INSTRUCTION BOOK

FOR

RADIO SETS SCR-240-A AND SCR-261-A

AND

MAINTENANCE SETS RC-40-A AND RC-42-A

MANUFACTURED BY

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

RESTRICTED

PUBLISHED BY AUTHORITY
OF
THE CHIEF SIGNAL OFFICER

Order No. SC-132377

13 October 1938
Date 10-13-38

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Order No. SC-132377
(2100) 5-1-41

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SAFETY NOTICE

SAFETY TO HUMAN LIFE

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST, AT ALL TIMES, OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH THE HIGH-VOLTAGE SUPPLY ON.

UNDER NO CIRCUMSTANCES SHOULD ANY PERSON BE PERMITTED TO OPERATE THE DYNAMOTOR WHEN IT IS REMOVED FROM ITS BASE, OR WITH END COVERS OFF, OR TO REPLACE FUSES WITH POWER ON, OR TO REMOVE, PLACE OR HANDLE REMOVED PLUGS WITH THE DYNAMOTOR RUNNING.

UNDER NO CIRCUMSTANCES ADJUST CIRCUITS OR SERVICE THE EQUIPMENT WHEN THE CARRIER IS KEYED OFF ONLY; HIGH VOLTAGES ARE STILL PRESENT ON PARTS OF THE CIRCUITS.

USE EXTREME CAUTION WHEN OPERATING THE EQUIPMENT WITH EXTERNAL SHIELDS REMOVED.

WHEN OPERATING THE RECEIVER ON THE SPECIAL TEST MOUNTING, USE EXTREME CAUTION NOT TO COME IN CONTACT WITH CIRCUITS CARRYING HIGH VOLTAGE.

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SECTION I

GENERAL DESCRIPTION OF COMPLETE EQUIPMENT

1.1 Use

Radio Sets SCR-240-A and SCR-261-A are designed for use in U. S. Army Aircraft for two way communication. The radio transmitters are designed for transmitting either CW or voice-modulated signals in the frequency band of 3000 to 8000 kc. The radio receivers are designed to receive tone telegraph or voice-modulated signals in the frequency bands of 200-400, 550-1500 and 2500-8000 kc. Maintenance Sets RC-40-A and RC-42-A are designed for use in adjusting and servicing Radio Sets SCR-240-A and SCR-261-A respectively.

1.2 Characteristics

All circuit components of Radio Sets SCR-240-A and SCR-261-A are especially designed for aircraft use and where necessary, suitable shock mountings are provided to prevent damage due to excessive vibration of the aircraft. All power used to operate Radio Set SCR-240-A can be obtained from a 12-14 volt airplane generator-battery system. Similarly, Radio Set SCR-261-A will operate from a 24-28 volt system. When transmitting, the total current drain for Radio Set SCR-240-A is approximately 35 amperes at 14 volts. When receiving only (transmitter filaments on, dynamotor not running —the condition when CW-VOICE switch is on VOICE), the current drain is 7 amperes. For Radio Set SCR-261-A the current drain at 28 volts is approximately 19 amperes while transmitting and 5 amperes when receiving only.

1.3 Major Components

1.3.1 Radio Sets SCR-240-A and SCR-261-A

Radio Sets SCR-240-A and SCR-261-A include the following major components:

Radio Set SCR-240-A (14 volt equipment)	Radio Set SCR-261-A (28 volt equipment)
Radio Transmitter BC-338-A (Includes Mounting FT-179-A)	Radio Transmitter BC-353-A (Includes Mounting FT-179-A)
Radio Receiver BC-225-A (Includes Mounting FT-180-A)	Radio Receiver BC-352-A (Includes Mounting FT-180-A)
Dynamotor Unit PE-59-A (Transmitting) (Includes Mounting FT-181-A)	Dynamotor Unit PE-62-A (Transmitting) (Includes Mounting FT-181-A)
Radio Control Box BC-226-A	Radio Control Box BC-351-A
Loop LP-16-A	Loop LP-16-A
Ammeter I-71-A	Ammeter I-71-A

All the above listed components are interconnected by conduits or cables and control is vested in the radio control box.

1.3.2 Maintenance Sets RC-40-A and RC-42-A

Maintenance Sets RC-40-A and RC-42-A include the following major components:

Maintenance Set RC-40-A (14 Volt equipment)	Maintenance Set RC-42-A (28 Volt equipment)
Tuning Equipment IE-6-A	Tuning Equipment IE-7-A
Antenna A-60-A for transmitter testing	Antenna A-60-A for transmitter testing
Antenna A-59-A for receiver testing	Antenna A-59-A for receiver testing
Signal Generator I-72-A	Signal Generator I-72-A
Mounting FT-182-A for receiver testing	Mounting FT-182-A for receiver testing
Dynamotor Unit PE-59-A (Includes Mounting FT-181-A)	Dynamotor Unit PE-62-A (Includes Mounting FT-181-A)
Mounting FT-179-A for transmitter testing	Mounting FT-179-A for transmitter testing
Radio Control Box BC-226-A	Radio Control Box BC-351-A
Loop LP-16-A	Loop LP-16-A
Ammeter I-71-A	Ammeter I-71-A

All of the above components are used in adjusting and servicing the radio sets. These units are not intended for installation in the aircraft.

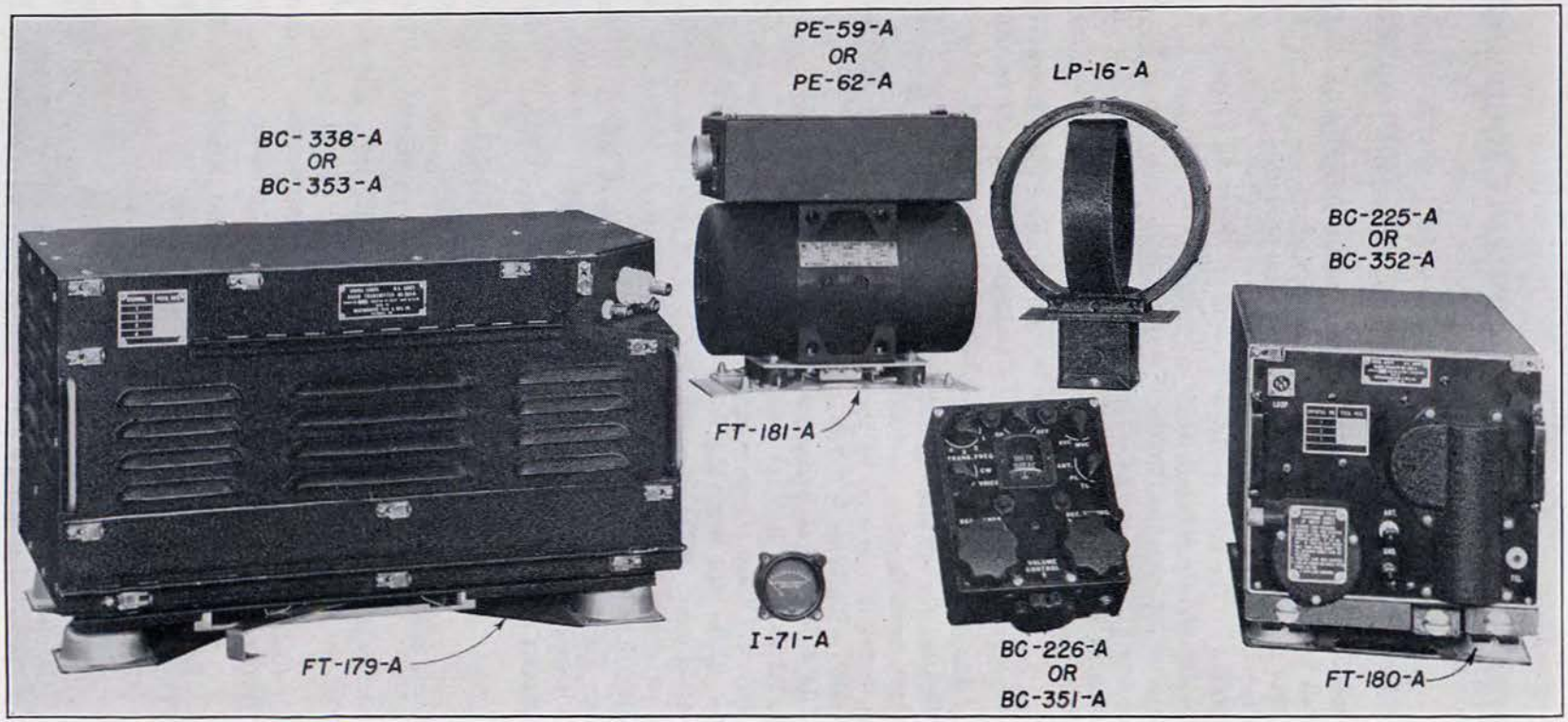


FIGURE 1—RADIO SET SCR-240-A OR SCR-261-A

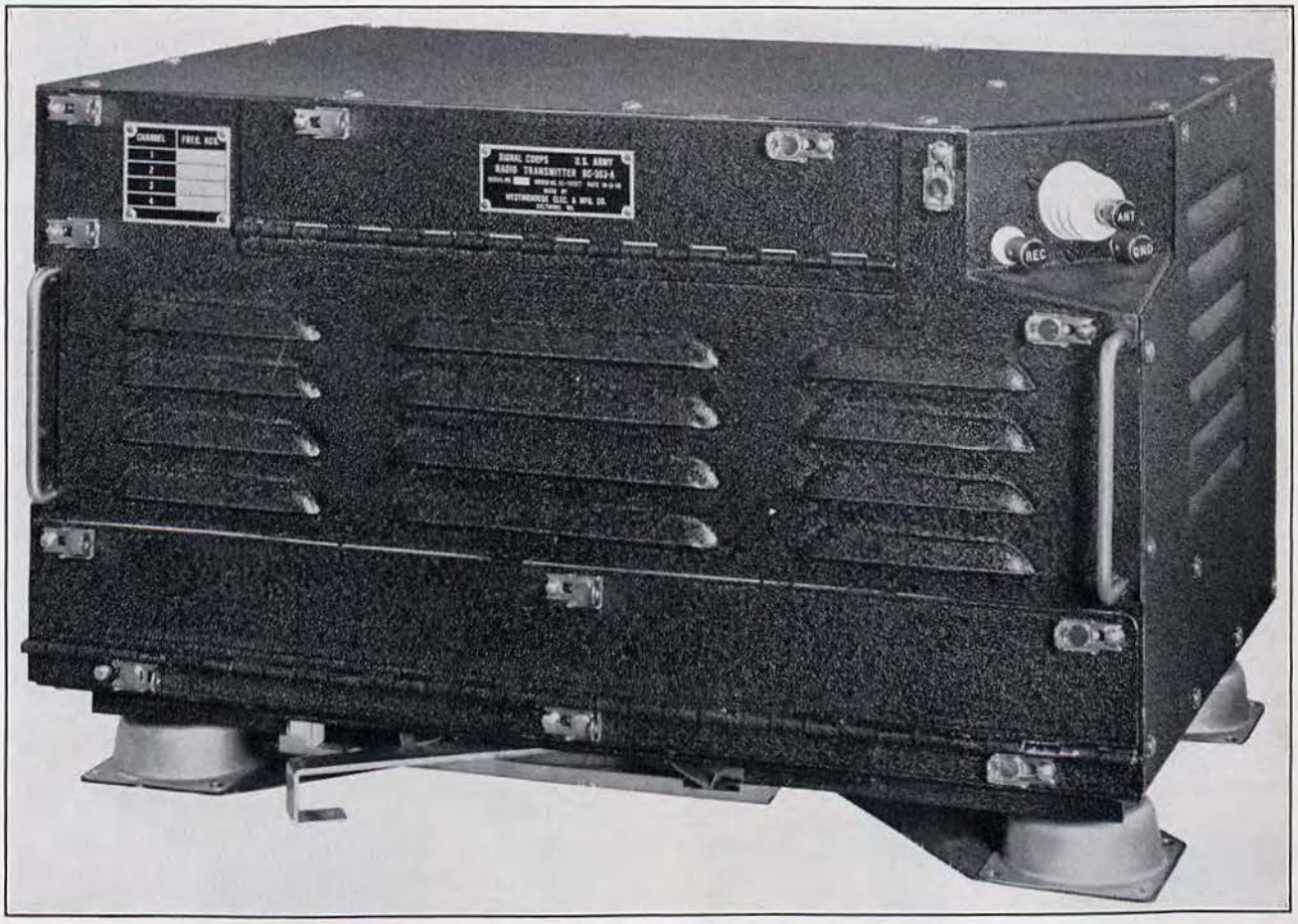


FIGURE 2—RADIO TRANSMITTER BC-338-A OR BC-353-A

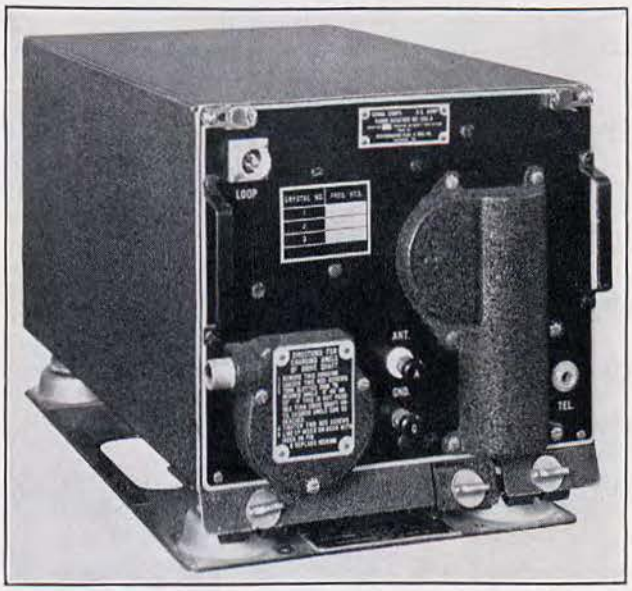


FIGURE 3—RADIO RECEIVER BC-225-A OR BC-352-A

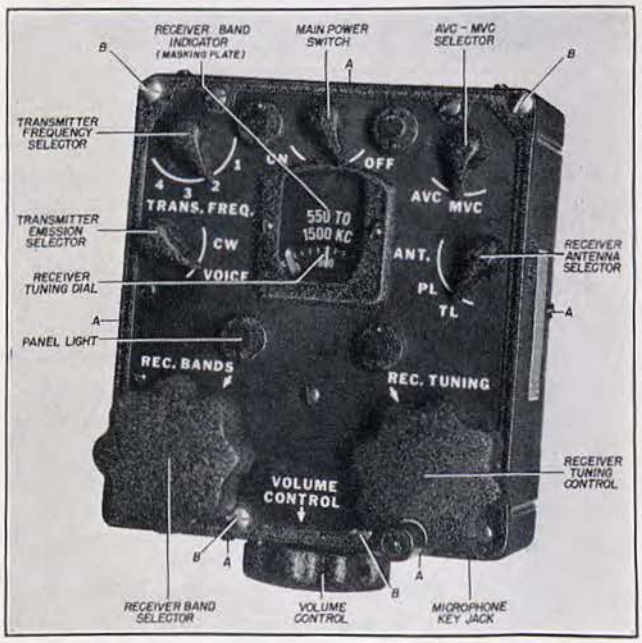


FIGURE 4—RADIO CONTROL BOX BC-226-A OR BC-351-A

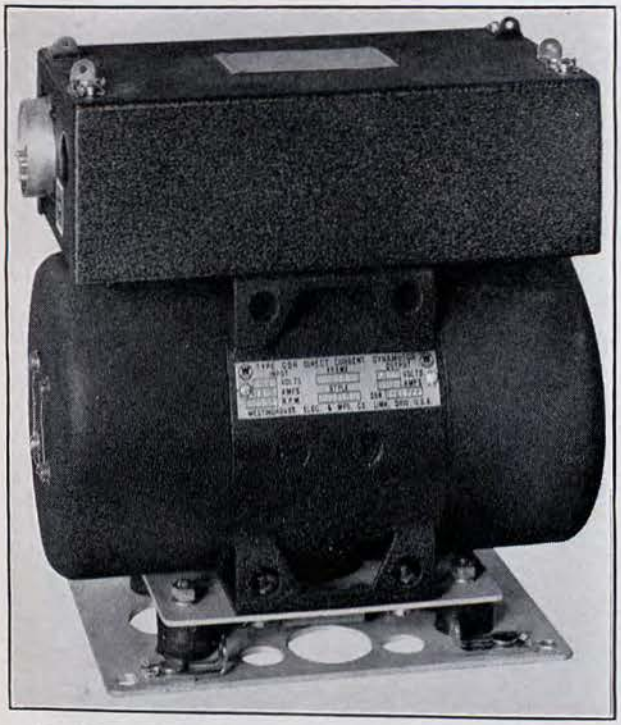


FIGURE 5—DYNAMOTOR UNIT PE-59-A OR PE-62-A

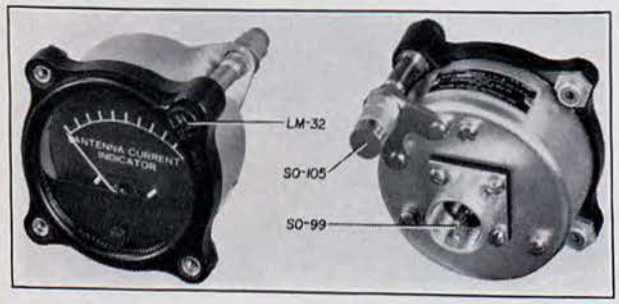


FIGURE 7—AMMETER I-71-A

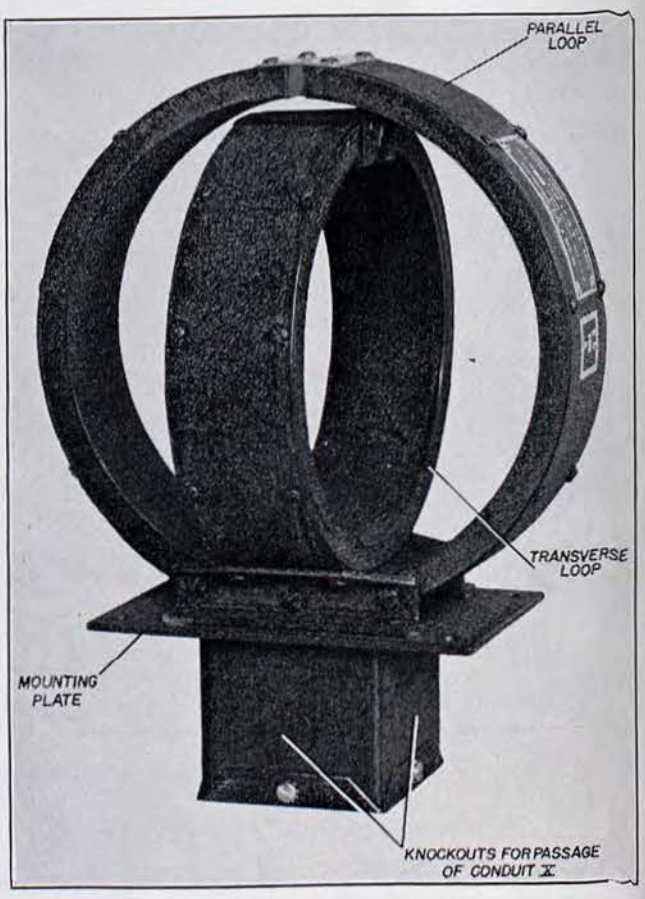


FIGURE 6—LOOP LP-16-A

1.4 List of Components Showing Weights and Dimensions

1.4.1 Radio Sets SCR-240-A and SCR-261-A

SCR-240-A Quantity	SCR-261-A Quantity	Article	Dimensions (inches) Height	Width	Depth	Unit Weight (Pounds)
1		Radio Transmitter BC-338-A. Includes Mounting FT-179-A	13	20 7/8	13 5/16	66.7
	1	Radio Transmitter BC-353-A. Includes Mounting FT-179-A	13	20 7/8	13 5/16	66.7
1		Radio Receiver BC-225-A. Includes Mounting FT-180-A	10 1/8	9 5/8	18	32.2
	1	Radio Receiver BC-352-A. Includes Mounting FT-180-A	10 1/8	9 5/8	18	32.2
1		Radio Control Box BC-226-A	7 1/2	6 3/16	4 3/4	4.5
	1	Radio Control Box BC-351-A	7 1/2	6 3/16	4 3/4	4.5
1		Dynamotor Unit PE-59-A. Includes Mounting FT-181-A	10 3/16	10	5 1/2	24

SCR-240-A Quantity	SCR-261-A Quantity	Article	Dimensions (inches) Height	Width	Depth	Unit Weight (Pounds)
	1	Dynamotor Unit PE-62-A. Includes Mounting FT-181-A	$10\frac{3}{16}$	10	$5\frac{1}{2}$	24
1	1	Loop LP-16-A	$10\frac{1}{2}$	$7\frac{7}{8}$	$6\frac{3}{8}$	1.9
1	1	Ammeter I-71-A	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{3}{8}$	0.59
1	1	Mounting FT-179-A for Transmitter	$4\frac{3}{8}$	$20\frac{7}{8}$	$12\frac{1}{4}$	8.5
1	1	Mounting FT-180-A for Receiver	$4\frac{3}{4}$	$9\frac{5}{8}$	$16\frac{13}{16}$	6.3
1	1	Mounting FT-181-A for Dynamotor	$\frac{3}{4}$	$5\frac{1}{2}$	10	0.80
4	4	Crystal Unit DC-8-A (Transmitter)	$3\frac{1}{16}$	$1\frac{3}{8}$	$1\frac{3}{8}$	0.15
3	3	Crystal Unit DC-8-A (Receiver)	$3\frac{1}{16}$	$1\frac{3}{8}$	$1\frac{3}{8}$	0.15
1		Dynamotor DM-22-A Receiver	$7\frac{3}{4}$	$4\frac{3}{4}$	$5\frac{5}{8}$	7.25
	1	Dynamotor DM-23-A Receiver	$7\frac{3}{4}$	$4\frac{3}{4}$	$5\frac{5}{8}$	7.25
2	2	Plug PL-117 (Instrument Lighting)	$1\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	0.028
1	1	Plug PL-119 (Control Box to Ammeter)	$1\frac{21}{64}$	$\frac{3}{4}$	$\frac{3}{4}$	0.030
1	1	Plug PL-126 (Junction Box to Control Box, Receiver Circuits)	$2\frac{1}{8}$	$1\frac{45}{64}$	$1\frac{45}{64}$	0.188
1	1	Plug PL-127 (Junction Box to Control Box, Transmitter Circuits)	$1\frac{15}{32}$	$1\frac{5}{16}$	$1\frac{5}{16}$	0.091
1	1	Plug PL-133 (Dynamotor to Transmitter)	$2\frac{1}{8}$	$1\frac{45}{64}$	$1\frac{45}{64}$	0.130
1	1	Plug PL-138 (Loop to Receiver)	$1\frac{21}{64}$	$\frac{3}{4}$	$\frac{3}{4}$	0.041
1	1	Cordage CO-202	$\frac{3}{8}$ diam. Length as req'd.			.07 oz./ft.
1	1	Tube VT-66 (Transmitter)	$3\frac{1}{4}$ high x $1\frac{5}{16}$ dia.			0.094
5	5	Tube VT-100 (Transmitter)	$5\frac{7}{8}$ high x $2\frac{1}{16}$ dia.			0.156
1	1	Tube VT-101 (Transmitter)	$5\frac{7}{8}$ high x $2\frac{1}{16}$ dia.			0.156
1	1	Tube VT-38 (Receiver)	$4\frac{17}{32}$ x $1\frac{9}{16}$ dia.			0.084
3	3	Tube VT-86-A (Receiver)	$4\frac{15}{32}$ high x $1\frac{9}{16}$ dia.			0.084
1	1	Tube VT-87-A (Receiver)	$4\frac{15}{32}$ high x $1\frac{9}{16}$ dia.			0.084
1	1	Tube VT-88-A (Receiver)	$4\frac{15}{32}$ high x $1\frac{9}{16}$ dia.			0.084
1	1	Tube VT-94-A (Receiver)	$4\frac{1}{8}$ high x $1\frac{9}{16}$ dia.			0.084
1	1	Fuse FU-18	$2\frac{15}{16}$ long x $\frac{1}{2}$ dia.			0.012
1		Fuse FU-32	2 long x $\frac{9}{16}$ dia.			0.051
	1	Fuse FU-31	2 long x $\frac{9}{16}$ dia.			0.051
1	1	Fuse FU-22	3 long x $\frac{13}{16}$ dia.			0.139

1.4.2 Maintenance Sets RC-40-A and RC-42-A

RC-40-A Quantity	RC-42-A Quantity	Article	Dimensions (inches) Height	Width	Depth	Unit Weight (Pounds)
1		Tuning Equipment IE-6-A	$10\frac{1}{4}$	$13\frac{3}{8}$	$5\frac{1}{2}$	13
	1	Tuning Equipment IE-7-A	$10\frac{1}{4}$	$13\frac{3}{8}$	$5\frac{1}{2}$	13
1	1	Antenna A-60-A	$12\frac{1}{2}$	16	10	16
1	1	Antenna A-59-A	$2\frac{1}{2}$	3	3	0.35
1	1	Signal Generator I-72-A	$9\frac{3}{4}$	16	$6\frac{3}{4}$	20
1	1	Mounting FT-182-A	$11\frac{1}{2}$	$11\frac{1}{2}$	$19\frac{3}{4}$	6.5
1		Dynamotor Unit PE-59-A	$10\frac{3}{16}$	10	$5\frac{1}{2}$	24
	1	Dynamotor Unit PE-62-A	$10\frac{3}{16}$	10	$5\frac{1}{2}$	24
1	1	Mounting FT-179-A	$4\frac{3}{8}$	$20\frac{7}{8}$	$12\frac{1}{4}$	8.5
1		Radio Control Box BC-226-A	$7\frac{1}{2}$	$6\frac{3}{16}$	$4\frac{3}{4}$	4.5
	1	Radio Control Box BC-351-A	$7\frac{1}{2}$	$6\frac{3}{16}$	$4\frac{3}{4}$	4.5
1	1	Mounting FT- 181-A	$\frac{3}{4}$	$5\frac{1}{2}$	10	0.8
1	1	Loop LP-16-A	$10\frac{1}{2}$	$7\frac{7}{8}$	$6\frac{3}{8}$	1.9
1	1	Ammeter I-71-A	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{3}{8}$	0.59

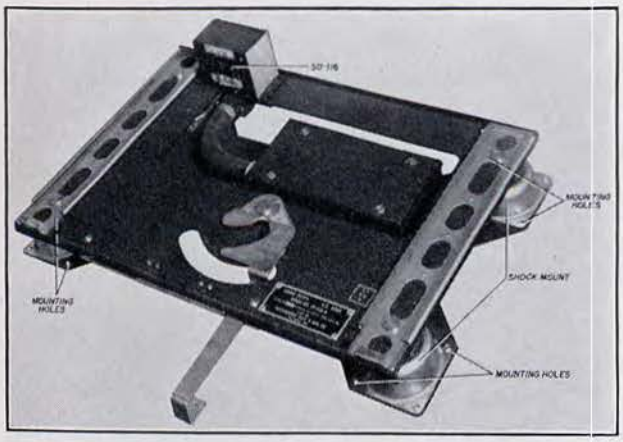


FIGURE 8—MOUNTING FT-179-A

1.5 Description of Major Components

1.5.1. Radio Transmitter BC-338-A or BC-353-A

1.5.1.1 General:—The radio transmitter consists of a sheet metal cabinet containing the necessary vacuum tubes, sockets, antenna tuning equipment, radio and audio frequency circuits, output terminals, etc., for full and complete operation on any one of four preselected, crystal-controlled frequencies. Vacuum tubes are mounted in the front portion of the frame and are readily accessible by removal of the front panel shield. The radio transmitter obtains its filament supply from the storage battery of the aircraft. The plate supply is obtained from the Dynamotor Unit PE-59-A or PE-62-A. The radio transmitter has an output of approximately 20 watts at 3000 kcs., increasing to approximately 55 watts at 8000 kcs. on either VOICE or CW emission. The emitted frequency is the same as that of the crystal being used.

1.5.1.2 Mounting FT-179-A:—This mounting is part of Radio Transmitter BC-338-A and BC-353-A. It provides the necessary shock mounting and connecting facilities and consists principally of two metal plates fastened together with rubber shock mountings. The bottom plate mounts directly to the aircraft structure and contains the terminal box where the wiring conduits terminate. The upper plate is provided with an electrical connector and a suitable lever and latch for connecting and securing the transmitter.

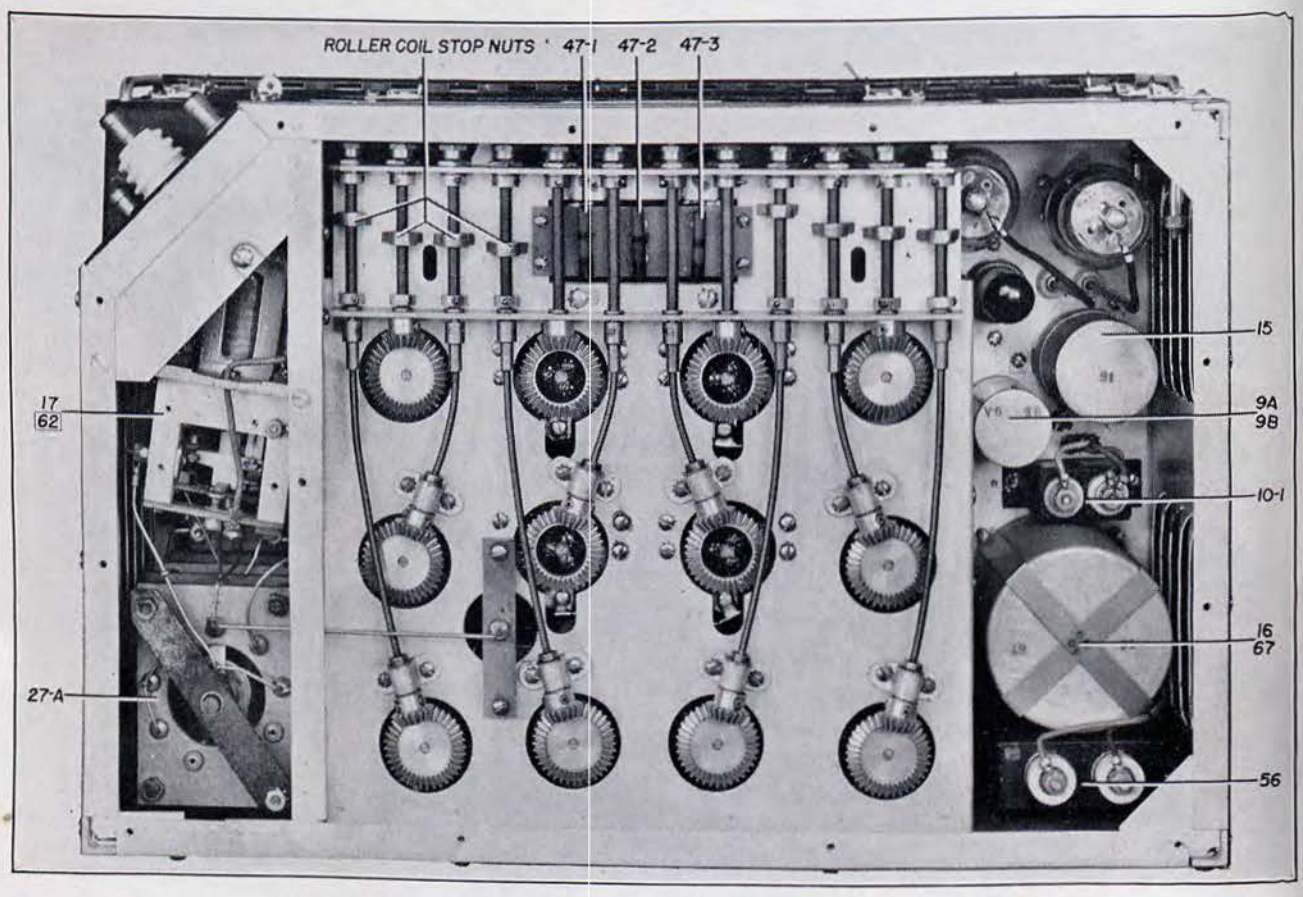


FIGURE 9—RADIO TRANSMITTER BC-338-A OR BC-353-A, TOP VIEW
SHIELD REMOVED

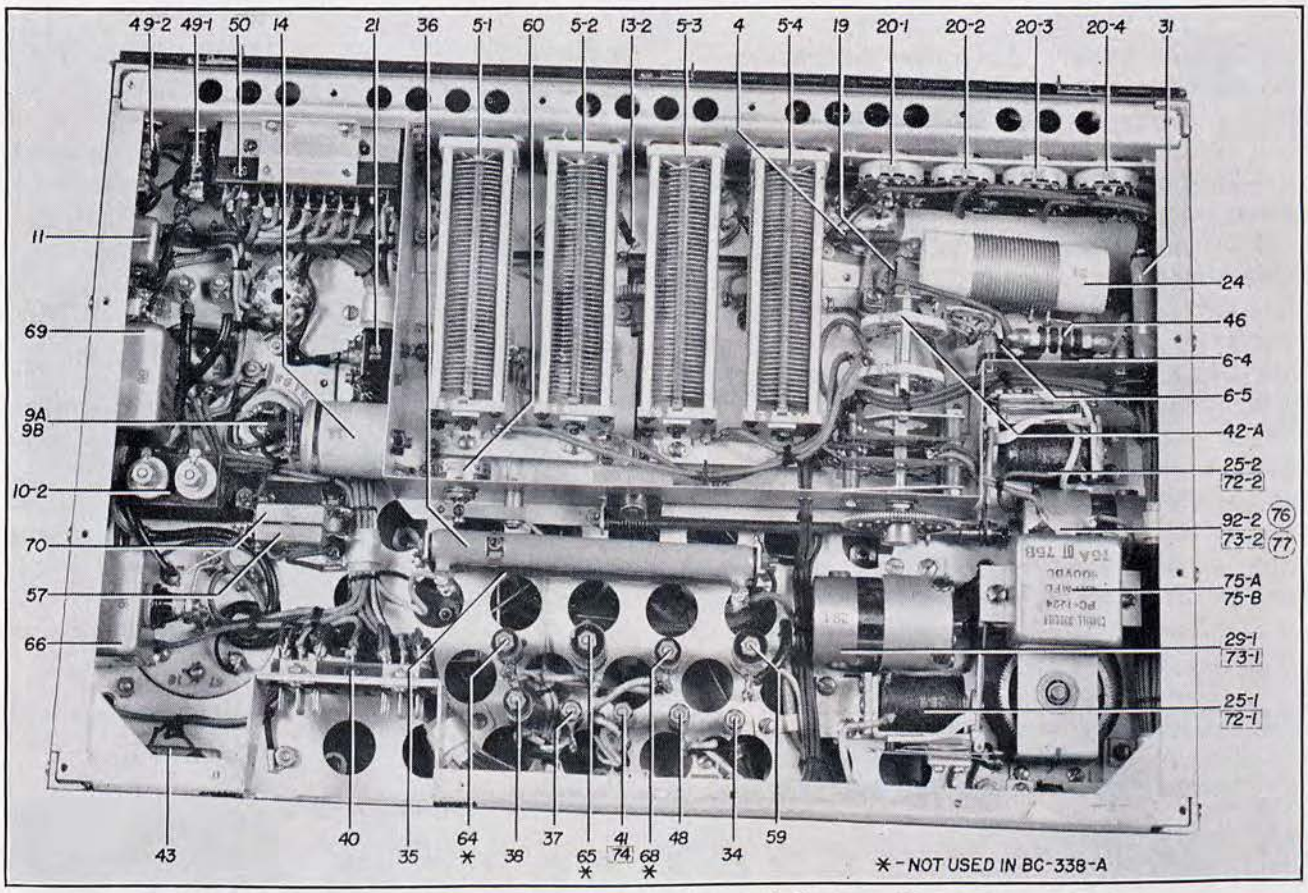


FIGURE 10—RADIO TRANSMITTER BC-338-A OR BC-353-A, BOTTOM VIEW, SHIELD REMOVED

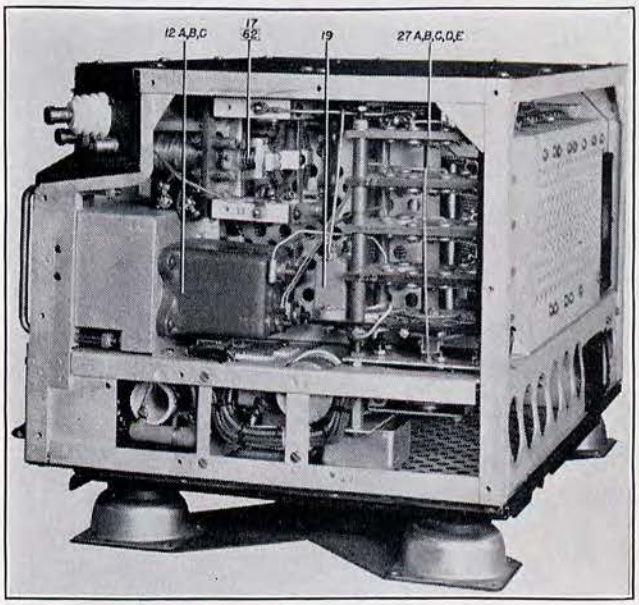


FIGURE 11—RADIO TRANSMITTER BC-338-A OR BC-353-A, RIGHT END VIEW, SHIELDS REMOVED

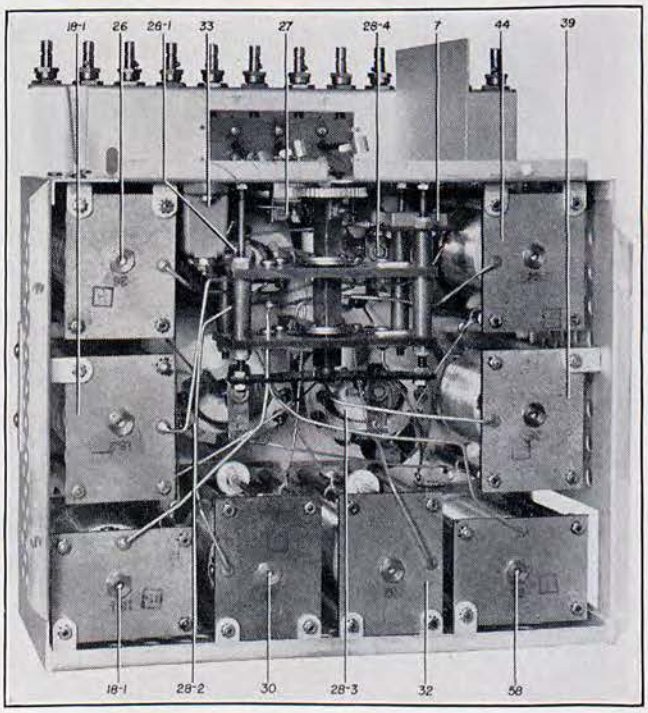


FIGURE 12—RADIO TRANSMITTER BC-338-A OR BC-353-A, COIL BOX, BOTTOM VIEW

1.5.1.3 The Location of Principal Components:—The principal component parts of Radio Transmitter BC-338-A or BC-353-A are located as shown in Figures 9 to 13, inclusive, and are as follows:

(1) The crystal sockets are located at the right front, midway from the top, in a separate compartment.

(2) The oscillator tank circuits are located at the front underneath the chassis.

(3) The amplifier tank circuits, associated coupling transformers and tuning inductances are in a perforated removable coil box assembly occupying the main body of the center of the transmitter.

(4) The keying relay is located in the top right side immediately behind the binding posts.

(5) The motor driven antenna step tuning switch is located at the right rear behind the keying relay.

(6) The audio transformers are located along the left side adjacent to the coil box.

1.5.1.4 Panel Controls:—The following parts are located on the front of the transmitter. Identification of controls are on the removable front panel.

(1) Test Key—A test key is located on the left side of the radio transmitter near the bottom, adjacent to Plug PL-139, and provides a convenient means for keying the radio transmitter while tuning adjustments are in progress.

(2) Socket for Tuning Equipment—Adjacent to the test key is the socket for tuning equipment. The tuning equipment is plugged into the radio transmitter only while the radio transmitter is being tuned. When tuning operations are complete, the tuning equipment is removed and the circuit closing or operating Plug PL-139 is inserted in its place.

(3) Plug PL-139—A circuit-closing plug for the metering circuits is provided. This plug must be in place when the tuning equipment is not connected to the radio transmitter.

(4) Oscillator Tuning—Located centrally near the

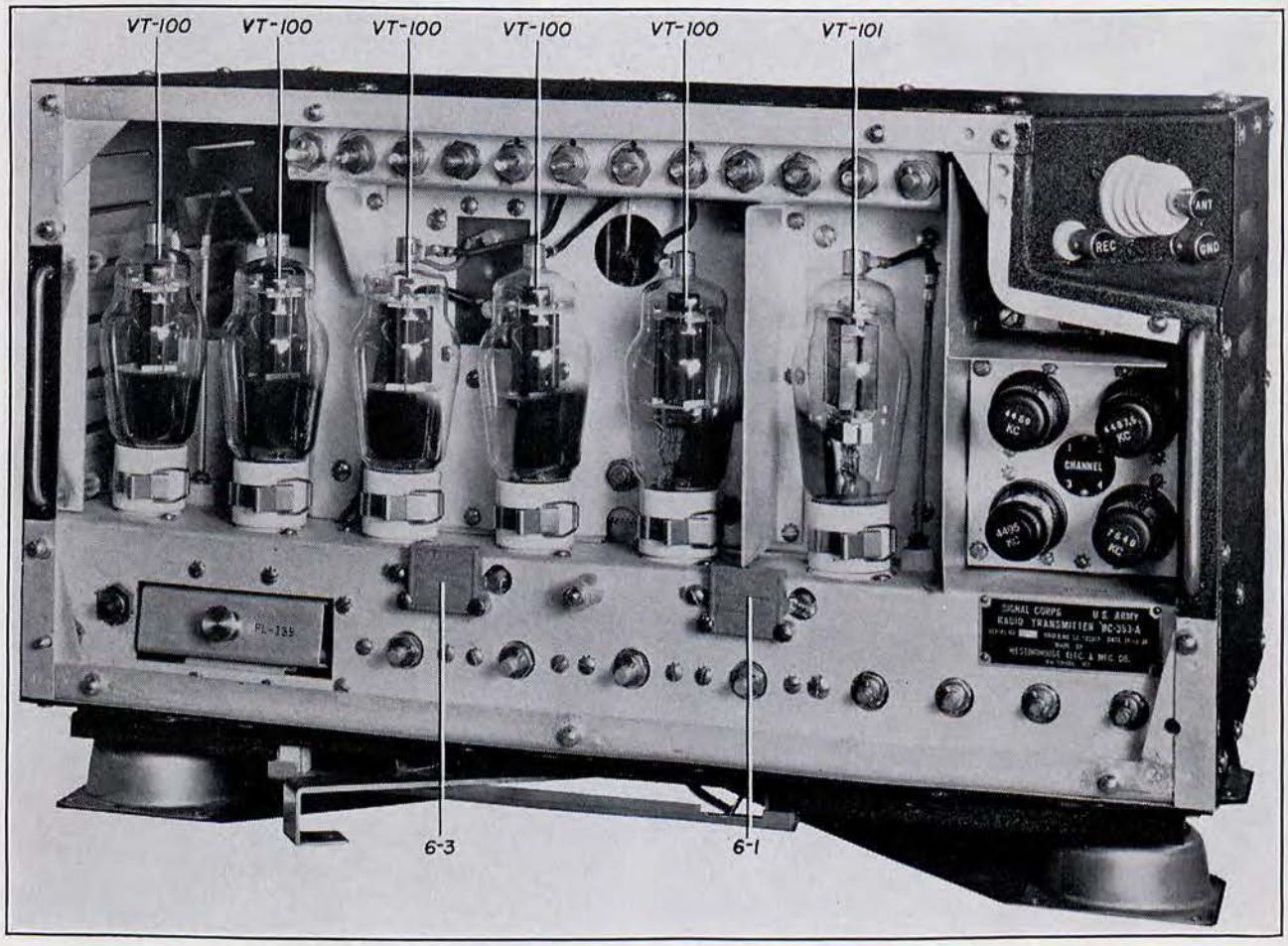


FIGURE 13—RADIO TRANSMITTER BC-338-A OR BC-353-A, FRONT VIEW, SHIELD REMOVED

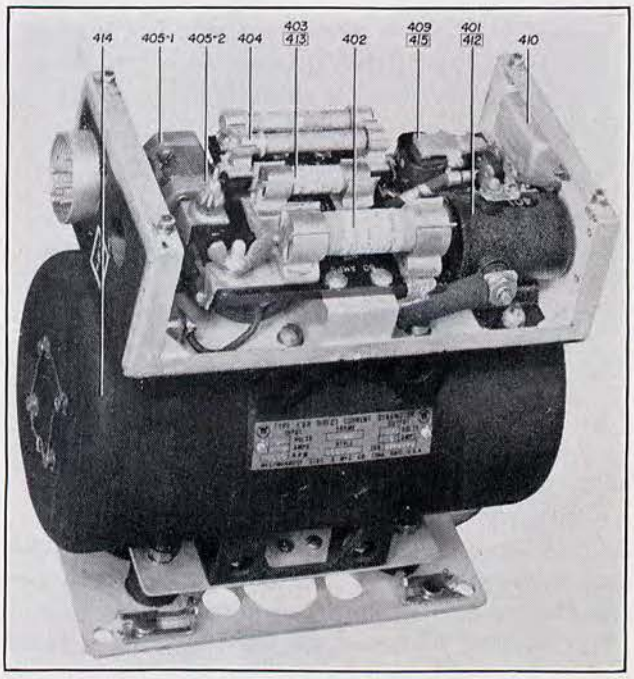


FIGURE 14—DYNAMOTOR UNIT PE-59-A OR PE-62-A, COVER REMOVED

bottom of the radio transmitter are four tuning controls marked Oscillator Tuning Channel 1, 2, 3 and 4. Each of these controls is connected to a variable capacitor, which will resonate the oscillator plate tank circuit to any frequency between 3000 and 8000 kcs.

(5) Power Amplifier Tuning Controls—To the left of the center of the radio transmitter, near the top, are located four tuning controls marked Amplifier Tuning Channel 1, 2, 3 and 4. Each of these tuning controls is connected to a continuously variable inductance which is the power amplifier tank inductance and will resonate the power amplifier tank to any frequency between 3000 and 8000 kcs.

(6) Antenna Coupling—Located on the top center of the front of the radio transmitter are four tuning controls marked Antenna Coupling Channel 1, 2, 3 and 4. Each of these controls is connected to a variable coupling radio frequency transformer which couples each of the four amplifier tank circuits to its respective antenna tuning circuit.

