your KWM-2 and operate from here, there, everywhere. Who has been behind all the reciprocal operating agreements? The ARRL.

Do you know the difference between a junction field effect transistor and an insulated gate FET? Ahh — you didn't see the October *QST*. No ham worth his call can get along without *QST*. No matter what your primary interest in the hobby may be — you need *QST*. Even Novices and beginners are well cared for in each issue. *QST alone* is worth the ARRL membership fee. . . .

You cannot afford *not* to be a League member . . . QST

IMPORTANT NOTICE

Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code*. Your promptness will help you, the postal service and us. Thanks.

Happenings of the Month

ELECTION RESULTS

League members in eight divisions have completed the choosing of their representatives for the next two years. In the six offices where there were more than one candidate, ballots were sent the second week of October to all amateurs who were members of the appropriate divisions on September 20. On November 21, deadline for receipts at headquarters of the completed ballots, the Committee of Tellers (Directors Crossley and Eaton, Treasurer Houghton) met to supervise the opening and counting of the votes, monitored by a certified public accountant.

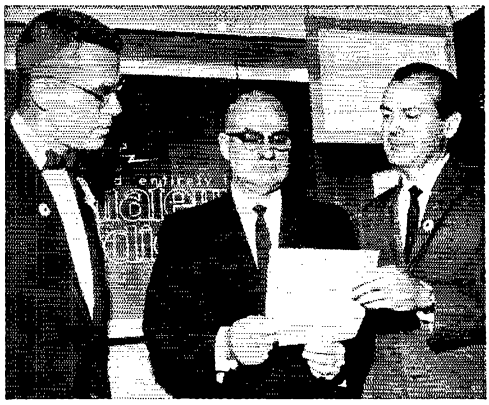
In the Hudson Division there were 3394 ballots for incumbent Director **Harry J. Dannals, W2TUK** to 629 for Christopher DiPasqua, WA2YQW, in contrast to a tie vote in this division two years ago. **Carl L. Smith, WØBWJ** won a fourth term as director from the Rocky Mountain Division, defeating B.R. Slats Council, KØATZ, 731 to 380. West Gulf Director **R. O. Best, W5QKF,** had 1243 votes to 859 for Fred E. Ellis, W5PTZ, also securing a fourth term thereby.

In the Southwestern Division, two former directors battled it out, with **John R. Griggs, W6KW** defeating Ray E. Meyers, W6MLZ 2128 to 1481. OM Griggs, a resident of Granada Hills, California and a senior electronics engineer for LPL Engineering Corporation, was director from the division from 1949 through 1954 and assistant director 1955-1959 and 1961 to the present. He has also served as president of the San Diego Amateur Radio Club and vice president of the Inglewood Amateur Radio Club. He's been continuously licensed since 1922 and is 59 years old.

John's teammate as vice director is **Thomas J. Cunningham, W6PIF,** of El Segundo, California, who garnered 2136 votes to 1349 for William G. Welsh, W6DDB. Tom has been an assistant director since 1962. He's a director, past president and past vice president of the Associated Radio Amateurs of Long Beach; chairman and past secretary-treasurer of the Southern California Chapter, Quarter Century Wireless Association; past secretary-treasurer, Los Angeles Council of Radio Clubs, Inc. and a member of RACES. Tom is 54, and works at Hughes Aircraft Company as an administrative budget analyst. His original call, which he still holds at his vacation hideaway, is W7CUK, issued in 1932.

Central Division Vice Director **Edmond A. Metzger, W9PRN,** won a second term, chalking up 2051 voters to 1430 for Sidonius M. Pokorny, W9NRP.

The uncontested elections, as reported in this department of *QST* for November, placed the following in office for 1967-1968: Directors Philip E. Haller, W9HPG, Central; Robert York Chapman, W1QV, New England; Robert B. Thurston, W7PGY, Northwestern; Victor C. Clark, W4KFC, Roanoke; Vice Directors Stan Zak, K2SJO, Hudson; Bigelow Green, W1EAE, New England; R. Rex Roberts, W7CPY, Northwestern; L. Phil Wicker, W4ACY, Roanoke Division; John H. Sampson, Jr., W7OCX, Rocky Mountain Division and Ray K. Bryan, W5UYQ, West Gulf Division. All terms start at noon on January 1.



Muskegon Police Chief W8CJ (center) receives a life membership certificate in the Muskegon Area Amateur Radio Council, of which he is a charter member, from WA8IQZ, left, council president and ARRL prexy WØNWX, right, during the ARRL Great Lakes Division Convention October 22, 1966.

This is the year for Expo 67, the World Exposition at Montreal, Quebec. Amateurs of the vicinity are using this bi-lingual QSL card to publicize the event, highlight of which for amateurs is our National Convention in that city June 30–July 1-2.

FOURTH QSL BUREAU SPLITS

The QSL Bureau in the Fourth U. S. Call Area has been split into two sections to ease a heavy workload for the volunteer personnel of the Bureau and to provide more efficient service.

H.R.H. Prince Philip, Patron of the Radio Society of Great Britain, cut the opening ribbon at the RSGB's 1966 radio exhibition in London. Here, at left, he is welcomed by Society President R. F. Stevens, G2BVN. At right, IARU/ARRL President Robert W. Denniston, WØNWX, and Canadian Director Noel B. Eaton, VE3CJ, bring greetings from W/K and VE/VO lands. Prince Philip exhibited deep interest in the activities of organized amateur radio and the advances in equipment and techniques on display.

Amateurs having callsigns beginning with WA4, WB4 or WN4 should now send their self-addressed stamped 5 x 8 inch manila envelopes to Richard Tesar, WA4WIP, 2666 Browning Street, Sarasota, Florida 33577.

Amateurs whose calls begin with W4 or K4 continue to use the Frye Amateur Radio Club, Box 13, Chattanooga, Tennessee 37401.

SPECIAL TEMPORARY AUTHORITY

The Federal Communications Commission, in addition to authorizing some ten modes of operation by amateurs in appropriate frequency bands, further encourages special experimentation by amateurs:

"Adequately qualified amateurs interested in undertaking, purely as an amateur activity, special technical investigations, such as observation and measurement of propagation phenomena, may apply for special temporary authority to employ types of emission other than those provided for in Section 97.61. Requests for such authority should include full details and should be addressed to the Secretary, Federal Communications Commission, Washington, D. C. 20554."

A current example is the one-year permission given to WAØNLQ, W7FEN, K7YZZ, W7ZXM, W9EUD, W9NTP, W9CTC and K9UZW for simultaneous voice and slow-scan TV, with a 6-kc. bandwidth in the 7, 14 and 21 Mc. bands. The special permission allows the transmission of pictures and similar visual material to personnel in the Antarctic.

FCC ADDS HERTZ TO DEFINITIONS

Part 2 of the FCC rules has been amended to include the following definition:

"*Hertz*. A unit of frequency equivalent to one cycle per second. The terms Hertz (Hz) and cycles per second (c/s) are synonymous and may be used interchangeably."

We understand that the Commission does not plan a wholesale change to the new name in the immediate future. As was indicated in August, *QST* expects to continue using cycles per second and its multiples pending a more definite decision by domestic as well as international regulatory bodies.

CANADIAN CENTENNIAL CALLS OKAY IN STATES

Canadian amateurs who have secured operating privileges in the United States may use either the standard VE or VO prefix or at their option, the special centennial prefixes 3C and 3B, followed by the regularly-assigned numeral and suffix (See page 88, October *QST*) and by the usual portable or mobile indication (i.e. 3C3CJ/W1). Americans operating in Canada, however, will use the regular VE or VO indicator only (i.e., W1LVQ/VE3).

U.S. CALLS IN BRITAIN SHORTENED

President Robert W. Denniston, WØNWX (and G5ADH) brings back from London the good news that it will no longer be necessary for U. S. amateurs operating under reciprocal privileges to use both the British and American calls (i.e., G5ADH/WØNWX) but instead sign only with the G5 call.

EXAMINATION SCHEDULE

For the convenience of those planning to take an FCC examination for General or Extra Class license, we present below a tentative schedule of dates and places. (Applicants for Novice, Technician or Conditional Class licenses should follow procedures outlined in Chapter 5 of the Radio Amateur's License Manual.)

Atlantic Division Director Gilbert L. Crossley, W3YA, at right, presents yet another *QST* Cover Plaque award to R. C. Dennison, W2HBE, whose article, "The TR-2 Transceiver," was voted best of the August issue by the ARRL directors. Presentation was made at the 50th Anniversary Banquet of the South Jersey Radio Association. (Thanks to W2OGZ for the photo.)

1 Boston, Mass. 02109; India & State Streets; Wed.-Fri., 8–10 A.M.
* Also conducts examinations at Bangor, Me. in May; Hartford, Conn. in March and Sept.; Portland, Me. in Apr. and Oct.

2 New York, N.Y. 10014; 641 Washington Street; Tues.-Fri., 9–12 A.M.
* Also conducts examinations at Schenectady, N.Y. in Mar., June, Sept. and Dec.

3 Philadelphia, Penn. 19106; 2nd & Chestnut Streets; Mon.-Wed., 9–10 A.M.

4 Baltimore, Md. 21202; Gay & Water Streets; Mon., and Fri., 9 A.M.

5 Norfolk, Va. 23510; Granby & York St.; Fri., 9–10 A.M.
* Also conducts examinations at Salem, Va. in Apr & Oct.; Wilmington, N.C. in June & Dec.; Winston-Salem, N.C. in Feb., May, Aug. and Nov.

6 Atlanta, Ga. 30303; 240 Peachtree Street, N.E.; Tues., and Fri., 8:30 A.M.
* Also conducts examinations at Nashville, Tenn. in Feb., May, Aug., and Nov.; Memphis, Tenn. in Jan., Apr., July and Oct.; Knoxville, Tenn. in Mar., June, Sept. and Dec.; Birmingham, Ala. in Mar., June, Sept. and Dec.

6S Savannah, Ga. 31402; York & Bull Streets; 2nd & 4th Tues. each month, by appointment only.

7 Miami, Fla. 33130; 51 S. W. First Ave.; Thurs., 9 A.M.
* Also conducts examinations at Jacksonville, Fla. in Apr. and Oct.

7T Tampa, Fla. 33602; 500 Zack Street; Mon.-Fri., by appointment only.

8 New Orleans, La. 70130; 600 South Street; Mon., 8:30 A.M.
* Also conducts examinations at Jackson, Miss. in June and Dec.; Little Rock, Ark. in Feb., May, Aug. and Nov.

8M Mobile, Ala. 36602; 113 St. Joseph Street; Wed. by appointment only.

9 Houston, Texas 77002; 515 Rusk Avenue; Tues., 9 A.M.
* Also conducts examinations at San Antonio, Texas in Feb., May, Aug., and Nov.; at Corpus Christi, Texas in Mar., June, Sept. and Dec.

9B Beaumont, Texas 77701; 300 Willow Street; Tues. by appointment only.

10 Dallas, Texas 75202; 1314 Wood Street; Tues., 8 A.M. to 1 P.M.
Aug.; Oklahoma City and Tulsa, Okla. in Jan., Apr., July and Oct.

11 Los Angeles, Calif. 90014; 849 S. Broadway; Wed. 9 A.M. and 1 P.M.
* Also conducts examinations at Bakersfield, Calif. in May; Las Vegas, Nev. in Jan. and July; Phoenix, Ariz. in Jan., Apr., July and Oct.; Tucson, Ariz. in Apr. and Oct.

11SD San Diego, Calif. 92101; 1215 Seventh Avenue; Wed., by appointment only.

12 San Francisco, Calif. 94111; 555 Battery St.; Fri., 8:30 A.M.
* Also conducts examinations at Fresno, Calif. in Mar., June, Sept. and Dec.

13 Portland, Ore. 97205; 620 S. W. Main Street; Fri. 8:45 A.M.
* Also conducts examinations at Boise, Idaho, in Apr. and Oct.; Klamath Falls, Ore. in May.

14 Seattle, Wash. 98104; 1st Avenue & Marion Street; Fri., 8:45 A.M.
* Also conducts examinations at Billings, Mont. in May; Great Falls, Mont. in Sept.; Spokane, Wash. in Apr. and Oct.

15 Denver, Colo. 80202; 19th Street between California and Stout Streets; 1st & 2nd Thurs., 8 A.M.
* Also conducts examinations at Albuquerque, N. Mex. in Apr. and Oct.; Rapid City, S. Dak. in May; Salt Lake City, Utah in Mar., June, Sept. and Dec.

16 St. Paul, Minn. 55102; 6th & Market Streets; Fri., 8:45 A.M.
* Also conducts examinations at Jamestown, N. Dak. in Oct.; Marquette, Mich. in May; Sioux Falls, S. Dak. in Mar., June, Sept. and Dec.

17 Kansas City, Mo. 64106; 601 E. 12th St.; Thurs., and Fri., 8:30-11 A.M.
* Also conducts examinations at Des Moines, Iowa in Mar., June, Sept. and Dec.; Omaha, Nebr. in Jan., Apr., July and Oct.; St. Louis, Mo. in Feb., May, Aug. and Nov.; Wichita, Kans. in Mar. and Sept.

18 Chicago, Ill. 60604; 219 South Dearborn Stt.; Fri., 9 A.M.
* Also conducts examinations at Davenport, Iowa in Jan., Apr., July and Oct.; Fort Wayne, Ind. in Feb., May, Aug. and Nov.; Indianapolis, Ind. in Feb., May, Aug., and Nov.; Louisville, Ky. Feb., May, Aug. and Nov.; Milwaukee, Wisc. in Jan., Apr., July and Oct.

19 Detroit, Mich. 48226; Washington Blvd. & La Fayette Street; Wed. and Fri., 9 A.M.
* Also conducts examinations at Charleston, W. Va. in Mar., June, Sept. and Dec.; Cincinnati, Ohio in Feb., May, Aug. and Nov.; Cleveland, Ohio in Mar., June, Sept. and Dec.; Columbus, Ohio in Jan., Apr., July and Oct.; Grand Rapids, Mich., in Jan., Apr., July and Oct.

20 Buffalo, N.Y. 14203; Ellicott & Swan Streets; 1st & 3rd Fri., 9 A.M.
* Also conducts examinations at Pittsburgh, Penna. in Feb., May, Aug. and Nov.; Syracuse, N.Y. in Jan., Apr., July and Oct.; Williamsport, Penna. in Mar., June, Sept. and Dec.

21 Honolulu, Hawaii 96808; 502 Federal Building; Tues. and Wed., 8 A.M. and by appointment.
* Also conducts examinations at Hilo in Oct.; Lihue, Kauai in Nov.; Wailuka, Maui in Oct.

22 San Juan, P. R. 00903; 322 U. S. Post Office & Courthouse; Fri., 9 A.M.

23 Anchorage, Alaska 99501; 4th Avenue at F & G Streets; Mon.-Fri., by appointment only.
* Also conducts examinations at Fairbanks in May and Nov.

24 Washington, D.C. 20555; 521 12th Street, N.W.; Fri., 9:30 A.M. and 1 P.M.
* Also conducts examinations at El Paso, Texas in Feb. and Aug., Lubbock, Texas in Feb. and Gettysburg, Penna. 17325; 334 York Street; 1st & 3rd Tues., by appointment only.

IMPORTANT

* Appointments should be made in the previous month with the District Engineer in-charge, who will then furnish the location, date and time of the test. He will probably require advance submission of the completed Form 610 and check or money order for $4, payable to the FCC.

(continued on next page)

MINUTES OF EXECUTIVE COMMITTEE MEETING
No. 313
November 19/21, 1966

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters office of the League in Newington, Conn., at 9:35 A.M. on November 19, 1966. Present: President Robert W. Denniston, WØNWX, in the Chair; First Vice President W. M. Groves, W5NW; Directors Charles G. Compton, WØBUO, Gilbert L. Crossley, W3YA, Noel B. Eaton, VE3CJ, and Carl L. Smith, WØBWJ; and General Manager John Huntoon, W1LVQ. Also present were Communications Manager F. E. Handy, W1BDI; General Counsel Robert M. Booth, Jr., W3PS; Assistant General Manager Richard L. Baldwin, W1IKE; and New England Division Director Robert Y. Chapman, W1QV.

Director Chapman demonstrated to the Committee his use of magnetic tape recordings prepared for divisional affiliated clubs for use in instances where personal appearance in response to invitations was not possible.

The Committee discussed at length the progress of the League program to encourage growth of amateur radio in "new and developing" countries, and requested the General Manager to report in detail to directors on the current status.

On motion of Mr. Groves, affiliation was unanimously GRANTED to the following societies:

Albany High School Amateur Radio Society, Albany, N. Y.
Burnaby Amateur Radio Club, Burnaby, B. C., Can.
Elkins Park Radio Club, Elkins Park, Pa.
Hughes Micro-Wave Radio Club, Los Angeles, Calif.
Jericho Radio Club (H.S.), Jericho, N. Y.
Knight Raiders VHF Club, Passaic, N. J.
Loomis School Amateur Radio Club (H.S.), Windsor, Conn.
Saint Benedict's Prep Radio Club (H.S.), Newark, N. J.
Worth Township Amateur Radio Club, Oak Lawn, Ill.
Assumption Radio Club (N.S.), Wisconsin Rapids, Wisc.

On motion of Mr. Compton, unanimously VOTED to approve the holding of a Central Division Convention in Milwaukee, Wis., on July 7–8, 1967, and a Dakota Division Convention in Minneapolis, Minn., on May 27–28, 1967.

The Committee was in recess for luncheon from 1:10 p.m. to 2:30 P.M., during which Director Chapman retired from the meeting.

The Committee then heard reports from President Denniston and Director Eaton on their attendance at the RSGB equipment exhibition and contacts with U.K. amateur and telecommunications officials.

The General Counsel reported at length on the status of various regulatory and enforcement matters in Washington, and tower/zoning cases in several parts of the country.

Director Compton presented to the Committee information concerning a Lion's Club meeting in Minneapolis calling public attention to the service being provided by amateurs in handling traffic between military personnel in the Far East and their families at home. The Committee requested Director Compton to continue with the arrangements for other such meetings, after suitable liaison with the General Manager and the directors of the divisions concerned.

On motion of Mr. Eaton, unanimously VOTED to nominate Howard W. Shepherd, Jr., W6QJW, to serve for an additional year as ARRL liaison with Project Oscar.

On motion of Mr. Eaton, unanimously VOTED to pay from the Building Fund the cost of installation of the 20-kw. emergency power supply unit at W1AW.

The Committee recessed at 6:00 P.M. and, following the counting of ballots in the current director elections, reconvened at 1:50 P.M. on November 21 with Messrs. Denniston, Crossley, Eaton, Smith and Huntoon present.

On motion of Mr. Smith, affiliation was unanimously GRANTED to the following societies:

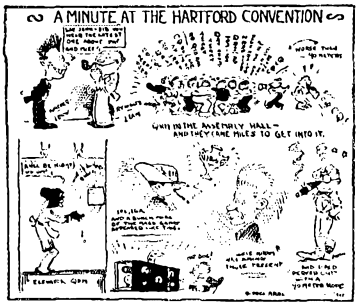
The Suburban Amateur Radio Club of Union Cty., Westfield, N. J.
St. Louis Contest Operators, Webster Groves, Mo.

There being no further business, the Committee adjourned at 2:00 P.M.

JOHN HUNTOON
Secretary

Philip Gildersleeve, W1CJD

IT is with deep sadness that we must report the death on Nov. 4, 1966, of Phil Gildersleeve, W1CJD, ex 1ANE, whose contributions to *QST* for almost forty years have become a tradition. Gil's artistic knack for expressing ideas or feelings unique to ham radio was unexcelled. Those of us who worked closely with him never ceased to wonder at his exceptional talent for turning a rudimentary idea into a final masterpiece with a few uncanny strokes of his pen. In addition to his artistic talents (see *Who's Who in American Art*), Gil was an avid radio amateur, a devoted family man and was exceptionally active in community affairs. For several early years he worked as a radio operator aboard merchant ships and in later years was News Editor of the *Middletown Press* (Conn.). Gil's creations will not soon be forgotten. The friendly companion and servant, "Jeeves," a lively and enthusiastic Podunk ARC on the way to a convention or field day, are as much a part of amateur radio as the "Old Man" or the "Wouff Hong." In tribute, we show on the facing page a sampling of Gil's work through the years.



Gil's first *QST* cartoon (June 1927)

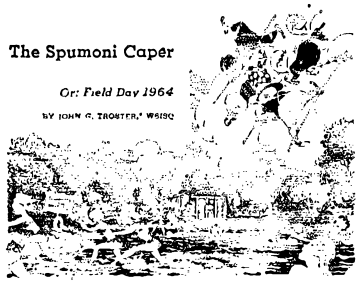
A popular subject in the 50s (Feb. 1952)

First *QST* cover (April 1930)

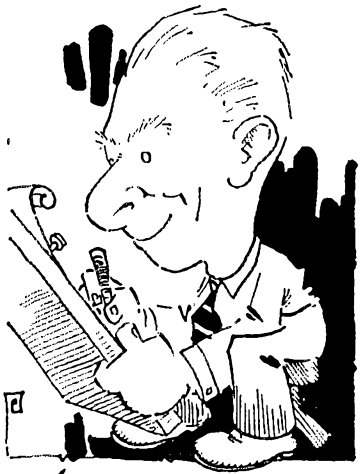
A pun cartoon of the 30s (Sept. 1936)

JEEVES

First Jeeves cartoon (Feb. 1940)

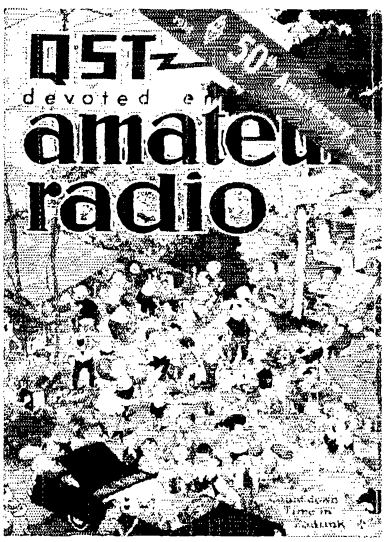


Troster articles were usually enhanced with a Gil cartoon (June 1964)



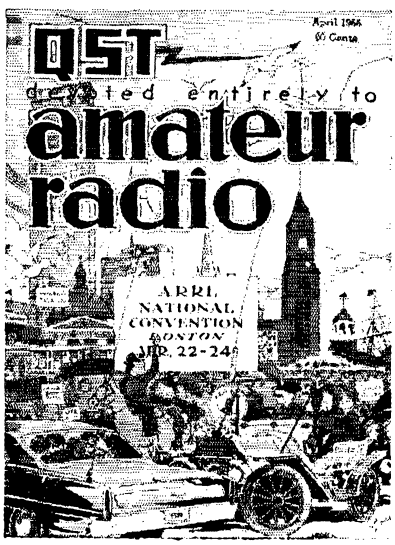
A war-time cartoon (May 1942)

A self portrait (Nov. 1939)



Gil did many ARRL house ads (above), contest write-ups, and department headings in *QST*

Gil's Field Day covers became a tradition as the Podunk ARC took to the field each year (June 1964)



Convention covers were his specialty. This one depicted the 1966 National at Boston (April 1966)

I.A.R.U. News

REGION II TO MEET IN CARACAS

The Inter-American Union of Radio Amateurs (Region II of the IARU) will hold its second General Assembly in Caracas, Venezuela, May 14–17, 1967.

Announcements have been sent to each Society requesting any proposals be submitted to OA4AV prior to March 1 for translation and distribution.

The Radio Club Venezolano is making arrangements for the Assembly called to discuss problems and strengthen international amateur relations.

While enroute to the recent *Federation of Clubs of Radio Amateurs of Central America and Panama* (FRACAP), IARU President WØNWX visited officials of the Radio Club of Costa Rica. Left to right are TI2HB, Secretary; TI2JIC, Vice President, WØNWX; TI2ER, President, and TI2MEF, Treasurer.

During a coffee-break at the ITU's frequency-management seminar, these three hams checked the bands at 4U1ITU. L to r.: HB9IL, EA5EJ, and VP9AX.

LICENSING IN INDIA

The Government of India, Ministry of Transport and Communications, presently issues two grades of amateur licenses. Grade I licensees are permitted up to 100 watts, phone and c.w., after passing an examination including a 12 word-per-minute code test. The Grade II license is similar to the U.S. novice. Grade II licensees are distinguished by the letter "Z" immediately following the prefix in their call.

Licensees must be at least 18 years old. However, 16- to 18-year-olds may be issued a Grade II license if their application is accompanied by a certificate from the head of an educational institution or legal guardian stating the applicant is interested in and competent to conduct experiments in wireless telegraphy, provided he meets other licensing requirements.

Both licenses are issued for one year; the Grade I license is continuously renewable and the Grade II ticket may be renewed only twice. All licenses are due for renewal between November 1 and December 31.

No third-party traffic mobile, or television operation is allowed.

The *Amateur Radio Society of India* estimates there are 460 amateur stations in the country. It maintains a headquarters in New Delhi.

OPERATING IN SVØ

Greece allows U.S. government personnel operating privileges in their country. The Government of Greece has authorized the Joint United States Military Aid Group Greece (JUSMAGG) to issue a fixed number of SVØW licenses. They are issued for the period of time the individual is in the employ of the U.S. government in Greece. A photostatic copy of the FCC license and completed form available from JUSMAGG, APO, New York, New York 09223 is all that is required for the SVØW application. When an amateur leaves Greece, his former call is immediately available for reissue to another W/K ham.

HURRICANE QUIETS SEVERAL FG7 AMATEURS

The *Radio Club de la Guadeloupe* reports several FG7 amateurs lost most or all of their station equipment during Hurricane Inez. The club is asking for used parts which could be used in repairing the damaged stations. The parts would be distributed by the Radio Club de la Guadeloupe, P.O. Box 387, Pointe-A-Pitre, Guadeloupe.

At the 1966 International Amateur Radio Club convention held in Geneva in August, Ted Robinson, F8RU (center), Secretary of IARC, talks things over with Bill Eitel, W6UF, while Sewell Brewer, EL2S, president of the Liberian Radio Amateur Association, looks on at the left. *(W1IKE photo)*

The International Frequency Registration Board of the ITU held a Frequency Management Seminar in Geneva during September, 1966. The purpose of the two-week conference was to explain, particularly to some of the new and developing countries, how to make better use of the radio-frequency spectrum. More than 80 delegates represented some 45 countries. Eight of those present were hams. Standing, l. to r.: 5T5AD, W3ASK, W2SLR, HB9ACD and W1IKE. Kneeling, VP9AX. Elsewhere when this picture was taken were HB9IL and EA5EJ.

FOUR NEW IARU MEMBERS, TWO MORE NOMINATED

Four new Societies have been elected members of the IARU. They are the *Amateurs Radios Algeriens* (ARA) with 126 members, the *Cyprus Amateur Radio Society* (CARS) which lists 25 members, the *Radio Society of East Africa* (RSEA) with 72 members and the *Liberian Radio Amateur Association* (LRAA) having 70 members, Welcome to the IARU!

The *Malta Amateur Radio Society* and the *Faroese Amateur Radio Society* have applied for IARU membership and the application was presented for membership vote in the December IARU Calendar.

U.S. — PANAMA RECIPROCAL SIGNED

A reciprocal operating agreement between the United States and The Republic of Panama was signed November 16.

The complete list of reciprocal agreements and other details appears on page 74 of December 1966, *QST*.

During recent visit to IARU Headquarters, Nicolas Simon, YV5BNW, Exterior Secretary of the *Radio Club Venezolano*, discussed IARU Region II Assembly plans with IARU Secretary W1LVQ.

Strays

The 1967 QCWA QSO Party is being sponsored this year by the Delaware Valley Chapter. Only members are eligible for the QCWA certificate and plaque donated by the National Headquarters, and only contacts with other members will count toward this award. Non-member participants are welcome, but are not eligible for awards. Your logs should show (in this order) date and time in GMT, contact No. sent and received, station worked, RST/RS report, freq., QTH, name and QCWA No. Party starts 2200 GMT Feb. 10, ends 2200 GMT Feb. 12. Activity will be found on or around the following freq.: (kc.) *c.w.* 3540, 3790, 7035, 7110, 14,110, 21,110, 28,110. *A.m.* 3810, 3950, 7230, 14,240, 21,340, 28.900. *S.s.b.* 3804, 3995, 7204, 7299, 14,315, 21,410, 21,440, 28.690. *RTTY* 7105, 21.140. Logs should be in the mail before March 20. Mail to: A. G. Wentzel, W2HX, 318 Gardner Ave., Trenton, N.J., 08618.

Feedback

The Stolen Equipment Stray on page 77 of December *QST* mentioned the theft of a KWM-2. The Serial No. given was in error; it should read 13636.

—•••—

It should be noted that, due to a clerical error, the names Gary C. Liebling, WAØDGG, and Gary L. Creason, WAØHTY, inadvertently appeared in the "Silent Keys" column of the Dec. 1966 issue of *QST*.

Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

SWITCH TO SAFETY

¶ It has come to my attention that MARS has a program of distributing war surplus emergency aerial type kites. These were for use with the survival kit and emergency rafts.

It is particularly important to the safety of the user that such kites be flown in an area where no possibility exists that the wire kite line can make contact with overhead power company facilities.

There have been a number of cases of electrocution when such a contact was made and the metallic kite line carried the electricity to the person flying the kite and through him to the earth. — *J. E. McMaster, W1MO, Director of Safety, NEGEA Service Corp., Cambridge, Mass.*

CHANGE DX CONTEST

¶ In order to improve the purpose of the ARRL DX Contest, I suggest contest rules be changed to have one weekend when W/K/VE stations may only work countries which they have never verified.

This would offer two excellent advantages: The old pro would not have to pad down his contest log with non-rare countries. Instead he could concentrate on the rare, unworked countries.

This would make it less difficult for newcomers and casual DX workers to work new countries for DXCC credit.

After all, it is only a contest to old-time DXers, while it is a real thrill for newcomers to work a new country.

How about some suggestions from other guys on how to make the test a way to get new countries? — *Richard Wilson, WAØKST, Storm Lake, Iowa.*

FREELOADERS AND FEES

¶ Here's another letter to add to your file on the recent freeloader controversy. I am presently a member of the League and will support it in any way my time will allow. However in my younger student days, I was frankly too broke to belong but it was nice to know the League didn't discriminate against me because I was broke. I'm sure there are many others who have been in my situation also. However, I also agree that lazy selfish freeloaders hurt us all. My present solution — don't throw out the bad if the good goes with it. — *John Deines, K8QOJ, Oxford, Ohio.*

¶ Enclosed check is for my 1967 dues. I am proud to be a member of ARRL, and feel ARRL needs me as much as I need ARRL.

No one has yet convinced me that I should discontinue my membership, and I have not as yet been shown that any other society or group has more to offer.

I'm against "free-loading" use of this five bucks and believe those who have the last word will come up with the right idea that will be best for ARRL. — *C. Nevin Miller, K3BWB, York, Pennsylvania.*

¶ Why not have official ARRL certificates available to members only? Help all other amateurs any way possible; we hams don't refuse to help others! If operating cost rise then let's face facts and increase our dues. — *James Belanger, WA1GCE, Brunswick, Maine.*

¶ If we start refusing help to amateurs, or requiring a fee for the help, except maybe for postage and paper, then we can no longer claim to be for the advancement of the amateur and amateur radio, but rather, only for the advancement of the ARRL and ARRL members. What comes next is requiring a fee from non-members for representing them in legislative matters.

If some members are so worried about "freeloaders," then I think the best way to get rid of them is to work to make all amateurs members. It seems to me that any amateur who writes to the ARRL for help is not anti-ARRL for any reason, and would probably join with just a few reminders and pushes by members. It always seemed to me that $5.00 was ridiculously cheap for all the ARRL's services, anyway. — *Jay VanSant, WA7ANY, Libby, Montana.*

¶ May I offer an opinion on the League's financial problems? Provide your "Fringe Benefits," such as operating aids and literature, to ARRL members only. Too many hams see little need to join when everything is free anyhow. If a dues hike is definitely needed, then let's do it now. — *Art Brown, WØIOT, St. Paul, Minn.*

BALANCED *QST*

¶ No comments on our magazine, but I keep thinking if you were to offer only articles on my favorite mode and practices, I would never be exposed to new ideas and methods. Keep the content balanced for all segments and sooner or later that "Dream Rig" or feature article will come along. — *Robert Williamson, WA6JCA, Oakland, California.*

¶ I have been licensed since 1929 and a member of the League for about the same period, and I have always looked forward to *QST* each month. To maintain a well-balanced technical and operating journal over such a span of time is certainly most difficult, as both the equipment and the people licensed as amateurs have undergone quite a change in the years. — *T. O. Jorgenson, K7VVQ, Spokane, Washington.*

SOMETHING FOR EVERYONE

¶ I'm a Novice who had no transmitter to use, until one of my friends (K3RPY) showed me his No-

vember issue of *QST*. In it was a 1-watt transmitter for 40 meters any Novice could build.

I had been told about *QST*, but I had no interest to buy it. Now I'm glad to be a member of the ARRL. It really is true *QST* has something for every amateur. — *Sterling Wayne Miles, WN3GOS, Washington, D. C.*

CODE PRACTICE QRM

¶ During the last code proficiency test, those inconsiderate hams who sat right on top of W1AW in the mode of s.s.b. sure messed it up for the unfortunate others who don't have selective receivers. A few kc. can't make that big a difference! — *Tim Karle, Natick, Mass.*

NOVICE ROUNDUP

¶ In regards to a letter in "Correspondence," *QST* for November 1966, written by WAØJES, I think his suggestion concerning the Novice Roundup is excellent. If a certificate was offered to Generals, it would give them an incentive to work as many Novices as they can, instead of just a few, as is often the case. The Generals could supply some hard-to-get multipliers. Such an award might attract more VE stations to operate the contest, and give out some QSOs from the Canadian ARRL sections. — *Gary Giambattista, WN1FXP, Dayville, Conn.*

HERTZ, PRO AND CON

¶ Many items have recently appeared in *QST* condemning the use of the term "hertz" as the unit of frequency, on the grounds that it is a meaningless innovation. Actually, "Hertz" has been used in Europe for decades, along with other such "new" terms as "picofarad."

Adoption of this and other new units and or terms is part of the widespread effort to convert to the International System of Units, pioneered in this country by the National Bureau of Standards.

Let's swallow the pill; it's not so bitter after all. — *Ken Thomson, W5IFH, Pasadena, Texas.*

¶ I usually consider myself a liberal, willing to welcome valid innovations, but this term "Mega-Hertz" is an illogical abomination and I hope you will resist it to the last cycle per second. — *H. R. Hands, VE3AOE, Hamilton, Ontario, Canada.*

¶ In my opinion, Mr. Harris, G3GFN (*QST* for August, 1966 page 48) hit the nail on the head in his explanation of the new term Hertz. I see no reason to change a well-standardized and meaningful term into a useless expression which would require a definition. In addition to the points that Mr. Harris expressed, could you imagine the confusion that would result from the change? I receive a current electronics magazine and I shudder each time I see kHz or mHz printed in it. I would say that Mr. Harris has the proper point of view and I would also be interested to see how many others agree with him. — *John Portelli, WA3CFU, West Pittston Penn.*

A GOOD PUBLIC IMAGE?

¶ This evening three first-rate men of my community were in my home. They showed interest in my ham equipment. I turned it on to let them listen and tuned in a 75-meter phone station. Suddenly I realized that we had just heard an utterly rotten and putrid "joke." Thanks a lot, "brother" ham, for your "help" in building a good public image of our hobby. Many work hard to build good community opinion and then . . . you! — *Hugh C. Crouch, W1HEZ/K1TJM, Springvale, Maine.*

BC RADIO HISTORY

¶ I have a project which could use some help from old hams everywhere. Five of us around the nation are in a joint endeavor to find old radio programs and tape them for permanent preservation in the audio archives of the Broadcast Pioneers in New York, the Library of Congess in Washington, D.C., the Hollywood Museum, and several schools with good starts. This is a labor of love for all of us, and everything is done gratis.

We are searching not for historic voices or events but the everyday bill of fare of early radio broadcasting. Some *QST* readers may have private recordings — made off the air, found, stolen, borrowed, etc. — of old radio shows, personalities, or unusual stuff. We will pay postage both ways on any loan of such items, and take professional care in the dubbing. Full credit to donor goes with each tape.

Strangely, much of early radio history will be silent if we cannot come up with some recordings.

For instance, any ham have a record of when the network announcers used to reel off in one long breath all the stations joined in the early networks? Anyone have a record of Admiral Byrd and his hams broadcasting from the South Pole? Anyone with a record of Tony Wons on the Camel Caravan? Only recently we lost 8 years of reference copies of CBS Lux Radio Theater when a Hollywood agency threw them out in a move of offices!

So dig in your files, hams, and help us. History will thank you and so will the broadcast pioneers and others. — *Stephen A. Cisler, ex-9SX, 5ADY, P.O. Box 1644, Louisville, Kentucky.*

PHONETICS

¶ I wish you would again call the attention of hams to the use of the ARRL phonetic alphabet. I don't think there is a place for the use of the very cute phonetics that some use, though I understand they did put in many hours trying to think up some real clever call. To me a long crazy phonetic call means the operator is a very new ham or that he does not really know what phonetics are used for. Usually, when I hear a real cute call (and almost everytime I have trouble figuring out just what his call really is) I turn the dial just a little more and pick someone that I have no trouble understanding. — *R. B. Hannah, W5ACC, Junction, Texas.*

AGE LIMITS?

¶ Many foreign countries set minimum ages for amateur licensees, usually at 15 or 18 years. I think this policy is in error. Generally people become interested in radio earlier than this. Thus such minimum age rules discourage those who would be otherwise interested.

In the past year of operating I have asked Novices, at random, their ages. It turned out they are either very young or are middle-aged. Many of these Novices would have been excluded under these age rules.

The IARU should make a further study of this situation and work to eliminate any age restrictions on amateur licensing. — *Nick Leggett, WB2UEQ, Somers, New York.*

Building Fund Progress

Here's our Honor Roll of League divisions which have achieved 100% of quota in the Building Fund drive:

Canada	**New England**
Dakota	**Northwestern**
Delta	**Pacific**
Hudson	**Roanoke**
Midwest	**Rocky Mountain**

West Gulf.

DURING November the West Gulf Division reached 100% of its quota in the Building Fund Drive, thus becoming the 11th division to achieve success. A concerted autumn effort, spurred on by the offer of a group of amateurs in Houston to match dollar for dollar the money contributed by other members of the division, brought the drive to a climax in the states of Texas and Oklahoma.

Will the Central Division be next? It's not far behind!

On behalf of the Houston Chapter of QCWA, Hal Sears, K5JLQ, presents a matching-fund check to Director Best, W5QKF, to swing the West Gulf Division over the top in the ARRL Building Fund drive. L to r., W5HZ; WA5BWV; W5QKF; K5JLQ; W5AIR.

January 1942

. . . When this issue went to press, everyone knew the war was on and hams were off the air, but good. Too bad there is an unavoidable time delay in getting out the magazine. Let's see, though, what was going on.

. . . Plans for the utilisation of amateur radio by the Office of Civilian Defense are being put down in writing. OCD will rely primarily on the wire services and nothing definite about hams has so far been forthcoming. KBW suggest that, in view of the outstanding success of f.m. on u.h.f. radiotelephone, we might pursue this matter to advantage.

. . . George Grammer, W1DF, has a comprehensive article on vibrator power supplies for emergency equipment. He describes in detail several types, capable of giving 100 ma. at 300 volts. This article is directed to those hams who do not have or will not be able to acquire the necessary boughten parts.

. . . The Navy is looking for hams to enroll in RADAR schools. At last the magic word appears in print! The War Department has openings for 200 men to operate high-speed circuits. The Civil Service needs a large number of amateurs for Radio Mechanic-Technicians. Pay is up to $2600.

. . . Hygrade-Sylvania announces a new line of u.h.f. tubes good for up to 750 Mc. These new tubes have the lock-in base with the tubes mounted inside.

. . . Using standard tubes, Byron Goodman, W1DX, has developed a line of 112 Mc. receivers for use in emergency work. These little boxes are super-regens and superhets. As usual, they have metal chassis with the tubes mounted on top. I sort of like this construction, even today. Tubes get plenty of air!

. . . Nice description of Fort Monmouth's ham station by S. Gordon Taylor, W2JCR. Although government owned and equipped, this rig is used solely for communication with other amateurs. The transmitter is a Hallicrafters HT4 operating at 425 watts c.w. and 325 phone. One of the receivers is an NC200.

. . . As I get further along in this issue, there is a last-minute addendum on yellow paper that reads "WAR COMES." FCC's order No. 87 is printed in full. All ham operation is suspended but the door is left open for subsequently authorizing certain amateurs to engage in directed activities. These must apply through channels . . . federal, state or local authorities who must also have a *need* for such services. "Let it be our high resolve that we shall never be found wanting." — *W1ANA*

Hamfest Calendar

California — The joint meeting of the Northern California and Southern California DX clubs will be held in Fresno, California at the Del Webb Town House Motor Hotel, January 21 and 22. This meeting is open to all members of the Two Clubs and their invited guests. For more information write Bob Thompson, K6SSJ, 4135 El Camino Way, Palo Alto, California.

Indiana — The Lake County ARC announces the 14th Annual Banquet which will be held at Teibel's Restaurant which is located at U.S. Highways 30 and 41 (Schererville, Ind., near Gary) at 6:30 P.M., CST, February 11. There will be entertainment and speakers. Tickets $4.00 each from Herb Brier, W9EGQ, 385 Johnson St., Gary, Indiana 46402.

Nevada — The Second Annual "SAROC" Sahara Amateur Radio Operator's Convention, hosted by the Southern Nevada ARC, P.O. Box 73, Boulder City, Nevada 89005, will be held January 5, 6, 7, and 8 at the Hotel Sahara, Las Vegas, Nevada. Send your QSL card to get on the mailing list for details.

Ohio — There will be a ham auction, Friday, February 3, at the Naval Armory, Ashland Rd., Mansfield, Ohio. The affair will start at 7:00 P.M. EST. For more information write Kenneth Portz, WA8QNP, 345 Ruth Ave., Mansfield, Ohio 44907. QST

Seasons Greetings From the Hams of the ARRL/QST Staff

Roland B. Bourne	W1ANA
F. E. Handy	W1BDI
Pete Chamalian	W1BGD
Doug DeMaw	W1CER
Jean DeMaw	W1CKK
Bob Rinaldi	W1CNY
Laird Campbell	W1CUT
Charles Utz	W1DEJ
George Grammer	W1DF
Bill Smith	W1DVE
Byron Goodman	W1DX
Sam Harris	W1FZJ
E. P. Tilton	W1HDQ
Helen Harris	W1HOY
Lewis G. McCoy	W1ICP
R. L. Baldwin	W1IKE
J. A. Moskey	W1JMY
John Huntoon	W1LVQ
Lance Johnson	K1MET
George Hart	W1NJM
A. M. Wilson	W1NPG
Murray Powell	W1QIS
Don Mix	W1TS
Perry F. Williams	W1UED
L. A. "Pete" Morrow	W1VG
R. L. White	W1WPO
C. R. Bender	W1WPR
Walter Lange	W1YDS
Ellen White	W1YYM
Miriam Y. Knapp	W1ZIM
Lillian M. Salter	W1ZJE
Stan Israel	WA2BAH
Bill Dunkerley	WA2INB
Louise Moreau	WB6BBO
John Troster	W6ISQ
Rod Newkirk	W9BRD
Maxim Memorial Station	W1AW
ARRL Headquarters Operators Club	W1NF

COMING A.R.R.L. CONVENTIONS

January 21-22, 1967 — Florida State, Miami
April 22-23, 1967 — New England Division, Swampscott, Massachusetts
May 27-28, 1967 — Dakota Division, Minneapolis, Minnesota
June 30, July 1-2, 1967 — ARRL National, Montreal, Quebec
July 7-8, 1967 — Central Division, Milwaukee, Wisconsin

RTTY BULLETIN

It was with deep regret, recently, the RTTY fraternity learned that Merrill Swan, W6AEE, had found it necessary to relinquish the editorship of the *RTTY Bulletin* — which he founded some 14 years ago.

Added responsibilities in the research laboratory where Merrill is associated made the mounting demands of the editorship increasingly difficult for him to meet on a spare-time basis. Arrangements have been made with Franklin "Dusty" Dunn, W8CQ, to carry on publication of the *Bulletin* after January 1, 1967.

Merrill Swan has been one of the pioneers in amateur RTTY since its inception soon after WW II. In about 1946 he and a group of friends in the Pasadena-San Marino area obtained a dozen surplus Model 12 machines from Southern California Edison, and soon thereafter formed a RTTY net using a.f.s.k. on the 2-meter band. The operation created so much local interest that it led to several related events — the formation of the RTTY Society of Southern California, the pioneering agreement with Pacific Tel. & Tel. to obtain their obsolete machines, and finally — in January, 1953 — the monthly publication of the *Bulletin* under Merrill's editorship. Soon after the first issue appeared, the long-awaited FCC authorization for f.s.k. on the lower frequency bands took place. RTTY was off and running.

The original RTTY 2-meter net is still going strong, and has not missed a weekly session in almost 20 years. Also, the RTTY Society of Southern California alone has distributed more than 5,000 surplus machines made available by various telephone companies. How many more have been placed in amateur hands by other societies, MARS and Western Union is unknown; but the total is now believed to exceed 20,000.

The *RTTY Bulletin* under Merrill's editorship — ably assisted by his wife Margaret — has had a wide influence on the development of amateur RTTY. New technical approaches to keying methods, terminal units, filters and operating techniques were pioneered in its pages. In many instances they have found their way into accepted commercial practice, and once again amateurs have been able to lead the way by unique contributions to communication.

All of us who have watched the development of amateur RTTY are grateful for Merrill's modest, conscientious and competent leadership. While we will miss his editorial direction, we can perhaps look forward to seeing him a bit more frequently on the air.

To Dusty, W8CQ, we wish the very best of success in carrying on this most worthwhile activity.

— *W6ZH*

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

This new year promises more than the usual abundance of DX blessings. One we're going to miss, though, is the wonderful work of the late W1CJD. Gil's masterful Jeeves productions have served as a zestful springboard for *QST*'s monthly DX commentaries since he and W1DX got together on the idea back in the '30s.

Ham radio, as evident in his spirited output, was truly a fun thing for W1CJD. Close contact didn't immunize Gil against a nip or two by the DX bug. He would admit to an occasional nocturnal prowl in search of VKs and ZLs on 80 c.w. when wee hours found him wakeful.

Many are the half-baked gag ideas that W1CJD turned into *QST* classics with artistic wizardry. OM Gildersleeve had that magical knack common to all the great ones, the virtuosi, in any field. He made it look so easy.

—•••—

Well, we've declared our usual new year's resolution to try to get fewer calls and addresses wrong in 1967. With a little bit of luck we may decrease the inevitable percentage.

Overseas licensing authorities could help. Like not giving the same call to different licensees without a few years' lapse between issuances. And how about returning to the proposition that a prefix's fundamental function is identification? This prime geopolitical purpose is negated when prefixes become mere promotional gimmicks, especially with scant advance notice. Special QSLs ought to suffice, anyway.

Another growing problem: You gadabouts who perform so admirably as guest operators at DX stations should take care that you don't become misidentified as QSL managers for other QSOs by those stations. Much wasted mail and lost QSLs ensue.

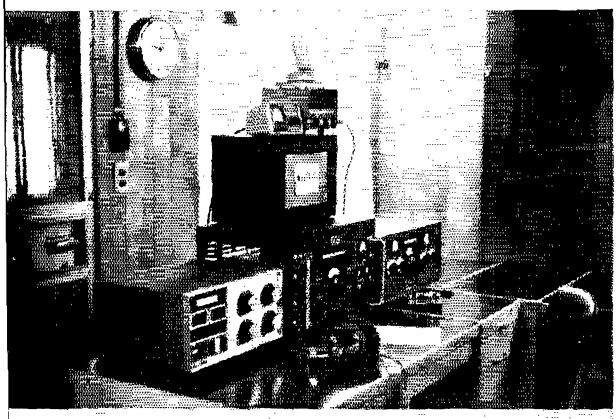
We should all resolve to operate more carefully in '67, with particular attention to accurate QSL work. Plenty of "new countries" go unconfirmed because call signs aren't logged correctly, often because they aren't transmitted clearly. Let's stamp out *slop*perating!

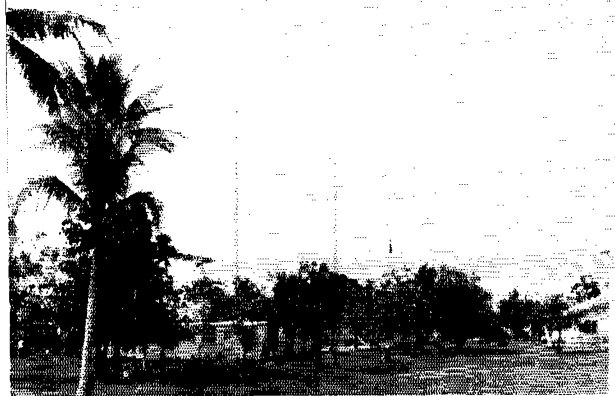
What:

DXdom's rotary flame-throwers steamed up the Indian Ocean in late '66 as W9WNV, CR7GF and others continued separate DXpeditionary pressures down that way, sometimes running challenge pile-up matches a few kilocycles apart on 20 and 15. Desroches, Farquhar, Aldabra, Glorieuses, the Comoros and other rarities risked consummate defoliation as the bands played on. If those guys ever head for the ice caps we'd better patch up our canoes. . . . The comeback of ten meters made the biggest DX news, however, and QRP-with-dipole lads are ordering more logbooks. Somewhat shocking to hear old 20 almost deserted at times while 15 and 10 stack 'em in the aisles. This is a multiband month for the "How's" Bandwagon — let's hit the DX road. . . .

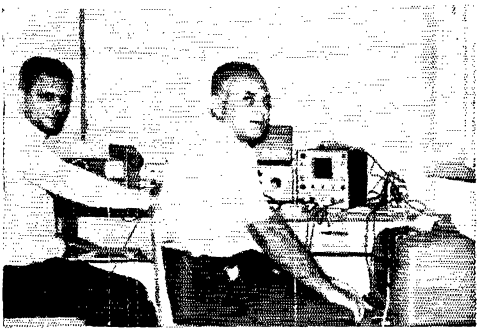
10 phone, as we said, greets the new year with ankle-deep DX QRM for reporters **Ws** 1CNY 4YOK 8YGR, **Ks** 6TXA ØJPJ ØJPL ØRWL, **WAs** 1DBR 2VFA 4OYW 4WIP 5MUE 8GGN 8OMF 9MQI 9SXQ, **WB2LDX**, G3IDG, I1ER and P. Kilroy who deal with the 28-Mc. voices of **CEs** 3JM* *2000* GMT, 3PI* (28,*460* kc.) 21, 3TV* 22, 4WG* 21, 6EW 17, **CN8s** CD* 11, FF, **CO8RA*** 21, **CRs** 6AM 6DX 15–16, 6HF 18, **7DS*** 16, **7ER***, **CTs** 1KT 14, 1SW* 17, 3AM* 17–18, a dozen **CXs**, **DJ8RR** 15, **DLs** 1KB* 8RL, **EAs** 7ID 20, 8AE (490) 13, 8AH 13, 8DV 20, **ELs** 2AA 16, 2AF 2AK 20, **ET3s** AC 8, WH (650) 11, **F3KW** (535) 14, **FH8CD** (620) 18, 1 fistful of **Gs**,

* 7862-B West Lawrence Ave., Chicago Ill., 60656.





WØGTA/8F4 brings a long missing country back into the DX fold with this Indonesian installation. The exterior view includes two-element beams for 10 through 40 meters, inverted vees for 40 and 80, on 70- and 95-foot towers. The group photo shows Bob at center, army communications Capt. Moeljono to his left, and valued assistants. WØGTA/8F4 has been most active on 14,140-kc. single-sideband, listening near 14,225 kc. at times, around 1400 GMT. He's handy with c.w., too, and you may have worked him as 9V1LP. (Photos via W1WPO)



11s AMP/M1 and SGS/M1, left and right, scored a first in September with their RTTY DXpedition to San Marino. Many W/K keyboarders were contacted. (Photo via W2FX)

GBs 2USA 3CSG, GC2FMV, GI3IBJ/9H1, GM5HBN, GW3s AHN 14, NWV, G5ABG/K1USO 15, HCs 1EL* (590) 23, 6GM 19, HI8XAL, HRs 1JR 19, 1KS* (943) 22, 2GK, JAs 1RJO (590) 22, 8PD*, K7WRR/KL7, KA2RJ (620) 1, KB6CZ 23, KH6s EOQ FRI FRT* IJ 22, KL7s EBY EDY 22, KP4s ACK AEB* (676) 21, CQW CRD CQZ*, KS6BT (620) 23-1, KW6DS, KX6BU (580) 22-23, KZ5s CD* 20, MB* 21, OW, fifteen LUs, MP4s BEU 8-11, TBC (592) 10, OAs 1BU 4PQ 20, OD5s BU* 12, CS* 13, EL (570) 14, OX3BX, PJ2s AP* 21, CR MI, plenty of PYs, SM7ANY* 20, SVØWL (595) 11, TF3AB (630) 17, TGs 8CJ (600) 14, 9DX* 22, 9HU* (678) 1, TI2LA, UA9WJ 11, UF6VA*, VKs 2ABW (555) 21, 3VL* 22, 6CF 6GH 8-10, 6RU, VO1HI, VPs 1VP 2AA (580) 17, 2KJ 17, 2KR* 22, 5RS 8CW 18, 9BDA, VSs 6AJ 9AJC (605) 11-16, 9ARV 9ATW (875) 14, W5MTX/KH6, XEs 1SSG 2DDZ*, YNIs MAV* 20, RK* (680) 19, YS1HKE* (645) 4, YVs 1AJ 1HA 1LA 5AGM 5BPJ 5KP 19-20, ZB2AJ 13, ZC4s CI (570) 10, CN (610) 15, KF* 12, MO 12-17, RM 14, SS 8, ZD8SKI, ZEs 1AA 8, 1BR* 10, 2JA* 12, 3JO* 17, 5JS, ZLs 1AK 1GJ (600) 22, 2ABP* 23, two dozen ZSs including 3HT 8L (610) 13, 9G* 18, 4M5A (620) 21, 4U1SU 10, 4X4s HQ IH 12, 4Z4HQ (480) 12, 5As 1TY 15, 2TR 16, 3TN 10, 5N2s AAF (611) 14, AAW, 7X0LA, 9G1FF, 9H1s A 10, AF* 12, B* 12, 9J2s BK 8, DT* FK MM 17, 9Q5s BD (590), FV 18, JW 18, 9X5MH 17, 9Y4s LF and VS* 19, the asterisks denoting non-s.s.b. specimens.

10 c.w. is fun for Ws 3DPR 8YGR ØCVZ, K3FKU, WAs 1 DBR 5MUE 5NOM 8OMF 8QYK, WB2s LDX THB and G3IDG because of CRs 6DX 16, 6EI (44) 17, 7AD (87) 16, 7IZ 16, 7LU (63) 17, CT3AS (92) 16, DJs 1TS 2GL 2RE 8IQ, DLs 3BJ 3XK 6NR ØJK, DM2CDO, EA8EO 13, EI9J (35) 15, F5s EF FY, FH8CD, scads of Gs, GI3SXG, HB9DD, HG2KRD (47) 14-16, JA1LXU (20) 23, KA9AK (38) 22, KG4CX, KH6FQE, KV4CI, LUs 3HBZ 18, 4DM, LZ1AG (60) 15, MP4BFK 8, OA4s KF 16-18, PF, OD5EJ, OK2BIX, PAØs AAJ FLX NG QU, PJ2ME (43) 17, enough PYs, SP3AIJ, UA9s FN 10, OK 11, WHT 11, UG6AB, UH8AY, UI8CD, UL7YL 10, UM8AP 11, VK2EO 8-12, VPs 2AA 2SJ (58) 17, 6PJ, VR2DK (17) 23, WØGTA/8F4 9, YO2BA, ZB2s AM (19) 17, AP (50) 15, ZC4s GB (57) 15-17, JU 10, ZDs 7IP 10, 8IP 8J 16, ZEs 1AS 10-12, 1CK 10, 2JE 16, 3JO (81) ZSs galore including 8L (30) 18, 4X4s UL (88) 14, VF WF 10, XM (84), 5N2AAF 12, 6W8DD 17-18, 7XØAH 12, 9H1s A AB (52) 16, AF (66) 16, 9J2s BC 9, MM, 9Q5s HJ LJ 16 and 9X5SA (10) 19. We'll probably have a little midwinter slack on 10 now but watch out for another upsurge around ARRL DX Test time!

15 phone bids fair to take over 20's position as DX wheelhorse for mike men. Ws 2DY 3HNK 8MLX 8YGR 9LNQ, Ks 1ZJA 2KYH 6TXA, WAs 1DBR 4WIP 8GGN 8MGD 8QJK 9MQI 9NXP 9SXQ, WB2s JYM LBJ LDX SCK, VP7DJ and Mr. Kilroy offer this stalk list: CE3s AG CZ DM 22, OE* 23, TS 17, CN8s AA 21, FC 20, FF, COs 5PP* 8MN* 8XW* 22, CPs 1 EK 1EN 5BK (325), 8AU 8BC, CRs 5CA 6ES 6EW (335), 7GF 17, CTs 1CT (300) 23, 1GE* 1IW 1JJ 18, 1LJ* 1SQ 16, 18X* 18, 3AS*, CXs 3UF (350) 22, 3UV 6AD* 8AAW (385) 19, 9AAN 9AAY* 9CO, DM3ZOL, EAs 6AX* 8AH (370) 12-13, 8ES*, EI3S, EL2s A AF AK (375) 22, O R 19, EP2BQ 9, ET3s AC (420) 11, GB RB WH (370) 20, FL8AC, FM7WQ (397), FO8s AB* 8, BR* 3, GCs 3MLR 3PLX (318), 8HT (334) 15, GD3s RFK (326) 14, TIU 16, GM5ABN/KP4BNY, HA5KDQ 15, HCs 1EY 1NX 1PB 1SP (300) 23, 2JF* 21, 6GM 21, HIs 3NAM* (259) 21, 3VC* 21, 7AGH 18, 8NTB 8RBG 0, 8RRM 14, 8XFS, HKs 2KL 3LT* ØAI 4, HPs 1HC* (130) 23, 2JO, HR3SC 0, HZ1AB (370) 11-12, IT1YL, JAs 1DDZ 1FQE (300) 18, 1MIN 1OYY 1PKU (399) 2, 2GJU 3EMD 3IXJ 0, 4DLP (359) 2, 6ATL 7BXS 7UJ 21, 8PD, JX6XF, KA2DO (337) 23, KB6CZ 4, KGs 4AN (375) 23, 6AAY (415) 10, KL7WAH 0, KM6BI, KR6TB (230) 9, KSs 4CC 19, 6BT (365) 0-1, 6BV 23, KV4s CX ES (435) 1, KW6DS, KX6DS, KX6s BQ BU (430) 3, EA (440) 0, KZ5s HK LD MB* 21, QM 22, SS* SY, LZ1WD, MP4s BBW (395) 15, BEU (210) 11, MAW TBO (288) 9, OAs 1AH 3L 18, 4EP* 4PQ 23, 4UO (290), 4VE (310), 4WI 17-18, 6BL 7L 8AE 18, 8M 16, OD5s BZ 15, FC (371) 17, OXs 3LP 3WX 13, 4FC (382) 21, PJ2s AQ 21, MI 19, PZ1BX (431) 1, SL7AZ 14, SV1s AE (340), AH 15, TF-2WAE (328) 16, TIs 2GXY (415) 22, 8LH, TN8AA (395) 18-20, TU2AE* 18, UD6BI (330) 13, UI8MN (340) 12, UP2KNP, UO5PK, UR2AR, VEs 1AED/SU 1, 8BZ*, VKs 2ABW 4YP 8KK, VPs 1PV (394) 21, 2AA 2AZ 2DDA* (288) 22, 2GLE 19, 3HAG 17, 3JR 0, 5AR (351) 21, 5RB (355), 6AQ 6BW* 7DJ 9BDA 9DF 9FR, VQs 8AV (350) 15-16, 9EF (390) 18-22, VS9s AJC (399) 19-20, ARV (363) 18, ASP*OC, VU2CQ (330) 11, WØGTA/-8F4 (370) 9, WB2VJD/CEØ (375), XEs 2WH* (235) 20, 3JD (385) 22, XP1AA, XW8AL (402) 15, YA1DAN 17, YNs 1JAD 19, 6BS 9BJM 16, YSs 1DHE (395) 20, 1GEC 23, 1HKE (405) 19, 1JBE 1MCG (338) 3, 1RCP 2CEN (320), YU3FC, YVs 1SA* (187) 17, 3CN (230) 23, 4OA* 9AA (390) 11, ZB2s AJ (377) 21, AO, ZC4JU (400) 20, ZDs 3E 8IF 8JES (350), 8LZ 21, 8RB 8SKI 8WZ 20, ZEs 2JJ* 19, 6JL* (300) 18, ZF1GC (390), ZLs 1CA* 1KD 10, 1KG 2BE, ZP3AL, many ZSs including 8L 17, 4U1SU, 4X4s BL (322) 14, CJ 15, QYC VB, 4Z4HQ (380) 11, 5As 1TZ 2TZ 20, 3TN (357) 14, 5H3s JH JL 20, JR, 5N2s AAE (350) 20, AAW AAX (380) 22, AVH (380) 11, 5Z4s AA (292) 9, JW (387) 19, 6Os 1PF (390) 20, 6BW, 6W8AG* 22, 7Q7s BN* 20, BS RM (360), 7X0s AH (310) 8, LE (215) 16, 9G1s DM (210) 11, ED EZ* (357), FK FL* MJ RW (410) 20, 9H1s A 14, AG 14, AI* AU (367) 17-18, 9J2s BK 20, DT FK (396) 19, GR WR, 9M2s LO (360), OV, 9Q5s BD DA DL EA FF IA IC* (250) 19, LB QR SS WE, 9U5s BB 19, DL 21, KU* UP, 9V1s ON MY 12, 9X5s AV and MH (370) 20, the stars for straight-a.m. types.

