

30 July 1945

COMMUNICATIONS EQUIPMENT

**MODIFICATION TO ELIMINATE 400-CYCLE HUM IN RADIO RECEIVER—
R-44/ARR-5**

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to the work directed in paragraph 2. will be entered on the AAF Forms 60-A for the aircraft affected. The work prescribed in paragraph 2. will be accomplished as soon as practicable by base maintenance activities with the aid of depots, if necessary, when arranged with the Chief, Maintenance Division, of the area ATSC. Receivers R-44/ARR-5, in stock but not packed for export shipment, and those undergoing overhaul or repair, will be inspected, and modified, if required, prior to issue or prior to release to service or to stock. The inspection and modification will be accomplished in accordance with the instructions contained in paragraph 2.

1. To eliminate the objectionable 400-cycle hum present in Radio Receiver R-44/ARR-5 caused by:

a. Coupling between filament leads and other circuit parts;

b. Common chassis currents in the audio system; and

c. Coupling between the heater and grid leads inside the vacuum tubes; all Radio Receivers R-44/ARR-5,

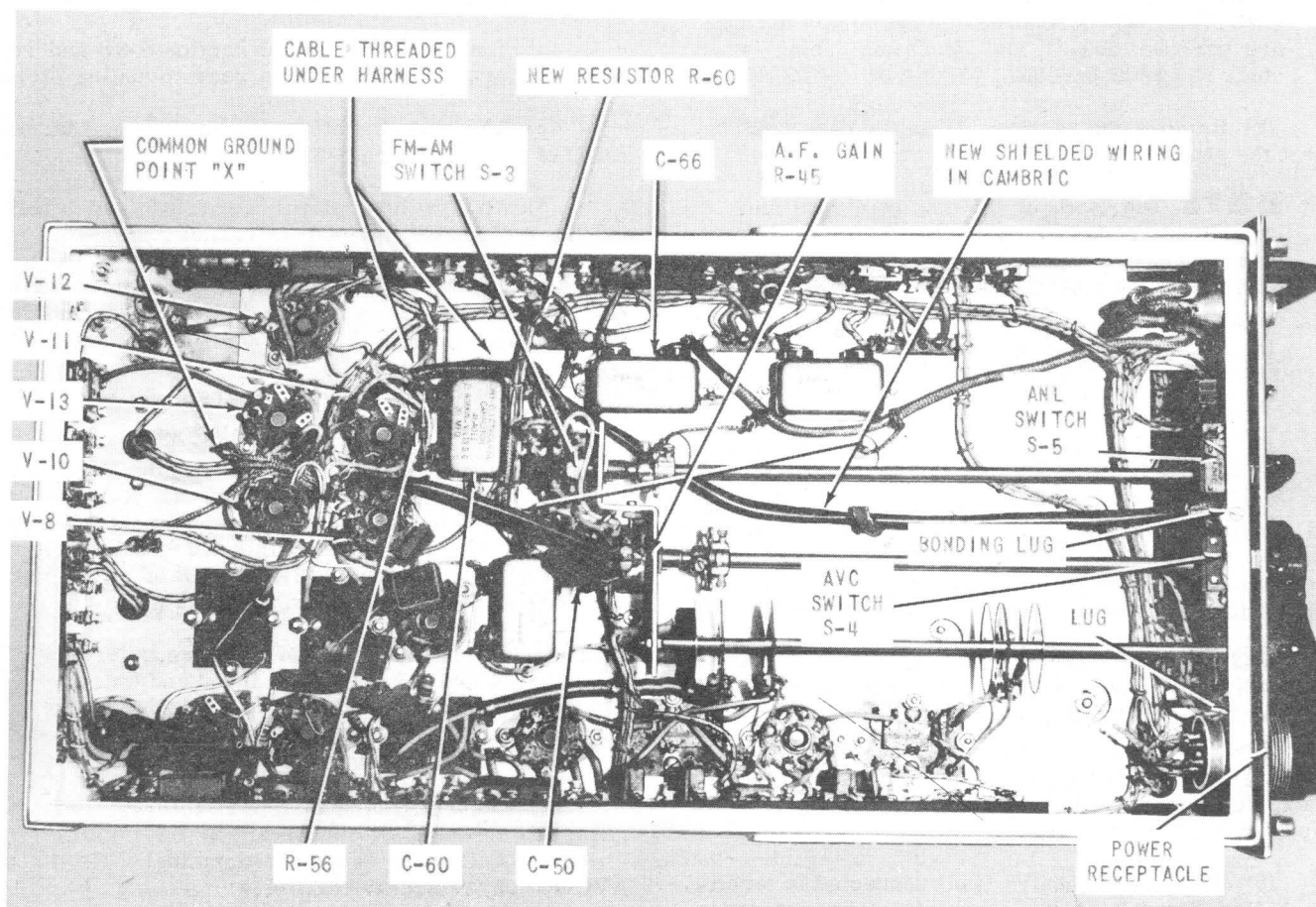


Figure 1 - Radio Receiver R-44/ARR-5, Bottom Interior View After Modification

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except those packed for export shipment, will be inspected, and modified, if required, in accordance with instructions contained in paragraph 2.

2. INSPECTION AND MODIFICATION.

a. INSPECTION.

(1) Inspect Radio Receiver R-44/ARR-5 to determine if either a red dot or the symbol "M-1" is present above and to the right of the name plate. If either is present, the changes directed herein have been accomplished, and further compliance with this Technical Order is not required for the receiver so marked. If neither the red dot nor the symbol "M-1" is present, proceed in accordance with the following instructions:

NOTE The following circuit changes are designed to connect to a common point, "X," as many as possible of the ground returns of critical circuits. Point "X" will be established by the installation of a terminal, part No. 660-51, on the mounting screw of tube socket, reference No. V-13, nearest to tube socket, reference No. V-10. All new wiring installed will be aircraft low-tension cable, shielded, No. 22 AWG, stock No. 8800-086820. Terminals used are part No. 660-51, and insulating tubing is stock No. 8800-919600.

(2) Remove the receiver from its case, and invert the chassis.

NOTE The leads of all new resistors and capacitors installed in accomplishing this change will be covered prior to installation with insulating tubing, stock No. 8800-919600.

