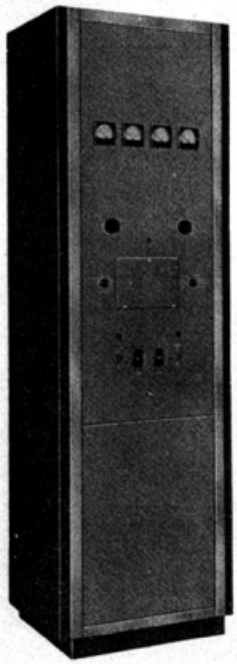
RCA

catalog RA.1021A

(Replaces B.6002)

1 kW AM Broadcast Transmitter, Type BTA-1N1

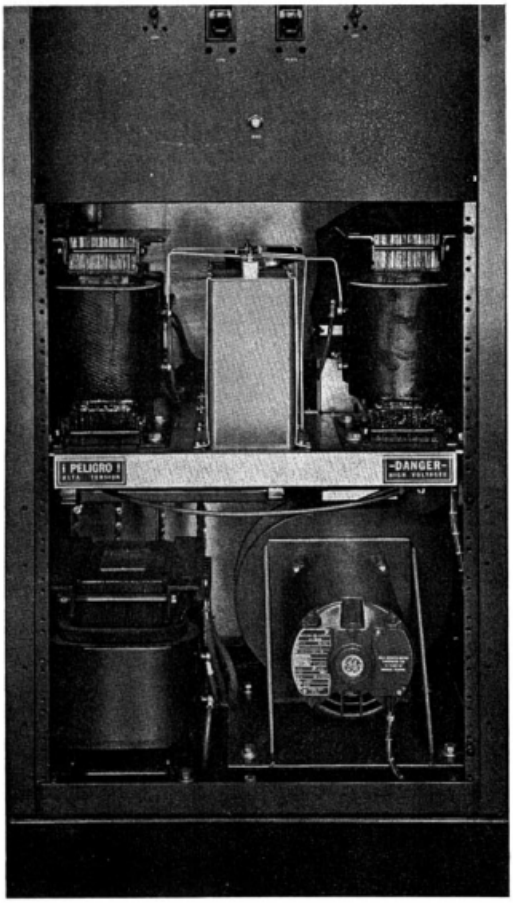
- Silicon power supplies
- Low operating cost
- Remote control provisions
- Requires less than three square feet (0.258 square meters) of floor space
- High speed magnetic circuit breaker protection—eliminates fuses



The Type BTA-1N1 is an amplitude-modulated transmitter of unique design that in every way leads broadcasting's modern trend to combine greater economy, simplicity and reliability in a single compact unit. A real performer, the Type BTA-1N1 uses fewer and less expensive components, incorporates simplified tuning, and easily produces 1000 watts maximum power output at any frequency between 535 and 1620 kilohertz.

Remote, unattended operation of the transmitter is a practical reality — enhanced by simplified start-stop and power-control circuitry, remote metering and the long-term reliability of semiconductor power supplies. In the audio channel there are only two tubes, one transformer and a small modulation choke. Silicon rectifiers are used throughout.

Lower front with access panel removed showing oversize blower, plate transformers and reactors.

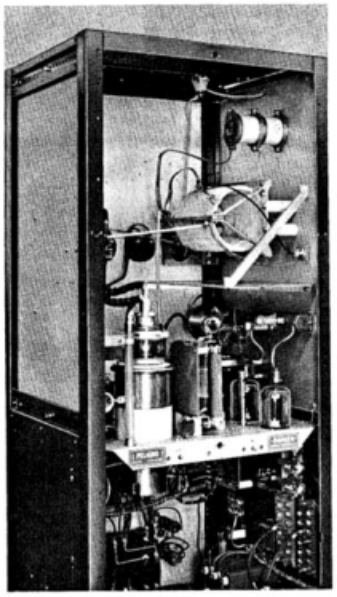


The Type BTA-1N1 1-kW Broadcast Transmitter is housed in a standard equipment rack that may be ganged with other racks. The transmitter is divided into three compartments: The upper compartment is completely enclosed in aluminum and contains the modulator, rf driver and power amplifier. The center compartment contains an oscillator/buffer assembly, bias supply, filter components for the high-voltage and intermediate high-voltage supplies and control curcuit. The lower compartment contains the high-voltage plate transformer, rectifier and blower. The rear panel of the upper two compartments is removable and both front and rear panels of the lower compartments are removable to allow complete access to all components. The blower intake is thru a filter in the lower rear, thru the compartment containing the high-voltage plate transformer and rectifier, thus providing ample cooling.

Simplified, Reliable Circuits

Simplicity of the Type BTA-1N1 transmitter circuitry is shown by the block diagram. In the rf section, carrier frequency generated by the pentode section of a Type 6AX8 crystal oscillator is first amplified by a broadband tuned Type 6AX8 buffer using only the pentode section of the tube. The signal is then fed to a Type 7094 single-ended, Class C stage which drives an air-cooled 3X3000F1 triode operating with fixed bias as a Class AB_1 power amplifier. The PA output circuit is broadband neutralized and includes a harmonic trap which is adjustable from the front panel. Both the rf driver, which is the plate-modulated stage, and the power amplifier are tuned from the front panel by variable capacitors. Rf voltage for frequency monitoring is derived from the Type 6AX8 crystal oscillator and fed to the frequency monitor through the triode section of the tube. An rf sample for the modulation monitor is obtained from the low tap on the PA tank coil which also serves as a discharge path for static charges in the antenna circuit.

Audio is fed through a 150/600-ohm line input transformer and amplified by the triode section of a Type 6AX8 tube (pentode section utilized as rf buffer). This triode is resistance coupled to a Type 7094 Class A modulator which is choke-coupled to the plate circuit of the rf driver stage.