15 c.w. is a lark for Ws 1BGD 1CNY 1CNU 2BAI 3HNK 3JZJ/9 8IBX 8YGR 9LNQ ØCVZ, Ks 1ZJA 3FKU 3UMM 5MHG/6 6TXA 9UIY ØJPJ ØRWL, WAs 1EYF 5EQA 5NOM 6JDT 8GGN 8MCQ 8MGD 8OVF 8QJK 9MQI 9NXP 9SXQ ØGQI, WBs 2JYM 2LBJ 2LDX 2RSS 2TII 2UHZ 6IEX, G3IDG and VE8AG thanks to CEs 1AV 23, 6EF, CMs 1AR 2BL/CO4, CN8s FC MI, CO2s BB BO (40) 12, CRs 3AD 6AL 6AR 6CK (20) 11, 6DX (65) 18-21, 6FA (90) 18, 6JA 18, 7AN (18) 17, 7IZ (30) 18, CTs 1CV (55), 1DJ 3AS (33) 16, CX1JM (86) 2, DMs 2AEB 18, 2ARD 2ATH 2BKK 2BTO (45), 3KOG 3VGO, EA8s EO (62) 18, FF (73) 10-11, ELs 2AH (35) 15, 2AM 2D 6B 18, 9NB 20, EP2RV (82) 12, ET3RF, FB8XX (65) 10, FG7XX (30) 17, FL8RA (50) 13, FM7WD (70) 20, FO8BJ (45) 8, FR7ZD (85), FY7YG (65) 21-22, GC3PLX, HAs 18D 4KYB 5DA 5KDQ 15, 8KCI 8UIJ, HCIs BW 19, JQ (62) 21, HI8s IBC (30) 13, XAL (28) 12, HL9TH (87) 9, HMs 1BB (35) 23, 1DE (33) 8, 1DM (44) 2, 9BZ, HP1AC, HR5LB, IS1SCB (64) 18, IT1AGA, oodles of JAs including 4CDY 4DLP 5AB 5BIN 5BQT 9AIH 9AMJ 9BA ØAIF ØBES ØBKX, JH1AAV also of Japan, KG6s AQA IG (40) 23, NAA (50) 11, KL7FKW (30), KR6AQ (35) 10, KV4s CI (20) 12, CX (80) 10, KX6DC (35) 23-0, KZ5s EX FX, LX1LF (15) 17, LZIs BK KPG (20) 14, MP4BDF, OA4s FA (25) 12, KF 10, PF UZ (48) 17, OD5s ED (100) 7, EJ (17) 8, EL (17) 16-17, ET FC (84) 8, OH0NM (60) 13, OX3BX (30) 12, PE2EVO (25) 12 of Holland, PZ1CM (32) 20, SLs 5CX 15, 6BH 15, SU1DL (50) 10, TA1AV (40) 20, TI2RK, TN8BG (75) 18, UB5s KFF (55) 15, KKM, UL7AA (117) 10, UM8AP (40) 7, UO5PK (70) 12, UP2KBC 16, UT5PX 19, VKs 6RS (14) 10, 7SM (48) 11, 8BA (80) 20, 9CJ (60) 5, 9GC (36) 12, 9GN 9GW (55) 6, 9VM (72) 12, 9XI, VPs 2AB 2AZ 2GLE 2KJ 16, 6PJ 8IJ (35) 17, 8IY 9FC (82) 12, VR2s DK (40) 9, EK (72) 7, VSs 6EN 9APW 9ARV (30) 10, 9ASP, VU2s FB TZ (48) 10, WB (75) 12, WA2TBQ/KP4, WH6FST, WP4CPL (160), WV4EY (120) 22-2, YOs 2CD 16, 3AR 20, 3JW (58) 22, 9HH, YS2OB (43) 15-18, ZB2AP, ZC4TX (10) 9-10, ZDs 8BUD 0, 8J (52) 21, 8RB 23, 8WK 0, 8WZ 9BE (43) 18, ZEs 1AS (43) 18, 1CK 1CS 1JL (50), 3JJ (25) 20, ZSs 3AH (53) 18, 8L (70) 18, 9P, 4S7DA (70) 11-12, 4U1ITU (35) 12, 4X4s NZG (105) 14-16, QA 19, QY VB, 4Z4HQ (54) 12, 5N2ABF (42) 11, 5A3TE 19, 6W8s DD DQ (40) 19, 6Y5MJ, 6O6BW (25) 14, 7Q7LC (26) 13, 7XØAH (30) 15, 9H1s AB (85) 10, AG (34) 16, AI AK, 9J2s IE (115) 17, WR, 9Q5s HD (55) 12, KL (65) 8, LJ (46) 19, 9M2OV, 9V1s LP (20) 14, MY NV (65) 16-17 and 9Y4VU 21.

15 's Novice gang, led by WNs 2VRK 4BVK 4BVS 5OSY 5PUQ 6SAZ 7FLR and 8TYF, practices code on BY5RM 12, CEs 2CR 3JP, CM1AR, CN8FF 22, CO6MD, CT1DJ, CX2FD, DJs 2NN 4AZ 4JZ 5VQ 5YQ 7CX 7FW 8GJ 9QH 9TQ, DLs 1MD 1QD 2MJ 2SQ 8VA 8VF 9KP ØSN, DMs 3KOG 4UG, EAs 5HR 8ET 23,

EL2D, Fs 2LG 2NB 3BV 3XN 5EF 8PI 9YZ, FG7XT 15, Gs 2KO 3IEP 3HDA 3JYP 3PBB 3PJW 3PYZ 4RDT 8SR 3TJD 3UW 3VIP 5AAJ 5CP 6FB 8DD 8DL, GI3AXI, GMs 3CSM 4FM, GW3KGD, HB9ABX, HI3JRF 0, HK7s XI 13, YB, HM1DM, HI5F, JAs 1CEU 1EKE 1FAF 1IGK 1IPX 1KRV 1KVT 1NUH 1OTX 1QVN 1RNH 1SWA 1SWL 1WWQ 2DOU 23, 2GNR 2HLX 2WB 3AYU 3BCC 3DAZ 3KEV 3LBU 4DND 5BQT 5BVB 6ANT 6BXE 6CNM 6EIC 7AOU 7CDV 8AXL 8CKC 8JL 9BEX, KA2DJ, KGs 4CX 6AAY (105), KL7s FMM FRM, KP4s BBN COZ CRD CRS, KZ5s 1KN OWN, LUs 6ABX 6DJX 8DR 8EY 9FDK, OEs 2JG 5LX, OHs 2TI 3MF, OK1AFN, ON5KL, OY3SL 23, OZ1W, PA0s FF FR 14, GF VDR, PI1BVF, PYs 2DN 2PU 2RT 3AKG 23, 3BVH 5A8N 5BAJ 5BAQ 6IL 7HO 7NJ 7OS (102), SL7AZ 13-16, SMs 2COL/mm 4CMG 6CAW 7DQC, SPs 3AIJ 6TQ 8AJK, TG9DX, VE2BUJ/-SU, VK2BKM (114) 22, VO1IW, VP2s DAH DK, VR2DK, WA2TBQ/KP4, WH6s GAV GDO, WP4CPG, WV4EY, XE1s JY MMU 1, YO2IS 23, YU2HH 22, YV5BPJ, ZE1JL, ZLs 2GH 3JO 23, 4X1s NYY NZG 23, 5N2ABF, 9G1FY 21, 9J2s IE 21, W, 9Q5KL and 9Y4VU. Know a more interesting way to learn c.w.?

40 c.w. maintains its DX appeal for Ws 1AYK 2JBL 3DPR 3HNK 8QXQ 8YGR, Ks 1ZJA 2MFY 3FKU 4TWJ 8YSO 9UIY, WAs 5NOM 8GGN 8MCQ 8QJK 8RQQ 9SXQ 0GQI 0JTB, WBs 2LDX 2RSS 2UIZ 2YVZ 6OLD and KL7WEF/W1 due to CE9AS, CM2s LF 1, QN (5) 23, CN8FS, COs 2BB 2BO/CO1 2DR (36), 2KG (5) 4, 3CS 6, 5EG 5FS 2, 7HC, CXs 1OP 2DLG (10) 5, DK1AA 3, EA8s EN (25) 4, EY, EL9NA (6) 0, ET3GB (10) 7, FG7NA (20) 5, FO8BJ, FP8s CA CS (14) 11, GC-3PLX (30) 2, 3UQM (10) 23, 8HT (12) 7, GD3TNS, GI3OQR, HAs 4KYB 4KYX 8KUC 9KOB (23) 1-2, HI7NRC (40) 5, HK3s AOW ASJ (17) 4, HP1AC (5) 0, HR5LB (10) 5, IT1s AGA (3) 5, AQ, JAs 1AEA 1BPM 1ISL 1LIT 1OHV 1OYT 1PSW 1QNX 1QZR 1THL 1UII 1UPS 1WWZ 2EPW 2HLX 3BRW 3CDK 3CST/1 3CWV 3DKQ 3FGJ 3KYU 4CLR 5AGO/3 5CP 5PL 7AGO 7CUA 7XF 0BCO all around breakfasttime U. S. A., KG4CX 2, KL7TI 3, KP4TIN, KZ5JF, LAs 1K 7QI, LUs 2ZG 6ZC 5, LZ1s KDZ KPW KSD (30) 1, SP, MP4BDF (1) 22, OA4VE 10-11, OHs 2AM 3TH 0NH (27) 22, ON4IIC (20) 5, OKs galore, OY2J (5) 3, PJ2ME (16) 1, PYs 1PC 5A8N 5BAJ 7AHA 7AQJ 0, 8EL (30) 4, SL5ZL, SPs 1AGE (30) 7, 1AII 2BMM 2JS 3BHG 3ZSW/3 5ANL, TF5TP (0) 19, TI2RK (12) 4, UA0PY (26) 23, UB5s IF (10) 2, KAA (20) 1, PG (23) 3, RR (10) 2, UC2CE (18) 2, UF6s AO LA (7) 2, UL7CD (15) 23, UP2KBA (5) 2, UT5TC (40) 2, numerous VKs including 7GK 11-12, 7SM, VPs 6AK 1-2, 6YF 8IY 9CD 4, VR2s DK ER (7) 10, XEs 1OE (4) 4-5, 2PMK, YOs 2KM 3AC 4XZ 8GV 8OK 8YF, YUs 2AAY 2RBE 3NY, YS1s CN RK (10) 11, YVs 1AD 3FB 5CET 5CXY, ZB2s AZ 19, U (25) 22, ZD7IP (5) 23, ZE2KL, ZLs 1ACW 1AIR (15) 11, 2BDA 7, 3ABV ZS6OS, 4U1ITU 0, 4X4s WN (11) 1, XM (17) 20, 6Y5s FH MJ 2, WJ (7) 4-5, 7X0AH (4) 4, 9J2IE (22) 4, 9Y4s DS (10) 10, RA (2) 23 and TU . . . . . Novice 7-Mc. diggers WNs 5PUQ 7FLR and 9PQY come up with KH6EXJ (173) 10-11, KL7FOT (162) 8 and WL7FQC (155) 8-9 among the SWBC noise generators.

40 phone, battled valiantly by WA8GGN, WBs 2RSS and 5OLD, surrenders DJ4SS, DKØAA 1, EA7GF 3, G2PU, GC2KN (55) 11, GD3GMH* (58) 11-12, GI3OQR, HI8XJG, HK2AQF, JA2BAY (45) 20, JX6XF (45) 1, KC4USV, KG4BB, KX6BU, MP4BBW (46) 19, OA4VE, PAØGMU 4, PE2EVO (42) 0, PJ2CE 11, UD6BR (46) 20, VKs 2AHT 2ID 3BM 3OZ 7SM 11, VPs 2AA (46) 21, 9BDA 3, W1FZJ/KP4, WØGTA/8F4 (43) 18-19, XE1CCW (80) 7, YO9CN 3, YU3BC 3, YV9AA (46) 0, ZD8ARP (46) 20-21, ZSs 1JA 6AJH and 9V1LP (46) 18, the specks for carrier a.m.

75 phone's season is opened by K1ZJA, KL7WEF/W1 and tuner Kilroy with GC2FMV 6-7, GI6TK 4, HI8XAL 4, ON4UN 5, SMs 4SB 7, 7XV 6, VEØMY 0, VPs 7EA 5, 9BW 0, ZL4LM 11 and 6Y5EM . . . . . At the other end of the band on 80 c.w. W1SWX, WAs 5NOM 6SLU 8MCQ and 9MQI get the DX ball rolling with DJ1FK, EI9J (10) 1, GI3OQR, GM3KKO, KL7PI, KP4CQ, KZ5s CQ MV, OKs 1WC 2HI, ON4TN (9) 1, OZ5EU, PAØDC (10) 6-7, SM6DHU, SP7GII, UA2CD, VR2DK, YU3EYZ, ZD8J, ZLs 1PL 2ANT 3ABV and 14E . . . . . 160 festivities commenced with pursuit of KL7FRY, VK5KO, some Caribbean and European early birds in the lower 1.8-Mc. segment. Don't forget those 160-Meter Transatlantic & World-Wide DX Tests scheduled for the 1st and 15th of this month (details on p. 101, November *QST*). Results of last month's opening week ends are just rolling in and it appears that increasing sunspot activity is separating 160-meter DX men from the boys.

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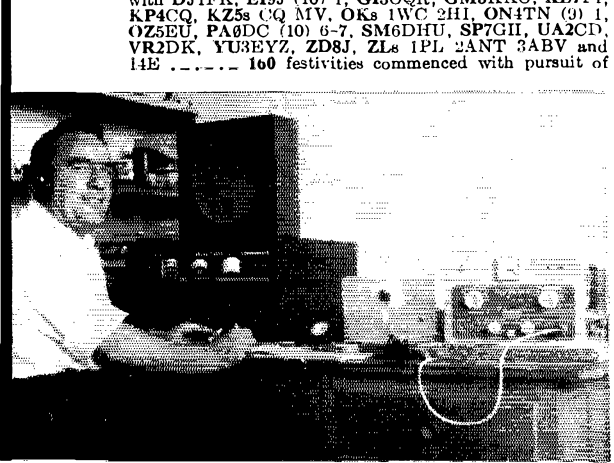
Next month's column will swing our DX spotlight back on 14-Mc. goings-on described by (phone) Ws 2DY 3LE 4YOK 8YGR 9LNQ, KØUCR, WAs 8GGN 9SXQ, WB2RSS, VE8AG; (c.w.) Ws 2JBL 3DPR 3HNK 4YOK 8YGR 9LNQ 9NN ØCVZ ØKAW, Ks 3FKU 3UXY 4TWJ 6TXA 9UCR ØRWL, WAs 6JDT 8GGN 8MCQ 9SXQ ØGQI, WB2RSS and VE8AG, plus added reporters now clawing at their mills. How's *your* DX?

Where:

WHEREABOUTS — When you encounter a strange prefix that does not appear on your Countries List, try the "Operating a Station" chapter in your latest ARRL *Radio Amateur's Handbook*, International Prefixes table. There you will find the 3BA-3FZ block labeled "Canada" (see p. 102, November's "How's", for details on those 3B-3C calls), 4Z4 for Israel, 8AA-8IZ Indonesia, etc. Doubtless we'll be hit by a fresh batch of tricky tags this new year . . . . . Here are your "QSLers of the Month" — CE2CR, CTs 2BO 3AR, DJ5TH, DLs 1LA 5IO 8VV ØITU, EA8EY, EL2D, FG7XT, FP8CA, FR7ZD, G2KW, GD5ACI/WB6QEP, HBs 9KC/p 9MD ØAAI, HC1RT, JAs 1CWZ 8QK, KG6ALW, KH6BCB/KS4, KS6BR, LU1DAY, LZ1CW, M1B, OEs 3GW 5PWL 6MDG, OHs 2BDL 3MH 3WW 4PX, OKs 1ABP 1APJ 1LN 2PO 3CAU 3KFV, PAØLOU, PY7ACQ/Ø, 8Ms 5DXL 7IA, SVØWLL, UAs 4HW ØRH, UG6KAA, UH8DII, UM8AP, UR2KAW, VK6MI, VPs 2GTL 7DJ, VQ9EF, XW8BS, YO4CT, YUs 1DP 2RAK, ZC4s GF KF, ZL3JO, 6W8BF, 7G1A and 9J2IE, as well as QSL tenders Ws 2CTN 4ECI 6RGG 7PHO, Ks 1ERT 2OJD, VEs 3ACD and 4OX — all honored for efficient QSLing in dispatches from "How's" correspondents Ws 7VRO 8YGR, Ks 1LMIS 9CVO/1 ØJPJ, WAs 5MUE 8GGN 9SXQ ØGQI, WB2BMQ and W.P. Kilroy. Any candidates for such honorable mention in *your* log? . . . . . 'ALP! W1s BGD and CNY search for a QSL route to ZS9P; W2JBL is thwarted by ZD8J and 9V4LT; KØJPJ is stalled on YJ1DL; WB2MBQ is frustrated by W2VCZ/mm and curious YJ1CJSE; G3IDG pines for postals from CT2AI '62, GC3MIH/a '61, KG1CD '61, KV4CG '59, OX3AB '59, UF6KPA '59, VP6KL '57 and 3A2CZ '59. Any notions or magic potions? . . . . . WA4OYW and WB4BIZ add their availability as QSL aides to overseas DX operators in need of Stateside assistants . . . . . OX5AR (W6IIM) corrects our November suggestion for confirmation of OX5BO contacts between July 27 and August 25, 1966. The address should be CMR Box 2102, APO, New York, N. Y., 09023. OX5BO QSOs on other dates should be QSLd via the appropriate *Callbook* address. "I do QSL 100 per cent in response to cards received," guarantees OX5AR . . . . . VP5BP pleads "Point out that the VP5 prefix now includes only Grand Turk and Caicos Islands. Cayman is ZF1, Jamaica 6Y5. A source of more confusion is that I was assigned VE3CJ's old Cayman call, VP5BP, for use here on Grand Turk." . . . . . "Happiness," says WA8GGN, "is your postman wondering about all those fancy foreign post cards with the big letters and numbers on them."

ASIA — Efforts by W7s SFF and VRO haven't panned out but WA2EFN of LIDXA's *DX Bulletin* will try to help with overdue JT1 QSLs. Bill needs your own card, five International Reply Coupons, a 15-cent U.S. airmail stamp, a self-addressed stamped envelope and a few months wait to attempt the job . . . . . "I'll discontinue handling QSLs for 8S7s DA and NE effective January 1, 1967," announces W5VA-W5AI, very busy with VS5JC QSL chores . . . . . K1QBP understands that MP4BCC may be of service in confirming QSOs with MP4MAH and VS9OSC . . . . . W7VRO is rounding up all OD5EE logs including those for QSOs preceding his appointment as QSL tender last June. "Tell the fellows to be patient till I get the records." Dick hears that OD5EE's MP4QBB plans fell through because of a single missing signature on equipment transportation papers . . . . . WA6JDT heard JH1AAV displaying the new supplementary Japanese prefix on 21-Mc. c.w.

AFRICA — "I have all FL8AC logs," declares W4NJF, "and all cards received have been answered. The operation ran from October 29th through November 1st. I



9L1TL enjoyed last year's ARRL DX Contest with this Njala layout but his log (1334 contacts!) arrived too late for listing in the October *QST* write-up. W1YYM of Hq. hopes all participants in this year's Competition will post their entries early, preferably with photos attached.

QST for

UA9OH speaks for amateur radio at a recent exhibition in Novosibirsk. At right is the 3-element quad that punches great holes in 20-meter c.w. QRM for Vlad's neighbor, UA9PP. (Photos via W1YYM)

am also QSL manager for 9J2MM. As soon as logs are received I'll commence business, s.a.s.e. required. By the way, it's obvious that many QSLers fail to synchronize their shack clocks with WWV or other accurate time sources. I see QSL entries more than an hour off the mark." . . . . "I'm now handling cards for ZS1s TP and TZ, formerly the duty of the late K4MYZ," notifies W1CRA . . . . REF secretary F9OE advises that FB8YY should be QSLd via his society's bureau, FB8WW via K2MGE, FB8s XX and ZZ via FR7ZD. DX Club of Puerto Rico's *DXer* says the latter began issuing FB8ZZ cards in October . . . . Sorry — W7VRO has no ET3 QSL arrangements . . . . "I'm QSL manager for ZD8WK," announces WA8CXU. "Have logs from September 1, 1966; s.a.s.e., if you please." . . . . Noted in LIDXA's perceptive *DX Bulletin:* W2GHK still digs for VQ9G logs. . . . The 9J2BB address in the listings to follow should be good till May. . . . 5R8AM may be Malagasy's most reluctant QSLer. . . . CR7GF still offers QSLs for his CT2GF-CR3GF '65 QSOs, s.a.e. and IRCs required.

EUROPE — F9OE gives the new REF QSL bureau address as B.P. 70, Paris 12, France . . . . "As of October 1, 1966, I am ZB2AP's QSL manager for W/K/VE QSOs," states WA8QJK. "Others should QSL him direct. I'll answer those requests including s.a.s.e. and GMT." . . . . OY7ML, WB2CGW and VP9H agree that OY calls still are mighty popular among the lunatic pirate fringe. In addition to usurpations of listed Faroe call signs, OYs 2AW 2G 3BB and 7U are recent sickies. Somebody, as they say, needs professional help . . . . LIDXA's WA2EFN has encouragement for those with U.S.S.R. toughies overdue. "Send a courteous letter to Central Radio Club, Box 88, Moscow, with three IRCs and explain the situation. You'll get back an answer in Russian, and the QSLs should arrive via the bureau in a few months."

SOUTH AMERICA — "Please indicate that I will act as QSL manager for CX4DT," writes W3LE. "The usual s.a.s.e. or s.a.e. plus IRC applies." For W/K/VEs this will surely beat the two weeks normally required for roundtrip airmail. A letter from CX4DT confirms the arrangement . . . . Reminder: 4M and 5J prefixes belong to Venezuela and Colombia, respectively . . . . Now let's dash through the grapevine's individual QTH specifications, being mindful of the fact that each item is necessarily neither accurate, "official" nor complete. . . .

ex-CN8GU-W9FJY (to W9GDX)
CP5BK, I. Pettigrew, P.O. Box 514, Cochabamba, Bolivia
CP6GQ, Casilla 642, Santa Cruz, Bolivia
CX3BBD, c/o U.S. Embassy, Montevideo, Uruguay
CX4DT, G. Cottin, Box 1657, Montevideo, Uruguay (or via W3LE)
DJ6QT/LX (via W2GHK)
DJ0PII, Gardenstrasse 14, 5321 Liessem, W. Germany
DL2VR, Radio Club, c/o JSB, BFPO 40, via London, England
EI6AY (via GI3TJJ)
EL2D (via K3JXO)
FB8WW (via K2MGE)
FB8s XX ZZ (via FR7ZD)
FB8YY (via REF)
FO8BQ, P.O. Box 374, Papeete, Tahiti
GB3WIJ, Wiltshire International Boy Scout Jamboree, Ogbourne, St. George, Marlborough, Wiltshire, England
HC1MF, Box 15, NASA, U.S. Embassy, Quito, Ecuador
HK2DP, F. Bravo, P.O. Box 1083, Santa Marta, Colombia
HZ1RR, P.O. Box 20, Riyadh, Saudi Arabia
IS1ALX/C (to I1ALX)
KA2DO, P.O. Box 2029, APO, San Francisco, Calif., 96594
KR6BL, Co HHD, 173rd SPT Bn., APO, San Francisco, Calif., 96331
LU6ZC (via RCA of Argentina)
MP4DAN, H. Puffer, c/o Schlumberger, Das Island via Bahrein, Arabian Gulf (or via DJ3BB)
OD5FC, P.O. Box 1217, Beirut, Lebanon
OX4FR, Box 121, APO, New York, N.Y., 09121
OX5AN, Base R, Director, APO, New York, N.Y., 09023
OX5AR (via W6FKH)
OX5BO (see preceding text)
PY8s GU IA, Box 305, Manaus, Brazil
SP9ZW/6, G. Kupka, Box 4, Wroclaw 11, Poland
TA2AC, (via K1AMC)
TI2ED, Box 3310, San Jose, C.R.
TI5ST, P. Antonio, S. minario Acares 3, Heredia, C.R.
TJ1QQ (via W4DQS)
TU2BK, Box 54, Port Bouet, Ivory Coast
TY4ATC/mm (to W6NMC)
VE1ASJ/VE1 (via W2GTN)
VE8AG, R. Schoonover, c/o Federal Electric, Hangar 9, Winnipeg Intl. Airport, Winnipeg, Man., Canada
VE8ZZ, Box 332, Frobisher Bay, N.W.T., Canada
VP8UK (via G3DHB)
VQ9AA/f (via W4ECI)
VR2FF, Box 184, Suva, Fiji Islands
W5MTX/KH6, E. Pierce, 99139 Heen, Aiea, Hawaii
W5YBF/KG6 (to W5YBF)
W6FHM/DU1 (to W6FHM)
W0PAN/KH6, L. Shima, Box 373, Pearl City, Hawaii, 96782
WB2VJD/CE0A (via K5GOT)
WB6HXQ/KH6/KX6, J. Lewis, c/o Federal Electric Co., 2990 Koapaka St., Honolulu, Hawaii, 96817
YO3ZA, D. Antoni, Box 8, Bucharest, Roumania
YS2CEN, C. Elenanieto, P.O. Box 133, Santa Ana, El Salvador
ZB2AP (via WA8QJK; see preceding text)
ZD8ARP, c/o BBC, Ascension Island
ZD8JES (via ZD8AR)
ZD8WK (via WA8CXU)
ZS1s TP TZ (via W1CRA)
ZS4JB (via K2BUI)
3C2ARC (to VE2ARC)
4S7s DA NE (see preceding text)
4Z4HQ (via IARC of Israel)
5A1TY (via HB9ADP)
5J4RCA (via LCRA of Colombia)
5N2AAF (via W7VRO)
5N2s ABF AVH, P.O. Box 2469, Lagos, Nigeria
6Y5VV, 2c Island Dr., Kingston 8, Jamaica
7Q7EC, E. Canaday (W5GIQ), P.O. Box 207, Zomba Malawi (W/Ks to W5GIQ)
7Q7s PH PS (via W1MRQ)
7X0PQ, Box 59, Bechar, Algeria
9G1FF, P.O. Box 1387, Kumasi, Ghana
9G1s FL RW, Box 151, Tema, Ghana
9G1FY, Box 194, Accra, Ghana
ex-9J2BB, 32 Leslie Pl., New Rochelle, N.Y.
9J2MM (via W4NJF)
9L1TL (via G3USF)
9Q5FV, Box 117, Luluabourg, R.C.
9Q5PI, APO, New York, N.Y., 09662

For this collection thanks go to **Ws** 1WPO 1YYM 2CHT 2DY 2JBL 3DPR 3GJR 3LE 4EMP 4PJG 4YOK 7VRO 9GFF 9LNQ 9NN, **Ks** 9CVO/1 9OTB 9UCR 0JPJ, **WAs** 1DJG 4OYW 8GGN 8QJK 9SXQ 0GQI, **WB2s** JYM RSS, F9OE, **KL7FEF/W1**, **SV0WG**, W.P. Kilroy, DARC's *DX-MB* (DLs 1EP 3RK), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4MVB), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WA2EFN), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025) and VERON's *DXpress* (PA0s FX LOU TO VDV WWP). Come again and often!

Whence:

AFRICA — 7Q7EC (W5GIQ) is frustrated by third-party traffic restrictions in Malawi, especially when he hooks a station in his home town. "My best contacts into the states have been long path. I'm on almost daily, 1330 GMT, and watch 14,200 kc. at 1130-1430, week ends. With improving conditions I think we'll be able to work W/Ks on the short path around 1800 and 0430-0530 GMT. I operate c.w. as well as s.s.b. and occasionally try 21 Mc. There are several other amateurs working in Malawi, all British or American. A number of natives are trained as operators and technicians for Malawi Broadcasting Corporation which has stations located throughout the country. I'm inclined to believe they would be interested in becoming amateurs." W1MRQ adds, "7Q7PH of Dedza is from Guernsey where he hopes to become a GC3 in a year or so. Peter uses a KW-2000, dipoles and a Heathkit

receiver." ._._._ WA8GGN says TY4ATC/mm was rover W6NMC returning Statesward from recent African travels ._._._ W4NJF learns that EL2AT's 14-Mc. spinner crashed a-building, and that ET3AC took time out for turkey in Virginia ._._._ W7VRO finds ZS1XR concentrating on rare U.S. counties with his 100-watter and new quad ._._._ K4TWJ notes Benghazi's 5A4TV regularly active around 14,200 kc. at 1200 GMT ._._._ 5N2AAF, W7VRO's new QSL client, sports 150 watts of sideband and c.w. with a TA-33 jr. at Zaria. Mike formerly signed 5N2JKO and is G3JKO back home ._._._ Hepatitis landed 6O1AU (W8HMI) in a German hospital instead of Jordan, according to W8YGR ._._._ African addenda via the clubs and groups: TR8AG's most likely c.w. spots are 14,020, 14,040 and 14,060 kc., with straight-a.m. work on 14,190, and Guy sometimes tunes for W/K sidewinders around 2200 GMT, FY2PE assisting. . . . 5U7AK appears on 14,230 kc. at 1930 GMT or so, Tuesdays and Fridays. . . . HK1QQ now displays his high-grade c.w. as TJ1QQ and expects a two-year Cameroun tour. . . . W6KG and XYL WB6QEP scheduled a Stateside sojourn after successful sorties as CTs 3AU and 2YA. Rarer African stops may follow. ._._._ The first International EL DX Competition will be held on January 14 and 15 starting at 0000 GMT on the 14th and ending at 2400 GMT on the 15th. All modes of operating will be used on all bands, 80 through 10 meters. Contest exchanges will consist of a 5 or 6 digit number which will be the RS or RST report plus a contact number starting at 001. Three points are given for each Liberian station contacted, and one point for any other contact. Multipliers will consist of the total number of EL prefixes worked on all bands. Entries may be single band, single operator; or all band, single or multi-operator. Certificates will go to the high scoring station in each country with more than 300 points. Logs must be signed by the operator or operators, and mailed not later than 28 February to the Liberian Radio Amateur Association, P.O. Box 1477, Monrovia, Liberia.

ASIA — "His Royal Highness, AC3PT, has had equipment for some time now but it's not in working order," regrets W3LE, a personal acquaintance of the Chogyal ._._._ "OD5EE (W5LAK), his middle east job terminated, headed for home in late October," reports W7VRO ._._._ "Those Novosibirsk boys seem to have the best signals from Asiatic Russia," muses WA8GGN. "UA9s OH PP and UW9OU are heard most often." ._._._ "Ran into G3VCS in the South China Sea last September," remarks W6YZD. Ham radio makes it an even smaller world ._._._ Among overseas WAS-hunters WØKAW finds VU2GW yearning for Nev., Wyo. and Utah QSOs plus a QSL from KH6-land. "I supplied first Colo. for UAØRC yesterday but he still needs Ark., Del., Miss., N. H., Vt. and Wyo." ._._._ WA6JDT finally caught a real Korean, HM1DM, on 15 c.w. Next night John tripled his score with HM1s BB and DE. It's DX feast or famine as a rule ._._._ Oriental oddments via clubs literature: Former ET3USA stalwart K1QHP must content himself with s.w.l. status in Vietnam for the present. . . . Pakistan's AP gang vainly strive to regain hamming privileges after last year's border troubles. . . . VU2WB, active on 10 and 15 meters at 0700-0900 GMT, is also HB9TK. . . . KAs 9MF 2TJ 2DW 2DJ 8HC 2USF and 2RJ finished in that competitive order in FEARL's '66 Field Day-a-go-go, the winner scoring 600 QSOs with 86 band-countries. KA2WF departed Japan and v.h.f. buff KA2RJ will follow. New or renewed FEARL memberships are held by KAs 2DO (K6GII), 2EP (K2QGC), 2MP (W7FHL) and 2TJ (WA3DBX).

OCEANIA — "Ten *is* open!" exclaim ops Lee and Hal of KG6IG in the Bonins. "On October 11th–14th we had 95 contacts with 29 states and five countries on 28 Mc. using a KWM-2A, 30L-1 linear and TH-6 beam. We were doing so well we didn't swing the antenna out of the northeast to see what was coming in from other directions." ._._._ VK3NR and W1YYM confirm that kidney trouble caused a quick QRT for Macquarie's VKØMI in October. Col was rushed to Melbourne by naval transport for treatment ._._._ "I have over a thousand contributed dollars banked for the widow of the late ZL2AWJ," reported Thorpe fund manager W4NJF in November ._._._ W5YBF/KG6 claims a 103/90 worked/confirmed countries tally for 20-sideband DXing last September and October from Guam ._._._ W4CHA tells ARRL Assistant Communications Manager W1YYM he leaves San Francisco for Sydney on the 10th of this month toting a KWM-2 and 75S-3. Ellen understands, "After three months on Norfolk he hopes to visit Lord Howe isle, Nauru and Christmas. Watch 7005, 14,065 and 21,065 kc." ._._._ KW6s DS and EJ keep twenty Wakeful on c.w. and sideband.

EUROPE — WA1DJG hears regularly from DX friends in Poland. SP7GH has much DX fun on the low edge of 80 c.w. where his vertical easily works into the eastern U.S.A. Tom's goal is to contact our west coast on 3.5 Mc. . . . SP6AAT already has a hundred countries with his newly homebrewed sideband outfit. Transmitting around 14,190 kc., he tunes the Yank phone band at 1800–2000 GMT. . . . SP3AIJ nears the 200-country mark with 100 watts, a 15-tube inhaler and a TH-4. Ted plans on 813s in an s.s.b. line-up now nearing completion ._._._ K4OLQ calls attention to S6S, a Czech operating award with a WAC slant, details available from Central Radio Club, Box 69, Prague. And DJ8CR can provide specs on the new Worked All Westfalia (WAWA) sheepskin for which W/K/VE/VOs must collect fifteen appropriate German QSLs ._._._ OY7ML says OY2J is the only Faroes s.s.b.er at present, a station sometimes operated by OYs 3SL and 7S. "We also work sideband from club station OY6FRA from time to time." ._._._ G3IDG observes 28 Mc. hotting up fast, 46 countries heard on the band in the first two weeks of November ._._._ Continental cullings in the club press: UW4HZ/UV4 was a display station at a November exhibition in Kuibyshev. . . . SVØs WL and WU, Crete and Rhodes respectively, are pursued by the s.s.b. crowd on 10, 15 and 20. . . . Preliminary WAE DX Contest returns show WB2CKS with 57,584 claimed points, W2MEL 51,420, W9IOP 51,035, W2PCJ 43,859 and WA4PXP 26,260. DJ2YA, EP2BQ, HI8XAL, I1KDB, OD5BZ, SM2BJI, VS9OC and 4X4HF also submitted early whoppers.

SOUTH AMERICA — LU6ACU comments on Argentine hamming: "Most LUs operate homebrew rigs, a common configuration being parallel 1625s modulated by push-pull 1625s. We can now import commercial gear from other countries but prices are very high in U.S. dollars. Single-sideband becomes more and more popular. My own 35-watt a.m./c.w. rig comprises a Geloso v.f.o. driving a 6146 final modulated by 1625s." Carlos is in our country for an accounting course and can be reached % H. B. Fuller Co., 1150 Eustis St., St. Paul, Minn., 55108 ._._._ Contacting any one of PYs ABK AJJ BD FX KGX MAC MDR MGQ MHT MHY MT NDP NFX NG OL OR PN and SO may qualify you for the *Aco em Jubileu* (Steel in Jubilee) diploma sponsored by the Brazilian National Steel Co. with details available from C.S.N., Caixa Postal 2736, Rio de Janeiro, Brazil ._._._ Squibs via club newshawks: CE9AO threatens a Juan Fernandez flap. . . . PYs 1BYK 7ZS and others talk up Atol de Rocas as a DXpeditionary objective, plus more St. Peter & Paul doings. . . . WB2VJD/CEØA gives Easter hunters brief breaks between schedules on 21,360 kc. at 2100 GMT, 14,300 at 0200.

HEREABOUTS — PJ5s BC and BD (KØs GZN and GZO) will be workable from Saba isle again over a three-week stretch beginning late this month. K9GZN remarks, "We should sail from New Orleans on the 12th and be operational around the 20th. Last year we had over 2500 contacts. We'll use Swans 240 and 350 to a Hy-Gain on 10, 15 and 20. Forty meters is out because SWBC stations in the area make it impossible to copy anything." ._._._ VP5s BP NK RB and RS keep Grand Turk perkin'. VP5BP writes, "My own pleasure in ham radio is to get on and rag-chew once in a while, c.w. or s.s.b. With the calls I've held since 1959 — VP7BP, ZD8RH and now VP5BP — this hasn't been easy, but I'm RCC for all three. I realize that a lot of people want to work VP5-land and I do try to oblige them as time permits. I do wish DX hounds would respect my hobby, too, and not break up my QSOs with ill-timed calls." ._._._ From VE8AG up north: "Been hamming for nine years but the DX bug didn't leave his mark until I moved into the Arctic. Now I'm a confirmed addict scouring the bands for new countries, 20 phone and 15 c.w. So far 28 Mc. hasn't been good here but this should change as time goes on. Working rotating shifts cuts into my contest work. I've been hearing KC4USN and hope to work him soon for a pole-to-pole QSO." ._._._ KL7WEF/W1 QSYs to become KL7WEF/W5 in Texas ._._._ ZF1EP, manned by W4s KET PJG, K4CAII and WA4WIP on October 20th–23rd, piled up more than 5000 QSOs ._._._ OX5AR (W6IIM) writes from Thule AFB: "I'll be operating from here with the USAF till about May, mostly week ends on 15- and 20-meter phone. Thirty-four states so far. Others active here are OX5s AC AN AP and MARS station OX5BO-XP1AA." ._._._ Former WIA prez VK2VN recently visited ARRL Hq. W1YYM says Morrie enjoys traveling for Qantas Air. Ellen also reports W1RAN top brain in the DX Quiz at November's New England DXCC shebang ._._._ QSL rep W3HNK recovers from a nearly fatal head-on auto smash ._._._ After capturing DXCC memberships on each coast as W6LER and K1MLI, WØKAW has applied for No. 3 from Colorado Springs. "Conditions here are surely different from either coast. It's a 6500-ft. mountain-side location. Heavy winds brought down my triband quad leaving me with a 3-el. 14-Mc. yagi for the winter. Going to miss 15 and 10!" ._._._ "Feel like a kid with a new toy, starting from DX scratch in this new QTH," observes W3DPR of Baltimore, formerly W8IBX. "Six weeks of casual activity with 250 watts and a 135-ft. wire brought in 67 countries." ._._._ WA8RQQ claims giant-killer status Grade A, working 7-Mc. VKs and South Americans with an Ameco 10-watter and dipole. All told Eddie has squeezed 1400 QSOs and 675 QSLs out of that midget rig. QST

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Contests: The Yardstick of Skill

CONTEST operation takes a heap of doin' whether we are wading through the eight-layer QRM of a Novice Roundup, where many of us get our feet wet and our tastes sharpened for this type activity, or the easy informality of YLRL Howdy Days. It is here, when we peel off the hustle, or the fast-paced exhilaration of competition that we uncover a real yardstick of our ability. There is nothing like a contest to show us just how poor or how good our skills really are, for, whether we submit a formal log or not, contests are an excellent place to make our operating techniques grow up. They are, in a sense, the 'qualifying run' of skill and know how, where the quality of the equipment takes a second place to the quality of the person behind the mike, or key, or keyboard.

Gwen, VE3AYL is an outstanding example of RTTY Contest operating ability. Up to two years ago her special liking was c.w., with some phone operation, and then she and OM, VE3GK were bitten by the RTTY bug. Since then, according to Gwen, her operating time has been spent "prestidigitating the verdant keys." Her greatest thrill is working RTTY-DX contests, and, not happy with being just another call on the list of participating stations, she finished among the top ten in the Spring 1966 RTTY Contest sponsored by the British Amateur Radio Teleprinter Group. October 1966, also saw her taking part in the Sixth World-Wide RTTY Sweepstakes, with a total of 115 stations, and 25 countries contacted. Again Gwen was active in the second edition of the Alexander Volta RTTY DX Contest sponsored by the SSB and RTTY Club of Como, Italy.

Gwen received her license in 1930, just six months after OM, Sid, VE3GK, and has the distinction of being the first Canadian YL to hold an Amateur Radio License. In those days they were issued for Advanced Operation. She has held her original call ever since. Among other really outstanding awards to her credit is the QCA Certificate awarded by the B.A.R.T.G., which was a "double first" because Gwen was the first YL and the first Canadian to receive this honor. She is a member of the ARRL, and also belongs to the Ontario Trillium Club, the (you guessed it) first Amateur Radio YL Club in Canada.

As might be expected, Gwen and Sid are not the only members of the Burnett family who hold

VE3AYL, Gwen Burnette.

amateur radio licenses, their daughter, Corrine, received the call VE3DYL while she was still in her teens, and is now married to VE3DSW.

What does this amazing young lady do in her spare time? Her hobbies are: dressmaking; painting oil portraits; gardening; and, not only playing both piano and organ, but composing scores for their dual Concert Hammond Organs!

Sid and Gwen have a station at their cottage at Lake Simcoe, and are planning on adding RTTY to the gear there next year. Maybe then she will be able to find that elusive Asian contact, the only one she needs to complete her WAC-RTTY.

YL-OM Contest

TIME:

Phone

Sat. February 25, 1967 — 1300 EST (1800 GMT)**
Sun. February 26, 1967 — 1300 EST (1800 GMT)

c.w.

Sat. March 11, 1967 — 1300 EST (1800 GMT)
Sun. March 12, 1967 — 1300 EST (1800 GMT)

** NOTICE THE TIME CHANGE THIS YEAR! It has been changed to two 24 hour periods to give all areas one daylight and one night time operating period.

ELIGIBILITY:
All licensed OM, YL, and XYL operators throughout the world are invited to participate.

OPERATION:
All bands may be used. Crossband operation is not permitted.

PROCEDURE:
OMs call "CQ YL." YLs call "CQ OM."

EXCHANGE:
QSO number, RS, or RST report, ARRL section or country. Entries in log should show band worked at time of contact, time, date, transmitter, and power.

SCORING:
(a) Phone and c.w. contacts will be scored as separate contests. Submit separate logs.

* YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena Calif. 91001

(b) One point is earned for each station worked. YL to OM, or OM to YL. A station may be contacted no more than once in each contest for credit.
(c) Multiply the number of QSOs by the number of different ARRL sections and countries worked.
(d) Contestants running 150 watts input or less at all times may multiply the results of (c) by 1.25 (low power multiplier).
(e) s.s.b. contestants running 300 watts p.e.p., or less, at all times may multiply the results of (c) by 1.25 (low power multiplier).

LOGS:

Copies of all phone and c.w. logs showing claimed scores, and signed by the operator must be postmarked no later than March 20, 1967, and received no later than April 10, 1967, or they will be disqualified. Please file separate logs for each section of the contest. Send copies of logs to:

Marte Wessel KØEPE
P.O. Box 756
Liberal, Kansas, 67901

AWARDS:

1st Place Phone: YL — Cup. OM — Cup.
1st Place c.w.: YL — Cup. OM — Cup.
The winner of the Phone Cup is also eligible for the c.w. Cup. Certificates will be awarded to high place c.w. and phone winners in each ARRL district and country.

NO LOGS WILL BE RETURNED. BE SURE THE COPY OF YOUR LOG IS LEGIBLE.

YLRL Howdy Days Results

YLRL's most casual, and because of its very informality, most delightful contest, Howdy Days, is simply YL's meeting YL's to say "hi," with a touch of contest flair by submitting logs for judging. This get together more or less ends the summer doldrums, and starts the fall activities.

"Unfortunately," says Edie, K1EKO, YLRL President, "very few YLs who participate, bother to submit a log. Guess it is just that kind of contest, slow and easy, and for fun."

The following logs were submitted:

1st Place — Ivy Smythe, VE3EZI.....152 points

Other logs submitted:

Jan Burgess, VE3BII.....150 points
Bobby Lemon, WA8ARJ..... 94 points
Doris Palmer, K2YMJ..... 58 points
Thelma Zwayer, K8TVX..... 56 points
Thelma Schrontz, WA8ENW..... 45 points
Ardell Vanderweel, WA9MIR..... 38 points
Carol Iams, W8WRJ..... 28 points
Helen Maillet, W7GGV..... 18 points
Bea Dietz, WA2GPT..... 15 points
Jan Fontana, WB2JCE..... 7 points

"Dixi" WA7DXI

Formally christened Charlene, WA7DXI is most often (and most appropriately) called "Dixi" on the air. But, on c.w., she is also found answering to the sign "LF."

WA7DXI, Dixi, and son Randy, WA7BZU. Picture courtesy W7PE.

Colorado YL Club's new officers. Left to right: WAØEXX, Betty Lindsay, Pres.; WØKEK, June Feller, Treas., KØZUW, Janice McGrath, Secy, WØHEM, Elaine High, V. Pres. Picture courtesy WØESD, Publicity Chairman.

Dixi got into radio, as many mothers have, through the influence of her son Randy, WA7BZU. Curiosity over his activity lured her into his shack, she stayed to keep his records straight, and finally, as she tells it "When I got to the point of asking 'what did he say?' every few minutes, I was hooked." Randy insisted she learn the code and copy them herself, and, in August 1965, received her Novice ticket.

Along with all the official visits that are a part of the duties of the district president of the VFW Auxiliary, Dixi still managed to learn the theory, and, thanks to the Code Practice Net, passed her General Class exam in April 1966.

A member of W.A.R.T.S., Noontime Net, Evergreen State Net, MINOW Net, and Columbia Basin Net, WA7-DXI is not a call heard on fone only. On c.w., she works the traffic nets: WSN, the Northwest Slow Speed Net, RN7, and recently has gone up to join the cream of traffic people on area net level. Since last December she has been manager of the Code Practice Net, where W7LEC regularly turns out top-level c.w. operators.

While her principal interest has been traffic, both fone and c.w., with several BPL to her credit, Dixi's first love is helping others with c.w. Her call is often heard on the novice frequencies working with the newcomers to amateur radio answering questions, giving suggestions, in general helping them get started.

Dixi is the mother of three children who are also quite outstanding. Randy, now 16, is the only one who is actively sharing his mothers interest in radio, but Karl, age 12, will soon have his Novice License. All share the hobbies of "rock-hounding" stamp-collecting, and visiting historical spots around the country. Daughter, Karen, and the OM, Gordon, join them in their family quintet which is well known throughout the Inland Empire, and all three children have appeared on TV during the past ten years.

If ever there is a "Long Suffering OM" award presentation, Gordon, Dixi's husband deserves first crack at it. A State Farm Agent, he has absolutely no interest in Amateur Radio.

Plan Ahead!

The West Coast YL Fun-Fest will be sponsored in 1967 by BAYLARC, at El Rancho Motel, in Millbrae, California, on March 31, April 1, 2, 1967.

Coming a week after Easter, this should be an excellent time for YL's to take time out for this annual frolic. BAYLARC is planning an outstanding series of "fun" things to do which includes an "Eyelash Party," an OM trip on Saturday, and a YL-OM Banquet.

If you have been to a Fun-Fest just remember the dates, if not, write them down, in either case PLAN AHEAD for this one.

The YLRC of Los Angeles will hold their annual Valentine Banquet for the OM's on Saturday, February 11, 1967, at the Petroleum Club in Long Beach, California. YL's from all clubs are cordially invited to attend. PLAN AHEAD for this one too. QST

CONDUCTED BY SAM HARRIS,* W1FZJ

November Leonids — Shower of a Lifetime

ALMOST everyone who has watched the night sky at all has seen an occasional "shooting star." Some of these meteors are mere rocketing pinpoints of light. Others glow with heavenly fire, trailing sparks comet-like behind them. But to witness a major meteor shower is an *unforgettable* experience. From shepherds, sailors, sentries and other night people have come a record of such celestial events almost as old as the history of man.

Generations of night-sky watchers have known that meteor displays can be expected at certain times of the year, and that some showers follow long-term cycles as well. The August Perseids and the December Geminids are probably the best known of the yearly visitors, but the November Leonids have a long recorded history, periodic sightings of them having been traced back to at least 585 A.D. Their long period, roughly 33 years between major peaks, has been known widely for more than 100 years.

In 1799 a brilliant Leonids shower was observed in the West Indies and the Gulf of Mexico. Ship captains and observers in Europe and Asia described large displays occurring Nov. 13, 1831 and again on Nov. 12 and 13, 1832. The shower of Nov. 12, 1833, one of the most spectacular on record, is generally credited with having triggered off the modern scientific study of meteor astronomy.

Hourly counts in the 1866 Leonids ran as high as 5000 on Nov. 13, and 1000 per hour were recorded on this date in 1867 and 1868, but the shower failed to live up to its reputation on its next round, in 1899. This drop-off, at a time when many people were looking for a major display, caused much disenchantment with astronomical predictions of that day, though it should be pointed out that there had been some cautious hedging. Astronomers calculated that the swarm might pass sufficiently close to the orbit of Jupiter to deflect them out of the earth's orbit.[1]

Meteor counts in 1899 were only 30 to 50 hourly. There was some comeback in 1932, notably in Europe, where up to 250 per hour were sighted, but nothing like the spectacle of 100 years earlier. The Leonids were relegated to minor-shower status until 1961, when they produced counts approximating those of the old reliables, the Perseids and Geminids. A report to this effect in *Sky and Telescope*[2] magazine encouraged the writer to post a warning to the growing army of v.h.f. meteormen in *QST* for August, 1962, citing the predicted major peak for November 1965.

"The World Above 50 Mc.," January, 1966, *QST*, makes it clear that the Leonids of 1965 were the most exciting meteor event in 144-Mc. history, up to that time. Between this report and advance publicity in the news media, there was no lack of activity on the 2-meter band during the small hours of the mornings of Nov. 15, 16 and 17 this year. Literally hundreds of skeds were being kept from about 0700 GMT on, each morning, but they were largely unproductive until after 0900 Nov. 17, when things started to happen in a big way.

By 1100, contacts were being made over distances up to 1400 miles, in the whole area from the Plains States eastward. Later the mania was to spread over the entire country, with stations in the central states hearing both coasts. Bursts overlapped and strong pings were superimposed on almost continuous weaker signals. Hundreds of contacts were made by calling CQ, or by breaking stations when their skeds were completed, as most were in the first minute or two of prearranged calls.

A remarkably long and stable weather front lay along the northern tier of states, and this may have contributed something to the occasion, but it is significant that signals were in only when the meteors were putting on their show. Listed below are some of the avalanche of reports that descended on ARRL Headquarters following the shower. Just the calls mentioned here show activity in 45 states by several hundred stations. Not bad for a show that started in the wee small hours of the morning!

Where a "new state" was mentioned by the reporting operator, it is shown with an asterisk in the tabulation. No attempt has been made at this writing to update the 2-meter states-worked box, but this will be done shortly. Be sure that your new standings (states, call areas and best DX worked) are on file, as there will be a major revision coming up.

We are particularly interested in any evidence of 144-Mc. communication or one-way work over distances in excess of 1400 miles. If you have a recording of a signal from beyond this distance, will you please send the undersigned a copy,

* P.O. Box 1738, Arecibo, Puerto Rico 00612.

1 *Sky and Telescope*, Nov. 1966, p. 251. *Natural History*, Nov., 1966, p. 43.

2 *Sky and Telescope*, Feb. 1962, "Leonid Meteors Give Unexpected Display."

Meteors appear to be falling out of the Dipper, at a rate of 1 per second, in this 43-second exposure during the height of the Leonid shower on November 17. The picture was taken atop Kitt Peak Arizona with a Pentax (50 mm.) at f/2 on Tri-X developed for 12 minutes in D-19. *(Photo courtesy David R. McLean)*

giving the time of the reception and any other information that might be of interest? Thanks to the many fellows who sent in reports so promptly. It was *quite* a morning! — *W1HDQ*

K1ABR, Cranston, R. I. — Worked WØDQY* (s.s.b.) W9IFA WØLER* W5UGO*. Heard K4EJQ K4IXC W4NUS K5TQP (?) WØQDH.

W1AZK, Chichester, N. H. — Worked WØCUC*. Heard WØLER WØNXF W9IFA W9WDD (s.s.b.).

W1HDQ, Canton, Conn. — Worked WØLER* KØEMO* W4AWS W4CKB K4IXC. Heard KØMQS K9VZY (s.s.b.) W4VHH W5UKQ W5WAX.

K1HTV, Thompsonville, Conn. — Worked WØCUC* K4EJQ* WØLER* W4VHH* W4CKB KØEMO* KØMQS W9WDD* (s.s.b.). Heard W4AWS W4NUS W4TLC (?) K4IXC W8PT W8TIU W8QOH W9IFA W9MAL W9QOP (?) WØBFB (calling W6) WØDQY (s.s.b.) WØNXF. Total 20 states, 8 call areas, 38 stations.

W1JDF, Methuen, Mass. — Worked KØMQS WA9DOT* W9MAL. Heard W4FJ W4LTU W4AWS K4EJQ W4CKB W4NUS W4TLG (?) W5RCI W5UKQ W5WAX K5WXZ (?) W8PT W9IFA W9MAL W9QXP WØLER WØCUC WØNXF KØEMO VE3DIR.

W1JSM, Waltham, Mass. — Worked WØCUC* WØNXF* KØEMO K9AAJ W9WDD (s.s.b.) K9GZY (s.s.b.) W5UGO*. Heard W4CKB W4VHH W4NUS K4IXC W8TIU W5UKQ W9QXP W9IFA K9SGD KØMQS.

K2HLA, Cutchogue, L.I., N. Y. — Worked K4EJQ* W4NUS* W5WAX* K9AAJ KØEMO* WØLER*. Heard W4MNT W4CKB W4TLA W4VHH W4AWS W5UGO W5UKQ.

W3GKP, Silver Spring, Md. — Worked W5UGO*.

W4AWS, Orlando, Fla. — Worked W1HDQ W2AZL W4LTU* KØMQS* WØCUC*. Heard K2IFK (?) K2HLA K3CFA K4QIF W5UKQ W5UBO (?) WØNXF.

W4MNT, N. Augusta, S. C. — Worked WØCUC* WØLFE* KØMQS* K1HTV K1BKK* W5UKQ* WØNXF*. Heard W1JSM K5WXZ W5WAX.

W4LTU, Springfield, Va. — Worked W4AWS W4CKB W9IFA WØEOZ WØCUC. Heard W1AZK W1AJR W5UGO W2SFK W5RCI K4IXC W5UKQ WØNXF. Nil on skeds with WØIC and W7JRG, though KØMQS reported hearing both ends of W4LTU-W7JRG sked!

W4MNT, Orlando, Fla. — Worked K1BKK* K3CFA. Heard W1AJR W1AZK K3CFA W3GKP W4NUS K4QIF K5WXZ W9MAL.

W4CKB, Lake Placid, Fla. — Worked W1HDQ K1HTV W2AZL W3BDP W3GKP W4LTU W4NUS K4EJQ K4QIF W5UKQ WØNXF. Heard VE3DIR.

W4FJ, Richmond, Va. — Worked WØEKZ* WØLFE* KØEMO* WØNXF*. Heard W1AJR K1ABR W4AWS W4CKB W4MNT K4IXC W4UJQ W5UGO W5UKQ W5WAX.

K4QIF, Salisbury, N. C. — Worked W4CKB W5WAX K5WXZ W9MAL WØNXF KØEMO WØLFE.

W4WNH, Elizabethtown, Ky. — Heard W1BKK W2AZL W4AWS W4CKB W4MNT W4RMU W4VHH W4NUS K4IXC W5PZ K5TQP-WA5MFZ W5UGO W5WAX K5WXZ WØBFB WØDQY WØENC WØENG (?) WØEOZ WØEYE WØIC KØIJN WØLFE WØMOX WØNXF VE3DIR.

K5WXZ, Garland, Texas — Worked K4QIF W9QXP VE3DIR. Heard W2AZL W3GKP W4CKB W4FJ W4VHH K4IXC.

W5UGO, Sand Springs, Okla. — Worked K1ABR W1JSM W2AZL K2GUG K6HAA. Heard 32 states, all call areas and VE3DIR.

W5WAX, Muskogee, Okla. — Worked K2HLA W3GKP K4QIF K4IXC W4RMU. Heard W1AJR W1HDQ W1JSM W2AZL W4AWS W4FJ W8SDJ W8QOH W9SXG (?) WØNXF VE3?

K5TQP-WA5MFZ, Tijeras, N. Mex. — Worked W8QOH W9QXP WA9DOT WØNXF WØEOZ. Heard W5UGO W7JRG K7NII W8PT K9AAJ K9SGD WØBFB WØYMG.

W6GDO, Rio Linda, Calif. — Worked W7MQW W7RQT W7UFB (40 watts!) W7MFP WØEOZ WØENC WØYMG. Heard K5WXZ W5FAG (s.s.b.) K7BBO (a.m.) WØEYE K6JYO WØMOX WØIC WØWYZ K7ICW.

WB6KAP, Woodside, Calif. — Worked W7UFB K7BBO K7MKW W7RQT K7NII. Heard W7JRG WØEOZ WØIC WØENC WØJYC W7MFP K6HAA.

K6HCP, San Jose, Calif. — Worked W7OKV K7ZIR (both s.s.b.) K7BBO W7MFP. Heard W7MKW K6JYO W5UJF.

K6HAA, Twin Peaks, Calif. — Worked W5UGO W7RQT WØYMG WØBFB (making 10 call areas for WØBFB on 144). Heard K7BBO W7UFB K9AAJ WØNXF WØIC WØMOX WØEKZ WØEYE W5UGO calling K2HLA!

K6GCD, Redlands, Calif. — Worked WØEYE W7RQT. Heard W5UKQ K7ZIR W7FS W7OKV K7BBO W7UFB W7MFP W5FAG WØMOX WØIC; N. Cal 6s, first time, via backscatter.

W7FS, Belfair, Wash. — Worked K6JYO. Heard K6MBY WB6KAP W6GDO K6HCP K6TSK W7RQT K7ICW.

K7ICW, Las Vegas, Nev. — Worked WØNXF. Heard W5RCI W6GDO K6HCP W7FS W7RQT WØEOZ WØEKZ WØBFB WØLCN.

K7NII, Scottsdale, Ariz. — WB6KAP W7UFB WØEOZ WØYMG. "Band like 20 in a DX Contest!"

W7RQT, Providence, Utah — Worked W6GDO K6GCD WB6KAP K6HAA K6OSY K6TSK. Heard K7BBO K7NII WØENC WØEKZ WØEYE *K2HLA* (8-second burst, recorded).

K7ZIR, Beaverton, Ore. — Worked K6TSK W6DNJ K6JYO K6KCP. Heard W6GDO WB6KAP.

K7BBO, Tacoma, Wash. — Worked K6IBY WB6GKK W6DEE K6JYO K6MBY K6TSK W6QWN K6HCP K6RIL WA6STS WB6KAP.

W8QOH, Cincinnati, Ohio — Worked W4CKB WA5MFZ WØENC WØEOZ WØWYZ.

W8PT, Watervliet, Mich. — Worked WØEYE. Heard K5TQP K5WXZ W5UGO WØMOX WØENC. No results on 220-Mc. skeds.

W9QXP, Crystal Lake, Ill. — Worked K4IXC K5TQP-WA5MFZ K5WXZ WØMOX. Heard W7JRG.

W9MAL, Peoria, Ill. — Worked W1HDQ K4QIF. Heard W1AJR W1AZK W1JDF W1VYF W2AZL W2SFK W4VHH W5RCI W7JRG.

W9WDD, East Alton, Ill. (s.s.b.) — Worked W3BDP* W3GKP* W1BXM*.

KØEMO, Hiawatha, Iowa — Worked W1JSM K1HTV W1HDQ W2SFK K2HLA W4FJ K4QIF. Heard W2JIL WA2VAI W1AJR W8PT W8QOH.

KØMQS, Cedar Falls, Iowa — Worked W1JDF K1HTV W2AZL W2SFK W4AWS W4VHH VE3DIR. Heard W1HDQ W1AZK K1ABR W4LTU W4TKV K4IXC K4QIF W7JRG.

WØENC, Rapid City, S. Dak. — Worked W8QOH W6GDO.

WØEYE, Boulder, Colo. — Worked W2GUG* K6GCD K7MKW* W8BKI W8PT K9AAJ. Heard WB6KAP W6GDO W6WSQ K7ICW W9AAG (s.s.b.) WA9DOT KØEMO WØBFB WØNXF W8QOH.

WØLER, Minneapolis, Minn. — Worked K1ABR* K1HTV* W1HDQ K2HLA W2HXK W4LTU W4NUS WØMOX. Heard W1JSM W4MNT W7JRG K7ICW WØBFB KØMQS.

* New state for reporting station.

144 Mc. and Up

Each month we receive a few reports concerning operation and building of equipment for the 1215-Mc. band, and Jack Ross, K4NTD, is one of the active ones. Says Jack: "Working up to 125 miles on 1296 Mc., using the *Handbook* converter (by K6AXN) and the varactor tripler by W1WID, from the *V.H.F. Manual*. Can't seem to get anyone on from farther away, to see how 1296 actually will do. We get good ducts occasionally, and signals from 100 miles or so run S9-plus, even with only 2 to 4 watts output. Seems that the higher in frequency you go the stronger the signals get, under good conditions." So, the rest of you 1296-Mc. boys out that-a-way please get in touch with Jack and see if his 125-mile range can't be extended.

