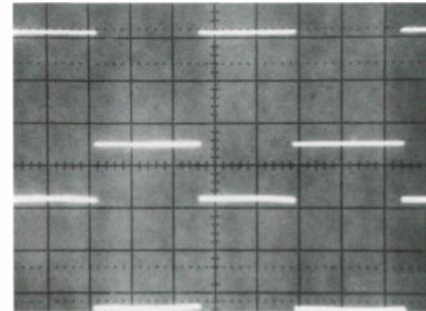


### Frequency Response and Transient Characteristics

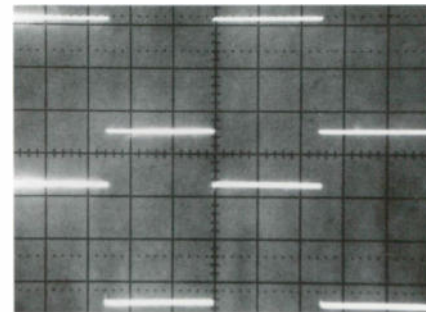
Square wave modulation of the 802A Exciter shows its outstanding frequency response and transient characteristics.

A comparison between the modulating square wave and recovered modulation from a modulation analyzer shows no significant differences, indicating a virtually transparent exciter.

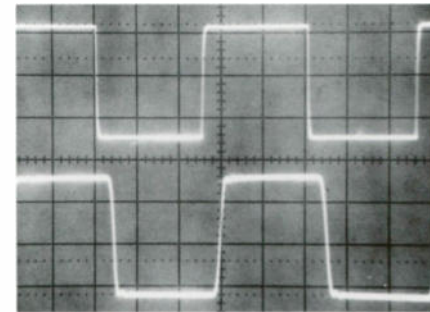
Upper trace, modulating signal. Lower trace, recovered modulation.



10 Hz



100 Hz

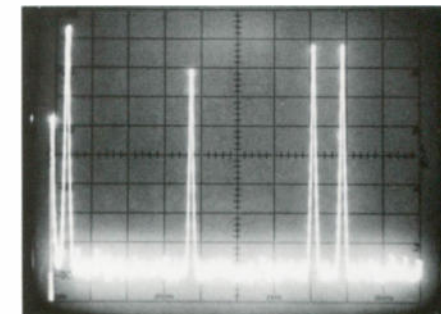


10 kHz

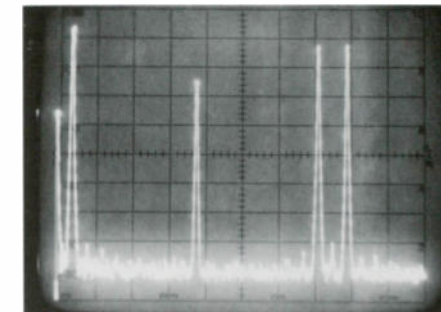
### Intermodulation Distortion and Crosstalk

Spectrum analyzer displays, with 802A Exciter being modulated by stereo signals, show that intermodulation distortion and crosstalk have been reduced below the level of any practical significance.

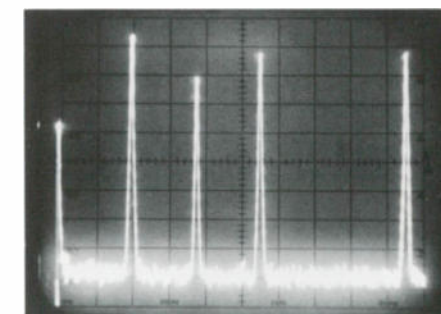
Modulation capability of the exciter is beyond the  $\pm 75$  kHz to accommodate foreseeable composite signal requirements. Supplemental data are available that describes monophonic, stereophonic and multi-channel SCA performance with several stereo generators and SCA monitors.



Stereo at 100% modulation: 2.0 kHz in left channel; pilot at 9% of 75 kHz deviation. Full scale equals 75 kHz deviation, 10 dB per division.



Stereo at 150% modulation: 2.0 kHz in left channel; pilot at 9% of 75 kHz deviation. Full scale equals 112.5 kHz deviation, 10 dB per division.



Stereo at 100% modulation: 10 kHz in left channel; pilot at 9% of 75 kHz deviation. Full scale equals 75 kHz deviation, 10 dB per division.

### SPECIFICATIONS 802A FM Exciter

#### GENERAL

**Power Output:**  
5 to 50 watts continuously adjustable

**RF Output Impedance:**  
50 ohms, VSWR less than 2:1 for full output, protected for open and short circuit; BNC connector

**RF Harmonic and Spurious:**  
60 dB or more below rated output

**Frequency Range:**  
87 to 109 MHz in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis from highly stable master oscillator

**Frequency Stability:**  
 $\pm 250$  Hz

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
 $\pm 200$  kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulating signal in 5% increments with over-modulation indicator; illumination of each LED occurs at  $\pm 2\%$  of indicated modulation level

#### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 volts peak to peak at 600 ohms) for  $\pm 75$  kHz deviation

**Audio Frequency Response:**  
 $\pm 0.5$  dB flat; 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**Transient IMD:**  
0.1% maximum (square wave/sine wave)

**FM S/N Ratio (FM Noise):**  
78 dB minimum below  $\pm 75$  kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
73 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
60 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation  $\pm 75$  kHz at 400 Hz

#### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nominal

**Composite Input Level:**  
1.25 volts RMS (3.54 volts peak to peak) for  $\pm 75$  kHz deviation

**Composite Amplitude Response:**  
 $\pm 0.1$  dB, 20 Hz to 100 kHz

**Composite Phase Response:**  
 $\pm 0.5^\circ$ , 20 Hz to 75 kHz

**Composite Group Delay Variation:**  
 $\pm 25$  ns, 20 Hz to 75 kHz

**Composite Total Harmonic Distortion:**  
0.08% maximum

**Composite Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**Composite Transient IMD:**  
0.1% maximum

**Composite FM S/N Ratio (FM Noise):**  
78 dB minimum below  $\pm 75$  kHz deviation

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nominal

**SCA Input Level:**  
1.25 volts RMS for  $\pm 75$  kHz deviation

**SCA Amplitude Response:**  
 $\pm 0.3$  dB, 40 kHz to 100 kHz

#### STEREO OPERATION

Most stereo performance parameters are determined by the stereo generator used. The following parameters are influenced by the rf system. These specifications assume that the stereo generator is a state of the art generator.

**Stereo Separation:**  
50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% maximum; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**FM Noise:**  
-72 dB referenced to 400 Hz, 75 kHz deviation; measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

**Linear Crosstalk:**  
-55 dB

#### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the rf system. These specifications assume that the SCA generator is a state of the art generator.

**Crosstalk, SCA to Main and Stereo:**  
(67 kHz and/or 92 kHz)  
-60 dB, SCA deviation 5 kHz main, 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA:**  
(67 kHz or 92 kHz)  
-50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; 150 microsecond SCA de-emphasis

**Crosstalk, SCA to SCA:**  
(67 and 92 kHz)  
-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; 150 microsecond de-emphasis

#### ELECTRICAL

**Input Power:**  
115V or 230V  $\pm 10\%$ ; 50/60 Hz  $\pm 5\%$ ; single phase, 200 watts maximum

**Operating Environment**

**Temperature Range:**  
-20°C to +55°C (-4°F to +131°F)

**Altitude Range:**  
0 to 15,100 ft. (0 to 4,600 M)

**Relative Humidity Range:**  
0 to 95%

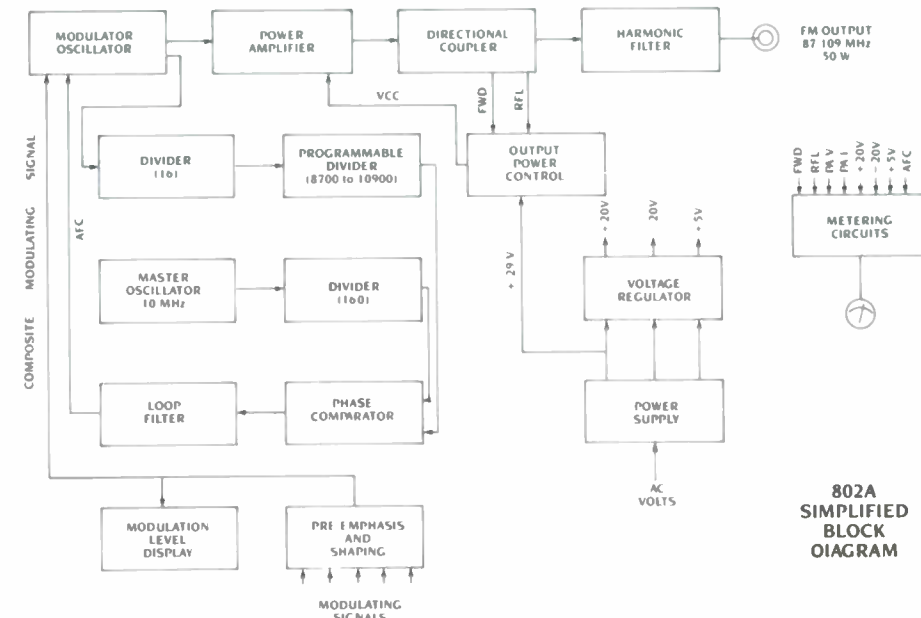
#### MECHANICAL

**Mounting:**  
Equipped with rack mounting slides

**Size:**  
17.5 inches wide (44.45cm), centered in a 19 inch wide (48.26cm) rack-mounting panel; 5.25 inches high (13.34cm); 22 inches deep (55.88cm)

**Weight:**  
Approximately 31.5 lbs. (14.3 kg)

All specifications are subject to change without notice.  
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802A SIMPLIFIED BLOCK DIAGRAM

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Continental's 802A  
Solid State  
FM Exciter



### The Ultimate FM Exciter

Continental's 802A solid-state FM Exciter offers broadcasters outstanding performance, high quality construction and outstanding reliability.

With its variable output of 5 to 50 watts and self-contained harmonic filter, the 802A can be used as a low power transmitter.

### State of the Art Design

The 802A continues the tradition of excellent and reliable performance set by Continental's 510R-1, one of the world's most popular FM exciters.

The 802A is completely solid-state. All subassemblies are modularized and fully accessible from the front. All components have been selected with proven reliability as well as electrical suitability as a prerequisite. The 802A FM Exciter is fully equipped to accept the composite baseband signal from any fine quality stereo generator and STL system, or monaural audio and SCA programming.

### Refined Linearity

Modulation linearity of the 802A Exciter is exceptional.

Measurements of distortion and noise indicate performance that approaches the measurement capability of some of the most advanced test equipment. Continental's 802A is designed to provide outstanding performance under any condition within its specified operating environment.

### Digital Frequency Selection

The 802A FM Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system. Internal programming switches provide instant selection of any one of 2,200 channels in increments of 10 kHz, from 87 MHz to 109 MHz. A highly stable, temperature-compensated crystal master oscillator operating at 10 MHz provides carrier frequency stability and accuracy of  $\pm 250$  Hz at all environmental and line voltage conditions.

### 50 Watt Output Broadband Amplifier

The 802A Exciter is completely solid-state and is entirely broadbanded. It requires no tuning adjustments other than the digital selection of the operating frequency. Power output of the 802A Exciter is conservatively rated at 50 watts into a 50 ohm load at all frequencies in the FM band.

### Automatic Power Control

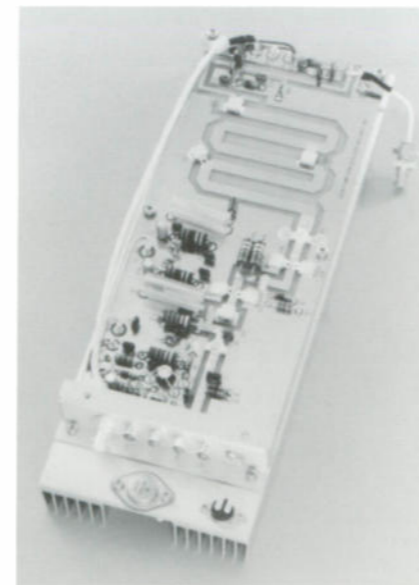
An automatic output power level control maintains the output at any pre-set level from 5 watts up to the maximum level. A strip line directional coupler is incorporated into the power amplifier subassembly, and a meter on the front panel shows both forward and reflected power. A special circuit protects the amplifier from any mismatched load, including open or short circuits.

### Sophisticated Styling

Front panel readouts present a clear and accurate indication of system performance while preserving an uncluttered and tasteful appearance. A digital LED display indicates the true peak level of the modulating signal in 5% increments, with an accuracy of better than  $\pm 2\%$  over the entire modulation bandwidth. An analog meter gives indications of forward and reflected rf power output, and a digital meter with associated push button switches displays accurate and unambiguous measurements of the amplifier current and operating voltages of the exciter. Individual LEDs indicate conditions of VCO lock, over modulation, VSWR, cooling status and input power. BNC connectors located on the front panel provide a sample of several of the rf and modulating signals at levels suitable for signal analysis.

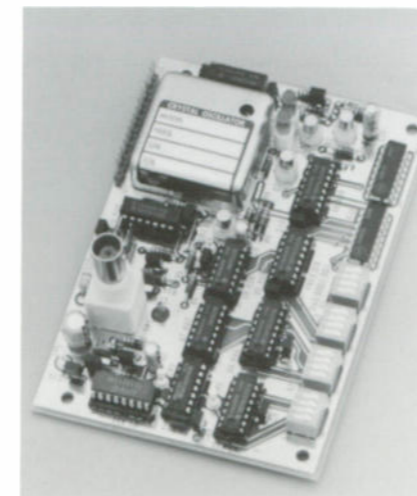
### Modular Construction

Because of its modular design and construction, any subassembly within the exciter can be removed without disturbing other components or assemblies. All exciter subassemblies can be reached and extracted without disconnecting the exciter from the transmitter. The entire exciter is slide-mounted for easy subassembly access, even with the system in full operation. For bench servicing, the exciter can be quickly and easily removed by disconnecting the few electrical connections and uncoupling the slides.



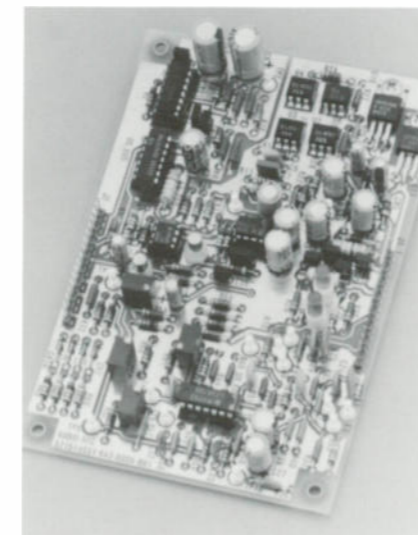
### Output amplifier module

The output amplifier is a three stage, strip line, broadband amplifier with 50 watt output power capability. There are no tuning controls. The amplifier is mounted on a large, forced air cooled heat sink to assure maximum reliability. RF power output is regulated by a series pass transistor which is also mounted on the heat sink. Directional couplers are built into the amplifier circuit board to give indications of forward and reflected power. These couplers also provide automatic power level control and protection from high VSWR loads.



### Frequency divider module

This board contains the 10 MHz frequency standard, the various frequency dividers of the frequency synthesizer and BCD coded DIP switches for selecting operating frequency. Frequency selection is made by a direct BCD code. No frequency off-sets are involved in the coding. LED indicators on the board show operational status of the frequency standard and the modulated oscillator.



### Audio AFC circuit module

This board contains all of the baseband amplification and signal shaping circuits: the frequency synthesizer phase comparator, loop filter, phase lock detector, modulated oscillator bias circuits and the voltage regulators. The board has multi-turn potentiometers for adjusting modulation levels and for optimizing signal shaping circuits to help achieve the highest program quality possible.

### Typical Performance of the 802A FM Exciter with Stereophonic and SCA Signals

Performance characteristics were recorded using a variety of available, high quality stereophonic and SCA generators. Please contact Continental Electronics if you would like to discuss the performance using specific equipment.

### Monaural Operation Performance

**Input level:**  
+ 10 dBm  $\pm 2$  dB for  $\pm 75$  kHz deviation

**Input impedance:**  
600 ohms, balanced with a return loss of 30 dB or better

**Frequency response:**  
 $\pm 0.5$  dB or less deviation from a 75 microsecond pre-emphasis (typical 0.25 dB); 25 and 50 microsecond pre-emphasis available

**Total harmonic distortion:**  
not more than 0.08%, 20 Hz to 15 kHz at 100% modulation (typical: 0.02%)

**Intermodulation distortion:**  
not more than 0.08% for 60 Hz and 7 kHz, 4:1 ratio at 100% modulation (typical: 0.015%)

**FM s/n ratio:**  
78 dB minimum, below  $\pm 75$  kHz deviation; 50 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

### Wideband Operation Performance

**Composite input level:**  
1.25 volts RMS (3.54 volts peak to peak)  $\pm 3$  dB for  $\pm 75$  kHz deviation

**Composite input impedance:**  
5000 ohms, balanced or unbalanced (via floating BNC connector)

**SCA input level:**  
1.25 volts RMS (3.54 volts peak to peak)  $\pm 3$  dB for  $\pm 75$  kHz deviation (two inputs)

**Frequency response:**  
 $\pm 0.1$  dB, 20 Hz to 100 kHz (typical:  $\pm 0.05$  dB)

**Total harmonic distortion:**  
not more than 0.08%, 20 Hz to 100 kHz at 100% modulation (typical: 0.02%)

**Intermodulation distortion:**  
not more than 0.08%, 60 Hz and 7 kHz, 4:1 ratio at 100% modulation (typical: 0.015%)

**Transient intermodulation distortion:**  
not more than 0.1%, as measured with a 3.18 kHz square wave and a 15 kHz sine wave at 100% modulation (typical: 0.02%)

### Stereo FM and SCA Performance with External Generators

Most stereo/SCA performance parameters are determined primarily by the stereo/SCA generator used.

**Stereo channel separation:**  
at least 50 dB, 50 Hz to 15 kHz (typical: 60 dB or better)

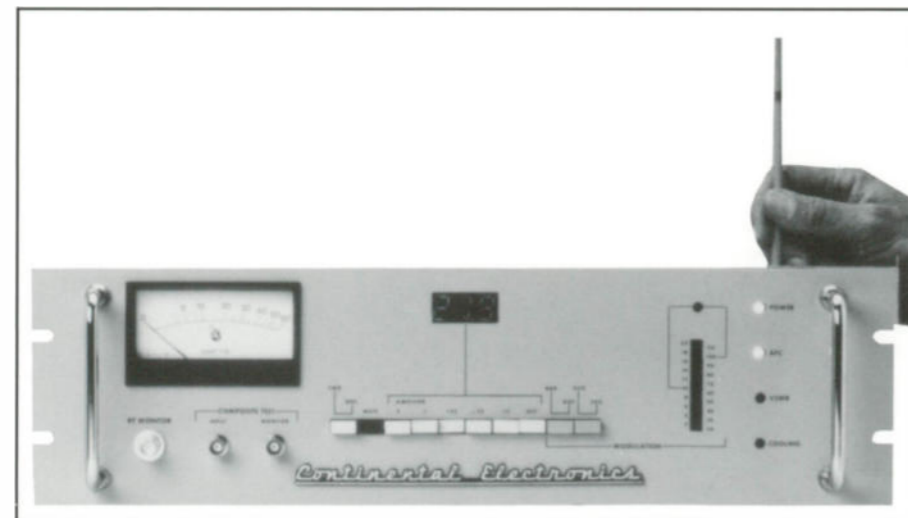
**Stereo crosstalk:**  
at least 55 dB below either single channel level; main-to-subcarrier, subcarrier-to-main (typical: 65 dB)

**Stereo frequency response:**  
 $\pm 0.25$  dB, 20 Hz to 15 kHz (typical:  $\pm 0.1$  dB)

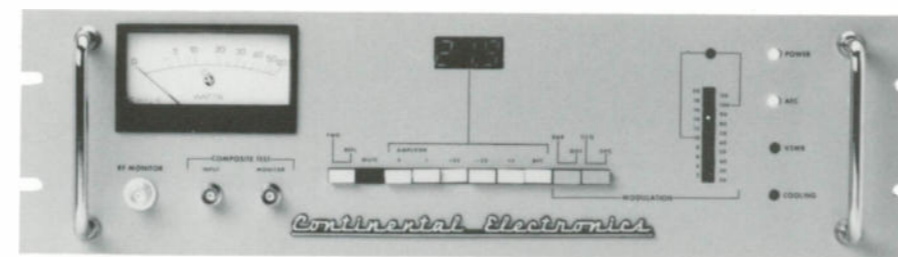
**Stereo total harmonic distortion:**  
not more than 0.08%, 20 Hz to 15 kHz at 100% modulation (typical: 0.02%)

**Stereo intermodulation distortion:**  
not more than 0.08%, 60 Hz and 7 kHz, 4:1 ratio at 100% modulation (typical: 0.015%)

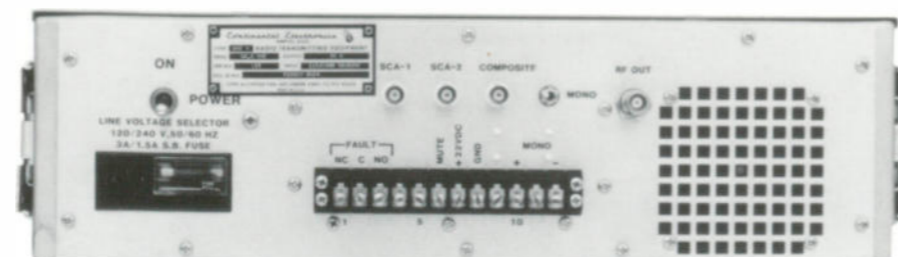
**SCA crosstalk into stereo subchannel:**  
not more than 60 dB below 90% modulation of main channel, with 67 kHz SCA at 10% modulation; at 92 kHz, SCA crosstalk typically improves to 75 dB with a 5 kHz tone modulating SCA channel to  $\pm 4$  kHz



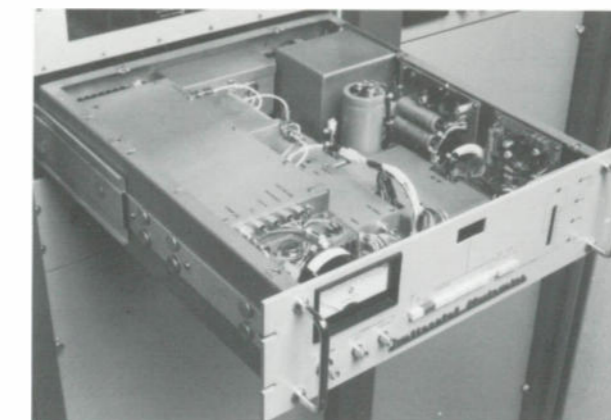
Exciter power output can be adjusted without removing cover.



Front view, 802A FM Exciter



Rear view



All exciter components are accessible from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## SPECIFICATIONS using 802A solid-state exciter

### GENERAL

**Rated Power Output:**  
3.8 kW

**Power Consumption:**  
10.5 kW, nominal

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase-locked loop frequency synthesis  
from high stability master oscillator

**Frequency Stability:**  
±250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
1-5/8" EIA flange

**VSWR:**  
1.2:1 maximum

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
±150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak  
level of modulated signal in 5%  
increments with accuracy better than  
±2%

**Exciter:**  
Solid-state unit with variable output of  
5 to 50 watts; has self-contained  
harmonic filter

**RF Harmonic Attenuation:**  
78.8 dB, minimum

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 V peak-to-peak) at 600  
ohms for ±75 kHz deviation

**Audio Frequency Response:**  
±0.5 dB; flat, 25, 50 or 75  
microsecond pre-emphasis, 20 Hz to  
15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

### FM S/N Ratio (FM Noise):

75 dB minimum below ±75 kHz  
deviation at 400 Hz, measured within a  
20 Hz to 15 kHz bandwidth with 75  
microsecond de-emphasis

### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference:  
100% AM modulation, full power, with  
75 microsecond de-emphasis, no FM  
modulation

### Synchronous AM S/N Ratio (Incidental AM Noise):

55 dB below carrier; reference: 100%  
AM modulation, full power, with 75  
microsecond de-emphasis, FM  
modulation ±75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nominal

**Composite Input Level:**  
1.25 V RMS (3.54 V peak-to-peak) for  
±75 kHz deviation

**Composite Amplitude Response:**  
±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
.08% maximum

**Composite Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nominal

**SCA Input Level:**  
1.25 V RMS for ±75 kHz deviation

**SCA Amplitude Response:**  
±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are  
determined primarily by the stereo  
generator used. The following  
specifications are influenced by the RF  
system and assume that a state-of-the-art  
stereo generator is used.

**Stereo Separation:**  
50 dB minimum; 50 Hz to 15 kHz (60  
dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% maximum; 50 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
.08% maximum; 60 Hz to 7 kHz, 4:1  
ratio

### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz  
deviation. Measured with 75  
microsecond de-emphasis within a 20  
Hz to 15 kHz bandwidth

**Linear Crosstalk:**  
-55 dB

### SCA OPERATION

Most SCA performance parameters are  
determined primarily by the SCA  
generator used. The following  
specifications are influenced by the RF  
system and assume that a state-of-the-art  
SCA generator is used.

**Crosstalk, SCA to Main and Stereo  
(67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz,  
main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA  
(67 kHz and/or 92 kHz):**

-50 dB, main and stereo 75 kHz  
deviation; SCA reference deviation, 5  
kHz and 200 Hz modulation; SCA  
de-emphasis, 150 microsecond

**Crosstalk SCA to SCA  
(67 kHz and/or 92 kHz):**

-50 dB, SCA reference deviation 5  
kHz and 200 Hz modulation frequency;  
de-emphasis, 150 microsecond

### ELECTRICAL

**Power Source:**  
200 to 250 VAC; 60 Hz, single-phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 VAC; 50 Hz  
available on request

**Permissible Line Voltage Variation:**  
±5%

### OPERATING ENVIRONMENT

**Altitude:**  
7,500 ft (2,286 m) standard

**Ambient Temperature Range:**  
-20°C to +45°C (-4°F to 113°F)

**Relative Humidity:**  
0 to 95%

### MECHANICAL

**Transmitter:**  
69" (175 cm) H

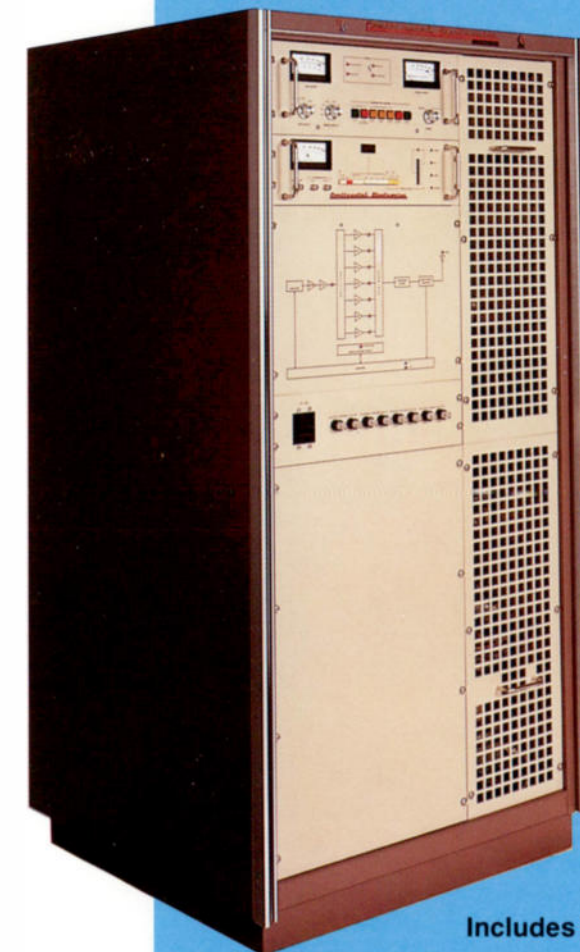
34 3/4" (88 cm) W

33 3/8" (61 cm) D

**Weight:**  
1,100 lbs (466 kg) nominal

All specifications are subject to change without notice.  
Printed in USA 2M 1188  
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## Continental's 814C, 3.8 kW Solid State Broadcast Transmitter



Includes the 802A solid-state exciter

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### Features

- Broadband Modular Design
- Transparent Audio Performance
- No Tuning
- 100% Solid-State
- Single-Phase Power Supply
- VSWR Protection Circuit
- 100% Self-Protected Solid-State Amplifier Modules
- Designed for Low Maintenance and Long Life
- Built-In Redundancy for Reliable Performance

### General Description

Continental's 814C is a compact, high performance transmitter that uses the 802A exciter to deliver a crisp, clean signal.

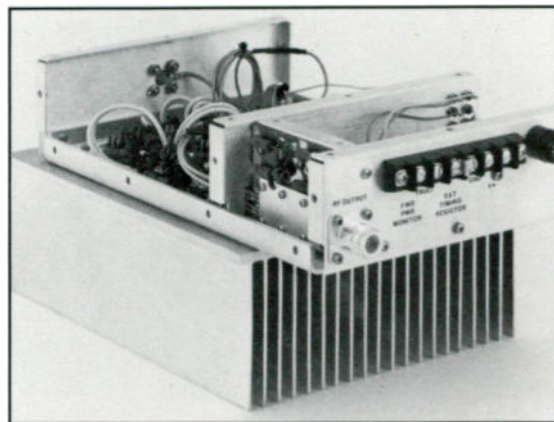
The transmitter design is based on a 700 watt broadband amplifier module and utilizes a splitter/combiner technique to achieve the rated output of 3,800 watts.

The RF chain consists of an 802A 50 watt solid-state exciter driving a solid-state amplifier module which serves as the IPA. The IPA output is split to drive the PA amplifier modules. The outputs of the PA modules are combined and treated as the transmitter's final power amplifier stage.

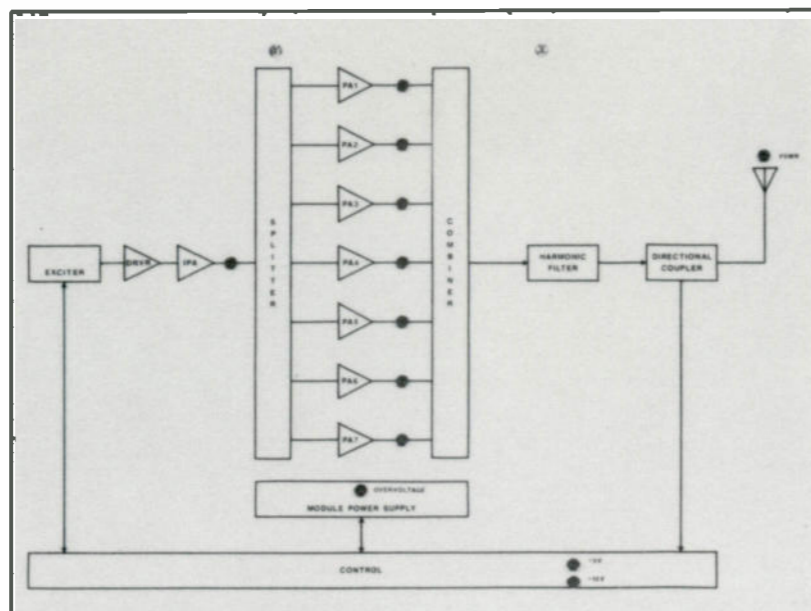
All modules are self-protected from excessive power supply voltage, VSWR overload, excessive drive power and high temperature.

A single-phase power supply powers all of the power modules. The power supply is fed by a pair of gated SCRs to allow control of the supply output voltage.

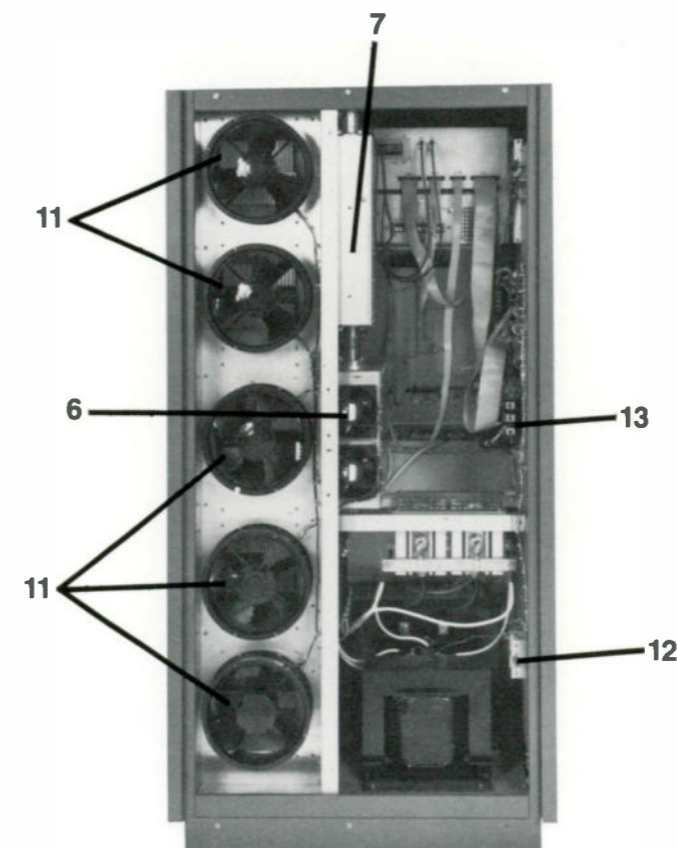
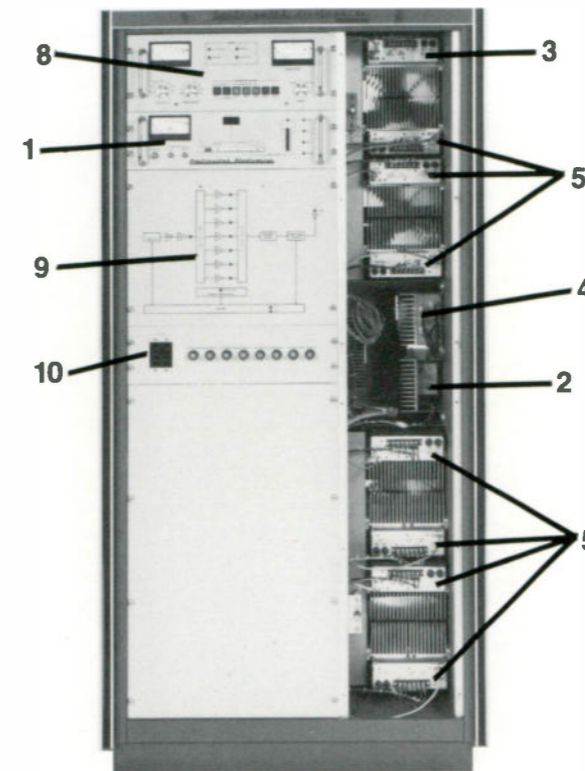
All transmitter controls, interface circuits and metering are housed in a self-contained control module which slides out on tracks for easy access. The control module provides access for local or remote operation.



One of eight power modules with cover removed.



Front panel of transmitter has LED display to show status of RF chain.



### The Inside Story

1. 802A exciter.
2. 150 watt pre-driver.
3. Driver module.
4. Seven-way power splitter. Divides driver output seven ways to provide input drive for the PA modules.
5. PA modules. Each PA module is rated for 700 watts. Seven are combined to conservatively provide 3.8 kW.
6. Combiner. Combines the outputs of the PA modules to deliver a clean transparent 3800 watts.
7. Harmonic filter. The fully contained harmonic filter inside cabinet makes installation easier; does not require extra space at transmitter location.
8. Control panel. All solid-state control panel provides extensive metering of module operating parameters.
9. Diagnostic panel. Displays block diagram of 814C RF paths including fault isolation LEDs.
10. Power control panel. Easily accessed circuit breaker/fuse panel.
11. Module cooling fans. Provide ample air for cool operation of transmitter.
12. Power supply. Integral single-phase power supply.
13. SCR control. Single-phase control of the module supply voltage with feedback maintains constant forward power output with line voltage variations. Exclusive "soft-start" gently brings transmitter to full power.

## SPECIFICATIONS using 802A solid-state exciter

### GENERAL

**Rated Power Output:**

5 kW

**Power Consumption:**

9.8 kW, nominal

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**

±250 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

1-5/8" EIA flange

**VSWR:**

2:1, maximum

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

±150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**

-80 dB, minimum

**Power Supply Rectifiers:**

Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+10 dBm (6.93 V peak-to-peak) at 600 ohms for ±75 kHz deviation

**Audio Frequency Response:**

±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB minimum below ±75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation ±75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nominal

**Composite Input Level:**

1.25 V RMS (3.54 V peak-to-peak) for ±75 kHz deviation

**Composite Amplitude Response:**

±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

0.1% maximum

**Composite Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

15,000 ohms, nominal

**SCA Input Level:**

1.25 V RMS for ±75 kHz deviation

**SCA Amplitude Response:**

±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**

0.15% maximum; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**

-70 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

**Linear Crosstalk:**

-55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

-50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**

-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

### ELECTRICAL

**Power Source:**

200 to 250 VAC; 60 Hz, single-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**

±5%

**Filament Regulator:**

±1% of optimum

### OPERATING ENVIRONMENT

**Altitude:**

7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**

-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**

0 to 95%

### MECHANICAL

**Transmitter:**

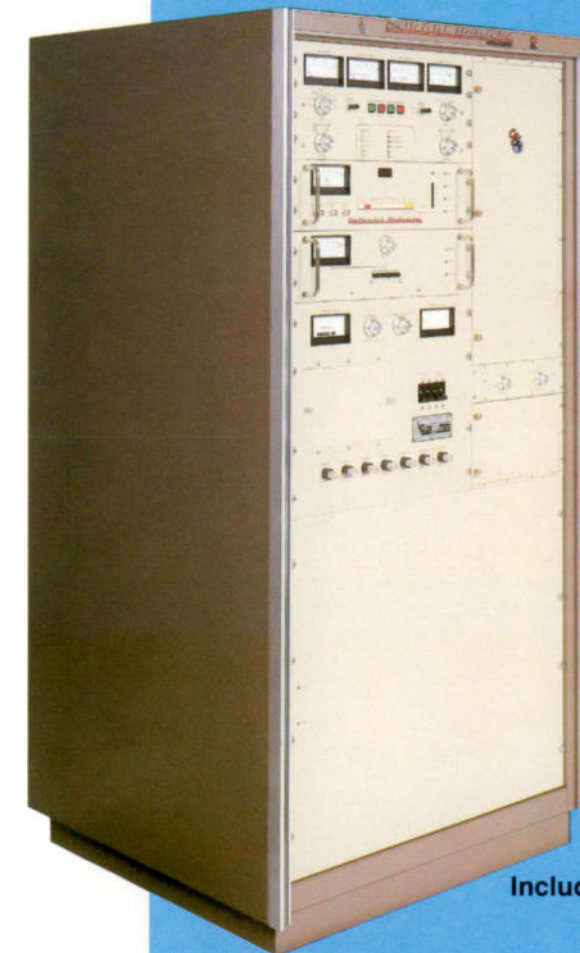
69" (175 cm) H  
34 3/4" (88 cm) W  
33 3/8" (61 cm) D

**Weight:**

1,020 lbs (466 kg) nominal

All specifications are subject to change without notice.  
Printed in USA 1.5M 1188  
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## Continental's 815A, 5 kW Single Tube Broadcast Transmitter



Includes the 802A solid-state exciter



# Continental Electronics Corporation

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 214-381-7161 TELEX: 73-398 FAX: 214-381-4949

Continental's customer service is the industry's best!

Call anytime, day or night. Main offices: (214) 381-7161 Engineering service: (214) 388-5800 Parts: (214) 388-3737

## Features

- Single Tube
- SCR Power Control
- Automatic Power Output Control
- Automatic VSWR Protection
- Automatic SWR Output Power Foldback
- Remote Control Interface
- Filament Voltage Regulator
- True RMS Filament Voltage Metering
- AC Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Internal Diagnostics
- Solid-State IPA

## Top Performance with a Proven Design

Continental's 815A is a high performance, state-of-the-art transmitter that uses the 802A exciter to deliver a crisp, clean signal.

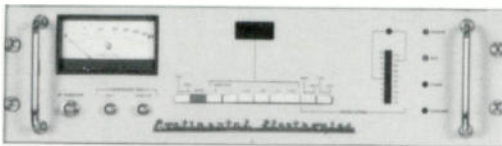
With an output power of 5,000 watts, it has an adequate power reserve for Class A FM operation using a two-bay antenna system.

The RF chain consists of an 802A 50 watt exciter and the solid-state IPA driving a 4CX3500A tetrode tube in the final amplifier.

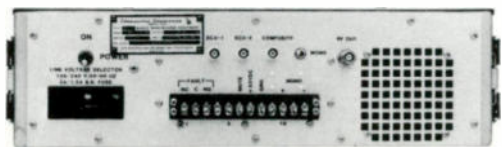
The harmonic filter is internally mounted, providing a 1-5/8" EIA flange for direct mounting to the transmission line.

IC logic is used for all control functions. A computer-like memory, powered by battery back-up, restarts the transmitter after a power failure.

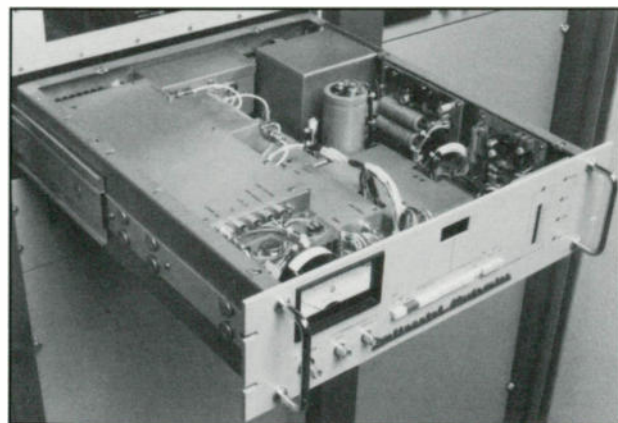
In keeping with the tradition of other Continental transmitters, the 815A uses ruggedized components and is built to give many years of reliable service.



802A FM exciter, front view



802A FM exciter, rear view



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## The FM Exciter

Continental's 802A solid-state FM exciter offers broadcasters unmatched performance.

### State-of-the-Art Design

Modular subassemblies are easily reached from the front of the exciter. The 802A will accept a composite baseband signal from a stereo generator, STL system of monaural audio and SCA programming.

### Refined Linearity

Exciter modulation performance surpasses the measurement capability of the most advanced test equipment.

### Digital Frequency Selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

### 50 Watt Broadband Amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

### Automatic Power Level Control

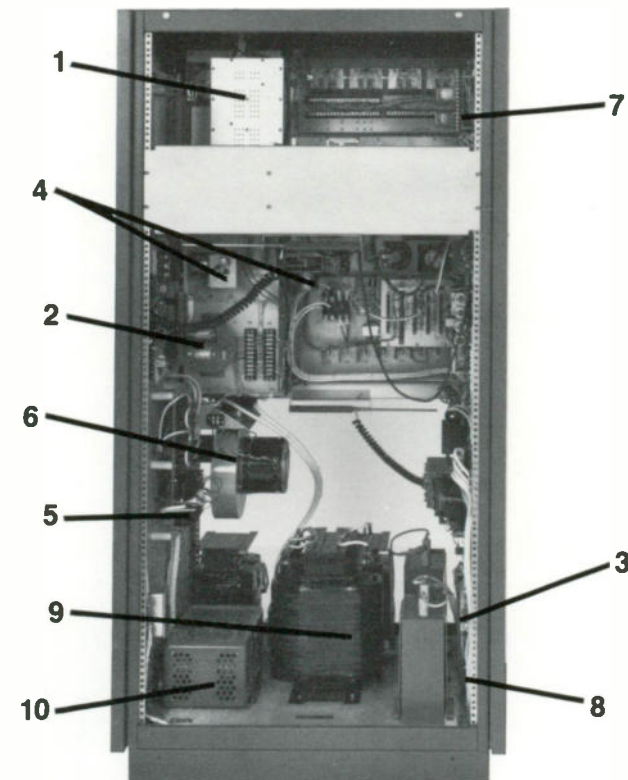
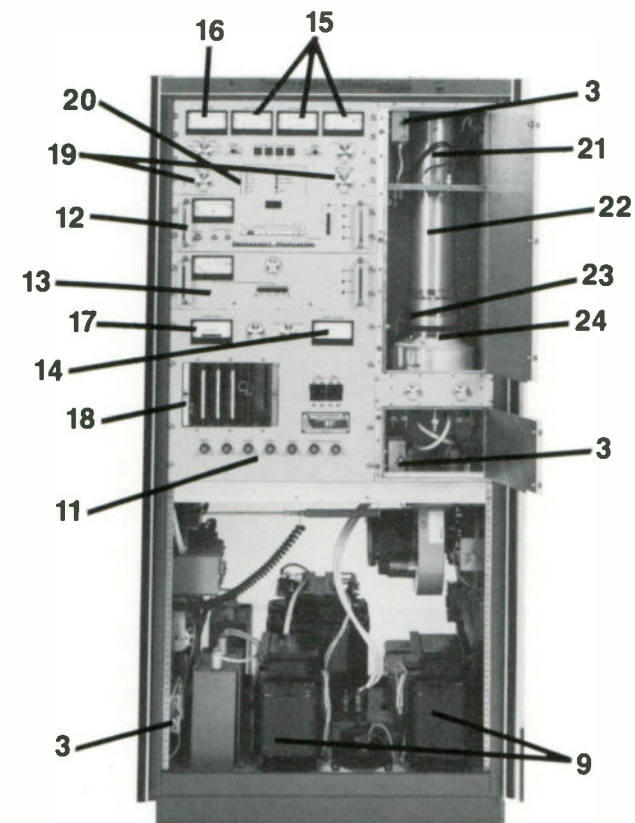
A special circuit protects the amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 to 50 watts.

### Sophisticated Styling

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

### Modular Construction

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



## The Inside Story

1. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier; does not require extra space at transmitter location.
2. **Air switch.**
3. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
4. **Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA.
5. **SCR control.** Single-phase control of the plate supply primary voltage with feedback maintains constant forward power output with line voltage variations. Exclusive "soft start" initially brings up the transmitter gently.
6. **PA blower.** PA blower moves the cooling air through the PA tube.
7. **Remote control connections.** Conveniently located for simple setup.
8. **Power input.** Either bottom or top entry is available; bottom entry shown here.
9. **Power supply.** A self-contained integral part of the transmitter.
10. **Filament voltage regulator.** A ferro-resonant CV transformer maintains constant filament voltage to the PA tube to maximize the tube life.
11. **Indicator fuses & circuit breakers.**
12. **802A exciter.**
13. **Solid-state IPA.** A broadband 120 watt amplifier provides ample drive to the PA.
14. **True RMS iron vane filament voltmeter.**
15. **Continuous readout meters.** Show plate current, plate voltage and output power at a glance.
16. **DC multimeter.** Six operating parameters at the turn of a dial.
17. **Filament running hour meter.**
18. **Solid-state control cards.** Cards for power, power monitor, tally-recycle and control circuits.
19. **Tuning & loading controls.** An exclusive motorized feature for easy adjustments. (With travel limit indicators)
20. **LED status indicators.**
21. **PA exhaust stack temperature sensor.** Redundant backup to the air switch protects the final amplifier tube if cooling air is lost or overdissipation occurs.
22. **Wideband quarter-wave cavity.** A proven feature for greater reliability.
23. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
24. **Final amplifier.** A rugged 4CX3500A tetrode.
25. **Cabinet flushing fan.** (not shown in photos) Fan, mounted on transmitter cabinet's removable back panel, delivers approximately 600 cfm to maintain positive cabinet pressure; has disposable filter.



**Modular Concept Offers Broadcasters Maximum Flexibility**

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output through the use of a combiner.

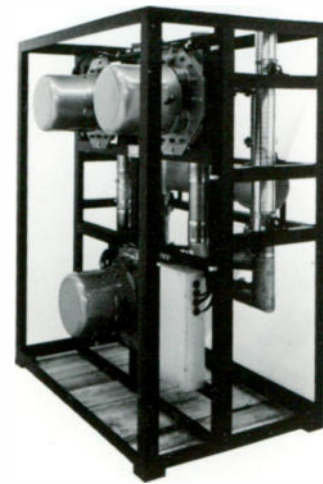
Our 817R-2B, 817R-1B and 817R-4B models each consist of two transmitters whose inputs are combined in a 90 degree hybrid: two 21.5 kW transmitters combine to achieve 40 kW output; two 25 kW transmitters combine to achieve 50 kW output; and two 27.5 kW transmitters combine to achieve 55 kW output.

**Proven Power Amplifier**

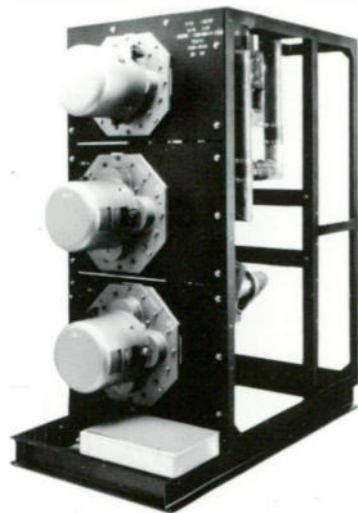
The field-proven 4CX15000A power amplifier tube is used to save on operating costs. The high plate dissipation rating and proven design enhance long-life performance. Continental's unique grounded screen tetrode design eliminates screen bypass capacitors and provides excellent stability.

**Fast Installation**

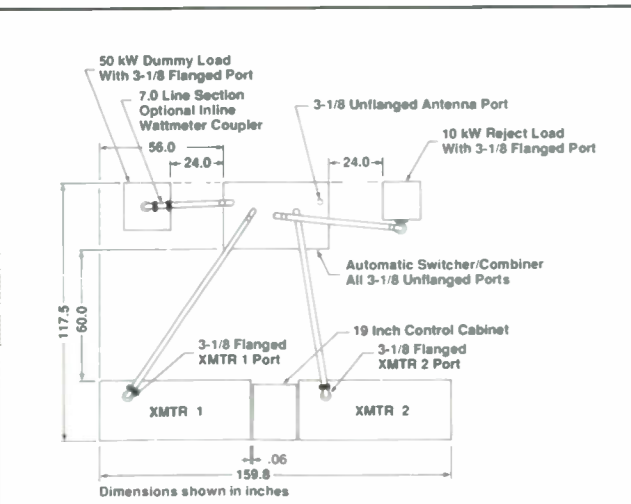
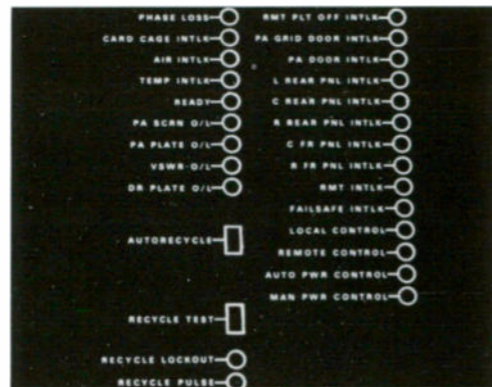
For shipments within the continental United States, all components are in place and interconnected. The ac power, audio inputs, monitoring outputs and transmission line hookups are direct and can enter either through the bottom or top of the cabinet. A 28 volt dc power supply is built-in for optional remote control and the harmonic filter is in place and ready to operate.



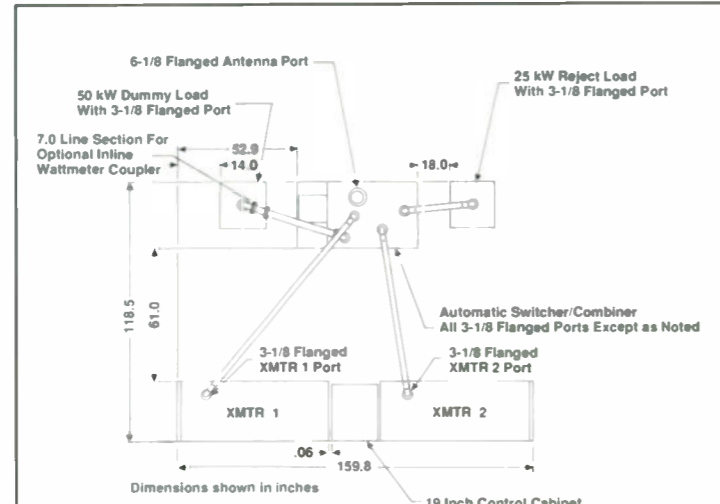
Combiner for 40 kW transmitter.



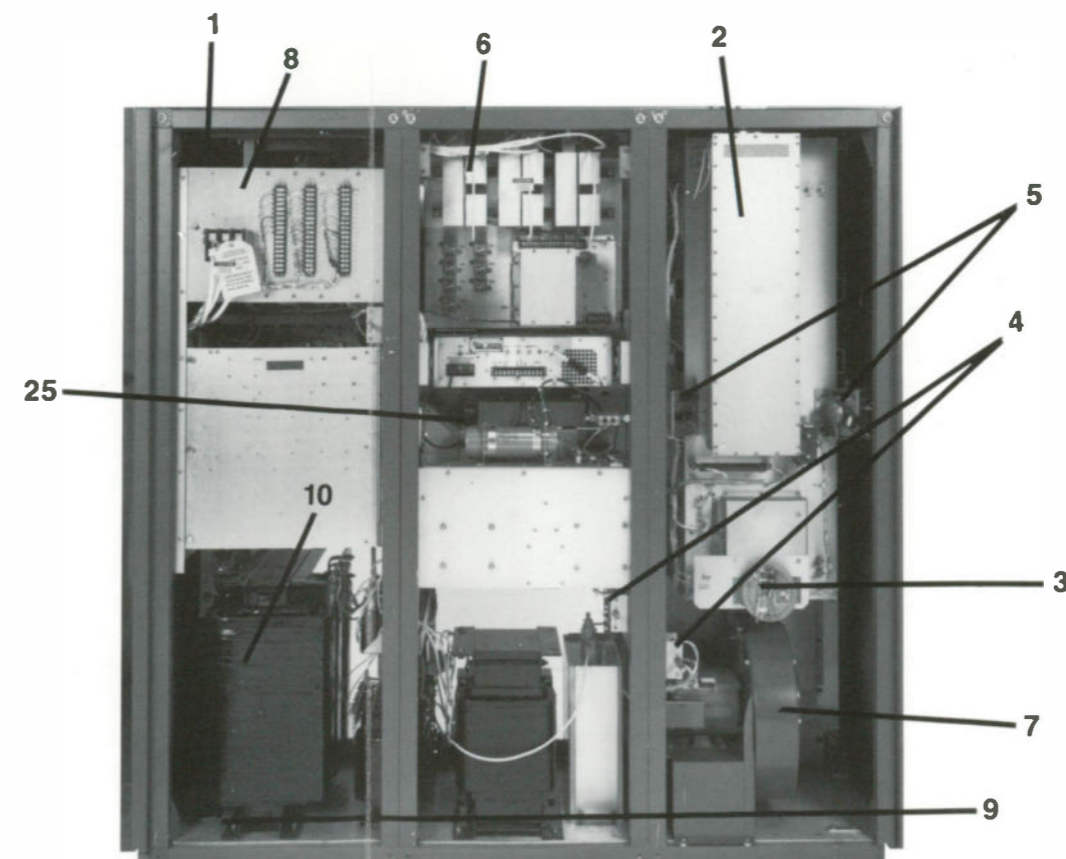
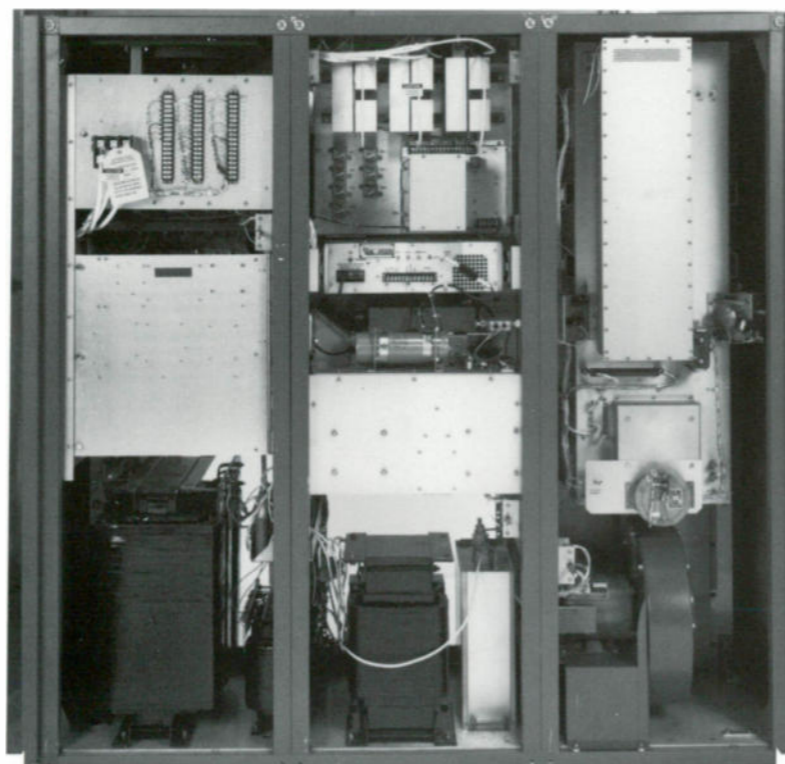
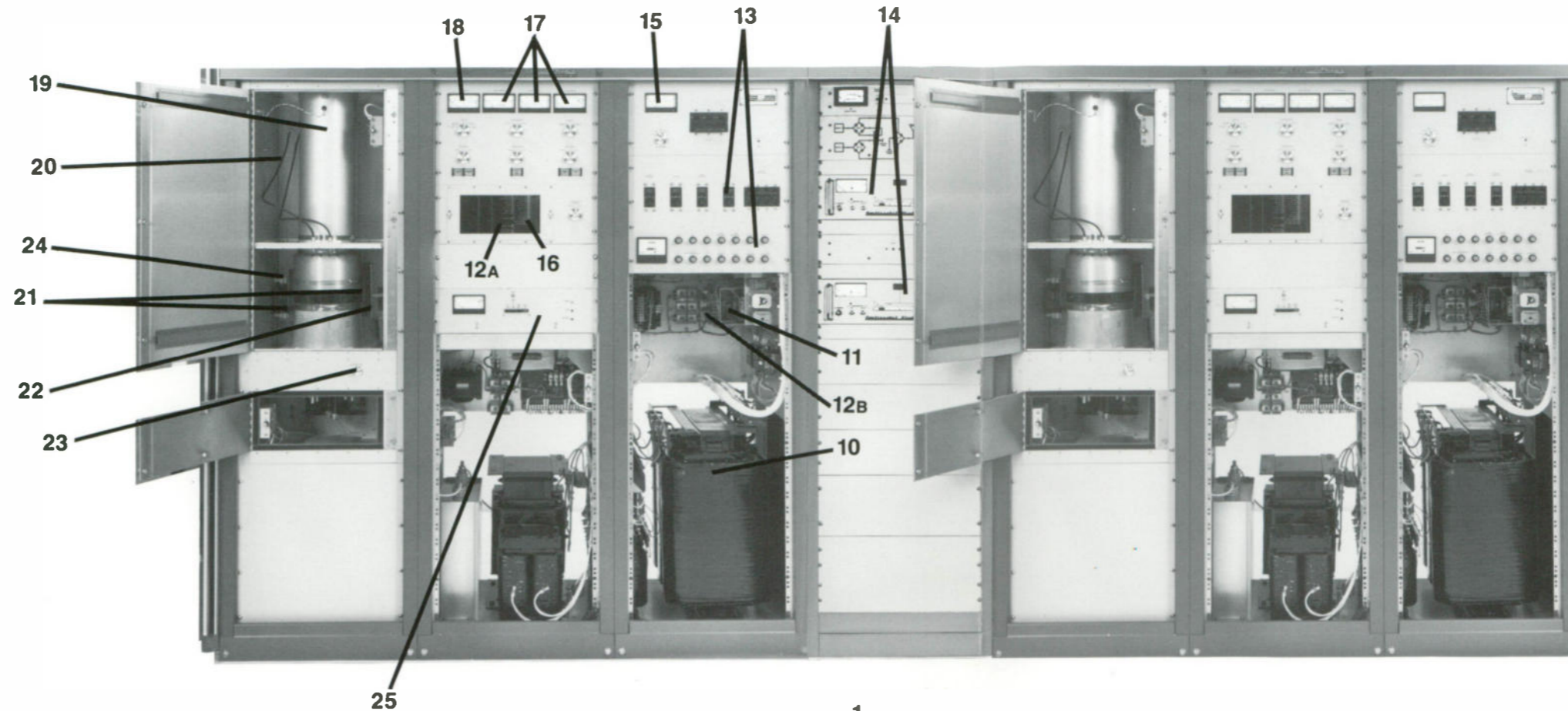
Combiner for 50/55 kW transmitter.



Typical Plan View, 40 kW FM Transmitter Installation



Typical Plan View, 50/55 kW FM Transmitter Installation



**The Inside Story**

1. Cabinet flushing blower. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. Fully contained inside cabinet for easy installation while reducing overall space requirements.
3. Air switch. Positioned for easy access.
4. Interlocks. Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. Tuning & loading motors. These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start", which initially brings up the transmitter gently.
7. PA blower. 1 hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. Remote control connectors. Conveniently located for simple setup.
9. Power wire. Either bottom or top entry is available; bottom entry shown here.
10. Power supply. A self-contained integral part of the transmitter.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to the PA tube to maximize tube life.
- A. Control card
- B. Control drive assembly
13. Indicator fuses & circuit breakers. Indicators glow brightly for fast troubleshooting.
14. 802A exciter.
15. True RMS iron vane meter & 150 amp ac mains circuit breaker. Meter gives readings on each of the three ac voltage phases, as well as filament voltage.
16. LED-equipped card cage. Twenty-seven LEDs give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. Continuous readout meters. At a glance you'll know plate current, plate voltage and output power.
18. DC multimeter. Eleven operating parameters at the turn of a dial.
19. PA exhaust stack temperature sensor. Redundant backup to the airflow switch protects the final stage if cooling air is lost or over-dissipation occurs.
20. Wideband quarter-wave cavity. A proven design for greater reliability.
21. Tuning & loading controls. Exclusive motorized system for easy adjustments.
22. Static drain choke. Bleeds off static build-up in transmission lines or antennas.
23. Driver plate adjustment. A single control tunes the driver plate.
24. Final amplifier. The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.
25. Solid-state driver.



## SPECIFICATIONS using 802A solid-state exciter

### GENERAL

**Rated Power Output:**  
35 kW

**Power Consumption:**  
54 kW, nominal

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase-locked loop frequency synthesis  
from high stability master oscillator

**Frequency Stability:**  
±250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
3 1/4" EIA flange

**VSWR:**  
2:1, maximum

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
±150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak  
level of modulated signal in 5%  
increments with accuracy better than  
±2%

**Exciter:**  
Solid-state unit with variable output of  
5 to 50 watts; self-contained harmonic  
filter

**RF Harmonic Attenuation:**  
-80 dB, minimum

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+ 10 dBm (6.93 V peak-to-peak) at 600  
ohms for ±75 kHz deviation

**Audio Frequency Response:**  
±0.5 dB; flat, 25, 50 or 75  
microsecond pre-emphasis, 20 Hz to  
15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB minimum, below ±75 kHz  
deviation at 400 Hz, measured within a  
20 Hz to 15 kHz bandwidth with 75  
microsecond de-emphasis

**Asynchronous AM S/N Ratio  
(AM Noise):**  
55 dB RMS below carrier; reference  
100% AM modulation, full power, with  
75 microsecond de-emphasis, no FM  
modulation

**Synchronous AM S/N Ratio  
(Incidental AM Noise):**  
50 dB below carrier; reference: 100%  
AM modulation, full power, with 75  
microsecond de-emphasis, FM  
modulation ±75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced, test

**Composite Input Impedance:**  
5,000 ohms, nominal

**Composite Input Level:**  
1.25 V RMS (3.54 V peak-to-peak) for  
±75 kHz deviation

**Composite Amplitude Response:**  
±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
0.08% maximum

**Composite Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nominal

**SCA Input Level:**  
1.25 V RMS for ±7.5 kHz deviation

**SCA Amplitude Response:**  
±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are  
determined primarily by the stereo  
generator used. The following parameters  
are influenced by the RF system, and  
assume that a state-of-the-art stereo  
generator is used.

**Stereo Separation:**  
50 dB minimum; 50 Hz to 15 kHz (60  
dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% maximum; 50 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% maximum; 60 Hz to 7 kHz, 4:1  
ratio

**FM Noise:**  
-72 dB minimum, below ±75 kHz  
deviation at 400 Hz, measured within a  
20 Hz to 15 kHz bandwidth with 75  
microsecond de-emphasis

**Linear Crosstalk:**  
-55 dB

### SCA OPERATION

Most SCA performance parameters are  
determined primarily by the SCA generator  
used. The following parameters are  
influenced by the RF system, and assume  
that a state-of-the-art SCA generator is  
used.

**Crosstalk, SCA to Main and Stereo  
(67 kHz and/or 92 kHz):**  
-60 dB, SCA deviation 5 kHz; main 75  
microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA  
(67 kHz and/or 92 kHz):**  
-50 dB, main and stereo 75 kHz  
deviation; SCA reference deviation, 5  
kHz and 200 Hz modulation; SCA de-  
emphasis, 150 microsecond

**Crosstalk, SCA to SCA  
(67 kHz and/or 92 kHz):**  
-50 dB, SCA reference deviation; 5  
kHz and 200 Hz modulation, 150  
microsecond de-emphasis

**ELECTRICAL**  
**Power Source:**  
200 to 250 VAC; 60 Hz, three-phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 VAC; 50 Hz  
available on request

**Permissible Line Voltage Variation:**  
±5% (each phase voltage variation;  
within 5% of the average of all three  
phases)

**Filament Regulator:**  
±1% of optimum

**OPERATING ENVIRONMENT**  
**Altitude:**  
7,500 ft (2,286 m) standard; optional to  
10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**  
-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
0 to 95%

**MECHANICAL**  
**Transmitter:**  
69" (175 cm) H  
72" (183 cm) W  
28" (71 cm) D

**Weight:**  
1,657 lbs (752 kg) nominal

**External Plate Transformer:**  
46" (117 cm) H  
35" (89 cm) W  
24" (61 cm) D

**Weight:**  
901 lbs (409 kg) nominal

**Note:**  
External plate transformer can be  
located up to 20 ft (6.10 m) away from  
the transmitter

All specifications are subject to change without notice.  
Printed in USA 2M 1188  
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## Continental's 816R-5B, 35 kW Single Tube Broadcast Transmitter



Includes the 802A solid-state exciter



# Continental Electronics Corporation

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 214-381-7161 TELEX: 73-398 FAX: 214-381-4949

Continental's customer service is the industry's best!

Call anytime, day or night. Main offices: (214) 381-7161 Engineering service: (214) 388-5800 Parts: (214) 388-3737

## Features

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- True RMS Filament Power Regulation/Metering
- AC Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Grounded Screen Amplifier
- Internal Diagnostics

## Top Performance and Proven Design in High Power FM

Continental's 816R-5B 35 kW FM transmitter is a high performance, state-of-the-art transmitter that uses the 802A exciter to deliver a crisp, clean signal.

The transmitter is solid-state except for one 9019/YC130 tetrode power amplifier operating at Class C.

The 9019/YC130 tetrode was specially designed by EIMAC for Continental, to meet stringent FM service requirements at 35 kW.

The 816R-5B is the latest addition to Continental's popular 816R Series of 11, 21.5, 25 and 27.5 kW transmitters, but employs a newly designed cavity for the 9019/YC130 tetrode.

The harmonic filter is internally mounted, providing a 3-1/8" EIA flange for direct mounting to the transmission line.

Transmitter power may be adjusted to any level between 0 and 100% with minimal retuning, by using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the RF when reflected power reaches 10%. The other circuit holds reflected power to a preset level during icing conditions, allowing power to be maintained at the highest safe level.

An exclusive "soft-start" circuit and low voltage controls are easy on the total system and limit current surges through the power supply components; this helps to minimize parts replacement.

Twenty-three different circuits or indicators are used to protect the transmitter and the control circuits are of the conventional 28 VDC design.

The meters and controls are strategically placed at or near eye level for easy reading and accurate adjustment. All components are easily accessible.

The wide, flat bandwidth is a result of the wideband quarter-wave cavity design which optimizes performance.

If a problem should occur, 27 LED indicators, 14 indicating fuseholders and six front panel circuit breakers assist in quickly isolating it.

The 816R-5B's control options offer operating flexibility. Its compact size and simple installation will get you air-ready with minimum time and cost.

The harmonic filter is contained within the transmitter cabinet.

The 816R-5B is self-contained in one cabinet except for the high voltage power supply which may be placed up to 20 feet away from the transmitter.

In keeping with the tradition of other Continental transmitters, the 816R-5B uses ruggedized components and is built to give many years of reliable service.

## Solid-State Driver

Featured in this transmitter is a solid-state driver which increases reliability and decreases maintenance and complexity. This driver also offers greater bandwidth and self-protecting RF modules.

## The FM Exciter

Continental's 802A solid-state FM exciter offers broadcasters unmatched performance.

## State-of-the-Art Design

Modular subassemblies are easily reached from the front of the exciter. The 802A will accept a composite baseband signal from a stereo generator, STL system or monaural audio and SCA programming.

## Refined Linearity

Exciter modulation performance surpasses the measurement capability of the most advanced test equipment.

## Digital Frequency Selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

## 50 Watts Output Broadband Amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

## Automatic Power Level Control

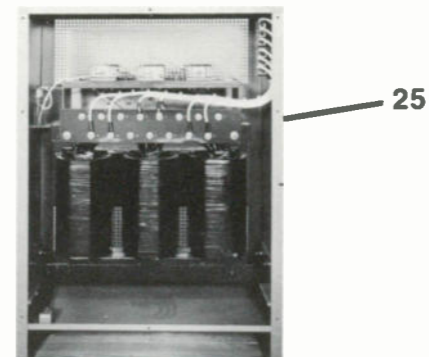
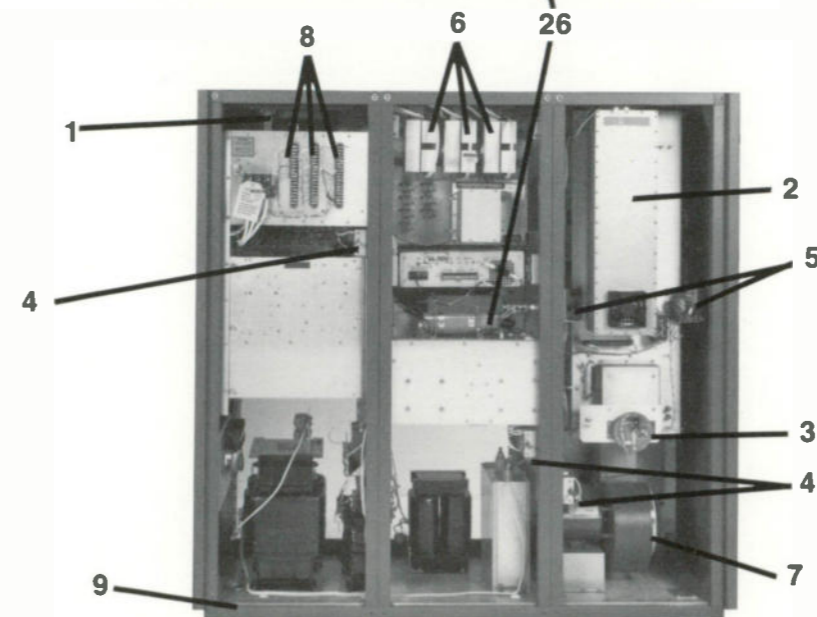
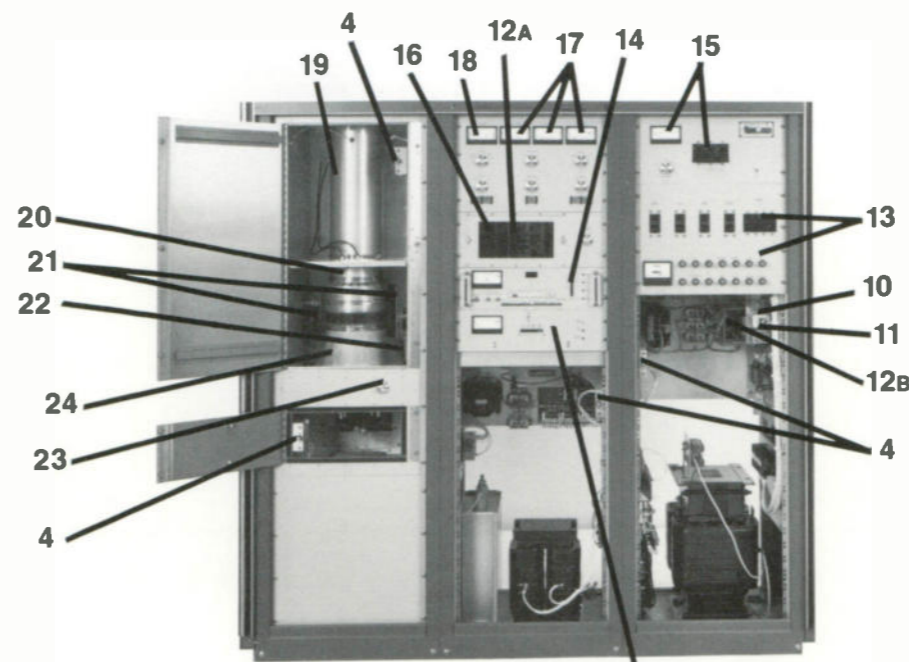
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 to 50 watts.

## Sophisticated Styling

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

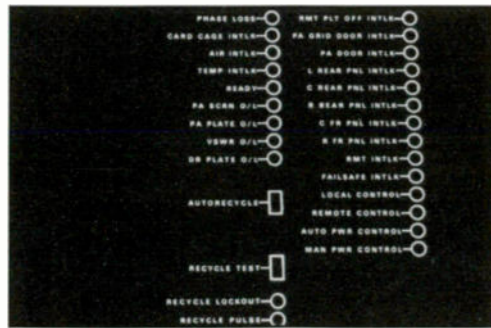
## Modular Construction

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

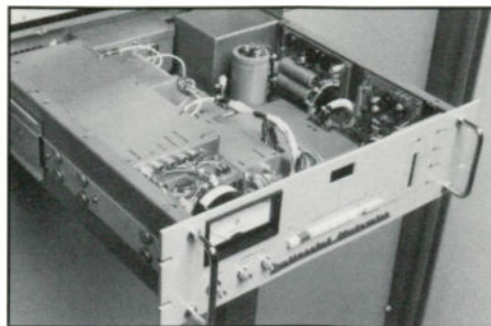


## The Inside Story

1. Cabinet flushing blower. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. Fully contained inside cabinet for easy installation while reducing overall space requirements.
3. Air switch. Positioned for easy access.
4. Interlocks. Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. Tuning & loading motors. These motors and connecting capacitor plates are the only moving parts in the PA.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start", which initially brings up the transmitter gently.
7. PA blower. 1 hp PA exhaust blower moves 525 cfm of cooling air through PA tube to help extend tube life and reduce heat accumulation.
8. Remote control connectors. Conveniently located for simple set-up of system.
9. Power wire. Either top or bottom entry is available; bottom entry shown here.
10. Tube cool-down timer. Continuous blower operation for up to 3 minutes after filaments are turned off.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to PA tube to maximize tube life.
- A = Control card
- B = Control drive assembly
13. Indicator fuses & circuit breakers. Indicators glow brightly for fast troubleshooting.
14. 802A exciter.
15. True RMS iron vane meter & 200 amp ac mains circuit breaker. Meter gives readings on filament voltage and three ac voltage phases.
16. LED-equipped card cage. Twenty-seven LEDs give a quick status readout of protection circuits and control modes.
17. Continuous readout meters. Shows plate current and voltage, output power.
18. DC multimeter. Eleven operating parameters at the turn of a dial.
19. PA exhaust stack temperature sensor. Redundant backup to airflow switch protects final stage if cooling air is lost or if over-dissipation occurs.
20. Wideband quarter-wave cavity. A proven design for maximum reliability.
21. Tuning & loading controls. Exclusive motorized system for easy adjustments.
22. Static drain choke. Bleeds off static buildup in transmission lines or antennas.
23. Driver plate adjustment. A single control tunes the driver plate.
24. Final amplifier. The 9019/YC130 tube uses lower filament power to save money. The grounded screen tetrode eliminates screen bypass capacitors and enhances stability.
25. Power supply. Plate transformer and rectifier are mounted in external cabinet which may be placed up to 20 feet from transmitter.
26. Solid-state driver.



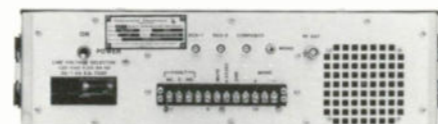
LED status indicators



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.



802A FM exciter, front view



802A FM exciter, rear view

## SPECIFICATIONS using 802A solid-state exciter

### GENERAL

#### Rated Power Output:

816R-2B: 21.5 kW  
816R-3B: 25 kW  
816R-4B: 27.5 kW

#### Power Consumption:

816R-2B: 33 kW nominal  
816R-3B: 40 kW nominal  
816R-4B: 42 kW nominal

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase-locked loop frequency synthesis  
from high stability master oscillator

#### Frequency Stability:

±250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3/8" EIA flange

#### VSWR:

2:1, maximum

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

±150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak  
level of modulating signal in 5%  
increments with accuracy better than  
±2%

#### Exciter:

Solid-state unit with variable output of  
5 to 50 watts; self-contained harmonic  
filter

#### RF Harmonic Attenuation:

-80 dB, minimum

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 V peak-to-peak) at 600  
ohms for ±75 kHz deviation

#### Audio Frequency Response:

±0.5 dB; flat, 25, 50 or 75  
microsecond pre-emphasis, 20 Hz to  
15 kHz

#### Total Harmonic Distortion:

0.08% maximum; 20 Hz to 15 kHz  
(Measured with spectrum analyzer)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz, 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB minimum, below ±75 kHz  
deviation at 400 Hz, measured within a  
20 Hz to 15 kHz bandwidth with 75  
microsecond de-emphasis

#### Asynchronous AM S/N Ratio

#### (AM Noise):

55 dB RMS below carrier; reference:  
100% AM modulation, full power, with  
75 microsecond de-emphasis, no FM  
modulation

#### Synchronous AM S/N Ratio

#### (Incidental AM Noise):

50 dB below carrier; reference: 100%  
AM modulation, full power, with 75  
microsecond de-emphasis, FM  
modulation ±75 kHz at 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 V RMS (3.54 V peak-to-peak) for  
±75 kHz deviation

#### Composite Amplitude Response:

±0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% maximum

#### Composite Intermodulation Distortion:

0.08% maximum; 60 Hz to 7 kHz, 4:1  
ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

15,000 ohms, nominal

#### SCA Input Level:

1.25 V RMS for ±7.5 kHz deviation

#### SCA Amplitude Response:

±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are  
determined primarily by the stereo  
generator used. The following parameters  
are influenced by the RF system. These  
specifications assume that a state-of-the-  
art stereo generator is used.

#### Stereo Separation:

50 dB minimum; 50 Hz to 15 kHz (60  
dB or better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% maximum; 50 Hz to 15 kHz  
(Measured with spectrum analyzer)

#### Intermodulation Distortion:

0.08% maximum; 60 Hz to 7 kHz, 4:1  
ratio

#### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz  
deviation. Measured with 75  
microsecond de-emphasis within a 20  
Hz to 15 kHz bandwidth

#### Linear Crosstalk:

-55 dB

### SCA OPERATION

Most SCA performance parameters are  
determined primarily by the SCA generator  
used. The following parameters are  
influenced by the RF system. These  
specifications assume that a state-of-the-  
art SCA generator is used.