Rear oblique view showing radio frequency driver and power compartment.

Solid State Power Supplies

A plate supply and bias supply each utilizing silicon diodes, equalizing resistors and printed wiring furnish all the dc voltages needed for the transmitter. The plate transformer is center tapped to provide plate voltage for the driver-modulator stages as well as regulated low voltage for the oscillator and buffer plates. Only two filament transformers are used in the transmitter.

Metering of all Stages

Individual meters are provided for reading PA plate voltage, PA plate current and rf output (optional). Remaining stages and circuits such as the oscillator, buffer, audio, and low voltage supplies, are monitored by a multimeter and selector switch combination which, in addition, provides other readings (useful in initial tune-up) such as the peak rf voltage at the grid and plate of the PA. There are also provisions for remote metering of PA plate voltage and current.

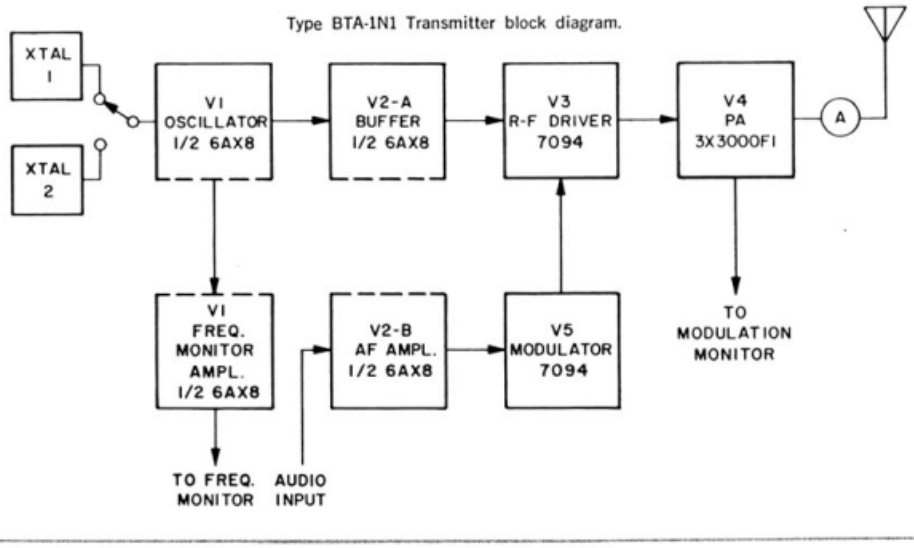
"Fail-Safe" Protection

Transmitter circuits are fail-safe protected by high-speed magnetic circuit breakers. A latching relay and an optional motor-driven power raise/lower control permits convenient remote control of the transmitter. Remote on-off switching is by a single control. This is made possible by interlocking of the bias and plate supplies, a feature which also prevents spurious overloads as a result of any brief power interruptions that may occur.

Ease of Tuning

Built-in facilities reduce the tuning and loading of the linear amplifier to a simple, three-step procedure which is performed at the control panel of the transmitter without need for accessory test equipment of any kind. Once initial adjustments are made, the transmitter can be operated over long periods of time with only the infrequent "touch-up" tuning required by any transmitter. Modulator circuits ordinarily require no adjustment.

Type BTA-1N1 Transmitter block diagram.



Specifications

Electrical

Frequency Range	535 to 1620 kHz
Power Output	500 to 1000 watts
Type of Output	Single-ended
Output Impedance	40 to 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level (100% Modulation)	+10 ±2 dBm
AF Response (50 to 7500 Hertz)	±1.5 dB
AF Distortion (90% Modulation)	3%
Noise (Below 100% Modulation)	50 dB
Frequency Stability	±2 Hz
RF Voltage for Frequency Monitoring	10 volts, 75 ohms
RF Voltage for Modulation Monitoring	10 volts, 75 ohms
Total Harmonic Radiation	–73 dB

Tube Complement

1 6AX8 (pentode) (triode)	Crystal Oscillator Frequency Monitor Amplifier
1 6AX8 (pentode) (triode)	Buffer Amplifier Audio Amplifier
1 7094	Amplifier Driver
1 7094	Modulator
1 3X3000FI	Power Amplifier

Power Requirements

Transmitter:

Line	208 to 240 V., single phase, 50/60 Hz
Combined Line Voltage Variation and Regulation	±5%
Power Consumption (at 1000 watts)	4.5 kW (approx.)
Power Factor	90% (approx.)

Cabinet Lighting and Crystal Heaters:

Line	110 to 125 V., single phase, 50/60 Hz

Mechanical

Dimensions (overall)	22″ wide, 84″ high, 18″ deep (560 mm, 2134 mm, 458 mm)
Weight	625 lbs. (283 kg)
Maximum Altitude	7500 feet (2500 meters)
Ambient Temperature Range	–20° to +45°C (–4 to +113°F)
Air Intake	200 cf/m
Heat Loss (0% Modulation)	3500 watts (200 BTU/min) (12,000 BTU/hr)

Accessories

Set of Spare Tubes	ES-562202
Set of Spare Tubes (recommended spares)	ES-562201
RF Output Line Current Meter (range determined by antenna characteristics)	MI-7157-H*
Remote Antenna Meter	MI-28037-B*
Crystal, Type TMV-130B	MI-27493
Frequency and Modulation Monitor, Type BW-50	MI-560767
Power Cutback Kit	MI-561301
Remote Power Adjust Kit	MI-561302

*Specify scale.

Ordering Information

One-Kilowatt AM Transmitter, Type BTA-1N1 ..... ES-562200
(Please specify operating frequency and transmission-line impedance.) (Includes harmonic filter and side panels.)