(3) Disconnect and remove feedback resistor, reference No. R-60 (100,000 ohms), and its connecting leads.

(4) Connect a resistor, stock No. 3Z6735-1, between the plates of tubes, reference Nos. V-11 and V-12, by connecting one resistor lead to the plate end of resistor, reference No. R-58, and the other to the junction of capacitor, reference No. C-66, and resistor, reference No. R-63, on the terminal board. The resistor just installed will be designated as R-60.

NOTE The foregoing changes the physical path of the feedback circuit but does not materially affect its electrical characteristics.

(5) Reverse the heater leads connected to terminals, Nos. 2 and 7, of the socket for tube, reference No. V-8.

(6) Reverse the heater leads connected to terminals, Nos. 2 and 7, of the socket for tube, reference No. V-10.

(7) Disconnect and remove resistors, reference Nos. R-75 and R-56, from the left side terminal board. Resistor, reference No. R-75, will not be reinstalled.

(8) Connect resistor, reference No. R-56, directly across the terminals of capacitor, reference No. C-60, and connect a length of shielded cable from the negative side of capacitor, reference No. C-60, to point "X."

(9) Replace the unshielded lead connected between resistor, reference No. R-64, and terminal No. 4 of the socket for tube, reference No. V-8, with a shielded lead of the same length.

(10) Replace the unshielded lead connected between capacitor, reference No. C-50, and section S-3A of FM-AM switch, reference No. S-3, with a shielded lead of the same length.

(11) Disconnect the two white-black tracer wires soldered to one of the terminals of the AVC switch, reference No. S-4, solder a terminal on the free ends and mount the terminal on one of the retaining screws of the power input receptacle.

(12) Disconnect and remove the leads connected between:

(a) AVC switch, reference No. S-4, and terminal A of switch section S-3B;

(b) Terminal A of switch section S-3B and resistor, reference No. R-54, on rear mounting strip;

(c) ANL switch, reference No. S-5, and terminal B of switch section S-3A;

(d) ANL switch, reference No. S-5, and terminal No. 4 of socket for tube, reference No. V-10;

(e) Center terminal No. 2 of AF gain control, reference No. R-45, and terminal No. 2 of socket for tube, reference No. V-11;

(f) Terminal No. 3 of AF gain control, reference No. R-45, and ground.

(13) Disconnect and carefully remove from rear terminal board, resistor, reference No. R-54, mount it on switch, reference No. S-3, and connect it, but do not solder the connections at this time, between terminals A of switch section S-3B and B of switch section S-3A.