(7) Antenna Tuning—Located near the top right center of the front of the radio transmitter are four tuning controls marked Antenna Tuning Channel 1, 2, 3 and 4. Each of these controls is connected to a continuously variable rotating coil, which is used to resonate the antenna.

(8) Antenna Tuning Steps—Located on the right front near the bottom of the radio transmitter are four tuning controls marked Antenna Tuning Step Channel 1, 2, 3 and 4. Each of these controls is connected to a switch which selects the value of capacity which is to be used with the antenna tuning coils for properly resonating the antenna.

1.5.1.5 Front Panel Accessories:—The following accessories are provided and are as described below:

(1) Tuning Instruction—Complete tuning instructions are on the inside of the doors on the front of the radio transmitter. The tuning instructions are visible when the doors are open.

(2) Tuning Tool—Carried as part of Tuning Equipment IE-6-A and IE-7-A are tuning tools which are especially designed for tuning this radio transmitter.

(3) Locks on Tuning Controls—Each tuning control, except antenna tuning step controls, is held securely in place during normal operation by a split-bushing locknut locking device. For tuning purposes, this lock is released by inserting the tuning tool and turning it one-half turn to the left.

(4) Binding Posts—Located on the right front corner of the radio transmitter and near the top are three binding posts; for the antenna the large binding post marked ANT, for the receiver-antenna connection the binding post marked REC and for the ground the binding post marked GND.

(5) Handles—Located centrally at each side of the front of the radio transmitter is a handle for carrying and handling the radio transmitter.

(6) Snap Catches—The entire front panel, as well as the two doors which cover the tuning controls, is held in place by snap catches which allow the front panel to be readily removed, providing access to the interior of the radio transmitter.

1.5.1.6 Other Sockets and Connections:—A crystal socket is provided for each of the four channels and is located near the middle of the right side of the radio transmitter. Crystal units of the desired frequency are inserted in each of the crystal sockets providing crystal control for each of the four pretunable channels. Located on the back

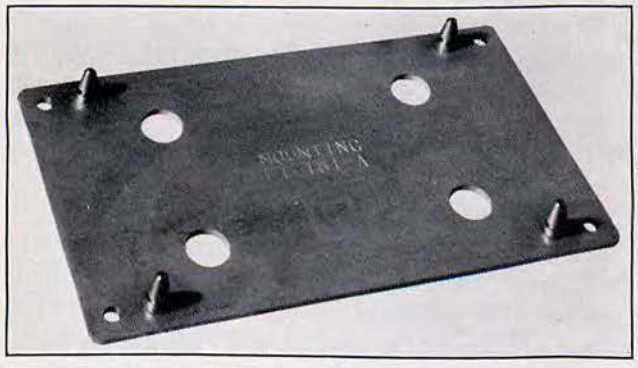


FIGURE 15—MOUNTING FT-181-A

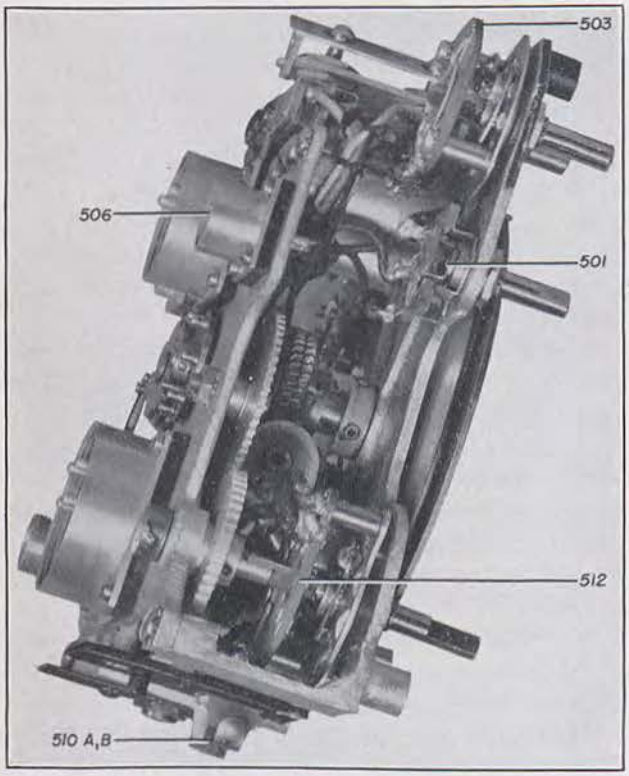


FIGURE 16—RADIO CONTROL BOX BC-226-A OR BC-351-A, LEFT SIDE, COVER AND MOUNTING PLATE REMOVED

side of the radio transmitter at the base is a socket which connects the radio transmitter electrically to the terminal box on the radio transmitter mounting, and thence to the various control and input circuits.

1.5.2 Dynamotor Unit PE-59-A or PE-62-A

This unit is shown in Figures 5 and 14 and consists of a dynamotor rated at .5 amperes at 500 volts d-c output, surmounted by a fuse and relay box. All fuses used in connection with the transmitting equipment and relays for control of the dynamotor are contained in this box.

1.5.3 Ammeter I-71-A

This unit is shown in Figure 7, and is intended for mounting on the instrument panel of the aircraft. It is connected through the cable system to a thermocouple located in the radio transmitter and gives an indication of antenna current when the radio transmitter is on.

1.5.4 Radio Control Box BC-226-A or BC-351-A

The radio control box contains all of the operating controls for both the radio transmitter and the radio receiver. The electrical connection to the radio transmitter and the radio receiver and the flexible tuning shaft for the radio receiver enter this unit through holes in the back plate.

The radio control box may be removed from the aircraft without removing its mounting plate. This is accomplished by removing the electrical connections, flexible tuning shaft and loosening the "B" screws shown in Figure 4.

The controls on this unit are as follows:

ON-OFF Switch
Transmitter frequency selector switch
Transmitter key and microphone jack
Transmitter VOICE-CW switch
Receiver band selector switch
Receiver tuning control
Receiver antenna selector switch
Receiver MVC-AVC switch
Receiver VOLUME CONTROL

All of these controls are located on the front panel of this unit, except the radio receiver volume control and the radio transmitter key and microphone jack which are located on the bottom. The controls on this unit have the function and operate as indicated below:

(1) The ON-OFF Switch controls the primary power to the entire equipment, both the radio transmitter and the radio receiver.

(2) The radio transmitter channel selector switch (TRANS-FREQ.) is a four-position switch with a pointer knob. Suitable marks on the front panel indicate each of the four positions. The operation of this switch applies power to the channel selector switching motor in the radio transmitter.

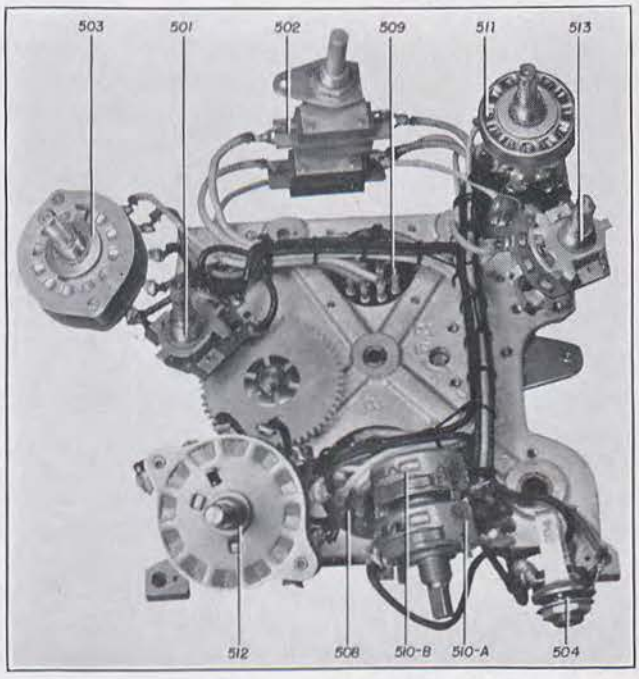


FIGURE 17—RADIO CONTROL BOX BC-226-A OR BC-351-A, EXPLODED FRONT VIEW SHOWING ELECTRICAL COMPONENTS

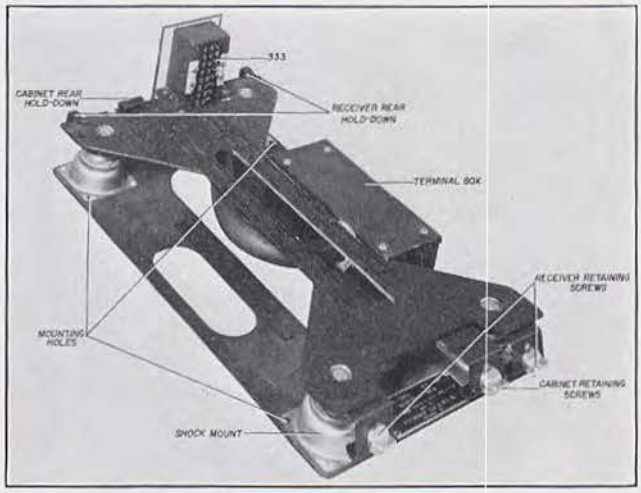


FIGURE 18—MOUNTING FT-180-A

(3) The VOICE-CW switch is a two-position switch which operates as described in paragraph below.

(4) The radio transmitter key and microphone jack, located on the bottom of the control box, is connected to the radio transmitter through the radio transmitter-VOICE-CW switch in such a way that with a microphone plugged into this jack and the switch on VOICE, operation of the push-to-talk switch on the microphone applies plate power to the transmitter and speaking into the microphone modulates the carrier. If a radio transmitter key is plugged into this jack, with the switch in CW position, the radio transmitter emits CW carrier whenever the key is pressed.

(5) The radio receiver band selector switch (REC. BANDS) is a seven position switch. Operation of this switch applies power to the radio receiver band change motor. This switch also operates a masking plate on the radio receiver tuning control dial so that the frequency calibration for only the particular band in use can be seen. The frequency limits for each tunable band are shown on the masking plate to permit easy location of the frequency desired.

(6) The radio receiver tuning control (REC. TUNING) is connected to the flexible shaft which drives the radio receiver tuning capacitor. This same control operates the dial calibrated directly in frequency.

(7) The radio receiver antenna selector switch actuates either of two relays located in the radio receiver. When this switch is set to the parallel loop position (PL), neither of the relays is operated; in the transverse loop position of this switch (TL), the first of the relays is operated, and when the switch is set in the antenna position (ANT), the second relay is operated. When set for operation on either loop the second relay grounds the open antenna.

(8) The radio receiver MVC-AVC switch is a two position switch which provides either manual or automatic control of the radio receiver sensitivity, and switches the electrical connection to the volume control so that the single control knob serves to control the radio receiver volume in either position.

(9) The radio receiver volume control consists of two potentiometers on one shaft so connected through the MVC-AVC switch, (Item 8 above), that one potentiometer will control the radio receiver sensitivity when the switch is in the MVC position and the second potentiometer will control the volume level in the AVC position. The control is so connected that only one potentiometer is in use at a time.

1.5.5 Radio Receiver BC-225-A or BC-352-A

1.5.5.1 General:—The radio receiver consists of a metal case housing all vacuum tubes, amplifying, tuning and detecting circuits, coils, capacitors, crystal units, dynamotor, etc. for full and complete operation on any one of the seven bands listed below. The above components are mounted on a chassis whose front panel forms the sixth side of the case when inserted therein. The radio receiver obtains its power supply from the storage battery of the aircraft. Plate and grid voltages are supplied by Dynamotor DM-22-A in Radio Receiver BC-225-A and by Dynamotor DM-23-A in Radio Receiver BC-352-A.

Band Number	*Designation*	*Description*
1	200—400 kc.	Continuously variable-remote tuning.
2	550—1500 kc.	Continuously variable-remote tuning.
3	2.5—5.0 mc.	Continuously variable-remote tuning.
4	5.0—8.0 mc.	Continuously variable-remote tuning.
5	Crystal #1	Fixed tuning (Between 3 and 5 mc.)
6	Crystal #2	Fixed tuning (Between 3 and 5 mc.)
7	Crystal #3	Fixed tuning (Between 5 and 8 mc.)

1.5.5.2 Mounting FT-180-A:—Mounting FT-180-A is a part of Radio Receiver BC-225-A and also part of Radio Receiver BC-352-A. It provides a shock-absorbing mounting for the receiver and includes three thumb screws for securing the receiver and case. Electrical connectors and a terminal box enclosing terminal strips for the electrical connection of the radio receiver with the other units of the equipment are also provided on this unit.

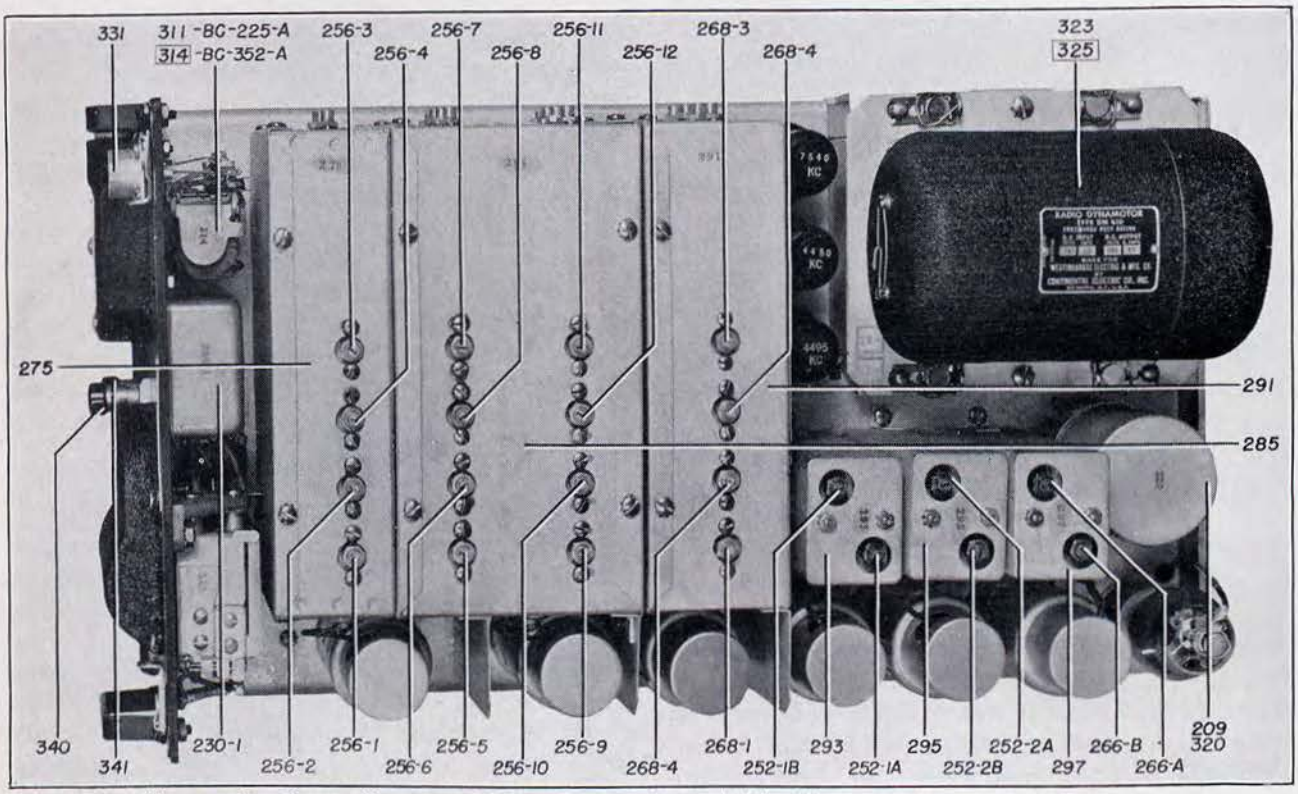


FIGURE 19—RADIO RECEIVER BC-225-A OR BC-352-A, TOP VIEW, REMOVED FROM CABINET

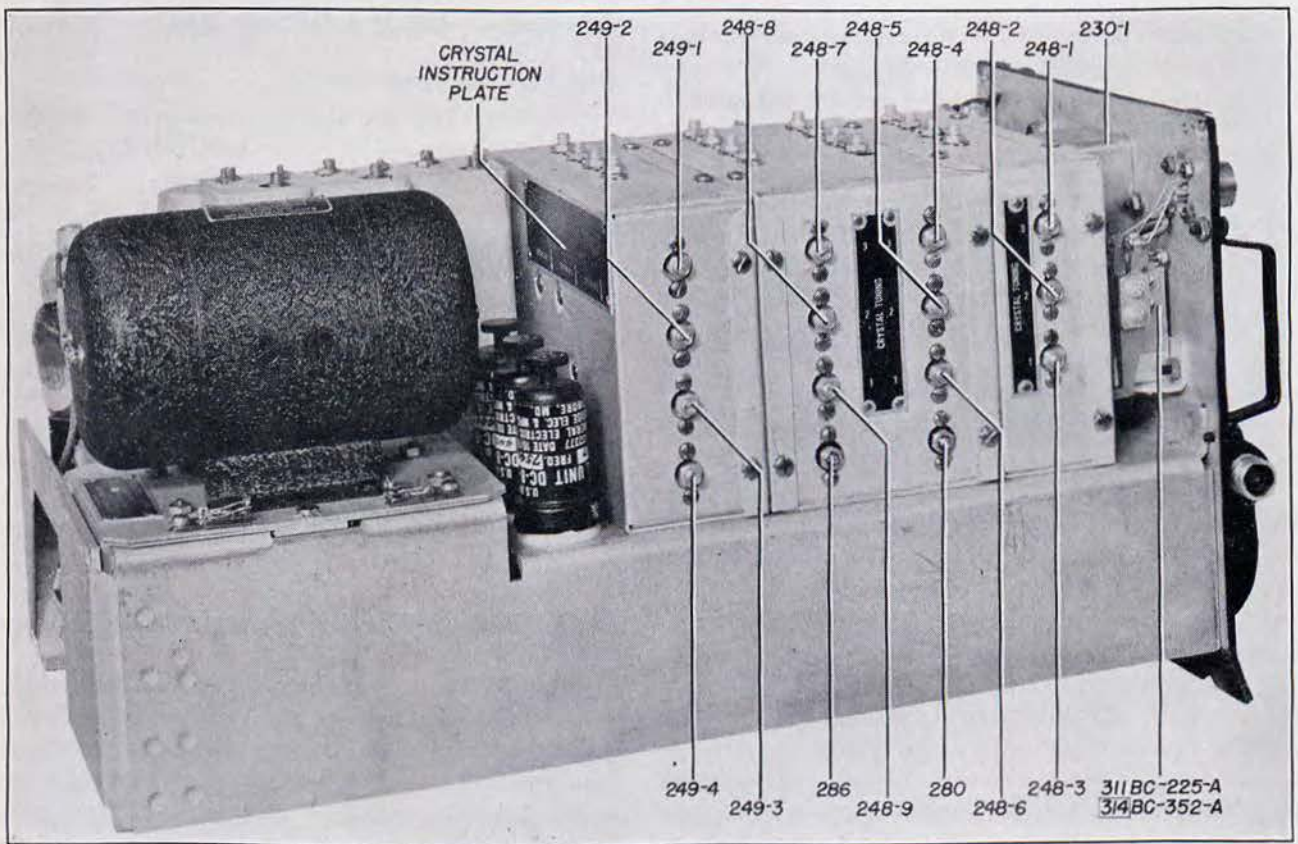


FIGURE 20—RADIO RECEIVER BC-225-A OR BC-352-A, LEFT SIDE VIEW OF CHASSIS

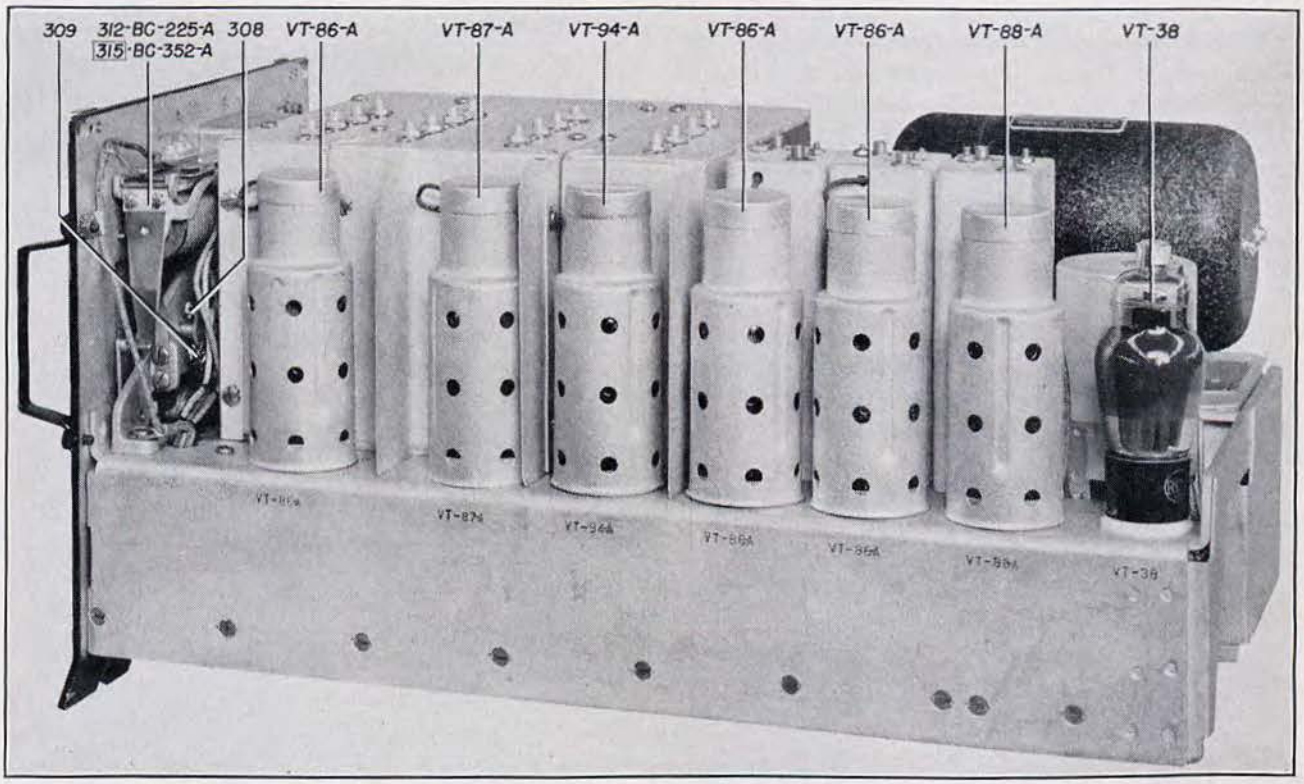


FIGURE 21—RADIO RECEIVER BC-225-A OR BC-352-A, RIGHT SIDE VIEW OF CHASSIS

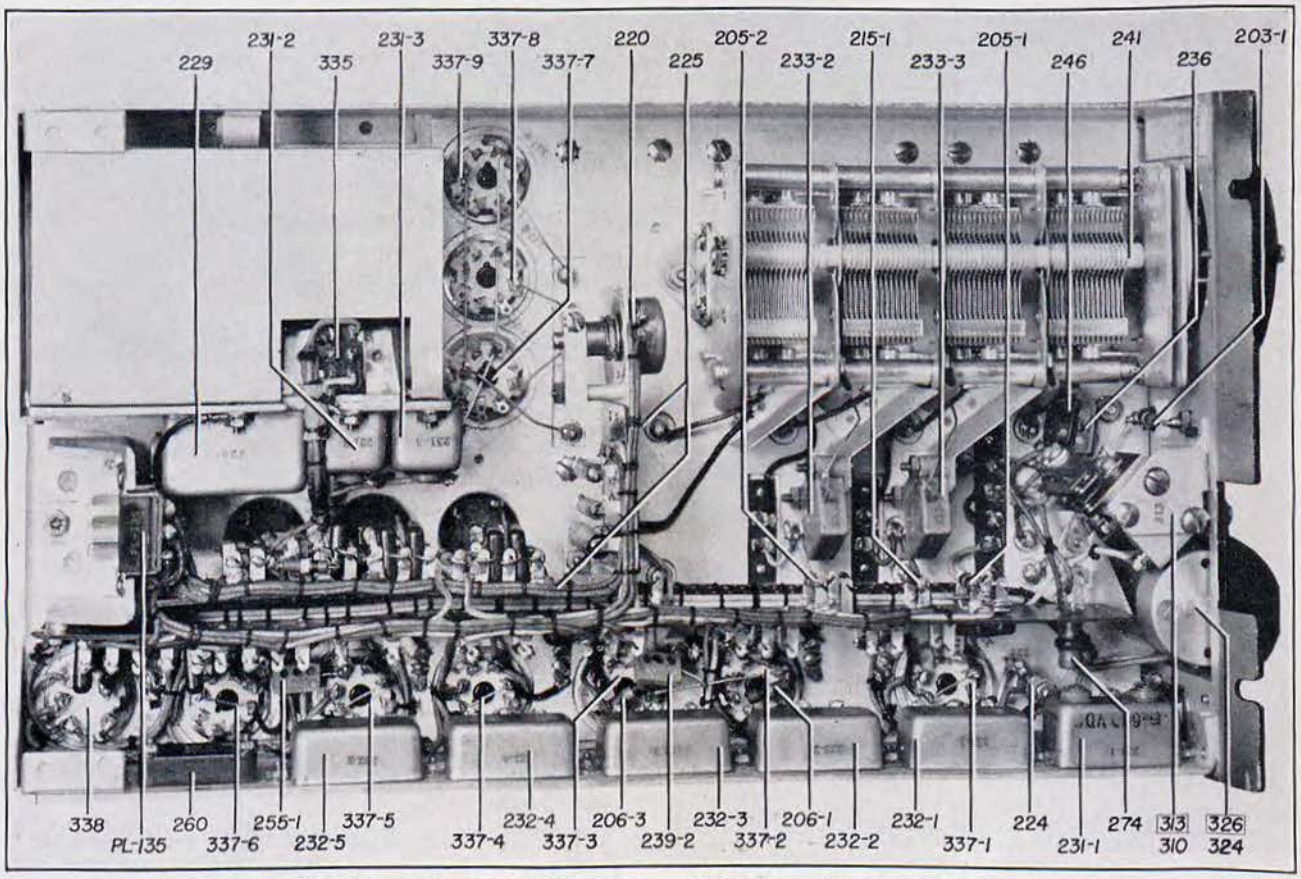


FIGURE 22—RADIO RECEIVER BC-225-A OR BC-352-A, BOTTOM VIEW OF CHASSIS

1.5.5.3 Location of Principal Components:—The component parts of the receiver are located as shown in Figures 19 to 24, inclusive, and as described below:

(1) The vacuum tubes are located in a line along the right side of the receiver from front to rear.

(2) The radio frequency amplifier and heterodyne oscillator units are located on the front portion of the upper side of the chassis.

(3) The intermediate-frequency amplifier transformers are arranged in a line beside the vacuum tubes and immediately to the rear of the oscillator unit.

(4) The crystal sockets are located immediately to rear of the oscillator unit which bears the crystal instruction nameplate.

(5) Dynamotor DM-22-A or DM-23-A is located at the left-hand rear corner of the chassis. It may be removed simply by releasing the snapslides and lifting vertically out of the chassis. Electrical connections are made through a plug and socket.

(6) The audio frequency output transformer is located at the rear and middle of the chassis.

(7) The tuning capacitor is located along the left edge on the under side of the chassis immediately behind the front panel.

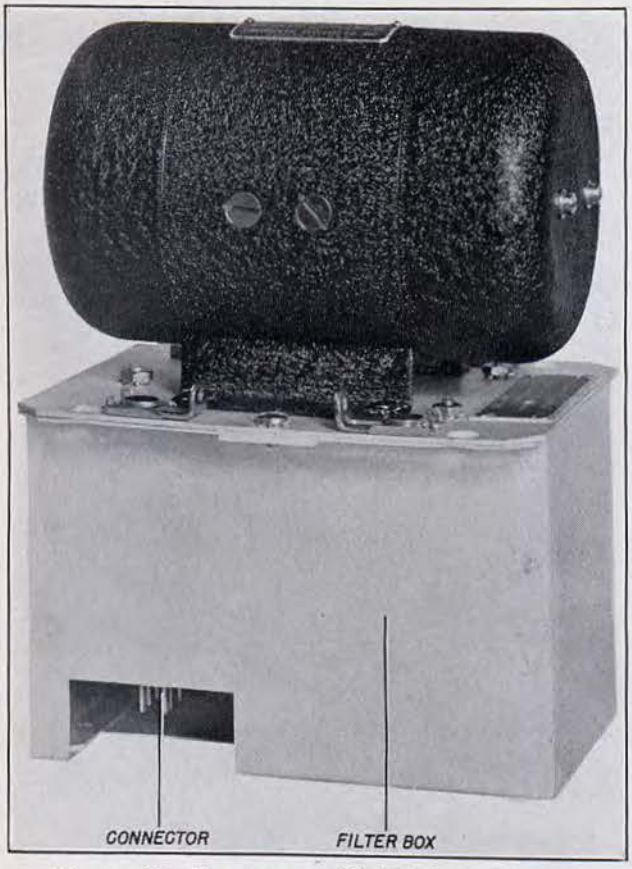


FIGURE 23—DYNAMOTOR DM-22-A OR DM-23-A

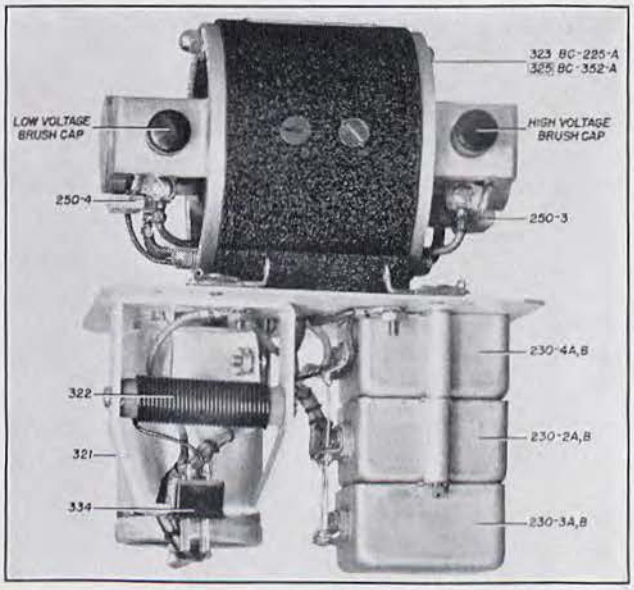


FIGURE 24—DYNAMOTOR DM-22-A OR DM-23-A, COVERS REMOVED

(8) The main connector plug is located on the under side of the chassis immediately under the output transformer.

1.5.5.4 Panel Accessories:—The following accessories are located on the front panel of the receiver:

(1) Binding Posts—Located near the bottom and middle of the radio receiver panel are two binding posts; for the antenna connection, the binding post marked ANT and for the ground the binding post marked GND.

(2) Connection for Tuning Drive—The mechanical connection for the tuning drive is located in the lower left hand corner of the front panel. It provides a connection for the flexible tuning shaft at any one of three approach angles.

(3) Band Change Mechanism—The band change mechanism is located in the right hand portion of the panel; its cover, when removed, provides access to the band change motor, clutch, drive gears and the band change switch shaft.

(4) Loop Socket SO-118—The loop socket is located in the upper left hand corner of the front panel. It provides connection for the loop to the receiver.

(5) Headset Jack—Located in the lower right hand corner and marked TEL is the headset jack. It provides for connection of a headset to the receiver output.

(6) Crystal Marking Plate—Located near the center of the panel is a plate which provides a marking surface for recording the signal frequency for each of three crystal bands.

(7) Snap Slides—Two snap slides are located on the top edge of the panel and serve to secure the chassis in

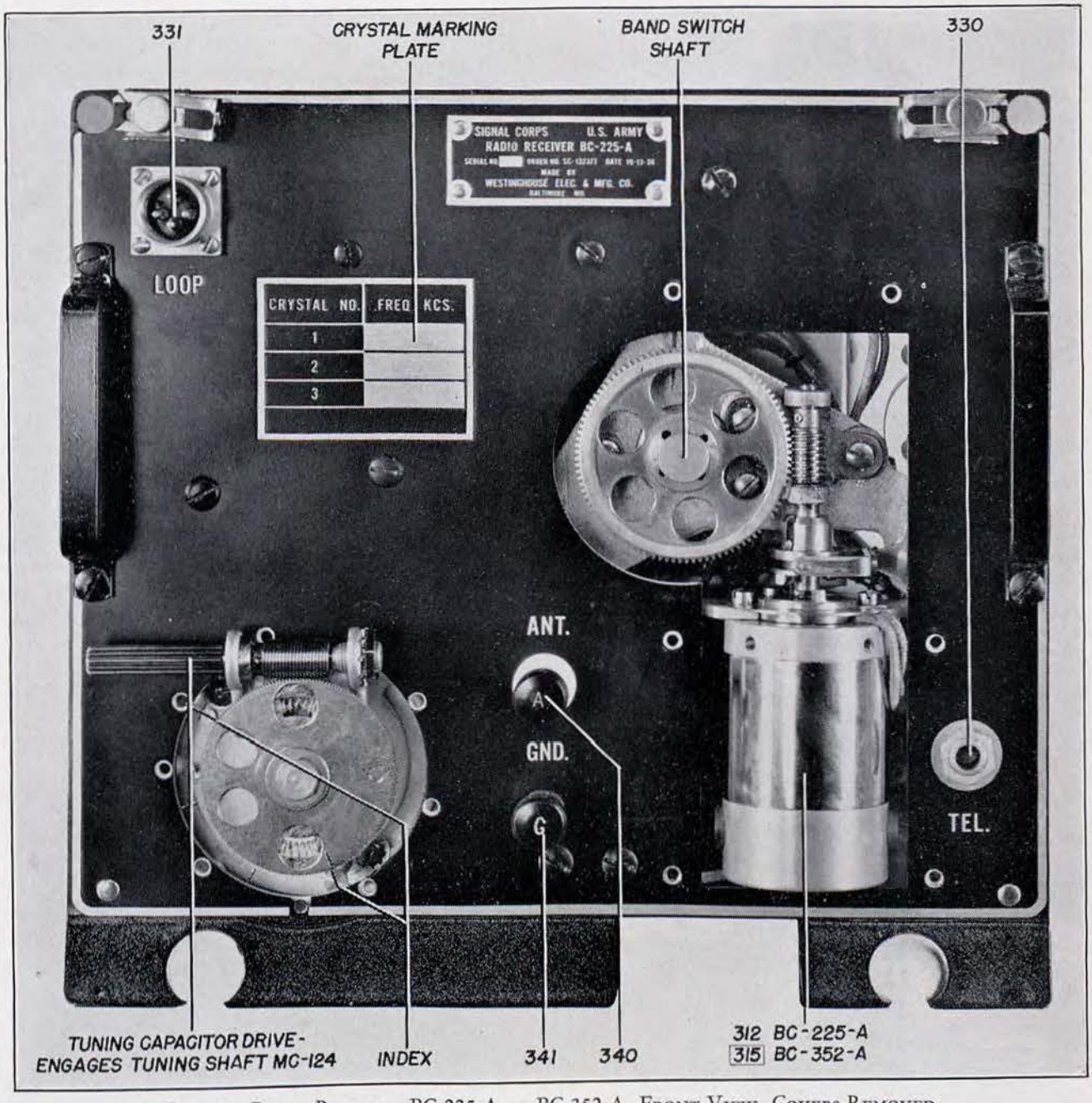


FIG. 25—RADIO RECEIVER BC-225-A OR BC-352-A, FRONT VIEW, COVERS REMOVED

the case. Two slots on the lower edge of the panel engage thumb screws of Mounting FT-180-A.

(8) Handles—Two handles, one on each vertical edge of the panel, provide means for manipulating the chassis in and out of the case and also provide a means for carrying the chassis.

1.5.6 Loop LP-16-A

The Loop LP-16-A consists of two fixed crossed loop antennas each enclosed in its own electro-static shield. A housing with knockouts is provided for protection of the terminals and for termination of conduit which carries the electrical Cordage CO-202 used to connect the loop assembly to the receiver. A cover for the housing is removable to permit access to the terminals for connecting the cordage. The design of the loop antennas is such that they will operate without adjustment or balancing of any kind when the length of cordage between the loop and the receiver is between 5 and 25 feet. This loop assembly is designed to be mounted on the outside of an aircraft and enclosed in a blister or zeppelin type of housing.

FIGURE 26—CRYSTAL UNIT DC-8-A

1.5.7 Crystal Unit DC-8-A

Crystal Unit DC-8-A is for use in Radio Transmitters BC-338-A and BC-353-A; and Radio Receivers BC-225-A and BC-352-A. The radio transmitter and radio receiver crystals are mechanically alike, but since the frequency of the radio receiver crystals differs from the signal frequency by 480 kc., the radio transmitter and radio receiver crystals cannot be used interchangeably and produce correct communication frequencies. The actual crystal units consist of a natural quartz crystal mounted in a pressure type assembly. This assembly is mounted in a metal container similar to that used for vacuum tubes, see Figure 26, the container being gas filled and provided with a handle and a standard 8-pin octal base.

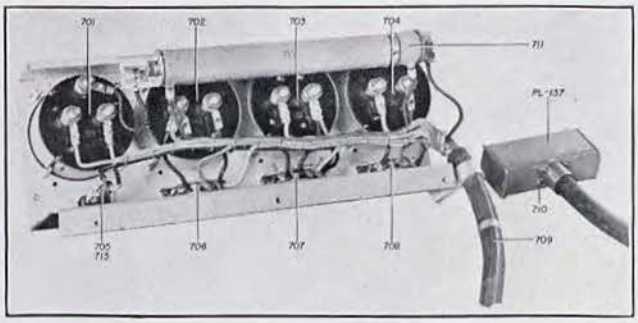


FIGURE 28—TUNING EQUIPMENT IE-6-A OR IE-7-A, COMPONENTS

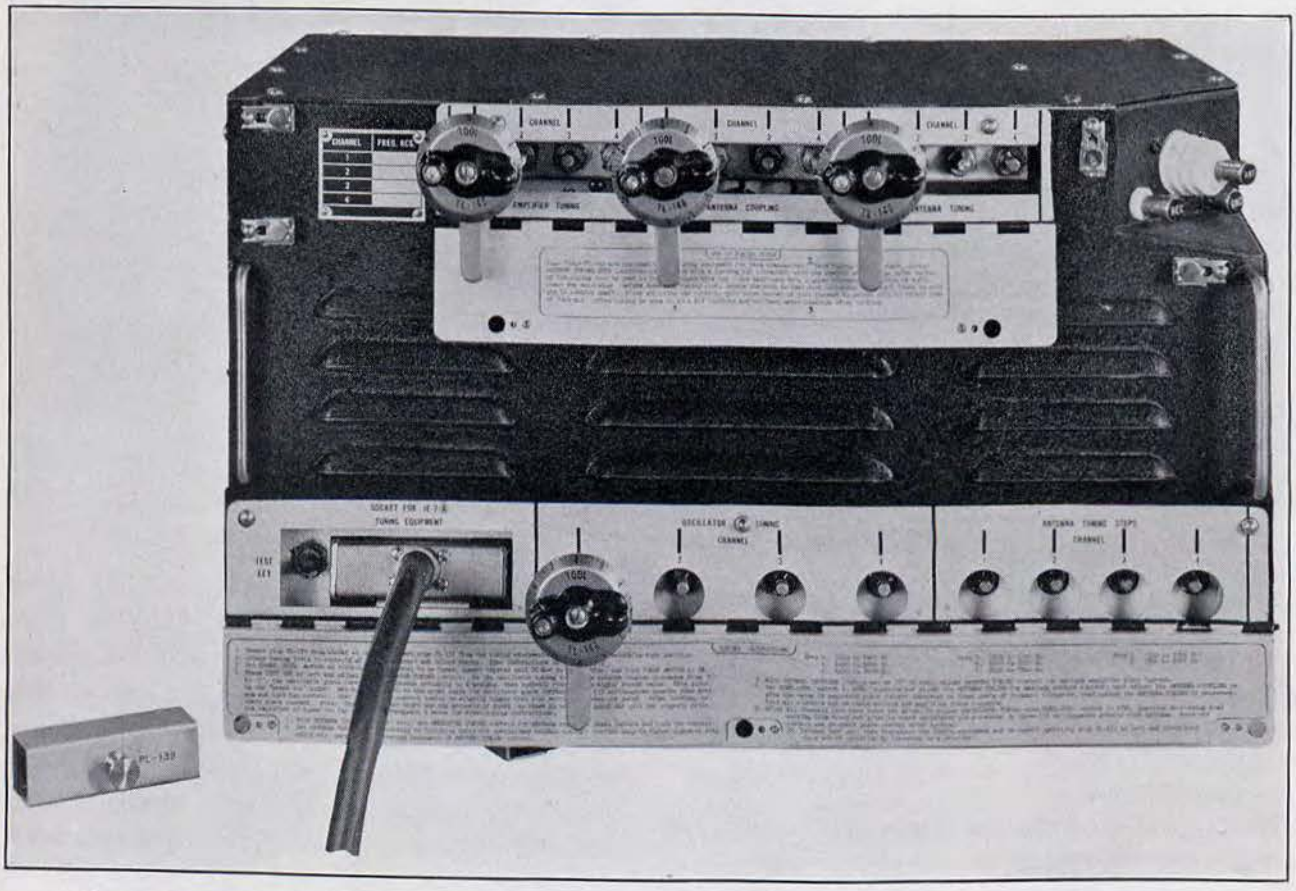


FIGURE 27—RADIO TRANSMITTER BC-338-A OR BC-353-A WITH TUNING TOOLS INSERTED, FRONT VIEW

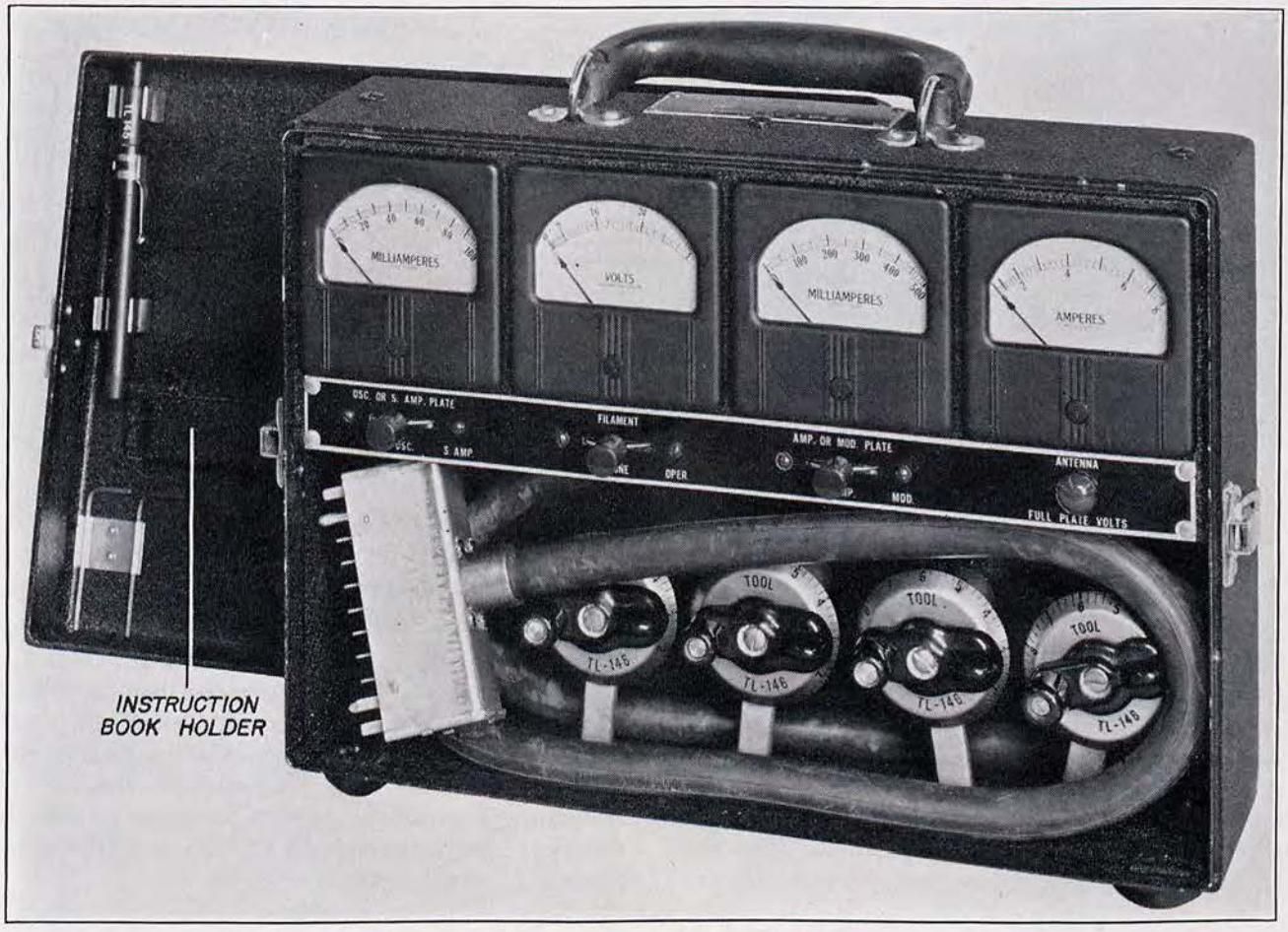


FIGURE 29—TUNING EQUIPMENT IE-6-A OR IE-7-A, COVER REMOVED

The radio transmitter crystals control the emitted frequency to plus or minus 1250 cycles of the rated frequency of the crystal, while the radio receiver crystals control the heterodyne oscillator frequency to plus or minus 1000 cycles of rated frequency of the crystal. This performance is maintained over the −30° C. to +50° C. ambient temperature range without the use of heater or temperature-controlling equipment.

