TM 11-4022

WAR DEPARTMENT TECHNICAL MANUAL

RADIO RECEIVER AND TRANSMITTERS

BC - 620 - A, - B, - F, - G, - H, AND - J

REPAIR INSTRUCTIONS

WAR DEPARTMENT • JUNE 1945

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TM 11-4022, Radio Receiver and Transmitters BC-620-A, -B, -F, -G, -H, and -I Repair Instructions, published for the information and guidance of all concerned.

[AG 300.7 (24 May 45)]

BY ORDER OF THE SECRETARY OF WAR:

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Refer to FM 21-6 for explanation of distribution formula.

CONTENTS

SECTION I

DESCRIPTION OF RADIO RECEIVER AND TRANSMITTERS BC-620-(*) A, -B, -F, -G, -H, AND -J

1. General

a. USE. Radio Receiver and Transmitter BC–620–(*) is designed for short-range two way voice communication. It is a low power, portable, frequency-modulated radio receiver and transmitter.

b. RANGE. The set is designed to operate over distances up to 5 miles. The maximum range will be greater when operating from an elevated position.

c. FREQUENCY COVERAGE. The unit is crystal-controlled in reception position, but not in transmit position, and will operate over the frequency range from 20,000 to 27,900 kilocycles (kc). The equipment is designed to operate on any two channels within its frequency range. The channel is selected by the use of a band change switch located on the front panel. It will operate on either one of the two frequencies individually but not simultaneously. The two frequencies of the unit are preset and cannot be changed from the operating panel. The set transmits and receives frequency-modulated voice signal only.

d. SOURCE OF POWER. Batteries BA–39 and BA–40 provide power for portable or portable-mobile operation. For vehicular use power is supplied by a 6- or 12-volt storage battery and Plate Supply Unit PE–97–(*).

1. See TM 11-605 for installation, operation, and other maintenance data on this equipment.

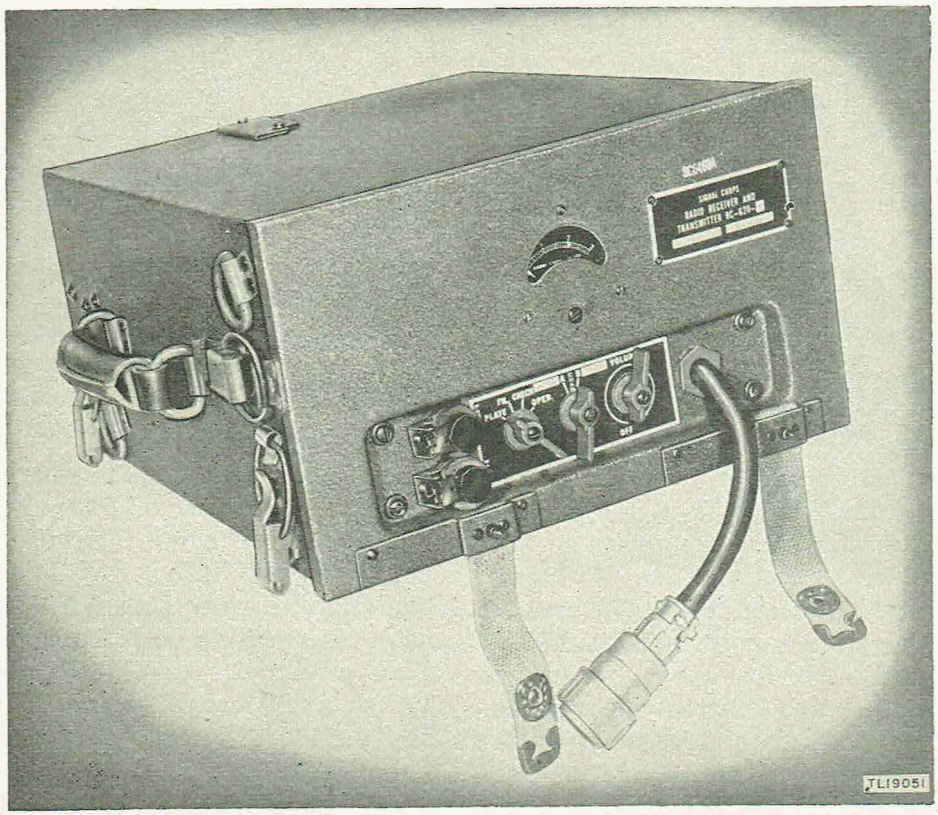


Figure 1. Radio Receiver and Transmitter BC–620–(*)

Table 1. Power Requirements for Radio Receiver and Tansmitter BC-620-(*)

Function	Battery	Battery No.	Volts	Amperes
Receiving	Recvr A	BA-40	1.5	0.7
Receiving	Recvr B	BA-40	90.	25 ma
Transmitting	Recvr A	B-39 & B-40	1.5	0.7
Transmitting	Recvr B	B-39 & B-40	90	45 ma
Transmitting	Tmtr A	B-39 & B-40	7.5	3
Transmitting	Tmtr B	B-39 & B-40	150	45

e. DESIGNATION. Official nomenclature followed by the symbol (*) indicates all models of the item of equipment covered in this manual. Thus, Radio Receiver and Transmitter BC-620-(*) represents Radio Receiver and Transmitters BC-620-A, -B, -F, -G, -H, and -J. The full type number is used only when a particular model must be identified.