#### Crosstalk, SCA to Main and Stereo

#### (67 kHz and/or 92 kHz):

-60 dB, SCA deviation 5 kHz; main 75  
microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA

#### (67 kHz and/or 92 kHz):

-50 dB, main and stereo 75 kHz  
deviation; SCA reference deviation, 5  
kHz and 200 Hz modulation; SCA de-  
emphasis, 150 microsecond

#### Crosstalk, SCA to SCA

#### (67 kHz and/or 92 kHz):

-50 dB, SCA reference deviation; 5  
kHz and 200 Hz modulation frequency,  
150 microsecond de-emphasis

### ELECTRICAL

#### Power Source:

200 to 250 VAC; 60 Hz, three-phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 VAC; 50 Hz  
available on request

#### Permissible Line Voltage Variation:

±5% (each phase voltage variation;  
within 5% of the average of all three  
phases)

#### Filament Regulator:

±1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft (2,286 m) standard; optional to  
10,000 ft (3,048 m) with modification kit

#### Ambient Temperature Range:

-20°C to +50°C (-4°F to +122°F)

### MECHANICAL

#### Transmitter:

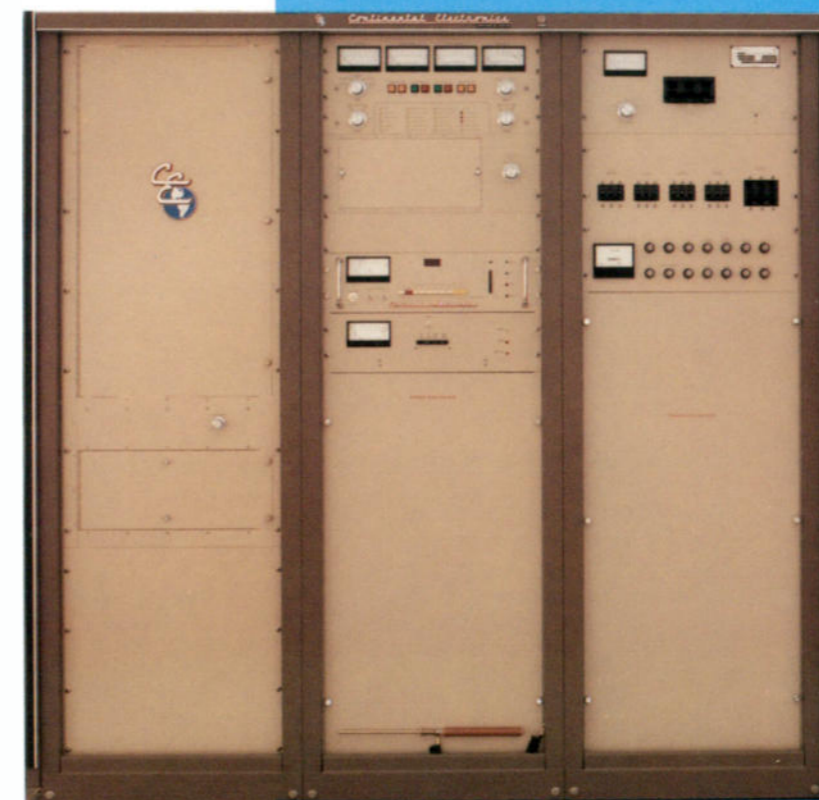
69" (175 cm) H  
72" (183 cm) W  
28" (71 cm) D

#### Weight:

1,962 lbs (890 kg) nominal

All specifications are subject to change without notice.  
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## Continental's 816R Series 21.5, 25 & 27.5 kW Broadcast Transmitters



Includes the 802A solid-state exciter



# Continental Electronics Corporation

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Continental's customer service is the industry's best!

Call anytime, day or night. Main offices: (214) 381-7161 Engineering service: (214) 388-5800 Parts: (214) 388-3737

### Top Performance and Proven Design in High Power FM

Continental's 21.5, 25 and 27.5 kW FM transmitters offer you high fidelity, low power consumption, low noise or distortion and excellent stereo separation.

Transmitter power may be adjusted to any level between 0 and 100%, with minimal retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the RF when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

An exclusive "soft-start" circuit and low voltage controls are easy on the total system and limit current surges through the power supply components; this helps to minimize parts replacement.

Twenty-three different circuits or indicators are used to protect the transmitter and the control circuits are of the conventional 28 VDC design.

The meters and controls are strategically placed at or near eye level for easy reading and accurate adjustment. All components are easily accessible.

The wide, flat bandwidth is a result of the wideband quarter-wave cavity design which optimizes performance.

If a problem should occur, 27 LED indicators, 14 indicating fuseholders

and six front panel circuit breakers assist in quickly isolating it.

The 816R Series' control options offer operating flexibility. Its compact size and simple installation will get you air-ready with minimum time and cost.

### Solid-State Driver

Featured in this transmitter is a solid-state driver which increases reliability and decreases maintenance and complexity. This driver also offers greater bandwidth and self-protecting RF modules.

### The FM Exciter

Continental's 802A solid-state FM exciter offers broadcasters unmatched performance.

### State-of-the-Art Design

Modular subassemblies are easily reached from front of exciter. The 802A will accept a composite baseband signal from a stereo generator, STL system or monaural audio and SCA programming.

### Refined Linearity

Exciter modulation performance surpasses the measurement capability of the most advanced test equipment.

### Digital Frequency Selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

### 50 Watt Output Broadband Amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

### Automatic Power Level Control

A special circuit protects the amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 to 50 watts.

### Sophisticated Styling

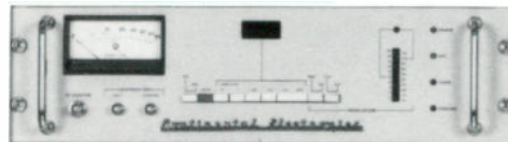
Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

### Modular Construction

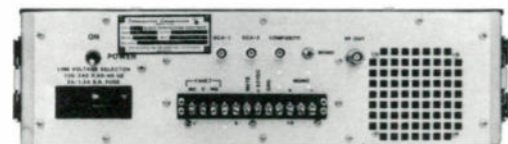
Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



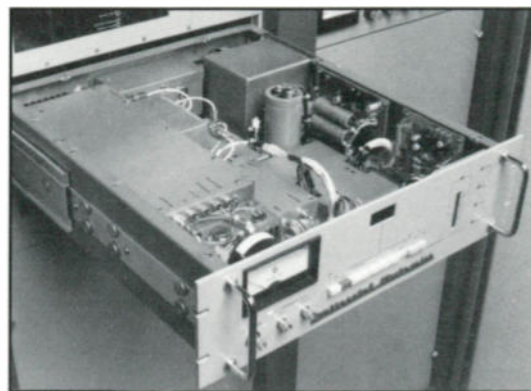
LED status indicators



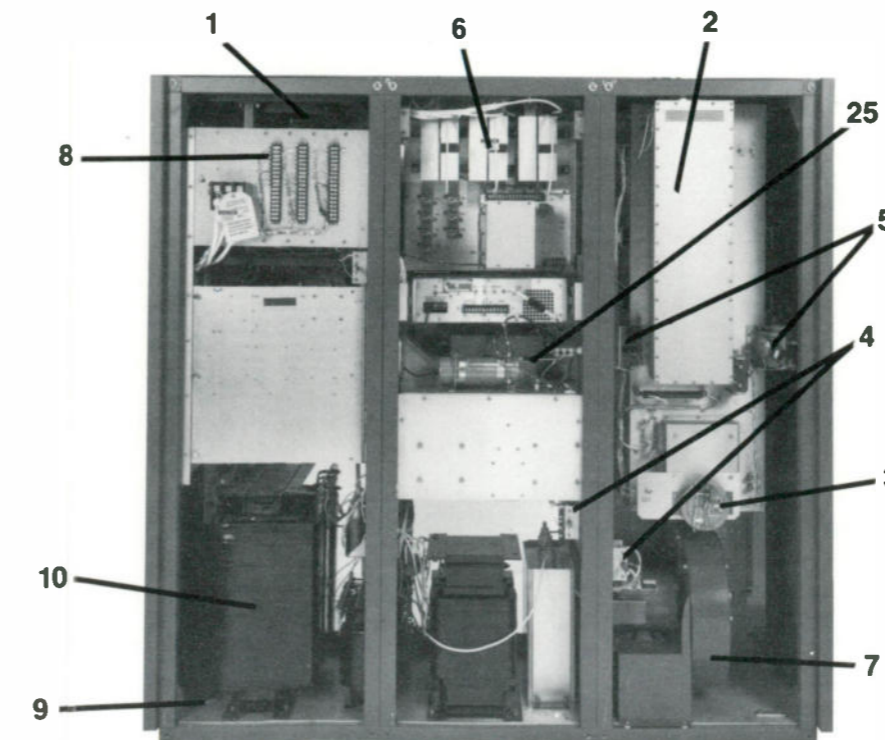
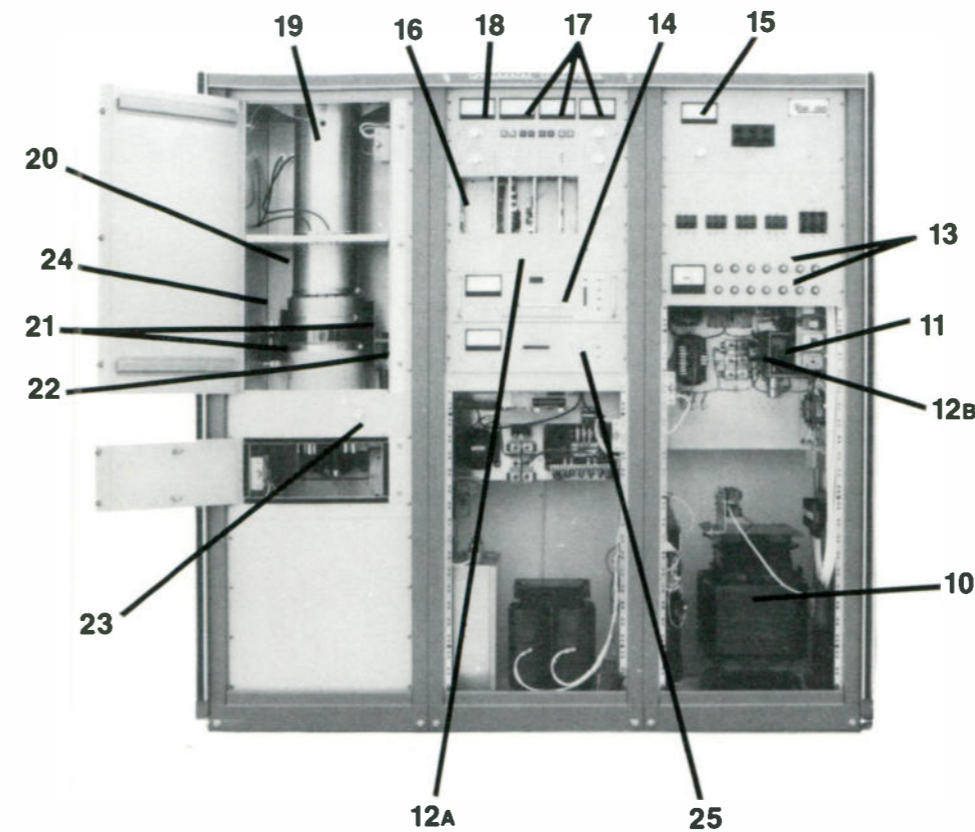
802A FM exciter, front view



802A FM exciter, rear view



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.



### The Inside Story

- Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
- Harmonic filter.** Fully contained inside cabinet for easy installation while reducing overall space requirements.
- Air switch.** Positioned for easy access.
- Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
- Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
- SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start", which initially brings up the transmitter gently.
- PA blower.** 1 hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
- Remote control connectors.** Conveniently located for simple set up.
- Power wire.** Either bottom or top entry is available; bottom entry shown here.
- Power supply.** A self-contained integral part of the transmitter.
- Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
- Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.
- Indicator fuses & circuit breakers.** Indicators glow brightly for fast troubleshooting.
- 802A exciter.**
- True RMS iron vane meter & 150 amp ac mains circuit breaker.** Meter gives readings on each of the three ac voltage phases, as well as filament voltage.
- LED-equipped card cage.** Twenty-seven LEDs give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
- Continuous readout meters.** At a glance you'll know plate current, plate voltage and output power.
- DC multimeter.** Eleven operating parameters at the turn of a dial.
- PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final stage if cooling air is lost or over-dissipation occurs.
- Wideband quarter-wave cavity.** A proven design for greater reliability.
- Tuning & loading controls.** Exclusive motorized system for easy adjustments.
- Static drain choke.** Bleeds off static build-up in transmission lines or antennas.
- Driver plate adjustment.** A single control tunes the driver plate.
- Final amplifier.** The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.
- Solid-state driver.**

### Top Performance and Proven Design in High Power FM

Continental's 70 kW FM transmitter offers you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100%, with minimal retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the RF when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

An exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges through the power supply components; this helps to minimize parts replacement.

Twenty-three different circuits or indicators are used to protect the transmitter and the control circuits are of the conventional 28 VDC design.

The meters and controls are strategically placed at or near eye level for easy reading and accurate adjustment. All components are easily accessible.

The wide, flat bandwidth is a result of the wideband quarter-wave cavity design which optimizes performance.

If a problem should occur, 27 LED indicators, 14 indicating fuseholders and six front panel circuit breakers assist in quickly isolating it.

The 817R-5B's control options offer operating flexibility. Its compact size and simple installation will get you air-ready with minimum time and cost.

### Solid-State Driver

Featured in this transmitter is a solid-state driver which increases reliability and decreases maintenance and complexity. This driver also offers greater bandwidth and self-protecting RF modules.

### The FM Exciter

Continental's 802A solid-state FM exciter offers broadcasters unmatched performance.

### State-of-the-Art Design

Modular subassemblies are easily reached from the front of the exciter. The 802A will accept a composite baseband signal from a stereo generator, STL system or monaural audio and SCA programming.

### Refined Linearity

Exciter modulation performance surpasses the measurement capability of the most advanced test equipment.

### Digital Frequency Selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

### 50 Watt Output Broadband Amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

### Automatic Power Level Control

A special circuit protects the amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 to 50 watts.

### Sophisticated Styling

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

### Modular Construction

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

### Optional Automatic Exciter Control

Continental's 377C-1A automatic exciter control unit provides monitoring and control for two 802A or similar exciters. If one exciter fails, the standby exciter is automatically put on line. Indicator lamps show which exciter is operating.

The control unit includes switching the station's monitoring to the exciter's dummy load for servicing and testing the standby exciter.

The 377C-1A is designed to fit in the control cabinet furnished with the 70 kW transmitter.

### Optional Automatic Combiner Control

Continental's 377D-1 combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times.

In the event of a transmitter failure, the remaining transmitter output is automatically switched through the combiner into the antenna. The transmitter that failed is automatically switched to the test load for troubleshooting.

The combiner control provides all interlock and sequencing functions; it is designed to fit in the control cabinet furnished with the 817R-5B 70 kW transmitter.

### SPECIFICATIONS using 802A solid-state exciter

#### GENERAL

**Rated Power Output:** 70 kW

**Power Consumption:** 108 kW, nominal

**Frequency Range:** 88 to 108 MHz, in 10 kHz steps

**Frequency Control:** Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  $\pm 250$  Hz

**Output Impedance:** 50 ohms

**Output Connector:**  $6\frac{1}{8}$ " EIA flange

**VSWR:** 2:1, maximum

**Modulation Type:** Direct carrier frequency modulation

**Modulation Capability:**  $\pm 150$  kHz deviation

**Modulation Indication:** Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than  $\pm 2\%$

**Exciter:** Solid-state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:** -80 dB, minimum

**Power Supply Rectifiers:** Silicon

#### MONAURAL OPERATION

**Audio Input Impedance:** 600 ohms, balanced

**Audio Input Return Loss:** 30 dB or better

**Audio Input Level:** +10 dBm (6.93 V peak-to-peak) at 600 ohms for  $\pm 75$  kHz deviation

**Audio Frequency Response:**  $\pm 0.5$  dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:** 0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:** 0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):** 75 dB minimum, below  $\pm 75$  kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):** 55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):** 50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation  $\pm 75$  kHz at 400 Hz

#### WIDEBAND OPERATION

**Composite Inputs:** Balanced, unbalanced, test

**Composite Input Impedance:** 5,000 ohms, nominal

**Composite Input Level:** 1.25 V RMS (3.54 V peak-to-peak) for  $\pm 75$  kHz deviation

**Composite Amplitude Response:**  $\pm 0.1$  dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:** 0.08% maximum

**Composite Intermodulation Distortion:** 0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:** Balanced or unbalanced

**SCA Input Impedance:** 15,000 ohms, nominal

**SCA Input Level:** 1.25 V RMS for  $\pm 7.5$  kHz deviation

**SCA Amplitude Response:**  $\pm 0.3$  dB, 40 kHz to 100 kHz

#### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:** 50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:** 0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:** 0.08% maximum; 60 Hz to 7 kHz; 4:1 ratio

**FM Noise** -72 dB minimum, below  $\pm 75$  kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Linear Crosstalk:** -55 dB

#### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):** -60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):** -50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):** -50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation, 150 microsecond de-emphasis

#### ELECTRICAL

**Power Source:** 200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**  $\pm 5\%$  (each phase voltage variation; within 5% of the average of all three phases)

**Filament Regulator:**  $\pm 1\%$  of optimum

#### OPERATING ENVIRONMENT

**Altitude:** 7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:** -20°C to +50°C (-4°F to +122°F)

**Relative Humidity:** 0 to 95%

#### MECHANICAL

**Transmitter:** 69" (175 cm) H  
159.8" (406 cm) W  
28" (71 cm) D

**Weight:** 3,314 lbs (1,503 kg) nominal

**External Plate Transformer:** 46" (117 cm) H  
35" (89 cm) W  
24" (61 cm) D (each)

**Weight:** 901 lbs (409 kg) nominal (each)

**Note:** The two external plate transformers can be located up to 20 ft (6.10 m) away from the transmitter

**Combiner, 70 kW:** 73" (185 cm) H  
68½" (174 cm) W  
31" (79 cm) D

**Weight:** 1,130 lbs (513 kg) nominal

All specifications are subject to change without notice. Printed in USA 1M388

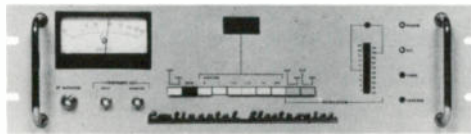
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Continental's 817R-5B, 70 kW Broadcast Transmitter



Includes the 802A solid-state exciter



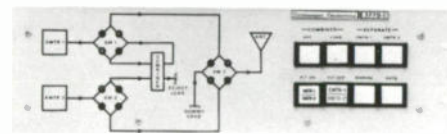
802A FM exciter, front view



802A FM exciter, rear view



Optional automatic exciter control



Optional automatic combiner control

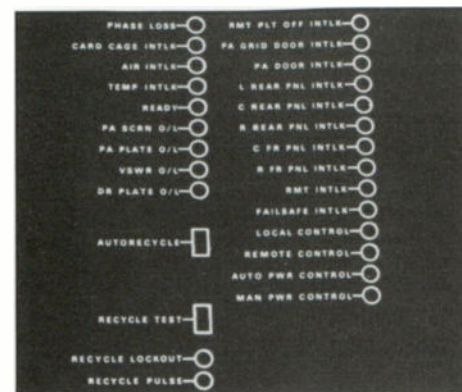


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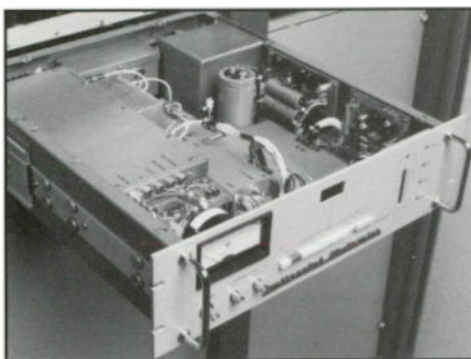
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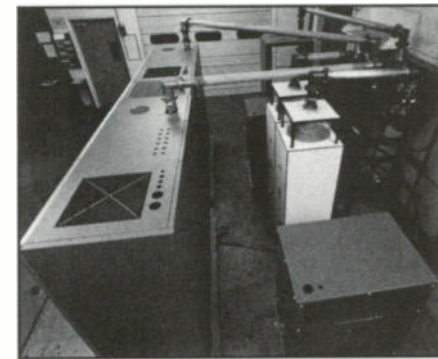
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LED status indicators.



All exciter components are easily reached from the front of the transmitter. The exciter moves on tracks for easy access; shown here with top cover off.



A typical arrangement of transmitter combiner, dummy load, external power supply and main transmitter cabinet modules.

### Features

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- True RMS Filament Power Regulation/Metering
- AC Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Grounded Screen Amplifier
- Internal Diagnostics

### Modular Concept Offers Broadcasters Maximum Flexibility

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output through the use of a combiner.

Continental's 817R-5B 70 kW transmitter consists of two 816R-5B 35 kW transmitters whose outputs are combined in a 90 degree hybrid to achieve 70 kW output. Through the use of optional coaxial switching, either transmitter may be put on the air independently.

The transmitter is solid-state except for a tube in each 9019/YC130 tetrode power amplifier operating at Class C.

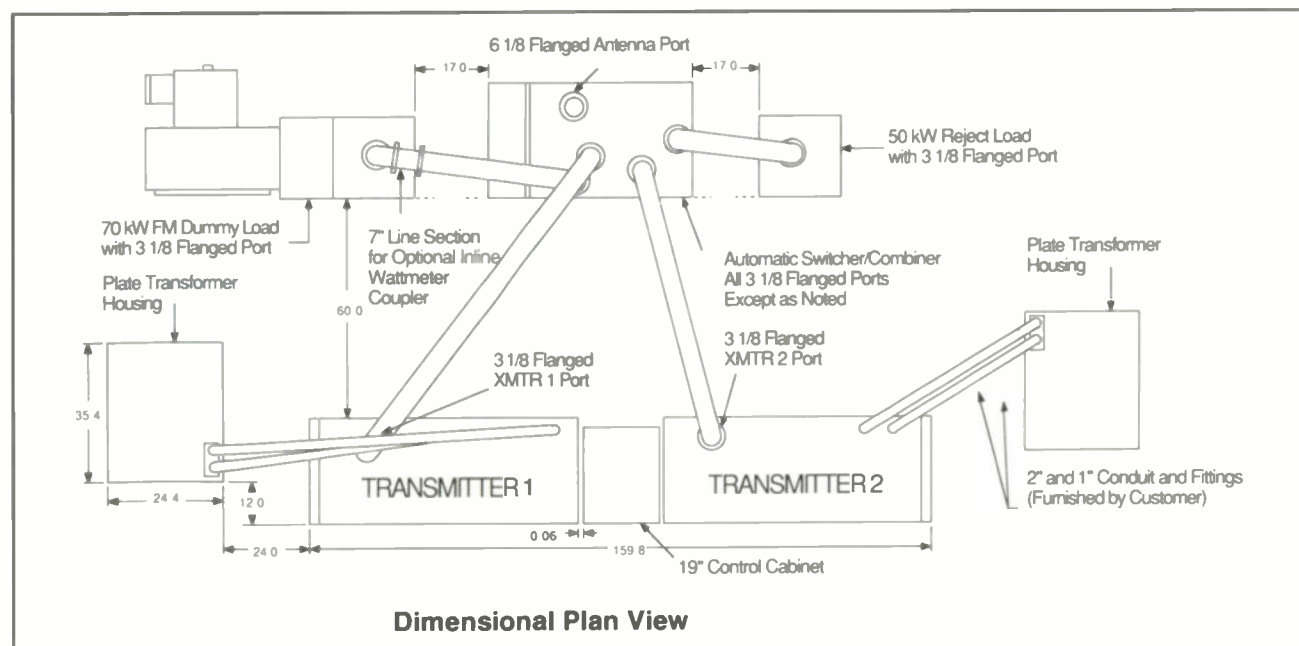
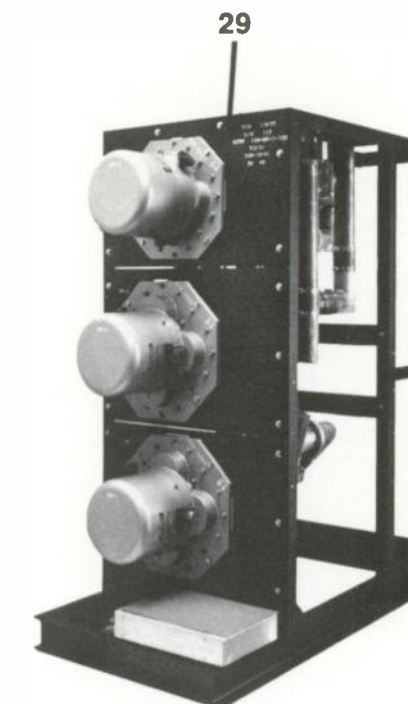
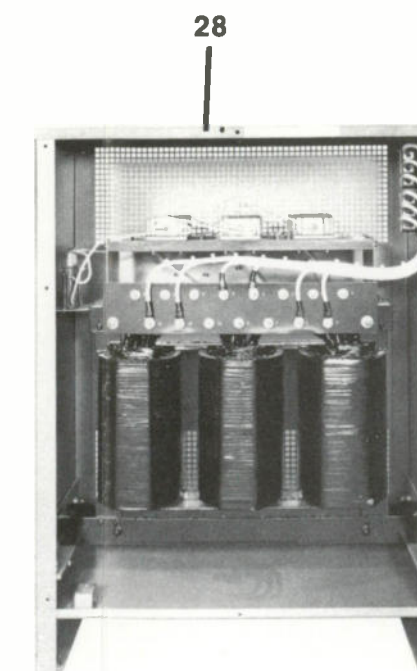
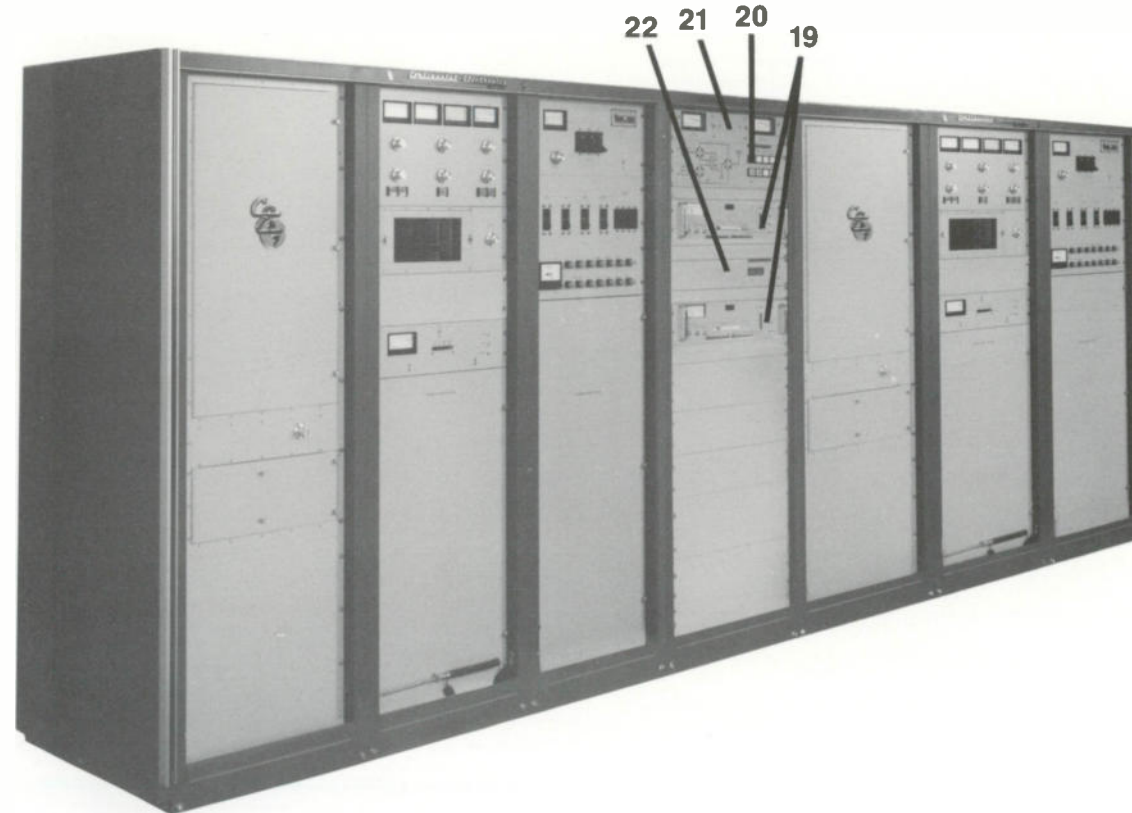
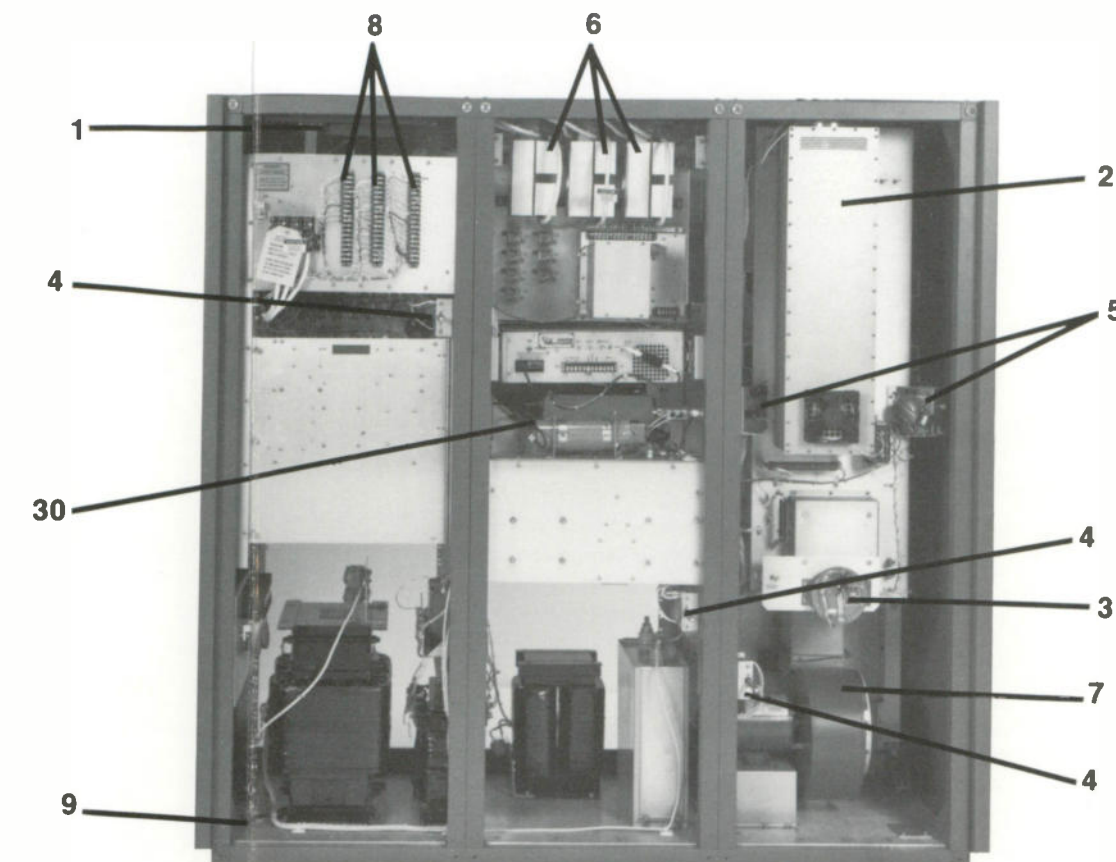
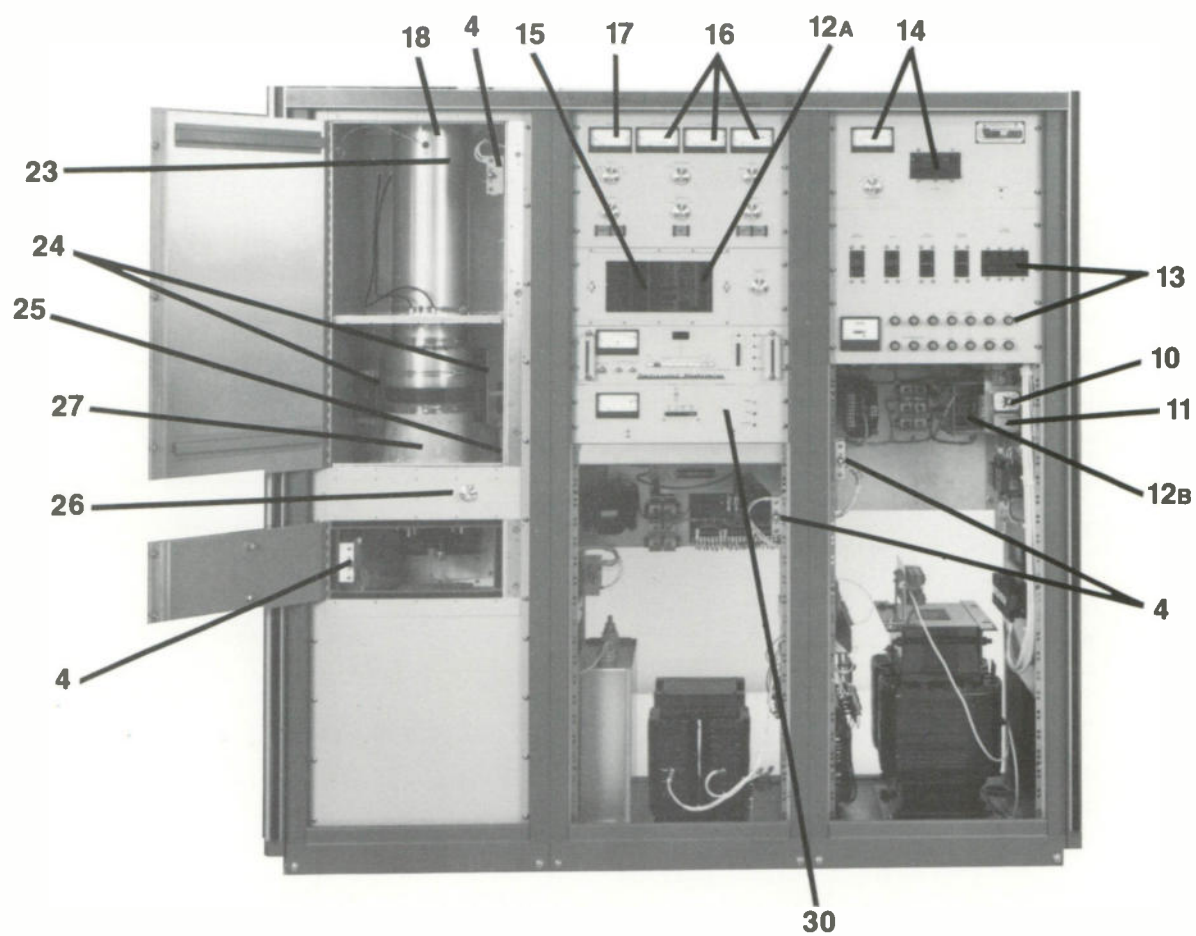
The 9019/YC130 tetrode was specially designed by EIMAC for Continental, to meet stringent FM service requirements at 35 kW.

The 817R-5B is the latest addition to Continental's popular 817R Series of 40, 50 and 55 kW transmitters, but employs a new cavity design for the 9019/YC130 tetrode.

The harmonic filter is internally mounted, providing a 3-1/8" EIA flange for direct mounting to the transmission line.

### Fast Installation

For shipments within the continental United States, all components within each transmitter are in place and interconnected. Audio inputs monitoring outputs and transmission line connections are through the top of the cabinet. The ac power may enter either through the top or bottom of the cabinet. A 28-volt dc power supply is built-in for optional remote control and the Harmonic filter is in place and ready to operate.



Dimensional Plan View

### The Inside Story

1. Cabinet flushing blower. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. Fully contained inside cabinet for easy installation while reducing overall space requirements.
3. Air switch. Positioned for easy access.
4. Interlocks. Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. Tuning & loading motors. These motors and connecting capacitor plates are the only moving parts in the PA.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start", which initially brings up the transmitter gently.
7. PA blower. 1 hp PA exhaust blower moves 525 cfm of cooling air through PA tube to help extend tube life and reduce heat accumulation.
8. Remote control connectors. Conveniently located for simple set up of system.
9. Power wire. Either top or bottom entry is available; bottom entry shown here.
10. Tube cool-down timer. Continues blower operation for up to 3 minutes after filaments are turned off.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to PA tube to maximize tube life.
  - A = Control card
  - B = Control drive assembly
13. Indicator fuses & circuit breakers. Indicators glow brightly for fast trouble-shooting.
14. True RMS iron vane meter & 200 amp ac mains circuit breaker. Meter gives readings on filament voltage and three ac voltage phases.
15. LED-equipped card cage. Twenty-seven LEDs give a quick status readout of protection circuits and control modes.
16. Continuous readout meters. Shows plate current and voltage, output power.
17. DC multimeter. Eleven operating parameters at the turn of a dial.
18. PA exhaust stack temperature sensor. Redundant back up to airflow switch protects final stage if cooling air is lost or if over-dissipation occurs.
19. 802A exciter.
20. Automatic combiner control.
21. Power monitor.
22. Automatic exciter control.
23. Wideband quarter-wave cavity. A proven design for maximum reliability.
24. Tuning & loading controls. Exclusive motorized system for easy adjustments.
25. Static drain choke. Bleeds off static build-up in transmission lines or antennas.
26. Driver plate adjustment. A single control tunes the driver plate.
27. Final amplifier. The 9019/YC130 tube uses lower filament power to save money. The grounded screen tetrode eliminates screen bypass capacitors and enhances stability.
28. Power supply. Plate transformer and rectifier are mounted in external cabinet which may be placed up to 20 feet away from transmitter.
29. 70 kW Combiner.
30. Solid-state driver.

**SPECIFICATIONS using  
Type 802A Exciter**

**GENERAL**

**Rated Power Output:**

814R-1: 2.5 kW

**Power Consumption:**

814R-1: 4.9 kW

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase Locked Loop Frequency  
Synthesis from high stability master  
oscillator

**Frequency Stability:**

± 275 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

1 1/8" EIA Flange

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

± 150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak  
level of modulating signal in 5%  
increments with accuracy better  
than ± 2%

**Exciter:**

Solid-state unit with variable output  
of 5 to 50 watts, and self-contained  
harmonic filter.

**RF Harmonic Attenuation:**

- 80 dB, min.

**Power Supply Rectifiers:**

Silicon

**MONAURAL OPERATION**

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+ 10 dBm (6.93 volts peak-to-peak)  
@ 600 ohms for ± 75 kHz deviation.

**Audio Frequency Response:**

± 0.5 dB; flat, 25, 50 or 75  
microsecond pre-emphasis,  
20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% max.; 20 Hz to 15 kHz  
(Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

0.1% or less, 60 Hz/7 kHz 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB min. below ± 75 kHz  
deviation @ 400 Hz, measured  
within a 20 Hz to 15 kHz bandwidth  
with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio  
(AM Noise):**

55 dB RMS below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, no FM modulation

**Synchronous AM S/N Ratio  
(Incidental AM Noise):**

40 dB below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, FM modulation ± 75 kHz  
@ 400 Hz

**WIDEBAND OPERATION**

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nominal

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak to  
peak) for ± 75 kHz deviation

**Composite Amplitude Response:**

± 0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic  
Distortion:**

0.08% max

**Composite Intermodulation  
Distortion:**

0.1% or less, 60 Hz/7 kHz 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

50,000 ohms, nominal

**SCA Input Level:**

1.25 volts RMS for ± 7.5 kHz  
deviation

**SCA Amplitude Response:**

± 0.3 dB, 40 kHz to 100 kHz

**STEREO OPERATION**

Most Stereo performance parameters  
are determined primarily by the Stereo  
Generator used. The following  
parameters are influenced by the RF  
system. These specifications assume  
that a "State-of-the-Art" Stereo  
Generator is used.

**Stereo Separation:**

50 dB min.; 50 Hz to 15 kHz. (60 dB  
or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% max.; 50 Hz to 15 kHz.  
(Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

0.1% max.; 60 Hz/7 kHz, 4:1 ratio.

**FM Noise:**

- 72 dB referenced to 400 Hz, 75  
kHz deviation. Measured with 75  
microsecond de-emphasis within a  
20 Hz to 15 kHz bandwidth.

**Linear Crosstalk**

- 55 dB

**SCA OPERATION**

Most SCA performance parameters  
are determined primarily by the SCA  
generator used. The following  
parameters are influenced by the RF  
System. These specifications assume  
that a "State-of-the-Art" SCA  
Generator is used.

**Crosstalk, SCA to Main and Stereo  
(67 kHz and/or 92 kHz):**

- 60 dB, SCA deviation 5 kHz, Main  
75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA  
(67 kHz or 92 kHz):**

- 50 dB, Main and Stereo 75 kHz  
deviation; SCA reference deviation,  
5 kHz and 200 Hz modulation; SCA  
de-emphasis, 150 microsecond

**Crosstalk SCA to SCA  
(67 kHz and 92 kHz):**

- 50 dB, SCA reference deviation 5  
kHz and 200 Hz modulation  
frequency; de-emphasis, 150  
microsecond

**ELECTRICAL**

**Power Source:**

200 to 250 volts ac; 60 Hz, single  
phase; available transformer taps  
are 200, 210, 220, 230, 240, 250  
volts ac; 50 Hz available on request.

**Permissible Line Voltage Variation:**

± 5%

**Filament regulator:**

± 1% of optimum

**OPERATING ENVIRONMENT**

**Operating Altitude:**

7,500 ft. (2286 m) standard; optional  
to 10,000 ft (3048 m) with  
modification kit

**Ambient Temperature Range:**

- 20°C to + 50°C (- 4°F to + 122°F)

**MECHANICAL**

**Size, as shown:**

69" (175 cm) H

35" (89 cm) W

24" (61 cm) D

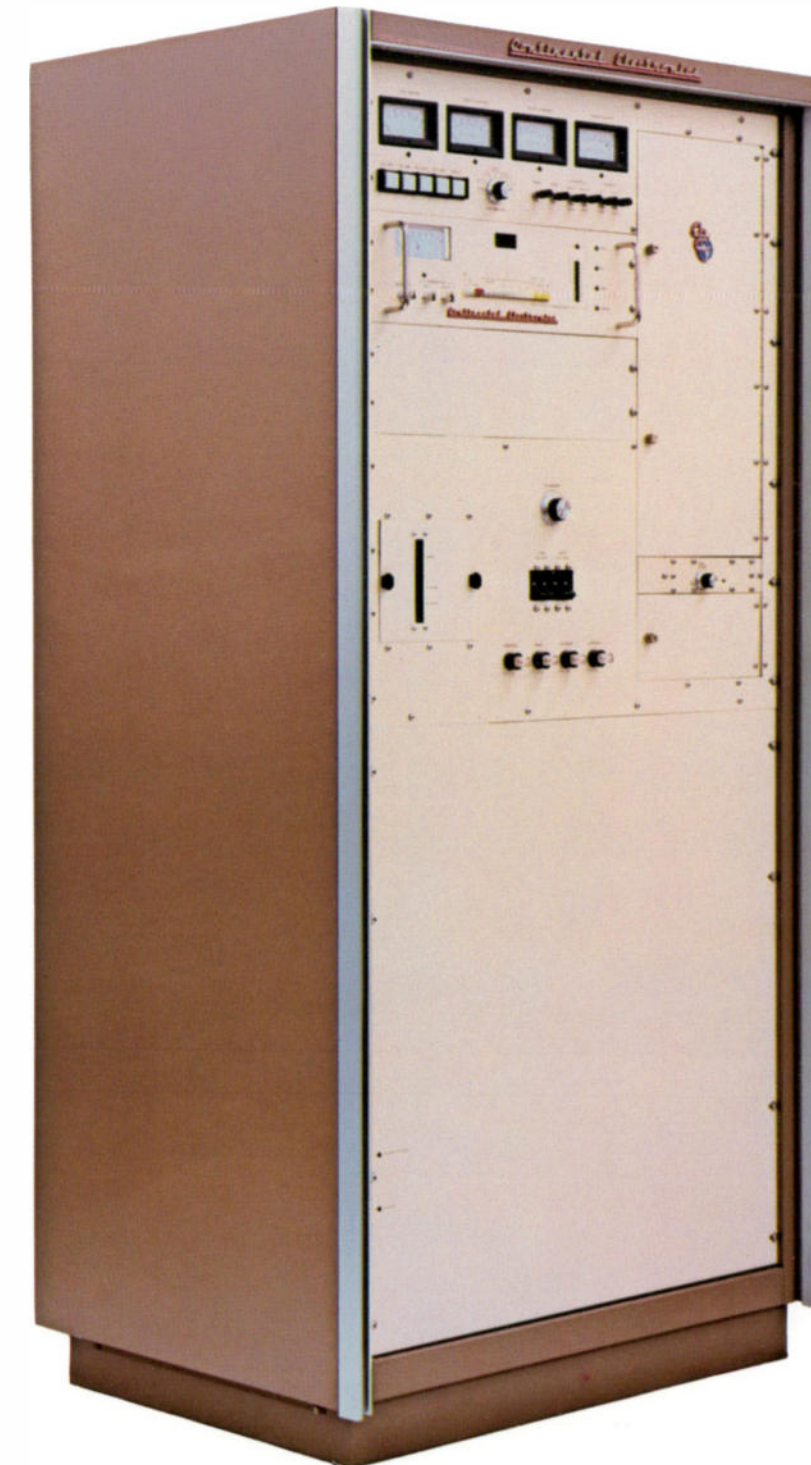
**Weight:**

750 lb (340 kg) nominal

All specifications are subject to change without notice.

Printed in USA 3M186/6145

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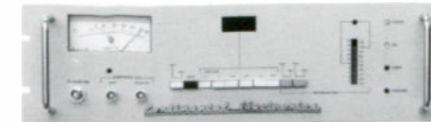
FEATURING 802A SOLID-STATE EXCITER

#### Field-Proven Features

- Lowest intermodulation distortion
- Highest stereo separation
- Automatic power output control
- Automatic overload recycling
- VSWR protection
- Superior frequency stability
- Automatic filament voltage regulation
- Overload indicator lights
- Front panel pushbutton control
- Superior PA stability
- Proven PA design
- Built-in remote control facilities
- Front panel monitoring
- Easy access
- Compact size
- Outstanding exciter

#### Type 814R-1 2.5 kW FM Transmitter

Continental's 814R-1 is a high-performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal. The transmitter is solid-state except for the single 5CX1500A tube in the final amplifier. The 814R-1 uses IC logic for all control functions, and incorporates a computer-like memory to restart the transmitter after a power failure. A built-in battery supply and charger enables the logic circuits to remember their state in the event of a power interruption. The transmitter utilizes automatic filament voltage regulation and automatic power control for unattended operation. Standard features include remote control equipment and automatic overload/recycle system. Overload conditions are indicated by an LED display. The 814R-1 is completely contained in one 35" wide (89 cm) cabinet.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

#### Introducing the ultimate FM Exciter!

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### State-of-the-art design

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### Refined linearity

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### Digital frequency selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### 50 watts output broadband amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### Automatic power level control

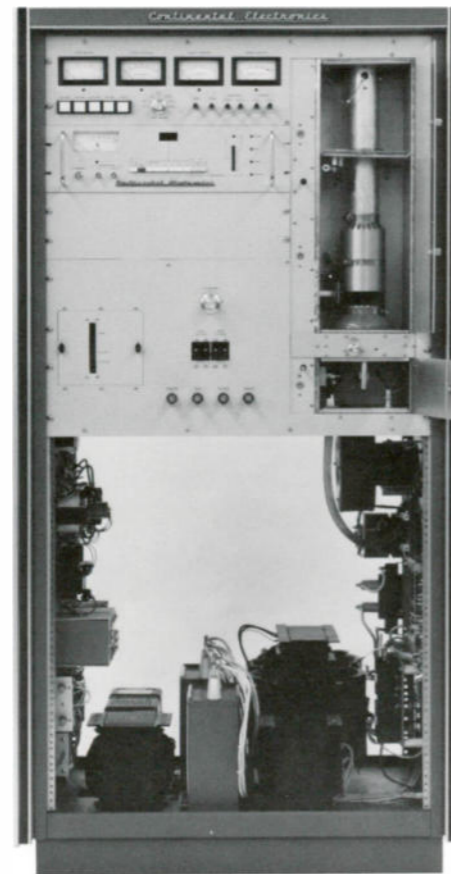
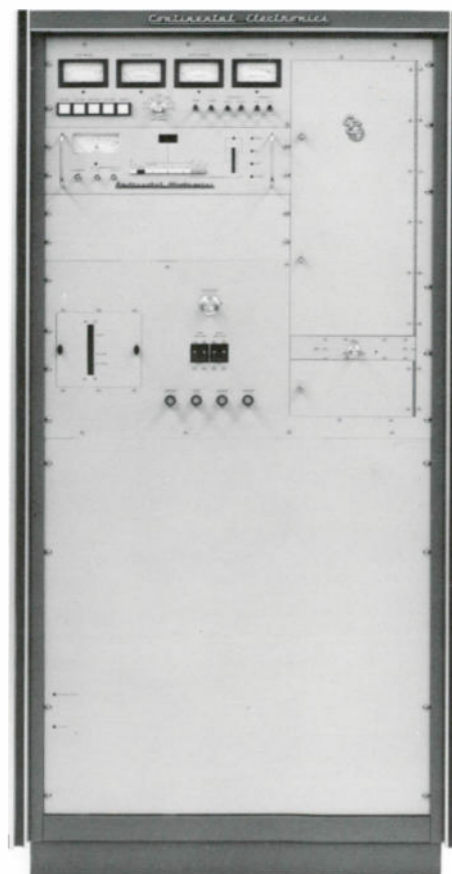
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

#### Sophisticated styling

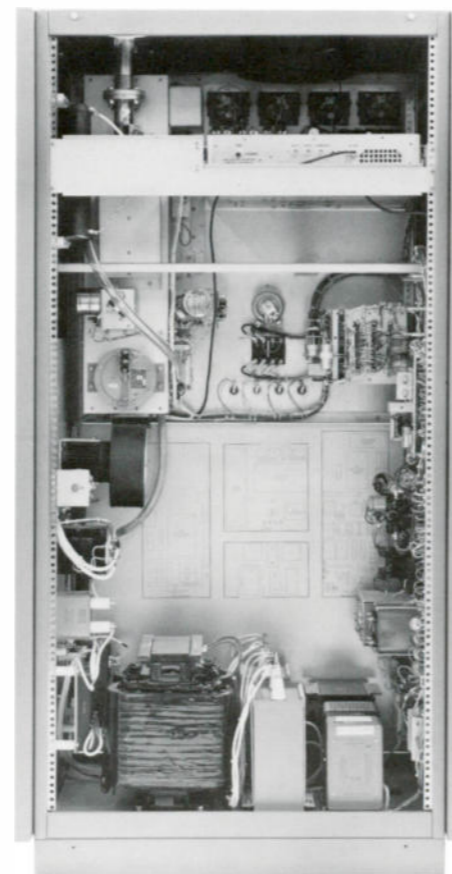
Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### Modular construction

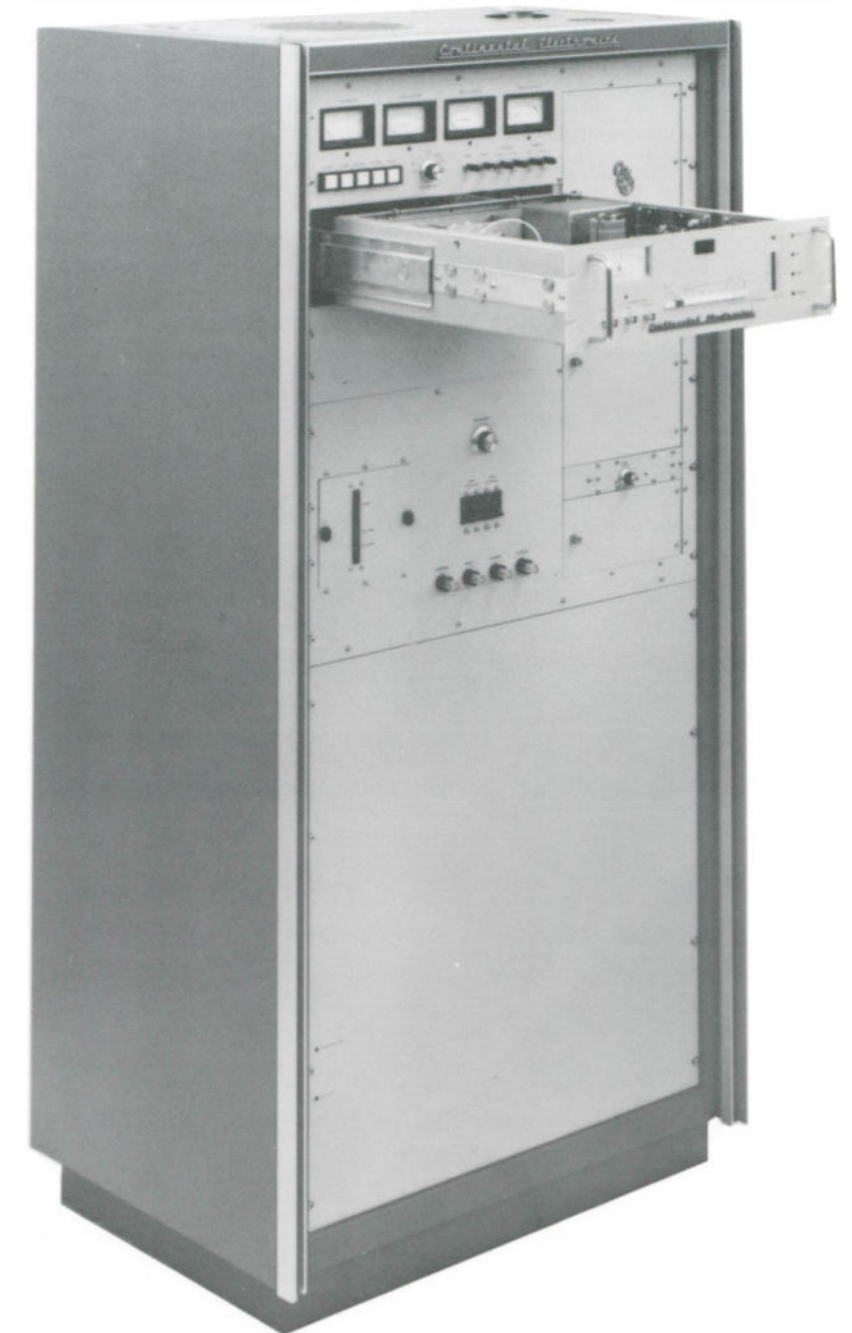
Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



Front view, Type 814R-1  
2.5 kW FM Transmitter



Rear view, Type 814R-1  
2.5 kW FM Transmitter

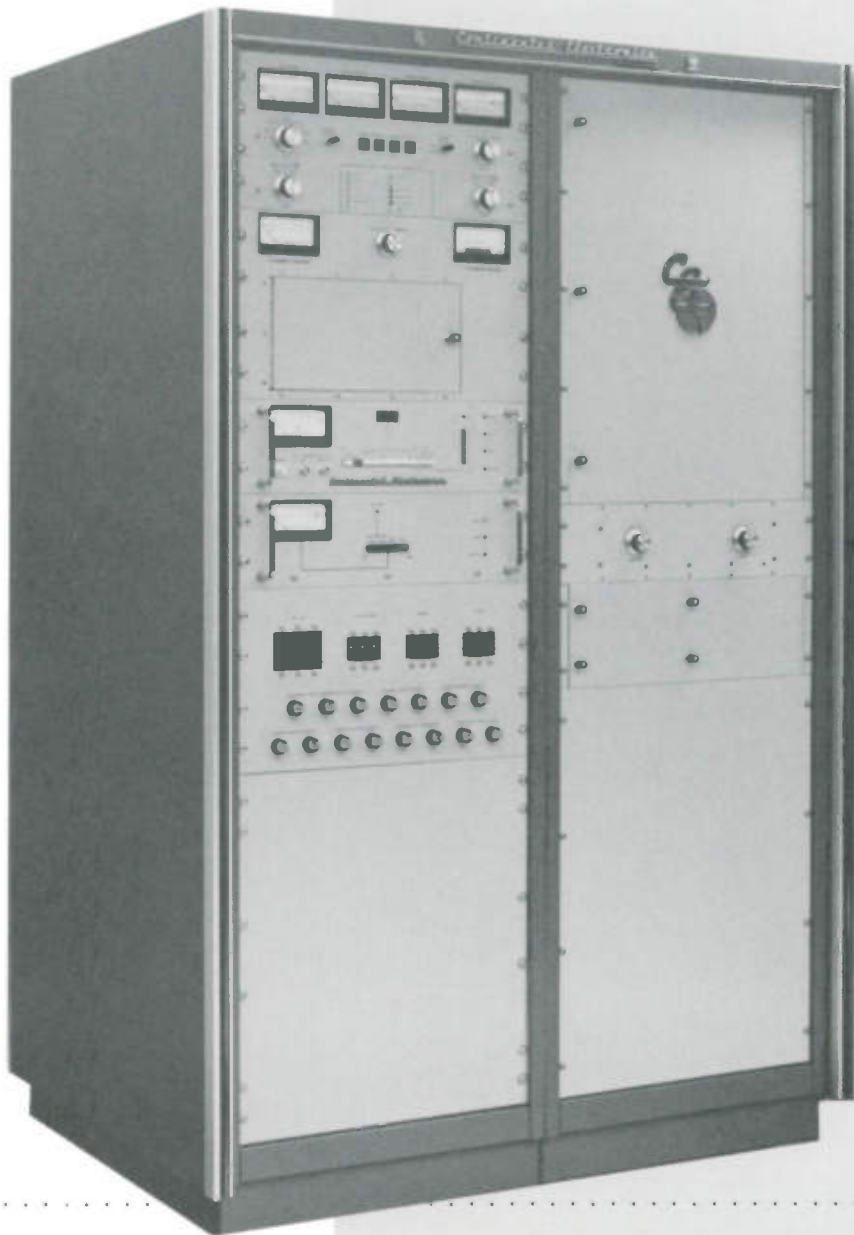


All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; it's shown here with top cover removed.



**CONTINENTAL'S  
TYPE 816A 11KW FM  
BROADCAST  
TRANSMITTER**

*fm*



## SPECIFICATIONS

### ► GENERAL

**Rated Power Output:**

11 kW (11.5 kW Max.)

**Power Consumption:**

17.8 kW, nom. (at 10 kW)

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**

±250 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

3<sup>1</sup>/<sub>8</sub>" EIA Flange

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

±150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**

-80 dB, min.

**Power Supply Rectifiers:**

Silicon

### ► MONAURAL OPERATION

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+10 dBm (6.93 volts peak-to-peak) at 600 ohms for ±75 kHz deviation

**Audio Frequency Response**

±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% max.; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB min. below ±75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

50 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ±75 kHz at 400 Hz

### ► WIDEBAND OPERATION

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nom.

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak-to-peak) for ±75 kHz deviation

**Composite Amplitude Response:**

±0.1 db, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

.08% max.

**Composite Intermodulation Distortion:**

.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

15,000 ohms, nom.

**SCA Input Level:**

1.25 volts RMS for ±7.5 kHz deviation

**SCA Amplitude Response:**

±0.3 dB, 40 kHz to 100 kHz

### ► STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% max.; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**

-72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**

-55 dB

### ► SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**

-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

### ► ELECTRICAL

**Power Source:**

200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request

**Permissible Line Voltage Variation:**

±5%

**Filament regulator:**

±1% of optimum

### ► OPERATING ENVIRONMENT

**Altitude Range:**

0 to 7,500 ft. (0 to 2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit

**Ambient Temperature Range:**

-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**

0 to 95%

### ► MECHANICAL

**Size, as shown:**

69" (175.26 cm) H × 45" (114.3 cm) W × 34" (86.36 cm) D

**Weight:**

1200 lb. (544 kg) est.

All specifications are subject to change without notice.

Printed in U.S.A. 1M/2-90

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# Continental Electronics Corporation

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Continental's customer service is the industry's best!

Call anytime, day or night. Main offices: (214) 381-7161 Engineering service: (214) 388-5800 Parts: (214) 388-3737



# Continental Electronics Corporation

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX NUMBER (214) 381-4949 TELEX ADDRESS: 73-398

## SPECIFICATIONS 802B FM EXCITER

### GENERAL

#### Power Output:

5 to 50 watts continuously adjustable

#### RF Output Impedance:

50 ohms, VSWR less than 2:1 for full output, protected for open and short circuit; BNC connector

#### RF Harmonic and Spurious:

60 dB or more below rated output

#### Frequency Range:

87 to 109 MHz in 10 kHz steps

#### Frequency Control:

Phase locked loop frequency synthesis from highly stable master oscillator

#### Frequency Stability:

±250 Hz

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

±200 kHz deviation

#### Modulation Indication:

Bargraph: 5% increments; Digital meter: 0.1% resolution

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, ±5% balanced

#### Audio Input Level:

+10 dBm ±2 dB (6.93 volts peak-to-peak at 600 ohms) for ±75 kHz deviation

#### Audio Frequency Response:

±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.005%

#### Intermodulation Distortion:

0.005%, 60 Hz/7 kHz, 4:1 using CCIR-2k filter

#### FM S/N Ratio (FM Noise):

90 dB @ 400 Hz, 75 microsecond de-emphasis measured using "A" weighted filter

#### Asynchronous AM S/N Ratio (AM Noise):

-70 dB

#### Synchronous AM S/N Ratio (Incidental AM Noise):

-60 dB

### COMPOSITE OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.50 volts peak-to-peak) for ±75 kHz deviation

#### Composite Amplitude Response:

±0.2 dB, 20 Hz to 100 kHz

#### Composite Phase Response:

±0.5°, 20 Hz to 75 kHz

#### Composite Group Delay Variation:

±25 ns, 20 Hz to 75 kHz

#### Composite Total Harmonic Distortion:

0.005% using "A" weighted filter

#### Composite Intermodulation Distortion:

0.005%, 60 Hz/7 kHz, 4:1 using CCIR-2k filter

#### Composite FM S/N Ratio (FM Noise):

90 dB @ 400 Hz, 75 microsecond de-emphasis, using "A" weighted filter

#### Three SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

15,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for 10% injection

#### SCA Amplitude Response:

±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined by the stereo generator used. The following parameters are influenced by the RF system. These specifications assume that the stereo generator is a state-of-the-art generator.

#### Stereo Separation:

50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

#### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz deviation; measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used.

### ELECTRICAL

#### Input Power:

115V or 230V ±10%; 50/60 Hz ±5%; single phase, 200 watts maximum

### OPERATING ENVIRONMENT

#### Temperature Range:

-20°C to +55°C (-4°F to +131°F)

#### Altitude Range:

0 to 15,100 ft. (0 to 4,600 m)

#### Relative Humidity Range:

0 to 95%

### MECHANICAL

#### Mounting:

Equipped with rack mounting sides

#### Size:

17.5" (44.45 cm) W, centered in a 19" (48.26 cm) W rack-mounting panel; 5.25" (13.34 cm) H; 22" (55.88 cm) D

#### Weight:

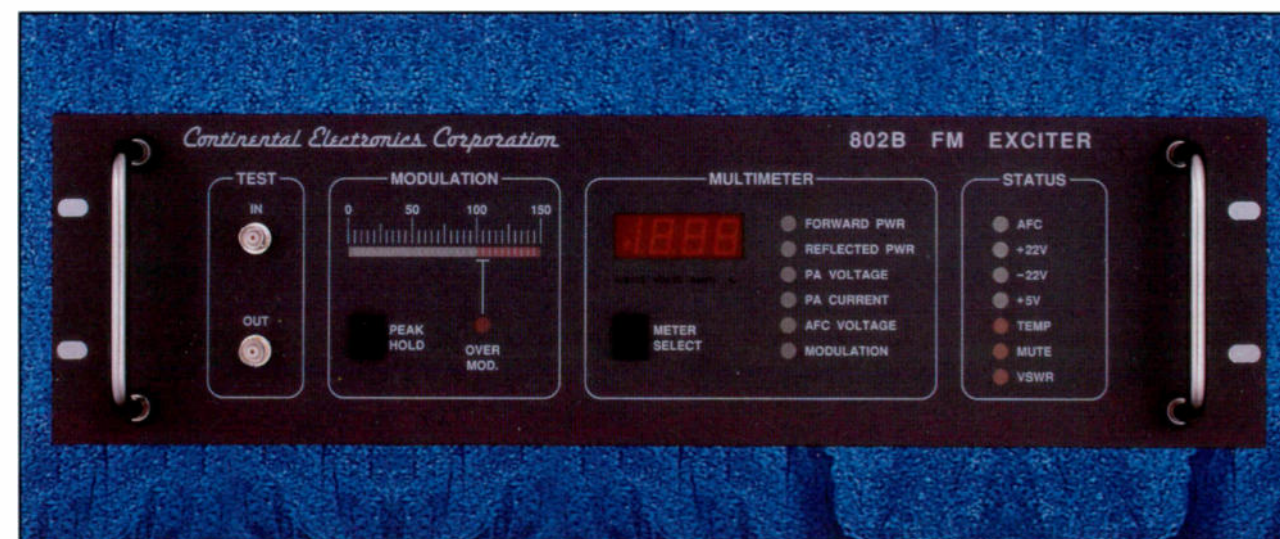
Approximately 31.5 lbs. (14.3 kg)

All specifications are subject to change without notice.  
Printed in USA 2M/7-93  
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Test measurements on state-of-the-art equipment such as the 802B may be affected by measurement techniques since many parameters are near the limit of the capability of the measuring instruments.

## CONTINENTAL'S 802B FM EXCITER

# fm



# Continental Electronics Corporation

## THE 802B FM EXCITER

### THE ULTIMATE FM EXCITER

Continental's 802B FM Exciter is the radio industry standard offering broadcasters the outstanding performance of digital quality, superb reliability and modular construction.

With a variable output from 5 to 50 watts and the internal harmonic filter, the 802B may be used as a low power transmitter. The 802B is totally self-contained and all subassemblies are modular and accessible from the top of the exciter. All components have been selected to exceed the rated requirement for their application providing years of maintenance free service.

The 802B exciter will accept the composite baseband signal from any stereo generator and STL system or monaural audio and SCA program input.

### FREQUENCY SELECTION

The operating frequency of the 802B is generated with a digitally programmed, dual speed, phase-locked synthesized system. Internal switches provide selection of any of one of the 2,200 channels in increments of 10 kHz, from 87 MHz to 109 MHz. A stable, temperature-compensated master oscillator operating at 10 MHz provides carrier frequency stability and accuracy of  $\pm 250$  Hz.

### BROADBAND AMPLIFIER

The 802B is completely broadband. No adjustments are required other than the digital selection of the operating frequency. Power output is conservatively rated at 50 watts into a 50 ohm load at all frequencies in the FM band.

### AUTOMATIC POWER CONTROL

The output power level control maintains the output power at a pre-set level from 5 watts to 50 watts. A strip line directional coupler is incorporated into the power amplifier subassembly. Both forward and reflected power are measured on the front panel digital meter. Special circuits protect the amplifier from any mismatched load, including open or short circuits.

### OVERTEMPERATURE AND MUTING

In the event an overtemperature occurs within the 802B, the power can be reduced to a user defined level, down to zero if desired. An external muting input allows the exciter to be muted for test or other purposes.

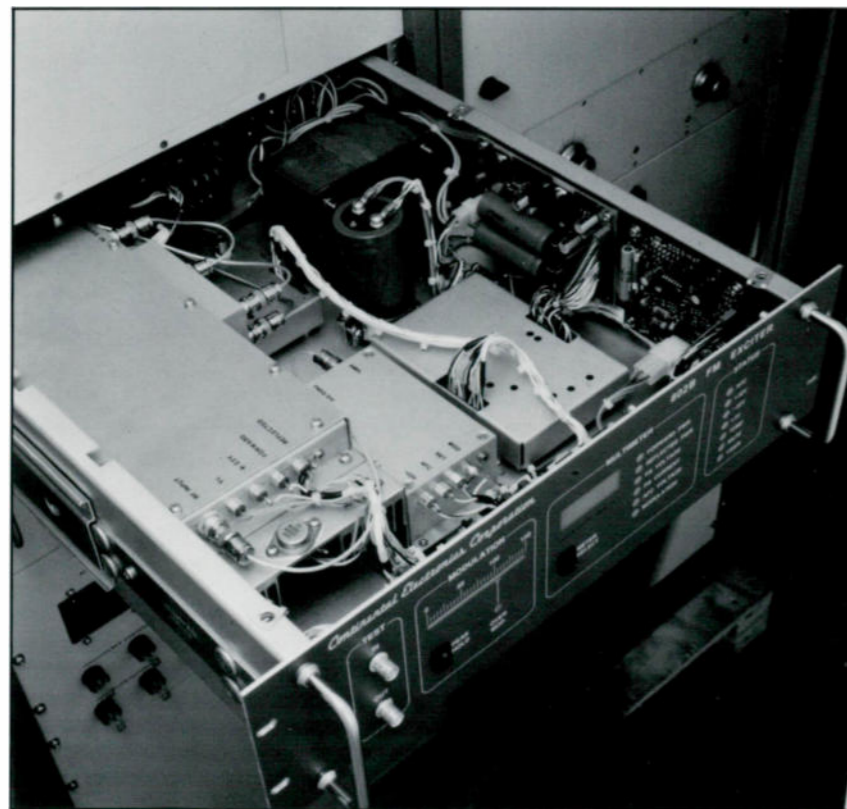
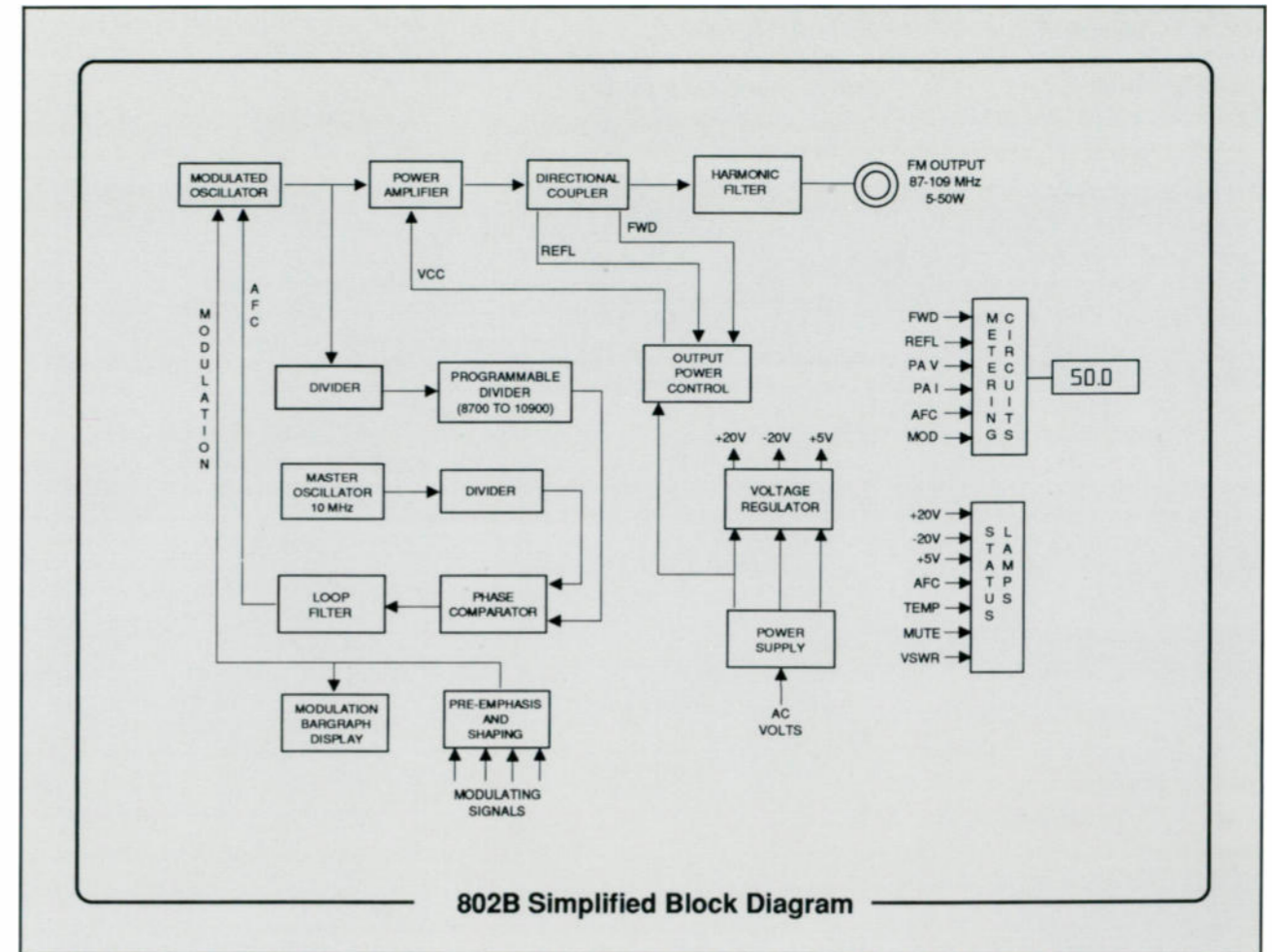
### METERING AND FRONT PANEL INDICATORS

Meter selection is derived from all electronic circuitry eliminating all mechanical assemblies. Multiple colored LEDs provide easy viewing of all operating parameters under high ambient lights.

### FUNCTIONAL STYLING

Status lamps indicate system performance while allowing an uncluttered front panel for easy visual monitoring. Forward and reflected RF power output is viewed on a digital meter, along with amplifier current and the operating voltages of the exciter.

Modulation is also indicated on a bargraph display. Individual status indicators indicate conditions of VCO lock, VSWR, cooling status, muting and overmodulation. A BNC connector located on the front panel provides a sample point of the modulating signal at a level suitable for signal analysis.



### CONSTRUCTION

The 802B is completely modular including all of the subassemblies. Any subassembly may be removed without removal of other assemblies and without removing the exciter from the transmitter.

The entire exciter is mounted on slides for ease of service and installation. For bench testing, the exciter can be completely removed from the transmitter by disconnecting several electrical connectors and uncoupling the slides.

### LINEARITY

Measurement of the modulation distortion and noise indicates performance that approaches that of the most sophisticated digital audio.

### REMOTE CONTROL AND METERING

Connections on the rear panel of the 802B exciter allow remote power level control and muting. Muting is accomplished by either a closure to ground or by applying a control voltage; this feature is user selectable. All

metering functions that are on the front panel may also be metered remotely. These metering connections are located on the rear panel of the exciter.

### ADDITIONAL FEATURES

A newly designed power transformer produces a very low external field with no measurable signal-to-noise ratio degradation. Improved design techniques have resulted in a lower level of oscillator sensitivity to ambient noise.

**CONTINENTAL'S  
814H 1kW  
BROADCAST TRANSMITTER**

*fm*





# Continental Electronics Corporation

P. O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX (214) 381-4949 TELEX 73-398

## SPECIFICATIONS 814H 1KW BROADCAST TRANSMITTER

### FEATURES

**Totally Solid-State**  
**Easily Transportable**  
**Compact**

The 814H is totally self-contained and continuously adjustable from 500 to 1000 watts. Power output adjustment is controlled by the output of the 802B exciter.

### GENERAL

**Rated Power Output:**  
1000W

**Power Consumption:**  
2410W (at 1 kW)

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
%250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
Type "N" female

**VSWR:**  
2:1, max.

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
±150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

**Exciter:**  
Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**  
-80 dB, min.

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 volts peak-to-peak) at 600 ohms for ±75 kHz deviation

**Audio Frequency Response:**  
±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.06% max.; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz; 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB min. below %75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
65 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
62 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ±75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nom.

**Composite Input Level:**  
1.25 V RMS (3.54 volts peak-to-peak) for ±75 kHz deviation

**Composite Amplitude Response:**  
±0.2 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
.06% max.

**Composite Intermodulation Distortion:**  
.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Three SCA Inputs:**  
Unbalanced

**SCA Input Impedance:**  
15,000 ohms, nom.

**SCA Input Level:**  
1.25 volts RMS for 10% injection

**SCA Amplitude Response:**  
±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.06% max.; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**  
-72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**  
-55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**  
-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**  
-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**  
-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

### ELECTRICAL

**Power Source:**  
188VAC-272VAC, 60Hz, single phase, 3-wire; available voltage taps are 188, 200, 210, 218, 230, 242, 250, 260, 272 (50Hz available on request)

### OPERATING ENVIRONMENT

**Altitude Range:**  
0 to 10,000 ft. (3048 m)

**Ambient Temperature Range:**  
-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
0 to 95%

### MECHANICAL

**Size, as shown:**  
42" (107 cm) H  
21" (53.5 cm) W  
25" (64.8 cm) D

**Weight:**  
448 lbs

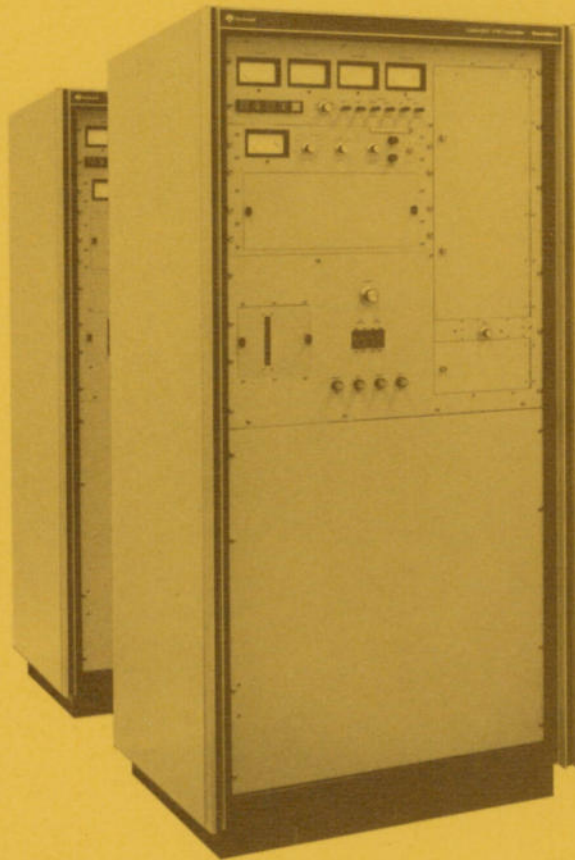
All specifications are subject to change without notice.  
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Collins Broadcast

# Generation 4

## 2.5 KW and 1 KW

For Class A FM Coverage



**2.5 kW 831D-2** The **Generation 4** 831D-2, an entirely new 2.5 kW FM transmitter, provides higher performance while still utilizing the proven design of the 831D-1B forerunner.

Contained in a single 89 cm (35 in) wide cabinet, the 831D-2 compact design saves on floorspace and has even greater maintenance accessibility than before. For a station requiring 500 watts to 2.5 kW, the 831D-2 with the **Phase 4** exciter is the most advanced FM transmitter in existence. Except for the 5C1500A PA tube, the 831D-2 is totally solid state, and uses IC logic for control functions. A computer-like memory restarts the transmitter after a power failure, eliminating the need for periodic checks of the power source. A built-in battery supply and charger enables the logic circuits to remember their state in any power interruption.

**1 kW 831C-2** The **Generation 4** 831C-2 was designed by Collins for those stations requiring 1 kW of power. Driven by the 310Z-2 **Phase 4** exciter, the 831C-2 transmitter delivers a signal that stands out above the competition. The 831C-2 utilizes automatic filament voltage regulation and automatic power control for unattended operation. An LED display indicates any overload conditions, and an automatic recycle option gets the transmitter back on the air immediately after an overload interruption. Completely contained within a single 89 cm (35 in) wide cabinet, the 831C-2 is another example of quality construction and dependable performance from Collins.

Put field-proven features to work for you.

**Lowest Guaranteed Intermodulation Distortion • Highest Stereo Separation  
Automatic Power Output Control • Automatic Overload Recycling • VSWR Protection  
Superior Frequency Stability • Automatic Filament Voltage Regulation • Overload Indicator Lights  
Front Panel Pushbutton Control • Superior PA Stability • Compact Design • Time-Proven PA Design  
Conservatively Stated Specifications • Built-In Remote Facilities • Access Ease  
Front Panel Monitoring**

## Specifications

**IM Distortion:** 0.25% maximum mono; 0.5% maximum stereo

**Output Impedance:** 50 ohms vswr, 2:1 maximum

**RF Power Output Control:**  $\pm 2\%$  of nominal (automatic)

**Frequency Range:** 88-108 MHz

**Frequency Stability:**  $\pm 500$  Hz

**Modulation Capability:**  $\pm 100$  kHz

**Audio Input Level:** 10 dBm  $\pm 2$  dB

**Audio Frequency Response:**  $\pm 1$  dB of preemphasis curve

**Audio Frequency Distortion:** 0.25% maximum mono; 0.5% maximum stereo

**Stereo Separation:** 50 Hz to 15,000 Hz 35 dB minimum reaching 50 dB at mid range

**Harmonic Attenuation:** Exceeds FCC requirements

**FM Noise Level:** 65 dB below 100% modulation

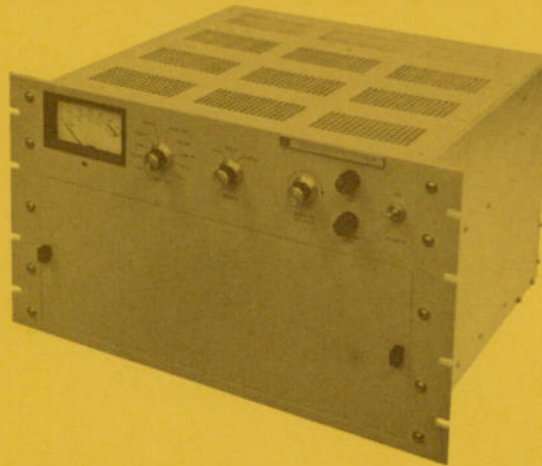
**AM Noise Level:**  $-55$  dB rms

**Filament Regulation:**  $\pm 1\%$  of optimum

**Permissible Line Voltage Variation:**  $\pm 5\%$

	Output Power	Size			Weight	Power Source (50/60 Hz)	Max. Power Consumption (kVA @ 0.97 pF)
		H	W	D			
<b>831D-2</b>	2.5 kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	340 kg (750 lb)	200-250V; 1 $\phi$	4.9
<b>831C-2</b>	1 kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	318 kg (700 lb)	200-250V; 1 $\phi$	2
<b>Phase 4 Exciter</b>	20 W	28 cm (11 in)	48 cm (19 in)	38 cm (15 in)	15 kg (34 lb)	117/234V; 1 $\phi$	0.1

**Collins Phase 4 exciter has the clearest stereo available plus built-in capability to accept discrete 4-channel broadcasting now.**



At the heart of **Generation 4** transmitters is the finest exciter available today, the all solid state **Phase 4**. It produces a sound so clean that Collins guarantees specification on IM distortion of only 0.5% in stereo and half that in mono.

