

# COLLINS RADIO COMPANY

CEDAR RAPIDS



IOWA, U. S. A.

ENGINEERING DATA

SERVICE MANUAL

on  
30FXB TRANSMITTER

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INSTRUCTIONS

COLLINS  
30FXB TRANSMITTER

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1. UNCRATING: Remove the transmitter from the crate and inspect it carefully to be certain that it has not been damaged in shipment. Inspect wiring to be sure that cable plugs are properly inserted in their sockets and that the wiring has not been damaged. All transmitters are carefully tested and inspected before shipment. File all claims for damage promptly with the transportation company. It is also desirable to preserve the original packing box and the packing material.

2. INSTALLATION: The 30FXB Transmitter is a complete unit, mounted in a single rack and it lends itself to installation in a restricted space without making any special provisions. Wherever it is possible to do so, it is desirable to bolt it to the floor although this is not necessary. The 405C Power Supply is removed from the rack for shipping. This is readily inserted and bolted in place.

Drawing #1346 and ~~Drawing #1547~~ clearly indicate all the external connections to the transmitter. The two power switches indicated on Drawing 1346 are not furnished because the user usually wishes to install these himself at some convenient point near the operating position. The stand-by switch and telegraph key are wired to terminals 5, 6 and 7 as shown. If CW operation only is contemplated, it is not necessary to use an external C battery and connections 2 and 4 together. For radiophone operation, it is necessary to use a bias battery for the class B modulators. The negative side of the battery goes to terminal #2 and the positive side to terminal #4. Adjustment of this bias battery is covered in a later section. Terminal #6 is at ground potential and it is desirable to ground the transmitter either by attaching the ground lead to this terminal, or by carrying a copper ground bus underneath the rack bolts in case the transmitter is bolted to the floor. The antenna or antenna transmission line is connected to the terminals at the top of the transmitter. The yellow wire, fitted with a tinned lug, extending from the bottom of the main cable is the negative grid bias lead to the class B modulators. This can be attached to terminal 2 on the 405C Power Supply to apply the same bias voltage to the modulators and the second amplifier.

3. TUBES: The 30FXB employs the following tubes:

- 1 47 Crystal Oscillator
- 2 46 First Amplifiers
- 1 203A Second Amplifier

- 2 830B Modulators
- 2 866 High Voltage Rectifiers
- 1 5Z3 Low Voltage Rectifier
- 1 45 Keying Rectifier

In addition to these tubes, the 7C Speech Amplifier uses the following tubes:

- 1 57
- 2 56
- 2 2A3
- 1 5Z3

The sockets on the 7C Amplifier are marked with the number of the tube to be used in each.

4. COILS: Three plug-in coils are required in the 30FXB transmitter for each band. Coils for each specified frequency are furnished as ordered. These should be inserted in their proper places.

The tuning charts for the 10J R.F. Unit show the appropriate coils to be inserted for each band of frequencies.

5. CRYSTAL: A crystal with the desired frequency is inserted in the crystal socket in the 10J R.F. Unit.

6. TUNING: After installation and wiring have been carefully checked, the filament power switch may be closed, applying filament voltage to all tubes and low voltage plate supply to the first amplifier and crystal oscillator. The crystal oscillator tuning dial is rotated until a downward deflection of the crystal oscillator plate milliammeter is obtained. This indicates that the crystal is oscillating.

The first amplifier is then switched on (toggle switch below the first amplifier plate milliammeter) and the plate meter now reads the sum of the oscillator and first amplifier plate currents. The first amplifier is tuned to resonance as indicated by minimum plate current.

The antenna network is disconnected from the plate coils of the second amplifier and the second amplifier tuning condenser is adjusted to the approximate position where resonance will be obtained by referring to the tuning chart for the power frequency being used.

The plate supply switch is then closed and the second amplifier tuning condenser is promptly adjusted for resonance as indicated by minimum plate current.

No neutralization adjustment is made in the field. The capacity of the neutralizing condensers is adjusted and locked at the factory.

The transmitter is now adjusted with the exception of the antenna circuit. It will be found that if the crystal is tuned out of oscillation that the crystal and first amplifier plate current will be substantially reduced. If the second amplifier is biased past cut-off, the plate current to this stage will drop to zero. If grid leak bias only is used, the plate current with the crystal not oscillating will be approximately 110 MA. The grid current will be zero in all cases when the crystal is not oscillating.

When CW operation is desired, the output can be increased by connecting the plate supply power to terminals 10 and ~~12~~ and shown on drawing #1347. This raises the plate voltage to 1250. When the transmitter is modulated, the plate supply power is connected to terminals 10 and 12, which gives a plate voltage of 1,000.

When the 2C antenna matching network is used to transfer power from the 2nd. amplifier plate circuit to the antenna, the 2nd. amplifier plate condenser should not be changed after it is adjusted to resonance with the load circuit disconnected. Adjustment of the load circuit is made as follows:

Adjustment of the antenna circuit is made in accordance with the enclosed instructions for the 2C Antenna Matching Network.