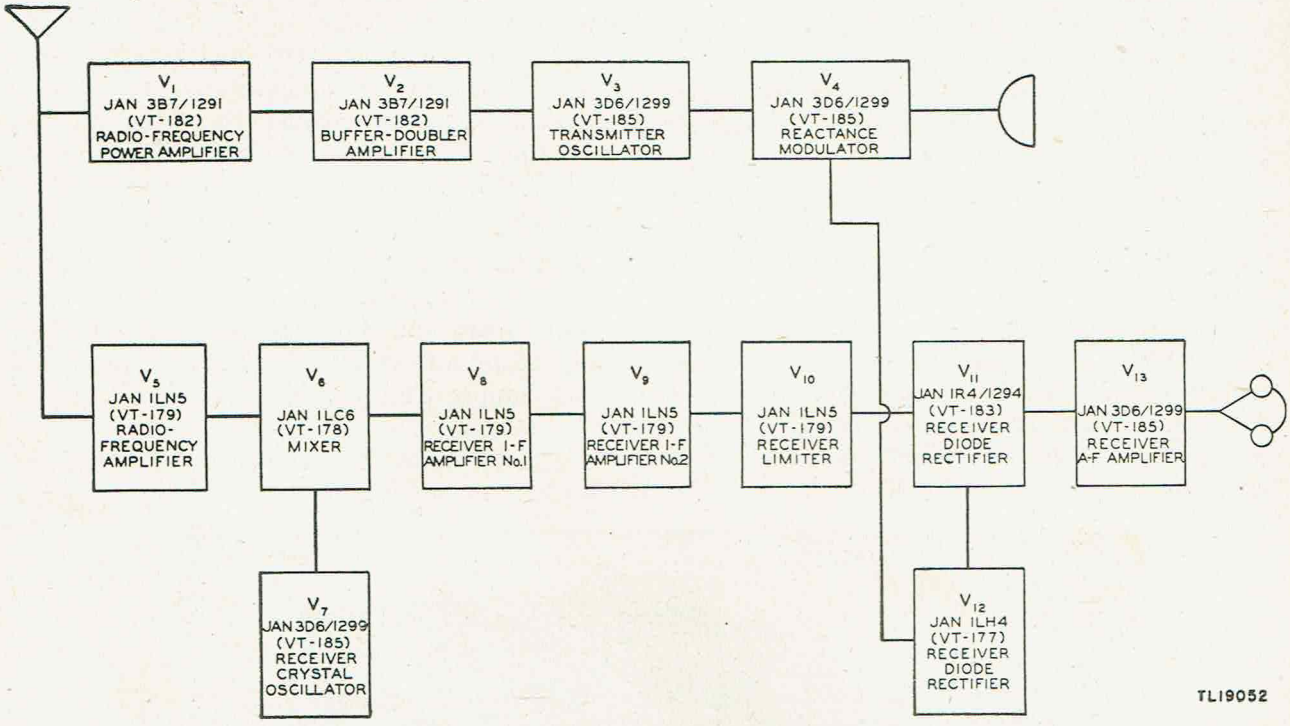


Figure 2. Block diagram Radio Receiver and Transmitter BC-620-(*).

1. Over-all System Function

a. GENERAL OPERATION. Radio Receiver and Transmitter BC-620-(*) is a two-channel receiver and transmitter with interrelated components. It is intended for portable, portable mobile, or fixed station operation. Power is received from either one of the two sources. Plate Supply Unit PE-97 (*) is designed for portable mobile work using the vehicular voltage supply (6 or 12 volts). Case CS-79-(*) contains the dry batteries for portable or fixed operation. The plate supply unit contains 2 tubes. The radio receiver and transmitter chassis contains a nine-tube frequency modulated receptor and a four-tube frequency modulated transmitter. Provision is made for two-channel operation for transmission and reception.

b. RECEIVER. The receiver is a superheterodyne type with a crystal-controlled oscillator and is designed for reception of frequency-modulated signals. In addition to its normal function, the receiver provides automatic frequency control of the transmitter. The tube complement of the receiver is as follows:

(1) A radio-frequency (r-f) amplifier stage using Tube VT-179; a Pierce crystal oscillator using Tube VT-185; a mixer stage using Tube VT-178; a two stage intermediate frequency (i-f) amplifier using two Tubes VT-179; a limiter stage with Tube VT-179; a discriminator circuit using diode Tube VT-183 and the diode section of tube VT-177; a direct-current (d-c) amplifier circuit using the triode section of Tube VT-177; and an amplifier stage using Tube VT-185.

(2) When receiving, the signal is picked up by the antenna and resonated in the power-amplifier plate tank circuit. It is impressed on the control grid of the amplifier Tube VT-179