FIGURE 30—ANTENNA A-60-A

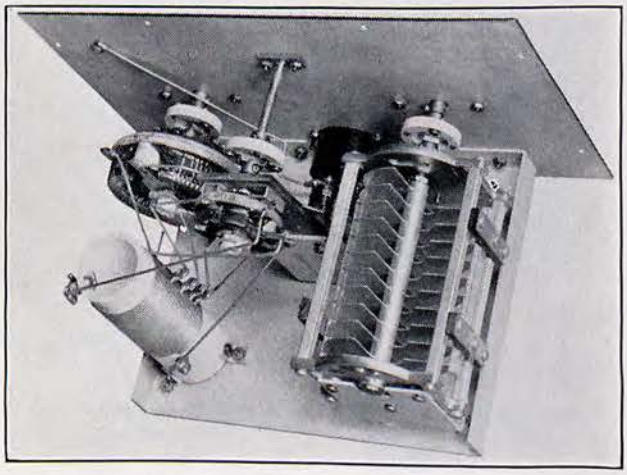


FIGURE 31—ANTENNA A-60-A, SHIELD REMOVED

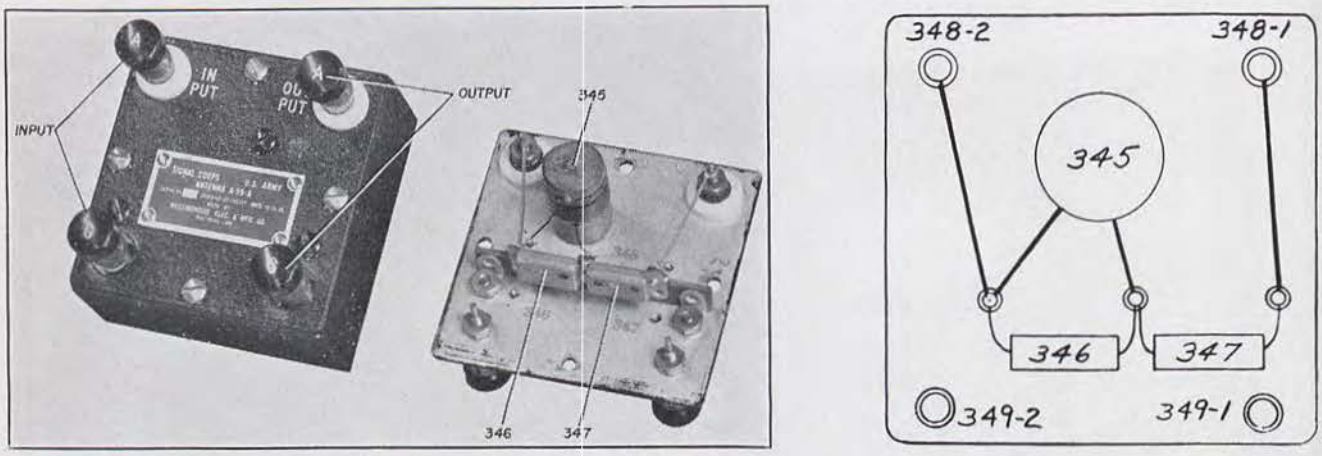


FIGURE 32—ANTENNA A-59-A

1.5.8 Tuning Equipment IE-6-A and IE-7-A (Transmitter Testing)

The tuning equipment contains all the necessary instruments and tuning tools for properly tuning the radio transmitter. This unit is not to be installed in the airplane. A short length of cable with a plug on the end is the means of connecting the meters in the proper circuits. A means is provided for measuring: filament voltage, oscillator plate current, speech-amplifier plate current, power amplifier plate current, modulator plate current and antenna current. A radio receiver aligning tool is also included in this unit.

1.5.9 Antenna A-60-A (Transmitter Testing)

This unit consists of a variable capacitor, tapped inductance, a variable resistance and a radio-frequency ammeter connected in series and housed in a metal cabinet. An instruction book is contained in the cover of the unit. The unit is intended for radio transmitter testing and provides a means of simulating the characteristics of an actual antenna.

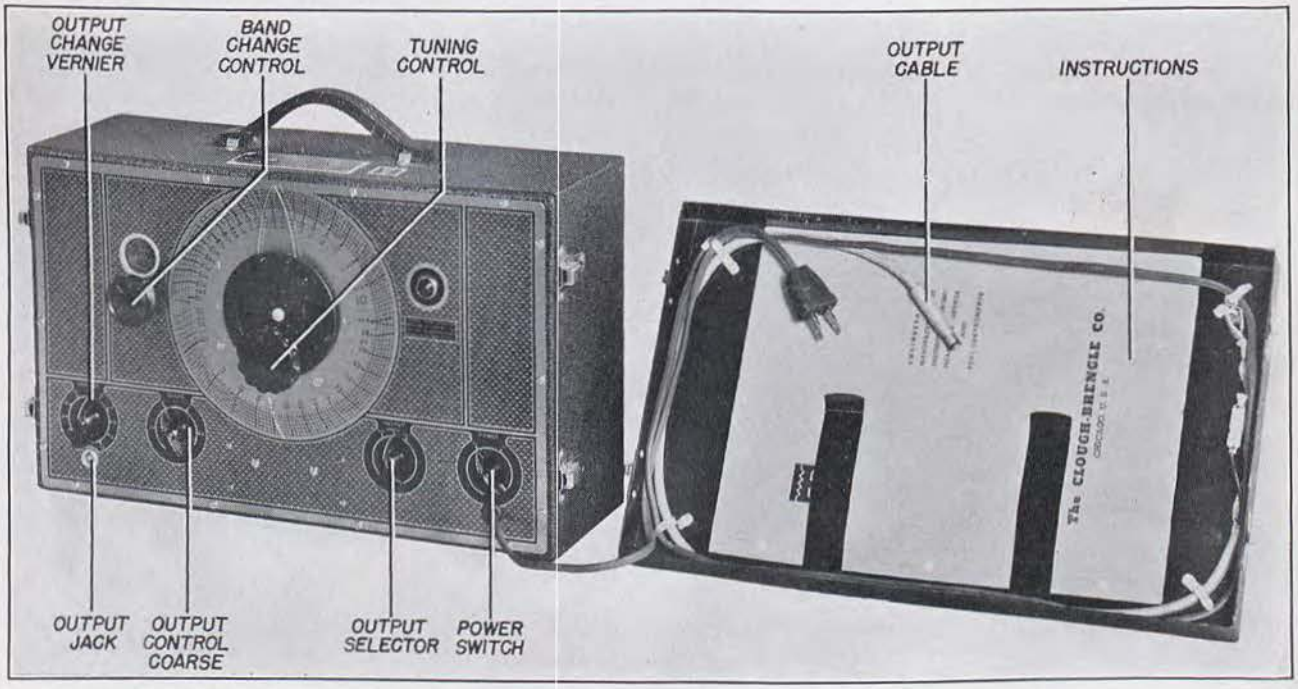


FIGURE 33—SIGNAL GENERATOR I-72-A, COVER REMOVED

1.5.10 Antenna A-59-A (Receiver Testing)

This unit simulates the characteristics of the antenna specified for this equipment, and is designed for use between Signal Generator I-72-A and the antenna input of Radio Receiver BC-225-A or Radio Receiver BC-352-A for overall measurements and adjustment of r-f grid trimmers.

1.5.11 Signal Generator I-72-A

This unit is a Clough-Brengle Model 110 signal generator for use on 110-volt, 60-cycle power supply. The unit is housed in an all-metal case which is provided with a metal cover and a carrying handle. The cover is provided with clips for storage of the instruction book, output cable and power cord. Four catches secure the cover to the case. The signal generator covers a range of frequencies from 100 kc. to 31 mc. in five bands. The following types of signal are available and may be selected by means of a switch on the front panel: radio frequency, radio frequency 30% modulated and 400 cycles audio frequency. Two knobs control the output: one, a four-step coarse control; the other, a continuously variable potentiometer.

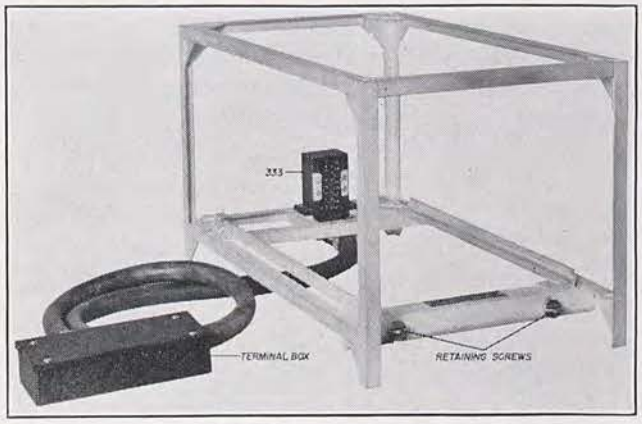


FIGURE 34—MOUNTING FT-182-A

1.5.12 Mounting FT-182-A

This unit consists of an aluminum angle framework with a mounting surface suitable for Radio Receiver BC-225-A or BC-352-A. A connector at the rear effects electrical connections to the radio receiver when properly placed and secured in the test mounting. The open construction of this unit allows access to all portions of the radio receiver chassis for purposes of alignment and servicing.

SECTION II

EMPLOYMENT

2.1 Initial Procedure

2.1.1 *Caution*

Care should be taken in unpacking or handling this equipment, as it may be easily damaged, particularly when not protected by cabinets and shock mountings. When removed from the shipping boxes, the equipment should be visually inspected for damage that might have occurred during shipment, and if necessary should be cleaned with a brush or blower before installation. *Caution! See par. 4.1.1.3 and 4.1.1.4.*

2.1.2 Interconnecting Cables or Conduits

Interconnecting cords, cables and conduits which are necessary for the operation of this equipment are not furnished by the radio set manufacturer. A typical manner of interconnecting the various units is shown in Figure 72. The actual connections required between units are shown in Figure 69. Both the radio transmitter and radio receiver are independently operative units, neither depending on the other, except that if the radio receiver only is installed, terminals 7 and 13 on Mounting FT-180-A should be connected together to complete the circuit in the radio receiver which is normally completed through the keying relay in the radio transmitter.

2.2 Preparation for Use

2.2.1 Battery

A check should be made to determine that the aircraft battery is installed with the negative side grounded If polarity of battery is wrong, the output voltage of the dynamotors will be reversed. The battery voltage should be approximately 12 volts for Radio Set SCR-240-A and approximately 24 volts for Radio Set SCR-261-A, at the input to the radio transmitter dynamotor, and at the battery terminals in the aircraft junction box, when the charging generator of the aircraft is not running.

2.2.2 Antenna and Ground Requirements

Radio Sets SCR-240-A and SCR-261-A are both designed to operate with an open-wire antenna of the following approximate characteristics:

Freq. in Kcs.	*Effective Resistance in Ohms*	*Effective Reactance in Ohms*	
		Inductive	*Capacitive*
200			4750
300			3250
400			2400
600			1600
800			1100
1000			850

Freq. in Kcs.	*Effective Resistance in Ohms*	*Effective Reactance in Ohms*	
		Inductive	*Capacitive*
1500			550
2000			400
2500			350
3000	1.0		300
3500	1.1		225
4000	1.3		160
4500	1.6		95
5000	2.0		20
5100	2.1	0	0
5500	2.7	60	
6000	4.0	150	
6500	6.0	250	
7000	10.0	350	
7500	21.0	530	
8000	50.0	1000	

Loop reception may also be effected in the 200 to 400 kcs. band. See paragraph 2.4.4.4. The insulation of the antenna should be able to withstand 4000 volts peak under all conditions of service. Ground connections should be made from the GND post on the transmitter and receiver to an adjacent point on the frame of the airplane. Be sure to remove all paint or other surface coating at the point where the ground is fastened to the airplane.

2.2.3 Transmitter Tubes

The following vacuum tubes are employed in the transmitter:

Position	*No. Used*	*Signal Corps Tube*
Oscillator	1	VT-101
Amplifier	3	VT-100
Speech Amp.	1	VT-66
Modulator	2	VT-100

All tubes are inserted in their sockets marked with the corresponding Signal Corps type number just behind the removable front panel. Connections to tops of tubes are made with flexible leads. See that these leads are spaced away from adjacent shields when installed. Tube clamps are provided for securely holding tubes except Tube VT-66 in place.

2.2.4 Receiver Tubes

The following vacuum tubes are employed in the radio receiver:

Position	*No. Used*	*Signal Corps Tube*
R-F. Amplifier	1	VT-86-A
1st Detector	1	VT-87-A
Oscillator	1	VT-94-A
I-F. Amplifier	2	VT-86-A
2nd Detector 1st Audio Amplifier	1	VT-88-A
Output	1	VT-38

The tubes are located along the right-hand edge of the radio receiver. See that they are seated firmly in the sockets marked with the corresponding Signal Corps type numbers, and that the shields and caps are firmly seated and that all grid clips are properly attached to the tube grid caps.

2.2.5 Transmitter Crystals

Four Crystal Units DC-8-A having the desired frequencies are inserted in the crystal sockets located on the right-hand side of the radio transmitter just behind the removable front panel.

2.2.6 Receiver Crystals

Three Crystal Units DC-8-A having the desired frequencies are inserted in the crystal sockets located on the left-hand side of the radio receiver just behind the oscillator unit.

2.2.7 Transmitter Fuses

All fuses associated with the radio transmitter are located in the radio transmitter Dynamotor Unit PE-59-A or PE-62-A. All fuses should be checked for proper rating (see engraving on fuse mounting) and continuity before installation of the equipment in aircraft.

2.2.8 Receiver Fuse

The fuse for the radio receiver is to be located in the main junction box of the aircraft.

2.2.9 **Caution**

Upon completion of the above and prior to installation, turn the power switch on the control box to the OFF position.

2.3 Installation

The main units of this equipment are constructed with detachable mounting bases. These bases are intended for permanent installation in aircraft with permanent connections through the conduit of the aircraft. Refer to the list of illustrations in front of book for drawings giving mounting and connecting details.

The junction boxes on the transmitter and receiver mountings have knockouts on three sides and the conduits may be run in the most convenient manner.

2.3.1 Connections

The equipment has been designed and tested using interconnections specified on government drawings which specified the wire sizes available in the various conduits. Refer to Figure 69 for the proper connections of the various wire sizes available. All plugs should be screwed tightly into their respective sockets.

2.3.2 Safety Wire

The snap slides which secure the radio transmitter dynamotor unit to its mounting base and the lever which secures the radio transmitter to its mounting are drilled for safety wire. Both these units should be safety wired as a precaution against their coming loose from their mountings. Likewise, the radio receiver dynamotor

unit should be safety wired in place and the wing screws and snap slides securing the receiver to the mounting should be safety wired.

2.3.3 Receiver Tuning Shaft

2.3.3.1 Before being shipped from the factory, the tuning control head on the panel of the radio receiver has been set for connection of the flexible tuning shaft in a horizontal position, from the left side of the radio receiver. However, it is advisable to check the setting of this mechanism before installing the flexible shaft to insure that no shift has occurred during transportation or unpacking. To check this point proceed as follows:

1—Remove the tuning control housing by removing the three securing screws.

2—Note that the index mark lines up exactly with the zero degree mark on the large disc. See Figure 25.

3—Note that the mark on the gear is exactly aligned with the index mark on the adjacent pin.

4—If these adjustments are correct, replace the cover and secure it by means of its three screws. Before tightening the three screws, check to see that the splined shaft is central in its guide hole in the cover. However, if the marks are not in their proper position, make the necessary adjustment, as indicated in the section below covering the change in approach angle of the flexible shaft.

5—CAUTION: *When driving the main tuning capacitor by other than the radio control box and associated drive cable do not fully mesh or unmesh the capacitor plates. Due to the high ratio used in the driving gears it is possible to so damage the main tuning capacitors that replacement of the unit may be necessary. Extreme care must be exercised when using Tuning Unit MC-127 due to the added leverage that may be obtained.*

2.3.3.2 In order to connect the radio receiver and the tuning unit in the radio control box by means of the flexible shaft, the above procedure should be followed at the radio receiver end, and the tuning control on the radio control box should be set against the stop at the low frequency end of dial. The splined fittings on the end of the flexible shaft can then be inserted into the couplings on both the radio receiver and the radio control box and the securing nuts tightly seated. This procedure will insure that the tuning of the radio receiver will be as indicated by the tuning unit of the radio control box.

2.3.3.3 *Angle Connections:*—If it is desired to connect the flexible shaft at any approach angle other than zero degrees as indicated above, proceed as follows:

1—Remove the cover from the tuning assembly.

2—Loosen, but do not remove, the two red screws in the large disc, and rotate the entire tuning assembly until the index mark lines up with the required degree mark on the large disc designated with the desired approach angle. If it is not possible to get these two marks in alignment, rotate the splined worm shaft by hand until this can be accomplished. (*Note caution under* 2.3.3.1).

3—With these marks in alignment, tighten the two red screws on the large disc assembly.

4—By rotating the splined worm shaft by hand, (*note caution under* 2.3.3.1) align the index mark on the gear with the mark on the pin beside this gear.

5—Replace the cover and secure it by means of its three screws. Before tightening the screws check to see that the splined shaft is central in its guide hole in the cover.

6—Set the tuning control in the radio control box against the stop at the low frequency end of the dial.

7—Connect the flexible shaft to the radio receiver and the radio control box as indicated above. By means of a flexible shaft having a right angle fitting on its receiver end, it is possible to have an installation in which the tuning shaft approaches the panel of the radio receiver from the rear. This type of flexible shaft may be coupled to the radio receiver when the radio receiver tuning mechanism is located in the zero degree position. The procedure for the alignment of this shaft with the receiver is exactly the same as for the straight shaft.

2.3.3.4 *Caution:*—Care should be taken that the spline fittings on the flexible shaft are accurately seated before the securing nuts are tightened. If this is not done, the spline may be damaged and the actual tuning of the radio receiver may not agree with the tuning indication on the radio control box.

2.3.4 Accessory Equipment

The radio transmitter is designed for use with a Microphone T-17. The microphone jack is located on the radio control box. Key J-5, J-5A or J-37 and Headset HS-18 or HS-23 should be used.

2.4 Operation

2.4.1 Cautions

2.4.1.1 *Radio Transmitter Controls:*—All the radio transmitter tuning controls, except the oscillator tuning controls, are provided with stops to limit the amount they can be turned. Forcing any control beyond its normal stop will seriously damage the equipment.

2.4.1.2 *Use of Tuning Tools:*—Tools for tuning this equipment are a part of Tuning Equipment IE-6-A or IE-7-A. Each radio transmitter tuning control shaft,

except the ANTENNA TUNING STEPS, is provided with a locking nut concentric with the control shaft. The outer barrel of the tuning tool is used to lock or unlock these nuts. One-half turn in a counterclockwise direction is sufficient for unlocking. Before inserting the tuning tool, rotate the knob so that the slot in the tuning tool shaft lines up with the pin in the control shaft. After unlocking the shaft pull the outer barrel and dial scale of the tuning tool forward so that it will rotate free of the locking nut. After tuning lock all controls.

2.4.1.3 *Tuning Equipment IE-6-A or IE-7-A:*—This equipment is always used when making adjustment on the radio transmitter. The radio transmitter cannot be properly adjusted without it. Tuning equipment IE-6-A is for use with Radio Set SCR-240-A (14 volt) and Tuning Equipment IE-7-A is for use with Radio Set SCR-261-A (28 volt).

2.4.1.4 *Application of Plate Voltage:*—Plate voltage is applied to radio transmitter by one of following operations:

By pressing TEST button on radio transmitter.

By pressing button on Microphone T-17.

By pressing a key on a connected interphone system.

The application of full plate voltage to an untuned radio transmitter results in overload, and beside damage to the tubes, may permanently damage the transmitter. A tune-operate switch is provided in the tuning equipment to reduce the plate voltage while tuning. Do not operate the radio transmitter at full plate voltage until it is properly tuned.

2.4.2 Tuning the Radio Transmitter

2.4.2.1 Remove plug from socket at left and insert plug from tuning equipment. Set TUNE-OPER. Switch to TUNE position.

2.4.2.2 Attach tuning tools to all controls of the desired channel except the antenna tuning step control.

2.4.2.3. Set TRANS. FREQ. switch on radio control box to channel to be tuned, insert crystal unit in radio transmitter, and turn OFF-ON switch on the radio control box to ON.

2.4.2.4 Press TEST key at left and adjust the OSCILLATOR TUNING control. As the oscillator tuning control is rotated counterclockwise from 6 to 0 the oscillator plate current will decrease gradually to a minimum, then suddenly rise to some higher steady value. This point is the "break-out" point. Set tuning control to a point where the oscillator plate current is two (2) milliamperes greater than minimum and lock the control. Dial setting for correct tuning is slightly higher than the dial setting of the "break-out" point. After locking, recheck the plate current to see that locking the control has not changed the tuning. Note: Crystal will not start to oscillate and will not key properly if tuned too close to "break-out" point and will not properly control the amplifier if tuned too far away. See 2.4.2.9 for final oscillator tuning instructions.

2.4.2.5 With ANTENNA COUPLING set at 0 on the dial set AMPLIFIER TUNING for minimum amplifier plate current and lock the control. Clockwise rotation of this control increases the frequency of resonance. After locking the control transfer the tuning tool used to the ANTENNA TUNING STEP control.

2.4.2.6 Set the ANTENNA TUNING STEP control according to the following table for preliminary antenna tuning. The correct step is the lowest numbered step which will permit tuning through resonance of the ANTENNA TUNING control.

Step 0.	3000 to 4400 kc.	Step 4.	6500 to 7000 kc.
1.	4400 to 4600 kc.	5.	7000 to 7300 kc.
2.	4600 to 6000 kc.	6.	7300 to 7700 kc.
3.	6000 to 6500 kc.	7.	7700 to 8000 kc.

2.4.2.7 With ANTENNA COUPLING set at "1" on the dial, (or very loose coupled) adjust the ANTENNA TUNING control for maximum amplifier plate current. If no indication is obtained with dial set at "1", increase the dial to "2". If a setting of "1" gives too much coupling for accurate tuning decrease dial setting to a suitable position.

2.4.2.8 Set TUNE-OPER. switch to OPER. position and adjust the ANTENNA TUNING for maximum antenna current; next adjust the ANTENNA COUPLING to give the value of amplifier plate current indicated on the lower scale of the filament voltmeter, readjusting the ANTENNA TUNING if necessary. Lock all controls and recheck antenna and amplifier plate currents.

2.4.2.9 After all channels have been tuned per above, readjust OSCILLATOR TUNING with TUNE-OPER. switch in OPER. position increasing dial setting from "break-out" point to where oscillator plate current is three (3) milliamperes greater than minimum. Lock the control and recheck oscillator plate current after locking.

2.4.2.10 Release TEST key, then remove tuning equipment plug, re-insert plug PL-139 and check both VOICE and CW operation by listening in on test radio receiver.

2.4.3 Operation of the Radio Transmitter

2.4.3.1 After the transmitter has been tuned as per instructions above, all subsequent operation and control is done at the radio control box. The radio transmitter filaments are turned on or off simultaneously with the radio receiver by the ON-OFF switch. Plate voltage is then applied by pressing either a key or the microphone button. If CW telegraph operation is desired the CW-

VOICE switch is placed in the CW position and a telegraph key plugged into the jack on the radio control box. If voice operation is desired a Microphone T-17 is plugged into the jack instead of a key and the CW-VOICE switch placed in the VOICE position.

2.4.3.2 When the radio transmitter is in operation the antenna current will be indicated on Ammeter 1-71-A. This meter will not read the same at all times or on different installations. Its reading will depend on the frequency being transmitted, type of antenna used and the battery voltage.

2.4.4 Radio Receiver

2.4.4.1 To start the radio receiver it is necessary to turn only the ON-OFF switch in the radio control box to the ON position (Caution: Reduce the volume control to prevent the possibility of an uncomfortable signal in the headphone when the tube filaments come up to their operating temperature).

2.4.4.2 To stop the radio receiver it is necessary to turn only the ON-OFF switch to the OFF position.

2.4.4.3 To tune the radio receiver:

1—Continuously tunable bands—to adjust the radio receiver for operation on any of its continuously tunable bands, set the radio receiver band switch to the desired frequency range, and adjust the radio receiver tuning control to the desired frequency.

2—MVC-AVC—Set this switch to either position, depending upon whether manual or automatic control of the radio receiver sensitivity is desired and adjust the radio receiver volume until the audio level of the radio receiver signal is a suitable value or, if no signal is being received, adjust the volume control until the noise level is just audible. To secure the most accurate tuning of the radio receiver to a given signal, set the MVC-AVC switch to the desired operating condition and adjust the radio receiver volume control to give a weak output, then readjust the radio receiver tuning to give maximum output. The volume control should then be adjusted to provide satisfactory output for operation purposes.

3—Fixed Channels—To set the radio receiver on any of its pretuned channels, it is necessary to rotate only the radio receiver band selector switch to the desired preset frequency position as recorded on the radio receiver front panel. Automatic or manual control of the radio receiver sensitivity is obtained as indicated in "2" above.

4—To change fixed channels—The operating frequency of the intermediate amplifier used in the radio receiver is 480 kcs. and, therefore, the frequency of the crystals must differ from the frequency of the desired signals by plus or minus 480 kcs. For example: if it is desired to receive a signal being transmitted on 6000 kcs., the crystal frequency must be 6480 kcs. or 5520 kcs. Likewise, a 6000 kcs. crystal can be used to receive signals on either 6480 kcs. or 5520 kcs., therefore, care must be exercised to tune the radio receiver on that side of the crystal frequency that gives the desired signal frequency. The frequency of any crystal used in this radio receiver should be within the limits of 2520 kcs. and 8480 kcs. Select a crystal in accordance with the above and insert in the indicated socket. The original crystals supplied as part of Order No. SC-132377 have frequencies 480 kcs. less than the specified signal frequencies. Align the radio frequency amplifier as follows:

a—Equipment Required:
Signal Generator I-72-A
Antenna A-59-A
Tuning Tool TL-145
Output Meter, Rectifier Type, 10 V.
4000 Ohms

b—Mount the radio receiver in the service test set-up (see par. 1.5.12) making certain that 12-14 volts are applied to Radio Receiver BC-225-A and 24-28 volts are applied to Radio Receiver BC-352-A. With the output posts of Antenna A-59-A connected to the receiver ANT and GND posts, connect the output cable of Signal Generator I-72-A to the input posts of Antenna A-59-A. The volume control should be set at maximum on MVC. Place the band switch on the desired crystal band.

c—Set the signal generator to the frequency for which the radio receiver is to be tuned. The signal frequency will be 480 kcs. higher or lower than the crystal frequency. Switch to modulated carrier and increase the signal generator output to give an indication on the output meter. Retune the signal generator to give maximum radio receiver output and then align the r-f stage trimmers which are located on the left-hand side of the first and second coil units (see Figure 20). These trimmers are clearly marked with the corresponding crystal band numbers. It is necessary to loosen the trimmer locknuts with the wrench end of Tuning Tool TL-145 before actually adjusting the trimmers. After the three trimmers have been aligned, tighten the locknuts to the original degree of tightness. Record the new signal frequency in the space provided on the radio receiver front panel.

2.4.4.4. Loop reception is available only in the band of 200-400 kcs. The parallel loop is intended for use when reception on the open-wire antenna is difficult due to the presence of rain or snow static. This loop is connected to the input of the radio receiver when the antenna selector switch is set to PL. Operation is otherwise the same as in paragraph 2.4.4.3 with manual control of receiver sensitivity. The transverse loop is intended for use as a homing device by orienting the plane until an aural null is obtained in the headphones. For this type of operation, MVC should be used so that a well defined null may be obtained.

2.4.5 Brief Summary of Normal Operation

1—*To start the equipment:*—Turn the ON-OFF switch to the ON position.

2—*To stop the equipment:*—Turn the ON-OFF switch to the OFF position.

3—*To select radio transmitter frequency:*—Turn the TRANS. FREQ. switch to the desired number.

4—*To transmit voice:*—Place the CW-VOICE switch to VOICE then press the microphone button and speak into the microphone.

5—*To transmit CW:*—Place the CW-VOICE switch to the CW position then key the radio transmitter with any key plugged into the radio control box or connected interphone system.

6—*To tune the radio receiver for the tunable bands:*—Turn the REC.-BANDS switch until the proper band appears in the window of the radio control box, then rotate the REC.-TUNING knob until the proper frequency appears on the dials and the desired signal is heard at maximum amplitude.

7—*To tune the radio receiver for the crystal bands:*—Turn the REC.-BANDS switch until the desired crystal number appears in the window of the radio control box.

8—*To select type of gain control:*—Set the AVC-MVC switch to the desired position.

9—*To change the volume level:*—Rotate the VOLUME CONTROL knob clockwise to increase output or counterclockwise to decrease output.

10—*To change antenna:*—Set the ANT.-PL-TL switch to the desired position.

SECTION III

DETAILED FUNCTIONING OF PARTS

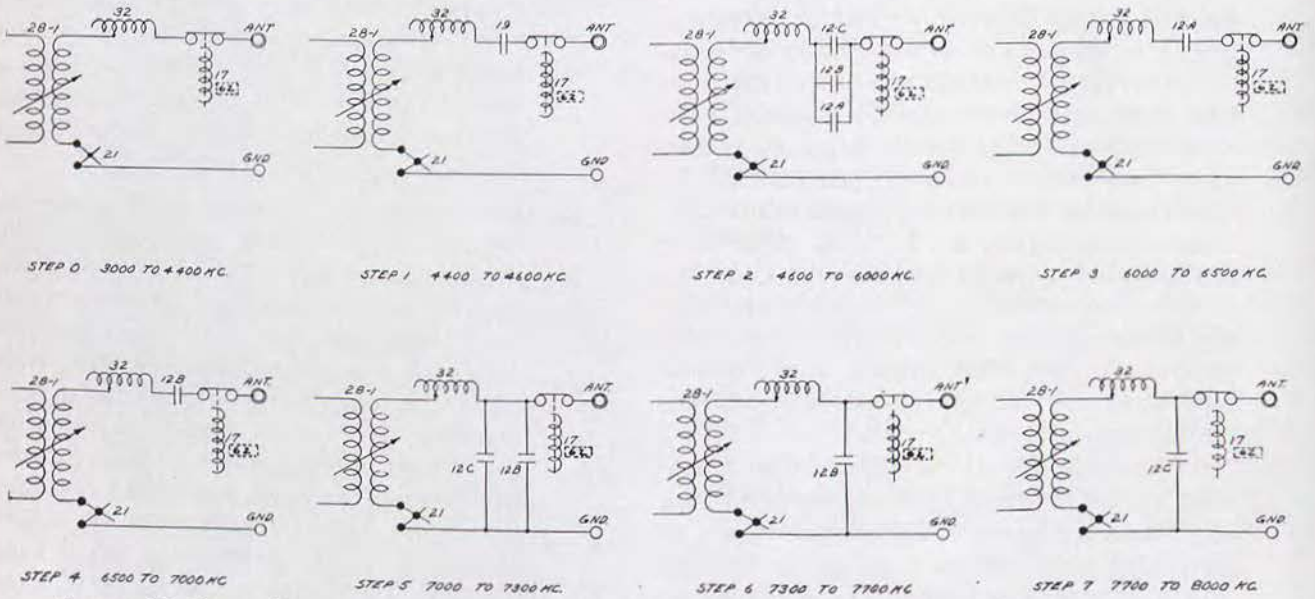


FIGURE 35—RADIO TRANSMITTER BC-338-A OR BC-353-A, ANTENNA TUNING STEPS, FUNCTIONAL DIAGRAM

3.1 Radio Transmitter BC-338-A or BC-353-A

3.1.1 General

The complete schematic diagram of the radio transmitting equipment is shown in Figure 54. Functions of the various tubes are indicated.

3.1.2 R-F Circuits

Refer to Figures 36 and 54.

3.1.2.1 Oscillator:—The oscillator consists of Tube VT-101, crystal 3-1, inductance 24 and capacitor 5-1. Plate voltage is supplied through resistor 36, radio-

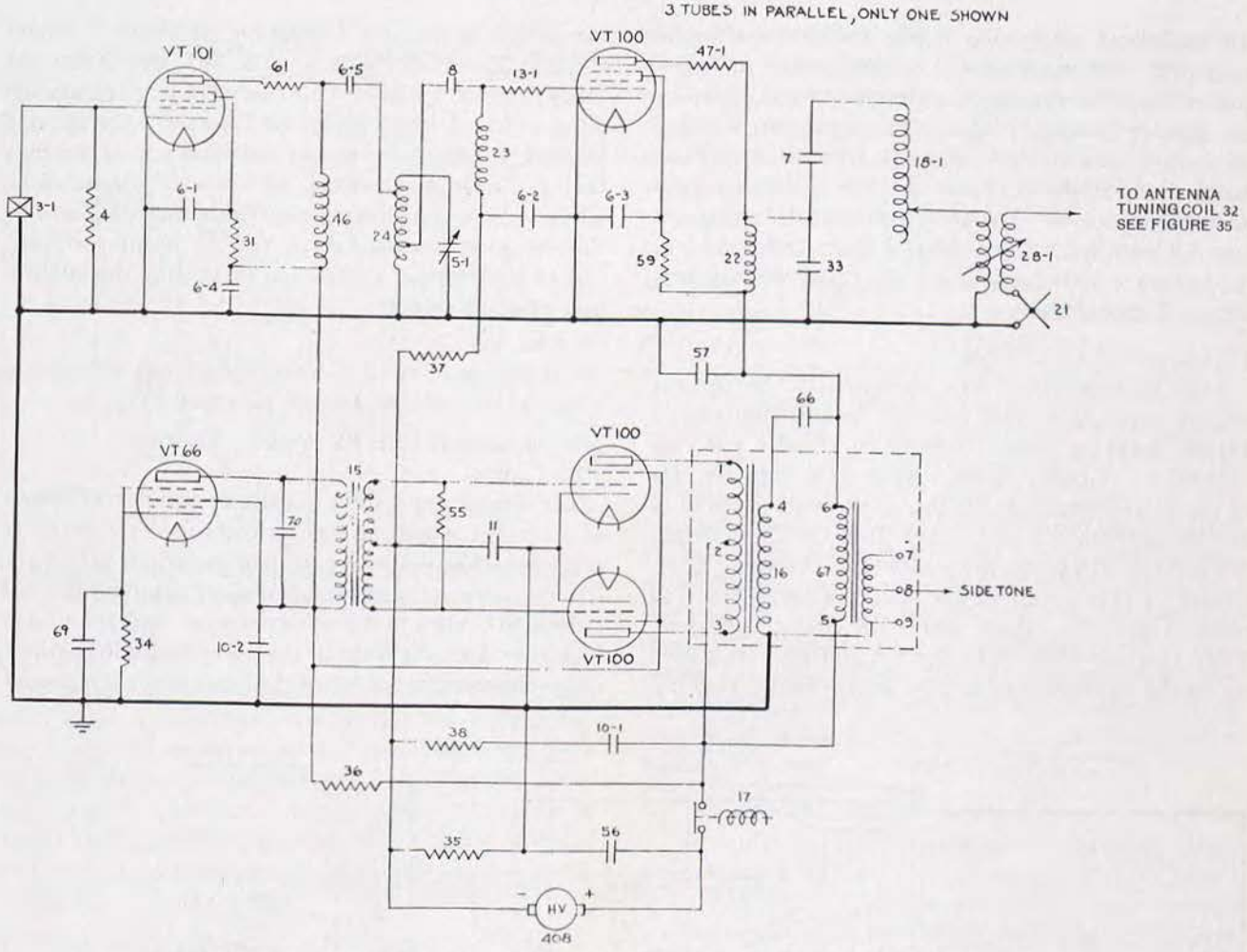


FIGURE 36—RADIO TRANSMITTER BC-338-A OR BC-353-A. HIGH VOLTAGE AND RADIO FREQUENCY CIRCUITS, FUNCTIONAL DIAGRAM

frequency choke coil 46 and resistor 61 from dynamotor 408. Grid bias is obtained from resistor 4 which carries the d-c grid current resulting from application of r-f from the crystal to the grid. Resistor 31 drops the voltage on the screen and suppressor to a suitable value. 6-1 and 6-4 are the screen and plate supply by-pass capacitors, respectively. In operation, 5-1 and 24 are resonated to a frequency very near to and slightly above the crystal frequency. Resistor 61 prevents oscillations at frequencies other than the crystal frequency.

3.1.2.2 *Amplifier:*—The radio frequency power amplifier consists of three Tubes VT-100 operating in parallel except as to filament circuits. Excitation voltage is applied to the control grids through resistor 13-1 and capacitor 8 from a tap on inductance 24. Grid bias is obtained from the drop across resistors 35 and 37, through radio frequency choke 23. The output circuit of the amplifier consists of resistor 47-1, capacitors 33 and 7, variable inductance 18-1 and the primary of coupling transformer 28-1. Plate voltage is applied through radio frequency choke coil 22, modulation choke 67 and contact of keying relay 17 from dynamotor 408. Screen voltage is obtained from the plate circuit through resistor 59. Capacitors 6-2, 6-3 and 57 are radio frequency by-pass capacitors. Resistors 13-1 and 47-1 are stabilizing resistors to prevent self oscillation of the amplifier.

3.1.2.3 *Antenna Tuning:*—Refer to Figure 35. The antenna tuning circuit consists of thermocouple 21, secondary of coupling transformer 28-1, variable inductance 32, capacitors 19, 12 A, B and C, switch 27 and a pair of contacts on relay 17. Each of the four channels has its own variable inductance parts 32, 39, 44 and 58. The antenna capacitors 12 and 19, however, are used in all channels, being automatically selected by switch 27 and motor 29-1, according to settings of switches 20-1 to 20-4 which are adjusted when the set is tuned

3.1.3 Audio System

The audio system consists of a Class A self-biased speech amplifier using a Tube VT-66, driving a Class

AB modulator using two Tubes VT-100 working in push pull. The modulator is coupled to the radio frequency amplifier through transformer 16 and capacitor 66. Side tone voltage is obtained from separate winding on audio choke coil 67. Current for the microphone being used, is drawn from the low voltage supply through resistor 41. The overall gain of the audio system is controlled by part 60 and is set and locked at the factory so that between 1.5 and 1.75 volts will produce 85% modulation.

3.1.4 Low Voltage Circuits

Refer to Figure 37. The operation of the channel selector mechanism is as follows: Assume that switch 503 is placed in number 2 position thereby selecting channel 2. A circuit is then made from negative side of the battery through 503 thence through one side of switch 42-D, motor 73-2, relay 72-2, ON-OFF switch 502 and fuse 413 to the other side of the battery. Completion of this circuit causes motor to rotate, driving rotor of 42-D to a point where the circuit is opened. Thus, switches 42-A, B, C, D, 45-A and 45-B are moved up to the channel number 2 position. When 42-C has moved up to number 2 position, it closes a circuit through 20-2 to motor 73-1, relay 72-1, switch 502 and fuse 413 to the battery. This causes 73-1 to operate and move switch 27-A, B, C, D and E to the point selected by 20-2. Thus, the proper combination of antenna tuning circuit components are chosen. Meanwhile, when current was flowing through either 72-1 or 72-2 their contacts remained open, thereby opening the circuit to keying relay coil 62 and preventing the application of plate voltage.

3.1.5 Keying

The keying relay 17 is controlled by test key 49-1 or a key or microphone plugged into jack 504.

3.2 Dynamotor Unit PE-59-A or PE-62-A

3.2.1 Control

The dynamotor unit is started or stopped by means of relay 401 which in turn is controlled by auxiliary relay 409. Relay 409 is controlled by switch 501, in the CW position; and test button 49-1, or any plug inserted in jack 504, when in the voice position. 49-2 is an interlock switch on the front of the radio transmitter which opens the start circuit when the front panel is removed.

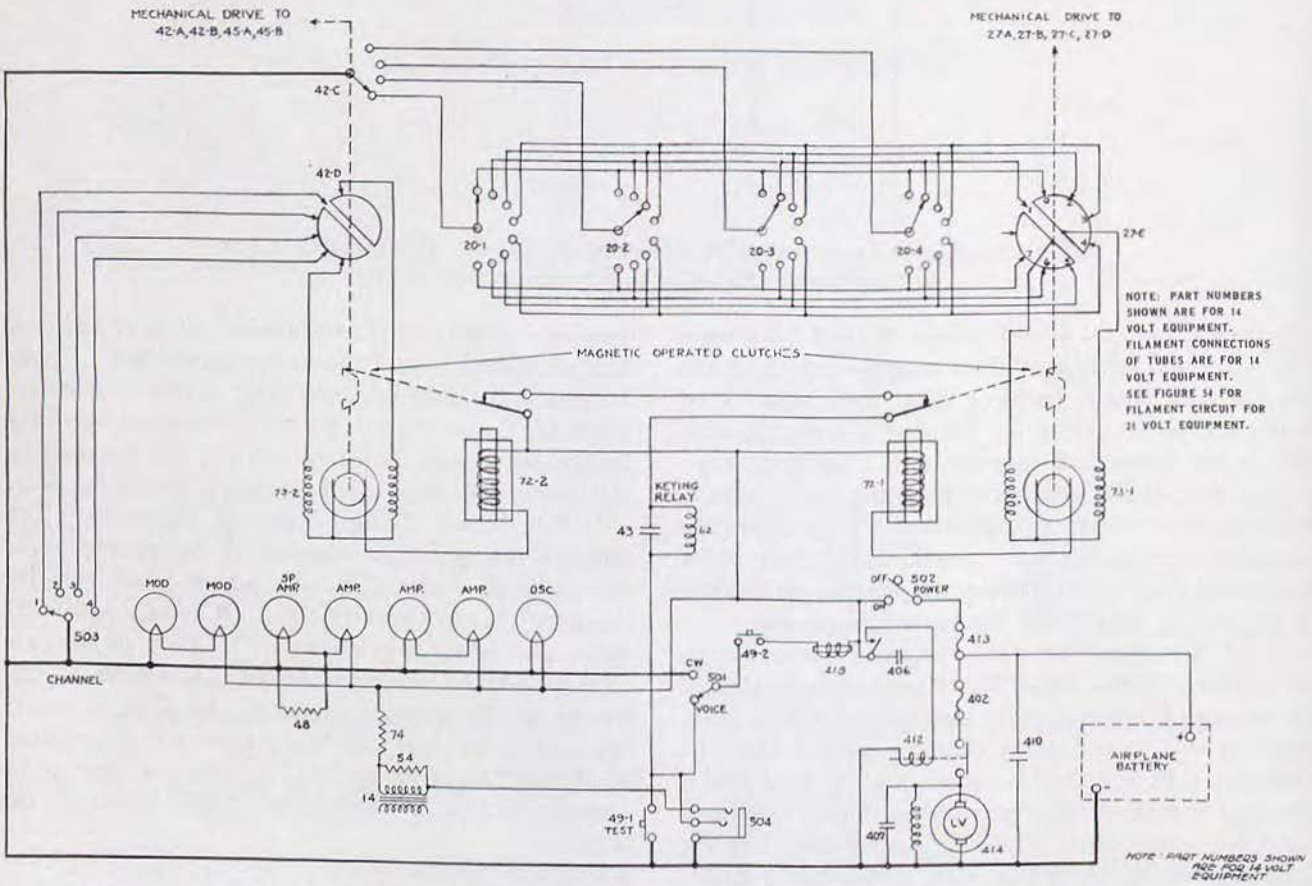


FIGURE 37—RADIO TRANSMITTER BC-338-A OR BC-353-A, LOW VOLTAGE CIRCUITS, FUNCTIONAL DIAGRAM

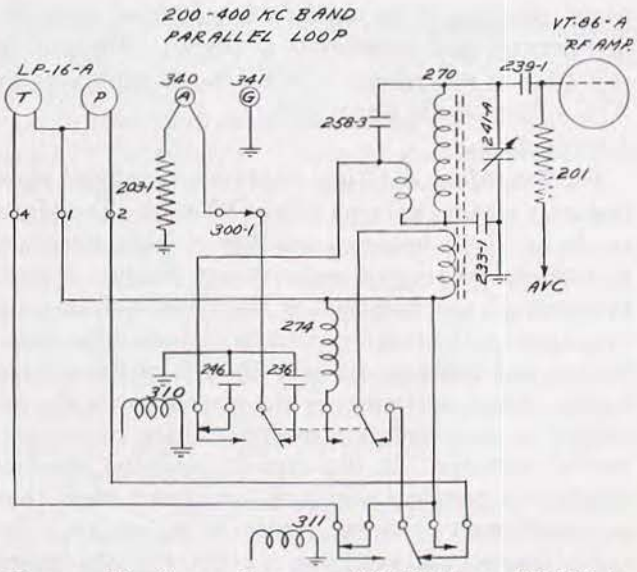


FIGURE 38—RADIO RECEIVER BC-225-A OR BC-352-A, R-F INPUT CIRCUIT, FUNCTIONAL DIAGRAM

3.2.2. Fuses

Three fuses are provided in the circuits of the dynamotor unit. Fuse 403 protects all the low voltage circuits except the primary circuit of the dynamotor. Fuse 402 is the dynamotor primary fuse and 404 is the dynamotor high voltage fuse. A spare high voltage fuse is carried along side the operating fuse. Spare links for the low voltage fuses are carried in an envelope in the cover of the dynamotor unit.

3.3 Detailed Functioning of the Radio Receiver

3.3.1 General

The radio receiver comprises a double-tuned stage of radio-frequency amplification preceding the first detector, a temperature-compensated heterodyne oscillator, two intermediate frequency amplifier stages, a second detector and two stages of audio-frequency amplification with a transformer coupled output circuit.

3.3.2 Input Circuit

The radio receiver input circuit is designed to match the radio receiver to Loop LP-16-A or to an antenna possessing the characteristics tabulated in par. 2.2.2.

3.3.2.1 *Loop Input:*—The band switch is wired so that the loop is connected for use in the 200-400 kc. band only. When the radio receiver is set for operation on this band, either parallel or transverse loop, or the open antenna may be selected. Reference to Figure 38 shows antenna relays 310 and 311 unenergized and in position for reception on parallel loop. Under these conditions, the open antenna is grounded through 236. So that the tuning of transformer 270 will not be affected by removing the open antenna capacity in switching to loop operation, a capacitor (246) is connected across the transformer primary. Relay 311 effects connection to parallel or transverse loop. The application of excessive r-f voltage to the loop input terminals will not damage the input circuit since the large voltage developed at the r-f amplifier grid causes grid current to flow in 201, which biases the r-f amplifier to cut-off, thereby protecting the tube and following circuits.

3.3.2.2 *Antenna Input:*—All bands except the 200-400 kc. band are automatically switched for operation on the open antenna. When using the 200-400 kc. band either the open antenna, parallel or transverse loop may be selected. Detuning of transformer 270 is avoided by loading the loop primary with an inductance 274 which simulates the loop loading. A resistor 203-1 provides a leakage path for static charges that collect on the antenna. The application of excessive r-f voltage will not damage the input circuit since the voltage appearing at the r-f grid causes grid current bias to be developed, thereby protecting the tube and following circuits. On the 2.5-5 mc. band resistor 221-2 (not shown) prevents excessive loading of the input transformer by the antenna which has but 20 ohms capacitive reactance at 5 mc. The same function is performed by resistor 221-1 on the 5-8 mc. band, where, at 5.1 mc., the antenna has 2 ohms resistance.

