

Collins Broadcast Products



828C-1 AM Transmitter

**Now Advanced
Technology Brings
PWM Performance
and Efficiency ... With
Tube-Final Reliability
... to 1 kW AM
Transmitters**

When the Collins 828E-1 5kW Power Rock™ transmitter was introduced, it leap-frogged the state-of-the-art ahead to a new AM standard for total audio performance with high efficiency operation. Now this same advanced pulse width modulation technology has been made available to 1-kW users, with all its inherent total performance advantages,

PLUS the reliability and economy of a tube-powered final amplifier.

The new Collins 828C-1 Power Rock One is the first and only 1-kW transmitter to give AM broadcasters the benefits of both pulse modulation and long-life tube reliability.

 **Rockwell**

AM Transmitters

What Are The Key Benefits?

- **Low Cost Reliability**
Knowledgeable and experienced broadcasters recognize the all too common problem of lightning strikes and other over-voltage surges, and the damage to solid state equipment that can be caused by such incidents. Experienced engineers also know that the "old reliable" vacuum tube is precisely that because it is inherently more tolerant to overloads than solid state devices. All-solid-state transmitters require a multiplicity of components—at extra cost—to provide protection; protection that is not needed with a tube

design. And, a full set of three replacement tubes for the 828C-1 currently costs less than the price of a single common solid state PA module.

- **Outstanding Audio Performance**

Designed with AM stereo in mind, the Power Rock One has the really important features required to give you the audio results you need to compete with FM stereo. The exclusive Collins Q-Taper output network gives you the flatter pass-band needed for good stereo performance. The Instantaneous Peak Limiter and the Automatic Modulation Control circuits combine with the

transformerless audio input and the capacity filter power supply to give you dramatically improved audio performance in three important areas: better low frequency response, lower intermodulation distortion, and increased over-all modulation density (loudness).

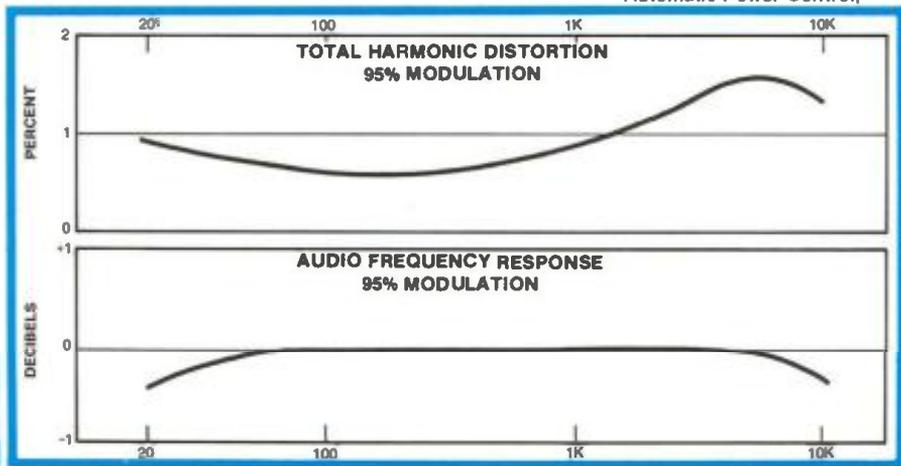
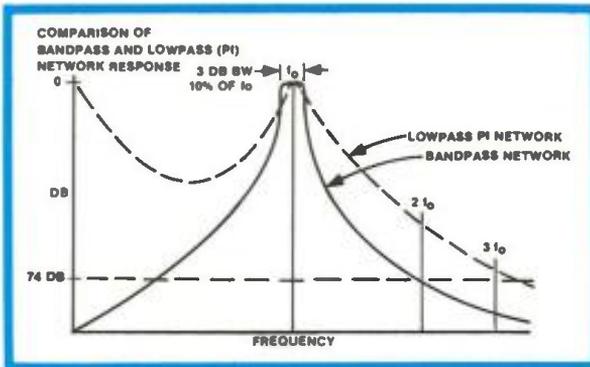
- **Efficient Operation**

The patented Collins Switch Mod System™ eliminates the energy consuming class AB or Class B modulator and related circuitry, thus giving the 828C-1 Power Rock One a significant improvement in power consumption efficiency over older models.

