

War Department Technical Manual
TM 11-275

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TM 11-275, Radio Set SCR-284-A, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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(For explanation of symbols see FM 21-6.)

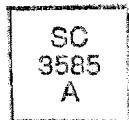


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DESTRUCTION NOTICE

WHY —To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN—When ordered by your commander.

HOW —1. Smash —Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools, etc.

2. Cut —Use axes, handaxes, machetes, etc.

3. Burn —Use gasoline, kerosene, oil, flame throwers, incendiary grenades, etc.

4. Explosives—Use firearms, grenades, TNT, etc.

5. Disposal —Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT—1. Smash —All vacuum tubes, coils, switches, capacitors, microphones, headsets, insulators, mast sections, dynamotor, batteries, key, remote control unit, frame, cable connectors, legs, cranks.

2. Cut —Coils and cables, antenna and counterpoise wire, and guys.

3. Burn —Canvas bags, technical manuals, and all inflammable parts of equipment.

4. Bury or scatter—Any or all of above pieces after destroying them.

DESTROY EVERYTHING

SAFETY NOTICE

THIS EQUIPMENT CONTAINS VOLTAGES HIGH ENOUGH TO ENDANGER LIFE. EVERY REASONABLE SAFETY MEASURE HAS BEEN INCORPORATED INTO THE DESIGN TO PROTECT OPERATING PERSONNEL.

BEFORE REMOVING THE TRANSMITTER-RECEIVER UNIT FROM ITS CASE, CHANGING TUBES OR MAKING INTERNAL ADJUSTMENTS TO ANY ONE OF THE UNITS, THE POWER SUPPLY MUST BE COMPLETELY DISCONNECTED.

WHEN THE EQUIPMENT IS STORED OR IS NOT TO BE USED FOR ANY LENGTH OF TIME, THROW THE CIRCUIT BREAKERS TO THE OFF POSITION.

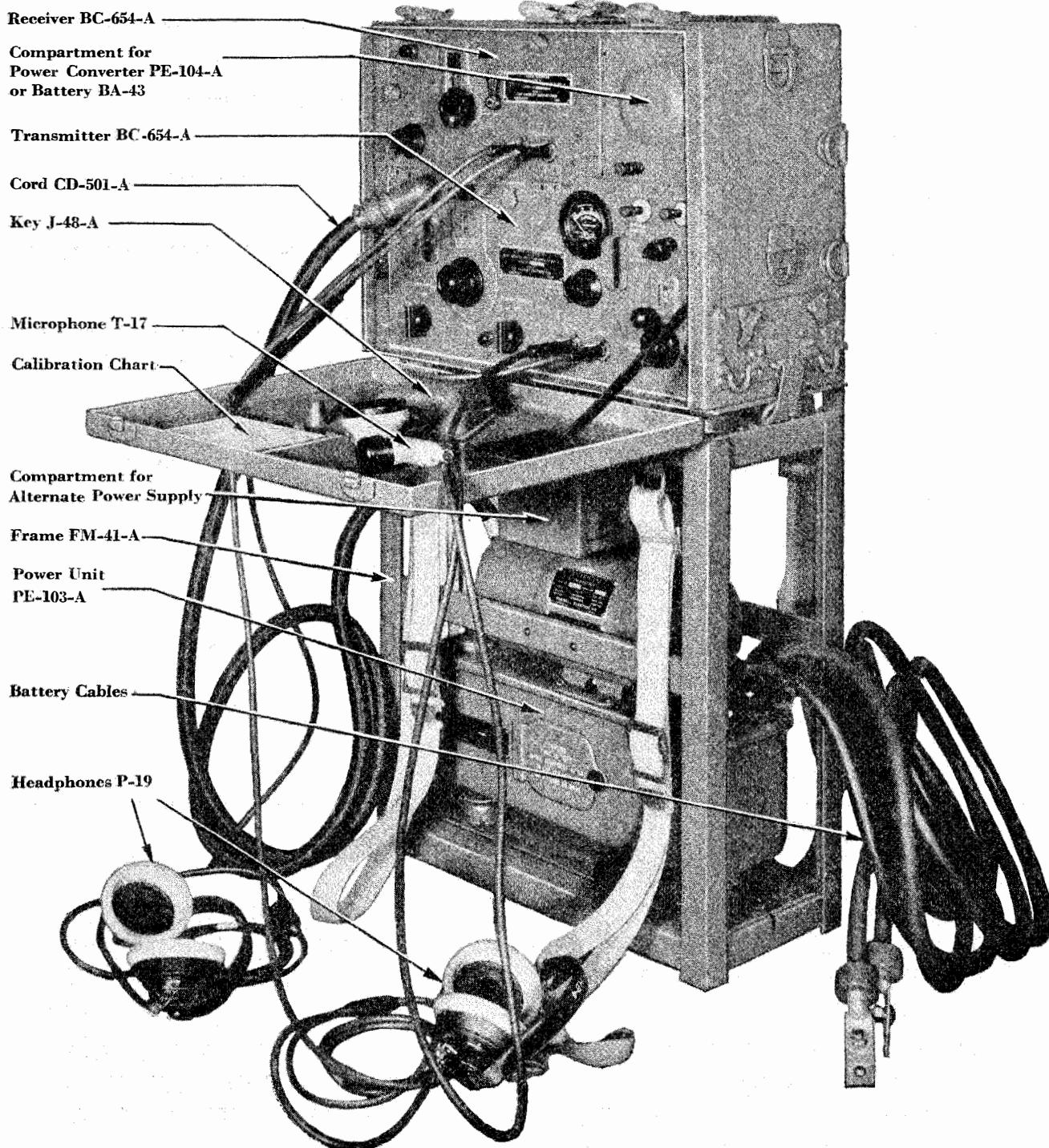


FIG. 1. RADIO SET SCR-284-A

SECTION I. DESCRIPTION

1. General

- a. Radio Set SCR-284-A is a combined receiver and transmitter, for operation in a vehicle or on the ground.
 - (1) For use in a vehicle, cotton-web straps, D-ring loops and mounting brackets are included for convenient installation.
 - (2) For ground operation, the necessary components may be grouped for a three man load.
 - (3) Remote Control Unit RM-29-(*) provides flexible control over a two wire telephone line in various combinations.

b. Receiver:—

- (1) Frequency range: Continuous 3800 to 5800 kc.
- (2) Beat frequency oscillator: On fixed frequency of 455 kc.

(3) Output: 100 mw. into two 8000 ohm headsets in parallel.

c. Transmitter:—

- (1) Frequency range: Continuous 3800 to 5800 kc.
- (2) Calibration: Every 10 kc. with crystal oscillator check every 200 kc.
- (3) Power output: 17 watts into vehicle antenna.

2. List of Component Parts

- a. When the Radio Set SCR-284-A is used in the field for ground operation, the following are the components, grouped as a three man load.

NOTE: The symbol (*) following a model number indicates that information given applies to all models.

<i>Quantity</i>	<i>Description</i>	<i>Dimensions</i>	<i>Unit Weight (Lbs.)</i>
<i>LOAD No. 1</i>			
1	Radio Receiver and Transmitter BC-654-A includes Crystal Unit installed in socket, and Key J-48-A, but not Battery BA-43.....	18" x 14" x 9¾"	44.75
<i>LOAD No. 2</i>			
1	Case CS-41 containing		
1	Generator GN-45-(*).....	9" x 6¼" x 9¾"	22.44
1	Roll BG-58, canvas, for carrying mast sections and generator legs.....	30" long, 8" diam.	3.40
	Items carried in Roll BG-58:		
2	Cranks GC-7 @ .35 lb. each.....		.70
1	Leg LG-2-A.....		4.25
2	Legs LG-3 @ 1 lb. each.....		2.00
4	Legs LG-13-A @ .30 lb. each.....		1.20
1	Insulator IN-106-A.....		.75
1	each Mast Sections MS-49 to MS-56 (incl.).....		5.45
15 ft.	Wire W-142.....		.50
			TOTAL 40.69

LOAD No. 3

1	Bag BG-102-A, canvas.....	14½" x 13¼" x 9¼"	3.25
Items carried in Bag BG-102-A:			
2	Batteries BA-43 @ 4.75 lbs. each.....		9.50
2	Headsets HS-30-(*) @ 1.18 lbs. each. See Note 1.....		2.36
1	Cord CD-501-A.....		3.25
1	Counterpoise CP-12.....		1.67
1	Counterpoise CP-13.....		1.50
1	Reel RL-28.....		.13
1	Reel RL-29.....		.75
1	Microphone T-17.....		.75
1	Guy GY-11.....		.12
1	Guy GY-12.....		.06

Quantity	Description	Dimensions	Unit Weight (Lbs.)
3	Stakes GP-27-A @ .17 lb. each.....		.51
<i>The following items are carried in zipper pocket:</i>			
3	Wrenches and 1 Screwdriver.....		.40
1	Vibrator and Electrolytic Kit.....		.75
			TOTAL 25.00

NOTE 1. If Headset HS-30-(*) and Cord CD-605 are not available, Headset P-19 shall be issued.

List of Main Components Not Included in Loads

2	Technical Manuals TM 11-275 for Radio Set SCR-284-A.....	8½" x 11" x ½"	2.80
1	Mast Bracket MP-45-A with Mounting Plate for ¼-ton Liaison or Command Car.....	7½" x 8¼"	13.50
1	Mast Bracket MP-46-A with Mounting Plate for ½-ton truck.....	10⅞" x 7⅓⅙"	13.25
1	Mast Base MP-37 or Mast Base MP-57.....	12⅞" x 7¼"	10.50
1	Case CS-76-B containing		
1	Remote Control Unit RM-29-(*) (including Battery BA-27).....	10⅛" x 8½" x 6¼"	15.00
1	Frame FM-41-A for Mounting Receiver-Transmitter Units and Power Unit PE-103-A.....	18¼" x 36¼" x 9½"	47.00
1	Power Converter PE-104-A.....	3⅞" x 4" x 7"	7.00
1	Power Unit PE-103-A.....	16½" x 12¾" x 5½"	53.00
1	Loudspeaker LS-7 or LS-11.....	7" x 4⅝" x 3"	6.37
1	Waterproof Bag BG-129.....	18" x 12" x 8"	
1	Waterproof Bag BG-154.....	14½" x 10⅛" x 18¾"	

Spare Parts Not Listed Under Bag BG-102-A or Roll BG-58

1	Battery BA-27.....	6¾" x 3⅝" x 3⅞"	1.00
2	Legs LG-13-A @ .30 lb. each.....	3½" dia., 22¾" long	.60
1	Microphone T-17.....	5⅞" x 1⅓"	.75
1	Stake GP-27-A.....	7¼" long, 5/8" dia.	.17
2	Antenna Mast Sections MS-49 and MS-50 @ .21 lb. each.....	3' 3½" long, ¾" dia.	.42
1	Pilot Lamp		

3. Sources of Power

a. Receiver:—

- (1) Power Converter PE-104-A or Battery BA-43.

b. Transmitter:—

- (1) Filament Voltage: Vehicular Battery (through

Power Unit PE-103-A) or Generator GN-45-(*)�

(2) Grid Bias Supply: Power Converter PE-104-A or Battery BA-43.

(3) High Voltage Supply: Power Unit PE-103-A or Generator GN-45-(*)�

4. Input Power

Power Supply	Position of STANDBY Switch	CW Watts	Phone Watts
Power Unit PE-103-A (6-volt Battery Powered) and Battery BA-43.	HIGH	129	141
	LOW	102	108
Power Unit PE-103-A (12-volt Battery Powered) and Battery BA-43.	HIGH	159	168
	LOW	120	132
Generator GN-45-(*) (Output)	LOW	50	57

For operation using Power Converter PE-104-A instead of Battery BA-43, add 6 watts to the values shown in chart above.

5. Description of Main Components

a. Radio Receiver and Transmitter BC-654-A-(FIG. 2)

The receiver is located in the upper left part of the case, the transmitter in the lower, and Power Converter PE-104-A or Battery BA-43 in the upper right corner behind a door permitting access to these units from the front panel. These units are mounted on a shelf which holds them in place in the case, permitting their removal without disconnecting any one of them.

b. Frame FM-41-A:— (FIG. 2)

This unit is provided for mounting Radio Receiver and Transmitter BC-654-A and Power Unit PE-103-A, when used in a vehicle. D-ring loops and cotton web straps are provided for fastening this equipment.

c. Battery BA-43:— (FIG. 2)

Battery BA-43 supplies the same voltage as Power Converter PE-104-A. When using equipment in a

vehicle in conjunction with Power Unit PE-103-A, it is advisable to use Power Converter PE-104-A. Should the equipment be used with Generator GN-45-(*)¹, it is recommended that Battery BA-43 be used instead of Power Converter PE-104-A, however in case of emergency, Power Converter PE-104-A will give satisfactory results.

d. Power Converter PE-104-A:— (FIG. 2)

This unit is of the vibrator type of the same dimensions as Battery BA-43, and is used as an alternate source of power for furnishing plate and filament voltages for the receiver and bias voltage for the transmitter. This unit operates from either a 6 or 12-volt supply. Before putting the transmitter-receiver into operation using Power Converter PE-104-A, open the small door to the power supply compartment, pull out the plug, slide power converter out far enough to reach the 6 or 12-volt switch and set it for the proper voltage. When not in use, this unit may be placed in the rubber cushioned case provided on Frame FM-41-A.

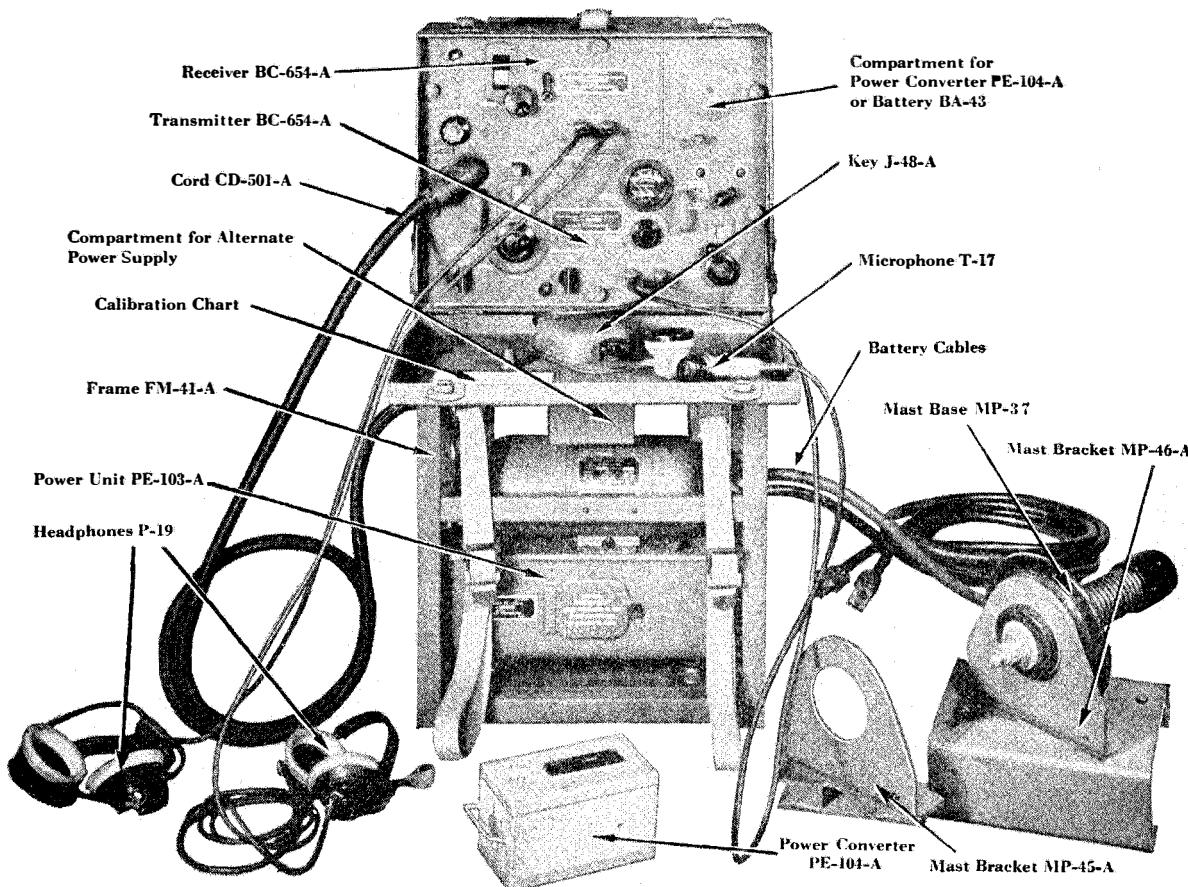


FIG. 2. RADIO SET SCR-284-A—VEHICULAR INSTALLATION COMPONENTS

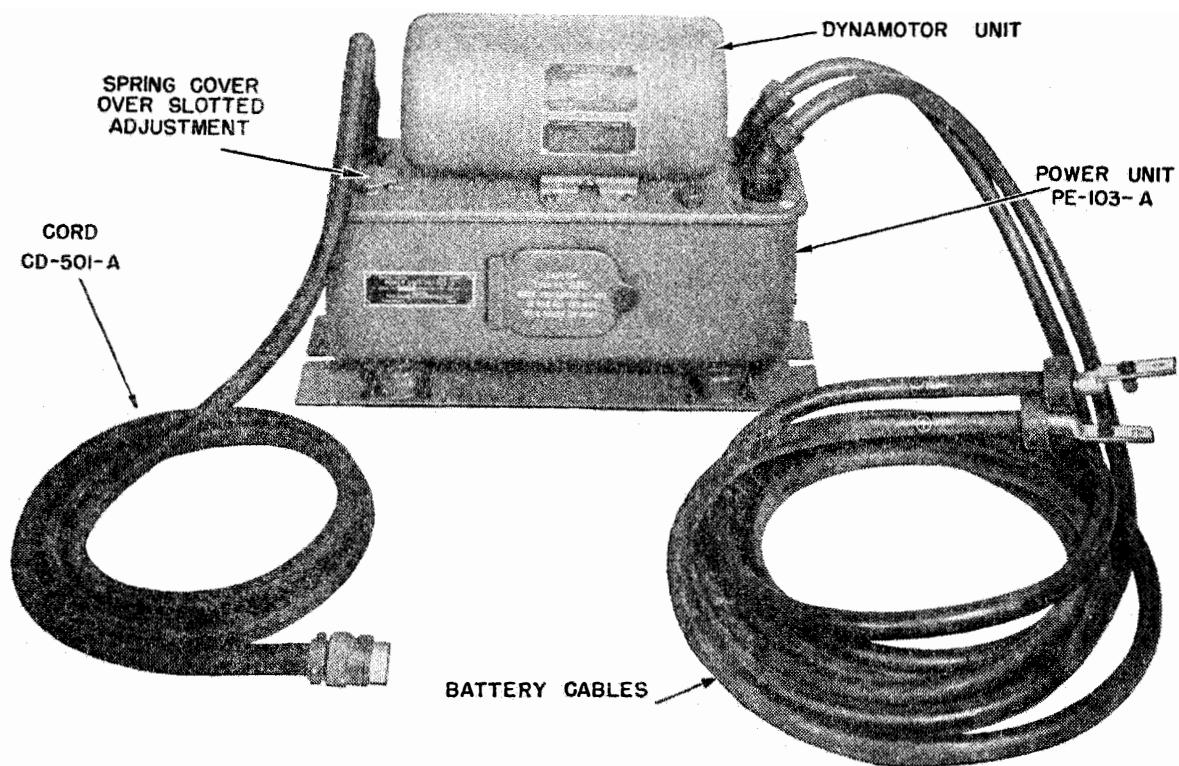


FIG. 3. POWER UNIT PE-103-A

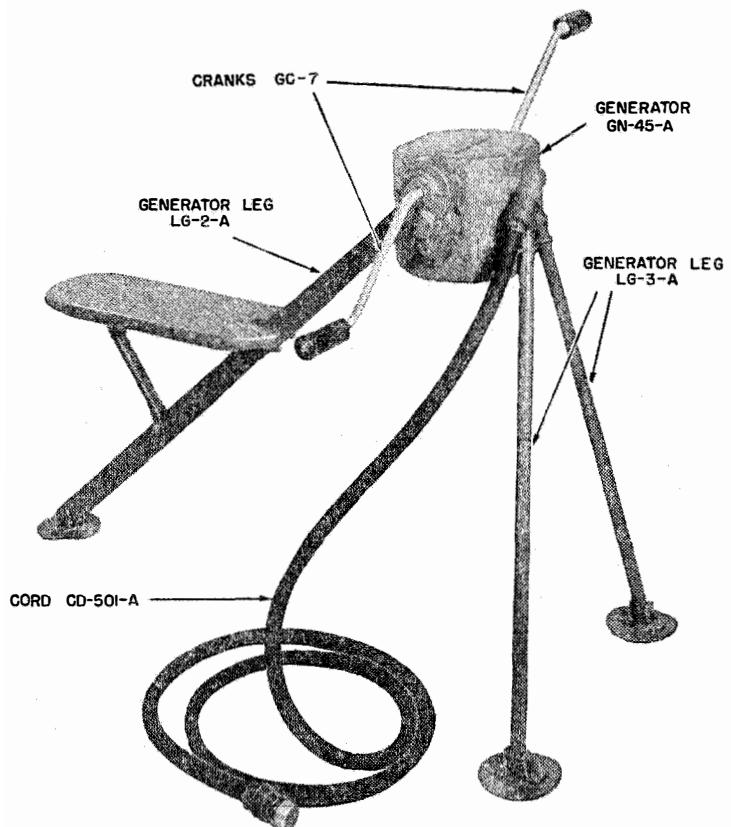


FIG. 4. GENERATOR GN-45-(*)

e. Power Unit PE-103-A:— (FIG. 3)

This unit contains a dynamotor which operates from either 6-volt or 12-volt vehicular battery, and supplies 500 volts direct current for the transmitter. Its base contains switches, relays and circuit breakers required as safety devices, and adjustments necessary to permit use of either 6 or 12 volts.

To set the power unit for the voltage of the battery being used, there is a selector switch (operated by a slotted knob, and protected by a spring cover), located on top of the dynamotor base.

f. Generator GN-45-():—* (FIG. 4)

This unit is hand-cranked and is provided with three mounting legs. When cranked at a speed of approximately 60 turns per minute, this unit will supply all necessary power when the set is operated at LOW output. In case of emergency, HIGH output can be achieved for a short period.

g. Antennas:— (FIG. 8)

Radio Set SCR-284-A may be used with almost any type of antenna. The two most often used are the 25-ft. rod antenna in the field, and the 15-ft. rod antenna on a vehicle.

- (1) The 25-ft. rod antenna consists of eight Mast Sections, MS-49 to MS-56 inclusive.
- (2) The 15-ft. rod antenna consists of five Mast Sections, MS-49 to MS-53 inclusive.

h. Antenna Mounting:— (FIG. 2)

Two Mast Brackets MP-45-A and MP-46-A are provided for use on the command car and the squad car. These brackets can also be used to facilitate mounting on other vehicles. Mast Base MP-37 (or MP-57) is mounted on the bracket.

i. Remote Control Unit RM-29-():—* (FIG. 5)

Remote Control Unit RM-29-(*) contained in Case CS-76-B is a self-powered unit which may be used with Radio Set SCR-284-A. It operates over a two wire telephone line in conjunction with Telephone EE-8-A. (See Technical Manual TM-11-308.) Although the set may be controlled only at Receiver-Transmitter BC-654-A, the terminus for signals transmitted and received may be either at the radio set or at any remote control unit on the line.

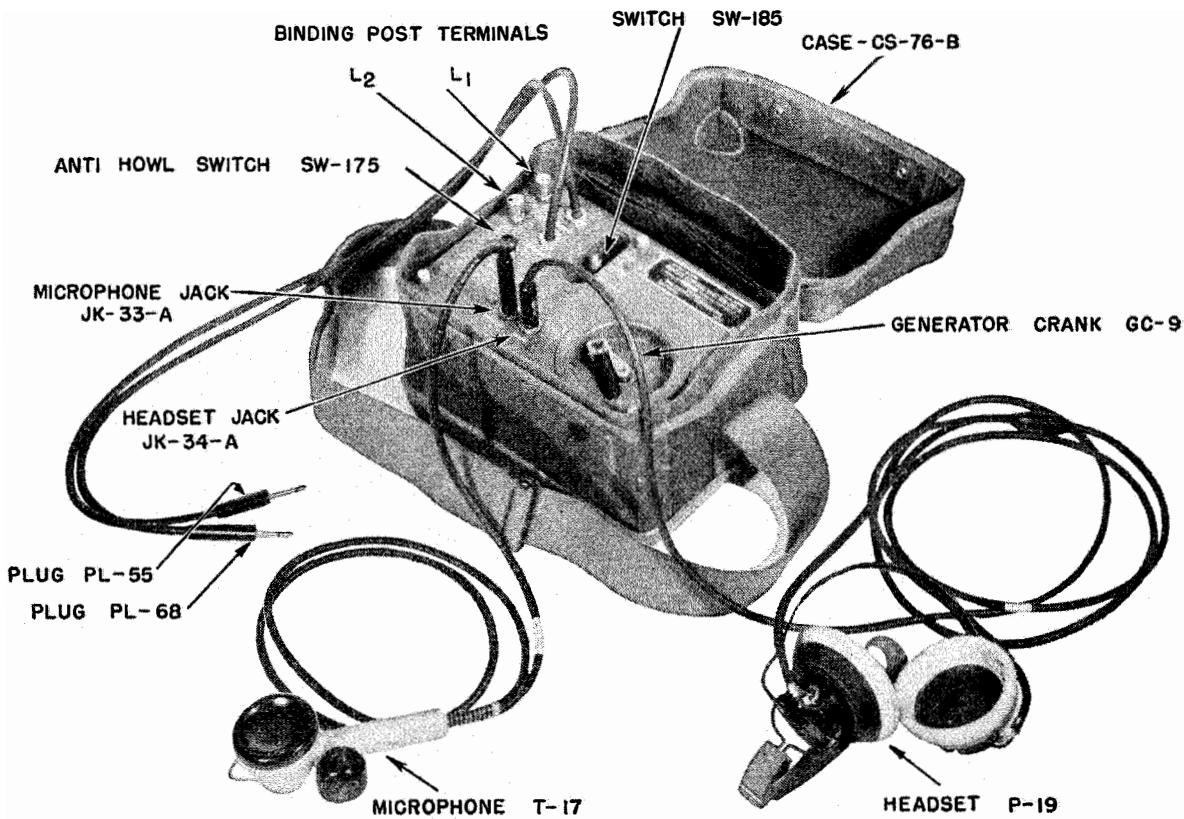


FIG. 5. REMOTE CONTROL RM-29-(*)

SECTION II. INSTALLATION AND OPERATION

6. Initial Procedure.

a. Unpacking and Stowing Equipment:—

- (1) Remove all cartons from packing box. Remove all equipment from cartons.
- (2) Place Mast Sections MS-49 to MS-56 inclusive in the spaces provided in Roll BG-58.
- (3) Place Legs LG-2 and LG-3 in the outer pocket of Roll BG-58.
- (4) Place Leg LG-13-A and Insulator IN-106-A in Roll BG-58.
- (5) Place Power Converter Unit PE-104-A or a Battery BA-43 in compartments in Radio Receiver and Transmitter BC-654-A and on Frame FM-41-A, depending on how set is to be used.
- (6) Place GN-45-(*) in Case CS-41.
- (7) Place contents of carton removed from Bag BG-102-A, together with Cord CD-501-A, in Bag BG-102-A.
- (8) Install one Battery BA-27 in Remote Control Unit RM-29-(*).
- (9) Unroll Counterpoise CP-12 and CP-13. There are two wires fastened on each end of a metal

junction. Stretch them out full length—two wires together in one direction and the other two wires together in the opposite direction. Wind Counterpoise CP-12 and CP-13 on Reel RL-29. Counterpoise CP-13 should be wound on reel FIRST, as there may be instances when only one counterpoise will be used and it must be CP-12 (with lead-in wire attached).

b. Checking Equipment:—

Determine that all items which appear on List of Component Parts, paragraph 2 a. are included.

7. Vehicular Installation.

a. Source of Installation Information:—

Complete instructions and drawings for all approved installations on Radio Set SCR-284-A in vehicles are available from the Storage and Issue Agency, Philadelphia Signal Depot. Make installations only according to approved instructions.

b. Mounting Frame FM-41-A:—

In most installations Frame FM-41-A is secured to the floor of the vehicle by means of three Z clamps. In addition, loops are installed through which web straps are passed to brace the set.

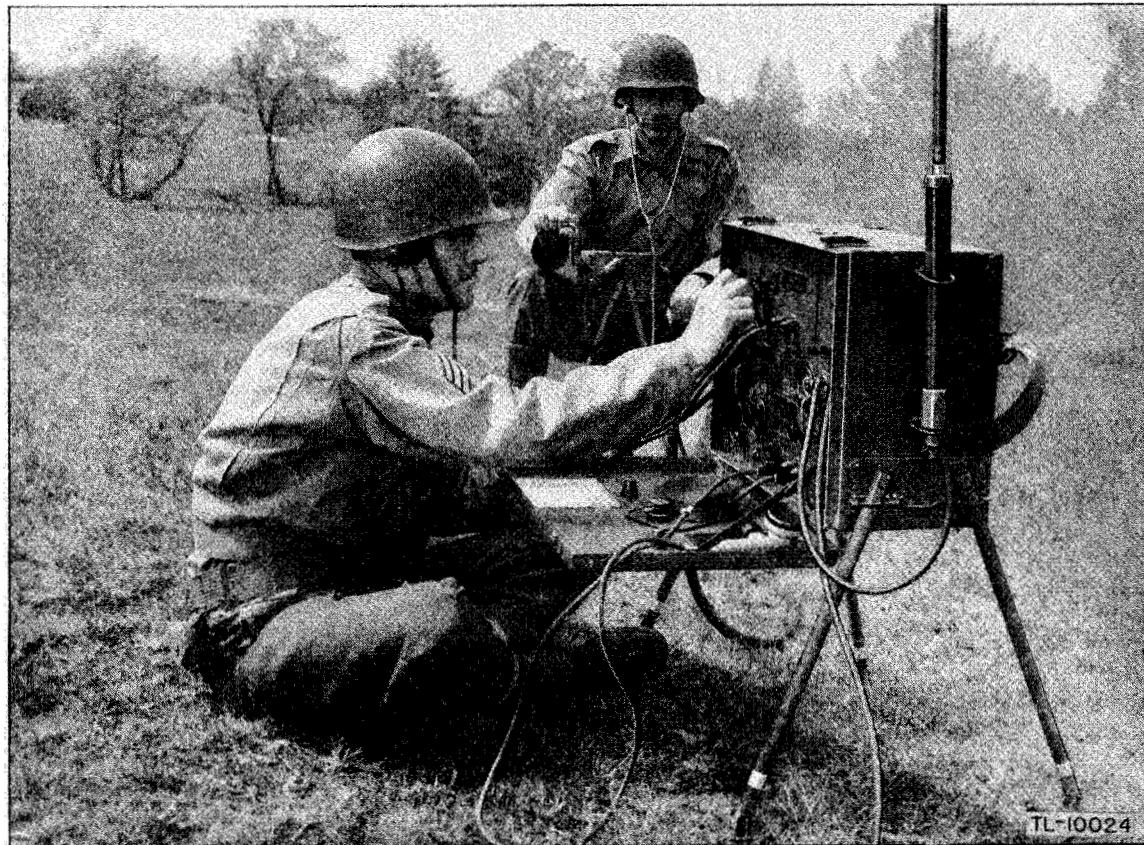
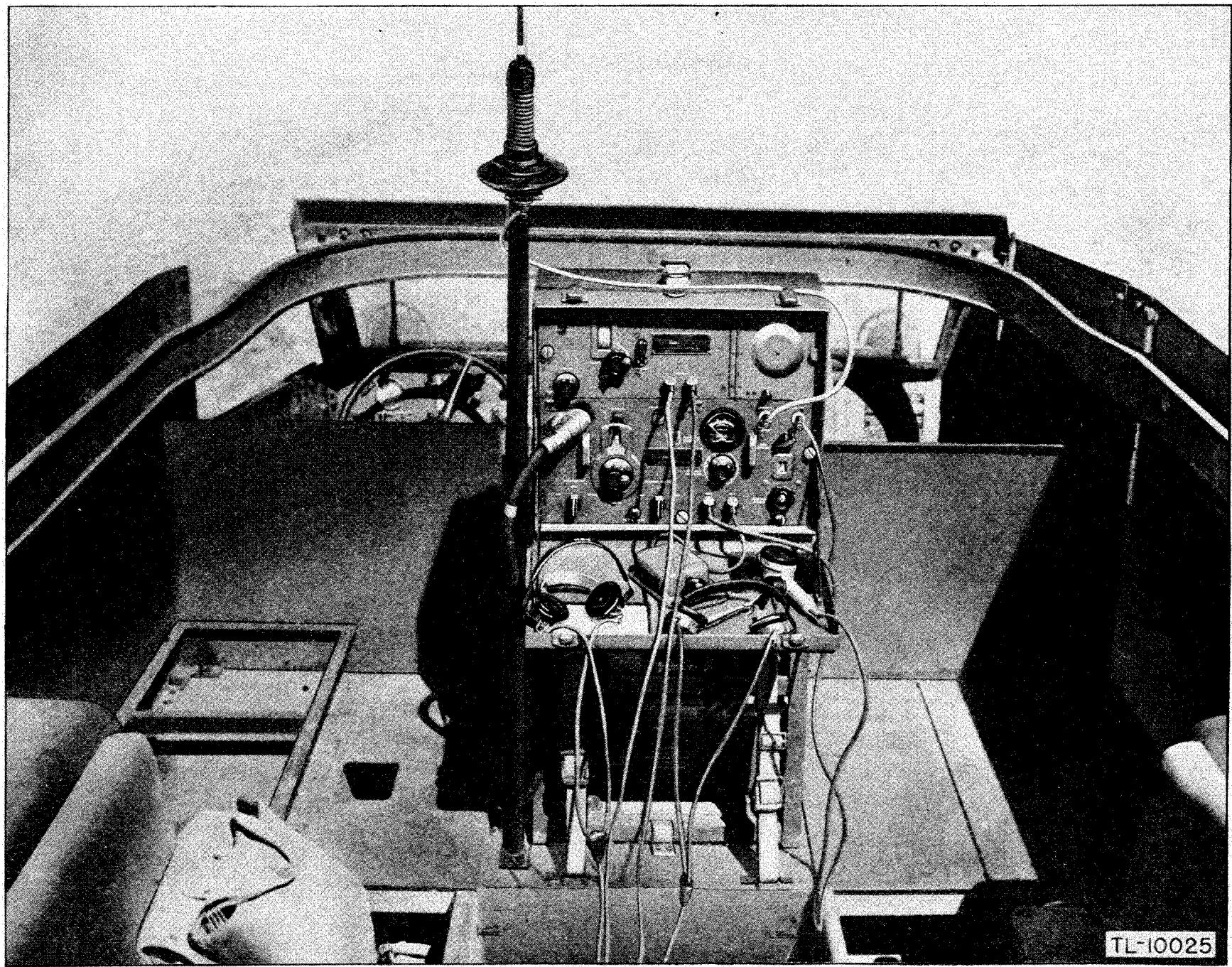


FIG. 6. FIELD INSTALLATION OF RADIO SET SCR-284-A

FIG. 7. RADIO SET SCR-284-A INSTALLED IN CAR, 1/2 TRACK, M2



c. *Mounting BC-654-A Transmitter-Receiver on Frame FM-41-A:*—

- (1) Place Unit on the rubber mounted shelf, making sure that guide pins in bottom of case fit in holes provided in shelf.
- (2) Fasten unit to shelf by the clamp at each end of shelf.
- (3) Fasten top of unit to frame by web strap on frame. *Pull strap taut.*

d. *Connecting Power Unit PE-103-A:*—

- (1) Determine whether the vehicle battery is a 6- or 12-volt battery. (A 6-volt battery has three cells and three filler caps. A 12-volt battery has six cells and six filler caps.)
- (2) At left front corner of Power Unit PE-103-A is a slotted metal knob which must be correctly set to either 6 or 12 volts, according to which battery is used in vehicle.

This knob is protected by a spring cover which must be lifted to gain access to knob. With a screwdriver or coin, turn the slotted knob in direction indicated to match voltage of vehicle battery.

- (3) On front of Power Unit PE-103-A is a small door covering three breaker switches. Open door and push switches down to the OFF position.

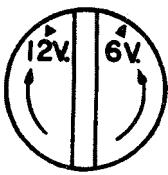
- (4) Determine by markings or with a voltmeter, which of the battery terminals is grounded to car chassis.

(a) If POSITIVE terminal (+) is grounded:

- (1) Connect cable marked \oplus to ground at the point shown on the installation drawing. *Scrape metal clean where cable lug makes contact.*
- (2) Remove nut and lugs from insulated terminal on starter motor and to this terminal fasten the other cable from Power Unit PE-103-A. This cable is marked \ominus (Negative).
- (3) The lugs which were normally connected to starter motor must now be connected to the NEGATIVE cable lug by a bolt provided for this.

(b) If NEGATIVE terminal (—) is grounded to car chassis:

- (1) Connect cable marked \ominus to ground at the point shown on the installation drawing. *Scrape metal clean where cable lug makes contact.*
- (2) Remove nut and lugs from insulated terminal on the starter motor, and to this



terminal fasten the other cable from Power Unit PE-103-A. This cable is marked \oplus (Positive).

- (3) The lugs which were normally connected to starter motor must now be connected to the POSITIVE cable lug by a bolt provided for this.

- (4) At left rear corner of Power Unit PE-103-A is a connector for Cord CD-501-A which connects Power Unit to Transmitter-Receiver BC-654-A. The connector on Power Unit is protected by a metal cover held by a chain. To remove cover, push down on lock on left side of connector and lift cover off. Attach one end of Cord CD-501-A to this connector, pushing cord down until locked in place.

e. *Connecting BC-654-A to Antenna and Ground:*—

- (1) Remove about $\frac{1}{2}$ " of insulation at one end of wire W-142 and scrape clean.
- (2) Push in on ANTENNA post and insert wire in top of opening.
- (3) Determine length of wire necessary to reach antenna post on bottom of Mast Base MP-37. (The wire may be run around right end and behind to reach antenna, or, a shorter connection may be made by running wire through handles on transmitter.) Do not pull wire taut—allow some slack. Cut wire after determining proper length.
- (4) Remove insulation as before, and fasten wire to antenna post on the mast base.
- (5) Similarly attach another piece of Wire W-142 to GROUND post on transmitter panel, and place ground wire alongside antenna wire and run it to ground post on the mast bracket. Cut off wire, remove $\frac{1}{2}$ " of insulation, and attach to ground post on the mast bracket.
- (6) Note: To prevent fraying of wire at ends where insulation is removed, apply hot solder.

f. *Installing Antenna:*—

Assemble Mast Sections MS-49 to MS-53. Tighten joints securely (gas pliers). To prevent loosening and loss of mast sections use Clamps MC-421 to MC-424. If clamps are not available, wrap the joints tightly with two servings of friction tape. Apply the first serving counter-clockwise, starting on the lower half of the joint and taping upward. Rope RP-5 and an insulator such as IN-86 or IN-87 may be used to tie down the antenna. Insert antenna in the mast base and connect antenna and ground lead-in wires.

8. Preparation for Vehicular Use.

- a. Unfasten front cover of BC-654-A, and pull down to horizontal position which is normal operating position. Mounted on this cover are a telegraph

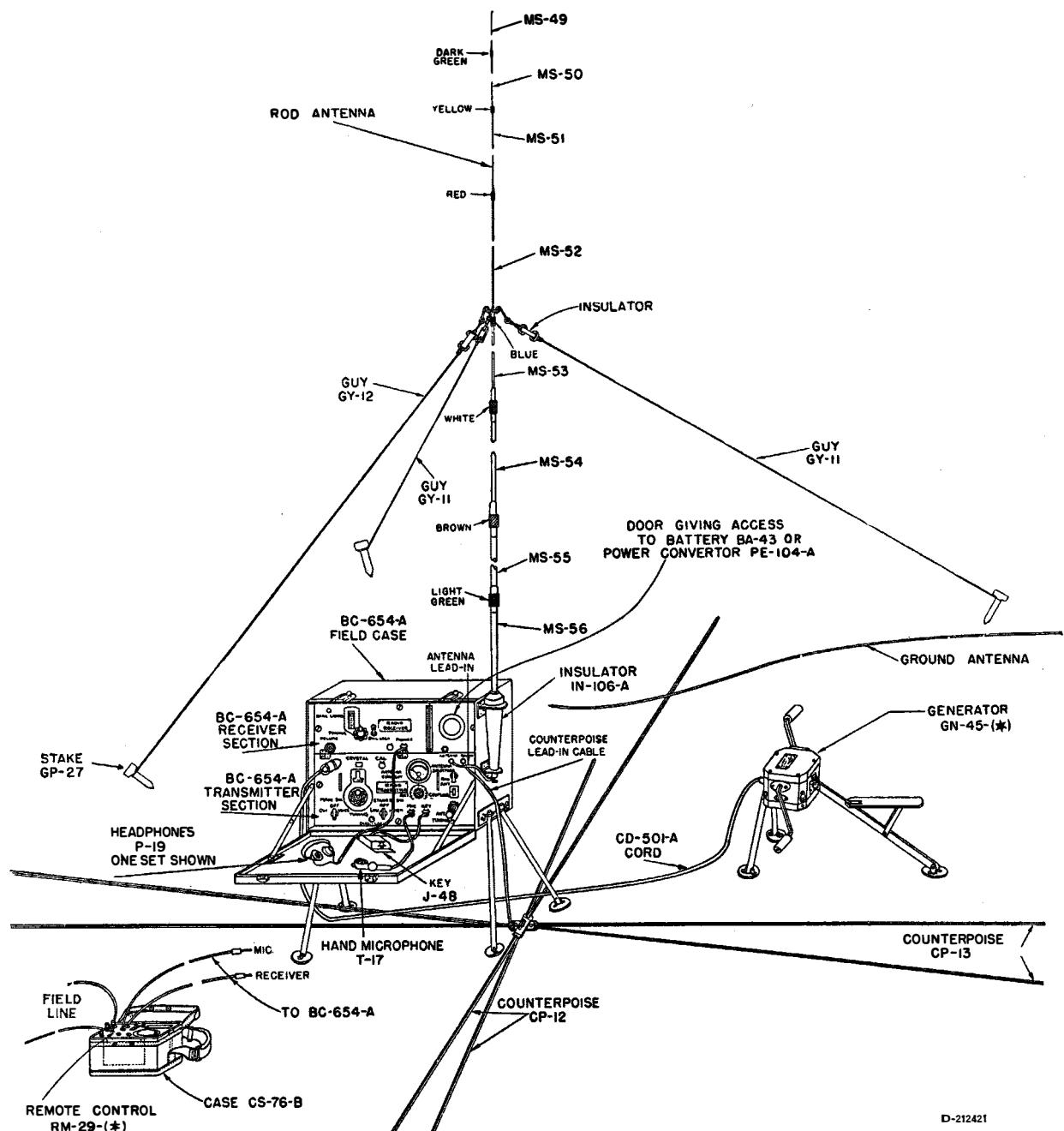


FIG. 8. RADIO SET SCR-284-A—FIELD INSTALLATION COMPONENTS

key, frequency calibration chart, and brief instructions for operation.

- b. Set MAIN SWITCH and STANDBY SWITCH to OFF.
- c. Power Converter PE-104-A has a 6- or 12-volt selector switch on top of unit and must be set to correspond to the voltage of vehicle battery as was done previously with Power Unit PE-103-A. After making this adjustment, insert the PE-104-A Unit in BC-654-A compartment and insert power plug in socket on front of Unit. Close and fasten door. (See Figure 9.)

CAUTION: THIS DOOR IS EQUIPPED WITH AN INTERLOCK SWITCH WHICH DISCONNECTS BATTERY BA-43 (OR POWER CONVERTER PE-104-A), WHEN DOOR IS OPEN.

Note: Battery BA-43 may be used instead of Power Unit PE-104-A, but it is considered better practice to save the battery for emergency use, or for installations where a vehicle battery is not available for primary power. The unit not in use (either BA-43 or PE-104-A) is stored in the compartment on the frame just above the dynamotor.

- d. Attach Cord CD-501-A to connector on left end of transmitter panel. *Be sure cord connector is pushed all the way in and locked.*
- e. On transmitter panel and under antenna coupling control knob are two jacks protected by a spring cover. Hold open covers and insert microphone plug and key plug in jacks designated MIC. and KEY.
- f. Two jacks for headphones are in receiver panel, and are protected by spring covers. Lift covers and insert plugs on headphones HS-30 or P-19. Either one or two pairs may be used.

9. Field Installation.

a. BC-654-A Unit:—

- (1) Turn Radio Receiver and Transmitter BC-654-A upside down.
- (2) Mount four Legs LG-13-A by inserting them through D-ring loops on ends of case, entering the spring clip into the hollow shank of each leg. *Be sure each leg is securely in place.*
- (3) Turn BC-654-A right side up.
- (4) Adjust discs on bottom of legs so they rest flat on ground. If necessary, turn the set so it rests as solidly and as nearly level as possible.

b. Antenna:—

- (1) On right side of case are two hinged rings. Pull them up to horizontal position and insert Insulator IN-106-A.
- (2) Cut a 12" length from Wire W-142, carefully remove insulation for $\frac{1}{2}$ " at each end, and scrape wire clean. *When convenient, dip bare wire into hot solder to prevent fraying.* Connect one end of this wire to the binding post on Insulator IN-106-A mounted on the right side of Transmitter-Receiver Case; connect other end of wire to ANTENNA post on BC-654-A. Note: When dismantling, this wire may be left

attached to Insulator IN-106-A for convenience of future installations.

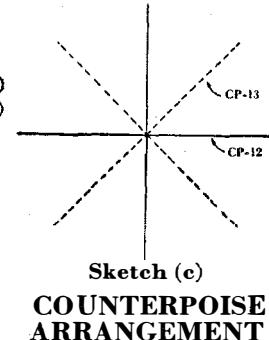
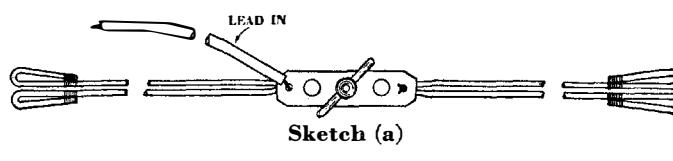
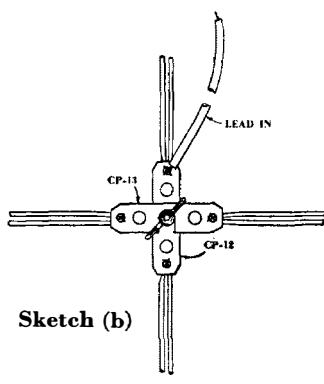
- (3) Assemble Mast Sections MS-49 to MS-56 inclusive.
- (4) Place the two-section clamp ring on Guy GY-11 above fourth joint (blue), close and place hook of Guy GY-12 through holes in clamp ring.
- (5) Pull complete 25-ft. antenna to an erect position and place the large end into Insulator IN-106-A mounted on the side of BC-654-A Case.
- (6) Anchor with stakes GP-27-A equally spaced.

CAUTION: AVOID PULLING GUY STAUT ENOUGH TO BEND ANTENNA.

c. Counterpoise CP-12 and CP-13:—

Each consists of four insulated wires. One end of each wire is connected to a common junction, the other end of each wire is left free. Junction of Counterpoise CP-12 has a bolt and wing nut for fastening junction of Counterpoise CP-13 to it. Counterpoise CP-13 junction has a slot which fits around bolt and under wing nut on junction of Counterpoise CP-12. Counterpoise CP-12 has a lead-in cable about 4 ft. long fastened to its junction.

- (1) Unroll Counterpoise CP-12, placing together the two wires which are on each end of junction, and lay them on the ground in opposite directions. (Sketch a.) Junction of wires must be placed on the ground directly under right end of Transmitter-Receiver Case. (See Figure 8.)
- (2) Unroll Counterpoise CP-13 similarly except crosswise to CP-12.
- (3) Using screw and wing nut on CP-12, fasten the two junctions together. (See Sketch b.)
- (4) Spread wires equally apart—"star shape." Note: SCR-284-A may be operated using only Counterpoise CP-12 (the one with lead-in wire attached), with wires spaced equally in four



directions, but a slight decrease in signal strength may be noted. (See Sketch c.)

- (5) Open cover of BC-654-A.
- (6) Push in on GROUND post on transmitter, and insert counterpoise lead-in wire into binding post from top.
- (7) Push in on ANTENNA post on transmitter, and insert antenna lead-in wire into binding post from top.
- d. Lift spring covers and insert microphone, key, and headphone plugs in their proper jacks.
- e. Connect Cord CD-501-A to BC-654-A.
- f. Install Battery BA-43 in compartment. (See Figure 9.)

In field installations, it is generally advisable to use Battery BA-43, instead of Power Converter PE-104-A, as this arrangement permits use of receiver without cranking generator (GN-45-(*)). However, Power Converter PE-104-A may be used.

- g. Generator GN-45-(*):— (FIG. 4)
 - (1) Remove from canvas case, and turn generator upside down.
 - (2) Attach two Legs LG-3-A in loops provided.
 - (3) Turn generator right side up on the two legs and attach Leg LG-2-A. (LG-2-A has seat mounted on it.)
 - (4) Place generator behind or to the left of the set, so generator operator can wear headphones without becoming entangled in headphone cord while cranking generator. Also, it is desirable for generator operator and radio operator to be able to constantly see each other.
 - (5) Adjust discs on legs so they rest flat on ground.
 - (6) Install a Crank GC-7 in square socket in each side of generator.
 - (7) Attach Cord CD-501-A to connector on generator.

This completes Field Installation of SCR-284-A, using Generator GN-45-(*).

10. Precautions Before Operation.

- a. Check that the 6/12 volt switches of Power Unit PE-103-A and Power Converter PE-104-A are set to the proper position.
- b. Set MAIN and STANDBY switches to OFF.
- c. Open the small door on the front of Power Unit PE-103-A and check that the three breaker switches are at ON.

- d. Check all connections and cords.

11. Operation.

a. Receiver:

- (1) Release DIAL LOCK. Lever is vertical in unlocked position.
- (2) On transmitter panel, turn MAIN SWITCH to CW. Receiver should operate with BFO on, ready for reception of CW signals.
- (3) Adjust volume as desired with VOLUME control located at lower left corner of receiver.
- (4) Turn crank-knob marked TUNING to any desired frequency indicated on drum dial.
- (5) For voice reception, turn MAIN SWITCH to VOICE.

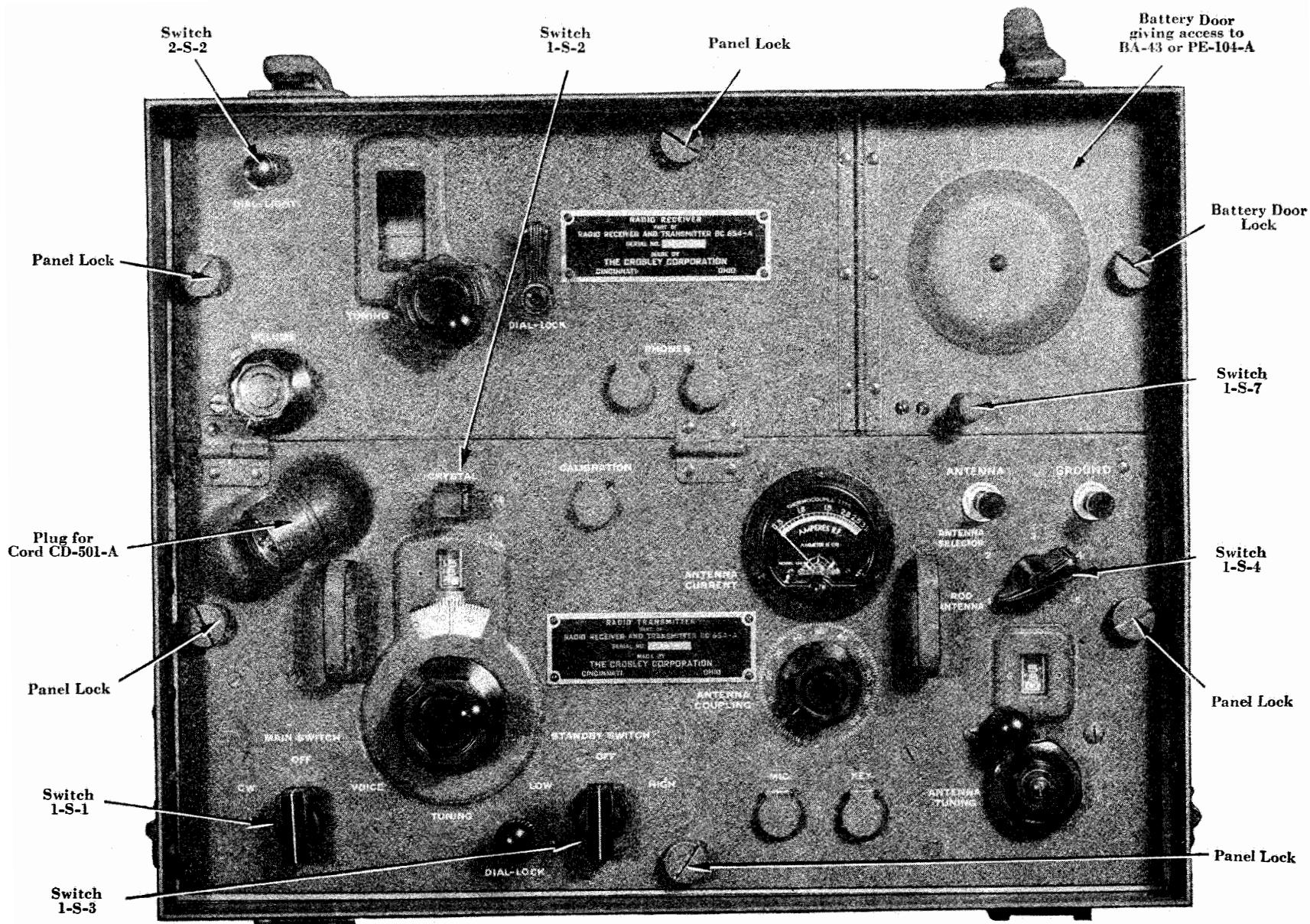
Note: Switching from VOICE to CW or CW to VOICE can be done without turning through the OFF position.

- (6) When desirable to lock dial at any particular setting to prevent accidental de-tuning, turn DIAL LOCK lever $\frac{1}{4}$ turn right to horizontal position. *Do not turn TUNING knob with dial lock on.*
- (7) To turn receiver off, turn MAIN SWITCH to OFF. (This also turns transmitter off.)

b. Transmitter:

- (1) Release DIAL LOCK—(turn left to release.)
- (2) Select frequency of operation.
- (3) Refer to CALIBRATION CHART mounted on BC-654-A case cover, and observe TUNING DIAL READING corresponding to desired frequency.
- Note: The term "dial" includes both Counter and Disc dials.*
- (4) Turn TUNING crank-knob to indicated dial setting. (See paragraph 15 j. for instructions on reading the dial.)
- (5) Lock dial by turning DIAL LOCK knob to right. *Don't turn the TUNING dial with dial lock on.*
- (6) Turn ANTENNA TUNING crank knob to approximate setting indicated on CALIBRATION CHART.
- (7) Set ANTENNA SELECTOR switch to ROD ANTENNA for any antenna up to 25-feet long.
- CAUTION: DO NOT ROTATE ANTENNA SELECTOR SWITCH WHILE KEY OR MICROPHONE SWITCH IS CLOSED.***
- (8) Set ANTENNA COUPLING at approximately 50.
- (9) Turn MAIN SWITCH to CW.

FIG. 9. RECEIVER AND TRANSMITTER BC-654-A—FRONT PANELS



- (10) Turn STANDBY SWITCH to LOW. This starts dynamotor of Power Unit PE-103-A.

Note: If unit fails to start when controls are properly operated, turn MAIN SWITCH to OFF, open door on front of Power Unit PE-103-A and check the position of breaker switches. The three switches should be ON to operate. (The breaker switches turn off if an overload or a short circuit develops.)

Check setting of 6/12 volt selector switch. Check for damage to Power Cord CD-501-A, or damage to other wiring. See SECTION IV, MAINTENANCE.

- (11) Hold down telegraph key.

(a) Adjust ANTENNA TUNING for maximum ANTENNA CURRENT indicated by meter.

(b) Adjust ANTENNA COUPLING for desired output. (Minimum output occurs at zero (0) setting; maximum output occurs at maximum antenna current.)

CAUTION: DO NOT OPERATE ANTENNA COUPLING BEYOND THAT SETTING WHICH PRODUCES MAXIMUM ANTENNA CURRENT.

(c) Release telegraph key.

- (12) Transmitter is ready for operation. When using Generator GN-45-(*) do not attempt to operate with STANDBY SWITCH at HIGH.

CAUTION: WHEN TRANSMITTER IS ON, DO NOT TOUCH ANY PART OF ANTENNA SYSTEM — PAINFUL BURNS MAY RESULT.

- (13) To operate at high power CW, turn STANDBY SWITCH to HIGH.

Note: Antenna current will increase when switching from LOW power to HIGH power but no further adjustments are required.

- (14) When telegraph key is up, receiver operates which permits break-in operation.

- (15) At end of a CW transmission period turn STANDBY SWITCH to OFF. This stops Power Unit PE-103-A.

- (16) To transmit voice:

(a) Turn MAIN SWITCH to VOICE.

(b) Turn STANDBY SWITCH to power desired, either LOW or HIGH.

(c) Press switch on microphone, which will cause Power Unit PE-103-A to operate.

(d) Speak directly into the microphone loudly enough to cause ANTENNA CURRENT

to increase approximately 20%, and speak distinctly.

- (e) When finished talking, release switch button on microphone and receiver will operate.

- (17) Monitoring:

When transmitter and receiver of BC-654-A are operated on the same frequency, signals being transmitted may be heard in receiver. This is a definite advantage to CW operator and is also a means of checking quality of VOICE transmission.

c. *Netting:*—

Adjusting BC-654-A to the frequency of a Net Control Station.

- (1) Turn MAIN SWITCH to CW to put receiver in operation.

- (2) Tune in Net Control Station to zero beat.

- (3) Read frequency indicated on receiver TUNING dial.

- (4) Refer to Transmitter CALIBRATION CHART and set transmitter TUNING dial as close to this frequency as possible.

- (5) Pull CRYSTAL switch out about $\frac{1}{4}$ " to crystal operating position. At this position, crystal oscillator is operating, master oscillator is operating, dynamotor is running, power amplifier is off, and the transmitter cannot radiate.

- (6) Carefully adjust transmitter TUNING dial to zero beat with receiver.

Note: If transmitter frequency is a multiple of 200, which is the crystal frequency, a beat note may be heard, but in this instance the master oscillator signal only is to be given consideration and can be distinguished as it is varied by TUNING dial.

- (7) Lock transmitter dial at this setting.

- (8) Push CRYSTAL switch IN.

- (9) Tune ANTENNA as described in 11. b. (6) to (11) inclusive.

d. *Adjusting Calibration of Transmitter:*—

THIS IS SELDOM NECESSARY EXCEPT FOLLOWING PERIODS OF EXTREMELY ROUGH HANDLING.

For calibration checking, the transmitter incorporates a 200 kc crystal oscillator providing a signal which can be heard in receiver at 200 kc intervals.

- (1) Refer to CALIBRATION CHART supplied with BC-654-A. In first column of chart under heading "KC" is a group of frequencies, 3800, 3900, 4000, etc. At alternate frequencies, or

every 200 kc, an asterisk (*) is shown which indicates this is a harmonic of the Crystal Oscillator, or a *crystal frequency* check point, and may be heard as a CW signal as described below.

- (2) From the CALIBRATION CHART supplied with BC-654-A, select a crystal frequency which is nearest the operating frequency.
- (3) Set receiver TUNING dial at the crystal frequency selected.
- (4) Set transmitter TUNING dial two or three revolutions either side of exact dial setting indicated on chart.
This precaution eliminates possibility of mistaking master oscillator signal for crystal oscillator signal.
- (5) Turn MAIN SWITCH to CW.
- (6) Turn STANDBY SWITCH to LOW.
- (7) Pull CRYSTAL switch out.
- (8) Adjust receiver TUNING to zero beat with crystal oscillator.

Note: If pointer of receiver dial is not exactly in line with graduation on dial, pointer should be adjusted. Adjustment screw is under dial light inside receiver.

