

AM Broadcast Transmitter, Type BTA-50F1

Features

- Low power consumption—reduced operating costs.
- Unified front design—facilitates flush mounting—attractive appearance.
- Fewer tube types—only 9 types of tubes used in entire 50 KW transmitter—fewer spares needed.
- Simplified Power Supply Circuits—only 3 vacuum tube rectifiers used in entire transmitter.
- Small floor space requirements—built-in wiring duct for ease of installation and lower installation costs.
- Spare tube positions in Power Amplifier, Modulator, and Main Rectifier.
- Modern P. A. and modulator design—Type RCA 5671 (thoriated-tungsten filament design) is used in both.
- Walk-in access to every section.
- Simplified control with high-speed air circuit-breaker fault interruption and reclosure.
- Supervisory control console furnished.

Description

Providing up to 53 kilowatts of r-f power, the new RCA BTA-50F1, all air-cooled AM transmitter operates in the range of 540 to 1600 kc. It not only incorporates the latest in modern, deluxe transmitter design—but includes features “proved in” through twenty years of actual service . . . many features as familiar to broadcasters as station call letters. Each RCA 50 kw design has improved on previous designs—new features added.

The BTA-50F1, latest of the “RCA 50” series, is designed to insure *minimum installation cost* plus economy and simplicity of operation. Heavy-duty components are used throughout. All are features that mean *less air time lost* and reduced maintenance costs. Moreover, the BTA-50F1 is outstanding among 50 kw designs in its *unusually low power consumption*—another factor contributing to reduced operating costs.

Electrically, the BTA-50F1 crystal oscillator is followed by three stages of r-f amplification and the final power amplifier. Simplified single-ended circuits are used with push-button motor tuning provided in IPA, R-F driver and Power Amplifier.

The audio section of the BTA-50F1 employs push-pull circuits with fixed audio feedback. This design results in excellent fidelity characteristics with very low distortion and noise level. A minimum number of audio stages and high level, class B modulation provide further economy of equipment and operation. By using high gain tubes in stabilized circuits—a total of only four audio stages are needed (including the modulator) to provide excellent over-all audio performance.

Both modulator and power amplifier employ the same type tube, thus providing greater spare tube economy. Fewer tuned circuits (only 8 simple, single-ended circuits—4 motor-tuned and 4 fixed tuned)—and fewer tube types (only 9 in the entire 50 kw transmitter) are required than in ordinary transmitters of similar power.

Mechanically, the BTA-50F1 is made up of five main units: the exciter, modulator, power amplifier, main rectifier, and control-and-distribution section. All sections are mounted immediately behind a single unified-front panel enclosure, which is thirty-three feet long and eighty-four inches high. Full length doors are provided in each section, front and rear to provide maximum accessibility to tubes and components.

Modulation transformer, reactor and high-voltage plate transformers are oil-filled and require no attention other than occasional inspection of oil. The main filter reactor is air cooled



and may be located in the transformer vault or at the rear of the transmitter. A typical transmitter installation requires a space of only 33 x 17 feet for transmitter and associated control and power equipment. A control console finished in umber gray to blend with the transmitter styling is furnished.

Performance Specifications

Operating Frequency	Any specific frequency in the band from 540 kc to 1600 kc	
R. F. Power Output	53 kw at transmitter terminals	
*Output Load Impedance	40 to 250 ohms—zero reactance	
Radio Frequency Stability	±10 cycles	
Audio Frequency Response	±1 db from 30 to 10,000 cycles from a reference level of 1000 cycles at 60% modulation	
Audio Input Impedance	600 ohms	
Audio Input Level	Plus 10 dbm at 100% modulation (0 VU, Average Program level)	
*Audio Distortion	Less than 3% RMS from 50 to 7500 cycles at 90% modulation	
Noise Level—RMS	60 db below 100% modulation	
*Carrier Shift	Less than 5%	
R. F. Harmonics	70 db below carrier fundamental measured at one mile	

	With 50 KW into Non-Directional Radiator	With 52.5 KW into A Directional System
Power Consumption:		
Without Modulation		
(@ 87% P. F.)	96.5 kw	99.5 kw
25% Modulation (@ 88% P. F.)	104.5 kw	108.0 kw
100% Modulation (@ 90% P. F.)	138.0 kw	143.0 kw

(A loss of 500 watts, approx., has been allowed between the transmitter terminals and the point of power measurement.)

Power Supply Requirements—460 volts, 60 cycles, 3 phase, 3 wire, with 5% maximum combined regulation and variation. The equipment can be adapted for 50 cycle operation by minor modification.

* These values are based on RMA minimum standard normal load specifications.