**Phase 4**, a direct FM exciter, uses a phase locked loop AFC to provide typical frequency stability of  $\pm 100$  Hz at any modulation level regardless of

program material. Complete front panel metering facilities include a peak reading meter to measure audio level. Field-proven plug-in modules facilitate servicing. **Phase 4** accepts a composite STL input and any of the proposed discrete quad systems. The EIA supervised discrete 4-channel broadcast field tests used a Collins **Phase 4** FM exciter. Make your own comparisons but we believe the clear choice is Collins **Phase 4**.

### With Generation 4 – you get...

Superior Sound • Quality • Reliability • Long Tube Life • 2-Year Warranty • Automatic Power Control and VSWR Protection • Proven Field Experience • 24-Hour Service and Parts • Ease of Service • Price and Financing Flexibility

Contact your local Collins Broadcast Salesman today. For his location or further information call:

Broadcast Marketing  
Collins Radio Group  
Rockwell International  
Dallas, Texas 75207 Cable: COLINRAD, Dallas  
Telephone: (214) 690-5424 / 690-5574



**Rockwell International**



## INTRODUCING CONTINENTAL'S HIGH POWER FM TRANSMITTERS

You'll like the way they've been designed to meet your needs: from 20 kW to 50 kW.

Continental's high-power FM transmitters are available in four series and offer 20 kW, 25 kW, 40kW and 50kW power with several operating options.

The transmitters are driven by Continental's Type 510R-1 exciter: a high-performance, thoroughly field-proven exciter that exceeds all FCC standards/requirements.

If you're a station owner or manager, you'll like the low operating costs of Continental's FM transmitters; the high reliability, quality sound and ease of operation and maintenance.

If you're a program director, you'll like the transparent reproduction of your program material; the minimum noise and distortion.

If you're an engineer, you'll like the easy installation; the convenient access; the compact design and ease of maintenance.

### MODULAR, BUILDING-BLOCK CONCEPT GIVES YOU MAXIMUM FLEXIBILITY

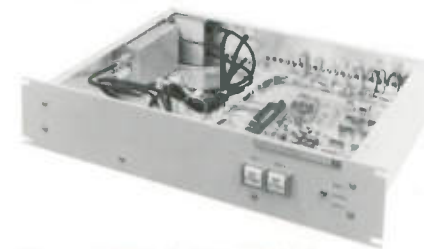
Continental high-power FM transmitters use similar and/or identical power components to give you the option of redundancy or higher power output thru use of a combiner.

The Type 816R-2 is a 20 kW transmitter. Two Type 816R-2 transmitters can be combined to achieve 40 kW output. If 40 kW power is required, the two 20 kW transmitters and combining network are identified as FCC Data Type 817R-2 40 kW FM transmitter.

The Type 816R-3 is a 25 kW transmitter. Two Type 816R-3 transmitters can be combined to achieve 50 kW output. If 50 kW power is desired, the two 25 kW transmitters and combining network are identified as FCC Data Type 817R-1 50 kW FM transmitter.

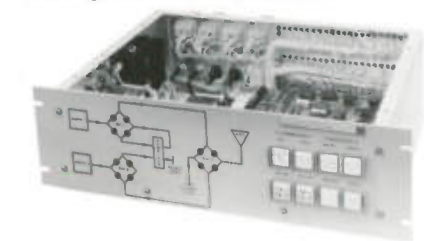
Continental 40 kW and 50 kW FM transmitters are available in four configurations:

1. basic system; one exciter; no switching
2. basic system; two exciters; manual exciter switching; no output switching
3. basic system; two automatically switched exciters; no output switching
4. basic system; two automatically switched exciters; automatic output switching



### Type 377C-1 OPTIONAL AUTOMATIC EXCITER CONTROL

Continental's exciter control provides monitoring and control for two Type 510R-1 or similar exciters. If one exciter fails, the standby exciter is automatically put on-line. Indicator lamps show which exciter is operating. While in the hot standby mode, an exciter is maintained at 5 to 10% of normal power. When switched to "on-air", it comes to full power in less than 100 milliseconds. Control unit includes switch station monitors to the dummy load for servicing and testing the standby exciter.



### Type 377D-1 OPTIONAL AUTOMATIC COMBINER CONTROL

Continental's combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times. If a

failure occurs in either transmitter, the remaining transmitter is switched to the antenna and the defective transmitter is switched to the dummy load. The combiner control unit provides all interlock and sequencing functions. An alternate controller is available to switch any two non-parallel AM or FM transmitters such as a hot standby or alternate main.

### TOP PERFORMANCE IN HIGH POWER FM

Continental high power FM transmitters offer you high fidelity, dynamic balance, very little noise or distortion, good stereo separation and excellent frequency stability.

The Type 510R-1 exciter is unequaled.

Transmitters have 23 different protection circuits or indicators.

Control circuits are solid-state and current technology 28-volt dc.

Tuning and loading are handled with just two motors.

Meters and controls are set at or near eye level for accurate adjustments.

Low power consumption.

Soft-starting circuit and low voltage controls are easy on the total system; helping to keep parts replacement at a minimum.

Compact size and simple installation get you air-ready fast and at low cost: three to five sets of connections will have you ready to switch on the Type 816R-3 25 kW FM transmitter.

If momentary power outages or overloads occur, special circuits protect the transmitters and will automatically restore them to operational status.

All transmitter controls are conveniently located; all transmitter components are easy to reach. The power supply and harmonic filter are within the transmitter cabinet.

## Specifications

### Rated Power Output

816R-3; 25 kW  
816R-2; nominal 20 kW  
(type accepted at 21.5 kW)

### Power Consumption

816R-3 25 kW  
40 kW nominal  
816R-2 20 kW  
32 kW nominal

### Frequency Range

88 to 108 MHz

### Output Impedance

50 ohms, maximum vswr 2:1

### Frequency Stability

± 500 Hz (typical ± 100 Hz)

### Modulation Capability

± 150 kHz

### Audio Input Level

10 dBm ± 2 dB

### Audio Frequency Response

± 1 dB of standard  
75 μs preemphasis curve  
(others available on request)

### Audio Frequency Distortion

0.25% maximum monaural (0.1 typical)  
0.5% maximum stereo (0.15 typical)

### Stereo Separation

50 to 15,000 Hz,  
35 dB minimum  
(40 dB or more typical)

### Harmonic Attenuation

-80 dB minimum

### FM Noise Level

65 db below 100% modulation  
(70 dB, typical)

### AM Noise Level

55 dB rms  
(58 dB, typical)

### Altitude

Operating 3048 m  
(10,000 ft) at 30°C (86°F)

### Power Source

200 to 250 volts  
ac 50/60 Hz, 3-phase  
(Available taps of  
transformers are 200,  
210, 220, 230, 240,  
and 250 volts)

### Permissible Line Voltage Variation

±5%

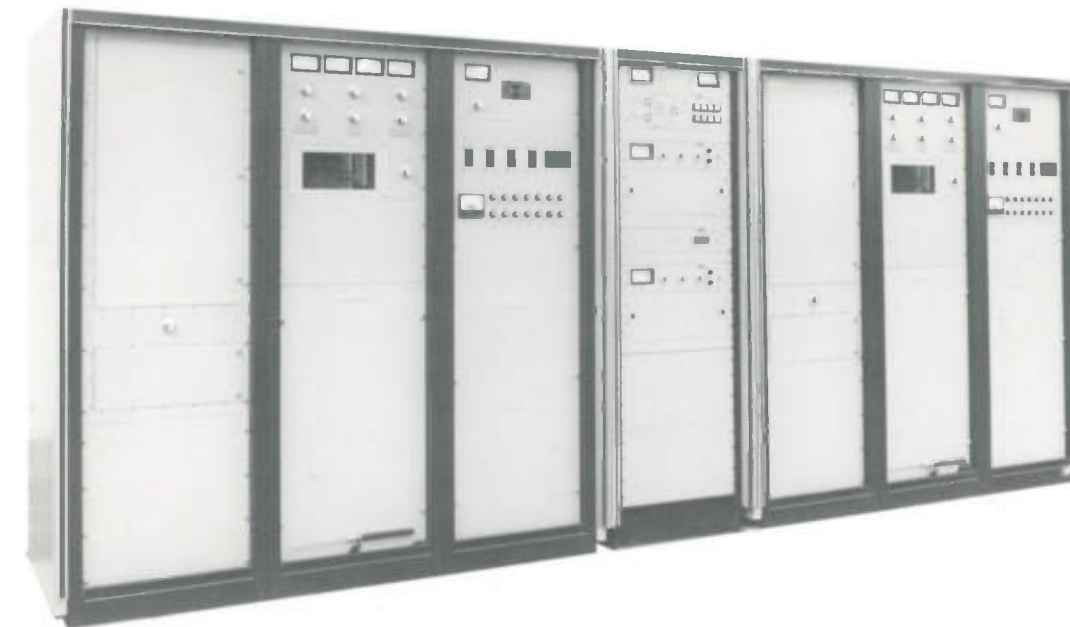
Each phase voltage shall be within 5% of the average of all three phases

### Size

1752 mm (68<sup>15</sup>/<sub>16</sub>" ) H;  
1816 mm (71<sup>1</sup>/<sub>2</sub>" ) W;  
698.5 mm (27<sup>1</sup>/<sub>2</sub>" ) D

### Weight

Approximately 890 kg (1962 lb)



Type 817R-1 50 kW transmitter

Continental Electronics

CONTINENTAL ELECTRONICS MFG. CO. BOX 270879 DALLAS, TEXAS 75227 (214) 381-7161



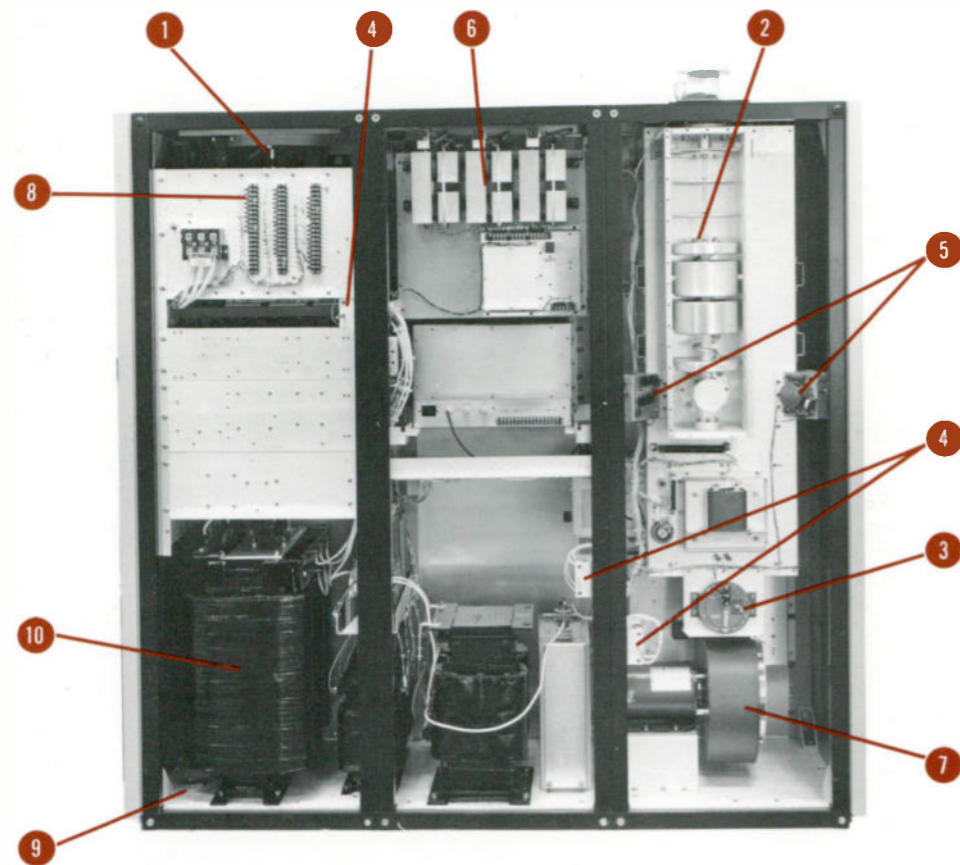
CONTINENTAL HIGH-POWER  
20, 25, 40 and 50 KW FM  
BROADCAST TRANSMITTERS

FM

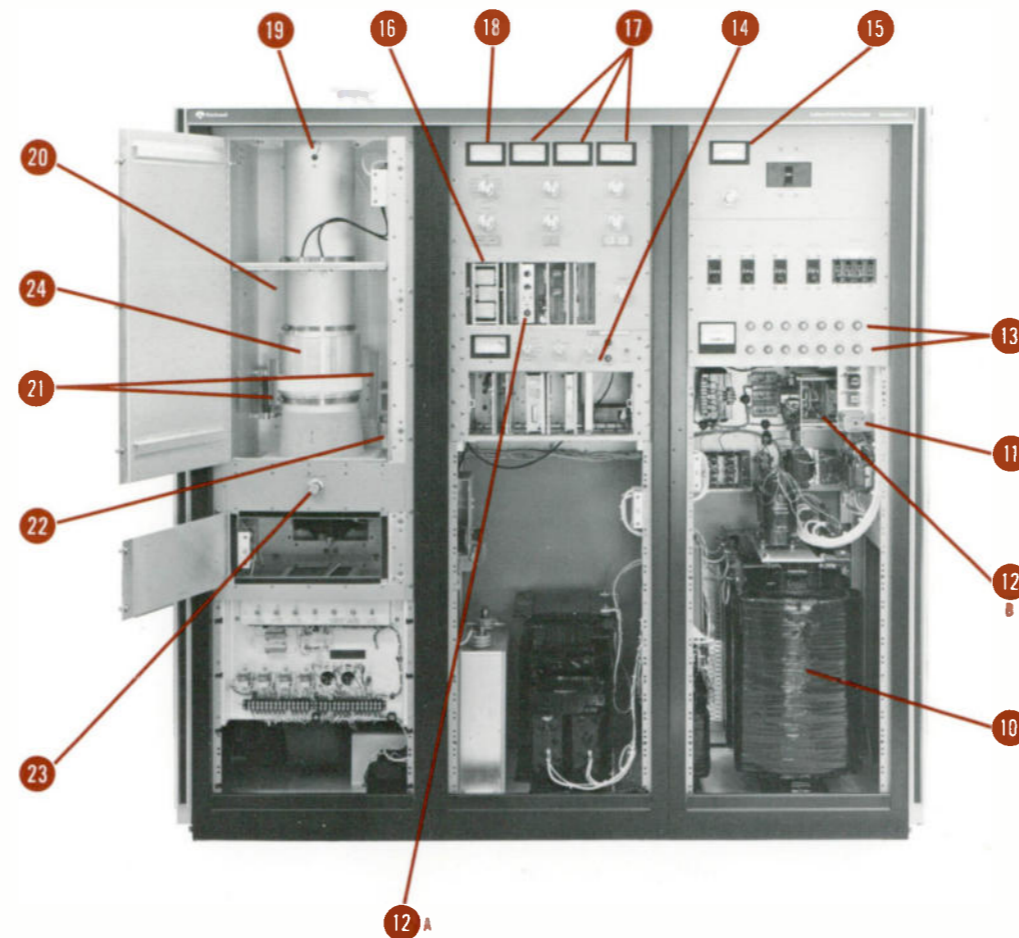


Continental Electronics





1. CABINET FLUSHING BLOWER. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. HARMONIC FILTER. The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. AIR SWITCH. Located here for easy access.
4. INTERLOCKS. Located at doors and access panels, these interlocks automatically short out high voltage when opened.
5. TUNING AND LOADING MOTORS. These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. SCR CONTROL. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Features exclusive "soft start," which initially brings up the transmitter gently.
7. PA BLOWER. 1-hp PA exhaust blower moves 535 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. REMOTE CONTROL CONNECTORS. Conveniently located for simple setup.
9. POWER WIRE (Bottom Entry). We also have a place for top entry, whichever is best for you.
10. POWER SUPPLY. A self-contained integral part of the transmitter



11. PHASE MONITOR. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. FILAMENT VOLTAGE REGULATOR. Keeps constant filament voltage to the PA tube to maximize tube life.  
A. CONTROL CARD  
B. CONTROL DRIVE ASSEMBLY
13. INDICATOR FUSES AND CIRCUIT BREAKERS. There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. 310Z-2 EXCITER. What can we say? It's so good we gave it a separate section in this brochure.
15. TRUE RMS IRON VANE METER AND 150-A AC MAINS CIRCUIT BREAKER. The meter will give you readings on each of the three ac voltage phases, as well as filament voltage.
16. LED-EQUIPPED CARD CAGE. Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. CONTINUOUS READOUT METERS. At a glance you'll know plate current, plate voltage, and output power.
18. DC MULTIMETER. Eleven operating parameters at the turn of a dial.
19. PA EXHAUST STACK TEMPERATURE SENSOR. Redundant backup to the air flow switch protects the final if cooling air is lost or overdissipation occurs.
20. WIDE-BAND 1/4-WAVE CAVITY. A proven feature for greater reliability.
21. TUNING AND LOADING CONTROLS. An exclusive motorized feature for easy adjustments.
22. STATIC DRAIN CHOKE. Bleeds off static buildup in transmission lines or antennas.
23. DRIVER PLATE ADJUSTMENT. A single control tunes the driver plate. It's another way to make your work easier.
24. FINAL. The 4CX15000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. Our unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.

## CONTINENTAL HIGH POWER FM TRANSMITTERS ARE EASY TO INSTALL AND OPERATE

### FAST INSTALLATION

- For domestic shipments (USA), all components are in-place and interconnected
- AC power, audio inputs, monitoring outputs and transmission line hookups are direct and thru cabinet top
- 28-volt dc power supply is built-in for optional remote control
- Harmonic filter is in-place and ready to operate

### PROVEN POWER AMPLIFIER

- 4CX15000A
- Standard filament voltage regulator
- Grounded screen
- No screen by-pass capacitors
- Simple screen neutralization
- Excellent stability

### MODERN, PROVEN CONTROL CIRCUITS

- Safe, reliable 28-volt dc
- SCR power control brings transmitter up to full power gently (exclusive "soft-start")
- LED status indicators for control ladder
- Automatic power output control assures steady, constant signal to the antenna
- Motor drive plate and loading controls

### 23 PROTECTION CIRCUITS AND INDICATORS

- Fused ac and dc exciter protection
- Selectable 2 or 4-shot overloads PA Plate  
PA Screen  
Driver Plate  
VSWR
- Phase loss/rotation protection
- Air pressure loss protection
- Overtemperature protection
- Indicator fuses for bias power supply; cabinet fan; FM exciter; power control; tube filaments
- Magnetic circuit breakers for ac mains supply; plate supply; screen supply; driver supply; 28-volt dc supply; and blowers

- Automatic overload recycle
- Automatic momentary power interrupt recycle
- Safety interlocks

### HUMAN-ENGINEERED

- Compact, accessible design
- Power supply and harmonic filter are mounted in cabinet
- Controls and meters at or near eye-level for accurate adjustments
- All panels are easily removed or opened
- One person can remove or replace most components
- Indicator lights aid troubleshooting

Full specifications are shown in the transmitter specifications. Following are significant operational capabilities: IM distortion is guaranteed to be 0.5% or less in stereo, 0.25% or less in mono; harmonic distortion is normally less than 0.5% in stereo; stereo separation typically runs 40 dB or more at midband.



### TYPE 510R-1 EXCITER

Continental's Type 510R-1 offers superb auto performance and unmatched field reliability. Its predecessors, like the 310Z-2, have been used in more than 700 installations throughout the world. The Type 510R-1 is a direct FM exciter that uses a phase locked loop AFC to provide typical frequency stability of  $\pm 100$  Hz at any modulation level, regardless of program material. Complete metering facilities on the front panel include a peak reading meter to measure audio level. Plug-in modules facilitate in-field servicing. The 510R-1 will accept a composite STL input and any of the proposed discrete quad systems.

**TYPE 814B SPECIFICATIONS  
USING TYPE 802A FM EXCITER**

**GENERAL**

**Rated Power Output:**  
4.3 kW

**Power Consumption:**  
8.7 kW, nom.

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
±250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
1-5/8" EIA Flange

**VSWR:**  
2:1, max.

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
±150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

**Exciter:**  
Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**  
-80 dB, min.

**Power Supply Rectifiers:**  
Silicon

**MONAURAL OPERATION**

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 volts peak-to-peak) at 600 ohms for ±75 kHz deviation

**Audio Frequency Response**  
±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.1% max.; 20 Hz to 15 kHz (Measured with spectrum analyzer.)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB min. below ±75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
55 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
50 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis; FM modulation ±75 kHz at 400 Hz

**WIDEBAND OPERATION**

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nom.

**Composite Input Level:**  
1.25 volts RMS (3.54 volts peak-to-peak) for ±75 kHz deviation

**Composite Amplitude Response:**  
±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
0.1% max.

**Composite Intermodulation Distortion:**  
0.08% or less, 60 Hz/7 kHz 4:1 ratio

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
50,000 ohms, nom.

**SCA Input Level:**  
1.25 volts RMS for ±7.5 kHz deviation

**SCA Amplitude Response:**  
±0.3 dB, 40 kHz to 100 kHz

**STEREO OPERATION**

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% max.; 50 Hz to 15 kHz (Measured with a spectrum analyzer)

**Intermodulation Distortion:**  
0.15% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**  
-70 dB referenced to 400 Hz, 75 kHz deviation; measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**  
-55 dB

**SCA OPERATION**

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and /or 92 kHz):**  
-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**  
-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**  
-50 dB, SCA reference deviation, 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

**ELECTRICAL**

**Power Source:**  
200 to 250 volts ac; 60 Hz, single phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request

**Permissible Line Voltage Variation:**  
±5%

**Filament regulator:**  
±1% of optimum

**OPERATING ENVIRONMENT**

**Altitude Range:**  
0 to 7,500 ft. (0 to 2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit

**Ambient Temperature Range:**  
-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
0 to 95%

**MECHANICAL**

**Size, as shown:**  
69" (175 cm) H x 34-3/4" (88.3 cm) W x 33- 3/8" (61 cm) D

**Weight:**  
1025 lb (466 kg) nom.

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Continental Electronics

a Division of Varian Associates, Inc.



**Top performance with a proven design**

**Overview**

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- Filament Voltage Regulator
- True RMS Filament Voltage Metering
- ac Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Internal Diagnostics
- Solid State IPA

**General description**

Continental's Type 814B is a high performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal.

With an output power of 4,300 watts, it has an adequate power reserve for Class A FM operation using a two-bay antenna system.

The transmitter is all solid-state, including a 120 watt intermediate power amplifier, except for a single tube in the final amplifier.

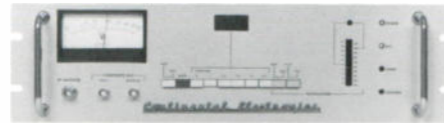
The RF chain consists of a Continental Type 802A 50 watt exciter and the solid-state 120 watt IPA driving a 4CX3500A tetrode tube in the final amplifier.

The output network consists of a fore-shortened quarter-wave coaxial resonator and harmonic filter.

IC logic is used for all control functions. A computer-like memory, powered by battery back-up, restarts the transmitter after a power failure.

The 814B is completely self-contained in one cabinet, including harmonic filter.

In keeping with the tradition of other Continental transmitters, the Type 814B uses husky components and is built to give many years of reliable service.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**The ultimate FM exciter**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from the front of the exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watt broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

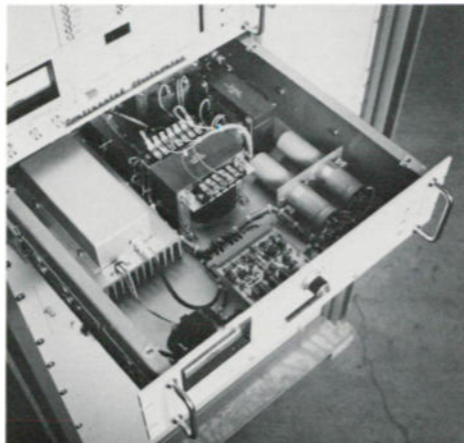
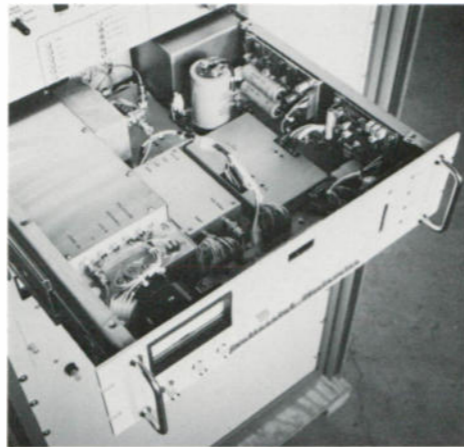
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

**Modular construction**

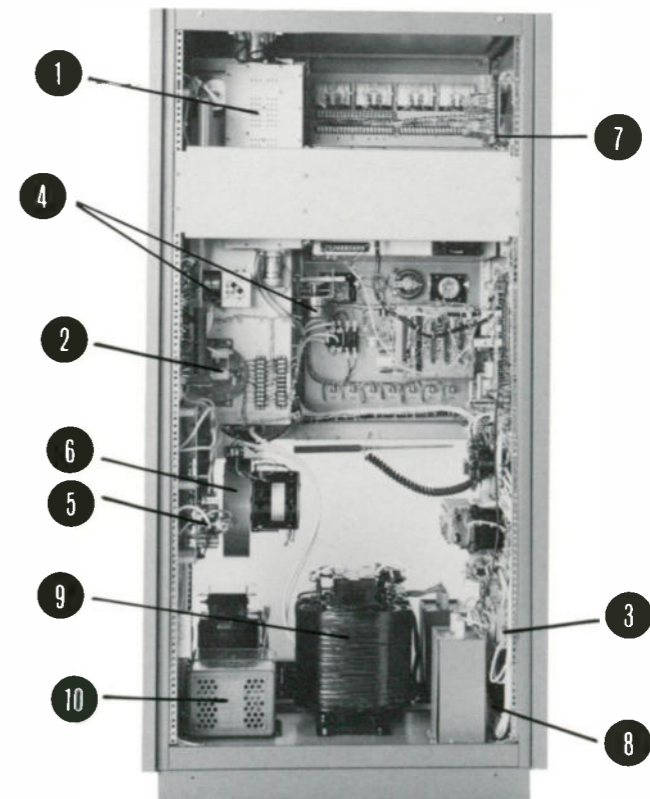
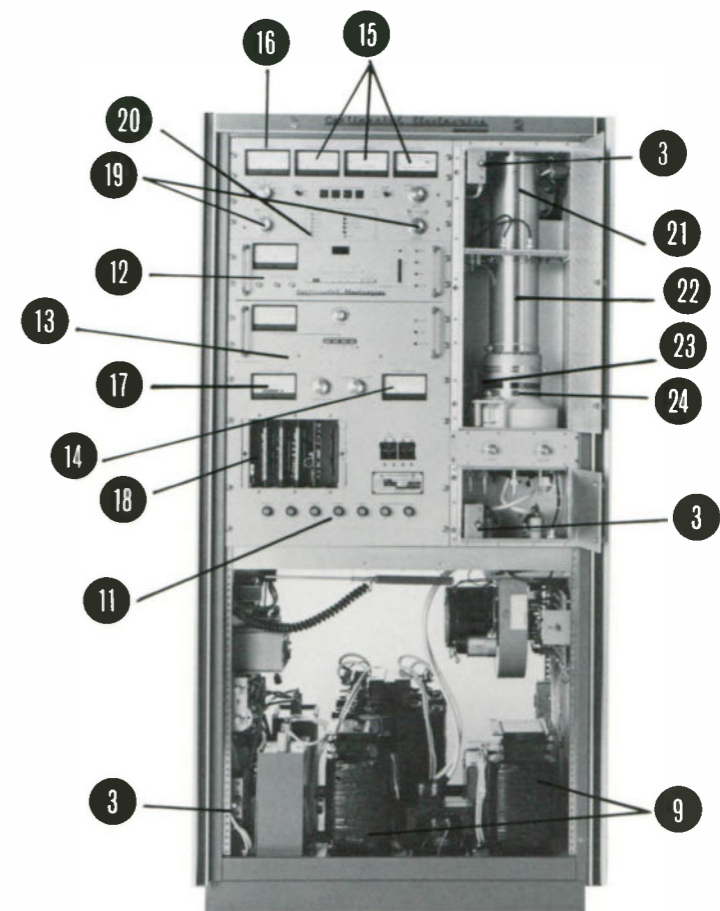
Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



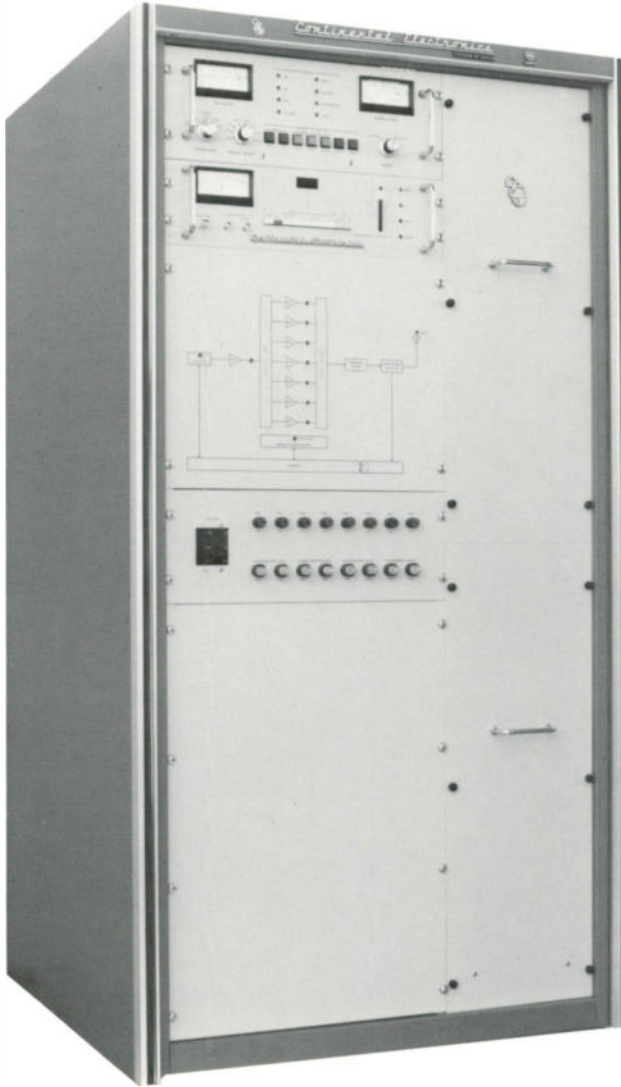
All exciter and IPA components are easily reached from in front of the transmitter. Both exciter and IPA drawers are mounted on tracks for easy access. Top picture shows 802A Exciter with cover removed; bottom picture shows IPA with cover removed.

**THE INSIDE STORY**

1. Harmonic filter. The fully contained harmonic filter inside cabinet makes installation easier; does not require extra space at transmitter location.
2. Air switch.
3. Interlocks. Located at doors and access panels, interlocks automatically short-out high voltage when opened.
4. Tuning and loading motors. These motors and connecting capacitor plates are the only moving parts in the PA.
5. SCR control. Single-phase control of the plate supply primary voltage with feedback maintains constant forward power output with line voltage variations. Exclusive "soft start" initially brings up the transmitter gently.
6. PA blower. PA blower moves the cooling air through the PA tube.
7. Remote control connections. Conveniently located for simple setup.
8. Power input. (bottom entry shown) Either bottom or top entry is available.
9. Power supply. A self-contained integral part of the transmitter.
10. Filament voltage regulator. A ferro-resonant CV transformer maintains constant filament voltage to the PA tube to maximize the tube life.
11. Indicator fuses and circuit breakers.
12. Type 802A Exciter.
13. Solid-state IPA. A broad band 120 watt amplifier provides ample drive to the PA.
14. True RMS iron vane filament voltmeter.
15. Continuous readout meters. Show plate current, plate voltage and output power at a glance.
16. DC multimeter. Six operating parameters at the turn of a dial.
17. Filament running hour meter.
18. Solid-state control cards. Cards for power, power monitor, tally-recycle and control circuits.
19. Tuning and loading controls. An exclusive motorized feature for easy adjustments. (With travel limit indicators)
20. LED status indicators.
21. PA exhaust stack temperature sensor. Redundant backup to the air switch protects the final amplifier tube if cooling air is lost or overdissipation occurs.
22. Wide-band 1/4-wave cavity. A proven feature for greater reliability.
23. Static drain choke. Bleeds-off static build-up in transmission lines or antennas.
24. Final Amplifier. A rugged 4CX3500A tetrode.
25. Cabinet flushing fan. (not shown in photos) Fan, mounted on transmitter cabinet's removable back panel, delivers approximately 600 cfm to maintain positive cabinet pressure; has disposable filter.



**New!**  
**Solid-state 3.8 kW**  
**FM Transmitter**



Type 814C, 3.8 kW FM Transmitter

#### Overview

- 100% Solid-state
- One Single-phase Power Supply
- Plug-in Modules
- VSWR Protection Circuit
- 100% Self-protected Solid-state Modules
- Designed for Unattended Operation
- Easy Maintenance

#### General Description

Continental's Type 814C is a compact, high performance transmitter that uses the Type 802A exciter to deliver a crisp, clean signal.

The transmitter design is based on a 700 watt broadband amplifier module and utilizes a splitter/combiner technique to achieve the rated output of 3,800 watts.

The RF chain consists of a Type 802A 50 watt solid-state exciter driving a solid-state amplifier module which serves as the IPA. The output of the IPA is split seven ways to drive seven amplifier modules. The seven PA modules function as the power amplifier: their outputs are combined and treated as the transmitter's final power amplifier stage.

All modules are self-protected from excessive power supply voltage, VSWR overload, excessive drive power and high temperature.

One single-phase power supply powers all eight power modules: the IPA and seven power amplifiers. The power supply is fed by a pair of gated SCRs to allow control of the supply output voltage.

All transmitter controls, interface circuits and metering are housed in a self-contained control module which slides out on tracks for easy access. The control module is designed for local or remote operation.



**PRELIMINARY DATA FOR TYPE 814C (transmitter meets or exceeds all FCC requirements)**

**SPECIFICATIONS  
USING TYPE 802A EXCITER**

**GENERAL**

**Rated Power Output:**  
3.8 kW

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis  
from high stability master oscillator

**Frequency Stability:**  
± 250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
1-5/8" EIA flange

**VSWR:**  
2:1, max.

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
± 150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak  
level of modulation signal in 5% incre-  
ments with accuracy better than ± 2%

**Exciter:**

Solid-state unit with variable output  
of 5 to 50 watts; has self-contained  
harmonic filter

**RF Harmonic Attenuation:**  
- 80 dB, min.

**Power Supply Rectifiers:**  
Silicon

**MONAURAL OPERATION**

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+ 10 dBm (6.93 volts peak to peak) at  
600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**  
± 0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

**WIDEBAND OPERATION**

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nom.

**Composite Input Level:**  
1.25 volts RMS (3.54 volts peak to  
peak) for ± 75 kHz deviation

**ELECTRICAL**

**Power Source:**

200 to 250 volts ac; 60 Hz single phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 volts ac; 50 Hz is  
available on request

**Permissible Line Voltage Variation:**  
± 5%

**OPERATING ENVIRONMENT**

**Altitude Range:**

Sea level to 7,500 ft (0 to 2286 m) stan-  
dard; optional to 10,000 ft (3048 m) with  
modification kit

**Ambient Temperature Range:**

- 20° C to + 50° C (- 4° F to + 122° F)

**Relative Humidity:**

0 to 95%

**MECHANICAL**

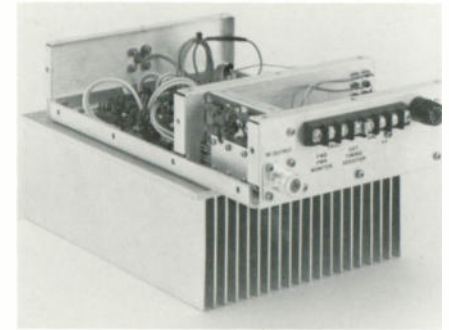
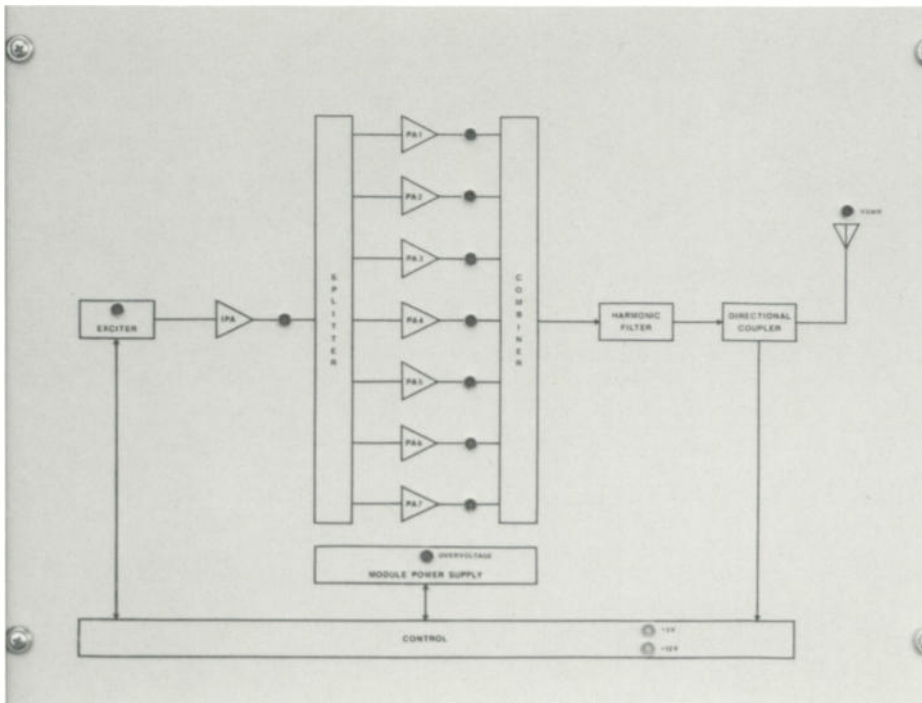
**Size, as shown:**

69" (175 cm) H x 34-3/4" (88.3 cm) W x  
33-3/8" (61 cm) D

**Weight:**

Approx. 1,000 lb (450 kg)

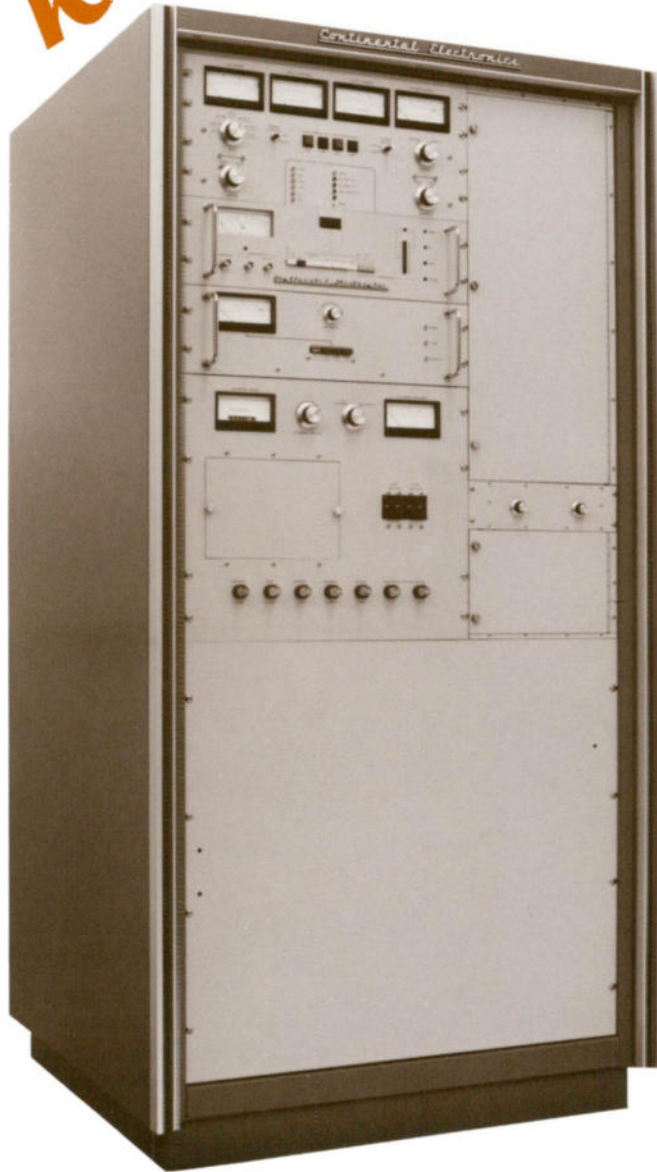
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Above: one of the eight power modules with cover removed. Left: front panel of transmitter has LED display to show status of RF chain.

**New!**  
**5 kW FM**

CONTINENTAL  
TYPE 815A, 5 KW FM  
BROADCAST TRANSMITTER | **FM**



Type 815A 5 kW FM Transmitter

Continental's Type 815A is a high performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal.

With an output power of 5,000 watts, it has an adequate power reserve for Class A FM operation using a two-bay antenna system.

The transmitter is all solid-state, including a 120 watt intermediate power amplifier, except for a single tube in the final amplifier.

The RF chain consists of a Continental Type 802A 50 watt exciter and the solid-state 120 watt IPA driving a 4CX3500A tetrode tube in the final amplifier.

The output network consists of a fore-shortened quarter-wave coaxial resonator and harmonic filter.

IC logic is used for all control functions. A computer-like memory, powered by battery back-up, restarts the transmitter after a power failure.

The 815A is completely self-contained in one cabinet, including harmonic filter.

In keeping with the tradition of other Continental transmitters, the Type 815A uses husky components and is built to give many years of reliable service.

**Brief Overview Of Transmitter**

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- Filament Voltage Regulator
- True RMS Filament Voltage Metering
- ac Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Internal Diagnostics
- Solid-State IPA

## TYPE 815A SPECIFICATIONS USING TYPE 802A FM EXCITER

### GENERAL

**Rated Power Output:**  
5 kW

**Power Consumption:**  
9.7 kW, nom.

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis  
from high stability master oscillator

**Frequency Stability:**  
±250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
1-5/8" EIA Flange

**VSWR:**  
2:1, max.

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
±150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of  
modulated signal in 5% increments with  
accuracy better than ±2%

**Exciter:**  
Solid-state unit with variable output of 5 to 50  
watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**  
-80 dB, min.

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 volts peak-to-peak)  
at 600 ohms for ±75 kHz deviation

**Audio Frequency Response**  
±0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% max.; 20 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB min. below ±75 kHz deviation at 400 Hz,  
measured within a 20 Hz to 15 kHz bandwidth  
with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
55 dB RMS below carrier; reference: 100% AM  
modulation, full power at 400 Hz with 75 micro-  
second de-emphasis, no FM modulation

**Synchronous AM S/N Ratio  
(Incidental AM Noise):**  
50 dB below carrier; reference: 100% AM  
modulation, full power at 400 Hz with 75  
microsecond de-emphasis, FM modulation  
±75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nom.

**Composite Input Level:**  
1.25 volts RMS (3.54 volts peak-to-peak)  
for ±75 kHz deviation

**Composite Amplitude Response:**  
±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
0.1% max.

**Composite Intermodulation Distortion:**  
0.1% or less, 60 Hz to 7kHz, 4:1 ratio

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
50,000 ohms, nom.

**SCA Input Level:**  
1.25 volts RMS for ±7.5 kHz deviation

**SCA Amplitude Response:**  
±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are  
determined primarily by the Stereo Generator  
used. The following specifications are  
influenced by the RF system and assume that a  
state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB min.; 50 Hz to 15 kHz (60 dB or better,  
400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% max.; 50 Hz to 15 kHz  
(Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**  
-72 dB referenced to 400 Hz, 75 kHz  
deviation. Measured with 75 microsecond  
de-emphasis within a 20 Hz to 15 kHz  
bandwidth.

**Linear Crosstalk:**  
-55 dB

### SCA OPERATION

Most SCA performance parameters are  
determined primarily by the SCA generator  
used. The following specifications are  
influenced by the RF System and assume that a  
state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo  
(67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, Main 75  
microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA  
(67 kHz and/or 92 kHz):**

-50 dB, Main and Stereo 75 kHz deviation;  
SCA reference deviation, 5 kHz and 200 Hz  
modulation; SCA de-emphasis, 150  
microsecond

**Crosstalk SCA to SCA  
(67 kHz and/or 92 kHz):**  
-50 dB, SCA reference deviation 5 kHz and  
200 Hz modulation frequency; de-emphasis,  
150 microsecond

### ELECTRICAL

**Power Source:**  
200 to 250 volts ac; 60 Hz, single phase;  
available transformer taps are 200, 210, 220,  
230, 240, 250 volts ac; 50 Hz available on  
request

**Permissible Line Voltage Variation:**  
±5%

**Filament regulator:**  
±1% of optimum

### OPERATING ENVIRONMENT

**Altitude Range:**  
0 to 7,500 ft (0 to 2286 m) standard; optional  
to 10,000 ft (3048 m) with modification kit

**Ambient Temperature Range:**  
-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
0 to 95%

### MECHANICAL

**Size, as shown:**  
69" (175 cm) H x 34-3/4" (88.3 cm) W x  
33-3/8" (61 cm) D

**Weight:**  
1050 lb (477 kg) est.

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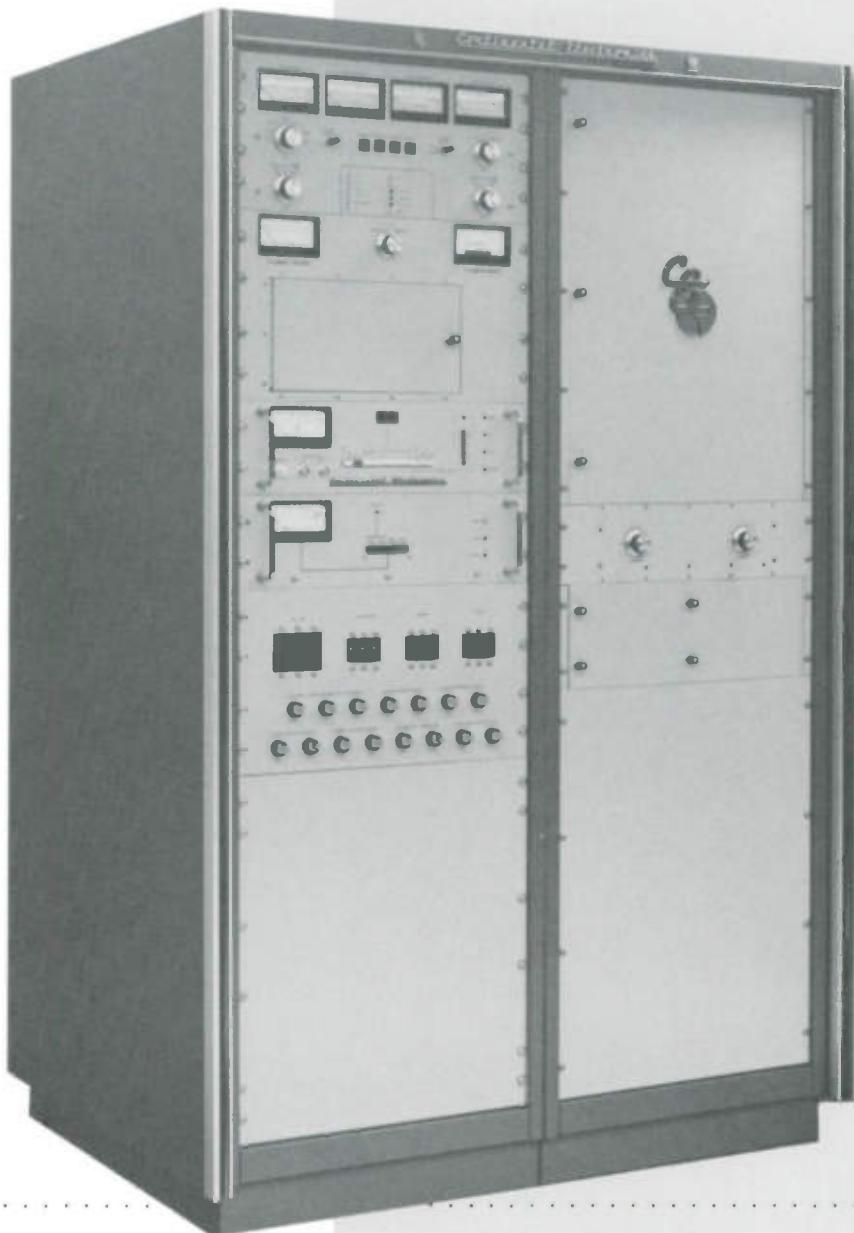
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**CONTINENTAL'S  
TYPE 816A 11KW FM  
BROADCAST  
TRANSMITTER**

*fm*



## SPECIFICATIONS

### ► GENERAL

**Rated Power Output:**

11 kW (11.5 kW Max.)

**Power Consumption:**

17.8 kW, nom. (at 10 kW)

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**

± 250 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

3<sup>1</sup>/<sub>8</sub>" EIA Flange

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

± 150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ± 2%

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**

- 80 dB, min.

**Power Supply Rectifiers:**

Silicon

### ► MONAURAL OPERATION

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+ 10 dBm (6.93 volts peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response**

± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% max.; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB min. below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

50 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

### ► WIDEBAND OPERATION

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nom.

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**

± 0.1 db, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

.08% max.

**Composite Intermodulation Distortion:**

.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

15,000 ohms, nom.

**SCA Input Level:**

1.25 volts RMS for ± 7.5 kHz deviation

**SCA Amplitude Response:**

± 0.3 dB, 40 kHz to 100 kHz

### ► STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% max.; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**

- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**

- 55 dB

### ► SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

- 60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

- 50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**

- 50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

### ► ELECTRICAL

**Power Source:**

200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request

**Permissible Line Voltage Variation:**

± 5%

**Filament regulator:**

± 1% of optimum

### ► OPERATING ENVIRONMENT

**Altitude Range:**

0 to 7,500 ft. (0 to 2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit

**Ambient Temperature Range:**

- 20°C to + 50°C (- 4°F to + 122°F)

**Relative Humidity:**

0 to 95%

### ► MECHANICAL

**Size, as shown:**

69" (175.26 cm) H x 45" (114.3 cm) W x 34" (86.36 cm) D

**Weight:**

1200 lb. (544 kg) est.

All specifications are subject to change without notice.

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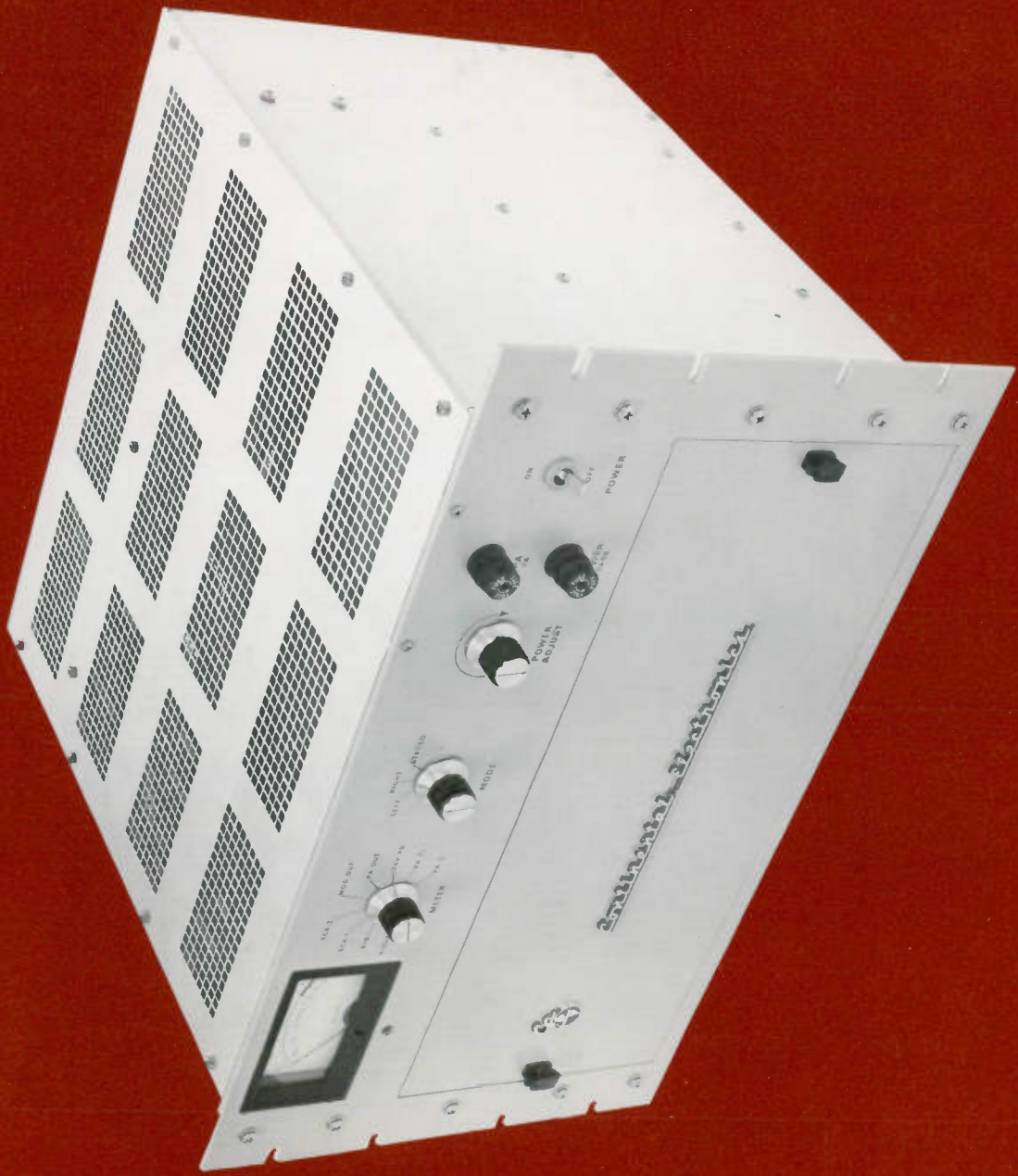
P.O. Box 270879 Dallas, Texas 75227

Telephone: 214-381-7161 Telex: 73-398 Fax: 214-381-4949



CONTINENTAL TYPE 510R-1 (310Z-2)  
FM EXCITER

FM



*Continental Electronics*

**Continental's Type 510R-1 is universally accepted; thoroughly field-proven.**

Continental's Type 510R-1 offers superb audio performance and unmatched field reliability. Its predecessor, the 310Z-2, it used in more than 700 installations throughout the world.

The Type 510R-1 is a direct FM exciter that uses a phase locked loop AFC to provide frequency stability of  $\pm 500$  Hz at any modulation level, regardless of program material. Complete metering facilities on the front panel include a peak reading meter to measure audio level. Plug-in modules facilitate in-field servicing. The 510R-1 will accept a

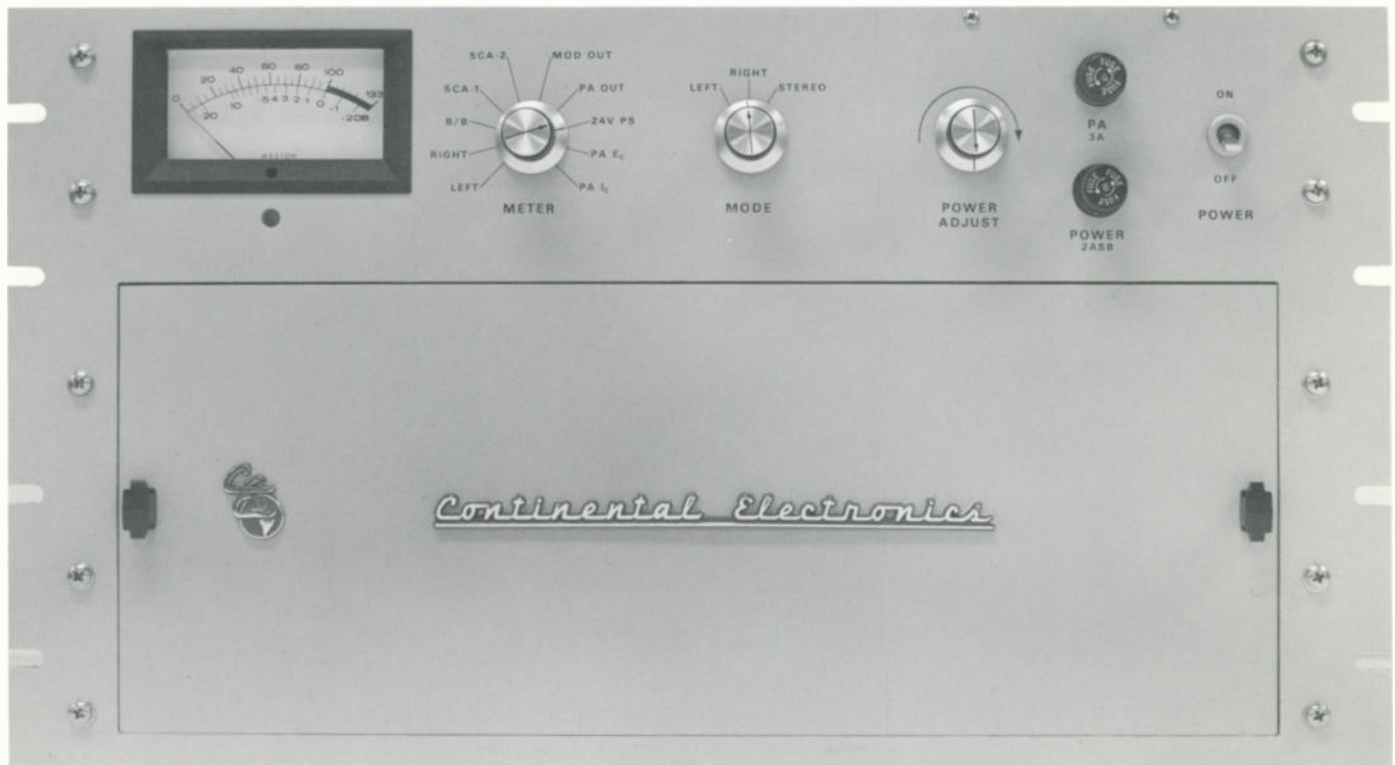
composite STL input on any of the proposed discrete quad systems.

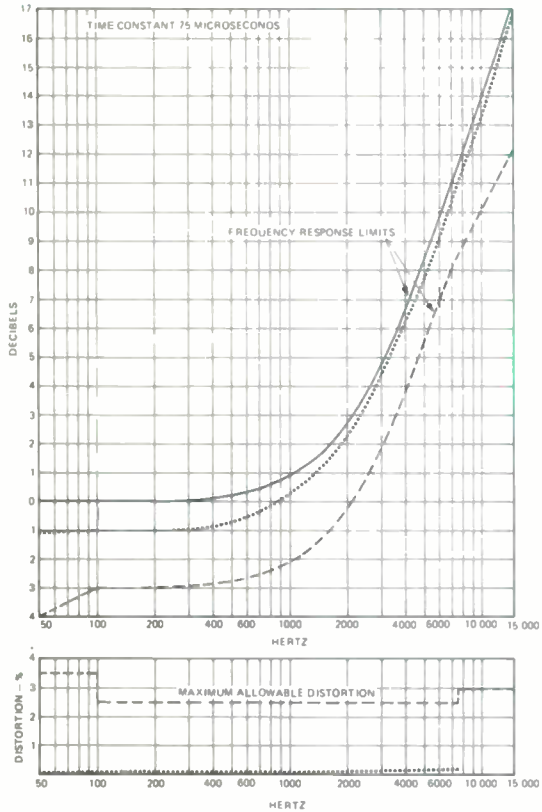
The Type 510R-1 is the exciter used in all Continental FM transmitters. It offers broadcasters these outstanding advantages:

- Completely solid state for improved reliability.
- Accepts any modulating frequency up to 100 kHz, improving performance for any application.
- Has no frequency multipliers to compound oscillator drift. Output frequency is crystal-controlled for rock-solid stability.
- The 510R-1 is prewired to accept an optional stereo (786V-1) and/or the SCA (786W-2)

generator. Both are available in the form of plug-in modules and may be added in seconds. A 785E-1 card also accepts a baseband input from a composite source.

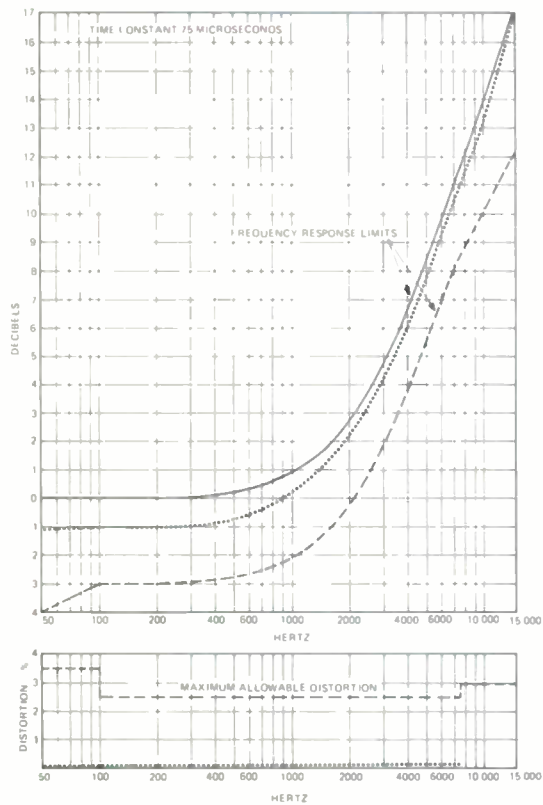
Continental's Type 510R-1 exciter can also be used to drive other FM transmitters; thus providing an opportunity to upgrade the performance of existing equipment at minimum cost. The current, less stringent FCC regulations, requiring only an informal application, now make this type of phased upgrade program easier than ever before.



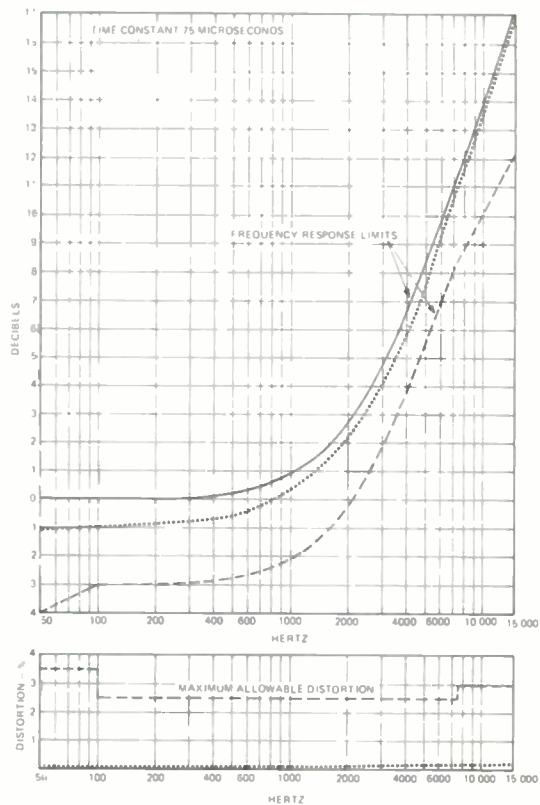


**Stereo: Right Channel Response and THD**

When you compare FCC requirements for maximum allowable distortion with Continental's typical distortion performance, you'll see that the Type 510R-1 exciter not only meets the specifications, but far exceeds them. We guarantee 0.5% IM Distortion in stereo and half that in monaural.



**Stereo: Left Channel Response and THD**



**Monaural Response and THD**

# SPECIFICATIONS

## GENERAL

Ambient Temperature Range ..... 0° to 55°C (32° to 131°F)  
Ambient Humidity Range ..... Up to 95%  
Maximum Altitude ..... 2300 m (7500 ft)  
Input Power Requirement ..... 117/234 volts ac,  
± 10%, single phase, 50/60 Hz

RF Power Output ..... 3 to 20 watts  
Output Impedance ..... .50 ohms unbalanced  
Output Frequency Range ..... 88 to 108 MHz, crystal-controlled  
(crystal installed and exciter adjusted  
at factory to meet customer requirement)

Carrier Frequency Stability ..... Within ±500 Hz with  
ac line voltage of ±10% and  
temperature range 0° to +55°C (32° to 131°F)

Carrier Frequency Control ..... Phase-locked modulated  
oscillator operating at the output frequency  
Harmonic and Spurious Radiation ..... Any emission appearing  
on a frequency removed from the carrier by  
between 120 and 240 kHz is attenuated at least  
30 dB below the level of the unmodulated carrier

Any emission appearing on a frequency removed  
from the carrier by more than 240 kHz up to and  
including 600 kHz is attenuated at least 35 dB  
below the level of the unmodulated carrier

Any emission appearing on a frequency removed  
from the carrier by more than 600 kHz is attenuated  
at least 80 dB below the level of the unmodulated carrier,  
with the exception of harmonics of the rf carrier

Type of Modulation ..... Direct frequency modulation  
Modulating Frequencies ..... 20 Hz to 100 kHz  
Modulation Capability ..... ±150 kHz  
AM Noise Level ..... 55 dB below carrier level  
(70 dB typical)

## MONAURAL FM

Audio Input Impedance ..... .600 ohms balanced  
Audio Input Levels .....  
Monaural ..... +10 ±2 dBm for 100% modulation  
SCA ..... -10 to +15 dBm adjustable from  
0% to 10% injection (67kHz and/or  
41 kHz available)

Frequency Response ..... Standard 75-microsecond pre-emphasis;  
others optional

Distortion ..... .Not more than 0.25% thd  
(total harmonic distortion)  
(typical 0.1% thd)

Intermodulation Distortion ..... Not more than 0.25% imd  
(typical 0.1%)

FM Noise Level ..... 65 dB below 100% modulation  
(70 dB typical)

AM Noise Level ..... 55 dB below carrier level  
(70 dB typical)

## STEREO FM WITH 786V-1

Audio Input Impedance ..... .600 ohms balanced  
Audio Input Levels ..... +10 ±2 dBm for 100% modulation  
Frequency Response ..... Standard 75-microsecond pre-emphasis  
for both right and left channels; others optional

Distortion ..... .Not more than 0.5% thd for 50 Hz  
to 15-kHz audio modulation (typical 0.25% thd)  
Not more than 0.5% imd (typical 0.25%)

## Stereophonic Subcarrier and

Pilot Carrier Phasing ..... Phase difference between the  
stereophonic subcarrier and pilot carrier is within the  
limits required for channel separation of more than 35 dB  
with audio-modulating frequencies of 50 Hz to 15 kHz

Stereo Channel Separation ..... At least 35 dB, 50 Hz to 15 kHz  
(typical 40 dB or better)

Crosstalk ..... At least 45 dB below either single-channel level  
(main-to-subcarrier and subcarrier-to-main)  
(typical 50 dB)

38-kHz Stereo Subcarrier Suppression ..... 45 dB below 90%  
modulation of the main carrier (typical 55 dB)

Pilot Carrier Frequency ..... 19 kHz ± 2 Hz

Pilot Carrier Level ..... Adjustable from 0% to 12%  
modulation of main carrier

## SCA

Audio Level ..... -10 to +15 dBm

Injection Level ..... 0% to 10% adjustable

Frequency ..... 67 kHz only

## FM Noise Level

Left Channel ..... 65 dB below 100% modulation  
(68 dB typical)

Right Channel ..... 65 dB below 100% modulation  
(68 dB typical)

AM Noise ..... 55 dB below carrier (typical 70 dB)

## SCA FM WITH 786W-2

Audio Input Impedance ..... 600 ohms, balanced

Audio Input Level ..... -10 to +15 dBm

SCA Subcarrier Center Frequency ..... 67 kHz or 41 kHz (mono only)  
67 kHz (stereo)

## SCA Frequency Modulation

of Main Carrier ..... Adjustable from 0% to 10%

SCA Generator Center Frequency Stability ..... Within ±0.5%

Frequency Response ..... Standard 150-microsecond pre-emphasis

## SCA Filtering

Audio Input ..... 50 Hz to 5000 Hz low pass filter

67/41 kHz Output ..... Bandpass filter centered  
around output frequency

FM Noise Level ..... Less than -55 dB (typical 60 dB)

Distortion ..... 1.0% for 50 Hz to 5 kHz  
with 4.0-kHz deviation

Crosstalk ..... Crosstalk from main channel and  
stereo subchannel into the SCA channel shall be  
50 dB below 4.0-kHz SCA deviation. Measured with  
either 75- or 150-microsecond deemphasis.  
(typical crosstalk 55 dB)

Crosstalk from 67-kHz SCA into stereo subchannel  
shall be at least 60 dB below 100% modulation of  
main channel (5-kHz tone deviating ±4 kHz)

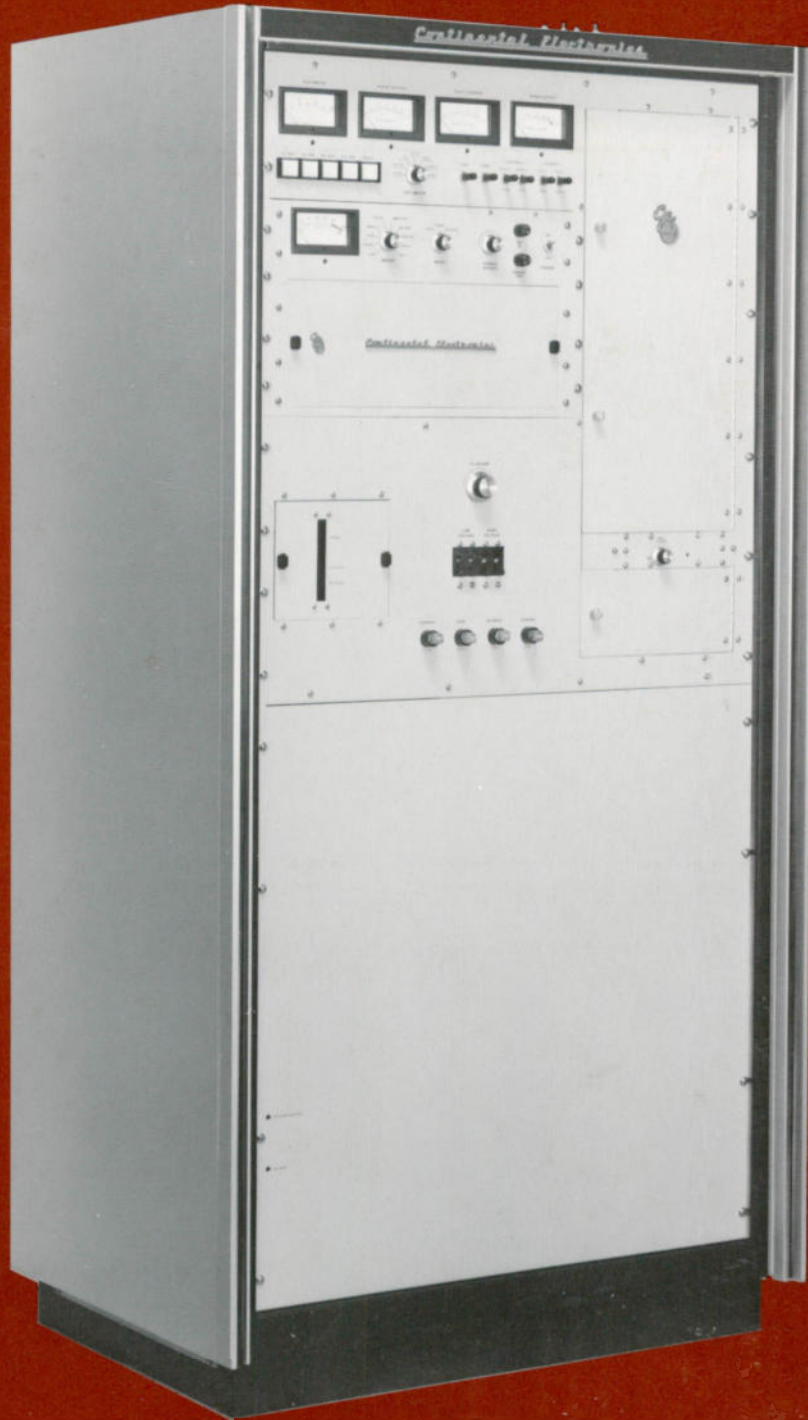
# Continental Electronics

CONTINENTAL ELECTRONICS MFG. CO. BOX 270879 DALLAS, TEXAS 75227 (214) 381-7161



CONTINENTAL LOW POWER  
1.25 and 2.5 KW FM  
BROADCAST TRANSMITTERS

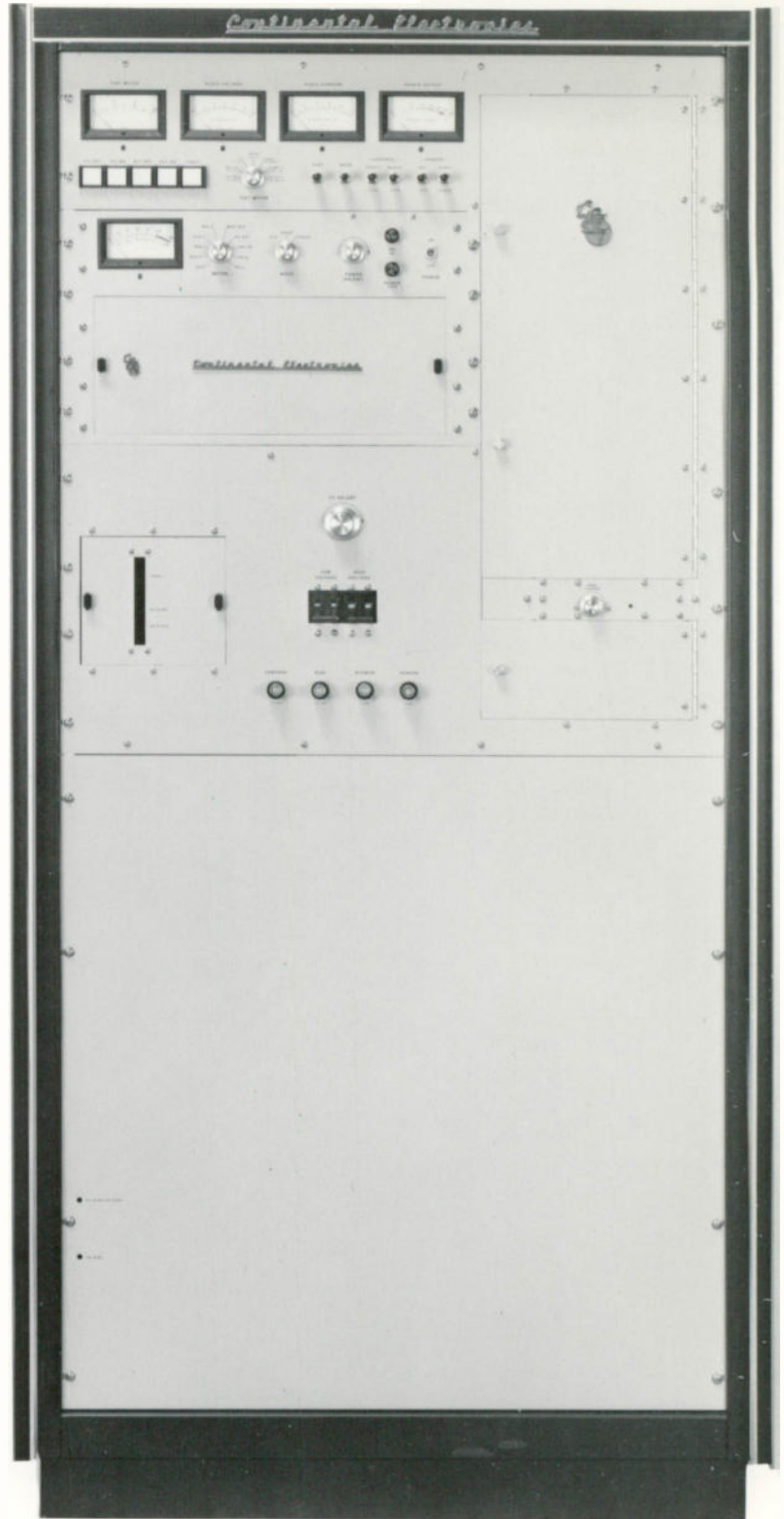
FM



Continental Electronics 

## FIELD-PROVEN FEATURES

- Lowest guaranteed intermodulation distortion
- Highest stereo separation
- Automatic power output control
- Automatic overload recycling (optional)
- VSWR protection
- Superior frequency stability
- Automatic filament voltage regulation
- Overload indicator lights
- Front panel pushbutton control
- Superior PA stability
- Proven PA design
- Built-in remote control facilities (optional)
- Front panel monitoring
- Easy access
- Compact size
- Outstanding exciter





**Type 814R-2**  
**1.25 kW FM**  
**TRANSMITTER**

Continental's 814R-2 is driven by a 510R-1 (310Z-2) exciter and delivers a crisp, clean signal. The 814R-2 utilizes automatic filament voltage regulation and automatic power control for unattended operation. Overload conditions are indicated by an LED display, and an automatic recycle option can put the transmitter back on the air immediately after an overload interruption. Continental's 814R-2 is completely contained in one 35" wide (89 cm) cabinet.

**Type 814R-1**  
**2.5 kW FM**  
**TRANSMITTER**

Continental's 814R-1 is a high-performance, state-of-the-art transmitter that uses the 510R-1 (310Z-2) exciter to deliver a crisp, clean signal. The transmitter is solid-state except for the single 5CX1500A tube in the final amplifier. The 814R-1 uses IC logic for all control functions, and incorporates a computer-like memory to restart the transmitter after a power failure. A built-in battery supply and charger enables the logic circuits to remember their state in the event of a power interruption. The transmitter utilizes automatic filament voltage regulation and automatic power control for unattended operation. Available options include remote control equipment and automatic overload/recycle system. Overload conditions are indicated by an LED display. The 814R-1 is completely contained in one 35" wide (89 cm) cabinet.



**Type 510R-1 (310Z-2) EXCITER**

Continental's 510R-1 solid-state exciter is thoroughly field-proven and has an outstanding performance record. It produces a very clean signal; stereo IM distortion is guaranteed to be 0.5% in stereo and .25% in mono.

The 510R-1 uses a phase locked loop AFC to provide typical frequency stability of  $\pm 100$  Hz at any level of modulation, regardless of program material. Front panel metering includes a peak reading meter to measure audio level. Plug-in modules facilitate servicing.

The exciter accepts a composite STL input or any of the proposed discrete quad systems.

Output frequency is crystal-controlled for exceptional stability. Output power can be controlled automatically from an external source or manually adjusted over a range of 3 to 20 watts.