WB6IOM suggests that the 1296-Mc. gang get hold of the TIVO5 diode (to be used in the mixer) for a marked improvement in reception. He sez that in his case it works out almost as well as the fifty-dollar transistor preamp. WØ/AHU/-K6HIJ is still working on development of the 144-432-1296-Mc. solid-beacon, and among a number of other projects has started construction of a crystal-controlled test transmitter for the 10,000 to 10,500-Mc. band WB6SAJ will soon be operating on 1296 Mc. with 13 watts. Present operation at that QTH is on 432 Mc. where attempts to make QSOs running 50 milliwatts has so far been unsuccessful. WB2TOM tells us that his surplus converter for 420 and 1215 has arrived and he is working on power requirements.

K1YLU at Leominster, Mass., reports on progress of equipment for the 420-Mc. band. Forty-eight elements have been added to the original sixteen-element beam and a two-transistor preamplifier has been completed. The present transmitter is a varactor tripler but a new cavity amplifier is "in the works." From Lagrangeville, N.Y., K2BGU writes that the improvements and shakedown involved with a new home have been completed and now he is looking forward to homebrewing some new equipment and more activity on the v.h.f. bands. Planned projects are a mixer linear for 432 from 50 Mc., probably using 4X150s and a two-meter transmitter. Existing 220-Mc. gear is due for an overhaul and being put back on the air. John also sez that the Mid-Hudson VHF Society is currently working on individual, homebrew-transistor converters for 432 Mc., and future projects will be 432-Mc. transmitters.

The building goes on and on with the 420 gang. W3AEQ is working on development of an Oscar system including converters for 50, 144 and 420 Mc.; kw. linear for 144 Mc.; c.w.-f.m.-RTTY driver on 144 Mc.; and advanced tracking facilities. Jon sez his on the air activity was limited during October and from the foregoing we can see why. WB2VFX is working on rigs for 420 and 220 Mc.; WB2RVE is working on ATV gear. W3IHA is working on a video modulator for 440 ATV with center frequency at 440 Mc. He'll probably be operational by the first of December. WA2ICW and W3IHA have all equipment working except the video modulator.

220- and 420-Mc. STANDINGS

220 Mc.

W1BU	14	5	600
W1HDQ	12	5	150
W1AJR	12	4	480
K1JIX	11	4	615
K1UGQ	9	3	400
K2CBA	16	7	660
W2AOC	15	5	530
W2SEU	12	5	150
W2DZA	12	5	410
W2NTY	12	5	300
K2DZM	12	5	400
W2LWI	12	4	400
K2KIB	12	4	300
K2ITQ	11	5	265
K2ISA	11	4	300
K2ITP	10	5	265
K2AXQ	9	3	240
K2JWT	6	3	244
K2UUR	6	3	210
WA2BAH	6	3	200
K2DIG	4	3	140
W3FEY	11	5	350
W3RUE	10	5	480
K3IUV	10	3	310
W3LCC	10	3	300
W3JYL	8	4	295
W3JZ1	4	3	250
W4TLC	5	1	315
K4QIF	4	2	500
W5AJG	3	2	1050
W6GDO	2	2	100
K7ICW	4	2	250
W7AGO	2	1	160
K8AXU	11	5	1050
W8PT	11	5	660
W9OVL	6	3	475
W9JCS	6	2	340
VE3BPR	3	3	300

420 Mc.

W1BU	13	3	390
W1AJR	12	4	410
W1GOP	11	3	390
W1UHE	10	4	430
W1HDQ	10	3	250
W1QWJ	10	3	230
K1JIX	9	3	310
W2BLV	13	5	460
K2DZM	10	4	390
W2OTA	10	4	300
K2CBA	9	7	220
W2VCG	9	4	280
WB2EGZ	9	4	260
WA2EUS	9	4	220
K2UUR	9	3	280
K2ACQ	8	5	525
WA2HQE	8	4	280
K2HQL	8	4	250
W7PUA/2	7	4	500
K2YCO	6	5	500
W2YPM	6	3	300
WA2DTZ	6	3	200
WA2TOV	5	3	140
K2GGA	4	4	383
W3MMV	11	5	410
W3RUE	10	5	470
K3CLK	9	4	———
W3FEY	8	4	296
K3IUV	8	3	310
W3SZD	5	4	300
W3UJG	4	2	350
W4HHK	10	4	550
K4SUM	7	4	368
W4GJO	6	2	1000
W4TLV	6	2	500
WA4BYR	6	2	420
W4GOO	6	2	415
W4RFR	5	2	665
W4TLV	4	2	500
K4QIF	4	1	285
W5RCI	16	5	725
W5AJG	7	3	1010
W5SWV	7	3	525
W5HTZ	5	3	440
W5ML	5	1	350
W5UKQ	4	2	500
W6GDO	2	2	493
W6PZA	1	1	280
K6GTG	1	1	180
K7ICW	3	2	165
W8PT	11	7	600
W8YIO	11	6	560
W8TYY	9	5	580
W8IFX	8	5	470
W8FWF	6	4	450
K8REG	6	4	275
W8JLQ	6	3	275
W8RQI	6	3	270
K8AXU	5	3	660
W9AAG	10	4	600
WA9HUV	9	6	460
K9AAJ	9	5	425
K9UIF	9	5	390
W9GAB	9	4	608
WA9NKT	7	3	310
W9OJI	6	3	330
WØIDY	9	5	560
WØNXF	4	3	———
KØITF	3	2	158
VE3AIB	5	4	450
VE3BQN	5	4	447
VE3BPR	4	4	600

The figures after each call refer to states, call area and mileage of best DX.

RECORDS

Two-Way Work

50 Mc.: LU3EX — JA6FR
12,000 Miles — March 24, 1956
144 Mc.: OH1NL — W6DNG
5250 Miles — April 11, 1964
220 Mc.: W6NLZ — KH6UK
2510 Miles — June 22, 1959
420 Mc.: KH6UK — W1BU
5092 Miles — July 31, 1964
1215 Mc.: W1BU — KH6UK
5092 Miles — August 9, 1962
2300 Mc.: W1EHF/1 — W2BVU/1
170 Miles — July 1963
3300 Mc.: W6IFE/6 — W6VIX/6
190 Miles — June 9, 1956
5650 Mc.: WA6KKK/6 — WB6JZY/6
117 Miles — Sept. 25, 1965
10,000 Mc.: W7JIP/7 — W7LHL/7
265 Miles — July 31, 1960
21,000 Mc.: W2UKL/2 — WA2VWI/2
27 Miles — Oct. 24, 1964
Above 30,000 Mc.: W6NSV/6 — K6YYF/6
500 Feet — July 17, 1959

"In the works" are the following: 432-Mc. converter at K3LLR; Removal of TV birdies from 432 converter at the mountain QTH; and a cavity preamp at K4EJQ; 32-element colinear completed and being tested at K4SUM; construction of RTTY control system for new installation at K6BPC; modulation system for 432 Mc. at W8CVQ; n.b.f.m. rig and a.f.s.k. at WA8EFK; a.f.s.k. and new 40-foot tower at WA8KRH; flying spot scanner at W9HWQ; 420-Mc. tripler and final for 144-Mc. f.m. mobile rig at WAØARL. We "slipped" a couple of months ago and told you that WØYMG and WAØDEA were converts to amateur TV. These boys are not as yet on 432 but are getting ready and have facsimile.

"Tropo conditions were above normal on 432 Mc. on October 2, 8, 9, 16, 22, 23 and 30." sez Paul, W4HHK, and he emphasizes that the 8th was extremely good. On that date Paul worked W5HPT, W5AJG and W5LDV with the band open to Dallas all day and signals very strong. October 2 was the day that Paul nabbed state-number ten on 420 Mc. with other end of the contact being W5UKQ in Louisiana (325 miles). W5AJG (450 miles) is heard or worked almost every weekend on one or the other skeds (Saturday morning, 0700; Sunday evening 1900). All 432-Mc. work done at W4HHK was using the 18-foot dish, 275 watts output, c.w. and the 75A3 converter. At Alexandria, Virginia, K4SUM also noted 432 in fair shape on a number of occasions during October with stations worked in 2, 3 and 4 lands on October 3, 9, 13, 14 and 23.

K7ICW reports that crossband work with W6DQJ (144 and 420 Mc.) on a tropo-obstacle gain path of 225 miles produced signals on 432 on October 25 from W6DQJ. However, attempts at a QSO were blocked by heavy radar interference.

"Several periods of quite good conditions during the month," says W8CVQ concerning 432 Mc. Walt had QSOs with WA9HUV and W9OKB on the 5th of October and with W8PT on the 27th. He also mentions having heard a number of weak carriers with little or no modulation. W8FAZ also mentions a number of weak carriers with little or no modulation. Jo also tells us that W8EKJ at Oberlin, Ohio, now on 432 Mc. is running 300 watts into a 36-element colinear.

WB2RVE reports conditions on 220 Mc. only fair during October with no good openings noted. Bob is working on ATV gear and has the receiving end all set to go. From W2SEU we hear: "Got back on 220 and was unable to put up the 88 elements. Had to settle for 44. Running 500 watts, phone, into the 4X150s. Still working on X-band gear and hope to get more than 50 feet." Welcome back, Fred! WA5HTL is working on transmitters for 220 and 432 Mc., and WA5OUD is modifying a TU-10 transverter for 220 Mc. operation. W9OVL writes to inform us that he is still on the air on 220 Mc. and recently worked WØYZV in Omaha, Nebraska, on 220-Mc. phone. However it was a cross-band contact with WØYZV coming back to Ben on two meters.

On two meters during October, consensus of opinion seems to be that the 15th was the date noticeable for good conditions. WA1DPX, K1FJM, W3BDP, K4EJQ, K4SUM and W4HJZ, all report good conditions on certain days during the month, with four of the six stations reporting the 15th as the best. The 1s were hearing 1s, (all New England), 2s and an occasional 3 and 4. W3BDP worked W1JSM in Massachusetts and W1AZK in New Hampshire and heard W8WEN. On the 31st, Sam worked W1HDQ in Connecticut who had an S7 signal.

At Bristol, Tennessee, K4EJQ worked a number of 8, 9 and Ø stations on the 15th and 16th using 50 watts a.m. Jim sez he has been hearing a number of novice stations to the southeast but has been unable to attract their attention. He wishes they would tune down the band a bit more. The 500 watt, 144-Mc. transmitter has been completed at K4EJQ after a long delay in obtaining parts. Next project is erection of 140-foot tower which Jim "hopes to get up nerve to erect soon." Four 8-element beams for two meters will be on top when it does go up.

K4SUM reports two meters open to New York on the morning of the 4th of October and also mornings of the 8th and 9th when a number of stations were worked in New York and New Jersey. W4HJZ reports a good tropo opening on the 10th of the month when W4VIHH (South Carolina) worked W5CKY in Mississippi and K5WXZ in Texas. WA5EQP tells us that he and W5ZCJ have been very successful in constructing a crystal filter for s.s.b. Tom is presently working on the transmitter with receiver soon to follow. WA6FWU is also building two-meter equipment with the converter about finished and transmitter under construction. K3ADS and K7HEN are on the verge of going to f.m. Larry (K3ADS) sez his two-meter f.m. gear runs 30 watts on 146.950, and Mack (K7HEN, Ogden, Utah) sez that the Ogden area hams on two meters are looking forward to a new type of activity with the recent acquiring of f.m. equipment.

WA9ABI reports that it isn't true that "nobody will run c.w. on two meters and especially above 145.0." Sez Ray, "Out of a total of 15 QSOs for October, 10 were c.w. only. On four occasions QSOs resulted when stations heard the chicken tracks and hung around 'til they could get in." He also reports good ground wave on October 3 on 144 Mc. Out in Lincoln, Nebraska, WØNXF is running 600 watts input on two, is open for meteor-shower skeds, and wonders if there is anyone on two meters in Idaho.

K7ICW reports on the Orionids: "Main activity this month was dedicated to the Orionids meteor shower, which on my chosen schedule and path

times appeared extremely poor compared to the last four years. Sporadic reception of others on non-shower skeds was also poor, except for the usual tropo path to the southern California area. More use of s.s.b. on the tropo path is possible due to circuit parameter improvements by certain stations regularly worked." (144 Mc. of course)

Report on the same shower from K7NII gives much the same information. Tom had a number of skeds during the shower with good reports both ways on only one contact, that with K6HAA on the 27th via s.s.b. Tom also reports that well equipped stations in southern California have been putting in regular signals that are quite loud on c.w. and 20 to 30 per cent copy on s.s.b. Skeds were held on 220 Mc. during the shower by W8PT, with WØEYE and W1AZK. Several pings were heard on WØEYE but nil on W1AZK. Jack did work W4CKB on 144 Mc. on the 23rd but sez that "conditions were very poor and activity very low on all v.h.f. bands."

50-Mc. DX

We received the following from Jack Gregory, K4OCK. "Had a really excellent opening to the south last evening (October 17) on 50 Mc. Worked PJ2CH, PJ3CH, PJ2CZ all on Curacao. All the PJs had excellent signals here in Miami running 5 7 to 9 most of the time with little or no QSB. Herman, PJ2CZ, says he is on every evening from 0000 to 0100 GMT at 50.250 Mc."

"To round out an excellent evening of DX, I worked PY5GK in Brazil, a path of over 4000 miles. This was the first transequatorial signal heard in a long, long time. Conrad's signals were Q5 with characteristic TE flutter." Many, many thanks for this good news, Jack. It ought to put all of us on our toes.

50 Mc.

K4PQF/1 wrote to tell us of his six-meter operation as a beginner on v.h.f. "I recently went on the air mobile with a Heath Sixer and a Saturn Halo. While operating in the New London area I have had solid QSOs with stations in northern New Jersey and northern New England. To top off the list today (Oct. 18) I had a solid ten-minute QSO with WAØGHW in Kansas with Al's signal well over S9 and mine at S7 plus. As a beginner in v.h.f. with my first rig I am really enjoying myself." Congratulations, Steve! You're doing right well "for a beginner." Another station from 4 land who is portable 1 also wrote us. K4GGI/1 at Cambridge, Mass., writes that he undertook to get W1MX back on the v.h.f. bands this past summer. On 50 Mc. the W1MX rig is running about 300 watts input and a 5-element Yagi, A1 and A3, and frequencies are 50.27, 50.4 and 50.55. On 144 Mc., 95 watts input and an 11-element Yagi, A1 and A3, 144.32, 144.63, 145.47 and 145.8. Glad to hear it, Steve. It must sound like old times again with the M.I.T. club W1MX, back on v.h.f.

Although six-meter skip is at a low level at this time we are receiving a few skip reports. K6BPC and WA6WKF both report hearing stations in Denver on October 9 and W4ISS reports an opening to the west on October 16. Frank (W4ISS) heard or worked K5GRV (Mississippi), W4WIA (Alabama), W4HYO (Alabama), W4DEN (South Carolina) and W4FVV (South Carolina). Rig at his QTH runs six watts out to a 6-element Yagi at 35 feet. K5GRV has 12-over-12 skeleton slots up at 150 feet, and the Alabama stations were both using 32-element colinears.

WA4FJO, WA4WZZ, WA5GHK, WA8KRH and WA9FIH all caught skip on October 26. Fred (WA4FJO) added the 27th and 28th to his good days and says the band was open to Massachusetts, New Jersey and Pennsylvania. Ken (WA4WZZ) did not have any luck with the skip but heard stations 15 miles east and 25 miles west of him getting good results. WA5GHK sez the opening was fair to good with stations worked in northeast Michigan and in 2 land. WA8KRH sez there were good openings on both six and two meters on October 25 and 26 but doesn't tell us what he heard or worked; and WA9FIH sez the only opening was on the 26th for about ten minutes when it was open to New York and New Jersey. K3JHE, WA4YXK and K8AQA all report good ground wave conditions throughout the month of October on 50 Mc. Bob (K3JHE) sez that on October 15 he was able to work Maryland, Virginia, New York, Connecticut and New Hampshire all with better than average signals and all on s.s.b. WA4YXK tells us that ground wave has been good between his location (Annandale, Virginia) and Delaware, and that W4YEB has had some luck working the boys in Pittsburg since they have been running kilowatt transmitters with multi-element beams. From K8AQA: "Extended ground wave throughout most of the month up to a maximum of about 200 miles. Also some extremely short sporadic openings to mostly 3 and 4 areas throughout most of the month." WB6NMT reports good to excellent tropo conditions during most of the month of October.

QST

50 Mc. WAS

1 WØZJB	22 W5SFW*	43 W6ABN*	64 W7ACD
2 WØBJV	23 W9ORE	44 VE3AET	65 K6PYH*
3 W9CJS	24 W9ALU	45 W9IFP	66 W4HOB
4 W5AJG	25 W8CAIS*	46 WØQIN	67 KØUJA
5 W9ZHL	26 WØMVG	47 WØWWN	68 K6RNQ**
6 W9OCA	27 W9CNM	48 K9ETD	69 W9QWT*
7 W6OB	28 W1VNH	49 WØFKY	70 W6EDC**
8 WØINI	29 W9OLY	50 W8LPD	71 K6VLM**
9 W1HDQ	30 W7HEA	51 WØZTW	72 K6GOX**
10 W5MJD	31 KØGQG	52 W6GCG	73 WØEDM
11 W2IDZ	32 W7FFE	53 W2RGV	74 W9JCI**
12 W1LLL	33 WØPFP	54 W1DEI	75 WØLLU*
13 WØDZM	34 W6BJI**	55 W1HOY	76 W7RT**
14 WØHVW	35 W2MEU	56 W6ANN	77 W7RDY**
15 WØWKB	36 W1CLS	57 W1SUZ	78 W6KIN**
16 WØSMJ	37 W6PUZ	58 W1AEP*	79 W6OKR**
17 WØOGW	38 W7ILL	59 W5LFH	80 K6GMX**
18 W7ERA	39 WØDDX	60 W6NLZ**	81 W7DYD**
19 W3OJÜ	40 WØDO	61 W7MAH	82 K6ZEE**
20 W6TMI**	41 K9DXT	62 W8ESZ	83 K6HCP**
21 K6EDX	42 W6BAZ	63 W2BYM	84 K6YIL**
			85 K6GMV

* 49 states ** 50 states

VE7CN	45	EI2W	37	LU3DCA	27	SM5CHH	20
KL7AUV	44	CO2SZ	36	LU3EX	27	LA7Y	20
VE1EF	42	Z83G	32	ZB2JV	26	VQ2PL	18
VE4HS	41	SM6ANR	30	LU9MA	26	JA8AO	18
XE1GE	39	CO2ZX	30	CO2DL	25	JA8BU	17
VE2AOM	38	SM7ZN	29	CT1CO	24	JA1AAT	17
KH6UK	37	PZ1AE	28	CO6WW	21	JA1AUH	16
		SM6BTT	28	LA9T	21	VP5FP	7

Strays

With Canada's Centennial Year, a new RTTY net is scheduled to start operation. First formal operating will be at 8 P.M. EST (0100 GMT) Jan. 1, 1967, connecting Quebec and Ontario points on 3630 kc. The net is ARRL registered. Operation is to be Tuesday and Thursday nights at 7:30 P.M. EST. It is hoped to expand traffic and emergency operations to a 5-day operation later. VE3GK reports that application has been made to DOT for the call VE3RTT for the CARTG club station which may act as OBS. Net participating stations are: Que.: VE2BYZ. Ont.: VE3DX VE3COL VE3WQ VE3FHQ VE3QG VE3AYL VE3GK.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ROBERT L. WHITE, W1WPO, DXCC Awards
GERALD PINARD, Club Training Aids
GEORGE HART, W1NJM, National Emergency Coordinator
ELLEN WHITE, W1YYM, Ass't. Communications Mgr.
PETER CHAMALIAN, W1BGD, Communications Asst.

Op Man. *The Radio Amateur's Operating Manual* is just hot off the press. Even those very latest ARL/MTX texts were included in the final put together. There's this and *much more* . . . all right up to date. The book is a reference work for newcomers and old timers alike. The text gives in expanded detail not only the information on net operating, traffic and public service work, but also sound operating procedures relating to contests, rag chewing, logging, DX work, message handling and emergency organizing. Unless you got one of the very first copies you will be needing this so you have instant reference to the questions that are constantly coming up as you operate.

Lessons from Inez. Some excerpts from a Texas RACES bulletin will be of interest, especially to Emergency Coordinators and RACES Radio Officers. "Impetuous Inez set a course for the Brownsville-Port Isabel area. The nets operated 7 A.M. Sunday until hurricane warnings were lowered 10 A.M. Monday. . . . In the disaster turned exercise we had solid radio communications throughout and were all set to provide emergency service if other communications failed. The net with W5KR/5 had arrival reports from evacuees for local delivery, handled weather bureau information when long distance was clogged up, and on one occasion got information for the telephone company when it couldn't get through to the Brownsville office."

W5TQN's bulletin cites the following lessons:

(1) Get ready now for next time.
(2) Each emergency station should have simultaneous capability 80/40 and 2 meters.
(3) Extra receivers for monitoring and searching are needed, to leave primary equipment on the nets.
(4) List all equipment each of the group will make available.

Time to Train Before Emergency Strikes. Keen capabilities demonstrated in some areas such as above are in sharp contrast to other kinds of reports. In proof of this statement we quote the following, from an entirely different section of the country. *Could it be yours?* "Our network in ..... county has had no training in message handling and circuit procedures. Should there be an emergency I am very much afraid it would be a mess on the air. Our net is check-in, check-out, some small talk with no instruction or practice of any kind. It is my firm belief that the time to train the members is *before an emergency.*"

Advance Preparations a Must. The great services we amateurs can render in the public service field are notably greatest (1) where we have *advance* registration of each amateur operator in AREC or RACES, and (2) where a Radio Officer and/or Emergency Coordinator has developed and tested plans, the EC having consistently accomplished the several numbered-assigned functions, as set forth on page 8 of *Operating an Amateur Radio Station.* Also it is important (3) to have held meetings for specific planned training and procedural exercises and (4) to have had critiques following test deployments, use of groups in parade monitoring, community drives or other highly interesting challenges to our radio capability.

Personal Capability? Let us all find ways to take part and push for action along the above lines. May we additionally suggest making *personal operating capability* one of your aims in the New Year? Engage in and support some net operating, if you are not so engaged. This has the benefits of both pleasure and self-training as we create radio-coverage by such means.

Aim to use emergency power whenever possible — that is, with your radio capability entirely independent of commercial mains. This will come in handy for next Field Day, and be vital should there be a power blackout or unexpected (but always possible) disaster. Finally, may we point out that unless you register your capability and willingness to serve in some AREC/RACES/NTS capacity, you are not making maximum use of your potential. It adds to the overall evaluation of our disaster capability, if you will only sign up and *participate.* Act on these suggestions; we feel you will enjoy and broaden your own amateur horizons.

Jan. 1: Time for a New Number Sheet. With the new month and the New Year each amateur station should make it a point to start a new *number sheet.* For those not up on the technique of the communicator we perhaps should explain that the number sheet is for recording consecutive message identifying numbers as you originate traffic at your amateur station . . . and assign consecutive numbers. Each ARRL logbook comes to you complete with a number sheet (CD-3) bound in. Anyone without one can get one free, if a CD-3 is requested by radiogram to the League. The ARL fixed-text message list and an explanation of precedences are part of the same form you will receive. Each

message started should be given a distinctive identifying number, and the proper precedence (R, P-2, P, or E) by the originating station. Such items of identification, with the station of origin, carry through and facilitate reference to a particular message, if occasion arises to trace the message or send a "service" concerning same. (No operator may change the text or these items in the course of handling on amateur circuits.)

The V.H.F. SS, Jan. 7–8. The first official ARRL/activity of 1967 will be the popular V.H.F. Sweepstakes. You will find the detailed rules on page 61 of December *QST*. This is the 20th of these popular annual contests. Get in it and you will work many of the stations whose September v.h.f. results are detailed in the same issue. The January "SS" will give your v.h.f. antennas and stations a real test. Unless you're at the top of our listings already you are pretty sure to work some new states and ARRL Sections in the doings. You'll have fun! Whether large or small, give us your results of some operation in this activity!

Attention Novices: Next month (February), ARRL is scheduling the annual activity that is exclusively for *your* benefit . . . *the Novice Roundup* (Feb. 4–19). Drop a postcard or radiogram to ARRL asking for the NR-reporting forms, which will be sent, no charge. Get your station ready and look for the detailed rules for the Round-Up in next *QST*.

In the half-month indicated for this activity you can put in just a little time each day to see how your Novice Station is getting out. Keep a list of all the stations you work and with whom you exchange consecutive QSO Numbers and the name of your Section (page 6, *QST*). Each contact you make rolls up the points. Report the results from intermittent but regular listening and operating time over the fifteen days of the activity. The rules are so set up that you can schedule your operating for minimum interference with home or a school. A "CQ NR" starts you off locating stations to 'exchange' with when the time comes. Also there's an extra point bonus or credit to add to your score, if you hold a Code Proficiency certificate based on a monthly W1AW or W6OWP run. You have time to try for such a credit on the January or February qualifying run dates, if you haven't done it yet. We hope you have grand results in the annual Novice Round-Up.

Clubs . . . and Licensing Classes. This is the time of year many club leaders are setting things in motion so the club may hold an *additional* series of briefing sessions or licensing classes . . . a first one having in some cases been completed. Rightly so! The LERC Amateur Radio Club, as a good example, reports in its Bulletin ". . . our W6LS Extra Class course is scheduled to start 23 January . . . and the next W6LS Novice Class Licensing Course will be held in the summer of 1967." It is now very timely, of course, too, for the many amateur radio clubs that have a HamQuest 67 club membership campaign going, to formalize a series of Licensing Classes. We believe that practically all clubs with study groups now have the spiral-bound Licensing Classes (by W6DDB) to aid those amateurs running the instruction. ARRL has been glad to provide these. A copy of Licensing Classes, as long as these last, will be sent (no charge) to assist in this work where the instructor of any newly organized group can report a current class operation. Give dates, number in the study group and expected level of instruction when you write, please.

The constant aim of any amateur radio club must be to render services to the club members. This may include everything from setting up working committees, to running auctions, promoting dinners and demonstrations of amateur radio and going all-out on plans for the picnic or the next ARRL June Field Day.

But high on the list of top considerations of club officers must be the need (1) to maintain a full and expanding membership roster, and (2) to help prospective and present club members in their practical aims in connection with amateur radio. So we hope every club will emulate LERC's eminently successful teaching program. Few amateurs are satisfied until they have full amateur privileges to work all modes and bands. Hence briefing sessions and classes are called for . . . now, and at other times in the year. Make your club's plans inviting to prospective amateurs, Novices, Technicians and every class

RESULTS, SEPTEMBER FREQUENCY MEASURING TEST

The September 8, 1966 FMT, open to all amateurs, brought entries from 253 participants who made a total of 855 measurements. Of these 93 ARRL Official Observers submitted 322, and 160 Non-OOs made 533 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accredit as of equal merit all reports where computations show 4/10ths parts per million or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

QST will announce details on the next ARRL FMT.

Observers	*Parts/ Million*	*Non-Observers*	*Parts/ Million*
W1BGW W3BFF W4CMP W4JUI W6GDO	(0 to .4)	W1MUN W1PLJ W2YRH W3PT K3WAU K4CG W5YCQ/W5OBV W6RCR W6SPB K8ANN W8UPW W9BCY WA9GOP W9GXZ	(0 to .4)
W2AIQ	.7		
KØBRS	1.1		
W9GFF	1.2		
KØAZJ	1.4		
W4NTO	1.8		
W6GQA	1.9	W5HTM	.5
K4HDX	2.0	W8LZY	.5
W9IQI	2.0		
W3TMZ	2.1		
VE6HM	2.7		

of licensee. Only thus can each amateur keep abreast of techniques, and also work for the next upward rung in the amateur-licensing ladder.

ARRL Helps to Clubs. A suitable newspaper announcement, when you get a club class plan ready to go, should give your club prestige and bring out a good group of prospective amateurs and present amateurs who want a refresher to your meetings. All local operators normally find it enjoyable to meet and work with other amateurs and share in club benefits, auctions, technical pow-pows, Field Days. An agressive program makes a strong club. For the new man, much ham know-how (beyond even license requirements and operating results) starts out with those beneficial discussions of technique within "licensing classes" and continues to all the things beyond.

SUGGESTIONS FOR A RADIO COURSE (CD-86 outline) is available (to clubs only) from ARRL on a request basis. Clubs presenting code-practice may ask for our CD-158, FCC Code Examination Standard's and for copies of S-45, Certificate for Volunteer Examiner. There are Club Award Code Proficiency Certificates for higher level club encouragement.

About Club Affiliation. All local non-commercial amateur radio societies in the United States and Canada having kindred aims and purposes with ARRL, if not already affiliated, are cordially invited to request the forms and information. The purpose in affiliation is to strengthen our common aims. There are no dues or costs entailed in becoming affiliated. The Board does require, to show that your club is truly "amateur," that 51% of your voting members be licensed amateurs, also that 51% of your voting members be full or associate ARRL members. There's only one exception. A *high school* club with a 51% licensed amateur club membership may make a showing of one voting member who is a Full Member of the League. As mentioned here individual amateurs can do much to enhance their own pleasure and success in amateur radio by belonging to an active up-and-doing club. There are specialist groups that have a chief interest in v.h.f., DX, contests etc. But the larger number of the groups have a cross-section of all amateur interests. ARRL has a library of visual Training Aids films, and tapes and slides as well that is exclusively for loan-booking by *affiliated* clubs. Such clubs also receive a progression of amateur letters and bulletins throughout the year. For clubs *not* affiliated . . . we invite your inquiry.

Ideas for Extending Operating Aims. If you have the slightest tendency to get bored in one facet of Amateur Radio it may be time to find a new challenge. At any rate, why not put in some *extra* effort. You get more *out*, much more, when you put something in. What about v.h.f. or h.f. netting? Get our Net Directory or make local inquiry. The steps in "belonging" to a net are generally very simple. The latch string is always out to welcome new reporters. When stations show signs of becoming regular, the calls are added to rosters. If you've never done it, start a radiogram, on a net, in proper form. Try a new band or mode. Get acquainted with others. Seek an ARRL Appointment from your SCM. Join a radio club, if possible. But don't stop at joining, add something to the club or whatever group you join. Fellows write us who have had a long and varied amateur career and but recently got into a club group. Many of them have found a new happiness in getting into the swim of making new hams and helping others. One may thus never lack a friend or have a dull moment.

SCMs and other ARRL Leaders: Please extend the invitation to all amateurs you contact when attending conventions, hamfests, and club or group meetings to *get into things*. Both pleasure and progress come through *participation*. We can extend our *coverage* for traffic and our liaison ties between nets (v.h.f. and h.f.) by finding a place and status-position (appointment) to suit the qualifications held by many amateurs not yet getting the most out of their amateur radio. Let's aim to invite the amateur not already in things, whether Technician, Novice, General or

ARRL ACTIVITIES CALENDAR

(Dates in GMT)

Jan. 5: CP Qualifying Run — W6OWP
Jan. 7–8: V.H.F. Sweepstakes (rules last issue)
Jan. 14–16: CD PARTY (c.w.)
Jan. 17: CP Qualifying Run — W1AW
Jan. 21–23: CD Party (phone)
Feb. 3: CP Qualifying Run — W6OWP
Feb. 4–5: DX Competition (phone)
Feb. 4–19 Novice Roundup
Feb. 10: Frequency Measuring Test
Feb. 15: CP Qualifying Run — W1AW
Feb. 18–19: DX Competition (c.w.)
Mar. 4–5: DX Competition (phone)
Mar. 18–19: DX Competition (c.w.)
June 18–19: V.H.F. QSO Party
June 24–25: Field Day

OTHER ACTIVITIES

The following lists date, name, and page reference of *QST* issue in which more details appear.

Jan. 7–9: Ark. QSO Party (p. 99, this issue).
Jan. 7–9: Va. QSO Party (p. 116, last issue).
Jan. 8–9: Sask. QSO Party (p. 134, this issue).
Jan. 14–15: EL DX Competition (p. 80 this issue.)
Jan. 22–23, 28–29: VE1 Contest (p. 132, this issue).
Jan. 28–29: La. QSO Party (p. 100, this issue).
Feb. 5, 9: 160 Meter Tests (p. 101, Nov. *QST*).
Feb. 10–12: QCWA QSO Party (p. 71, this issue).
Feb. 11–12: Me. QSO Party (p. 108, this issue).
Feb. 26: Tenn. QSO Party (next issue.)

whatever class, to try operating and organizational things new to him. As you set and revise your Section goals, follow new programs or start men reporting on a net or participating in other activities you will have contributed to making the lives of other amateurs more worthwhile and interesting. Swap dollars, as they say, and you still have but a single dollar. But swap ideas, organize new networks and arrange communications links between them! Both the individuals and overall amateur organization have made permanent and worthwhile progress and gains through Amateur Radio. — *F. E. H.*

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Oct. Traffic:

Call.	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	5622	2418	2250	168	10458
W3CUL	412	2769	2714	40	5935
K5TEY	18	1488	1483	5	2994
K0ONK	118	999	977	36	2130
W7BA	9	763	689	70	1531
W0LGG	17	775	710	10	1512
W1PEX	113	656	575	33	1377
K6EPT	8	636	584	52	1280
W7HMA	19	629	604	14	1266
W6RSY	127	591	378	163	1259
K7TCY	27	566	481	59	1133
WA4SCK	38	534	504	10	1086
W6GYH	58	523	487	8	1076
W3EML	80	546	443	1	1070
W0LCX	29	517	500	17	1063
W8RYP	51	425	381	49	906
WB6BBO	35	412	393	9	849
W6EOT	0	424	422	0	846
W7ZIW	12	402	378	8	800
WB6QXY	21	378	369	30	798
K6MCA	14	370	370	6	760
W1BGD	15	384	172	180	751
W7DZX	11	384	342	9	746
W6BGF	23	347	344	29	743
K6AJU	26	344	336	5	711
W0ZWL	2	410	5	262	679
W6VNQ	42	320	302	1	665
W6YBV	9	311	301	19	640
WB2OHK	23	306	295	8	632
WA7DXI	23	310	271	25	629
W2SEI	23	299	293	8	623
K3MYS	23	317	267	9	616
K2EIU/5	4	301	292	8	605
WA4RQR	19	290	256	32	597
WA0MLE	39	268	257	17	581
W8UPH	6	281	245	34	566
WA2GPT	31	260	213	39	543
W3VR	74	243	214	6	537
WA8PMN	39	273	192	29	533
K6IOV	6	291	231	2	530
WB2HZY	36	245	212	31	524
W6IDY	2	260	247	13	522
W9JUK	17	301	201	0	519
WA4DXJ	69	179	248	15	511
WB6JFO	56	225	160	60	501
Late Reports:					
W6TYM (Sept.)	27	248	243	3	521

More-Than-One-Operator Station

WØEEE	172	200	128	69	569

BPL for 100 or more *originations-plus deliveries*

WA4BMC 306	W3TN 128	WB2PYI 108	
W6JXK 224	K1RQO 126	WB2RBA 108	
K8LGA 188	W2EW 121	WA8CXY 107	
WA8PII 167	WØHVJ 121	W2QE 106	
K7CTP 163	W2RUF 119	W1TXL 105	
W4PQP 158	WA5NTI 119	K2SJN 105	
W4ILE 155	WA6TWS 118	K3YVG 104	
WAØGSA 153	WA8AIAM 117	WB6NMT 104	
W6WPF 152	W6TNJ 115	WB6SQF 102	
K8HLR 152	WA3ATQ 113	WB6OUD 101	
K5ZCJ 149	WA4AJY 112	WB2SKD 100	
WAØKGD 146	WA4HJM 112	K4LMB 100	
WA7CFN 140	WA6KIL 112	Late Report:	
WA4AGH 139	W3ZRQ 109	K6LRN (Sept.) 108	
WAØEDN 136	WA8QND 109		

More-Than-One-Operator Station

W4DV/4 255	K4CG 152	W1AW 132	
WØZLN 173	WA9DWZ 152	W2SZ 128	

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: WA4TPB, WA5KQN, W6MLF, WA8FSX.

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCM, a message total of 500 or a sum origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

Ever wonder what that CQ & CD is all about every Jan., Apr., July and Oct.? Why not check with your SCM (p. 6 *QST*) and apply for an ARRL Appointment along the lines of your natural operating interest. An additional "fringe benefit" is this get-together with the cream of the operating crop every three months.

OCTOBER CD PARTIES

Would you believe two new records? On c.w. the savvy W6RW crew broke 300-K by a very comfortable margin to establish both a west coast record and c.w. high. On phone, K2EIU/5 (for the first time by anyone!) turned in over 100-K. Ken's phone secret was a borrowed transceiver and faster band changing with notable band improvements on 10 and 15. It's no secret though to see how often Ken has topped both phone and c.w. CD tabulations, regardless of gear! A fine phone party, with many c.w.-type scores. Totals were so high that once again our high-claimed cut-off point has been advanced, this time to 15-K. In case you've forgotten, in the Oct. 1965 Party, only 36 broke 20-K on phone while 36 did it this October, this in spite of many of the faithful attending the Hudson Division convention that weekend. As press time approaches for this issue of *QST*, we can tell that the Oct. CD try-outs for the annual SS paid off — tremendous results evidenced by the CD gang! *FB, OMs!*

The following are high-claimed scores, numbers of QSOs, sections and operating times, with final corrected results to appear in the *January CD Bulletin.* — *W1YYM*

C.W.

K2EIU/5	265,650-763-69-20
W1BGD	257,600-729-70-17
W9YT (K9ZMS, opr.)	244,300-691-70-19
W1EOB	233,970-702-66-19
K2KTK	233,640-701-66-20
W9RQM	225,790-667-67-18
K4VFY	211,480-615-68-18
K2AJA	210,600-641-65-18
K2DXV	203,940-612-66-19
K5OCX	192,960-570-67-17
W4DVT	187,335-536-69-19
W1MX (K3QDD, opr.)	184,500-609-60-17
K2KNV	184,000-569-64-19
W6EGP	182,650-555-65-18
W4YGY	176,150-535-65-20
K1ZND	165,005-534-61-18
W9LNQ	159,075-500-63-14
W8AEB	157,740-473-66-18
W3EIS	154,025-499-61-17
WB2OHK	153,720-488-63-19
KØAZJ	153,720-500-61-17
WØINH	150,300-494-60-13
W4HJS	148,480-458-64-19
WA8GYT	147,925-478-61-17
K1WJD	145,800-479-60- 8
WØEEE (KØVXU, opr.)	144,000-477-60-20
K6BPC (K6QPH, opr.)	142,350-433-65-17
W4YE	140,745-504-59-14
K3HNP	129,600-427-60-13
K4UWH	129,200-376-68-17
WØWYJ	127,490-411-61-12
W2SEI	107,010-362-58-16
K4BAI	105,900-346-60- 8
WA5KUD	105,270-358-58-19
K9GDF	105,020-349-59-14
W5DTR	104,960-324-64-20
K4BSS/4	102,900-337-60-12
KØYIP	103,230-326-62-18
K3OAE	101,520-376-54-16
W1YYM	101,500-343-58- 6
WA9NPB	101,175-351-57-14
W4OWE	100,320-345-57-18
W6RW (K2PHF, W6RW, K9ELT)	319,470-926-69-19

PHONE

K2EIU/5	100,300-333-59-19
W9YT (K9LBQ, opr.)	90,475-322-55-16
W6EGP	83,810-282-58-20
K2QDT	65,280-252-51-15
K2AJA	63,750-248-50-14
W9DOB/9	62,140-233-52-15
W2CXM (WB2CPV, opr.)	58,880-256-46-20
W1EJJ	58,800-234-49-12
WØTDR	58,760-221-52-20
W8AEB	52,675-210-49-15
W9RQM	52,210-220-46-13
W9LNQ	51,695-206-49-13
K6BPC (K6QPH, opr.)	50,875-180-55-17
W1PYM	49,725-316-45-18
K1YSD	37,840-171-43-17
K4TTN	37,030-161-46-17
KØYIP	36,895-150-47-16
K4VFY	36,120-166-42-12
WØWYJ	33,880-147-44- 9
K5ZCJ	32,250-147-43- 7
VE2AE	31,200-156-40-11
K4BSS/4	30,660-140-42- 9
K0CSV	30,140-132-44-10
W3KJJ	29,045,151-37-10
WA0MOB	29,610-141-42- 8
WA4AJY	27,930-133-42-18
K1ZND	25,715-132-37-10
K2KNV	25,150-130-37-10
KØLGZ	24,800-121-40- 7
W1BGD	24,700-123-38- 3
W9AQW/9	23,560-124-38-11
WA4KWC	22,755-123-37-12
W8VPC	22,610-112-38- 8
WA0MLE	20,700-111-36- 7
W1LYH	20,330-100-38-11
K9IVG	20,000- 98-40- 9
K4BAI	19,890-110-34- 4
W4ZM	19,795-100-37- 4
WA0KQU	18,620- 94-38- 5
WA9AUM	18,240-108-32- 5
K5MDX	17,680-104-34- 3
WØCUC	16,380- 85-36- 5
W8WCW	15,640- 87-34- 9
K2DXV (K2s DXV UFT)	73,935-272-53-14

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Jan. 17 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on listed c.w. frequencies. The next qualifying run from W6OWP only will be transmitted Jan. 5 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Jan. 17 becomes 2130 EST Jan. 16.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simultaneously on all listed c.w. frequencies. At 0030 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date Subject of Practice Text from Nov. *QST*

Jan. 4: *It Seems to Us*, p. 9
Jan. 10: *Low-Level Blocked-Grid Keying*, p. 11
Jan. 13: *Building a Simple Crystal V.F.O.*, p. 18
Jan.18: *A Transverter for 144 Mc.*, p. 25

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Jan. 25: *The Oscillator*, p. 59
Jan. 30: *R.F. Amplifiers*, p. 60

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Hawaiian −10, Central Alaska −10.

A convenient GMT conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

FD Feedback

Tops in 4-A in last June's Field Day was the Seven-Eleven ARC and the call should have appeared as K2ZSS/2. In Class 1-B, the two-man portable operation of WN6TJM should have been shown as WN6TJM, aided by his Dad K6QHZ. Sorry Kurt, and good luck under that fine new WB6TJM call!

NEW FILM AVAILABLE

The Training Aids Library has obtained *Though the Earth Be Moved* for its affiliated clubs only. This film in part shows how amateur radio and RACES were utilized during the Alaskan Earthquake. It contains some of the rare shots made by amateur photographers who were on the scene at the time of the disaster. This is a well-produced film with excellent coverage of what took place at the time of the earthquake and what was done to help the people of Alaska. This is a 16-mm. sound film and runs for 45 minutes. An excellent film for building up a weak program and for mixed groups.

W1AW SCHEDULE, JANUARY 1967

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.-3 A.M. EST, Saturday 7 P.M.-2:30 A.M. EST and Sunday 3 P.M.-10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed January 1 and 2.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY OBS[3],[7]	.....	.....
0030	**Code Practice Daily[1] 10-13 and 15 w.p.m.**						
0100	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0120-0200[4]	.....	.....	7.080	3.555	7.080[6]	3.555[6]	7.080
0200	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0205-0230[4]	.....	.....	3.945	50.7	145.6	1.82	3.945
0230	**Code Practice Daily[1] 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.**						
0330-0400[4]	.....	.....	3.555	7.080	1.805	7.080	3.555
0400	RTTY OBS[3]	.....	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]
0410-0130[4]	.....	.....	3.625	14.095	7.045	14.095	3.625
0430	Phone OBS[2]	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0435-0500[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS[1]	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0530-0600[4]	.....	.....	3.555[6]	7.080[6]	3.555	7.255	3.555
0600-0700	.....	.....	7.080	3.945	3.555	7.255	7.080
0700-0800	.....	.....	3.945	7.255	3.945	3.555	3.945
2000-2100	.....	14.280	21/28[5]	14.095	21/28[5]	14.280	.....
2100-2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300-2345	.....	7.255	21/28[5]	21.1[6]	21/28[5]	7.255	.....

[1] C.W.OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045 and 14.095 Mc. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operation period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.
[6] W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.
[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1s QIS WPR NPG. *Times/days in GMT. General operating frequencies approximate.

DX Century Club

The following list contains the calls and country totals of holders of DX Century Club Award who have submitted confirmations to ARRL Hq. for the period from October 1, 1964 through October 31, 1966. New Members in DXCC for the period from October 1, through October 31, 1966 will appear in next month's listings. DXCC Members qualifying for the Honor Roll appear in the Honor Roll list below. Since the necessary space to run the complete DXCC Roster is not available, (the total number of DXCC certificates issued as of September 30, 1966 was 12,050) this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 25-month period.

Honor Roll

The DXCC Honor Roll consist of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through October 31, 1966.

G3FKM....321/337
W3GAU....321/343
W6AM.....321/345
W7GUV....321/343
W8BF.....321/341
W8EWS....321/344
DL1IN....320/335
DL3LL....320/335
HB9J.....320/343
OF1ER....320/341
W1MV.....320/336
W2AGW....320/343
W2JT.....320/338
W2ZX.....320/338
W3GHD....320/343
W5ABY....320/336
W8KIA....320/343
W8MPW....320/337
W9NDA....320/343
W9RBI....320/344
WØQVZ....320/340
G8KS.....319/336
HB9MQ....319/335
K6ENX....319/335
W1JYH....319/341
W2BXA....319/342
W2HTI....319/333
W2LAX....319/335
W2NUT....319/334
W2SSC....319/336
W4ML.....319/338
W4VPD....319/335
W5UX.....319/333
W6EPZ....319/339
W7AC.....319/342
W8JBI....319/337
W8JIN....319/343

K6EVR....318/334
W1CLX....318/340
W2FZY....318/330
W2TP.....318/326
W2WZ.....318/340
W4LRN....318/329
W4OPM....318/332
W4PLL....318/332
W4TM.....318/339
W5CKY....318/336
W6CUQ....318/342
W7PHO....318/335
W8DAW....318/341
W8PQQ....318/334
W9YFV....318/441
WØDU.....318/339
WØSYK....318/335
G4MJ.....317/333
K2LWR....317/329
K4TJL....317/325
K4TWF....317/322
VE3CFG...317/330
VK3KB....317/339
W1BAN....317/329
W1BIH....317/340
W1HX.....317/336
W2BOK....317/333
W2CTO....317/336
W2SUG....317/333
W2ZGB....317/332
W3KT.....317/340
W4GXB....317/337
W4LYV....317/336
W4OM.....317/338
W5KC.....317/339
W5QK.....317/327
W6OSU....317/328

W7ENW....317/340
W7GBW....317/340
W8IRN....317/334
W8UAS....317/337
WØBMQ....317/329
WØELA....317/339
WØMLY....317/332
WØNLY....317/332
CE3AG....316/339
DL3RK....316/332
IT1TAI...316/331
LU6DJX...316/339
ON4DM....316/334
PAØFX....316/335
W1GKK....316/340
WA2IZS...316/332
W2FXN....316/329
W2OKM....316/333
W2TQC....316 334
W2YTH....316/333
W4AIT....316/338
W4DQS....316/322
W5AFX....316/340
W5IGJ....316/333
W5PQA....316/333
W6BZE....316/335
W6YY.....316/335
W8BRA....316/338
W8DMD....316/337
W9HUZ....316/335
W9LNM....316/338
WØQGI....316/331
4X4DK....316/333
DL6EN....315/329
G2PL.....315/337
G3HGT....315/325
K2BZT....315/331

W1FH.....315/340
W1HZ.....315/332
W2LV.....315/333
W2SAW....315/331
W3ECR....315/331
W3LMA....315/336
W3WGH....315/329
W5KBU....315/332
W5MMK....315/335
W5QLG....315/335
W6CYV....315/332
W8HGW....315/339
W8NGO....315/331
W9SFR....315/328
DJ1BZ....314/331
DJ2BW....314/330
DL9OH....314/324
K3UPG....314/337
K4AIM....314/327
K4ICK....314/325
K4LNM....314/327
K4RPK....314/322
W1ZW.....314/330
W2AYJ....314 332
W2DOD....314/331
WA2ELS...314/318
W2LPE....314/334
W3LMO....314/326
W3RNQ....314/331
W4BJ.....314/325
W4BYU....314/331
W4MR.....314/333
W6GPB....314/334
W6WWQ....314/330
W8WZ.....314/335
WØBFB....314/331
WØPNQ....314/335

K6EC.....313/326
VE7ZM....313/336
W1ME.....313/335
W2HO.....313/328
W2RDD....313/326
W2UVE....313/340
W3CGS....313/331
W3JNN....313/336
WA6EYP...313 326
W6KZL....313/328
W6LDD....313/333
W6NJU....313/326
W6TZD....313/333
W8LKH....313/332
W9AMU....313/329
W9GIL....313/329
DL7AA....312/333
G2BOZ....312/329
G3AAM....312/335
G3HDA....312/323
HAMU.....312/330
K8LSG....312/322
W1FZ.....312/330
W2FXA....312/324
W2MES....312/319
W2PGJ....312/328
W2RGV....312/327
W5LGG....312/331
W6HOG....312/324
W6ID.....312/330
W6RKP....312/324
W6UOV....312 325
W7CMO....312/322
W8KML....312/332
W9YSX....312/328
WØAJU....312/325
ZL1HY....312/335

Radiotelephone

W3RIS....321/345
W8BF.....321/341
W2ZX.....320/338
W8GZ.....320/342
W2JT.....319/332
W2BXA....318/339
W6AM.....318/341

W7PHO....318/335
G3FKM....317/330
PY4TK....317/333
W2HTI....317/330
DL3LL....316/331
W6YY.....316/335
W8PQQ....316/332

W9NDA....316 335
ON4DM....315/333
W1BAN....315/326
W8HGW....315/336
4X4DK....315/332
K4TJL....314/322
K8RTW....314 322

W2VGZ....314/322
5Z4ERR...314/335
G8KS.....313/326
W2TP.....313 318
W3GHD....313/330
W3JNN....313/333
W9JJF.....313 329

W9RBI....313/335
WØJYW....313/329
DL1IN....312/327
W1FH.....312/332
W4PDL....312/321
WØQVZ....312/326

332
W6KEV

331
VK2ADE
W2QHH
W6PUY

330
LA7Y
OH2NB
W2CYS
W4LVV
WØNTA

329
W2GUM
W3EVW
W6FOZ
W9KOK

328
G3FXB
G3AAE

W6IBD
W8KPL
5Z4AQ

327
K2DCA
W2CR
W3NKM
W5EGK
W8PUD

326
DL7BA
HB9TL
LU4DMG
W1BIL
W2GNQ
W2TVR
WØQDF

325
K2OEA
W4AAU
W9WHM

WØAIH
WØBVQ
WØPGI

324
W5CE
W6TS
W8ZCQ

323
K5BGB
W2SHC
W6CYI
W6UJ

322
GI3IVJ
K9EAB
SM3BIZ
VK2DI
W2GLF
W2GT
W7AQB

W9FKC

321
G3DO
VE2NV
W2BQM
W2MJ
W9GFF
W9JUV

320
CR6BX
G2BVN
JA1DM
K2SHZ
K2UVU
K8RDE
PAØLOU
W1AZY
W2JVU
W2ZVS
W3IYE
W3OP
W4AVY

W5OGS
W5PSB
W6ANN
W6CHV
W7CNM
W8ONA
W8PHZ
W9DWQ
W9HB
W9UXO

319
HB9EU
W1GYE
W4CFD
W6CAE
W9FID

318
K4RID
W1RB
WØBTD

317
K6RWO
K6VVA
W1CKA
W1IAS
W5HDS

316
DL1KB
DL7EN
W1CBZ
W2DXX
W7BTH

315
K2MGE
W2TQR
W3KVQ/2
W4SSU
W6BVM

314
G6XL
K7GCM

W2IRV
WØLWG

313
K8IKB
KØRAL
KH6CD
VE2WW
W4ZRZ
W6LN
WA6SBO
W7ADS
WØTJ

312
F3YR
W2EQS
W2JAE
W2WMG
W3AFM
W4RLS
W5PWW
W6WX
W8SZS

WØIJW

311
HB9EO
K4ASU
OK1FF
VE2BV
VE3BWY
W1JNV
W2ZKQ
W3ZAO
W4NJF
W5PM
W6MVL
W6NGA
W9RKP
W9WYB
YV5AB

310
DL1JW
DL3BK
K1SHN
K4SCT
K6KII

K6LGF
K9ECE
ON4NC
W1HA
W1MQV
W1OJR
W1VG
W2AEB
W2BBS
W2ESO
W2EXH
WA2OJD
W2PDB
W3GRS
W3MWC
W4MS
W4PAA
W5BRR
W5IYU
W6DQH
W6HYG
W6KSM
W6KUT
W6OME

W6ULS
W7AH
W7DLH
W7HKT
W8CLR

309
W4EPA
W5WZQ
W7UMJ

308
DJ3KR
W3GJY
W3KDP
W6HX
W6SQP

W9FVU
W9KXK
W8SNL
YV5BX

307
JA1BK
SMØCO
W9QYW
WØGKL

306
DL1BO
K2FC

305
K4JVE
LU5AQ
W2KIR
WB6OOP
W8GLK
W8KBT

304
W1OOS

W1WDD
W5FFW
W6UHA

303
LA5HE
W2OIB

302
K9CJK
ON4FU
VE3RE
W2BMK
G3AIZ
G8JM
I1ZL
K2ZKU
K4HNA
K5ADQ
K6CYG
K6JIC

301
KP4RK
PZ1AX

K5AAD
KL7PI
SM7QY
W2GKZ
W4BFR
W4HUE
W4KFC
W8QNW
W8YCP
YS1O

300
W4BBR
W4CKB
W4EEE
W4MCM
W5EJT
W5VSQ
W6KG
W6REH
WA6TGY
W6TXL
W7EJD
W8CUT

SM5CCE
VE2YU
VE6JR
W1BGW
W1BPW
W1KXU
W1RAN
W1TS
W2CWK
WA2RAU
W3KBC
W3PN

W8EVZ
W9FKH
ZS6LW

299
K2YXY
OE1FF
PY1HX

298
K8WOT
VE3ES
W6UQQ

297
W1BGA

296
WA2SFP
W5RDA

295
ZL1AH

294
W5ARJ

293
KP4WD
W6LDA

292
HB9JG
SM7MS
W1ELR
W5LCI
W5NW
W6BUO
W9WFS

291
DL3ZI
K9BGM
W1YDO
W2VUF
W8KMD
W8LY

290
F9MS
G3KZI
OH1TM
WA2DIG
W4UKA
W9HLY

289
K8OHG
W9GID
W9ZB
ZP5LS

288
DJ3JZ
HB9KU
PY4OD
W1AXA
W1UOP
W3AYD
W4FVR
WØQMD
ZS1RM

287
JA2JW
K1YRO
W2PTM
W4HA
W5KTW
W5NUT
W5QVZ
ZS1OU

286
W7HIA

285
K2GUN
VE4OX
W8IBX

284
K8VUR
OH2YV
W3YZI
W4GRP
W4IF
W4RBZ
W7CSW
W8SCU

283
EA1BC
OY7ML
SM5BPJ
W1EOB
W1ICP
W2GDX
W2IOT
W6NWI
W9NLJ
WØANF

282
DL1DC
I1UA
K1IMP
K2JGG
K6EDE
SM3AGD
VE6TP
W1QJR
W2CKY
W2UFT
W4DLG
W9LTR
W9WIO
WØSMV

281
DL7CS
DL7HU
G6RH
I1KDB
PY2CQ
PY2SO
W1ORV
W1WY
W2EMW
WA5EFL
W6ERS
W6GRX
W6WO
W7BA
W8ARH
W8WT
W9PQA
WØQKC

280
DJ9GD
HB9KB
K3DCP
K4AJ
K4EZ
K4RZK
K4TWK
K6BPR
K6OHJ
K7ADL
KP4YT
UA2AO
W1DGJ
W1EVT
W1YYM
W2AZS
W2PZI
W2QKJ
W2ZTV
WA2RLQ
WB2CKS
WB2FSW
WB2HXD
W4HKJ
W4JJL
W4VMS
W5TIZ
W5UVR
W5VA
W6ISQ
W6PBI
W6PHF
W6PLK
W6PQT
W6UMI
W7GHB
W8KIT
W9EHW
W9RQM
WØAUB
WØDEI
WØNGF
WØOAQ

279
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TG9AD
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WA6GLD
W9TQL
ZL3IS

278
K3HQJ
K6EXO
W4NO

277
KØEZH
W3TMZ
W7HDL

276
K9BVR
SM5WJ
W1AEW
W3LPF
W7BGH

275
W2FAR
W4EEO

274
W3DJZ
W6KYG
W9UZS
ZL1PV

273
DJ5VQ
I1RB
JA7AD
W1ICV
WA6MWG
W9QIY

272
K2UKQ
W2BHM
PY7YS
VE5JV
W5NMA

271
G2FFO
G3FPK
HB9MO
K8DYZ
KØLFY
SM5KV
SP9KJ
VE7CE
W1BPY
W2FXE
W4OEP
W7AUS
W9IVG

270
DJ7ZG
DL7AP
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LA5YE
W6LGZ
W8LUZ
W9IHN

269
VE2WA
W2DGW
WA2HUV
W3BVL
W6BIF
W8YGR

268
K1HVV
W4THZ
W6ABA
YV5BOA

267
W2IWC
WA2CBB
W5QN
W6BIL

266
JA8AQ
K1DIR
W6AAO
W6VUW

265
DL1EE
F3FA

I1SM
LA6U
VE8RG
WA2EFN
W3FLY
W4IKL

264
I1CQD
W1FQA
W3VKD
W4QVJ
W9WKU
WØLBB
WØYCR
ZS6YQ

263
DL6QW
F3AT
K4BVQ
W2CZF
W2GHK
W2OBX
W5LGS
WA6OET

262
DJØIK
G6VQ
K9ECO
W9IRH
XE1CE

261
HB9AAF
JA1BN
K4SHB
K7CHT
KØTJW
KØUKN
OZ7BG
W1BGY
W1ECH
W2PXR
WB2EPG
W6OF
W7ACD
W8IJZ
W9AZP
W9ERU
WØYTQ

260
DJ4TZ
F8PI
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K5RFJ
K8AJK
K9PPX
K9WTS
SM5BCE
SP7HX
SP8CK
VE3AAZ
VK3AHQ
WB2CKS
WB2FMK
W3AYS
W3KA
W3KDF
W3WPG
W4AXE
W4HOS
W5AI
W5LEF
WA6KNE
W8KSR
W9PIO
W9HKL

259
G2GM
W2UZF
W8ETU

258
K5KBH
SP9RF
W1CJK
W2YCW

257
HB9DX
OE1FT

256
W2TXB
W9QQN

YU1AG
YV5AE

255
W4EEU
W5MCO
W9KMN
ZB1CR

254
OZ3Y
W6PZ
W7TDK
WØGUV

253
ZL4BO

252
HB9IK
OK1KTI
VE7PU
W1TX
W2RA
W3HTF
W6KTE
W8ELL
W9RH

251
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I1IF
KP4BEA
VE1WL
W4EJN
W5MUG
W6EHV

250
DL1GU
HB9MX
K1IGO
K4TKM
ON4LX
W1GDQ
W1IKB
W4ZKZ
WA4PXP
W5LZG
W5MBB
W5PIO
W7ABO

247
EA2CA
K2JFV
K4CEB
W8DUS
WØVQ

246
CR6AI
HB9TT
K5JZY
SM7ANB
VE3ADV
VE3CIO
W1AUR
WA4WIP
W6NWZ
W8ILG

245
HK3LX
W4IUO

244
DL1HH
K2LAF
K4IKR
W1FJJ
W1QV
W1ZL
WB2MFX
W4PRP

243
IT1AGA
K2KER
K6HOR
ON5ZO
W1FTX
W3QMG
W4AUL
W4BHG
W8HDB
WØCDP

242
K4JEY
K6IEC

K9COS
KØMAS
OK1ZL
OK3EA
PAØFAB
SM6FB
VE3TB
W2VJN
W3ZQ
W6BCT
W6JKJ
WB6LFR
W6RGG
WØBPA

241
DJ1VS
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DJØKQ
F8EJ
I1PP
K6SOK
LU8BAJ
OH3UO
W1KXP
W1RLQ
W6ZY
W9MZP
WØWRO

240
DL9RK
F3ZU
G2IO
G5VU
HB9NL
HB9PL
JA1ADN
JA8AA
K2INP
K5GOT
K6HZP
K6POC
K7MKW
K9OTB
K9QIE
OK1MP
PY2BKO
SM1CXE
UA3HI
VE3AGC
W1IKE
W1UUK
W1WQC
W2CES
W2MEL
W2QDY
W2VYX
WA2JBV
W4EFX
W4FRO
W4RVW
W4ZXI
W5CK
W5IPH
W5LRY
W6EUF
W6VNJ
W6VVR
WA6HRS
W9LJU
W9VZP
W9WNB
YV5BZ
ZS2RM

239
DJ3BB
DL8CH
DL8CM
G2FYT
HB9NU
KØMNO

238
G3OZU
I1BAF
ON4QJ
VK3YL
VP7NS
W2ROM
W6FET

237
JA4BJO
SP4JF
UC2AR
VE3DDR
W3VRJ
W8MCC

236
GM3CIX

235
W1JTD
W3WJD
WAØKDI

234
DL1TA
EA4CR
I1FO
KØZEC
W8LAV
W9UX

233
LU5ABL
W7NRB
W8BQH
W9QFC

232
K3UZY
KØBIT
SP9TA
VE3EUU
W3PH
WØJRI

231
G2RO
JA1CIB
W1AW
W1HWH

230
G3JOC
G4JZ
KØIKL
OK1GT
SM5AJU
SP5ADZ
W3PVZ
W4JBQ
W4SNU
W5ERY
WA5CBL
W7FUL
W7LZF
WØCKC
WØMAF
WØSLB

229
DJ3HW
PAØVO
W1AH
W5ACL
W5NGW
W8RCM
W9EGQ

228
DL1BS
EA1GZ
K4YFQ
VE3LZ
VR2DK
W2BXC
W2CDP

227
K1CDN
OH2LA
W6DYJ
W7DIS
W9GXH

226
DL1CF
DL9KP
HB9QO
W2ZY
W8JXY
W9UXS
W9WHY
ZL1AJU

225
K5DGJ
K8JWC
WA4FKJ
WA4GCS
W7UVR
W7UZA

224
K2DJD
PY2BGL

SM3TW
XE2FL
ZS6IW

223
DJ5IM
DL1PM
K2OUS
K3MNW
OE1HGW
VK5QR
W8IQS

222
DJ5AA
K4BVD
OH3TH
VK5KO
ZS2U
W6FLT
WA6QWN

221
F9RM
HB9YL
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K4ZCP
SM5RK
VE2BCT
VE3BHS
W1WHQ
W2FVI
W2ODZ
W3HDZ
W3MSR
WB6AKZ
WB6LZI
W8DX
W9NN
WØCAW