3.3.3. Radio-Frequency Amplifier

The radio-frequency pre-selector comprises three ganged tuned circuits coupled by one Tube VT-86-A and a link circuit. Separate trimmers and transformers are employed for each of the tunable frequency bands. Preselection for the three crystal bands is obtained in the same manner as for the tunable bands, but in place of the tuning capacitor nine small variable capacitors are used—three per band and three bands. Crystal Bands 1 and 2 utilize the 2.5-5 mc band transformers, while Crystal Band 3 utilizes the 5-8 mc. band transformers.

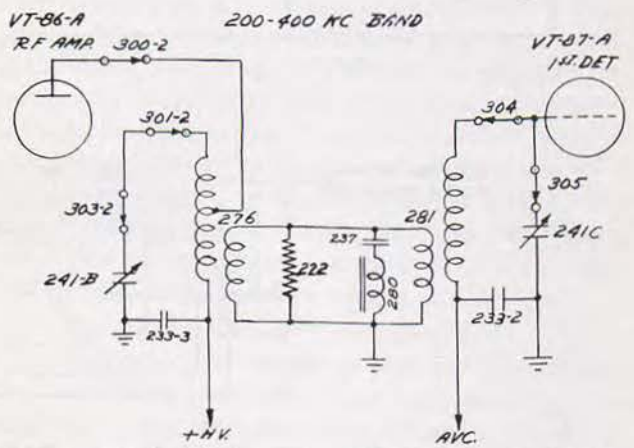


FIGURE 39—RADIO RECEIVER BC-225-A OR BC-352-A, R-F. AMPLIFIER CIRCUIT, FUNCTIONAL DIAGRAM.

The gain of the link-coupled r-f amplifier, see Figure 39, is maintained substantially uniform between bands by tapping the plate connection part way down transformer 276 for the 200-400 kc. band and similarly for the 550-1500 kc. band, while on the 2.5-5 mc. and the 5-8 mc. band, the whole primary is used. The gain in the 200-400 kc. band is kept substantially uniform by resistor 222 across the link. The next two higher bands are similarly compensated in the link. Rejection of the intermediate frequency is maintained high by a permeability-tuned trap connected across the link circuit. The trap consists of capacitor 237 and variable inductance 280. A similar trap consisting of capacitor 234 and variable inductance 286, is connected in the link circuit of band 2. The gain of this stage is controlled on MVC by varying the cathode voltage and on AVC by grid voltage supplied by the AVC diode.

3.3.4 First Detector

The first detector employs a Tube VT-87-A which has a remote cut-off characteristic, thus permitting the handling of signals without cross modulation. The oscillator output is capacity coupled to the injection grid, and due to electronic modulation of the first detector, detuning of the oscillator is minimized when the first detector grid transformer is aligned. The gain of this stage is not subject to MVC but is controlled by AVC voltage to the signal grid.

3.3.5 Oscillator

The heterodyne oscillator employs a tuned-grid plate feed-back circuit, utilizing a Tube VT-94-A. The effects on the oscillator frequency stability of wide variations in ambient temperature under service conditions have been reduced to a minimum by the use of compensating capacitors in the tuned-grid circuit. Individual transformers and trimmers are used for each of the tunable bands. When operating on the crystal bands the oscillator is connected as a modified Pierce crystal-controlled oscillator. In this type of operation, the frequency is determined solely by the crystal used, thus no transformers or tuning capacitors are needed. The crystal frequency may be lower or higher than the desired signal frequency if the signal frequency is within the limits of 3 to 8 mc. (See Par. 5.2).

3.3.6 Intermediate-Frequency Amplifier

The intermediate-frequency amplifier comprises two medium gain amplifying stages coupled by three highly

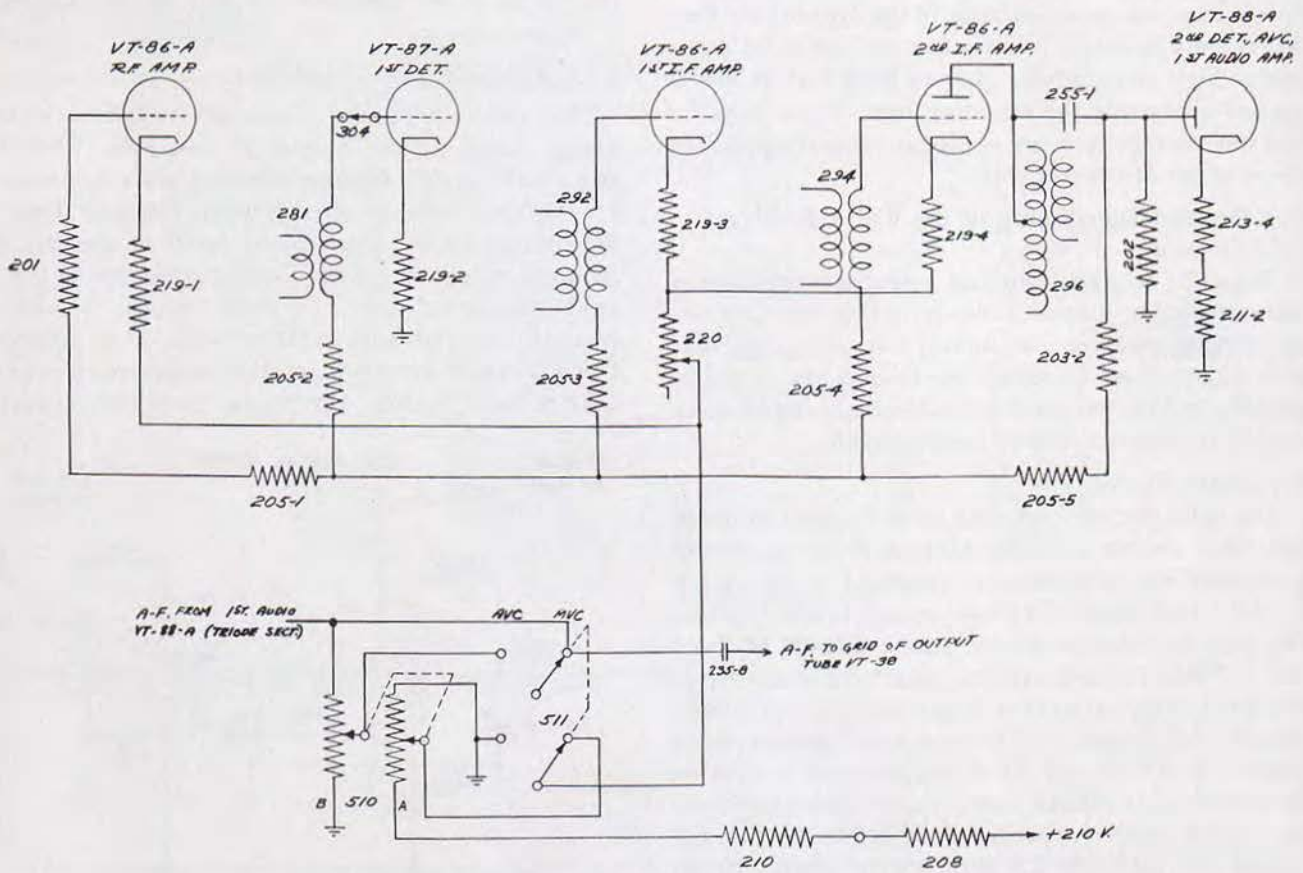


FIGURE 40—RADIO RECEIVER BC-225-A OR BC-352-A, MVC-AVC CIRCUITS, FUNCTIONAL DIAGRAM

selective, double-tuned circuit transformers associated with two Tubes VT-86-A. The i-f transformers are tuned by variable capacitors and fixed iron cores are used in the transformers to increase the permeability, thereby contributing to the highly selective transformer characteristics; while the lowered tuned circuit impedance, secured by additional capacity in parallel with the trimmers, provides an inherently stable amplifier. Certain combinations of transformers, capacitors and resistors can result in radio receivers having excessive noise at full volume control and in order to compensate for this condition an i-f gain adjustment is made at the factory by setting rheostat 220. Both stages are subject to manual control of gain, as well as AVC.

3.3.7 Second Detector

A relatively high level signal is supplied by the second i-f amplifier to the diodes of the Tube VT-88-A which functions as the second detector. One diode functions as the signal linear detector while the other diode is capacitively coupled to the second i-f plate and provides high level, delayed automatic volume control bias. Correct proportioning of components results in practically linear demodulation.

3.3.8 Audio Amplifier

The triode section of Tube VT-88-A serves as the audio amplifier. The grid of this tube is capacity coupled to the signal diode through a voltage divider, which minimizes overload in this stage due to large signals. The cathode circuit contains two resistors which provide grid bias and AVC delay voltage.

3.3.9 Output Stage

A Tube VT-38 functions in the output stage, being resistance coupled through the volume control to the audio amplifier. The plate of the output stage is transformer coupled to provide suitable loading and to isolate d-c from the headphone circuit. Resistor 209 connected across the transformer primary permits the use of additional headphones with but small reduction in the signal output. Self-bias of this stage assures optimum operation of Tube VT-38 for all normal operating conditions.

3.3.10 Volume Control

3.3.*10.1:*—The control of gain in Radio Receivers BC-225-A and BC-352-A is vested in a dual potentiometer located in the radio control box. This potentiometer, 510, consists of two sections, A and B, both operated from a single shaft.

3.3.*10.2 Manual Control:*—Section A controls the cathode voltage of the r-f amplifier and the two i-f amplifiers. Switching to manual control sets the audio amplifier at full gain and permits manual control of the radio receiver gain. If a signal of sufficient strength to over shoot the bias applied by the manual control is applied

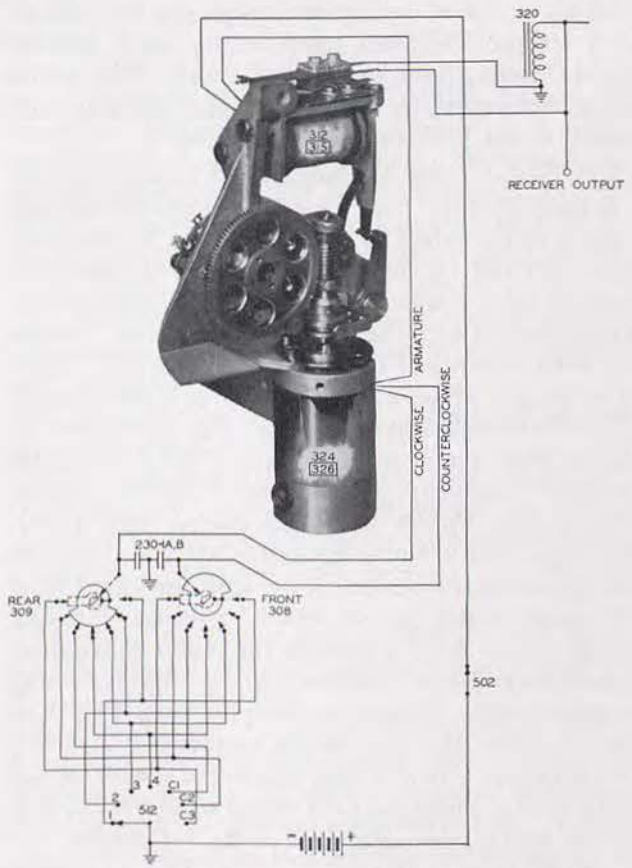


FIGURE 41—RADIO RECEIVER BC-225-A OR BC-352-A, BAND CHANGE MECHANISM AND CONTROL CIRCUITS, FUNCTIONAL DIAGRAM

to the radio receiver, the automatic volume control will take hold and prevent blocking of the radio receiver. The manual control has sufficient range of action to handle input signals in a range of more than 500,000 to 1.

3.3.*10.3 Automatic Control:*—When a signal sufficiently strong to exceed the delay voltage is applied to the A.V.C. diode of Tube VT-88-A, bias voltage is developed and applied to the grids of the r-f amplifier, the first detector and the two i-f amplifiers. The A.V.C. system is proportioned so that the output of the radio receiver remains substantially constant for a wide range of signal strength. The volume control, Section B of 510, is placed electrically between the audio amplifier and the output tube where the gain following the control is low and consequently, noise and hum pickup a minimum.

3.3.11 Dynamotors DM-22-A and DM-23-A

The dynamotor and associated high and low voltage filter circuits are assembled in one unit. Removal and servicing of this unit are described under Paragraph 1.5.5.3–5 and Section IV—Maintenance, paragraph 4.1.1.11 to 13. Both the high and low-voltage negative

leads are grounded and positive high and low-voltage leads are provided with ample r-f filtering to prevent any r-f getting into the plane's cables. The audio-frequency components of the dynamotor ripple are well filtered in the high voltage positive lead.

3.3.12 Band Change Mechanism and Control Circuits

Remote electrical band switching is effected through a drive motor which is connected by a magnetically operated clutch to the band switch through the drive gearing, and a two-section positioning switch operating in synchronism with the band change switches. Assume the receiver switched to Band 1; changing 512, Figure 41 to Band 3, grounds the switch-drive motor through its clockwise field and switch 309. The initial surge of current starts the motor and operates the magnetically operated clutch engaging the motor and the switch drive gearing. When the switch reaches Band 3 position, the circuit is broken by switch 309, and the clutch disengages thereby preventing the armature inertia from driving the switch past the selected position. Rotating switch 512 to Band 2 grounds the motor through its counterclockwise field and switch 308. The remaining action is similar to that for changing from Band 1 to Band 3. The relay part of the magnetically operated clutch carries a switch that shorts the output of the radio receiver during the band switching operation, thus preventing uncomfortable noise in the headphones.

3.4 Detailed Functioning of Radio Control Box

3.4.1 General

The control of the complete equipment is centered in the radio control box from which point both radio transmitter and radio receiver are controlled to the extent required by this type of equipment.

3.4.2 Main Power Switch

The main power switch 502 controls all power and when placed in the ON position, voltage is applied to the radio receiver and radio transmitter tube filaments, the radio receiver dynamotor, radio receiver and radio transmitter controls. In the OFF position of 502, no power is taken by the equipment from the plane's battery.

3.4.3 Radio Transmitter Controls

3.4.3.1 *Transmitter Frequency Selector:*—The radio transmitter frequency selector switch 503 operates the wave band switch, as explained in paragraph 3.1.4.

3.4.3.2 *CW-VOICE CONTROL:*—The CW-VOICE switch controls the type of transmission, as explained in paragraph 3.2.1.

3.4.3.3 *Microphone Jack:*—The microphone jack provides a connection for microphone or key to control the radio transmitter output as shown in Figure 37.

3.4.4 Radio Receiver Controls

3.4.4.1 *MVC-AVC Selector:*—The MVC-AVC switch 511 selects the type of gain control in the radio receiver as explained in paragraph 3.3.10.

3.4.4.2 *Antenna Selector:*—Antenna selector switch 513, selects the open antenna or either loop as explained in par. 3.3.2.

3.4.4.3 *Radio Receiver Tuning:*—Rotation of the radio receiver tuning knob actuates the four-section tuning capacitor through its 183 to 1 ratio worm drive. This same rotation drives the dial through a 100 to 1 ratio drive and the dial drive mechanism actuates stops that engage a pin on the tuning shaft. Backlash in the tuning and dial mechanism is prevented by the use of split, sprung worm gears. Complete coverage of any of the tunable bands is obtained by approximately 90 revolutions of the tuning knob.

3.4.4.4 *Radio Receiver Band Selector:*—Changing the position of the radio receiver band selector rotates switch 512 which operates the radio receiver band change mechanism as explained in par. 3.3.12. At the same time, the masking plate is rotated by means of gears connecting the shaft of switch 512 and the masking plate. Both switch 512 and the masking plate have positive detents which operate independently due to the amount of play between the drive gears.

3.4.4.5 *Volume Control:*—The operation of the volume control is covered in par. 3.3.10.

3.4.4.6 *Panel Lamps:*—Four Lamps LM-32, provide indirect edge-lighted panel illumination. Each lamp is provided with a separate voltage dropping resistor.

3.4.4.7 *Control Panel:*—The "Plexiglass" control panel bears the control designations which are clearly legible in either daylight or the indirect panel lighting. The panel is protected by sun-proof varnish.

3.5 Loop

The loop antenna, connected to the radio receiver input through Cordage CO-202, is effectively tuned by the tuning capacitor through the close coupling of the input transformer. Relatively low inductance in the loop-primary circuit results in high effective tuning capacity, thus minimizing the effects of different lengths of loop cordage. Furthermore, resistance change is kept small by using large conductors in the cordage. These two design features allow the use of cordage in lengths between 5 and 25 feet without requiring any balancing or compensating adjustment. Symmetrical arrangement of the loop-primary circuit permits an excellent null on either loop for aural direction-finding.

SECTION IV
MAINTENANCE

4.1 Servicing

4.1.1 Inspections

4.1.1.1:—The various components of the radio set should be given a thorough visual inspection each time it is removed from or installed in an aircraft. Making such inspections properly will insure that the set is always left in operating condition and ready for use when needed. This inspection should include examination of all cordage to see that it is securely fastened and that it has not been damaged. All accessible components should be examined and, if excessively dirty, should be cleaned. At the end of a long period of storage check to see that dynamotor and band switch motor armatures revolve freely. Examine the connectors on the rear of radio transmitter and radio receiver to see that pins have not been bent or deformed. A thorough periodic inspection of the complete installation at least once every 50 hours of operation will materially aid in securing uninterrupted performance in the field. The following procedure is recommended.

4.1.1.2:—Determine that the storage battery is at the proper specific gravity and that the charging generator and regulator are adjusted so as to keep the battery fully charged.

4.1.1.3:—Clean accumulated dust and dirt from all units, using air hose (free from moisture) or bellows, paying particular attention to radio transmitter components such as variable air capacitors, rotating coils in coil box and wave band switches and gears. Rotating coils may be seen through perforations in the coil box and if washing or wiping of coils is necessary the entire coil box can be removed by removing the six hold-down screws and unsoldering two wires from front of box and one from the top. Coils may then be cleaned by rotating them against a toothbrush, or a cloth wrapped around a stick and moistened with carbon tetrachloride. Check stops on rotating coil drive shafts to see that they do not permit roller to travel beyond the ends of the coil winding. Roller travel can be adjusted by disengaging the gear. When replacing the coil box on chassis make the index lines on the gears line up exactly.

4.1.1.4 Radio Receiver Cleaning:—The air hose should not be used on the radio receiver variable air capacitor, but instead use a pipe cleaner, running it between the rotor plates and then the stator plates while the capacitor is fully out of mesh. Clean off any collection of dirt between the brushes and the rotor using carbon tetrachloride on a cloth. In cleaning the under part of the radio receiver chassis, exercise care that dirt is not driven into the i-f transformer units. When cleaning the top of the chassis, exercise care that dirt is not forced into the r-f and i-f trimmer holes. If it is necessary to remove the r-f units for inspection or servicing, the units should be thoroughly cleaned just before closing the unit. In no case, should carbon tetrachloride be used on the switch section contacts because they are provided with a thin lubricating film.

4.1.1.5:—Make certain that all permanent safety wiring is in place and that all nuts and machine screws supplied with lockwashers are tight.

4.1.1.6:—Determine that male contacts of all connectors are not bent or deformed.

4.1.1.7:—Determine that shock mountings for the radio transmitter and radio receiver are secure and that no parts have become loose. Examine the studs in the radio transmitter dynamotor unit mounting to see that they are tight.

4.1.1.8:—Make certain that all fuses are held tightly in their clips and that the contact surfaces of fuses and clips are clean and bright.

4.1.1.9:—Inspect the antenna system for broken or frayed wires and wipe all insulators clean. See that there is sufficient clearance between the antenna lead-in and metal parts of the ship to prevent spark over. Antenna and lead-in should be taut and not free to vary its capacity appreciably, otherwise a vibration modulation of the transmitted wave will be set up.

4.1.1.10:—Inspect keys and microphones for broken cords and deformed plugs.

4.1.1.11:—Inspect dynamotor brushes for length.

4.1.1.12:—Inspect dynamotor commutators for cleanliness and excessive wear.

4.1.1.13:—Rotate the dynamotor armature by hand to make certain it turns freely and is not rubbing on leads or pole pieces. When all four brushes are removed the armature should spin freely on its bearings.

4.1.2 Lubrication

4.1.2.1 Lubricants:—The lubrication of the equipment involves the use of the following lubricants and one cleaning solvent. These are:

Light oil—Aero instrument oil "Gyro" #3 made by Standard Oil Company of New Jersey.

Grease—For the radio transmitter dynamotor, use only high temperature ball bearing grease such as Grade 295 Air Corps Specification No. 3650. "Refined Calol Grease" as manufactured by the New Departure Manufacturing Company, Bristol, Connecticut, or New York and New Jersey Lubricant Company No. 1572 meet the requirements of the above specification. "Calol" is a stiff, pale yellow, high

flow point, sodium base grease, which has been developed particularly for ball bearing applications of this nature. Do not use unauthorized greases as these may melt out at high temperatures or may oxidize rapidly and become gummy when packed in the bearings. For the radio receiver dynamotor, use only grease complying with Air Corps Specification No. 3650, Grade 375, such as Master Lubricants Company "Lubriko" or New York & New Jersey Lubricant Company No. F-927.

Cleaning solvent—Carbon tetrachloride.

4.1.2.2:—The various spur and bevel gears in the radio transmitters are to be run dry and should not be lubricated. Clean them thoroughly with carbon tetrachloride if they become dirty or pick up oil from an adjacent bearing. Any oil or gum will collect dust and dirt. The three worm gears should be oiled with light instrument oil just sufficient to cover them with a thin film. The worm gears are made of stainless steel but will have a tendency to rust in hot humid climates if not protected or used frequently. Do not use heavy oil as it will harden at low temperatures and stall the motors. The various motor driven switches, particularly 27-E and 42-D should be oiled on their contact surfaces with light instrument oil.

Caution: Do not oil the plunger of the keying relay.

4.1.2.3 Radio Receiver:—The only parts of the radio receiver requiring lubrication other than the dynamotor are the switch drive mechanism and the tuning capacitor bearings and its drive bearings. When required, use the light oil on the switch drive worm and worm bearings. Use the light oil, when required, on the tuning capacitor bearings, but use no lubricant on the rotor brushes.

4.1.2.4 Radio Control Box:—Lubricate all gears, bearings and thrust surfaces once a year with light oil.

4.2 Trouble Location and Remedy

4.2.1 Radio Transmitter BC-338-A or BC-353-A

Trouble in the radio transmitter with the electrical circuits can usually be located most easily by use of Tuning Equipment IE-6-A or IE-7-A. The normal current in the various circuits for CW or Voice carrier operation with 14 volts input to the dynamotor unit for BC-338-A and 28 volts for BC-353-A is as follows:

Tube	*Use*	*Normal Current*
VT-66	speech amplifier	30 to 35 milliamperes
VT-100	modulators (2 used)	70 to 110 milliamperes
VT-101	oscillator	28 to 38 milliamperes
VT-100	amplifier (3 used)	260 to 280 milliamperes

The antenna current will vary from 1 to 5 amperes depending on the frequency and antenna in use. Various troubles which may develop are listed below along with some of the possible causes. The remedy will be obvious.

Trouble	*Possible Cause*
1—No output	*a* Blown fuse. *b* Antenna circuit open or grounded. *c* Antenna circuit detuned. *d* Burned out thermocouple part 21. *e* Crystal not working. *f* Burned out tubes.
2—No modulation	*a* Microphone button defective. *b* Broken microphone cord. *c* Burned out Tube VT-66. *d* Shorted transformer. *e* Broken tube connection.
3—Crystal not working	*a* Improperly tuned. *b* Crystal has been shattered by dropping. *c* Detuned by locking of tuning capacitor. *d* Capacitors shorted by dirt or by accident. *e* Defective tube. *f* Open tube connection.
4—Intermittent or varying output	*a* Poor contact in roller of antenna or power amplifier coils. *b* Crystal tuned too close to break out point. *c* Unsteady battery voltage. *d* Poor relay contact. *e* Swinging antenna. *f* Tuning control not locked.
5—Failure to switch bands	*a* Low battery voltage. *b* Dirt on worm gear of drive mechanism. *c* Worn or burned control switch 42-D or 27-E. *d* Relay 25-1 or 25-2 stuck or shorted. *e* Excessive friction throughout due to corrosion during storage, dirt, etc.

4.2.2 Dynamotor Unit PE-59-A or PE-62-A

These units are very rugged and are not likely to develop trouble, even over long periods of time. Regular mechanical inspection plus greasing and replacement of brushes as required are all that are necessary.

4.2.3 Trouble Location and Remedy in Radio Receiver

4.2.3.1 General:—The normal sensitivity (number of microvolts to produce 10 milliwatts—6.3 volts output into a 4000 ohm resistance load) of the radio receiver is better than 5 microvolts when measured under the following conditions: Antenna switch set at ANT; output load 4000 ohms; 30% modulated carrier to the receiver antenna through phantom Antenna A-59-A; control set for MVC and the volume control at maximum unless the output, without modulation, exceeds 2.5 milliwatts (3.2 volts), in which case, the volume control is adjusted to give 2.5 milliwatts (3.2 volts) output. This sensitivity will, of course, be subject to variation with time due to tube aging, etc. *Therefore, it is recommended that no attempt be made to retrim or realign the equipment unless the sensitivity is found to be less than 6 microvolts with new, average tubes.* Satisfactory operation of the receiver in the test set-up indicates that the trouble is in the aircraft. Therefore, circuit check the radio control box in accordance with Figure 68. The following graphically outlines the procedure for trouble location, the numbers in each block referring to the paragraph numbering in the following discussion.

4.2.3.2 Equipment Required:—The following instruments are required in locating and correcting the most probable troubles in this receiver:

1—Signal Generator I-72-A.
2—Test Analyzer—Weston 772 or equivalent.
3—Output meter, rectifier type, 0-10 volt, 4000 ohms.
4—Tube checker—Weston 773, or equivalent.

4.2.3.3 Weak or No Signals on All Bands:—

1—Check of Dynamotor Voltages—When all signals on all bands are weak or no signals are heard even when known to be present, the procedure follows that shown in the chart. The voltages checked on the dynamotor socket should closely approximate the values shown below. If the voltage readings do not approximate the values shown, the dynamotor and filter circuits should be checked, as well as the wiring and components.

2—Tube Check—If the voltages at the dynamotor socket approximate the values given, proceed to check all tubes for emission, shorts and opens or replace all tubes with those of known average characteristics.

3—Check of Socket Voltages—If tubes check satisfactorily, or if after replacing with tubes known to be good, the sensitivity is still low, proceed to check all tube socket voltages. The average socket voltages are given in Figure 43. Conditions

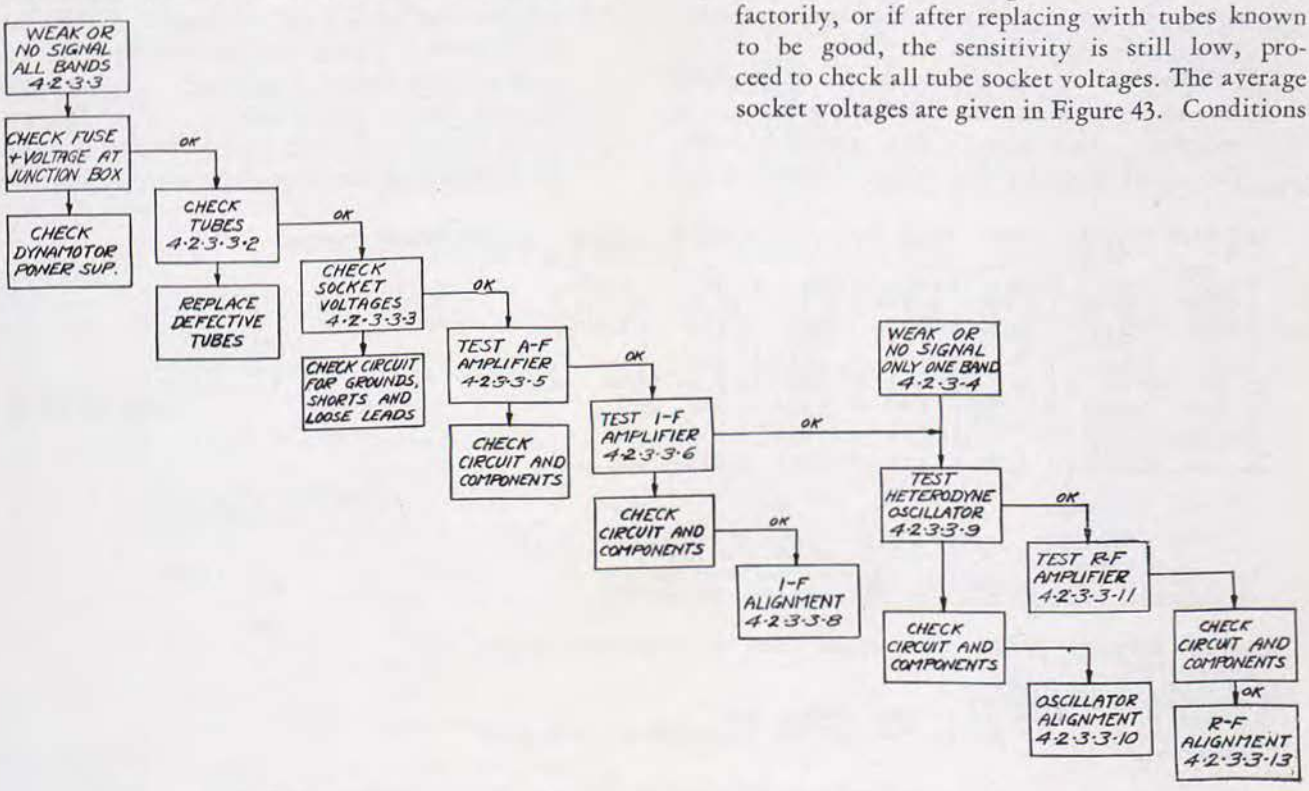


FIGURE 42—RADIO RECEIVER BC-225-A OR BC-352-A, TROUBLE LOCATION AND REMEDY CHART

of measurement are input voltage 14 volts (BC-225-A) or 28 volts (BC-352-A); MVC; Volume "Maximum".

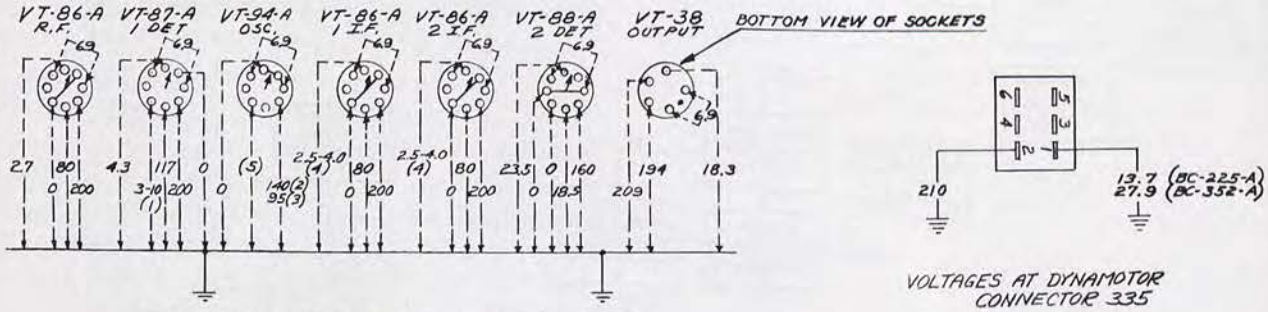
4—Check Circuit Wiring and Components—If the tube socket voltages do not approximate the values shown in Figure 43, the associated circuits and components should be checked for grounds, shorts and similar defects.

5—Test of Audio Amplifier—Having checked all socket voltages and found the values to be correct, proceed to the test of the audio-frequency amplifier. This can be checked by capacitively coupling the 400 cycle output of Signal Generator I-72-A from ground to the audio diode socket prong through a 500 mmfd. capacitor. Proper functioning of the audio amplifier will be indicated by an output of approximately 4 milliwatts (4.0 volts) for the full output of the generator, with the receiver on MVC. Circuits, wiring and components should be checked if this order of response is not obtained.

6—Test of Intermediate-Frequency Amplifier—Following a satisfactory test of the audio amplifier, check the intermediate-frequency amplifier by connecting the signal generator to the grid cap of the first detector tube, the frequency being adjusted to 480 kc. A rough check of the proper functioning of the i-f amplifier is indicated by 10 milliwatts (6.3 volts) or more output with the signal generator output adjusted to Step 2 Vernier 1.

7—I-F Amplifier Circuit Check—If the i-f amplifier does not respond as above or lacks sensitivity, a progressive check stage by stage, should be made. The signal generator is connected through a 500 mmfd. capacitor to the signal diode socket prong and to ground, and tuned to give maximum output (This occurs near 450 kc.). The full output of the signal generator will give approximately 0.3 milliwatt (1.1 volts) output for a properly functioning circuit. Coupling the generator to the grid of the second i-f amplifier should indicate a decided gain in sensitivity. Proceeding similarly towards the first detector, each stage should show a decided gain, and a faulty stage can be circuit checked for grounds, shorts, or defective components.

8—Alignment of I-F Amplifier—When all stages have been tested, the i-f amplifier alignment is checked by coupling a low level input signal of 480 kc. to the second i-f amplifier grid, and adjusting the trimmers of transformer 297 for maximum output. The volume control should be set for maximum position and, as this transformer is closely coupled, it is necessary to check the alignment for peak and symmetry and retune, if required. Check for symmetry by detuning the signal generator both higher and lower in frequency from 480 kc. until the receiver output is one-half of the value at resonance. Symmetrical trimming is obtained when the above detuning results in approximately equal frequency changes from 480 kc. Shift the generator output leads to the grid of the first i-f amplifier and align both trimmers of transformer 295 at 480 kc. Check the alignment for peak and symmetry and retune, if necessary. Do not touch the trimmers of transformer 297. Shift the generator output lead to the grid of the first detector, the band switch turned to a crystal band and with



TUBE SOCKET VOLTAGES

MEASURED WITH 14 VOLTS AT JUNCTION BOX FOR BC-225-A
MEASURED WITH 28 VOLTS AT JUNCTION BOX FOR BC-352-A

(1) VARIES BETWEEN BANDS. NO READING HERE IF OSCILLATOR IS NOT OSCILLATING.
(2) OSCILLATING CONDITION
(3) NON-OSCILLATING CONDITION
(4) VARIES WITH SETTING OF I-F GAIN CONTROL, 220
(5) HIGHLY VARIABLE. SEE NOTE (1) FOR BETTER INDICATION OF OSCILLATOR CONDITION.

FIGURE 43—RADIO RECEIVER BC-225-A OR BC-352-A, TUBE SOCKET AND DYNAMOTOR VOLTAGES

the crystal removed, align both trimmers of transformer 293 at 480 kc. + 1.5 kc. then tune the signal generator to 480 kc. — 1.5 kc. and check the alignment of both trimmers at this frequency. If an alignment change is necessary, change the frequency deviation, keeping equal amounts plus and minus. Repeat the above procedure until no alignment change is necessary when changing from the plus to the minus frequency.

Caution: After each trimmer has been adjusted, its lock-nut should be tightened. In order to prevent turning the trimmers when locking, the lock-nut should be turned reasonably tight before the final alignment.

9—Check of Heterodyne Oscillator—Having checked the functioning of the i-f amplifier, if signals are not heard on any band, the oscillator should be checked for oscillation. This can be done by noting i-f sensitivity at the first detector grid when the band switch is turned to the defective band and when turned to a crystal band with the crystal removed. If the heterodyne oscillator is functioning the sensitivity as measured above on the tunable band will be approximately 20% lower than on the crystal band. If this difference is not observed, the oscillator circuit should be checked for grounds, shorts or defective components.

10—Alignment of Heterodyne Oscillator—Couple the signal generator to the first detector grid, and align the heterodyne oscillator in accordance with the table of alignment data given below.

This alignment of the oscillator does not constitute a final adjustment. Having aligned the oscillator on Bands 1 to 4, proceed with check of the r-f amplifier.

11—Test of R-F Amplifier—Introduce a signal into the antenna post of the radio receiver through Antenna A-59-A. With the radio receiver set to any one of the aligned frequencies and the signal generator adjusted to Step 1 and Vernier 6, tuning the signal generator to the receiver frequency should give an output over 10 milliwatts (6.3 volts).

12—R-F Amplifier Circuit Check—If the r-f amplifier does not respond as above or lacks sensitivity, a progressive check stage by stage, should be made. With the signal generator set on Step 2 and Vernier 1 and its output introduced to the grid on the first detector, there should be approximately 10 milliwatts (6.3 volts) output. Coupling the signal generator to the grid of the r-f amplifier should indicate a decided gain in sensitivity. Proceeding similarly to the antenna, the input stage should also show a decided gain. Circuit check the defective stage for grounds, shorts or defective components.

13—Alignment of R-F Amplifier—Proceed as follows to align the r-f amplifier:

a—Tunable Bands—All alignment is done by feeding the test signal into the radio receiver antenna post through Antenna A-59-A. Place the band switch on the band lacking sensitivity, and adjust the input signal frequency accurately to the alignment frequency (higher value)

TABLE OF ALIGNMENT DATA

Band No.	*Freq. Range*	*Alignment Freq.*	*Trimmers*** *Ant.*	*R-F Plate*	*Det. Grid*	*Osc.*
1	200–400 kc.	400 Kc., 210 Kc.*	256–4	256–8	256–12	268–4, 249–4*
1	400 Kc.	480 Kc.		280		
2	550–1500 kc.	1440 Kc., 570 Kc.*	256–3	256–7	256–11	268–3, 249–3*
2	550 Kc.	480 Kc.		286		
3	2.5–5.0 mc.	5 Mc., 2.7 Mc.*	256–2	256–6	256–10	268–2, 249–2*
4	5–8 mc.	8 Mc., 5.05 Mc.*	256–1	256–5	256–9	268–1, 249–1*
5	3–5 mc.	Crystal Xtal. Freq.+480 kc.	1	1	1	+
6	3–5 mc.	Crystal Xtal. Freq.+480 kc.	2	2	2	+
7	5–8 mc.	Crystal Xtal. Freq.+480 kc.	3	3	3	+

*Oscillator series trimmer and trimming frequencies.
**Refer to Figures 19 and 20 for location.
+No trimmers are used on the oscillator in these bands, since the crystals determine the oscillator frequency.

shown in the "Table of Alignment Data" for the band under test. With the tuning control set for this alignment frequency, adjust the oscillator trimmer which is found on the top of the oscillator unit. Having adjusted the oscillator trimmer for maximum output of the radio receiver, proceed to adjust the r-f trimmers, starting with Det. Grid and adjusting R-F Plate and Ant. trimmers in order. Readjust the oscillator trimmer accurately and then proceed to adjust at the alignment frequency marked * in "Table of Alignment Data". With the signal generator and radio receiver dial set at this frequency, adjust the trimmer marked * for maximum output. Tune the radio receiver slightly higher or slightly lower in frequency, adjusting the trimmer for each frequency until a simultaneous tuning and adjustment give a maximum output. Repeat the operations at the high and low frequency ends of each band until perfect alignment is obtained. After the trimmers of Band 1 have been aligned, set the tuning dial at 400 kc. and with the signal generator tuned to 480 kc. set the signal generator for slightly less than its maximum output. Adjust the permeability tuned trap 280 until a minimum reading is obtained on the output meter. Since this trap has high attenuation, tuning the signal generator from 470 kc. to 490 kc. will disclose two peaks of response. In order to equalize these peaks, tune the signal generator to a slightly higher or lower frequency than 480 kc. and readjust 280. The above procedure is followed on Band 2 after its trimmers have been aligned. Tune the radio receiver to 550 kc. and adjust the permeability tuned trap 286.

b Crystal Bands—Follow the same procedure as for the tunable bands with the exception that the signal generator is set to the frequency marked on the front panel of the radio receiver. This frequency should be exactly 480 kc. higher or lower than the frequency marked on the crystal in use. Tune the signal generator accurately to the radio receiver resonance and align the three crystal band trimmers which are marked with the number of the crystal band to which the radio receiver is set. See paragraph 2.4.4.3 for alignment of radio receiver to a new crystal frequency.

4.2.3.4 Weak or No Signals on any One Band:—Follow the procedure given below:

1—The condition of satisfactory reception on several bands and weak or no signals on one or more bands, indicates the correct functioning of the i-f and a-f amplifier and requires checking only the r-f amplifier and heterodyne oscillator for the defective band or bands. The procedure outlined in paragraph 4.2.3.2-9 to 4.2.3.2-13 should be followed for the defective band or bands.

2—Weak or No Signals on Band 1 Loop—If Band 1 operates satisfactorily on ANT, but is weak or receives no signal on PL or TL, disconnect Plug PL-138 at the front panel on the radio receiver and circuit check the input circuit for grounds, shorts and components. Also, circuit check both the transverse and parallel loop circuits of Loop LP-16-A and Cordage CO-202.

4.2.3.5 Measurements and Circuit Checks:—The procedure and values given in the following discussion are based on the use of Weston Test Analyzer 772.

1—If all parts seem to be securely in position with the dynamotor running, and poor operation is obtained on the radio receiver, a careful check should first be made of the cables and plugs using the voltmeter and ohmmeter sections of the analyzer. If all plug-in cable connections seem to be functioning properly, a test should be made of the tubes in the radio receiver using a Weston Tube Checker 773. Should neither of these tests locate the difficulty, voltage and current or resistance measurements should be made as outlined in the following paragraph.

2—Voltage Measurements—When removing the radio receiver from an aircraft it is recommended that both chassis and case be taken out together. This procedure will protect the radio receiver against possible damage to components mounted on the chassis top. When ready to place the radio receiver on Mounting FT-182-A, release the two snap slides and remove the chassis from the case. Make sure that Radio Receiver BC-225-A is connected to a 14-volt test set-up and that Radio Receiver BC-352-A is connected to a 28-volt test set-up. Set up the analyzer and check the voltages in accordance with the instructions given below:

a—Be sure the plug and tube top grid connections are secure when taking readings.

b—Keep the analyzer AC-DC switch on DC.

c—Insert the test leads on the DC VOLTS jacks.

d—Select the appropriate voltage range by rotating the selector switch to the indicated position.

e—Set the radio receiver switch to the MVC position, unless otherwise specified.

f—Test the radio receiver with the volume control at the maximum position (clockwise).

g—Set the tuning control to 1500 kc. Readings should deviate but slightly when switching to other bands with the tuning control remaining at the high-frequency end of each band.

NOTE: The readings given below are average values taken on radio receivers of this type using a 14-volt power supply in the case of the Radio Receiver BC-225-A and 28 volt power supply in case of the Radio Receiver BC-352-A. The power supply voltage in each case is measured at the junction box between terminals 1 and 3. Meter indications within plus or minus 10% of these values will in most cases indicate correct operation.

3—Resistance and Continuity Measurements—Set-up the receiver on Mounting FT-182-A as for measurement of voltages but do not turn on the power. It is preferable to disconnect the battery. This procedure permits testing without the accidental application of power and the consequent danger of voltages being built up across the various resistors and capacitors, which would cause serious errors in reading on the ohmmeter ranges and might possibly damage the test instrument. Set the Model 772 Analyzer for resistance measurements by rotating the selector switch to the suitable range. Before taking a resistance reading on any of the ranges, short the two test leads together and rotate the Ohmmeter Adjuster until the instrument pointer reads exactly full scale. (Full scale is zero ohms). In general, ohmmeter readings will be most accurate when taken on the upper two-thirds of the scale, and whenever possible, a range should be chosen that will give indications in this area. With the analyzer so adjusted resistance measurements will be approximately as tabulated below. These are average values taken on receivers of this type with the dynamotor removed, controls set to MVC and volume maximum. Meter indications within plus or minus 20% of these values will in most cases indicate correct operation.

TUBE VOLTAGES

Stage	*Tube*	*Plate Volts*	*Screen Volts*	*Cathode Volts*	*Heater Volts*	*Inj. Grid Volts*	*AVC Diode*	*Sig. Diode*
R-F	VT-86-A	200	80	2.7	6.9			
1 Det.	VT-87-A	200	117	4.3	6.9	3–10(1)		
Osc.	VT-94-A	140(2) 95(3)	...	0	6.9			
1 I-F	VT-86-A	200	80	2.5–4.0(4)	6.9			
2 I-F	VT-86-A	200	80	2.5–4.0(4)	6.9			
2 Det.	VT-88-A	160	...	23.5	6.9		0	18.5
Output	VT-38	194	209	18.3	6.9			

Notes: (1) Varies between bands. No reading here if oscillator is not oscillating.
(2) Oscillating condition.
(3) Non-oscillating condition.
(4) Varies with setting of i-f gain control 220.

RESISTANCE TO GROUND (OHMS)

Stage	*Plate*	*Screen*	*Cathode*	*Grid*	*Inj. Grid*	*AVC Diode*	*Signal Diode*
R-F	34000	22000	400	4.2 meg.	50000		
1 Det.	34000	44000	400	1.7 meg.			
Osc.	42000		0	50000			
1 I-F	34000	22000	400–800*	1.7 meg.			
2 I-F	34000	22000	400–800*	1.7 meg.			
2 Det.	67000		15000	.5 meg.		1 meg.	265000
Output	33100	32000	900	.5 meg.			

Notes: *Depends on setting of i-f gain control 220.
All suppressors are connected to ground. With good tubes in the sockets, all heater terminals should show continuity to ground.

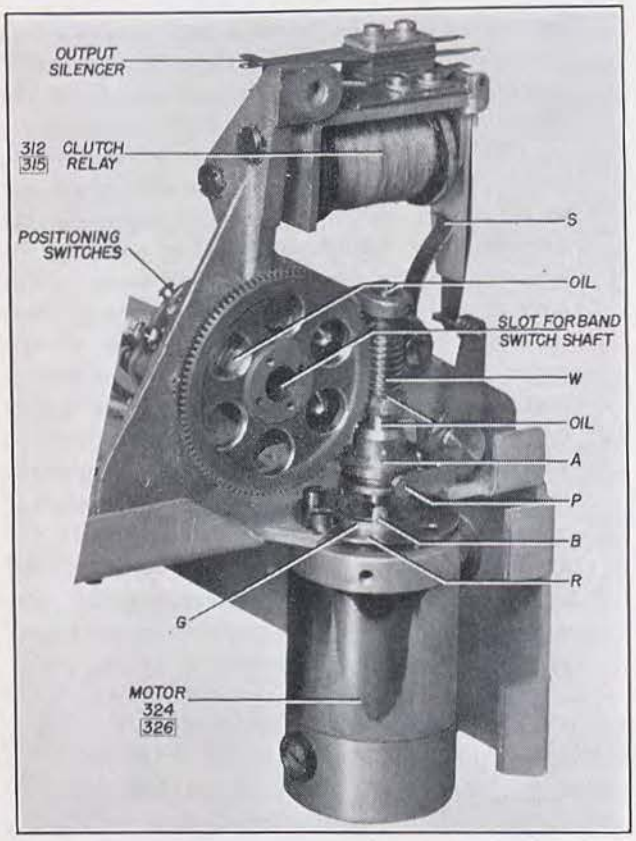


FIGURE 44—RADIO RECEIVER BC-225-A OR BC-352-A, BAND CHANGE MECHANISM

4.2.3.6 Mechanical Trouble:—This receiving equipment, having been carefully designed and constructed of the best materials for the purpose, should give a long trouble-free life. However, due to the complexity of the band change system, mechanical misalignment may occur in this part of the radio receiver. This condition is particularly true if any component, such as coil unit, the magnetic clutch or the band change motor has to be removed for servicing. Misalignment will show up in sluggish action of band changing under condition of low battery voltage. Another case of misalignment will cause the switch to oscillate about the selected position when the battery voltage is high. The correction of these troubles is covered in the following paragraphs.