The First 1 kW AM Transmitter with the Advantages of Pulse Modulation

Collins SwitchMod System™

Far more than just an improvement to a pulse modulation circuit, the Collins Switch Mod System is a total concept that includes the interplay of all aspects of the transmitter system from the audio input to the modulated audio output and from the main power supply to the RF output network. The 828C-1 is the only 1-kW AM transmitter to provide the combination of a built-in Instantaneous Peak Limiter, Automatic Power Control,



AND Automatic Modulation Control to maintain the correct output power and maximum modulation even in the face of input line voltage variations of as much as $\pm 5\%$. Simple adjustments on the IPL allow you to independently set both positive and negative limits of modulation. Below the limiting levels audio performance is virtually unaffected, while over-modulation due to power line variations or audio peaks is effectively prevented.

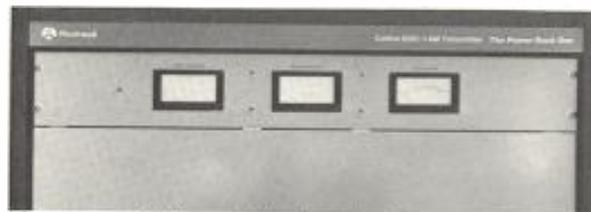
Transformerless Audio Input
 The Collins Power Rock One is the first 1-kW AM transmitter to eliminate old-fashioned transformer input to the audio chain. With a DC-coupled OP-amp developed for and field proven in the highly successful 828E-1 5-kW Power Rock transmitter, Rockwell engineers have successfully minimized the ringing and overshoot problems common to all other AM transmitters—including all-solid-state designs—that are still tied to transformer audio input. The new Collins 828C-1 transmitter will faithfully handle a 20 Hz square wave at 100% modulation.

AM Stereo

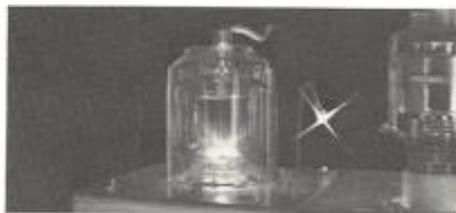
The 828C-1 has been designed to convert to stereo operation with a minimum of effort. The left channel is presently wired as part of the main audio chain, and provisions have been made on the PC board for future addition of the right channel and audio matrix by the insertion of appropriate components. Both mono and future stereo versions of the plug-in RF Exciter Cards are interchangeable with no transmitter modification.

Q-Taper™ Network

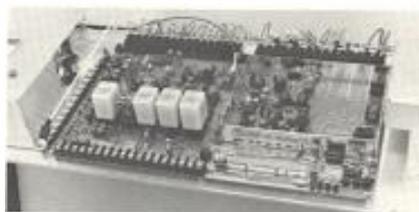
The Q-Taper output network, a proven performer in Collins AM transmitters for over a decade, provides flatter response across the audio pass band, and very steep skirts on both sides of the pass band. Unlike conventional "Pi"



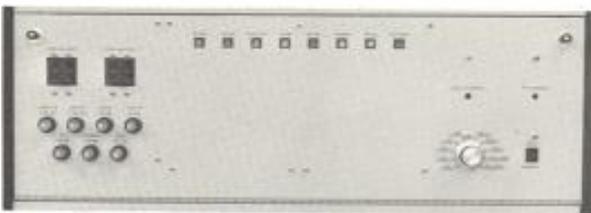
- Eye level meters permit quick checks of transmitter performance



- Advanced fiber optic coupling to modulation tube



- One solid state board controls the transmitter and pulse width modulation.



- Convenient switches and LED status indicators simplify troubleshooting and maintenance.

networks used by even the popular all-solid-state transmitters, the skirts of the Q-Taper network are nearly symmetrical, with second harmonic suppression that exceeds FCC requirements without the use of additional traps. The 3 dB bandwidth is approximately 10% of the operating frequency (or 100 KHz average). The Q-Taper network also gives improved phase linearity over other network designs, an important consideration for AM stereo.

Grounded Anode and Fiber Optics Coupling

By operating the anode of the final amplifier at DC ground, peak voltages with respect to the chassis are reduced to about one-half the value in other configurations, thus reducing significantly the possibility of arcing or corona. In addition, this permits the required metering of the final plate current and voltage to be done directly at ground reference, for both local and remote readings. Important, too,

since the anode is grounded, there is no blocking capacitor or DC feed choke required—a common source of potential problems in other designs.

This improved approach is made practical by the use of advanced fiber optics technology to couple to the modulator driver—an exclusive Collins transmitter feature. DC coupling, in the audio chain, is thereby maintained throughout for unsurpassed audio performance.

No-Bounce Power Supply

To eliminate power supply bounce and overshoot, the 828C-1 Power Rock One utilizes a new capacity input filter power supply that has no choke. The elimination of this choke eliminates the power supply low frequency resonance problem that plagues other designs, and contributes to the superior low frequency audio performance of the Collins transmitter.