## SPECIFICATIONS

**IM Distortion:**

0.25% maximum mono;  
0.5% maximum stereo

**Output Impedance:**

50 ohms vswr, 2:1  
maximum

**RF Power Output Control:**

± 2% of nominal  
(automatic)

**Frequency Range:**

88-108 MHz

**Frequency Stability:**

± 500 Hz

**Modulation Capability:**

± 100 kHz

**Audio Input Level:**

10 dBm ± 2 dB

**Audio Frequency Response:**

± 1 dB of preemphasis  
curve

**Audio Frequency Distortion:**

0.25% maximum mono;  
0.5% maximum stereo

**Stereo Separation:**

50 Hz to 15,000 Hz 35 dB  
minimum reaching 50 dB at  
mid range. Harmonic  
Attenuation: Exceeds FCC  
requirements

**FM Noise Level:**

65 dB below 100%  
modulation

**AM Noise Level:**

-55 dB rms

**Filament Regulation:**

± 1% of optimum

**Permissible Line Voltage**

**Variation:**

± 5%

	Output Power	Size			Weight	Power Source (50/60 Hz)	Max. Power Consumption (kVA @ 0.97 pF)
		H	W	D			
814 R-1	2.5kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	340 kg (750 lb)	200-250V; 1ϕ	4.9
814 R-2	1.25 kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	318 kg (700 lb)	200-250V; 1ϕ	2
510 R-1 Exciter	20 W	28 cm (11 in)	48 cm (19 in)	38 cm (15 in)	15 kg (34 lb)	117/234V; 1ϕ	0.1

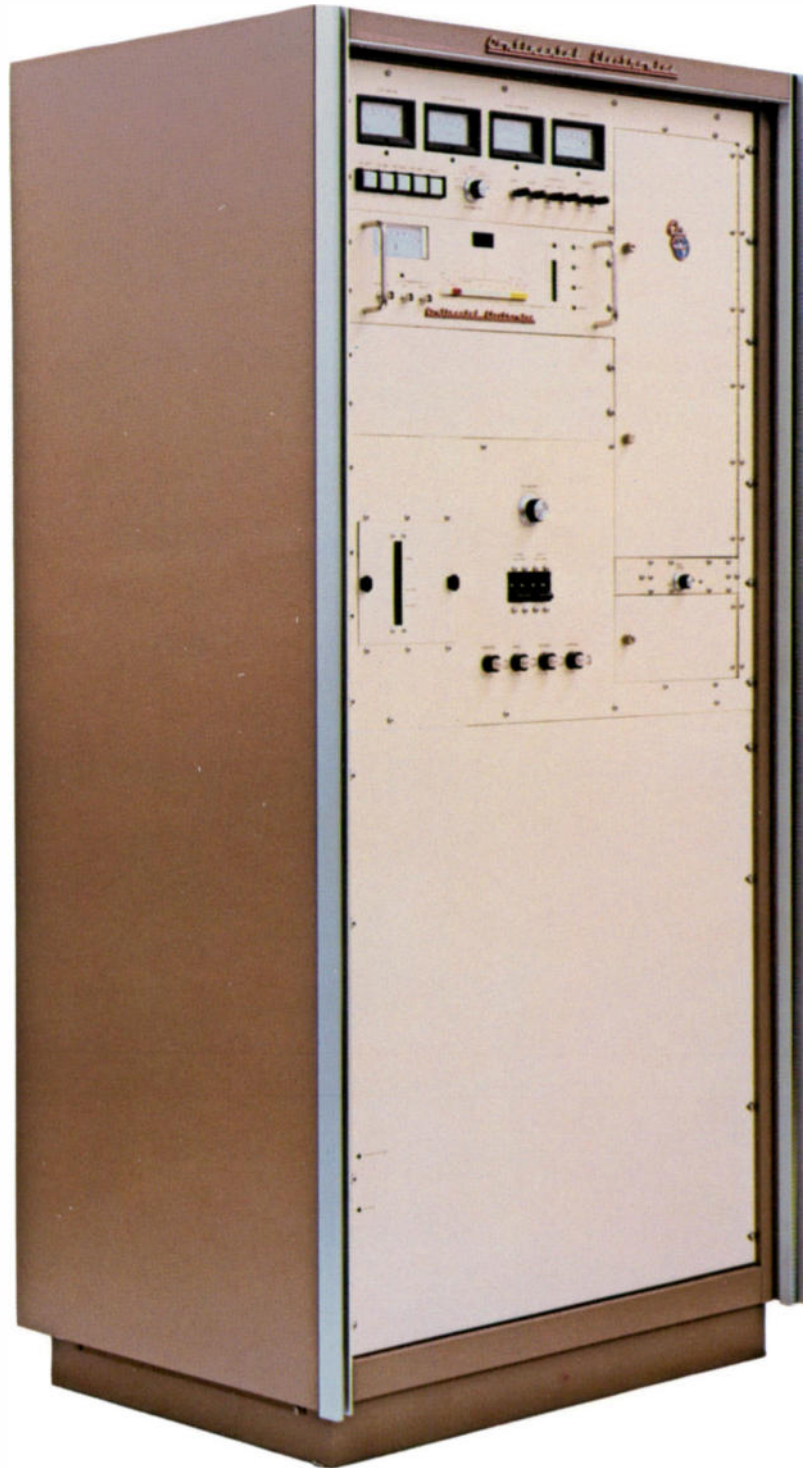
*Continental Electronics*

CONTINENTAL ELECTRONICS MFG. CO. BOX 270879 DALLAS, TEXAS 75227 (214) 381-7161



CONTINENTAL LOW POWER  
2.5 KW FM  
BROADCAST TRANSMITTERS

FM



FEATURING 802A SOLID-STATE EXCITER



Continental Electronics  
a Division of Varian Associates, Inc.

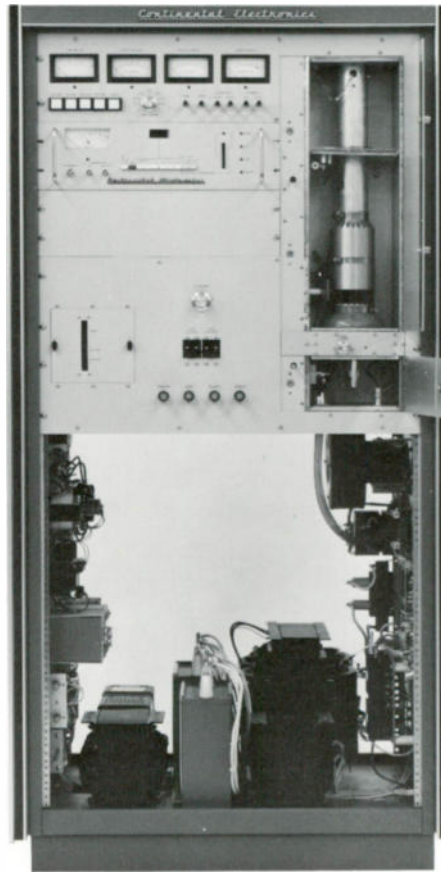
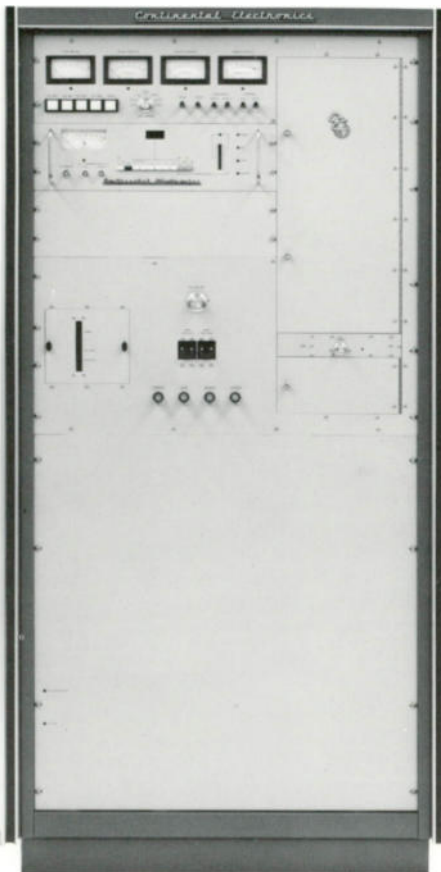


### Field-Proven Features

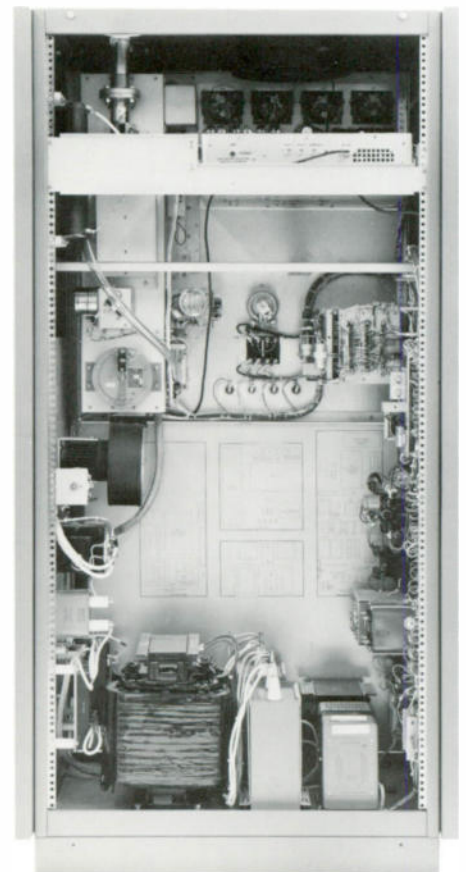
- Lowest intermodulation distortion
- Highest stereo separation
- Automatic power output control
- Automatic overload recycling
- VSWR protection
- Superior frequency stability
- Automatic filament voltage regulation
- Overload indicator lights
- Front panel pushbutton control
- Superior PA stability
- Proven PA design
- Built-in remote control facilities
- Front panel monitoring
- Easy access
- Compact size
- Outstanding exciter

### Type 814R-1 2.5 kW FM Transmitter

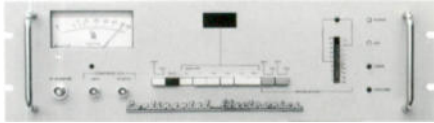
Continental's 814R-1 is a high-performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal. The transmitter is solid-state except for the single 5CX1500A tube in the final amplifier. The 814R-1 uses IC logic for all control functions, and incorporates a computer-like memory to restart the transmitter after a power failure. A built-in battery supply and charger enables the logic circuits to remember their state in the event of a power interruption. The transmitter utilizes automatic filament voltage regulation and automatic power control for unattended operation. Standard features include remote control equipment and automatic overload/recycle system. Overload conditions are indicated by an LED display. The 814R-1 is completely contained in one 35" wide (89 cm) cabinet.



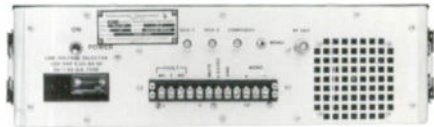
Front view, Type 814R-1  
2.5 kW FM Transmitter



Rear view, Type 814R-1  
2.5 kW FM Transmitter



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

### **Introducing the ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### **State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### **Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### **Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### **50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### **Automatic power level control**

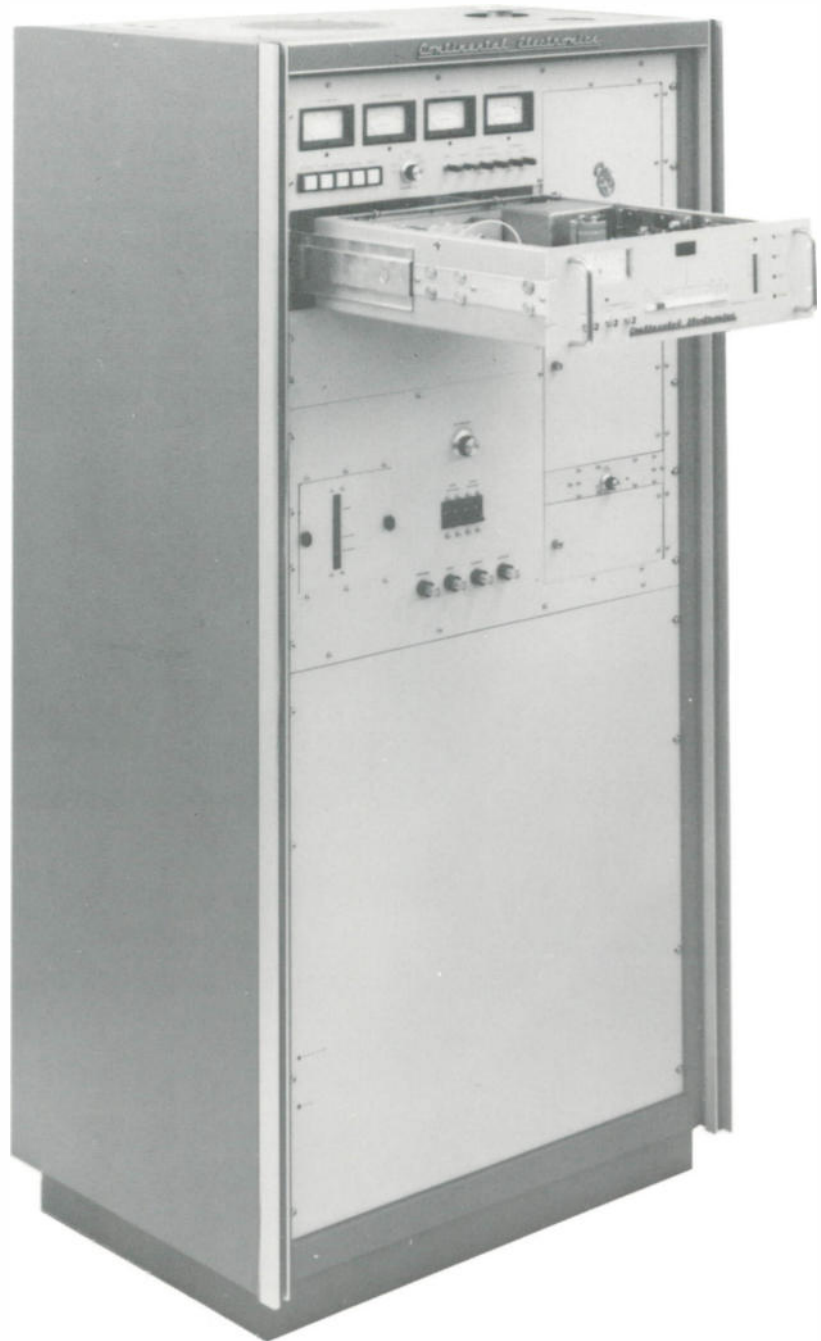
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

#### **Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### **Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; it's shown here with top cover removed.

## SPECIFICATIONS using Type 802A Exciter

### GENERAL

#### Rated Power Output:

814R-1: 2.5 kW

#### Power Consumption:

814R-1: 4.9 kW

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency  
Synthesis from high stability master  
oscillator

#### Frequency Stability:

± 275 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

1½" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

± 150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak  
level of modulating signal in 5%  
increments with accuracy better  
than ± 2%

#### Exciter:

Solid-state unit with variable output  
of 5 to 50 watts, and self-contained  
harmonic filter.

#### RF Harmonic Attenuation:

- 80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 volts peak-to-peak)  
@ 600 ohms for ± 75 kHz deviation.

#### Audio Frequency Response:

± 0.5 dB; flat, 25, 50 or 75  
microsecond pre-emphasis,  
20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below ± 75 kHz  
deviation @ 400 Hz, measured  
within a 20 Hz to 15 kHz bandwidth  
with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, no FM modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

40 dB below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, FM modulation ± 75 kHz  
@ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak to  
peak) for ± 75 kHz deviation

#### Composite Amplitude Response:

± 0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic

#### Distortion:

0.08% max

#### Composite Intermodulation

#### Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ± 7.5 kHz  
deviation

#### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters  
are determined primarily by the Stereo  
Generator used. The following  
parameters are influenced by the RF  
system. These specifications assume  
that a "State-of-the-Art" Stereo  
Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB  
or better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz.  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% max.; 60 Hz/7 kHz, 4:1 ratio.

#### FM Noise:

- 72 dB referenced to 400 Hz, 75  
kHz deviation. Measured with 75  
microsecond de-emphasis within a  
20 Hz to 15 kHz bandwidth.

#### Linear Crosstalk

- 55 dB

### SCA OPERATION

Most SCA performance parameters  
are determined primarily by the SCA  
generator used. The following  
parameters are influenced by the RF  
System. These specifications assume  
that a "State-of-the-Art" SCA  
Generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz, Main  
75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

- 50 dB, Main and Stereo 75 kHz  
deviation; SCA reference deviation,  
5 kHz and 200 Hz modulation; SCA  
de-emphasis, 150 microsecond

#### Crosstalk SCA to SCA (67 kHz and 92 kHz):

- 50 dB, SCA reference deviation 5  
kHz and 200 Hz modulation  
frequency; de-emphasis, 150  
microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, single  
phase; available transformer taps  
are 200, 210, 220, 230, 240, 250  
volts ac; 50 Hz available on request.

#### Permissible Line Voltage Variation:

± 5%

#### Filament regulator:

± 1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft. (2286 m) standard; optional  
to 10,000 ft (3048 m) with  
modification kit

#### Ambient Temperature Range:

- 20°C to + 50°C (- 4°F to + 122°F)

### MECHANICAL

#### Size, as shown:

69" (175 cm) H

35" (89 cm) W

24" (61 cm) D

#### Weight:

750 lb (340 kg) nominal

All specifications are subject to change without notice.

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Telex: 73-398



varian

*fm*

**813A 500 WATT  
814D 1000 WATT  
SOLID-STATE  
FM TRANSMITTER**

**813A ▶**



**814D ▶**



*Continental Electronics Corporation*

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 214-381-7161 TELEX: 73-398 FAX: 214-381-4949

## SPECIFICATIONS

### 813A 500W/814D 1000W FM TRANSMITTER

#### ■ GENERAL

**Rated Power Output:**

813A - 500W  
814D - 1000W

**Power Consumption:**

1188W nom. (at 500W)  
2886W nom. (at 1 kW)

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**

± 250 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

Type "N" female

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

± 150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ± 2%

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**

-80 dB, min.

**Power Supply Rectifiers:**

Silicon

#### ■ MONAURAL OPERATION

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+10 dBm (6.93 volts peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**

± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% max.; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB min. below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

62 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

60 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

#### ■ WIDEBAND OPERATION

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nom.

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**

± 0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

.08% max.

**Composite Intermodulation Distortion:**

.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

15,000 ohms, nom.

**SCA Input Level:**

1.25 volts RMS for ± 7.5 kHz deviation

**SCA Amplitude Response:**

± 0.3 dB, 40 kHz to 100 kHz

#### ■ STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% max.; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**

-72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**

-55 dB

#### ■ SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**

-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

#### ■ ELECTRICAL

**Power Source:**

813A - 94 to 136 VAC, 60 Hz, single phase; available voltage taps are 94, 100, 105, 109, 115, 121, 125, 130, 136  
814D - 188 to 272 VAC, 60 Hz, single phase; available voltage taps are 188, 200, 210, 218, 230, 242, 250, 260, 272 (50 Hz available on request)

#### ■ OPERATING ENVIRONMENT

**Altitude Range:**

0 to 10,000 ft. (3048 m)

**Ambient Temperature Range:**

-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**

0 to 95%

#### ■ MECHANICAL

**Size, as shown:**

42" (107 cm) H x 21" (53.5 cm) W x 25" (64.8 cm)

**Weight:**

813A - 371 lbs.  
814D - 448 lbs.

All specifications are subject to change without notice.  
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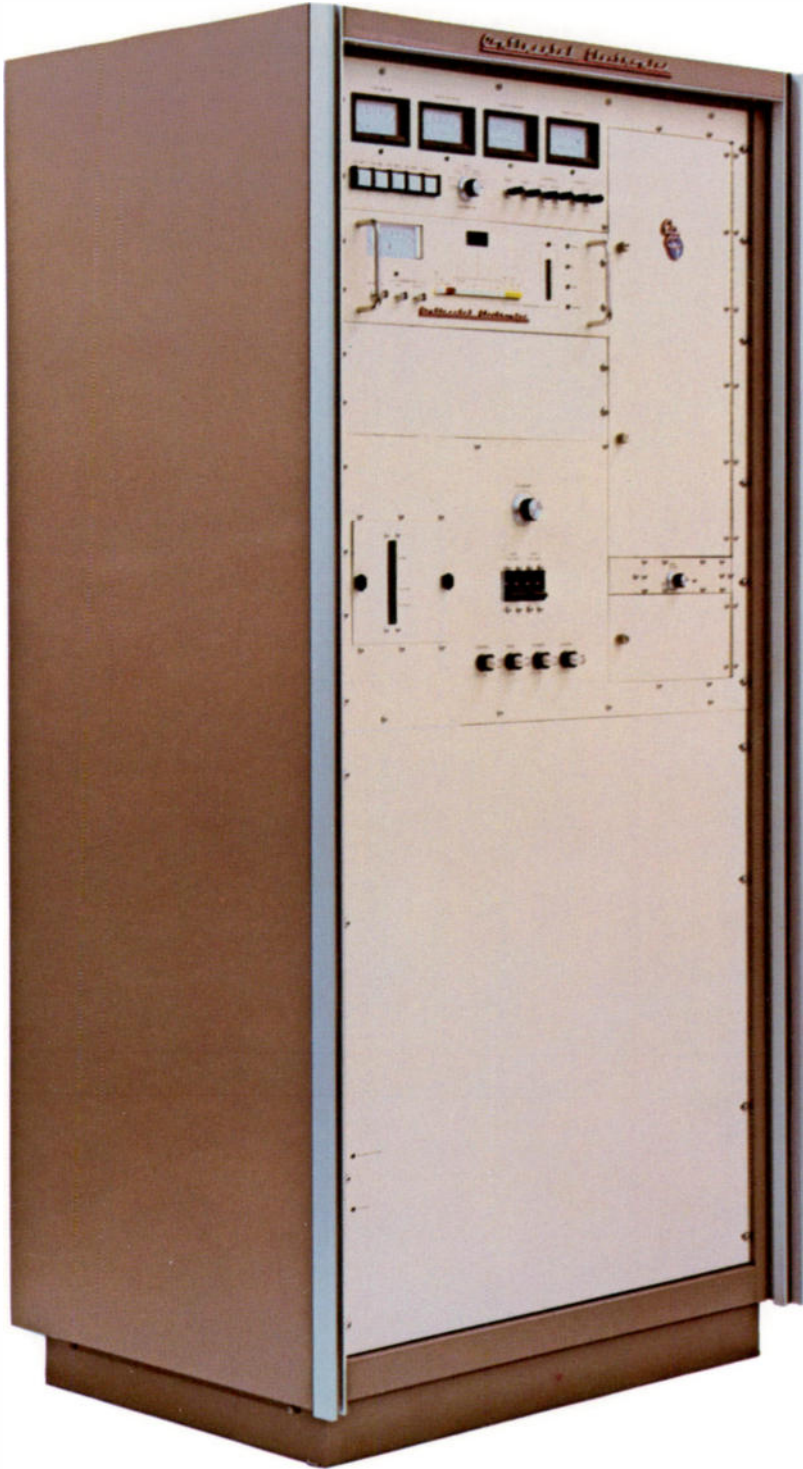
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**CONTINENTAL LOW POWER  
1.25 and 2.5 KW FM  
BROADCAST TRANSMITTERS**

**FM**



**FEATURING 802A SOLID-STATE EXCITER**

*Continental Electronics*

Continental Electronics Mfg. Co. Dallas, Texas



## FIELD-PROVEN FEATURES

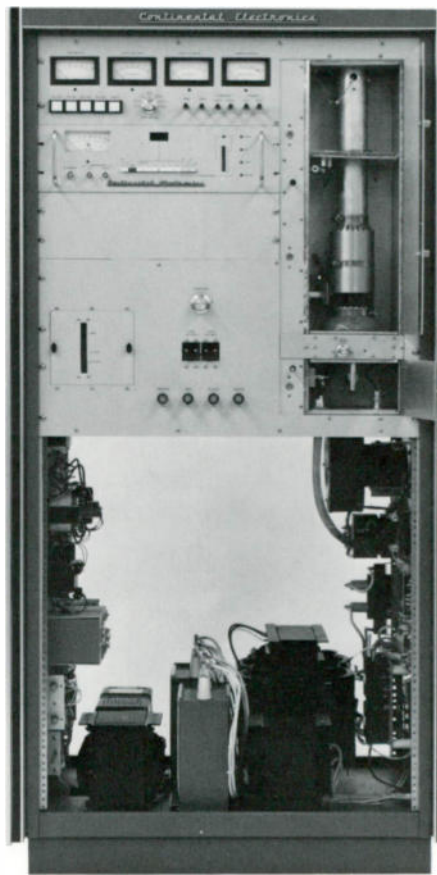
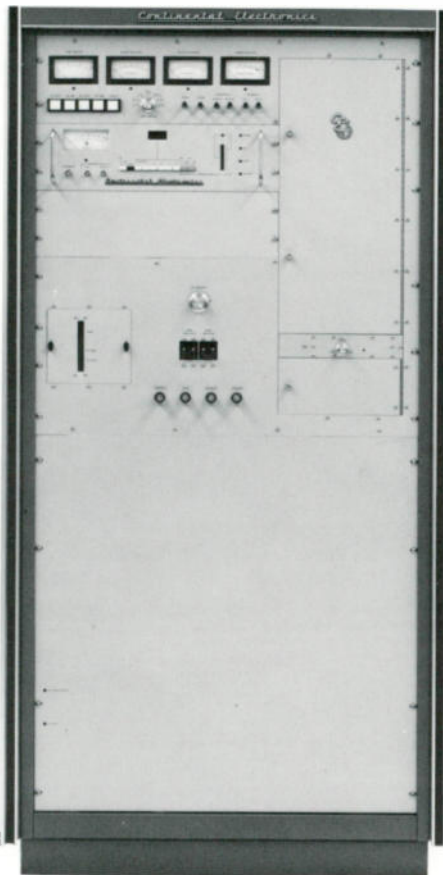
- Lowest guaranteed intermodulation distortion
- Highest stereo separation
- Automatic power output control
- Automatic overload recycling (optional)
- VSWR protection
- Superior frequency stability
- Automatic filament voltage regulation
- Overload indicator lights
- Front panel pushbutton control
- Superior PA stability
- Proven PA design
- Built-in remote control facilities (optional)
- Front panel monitoring
- Easy access
- Compact size
- Outstanding exciter

## Type 814R-2 1.25 kW FM TRANSMITTER

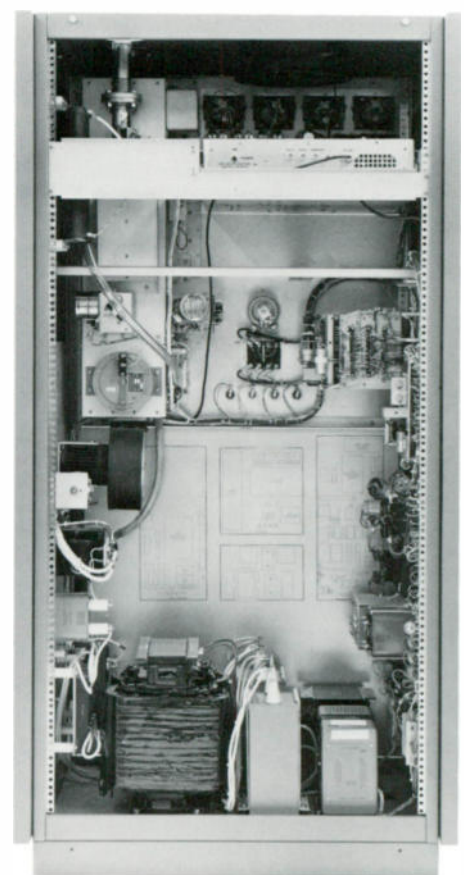
Continental's 814R-2 is driven by the Type 802A exciter and delivers a crisp, clean signal. The 814R-2 utilizes automatic filament voltage regulation and automatic power control for unattended operation. Overload conditions are indicated by an LED display, and an automatic recycle option can put the transmitter back on the air immediately after an overload interruption. Continental's 814R-2 is completely contained in one 35" wide (89 cm) cabinet.

## Type 814R-1 2.5 kW FM TRANSMITTER

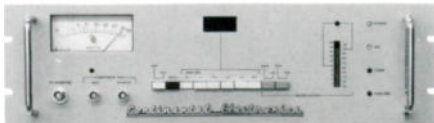
Continental's 814R-1 is a high-performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal. The transmitter is solid-state except for the single 5CX1500A tube in the final amplifier. The 814R-1 uses IC logic for all control functions, and incorporates a computer-like memory to restart the transmitter after a power failure. A built-in battery supply and charger enables the logic circuits to remember their state in the event of a power interruption. The transmitter utilizes automatic filament voltage regulation and automatic power control for unattended operation. Available options include remote control equipment and automatic overload/recycle system. Overload conditions are indicated by an LED display. The 814R-1 is completely contained in one 35" wide (89 cm) cabinet.



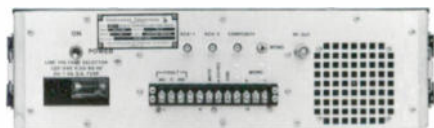
Front view,  
Type 814R-1 2.5 kW FM Transmitter



Rear view,  
Type 814R-1 2.5 kW FM Transmitter



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

### **Introducing the ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### **State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### **Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### **Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### **50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### **Automatic power level control**

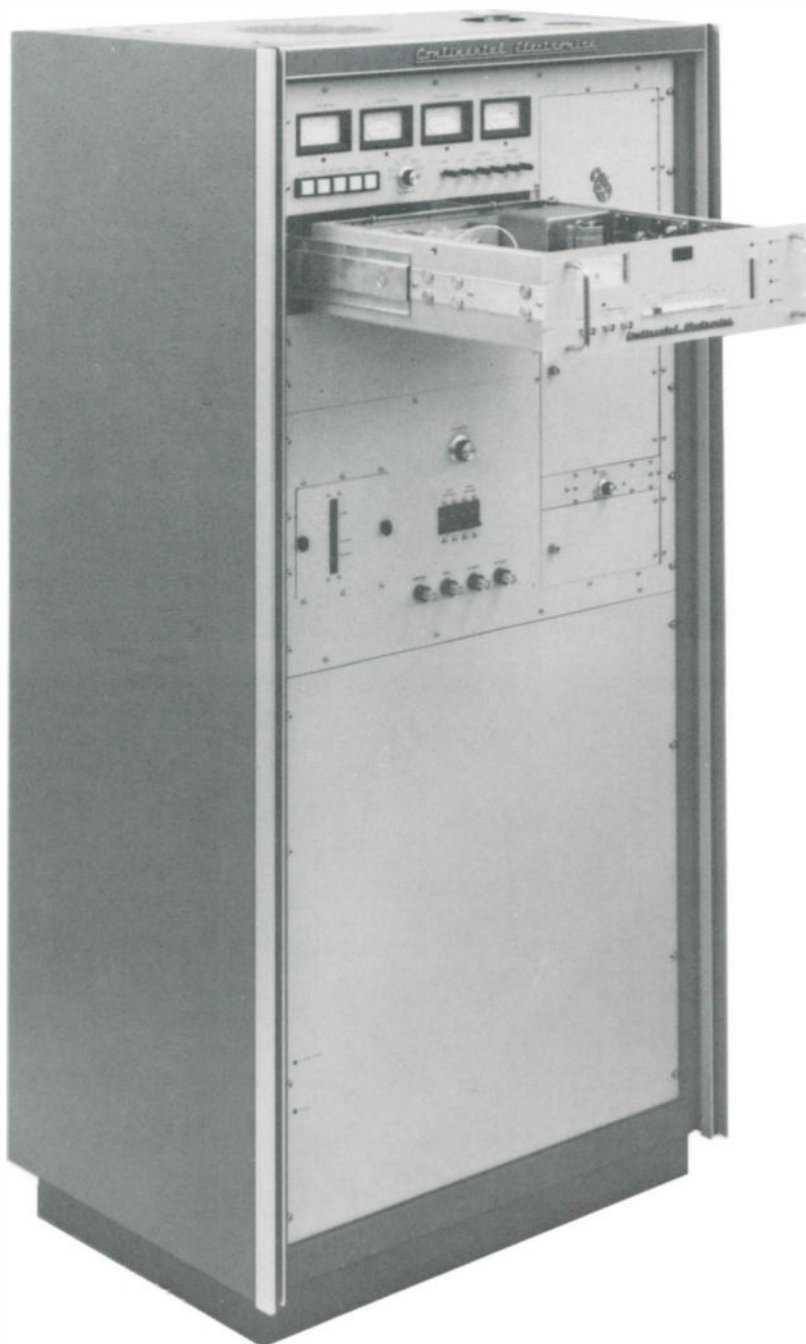
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

#### **Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### **Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; it's shown here with top cover removed.

# SPECIFICATIONS

**IM Distortion:**  
 0.25% maximum mono;  
 0.5% maximum stereo

**Output Impedance:**  
 50 ohms vswr, 2:1  
 maximum

**RF Power Output Control:**  
 ± 2% of nominal  
 (automatic)

**Frequency Range:**  
 88-108 MHz

**Frequency Stability:**  
 ± 500 Hz

**Modulation Capability:**  
 ± 100 kHz

**Audio Input Level:**  
 10 dBm ± 2 dB

**Audio Frequency Response:**  
 ± 1 dB of preemphasis  
 curve

**Audio Frequency Distortion:**  
 0.25% maximum mono;  
 0.5% maximum stereo

**Stereo Separation:**  
 50 Hz to 15,000 Hz 35 dB  
 minimum reaching 50 dB at  
 mid range. Harmonic  
 Attenuation: Exceeds FCC  
 requirements

**FM Noise Level:**  
 65 dB below 100%  
 modulation

**AM Noise Level:**  
 -55 dB rms

**Filament Regulation:**  
 ± 1% of optimum

**Permissible Line Voltage  
 Variation:**  
 ± 5%

All specifications are subject to change without notice.  
 © 1984 Continental Electronics Mfg. Co./5619  
 Printed in USA 1M484

	Output Power	Size			Weight	Power Source (50/60 Hz)	Max. Power Consumption (kW @ 0.9 pF)
		H	W	D			
814 R-1	2.5kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	340 kg (750 lb)	200-250V; 1ϕ	4.9
814 R-2	1.25 kW	175 cm (69 in)	89 cm (35 in)	61 cm (24 in)	318 kg (700 lb)	200-250V; 1ϕ	3

**RF response  
of the new  
20-KW**

***Generation 4*™  
from Collins**



Rockwell International

Figures 1, 2 and 3 graphically depict the rf passband response of the 831G-2 Transmitter.

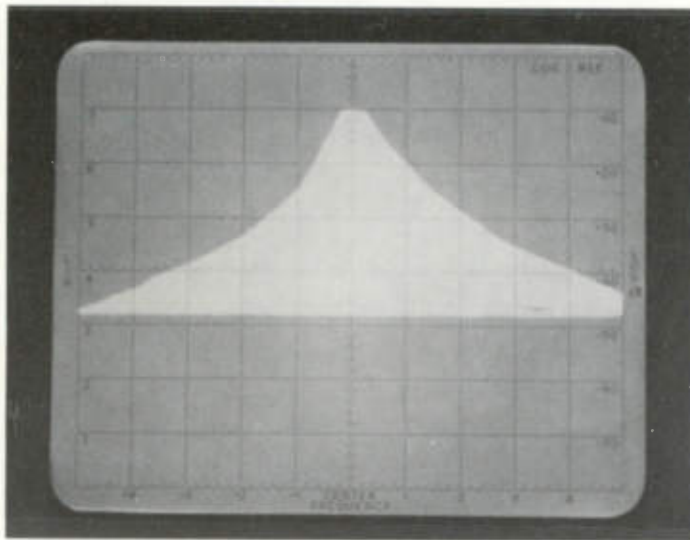


Figure 1  
Horizontal: 1 MHz/DIV  
Vertical: 10 dB/DIV

Figure 1 illustrates the power amplifier response  $\pm 5$  MHz from center frequency. Of interest here is the freedom from any tendency to "parasite" or produce spurious responses when excited by an off-frequency signal.

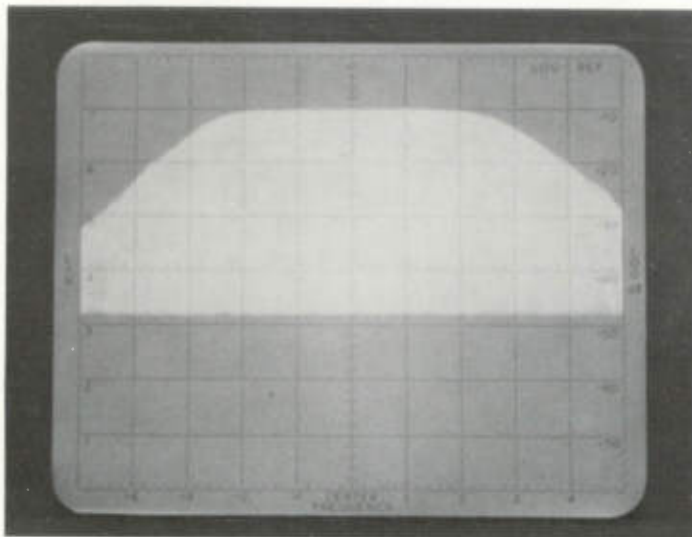


Figure 2  
Horizontal: 100 kHz/DIV  
Vertical: 2 dB/DIV

Figure 2 shows the passband response  $\pm 500$  kHz from center frequency. Note the flat passband  $\pm 200$  Hz from center frequency and the symmetrical skirts.

Figure 3 is an expansion of Figure 2 that displays the passband response  $\pm 250$  kHz from center frequency. The response is very linear over this range.

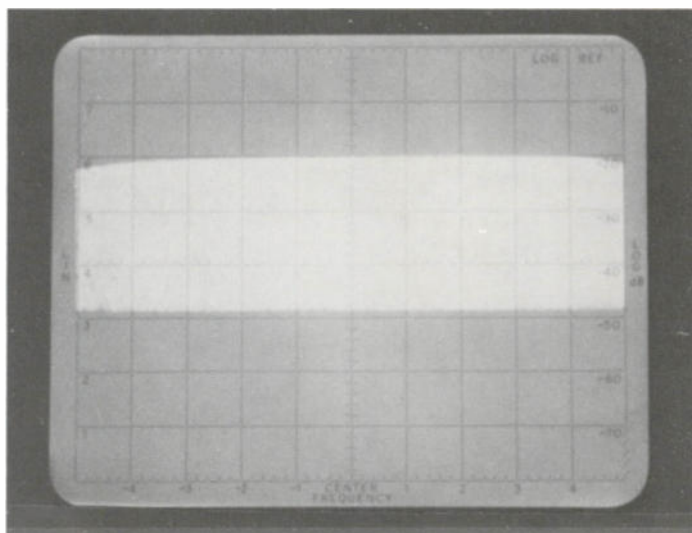


Figure 3  
Horizontal: 50 kHz/DIV  
Vertical: 2 dB/DIV

The wide bandwidth and linear response ensure superior phase response necessary for excellent stereo separation and freedom from crosstalk.

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Dallas, Texas 75207  
Telephone: (214) 690-5574  
(214) 690-5424  
Cable: COLINRAD, Dallas



**Rockwell International**



**Top performance and proven design in high power FM**

Continental's 70 kW FM transmitter offers you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% with minimal retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the RF when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges through the power supply components; this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

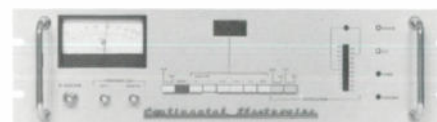
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach.

Wide-band 1/4-wave cavity design provides a wide, flat bandwidth which optimizes transmitter performance.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**The ultimate FM exciter**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from the front of the exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watt output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than ±2%.

**Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

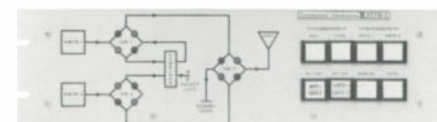


**Optional Automatic Exciter Control**

Continental's Type 377C-1A automatic exciter control unit provides monitoring and control for two Type 802A or similar exciters. If one exciter fails, the standby exciter is automatically put on-line. Indicator lamps show which exciter is operating.

The control unit includes switching the station's monitoring to the exciter's dummy load for servicing and testing the standby exciter.

The Type 377C-1A is designed to fit in the control cabinet furnished with the 70 kW transmitter.



**Optional Automatic Combiner Control**

Continental's Type 377D-1 combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times.

In case one transmitter fails, the remaining transmitter is automatically switched around the combiner into the antenna. The transmitter that failed is automatically switched to the test load for troubleshooting.

The combiner control provides all interlock and sequencing functions; it is designed to fit in the control cabinet furnished with the 817R-5 70 kW transmitter.

**TYPE 817R-5 SPECIFICATIONS USING TYPE 802A FM EXCITER**

**GENERAL**

**Rated Power Output:** 70 kW

**Power Consumption:** 108 kW, nom.

**Frequency Range:** 88 to 108 MHz, in 10 kHz steps

**Frequency Control:** Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:** ±250 Hz

**Output Impedance:** 50 ohms

**Output Connector:** 6½" EIA flange

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

±150 kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**

– 80 dB, min.

**Power Supply Rectifiers:**

Silicon

**MONAURAL OPERATION**

**Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+ 10 dBm (6.93 volts peak-to-peak) at 600 ohms for ±75 kHz deviation

**Audio Frequency Response:**

±0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% maximum; 20 Hz to 15 kHz

(Measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% or less, 60 Hz/7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB minimum, below ±75 kHz deviation

at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

40 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ±75 kHz at 400 Hz

**WIDEBAND OPERATION**

**Composite Inputs:**

Balanced, unbalanced, test

**Composite Input Impedance:**

5,000 ohms, nom.

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak-to-peak) for ±75 kHz deviation

**Composite Amplitude Response:**

±0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Composite Intermodulation Distortion:**

0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

50,000 ohms, nom.

**SCA Input Level:**

1.25 volts RMS for ±7.5 kHz deviation

**SCA Amplitude Response:**

±0.3 dB, 40 kHz to 100 kHz

**STEREO OPERATION**

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB minimum; 50 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% maximum; 50 Hz to 15 kHz

(Measured with spectrum analyzer)

**Intermodulation Distortion:**

0.08% maximum; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**

– 75 dB minimum, below ±75 kHz deviation

at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Linear Crosstalk:**

– 55 dB

**SCA OPERATION**

Most SCA performance parameters are determined primarily by the SCA generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

– 60 dB, SCA deviation 5 kHz; Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

– 50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis. 150 microsecond

**Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):**

– 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation, 150 microsecond de-emphasis

**ELECTRICAL**

**Power Source:**

200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request

**Permissible Line Voltage Variation:** ±5% (each phase voltage variation; within 5% of the average of all three phases)

**Filament Regulator:**

±1% of optimum

**OPERATING ENVIRONMENT**

**Altitude:**

0 to 7,500 ft (2286 m) standard; optional to 10,000 ft (3048 m) with modification kit

**Ambient Temperature Range:**

–20°C to +50°C (–4°F to +122°F)

**Relative Humidity:**

0 to 95%

**MECHANICAL**

**Transmitter Size as Shown:**

69" (175 cm) H x 159.8" (406 cm) W x 28" (71 cm) D

**Weight:**

3,314 lb (1,491.3 kg) nom.

**External Plate Transformer Size as Shown:**

46" (116.8 cm) H x 35" (88.9 cm) W x 24" (60.9 cm) D

**Weight:**

901 lb (405.4 kg) nom.

**Note:**

The two external plate transformers can be located up to 20 ft (6.10 m) away from the transmitter

**Combiner, 70 kW Size as Shown:**

73" (185.4 cm) H x 68-1/2" (174 cm) W x 31" (78.7 cm) D

**Weight:**

1,130 lb (513 kg) nom.

**Note:**

The two external plate transformers can be located up to 20 ft (6.10 m) away from the transmitter

**Combiner, 70 kW Size as Shown:**

73" (185.4 cm) H x 68-1/2" (174 cm) W x 31" (78.7 cm) D

**Weight:**

1,130 lb (513 kg) nom.

All specifications are subject to change without notice.

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**Continental Electronics**  
a Division of Varian Associates, Inc. PO Box 270879 Dallas, Texas 75227 Ph: (214) 381-7161 Telex: 73-398



**Continental Electronics**  
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**varian**

### Transmitter Overview

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- True RMS Filament Power Regulation/ Metering
- AC Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Grounded Screen Amplifier
- Internal Diagnostics

### Modular Concept Offers Broadcasters Maximum Flexibility

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output through the use of a combiner.

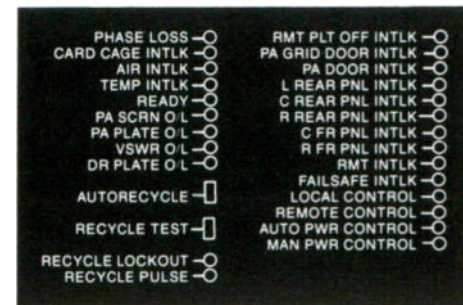
Continental's Type 817R-5 70,000 watt transmitter consists of two Type 816R-5 35,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 70,000 watts output. Through the use of optional coaxial switching, either transmitter may be put on the air independently.

The transmitter is all solid-state except for three tubes in each 35 kW module: a pair of 4CX250B drivers, and one 9019/YC130 tetrode power amplifier operating at Class C.

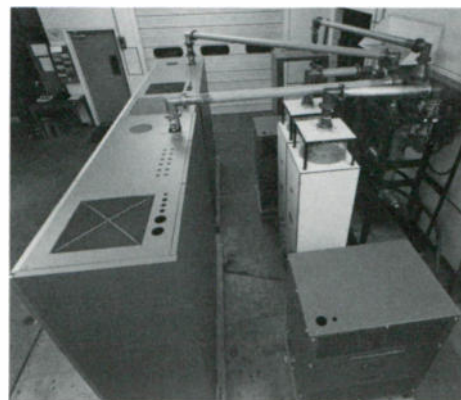
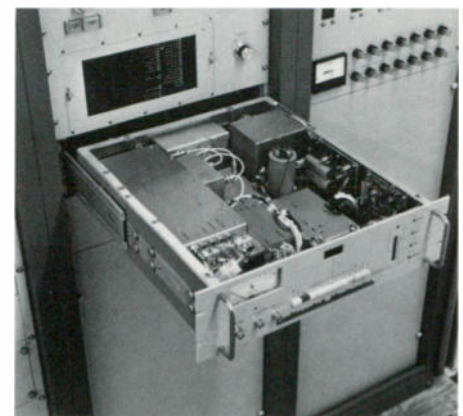
The 9019/YC130 tetrode was specially designed by EIMAC for Continental, to meet stringent FM service requirements at 35 kW.

The 817R-5 is an outgrowth of Continental's popular 817R Series of 40, 50 and 55 kW transmitters, but employs a new cavity design for the 9019/YC130 tetrode.

The output network consists of a foreshortened quarter-wave coaxial resonator and self-contained elliptic filter of the Cauer design.



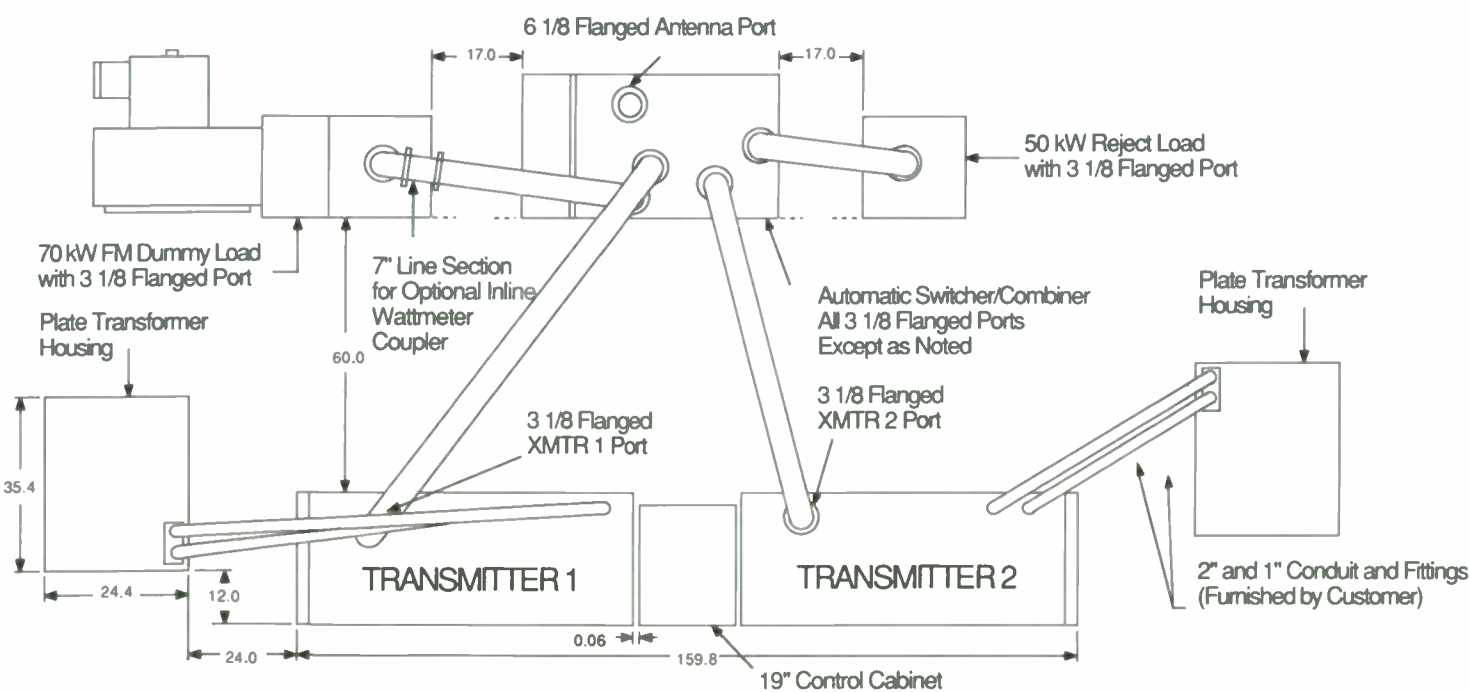
LED status indicators are displayed just above the transmitter's exciter drawer. All exciter components are easily reached from the front of the transmitter. The exciter moves on tracks for easy access; it's shown here with top cover off.



### Fast Installation

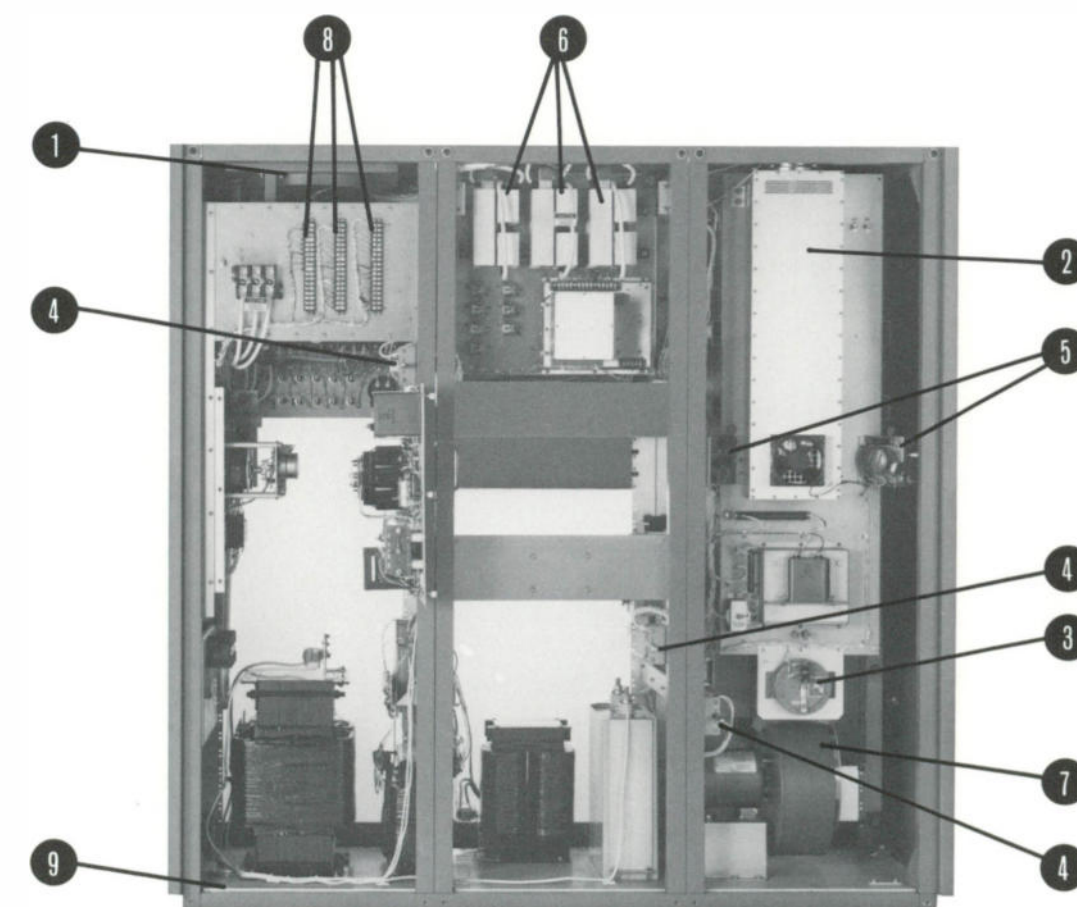
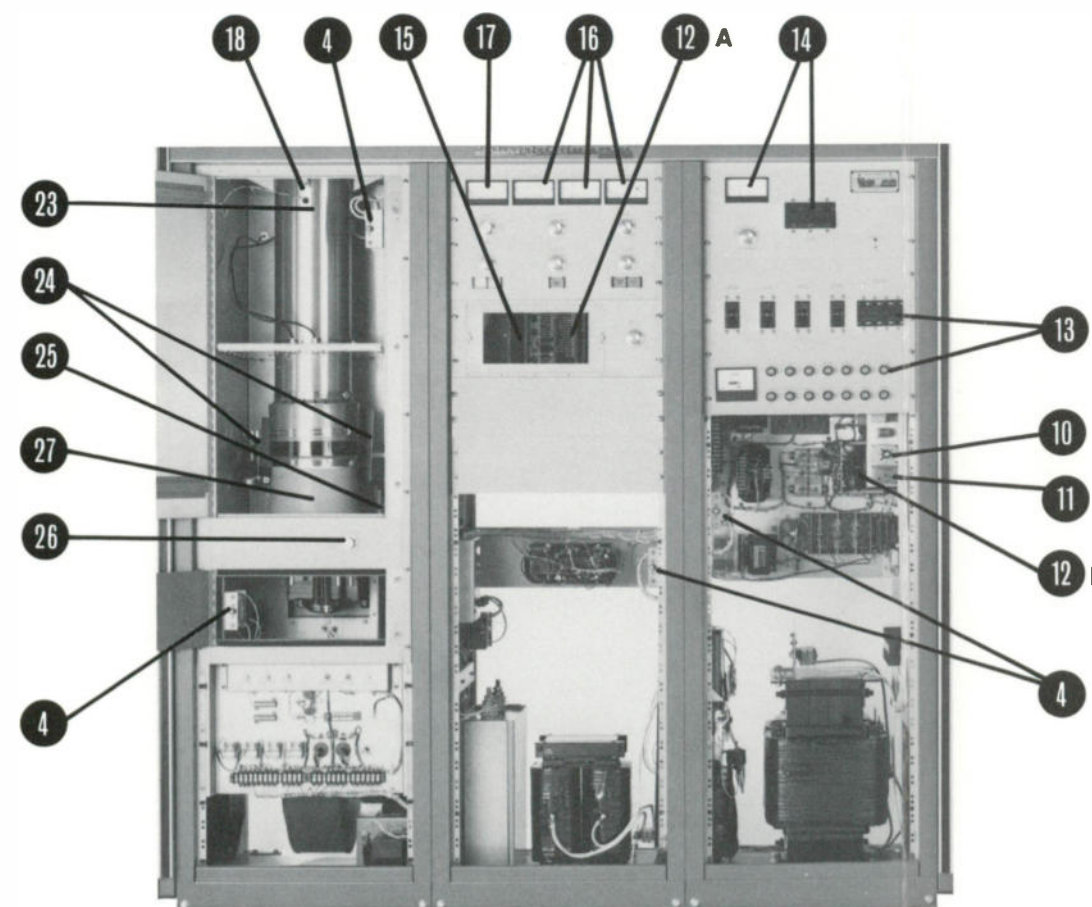
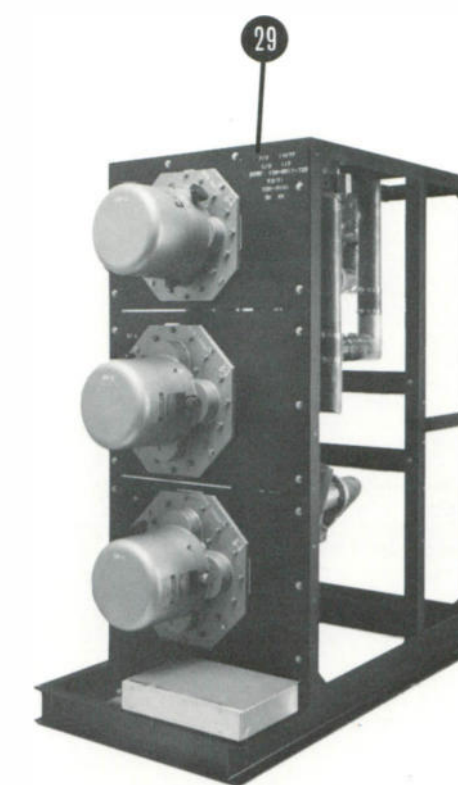
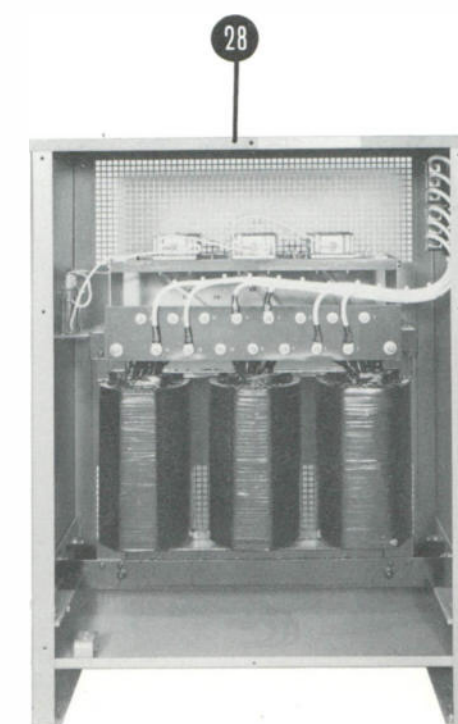
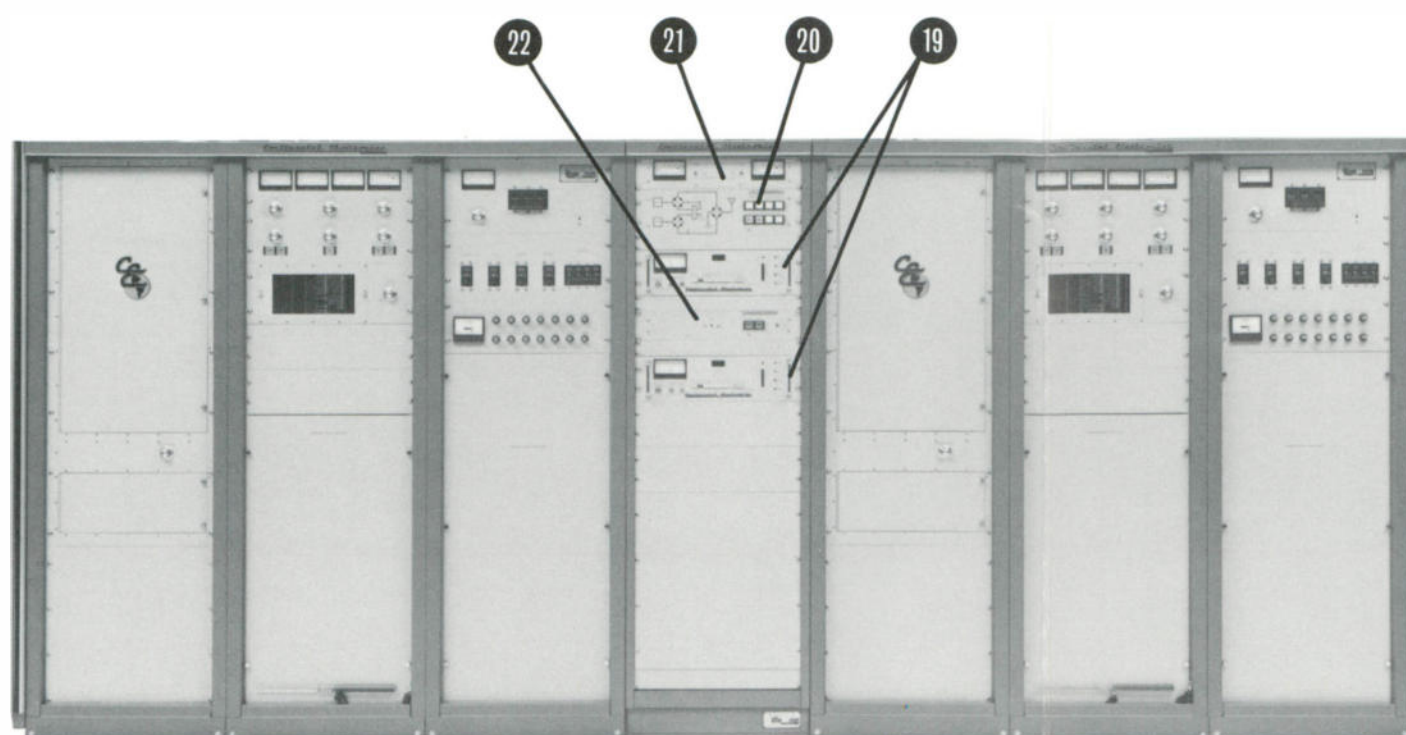
For shipments within the continental United States, all components within each transmitter are in-place and interconnected. Audio inputs, monitoring outputs and transmission line connections are through the top of cabinet. AC power may enter either top or bottom of cabinet. 28-volt dc power supply is built-in for optional remote control. Harmonic filter is in-place and ready to operate.

Photo shows typical arrangement of transmitter combiner, dummy load, external power supply and main transmitter cabinet modules. Drawing gives plan view and dimensional information.



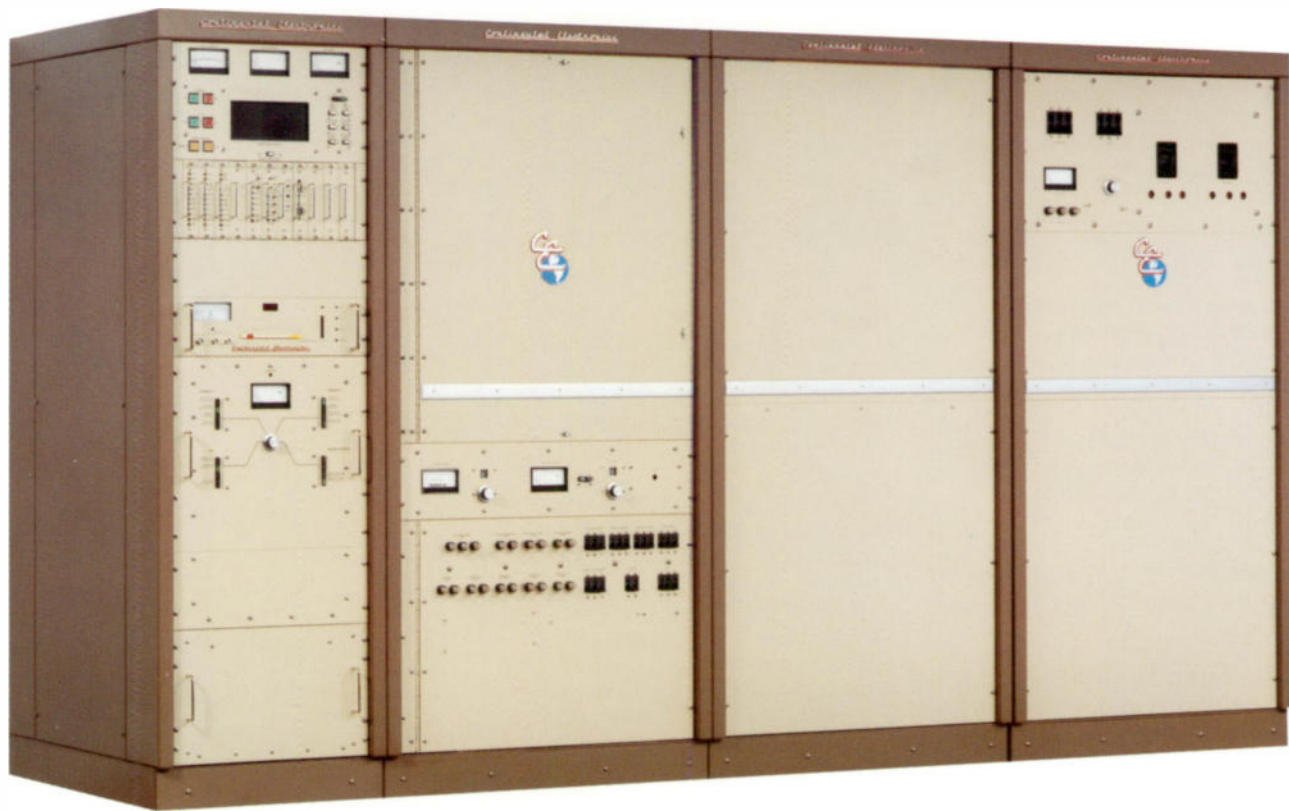
### The Inside Story

1. Cabinet flushing blower. A powerful fan with washable air filter delivers approx. 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. Fully contained inside cabinet to speed installation while reducing overall space requirements.
3. Air switch. Located for easy access.
4. Interlocks. Positioned to automatically short-out high voltage when doors/panels are opened.
5. Tuning & loading motors. Motors and connecting capacitor plates are the only moving parts in the PA section.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start" initially brings up the transmitter gently.
7. PA blower. 1 hp PA exhaust blower moves 525 cfm of cooling air thru PA tube to help extend tube life and reduce heat accumulation.
8. Remote control connectors. Conveniently located for simple hook-up of system.
9. Power wire. Either top or bottom entry is available; bottom entry is shown here.
10. Tube cool-down timer. Continues blower operation for up to 3 minutes after filaments are turned off.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to PA tube to maximize tube life. A = control card, B = drive assembly
13. Indicator fuses & circuit breakers. Indicators glow brightly for fast trouble-shooting.
14. True RMS iron vane meter & 200 amp ac mains circuit breaker. Meter shows readings on filament voltage and three ac voltage phases.
15. LED-equipped card cage. 27 LEDs show quick status readout of protection circuits and control modes.
16. Continuous readout meters. Show plate current and voltage, output power.
17. DC multimeter. Shows 11 operating parameters at the turn of a dial.
18. PA exhaust stack temperature sensor. Redundant back-up to airflow switch protects final stage if cooling air is lost or if over-dissipation occurs.
19. Type 802A Exciter.
20. Automatic combiner control.
21. Power monitor.
22. Automatic exciter control.
23. Wideband quarter-wave cavity. A proven design for maximum reliability.
24. Tuning & loading controls. Exclusive motorized system for easy adjustments.
25. Static drain choke. Bleeds-off static build-up in transmission lines or antennas.
26. Driver plate adjustment. A single control tunes the driver plate.
27. Final amplifier. The 9019/YC130 tube uses lower filament power to save money. The grounded screen tetrode eliminates screen bypass capacitors and enhances stability.
28. Power supply. Plate transformer and rectifier are mounted in external cabinet which may be placed up to 20 feet away from transmitter.
29. 70 kW Combiner.

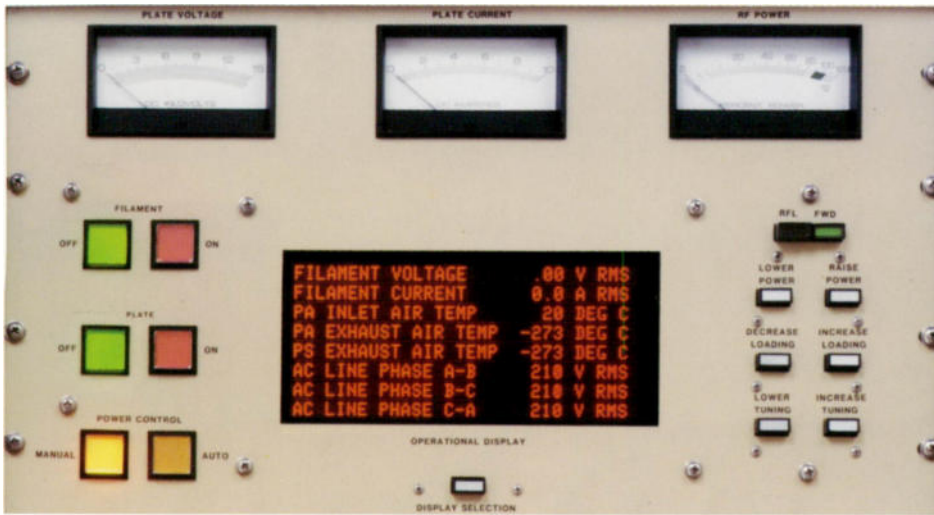


CONTINENTAL HIGH POWER  
60 KW FM  
BROADCAST TRANSMITTER

FM



FEATURING 802A EXCITER



The Controls/Display Panel showing analog meters, control switches, operational display screen.

### Top Performance From A State-Of-The-Art High Quality High Power FM Transmitter

Continental Electronics' Type 817A meets the need for a self-contained, highly dependable, easily maintained, high power FM transmitter.

The transmitter achieves its high levels of performance with low power consumption.

It has excellent stereo separation and frequency stability; operates with minimal noise and distortion; uses the Type 802A Exciter to deliver a crisp clean signal.

The transmitter is solid-state up to the power amplifier which uses one tube: a husky EIMAC Type 4CX40,000G Tetrode operating in Class C.

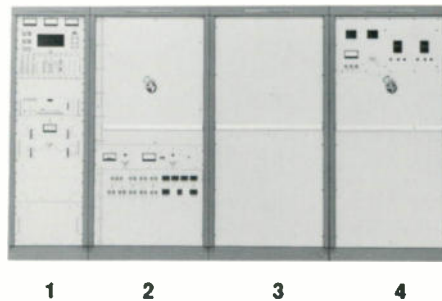
Operating over the frequency range from 88 to 108 MHz, the 817A can be operated at power outputs from 30,000 to 60,000 watts.

The transmitter control system uses an 8-bit microprocessor for certain internal and external control and status reporting. Additionally, full hands-on local control of the transmitter is provided by front panel controls, meters and indicators, as well as the plasma operational display.

In keeping with the tradition of other Continental transmitters, the 817A utilizes conservatively-rated components and is built to give many years of reliable service.

#### A Brief Overview Of The Transmitter

- Simple installation
- Only one tube
- Completely self-contained including internal harmonic filter
- Solid-state driver
- SCR power control
- Filament voltage regulation
- Automatic SWR power control
- Conventional remote control interface
- Internal diagnostics



#### Transmitter Cabinet

The 817A Transmitter is housed in an all aluminum sheet metal enclosure consisting of four cabinets forming a single entity. All components related to the transmitter are contained within the enclosure.

The left-hand cabinet contains the control and metering panel, the control card cage, the 802A 50 watt FM exciter, the driver amplifier, the control power supplies and the dual redundant control/monitoring microprocessor.

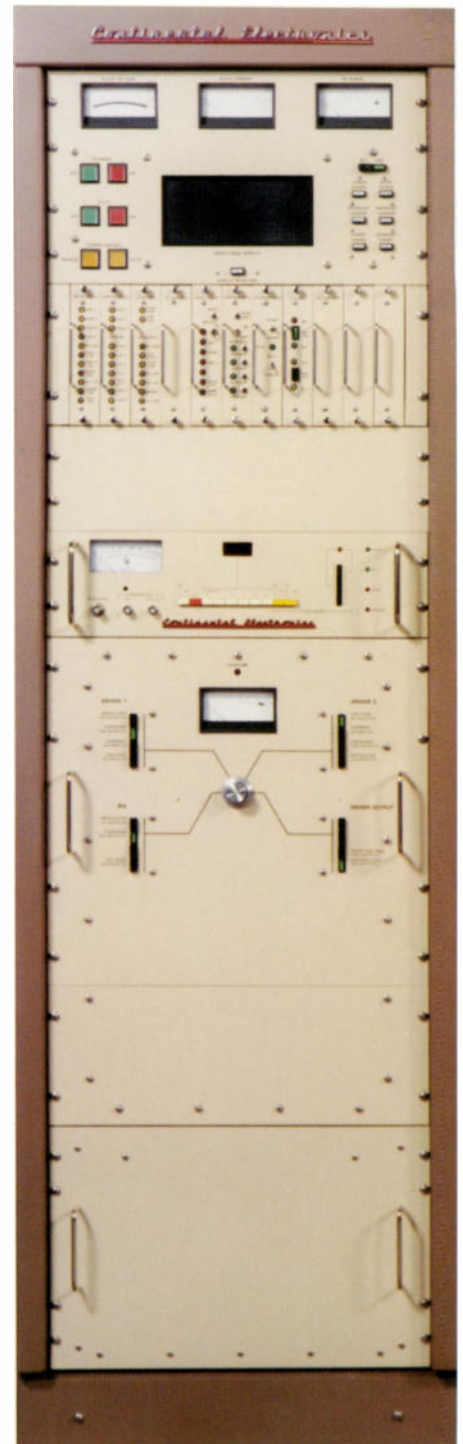
The next cabinet contains the PA cavity, harmonic filter, directional couplers, PA cooling blower, and regulated PA filament voltage supply.

The third cabinet from the left houses the plate and screen power supply filtering as well as the overload/metering circuitry.

The fourth cabinet, the right-hand cabinet, houses the plate and screen power supplies, SCR power controller and associated circuit breakers. This unit may be removed from the main enclosure and located a short distance away for installation convenience.

#### Control and Driver Unit

The Control and Driver Unit contains the Control/Display, the Control/Monitor, the Exciter Model 802A, and the RF Driver Amplifier.



Above photo: the Control and Driver Unit houses the Type 802A FM Exciter, IPA and Driver Units, transmitter control and monitoring.

#### Control/Display Panel

The analog meters include plate voltage, plate current, and RF power output. Front panel controls exist for filament and plate ON and OFF, power control MANUAL and AUTO, FORWARD and REFLECTED POWER, power RAISE and LOWER, loading DECREASE and INCREASE, and tuning LOWER and INCREASE. There is a manual switch labeled, DISPLAY SELECTION, that will provide seven different screens on the operational display panel. The viewing screen uses

a pixel display of large, easily read characters, providing data equivalent to a video display. Each of the seven screens can display up to 8 lines of 32 characters per line, for a total of 256 characters per screen, or a total of 1792 for the system. Suitable connections are provided within the transmitter for hard-wire connections to a customer furnished remote control system. The microprocessor control system provides facilities for complete remote control and status indication by customer-furnished data link. This interface consists of a single RS232 two-pair port for connection to customer-furnished video terminals, keyboard printers, or through modems to full duplex data communications systems.

On start up of the transmitter, at preset intervals or on demand, the microprocessor will self-check the entire transmitter system. Any failures, malfunctions, or inappropriate conditions will be identified and displayed. A successful checkout will also be displayed with an appropriate indication. If a customer-furnished keyboard or printer is connected to the system, it can be activated to print out the operational status of the transmitter.

#### **Control/Monitor Card Cage**

The following plug-in modules are included in the Control/Monitor Card cage:

- Interlock Indicator Panel
- Shorting Stick Indicator Panel
- Control/Indicator Panel
- Fault Tally Indicator Panel
- RF Power Monitor/Control
- Filament Regulator Control
- Local/Remote Interface Panel

#### **RF Driver Amplifier**

The solid-state Driver Amplifier achieves 1 kW output by combining two 600 watt amplifiers. On the control panel for the RF driver amplifier is a meter that is selected by Driver 1 functions, Driver 2 functions, or the combined Driver output functions, as well as the IPA.

#### **Power Amplifier**

The Power Amplifier is contained in a well shielded enclosure to minimize RFI and to maintain the integrity of the RF path. The Power Amplifier tube is a single 4CX40,000G Tetrode, operating in Class C. The screen grid is operated at DC chassis ground.

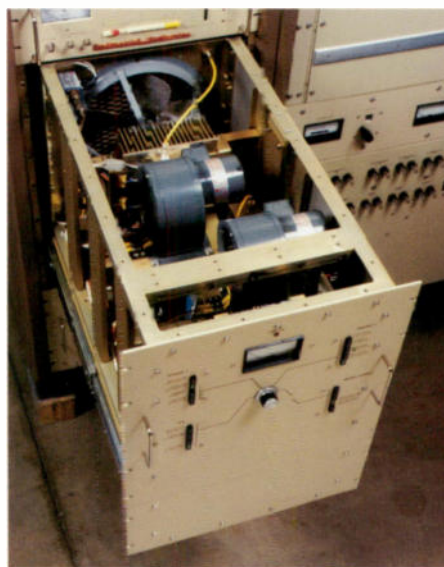
The EIMAC 4CX40,000G, designed for FM service, is an air-cooled version of a pyrolytic graphite tube with 100 kW capability.

The rugged pyrolytic graphite screen grid meets the stringent dissipation requirements of a high efficiency, stable and reliable FM amplifier.

A self-contained harmonic filter and directional coupler are included in the power amplifier unit.



*A view of the Exciter drawer in the extended position shows component accessibility.*



*RF Driver Amplifier Unit in the extended position shows component accessibility.*



*Rear view of transmitter Cavity Unit with cover removed shows self-contained harmonic filter.*



*Front view, Type 802A Exciter.*



*Rear view, Type 802A Exciter.*

#### **The ultimate-FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### **State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### **Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### **Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### **50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### **Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 watts up to the maximum level.