1—Sluggish action of band switch may be corrected as follows:

a—Make certain that all points indicated in Figure 44 are lubricated, applying light oil sparingly.

b—When replacing a coil unit, insert the mounting screws toward the rear of the unit first, and the remaining screws next. This procedure will insure proper alignment of coil units. However, if a switch section has to be replaced, the leads to the switch must be positioned so that they do not place any strain on the switch section.

c—In replacing the switch drive motor, 324 or 326, it is necessary to centralize the two engaging portions of the clutch and at the same time, to centralize the ring, part R Figure 44, with the governor shoes to reduce to a minimum the frictional load on the motor. After having positioned the motor properly and secured it to the chassis, make certain that the worm and worm wheel parts W do not bind when the switch is rotated between Band 1 and Crystal 3. If there is any binding, loosen the three screws that secure the worm bracket and disengage the worm slightly, being sure to maintain the clutch alignment. Tighten the three screws and check for binding.

d—When replacing the clutch relay, 312 or 315, it will be necessary to set the moving clutch member A to just bear on the face of the fixed clutch member B. When all the backlash is taken up, by loosening the two relay armature holding screws and sliding relay armature assembly, tighten screws to lock in position. Also, set the moving clutch member to just bear on drive pin P when all backlash is taken up by bending relay contact operating arm.

2—Oscillation of Band Switch. This condition is most likely to be caused by the release spring S not giving rapid enough clutch release. If this appears to be so, bend the spring slightly to the right. *WARNING: If the spring is bent too much, the magnetic clutch will not pull in when the battery voltage is low.* It is imperative that no oil be used in the over-speed governor G. Should oil get into the governor, hold the magnetically operated clutch open and switch to some other band allowing the band switch motor to run "free" for 10 or 15 seconds. This operation will burn out any accumulated oil.

4.2.4 Trouble Location and Remedy in Radio Control Box

4.2.4.1 General:—The radio control box front panel lights, will require occasional renewal which can be done by easy removal of the defective lamp from the front of the panel and replacement with a good Lamp LM-32. Any other electrical or mechanical trouble will require removing the radio control box from the aircraft for test and repair.

4.2.4.2 Electrical Trouble:—To locate defective electrical components or wiring, use the Weston Test Analyzer 772, checking against Figure 68. This checking can be done without disassembling the radio control box by

using the Ohmmeter connection (see par. 4.2.3.5-3) and checking continuity between the proper pins on the control box sockets. The microphone jack, 504, can be tested by means of a PL-68 inserted in the jack. If the continuity check indicates a defective component or connection, disassemble the radio control box as explained in par. 4.2.4.3 and replace or repair the defective part.

4.2.4.3 Disassembly of Radio Control Box:—This can best be accomplished as follows:

1—Remove all knobs using the set-screw wrench, which is contained in Tuning Equipment IE-6-A or IE-7-A.

2—Disconnect all panel light resistors and ground leads marked A in Figure 45.

3—Remove all screws marked A in Figure 4.

4—Withdraw the parts from the case. At this point, all components except 512 can be replaced without removing the back plate. If it is necessary to replace 512 or some of the mechanical parts, it will be necessary to remove the back plate as follows:

a—Scratch a reference line on the hub of the detent wheel and the end of the shaft to insure correct assembly. See D, Figure 46.

b—Remove the taper pin and the detent wheel.

c—Remove the four screws S that mount the back plate.

d—Withdraw the back plate, maintaining it parallel to the front plate until the back plate is clear of the locating pins and shafts.

4.2.4.4 Mechanical trouble:—Mechanical trouble will probably be confined to the following:

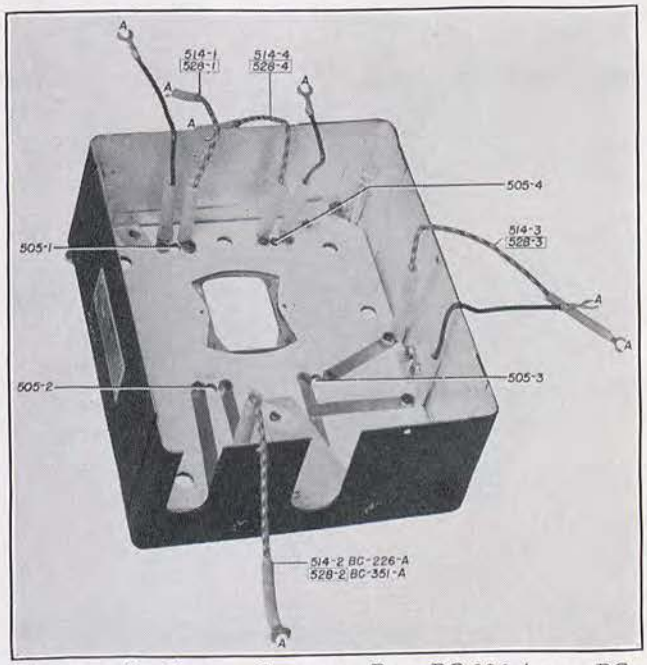


FIGURE 45—RADIO CONTROL BOX BC-226-A OR BC-351-A, INSIDE VIEW OF COVER

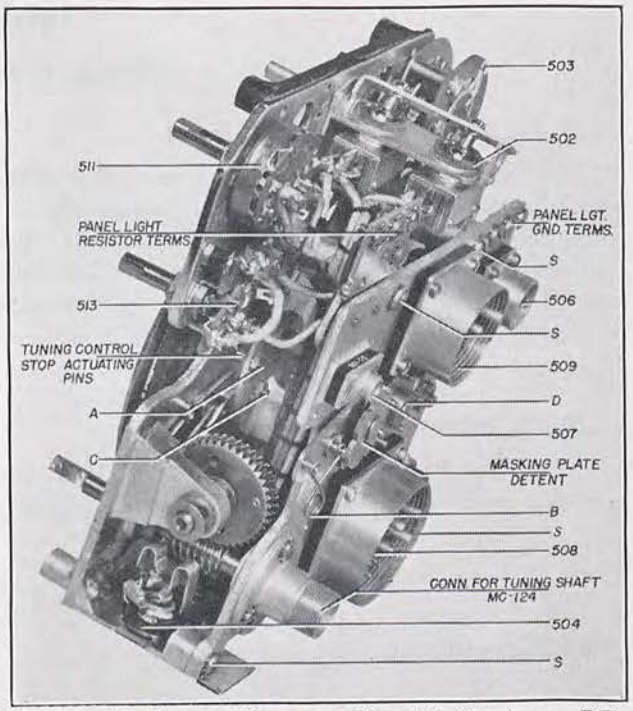


FIGURE 46—RADIO CONTROL BOX BC-226-A OR BC-351-A, REAR RIGHT VIEW, COVER REMOVED

1—Loose Masking Plate. The probable cause of a loose masking plate that does not position properly is a broken or disconnected detent spring. Remove the radio control box from the aircraft and replace the spring being sure that, when it is in place, as shown at B, Figure 46, the notched disc is forced against the detent wheel.

2—Tuning Control Stop Adjustment. When properly adjusted, the tuning dial should stop at 195 kc. and should require 90½ revolutions to reach the stop at the high-frequency end. The low frequency or counterclockwise stop should never allow the dial to rotate past the 195 kc. mark, because the tuning capacitor would act as a stop with consequent danger of damage. In order to reset the tuning stops, remove the parts from the radio control box case in accordance with par. 4.2.4.3. Rotate the tuning control approximately 30 turns from the counterclockwise stop to make the adjustable eccentric stop pins accessible from the left hand side of the unit. Loosen the nut on A, Figure 46 for adjustment of the counterclockwise stop and turn the eccentric pin by means of the integral hexagonal nut. Tighten the first nut and rotate the tuning knob to the stop and check the dial indication. Repeat until the 195 kc. mark lines up with the fiducial mark. Adjust C similarly so that the clockwise stop is 90½ turns from the counterclockwise stop.

SECTION V

SPECIAL REQUIREMENTS

5.1 Radio Transmitter Crystal Control

5.1.1 The transmitter frequency is controlled solely by the crystal of the particular channel in use. If it becomes necessary to change frequency to something other than those provided with available crystals then new crystals must be obtained. Each if the four channels may be tuned anywhere within the band of 3000 to 8000 kc.

5.2 Radio Receiver Crystal Control

5.2.1 Radio Receivers BC-225-A and BC-352-A are provided with three-pre-tuned crystal-controlled bands wherein the oscillator frequency is determined solely by the crystal in use. The r-f pre-selector is provided with trimmers of sufficient capacity range to cover in crystal bands 1 and 2 from 3 to 5 mc. and in crystal band 3 from 5 to 8 mc. The adjustment of the crystal bands is covered in paragraph 2.4.4.3-4.

5.3 Motor Brake

During production of Radio Transmitters BC-338-A and BC-353-A a special overspeed brake was added to the channel selector motor to insure more reliable performance. The equipments involved are indicated on Figure 54.

5.4 Vacuum Tube Characteristics

5.4.1 Radio Receiver Tube Characteristics

Tube	*Heater*		*Esg.*	*Ep.*	*Ecg.*	*Ip.*	*Isg.*		*Rp.*	*Gm.*
	Volts	*Amps.*	*Volts*	*Volts*	*Volts*	*Ma.*	*Ma.*	*Mu.*	*Ohms*	*Microhms*
VT-38	6.3	0.3	180	180	–18	14	2.4	120	115,000	1050
VT-86-A	6.3	0.3	75	180	– 3	4.0	1.0	1100	1,000,000	1100
VT-87-A	6.3	0.3	100	250	– 3	2.4	7.1	....	1,000,000+	350
VT-88-A	6.3	0.3	...	250	– 9	9.5	...	16	8,500	1900
VT-94-A	6.3	0.3	...	250	– 8	9	...	20	7,700	2600

5.4.2 Radio Control Box Panel Lamps

Type No.	*Volts*	*Amps.*
LM-32	3	0.19

5.4.3 Radio Transmitter Tube Characteristics

Tube	*Heater*		*Esg.*	*Ep.*	*Ip.*	*Wsg.*	*Ecg.*
	Volts	*Amps.*	*Volts*	*Volts*	*Ma.*	*Watts*	*Volts*
VT-66†	6.3	.7	285	375	38	11	–20
VT-100*	6.3	.9	300	600	120	3.5	–30
VT-100ø	6.3	.9	300	475	83	2.5	–200
VT-101°	12.6	.7	200	500	80	8.0	–200

†Maximum values as class AB modulator.
*Maximum values as plate modulated r-f amplifier.
øMaximum values as class C oscillator.
°Maximum values as class A amplifier.

SECTION VI

SUPPLEMENTARY DATA AND LIST OF REPLACEABLE PARTS

6.1 List of Replaceable Parts—Table I

6.1.1 RADIO TRANSMITTER BC-338-A OR BC-353-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-338-A	BC-353-A					
1–1, 1–2, 1–3, 1–4, 1–5	1–1, 1–2, 1–3, 1–4, 1–5	Socket, 5 contact ceramic, tube	American Phenolic Corp.	T-7605948 Pt. 54		
2	2	Socket, 7 contact ceramic, tube	American Phenolic Corp.	T-7605948 Pt. 55		
3–1, 3–2, 3–3, 3–4	3–1, 3–2, 3–3, 3–4	Socket, octal, crystal	Cinch Mfg. Co. 6749-CW	M-7407079 Pt. 3		
4	4	Resistor, 150,000 ohms ±20% 1W., osc. bias	I.R.C. BT-1	T-7605948 Pt. 123		
5–1, 5–2, 5–3, 5–4	5–1, 5–2, 5–3, 5–4	Capacitor, osc. tuning	E.F. Johnson Co. Special	M-7407053 Pt. 1		
6–1	6–1	Capacitor, .01 mfd. ±10% 1000 V., osc. screen	Cornell Dubilier 4LS-11010	P-7706920 Pt. 1		
6–2	6–2	Capacitor, .01 mfd. ±10% 1000 V., P.A. grid	Cornell Dubilier 4LS-11010	P-7706920 Pt. 1		
6–3	6–3	Capacitor, .01 mfd. ±10% 1000 V., P.A. screen grid	Cornell Dubilier 4LS-11010	P-7706920 Pt. 1		
6–4	6–4	Capacitor, .01 mfd. ±10% 1000 V., osc. plate	Gornell Dubilier 4LS-11010	P-7706920 Pt. 1		
6–5	6–5	Capacitor, .01 mfd. ±10% 1000 V., osc. blocking	Cornell Dubilier 4LS-11010	P-7706920 Pt. 1		
7	7	Capacitor, .001 mfd. ±2% 2500 V., P.A. plate	Cornell Dubilier 4LS-22010	P-7706920 Pt. 2		±2%
8	8	Capacitor, .002 mfd. ±10% 1000 V., P.A. grid	Cornell Dubilier 4LS-12020	P-7706920 Pt. 3		
9A,9B	9A,9B	Capacitor, 25-25 mfd. —0 +150% 25 V.,mic. supply	Cornell Dubilier EP-10005	P-7706920 Pt. 12		
10–1	10–1	Capacitor, 1 mfd. —10 +20% 600 V., surge suppressor	Westinghouse S# 1105489	P-7706920 Pt. 15		
10–2	10–2	Capacitor, 1 mfd. —10 +20% 600 V., S.A. by-pass	Westinghouse S# 1105489	P-7706920 Pt. 15		
11	11	Capacitor, .5 mfd. —10 +20% 600 V., mod. grid	Cornell Dubilier DYR-6050-N	P-7706920 Pt. 11		
12A,12B, 12C	12A,12B, 12C	Capacitor, 48, 25 and 13 mmfd. ±5% 5000 V., ant. tuning	Cornell Dubilier PL-1008-30 BLS	P-7706920 Pt. 9		

6.1.1 RADIO TRANSMITTER BC-338-A OR BC-353-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	(W) Drawing Number	Stock Number	Notes
BC-338-A	BC-353-A					
13–1	13–1	Resistor, 25 ohms ±20% ½ W., grid	I.R.C. BW-½	T-7605948 Pt. 63		
13–2	13–2	Resistor, 25 ohms ±20% ½ W., grid	I.R.C. BW-½	T-7605948 Pt. 62		
13–3	13–3	Resistor, 25 ohms ±20% ½ W., grid	I.R.C. BW-½	T-7605948 Pt. 61		
14	14	Transformer, microphone	Westinghouse	L-340186		
15	15	Transformer, interstage	Westinghouse	L-365711		
16	16	Transformer, modulation	Westinghouse	L-365727		In same can as part 67
	17	Relay, keying	Westinghouse	T-7605940 G2		
18–1	18–1	Coil, P.A. tank, channel 1	Westinghouse	T-7605943 G3		
18–2	18–2	Coil, P.A. tank, channel 3	Westinghouse	T-7605943 G3		
19	19	Capacitor, .0015 mfd. ±2% 3000 V., ant. series	Cornell Dubilier, PL-679-15LS	P-7706920 Pt. 4		±2%
20–1,20–2, 20–3,20–4	20–1,20–2, 20–3,20–4	Switch, ant. cap. selector	Yaxley	M-7407065 G1		
21	21	Thermocouple, ant. current	Weston Type 606	T-7605936 Pt. 11		
22	22	R.F. choke, P.A. plate	Westinghouse	M-7407116		
23	23	R.F. choke, P.A. grid	Westinghouse	M-7407117		
24	24	Inductance, osc. plate	Westinghouse	M-7407224		
	25–1	Relay, clutch engaging	C.P. Clare, special	M-7407184 Pt. 2		
	25–2	Relay, clutch engaging	C.P. Clare, special	M-7407184 Pt. 2		
26	26	Coil, P.A. tank channel 2	Westinghouse	T-7605943 G1		
27A to 27E	27A to 27E	Switch, ant. capacitor	Westinghouse	T-7605852 G1		
28–1,28–2, 28–3,28–4	28–1,28–2, 28–3,28–4	Transformer, r-f coupling	Westinghouse	P-7706658 G1		
	29–1	Motor, ant. tuning	Pioneer Gen-E-motor special	P-7706876 G6		

6.1.1 RADIO TRANSMITTER BC-338-A OR BC-353-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-338-A	BC-353-A					
	29–2	Motor, channel selector	Pioneer Gen-E-motor special	P-7706876 G6		
30	30	Coil, P.A. tank, channel 4	Westinghouse	T-7605943 G5		
31	31	Resistor, 10,000 ohms ±10% 2″-O, osc. screen	Ward Leonard K40763	T-7605936 Pt. 33		
32	32	Coil, ant. tuning, channel 1	Westinghouse	T-7605943 G6		
33	33	Capacitor, .00009 mfd. ±2% 3000 V., P.A. tank	Cornell Dubilier PL-871-15LS	P-7706920 Pt. 6		
34	34	Resistor, 700 ohms ±10% 1¾″-Z, S.A. cathode	Ward Leonard K40763	T-7605948 Pt. 70		
35	35	Resistor, 63 ohms ±10% 6″-T, bias	Ward Leonard K40763	T-7605948 Pt. 73		
36	36	Resistor, 2500 ohms ±10% 6″-T, screen grid	Ward Leonard K40763	T-7605948 Pt. 74		
37	37	Resistor, 2000 ohms ±10% 1¾″-Z, P.A. grid	Ward Leonard K40763	T-7605948 Pt. 69		
38	38	Resistor, 100 ohms ±10% 2″-O, surge	Ward Leonard K40763	T-7605948 Pt. 68		
39	39	Coil, ant. tuning, channel 2	Westinghouse	T-7605943 G4		
40	40	Plug PL-136, power connector	H.B. Jones special	M-7407027 Pt. 1		
	41	Resistor, 300 ohms ±10% 1¾″-Z, mic. series	Ward Leonard	T-7605948 Pt. 135		
42A,42B, 42C,42D	42A,42B, 42C,42D	Switch, channel selector	Westinghouse	T-7605979 G1		
43	43	Capacitor, .1 mfd. —10+20% 600 V., spark supp.	Cornell Dubilier DYR-6010-N	P-7706920 Pt. 10		
44	44	Coil, ant. tuning, channel 3	Westinghouse	T-7605943 G2		
45A,45B	45A,45B	Switch, P.A. and ant. tuning channel sel.	Westinghouse	P-7706907 G1		
46	46	Coil, osc. plate choke	National Co. R-100	T-7605936 Pt. 38		
47–1	47–1	Resistor, 10 ohms ±20% 1 W., P.A. plate	I.R.C. BW-1	M-7407171 Pt. 7		
47–2	47–2	Resistor, 10 ohms ±20% 1 W., P.A. plate	I.R.C. BW-1	M-7407171 Pt. 7		

6.1.1 RADIO TRANSMITTER BC-338-A OR BC-353-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-338-A	BC-353-A					
47–3	47–3	Resistor, 10 ohms ±20% 1 W., P.A. plate	I.R.C. BW-1	M-7407171 Pt. 7		
48	48	Resistor, 31.5 ohms 1¾"-Z, fil. shunt	Ward Leonard K40763	T-7605948 Pt. 72		
49–1	49–1	Key, test	Cutler Hammer	T-7605948 Pt. 35		
49–2	49–2	Switch, panel interlock	Cutler Hammer	T-7605948 Pt. 23		
50	50	Plug and socket, metering	H.B. Jones Special	P-7706746 G1		
51	51	Binding post, ant.	Westinghouse	T-7605960 G12		
52	52	Binding post, rec.	Westinghouse	T-7605960 G13		
53	53	Binding post, gnd.	Westinghouse	T-7605960 G10		
54	54	Resistor, 50 ohms ±20% ½ W., mic. loading	I.R.C. BT-½	T-7605936 Pt. 13		
55	55	Resistor, 10,000 ohms ±20% 1 W., mod.	I.R.C. BT-1	T-7605948 Pt. 132		
56	56	Capacitor, 8 mfd. —10 + 20% 600 V., H.V. filter	Westinghouse S# 1105490	P-7706920 Pt. 16		
57	57	Capacitor, .002 mfd. ±10% 2500 volt, P.A. plate	Cornell Dubilier 4LS-22020	P-7706920 Pt. 6		
58	58	Coil, ant. tuning, channel 4	Westinghouse	T-7605943 G7		
59	59	Resistor, 8000 ohms ±10% 2"-A, P.A. screen	Ward Leonard K40763	T-7605948 Pt. 75		
60	60	Rheostat, 25,000 ohms ±20% audio gain adj.	Allen Bradley Special	M-7407041 Pt. 2		
61	61	Resistor, 20 ohms ±20% ½ W., osc. plate	I.R.C. BW-½	T-7605948 Pt. 124		
62		Relay, keying	Westinghouse	T-7605946 G1		
63	63	Socket, S.A. tube	Amphenol	T-7605948 Pt. 49		
	64	Resistor, 5.7 ohms ±10% 2"-O, fil. series	Ward Leonard K40763	T-7605948 Pt. 152		
65	65	Resistor, 16.3 ohms ±10% 2"-A, osc. fil.	Ward Leonard K40763	T-7605948 Pt. 134		

6.1.1 RADIO TRANSMITTER BC-338-A OR BC-353-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-338-A	BC-353-A					
66	66	Capacitor .25 mfd. —10+20% 575 volt, mod. coup.	Cornell Dubilier	P-7706920 Pt. 17		
67	67	Choke, modulation	Westinghouse	L-365727		In same can with part 16
	68	Resistor, 5.7 ohms ±10% 2"-O, fil. series	Ward Leonard K40763	T-7605948 Pt. 152		
69	69	Capacitor, 2 mfd. —10+20% 600 V., S.A. cathode	Cornell Dubilier DYR-6200-N	P-7706920 Pt. 19		
70	70	Capacitor, .003 mfd. ±10% 1000 V., transformer by-pass	Cornell Dubilier 4L-12030	P-7706920 Pt. 20		
71	71	Resistor, 1000 ohms ±20% ½ W., vol. control series	I.R.C. BT ½	T-7605936 Pt. 44		
72-1, 72-2		Relay, clutch operating	C.P. Clare Co. special	M-7407184 Pt. 1		
73-1, 73-2		Motor, channel selector and ant. tuning	Pioneer Gen-E-Motor special	P-7706876 G2		
74		Resistor, 100 ohms ±10%, mic. series	Ward Leonard K40763	T-7605948 Pt. 71		
75A,75B	75A,75B	Capacitor, .1-.1 mfd. —10+20% 600 V., spark sup.	Cornell Dubilier PC-1224	P-7706920 Pt. 21		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RESISTORS (± 10% unless noted)				
201	201	R-F grid—2.5 meg. ½ W.	I.R.C. F-½	T-7605849 Pt. 48		
202	202	AVC. diode Load—1 meg. ½ W.	I.R.C. BT-½	T-7605849 Pt. 12		
203-1	203-1	Ant. protective res.—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		
203-2	203-2	AVC. diode filter—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		
203-3	203-3	Output grid res.—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		
203-4	203-4	1st Audio grid—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		
203-5	203-5	1st Audio grid—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RESISTORS (± 10% unless noted) —Continued				
203–6	203–6	1st I-F. grid res.—500,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 13		
204–1	204–1	Signal diode load—200,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 39		
204–2	204–2	R-F plate trans. shunt—200,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 39		
205–1	205–1	R-F AVC. filter—100,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 15		
205–2	205–2	1st det. AVC. filter—100,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 15		
205–3	205–3	1st I-F AVC. filter—100,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 15		
205–4	205–4	2nd I-F AVC. filter—100,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 15		
205–5	205–5	AVC. diode filter—100,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 15		
206–1	206–1	1st det. grid ✱3 res.—50,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 9		
206–2	206–2	Signal diode filter—50,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 9		
206–3	206–3	Oscillator grid leak—50,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 9		
207	207	2nd I-F sec. shunt res.—350,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 58		
208	208	Screen dropping res.—15,000 ohms 2 W.	I.R.C. BT-2	T-7605849 Pt. 35		
209	209	Output trans—pri. shunt—15,000 ohms ±5% ½ W.	I.R.C. BT-½	T-7605849 Pt. 49		
210	210	MVC dropping res.—12,000 ohms 1 W.	I.R.C. BT-1	T-7605849 Pt. 36		
211–1	211–1	1st det. screen res.—10,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 38		
211–2	211–2	AVC delay res.—10,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 38		
212	212	Osc. plate load—8,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 43		
213–1	213–1	R-F screen filter—5,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 40		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RESISTORS (± 10% unless noted) —Continued				
213–2	213–2	1st I-F screen filter—5,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 40		
213–3	213–3	2nd I-F screen filter—5,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 40		
213–4	213–4	2nd Det. cathode res.—5,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 40		
214	214	Osc. plate & 1st det. scr. filter—2,000 ohms 1 W.	I.R.C. BT-1	T-7605849 Pt. 37		
215–1	215–1	R-F plate filter—2,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 11		
215–2	215–2	1st i-f plate filter—2,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 11		
215–3	215–3	2nd i-f plate filter—2,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 11		
215–4	215–4	1st det. plate filter—2,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 11		
216	216	1st audio plate load res.—35,000 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 59		
217	217	Output cathode res.—900 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 41		
218	218	Panel, Resistor—Capacitor, long		T-7606246		
219–1	219–1	R-F cathode res.—400 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 10		
219–2	219–2	1st det. cathode res.—400 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 10		
219–3	219–3	1st i-f cathode res.—400 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 10		
219–4	219–4	2nd i-f cathode res.—400 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 10		
220	220	Rheostat—i-f sens. adj.—400 ohms	Allen-Bradley type J	P-7707208 Pt. 3		
221–1	221–1	Band 4, ant. reson. supp.—150 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 47		
221–2	221–2	Band 3, ant. reson. supp.—150 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 47		
222	222	Band 1, r-f link shunt—80 ohms ½ W.	I.R.C. BT-½	T-7605849 Pt. 44		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RESISTORS (± 10% unless noted) —Continued				
224	224	Heater dropping res.—21 ohms 4 W.	Ward-Leonard-type 1" Z	T-7605849 Pt. 42		
225	225	Panel, Resistor-capacitor, short		T-7707188 G-1		
226-1	226-1	Band 2, r-f link shunt—10 ohms ½ W.	I.R.C. BW-½	T-7605849 Pt. 46		
226-2	226-2	Band 3, r-f link shunt—10 ohms ½ W.	I.R.C. BW-½	T-7605849 Pt. 46		
		CAPACITORS—PAPER, —10+20% (600 V. unless noted)				
229	229	Output cathode by-pass 10 mfd.—electrolytic 50 V.	Solar-XEDR	P-7706920 Pt. 22		
230-1A&B	230-1A&B	Motor sw. cap.—2X1.0 mfd.	Solar-XDRC or Aerovox 630	T-7606278 Pt. 1		
230-2A	230-2A	Dyn. H.V. 2nd filter cap.—1.0 mfd.	Solar-XDRC or Aerovox 630	T-7606278 Pt. 1		
230-2B	230-2B	Dyn. H.V. 1st filter cap.—1.0 mfd.	Solar-XDRC or Aerovox 630	T-7606278 Pt. 1		
230-3A&B	230-3A&B	Dyn. H.V. 2nd filter cap.—2X1.0 mfd.	Solar-XDRC or Aerovox 630	T-7606278 Pt. 1		
230-4A&B	230-4A&B	Dyn. L.V. filter cap.—2X1.0 mfd.	Solar-XDRC or Aerovox 630	T-7606278 Pt. 1		
231-1	231-1	R-F cathode by-pass—.5 mfd.	Solar-XDRMT	T-7606278 Pt. 2		
231-2	231-2	2nd Det. cathode by-pass—.5 mfd.	Solar-XDRMT	T-7606278 Pt. 2		
231-3	231-3	Screen supply filter—.5 mfd.	Solar-XDRMT	T-7606278 Pt. 2		
232-1A	232-1A	R-F cathode by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232-1B	232-1B	R-F screen by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232-2A	232-2A	1st det. cathode by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232-2B	232-2B	1st det. screen by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232-3A	232-3A	1st det. screen filter—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—PAPER, −10+20% (600 V. unless noted)—Continued				
232–3B	232–3B	Cathode feeder by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232–4A	232–4A	1st i-f cathode by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232–4B	232–4B	1st i-f screen by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232–5A	232–5A	2nd i-f cathode by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
232–5B	232–5B	2nd i-f screen by-pass—.1 mfd.	Solar-XDRM or Aerovox 630	T-7606278 Pt. 3		
		CAPACITORS—MICA, ±10% unless noted				
233–1	233–1	Ant. transf. isolating cap—.025 mfd. ±2%	C-D type 4LS	T-7606278 Pt. 4		
233–2	233–2	1st det. AVC filter—.025 mfd. ±2%	C-D type 4LS	T-7606278 Pt. 4		
233–3	233–3	r-f plate filter—.025 mfd. ±2%	C-D type 4LS	T-7606278 Pt. 4		
234	234	Band 2, i-f trap tuning—.01 mfd. ±2%	C-D type 1WTS	T-7606278 Pt. 5		
235–1	235–1	AVC r-f filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–2	235–2	1st det. plate filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–3	235–3	1st i-f AVC filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–4	235–4	1st i-f plate filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–5	235–5	2nd i-f AVC filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–6	235–6	2nd i-f plate filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–7	235–7	1st audio grid coupling cap.—.01 mfd.	C-D type 1 WS	T-7606278 Pt. 6		
235–8	235–8	Audio interstage coupling cap.—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		
235–9	235–9	AVC diode filter—.01 mfd.	C-D type 1WS	T-7606278 Pt. 6		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—MICA, ±10% unless noted—Continued				
236	236	Ant. grounding cap.—5000 mmfd.	Solar type MWW	T-7606278 Pt. 8		
237	237	Band 1 i-f trap tuning—5000 mmfd. ±2%	Solar type MWWC-2	T-7606278 Pt. 9		
238	238	Output plate equalizer—2000 mmfd.	Solar type MWW-10	T-7606278 Pt. 10		
239-1	239-1	R-F grid coupling—500 mmfd.	Solar type MOWB-10	T-7606278 Pt. 11		
239-2	239-2	Osc.—1st det. coupling—500 mmfd.	Solar type MOWB-10	T-7606278 Pt. 11		
239-3	239-3	1st audio plate by-pass—500 mmfd.	Solar type MOWB-10	T-7606278 Pt. 11		
240-1	240-1	Band 3, r-f grid tracking—495 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 12		
240-2	240-2	Band 3, r-f plate tracking—495 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 12		
240-3	240-3	Band 3, 1st det. grid tracking—495 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 12		
241-A,B, C,D	241-A,B, C,D	Receiver tuning—variable 4 section 490 mmfd.	Radio Cond. Co. Series 17 type K 29 plates	T-7606159 G-1		All invar steel construction with exception of 3 r-f sections.
242	242	Band 2, osc. fixed series trim.—535 mmfd. ± 1%	C-D type 1R	T-7606278 Pt. 13		
243	243	Osc. plate coupling—250 mmfd.	Solar type MOWB-10	T-7606278 Pt. 14		
244-1	244-1	Band 4, r-f grid tracking—230 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 15		
244-2	244-2	Band 4, r-f plate tracking—230 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 15		
244-3	244-3	Band 4, 1st det. tracking—230 mmfd. ±1%	C-D type 5R	T-7606278 Pt. 15		
245	245	Band 3, osc. fixed series trim.—275 mmfd. ±3%	C-D type 5R	T-7606278 Pt. 16		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—MICA, ±10% unless noted—Continued				
246	246	Open antenna dummy—200 mmfd. ±5%	Solar type MOWB-5	T-7606278 Pt. 17		
247	247	Band 1 osc. fixed shunt trim—190 mmfd. ±2%	C-D type 5R	T-7606278 Pt. 39		
		CAPACITORS—VARIABLE AND MICA (± 10%)				
248-1	248-1	Crystal 3, r-f grid trim.—160 mmfd. var.	Hammarlund APC-160C	T-7606028 Pt. 6		
248-2	248-2	Crystal 2, r-f grid trim—160 mmfd. var.	Hammarlund APC-160C	T-7606028 Pt. 6		
248-3	248-3	Crystal 1, r-f grid trim—160 mmfd. var.	Hammarlund APC-160C	T-7606028 Pt. 6		
248-4	248-4	Crystal 3, r-f plate trim—160 mmfd. var.	Hammarlund APC-160C	T-7606028 Pt. 6		
248-5	248-5	Crystal 2, r-f plate trim—160 mmfd. var.	Hammarlund APC-160C	T-7606028 Pt. 6		
248-6	248-6	Crystal 1, r-f plate trim—160 mmfd. var.	Hammarlund APC-160-C	T-7606028 Pt. 6		
248-7	248-7	Crystal 3, 1st det. grid trim—160 mmfd. var.	Hammarlund APC-160-C	T-7606028 Pt. 6		
248-8	248-8	Crystal 2, 1st det. grid trim—160 mmfd. var.	Hammarlund APC-160-C	T-7606028 Pt. 6		
248-9	248-9	Crystal 1, 1st det. grid trim—160 mmfd. var.	Hammarlund APC-160-C	T-7606028 Pt. 6		
249-1	249-1	Band 4, osc. series trim—50 mmfd. var.	Hammarlund APC-50-C	T-7606028 Pt. 17		Invar steel plates and shaft-silver plated
249-2	249-2	Band 3, osc. series trim—50 mmfd. var.	Hammarlund APC-50-C	T-7606028 Pt. 17		Invar steel plates and shaft-silver plated
249-3	249-3	Band 2, osc. series trim—50 mmfd. var.	Hammarlund APC-50-C	T-7606028 Pt. 17		Invar steel plates and shaft-silver plated
249-4	249-4	Band 1, osc. series trim—50 mmfd. var.	Hammarlund APC-50-C	T-7606028 Pt. 17		Invar steel plates and shaft-silver plated

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—VARIABLE AND MICA (±10%)—Continued				
250-1	250-1	Signal diode filter—100 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 19		
250-2	250-2	Signal diode filter—100 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 19		
250-3	250-3	Dyn. H.V. brush filter—100 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 19		
250-4	250-4	Dyn. L.V. brush filter—100 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 19		
250-5	250-5	Osc. grid coupling—100 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 19		
251-1	251-1	1st i-f pri. fixed trim—178 mmfd. ±2% mica.	C-D type 2R	T-7606278 Pt. 37		
251-2	251-2	1st i-f sec. fixed trim.—178 mmfd. ±2% mica.	C-D type 2R	T-7606278 Pt. 37		
251-3	251-3	2nd i-f pri. fixed trim.—178 mmfd. ±2% mica.	C-D type 2R	T-7606278 Pt. 37		
251-4	251-4	2nd i-f sec. fixed trim—178 mmfd. ±2% mica.	C-D type 2R	T-7606278 Pt. 37		
252-1A	252-1A	1st i-f pri. trimmer—44 mmfd. var.	Sickles ATR-98 spec.	T-7606028 Pt. 14		Special-clamping type
252-1B	252-1B	1st i-f sec. trimmer—44 mmfd. var.	Sickles ATR-98 spec.	T-7606028 Pt. 14		Special-clamping type
252-2A	252-2A	2nd i-f pri. trimmer—44 mmfd. var.	Sickles ATR-98 spec.	T-7606028 Pt. 14		Special-clamping type
252-2B	252-2B	2nd i-f sec. trimmer—44 mmfd. var.	Sickles ATR-98 spec.	T-7606028 Pt. 14		Special-clamping type
253	253	Band 4, 1st det. grid fixed trim—20 mmfd. mica.	C-D type 5R	T-7606278 Pt. 21		
254-1	254-1	Band 1, r-f grid fixed trim.—50 mmfd. ±5% mica.	C-D type 5R	T-7606278 Pt. 22		
254-2	254-2	Band 1, 1st det. grid fixed trim.—50 mmfd. ±5% mica.	C-D type 5R	T-7606278 Pt. 22		
255-1	255-1	A.V.C. diode coupling—50 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 23		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—VARIABLE AND MICA (±10%)—Continued				
255–2	255–2	Crystal by-pass—50 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 23		
256–1	256–1	Band 4, r-f grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–2	256–2	Band 3, r-f grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–3	256–3	Band 2, r-f grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–4	256–4	Band 1, r-f grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–5	256–5	Band 4, r-f plate trim—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–6	256–6	Band 3, r-f plate trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–7	256–7	Band 2, r-f plate trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–8	256–8	Band 1, r-f plate trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–9	256–9	Band 4, 1st det. grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–10	256–10	Band 3, 1st det. grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–11	256–11	Band 2, 1st det. grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
256–12	256–12	Band 1, 1st det. grid trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 18		
257–1	257–1	Band 2, osc. fixed shunt trim.—15 mmfd. mica.	C-D type 5R	T-7606278 Pt. 24		
257–2	257–2	Band 4, r-f grid fixed trim.—15 mmfd. mica.	C-D type 5R	T-7606278 Pt. 24		
258–1	258–1	Band 4, r-f plate fixed trim.—10 mmfd. mica.	C-D type 5R	T-7606278 Pt. 25		
258–2	258–2	Band 2, r-f plate fixed trim.—10 mmfd. mica.	C-D type 5R	T-7606278 Pt. 25		
258–3	258–3	Band 1, ant. coupling—10 mmfd. mica.	C-D type 5R	T-7606278 Pt. 25		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—VARIABLE AND MICA (± 10%)—Continued				
259–1	259–1	Crystal 3, r-f grid fixed trim.—5 mmfd. ±1 mmfd. mica.	C-D type 5R	T-7606278 Pt. 26		
259–2	259–2	Crystal 2, r-f grid fixed trim.—5 mmfd. ±1 mmfd. mica.	C-D type 5R	T-7606278 Pt. 26		
259–3	259–3	Band 2, ant. coupling—5 mmfd. ±1 mmfd. mica.	C-D type 5R	T-7606278 Pt. 26		
260	260	1st audio plate coupling—.03 mfd. mica.	C-D type 4S	T-7606278 Pt. 27		
261–1	261–1	Crystal 1, by-pass—25 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 28		
261–2	261–2	Crystal 2, by-pass—25 mmfd. mica.	Solar type MOWB-10	T-7606278 Pt. 28		
		COMPENSATORS				
262–1	262–1	Band 2, osc. compensator—9 mmfd.	Sprague Model LX-6 type I	T-7606278 Pt. 29		Liquid filled Comp. 0.0165 mmfd. per deg. C.
262–2	262–2	Band 4, osc. compensator—9 mmfd.	Sprague Model LX-6 type I	T-7606278 Pt. 29		Liquid filled Comp. 0.0165 mmfd. per deg. C.
263	263	Band 3, osc. compensator—6 mmfd.	Sprague Model LX-6 type II	T-7606278 Pt. 30		Liquid filled Comp. 0.0120 mmfd. per deg. C.
		CAPACITORS—VARIABLE AND MICA				
265	265	Band 4, osc. fixed series trim.—140 mmfd. ±5% mica.	C-D type 5R	T-7606278 Pt. 32		
266–A	266–A	3rd i-f pri. trimmer—82 to 119 mmfd. var.	Sickles ATF 111010 spec.	T-7606028 Pt. 15		Special-clamping type
266–B	266–B	3rd i-f sec. trimmer—82 to 119 mmfd. var.	Sickles ATF 111010 spec.	T-7606028 Pt. 15		Special-clamping type

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		CAPACITORS—VARIABLE AND MICA—Continued				
267	267	Band 1, osc. fixed series trim.—345 mmfd. ±2% mica.	C-D type 5R	T-7606278 Pt. 38		
268–1	268–1	Band 4, osc. shunt trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 16		Invar steel plates and shaft-silver plated
268–2	268–2	Band 3, osc. shunt trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 16		Invar steel plates and shaft-silver plated
268–3	268–3	Band 2, osc. shunt trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 16		Invar steel plates and shaft-silver plated
268–4	268–4	Band 1, osc. shunt trim.—25 mmfd. var.	Hammarlund APC-25-C	T-7606028 Pt. 16		Invar steel plates and shaft-silver plated
269	269	Band 1, r-f plate fixed trim.—60 mmfd. ±5% mica.	C-D type 5R	T-7606278 Pt. 40		
		TRANSFORMERS—R-F				
270	270	Band 1, ant. and loop.—universal, iron core	Westinghouse	T-7606311 G-1		
271	271	Band 2, antenna—universal, iron core	Westinghouse	T-7606311 G-2		
272	272	Band 3, crystals 1 and 2 ant.—solenoid	Westinghouse	T-7606311 G-3		
273	273	Band 4, crystal 3 ant.—solenoid	Westinghouse	T-7606311 G-4		
274	274	Loop dummy coil—universal	Westinghouse	M-7407425		
275	275	Antenna unit—assy. of transformers, switches and trimmers	Westinghouse	P-7707179		
276	276	Band 1, r-f plate—universal	Westinghouse	T-7606311 G-5		
277	277	Band 2, r-f plate—universal	Westinghouse	T-7606311 G-6		
278	278	Band 3, r-f plate—solenoid	Westinghouse	T-7606311 G-7		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		TRANSFORMERS—R-F —Continued				
279	279	Band 4, r-f plate—solenoid	Westinghouse	T-7606311 G-8		
280	280	Band 1, i-f trap, inductive element. Permeability tuned, iron core and housing	Westinghouse	M-7407402 G-1		
281	281	Band 1, 1st det. grid—universal	Westinghouse	T-7606311 G-9		
282	282	Band 2, 1st det. grid—universal	Westinghouse	T-7606311 G-10		
283	283	Band 3, 1st det. grid—solenoid	Westinghouse	T-7606311 G-11		
284	284	Band 4, 1st det. grid—solenoid	Westinghouse	T-7606311 G-12		
285	285	R-F unit-assy. of transformers, switches and trimmers	Westinghouse	T-7606258		
286	286	Band 2, i-f trap, inductive element. Permeability tuned iron core and housing	Westinghouse	M-7407402 G-2		
287	287	Band 1, osc.—universal	Westinghouse	T-7606311 G-13		
288	288	Band 2, osc.—solenoid	Westinghouse	T-7606311 G-14		
289	289	Band 3, osc.—solenoid	Westinghouse	T-7606311 G-15		
290	290	Band 4, osc.—solenoid	Westinghouse	T-7606311 G-16		
291	291	Osc. unit—assy. of transformers, switches, compensators and trimmers	Westinghouse	T-7606257		
292	292	1st i-f—universal, iron core	Meissner	T-7606242 Pt. 10		
293	293	1st i-f unit—assy. of transformer and trimmers in shield	Meissner	T-7606242 G-1		Shield supplied by Westinghouse
294	294	2nd i-f—universal, iron core	Meissner	T-7606242 Pt. 11		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		TRANSFORMERS—R-F —Continued				
295	295	2nd i-f unit—assy. of transformer and trimmers in shield	Meissner	T-7606242 G-2		Shield supplied by Westinghouse
296	296	3rd i-f—universal, iron core	Meissner	T-7606242 Pt. 12		
297	297	3rd i-f unit—assy. of transformer and trimmers in shield	Meissner	T-7606242 G-3		Shield supplied by Westinghouse
		BAND SWITCH SECTIONS				
300–1	300–1	Ant. pri. selector	Mallory type RM-Iso.	T-7606234 Pt. 2		
300–2	300–2	R-F plate selector	Mallory type RM-Iso.	T-7606234 Pt. 2		
301–1	301–1	Ant. sec. selector	Mallory type RM-Iso.	T-7606234 Pt. 7		
301–2	301–2	R-F plate transf. selector	Mallory type RM-Iso.	T-7606234 Pt. 7		
303–1	303–1	Ant. tuning cap. selector	Mallory type RM-Iso.	T-7606234 Pt. 3		
303–2	303–2	R-F plate tuning cap. selector	Mallory type RM-Iso.	T-7606234 Pt. 3		
304	304	1st det. transf. selector	Mallory type RM-Iso.	T-7606234 Pt. 13		
305	305	1st det. grid tuning cap. selector	Mallory type RM-Iso.	T-7606234 Pt. 12		
306–1	306–1	Osc. plate selector	Mallory type RM-Iso.	T-7606234 Pt. 5		
306–2	306–2	Osc. grid selector	Mallory type RM-Iso.	T-7606234 Pt. 5		
306–3	306–3	Crystal by-pass sw.	Mallory type RM-Iso.	T-7606234 Pt. 5		
307	307	Crystal selector	Mallory type RM-Iso.	T-7606234 Pt. 6		
308	308	Motor control—front sect.	Mallory type RM	T-7606234 Pt. 8		
309	309	Motor control—rear sect.	Mallory type RM	T-7606234 Pt. 9		

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RELAYS				
310		Ant.-loop selector—100 ohms	Clare type G	P-7707189 Pt. 1		
311		Parallel-transverse loop selector—100 ohms	Clare type G	P-7707189 Pt. 2		
312		Band sw. motor relay-magnetic oper. clutch—.43 ohms	Clare type G	P-7707189 Pt. 3		
	313	Ant.-loop selector—400 ohms	Clare type G	P-7707189 Pt. 7		
	314	Parallel-transverse loop selector—400 ohms	Clare type G	P-7707189 Pt. 8		
	315	Band sw. motor relay-magnetic oper. clutch—1.67 ohms	Clare type G	P-7707189 Pt. 9		
320	320	Transformer-audio freq. output 1.6:1	Westinghouse	L-365716		
321	321	Choke-dyn. H.V. a-f filter 5 henries, 360 ohms	Westinghouse	L-340183		
322	322	Choke-dyn. H.V. r-f filter	Westinghouse	P-7707180 G-1		
323		Dynamotor H.V. supply input 14V., 2.6 amps.—output: 240 V., .080 amps.	Continental type DM-410	P-7706715 Pt. 1		
324		Motor-band switch 14 V.	Pioneer	P-7707191 Pt. 1		
	325	Dynamotor-H.V. supply; input: 28 V., 1.3 amps. output: 240 V., .080 amps.	Continental type DM-410	P-7706715 Pt. 2		
	326	Motor-band switch, 28 V.	Pioneer	P-7707191 Pt. 3		
330	330	Phone jack-receiver output, single circuit	Ulmer	M-7407225 Pt. 1		JK-34A Dwg. SC-D-2339-B
331	331	Socket SO-118 (Loop) engages PL-138 on Cordage CO-202	Breeze—Similar to No. 1003-3-20 special	M-7407068 G-1		Stamped SO-118 7/8–20 threads to engage conduit nut