Proper loading of the final amplifier obtained when a plate current of 200 MA is drawn at resonance. The final amplifier tube should run cool at full load and should show no color on the plate whatever.

TABLE I. Meter Readings of 30FXB Transmitter for Correct Operation:

Filament volts . . . . .	10. . . V	AC
Oscillator Plate Current (First Amp. Switched off). . . . .	20- 40. . MA	DC

Oscillator and 1st Amp. Plate Current (Buffer Switched on)	. . . 100-150 . . MA	DC
Grid Current (2nd Amp. off)	. . . .35-50 . . MA	DC
Grid Current (2nd Amp. on with full load)	. . . .25-40 . . MA	DC
2nd Amplifier Plate Current	. . . 175-200 . . MA	DC
Modulator Plate Current - At zero modulation (830B modulators)	.50 . . MA	DC
Modulator Plate Current at 100% modulation	. . . 150 . . MA	DC

TABLE II. Voltages Occurring in 30FKB Transmitters:

Line voltage	. . . . . 110-115 V. .	50/60 cycle
203A and 830B Filaments	. . . . . 10 V. .	AC
45, 46, 47, 57, 56, 2A3	. . . . .	
866 Filaments	. . . . . 2.5 V. .	AC
5Z3 Filaments	. . . . . 5 V. .	AC
57 Plate	. . . . . 100 V. .	DC
57 Screen	. . . . . 55 V. .	DC
1st 56 Plate	. . . . . 115 V. .	DC
2nd 56 Plate	. . . . . 270 V. .	DC
2A3 Plate	. . . . . 362 V. .	DC
2A3 Filament	. . . . . 60 V. .	DC
203A Plate	. . . . . 1000 V. .	DC
(Using tap 11 on 405C)		
203A Plate (Using tap 12 on 405C)	. . . . . 1250 V. .	DC
46 Plates	. . . . . 400 V. .	DC
47 Plate	. . . . . 400 V. .	DC
47 Screen	. . . . . 125 V. .	DC
(With crystal oscillating)		
Battery Bias on 203A and 830B's (approx.)	. . . . . 28½V. .	DC

All DC voltages measured against ground (chassis) with 1000 ohms per volt instrument under full load conditions.

7. RADIOTELEGRAPH OPERATION: The adjustments just described place the transmitter in an operating condition for radiotelegraph transmission. However, for this type of service it is necessary to short-circuit the secondary of the modulation transformer by means of a bus connector located on the transformer terminals. This prevents inductive surges which would result from interruption of current through this transformer. The transmitter can be keyed at high speeds if desired. The stand-by switch is provided to make it possible to listen on the crystal frequency.

8. RADIOTELEPHONE OPERATION: A crystal microphone equipped with a shielded cord and a shielded plug is connected in the jack provided for that purpose on the 7C amplifier. The microphone cord is carried through the side of the rack in the rubber bushing provided for this purpose. The 7C Amplifier is switched on by means of the toggle switch on the front of its panel. The modulator tubes are inserted in their sockets and the short circuiting switch on the secondary of the modulator transformer is opened. The transmitter is tuned as just described for CW operation, but the plate voltage is reduced to 1,000 by connecting the plate power leads to terminals 10 and 19. The transmitter is tuned and with the plate voltage on the modulators, the C bias is adjusted for a plate current of 50 MA with no modulation. 100% modulation is obtained when the modulator plate milliammeter swings up to approximately 150 MA. Larger modulator plate currents will result in over modulation, which causes serious distortion and interference on adjacent channels. It is a good plan to keep the average level well below the point where 100% modulation occurs, in order to allow for the occurrence of modulation peaks.

It is important that the modulators be operated only when the final Class C amplifier is drawing the rated plate current of 175-200 MA. In no case should the modulators be excited with the Class C amplifier switched off.

9. TRANSMITTER PERFORMANCE: Each Transmitter is individually tested for uniform frequency response and power output. If tubes in good condition are used, high quality performance should be expected over a period of years. All parts are manufactured with extreme care to avoid damaging effects of climate and ample margin of safety is used to assure reliable operation on the rated power. If low output or distortion occurs, the first step is to test all of the tubes in the transmitter. If the difficulty is not located as being due to a defective tube, it is suggested that the user communicate with the manufacturer.

10. GUARANTEE: The 30FXB Transmitter is guaranteed against defects in material and workmanship for a period of one year, providing it is operated in accordance with these instructions and that the supply voltage and frequency is as specified. Correspondence, relating to the operation of this apparatus, should be addressed to the COLLINS RADIO COMPANY, Cedar Rapids, Iowa.

Drawings

1546 30FXB

~~1547 Connections~~

Tuning Charts for the 10J