#### **Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

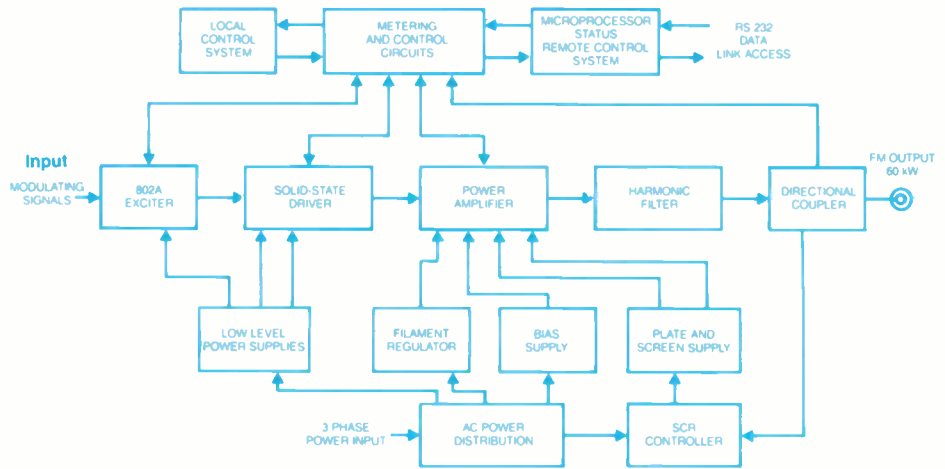
#### **Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

**SPECIFICATIONS using 802A Exciter**  
**GENERAL**

- Rated Power Output:**  
 817A: 30, 40, 50, 60 kW
- Power Consumption:**  
 817A: 53, 65.6, 80.8, 94.4 kW nominal
- Frequency Range:**  
 88 to 108 MHz, in 10 kHz steps
- Frequency Control:**  
 Phase Locked Loop Frequency Synthesis from high stability master oscillator
- Frequency Stability:**  
 ± 250 Hz
- Output Impedance:**  
 50 ohms
- Output Connector:**  
 6 1/4" EIA Flange
- VSWR:**  
 2:1, max.
- Modulation Type:**  
 Direct carrier frequency modulation
- Modulation Capability:**  
 ± 150 kHz deviation
- Modulation Indication:**  
 Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ± 2%
- Exciter:**  
 Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter
- RF Harmonic Attenuation:**  
 - 80 dB, min.
- Power Supply Rectifiers:**  
 Silicon
- MONAURAL OPERATION**
- Audio Input Impedance:**  
 600 ohms, balanced
- Audio Input Return Loss:**  
 30 dB or better
- Audio Input Level:**  
 + 10 dBm (6.93 volts peak-to-peak) @ 600 ohms for ± 75 kHz deviation
- Audio Frequency Response:**  
 ± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz
- Total Harmonic Distortion:**  
 0.2% max.; 20 Hz to 15 kHz (measured with Spectrum Analyzer.)
- Intermodulation Distortion:**  
 0.1% or less, 60 Hz/7 kHz 4:1 ratio
- FM S/N Ratio (FM Noise):**  
 72 dB min. below ± 75 kHz deviation @ 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis
- Asynchronous AM S/N Ratio (AM Noise):**  
 55 dB RMS below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, no FM modulation
- Synchronous AM S/N Ratio (Incidental AM Noise):**  
 40 dB below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, FM modulation ± 75 kHz @ 400 Hz

**SIMPLIFIED BLOCK DIAGRAM**



**WIDEBAND OPERATION**

- Composite Inputs:**  
 Balanced, unbalanced and test
- Composite Input Impedance:**  
 5,000 ohms, nominal
- Composite Input Level:**  
 1.25 volts RMS (3.54 volts peak-to-peak) for ± 75 kHz deviation
- Composite Amplitude Response:**  
 ± 0.1 dB, 20 Hz to 100 kHz
- Composite Total Harmonic Distortion:**  
 0.2% max.
- Composite Intermodulation Distortion:**  
 0.08% or less, 60 Hz/7 kHz 4:1 ratio
- Two SCA Inputs:**  
 Balanced or unbalanced
- SCA Input Impedance:**  
 50,000 ohms, nominal
- SCA Input Level:**  
 1.25 volts RMS for ± 7.5 kHz deviation
- SCA Amplitude Response:**  
 ± 0.3 dB, 40 kHz to 100 kHz

**STEREO OPERATION**

- Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.
- Stereo Separation:**  
 50 dB min.; 40 Hz to 15 kHz.
- Total Harmonic Distortion:**  
 0.1% max.; 40 Hz to 15 kHz (Measured with Spectrum Analyzer.)
- Intermodulation Distortion:**  
 0.08% max.; 60 Hz/7 kHz, 4:1 ratio
- FM Noise:**  
 - 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.
- Linear Crosstalk:**  
 - 55 dB

**SCA OPERATION**

- Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" SCA Generator is used.
- Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**  
 - 60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis
- Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):**  
 - 47 dB, Main and Stereo 715 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond
- Crosstalk SCA to SCA (67 kHz and 92 kHz):**  
 - 50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

**ELECTRICAL**

- Power Source:**  
 200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request.
- Permissible Line Voltage Variation:**  
 ± 5% (each phase voltage variation: within 5% of the average of all three phases).
- Filament regulator:**  
 ± 1% of optimum

**OPERATING ENVIRONMENT**

- Altitude Range:**  
 0 to 7,500 ft. (2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit
- Ambient Temperature Range:**  
 - 20°C to + 50°C (- 4°F to + 122°F)
- Relative Humidity:**  
 0 to 95%

**MECHANICAL**

- Size, as shown:** 72" (175.3 cm) H, 128" (200.6 cm) W, 40" (86.4 cm) D
- Weight:** 4074 lb (2130 kg) nominal

All specifications are subject to change without notice.  
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 Printed in USA 1M486 / 6179

**Top performance and proven design in high power FM**

Continental's 40, 50 and 55 kW FM transmitters offer you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components; this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

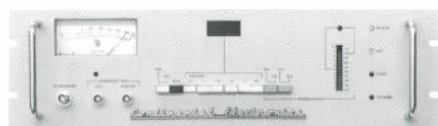
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

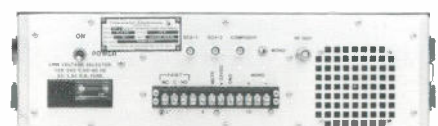
Wide-band 1/4-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**Featuring The Ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

**Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

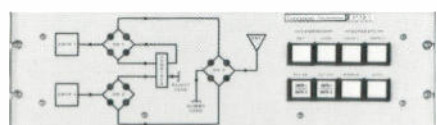


**OPTIONAL AUTOMATIC EXCITER CONTROL**

Continental's Type 377C-1A automatic exciter control unit provides monitoring and control for two Type 802A or similar exciters. If one exciter fails, the standby exciter is automatically put on-line. Indicator lamps show which exciter is operating.

The control unit includes switching the station's monitoring to the exciter's dummy load for servicing and testing the standby exciter.

The Type 377C-1A is designed to fit in the control cabinet furnished with the 40, 50 and 55 kW transmitters.



**OPTIONAL AUTOMATIC COMBINER CONTROL**

Continental's Type 377D-1 combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times.

In case one transmitter fails, the remaining transmitter is automatically switched around the combiner into the antenna. The transmitter that failed is automatically switched to the test load for troubleshooting.

The combiner control provides all interlock and sequencing functions; it is designed to fit in the control cabinet furnished with the 817R-2A 40 kW, 817R-1 50 kW, or 817R-4 55 kW transmitters.

**SPECIFICATIONS using Type 802A Exciter**

**GENERAL**

**Rated Power Output:**

- 817R-4: 55 kW
- 817R-1: 50 kW
- 817R-2A: 40 kW

**Power Consumption:**

- 817R-4: 84 kW nominal
- 817R-1: 80 kW nominal
- 817R-2A: 62 kW nominal

**Frequency Range:**

- 88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

- Phase Locked Loop Frequency Synthesis from high stability master oscillator

**Frequency Stability:**

- $\pm 250$  Hz

**Output Impedance:**

- 50 ohms

**Output Connector:**

- 3/8" EIA Flange

**VSWR:**

- 2:1, max.

**Modulation Type:**

- Direct carrier frequency modulation

**Modulation Capability:**

- $\pm 150$  kHz deviation

**Modulation Indication:**

- Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than  $\pm 2\%$

**Exciter:**

- Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter.

**RF Harmonic Attenuation:**

- 80 dB, min.

**Power Supply Rectifiers:**

- Silicon

**MONAURAL OPERATION**

**Audio Input Impedance:**

- 600 ohms, balanced

**Audio Input Return Loss:**

- 30 dB or better

**Audio Input Level:**

- +10 dBm (6.93 volts peak-to-peak) @ 600 ohms for  $\pm 75$  kHz deviation.

**Audio Frequency Response:**

- $\pm 0.5$  dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

- 0.08% max.; 20 Hz to 15 kHz (Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

- 0.08% or less, 60 Hz/7 kHz 4:1 ratio

**FM S/N Ratio (FM Noise):**

- 75 dB min. below  $\pm 75$  kHz deviation @ 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

- 55 dB RMS below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

- 40 dB below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, FM modulation  $\pm 75$  kHz @ 400 Hz

**WIDEBAND OPERATION**

**Composite Inputs:**

- Balanced, unbalanced and test

**Composite Input Impedance:**

- 5,000 ohms, nominal

**Composite Input Level:**

- 1.25 volts RMS (3.54 volts peak-to-peak) for  $\pm 75$  kHz deviation

**Composite Amplitude Response:**

- $\pm 0.1$  dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

- 0.08% max

**Composite Intermodulation Distortion:**

- 0.08% max.; 60 Hz/7 kHz 4:1 ratio

**Two SCA Inputs:**

- Balanced or unbalanced

**SCA Input Impedance:**

- 50,000 ohms, nominal

**SCA Input Level:**

- 1.25 volts RMS for  $\pm 7.5$  kHz deviation

**SCA Amplitude Response:**

- $\pm 0.3$  dB, 40 kHz to 100 kHz

**STEREO OPERATION**

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.

**Stereo Separation:**

- 50 dB min.; 50 Hz to 15 kHz. (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

- 0.08% max.; 50 Hz to 15 kHz. (Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

- 0.08% max.; 60 Hz/7 kHz, 4:1 ratio.

**FM Noise:**

- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

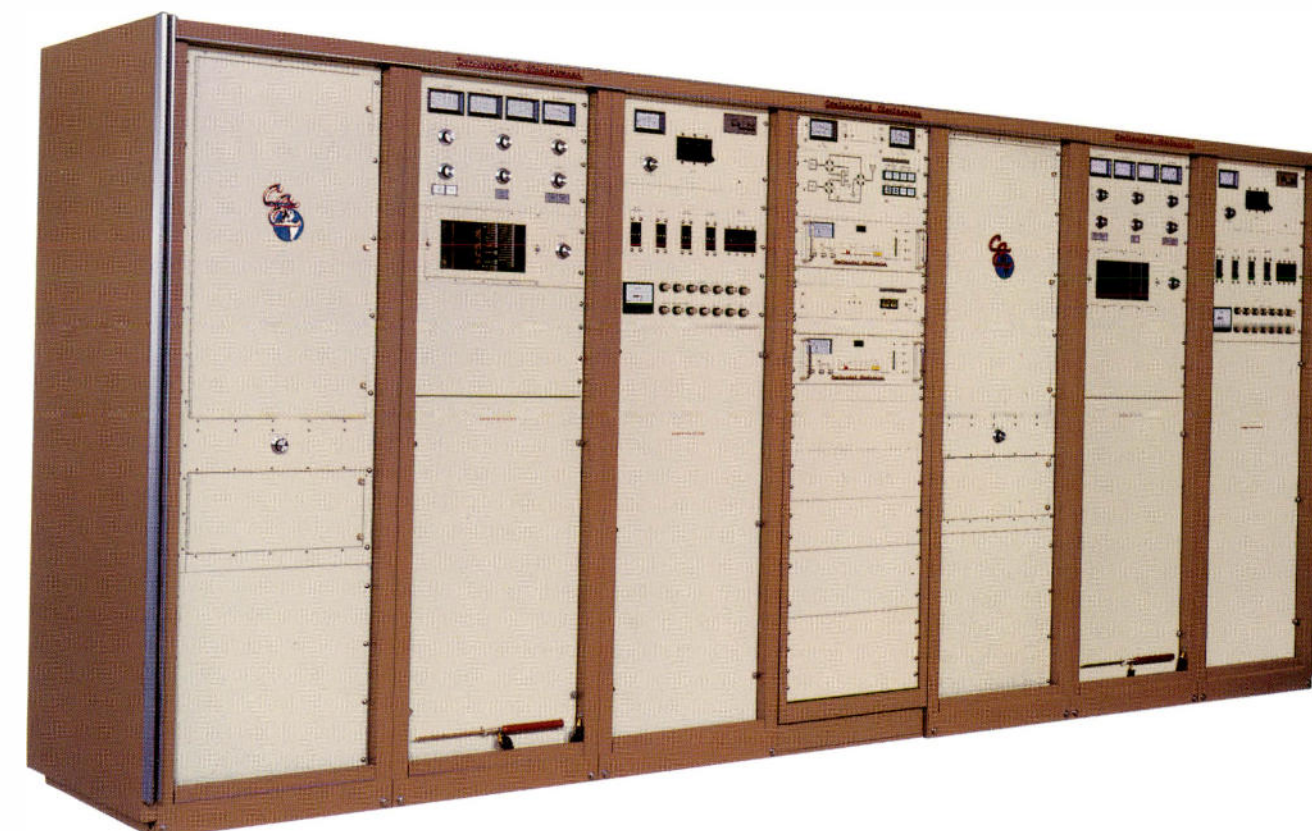
**Linear Crosstalk**

- 55 dB

**SCA OPERATION**

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" SCA Generator is used.

**New  
Solid-state  
Drivers**



**FEATURING 802A SOLID-STATE EXCITER**

**MODULAR CONCEPT OFFERS BROADCASTERS MAXIMUM FLEXIBILITY**

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output thru the use of a combiner.

Continental's Type 817R-2A 40,000 watt transmitter consists of two Type 816R-2A 20,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 40,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

Continental's Type 817R-1 50,000 watt transmitter consists of two Type 816R-3 25,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 50,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

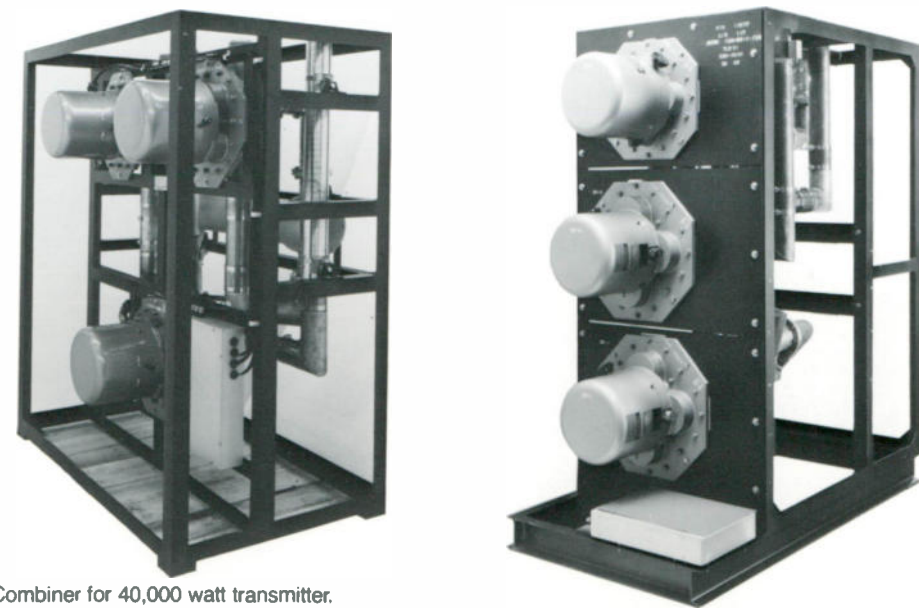
Continental's Type 817R-4 55,000 watt transmitter consists of two Type 816R-4 27,500 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 55,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

**PROVEN POWER AMPLIFIER**

A field-proven 4CX15000A power amplifier tube is used to save on operating costs. The high plate dissipation rating and proven design enhance long-life performance. Continental's unique grounded screen tetrode design eliminates screen bypass capacitors and provides excellent stability.

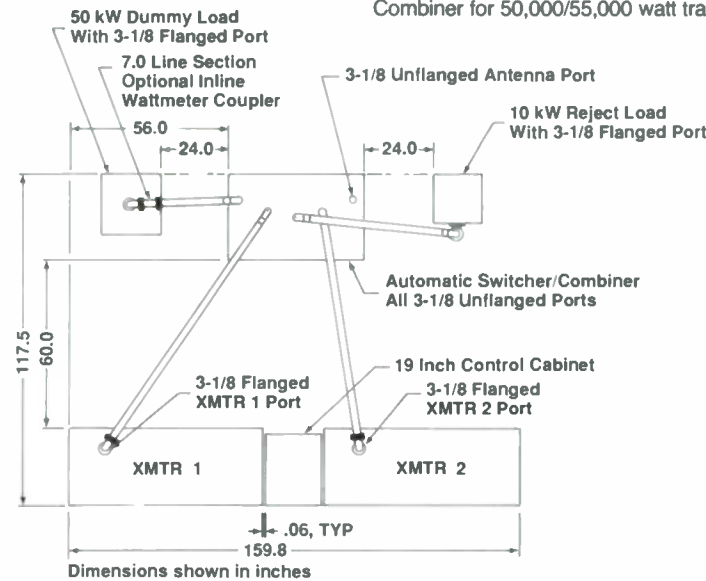
**FAST INSTALLATION**

For shipments within the continental United States, all components are in-place and interconnected. AC power, audio inputs, monitoring outputs and transmission line hookups are direct and can enter either at bottom or top of cabinet. 28-volt dc power supply is built-in for optional remote control. Harmonic filter is in-place and ready to operate.

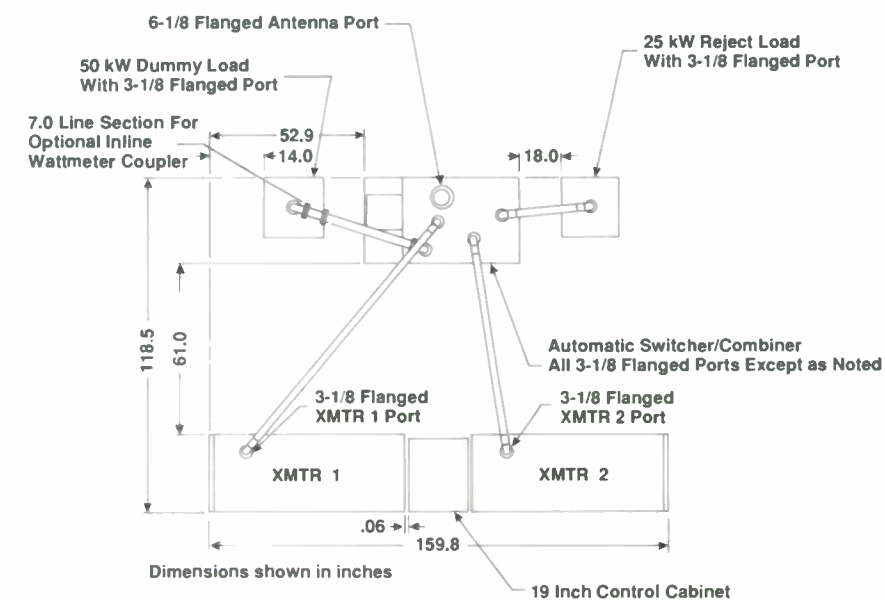


Combiner for 40,000 watt transmitter.

Combiner for 50,000/55,000 watt transmitter.



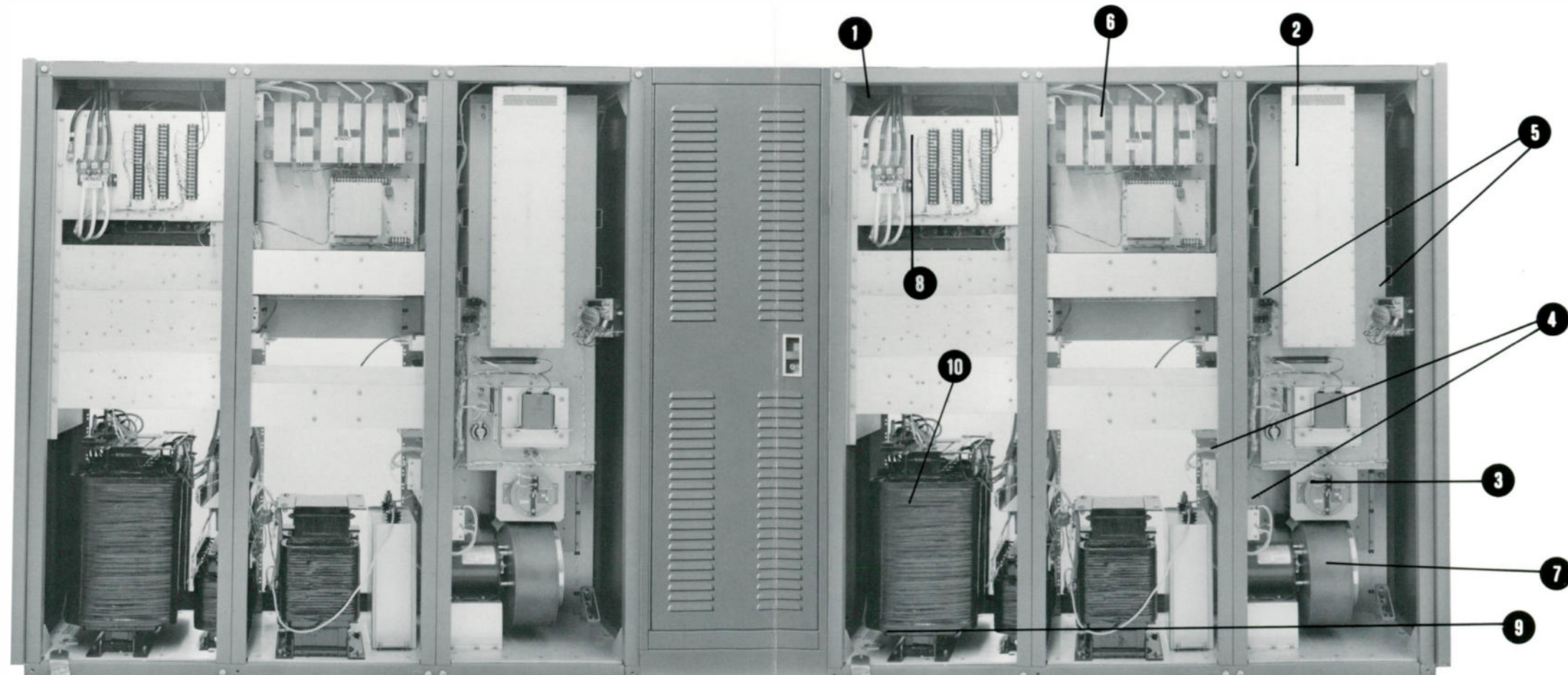
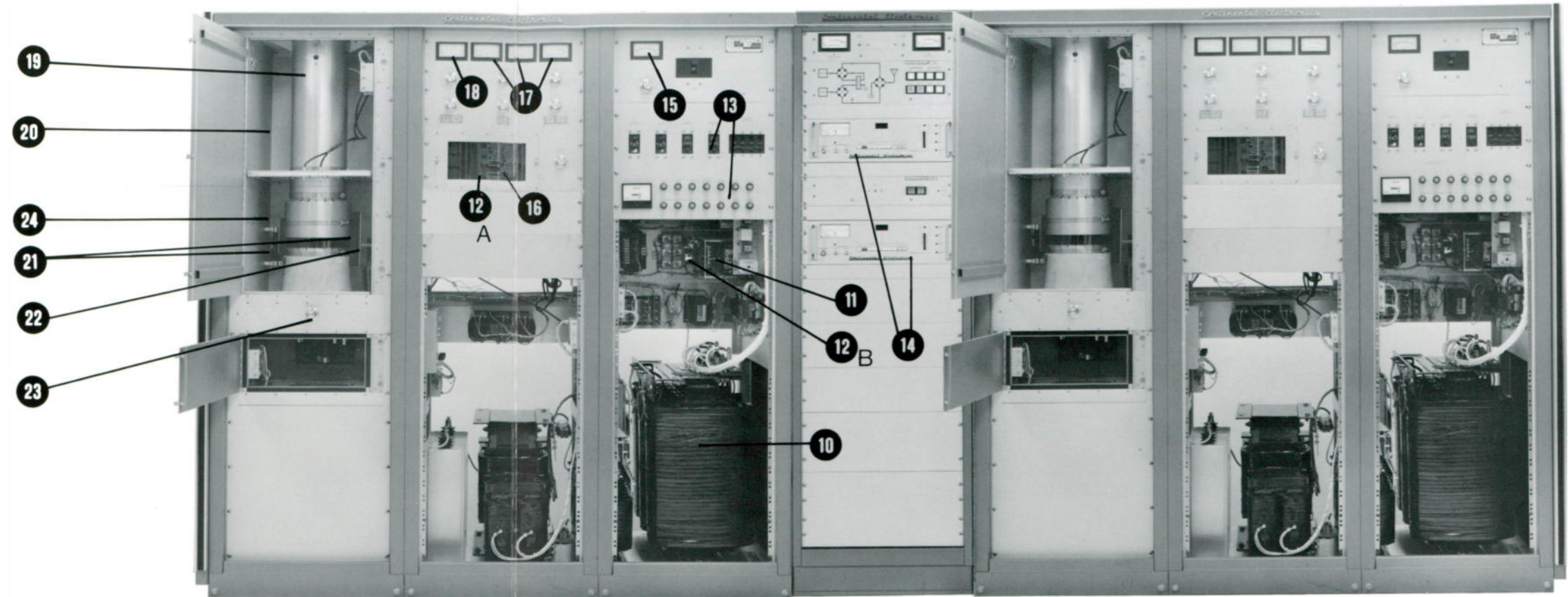
Typical Plan View, 40 kW FM Transmitter Installation



Typical Plan View, 50 kW FM Transmitter Installation

**THE INSIDE STORY**

1. Cabinet flushing blower. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. Air switch. Located here for easy access.
4. Interlocks. Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. Tuning and loading motors. These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
7. PA blower. 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. Remote control connectors. Conveniently located for simple setup.
9. Power wire (Bottom Entry). Either bottom or top entry is available.
10. Power supply. A self-contained integral part of the transmitter.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control Card
  - B. Control drive assembly
13. Indicator fuses and circuit breakers. There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. 802A Exciter.
15. True rms iron vane meter and 150-A ac mains circuit breaker. Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
16. LED-equipped card cage. Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. Continuous readout meters. At a glance you'll know plate current, plate voltage, and output power.
18. DC multimeter. Eleven operating parameters at the turn of a dial.
19. PA exhaust stack temperature sensor. Redundant backup to the air flow switch protects the final if cooling air is lost or overdispersion occurs.
20. Wide-band 1/4-wave cavity. A proven feature for greater reliability.
21. Tuning and loading controls. An exclusive motorized feature for easy adjustments.
22. Static drain choke. Bleeds off static buildup in transmission lines or antennas.
23. Driver plate adjustment. A single control tunes the driver plate.
24. Final. The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.





**New!**  
**Solid-state Driver**  
**For 816R Series**  
**FM Transmitters**

### Solid-State Driver For 816R Series FM Transmitters

Continental's Type 816R Series of 10 kW, 20 kW, 25 kW, 27.5 kW and 35 kW FM transmitters have proven to be very reliable and popular with broadcasters around the world.

These high performance, state-of-the-art transmitters use Continental's Type 802A exciter to deliver a crisp, clean signal.

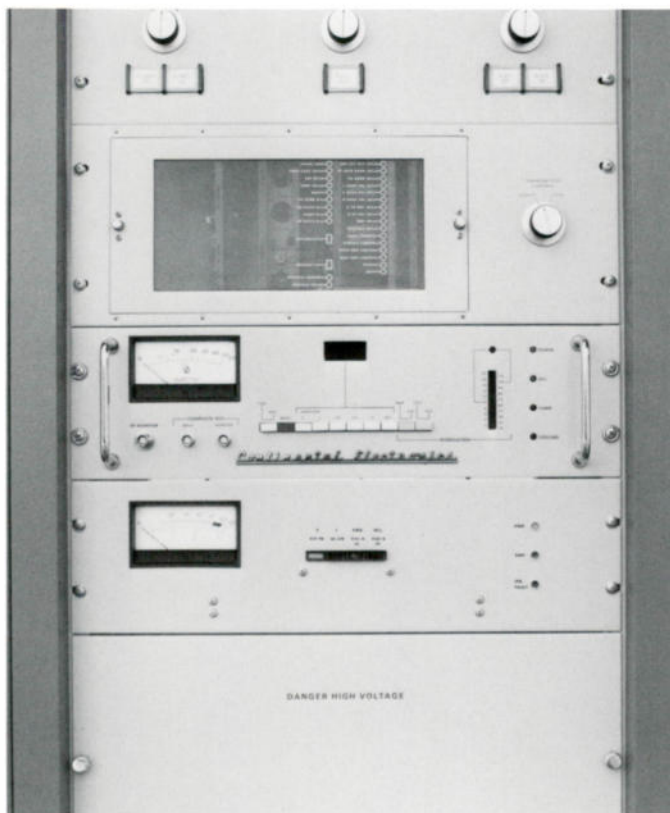
With the addition of the solid-state driver, the 816R Series transmitters offer an increased bandwidth at all power levels from 10 kW through 35 kW.

The RF chain consists of the Type 802A 50 watt exciter and a solid-state 600 watt IPA driving a 4CX10,000D, 4CX15,000A or a 9019/YC130 tetrode tube, depending upon transmitter power level, in the final amplifier. (The 10 kW transmitter uses a 4CX10,000D; the 20/25 and 27.5 kW transmitters use a 4CX15,000A, and the 35 kW transmitter uses a 9019/YC130 tetrode).

The output network consists of a fore-shortened quarter-wave coaxial resonator and harmonic filter. The harmonic filter is contained within the transmitter cabinet.

Control circuits are of a conventional, low voltage design (28 volts, dc). IC logic is used for control/monitor functions such as SWR foldback, automatic power control and power failure recycle circuits.

Solid-state drivers will be available on new 816R Series transmitters; existing 816R Series transmitters can be modified to accept the solid-state driver.

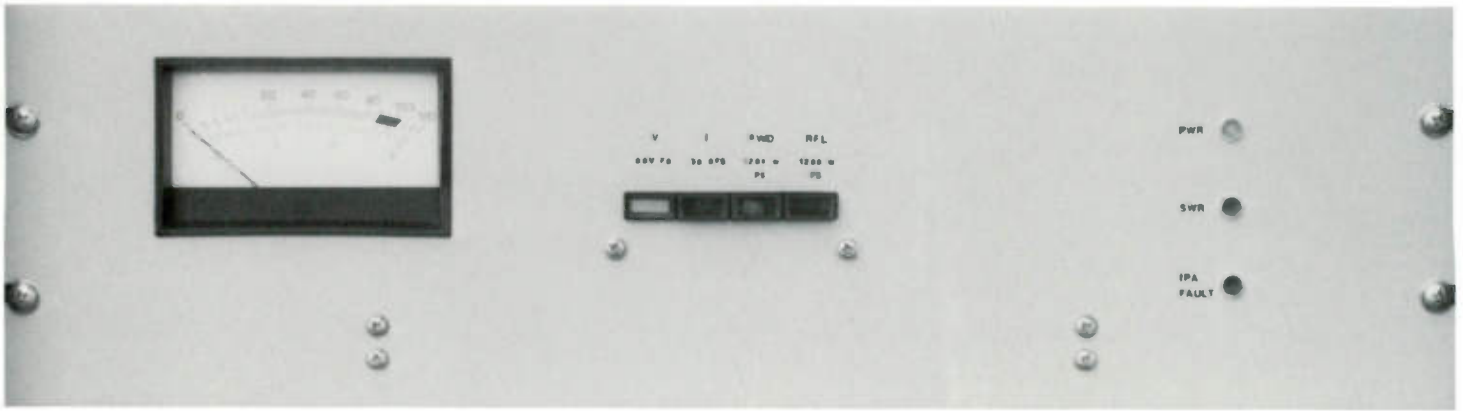


Solid-state control panel/module mounts below the exciter control panel/module on all 816R Series transmitters.

### Overview

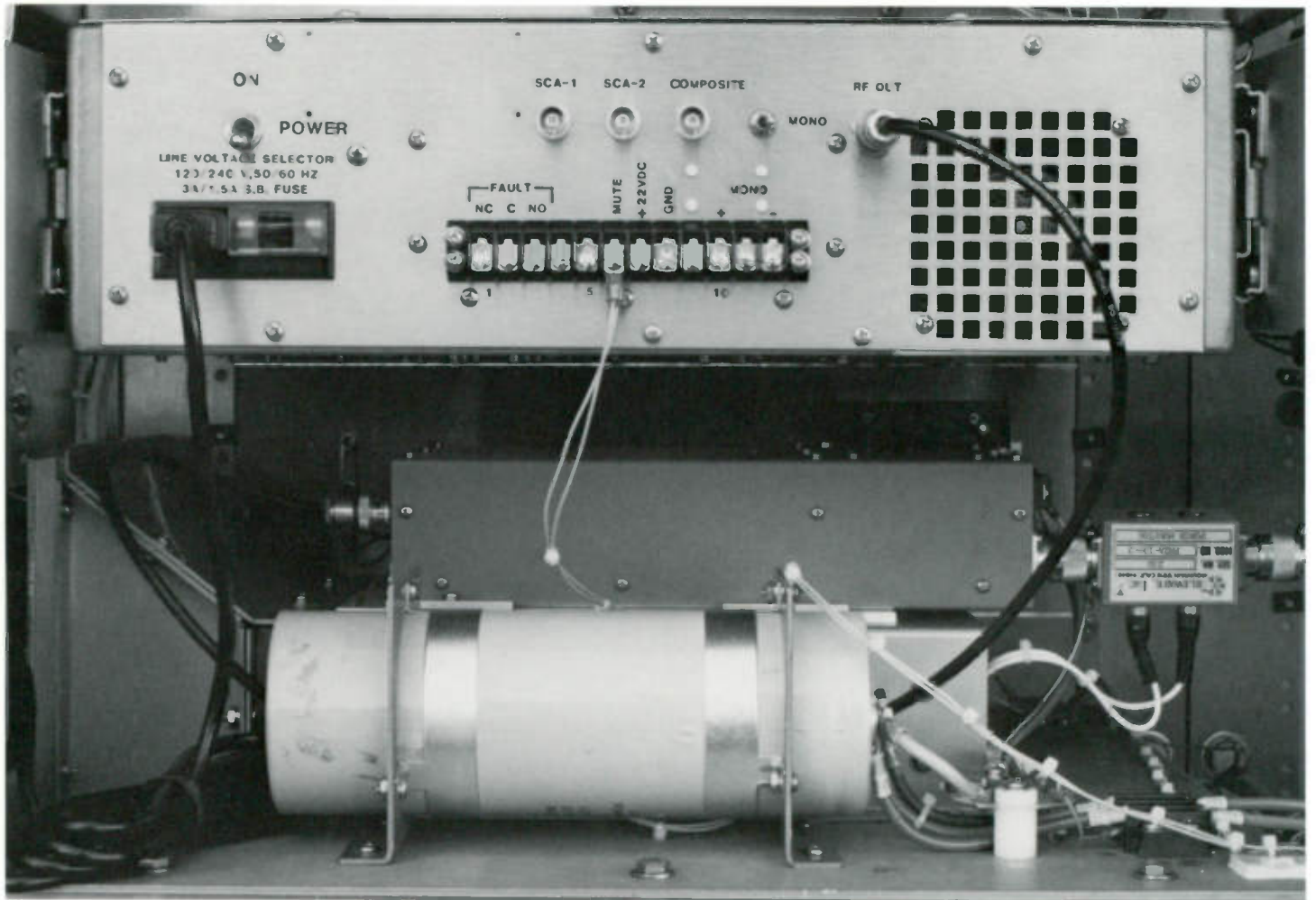
- Solid-state IPA (driver)
- Increased Bandwidth
- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- True RMS Filament Voltage Metering
- True RMS Filament Voltage Regulation
- Two/Four Shot Overload Recycle
- AC Power Failure Recycle
- Internal Diagnostics
- Remote Control/Monitoring Interface
- Self-contained Harmonic Filter
- 100% Self-protected Solid-state Driver Module





Above: close-up of solid-state driver control panel from in front of the transmitter.

Below: rear view of transmitter, with panel removed, shows solid-state driver module mounted just below the exciter module.



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# Continental Electronics Corporation

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX NUMBER (214) 381-4949 TELEX ADDRESS: 73-398

## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### GENERAL

**Rated Power Output:**  
 816R-2C: 21.5 kW  
 816R-3C: 25 kW  
 816R-4C: 27.5 kW  
 816R-5C: 35 kW

**Power Consumption:**  
 816R-2C: 33 kW nominal  
 816R-3C: 40 kW nominal  
 816R-4C: 42 kW nominal  
 816R-5C: 54 kW nominal

**Frequency Range:**  
 88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
 Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
 $\pm 250$  Hz

**Output Impedance:**  
 50 ohms

**Output Connector:**  
 3-1/8" EIA flange

**VSWR:**  
 2:1, maximum

**Modulation Type:**  
 Direct carrier frequency modulation

**Modulation Capability:**  
 $\pm 150$  kHz deviation

**Modulation Indication:**  
 Digital LED display shows true peak level of modulating signal in 5% increments.

**Exciter:**  
 Solid-state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:**  
 - 80 dB, minimum

**Power Supply Rectifiers:**  
 Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
 600 ohms, balanced

**Audio Input Return Loss:**  
 30 dB or better

**Audio Input Level:**  
 + 10 dBm (6.93 V peak-to-peak) at 600 ohms for  $\pm 75$  kHz deviation

**Audio Frequency Response:**  
 $\pm 0.5$  dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
 0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
 0.08% or less, 60 Hz/7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
 75 dB minimum, below  $\pm 75$  kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
 55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
 50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation  $\pm 75$  kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
 Balanced, unbalanced and test

**Composite Input Impedance:**  
 5,000 ohms, nominal

**Composite Input Level:**  
 1.25 V RMS (3.54 V peak-to-peak) for  $\pm 75$  kHz deviation

**Composite Amplitude Response:**  
 $\pm 0.2$  dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
 0.08% maximum

**Composite Intermodulation Distortion:**  
 0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**Three SCA Inputs:**  
 Balanced or unbalanced

**SCA Input Impedance:**  
 15,000 ohms, nominal

**SCA Input Level:**  
 Adjustable 1.25 V RMS for 10% injection.

**SCA Amplitude Response:**  
 $\pm 0.3$  dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
 50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
 0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
 0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**FM Noise:**  
 - 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

**Linear Crosstalk:**  
 - 55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**  
 - 60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**  
 - 50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):**  
 - 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation frequency, 150 microsecond de-emphasis

### ELECTRICAL

**Power Source:**  
 200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**  
 $\pm 5\%$  (each phase voltage variation; within 5% of the average of all three phases)

**Filament Regulator:**  
 $\pm 1\%$  of optimum

### OPERATING ENVIRONMENT

**Operating Altitude:**  
 7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**  
 - 20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
 0 to 95%

### MECHANICAL

**Transmitter: (including directional coupler)**  
 73" (185.5 cm) H  
 72" (183 cm) W  
 28" (71 cm) D

**Weight:**  
 1,962 lbs (890 kg) nominal

**35 kW External Plate Transformer:**  
 46" (117 cm) H  
 35" (89 cm) W  
 24" (61 cm) D

**Weight:**  
 901 lbs (409 kg) nominal

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## CONTINENTAL'S 816R SERIES 21.5, 25, 27.5 & 35 kW BROADCAST TRANSMITTERS

# fm



# Continental Electronics Corporation

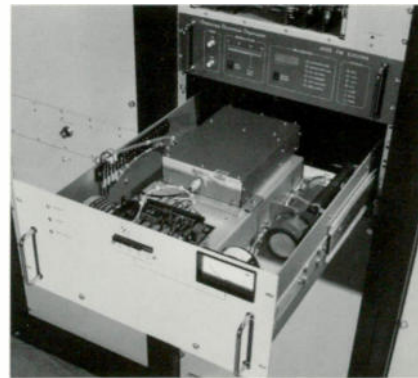
## THE HIGH POWER FM TRANSMITTER

### FEATURES

**Solid-State IPA**  
**"Soft Start™"**  
**Totally Self Contained**  
**Internal Harmonic Filter**  
**Front Panel Indicators and Breakers**  
**Automatic Power Level Control**

Continental's 21.5, 25, 27.5 and 35 kW transmitters offer the broadcaster excellent stereo performance and separation, low noise and power consumption and a field proven track record of dependability. The transmitter power may be adjusted, using front panel controls, to any level between 0 and 100% with minimal tuning.

These transmitters use only one tube, the final power amplifier tube. The IPA is totally solid state and requires no tuning. The exclusive "soft-start™" circuit and low voltage controls allow the transmitter to recycle and return to the exact previous operational status. This feature assists in prolonging component life and enhances product reliability.



**Solid-State IPA** in this transmitter increases reliability and decreases maintenance and complexity. This IPA also offers greater bandwidth and a self-protecting RF module. The entire IPA section of the 816R series transmitters is mounted on slides for easy access.

**SCR "Soft-Start™"** gently applies primary voltage to the plate and screen power supplies when the plate control is turned on. The SCRs are conservatively rated at 350A in a 40A to 75A circuit.

**Automatic Power Output Control** uses an all solid-state SCR Power Controller to automatically maintain the power output to any preset level. The power can also be manually adjusted from zero to full rated power with a single front panel control. A unique feature of the Continental transmitters is the ability to control both the plate and screen voltages simultaneously so that the transmitter stays tuned at all power levels.

**Broadband Quarter Wave Cavity** uses the highly reliable, long life 4CX15000A tube in all power levels from 21.5kW through 27.5kW. (9019 in the 35kW)

**Automatic Filament Voltage Regulation** keeps a constant filament voltage on the PA tube to help extend tube life.

**Screen Neutralization** is used in the PA in a highly stable grounded screen grid circuit.

**Automatic Power Interrupt Recycle** remembers and restores the transmitter to its previous operating status after a momentary power interruption.

**Two Independent VSWR Protection Circuits** prevent the reflected power from exceeding safe levels. One circuit handles severe instantaneous mismatches, such as lightning strikes, by momentarily interrupting the plate and screen voltage when the reflected power reaches a preset level. The second circuit limits the reflected power to a preset level by controlling the plate and screen voltage during icing conditions. This allows the transmitter to operate at the highest safe user selected power level during severe antenna icing.

**Completely Self Contained** in a single cabinet including the high voltage power supply, harmonic filter and filament voltage regulator. In the 35kW transmitter the high voltage power supply is housed in a separate cabinet.

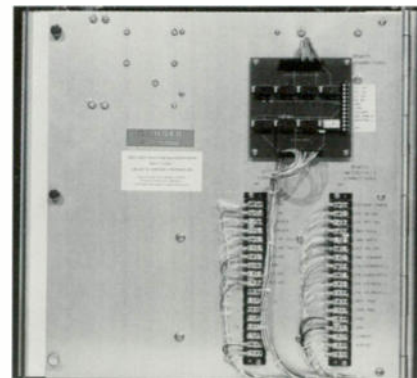
**Positive Pressure Cabinet** keeps dust from collecting on critical components. The 816R filtered air intake and exhaust are located on the top of the cabinet for easy ductwork installation.

### THE 35kW TRANSMITTER

The 35kW Transmitter is comparable to the other 816R transmitters with two exceptions. This transmitter utilizes the conservatively rated 9019 tetrode in the final amplifier. The other difference in this transmitter is the external plate supply cabinet. This cabinet may be located up to 20 feet away from the transmitter cabinet. All other aspects of this transmitter remain unchanged.

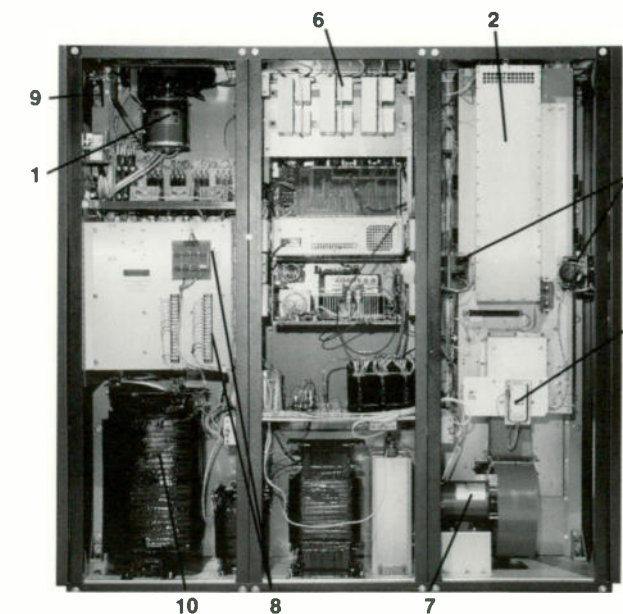
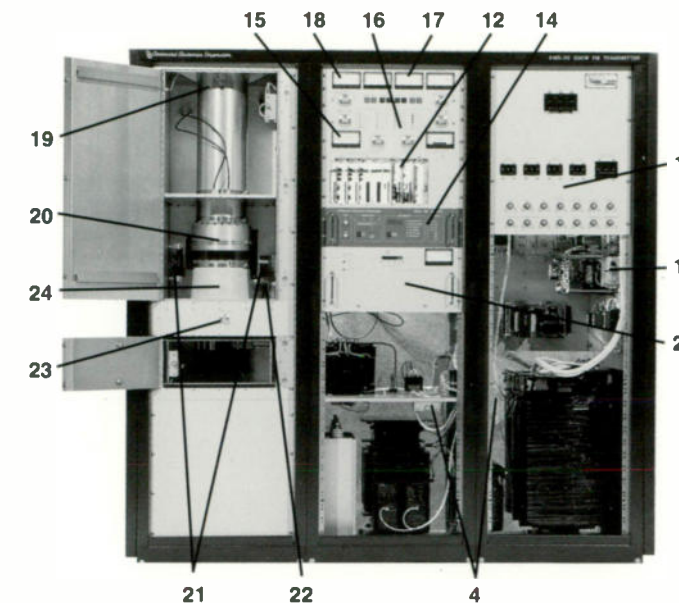
### THE EXCITER

All Continental transmitters come equipped with the 802B exciter. This exciter may be operated from 5 to 50 watts depending on the amount of drive required for the power amplifier. This exciter may also be used as an emergency transmitter directly into the antenna.



Remote Control Interfaces

## THE INSIDE STORY



6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft-start™", which initially brings up the transmitter gently.

7. **PA blower.** 1 hp PA exhaust blower moves 525 cfm of cooling air through the PA tube which extends tube life and reduces heat accumulation.

8. **Remote control connections.** Conveniently located for simple set up.

9. **Power wiring.** Either bottom or top entry is available; top entry shown here.

10. **Power supply.** A self-contained integral part of the transmitter (except 35 kW).

11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.

12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.

13. **Indicator fuses & circuit breakers.** In the event of a failure, indicators glow brightly for fast troubleshooting.

14. **802B exciter.**

15. **True RMS iron vane meter.** Meter gives readings on each of the three ac voltage phases, as well as filament voltage.

16. **LEDs.** Twenty-seven LEDs give a quick status readout of the protection circuits and control modes.

17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage and output power.

18. **DC multimeter.** Five operating parameters at the turn of a dial.

19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final stage if cooling air is lost or over-dissipation occurs.

20. **Wideband quarter-wave cavity.** A proven design for greater reliability.

21. **Tuning & loading controls.** Exclusive motorized system for easy adjustments.

22. **Static drain choke.** Bleeds off static build-up in transmission lines and antennas.

23. **PA grid adjustment.** Convenient controls for tuning the PA grid.

24. **Final amplifier.** The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.

25. **Solid-state IPA.**

1. **Cabinet flushing fan.** This powerful fan with washable air filter delivers approximately 815 cfm to maintain positive cabinet air pressure.

2. **Harmonic filter.** Fully contained inside cabinet for easy transmitter installation while reducing overall space requirements.

3. **Air switch.** Positioned for easy access.

4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.

5. **Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.



# Continental Electronics Corporation

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## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### GENERAL

**Rated Power Output:**

11 kW (11.5kW maximum)

**Power Consumption:**

17.8 kW, nominal (at 10 kW)

**Frequency Range:**

88 to 108 MHz

**Frequency Control:**

Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**

± 250 Hz

**Output Impedance:**

50 ohms

**Output Connector:**

3-1/8" EIA flange

**VSWR:**

2:1, maximum

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

±200 kHz deviation

**Modulation Indication:**

Bargraph: 5% increments; Digital meter: 0.1% resolution.

**Exciter:**

Solid state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:**

- 80 dB, minimum

**Power Supply Rectifiers:**

Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**

600 ohms, ±5% balanced

**Audio Input Level:**

+ 10 dBm ± 2dB (6.93 V peak-to-peak at 600 ohms) for ± 75 kHz deviation

**Audio Frequency Response:**

± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08%; 50 Hz to 15 kHz

**Intermodulation Distortion:**

0.08% SMTPE method

**FM S/N Ratio (FM Noise):**

80 dB below ± 75 kHz deviation at 400 Hz

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

50 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ±75 kHz at 400 Hz

### COMPOSITE OPERATION

**Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nominal

**Composite Input Level:**

1.25 V RMS (3.54 V peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**

± 0.2 dB, 20 Hz to 100 kHz

**Composite Intermodulation Distortion:**

0.08% SMTPE method

**Composite Total Harmonic Distortion:**

0.08%, 50 to 15 kHz

**Three SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

15,000 ohms, nominal

**SCA Input Level:**

1.25 V RMS for 10% injection

**SCA Amplitude Response:**

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications

are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**

50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**FM Noise:**

- 72 dB referenced to 400 Hz, 75 kHz deviation.

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used.

### ELECTRICAL

**Power Source:**

200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**

± 5%

**Filament Regulator:**

± 1% of optimum

### OPERATING ENVIRONMENT

**Altitude:**

0 to 7,500 ft (0 to 2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**

- 20°C to +50°C (- 4°F to + 122°F)

**Relative Humidity:**

0 to 95%

### MECHANICAL

**Transmitter:**

69" (175 cm) H  
45" (114.3 cm) W  
34" (86.36 cm) D

**Weight:**

1,658 lbs (544 kg) nominal

All specifications are subject to change without notice.  
Printed in USA 1M 294  
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## CONTINENTAL'S 816B 11kW BROADCAST TRANSMITTER

*fm*



# Continental Electronics Corporation

## THE FM TRANSMITTER

### FEATURES

Solid-State IPA

"Soft Start™"

Totally Self Contained

Internal Harmonic Filter

Front Panel Indicators and Breakers

Automatic Power Level Control



Slide-Out Tube Socket

Continental's 11kW transmitter offers the broadcaster excellent stereo performance and separation, low noise and power consumption and a field proven track record of dependability. The transmitter power may be adjusted, using front panel controls, to any level between 0 and 100% with minimal tuning.

This transmitter uses only one tube, the final power amplifier tube. The IPA is totally solid state and requires no tuning. The exclusive "Soft-Start™" circuit and low voltage controls allow the transmitter to recycle and return to the exact previous operational status. This feature assists in prolonging component life and enhances product reliability.

**Solid-State IPA** in this transmitter increases reliability and decreases maintenance and complexity. This IPA also offers greater bandwidth and a selfprotecting RF module. The entire IPA section of the 816B transmitter is mounted on slides for easy access.

**SCR "Soft-Start™"** gently applies primary voltage to the plate and screen power supplies when the plate control is turned on. The SCRs are conservatively rated at 140A in a 22A to 32A circuit.

**Automatic Power Output Control** uses an all solid-state SCR Power Controller to automatically maintain the power output to any preset level. The power can also be manually adjusted from zero to full rated power with a single front panel control. A unique feature of the Continental transmitter is the ability to control both the plate and screen voltages simultaneously so that the transmitter stays tuned at all power levels.

**Broadband Quarter Wave Cavity** uses the reliable, long life 4CX15000A tube.

**Automatic Filament Voltage Regulation** keeps a constant filament voltage on the PA tube to help extend tube life.

**Screen Neutralization** is used in the in a highly stable grounded screen grid circuit.

**Automatic Power Interrupt Recycle** remembers and restores the transmitter to its previous operating status after a power interruption.

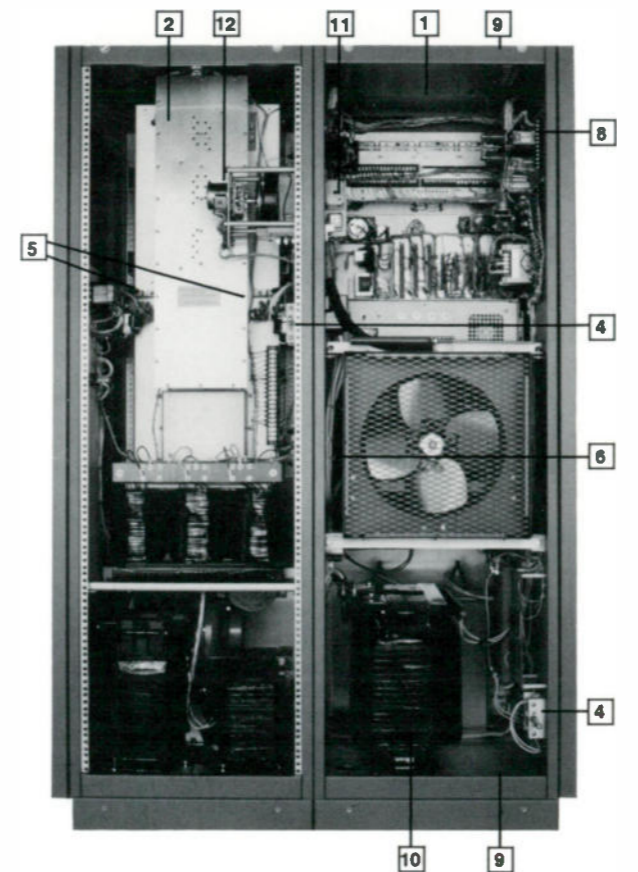
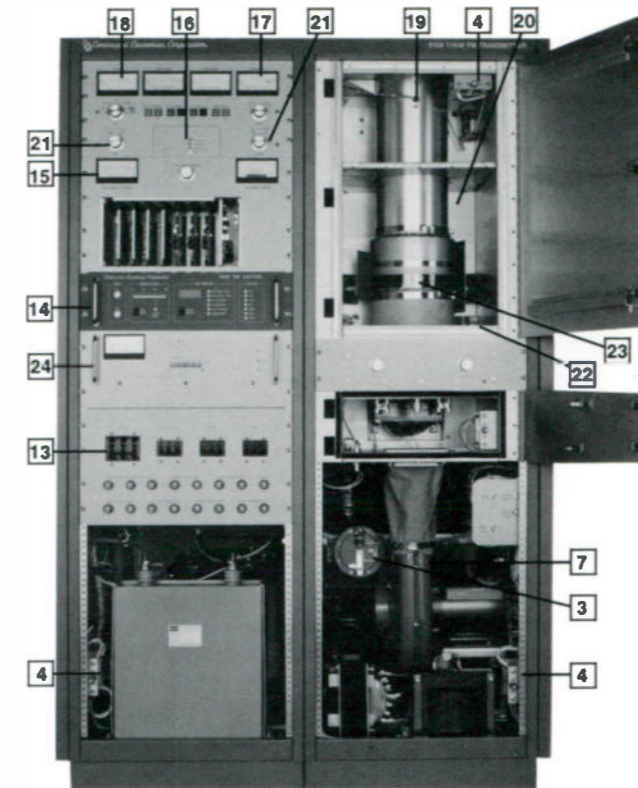
**Two Independent VSWR Protection Circuits** prevent the reflected power from exceeding safe levels. One circuit handles severe instantaneous mismatches, such as lightning strikes, by momentarily interrupting the plate and screen voltage when the reflected power reaches a preset level. The second circuit limits the reflected power to a preset level by controlling the plate and screen voltage during icing conditions. This allows the transmitter to operate at the highest safe user selected power level during severe antenna icing.

**Completely Self Contained** in a single cabinet including the high voltage power supply, harmonic filter and filament voltage regulator.

**Positive Pressure Cabinet** keeps dust from collecting on critical components. The 816B filtered air intake is located on the rear door and air exhaust is located on the top of the cabinet for easy ductwork installation.

## THE EXCITER

All Continental transmitters come equipped with the 802B exciter. This exciter may be operated from 5 to 50 watts depending on the amount of drive required for the power amplifier. This exciter may also be used as an emergency transmitter.



## THE INSIDE STORY

1. **Cabinet flushing blower.** The high speed fan delivers 750 cfm to maintain positive cabinet pressure. Air filters are washable.

2. **Harmonic filter.** Fully contained inside cabinet for easy system installation while reducing overall space requirements.

3. **Air switch.** Positioned for easy access and adjustment.

4. **Interlocks.** Located at each access panel, interlocks automatically remove high voltage when panels are removed.

5. **Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA.

6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback loop that maintains constant forward power output with line voltage variations.

7. **PA blower.** 1/2 hp PA exhaust blower moves 490 cfm of cooling air through the PA tube.

8. **Remote control interface.** Conveniently located for easy set up.

9. **AC power input.** Top or bottom entry is provided.

10. **Power supply.** Self-contained within the cabinet.

11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown in the event of AC mains problems.

12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.

13. **Indicator fuses & circuit breakers.** Front panel accessibility for fast trouble shooting.

14. **802B exciter.**

15. **True RMS iron vane meter.** Meter provides AC voltage measurement of the three input phases, as well as filament voltage.

16. **LED Status.** Gives a quick status readout of protective circuits and control modes.

17. **Continuous readout meters.** At a glance you will know plate current, plate voltage and output power.

18. **DC multimeter.** Six operating parameters at the turn of a dial.

19. **PA exhaust stack temperature sensor.** Additional backup to the air flow switch protects the final stage if cooling air is lost or over dissipation occurs.

20. **Wideband quarter-wave cavity.** A proven design for greater reliability.

21. **Tuning & loading controls.** Exclusive motorized system for easy adjustments.

22. **Static drain choke.** Bleeds off static build-up in transmission lines or antennas.

23. **Final amplifier.** The high plate dissipation rating and proven design give long live performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.

24. **Solid-state driver.** 700 watt module delivers adequate power to the PA.

**CONTINENTAL'S  
816R - 6C SERIES  
30kW  
BROADCAST TRANSMITTER**

*fm*





# Continental Electronics Corporation

P. O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX (214) 381-4949 TELEX 73-398

## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### FEATURES

Continental's 30kW transmitter offers the broadcaster the same performance and reliability as the other 816R series transmitters. The following information pertains to the 30kW transmitter.

The 30kW transmitter uses the same power amplifier cavity and harmonic filter as the 35kW transmitter, the conservatively rated 9019 tetrode tube. The power supply is located inside the main transmitter cabinet and is conservatively rated. All other components in this new transmitter are used in the current 816R product line.

### GENERAL

**Rated Power Output:**  
30 kW

**Power Consumption:**  
816R-6C: 46 kW nominal

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
± 250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
3-1/8" EIA flange

**VSWR:**  
2:1, maximum

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
± 150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulating signal in 5% increments.

**Exciter:**  
Solid state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:**  
- 80 dB, minimum

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+ 10 dBm (6.93 V peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**  
± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz, 4:1 ratio

### FM S/N Ratio (FM Noise):

75 dB minimum, below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

### Synchronous AM S/N Ratio

#### (Incidental AM Noise):

50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 V RMS (3.54 V peak-to-peak) for ± 75 kHz deviation

#### Composite Amplitude Response:

± 0.2 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% maximum

#### Composite Intermodulation Distortion:

0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

#### Three SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

15,000 ohms, nominal

#### SCA Input Level:

Adjustable 1.25 V RMS for 10% injection.

#### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art stereo generator is used.

#### Stereo Separation:

50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

#### Intermodulation Distortion:

0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

#### FM Noise:

- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond

de-emphasis within a 20 Hz to 15 kHz bandwidth

#### Linear Crosstalk:

- 55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art SCA generator is used.

#### Crosstalk, SCA to Main and Stereo

##### (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA

##### (67 kHz and/or 92 kHz):

- 50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

#### Crosstalk, SCA to SCA

##### (67 kHz and/or 92 kHz):

- 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation frequency, 150 microsecond de-emphasis

### ELECTRICAL

#### Power Source:

200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

#### Permissible Line Voltage Variation:

± 5% (each phase voltage variation; within 5% of the average of all three phases)

#### Filament Regulator:

± 1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

#### Ambient Temperature Range:

- 20°C to +50°C (- 4°F to + 122°F)

#### Relative Humidity:

0 to 95%

### MECHANICAL

#### Transmitter:

##### (including directional coupler)

73" (185.5 cm) H

72" (183 cm) W

28" (71 cm) D

#### Weight:

2101 lbs (953 kg) nominal





## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### GENERAL

**Rated Power Output:**  
D816R-2C: 40 kW D816R-3C: 50 kW  
D816R-4C: 55 kW D816R-6C: 60 kW  
D816R-5C: 70 kW

**Power Consumption:**  
D816R-2C: 62 kW nominal  
D816R-3C: 80 kW nominal  
D816R-4C: 84 kW nominal  
D816R-6C: 60 kW nominal  
D816R-5C: 108 kW nominal

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
± 250 Hz

**Output Impedance:**  
50 ohms

**Combined Output Connector:**  
D816R-2C 3/4" unflanged. All other power levels 6/8" EIA flanged.

**VSWR:**  
2:1, maximum

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
± 150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulating signal in 5% increments.

**Exciter:**  
Solid-state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:**  
- 80 dB, minimum

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+ 10 dBm (6.93 V peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**  
± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz/7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB minimum, below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

### Synchronous AM S/N Ratio (Incidental AM Noise):

50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nominal

**Composite Input Level:**  
1.25 V RMS (3.54 V peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**  
± 0.2 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
0.08% maximum

**Composite Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**Three SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nominal

**SCA Input Level:**  
Adjustable 1.25 V RMS for 10% injection

**SCA Amplitude Response:**  
± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**FM Noise:**  
- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

**Linear Crosstalk:**  
- 55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art SCA generator is used.

### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

### Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):

- 50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

### Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):

- 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation frequency, 150 microsecond de-emphasis

### ELECTRICAL

**Power Source:**  
200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**  
± 5% (each phase voltage variation; within 5% of the average of all three phases)

**Filament Regulator:**  
± 1% of optimum

### OPERATING ENVIRONMENT

**Operating Altitude:**  
7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**  
- 20°C to +50°C (- 4°F to + 122°F)

**Relative Humidity:**  
0 to 95%

### MECHANICAL

**Transmitter:** (including directional coupler)  
73" (185.5 cm) H  
159.8" (406 cm) W  
28" (71 cm) D

Weight: 4,074 lbs (1,836 kg) nominal

**Combiner, 40 kW:**  
60" (152 cm) H  
48" (122 cm) W  
30" (76 cm) D

Weight: 790 lbs (358 kg) nominal

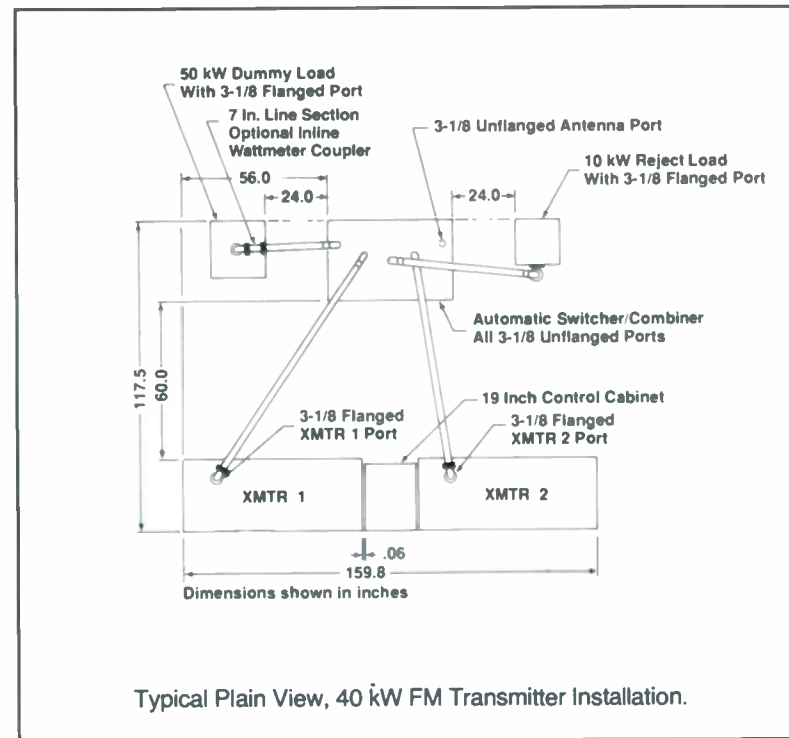
**Combiner, 50/55 kW:**  
73" (185 cm) H  
68 1/2" (174 cm) W  
31" (79 cm) D

Weight: 1,130 lbs (513 kg) nominal

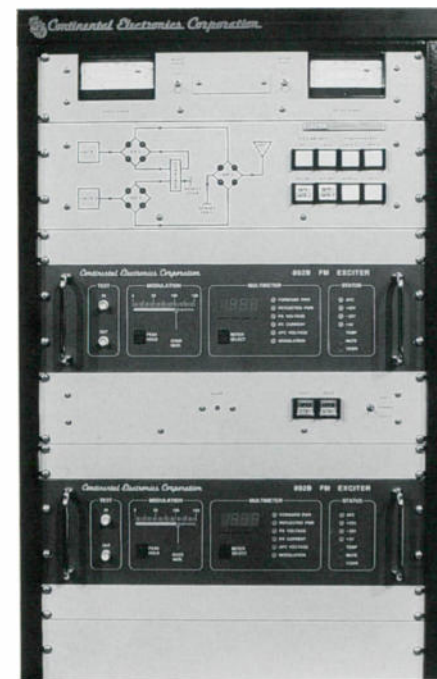
**Combiner, 70 kW:**  
73" (185 cm) H  
68 1/2" (174 cm) W  
31" (79 cm) D

Weight: 1,130 lbs (513 kg) nominal

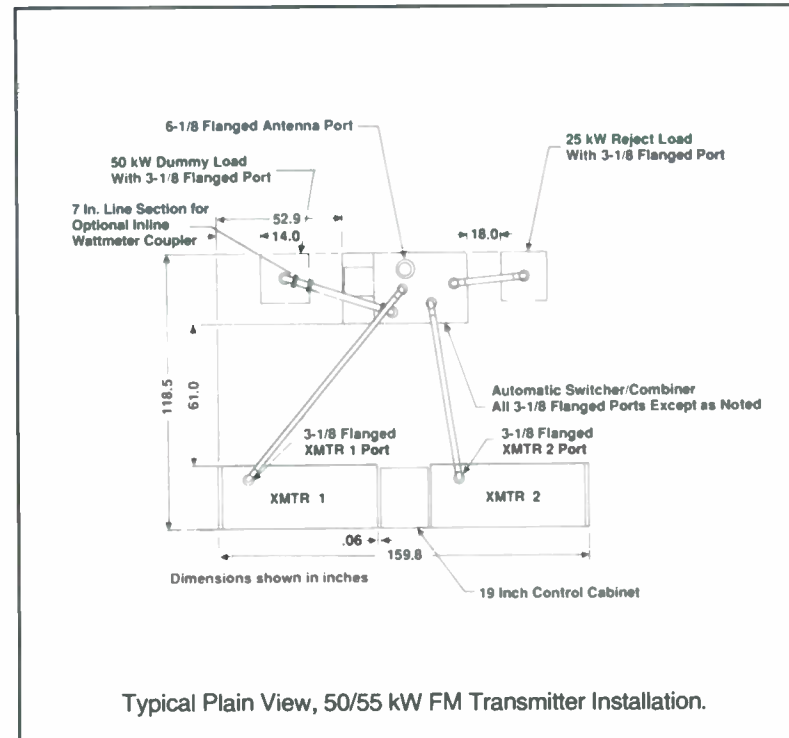
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Typical Plain View, 40 kW FM Transmitter Installation.



Optional automatic combiner control and automatic exciter control.



Typical Plain View, 50/55 kW FM Transmitter Installation.

## CONTINENTAL'S D816R SERIES 40, 50, 55, 60 & 70kW BROADCAST TRANSMITTERS

# fm



# Continental Electronics Corporation

## THE INSIDE STORY

### THE HIGH POWER FM TRANSMITTER

#### FEATURES

##### Solid-State IPA

##### "Soft Start™"

##### Totally Self Contained

##### Internal Harmonic Filter

##### Front Panel Indicators and Breakers

##### Automatic Power Level Control

Continental's 40, 50, 55, 60 and 70kW transmitters offer the broadcaster excellent stereo performance and separation, low noise and power consumption and a field proven track record of dependability. The transmitter power may be adjusted, using front panel controls, to any level between 0 and 100% with minimal tuning.

These transmitters use only one tube, the final power amplifier tube in each transmitter. The IPAs are totally solid-state and require no tuning. The exclusive "Soft-Start™" circuit and low voltage controls allow the transmitter to recycle and retrieve the exact previous operational status. This feature assists in prolonging component life and enhances product reliability.

**Solid-State IPAs** in this transmitter improve reliability and decrease maintenance and complexity. Solid-state IPAs offer greater bandwidth and self-protecting RF modules. The entire IPA section of the D816R series transmitter is mounted on slides for easy access.

**SCR "Soft-Start™"** gradually increases primary voltage to the plate and screen power supplies when the plate control is turned on.

**Automatic Power Output Control** uses an all solid-state SCR Power Controller to automatically maintain the power output to any preset level. The power can also be manually adjusted from zero to full rated power with a single front panel control. A unique feature of the Continental transmitters is the ability to control both the plate and screen voltages simultaneously providing the optimum ratio of plate to screen voltage for superior audio performance.

**Broadband Quarter Wave Cavity** uses the highly reliable, long life 4CX15000A tube in all power levels from 40kW through 55kW. The 60kW and 70kW transmitter use the conservatively rated 9019/YC130 tetrode tube.

**Automatic Filament Voltage Regulation** maintains a constant filament voltage on the PA tube to extend tube life.

**Screen Neutralization** is used in the PA in a highly stable grounded screen grid circuit.

**Automatic Power Interrupt Recycle** remembers and restores the transmitter to its previous operating status after a momentary power interruption.

**Two Independent VSWR Protection Circuits** prevent the reflected power from exceeding safe levels. One circuit handles severe instantaneous mismatches, such as lightning strikes, by momentarily interrupting the plate and screen voltage when the reflected power reaches a preset level. The second circuit limits the reflected power to a preset level by controlling the plate and screen voltage during icing conditions. This allows the transmitter to operate at the highest safe user selected power level during severe antenna icing.

**Completely Self Contained** in a single cabinet each individual transmitter includes the high voltage power supply, harmonic filter and filament regulator. In the 70kW transmitter the high voltage power supply for each 35kW transmitter is housed in a separate cabinet.

**Positive Pressure Cabinet** keeps dust from collecting on critical components. The D816R air intake and exhaust are located on the top of the cabinet for easy ductwork installation.

### THE 60kW TRANSMITTER

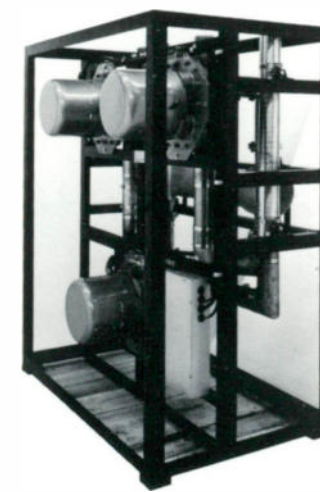
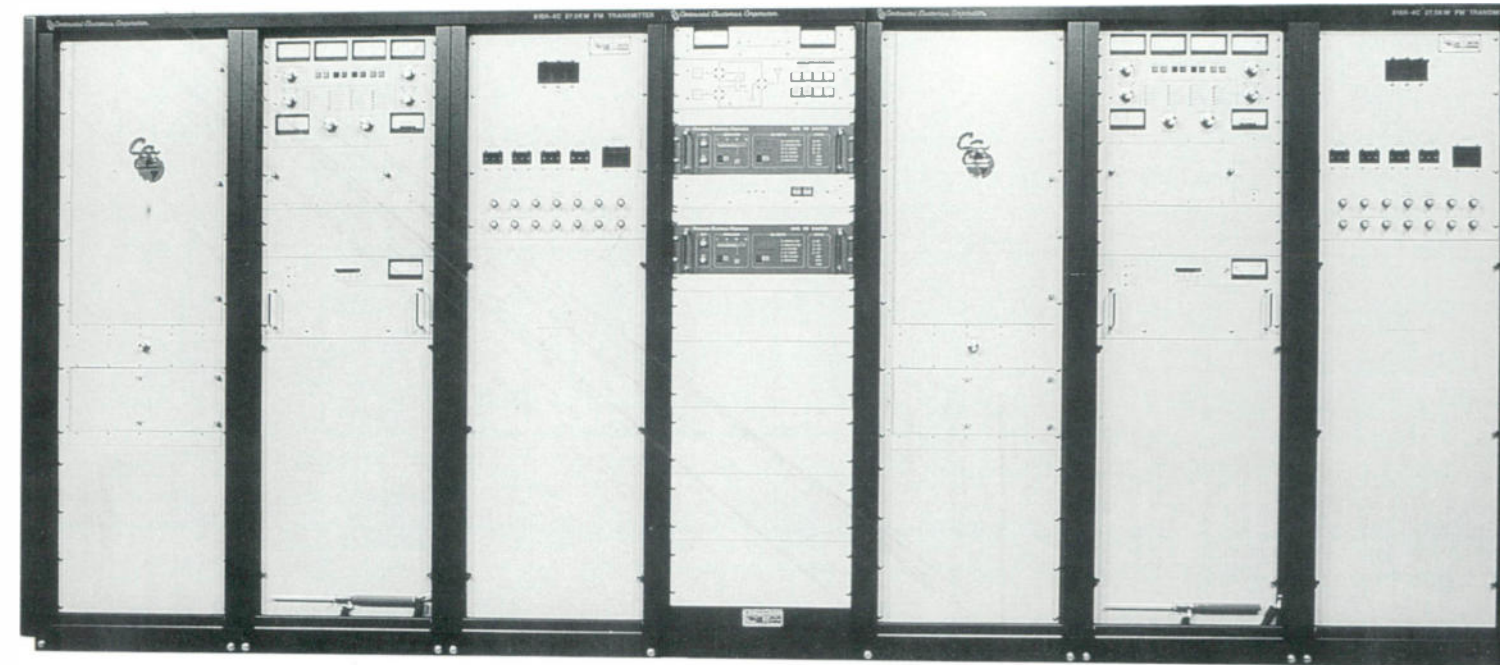
The 60kW Transmitter is comparable to the other D816R transmitters with one exception. This transmitter utilizes the conservatively rated 9019/YC130 tetrode in the final amplifier of each transmitter.

### THE 70kW TRANSMITTER

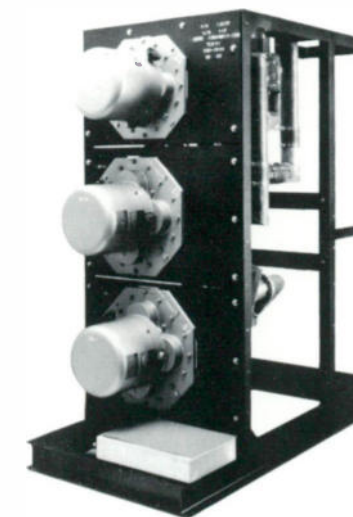
The 70kW Transmitter also utilizes the 9010/YC130 tetrode tube in each transmitter. The other difference is the external plate supply cabinet. This cabinet may be located up to 20 feet away from the transmitter cabinet. All other aspects of this transmitter remain unchanged.

### THE EXCITER

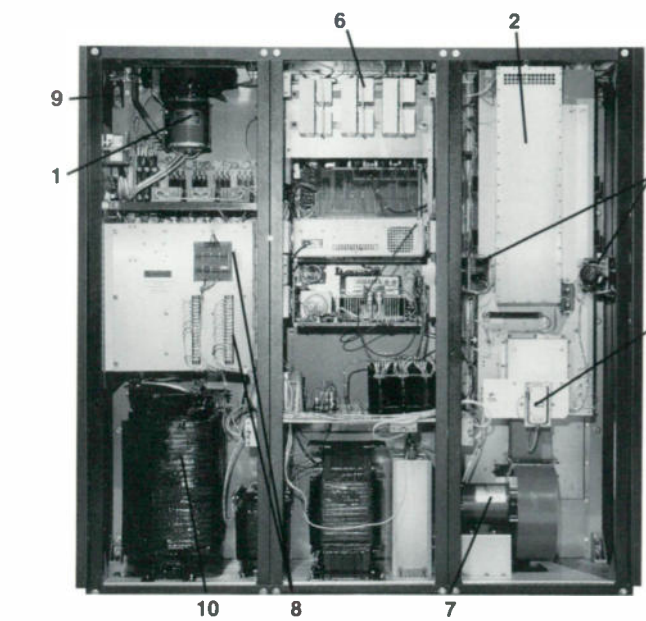
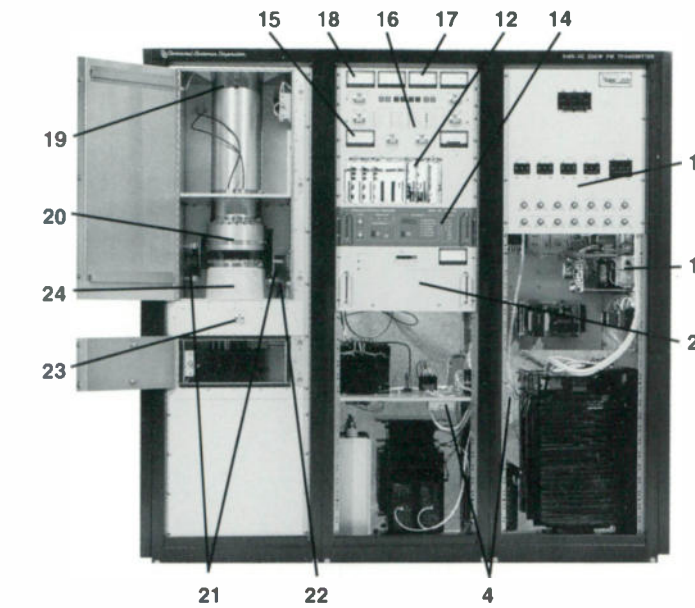
All Continental transmitters come equipped with the 802B exciter. This exciter may be operated from 5 to 50 watts depending on the amount of drive required for the power amplifier, and may also be used as an emergency transmitter directly into the antenna.



Combiner for 40 kW transmitter.



Combiner for 50/55 kW transmitter.



- Cabinet flushing fan.** This powerful fan with washable air filter delivers approximately 815 cfm to maintain positive cabinet air pressure.
- Harmonic filter.** Fully contained inside cabinet for easy transmitter installation while reducing overall space requirements.
- Air switch.** Positioned for easy access.
- Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
- Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
- SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "Soft-Start™", which initially brings up the transmitter gently.
- PA blower.** 1 hp PA exhaust blower moves 525 cfm of cooling air through the PA tube which extends tube life and reduces heat accumulation.
- Remote control connections.** Conveniently located for easy connection simple set up.
- Power wiring.** Either bottom or top entry is available; top entry shown here.
- Power supply.** A self-contained integral part of the transmitter (except 35 kW).
- Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in the event of ac mains problems.
- Filament voltage regulator.** Maintains constant filament voltage to the PA tube to maximize tube life.
- Indicator fuses & circuit breakers.** In the event of a failure, affected circuits are easily identified.
- 802B exciter.**
- True RMS iron vane voltmeter.** Provides readings on each of the three ac voltage phases, as well as filament voltage.
- LEDs.** Twenty-seven LEDs give a quick status readout of the protection circuits and control modes.
- Continuous readout meters.** At a glance you'll know plate current, plate voltage and output power.
- DC multimeter.** Five operating parameters at the turn of a dial.
- PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final stage if cooling air is lost or over-dissipation occurs.
- Wideband quarter-wave cavity.** A proven design for greater reliability.
- Tuning & loading controls.** Exclusive motorized system for easy adjustments.
- Static drain choke.** Bleeds off static build-up in transmission lines and antennas.
- PA grid adjustment.** Convenient controls for tuning the PA grid.
- Final amplifier.** The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.
- Solid-state IPA.**



# Continental Electronics Corporation

P.O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX NUMBER (214) 381-4949 TELEX ADDRESS: 73-398

## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### GENERAL

#### Rated Power Output:

- 816R-2C: 21.5 kW
- 816R-3C: 25 kW
- 816R-4C: 27.5 kW
- 816R-5C: 35 kW

#### Power Consumption:

- 816R-2C: 33 kW nominal
- 816R-3C: 40 kW nominal
- 816R-4C: 42 kW nominal
- 816R-5C: 54 kW nominal

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase-locked loop frequency synthesis from high stability master oscillator

#### Frequency Stability:

± 250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3-1/8" EIA flange

#### VSWR:

2:1, maximum

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

± 150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level of modulating signal in 5% increments.

#### Exciter:

Solid-state unit with variable output of 5 to 50 watts; self-contained harmonic filter

#### RF Harmonic Attenuation:

- 80 dB, minimum

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 V peak-to-peak) at 600 ohms for ± 75 kHz deviation

#### Audio Frequency Response:

± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz, 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB minimum, below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 V RMS (3.54 V peak-to-peak) for ± 75 kHz deviation

#### Composite Amplitude Response:

± 0.2 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% maximum

#### Composite Intermodulation Distortion:

0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

#### Three SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

15,000 ohms, nominal

#### SCA Input Level:

Adjustable 1.25 V RMS for 10% injection.

#### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art stereo generator is used.

#### Stereo Separation:

50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

#### Intermodulation Distortion:

0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

#### FM Noise:

- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

#### Linear Crosstalk:

- 55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF system. These specifications assume that a state-of-the-art SCA generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):

- 50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

#### Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):

- 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation frequency, 150 microsecond de-emphasis

### ELECTRICAL

#### Power Source:

200 to 250 VAC; 60 Hz, three-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

#### Permissible Line Voltage Variation:

± 5% (each phase voltage variation; within 5% of the average of all three phases)

#### Filament Regulator:

± 1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

#### Ambient Temperature Range:

- 20°C to +50°C (- 4°F to + 122°F)

#### Relative Humidity:

0 to 95%

### MECHANICAL

#### Transmitter:(including directional coupler)

73" (185.5 cm) H

72" (183 cm) W

28" (71 cm) D

#### Weight:

1,962 lbs (890 kg) nominal

#### 35 kW External Plate Transformer:

46" (117 cm) H

35" (89 cm) W

24" (61 cm) D

#### Weight:

901 lbs (409 kg) nominal

All specifications are subject to change without notice.  
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## CONTINENTAL'S 816R SERIES 21.5, 25, 27.5 & 35 kW BROADCAST TRANSMITTERS

# fm



# Continental Electronics Corporation

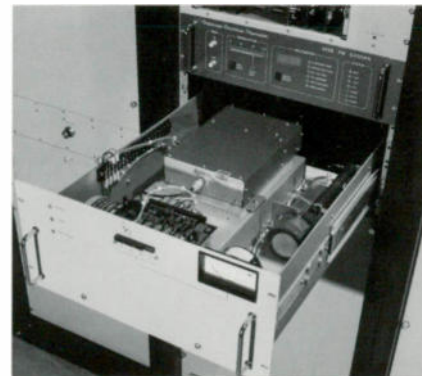
## THE HIGH POWER FM TRANSMITTER

### FEATURES

**Solid-State IPA**  
**"Soft Start"**  
**Totally Self Contained**  
**Internal Harmonic Filter**  
**Front Panel Indicators and Breakers**  
**Automatic Power Level Control**

Continental's 21.5, 25, 27.5 and 35 kW transmitters offer the broadcaster excellent stereo performance and separation, low noise and power consumption and a field proven track record of dependability. The transmitter power may be adjusted, using front panel controls, to any level between 0 and 100% with minimal tuning.