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		RELAYS—Continued				
332	332	Plug PL-135. Main connector between receiver and Mounting FT-180-A. Attached to receiver	Jones-P-324-AB modified	P-7707182 Pt. 1		Locating pin holes added by Westinghouse
333	333	Socket SO-115. Mounted on Mounting FT-180-A—engages 332	Jones-S-324-AB modified	P-7707182 Pt. 2		Locating pin holes added by Westinghouse
334	334	Plug-dynamotor connector, 6 contact	Jones-P-306-AB modified	P-7707182 Pt. 3		Mounting holes-.146″ dia.
335	335	Socket—engages 334 attached to chassis	Jones-S-306-AB modified	P-7707182 Pt. 4		Mounting holes-.154″ dia.
		TUBE SOCKETS				
337–1	337–1	R-F amplifier-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–2	337–2	1st detector-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–3	337–3	Oscillator-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–4	337–4	1st i-f amplifier-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–5	337–5	2nd i-f amplifier-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–6	337–6	2nd detector-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–7	337–7	Crystal 1-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–8	337–8	Crystal 2-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
337–9	337–9	Crystal 3-Isolantite, beryllium copper contacts	Amphenol SS8	P-7706969 Pt. 3		
338	338	Output tube-Isolantite, beryllium copper contacts	Amphenol SS5	P-7706969 Pt. 6		
340	340	Binding post Ant.-push type	G.E. Dwg. K-7875617 modified	T-7606319 G-12		Stud and locating pin added by Westinghouse

6.1.2 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		TUBE SOCKETS—Continued				
341	341	Binding post, ground-push type	G.E. Dwg. K-7875617	T-7606319 G-11		Stud and locating pin added by Westinghouse

6.1.3 ANTENNA—A-59-A

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
345	Coil-solenoid. Inductive element	Westinghouse	M-7407432 G-1		
346	Capacitor, shunt. 87 mmfd. ±1 mmfd.	C-D type 5 WLS	T-7606278 Pt. 33		
347	Capacitor, series. 170 mmfd. ±1%	C-D type 5 WLS	T-7606278 Pt. 34		
348–1	Binding post, ant. input	G.E. Dwg. K-7875617	T-7606319 G-12		
348–2	Binding post, ant. output	G.E. Dwg. K-7875617	T-7606319 G-12		Stud and locating pin added by Westinghouse
349–1	Binding post, ground	G.E. Dwg. K-7875617	T-7606319 G-11		
349–2	Binding post, ground	G.E. Dwg. K-7875617	T-7606319 G-11		
		All binding posts modified			

6.1.4 DYNAMOTOR UNIT PE-59-A OR PE-62-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
PE-59-A	PE-62-A					
	401	Relay, Dynamotor starting	Parks & Hull Co.	T-7605833 Pt. 38		
402	402	Fuse FU-22, L.V. dynamotor	Bussman 60 amp.	T-7605833 Pt. 15		
	403	Fuse FU-31, L.V. transmitter	Bussman 10 amp.	T-7605833 Pt. 40		
404	404	Fuse FU-18, H.V. dynamotor	Littelfuse 1 amp.	T-7605833 Pt. 13		

6.1.4 DYNAMOTOR UNIT PE-59-A OR PE-62-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
PE-59-A	PE-62-A					
405–1, 405–2	405–1, 405–2	Capacitor, .01 mfd. 2500 V. H.V. by-pass	Cornell Dubilier 9L-21010	P-7706920 Pt. 8		
406	406	Capacitor, .1 mfd. 600 V. spark sup.	Cornell Dubilier DYR-6010-N	P-7706920 Pt. 13		
407	407	Capacitor, .01 mfd. 2500 V. L.V. by-pass	Cornell Dubilier 9ALS-21010	P-7706920 Pt. 18		
	408	Dynamotor, voltage supply	Westinghouse	T-7605941 Pt. 18		
	409	Relay, Auxiliary starting	Struthers Dunn special	M-7407247 Pt. 2		
410	410	Capacitor, .5mfd. 400 V. by-pass	Cornell Dubilier DHR-4050	P-7706920 Pt. 14		
411	411	Socket SO-113 Trans. connection	Breeze Corp. SO-113	M-7407398 Pt. 1		
412		Relay, Dynamotor starting	Parks & Hull Co.	T-7605833 Pt. 6		
413		Fuse FU-32, L.V. Transmitter	Bussman 20 amp.	T-7605833 Pt. 14		
414		Dynamotor, voltage supply	Westinghouse	T-7605941 Pt. 16		
415		Relay, Auxiliary starting	Struthers Dunn special	M-7407247 Pt. 1		

6.1.5 RADIO CONTROL BOX BC-226-A OR RADIO CONTROL BOX BC-351-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-226-A	BC-351-A					
501	501	CW-VOICE switch—single pole. 2 position	Yaxley #3512 modified	M-7407210 Pt. 1		Made in accordance with Westinghouse dwg.
502	502	OFF-ON switch—4 circuit toggle switch	Hart & Hegeman	M-7407229 Pt. 1		
503	503	Switch-transmitter freq. selector single circuit 4 position	Yaxley type RM	M-7407209 Pt. 1		

6.1.5 RADIO CONTROL BOX BC-226-A OR RADIO CONTROL BOX BC-351-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-226-A	BC-351-A					
504	504	Microphone jack—2 circuit	Ulmer	M-7407249 Pt. 1		JK-33-A Signal Corps Dwg. SC-D-2332-B
505–1	505–1	Lamp LM-32, panel and dial illumination 3 V., .19 amp.	Kollsman type 71-A	T-7605954 Pt. 4		LM-32 SC-B-2193-D
505–2	505–2	Lamp LM-32, panel and dial illumination 3 V., .19 amp.	Kollsman type 71-A	T-7605954 Pt. 47		LM-32 SC-B-2193-D
505–3	505–3	Lamp LM-32, panel and dial illumination 3 V., .19 amp.	Kollsman type 71-A	T-7605954 Pt. 48		LM-32 SC-B-2193-D
505–4	505–4	Lamp LM-32, panel and dial illumination 3 V., .19 amp.	Kollsman type 71-A	T-7605954 Pt. 49		LM-32 SC-B-2193-D
506	506	Socket—2 contact for conduit to ant. ammeter	Breeze No. E-1003-13-20 modified	T-7606119 Pt. 2		SO-99 stamped by Breeze
507	507	Socket—single contact to instrument lighting	Breeze No. E-1003-15-20 modified	T-7606119 Pt. 4		SO-105 stamped by Breeze
508	508	Socket—22 contact, control circuits to receiver	Breeze No. E-1003-14-10 modified	T-7606119 Pt. 3		SO-106 stamped by Breeze
509	509	Socket-14 contact, control circuits to trans.	Breeze No. E-1003-1-10 modified	T-7606119 Pt. 1		SO-107 stamped by Breeze
510-A	510-A	Volume control—MVC. section, 5000 ohms	Allen-Bradley type JJ	P-7707208 Pt. 1		
510–B	510–B	Volume control—AVC. section, 250,000 ohms	Allen-Bradley type JJ	P-7707208 Pt. 1		
511	511	Switch—MVC-AVC., 3 pole 2 position	Yaxley ✻ 3132 modified	M-7407210 Pt. 3		Made in accordance with Westinghouse dwg.
512	512	Switch-single circuit 7 position. Receiver band selector	Yaxley type RL	M-7407207 Pt. 1		
513	513	Switch-single pole 3 position. Ant. selector	Yaxley ✻ 3513 modified	M-7407210 Pt. 2		Made in accordance with Westinghouse dwg.

6.1.5 RADIO CONTROL BOX BC-226-A OR RADIO CONTROL BOX BC-351-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-226-A	BC-351-A					
514–1		Resistor-lamp series res. 58 ohms 2.5 W.	Clarostat FX-5 in.	M-7407352 Pt. 1		
514–2		Resistor-lamp series res. 58 ohms 2.5 W.	Clarostat FX-5 in.	M-7407352 Pt. 1		
514–3		Resistor-lamp series res. 58 ohms 2.5 W.	Clarostat FX-5 in.	M-7407352 Pt. 1		
514–4		Resistor-lamp series res. 58 ohms 2.5 W.	Clarostat FX-5 in.	M-7407352 Pt. 1		
	528–1	Resistor-lamp series res. 132 ohms 3.5 W.	Clarostat FY-7 in.	M-7407352 Pt. 2		
	528–2	Resistor-lamp series res. 132 ohms 3.5 W.	Clarostat FY-7 in.	M-7407352 Pt. 2		
	528–3	Resistor-lamp series res. 132 ohms 3.5 W.	Clarostat FY-7 in.	M-7407352 Pt. 2		
	528–4	Resistor-lamp series res. 132 ohms 3.5 W.	Clarostat FY-7 in.	M-7407352 Pt. 2		

6.1.6 TUNING EQUIPMENT IE-6-A OR IE-7-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
IE-6-A	IE-7-A					
701	701	Ammeter, Ant. tuning 0–8 amp.	Westinghouse S# 1101749			Remote thermo-couple
702	702	Milliammeter, 0–500 MA. Amp. and Mod.	Westinghouse S# 1101750			
	703	Voltmeter, 0–32 V. Filament	Westinghouse S# 1101748			
704	704	Milliammeter, 0–100 MA. osc. S.A. Plate	Westinghouse S# 1101751			
	705	Lamp, 32 V. indicator	Stromberg Carlson Code # 28			
706	706	Switch, amp.-mod.	Centralab special	53-C-821 Pt. 3		
707	707	Switch, Tune-operate	Centralab special	53-C-821 Pt. 4		
708	708	Switch, Osc.-S. Amp.	Centralab special	53-C-821 Pt. 3		

6.1.6 TUNING EQUIPMENT IE-6-A OR IE-7-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
IE-6-A	IE-7-A					
709	709	Cable, connection		P-7707008 Pt. 2		
710	710	Plug PL-137, connection	H. B. Jones special	M-7407025 Pt. 2		
711	711	Resistor, 1000 ohms, low power tuning	Ward Leonard WX-8			
712		Voltmeter, 0–16 V. Filament	Westinghouse S# 1101747			
713		Lamp, 16 V. indicator	Stromberg Carlson Code # 31			
		Tool TL-146 transmitter tuning	Westinghouse	T-7606104 G-1		
		Tool TL-145 receiver tuning	Westinghouse	T-7606094 Pt. 34		

6.1.7 ANTENNA A-60-A

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
802	Coil, variable L	Westinghouse	T-7605815 Pt. 23		
803	Switch, tap selector	Ohmite TJ-5 with detent	T-7605815 Pt. 21		
804	Resistor, variable R	Ohmite 5 ohm Model L	T-7605815 Pt. 20		
805	Capacitor, variable C	Hammerlund special	T-7605815 Pt. 19		
806	Ammeter, 8 amp. R-F 2½ inch flush	Westinghouse	T-7605815 Pt. 22		

6.1.8 SIGNAL GENERATOR I-72-A

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
	Cord—output	C-B for 110 Sig. Gen.	K7810045		
	Cord—input 110 V.	Essex for C-B 110 Sig. Gen.	K7810045		
	Choke—audio filter	C-B 1548-A	K7810045		
	Choke—r-f—oscillator plate	C-B 1527	K7810045		

6.1.8 SIGNAL GENERATOR I-72-A—Continued

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
	Choke—r-f—oscillator filament	C-B 1528	K7810045		
	Pilot Lamp—6–8 V. ST-40	Tungsol	K7810045		
	Handle	C-B M-1493	K7810045		
	Pointer—for freq. scale	C-B for 110 Sig. Gen.	K7810045		
	Knob—band change	Davies # 1020	K7810045		
	Knob—tuning pointer	Davies # 3000	K7810045		
	Knob—attenuator, coarse	Davies # 2300	K7810045		
	Knob—attenuator, fine	Davies # 2300	K7810045		
	Knob—output selector	Davies # 2300	K7810045		
	Knob—on-off switch	Davies # 2300	K7810045		
	Socket—tube, 4 prong	Cinch X-15	K7810045		
	Socket—tube, 5 prong	Cinch Y-15	K7810045		
	Socket—tube, octal	Amphenol S-8	K7810045		
	Switch—on-off	H&H. # 1561	K7810045		
	Switch—attenuator steps	Mallory # M-1636	K7810045		
	Switch—output selector	Oak # M-1698	K7810045		
	Potentiometer-attenuator, fine 110 ohms curve 1	Centralab Radiohm	K7810045		
	Resistor-Band 5, r-f osc. output. 50 ohms ½ W.	I.R.C. BW-½	K7810045		±10% tolerance
	Resistor-attenuator, shunt arm 110 ohms ½ W.	I.R.C. BT-½	K7810045		±10% tolerance
	Resistor-attenuator, series arm 990 ohms ½ W.	I.R.C. BT-½	K7810045		±10% tolerance
	Resistor—r-f oscillator output attenuator, 1800 ohms ½ W.	# 710 CRL	K7810045		±10% tolerance
	Resistor—audio osc. plate res. 5800 ohms ½ W.	# 710 CRL	K7810045		±10% tolerance
	Resistor—r-f osc. grid leak 60,000 ohms ½ W.	# 710 CRL	K7810045		±10% tolerance
	Capacitor—r-f osc. output coupling .0015 mfd.	Micamold type W	K7810045		

6.1.8 SIGNAL GENERATOR I-72-A—Continued

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
	Capacitor—r-f osc. filament filter .005 mfd.	Micamold type W	K7810045		
	Capacitor—A-C line filter .1 mfd. paper 200 V.	Fast # 5859	K7810045		
	Capacitor—audio osc. tuning—.5 mfd. paper 200 V.	Fast # 3454	K7810045		
	Capacitor—filter 4 mfd. 350 V.	Mallory LA	K7810045		
	Transformer—audio oscillator	C-B 1524-A	K7810045		
	Shield—osc.	C-B-M-1714	K7810045		
	Jack—output, assembly	C-B # 1860926	K7810045		
	Capacitor—r-f osc. plate filter—.1 mfd. paper 200 V.	Fast # 5859	K7810045		
	Dial assembly, with bushing—Band change dial	C-B M-261	K7810045		

6.2 List of Replaceable Parts—Table II

6.2.1 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		Insulator—antenna post, ceramic	Isolantite	K-7809657 Pts. 2, 3		
		Insulator—coil unit, ceramic	Isolantite	M-7407320 Pt. 1		
		Armature and bearings—dynamotor	Continental Elec. Co.	For. P-7706715 Pt. 1		For DM-22-A
		Armature and bearings—dynamotor	Continental Elec. Co.	For. P-7706715 Pt. 2		For DM-23-A
		Brushes—dynamotor	Continental Elec. Co.	For. P-7706715 Pts. 1, 2		
		Brushes—band switch motor	Pioneer Gen-E—Motor	P-7707191 Pt. 2		
		Bearings—dynamotor	Continental Elec. Co.	For. P-7706715 Pts. 1, 2		

6.2.1 RADIO RECEIVER BC-225-A OR RADIO RECEIVER BC-352-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-225-A	BC-352-A					
		Shield—vacuum tube	Alum. Goods Co. # B 730	T-7606269 Pt. 42		Given Nas-at finish by Westing-house
		Cap—vacuum tube shield	Alum. Goods Co. # B 901	T-7606269 Pt. 62		Given Nas-at finish by Westing-house
		Shock Absorber for Mounting FT-180-A	Lord # 150-PH-12	T-7606251 Pt. 9		
		Gasket—connector socket cover plate	U. S. Rubber Co. Grade A 158	M-7407413 Pts. 3, 4		
		Cement—for Gasket, Marine Glue		M-7407413 Pt. 5		

6.2.2 RADIO CONTROL BOX BC-226-A OR RADIO CONTROL BOX BC-351-A

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-226-A	BC-351-A					
		Knob—TRANS. FREQ.	Westinghouse	M-7407201 Pt. 1		
		Knob—CW—VOICE	Westinghouse	M-7407201 Pt. 1		
		Knob—ON—OFF	Westinghouse	M-7407201 Pt. 2		
		Knob—AVC—MVC	Westinghouse	M-7407201 Pt. 1		
		Knob—ANT.—PL—TL	Westinghouse	M-7407201 Pt. 1		
		Knob—REC. BANDS	Westinghouse	M-7407200 Pt. 3		
		Knob—REC. TUNING	Westinghouse	M-7407200 G-1		
		Knob—VOLUME CONTROL	Westinghouse	M-7407200 G-2		
		Window—cellulose acetate 1/32 in. thick	Westinghouse	P-7707228 Pt. 3		
		Dial Indicator—cellulose acetate 1/64 in. thick	Westinghouse	P-7706854 G-3		

6.2.2 RADIO CONTROL BOX BC-226-A OR RADIO CONTROL BOX BC-351-A—Continued

Reference Number		Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
BC-226-A	BC-351-A					
		Screw—Captive		P-7706868 P-9		
		Nut—captive screw		P-7706868 P-7		
		Screw—set		T-7605954 P-25		
		Screw—set		T-7605954 P-26		
		Screw—set		T-7605934 P-64		

6.2.3 ANTENNA A-59-A

Reference Number	Name of Part Function—Description	Mfg's. Name and Type	Ⓦ Drawing Number	Stock Number	Notes
	Insulator—antenna post, ceramic	Isolantite	K-7809657 Pt. 2		
	Insulator—antenna post, ceramic	Isolantite	K-7809657 Pt. 3		

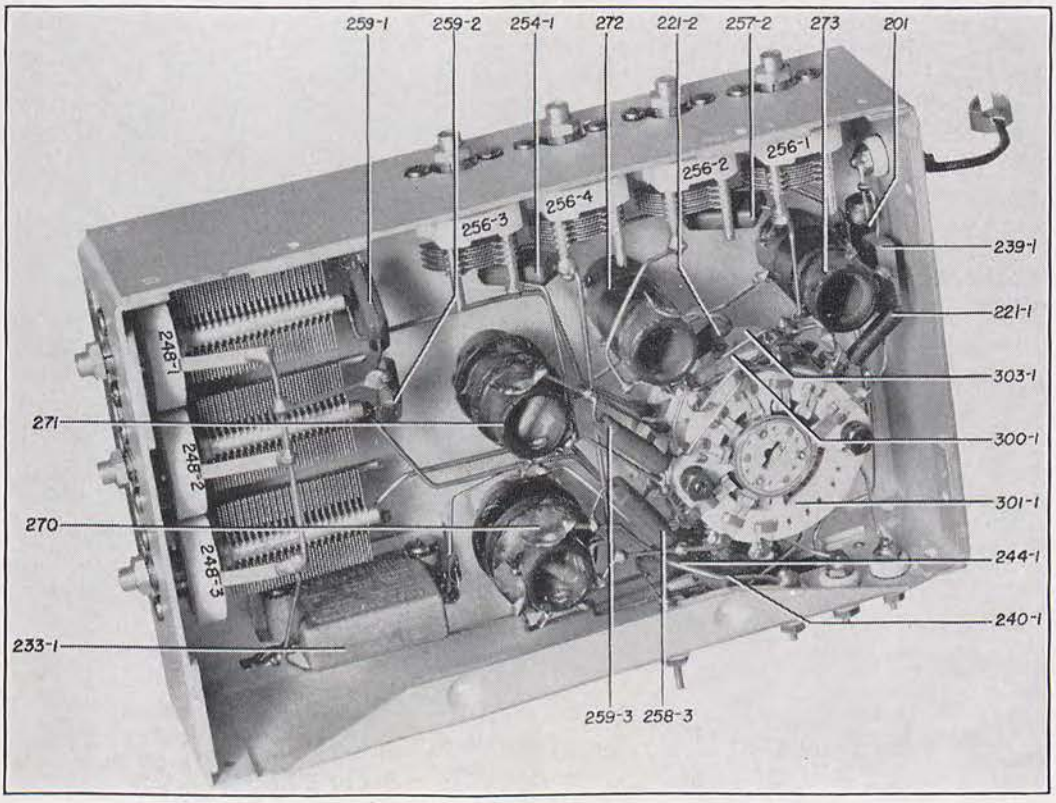


FIGURE 47—RADIO RECEIVER BC-225-A OR BC-352-A, ANTENNA UNIT

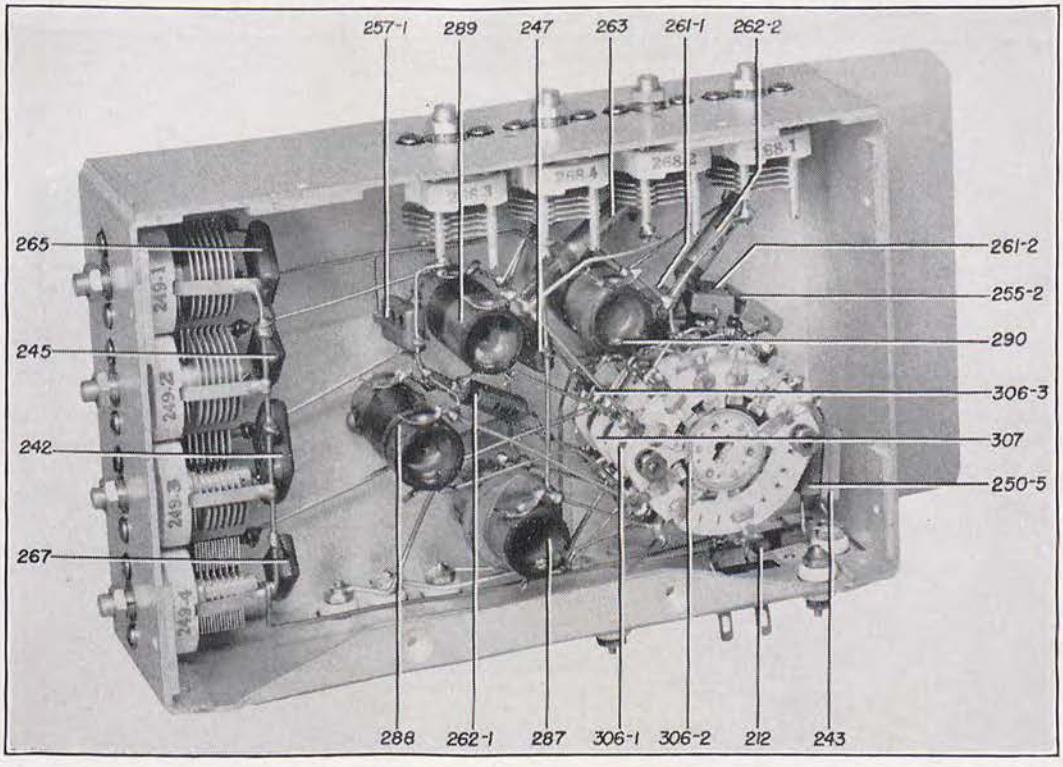


FIGURE 48—RADIO RECEIVER BC-225-A OR BC-352-A, OSCILLATOR UNIT

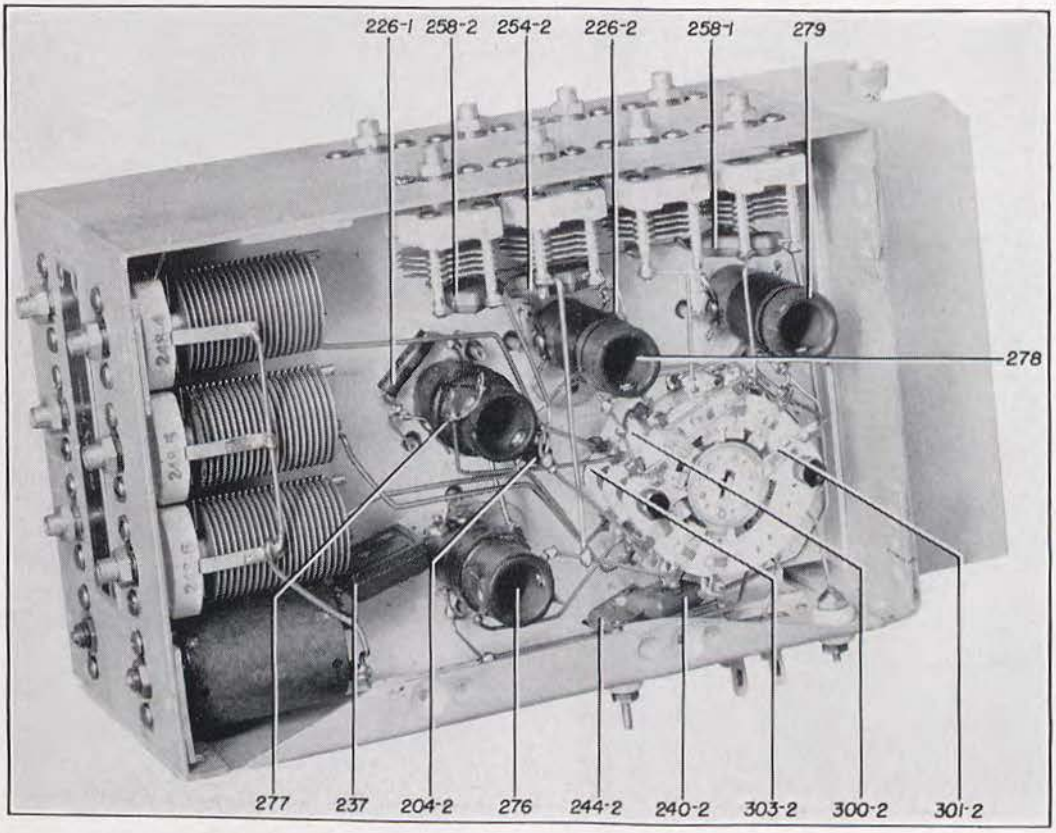


FIGURE 49—RADIO RECEIVER BC-225-A OR BC-352-A, R-F UNIT, FRONT SECTION

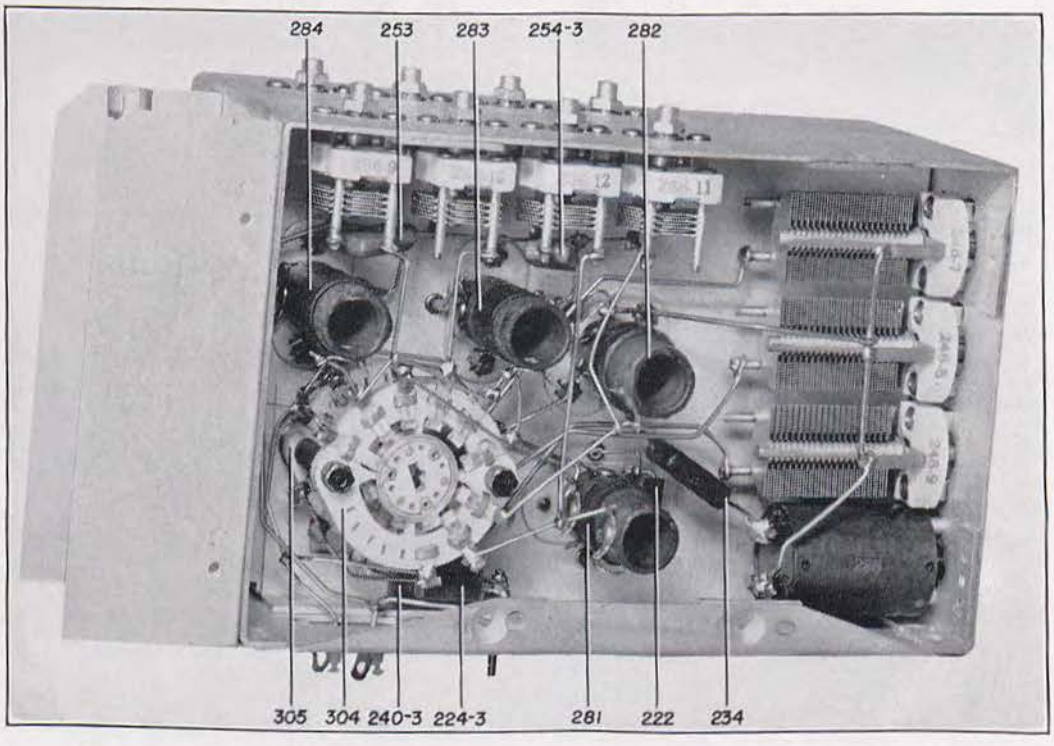


FIGURE 50—RADIO RECEIVER BC-225-A OR BC-352-A, R-F UNIT, REAR SECTION

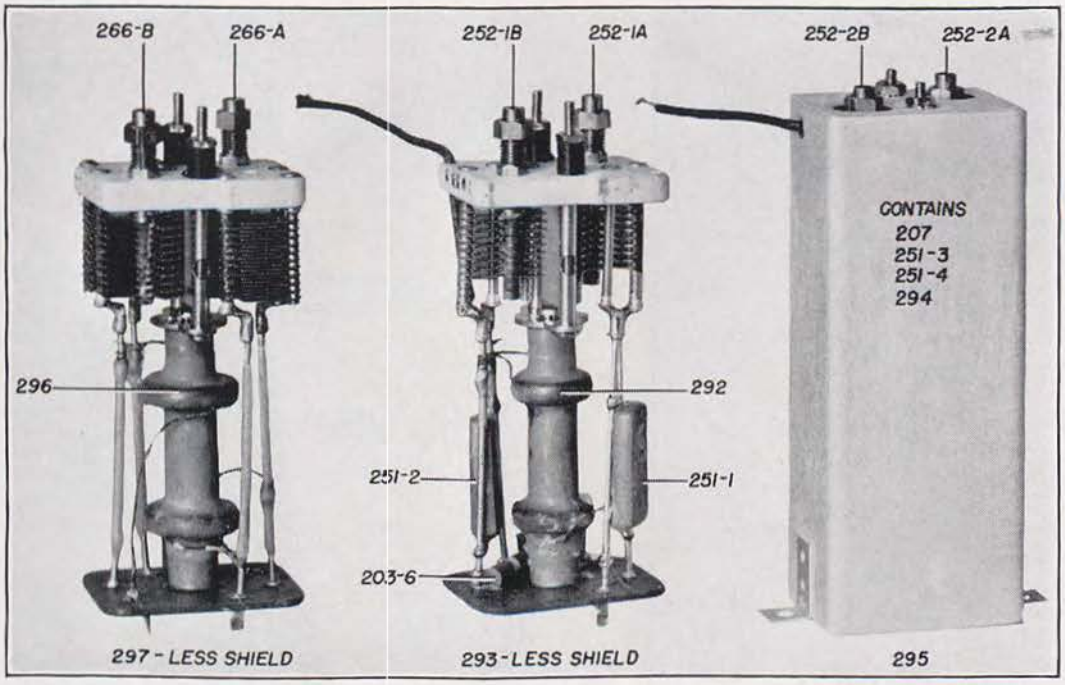


FIGURE 51—RADIO RECEIVER BC-225-A OR BC-352-A, I-F TRANSFORMERS

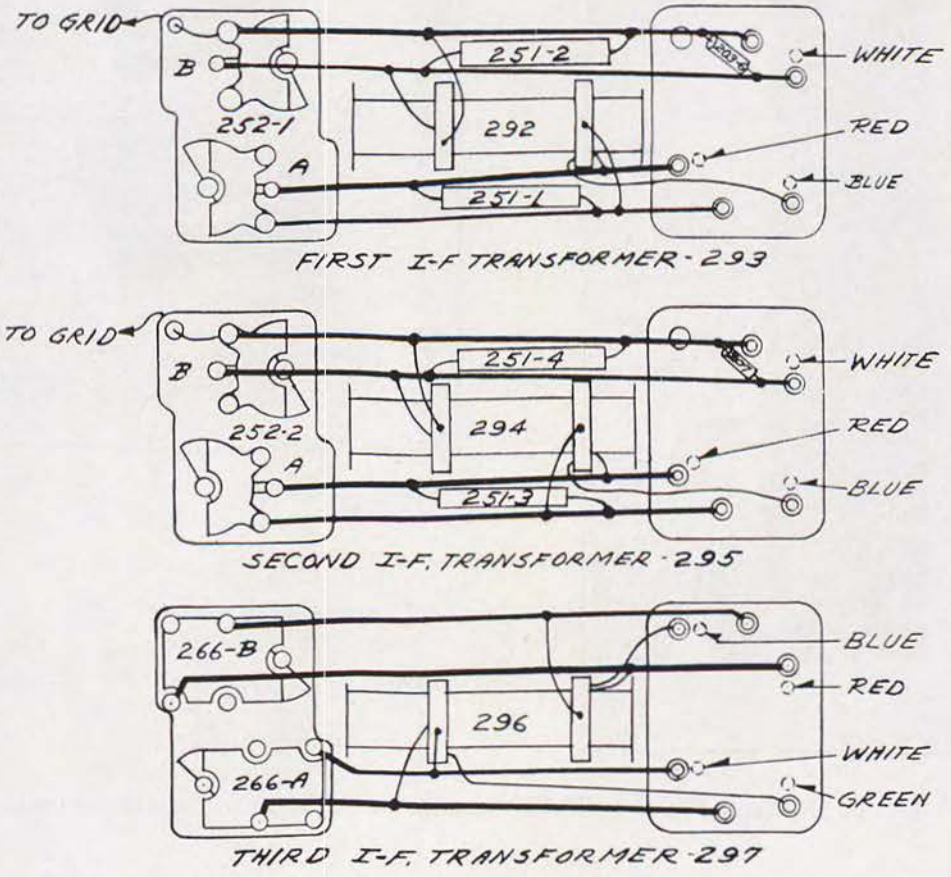


FIGURE 52—RADIO RECEIVER BC-225-A OR BC-352-A, I-F TRANSFORMERS, WIRING DIAGRAMS

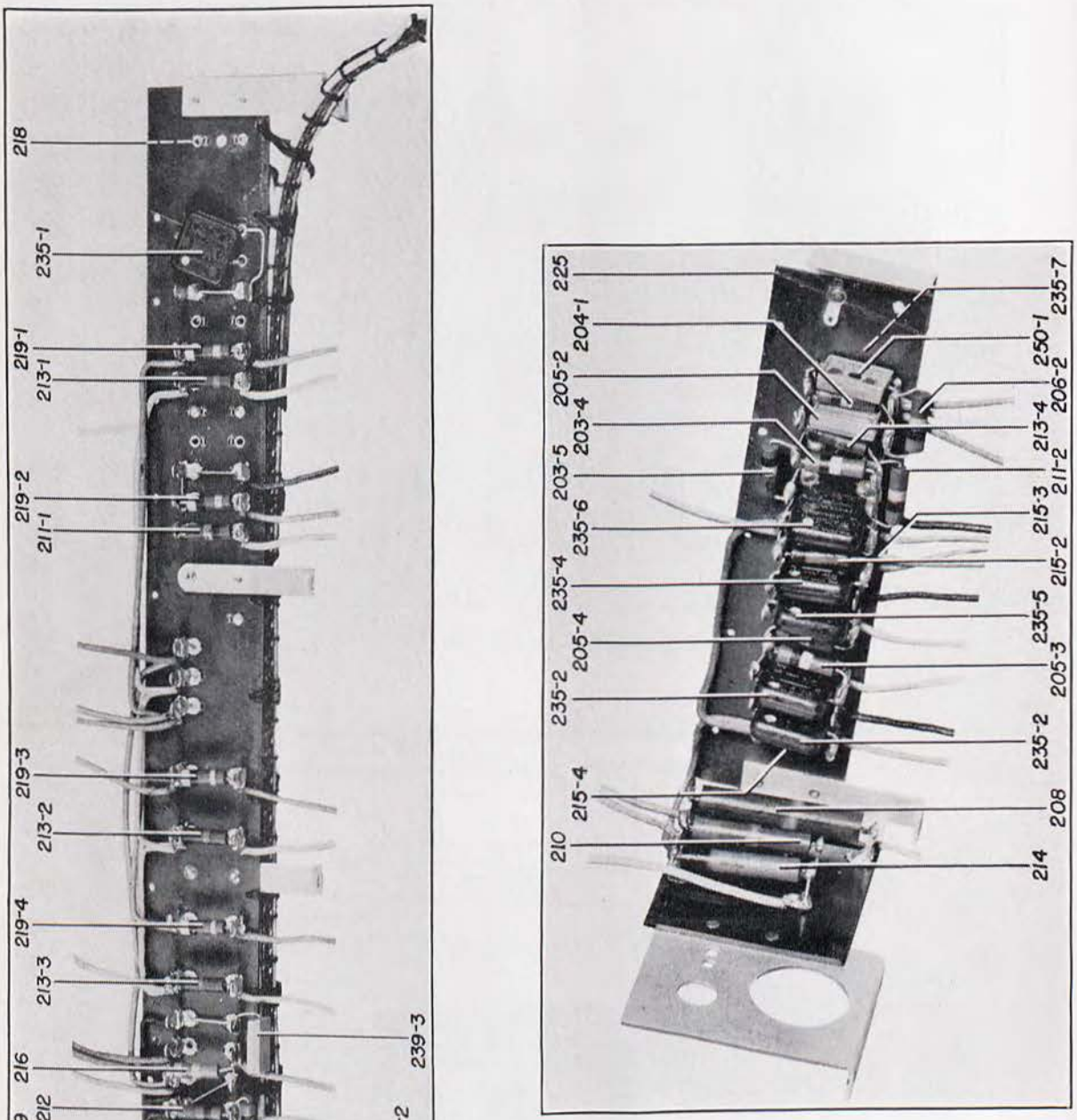
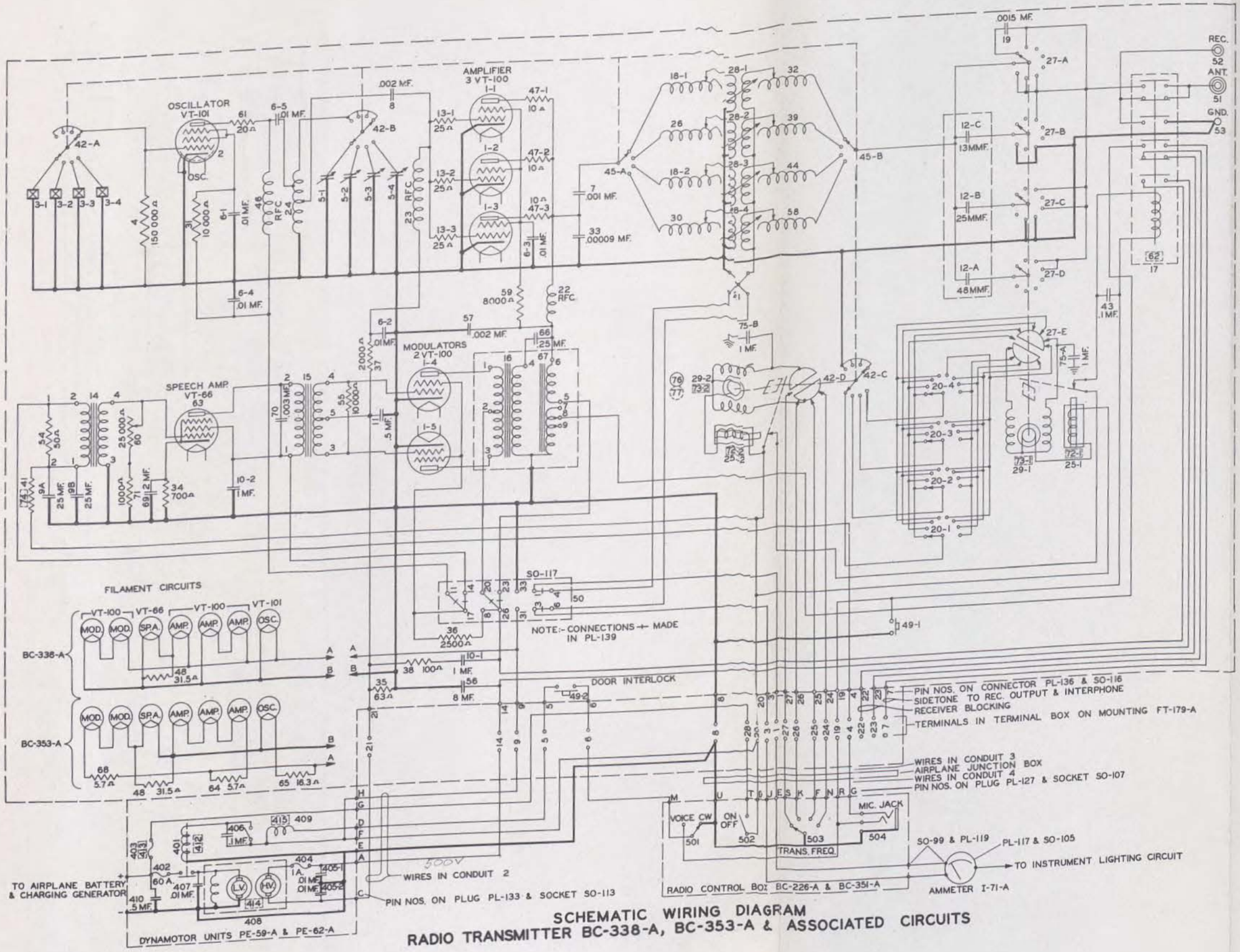


FIGURE 53—RADIO RECEIVER BC-225-A OR BC-352-A, RESISTOR-CAPACITOR PANELS



SCHEMATIC WIRING DIAGRAM
RADIO TRANSMITTER BC-338-A, BC-353-A & ASSOCIATED CIRCUITS

CIRCUIT SYMBOLS SHOWN ENCLOSED IN DOTTED LINES THUS [73-2] APPLY TO 14 VOLT SET ONLY.