220
DJ1QP
DJ5GG
DJ5LA
DL1YA
HK3RQ
HP1BR
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K2KBI
K4GSS
K4YYL
K8EHD
LA5Q
OE2EGL
OE8KI
SM5AM
SM5ATN
UA3CT
VE3ACD
VQ4KRL
W1BFA
W1WAI
W1WLZ
W2LJF
W3FSF
W4BRB
W4HKQ
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WA4HOM
W6KEK
W7WLL
W9BZW
W9WGQ
WØGNG
WØGNX
ZL1ARY
ZL3GS

219
K5QVH
SM5AJR
WA2BRI
WA5CBE
WB6CIY
W7MX
W9WJH
ZL2JO

218
G3CEG
W5DMR
ZL4GA

217
K6CTV
OA4FM
W8DGP
YV2CJ

215
OH3NY
VE6AAV
VE6ABP
W8GMK
W9LQF
WØICQ

214
F8SK
K8SWE
W6DAX

213
KØJPL
OH5UQ
W8FKY

212
K9JJR
SP6AAT
VE1AE
VO1BD
W3JW
W5RU
W6EOZ
WA6LCK
W9LNQ

211
GM3BCL
HB9KC
JA2DN
KL7-
DTB/6
KL7MF
LA7H
VS1FZ
W1EIO
W2FCQ
W4SHX
WA6QGW
W8SYR
WØDIB
YV5AK

210
DL3TJ
F8CW
G3JLB
K2DBN
ON4FL
SP6FZ
VE3IR
VE7EH
W1NTH
W2RSJ
WA8DXA
W9ALI

209
DL1CR
JA1CRR
OZ7KV
W1DEP
W1DGT
WA2-
NWW
W8ROC

208
DL3JV
K9ZEL
SP9ADU
WA2IEK
WB2CNA
W5LJT
W7UZE

207
DJ5DA
I1CWN
MP4BBE
OK3KAB
9Q5AB

206
DU7SV
K9BGL
OH4NS
VE4MP
W3JNM
W7GDS
ZS6VX

205
DJ2HI
DL4LF
WB6ADY

W8HEV

204
CR7BC
HB9UD
I1SF
JA2ANX
K1GAX
K4CLT
K4OEI
K4ZJF
KR6BQ
SM7BHF
W5AJY
W7DQM

203
DJ4HR
DL1FZ
DL9NA
G4FN
K6BWX
KØIFL
OK3KMS
SM5MC
SM7ACB
VE8JJ
W1EZD
W3CBY
W5JCY
W6OMR
W9QLD

202
DJ2SR
DL3ZA
K2PKT
K8MFO
SM3AZI
SM7TV
W1NEP
W2LWI
W3AHX
ZS2CV

201
EP3AM
G2AAN
G3GSZ
K1LWI
K4GRD
K5LIL
K6ALH
K9TZH
OK3UL
ON4ZY
SM5BVF
SM7TQ
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W3UHV
W6CUF
WA6FTM
WA6GFY
WA6SLU
WØCU

200
DL3AR
G2AJB
HB9BJ
IS1FIC
K1TUQ
K1ZSI
K2AFY
K2YMO
K3FGO
K4IIF
K4ISV
K5AEU
K7BJE
K7UCH
KØTYO
KR6JZ
OH2FS
OH2VZ
SM3BNV
SP8HR
SP8HT
TN8AF
VE1AFY
VE4XJ
W1MX
W2MOF
WA2FQG
WA2-
LMW
W3URE
W4GHP
W4OEL

W5QVE
W6GSV
W6HVN
W6NUQ
W6NUU
WA6GFE
WA6OHJ
W7AIB
W7IYW
W7MH
W8MFW
WA8LSO
W9GHK
W9OVF
W9ZTD
WØFDL
WØPAH
ZL1AMO
ZS1NQ

199
I1IR
W5HTY
W6MUF
WØTDR

198
HB9US
I1ZPB
W9OW
W9SCZ
WØDGH

197
K4RLO
SP8YA
W4TFL/1
YV5BNR

196
W6CLS

195
VE6SF

194
CE5EF
DJ7CX
K2ISP
WA4LYQ
W5EJV

193
VE3XK
W2JSX
WØFLK
YU3OV

192
DJ2WN
DL1ME
OHØNC
W1DBM
WØJQQ
WØTW

191
EA2CR
K2UPD
LA3UF
W4OMW
ZE3JJ

190
DL1AM
K1DMG
K8VSL
SP8SZ
UA3FT
W2FLD
WA4LXX
W7JWE
W7WDM
W9BZB

189
LA1K
SM7CAB
VE2JC
W2BXY
WA6VAT
W9PWM
9V1LP

188
LA8WF
UA4PA
W1NI
WA4NBC

187
WB2FON
W4ID
ZS1ACD

186
CR6DB

185
K9VRU

184
DJ2BG
K5STL
K8DTZ
K9GVE
WA9NUQ

183
K2HVN
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OK3IR
SM5CAK
VE2AFC
W1MRQ
W4JVU
WA4QBX
WA6LBP
W7GJ
W9MCJ

182
K1PNL
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KH6COB
OZ4H
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W1RLV
W3DYU
W4FZO
W7RVM
W9BGX
WØRZU

181
DL7DE
G3RFE
JA8ADQ
K1OZR
K1SCQ
K6OT
KP4BJD
UW3DR
VE5KG
VQ8AI
W3AG
W3LIV
WA4DZU
WA4FDR
W5LV
W7QON
W8LZV
W8NAN
W8OKB

180
DL1ES
DL1KS
DL1LD
EA7CP
G6GH
HB9TU
I1ZQ
IT1AQ
K2BG
K2PFC
K2QIL
K3JLI
K4PVZ
K8BCK
K8GHG
K8ZBY
K9YOE
KØBHM
LA1H
OH5VF
OK1VK
OZ7X
SM5BIU
SM7EH
SP9DH
SVØWAA
VE3FAW
VE3MZ
VP7NQ
W1EOA
W1PNR
W2GUR
W2IP

W2KIT
W2LJX
W2OCL
WA2RUB
W4GTS
W4JFW
W6ANB
W6FB
WA8GUA
W9QQG
WA9JDV
WØLBS
ZE3JO

179
DL7EG
F2PO
OK1ABP
W4WHF

178
K9ALP
KL7BZO
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SP6RT
W2HUG
WB6CFO
WØHNA

177
LA7JF
W3AXW

176
OZ5DX
SM6AEK
W5BPF

175
K1AQI
OK2KJU
W1GDY
WA4SUR
WØOMM

174
DJ5IO
I1CJW
OH2SB
VE1DB

173
EI5F
K4MOJ
K5BZU
KZ5TD
ON4IZ
VE3KP
W1MD
W4LSC
WA4WAO
W5HTM
W6DFR
ZL1QW

172
K8YCM
W1LBA
W4SXE
W9LKJ
WA9LZA
ZD5M
ZD5R

171
DJ1UE
JAØAC
KØWKE
SP9PT
UH8DA
VE2DR
W1QQV
W4CQI
W4KN
W6QQW
W9YZA

170
I1ARS
I1BAY
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K3LJZ
K3MNJ
K7CVL
K8GJD
K8ZIP
K9OYD
K9WJU
SP2HL

SP5GX
UC2AW
UT5CC
VE3AVV
VE3UR
VP7NY
W1GOG
W2MZV
WA2-
MNQ
WA2PWI
WB2APG
W4JUJ
W5CPW
W6WGC
W8BQV
W9IGW

169
DL6TQ
DL7EM
KG6AAY
VE7BW
W1EHT
WA2MTI
W8DDK

168
HB9OA
OK2NN
SM6CAS

167
DJ2ZX
W2AAU
WA2FJW
W6-
BRW/5
W8NPF
WØMVG
YV5BIG
ZE4JS

166
DL3OH
K4GLA
K8LNL
KH6FBJ
LA8LG
OK2KMB

165
K3MCO
W4FNS
9J2IE

164
DL9JF
JA1ACA
K2LBB
KH6BIH
LA9CE
SM4ARQ
SM5AQB
VK3BG
W2LQP
WA2ZEZ
W4MZP
W6YC
W9NNX
WØGTU
YU2AKL

163
DL1XZ
F9TE
G3JEC
I1CSA
K3CNN
K5BXQ
K7JVF
SP3PL
W1YRC
WA2RMP
WB6GMN
W8SH
YV5AO

162
EI8H
F8OQ
SM7CXH
SP5AEF
VE5GF
W2GRA
W2KOY
W2KXL
WA2KSD
WB2FOV
WB4BMV

W6HJ
WØJSN
4X4HK

161
DJ2XP
DJ2ZJ
DJ6RY
I1IZ
I1WT
K1DFC
K5JCC
KP4BJU
W1HOZ
W2HL
WB2AMO
WB2PGM
W4DVT
W5NXF
WA6CAL
W7QY
W9YYG
WØDCA
XE1KKV

160
DJ2AJ
EA3KI
G3LP
HB9AHA
HB9T
JA1ZZ
JA7OD
K3BNS
K6IXS
K8DBW
K8YEK
KØEUV
KP4BJM
OH3TA
OK1AVD
OZ6RL
PY2BJH
W1HNI
W2BTG
W2CUE
W2HPV
WA2CLQ
WB2CKO
W3GJR
W3KID
W4KJL
W4ORT
W5EGS
WA6KMF
W7VIU
W7VRO
W8ELE
W8GQU
W8TRN
W9FJX
W9ZWH
WA9IVL
WØCVZ
4X4TP

159
CR7CR
JA7MN
K1JHX
KP4AZ
OK2BCI
OZ2NU
W1YQF
W5EIL
W7NNF
W7NPU
W7OQO

158
CR6AU
DJ3CI
K1AWP
K4SMX
OZ4FF
WA4JLY

157
K2YTC
OK3EE
SM7VX
W3FIU
W4GJY
WØNGM

156
K1KPS
SP2IU
UA1DI

155
DJ2IB
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KØJAC
OK1ADP
OK2KOS
SM3BHT
SP3AIJ
UB5DQ
VE3AU
W3VQE

154
DJ4XA
G5DJ
K9KGF

153
DJ4OQ
EP2RC
K6JAJ
SL6BH
SM6AMD
SP6ALL
VE7BFN
W1WTF
ZS6AMS

152
HA5KFR
K2ZCD
K5JVF
K6BIA
K8QYA
KH6ACC
OH3SE
OK1BP
PJ3AO
SP5AIB
W2DVC
W4VWW
WB6EED
WA8GUN

151
F9EP
JA2TH
JA8GR
K7CAD
OK1AFC
PY5ASN
SM6RS
SP5AFL
SVØWPP
UA9BZ
VE3BCF
VE4DB
W1DIT
W3ZNB
W6TZN
WA6YVW

150
DL8AM
F9BB
G5PQ
JA1EM
K3JHG
K9DKU
OE1IZ
PY1BTX
UA3KAO
UB5KDS
VE2BCK
W2NCG
W9ADV
W9GMS
WØCDV

149
G2DCG
I1LCL
I1TM
K3AMI
K5TYW
OH7PJ
WA4IWC
WØNCK
9Q5HD

148
K1IMD
SM7BEM
VE3UC
VE6MF
W2GKW
W4HEG
WA4NGO
YU3EA
YU6FA

147
DJ5JH
DL1GK
K1YPN
K4TUA
K5RUO
K9JJS
OK1KAM
PAØXPQ
SP5ALG
WAØEMS

146
EP2DJ
JA3BG
K9ZXG
OK1HA
WA3ATP
WØQEV
WØSUU

145
K4KIF
K5IIX
KZ5IP
SM4CMG
SP2LV
UB5AR-TEK
W8MSG
4X4WF

144
KØCER
LA8PF
WB2CDZ
WA4BJL

143
K4EOP
OE5LX
SM6ARH
SM6CAW
SM7AUO
UC2WP
VE3HL
W1QUS
WB6KPR

142
DJ1AK
DJ5IH
G3JBR
JA1HGY
JA7JI
K7PBM
OH3XZ
OK2YF
ON4NM
OZ1TL
PAØLV
SM4AWC
SM7BHH
W2OQS
W4TVQ
W4WBC
WA5ALB
W6VUN

141
DL6KK
DL9KJ
DLØFT
G3EFS
K1EUW
K3TVU
K8AEX
K9WDY
LA9HC
SP8MJ
VE8DX
VP6PJ
VP7NA
W2HWA
WA2HXC
WA2VFU
WB2OAE
W5DWB
WB6GVV
WA8CZH
W9RUB
ZD8BC

140
CR7BN
DJ9SB
DL5DU
DL7CT
HB9TE
I1HL
K1UDD
K1HPR
K4KJD
K4KLR
K4OA
K4SXD
K4THA
K5QHZ
K6TZX
K8BPX
K8INA
K8PYD
K9CZV
K9KKU
K9TRP
KØHWB
KØYIP
KP4BAJ
OE1KW
SM5BFJ
SMØUU
TG9GZ
UA6MF
UAØEH
UI8LB
VE2TJ
VE3BXY
VE3CLK
VE3FKL
VE4SK
W1BDI
W1CSP
W1DDO
W1DYE
W1RFQ
WA1ABW
W2BAI
W2BOT
W2RIR
W2TKG
WA2HJF
WA2ZKO
WB2BAL
WB2GYD
WB2JJF
WB2JYN
WB2KTO
WB2POH
W3KJ
W3MHR
W4LIU
W4MF
W4NTE
W4ZSH
WA4KXC
W6SUD
W7OEB
W8QBG
WA8JCD
W9AFX
W9ALP
W9BMD
W9MAK
W9NNC
W9NVJ
W9UTQ
WA9KQS
WØKZJ
WØOVQ
WØPFG
ZE1BK
ZL2VN

139
K1VKY
K6PJT
K7PJF
OK2OQ
SM6CKS
UD6BZ
UG6AD
VU2GG
W3MYE
W7TLG

138
K2GTF
K6SVG
W4MRT
W7TVF
W9ARV

137
K6AJ
K9ILH
LA1M
OK2BBJ
UF6KPE
5B4TX

136
F3SM
K9PQG
ON4UQ
W1OQP
YU1AA
YV2AH

135
I1NT
K4RSY
K7BVZ
KØMIC
OD5AX
OH5SS
OK1GA
ON5AX
SM4CLU
W6LYC

134
DM2AEC
KØBUU
SM3CJD
VE2ATU
WA2KHD
WA2SNY
WB6CWD
WA8MCR

133
DJ4VU
OE2JZ
PY2BBO
UA4KKC
VS6BJ
W5GZR
WA5LES
WA6AJB
WA6TQK
W8FRM

132
JA4XW
K2DQI
SM5BAS
SV1AA
UA3FU
VO2NA
W3ZAQ
9K2AN

131
DL3VR
DL8AJ
HA5KDQ
K2YFE
K3AIG
WA2YWI
WB2AYU
WA9NHI

130
CR7FN
DJ9KG
EA3IH
G3EIX
HB9ADD
HB9ADP
I1RL
I1ZBS
JA8BB
K1KDP
K4LFC
K6IMT
KØGSV
KØHUD
KØMLM
KØQYD
UA2KAK
UC2AF
SM2ABX
W1AGF
W1ET
W1PYM
WA2UBC
W3HTW
W4JD
W4RJL
W4VPM
W4YSY
W6GTE
W6PLS
W9FRS

129
K5SSZ
K7VYU
OH3ND
OK2PO
UD6BW
SM2CXU
VE3DDX
VE7AC
W4WSF
W6JTA
WA7BOB
XW8AS

128
DJ4KU
JA1OIO
K2HOE
LA7WI
OZ3KE
PY2BPE
SM3YF
UB5KJE
W1BU
W4HZI
W6BRW/1

127
DL4GS
KØWTT
WA2OTJ
W5RY

126
DJ9NX
JA2AB
JA5AB
K1VSK
MP4BEQ
VE4ZX
W1WSN
W6KNE

125
DJ6BW
HB9ABN
HB9P
JA1GTF
K3ICA
K5LMG
LA4LE
OH2MK
VE3CZC
WA6OIU
W8EGR
W9ECF
WØMPW

124
DJ7MI
EA1FD
F3TK
G3JFF
K4RCS
K8YTY
KH6FJL
OE3SGA
SL6BU
UB5TQ
W3GQF
W3HNK
WB6FYW
W7YBX
W9SGI
9Q5TJ

123
K1MRP
K2CHS
K2RNN
K9YBC
LA6EF
OK1ADM
UW3CX
W1LEL
W1ODI
W4DLA
W4TXE
W5KHP
W5ZVU
W6ZER
WB6JWY
WA9IBT

122
DL1PN
DL9EM
DM3SBM
EL2S
HA5AW
JA2XI
K1ZHJ
K2JJK
K4NVI
LA9TG
SVØWF
TU2AE
VE3DBB
VE7AGC
WA2HLH
W3QZA
W3UHN
W4HHN
WA4END
W6CZP
W6WKJ
WB6HGU
WØJWD

121
DJ7AY
DL6HP
G3TKK
HK3AVK
HM5BF
I1BOL
I1TIC
K1JKS
K1NWE
K1ZND
K3BSY
K3HTZ
K3IKM
K4GHA
OH2PB
VE2CK
VE4DQ
VS6AJ
W3TIE
W5KZA
WA6NYK
WA6TKQ
W8BNF
WA8HFN
W9OPD
W9TQA
WØGQL
XE1TQ
ZS6BIJ

120
DJ1QT
DJ8IF
DL1NC
DL1VG
I1PPI
I1SZE
LA9AF
K1EIN
K1MBM
K1MXY
K1QGC
K1RQY
K2AGU
K2MGM
K2MRB
K2UMM
K2VAC
K3EKO
K3GUR
K3JGJ
K3SLP
K4CK
K4JSZ
K4LDR
K4LRX
K5KYD
K5VTA
K6RSY
K7CHH
K8EHU
K9DWG
K9PTW
K9QVB
K9VYT
KA2RJ
LU2EN
SL5CX
SP8SR
VE2RB
VE3DKE
W1GF
W1GTO
W1TZ
W1ZLX
W2IWP
W2RSO
WA2CFG
WA2CUI
WA2CYQ
WA2IZV
WA2JWV
WA2KAZ
WA2LGX
WA2PLZ
WB2HJW
WB2PBI
WB2PXU
W4IA
W4NML
W4WHK
WA4AMU
WA4CZM
WA4EPL
WA4HHW
WA4TLI
W5DZA
W5KGJ
W6BNK
W6IVZ
W6VEB
WA6MAR
WA6BBJ
WB6CEP
W7FLD
W7MVC
W7PSO
W8FOV
W8GOC
WA9GQT
W9QWM
WØRJF
WAØDKA
YU2NEG
6W8BF

119
K2LAI
K9HUY
KA2CM
KG6AIG
OK1BMW
OK3CDP
VE3EVK
WA6AUD
W8BEK
W9EB
XE2OK
ZL2AQV

118
G3ERB
K8TVO
OK1JN
UA4KEA
VE3PE
WA2LRK
W7AZG

117
DL1ND
VP8HJ
W1FEF
W9UC
4X4ON

116
DJ8LF
DM2ATD
SP8ABQ
VE8BB
W1MND
WA4CGA
W8KC
YU1SJ

115
DJ4LI
DL6ZT
DL9OA
HK3AH
K5INB
K9KGC
KZ5AY
OZ5MJ
VE5JI
W1GBW
WAØFQZ
ZS6BEJ

114
DJ6QP
JA1IBX
OE1ZL
SP9UH
VS9AWR
W3MCH

113
DJ4SO
DJ6NS
DJ6SI
DLØBT
DM2BLJ
G3JYP
G3POR
I1AVD
IS1SZU
K5VLO
KØPUB
OK3CBN
OK3EM
UT5BP
WA4FAZ
W4ZFE
W6HS
W9ELQ
YU1NIG
ZD4AM

112
DJ2XO
DL1IW
DM2BJD
EA3KT
G3JQC
K1NIY
K2MHE
K4SSW
K6OZL/KP4
KZ5AG
OK1OO
OK2PE
SM2RI
UA4YG
VE3AA
K5YAA/VO1
W1AA
W1ATP
WB2BEV
W3NJV
WA4HTR
W8KXH
4X4QA

111
K1OBT
K1QPN
K1UTC
K2QDT
K3LJP
KR6MM
LA7VE
ON4MW
UA6FJ
UB5FL
UB5KIX
UB5LU
UQ2CC
VU2GW
W1CNU
W1PLJ
W5TKB
W6QBH
WA7BOA
YU1SF

110
DJ2WV
DJ4XQ
DL2DK
DL9OK
DL3ST
G3OHG
HA6KVB
I1LCC
K1CEC
K1EWL
K1JFF
K1LDK
K2CWQ
K2DDK
K2KXW
K2MPS
K4GSX
K5HYB
KØJPJ
KP4CKX
OE8DM
OK3CAG
OZ6HS
UF6FN
VE3BJK
VE3EWY
W2EYJ
W2VIR
WA2BEX
WA2-KWH
WB2CZZ
W4HAE
W4RZN
WA4QME
W5AKI
W5FPN
W5HTG
W6CLZ
W6USV
WA6QNN
WA7AHH
WA8ETX
XE1FE
ZD3A
ZS6BIG
5B4JF

109
DM2AUO
DU6TY
F3RG
K1OTA
K8ELF
K9AWK
KØZGC
OK1KTL
OK1KUL
SM2BYW
UT5BX
UW3AM
VO1IB
W2COT
W2NEP
W4FTB
W8LXU
W8SXG
XE1OE
ZS6AUZ

108
DJ5BW
G3NKQ
G3OAG
JA1DZY
JA1ITX
K1LMS
K4AVC
K7VAL
K9MWE
KØDYB
KX6DR
OHØVF
SP9YP
UA3IM
UA3KBO
UA6MT
W1SWX
WA2TJA
WA4VAI
W6MWF
YU3AR
YU3FZ
5B4PC

107
CN8FW
DJ5HL
DL1TV
DL9DH
DL9NM
EA2DT
JA1BYL
JA3BCC
JA8AJM
K8GIM
OK1FN
SM3DSE
UA4PX
UP2OK
WA2TKL
WB2GHI
WB2GMN
W3IOP
WA6UQS
WB6CGA
WAØAHL
WAØBWM
WAØDUB
YU2RAK
ZS6AXU

106
DJ3YC
DJ7OM
DL3WP
DM3ML
F2RK
HB9ADO
HB9AFI
JA6CDE
JA8ZO
K8NSE
OH5PX
OK1IQ
OK1VB
OK3CBR
OK3KFF
PY1FH
UA3KET
UA6BV
UB5PG
UB5QA
UN1BK
VE5JS
W2SZ
WB2FBN
W3VTT
W4SMU
W5LJY
W5ZWX
W6WWD
WB6CEG
WB6HGH
W9LVO
WØCYY
YV5BPG

105
CE3LB
DJ4KF
DJ4VX
DL8BL
DM2AIO
G3OIZ
HAØHC
HK3SO
JA1AKH
JA1FAF
K1WJL
K1ZQL
K9BHT
KP4MO
KZ5KY
LZ1KPW
OD5EL
ON4CE
OZ8JD
PAØWDG
SM6CMU
SP9AOX
UA3UH
UP2NK
UQ2GA
W2GGT
W3FWI
W4WGI
WA4DAA
WA4OJN
WA5HEC
WA6JYJ
WA6NYJ
WA8MQE
YO4KCA
YO5LC
YU3DQ
YU3FS

104
DJ2YH
DJ4FZ
DL1CW
DL1DAA
DM2AXO
DM3PBM
DM3SMD
F8BC
FR7ZI
G3HSL
G3RHM
GM3SDZ
HA5DJ
HA8UD
I1GO
JA1FI
JA7MJ
K1DNW
K1PBW
K4QLO
K4SWO
K7TCL
LA8D
OA4CG
OE5PWL
OK1PT
OK1RX
OK1VU
OK2YJ
OZ2CE
SM5BOE
SP6CB
SP8KBM
UC2AZ
VE6AQL
VK5OL
VO1AW
W1GIV
WA1AKL
WA2VWI
WA2YRV
WB2BGM
WB2FIT
WB2HWH
WB2MDU
WA3BHY
WA4LUG
W6KWU
W6RMM
WB6SHL
W7FKK
WA8FAE
W9EXE
WA9HBA
WA9KVA
4X4NY
7X2AH

103
DJ2SJ
DJ7XC
DL1EQ
DM3AYH
F7CK
G3RWQ
HA1SD
HK3HY
HK3NQ
JA4CNS
JT1AA
K1JKT
K6LBV
K6VTC
K7NEQ
K7QMK
K7STK
K9OSO
KØGJX
KØQCT
OE3SJW
OE8IS
OH1NM
OR4TX
OZ5CV
SM5BGK
SM6AFH
SM6CPG
SP7AOD
SP8RW
TI2KR
UA3DI
UA3KAS
UA4KHN
UA9JS
UT5FI
UV3TQ
VE3CDX
VE6AJJ
VE6BR
VE7BEA
VP9EU
WA1EJN
W2CNQ
WB2OZW
W3BWZ
WA4NST
W5MOQ
W6ETR
W6KGP
WA6GCP
WB6IUH
W7QLE
W7ULC
W7VSM
W8MRS
WA8GYX
W9LQR
W9ZEN
WA9CYV
WA9DJO
WØNSY

102
CR4BB
DJ2RT
DJ2WF
DJ6OG
DJ9HA
DL3WC
DL4LG
DL6CT
DL9DX
DM2AMM
DM2AYK
DM2BYN
DM3XSB
G3NRS
G3PVL
G3RDE
G3SVH
HA1SB
HA5AT
HB9AGO
HM2BD
K3AFO
K3TCY
K3TJE
K4BE
K4KZZ
K5BYV
K7OPB
K9AGT
K9BPV
K9KXM
K9ZSE
KØBUR
KA2BW
KR6DB
OE1KU
OK1KKH
OK1IJ
OK1JD
OK3JV
PAØMIB
SM5CON
SM5CPD
SM5DKH
SM7CPL
SP9RB
UA4ZA
UA9MR
UB5KNF
UW4HW
VE3AWE
VE3DBO
VE6CJ
VE7SE
VO1AQ
W1DAY
W1DYT
WA1ANR
W7UXP/1
W2FZJ
W2KJR
W2TOD
WA2JMW
WB2BOM
W3KUN
W3MPX
W3UVH
W4RJL
WA4PHA
W6MTJ
WA6FOF
WB6BSJ
WA7ARO
W8MEE
W8VQM
WA8ECE
W9CGC
W9HHX
W9MRX
W9YXX
WA9AXX
ZL2BAH
ZS5BA
4X4JO
5Z4IR

101
DJ1TX
DJ2OEC
DJ4PX
DJ7BM
DJ8PB
DM2AGH
DM3YPE
F3MR
F5CH
G3FLS
G3LUW
G3OZP
G3RJB
GM2DPW
HA9OS
HB9ZE
HK7UL
JA6PN
K2HWF
K3NWD
K3OIO
K3QJE
K3ZMH
K4ARO
K4SCL
K6YUL
K7AHO
K7PFU
K7ZKH
K8ETM
K8UZX
K8VYY
K9GCE
K9ULF
KR6UD
LA3HI
LA9EG
OE1KRW
OE5CA
OK2KFP
PAØBZH
PE2EVO
PY1BYK
SL5ZL
SM4CHM
SM5BTS
SM6CZU
SP6SO
UA1KBA
UA1ND
UA3AA
UA3KZO
UB5IU
UR2IP
VE3ETB
W1AYR
W1MBX
W2JLX
W2PHT
WA2UXC
WB2NZH
W3LMZ
W3NWB
WA4FJM
WA4MCV
WA4SGF
W5KFN
WA6RMH
WB6GFJ
W7QB
W7VZX
W7ZCX
W8CZN
WA8EWT
WA9GXL
WA9HJM
WAØCHH
WAØHMP
YO8RL
ZS1O
3A2BT
5R8AI

100
AP5HQ
CT1UT
DJ1HL
DJ6SL
DL1VN
DL4BV
DL5FL
DM2ANN
DM3RM
DM3ZCQ
F2ZE
F7DO
G2ATM
G3MWP
G3OLN
G3RDX
G3SGH
HA3MJ
HAØHH
HM1AP
I1BAK
JA1UT
JA7KW
JA8BY
K1AFC
K1FNU
K1IIK
K1IJU
K1OGA
K1QPV

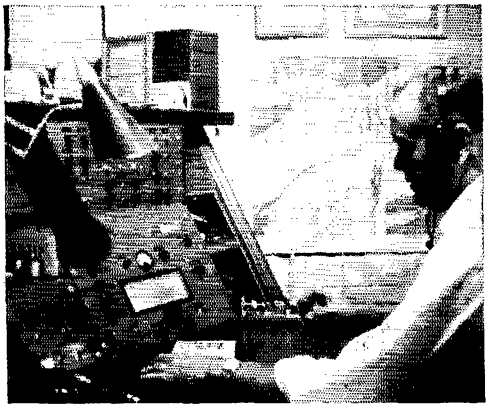
Strays

NEW 2-METER MOONBOUNCE RECORD

K2MWA/2 and VK3ATN Communicate 10,300 Miles on 144 Mc.

The long-continued moonbounce efforts of T. R. Naughton, VK3ATN, Birchip, Australia, paid off on Nov. 28, 1966, when a QSO of some 6 minutes duration was completed with K2MWA/2, the station of the Crawford Hill Radio Club, Colts Neck, N. J. Signals at VK3ATN peaked some 18 db. over receiver noise, while his 100-watt signal just managed a unity S/N ratio in the 300-cycle-bandwidth receiver at K2MWA/2. Antennas were the large stacked rhombic at VK3ATN, and a 60-foot commercial-experimental dish at K2MWA/2. Present at the New Jersey end were W2IMU, W2FZY, K2MWA, W2JIB, and British worker and observer Roger Abson.

—•••—



This completely home-designed and built station belongs to W2SEI, Liverpool, N. Y. The set-up includes a console, 23-tube double-conversion superhet, and 250-watt transmitter.

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Remember the article, "A One-Tube Two-Meter Rig with Transistor Modulator," in *QST* June 1957? The author, R. J. Schlesinger, K6LZM, has now come up with a completely transistorized station, transmitter and receiver, for use on the 80-meter c.w. band. The transmitter (right) has a v.f.o. and requires 18 volts at 70 ma. to power the 2N696 final. Power output is approximately 1 watt. The receiver is a converted b.c. receiver with a b.f.o. added.

K6LZM's transistor station

K6LZM uses the station almost every night to handle traffic on the Golden State Net and has also done some DX work with the flea-power rig; he worked KL7PI and is now trying for a WAS.

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A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. **Changes are shown in heavy type.**

W1, K1, WA1, WN1[1] — Providence Radio Ass'n., W1OP, Box 2903, Providence, Rhode Island 02908.
W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505, Ridgewood, New Jersey 07451.
W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.
W4, K4,[1] — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.
WA4, WB4, WN4[1] — Richard Tesar WA4WIP, 2666 Browning St., Sarasota, Florida 33577.
W5, K5, WA5, WN5 — Hurley O. Saxon, K5QVH, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6, WN6 — San Diego DX Club, Box 6029, San Diego, California 92106.
W7, K7, WA7, WN7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.
W8, K8, WA8, WN8 — Paul R. Hubbard, WA8OXY, 921 Market St., Zanesville, Ohio 43701.
W9, K9, WA9, WN9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.
WØ, KØ, WAØ, WNØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minnesota 55921.
VE1, **3C1** — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N.S.
VE2, **3C2** — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.
VE3, **3C3** — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.
VE4, **3C4** — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5, **3C5** — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan.
VE6, **3C6** — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7, **3C7** — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.
VE8, **3C8** — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N.W.T.
VO1, **3B1** — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
VO2, **3B2** — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador.
KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701.
KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
KP4, WP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, Puerto Rico 00902.
KV4, WV4 — Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, Virgin Islands 00820.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.
SWL — Leroy Waite, 39 Hanum St., Ballston Spa, New York 12020.

NOTE: Foreign and U.S. Possessions Bureaus were listed in IARU News, December 1966 *QST*.

[1] **These bureaus prefer 5 × 8 inch manila envelopes.**

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of al SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belaire, W3IYE—SEC: K3NYG. RM: W3EEB.

Net	*Freq.*	*Local Time*	*Day*
DEPN	3905 kc.	1800	Sat.
DSMN	50.4 Mc.	2100	Tue
Dover 6 & 2	50.4 Mc.	2000	Wed
KCEN	3905 kc.	1300	Sun

New appointment: W3FPJ as Official VHF Station. Renewal: K3GKF as 00. John M. Thompson, W3HC, will be Delaware's SCM for the next term. Welcome and good luck, John. K3OCE is charman of HamQuest 67 for the Kent County Radio Club. W3PK was assistant to W3PM for the Oct. SET. Traffic: W3EEB 301, K3NYG 29, WA3-DYG 27, W3HKS 16, W3BKN 6, WA3CRU 3, W3IYE 3, WA3DUM 2.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: K3YVG, W3CBH, W3-EML. PAMs: W3SAO, W3FGQ. The EPA CW Net had QNI 360 and QTC 425. The PTTN Training Net had QTC of 291. The EPA Emergency Fone and Traffic Net had QNI 736 with QTC 402. K3MSG is now General Class. The Pottstown RC has classes for General and Extra Class under the direction of K3NUM and W3BIP. K3RND, now at Kansas U., will bring his QSLing up to date if you drop a card to P.O. Box 26, Orrtanna, Pa. Being manager of the football team cuts into WA3AJT's traffic work. K3-MHD now is stationed at Pensacola, Fla., and taking up communications. WA3CFU finally got Miquelon Islands on 40. WA3FNW is now General Class. WN3FUF is operating from the Hoffman Orphanage. EC WA3BBI is moving to Trenton, N.J. Any amatehr interested in filling his shoes as EC from Snyder, Union or Northumberland Counties is asked to drop your editor a line. W3MPX added a t.r. switch to the shack. W3FGQ is now OVS and has most of his v.h.f. antennae erected again. K3WEU has been appointed v.h.f. Coordinator for the 1st Army MARS for the Mid-Atlantic area. New officers of the Cumberland Valley ARC are K3SWZ, pres.; K3WEB, vice-pres.; WA3BKK, secy.-treas. WB6BBO, ex-W3WRE, visited W3CUL and W3VR. K3SME, a graduate of Philco Tech. Institute, plans to activate his station in the Philadelphia area. If we owe you some operating aids or a reply to a letter, perhaps you forgot to place your return address on the letter. Want to try again? A new QCWA chapter is being formed in the Lower Anthracite area. Interested amateurs should contact W3KJJ or W3PVY. In case you have forgotten, it's just a little over a year now that we had the Northeast Blackout. How about giving the 'ole emergency generator a workout now—just in case! *Do it today*, tomorrow may be too late. Traffic: W3CUL 5935, W3EML 1070, K3MYS 616, W3VR 537, W3AEQ 408, WA3CTP 379, K3PIE 375, W3ZRQ 335, K3MVO 330, W3-AIZ 306, K3YVG 295, WA3ATQ 229, W3FGQ 188, KWEU AIZ 066, K3YVG 295, WA3ATQ 229, W3FGQ 188, K3WEU 144, W3JKX 131, W3KJJ 130, W3ELI 119, W3CBH 118, WA3BFR 98, W3OY 90, WA3AFI 89, W3MPX 78, W3VAP 64, WA3BSV 62, WA3BBI 58, K3KTH 51, K3RTX 48, W3-FAF 46, K3TNL 40, K3WAJ 31, WA3FWT 29, W3RV 27, W3NNL 25, W3BUR 20, K3KKO 20, K3HHB 19, K3YQL 19, WA3CFU 16, K3PWM 16, K3MDG 11, W3PVY 10, K3-MHD 9, W3ADE 8, W3BFF 8, K3HKW 6, W3ID 6, WA3-AJT 3, W3EU 3, WA3BJQ 2, WA3EMY 1, K3YVP 1.

MARYLAND—DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, K3-OAE, W3PRC, W3UE. PAMs: W3JZY, K3LFD. The SET exercise appears to have been very successful this year. WA3BTA, WA3ERL, W3MCG, K3NCM and W3TN all expressed satisfaction with SET operation. W3TN also made the BPL in October. The September FMT also had an excellent showing with W3AEA, WA3BDK, K3CYA, W3ECP, WA3NEM, W3LUL, W3TIK and W3TMZ reporting. W3TMZ had the closest measurement with a 2.1 p.p.m. error. WA3BDK and W3LUL tied for second with 2.3 p.p.m. MEPN had 21 sessions and handled 135 messages for a 6.4 average. *Clubs and nets*: The Maryland Two-Meter Termite Net is an active organization with 55 members and meets twice a week, Mon. and Thurs. on 145.206 Mc. at 8:30 P.M. EST. WA3EWT has organized a radio club at St. John's College High School in Washington. WA3EOP is busy on v.h.f. from the University of Maryland Radio Club station, W3EAX. W3RKK is working to promote cooperation between the Baltimore Amateur Radio Club and the Red Cross. WA3CFK, although busy with low-band traffic, school work and the *MDD Flyer*, also keeps the Cumberland Valley Traffic Net running on 145.602 Mc. WA3ELA has organized a radio club at his school (Good Counsel High) in Rockville. *Equipment*: K3LLR is experimenting with a turnstile antenna on 6 and 2. W3EOV is debugging his RTTY gear. *Other*: K3JYZ spent too much time in California to run up his usual high traffic total. W3JZY is rushing to get the outside work done before his mountaintop is snowed in. W2NIY/3 is recovering from the flu. K3CYA reported some unusual wide-band QRM on 20 meters. Traffic: (Oct.) W3TN 252, WA3CFK 191, W3LBC 168, K3LFD 166, K3OAE 161, W3PQT 159, WA3EEQ 146, WA3BDK 103, K8MZY/3 101, W3MCG 86, K3GZK 84, WA3ERL 71, WA3BTA 52, W3EOV 44, K3NCM 38, WA3CVM 33, WA3-CEK 30, K3JYZ 16, WA3DWF 9, WA3EOP 6, K3LLR 2, WA3EXJ 1. (Sept.) W3EOV 25.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2BZJ. RMs: WA2KIP, WA2UPC, W2RG. PAM: NJPN Net Mgr. W2ZI. The Oct. SET was the best ever. SEC W2BZJ has issued a fine AREC Bulletin, to all members in 21 counties and reports 28 messages handled in the SET. WA2KIP is the new NJN Mgr. K2JOX and W2BBH made good scores in the Sept. FMT. NJPN reports traffic 170, QNI 419, 31 sessions and 84 traffic in the SET. WB2BSD received a QSL card from Barry Goldwater. W2ZI has returned from a 3000-mile trip down the Mississippi River *on a "Mark Twain" era packet* boat to New Orleans *and* return. The NJN Annual Meeting was held Nov. 5 at Red Cross Hq., New Brunswick. WB2AEJ did a swell job as last year's mgr. We lost K4RAD/2 as an OO, but gained K2BG. W2LVW did an outstanding job during the SET for Gloucester Co. WB2RVE is working on ATV gear and sends in a nice report as OVS. W2YPZ has been appointed as Asst. SCM. K2CPR resigned as OO. WA2UPC is the new Asst. NJN Mgr. The DVRA is participating in ARRL's "HamQuest 67" campaign. W2CUC is working on the Intruder Watch. W2ZEW is a new traffic man in Bordentown. K2SHE returned from a trip to the Southwest and Mexico. WB2YCI received the CP-25 award, and is 2RN representative Wed. night. WB2VFX is ANCS on the new SNJ V.H.F. Net. W2BEI added a 30L-1. W2BAY is working the PMRC Net on 29.493 Mc. daily. W2HAZ is a new NJN member. WB2GTE is a new traffic station. K2ARY reports progress in Salem Co. Traffic: (Oct.) WB-2CYI 118, WA2KIP 112, W2ZI 95, W2RG 79, W2BZJ 41, W2YPZ 28, K2SHE 26, K2JJC 19, WA2DVU 17, W2BEI 10, W2ZEW 10, WA2KAP 7, WB2SBD 7, WB2GTE 3, WB2-VFX 3, K2BG 2, WB2VFW 1. (Sept.) WA2KIP 65, K2SHE 28, WB2TEN 12, W2BZJ 6, K2JJC 3.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2EZB and W2FEB. NYS C.W. Net meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800; NYSPTEN on 3925 kc. at 2200 GMT; NYS C.D. on 3510.5 and 3993 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed.; TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT; NYS County Net on 3510 kc. Sun. at 1400 and 2345 GMT Mon. Congratulations to W2SEI, W2OE and W2RUF on making the BPL. Happy New Year! Let's all resolve to improve our operations and be aware of opportunities to perform public service through amateur radio. W2EUP was elected pres. of the newly-formed Buffalo Amateur Radio Repeater Assn. (BARRA). Other officers include WA2ZZZ, K2-GUG, K2ISO and K2HUK. Cornell ARC, W2CXM, has

become active again. Members include WB2CPV, WB2CPU, WB2FGA and WA4OQL/2. W2FVI has been appointed OBS in the Hudson Falls area; W2RHQ is an OVS. Endorsements: K2DNN as Chemung Co., EC; K2DNN as ORS; W2CXM and W2RQF as OPSs; W2KBK as OO. WB2UHK reports that new hams in the Hornell area are WN2YFG, WB2YWS and his sister WB2ZAQ. W2RUF and K2KQC are starting AREC clubs in the Buffalo area. Traffic-handling in emergency situations will be stressed. The Chemung County AREC Assn. elected WB2HSR, pres.; WA2HFL, vice-pres.; and WA2ZBD, secy.-tres. K2CC is the new call of the Clarkson College ARC, replacing W2TAB. WB2GAL built a 20-meter beam and put it up 20 feet for a total cash outlay of $3.57 not including the feedline and it works! WB2NZA got a TA33 beam and ham-m rotor. The NFDXA now has K2LWR, W2FXA, W2PDB, W2PZI, W2SSC and W2UVE with over 300 countries confirmed. W2RMB spoke on RTTY at a recent Chenango Valley ARA meeting. The NYS C.W. Net needs outlets in the Rochester-Monroe county area. The RARA has eight members active since 1938-39. They are W2GB, W2CSK, W2BGN, W2ICE, W2PZU, W2TBL, W2RGA and W2RIS. K2RUM won a recent ARATS transmitter hunt. The Utica ARC held an auction. The GRAM is running a contest to find the most active members of the club, both in operating and DX. Many thanks to those of you who participated in the SET. Traffic: (Oct.) W2SEI 623, W2OE 330, W2RUF 267, WB2GAL 170, W2GVH 112, W2FEB 111, K2DNN 58, K2RYH 53, WA2IHP 29, K2MQN 29, K2OFV 29, K2IMI 27, WA2OYE 26, W2FCG 20, WA2HSB 16, WAKQE 13, WB3OMY 23, W2DNW 12, K2CC 10, WB2UHK 9, K2BWK 8, WA2GLA 4, WN2NZA 4, K2PBU 4, WA2PZD 4. (Sept.) W2GVH 94.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: K3KMO. PAM: K3VPI (v.h.f.). RMs: W3KUN, K3SOH, W3MFB, W3UHN. Traffic nets: WPA, 3585 kc. daily at 0000 GMT and KSSN, 3585 kc. Mon. through Fri. at 2330 GMT. Nominating petitions will be accepted until January 31, 1967 for the William G. Walker, W3NUG, Annual Memorial Award. The award is given annually to a deserving amateur radio operator in Western Pennsylvania. Nominations may be submitted by any individual amateur or club. The nominating petition should contain the name of the amateur nominated, call and full address, also a brief outline of the nominee's radio amateur activity or activities which prompted the petition. Mail in triplicate to John F. Wojtkiewicz, W3GJY, 1400 Chaplin St., Conway, Pa. 15027. The Etna Radio Club reports via the *Oscillator* the following new officers: K3LKP, pres.; K3VYO, vice-pres.; W3OJM, secy.; W3TZW, treas.; K3GWX, director. Congratulations and good luck, men. Also, W3TZW is the new editor of the *Oscillator*; K3GWX copied the Armed Forces Day RTTY communications perfectly; W3RSB and K3SMB have new HE-410s. W3LCI is now operating a new SB-300 and SB-400 and a new Henry 2K on 14 Mc. WA3BGE had his first experience as NCS on WPA and representative to 3RN. K3EXE has returned from a two-week trip to Greenland where he operated as OX5BO. The WPA SCM and SEC had a very enjoyable visit with the Johnstown and Ebensburg Radio Clubs at a joint meeting in Johnstown Nov. 3. Traffic: W3NEM 327, W3KUN 275, K3PYS 140, W3BLZ 111, W3LOS 82, K3SOH 68, WA3AKH 63, K3RZE 61, K3HKK 50, K3KMO 49, WA3AKB 47, W3LOD 42, W3SMV 30, WA3BGE 22, W3OEO 17, W4ZAU/3 12, W3YA 9, W2KAT/3 7, W3ELZ 7, W3RUL 7, W3GJY 3, W3KNQ 3.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: WA9GUM. PAMs: W9VWJ, WA9CCP, W9KLB (v.h.f.) and WA9RLA (v.h.f.). Cook County EC: W9HPG. Net reports.

Net	*Freq.*	*Times*	*Days*	*Tfc.*
ILN	3760 kc.	0000Z	Daily	214
NCPN	3915 kc.	1300Z	Mon.-Sat.	207
NCPN	3915 kc.	1800Z	Mon.-Sat.	306
Ill PON	3925 kc.	1700 CST	Mon.-Fri.	436
Ill PON	50.29 Mc.	2000 CST	Mon. & Thurs.	14
Ill PON	145.5 Mc.	2030 CST	M-W-F	67
Chgo TNT	145.35 Mc.	2100 CST	Sun.-Fri.	178

W9WYB, K9WMP, W9JUV/K9OSO, W9HPG, K9IFE, W9GFF, W9KEZ, W9HSD/K5VHE, W9GEG, K9AUD, K9WEH, W9RWD, WN9RSP and W9REC participated in the recent ARRL Frequency Measuring Test. K9AUD is a student at the U. of I. at Champaign. K9FHV's new QTH is Granite City. W9NWK has been elected manager of the Interstate Single Sideband Net. W9MCE and his XYL, W9KMD, have been notified that their son has received a General Class license and is now WB6SJT. WA9NRI, WA9LFR, WA9QMR, W9PYG, WA9HJM, W9QKE, WA9AJF and W9OKI were elected officers of the York Radio Club, Inc. The Milwaukee Amateur Radio Club has announced tentative plans for a Central Division ARRL Convention which will be held July 7 and 8 in Milwaukee, Wisc. K9ZPP is chairman, assisted by W9GPI, W9ROM, W9DHW and W9LVR. This section and all the DXCC gang wish W9RBI a very speedy recovery from his illness. New appointments include W9NWK as OPS and ORS, K9WDY and W9HSD/K5VHE as OOs. K9CDM is with the Army in Germany. WA9OYR was named Ham of the Month by The Tri-Town Radio Amateurs Club, Inc. K9KDI is back on the air after his honeymoon. WA9KHR has gone mobile. K9BZY is the proud parent of a male harmonic. A new General heard was W9RSP. W9IDY has a new 10-15-20-meter dipole and is bringing in the hard ones on DX. WA9HSK has a new Valiant. W9UHD installed a Swan 350 and TA-33 Sr. beam in his shack. W9PVD is back after serious abdominal surgery. W9OIJ/WB2LZF is doing graduate work at Northwestern University. This section's sympathy is extended to the widow and family of Illinois State Senator George Drach, who recently passed away and was indeed a friend of the amateurs. Traffic: (Oct.) K9KZB 367, W9EVJ 346, WA9NFS 239, WA9SEO 200, WA9MHU 193, W9AXR 178, W9NXG 156, W9DOQ 121, W9JXV 91, W9EET 83, WN9RSN 77, W9ELL 66, WN9SPA 66, W9CGC 58, WA9RLA 55, K9BTE 46, K9HSK 41, WA9PPA 36, W9UHD 31, WA9GUM 30, K9TVA 30, W9IDY 25, WA9QEL 23, WA9KCN 21, W9HOT 20, W9PRN 20, K9ADQ 12, W9HJM 11, W9PVD 10, W9LNQ 6, K9SNC 5, WA9FIH 4, WA9HSZ 2, K9IDQ 2, K9RAS 2. (Sept.) WA9CNV 251, W9EET 174, W9JXV 74, W9CGC 69, K9WMP 4. (Aug.) W9EET 138, W9CGC 80, K9WMP 76.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	*Freq.*	*Time*	*Oct. Tfc.*	*Mgr.*
IFN	3910	1330Z Daily 2300 M-F	295	K9IVG
ISN	3910	0300Z Daily 2130 M-S	408	K9CRS
QIN	3656	0000Z Daily	169	W9HRY

W9PMT, mgr. of the Hoosier v.h.f. nets, reports Oct. traffic of 158. K9DHC, mgr. of RFN, reports Oct. traffic 60. K9EFY, mgr. of PON nets reports Oct. traffic 198. W9QLW, RM of 9RN, reports Indiana was represented 100% in Oct. QIN Honor Roll: K9VHY 24, W9ZYK 24, K9HYV 22, K9RLW 19, W9HRY 19, WA9FDQ 17, K9DHC 15, K9WWJ 15. The Tri-State ARC provided communications for the Womens National Air Race. K9KTL is now W7DQS in Wickenberg, Ariz. New officers of the HAWKs: W9RTH, pres.; W9LYU, vice-pres.; WA9BWT, secy.-treas. Indianapolis ARC is sponsoring a class for Extra Class licensees. There is a new male harmonic at W9HRY's home. New officers of the Michigan City ARC: W9TWU, pres.; K9URA, vice-pres.; WA9HQP, secy.; K9DZE, treas. W9FJI reports the Gibson ARC held several successful drills. Congratulations to WA9QOF, WA9LFV, WA9AXF, WA9REY and WA9EAA on passing the General Class exam. Welcome to new Novices WN9THH and WN9TDT. WA9AOT has a new linear. Lake Co. ARC is busy with plans for its annual banquet to be held Feb. 11. *Amateur radio exists because of the service it renders.* W9JUK made the BPL. Traffic: (Oct.) W9JUK 519, K9IVG 485, W9HRY 461, W9ZYK 432, WA9OYI 314, W9QLW 301, WA1DAG/9 232, WA9FDQ 195, W9VAY 157, K9FZX 123, K9RLW 120, K9HYV 118, WA9BGI 96, W9UB 94, W9SNQ 76, W9MIM 70, K9VHY 64, K9CRS 62, WA9BWY 57, K9RWQ 48, W9GFS 47, WA9JHH 42, WA9GKF 39, WA9KAG 39, K9EFY 36, W9CC 34, W9YYX 31, W9DOK 30, W9PMT 30, WA9LUG 24, WA9GJZ 23, K9BSL 20, W9CLF 19, K9EOH 18, WA9NGN 18, WA9BHG 15, WA9CHY 15, K9ILK 15, W9PU 15, W9RTH 15, WA9CFW 11, W9DGA 11, K9LZJ/9 11, WA9BNX 10, W9EJW 10, W9FWH 10, K9FUJ 10, WA9KOH 9, WA9RNT 9, K9UEO 9, K9WET 9, WA4RBQ/9 8, K9GBR 8, WA9LGQ 8, W9DZC 7, WA9FSZ 7, WN9SIF 7, W9DKR 6, W9LG 6, K9JQY 5, WA9MFY 5, WA9JIX 4, W9BDP 3, K9LMG 3, K9YFT 3. (Sept.) K9RLW 55, WA9KAG 29, WA9CJR 26, WA4RBQ/9 20, WA9BNX 11, K9JQY 7. (Aug.) W9VAY 65. (July) W9VAY 34. (June) W9VAY 46.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. RM: WA9MIO. PAMs: K9IMR, K9HJS and W9NRP.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*ONI*	*QTC*	*Mgr.*
BEN	3985 kc.	1300Z	Mon.-Sat.	26	264	88	W9NRP
BEN	3985 kc.	1800Z	Daily				K9IJS
WSBN	3985 kc.	2315Z	Daily	31	1079	445	K9IMR
WIN	3662 kc.	0115Z	Daily				WA9MIO
SWRN	50.4 Mc.	0300Z	Mon.-Sat.	25	319	1	W9JZD

Net certificates went to WA9JCJ and WA9RYT for SWRN, WA9FKL, WA9HOI and W9JKM. New appointments: K9WXS as EC for Dane County. Renewed appointments: W9RQM as ORS/OPS; K9MKC as OO; K9DBR, W9EWC, W9FBC, WA9FMQ, K9FPM, K9FWF, K9GSC, W9HWQ, WA9JFM, K9LBQ, WA9PBW, WA9-

QMP, W9RQM and W9YT as OVSs. FMT results: W9-BCY .1, W9GXZ .2, W9KCR 18.0 and W9CBE 38.7 p.p.m. error. K9GDF led the OOs with 13 notices sent. Wisconsin will host the Central Division Convention in Milwaukee next July. WA9NBU is at school in Michigan. New club officers: Mancorad Radio Club—W9HPC, pres.; K9EOS, vice-pres.; W9BZU, secy.-treas. West Allis ARC—WA9-KRF, pres.; W9TPO, vice-pres.; WA9IAT, secy.; K9-BTQ, treas. W9KCR is building a binary counter for use in the FMTs. WA9IZK is starting a Southern Wisconsin Two-Meter Relay Net daily at 0230Z. 9 RN certificates were earned by W9KQB, W9RTP and WA9NDV. The gang at W9YT assisted several Peruvian students in contacting their families following the Peruvian earthquake. Traffic: WA9NPB 322, W9KQB 288, K9IMR 255, W9DYG 247, WA9DWZ 154, W9DND 142, W9SUF 74, WA9QMP 73, W9JKM 67, W9CBE 57, K9FHI 55, WA9NFG 55, W9ONI 55, W9NRP 51, W9IFS 43, K9GDF 38, W9YT 35, W9HWQ 32, K9UTQ 32, WA9OMO 26, W9AYK 25, WA9PKM 24, W9SWQ/9 24, WA9VNY 21, W9HPC 16, WA9KFL 15, W9-OTL 15, W9IRZ 12, WA9LIY 10, W9RQM 10, K9QKU 9, W9HQT 6, WA9NDV 5, K9GSC 3, WA9NBU 2, K9ZMS 2.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØIEF. RMs: WØISJ, WAØEPX. PAMs: KØQBI, WAØJKT, WØHEN, WAØDWM. MSN meets daily on 3595 kc. at 0030Z. MJN meets M-S on 3595 kc. at 0100Z. Noon MSPN meets M-S on 3820 kc. at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 kc. at 2400Z. MSTN meets M-F on 50.4 Mc. at 0430Z and Sat. at 0200Z. The PO Net meets Sun. on 3812 kc. at 1830Z. Appointments renewed: WAØFUR as EC for Ramsey Co., WØBUO as OPS. It is with deep regret that we report the passing of WØAA, one of the old-time operators in Minneapolis. The QCWA held its Oct. meeting at NW Airlines and toured the dispatch and communications facilities there. OO WØTIV observed six stations operating out of the band in Oct. KØCXJ, Moorhead, is now active on 2-meter s.s.b. with a 6360 PA. WAØQAK is a new General in Austin. WA6MOX/Ø now is operating under his new call, WØPVF. A large number of ARPSC groups participated in the Annual SET again this year. With the Belmond, Iowa, emergency fresh in our memories we are reminded of the importance of these regular drills to keep prepared for proper business-like operation that may be needed without warning. This emergency again reminded us why formal type of messages are an absolute necessity in handling third-party traffic. WAØEDN qualified for the BPL award this month. Traffic: (Oct.) WØYC 260, WAØEDN 184, WAØJKT 150, WAØEPX 149, WAØBYO 135, WØISJ 55, WØPET 43, WAØAQT/Ø 42, WAØAKM 40, KØQBI 35, KØZRD 28, WAØJPR 26, WØTCK 26, KØFLT 25, KØIGZ 23, KØICG 22, WØHEN 21, WAØ-KQU 21, WØBUO 20, WAØMMV 19, WØUMX 19, WØ-ATO 13, WØKYG 11, KØZKK 9, WAØDFT 7, KØLWK 7, WØMFW 4, WØKLG 3, WØSZJ 3. (Sept.) WØBUO 21, KØQBI 20.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. The Bark Club of Bismarck meets at KØEOF's shack. WAØEWW is on now with a Galaxy 3. KØPHC is back at the Veteran's Hospital at Fargo. WAØOVT is on with a Pacemaker. WØPQW has returned from that goose-hunting trek to Canada. He took along a new Swan 350 to use mobile. WØMSJ and WAØAOT have HT-32s on the air. WØWWL is back on the air now. WAØBIT and the gang on 2 meters in Grand Forks were in the SET. WNØPPK is on 15 meters and working plenty of states when she can use the OM's antenna and a borrowed 75-A3. K7CCM/Ø, a Great Northern Auditor, is on 75 meters now. KØIVQ, who recently went to the West Coast, has undergone major surgery and is recuperating nicely. His dad, WØ-TUF, is getting an Elmac station out to him. WAØKSB is putting the finishing touches on a new Eico rig. WAØ-MND is back home much improved in health. She and WAØGRX will soon be calling the Weather Net. While in Fargo attending the Teacher's Convention WØDM visited WAØGRX and WØOVB. WØBIH is back in Aneta. WAØILI/Ø is headquartering in St. Thomas for the winter. He has a dipole up for three bands and is running a Galaxy 5. KØTYY reports a new SB-301 and SB-400 on the air. KØOVE is back on with the SB-34. WAØAYL has returned and is available for phone traffic into Grand Forks. WAØACQ and WØAEW have departed from N.D. and are now "7s." N. Dak RACES reports 16 sessions, 519 check-ins and 116 traffic. The PO Net had 10 sessions, 115 check-ins and 38 traffic. Traffic: KØITP 124, WAØMSJ 13, WØDM 8.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. Please mail your AREC applications to Lester Lauritzen, WØSCT, Centerville, So. Dak., if you cannot locate your EC. WØZWL reports the best QNI for Oct. of any year of operation of the WX Net, a daily QNI of 20.8. WØRWX has moved to Sturgis. Mitchell ARC has available some very fine So. Dak. directories. Anyone interested write to Box 62, Mitchell, S. Dak. Price 1.50. The So. Dak. C.W. Net reports 65 QNI, 11 QTC. So. Dak. S.S.B. Net reports 1178 QNI, 239 QTC. WOCUC has 500 watts on 6 meters. Traffic: WØZWL 679, WAØAOY 195, WAØLLG 71, WØSCT 69, KØVYY 64, WAØLYO 56, KØGSY 48, WØDVB 34, KØBMQ 25, WØDJO 25, KØAIE 22, WØZAL 16, KØYGZ 13, WØHOJ 10, WØRWM 8, WAØFUZ 3, KØJGM 3, KØTNM 3, WAØBMG 2, WAØCKH 2, KØKOY 2.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—SEC: WA5KTX. PAM: WA5GPO. RM: K5TYW. NMs: WA5IIS, WA5HNN, W5MJO, K5IPS. W5RIT reports that he has installed a new 50-ft. vertical and is having excellent DX results. The North Arkansas Amateur Radio Society of Harrison announces its Second Arkansas QSO Party and invites all amateurs to participate. Thanks to all nets and individual stations who worked in and assisted our SEC, WA5KTX, in the recent SET. The Southeast Arkansas Amateur Radio Club has elected WA5HHG, pres.; WA5LUW, vice-pres.; and W5CAM, secy.-treas. Net reports for Oct.:

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Net Time*
RN	3815 kc.	0001Z	Daily	31	130	758	840 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	26	41	847	1744 min.
OZK	3790 kc.	0100Z	Daily	27	64	154	604 min.
APON	3825 kc.	2130Z	Mon.-Fri.	21	165	369	630 min.

Traffic: W5MJO 205, W5NND 157, WA5KEF 91, K5TYW 60, W5CAF 56, W5YM 44, K5EDH 32, WA5LKB 7, WA5-KUD 1.

SECOND ARKANSAS QSO PARTY

January 7-9, 1967

The North Arkansas Amateur Radio Society of Harrison announces its second Arkansas QSO Party and invites all amateurs to participate.

Rules: 1) The time will be the 30-hour period from 2200 GMT January 7 to 0400 GMT January 9, 1967. 2) No time limit or power restrictions. 3) Arkansas stations score 1 point per contact and multiply by the number of states, Canadian provinces and foreign countries worked during the contest period. Outside stations score 5 points for each Arkansas station worked and multiply the total by the number of counties in Arkansas worked during the period. 4) Stations may be worked once on each band and each mode. 5) A certificate will be awarded to the highest-scoring station in each state, Canadian Province and foreign country (with 100 or more points). 6) General call: "CQ ARK". Arkansas c.w. stations should identify themselves by signing de (call) ARK K. Phone say "Arkansas calling." 7) Suggested frequencies are a.m. 3825 7225 14,225 21,220 28,560; c.w. 3525 7025 14,025 21,025 28,025; s.s.b. 3975 7275 14,325 21,425 28,650; Novice 3735 7175 21,110. 8) Arkansas stations send QSO number, RS(T) and county, all others send QSO number, RS(T) and state, province or country. 9) Logs and scores must be postmarked no later than January 30 and sent to the North Arkansas Amateur Radio Society, c/o Don Anderson WA5GVG, 508 North Robinson, Harrison, Arkansas, 72601.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—RM: W5CEZ V.H.F. PAMs: W5UQR, WA5DXA.