- (9) Lock receiver dial at zero beat with crystal oscillator.
- (10) Adjust transmitter TUNING dial to the *exact* setting as indicated by CALIBRATION CHART.
- (11) If zero beat is off more than one division (on disc dial) from the setting indicated by CALIBRATION CHART, make adjustment as follows:
 - (a) Set transmitter TUNING dial to *exact* reading as indicated by CALIBRATION CHART.
 - (b) Lock dial at this setting.
 - (c) Lift dust cover marked CALIBRATION.
 - (d) Insert screwdriver in shaft slot located about 2" from face of panel. (Screwdriver is packed in Zipper Pocket of Bag BG-102-A.) Carefully adjust slotted shaft for *zero beat* note in receiver.
- (12) Push CRYSTAL switch in. (Crystal oscillator inoperative.)

This completes calibration correction.

e. *Remote Control Unit RM-29-(*)*:

- (1) To connect Remote Control Unit RM-29-(*) to Radio Set SCR-284-A, insert Plug PL-68 of Microphone T-17 and the plug of the headset into the correct jacks marked MICROPHONE and HEADSET on the panel of Remote Control Unit RM-29-(*)�

Insert Plugs PL-55 and PL-68, on the leads coming from the panel holes marked RECEIVER and MICROPHONE, into the correct jacks of the radio set.

Connect telephone line to L₁ and L₂.

(2) *RADIO position*:

To operate the radio set from Remote Control Unit RM-29-(*) only, proceed as follows:

- (a) Set Switch SW-185 to RADIO.
- (b) If the radio receiver is operating, signals will ordinarily be heard in the headset.
While receiving, don't press the microphone PRESS TO TALK switch.
- (c) To transmit, press the microphone PRESS TO TALK switch and talk into the microphone.
- (d) If a call is made from any telephone on the line, the ringer in Remote Control Unit RM-29-(*) will operate.
To answer, throw Switch SW-185 to TELEPHONE, press microphone switch and speak into microphone.

(3) *THROUGH position*:

To use the radio set with Telephone EE-8-A, the procedure is as follows:

- (a) Set Switch SW-185 to THROUGH.
- (b) Monitor all signals passing through the line from Telephone EE-8-A to the transmitter-receiver.
The operator at Remote Control Unit RM-29-(*) can hear all signals but cannot transmit.
- (c) To permit transmission from Telephone EE-8-A to the radio set, press the ANTI-HOWL Switch SW-175.

When transmission ceases, release ANTI-HOWL Switch SW-175 to permit signals to pass through from radio to Telephone EE-8-A.

- (d) If a call is made from any telephone on the line, the ringer in Remote Control Unit RM-29-(*) will operate.

To answer, throw Switch SW-185 to TELEPHONE, press microphone switch and speak into microphone.

(4) *TELEPHONE position*:

To operate Remote Control Unit RM-29-(*) as a telephone, proceed as follows:

- (a) Set Switch SW-185 to TELEPHONE.

- (b) Transmission coming from Telephone EE-8-A will be heard in the headset.
- While listening, don't press the microphone PRESS TO TALK switch.
- (c) To talk, press the microphone PRESS TO TALK switch and speak into the microphone.
- (d) If a call is made from any telephone on the line, the ringer in Remote Control Unit RM-29-(*) will operate. Press the microphone PRESS TO TALK switch and answer into the microphone.
- (e) To call another telephone, lift the handle of Generator Crank GC-9, and rotate to the right.
- (5) Consult TM 11-308, or separate instructional literature packed with each Remote Control Unit RM-29-(*)�.

f. Antennas:—

- (1) In event communication from a vehicular installation is not satisfactory due to weak signals, the condition may be improved by using the 25-foot rod antenna provided the vehicle top is not in place and the vehicle is not in motion.
- (2) If, under certain circumstances, it is not advisable to use the 25-foot antenna rod which is normally used in a field installation, sections may be removed as desired. The SCR-284-A will operate with only the bottom mast section (MS-56) in place. Of course, any antenna must be properly tuned and signal strength decreases as sections of the rod antenna are removed.
- (3) If desirable to operate SCR-284-A without any portion of the rod antenna, a single insulated wire may be stretched out along the ground. In this instance Counterpoise CP-12 only may be used, and should be stretched out with all wires together or slightly fan shape, and in a direction OPPOSITE to the direction of the antenna wire. Tune antenna carefully!
- (4) Any insulated wire may be used for an antenna and in some cases it may be desirable to use a long insulated wire fastened to a high object, or thrown over a tree.
- (5) See Figure 22 for details of a "T" antenna which may be desirable under certain conditions such as a permanent installation where a certain frequency is generally used—as this antenna operates most efficiently at a definite frequency.
- (6) Almost any wire may be used as an antenna in an emergency. Usually the higher and longer,

the better. However, it is generally advisable to use an antenna as simple as possible for the results desired.

g. Microphone T-17:—

- (1) When operating VOICE in a vehicle moving over rough terrain, hold one edge of microphone against face which will provide a "steady rest," and speak slightly across the opening in microphone.
- (2) Microphone T-17 is rugged but do not subject it to unnecessary rough handling. Treat it kindly.
- (3) Transmitter is being completely modulated when antenna current increases approximately 20% when speaking into microphone. If antenna current is 1.0 ampere when not talking into microphone, current shown by meter should rise to 1.2 amperes when speaking into microphone. If antenna current is 2.0 amperes when not talking, it should rise to 2.4 when speaking into microphone to modulate 100%.
- (4) If necessary, speak loudly, but more important, speak distinctly!
- (5) **CAUTION: IF ANTENNA CURRENT DECREASES WHEN SPEAKING INTO MICROPHONE, TRANSMITTER NEEDS SERVICING.**

12. Precautions Before Operation

- a. To insure maximum battery life or minimum load on hand Generator GN-45-(*), it is important to have the antenna circuit properly tuned.
Do not advance ANTENNA COUPLING beyond the point of maximum antenna current.
- b. If during operation, the circuit breakers in Power Unit PE-103-A continue to snap OFF, the source of trouble may be found in cable Cord CD-501-A.
- c. If during operation, excessive or more than normal force is required to crank hand Generator GN-45-(*), the trouble may be due to short circuits in the filament or filter capacitors.
- d. On sets without dial locks, check frequently that the TUNING dial settings have not shifted due to vibration.
- e. Do not operate with a vehicular antenna tied down except if necessary when in motion to avoid overhead obstructions, or when stationary for concealment reasons.

CAUTION: DURING TRANSMISSION, DO NOT TOUCH ANY PART OF THE ANTENNA SYSTEM SINCE PAINFUL r-f BURNS WILL RESULT.

SECTION III. FUNCTIONING OF PARTS

13. Receiver Controls and Their Functions

a. Tuning:—

(1) The TUNING control of the receiver in conjunction with the drum dial permits adjustment for direct reading of the frequency received.

b. Dial Lights:—

(1) The push switch marked DIAL LIGHT located in the upper left corner of the front panel, controls the three pilot lights which illuminate the receiver TUNING, transmitter TUNING, and the transmitter ANTENNA TUNING dials.

c. Volume:—

(1) VOLUME control actuates two variable resistors thereby adjusting the power output of the receiver.

d. AVC Switch:—

(1) For VOICE reception, the volume control may be automatic or normal.

(2) For CW reception, the volume control is manual.

NOTE: IN SETS WITH SERIAL NUMBERS HIGHER THAN 9500, THE AVC SWITCH HAS BEEN REMOVED FROM THE FRONT PANEL OF THE RECEIVER. AVC SWITCHING IS HANDLED IN THESE SETS ENTIRELY BY THE CW-OFF-VOICE SWITCH ON THE TRANSMITTER PANEL. AVC IS AUTOMATICALLY SWITCHED ON WHEN THE CW-OFF-VOICE SWITCH IS AT VOICE, AND OFF WHEN THIS SWITCH IS AT CW. (FIGURES 42-C AND 43-C.)

e. Dial Lock:—

On sets with serial numbers above 9500, there is a knob directly above the words DIAL LOCK on the receiver front panel.

When at vertical position, this lock is inoperative, and when rotated 90° to the right, the tuning dial on the receiver is locked.

WARNING: DO NOT OPERATE THE TUNING DIAL WHEN THE LOCK IS ON.

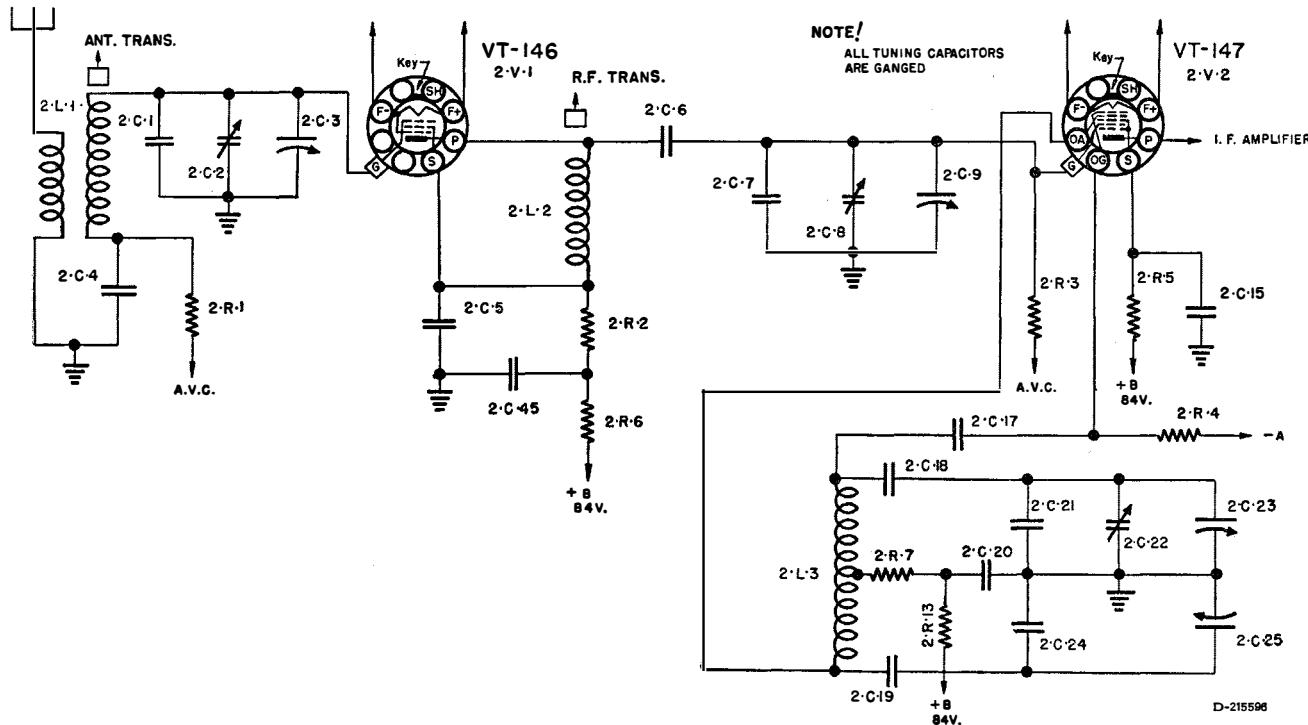


FIG. 10. RADIO FREQUENCY AND OSCILLATOR CIRCUIT

14. Receiver Circuit Functions

The receiver unit of Radio Set SCR-284-A functions by means of a series of four circuits explained in detail as follows:

a. Radio Frequency and Oscillator Circuit:—(FIG. 10)

(1) Signals picked up by the antenna are fed into the tuning system through the antenna coil (2-L-1) and impressed on the control grid of the

r-f amplifier Tube VT-146 (2-V-1). This radio frequency circuit consists of a high Q antenna transformer with its secondary tuned by capacitors 2-C-1, 2-C-2 and 2-C-3, an r-f amplifier Tube VT-146, and an r-f coil, tuned by capacitors 2-C-7, 2-C-8 and 2-C-9.

The secondaries of the antenna transformer and the r-f coil are provided with adjustable slugs for permeability tuning. The amplified r-f voltage is applied to the control grid of the pentagrid converter Tube VT-147 (2-V-2).

(2) The oscillator, tuned by sections 2 and 3 of the ganged capacitors (2-C-23 and 2-C-25), is adjusted to track 455 kc above that of the incoming carrier by the series padding Capacitors 2-C-18 and 2-C-19. The values of these capacitors were chosen to provide tracking throughout the frequency range of the receiver.

This output is coupled through a $15 \mu\text{f}$ capacitor 2-C-17 to grid No. 1 on the converter tube, which serves to combine the oscillator and signal voltages, to produce an intermediate frequency of 455 kc in its plate circuit.

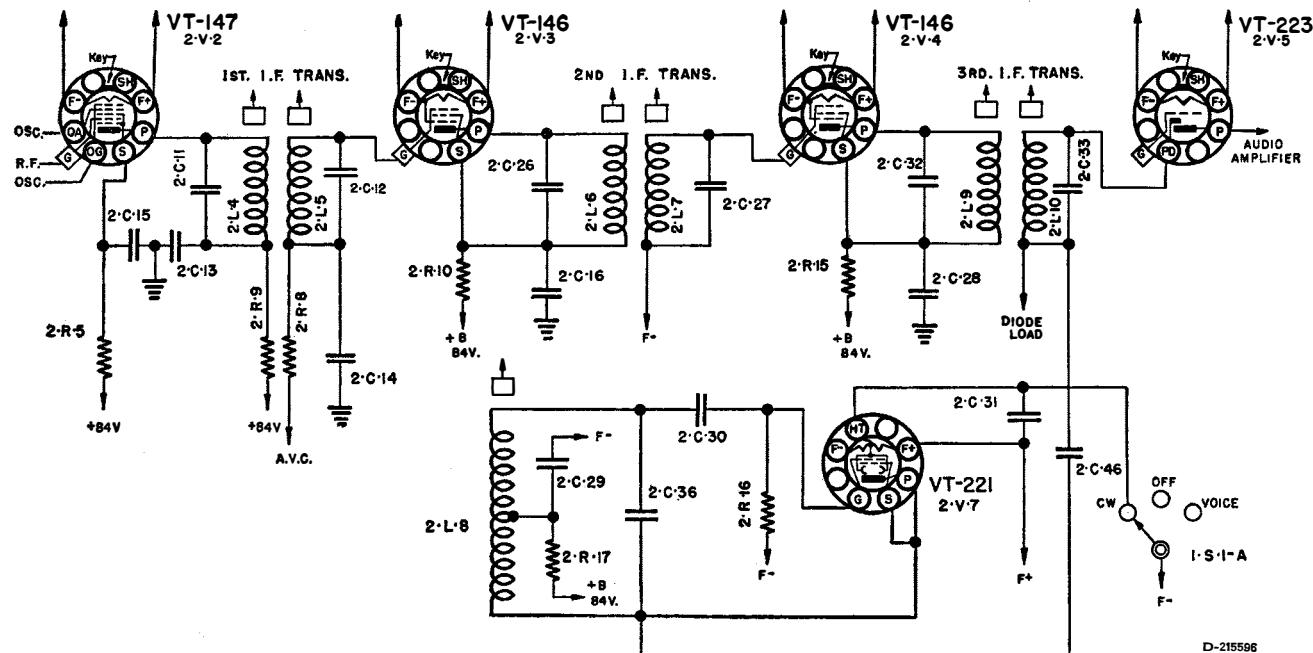


FIG. 11. INTERMEDIATE AND BEAT FREQUENCY OSCILLATOR CIRCUIT

b. Intermediate and Beat Frequency Oscillator Circuits: (FIG. 11)

- (1) The i-f amplifier consists of a two stage amplifier using two Tubes VT-146 (2-V-3 and 2-V-4), and three transformers (No. 1: 2-L-4 and 2-L-5, No. 2: 2-L-6 and 2-L-7, No. 3: 2-L-9 and 2-L-10) with permeability tuned primaries and secondaries. Each transformer together with the $270 \mu\text{f}$ capacitors across primary and secondary, is mounted in an aluminum shield.
 - (2) The beat frequency oscillator uses a separate Tube, VT-221 (2-V-7), and oscillates at a fixed frequency of 455 kc.
- Its output is loosely coupled by means of a 4.7

μf Capacitor (2-C-46), to the secondary of the third intermediate frequency transformer.

By slight detuning of the incoming carrier, an audio beat note is obtained which is amplified by the triode section of Tube VT-223 (2-V-5), and the following audio amplifier.

The band width is sufficiently wide to allow detuning from 455 kc (approximately 400 to 1000 cycle), without appreciably affecting the sensitivity of the i-f amplifier.

The following parts are contained in one shield can: Coil (2-L-8), Resistor (2-R-17), Capacitors (2-C-29), 2-C-30, and 2-C-36).

c. Audio Amplifier Circuit:—

(FIG. 12)

(1) The triode section of detector Tube VT-223 (2-V-5), and output Tube VT-221 (2-V-6), serve as a two-stage resistance-coupled amplifier, feeding into the output transformer.

(2) When operated on VOICE, the audio volume control (2-R-20), permits a controlled portion of the diode output to be applied to the grid of the triode section of the detector Tube VT-223 (2-V-5), thus controlling the input level of the audio amplifier.

(3) For CW operation, the return for volume control (2-R-20) remains open at switch 1-S-1-C, however the variable terminal of volume control 2-R-21, which is across the cathode resistor (2-R-24), is connected to the AVC grid return line, thus applying a bias on the grids of the r-f amplifier, r-f converter and first i-f tubes, thereby controlling the gain.

d. A VC Circuit:—

(FIG. 13)

(1) Due to the action of the diode detector, a rectified voltage is developed across the resistor 2-R-19 and applied through resistor-capacitor filters 2-R-12, 2-C-47 and 2-R-11, 2-C-10 to the grids of 2-V-1, 2-V-2, and 2-V-3. A small positive delay voltage taken from the junction of voltage divider resistors 1-R-18 and 1-R-19 is applied to the diode through 2-R-20 when operating on VOICE. This prevents the AVC system operating until a signal greater than approximately 8 microvolts is received.

This rectified voltage applied to the grids of the r-f Tube VT-146 (2-V-1), converter Tube VT-147 (2-V-2), and the first i-f Tube VT-146 (2-V-3) reduces the gain of these tubes and also the voltage delivered to the detector Tube VT-223 (2-V-5).

(2) For CW operation, the AVC voltage is removed at switch 1-S-1-B, so as not to decrease the sensitivity of the receiver.

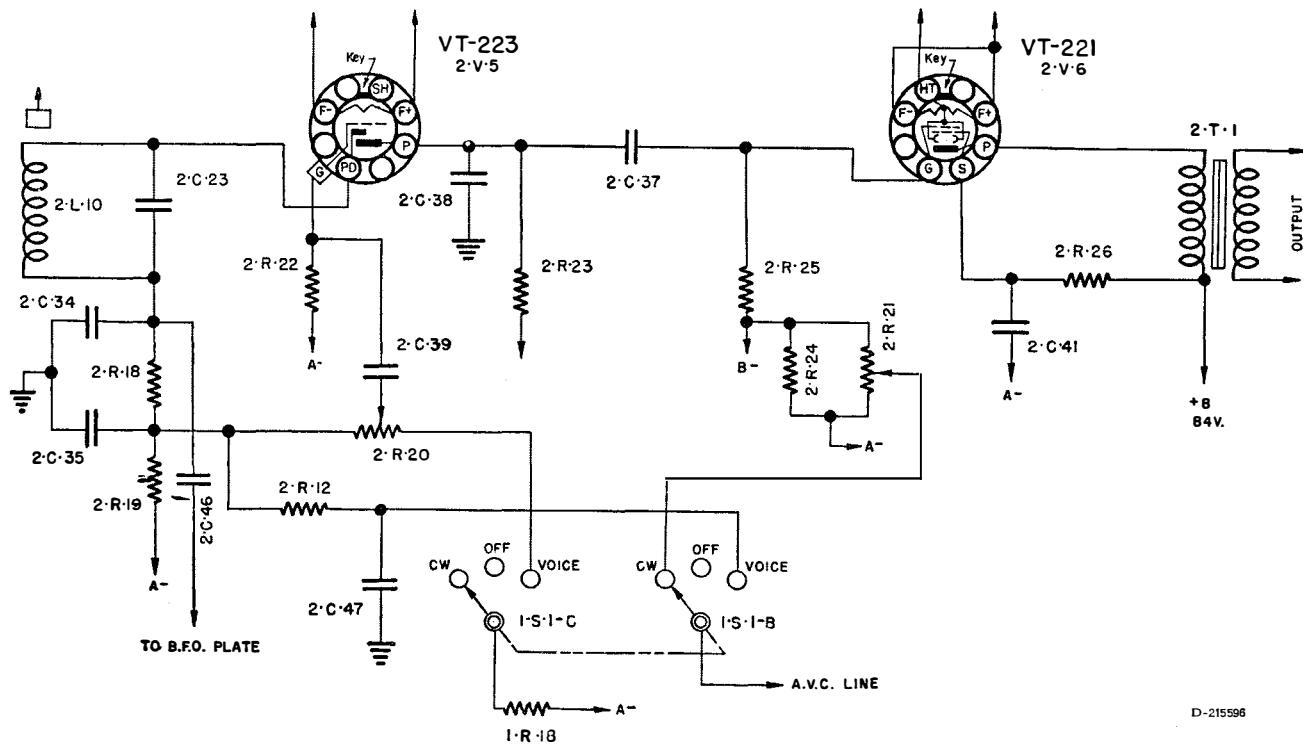


FIG. 12. AUDIO AMPLIFIER CIRCUIT

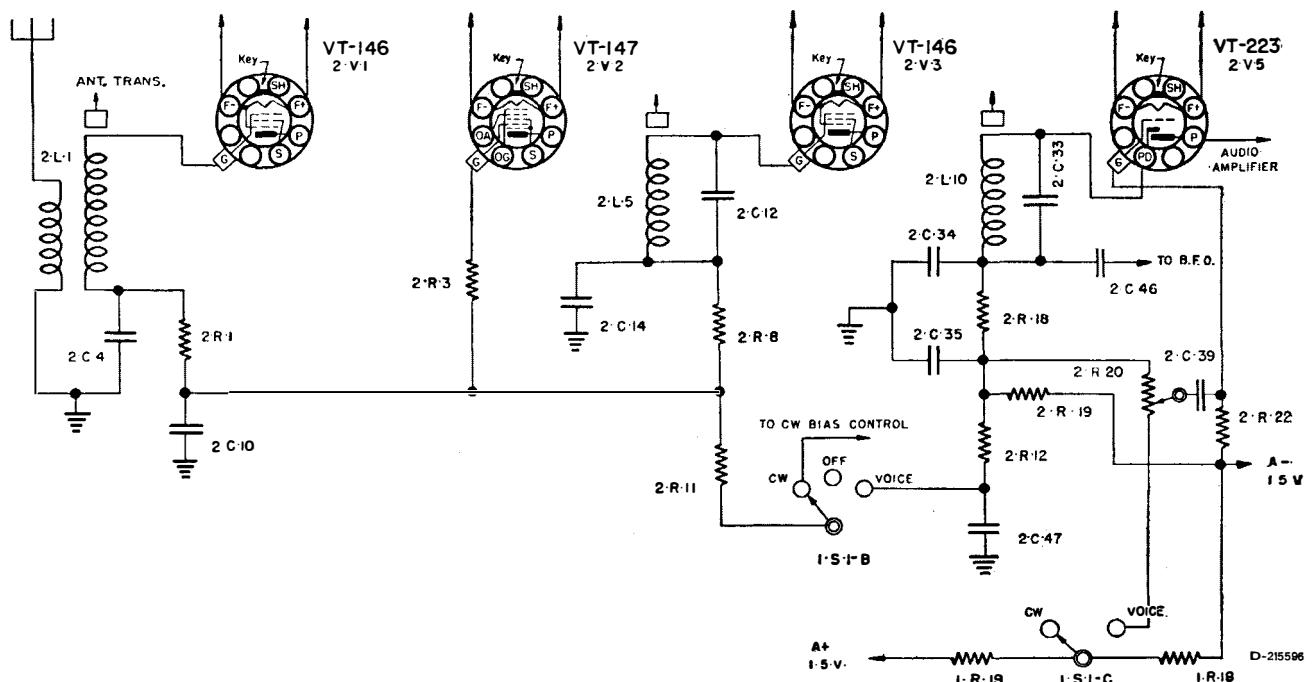


FIG. 13. AVC CIRCUIT

15. Transmitter Controls and Their Functions

a. Main Switch:—

A three-position switch, associated with both receiver and transmitter functions.

- (1) At OFF, transmitter and receiver are inoperative.
- (2) At CW, filament and plate voltage are supplied to receiver, BFO is on, and receiver is ready for reception of CW signals.
- (3) At VOICE, BFO is off, and receiver is ready for reception of modulated (VOICE) signals.

b. Standby Switch:—

A three-position switch, associated only with transmitter functions.

- (1) At OFF, transmitter is shut off completely.
- (2) At HIGH, filaments are heated in all tubes normally in use during operation, if MAIN SWITCH is at CW or VOICE.
- (3) At LOW, filaments are heated in all tubes normally in use during operation, except one of the two VT-225 P. A. Tubes, (1-V-3), if MAIN SWITCH is at CW or VOICE.

c. Operation of MAIN SWITCH and STANDBY SWITCH is inter-dependent:—

- (1) If MAIN SWITCH is at CW and STANDBY SWITCH is at either LOW or HIGH, the dynamotor is running and CW transmission can be

had by operating telegraph key. Receiver will operate on CW when key is up, although dynamotor is running. In this way, *break-in* operation on CW is obtained.

- (2) If MAIN SWITCH is at VOICE, and STANDBY SWITCH is at either LOW or HIGH, the transmitter may be operated by pressing the button on Microphone T-17, and talking into microphone.

Pressing microphone button starts Power Unit PE-103-A which supplies high voltage to transmitter. Releasing the button stops dynamotor of PE-103-A, and voice signals may be received without operating any other controls.

d. Crystal Switch:—

Normal position of this switch is *pushed in* (crystal inoperative). Pulling the switch out about $\frac{1}{4}$ " starts crystal oscillator, starts Power Unit PE-103-A, but stops power amplifier. This permits checking calibration with crystal oscillator, without radiating any signal from antenna. Details of operation are covered in 11 e.

e. Dial Lock:—

On sets above Serial No. 9500, the knob directly above wording DIAL-LOCK operates a dial locking device. When knob is turned to right, lock is on; turning one turn to the left, releases lock.

CAUTION: DO NOT OPERATE TUNING DIAL WHEN LOCK IS ON.

f. Antenna Selector:—

- (1) When using rod types of antennas, 15 to 25-feet long, ANTENNA SELECTOR switch is at position 1, ROD ANTENNA.
- (2) It may be necessary to use other settings for other types of antennas, and correct settings for other types must be learned by experience. *In all cases, set ANTENNA SELECTOR switch for maximum antenna current.*

g. Antenna Tuning:—

- (1) The ANTENNA TUNING crank-knob is coupled directly to a loading coil, which is gear coupled to a counter reading from zero to 600.
- (2) This control is to be operated in conjunction

with ANTENNA SELECTOR switch and tunes the antenna to the operating frequency.

- (3) Typical CALIBRATION CHART (Figure 14), shows approximate readings of counter at intervals of 100 kc throughout the frequency range.

CAUTION: THIS IS A SAMPLE CHART, AND NOT TO BE USED TO SET FREQUENCY OF ANY TRANSMITTER. EACH TRANSMITTER IS INDIVIDUALLY CALIBRATED AND IS FURNISHED WITH PROPER CHART.

h. Antenna Coupling:—

- (1) ANTENNA COUPLING control adjusts transmitter power output from minimum to maximum.

CALIBRATION CHART															
SERIAL NO.		RADIO TRANSMITTER BC-654-A													
		TUNING DIAL READING												APPROX. ANT. TUN'G	
KC	00	10	20	30	40	50	60	70	80	90	15' ROD	25' ROD			
3800	*	0314	0352	0391	0429	0468	0506	0542	0577	0613	0648	310	365		
3900		0684	0718	0752	0785	0819	0853	0886	0919	0951	0984	330	380		
4000	*	1017	1049	1081	1145	1177	1209	1240	1272	1303	1321	345	395		
4100		1335	1366	1397	1428	1459	1490	1520	1550	1579	1609	360	410		
4200	*	1639	1669	1698	1728	1757	1787	1816	1845	1875	1904	375	425		
4300		1933	1962	1991	2020	2049	2078	2106	2134	2161	2189	390	440		
4400	*	2217	2245	2273	2302	2330	2358	2386	2414	2442	2470	400	455		
4500		2498	2525	2552	2580	2607	2634	2661	2688	2714	2741	410	465		
4600	*	2768	2796	2823	2851	2878	2906	2933	2960	2987	3014	420	475		
4700		3041	3067	3093	3118	3144	3170	3196	3223	3249	3276	430	485		
4800	*	3302	3328	3355	3381	3408	3434	3460	3485	3511	3536	440	495		
4900		3562	3588	3614	3640	3666	3692	3717	3743	3768	3794	450	505		
5000	*	3819	3844	3870	3895	3921	3946	3972	3998	4023	4049	460	515		
5100		4075	4099	4124	4148	4173	4197	4222	4246	4271	4295	470	525		
5200	*	4320	4345	4370	4394	4419	4444	4468	4491	4515	4538	475	535		
5300		4562	4586	4610	4635	4659	4683	4706	4730	4753	4777	485	545		
5400	*	4800	4824	4847	4871	4894	4918	4941	4964	4988	5011	490	555		
5500		5034	5056	5079	5101	5124	5146	5169	5192	5215	5238	500	565		
5600	*	5261	5283	5305	5326	5348	5370	5393	5416	5438	5461	505	575		
5700		5484	5506	5529	5551	5574	5596	5623	5651	5678	5708	515	585		
5800	*	5733										520	595		

FIG. 14. TYPICAL CALIBRATION CHART

- (2) Graduations of 0 to 100 are marked on panel, but maximum output usually occurs before reaching 100.
- (3) Coupling should never be increased beyond the point which produces maximum antenna current.
- (4) Transmitter range may be reduced to a minimum by setting ANTENNA COUPLING control at zero. This is usually desirable when communicating over short distances, such as less than $\frac{1}{2}$ mile. Under this condition of reduced coupling, antenna current meter may show little or no reading, but if antenna has been properly tuned, there will be enough radiation from the antenna for short range communication.

i. Tuning:—

- (1) The transmitter TUNING control adjusts frequency of transmitter.
- (2) Dial readings are obtained by using a combination of counter and disc dial.
- (3) The counter has three horizontal revolving drums. The two upper drums are black, with white numerals; the lower is white with black numerals.
- (4) The disc dial is graduated in two sections—each reading 0 to 100.

Note: The numeral 100 does not appear on the disc dial.

- (5) By using a combination of counter and disc dial, a total of 6,000 dial settings is possible and requires thirty revolutions of TUNING crank-knob to cover frequency range of transmitter.
- (6) As disc dial is turned to the right from 0 to 100, middle drum of counter advances one number. At the same time, the bottom drum advances ten numbers.

Note: Numeral 10 does not appear on drums.

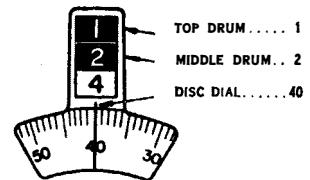
Thus the lower drum of the counter indicates tenths of one section of the disc dial, which is graduated 0 to 100.

Note: The lower drum may be ignored in observing readings.

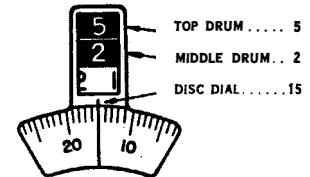
As the middle drum of the counter advances ten numbers, the top drum advances *one* number, etc.

j. Reading the TUNING Dial:—

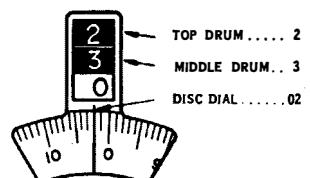
- (1) Suppose, for example, we want to transmit a frequency of 4060 kc. Referring to the typical CALIBRATION CHART, Figure 14, we see that for this frequency, a dial setting of 1240 is required. Turn the TUNING crank-knob until this setting appears.



- (2) Suppose, for example, we want to transmit a frequency of 5580 kc. Again referring to the typical CALIBRATION CHART, Figure 14, we see that for this frequency, a dial setting of 5215 is required. Turn TUNING crank-knob until this setting appears.



- (3) Suppose, for example, we want to transmit a frequency of 4430 kc. Again referring to the typical CALIBRATION CHART, Figure 14, we see that for this frequency, a dial setting of 2302 is required. Turn TUNING crank-knob until this setting appears.



- (4) **CAUTION: CALIBRATION CHART, FIGURE 14, IS SHOWN ONLY AS AN EXAMPLE, AND WILL NOT BE CORRECT FOR ANY TRANSMITTER. EACH TRANSMITTER IS INDIVIDUALLY CALIBRATED, AND IS SUPPLIED WITH PROPER CHART.**

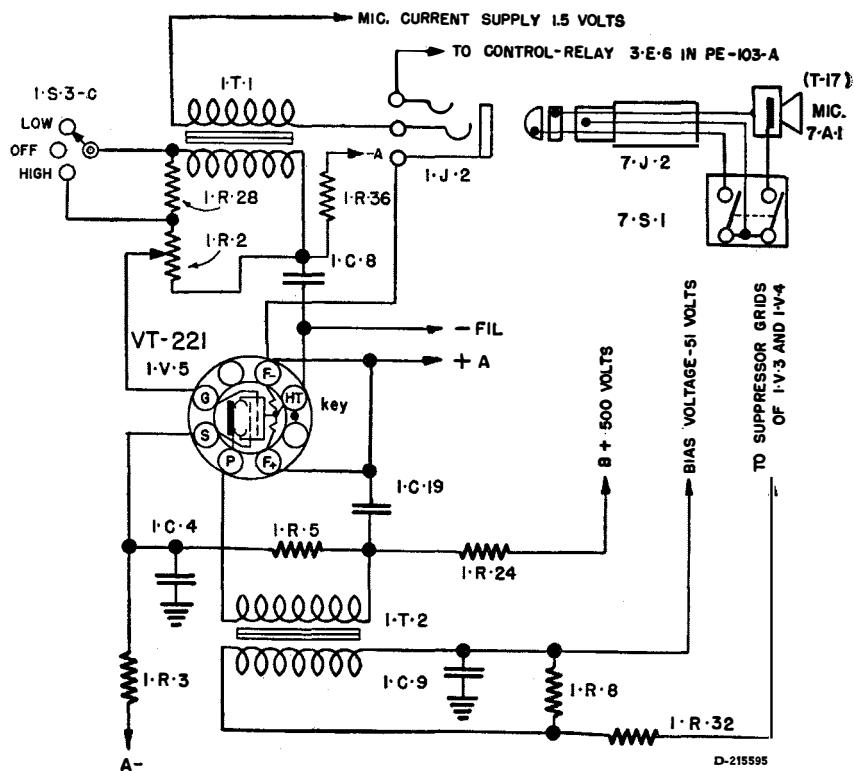


FIG. 15. AUDIO AMPLIFIER AND MODULATOR CIRCUIT

16. Transmitter Circuit Functions

The Transmitter Unit of Radio Set SCR-284-A uses five circuits explained in detail as follows:

a. Audio Amplifier and Modulator Circuit:—(FIG. 15)

- (1) The microphone (7-A-1) and switch (7-S-1), are contained in a single unit.

One section of switch 7-S-1 forms a part of the control circuit of the transmitter, while the other section completes the microphone circuit, the power being furnished by Battery BA-43, or Power Converter PE-104-A.

- (2) The output of microphone (7-A-1) is fed into the primary of matching transformer (1-T-1), and the secondary of transformer (1-T-1) is shunted by variable resistor (1-R-2), the arm of which is connected to the grid of the modulator Tube VT-221 (1-V-5). This variable resistor acts as a gain control for the modulator stage. 1-R-28 reduces gain for proper operation at LOW.

- (3) The signal is amplified by modulator Tube VT-221 (1-V-5), and is fed into the primary of output transformer (1-T-2).

The plate voltage of modulator Tube VT-221 (1-V-5), is supplied from the +500 volt supply through decoupling resistor (1-R-24) and the primary of transformer (1-T-2).

The regulated screen voltage is supplied from the same source, through a voltage divider network composed of resistors (1-R-3 and 1-R-5). The output voltage from the secondary of transformer (1-T-2) is fed into the suppressor grids of Tubes VT-225 (1-V-3 and 1-V-4).

The grid return through the secondary is connected to negative 51-volt supply.

- (4) The application of the audio voltage will change the bias on the suppressor grids of the power amplifier, which in turn changes the radio frequency output of the amplifier Tube VT-225, thus providing modulation.

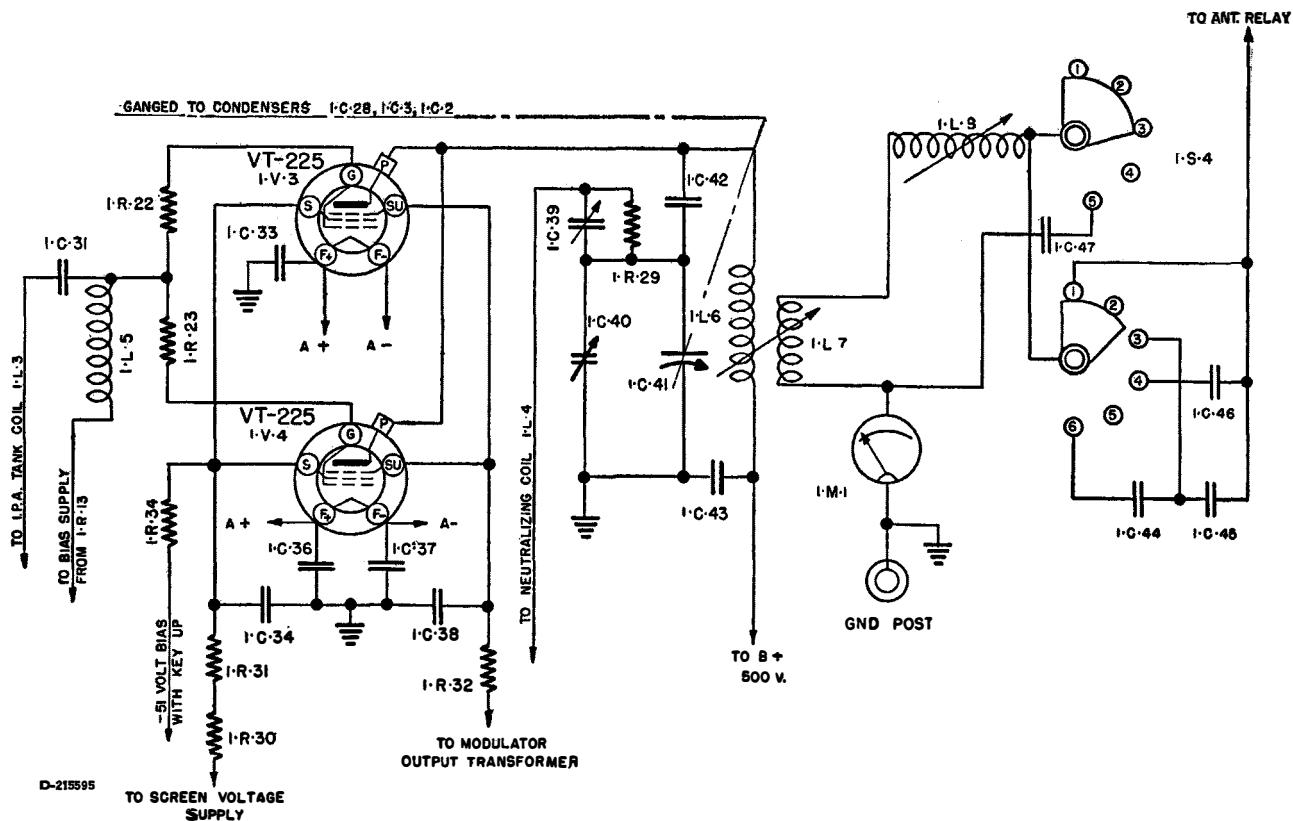


FIG. 16. POWER AMPLIFIER OUTPUT CIRCUIT

b. Power Amplifier Output Circuit:—

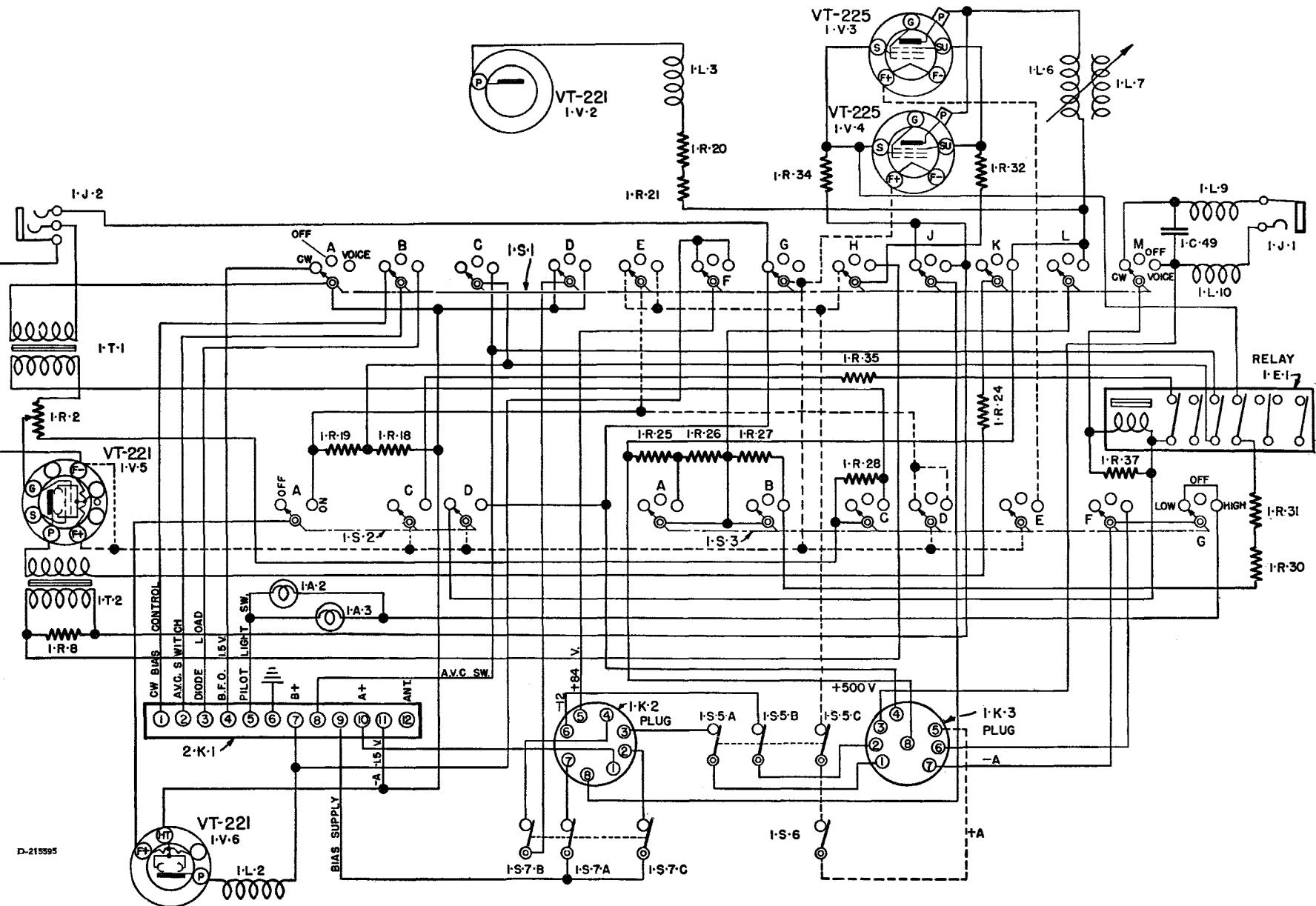
- (1) Power amplifier Tubes VT-225 (1-V-3 and 1-V-4), function as a class C radio frequency amplifier and are connected in parallel for high power.
 - (2) The series resistors (1-R-22 and 1-R-23) function as parasitic suppressors. A combination of fixed and automatic bias is supplied through radio frequency choke (1-L-5) and a resistor network, resistor (1-R-13) furnishing fixed bias from negative 51-volt supply, and resistors (1-R-14 and 1-R-16), the automatic bias.
 - (3) The screen grids are by-passed by capacitor (1-C-34). The screen voltage is obtained from the +500-volt supply through resistors (1-R-31, 1-R-30, 1-R-25, 1-R-26 and 1-R-27).
 - (4) The suppressor grids are by-passed by capacitor (1-C-38). The modulator voltage for suppressor grids is obtained from negative 51-volt supply through dropping resistor (1-R-32) and the secondary of the modulation transformer (1-T-2).
 - (5) The plate circuit is comprised of coil (1-L-6) and capacitor (1-C-41). Tracking is made pos-

sible by capacitor (1-C-40). Capacitor (1-C-42 and 1-C-43), serve as blocking capacitors, isolating the d. c. plate-voltage from the variable capacitor (1-C-41). The neutralizing network is comprised of coil (1-L-4), capacitor (1-C-39), and associated resistor (1-R-29).

Variable antenna coupling to the power amplifier plate circuit is provided through a mutual inductance between coil (1-L-6) and variable coil (1-L-7).

- (6) The antenna matching network is comprised of selector switch (1-S-4), capacitors (1-C-44, 1-C-45, 1-C-46, 1-C-47), and coil (1-L-8). The proper shunt or series capacity for the antenna used is connected into the antenna circuit by means of switch (1-S-4). Antenna coil (1-L-8) is used to interpolate between the steps of switch (1-S-4).

Relative output into the antenna circuit is indicated on meter (1-M-1). In sets with serial numbers below 9501, a slightly different antenna matching network is used. For a schematic of this revision, see Figures 44-A & 44-B.



c. Master Control Switching for Circuits:— (FIG. 17)

- (1) The multi-section switch (1-S-1) is used to select CW or VOICE operation, or to switch OFF, and is connected as follows:

Section A. At CW, the A minus is connected to the beat frequency oscillator filament, putting the beat frequency oscillator circuit into operation.

At VOICE, there is no connection.

Section B. At CW, fixed bias is applied to AVC line supplying r-f Tube VT-146 (2-V-1), i-f Tube VT-146 (2-V-3), and converter Tube VT-147 (2-V-2). This connects points No. 1 and No. 2 on terminal strip 2-K-1.

At VOICE, the AVC circuit in the receiver functions normally with the AVC line connected to the diode load.

Section C. At CW, there is no connection.

At VOICE, the volume control return lead is connected through a resistor bridge to the filament.

Section D. At CW or VOICE, the negative 1.5-volt circuit is completed.

Section E. At CW or VOICE, the positive 6-volt circuit is completed.

Section F. At CW or VOICE, the positive 84-volt circuit is completed.

Section G. At CW, the control relay (3-E-6), in Power Unit PE-103-A, is closed.

At VOICE, there is no connection.

Section H. At CW, the suppressors of Tubes VT-225 (1-V-3 and 1-V-4) are connected to the positive 6-volt supply.

At VOICE, the suppressor grids of Tubes VT-225 (1-V-3 and 1-V-4) are connected through the modulation transformer secondary (1-T-2) to —51 V.

Section J. At CW or VOICE, the bias supply circuit (minus 51 volts), is completed.

Section K. At CW, there is no connection.

At VOICE, the positive 500-volt supply to the plate of Tube VT-221 (1-V-5), (through dropping resistor 1-R-24, and the primary of the modulation transformer 1-T-2), is connected.

Section L. At CW, there is no connection.

At VOICE, the resistors (1-R-25 and 1-R-26) are shorted out to raise the screen voltage on Tubes VT-225 (1-V-3 and 1-V-4).

Section M. At CW, the key is connected in series with the keying relay.

At VOICE, the push-to-talk switch on the handle of Microphone T-17 is connected in series with the keying relay.

- (2) Switch 1-S-2 is used to throw the crystal calibrator OFF or ON, and is connected as follows:

Section A. At OFF, there is no connection.

At ON, it connects the filament of Tube VT-221 (1-V-6), to positive 1.5-volts.

Section B. This position is not used.

Section C. At OFF, there is no connection.

At ON, biasing resistor 1-R-35 is out of the circuit, while the return for resistor 1-R-1

is connected to the positive 6 volt supply, to key the master oscillator.

Section D. At OFF, the positive 6 volt supply is connected to the keying relay.

At ON, the positive 6 volt supply is connected to the control relay 3-E-6, in dynamotor of Power Unit PE-103-A.

- (3) Switch 1-S-3 is used to select operation at LOW, OFF, and HIGH.

This switch (1-S-3), is referred to as the STANDBY switch, and its connections are as follows:

Section A. At LOW, there is no connection.

At HIGH, connection is across resistor (1-R-26) increasing the screen voltage to Tubes VT-225 (1-V-3 and 1-V-4).

Section B. At LOW, there is no connection.

At HIGH, connection is across resistor (1-R-27) increasing the screen voltage to Tubes VT-225 (1-V-3 and 1-V-4).

Section C. At LOW, there is no connection.

At HIGH, connection is across resistor 1-R-28 providing the same percentage of modulation in high or low power.

Section D. At either LOW or HIGH, switch 1-S-3 completes the positive 6 volt current.

Section E. At LOW, there is no connection. At HIGH, positive 6 volt connection is made to Tube VT-225 (1-V-3).

Section F. At LOW, there is no connection.

At HIGH, connection is across pins No. 6 and No. 7 on power connector 1-K-3, connecting resistors (3-R-1 and 3-R-2) in dynamotor of Power Unit PE-103-A.

Section G. At either LOW or HIGH, minus 6 volts is supplied to the transmitter pilot lights.

d. Master Oscillator-Intermediate Power Amplifier

Circuit: (FIG. 18)

- (1) The master oscillator uses the Colpitts circuit. Oscillator Tube VT-221 (1-V-1), is connected as a triode, with the screen and plate joined. The tuning is accomplished in the oscillator circuit by capacitors (1-C-2 and 1-C-3), connected in series forming a split or balanced circuit to ground. Capacitors (1-C-5 and 1-C-6) are of the negative co-efficient type, to prevent drifting with temperature in the oscillator circuit.

Capacitor (1-C-1) is used to permit tracking of the oscillator to other stages of the transmitter. The mid-tap of coil (1-L-1) is connected to the positive plate supply.

- (2) For calibration of the master oscillator, trimmer capacitor (1-C-7) is used. The tube filament is by-passed by capacitors (1-C-13 and 1-C-14).

- (3) The neutralizing network is comprised of capacitors (1-C-12, 1-C-20 and 1-C-17). Neutralizing is accomplished by supplying a voltage from Coil (1-L-1) to the plate circuit of tube 1-V-2, which is opposite the phase to the voltage driving the grid of tube 1-V-2. The magnitude of this neutralizing voltage is controlled by capacitor (1-C-17).

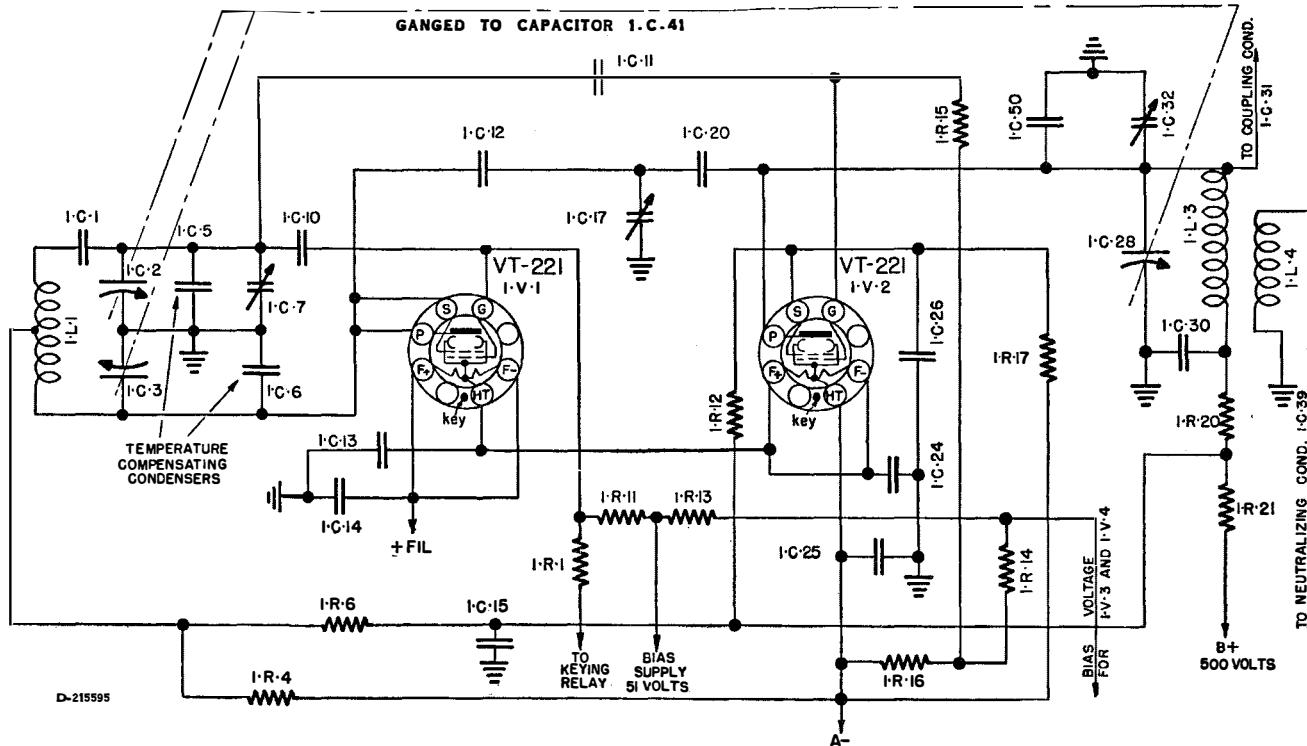


FIG. 18. MASTER OSCILLATOR - INTERMEDIATE POWER AMPLIFIER CIRCUIT

- (4) Resistor (1-R-1) acts as a bias dropping resistor. The bias is supplied through (1-R-11), and terminates at the negative 51-volt supply. Grid blocking is accomplished by capacitor (1-C-10).
 - (5) Coupling between the oscillator and i-p-a stage is made by capacitor (1-C-11). The i-p-a stage operates in class "C". The bias is derived from grid-leak (1-R-15) and a resistor network, which terminates at negative 51-volt supply.
 - (6) Screen voltage is supplied by (1-R-12 and de-coupling resistor 1-R-21) and is regulated by resistor (1-R-17). The screen circuit is by-passed to ground by capacitor (1-C-26). The filament is by-passed by capacitors (1-C-24 and 1-C-25).
 - (7) Tank coil 1-L-3 in the plate circuit of the i-p-a is tuned by a section of gang (1-C-28). Capacitor (1-C-30) is used for tracking. Capacitor (1-C-50) is a fixed parallel padding capacitor, used in conjunction with trimmer capacitor (1-C-32).
 - (8) Plate voltage for i-p-a is supplied from the posi-

tive 500-volt supply through resistors (1-R-20, 1-R-21) and by-passed by (1-C-30).

- e. *Crystal Oscillator Circuit:*— (FIG. 19)
The crystal oscillator permits a calibration check of the receiver or transmitter every 200 kc.

Coupling to the receiver is through one filament lead which is not by-passed

The crystal (1-A-1) is connected between the grid of the oscillator tube VT-221 (1-V-6), and one side of the filament. The tube is a tetrode, but is used as a triode by connecting the screen and plate together. The grid leak (1-R-9) is shunted across crystal (1-A-1).

Capacitor (1-C-16) is connected between grid and plate of tube (1-V-6) and provides the proper amount of feedback into the grid circuit for oscillation.

Choke (1-L-2) forms the plate load, and is bypassed to ground by capacitor (1-C-22). Plate voltage is supplied by Battery BA-43 or Power Converter PE-104-A, through choke (1-L-2) to the plate of oscillator Tube VT-221 (1-V-6).

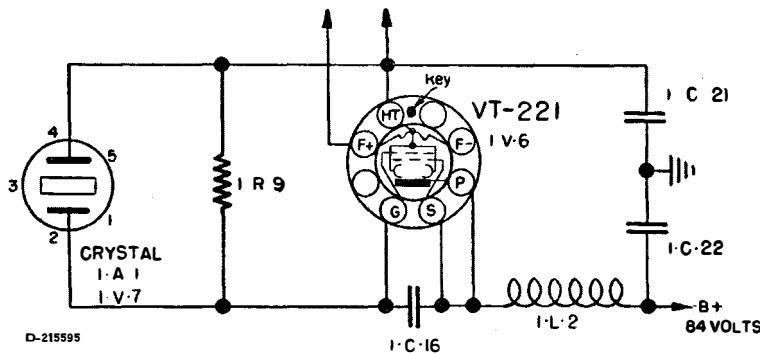


FIG. 19. CRYSTAL OSCILLATOR CIRCUIT

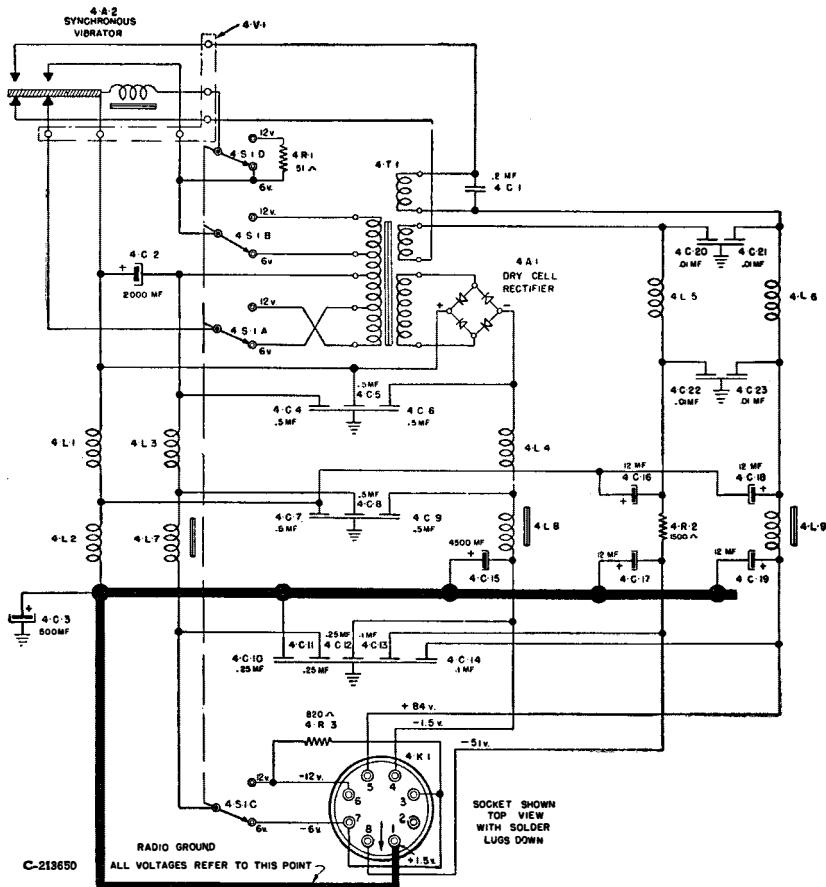


FIG. 20. POWER CONVERTER PE-104-A, SCHEMATIC DIAGRAM

Used on Sets 1-12000. For Sets above 12000, see Fig. 48-A.