These transmitters use only one tube, the final power amplifier tube. The IPA is totally solid state and requires no tuning. The exclusive "soft-start" circuit and low voltage controls allow the transmitter to recycle and return to the exact previous operational status. This feature assists in prolonging component life and enhances product reliability.



**Solid-State IPA** in this transmitter increases reliability and decreases maintenance and complexity. This IPA also offers greater bandwidth and a self-protecting RF module. The entire IPA section of the 816R series transmitters is mounted on slides for easy access.

**SCR "Soft-Start"** gently applies primary voltage to the plate and screen power supplies when the plate control is turned on. The SCRs are conservatively rated at 350A in a 40A to 75A circuit.

**Automatic Power Output Control** uses an all solid-state SCR Power Controller to automatically maintain the power output to any preset level. The power can also be manually adjusted from zero to full rated power with a single front panel control. A unique feature of the Continental transmitters is the ability to control both the plate and screen voltages simultaneously so that the transmitter stays tuned at all power levels.

**Broadband Quarter Wave Cavity** uses the highly reliable, long life 4CX15000A tube in all power levels from 21.5kW through 27.5kW. (9019 in the 35kW)

**Automatic Filament Voltage Regulation** keeps a constant filament voltage on the PA tube to help extend tube life.

**Screen Neutralization** is used in the PA in a highly stable grounded screen grid circuit.

**Automatic Power Interrupt Recycle** remembers and restores the transmitter to its previous operating status after a momentary power interruption.

**Two Independent VSWR Protection Circuits** prevent the reflected power from exceeding safe levels. One circuit handles severe instantaneous mismatches, such as lightning strikes, by momentarily interrupting the plate and screen voltage when the reflected power reaches a preset level. The second circuit limits the reflected power to a preset level by controlling the plate and screen voltage during icing conditions. This allows the transmitter to operate at the highest safe user selected power level during severe antenna icing.

**Completely Self Contained** in a single cabinet including the high voltage power supply, harmonic filter and filament voltage regulator. In the 35kW transmitter the high voltage power supply is housed in a separate cabinet.

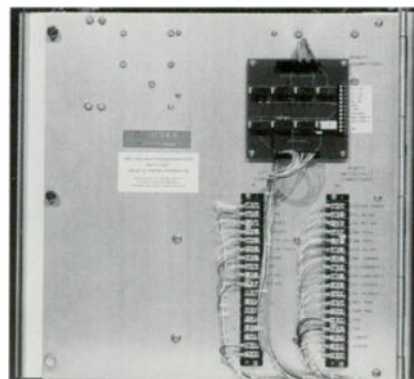
**Positive Pressure Cabinet** keeps dust from collecting on critical components. The 816R filtered air intake and exhaust are located on the top of the cabinet for easy ductwork installation.

### THE 35kW TRANSMITTER

The 35kW Transmitter is comparable to the other 816R transmitters with two exceptions. This transmitter utilizes the conservatively rated 9019 tetrode in the final amplifier. The other difference in this transmitter is the external plate supply cabinet. This cabinet may be located up to 20 feet away from the transmitter cabinet. All other aspects of this transmitter remain unchanged.

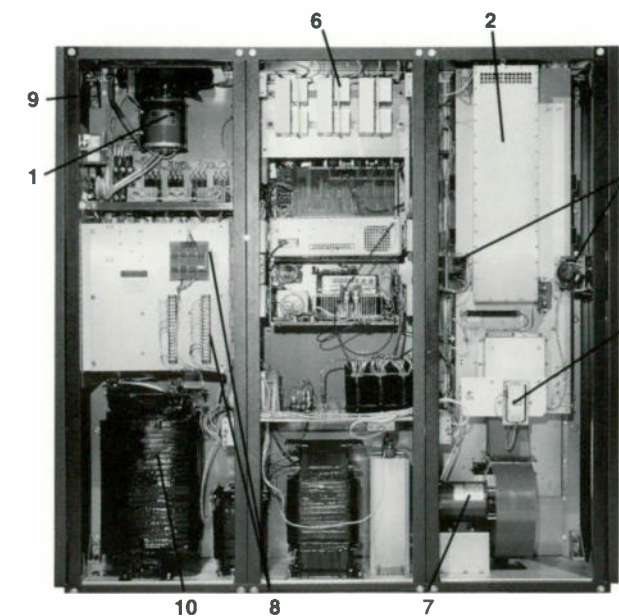
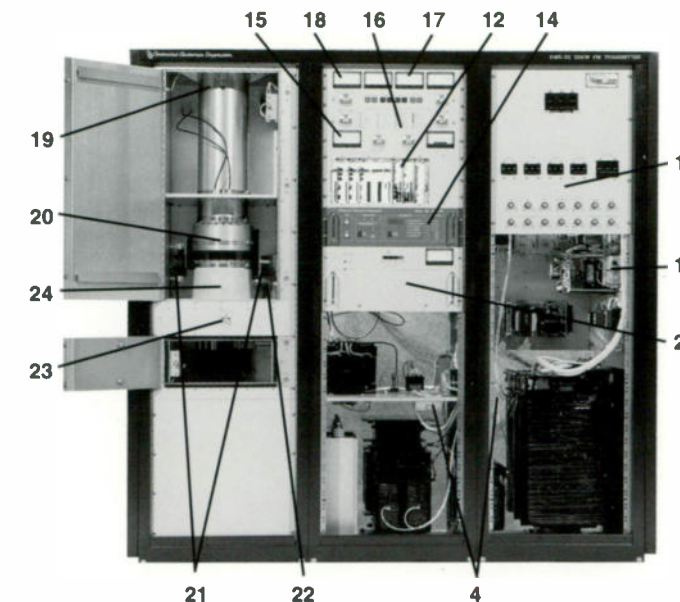
### THE EXCITER

All Continental transmitters come equipped with the 802B exciter. This exciter may be operated from 5 to 50 watts depending on the amount of drive required for the power amplifier. This exciter may also be used as an emergency transmitter directly into the antenna.



Remote Control Interfaces

## THE INSIDE STORY



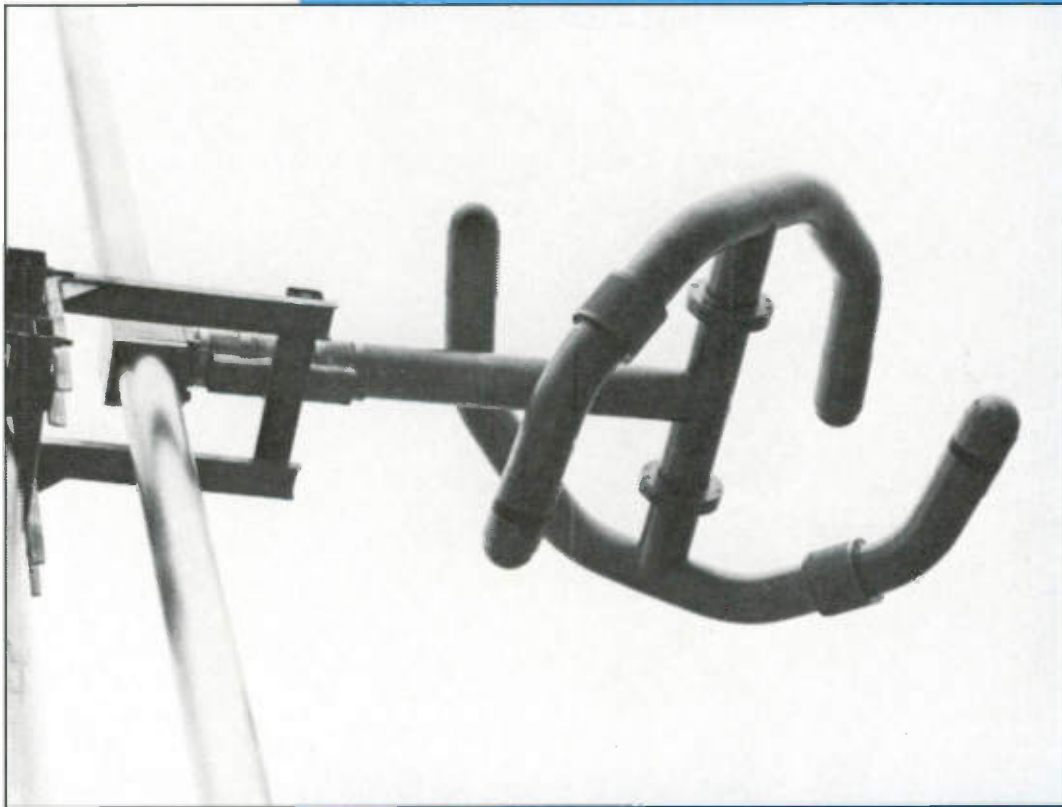
1. **Cabinet flushing fan.** This powerful fan with washable air filter delivers approximately 815 cfm to maintain positive cabinet air pressure.  
 2. **Harmonic filter.** Fully contained inside cabinet for easy transmitter installation while reducing overall space requirements.

3. **Air switch.** Positioned for easy access.  
 4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.  
 5. **Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.

6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft-start", which initially brings up the transmitter gently.  
 7. **PA blower.** 1 hp PA exhaust blower moves 525 cfm of cooling air through the PA tube which extends tube life and reduces heat accumulation.  
 8. **Remote control connections.** Conveniently located for simple set up.  
 9. **Power wiring.** Either bottom or top entry is available; top entry shown here.  
 10. **Power supply.** A self-contained integral part of the transmitter (except 35 kW).  
 11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.  
 12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.  
 13. **Indicator fuses & circuit breakers.** In the event of a failure, indicators glow brightly for fast troubleshooting.  
 14. **802B exciter.**  
 15. **True RMS iron vane meter.** Meter gives readings on each of the three ac voltage phases, as well as filament voltage.  
 16. **LEDs.** Twenty-seven LEDs give a quick status readout of the protection circuits and control modes.  
 17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage and output power.  
 18. **DC multimeter.** Five operating parameters at the turn of a dial.  
 19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final stage if cooling air is lost or over-dissipation occurs.  
 20. **Wideband quarter-wave cavity.** A proven design for greater reliability.  
 21. **Tuning & loading controls.** Exclusive motorized system for easy adjustments.  
 22. **Static drain choke.** Bleeds off static build-up in transmission lines and antennas.  
 23. **PA grid adjustment.** Convenient controls for tuning the PA grid.  
 24. **Final amplifier.** The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.  
 25. **Solid-state IPA.**

Continental's G5CPS,  
G5CPM, G8CPS, G6 Series,  
G4CPH, G4CPL, G4D

*FM*  
*Antennas*



**G5CPS Series**

## FM Antennas

### FM Antennas

Continental offers FM broadcasters a wide variety of antennas to meet commercial and educational station requirements, from low power to high power including circularly and horizontally polarized and dual polarized directional antenna designs.

### G5 Series, Circularly Polarized FM Antennas

The G5 antenna was introduced in 1976. Since then, it has become the most popular FM antenna available in the United States. It is an electrically sound, mechanically rugged, thoroughly field-proven antenna design. The antenna may be purchased in any number of bays from 1 to 16 (Series A & B).

Each bay level element consists of two segmented series-fed dipoles that form a space-phased, circularly polarized radiator. Each segmented dipole is manufactured using a custom-made Wallace Bending machine. The dipoles are constructed of  $3\frac{1}{8}$ " o.d. brass which provides an excellent element bandwidth as well as protection against corona discharge failure.

The isolated feed point of the two segmented dipoles is pressurized to avoid the effects of atmospheric changes and metal corrosion on the feed point impedance. The insulators are custom-made melamine insulators with machined flange fitting for bolt down "O" ring sealed flange assembly. Each feed

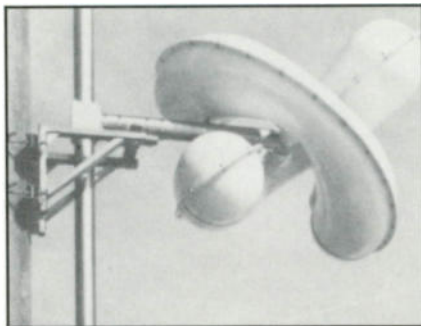
point is silver soldered to the inner conductor inside the driven element. The entire inner conductor assembly of the element is silver-plated to minimize antenna loss.

Each individual segmented dipole can be removed from any bay level element and replaced with a new segmented dipole with no change in the VSWR of the antenna.

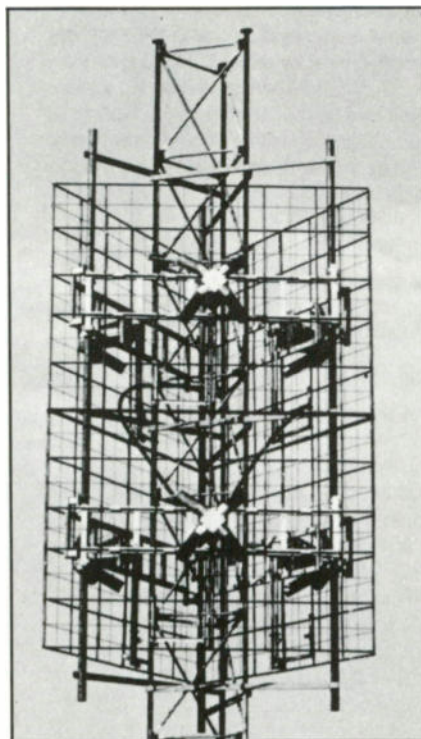
Each segmented dipole is constructed with a captive male  $3\frac{1}{8}$ " coax 50 ohm inner conductor connector, and is connected to the antenna element using a five bolt pinned flange. This unique construction design assures proper dipole installation.

Electrically, each element in a G5 array is a 50 ohm element at the frequency of operation. When the array is matched, a quarter-wave transformation section is designed for each element's feed stem, so that each element adds in shunt with the other elements in the array, with impedance of  $n \times 50$  ohms, where  $n$  equals the number of elements being added in shunt. This method of matching limits the maximum voltage and current in the antenna array interbay coax while utilizing the advantage of a 50 ohm bay level impedance.

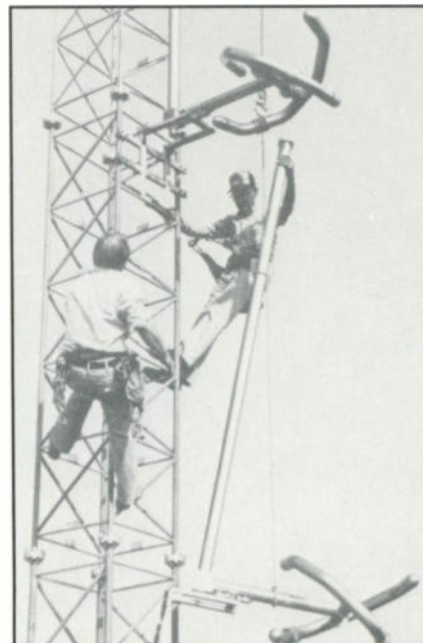
The G5 antenna design is very flexible. It permits side, corner leg or top mounting on any type of tower. All radiating elements and feed stem are constructed of 85-15 brass; all support brackets and hardware are made of stainless steel.



G5CPS with radome.



1080 panel antenna.



## G5CPS Series

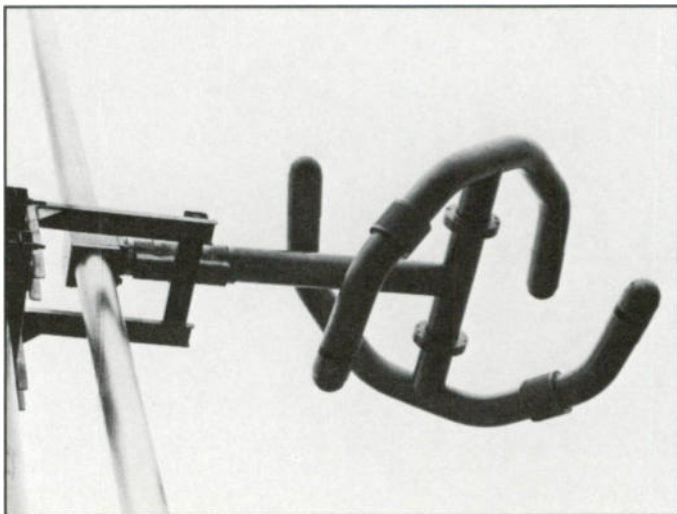
The Continental G5CPS series of super power, circularly polarized antennas was designed for stations needing input powers up to 120 kW. These antennas offer the broadband characteristics that are important for optimum main and sub-carrier performance, and above average immunity to the detuning caused by icing. Radomes or deicing heater elements are needed only where the most severe icing conditions are likely to occur. Typical VSWR is 1.5:1 or less with one-half inch of radial ice if the antenna has been field tuned.

Long life, reliability and freedom from the deteriorating effects of weather, including salt air, are the results of using only brass, copper and stainless steel in the G5CPS series antennas. The brass radiating elements have an outside diameter of  $3\frac{1}{8}$ " with a feed point that is completely internal and pressurized to prevent the accumulation of moisture through condensation.

The power handling capability of the G5CPS series is determined by three main factors:

1. Size of input flange;
2. Size of interbay line;
3. Method of feeding, either end or center.

One bay of a G5CPS antenna with  $3\frac{1}{8}$ " input flange will handle 32 kW of input power. A three-bay C series antenna with  $6\frac{1}{8}$ " interbay line and  $4\frac{1}{8}$ " input stem can handle a 120 kW input. The chart gives details of the many combinations available to suit any station's particular requirements.



Since its introduction, many improvements have been made in the design and manufacture of the G5CPS series. Where initially the elements were formed through the use of several mitered and welded sections, they are now formed by a machine specially designed for bending large diameter tubing. This substantially reduces the possibility of air or gas leaks.

The horizontally polarized horizontal-plane radiation pattern of the G5CPS is essentially omnidirectional when pole mounted atop a tower. Circularity of  $\pm 2$ dB is typical when mounted on a 14 inch diameter pole.

When side mounted on a tower, the antenna pattern will be affected by the tower structure.

Our pattern testing uses a single bay. The full scale measurement of the horizontal and vertical polarization radiation patterns are performed with the test antenna mounted on a copy of the actual supporting structure.

Optimization is performed when mounted on a copy of the support structure, with parasitic elements used to provide optimum omnidirectional azimuth pattern for vertical component.

A low standing wave ratio of 1.07:1 or less can be achieved over a 200 kHz bandwidth with field tuning. VSWR at antenna input without field tuning is 1.2:1 or less for pole mounting; 1.5:1 or less when side mounted on a tower.

The broadband characteristic of the G5CPS series makes it suitable for multi-station operation in many instances. Continental Electronics can quote the filtering and multiplexing components required for this type of operation.

### SPECIFICATIONS

**Frequency range:**

88 to 108 MHz (factory tuned to one frequency)

**Polarization:**

Circular (clockwise)

**Power gain:**

See chart

**Azimuthal pattern:**

$\pm 2$  dB in free space, both horizontal and vertical

**Ellipticity:**

$\pm 3$  dB in free space

**VSWR at input (without field tuning):**

1.2:1 or less for pole mounted;  
1.5:1 or less, side mounted

**VSWR at input (with field tuning):**

1.07:1 or less

# G5CPS Series

## Series A: 3 1/8" interbay line, 3 1/8" element stem

No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power <sup>3</sup> Input Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	3 1/8"	32 kW	114	137	185	354	—
2	0.9971	-0.0128	End	3 1/8"	32 kW	225	304	376	742	10
2	0.9971	-0.0128	Center	3 1/8"	39 kW	250	319	385	749	10
2	0.9971	-0.0128	Center	6 1/8"	64 kW	301	421	436	851	10
3	1.5588	1.9278	End	3 1/8"	32 kW	336	470	568	1130	20
4	2.1332	3.2903	End	3 1/8"	32 kW	447	637	759	1518	30
4	2.1332	3.2903	Center	3 1/8"	39 kW	472	652	768	1525	30
4	2.1332	3.2903	Center	6 1/8"	64 kW	523	758	819	1631	30
5	2.7154	4.3384	End	3 1/8"	32 kW	558	804	951	1905	40
6	3.3028	5.1888	End	3 1/8"	32 kW	669	971	1142	2294	50
6	3.3028	5.1888	Center	3 1/8"	39 kW	694	986	1151	2300	50
6	3.3028	5.1888	Center	6 1/8"	64 kW	745	1096	1202	2410	50
7	3.8935	5.9034	End	3 1/8"	32 kW	780	1138	1334	2682	60
8	4.4872	6.5197	End	3 1/8"	32 kW	891	1305	1525	3070	70
8	4.4872	6.5197	Center	3 1/8"	39 kW	916	1320	1534	3076	70
8	4.4872	6.5197	Center	6 1/8"	64 kW	967	1433	1585	3190	70
10	5.6800	7.5435	Center	3 1/8"	39 kW	1138	1653	1917	3852	90
10	5.6800	7.5435	Center	6 1/8"	64 kW	1189	1770	1968	3970	90
12	6.8781	8.3747	Center	3 1/8"	39 kW	1360	1987	2300	4628	110
12	6.8781	8.3747	Center	6 1/8"	64 kW	1411	2108	2351	4750	110

## Series B: 4 1/8" interbay line, 4 1/8" element stem

No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power <sup>3</sup> Input Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	6 1/8"	40 kW	159	201	223	421	—
2	0.9971	-0.0128	End	6 1/8"	56 kW	297	407	425	847	10
2	0.9971	-0.0128	Center	6 1/8"	80 kW	336	468	464	908	10
3	1.5588	1.9278	End	6 1/8"	56 kW	435	613	627	1273	20
4	2.1332	3.2903	End	6 1/8"	56 kW	573	818	829	1699	30
4	2.1332	3.2903	Center	6 1/8"	112 kW	612	879	869	1762	30
5	2.7154	4.3384	End	6 1/8"	56 kW	711	1024	1031	2125	40
6	3.3028	5.1888	End	6 1/8"	56 kW	849	1229	1233	2551	50
6	3.3028	5.1888	Center	6 1/8"	112 kW	888	1290	1272	2612	50
7	3.8935	5.9034	End	6 1/8"	56 kW	987	1435	1435	2997	60
8	4.4872	6.5197	End	6 1/8"	56 kW	1125	1641	1637	3043	70
8	4.4872	6.5197	Center	6 1/8"	112 kW	1164	1702	1676	3462	70
10	5.6800	7.5435	Center	6 1/8"	112 kW	1440	2113	2080	4312	90
12	6.8781	8.3747	Center	6 1/8"	112 kW	1716	2524	2484	5162	110

## Series C: 6 1/8" interbay line, 4 1/8" element stem

No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power <sup>3</sup> Input Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	6 1/8"	40 kW	205	260	269	480	—
2	0.9971	-0.0128	End	6 1/8"	80 kW	410	520	538	960	10
3	1.5588	1.9278	End	6 1/8"	120 kW	615	780	807	1440	20
4	2.1332	3.2903	End	6 1/8"	120 kW	820	1040	1076	1920	30
5	2.7154	4.3384	End	6 1/8"	120 kW	1025	1300	1345	2400	40
6	3.3028	5.1888	End	6 1/8"	120 kW	1230	1560	1614	2880	50

<sup>1</sup> Windload based on 50/33 psf.

<sup>2</sup> End-fed antenna lengths do not include the six ft. matching transformer.

<sup>3</sup> Power input capability up to 2,000 feet above mean sea level; derating required above 2,000 feet.

Note: Brackets included in weight and windload calculations.



## G5CPM Series

The G5CPM series of FM antennas has many of the characteristics of the super power G5CPS series, but is designed for use by low to medium power stations. Input powers of up to 9 or 12 kW can be used depending upon the number of bays and whether the antenna is center or end-fed.

All G5CPM antennas have radiating elements made of 1 $\frac{3}{8}$ " diameter heavy duty brass and 1 $\frac{5}{8}$ " interbay line.

Like the G5CPS series, the G5CPS has broadband response and machine formed, rather than welded, radiating elements. As a result, the G5CPM is capable of normal operation with up to  $\frac{1}{3}$ -inch of radial ice. While heaters and radomes are now available for the G5CPM series, they are recommended only for areas where icing conditions are likely to be severe.

The G5CPM uses a six foot transformer section for impedance matching and fine tuning after installation if the very lowest VSWR is required. VSWR without field tuning is normally 1.2:1 or less when pole mounted; 1.5:1 or less when side mounted on a tower.

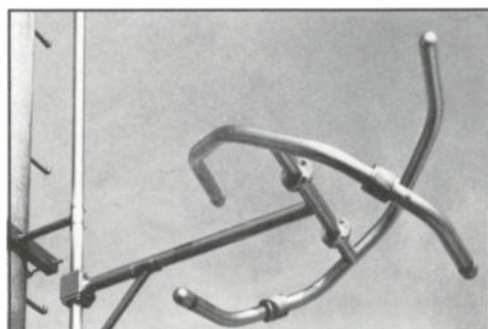
A quarter-wave grounding stub which places the antenna at ground potential for additional protection against lightning is available as an option at added cost.

Freedom from deterioration caused by weather elements is assured through the use of brass, copper and stainless steel throughout the antenna.

The feed point is completely internal and includes a pressurized environment up to the feed point of each bay.

The broadband characteristics achieved by the design of the G5CPM series make these antennas well suited for optimum performance on both the main and sub-carrier channels.

Detailed specifications covering one to twelve bays of G5CPM antennas with end or center-fed construction can be found on the chart.



No. of Bays	Power Gain <sup>1</sup>	dB Gain <sup>1</sup>	Type Feed <sup>2</sup>	Female 50 Ohm Input	Power Input Capability	Calculated Weight (lbs)	Calculated Windload <sup>3</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>4</sup> (ft)
1	0.4611	-3.3623	End	1 $\frac{5}{8}$ "	9 kW	57	102	83	224	
2	0.9971	-0.0128	End	1 $\frac{5}{8}$ "	9 kW	114	212	166	457	10
2	0.9971	-0.0128	Center	3 $\frac{1}{8}$ "	12 kW	147	289	199	533	10
3	1.5588	1.9278	End	1 $\frac{5}{8}$ "	9 kW	170	323	248	689	20
3	1.5588	1.9278	Center	3 $\frac{1}{8}$ "	12 kW	204	399	282	766	20
4	2.1332	3.2903	End	1 $\frac{5}{8}$ "	9 kW	227	433	331	922	30
4	2.1332	3.2903	Center	3 $\frac{1}{8}$ "	12 kW	260	509	364	998	30
5	2.7154	4.3384	End	1 $\frac{5}{8}$ "	9 kW	283	543	413	1154	40
5	2.7154	4.3384	Center	3 $\frac{1}{8}$ "	12 kW	317	620	447	1231	40
6	3.3028	5.1888	End	1 $\frac{5}{8}$ "	9 kW	340	654	496	1387	50
6	3.3028	5.1888	Center	3 $\frac{1}{8}$ "	12 kW	373	730	529	1463	50
7	3.8935	5.9034	End	1 $\frac{5}{8}$ "	9 kW	396	764	578	1619	60
7	3.8935	5.9034	Center	3 $\frac{1}{8}$ "	12 kW	430	840	612	1696	60
8	4.4872	6.5197	End	1 $\frac{5}{8}$ "	9 kW	453	874	661	1852	70
8	4.4872	6.5197	Center	3 $\frac{1}{8}$ "	12 kW	486	950	694	1928	70
9	5.0826	7.0608	Center	3 $\frac{1}{8}$ "	12 kW	543	1060	777	2160	80
10	5.6800	7.5435	Center	3 $\frac{1}{8}$ "	12 kW	599	1171	859	2393	90
11	6.2783	7.9785	Center	3 $\frac{1}{8}$ "	12 kW	656	1281	942	2626	100
12	6.8781	8.3747	Center	3 $\frac{1}{8}$ "	12 kW	712	1391	1024	2858	110

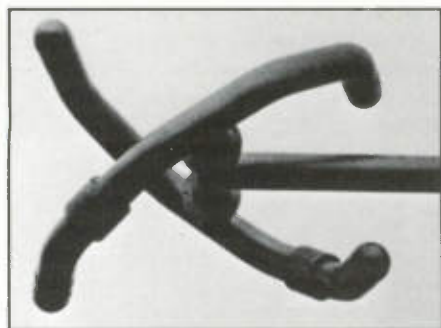
<sup>1</sup>Power split is 50/50 vertical and horizontal only. Beam tilt and null fill, are available as extra cost options on center-fed antennas, but will change the gain figures given above and may reduce the power rating.

<sup>2</sup>End-feeding is done with a six ft. matching transformer section. Center-feeding of an odd number of bays is done at a point one-half bay below the center of the antenna. Six ft. matching transformer is connected to an elbow at the center-feed point and extends downward.

<sup>3</sup>Windload based on 50/33 psf. Brackets are included in weight and windload calculations.

<sup>4</sup>End-fed antenna lengths do not include transformer.

## G8CPS Series



### G8CPS Super Power Circularly Polarized FM Antenna

Similar to the G5CPS antenna, the G8 antenna is designed to achieve maximum circularity of coverage, especially when mounted on tower sections having a 24 inch face dimension.

Tables show the most popular models. Other standard models are available.

#### SPECIFICATIONS

**Frequency range:**  
88 to 108 MHz (factory tuned to one frequency)

#### Polarization:

Circular (clockwise)

#### Power gain:

See chart

#### Azimuthal pattern:

±2 dB in free space, both horizontal and vertical

#### Ellipticity:

±3 dB in free space

#### VSWR at input (without field tuning):

1.2:1 or less for pole mounted;

1.5:1 or less, side mounted

#### VSWR at input (with field tuning):

1.1:1 or less

Series A: 3 1/8" interbay line, 3 1/8" element stem										
No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power Input <sup>3</sup> Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	3-1/8"	32 kW	114	137	167.5	387	
2	0.9971	-0.0128	End	3-1/8"	32 kW	225	304	341	808	10
2	0.9971	-0.0128	Center	3-1/8"	39 kW	250	319	350	815	10
3	1.5588	1.9278	End	3-1/8"	32 kW	336	470	515.5	1228	20
4	2.1332	3.2903	End	3-1/8"	32 kW	447	637	689	1649	30
4	2.1332	3.2903	Center	3-1/8"	39 kW	472	652	698	1656	30
4	2.1332	3.2903	Center	6-1/8"	64 kW	523	758	749	1770	30
5	2.7154	4.3384	End	3-1/8"	32 kW	558	804	863.5	2069	40
6	3.3028	5.1888	End	3-1/8"	32 kW	669	971	1037	2491	50
6	3.3028	5.1888	Center	3-1/8"	39 kW	694	986	1046	2497	50
6	3.3028	5.1888	Center	6-1/8"	64 kW	745	1096	1097	2614	50
7	3.8935	5.9034	End	3-1/8"	32 kW	780	1138	1211.5	2912	60
8	4.4872	6.5197	End	3-1/8"	32 kW	891	1305	1385	3332	70
8	4.4872	6.5197	Center	3-1/8"	39 kW	916	1320	1394	3338	70
8	4.4872	6.5197	Center	6-1/8"	64 kW	967	1433	1445	3457	70
10	5.6800	7.5435	Center	3-1/8"	39 kW	1138	1653	1742	4180	90
10	5.6800	7.5435	Center	6-1/8"	64 kW	1189	1770	1793	4300	90
12	6.8781	8.3747	Center	3-1/8"	39 kW	1360	1987	2090	5022	110
12	6.8781	8.3747	Center	6-1/8"	64 kW	1411	2108	2141	5144	110
Series B: 4 1/8" interbay line, 4 1/8" element stem										
No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power Input <sup>3</sup> Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	6-1/8"	40 kW	159	201	206	454	
2	0.9971	-0.0128	End	6-1/8"	56 kW	297	407	393	913	10
2	0.9971	-0.0128	Center	6-1/8"	80 kW	336	468	432	974	10
3	1.5588	1.9278	End	6-1/8"	56 kW	435	613	579	1119	20
4	2.1332	3.2903	End	6-1/8"	56 kW	573	818	765	1830	30
4	2.1332	3.2903	Center	6-1/8"	112 kW	612	879	804	1891	30
5	2.7154	4.3384	End	6-1/8"	56 kW	711	1024	951	2289	40
6	3.3028	5.1888	End	6-1/8"	56 kW	849	1229	1137	2747	50
6	3.3028	5.1888	Center	6-1/8"	112 kW	888	1290	1176	2808	50
7	3.8935	5.9034	End	6-1/8"	56 kW	987	1435	1323	3206	60
8	4.4872	6.5197	End	6-1/8"	56 kW	1125	1641	1509	3665	70
8	4.4872	6.5197	Center	6-1/8"	112 kW	1164	1702	1548	3762	70
10	5.6800	7.5435	Center	6-1/8"	112 kW	1440	2113	1920	4643	90
12	6.8781	8.3747	Center	6-1/8"	112 kW	1716	2524	2292	5560	110
Series C: 6 1/8" Interbay line, 4 1/8" element stem										
No. of Bays	Power Gain	dB Gain	Type Feed	Female 50 Ohm Input	Power Input <sup>3</sup> Capability	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)	Approx. Length <sup>2</sup> (ft)
1	0.4611	-3.3623	End	6-1/8"	40 kW	205	260	253	513	
2	0.9971	-0.0128	End	6-1/8"	80 kW	410	520	506	1026	10
3	1.5588	1.9278	End	6-1/8"	120 kW	615	780	759	1539	20
4	2.1332	3.2903	End	6-1/8"	120 kW	820	1040	1012	2052	30
5	2.7154	4.3384	End	6-1/8"	120 kW	1025	1300	1265	2565	40
6	3.3028	5.1888	End	6-1/8"	120 kW	1230	1560	1518	3078	50

<sup>1</sup> Windload based on 50/33 psf.

<sup>2</sup> End-fed antenna lengths do not include the six ft. matching transformer.

<sup>3</sup> Power input capability up to 2,000 feet above mean sea level; derating required above 2,000 feet.

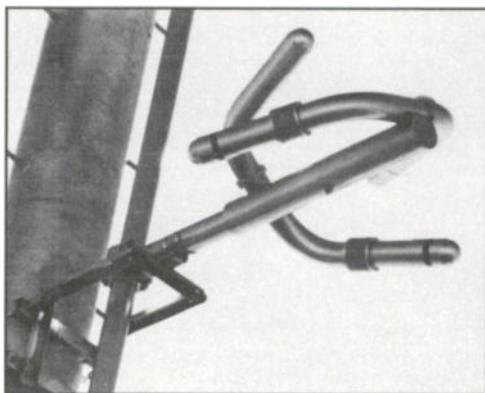
Note: Brackets included in weight and windload calculations.

## G6 Series

Continental Electronic's G6 series of antennas are designed for stations requiring fringe area coverage. This is achieved due to the internal feed design and element geometry of the G6 series.

These antennas offer an exceptional axial ratio,  $\pm 3$  dB or better, and free space horizontal plane circular patterns that are better than  $\pm 2$  dB in both horizontal and vertical polarizations.

The elements, constructed of stainless steel and heliarced brass, have a  $3\frac{1}{8}$ " outer diameter and are weather resistant. The feed systems, both end and center, are completely within an internal pressurized environment up to the feed point of each bay. Each element has its own internal dc short.



Continental's G6 antenna systems are completely assembled, pressure tested and tuned to the customers' frequency. High quality performance standards assure optimum operation of the system after installation.

Deicers are available as an option, depending on your installation sites' environmental factors. We recommend them for severe conditions. As with other antenna series, Continental offers antenna measurements and pattern optimization services for both horizontal and vertical polarization where optimum circularity is essential.

### SPECIFICATIONS

#### Frequency range:

88 to 108 MHz (factory tuned to one frequency)

#### Polarization:

Circular (clockwise)

#### Power gain:

See chart

#### VSWR at input (without field tuning):

1.2:1 or less for pole mounted;

1.5:1 or less, side mounted

#### VSWR at input (with field tuning):

1.1:1 or less

### Specifications for the G6 FM Antenna

Antenna Type	Power Gain	dB Gain	Type Feed	Power Input Capability (kW)	Calculated Weight (lbs)	Calculated Windload <sup>1</sup> (lbs)
G6-1AE	.4611	-3.3623	End	10	108	176.4
G6-2AE	.9971	-0.0128	End	20	225	382.5
G6-2AC	.9971	-0.0128	Center	20	243	405.7
G6-3AE	1.5588	1.9278	End	20	342	588.6
G6-4AE	2.1332	3.2903	End	30	459	794.7
G6-4AC	2.1332	3.2903	Center	30	477	817.9
G6-5AE	2.7154	4.3384	End	32	576	1000.8
G6-6AE	3.3028	5.1888	End	32	693	1206.9
G6-6AC	3.3028	5.1888	Center	39	711	1230.1
G6-7AE	3.8935	5.9034	End	32	810	1413.0
G6-8AE	4.4872	6.5197	End	32	927	1619.1
G6-8AC	4.4872	6.5197	Center	39	945	1642.3
G6-10AC	5.6800	7.5435	Center	39	1179	2054.5
G6-12AC	6.8781	8.3747	Center	39	1413	2466.7
G6-14AC	8.0798	9.0740	Center	39	1647	2878.9

<sup>1</sup>Windload calculated based on 50/33 psf, 112 mph actual wind velocity, no ice.

Power input capability up to 2,000 ft. above mean sea level. Derating required above 2,000 ft.

Note: All antenna systems have 50 ohm female inputs.

Weight and windload calculations include brackets.

## G4CPH Series

### G4CPH High Power Circularly Polarized FM Antenna

The G4CPH is a rugged, heavy-duty design capable of handling powers from 5 kW (single bay) to 40 kW (eight or more bays). The antenna may be purchased in any number of bays from 1 to 16. The antennas are end-fed in combinations from one to eight bays. In center-fed antenna arrays, the center-fed "T" input is located one half bay spacing below the center of the array if the array consists of an odd number of bays. Antennas of one to eight bays are end-fed with a six foot matching section connected to the bottom bay.

The rings of the antenna are mounted on 3 1/8" transmission line with a 3 1/8" input flange on standard antennas. Antennas that are to have 40 kW input are provided with a 6 1/8" flange and center feed block (at extra cost). 3" diameter Corona balls

are provided at the outer extremity of the arms of each bay of the antenna. The G4CPH is designed to withstand wind velocities up to 150 miles per hour.

Factory installed deicers are available in powers of 300 and 500 watts per bay. Specify 120 or 230 volt operation when ordering. Shielded interbay heater cable and junction boxes are supplied as a part of the heater system. Heater weight, including junction boxes and cable, is seven lbs. per bay. Heaters are field replaceable.

Special power splits, other than 50/50 (vertical and horizontal), beam tilt and/or null fill are available at extra cost.

Radomes are also available to reduce the effects of icing on the VSWR of the antenna.

### SPECIFICATIONS

#### Frequency range:

88 to 108 MHz (factory tuned to one frequency)

#### Polarization:

Circular (clockwise)

#### Power gain:

See chart

#### Azimuthal pattern:

±2 dB in free space, both horizontal and vertical

#### Ellipticity:

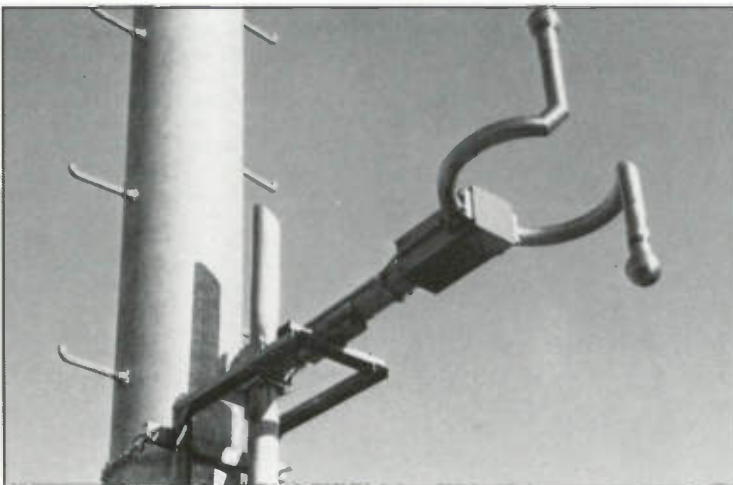
±3 dB in free space

#### VSWR at input (without field tuning):

1.25:1 or less for pole mounted;  
1.5:1 or less, side mounted

#### VSWR at input (w/ith field tuning):

1.1:1 or less



Type	Power Gain	dB Gain	Input Power Rating (kW)	Approx. Length (ft)	Calculated Weight (lbs)	Calculated Windload (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)
G4CPH-1	0.4611	-3.3623	5.0	—	84	144	104	265
G4CPH-2	0.9971	-0.0128	10	10	184	318	224	560
G4CPH-3	1.5588	1.9278	15	20	274	492	334	855
G4CPH-4	2.1332	3.2903	20	30	364	666	444	1150
G4CPH-5	2.7154	4.3384	25	40	454	840	554	1445
G4CPH-6	3.3028	5.1888	30	50	544	1014	664	1740
G4CPH-7	3.8935	5.9034	35	60	634	1187	774	2034
G4CPH-8	4.4872	6.5197	40	70	724	1361	884	2329
G4CPH-9	5.0826	7.0608	40	80	835	1608	1015	2697
G4CPH-10	5.6800	7.5435	40	90	925	1782	1125	2992
G4CPH-11	6.2783	7.9785	40	100	1015	1956	1235	3287
G4CPH-12	6.8781	8.3747	40	110	1105	2130	1345	3582
G4CPH-13	7.4785	8.7381	40	120	1195	2303	1455	3876
G4CPH-14	8.0800	9.0741	40	130	1285	2477	1565	4171
G4CPH-15	8.6818	9.3861	40	140	1375	2651	1675	4466
G4CPH-16	9.2846	9.6776	40	150	1465	2825	1785	4761

All antenna brackets are stainless steel. All weights given include brackets, interbay line, and transformer section. Factory-installed deicers are available using either 300 watts or 500 watts per bay. Specify 120 or 230 volts. Heater elements are replaceable in the field. Shielded interbay heater cable and junction boxes are supplied. Heater weight, including junction boxes and interbay cable, is six lbs. additional per bay. Windload based on 50/33 psf.

## G4CPL Series

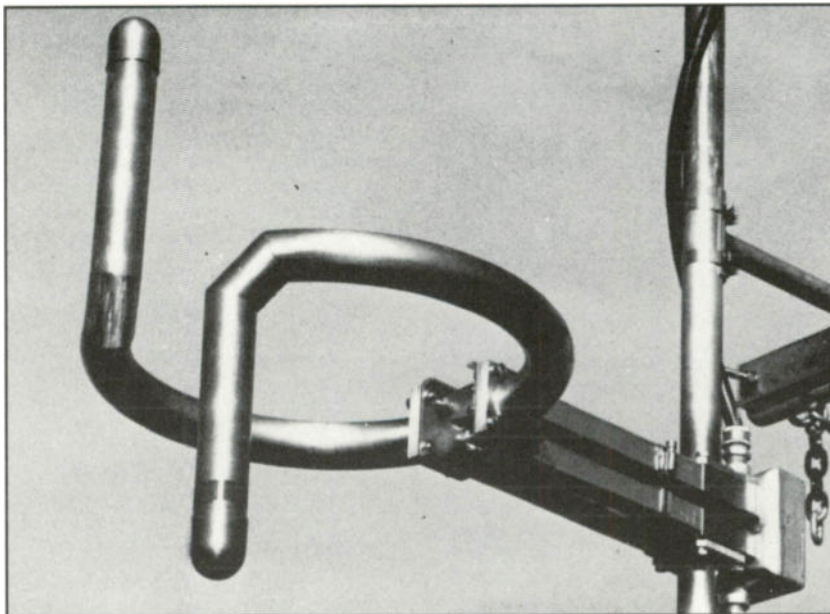
Continental Electronics' G4CPL series of circularly polarized FM antennas meets the requirements of virtually all Class A licensed stations. They are end-fed antennas which have a maximum input power of 7.5 kW and power gains ranging from 0.46 for one bay up to 4.48 for the eight-bay model. A single bay of G4CPL does have an input power limitation of 3 kW. Power gains, weights and windloads are shown in the chart below.

An integral part of the G4CPL design is a dc short which puts the antenna at ground potential for added protection against lightning damage to the transmitter and transmission line. Beam tilt and null fill are not available with the G4CPL series and no power splits other than 50/50 are offered with these antennas.

If the G4CPL is to be used where icing conditions can occur, either factory installed deicers or radomes are recommended.

A six-foot matching transformer extends below the bottom bay of the antenna and terminates in a 1½" EIA input flange.

We use only brass, copper and stainless steel in the construction of the G4CPL to assure long term service and freedom from maintenance problems suffered as a result of weather conditions.



### SPECIFICATIONS

**Frequency range:**

88 to 108 MHz

**Polarization:**

Circular (clockwise)

**Power gain:**

See chart

**Azimuthal pattern:**

±2 dB in free space, both horizontal and vertical

**Ellipticity:**

±3 dB in free space

**VSWR at input (without field tuning):**

1.25:1 or less for pole mounted;

1.5:1 or less, side mounted

**VSWR at input (with field tuning):**

1.1:1 or less

Type	Power Gain	dB Gain	Input Power Rating (kW)	Approx. Length (ft)	Calculated Weight (lbs)	Calculated Windload (lbs)	Calculated Weight (with Radomes and Brackets) (lbs)	Calculated Windload (with Radomes and Brackets) (lbs)
G4CPL-1	0.4611	-3.3623	3	—	36	74	54	161
G4CPL-2	0.9971	-0.0128	6	10	77	104	115	338
G4CPL-3	1.5588	1.9278	7.5	20	118	254	172	515
G4CPL-4	2.1332	3.2903	7.5	30	159	344	231	693
G4CPL-5	2.7154	4.3384	7.5	40	200	434	290	870
G4CPL-6	3.3028	5.1888	7.5	50	241	524	349	1047
G4CPL-7	3.8935	5.9034	7.5	60	282	614	408	1224
G4CPL-8	4.4872	6.5197	7.5	70	323	704	467	1402

All antenna brackets are stainless steel. All weights given include brackets, interbay line, and transformer section. Factory-installed deicers are available using either 300 watts or 500 watts per bay. Specify 120 or 230 volts. Heater elements are replaceable in the field. Shielded interbay heater cable and junction boxes are supplied. Heater weight, including junction boxes and interbay cable, is six lbs. additional per bay. Windload based on 50/33 psf.

## G4D Series

Continental's G4D antenna, designed to radiate power in a 180-degree pattern, is built primarily for FM stations located along coasts or in mountainous areas. It can also be used in areas where the licensing authority such as the FCC will allow the use of a directional antenna to meet special requirements.

The elements of the G4D antenna are pole mounted; it is also available without the pole. In that case, exact details of the customer-supplied pole will be required before fabrication begins.

The G4D consists of vertical and horizontal elements that are 3 1/8" in diameter and made of brass to resist the effects of weathering.

Typically, the bandwidth is 5 MHz between the 1.5:1 VSWR points. The size of the elements contribute to this very wide bandwidth. The G4D does not require deicing provisions except under the most severe conditions. G4D antennas have been operated with up to half of an inch of radial ice without causing serious detuning. Radomes are recommended in severe environments.



Because it is a directional antenna, each G4D is pattern tested on the antenna range prior to shipment. Pattern documentation is provided with the antenna to meet the filing requirements of the FCC. Field tuning is seldom required because the antenna and the mounting pole make up an integral unit.

Typical patterns achieved with the G4D are shown in the diagram. The gain figures are for the particular pattern achieved and can therefore vary depending upon a station's requirements.

When ordering a G4D antenna, the following information must be supplied: maximum ERP authorized, true azimuth orientation, radiated power limitations and their true orientation, transmission line efficiency or transmission line type and length, and the power output of the transmitter with which the antenna will be used.

As with all Continental Electronics FM antennas, the G4D is designed to be pressurized with either dry air or nitrogen. A positive pressure of 3 to 5 pounds should be maintained after the line and antenna have been initially purged to remove moisture.

## G4D Dual Polarized Directional FM Antennas

Type	Input Power Rating	Input <sup>1</sup> Flange	Calculated Pole Length (ft)	Calculated Pole Weight (lbs)	Calculated Antenna <sup>6</sup> Weight (lbs)	Calculated Pole <sup>2</sup> Wind Load (lbs)	Calculated Antenna <sup>3</sup> Wind Load (lbs)	Calculated Outer Diameter of Pole (inches)	Calculated Height <sup>4</sup> Electrical Center Above Pole Base (ft)
G4D-1A	12 kW	1-5/8"	25	1088	280	1363	418	8-5/8	22
G4D-1B	40 kW	3-1/8"	25	1088	280	1363	418	8-5/8	22
G4D-2A	12 kW	1-5/8"	35	1526	479	1955	855	8-5/8	26.4
G4D-2B	40 kW	3-1/8"	35	1526	479	1955	855	8-5/8	26.4
G4D-3A	12 kW	1-5/8"	45	1975	678	2812	1293	10-3/4	31
G4D-3B	40 kW	3-1/8"	45	1975	678	2812	1293	10-3/4	31
G4D-4A	12 kW	1-5/8"	55	3216	877	3462	1731	10-3/4	35.3
G4D-4B	40 kW	3-1/8"	55	3216	877	3462	1731	10-3/4	35.3
G4D-5A	12 kW	1-5/8"	65	4761	1076	4474	2168	12-3/4	39.7
G4D-5B	40 kW	3-1/8"	65	4761	1076	4474	2168	12-3/4	39.7
G4D-6A	12 kW	1-5/8"	75	5963	1275	5441	2606	14	44.2
G4D-6B	40 kW	3-1/8"	75	5963	1275	5441	2606	14	44.2
G4D-7A	12 kW	1-5/8"	85	7670	1474	6182	3044	14	48.6
G4D-7B	40 kW	3-1/8"	85	7670	1474	6182	3044	14	48.6
G4D-8A	12 kW	1-5/8"	95	8896	1673	6633	3481	14 <sup>5</sup>	53
G4D-8B	40 kW	3-1/8"	95	8896	1673	6633	3481	14 <sup>5</sup>	53

1. All 1-5/8" antennas are male input and all 3-1/8" antennas are female input.
2. Based on 50 lbs with 1/2" radial ice on pole.
3. Based on 50/33 psf. (112 mph wind); the windload with radome is 248 lbs. per level based on 50/33 psf.

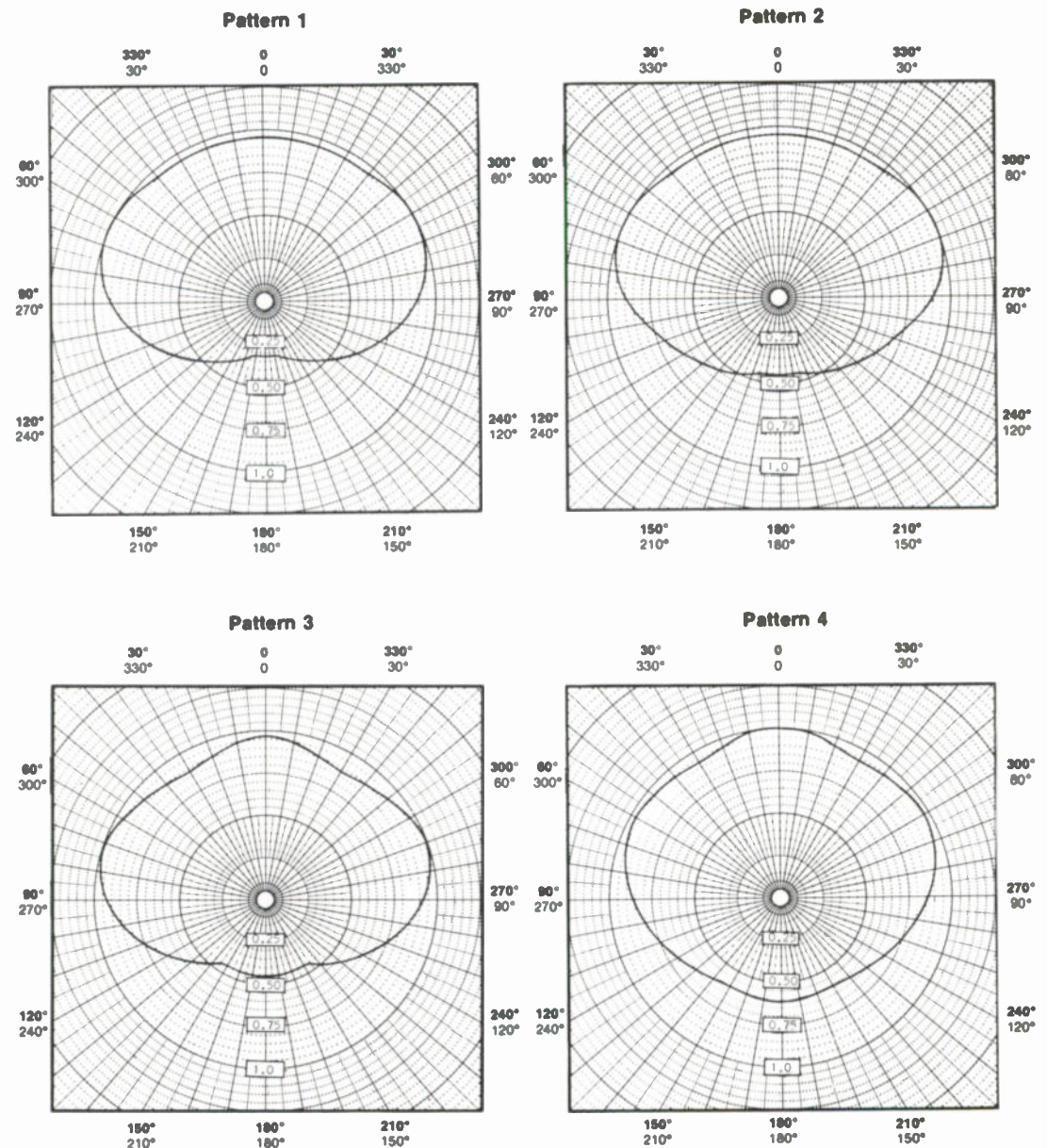
4. At approximately 89.0 MHz.
5. Eight-bay antennas require two ft. section of 16" pole at base of pole structure.
6. Additional weight with radome per level is 57 lbs.

## G4D Dual Polarized Directional FM Antennas

Number of Bays	Pattern 1		Pattern 2		Pattern 3		Pattern 4	
	Maximum Power Gain Horizontal	Maximum Power Gain Vertical	Maximum Power Gain Horizontal	Maximum Power Gain Vertical	Maximum Power Gain Horizontal	Maximum Power Gain Vertical	Maximum Power Gain Horizontal	Maximum Power Gain Vertical
1	0.81	0.72	0.79	0.70	0.76	0.70	0.72	0.69
2	1.74	1.53	1.70	1.49	1.63	1.50	1.54	1.47
3	2.71	2.39	2.64	2.33	2.54	2.34	2.39	2.29
4	3.70	3.26	3.61	3.18	3.47	3.19	3.26	3.13
5	4.71	4.14	4.58	4.03	4.40	4.05	4.14	3.98
6	5.71	5.03	5.56	4.90	5.35	4.92	5.03	4.83
7	6.73	5.92	6.55	5.77	6.29	5.79	5.92	5.68
8	7.75	6.82	7.55	6.64	7.25	6.67	6.82	6.54

Note: The listed power gain figures are approximate only, but are useful as a guide in determining the number of bays required. The gain figures will vary with the pattern shape, and the exact gain figures are determined when the final antenna pattern is achieved.

The power gain for the vertical polarization component may be less than the horizontal polarization component since it will differ a bit in shape. The RMS of the vertically polarized component can't exceed the RMS of the horizontally polarized component. The vertically polarized component can't exceed the horizontally polarized component at any azimuth.



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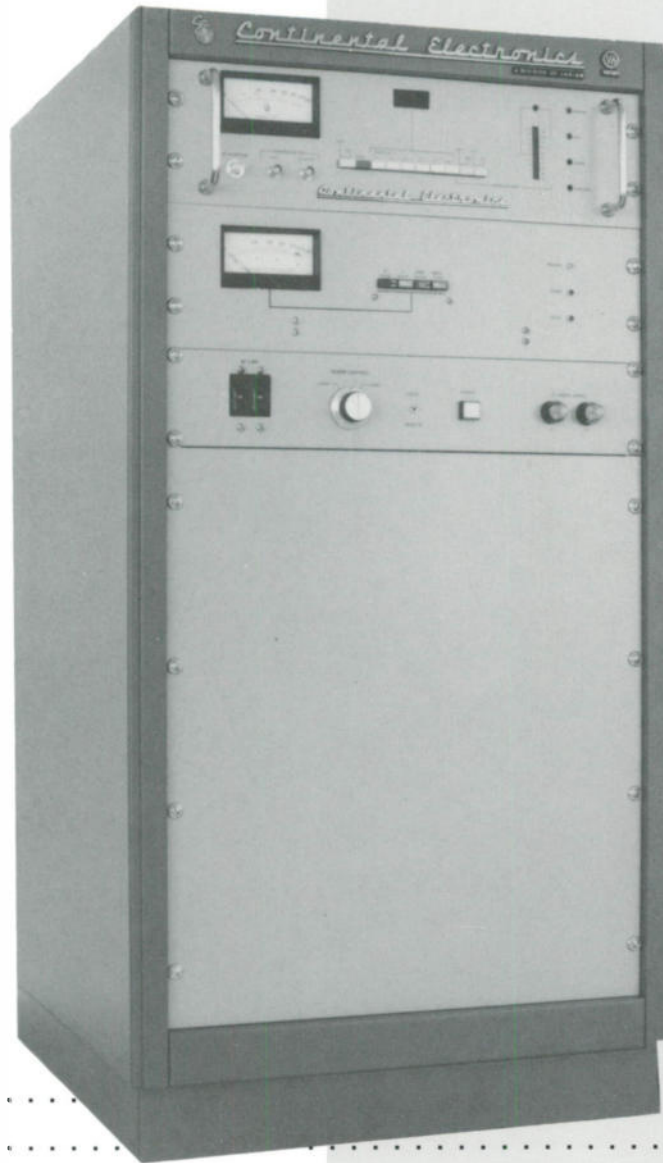
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## SPECIFICATIONS

### 813A 500W FM TRANSMITTER

#### ▪ GENERAL

**Rated Power Output:**  
500W

**Power Consumption:**  
1188W nom. (at 500W)

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
± 250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
Type "N" female

**VSWR:**  
2:1, max.

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
± 150 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ± 2%

**Exciter:**  
Solid-state unit with variable output of 5 to 50 watts; has self-contained harmonic filter

**RF Harmonic Attenuation:**  
-80 dB, min.

**Power Supply Rectifiers:**  
Silicon

#### ▪ MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+10 dBm (6.93 volts peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**  
± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% max.; 20 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB min. below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
65 dB RMS below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
60 dB below carrier; reference: 100% AM modulation, full power at 400 Hz with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

#### ▪ WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nom.

**Composite Input Level:**  
1.25 volts RMS (3.54 volts peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**  
± 0.1 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
.08% max.

**Composite Intermodulation Distortion:**  
.08% or less, 60 Hz to 7 kHz, 4:1 ratio

**Two SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nom.

**SCA Input Level:**  
1.25 volts RMS for ± 7.5 kHz deviation

**SCA Amplitude Response:**  
± 0.3 dB, 40 kHz to 100 kHz

#### ▪ STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following specifications are influenced by the RF System and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB min.; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% max.; 50 Hz to 15 kHz (measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% max.; 60 Hz to 7 kHz, 4:1 ratio

**FM Noise:**  
-72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk:**  
-55 dB

#### ▪ SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following RF specifications are influenced by the RF System and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**

-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and/or 92 kHz):**

-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

#### ▪ ELECTRICAL

**Power Source:**

94 to 136 VAC, 60 Hz, single phase; available voltages are 94, 100, 105, 109, 115, 121, 125, 130, 136

#### ▪ OPERATING ENVIRONMENT

**Altitude Range:**  
0 to 10,000 ft. (3048 m)

**Ambient Temperature Range:**  
-20°C to +50°C (-4°F to +122°F)

**Relative Humidity:**  
0 to 95%

#### ▪ MECHANICAL

**Size, as shown:**

42" (107 cm) H x 21" (53.5 cm) W x 25" (64.8 cm)

**Weight:**  
371 lbs.

All specifications are subject to change without notice.  
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**Top performance and proven design in high power FM**

Continental's 40, 50 and 55 kW FM transmitters offer you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

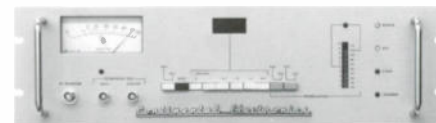
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

Wide-band ¼-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**Introducing the ultimate-FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than ±2%.

**Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

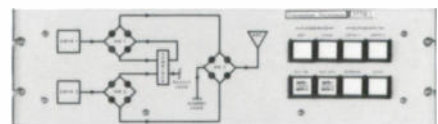


**OPTIONAL AUTOMATIC EXCITER CONTROL**

Continental's Type 377C-1A automatic exciter control unit provides monitoring and control for two Type 802A or similar exciters. If one exciter fails, the standby exciter is automatically put on-line. Indicator lamps show which exciter is operating.

The control unit includes switching the station's monitoring to the exciter's dummy load for servicing and testing the standby exciter.

The Type 377C-1A is designed to fit on the control panel furnished with the 40, 50 and 55 kW transmitters.



**OPTIONAL AUTOMATIC COMBINER CONTROL**

Continental's Type 377D-1 combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times.

In case one transmitter fails, the remaining transmitter is automatically switched around the combiner into the antenna. The transmitter that failed is automatically switched to the test load for troubleshooting.

The combiner control provides all interlock and sequencing functions; it is designed to fit on the control panel furnished with the 817R-2 40 kW, 817R-1 50 kW, or 817R-3 55 kW transmitters.

**SPECIFICATIONS**

**Rated power output:**

817R-3: 55 kW  
817R-1: 50kW  
817R-2: 40 kW

**Power consumption:**

817R-3: 84 kW nominal  
817R-1: 80 kW nominal  
817R-2A: 62 kW nominal

**Frequency range:**

88 to 108 MHz

**Output impedance:**

50 ohms, max, VSWR 2:1

**Frequency stability:**

± 500 Hz (typical: ± 100 Hz)

**Modulation capability:**

± 150 kHz

**Audio input level:**

10 dBm ± 2 dB

**Audio frequency response:**

± 1 dB of standard 75 μ preemphasis curve

**Audio frequency distortion:**

mono: 0.25% max. (0.1 typical)  
(40 dB or more typical)

**Harmonic attenuation:**

- 80 dB minimum

**FM noise level:**

65 dB below 100% modulation  
(70 dB typical)

**AM noise level:**

- 55 dB, rms (- 58 dB typical)

**Power source:**

200 to 250 v ac, 60 Hz, 3-phase:  
available transformer taps are  
200, 210, 220, 230, 240, 250 v ac;  
50 Hz available on request

**Permissible line voltage variations**

± 5% (each phase voltage shall  
be within 5% of the average of all three  
phases)

**Operating altitude:**

7,500 ft (2286 m) standard;  
optional to 10,000 ft (3048 m)  
with modification kit

**Size, as shown:**

68 1/4" (175.1 cm) H  
164 3/8" (417.03 cm) W  
27 1/2" (69.85 cm) D

**Weight:**

4074 lb (1848 kg) nominal

**Combiner, 40 kW:**

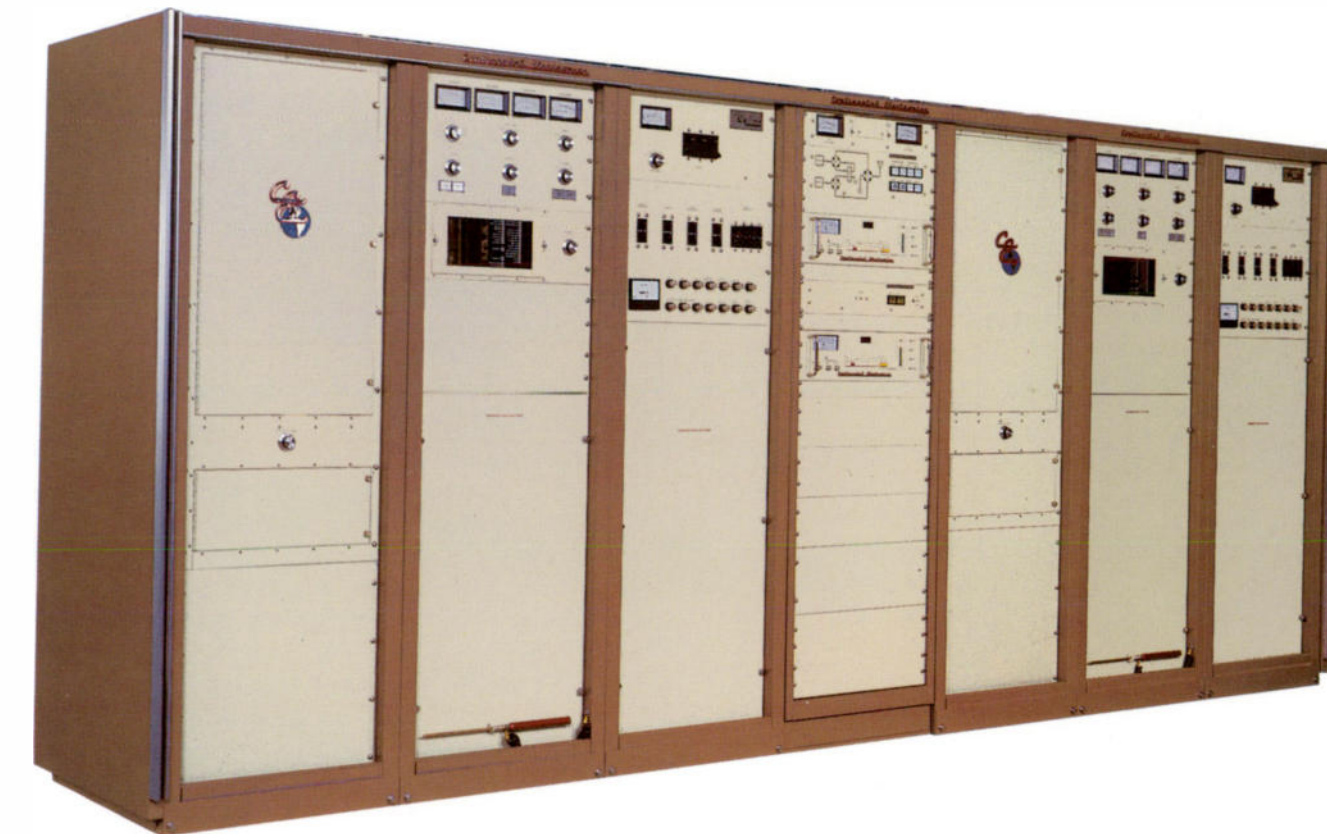
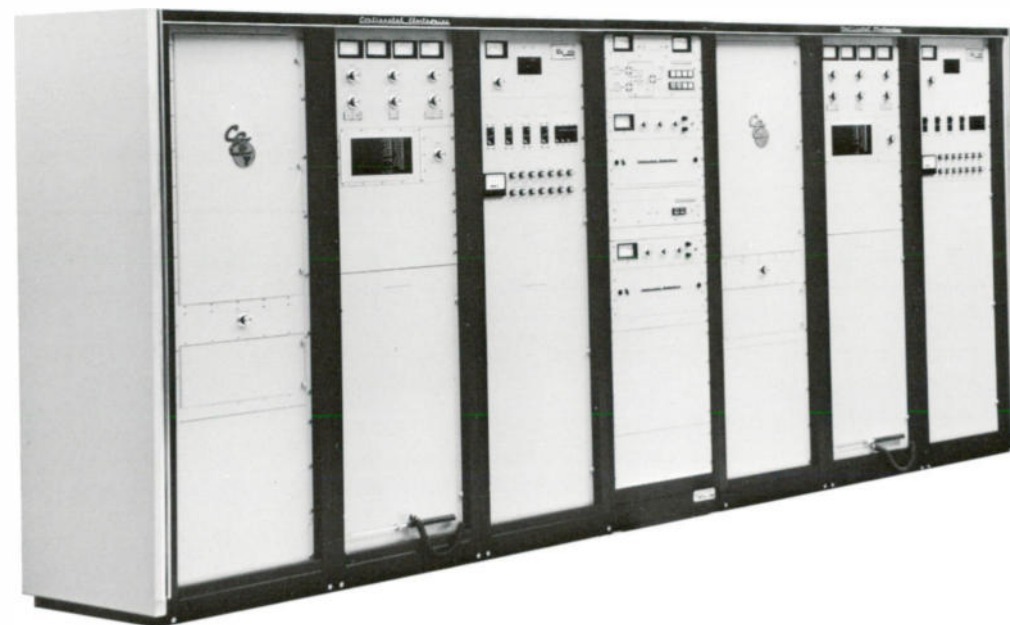
60" H (152.4 cm)  
48" W (122 cm)  
30" D (76.2 cm)

**Combiner, 50/55 kW**

73" H (185.4 cm)  
68 1/2" W (174 cm)  
31" D (78.7 cm)  
weight: 1130 lb nominal (513 kg)

All specifications are subject to change without notice.

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Featuring the new 802A solid-state exciter

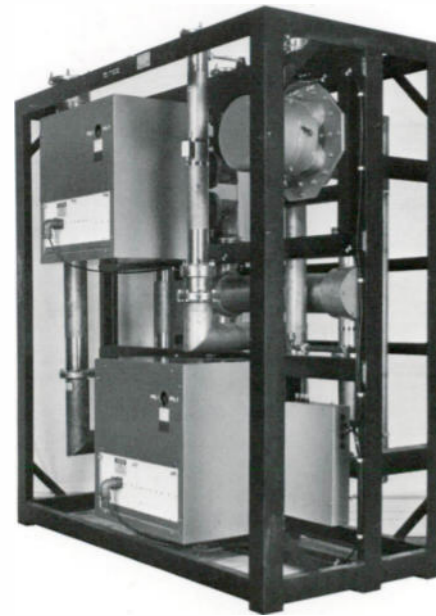
**MODULAR CONCEPT OFFERS BROADCASTERS MAXIMUM FLEXIBILITY**

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output thru the use of a combiner.

Continental's Type 817R-2A 40,000 watt transmitter consists of two Type 816R-2A 20,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 40,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

Continental's Type 817R-1 50,000 watt transmitter consists of two Type 816R-3 25,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 50,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

Continental's Type 817R-3 55,000 watt transmitter consists of two Type 816R-4 27,500 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 55,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.



Combiner for 50,000/55,000 watt transmitter.

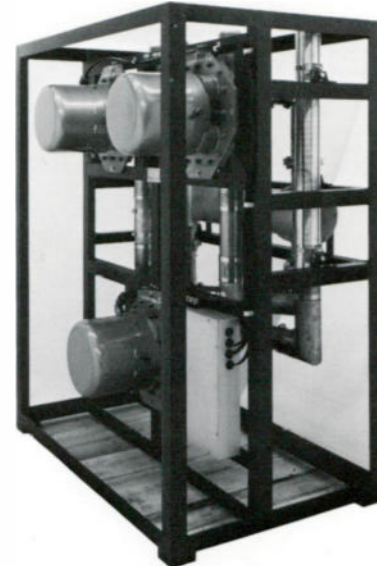
**PROVEN POWER AMPLIFIER**

A field-proven 4CX15000A power amplifier tube is used to save on operating costs. The high plate dissipation rating and proven design enhance long-life performance. Continental's unique grounded screen tetrode design eliminates screen bypass capacitors and provides excellent stability.

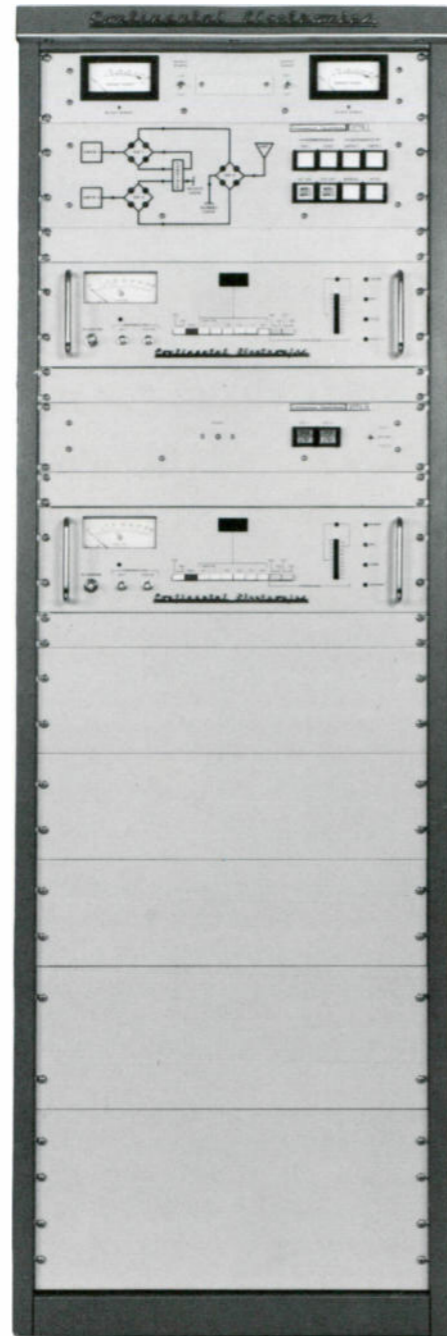
**FAST INSTALLATION**

For shipments within the continental United States, all components are in-place and interconnected. AC power, audio inputs, monitoring outputs and transmission line hookups are direct and thru cabinet top.

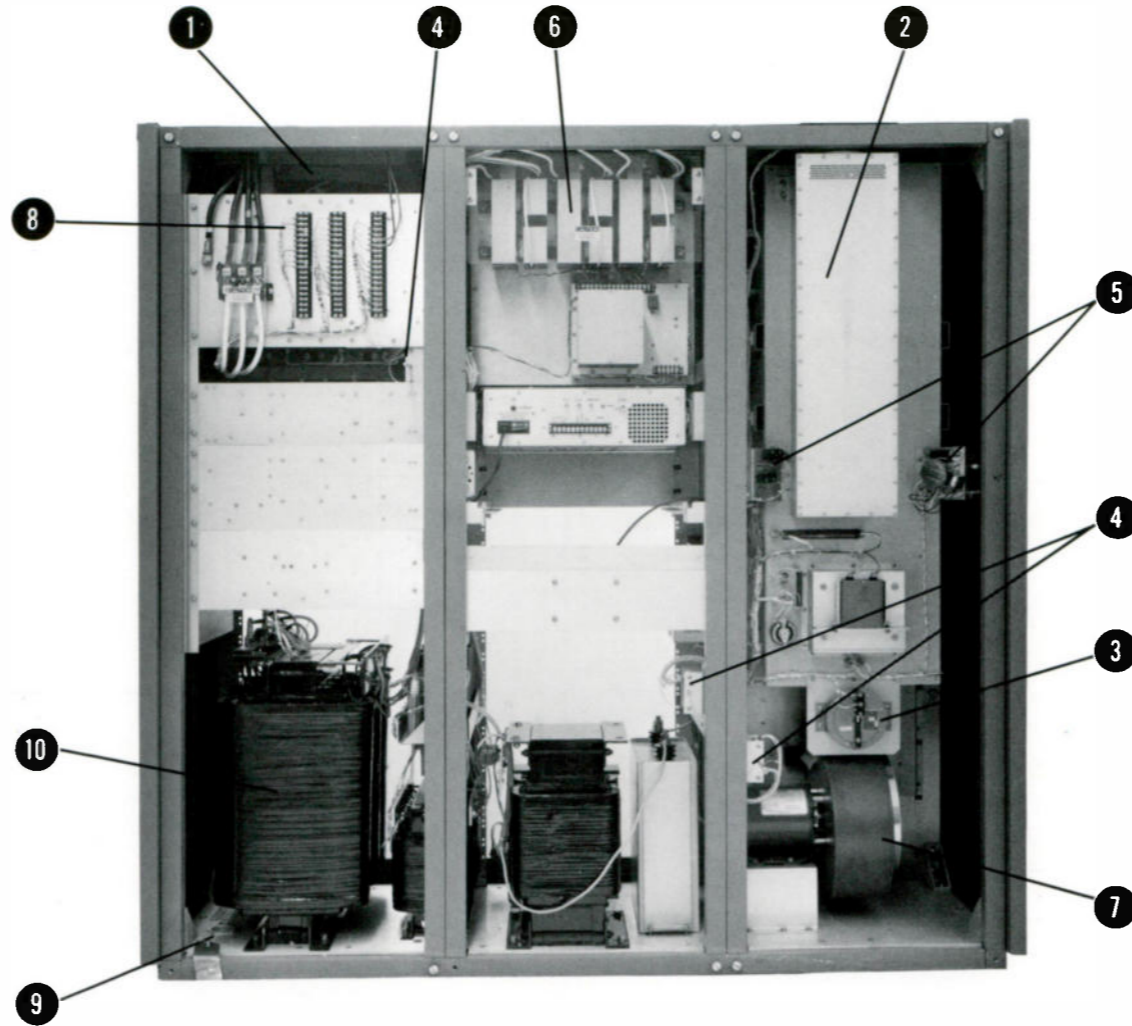
28-volt dc power supply is built-in for optional remote control. Harmonic filter is in-place and ready to operate.



Combiner for 40,000 watt transmitter.



Control panel.

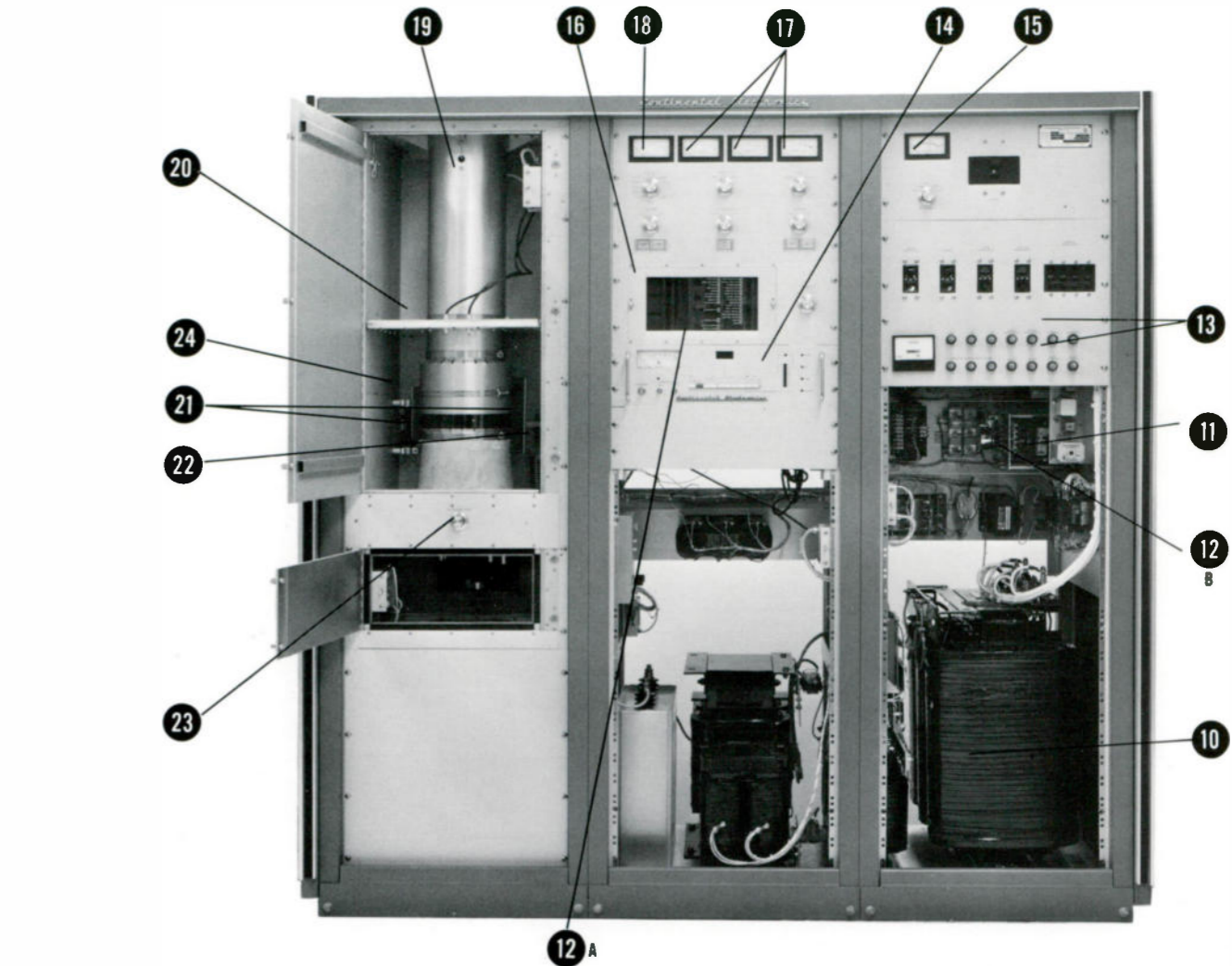


**THE INSIDE STORY**

- 1. **Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
- 2. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
- 3. **Air switch.** Located here for easy access.
- 4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.