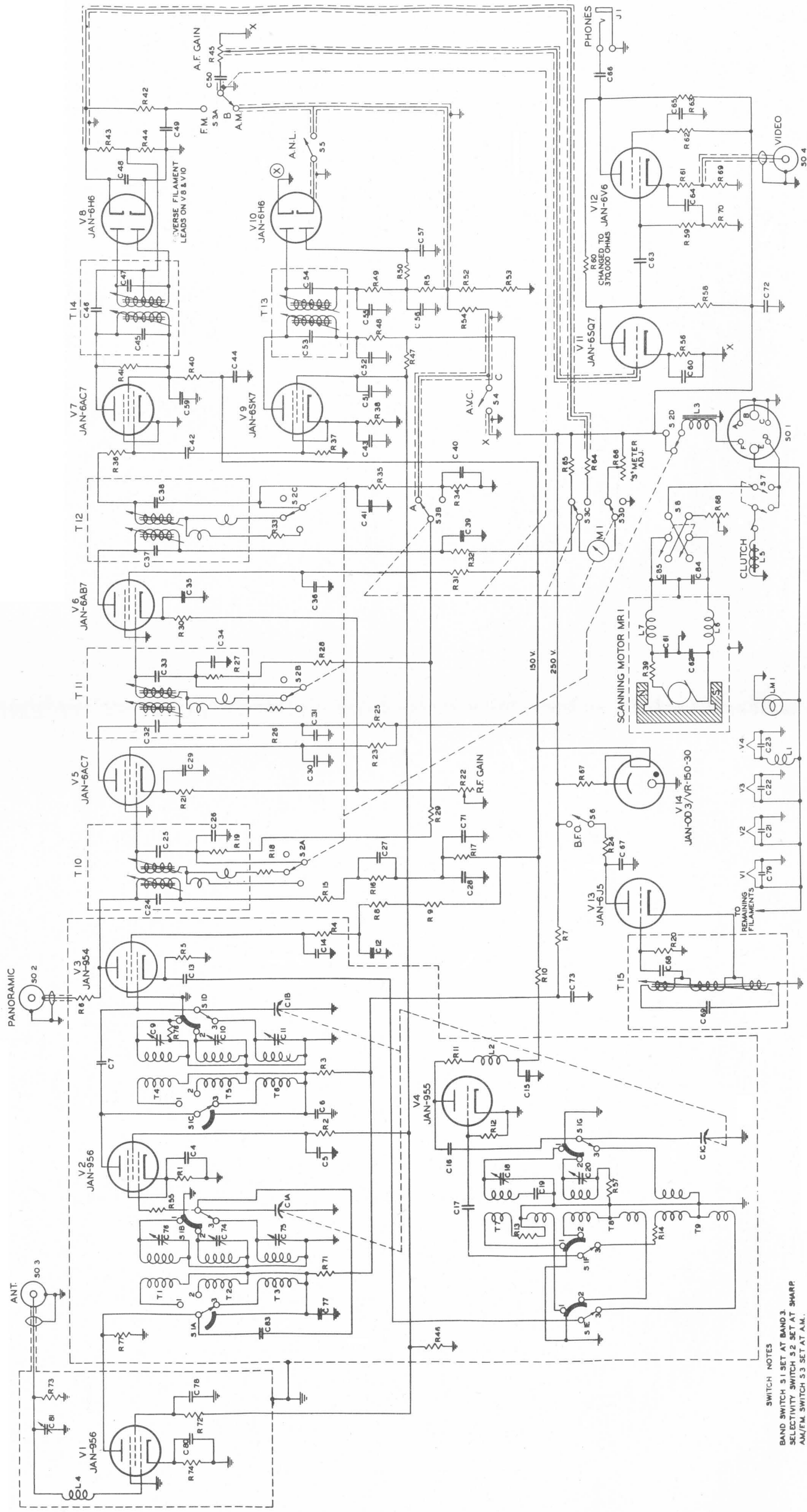
NOTE The terminals of switches, reference Nos. S-4 and S-5, are not marked and the numbers 1 and 2 are arbitrarily assigned to the terminals in the following instructions for convenient reference.