17. Power Converter PE-104-A (FIGS. 20 & 21)

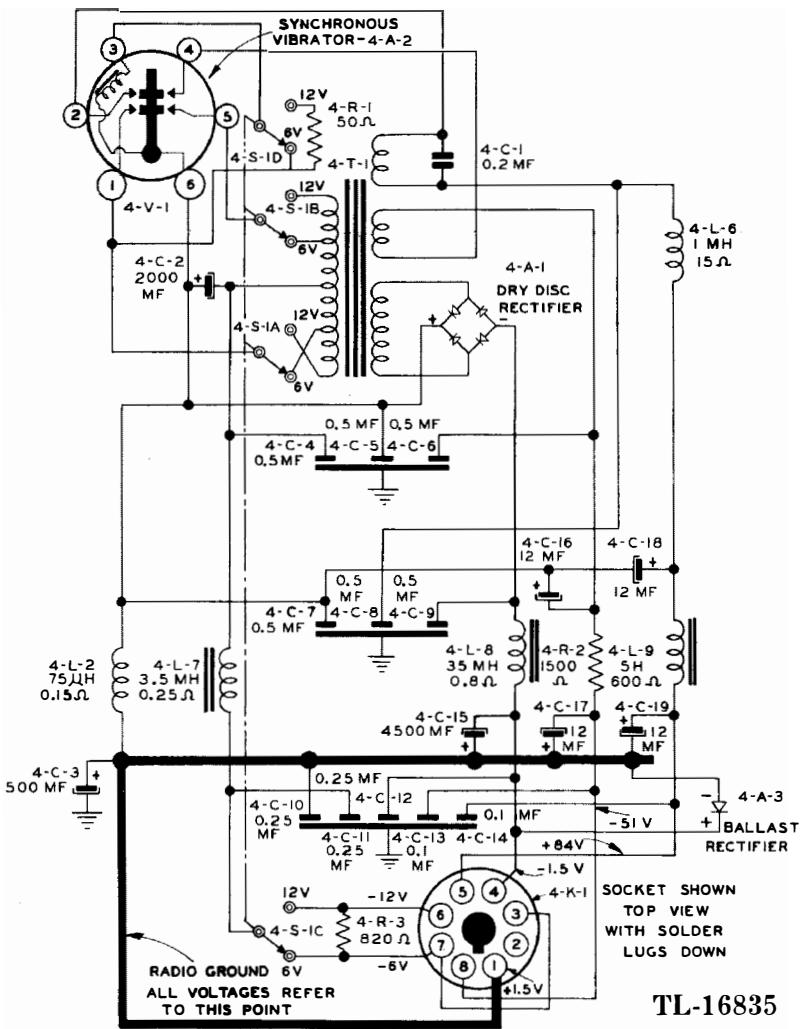
Power Converter PE-104-A may be used as an alternate source of power with Battery BA-43, being equivalent in both physical size and voltage. It is flexible in that it can be adjusted from 6-volt to 12-volt input by switch 4-S-1, with a slotted shaft for screwdriver adjustment, located on the top cover near the name plate. Adjustment from 6-volt to 12-volt is accomplished through the primary of the power transformer (4-T-1). Power Converter PE-104-A, operating in conjunction with the 6- or 12-volt storage battery, or Generator GN-45-(*), supplies plate and filament voltages to the receiver, and bias and filament voltages to the transmitter.

NOTE: AN ALTERNATE POWER CONVERTER PE-104-A IS USED IN A NUMBER OF RADIO SETS SCR-284-A.

THE FUNCTIONING OF THE ALTERNATE POWER CONVERTER PE-104-A IS IDENTICAL WITH POWER CONVERTER PE-104-A. FOR REFERENCE TO ALTERNATE SCHEMATIC AND CONNECTION DIAGRAMS, (FIGURES 48-A AND 48-B.)

- Primary voltage enters connector 4-K-1 at point No. 1 to No. 6, or point No. 1 to No. 7 (as selected), Figure 20, and terminates at the center tap of the primary of Power Transformer (4-T-1). It is filtered by iron core choke (4-L-7), air core choke (4-L-3), and capacitors (4-C-11, 4-C-8, 4-C-4, and 4-C-2). The positive side of the vibrator is connected from the return bus and filtered to the vibrator by capacitors (4-C-3, 4-C-5, and 4-C-7) and air core chokes (4-L-1 and 4-L-2).
- The synchronous vibrator (4-A-2) interrupts the direct current in the primary of Transformer (4-T-1), changing direct current into alternating, or pulsating current. The transformer then steps up this voltage. This is rectified by the other set of points on vibrator (4-A-2), and is filtered by chokes (4-L-6 and 4-L-9), and capacitors (4-C-21, 4-C-23, 4-C-18, and 4-C-19). Capacitor (4-C-1) is connected across the high voltage secondary serving as a buffer, absorbing surges which occur on breaking current at the vibrator points. Current at this point is d-c and terminates at pin No. 5 on socket (4-K-1). The negative return connects between the high voltage secondary and pin No. 8 on socket (4-K-1), filtered by capacitors (4-C-20, 4-C-22, 4-C-16, and 4-C-17),

NOTE: POWER CONVERTER PE-104-A, PROCURED ON ORDER No. 29069-PHILA-45-10, IS SIMILAR TO THE POWER CONVERTER PE-104-A AS SHOWN IN FIGURE 20 WITH THE ADDITION OF BALLAST RECTIFIER 4-A-3 IN THE FILAMENT CIRCUIT AND WITH THE ELIMINATION OF CAPACITORS 4-C-20, 4-C-21, 4-C-22, 4-C-23, CHOKES 4-L-1, 4-L-3, 4-L-4, AND 4-L-5. IT IS ALSO IDENTICAL WITH ALTERNATE POWER CONVERTER PE-104-A SHOWN IN FIGURES 48-A AND 48-B WITH THE ADDITION OF BALLAST RECTIFIER 4-A-3 TO THE FILAMENT CIRCUIT.



**FIG. 20.1. POWER CONVERTER PE-104-A,
SCHEMATIC DIAGRAM (SECOND REVISION)**

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- air choke (4-L-5), and bias resistor (4-R-2), across which is developed the 51-volts bias.
- c. Another secondary on transformer (4-T-1) is connected to the input arms of rectifier (4-A-1). Pulsating d.c. coming out of the other two arms is filtered on the positive side by capacitors (4-C-5, 4-C-2, 4-C-7, and 4-C-3), and chokes (4-L-1 and 4-L-2). On the negative side it is filtered by capacitors (4-C-6, 4-C-9, 4-C-12, and 4-C-15), aircore choke (4-L-4) and iron core choke (4-L-8),

and then connects to pin No. 4 on socket 4-K-1.

- d. Air core chokes (4-L-1, 4-L-2, 4-L-3, and 4-L-4) serve to eliminate "hash" which may otherwise back up through the filaments causing undesirable noises. The air core chokes also reduce some of the pulsation and noise caused by the breaking of the points of the vibrator.

Iron core chokes (4-L-8 and 4-L-9), smooth pulsation so that direct current flows smoothly.

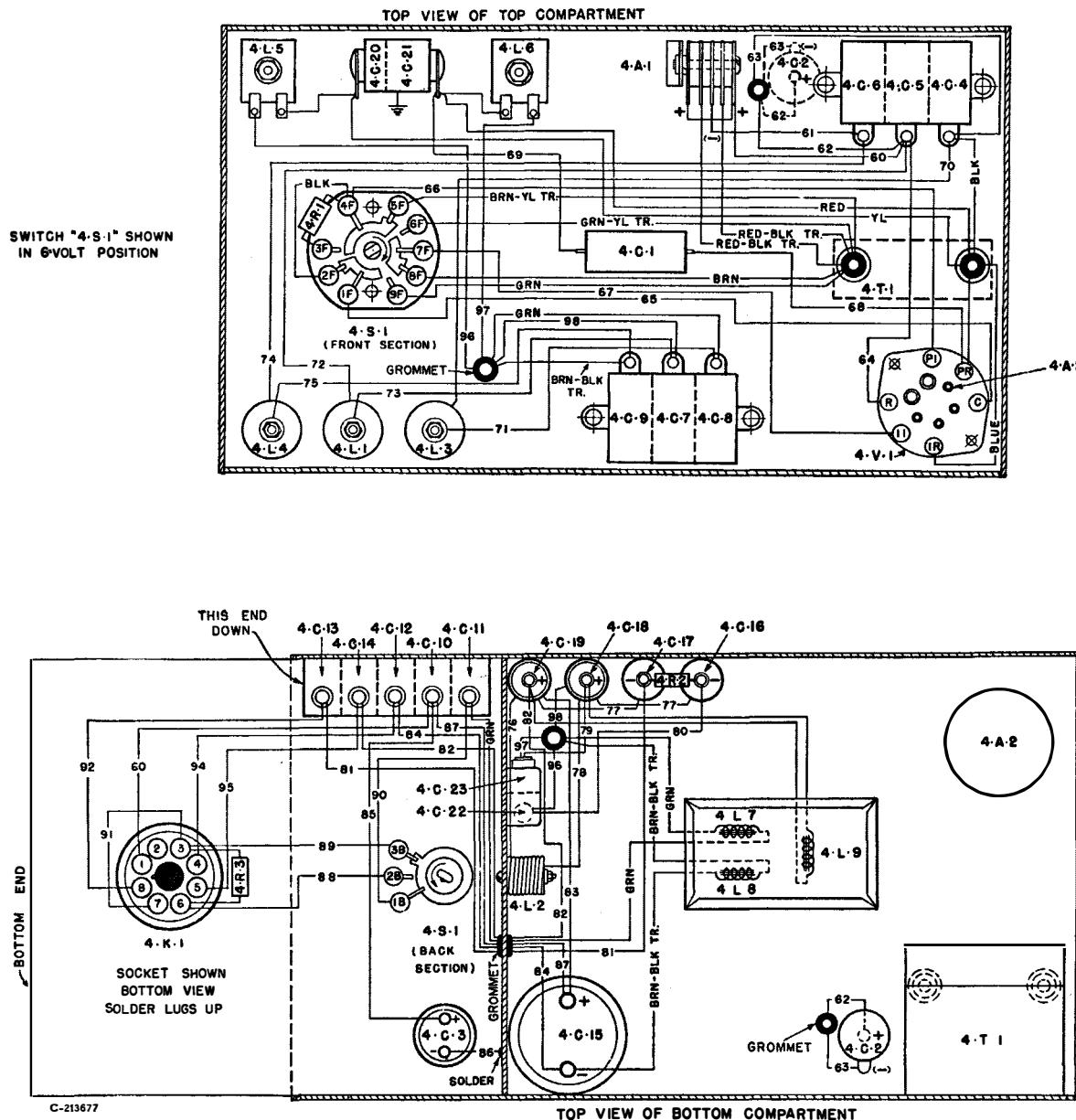


FIG. 21. POWER CONVERTER PE-104-A, CONNECTION DIAGRAM

Used on Sets 1-12000. For Sets above 12000, see Fig. 48-B.

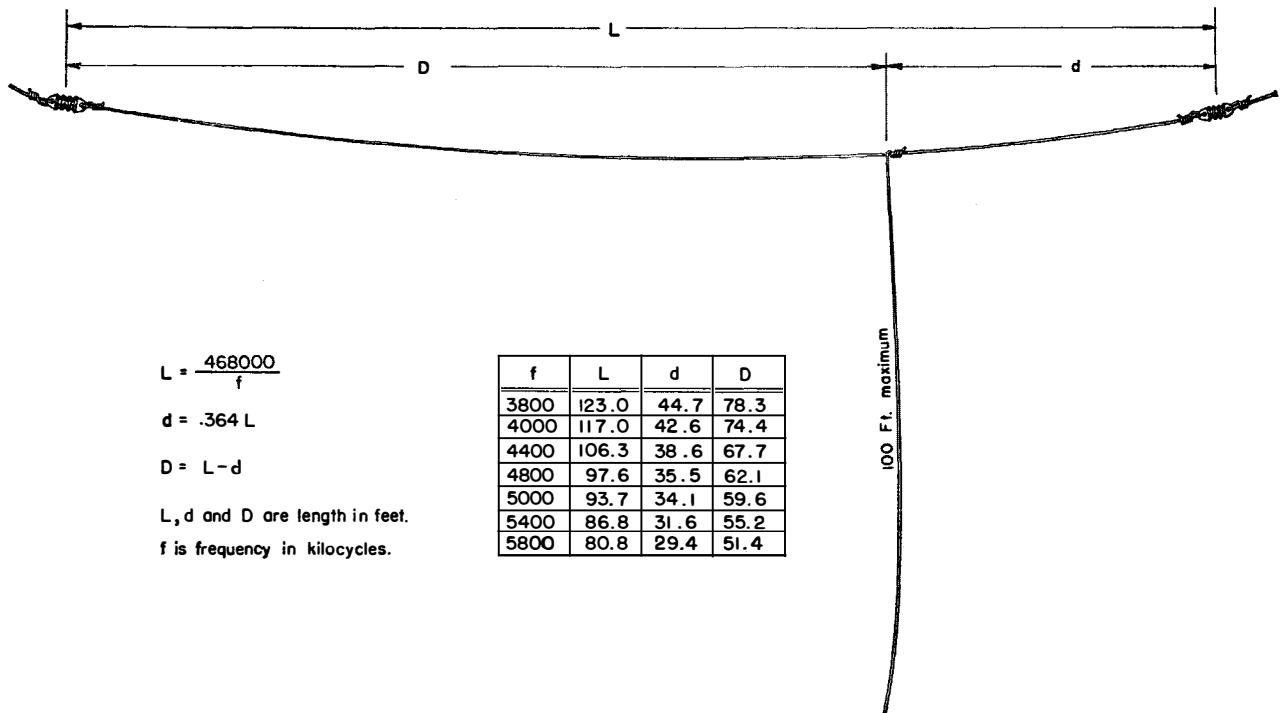


FIG. 22. T-SHAPED ANTENNA

18. Functioning of Optional Antennas (FIG. 22)

- When using either the 25-foot or the 15-foot rod antenna set the ANTENNA SELECTOR switch to position 1. If any other type of antenna is used, as for example, a ground antenna (any piece of wire of any length lying on the ground), (Figure 8) or a T-shaped antenna (Figure 22), select the position of the ANTENNA SELECTOR switch very carefully. To determine the best position for this switch, turn it to the right, step-by-step, from position 1 to position 5. For each position, turn the ANTENNA TUNING dial through its entire range with the ANTENNA COUPLING dial set at, or near 50. The most desirable position of the ANTENNA SELECTOR switch is the one that gives the highest current reading.
- When using a T-shaped, or Hertz antenna, best results may be obtained by adhering to the dimensions given in Figure 22. The transmitting frequency should be decided upon before constructing the antenna.
- If, for certain types of antennas, no appreciable reading is obtained on the ANTENNA CURRENT meter, place an auxiliary external r-f ammeter, having a scale reading from zero to .5 ampere, between the ANTENNA binding post and the antenna. Use the ANTENNA SELECTOR position which gives the highest reading on the auxiliary meter.

d. If the antenna used draws so much current that it causes the ANTENNA CURRENT meter, mounted on the panel, to go off scale, adjust the ANTENNA COUPLING control so as to decrease the current to the point where the ANTENNA TUNING control may be set for peak current without the meter going off scale. This is necessary to prevent burn-out of the meter.

19. Power Unit PE-103-A

(FIGS. 23 & 24)

a. Using 6-Volt Battery:

Set slotted shaft of switch 3-S-1 for 6-volt operation. At this position, the power unit functions as follows:

(1) Through negative terminal of battery:

(a) Current enters through circuit breaker 3-E-4 (which prevents overloading the dynamotor), through starter relay 3-E-2 (which has closed because switch 3-S-1 is on 6-volt side), to the 6-volt input side of the dynamotor.

(b) To (and through) overload circuit breaker 3-E-5 (which protects the transmitter filaments), and Power Converter PE-104-A, when used. The current then enters switch 3-S-1, which connects to sections A-B-C-D and E.

Section A functions as a shorting device across resistor 3-R-3, when Power Unit PE-103-A is used on 6-volts. Section A remains open for 12-volt operation.

Section B connects the negative side of the 6-volt battery to point No. 1 on cable connector 3-K-1, or to the negative side of 12-volt battery, to point No. 2 on 3-K-1.

Section C functions as a shorting device across resistor 3-R-1, and operates as in section A.

Section D connects relay 3-E-2 in 6-volt circuit, or 3-E-1 in 12-volt circuit by allowing negative current through (terminating at A position), completing the circuit.

Section E connects safety relay 3-E-7 in circuit for 6-volt operation. The relay is designed so as not to close at 8.2 volts, but will close at 9 or 10 volts. This action places resistor 3-R-4 across the battery circuit, causing a short circuit, tripping overload switch 3-E-5, which is designed for 7.5 amp. capacity.

(2) Through positive terminal of battery:—

- (a) Current enters other terminal of safety relay 3-E-7.
 - (b) Connects to negative side of the 500-volt supply.
 - (c) Connects to positive side of 6-volt input of the dynamotor.
 - (d) Connects to positive side of the 12-volt input of the dynamotor.

- (e) Connects to pin No. 5 on cable connector 3-K-1.

(f) Connects to switch of relay 3-E-6, and through switches of relays 3-E-3 and 3-E-4, to the other side of starter relays 3-E-1 and 3-E-2.

(g) Connects at terminal No. 4 on cable connector, 3-K-1 (due to switching in transmitter circuits), to one side of relay 3-E-6.

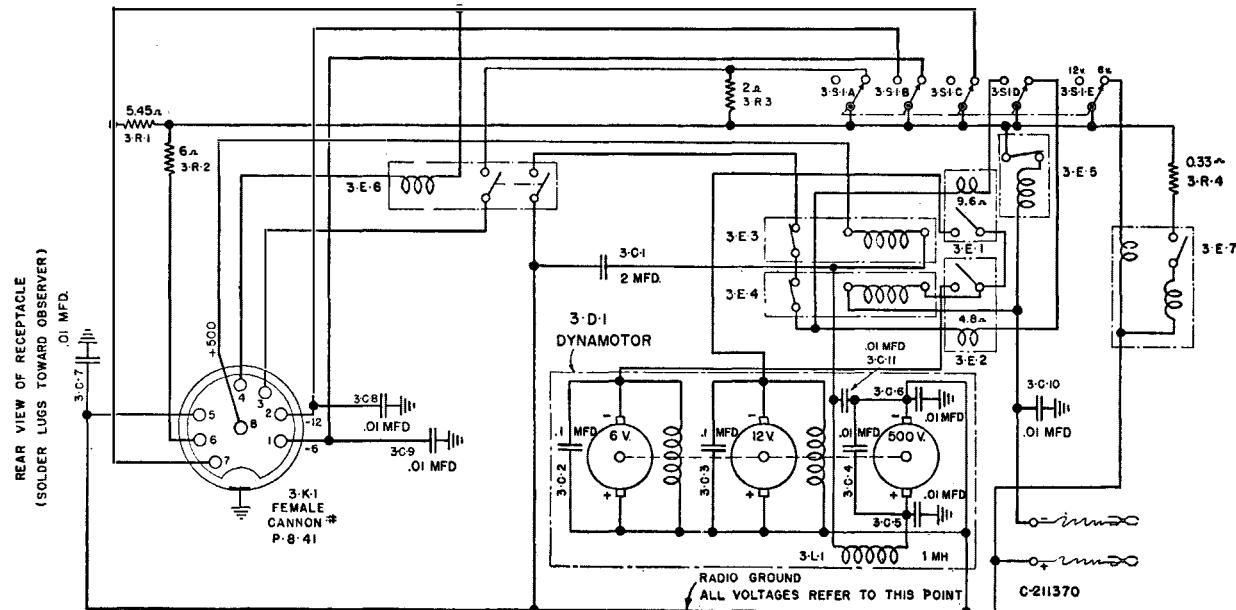
NOTE: IN SETS WITH SERIAL NUMBERS 1 TO 4710 INCLUSIVE, THERE IS A SOMEWHAT DIFFERENT CIRCUIT ARRANGEMENT THAN SHOWN ON FIGURES 23 AND 24. CIRCUIT BREAKER 3-E-4 IS USED IN THE 6-VOLT INPUT CIRCUIT, AND CIRCUIT BREAKER 3-E-3 IS USED IN THE 12-VOLT INPUT CIRCUIT OF THE DYNAMOTOR. CIRCUIT BREAKER 3-E-5 FUNCTIONS THE SAME AS IN THE LATER SETS.

See Figures 49-A and 49-B.

b. Function of Dynamotor in Power Unit PE-103-A:—

The dynamotor output connections terminate at cable connector 3-K-1, and feeds the transmitter through Cord CD-501-A.

- (1) The positive terminal of 500-volts d. c. of the dynamotor is connected to pin No. 8 on cable connector 3-K-1 through:



(Sets with Serial Numbers 4711 and higher)

FIG. 23. POWER UNIT PE-103-A, SCHEMATIC DIAGRAM

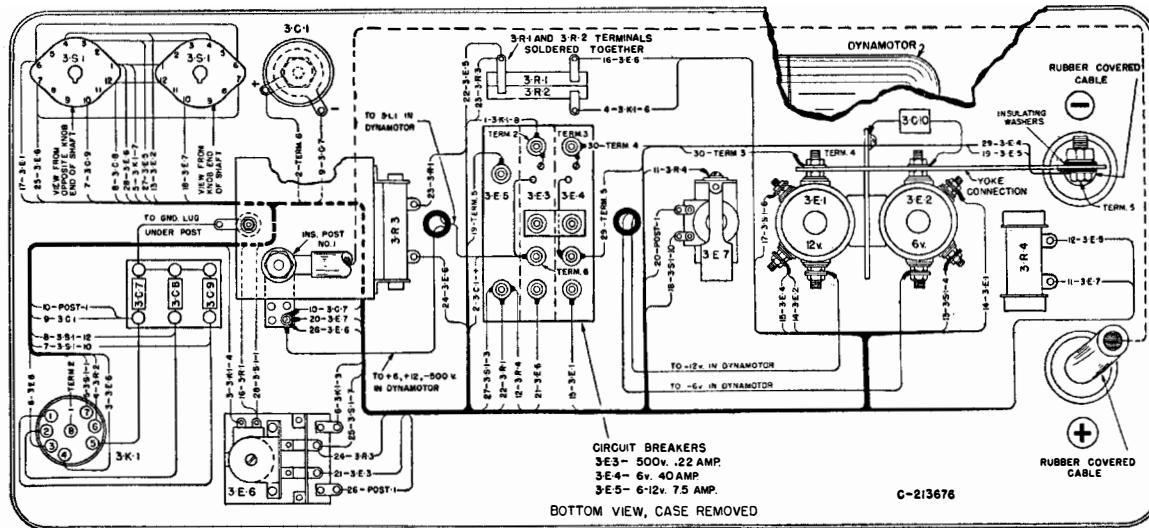


FIG. 24. POWER UNIT PE-103-A, CONNECTION DIAGRAM

(a) Air core choke (3-L-1), and overload circuit breaker (3-E-3), protect the transmitter plate supply. Circuit breaker 3-E-3 is set to trip between 220 and 250 milliamperes.

(b) The dynamotor is noise filtered in the high voltage circuit by capacitors:

(3-C-4), across the plus and minus of the 500-volt output supply.

(3-C-5), from the positive side of the 500 volt d-c output to ground.

(3-C-6), from the negative side of the 500 volt d-c output to ground.

(3-C-1) functions as a ripple filter and is connected from inductor 3-L-1 to reference point or A positive.

(c) The dynamotor is noise filtered in the low voltage circuit by capacitors:

(3-C-2), across the positive and negative of 6-volt input of generator.

(3-C-3), across the 12 volt input of generator.

(3-C-8), connected from pin No. 2 on cable connector 3-K-1, to ground.

(3-C-9), connected from pin No. 1 on cable connector 3-K-1, to ground.

(3-C-7), connected from pin No. 5 on cable connector 3-K-1, to ground.

(3-C-10), connected from negative input or battery, to ground.

(d) The remaining pins on output cable connector 3-K-1 connect as follows:

Pin No. 6, connects to resistor (3-R-2).

Pin No. 7, connects to resistor (3-R-1), relay (3-E-6), and switch (3-S-1C).

Switching in the transmitter places a short circuit across Pins No. 6 and No. 7 when the transmitter is operated at HIGH power.

Pin No. 4 connects to relay (3-E-6), also joining wire in Cable CD-501-A to a positive voltage, controlled by switching ON the transmitter, or by the push-to-talk button on the microphone when the transmitter is operated at VOICE. This voltage completes the circuit through relay (3-E-6).

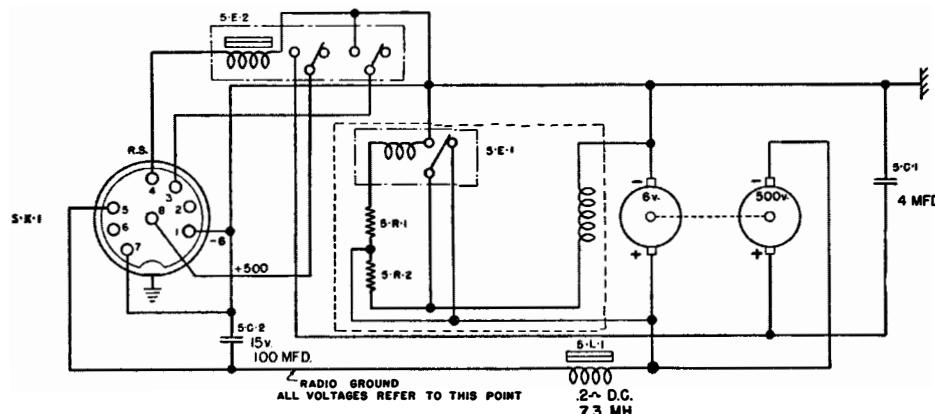


FIG. 25. GENERATOR GN-45-A, SCHEMATIC DIAGRAM

20. Generator GN-45-(*) (FIGS. 25 & 26)

Hand Generator GN-45-(*) furnishes power as follows:

6-volts for the transmitter filaments.

6-volt supply for Power Converter PE-104-A when necessary.

500-volts for plate supply in the transmitter.

a. Circuit:—

- (1) All voltages and control leads to the transmitter are through Cable Cord CD-501-A which terminates at cable connector 5-K-1 on the case of Generator GN-45-(*).
- (2) The negative side of the 6-volt supply terminates at Pin No. 1 on cable connector 5-K-1 and connects to the case ground, thereby grounding one side of the generator field.
- (3) The positive side of the 6-volt supply terminates at pin No. 5 on cable connector 5-K-1 and connects with the negative end of the 500-volt supply, the reference point for all voltage measurement.
- (4) In addition to voltage regulator (5-E-1) and double pole relay (5-E-2), a complete filter system for all voltages supplied is included in the case of Generator GN-45-(*).

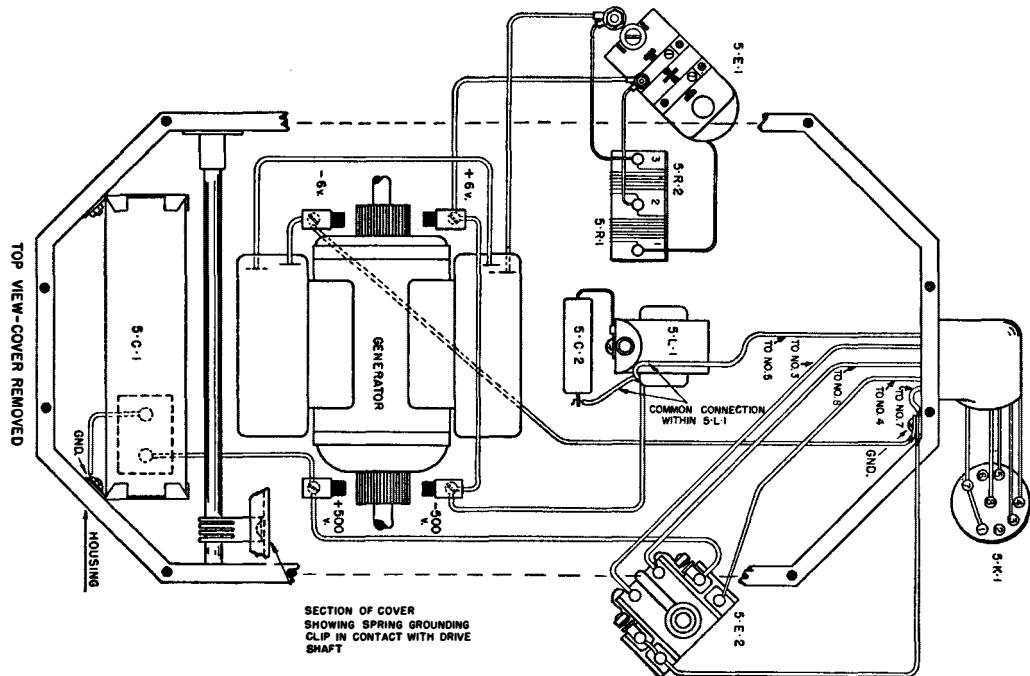
b. Circuit Analysis:—

- (1) When the generator is turned at the rate of 50

to 70 revolutions per minute, current starts to flow through the armature.

- (2) When the proper speed of the generator is reached, the double pole relay (5-E-2) closes. This action takes place between 4.8 and 5.0 volts, closing the positive 500-volt line and supply to the keying relay. The transmitter may then be put into operation in the usual manner.
- (3) Regulator (5-E-1) controls the output voltage, the limit being set at 6.2 volts. When voltage rises above 6.2 volts, the normally closed contact of Regulator (5-E-1) opens, connecting resistor 5-R-2 in series with the field winding. If the output voltage is still too high, regulator (5-E-1) closes and shorts the field winding. This voltage regulating action takes place at a vibrating rate like that of the voltage regulator in automotive electric systems.
- (4) Resistor (5-R-1) is used as a current limiting resistor for voltage regulator (5-E-1).
- (5) Capacitors (5-C-1 and 5-C-2), and iron core choke (5-L-1) comprise the filter network, smoothing the ripples or noise that may be caused by brushes or points of the regulator.

NOTE: OPERATION OF GENERATOR GN-45-B IS IDENTICAL TO THE GN-45-A, EXCEPT THAT RESISTOR 5-R-1 IS NOT USED. Refer to Fig. 50-A.



21. Remote Control Unit RM-29-(*)

Note: Refer to TM 11-308 for complete information of this unit.

a. Telephone:

- (1) With Switch SW-185 set at TELEPHONE, incoming speech from the remote telephone appears at L1 and L2 and is transferred to the headset plugged into Jack JK-34A through Transformer C-280 terminals 1-2.
- (2) Outgoing speech to the remote telephone is transferred to the line through terminals 3-4 of Transformer C-280. Current for the microphone plugged into Jack JK-33A is supplied by Battery BA-27.
- (3) The operation of Ringer MC-131 and Generator GN-38 is conventional.

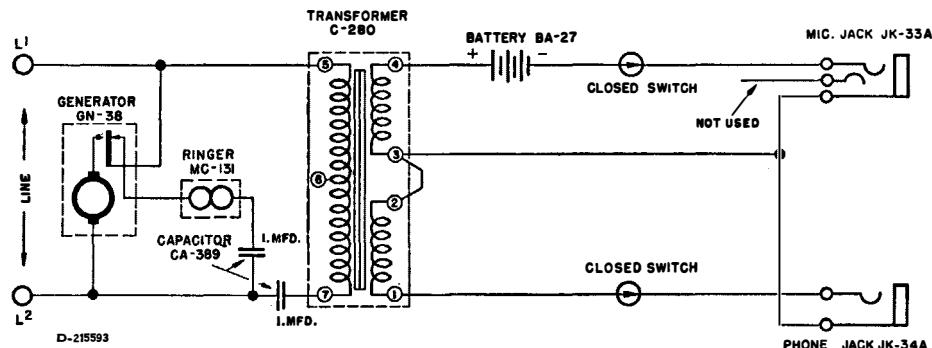


FIG. 27. REMOTE CONTROL RM-29-(*), TELEPHONE POSITION

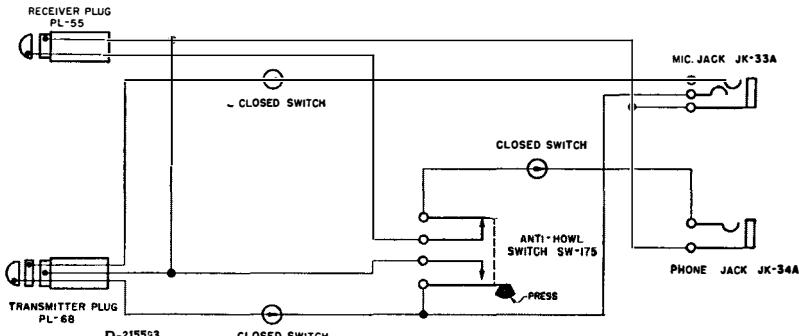


FIG. 28. REMOTE CONTROL RM-29-(*), RADIO POSITION

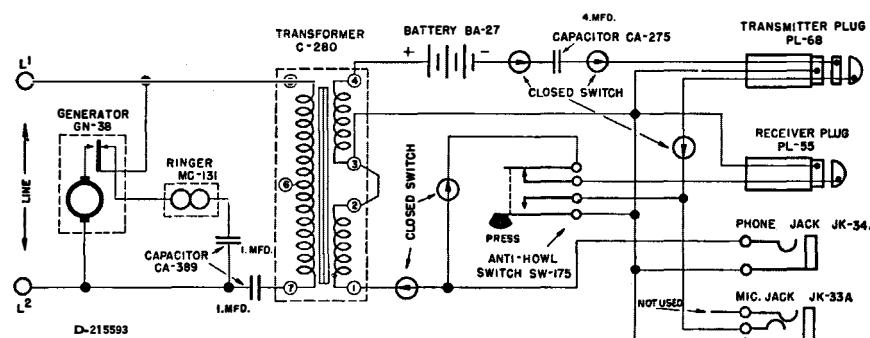


FIG. 29. REMOTE CONTROL RM-29-(*), THROUGH POSITION

b. Radio:

- (1) With Switch SW-185 set at RADIO, RM-29-(*) becomes in effect merely an extension of the microphone and headset circuits. However, ANTI-HOWL Switch SW-175 may be used instead of the microphone PRESS-TO-TALK switch to start the transmitter.

c. Through:

- (1) With Switch SW-185 set at THROUGH, incoming speech from the remote telephone is transferred to the microphone input of SCR-284-A through Transformer C-280 terminals 3-4 and Plug PL-68. Capacitor CA-275 serves as a blocking capacitor for Battery BA-27 and the microphone supply circuit in SCR-284-A. Microphone current is supplied by a battery in the remote telephone. The radio operator moni-

tors transmission in his headset plugged into Jack JK-34A which is connected to Transformer C-280 terminals 1-2. Pressing the ANTI-HOWL switch closes the transmitter control circuit (tip and sleeve of PL-68) and also opens the circuit from the receiver to terminals 1-2 of Transformer C-280. This prevents any receiver signal being coupled into the microphone

circuit through the two secondaries which might cause feed-back and howl.

- (2) When receiving, the ANTI-HOWL switch is released, and the receiver output is transferred to the remote telephone line through terminals 1-2 of Transformer C-280. The radio operator's headset is also connected to the RM-29-(*) for monitoring purposes.

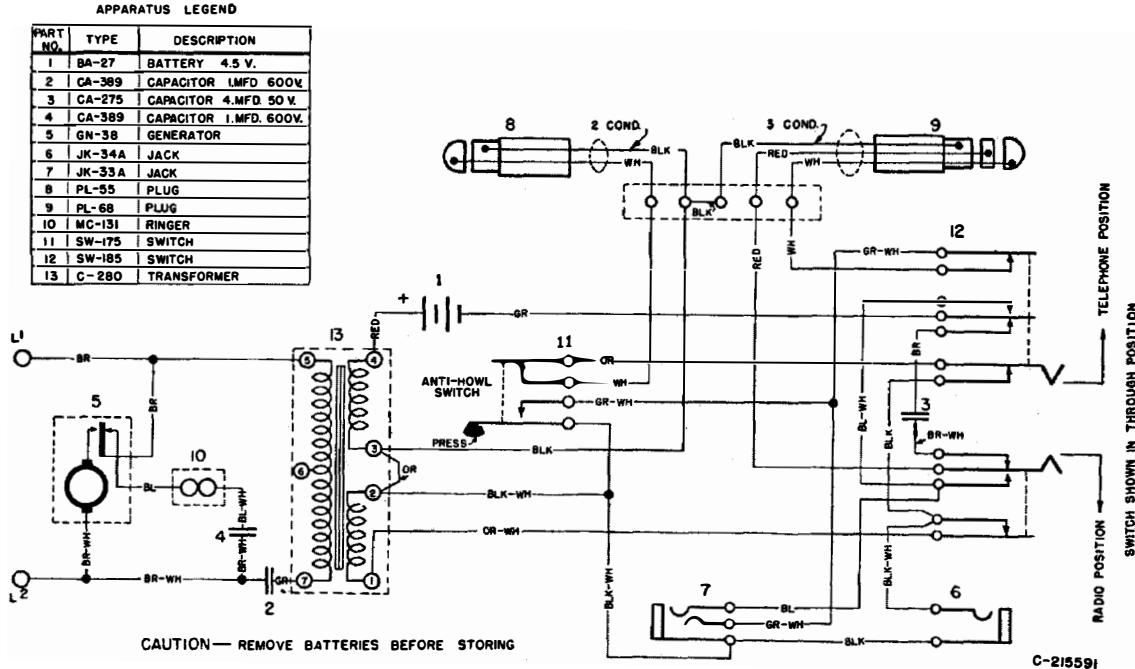


FIG. 30. REMOTE CONTROL RM-29-(*), SCHEMATIC DIAGRAM

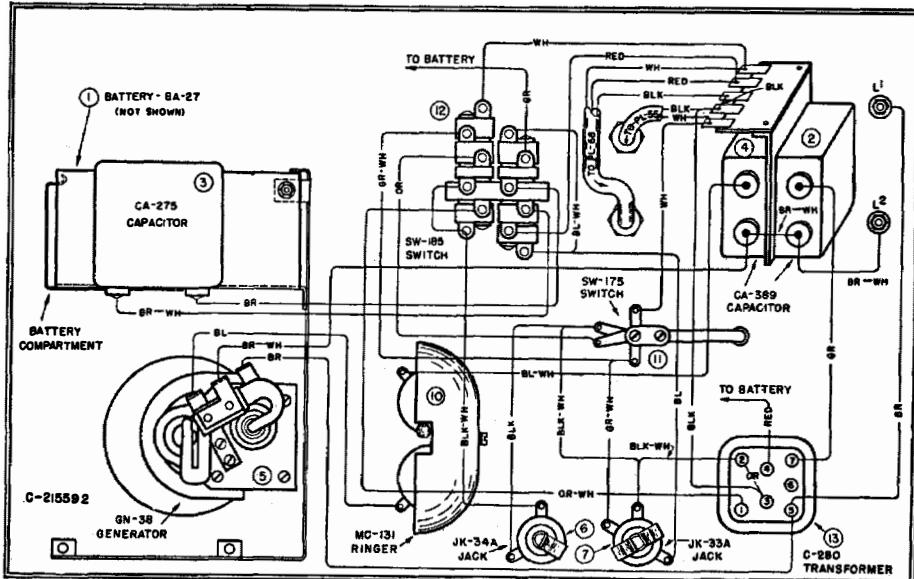


FIG. 31. REMOTE CONTROL RM-29-(*), CONNECTION DIAGRAM

SECTION IV. MAINTENANCE

NOTE: FAILURE OR UNSATISFACTORY PERFORMANCE OF EQUIPMENT USED BY ARMY GROUND FORCES AND ARMY SERVICE FORCES WILL BE REPORTED ON W. D., A. G. O. FORM No. 468 (UNSATISFACTORY EQUIPMENT REPORT); BY ARMY AIR FORCES, ON ARMY AIR FORCES FORM No. 54 (UNSATISFACTORY REPORT). IF EITHER FORM IS NOT AVAILABLE, PREPARE THE DATA ACCORDING TO THE SAMPLE FORM REPRODUCED IN FIGURE 35.1.

CAUTION: REPAIR OR ADJUSTMENT OF RADIO SET SCR-284-A MUST NOT BE ATTEMPTED EXCEPT BY THOROUGHLY TRAINED PERSONNEL, ADEQUATELY EQUIPPED.

22. Noise Suppression

Ignition noise, generator hash and similar types of interferences may be encountered in certain vehicular installations. This type of interference may be greatly reduced by certain alterations or additions to the vehicle in which the equipment is installed.

In a vehicle not equipped with a suppression system, the following expedients will reduce interference:

- (1) Connect a $.01 \mu\text{f}$ capacitor from the field terminal of the voltage regulator to ground.
- (2) Connect a $.1 \mu\text{f}$ capacitor from the armature terminal of the voltage regulator to ground.
- (3) Connect a $.1 \mu\text{f}$ capacitor from the generator terminal of the voltage regulator to ground.
- (4) Connect a $.1 \mu\text{f}$ capacitor from the vehicle generator output terminal to ground.
- (5) Connect a capacitor from each of the two bottom terminals on the gas gauge to the top center terminal of the same. These capacitors should be $.001 \mu\text{f}$ to $.003 \mu\text{f}$ each.
- (6) Bond the engine to firewall with a 6-inch length of heavy copper braid connected between the right rear engine-head bolt and the firewall.

- (7) Install suppressors on spark plugs and distributor.

NOTE: A GOOD MECHANICAL MOUNTING SHOULD BE PROVIDED FOR ALL CAPACITORS. THESE CAPACITORS SHOULD BE SO LOCATED THAT THEY WILL ALLOW THE CONNECTING LEADS TO BE AS SHORT AS POSSIBLE.

23. Inspection

a. Radio Receiver and Transmitter BC-654-A:—

- Defective latches or hinges on case.
- Defective leg-support eyelets and snaps.
- Damaged receptacle for Cord CD-501-A.
- Damaged binding posts for ANTENNA and GROUND.
- Broken meter window.
- Damaged or sticking controls.
- Burned out dial lights.
- Broken radio tubes.
- Dirty contact wheel on antenna tuning coil.

b. Power Unit PE-103-A:—

- Damaged receptacle for Cord CD-501-A.
- Damaged battery leads.
- Screws lost from end covers.
- Worn brushes or dirty commutator.
- Broken leads on filter capacitors inside the dynamotor of Power Unit PE-103-A.
- Broken leads inside base of Power Unit PE-103-A.
- Operation of circuit breakers.
- Operation of 6/12-volt switch.

c. Frame FM-41-A:—

- Damaged battery case.
- Broken or damaged straps.
- Worn or damaged bumpers on the mount for the receiver-transmitter unit.
- Missing or damaged rubber bumpers.
- Missing or damaged wing nuts and bolts for fastening Power Unit PE-103-A to the frame.

d. Battery BA-43:—

- Dented case.
- Damaged receptacle.
- Damaged or broken strap on case.

e. Power Converter PE-104-A:—

Damaged receptacle.
Damaged case.
Damaged or broken handle on case.
Damage to 6/12-volt selector shaft.

f. Antenna:—

Cracked insulator on mast base.
Cracked ferrules on antenna mast sections.
Damaged male and female end members of mast sections.
Broken or bent mast sections.

24. Disassembly of Radio Receiver and Transmitter BC-654-A for Servicing

a. Removal of Radio Receiver and Transmitter BC-654-A from case:—

- (1) Unclasp the hinges at the top of the case and swing the door out and down to the operating position.

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- (2) Release the cover supports by pushing the slide fasteners up as far as possible and slipping the cover supports loose.
- (3) Remove the cover by swinging it down and pulling it straight forward.
- (4) To remove the receiver-transmitter assembly from the case, loosen the six knurled thumbscrews on the outside edges of the front panels. It will be necessary to turn these thumbscrews to the left until they strike the stop mechanism.
- (5) Grasp the assembly by the handles on the front of the transmitter and pull it clear of the case.

b. Tilting the Receiver to give access to Transmitter:—

CAUTION: BEFORE TILTING THE RECEIVER SHELF FORWARD, REMOVE ANTEENA CONNECTOR PLUG FROM RECEPTACLE ON THE KEYING RELAY SHELF. THE RECEIVER AND POWER CONVERTER PE-104-A (OR BATTERY BA-43) ARE MOUNTED ON A SHELF. THE BOTTOM EDGE OF THE RECEIVER PANEL IS TILTED FORWARD OR OUTWARD TO PERMIT SERVICING THE TRANSMITTER WITH A MINIMUM OF DISASSEMBLY.

c. Removal of Receiver and Power Supply Shelf from Transmitter:—

If the receiver still interferes with servicing the transmitter, the entire shelf assembly may be lifted free and placed to one side **WITHOUT REMOVING ANY ELECTRICAL CONNECTIONS**.

- (1) Disconnect the lever arm of the shelf by unhooking the latch on the transmitter chassis.
- (2) Remove one end of the bonding strap between the ground binding post and the shelf.
- (3) Slide the shelf to the left to disengage the hinges.
- (4) Place the shelf assembly on the work-bench to the right of the transmitter.

d. Removal of Receiver from Shelf:—

CAUTION: LOOSEN THE END SCREW ON THE RECEIVER TERMINAL STRIP AND REMOVE THE ANTENNA CONNECTOR TERMINAL (SPADE LUG).

- (1) Loosen the wiring harness (cable) from the two bolts which hold it to the side of the power supply compartment.
- (2) Remove one screw from the left side of the receiver chassis and two from the right. The two screws at the right enter from underneath and engage two elastic stop-nuts which are spotted to a flange of the chassis.
- (3) Now, remove the receiver from the shelf without further disconnecting it electrically.

25. Removal and Assembly of Parts

a. Receiver Tubes:—

To remove tubes from the receiver press the tube clamp down (if one is used) away from the base of

the tube and remove the tube from the socket by tilting it back and forth and lifting upward at the same time.

b. Transmitter Tubes:—

To remove any tube from the transmitter (except the three large power amplifier Tubes VT-225), hold the clamp (if one is used) away from the base of the tube and loosen the tube by tilting it back and forth and lifting upward at the same time.

IMPORTANT: To remove any of the three large power amplifier Tubes VT-225, from the transmitter: first, loosen the screw-clamp from the base of the tube, and grasp the tube firmly lifting it straight upward. Do not twist or move the tube back and forth to loosen it from its socket. It is possible to change nearly all tubes and both dial lamps in the transmitter without removing the receiver and shelf from the transmitter panel. (Paragraph 24-d for instructions for removing the receiver from its shelf.)

c. Pilot Lamps:—

To aid in replacing pilot lights, a special tool has been provided which consists of a piece of bakelite tubing with a piece of rubber tubing slipped over one end. When not in use this tool is held in a pair of clips mounted on the side of the power-supply compartment. To reach the pilot light behind the tuning dial of the transmitter the wiring harness must be pushed back away from the front panel.

d. Replacing Battery:—

- (1) Turn transmitter MAIN SWITCH to OFF.
- (2) Turn the knurled nut on outside edge of the power supply compartment door to the left until it strikes the stop mechanism, and open the door.
- (3) Pull out the plug attached to cable harness, press down on spring clamp which holds the battery in place, and remove battery from compartment.
- (4) Remove protective cover from receptacle of new Battery BA-43, and slide battery into the power-supply compartment.
- (5) Insert battery plug in battery receptacle, close the door and tighten the knurled locking nut.

26. Receiver Tubes

a. The following charts list Tube Voltages:—

- (1) The following listed readings were obtained by using a 1000-ohm per volt direct current voltmeter.

All voltages are measured from the socket contacts to the positive filament pin. The pin numbers start at key and run clockwise, when sockets are viewed from under side of chassis.

NOTE: THERE MAY BE VARIATIONS OF APPROXIMATELY 15% BETWEEN DIFFERENT SETS.

TABLE OF TUBE SOCKET VOLTAGES

R. F. AMPLIFIER TUBE VT-146, (2-V-1)

Pin No.	Voice Position		CW Position	
	Maximum Volume Control	Minimum Volume Control	Maximum Volume Control	Minimum Volume Control
1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 51	+ 51	+ 51.6	+ 61.6
4	+ 55.3	+ 54.3	+ 56	+ 63
5	No Connection			
6	No Connection			
7	— 1.29	— 1.28	— 1.28	— 1.28
8	— 1.29	— 1.28	— 1.28	— 1.28

OSCILLATOR AND CONVERTER TUBE VT-147, (2-V-2)

1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 68	+ 68	+ 68	+ 68
4	+ 33	+ 32	+ 33	+ 33
5				
6	+ 65	+ 65	+ 65	+ 65
7	— 1.28	— 1.28	— 1.28	— 1.28
8	No Connection			

1st I. F. AMPLIFIER TUBE VT-146, (2-V-3)

1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 40	+ 40	+ 42	+ 48
4	+ 40	+ 40	+ 42	+ 48
5	0	0	0	0
6	No Connection			
7	— 1.28	— 1.28	— 1.28	— 1.28
8	No Connection			

2nd I. F. AMPLIFIER TUBE VT-146, (2-V-4)

1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 37	+ 37	+ 37	+ 39
4	+ 38	+ 37	+ 38	+ 39
5	No Connection			
6	No Connection			
7	— 1.28	— 1.28	— 1.28	— 1.28
8	No Connection			

2nd DETECTOR AND 1st AUDIO AMPLIFIER TUBE VT-223, (2-V-5)

1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 27	+ 27	+ 27	+ 27
4	No Connection			
5	— .18	— .18	— .18	— .18
6	No Connection			
7	— 1.29	— 1.29	— 1.29	— 1.29
8	+ 45	+ 45	+ 13	+ 13

AUDIO OUTPUT TUBE VT-221, (2-V-6)

Pin No.	Voice Position		CW Position	
	Maximum Volume Control	Minimum Volume Control	Maximum Volume Control	Minimum Volume Control
1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 70	+ 66	+ 69	+ 65
4	+ 65	+ 65	+ 67	+ 65
5				
6	+ 73	+ 70	+ 73	+ 72
7	0	0	0	0
8	— 1.28	— 1.28	— 1.28	— 1.28

BEAT FREQUENCY OSCILLATOR TUBE VT-221, (2-V-7)

1	Chassis	Chassis	Chassis	Chassis
2	0	0	0	0
3	+ 42	+ 40	+ 10	+ 10
4	+ 42	+ 40	+ 10	+ 10
5				
6	No Connection			
7	0	0	0	0
8	0	0	— 1.28	— 1.28

(2) Readings listed below obtained using RCA Volt-Ohmyst Jr.—Vacuum tube voltmeter.

R. F. AMPLIFIER TUBE VT-146, (2-V-1)

Grid Cap	— 2.1	— 1.98	— 1.99	— 3.4
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OSCILLATOR AND CONVERTER TUBE VT-147, (2-V-2)

5	— 6	— 6	— 5.6	— 5.7
Grid Cap	— 2.8	— 2.7	— 3.3	— 3.35

1st I. F. AMPLIFIER TUBE VT-146, (2-V-3)

Grid Cap	— 1.67	— 1.61	— 1.56	— 1.95
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2nd I. F. AMPLIFIER TUBE VT-146, (2-V-4)

Grid Cap	— 1.26	— 1.26	— 1.2	— 1.2
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2nd DETECTOR AND 1st AUDIO AMPLIFIER TUBE VT-223, (2-V-5)

3	+ 56	+ 55	+ 55	+ 55
8	+ 71.3	+ 70	+ 19.6	+ 18.6
Grid Cap	— 1.23	— 1.31	— 1.14	— 1.17

AUDIO OUTPUT TUBE VT-221, (2-V-6)

5	— 5.8	— 4.3	— 5.96	— 4.3
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B. F. OSCILLATOR TUBE VT-221, (2-V-7)

3	+ 72.6	+ 68.6	+ 19.3	+ 18.8
4	+ 72.6	+ 68.6	+ 19.3	+ 18.8
5	— 1.18	— 1.18	— 2.68	— 2.58

27. Transmitter Tubes

a. The following charts list Tube Voltages:—

All voltages are measured from the tube socket

lugs to the +6 volt filament lug, using a 1000 ohms per volt voltmeter. Variations of approximately 15% are to be expected between different sets.

TABLE OF TUBE SOCKET VOLTAGES
MASTER OSCILLATOR TUBE VT-221, (1-V-1)

Pin No.	Voice Position		Crystal Sw. OUT	CW Position		Crystal Sw. OUT	Note Below
	LOW	HIGH		LOW	HIGH		
1		No Connection					
2	— 3.7	— 3.6	— 3.6	— 3.7	— 3.6	— 3.7	1
3							1
4							1
5							1
6		No Connection					
7	— 3.7	— 3.6	— 3.6	— 3.7	— 3.6	— 3.7	
8	— 2.4	— 2.5	— 2.36	— 2.43	± 2.37	— 2.4	

INTERMEDIATE POWER AMPLIFIER TUBE VT-221, (1-V-2)

1		No Connection					
2	— 3.7	— 3.66	— 3.7	— 3.7	— 3.7	— 3.7	
3							1
4	94	91.6	102	94	92	102	
5							1
6		No pin on tube					
7	— 3.7	— 4.16	— 4.23	— 3.73	— 4.16	— 4.23	
8	— 5.1	— 4.9	— 5.1	— 5.1	— 4.9	— 5.1	

FINAL POWER AMPLIFIER TUBE VT-225, (1-V-3)

Fila. +	— 5.1	0	0	— 5.1	0	0	2
Screen	245	275	0	220	210	0	
Grid							1
Suppr.	— 48.6	— 47.6	— 52	0	0	0	
Fila.—	— 5.13	— 5	— 5.13	— 5.13	— 5	— 5.13	
Plate							1

FINAL POWER AMPLIFIER TUBE VT-225, (1-V-4)

Fila. +	0	0	0	0	0	0	
Screen	245	275	0	220	210	0	
Grid							1
Suppr.	— 48.6	— 47.6	— 52	0	0	0	
Fila.—	— 5.13	— 5	— 5.1	— 5.13	— 5	— 5.13	
Plate							1

AUDIO AMPLIFIER AND MODULATOR VT-221, (1-V-5)

1		No Connection					
2	0	0	0	0	0	0	
3							1
4	78.3	75	80	0	0	0	
5							1
6		No Connection					
7	0	0	0	0	0	0	
8	— 1.28	— 1.28	— 1.28	— 1.28	— 1.28	— 1.28	

CRYSTAL OSCILLATOR TUBE VT-221, (1-V-6)

1		No Connection					
2		No Connection					
3							1
4							1
5							1
6		No Connection					
7							
8	— 1.28	— 1.28	— 1.28	— 1.28	— 1.28	— 1.28	

(1) This voltage measurement is impractical taken at socket terminal.

(2) —6 volts for STANDBY switch on LOW position and 0 volts on HIGH position.

See table of plate and grid voltages, Page 40.

TRANSMITTER GRID AND PLATE VOLTAGES MEASURED WITH DC VOLTMETER 1000-ohm per volt

Socket	Function	Term No.	Voice Pision			CW Position			Where Measured
			LOW	HIGH	CRYSTAL SW. OUT	LOW	HIGH	CRYSTAL SW. OUT	
1-V-1	Master Oscillator	3 and 4	89	85	90	89	86	96	Center-tap of Coil 1-L-1
		5	0	0	0	0	0	0	Junction of 1-R-1 and 1-R-35
1-V-2	I. P. A.	3	115	106	119	116	110	121	Junction of 1-L-3 and 1-R-20
		5	— 6	— 7.5	— 8.7	— 6	— 7.5	— 8.7	Junction of 1-R-14 and 1-R-16
1-V-3 and 1-V-4	P. A.	Plate	512	482	556	505	504	561	Junction of 1-L-6 and 1-C-43
		3	— 41	— 49	— 53	— 41	— 46	— 53	Junction of 1-L-5 and 1-R-14
1-V-5	Modulator	3	91	86	96	0	0	0	Junction of 1-R-5 and 1-R-24
		5	0	0	0	0	0	0	Junction of 1-R-2 and 1-R-28
1-V-6	CRYSTAL Oscillator	3 and 4	70	70	66	73	74	70	Junction of 1-L-2 and 1-C-22
		5	Measurement Impractical with this type voltmeter						

**IMPORTANT VOLTAGES MEASURED ON GRID TERMINAL USING RCA "VOLT-OHMYST,"
ALL VOLTAGES REFERRED TO +6 VOLT FILAMENT LEAD**

1-V-1	Mast. Osc.	5	— 17.8	— 16.7	— 19	— 17.7	— 16.6	— 19	On Grid Terminal
1-V-2	I. P. A.	5	— 22	— 26	— 26	— 22	— 22	— 26	"
1-V-3 and 1-V-4	P. A.	3	— 48	— 52	— 61	— 46	— 52	— 62	"
1-V-5	Modulator	5	— 5	— 4.7	— 4.9	— 5	— 4.8	— 4.9	"
1-V-6	CRYSTAL Oscillator	5	— 1.17	— 1.1	— 12.25	— 1.12	— 1.12	— 12.28	"

TRANSMITTER continuity data referred from A+ Radio ground, on pin No. 1 of Plug 1-K-2 (Battery or BA-43 Power Converter PE-104-A Plug) to other pins in 1-K-2. Switches 1-S-5 and 1-S-6 are closed. 1-S-2 open, Key 7-A-2, Microphone 7-A-1 and Cord CD-501-A are disconnected. Power Converter PE-104 and Battery BA-43 are also disconnected. Volume control in full on position. Readings were taken with a Triplet Model No. 1183-SC, combination tester of Test Set I-56-C. Connect ohmmeter common lead to pin No. 1 of plug 1-K-2.

1-K-2 Pin No.	Control Positions		Resistance	Probable cause of incorrect reading
	Main SW	Standby SW		
1			Reference Point	
2	All	All	500 ohms	Open resistor 2-R-24, shorted capacitor 2-C-42, shorted resistor 2-R-21
3	All	All	Infinite	Shorted switch 1-S-5, defective plugs 1-K-2, 1-K-3
4	CW	All	1.45 ohms	Defective switch 1-S-1-D, 1-S-1-A, 1-S-7-B, open receiver tube filament
	VOICE	All	1.65 ohms	Defective switch 1-S-1-D, 1-S-1-A, 1-S-7-B, open receiver tube filament
	OFF	All	Infinite	Defective switch 1-S-1-D, or 1-S-7-B
5	All	All	Infinite	Shorted by-pass capacitor
6	All	All	Infinite	Defective plugs 1-K-2, 1-K-3, shorted switch 1-S-5
7	All	All	500 ohms	Open resistor 2-R-24, shorted capacitor 2-C-42, shorted resistor 2-R-21
8	CW-VOICE	All	50,000 ohms	Open resistors 1-R-13, 1-R-14, 1-R-16, switch 1-S-1-J shorted to chassis
	OFF	All	Infinite	Faulty switch 1-S-1-J

RECEIVER continuity data referred from A+ Radio ground No. 10 pin on terminal board 2-K-1, to other terminals on board 2-K-1. Volume control in full on position. No connection to 1-K-2 or 1-K-3. Key 7-A-2 and microphone 7-A-1 are disconnected. All readings are approximations. Measurements are made with unit removed from case, switches 1-S-5 and 1-S-6 are closed. Readings were taken with a Triplett Model No. 1183-SC combination tester of Test Set I-56-C. Connect ohmmeter common leads to common return (A+), which is No. 10 on 2-K-1. Readings marked (*) are subject to wide variation depending on the type of meter used. AVC switch, if any, is on at voice position.

Term. No.	Control Positions		Resistance	Probable cause of incorrect reading
	Main SW	Standby SW		
1	CW-Voice	All	Less than 100 ohms	Faulty control 2-R-21
2	CW Voice	All All	Less than 100 ohms More than 1.0 meg.	Faulty control 2-R-21 Faulty resistors 2-R-12, 2-R-19, or control 2-R-20, capacitor 2-C-47
3	CW Voice	All All	1.6-2.2 meg. More than 1.0 meg.	Resistor 2-R-12, 2-R-19, control 2-R-20, capacitor 2-C-47 and 2-C-35 Resistor 2-R-12, 2-R-19, control 2-R-20, capacitor 2-C-47
4	CW Voice	All All	1.4 ohms 10.0 ohms	Faulty switch 1-S-1-A or shorted tube filament Open filament on 2-V-7
5	CW-Voice CW-Voice	Low High	4.0 ohms 3.50 ohms	Shorted switch 2-S-2, faulty switch 1-S-3-G Open pilot 1-A-2 and 1-A-3, faulty switch 1-S-3-G, shorted switch 2-S-2
6	CW-Voice CW-Voice CW-Voice	Low High Off	1200 ohms 1200 ohms *More than 50000	Faulty resistor 1-R-10, filament shorted to chassis Faulty resistor 1-R-10, filament shorted to chassis Faulty capacitors 2-C-44, 2-C-43, or switch 1-S-1
7	All po sitions		Infinite	Shorted by-pass capacitor
8	Voice CW Off	All All Off	100 ohms More than 1.0 meg. Infinite	Open resistors 1-R-18 or 1-R-19 Faulty control 2-R-20, 2-R-12, 2-R-19, switch 1-S-1-C Shorted switch 1-S-1-C
9	All Po sitions		500 ohms	Open resistor 2-R-24, shorted capacitor 2-C-42, shorted resistor 2-R-21
10	Referen ce Point			
11	CW Phone	All All	1.4 ohms 1.5 ohms	Shorted receiver tube socket Shorted receiver tube socket
12	CW-Voice CW	Off Low-High	*More than 50000 ohms 1200 ohms	Faulty capacitors 2-C-44, 2-C-43 or switch 1-S-1 Faulty resistor 1-R-10, open 2-L-1 primary

POWER UNIT PE-103-A continuity data referred from A+, pin No. 5 on socket 3-K-1, to other pins on 3-K-1. Circuit breakers 3-E-3, 3-E-4, 3-E-5, are closed. Relays 3-E-6, 3-E-1, 3-E-2, 3-E-7 are open.

(a) On PE-103-A units with serial numbers below 4711, these resistance values are 290 ohms.