- 5. **Tuning and loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
- 6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
- 7. **PA blower.** 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube.

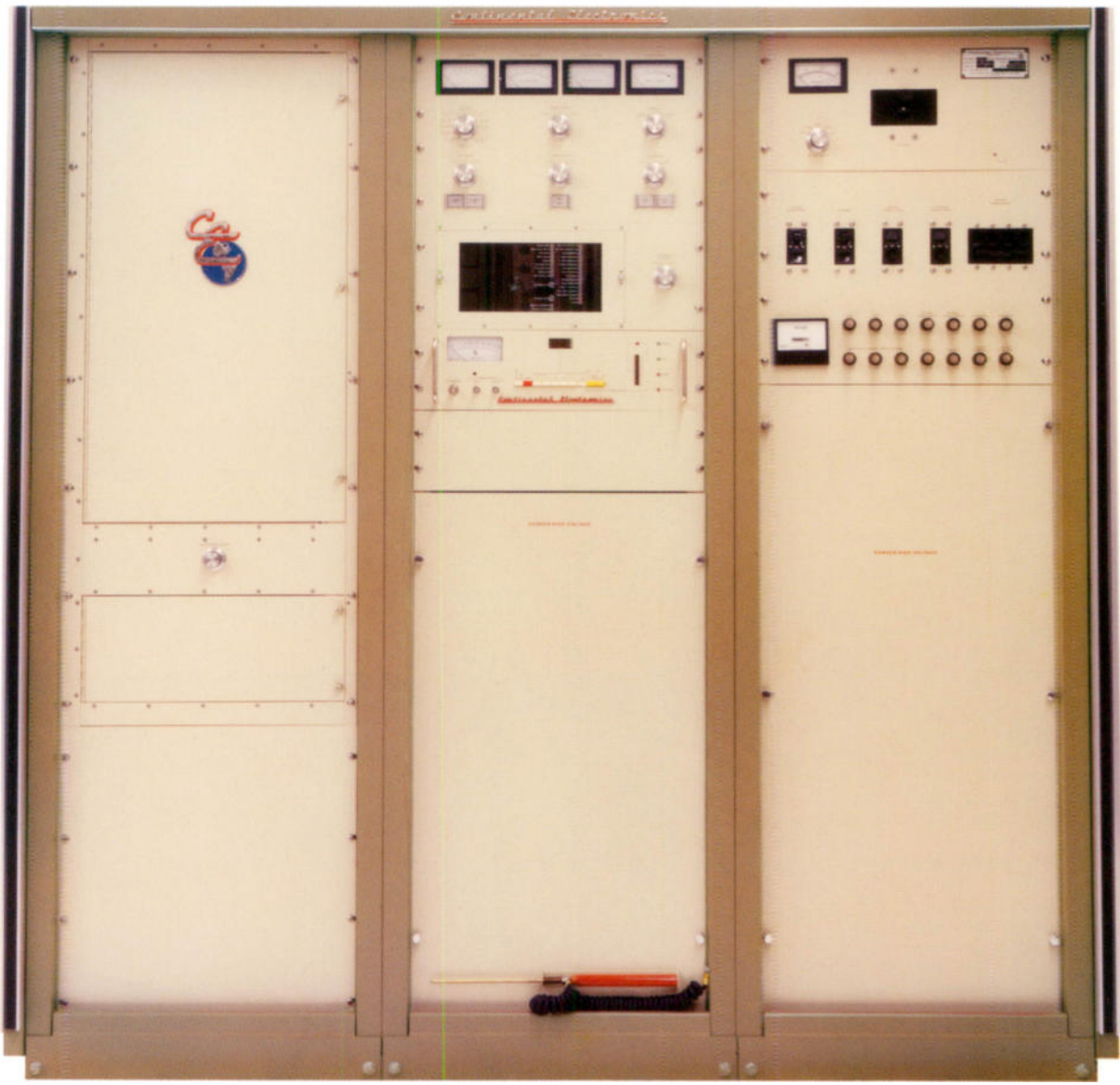
- 8. **Remote control connectors.** Conveniently located for simple setup.
- 9. **Power feed.** Either bottom or top entry is available.
- 10. **Power supply.** A self-contained integral part of the transmitter.
- 11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
- 12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control card
  - B. Control drive assembly



- 13. **Indicator fuses and circuit breakers.** There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
- 14. **802 A Exciter.**
- 15. **True rms iron vane meter and 150-A ac mains circuit breaker.** Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
- 16. **LED-equipped card cage.** Twenty-seven LED's give a quick status readout of the protection circuits and controls modes. Remote control relays are also here for easy access.

- 17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage, and output power.
- 18. **DC multimeter.** Eleven operating parameters at the turn of a dial.
- 19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final if cooling air is lost or overdissipation occurs.
- 20. **Wide-band 1/4-wave cavity.** A proven feature for greater reliability.
- 21. **Tuning and loading controls.** An exclusive motorized feature for easy adjustments.

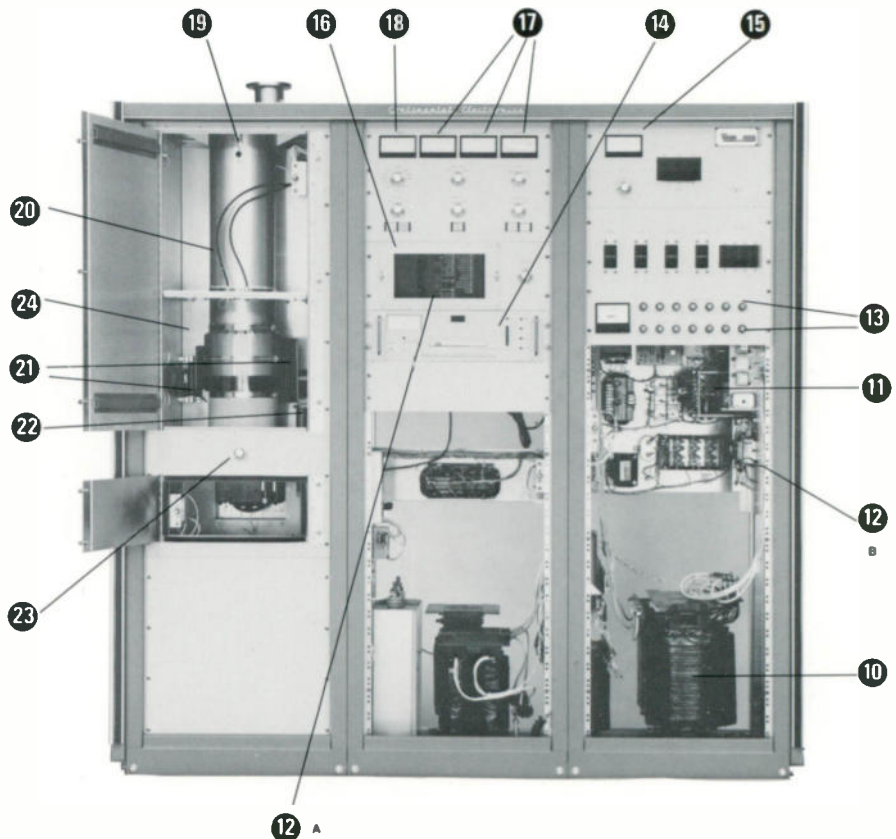
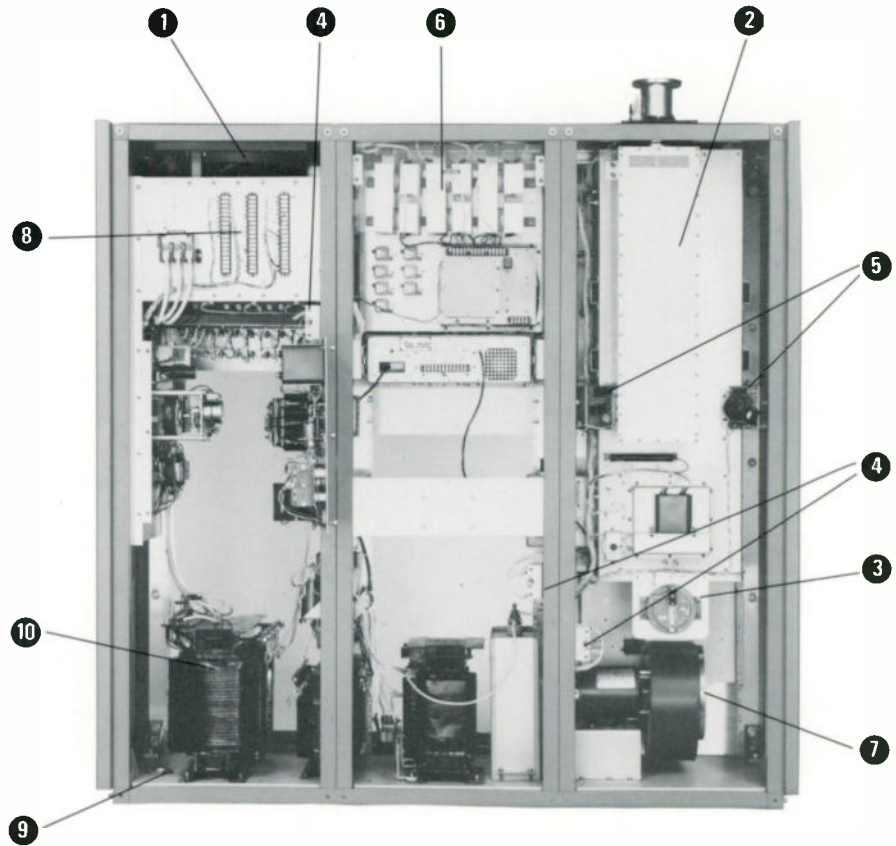
- 22. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
- 23. **Driver plate adjustment.** A single control tunes the driver plate.
- 24. **Final.** The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.



FEATURING 802A SOLID-STATE EXCITER

## THE INSIDE STORY

1. **Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. **Air switch.** Located here for easy access.
4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. **Tuning and loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
7. **PA blower.** 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. **Remote control connectors.** Conveniently located for simple setup.
9. **Power wire (Bottom Entry).** Either bottom or top entry is available.
10. **Power supply.** A self-contained integral part of the transmitter.
11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control card
  - B. Control drive assembly
13. **Indicator fuses and circuit breakers.** There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. **802A Exciter.**
15. **True rms iron vane meter and 150-A ac mains circuit breaker.** Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
16. **LED-equipped card cage.** Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage, and output power.
18. **DC multimeter.** Eleven operating parameters at the turn of a dial.
19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final if cooling air is lost or overdissipation occurs.
20. **Wide-band 1/4-wave cavity.** A proven feature for greater reliability.
21. **Tuning and loading controls.** An exclusive motorized feature for easy adjustments.
22. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
23. **Driver plate adjustment.** A single control tunes the driver plate.
24. **Final.** The 4CX10,000D tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.



**Top performance  
and proven design  
in high power FM**

Continental's 10 kW FM transmitter offers you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

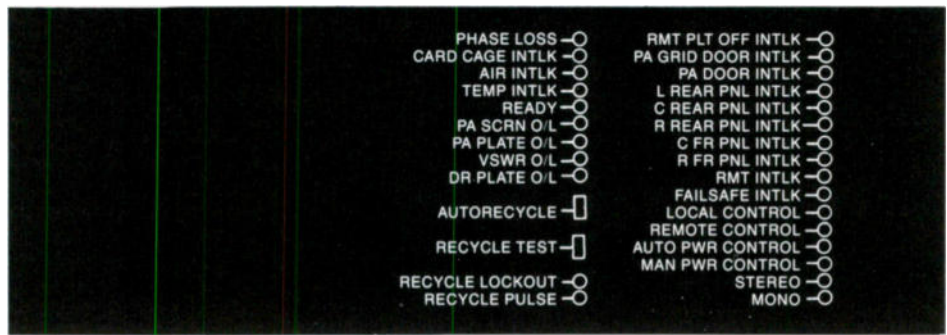
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

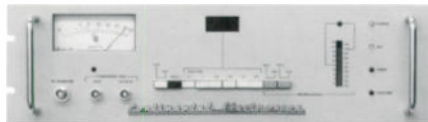
Wide-band, 1/4-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Transmitter LED status indicators



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**Featuring  
The Ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

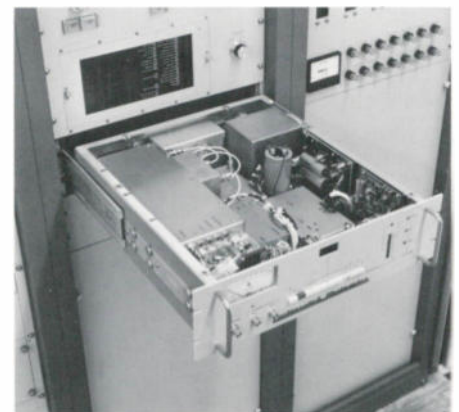
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

**Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## SPECIFICATIONS using Type 802A Exciter

### GENERAL

#### Rated Power Output:

816R-1A: 10 kW

#### Power Consumption:

816R-1A: 18 kW, nominal

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency Synthesis  
from high stability master oscillator

#### Frequency Stability:

± 250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3/8" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

± 150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level  
of modulating signal in 5% increments with  
accuracy better than ± 2%

#### Exciter:

Solid-state unit with variable output of 5 to  
50 watts, and self-contained harmonic filter.

#### RF Harmonic Attenuation:

- 80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 volts peak-to-peak) @ 600  
ohms for ± 75 kHz deviation.

#### Audio Frequency Response:

± 0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below ± 75 kHz deviation @  
400 Hz, measured within a 20 Hz to 15 kHz  
bandwidth with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference: 100%  
AM modulation, full power @ 400 Hz with  
75 microsecond de-emphasis, no FM  
modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

40 dB below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75  
microsecond de-emphasis, FM modulation  
± 75 kHz @ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak)  
for ± 75 kHz deviation

#### Composite Amplitude Response:

± 0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max

#### Composite Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ± 7.5 kHz deviation

#### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are  
determined primarily by the Stereo Genera-  
tor used. The following parameters are influ-  
enced by the RF system. These specifica-  
tions assume that a "State-of-the-Art" Stereo  
Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB or  
better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz. (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz, 4:1 ratio.

#### FM Noise:

- 72 dB referenced to 400 Hz, 75 kHz de-  
viation. Measured with 75 microsecond de-  
emphasis within a 20 Hz to 15 kHz band-  
width.

#### Linear Crosstalk

- 55 dB

### SCA OPERATION

Most SCA performance parameters are de-  
termined primarily by the SCA generator used.  
The following parameters are influenced by  
the RF System. These specifications as-  
sume that a "State-of-the-Art" SCA Genera-  
tor is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz, Main 75  
microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

- 50 dB, Main and Stereo 75 kHz devia-  
tion; SCA reference deviation, 5 kHz and  
200 Hz modulation; SCA de-emphasis, 150  
microsecond

#### Crosstalk SCA to SCA (67 kHz and 92 kHz):

- 50 dB, SCA reference deviation 5 kHz  
and 200 Hz modulation frequency; de-em-  
phasis, 150 microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, three phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 volts ac; 50 Hz avail-  
able on request.

#### Permissible Line Voltage Variation:

± 5% (each phase voltage variation: within  
5% of the average of all three phases).

#### Filament regulator:

± 1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft. (2286 m) standard; optional to  
10,000 ft (3048 m) with modification kit

#### Ambient Temperature Range:

- 20°C to + 50°C (- 4°F to + 122°F)

### MECHANICAL

#### Size, as shown:

69" (175 cm) H  
72" (183 cm) W  
28" (71 cm) D

#### Weight:

1875 lb (836 kg) nominal

All specifications are subject to change without notice.

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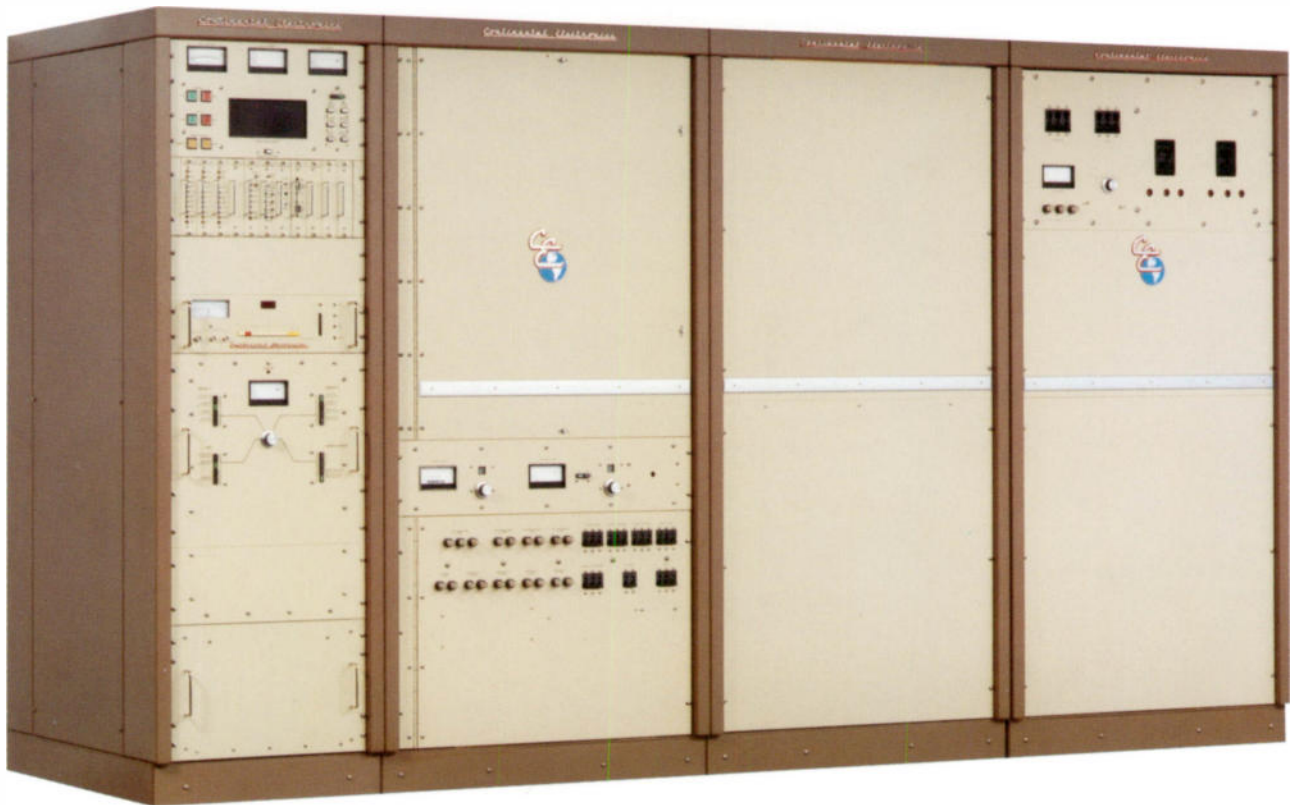
Ph: (214) 381-7161

Telex: 73-398



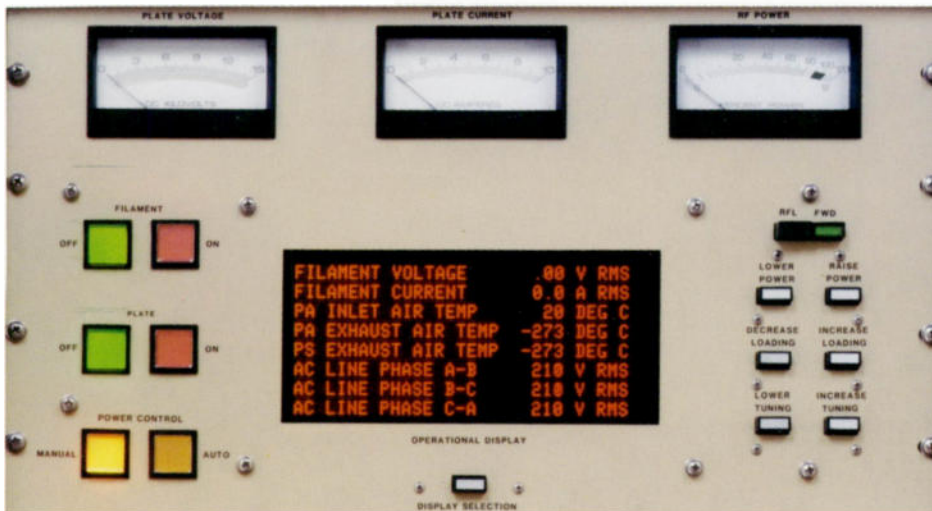
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FEATURING 802A EXCITER





The Controls/Display Panel showing analog meters, control switches, operational display screen.

### Top Performance From A State-Of-The-Art High Quality High Power FM Transmitter

Continental Electronics' Type 817A meets the need for a self-contained, highly dependable, easily maintained, high power FM transmitter.

The transmitter achieves its high levels of performance with low power consumption.

It has excellent stereo separation and frequency stability; operates with minimal noise and distortion; uses the Type 802A Exciter to deliver a crisp clean signal.

The transmitter is solid-state up to the power amplifier which uses one tube: a husky EIMAC Type 4CX40,000G Tetrode operating in Class C.

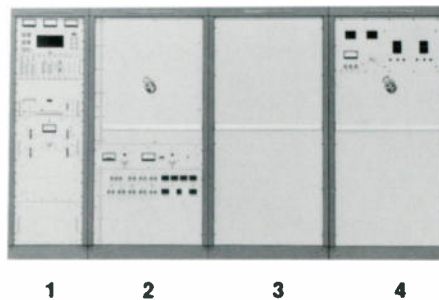
Operating over the frequency range from 88 to 108 MHz, the 817A can be operated at power outputs from 30,000 to 60,000 watts.

The transmitter control system uses an 8-bit microprocessor for certain internal and external control and status reporting. Additionally, full hands-on local control of the transmitter is provided by front panel controls, meters and indicators, as well as the plasma operational display.

In keeping with the tradition of other Continental transmitters, the 817A utilizes conservatively-rated components and is built to give many years of reliable service.

#### A Brief Overview Of The Transmitter

- Simple installation
- Only one tube
- Completely self-contained including internal harmonic filter
- Solid-state driver
- SCR power control
- Filament voltage regulation
- Automatic SWR power control
- Conventional remote control interface
- Internal diagnostics



#### Transmitter Cabinet

The 817A Transmitter is housed in an all aluminum sheet metal enclosure consisting of four cabinets forming a single entity. All components related to the transmitter are contained within the enclosure.

The left-hand cabinet contains the control and metering panel, the control card cage, the 802A 50 watt FM exciter, the driver amplifier, the control power supplies and the dual redundant control/monitoring microprocessor.

The next cabinet contains the PA cavity, harmonic filter, directional couplers, PA cooling blower, and regulated PA filament voltage supply.

The third cabinet from the left houses the plate and screen power supply filtering as well as the overload/metering circuitry.

The fourth cabinet, the right-hand cabinet, houses the plate and screen power supplies, SCR power controller and associated circuit breakers. This unit may be removed from the main enclosure and located a short distance away for installation convenience.

#### Control and Driver Unit

The Control and Driver Unit contains the Control/Display, the Control/Monitor, the Exciter Model 802A, and the RF Driver Amplifier.



Above photo: the Control and Driver Unit houses the Type 802A FM Exciter, IPA and Driver Units, transmitter control and monitoring.

#### Control/Display Panel

The analog meters include plate voltage, plate current, and RF power output. Front panel controls exist for filament and plate ON and OFF, power control MANUAL and AUTO, FORWARD and REFLECTED POWER, power RAISE and LOWER, loading DECREASE and INCREASE, and tuning LOWER and INCREASE. There is a manual switch labeled, DISPLAY SELECTION, that will provide seven different screens on the operational display panel. The viewing screen uses

a pixel display of large, easily read characters, providing data equivalent to a video display. Each of the seven screens can display up to 8 lines of 32 characters per line, for a total of 256 characters per screen, or a total of 1792 for the system. Suitable connections are provided within the transmitter for hard-wire connections to a customer furnished remote control system. The microprocessor control system provides facilities for complete remote control and status indication by customer-furnished data link. This interface consists of a single RS232 two-pair port for connection to customer-furnished video terminals, keyboard printers, or through modems to full duplex data communications systems.

On start up of the transmitter, at preset intervals or on demand, the microprocessor will self-check the entire transmitter system. Any failures, malfunctions, or inappropriate conditions will be identified and displayed. A successful checkout will also be displayed with an appropriate indication. If a customer-furnished keyboard or printer is connected to the system, it can be activated to print out the operational status of the transmitter.

#### **Control/Monitor Card Cage**

The following plug-in modules are included in the Control/Monitor Card cage:

- Interlock Indicator Panel
- Shorting Stick Indicator Panel
- Control/Indicator Panel
- Fault Tally Indicator Panel
- RF Power Monitor/Control
- Filament Regulator Control
- Local/Remote Interface Panel

#### **RF Driver Amplifier**

The solid-state Driver Amplifier achieves 1 kW output by combining two 600 watt amplifiers. On the control panel for the RF driver amplifier is a meter that is selected by Driver 1 functions, Driver 2 functions, or the combined Driver output functions, as well as the IPA.

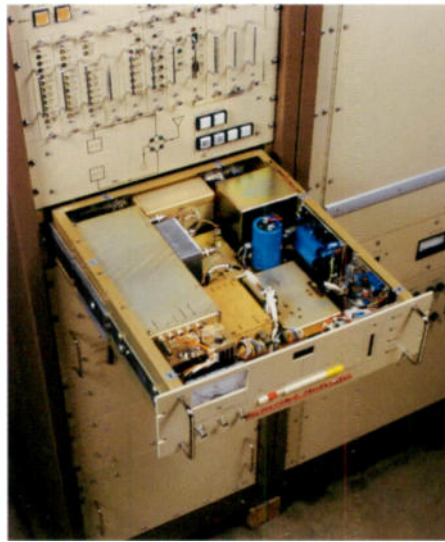
#### **Power Amplifier**

The Power Amplifier is contained in a well shielded enclosure to minimize RFI and to maintain the integrity of the RF path. The Power Amplifier tube is a single 4CX40,000G Tetrode, operating in Class C. The screen grid is operated at DC chassis ground.

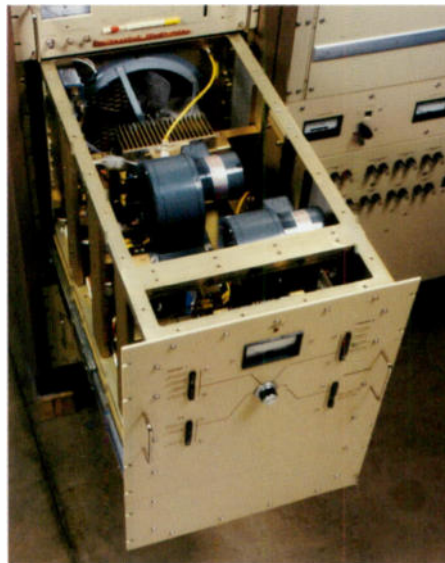
The EIMAC 4CX40,000G, designed for FM service, is an air-cooled version of a pyrolytic graphite tube with 100 kW capability.

The rugged pyrolytic graphite screen grid meets the stringent dissipation requirements of a high efficiency, stable and reliable FM amplifier.

A self-contained harmonic filter and directional coupler are included in the power amplifier unit.



*A view of the Exciter drawer in the extended position shows component accessibility.*



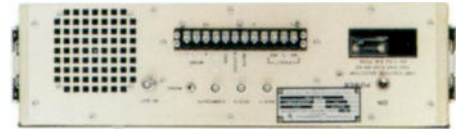
*RF Driver Amplifier Unit in the extended position shows component accessibility.*



*Rear view of transmitter Cavity Unit with cover removed shows self-contained harmonic filter.*



*Front view, Type 802A Exciter.*



*Rear view, Type 802A Exciter.*

#### **The ultimate-FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### **State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### **Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### **Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### **50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### **Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any preset level from 5 watts up to the maximum level.

#### **Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### **Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

## SPECIFICATIONS using 802A Exciter GENERAL

### Rated Power Output:

817A: 30, 40, 50, 60 kW

### Power Consumption:

817A: 53, 65.6, 80.8, 94.4 kW nominal

### Frequency Range:

88 to 108 MHz, in 10 kHz steps

### Frequency Control:

Phase Locked Loop Frequency Synthesis from high stability master oscillator

### Frequency Stability:

± 250 Hz

### Output Impedance:

50 ohms

### Output Connector:

6 1/2" EIA Flange

### VSWR:

2:1, max.

### Modulation Type:

Direct carrier frequency modulation

### Modulation Capability:

± 150 kHz deviation

### Modulation Indication:

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ± 2%

### Exciter:

Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter

### RF Harmonic Attenuation:

- 80 dB, min.

### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 volts peak-to-peak) @ 600 ohms for ± 75 kHz deviation

#### Audio Frequency Response:

± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.2% max.; 20 Hz to 15 kHz (measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

72 dB min. below ± 75 kHz deviation @ 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio

##### (AM Noise):

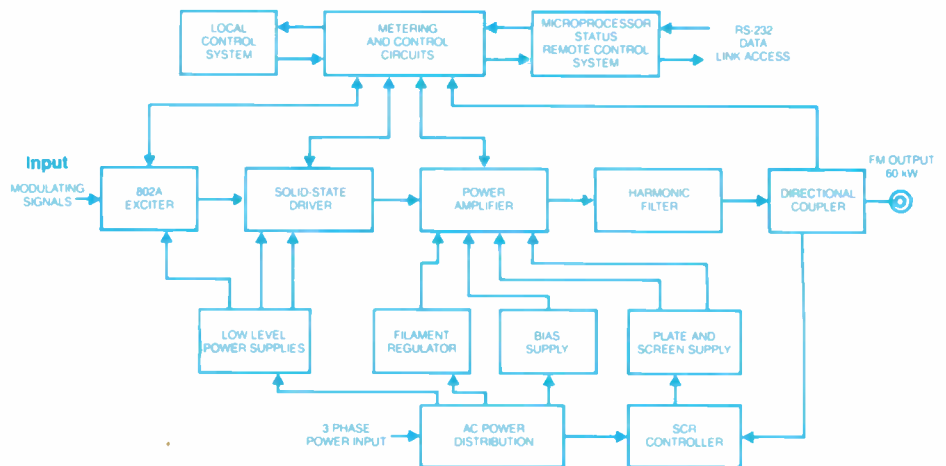
55 dB RMS below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, no FM modulation

#### Synchronous AM S/N Ratio

##### (Incidental AM Noise):

40 dB below carrier; reference: 100% AM modulation, full power @ 400 Hz with 75 microsecond de-emphasis, FM modulation ± 75 kHz @ 400 Hz

## SIMPLIFIED BLOCK DIAGRAM



## WIDEBAND OPERATION

### Composite Inputs:

Balanced, unbalanced and test

### Composite Input Impedance:

5,000 ohms, nominal

### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak) for ± 75 kHz deviation

### Composite Amplitude Response:

± 0.1 dB, 20 Hz to 100 kHz

### Composite Total Harmonic Distortion:

0.2% max.

### Composite Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

### Two SCA Inputs:

Balanced or unbalanced

### SCA Input Impedance:

50,000 ohms, nominal

### SCA Input Level:

1.25 volts RMS for ± 7.5 kHz deviation

### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

## STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.

### Stereo Separation:

50 dB min.; 40 Hz to 15 kHz.

### Total Harmonic Distortion:

0.1% max.; 40 Hz to 15 kHz (Measured with Spectrum Analyzer.)

### Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz, 4:1 ratio

### FM Noise:

- 72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

### Linear Crosstalk:

- 55 dB

## SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" SCA Generator is used.

### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

- 47 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

### Crosstalk SCA to SCA

#### (67 kHz and 92 kHz):

- 50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

## ELECTRICAL

### Power Source:

200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request.

### Permissible Line Voltage Variation:

± 5% (each phase voltage variation: within 5% of the average of all three phases).

### Filament regulator:

± 1% of optimum

## OPERATING ENVIRONMENT

### Altitude Range:

0 to 7,500 ft. (2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit

### Ambient Temperature Range:

- 20°C to + 50°C (- 4°F to + 122°F)

### Relative Humidity:

0 to 95%

## MECHANICAL

Size, as shown: 72" (175.3 cm) H, 128" (200.6 cm) W, 40" (86.4 cm) D

Weight: 4074 lb (2130 kg) nominal

All specifications are subject to change without notice.

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Continental Electronics

a Division of Varian Associates, Inc.

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# Continental Electronics Corporation

P. O. BOX 270879 DALLAS, TEXAS 75227-0879 (214) 381-7161 FAX (214) 381-4949 TELEX 73-398

## SPECIFICATIONS USING 802B SOLID-STATE EXCITER

### GENERAL

**Rated Power Output:**  
5 kW

**Power Consumption:**  
9.8 kW nominal

**Frequency Range:**  
88 to 108 MHz, in 10 kHz steps

**Frequency Control:**  
Phase-locked loop frequency synthesis from high stability master oscillator

**Frequency Stability:**  
± 250 Hz

**Output Impedance:**  
50 ohms

**Output Connector:**  
1-5/8" EIA flange

**VSWR:**  
2:1, maximum

**Modulation Type:**  
Direct carrier frequency modulation

**Modulation Capability:**  
± 200 kHz deviation

**Modulation Indication:**  
Digital LED display shows true peak level of modulating signal in 5% increments with accuracy better than ±2%.

**Exciter:**  
Solid state unit with variable output of 5 to 50 watts; self-contained harmonic filter

**RF Harmonic Attenuation:**  
- 80 dB, minimum

**Power Supply Rectifiers:**  
Silicon

### MONAURAL OPERATION

**Audio Input Impedance:**  
600 ohms, balanced

**Audio Input Return Loss:**  
30 dB or better

**Audio Input Level:**  
+ 10 dBm (6.93 V peak-to-peak) at 600 ohms for ± 75 kHz deviation

**Audio Frequency Response:**  
± 0.5 dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**  
0.08% maximum; 20 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.08% or less, 60 Hz/7 kHz, 4:1 ratio

**FM S/N Ratio (FM Noise):**  
75 dB minimum, below ± 75 kHz deviation at 400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**  
55 dB RMS below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**  
50 dB below carrier; reference: 100% AM modulation, full power, with 75 microsecond de-emphasis, FM modulation ± 75 kHz at 400 Hz

### WIDEBAND OPERATION

**Composite Inputs:**  
Balanced, unbalanced and test

**Composite Input Impedance:**  
5,000 ohms, nominal

**Composite Input Level:**  
1.25 V RMS (3.54 V peak-to-peak) for ± 75 kHz deviation

**Composite Amplitude Response:**  
± 0.2 dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**  
0.08% maximum

**Composite Intermodulation Distortion:**  
0.08% maximum; 60 Hz/7 kHz, 4:1 ratio

**Three SCA Inputs:**  
Balanced or unbalanced

**SCA Input Impedance:**  
15,000 ohms, nominal

**SCA Input Level:**  
1.25 V RMS for ± 7.5% kHz deviation (adjustable)

**SCA Amplitude Response:**  
± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most stereo performance parameters are determined primarily by the stereo generator used. The following specifications are influenced by the RF system and assume that a state-of-the-art stereo generator is used.

**Stereo Separation:**  
50 dB minimum; 50 Hz to 15 kHz (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**  
0.08% maximum; 50 Hz to 15 kHz (Measured with spectrum analyzer)

**Intermodulation Distortion:**  
0.15% maximum; 60 Hz/7 kHz, 4:1 ratio

**FM Noise:**  
- 70 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth

**Linear Crosstalk:**  
- 55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF system and assume that a state-of-the-art SCA generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**  
- 60 dB, SCA deviation 5 kHz; main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz and/or 92 kHz):**  
- 50 dB, main and stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk, SCA to SCA (67 kHz and/or 92 kHz):**  
- 50 dB, SCA reference deviation; 5 kHz and 200 Hz modulation frequency, 150 microsecond de-emphasis

### ELECTRICAL

**Power Source:**  
200 to 250 VAC; 60 Hz, single-phase; available transformer taps are 200, 210, 220, 230, 240, 250 VAC; 50 Hz available on request

**Permissible Line Voltage Variation:**  
± 5%

**Filament Regulator:**  
± 1% of optimum

### OPERATING ENVIRONMENT

**Altitude:**  
7,500 ft (2,286 m) standard; optional to 10,000 ft (3,048 m) with modification kit

**Ambient Temperature Range:**  
- 20°C to +50°C (- 4°F to + 122°F)

**Relative Humidity:**  
0 to 95%

### MECHANICAL

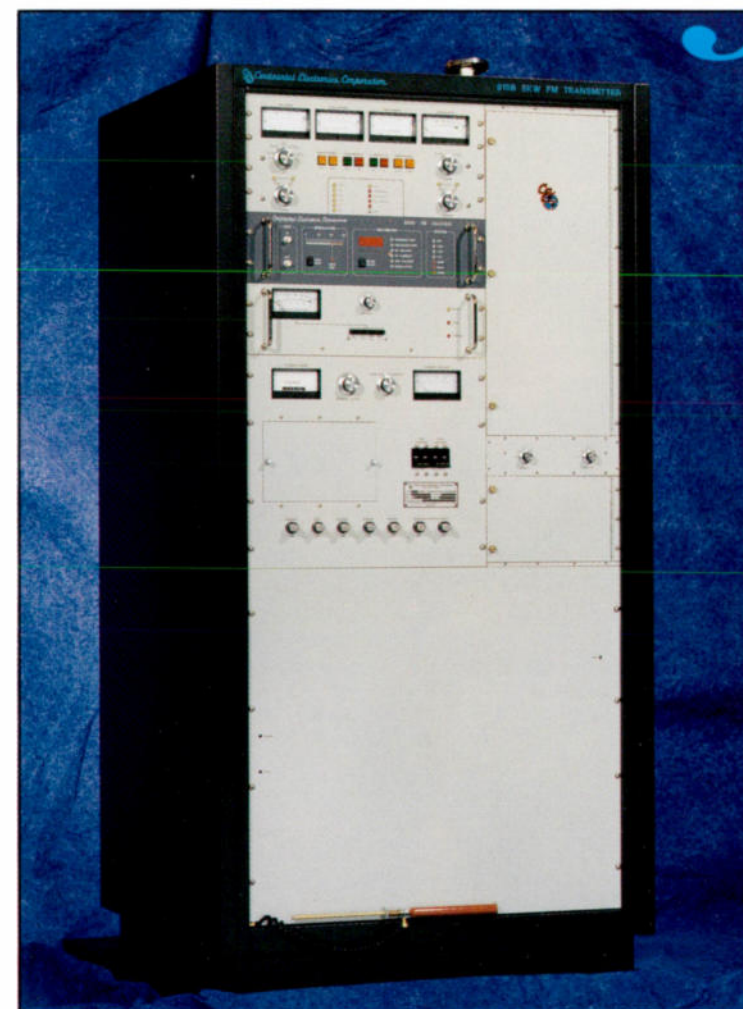
**Transmitter:**  
69" (175 cm) H  
34-3/4" (88 cm) W  
33-3/8" (61 cm) D

**Weight:**  
1,020 lbs (466 kg) nominal

All specifications are subject to change without notice.  
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## CONTINENTAL'S 815B 5kW BROADCAST TRANSMITTER

# fm



# Continental Electronics Corporation

## THE FM TRANSMITTER

### FEATURES

Single Tube

SCR Power Control

Automatic Power Output Control

Automatic VSWR Protection

Automatic Reflected Power Foldback

Remote Control Interface

Filament Voltage Regulator

True RMS Filament Voltage Metering

AC Power Failure Recycle

Two/Four Shot Automatic Overload  
Recycle

Internal Diagnostics

Solid-State IPA

Slide-Out Tube Socket

Continental's 5 kW transmitter offers the broadcaster excellent stereo performance and separation, low noise and power consumption while providing years of dependable service.

The RF chain consists of a solid-state driver, the 802B 50 watt exciter and the reliable 4CX3500A tetrode final amplifier tube.

**The Solid-State Driver** is a 150 watt driver mounted in a drawer on slides for easy servicing. This driver is usually operated at about 70 watts output and has reflected power protection.

**SCR "Soft-Start"™** gently applies primary voltage to the plate and screen power supplies when the plate control is turned on. The SCRs are conservatively rated at 110A in a 30A to 50A circuit.

**Automatic Power Output Control** uses an all solid-state SCR Power Controller to automatically maintain the power output to any preset level. The power can also be manually adjusted from zero to full rated power with a single front panel control. A unique feature of the Continental transmitter is the ability to control both the plate and screen voltages simultaneously so that the transmitter stays tuned at all power levels.

**Broadband Quarter Wave Cavity** uses the reliable 4CX3500A tube. The tube and socket assembly are slide mounted for easy tube replacement and maintenance of the socket.

**Automatic Filament Voltage Regulation** keeps a constant filament voltage on the PA tube to help extend tube life.

**Automatic Power Interrupt Recycle** remembers and restores the transmitter to its previous operating status after a power interruption.

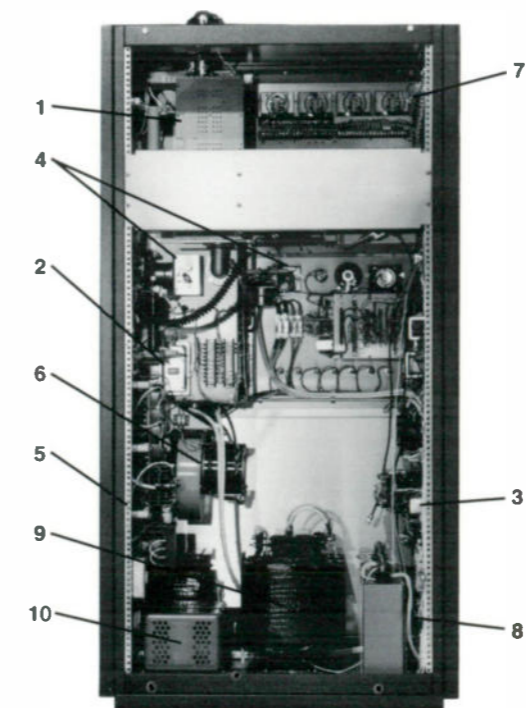
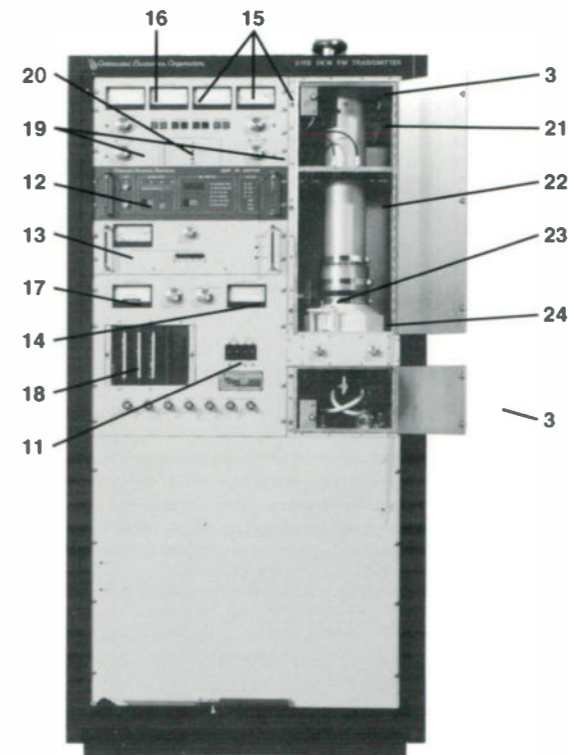
**Two Independent VSWR Protection Circuits** prevent the reflected power from exceeding safe levels. One circuit handles severe instantaneous mismatches, such as lightning strikes, by momentarily interrupting the plate and screen voltage when the reflected power reaches a preset level. The second circuit limits the reflected power to a preset level by controlling the plate and screen voltage during icing conditions. This allows the transmitter to operate at the highest safe user selected power level during severe antenna icing.

**Completely Self Contained** in a single cabinet including the high voltage power supply, harmonic filter and filament voltage regulator.

**Positive Pressure Cabinet** keeps dust from collecting on critical components. The 815B filtered air intake is located on the rear door and air exhaust is located on the top of the cabinet for easy ductwork installation.

### THE EXCITER

All Continental transmitters come equipped with the 802B exciter. This exciter may be operated from 5 to 50 watts depending on the amount of drive required for the power amplifier. This exciter may also be used as an emergency transmitter.



### THE INSIDE STORY

**1. Harmonic filter.** Fully contained inside cabinet for easy transmitter installation while reducing overall space requirements.

**2. Air switch.**

**3. Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.

**4. Tuning & loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA.

**5. SCR control.** Single-phase control of the plate supply primary voltage with feedback maintains constant forward power output with line voltage variations. Exclusive "Soft-Start"™, initially brings the transmitter up gently.

**6. PA blower.** PA blower moves the air through the PA tube.

**7. Remote control connections.** Conveniently located for simple set up.

**8. Power input.** Either bottom or top entry is available; bottom entry shown here.

**9. Power supply.** Self-contained integral part of the transmitter.

**10. Filament voltage regulator.** A ferroresonant CV transformer maintains constant filament voltage to the PA tube to maximize tube life.

**11. Indicator fuses & circuit breakers.**

**12. 802B exciter.**

**13. Solid-state IPA.** Broadband 150 watt amplifier provides ample drive to the PA.

**14. True RMS iron vane filament voltmeter.**

**15. Continuous readout meters.** Show plate current, plate voltage and output power at a glance.

**16. DC multimeter.** Six operating parameters at the turn of a dial.

**17. Filament hour meter.**

**18. Solid-state control cards.** Cards for power, power monitor, tally-recycle and control circuits.

**19. Tuning & loading controls.** An exclusive motorized feature for easy adjustments. (With travel limit indicators)

**20. LED status indicators.**

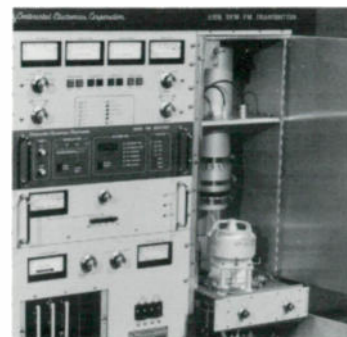
**21. PA exhaust stack temperature sensor.** Redundant backup to the air switch protects the final amplifier tube if cooling air is lost or overdissipation occurs.

**22. Wideband quarter-wave cavity.** A proven design for greater reliability.

**23. Static drain choke.** Bleeds off static build-up in transmission lines or antennas.

**24. Final amplifier.** A rugged 4CX3500A tetrode.

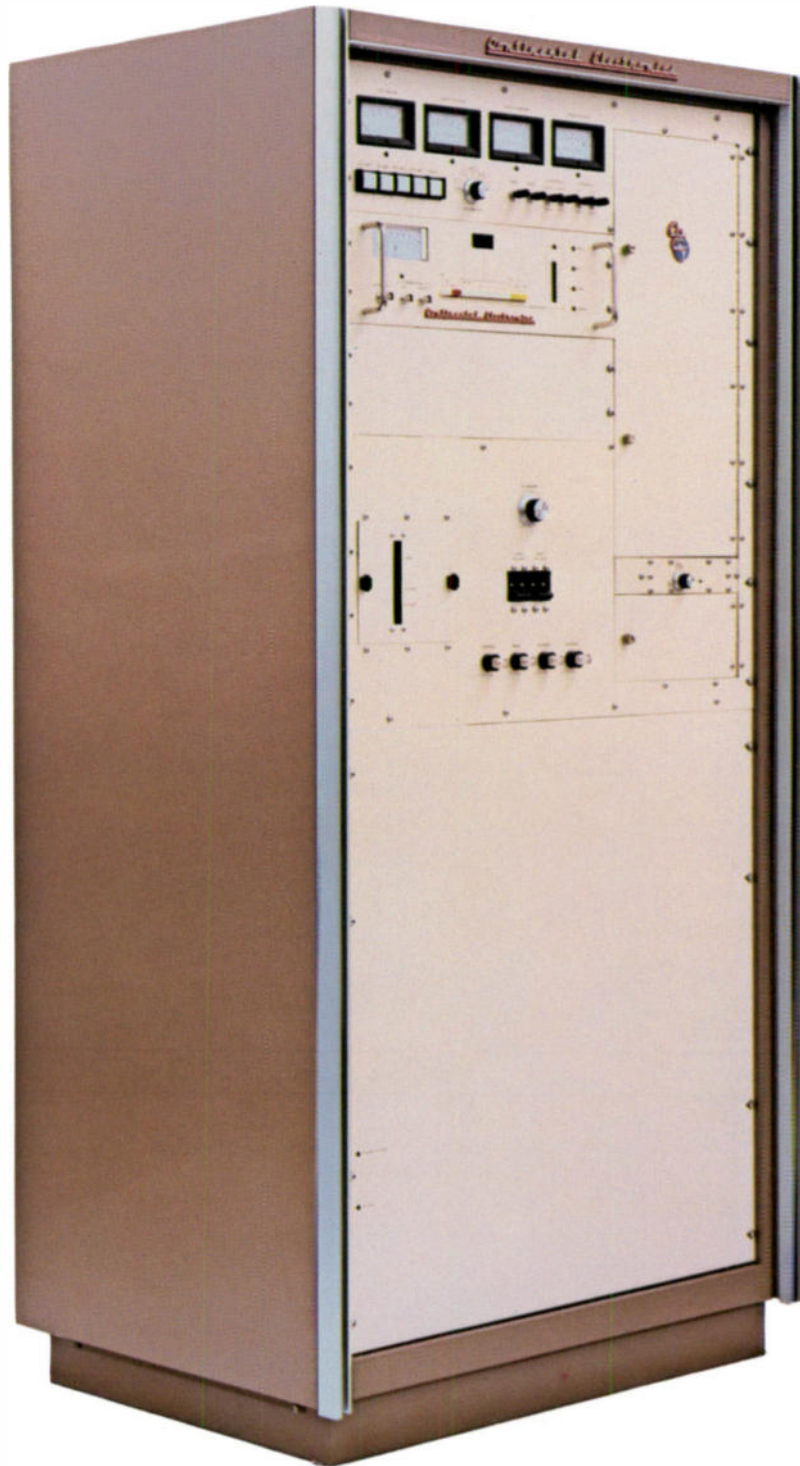
**25. Cabinet flushing fan.** (not shown in photos) Fan, mounted on transmitter cabinet's removable back panel, delivers approximately 600 cfm to maintain positive cabinet pressure; has disposable filter.



Slide-Out Tube Socket

CONTINENTAL LOW POWER  
2.5 KW FM  
BROADCAST TRANSMITTERS

FM



FEATURING 802A SOLID-STATE EXCITER



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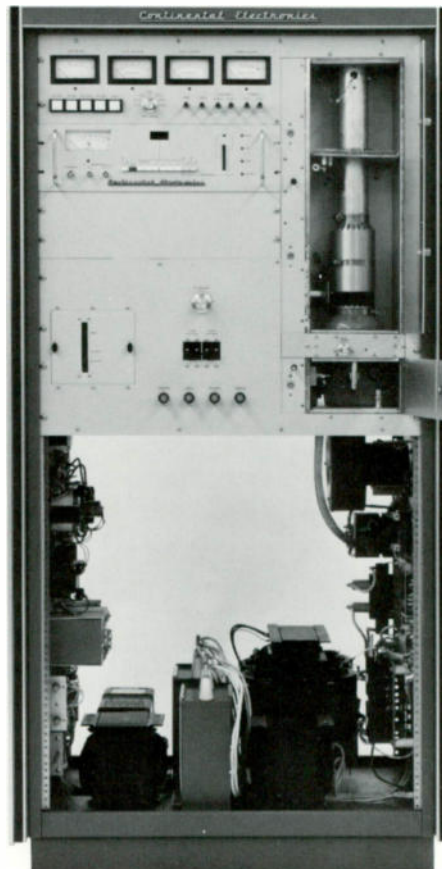
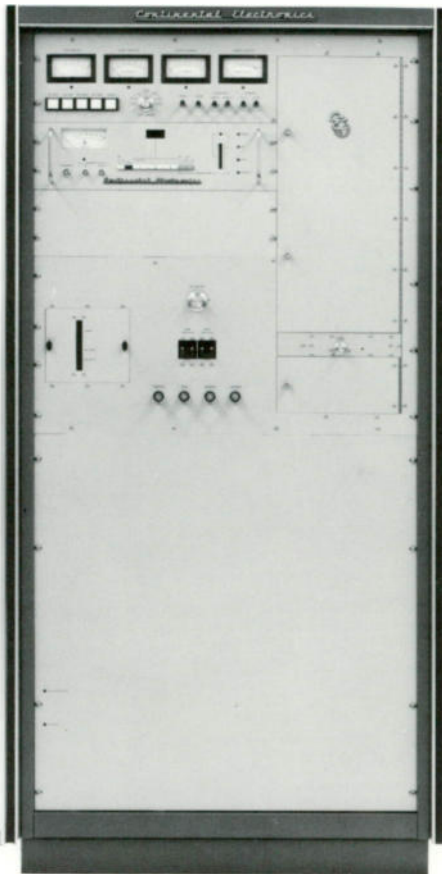


### Field-Proven Features

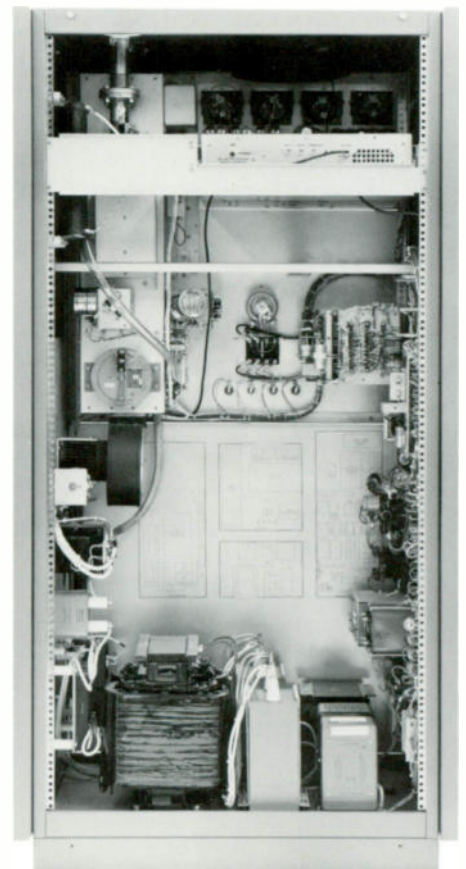
- Lowest intermodulation distortion
- Highest stereo separation
- Automatic power output control
- Automatic overload recycling
- VSWR protection
- Superior frequency stability
- Automatic filament voltage regulation
- Overload indicator lights
- Front panel pushbutton control
- Superior PA stability
- Proven PA design
- Built-in remote control facilities
- Front panel monitoring
- Easy access
- Compact size
- Outstanding exciter

### Type 814R-1 2.5 kW FM Transmitter

Continental's 814R-1 is a high-performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal. The transmitter is solid-state except for the single 5CX1500A tube in the final amplifier. The 814R-1 uses IC logic for all control functions, and incorporates a computer-like memory to restart the transmitter after a power failure. A built-in battery supply and charger enables the logic circuits to remember their state in the event of a power interruption. The transmitter utilizes automatic filament voltage regulation and automatic power control for unattended operation. Standard features include remote control equipment and automatic overload/recycle system. Overload conditions are indicated by an LED display. The 814R-1 is completely contained in one 35" wide (89 cm) cabinet.

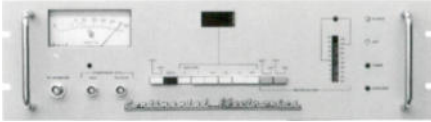


Front view, Type 814R-1  
2.5 kW FM Transmitter

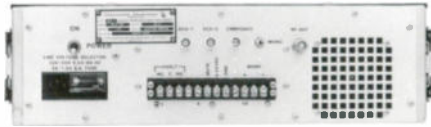


Rear view, Type 814R-1  
2.5 kW FM Transmitter





Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

### **Introducing the ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### **State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### **Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### **Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

#### **50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### **Automatic power level control**

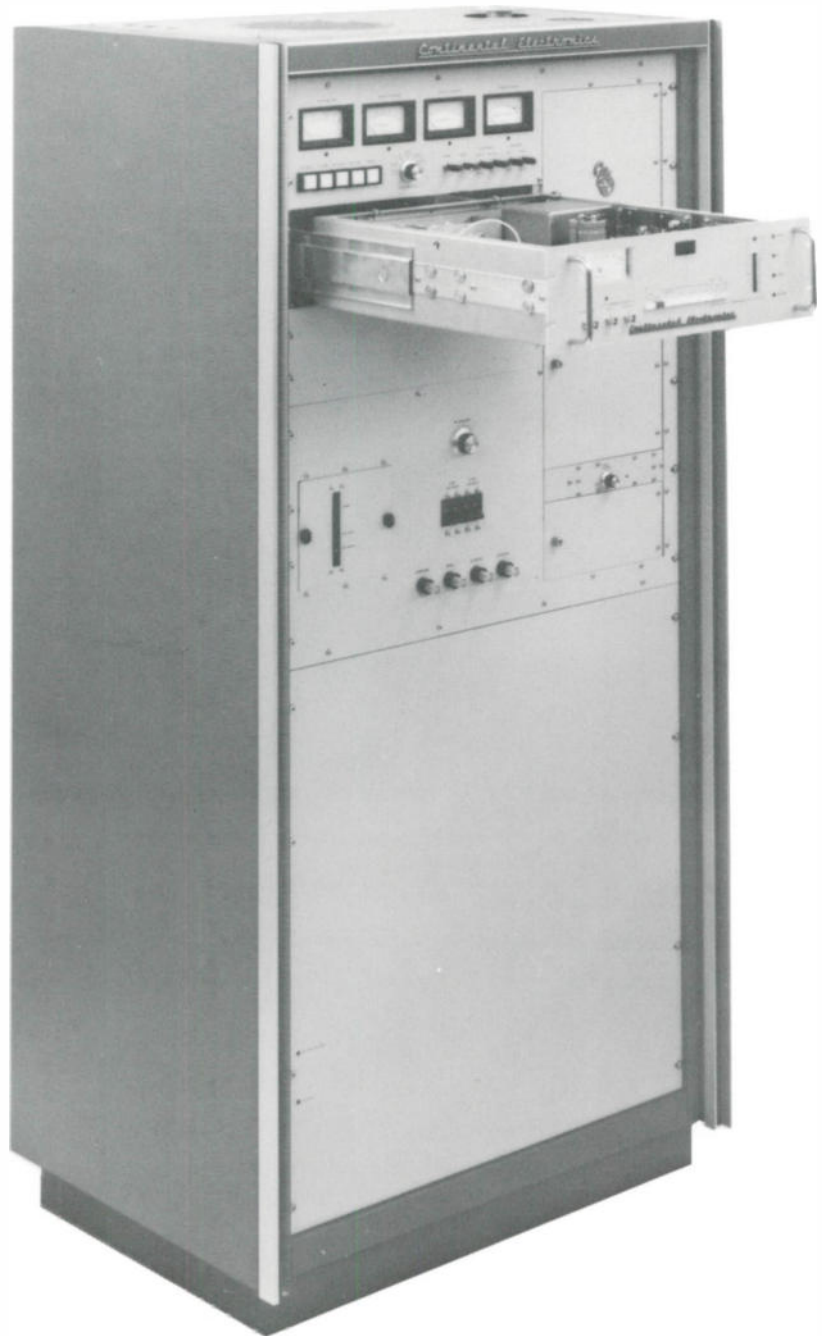
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

#### **Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### **Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; it's shown here with top cover removed.

## SPECIFICATIONS using Type 802A Exciter

### GENERAL

#### Rated Power Output:

814R-1: 2.5 kW

#### Power Consumption:

814R-1: 4.9 kW

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency  
Synthesis from high stability master  
oscillator

#### Frequency Stability:

$\pm 275$  Hz

#### Output Impedance:

50 ohms

#### Output Connector:

1 $\frac{1}{2}$ " EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

$\pm 150$  kHz deviation

#### Modulation Indication:

Digital LED display shows true peak  
level of modulating signal in 5%  
increments with accuracy better  
than  $\pm 2\%$

#### Exciter:

Solid-state unit with variable output  
of 5 to 50 watts, and self-contained  
harmonic filter.

#### RF Harmonic Attenuation:

-80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+10 dBm (6.93 volts peak-to-peak)  
@ 600 ohms for  $\pm 75$  kHz deviation.

#### Audio Frequency Response:

$\pm 0.5$  dB; flat, 25, 50 or 75  
microsecond pre-emphasis,  
20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below  $\pm 75$  kHz  
deviation @ 400 Hz, measured  
within a 20 Hz to 15 kHz bandwidth  
with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, no FM modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

40 dB below carrier; reference:  
100% AM modulation, full power @  
400 Hz with 75 microsecond de-  
emphasis, FM modulation  $\pm 75$  kHz  
@ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak to  
peak) for  $\pm 75$  kHz deviation

#### Composite Amplitude Response:

$\pm 0.1$  dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max

#### Composite Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for  $\pm 7.5$  kHz  
deviation

#### SCA Amplitude Response:

$\pm 0.3$  dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters  
are determined primarily by the Stereo  
Generator used. The following  
parameters are influenced by the RF  
system. These specifications assume  
that a "State-of-the-Art" Stereo  
Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB  
or better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz.  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% max.; 60 Hz/7 kHz, 4:1 ratio.

#### FM Noise:

-72 dB referenced to 400 Hz, 75  
kHz deviation. Measured with 75  
microsecond de-emphasis within a  
20 Hz to 15 kHz bandwidth.

#### Linear Crosstalk

-55 dB

### SCA OPERATION

Most SCA performance parameters  
are determined primarily by the SCA  
generator used. The following  
parameters are influenced by the RF  
System. These specifications assume  
that a "State-of-the-Art" SCA  
Generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

-60 dB, SCA deviation 5 kHz, Main  
75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

-50 dB, Main and Stereo 75 kHz  
deviation; SCA reference deviation,  
5 kHz and 200 Hz modulation; SCA  
de-emphasis, 150 microsecond

#### Crosstalk SCA to SCA (67 kHz and 92 kHz):

-50 dB, SCA reference deviation 5  
kHz and 200 Hz modulation  
frequency; de-emphasis, 150  
microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, single  
phase; available transformer taps  
are 200, 210, 220, 230, 240, 250  
volts ac; 50 Hz available on request.

#### Permissible Line Voltage Variation:

$\pm 5\%$

#### Filament regulator:

$\pm 1\%$  of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft. (2286 m) standard; optional  
to 10,000 ft (3048 m) with  
modification kit

#### Ambient Temperature Range:

-20°C to +50°C (-4°F to +122°F)

### MECHANICAL

#### Size, as shown:

69" (175 cm) H

35" (89 cm) W

24" (61 cm) D

#### Weight:

750 lb (340 kg) nominal

All specifications are subject to change without notice.

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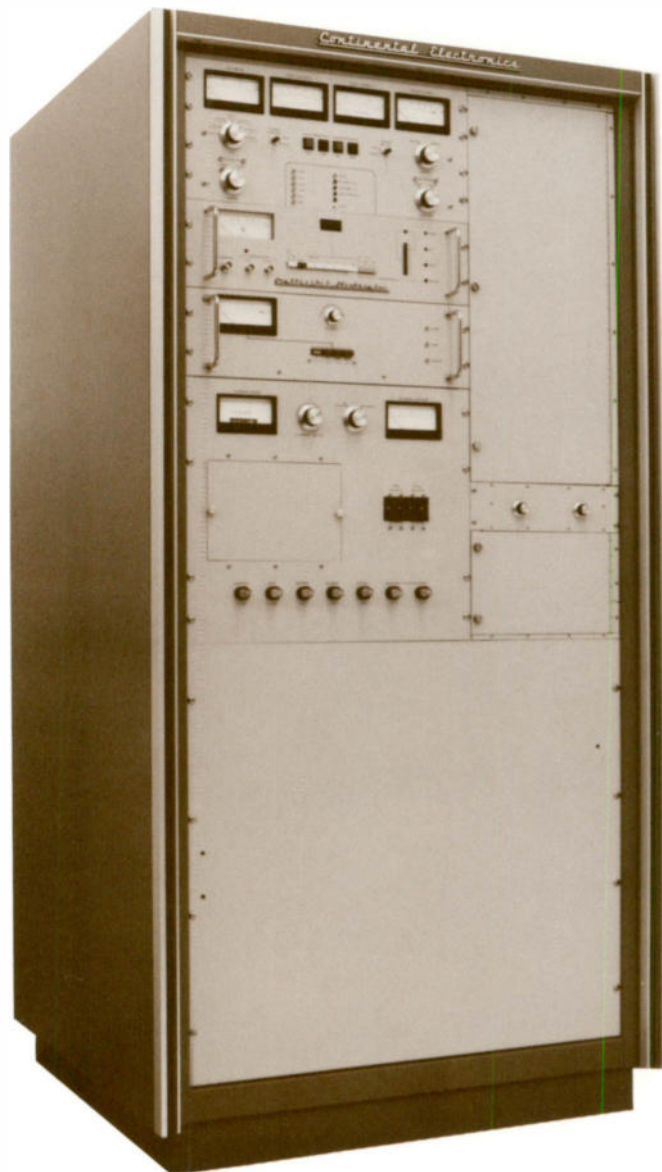


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**NEW!**

CONTINENTAL TYPE 814B  
4.3 KW FM  
BROADCAST TRANSMITTER

**FM**



Type 814B 4.3 kW FM Transmitter

Continental's Type 814B is a high performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal.

With an output power of 4,300 watts, it has an adequate power reserve for Class A FM operation using a two-bay antenna system.

The transmitter is all solid-state, including a 100 watt intermediate power amplifier, except for a single tube in the final amplifier.

The RF chain consists of a Continental Type 802A 50 watt exciter and the solid-state 100 watt IPA driving a 4CX3500A Tetrode tube in the final amplifier.

The output network consists of a fore-shortened quarter-wave coaxial resonator and harmonic filter.

IC logic is used for all control functions. A computer-like memory, powered by battery back-up, restarts the transmitter after a power failure.

The 814B is completely self-contained in one cabinet, including harmonic filter.

In keeping with the tradition of other Continental transmitters, the Type 814B uses husky components and is built to give many years of reliable service.

#### **Brief Overview Of Transmitter**

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- Filament Voltage Regulator
- True RMS Filament Voltage Regulator
- ac Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Internal Diagnostics



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## Specifications using 802A Exciter

### GENERAL

#### Rated Power Output:

814B: 4.3 kW

#### Power Consumption:

814B: 7.0 kW, nominal

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency Synthesis  
from high stability master oscillator

#### Frequency Stability

±250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

1½" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

±150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

#### Exciter:

Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter

#### RF Harmonic Attenuation:

-80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+10 dBm (6.93 volts peak-to-peak)  
@ 600 ohms for ±75 kHz deviation

#### Audio Frequency Response:

±0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below ±75 kHz deviation @ 400  
Hz, measured within a 20 Hz to 15 kHz band-  
width with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM

#### Noise):

55 dB RMS below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75 micro-  
second de-emphasis, no FM modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

40 dB below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75  
microsecond de-emphasis, FM modulation  
±75 kHz @ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak)  
for ±75 kHz deviation

#### Composite Amplitude Response:

±0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max.

#### Composite Intermodulation Distortion:

0.1% or less, 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ±7.5 kHz deviation

#### SCA Amplitude Response:

±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.

#### Stereo Separation:

50 dB min; 50 Hz to 15 kHz. (60 dB or better,  
400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz.  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.1% max.; 60 Hz/7 kHz, 4:1 ratio

#### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz deviation.  
Measured with 75 microsecond de-emphasis  
within a 20 Hz to 15 kHz bandwidth.

#### Linear Crosstalk:

-55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" SCA Generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

-60 dB, SCA deviation 5 kHz, Main  
75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

-50 dB, Main and Stereo 75 kHz deviation;  
SCA reference deviation, 5 kHz and 200 Hz  
modulation; SCA de-emphasis, 150  
microsecond

#### Crosstalk SCA to SCA (67 kHz and 92 kHz):

-50 dB, SCA reference deviation 5 kHz and  
200 Hz modulation frequency; de-emphasis,  
150 microsecond

### ELECTRICAL POWER SOURCE

200 to 250 volts ac; 60 Hz, single phase;  
available transformer taps are 200, 210, 220,  
230, 240, 250 volts ac; 50 Hz available on  
request.

#### Permissible Line Voltage Variation:

±5%

#### Filament regulator:

±1% of optimum

### OPERATING ENVIRONMENT

#### Altitude Range:

0 to 7,500 ft. (0 to 2286 m) standard; optional  
to 10,000 ft (3048 m) with modification kit

#### Ambient Temperature Range:

-20°C to +50°C (-4°F to + 122°F)

#### Relative Humidity:

0 to 95%

### MECHANICAL

#### Size, as shown:

69" (175 cm) H  
35" (89 cm) W  
33¾" (61 cm) D

#### Weight:

850 lb (386 kg) nominal

All specifications are subject to change without notice.  
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Continental Electronics

® a Division of Varian Associates, Inc.

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Dallas, Texas 75227

Ph: (214) 381-7161

Telex: 73-398



varian



# Introducing Continental's Type 817A 60 kW FM Transmitter

- **Single Tube Amplifier**
- **Broadband, Solid-State Driver**
- **Automatic Power Control**
- **Advanced Remote Control Access System**
- **VSWR Protection**
- **Totally self-contained**
- **Type 802A FM Exciter**

The 817A uses a single Eimac 4CX40,000G tube in a highly stable grounded screen, reentrant half-wave cavity amplifier. Filament voltage for the amplifier is regulated with a true RMS sensing system to insure long tube life. The amplifier output power is held to a preset level by SCR control of the plate and screen voltages.

The driver amplifier consists of four identical solid state modules. The output of these modules is combined in a hybrid system so that failure or

removal of any one module has little affect on transmitter power output.

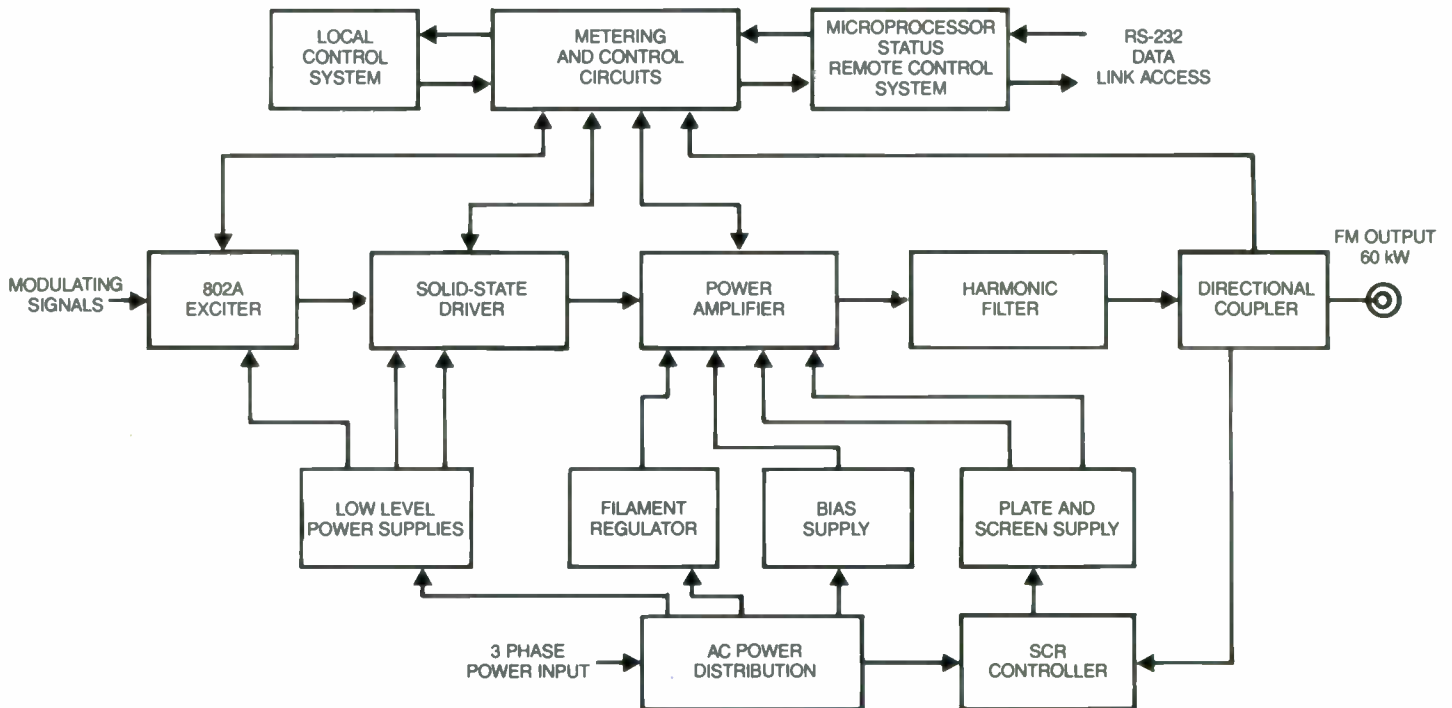
A dual redundant 8-bit microprocessor system is incorporated that provides total system monitoring and remote control interface over any voice grade circuit which will support data modems at 300 Baud. Because control of the transmitter is preserved in conventional local control circuitry, de-activation of the microprocessor has no affect on any local control features of the transmitter.

*Continental Electronics*

Continental Electronics Mfg. Co. Dallas, Texas



## SIMPLIFIED BLOCK DIAGRAM



### TENTATIVE SPECIFICATIONS

#### Rated Power Output:

60 kW, adjustable  
down to 30 kW

#### Power Consumption:

96 kW, 0.9 pf at  
60 kW output

#### Frequency Range:

88 to 108 MHz

#### Output Impedence:

50 ohms,  
max VSMR 2:1

#### Output Connector:

EIA 6 $\frac{1}{8}$  inch  
flange fitting

#### Size:

128 inches (200.6 cm) wide  
40 inches ( 86.4 cm) deep  
72 inches (175.3 cm) high  
Min. entrance opening  
34 inches ( 86.4 cm) by  
76 inches (193.0 cm)

#### Weight:

4700 pounds (2130 kg) max

#### Power Source:

200 to 250 v ac  
50 or 60 Hz 3 phase;  
available transformer  
taps are 200, 210, 220,  
230, 240, and 250 v.

#### Permissible line voltage variation:

Each phase voltage shall  
be within 5% of the aver-  
age of all three phases

#### Operating Altitude:

Sea level to 7500 feet  
(2286 meters) with derating  
to 50 kW output at 10000  
feet (3048 meters).  
Optional cooling system  
available for full power  
operation to 10000 feet  
(3048 meters) and derating  
to 50 kW output to 15000  
feet (4572 meters).

#### Ambient temperature range:

-4 F to +113 F  
(-20 C to +45 C)

#### Harmonic Attenuation:

-80 db

#### FM Noise level:

75 db below 100% modu-  
lation (typically 78 dB)

#### AM noise:

60 db below 100% modu-  
lation of referenced  
carrier (typically 65 dB)

#### Composite Amplitude Response:

$\pm 0.1$  dB 20 Hz to 100 kHz

#### Composite total Harmonic and Intermodulation Distortion:

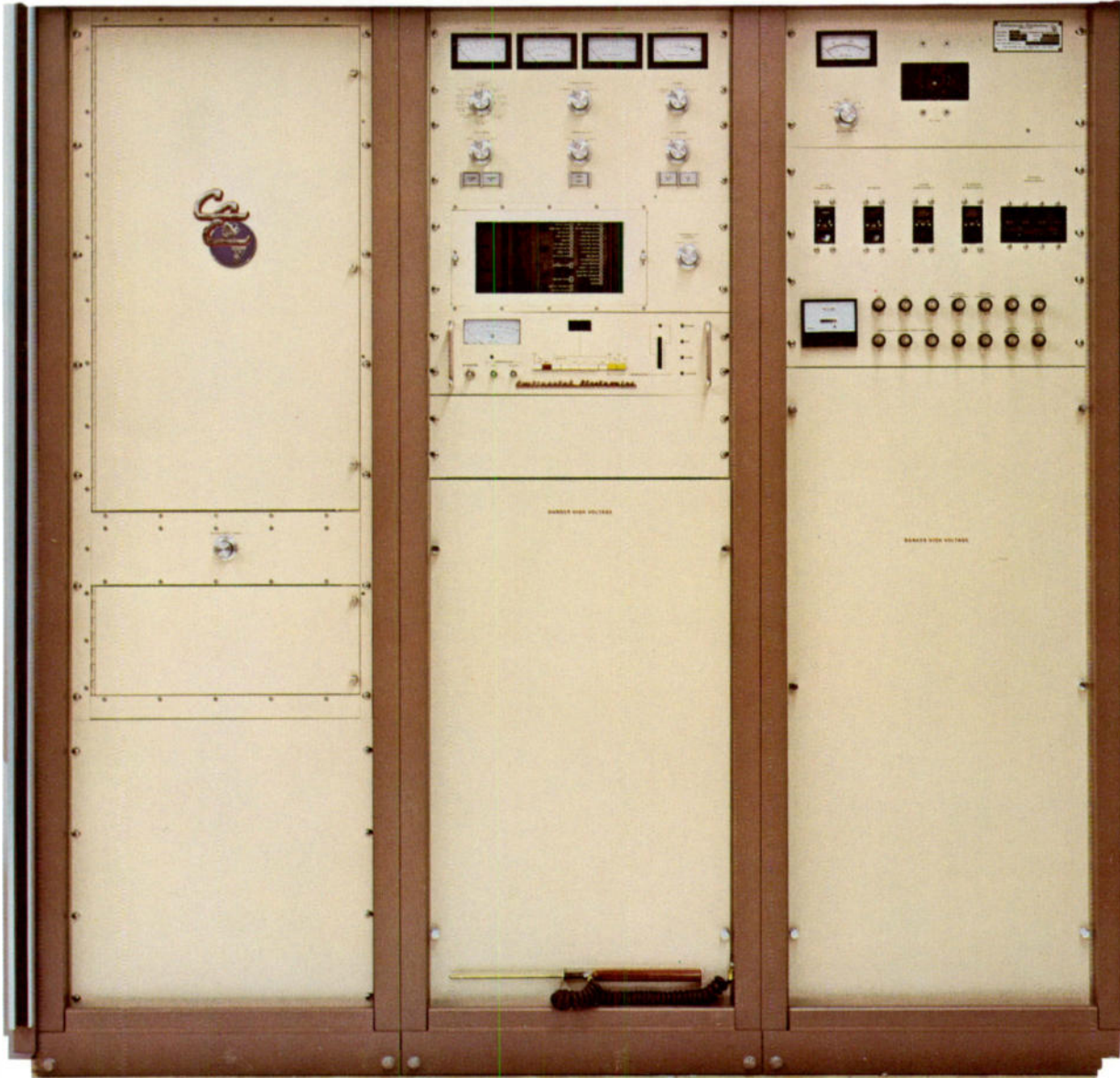
0.08% maximum  
(typical 0.02%)

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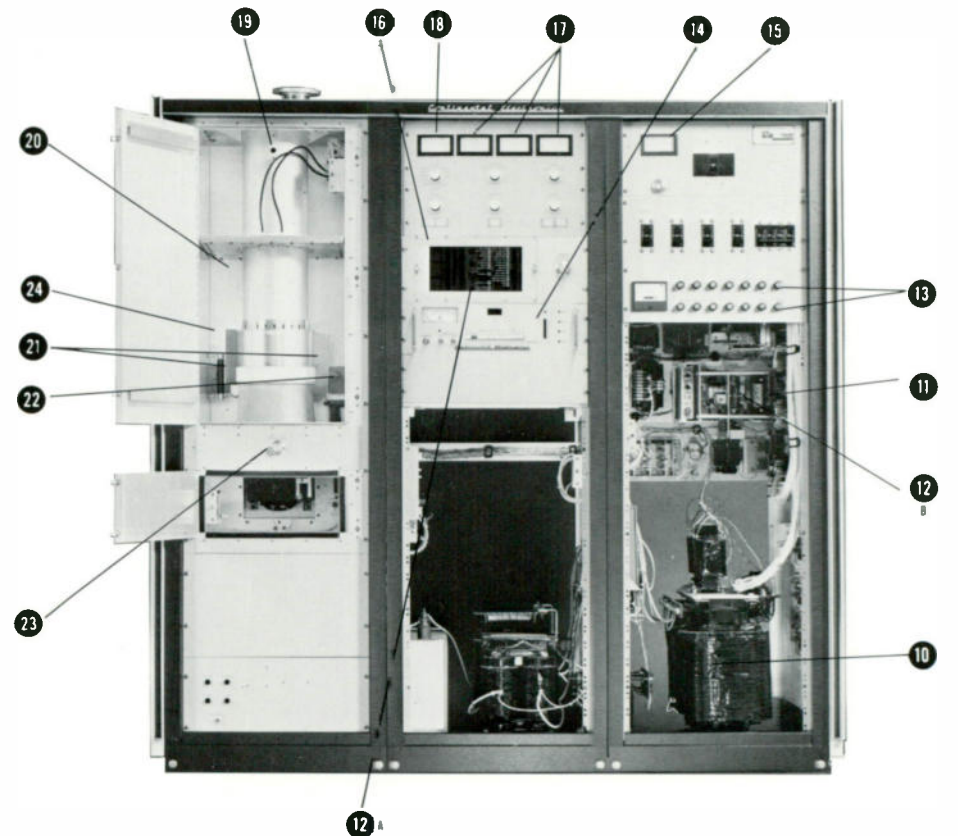
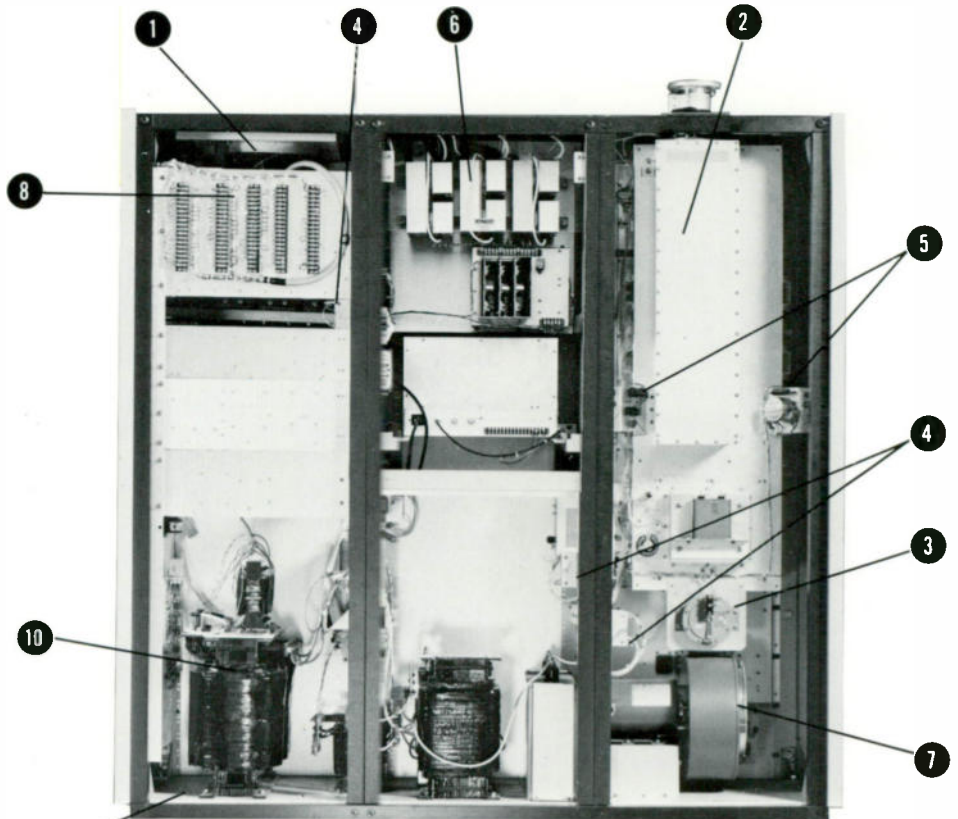




Featuring the new 802A solid-state exciter.