(14) Connect shielded cable as follows:

(a) A 16-inch length to terminal "No. 1" of AVC switch, reference No. S-4;

(b) A 20-inch length to terminal "No. 2" of AVC switch, reference No. S-4;

(c) A 15-inch length to terminal "No. 1" of ANL switch, reference No. S-5;



RADIO RECEIVER R-44/APR-5—SCHEMATIC WIRING DIAGRAM

SWITCH NOTES
BAND SWITCH S1 SET AT BAND 3
SELECTIVITY SWITCH S2 SET AT SHARP
AM/FM SWITCH S3 SET AT A.M.

NOTES
1-DELETE AVC LEAD WHICH RUNS FROM REAR RESISTOR BOARD TO AM/FM SWITCH
2-CHANGE POSITION OF R54 FROM REAR TERMINAL BOARD TO AM/FM SWITCH
3-ALL GROUNDS MARKED 'X' ARE WIRED TOGETHER AND GROUNDED AT THE POINT MARKED 'X'

Figure 2 - Schematic Wiring Diagram

(25) Install a terminal on the rear mounting screw of capacitor, reference No. C-66, and ground the shields of all leads from switches, reference No. S-3, S-4, and S-5.

(26) Connect a 7-1/2 inch length of shielded cable to the center terminal No. 2 and another 7-1/2 inch length to terminal No. 3 of the AF gain control, reference No. R-45, and place a 5-inch length of insulating tubing over the two wires.

(27) Install a terminal on one of the mounting screws of the bracket supporting the AF gain control switch, reference No. R-45, and the FM-AM switch, reference No. S-3, and ground shields of the two 7-1/2 inch leads to it.

(28) Connect free end of lead from terminal No. 2 of the AF gain control, reference No. R-45, to terminal No. 2 of the socket for tube, reference No. V-11, and connect terminal No. 3 of the AF gain control to point "X."

(29) Check all connections to make certain all are properly soldered.

(30) Reinstall receiver in case.

b. TESTING.

(1) Temporarily connect an 8,000-ohm resistor across the audio output of receiver, and place receiver

in operation. Turn R-F gain control, reference No. R-22, to minimum (extreme counterclockwise position) and disconnect antenna.

(2) Turn audio gain control, reference No. R-45, to maximum (extreme clockwise position) and measure the voltage (hum voltage) across the 8,000-ohm resistor, using a VT voltmeter, RCA-165, or equivalent. Voltage should not exceed 0.2 volt.

(3) Turn audio gain control to minimum (extreme counterclockwise position) and measure the voltage across the resistor. Voltage should not exceed 0.02 volt.

(4) If the results given preceding are not obtained, check each step of the instructions contained in paragraph 2.a. and rectify any misconnections found.

c. MODIFICATION MARKING.

(1) Using any available red lacquer or red paint and letters approximately 1/2 inch high, paint the marking "M-1", 1/2 inch to the right of right-hand edge of name plate, opposite the nomenclature line "Radio Receiver R-44/ARR-5." This constitutes the modification symbol indicating compliance with this Technical Order.

3. a. The following compliance parts are required to accomplish the changes directed herein and will be obtained by requisition submitted through normal channels.

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
1	3Z6735-1		Resistor - Fixed, 350,000-ohm \pm 10%, 1/2-watt	16-E	AF Stock
1	6500-513700	AN365-832	Nut - Self-locking steel 8-32	04-A	AF Stock
14 ft	8800-086820		Cable - Aircraft power and lighting shielded No. 22 AWG, Specification No. 27273	08-B	AF Stock
12	8800-875479-22	660-51	Terminal - Electrical copper soldering lug light	08-B	AF Stock
3 ft	8800-919600		Tubing - Varnished cambric .255-in. ID	08-B	AF Stock
1	6700-711100	AN515-8-6	Screw - Machine steel RH 8-32 x 3/8 in.	29	AF Stock

b. The following part removed in accordance with the preceding instructions will be returned to stock if serviceable.

1 Resistor-Fixed, reference No. R-75 16-E

4. MAN-HOURS REQUIRED.

The estimated time required to accomplish the changes directed herein is 3 man-hours.