3-K-1 Pin No.	SW-3-S-1 on 6-V Position	Probable cause of incorrect reading	Term. No.	SW-3-S-1 on 12-V Position	Probable cause of incorrect reading
1	350 ohms	Open relay coil 3-E-7	1	Infinite	Shorted switch 3-S-1-B
2	Infinite	Shorted switch 3-S-1-B	2	Infinite	Shorted switch 3-S-1-E
3	Infinite	Shorted relay 3-E-6	3	Infinite	Shorted relay 3-E-6
4	625 ohms	Open relay coil 3-E-6, 3-E-7	4	Infinite	Shorted relay 3-E-7, SW 3-S-1-E, 3-S-1-C
5		Reference Point	5		Reference Point
6	350 ohms	Open resistor 3-R-2, relay coil 3-E-7	6	Infinite	Shorted relay 3-E-7, SW 3-S-1-E, 3-S-1-C
7	3.50 ohms	Open relay coil 3-E-7	7	Infinite	Shorted relay 3-E-7, SW 3-S-1-E, 3-S-1-C
8	300 ohms (a)	Open circuit breaker coil 3-E-3, choke coil 3-L-1, shorted capacitor 3-C-11, 3-C-4, 3-C-1, defective brushes on 500 V armature	8	300 ohms	Open circuit breaker coil 3-E-3, choke coil 3-L-1, shorted capacitor 3-C-11, 3-C-4, 3-C-1, defective brushes on 500 V armature

POWER CONVERTER PE-104-A continuity data referred to +6, +1.4, lug No. 1 of 4-K-1 as common return. Test is made between the common point and other points on socket 4-K-1. Readings were taken with a Triplett Model No. 1183-SC combination tester of Test Set I-56-C. Connect ohmmeter common lead to lug No. 1 of 4-K-1. Readings marked with (*) are subject to wide variation, depending on the type of meter used.

Term. No.	Term. Label	6-V Position Resistance Value	Probable cause of incorrect reading	Term. No.	Term. Label	12-V Position Resistance Value	Probable cause of incorrect reading
1	+6 +1.4	Reference Point		1	+6 +1.4	Reference Point	
2		No connection		2		No connection	
3	-6	35 ohms	Def. chokes 4-L-2, 4-L-7, Trans. 4-T-1, SW 4-S-1, Vibrator 4-A-2	3	-6	900 ohms	Def. chokes 4-L-2, 4-L-7, Trans. 4-T-1, SW 4-S-1, Vibrator 4-A-2, Resistor 4-R-3 and 4-R-1
4	-1.4	70 ohms	Def. rectifier 4-A-1, Chokes 4-L-8, 4-L-2	4	-1.4	70 ohms	Def. rectifier 4-A-1, Chokes 4-L-8, 4-L-2
5	+84	*50000 ohms or over	Shorted capacitors 4-C-14, 4-C-18, 4-C-19	5	+84	*50000 ohms or over	Def. capacitors 4-C-14, 4-C-18, 4-C-19
6	-12	850 ohms	Def. Res. 4-R-3, Chokes 4-L-2, 4-L-7, Trans-4-T-1, SW 4-S-1, Vibr. 4-A-2.	6	-12	95 ohms	Def. Chokes 4-L-2, 4-L-7, Resistor 4-R-1
7	-6	35 ohms	Def. Chokes 4-L-2, 4-L-7, Trans. 4-T-1, SW 4-S-1, Vibrator 4-A-2.	7	-6	900 ohms	Def. Chokes 4-L-2, 4-L-7, Res. 4-R-3, 4-R-1, Trans. 4-T-1, SW 4-S-1, Vibrator 4-A-2.
8	-51	*200000 ohms or over	Def. Capacitors 4-C-13, 4-C-16, 4-C-17	8	-51	*200000 ohms or over	Def. Capacitors 4-C-13, 4-C-16, 4-C-17

TRANSMITTER continuity data referred from A+ on connector 1-K-3, pin No. 5, to other pins on connector 1-K-3. Switch 1-S-2 open, 1-S-5 and 1-S-6 closed. Key 7-A-2 and microphone 7-A-1 are disconnected. Power Converter PE-104 and Battery BA-43 are also disconnected. Readings taken with a Triplett combination tester No. 1183-SC, Test Set I-56-C. Connect the ohmmeter common leads to pin No. 5 of connector 1-K-3. Readings marked with (*) are subject to wide variation depending on the type of meter used.

1-K-3 Pin No.	Control Positions		Resistance	Probable cause of incorrect reading
	Main SW	Standby SW		
1	All Positions		Infinite	Faulty switch 1-S-5
2	All Positions		Infinite	Faulty switch 1-S-5
3	Voice	Off	*50,000 ohms or over	Faulty capacitor 2-C-43, 2-C-44, switch 1-S-3-D, 1-S-3-E
	Voice	Low-High	.12 ohms	Faulty coil on relay 1-E-1, shorted resistor 1-R-37
	CW-Off	All	Infinite	Faulty 1-S-1-M, jack 1-J-1, capacitor 1-C-49
4	CW	Low-High	.2 ohms	Faulty switches 1-S-1-G, 1-S-3-D
	CW	Off	*50,000 ohms or over	Faulty capacitor 2-C-43, 2-C-44, switch 1-S-3-D, 1-S-3-E
	Off	Off	Infinite	Shorted jack 1-J-2, shorted switch 1-S-2-D, 1-S-1-G
5			Reference Point	
6	CW-Voice	High	.8 ohms	Open filament, transmitter tube
	All	Low-Off	Infinite	Shorted 1-S-3-F switch
7	CW-Voice	Off	*50,000 ohms or over	Faulty capacitors 2-C-43, 2-C-44
	CW-Voice	Low	1.4 ohms	Open transmitter tube filament, faulty 1-S-3-D
	CW-Voice	High	.75 ohms	Open transmitter tube filament, faulty 1-S-3-D, or 1-S-3-E
8 + 500 v	CW	Low-High	55,000 ohms	Open resistors 1-R-21, 1-R-6, 1-R-4, 1-R-12, 1-R-17
	CW	Off	*65,000 ohms or over	Open resistors 1-R-21, 1-R-6, 1-R-4, 1-R-12, 1-R-17 Shorted capacitors 2-C-43, 2-C-44
	Voice	Low-High	40,000 ohms	Open resistors 1-R-21, 1-R-6, 1-R-4, 1-R-12, 1-R-17, 1-R-24, 1-R-5, 1-R-3
	Voice	Off	*65,000 ohms or over	Open resistors 1-R-21, 1-R-6, 1-R-4, 1-R-12, 1-R-17, 1-R-24, 1-R-5, 1-R-3, shorted 2-C-43, 2-C-44

RECEIVER**TABLE OF INDUCTANCE OF COIL IN SHIELD AND THEIR Q**

Circuit Symbol	Function	Inductance in Shield	Q in Shield
2-L-1	Antenna Coil Assembly Primary	45.1 μ h at 1.5 and 3 mc	36 at 3 mc
2-L-1	Antenna Coil Assembly Secondary	7.46 μ h at 3 and 6 mc	151 at 6 mc
2-L-2	R. F. Coil Assembly	7.54 μ h at 3 and 6 mc	159 at 6 mc
2-L-3	Oscillator Coil Assembly	14.6 μ h at 2 and 4 mc	142 at 6 mc
2-L-4	1st I. F. Transformer Primary	330 μ h at 455 kc	76 at 455 kc
2-L-5	1st I. F. Transformer Secondary	330 μ h at 455 kc	76 at 455 kc
2-L-6	2nd I. F. Transformer Primary	330 μ h at 455 kc	76 at 455 kc
2-L-7	2nd I. F. Transformer Secondary	330 μ h at 455 kc	76 at 455 kc
2-L-8	Beat Frequency Oscillator	330 μ h at 455 kc	76 at 455 kc
2-L-9	3rd I. F. Transformer Primary	330 μ h at 455 kc	65 at 455 kc
2-L-10	3rd I. F. Transformer Secondary	330 μ h at 455 kc	76 at 455 kc

All of the above measurements include 1½" lead lengths.

2-T-1	Audio Transformer	Terminal No. 1 Plate No. 2 Phones Rp 1110 ohms $\pm 5\%$ No. 3 B Rs 366 ohms $\pm 5\%$ No. 4 Ground
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INPUTS AT DIFFERENT STAGES FOR A STANDARD OUTPUT OF 10 MV.

Measurements made on VOICE position at 400 c. p. s. and 30% Modulation.

Antenna:	4-5 microvolts for 10/1 signal to noise ratio.
Converter Grid	60-100 microvolts with volume control in maximum position.
1st I. F.	400-500 microvolts with volume control in maximum position.
2nd I. F.	9000-11000 microvolts with volume control in maximum position.

TRANSMITTER**TABLE OF INDUCTANCE OF COIL IN SHIELD**

Measurements made using a Boonton Q Meter, Model 160-A

Circuit Symbol	Function	Inductance in Shield
1-L-1	Oscillator Tank Coil	16 microhenries
1-L-2	Crystal Oscillator Plate Choke	2.1 millihenries
1-L-3	I. P. A. Tank Coil	8.1 microhenries
1-L-4	P. A. Neut Coil	.84 microhenries
1-L-5	P. A. Grid Choke	2.1 millihenries
1-L-6	P. A. Tank Coil	8.1 microhenries
1-L-7	P. A. Tank Coil	2.2 microhenries
1-L-8	Antenna Loading Coil	23.5 microhenries max.

28. Receiver Performance Characteristics

a. Average Performance:—

(1) Frequency Range 3750-5850 kc.

(2) Sensitivity:—

For an output of 10 milliwatts across a non-inductive load of 4000 ohms, a signal-to-noise ratio of 10:1, and the input signal at VOICE modulated 30% by a 400-cycle note, the sensitivity of the receiver is:

SENSITIVITY IN MICROVOLTS

FREQUENCY	VOICE	CW
5800 kc.	3.5	.5
3800 kc.	4.5	1.0

(3) Selectivity:—

Times normal input	Band width in kc
2X	5.0
10X	9.0
100X	15.0
1000X	21.0

(4) Image Frequency Rejection Ratio:—

From 1000:1 at 5800 kc to
4000:1 at 3800 kc

(5) Intermediate Frequency Rejection Ratio:—

From 35,000:1 at 5800 kc to
200,000:1 at 3700 kc

(6) Power Output:—

Maximum Power 50 milliwatts
Undistorted Power 100 milliwatts

(7) Volume Control Attenuation Ratio:—

350,000:1

(8) Frequency Stability:—

Maximum drift, 300 cycles.

(9) Frequency Deviation from Dial Calibration:—
± 5 kc

b. Minimum Performance:—

(1) Frequency Range 3775-5825 kc.

(2) Sensitivity:—

For an output of 10 milliwatts across a non-inductive load of 4000 ohms, a signal-to-noise ratio of 10:1, and the input signal at VOICE position modulated 30% by a 400 cycle note:

SENSITIVITY IN MICROVOLTS

FREQUENCY	VOICE	CW
5800 kc.	5	3
3800 kc.	5	3

(3) Selectivity:—

Times normal input	Band width in kc
2X	4.0- 6.0
10X	8.5-11.5
100X	12.0-18.0
1000X	15.0-25.0

(4) Image Frequency Rejection Ratio:—

800:1

(5) Intermediate Frequency Rejection Ratio:—

25,000:1

(6) Power Output:—

Maximum Power 100 milliwatts
Undistorted Power 75 milliwatts

(7) Volume Control Attenuation Ratio:—

100,000:1

(8) Frequency Stability:—

Maximum drift, 500 cycles.

29. Alignment of the Receiver (FIGS. 32 & 33)

a. Preliminary Setup:—

(1) Connect transmitter to Power Unit PE-103-A. Leave the receiver connected to the transmitter, but place it, with its shelf and power supply to one side. Remove the shelf from receiver-chassis.

(2) Close switches 1-S-5 and 1-S-6 in the battery compartment.

(3) Connect receiver to Battery BA-43 or Power Converter PE-104-A if this connection has not already been made.

(a) Check to be sure that filament voltage is between 1.4 and 1.5 volts.

(b) Check plate voltage. Maximum plate supply voltage at receiver is 84 volts with a battery supply voltage of 90 volts.

(4) Turn VOLUME to maximum.

(5) Plug output meter in righthand jack marked PHONES. Plug HEADSET in lefthand jack marked PHONES on front of receiver panel.

(6) Set capacitor gang for maximum capacitance. (Plates fully meshed.)

(7) Set transmitter MAIN SWITCH to VOICE and the STANDBY SWITCH to OFF.

b. Intermediate Frequency Alignment:—

(1) Connect a modulated signal generator set at a frequency of 455 kc (400 cycles, 30% modulation), to grid terminal "G" on the base of the second i-f transformer (grid connection of tube VT-146, socket 2-V-4).

The input from the signal generator should not be any higher than is necessary for accurate tuning.

(2) Adjust 2-L-10 (secondary) of third i-f transformer by loosening the locknut on the slotted shaft (on the under side of the chassis) and turning the shaft to the position which gives a maximum reading on the output meter.

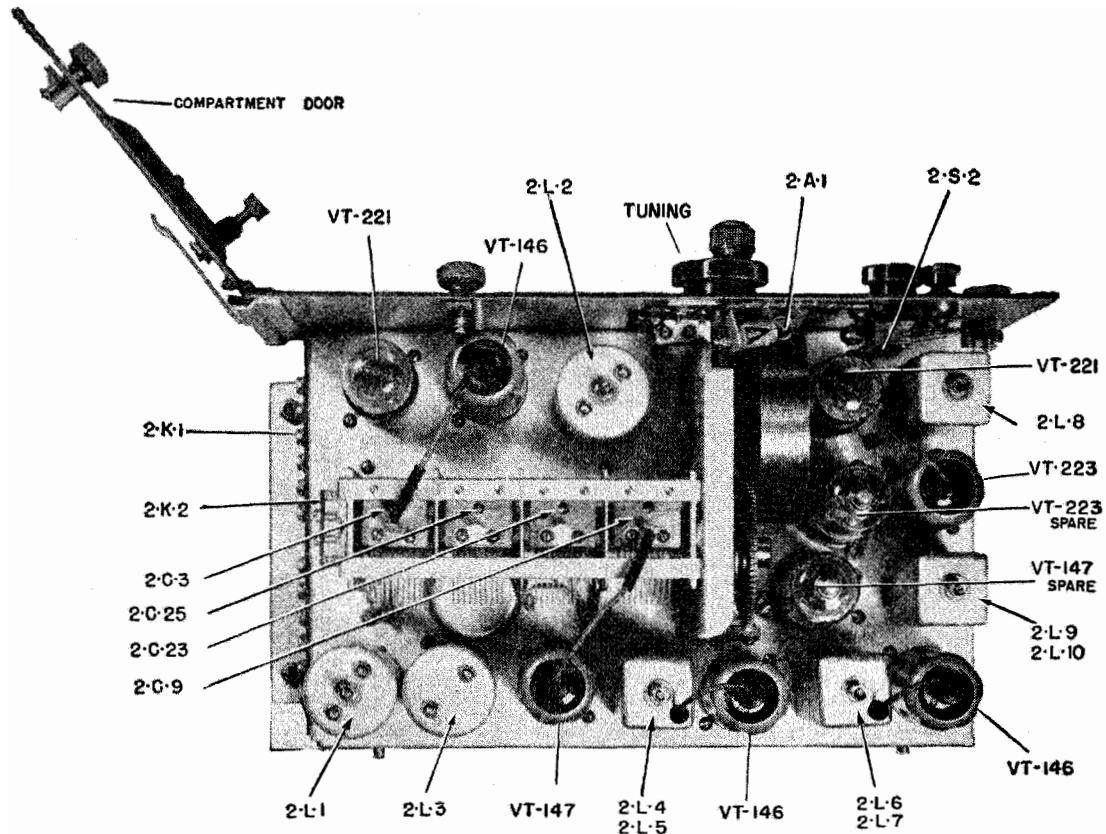


FIG. 32. RECEIVER CHASSIS (TOP VIEW)

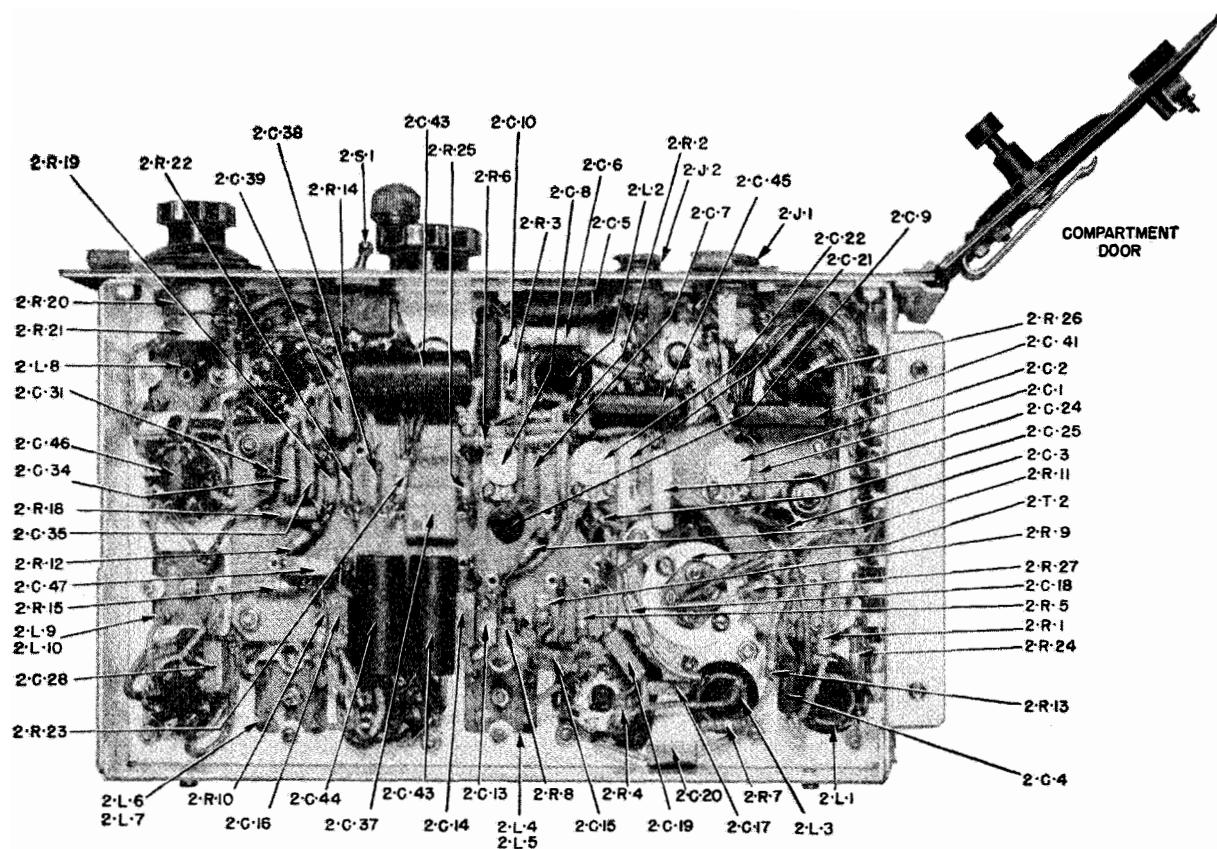


FIG. 33. RECEIVER CHASSIS (BOTTOM VIEW)

- (3) Adjust 2-L-9 (primary) of third i-f transformer by turning the slotted shaft in the top of the transformer can.
Tighten the locknut to prevent the adjustment from shifting.
- (4) Connect the signal generator set at a frequency of 455 kc (400 cycles, 30% modulation), to the grid terminal "G" on the base of the first i-f transformer (grid connection of tube, VT-146, socket 2-V-3).
- (5) Adjust 2-L-7 (secondary) and 2-L-6 (primary) of second i-f transformer in the manner described in (2) and (3).
- (6) Connect the signal generator set at a frequency of 455 kc (400 cycles, 30% modulation), to the ungrounded side of the r-f trimmer (2-C-8). (Grid connection of tube, VT-147, socket 2-V-2.)

CAUTION: DO NOT DISTURB THE POSITION OF THE GREEN LEADS TO THIS TRIMMER AFTER MAKING THE FOLLOWING ADJUSTMENTS.

- (7) Adjust 2-L-5 (secondary) and 2-L-4 (primary) of the first i-f transformer as described in (2) and (3).
- (8) Turn the MAIN SWITCH of the transmitter to CW and turn the modulation control on the signal generator to the OFF position. Adjust 2-L-8, the beat frequency oscillator coil, for exact zero-beat frequency.
- (9) Repeat steps (2) through (7) inclusive to see if further adjustment raises the output voltage.

c. *Radio Frequency Alignment:*—

- (1) Set MAIN SWITCH of transmitter to VOICE. Set AVC switch to ON, (Sets 1-9500).
- (2) Feed a modulated r-f signal from the signal generator set at a frequency of 5800 kc to the grid of the r-f amplifier tube VT-146 (socket 2-V-1), by connecting the generator to the ungrounded side of the antenna trimmer (2-C-2). Set the receiver dial to a frequency of 5800 kc.
- (3) Adjust the oscillator trimmer (2-C-22) for a maximum reading on the output meter.
- (4) Feed a modulated r-f signal set at 5800 kc into the antenna terminal through a $50 \mu\text{f}$ capacitor which is used as a dummy antenna.
- (5) Adjust the antenna (2-C-2) and r-f (2-C-8) trimmers for a maximum reading on the output meter.
- (6) With the same set-up as in (4), adjust the signal generator to 3800 kc-output and set the receiver TUNING dial to this frequency.

- (7) Adjust the antenna coil (2-L-1) by loosening the locknut on the slotted shaft and adjusting for maximum output. Likewise, adjust the r-f coil (2-L-2) for maximum output.
- (8) Repeat (4) through (7) inclusive.

29.1 Receiver Output Transformer

The following differences exist between sets manufactured on Order No. 32903-Phila-43, serial Nos. above 43,683, and those manufactured on previous orders covered by this Technical Manual.

The output transformer, symbol number 2-T-1, used in the Receiver has been provided with a tap at 250 ohms impedance for use with low impedance headsets. See Figure 43-E. The sets are supplied wired for 4000 ohms output impedance, as they were on previous orders. To rewire the set for 250 ohms output, remove the leads from terminal number 4 on 2-T-1, and attach them to terminal number 5. Remove the plate marked 4000 ohms from the front panel by dismounting the headphone jacks. Turn the plate over and remount it under the jacks so that the wording "250 ohms" appears on the front panel.

If a replacement transformer is obtained as a maintenance part, it may be of either the old (four terminal) or new (five terminal) type. The old type supplies only 4000 ohm output impedance, but it can directly replace the new type, provided the plate on the front panel is turned so that the marking "4000 ohms" shows. To replace an old type transformer supplied on a set manufactured on a previous order with a new type which may be supplied as a maintenance part, it is necessary to replace the spacers which hold the transformer mounting plate with the longer spacers supplied with the transformer, and replace the insulating washers which are mounted against the front of the panel on the headphone jacks with the nameplate which is also furnished with the transformer. The output impedance desired will determine which face of this plate should be showing.

30. Transmitter Performance Characteristics

a. *Average Performance:*—

(1) *Frequency Range* 3761-5825 kc.

(2) *Power Output:*—

	CW	PHONE	Dummy Antenna
Low	11.1 Watts	7.8 Watts	8.75 ohms in series with 110 mmf.
High	24.6 Watts	11.2 Watts	

(3) *Resetability:*—

Average deviation—.0075% or 1.5 dial divisions.

(4) *Reactance of Controls:*—

Average deviation—170 cycles.

(5) *Frequency Stability, Master Oscillator:*—

Average deviation—.005% for the first five minutes of operation at any temperature between -30° C and $+55^{\circ}\text{ C}$.

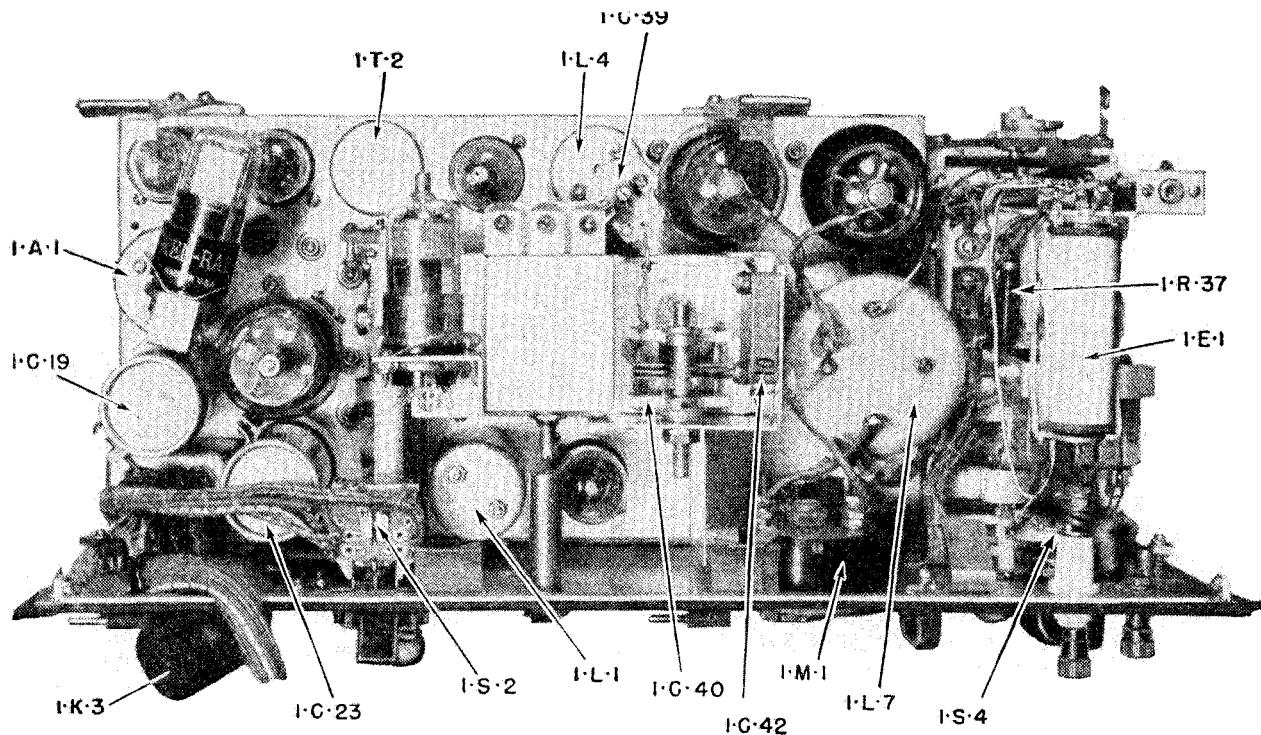


FIG. 34. TRANSMITTER CHASSIS (TOP VIEW)

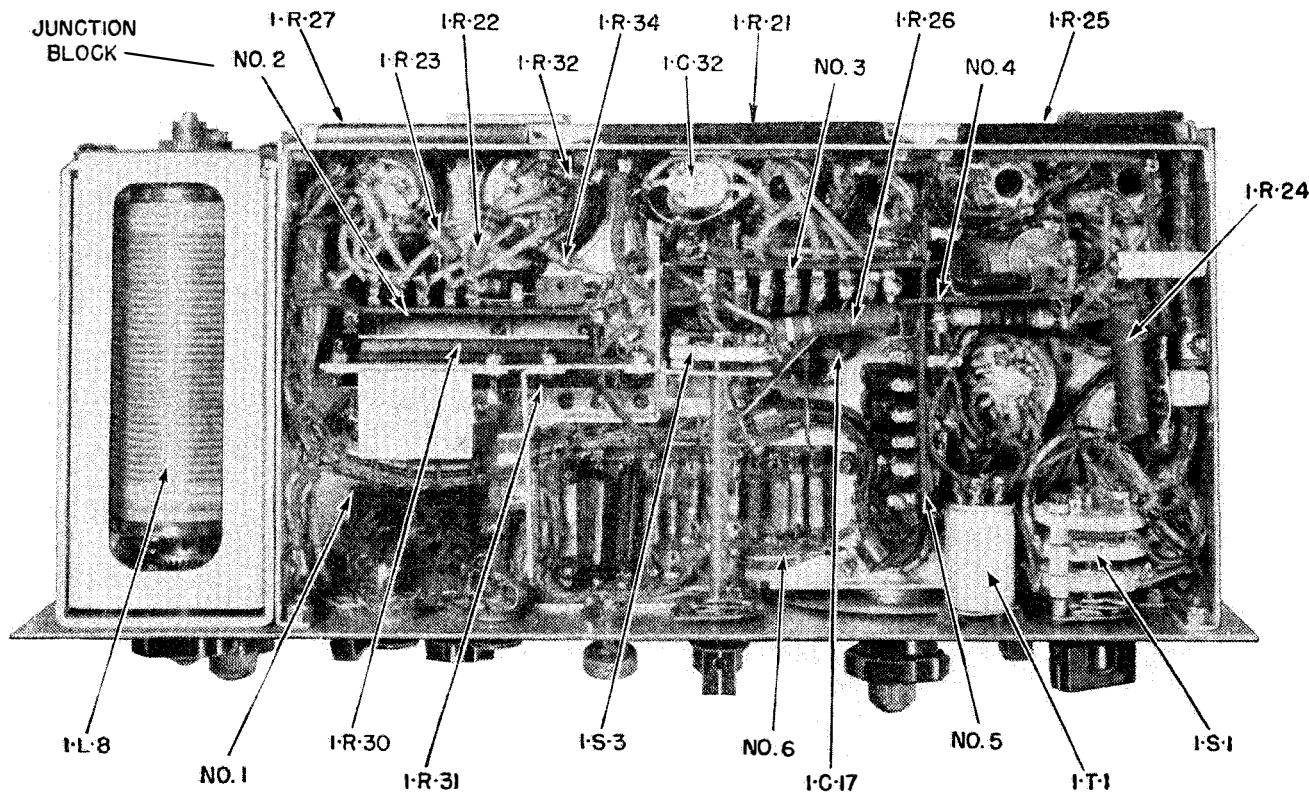


FIG. 35. TRANSMITTER CHASSIS (BOTTOM VIEW)

- (6) *Frequency Stability, Crystal Oscillator:*—
 +.0032% at +20° C.
 -.01% from —30° C to +55° C.
- (7) *Distortion:*—
 7.5% for 2 Watts output in HIGH power position.

b. Minimum Performance:—

- (1) *Frequency Range* 3775-5825 kc.
 (2) *Power Output:*—

	CW	PHONE	Dummy Antenna
Low	6.5 Watts	2 Watts	8.75 ohms in series with
High	17.0 Watts	5 Watts	110 μuf .

- (3) *Resetability:*—
 Maximum allowable deviation—.01% or two dial divisions.
- (4) *Reactance of Controls:*—
 Maximum allowable deviation—250 cycles.
- (5) *Frequency Stability, Master Oscillator:*—
 Maximum allowable deviation—.02% for first five minutes of operation at any temperature between —30° C and +55° C.
- (6) *Frequency Stability, Crystal Oscillator:*—
 ±.005% at +20° C.
 ±.015% from —30° C to +55° C.
- (7) *Distortion:*—
 10% for 2 Watts output in HIGH power position.

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**31. Alignment of the Transmitter
(FIGS. 34 & 35)**

IMPORTANT: WHEN MAKING THESE ADJUSTMENTS USE ONLY A WELL-CHARGED 6-VOLT BATTERY, NEVER A 12-VOLT BATTERY.

a. Calibrating Master Oscillator:—

- (1) Connect transmitter to Power Unit PE-103-A. Leave the receiver connected to the transmitter, but place it, with its shelf and power supply, to one side. Close switches 1-S-5 and 1-S-6 on the receiver shelf.
Disconnect antenna and ground, and short these two binding posts together with a very short piece of wire.
- (2) Turn the STANDBY SWITCH to HIGH and the MAIN SWITCH to CW. (The setting of controls not mentioned herein is immaterial).
- (3) Pull out CRYSTAL switch—(Crystal operating).
- (4) Spin the receiver TUNING dial and notice that the zero beat notes from the crystal oscillator of the transmitter can be heard every 200 kc. Set the receiver TUNING exactly on the zero beat, occurring at approximately 3800 kc. on the receiver TUNING dial. Reduce the receiver VOLUME to the point where the signal can just be heard distinctly to permit sensitive adjustment.
- (5) Refer to the Calibration Chart on the door of the case, for the transmitter TUNING dial setting corresponding to 3800 kc.
- (6) Set the transmitter TUNING dial to the reading found in (5) above.
- (7) Find the screw-driver adjustment marked CALIBRATION on the front of the transmitter. This is the adjustment for variable capacitor (1-C-7). Turn this adjustment slowly in either direction until the master oscillator is tuned exactly to zero beat with the crystal oscillator and the beat-frequency oscillator of the receiver.

b. Intermediate Power Amplifier Tuning and Neutralizing:—

A dummy VT-221 is needed for this procedure, that is, one in which the plate circuit is complete, but the filament is not lighted. This can be a tube which has the filament burned out, but which has no other defects; that is, the grids are not shorted to each other or to the filament or plate.

- (1) Turn the MAIN SWITCH to OFF.
- (2) Place the dummy tube in socket 1-V-2.
- (3) Since the filament of the i.p.a. tube is in series with the filaments of three of the other small

tubes, the burned out filament must be replaced with an electrical equivalent. To do this, connect a 14 or 15-ohm resistor between socket lug 8 and either of the other two filament lugs, 2 or 7, using clip leads.

- (4) Set transmitter TUNING dial for the reading corresponding to a frequency of 5800 kc.
Refer to Calibration Chart for transmitter TUNING dial setting corresponding to 5800 kc. Set antenna tuning adjustment for maximum dial reading.
 - (5) Connect the HIGH terminal of a vacuum-tube voltmeter (for reading a-c voltage) to the terminal to which both resistors 1-R-22 and 1-R-23 are connected. Connect the LOW terminal to either filament terminal on the socket.
 - (6) Adjust key so that contacts remain closed, then turn MAIN SWITCH to CW and STANDBY SWITCH to LOW.
 - (7) Adjust capacitor 1-C-32 (mounted on small bracket on the underside of the chassis) for resonance (maximum voltmeter reading) using an insulated screwdriver.
 - (8) Adjust neutralizing capacitor 1-C-17 (centrally located on bottom of chassis) for a minimum reading on the voltmeter.
 - (9) Repeat (7) and (8).
 - (10) Turn the MAIN SWITCH to OFF.
 - (11) Remove the temporary resistor and replace the dummy tube with a good Tube VT-221.
 - (12) Connect vacuum tube voltmeter across the antenna coupling coil 1-L-7 with the LOW terminal connected to the r.f. ammeter. Set MAIN SWITCH at CW and STANDBY SWITCH at HIGH.
 - (13) With an insulated screwdriver re-adjust capacitor 1-C-32 for maximum voltmeter reading. The increase will be slight.
- c. Power Amplifier Tuning and Neutralizing:—*
- (1) Turn MAIN SWITCH to OFF.
 - (2) Set transmitter TUNING dial for the reading corresponding to a frequency of 5800 kc. Set antenna TUNING adjustment for maximum dial reading.
 - (3) Remove Power Amplifier Tube VT-225 from socket 1-V-4 and replace with a dummy VT-225 (that is, one which has a burned out filament but no other defects).
 - (4) Connect a vacuum-tube voltmeter across the antenna coupling coil 1-L-7, with the LOW side connected to the r-f ammeter.

- (5) Turn the MAIN SWITCH to CW, and the STANDBY SWITCH to LOW.
- (6) Adjust the trimmer capacitor 1-C-40 on the top of the capacitor gang until a maximum reading is obtained on the voltmeter. Adjust the ANTENNA COUPLING control to be sure it is set for a maximum voltmeter reading.
- (7) Turn MAIN SWITCH to OFF.
- (8) Move the HIGH side connection of the vacuum-tube voltmeter to the plate end of the coil 1-L-6, which is cap connection on tube VT-225, and turn MAIN SWITCH to CW.
- (9) Adjust the power amplifier neutralizing capacitor 1-C-39 until a minimum reading is obtained on the voltmeter.
- (10) Turn MAIN SWITCH to OFF, remove dummy tube and replace with good tube. Move HIGH side connection of the vacuum-tube voltmeter back to the antenna coupling coil 1-L-7.
- (11) Readjust trimmer capacitor 1-C-40 until maximum reading is obtained on V. T. voltmeter.

d. Modulation Adjustment:

The modulation adjustment 1-R-2 is set at the factory for 100% modulation using an input of 0.2 volts at 1000 cps and should not require adjustment. If setting has been disturbed and it is necessary to readjust in the field, an expedient method is to adjust 1-R-2 for a 15-20% rise in antenna current on sustained modulation.

32. Generator GN-45-(*) Voltage Regulator Adjustment

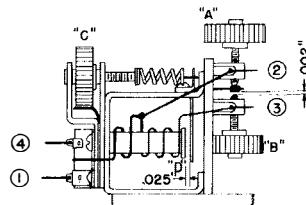
- a. The interior of the top cover of GN-45-(*) carries a sketch showing proper adjustment of contacts and armature air gap of voltage regulator 5-E-1. A thickness gauge, TL-127, is furnished with SCR-284-A for use in making these adjustments. This gauge will be found attached to the cover of GN-45-A, but is packed separately in sets using GN-45-B.
- b. The output voltage is adjusted by varying the tension on the armature. This adjustment is a screw in GN-45-A; in GN-45-B a knob is provided. Using a voltmeter, adjust the armature tension to obtain 500 volts at the generator terminals under full load.

32.1 Voltage Regulator Alternate Versions

Hand Generator GN-45-B supplied on Order No. 32903-Phila-43 uses a revised voltage regulator, symbol number 5-E-1. See Figures 50-A and 51-A.

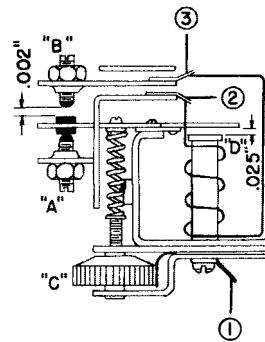
- a. To replace the new type G-199 regulator with a maintenance part of type G-188 (Examples 1 and 2), the following steps must be taken.
- (1) Remove the leads from terminals 1, 2, 3, and 4.

- (2) Connect the leads from terminals 1, 2, and 3 to the corresponding terminals on type G-188 regulator.
- (3) Connect the lead from terminal 4 to the terminal which is third from the power plug end of the terminal strip.
- (4) Use the same regulator adjustments as for type G-199.
- b. To replace the voltage regulator in a generator, supplied on a previous order, containing type G-188 regulator, with the new type G-199 (Examples 1 and 2), the following steps must be taken.
 - (1) Remove the leads from terminals 1, 2 and 3.
 - (2) Connect these leads to the corresponding terminals on type G-199 regulator.
 - (3) Remove the 5-L-1 choke lead from the terminal which is third from the power plug end of the terminal strip.
 - (4) Connect this lead to terminal 4 on type G-199 regulator.
 - (5) Use the same regulator adjustments as for type G-188.



(USED ON SETS WITH SERIAL NOS. ABOVE 17,030)

**W-224866-2 Example No. 2
VOLTAGE REGULATOR TYPE G-199**



**W-224867-2 Example No. 1
VOLTAGE REGULATOR TYPE G-188**

33. Lubrication of Equipment

a. Since the receiver-transmitter unit has been lubricated during manufacture it should not require further attention. However, inspect the antenna tuning coil occasionally and clean both the coil winding and contact wheel carefully to insure positive contact at all times. If the contact wheel has slipped off the wire and is riding between turns, rotate the knob to the extreme clockwise position and place the contact wheel on the end turn of the winding.

b. *Lubrication Instructions, Generator GN-45-(*)*:

(1) After 1000 hours of service, or every 6 months if used infrequently, clean, thoroughly examine, and lubricate the bearings and gears. The grease to be used for temperatures between -40° F. and $+140^{\circ}$ F. is U. S. Army Spec. 2-108, No. 2 General Purpose Grease. Cleaning Solvent may be Federal Spec. P-S-661a Solvent, benzene, kerosene, or unleaded gasoline.

(a) Remove the five screws from the gear cover. Remove cover by tapping lightly, *do not pry off with a screw driver*. Remove intermediate gear and pinion, clean bearings and gears and wash out gear case.

CAUTION: DO NOT ALLOW FLUID TO ENTER CASE.

(b) Apply grease to ball races in gear case, also to ball races in magnet frame and armature bearings. Apply grease to the gears, filling up between the gear teeth. Place grease in depression of the gear cover (armature pinion end only), and wipe off excess. *Do not pack ball bearings*.

(c) Replace gears and gear cover, making certain that gear teeth match and that cover screws are tightened evenly.

(d) Remove the two plates on the left side of the generator. Clean the cranking shaft and armature bearings, coat (*do not pack*) with grease and replace plates.

NOTE: GN-45-B is provided with an armature removal plate on the left side. In order to lubricate the left armature bearing, remove the four screws holding the plate and the four screws holding the two brush holders. Remove the plate by tapping for access to the bearing. When assembling, align brush holders, first. Tighten all screws evenly and securely.

c. *Lubrication Instructions, Dynamotor of PE-103-A:*

(1) After 300 hours of service, or every 3 months if used infrequently, add 1 or 2 drops of light oil (S. A. E. No. 10) to each bearing oiler to soften the grease.

CAUTION: DO NOT OVER-LUBRICATE.

(2) After 1000 hours of service, or every 6 months if used infrequently, remove bearing end plates and inspect bearings. If grease is discolored (oxidized) or dried through evaporation, replace it. Regardless of its condition, replace grease after 2000 hours of service.

(a) Flush out old grease by injecting solvent into the bearing while the dynamotor is running freely. Use a syringe or oil can to

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apply solvent. Continue to add solvent, until it drains out clear.

CAUTION: DO NOT ALLOW SOLVENT TO ENTER THE INTERIOR OF THE DYNAMOTOR.

- (b) After flushing, inject a small amount of light oil into the bearing. Allow it to churn a minute or two before draining off. This will flush out the solvent.
- (c) Immediately coat (*do not pack*) the bearing, and replace end plates.
- (d) The grease to be used for temperatures between -40° F. and $+140^{\circ}$ F. is U. S. Army Spec. 2-108, No. 2 General Purpose Grease.
- (e) Cleaning solvent may be Federal Spec. P-S-661A Solvent, benzene, kerosene or unleaded gasoline.

CAUTION: NEVER PACK BALL BEARINGS HARD. APPLY A COATING ONLY TO RACES AND BALLS. DO NOT PACK BEARING HOUSINGS.

34. Moisture and Fungus Proofing SCR-284-A

- a. Before processing, give the equipment a maintenance check to insure that it is operating properly. Make all the necessary repairs and thoroughly clean off all dust, dirt, grease, rust, and corrosion.
- b. Preparation of Radio Receiver and Transmitter BC-654-A.
 - (1) Remove receiver and transmitter from case.
 - (2) Remove receiver chassis from bracket.
 - (3) Remove Battery BA-43 and cover prongs of plug with masking tape.
 - (4) Remove all shields from coils.
 - (5) Mold paper completely around the variable gang capacitor and fasten in place with masking tape.
 - (6) Cover all receiver gears with masking tape.
 - (7) Cover caps of spare tubes with masking tape.
 - (8) Remove wires from binding posts along bakelite strip.
 - (9) Fasten all screws down on bakelite strip where wires are attached.
 - (10) Mask the lugs.
 - (11) Tighten screw where antenna is connected and cover lug with masking tape.
 - (12) Cover dial light contacts with masking tape.
 - (13) Remove bakelite where battery is mounted.
 - (14) Cover moving mechanical parts and contacts with masking tape.
 - (15) Mold paper completely around antenna tuning unit including antenna selector switch con-

tacts, relay contacts and gears located in rear of tuning coil.

- (16) Remove shield from antenna coupling coil.
- (17) Cover all trimmers with masking tape.
- (18) Cover crystal switch contacts with masking tape.
- (19) If crystal is in socket, remove and cover socket.
- (20) If any of the spare tubes have been used, cover the sockets with masking tape.
- (21) Cover all transmitter gears.
- (22) Cover STANDBY SWITCH contacts with masking tape.
- (23) Cover MAIN SWITCH contacts with masking tape.
- (24) Cover contacts of all jacks with masking tape.
- (25) Mask all parts wherever good grounds are to be maintained, that is, from chassis to chassis by means of bolts, etc.
- (26) Cover end of connector where cable from dynamotor plugs into set, with masking tape.

c. Preparation of Power Unit PE-103-A.

- (1) Remove bottom cover of power unit.
- (2) Wipe component parts with rag to insure that all foreign matter is removed.
- (3) Cover the three circuit breakers with masking tape.
- (4) Cover relay contacts with masking tape.
- (5) Tighten all screw nuts where connections are made with wire and lugs.
- (6) Remove end covers of dynamotor and expose commutators and brushes.
- (7) Cover commutators and brushes with masking tape.
- (8) Mask rotary voltage selector switch.

d. Preparation of Power Converter PE-104-A.

- (1) Remove four screws, two holding top cover, two holding bottom cover, remove covers.
- (2) Remove vibrator.
- (3) Remove ground contact strips from base.

NOTE: While unit is in oven, varnish the rubber gasket in base of vibrator—do not varnish pins.

When unit has dried—replace vibrator before spraying.

e. Drying and Application of Varnish.

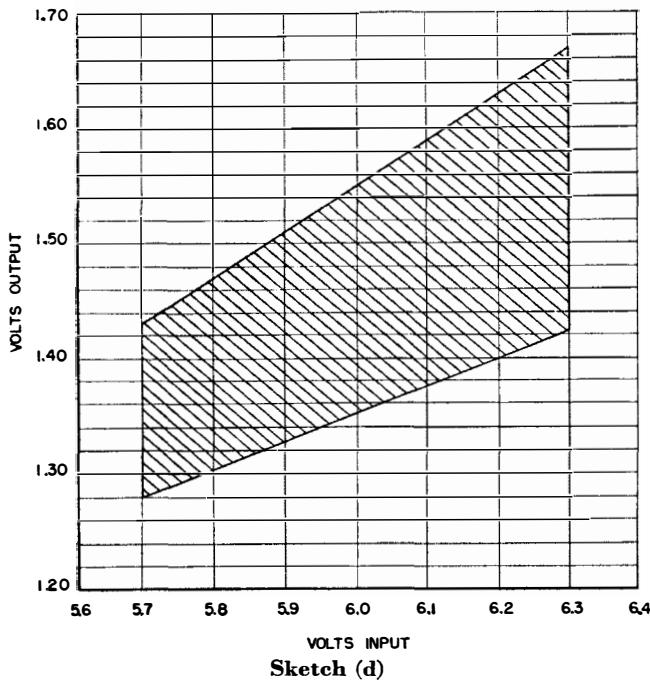
- (1) After completing the above, place the components in a heating apparatus and bake at a temperature of maximum 160° F. DO NOT EXCEED THIS TEMPERATURE.
- (2) Bake the unit for approximately three hours. Watch for indications of melted wax. If this

becomes evident, lower the baking temperature, adding one hour to the baking time for each 10° F. drop.

- (3) After the baking operation remove from heating apparatus and apply varnish to all parts and exposed metal with a paint brush or spray. Follow instructions provided with the kit.
- (4) After varnish has been applied, replace the component in the heating apparatus and allow to remain there for approximately one-half hour—until varnish has dried.
- (5) Remove from heating apparatus and repeat the application of varnish.
- (6) Replace in heating apparatus. Shut off heat and allow to cool for approximately twelve hours.
- (7) When component has returned to normal ambient temperature, and varnish is absolutely dry (not tacky), remove all masking tape.
- (8) Clean off any excess varnish on those portions where it will impede electrical continuity or mechanical action.
- (9) Extreme caution should be taken when varnishing around moving parts. Varnish, when dry, will impede the mechanical motion.

35. Power Converter PE-104-A

- a. In some power converter units transformer 4-T-1 has a dropping resistor, covered with black insulated sleeving, connected in series with one lead to rectifier 4-A-1. If 4-T-1 is replaced, remove the series resistor. It is a part of the old transformer and should not be used with the replacement unit.



PE-104-A VOLTAGE CHART

If a resistor is necessary, it will be issued as a part of the replacement transformer.

- b. It is possible for the vibrator used in the Power Converter PE-104-A to control the output voltages over a considerable range. Therefore, it is important to check the output voltages when the vibrator is replaced. The most important of these checks is that on the filament supply voltage, nominally 1.4 volts. If this supply is too high, very short tube life will result, and if it is too low, the receiver performance will suffer.

These voltages may be checked by applying a source of approximately 6 volts d-c from a storage battery to terminals 1 and 7 on power plug 4-K-1. (See Figure 48-A.) Connect a 3.5 ohm resistor, which is rated at 1 watt or greater, between terminals 1 and 4. Use a voltmeter of 1000 ohms per volt or greater, and carefully measure the input voltage between terminals 1 and 7, and the output voltage between terminals 1 and 4. If the output voltage does not fall within the shaded area of Sketch (d), use another vibrator. For example, if 6.1 volts is measured on the input, the output voltage should be between 1.375 and 1.590 volts. Any vibrators which do not come within the limits shown on Sketch (d), may be usable for replacement in another power converter.

- c. In the later models of Power Converter PE-104-A, bakelite has been substituted in place of fibre and fishpaper for insulating parts. All bakelite parts have been processed to make them fungi- and moisture-resistant.

On all power converters with serial Nos. 10,001 and higher, chokes 4-L-7, 4-L-8, and 4-L-9 in a metal container, and transformer 4-T-1 also in a metal container are hermetically sealed.

36. Receiver Audio Oscillation

Some Radio Sets SCR-284-A serially numbered from 1-3500 only, may develop an audio howl of continuous intensity at any position of the volume control. This condition can be corrected as follows:

- (a) Disconnect the plate lead from the tube socket of 2-V-6 tube (at the socket). This lead is a blue wire, identified in the connection diagram as lead number 49 and connects with number 1 terminal of transformer 2-T-1.
- (b) Pull this wire out of the cable. If the insulation is not damaged this wire may be reused. Otherwise a new lead shall be installed.
- (c) Relocate this wire as far as possible away from the cable and number 8 terminal.
- (d) Connect this lead back to the plate terminal of tube socket 2-V-6.
- (e) After the above wiring change is made, check the set for overall performance.

37. Breaking of Conductors in Cord CD-501-A

It may be found that the cable connector clamps do not grip the cable properly, putting a strain on the connections. Wrap a few layers of friction tape around the portion of the cable under the clamp, being sure to leave the sheath grounding tab outside the tape for grounding.

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38. Protection of Equipment from Moisture

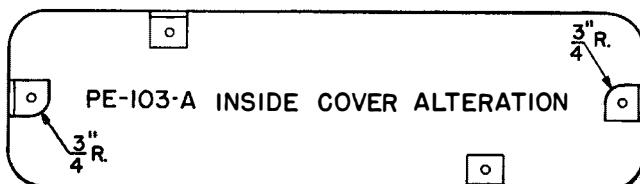
- a. Due to seepage and condensation, trouble may be experienced with corrosion and insulation breakdown in PE-103-A due to collection of water inside the case.
- b. As a temporary corrective measure, drill a $\frac{1}{8}$ -inch hole in each of the four corners of the bottom of the case. These holes should be far enough from the corners to allow for the future insertion of plugging bolts if deemed necessary.
- c. Waterproof covers are available as follows and should be requisitioned for all sets that lack them. These covers need not be removed during operation of the equipment.

For Radio Receiver and Transmitter BC-654-A—Cover BG-154, Stock No. 2Z3400-154.

For Power Unit PE-103-A—Bag BG-129, Stock No. 2Z529.

39. Guard for 6/12-volt Switch in Power Unit PE-103-A

- a. This switch is often damaged when installing the cover due to being struck by the brackets welded inside the cover at the ends.
- b. Round off the corners of these two end brackets to a radius of $\frac{3}{4}$ inch as shown in sketch e.
- c. Form a guard for the switch as shown in sketch f, and install by means of the two screws and lock-nuts that hold the switch assembly.
- d. Power Units with serial numbers above 34092 have an additional guard provided, so that this change is unnecessary on those sets.



Sketch (e)

PE-103-A COVER ALTERATION

40. Arc-over in Power Cord Connectors

- a. Sets serial No. 1-9500 had the +500-volt lead connected to No. 3 pin of the connectors for power Cord CD-501-A. Insulation breakdown and arc-over to ground occurs under humid conditions. Sets above serial 9500 have the +500-volt lead

connected to the center or No. 8 pin and the connectors are marked with a yellow arrow.

- b. This change should be made on all sets not already changed over, and the connectors marked with a yellow arrow. Simply interchange No. 3 and No. 8 leads in *all* connectors, viz.:

Transmitter and Receiver BC-654-A.

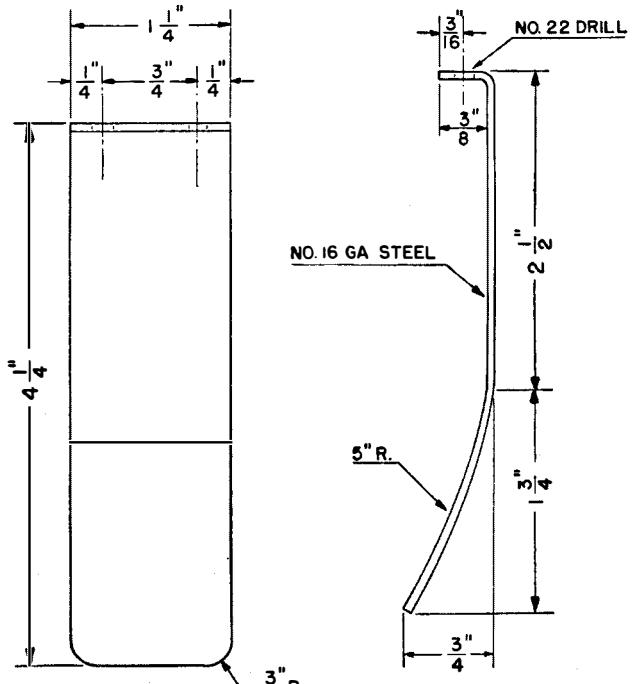
Power Unit PE-103-A.

Generator GN-45-(*)�.

CAUTION: BE EXTREMELY CAREFUL NEVER TO CONNECT MODIFIED COMPONENTS TO UNMODIFIED COMPONENTS. TO DO SO WILL ENDANGER BOTH THE OPERATOR AND EQUIPMENT.

41. Loudspeaker

Initial procurements of SCR-284-A did not include a loudspeaker. Organizations having Radio Sets SCR-284-A on hand, less loudspeakers, should requisition Loudspeaker LS-7, Stock No. 2Z6310-7, on the basis of one per radio set, through usual channels.



Sketch (f)

DETAILS OF SWITCH GUARD

41.1. Unsatisfactory Equipment Report

- a. When trouble in equipment used by Army Ground Forces or Army Service Forces occurs more often than repair personnel feel is normal, War Department Unsatisfactory Equipment Report, W. D., A. G. O. Form No. 468 should be filled out and forwarded through channels to the Office of the Chief Signal Officer, Washington 25, D. C.
- b. When trouble in equipment used by Army Air Forces occurs more often than repair personnel feel is normal, Army Air Forces Form No. 54 should be filled out and forwarded through channels.
- c. If either form is not available, Form No. 468 (fig. 35.1) may be reproduced, filled out, and forwarded through channels. When Army Air Forces Form No. 54 is required but unavailable, reproduce Form No. 468 and forward it through channels in accordance with directions on Form No. 468.

WAR DEPARTMENT
UNSATISFACTORY EQUIPMENT REPORT

FOR	TECHNICAL SERVICE Signal Corps		MATERIEL	DATE 1 Feb 45
FROM	ORGANIZATION 175 Signal Repair Co.			STATION APO 102
TO	NEXT SUPERIOR HEADQUARTERS Supply Sec. Hq Fourth Army Sig Sv.	STATION APO 110	TECHNICAL SERVICE Signal Corps	

COMPLETE MAJOR ITEM

NOMENCLATURE Radio Transmitter BC-123-A		TYPE Ground, vehicular	MODEL A
MANUFACTURER American Radio Corp	U. S. A. REG. NO. 1234-Phila-45	Order No. 12345	SERIAL NO. 12345
EQUIPMENT WITH WHICH USED (If applicable) Radio Set SCR-456-A Tank, Medium, M4			

DEFECTIVE COMPONENT-DESCRIPTION AND CAUSE OF TROUBLE

PART NO. Sig C Stk. No. 3E47-2	TYPE Capacitor C20:fixed: 1-mf; 500 vdow	MANUFACTURER American Radio Corp	DATE INSTALLED when manufactured
-----------------------------------	---	-------------------------------------	-------------------------------------

DESCRIPTION OF FAILURE AND PROBABLE CAUSE (If additional space is required, use back of form)

Capacitor C20 shorts out due to humid operating conditions

DATE OF INITIAL TROUBLE 15 Jan 45	TOTAL TIME INSTALLED			TOTAL PERIOD OF OPERATION BEFORE FAILURE				
	YEARS -	MONTHS -	DAYS -	YEARS 0	MONTHS 0	DAYS 5	HOURS -	MILES -

BRIEF DESCRIPTION OF UNUSUAL SERVICE CONDITIONS AND ANY REMEDIAL ACTION TAKEN

Operation in tropics; heavy rainfall. Was replaced and set given moistureproofing and fungiproofing treatment, 20 Jan 45.

TRAINING OR SKILL OF USING PERSONNEL	RECOMMENDATIONS (If additional space is required, use back of form)			
POOR	FAIR	GOOD <input checked="" type="checkbox"/>	Substitute capacitor designed for tropical operation	

ORIGINATING OFFICER

TYPED NAME, GRADE, AND ORGANIZATION E.A. WILSON, 1st Lt., Sig C. 175 Sig Repair Co.	SIGNATURE <i>E.A. Wilson</i>
---	---------------------------------

FIRST ENDORSEMENT

TO CHIEF	TECHNICAL SERVICE	OFFICE
NAME, GRADE, AND STATION		STATION
		DATE

Instructions

1. It is imperative that the chief of technical service concerned be advised at the earliest practical moment of any constructional, design, or operational defect in matériel. This form is designed to facilitate such reports and to provide a uniform method of submitting the required data.
2. This form will be used for reporting manufacturing, design, or operational defects in matériel, petroleum fuels, lubricants, and preserving materials with a view to improving and correcting such defects, and for use in recommending modifications of matériel.
3. This form will not be used for reporting failures, isolated material defects or malfunctions of matériel resulting from fair-wear-and-tear or accidental damage nor for the replacement, repair or the issue of parts and equipment. It does not replace currently authorized operational or performance records.
4. Reports of malfunctions and accidents involving ammunition will continue to be submitted as directed in AR 750-10 (change No. 3).
5. It will not be practicable or desirable in all cases to fill all blank spaces of the report. However, the report should be as complete as possible in order to expedite necessary corrective action. Additional pertinent information not provided for in the blank spaces should be submitted as inclosures to the form. Photographs, sketches, or other illustrative material are highly desirable.
6. When cases arise where it is necessary to communicate with a chief of service in order to assure safety to personnel, more expeditious means of communication are authorized. This form should be used to confirm reports made by more expeditious means.
7. This form will be made out in triplicate by using or service organization. Two copies will be forwarded direct to the technical service; one copy will be forwarded through command channels.
8. Necessity for using this form will be determined by the using or service troops.

W. D., A. G. O. Form No. 468
30 August 1944

This form supersedes W. D., A. G. O. Form No. 468, 1 December 1943, which may be used until existing stocks are exhausted.