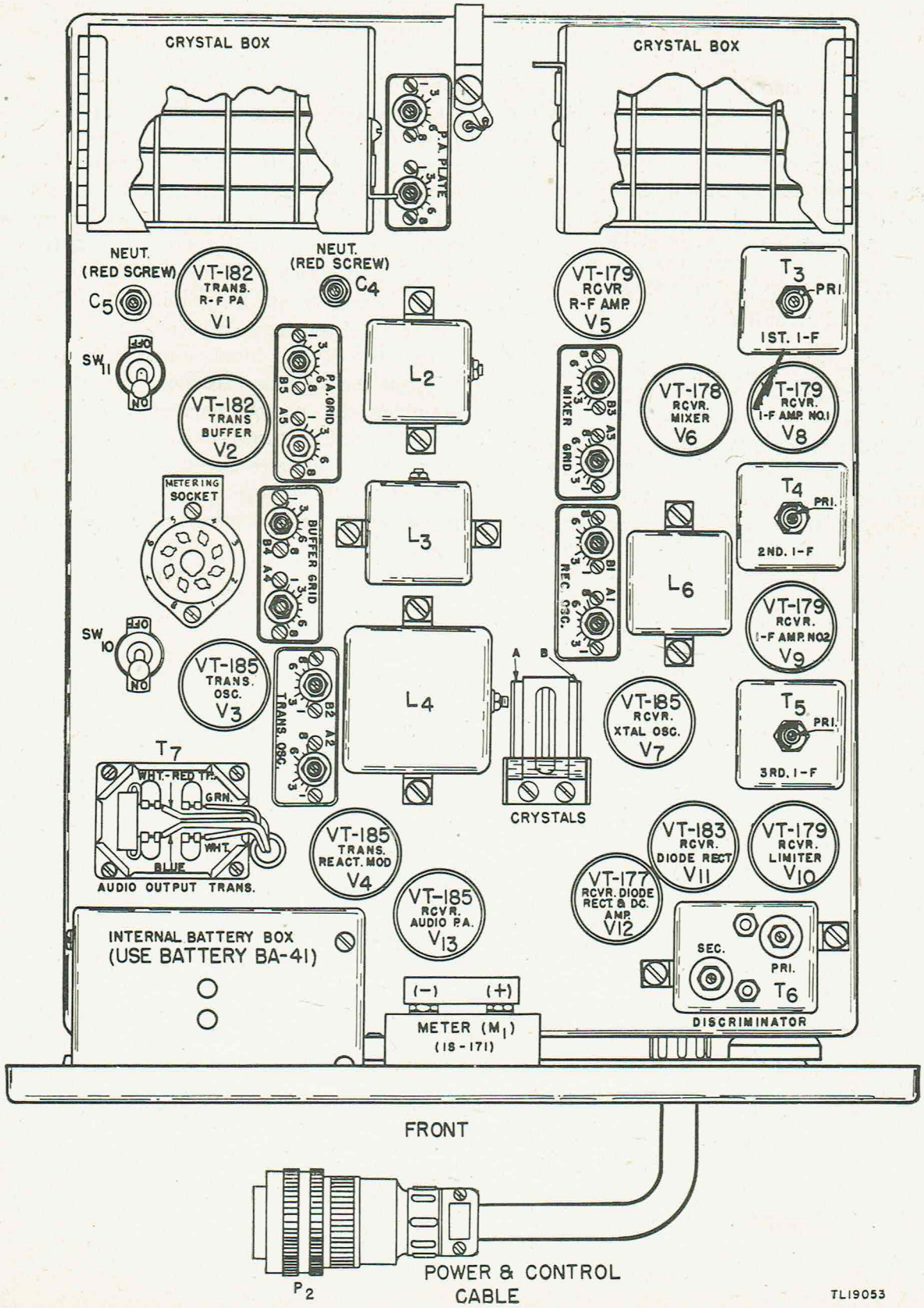


Figure 3. Top view of chassis, Radio Receiver and Transmitter BC-620-(*).

(V5). The resulting voltage is impressed on the control grid of mixer Tube VT–178 (V6). The crystal-controlled local oscillator operates on the third harmonic to produce the (i-f) beat. Two stages of i-f amplifications are included using Tubes VT–179 (V8) and VT–179 (V9). The amplified i-f signal is impressed on the grid of the limiter Tube VT–179 (V10). This stage eliminates the amplitude variations present in the signal and feeds the signal to the discriminator Tube VT–183 (V11) and the diode elements of Tube VT–177 (V12) in the conventional discriminator circuit. The triode portion of Tube VT–177 (V12) is used as a d-c amplifier. The resulting audio signal is fed into output Tube VT–185 (V13). For use of d-c amplifier (V12) see *c* below.

c. TRANSMITTER. (1) The transmitter consists of a reactance modulator, Tube VT–185 (V4), an electron-coupled oscillator, Tube VT–185 (V3), a transmitter buffer-doubler, Tube VT–182 (V2) and an r-f power amplifier Tube VT–182 (V1).

(2) The oscillator is designed for good stability over a wide temperature range. It uses an inductance-capacitance (LC) circuit in conjunction with the reactance tube to control its frequency. A portion of the transmitter signal is fed back into the receiver and since the receiver is crystal-controlled, the transmitter frequency is made to follow any frequency change that appears at the receiver input. The bias produced by the d-c amplifier tends to hold the transmitter frequency constant.

(3) The doubler-input tuned circuit is tuned to twice the oscillator frequency and therefore amplifies the second harmonic. The output tuned circuit is tuned to twice the amplified signal or four times the oscillator frequency. The resulting voltage is amplified by the r-f power amplifier and passed to the antenna.

SECTION II

DIFFERENCES BETWEEN MODELS

3. Operational Differences

There are no operational differences between the models of Radio Receiver and Transmitter BC–620–(*).

4. Design Differences (fig. 27)

a. The output transformers have been changed to provide an extra impedance-matching tap to accommodate a 250-ohm load in addition to the 4,000-ohm load. A label located on the outside chassis wall indicates the manner in which the change of impedance should be made. A reversible metal tag is mounted near the phone jack to indicate the impedance connection. All impedance changes should be accompanied by a corresponding reversal of tag.

b. Some models of Receiver and Transmitters BC–620–A, BC–620–B, and BC–620–H are modified in production to incorporate Adapter M–394, to permit use of the meter and the receiver amplifier tube of the set for alignment procedure. All other models of Radio Receiver and Transmitter BC–620–(*) are equipped with Adapter M–394 by the manufacturer. See figure 27, for other changes.