MOTOR 29-2 USED ON RADIO TRANSMITTERS SERIAL NOS. 1 TO 63
MOTOR (76) USED ON RADIO TRANSMITTERS SERIAL NOS. 64 TO 124
MOTOR [73-2] USED ON RADIO TRANSMITTERS SERIAL NOS. 1 TO 90
MOTOR (77) USED ON RADIO TRANSMITTERS SERIAL NOS. 91 TO 267

TABLE OF INTERCONNECTION CONDUCTOR SIZES

CONDUIT NO.	REFERENCE	TERMINAL	WIRE SIZE
2	PL-133	A	NO.20 AWG
		B	18
		C	20
		D	20
		E	12
		F	14
		G	12
		H	14
3	TRANSMITTER J. BOX TER. BD.	6	18
		8	18
		20	14
		3	20
		1	20
		27	20
		26	20
		25	20
		24	20
		19	18
		4	20
		22	20
		23	20
		7	20
		28	14
4	PL-127	M	18
		U	18
		T	14
		E	20
		D	14
		J	20
		S	20
		K	20
		F	20
		N	20
		R	18
		G	20

FIGURE 54—RADIO TRANSMITTER BC-338-A OR BC-353-A, SCHEMATIC DIAGRAM

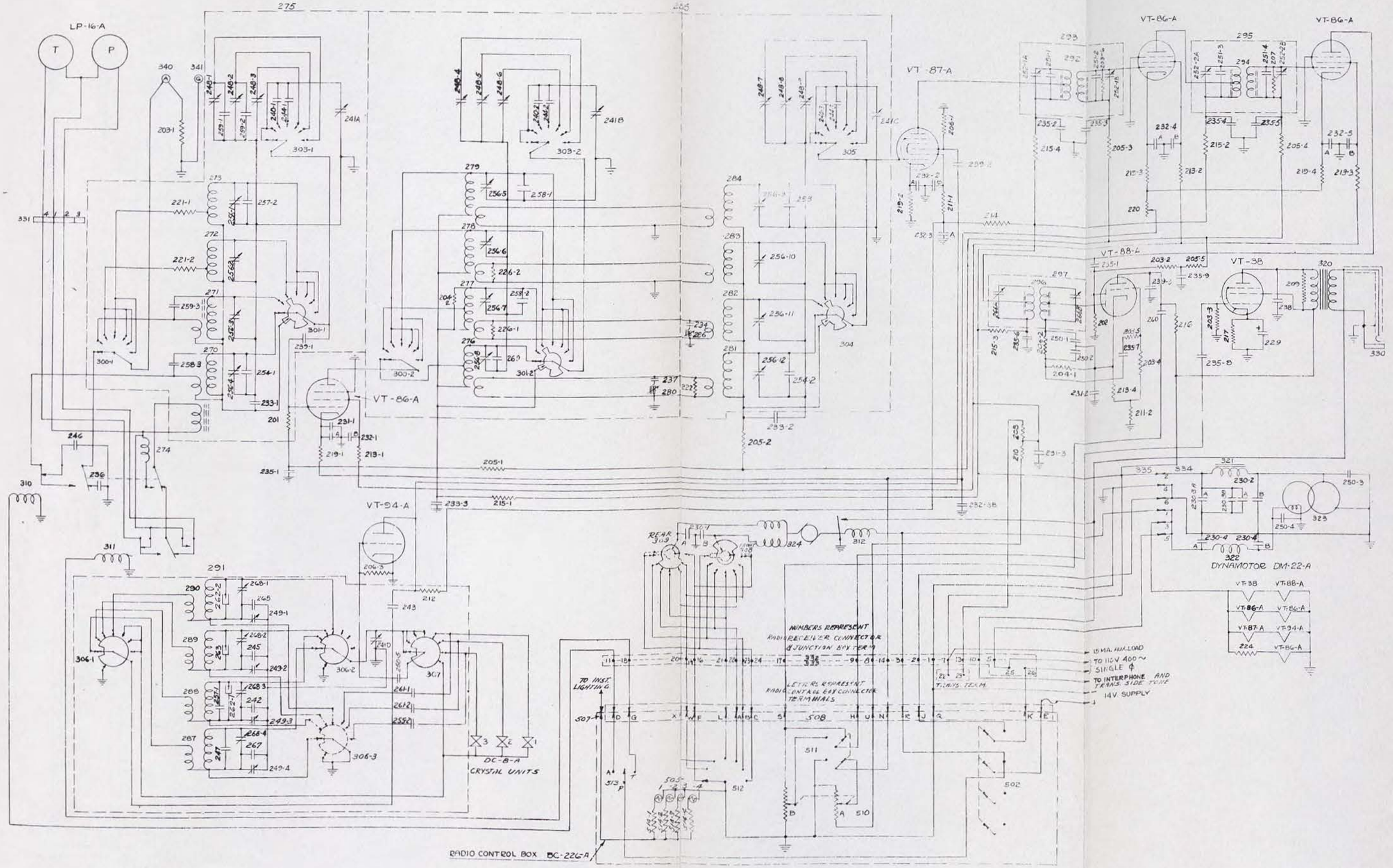


FIGURE 55—RADIO RECEIVER BC-225-A, SCHEMATIC DIAGRAM

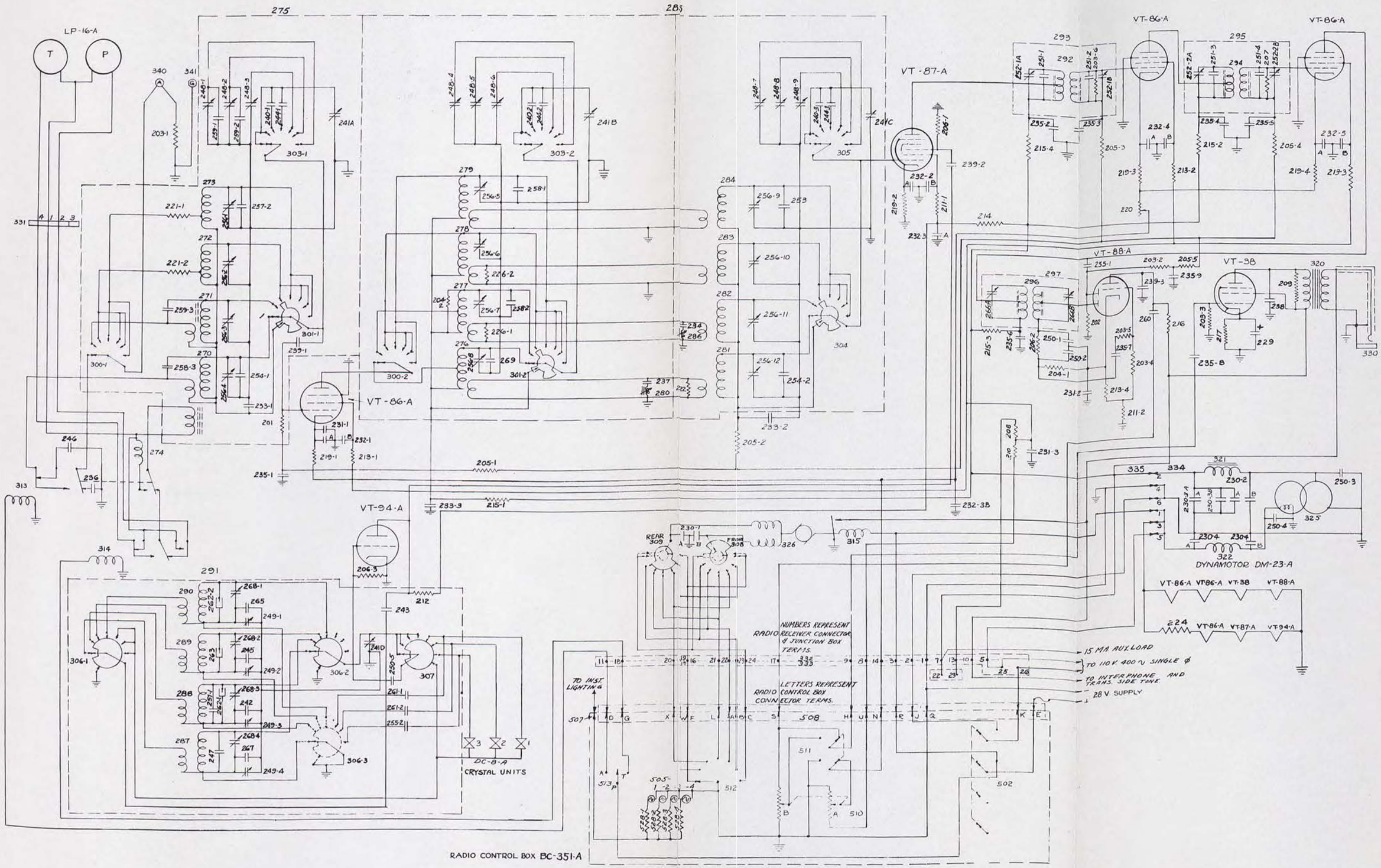


FIGURE 56—RADIO RECEIVER BC-352-A, SCHEMATIC DIAGRAM

FIGURE 56—RADIO RECEIVER BC-352-A, SCHEMATIC DIAGRAM

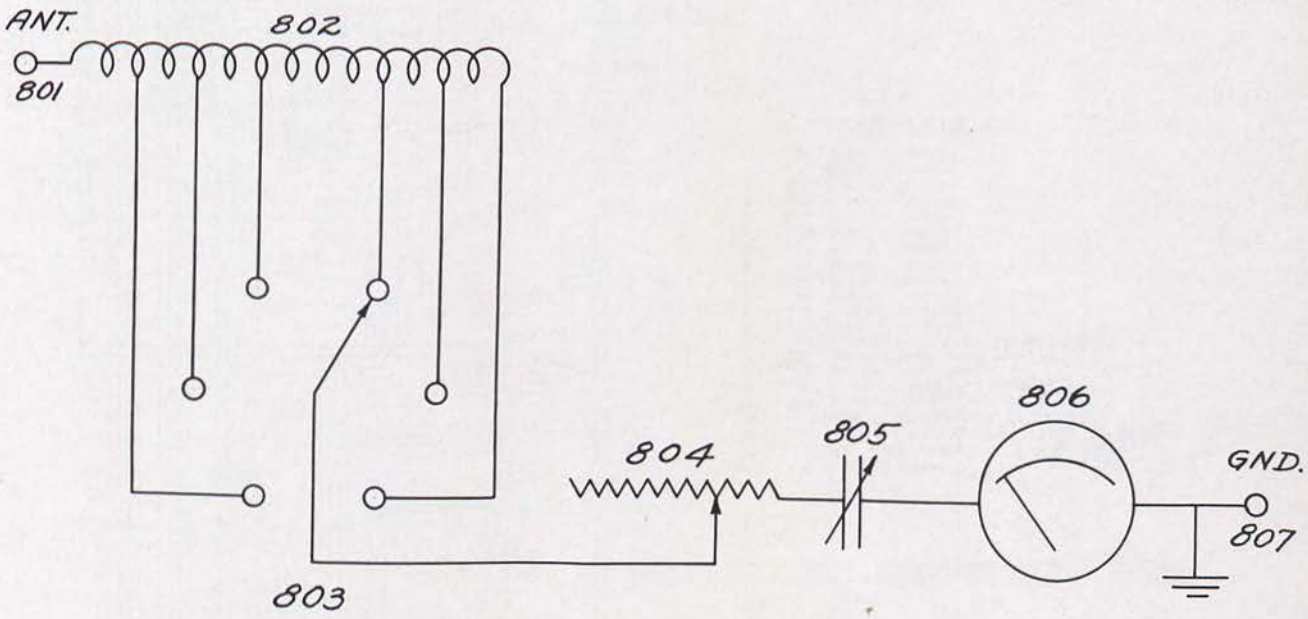


FIGURE 57—ANTENNA A-60-A, SCHEMATIC DIAGRAM

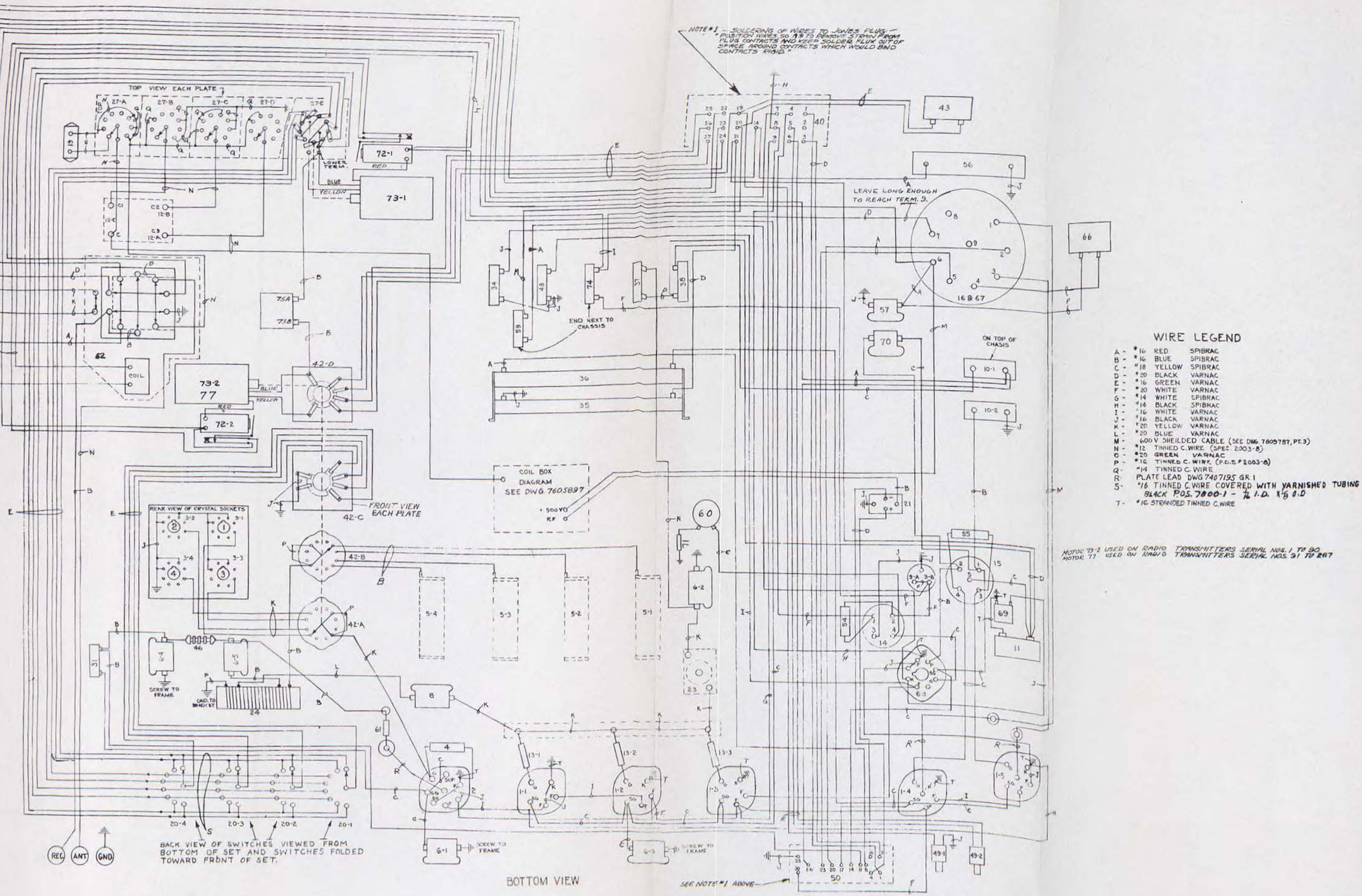
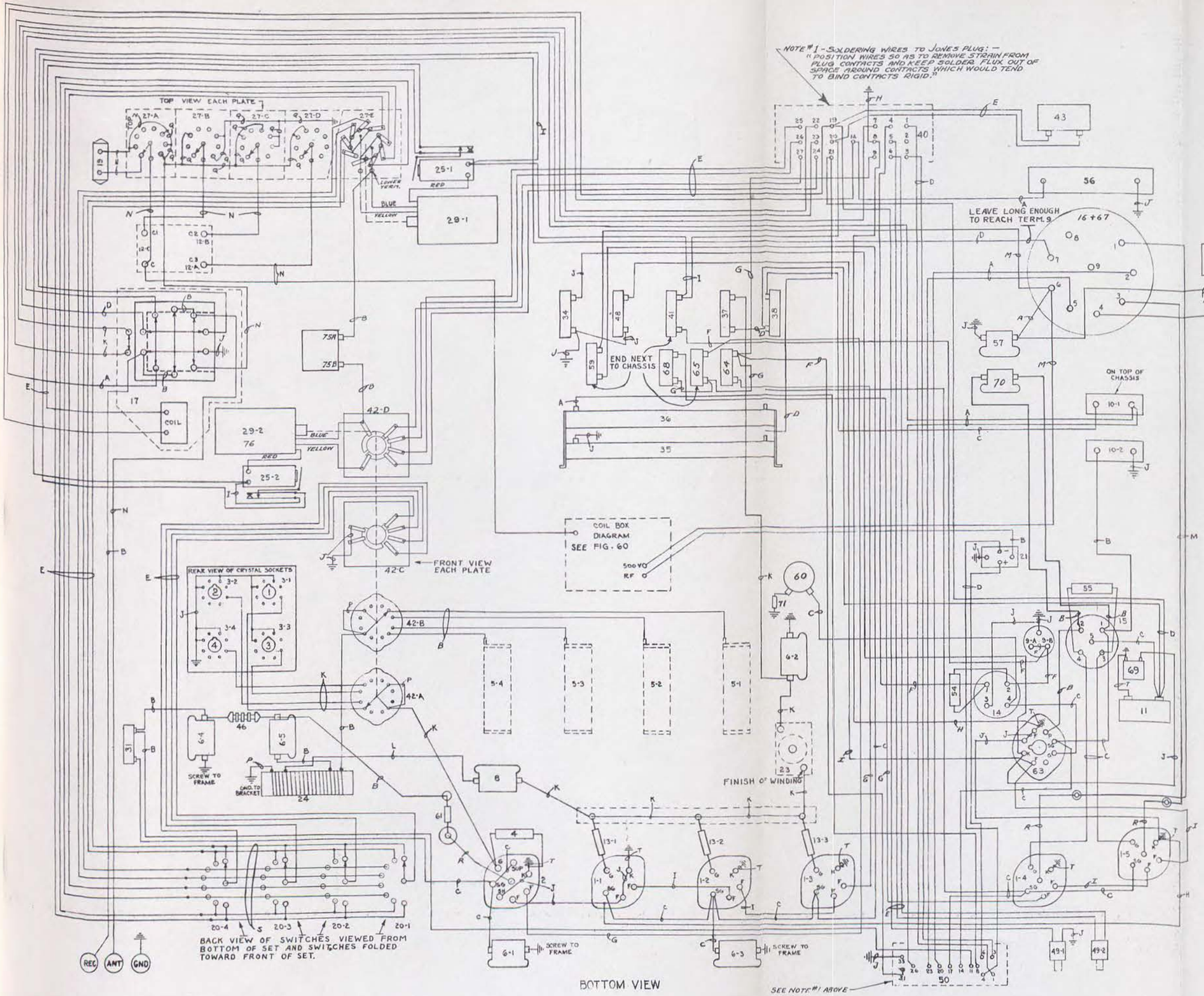


FIGURE 58—RADIO TRANSMITTER BC-338-A, WIRING DIAGRAM

FIGURE 58—RADIO TRANSMITTER BC-338-A, WIRING DIAGRAM



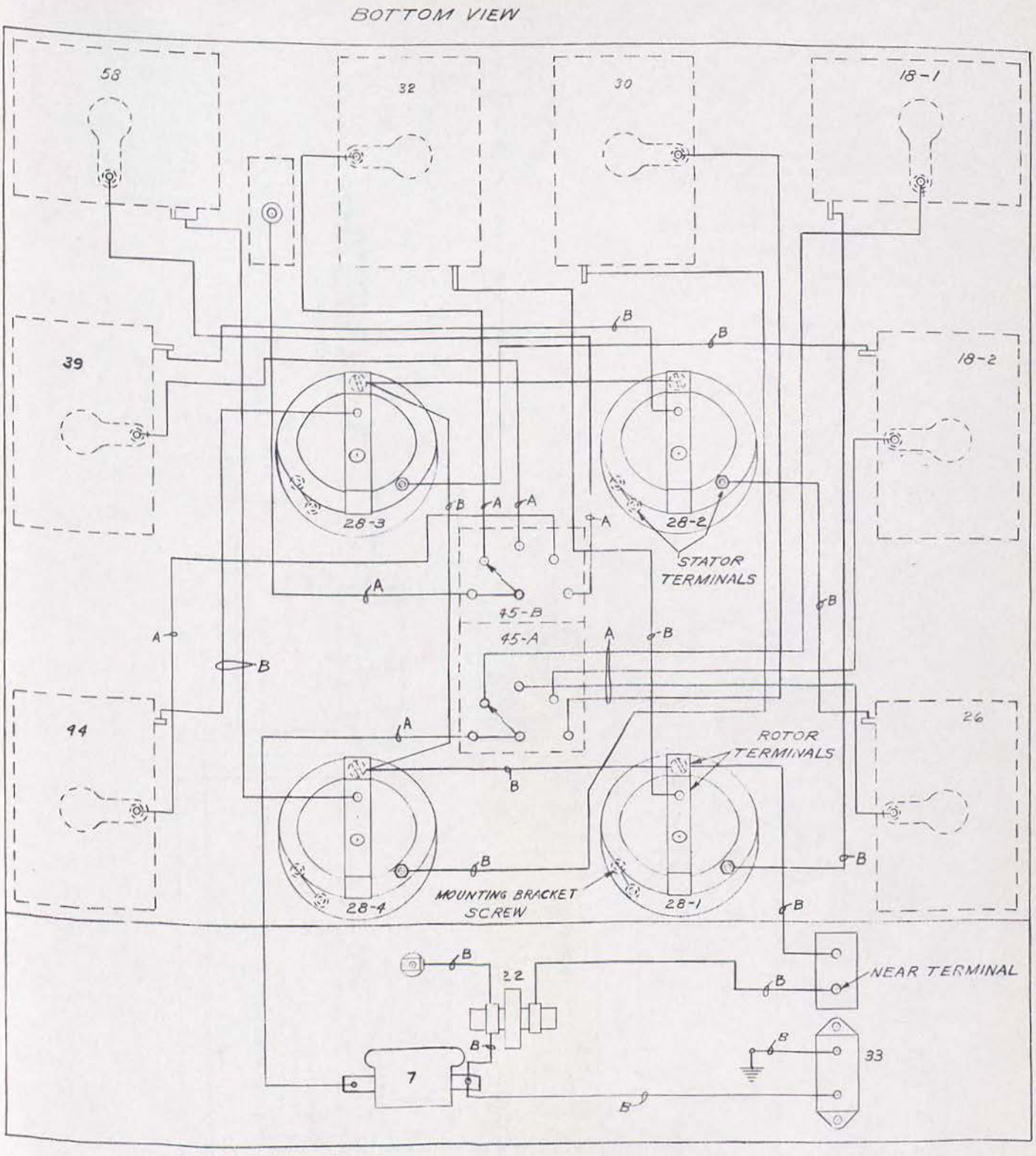
WIRE LEGEND

A -	#16	RED	SPIBRAC
B -	#16	BLUE	SPIBRAC
C -	#18	YELLOW	SPIBRAC
D -	#20	BLACK	VARNAC
E -	#16	GREEN	VARNAC
F -	#20	WHITE	VARNAC
G -	#14	WHITE	SPIBRAC
H -	#14	BLACK	SPIBRAC
I -	#16	WHITE	VARNAC
J -	#16	BLACK	VARNAC
K -	#20	YELLOW	VARNAC
L -	#20	BLUE	VARNAC
M -	600 V SHIELDED CABLE (SEE DWG. 7809787, PT. 3)		
N -	#12	TINNED C. WIRE (SPEC. 2003-8)	
O -	#20	GREEN	VARNAC
P -	#16	TINNED C. WIRE (P.D.S. #2003-8)	
Q -	#14	TINNED C. WIRE	
R -	PLATE LEAD DWG. 7407195 GR. 1		
S -	#16 TINNED C. WIRE COVERED WITH VARNISHED TUBING BLACK P.D.S. 7800-1 x 1/4 I.D. x 1/8 O.D.		
T -	#16 STRANDED TINNED C. WIRE		

MOTOR 29-2 USED ON RADIA TRANSMITTERS SERIAL NOS. 1 TO 63
MOTOR 76 USED ON RADIO TRANSMITTERS SERIAL NOS. 6478 124

FIGURE 59—RADIO TRANSMITTER BC-353-A, WIRING DIAGRAM

FIGURE 59—RADIO TRANSMITTER BC-353-A, WIRING DIAGRAM



WIRE LEGEND

A #12 TINNED MEDIUM HARD COPPER WIRE #2003-8
B #14 TINNED MEDIUM HARD COPPER WIRE #2003-8
ALL TERMINAL CONNECTIONS SHOULD BE BUILT UP WITH SOLDER TO ELIMINATE SHARP CORNERS.

FIGURE 60—RADIO TRANSMITTER BC-338-A, WIRING DIAGRAM OF COIL BOX

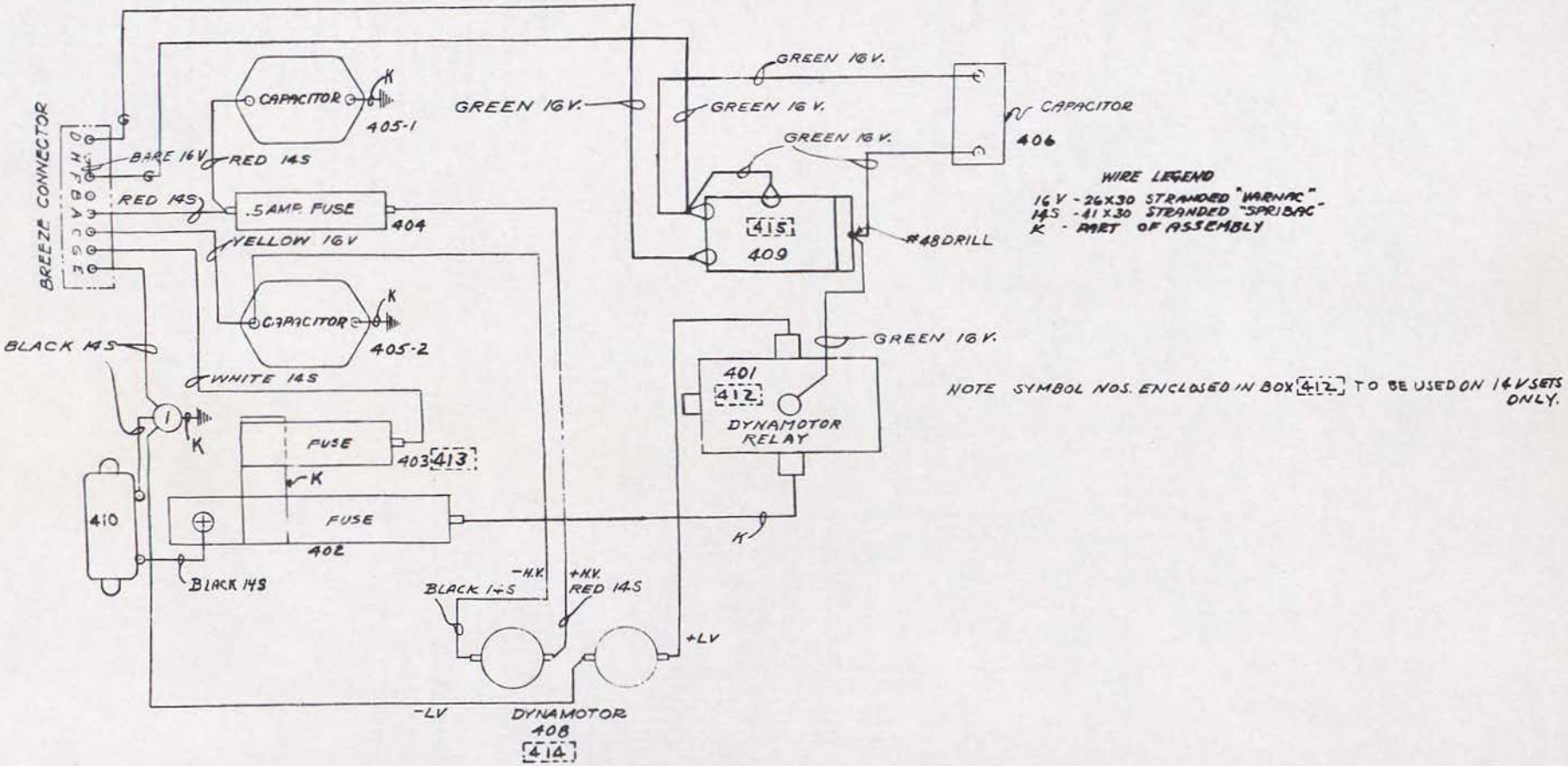


FIGURE 61—DYNAMOTOR UNIT PE-59-A OR PE-62-A, WIRING DIAGRAM

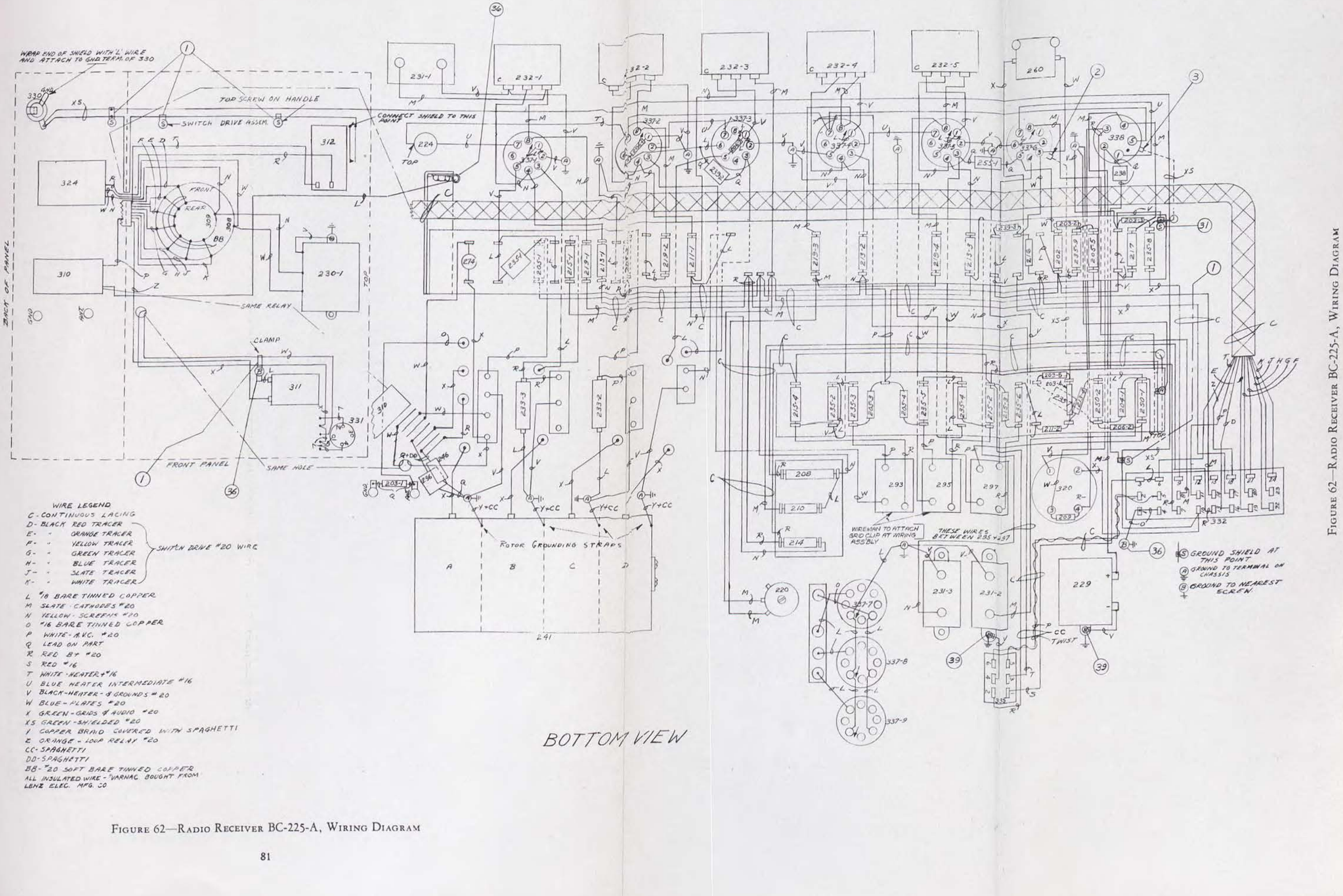


FIGURE 62—RADIO RECEIVER BC-225-A, WIRING DIAGRAM

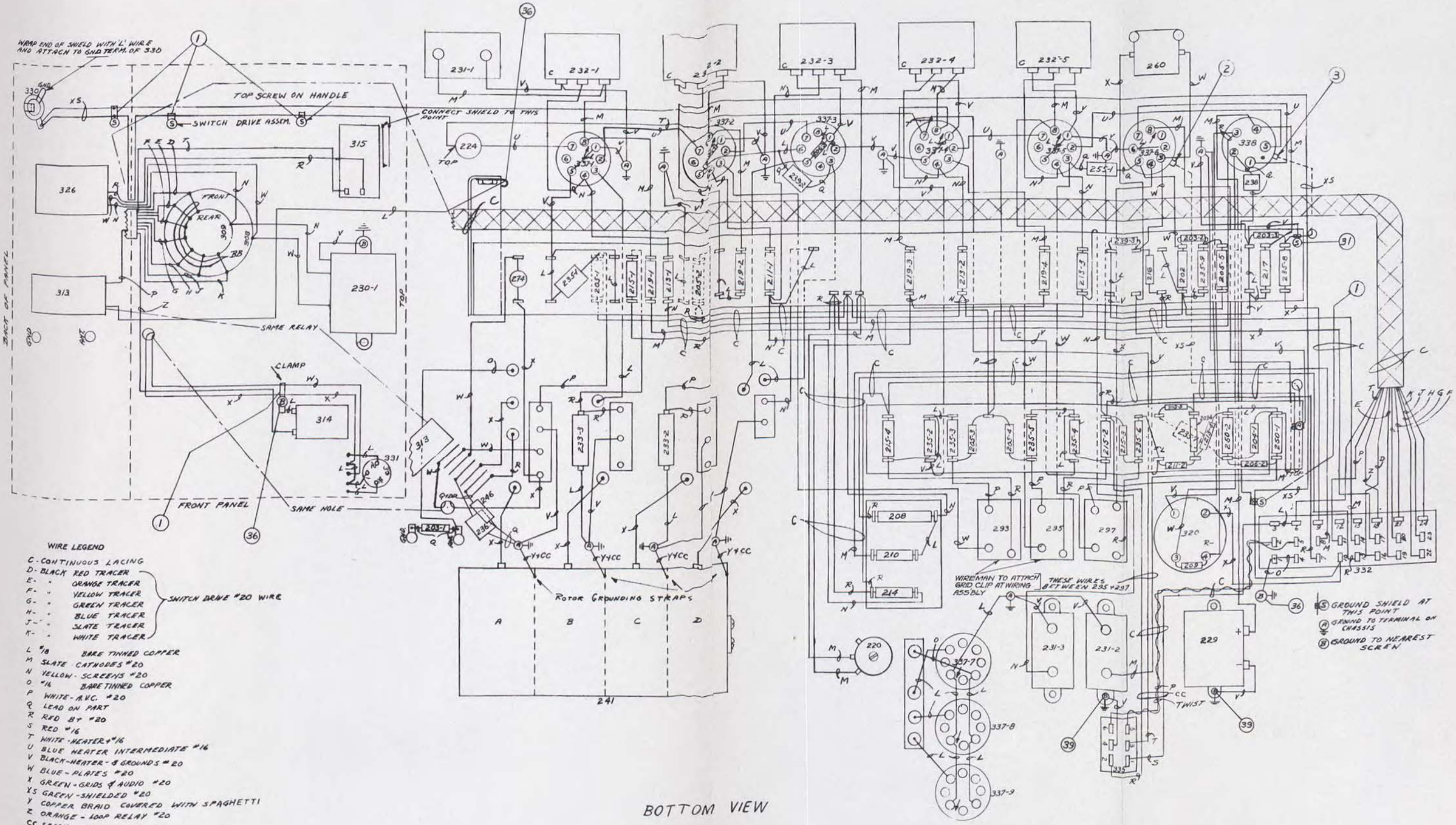


FIGURE 63—RADIO RECEIVER BC-352-A, WIRING DIAGRAM

FIGURE 63—RADIO RECEIVER BC-352-A, WIRING DIAGRAM

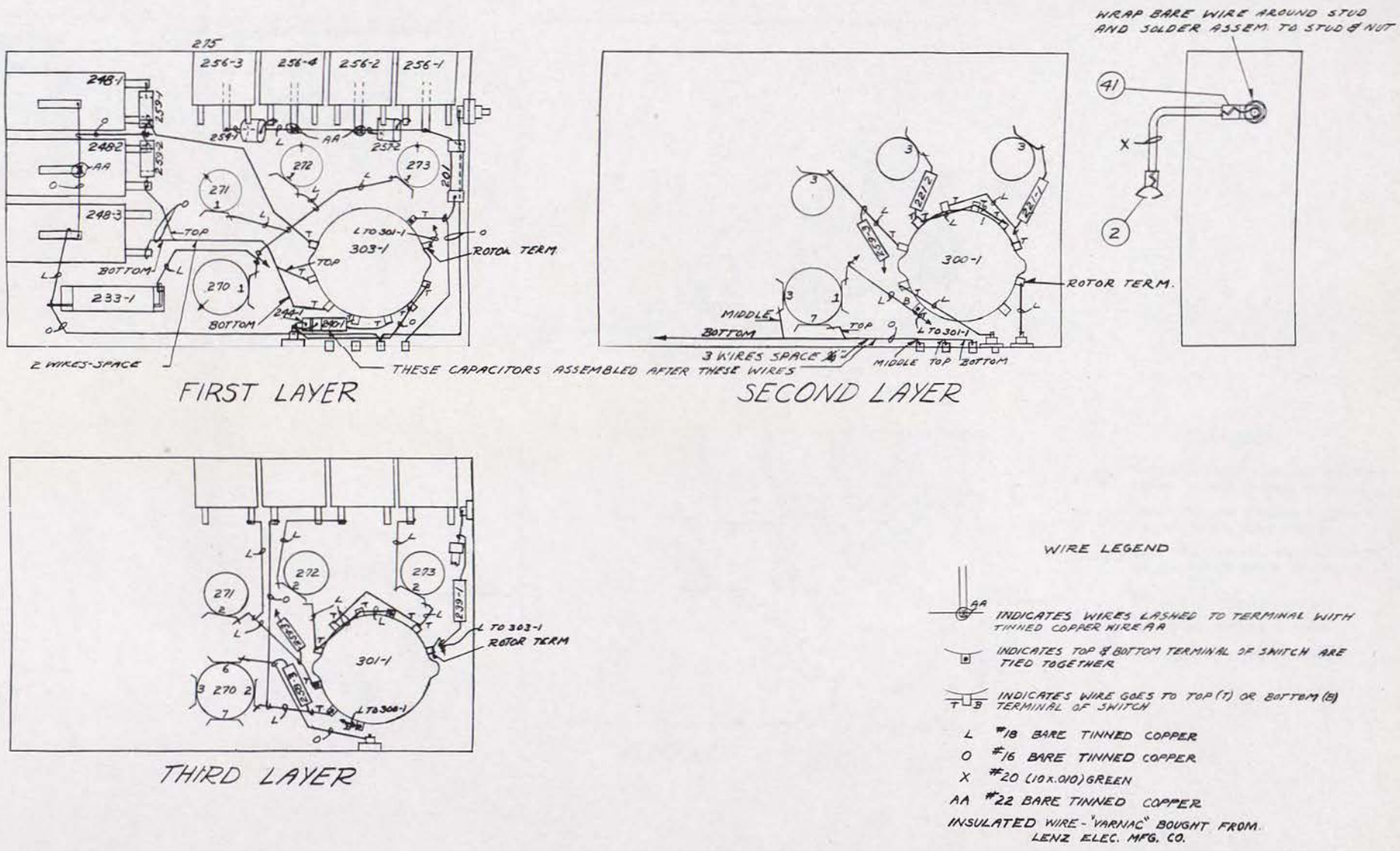


FIGURE 64—RADIO RECEIVER BC-225-A OR BC-352-A, ANTENNA UNIT, WIRING DIAGRAM

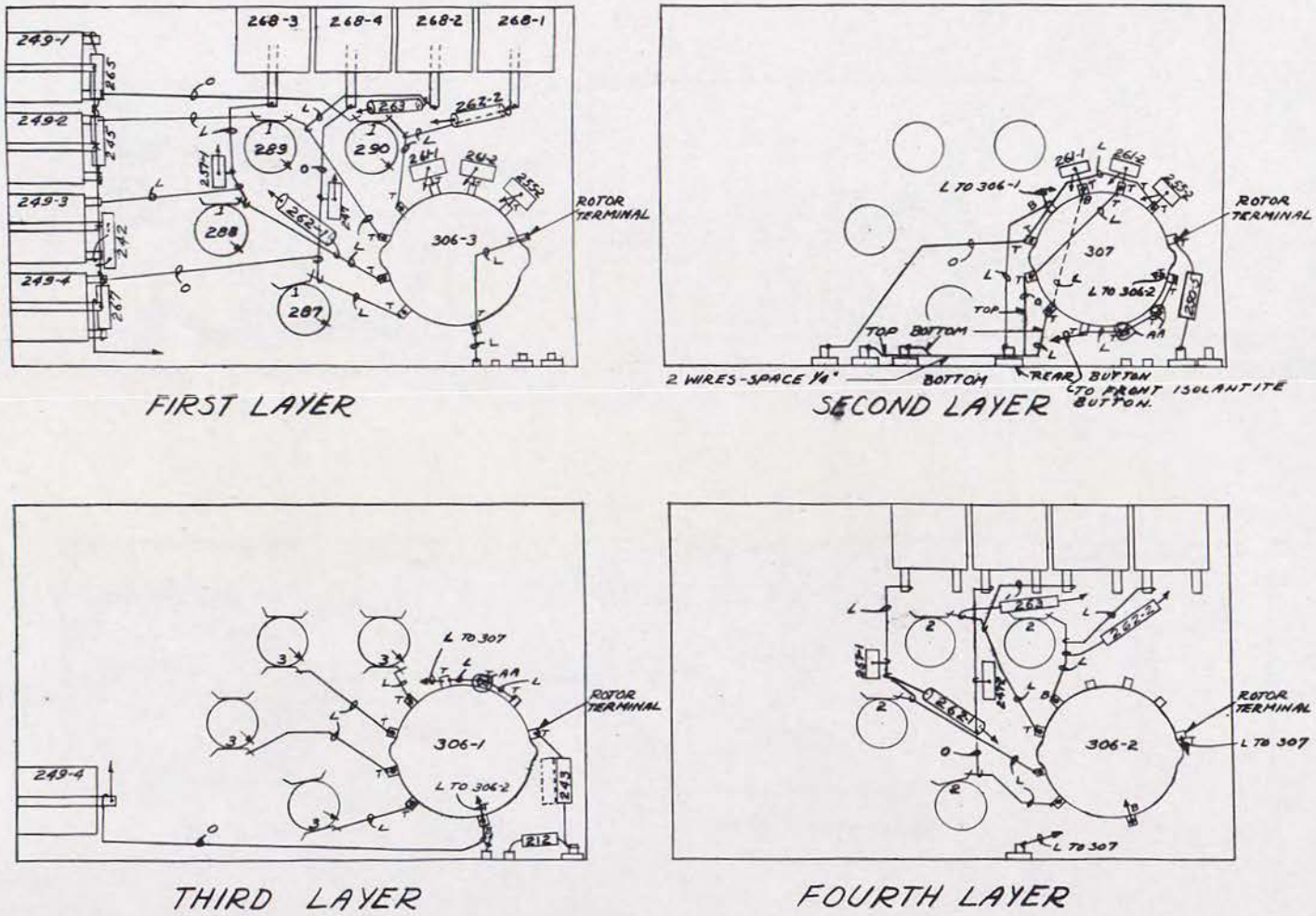


FIGURE 65—RADIO RECEIVER BC-225-A OR BC-352-A, OSCILLATOR UNIT, WIRING DIAGRAM

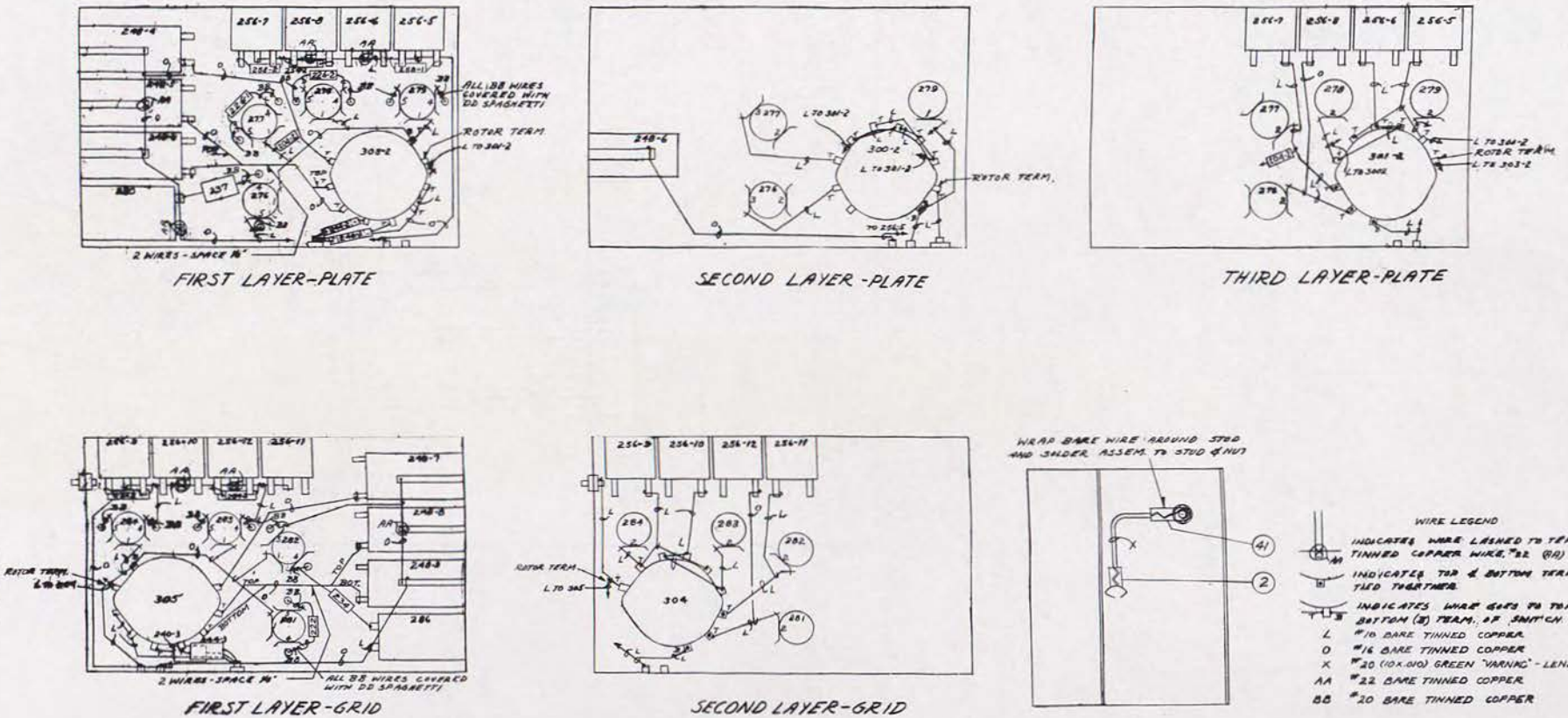
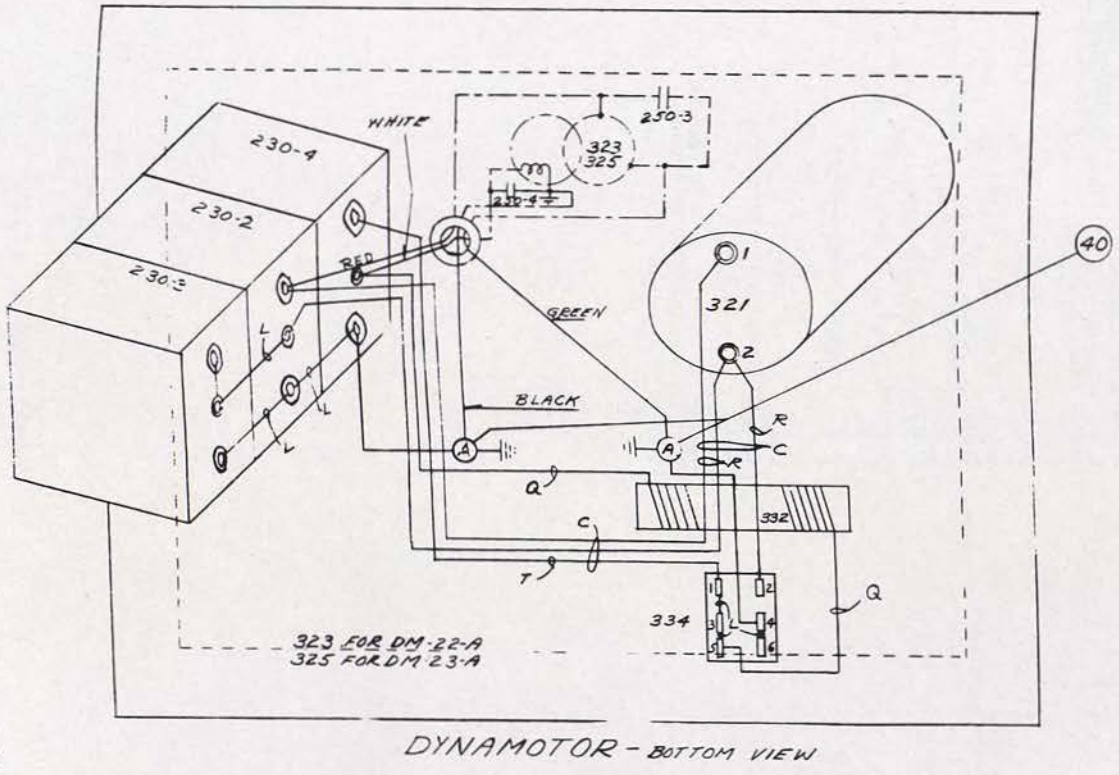
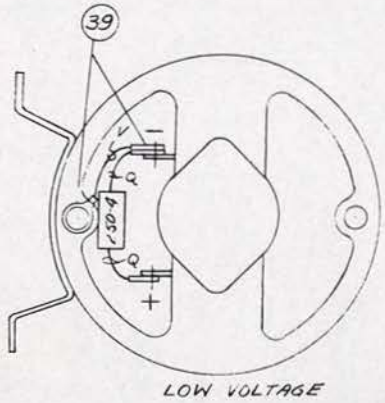
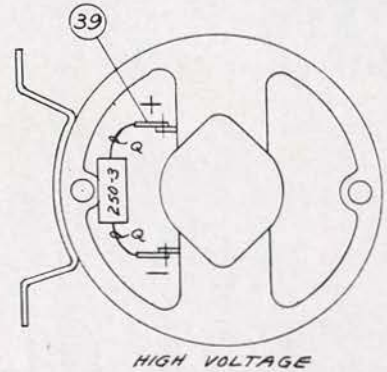


FIGURE 66—RADIO RECEIVER BC-225-A OR BC-352-A, R-F UNIT, WIRING DIAGRAM



DYNAMOTOR - BOTTOM VIEW





WIRE LEGEND

(A) - INDICATES GROUND TO SCREW MTG. MOTOR

Q - INDICATES WIRE INTEGRAL WITH PART

C - CONTINOUS LACING

R #20 (10 x .010) RED
T #16 (26 x .010) WHITE
U #16 (26 x .010) BLUE
V #20 (10 x .010) BLACK

INSULATED WIRE - "VARNAC" BOUGHT FROM LENZ ELEC. MFG. CO.