Designed for Service
The 828C-1 is designed to

give years of dependable service, but to make routine maintenance as simple as possible, maximum accessibility has been provided to all areas of the transmitter. Modular circuit boards and LED status indicators on major circuits help to simplify troubleshooting and maintenance.

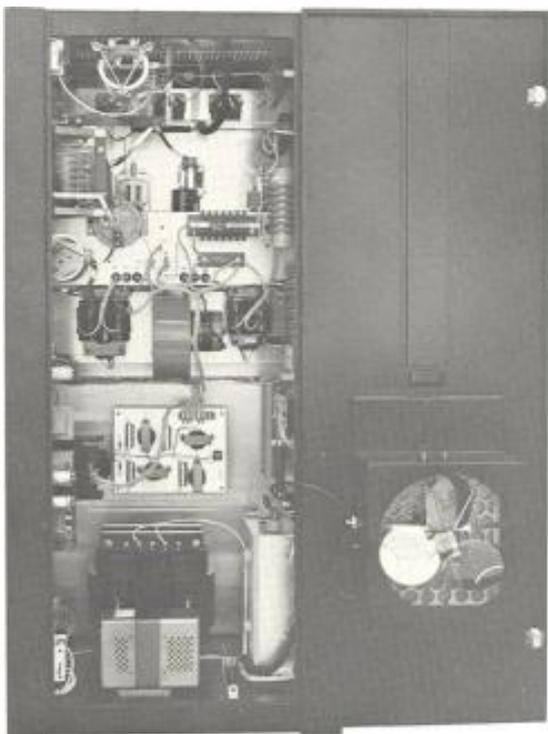
All control and overload circuits, the RF exciter, the driver module, and the Switch Mod module are plug-in units. Since the driver is broadband it needs no tuning—only the PA elements ever be tuned.

A single tube type, the low cost 3-500Z triode, is used for both the switching modulator and the final amplifiers, thus minimizing spare tube stockage. Use of the triode further simplifies maintenance since no screen supply is required.

Built-in forward and reflected power metering with VSWR protection is standard, making possible quick checks of transmitter performance and checks for changes in the antenna system. All needed metering is easily read from the front of the cabinet without the need for any additional external devices. Remote control connections are made directly with no interface unit required.

Audio feedback is taken from modulated DC rather than from the output envelope, thus reducing the sensitivity of the Power Rock One to changing load conditions, while providing automatic power output control. Your low power setting can be simply dialed to its correct value for setup, and thereafter changes from either power level are accomplished by a push button control (which can be readily removed). When required, the 828C-1 will come up to full power from a cold start in a matter of seconds at the push of a button.

The Power Rock System for AM broadcasters who want a louder, cleaner and better sound with increased reliability, lower operating costs



and easier maintenance for the most advanced combination of audio technology and overall reliability . . . for your best choice in a 1-kW AM transmitter today, it is the Collins 828C-1 Power Rock One.

We Invite You To Compare

- High efficiency SwitchMod™ pulse modulation technique.
- Overall efficiency exceeding 43% at 95% modulation.
- Harmonic distortion less than 2.0% from 20 to 10000 Hz.
- Low intermodulation distortion per standard 4:1 SMPTE.
- Feedback taken from modulated DC, not from RF envelope for reduced sensitivity to load conditions.
- Bandpass "Q-Taper"™ output network for flatter response across the audio pass-band and improved adjacent signal rejection.
- Lower peak voltages as a result of operation of the PA anode at DC ground.
- Local and remote metering directly at ground reference.
- No plate blocking capacitor or DC feed choke required.
- Automatic modulation control keeps modulation sensitivity constant at all power levels and with a ±5% line voltage variation, standard.
- Built-in Instantaneous Peak Limiter, standard.
- +125% modulation capability, standard.
- Built-in Forward/Reflected Power meter, standard.
- Low power setting continuously adjustable over entire power range of the transmitter, standard.
- Built-in troubleshooting aids, standard.
- Using only one tube type for lower spares stockage costs.
- Use of triodes eliminates need for screen grid supply.

- Overload recycle interrupts pulse train to remove high voltage in microseconds. After third overload, high voltage power supply is shut down, standard.

- Improved phase linearity in "Q-Taper" network for AM stereo.