Net	*Freq.*	*Time*	*Days*	*ONI*	*QTC*	*Mgr.*
Delta 75	3900	1230Z	Sun.	20	18	WA5EVU
LAN	3615	0030Z	Daily			WA5FNB
PON	3870	1300Z	Sun.			W5KC

W5BUK is back chasing those elusive DXpeditions when time from his OO chores allow. W5CQS is a new OVS. K5VJZ is OVS and ORS. W5PGT is busy handling traffic on LAN. WA5HGX is interested in forming a La. college net. WA5LQZ had the Scouts from Troop 86 over for a scout jamboree on the air. WA5QVN is a newcomer from Georgia. For the fourth consecutive year W5AJY was the high phone station in the La. section in the 1966 DX Contest. WA5IRI operated recently from the top of the new International Trade Mark Building in New Orleans on 6 meters. W5UK/5, GNARC station, participated in the SET. W5JFB operated 6 meters aero-mobile aboard

a DC-3. W5EA spent a nice vacation of four weeks loafing. W5BSR has moved back to LC for the winter. W5CEW still haunts the middle portion of 75. W5PM is chasing DX again with a 319 c.f.m.d. W5NQR writes a very nice DX column for LARK. WA5EDK is interested in selling or trading a rack panel. WA5MHM operated portable in Texas during his recent vacation. W5AXU and his XYL are off again to the Carolinas in their airstream trailer. The Cen. La. ARC puts out a fine paper called *Spark*. The GNOARC is changing its net frequency to 28.750 Mc. Your Director is ably pushing around the section for great efforts to be made this coming year in operation HamQuest 67. Write to W5LDH or myself if you need any assistance. The OARC of Slidell had a laser demonstration put on by W5OJY. In a recent copy of *QRM* W5PBQ presented an article on how to easily and cheaply construct a 80-10 inverted trap antenna. Traffic: W5KRX 317, W5PGT 242, K5OKR 163, WA5FNB 126, W5BJG 101, W5MXQ 97, WA5LQZ 96, K5VJZ 69, W5AJY 26, W5PM 17, W5UK/5 13, WA5DXA 10, WA5QVN 9, W5KC 8, WA5HGX 7.

LOUISIANA QSO PARTY

January 28-29, 1967

The Second Annual Louisiana QSO Party sponsored by the Lafayette Amateur Radio Club will start at 1800 GMT Saturday January 28 and end at 2200 GMT Sunday, January 29, 1967. All bands may be used, c.w. and phone (phone classified as both a.m. and s.s.b.). The same station can be worked and counted for QSO points on each band and each mode. Louisiana stations score 1 point for each contact (including contacts with other Louisiana stations). All others score 1 point for each contact with a Louisiana station. Louisiana stations multiply total QSO points by number of different states, Canadian Provinces and countries worked. All others multiply total QSO points by the total number of different Louisiana parishes worked. Louisiana stations give QSO number, RS(T) and parish. Others give QSO number, RS(T) and state, province or country. Suggested frequencies are: 3600 3910 7105 7230 14.100 14,300 21,100 21,405 28,105 and 28,700. In Louisiana, certificates will be issued to the 1st, 2nd and 3rd place scorers. Other stations outside Louisiana will be issued certificates for highest scoring stations in each state, Canadian call area and each country. (Note that a minimum score of 50 points is needed to win). Logs must show dates, times, stations worked, exchanges sent, exchanges received, bands, modes and scores claimed. Logs must be postmarked no later than February 28, 1967 and sent to the Lafayette Amateur Radio Club, 612 Harding Street, Lafayette, Louisiana 70501.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDP. W5HTV has a beautiful signal with the complete SB line. W5BW really has his family net going strong. K5WUX is making Lumberton famous. W5WZ makes that 813 produce a fine signal to pass lots of traffic. WA5DGO is very happy about his success so far on 2 meters. WA5CAM built an SB-100 and got his 50th state for WAS. K2DEM/5 did a remarkable job in the FMT with a 75-A4, BC-221, etc. W5JDF is now running two rigs, 80 through 10 meters, a.m. and c.w. We need more qualified OOs to help keep our frequencies clean. Thanks for your vote of confidence in me as SCM. Will try to make the next two years the best yet. Check into our nets: Gulf Coast Sideband, 3925 kc. daily 1730 CST; Mississippi Sideband, 3888 kc. daily 1815 CST; "Miss" C.W., 3647 daily 1854 CST. Traffic: W5JDF 278, W5WZ 147, W5BW 65, WA5OKI 37, W5HTV 21, WA5JWD 15, K5WUX 6.

TENNESSEE—SCM, William A. Scott, W4UVP—

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
TPN	3980 kc.	M-Sat.	1215Z	31	1159	259
	3980 kc.	Sun.	1400Z			
TSSB	3880 kc.	Tue.-Sun.	0030Z	24	1165	136
ETPN	3980 kc.	M-F	1140Z	21	397	37
TN	3635 kc.	Daily	0100Z 0230Z			

Sorry to learn of the passing of W4BS of Memphis. The Southern Missionary College Club is looking for 6-meter gear to join the local nets. W4ZBQ, WA4YEM and W4WBK scored high in the Sept. FMT. K4VAJ, formerly in Memphis, now is active in Martin. W4HHK reports Sept. sun noise from 3.0 db. with 5.3 db. on the 16th and 5.6 db. on the 20th during the aurora sessions; Oct. as 4.2 db. on the 18th and 5.0 db. on the 20th. K4EJQ wishes Carolina Novices would listen for his calls on 145 mc. K4PZT reports on superior noise figures of 7308 over 6RQT or 6922. He and K4EJQ fear Educational TV channel 2 coming on the air the first of the year. East Tenn. TVI committees note, *TSSB is looking for net controls and* TN for RN5 reps. W4PQP again made the BPL on originations. Traffic: (Oct.) W4OGG 291, W4FX 244, W4PQP 188, W4SQE 180, WA4YDT 152, WA4YEM 145, K4UWH 89, W4WBK 72, W4DIY 67, W4UVP 49, K4UMW 44, W4PFP 35, K4COT 29, WA4NEC 28, W4KAT 27, WA4NUJ 24, W4RUW 22, W4TZJ 22, WB4CDE 20, W4FLW 16, WA4EWW 12, WA4CGK 11, W4TZB 11, W4FEP 8, WA4ZBC 6, WA4COL 4, W4VTS 4, K4MQI 2, WA4WYP 2. (Sept.) K4MQI 11.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawren F. Joffrey, WA4KFO SEC: W4OYI. Appointments: W4JSH and WA4YQE as ECs. Endorsements: W4ADH as OVS/OPS/OBS; WA4AGH as OBS/OPS; K4DZM as ORS; W4GSH as OVS; K4QIO, W4YYI and K4YZU as OPSs.

Net	*Freq.*	*Days*	*EST*	*Sess.*	*QNI*	*QTC*	*Mgr.*
EMKPN	3960	M-F	0630	21	415	81	K4KIS
MKPN	3960	Daily	0830	31	434	90	WA4KFO
KTN	3960	Daily	1900	31	798	392	WA4AGH
KYN/KSN	3600	Daily	1900/1700	51	360	500	W4BAZ
KPON	3945	Sat.	1300	5	144	60	WA4AVV

W1CER, from ARRL, represented Headquarters at the Louisville Ham Kenvention and gave a fine talk on solid state devices. W4BCV is to be commended for his FB job as chairman of the whole affair. K4PNA is Wilderness Road ARC pres. and plans have been started by the club to get a 2-meter net going. K4DZM and K4QCQ represented Kentucky at the Great Lakes Convention. W4ISF has a new tower and beams and is going s.s.b. mobile soon. W4KKG handled Lima earthquake traffic. K4FPW has a new v.h.f. antenna system and is building RTTY equipment. W4RHZ took the code speed honors at the Kenvention and WB4AIN and WA4WWT got 31-w.p.m. certificates in the contest. W4WNH has moved to a new QTH. Traffic: (Oct.) WA4WWT 455, WA4AGH 376, WA4YUE 298, W4BAZ 286, WA4DYL 267, WA4KFO 166, K4DZM 144, WA4HJM 130, W4YOQ 105, W4RCE 88, K4MAN 80, WA4GMA 65, K4NHY 55, WB4AIN 53, W4OYI 50, W4NBZ 48, K4KJP 47, K4HOE 44, WA4GHQ 42, WA4SOM 28, W4CDA 26, WA4IBG 23, WA4UAZ 22, W4KKG 17, WA4ZIR 17, K4VDO 15, K4UMN 12, W4BTA 11, K4FPW 11, W4ISF 6, WA4BZS 5. (Sept.) K4UMN 5.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—Asst. SCM: K. E. Stecker, W8SS. SEC: K8GOU. RMs: W8ELW, K8QLL, W8EU, K8KMQ. PAMs: W8CQU, K8LQA, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8CUL, W8FLW, WA8GBN, K8MJK, W8UCG as ECs; W8FWQ, K8JJC, WA8OGR, W8PBO as ORSs; WA8CZJ, K8EFY, WA8LRC, W8OQH as OPSs; W8DSW, K8IJC, WA8OLD, W8OQH, W8TMO as OBSs; WA8DHP as OVS. W8MTI as OO. Silent Keys: Ex-8AB/W8AC, WA8DBX, W8OSI. New officers of the Motor City RC are K8ZJU, pres.; WA8OEJ, vice-pres.; WA8-TML, secy.; W8SKC, treas. Net reports: U.P. Evening Net, daily, 3920, sessions 31, QNI 723, traffic 106; Mich. PON C.W. Net, Mon. through Sat., 3645. 000Z, sessions 26, QNI 165, traffic 53; Mich. 6-Meter Traffic Net, daily, sessions 26, QNI 250, traffic 50; Mich. PON V.H.F. Net, Mon. through Sat., 50.7, 0000Z; WSSB Net, daily, 3935, 0000Z; Mich. (QMN) Traffic Net, daily, 3663, 2300Z, sessions 31, QNI 944, traffic; Monroe County AREC Net, Mon., 50.4, 0300Z, sessions 5, QNI 75, traffic 5; Mich. AREC Net, Thurs., 3935, 0130Z; Mich. PON Fone Net, Tue., 3860, 2300Z; Mich. Daytime PON Fone Net, Mon. to Sat., 3860, 1600Z; Mich. PON V.H.F. Net, Mon., 0100Z, 50.4, PON secy. WA8LMR; Genesee County Emerg. Hospital Net, Wed., 2 and 10, 0100Z; 29ers, Sun., 29610, 1500Z. All net data should contain name, days, frequency, time (GMT), sessions, QNI and traffic per month. If connected with NTS and/or AREC, send it in. The N.E. Mich. V.H.F. Hamfest at E. Tawas was attended by 120 hams. K8PPO got a new car, but the TR-3 won't fit. K8LPH graduated from MSU. WA8MGG moved to Ohio. W8GZF went to Colorado for the USAF, after buying K8OHP's Clegg Zeus. The Schoolcraft College Club is "go" with new gear. The Mich. 6-Meter Club ran "Operation Veteran's Hospital" again, on 50.250, with the call W8ARD. The Eve Bank Net, daily, 3970 at 8 A.M. and 8 P.M. has transferred nearly 1500 eyes in the last two years and 10 months. Here is a net that really gives us hams some status. Traffic: K8KMQ 496, WA8PII 364, WA8OGR 326, K8HLR 282, WA8IAQ 275, W8IWF 246, WA8MAM 204, W8CQB 201, K8PBA 128, W8OQH 121, W8HQL 116, W8EU 115, WA8IAL 113, WA8PIM 106, W8-ELW 105, WA8QAF 86, W8ACW 82, K8ZJU 77, WA8OBQ

74, W8FX 73, WA8JDF 69, WA8LXY 60, W8BEZ 51, K8QLL 51, W8YAN 51, W8UFH 46, WA8MCQ 43, WA8LRC 42, W8RTN 40, WA8GTM 39, WA8CZJ 33, K8VDA 33, K8GOU 29, WA8ORC 24, WA8SLP 22, K8TYK 21, W8PBO 20, W8FWQ 18, WA8PWF 18, W8SCW 16, K8JED 14, W8IBB 13, W8AUD 6, W8DSE 6, WA8OLD 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ and K8UBK. W8EFW is improving every day and W8KC put up a tribander beam for him. W8LT says the club held an auction in Ohio State football stadium. W8BZX says that Miami County RC held an auction. K8ONQ has added teaching duties at U. of Cincinnati to his work. K8BXT says W8HLX has a new Swan 350 and is operating mobile. WA8ABE and WA8KIG built a new house. K8SFC is a Silent Key. K8RMO moved to Warren. WA8OUE and WN8ZVS are new amateurs in Warren. K8DHJ is back on 10-meter mobile. Please correct the time of the Ohio Slow Net to 6:25 EST (2325Z). K8UBK drove your SCM to the Great Lakes Division Convention at Muskegon, Mich. About 3200 attended, including W8FX, Michigan SCM, and W1NJM, ARRL National Emergency Coordinator. Toledo's *Ham Shack Gossip* tells us that WA8RYC, WA8RZR, WA8SAE, WA8SVF, WA8SYF, WA8TDK, WA8UUL, WA8UUR and WA8VAQ received their General Class licenses. WA8UVC is a new Tech., WN8UTH, WA8UTQ, WN8UYA, WN8UZI and WN8UZM are new Novices, K8IQL was in the hospital, WA8CJK moved to Texas, K8LVR received his private pilot's license and K8KOM visited his son in Va. Miamisburg Wireless Association's *The Spectrum* informs us 1967 club officers are W8FIR, pres.; Pete Drake, vice-pres.; WA8PRA, secy.-treas.; WA8PLZ and W8GGE trustees. The club started its code and theory classes and W8PGF moved to Ill. From W8BAH's column, *Ham Radio*, in the Cleveland *Plain Dealer* we learn that amateur radio played a part in the Boy Scout on the Air Jamboree and WA8TKW received his General Class license. WA8SNX has a Lafayette HA-350 receiver. Greater Cincinnati ARA's *The Mike & Key* says that W1NJM spoke on Amateur Radio Emergency Communications. Steubenville Area ARC's 1967 officers are K8APH, pres.; W8CWY, vice-pres.; W8DYF, secy.; K8LQM, treas.; K8VBH, Radio Officer. Parma RC's *P.R.C. Bulletin* tells us the club saw two color films, "Hawaii Calls" and "Busch Gardens." Fire destroyed W8WEG's barn and corn crib. A bulletin was received from the South Shore RC called *Mike Talk* which informs us the club meets at East Cleveland YMCA at 8:30 P.M. the 2nd and 4th Thurs. of the month. WB2TNC/8 received his General Class license and WN8s TLB, TLC, TNU, TPY, UNA, UNC, UND, UTZ, UUC, UUD and UUF received their Novice licenses. Ohio traffic nets did a bang-up job in the Oct. SET. W8RYP, W8UPH, WA8PMN, WA8CXY and K8LGA made the BPL in Oct. From Springfield ARC's *Q-Match* we are told the club's 1967 officers are W8HQX, pres.; WA8NNV, vice-pres.; WA8HVK, secy.; WA8QNI, treas. Inter-City RC's *IRC News Bulletin* informs us that K8UGA is the proud father of a new baby boy. W8OQ has been on s.s.b. and is back on c.w. and WA8MHO vacationed in Florida mobiling with his new Eico transceiver. Lancaster & Fairfield County ARC's *The Rag Chewer* says that WA8RTH and WA8CUF were hospitalized and the club has started classes in code and theory. The Six Meter Nomads mobiles helped the police of Broadview Heights in the Goblin Patrol and during a parade with K8AJG, W8CWL, K8JSE, K8PXR, K8VGF, K8VIL, K8SRA, WA8GEO, WA8GFV, WA8NIL and WA8PIW taking part.

Net	*QNI*	*QTC*	*Sess.*	*Ave.*
OSSBN	1755	1255	57	22.4%
BN		540	45	12.
OLN		172	29	6.

Traffic: (Oct.) W8RYP 906, W8UPH 566, WA8PMN 533, WA8CXY 380, WA8FGX 363, K8LGA 363, WA8CEJ 334, W8CHT 334, W8NAL 278, WA8OCG 273, W8BZX 225, WA8PZA 189, WA8GYT 176, WA8LAM 173, WA8NSL 165, W8DAE 156, WA8LAG 154, WA8AUZ 131, W8GOE 123, WA8HTR 110, W8FGD 96, WA8PQL 96, K8UBK 93, W8OE 85, WA8JXM 80, W8OZK 80, K8LGB 78, W8TV 65, W8PMJ 62, W8OUU 53, K8HKB 52, K8DDG 40, K8EZJ 37, WA8MHO 28, WA8AJZ 27, K8TVX 26, WA8FKD 23, W8LT 21, WA8SHP 21, W8ETO 20, WA8LOW 20, W8DQD 19, K8DHJ 16, K8LFI 14, W8WEG 14, WA8RWK 8, W8LAG 7, WA8AJD 6, K8BXT 5, WA8OVC 4, WA8KPN 3, W8LZE 3, W8EFW 2, W8GXQ 2. (Sept.) WA8RWK 28, WA8AJZ 20, W8LT 9.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracey, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Congrats to our three BPL winners for Oct. traffic: W2SZ, K2SJN and WB2IIZY. Among those receiving General Class licenses are WB2VUK, WB2VVS, WB2VVT and WB2WUS. Also our congrats. New officers of the Union College Club, W2UC, include K1OQQ, pres.; WA2RTO, vice-pres.; WB2CNC, secy.; WA3FTB, treas. Appointments: W2UC as ORS and OPS; WB2KOY as OBS. Endorsement: WA2HYA as ORS. The RPI Club, W2SZ, reports 65 members on campus including 48 with licenses. A new DX-60 is on the air at the Yorktown H.S. ARC and new officers are WB2OZN, pres.; and WB2UHZ, secy.; who also is Asst. EC for the Bronx-Westchester AREC Net on 6 meters. WA2ZPD is a charter member of the "Termite Net," which meets each Sat. on 145.60 Mc. at 9 P.M. Among those participating in the Sept. FMT were K2UTC, WA2BXK and WB2NBY. October was Auction Nite at the Albany Club, which reports a new General, WB2VIM. Congrats. New officers of the RPI Club include WA2PJL, pres.; WA0DEV, secy.; WA2KIZ, treas. Slides of past V.H.F. Parties were shown at the Communications Club of New Rochelle. Sorry to report W2KN as a Silent Key. K2BPP, of Squire Sanders, was the speaker at the Schenectady Club. Observer K2UTC sent out 45 infraction notices in Oct. Traffic: WB2HZY 524, K2SSX/2 186, WB2UHZ 183, W2SZ 173, WA2VYS 110, W2UC 84, W2ANV 43, WB2VJB 41, WB2JYV 26, WB2FOA 24, WB2DXL 20, WA2WGS 14, K2HNW 12, WA2ZPD 11, WA2JWL 2.

NEW YORK CITY AND LONG ISLAND—SCM Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. Section nets:

NLI	3630 kc.	1915 Nightly	K2UFT	—RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW	—PAM
VHF Net	146.25 Mc.	1900 FSSnM	W2EW	—PAM
NYCLIPN	3932 kc.	1600 Daily	WB2DXM	—PAM
NLS (Slo)	3630 kc.	1900 Nightly	WB2SLI	—RM

NYCLI AREC nets: *See Dec. 1965 column for skeds.*

BPL certificates were awarded to WA2GPT, WB2RBA, W2EW and WB2PYI. WA2GPT has been playing with the DXers and County Hunters since putting up the new TA33 beam. K2UBG reports that the folks of the Mike Fard Net did themselves up proud in assisting the interception of a man in need of rabies preventive treatment last Oct. 29. WB2PYI has turned the chair of the 2nd District YLRL over to WB2JCE, who is now looking for all of your YLRL-type news! WB2OJX reports the Opossums sponsored a v.h.f. contest. WB2MBU has gone RTTY on 2. Word leaked out that WA2UWA, WB2DXM, WB2EMJ, WB2FAJ, WB2RBA, WB2SLH and WB2UQP joined WB2SRN in his faithful old open tonneau touring special for a week end of fun and frolic at the HARC Convention. Although each was obviously enamored by WB2UHZ at the banquet, reliable sources confirmed the attributes of WB2PIV were not unnoticed. Net reports reflect all had a good time. WB4APN operates out of the Brooklyn Naval Air Station occasionally. WB2UGP replaced the BC-348 with an HQ-110C and picked up a CP-25 sticker besides. WB2NGZ reports his two jobs are slowing down his traffic work a bit. W2DBQ built a SB-610 monitor-scope and scared himself looking at some of the signals on our bands (will work up to 11 meters slowly). WB2DVK is on 432-Mc. TV with a vidicon camera, a modified u.h.f. TV tuner and a homebrew 100-watt TV transmitter. Odd that you should ask, but WA2PQU and WA2RAR are putting their TV station together right now. WB2PFY operated mobile in the SET with WA2JPII. Every Mon. at 2000 it's Queens AREC-s.s.b. on 29.4 Mc. and AREC-a.m. on 29.5 Mc. All interested amateurs in Queens are urged to drop a card to W2IAG, EC 10 meters. WB2UNJ put up a new eleven-element beam and you should hear his signal in the V.H.F. Traffic Net now, boy! W2PF reports that he and some of the Brooklyn old-timers are trying to reactivate the venerable Radio Club of Brooklyn, Cardinal Hayes HSRC, WA2THR, says that three of its members have just passed the Novice exams. It is rumored that the 80-meter rig over at W2RCB has expired and so a modernization program is about to begin. New officers of QRP I are WA2JKX, pres.; WA2HYY, vice-pres.; WB2TNY, secy.; WB2TVM, treas. W2LGK went to his first QCWA Dinner and had a good time with his buddies. The ARC of Canarsie meets at the Isaac Bildersee JHS in Brooklyn at 2030 the 1st and 3rd Fri. TARCOM members are using their spare time to repair talking books for the Lighthouse of the Blind. How's that for some good old amateur spirit? Traffic: (Oct.) WA2GPT 543, WA2UWA 482, WB2RBA 291, W2EW 273, K2UBG 269, WB2DXM 226, WB2QKJ 223, WA2RUE 168, WB2PTS 131, W2GKZ 121, WB2PYI 108, KUAT 70, WB2TCS 66, WB2RQF 60, WB2UQP 57, WB2HLX 55, WB2OJX 49, K2UFT 47, WB2DZZ 42, WA2TKS 35, K2IDB 33, WB2MBU 32, WB2EMJ 28, WB4APN/2 28, WB2AEK 20, W2EC 19, WB2UGP 19, WB2NGZ 18, WA2RAR 16, W2DBQ 13, WB2DVK 13, WB2PFY 13, WB2UJV 10, W2IAG 9, WB2UNJ 9, W2GP 6, W2PF 6, WA2THR 4, WB2AWX 2, K2DGI 2, WB2TOM 1. (Sept.) WA2GPT 198, WA2QJN 12.

NORTHERN NEW JERSEY—Acting SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: K2ZFI. ARPSC section net schedules:

NJN	3695 kc.	Daily	7:00 P.M.	W2BVE RM
NJ Phone	3900 kc.	Ex. Sun.	6:00 P.M.	W2PEV PAM
NJ Phone	3900 kc.	Sun.	9:00 A.M.	W2ZI PAM
NJ 6	51,150 kc.	M-W-Sat.	11:00 P.M.	K2VNL PAM
NJ 2	146,700 kc.	Tue.-Sat.	10:00 P.M.	K2PTZ Mgr.

All times shown are local in effect. AREC net skeds are available from K2ZFI. New appointments: WA2ASM as EC for Plainfield and vicinity; W2BVE as RM for NNJ. On behalf of everyone in the NNJ section I would like to say "thank you" to W2CVW, our Retiring SCM for an outstanding job during the past 3½ years. Ed, as you know, gave his all. He has promised to stay around for a time as Asst. SCM. We also would like to thank WB2AEJ for his work as RM of NNJ during the past year. The heavy load of school work forced him to resign. K2RDX is looking for other 432-Mc. stations in Ocean County. WB2FYB, WB2JYM and WB2SPD are all running 1-watt rigs on 7 Mc. WN2YXV has worked 15 states after a month and a half of operating. WB2LAM is home following surgery. W2MTP is a new member of the 2-Meter Gonyagle Net. K2IEF is building Ted Crosby's HBR-13 receiver. WB2WNH and his XYL, WN2YOZ, took in the recent Hudson Division Convention with their harmonics. We wish to congratulate the following groups in NNJ for winning their Field Day class. Morris RC, Seven-Eleven RC, Tri-County RC and the Englewood Amateur RA. The Nutley Amateur Radio Club's officers are W2TJD, pres.; WB2RSU, vice-pres.; WB2VPB, secy.; and W2JYF, treas. K2KFP moved to a new QTH and plans a quad atop the new 55-ft. tower. W2PBZ still is chasing s.s.b. DX. Hudson Division Director W2TUK, Vice-Dir. K2SJO and SCM W2LQP spoke at the Nutley Amateur Radio Club on HamQuest 67. The group is available to all clubs in the area. The Fairlawn ARC conducts code classes for beginners before all meetings. If any other clubs have this worthwhile project going please let the SCM know. It will appear in this column. Your SCM, his staff and all who help out wish to say Happy New Year to all and may "67" be your best. Traffic: (Oct.) WB2OHK 632, WB2SKD 276, WA2TEK 159, WB2WWH 117, K2KDQ 96, K2ZFI 84, W2EWZ 54, W2CVW 51, WB2VUJ 45, W2PEV 43, W2QNL 40, WB2UCS 40, W2LQP 38, WB2IYO 20, W2IGL 16, W2DRV 13, K2MFX 12, WB2QGB 11, K2JTU 10, W2TFM 10, WA2TAF 9, K2EQP 7, WA2TBS 7, W2RVE 6, K2DEL 6, WB2GFY 6, WB2RSS 5, WN2YPQ 5, WA2CCF 4, WB2KTO 4, K2SLG 4, WB2VHG 4, WB2UFV 3, W2ABL 2, WN2YON 2, W2CFB 1, WB2ICH 1. (Sept.) W2QNL 23.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. In late October a severe tornado struck the town of Belmond and the Iowa amateurs set up operations almost immediately and maintained communications for several days. During this time the 75-Meter Net was in special sessions with QNI 300, QTC 500. WØOCS and WAØINC reported SET activity. WØJAQ sends Official Bulletins Mon.-Wed.-Fri. at 1900 GMT on 3850 kc. WØUSL reports that he is moving to Indiana. We are losing a fine OO and traffic man. The Iowa 160-meter emergency net reports QNI 640, QTC 8 in 31 sessions. The Iowa 75-Meter Phone Net reports QNI 1250, QTC 275 in 25 sessions. Traffic: WØLGG 1512, WØLCX 1063, WAØJEG 227, WAØMIH 138, KØASR 79, KØBRE 68, WØYLS 39, KØEXN 34, WAØIYH 33, WØUSL 30, WAØNEH 24, WAØJUT 23, WØLJW 22, KØQKD 21, WAØDYV 18, WAØINC 16, WAØAFY 14, KØKAQ 13, WAØAJA 10, KØTDO 10, WØNGS 9, WAØMIT 3, WAØMWW 2, KØDYS 1.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. RM: WAØJII. PAM: KØJHF. V.H.F. PAMs: WØHAJ, WAØKSK. WØHBD is now a Silent Key. KØMZZ reports the repeater in Salina about to be put into operation. WAØCCW still holds his many skeds on 2 meters. WAØMLE is now using a new HA-1 keyer. WAØJFV reports QKN still could use some new QNI. 3735 kc., 1600 CST Sun. KØJMF reports Sun. KPN QNI 137, QTC 51 and week-day KPN, QNI 155, QTC 32; KSBN, 26 sessions, QNI 536, QTC 266. WAØHMZ sends Official Bulletins on 145.350 Mc. Tue. at 9:30 P.M. CST, Sat. at 8:30 P.M. CST, Sun. at 7:30 P.M. CST. HBN reports QNI 485, QTC 250 and Operator of the Month on HBN, W5MJO and WØEEE tied. WØFII completed the Automatic CQ sender, per Oct. '63 *QST*. KØEMB transmits OBS on 3920 kc. Tue. and Wed. at 1755 CST on 145.350 Mc. Sat. at 2055 CST. WAØLLC is the new net mgr. of the Kansas Weather Net. Kansas WX Net reports QNI 637 for Oct. with QTC 16; Zone 10 QNI 44 in 4 sessions of the AREC Net; Zone 11 averages 79 QNI a month on 3900 kc. Sun. at 1230 CST, and 42 QNI a month on the 2-Meter AREC Net; Zone 13 QNI 56; Zone 15 QNI 61, QTC 20 on the 3910-kc. Net 0930 CST Sun. The C.W. Net Zone 15 and 6-Meter Net are very active, with QTC 44 on the 6-Meter Net. QKS reports traffic 128 29 sessions, 192 QNI. WØBYV is back on the air. The Kansas Pi Net had QNI 115, QTC 71 in 16 sessions. Kansas AREC had 578 members as of Oct. 31. Traffic: WAØMLE 581, KØGZP 207, KØEMB 140, KØJMF 135, WAØJII 128, KØUVH 123, WAØLLC 109, KØMZZ 93, KØMRI 85, WAØGKZ 81, WØINH 76, WAØCCW 69, KØGII 61, WØAVX 54, WØQQQ 52, KØKED 48, KØLPE 39, KØBXF 34, WØFII 2.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. KØWJB was appointed EC for Dunklin, Butler and Pemiscott Counties upon the resignation of WØYHT. WAØKNW moved to Brunswick and is Chariton County EC. Other appointments: WØEEE as OPS/ORS/OBS; WAØJRP, WAØITU, WØHHG and KØGOB as OVSs. Appointments renewed: WAØFLL as OBS; WØKIK as ORS; WAØFKD as RM; KØJWN as OVS; KØRPH as ORS/OPS. New officers of the MSM RC (WØEEE) are WA9GUU, pres.; KØDJG vice-pres.: WØBCG, treas.; WA2LLG/Ø, secy.; KØJXI/Ø, sta. mgr.; WAØAHM, act. mgr.; KØVXU, tfc. mgr. KØONK visited with KØJTW and spent a week end on the U. of Nebr. campus. The K.C. RACES handled communications for the American Royal parade, and 8 mobiles with Reserve Police patrolled K.C. on Halloween. WØAIB organized these two service activities and KØORB acted as NCS for both. KØJPL worked ZD8 on 40 s.s.b. KØAXU was located in the Red Cross Building during the SET. KØRPH is active again with an NCX-3, 80-40-20 dipole and 50-ft. tower. WNØPCG, WAØFLL, WAØENI, KØYIP and KØGSV participated in the Sept. FMT. OO reports were received from KØJPJ, WØQWS and KØGSV. OVS reports were received from WØJTD, WAØITU, WAØJRP and KØJWN. Net reports for Oct.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	15	205	55	WØBUL
MON	3580	0100Z	Daily	31	234	232	WØWYJ
MNN	7063	1900Z	M-Sat.	25	71	23	WØOUD
MoSSB	3963	2400Z	M-Sat.	26	543	350	KØTCB
MoPON	3810	2100Z	M-F	21	334	375	WØHVJ
MTTN	3940	2300Z	M-F	20	207	100	WAØELM
QMO	3580	2200Z	Sun.	5	17	17	WAØFKD
M8N	3715	0300Z	Daily	31	60	26	KØONK
PHD	50.4	0130Z	Tue. (GMT)	5	73	2	WAØFLL

Traffic: KØONK 2130, WØEEE 569, KØAEM 380, WØHVJ 333, WØZLN 247, KØYGR 211, WAØKBZ 166, WØOUD 147, KØRPH 129, WAØFMD 110, WØTDR 104, KØAXU 66, WAØJIH 60, KØJPL 56, WAØELM 53, WAØPYJ 45, KØTCB 43, WØBAZ 38, KØVXU 38, WØBUL 35, WAØLYE 34, KØENH 23, WØRTO 28, KØJPS 21, WØGBJ 18, WAØKYB 17, WØGQR 14, WAØFLL 13, KØORB 13, WAØIHV 9, WAØCHH 7, KØJPJ 6, WAØHQR 5, WAØJZK 4, WAØBGU 2, WØBVL 2, WAØFKD 2, KØGOB 2.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØOAL. Appointments: KØOAL as SEC and WAØJUF as PAM. Net reports for the month: Nebr. Emergency Phone Net, WAØGHZ, QNI 1580, QTC 102. Nebr. AREC C.W. Net, WAØEEI, QNI 10, QTC 2. Nebr. C.W. Net, WAØGHZ, 1st session QNI 90, QTC 38; 2nd sessions QNI 93, QTC 49. Nebr. AREC Phone Net, WØIRZ, QNI 188, QTC 6. Dead End Net, WAØMCX, QNI 424, QTC 54. Nebr. Morning Phone Net, KØUWK, QNI 1036, QTC 68. Nebr. Storm Net, WAØKGD, (Sept.) 1st. session QNI 982, QTC 94; 2nd session QNI 803, QTC 73; (Oct.) 1st session QNI 842, QTC 86; 2nd sessions QNI 1061, QTC 115. 160 Meter Net, WAØCBJ, QNI 407, QTC 7 (meets at 6:30 MST, 1995 kc. daily.) West Nebr. Phone Net, WØNIK, QNI 588, QTC 35. We were saddened by the death on Oct. 31 of KØJCH, of Cambridge. He was a loyal member of many nets and will be missed by us all. Traffic: WAØGHZ 468, WAØHWR 220, WAØKGD 169, WØLOD 88, WØGEQ 74, KØUWK 57, WAØAES 44, WØAGK 37, WAØCBJ 33, WØGGP 32, KØRRL 26, WØBFV 25, WAØLOY 23, WØVEA 23, WAØIBB 21, WAØKHE 18, KØIXY 17, WØNIK 17, WAØGVJ 16, WAØLLQ 16, WØZJF 16, KØJFT 15, KØVTD 15, WØWKP 15, KØJFN 14, WØFBY 12, WAØMOB 12, KØQKW 12, WAØEEI 10, KØFRU 9, WAØJAV 6, WAØOHO 6, KØDGW 5, WAØIXD 5, WAØJUF 5, WØQB 5, KØHNT 4, WØHOP 3, WØWZR 3, WAØLRP 2, WAØPFJ 2, WØRAM 2, WAØKFP 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. Net reports for Oct.:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845			
CPN	3680	M-S	1800	32	508	261

Technical Notes from RAYTHEON

This, the January 1967 issue, marks the initial appearance by the Raytheon Company in a particular page that has long served to present QST readers with ideas of men in industry concerned with designing and producing better electronics equipment.

It seems appropriate at this time to discuss the unique dual power supply that is built into the well known Raytheon SB-34, SSB transceiver. Many months went into designing a supply that would operate both on 117V AC and 12V DC and also fit into a housing only 5" high, 11¼" wide and 10" deep that already contained 21 transistors, 20 diodes and 3 tubes! Ultimately it was done—we think ingeniously—and with little compromise. For some time though it appeared that the complexity and attendant costs of switching from one power source to another would nullify the painstakingly-achieved savings in the rest of the equipment. Happily, switching was eliminated entirely by terminating the normally-switchable power supply leads at the pins of a plug located on the rear of the SB-34 chassis. Matching plugs on the respective AC and DC power cable sets (both are furnished) are strapped so that circuit changes are made automatically when the proper cord set is used. It's simple, low in cost. The actual power supply works out like Figures 1 and 2.

A single power transformer with 3 primary windings is used. When on DC, two of these windings comprise part of the circuitry for a common-emitter transistorized power-type oscillator which operates from 12V DC. This oscillator generates a square wave voltage which is stepped up, rectified and filtered and applied to RF driver and output linear amplifier. The other 21 transistors in the equipment require only the 12 volts available (through an L/C filter) from the storage battery. The entire job is done with minimum parts and wiring labor.

In AC operation, the 117V AC is applied to the third winding of the power transformer. Oscillator frequency and several other factors are design-set so that comparable high voltages are obtained with either AC or DC power sources. Significantly, switching complications are avoided by also using the two transistors in AC operation; the base/collector junctions serving as full wave diode rectifiers to supply 12 volts for transistor operation and heater voltage for the 3 tubes with feedback and collector transformer windings connected essentially in series. (This saves an extra winding—lowers transformer costs—keeps down size.)

This power supply is rugged, dependable—requires minimum components and labor, maintains selling price of equipment with built-in dual supply at levels unmatched by other equipment. There are no moving parts —no relays here (or anywhere else) in the SB-34—nothing to wear out. The transistors used throughout will last for years.

For further information, write:
SBE, 213 East Grand Avenue,
South San Francisco, Calif. 94080.

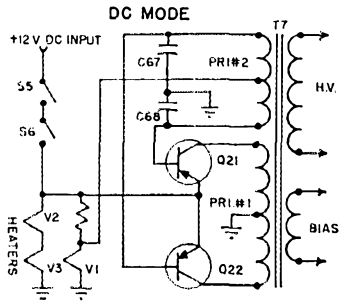

Figure 1.

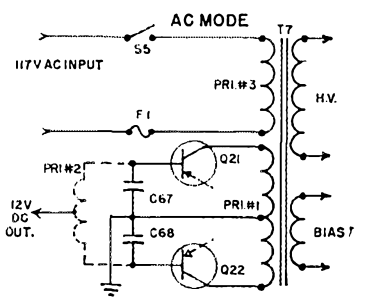

Figure 2.

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New HEATHKIT® SB-301 amateur band receiver

With These New Extra-Performance Features

• RTTY position on mode switch — SB-301 is a fully capable RTTY receiver • 15 to 15.5 MHz coverage for WWV reception • Built-in switch-selected ANL • Front-panel switching for control of 6 and 2 meter plug-in converters — enables complete 80 through 2 meter amateur band coverage • Improved product detector and audio circuitry • Simplified assembly procedure through "sub-pack" packaging and assembly techniques

Plus These Pace-Setting Features That Have Already Made The SB-300 Famous In Amateur Radio

• 80 through 10 meter AM, CW, & SSB reception with all crystals furnished • Crystal controlled front-end for same rate tuning on all bands • Famous Heath factory-assembled & tuned LMO for the ultimate in high stability and linear tuning • 1 kHz dial calibration — 100 kHz per dial revolution • Bandspread equal to 10 feet per megahertz • Tuning dial to knob ratio approximately 4-to-1 • The unequaled satisfaction of using a truly high-performance receiver you have assembled yourself

THE NEW SB-301 SETS "THE STATE OF THE ART" FOR AMATEUR BAND RECEIVERS. The new 15 to 15.5 MHz tuning range enables the most accurate attainable frequency check with the built-in 100 kHz crystal calibrator and WWV ... and as you read the specifications, notice the Heath pre-built LMO surpasses the tuning characteristics of every other receiver on the market. What's more, if your QTH is a high noise location, you'll appreciate the new ANL, providing excellent impulse noise rejection.

NEW "SUB-PACK" PACKAGING & ASSEMBLY SPEEDS CONSTRUCTION TIME. Components are packaged separately for each phase of construction ... saves you time in selecting components ... lets you see your progress more clearly as each phase is completed. Order the new SB-301 for unmatched value in a deluxe AM, CW, SSB, and now RTTY amateur band communications receiver.

Kit SB-301, Amateur Band Receiver, less speaker, 23 lbs.....**$260.00**

SBA-301-1, Optional AM crystal filter (3.75 kHz), 1 lb...**$20.95**

SBA-301-2, Optional CW crystal filter (400 Hz), 1 lb.....**$20.95**

Kit SBA-300-3, 6-Meter Plug-in Converter, 2 lbs.....**$19.95**

Kit SBA-300-4, 2-Meter Plug-in Converter, 2 lbs.....**$19.95**

Kit SB-600, Communications Speaker, 5 lbs.....**$17.95**

SB-301 SPECIFICATIONS — **Frequency range** (megahertz): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 15.0 to 15.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3.395 megahertz. **Frequency stability:** *Less than* 100 Hz *per hour after* 20 *min. warmup* under normal ambient conditions. Less than 100 Hz for ±10% line voltage variation. **Visual dial accuracy:** Within 200 Hz on all bands. **Electric dial accuracy:** Within 400 Hz on all bands after calibration at nearest 100 kHz point. **Backlash:** No more than 50 Hz. **Sensitivity:** Less than *0.3 microvolt for* 10 db *signal-plus-noise to noise ratio for* SSB *operation.* **Modes of operation:** Switch selected; LSB, USB, CW, AM, RTTY. **Selectivity:** RTTY; 2.1 kHz at 6 db down, 5.0 kHz at 60 db down (crystal filter supplied). SSB; 2.1 kHz at 6 db down, 5.0 kHz at 60 db down (crystal filter supplied). AM; 3.75 kHz at 6 db down, 10 kHz at 60 db down (crystal filter *available as accessory*). CW; 400 Hz at 6 db down, 2.0 kHz at 60 db down (crystal filter available as accessory). **Spurious response:** Image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Audio response:** SSB; 350 to 2450 Hz nominal at 6 db. AM; 200 to 3500 Hz nominal at 6 db. CW; 800 to 1200 Hz *nominal at* 6 db. **Audio output impedance:** Unbalanced nominal 8 ohm speaker and high impedance headphone. **Audio output power:** 1 watt with less than 8% distortion. **Antenna input impedance:** 50 ohms nominal. **Muting:** Open external ground at Mute socket. **Crystal calibrator:** 100 kHz crystal. **Front panel controls:** Main tuning dial; *function switch; mode switch;* AGC *switch; band switch;* AF *gain control;* RF gain control; preselector; connector & ANL switch; phone jack. **Rear apron connections:** Accessory power plug; HF antenna; VHF #1 antenna; VHF #2 antenna; mute; spare; anti-trip; 500 ohm; 8 ohm speaker; line cord socket; heterodyne oscillator output; LMO output; BFO output; VHF *converter switch.* **Tube complement:** (1) 6BZ6 RF *amplifier;* (1) 6AU6 Heterodyne mixer; (1) 6A84 Heterodyne oscillator; (1) 6AU6 LMO osc.; (1) 6AU6 LMO mixer; (2) 6BA6 IF amplifier; (1) 6AU6 Crystal calibrator; (1) 6HF8 1st audio, audio output; (1) 6AS11 Product Detector, BFO, BFO Amplifier. **Power supply:** Transformer operated with silicon diode *rectifiers.* **Power requirements:** 120 *volts AC, 50/60 Hz, 50 watts.* **Dimensions:** 14⅞" W x 6⅝" H x 13⅜" D. **Net weight:** 17 lbs.

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New HEATHKIT® SB-401 5-band SSB transmitter

With Expanded Versatility — Whether You're DXing, In A Round Table, Net, Or Rag-Chew

• A single panel switch selects transceive or independent operation of SB-401 and SB-301 (or SB-300) combination — no cable changing required • Can be operated as an independent transmitter with any receiver when SBA-401-1 crystal group is installed • New simplified assembly procedure through "sub-pack" packaging and assembly techniques

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• A completely self-contained desk-top transmitter with built-in power supply • Built-in antenna changeover relay • Famous Heath pre-built & tuned LMO frequency control • ALC for higher talk power • Optimum power level for operation "bare foot" or as a driver — 180 watts PEP SSB, 170 watts CW • Crystal filter SSB generation • Operates upper or lower sideband • VOX and PTT control • The same uncompromized tuning calibration, linearity, and stability that have made the Heath SB-Series unequalled not only in specifications but on-the-air performance.

VALUE COMPANION TO THE SB-301 OR SB-300. The Heathkit SB-401 provides full transceive operation with the SB-301 or SB-300 ... gives you outstanding performance 80-10 meters with single-knob LMO control. In addition the SB-Series "combo" goes from transceive to independent transmitter-receiver operation with a flip of a single switch on the SB-401 front panel ... perfect for DXing! The SB-401 derives all the necessary crystal oscillator voltages from the SB-301 or SB-300 ... eliminates redundant circuitry! Include the SBA-401-1 crystal pack for complete, independent transmitter operation with receivers other than the SB-301 or SB-300.

Kit SB-401, 34 lbs.....$285.00
SBA-401-1, Crystal Pack, 1 lb.....$29.95

SB-401 SPECIFICATIONS — Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohm — less than 2:1 SWR. **Frequency range:** (MHz) 3.5 — 4.0; 7.0 — 7.5; 14.0 — 14.5; 21.0 — 21.5; 28.0 — 28.5; 28.5 — 29.0; 29.0 — 29.5; 29.5 — 30.0. **Frequency stability:** Less than 100 Hz per hr. after 20 min. warmup. **Carrier suppression:** 55 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kHz. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **CW sidetone:** 1000 Hz. **ALC characteristics:** 10 db or greater @ 0.2 ma final grid current. **Noise level:** 40 db below rated carrier. **Visual dial accuracy:** Within 200 Hz (all bands). **Electrical dial accuracy:** Within 400 Hz after calibration at nearest 100 kHz point (all bands). **Backlash:** Less than 50 Hz. **Oscillator feedthrough or mixer products:** 55 db below rated output (except 3910 kHz crossover which is 45 db). **Harmonic radiation:** 35 db below rated output. **Audio input:** High impedance microphone **Audio frequency response:** 350-2450 ±3 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅛" W x 6⅝" H x 13⅜" D.

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CPN high QNI: WA1EEJ and W1GVT 31, W1ULH 28, W1HBH and W1YBH 25, K1EIC and K1SRF 24, WA1GBA 21, WA1DEM, K1DGK and W1MPW 19. With regret we note W1CJD added to the roster of Silent Keys. *QST* cartoons by "Gil" will be long remembered and missed by all. Amateur radio has lost a most understanding friend. SEC W1PRT and W1GVT attended the Hartford County ARA meeting. The SET provided a considerable increase in traffic—this could be as interesting as Field Day! EC was provided by Halloween Goblin Patrols. Reports were received from K1SRF, W1ADW, K1QPM, K1OQG and W1WHR. Club reports: Danbury CARA via W1ADW—The Conn. QSO Party was very successful. The club made high scores in the FD Contest. The HCARA holds code and theory classes Thurs. P.M. at ARRL. The Conn. Council, via W1WHQ requests monthly club reports via any of the traffic nets. The Southington ARA was active in the Scout Jamboree on the air via K1CSY. W1DNJ and K1EUW. Eastern Conn. ARA, via WA1DWE—N.E. high scores in the FD was made by K1MUH/1. Nets are active on 50.5 and 28.6 Mc. with a certificate offered. W1LXV, U. of Conn. and W1YU, Yale University, are active on traffic nets. W1KAM invites all to join the Slo C.W. Net at 6 P.M. on 3748 kc. Congratulations to W1BGD and K1RQO on making the BPL in Oct. and to K1LMS on the 30-w.p.m. sticker. Many more OOs are needed for 10, 6 and 2 meters. Contact your SCM. Suggestions for New Year's Resolutions: Join a traffic net, improve your c.w. speed, build some piece of equipment, get a higher class license! My sincere thanks to all for your help. Good Health, Good Luck and a Happy New Year to all! Traffic: W1BGD 751, K1LMS 495, W1EFW 486, W1AW 288, K1RQO 284, K1OQG 226, K1STM 190, K1UDD 182, WA1CYV 179, W1BDI 135, W1GVT 135, WA1FNJ 128, W1KAM 88, K1SXF 78, W1YBH 66, W1MPW 47, K1SRF 40, W1PRT 39, W1LVQ 35, WA1DEM 32, W1LXV 28, WA1ELA 27, W1KUO 23, W1CTI 20, W1QV 19, K1QPN 16, K1DXE 12, W1ZL 12, K1YGS 11, W1OBR 6, W1BNB 4.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—SEC: W1AOG received reports from K1s ERO, WVW and DZG. W1s RM, EHT, QMN and K1PNB took part in the SET. W1s PLJ, BGW, WAJ, K1QDR, K4GGI/1 and A.G. Gann took part in the Sept. FMT. W1ALB writes from London. W1KAN now is in Ashland; W1ARO/MP in Scituate. Ex-W1GEF is getting the bug again. W1OTN had an operation. W1NF has a sked with W3OY Wed. nights. The 6-Meter Crossband Net reports 21 sessions, 302 QNIs, 22 traffic. WA1DEC/DED mobiled to Ohio via 6 meters. The South Shore Club will hold an auction at 7:30 P.M. Thurs., Jan. 19, at the Viking Club, 410 Quincy Ave., Braintree. W1AKY will be auctioneer. Silent Keys are W1KNO, Terrill Smith, formerly of Medford, W1HPW, W2RTP and W8AAJ. W1BGW rebuilt his frequency measuring equipment. The EM2MN held 21 sessions, 195 QNIs, 180 traffic. WA1BLT says that there are 10 operators in Gloucester on 6 and 2 and asks the gang to point their beams that way. W1HIL is keeping his skeds. The QRA auction was very good. K1OJQ is working on a rig for 432 Mc. and says he and W1s AYG, BW, WK and K1FFE are on s.s.b. on 2. W1EKG is working DX with the rig in his car. New officers of the Barnstable Radio Club are K1BIF, pres.; W1PX, vice-pres.; K1LIE, secy.-treas.; W1BNC, K1s GAZ, LEK, ZFL, directors. The club conducts theory and code classes at the W. Yarmouth Community Bldg. W1IH's rig blew up. WA1DDO has a sixteen-element skeleton slot on 2. K1WYS is with the Air Force in Montana. WAØGSA/1 took part in the SET. WA1BFD worked 43 states in the Mass. QSO Party. W1CED worked some JAs. W1PEX and WAØGSA/1 made the BPL. K1GPH is on again after antenna troubles. W1AOG was on 2, 6 and 75 for the SET. W1UIR is on 75 again. W1DAL has a new keyer. The Needham Emerg. Net meets on 51.75 Mc. Sun. at 1930. WA1FSI, trying to work her dad in England (G5ACU/W2AXL), has an SB-301. WA1DJC is going after WAS now. WA4JYB/1 is secy. of the MIT Radio Society. W1MX. W1OFK is modifying the BC-342. K1CTK/DU writes from Clark Air Base in the Philippines. W1ALP attended a meeting of the Seacoast ARC in Newburyport. K1BGK has the beam for 2 meters 76 feet up. W1BVP now is on a Coast Guard Cutter. K1s OJQ and OWM are new OVSs: WA1EVY is a new ORS. W1AOG has been endorsed as SEC and OBS. WA1FIQ is on 2 with a 522. WN1s GUF and GZV joined the Somerville "Y" Club. K1VOK is helping Novices to get their General Class tickets. K9AQP/1 has built a transistor s.s.b. exciter. W1HGT has gone back to BU. K1FJM worked W2s and W3s on 2. W1BB and his XYL are on a cruise in the Pacific until Feb. WA1DPX worked W2s on 2. W1FON says there are 17 Army MARS stations in Vietnam. W1EAE spoke at the Wellesley ARS on traffic work. Officers of the Roxbury YMCA Radio Club are W1DXM, pres.; W1QLC, vice-pres.; WN1ENU, secy.; WA1EHX, treas.; W1AQV club mgr. W1s BVP and WLZ went to Nantucket Isle at W1OH's QTH for the Mass. QSO Party. Traffic: (Oct.) W1PEX 1377, W1EMG 406, WAØGSA 262, W1OJM

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	301-R	144-148	7-11
	301-S	143.5-148.5	30-35
6M	301-B1	50-51	.6-1.6
	301-B2	51-52	.6-1.6
	301-C1	50-54	7-11
	301-C2	50-54	14-18
	301-J	50-52	28-30
20M	301-G	13.6-14.6	.6-1.6
CB	301-A1	26.5-27.5	.6-1.6
	301-A2	26.8-27.3	3.5-4.0
40M	301-K	7-8	.6-1.6
CHU	301-L	3.35	1.0
WWV	301-H	5.0	1.0
Int'l. Marine	301-I1	9-10	.6-1.6
	301-I2	15-16	.6-1.6
	301-M	2-3	.6-1.6
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	301-N2	119-120	.6-1.6
	301-N3	120-121	.6-1.6
	301-N4	121-122	.6-1.6
	301-N5	122-123	.6-1.6
	301-N6	123-124	.6-1.6
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	301-P2	155-156	.6-1.6
	301-P3	154-158	7-11
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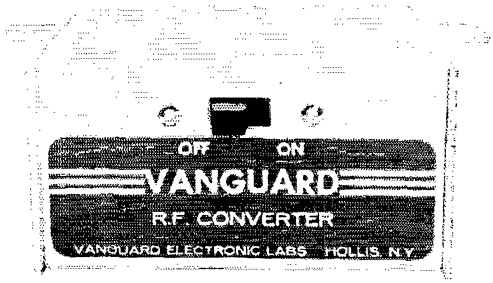

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215, WA1EYY 154, W1DOM 124, K1GPH 94, W1OFK 90, K1CLM 87, W1AOG 85, W1UIR 71, W1DAL 66, K1VPJ 60, WA1EAT 53, WA1DPX 33, WA1EVY 33, W1KBN 31, K1GKA 26, K1RCD 26, W1ZSS 26, W1CTR 18, W1FDN 18, WA1FSI 16, W1MIX 15, K1VOK 10, W1ALP 9, K1LCQ 6, K1OKE 6, WA1DJC 2, WA1FHJ 2, K1YUB 2. (Sept.) W1OJM 95, WA4JYB 4, W1BVP 2.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1WQI, K1ZVN. RM: K1TZH. Traffic nets: Sea Gull Net, 1700 to 1800 and 2000 to 2100 Mon. through Sat. on 3940 kc. Pine Tree Net, daily on 3596-kc. c.w. at 1900. Tribute to a Silent Key: W1IUG, Calvin L. Davis of Machais, passed away. He was active on most of the bands and very well known by many. He will be sadly missed by all who knew him along the way. K1JKT reports that the PAWA meets every Tue. at 7:30 P.M. at 227 Spring Street, new headquarters. W1KVI will be on 80- and 40-meter c.w. Code and theory classes will be conducted. W1GKJ is putting bulletins on both 6 and 2 meters on RTTY. W1GIU, W1GKJ, K1LMJ, W1YTW and W1-WHI are all on 2-meter RTTY. WA1ATX is handling lots of traffic on 2 meters. Traffic: W1GU 61, W1NND 49, K1WNC 2.

MAINE QSO PARTY

February 11-12, 1967

The contest period is from 1600 GMT February 11 to 0400 GMT February 13. The general call is CQ Me on c.w. and CQ the Maine QSO Party on phone. Exchange number, RS(T), ARRL section, county or country. Out-of-state stations multiply by Maine counties and Maine stations multiply by ARRL sections and countries worked. A station may be worked once per band/mode. Suggested frequencies are 3596 3940 7050 7255 14,150 14,250 21,150 21,350 28,500 29,500 50.5 144,720 and 145.08. Certificates will be awarded to high scorers. Send all logs before March 12 to the Maine SCM, Herbert A. Davis, K1DYG, RFD #1, Franklin, Maine 04634.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1YSD. PAM: K1APQ.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
GSPN	3842	2330Z	M to F	26	759	188	K1APQ
GSPN	3842	1430Z	Sun.	—	—	—	K1APQ
VTNHN	3685	2330Z	M to F	22	73	27	K1UZG
NHPON	50.82		M to F				K1BGI
MV AREC	50.82		Mon.				K1DWK
CBP	28.6		Thurs.				W1JB

Endorsements: K1APQ as PAM; W1IIQ, K1QES, K1-MNK and WA1DAO as ECs; W1EVN as ORS; K1AEG as OO. The ARRL SET has come and gone and K1YSD did a fine job. W1DYE is operating from his new QTH. K1PCY and K1PCZ did a fine job for the recent GSPN Dinner. W1HTE was active in the Conn. and Md./D.C. QSO Parties. New Asst. ECs are W1ALE, WA1DKD and W1EVN. K1MVA is active in Air Force MARS. W1BPW is looking for a good DX location in N.H. W1PZA is chasing DX on 80 meters. New hams: WN1HAT, Hillsboro; WA1HAD, Lincoln. The VTNH Net held two special sessions during the SET. W1ARE is chasing DX. K1NBN is getting ready for the 160-meter season. Traffic: W1ALE 77, K1PQV 27, K1YSD 23, W1MHX 16, K1BGI 13, W1SWX 9, K1PCY 1.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. PAM: W1TXL. RM: W1BTV, V.H.F. PAM: K1TPK. Endorsements: W1POP as EC, K1PAM as OO and OES. K1LII as SEC. RISPN reports: 31 sessions, 509 QNI, 175 traffic. It was with deep regret that I accepted the resignation of W1YNE as Rhode Island SEC. W1YNE did much to set up the AREC organizations in the state but because of the demands of his new position he felt that he could not adequately perform the duties of SEC. I have appointed Chester P. Tammany, K1LII, 119 Owen Ave., Pawtucket, as the new SEC. If your EC appointment has lapsed, contact K1LII or the SCM to have it updated. The Roger Williams V.H.F. Society of Providence provided mobiles for the Columbus Day Parade recently. Those taking part were K1PNI, W1CFT, K1CPL, WA1DPF, K1VOU, WA1BJS, K1UXS, K1NTJ and K1VYC. The club had six mobile units along the parade route with K1PNI acting as control. W1CFT provided hot coffee for the club. During the SET W1YKQ acted as liaison between IRN and the RISPN Nets. W1BTV was net control of the First Regional Net for two hours. Traffic: W1TXL 441, W1YKQ 423, W1BTV 158, K1VYC 103, K1NJT 62, K1TPK 57, WA1EEJ 49, K1YEV 43, K1YVN 31.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: K1UZG. Oct. Net reports.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2130Z	Dy & S	490	17	W1VMC
Vt. Fone	3855	1300Z	Sun.	184	—	W1UCL
VTNH	3685	2230Z	M-F	73	27	K1UZG
VTCD	3990½	1400Z	Sun.	42	8	W1AD
VTSB	3909	2230Z	M-Sat.	717	20	W1CBW
		1230Z	Sun.			

Note the new time for the VTSB Net (5:30 P.M. local time). Welcome to new Generals WA1GYG (N. Pomfret) and WA1GYS (Springfield). Catamount Club's new officers are K1SVW, pres.; K1NLD, vice-pres.; W1ADV, treas.; W1UXK, secy. The CVARC will sponsor the Vt. QSO Party next Feb. 18-19. Glad to hear K1BQB back on the air. Seasons greetings to all. Traffic: K1BQB 119, W1AD 73, K1UZG 22, W1FRT 21, W1IDM 8, K1LLJ 6, K1MPN 6, K1EQI 4.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU. C. W. RM: K1IJV. The Valley Amateur Radio Club of Springfield reports that it handles three distinct theory classes: The Extra Class every Tue. and Thurs. evenings at individual QTHs, General Class every Thurs. evening at Chet's shop on Hamburg Street, Novice Class by WA1DCH at his QTH. These are open to club members. Officers of the Montachusetts Club are W1FKT, pres.; K1ZDX, 1st vice-pres.; W8-FXX/1, 2nd vice-pres.; W1VBT, treas. K1KVJ, bulletin editor. A total of $210 was spent for goodies at the annual auction of the Hampden County Club. In the June Field Day competition the Hampden County Club won over the Tri-City Club by a score of 8740 to 7780. For the month of Sept. RM K1IJV reports The West. Mass. C.W. Traffic Net (WMN) handled 63 messages with the following in attendance in order of activity: W1DVW 25 sessions, K1IJV 19, K1WZY 15, W1BVR 12, W1DWA 8, K1SSH 7, W1MNG 3, W1EOB 3, W1YK 1, W1ZPB 1. W1MNG has left the Springfield Armory and is now teaching at the West Springfield High School. (Welcome to the fold, Art). For the very few of you who apparently read this column, please get your neighbor hams to send in items to me for this column. Or, maybe nobody reads this column. Sometimes I think so! Traffic: (Oct.) W1DWA 241, W1BVR 52, W1DVW 10. (Sept.) K1IJV 90.

NORTHWESTERN DIVISION

ALASKA—Acting SCM, John P. Trent, KL7DG—KL7BTP and his bride-to-be were in an auto mishap the day before their wedding but neither was injured. KL7AGU is QRL winter overhaul of the State of Alaska communication equipment. KL7FLS relayed NARC messages from Chitna on c.w. WL7FPX is working KL7IS 250 miles distant on twoer using a beam and Mt. McKinley 2-meter bounce. WL7FON is boning up for his General. KL7FNM (YL) was the first to work KL7 "Dreadful Ghost" at Chitna. KL7CAH is doing a wonderful job with the Sourdough Net, which meets nightly on 3892 kc. at 0400 GMT. The Polar Amateur Radio Club of Anchorage (YL and XYLs) had a nice all-hands party in late Oct. KL7FDG teaches General theory classes every Tue. night for the NARC; Kay Anderson handles the Novice section Mon. nights. The NARC has applied to the Alaska Centennial Commission to represent Anchorage for Amateur Radio Operators during the 1967 Alaska Centennial Year.

IDAHO—SCM, Donald A. Crisp, W7ZNN—The Idaho FARM Net convenes Mon. through Fri. on 3939 kc. at 0200 GMT. W7IWU visited W6EBK at Baldwin Park, Calif. The Lewiston-Clarkston Club is sponsoring a code and theory course. K7HLR has been appointed ORS. WA7EWV has been appointed OBS for the Lewiston Area. Applications are solicited for SEC and for EC, OVS, ORS, OPS, OO and OBS appointments. If interested, contact your SCM. WA7ETO is active with MARS traffic from Viet Nam. K7CPC is instructing a code class at the University of Idaho. FARM Net report for Oct.: 19 sessions, 603 check-ins, 96 traffic handled. Traffic: K7-HLR 414, W7GGV 19, K7OAB 8, WA7EWV 6, W7ZNN 4.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RZY. OBSs: K7EGJ, K7UPH.

Montana Traffic	3910 kc.	1800 MST	M-F
Montana PON	3885 kc.	0815 MST	Sun.
Montana RACES	3996.5 kc.	0900 MST	1-3 Sun.
Great Falls AREC Net	3910 kc.	0930 MST	Sun.
Billings AREC Net	3895 kc.	0915 MST	Sun.
Missoula AREC Net	3895 kc.	0900 MST	Sun.