## THE INSIDE STORY

1. **Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. **Air switch.** Located here for easy access.
4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. **Tuning and loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
7. **PA blower.** 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. **Remote control connectors.** Conveniently located for simple setup.
9. **Power wire (Bottom Entry).** Designed for bottom entry; top entry available.
10. **Power supply.** A self-contained integral part of the transmitter.
11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control card
  - B. Control drive assembly
13. **Indicator fuses and circuit breakers.** There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. **802A Exciter.**
15. **True rms iron vane meter and 150-A ac mains circuit breaker.** Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
16. **LED-equipped card cage.** Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage, and output power.
18. **DC multimeter.** Eleven operating parameters at the turn of a dial.
19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final if cooling air is lost or overdissipation occurs.
20. **Wide-band ¼-wave cavity.** A proven feature for greater reliability.
21. **Tuning and loading controls.** An exclusive motorized feature for easy adjustments.
22. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
23. **Driver plate adjustment.** A single control tunes the driver plate.
24. **Final.** The 4CX10,000D tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.





**Top performance and proven design in high power FM**

Continental's 10 kW FM transmitter offers you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors; there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

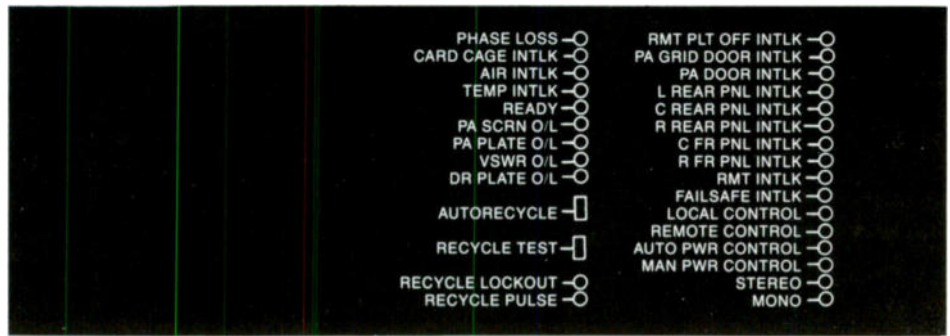
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

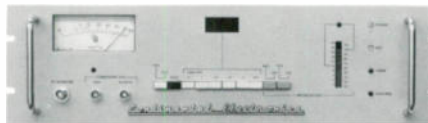
Wide-band, 1/4-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Transmitter LED status indicators



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**Introducing the ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

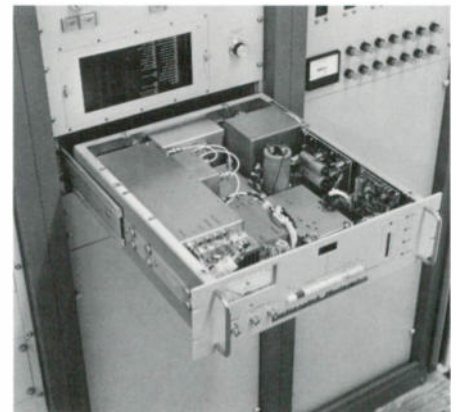
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than ±2%.

**Modular construction**

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## SPECIFICATIONS

**Rated power output:**

816R-1A: 10 kW

**Power consumption:**

816R-1A: 18 kW nominal

**Frequency range:**

88 to 108 MHz

**Output impedance:**

50 ohms, max. VSWR 2:1

**Frequency stability:**

± 500 Hz (typical: ± 100 Hz)

**Modulation capability:**

± 150 kHz

**Audio input level:**

10 dBm ± 2 dB

**Audio frequency response:**

± 1 dB of standard 75  $\mu$ s  
preemphasis curve

**Audio frequency distortion:**

mono: 0.25% max. (0.1 typical)  
stereo: 0.5% max. (0.15 typical)

**Stereo separation:**

50 to 15,000 Hz, 35 dB min.  
(40 dB or more typical)

**Harmonic attenuation:**

- 80 dB minimum

**FM noise level:**

65 dB below 100% modulation  
(70 dB typical)

**AM noise level:**

- 55 dB, rms (- 58 dB typical)

**Power source:**

200 to 250 v ac, 60 Hz, 3-phase;  
available transformer taps are  
200, 210, 220, 230, 240, 250 v ac;  
50 Hz available on request

**Permissible line voltage variation**

± 5% (each phase voltage shall be within 5%  
of the average of all three phases)

**Operating altitude**

7,500 ft (2286 m) standard; optional to 10,000  
ft (3048 m) with modification kit

**Size, as shown**

68- $\frac{1}{16}$ " (175.1 cm) H

71- $\frac{1}{2}$ " (181.6 cm) W

27- $\frac{1}{2}$ " (69.85 cm) D

**Weight**

1875 lb (836 kg) (nominal)

All specifications are subject to change without notice.

Printed in USA 1M484/5568

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*Continental Electronics*

Continental Electronics Mfg. Co. Box 270879 Dallas, Texas 75227 (214) 381-7161



CONTINENTAL  
20, 25, & 27.5 KW FM  
BROADCAST TRANSMITTERS

FM



FEATURING 802A SOLID-STATE EXCITER



Continental Electronics  
a Division of Varian Associates, Inc.



**Top performance  
and proven design  
in high power FM**

Continental's 20, 25 and 27.5 kW FM transmitters offer you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

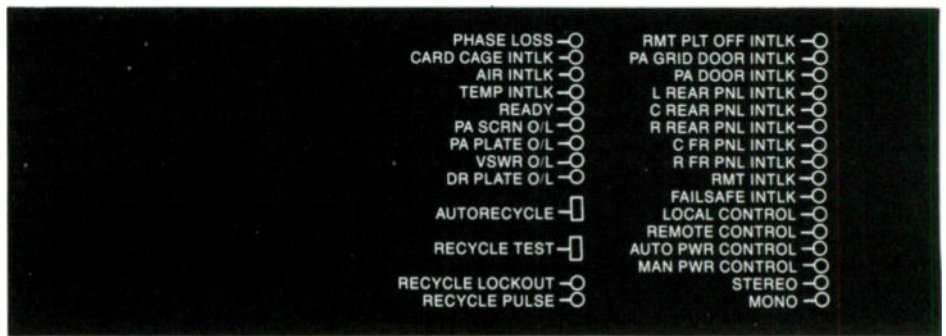
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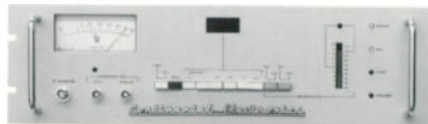
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Solid-state, automatic filament voltage regulation helps to increase tube life.

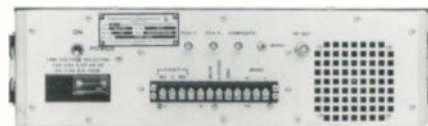
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Type 802A FM Exciter, rear view

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The Ultimate FM Exciter**

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Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

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Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

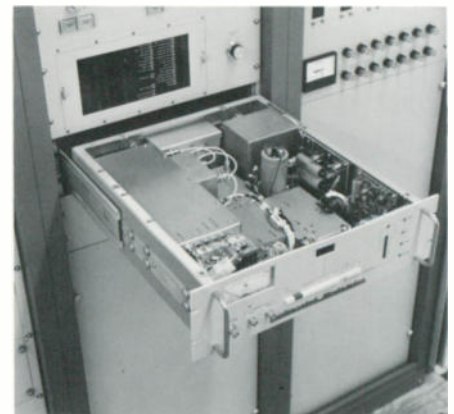
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**Modular construction**

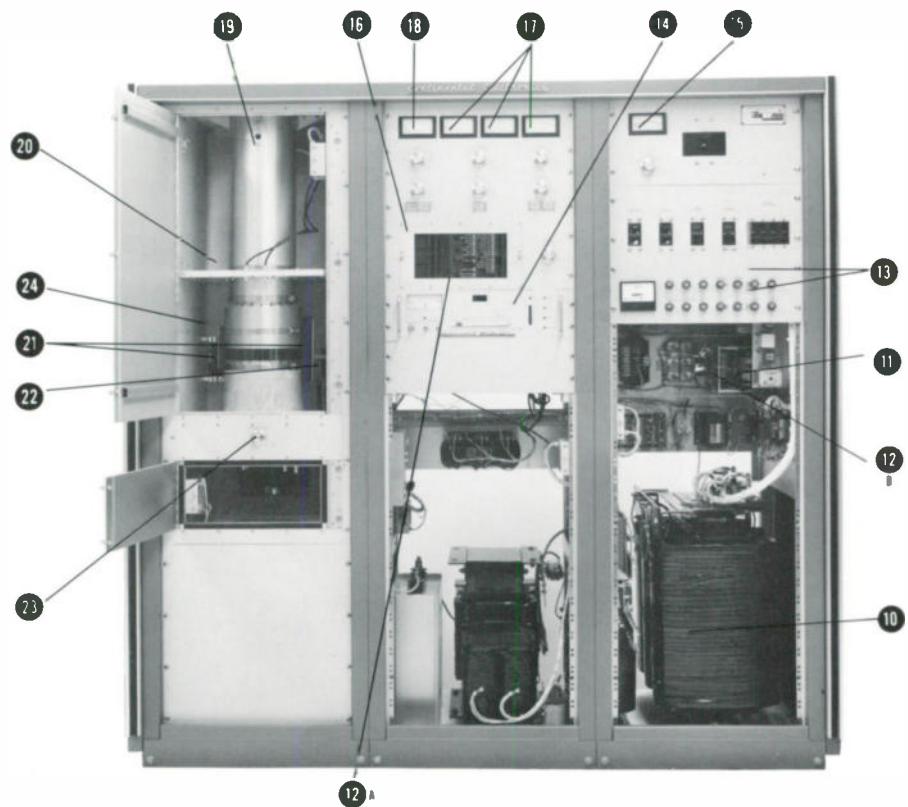
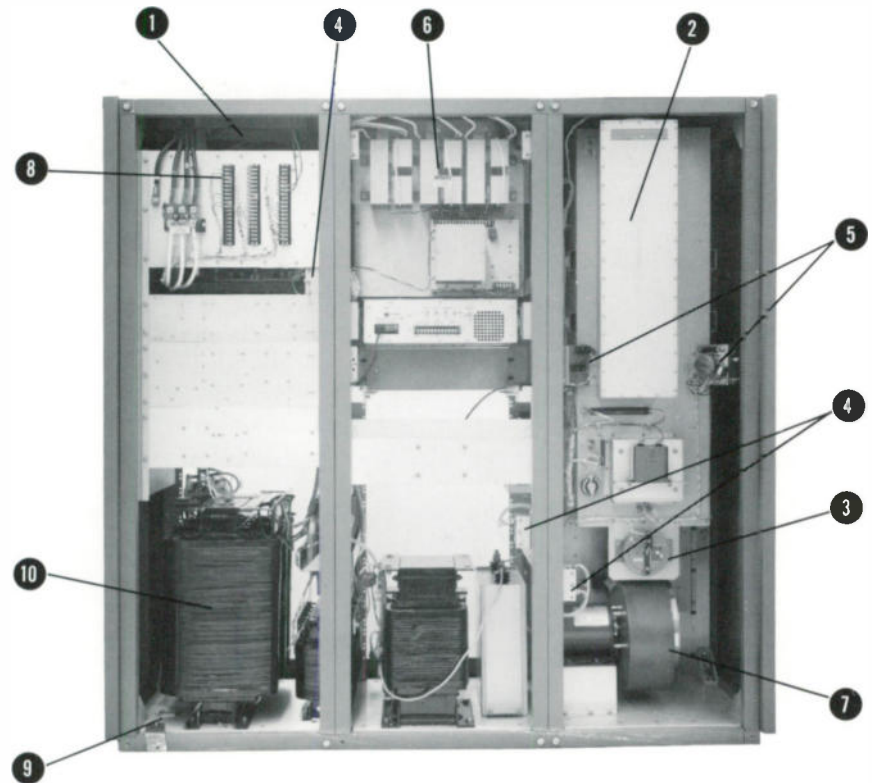
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All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## THE INSIDE STORY

1. **Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. **Air switch.** Located here for easy access.
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7. **PA blower.** 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. **Remote control connectors.** Conveniently located for simple setup.
9. **Power wire (Bottom Entry).** Either bottom or top entry is available.
10. **Power supply.** A self-contained integral part of the transmitter.
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  - B. Control drive assembly
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20. **Wide-band 1/4-wave cavity.** A proven feature for greater reliability.
21. **Tuning and loading controls.** An exclusive motorized feature for easy adjustments.
22. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
23. **Driver plate adjustment.** A single control tunes the driver plate.
24. **Final.** The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.



## SPECIFICATIONS using Type 802A Exciter

### GENERAL

#### Rated Power Output:

816R-4: 27.5 kW  
816R-3: 25 kW  
816R-2A: 20 kW (21.5 kW max.)

#### Power Consumption:

816R-4: 42 kW nominal  
816R-3: 40 kW nominal  
816R-2A: 31 kW nominal  
(33 kW @ 21.5 kW RF output)

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency  
Synthesis from high stability master  
oscillator

#### Frequency Stability:

± 250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3/4" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

± 150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level  
of modulating signal in 5% increments  
with accuracy better than ± 2%

#### Exciter:

Solid-state unit with variable output of 5  
to 50 watts, and self-contained harmonic  
filter.

#### RF Harmonic Attenuation:

- 80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+ 10 dBm (6.93 volts peak-to-peak) @  
600 ohms for ± 75 kHz deviation.

#### Audio Frequency Response:

± 0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below ± 75 kHz deviation @  
400 Hz, measured within a 20 Hz to 15  
kHz bandwidth with 75 microsecond de-  
emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference:  
100% AM modulation, full power @ 400  
Hz with 75 microsecond de-emphasis, no  
FM modulation

#### Synchronous AM S/N Ratio

##### (Incidental AM Noise):

40 dB below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75  
microsecond de-emphasis, FM  
modulation ± 75 kHz @ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak)  
for ± 75 kHz deviation

#### Composite Amplitude Response:

± 0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max

#### Composite Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ± 7.5 kHz deviation

#### SCA Amplitude Response:

± 0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are  
determined primarily by the Stereo  
Generator used. The following parameters  
are influenced by the RF system. These  
specifications assume that a "State-of-the-  
Art" Stereo Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB or  
better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz. (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz, 4:1 ratio.

#### FM Noise:

- 72 dB referenced to 400 Hz, 75 kHz  
deviation. Measured with 75 microsecond  
de-emphasis within a 20 Hz to 15 kHz  
bandwidth.

#### Linear Crosstalk

- 55 dB

### SCA OPERATION

Most SCA performance parameters are  
determined primarily by the SCA generator  
used. The following parameters are  
influenced by the RF System. These  
specifications assume that a "State-of-the-  
Art" SCA Generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

- 60 dB, SCA deviation 5 kHz, Main 75  
microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

- 50 dB, Main and Stereo 75 kHz  
deviation; SCA reference deviation, 5  
kHz and 200 Hz modulation; SCA de-  
emphasis, 150 microsecond

#### Crosstalk SCA to SCA

##### (67 kHz and 92 kHz):

- 50 dB, SCA reference deviation 5 kHz  
and 200 Hz modulation frequency; de-  
emphasis, 150 microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, three phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 volts ac; 50 Hz  
available on request.

#### Permissible Line Voltage Variation:

± 5% (each phase voltage variation:  
within 5% of the average of all three  
phases).

#### Filament regulator:

± 1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft. (2286 m) standard; optional to  
10,000 ft (3048 m) with modification kit

#### Ambient Temperature Range:

- 20°C to + 50°C (- 4°F to + 122°F)

### MECHANICAL

#### Size, as shown:

69" (175 cm) H  
72" (183 cm) W  
28" (71 cm) D

#### Weight:

1962 lb (890 kg) nominal

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**Top performance and proven design in high power FM**

Continental's 40, 50 and 55 kW FM transmitters offer you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

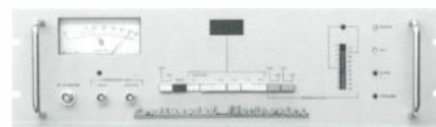
Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

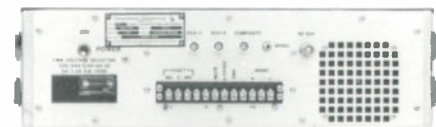
Wide-band 1/4-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

**Featuring The Ultimate FM Exciter!**

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

**State-of-the-art design**

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

**Refined linearity**

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

**Digital frequency selection**

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

**50 watts output broadband amplifier**

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

**Automatic power level control**

Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

**Sophisticated styling**

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulated signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

**Modular construction**

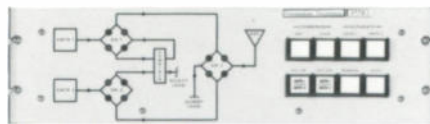
Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.

**OPTIONAL AUTOMATIC EXCITER CONTROL**

Continental's Type 377C-1A automatic exciter control unit provides monitoring and control for two Type 802A or similar exciters. If one exciter fails, the standby exciter is automatically put on-line. Indicator lamps show which exciter is operating.

The control unit includes switching the station's monitoring to the exciter's dummy load for servicing and testing the standby exciter.

The Type 377C-1A is designed to fit in the control cabinet furnished with the 40, 50 and 55 kW transmitters.

**OPTIONAL AUTOMATIC COMBINER CONTROL**

Continental's Type 377D-1 combiner control provides automatic or manual control of two parallel FM transmitters, and automatically assures maximum available power to the antenna at all times.

In case one transmitter fails, the remaining transmitter is automatically switched around the combiner into the antenna. The transmitter that failed is automatically switched to the test load for troubleshooting.

The combiner control provides all interlock and sequencing functions; it is designed to fit in the control cabinet furnished with the 817R-2A 40 kW, 817R-1 50 kW, or 817R-4 55 kW transmitters.

**SPECIFICATIONS using Type 802A Exciter****GENERAL****Rated Power Output:**

817R-4: 55 kW  
817R-1: 50 kW  
817R-2A: 40 kW

**Power Consumption:**

817R-4: 84 kW nominal  
817R-1: 80 kW nominal  
817R-2A: 62 kW nominal

**Frequency Range:**

88 to 108 MHz, in 10 kHz steps

**Frequency Control:**

Phase Locked Loop Frequency Synthesis from high stability master oscillator

**Frequency Stability:**

$\pm 250$  Hz

**Output Impedance:**

50 ohms

**Output Connector:**

3/8" EIA Flange

**VSWR:**

2:1, max.

**Modulation Type:**

Direct carrier frequency modulation

**Modulation Capability:**

$\pm 150$  kHz deviation

**Modulation Indication:**

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than  $\pm 2\%$

**Exciter:**

Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter.

**RF Harmonic Attenuation:**

-80 dB, min.

**Power Supply Rectifiers:**

Silicon

**MONAURAL OPERATION****Audio Input Impedance:**

600 ohms, balanced

**Audio Input Return Loss:**

30 dB or better

**Audio Input Level:**

+10 dBm (6.93 volts peak-to-peak) ( $\alpha$  600 ohms for  $\pm 75$  kHz deviation.

**Audio Frequency Response:**

$\pm 0.5$  dB; flat, 25, 50 or 75 microsecond pre-emphasis, 20 Hz to 15 kHz

**Total Harmonic Distortion:**

0.08% max.; 20 Hz to 15 kHz (Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

0.08% or less, 60 Hz/7 kHz 4:1 ratio

**FM S/N Ratio (FM Noise):**

75 dB min. below  $\pm 75$  kHz deviation ( $\alpha$  400 Hz, measured within a 20 Hz to 15 kHz bandwidth with 75 microsecond de-emphasis

**Asynchronous AM S/N Ratio (AM Noise):**

55 dB RMS below carrier; reference: 100% AM modulation, full power ( $\alpha$  400 Hz with 75 microsecond de-emphasis, no FM modulation

**Synchronous AM S/N Ratio (Incidental AM Noise):**

40 dB below carrier; reference: 100% AM modulation, full power ( $\alpha$  400 Hz with 75 microsecond de-emphasis, FM modulation  $\pm 75$  kHz ( $\alpha$  400 Hz

**WIDEBAND OPERATION****Composite Inputs:**

Balanced, unbalanced and test

**Composite Input Impedance:**

5,000 ohms, nominal

**Composite Input Level:**

1.25 volts RMS (3.54 volts peak-to-peak) for  $\pm 75$  kHz deviation

**Composite Amplitude Response:**

$\pm 0.1$  dB, 20 Hz to 100 kHz

**Composite Total Harmonic Distortion:**

0.08% max

**Composite Intermodulation Distortion:**

0.08% max.; 60 Hz/7 kHz 4:1 ratio

**Two SCA Inputs:**

Balanced or unbalanced

**SCA Input Impedance:**

50,000 ohms, nominal

**SCA Input Level:**

1.25 volts RMS for  $\pm 7.5$  kHz deviation

**SCA Amplitude Response:**

$\pm 0.3$  dB, 40 kHz to 100 kHz

**STEREO OPERATION**

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.

**Stereo Separation:**

50 dB min.; 50 Hz to 15 kHz. (60 dB or better, 400 Hz to 7.5 kHz typical)

**Total Harmonic Distortion:**

0.08% max.; 50 Hz to 15 kHz. (Measured with Spectrum Analyzer.)

**Intermodulation Distortion:**

0.08% max.; 60 Hz/7 kHz, 4:1 ratio.

**FM Noise:**

-72 dB referenced to 400 Hz, 75 kHz deviation. Measured with 75 microsecond de-emphasis within a 20 Hz to 15 kHz bandwidth.

**Linear Crosstalk**

-55 dB

**SCA OPERATION**

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" SCA Generator is used.

**Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):**

-60 dB, SCA deviation 5 kHz, Main 75 microsecond de-emphasis

**Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):**

-50 dB, Main and Stereo 75 kHz deviation; SCA reference deviation, 5 kHz and 200 Hz modulation; SCA de-emphasis, 150 microsecond

**Crosstalk SCA to SCA (67 kHz and 92 kHz):**

-50 dB, SCA reference deviation 5 kHz and 200 Hz modulation frequency; de-emphasis, 150 microsecond

**ELECTRICAL****Power Source:**

200 to 250 volts ac; 60 Hz, three phase; available transformer taps are 200, 210, 220, 230, 240, 250 volts ac; 50 Hz available on request.

**Permissible Line Voltage Variation:**

$\pm 5\%$  (each phase voltage variation; within 5% of the average of all three phases).

**Filament regulator:**

$\pm 1\%$  of optimum

**OPERATING ENVIRONMENT****Operating Altitude:**

7,500 ft. (2286 m) standard; optional to 10,000 ft. (3048 m) with modification kit

**Ambient Temperature Range:**

20°C to +50°C (-4°F to +122°F)

**MECHANICAL****Size, as shown:**

69" (175 cm) H  
165" (419 cm) W  
28" (71 cm) D

**Weight:**

4074 lb (1848 kg) nominal

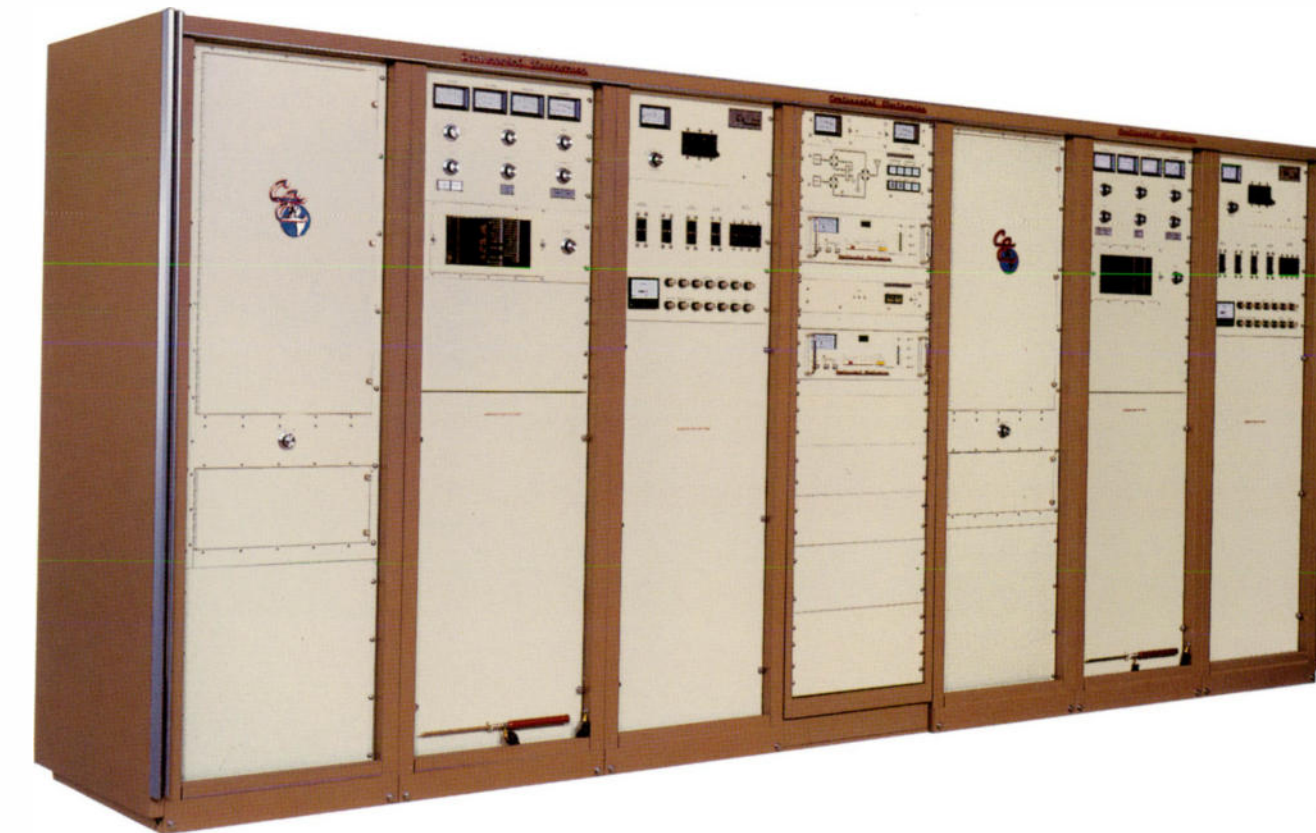
**Combiner, 40 kW:**

60" H (152.4 cm)  
48" W (122 cm)  
30" D (76.2 cm)  
weight: 790 lb nominal (358.6 kg)

**Combiner, 50/55 kW**

73" H (185.4 cm)  
68 1/2" W (174 cm)  
31" D (78.7 cm)  
weight: 1130 lb nominal (513 kg)

All specifications are subject to change without notice.  
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FEATURING 802A SOLID-STATE EXCITER

**MODULAR CONCEPT OFFERS BROADCASTERS MAXIMUM FLEXIBILITY**

Continental's high power FM transmitters use similar or identical power components to provide the option of redundancy or higher power output thru the use of a combiner.

Continental's Type 817R-2A 40,000 watt transmitter consists of two Type 816R-2A 20,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 40,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

Continental's Type 817R-1 50,000 watt transmitter consists of two Type 816R-3 25,000 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 50,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

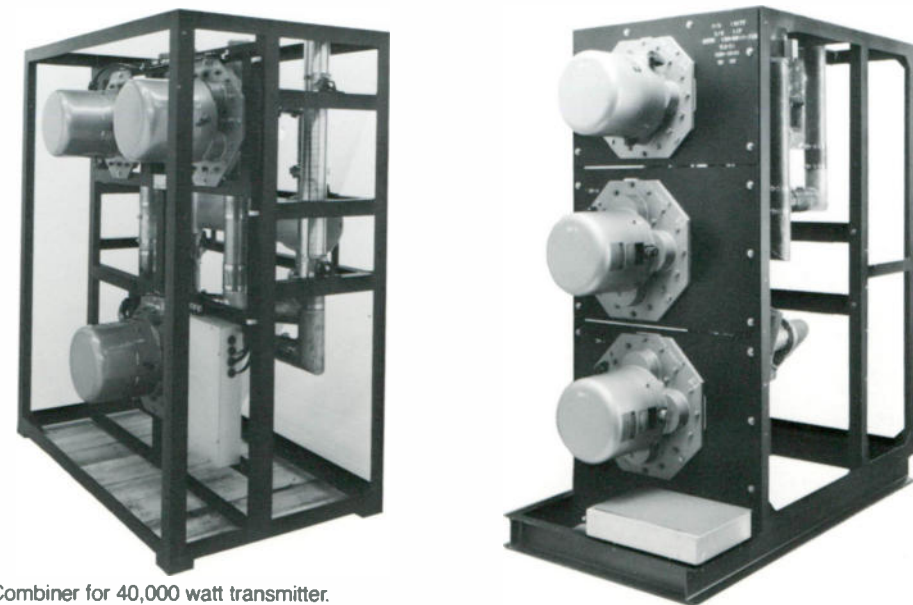
Continental's Type 817R-4 55,000 watt transmitter consists of two Type 816R-4 27,500 watt transmitters whose outputs are combined in a 90 degree hybrid to achieve 55,000 watts output. Thru the use of optional coaxial switching, either transmitter may be put on the air independently.

**PROVEN POWER AMPLIFIER**

A field-proven 4CX15000A power amplifier tube is used to save on operating costs. The high plate dissipation rating and proven design enhance long-life performance. Continental's unique grounded screen tetrode design eliminates screen bypass capacitors and provides excellent stability.

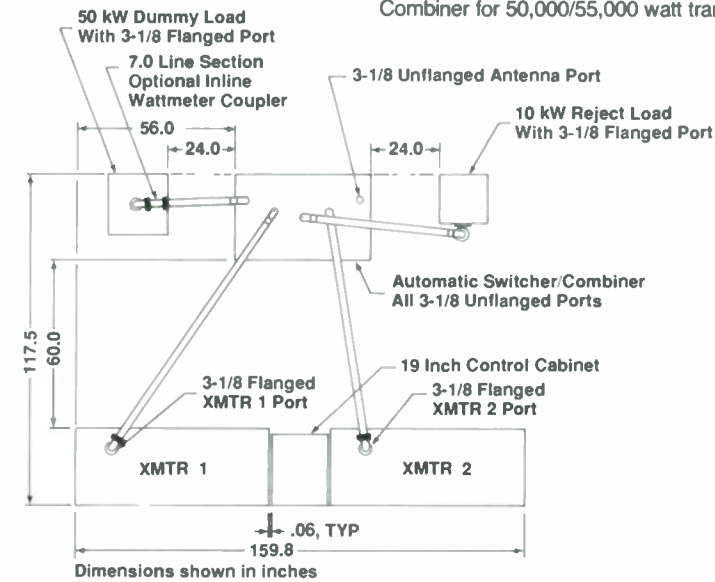
**FAST INSTALLATION**

For shipments within the continental United States, all components are in-place and interconnected. AC power, audio inputs, monitoring outputs and transmission line hookups are direct and can enter either at bottom or top of cabinet. 28-volt dc power supply is built-in for optional remote control. Harmonic filter is in-place and ready to operate.

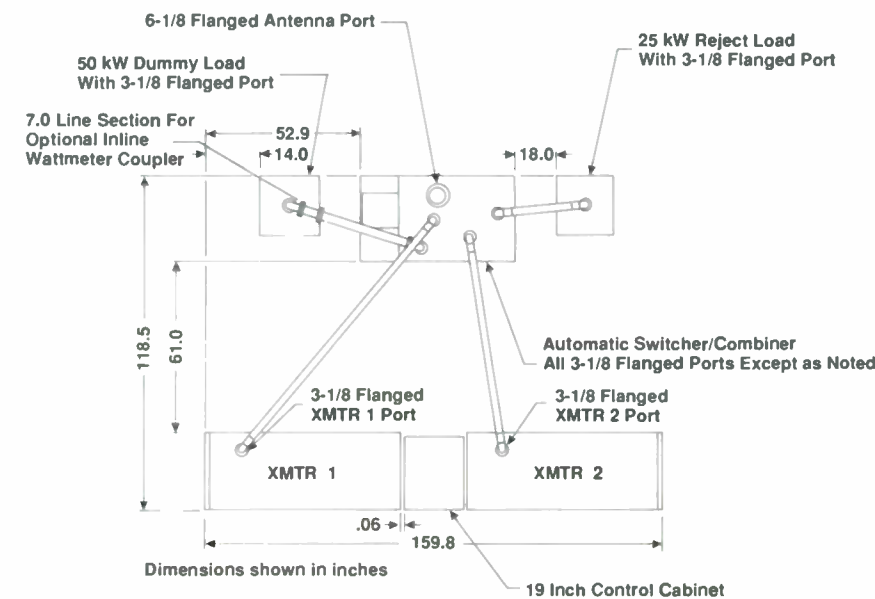


Combiner for 40,000 watt transmitter.

Combiner for 50,000/55,000 watt transmitter.



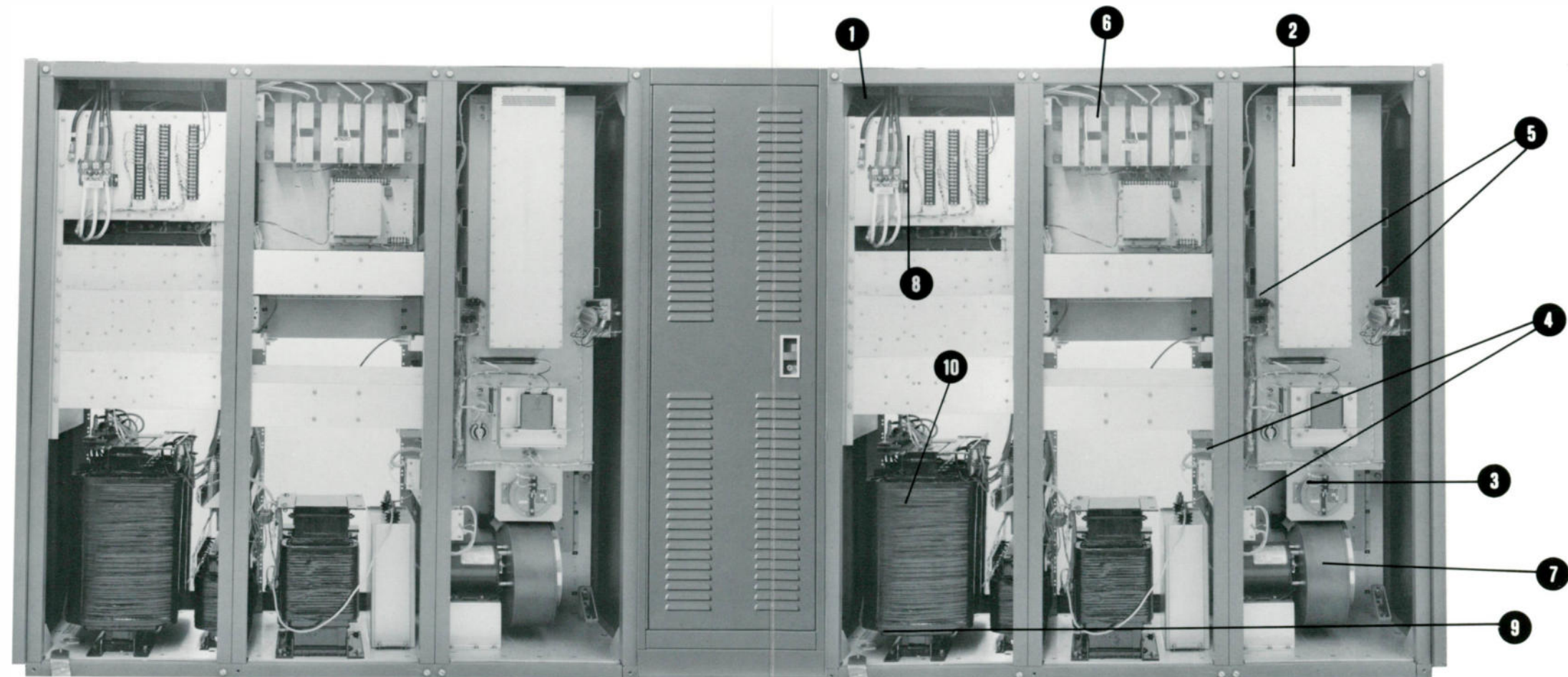
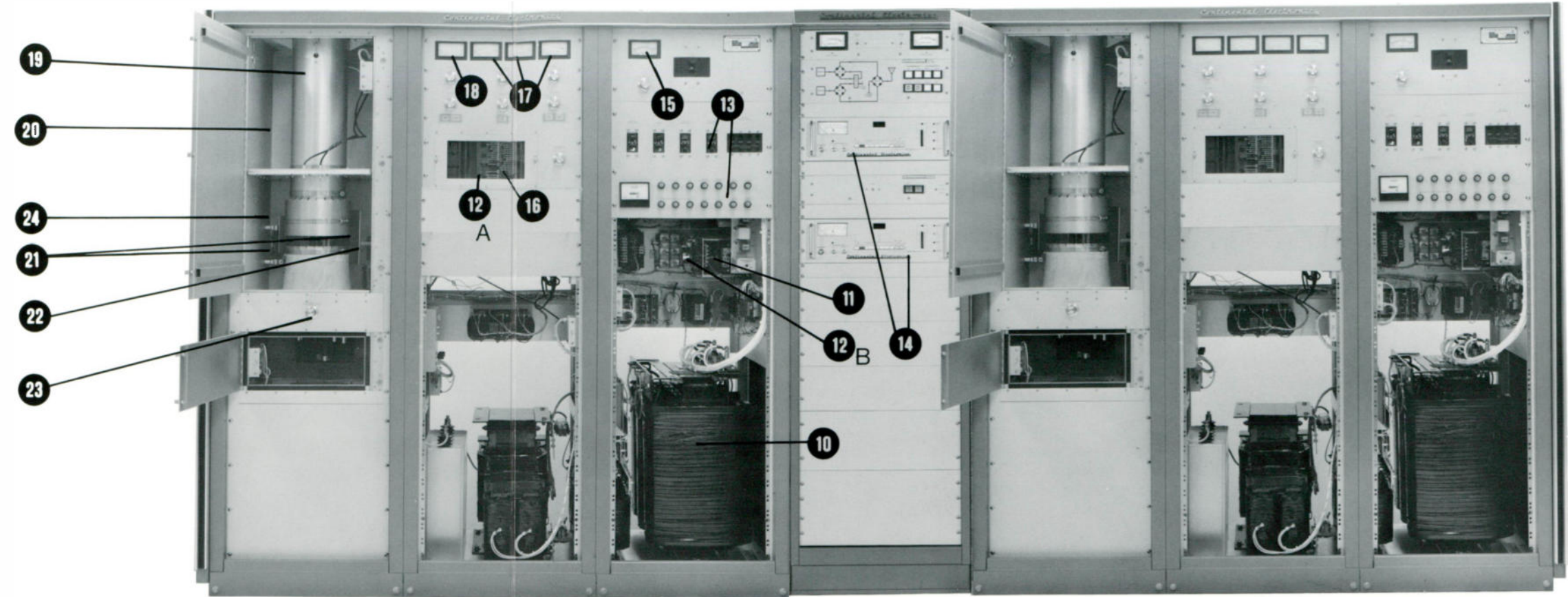
Typical Plan View, 40 kW FM Transmitter Installation



Typical Plan View, 50 kW FM Transmitter Installation

**THE INSIDE STORY**

1. Cabinet flushing blower. This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. Harmonic filter. The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. Air switch. Located here for easy access.
4. Interlocks. Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. Tuning and loading motors. These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. SCR control. Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
7. PA blower. 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. Remote control connectors. Conveniently located for simple setup.
9. Power wire (Bottom Entry). Either bottom or top entry is available.
10. Power supply. A self-contained integral part of the transmitter.
11. Phase monitor. Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. Filament voltage regulator. Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control Card
  - B. Control drive assembly
13. Indicator fuses and circuit breakers. There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. 802A Exciter.
15. True rms iron vane meter and 150-A ac mains circuit breaker. Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
16. LED-equipped card cage. Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. Continuous readout meters. At a glance you'll know plate current, plate voltage, and output power.
18. DC multimeter. Eleven operating parameters at the turn of a dial.
19. PA exhaust stack temperature sensor. Redundant backup to the air flow switch protects the final if cooling air is lost or overdispersion occurs.
20. Wide-band 1/4-wave cavity. A proven feature for greater reliability.
21. Tuning and loading controls. An exclusive motorized feature for easy adjustments.
22. Static drain choke. Bleeds off static buildup in transmission lines or antennas.
23. Driver plate adjustment. A single control tunes the driver plate.
24. Final. The 4CX15,000A tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.

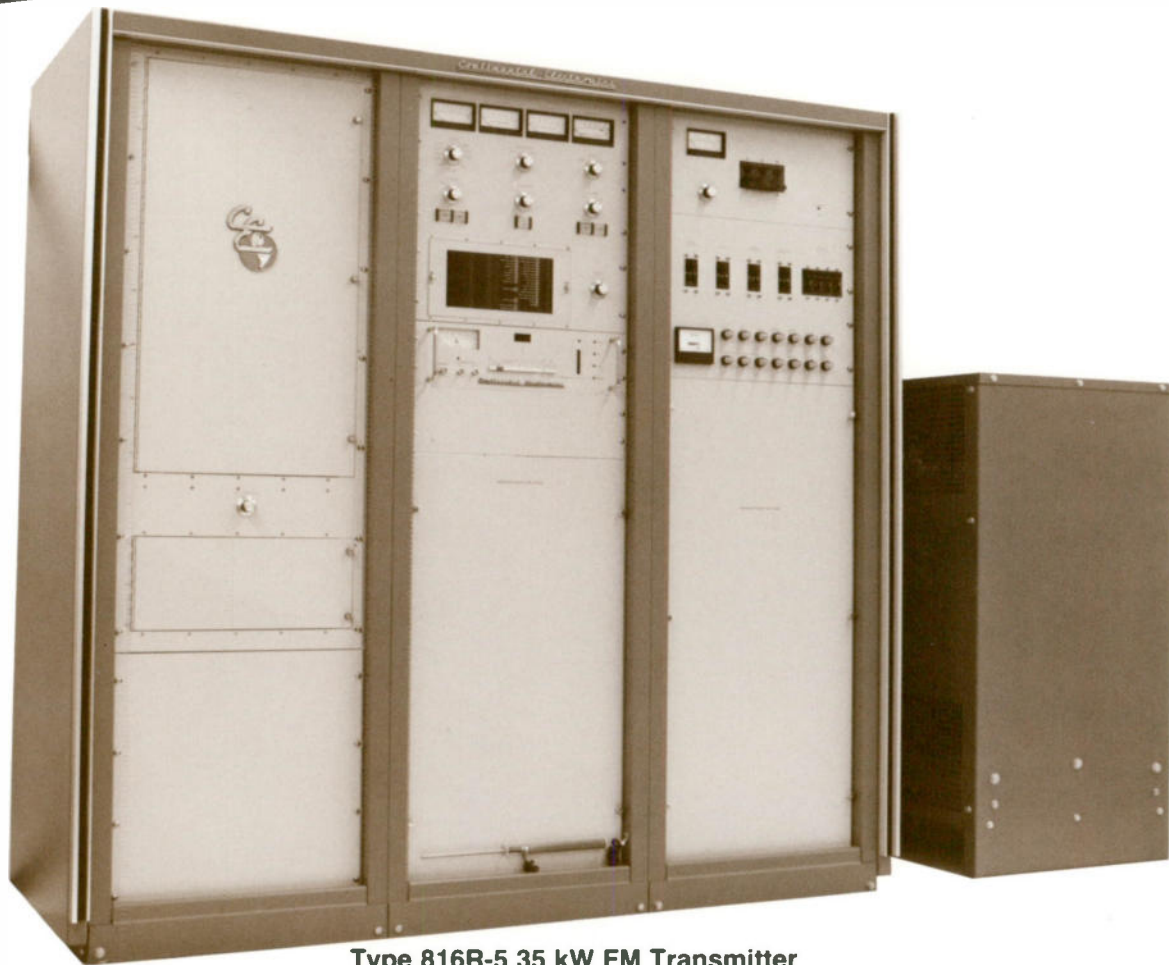




# NEW!

CONTINENTAL TYPE 816R-5  
35 KW FM  
BROADCAST TRANSMITTER

# FM



**Type 816R-5 35 kW FM Transmitter**

Continental's Type 816R-5 is a high performance, state-of-the-art transmitter that uses the Type 802A exciter to deliver a crisp, clean signal.

The transmitter is all solid-state except for three tubes: a pair of 4CX250B drivers, and one YC130/9019 Tetrode power amplifier operating at Class C. The YC130/9019 Tetrode was specially designed by EIMAC for Continental, to meet stringent FM service requirements at 35 kW.

The Type 816R-5 is an outgrowth of Continental's popular 816R Series of 10, 20, 25 and 27.5 kW transmitters, but will employ a newly designed cavity for the YC130/9019 Tetrode.

The output network consists of a foreshortened quarter-wave coaxial resonator and a self-contained elliptic filter of the Cauer design.

IC logic is used for all control functions. A computer-like memory, powered by battery back-up, restarts the transmitter after a power failure.

The Type 816R-5 is self-contained in one cabinet except for the HV power supply which may be placed at any location convenient to the transmitter.

In keeping with the tradition of other Continental transmitters, the Type 816R-5 uses husky components and is built to give many years of reliable service.

### **Transmitter Overview**

- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- Remote Control Interface
- True RMS Filament Power Regulation and Metering
- ac Power Failure Recycle
- Two/Four Shot Automatic Overload Recycle
- Grounded Screen Amplifier
- Internal Diagnostics

## SPECIFICATIONS using 802A Exciter

### GENERAL

#### Rated Power Output:

816R-5: 35 kW

#### Power Consumption:

816R-5: 53 kW

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency Synthesis  
from high stability master oscillator

#### Frequency Stability

±250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3/8" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

±150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level of modulated signal in 5% increments with accuracy better than ±2%

#### Exciter:

Solid-state unit with variable output of 5 to 50 watts, and self-contained harmonic filter

#### RF Harmonic Attenuation:

-80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+10 dBm (6.93 volts peak-to-peak)  
@ 600 ohms for ±75 kHz deviation

#### Audio Frequency Response:

±0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 db min. below ±75 kHz deviation @ 400  
Hz, measured within a 20 Hz to 15 kHz band-  
width with 75 microsecond de-emphasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75 micro-  
second de-emphasis, no FM modulation

#### Synchronous AM S/N Ratio

##### (Incidental AM Noise):

40 dB below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75  
microsecond de-emphasis, FM modulation  
±75 kHz @ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak)  
for ±75 kHz deviation

#### Composite Amplitude Response:

±0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max.

#### Composite Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ±7.5 kHz deviation

#### SCA Amplitude Response:

±0.3 dB, 40 kHz to 100kHz

### STEREO OPERATION

Most Stereo performance parameters are determined primarily by the Stereo Generator used. The following parameters are influenced by the RF system. These specifications assume that a "State-of-the-Art" Stereo Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB or better,  
400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz.  
(Measured with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz, 4:1 ratio

#### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz deviation.  
Measured with 75 microsecond de-emphasis  
within a 20 Hz to 15 kHz bandwidth.

#### Linear Crosstalk:

-55 dB

### SCA OPERATION

Most SCA performance parameters are determined primarily by the SCA generator used. The following parameters are influenced by the RF System. These specifications assume that a "State-of-the-Art" Generator is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

-60 dB, SCA deviation 5 kHz, Main  
75 microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA (67 kHz or 92 kHz):

-50 dB, Main and Stereo 75 kHz deviation;  
SCA reference deviation, 5 kHz and 200 Hz  
modulation; SCA de-emphasis, 150  
microsecond

#### Crosstalk SCA to SCA

##### (67 kHz and 92 kHz):

-50 dB, SCA reference deviation 5 kHz and  
200 Hz modulation frequency; de-emphasis,  
150 microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, three phase;  
available transformer taps are 200, 210, 220,  
230, 240, 250 volts ac; 50 Hz available on  
request.

#### Permissible Line Voltage Variation:

±5% (each phase voltage variation: within 5%  
of the average of all three phases).

#### Filament regulator:

±1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

0 to 7,500 ft. (2286 m) standard; optional to  
10,000 ft (3048 m) with modification kit

#### Ambient Temperature Range:

-20°C to +50°C (-4°F to +122°F)

#### Relative Humidity:

0 to 95%

### MECHANICAL

#### Transmitter Size as shown:

69" (175 cm) H, 72" (183 cm) W,  
28" (71 cm) D

#### Weight:

1425 lb (641.2 kg) nominal

#### External HV Power Supply Size as shown:

46" (116.8 cm) H, 35" (88.9 cm) W,  
24" (60.9 cm) D

#### Weight:

837 lb (376.6 kg)

#### Note:

External plate transformer can be located  
at any location convenient to the transmitter

All specifications are subject to change without notice.  
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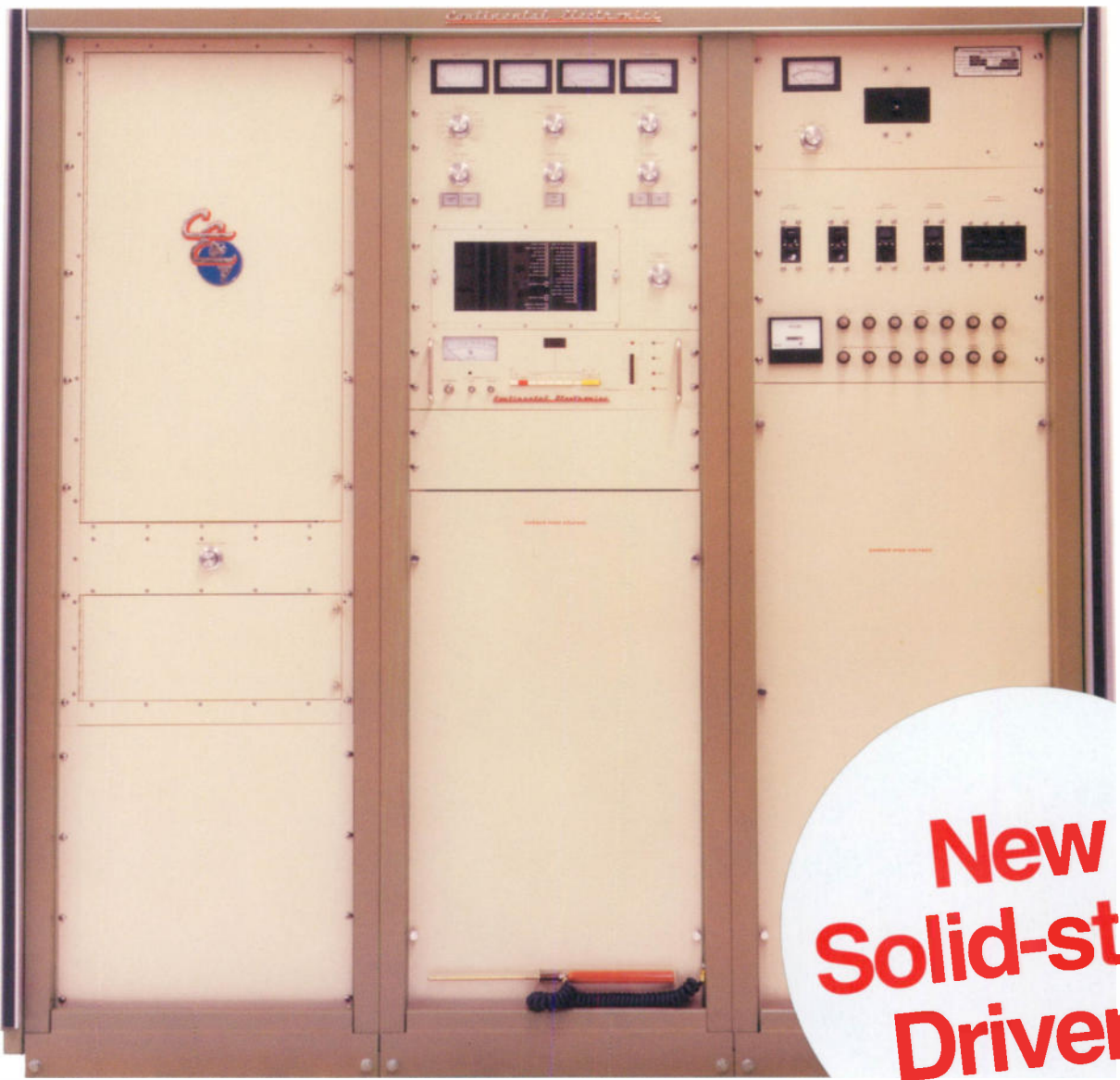
Dallas, Texas 75227

Ph: (214) 381-7161

Telex: 73-398



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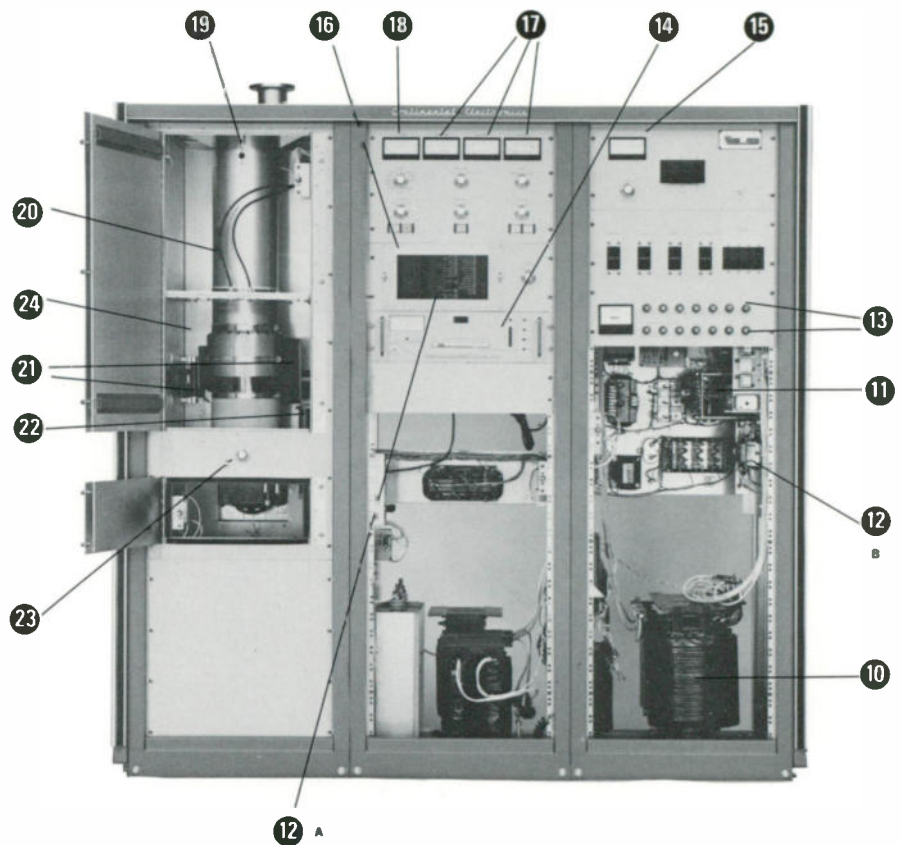
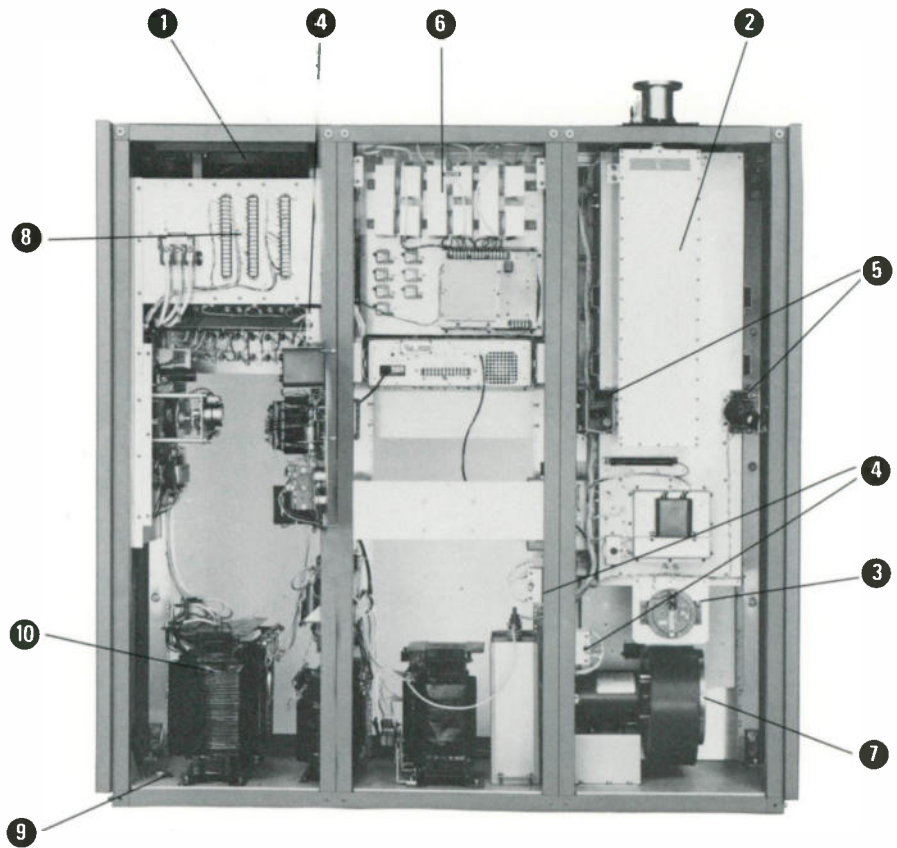


**New  
Solid-state  
Drivers**

FEATURING 802A SOLID-STATE EXCITER

## THE INSIDE STORY

1. **Cabinet flushing blower.** This powerful fan with washable air filter delivers approximately 850 cfm to maintain positive cabinet air pressure.
2. **Harmonic filter.** The fully contained harmonic filter inside cabinet makes installation easier and takes up less valuable space at your transmitter location.
3. **Air switch.** Located here for easy access.
4. **Interlocks.** Located at doors and access panels, interlocks automatically short out high voltage when opened.
5. **Tuning and loading motors.** These motors and connecting capacitor plates are the only moving parts in the PA. They eliminate complicated chains and gears.
6. **SCR control.** Three-phase control of the plate supply primary voltage with feedback that maintains constant forward power output with line voltage variations. Exclusive "soft start," which initially brings up the transmitter gently.
7. **PA blower.** 1-hp PA exhaust blower moves 525 cfm of cooling air through the PA tube. This helps extend tube life and reduces heat accumulation.
8. **Remote control connectors.** Conveniently located for simple setup.
9. **Power wire (Bottom Entry).** Either bottom or top entry is available.
10. **Power supply.** A self-contained integral part of the transmitter.
11. **Phase monitor.** Detects phase loss, phase rotation, and low voltage. Provides protective shutdown of transmitter in event of ac mains problems.
12. **Filament voltage regulator.** Keeps constant filament voltage to the PA tube to maximize tube life.
  - A. Control card
  - B. Control drive assembly
13. **Indicator fuses and circuit breakers.** There's rarely a problem, but when there is, indicators glow brightly for fast troubleshooting.
14. **802A Exciter.**
15. **True rms iron vane meter and 150-A ac mains circuit breaker.** Meter gives you readings on each of the three ac voltage phases, as well as filament voltage.
16. **LED-equipped card cage.** Twenty-seven LED's give a quick status readout of the protection circuits and control modes. Remote control relays are also here for easy access.
17. **Continuous readout meters.** At a glance you'll know plate current, plate voltage, and output power.
18. **DC multimeter.** Eleven operating parameters at the turn of a dial.
19. **PA exhaust stack temperature sensor.** Redundant backup to the air flow switch protects the final if cooling air is lost or overdissipation occurs.
20. **Wide-band 1/4-wave cavity.** A proven feature for greater reliability.
21. **Tuning and loading controls.** An exclusive motorized feature for easy adjustments.
22. **Static drain choke.** Bleeds off static buildup in transmission lines or antennas.
23. **Driver plate adjustment.** A single control tunes the driver plate.
24. **Final.** The 4CX10,000D tube uses lower filament power to save money. The high plate dissipation rating and proven design give long life performance. A unique grounded screen tetrode design eliminates screen bypass capacitors and greatly enhances stability.



## Top performance and proven design in high power FM

Continental's 10 kW FM transmitter offers you high fidelity, low power consumption, very little noise or distortion, good stereo separation and excellent frequency stability.

Transmitter power may be adjusted to any level between 0 and 100% without retuning, using front panel controls.

If momentary power outages or overloads occur, special circuits protect the transmitter and will automatically restore it to operational status.

Two independent VSWR protection circuits automatically reduce transmitter power to a safe operating level whenever abnormal antenna mismatches occur. One circuit handles severe mismatches such as lightning strikes by interrupting the rf when reflected power reaches 10%. The other circuit holds reflected power to a preset level during severe icing conditions, allowing power to be maintained at the highest "safe" level.

Exclusive "soft start" circuit and low voltage controls are easy on the total system and limit current surges thru the power supply components: this helps to minimize parts replacement.

23 different circuits or indicators are used to protect the transmitter.

Control circuits are conventional low voltage design (28-volt dc).

Tuning and loading are handled with two motors: there are no chains, gears or couplings to slip or break.

27 LED indicators, 14 indicating fuseholders and 6 front panel circuit breakers help to quickly isolate any transmitter problem.

Meters and controls are set at or near average eye level for easy reading, accurate adjustment.

All transmitter controls are conveniently located; all components are easy to reach. Power supply and harmonic filter are within the transmitter cabinet.

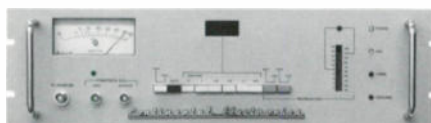
Wide-band, ¼-wave cavity design provides a wide, flat bandwidth which has a minimal effect on stereo noise and separation characteristics.

Solid-state, automatic filament voltage regulation helps to increase tube life.

Compact size, simple installation get you air-ready fast and at low cost. Several control options add to operating flexibility.



Transmitter LED status indicators



Type 802A FM Exciter, front view



Type 802A FM Exciter, rear view

### Featuring The Ultimate FM Exciter!

Continental's Type 802A solid-state FM Exciter offers broadcasters unmatched performance.

#### State-of-the-art design

Modular subassemblies are easily reached from front of exciter; the 802A will accept composite baseband signal from stereo generator, STL system or monaural audio and SCA programming.

#### Refined linearity

Exciter modulation performance approaches measurement capabilities of the most advanced test equipment.

#### Digital frequency selection

Exciter generates its operating frequency with a digitally programmed, dual speed, phase-locked frequency synthesis system.

### 50 watts output broadband amplifier

The 802A is completely solid-state and needs no tuning adjustments other than selection of operating frequency. Power output is 50 watts into a 50 ohm load at all frequencies in the FM band.

#### Automatic power level control

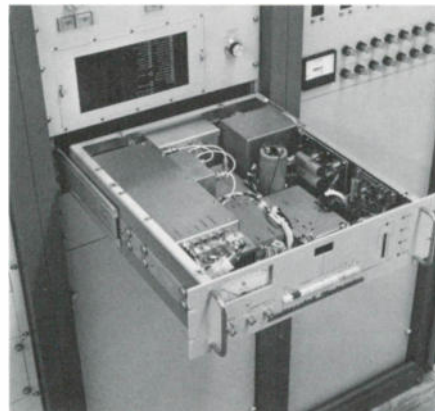
Special circuit protects amplifier from any mismatched load, including open or short circuits. Automatic power control maintains output at any present level from 5 watts up to the maximum level.

#### Sophisticated styling

Front panel readouts present clear and accurate indication of system performance. Digital LED display indicates true peak level of modulating signal in 5% increments with an accuracy of better than  $\pm 2\%$ .

#### Modular construction

Any subassembly within the exciter can be removed without removing the exciter from the transmitter, and without disturbing other exciter assemblies or components. The exciter is mounted on slides for easy access.



All exciter components are easily reached from the front of the transmitter. Exciter moves on tracks for easy access; shown here with top cover removed.

## SPECIFICATIONS using Type 802A Exciter

### GENERAL

#### Rated Power Output:

816R-1A: 10 kW

#### Power Consumption:

816R-1A: 18 kW, nominal

#### Frequency Range:

88 to 108 MHz, in 10 kHz steps

#### Frequency Control:

Phase Locked Loop Frequency Synthesis  
from high stability master oscillator

#### Frequency Stability:

±250 Hz

#### Output Impedance:

50 ohms

#### Output Connector:

3/8" EIA Flange

#### VSWR:

2:1, max.

#### Modulation Type:

Direct carrier frequency modulation

#### Modulation Capability:

±150 kHz deviation

#### Modulation Indication:

Digital LED display shows true peak level  
of modulating signal in 5% increments with  
accuracy better than ±2%

#### Exciter:

Solid-state unit with variable output of 5 to  
50 watts, and self-contained harmonic fil-  
ter.

#### RF Harmonic Attenuation:

-80 dB, min.

#### Power Supply Rectifiers:

Silicon

### MONAURAL OPERATION

#### Audio Input Impedance:

600 ohms, balanced

#### Audio Input Return Loss:

30 dB or better

#### Audio Input Level:

+10 dBm (6.93 volts peak-to-peak) @ 600  
ohms for ±75 kHz deviation.

#### Audio Frequency Response:

±0.5 dB; flat, 25, 50 or 75 microsecond  
pre-emphasis, 20 Hz to 15 kHz

#### Total Harmonic Distortion:

0.08% max.; 20 Hz to 15 kHz (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% or less, 60 Hz/7 kHz 4:1 ratio

#### FM S/N Ratio (FM Noise):

75 dB min. below ±75 kHz deviation @  
400 Hz, measured within a 20 Hz to 15 kHz  
bandwidth with 75 microsecond de-em-  
phasis

#### Asynchronous AM S/N Ratio (AM Noise):

55 dB RMS below carrier; reference: 100%  
AM modulation, full power @ 400 Hz with  
75 microsecond de-emphasis, no FM  
modulation

#### Synchronous AM S/N Ratio (Incidental AM Noise):

40 dB below carrier; reference: 100% AM  
modulation, full power @ 400 Hz with 75  
microsecond de-emphasis, FM modula-  
tion ±75 kHz @ 400 Hz

### WIDEBAND OPERATION

#### Composite Inputs:

Balanced, unbalanced and test

#### Composite Input Impedance:

5,000 ohms, nominal

#### Composite Input Level:

1.25 volts RMS (3.54 volts peak-to-peak)  
for ±75 kHz deviation

#### Composite Amplitude Response:

±0.1 dB, 20 Hz to 100 kHz

#### Composite Total Harmonic Distortion:

0.08% max

#### Composite Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz 4:1 ratio

#### Two SCA Inputs:

Balanced or unbalanced

#### SCA Input Impedance:

50,000 ohms, nominal

#### SCA Input Level:

1.25 volts RMS for ±7.5 kHz deviation

#### SCA Amplitude Response:

±0.3 dB, 40 kHz to 100 kHz

### STEREO OPERATION

Most Stereo performance parameters are  
determined primarily by the Stereo Genera-  
tor used. The following parameters are influ-  
enced by the RF system. These specifica-  
tions assume that a "State-of-the-Art" Stereo  
Generator is used.

#### Stereo Separation:

50 dB min.; 50 Hz to 15 kHz. (60 dB or  
better, 400 Hz to 7.5 kHz typical)

#### Total Harmonic Distortion:

0.08% max.; 50 Hz to 15 kHz. (Measured  
with Spectrum Analyzer.)

#### Intermodulation Distortion:

0.08% max.; 60 Hz/7 kHz, 4:1 ratio.

#### FM Noise:

-72 dB referenced to 400 Hz, 75 kHz de-  
viation. Measured with 75 microsecond de-  
emphasis within a 20 Hz to 15 kHz band-  
width.

#### Linear Crosstalk

-55 dB

### SCA OPERATION

Most SCA performance parameters are de-  
termined primarily by the SCA generator used.  
The following parameters are influenced by  
the RF System. These specifications as-  
sume that a "State-of-the-Art" SCA Genera-  
tor is used.

#### Crosstalk, SCA to Main and Stereo (67 kHz and/or 92 kHz):

-60 dB, SCA deviation 5 kHz, Main 75  
microsecond de-emphasis

#### Crosstalk, Main and Stereo to SCA

#### (67 kHz or 92 kHz):

-50 dB, Main and Stereo 75 kHz devia-  
tion; SCA reference deviation, 5 kHz and  
200 Hz modulation; SCA de-emphasis, 150  
microsecond

#### Crosstalk SCA to SCA

#### (67 kHz and 92 kHz):

-50 dB, SCA reference deviation 5 kHz  
and 200 Hz modulation frequency; de-em-  
phasis, 150 microsecond

### ELECTRICAL

#### Power Source:

200 to 250 volts ac; 60 Hz, three phase;  
available transformer taps are 200, 210,  
220, 230, 240, 250 volts ac; 50 Hz avail-  
able on request.

#### Permissible Line Voltage Variation:

±5% (each phase voltage variation: within  
5% of the average of all three phases).

#### Filament regulator:

±1% of optimum

### OPERATING ENVIRONMENT

#### Operating Altitude:

7,500 ft. (2286 m) standard; optional to  
10,000 ft (3048 m) with modification kit

#### Ambient Temperature Range:

-20°C to +50°C (-4°F to +122°F)

### MECHANICAL

#### Size, as shown:

69" (175 cm) H  
72" (183 cm) W  
28" (71 cm) D

#### Weight:

1875 lb (836 kg) nominal

All specifications are subject to change without notice.

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**New!  
Solid-state Driver  
For 816R Series  
FM Transmitters**

### Solid-State Driver For 816R Series FM Transmitters

Continental's Type 816R Series of 10 kW, 20 kW, 25 kW, 27.5 kW and 35 kW FM transmitters have proven to be very reliable and popular with broadcasters around the world.

These high performance, state-of-the-art transmitters use Continental's Type 802A exciter to deliver a crisp, clean signal.

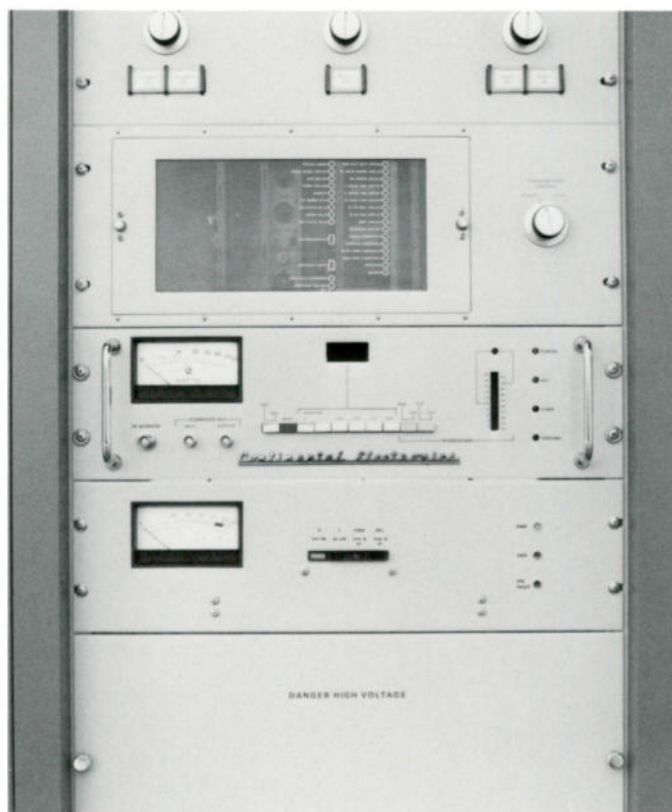
With the addition of the solid-state driver, the 816R Series transmitters offer an increased bandwidth at all power levels from 10 kW through 35 kW.

The RF chain consists of the Type 802A 50 watt exciter and a solid-state 600 watt IPA driving a 4CX10,000D, 4CX15,000A or a 9019/YC130 tetrode tube, depending upon transmitter power level, in the final amplifier. (The 10 kW transmitter uses a 4CX10,000D; the 20/25 and 27.5 kW transmitters use a 4CX15,000A, and the 35 kW transmitter uses a 9019/YC130 tetrode).

The output network consists of a fore-shortened quarter-wave coaxial resonator and harmonic filter. The harmonic filter is contained within the transmitter cabinet.

Control circuits are of a conventional, low voltage design (28 volts, dc). IC logic is used for control/monitor functions such as SWR foldback, automatic power control and power failure recycle circuits.

Solid-state drivers will be available on new 816R Series transmitters; existing 816R Series transmitters can be modified to accept the solid-state driver.



Solid-state control panel/module mounts below the exciter control panel/module on all 816R Series transmitters.

### Overview

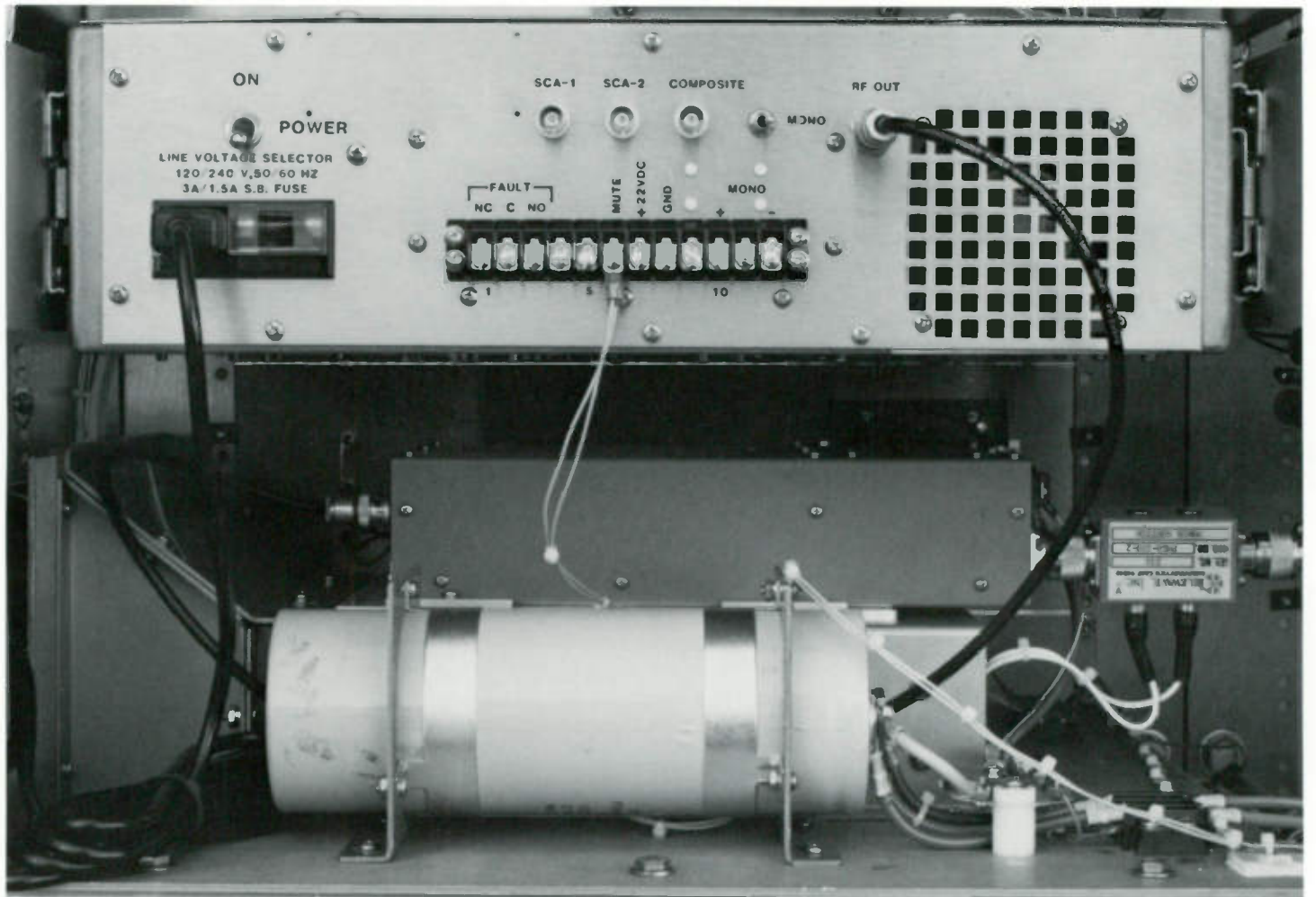
- Solid-state IPA (driver)
- Increased Bandwidth
- SCR Power Control
- Automatic RF Power Output Control
- Automatic SWR Circuit Protection
- SWR Output Power Foldback
- True RMS Filament Voltage Metering
- True RMS Filament Voltage Regulation
- Two/Four Shot Overload Recycle
- AC Power Failure Recycle
- Internal Diagnostics
- Remote Control/Monitoring Interface
- Self-contained Harmonic Filter
- 100% Self-protected Solid-state Driver Module





Above: close-up of solid-state driver control panel from in front of the transmitter.

Below: rear view of transmitter, with panel removed, shows solid-state driver module mounted just below the exciter module.



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