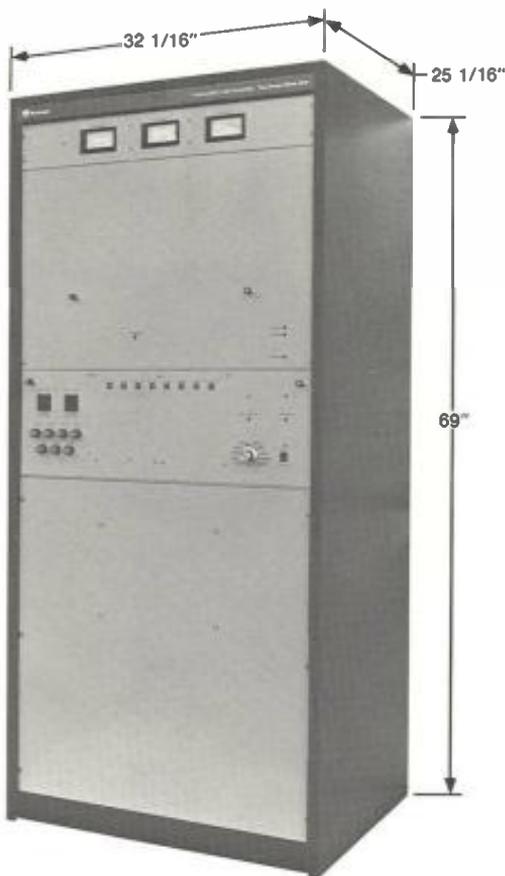
- Backed by the Rockwell two year limited parts warranty.

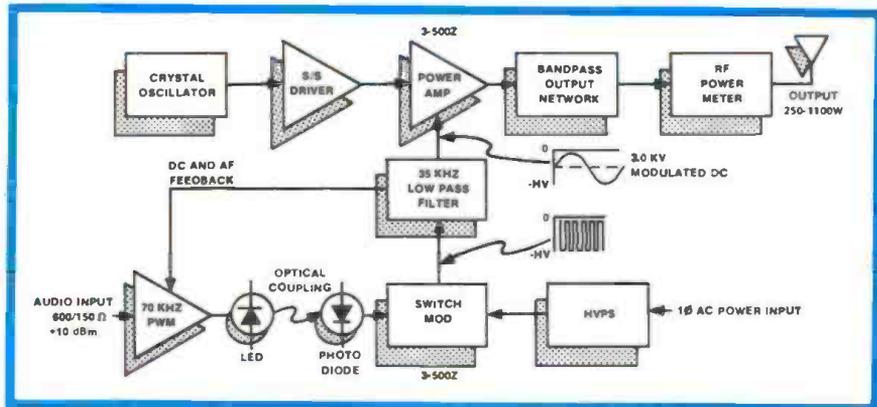
- Supported by the Collins Broadcast Field Service Engineering team providing 24-hour emergency technical

assistance 365 days a year.

- Further supported by emergency parts service available 24 hours, year-round.

- Competitive pricing . . . see your Collins Broadcast team for full details.





828C-1 Equipment Specification

Frequency Range

540 to 1600 kHz

RF Power Output

250W to 1100W max

RF Output Impedance

50 ohm, Unbalanced, Nominal

RF Output Fitting

Coax. Type LC (Optional Stud)

Harmonic and Spurious

-73.4 dB, meets FCC and CCIR

Carrier Regulation

2% max (400 Hz, 95% MOD)

Frequency Stability

± 5 Hz (0 to 50° C)
± 20 Hz (-20° C to +50° C)

Audio Response

± 1 dB, 20-10 KHz.
1 KW, -95% Modulation

Audio Distortion

Less than 2%, 20-10 kHz
1 KW, 95% Modulation

Noise

-55 dB (400 Hz, 95% MOD)

Audio Input

+10 dBm ± 2 dB,
600/150 ohms. Balanced

Modulation Capability

-100% +125% (1100 W, 1 kHz)

Power Requirements

1φ, 200/250V, 50/60 Hz

Power Consumption

3500W at 1 KW, 95% MOD

Overall Efficiency

43% at 1 kW, 95% MOD
(44% at 1100W, 95% MOD)

Ambient Temperature

-20° C to +50° C

Humidity

95% Max

Altitude

7500 Ft.

Size

32-1/16" (81.4cm)W x 25-1/16"
(63.6cm)D x 69" (175.3cm)H

Weight

760 Lbs. (345 Kg)

Tubes

3-500Z (3) (1 MOD, 2RF)

Remote Control

Direct - No Interface Required

Features

IPL, Auto Power Control,
Auto MOD Control

For further information contact:

Rockwell International
Collins Broadcast Products
P.O. Box 10462
Dallas, Texas 75207
(214) 996-5424
Telex: 73-307



Rockwell International

...where science gets down to business