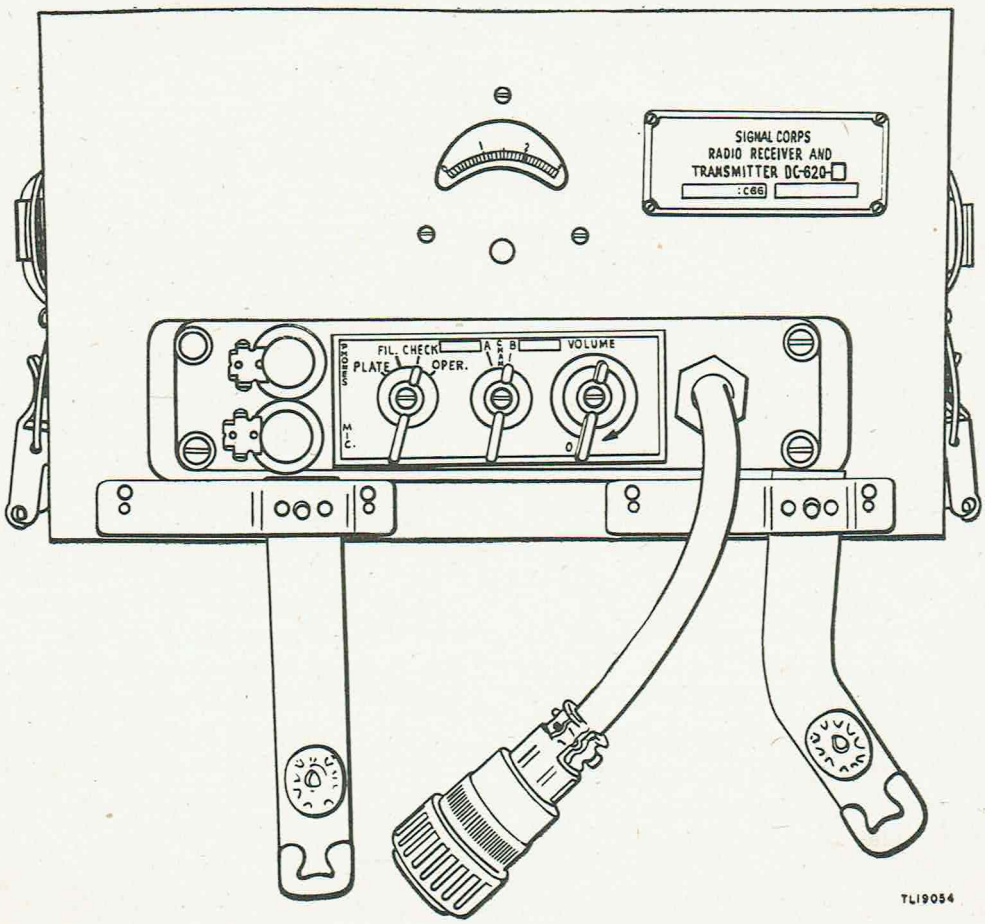


Figure 4. Front panel, Radio Receiver and Transmitter BC–620–(*).

SECTION III

INITIAL REPAIR PROCEDURES

Note. Before making any repairs or adjustments, all authorized modification work orders should be applied. See FM 21-6 for list of applicable MWO's.

5. General

Maintenance personnel should follow the procedure outlined in this manual when repairing and overhauling Radio Receiver and Transmitter BC-620-(*). The repair information in this and the following sections is presented in the order in which the repairman should actually perform the various operations on the equipment in the repair shop. This procedure permits repair of the equipment in the shortest time possible, resulting in sensitivity and selectivity comparable to that of new equipment.

6. Tools, Test and Cleaning Equipment

The following items should be available for repair of this set.

Table II

Item	Description
Assorted hand tools	
Insulated alignment tool	
Soldering iron and solder	
Alignment Equipment ME-73-(*)	
Maintenance Equipment ME-13-(*)	
Signal Generator r-f	Covering range 2.0 mc to 28.0 mc Providing 250 cps to 3000 cps.
Signal Generator a-f	
Solvent, Dry-cleaning Assorted brushes	
Pipe cleaners	Lint-free.
Clean cloths	#0000.
Sandpaper	
Crocus cloth	

7. Disassembly for Inspecting and Cleaning

a. CHASSIS. The chassis and front operating panel are permanently attached and can be removed from the chassis housing by opening the tension clamps on either side of the operating panel. The radio receiver and transmitter can then be slid out from the housing for repair.

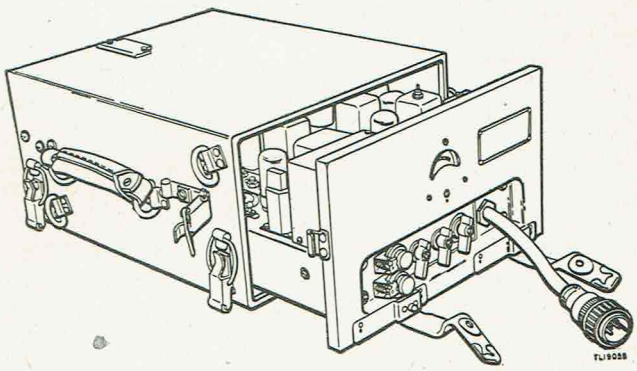


Figure 5. Removing chassis from housing. Radio Receiver and Transmitter BC-620-(*).

b. DESICCATOR. Remove desiccator by removing the four binderhead screws noted to be in close proximity with the perforated desiccator frame. The four screws will be removed from the bottom of the radio receiver and transmitter housing. Remove the desiccator only if it presents a pink appearance.

c. CRYSTAL REMOVAL. Remove both crystals from chassis by lifting crystal retaining spring. Insert a small screw driver between one of the crystals and the crystal socket and pry gently. After removal has been started, the crystals may be withdrawn by hand.

d. REMOVAL OF TUBES. The removal of the lock-in type tubes supplied with the set is slightly more difficult than other types. A special technique is necessary to prevent possible crushing of tube and injury to the hands.

e. INTERNAL BATTERY REMOVAL. The battery box is located on the transmitter side of the radio receiver and transmitter chassis and behind the front control panel. The cover plate is held in place by four binderhead screws, two on the top and two on the left side. The removal of the battery will necessitate the removal of the four screws.