TL19589

U. S. GOVERNMENT PRINTING OFFICE 16-41546-1

Revised 5 April 1945

FIG. 35.1. W. D., A. G. O. FORM No. 468,
FILLED IN

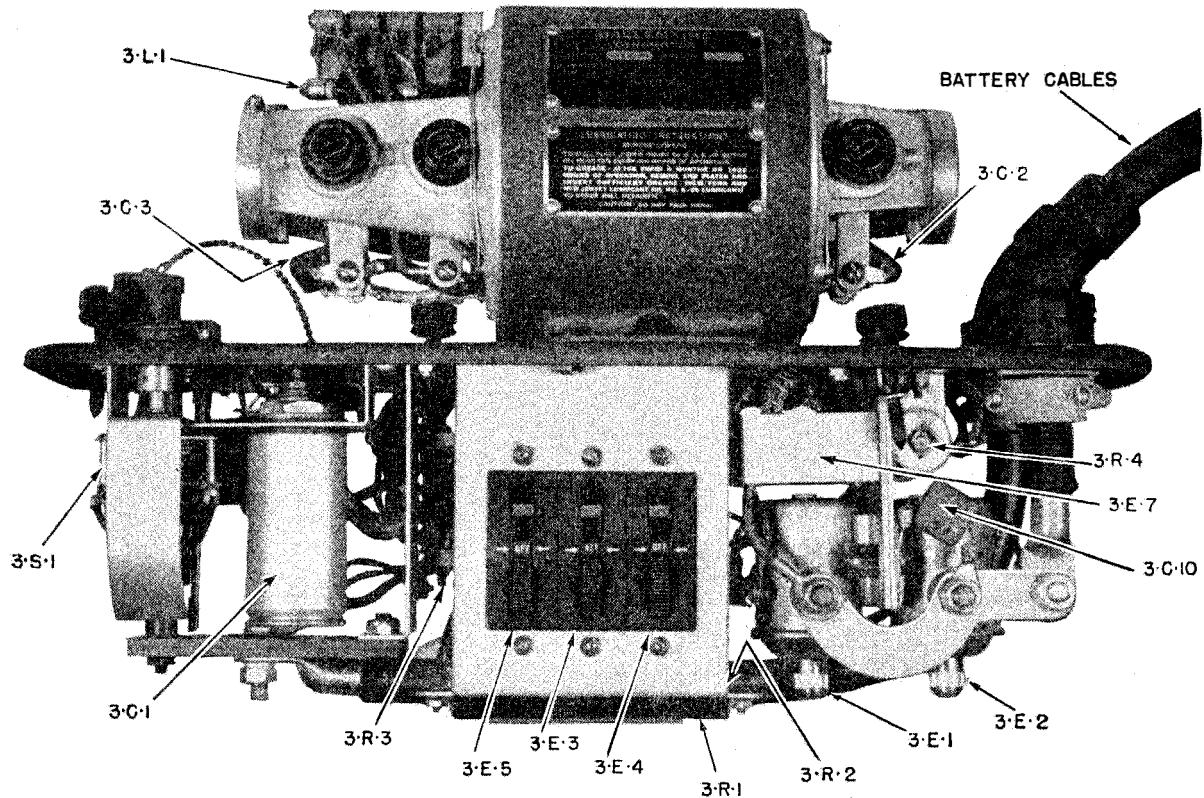


FIG. 36. DYNAMOTOR FOR POWER UNIT PE-103-A (FRONT VIEW)

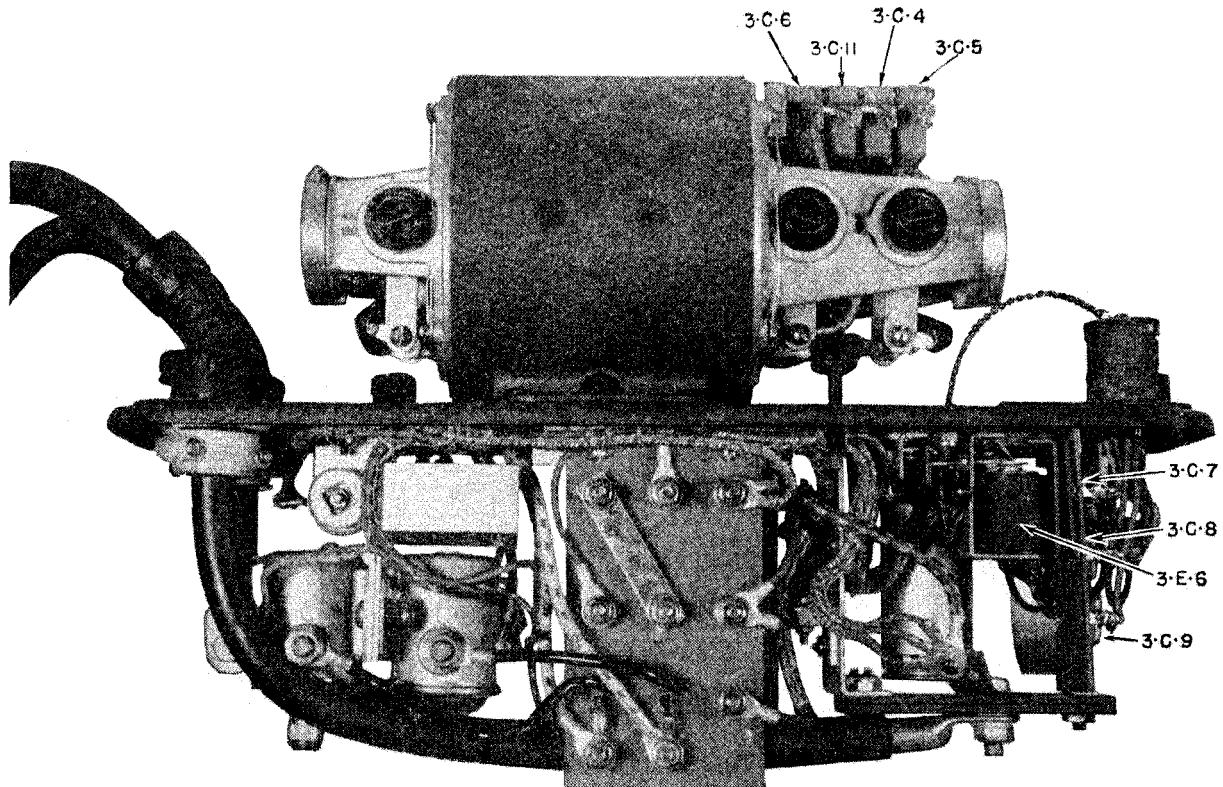


FIG. 37. DYNAMOTOR FOR POWER UNIT PE-103-A (REAR VIEW)

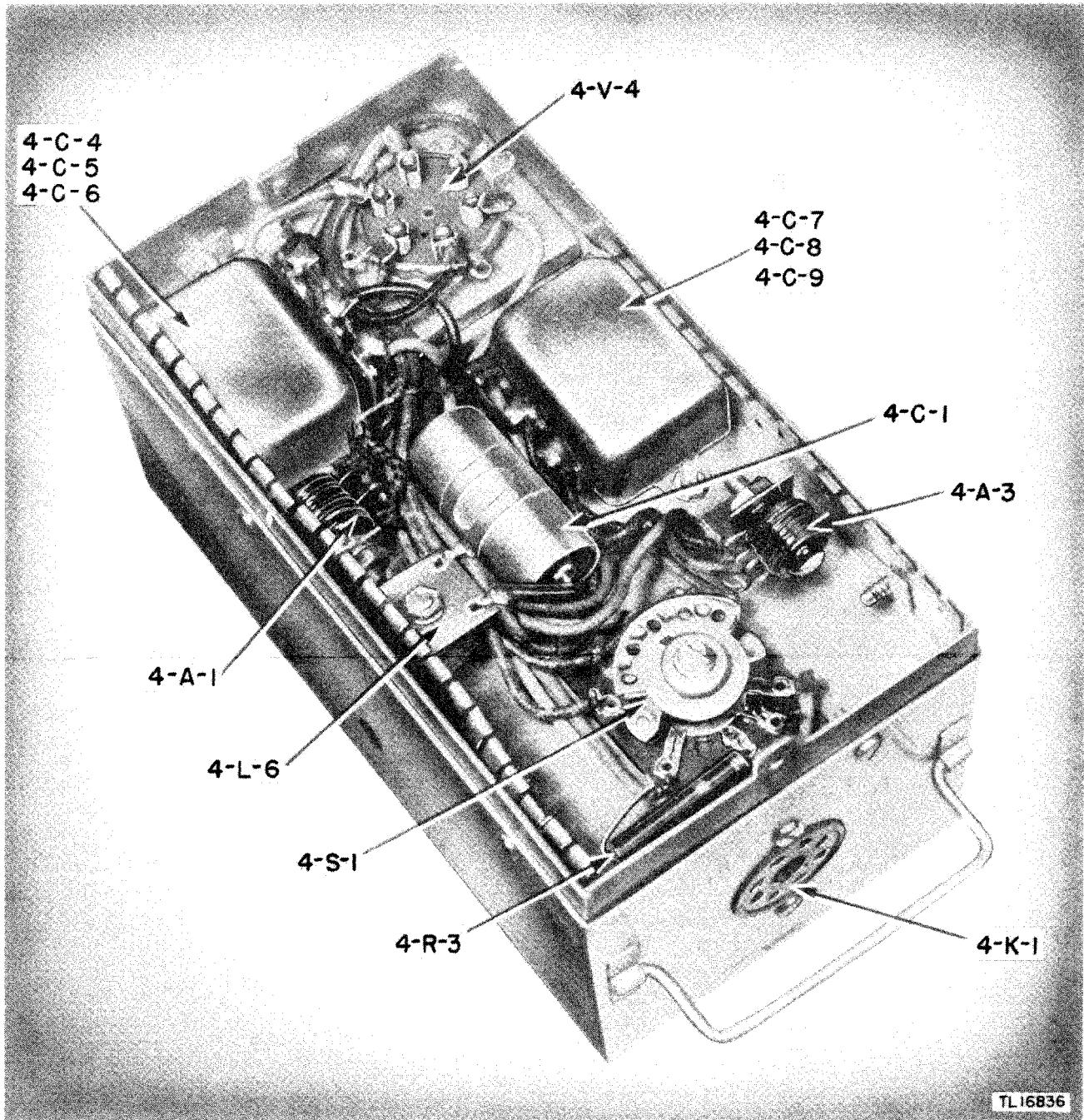


FIG. 36.1. POWER CONVERTER PE-104-A (SECOND REVISION) TOP COVER REMOVED

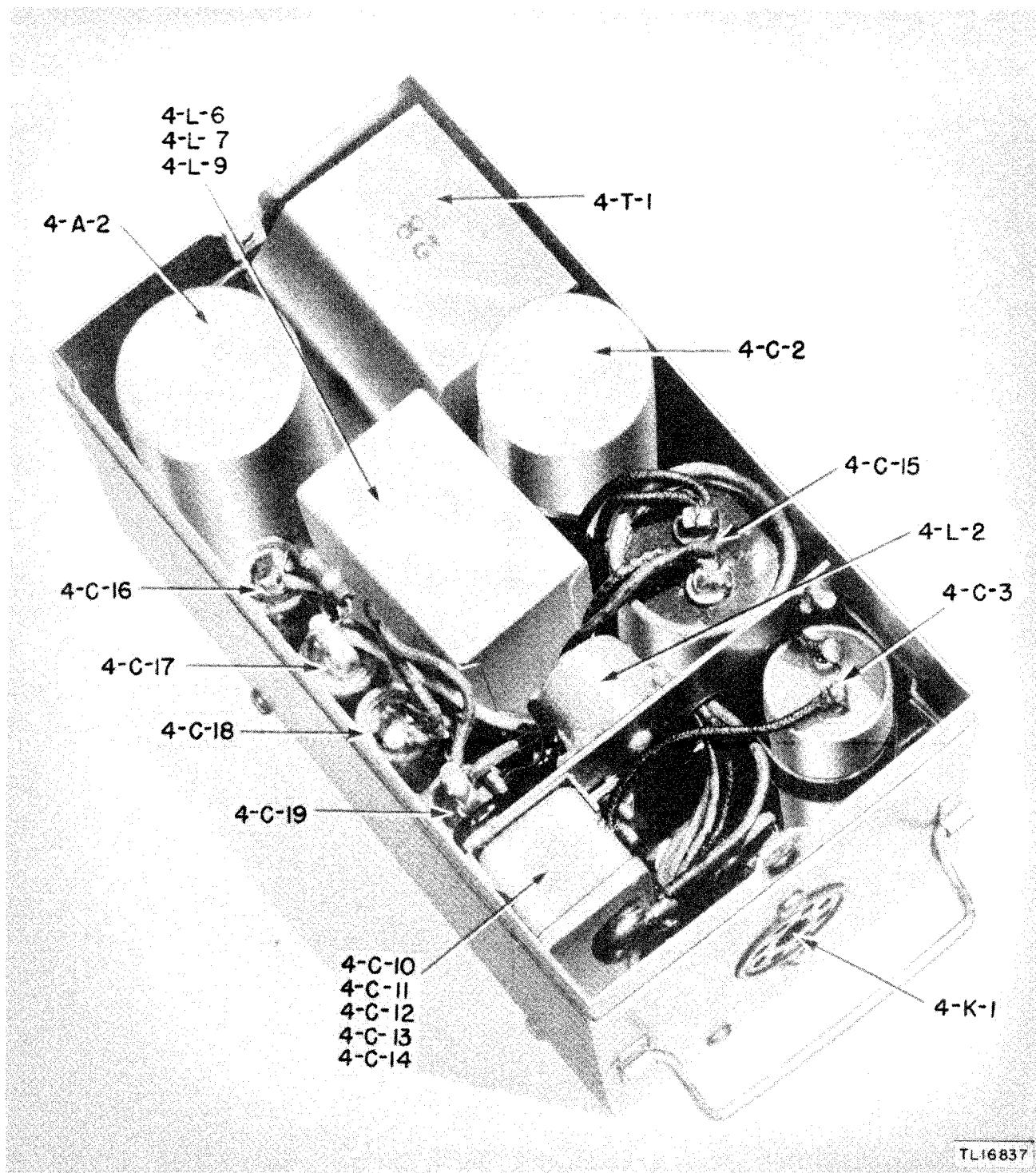


FIG. 36.2. POWER CONVERTER PE-104-A (SECOND REVISION) BOTTOM COVER REMOVED

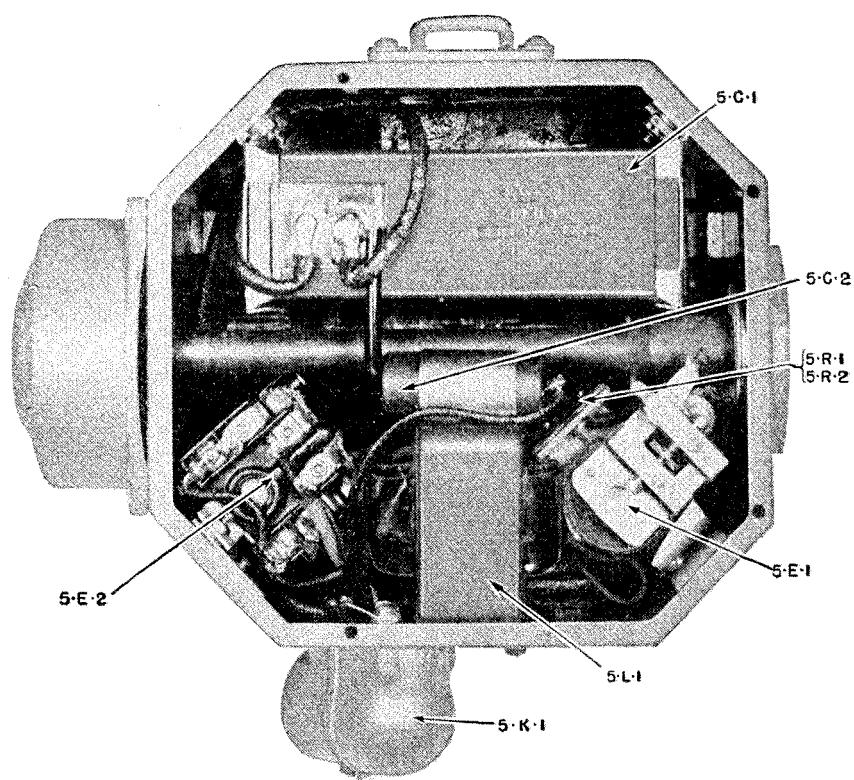


FIG. 38. GENERATOR GN-45-A (TOP COVER REMOVED)

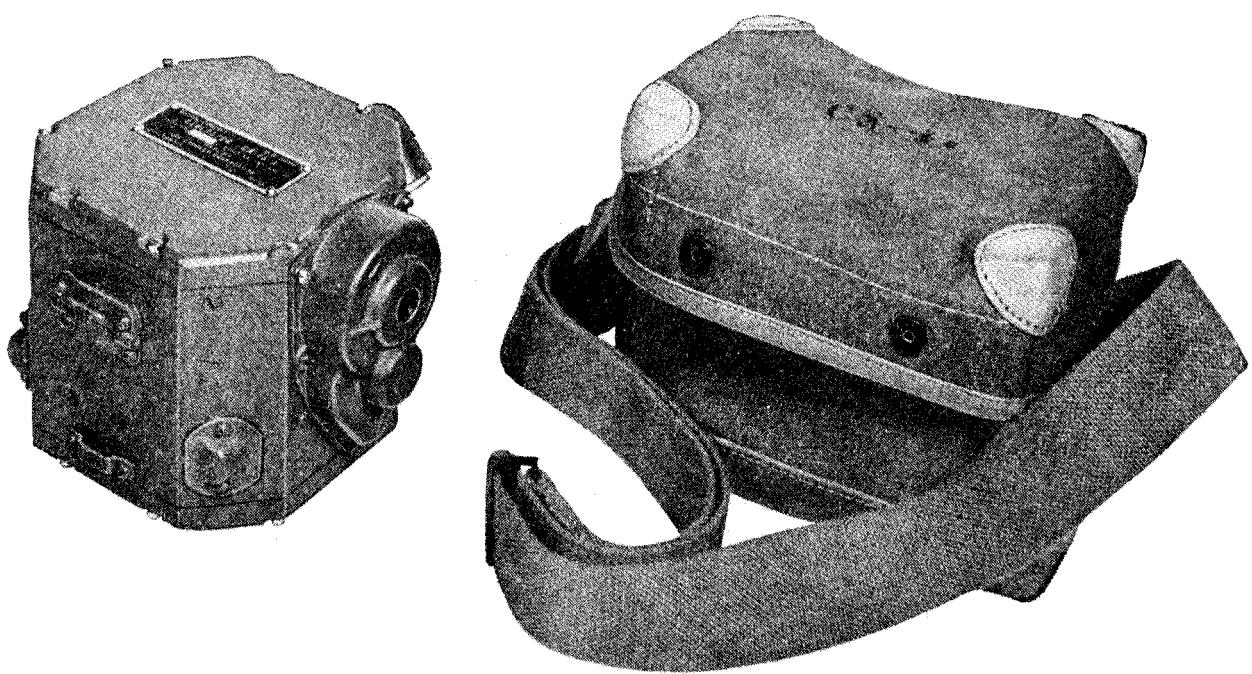


FIG. 39. GENERATOR GN-45-A, AND CASE CS-41

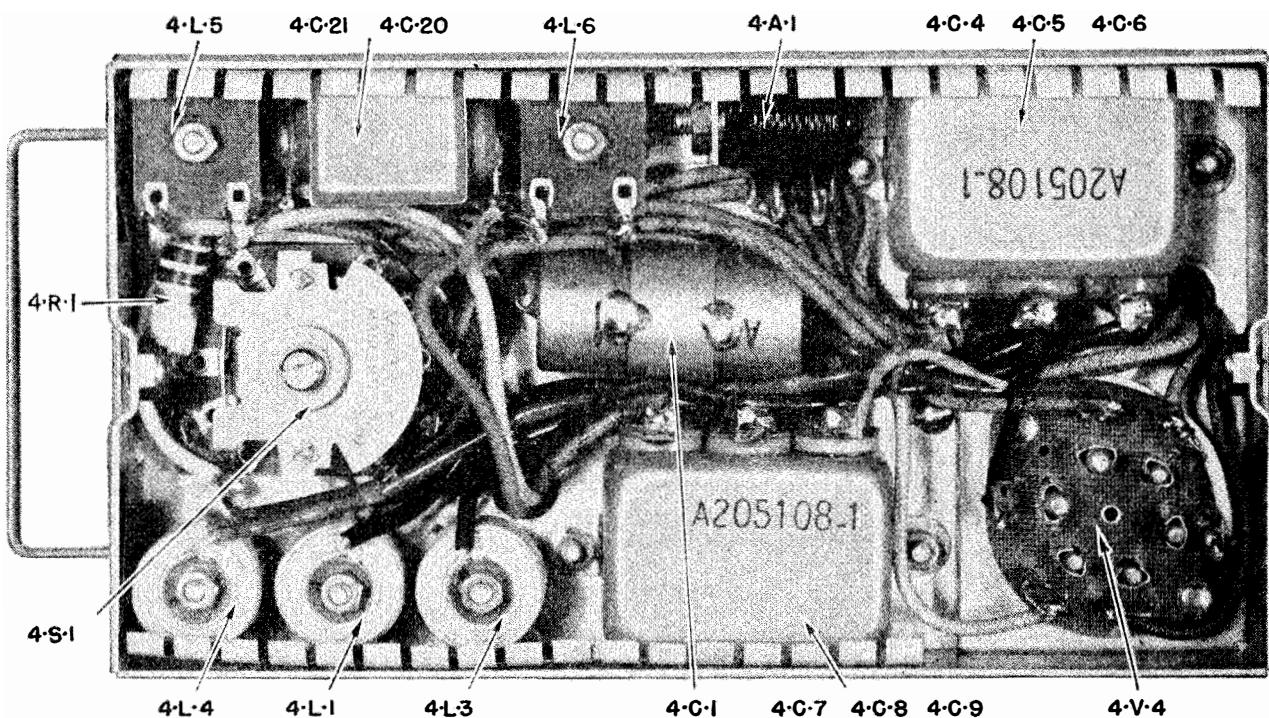


FIG. 40. POWER CONVERTER PE-104-A (BOTTOM COVER REMOVED)

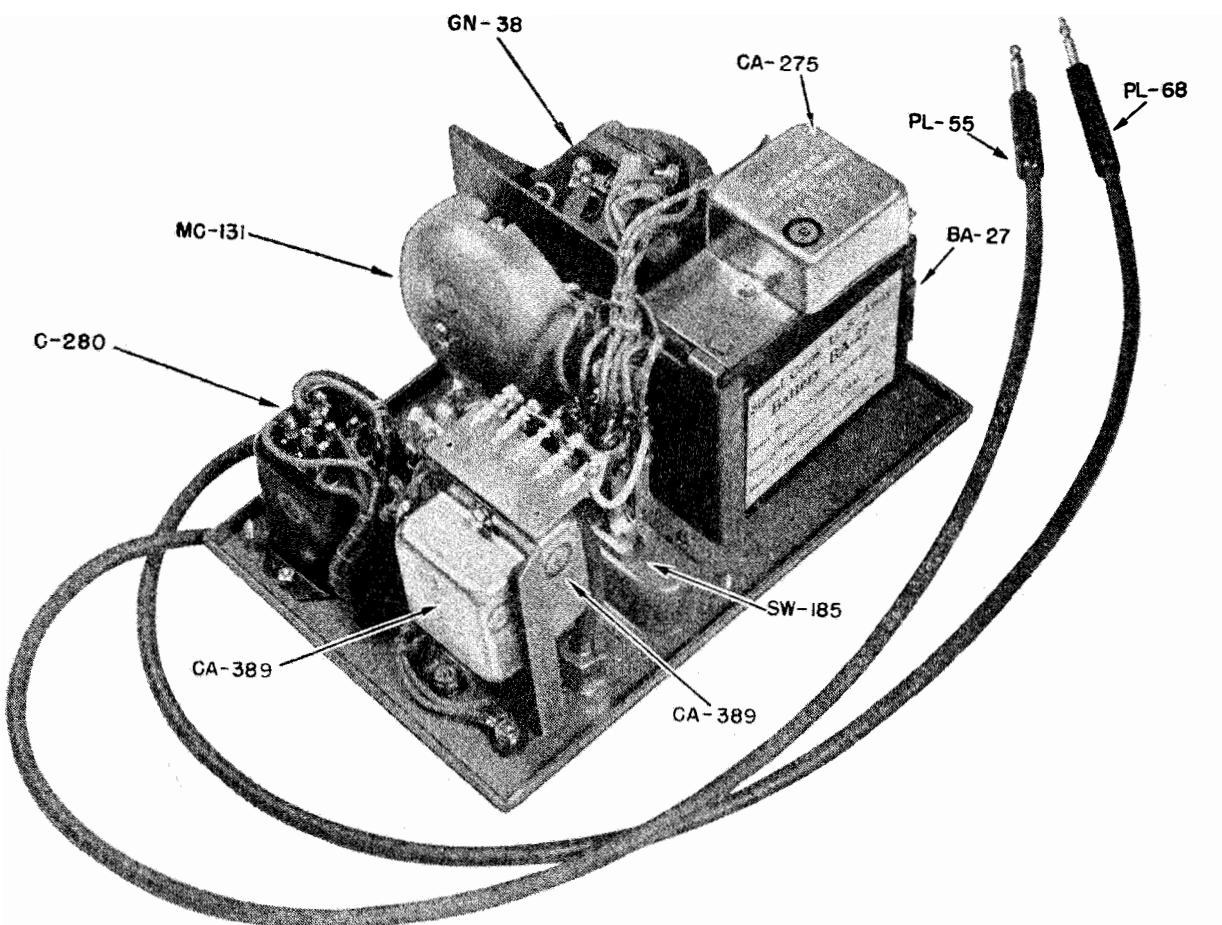


FIG. 41. REMOTE CONTROL UNIT RM-29-A (CASE REMOVED)

SECTION V. SUPPLEMENTARY DATA

42. REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
ADAPTER				
1		2Z262	(Standard), 5 prong tube base with modified octal base mounted in top.	Adapts 1-A-1 crystal to 5 prong socket
BINDING POSTS				
1			(Standard), brass, black nickel plated, $\frac{1}{2}$ " dia. x $1\frac{3}{5}$ ". (Crosley Dwg. No. W-215464-2.)	Ground connection on sets under 17,692
2		3Z772	(Special), terminal assem. binding post and spring mounted on threaded brass rod through ceramic feed-thru insulator.	Connections for antenna and ground
BRACKET ASSEMBLIES				
1		2Z8723.1	(Special), miniature bayonet socket and bracket assembly for sets using glass coil form.	Holds antenna tuning coil lamp (used only after No. 20891)
1		2Z5990-10	(Special), miniature bayonet socket and bracket assembly for sets using ceramic coil form.	Holds antenna tuning coil lamp (used only below No. 20892)
CAPACITORS (Fixed)				
1	1-C-1	3DA2.500-4	Fixed (Standard), .0025 μ f $\pm 5\%$, 500 v.d.c., mica, molded case $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Oscillator blocking capacitor
1	1-C-4	3DA22-1	Fixed (Standard), paper, .022 μ f, +20% —10%, 400 v.d.c., molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ".	Modulator screen by-pass
1	1-C-5	3D9033-1	Fixed (Standard), 33 μ uf $\pm 10\%$, 500 v.d.c., ceramic insulated, $\frac{7}{32}$ " dia. x $1\frac{1}{16}$ ". Wire leads.	Temperature compensator in oscillator circuit
1	1-C-6	3D9056-4	Fixed (Standard), 56 μ uf $\pm 10\%$, 500 v.d.c., ceramic insulated, $\frac{7}{32}$ " dia. x $1\frac{1}{16}$ ". Wire leads.	Temperature compensator in oscillator circuit
1	1-C-8	3DA22-1	Fixed (Standard), .022 μ f +20% —10%, 400 v.d.c., paper, molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ". Wire leads.	By-pass modulator audio return
1	1-C-9	3DA100-112	Fixed (Standard), .1 μ f —10% +20%, paper, molded in bakelite case, $\frac{3}{4}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ". Wire leads.	By-pass bias side of modulator output transformer
1	1-C-10	3D9015-17	Fixed (Standard), 15 μ uf $\pm 10\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	Couple oscillator grid to coil
1	1-C-11	3D9010-32	Fixed (Standard), 10 μ uf $\pm 20\%$, 500 v.d.c., ceramic insulated, $\frac{7}{32}$ " dia. x $\frac{7}{16}$ ". Wire leads.	Couple oscillator to intermediate power amplifier

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)**ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION**

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
CAPACITORS (Fixed) Continued				
1	1-C-12	3D9004E7-1	Fixed (Standard), $4.7 \mu\text{f} +20\% -0\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}'' \times \frac{7}{16}'' \times 1\frac{1}{16}''$. Wire leads.	In neutralizing network for intermediate power amplifier
1	1-C-13	3DA22-1	Fixed (Standard), $.022 \mu\text{f} +20\% -10\%$, 400 v.d.c., paper, molded bakelite case, $\frac{5}{16}'' \times \frac{3}{4}'' \times 1\frac{7}{16}''$. Wire leads.	By-pass oscillator filament to chassis
1	1-C-14	3DA22-1	Fixed (Standard), $.022 \mu\text{f} +20\% -10\%$, 400 v.d.c., paper, molded bakelite case, $\frac{5}{16}'' \times \frac{3}{4}'' \times 1\frac{7}{16}''$. Wire leads.	By-pass oscillator filament to chassis
1	1-C-15	3DA1-34	Fixed (Standard), $.001 \mu\text{f} +14\% -6\%$, 500 v.d.c., mica, molded bakelite case, $\frac{1}{4}'' \times \frac{3}{4}'' \times \frac{3}{4}''$. Wire leads.	By-pass oscillator plate supply
1	1-C-16	3D9033-2	Fixed (Standard), $33 \mu\text{f} \pm 10\%$, mica, molded bakelite case, $\frac{3}{16}'' \times \frac{7}{16}'' \times 1\frac{1}{16}''$. Wire leads.	Feedback capacitor
1	1-C-18	3DB4-59	Fixed (Special), paper, $4 \mu\text{f} \pm 20\%$, 100 v.d.c., sealed metal can, $1'' \times 2'' \times 2''$ with $\frac{3}{16}''$ dia. holes in mtg. ears. Two solder lug terminals.	Filament by-pass
1	1-C-19	3DB4-58	Fixed (Special), paper, $4 \mu\text{f} \pm 10\%$, 600 v.d.c., tubular oil filled sealed metal case, $1\frac{1}{2}''$ o.d. $\times 5\frac{7}{16}''$, requires $\frac{3}{4}''$ mtg. hole. Solder lug on screw terminal.	Modulator plate supply filter
1	1-C-20	3D9004E7-1	Fixed (Standard), $4.7 \mu\text{f} +20\% -0\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}'' \times \frac{7}{16}'' \times 1\frac{1}{16}''$. Wire leads.	In neutralizing network of I.P.A.
1	1-C-21	3DA100-112	Fixed (Standard), $.1 \mu\text{f} -10\% +20\%$, paper, molded in bakelite case, $\frac{3}{8}'' \times \frac{3}{4}'' \times 1\frac{7}{16}''$. Wire leads. (Used to replace $.0033 \mu\text{f}$ mica capacitor used in sets with serial numbers below 19820.)	By-pass crystal oscillator filament (Used in sets with serial numbers above 19819)
1	1-C-22	3DA3.300	Fixed (Standard), $.0033 \mu\text{f} \pm 10\%$, mica, molded bakelite case, $\frac{1}{4}'' \times \frac{3}{4}'' \times \frac{3}{4}''$. Wire leads.	By-pass of crystal oscillator plate supply
1	1-C-23	3DB4-58.1	Fixed (Special), paper, $4 \mu\text{f} \pm 10\%$, 600 v.d.c., tubular oil filled sealed metal case $1\frac{1}{2}''$ o.d. $\times 5\frac{7}{16}''$, requires $\frac{3}{4}''$ mtg. hole. Solder lug on screw terminal.	Receiver B+ supply filter

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	1-C-24	3DA22-1	Fixed (Standard), .022 μ f +20% —10%, 400 v.d.c., paper, molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{7}{16}$ ". Wire leads.	By-pass I.P.A. filament
1	1-C-25	3DA22-1	Fixed (Standard), .022 μ f +20% —10%, 400 v.d.c., paper, molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{7}{16}$ ". Wire leads.	By-pass I.P.A. filament
1	1-C-26	3DA22-1	Fixed (Standard), .022 μ f +20% —10%, 400 v.d.c., paper, molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{7}{16}$ ". Wire leads.	By-pass I.P.A. screen
1	1-C-29	3DA22-1	Fixed (Standard), .022 μ f —10% +20%, 400 v.d.c., paper, molded in bakelite case, $\frac{5}{16}$ " x $\frac{3}{4}$ " x $1\frac{7}{16}$ ". Wire leads.	AVC voltage delay by-pass
1	1-C-30	3DA5-22	Fixed (Standard), .005 μ f \pm 10%, 500 v.d.c., mica, molded bakelite case, $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass I.P.A. plate supply
1	1-C-31	3D9100-79	Fixed (Standard), .0001 μ f \pm 10%, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	Coupling I.P.A. to P.A.
1	1-C-33	3DA10-53	Fixed (Standard), .01 μ f \pm 10%, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass P.A. filament
1	1-C-34	3DA3.300	Fixed (Standard), .0033 μ uf \pm 10%, mica, molded bakelite case, $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass power amplifier screen
1	1-C-35	3DA100-112	Fixed (Standard), paper, .1 μ f +20% —10%, 400 v.d.c., molded in bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{7}{16}$ ". Wire leads.	By-pass from —6 bus to ground
1	1-C-36	3DA10-53	Fixed (Standard), .01 μ f \pm 10%, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass power amplifier filament
1	1-C-37	3DA10-53	Fixed (Standard), .01 μ f \pm 10%, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass power amplifier filament
1	1-C-38	3DA1-34	Fixed (Standard), .001 μ f +14% —6%, mica, molded bakelite case, $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	By-pass power amplifiers suppressor
1	1-C-42	3DA10-65	Fixed (Standard), .01 μ f \pm 5%, 1200 v.d.c., mica, molded bakelite case, $\frac{7}{16}$ " x $1\frac{7}{8}$ " x $1\frac{5}{16}$ ", mtg. centers $1\frac{5}{16}$ ".	Tune P.A. circuit

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	1-C-43	3DA10-65	Fixed (Standard), .01 μ f $\pm 5\%$, 1200 v.d.c., mica, molded bakelite case, $\frac{7}{16}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers $1\frac{5}{16}$ ".	By-pass power amplifier plate supply
1	1-C-44	3D9050-71	Fixed (Standard), 50 $\mu\mu$ f $\pm 10\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers above 9500)
1	1-C-44		Fixed (Standard), 500 $\mu\mu$ f $+14\% -6\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers below 9501)
1	1-C-45	3D9050-71	Fixed (Standard), 50 $\mu\mu$ f $\pm 10\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers above 9500)
1	1-C-45		Fixed (Standard), 500 $\mu\mu$ f $+14\% -6\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers below 9501)
1	1-C-46	3D9050-71	Fixed (Standard), 50 $\mu\mu$ f $\pm 10\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers above 9500)
1	1-C-46		Fixed (Standard), 200 $\mu\mu$ f $+14\% -6\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers below 9501)
1	1-C-47	3D9150-16	Fixed (Standard), 150 $\mu\mu$ f $\pm 10\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers above 9500)
1	1-C-47		Fixed (Standard), 100 $\mu\mu$ f $+14\% -6\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers below 9501)
1	1-C-48		Fixed (Standard), 100 $\mu\mu$ f $+14\% -6\%$, 2500 v.d.c., mica, molded bakelite case, $1\frac{1}{32}$ " x $1\frac{1}{8}$ " x $1\frac{5}{16}$ ", mtg. centers spaced $1\frac{5}{16}$ ".	Antenna matching (Used in sets with serial numbers below 9501)
1	1-C-49	3DA250-43	Fixed (Standard), .25 μ f $-10\% +20\%$, 200 v.d.c., paper, molded in bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{5}{16}$ ".	Kecklick filter
1	1-C-50	3D9010-32	Fixed (Standard), 10 $\mu\mu$ f $\pm 20\%$, 500 v.d.c., ceramic insulated, $\frac{7}{32}$ " dia. x $\frac{7}{16}$ ". Wire leads.	I.P.A. padder

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Variable)				
1	1-C-2	3D9147A2	Variable (Special), air dielectric, min. cap. less than 12 $\mu\mu f$, max. cap. 147 $\mu\mu f$, 4-sections, 19 plates per section, .020" air gap. (1000 V. test), Mycalex insulation, shaft $\frac{1}{4}$ " dia. projects $1\frac{5}{16}$ ".	Ganged tuning capacitor; 1-C-2 oscillator tuning, 1-C-3 oscillator tuning, 1-C-28 intermediate power amplifier tuning, 1-C-41 power amplifier tuning
1	1-C-7	* (1)	Variable (Special), single section, air dielectric trimmer, min. capacity less than 6 $\mu\mu f$, max. cap. more than 19 $\mu\mu f$, air gap .026", ceramic insulation, shaft $\frac{1}{4}$ " dia. x $3\frac{1}{32}$ ".	Oscillator trimmer
1	1-C-17	3D9020V-8	Variable (Standard), single section, ceramic insulated trimmer, 5 to 20 $\mu\mu f \pm 20\%$, screw driver adjustment, $\frac{3}{8}$ " x $\frac{5}{8}$ " x $\frac{7}{8}$ ".	Neutralizing adjustment of I.P.A.
1	1-C-32	3D9020V-8	Variable (Standard), ceramic insulated trimmer, 5 to 20 $\mu\mu f \pm 20\%$, single section, screw driver adjustment, $\frac{3}{8}$ " x $\frac{5}{8}$ " x $\frac{7}{8}$ ".	I.P.A. trimmer
1	1-C-39	3D9013V-1	Variable (Standard), single section, air dielectric trimmer, 3 $\mu\mu f$, to more than 13 $\mu\mu f$, 4-plates, screw driver adjustment.	Power amplifier neutralizing capacitor, mounts on top of 1-L-3, 1-L-4
1	1-C-40	* (2)	Variable (Special), single section, air dielectric trimmer, min. cap. less than 6 $\mu\mu f$, max. cap. more than 34 $\mu\mu f$, air gap .026", ceramic insulation, shaft $\frac{1}{4}$ " dia. x $3\frac{1}{32}$ " long.	Power amplifier tuning trimmer capacitor
CHOKES				
1	1-L-2	3C308-4	(Special), freq. range 3800 to 5800 kc., 2.1 mh, max. current 125 ma., distributed cap. 1 $\mu\mu f$, $1\frac{5}{32}$ " dia. x $1\frac{1}{2}$ ", wire terminals.	In crystal oscillator plate circuit. To block radio frequency current
1	1-L-5	3C308-4	(Special), freq. range 3800 to 5800 kc., 2.1 mh, max. current 125 ma., distributed cap. 1 $\mu\mu f$, $1\frac{5}{32}$ " dia. x $1\frac{1}{2}$ ", wire terminals.	Series grid choke, to power amplifier grids
1	1-L-9	3C338-1	(Special), approx. $8\frac{1}{2}$ " of wire per coil, 6 turns No. 18, green, blk. tracer, interchangeable with 1-L-10.	Key-click filter
1	1-L-10	3C338	(Special), approx. $8\frac{1}{2}$ " of wire per coil, 6 turns No. 18, green, yellow tracer, interchangeable with 1-L-9.	Key-click filter

* (1) Modified Hammarlund MC-20-S or equivalent. Crosley Dwg. No. B-211105-6.
 * (2) Modified Hammarlund MC-35-S or equivalent. Crosley Dwg. No. B-211105-7.

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
COIL ASSEMBLIES				
1	1-L-1	3C1081-5B	Osc. coil assembly (Special), 1 $\frac{1}{4}$ " winding length on a $\frac{3}{4}$ " o.d., form mounted in shield can 1 $\frac{1}{2}$ " o.d., x 2 $\frac{3}{8}$ ". Coil, 3750-5850 kc., 16 μ h.	Master oscillator coil
1	1-L-3 1-L-4	3C4123	I.P.A. assembly (Special), 2-windings on form $\frac{3}{4}$ " o.d. x 2 $\frac{3}{8}$ ", mounted in shield 1 $\frac{1}{2}$ " o.d., x 2 $\frac{3}{8}$ ", coil 1-L-3 is 8.1 μ h, 1-L-4 is 8.4 μ h, 3750-5850 kc.	I.P.A. coil
1	1-L-6 1-L-7	3C2511	Coil assembly (Special), laminated phenolic, stator coil 1 $\frac{5}{8}$ " o.d., x 3 $\frac{1}{16}$ ", 19 threads at 14 threads per inch. Rotor coil mounted on rotating shafts, form 1" o.d. x $\frac{3}{4}$ ". 1-L-6 is 8.1 μ h, 1-L-7 is 2.2 μ h, 3750-5850 kc.	P.A. tank and coupling coil
1	1-L-8		(Special), rotating tuning coil assembly with roller contact. Form ceramic, to set No. 20,891, thereafter glass. Assembly (with glass form) No. B-215787-10, cannot be used as a replacement for B-215027-2 (ceramic). Inductance from approx. zero to 25 μ h.	Used in conjunction with capacitor switching arrangement to tune various antenna systems
CONNECTORS				
1	1-K-2	2Z7118.9	(Special), molded bakelite, similar to octal tube base, with metal cover.	Cable connector to battery or vibrator
2		2Z8671.6	(Special), single contact, bakelite base, $\frac{1}{16}$ " x $\frac{3}{8}$ " x $1\frac{5}{16}$ ", (2) mounting holes spaced .687".	Receptacle for antenna cable
1	1-K-3	2Z7118.1	Cable connector (Standard), 8-contacts, approx. $1\frac{13}{16}$ " x $1\frac{7}{8}$ " x 1 $\frac{1}{4}$ ".	Power cord connector on transmitter panel
COUPLER				
1		2Z3269-4	(Standard), porcelain disc with metal collars $\frac{1}{4}$ " i.d. secured to each side.	Mechanical connection between coupling control knob and coupling coil
COVER				
2		2Z3403.11	Aluminum cap from Gits Bros. Mfg. Co. No. 305 oiler, $\frac{3}{4}$ " o.d., rolled edge.	Cover for MIC. and KEY jacks and CALIBRATION adjustment

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
CRYSTAL				
1	1-A-1	2Z3541A-200	(Standard), DC-24 (200 kc. crystal in FT-241-A case), 2 prongs fit standard octal socket, approx. $1\frac{1}{8}''$ x $1\frac{1}{8}''$ x $\frac{7}{16}''$. This crystal furnished instead of DC-12 on all sets after Serial No. 17,691 and on some other sets. Adapter 2Z262 must be supplied when DC-24 is used as a replacement for DC-12.	Calibration checking
FUSE CLIPS				
2		3Z1026-2	(Standard), .032" copper, nickel plated, 30-amp. cartridge fuse clip.	Bracket for dial light tool
HANDLE				
1		6Z5016-1	(Special), C-shaped flat strip $\frac{3}{8}''$ wide formed to $1\frac{5}{16}''$ x $\frac{7}{8}''$.	For convenience in handling
JACKS				
1	1-J-1	2Z5995	Assembly (Special), open circuit, $\frac{1}{4}''$ i.d. sleeve threaded $\frac{3}{8}$ -32.	Receptacle for telegraph key plug
1	1-J-2	2Z5595-1	Three circuit jack (Standard), three connection, to fit Western Electric plug No. 309.	Microphone input. Connection to tip, ring and sleeve of microphone plug
KNOBS				
1		2Z5824.1	Black bakelite (Standard), $1\frac{1}{2}''$ o.d., brass insert $\frac{1}{4}''$ i.d.	Antenna coupling coil operation
1		2Z5790-6	(Special), black bakelite, knurled, $\frac{3}{4}''$ o.d., brass insert $\frac{1}{4}''$ i.d.	Operate dial lock (Used only on sets with serial numbers above 17691)
1		2Z5822-2	Heavy duty (Standard), black bakelite, pointer type knob, approx. overall size $\frac{3}{4}''$ wide x $1\frac{1}{2}''$ long. Brass insert $\frac{1}{4}''$ i.d.	Antenna selector switch operation
1		2Z5822-1	(Special), black bakelite, fluted knob $1\frac{5}{8}''$ o.d., skirt $2''$ o.d., overall thickness of knob $\frac{7}{8}''$, counter-bored $\frac{1}{4}''$ i.d., $\frac{3}{4}''$ o.d. knob mounted on rim.	Operates transmitter tuning capacitor
2		2Z5824.2	Bar (Standard), Type HRP, black bakelite $\frac{1}{2}''$ x $\frac{1}{16}''$ x $1\frac{1}{4}''$. Brass insert $\frac{1}{4}''$ i.d., white pointer line full length extending over both ends.	LOW-OFF-HIGH and CW-OFF-VOICE switch operation
1		2Z5824.4	(Special), black bakelite, $\frac{1}{2}''$ x $\frac{1}{16}''$ x $\frac{3}{4}''$.	Operate crystal switch

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
KNOBS (Continued)				
1			(Special), black bakelite, $1\frac{5}{8}$ " o.d. x $\frac{7}{16}$ ", tapered square hole in center. Bakelite knob $\frac{3}{4}$ " o.d. mtd. on rim, brass insert $\frac{1}{4}$ " i.d. (Crossley Dwg. No. W-215455-1.)	Drives antenna coil shaft (Used only on sets with serial numbers below 20892)
1		2Z3407	(Special), $1\frac{1}{2}$ " dia. knob with $\frac{3}{4}$ " dia. knob mounted on rim.	Drives antenna coil shaft (Used only on sets with serial numbers above 20891)
LAMPS				
1	1-A-2	2Z5964	(Standard), 6-8 volts, .15 ampere. Miniature bayonet base.	Dial light
1-A-3				
LATCH				
6		3Z4115	Knurled steel slotted head $\frac{3}{4}$ " o.d., screw $1\frac{1}{16}$ " long threaded 10-24, and bar with $\frac{1}{4}$ " right angle bend, overall dim. $\frac{1}{8}$ " x $\frac{5}{16}$ " x 1". Includes washer, spring and pin.	Secure set in case
LUGS				
2		3Z12012	Lug and bolt assembly (Special), 1" wide x $3\frac{1}{4}$ " long, one round and one square hole in flat portion.	Terminals on ends of battery cables
METER				
1	1-M-1	3F349	(Special), radio frequency (thermo-couple type) ammeter, bakelite case.	Antenna current indicator
RELAY				
1	1-E-1	2Z7650.5	(Special), type "C" contacts: one single pole—double throw, five single pole—single throw.	Keying relay
RESISTORS (Fixed)				
1	1-R-1	3Z4550	Fixed (Standard), composition, 100,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Keying resistor
1	1-R-3	3Z6647-3	Fixed (Standard), composition, 47,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Modulator screen voltage divider
1	1-R-4	3Z6647-3	Fixed (Standard), composition, 47,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	B+ voltage divider for oscillator
1	1-R-5	3Z6470-18	Fixed (Standard), composition, 4700 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Voltage divider to modulator screen

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
RESISTORS (Fixed) Continued				
1	1-R-6	3Z4614	Fixed (Standard), composition, 15,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	B+ voltage divider for oscillator
1	1-R-7	3Z6001D4-1	Fixed (Standard), wire wound, 14 ohms $\pm 5\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Filament series resistor
1	1-R-8	3Z6647-3	Fixed (Standard), composition, 47,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Shunt secondary of transformer 1-T-2
1	1-R-9	3Z6722-1	Fixed (Standard), composition, 220,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Crystal oscillator grid leak
1	1-R-10	3Z6120-8	Fixed (Standard), composition, 1200 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Protective resistor between case and A—
1	1-R-11	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire terminals.	Oscillator grid resistor
1	1-R-12	3Z6622-2	Fixed (Standard), composition, 22,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Screen voltage divider for I.P.A.
1	1-R-13	3Z4529	Fixed (Standard), composition, 10,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Bias resistor for 1-V-3 and 1-V-4 tubes
1	1-R-14	3Z6639-7	Fixed (Standard), composition, 39,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Series resistor bias I.P.A.
1	1-R-15	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	I.P.A. grid resistor
1	1-R-16	3Z6470-18	Fixed (Standard), composition, 4700 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	I.P.A. bias resistor
1	1-R-17	3Z6668	Fixed (Standard), composition, 68,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	I.P.A. screen voltage divider
1	1-R-18	3Z6022-16	Fixed (Standard), wire wound, $\frac{1}{2}$ watt, 220 ohms $\pm 5\%$, molded phenolic, $\frac{3}{16}$ " x $\frac{5}{8}$ ". Wire leads.	Audio frequency balance resistor

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
RESISTORS (Fixed) Continued				
1	1-R-19	3Z6015-19	Fixed (Standard), wire wound, $\frac{1}{2}$ watt, 150 ohms $\pm 5\%$, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Axial wire terminals.	Audio frequency balance resistor
1	1-R-20	3Z6582-6	Fixed (Standard), composition, 8200 ohms $\pm 10\%$, 1 watt, molded phenolic, $\frac{1}{4}$ " dia. x $1\frac{1}{4}$ ". Wire leads.	I.P.A. plate dropping resistor
1	1-R-21	3Z6623	Fixed (Standard), wire wound, 23,000 ohms $\pm 5\%$, 14.4 watts, molded phenolic, bracket mounting, $1\frac{1}{16}$ " x $4\frac{1}{2}$ ". Solder lug terminals.	B+ voltage divider
1	1-R-22	3Z6010-52	Fixed (Standard), composition, 100 ohms $\pm 10\%$, 1 watt, molded phenolic, $\frac{1}{4}$ " dia. x $1\frac{1}{4}$ ". Wire leads.	Parasitic suppressor in grid circuit of power amplifier
1	1-R-23	3Z6010-52	Fixed (Standard), composition, 100 ohms $\pm 10\%$, 1 watt, molded phenolic, $\frac{1}{4}$ " dia. x $1\frac{1}{4}$ ". Wire leads.	Parasitic suppressor in grid circuit of power amplifier
1	1-R-24	3Z6640-24	Fixed (Standard), wire wound, 40,000 ohms $\pm 5\%$, 10 watts, ceramic case, $\frac{7}{16}$ " dia. x $1\frac{15}{32}$ ". Wire leads.	Voltage divider to modulator plate and screen
1	1-R-25	3Z6590-4	Fixed (Standard), wire wound, 9000 ohms $\pm 5\%$, 10.9 watts, molded phenolic, bracket mtg. $1\frac{1}{16}$ " x $3\frac{1}{2}$ ". Solder lug terminals.	Voltage divider in +500 supply (Replaces 16000 ohms in sets below No. 3501)
1	1-R-26	3Z6616E5	Fixed (Standard), wire wound, 16,500 ohms $\pm 5\%$, 5 watts, ceramic case, $\frac{7}{16}$ " dia. x $1\frac{15}{32}$ ". Wire leads.	Voltage divider in +500 supply (Replaces 39000 ohms in sets below 3501)
1	1-R-27	3Z6590-4	Fixed (Standard), wire wound, 9000 ohms $\pm 5\%$, 10.9 watts, molded phenolic, bracket mtg., $1\frac{1}{16}$ " x $3\frac{1}{2}$ ". Solder lug terminals.	Voltage divider in positive 500-volt supply
1	1-R-28	3Z6722-1	Fixed (Standard), composition, 220,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Modulator gain reduction for LOW power
1	1-R-29	3Z6756-7	Fixed (Standard), composition, 560,000 ohms $\pm 10\%$, $\frac{1}{3}$ watt, Isolantite insulation, $\frac{1}{4}$ " dia. x $\frac{3}{4}$ ". Wire leads.	Power amplifier neutralizing capacitor flash preventor
1	1-R-30	3Z6250-35	Fixed (Standard), wire wound, 2500 ohms $\pm 5\%$, 14.4 watts, molded phenolic, $1\frac{1}{16}$ " x $4\frac{1}{2}$ ", bracket mtg. Solder lug terminals.	Voltage divider to screens of power amplifier

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
RESISTORS (Fixed) Continued				
1	1-R-31	3Z6250-35	Fixed (Standard), wire wound, 2500 ohms $\pm 5\%$, 14.4 watts, molded phenolic, $1\frac{1}{16}$ " x $4\frac{1}{2}$ ", bracket mtg. Solder lug terminals.	Voltage divider to screens of power amplifier
1	1-R-32	3Z4525	Fixed (Standard), composition, 1000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $5\frac{5}{8}$ ". Wire leads.	Suppressor grid resistor in power amplifier
1	1-R-34	3Z6747-1	Fixed (Standard), composition, 470,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $5\frac{5}{8}$ ". Wire leads.	Screen resistor
1	1-R-35	3Z6047	Fixed (Standard), composition, 470 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $5\frac{5}{8}$ ". Wire leads.	Keying resistor
1	1-R-36	3Z4550	Fixed (Standard), composition, 100,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $5\frac{5}{8}$ ". Wire leads.	Modulator grid filter
1	1-R-37	3Z6012-8	Fixed (Standard), composition, 120 ohms $\pm 10\%$, 2 watts, molded phenolic, $\frac{5}{16}$ " dia. x $1\frac{3}{4}$ ". Wire leads.	Shunt across relay coil
RESISTOR (Variable)				
1	1-R-2	2Z7272-1	Variable (Special), 500,000 ohms, with "D" curve, slotted shaft.	Modulation control
SLEEVE				
1		3G2300-8	(Special), phenolic tubing $\frac{1}{2}$ " o.d. x $1\frac{1}{16}$ ".	Dial light socket insulator
SOCKETS				
3		2Z8678.23	Ceramic (Standard), octal socket. Cad. plated steel saddle, standard $1\frac{1}{2}$ " mtg. centers. Mtg. hole $1\frac{1}{8}$ ".	For mounting tubes 1-V-1, 1-V-2, 1-V-6
1	1-V-7	2Z8763.4	Ceramic (Standard), 5-prong, overall dim. $1\frac{3}{8}$ " x $2\frac{1}{8}$ " x $1\frac{3}{16}$ ". Mtg. holes spaced $1\frac{7}{8}$ ".	For mounting crystal 1-A-1
1		2Z8678.4	(Special), octal, shock mounted in rubber.	For mounting modulator tube 1-V-5
2		2Z8675	Shell assembly. Socket ceramic, five prong. Nickel plated steel shell, permits under surface mtg., approx. overall $2\frac{13}{16}$ " o.d. x $1\frac{3}{16}$ ".	For mounting power amplifier tubes 1-V-3 and 1-V-4
1		2Z8675	Shell assembly. Socket ceramic, five prong. Nickel plated steel shell, permits under surface mtg., approx. overall $2\frac{3}{16}$ " o.d. x $1\frac{3}{16}$ ".	Mounting spare for VT-225 307-A tube

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
SOCKETS				
2		2Z8659-6	Phenolic octal socket. Cad. plated steel saddle, std. 1½" mtg. centers, mtg. hole 1⅛".	Mounting spares for 2-V-6, 2-V-7, 1-V-1, 1-V-2, 1-V-5 and 1-V-6
1		2Z5987.2	(Special), miniature bayonet base socket mounted on cylindrical bracket 1½" i.d. x ¾".	Transmitter tuning dial lamp socket
SPACERS				
1		3G1250-6.2	(Special), ceramic ⅜" dia. x 1¼", both ends tapped 6-32.	Insulating spacer
1		3G1250-8.5	(Special), ceramic ½" dia. x ½", both ends tapped 6-32.	Insulating spacer
4		3G1250-8.4	(Standard), ceramic ½" dia. x ½", both ends tapped 8-32.	Insulating spacer
SWITCHES				
1	1-S-1	3Z9825-63.3	Switch Assembly (Special), No stop, three-section, six positions, rotor and stator blades solid silver, ceramic insulation. Single hole mount bushing threaded ⅜-32. Approx. overall size 2¾" x 1⅞". Shaft ¼" dia.	CW-OFF-VOICE switch
1	1-S-2	3Z9815	Push-pull type, frame and shaft steel. Silver plated contacts. ⅜" dia. Mtg. holes spaced 1.625". Body is approx. ½" x 1⅓" x 1⅛". Shaft ⅛" x ⅜" (flat). Top section makes three connections in "OFF" position. In "ON" position, four. Bottom section no connections in "OFF" position.	OFF-ON switch for crystal oscillator
1	1-S-3	3Z9825-63.2	Switch Assembly (Special). No stop position, single section, six position, rotor and stator blades solid silver, ceramic insulation. Switch mounts on metal bracket. Approx. overall 1⅞" x 5". Combination flexible and rigid shaft.	LOW-OFF-HIGH power switch
1	1-S-4	3Z9825-63.1	Selector switch assembly (Special), single section, 5-position rotary switch, ceramic insulation. Solid silver contacts, stainless steel mtg. plate.	Used in antenna matching system in sets with serial numbers above 9500
1	1-S-4		Selector switch assembly (Special), single section, 5-position rotary switch, ceramic insulation, silver contacts. (Crosley Dwg. No. W-211526-4.)	Used in antenna matching system in sets with serial numbers below 9501

REPLACEABLE PARTS FOR TRANSMITTER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
SWITCHES (Continued)				
1	1-S-5	3Z9858-10	Triple pole, single throw, rated 5 amps at 25 v.d.c., all sections normally open, closed when depressed. Approx. overall size $\frac{9}{16}$ " x $2\frac{1}{2}$ " x $5\frac{7}{8}$ ". Plunger .050" x .312".	Battery door switch
1	1-S-6	3Z9858-10.1	Toggle (Special), single pole, single throw, 100 volts, 3 amperes, size $1\frac{3}{32}$ " x .468". Mtg. holes tapped 4-36 and spaced 1.062".	Case interlock protective switch
1	1-S-7	3Z9812-4	Toggle (Special), triple pole single throw. Approx. $\frac{3}{8}$ " x $1\frac{1}{8}$ " x $2\frac{1}{4}$ ".	Battery saver switch
TRANSFORMERS				
1	1-T-1	2Z9631.28	(Special), d.c. resistance of primary 45.5 ohms, secondary 1250 ohms $\pm 10\%$, ratio 1:10, 1" dia. x $1\frac{1}{2}$ " long.	Modulator input transformer
1	1-T-2	2Z9634.5	Shielded (Special), pri. 600 ohms $\pm 10\%$, secondary, 1100 ohms $\pm 10\%$, d.c. resistance, size $1\frac{1}{2}$ " dia. x $2\frac{1}{8}$ " long. Slotted solder post terminals. Mtg. holes tapped 8-32 and spaced 1.125".	Modulator output
TUBES				
1	1-V-1	2V3Q5GT	VT-221, 3Q5GT.	Oscillator tube
1	1-V-2	2V3Q5GT	VT-221, 3Q5GT.	i-p-a tube
2	1-V-3 1-V-4	2V307A	VT-225, 307A.	Power amplifier tube
1	1-V-5	2V3Q5GT	VT-221, 3Q5GT.	Modulator tube
1	1-V-6	2V3Q5GT	VT-221, 3Q5GT.	Crystal oscillator tube
1 for 1-V-3 or 1-V-4	2V307A	VT-225, 307A.	Spare	
1 for 1-V-1, 1-V-2, 1-V-5, or 1-V-6	2V3Q5GT	VT-221, 3Q5GT.	Spare	
1 for 2-V-1, 2-V-3, or 2-V-4	2T146	VT-146, 1N5GT.	Spare	
WASHER				
2		6L52011-1	(Special), $\frac{1}{16}$ " x .380" i.d. x $\frac{5}{8}$ " o.d.	Panel jack insulating washer

43. REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
BUMPERS				
1			(Special), soft rubber $\frac{1}{2}$ " o.d., $\frac{5}{16}$ " o.d. slot. (Crosley Dwg. No. W-214520-1.)	Battery plug bumper
1			(Special), rubber, $\frac{1}{2}$ " o.d. x $\frac{3}{8}$ " i.d. (Crosley Dwg. No. W-214133-1.)	Plunger cushion (battery door)
CABLE				
2		1F4A2.1	(Special), concentric line $9\frac{3}{4}$ " long, woven cloth covered. Lug connection.	Antenna connection
CAPACITORS (Fixed)				
1	2-C-1	3D9051-2	Fixed (Standard), $51 \mu\text{f} \pm 5\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	Antenna coil padder
1	2-C-4	3DA10-53	Fixed (Standard), $.01 \mu\text{f} \pm 20\%$, 300 v.d.c., mica, molded bakelite case, $\frac{3}{4}$ " x $\frac{3}{4}$ " x $1\frac{1}{32}$ ". Wire leads.	AVC line blocking
1	2-C-5	3DA250-43	Fixed (Standard), $.25 \mu\text{f} -10\% +20\%$, 200 v.d.c., paper insulation, molded bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ".	r-f plate by-pass
1	2-C-6	3DA10-53	Fixed (Standard), $.01 \mu\text{f} \pm 10\%$, 300 v.d.c., mica, molded bakelite case, $\frac{9}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	r-f to converter coupling
1	2-C-7	3D9030-14	Fixed (Standard), $39 \mu\text{f} \pm 5\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	r-f parallel padder
1	2-C-10	3DA250-43	Fixed (Standard), $.25 \mu\text{f} -10\% +20\%$, 200 v.d.c., paper, molded bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ".	AVC filter
2	2-C-11 2-C-12	(See 2-L-4, 2-L-5)	Fixed (Standard), $270 \mu\text{f} \pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ".	Tune 1st i-f transformer (Part of 2-L-4, 2-L-5 assembly)
1	2-C-13	3DA10-53	Fixed (Standard), $.01 \mu\text{f} \pm 10\%$, 300 v.d.c., mica dielectric, molded bakelite case, $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Plate converter by-pass
1	2-C-14	3DA10-53	Fixed (Standard), $.01 \mu\text{f} \pm 10\%$, 300 v.d.c., mica dielectric, molded bakelite case, $\frac{9}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	1st i-f AVC filter
1	2-C-15	3DA10-53	Fixed (Standard), $.01 \mu\text{f} \pm 10\%$, 300 v.d.c., mica, molded bakelite case, $\frac{9}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Converter screen by-pass