FIGURE 67—DYNAMOTOR DM-22-A OR DM-23-A, WIRING DIAGRAM

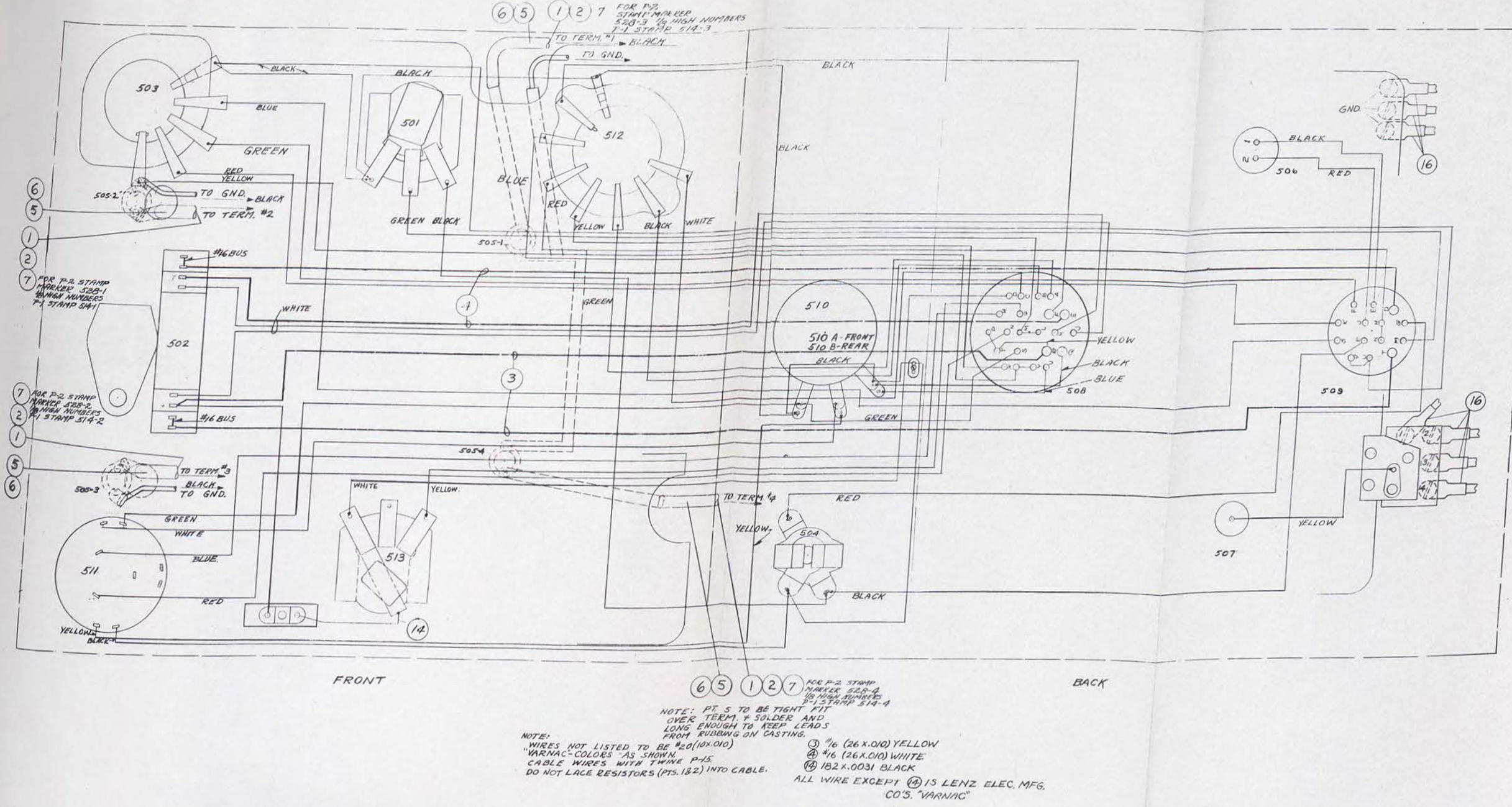


FIGURE 68—RADIO CONTROL BOX BC-226-A AND BC-351-A, WIRING DIAGRAM

FIGURE 68—RADIO CONTROL BOX BC-226-A AND BC-351-A, WIRING DIAGRAM

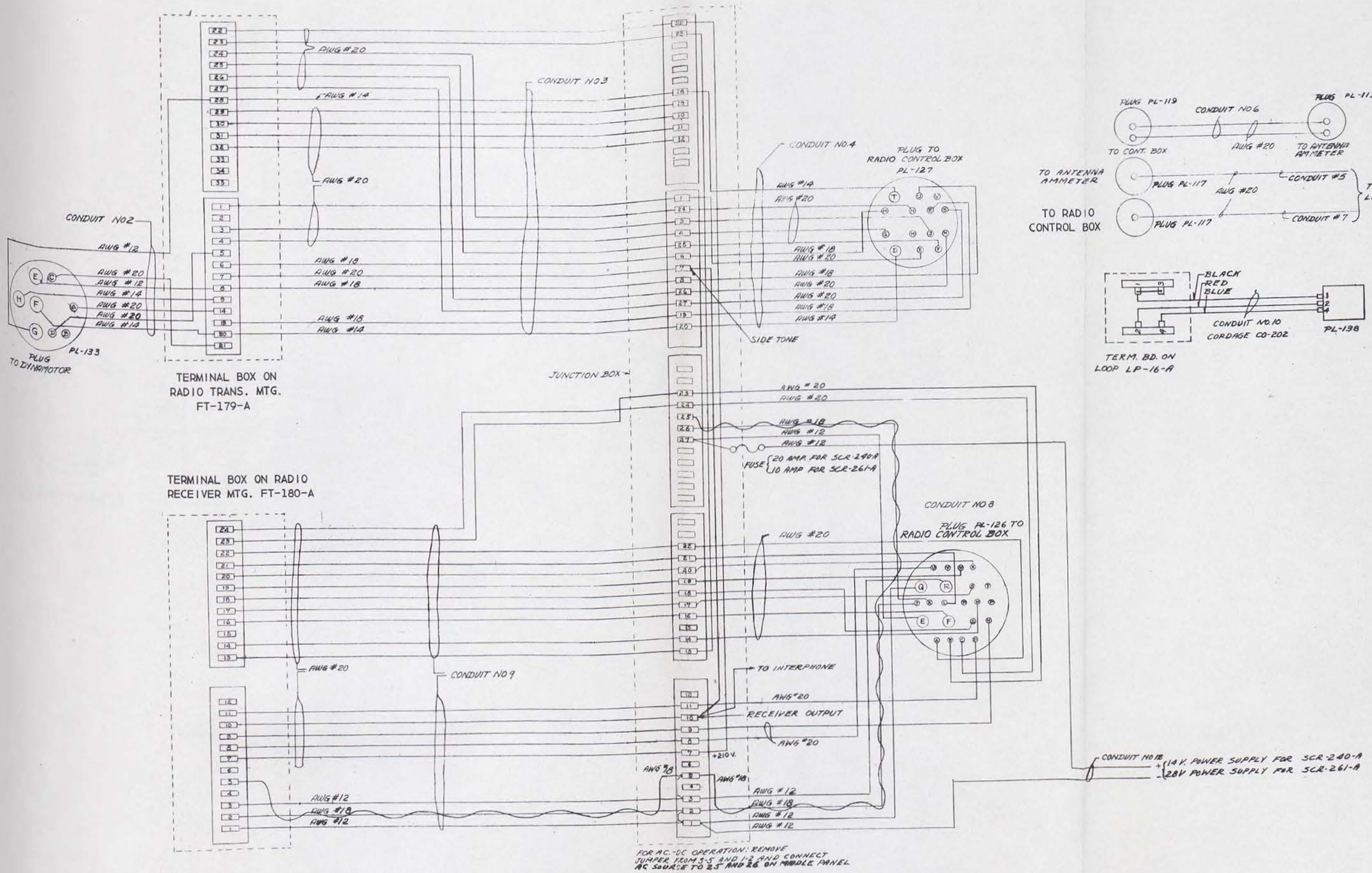


FIGURE 69—RADIO SET SCR-240-A OR SCR-261-A, INTERCONNECTING CABLES DIAGRAM

FIGURE 69—RADIO SET SCR-240-A OR SCR-261-A, INTERCONNECTING CABLES DIAGRAM

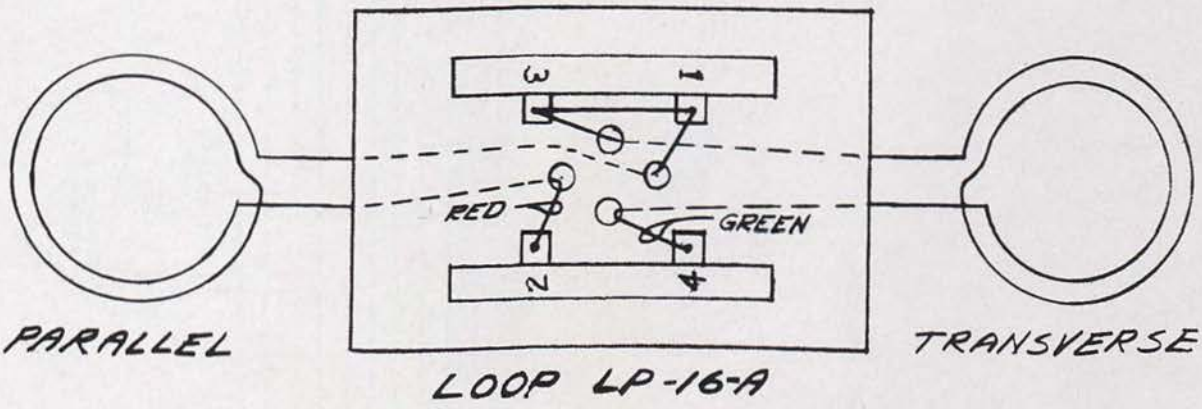


FIGURE 70—LOOP LP-16-A, WIRING DIAGRAM

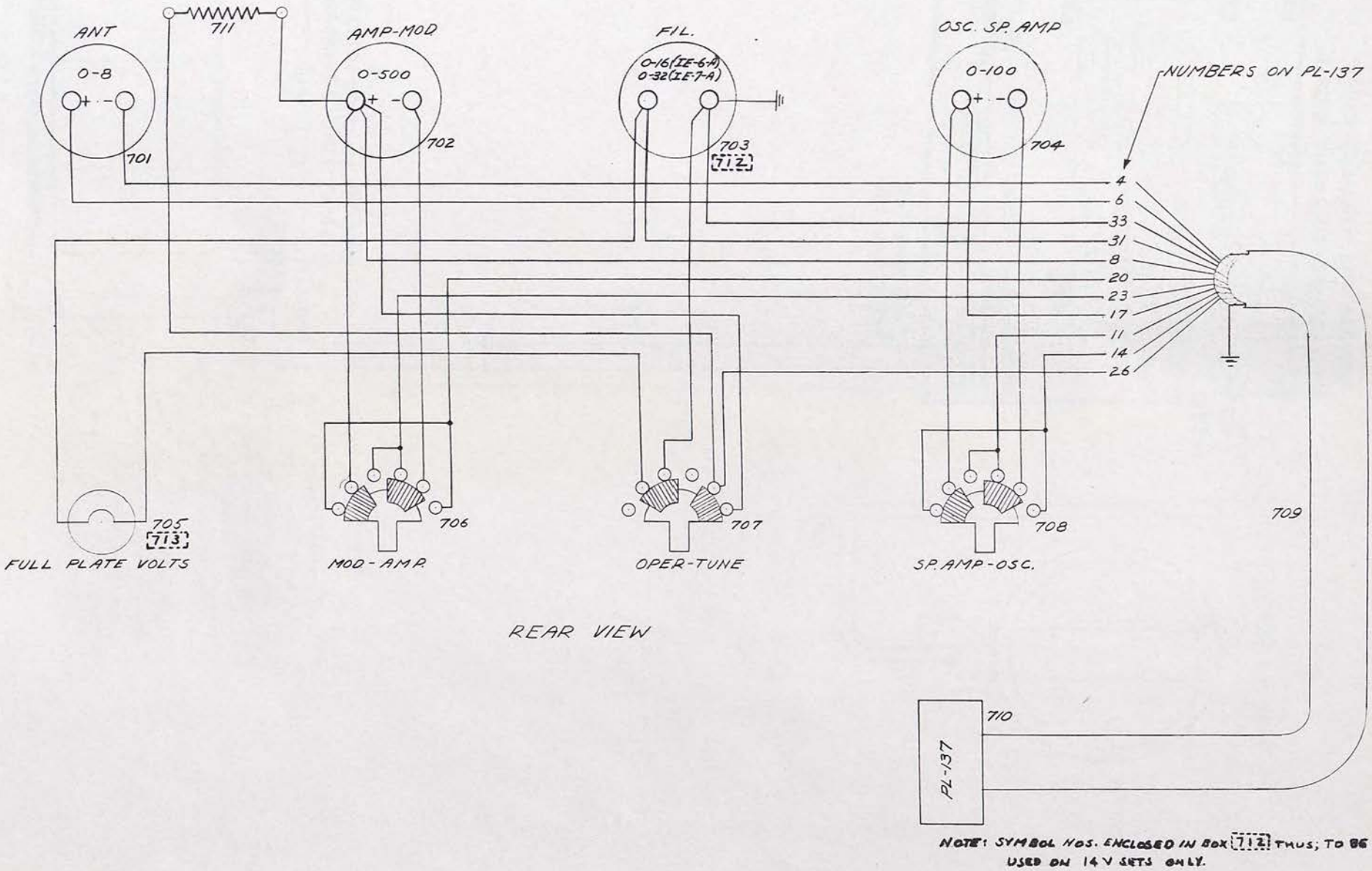
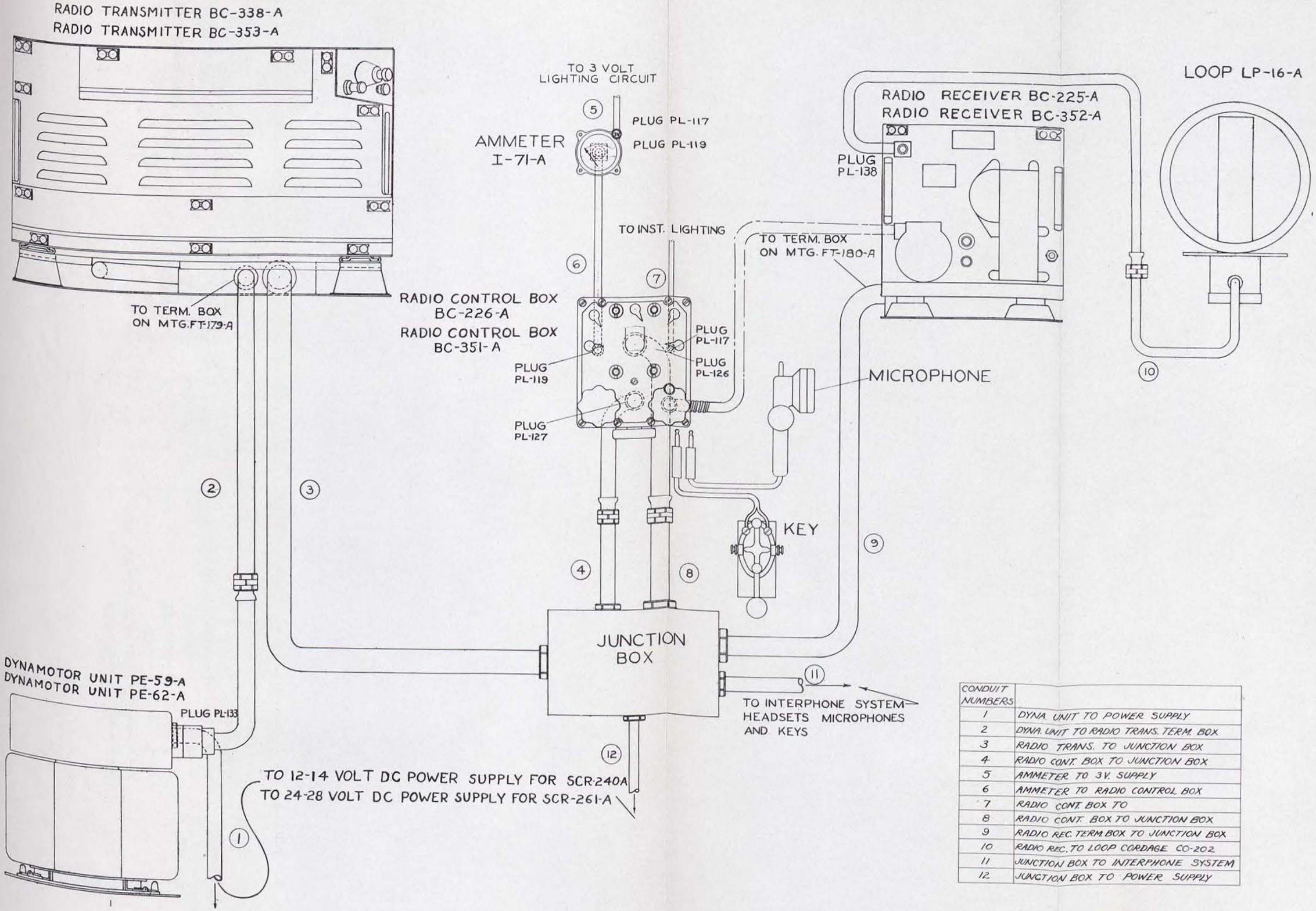


FIGURE 71—TUNING EQUIPMENT IE-6-A OR IE-7-A, WIRING DIAGRAM



CONDUIT NUMBERS	
1	DYNA. UNIT TO POWER SUPPLY
2	DYNA. UNIT TO RADIO TRANS. TERM. BOX
3	RADIO TRANS. TO JUNCTION BOX
4	RADIO CONT. BOX TO JUNCTION BOX
5	AMMETER TO 3V. SUPPLY
6	AMMETER TO RADIO CONTROL BOX
7	RADIO CONT. BOX TO
8	RADIO CONT. BOX TO JUNCTION BOX
9	RADIO REC. TERM BOX TO JUNCTION BOX
10	RADIO REC. TO LOOP CORDAGE CO-202
11	JUNCTION BOX TO INTERPHONE SYSTEM
12	JUNCTION BOX TO POWER SUPPLY

FIGURE 72—RADIO SET SCR-240-A OR SCR-261-A, CORDING DIAGRAM

FIGURE 72—RADIO SET SCR-240-A OR SCR-261-A, CORDING DIAGRAM

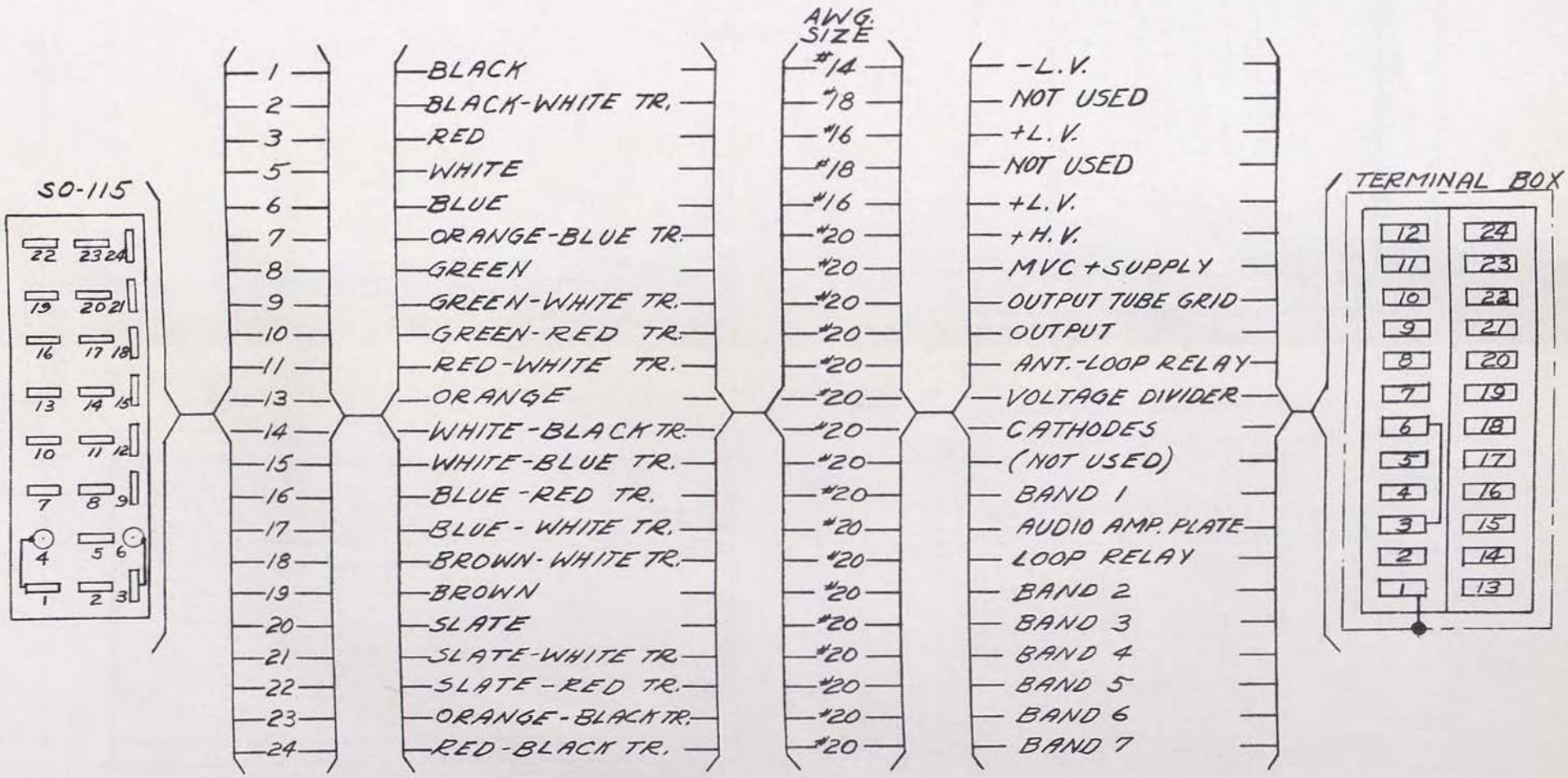


FIGURE 73—MOUNTINGS FT-180-A AND FT-182-A, CORDING DIAGRAM

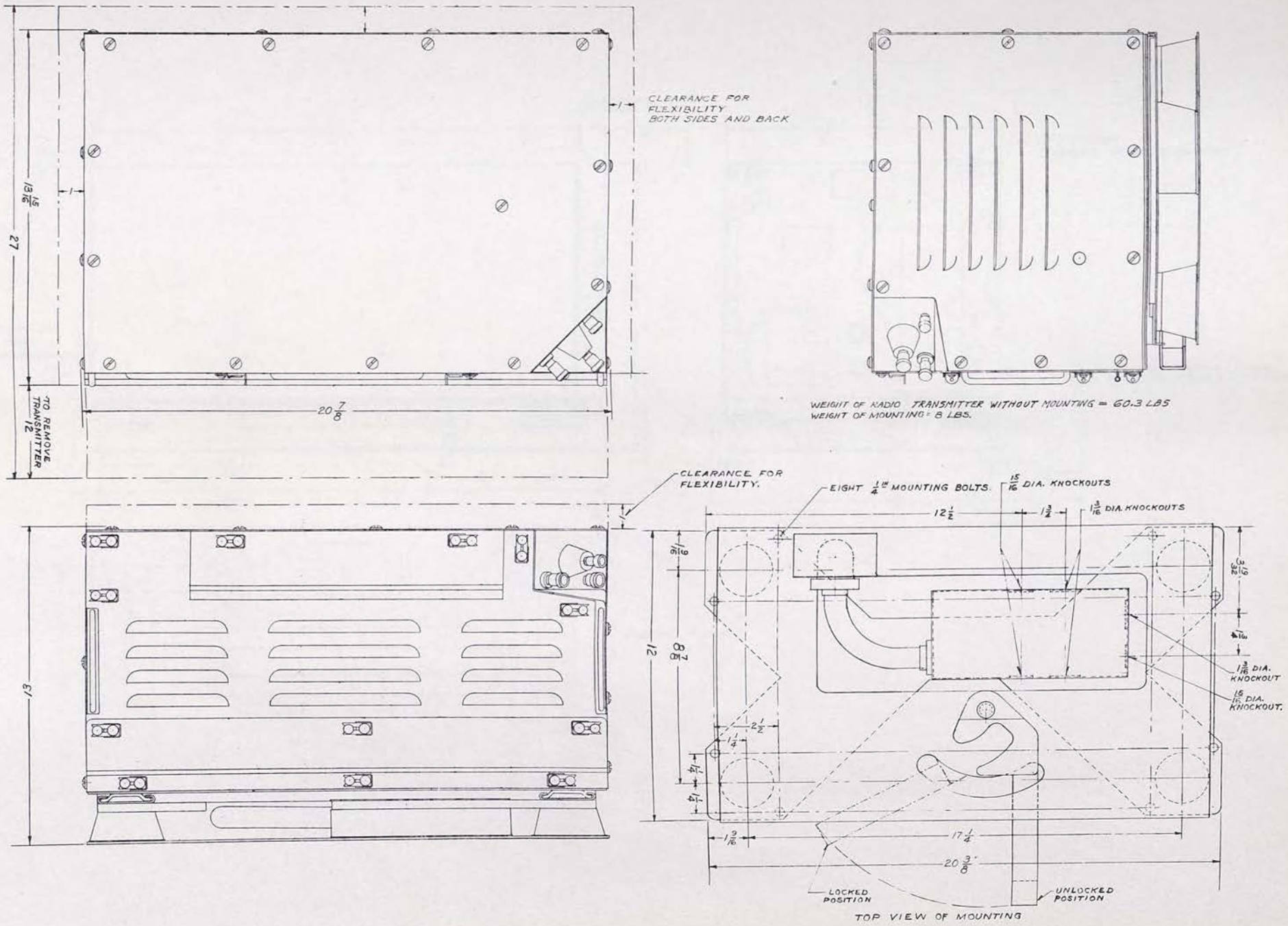


FIGURE 74—RADIO TRANSMITTER BC-338-A OR BC-353-A, OUTLINE DIMENSIONS

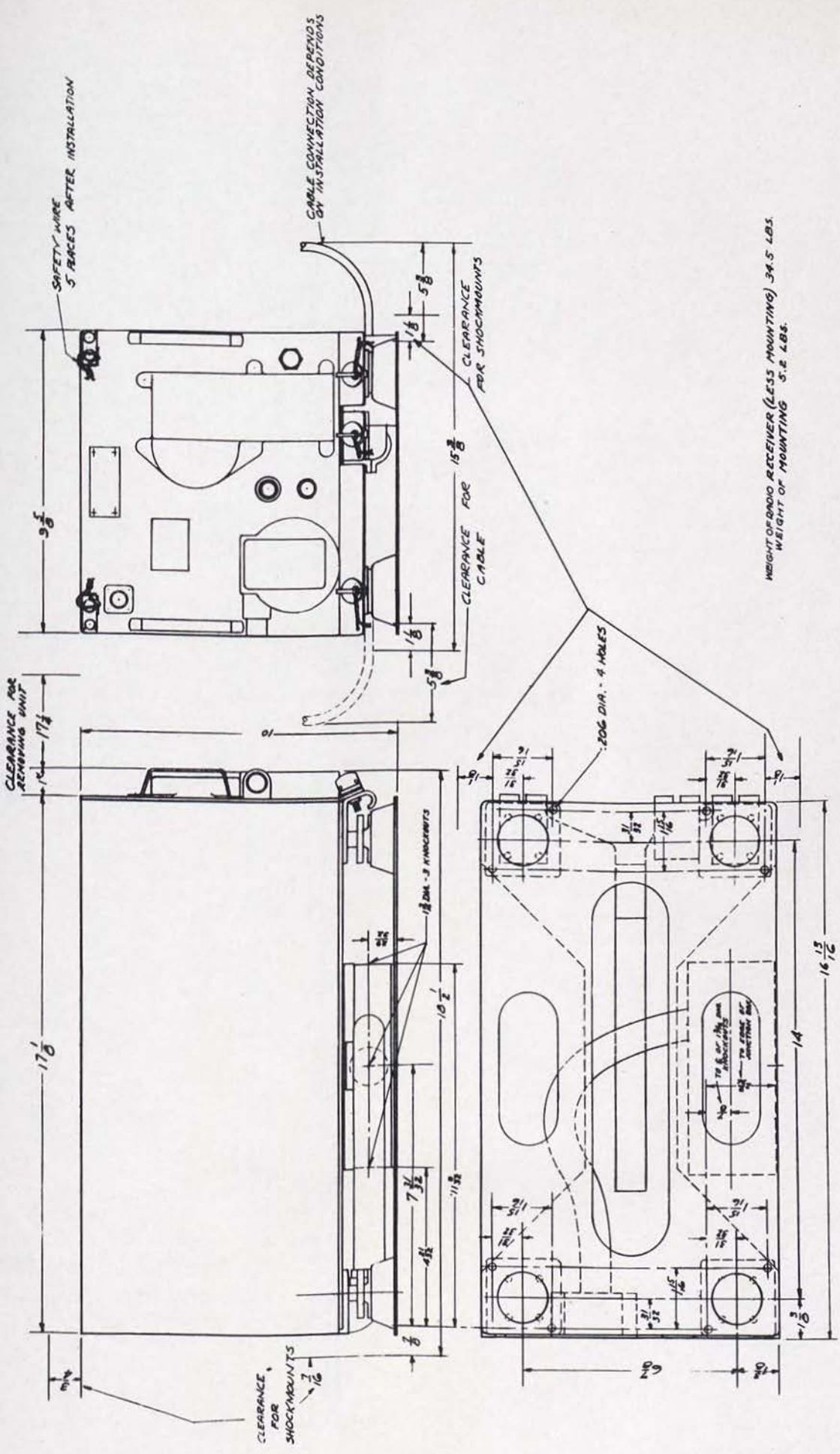
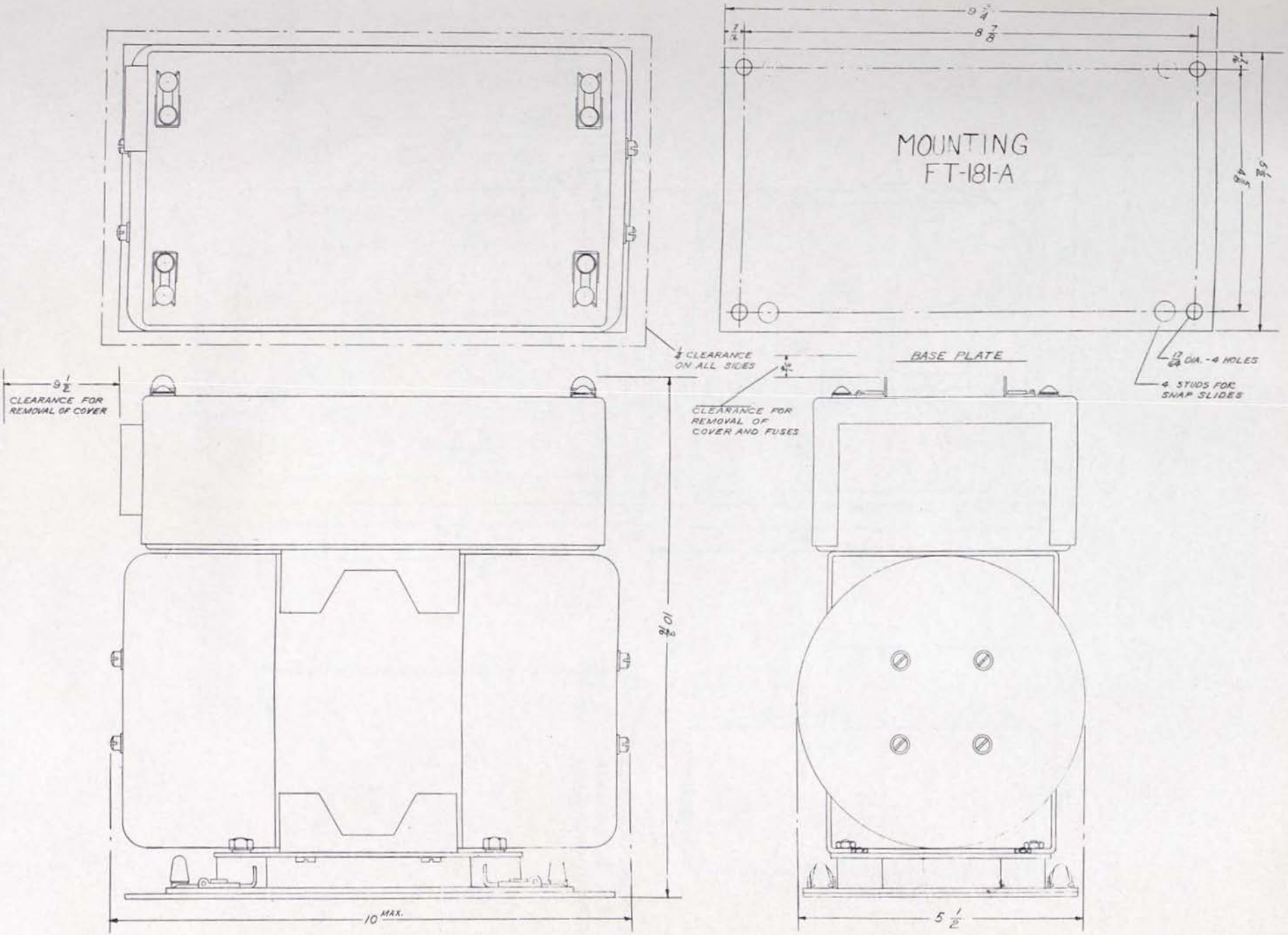


FIGURE 75—RADIO RECEIVER BC-225-A OR BC-352-A, OUTLINE DIMENSIONS



WEIGHT (INCLUDING MOUNTING) 24 LBS.

76—Dynamotor Unit PE-59-A or PE-62-A, Outline Dimensions.

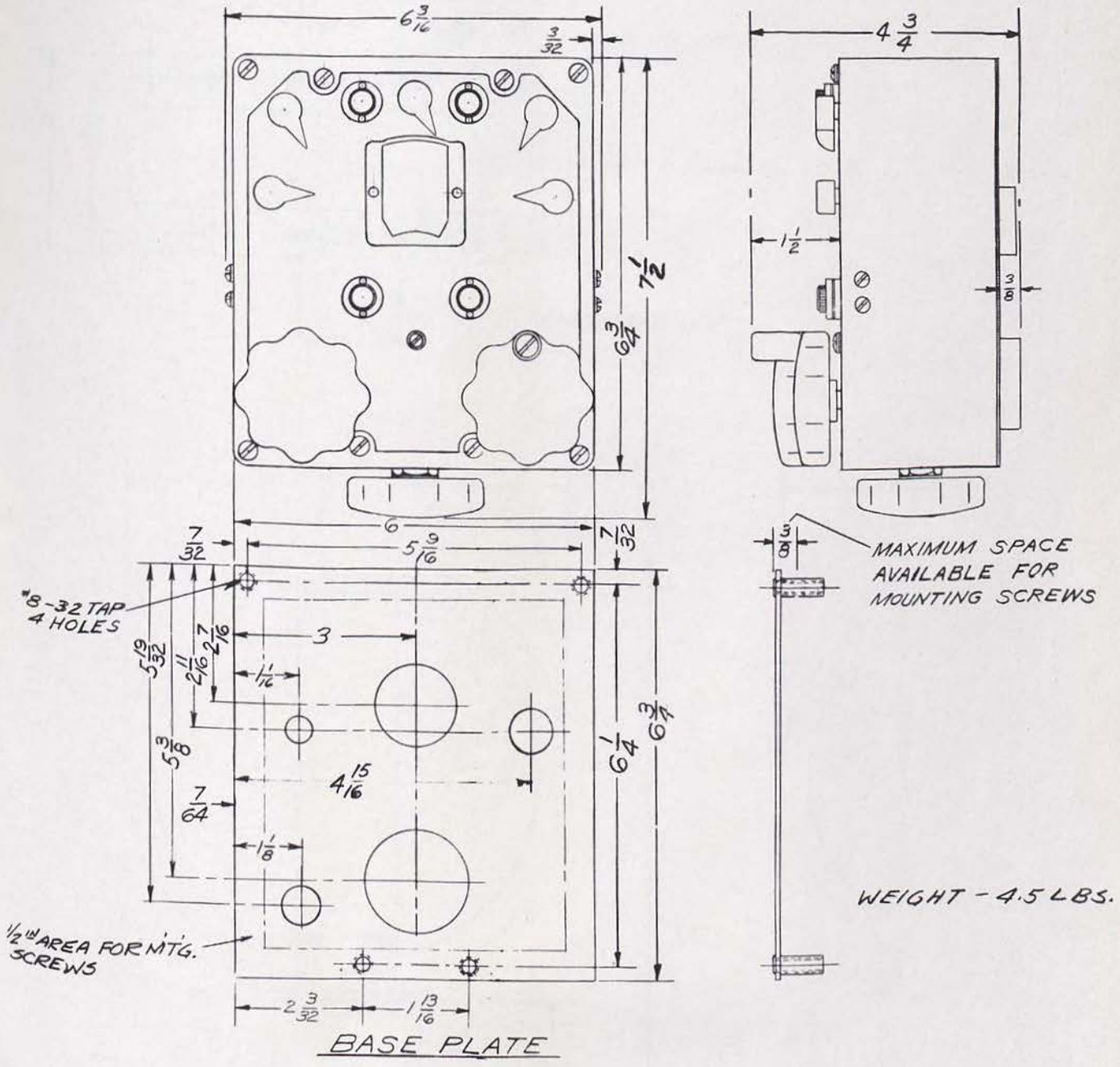
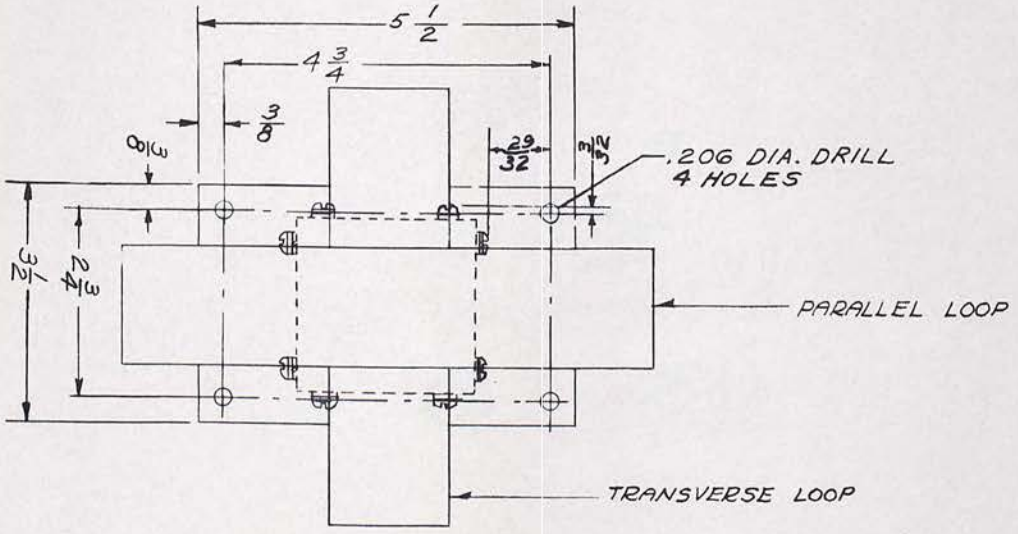
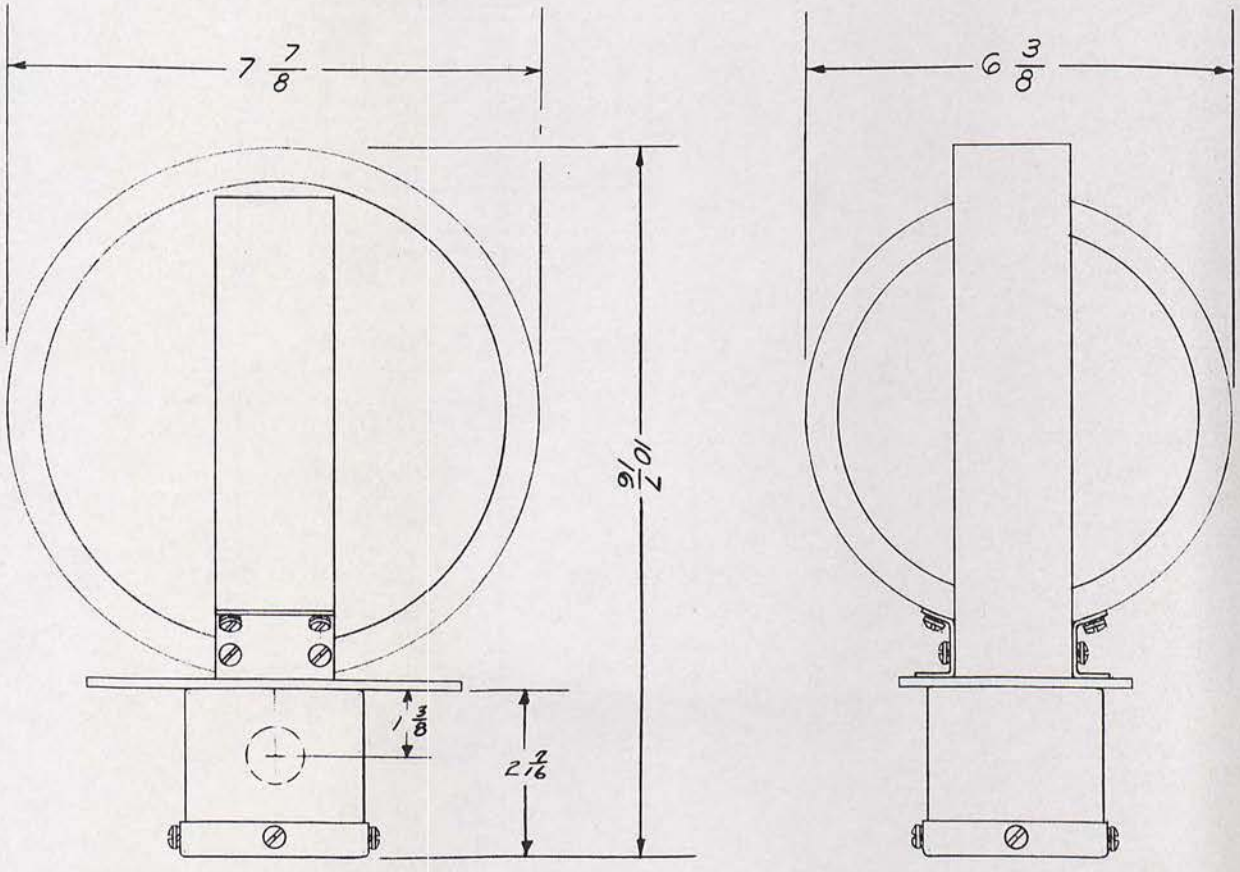


FIGURE 77—RADIO CONTROL BOX BC-226-A OR BC-351-A. OUTLINE DIMENSIONS





WEIGHT - 1.9 LBS.

FIGURE 78—LOOP LP-16-A, OUTLINE DIMENSIONS

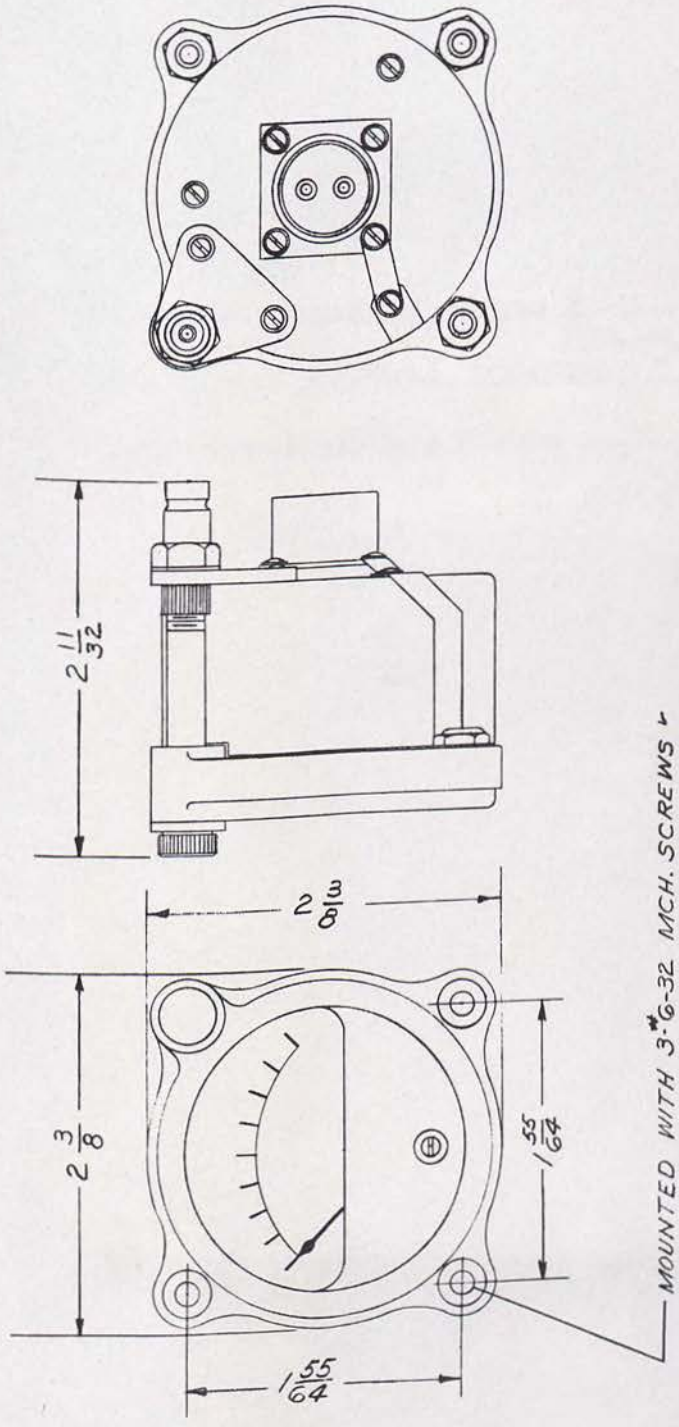


FIGURE 79—AMMETER I-71-A, OUTLINE DIMENSIONS

SCR-240-A, SCR-261-A, RC-40-A, RC-42-A A

S/S Copy

Radio Sets SCR-240-A, SCR-261-A, ,

AUTHOR

and Maintenance Sets RC-40-A . . .

TITLE

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