8. Cleaning and Inspecting Chassis

a. CLEANING MAIN CHASSIS. The chassis

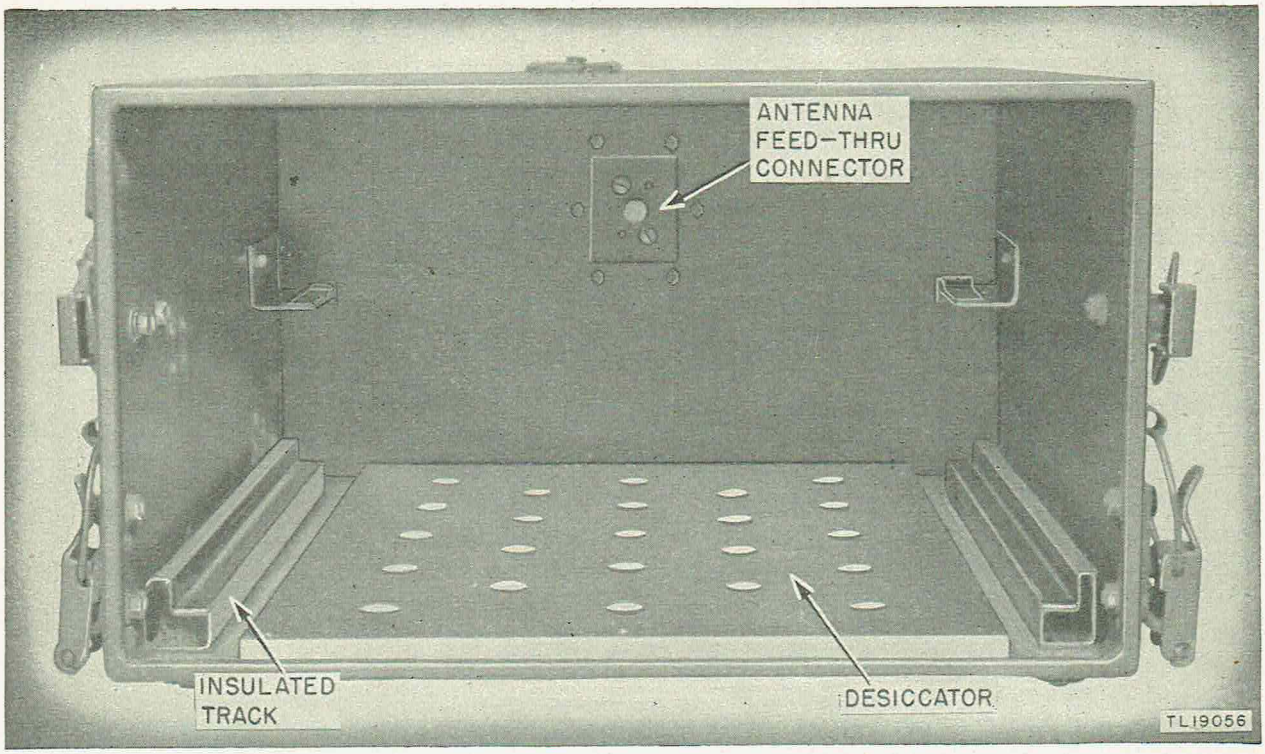


Figure 6. Desiccator position, Radio Receiver and Transmitter BC-620-(*).

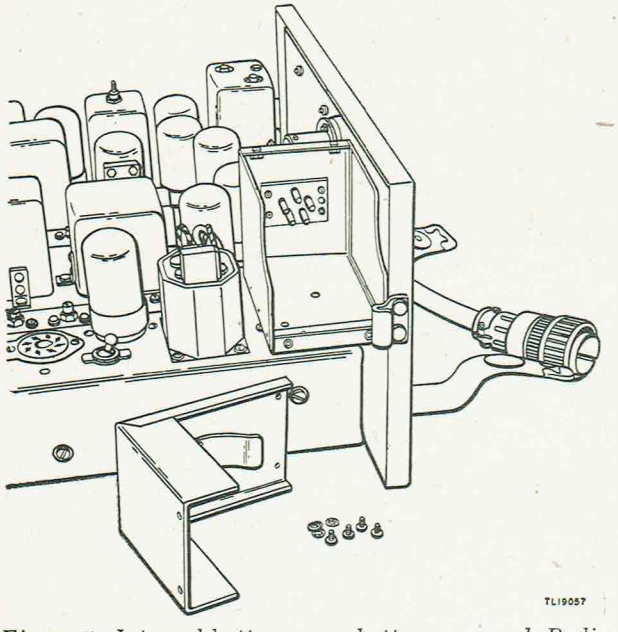


Figure 7. Internal battery case, battery removed, Radio Receiver and Transmitter BC-620-(*).

must be clean and free from rust and corrosion. Blow out all dust and dirt using clean, dry compressed air. Use dry-cleaning solvent (SD), applied with a lint-free cloth, brushes, or pipe cleaners.

Caution: Do not attempt to remove tarnish from silver-plated switch contacts. Remove rust and corrosion with a stiff brush and dry-cleaning solvent (SD). Heavier rust and corrosion may be removed by careful use of crocus cloth, dry-cleaning solvent (SD), and compressed air.

b. INSPECTING MAIN CHASSIS. After cleaning the set, inspect the chassis to determine the exact model. Check to see that model has been modified as required. During inspection

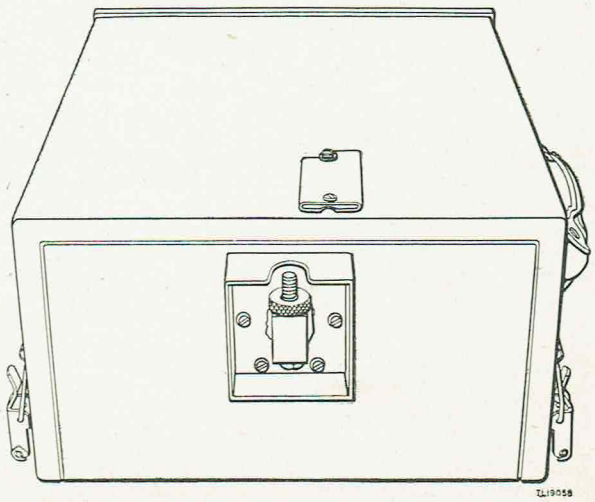


Figure 8. Antenna coupling, Radio Receiver and Transmitter BC-620-(*).

a careful check must be made for any evidence of temporary field repairs. All electrical components must be free from obvious mechanical and electrical defects when inspected visually. *Any part, the failure of which was obviously caused by an electrical fault, must not be replaced until circuit is checked and cause of failure is determined.*

(1) *Wiring.* All soldered joints must present a good mechanical and electrical connection. Wiring insulation must not be worn or chafed. Insulated tubing must not be torn or missing, and bare wires must not be shorted to chassis or other parts. Chassis must be clean and free from corrosion.