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	2-C-16	3DA10-53	Fixed (Standard), .01 μf $\pm 10\%$, 300 v.d.c., mica dielectric, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	1st i-f screen and plate by-pass
1	2-C-17	3D9015-17	Fixed (Standard), $15 \mu\mu\text{f}$ $\pm 10\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$. Wire leads.	Oscillator coupling
1	2-C-18	3D297	Fixed (Standard), $1600 \mu\mu\text{f}$ $\pm 2\%$, 500 v.d.c., mica, molded bakelite case, $\frac{1}{4}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	Oscillator series padder
1	2-C-19	3DA1.050-1	Fixed (Standard), $1050 \mu\mu\text{f}$ $\pm 2\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{4}''$ x $\frac{3}{4}''$ x $\frac{1}{4}''$. Wire leads.	Oscillator series padder
1	2-C-20	3DA10-53	Fixed (Standard), .01 μf $\pm 10\%$, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	Oscillator plate blocking
1	2-C-21		Fixed (Standard), $68 \mu\mu\text{f}$ $+0\% -10\%$, 500 v.d.c., ceramic insulation, $\frac{5}{16}''$ dia. x $1\frac{1}{16}''$. Wire leads.	Oscillator parallel padder
1	2-C-24		Fixed (Standard), $56 \mu\mu\text{f}$ $+0\% -10\%$, 500 v.d.c., ceramic insulation, $\frac{5}{16}''$ dia. x $1\frac{1}{16}''$. Wire leads.	Oscillator parallel padder
2	2-C-26 2-C-27	(See 2-L-6, 2-L-7)	Fixed (Standard), $270 \mu\mu\text{f}$ $\pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$.	Tune 2nd i-f transformer (Part of 2-L-6, 2-L-7 assembly)
1	2-C-28	3DA10-53	Fixed (Standard), .01 μf $\pm 10\%$, 300 v.d.c., mica dielectric, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	2nd i-f screen and plate by-pass
	2-C-29		Fixed (Standard), .01 μf $\pm 20\%$, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	By-pass (Part of 2-L-8 assembly)
	2-C-30		Fixed (Standard), $22 \mu\mu\text{f}$ $\pm 10\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$. Wire leads.	Blocking capacitor (Part of 2-L-8 assembly)
1	2-C-31	3DA10-53	Fixed (Standard), .01 μf $\pm 10\%$, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	BFO filament by-pass
2	2-C-32 2-C-33	(See 2-L-9, 2-L-10)	Fixed (Standard), $270 \mu\mu\text{f}$ $\pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$.	Tune 3rd i-f transformer (Part of 2-L-9, 2-L-10 assembly)
1	2-C-34	3D9100-79	Fixed (Standard), $100 \mu\mu\text{f}$ $\pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$. Wire leads.	Diode load filter

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	2-C-35	3D9100-79	Fixed (Standard), 100 μf $\pm 5\%$, 500 v.d.c., ceramic, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	Diode load filter (Used only on sets with serial numbers below 17692)
1	2-C-35	3D9680	Fixed (Standard), 680 μf $\pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads. (Should be used to replace 100 μf mica capacitor used in sets with serial numbers below 17692.)	Diode load filter (Used only on sets with serial numbers above 17691)
	2-C-36		Fixed (Standard), 270 μf $\pm 10\%$, 500 v.d.c., mica dielectric, molded bakelite case, $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Tune BFO coil (Part of 2-L-8 assembly)
1	2-C-37	3DA3.300	Fixed (Standard), .0033 μf $\pm 10\%$, mica, 500 v.d.c., $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Audio coupling to output tube
1	2-C-38	3D9680	Fixed (Standard), 680 μf $\pm 10\%$, 500 v.d.c., mica, molded bakelite case, $\frac{3}{16}$ " x $\frac{7}{16}$ " x $1\frac{1}{16}$ ". Wire leads.	Audio plate by-pass for first stage
1	2-C-39	3DA3.300	Fixed (Standard), .0033 μf $\pm 10\%$, 500 v.d.c., mica, molded phenolic case, $\frac{1}{4}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	Audio coupling to first stage
1	2-C-41	3DA100-112	Fixed (Standard), .1 μf -10% $+20\%$, 400 v.d.c., paper, molded bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ". Wire leads.	Second audio screen by-pass
1	2-C-42	3DB100-3	Fixed (Standard), 100 μf $+100\%$ -10% , 15 v.d.c., tubular electrolytic, metal can insulated by black fibre tubing $1\frac{1}{16}$ " dia. x $1\frac{1}{16}$ " long. Wire leads.	Bias supply filter
1	2-C-43	3DB100-3	Fixed (Standard), 100 μf $+100\%$ -10% , 15 v.d.c., tubular electrolytic, metal can insulated by black fibre tubing $1\frac{1}{16}$ " dia. x $1\frac{1}{16}$ " long. Wire leads.	By-pass from A— supply to chassis
1	2-C-44	3DB100-3	Fixed (Standard), 100 μf $+100\%$ -10% , 15 v.d.c., tubular electrolytic, metal can insulated by black fibre tubing $1\frac{1}{16}$ " dia. x $1\frac{1}{16}$ " long. Wire leads.	By-pass from A + radio ground to chassis
1	2-C-45	3DB12-15	Fixed (Standard), 12 μf $+100\%$ -20% , 150 v.d.c., electrolytic, wax impregnated fibre cover, $2\frac{3}{32}$ " diameter x $2\frac{1}{16}$ ", lug terminals. (Should be used to replace .1 μf paper capacitor used in sets with serial numbers below 24734.)	r-f filter

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	2-C-46	3D9004E7-1	Fixed (Standard), 4.7 $\mu\mu f$ $\pm 20\%$, 500 v.d.c., mica dielectric, molded bakelite case, $\frac{3}{16}''$ x $\frac{7}{16}''$ x $1\frac{1}{16}''$. Wire leads.	Beat frequency oscillator coupling
1	2-C-47	3DA10-53	Fixed (Standard), .01 μf $\pm 10\%$, 300 v.d.c., mica, molded bakelite case, $1\frac{1}{32}''$ x $\frac{3}{4}''$ x $\frac{3}{4}''$. Wire leads.	Automatic volume control filter
CAPACITORS (Variable)				
1	2-C-2	3D9020V-8	Variable (Standard), ceramic trimmer, 5 to 20 $\mu\mu f$ $\pm 20\%$, screw driver adj., $\frac{3}{8}''$ x $2\frac{1}{32}''$ x $5\frac{5}{64}''$.	Antenna coil trimmer
1	2-C-3 2-C-9 2-C-23 2-C-25	3D9147A2-1	Variable (Special), air dielectric, min. cap. less than 12 $\mu\mu f$; max. 147 $\mu\mu f$, 4 section, 19 plates per section, .020" air gap (1000 V. test), mycalex insulation, shaft $\frac{1}{4}''$ dia. projects $1\frac{5}{16}''$.	Ganged tuning capacitor; 2-C-3 antenna tuning 2-C-9 radio frequency tuning 2-C-23 oscillator tuning 2-C-25 oscillator tuning
1	2-C-8	3D9020V-8	Variable (Standard), ceramic insulated trimmer 5 to 20 $\mu\mu f$ $\pm 20\%$, screw driver adj., $\frac{3}{8}''$ x $2\frac{1}{32}''$ x $5\frac{5}{64}''$.	r-f trimmer
1	2-C-22	3D9020V-8	Variable (Standard), ceramic insulated trimmer, 5 to 20 $\mu\mu f$ $\pm 20\%$, screw driver adj., size $\frac{3}{8}''$ x $2\frac{1}{32}''$ x $5\frac{5}{64}''$.	Oscillator variable padder
COILS				
1	2-L-1	3C302D	Rec. Ant. Coil Assem. (Special), primary 45.1 μh , secondary 7.46 μh , iron core coil assembled in shield approx. $1\frac{1}{2}''$ o.d. x $2\frac{3}{8}''$, 3750-5850 kc.	Antenna coil
1	2-L-2	3C1084A	(Special), iron core coil assembled in shield approx. $1\frac{1}{2}''$ o.d. x $2\frac{3}{8}''$, 7.54 μh , 3750-5850 kc.	r-f coil
1	2-L-3	3C1081-5A	(Special), 14.6 μh , coil form approx. $\frac{3}{4}''$ o.d. x $2\frac{5}{8}''$, assembled in shield approx. $1\frac{1}{2}''$ o.d. x $2\frac{3}{8}''$.	Oscillator coil
1	2-L-4 2-L-5	2Z9641.5	(Special), 455 kc., primary and secondary iron core coils assembled in shield approx. $1\frac{1}{8}''$ x $1\frac{1}{8}''$ x $2\frac{7}{8}''$, tube connector through top of shield. Each coil 330 μh ; fixed trimmers, 270 $\mu\mu f$, 500 v., across primary and secondary windings.	1st i-f transformer

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
COILS (Continued)				
1	2-L-6	2Z9641.5	(Special), 455 kc., primary and secondary iron core coils assembled in shield approx. $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $2\frac{7}{8}$ ", tube connector through top of shield. Each coil 330 μ h; fixed trimmers, 270 $\mu\mu$ f, 500 v., across primary and secondary windings.	2nd i-f transformer
1	2-L-7			
1	2-L-8	2Z9644.2	(Special), 455 kc., 330 μ h, iron core oscillator coil assembly in shield, $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $2\frac{7}{8}$ ".	BFO coil assembly
1	2-L-9	2Z9641.7	(Special), 455 kc., primary and secondary iron core coils assembled in shield approx. $1\frac{1}{8}$ " x $1\frac{1}{8}$ " x $2\frac{7}{8}$ ". Each coil 330 μ h; fixed trimmers, 270 $\mu\mu$ f, 500 v., across primary and secondary windings.	3rd i-f transformer
	2-L-10			
COVER				
2		2Z3403.11	Aluminum cap from Gits Bros. Mfg. Co. No. 305 oiler, $\frac{3}{4}$ " o.d., rolled edge.	Cover for PHONES jack
JACKS				
2	2-J-1	2Z5595	Open circuit, $\frac{1}{4}$ " i.d., mounting sleeve threaded $\frac{3}{8}$ -32.	Receptacle for headset
	2-J-2			
KNOBS				
1		2Z5823-1	Crank knob assembly (Special). Large bakelite (W-210993-1), $1\frac{5}{8}$ " o.d. x $\frac{3}{4}$ ", brass insert for $\frac{1}{4}$ " shaft. Small bakelite knob (W-210747-2), $\frac{3}{4}$ " o.d. x $\frac{3}{4}$ ", brass insert $\frac{1}{4}$ " i.d. mounted on rim of large knob.	Receiver tuning
1		2Z5824.1	(Standard), black bakelite, $1\frac{1}{2}$ " o.d. x $1\frac{3}{16}$ " brass insert for $\frac{1}{4}$ " shaft.	Receiver volume control knob
1		2Z5824.6	(Special), black bakelite, $\frac{9}{16}$ " o.d. x $\frac{5}{16}$ " for $\frac{1}{4}$ " shaft. Push button type.	Dial light switch knob
1		2Z5790-4	(Standard), black bakelite, approx. overall length $1\frac{3}{4}$ ", width $\frac{5}{8}$ ", lever type, $\frac{1}{4}$ " bore.	Dial lock knob (Used only on sets with serial numbers above 17691)

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
LAMP				
1	2-A-1	2Z5985.2	(Standard), 1.3 volt, 0.1 amp., white bead, miniature bayonet base, type G-3½ bulb.	Illuminate dial
LATCH				
	6L7024-109		(Special), panel latch assem., thumb screw and L clamp.	Hold panel in case
POINTERS				
1			(Special), black finish stainless steel wire .020" dia. x 2½" long. (Crosley Dwg. No. W-210868-1.)	Indicate dial setting (Used only in sets with serial numbers below 24692)
1			(Special), white finish stainless steel wire .022" dia. x 1¾" long. (Crosley Dwg. No. W-215326-2.)	Indicate dial setting (Used only in sets with serial numbers above 24691)
RESISTORS (Fixed)				
1	2-R-1	3Z6722-1	Fixed (Standard), composition, 220 M ohms ±10%, ½ watt, molded phenolic, ¾" o.d. x 5/8". Wire leads.	Automatic volume control resistor
1	2-R-2	3Z4614	Fixed (Standard), composition, 15 M ohms ±10%, ½ watt, molded phenolic insulation, ¾" o.d. x 5/8". Wire leads.	r-f decoupling
1	2-R-3	3Z4534	Fixed (Standard), composition, 1 megohm ±10%, ½ watt, molded phenolic insulation, ¾" o.d. x 5/8". Wire leads.	Converter control resistor
1	2-R-4	3Z6722-1	Fixed (Standard), composition, 220 M ohms ±10%, ½ watt, molded phenolic insulation, ¾" o.d. x 5/8". Wire leads.	Converter osc. grid leak
1	2-R-5	3Z6668	Fixed (Standard), composition, 68 M ohms ±10%, ½ watt, molded phenolic, ¾" o.d. x 5/8". Wire leads.	Converter screen resistor
1	2-R-6	3Z4614	Fixed (Standard), composition, 15 M ohms ±10%, ½ watt, molded phenolic, ¾" o.d. x 5/8". Wire leads.	r-f plate filter
1	2-R-7	3Z6220-4	Fixed (Standard), composition, 2200 ohms ±10%, ½ watt, molded phenolic insulation, ¾" dia. x 5/8". Wire leads.	Oscillator plate supply resistor
1	2-R-8	3Z4534	Fixed (Standard), composition, 1 megohm ±10%, ½ watt, molded phenolic, ¾" dia. x 5/8". Wire leads.	1st i-f AVC decoupling resistor

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
RESISTORS (Fixed) Continued				
1	2-R-9	3Z6470-18	Fixed (Standard), composition, 4700 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Converter plate decoupling
1	2-R-10	3Z6668	Fixed (Standard), composition, 68,000 ohms $\pm 10\%$, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	1st i-f screen and plate decoupling
1	2-R-11	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	AVC resistor
1	2-R-12	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Diode load resistor
1	2-R-13	3Z6220-4	Fixed (Standard), composition, 2200 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Oscillator plate supply resistor
1	2-R-14	3Z6722-1	Fixed (Standard), composition, 220,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	AVC delay resistor (Used only in sets with serial numbers below 9501)
1	2-R-15	3Z6668	Fixed (Standard), composition, 68,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	2nd i-f screen and plate decoupling resistor
	2-R-16		Fixed (Standard), composition, 220,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Grid resistor (Part of 2-L-8 assembly)
	2-R-17		Fixed (Standard), composition, 220,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	BFO plate supply resistor (Part of 2-L-8 assembly)
1	2-R-18	3Z6668	Fixed (Standard), composition, 68,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Automatic volume control resistor
1	2-R-19	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Diode load resistor
1	2-R-22	3Z6802A2-8	Fixed (Standard), composition, 2.2 megohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	1st audio grid resistor

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
RESISTORS (Fixed) Continued				
1	2-R-23	3Z6747-1	Fixed (Standard), composition, 470,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	1st audio plate resistor
1	2-R-24	3Z6056-5	Fixed (Standard), composition, 560 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia x $\frac{5}{8}$ ". Wire leads.	Audio bias resistor
1	2-R-25	3Z6802A2-8	Fixed (Standard), composition, 2.2 megohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	2nd audio grid resistor
1	2-R-26	3Z4529	Fixed (Standard), composition, 10,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	2nd audio screen resistor
1	2-R-27	3Z4614	Fixed (Standard), composition, 15,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Monitoring resistor (Used in sets with serial numbers above 17691)
1	2-R-27	3Z6150-48	Fixed (Standard), composition, 1500 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{1}{4}$ " dia. x $1\frac{1}{16}$ ". Wire leads.	Monitoring resistor (Used in sets with serial numbers between 3501-17691)
1	2-R-28	3Z4534	Fixed (Standard), composition, 1 megohm $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic insulation, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	AVC resistor (Used in sets with serial numbers above 17691)
1	2-R-29	3Z6639-7	Fixed (Standard), composition, 39,000 ohms $\pm 10\%$, $\frac{1}{2}$ watt, molded phenolic, $\frac{3}{16}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Voltage divider (Used in sets with serial numbers above 17691)
RESISTORS (Variable)				
1	{2-R-20} 2-R-21}	2Z7284-11	Dual Potentiometer, each section 1 meg., carbon. 2-R-20 "C" taper, 2-R-21 "D" taper.	Volume control
SHIELD				
5		2Z8299	(Special), .014" drawn metal, $1\frac{1}{4}$ " dia. x $2\frac{1}{4}$ ".	Tube shield
SLEEVE				
1		3G2300-8	(Special), phenolic tubing, $\frac{1}{2}$ " o.d. x $1\frac{1}{16}$ ".	Dial light socket insulator
SOCKETS				
3		2Z8678-1	(Standard), phenolic, octal.	Tube mounting and connection to 2-V-3, 2-V-4, 2-V-7 (Also used for 2-V-5, 2-V-6 in sets with serial numbers below 9501)

REPLACEABLE PARTS FOR RECEIVER SECTION OF BC-654-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
SOCKETS—(Continued)				
2		2Z8678.4	(Special), octal, mounted in rubber	Tube mounting and connection to 2-V-5, 2-V-6 (Used only in sets with serial numbers above 9500)
2		2Z8678.23	(Standard), ceramic, octal base.	Tube mounting and connection to 2-V-1, 2-V-2
2		2Z8659-6	(Standard), octal, with mounting ring.	Spare tube mounting socket
1		2Z8723.1	(Special), miniature bayonet socket, riveted to formed metal bracket.	Dial light socket (Used only on sets with serial numbers below 24692)
1		2Z5990-8	(Special), bayonet type socket, riveted to formed metal bracket.	Dial light socket (Used only on sets with serial numbers above 24691)
SWITCHES				
1	2-S-1		(Standard), double pole, double throw, one hole mounting toggle switch. (Cutler Hammer No. 8363.)	AVC OFF-ON switch (Used only in sets with serial numbers below 9501)
1	2-S-2	3Z9824-33	(Special), push type, single throw, three contacts, one and two connect to three when switch is depressed.	Dial light switch
TERMINAL BOARDS				
1	2-K-1		(Special), phenolic; 12 contact screw type terminal strip; mounts on end of chassis. (Crosley Dwg. No. B-210633-4.)	Connect receiver to battery and transmitter
1	2-K-2		(Standard), phenolic, Two No. 6-32 x $\frac{3}{8}$ " nickel plated binder head screws. (Cinch No. 8756.)	Connection to monitoring resistor 2-R-27, from keying relay in transmitter
TRANSFORMER				
1	2-T-1	2Z9632.8	(Special), primary 1110 ohms d.c., secondary 366 ohms d.c., to match 4000 ohm impedance. Metal case, $1\frac{1}{16}$ " o.d. x $1\frac{1}{16}$ " x $1\frac{13}{16}$ ", four solder posts.	Receiver audio output transformer (Sets serial Nos. 1-43683)
1	2-T-1		(Special), to match 3Q5 output tube to either 250 or 4000 ohm load. (Crosley Dwg. No. W-210839-7.)	Receiver Audio Output Transformer. (Used on sets with serial numbers above 43683)
TUBES				
1	2-V-1	2T146	VT-146, 1N5GT	Radio frequency tube
1	2-V-2	2T147	VT-147, 1A7GT	Converter tube
1	2-V-3	2T146	VT-146, 1N5GT	Intermediate frequency tube
1	2-V-4	2T146	VT-146, 1N5GT	Intermediate frequency tube
1	2-V-5	2V1H5GT	VT-223, 1H5GT	Second detector
1	2-V-6	2V3Q5GT	VT-221, 3Q5GT	Audio amplifier tube
1	2-V-7	2V3Q5GT	VT-221, 3Q5GT	Beat frequency oscillator tube
1 for 2-V-5		2V1H5GT	VT-223, 1H5GT	Spare
1 for 2-V-2		2T147	VT-147, 1A7GT	Spare
WASHER				
2		6L52011-1	(Special), phenolic, $\frac{1}{16}$ " x $\frac{5}{8}$ " o.d. x .380" i.d.	Panel jack insulating washer

44. REPLACEABLE PARTS FOR POWER UNIT PE-103-A
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
ARMATURE ASSEMBLY				
1			Complete with ball bearings, 3-section, two low and one high potential winding. Windings insulated from each other. Approx. overall size 3" dia. x $10\frac{3}{16}$ ".	A part of dynamotor which converts low potential electrical energy into mechanical. Rotation in magnetic field produces electrical energy at high potential
BRUSHES				
2		3H4600 103A/B3	Carbon, approx. overall size $\frac{5}{16}$ " x $\frac{9}{16}$ " x $\frac{5}{8}$ ".	Single commutator end, low voltage brushes
2		3H4600 103A/B4	Carbon, approx. overall size $\frac{1}{4}$ " x $\frac{7}{16}$ " x $\frac{5}{8}$ ".	Double commutator end, low voltage brushes
2		3H4600 103A/B5	Carbon, approx. overall size $\frac{3}{16}$ " x $\frac{5}{16}$ " x $\frac{5}{8}$ ".	Double commutator end, high voltage brushes
CABLES				
1			(Standard), No. 1/0 stranded cable, 2646 \pm 150 strands plain copper wire, one layer of paper serving, one layer rubber, minimum thickness .093", length 11 ft. 3 in., both ends stripped $\frac{7}{8}$ " and tinned.	Battery connection
1			(Standard), No. 1/0 stranded cable, 2646 \pm 150 strands plain copper wire, one layer of paper serving, one layer rubber, minimum thickness .093", length 12 ft. 3 in., both ends stripped $\frac{7}{8}$ " and tinned.	Battery connection
CAPACITORS (Fixed)				
1	3-C-1	3DB2.6020	Fixed (Standard), 2 μ f \pm 10%, 600 v.d.c. Oil filled sealed metal case, $1\frac{1}{2}$ " dia. x $3\frac{3}{16}$ ". Terminal threaded 10-32.	+500 volt filter
1	3-C-2	3DA100-112	Fixed (Standard), .1 μ f —10% +20%, 400 v.d.c., paper, molded in bakelite case, $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ". Wire leads.	Across 6 volt section of dynamotor
1	3-C-3	3DA100-112	Fixed (Standard), .1 μ f —10% +20%, 400 v.d.c., paper, molded in bakelite case $\frac{3}{8}$ " x $\frac{3}{4}$ " x $1\frac{1}{16}$ ". Wire leads.	Across 12 volt section of dynamotor
1	3-C-4	3DA10-65	Fixed (Standard), .01 μ f \pm 5%, 1200 v.d.c., mica, molded bakelite case $\frac{7}{16}$ " x $1\frac{1}{8}$ " x $2\frac{1}{4}$ ". Two molded mtg. holes .140" to .145". Two solder terminals with holes .168" to .178".	Across 500 volt section of dynamotor
1	3-C-5	3DA10-65	Fixed (Standard), .01 μ f \pm 5%, 1200 v.d.c., mica, molded bakelite case, $\frac{7}{16}$ " x $1\frac{1}{8}$ " x $2\frac{1}{4}$ ". Two molded mtg. holes .140" to .145". Two solder terminals with holes .168" to .178".	+500 volt filter

REPLACEABLE PARTS FOR POWER UNIT PE-103-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	3-C-6	3DA10-65	Fixed (Standard), .01 μ f $\pm 5\%$, 1200 v.d.c., mica, molded bakelite case $\frac{1}{16}$ " x $1\frac{1}{8}$ " x $2\frac{1}{4}$ ". Two molded mtg. holes .140" to .145". Two solder terminals with holes .168" to .178".	—500 volt side of dynamotor to ground
1	3-C-7	3DA10-53	Fixed (Standard), .01 μ f $\pm 10\%$, 300 v.d.c., mica, molded bakelite case $1\frac{1}{32}$ " (max.) x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	A + filter
1	3-C-8	3DA10-53	Fixed (Standard), .01 μ f $\pm 10\%$, 300 v.d.c., mica, molded bakelite case $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	—12 volt by-pass
1	3-C-9	3DA10-53	Fixed (Standard), .01 μ f $\pm 10\%$, 300 v.d.c., mica, molded bakelite case $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	—6 volt by-pass
1	3-C-10	3DA10-53	Fixed (Standard), .01 μ f $\pm 10\%$, 300 v.d.c., mica, molded bakelite case $1\frac{1}{32}$ " x $\frac{3}{4}$ " x $\frac{3}{4}$ ". Wire leads.	A — by-pass
1	3-C-11	3DA10-65	Fixed (Standard), .01 μ f $\pm 5\%$, 1200 v.d.c., mica, molded bakelite case $\frac{1}{16}$ " x $1\frac{1}{8}$ " x $2\frac{1}{4}$ ". Two molded mtg. holes .140" to .145". Two solder terminals with holes .168" to .178".	+500 volt filter
CHOKE				
1	3-L-1	3C326-300	R-f choke (Standard), 1 mh, 300 ma. max., d.c. resistance 10 ohms, approx. overall size $\frac{1}{2}$ " dia. x 2". Wire leads.	r-f choke in + 500 volt lead
CIRCUIT BREAKERS				
1	3-E-3	3H900A-22	(Special), minimum current required to trip .220 ampere d.c. and not more than .250 ampere d.c., coil insulated from contacts and housing. 10-32 screw terminals. Mtg. holes tapped 6-32 and spaced 2.750". Approx. overall size 1" x $3\frac{1}{2}$ " x $5\frac{1}{4}$ ".	Overload breaker in 500 volt supply circuit. (Used only in sets with serial numbers above 4710)
1	3-E-4	3H900-40	(Special), coil normal load 40 amperes. Contacts normal load 4 amperes. Coils and switch contacts insulated from each other. 10-32 screw terminals. Approx. overall size 1" x $3\frac{1}{2}$ " x $5\frac{1}{4}$ ".	Overload breaker in dynamotor A voltage supply (Used only in sets with serial numbers above 4710)
1	3-E-5	3H900-7	(Special), coil normal load 7.0 amperes d.c., normal contact load 30 amperes. 10-32 screw terminals. Mtg. holes tapped 6-32 and spaced 2.750". Approx. overall size 1" x $3\frac{1}{2}$ " x $5\frac{1}{4}$ ".	Overload breaker in filament supply (Used only in sets with serial numbers above 4710)

REPLACEABLE PARTS FOR POWER UNIT PE-103-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CIRCUIT BREAKERS (Continued)				
1	{3-E-3} {3-E-4} {3-E-5}		(Special), assembly of three circuit breakers on bakelite base. (Crosley Dwg. No. C-211955-7.)	Protect dynamotor and filament supply from overload (Used only in sets with serial numbers below 4711)
CONNECTOR				
1	3-K-1	2Z7118.7	(Standard), 8 contact female surface mtg. connector. Approx. overall size 2" dia. x 1 1/4". 4 mtg. holes in flange.	Output voltage connector
COVERS				
1		3Z3352.9	(Special), knurled brass cap 1" o.d. riveted to link chain.	Cover output voltage connector
1		2Z3403.13	(Special), cover assembly, oil cup type cover 1 1/32" o.d., rolled edge.	Cover for slotted knob on 6-12 volt selector switch (3-S-1)
1		3H4600-130A/C4	(Special), aluminum, 5" x 3 1/8", incl. spring and hinge.	Circuit breaker access door
DYNAMOTOR				
1	3-D-1		Input 6 or 12 volts, output 500 volts $\pm 5\%$, 160 ma., metal encased, 5 7/16" dia. x 11 5/8". Metal mtg. bracket .093" x 3 1/4" x 5 7/16", with 4 mtg. holes .261" dia. spaced 2.625".	High voltage supply
LUGS				
2		3Z12025-1	(Standard), Sherman copper solder lug or equivalent, for cable .461" o.d. max., 1 3/16" wide x 2" long, 1 13/32" dia. hole in flat portion.	Solder lug on dynamotor end of battery cable
2		3Z12012	(Special), Sherman copper solder lug or equivalent, for 9/16" dia. cable. 1" wide x 3 1/4" long, 1 round hole and 1 square hole in flat portion.	Battery cable terminal
POWER UNIT				
1		3H4600-103A	(Standard), Signal Corps PE-103-A.	Supply high voltage to transmitter from 6 or 12 volt vehicle battery
RELAYS				
1	3-E-1	2Z7590.3	(Special), Type No. 70, d.c., altered, contact load 25 amp. continuous. Relay pulls in at 9 volts. 18 ohms, insulated coil. Approx. size 3 1/2" wide x 3 3/32" long. (2) screw terminals No. 10-32, and (2) 5/16-24. (2) elongated mtg. holes 9/32" x 1 1/32", spaced 2 3/16".	Starting relay for 12 volt section of dynamotor
1	3-E-2	2Z7590.5	(Special), Type No. 70, d.c., altered, contact load 50 amp. continuous. Relay pulls in at 4.5 volts. 5 ohms, insulated coil. Approx. size 3 1/2" wide x 3 3/32" long. (2) screw terminals threaded 10-32 and (2) 5/16-24. (2) elongated mtg. holes 9/32" x 1 1/32", spaced 2 3/16".	Starting relay for 6 volt section of dynamotor

REPLACEABLE PARTS FOR POWER UNIT PE-103-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
RELAYS (Continued)				
1	3-E-6	2Z7650.7	(Special), two pole, single throw. Contact load 8 amp. continuous. Relay closes at 4 volts, 300 ohm insulated coil. Contacts solid silver. Approx. overall size 2" x 2 $\frac{1}{4}$ " x 2 $\frac{3}{4}$ ". Mtg. holes spaced 1.562" for No. 8 screws.*	Control relay
1	3-E-7	2Z7590.7	Safety (Special), single pole, single throw, contact load 8 amps. Relay closes with 9 to 10 volts d.c., 400 ohm insulated coil; contacts solid silver. Approx. overall size 1 $\frac{1}{32}$ " x 1 $\frac{3}{4}$ " x 2 $\frac{13}{16}$ ". Solder lug terminals. Mtg. holes tapped 6-32, and spaced 1.812".	Safety relay
RESISTORS				
1	3-R-1	3Z5995-7	Fixed (Standard), wire wound, 5.45 ohms $\pm 5\%$, 14.4 watts, molded phenolic, bracket mtg., size 1 $\frac{1}{16}$ " dia. x 4 $\frac{1}{2}$ ". Solder lug terminals.	Voltage compensator
1	3-R-2	3Z5996-5	Fixed (Standard), wire wound, 6 ohms $\pm 5\%$, 14.4 watts, molded phenolic, bracket mtg., size 1 $\frac{1}{16}$ " dia. x 4 $\frac{1}{2}$ ". Solder lug terminals.	Voltage compensator
1	3-R-3	3Z5992-7	Fixed (Standard), wire wound, 2 ohms $\pm 10\%$, 4.8 watts, solder lug terminals. Overall size approx. $\frac{9}{16}$ " dia. x 2 $\frac{1}{2}$ ". Bracket mtd.	Voltage dropping resistor
1	3-R-4	3Z5983-3	Fixed (Standard), wire wound, .33 ohms $\pm 10\%$, 6 watts, solder lug terminals. Overall size approx. $\frac{7}{8}$ " dia. x 2 $\frac{1}{2}$ ". Bracket mtd.	Tripping resistor
SWITCH				
1	3-S-1	3Z9825-63.4	(Special), two position switch. (5-pole, double throw.) Bakelite rotor and stator wafers. Silver plated contacts. Solder lug terminals. Shaft $\frac{1}{4}$ " dia. Approx. overall size of switch 1 $\frac{3}{8}$ " x 1 $\frac{3}{4}$ " x 1 $\frac{7}{8}$ ".	Voltage change from 6 to 12 volts
TAG				
2		3Z12537	(Special), No. 30 Ga. aluminum or No. 5 Ga. zinc, $2\frac{7}{32}$ " i.d. in place, $\frac{3}{4}$ " wide, die stamped CORD CD-501-A.	Cable identification
THUMB SCREW				
8		6L7933-33.8K	(Special), slotted knurled head $\frac{3}{4}$ " o.d. on a screw 1 $\frac{5}{8}$ " long, threaded $\frac{1}{4}$ -20 for distance of $\frac{3}{4}$ ".	Fasten cover of PE-103-A

45. REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed)				
1	4-C-1	3DA200-6	Fixed (Special), .2 μ f $\pm 10\%$, 100 v.a.c., case, brass tube $\frac{3}{4}$ " dia. x $1\frac{5}{8}$ ". Wire leads.	Buffer across high voltage
1	4-C-2	3DB2000-4	Fixed (Standard), electrolytic, 2000 μ f $+100\% -20\%$, 15 v.d.c., solder lug terminals. Positive terminal marked red. Approx. size $1\frac{3}{8}$ " dia. x 3", metal can.	A supply filter, 6-12 volts
1	4-C-3	3DB500-6	Fixed (Standard), electrolytic, 500 μ f $+100\% -20\%$, solder lug connection. Positive terminal marked red. Approx. size 1" dia. x $2\frac{13}{16}$ ", metal can.	A supply filter
1	{4-C-4 4-C-5 4-C-6}	3DA500-87	Fixed (Special), paper dielectric, triple section, .5 μ f $\pm 15\%$, 100 v.d.c., solder lug terminals. Sealed metal case $\frac{3}{4}$ " x $1\frac{1}{4}$ " x $2\frac{1}{8}$ ", (2) $\frac{3}{16}$ " dia. mtg. holes spaced $2\frac{1}{8}$ ".	Hash filter
1	{4-C-7 4-C-8 4-C-9}	3DA500-87	Fixed (Special), paper dielectric, triple section, .5 μ f $\pm 15\%$, 100 v.d.c., solder lug terminals. Sealed metal case $\frac{3}{4}$ " x $1\frac{1}{4}$ " x $2\frac{1}{8}$ ". (2) $\frac{3}{16}$ " dia. mtg. holes spaced $2\frac{1}{8}$ ".	Hash filter
1	{4-C-10 4-C-11 4-C-12 4-C-13 4-C-14}	3DE250	Fixed (Special), paper dielectric, 5-section, three .25 μ f, 35 v.d.c., two .1 μ f, 100 v.d.c., $+50\% -10\%$, solder lug terminals. Sealed metal case, approx. size $1\frac{1}{32}$ " x 1" x $2\frac{3}{4}$ ".	By-pass
1	4-C-15	3DB4500	Fixed (Special), 4500 μ f $+100\% -20\%$, 2 v.d.c., tubular fibre case, wax impregnated, size $1\frac{1}{16}$ " dia. x 3". Solder lug terminal. Positive terminal marked red.	Filter for $1\frac{1}{2}$ -volt supply
1	4-C-16	3DB12-15	Fixed (Standard), electrolytic, 12 μ f $+100\% -20\%$, tubular fibre case, wax impregnated, size $\frac{3}{4}$ " dia. x $2\frac{1}{16}$ ". Solder lug terminals.	C filter
1	4-C-17	3DB12-15	Fixed (Standard), electrolytic, 12 μ f $+100\% -20\%$, tubular fibre case, wax impregnated, size $\frac{3}{4}$ " dia. x $2\frac{1}{16}$ ". Solder lug terminals.	C filter
1	4-C-18	3DB12-15	Fixed (Standard), electrolytic, 12 μ f $+100\% -20\%$, fibre case, wax impregnated, approx. overall size $\frac{3}{4}$ " dia. x $2\frac{1}{16}$ ". Solder lug terminals.	B filter

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
CAPACITORS (Fixed) Continued				
1	4-C-19	3DB12-15	Fixed (Standard), electrolytic, 12 μf $\pm 100\%$ -20% , fibre case, wax impregnated, size $\frac{3}{4}''$ dia. x $2\frac{1}{16}''$. Solder lug terminals.	B filter
1	{4-C-20} {4-C-21}		Fixed (Special), dual .01 μf $+50\% -10\%$, 200 v.d.c., solder lug terminals. Approx. size $\frac{3}{4}''$ x $\frac{3}{4}''$ x $2\frac{1}{16}''$. Mtg. holes $1\frac{1}{64}''$ dia. spaced $2\frac{5}{16}''$.	By-pass —51 and +84 volt supply (Used only in packs with serial numbers below 12001)
1	4-C-22 4-C-23		Fixed (Special), dual .01 μf $+50\% -10\%$, 200 v.d.c., solder lug terminals. Approx. size $\frac{3}{4}''$ x $1''$ x $1\frac{13}{32}''$. Mtg. holes $.156''$ dia. spaced $\frac{1}{2}''$.	By-pass —51 and +84 volt supply (Used only in packs with serial numbers below 12001)
CHOKES				
1	4-L-1	3C337-1	(Special), iron core, min. inductance 75 μh , max. coil resistance .15 ohms. Approx. size $1\frac{3}{16}''$ dia. x $1\frac{1}{16}''$. Leads 6" long.	Filter in +1.5 volt lead (Used only in packs with serial numbers below 12001)
1	4-L-2	3C337-1	(Special), iron core, min. inductance 75 μh , max. coil resistance .15 ohms. Approx. size $1\frac{3}{16}''$ dia. x $1\frac{1}{16}''$. Leads 6" long.	Filter in +1.5 volt lead
1	4-L-3	3C337-1	(Special), iron core, min. inductance 75 μh , max. coil resistance .15 ohms. Approx. size $1\frac{3}{16}''$ dia. x $1\frac{1}{16}''$. Leads 6" long.	Filter in input voltage lead (Used only in packs with serial numbers below 12001)
1	4-L-4	3C337-1	(Special), iron core, min. inductance 75 μh , max. coil resistance .15 ohms. Approx. size $1\frac{3}{16}''$ dia. x $1\frac{1}{16}''$. Leads 6" long.	Filter in —A $1\frac{1}{2}$ volt lead (Used only in packs with serial numbers below 12001)
1	4-L-5	3C337	(Special), inductance 1 mh, coil resistance 15 ohms $\pm 20\%$. Approx. size $1\frac{3}{16}''$ dia. x $\frac{3}{8}''$. Leads 1" long.	Filter in —51 volt lead (Used only in packs with serial numbers below 12001)
1	4-L-6	3C337	(Special), inductance 1 mh, coil resistance 15 ohms $\pm 20\%$. Approx. size $1\frac{3}{16}''$ dia. x $\frac{3}{8}''$. Leads 1" long.	Filter in +84 volt lead
1	{4-L-7} {4-L-8} {4-L-9}	3C337-2	(Special), iron core, three chokes in metal container, 4-L-7 inductance 3.5 mh, and max. coil resistance .25 ohms. 4-L-8 inductance 35 mh, and max. coil resistance .8 ohm. 4-L-9 inductance 5.0 henries and max. coil resistance 600 ohms. Approx. size $1\frac{5}{16}''$ x $2''$ x $2\frac{7}{8}''$. Wire leads.	4-L-7 filter in negative input voltage lead 4-L-8 filter in negative 1.5 volt 'A' lead 4-L-9 filter in positive 84 volt lead

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
COVER ASSEMBLIES				
2		2Z3401.9	Bottom (Special), .042" c.r.s. $3\frac{3}{4}$ " x 7", connection diagram inside; .010" paper base bakelite insulator $3\frac{1}{2}$ " x $6\frac{5}{8}$ ".	Bottom cover PE-104-A
2		2Z3401.7	Top (Special), .042" c.r.s. $3\frac{3}{4}$ " x 7", $\frac{3}{8}$ " i.d. adjustment hole in cover; .010" paper base bakelite insulator $3\frac{1}{2}$ " x $6\frac{5}{8}$ ".	Top cover PE-104-A
GROUND STRIP ASSEMBLIES				
2		2Z3003.3	(Special), (long), .010" phosphor bronze 1" x $6\frac{3}{4}$ ", 24 teeth, riveted to .010" fish paper $\frac{3}{4}$ " x $5\frac{1}{2}$ ".	Ground top cover to case
2		2Z3003.1	(Special), (short), .010" phosphor bronze 1" x $4\frac{3}{4}$ ", 17 teeth, riveted to fish paper .010", $\frac{3}{4}$ " x $3\frac{3}{4}$ ".	Ground top cover to case
PLUG BUTTON				
2		2Z1480-1	(Standard), 6-section snap cover, $1\frac{3}{32}$ " dia.	Cover hole in case of PE-104-A
POWER CONVERTER PE-104-A				
1		3H4600-104A	(Standard), Signal Corps PE-104-A $3\frac{7}{8}$ " x 4" x 7", octal socket in front.	Alternate source of power for receiver A and B voltages and transmitter bias
RECTIFIER				
1	4-A-1	3H4845-3	(Special), MG-CU-Sulphide, max. output voltage 1.8 volts d.c. Solder lug terminals. Approx. size $\frac{5}{8}$ " dia. x $1\frac{1}{8}$ ". Mtg. screw No. 10-32.	Rectify 'A' supply
RESISTORS				
1	4-R-1	3Z6005A1-3	(Standard), composition, 50 ohms $\pm 5\%$, 1 watt, $\frac{1}{4}$ " dia. x $\frac{3}{4}$ ". Wire leads.	Reduce 12 to 6 volts
1	4-R-2	3Z6150-48	(Standard), composition, 1500 ohms $\pm 10\%$, $\frac{1}{2}$ watt, $\frac{1}{4}$ " dia. x $\frac{1}{16}$ ". Wire leads.	Bias
1	4-R-3	3Z6082	(Standard), composition, 820 ohms $\pm 5\%$, $\frac{1}{2}$ watt, $\frac{1}{4}$ " dia. x $\frac{5}{8}$ ". Wire leads.	Reduce 12 to 6 volts for vibrator coil
SOCKETS				
1	4-K-1	2Z8678.6	(Special), bakelite octal socket.	Output voltage connector
1	4-V-1	2Z8676	Socket (Standard), 6 contacts, bakelite, $\frac{5}{32}$ " dia. mtg. holes spaced $1\frac{1}{2}$ ".	Vibrator socket

REPLACEABLE PARTS FOR POWER CONVERTER PE-104-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
SWITCHES				
1	Part of 4-S-1	3Z9825-63.7	(Special), half-section, wafer, paper base bakelite, impregnated. Lugs and rotor contacts silver or silver alloy. Contacts, non-shortening type. Mtg. holes .130" to .145" dia., spaced 1.031". Approx. size of wafer 1 ³ / ₆₄ " x 1 ³ / ₈ ".	Part of 4-S-1 voltage change switch
1	Part of 4-S-1		(Special), full-section, wafer, paper base bakelite, impregnated. Lugs and rotor contacts silver or silver alloy. Contacts, non-shortening type. Mtg. holes .130" x .145" dia., spaced 1.031". Approx. overall size of wafer 1 ⁵ / ₈ " x 1 ³ / ₈ ".	Part of 4-S-1 voltage change switch
1	Part of 4-S-1		Index (Special), two position. Shaft slotted on one end. Approx. overall size 1 ¹ / ₄ " x 1 ³ / ₈ " x 1 ⁷ / ₃₂ ".	Part of 4-S-1 voltage change switch
TERMINAL BOARD ASSEMBLY				
2		2Z9402.11	(Special), 2 eyelets mounted in laminated phenolic $\frac{1}{16}$ " x $\frac{3}{4}$ " x $\frac{13}{16}$ ".	Junction block for plate voltage choke
TRANSFORMER				
1	4-T-1	2Z9625-1	(Special), 6 and 12-volt primary, 3 secondaries furnish approx. 84, 51 and 1 $\frac{1}{2}$ volts d.c. when rectified. Wire leads. Approx. overall size 1 $\frac{7}{8}$ " x 2 $\frac{3}{32}$ " x 2 $\frac{9}{16}$ ".	Power transformer
VIBRATOR				
1	4-A-2	3H6690	(Standard), 6-prong synchronous, enclosed in metal can. Fits standard 6-contact socket. Approx. size 1 $\frac{1}{2}$ " dia. x 3 $\frac{5}{8}$ ".	Convert d.c. to a.c.

46. REPLACEABLE PARTS FOR HAND GENERATOR GN-45-A
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
BRUSHES				
4		3H2335/10	Carbon. Approx. size .156" x .250" x $1\frac{3}{16}$ ".	Low voltage brush
4		3H2335/9	Carbon. Approx. size .156" x .250" x $1\frac{3}{16}$ ".	High voltage brush
CAPACITORS (Fixed)				
1	5-C-1	3DB4-56	Fixed, paper (Special), 4 μ f, 500 volt, approx. size $1\frac{5}{8}$ " x $1\frac{15}{16}$ " x $4\frac{1}{2}$ ". Wire leads with No. 8 solder lugs.	Filter high voltage
1	5-C-2	3DB100-2	Fixed, electrolytic (Special), 100 μ f, 15 volt, approx. size $5\frac{5}{8}$ " dia. x $1\frac{5}{8}$ ". Wire leads.	Filter low voltage
CHOKE				
1	5-L-1	3C4075	(Special), iron core, 7.3 μ h, .2 ohm, approx. size 2" x 2" x $2\frac{3}{8}$ ". (2) mtg. holes tapped 8-32 and spaced $1\frac{9}{16}$ ". Wire leads.	Filter choke
CONNECTOR				
1	5-K-1	2Z8654.2	Metal shell (Special), female (8) contacts, (3) mtg. holes tapped 6-32. Approx. size $1\frac{1}{8}$ " wide x 2" long.	Output voltage connector
CRANK				
2		3H1407	Standard Signal Corps GC-7.	Crank for generator GN-45-A or GN-45-B
GENERATOR				
1		*3H2345A	(Standard), Signal Corps GN-45-A.	Furnish high and low voltage to BC-654-A
REGULATOR				
1	5-E-1	3H4963	(Special), DPST, normally open, 33 ohm coil, 4 wire leads and 2 screw terminals, $1\frac{5}{8}$ " x $1\frac{15}{16}$ " x $2\frac{1}{8}$ ".	Regulate voltage
REGULATOR G-199				
1	5-E-1		(Special), 2" x 2" x $3\frac{3}{8}$ " mounted on fabricated phenolic base. 3 knurled adjusting screws. (Crosley Dwg. No. W-224866-2.)	Regulate voltage output. (Used on generators with serial numbers above 17030)
RELAY				
1	5-E-2	2Z7590.2	Double pole, single throw (Special), normally open. Pull in voltage 0.5 volt below max. d.c. voltage at relay. Min. 4.0 volts. D.C. resist- ance 33 ohms, approx. size $1\frac{5}{8}$ " x $1\frac{15}{16}$ " x $2\frac{1}{8}$ ". Wire leads.	Operating relay
RESISTOR				
1	5-R-1 5-R-2	3Z6002C3	Wire wound (Special), tapped; 5-R-1, 28 ohms; 5-R-2, 5.7 ohms. Wound on black phenolic plate, $1\frac{1}{16}$ " x 1" x $1\frac{13}{16}$ ". Wire leads.	Voltage regulation

* Interchangeable with Generator GN-45-B.

47. REPLACEABLE PARTS FOR HAND GENERATOR GN-45-B
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
BRUSHES				
1		3H2337A/B8	Assembly (Special), consists of carbon brush, pigtail, spring, and end plug.	Low voltage brush
1		3H2337A/B9	Assembly (Special), consists of carbon brush, pigtail, spring, and end plug.	High voltage brush
CAPACITORS (Fixed)				
1	5-C-1		Fixed, oil capacitor (Special), 4 μ f, 600 v.d.c., round metal container, 1 $\frac{1}{2}$ " dia. x 4 $\frac{1}{8}$ ". Solder lug terminals.	Filter high voltage
1	5-C-2	3DB100-2	Fixed, electrolytic, 100 μ f, 15 v.d.c., metal container, $\frac{5}{8}$ " dia. x 1 $\frac{1}{2}$ ". Wire leads.	Filter low voltage
CHOKE				
1	5-L-1	3C344	Iron core (Special), 7.3 μ h, .2 ohm; approx. size 2" x 2" x 2 $\frac{3}{8}$ ". Two mtg. holes tapped 8-32. Wire leads.	Filter choke
CONNECTOR				
1	5-K-1	2Z8654.2	Metal shell (Special), female 8 contacts, (3) mtg. holes tapped 6-32. Approx. size 1 $\frac{1}{8}$ " wide x 2" long.	Output voltage connector
CRANK				
2		3H1407	Standard Signal Corps GC-7.	Crank for generator GN-45-A or GN-45-B
GENERATOR				
1		*3H2345B	(Standard), Signal Corps GN-45-B.	Furnish high and low voltage to BC-654-A
REGULATOR				
1	5-E-1	2H4963.1	(Special), voltage regulator, adjustable relay with insulated base mounted on metal base supported by three rubber grommets with metal inserts for No. 6 screw.	Regulate voltage
RELAY				
1	5-E-2	2Z7650.9	Double pole single throw, operating relay. Base 1 $\frac{1}{2}$ " wide x 2 $\frac{3}{8}$ " long. Mtg. holes tapped 8-32 and spaced $\frac{5}{8}$ ". Wire leads.	Operating relay
RESISTORS				
1	5-R-2	3Z6001B2-7	Vitreous enamel coated, wire wound, 12.5 ohms $\pm 5\%$, 5 watts. Approx. overall size $\frac{3}{8}$ " dia. x 1". Wire leads.	Voltage regulating (This resistor used to and including Serial No. 5177 generator)
1	5-R-2		Vitreous enamel coated, wire wound, 6.5 ohms $\pm 5\%$, 10 watts. Approx. overall size $\frac{3}{8}$ " dia. x 1 $\frac{3}{4}$ ". Wire leads.	Voltage regulating (This resistor used including and after Serial No. 5178 generator)

* Interchangeable with Generator GN-45-A.

48. MISCELLANEOUS REPLACEABLE PARTS FOR SCR-284-A
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
BAGS				
1		2Z502A	BG-102-A, canvas, 9 $\frac{1}{4}$ " x 13 $\frac{1}{4}$ " x 14 $\frac{1}{2}$ ".	Carrying case for batteries, headphones, microphone, counterpoise, reels, guys, stakes, etc.
1		2Z529	(Special), BG-129, canvas, 8" x 12" x 18", round top, flat bottom.	Carrying case for Power Unit PE-103-A
1		2Z3400-154	(Special), BG-154, canvas, 10 $\frac{1}{8}$ " x 14 $\frac{1}{2}$ " x 18 $\frac{3}{4}$ ", zipper.	Carrying case for Radio Receiver and Transmitter BC-654-A
1		2Z8058	(Standard), Signal Corps Roll BG-58.	Carrying case for mast sections and generator legs
BATTERIES				
2		3A27	(Standard), Signal Corps BA-27, 4 $\frac{1}{2}$ volt.	RM-29-(*)
3		3A43	(Standard), Signal Corps BA-43.	BC-654-A
BOX				
1		2Z1131A	(Standard), Signal Corps BX-31-A.	Spare tube box
CASES				
1		2Z1841	(Standard), Signal Corps CS-41.	Case for generator GN-45
1		2Z1800.4	(Special), $\frac{1}{16}$ " aluminum, approx. dim. 9 $\frac{1}{4}$ " x 14 $\frac{1}{2}$ " x 18 $\frac{1}{4}$ ".	Case for BC-654 transmitter and receiver
CONNECTORS				
1	5-K-2	2Z7118	(Standard), 8 contact cable connector with metal shell. (Male.)	Power supply connection to power unit (Part of CD-501-A)
1	5-K-3	2Z8734.3	8 contact cable connector with metal shell. (Female.)	Power supply connection to transmitter (Part of CD-501-A)
CORDS				
2		3E1307A	(Standard), Signal Corps CD-307-A.	Connection to HS-30 headset
2		3E1604	(Standard), Signal Corps CD-604.	Connection to HS-30 headset
1		3E1501A	CD-501-A, 8-wire shielded cable.	Connection of power units to BC-654 transmitter
COUNTERPOISE				
1		2A712	(Standard), Signal Corps CP-12.	Counterpoise
1		2A713	(Standard), Signal Corps CP-13.	Counterpoise
FRAME				
1		2Z4641A	FM-41-A, 9 $\frac{1}{2}$ " x 18 $\frac{1}{4}$ " x 36 $\frac{1}{4}$ ".	Mounting for receiver, transmitter and Power Unit PE-103-A

MISCELLANEOUS REPLACEABLE PARTS FOR SCR-284-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

Quan.	Symbol	Stock No.	Name of Part and Description	Function
GUYS				
1		2A1311	(Standard), Signal Corps GY-11.	Antenna mast guy
1		2A1312	(Standard), Signal Corps GY-12.	Antenna mast guy
HEADSET				
2		2B830 ()	(Standard), Signal Corps HS-30-(*)	Reproducer
INSULATOR				
1		3G606A	(Standard), Signal Corps IN-106-A.	Antenna mast insulator
KEY				
1		3Z3448A	(Standard), Signal Corps J-48-A.	For CW operation
LEGS				
1		2Z6102A	(Standard), Signal Corps LG-2-A.	Leg for GN-45-A generator
2		2Z6103A	(Standard), Signal Corps LG-3-A.	Leg for GN-45-A generator
6		2Z6113A	LG-13-A, $\frac{3}{4}$ " x $22\frac{3}{4}$ " (approx.).	Legs for BC-654-A
LOUDSPEAKER				
1		2Z6310-7	(Standard), Signal Corps LS-7.	Reproducer
MAST BASE				
1		*2A2088-57	(Standard), Signal Corps MP-57.	Base for antenna on vehicle
MAST BRACKETS				
1		2A2090-46A	MP-46-A, approx. $7\frac{13}{16}$ " x $10\frac{7}{8}$ ".	Mast bracket for antenna mounting on $\frac{1}{2}$ ton truck
1		2A2090-45A	MP-45-A, approx. $7\frac{5}{8}$ " x $8\frac{1}{4}$ ".	Antenna mast bracket for $\frac{1}{4}$ ton liaison and command car
MAST SECTIONS				
2		2A2349	(Standard), Signal Corps MS-49.	Antenna mast section
2		2A2350	(Standard), Signal Corps MS-50.	Antenna mast section
1		2A2351	(Standard), Signal Corps MS-51.	Antenna mast section
1		2A2352	(Standard), Signal Corps MS-52.	Antenna mast section
1		2A2353	(Standard), Signal Corps MS-53.	Antenna mast section
1		2A2354	(Standard), Signal Corps MS-54.	Antenna mast section
1		2A2355	(Standard), Signal Corps MS-55.	Antenna mast section
1		2A2356	(Standard), Signal Corps MS-56.	Antenna mast section
MICROPHONE				
2		2B1617	(Standard), Signal Corps T-17.	Voice input
PILOT LAMP TOOL				
1			Phenolic paper base tube, $\frac{7}{16}$ " o.d. Rubber tubing over one end. Overall length $5\frac{5}{8}$ ". (Crosley Dwg. No. W-212492-1.)	To remove and replace pilot lamps

* Interchangeable with MP-37.

MISCELLANEOUS REPLACEABLE PARTS FOR SCR-284-A (Continued)
ORDER BY SIGNAL CORPS STOCK NO., NAME OF PART AND DESCRIPTION

<i>Quan.</i>	<i>Symbol</i>	<i>Stock No.</i>	<i>Name of Part and Description</i>	<i>Function</i>
PLUGS				
4		2Z7155	(Standard), Signal Corps PL-55, two-conductor.	Phones and key plugs
2		2Z7168	(Standard), Signal Corps PL-68, three-conductor.	Microphone key
REEL				
1		2A3128	(Standard), Signal Corps RL-28.	Reel for wire W-142
1		2A3129	(Standard), Signal Corps RL-29.	Reel for Counterpoise CP-12 and CP-13
SHOCK MOUNTS				
6			Shock mount, $1\frac{1}{16}$ " x $2\frac{3}{8}$ " x $2\frac{3}{8}$ ". (Lord No. 150-PH-12.)	Shock absorber for BC-654-A
3			Shock mount, cadmium plated steel with rubber insert. Overall dim. $\frac{3}{4}$ " x 1" x 2". (Crosley Dwg. No. W-212492-1.)	Shock absorber for spare power supply (mtd. on Frame FM-41-A)
4			Shock mount, $2\frac{3}{8}$ " square x $1\frac{1}{16}$ ". (Lord No. 150-PH-10.)	Shock absorber for PE-103-A
STAKES				
4		2A3327A	(Special), $\frac{5}{16}$ " dia. x $7\frac{1}{2}$ ", GP-27-A.	Hold antenna guys
STRAPS				
1		6Z8472-4	(Special), olive drab cotton webbing, $1\frac{1}{4}$ " x $44\frac{1}{2}$ ".	For carrying equipment
1		6Z8472-3	(Special), olive drab webbing, approx. $1\frac{1}{2}$ " x $19\frac{1}{4}$ ".	Top case strap
1		6Z8472-5	(Special), olive drab cotton webbing, approx. $1\frac{1}{4}$ " x 18".	Hold down strap
4		6Z8472-2	(Special), olive drab cotton webbing, approx. $1\frac{1}{4}$ " x 46".	Hold down strap
WIRE				
15 ft.		1B142	(Standard), Signal Corps W-142.	Antenna and ground connection, etc.

48.1. Maintenance Parts for Power Converter PE-104-A

The appropriate section of the ASF Signal Supply Catalog for Power Converter PE-104-A is:

SIG 8—PE-104, Higher Echelon Spare Parts.

For the latest index of available catalog sections, see ASF Signal Supply Catalog SIG 2.