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GRID DISSIPATION	200 MAX. WATTS

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Endorsements: W7CJN and W7JRG as OVSs. Most of the ECs in the state held SET drills during Oct. K7OEK and K7SIK will be on soon with new SB-100s. K7SMT is back in school in Bozeman. Both the Butte and the Anaconda Amateur Radio Club's code and theory classes are in full swing. W7PX made a short trip to the NPBA Hospital for some dental surgery. WA7DMA has a new 20-meter beam. W7CJN and his XYL spent their vacation in KP4-Land. W7FL has been on portable from Hot Springs with a very good signal. K7TZZ has his mobile working with the TR-3. W7ROE has a new trap antenna up at Columbia Falls. W7OIO has his converted 2-meter station on at Butte and is putting out a fine signal in the tri-county area. We still need a station to check into RN7. The Kalispell/Columbia Falls group will sponsor the hamfest at Apgar this year. Season's Greetings from your League staff here in the State of Montana. Traffic: K7LDZ 118, K7DCH 64, K7EGJ 41, K7ZIX 4, K7TZZ 3.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH. SET reports: WA7APD, Multnomah County AREC station permanently located in the Red Cross Building, was operated by WA7AWJ, WA7DLE, WA7DCC, using Communicator IV on 2 meters. A total of 17 stations and 7 mobile units participated. W7DEM, EC of Josephine County SET, reports using his station as control point, with emergency power; 21 stations participated in the exercises. They received a nice write-up in the local Grants Pass paper. WA7AHW, net manager of Oregon AREC Net, reports 31 daily sessions, total attendance 491, maximum counties per session 14, contacts 47, QST 3. Also 22 Section Net certificates were issued by SCM W7AJN to participants. New Novices in the Grants Pass area are WN7GKB and WN7GKC. K7-NXX-DL4EY is back from Germany. W7OPH is C.D. Radio Officer for Josephine County; W7ADF is assistant. W7WHY has his new linear in operation, also his antenna back up to 40 feet after difficulty with city engineers. K7DVK vacationed in B.C. and had a talk with VE7-AAT. Traffic: K7IFG 240, W7ZB 92, WA7BYP 46, W7-DEM 17, W7WHY 16, WA7CIP 13, W7AJN 8.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7UWT. RM: W7OEB. PAM: W7LEC. Section nets:

WSN	Daily	3535	0230Z	QNI	383	QTC	601	Sess. 31
WARTS	Ex. Sun.	3970	0200Z	QNI	1049	QTC	122	Sess. 27
NTN	Daily	3970	2130Z	QNI	1061	QTC	730	Sess. 31
NSN	Daily	3700	0300Z	QNI	539	QTC	180	Sess. 29

All Washington section nets were active in the SET and get a big "E" for effort. WSN is deserving of the highest commendations. Of the 8495 traffic count, over 3300 were in or out of ARAB country. Two gals make the BPL, RN7 and TCC, along with QNB to PAN, were ready and get our thanks. W7ZIW is a new ORS and a member of ARAB. W7PI, WSN recorder, has CD-3 forms in all member shacks. W7CHX and K7TCY visited W7BTB. The N.W. Weather Net again is active on 3890 kc. at 1330Z Mon.-Fri. K7EAM is MC. K7VNB goes from 25 watts f.m. to point 25 watts. K7ZVA totaled 19 hours in the SET. Kitsap County AREC-RACES holds drills the 1st and 3rd Mon. at 0430. K7VNV is the new vice-prexy of the Richland ARC, which is setting up code and theory classes at Benton County airport. The Rattlesnake Mountain repeater has in at 52.525 and out at 53.290 kc. f.m. W7GYF made 150 contacts in the CD Party and managed CT2YA on 10-meter c.w. W7AIB is back from a Nevada vacation. W7RXH is sporting a new Tri-bander. ORS W7AXT also is Asst. EC and RACES is active in Bremerton. WA7CSK operates a Marauder on 40-15 and is a new OBS. K7MGA has converted the handy-talkie to 6 meters. K7CHH racked up 80K in the C.W. CD Party. W7BX was honored at Centralia by the Lewis County ARC for fifty years in amateur radio. WA7BDF made Extra Class. Mary Ann. W7FWR, was honored at Olympia for "loyalty and service above and beyond the norm for amateur radio in general." Certificates went to 35 winners of the 1st Washington Section QSO Party. ARAB meets the 1st and 3rd Wed., Room 104H Olympic College. WN7FUF is secy. of the Radio Club of Tacoma. The Puget Sound Council of ARCs held its fifth annual banquet in October. Reported participants in the Boy Scouts Jamboree in Oct. were W7OS, W7IKG, K7AMJ, W7DNU, K7VCX, W7UMJ, W7WHV, W7BUN. K7CYZ still is looking for a deer with at least a dipole on its head. The Code Practice Net (CPN), under the direction of WA7-DXI, is on 3728 kc. Mon.-Sat. Traffic: (Oct.) W7BA 1531, W7HMA 1266, K7TCY 1133, W7ZIW 800, W7DZX 746, WA7DXI 629, W7JEY 417, W7OEB 344, K7CTP 336, W7-PI 300, W7BTB 161, WA7CFN 152, W7KZ 93, W7APS 92, W7JHA 90, K7VNB 78, K7ZVA 72, W7MCW 46, W7HMQ 45, WA7CXD 39, W7AMC 32, W7GYF 23, W7AAO 22, W7AIB 22, W7RXH 15, W7AXT 9, WA7CSK 4, W7EVW 4, (Sept.) K7MGA 41, W7LEC 18.

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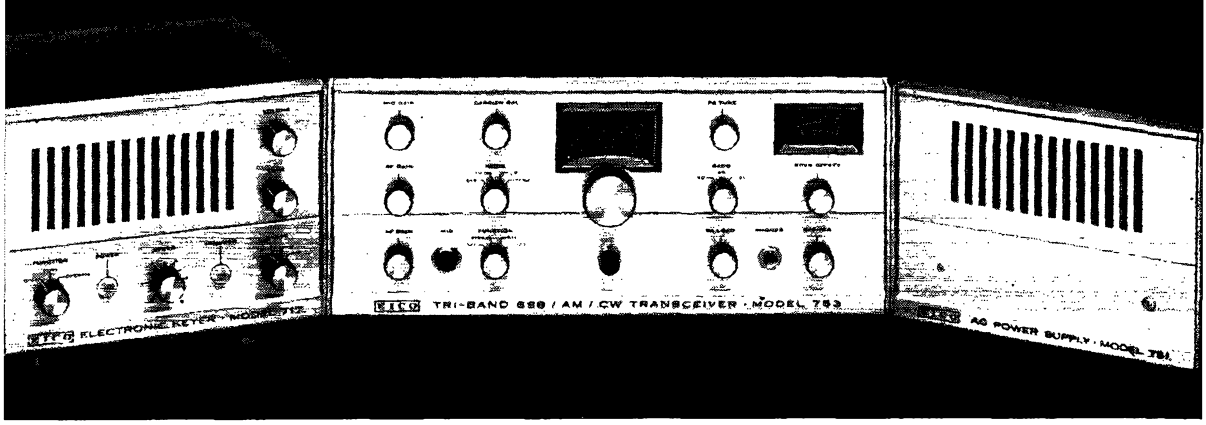

Who else but EICO

***Pro* all the way, from concept to execution — that's what ham editors say about EICO. Critical customers agree, and like the low price, too. They've made the 753 kit, for example, the industry's hottest seller. And the new 717 Keyer seems headed for the same fate. Highlights of both give you some inkling why:**

The EICO 753 is a complete 3-band transceiver, offering SSB/AM/CW operation with conservatively rated 200 watts PEP on all modes (rated for maximum efficiency rather than maximum possible input power). A new Silicon Solid State VFO provides full coverage of the 80, 40, and 20 meter bands. Assembly is made faster and easier by VFO and IF circuit boards, plus pre-assembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The EICO 753 is at your dealer now, in kit form and factory-wired.

FEATURES: High level dynamic ALC prevents flat-topping even with extreme over-modulation. Automatic carrier level adjustment on CW & AM. Receiver offset tuning (10 kc bandspread) without altering transmit frequency. Front panel selected STANDBY, VOX, or P-T-T operation. Unique ball drive provides both 6:1 rapid band tuning and 30:1 vernier bandspread with single knob. The Model 753 is an outstanding value **factory wired at $299.95**

EICO Model 751 AC Supply/Speaker Console: Provides all necessary operating voltages for Model 753. Incorporates PM Speaker, conservatively rated components and silicon rectifiers for minimum heat and extended trouble-free life. Includes interconnecting plug-in cables. **Kit $79.95 Wired $109.95**

SPECIFICATIONS: Output Voltages: 750 volts DC at 300ma, 250 volts DC at 170ma — 100 volts DC at 5ma, 12.6 volts AC at 4 amps. INPUT VOLTAGE: 117VAC.

EICO Model 752 Solid State Mobile Power Supply: (Not Shown). For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload. Output voltages identical to Model 751. Input voltage 11-14 volts DC.

Kit $79.95 Wired $109.95

The ideal accessory for the CW ham— the **fully automatic 717 Electronic Keyer.** It provides self-completing clean-cut dots, dashes, and spaces accurately timed and proportioned from 3 to 65 WPM in four overlapping switch-selected ranges with vernier control of all speeds within each range. Matches EICO 753 in appearance to make it a perfect table-top companion unit.

FEATURES: Output Contacts — 25 volt-ampere dry-reed SPST relay. Built-in adjustable tone and volume oscillator with a 3 x 5 inch speaker for monitoring. Can be used as a code practice oscillator.

Kit $49.95 Wired $69.95

For FREE catalog and Amateur Radio brochure write to EICO 131-01 39th Ave., QST-1; Flushing, New York 11352 EICO

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—WB6QNE is a new QNI to NCN. He is in Pinole and operates a KWM-2. W6UB reports activity is slow on 6. W6TYM is attending school from 1830 to 2200, which interferes with his TCC skeds. W6CBF and others missed the CD Party as it fell on the same week end as the Greater Bay Area Hamfest. W6ICR has a Swan 350 and W6DJK a Clegg 22-er. WA6QZA and WA6PTU have left the East Bay section for the sun and sand of Yucca Valley in the Orange section. WA6OJR and K6PXT are improving their stations. K6SPP has taken an assistant editor for the HRC's *Chewed Rag* and a new XYL. Congrats, Larry, on the XYL that is. WB6NUI has an NCX-3 but seldom finds time to operate. K6TFT is back from active duty in the USNR and has been reinstated as EC for Vallejo/Napa County. W6IIW has moved to Oakland. Traffic: (Oct.) W6IDY 522, W6TYM 472, K6LRN 162, W6YKS 141, WA6JKB 54, WB6QNE 8, W6CBF 4, WB6-LFJ 2. (Sept.) W6TYM 521, K6LRN 326, W6IDY 125, K6TFT 42, WB6LFJ 3.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. PAM: WØPAN/KH6. RM: Considering all offers. V.H.F. PAM: KH6-EEM.

Net	*Freq. (Mc.)*	*Time (GMT)*	*Days*
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F
No Ka Oi	7.290	2230Z	Sat.
50th State	3.895	0500Z	Tue-Sat.
RACES Nets	(40, 10, 6 & 2)	Coordinate with KH6GG.	

KH6KS and KH6AFC, closed shop in Hawaii after 32 years here and are now in 7-Land. Their address is c/o 6735 Fruitland Rd.; Salem, Ore. KS6BR/KH6 is active in the Pacific Interisland and Samoa Nets. KH6IJ reports that he's just completed a "Homewound Grain-Oriented 4 kVolt compact transformer for his final." KL7WH/KH6 and his XYL are leaving the islands. KH6s BZF, EEM, ECE, GDR, MM, DE, BB, FLN, FON, SP and others were on 10 during the last openings. WØPAN/KH6 finally worked DXCC and received his WAS and A-1 Operator Club certificates. KH6EPW's entire tower collapsed because of a snapped cable. Only the Telrex Stacked Monobanders were ruined. KH6FRO has applied for OPS appointment. KH6AX will not work on the TRANSPAC Race this upcoming season. KH6DXB, KH-6BB, KH6BZF and KH6BWT, are just a few of the local KH6s active in the AUTODIN program. KH6AIO and his gracious XYL have moved to Haiku Plantations on the Windward side of the island of Oahu. Trav Wood, ex-KH6EWD, writes from Trinidad and sends his hellos to all the KH6 clan. Write him at Omega Station; U.S. Naval Station; F.P.O., N.Y. 09555. Trav is now WB4-DWB. Traffic: (Oct.) KS6BR/KH6 54, KH6BZF 16, KH6FRO 1. WØPAN/KH6 1. (Sept.) KH6IJ 2.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. WN7EGW and WN7FZH are new Nevada amateurs. K7ICW is active on v.h.f. and u.h.f. and now is looking at m.f. with a Drake T4X and an R4A. The Nevada Emergency Net, on 3825 kc. s.s.b. Mon. and Thurs. at 1900P is doing a fine job. W7PRM, an OVS, reports failure on all experiments. WA7EPT has a new quad and RTTY gear. K7OHX says the restaurant business is keeping him busy but he reports some traffic. W7-PBV and WA7BEU attended the Director-called meeting in Oakland. The Southern Nevada f.m. group's repeater receives on 146.94 and transmits on 147.5 Mc. W7ZT is providing communications to Viet Nam. K7ZAU is doing an FB job with the *WCAR Sentinel*; also W7YKN and HH2PR with the *Rogchow*. W7BIF, K7NYU and K7RKH kept things rolling in the SET. WA7ARZ has a very nice QSL card. K7YXX is active on 15 and 20. Watch for the new Nevada Worked-All-Counties Certificate put out by the Reno NARA gang. Traffic: WA7ECT 69, K7OHX 16, WA7CFS 15, WA7BEU 13, K7RKH 9, W7PVB 6, W7KOI 2, W7YDX 2.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6RWB. ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ. RM: W6LNZ. ORSs: WB6HAW, W6-LNZ, W6OFK. OPSs: WB6EAG, K6IKV, WB6MAE, WA6TQJ. OBSs: W6AF, WB6PHQ, WA6TQJ. OOs: WB6 MPP, W6ZJW. OVSs: WA6CXB, WA6FWU, W6GDO. WB6MPP is a newly-appointed OO in Carmichael. WA6-SLU is resigning as OBS to go into the Navy. September participants in the Sept. FMT were W6GDO, W6KDJ W6TZK, W6WLI and W6ZJW. It was interesting to notice that all 11 of W6GDO's readings had an error of *zero!* We welcome newcomers W6KDJ and W6TZK to the FMTs. The RAMS held its Annual Dinner Dance Oct. 15, WN6RSY is now WB6RSY and is QNI to NCN from

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Redding. W6BGX is having success working Europe on 80-meter c.w. WA6FWU is an Asst. EC for Nevada County on the eastern end. The Sacramento Valley Net has been suspended because of lack of activity. The Oroville ARS has applied for a station license. W6LNZ and WB6HAW are organizing training sessions for SCEN so as to be effective in the event of an emergency. WB6MAE has been out of town working in Eureka. K6CB presented his homebrew S.S.B. exciter (Jan. '63 *QST*) for viewing at the Sacardep RC. New officers of the Sacardep are K6TWE, pres.; WB6HLJ, vice-pres.; WB6RIM, secy.; K6JIK, sgt. at arms; W6CLB, training officer. Traffic: (Oct.) W6LNZ 191, WA6TQJ 42, WB6EAG 30, WB6RSY 12, K6IKV 7, WA6JDT 5, WB6MAE 2. (Sept.) WB6MAE 10, WA6SLU6.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF. WB6GVI reports finding 10 meters opening more and was active in the Sweepstakes. WB6DGJ reports on plans for a 2-meter repeater in the Eureka area. WB6OGF has a new SR-150 and was working into Siberia on 20 meters with it. The Tamalpais Radio Club was asked by the Novato Police Department to help with its annual "Spook Patrol." A new call in Marin is WN6ULW, from Novato. W6OPL has been inactive during recent months because of the press of business problems. W6WLV, W6HSA and W6GQA were active in the Oct. CD Party. W6WLV made the NCN luncheon at Livermore. A new ORS certificate was sent to W6JXK, while WB6QGT is a new v.h.f. appointee. WA6STS worked San Jose, some hundred miles or so, on 432 Mc. with 100 mw output and now is working on a kw final for 432 Mc. W6UDL, W6BIP, W6JXK and W6JWF were active handing SET traffic into the Western Regional Headquarters of the Red Cross in San Francisco. K6JGX put up a beam and found out that there is a KH6-Land. WA6QXV is on a long vacation that started in Nov. WA6JUV was at the hamfest and talking with the other active v.h.f.ers. WN6TBC took his Conditional test in Eureka and expects to move up to new frequencies soon. W6BWV was in San Diego to visit his son and grandchildren in November. WB6DGJ is moving an 80-ft. Vesto tower to his QTH. WA6MGG continues to check into the section net from Sunnyvale. WB6JOX continues as N/C on the Section Net with a strong s.s.b. signal. The net meets Mon. and Fri. at 1830 local time on 3900 kc. W6CYO reports 65 countries confirmed since the first of the year. WB6AIS is looking for a drive unit for a Boehme automatic keying-head to perfect a new method of learning high-speed c.w. Public Service Awards were issued to K6OVV, K6RAO, WB6AIS and W6CYO for action reported in Jan. 1966 *QST*. The Marin Club held its Annual Christmas Dinner at the Deer Park Villa Dec. 10 while the San Francisco clubs were at the New Tivoli. W6BCM and WB6IMO were at the Western Single Sideband Luncheon at the San Francisco Airport in Oct. WN6MLV got his General Class license and ended up with the call WB6UGO. WA6AUD and W6GPB worked VQ-9AA, Don Miller, from Farquhar while W6CYO had to figure out a correction on his GMT time for Heard Island. Traffic: W6JXK 462, W6WLV 255, W6KVQ 138, W6UDL 72, W6BIP 50, K6TWJ 32, WA6AUD 19, K6TZN 18, WB6GVI 10, W6CYO 8, WB6DGJ 5, WB6IMO 2, WN6TBC 2, WB6OGF 1.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—K6AJU made the BPL for the first time with a total traffic count of 711. W6VKS got his Code Proficiency award for 30 w.p.m. W6VKS has ordered an SB-300 and an SB-400. WB6NCJ has a 75A-1 and an HT-37 and is active on 40 and 20 when no school activities. WB6PCQ received her 25-w.p.m. Code Proficiency award and is happy. WB6GJG is OBS and is active on several nets. W6HKV has a 20-meter beam up and is on 20. W6UBK has moved closer to town, next door to W6KOK who is active on 40 meters. The Turlock ARC had a 2-meter hunt with good results and participation. K6IXA is working on a 2-meter repeater. The Delta Amateur Radio Club meets the 3rd Fri. of each month at the Jr. Museum. All are invited to attend. W6RRN is having rotator problems. WA6UAA is attending Fresno State College. WB6IGD participated in the Sept. V.H.F. Contest and had a good time. W6JPU reports that he still has his call, even though you won't find it in the Fall Call Book. WB6MZU is active handling traffic. WA6FFJ is experimenting with ham TV. W6OWL is looking for some equipment for his MG sedan. The Fresno Amateur Radio Club meets the 2nd Fri. of each month in the Power Building, downtown Fresno. Send in those reports, men. Any activity in Bakersfield? Traffic: (Oct.) K6AJU 711, WB6HVA 341, WB6PCQ 296, W6ADB 270, WB6GJG 12, WA6SCE 7, WB6NCJ 2. (Sept.) WB6MZU 35. (Aug.) WB6MZU 251.

SANTA CLARA VALLEY—SCM, Jean A. Gimelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: W6VZE. RM: W6QMO. W6VZE, our new SEC, did a bang-up job in organizing the section activity in the SET. Charlie has

ANTENNA BREAKTHRU IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

Answers to frequent questions on the 10-15-20 Cubical Quads: the shipping weight is 28 lbs; complete sets of wires are included (all Gotham antennas are complete); SWR is 1.1:1 or better at resonance; spreaders are high-strength aluminum alloy tubing—this is the strongest quad we have ever made; our 13 years plus in QST is your guarantee of integrity and value, so order with confidence.

ALL-BAND VERTICALS

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Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

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Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

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Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

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Goes almost anywhere. On the ground, on the roof, or outside your window.

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Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YIHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters.....$14.95

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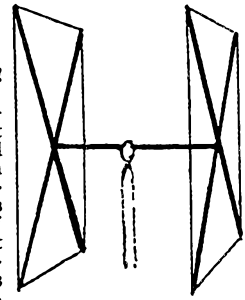
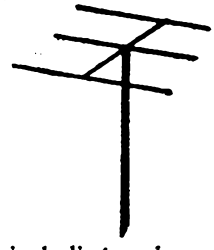
QUADS



NEW! NEW! NEW! CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD.....$35.00
10-15 CUBICAL QUAD..... 30.00
15-20 CUBICAL QUAD..... 32.00
TWENTY METER CUBICAL QUAD. 25.00
FIFTEEN METER CUBICAL QUAD. 24.00
TEN METER CUBICAL QUAD..... 23.00
(all use single coax feedline)

BEAMS



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20.....	$16	4 El 10.....	$18
3 El 20.....	22*	7 El 10.....	32*
4 El 20.....	32*	4 El 6.....	15
2 El 15.....	12	8 El 6.....	28*
3 El 15.....	16	12 El 2.....	25*
4 El 15.....	25*	*20′ boom	
5 El 15.....	28*		

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GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

been busy making plans for an EC meeting to be held in South San Francisco. W6RSY and W6YBV made the BPL; both are active on the NTS nets. Your SCM attended the Bay Area Hamfest with W6HC. WA6OXE/6, in San Mateo, is active on the West Coast Emergency Radio Service and Mission Trail. K6GK had difficulty with RTTY QRM on NCN, but managed to make most sessions. W6SAW attended the BAHamfest and is busy with OBS. Herb also is active on ARRL Intruder Watch. WB6IZF sports a new three-band two-element quad and was busy with the Boy Scout Jamboree on the air as well as the SET. W6BVB is building a Q-Multiplier and reports operation in the CD Party. W6AUC is busy as OO, OPS and ORS. W6RFF is busy building a 2-meter transistor converter. K6YKG now has an SX-25. K6PJW reports for the San Mateo AREC Net. W6YHM is busy with changes in his shack, mostly involving TTY gear. WB6NXK is working DX on 15 and 10 as well as handling NCN duties. Jim is a junior at Fremont High School in Sunnyvale. W6DEF reports for several AREC and traffic nets and says that activity was down during the SET this year, but the gang still was active. Hal also had a story on working the amateur who took his first FCC test with him in 1934. The PARA's November meeting included a talk by W6SAI. The SCCARA held an auction in October. The Santa Cruz Radio Club held a joint meeting with the West Valley Radio Club in Campbell Oct. 20. Guest speaker at the meeting was K6TWF. The Santa Cruz Club also held an auction at its Oct. meeting. The Foothills Club had an auction in October. The club puts out a fine bulletin, *FARS News Notes*, edited by K6RTU and WA6NIL. K6DYX is active as OBS on RTTY and c.w. W6ZRJ also is sending both the ARRL and Pacific Division Bulletins Wed. at 8 P.M. local time on 3635 kc. Speed is 20 w.p.m. for Extra Class code practice. The SCARS held its annual auction Oct. 24. Nominations of officers was the main order of business at the NPEC Oct. meeting in South San Francisco. Guest speaker was Capt. Ellison, who spoke on transistors. Traffic: (Oct.) W6RSY 1259, W6YBV 640, WB6NXK 230, W6DEF 124, W6ZRJ 73, K6GK 65, W6SAW 49, W6VZE 48, WB6IZF 24, W6BVB 15, W6AUC 12, W6RFF 8, K6YKG 5. (Sept.) K6YKG 3. (Aug.) WA6OXE/6 306.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RMs: WA4ANH and K4CWZ. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. WA4QLP is off to college and hopes to have a station set up there soon. WA4KWC is adding a WRL Duo-Bander 84 transceiver to his station equipment. K4EO says 15 meters is having some very good openings. K4ZKQ says the 2-meter link in Greensboro between the different nets has been working out fine. WA4NUO reports 10 meters has been wide open to Europe and Africa lately. WA4ZLK says the Wilson County Civil Defense RACES Net meets at 7:30 P.M. each Thurs. on 2 meters. W4IRE now has his Model 15 and TD running.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
NCN(E)	3573 kc.	2330Z	Daily	218	K4CWZ
THEN	3865 kc.	0030Z	Daily	127	K4ODX
NCN(L)	3573 kc.	0300Z	Daily	83	WA4ANH

Traffic: (Oct.) W4HJS 429, WB4BGL 310, W4EVN 303, WA4UFQ 281, K4CWZ 174, W4IRE 98, WA4LWE 69, W4RWL 69, WA4ZLK 69, WA4NUO 58, WA4FJM 54, WA4UVH 50, WA4VNV 48, W4BNU 38, K4ZKQ 33, WA4ANH 32, K4EO 17, WA4VTV 13, K4VQD 11, WA4GMB 10, W4NAP 8, W4ACY 7, K4TTN 7, W4UWS 7, WA4KWC 5, WA4QLP 2. (Sept.) K4HZP 44.

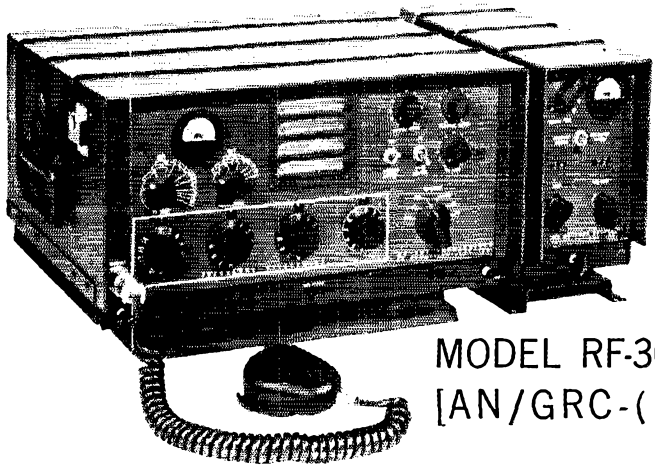
SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LNJ—SEC: WA4ECJ. Asst. SECs: W4WOM, WA4EFP. RM: K4LND. PAM: WA4RUB.

SCN	3795 kc.	Daily	0000Z/0300Z	
SCSSBN	3915 kc.	Daily	0000Z	Oct. Traffic 331

K4LND is back getting the C.W. Net going with the help of W4PED and the regulars. K4EIB is working the night shift. W4NTO is continuing with long reports of violations from OOing. Stations over the state are experimenting with 2 meters to determine ways and means of the state-wide 2-Meter Net. W4GPX will work 2 meters from Paris Mountain. 2-meter operation is spirited by RACES. GPX reports 300 to 400 miles with good reception. A quarterly net meeting of the SSBN was held in Greenwood Nov. 13 with a picnic lunch. W4ZIZ and W4UFV cover the Eyebank Net daily. W4HMG is state representative in the Selective Service Net, which still is looking for more s.s.b. stations to check into the C.W. Net for liaison. K4EUH is back on the air with a new NCX-3. WA4UYT, from the Georgia section at Clemson University is checking in as studies will permit. Traffic: W4PED

NOW—FROM R F COMMUNICATIONS, INC.

A NEW HF SSB TRANSCEIVER



MODEL RF-301A
[AN/GRC-( )]

For Army Tactical Communications Applications

GENERAL. The RF-301A [AN/GRC-( )] was designed by R F Communications specifically for Army Tactical Communications applications. It is a rugged and very reliable modern Single Sideband Transceiver that can withstand the rough usage normally expected in the field army. The RF-301A includes in a single unit features usually found in transceivers costing two or three times as much.

This transceiver is compatible with all military type HF, SSB and AM equipment currently operational, and is now in full production.

PROVEN BY OPERATIONAL USE. The RF-301A [AN/GRC-( )] is a revised Army version of the widely used RF-301 (AN/URC-58) SSB Transceiver. This unit has been sold to military users in the United States and in 14 other countries. It has been used extensively in the field under tactical conditions and has proven to be a highly reliable and dependable radio set.

FOR FULL MILITARY APPLICATIONS. The RF-301A can operate under severe shock and vibration. It is designed for use at extreme temperatures and high humidity. The unit is fully splashproof and can be used in vehicles, transportable shelters, or in fixed station applications.

FULL FREQUENCY FLEXIBILITY. RF-301A transceiver includes a fully transistorized synthesizer that can be set to any frequency in one kilocycle steps between 2 and 15 megacycles. Standard stability is 1 part in 10^6 which is suited for normal voice SSB, AM, CW and wideband FSK communications. In addition, continuous tuning with resolution of 100 cycles over the entire 2 to 15 Mc frequency range of the transceiver is provided.

This is the only transceiver available with both synthesizer and continuous tuning in both receive and transmit.

FULL COMPATIBILITY. The RF-301A transceiver is an extremely flexible unit, fully compatible with all high frequency SSB and AM equipment used by U. S. Defense agencies and by commercial organizations throughout the world. Operating modes include SSB (upper and lower sideband), AM, CW and FSK (with external adapter).

HIGH RF POWER OUTPUT. 100 watts PEP and average r.f. power output. The RF-301A transceiver can operate continuous duty, keydown, at 100 watts output at a temperature of +50°C.

UNIVERSAL POWER INPUT. Operates from 110/230 volt, 50/60 cycle power. In addition, a small module can be added within the RF-301A cabinet which makes it possible to use the transceiver on DC power as well as AC. Modules are available for either 12 or 24 volt DC operation.

TRANSISTORIZED. Fully transistorized except for P.A. and receiver R.F. input stage.

• For further information, please request a copy of our brochure on the RF-301A and its accessories.

RF COMMUNICATIONS, INC.
1680 UNIVERSITY AVENUE • ROCHESTER, NEW YORK 14610

134, W4WQM 74, K4LND 72, K4LNJ 45, K4OCU 30, W4JA 29, W4NTO 29, W4FFH 28, WA4QKQ 14, K4EIB 11.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4LJK, WA4EUL. PAM: W4OKN. It is with regret that we report the passing of another of our valued members: K4GRZ has joined the Silent Keys. When active he held EC, RM and ORS. A very interesting and colorful booklet is available outlining *The Navy in Tidewater*. It is free if you contact the SCM or W4NJF direct. WB4AMT is a new 13-year-old General in Richmond. W4JUJ, W4KFC and W4SZT have new s.s.b. equipment. W4KFC and W4PTR have improved their beams. W4IA is back and active in the section after a long overseas assignment. SEC K4LMB is looking for qualified ECs for many areas of the section. Traffic totals were much higher during Oct., probably because of the SET. There were three BPLers: K4LMB, K4CG and WA4DXJ. Traffic: (Oct.) WA4DXJ 511, WA2UFI/4 475, W4DVT 318, W4SZT 242, K4CG 227, W4ZM 198, K4ASU 188, K4LMB 171, W4NLC 153, K4LJK 146, W4RHA 144, K4ITV 139, W4TE 135, K4QUIY 123, W4ZMT 119, WA4URN 117, W4KFC 108, WA9JKR/4 97, W4SHJ 86, W4OKN 73, W4JUJ 55, K4KNP 48, W4KX 48, WA4PBG 33, K4FSS 32, W4BWF 30, WA4UMX 29, K4SDS 27, W4WG 23, K4YCH 15, WB4DRB 12, W4IA 12, WA4QOC 12, K4VCY 12, W4MK 8, W4PTR 8, K4MXF 5, W4LK 4, K4PIK 4, K4YEE 1. (Sept.) K4KNP 83, K4QIY 59, W4BZE 3. (Aug.) K4QIY 19.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAMs: K8CHW, W8IYD. RMs: K8TPF, W8LMF. Phone Mgr: WA8RQB. C.W. Mgr.: W8HZA. Congratulations to the following clubs on their fine Field Day activity: W8COE, Kanawha ARC; WA8UCB, Monongalia Wireless ARC; W8VA, Tri-State ARC; W8MOP, East River ARC: WA8FSE, Opequon Amateur Society. It is with deep regret I report the passing of WA8NLI. WA8QND made the BPL and is now Upshur County EC. WVN CW Net held 27 sessions, 120 stations and 86 messages, passing 12 messages during the SET. WA8AKU is on 29.6 Mc. f.m. from St. Albans. WVN PON reports 13 sessions, 187 stations, 69 messages handled. WA8RQB is a new OPS. WVN Phone Net with 21 sessions and 612 stations, passed 193 messages, plus 17 in the SET. WA8ANS, K8ZPR, K8AON, W8IRN and WA8HPE renewed their EC appointments. West Va. needs more OBSs and OOs. Traffic: K8TPF 291, WA8QND 140, WA8POS 82, K8BIT 76, W8HZA 76, K8MQB 73, WA8RQB 55, W8IMX 29, W8CKX 24, K8WWW 15, WA8PXF 14, W8AY 10, WA8QZO 10, K8CHW 9, W8JM 8, K8WMQ 4, W8CRW 2, W8CUL 2, W8CZT 2, K8ELH 2, W8GUL 2, W8IYD 2, WA8LAL 2, WA8NDY 2, WA8RHT 2, K8SOR 2, W8VYI 2, K8ZDV 2, WA8ALI 1, WA8BUM 1, K8CNB 1, W8EEO 1, W8ETX 1, WA8FCZ 1, WA8FIE 1, W8IRN 1, K8KFL 1, WA8KMZ 1, WA8OPM 1, W8ORT 1, WA8PWN 1, K8QYG 1, W8SSA 1, W8YSX 1.

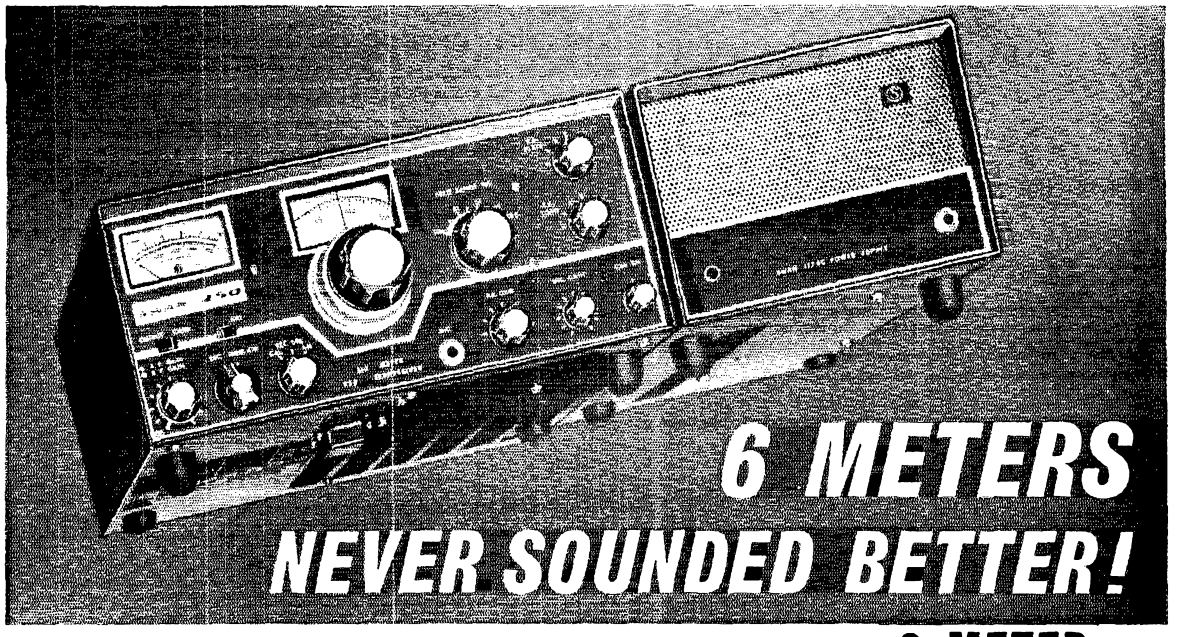
ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØTTB—Asst. SCM: A. E. Hankinson, WAØNQL. SEC: WØSIN. The following traffic nets are listed for information and to encourage participation by section members.

Columbine Net	0200Z	3989 kc.	Daily
Colorado Code Net	0130Z	3780 kc.	Daily
High Noon Net	1900Z	3895 kc.	Daily

Every club, every population center (10 or more people) should have a representative meeting one of these nets. KØSPR, EC for Pueblo, reports activity in Pueblo in the SET. Note the increased traffic reports from individuals. Please continue forwarding monthly traffic reports via the traffic nets to WAØNQL, Littleton. Personal items and comments can be sent by mail. As of Nov. 1 Ham-Quest 67 had produced at least a 5% increase in section membership. The Arapahoe Radio Club is the leading recruiter as of this writing. Thanks to WØMIMI and WØKAU for their help. Code classes are being given by WØOUI of the Denver RC. WØFA. Skeds will be sent on request. Traffic: KØFDH 187, WAØJEV 79, KØZSQ 54, KØDCW 45, KØZIJ 28, WØENA 21, KØTIV 10, WØLEK 7, KØGOT 6, KØIGA 4, KØFBM 2.

NEW MEXICO—SCM, Bill Farley, WA5FLG—W8BZY/5 reports that he made first place in the New Mexico section of the Tennessee, VE/W, Missouri and Massachusetts QSO Parties. K5TQP, on OVS, reports that he had a fine trip to the Sooner State and a good get-together with our former SCM, K5IQL. Fred says he has a full kw. on 2 meters and is continuing work on his 432-Mc. antenna and transmitters. Glad to hear that our PAM WA5MCX can stop worrying about his XYL. She is doing fine now. The power and light company in Alamogordo has gotten its new noise-locating equipment. Seems every active ham in town has asked them to check out their noise factors. Good cooperation has been the key word



than with a SWAN-250 6-METER TRANSCEIVER

6 Meter Band Openings Increase! With sun spot activity now on the increase, 6 meters is rapidly becoming one of the most interesting bands to operate, and the next few years will undoubtedly see tremendous activity on this band. Sporadic E openings are occurring several times each week over all parts of the country, making excellent contacts possible from Coast to Coast and over intermediate paths. With long F2 skip and trans-equatorial propagation to look forward to, plus the consistent ground wave and tropospheric scatter contacts made possible with the power of the Swan 250, there is practically no limit to the operating pleasure you can find in the VHF world above 50 mc.

The Swan 250 is at its best in the SSB mode, for which it was primarily designed. With 240 watts PEP input and an average beam antenna, its talk power does an outstanding job. To work your AM friends you simply insert carrier to 75 watts input, and they will read you loud and clear. AM reception is provided for by the receiver function switch. Also, a noise limiting circuit is effective on both AM and SSB.

The Swan 250 is engineered to provide the same excellent voice quality which has become the trademark of all Swan transceivers. And, naturally, the same customer service policy, second to none, applies to our VHF models.

If you are seriously interested in working 6 meters, see the new Swan 250 at your dealer. We are delivering now, but the back order list is getting longer, and we suggest you place your order soon.

73 Herb Johnson W6QKI

SPECIFICATIONS:

- ★ **240 watts** P.E.P. input on single sideband, 180 watts cw input, 75 watts AM input with carrier insertion.
- ★ Two 6146B tubes in Power Amplifier.
- ★ Complete band coverage, 50-54 mc.
- ★ Velvet smooth vernier tuning covers 500 kc, calibrated in 5 kc increments.
- ★ Transmits and receives on Upper Sideband.
- ★ 2.8 kc bandwidth with crystal filter at 10.7 mc.
- ★ Single conversion design for minimum image and spurious.
- ★ 40 db unwanted-sideband suppression, 50 db carrier suppression.
- ★ Receiver noise figure better than 3 db. 6HA5 triode R.F. amp., 6HA5 triode mixer.
- ★ **Separate AM detector.**
- ★ **Automatic noise limiter.**
- ★ Separate AF and RF gain controls.
- ★ Audio response essentially flat from 300 to 3100 cycles.
- ★ Pi output coupling for matching wide range of load impedances.
- ★ Meter indicates either cathode current or relative output for optimum tuning and loading.
- ★ Provisions for adding 500 kc calibrator, or plug-in Vox unit.
- ★ Dimensions: 5½ in. high, 13 in. wide, 11 in. deep. Weight: 17 lbs.
- ★ **Price, amateur net: Swan-250 .....$325**

External VFO for separate transmit-receive control available soon.

117XC AC Power Supply.....$ 95.00
14-117 12 Volt DC Power Supply.....$130.00
500 kc Calibrator Kit.....$ 19.50
Model VX-1 Plug-in VOX.....$ 35.00

MARK VI 50 mc LINEAR AMPLIFIER
2000 Watts P.E.P., two 3-400Z tubes. Includes Power Supply.
Price, less tubes.....$475.00

SWAN
ELECTRONICS
OCEANSIDE, CALIFORNIA

and everyone concerned has been made happy. WA5FJK and his intrastate delivery service will no longer be in service since he has been sent back to the home office. W5ALL has been appointed as SEC. Let's give him our best support. If you are an EC please sent in your monthly report. Traffic: WA5FJK 116, W5WZK 79, W5UBW 28, K5VXJ 27, W5DMG 20, K5ONE 19, K5GAX 17, WA5JNC 5, W5NUI 4, WA5BLI 2.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Section nets: BUN, daily on 7272 kc. at 1930Z. UARN, Sat.-Sun. on 3987.5 kc. at 1500Z. Reports seem to indicate that the '66 SET went somewhat better than last year. New stations reporting: WA7DET and WA7DYH, of Cedar City. Congratulations to W7OCX, who has been reelected as Rocky Mountain Division Vice-Director. WA7ADK has a new home-brew 2-meter transceiver. Welcome to traffic man WA7EBR, ex-KL7DEM, who recently moved to Monticello. Club station WA7FOC is now in business at the Intermountain School in Brigham City, with K7EZR as trustee. The Utah ARC again has won first place in the Utah Council of ARC 1A Field Day competition. New EC: WA7ADK for Davis County. K7QPE sports a new electronic keyer. Traffic: (Oct.) W7LQE 215, W7OCX 119, WA7BME 80, WA7ADK 41, WA7EBR 37, WA7FOC 18, W7VSS 9, K7CLS 8, K7ERR 4, K7QPE 2, K7HEN 1. (Sept.) W7BAJ 250.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: WA7CLF. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7ZHT, WA7DNZ. Nets: Pony Express, Sun. at 0830 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. Notice that the YO Net has gone to a daily basis and is looking for more state coverage and relay stations. WA7DNZ was in a serious auto accident but is recovering rapidly. K7KMT is now in the service stationed at Ft. Bliss, Tex. W7NNX is back on the air after not being heard for a couple of years. At last count there were about 7 hams in Green River and the same number in Evanston. Traffic: WA7CLF 67, WA7DKZ 25, K7ITH 20, K7AHO 12, W7TZK 8, K7BTE 7, WA7BPO 6, W7NKR 5, WA7EUX 4, W7AEC 2, K7LOH 2, K7OWT 2, K7VWA 2.

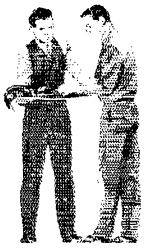
SOUTHEASTERN DIVISION

ALABAMA—SCM, Williams S. Crafts, K4KJD—Asst. SCM/SEC. William C. Gann, W4NML. RM: WA4EXA. PAM: K4WHW. K4WHW has been elected our new SCM, as of Dec. 26. Oct. net reports (times in GMT).

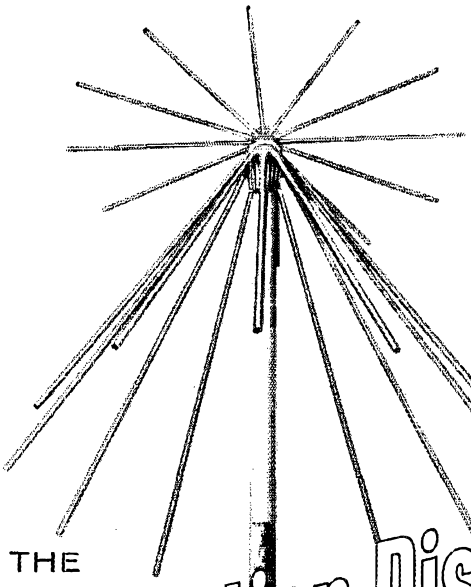
Net	*Freq.*	*Time*	*Days*	*Sess.*	*Avg. Tfc.*	*Avg. QNI*
AENB	3575	0100	Daily	45	1.7	3.0
AEND	3725	2400	Daily	30	1.0	5.0
AENH	50.7	0200	Sun./Tue.	10	5.0	20.5
AENM	3965	0030	Daily	31	5.25	47.5
AENO	50.55	0115	T/T/Sat.	13	.3	13.0
AENR	50.52	0115	Wed./Fri.	10	5.6	19.0
AENT	3970	2230	Daily	34	2.0	5.7

New officers of the Springville Club are K4NUW, WN4ETC, K4WSK, W4HSU and WA4AZJ. W4NML received DXCC and WAC certificates. K4IKR, WA4WAO, W4NML and WA4GCS were active during the DX Contest. GCS worked 94 countries on 15 meters during the contest week end. WB4BLX is a new General. K4TUT has a new 70-ft. tower and four-element beam. WA4DBQ has a new antenna. WA4PUX again is active. WA4QVQ has a new HT-41 linear. Traffic: K4NUW 263, W4NML 233, WA4UXC 136, W4USM 132, WA4EXA 91, K4AOZ 70, K4BSK 69, K4WHW 69, W4FVY 63, WA4EEC 43, K4KJD 41, WA4FYO 33, WA4GGD 33, WA4PIZ 31, WB4BNO 30, WA4VKT 29, WA4WLD 23, K4AVM 22, WB4BLX 22, K4UEC 20, K4TUT 15, K4UUC 14, WA4DBQ 11, W4WGI 10, W4YRM 9, K4ADK,7, WA4YYV 4, WA4BTA 3, WA4QVQ 3, W4HON 1.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5TT—Asst. SCM: Russell Oberholtzer, KZ5OB. SEC: KZ5MV. The CZARA Nov. meeting had visitors ZK1AA, Stuart Kingan, and Tony Utonga, members of Cook Islands Radio Club, who are en route to Lima to study propagation phenomena caused by eclipses. The Crossroads Club meeting featured color slides by KZ5SS and KZ5SN of their mobiling trip through Central America. KZ5UR retired Dec. 1 and will be KQ4MHY. New KZ5s include Generals KZ5EH, KZ5WL, KZ5FH and KZ5CW (who is ex-KL7BXJ, KG6ALG, KB6CN, KW6EF), Novices KZ5WFN and KZ5GRN. KZ5TW reports working 40 countries on 10-meter phone during a recent DX Contest. HP1JC's new two-element 40-meter beam did all the good during the same contest. KZ5RW is on the air with a new TR4. Ex-KZ5s heard from during the month: KZ5HL—K4HRA; KZ5GD—K5MRT; KZ5HO—WA4QXI. Traffic: KZ5SS 33, KZ5SN 21, KZ5FN 18, KZ5FX 11.



WE ANTICIPATED YOUR E/M* PROBLEMS— CHECK THE SPECS!



IT'S THE NEW CPC

Base Station Discone Antenna

Cat. No. 396-509
Frequency Range 150-470 Mc

Cat. No. 396-509 Discone Antenna is a skeletonized discone in which the disc element is fabricated of twelve ¼" diameter solid brass rods. The cone element consists of twelve ⅜" heavy wall brass tubes. Feed point insulator is fabricated of polycarbonate resin. The antenna assembly is mounted on a 4 ft. 1 in. IPS galvanized steel pipe. Cat. No. 396-509 is supplied with RG8A/U internal feed line terminated 18" below the support pipe with a Type N male connector and neoprene weatherproof housing.

Specifications

***ELECTRICAL**	
NOMINAL INPUT IMPEDANCE	50 OHMS
MAXIMUM POWER INPUT	500 WATTS AT 150 MC 150 WATTS AT 470 MC
VSWR	2.0:1 MAXIMUM
BANDWIDTH	150-470 MC
LIGHTNING PROTECTION	STARGAP
***MECHANICAL**	
ELEMENT MATERIAL	BRASS
DISC DIAMETER	20"
CONE—MAXIMUM DIAMETER	23-1/2"
SUPPORT PIPE	1-5/16" DIA. GALVANIZED STEEL
RATED WIND VELOCITY	100 MPH
LATERAL THRUST AT RATED WIND	24.5 LBS.
BEND. MOMENT 6" BELOW CONE	37.0 FT. LBS.
WEIGHT	16 LBS.

Communication Products Company
DIVISION OF
PHELPS DODGE ELECTRONIC PRODUCTS
CORPORATION
Marlboro, New Jersey 07746—Tel. (201) 462-1880
Los Angeles, California 90065—Tel. (213) 245-1143

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX PAMs: W4SDR, W4TUB. V.H.F. PAM: WA4BMC. Sorry to see that this month the news is as scarce as it was plentiful last month. By this time I hope that W4SDR, our congenial and highly efficient manager of FMTN, has recovered sufficiently to start giving his nurses a hard time. Hi. I have seen some very good clubs in the past few years but I must take my hat off to the Jacksonville gang, both clubs. Their EC, W4GUJ is not to be sneezed at either. Sure we have many other fine clubs but I have only so much space here. Hope you all are taking advantage of HamQuest 67. You are missing a good bet if you do not and you *could* be discouraging a lot of hard-working staff members up at ARRL Hq. who are trying real hard to please you folks. Hope to see you-all at the Hamboree/Convention at Miami in January. Traffic: (Oct.) WA4SCK 1086, WA4RQR 597, W4DFU 444, W4ILE 375, WA4BMC 363, WB4AJV 271, WA4NEV 235, WA4IJH 186, K4SJH 151, W4FP 137, W4TUB 109, K4BY 77, W4AKB 75, K4BNE 74, K4KDN 74, W4GUJ 73, WA4PWF 69, WA4MRK 68, W4OGX 68, WA4HDH 65, W4SMK 65, W4EHW 60, WB4AIW 58, K4ILB 55, WA4WZZ 54, W4NUH 53, K4DAX 52, WA4DEL 44, W4GM 42, WB4CAP 41, W4BJD 35, WA4WOW 35, W4YPX 35, WA4CIQ 34, WA4IVE 34, WA4BWE 33, WA4FGH 33, WA4OHO 30, W4DVO 28, K4LPS 26, WA4VZD 25, WN4DDO 22, W4VWL 22, W4BKC 21, K4IEX 21, K8UNE/4 20, WA4TXV 19, W4GDK 18, K4BHL 16, W4MVB 16, K4MTP 14, W4TJM 14, K4ENW 13, W4VPQ 13, W4QBY 12, WA4ZEV 12, W4BAV 11, WA4YRU 10, W4VDC 9, K4EBE 8, WA4LRW 8, WN4DUB 7, K4FQP 6, W4LVV 5. (Sept.) W4DFU 218, W4BJD 68, K4ENW 20, K4EVY 18, WN4CBM 10, W4LVV 3.

GEORGIA—SCM, Howard L. Schonher, WA4ZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4DDY. RM: W4CZN. PAMs: K4PKK, WA4JSU, K4GHR, WA4WDE. W4LRR is planning f.m. mobile. K4HAV has returned to Georgia after two years at Penn State Graduate School for Masters in EE and a tour in the service. Welcome home, Jim. W4DV/4 reports on activity at the Augusta Exchange Club Fair. WA4JSU added a Swan 240 to the station for mobile work. W4HYW was active in the SET, CD and Calif., Md., Conn. and W. Va. QSO Parties.

Net	*Freq.*	*Time*	*Sess.*	*QNI*	*QTC*
GSN	3595	0000 & 0300 Dy.	62	767	568
GTN	3718	2200 Dy.	30	219	70
GTAN	3855	1600 Sat. 2130 Wed.	9	69	51
GPSN	3975	1730 Dy.	31	141	62
GSSN	3975	0100 Dy.	31	950	263

Cobb, Co. AREC 145.8, NEGEN 52.250, CSC Net 145.350. The Georgia Cracker Mobile Net meets on 3995 kc. Sun. at 1800Z. K4NFP and WA4GAY are active from Young Harris College. New officers of the Ga. S.S.B. Assn. are W4JCA, pres.; WA4WQU, vice-pres.; W4SLP, secy.-treas.; WA4JSU and WA4MOC, members of the board. Traffic: W4CZN 419, W4FOE 330, WA4WQU 295, W4DV 271, WB4BDG 218, W4PIM 216, W4RZL 210, WA4RAV 194, W4DDY 184, K4BAI 174, WA4WDE 151, WA4NMU/4 133, WA4AJY 112, WA4JSU 59, W4HYW 48, K4UUM 41, WB4DTN 30, K4NFP 29, W4HBS 20, WAVVF 13, WB4AYP 12, WA4JES 7, WA4BVD 4, K4TXK 4.

WEST INDIES—SCM, Albert R. Crumley, Jr., KP4DV—KP4WT and KP4ANH were active during Hurricane Inez and were almost continuously passing traffic to and from HI8HV in Santo Domingo. KP4ID and its operators, KP4JM and KP4BBN all contributed their efforts and stations for aid to that hurricane-ridden republic. KP4CNX, of FAA, said the side-effects of Inez, which passed about 60 miles south of Puerto Rico, resulting in winds of up to 50 m.p.h. in the San Juan area, wrecked his tower and beam. KP4ES and son kept the emergency generator prepared for possible loss of commercial power during the hurricane. KP4RA, of Arecibo, is looking around Florida and W4-K4-Land for a possible change of QTH since he has retired from the Social Security Administration. KP4TL operated in San Salvador from July 30 to Sept. 8 using the call YS1ASE. KP4BQQ/Ø is T/Sgt. Carlos R. Hernandez, ex. KØQFM, with a QTH of 2208 B South Cyprus Drive, Grand Forks AFB, N. Dak. 58201. Traffic: KP4WT 285.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: WA4FIJ RM.: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3950 kc.	2300Z	Daily	31	536	219
QFN	3651 kc.	2330/0300Z	"	62	—	—

The section was pleased to have W4LVV, ARRL S.E. Division Director, visit clubs in Pensacola, Panama City

Nothing halfway about the

DRAKE L-4 LINEAR AMPLIFIER

built for continuous duty at full capacity

- 2000 watts PEP SSB—1000 watts DC input power on CW, AM and RTTY. Massive plate transformer, large heavy duty plate tank components and voluminous cooling system insure continuous operation at these ratings.
- High efficiency Class B Grounded Grid circuit uses two 3-400Z or 8163 zero bias triodes. These two tubes have a total plate dissipation rating of 800 watts and their rugged construction withstands abuse.
- A broadband tuned input circuit is employed on each band for minimum distortion, higher efficiency and a 50 ohm input impedance.
- The L-4 Linear Amplifier matches the TR-4 Transceiver and the T-4/T-4X Transmitters in appearance and drive requirements to run the maximum legal input power. Any exciter that can deliver 100 watts PEP SSB and 75 watts on CW will be able to drive the L-4 to the maximum legal input power. An advantage of the Grounded Grid Circuit is that most of the driving power adds to the output power.
- RF negative feedback decreases distortion to better than 35 db and tends to equalize tube characteristics from tube to tube and from brand to brand.
- A transmitting AGC circuit controls the exciter gain to allow a higher audio level without peak clipping. An adjustment is provided to set the threshold level for optimum operation of different exciters.
- Rapid heating filaments and the solid state power supply allow the L-4 to remain off until its use is required. It needs only 3 seconds from switch on to 2000 watts.
- Two taut-band suspension meters indicate plate current, grid current, plate voltage, and relative RF ouput power. The frictionless suspension eliminates sticking and improves accuracy.
- An internal changeover relay feeds the antenna through when on receive or when power is off. A pair of relay contacts bias the output tubes to cut off, eliminating any diode noise when receiving.
- A quiet, low velocity, high volume internal blower effectively cools tube base seals, envelopes and plate seals.

The buy of a lifetime... to last a lifetime... only

$695.00 Amateur Net

including Power Supply

SPECIFICATIONS

Frequency Range: Ham bands 80 thru 10 meters. All frequencies 3.5 to 30 Mc may be covered with some retuning of input coils.

Plate Input: 2000 watts PEP-SSB, 1000 watts DC on CW, AM, RTTY and Tune.

Drive Requirements: 100 watts PEP-SSB, 75 watts CW, AM, RTTY and Tune.

Input Impedance: 50 ohms.

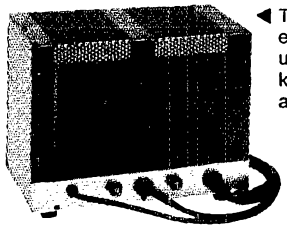
Output Impedance: Adjustable Pi-Network matches 50 ohm line with SWR not to exceed 2:1.

Power Requirements: 230 volts, 50-60 cycles, 15 amperes or 115 volts, 50-60 cycles, 30 amperes.

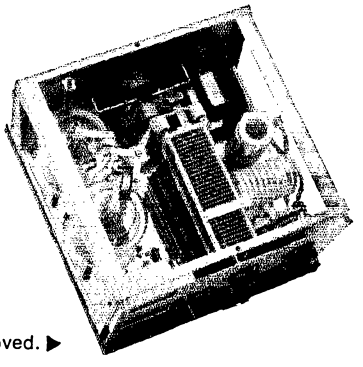
Tubes: Two 3-400Z or two 8163.

Size: Amplifier—13 15/16W x 7⅞H x 14 5/16D; Power Supply—6¾W x 7⅞H x 11D.

Weight: Amplifier 32 lbs; Power Supply 43 lbs.



◀ The solid state Power Supply provides excellent dynamic and static voltage regulation. The Power Supply is separate to keep the weight off the operating desk and to make a more flexible installation.



L-4 Linear Amplifier with cover removed. ▶

For more information, see your distributor, or write:

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and Tallahassee. Tallahassee: LA2AD, from Norway, is a Research Associate in the Physics Dept. at FSU this winter. Chipley: W4IKB has a second station on 145.2 Mc. with antenna 150 feet high. WA4ZIM is on 2 meters. Defuniak Springs: W4COD is aiding every active ham in town to get on 2 meters. So far, K4VWE, WB4BYO and WA4IZS are on; WA4PXR and W4JOZ will be soon. Panama City: The PCARC had an FB annual dinner and installed W5MPK/4. pres.: W4YUT, K2SBV/4, K4YQJ and K4MZA. Tyndall MARS members are working on 2-meter f.m. gear. K4VFY applied for DXCC. WA4FIJ operated as SVOOWR recently. Ft. Walton/Eglin AFB: W4BVE has assumed the job of QFN Net Manager. WA4IZM is now stationed at Eglin. W4AQN and W4UXW are on 2-meter f.m. W4ZGS renewed OBS, OVS and V.H.F.-PAM appointments. Pensacola: K4COE has joined QFN. K4-SOI is working DX regularly on 10-meters. WN4DLX passed the General test. Traffic: (Oct.) K4VFY 414, W4-BVE 139, K4BSS/4 137, WA4EOQ 85, WA4IMC 58, W4IKB 40, WA4JIM 28, WA4FIJ 19. (Sept.) K4VFY 284, K4PMO 6, K4SOI 2.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7NHL. K7RUR and K7-OIX are busy with OO work. K7HQI is the proud new owner of a 70-ft. crank-up tower. K7NII is building an FET 144-Mc. converter. Congratulations to W7TLG on becoming a new member of the DX Century Club. K7-UJU and K7UJV were the winners of the 75-meter transmitter hunt sponsored by the Arizona Amateur Radio Club. K7VOR, K7PLO, K7UJV, K7CEH, W7UXZ and WA7DSW are doing an excellent job in getting members in the ARRL HamQuest 67 membership drive. Seven lucky winners of teletype machines awarded by the Arizona Amateur Radio Club are K7NOS, W7KYM, K7UXG, K7VOR, K7ZRC, WA7DZW and K7NNL. WA7EGZ received his General Class license. Most of the information for this column is gleaned from club bulletins and newsletters. If you or your group would like to be represented here, please send information to W7FKK. Traffic: K7-RUR 10, W7DQS 4. W7FKK 3.