(2) *Housing.* The housing must not have cracks or breaks in the metal. It must be free from corrosion. It must not be scratched, and must have no outside painted areas.

(3) *Chassis straps.* The chassis straps should be inspected for rips in the fabric or general signs of wear.

(4) *Painting.* The housing must be touched up using olive-drab wrinkle-finish paint if the housing presents a poor appearance. If scratches are deep or unpainted areas are large, the entire assembly should be repainted with olive-drab paint.

(5) *1299 tube socket check.* Check all 1299 tube sockets for solder in socket pin No. 8. It is to be noted that the 1299 type tube base contains only seven pins, with No. 8 missing. The exception to the above is the Raytheon type 1299, which has all eight pins. Therefore, it is important, from the standpoint of replacement, that the No. 8 socket pin be free from foreign material.

(6) *Antenna spring tension.* Check antenna spring tension. This spring will be found in the back of the chassis mounted up on an insulator. This spring must make good contact with antenna coupling on set housing.

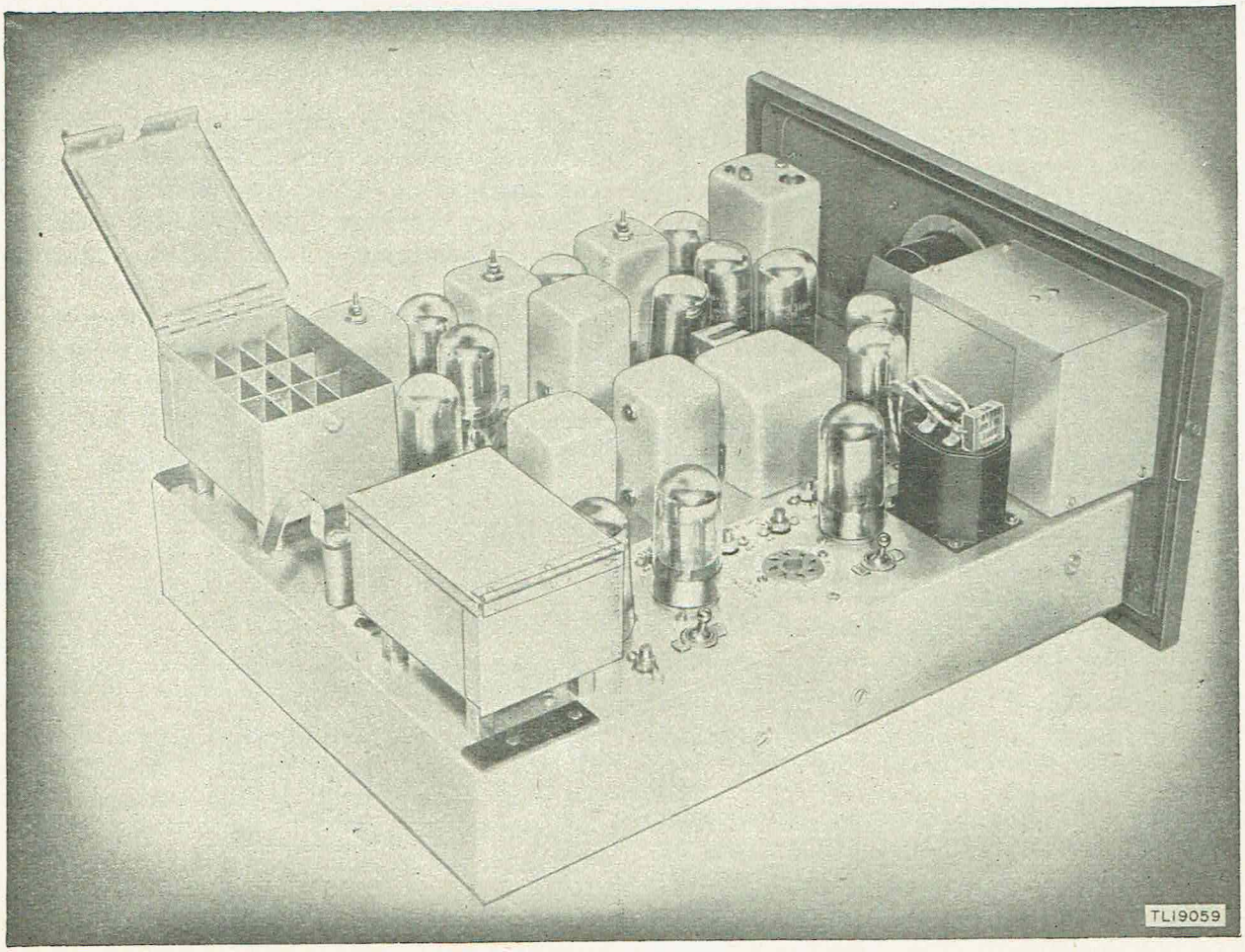


Figure 9. Chassis removed from case, Radio Receiver and Transmitter BC-620-(*).

(7) *I-F transformer alignment screws.* The alignment screws on the top and bottom of T3, T4, T5, and T6 should be checked for tightness. If screws are loose, the units will change tuning under normal operation.

(8) *Variable capacitor rotor locking nuts.* With a 5/16 inch Spintite wrench, or alignment tool, tighten the locking nuts on all variable air capacitors, making sure that the rotor assembly does not move. If movement is found it will be necessary to replace the capacitor. Unlock the nuts after this test.