5. The change in weight resulting from these modifications is negligible.

BY COMMAND OF GENERAL ARNOLD:

H. J. KNERR
Major General, U.S.A.
Commanding General
Air Technical Service Command

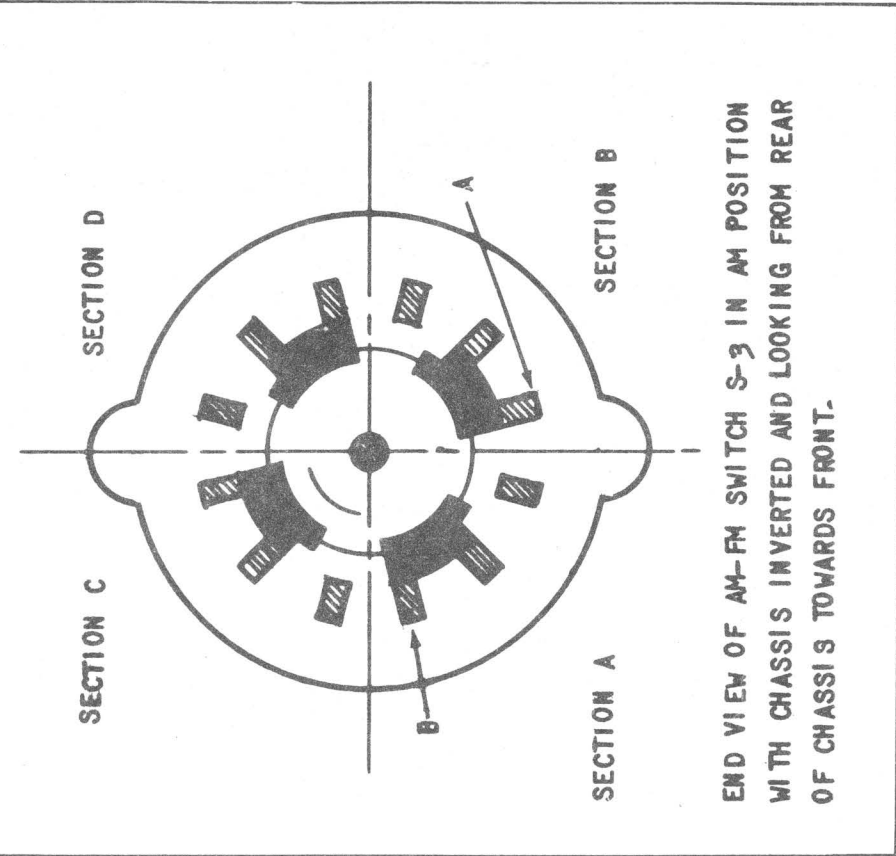


Figure 3

(d) A 20-inch length to terminal "No. 2" of ANL switch, reference No. S-5.

(15) At a convenient point near the AVC and ANL switches, bond the shields of the four leads just installed, install a terminal on free end of bonding wire and ground the terminal to front flange of chassis, using a screw, part No. AN515-8-6, and a nut, part No. AN365-832.

(16) Place an 11-inch length of insulating tubing over the four wires just installed, with one end against the bonding wire.

(17) Connect the 16-inch lead from terminal "No. 1" of AVC switch, reference No. S-4, to terminal A of switch section S-3B, and solder both this connection and the lead of resistor, reference No. R-54, installed on the same terminal.

(18) Connect the 15-inch lead from terminal "No. 1" of ANL switch, reference No. S-5, to terminal B of switch section S-3A, but do not solder the connection at this time.

(19) Connect a 10-inch length of shielded cable to terminal B of switch section S-3A, and solder it, the 15-inch lead from terminal No. 1 of ANL switch, reference No. S-5, and the lead of resistor, reference No. R-54, to terminal B.

(20) Place a 4-1/2 inch length of insulating tubing on the 10-inch lead just installed and the leads connected to terminals "No. 2" of AVC switch, reference No. S-4, and ANL switch, reference No. S-5. Dress the tubing and contained wires underneath the cable harness and between the sockets for tubes, reference Nos. V-11 and V-13.

(21) Connect free end of the 10-inch lead from terminal B of switch section S-3A to the junction of resistors, reference Nos. R-51 and R-52, on rear terminal board.

(22) Install a terminal on the screw adjacent to the lower terminal of resistor, reference No. R-51, and connect the shield of the 10-inch lead to the terminal.

(23) Connect free end of the 20-inch lead from ANL switch, reference No. S-5, to terminal No. 4 of socket for tube, reference No. V-10.

(24) Connect free end of the 20-inch lead from AVC switch, reference No. S-4, to its shield and ground at point "X."

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