ARIZONA QSO PARTY

January 28-29, 1967

The first Arizona QSO Party, sponsored by the Saguaro H. S. AR Society, and approved by the Arizona SCM, will take place as follows:

Rules: 2100 GMT Saturday January 28 to 2100 GMT Sunday January 29. All W/VE amateurs are invited to participate and only single transmitter class, both single and multioperator, will be considered for awards. Arizona stations count one point per QSO multiplied by the number of states, provinces and countries. Out of state stations count five points per contact with all Arizona stations ONLY, multiplied by the number of Arizona counties worked. Exchange contact number, signal report and state, province and country. Arizona stations send signal report and county. An extra 100 points bonus will be given to each station is substantial proof of ARRL membership con be provided. (This bonus will be added on at contest Headquarters). A certificate will go to the top two scorers from each state or province and to the top four from Arizona. Logs must show date and time in GMT as well as contest number signal report and location. Totals must be made on the last log sheet for credit. Suggested frequencies: c.w.; 7025 7075 7160 7180 3750 3665 14010 14005 21105 21110 28010 28100; a.m. 3880 7285 14220 21300 28500; s.s.b. 3900 3995 7225 7245 14275 14325 21350 21400 28600 29000. Reports must be sent promptly to WA7CNP, c/o The Saguaro H. S. AR Society, 6250 N. 82nd St., Scottsdale, Arizona, 85251.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: W. R. Calkins, W1KUX/6. RMs: W6-BHG, W6QAE, WB6BBO. PAMs: K6MIDD, W6MILZ, W6ORS. BPLers for Oct.: K6EPT, K6IOV, W6GYH, W6-TXJ, W6WPF, WA6TWS, WB6BBO, WB6KIL, WB6OUD WB6QXY. WB6QXY got a Seneca 6&2 transmitter for his birthday. K6IOV is rebuilding for 2 through 160 meters including a half-gallon linear. W6RTV is constructing an antenna for 2 meters. WB6AEL received his WAS certificate. W6HUJ is assembling a Heathkit SB-100. W6-NAA is working on the mobile ham-shack/house car. W6CXC is busy arranging his round-the-world trip for next year with possible M/M operation. Newly-elected officers of the So. Calif. Chapter, QCWA, are W6PIF

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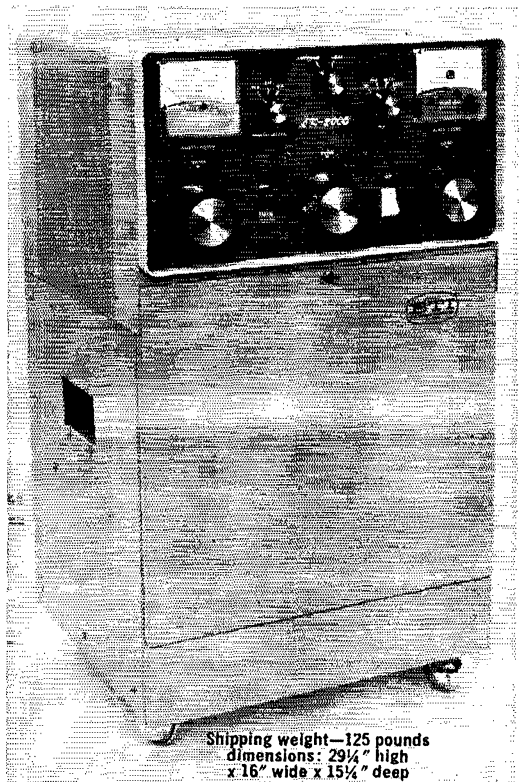

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chairman; K6GMA, vice-chairman; K6GIL, secy.-treas.; W6GH, historian; K6HV, director-at-large. K6HV operated aeronautical mobile in a single engine airplane, Los Angeles to Miami and return. The Inglewood Club is sponsor of the LA Board of Education teaching Amateur Radio in Space Museum, Exposition Park. W6ORS is mobile on 40 meters. W6PUZ is building toward the next Oscar launch. W6SRE is QRL traveling. WA6ILI has converted the APX-6 on the 1215-Mc. band. WA6GAG is busy with a new QTH. W6ZDO operates 1.8 through 1215 Mc. all bands and has gear readied for the 2400- and 10,000-Mc. bands. WA6SLG is attending LA Valley College full time. Amateur Radio in Experimental Satellites (ARIES) is submitting for a corporation status, non-profit. Mailing QTH—ARIES, Inc., Box 3083, Van Nuys, Calif. 91407. W6OZ is at RCA Coastal Station KPH, Point Reyes, Calif. after getting his radiotelegraph 2nd-class license. Anyone wanting contact with W6OZ should try 7255 kc. during daytime hours. WA6YKP is studying for the radio-telegraph 2nd-class license. *Support your section level nets:* EBN, Mon. through Fri. at 1615Z and Tue. through Sat. at 0230Z on 50,500 kc.; SCS, daily at 0230Z and 2000Z on 50,400 kc.; SCN, daily at 0300Z on 3600 kc. Net Managers of these nets are EBN, K6MDD; SCS, W6OFJ; SCN, K6IME. Traffic: (Oct.) K6EPT 1280, W6GYH 1076, WB6BBO 849, WB6QXY 798, K6IOV 530, W6WPF 488, WA6TWS 376, W6QAE 321, K6MDD 200, WA6KZI 170, WB6KIL 167, W6TXJ 157, W6FD 140, WA6KWV 139, WA6WKF 135, K6CDW 121, WB6QGM 118, WA6UCR 112, K6BPC 110, WB6OUD 106, W6BHG 95, K6ASK 59, WA6VFM 55, WA6TYR 53, W6BTV 48, W6DQX 42, WB6AEL 32, WA6WJT 21, WB6KGK 20, WB6QMF 16, W6HUJ 15, W6NAA 14, W6PCP 11, WB6GGL 9, W6LVQ 8, W6USY 8, W6TN 7, W6MLZ 5, W6DGH 4, K6UMV 4, W1KUX/6 3, K6EA/Ø 3, W6QJW 3, WB6QWJ 3, K6LJ 2. (Sept.) WA6WJT 5.

ORANGE—SCM, Roy R. Maxson, W6DEY—RM WA6ROF reports full participation in the NTS during the SET. EC W6TAG reports a successful SET with RACES and the Red Cross. SEC W6WRJ and EC WB6QAK advise that for SET purposes 6 mobiles and one portable station furnished communications for the Tustin Tiller Days Parade Oct. 15. W6BAM, W6WRJ, WB6NRB, W6NCP, K6JWS/6, K6JBG, W6FII and K6BVE all made a good showing in the recent FMT. W6EOO is the new call of ex-W7SMB/6. WA6EWM, MC of the Little Acorn Net, 7243 kc., is touring the Midwest, courtesy of WA6FKU and WA6GCS. Very informative OVS reports were received from K6HIJ and WB6PHO. Asst. SCM, W6JQB and his XYL attended the Fall QCWA Dinner at Long Beach. WA6OQM is rebuilding the shack. Many Orange section hams plan to attend the SAROC. The AREC Net meets Sun. at 9 A.M. local time on 3965 kc. EC WB6QAK invites all section members and interested amateurs to attend sessions. PAM WA6IDN's new QTH is Fullerton. W6DEY and W6PJU attended the 28th Anniversary of the Inglewood ARC. Traffic: K6MCA 760, WB6JFO 501, WA6ROF 337, K6IME 198, WA6OQM 101, WA6TAG 32, W6WRJ 25, WB6MVU 16, WB6NGE 12, KØYVN/6 3, W6PQA 2.

SAN DIEGO—SCM, Don Stansifer, W6LRU/WA6VUI—Here follow the ARRL appointments effective in the section as of Dec. 1: SCM: W6LRU/WA6VUI. Asst. SCM: W6EWU. SEC: W6SK. Asst. SEC: W6VNM. ECs: San Diego County CD and RACES, W6MHY; North County, W6NDH; Eastern District, WB6KSA; Central District, K6KX; Imperial County, W6DLN; 2-meter a.m., WA6TAD: 2-meter f.m., WA6OSB: ARPSC c.w. nets, W6BGF; 75-meter mobile, W6TAI; 10 meters, WA6TWF. PAM: WB6GMM. RMs: W6BGF, W6EOT, W6VNQ. ORSs: W6EOT, W6VNQ. OVSs: K6BTO, W6NZX, WA6OSB, WA6UEL, WB6NMT. OBSs: K6BPI, K6YRF, WA6TAD, WA6QAY, W6LRU. OOs: W6CAE, W6SK, W6LRU, K6EC and K6ENX. W6ID is doing an outstanding job in the ARRL Intruder Watch. The San Diego County Ham of the Year Award Dinner and Presentation will be held in February. This event is sponsored by the SOBARS in cooperation with the council of amateur radio organizations. Newest OVSs are W6NXZ and WB6NMT. WB6MPD helped on communications for the Julian Apple Day Parade. W6BKZ worked a ZL on 75 meter s.s.b. en route a vacation in Oct. WB6NMT is active in the SCS Net on 50.4 Mc. Traffic: K6BPI 10,458, W6EOT 846, W6BGF 743, W6VNQ 665, WB6NMT 356, WB6SQF 103, W6BKZ 18, WB6MPD 9, W6YZD 2.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—The planned 6-meter repeater in the Simi Valley is going well with the current effort being devoted to the 432-Mc. control link. K6GOS (president of the Simi Valley ARC) and WB6GWX, using a hilltop location, have worked San Francisco on 6, 2 and 220. WB6MFF recently moved to Thousand Oaks and has joined the Simi Valley ARC. WA6KLA attends the Simi ARC even though he now lives in L.A. WB6MHL has a new Galaxy 5 on order.

WB6IFK sent his Swan 350 back to the hospital. W6VUV is building a linear with 3-400Zs to pump more r.f. to the four-element quad. WB6MPJ is leaving for Viet Nam. The Satellite ARC has designed a plaque to honor the memory of J. C. Lewis whose call, W6AB, is now the club call. New appointment: K6GOS as OVS. Cancellation: WB6DRY as ORS. Traffic: W6AMI 16.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. On Oct. 20 I attended the meeting of the Waco ARC and was pleasantly surprised at the attendance. This is an old club that has been doing things and has the support of the city in that they have a club house and equipment furnished jointly with the civil defense organization. New club officers are W5OMQ, pres.; K5KVE, vice-pres.; K5MBB, secy.; W5GLY, treas.; K5ZYQ, chairman of the ARRL membership drive. On Oct. 30 I attended the Brownfield Annual Swapfest. More than 500 attended with plenty of gear swapping and eye-ball QSOs. W5PYI was very active in recruiting the following ECs for this West Texas area: W5DXT for Bailey County, W5DJW for Hale County, W5TUW for Lubbock County, W5SHL for Ector County, K5AVG Swisher County and K5RZN for Lamb County. To the amateurs in these counties: Please give these appointees your full cooperation. Arlington ARC members took part in a Spook Patrol and received the thanks of the City of Arlington for their help. The Arlington ARC is holding its annual Novice school and has 16 students. The Dallas ARC held an Old-Timers Night Nov. 1. W5QKF, West Gulf Division Director, attended. Traffic: K2EIU/5 605, K5DBJ 203, WA5ADH 201, K5LGU 76, K4UBR/5 66, WA4PDM/5 37, WA5PBN 15.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5ZCJ. RM: W5QMJ PAM-75: WA5BTQ. PAM-6 Meters: K5VFR. PAM 2-Meters: WA5LBL. There was a very good turnout over the state as a whole during the SET. Reports were good on the different area activities and traffic was heavier than any year in the past. Thanks to the many ECs who worked out in the test and held the SET. W5MFX is doing fine after surgery again. WA5KZA is mobile with an Eico 753 now. WN5QXY is on the air with the help of K5OOV. K5TEY is using a Galaxy III now. The Aeronautical Club at City worked with the FAA in the communications test with good success. WA5KNR is back from Thailand and operates from Moore with a new T-4X and 2-B. W5QMJ put out a very informative traffic bulletin recently for operators who work 3682.5. Congratulations to K5KHA and K5INC on their FMT report of 3 to 19 cycles. W5WAX has his 432 antenna up and is looking for contacts. W5HXK is back on the road to recovery after a heart attack. Traffic: K5TEY 2994, K5ZCJ 338, WA5NTI 140, WA5KZA 99, W5QMJ 87, W5PML 69, W5MFX 55, K5DLP 54, W5UYQ 47, K5CAY 38, W5FEC 23, WA5IMO 33, WA5OHX 28, K5OCX 18, WA5FVJ 16, K5WPP 16, W5FKL 13, WA5DZP 8, WA5MDN 7, W5EHC 6, K5OOV 6.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. K5ANS formerly an RM, has moved to the West Coast. A new RM is needed for this section. A great deal of activity in Southern Texas was centered around the southern area when Hurricane Inez moved in. TEX as State RACES and the Gulf Coast Hurricane Industrial Networks were in operation, along with other emergency nets on an alert if needed. PAM W5KLV expresses appreciation to all stations not participating in the hurricane emergency for their help in keeping the frequencies clear. He says, without exception, they were perfect gentlemen. W5KTC passed weathercasts to the SS *Ingles*. K5OID, a San Antonio Police Patrolman, helped with communications to Peru during the recent earthquake. Many Southern Texas clubs had their SET plans changed when Hurricane Inez threatened Brownsville, and immediately turned to the real thing rather than a Simulated Test. The San Antonio Club is holding code and theory classes at the Red Cross Chapter House. The club recently expanded for civil defense and now has 140 students. EC W5DAA advises that the Kingsville ARC was ready for Inez. Best of health to the fellows just out of the hospital, W5VW, W5EMW and WA5CPW. The Houston ARC and Southmost ARC both had enjoyable hamfests late in Oct. and early Nov. New OPSs are WA5BSD, W5VCE/W5OBC, K5QQG, K5WYN and K5GJQ. WA5AUB has a new Swan 350 and is collecting gear for a 2-meter repeater. The TEX Traffic Net is perkin' up some. Come on in, fellows, on 3770 kc. at 1900 and 2200 CST. Old-timers in the Houston area have a dinner meeting at the GEO Club the first Wed. of each month. All are members of the QCWA. You old-timers, join us. Traffic: K5HZR 230, W5BGE 171, WA5MXY 166, WA5KMY 106, K5QQG 101, W5AIR 54, W5HWY 39, W5KLV 39, W5AQN 36, W5TFW 22, K5HMF 17, WA5LMV 13, K5LQJ 13, W5ABQ 11, W5JKB 10.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM APN: VE6ADS. PAM SSBN: VE6ALQ. ECs: VE6SA, VE6SS, VE6XC, VE6AFQ. ORSs: VE6BR, VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ADS. OOs: VE6HM, VE6TY, VE6AKV. OBSs: VE6HM, VE6AIF. It is with regret that we mention the passing of XYL VE6AFQ. Calgary has a 2-meter net going now, and also will give lessons on traffic-handling. Look for the Vulcan gang on its 2-meter net Sun. at 2230 MST. Liaison is working with NWSBN and the NW Eye Bank Net very well. City Police in Lethbridge and Calgary thank the boys for their support on Halloween. APN and ABSN are doing very nicely these days. Our two new ORSs are working out very well, so keep it up, Donez and Cal. VE6OW still is busy mobiling around the country. VE6-XC is busy chasing around for EMO, he may drop in on some of you. VE6AAI is checking the nets quite regularly on c.w. What happened to the phone ticket Emma? Traffic: VE6ATH 144, VE6XC 134, VE6FK 80, VE6HM 50, VE6AKV 14, VE6SS 9, VE6AKD 8, VE6AKQ 7, VE6-AFQ 6, VE6AKA 6, VE6KS 6, VE6SA 6, VE6TG 5, VE6-WN 4, VE6AFJ 2, VE6AHV 2, VE6AOO 2, VE6FS 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7BLO has been keeping schedules with our WX ship *Stonehouse*, VEOMC. VE7QF did very well in the Sept. EMT. Nanaimo ARC is preparing for a busy winter session. Powell River ARC also is setting things into motion for code and theory classes. RM VE7QQ has changed jobs. West Kootenay ARC's monthly news letter shows good club activity. The club holds a net the 1st Tue. night on 3745 kc. North and West ARC has a very nice certificate, "Centennial 1967." To obtain this B.C. amateurs must work ten club members. Outside of B.C. you need work only five. Send proof of QSO to VE7BQN. VE7KY now is active on 2 meters. Chilliwack ARC's new officers are VE7BTF, pres.; VE7RS, vice-pres.; VE7-BHG, secy. The club's s.s.b. exciter is completed. VE7-BFZ up and married and moved away. VE7BEN and VE7BOK *have each* wired an Eico 753. For QSL cards, Centennial issue, fifty per amateur, mail an envelope with postage to Jim Smith, c/o Burnaby ARC, P.O. Box 83, South Burnaby, Vancouver. ARC's officers are VE7AGX, pres.; VE7FB, vice-pres.; VE7APU, secy. The Slow-speed Net meets on 3650 kc. at 0300 GMT. Here is the beginning of your entrance into traffic-handling. Have no fear of errors or speed. This is open for you to start. Please come and join us. Our Net Manager, VE7ASY, welcomes all comers. Traffic: VE7ASY 339, VE7BLO 111, VE7BAV 43, VE7BCJ 20, VE7SE 5, VE7BOQ 3.

MANITOBA—SCM, John Thomas Stacey, VE4JT—MTN was *active during* the SET but *RM* VE4EI reports that the traffic volume was low. The Flin Flon gang, headed by VE4NW, carried out a very successful simulated emergency test of its own serving Red Cross, EMO and various town departments. VE4PW is getting tower and antennas in shape for winter operating. OVS certificates have been issued to VE4RE and VE4HI. VE4SC is *on the mend after surgery and reports the DX was never* better. VE4LI is busy stringing antennas and working DX at 3 A.M. from the RCAF barracks. VE4NE is active in the Inter-Provincial S.S.B. Net at 0200Z on 3770. VE4-EL has an Adventurer on the air. The Brandon ARC has applied to DOT for the call VE4QD to perpetuate the memory of Barney, who recently became a Silent Key. VE4DQ is *manager of the Central section of the Trans-*Canada ARPSC Net and VE4XN is active in the same net as NCS. VE4DQ has returned from Japan where he reported eye-ball QSOs with several JAs. MTN reports sessions 32, QNI 204, QTC 180. The use of the new Centennial call 3C4 will start Jan. 1, 1967. Remember, that is 0601Z and not 0001Z. Traffic: (Oct.) VE4JT 182, VE4LG 130, VE4NE 111, VE4EI 91, VE4SC 32, VE4GN 24, VE4-RW 14, VE4QJ 11, VE4DL 10, VE4XN 9, VE4GS 6, VE4-AN 2, VE4EG 2, VE4JQ 2, VE4OL 2, VE4TE 2, VE4MK 1. (Sept.) VE4GN 12.

MARITIME—SCM, J. Harley Grimmer, VE1MX—Asst. SCM: R. P. Thorne, VO1EI. SEC: VE1HJ. This is my first report as SCM and I wish to thank those who nominated me. I will do my best to further amateur radio and ARRL activities in our section. On behalf of all members in the Maritime section I offer our sincere thanks to VE1WB for a job well done over the past ten years. All VE1s are minded of the VE1 Contest to be held Jan. 21-22, 1967. VE1WL has a new 30-ft. tower for his three-element tribander and five-element 2 meter beams. Your support of APN is requested daily on 3653 at 0000Z. Recent visitors to Newfoundland were VE3DTX and VE8PZ. VO1AW is now operating on board the M.V. *Lief Erikson as* VEOMD. Traffic: VE1RT 87, VE1DB 51, VE1AAX 30, VE1OM 17, VE1PZ 10, VE1AAW 9.

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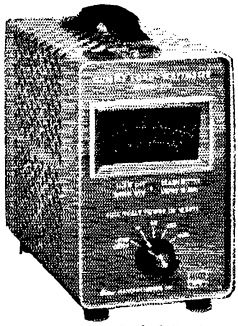

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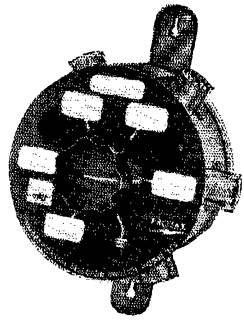
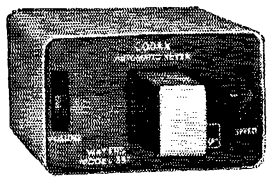


Model 376 "PROTAX" Antenna Switch (Radial Terminals)



Model 361 – Codax Automatic Keyer

To: AMATEUR ELECTRONIC SUPPLY
4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216 Q

Ship me the following Waters items:

_____

_____

(check one)

☐ I am enclosing cash in full

☐ I am enclosing a 20% deposit – ship COD for balance

☐ Please charge to my Account. I will pay in 30 days. My AES Credit Card Number is: _____

Name _____

Address _____

City _____

State _____ Zip Code _____

☐ Send Waters catalog

☐ Send NEW AES Catalog and Reconditioned Equipment Bulletin.

THIRTEENTH ANNUAL VE1 CONTEST

Jan. 21-22 and 28-29, 1967

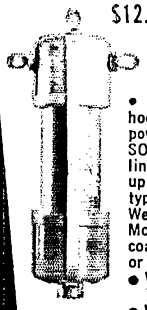
All VE1 amateurs are invited to participate in a contest sponsored by the New Brunswick Amateur Radio Association. The contest is divided into two sections, phone and c.w. The highest scoring contestant in each section will be awarded permanent possession of an engraved cup, the NBARA Trophy. A special certificate of recognition will be issued to any participant submitting logs showing 25 or more valid contacts.

RULES: 1) The c.w. contest will begin at 2400 GMT Saturday, Jan. 21 and end at 2400 GMT Sunday, Jan. 22. 2) The phone contest will begin at 2400 GMT Saturday, Jan. 28 and end at 2400 GMT Sunday, Jan. 29. 3) Any and all amateur bands may be used but only c.w. to c.w., or phone to phone contacts will count. Any contestant may participate and be eligible for awards in both sections. 4) The same station may be counted but once for credit (in each section) regardless of band used. Mobile, portable, and home stations covered by the same station license constitute the same station. 5) The general call is "CQ VE1." 6) Exchange signal reports, county, province, and operator's name. Local QTH is not required. 7) Logs should show band, type emission, signal reports, country, province, time, and date. Logs not showing this information IN FULL will be disqualified. 8) Score one point for information received and one for information sent and confirmed. Multiply total points by the number of individual counties worked in the three provinces to determine final score. For contest purposes Sable Island will be classed as part of Halifax County. 9) Decisions of the contest committee will be final. Logs must be postmarked not later than Feb. 6 and should be in committee hands not later than Feb. 14. Forward all entries to: Contest Committee, P. O. Box 366, St. Stephen, N. B., Canada.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The recent SET was a great success. Messages were passed to all SCMs in the U.S.A. and Canada. A message was passed to our Prime Minister in Ottawa, to President L. B. Johnson in Texas and to General U. Thant of the United Nations in New York. Receipts have been received by mail. Many more messages were passed from Red Cross officials, some EMO, and from our own operators to ECs and the SEC. VE3AKL is now in Toronto. VE3ATI, on behalf of the North Shore ARC of Oshawa, was host to the local scouts during the On-the-Air Jamboree. The Grey Bruce ARA sent eight delegates to the Ontario Division Convention held in Sept. at Niagara Falls. When writing this column I have to think ahead as there is quite a lapse until you read it. The Trillums complained that they were not mentioned for their FD effort. Ladies, to be sure you were. See page 154 Nov. *QST*, Ontario news. VE3CU is now QTH Barrie. The London ARC published some FB pictures in its Oct. club paper. These were taken at the club's recent picnic. Renfrew ARC visited the RCA Victor plant in Renfrew recently. We regret the passing of VE3EUH, of Kitchener. He was president of the K-W. ARC. The Lakehead gang is a busy group although we do not hear too many of the members on the air down here in the southeast. We learn from the Peel ARC that VE3SG is in the body shop. Hurry back, Fred. The Nortown ARC has a snappy new cover for its paper, *Nortopics*. The Hamilton ARC held its annual picnic early in October. Happy Holidays. Traffic: VE3BWM 363, VE3DU 158, VE3GCE 143, VE3NG 140, VE3DPO 132, VE3ATI 115, VE3GI 93, VE3AWE 91, VE3EAM 90, VE3CYR 83, VE3EBH 72, VE3DGB 63, VE3EBC 53, VE3FHV 40, VE3CCB 39, VE3ETM 38, VE3AUU 35, VE3BLZ 35, VE3DVE 30, VE3DBG 29, VE3BUR 20, VE3DMU 19, VE3EHL 17, VE3FGV 15, VE3VD 6.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ABV, RM: VE2DR. A Happy New Year to all; a year filled with such good things as the ARRL National Convention and the Worlds Fair in VE2-Land. Montreal EC VE2ANH did a fine job during a disastrous explosion at a chemical plant. With the help of VE2KM, VE2BWS, VE2BML, VE2XO, VE2DCS, VE2BQP, VE2BOQ, VE2AYD, VE2BMS, VE2SH communication was maintained. For all traffic-minded, as well as AREC-minded, amateurs, let's have all the ideas about next year's SET be-

$12.95 W2AU FOUR PURPOSE BALUN $12.95



BALANCE YOUR ANTENNA • STOP YOUR COAX FROM RADIATING • HELP ELIMINATE TVI • IMPROVE YOUR RADIATION PATTERN PLUS F/B RATIO

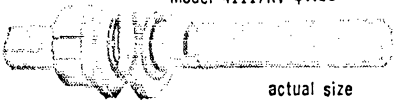
• Broad-banded 3-32 mc. • Center hang-up hook for inverted Vees • Handles full legal power, 2KW PEP • Built-in lightning arrester • SO239 RF connector for coax transmission feed line eliminates center insulator • Withstands up to 600 lb antenna pull • For use with all type antennas fed with unbalanced coax line • Weighs only 6½ oz. 1½ diam. 6" long • 2 Models: 1:1 matches 50 or 75 ohm unbalanced coax to 50 or 75 antenna load. 4:1 matches 50 or 75 ohm unbalanced coax to 200 or 300 ohm.

- W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad **$64.95**
- W2AU Super-Fiberglas 2 element 10-15-20 meter quad. Complete quad **$99.95**

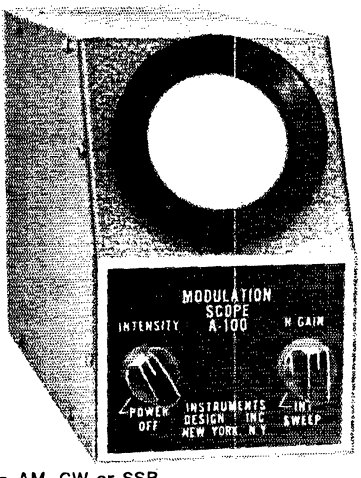
DIRECT/5:1 REVERSE VERNIER DRIVE

The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one ⅜" hole. High torque, low back lash, smooth and permanent movement, coaxial spindles, ¼" shaft dia.

Model 4111/RV **$1.95**



actual size



- AM, CW or SSB
- Wave envelope or trapezoid patterns
- No tuning required
- Up to 60 Mc
- Will handle 5W to 1 KW
- Uses standard connectors **$29.95**
- Internal sweep
- Size: 9½" deep, x 5½" high, x 3½" wide
- Weight: approx. 5 lbs.

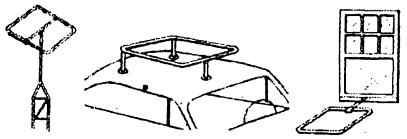
Cush Craft

SQUALO MOBILE/FIXED ANTENNAS

2 - 6 - 10 - 15 - 20 - 40 METERS

SQUALO is a full half wave, horizontally polarized, omni-directional antenna. Outstanding all around performance is achieved through a 360° pattern with no deep nulls. The square shape allows full electrical length in compact dimensions. Direct 52 ohm Reddi Match feed provides ease of tuning and broad band coverage.

ON A MAST ON YOUR CAR OUT A WINDOW



ASQ-2	2 Meter, 10" Square	$ 9.95
ASQ-6	6 Meter, 30" Square	13.95
ASQ-10	10 Meter, 50" Square	19.50
ASQ-15	15 Meter, 65" Square	23.50
ASQ-20	20 Meter, 100" Square	32.50
ASQ-40	40 Meter, 192" Square	66.50

VERSATILE MINIATURE TRANSFORMER

Same as used in W2EWL SSB Rig—March, 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

$1.49 ea. 3 for $3.95 10 for $12.50

PRECISION PLANETARY-VERNIER for exceptionally fine tuning

Shown approximately actual size

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. Shaft 1⅛" long: 6:1 ratio. Vv FB for fine tuning. Easily adaptable to any shaft. Comparable value. $5.95 Model 4511. DAF.

$1.50 ea. 10 for $13.50

BULLS EYE BUYS AT ARROW

ARROW ELECTRONICS INC

900 Rte. 110, Farmingdale, N.Y., 516 — MYrtle 4-6822

65 Cortlandt St., N.Y. 7, N.Y. 212 — Digby 9-4730 • 525 Jericho Tpke., Mineola, N.Y. 516 — Pioneer 2-2290 • 18 Isaac St., Norwalk, Conn. 203 — 838-4877 • 225 Rte. 46, Totowa, N. J. 201 — 256-8555

fore it is too late. VE2VV is doing a big job for Ham-Quest 67 and our hopes are for many new League members. A recent meeting of the MARC included a good talk on high-frequency cooking by VE2DAY. Ex-VE2YA has returned from VE1-Land and is now VE2AJ. For those who may be strangers to 2 meters you will find VE2BZH (a regular OVS reporter), VE2BK, VE2JO, VE2BTS and VE2AGK with a new mobile. VE2TT, VE2OK, VE2CK, VE2ALE and VE2BZH helped test the Ottawa 2-meter repeater from Mt. Rigaud. The repeater at Three Rivers, VE2CTR, is in full operation. Le nouveau bureau de direction du Radio Club de Quebec, Inc.: VE2AYN, pres.; VE2BEP, vice-pres.; VE2DBF, secy.; VE2AAG, treas.; VE2GF, VE2NK, VE2AB, VE2IM and VE2ASU, directeurs. VE2's loss is VE3's gain—VE2TY is now VE3GML in Toronto. Traffic: VE2DR 137, VE2AGQ 127, VE2BRD 75, VE2OJ 57, VE2BGJ 30, VE2EC 20, VE2NT 7.

SASKATCHEWAN QSO PARTY CELEBRATING CANADA'S CENTENNIAL

January 8, 1967

All radio amateurs are invited to participate in the Saskatchewan QSO party sponsored by the Regina Amateur Radio Association.

Time: 0001 GMT January 8 to 0001 January 9, 1967. *Call:* CQ VE5 (or 3C5) or CQ Saskatchewan. *Exchange:* Saskatchewan stations will send a QSO number, report and QTH. Outside stations will send QSO number, report and state or province. *Scoring:* VE5/3C5 stations count one point per outside contact and multiply by the number of states and provinces worked. Outside stations count 3 points per Saskatchewan contact and multiply by the number of different QTHs worked. Phone (s.s.b. or a.m.) counts as a separate contest. Only one contact per band with the same station is permitted. There are no power restrictions. *Awards:* Certificates will be awarded to the top scoring station from each state/province. The top five Saskatchewan stations will also receive certificates. *Frequencies:* 3560, 7050, 14075, 21050, 28050, 3850, 7250, 14250, 21300, 28550. *Entries:* All entries shall be sent to: 2117 McPherson Avenue, REGINA, Saskatchewan, Canada. Closing date is January 31, 1967.

A Two-Tube 75-Watt Transmitter

(Continued from page 38)

length of 50-ohm coaxial line. The transmatch should be adjusted as outlined in the above-mentioned article. The reflectometer built into the rig is used for indicating the correct transmatch adjustments. Once the transmatch is adjusted so that the rig "sees" a 50-ohm load, the meter can be set in the forward position and R_2 adjusted so that the meter reading is about half scale; then C_6 and C_7 should be adjusted for maximum output. The greater the meter reading, the more output.

This, of course, leads us up to the point of maximum input for a Novice, 75 watts. Check the plate current from time to time as you make the adjustments to C_6 and C_7, to make sure that you are not exceeding the legal input. (Input is figured by multiplying the plate current by the plate voltage.) TV transformers will vary as to output voltage, but it should be somewhere between 350 and 450 volts. If you find you cannot get *below* 75 watts input — and this is possible — change V_4 to a 0B3/VR90. This will lower the screen voltage on the amplifier and reduce the input. Of course, after you get your higher-grade license you can run as much as the

(Continued on page 138)

NOW INSTANT CREDIT, INSTANT SHIPMENT ON OPEN ACCOUNT OR TIME PAYMENTS

Trigger has cut the red tape of time-consuming credit investigations and interminable delays! If you are the holder of any *major* credit card such as:

■ **Town & Country** ■ **American Express** ■ **Carte Blanche** ■ **Diner's Club, Etc.**

we will grant you *instant credit* on Open Account or Time Payments—on either brand new equipment, or like-new equipment. Just pick up the phone and call us (no collect calls, please) or write and your goodies will be on their way the very same day. If you live in the Chicago area, drop in and take the merchandise home with you. What's more, there is no carrying charge, up to 25 days, on Open Account. Or you can take advantage of Trigger's easy budget terms at a *very* low interest rate. Merely give us the name of your credit card, and its number, and tell us what you want. You can also get a substantial trade-in on your present gear.

For a real eye-opener, visit Trigger, located near the junction of Routes 64 and 42A, where there's plenty of free parking.

No company processes foreign orders and inquiries with greater dispatch than Trigger.

NEW EQUIPMENT ON LOW BUDGET TERMS

SWAN	**DRAKE**	**SBE**
HALLICRAFTERS	**HY-GAIN**	**NATIONAL**
JOHNSON	**REGENCY**	**WELLER**
AMECO	**WATERS**	**SHURE**
ASTATIC	**NUMECHRON**	**DOW-KEY**
FINCO	**CDR**	**B & W**
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and other major brands

LIKE-NEW EQUIPMENT ON LOW BUDGET TERMS

■ **Ten-Day Trial** ■ **30-Day Guarantee** ■ **Trades Accepted**

Tops in performance and appearance, thoroughly reconditioned, clean-as-a-pin; alignment, calibration as good as new. Write for complete listing and prices.

another important TRIGGER service:

WE BUY USED HAM GEAR FOR CASH

PROMPT SERVICE... PROMPT CASH!

SPECIALS OF THE MONTH FOR JANUARY

75S3B	$495	S85	$ 67	DX60	$ 59
30L1 W/572B'S	399	S118	59	DX60A	69
516F1 AC	69	S120	39	HX11	39
KWM1 CONSOLE	67	SX110	87	HW32	89
KWM DC SUPPLY	57	SX111	157	MP1 SUPPLY	24
KWM2 MOBIL MT	57	SX140	77	HEATH GDO	19
DRAKE TR3	379	HT40	57	HEATH BALUM SET	9
DRAKE TR4	519	HA5 VFO	49	SWR BRIDGE	12
DRAKE R4	289	RANGER II	159	KNIGHT T60	47
DRAKE R4A	349	HQ105TR	127	KNIGHT T150A	87
DRAKE T4X	319	HQ170AC & NB	329	EICO 723	39
SWAN 240	177	NC155	99	ELMAC PMR7	37
SWAN 350	349	NCX5	379	GONSET GR211	37
SBE34	339	HRO50T1R & 4 CS	137	HE35 6MTR TSVR	47
582LA LINEAR	209	HRO500	1350	GALAXY Q MULT	20
INTERCEPTOR	279	NCL2000	549	24 HOUR CLOCK	7
CLEGG 22ER	177	VX501 VFO	179	100KC XTAL CAL	9

TRIGGER Attn: W9IVJ Q167
7361 North Avenue
River Forest, Illinois

RUSH THE FOLLOWING: Amount Enclosed

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

ORDER BLANK TO: trade ur present gear, order equipment, sell ur gear for cash.

A SMALL DEPOSIT WILL HOLD ANY UNIT ON LAY-AWAY.

STORE HOURS Weekdays 11:00 A.M.—8:00 P.M.
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TRIGGER Electronics
7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)

SUNDAY TELEPHONE SERVICE
11 A.M.—3 P.M.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1BD, Roy L. Gale, Barre, Vt.
W1CFE, George W. Korper, Woodbridge, Conn.
W1CJD, Philip Gildersleeve, Portland, Conn.
WA1DTY, Clyde E. Smith, Bristol, N. H.
ex-W1HPW, William T. Smith, Medford, Mass.
W1IK, Thomas F. Keena, Farmington, Conn.
W1KNO, Joseph C. O'Shea, Saugus, Mass.
K1LDA, Albert W. Armstrong, Clinton, Mass.
W1UL, George D. Preston, East Stoneham, Me.
ex-W2AOI, John Eichman, Jr., Buffalo, N. Y.
W2CPH, Frederick C. Winter, Oradell, N. J.
W2EAO, Edward Klarfeld, Newark, N. J.
WB2ICT, James Sheehy, College Point, N. Y.
K2PGI, Lester Ludwig, Fords, N. J.
K2UFG, Leroy Burke, Schenectady, N. Y.
WN2VUA, James T. LeGrand, Clementon, N. J.
W2ZAA, Robert C. Lanik, Port Washington, N. Y.
W2ZM, Ralph G. Barber, Locust Valley, N. Y.
WA2ZWM, Elwood Shafer, Oswego, N. Y.
W3PBW, Richard L. Dolecek, Washington, D. C.
W4BS, Nobel W. Guthrie, Memphis, Tenn.
W4CAK, Claude A. Pennington, Ben Hur, Va.
WA4DKH, Peter B. Nold, Delray Beach, Fla.
K4GRZ, Charles H. Belcher, Christiansburg, Va.
W4IYR, Alvah N. Cole, Norfolk, Va.
W4JQJ, Harvey J. Warner, Pompano Beach, Fla.
W4NAS, George R. Wilson, Evergreen, Ala.
W4OED, Donald L. Purcell, Burlington, N. C.
W4SNZ, Andrew J. Jones, Hendersonville, Tenn.
WA5DNJ, Clifford B. Rial, Belden, Miss.
W5EPT, Eugene B. Davis, Jackson, Miss.
W5FYO, Alton C. Heskew, San Antonio, Texas
WA5K8Z, William H. Wiggins, Batesville, Miss.
W6BOG, Harvey A. Drake, Redding, Calif.
W6ETI, Loren H. Nelgen, Hesperia, Calif.
K6EXX, Charles F. Lord, Panorama City, Calif.
W6GK, George G. Glade, Tujunga, Calif.
WA6JJK, Robert W. Michael, Sacramento, Calif.
W6LPC, Robert H. Meyer, Oakland, Calif.
W6NS, Paul Hair, Campo, Calif.
W6NYS, Joseph A. Pierce, Sunnyvale, Calif.
WA6SIIU, John E. Azbill, Paso Robles, Calif.
W6UUL, Mike M. Strboya, Lawndale, Calif.
W7IKM, Paul E. Grass, Bainbridge Island, Wash.
W7IOA, Edgar N. Simpson, Avondale, Ariz.
K8CQJ, John J. Thornton, Cleveland, Ohio
WA8NLI, Edwin A. Quarnstrom, Charleston, W. Va.
W8WMO, Oakie R. Hess, Pratt, W. Va.
W9BGC, Joseph C. Juel, Wonder Lake, Ill.
K9BOF, Loren J. Keller, Anderson, Ind.
K9FLJ, William E. McNely, Champaign, Ill.
WØAA, Arthur C. Andersen, St. Paul, Minn.
WØRVN, Henry L. Perkinson, St. Louis, Mo.
WØSQN, Theron G. Pedrick, Ottumwa, Iowa
DJ1HU, Otto Gerspacher, Waldprechtsweier, Germany
DL3JJ, Hans Plisch, Viernheim/Hessen, Germany
VE1AOT, Fred F. Welsford, St. John, N. B.
VE2BYO, Jacques Tardif, Saint Michel, Que.
VE3BF, Lou W. Lodge, Scarborough, Ont.
VE3EUH, John Lubenkov, Elmira, Ont.
VE3PW, E. E. Thompson, Willowdale, Ont.
VE7FG, H. John Hocking, Kelowna, B. C.
VO1AU, George Tucker, St. Johns, Nfld.

Because of the need for accuracy in our "Silent Keys" listing, please send all notices to the ARRL and include both name and call of the deceased.

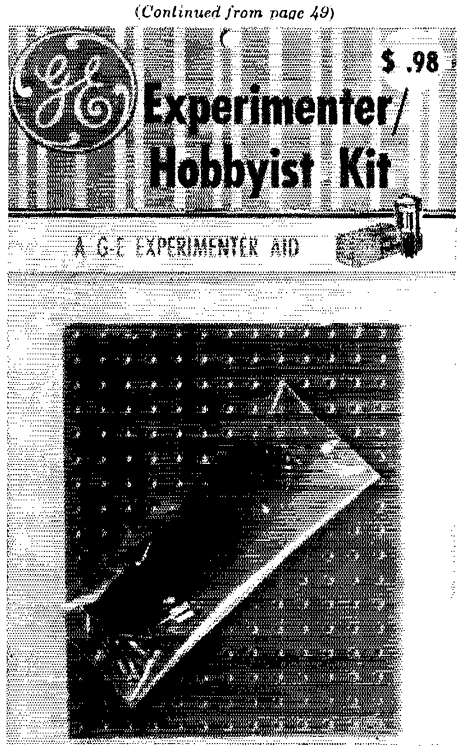
rig will take, probably something more than 100 watts input.

In weak signal areas it may be necessary to install a low-pass filter in the line feeding the antenna system. The low-pass filter will serve to attenuate any harmonics that otherwise might reach the antenna. A simple inexpensive filter is described in *Understanding Amateur Radio*.[4] QST

[4] *Understanding Amateur Radio*, page 215.

New Apparatus

(Continued from page 49)



The terminal board kit, model ETR-4288, is available for less than $1.00 from most General Electric component distributors.

— *W1YDS*

Novice Roundup

(Continued from page 55)

3) *QSOs:* Contacts must include certain information sent in the form as shown in the example. QSOs must take place on the 80-, 40-, 15-, or 2-meter bands. Crossband contacts are not permitted. C.w. to phone, c.w. to c.w., phone to phone, phone to c.w. contacts are permitted. Novices work any amateur stations eligible; non-Novices work only Novices. Valid points can be scored by contacting stations not working in the contest, upon acceptance of your number and section and receipt of a number and section.

A Novice may operate in the Novice portion of the competition until he *receives* his General Class License, then *must* operate as a non-Novice entry.

4) *Scoring:* Each exchange counts one point. Only one point may be earned by contacting any one station, regardless of the frequency band. The total number of ARRL sections (see page 6 of this *QST*) worked during the contest is the "section multiplier." Yukon-N.W.T. (VE8) also counts as a multiplier. A fixed scoring credit may be earned by entrants who hold ARRL Code Proficiency certificates. If an entrant does not hold a CP award he can apply for credit by attaching to his Roundup report a copy of quali-

fying run from W6OWP, January 5, or February 3, or from W1AW, January 17 or February 15. CP credit equals the w.p.m. speed indicated on the latest certificate or sticker held by the entrant. The final score equals the "total points" plus "Code Proficiency credit" multiplied by the "section multiplier."

5) *Reporting:* Contest work must be reported as shown in the sample form. Reporting forms and a map of the United States will be sent gratis upon request. Indicate starting and ending times for each period on the air. All Roundup reports become the property of ARRL and must be postmarked not later than March 3, 1967.

6) *Awards:* A certificate award will be given to the highest-scoring Novice in each ARRL section.

7) *Disqualifications:* Failure to comply with the contest rules or FCC regulations are grounds for disqualification. ARRL Contest Committee decisions are final. QST

Recent Equipment

(Continued from page 46)

current are beyond the maximums mentioned the HD-10 can be used to control an external relay or keyer tube, which in turn can key the transmitter.

The power supply is built-in and operates from the 115-volt line. An isolation transformer is connected between the line and the rectifier diodes, preventing the keyer chassis from being common to one side of the a.c. line. One of the rectifier diodes is connected to provide − 16 volts while the remaining rectifier furnishes + 19 volts to the circuit. A battery pack can be used to operate the HD-10 by connecting a 45-volt battery (with 22.5-volt tap) to the terminals provided on the rear of the keyer, or two 22.5-volt batteries can be used.

Some of the Features

The slide switch on the front panel has three positions. The left-hand setting turns the power supply off. The center position places the keyer in the OPERATE mode. When the switch is all the way to the right, HD-10 is in a HOLD condition, enabling the operator to tune up the transmitter.

Wiring instructions are given which show how to connect the circuit for either right- or left-hand operators. Also, the keyer can be changed over for automatic-dot and manual-dash operation by changing jumper connections on the rear terminal block. This permits simulated bug-key operation.

The color scheme of the cabinet matches that of the newer Heath equipment. The panel is finished in light green and the outer cover is painted dark green. Because the case is made from heavy-gauge steel stock, the assembly is quite heavy and will not creep about on the operating table as most keys are prone to do. Rubber feet, mounted on the bottom of the case, aid further in keeping the HD-10 anchored to one spot on the table.

Operation from 230 volts a.c. is possible by opening up one side of the a.c. line cord and inserting a 0.068-μf., 600-volt capacitor in series with the line. This lowers the input voltage to the keyer to 115 volts at the primary of the HD-10's power transformer. — *W1CER*

Modeling Radiation Patterns

(Continued from page 33)

plane model does agree fairly well with the scale model. Indeed, the standard deviation of the measured points was 1.2 db. for both the normal and tilted conditions.

Conclusions

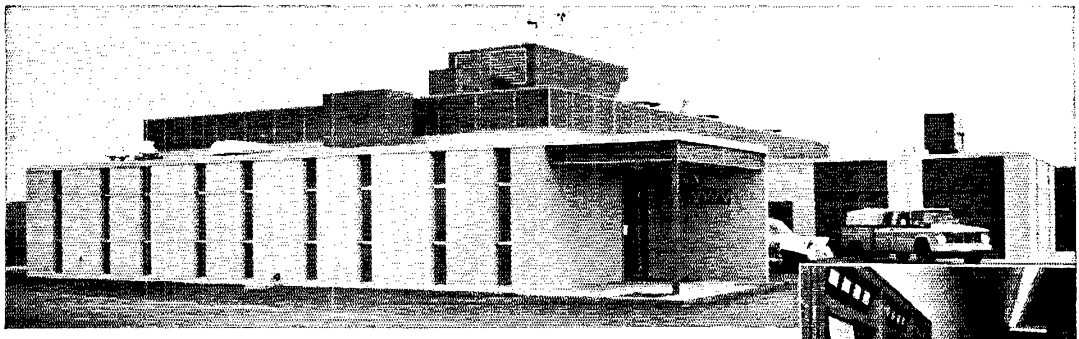
The radiation patterns of a ¼-wave ground plane model have been employed to approximate the patterns from a mobile whip in the 10-20 meter range. For these bands the operating experiences of several mobile hams indicate that the field strength over the car body is on the average 3 to 6 db. stronger than the field in the opposite direction. This magnitude and direction are confirmed by the model. The model also predicts that the patterns are more directive when the soil conductivity increases, when the contact is by means of a short skip, or when the whip curves back from the normal at high speeds. Low angle DX work is less sensitive to ground-plane orientation. Large variations from the patterns could arise from field distortions produced by nearby objects, poor electrical contact over various parts of the car body, and a bumper mount instead of a deck mount. A tilted ground plane instead of a horizontal ground plane would be a more accurate model in this latter case. The net effect would reduce the fields over the ground plane and increase the fields in the opposing quadrant.

In addition to the references listed, helpful ideas are gratefully acknowledged from two other sources: first, from conversations with K8MBV and a number of other mobile hams, and second, from the pleasant and informative hours spent in assembling, testing, and operating mobile equipment with WA4KQO. QST

DXCC Listings

(Continued from page 96)

K1SGU	K6EBB	OE1SQ	VE3BBB	W3DHO	W7SFF	WØPJB
K1SWG	K6OZV	OE3HOW	VE3CCB	W3KHW	W7YBI	WØPJF
K2BKU	K7HIU/6	OE8RT	VS9AMD	W3QBK	W8AFN	WØREU
K2BYX	K7JCA	OK1KMM	W1AGP	W4DII	W8BTX	WØYI
K2MYR	K7KBN	OK1NH	W1CT	WA4CJV	W8OUU	WAØBGU
K2PKH	K7QXG	OK2KGE	W1DMD	WA4EII	W8TN	WAØBSZ
K2PZF	K7RJK	OK2KZC	W1ETV	WA4EPM	WA8CGZ	WAØHXW
K3AHN	K8CSW	OK3CAU	W1RFW	WA4LDC	WA8EZW	YO3CM
K3LEC	K8EDQ	OZ5KU	W1YCH	WA4S8M	WA8LST	YO3UA
K3KMO	K8EOP	SM2OZ	W2QJT	WA4TJM	WA8NQC	YO7DO
K3MUB	K8POJ	SM5BPZ	WA2ARM	WA4UOE	W9CRW	YO8DD
K3QVV	K9GEL	SP8ARY	WA2FPT	WA5AET	W9HTF	YU2YG
K3SGE	K9SPO	TF2WBZ	WA2GHW	W6HCX	W9JCV	YU3BUV
K3SMN	K9VQK	UA1TL	WA2HJU	W6QFU	W9JQE	YU3EC
K3TRZ	K9WMM	UA3BK	WA2LRI	W6QXP	W9MG	YU3JS
K3WNL	KØARS	UA3BS	WA2THY	W6WAW	W9OGY	YU3NP
K4BP	KØGML	UA6KAF	WA2WEE	WA6AYF	W9SCD	ZS6BL
K4ILW	KØYRX	UA9KSC	WA2WLN	WA6NON	W9SKR	4X4HC
K4KSB	KG6AIU	UA9SH	WB2CON	WA6SBS	WA9AIB	4X4NJ
K4MYO	LA2Q	UAØEK	WB2OLN	WA6SZW	WA9JDT	6O6BW
K5IAN	LZ2FN	UW3BX	WB2OQU	WB6KIL	WØCRY	9L1NH
K6CAA	LZ2VB	UW3CS	WB2QJI	W7AST	WØDCP	



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We at TMC are proud of the part we were privileged to play in WWV's vital new communications achievement. All of the HF transmitters at the Ft. Collins, Colorado, Time and Frequency Standard Station were manufactured by The Technical Materiel Corporation. Three GPT-40K transmitters are used on 5, 10 and 15 MHz, with a fourth as standby. Three GPT-10K transmitters are used on 2.5, 20 and 25 MHz, with a fourth as standby.

Mr. Peter Viezbicke, Bureau of Standards' Installation Engineer, adjusts one of TMC's 40 kW transmitters shortly after the first signals were broadcast from the new Ft. Collins facility at 0000 GMT, 1 December.

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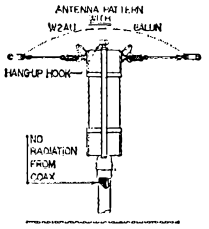

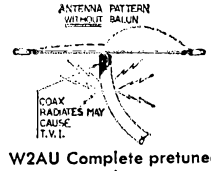

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(*Continued from page 142*)

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W3KT

327
VE7ZM

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W1BAN
W1ONK

325
HB9TL
LU4DMG
W2OKM
W4ANE

324
W9WHM
W9YSX

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K4AIM

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G3DO
OE1ME
W2FXN
W2GLF
W3MAC
ZL1HY

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DJ2YI
K6LAS
VK3AHO

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W1LLF
W2PTE
W5KBU
W5PQA
W8JIN

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W5JWM

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K6IFL
VE3EDR

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PY6CN
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DJ3WE
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IS1VAZ
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K4BBH
OZ8EA
VE2TJ
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W9PBY

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WØDIB

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KH6FBJ
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163
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WA8OJI
WØIJM
XE1FFW
YV5AMW

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WA2CGD
W7GDS
W9BZB

142
G5DJ
VE3DYB
W9ADV

141
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K4DI
PAØDEC
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WA5ALB
W6DFR

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K4RHL
K8RDE
K9TRP
LU6AL
PAØTGW
UD6KAR
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WB6AJH
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KR6OF
OA1W
OH3NY
VE3EG
VE3FKL
W9CPD
5A4TK

129
W4IKL
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I1RL
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WB2HZG
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WA2IEK
WB6GVV
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K1IMD
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W1QCO

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WA4SUR
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WA2JBV
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I1HL
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W1MGP
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W6RGG
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199
HI8XMT
I1ZBS
K4IMS
K4ZCP
VE3BLD
VE4DQ
W1NTH
WA2IWH
WA3BYS
WA4KLT
W6KG
WA6AUD
W9WYB
WAØEMS

118
DL1CR
F9IE
KL7MF
OE7UD

117
TI2RMV
VS6AJ

116
OE1KW
SM5AQB
W8AXI
YV1II
5A4TQ

115
I1TIC
9M2GF

114
G3LDO
K4KJD
K6RSY
W4UAF/KH6
W2GSC
W8DGP
W8FWK

113
YV1LA
ZS5TC

112
G3POR
HB9U8
JA1CYV
YV6BR
9M4MB
9N1DD

111
DJ5BV
DL7EM
EA3KI
K5BXG
K8ZPK
W5NW
WØNWO
ZS6BIN

110
DJ4XE
DL4PA
DL6SI
DL8CH
IT1CFN
JA1CIB
K3CNN
K5IIX
LA7WI
UA1IG
W1AA
WB2GSK
WB2HIZ

WA4HTR
WA4LWE
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109
DL1EG
K4GRD
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OE1WP
OK3KAB
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108
DJ1YL
DL9CQ
HA5AM
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K5JCC
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WB6ADY
WØJQQ

107
DJ2HC
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K9YWY
KX6DR
SM6AMD
W6OSU
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YV3CN
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YV5ED

106
DJ6NE
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JA8ADQ
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K1NIY
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K9TXZ
OE1CAA
PY7AKW
WA4NGO
WØCQT
XE1XS

105
DJ2MV
HK4DP
I1FBI
K6JBG
K7IIU
KØSPH
KZ5AG
ON4AM
VE3BSR
W1LEL
W2LJF
WB6CGA
W8CEM
WA8OUM
ZP5IT

104
DJ3GY
DJ3YC
DJ8BQ
HK3SO
I1PAI
K1ZQL
K3CRV
K5TOK
OE1IC
VE3CUS
VE3LZ

W2QDY
W4BHG
W4KOU
W4YHW
WA5ATM
W6OMR
W8WAH
ZS6ALM
5A2TR
9L1HX

103
DJ3BB
DJ4VZ
DM2AEC
F2RK
I1CJW
K1IYD
UA1CX
UA1ZF
W2ONK
W2URM
W2ZGB
WA3BHY
W4WSF
WB6ABL
WB6HGH
W7REZ
W8BRL
W8IBX
W9GFF
W9KGO
WØIQW
WØJWD
XE1YG
YV5BPG
YV5CHO
9K2AN

102
AP2MI
DL6JJ
G3MTB
HM2BD
K3MLR
KL7BCS
LA4DJ
SVØWG
TI2KR
VE2JD
VE6CJ
VP9CP
W3GVD
W4TZT
WA4MUB
W5YKF
W6EHV
W6KWU
W7VSM
W9UX
YV1KZ
YV3LD
ZS3LW

101
DL3LS
DL9OK
F7CK
G3PFE
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I1MY
K1PYI
K1POA
K2HER
K2HOE
K4REC
K6OJO/4
K5AAD
K7TCL
K8YRN
K9VLE
KØHUU
OZ2KT
SM6CAS
UA1TT
UA3BT

VP9BY
VS9AWR
W1DAY
W1SEB
W1YLB
W2AUO
W2CNQ
W2UFT
WB2BEF
WB2FBN
W3FWI
W3UJ
W4ZDK
W7LEB
WA9AVV
XE1NI
ZD8JC

100
CN8AQ
DJ6VH
DJ8II
DL3RE
DL6XV
EA3KT
G3RHM
G3SVH
HK3APC
K1WYD
K2HWB
K2PKH
K2PZF
K3RPY
K4KZZ
K4RNS
K7DVK
K7ZKH
K8KOM
K8QYA
K8ZNC
K9AXS
KX6BW
OA4PI
PAØPOB
SM5BPZ
SV1AA
VE3EVU
VE3NN
VE7BEA
VE8AA
VK3SM
W2PBZ
WA2RUB
WA2WFI
WB2ICS
WB2OLN
W3LNE
WA3-APO/4
W4AVL
W4JFW
WA4BRW
WA4LSK
WA4OQO
WA4TLI
W6-MRU/W5BCU
WA5CST
W6ORC
W7HLH
W7UZE
W7YBX
W7ZPV
W8NNR
W9OFO
WA9CYV
WØCMD
WØGYM
WAØHMP
YN1LH
W2ZLA/ZK1
ZL1AJD

QST

FM SURPLUS SPECIALS

MOTOROLA POWER SUPPLIES

P-8464 110 VAC 60w BASE STATION power supply $65.00
TU-136 Mob 6/12 vdc used in T44 mobile synamotor type ..... $ 9.95
TU-277 Mobile 6/12 vdc used in T53 60w mobile Vibrator type ..... $ 9.95
TU-320S Mobile 6/12 vdc for 10w mobile ..... $ 6.00
TU-461 6/12 vdc can be used for lo or hi band mobile ..... $ 9.95
On the TU-136 and TU-277 or TU-461 specify 2nd choice

SPECIAL COMBINATION OFFER

P-8464 power supply with Sensicon Rec and 60w Trans with harness
30-50 Mcs $110.00
150 Mcs $125.00

MOTOROLA EQUIPMENT

PA-8270 remote unit—as is $55.00
TU-3121 cavities 150 Mcs. Can be used for duplexing T&R on single antenna $120.00
D33-7 Front mount Dispatcher 6 vdc solid state pow supply rec has only 3 tubes. Trans 8 watts power output $65.00
FSTR-140-BY—110vac desk top station 60W-30-50 mcs—poor condition $125.00
FSTR-80-BY 110vac desk top station. No conversion necessary in 6 mtr band. Very clean/hang up box $175.00
TU-204 450 mc tran strip 18w $25.00
PA-8634 30w 30-50mc xmtr $15.00
T51AGD Poor Condition 6/12vdc $30.00

FMTR-140-D MOB 40-50 mcs
6 vdc ..... $ 55.00
12 vdc ..... $ 75.00

FMTR-80-D mob 40-50 mcs 6 vdc 2 freq. tran .. $ 46.00
12 vdc ..... 1 freq. ..... $ 56.00

FMTRU-80-D 150 mcs 30w tran poor condition .. $ 25.00

FMTRU-41-V very poor 150 mc ..... $ 20.00

FMTRU-40-V 150 mc 8w tran-6v ..... $ 39.50

T-44A6 450mc mob 18w tran ..... $ 54.50

SPECIALS

GE TWIN UNIT COMBINATION 30w Trans. Rec. Control head and cables Range 40-50 mcs ..... $ 44.50
GE TRANS ONLY ..... Range 40-50 mcs ..... Post Paid $ 9.95
HALLICRAFTERS S-27 rec 140-225 mcs ..... $ 65.00
RCA CMV-2A 30-50 mc mob 12 vdc ..... 30 w trans ..... $ 25.00
JOHNSON VIKING TRANSMITTER ..... VIKING I ..... $ 35.00
HEWLETT PACKARD Frequency meter MOD 500B $125.00
PANORAMIC ADAPTOR SB-12a with PS-12 power supply 500 kc I.F. input $450.00

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A comprehensive collection of Motorola transmitters, receivers, power supplies and interconnecting diagrams for FM equipment manufactured between 1949 and 1954. Included are crystal formulas and alignment instructions for most of the equipment shown.

30 Pages ..... $3.95 post paid
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**On the 80 BY and 140 BY base station and P8464 chassis combination please furnish a signed statement as follows: "This equipment purchased for use on amateur bands and will not be resold for commercial use."

ALL SHIPMENTS FOB BOSTON, MASS., UNLESS OTHERWISE SPECIFIED—SPECIFY CARRIER. ALL EQUIPMENT IS USED AS IS AND SUBJECT TO PRIOR SALE. TERMS:—PAYMENT WITH ORDER. PLEASE INCLUDE YOUR ZIP CODE.

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ATTN. DEPT. #8

Telrex "BALUN" FED INVERTED "V" ANTENNA KITS

SIMPLE-TO-INSTALL, HI-PERFORMANCE ANTENNA SYSTEMS:

1 KW P.E.P. Mono-Band Kit . . . 1KMB1V/81K . . . $21.95*
2 KW P.E.P. Mono-Band Kit . . . 2KMB1V/81K . . . $26.95*

*Kit comprises, encapsulated, "Balun," copperweld, insulators, plus installation and adjustment instructions for any Mono-band 80 thru 10 Meters. Also available 2, 3, 4, 5 Band Models.

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Hams- $500 per month?

Conservative extra income from citizens band and business radio maintenance!

Get into booming two-way radio maintenance!

Free booklet tells you how—see coupon below!

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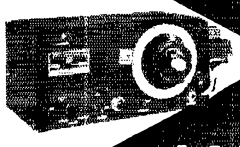
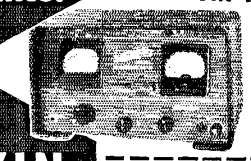
MICROMETER FREQUENCY METER

Measures nearby transmitters, continuous coverage 100 KC to 175 MC and up. Internal calibrator. Only 8 lbs. $295.00



PPM METER — inexpensive accessory for the 105-B for 0.0001% accuracy on split-channels.



205-A
FM MODULATION METER

Tunable 25 to 500 MC any channel. Direct reading. Light weight. Measures peak swing 0-12.5 and 25 KC. $290.00 Quad-Scale model $340.00

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dependable low cost equipment used by thousands of engineers.

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At no obligation to me, please send me free booklet "HOW to MAKE MONEY in MOBILE-RADIO MAINTENANCE"—and data on Lampkin meters.

Name_____
Address_____
City_____ State_____ Zip_____

I would like the following League publications shipped to me postpaid. I am enclosing payment of $_____. (These prices apply only to the USA.)

Ship to this address:

NAME ..... CALL .....

STREET .....

CITY ..... STATE ..... ZIP .....

- ☐ **ARRL HANDBOOK** $4.00 — The standard comprehensive manual of amateur radiocommunication
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- ☐ **LICENSE MANUAL** 50¢ — Complete text of amateur regs, plus Q&A for amateur exams
- ☐ **HOW TO BECOME A RADIO AMATEUR** $1.00 — All about amateur radio and how to get started
- ☐ **A COURSE IN RADIO FUNDAMENTALS** $1.00 — Use this in conjunction with the Handbook
- ☐ **ANTENNA BOOK** $2.00 — Theory and construction of antennas
- ☐ **SINGLE SIDEBAND FOR THE RADIO AMATEUR** — The best s.s.b. articles from **QST** $2.50
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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is no charge for zipcode when you furnish it. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**

(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

DAYTON Hamvention April 15, 1967. Dayton Amateur Radio Association's 16th Annual Hamvention, Wam pler Arena Center, Dayton, Ohio. Participate in the technical sessions, forums, banquet, hidden transmitter hunt. Bring XYL for best in women's activities. For information write Dayton Hamvention, Department B, Box 44, Dayton, Ohio 45401.

INVITATION: New York Radio Club cordially invites New York City area hams and SWLs to its regular monthly meetings. Second Monday of each month at George Washington Hotel, 23rd St. and Lexington Ave., promptly at 8 P.M. All are welcome. W2ATT, New York Radio Club.

OLD Old Timers Club now over 650 members with verified 2-way contacts before 1926. Life membership $15.00. Bi-monthly "Spark Gap Times" $2.50 annually. Roster free to members. Write Secretary, W5VA, Box 840, Corpus Christi Texas 78403.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA Wayne Nelson, Concord, N.C. 28025.

WANTED: all types of aircraft or ground radios. 17L 618F or S38B, 390, GRC, PRC, 51 JRVX, Collins linear amplifier. Type 294: Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames W2KUW, 308 Hickory, Arlington, N.J.

SELL, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts: 617-598-2530 for the gear u want at the prices u want to pay.