(9) *Alignment screw position.* Check the position of all alignment screws on T3, T4, T5, and T6. The position shall not be such that the screw driver slot is flush or almost flush to the containing bushing. Note that there are two positions of the aligning screw at which it is possible to align the transformer. The correct position is the one in which the aligning screw is extended the farthest.

(10) *Leakage resistance.* With a high-resistance ohmmeter, measure for leakage resistance between panel and chassis. This resistance value must be more than 10 megohms. If leakage exists, check condition of insulating bushing around jacks and other panel insulating bushings.

(11) *Meter protecting fuse F2.* On some models of Radio Receiver and Transmitter BC–620–(*), it will be found that resistor R13, wire-wound, 100-ohm, 1-watt, is substituted for fuse F2. It has been found that the presence of R13 is beneficial in regard to filtering of vibrator hash in the plate voltage. In all sets substitute R13 for fuse F2. In no case should both resistor R13 and fuse F2 be installed in the same set.

(12) *Panel nuts.* It may be found in some cases that the bushings under the nuts are too thick to allow sufficient surface pressure between the nuts and the panel. Therefore, the bushings should be replaced with thinner ones.

(13) *Coil shields.* All coil shields, as well as the shield under the chassis should be tight. It is to be noted in particular that poor grounds at these points are responsible for narrow bandwidth and nonlinearity in the i-f response.

(14) *Red dots on trimmer capacitors.* The red dots on trimmer capacitors should be repainted when original paint is missing or defaced.

(15) *Shorted A and B trimmer.* With an ohmmeter, check for short circuits across all A and B trimmer capacitors as each capacitor is rotated through its entire range. Put the channel selector switch in A position while checking B trimmers, and vice versa.

c. CLEANING AND INSPECTING REMOVED PARTS. (1) *Crystals.* The crystal holder must be free from cracks or chips and must be properly sealed. Inspect and clean pins of crystal units with dry-cleaning solvent (SD) applied with a brush. If pins are bent or broken replace crystal unit with a new unit. Remove any heavy corrosion by careful use of crocus cloth. Wipe off the unit with a lint-free cloth moistened with dry-cleaning solvent (SD).

(2) *Desiccator.* A silica gel desiccator, inclosed in a spun glass bag, is used in this set as an extra precaution to absorb any moisture. A portion of this bag is coated cobalt chloride to serve as an indicator of the moisture content of the silica gel. A BLUE color indicates a DRY desiccator; a PINK color indicates a moisture-saturated desiccator requiring regeneration.

(3) *Tubes.* Inspect the removed tubes. Clean pins of each tube with dry-cleaning solvent (SD) applied with a brush. For heavier corrosion use crocus cloth applied with care. Inspect tube for bent pins, internal and external breaks. Shake tubes to detect loose pins and loose elements. Check tubes on the tube tester, allowing sufficient time for tube to warm up. Tap tube gently during test to detect loose or defective elements. Check for shorts between elements.

(4) *Battery* BA–31. Use a high-resistance voltmeter to check battery for rated voltages. If the battery checks low it should be discarded. Replace good battery in set chassis. In making replacement, insert the plug firmly into the battery socket to assure good contact, and replace the battery box cover.

d. REPLACING REMOVED PARTS. Replace crystals, desiccator, and tubes in chassis and fasten in place.

SECTION IV

PRELIMINARY TROUBLE-SHOOTING PROCEDURES

9. General

a. CRYSTALS AND TUBES. Install the proper crystals for the desired operating frequency and one set of tubes as listed in table III below.

Table III

Tube	Quantity
JAN-3B7/1291 (VT-182)	2
JAN-3DC/1299 (VT-185)	4
JAN-1LN5 (VT-179)	4
JAN-1LH4 (VT-177)	1
JAN-R4/1294 (VT-183)	1
JAN-1LC6 (VT-178)	1

b. REPLACING CRYSTAL UNITS IN CHASSIS. Care must be taken to insure the proper placement of the two crystal units. Metal nameplates should face outward away from each other. When crystals are in place, close the retaining spring.

10. Returning Chassis to Housing

Return the chassis to the housing by sliding it into the open end with the chassis riding on the bakelite insulated track. Fasten the clamps holding the chassis in the case.

11. Input Resistance Check

Trouble within the unit can often be detected by checking the resistance at the power input terminals of the set before applying power to the equipment, thereby preventing damage to the unit or its power supply. Check the resistance at the power and control cable plug and compare with values shown below. If the readings indicated are incorrect, see section VIII, and correct the fault before proceeding. All measurements are made between plug pins and the chassis. Pins on the plug are identified by letters.

Pin No.	*Resistance to Chassis*
A	Open
B	Open
C	Open
D	Open
E	Open
F	1 megohm minimum (depends on current leakage through electrolytic capacitor C 31).
G	Open
H	Continuity

12. Operational Test

Connect the set to the power supply and turn on by rotating the volume control clockwise. Inspect set for any signs of abnormal operation such as smoking, arcing, crackling, or burning. If abnormal behavior is noted, turn off the set immediately. See section VIII, and correct the fault before proceeding. If all indications appear normal check the performance of the set by communicating with another unit operating on the same frequency.