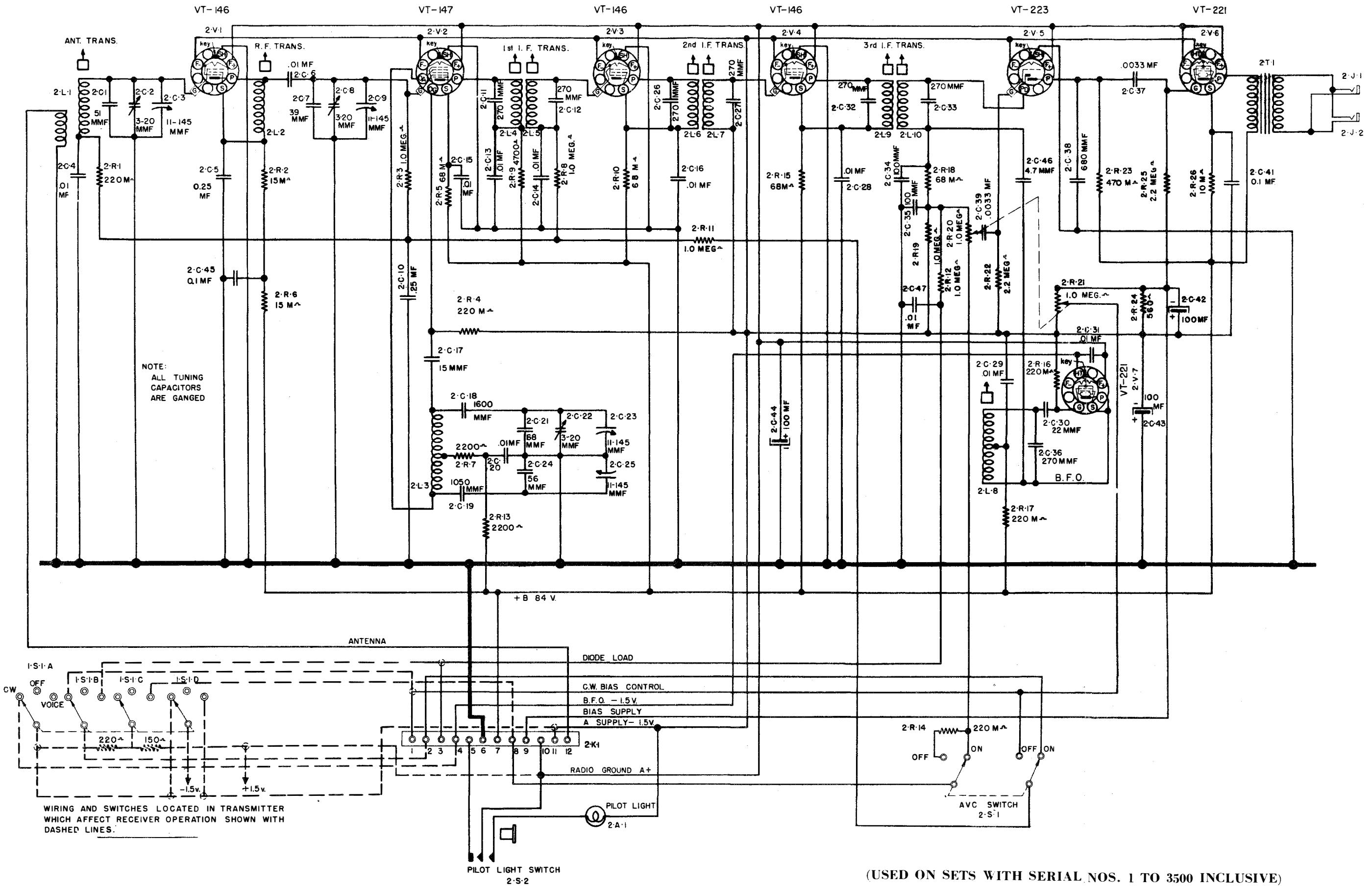


FIG. 42-A RECEIVER, SCHEMATIC DIAGRAM

FIG. 42-B RECEIVER, SCHEMATIC DIAGRAM

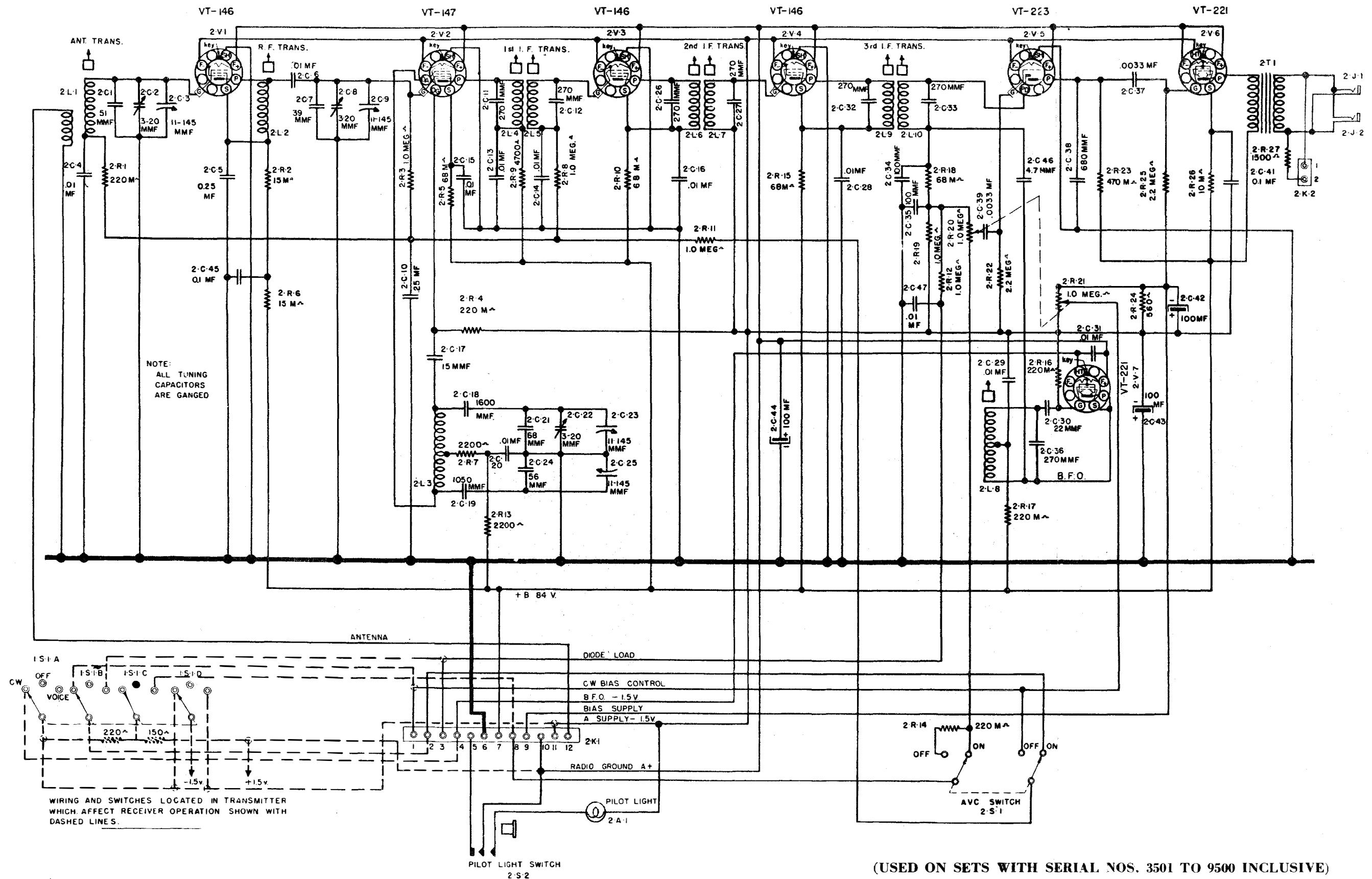


FIG. 42-C RECEIVER, SCHEMATIC DIAGRAM

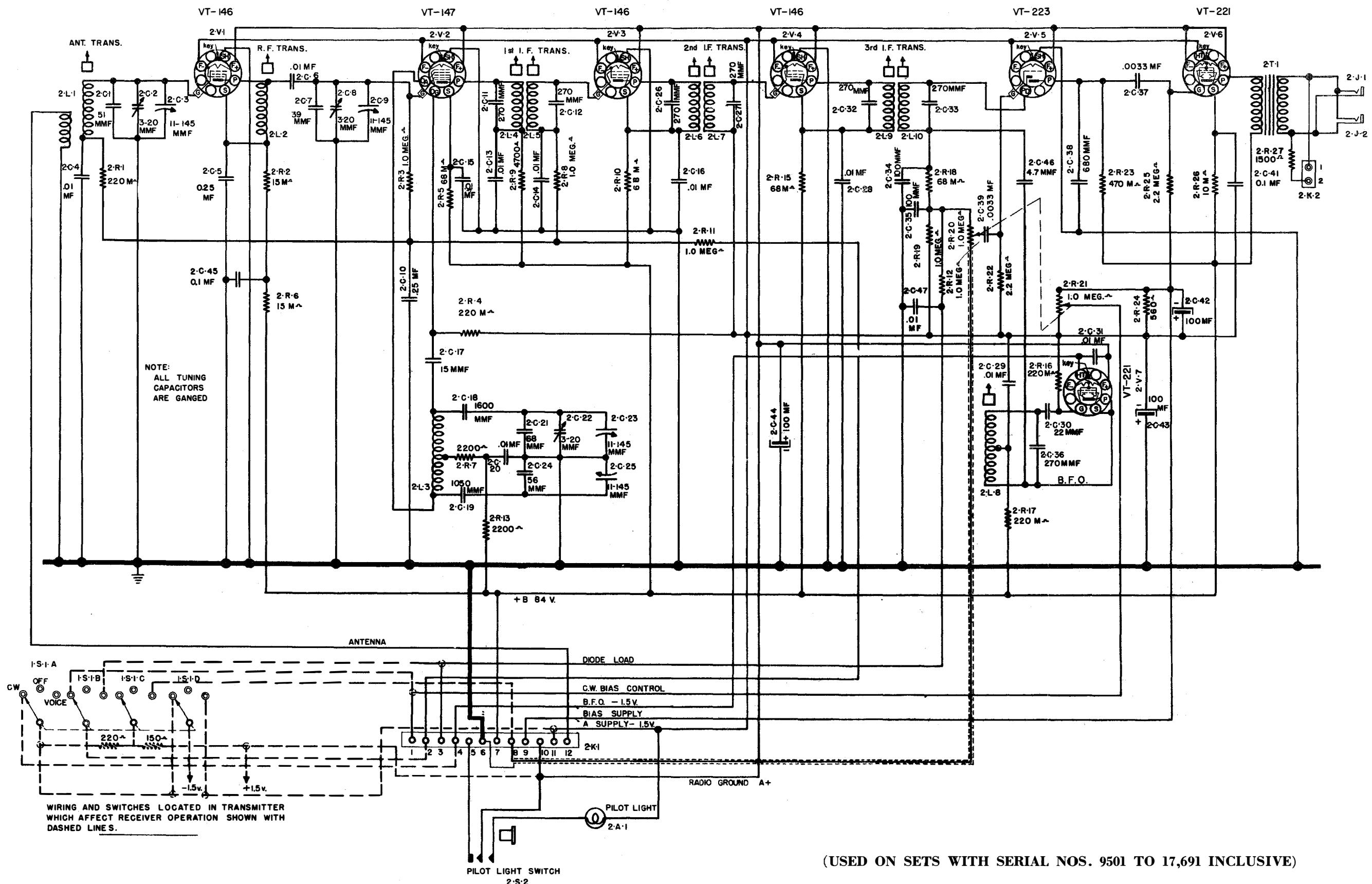


FIG. 42-D RECEIVER, SCHEMATIC DIAGRAM

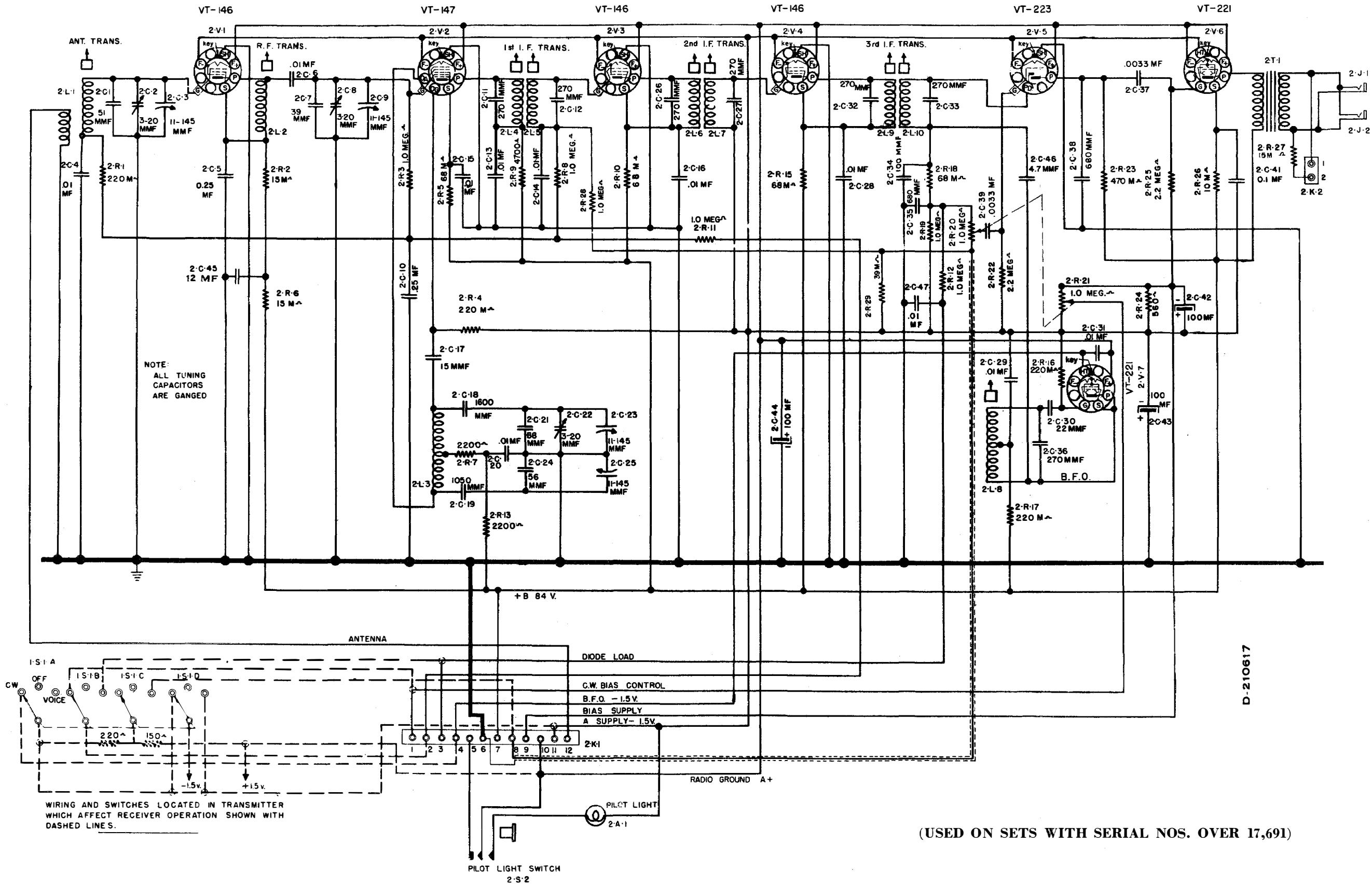
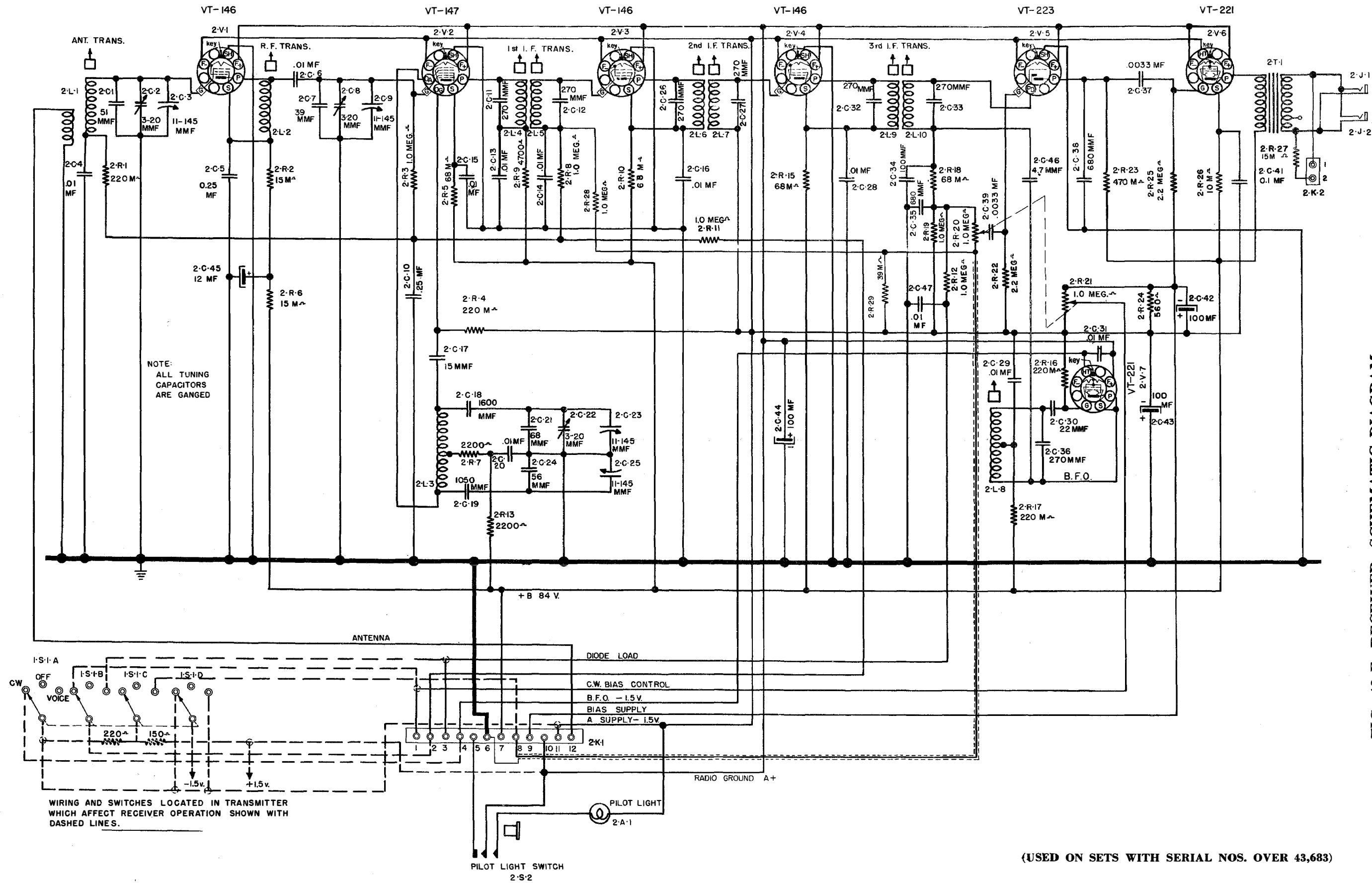
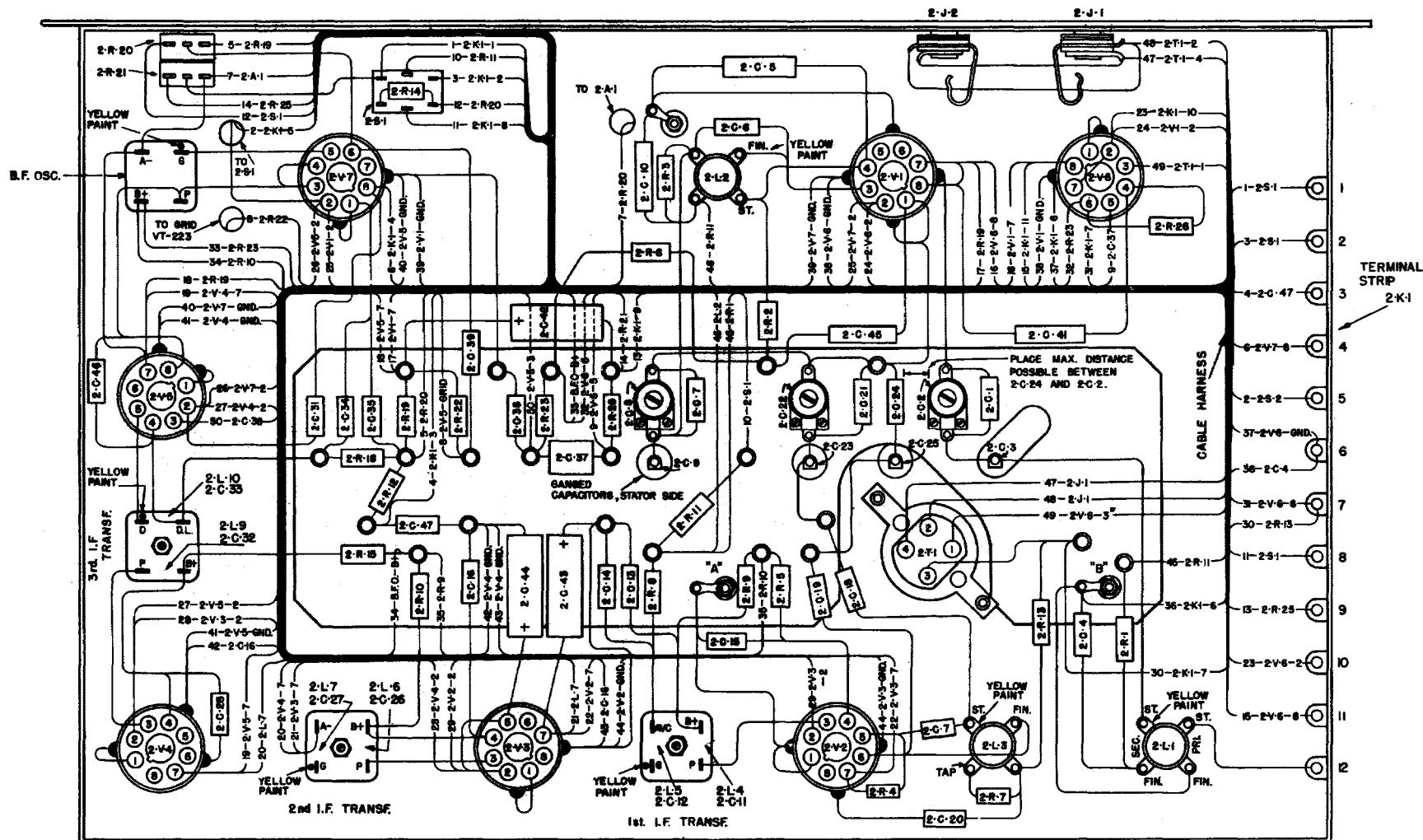


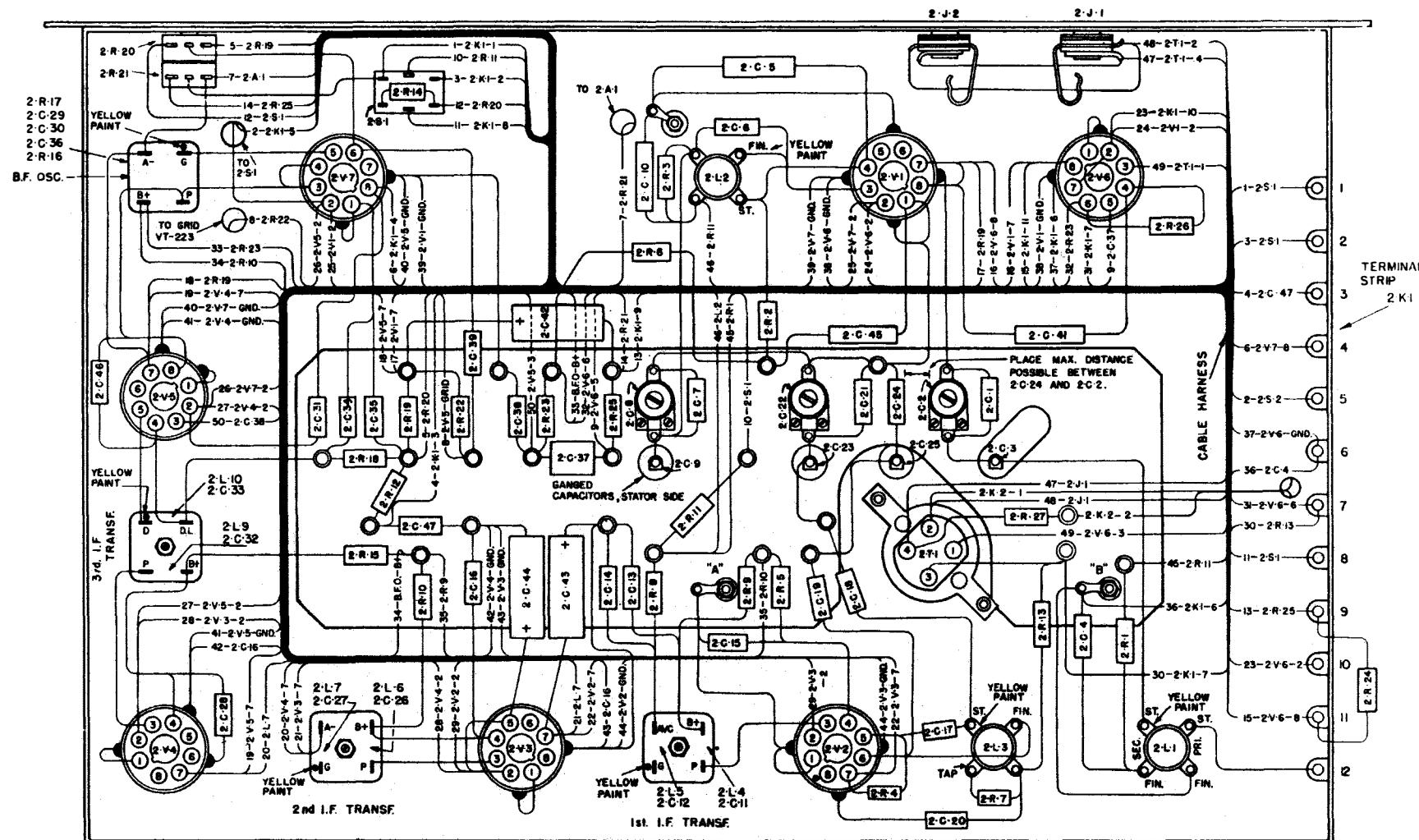
FIG. 42-E. RECEIVER, SCHEMATIC DIAGRAM





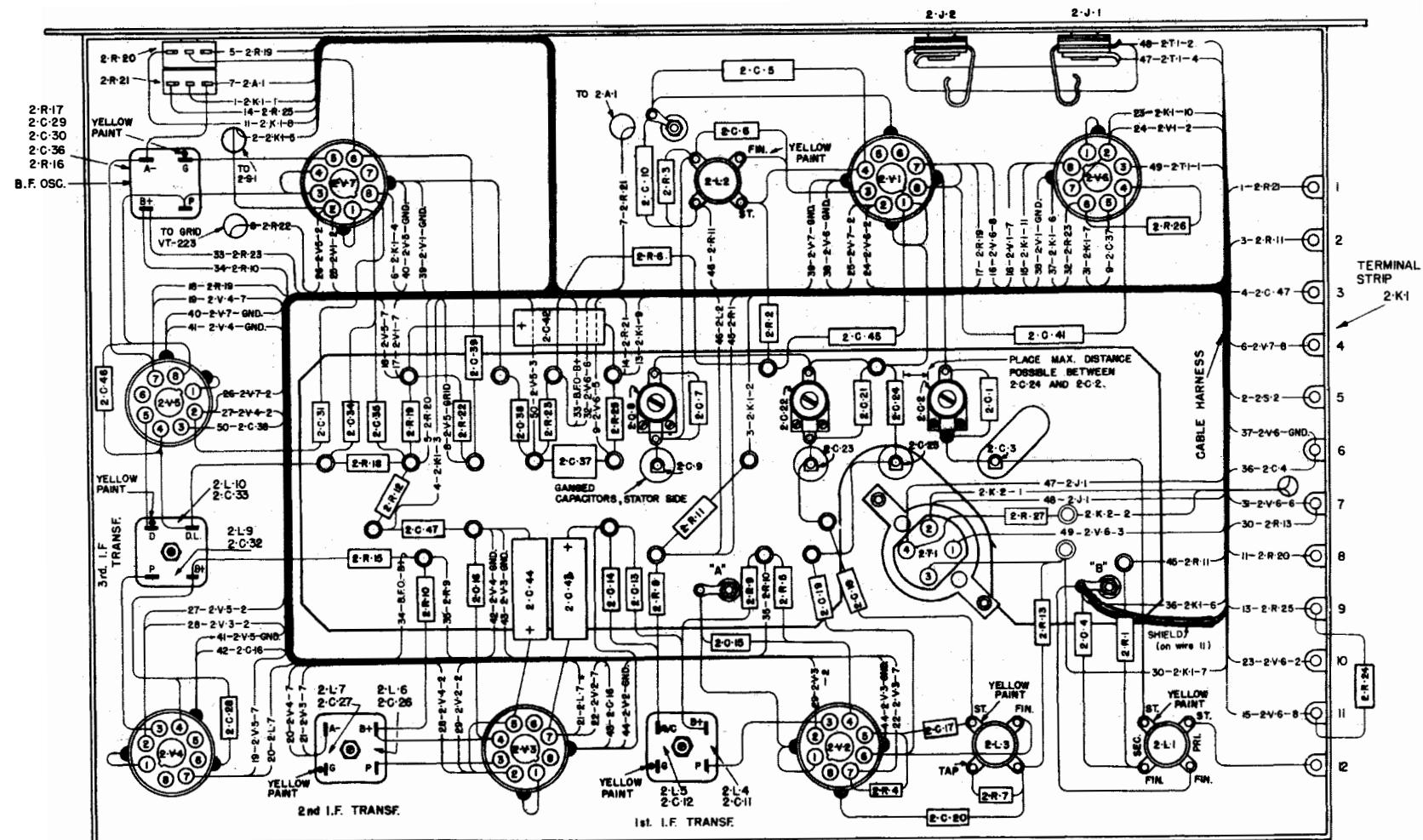
(USED ON SETS WITH SERIAL NOS. 1 TO 3500 INCLUSIVE)

FIG. 43-A RECEIVER, CONNECTION DIAGRAM



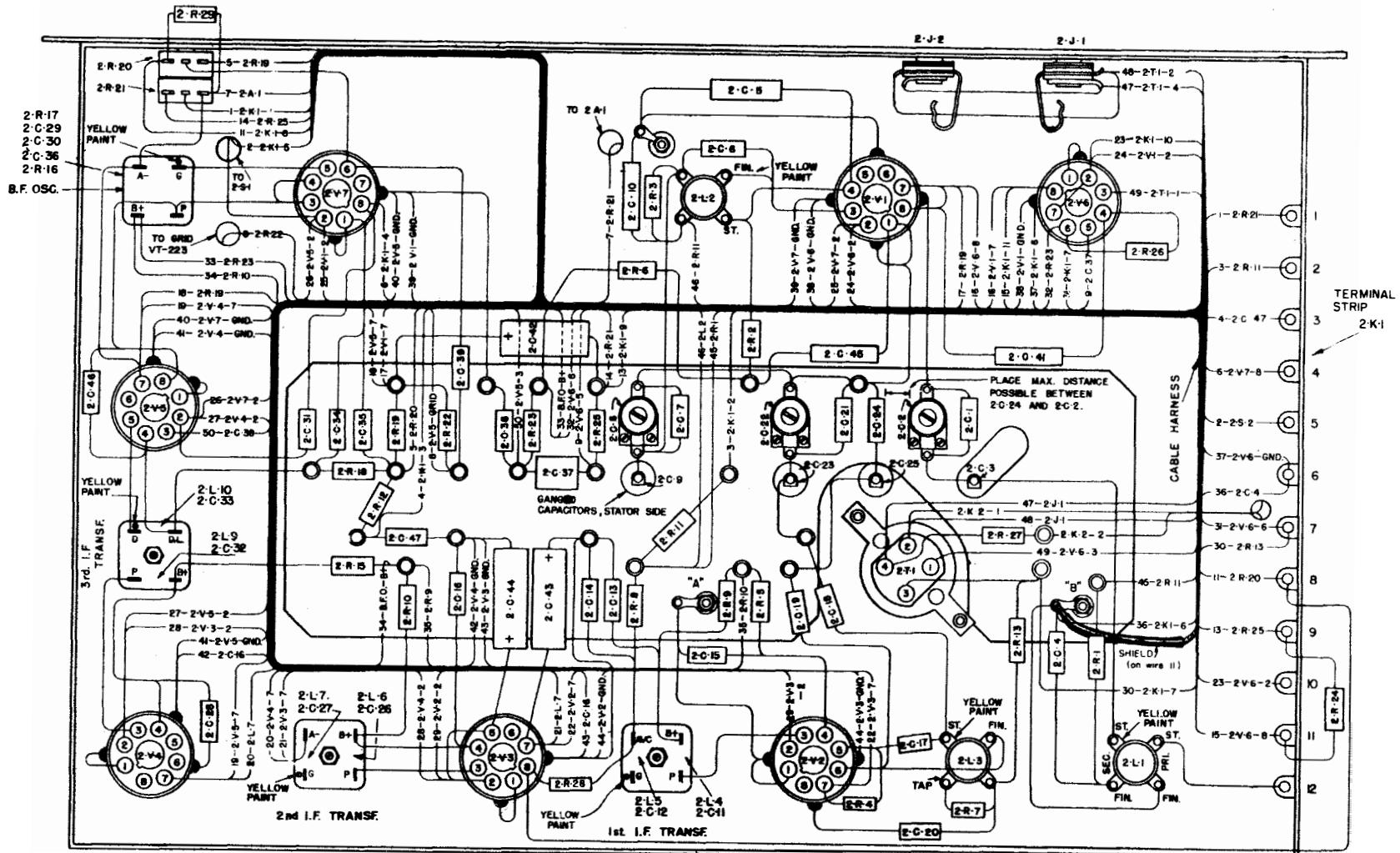
(USED ON SETS WITH SERIAL NOS. 3501 TO 9500 INCLUSIVE)

FIG. 43-B RECEIVER, CONNECTION DIAGRAM



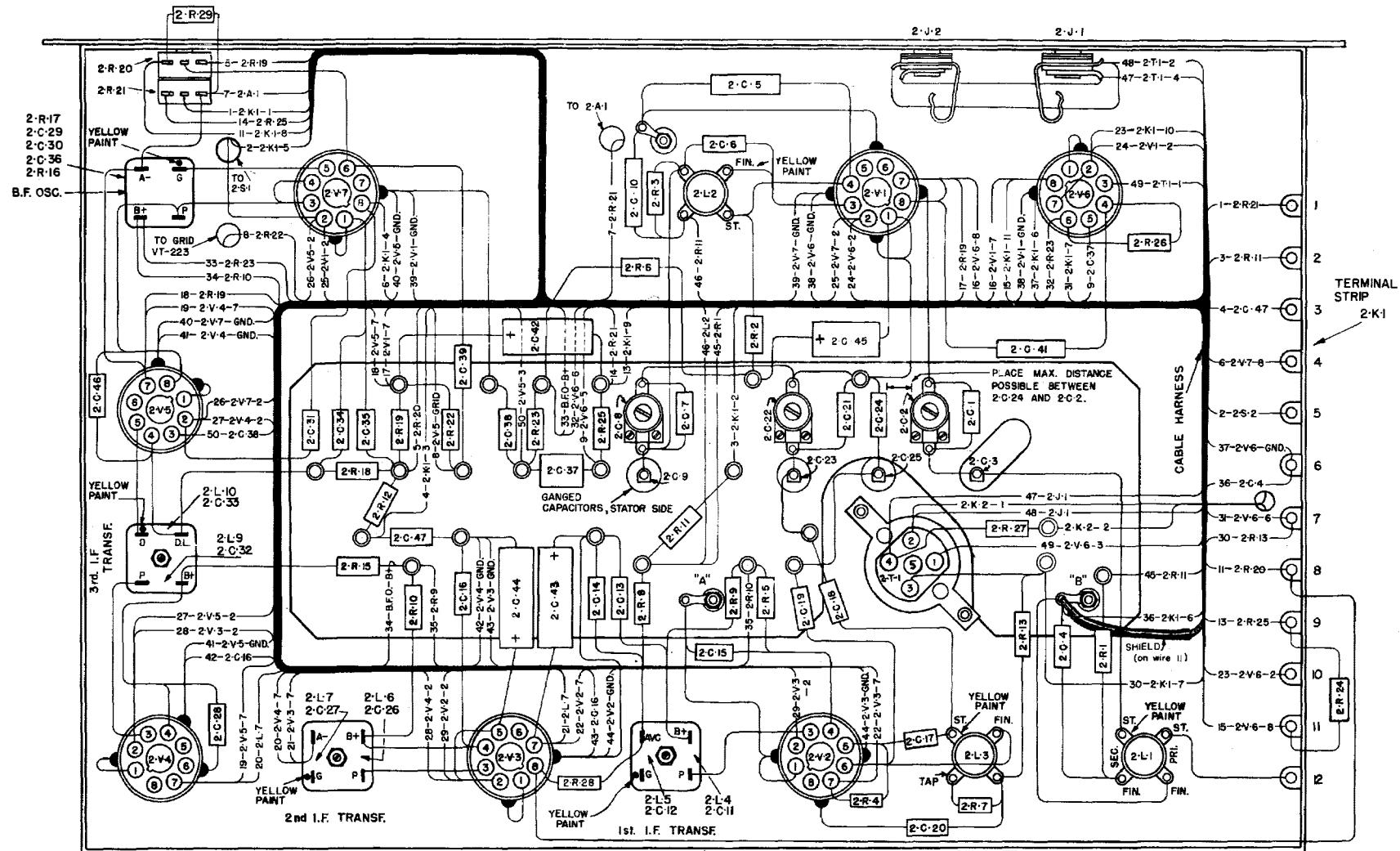
(USED ON SETS WITH SERIAL NOS. 9501 TO 17,691 INCLUSIVE)

FIG. 43-C RECEIVER, CONNECTION DIAGRAM



(USED ON SETS WITH SERIAL NOS. OVER 17,691)

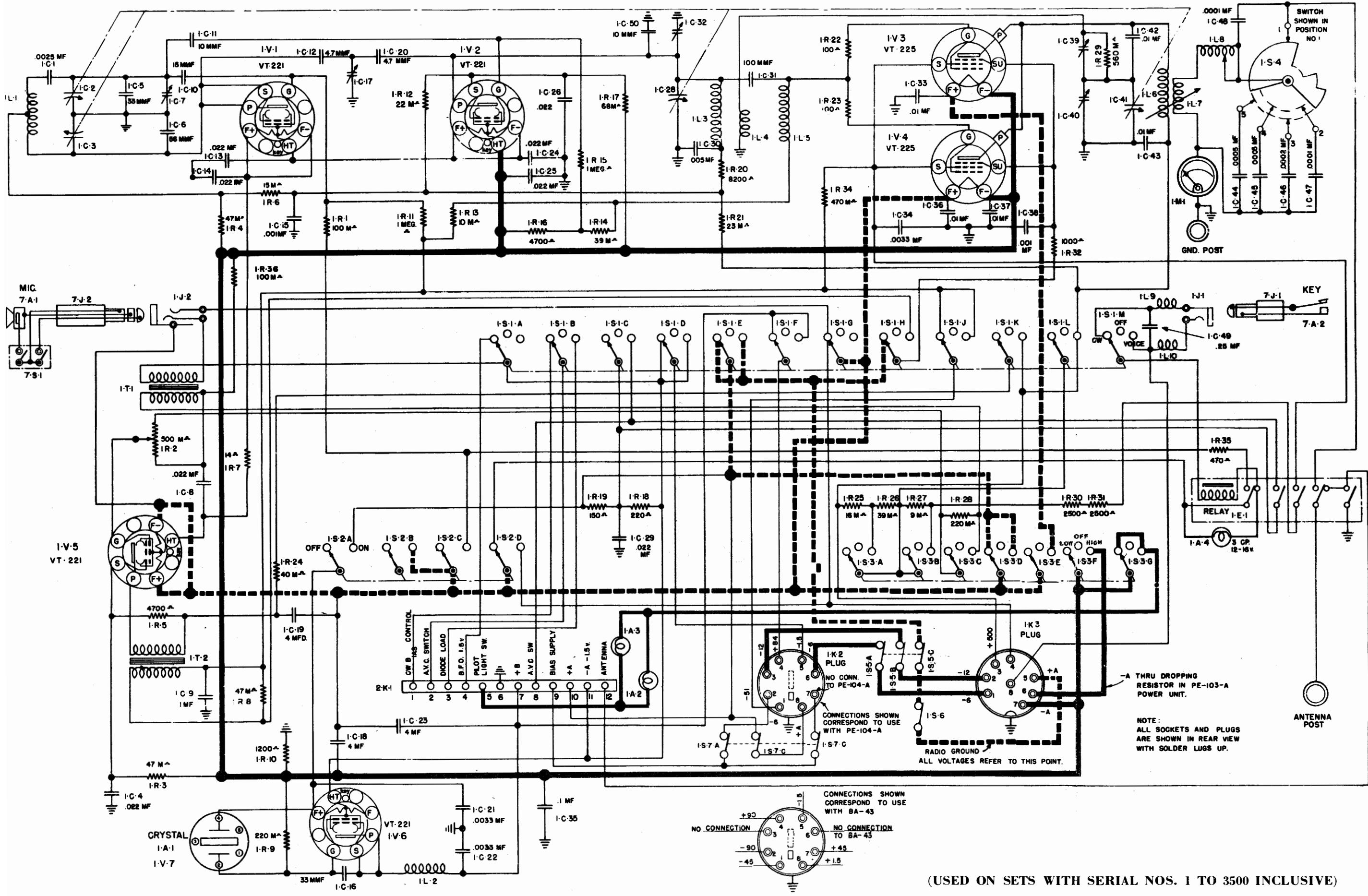
FIG. 43-D RECEIVER, CONNECTION DIAGRAM



(USED ON SETS WITH SERIAL NOS. OVER 43,683)

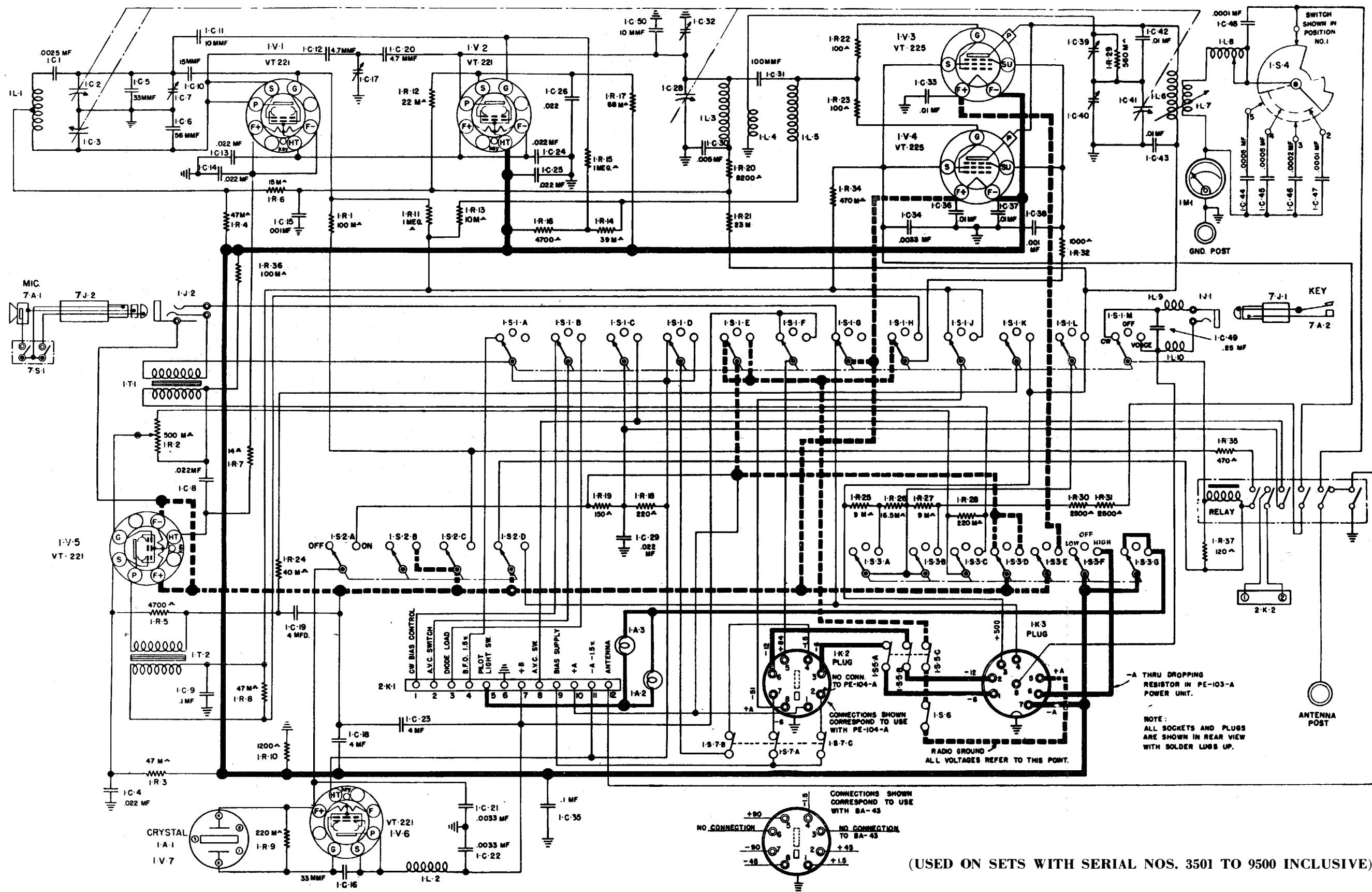
FIG. 43-E. RECEIVER, CONNECTION DIAGRAM

FIG. 44-A TRANSMITTER, SCHEMATIC DIAGRAM



(USED ON SETS WITH SERIAL NOS. 1 TO 3500 INCLUSIVE)

FIG. 44-B TRANSMITTER, SCHEMATIC DIAGRAM



(USED ON SETS WITH SERIAL NOS. 3501 TO 9500 INCLUSIVE)

FIG. 44-C TRANSMITTER, SCHEMATIC DIAGRAM

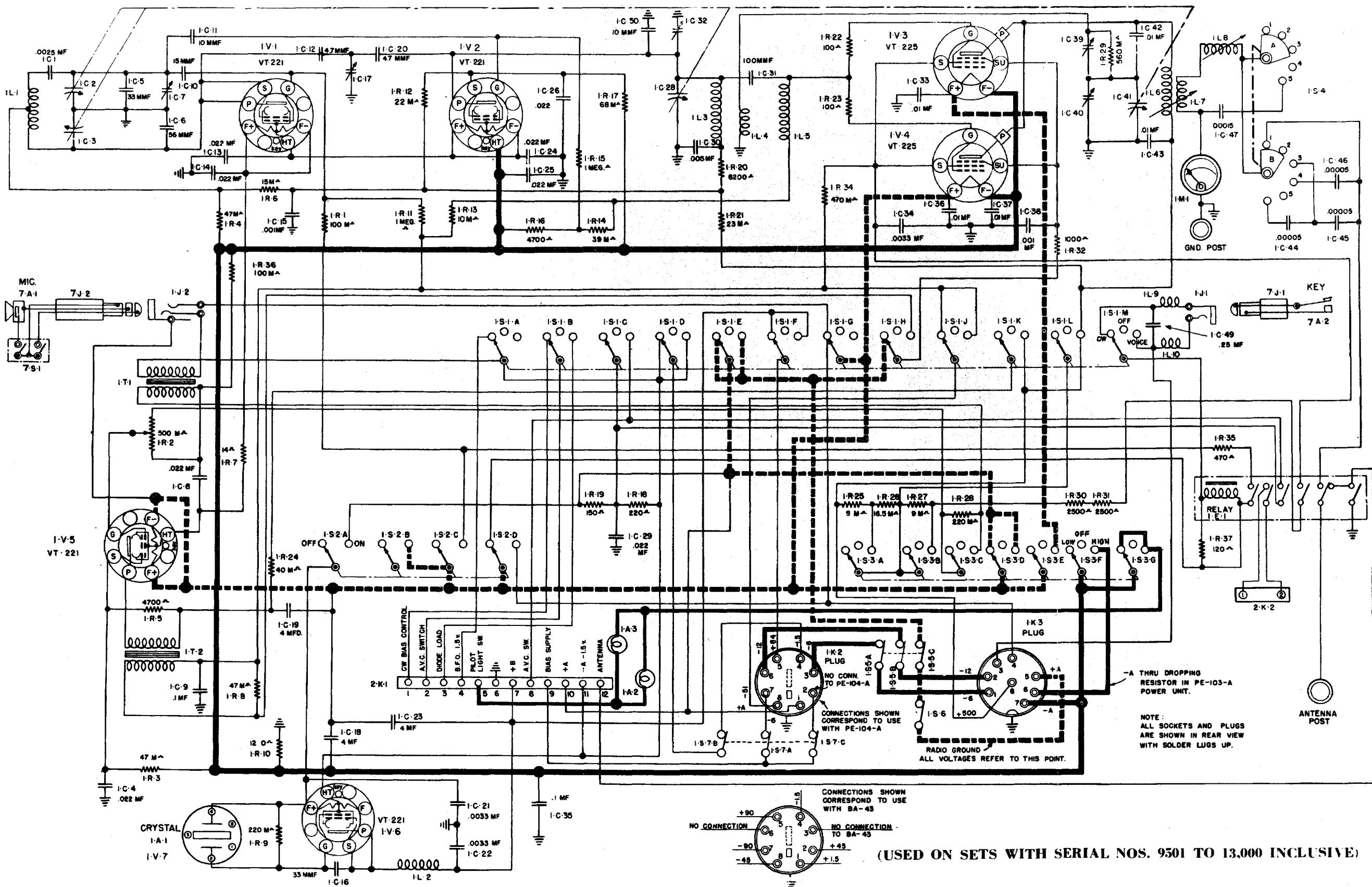


FIG. 44-D TRANSMITTER, SCHEMATIC DIAGRAM

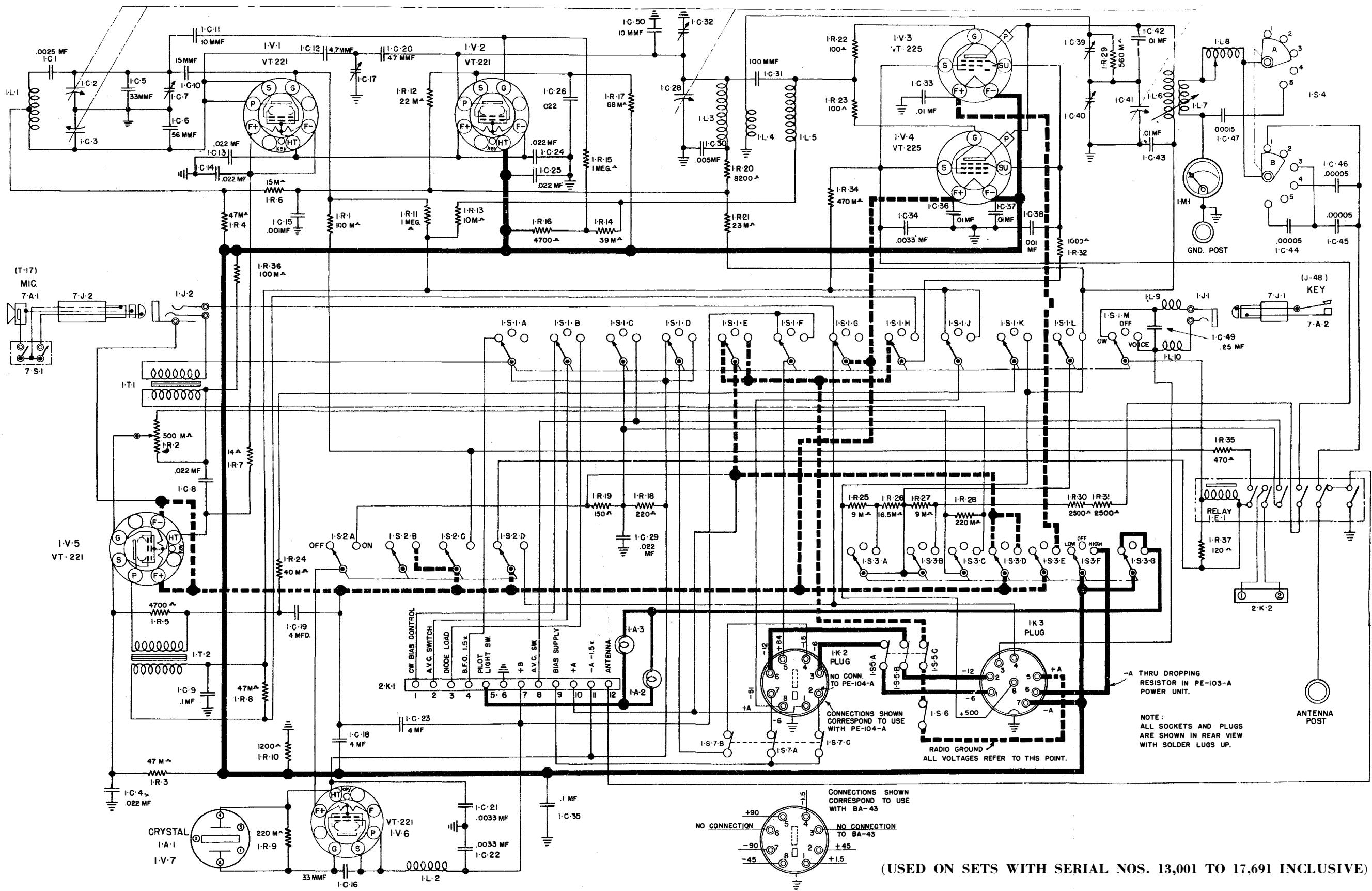


FIG. 44-E TRANSMITTER. SCHEMATIC DIAGRAM

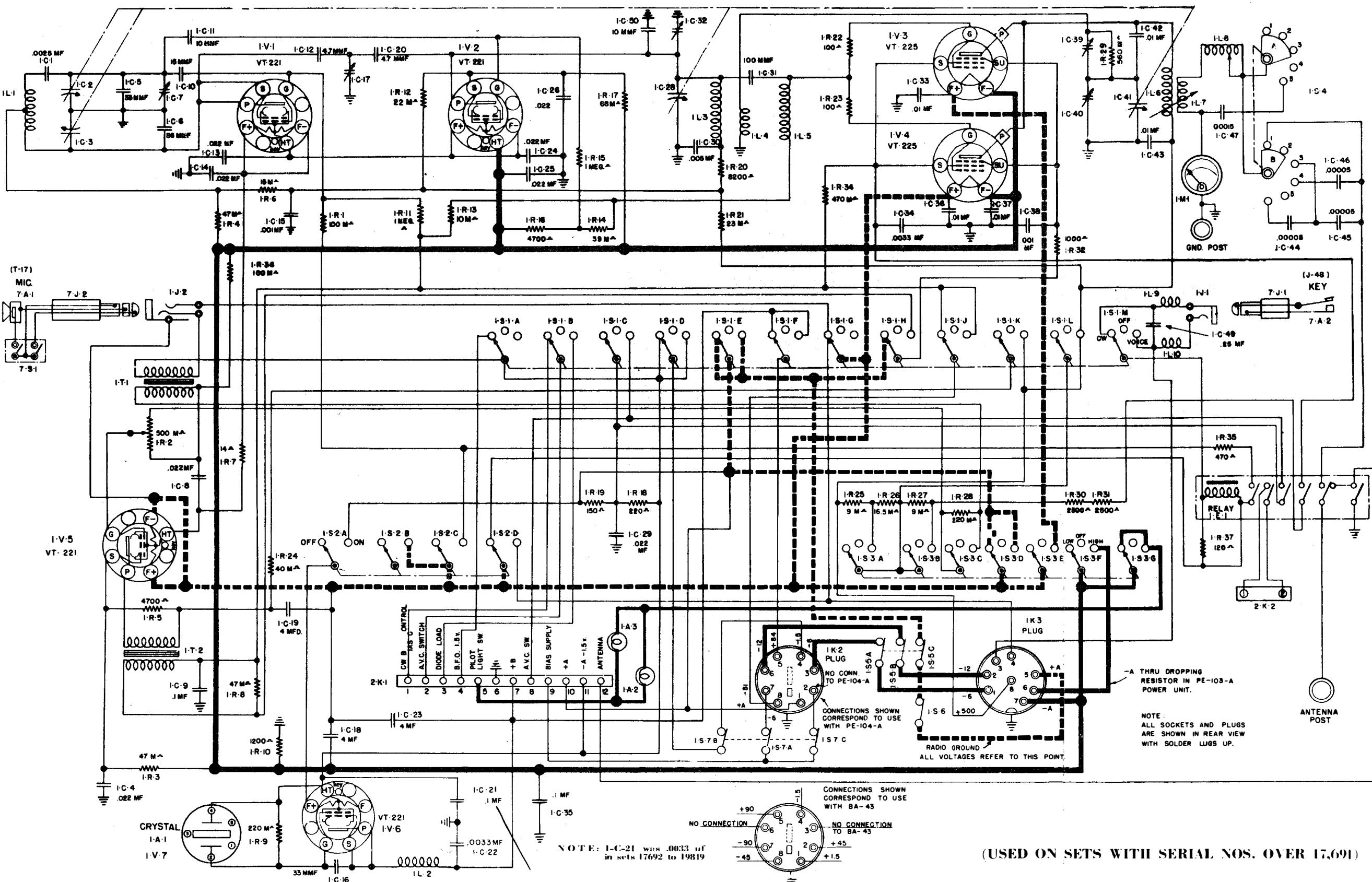
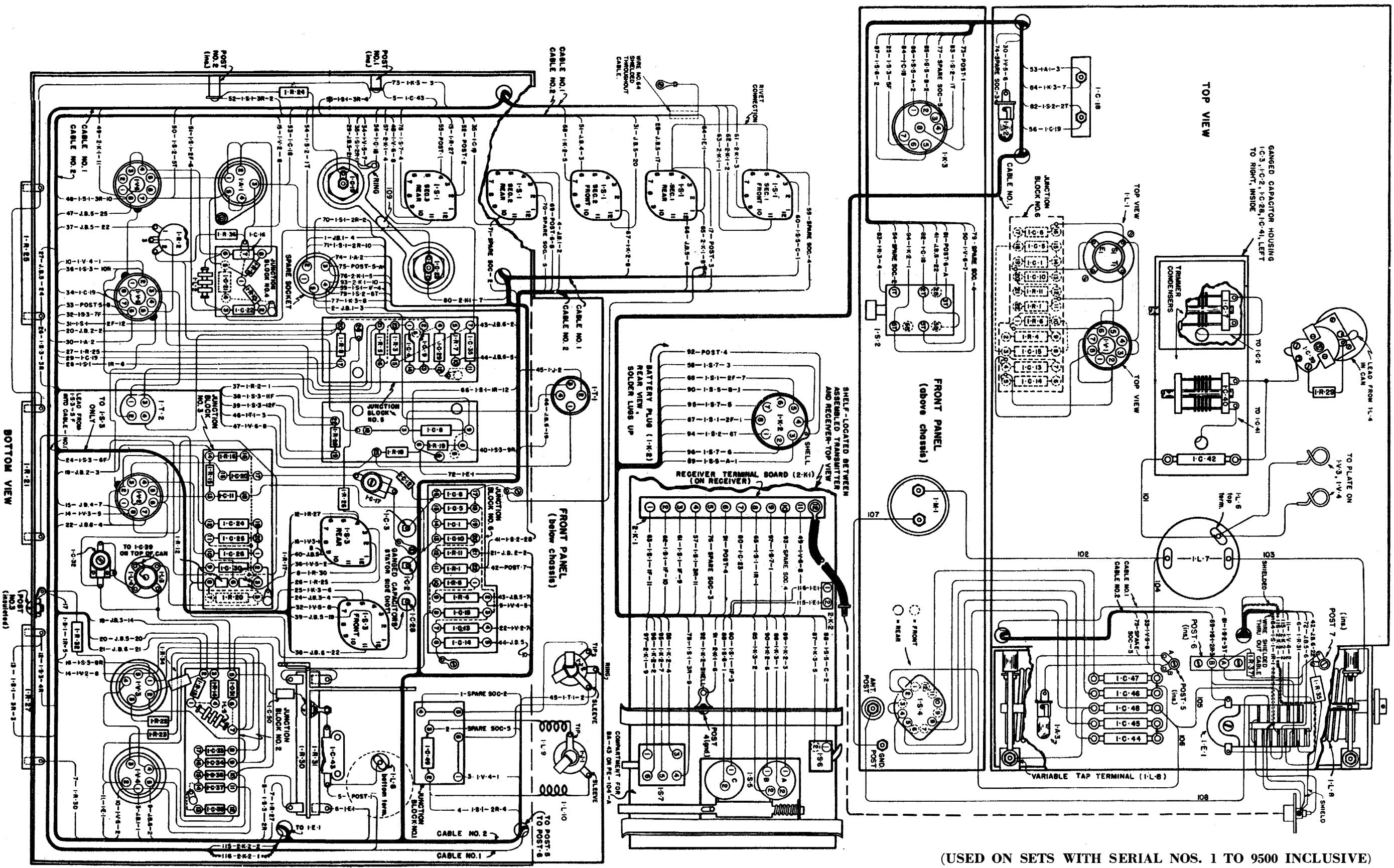
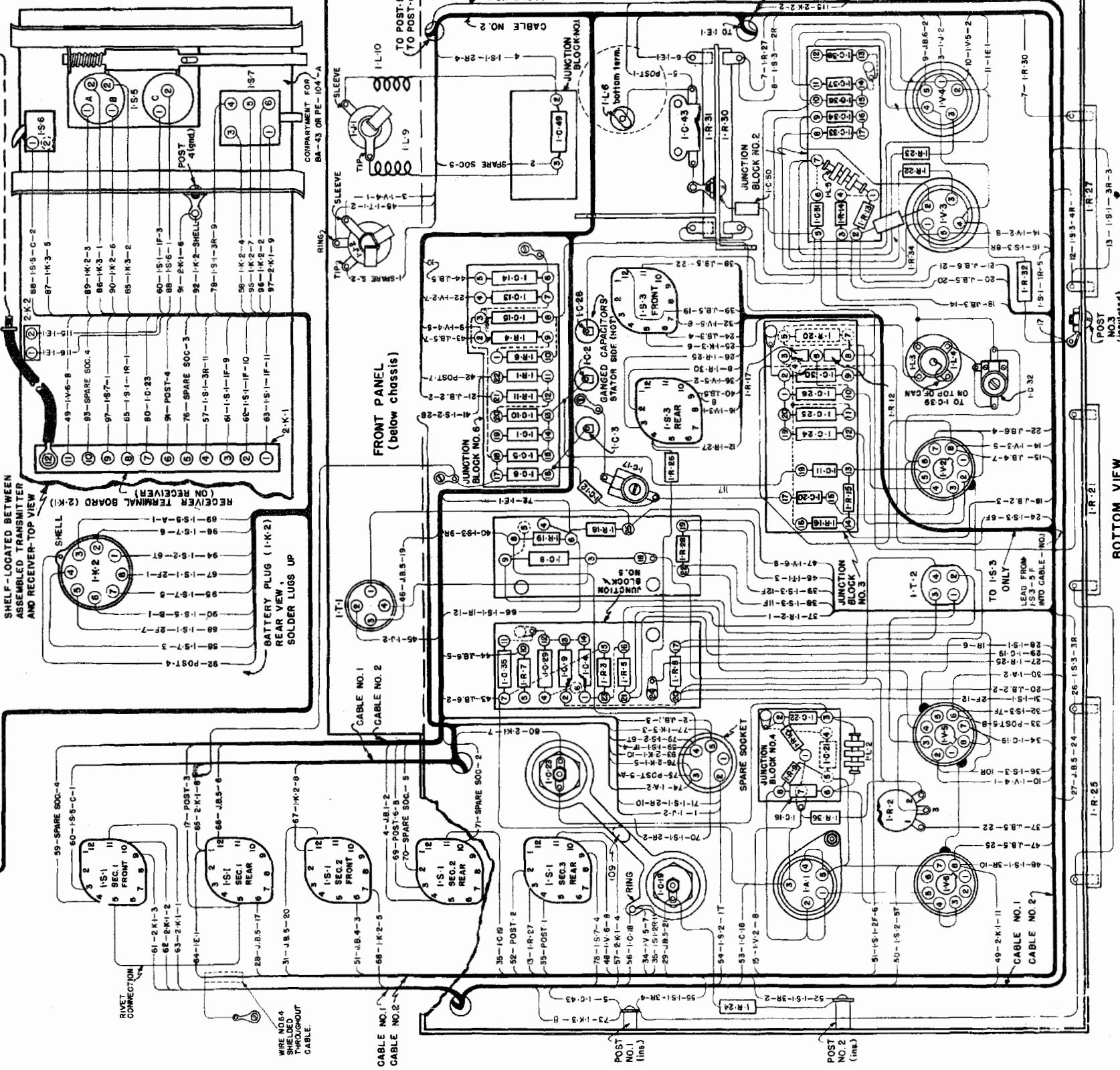
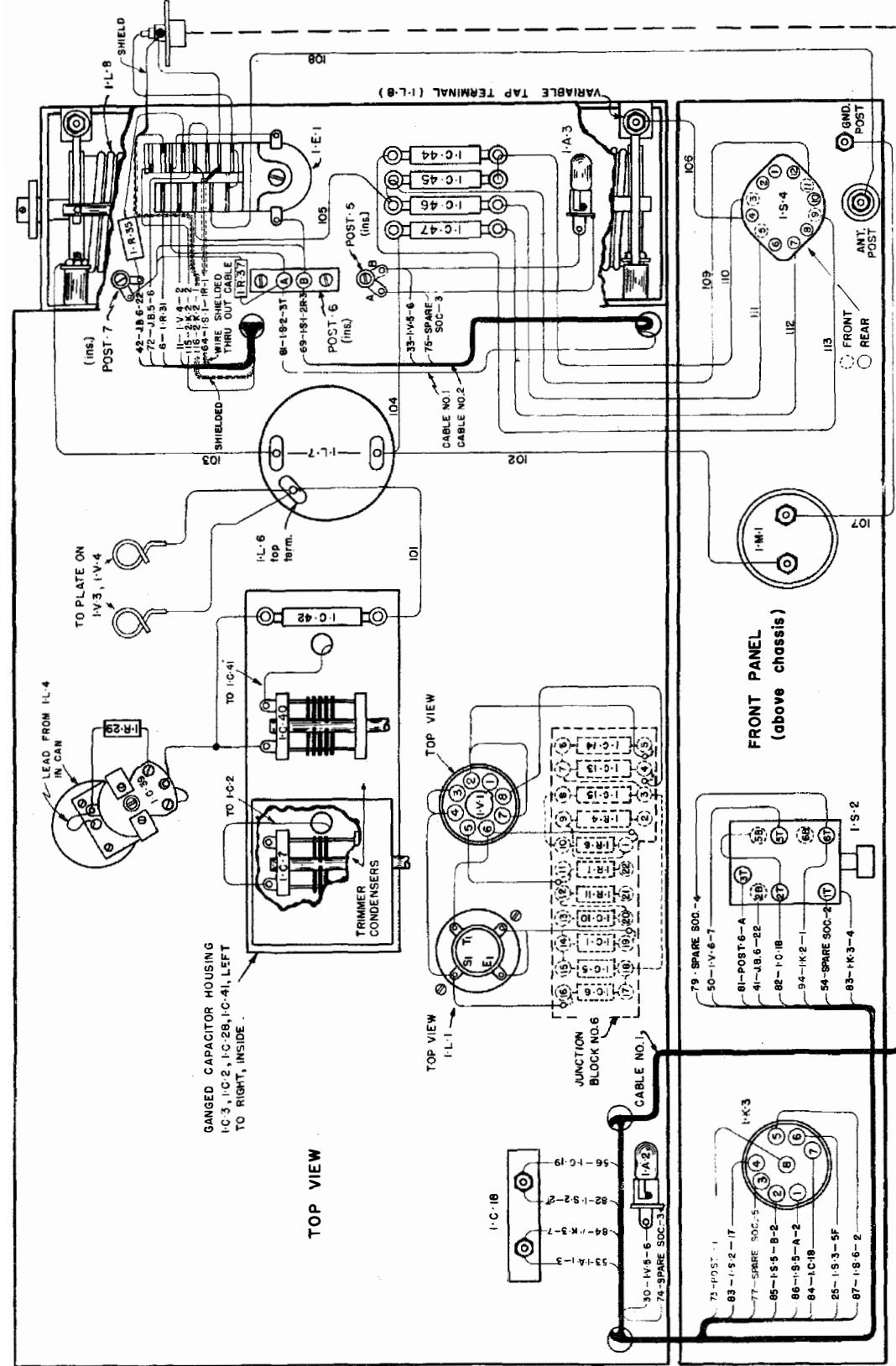