WANTED: 2 to 12 304TL tubes. Callanan. W9AU, 118 S. Canton, Chicago 6, Ill.

TOPPING All offers for any piece of aircraft or ground radios, tubes or test equipment. In a hurry? Cash-in-advance arranged. Turn those unused units into money. Air Ground Electronics, 64 Grand Place, Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7359.

MANUALS for surplus electronics. List, 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Collins Parts, BC-610, GRC-2, Antodyne, Bethpage, L.I., N.Y.

TELETYPE: Buy 28s, sell parts. W4NYF, Schmidt.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 37 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

RTTY Gear for sale. List issued monthly. 88 or 44 mhy toroids, five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TOOOOBES: 6146B, $4.00; 6CW4, $1.40; 417A, $3.95; 6360, $3.45; 6146, $2.55; 5894, $15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 444Z, Stirling, N.J. 07980.

QSLS?? SWLS?? America's Finest! Made-to-order! Samples 25¢. DeLuxe, 35¢. Sakkers, W8DED, Box 218, Holland, Michigan 49423.

QSLS's, samples 20¢. QSL Press, Box 281, Oak Park, Ill. 60303.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

C. FRITZ For better QSLS! Bringing hams greater returns for over a quarter-century. Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Ill.)

QSLS: Moyers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

QSLS-SMS. Samples 10¢. Malgo Press, Box 373, M.O., Toledo 1, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples. 5¢. Dick, W8VXK, 1944 N.M.-18, Gladwin, Mich.

10¢ Brings free samples. Sims Advertising Service, 32227 Missouri Ave., St. Louis, Mo. 63118.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois 60639.

QSLS, finest, YLRL's, OMs, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

QSLS, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS 300 for $4.35. Samples 10¢ W9SKR, George Vescly Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS. Radio Press, Box 17112, San Diego, Calif.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples, Thomas St., Riegel Ridge, Milford, N.J.

QSLS Kromekote 2 & 3 colors attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Call decals K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS-100 3-color glossy $3.00: silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLS Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

RUBBER Stamps $1.15 includes tax and postage. Clint's radio W2UDO, 32 Cumberland Ave., Verona, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth. Box 51Q, Jutland, N.J.

QSLS—Free samples. Attractive designs. Quick Service. W7IIZ, Press, Box 183, Springfield, Ore.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

QSL Cards. Quality printing. Samples 15¢. Sargent Press, 19 Glen Ave., Lynn, Mass.

QSLS Glossy coated, 3 and 4 colors, 100-$2.00. Samples dime. Bob Garra, Lehighton, Penna.

SINCE 1937. QSLS by W1LMS, Shechan Press, 23 West St., Stoneham, Mass. 02180. Samples 10¢. Catalog. 25¢.

QSLS: Quality with Service. Samples free with zip. R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

AWARD Winning QSLS. Very artistic. Very colorful High gloss colors including glow in dark type. Samples 10¢ or SASE. Colorful QSLS, 510 Riddle Road, Cincinnati, Ohio 45220.

PICTURE QSL Cards for your shack, etc. Made from your photograph. 1000, $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS. Fast one day service. Free samples. Bolles, W5OWC. Box 9363, Austin, Texas.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSL Cards. Free samples. Send stamped envelope to George, WA4OKD, Box 282, Valparaiso, Florida 32580.

QSLS. Your personal combination from a large selection, glossy reds, blacks, Calypso, Pinecraft, etc. Silver, Gold, Rainbow inks. Many card styles, types, cuts, photos. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

QSLS. 30 sharp samples. Catalog, 10¢. Filmcrafters, Box 304X, Martins Ferry, Ohio 43935.

QSL Rubber Stamp 3" x 5". $5.00. Other ham stamps. $1.00 up. Set sample impressions 5¢ Postage. Wes's. W1FP, RFD Amesbury, Mass. 01913.

HUNDRED QSLS, $1.00. Samples, dime. Holland, R3, Box 649, Duluth, Minnesota, 55803.

QSLS Glossy coated 3 & 4 colors. 100 $2.00. Samples dime. Bob Garra, Lehighton, Penna.

DON'T Buy QSL Cards until you see our free samples. Wilshire Printing, Box 292, Crowley, Texas 76036.

BEST Quality rubber stamp or 10000 address labels, $1.25 postpaid. Joe Harms, 905 Fernald, Edgewater, Fla. 32032.

CANADIANS: Best used gear list in Canada. Free list. *ETCO*, Marv, VE2ANN, Box 744, Montreal 3.

CANADIANS: HT-44, SX-117 transceiver, mint. VE3PV, 462 E. 38th Hamilton, Ont., Canada.

CANADIANS: New Bud deluxe cabinet 21" x 13" x 15" deep. Partially completed transmitter to fit; new 814; 19 set; Hammond 762 plate transformer; QSTs, CQs 1958-1961. Sell anything. Best offer. VE7C1, 3636 West 17, Vancouver 8.

SELL: New Heathkit SB-610, VE2AJQ.

CASH Paid for your unused Tubes, and good Ham and Commercial Equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NYC 10012. Call 212-WAlker 5-7000.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J., Tel:GArfield Area code 201-471-2020.

NOVICE Crystals 80-40M, $1.30 each. Also other freqs. Free list Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

RTTY Channel Filters, octal mounted, 2125/2975 cps, $5.95 pair, 88 mhy toroids, uncased, 5 for $2.50. Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

SELL: CQ, QST, Handbooks, old IRE Proceedings, any quantity. Buy: Old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

WANTED: For personal collection: QST, May 1916: Learning the Radiotelegraph Code, 3rd edition; How to Become a Radio Amateur, Edition 10; The Radio Amateur's License Manual, Edition 7, 11, 12, 15 and 16. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

HEATH HO-10 signal monitor completely wired and in perfect operating condx. Cabinet in A-1 shape. Will ship to first offer over $60.00. Send check or money-order to Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107. (Shipping Continental U.S. and Canada only).

TOROIDS, 88 mh. uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

COLLINS Owners! AM wired kit, $5.00! No soldering! Holes! Chassis Removal! Switch In-Out! (State Model). Kit Kraft, B-763, Harlan, Ky.

SELL: Eimac 4X250B tubes. Guaranteed gud condx. $6.50 each, $10,000 paid prepair in U.S.A. Send check or m.o. Everett Stidham, Jr., W5LO, 722 So. 30th, Muskogee, Okla.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

STAINLESS Steel Hardware. Small quantities. Send SASE for list. Arlington Stainless, Section B, Box 2641, Baltimore, Md. 21215.

SALE! Invader 2000. W4SD.

SB-300, $225.00; Ham-M rotator with control box, $65.00; Tri-Ex THD-354K, 54 ft. tower with all guy-wires and accessories needed for installation; $125.00, plus shipping. HP-13 power supply, $45.00. Write: WA2SJZ, 215-28 Spencer Avenue, Queens Village, L.I., N.Y. 11427.

EICO 753 and AC supply. Excellent condition, with original cartons and warranty cards. $250.00. Unaltered BC-348Q, $60.00. Charles Cranfill, W3VCN, Worton, Maryland.

SELL: New SB-34 with microphone, $345.00. W6BLZ, 528 Colima, La Jolla, California 92037.

ESTATE Liquidation offers. Big list. Paradd Engineering Service, 284 Rte. 10, Dover, N.J. 07801.

DRAKE 2A, 2AC, 2AQ, SR1, SB-175, V-10, PSA-63. All for $250.00 or best offer. K9BWL, Box 43, Cedarburg, Wis.

FOR Sale: HT-46 Hallicrafters Transmitter in sealed carton, won as 2nd prize at the Foundation Hamfest. Best offer. W3DOJ, F. Gartrell, 281 Washington Road, Westminster, Maryland 21157. Phone 848-4028.

FOR Sale: 2 el. 3-band quad Skylane with steel boom, Fibreglass arms, $75.00. W2UGM, 66 Columbus Ave., Closter, N.J. Tel: 201-768-1884.

WANTED: Heavy duty oil filled capacitors 2-100 mfd. at 2500-6000V. Also need 25-30 A Variac. State price in your first letter. Bill Smitherman, WA4YFI, 2705 Riverside Dr., Knoxville, Tenn.

FOR Sale: In excellent condition: Drake Model 2-B receiver, Drake Model 2-BQ "Q" Multiplier; Johnson Viking Adventurer transmitter with key and 40M-80M crystals. All for $350.00. Will sell separately. Write Wayne Banks, 1207 Loch Lomand, Ct., Richmond, Va. 23221.

WANTED: Model #28 Teletype equipment. R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

WANTED: Military, Commercial, Surplus, Airborne, Ground, Transmitters, Receivers, Test sets, Accessories. Especially Collins. We pay cash and freight. Ritco Electronics, Box 156, Annandale, Virginia. Tel: (703)560-5480 collect.

HEATH Test equipment: RF signal generator IG-102, $20.00; professional laboratory R.F. generator LG-1, $30.00. Regulated power supply, $35.00. VTVM, IM-11, $18.00; laboratory AC VTVM, IM22, $25.00; B&K Model 600 "Dyna-Quick" tube-tester, $40.00. WB2GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, N.J. 07012.

COMPLETE Mobile Station. NCX-3, NCX-D, EV 727 microphone, heavy-duty stainless steel mount, extension and whip with coil stock loading coil. First $300 certified check or money order takes it. Express collect. Oron Schmidt, W5OMB, 904 Rosewood Drive, Dickinson, Texas.

JANUARY Specials: Free! One AC supply with the purchase of a TR-4, Galaxy V, Swan 350 or T4X-R4A Combo—RG/8-U, $11/M Hustler 10% off on two or more, Hy-Gain 12% off. Save every day at Evansville Amateur Radio Supply, 1306 Division, Evansville, Indiana. Tel: 812-422-4551. William Ogg, WA9RMO. Corrected price listing of R4A, T4X, $340 instead of $330 in last ad; SB-34 for $325 instead of $225 in last ad.

FOR Sale: SB-100, SB-200, SB-300. Wanted: Any kit to wire and repair, preferably Heathkit. Most Heathkits in stock. Business ref. on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

FOR Sale: Bound volumes of CQ-1948 to 1960 and QST 1948-1960. Best offer. W20XR, Reuben E. Gross, 79 Howard Ave., Staten Island, N.Y. 10301.

SELL: Eico #720 transmitter, Johnson VFO-122 with power supply, low pass filter, $70. Heathkit high fidelity stereo amplifier pre-amp Model SA-2 stereo AM and FM tuner, Model AJ-10 Multiplex adapter, $100. Jack Katz, WA2HZU. Tel: EX2-4723.

A Fond Farewell to some fine equipment: Drake 2B, 2BQ with 500 Kc calibrator, $185.00; Johnson Viking II plus V-122 VFO, $100.00; Heath Warrior KW Linear, $150.00; all freight collect. Want: Drake R4A, T4X, Heath SB-200, approx. 50 ft. crank-up tower (local deal only). Oleg Kolen, WB4BXK, 703-256-9424, 3721 Rodes Ct., Annandale, Va. 22003.

FB Condition, SX101 MK 3, G SB-100, GSB-101, plus other ham needs. All $475. WA2QEK, RN3-0591.

FOR Sale: NC 240D, with matching speaker, $65.00. RME Preselector, $22.10. Federal tel. 1105 cycle band-pass filter, $6.00. Victor Soens, 922 South 12th St., Edinburg, Texas.

SELL: Moving to an apartment. Complete SSB station, SX-101A, HT-44 with ACPS, Johnson Matchbox, Heath keyer. Original owner. All like new condx. Asking $500 for package. WA2OZQ, Rosenberg, Northfield, N.J. 08225.

SWEEP Generator, TV-FM, Eico Model 360. Excellent condx. $25.00. Tom Benewicz, 11 Montrose, Allendale, N.J. WA2OBT.

SALE: Heathkit GR-54, $70.00; Eico 720, $60.00; Heathkit HR-10 with spkr es 100 Kc. xtal calibrator, $60.00; Heathkit HG-10 (VFO), $25.00 with manuals. WA1EUF, 295 Union St., Manchester, N.H. 03103.

SELL: Drake 2-A receiver, Q-Multiplier-speaker, crystal calibrator, in good condition. $175.00. Roger A. Guillemetter, K1GQH, 32 Westminster St., Manchester, N.H.

WANTED: Electronics Instructor. Generally indispensable. Theory and workshops. Science Camp, Lake Placid, New York. Write Eppstein, 440 West End Ave., N.Y. 24.

TRANSMITTER Wanted: SSB-T4X, SB400, HT-37, HT-44, HT-46, HX-50. Must be in excellent working order. Louis Marko, W2CVY, 70 Beech Terrace, Wayne, N.J.

DIODES: 500 Ma, 600 piv, 12/$1.00; 3-5A 400-600 piv, 15¢, 6146s, $1.00; 6197/6CL6, $1.00; OA2s, OB2's, 15¢; 6J6s, 10¢. Rotron muffin fans, $4.00; capacitors 500 μfd 310 vdc, 50¢; 1000 μfd 410 vdc, $1.00; Simpson Model 29 meter 500 vdc, scale, $3.00. Running-time meter, $3.00. All plus postage. SASE for list. Dell Thomas, WB2NBY, 15 Creek Bend Rd., Poughkeepsie, N.Y. 12603.

TV Cameras, Vidicon-Orthicon, Industrial, new and used lenses, Vidicons, Pan, Tilts, Zooms, Industrial Suppliers camera reconditioning and repair. Closed circuit T.V. Center, Inc., Rte. 46, Little Falls, N.J. Tel: 201-256-7379.

FOR Sale: Hallicrafters HT-32, $225.00; Heathkit Warrior, $140; Ameco TX-62, $120.00. All in excellent condition. Ronald Mason, 278 E. North Ave. East, Palestine, Ohio 44413.

FROM The Estate of W3JDP: C-E 200V, $395.00; Viking II with 122 VFO, $95.00; SX-71 (Covers 80-6), $75.00; B&W SSB receiving adaptor, $33.00; 275W Matchbox, $30.00; Heathkit SWR Bridge, $10.00; Ameco SWR Bridge and indicator, $16.00; Ameco Model CM-6 meter converter, $30.00; Command sets: Two 405.3 transmitters, one 3-6 receiver, one 6-9 receiver, $6.00 each; homebrew 80 and 40 transmitter; all items F.o.b. Write K3BYJ, 111 Elm Ave., Morrisville, Pennsylvania 19067.

CLEGG Zeus and interceptor with Allbander 3-31 Mc. Converter-speaker. Like new condx. $650.00. WB6PDN, 7800 Brentwood, Stockton, Calif. Tel: 209-477-0536.

FOR Sale: Drake R-4A receiver with speaker, late model, in excellent condition. $295.00. F.o.b. Laver, 8512 Fox Run, Potomac, Maryland.

FOR Sale: RME DB-23 Preselector, $30.00; HM-11 SWR Bridge, $12.00; HO-10 Monitor scope, $50.00; DX-40 transmitter, $40.00; UTC S-50 plate transformer, $35.00; S-40 plate transformer, $20.00; 24-hour clock, $4.00. WA2ALA, 1044 Roxbury Dr., Westbury, N.Y. 11590.

RANGER I, $83.00; R-100A w/all accessories, $63.00; HA-5 VFO, $45.00. WA9NDU, 5248 Arcadia, Skokie, Illinois.

SELL: Collins 75S-3B, S.N. 15544. All filters. Can't be told from new. Write to W7GYO, 98270.

COLLINS 75S-3 Serial No. 12652 and control unit 312B-4 Serial No. 53058. Both are in mint condition and will ship in original cartons for first certified check of $525. Jim Rabil, K4GWV, Box 1111, Rocky Mount, North Carolina.

WANTED: Heath Twoer HW-30. Write, giving condition and price F.o.b. Chicago. W9GVA, 6760 N. Ionia, Chicago, Ill. 60646.

SHAWNEE HW-10, vy gud condx. $145.00. Will ship prepaid first certified check. WA8LTJ, 131 Pepperidge Lane, Battle Creek, Mich. 49015.

MAY 13th-14th. W.N.Y. Hamfest and East Coast V.H.F. Conference at Rochester, N.Y. See future OSTs for additional information.

D-104 mike w/stand, immaculate. High output. $8.00. Howard Robb, Bird Island, Minn.

SIX Meter Heath Shawnee, 6, 12, 110V supply. Make an offer. Bill, K4AJF, 3521 3rd Ave., Tuscaloosa, Alabama 35401.

MOVING To Arizona? Have 3 bedroom 1¾ bath, double carport home in Scottsdale, on a 75' x 105' lot, with 6 ft. colored block fenced back yard. Home has electric heat (Honeywell Electronic Precipitron—wonderful for allergies), thermostat in each room; also 3 tone retrigeration. Large patio, 6 ft. sliding doors to a 10 x 15 ham shack, electric heat, 1½ ton refrigeration; Collins S/Line, including 30L-1, 71 foot self-supporting Tri-Ex motorized tower with Telrex Triband beam, Ham-M rotor. Yard has sprinkler system, complete, wonderful landscaping. Priced in low 20s, small down payment. Sell furnished. K7KAW. Tel: 945-0250. 6714 East Sheridan St., Scottsdale, Arizona 85257.

APACHE TX-1, perfect, make an offer. Trout, W4MLF, P.O. Box 6143, Alexandria, Va. 22306.

WANTED: National HRO-60 coil set AB, and NFM-83-50 narrow band FM adaptor. Also proportional temperature controlled 100 KHZ freq. standard "stability" three parts in ten to the ninth per day or better. Bill O'Brien, 14 Laurel St., Rockville, Conn. 06066.

SELL Hammarlund HQ-170AC, matching speaker, manual plus 300-D 2-meter converter all new condx. $265.00. Knight T-150 transmitter with EV-729-SR mic. $60.00. Wes's, W1FP, RFD Amesbury, Mass. 01913.

SACRIFICE: Knight T-150A and R100A with xtal cal., spkr, S-meter, $150.00; Heath PT-1 AM-FM tuner, $50.00, P-2 SWR, $10.00. DK60-G2C 115VAC, $15.00. 454C mike, $10.00. Separately or all for $225.00 plus postage. WA3CFW, R.D. #1, Box 332-A Rehoboth, Del. 19971.

HEATH Marauder transmitter, HX-10, $225.00; Hallicrafters SX-115 receiver, $325.00; both in excellent condition. Will deliver 100 miles. W4NI, 3600 Old Vineyard Rd., Winston-Salem, N.C. 27103.

INTERESTED in low power? Join QRP International ARC-NYC Chapter #1. For information contact: WA2HYY, Paul Smolarz, Jr., 78-35 85th St., Glendale, N.Y. 11227.

TRANSMITTERS, Receivers repaired by Radio Engineer. Lab Equipment. J & J Electronics, Windham Rd., Canterbury, Conn. Tel: 203-546-9126.

XYL Says clean out excess gear! Plug in and you're on the air with beautiful signals: top grade suppression, keying and stability, fractional kc. readout and resettability. Perfect pair to hear and work DX. Heathkit SB300 with individual SSB/CW/AM filters ($250) and SB400 ($285), or first $500 takes both. Also Elco 730 modulator, needs minor repair, $25.00. Electro Voice 630 H-Z dynamic mike and chrome floor stand, $20. Pick-up, or will deliver within metropolitan NYC area only. W3JDL, 82 Boston Ave., Massapequa, Long Island (Phone nights 516-541-9355).

SURPLUS Giant new catalog of equipment and parts, 25¢. Capitol Surplus, Box 891, Springfield, Ill.

MERCURY Relays for HA-1 keyer, etc. $5 postpaid. K3MNJ.

HW-12, 6 months old, absolutely perfect, $79.00 prepaid to your door. K3JZH.

SELL: NC-190 receiver, $140.00; HQ-129X, $90; BC-453 with powr supply, $15.00; 19 QST Binders, $38.00, QST, 1930 through 1949, $80.00; 73 Magazine, October 1960 through September 1964, $16.00; CQ, 1945 (8 months) through 1959, $60.00, Dow-Key coaxial relay, $8; LP Filter, $4.00; Heath O-11 'scope with probe, $55.00; Heath 'scope applications course, $10.00 21 inch table rack, $5.00. 24 hour wall clock, unused, $5.00, Aluminum chassis, $2.00 each. 832-B tube, $3.00. 3½" round meters, $3.00 each. George Ruffs, Jr., K1FTR, RFD 1, Rte. 113, Sebago Lake, Maine 04075. Tel: 207-642-2442.

HA-14 and HP-24, assembled, tested, in mint condx. with all necessities, $175.00 or you make offer. WA3CBL, 900 Stony Lane, Gladwyne, Penna. Tel: (215) LA5-7581.

AMECO Nuvistor preamp, Model PCLP, $25.00. WA8IYL.

LAFAYETTE 10-meter 20W. transceiver, mike, 12VDC 120VAC, hot performer, absolutely mint condx. $49.00; Heath 90W fone/c.w. transmitter, bandswitching VFO, 80-10M, factory-calibrated, never used, mike, AC supply, $49.00. Two 813s, two 805s, new, p-paid, $12.95. Harold Greene, 377 Oldham, Pembroke, Mass.

SELL: NC-155, $85.00; DX-100B, $80. D. Schellens, Hotchkiss School, Lakeville, Conn.

COLLINS 75S-3B, $450.00, in mint condition. Marine Radar Sperry Five, one and five-mile range 12 or 32 VDC, like new condx. new, $400. Arthur Brown, Box 32B, RT1, Troy, Virginia.

BC-453 or BC-348 with AC supply wanted, in gud condx. W3FXR, J. Armstrong, 7 Long Lane, Malvern, Penna. Tel: N14-4387.

TUBES Wanted: All types, de Forest spherical audion, Marconi, Weigant, Telefunken, Moorehead, Phillips, Brighton, Welsh, OZ3, UX221, UV203, W9EWK, 610 Monroe Ave., River Forest, Illinois 60305.

GOING Mobile, trade perfect KWS-1 Serial 1491, Collins realigned November 1966 for KWM-2 and 516F-2. W7BIF, 107 Wyoming, Boulder City, Nev. 89005.

FOR Sale: Eico 753 SSB transceiver, $150.00; HX-50 SSB transmitter, $200. Wanted: 14AVQ/12AVQ vertical, Heath HG-10 VFO, Eico 720 transmitter. K3KMO, RD Box 390A, State College, Penna. 16801.

CINE special, other professional 16 or 35mm cameras or lenses, video recorders wanted for cash or trade. Ted, W2KUW, 64 Grand Place, Arlington, New Jersey.

QST 1937 thru 1946 complete, $30.00. P. D. Stark, WB2MAV, 246 Lurline, Millington, N.J.

SWAN Mark I linear, 2 Kw, new in March 1966, few hours use, still in warranty, with brand new spare 3-4002 tube, $395, Shipped prepaid. Send check or money-order. W6MCS, Rte. 1, Box 666, Arroyo Grande, Calif. 93420.

SX-101A receiver, $165.00. Excellent condition. Priced for fast sale. Les Moskowitz, WB2RSW, Tel: 212-H15-0241 between 5 and 10 PM.

WANTED: Manual for CV 357/A RTTY converter. W1CNY, 228 Hockory Hill Lane, Newington, Conn. 06111.

FISHING Stops my hamming. For sale: Collins 32s-1 xmtr, 75S-3 rcvr, 312B-4 control console, Filter, cable, 44 ft. tower, Mosley T-33 beam; Astatic mike, etc., etc. Cost me $1900+. Sell for $1200. Mint condition. W4GJK, Box 130, Rte 1, Stuart, Fla. 33494.

WANTED: Heathkit Models XC-2 and XC-6 2 M and 6 M converters for Mohawk. H. S. Waites, VE7FL, Marysville, B.C., Canada.

DRAKE 2B with calibrator, $175.00; Johnson 275 W Matchbox, $39.00; PMR-6, AF67, complete mobile installation, $95; 2 meter Comm IV, $185.00. SASE for list. W2FNI, 18 Hillcrest Terr., Linden, N.J. 07036. Tel: 201-486-6917.

WANTED: IMA Esterline Angus 424 pen motor. Also other makes, any fair condition. WA9KKW, 123 W. Daphne Rd., Milwaukee, Wis. 53217.

GONSET SSB 2 M and 6 M Sidewinder transceivers, w/o p.s., $239.00 each. John Boyd, WAØAYP, 918 7th Ave., Brookings, So. Dak. 57006.

WANTED: SB-10. WB2RJL, 52 Further Lane, Riverhead, N.Y.

FOR Sale: SB-300 with AM crystal, $255.00; SB-400, $310.00. Both for $550.00. In excint condx. Used about 20 hours. W8NRE.

SELL: National NC-270 receiver, $120.00; Eico 730 modulator, $35.00 Heath SB-10, $50. K3OKF.

WANTED: 2100, 500 cycle filters for 75A4. W7PGX, Rte 1, Box 1063, Scottsdale, Arizona.

COLLINS 30S-1, Serial 10184, $795. Mint condx. D. Leddin, Richardson, Texas 75080. Tel: (214)AD1-4756.

HEATH HX-20, HR-20, HP-23, like new. Plug-in station, $250.00. Fred Sanborn, Box 669, Eagle River, Wis.

SELL: NCX-3 Adcom DC supply homebrew AC supply base/mobile mikes, speaker, Hustler with 80/40 meter coils, cables and manuals: $315.00. WA4EUL, Bill Holland, 1412 Mediterranean Avenue, Virginia Beach, Va. 23451.

KNIGHT R100A with S-meter, $65.00; T150A, $60.00; P-2 SWR bridge, $10.00. All assembled professionally and in excellent condition. DK60G, $10.00, Turner 454X, $10.00; QST Transmatch, $8.00. WØDKX, 532 33rd St., West Des Moines, Iowa.

APACHE SB-10 combination. Mint condx. $175.00. Need T/M AN16-30 USM 25, 1 & 2 for OS4A/AP scope. J. J. Slemenda, K3PZU, 4971 Parkvue Dr., Pittsburgh, Penna. 15236.

FREE Catalog. Loads of electronic bargains. R. W. Electronics, Inc., 2244 So. Michigan Ave., Chicago, Ill. 60616.

WILL Trade Drake TR-3 DC power supply for AC or $80.00. T. S. Cliff, W9ET, 807 North 14th, Terre Haute, Ind.

TR-4, $480.00; AC-4, $83.00; DC-3, $123.00; R-4A, $330.00; T4-X, $330.00; MS-4, $17.50; RV-4, $83.00; factory-sealed boxes, warranted, sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C.

BARGAINS: Novice receiver, transmitter, $25.00. Adventurer, VF-1, 6M converter, dirt cheap. K4JCX, Box 162, Oak Ridge, Tenn. 37830.

FOR Sale: Have complete set of unused, repeat unused, equipment as follows: Hallicrafters SR-150, 12 VDC power pack, Mosley D4-BC-A antenna, V-4-6 80 meter coil, Hallicrafters speaker, Shure mike and other accessories. Contact Don Mosley, Box 1552, Waco, Texas. Telephone SWift 9-2491.

BUYING Transceiver: Must sell SX-111 in good condition: $139.00. Mike Wollitz, WA5OAU, 2413 East Austin, Harlingen, Texas 78550.

SUMMER Counselor as ham instructor for N.H. boys' camp, 19 years age or over, with General Class ticket. We have complete operating/training equipment. Write Camp Cody for Boys, 99 Park Avenue, NYC 10016 or call 203-226-4389.

FOR Sale: DX-60 fone es CW very good for a beginner: $75.00, with xtals; Johnson Matchbox, $45.00; B&W low-pass filter, $15.00. Call or write M. Theodorou, 16 Fane Ct., Brooklyn 11229 N.Y. Tel: TW1-3714.

SACRIFICE: KWM-2 mint condx, $659, "Factory installed", Noise Blanker $69.00; mobile supply, $49.00; mobile mount, $64.00; A.C. supply, $65.00; 30L-1, $319.00; Heath HO-10 Monitor 'scope, $54.00; Hy-Gain full size 3-el. 20M beam, $35.00. Fred Breidbart, 1725 Broadway, Brooklyn, N.Y. GL-5-2222.

DON'T Pass this up! SBE-33 transceiver, SB1-LA KW linear, SB1-VOX, Shure mike, all cables, plus 6 new linear tubes. Save 33%. Only $495.00. Bank financing available, 200 mile free delivery. Send 10¢ for photo. John Green, W9CTX, University Trailer Court #55, Carbondale, Ill. Phone 618-549-3535.

WRL's Bluebook saves money. These prices, without trades, cash or charge: SS1-R, $449.10; HT-32, $251.10; HT-37, $233.10; SX-99, $85.05; SX-101, $161.10; HX-10, $260.10; Champ 350, $170.00; King 500A, $206.10; HQ-170C, $179.10; Ranger, $89.95; NC-400, $269.95; SB-34, $269.95; Galaxy 300, $161.10. Hundreds more. Free list, WRL, Box 919, Council Bluffs, Iowa 51501.

WANTED: Johnson K. W. Matchbox; Heath SB-10. Write or call Dick Wrobel, W4HLI, 4019 Brookhill Road, Tuscaloosa, Ala. Tel: 553-5349.

CLEANING House. List free. K2IKZ/7, 8556 Elm St., Fairchild AFB, Washington 99011.

WANTED: NC-183-D or equal general coverage receiver in excellent condition. Paul Stitzel, K8OHK, 3130 Park Drive, Stow, Ohio 44224.

FOR Sale: DX 60, $55.00; HG-10, $25.00. Mint condition. Ship ppd. insured. 50% down, balance c.o.d. W. B. Dodge, 300 Waynerige Rd., Waynesboro, Va. 22980.

EXCELLENT Condition: NCX-3, plus power supply, $225.00 takes both. Call Jack Siegel, 914-769-7500.

HALLICRAFTERS SR-150 transceiver, AC supply w/speaker, DC supply, station mike and stand, mobile mount, mobile mike and speaker, Hustler mast and bumper mount w/75, 40-20 resonators: $550.00. R. W. Fanus, WB4CPR, 411 Hibiscus St., West Palm Beach, Fla.

FOR Sale or trade, NCX-3, AC and DC power supplies, mike, whip ant, and SWR Bridge, $350.00 cash or trade for competition pistols with like value. P. Linneer, WA5HIU, 4912 Century, El Paso, Texas. 915-75:-4141.

FOR Sale: Heath HR-20 receiver and Heath GP-11 mobile power supply. Both in very good condition. $70 firm for receiver, $10 firm for mobile supply. May consider trade for VHF equipment. First check takes. Will ship freight collect. Tom Hamilton, WA9PGX, 520 Bloomingdale Road, Itasca, Ill. 60143.

SELL: Galaxy 2000+linear amplifier. Guaranteed perfect in mint condition. Guaranteed 1200 watts PEP output on all bands! 2000 watts PEP. Includes AC power supply and cables. The finest linear for the price of only $365.00. Call or write K3MVP, 8258 Brittany Place, Pittsburgh, Penna. 15237.

DRAKE R4, barely used, $300. KØCHB, 1207 St. S.E., Cedar Rapids, Iowa 52403

MOVING. Must sell in total QST, CQ, Radio or Rider's lots only. Make offer. QST 1932 to 1957 inclusive, 4 missing, 308 copies. CQ 1953 to 1957 inclusive and 12 earlier copies, 72 copies. R-9/Radio Jan. 1936 to Dec. 1944, 27 missing, 81 copies. All above in good to fair condition. Rider's Radio Manuals #1 through #17, mostly new in original wrappers. W5EDX, H. Frank Jordan, 2334 West Mulberry, San Antonio, Texas 78201.

SELL: LPA-1 linear and PS, mint, best offer. WØHNA.

WANTED: Collins VFOs, Richard Mann, 430 Wilmot Road, Deerfield, Ill. 60015.

NOVICES! Complete station! Must sell! Write WA7EEP, Rte 2, Box 216C, Gresham, Oregon.

HAMMARLUND HQ-180 general coverage receiver SSB, CW and AM (just rechecked at factory) $295.00. Clean, sharp. Hallicrafters HT-37 transmitter, $225.00. Take both for $480. W4HL, 610 Park Lane, Decatur, Georgia 30033, Phone 634-7768.

SELL Or trade: Link FM gear, 146.94 Mc. Model 1907 base, $125.00, Model 2210 12-volt mobile, $60.00; both for $150.00. Joe Moomaw, W4FZG, 304 Valley View, Staunton, Virginia. Phone 703-886-1428.

ALL In one, New Mexico Amateur Radio Directory with counties listed after each address. Albuquerque hams also by name with phone. PP, $2.00. Electronic Parts, 222 Truman, N. E., Albuquerque, New Mexico 87108.

FOR Sale: National NCX5 all latest factory modifications. NCXA power supply/speaker, VX501 VFO console, with xtal calibrators. Seven months old, like new, $650.00. Also Model 3002, unused, $50.00. Leo C. Cunniff, W2OEH, 35 Hillcrest Road, Cedar Grove, N.J. 07009. Phone Days: 201-239-6200, Nights: 201-239-2805.

COLLINS 32S-3, 516F-2. Immaculate, $600.00. Eldico SSB-100F, 80-10M xmtr with Dow antenna relay, filter type rig with 1-inch monitor scope built-in, 100 W. output on SSB, perfect, $250.00. Lee Richmond, WB2OSF, 166 Floral Ave., Plainview, L.I., N.Y. 11803. Tel: (516)GE3-8663.

FOR Sale: HQ-150 receiver with product detector, xtal calibrator and speaker, $125.00. Central Electronics 10B exciter with VFO, $50.00. Donald R. Traub, K6DMG/1, 106 Upland Ave., Newton Highlands, Mass. 02161.

EXCELLENT Condition, ART-13 including low-frequency broadcast band tuning unit. Complete all tubes and crystals. Famous Collins rig, first $35.00, express collect. W4FPQ, Box 467, Greenvile, N.C. 27834.

B&W 6100 SSB xmtr. Original factory condition. $400.00. Bill Briggs, K6ANV, 1930 Euclid Avenue, El Cajon, Calif. 92021. Phone: 714-442-1760.

FOR Sale: Excellent condition: Johnson Courier 500-watt all-band amplifier, $100.00 plus shipping. Hoke Franciscus, Carlisle, Penna. W3ELV.

BEST Offer over $100 takes flawless SX-101, Mk III. F.o.b. Chicago. K9DNR, Box 183, Cicero, Ill. 60650.

SBE-33 with 12-volt power supply, excellent condition: $220.00. W1AOL, Box 172, Milton, Mass. 02187.

EICO 723 xmtr, factory-wired, $40.00. K2ITO, 1935 83 St., Brooklyn, N.Y. 11214.

BC-610E complete with instruction books. Open to any type offer. All letters answered. East Coast Electronics, 123 St. Boniface Rd., Cheektowago, N.Y. 14225.

INCENTIVE Licensing? You need Posi-Check, Amateur Extra and General Class FCC type exams, complete in detail and style, even to the IBM type answer sheets. A very good aid to learning and a Must in preparation for FCC Amateur exams. General Posi-Check consists of 297 questions and explained answers for only $2.98. Extra Class, 115 questions and diagrams with explained answers, $2.00. 139 questions of the 297 in the General Posi-Check apply directly to Extra Class also. Get both for only $4.50 postpaid. Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322

QUAD Owners, get improved single feedline operation of any two, three or four band Quad with Tenna Switch (kilowatt rated remote switching system). $15.95 PPD U.S.A. Cubex Company, P. O. Box 131, Altadena, Calif. 91001.

SELL Back copies of Radio. All clean and with covers. 1936: April, May, June, July, Oct., Nov., Dec. 1937: Jan., Feb., Mar., Apr., May, June, July, Oct., Nov., Dec. 1938: Jan., Feb., Mar., Apr., May, June, July, Oct., Nov., Dec. 1939: Oct. 1940: Jan., Feb., Mar., Apr., May, June, July. 1941: Jan., Apr., May, June, July, Oct., Nov., Dec. 1942: Jan., Mar. 50¢ each copy. R. L. Baldwin, W1IKE, 26 Ridge Rd., Simsbury, Conn.

FOR Sale: Johnson Viking 500 transmitter, 500 watts c.w., FSK, plate-modulated AM, SSB with external exciter. Separate power supply and modulator unit would be excellent for VHF use. Original Canadian price was $1500. Will sacrifice at $350 American or Canadian funds or highest offer. Will deliver in Ontario, Quebec or Northeastern U.S.A. Also sell: SB-10 and power supply, $50. Contact VE2UN, 3480 McTavish St., Montreal, Quebec, Canada.

HW-32, HB supply, good condition. $100. WB2VIN, Jacob Yellin, 315 Rogers Ave., Brooklyn, N.Y. 11225.

NEW and excellent reconditioned equipment at lower prices. Terms. Collins 75S-1, 32S-3, KWM-2; Drake 2-B, T-4X. Gonset GSB-101, GSB-201, G-50; Hallicrafters SX-110, SX-111, SX-101A, HT-37, SR-160, SR-150; Hammarlund HQ-150, HQ-170, HQ-170A; National HRO-60, NC-303, NCX-3, NCX-5, NCL-2000, HRO-500. Much other equipment. Write for price lists. Henry Radio Co., Butler, Mo.

STUDENT In Argentina must sell NCX-5/NCX-A, Mark I factory modified to Mark II, $529.00. Shipped prepaid, or best offer. All answered. WA1FEO/LU5DGQ, c/o Siddall, Box 44, Hyannis, Mass. 02601.

SELL: Collins 75S-1 receiver, seril 2668, sharp condition, $250.00. W9NRT, Effingham, Ill.

COLLINS 32S-1 transmitter and power supply used less than eight hours. $375.00. Dynamic Astatic microphone with push-to-talk stand, $15.00. W1FA, 33 Lee St., Marblehead, Mass. Tel: 617-631-0755.

GONSET Comm. III 6 mtr., asking $125.00 or best offer. In perfect working condx. WA1CQA, 142 Marion Ave., North Adams, Mass. 01247.

HT-37 SX-101A package deal, $410.00. Will not ship. Pick-up at Roslyn, L.I., N.Y. Rodin call 9 to 5 (516) IV-1-9844.

BC-342 recvr, w/manual, $50.00; BC-1031B Panadapter, w/manual, $50; QST 1957, 1958, 1959, $5 yr. Make offer on ARRL Handbooks 1933, 1941. All F.o.b. WB6JWR, 22214 Shadycroft, Torrance, Calif. 90505.

COMPLETE SSB Station. Apache, SB-10, SX-100 (with product detector installed). All excellent. $350.00. K2GKU, BA9-2738.

4X250B, $10 pair; 4X150A, $5 pair; 4CX250B, $12 pair, used, new, $20 pair p.p.: 4-65 new $7.50 pair; 811A, new, $5.50 pair. Powerstat variac new 0-250V, 1.5 KVA, $23.00; excellent BC-640, 811A modulator and power supply, $45.00. C. M. Pruett, Star Rte C, Flamingo Bay, Ft. Myers, Fla. 33901.

DRAKE R-4A recvr. Never used, $300. NC-303 with xtal calibrator very good condition, $200. Ranger II with Dow-Key relay and low-pass filter $195. S. Partyka, 141 Waite Ave., Chicopee Falls, Mass. Tel: 413-592-2952. Call person-to-person, pls.

HEATH SB-300 receiver, perfect in operation and condition. Sacrifice for $195.00. Reason: assembling new SB-100 transceiver. J. G. Luckner, W2RRB, Willow Drive, Rome, N.Y. 13440. Tel: (315) 337-0643.

WANTED: Bird Thruline wattmeter plug-ins: 1000 watt and 100 watt, 2-30 Mc. Also 1000, 500 and 250 watt, 200-500 Mc or 400-1000 Mc. Buy $10 or trade for Collins mechanical filters. K4GYO, 43 Island Beach, Merritt Island, Florida.

CRYSTALS Airmailed: MARS, Nets, SSB, Novice, etc., Custom finished etch stabilized FT-243 .01% or fraction, 3500 to 8600 $1.90. (Five or more same or mixed $1.70) (Nets: Ten or more same frequency $1.35). 1700 to 3499 and 8601 to 20,000 $2.50. Overtones supplied above 10,000 kilocycles. Add 50¢ each for .005%. HC-6/u metal miniatures above 2000 add 75¢ each. Other frequency ranges and crystal types available. Write for information—order bulletin. Crystals since 1933. Add 10¢/crystal airmail return, 5¢ surface. C-W Crystals, Rt. #2, Box 22-B, Marshfield, Missouri 65706."

SELL: 75A3 wih accessory plug-in product detector. $230.00. Homebrew 80-40 c.w. 75 watt transmitter, $15.00. Pair of Penta Lab PL-254W's, $15.00 each. 7038 Vidicon, $50.00 or trade. WA1CYB, 126 Farmington Ave., Bristol, Conn. 06010.

WANTED: Transmitting tubes, types 4-250A, 4-400A or PL-175A, new or used. Write or call, stating manufacturer, condition and price. F. W. Rockwood, W1IOB, 186 North Rolling Acres, Cheshire, Conn. 06410. Tel: a.c. 203-272-8559.

WANTED: Collins 75S-1 receiver, Swan 350 transceiver w/AC power supply, Hallicrafters SR-42/42A transceiver. All must be mint. WA6JWK, 6951 San Joaquin Circle, Buena Park, Calif. 90620

HALLICRAFTERS 33B linear, 2 kw. P.E.P., $375.00. TRP Tunaverter 750, new, $20.00. Instructograph with 8 tapes, $32.00. All one owner. W6PLS, Rte. 1, Box 151, Halfmoon Bay, Calif. 94019.

SELL: Heath DX60A, HR-10, Q-multiplier, little used, $125.00. Will prepay freight. Also, Drake 2B and 2BQ, Q multiplier, speaker, $225.00 WN9RZX, 4434 Huron Circle, South Bend, Ind.

ESTATE Sale: Complete, ham rig: NC-303 receiver, Johnson Viking Invader 2000 transmitter; Knight P2 SWR meter; GMT Numechron Tymeter, CDR rotor TR-44; Vibroplex Key, T234 Tri-Ex Tower; DB24 Hy-Gain beam antenna; DK-60 Dow-Key relay; all cables and misc. equipment to complete hook-up and manuals. All equipment purchased new and in excellent condition, very little use. Will ship anywhere in USA. $1100.00 or reasonable offer. Marc Maury. Phone 714-626-0441 or write to 1679 Sumner Ave., Claremont, Calif.

EMERGENCY Sale: Swan 350, 117XC, purchased October 1966, 10 hours use, factory carton, $460.00. Claude Finn, 13958 Runnymede, Van Nuys, Calif. 91405.

WINTER Specials: R4, $285.00; 32S-1, $425.00; HT-37, $235.00 HT-44, $245.00; SW250 demo; $295.00; GSB100, $169.00; SX-96, $109.00; SX-100, $139.00; 2A, $149.00; Phasemaster II, $119.00; A1-67's, $32.50; NC-183, $99.00; Viking II, $79.00. Free List. Howard Radio, Box 1269, Abilene, Texas 79604.

COMMERCIAL Transmitter, used by Major Airline. Wilcox Electric Type 99A, two RF units, HF 2-18 Mc., VHF 108-132 Mc. A0, A1, A2, A3, 400 watts continuous output, all modulators, power supplies, meters. All functions may be remote-controlled by phone dial. Manual. Sell or trade for 32S-1 or SSB transceiver. Heathkit Apache and SB-10, excellent condition. $175.00. Heathkit 'scope, $35.00; Heathkit reflected power meter, $10.00. Shipped collect. WA5EUN, 3202 South Delawere Place, Tulsa, Oklahoma 74105.

YOU Need it, we got it! Unheard of bargains in coaxial cable, switching equipment, meters, relays, connectors, capacitors, transformers, etc. Phone or visit us! Open Monday-Saturday till 5 P.M. Windsor Distributors, 46 Fulton St., Brooklyn, N.Y. 212-MA4-7038.

SELL: Late 75A-1 with matching speaker in perfect condition, $150 or offer. Ameco Nuvistor pre-amp with built-in AC supply, $25.00. Bill Smith, W1DVE, 102 West Street, Apt. B-6, Rocky Hill, Connecticut.

SELL: 75A4 #3739 excellent condition. 3.1 and 1.5 Kc filters $395.00; HT-44 with matching a.c. supply. Little used, like new, $295.00. BC-221C, a.c. supply and book, $50.00. Johnson Matchbox 275W, built-in SWR indicator and coupler, $50.00; Millen Grid dip meter, $45.00. H. Taubin, W2GCW, 192-15A 69th Ave., Flushing 11365, N.Y. Tel: 454-2775.

SB-200 Professionally assembled, used very little, $170.00. Harvey-Wells T-90 transmitter with FSK for RTTY, excellent, $50. *A. M. Hughes, 145 Pinckney St., Boston, Mass. 02114. Phone 617-742-0029.*

HAM TV. Toshiba 7038 Vidicon, $5; RCA 7735A Grade C, $10; Vidicon socket, $2; 15.75 Kc xtal, $14; RCA image orth, 8820, $10. WB2GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, N.J. 07012.

WHEATSTONE Perforator, keyboard type in mahogany case, for sale or trade. Roy Brougher, W5HPB, 4002 Levonshire Drive, Houston, Texas 77025.

E-Z Way Tower—galvanized 75 foot self-supporting crank-up tilt-over Model TORBZ 75-3g complete-stored in basement, never erected. $990. F.o.b. W4TYC.

HY-GAIN Long John 5-element 20 meter beam. Sacrifice new 205B absolutely perfect. $375. Mint SX-115, $269. W4ETO, 813-595-3447 evenings.

THE Following Heath equipment is in excellent condition for sale at less than kit cost: Marauder; Mohawk, Warrior, Monitorscope, Mohican. K8VHD, 788 Pipestone, Benton Harbor, Michigan 49022. All inquiries acknowledged.

HALLICRAFTERS HT-41, 1 Kw linear, $160; Heath HX-20 80-10 SSB-CW exciter, 100 W. P.E.P. $125.00 Both for $275.00. Tom Carney, 1727 Monte Sano Blvd., Huntsville, Ala. 35801.

LINEAR for sale: HT-33. Maximum legal power. TA-33 Tribander. Erico 730 Modulator. Heath Twoer. Free tubes/extras with purchases. Call weekday evenings: WB2NEE, Anthony Salzman, tel: 212-879-6369.

FOR Sale: SX-101A, R48 spkr, $200; DX-100, coax relay, 22X mic, $100; excellent condition, no scratches. Manuals. W2EPZ, 80-44 259 St., Floral Park, L.I., N.Y. 11004.

75A-4 500 cps filter, $45.00; new, $50.00; Wheatstone code perforator and Boehme keyer, excellent $295; Eico 460, $55.00. Federal 804, $80. Want: APR-4, frequency counter, transfer oscillator, S-37. W8RMH, 1910 Longpoint, Pontiac, Mich.

HAMMARLUND HQ-129X rcvr, V.G. xtal control, AVC, BFO, ANL, selective tuning, S-meter, $90.00. L. Asbell, 181 Spoonwood Road, Wilton, Conn. 06897.

AUTOTUNE ART-13, with tubes, schematic and manual, $29.00.F.o.b. Joe Harms, W3COP/4, 905 Fernald, Edgewater, Fla. 32032.

CLEAN NC-173, $65.00 f.o.b. Wm. Kindler, W3STV, 727 William, Trafford, Penna.

QST-All copies, January 1941 to present, Six binders, 1936 edition, "Two Hundred Meters and Down". Best offer. Dr. B. M. Chambers, 44 Broad St., N.W., Atlanta, Ga. 30303.

WANTED: Heath Chippewa linear amplifier. K3KRF, 2017 Ogden St., Phila., Penna. 19130.

SELL: DX-60, in perfect condition. $50.00: HG-10, also in like-new condx, $25.00; AM2 reflected power meter, $10.00. Robert L. Frie, W2EWS, 17 Sedgwick Road, Trenton, N.J.

SELL: DX-60 and VF-1; BC348 receiver, SS-3 Q multiplier, "Bonus" 15/10 converter. $165.00 takes all. Write Don Ross, W2JMZ, Mossy Brook Road, High Falls, N.Y.

WANTED: December 1941 issue of QST. Also photos, etc. of Gallups Island. R. Taylor, R. 32, W1QCO.

QST Library January 1951 through 1966. Like new. $30.00. F.o.b. WØBGE, 10516 Wisteria, St. Louis, Mo. 63126.

FOR Sale: Heathkit HW-12 with Dynalab conversion 75-40-20 with manual, $95.00; HA-14 KW Kompact linear, $95.00; HP-14 linear mobile power supply, $85.00. All kits lab wired and tested, never used. K4NI, W. Bickmeyer, 137 Bahama Blvd., Cocoa Beach, Fla. 32931.

COLLINS R-390A, my personal receiver last 3 years in excellent condition, all mechanical filters to factory specs, VFO linearity 2000 cps/mc, all c controls working. See to appreciate! First $700 cashier's check. Collins R-390, immaculate condition, also my personal RTTY receiver, all controls and functions perform to specs, cabinet excellent. A c.w. dream receiver at $500 firm. Commercial RTTY converter CV-89A excellent working condition. $135.00 firm. Will crate and ship anywhere. Weldon Drennan, 510 Iowa, Beaumont, Texas 77705.

HQ-180AC speaker, Brand new. Best offer. E. Taggart, Nashville, Ind. 47448.

APACHE Xmtr, first $105.00. Can ship immediately. Heath Q-multiplier, $7.00. New 30 watt hi-fi spkr, $25.00. Cost $42.00. Want 16 MM sound films. W1AHC.

SELL: 239 issues of QST, 1933-1958, good condition. 15 complete year run, best offer over $30.00. W2GPO. William Asbury, 185 Soundview Rd., Huntington, N.Y. Box 697.

WANTED: DM-35 dynamotor. No modifications. Mosley Triband beam, 5 Mc. xtals. WA9HJY, 439 N. Henderson St., Galesburg, Ill. 61401.

IN Army, must sell NCX-3, transceiver with AC and DC power supplies, $340.00. Michael Bruce, 2819 Blossom St., Columbia, S.C. Phone 2561718.

APACHE and SB-10. Both perfect. $175.00. Mohawk and matching speaker. $130.00. A. B. Watson, WA4VPK, 3606 Skyview Drive, Huntsville, Ala. 35801. Phone 205-536-9776.

CERTIFICATE Hunters earn the Bergen County Award. Within 100 miles of Hackensack. New Jersey work 25 towns. Other stations work 5 towns. Town list of SASE. GCR list and 50¢ for award to BARA, 322 Howard St., Westwood, New Jersey 07675.

CE-10B, QT1, VFO, $70; Tecraft 144 Mc. converter, 14 Mc. IF, supply, $18.00; Hy-Gain Yagi Model 28, $10. WA9NKT, 1235 Hillcrest Lane, Freeport, Illinois 61032.

WANTED: Boehme keyer, keying head, AC motor drive, speed control indicator, electronics not necessary; McElroy Wheatstone code tape perforator, model PFR-443. KØACG, 1532 N.E. 1st Ave., Miami, Florida, 33132.

WANTED: SX-71 receiver. Must be late model with black dials and 15 meters calibration. Will pay top dollar for good unit. Write details and price wanted to M. M. Ward, 16 Sunset Drive, Cherry Hill, N.J. 08034.

HEATH: SB-300 rcvr. A-1, $200; SWR bridge, new, $12; TTO keyer and Nikey, A-1, $30. Lot $250.00. WA3CKZ, 328 Castlegate Rd., Pittsburgh, Penna. 15221.

COLLINS 75A-1 with speaker, excellent condition, $140.00. WA2MNQ, Ron Stockton, Brookside, N.J. 07926.

WANTED: Plug-in coils for National SW-3 and FB-7 receivers. Leland W. Smith, W4YE, 1147 Houston, Mill Road, NE, Atlanta, Ga. 30329.

WANT: Collins 516F-2 power supply, K5DUE, 700 West Acheson Street, Denison, Texas, 75020. 214HO5-6278.

SELL: Heath Seneca in wkg condx. As is. $70. K2ARO, 177 Roosevelt Rd., Hyde Park, N.Y.

SEND SASE for list of goodies galore. Liquidation. No junk! WØLQQ, 2016 Grandview Blvd., Kansas City, Kansas 66102.

GALAXY 300, PSA300AC, mobile mount, cables, 80 mtr. dipole, mint, $165.00. SX-96, speaker, excellent, $70; 11 hy., 500 Ma. choke, $5.00; (2) 3 mfd. 4000 vdc capacitor, $3 ea. SASE list of parts. WØLWZ/6, General Delivery, Mountain View, California 94040.

FOR Sale: Collins 32S-1, 75S-1, Heath SB-200, separate or complete; best offer takes it. Excellent condition. Dan Pierce, KØQCT. 1930 8th Avenue, Kearney, Nebraska.

"HOSS TRADER Ed Moory says if "you can pay cash and no trades are involved, you can purchase the following demonstrator equipment with factory warranty: NCX-5, $459.00; NCL-2000, $549.00; NC-200, $296.00; Swan 350, $349.95; Mark I linear, $389.95; Swan 250, $269.95; Galaxy V, $344.00; 32S-3, $619.00; KWM-2, $899.00; SB-34, $329.00; Drake R-4A, $334.95; T4-X, $338.00; 30L-1, $419.00; new 516F-2, $124.00; Drake 2-C receiver, $185.00; new Ham-M rotor and demo TA-33 beam, $188.95. Demo Mosley Classic 33 beam, $105.00; Special Rohn 50 ft. fold-over steel tower, $189.00; demo Ham-M rotor, $89.95. Reconditioned gear: HT-37, $219.00; KWM-2, $639.00; 32S-3, $529.00; Swan 350, $295.00; SB-33, $179.00; Swan 240, $195.00; Ed Moory Wholesale Radio, P.O. Box 506, DeWitt, Arkansas. Phone 946-2820.

EICO 753 xcvr, $150.00. Perfect condition. 2616 Liberty, Erie, Penna. 16508. Tel: 8660935.

ESTATE OF W1BI: Still have Mosley 20-M. Minibeam. Reasonable. Mrs. W. H. Northrup, 3 Rundelane, Bloomfield, Conn. 06002.

MUST Sacrifice Apache $120.00, immaculate, professionally wired, with original carton and manual. J. Hychko, K3IUN, 98 Newport Ave., Nanticoke, Penna. 18634.

W2HF wants instruction manual for Hickok Model 604-AF 'scope. All mail answered.

HQ-129X, 250-watt Johnson Matchbox, Heath Mohican receiver with A.C. and battery supply, $175.00. Or will sell individually. Don W. Miller, K8CKP, 284-8C N. Gould Rd., Columbus, Ohio 43209.

ANTENNA Sale: Mor-Gain 5 band dipole, never used, in original packing, $25.00: unused pre-cut wire elements for Cubex 2-element Triband quad, instructions, all insulators, reflector coils, $20 value for $12.00. Jaystick all-band antenna with matching network and tuning chart, $12.00. W4GNS, 8206 Midnight Pass Road, Sarasota, Fla. 33581.

COLLINS: 75S-1 deluxe, with Collins spinner knob, Waters rejection tuning, 500 cycle c.w. mechanical filter and matching BFO crystal. Looks and works like new. Complete factory overhaul Sept. 1966. With manual $330.00. Will ship prepaid upon receipt of check. Stan Flegler, K8 RPA, 1400 Poxson, Lansing, Michigan 48910.

SELL: QST, Radio, CQ issues from 1924. List. W7HHE, Box 23, 502, Tigard, Oregon 97223.

FOR Sale: Twoer, want $35.00. WN5QYO, L. C. Ballentine, 2916 Ludwig St., Little Rock, Arkansas. 72204.

FOR Sale: Heath HO-10 'scope, exc. condx. $57.50. Top shape NCX-3, NCX-D, NCX-A Power supplies $300.00. Will consider trade for 6 mtr. Heath SB-110. John F. Strough, Rte #4, Marshall, Mich. Tel: 1-616-781-2715.

VHF Gonset 910A 6-meter Sidewinder; 911A P.S., 913A linear c.w.-ssb-AM. $300 takes all. Will ship. Larry Pepple, 5136 Riviera Dr., Fort Wayne, Indiana 46805. Tel: 748-0571.

WANTED: Heath Marauder and Mohawk receiver. Need not be in working condition if price is right. Robert E. Brown, 25352 Martindale Rd., North Liberty, Indiana 46554.

QUALITY Amateur rig cheap! Collins 150 W AM-CW all-band transmitter 32V-3, $140.00; Collins 75A-1 receiver with SSB mech. filter, $130.00. Both units are in excellent condition. C. V. Kimball, WA8UNS, 810 W. Jefferson, Ann Arbor, Mich. 761-4791.

ELMAC AF-68 PMR-8 and 1070 power supply. Short and long cables, mike, complete station for mobile, portable and Novice operation. $125.00. No shipping, sry. W2RFC, 525A East 72nd, New York City 10021.

HY-TOWER 18 HT vertical, $75.00; HQ-140X, $80. WB6MNL, 706 Scripps Drive, Claremont, Calif. 91711.

HELP! Have been given HRO-50 receiver with only one coil. Desperately need 20-meter coil, at least. W5EUY, Arlington State College, Arlington, Texas 76010.

HAVE Complete following QST years: 1928, 1929, 1931, 1932, 1935, 1936, 1938, 1939, 1940, 1952, 1953, and 1956. $100. A. Winslow, 381 Cornwall, Hartford, Conn.

WANTED: Farnsworth 10" table television Model GV-240, GV-250 or GV-260. C. T. Brown, 1004 Burr, Corona, Calif. 91720.

HQ-180A, $275.00: HT-41 linear, $150.00: DX-100B, $100. In gud condx. WA4JUT, 3501 Meadowbridge Rd., Richmond, Va. 23222.

WANTED: 700 watt homebrew linear. WA3EMR, 1102 3rd Ave., Brackenridge, Penna. 15014.

WANTED: Operating service manual, Sylvania tube tester Model 220. Will photostat. KØRHK, 13312 Inverness Road, Hopkins, Minnesota 55343.

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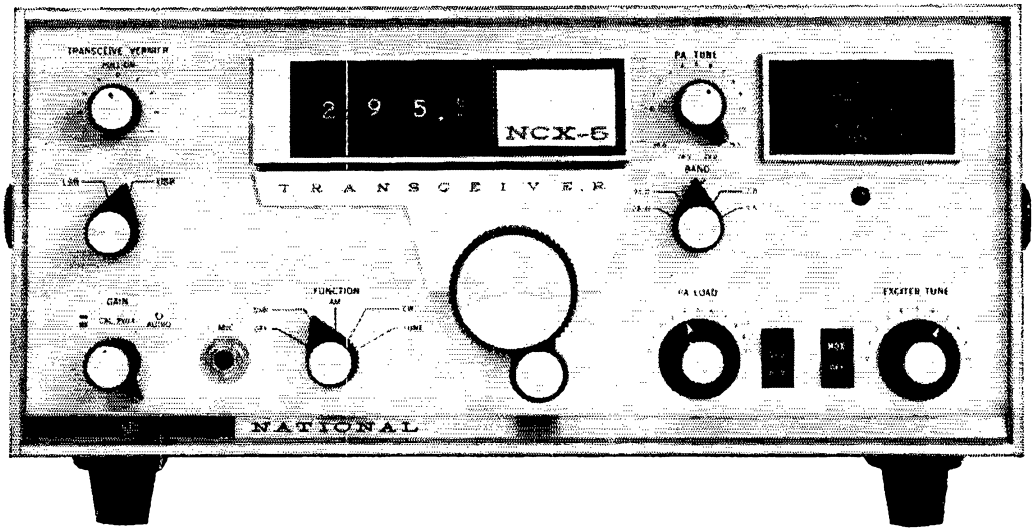

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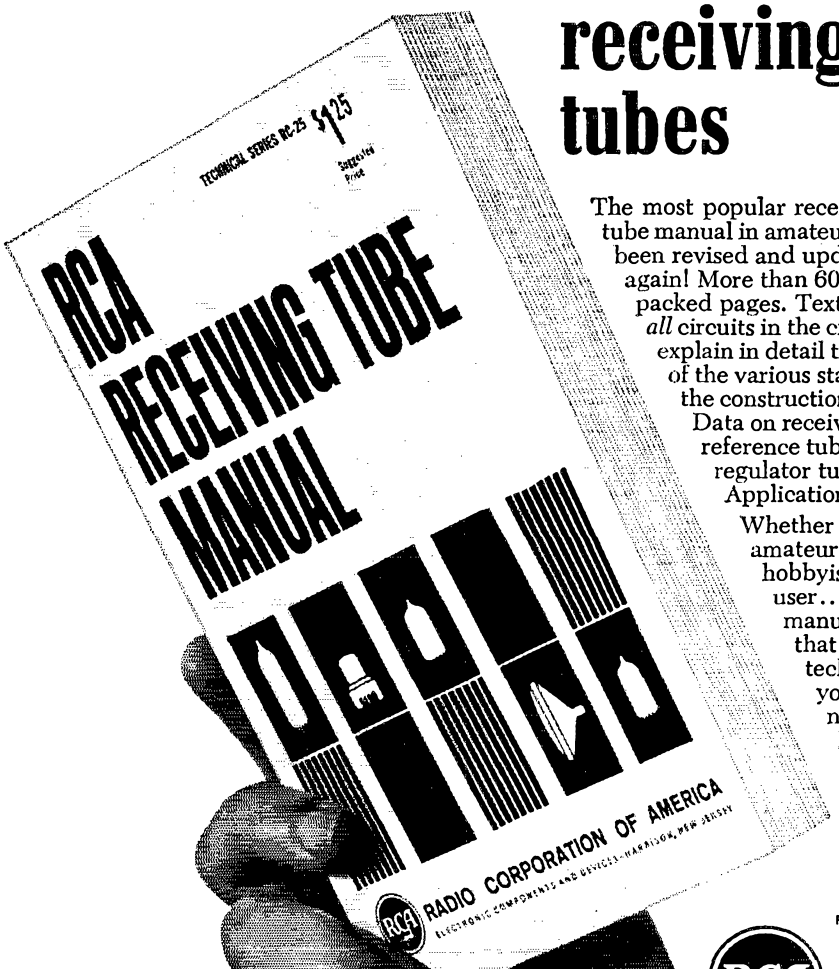

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