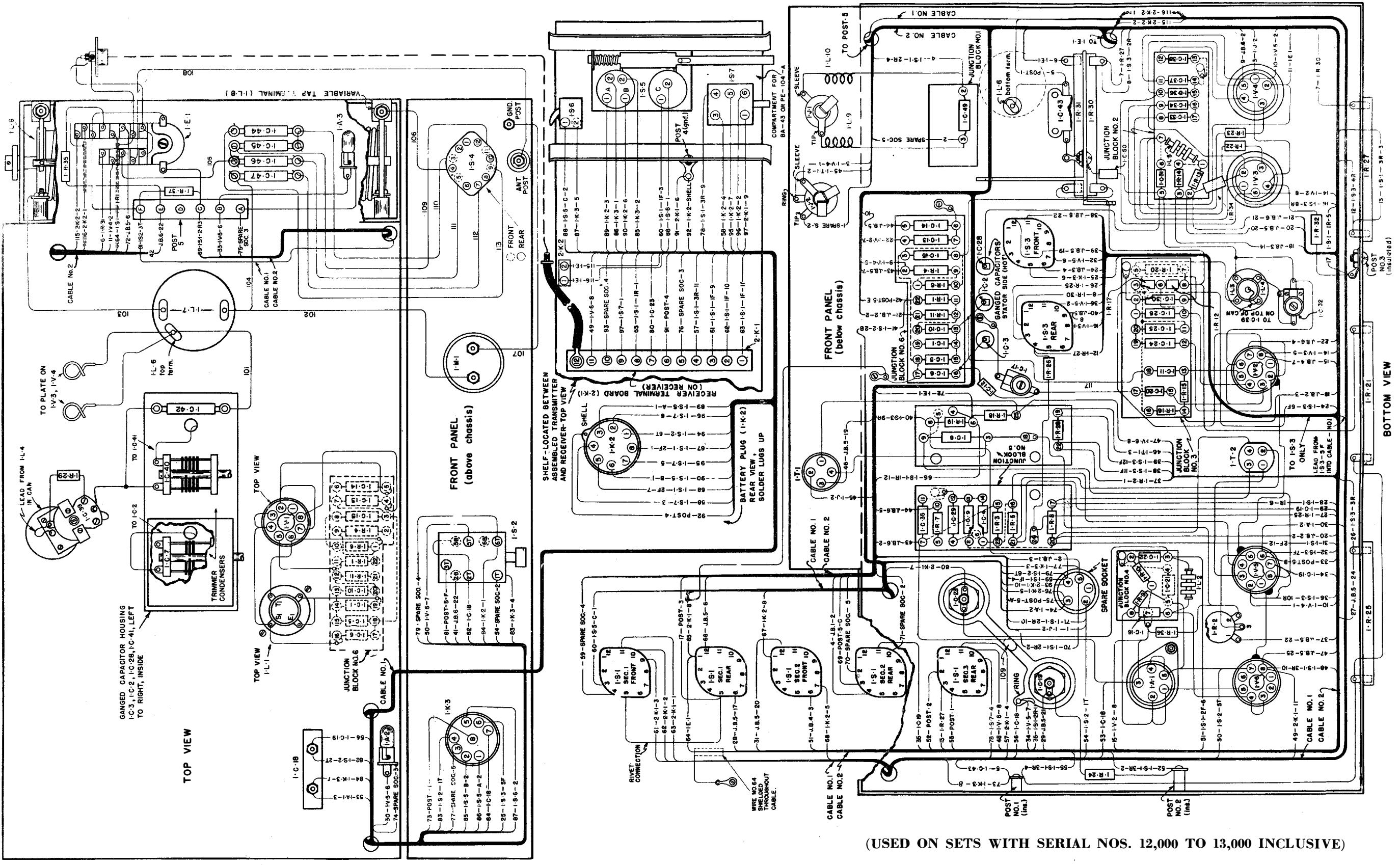
FIG. 45-A TRANSMITTER, CONNECTION DIAGRAM



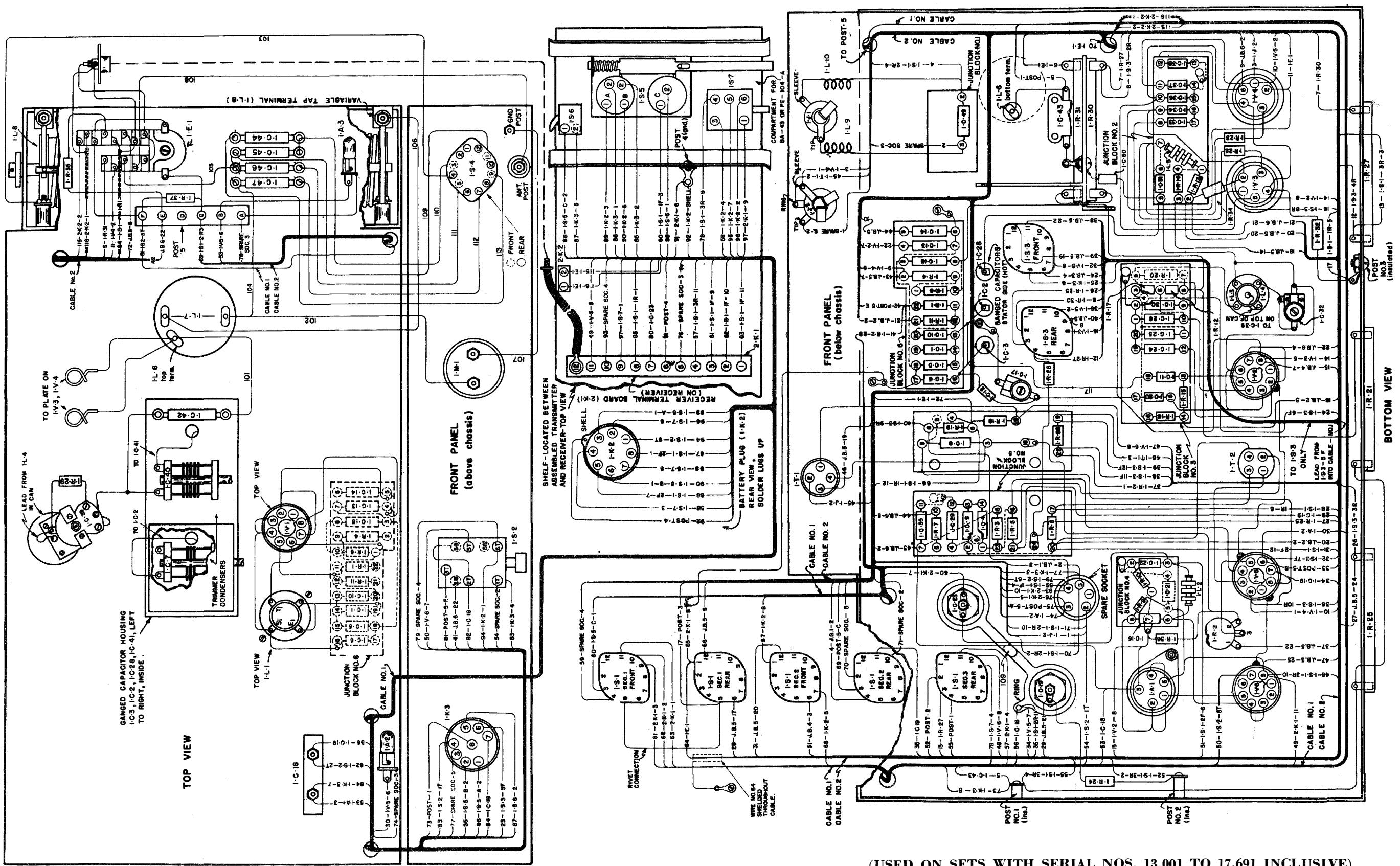
(USED ON SETS WITH SERIAL NOS. 1 TO 9500 INCLUSIVE)



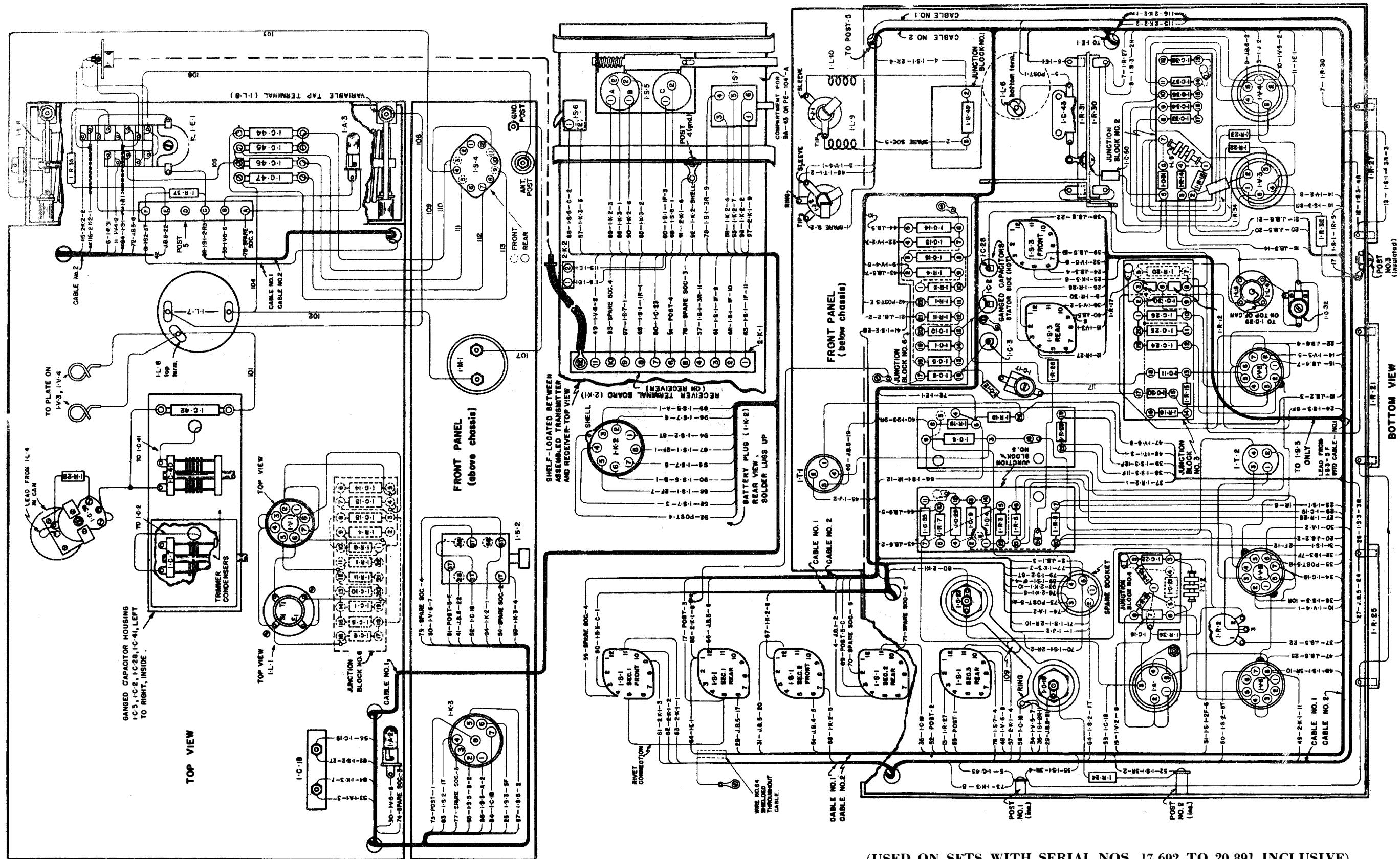
(USED ON SETS WITH SERIAL NOS. 9501 TO 12,000 INCLUSIVE)



(USED ON SETS WITH SERIAL NOS. 12,000 TO 13,000 INCLUSIVE)



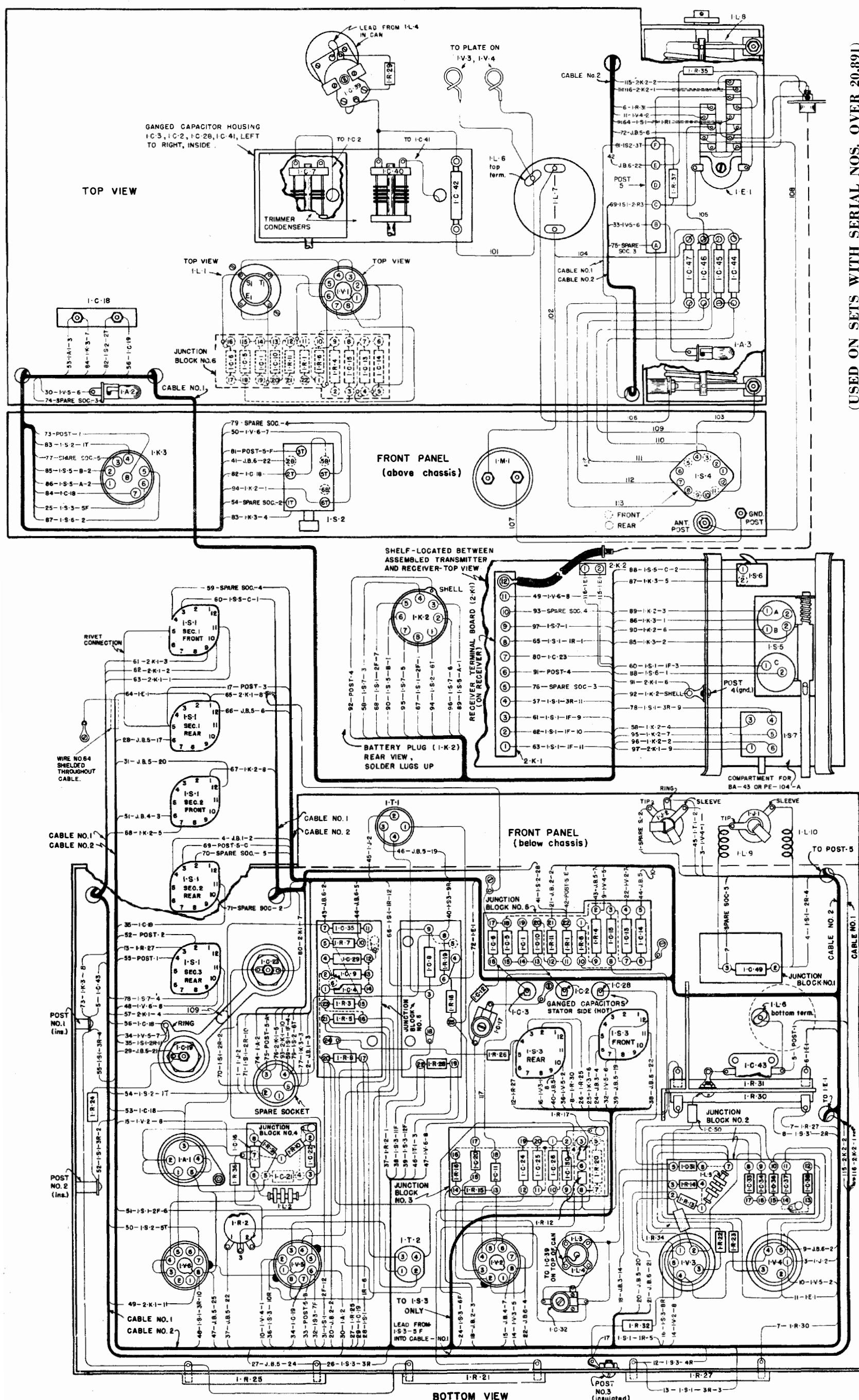
(USED ON SETS WITH SERIAL NOS. 13,001 TO 17,691 INCLUSIVE)



(USED ON SETS WITH SERIAL NOS. 17,692 TO 20,891 INCLUSIVE)

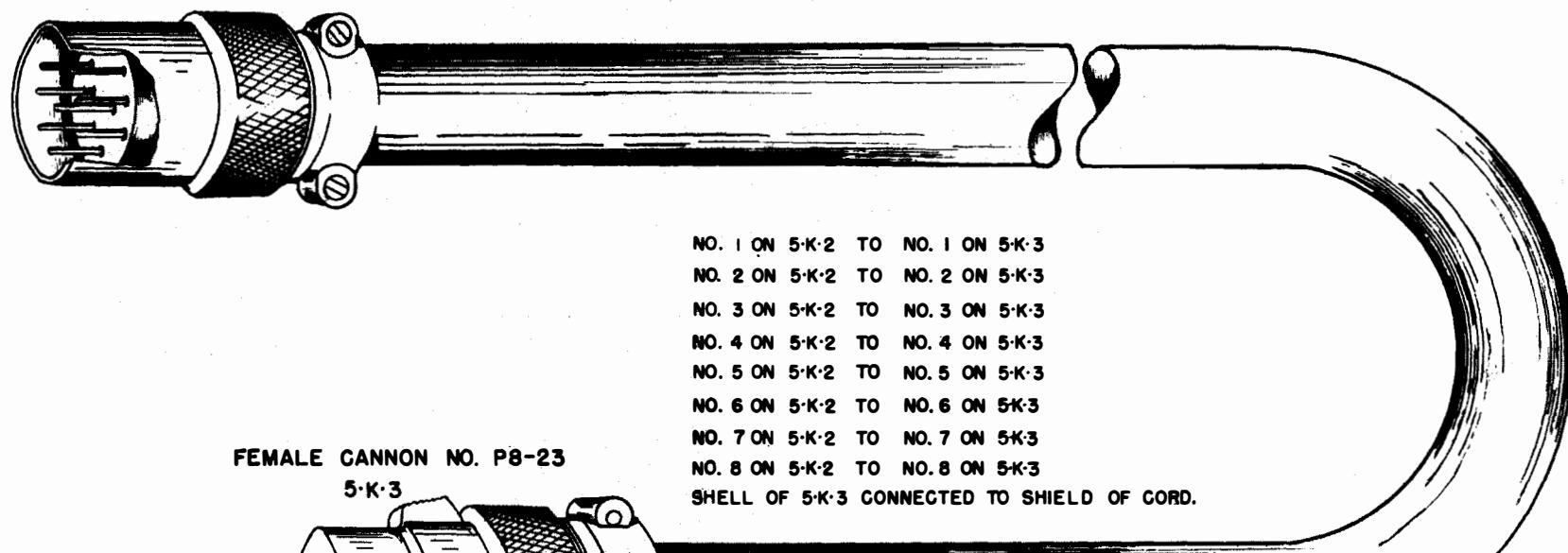
FIG. 45-F TRANSMITTER, CONNECTION DIAGRAM

5



MALE CANNON NO. P8-24

5·K·2



NO. 1 ON 5·K·2 TO NO. 1 ON 5·K·3
NO. 2 ON 5·K·2 TO NO. 2 ON 5·K·3
NO. 3 ON 5·K·2 TO NO. 3 ON 5·K·3
NO. 4 ON 5·K·2 TO NO. 4 ON 5·K·3
NO. 5 ON 5·K·2 TO NO. 5 ON 5·K·3
NO. 6 ON 5·K·2 TO NO. 6 ON 5·K·3
NO. 7 ON 5·K·2 TO NO. 7 ON 5·K·3
NO. 8 ON 5·K·2 TO NO. 8 ON 5·K·3

SHELL OF 5·K·3 CONNECTED TO SHIELD OF CORD.

FEMALE CANNON NO. P8-23

5·K·3

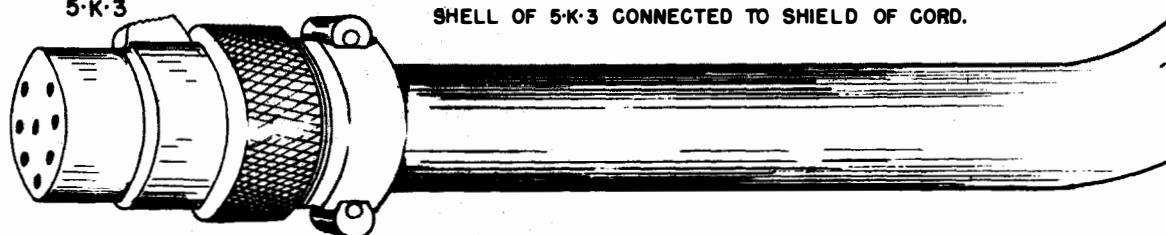


FIG. 46-A CORD CD-501-A, CONNECTION DIAGRAM

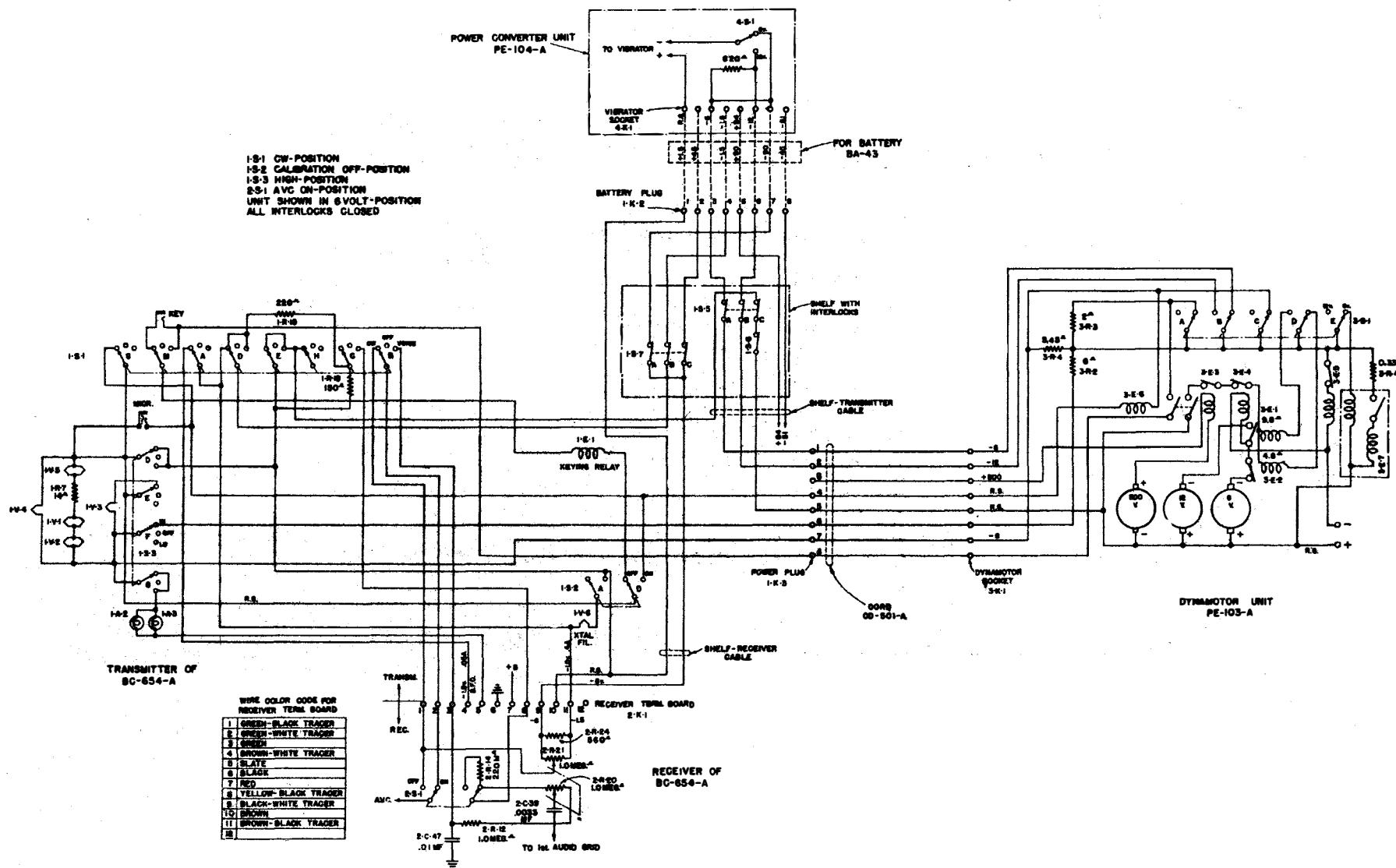
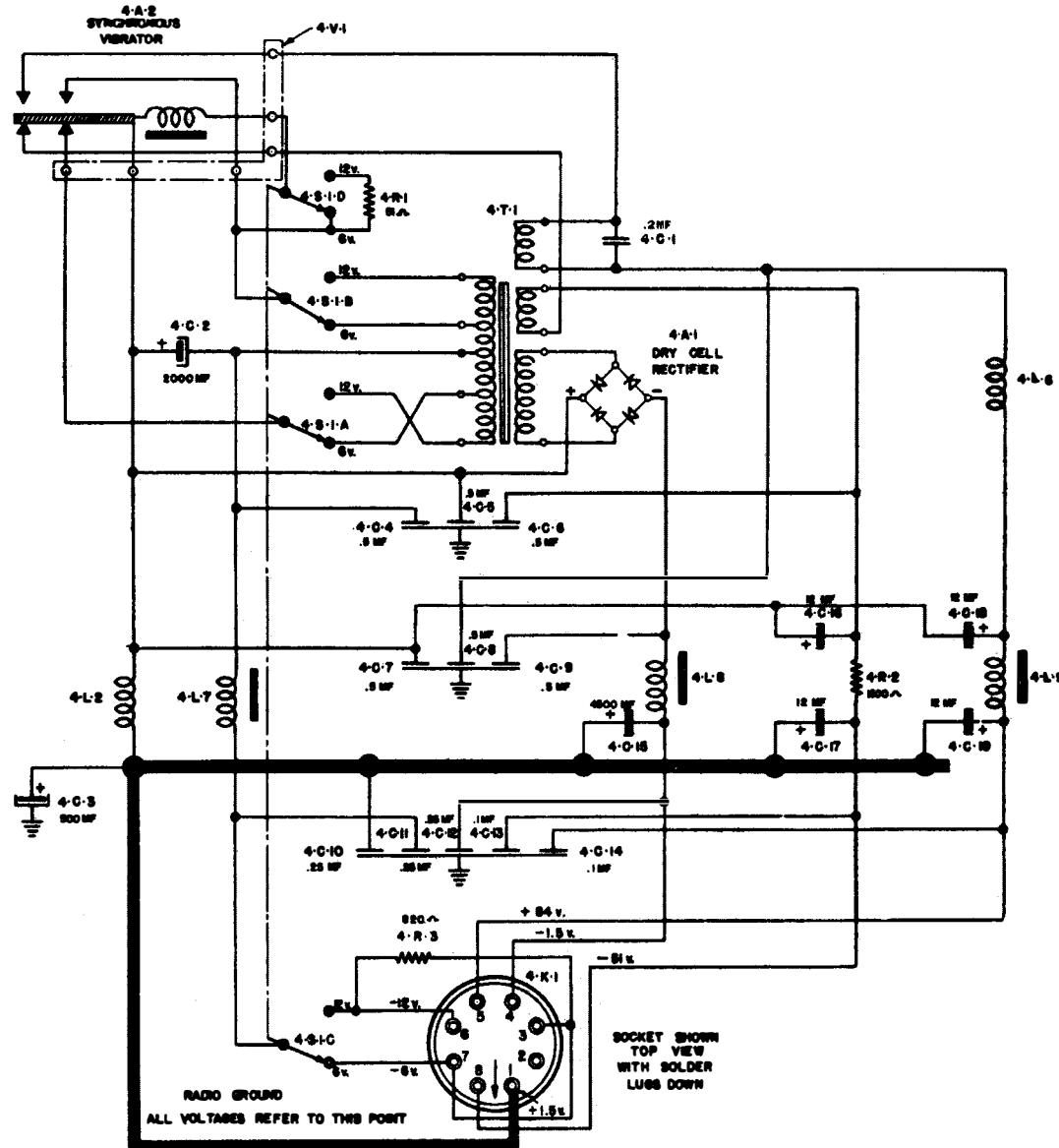


FIG. 47-A SIMPLIFIED SWITCHING AND CODING, SCHEMATIC DIAGRAM



(USED ON SETS WITH SERIAL NOS. ABOVE 12,000. FOR SETS 1-12,000, SEE FIG. 20)

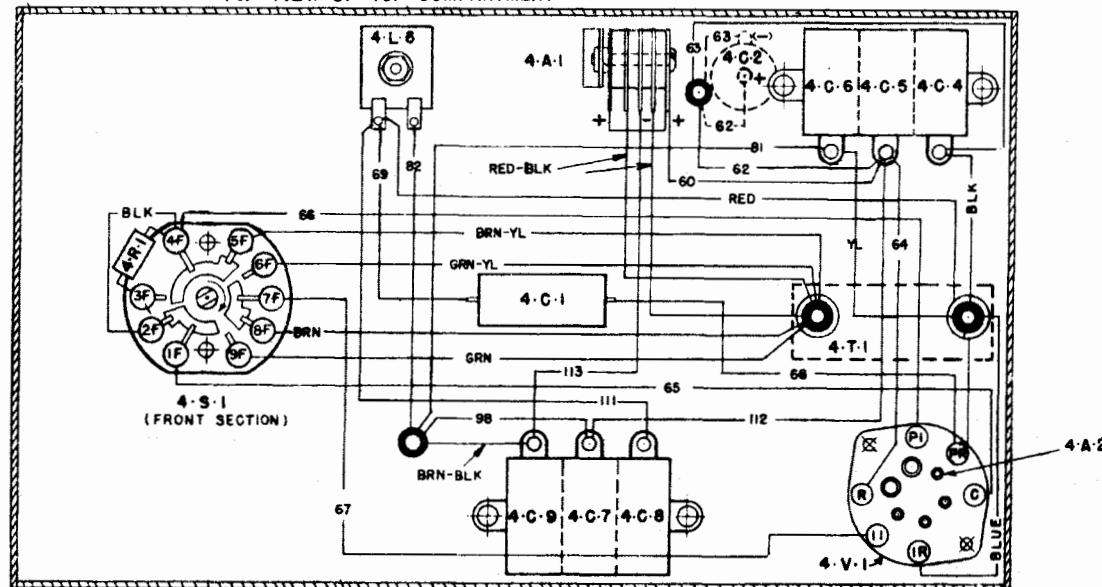
FIG. 48-A POWER CONVERTER PE-104-A (ALTERNATE) SCHEMATIC DIAGRAM

COLOR LEGEND

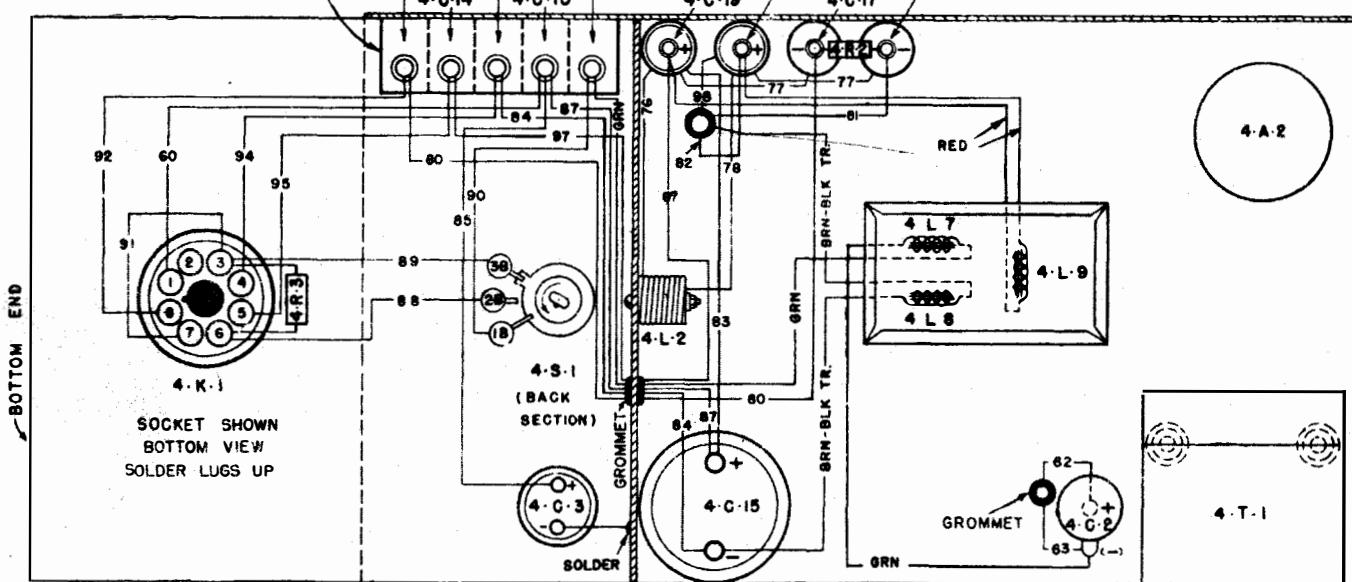
BLK - BLACK
BRN - BRCWN
CRN - GREEN
YL - YELLOW

SWITCH "4-S.1" SHOWN
IN 6-VOLT POSITION

TOP VIEW OF TOP COMPARTMENT



THIS END
DOWN

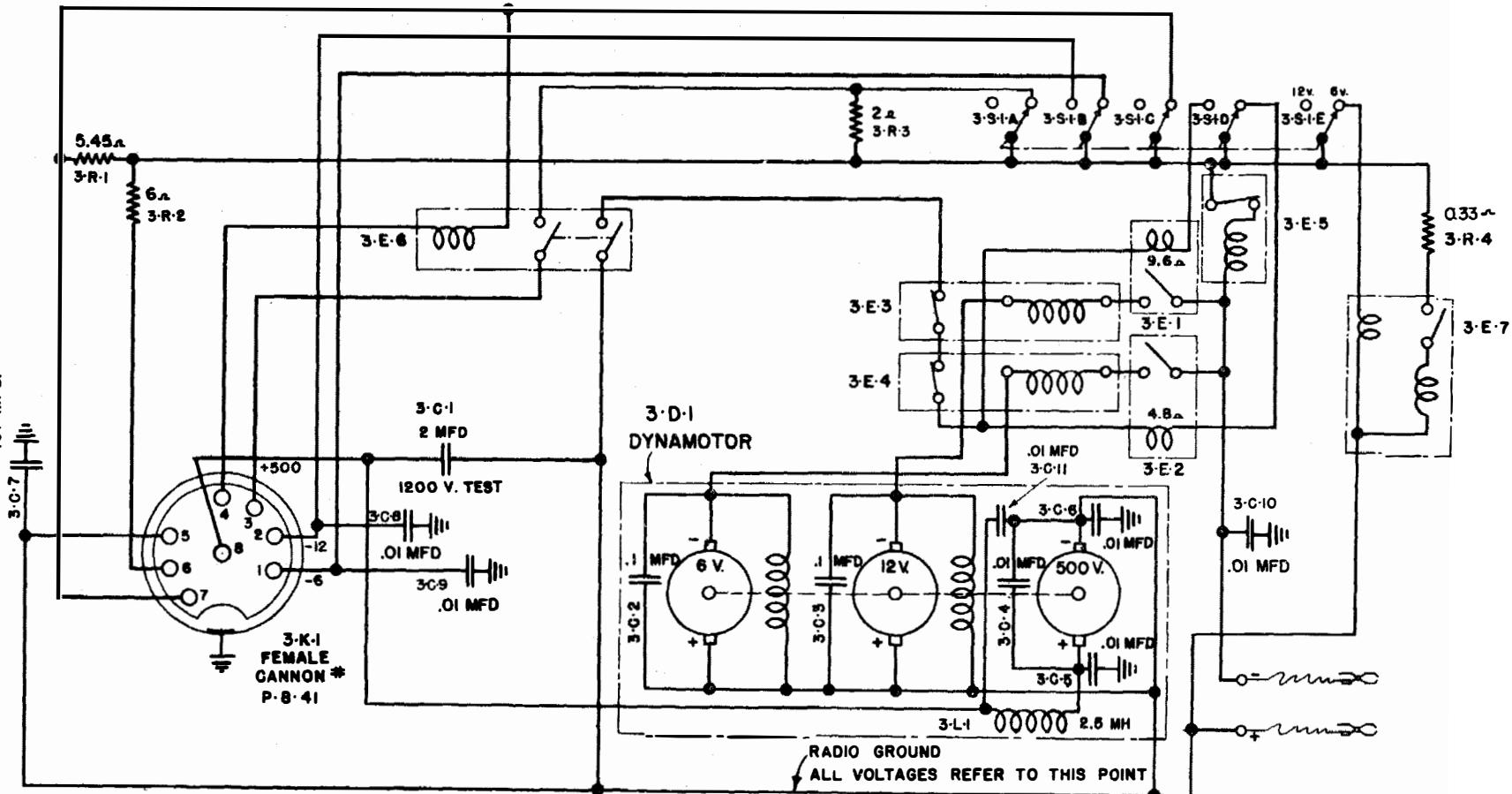


TOP VIEW OF BOTTOM COMPARTMENT

(USED ON SETS WITH SERIAL NOS. ABOVE 12,000. FOR SETS 1-12,000, SEE FIG. 21)

FIG. 48-B POWER CONVERTER PE-104-A (ALTERNATE) CONNECTION DIAGRAM

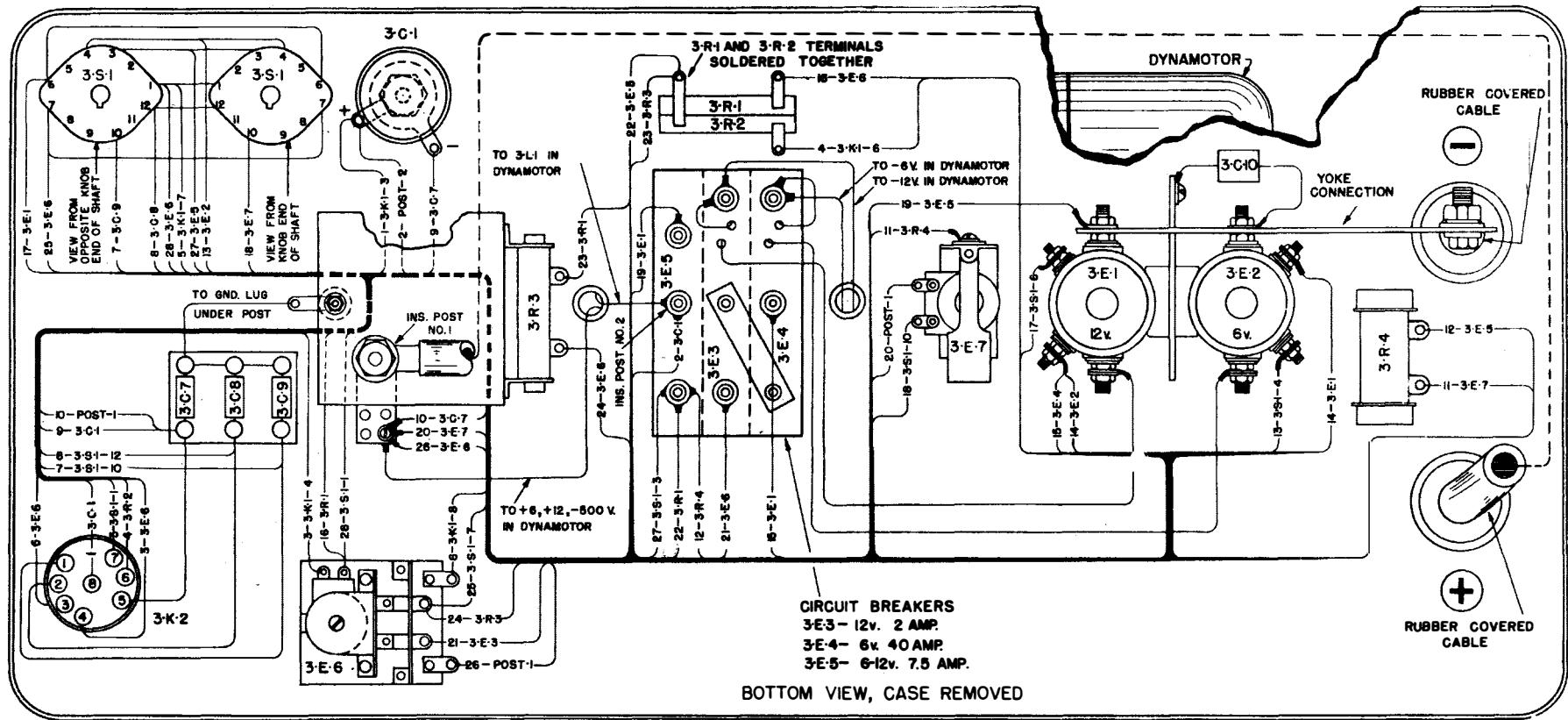
**REAR VIEW OF RECEPTACLE
(SOLDER LUGS TOWARD OBSERVER)**



(USED ON SETS WITH SERIAL NOS. 1 TO 4710 INCLUSIVE)

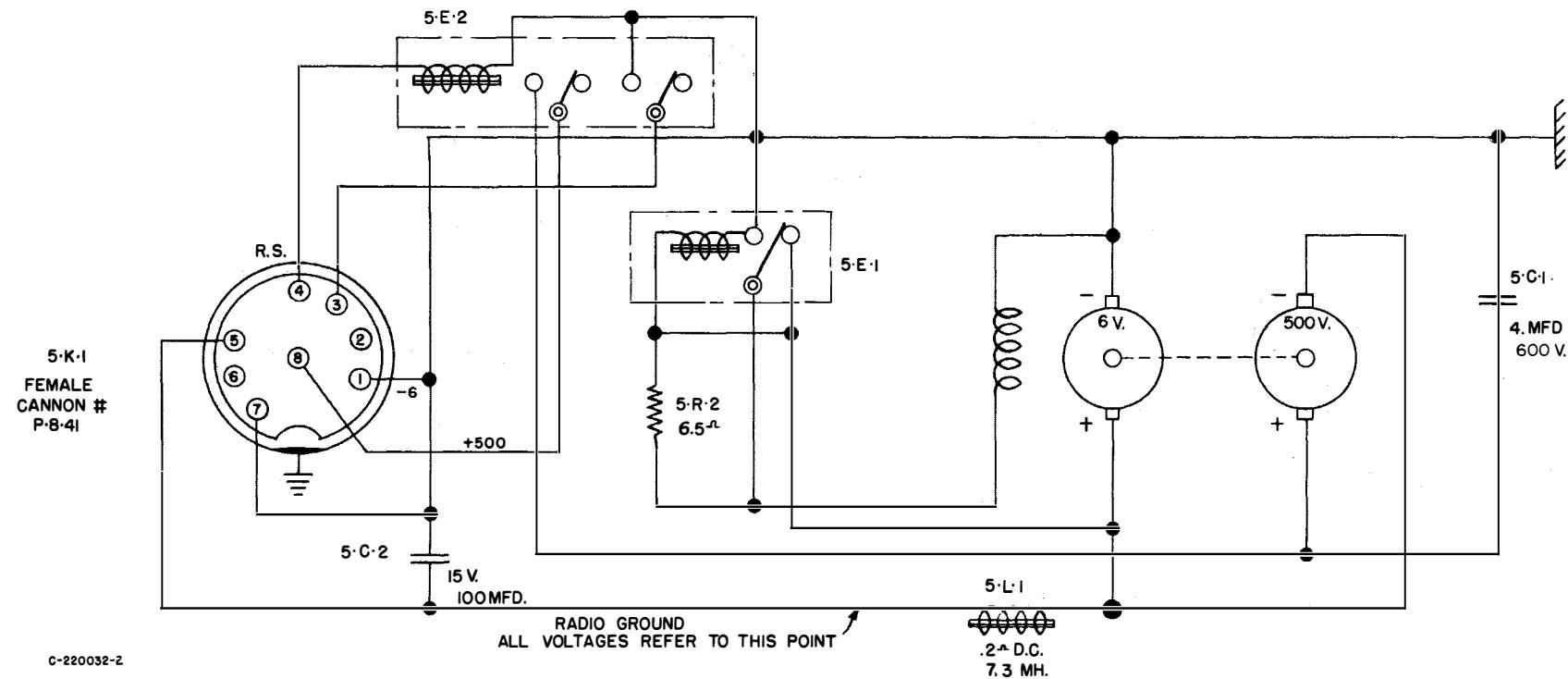
(FOR SETS ABOVE 4710 SEE FIG. 23)

FIG. 49-A POWER UNIT PE-103-A, SCHEMATIC DIAGRAM



(USED ON SETS WITH SERIAL NOS. 1 TO 4710 INCLUSIVE. FOR SETS ABOVE 4710, SEE FIG. 24)

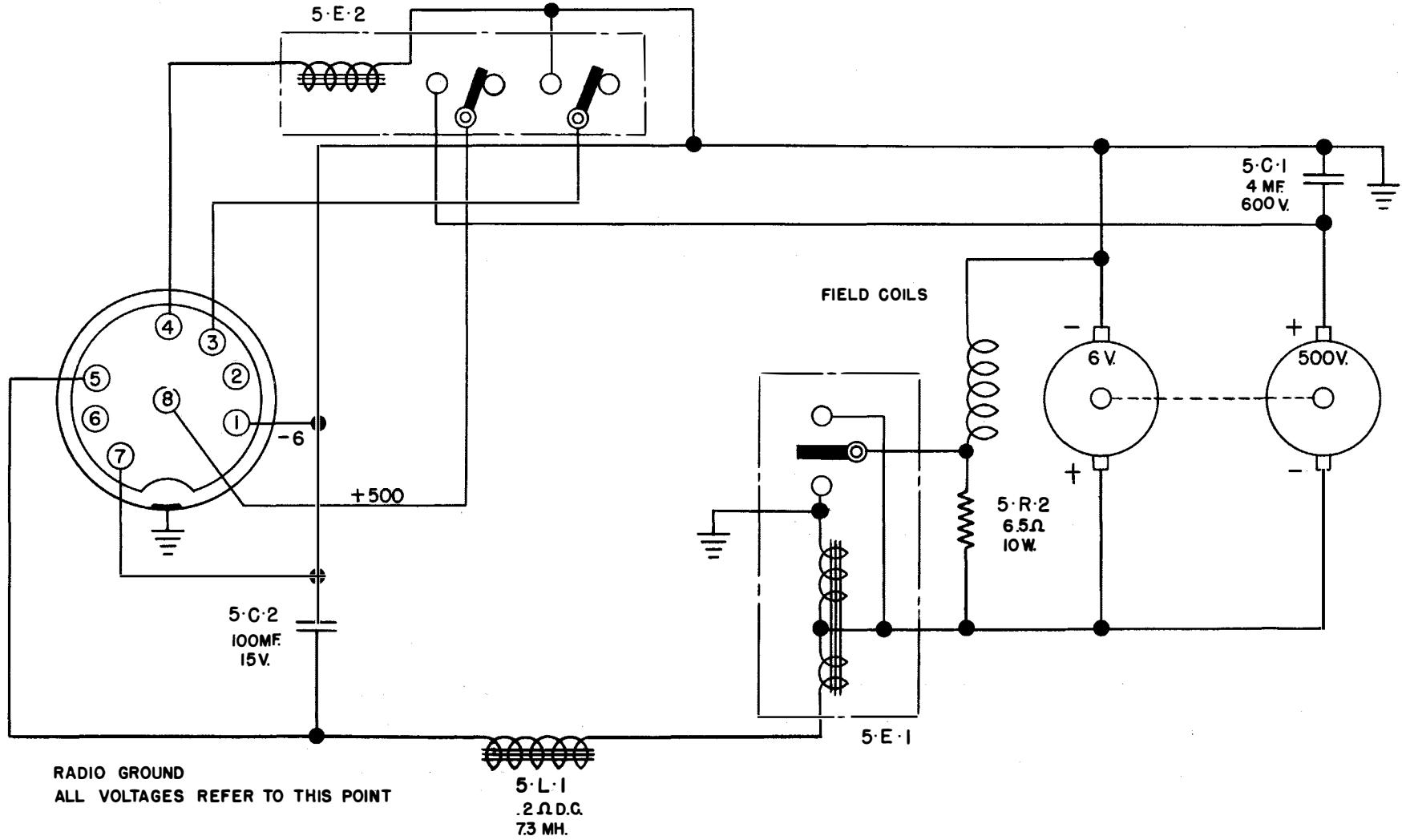
FIG. 49-B POWER UNIT PE-103-A, CONNECTION DIAGRAM



5-R-2 IS 12.5 Ω IN GENERATORS WITH SERIAL NOS. 1-5177 INCL.

FIG. 50-A GENERATOR GN-45-B, SCHEMATIC DIAGRAM

5·K·1
FEMALE
CANNON
#P-8-41



C-220032-4

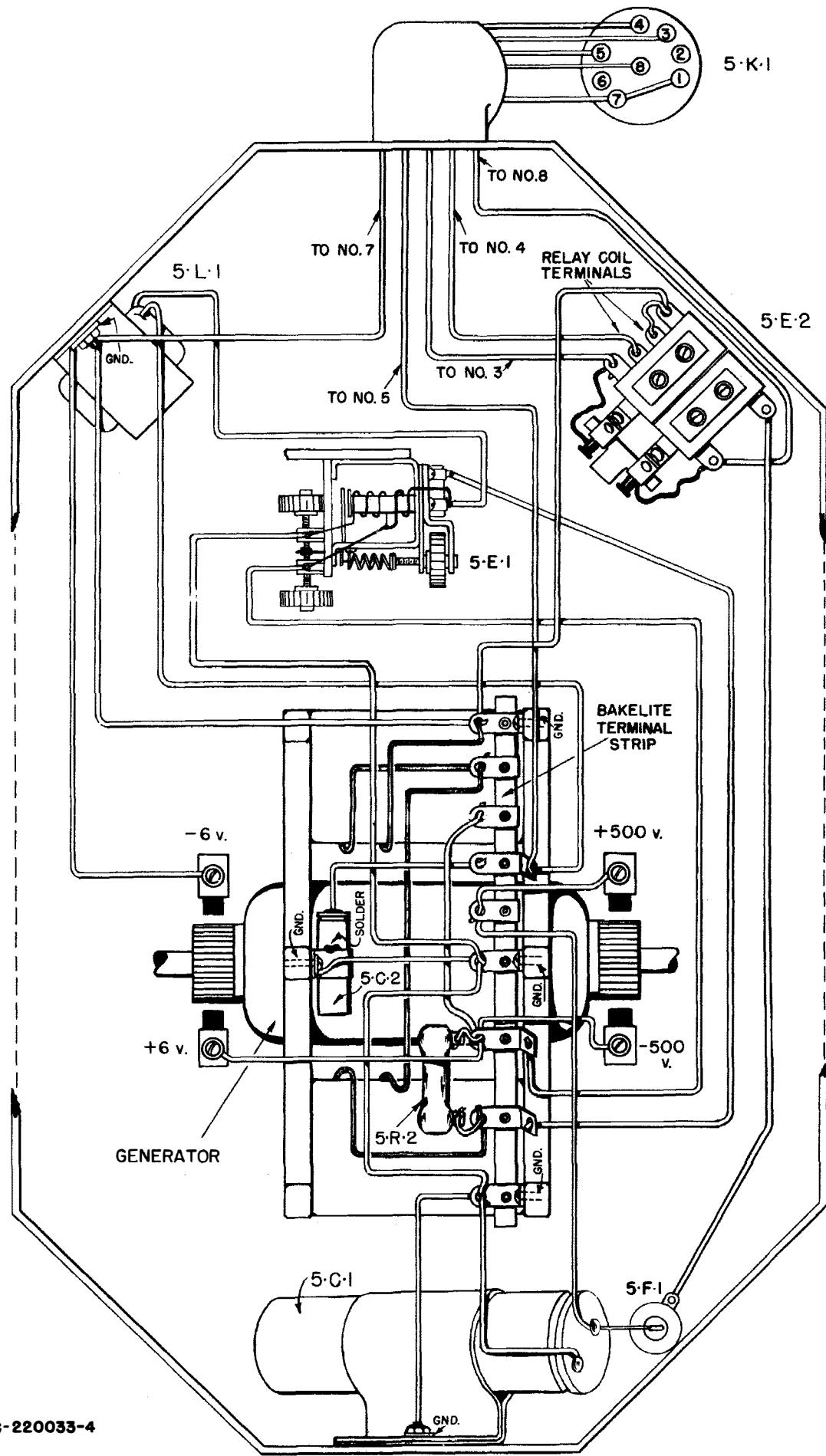
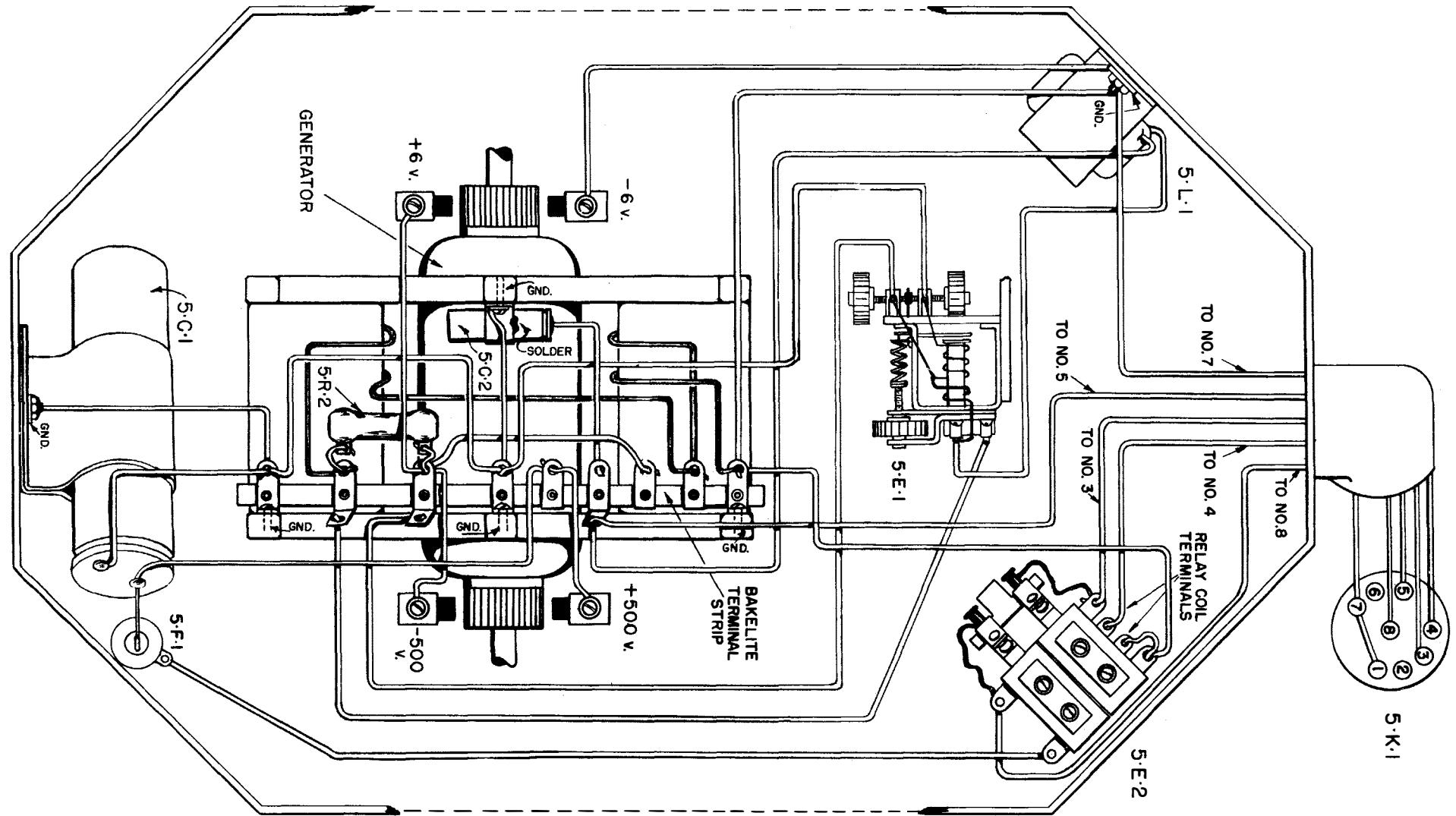


FIG. 51-A. GENERATOR GN-45-B, CONNECTION DIAGRAM

C-220033-4

TOP VIEW - COVER REMOVED



(USED ON SETS WITH SERIAL NOS. ABOVE 17,030)

FIG. 51-B. GENERATOR GN-45-A, CONNECTION DIAGRAM