SECTION V

ALIGNMENT PROCEDURE

13. Presetting Radio Receiver and Transmitter BC-620-(*)

a. GENERAL. Radio Receiver and Transmitter BC-620-(*) is designed to operate on any frequency within the range of 20.0 to 27.9 megacycles. The frequency of the receiver is crystal-controlled for operation on any 2 of 80 different channels, spaced 100 kilocycles apart, within this range. By use of an automatic frequency control bias generated in the receiver and applied to the reactance modulator of the transmitter, the transmitter frequency is crystal-stabilized. Sets when issued, are properly aligned and preset on the two frequencies marked on the container. With batteries and crystals installed, and proper connections made in accordance with section II, the set should operate on these two frequencies. Check that the set operates properly before attempting to change the channel presettings.

b. FREQUENCIES. Before placing the set in operation on any two assigned frequencies, it is necessary first to have the proper crystal for each assigned channel, and then properly to adjust (preset) the trimmer capacitors on the chassis to the assigned channels. These trimmers are arranged in six pairs, marked A1 (B1) to A6 (B6) on the chassis and are provided with dial cards. *Only these trimmers need to be adjusted when presetting channels. Do not disturb any other adjustments.*

c. CHANNELS. For convenience in distinguishing between the controls for the two channels, all of the controls for one channel are labeled A, and all of the controls for the other are labeled B. Channel selector switch 15 is marked CHAN, on the panel of Radio Receiver and Transmitter BC-620-(*), and the two positions in the crystal sockets on top of the chassis are also labeled A and B.

d. METERING SOCKET. A metering socket is provided on the chassis of Radio Receiver and Transmitter BC-620-(*) for connecting a meter at various points in the circuit for alignment and test. The pin jacks on this socket are numbered from 1 to 8 and are connected to the various parts of the circuit so that when the common lead of an electronic voltmeter is connected to the chassis, *not the front panel* of the set and the d-c probe of the electronic voltmeter is inserted into the pin jack indicated in the following table, the corresponding voltage is read on the electronic voltmeter:

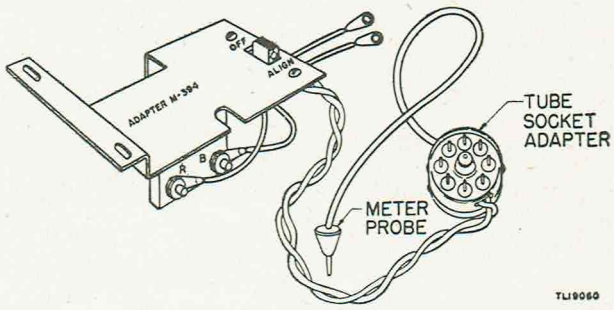


Figure 10. Adapter M-394.

e. PIN CONNECTIONS. The metering socket pin jack connections are as follows:

Pin jack No. 1—Receiver oscillator grid voltage.
Pin jack No. 2—Receiver converter injection grid voltage.
Pin jack No. 3—Receiver limiter grid voltage.
Pin jack No. 4—Reactance modulator grid voltage (d-c amplifier output).
Pin jack No. 5—Transmitter buffer grid voltage.
Pin jack No. 6—Transmitter oscillator grid voltage.
Pin jack No. 7—Receiver discriminator output voltage.
Pin jack No. 8—Not connected.

f. TEST EQUIPMENT. The special items of test equipment required to preset channels are furnished in or issued with Maintenance

Equipment ME–13–(*) and Alignment Equipment ME–73:

(1) An electronic voltmeter for measuring voltages at the metering socket, which may be:

(*a*) Voltohmmeter I–107–(*), part of Maintenance Equipment ME–13–(*). See TM 11–306.

(*b*) The panel meter of Radio Receiver and Transmitter BC–620–(*) in conjunction with Adapter M–394.

(*c*) Any other electronic voltmeter such as Hickock model 202.

(2) Alignment Tool TL–150 or TL–207.

(3) Adapter RS–259.

(4) Other tools such as hex socket wrench, screw drivers, etc.

14. Setting up Test Equipment

a. GENERAL. These steps in setting up equipment can be followed regardless of the type of electronic voltmeter used. Additional steps, as necessary, are given under the presetting procedures in paragraphs 15 and 16.

(1) Remove the chassis of the Radio Receiver and Transmitter from its case by removing all screws around the edge of the panel and pulling the chassis forward.

Note. Radio Receiver and Transmitter BC–620–F is fastened to its case with two catch-clips, one on each side of front panel.

(2) Set switches SW10 and SW11 to OFF. Set panel meter switch to CHECK.

(3) Insert the required crystals in the proper channel sockets. The metal nameplates should face outward, away from each other. Plug in a handset.

(4) Set the locknuts on the trimmers A1 (B1) through A6 (B6) with Alignment Tool TL–207 (or other 5/16-inch wrench) for a fairly stiff *drag* on the trimmer adjusting shafts. *Do not tighten them so that trimmer shafts jam. Do not tighten locknuts further after presetting* as further tightening tends to change the adjustment and may damage the capacitors.

(5) Set each trimmer to its approximate setting and insert L1 tap connector pins as shown in the following chart:

Table IV. Approximate trimmer settings.

Channel No.	A1	A2	A3	A4	A5	A6	Positions of pins in L1
0–19	3.0	2.0	2.0	2.0	1.5	3.0	8
20–29	5.0	2.8	4.0	2.5	2.0	3.8	6
30–39	5.5	5.0	4.5	4.5	4.5	5.0	4
40–54	6.0	5.8	5.5	5.2	5.2	5.8	3
55–74	6.9	6.8	6.5	6.0	6.2	6.5	2
75–80	7.4	7.8	7.2	7.0	7.8	7.2	1

Note. Red dots on the trimmer shafts indicate the side of the slot that should be toward the dial card. The width of the slot is about one-tenthdivision. In case the red dot has worn off, its proper location can be found by fully meshing the capacitor. The end of the slot near the 0 of the 0 to 6 scale is the end that should carry the red dot.

Caution: In adjusting the trimmers in the following operations they need not be turned very far from the approximate settings shown in this chart. If it does appear necessary to turn them far from these settings, it means that some adjustment has been incorrectly made, or that these capacitors are defective. Recheck your previous steps and examine the capacitors for misalignment of plates, or breakage.

(6) Check the condition of Battery BA–41 with an electronic voltmeter by inserting the probe in pin No. 4 of the metering socket. Replace the battery if the voltage is less than 20 volts.

(7) Connect Radio Receiver and Transmitter BC–620–(*) to its source of power by joining the two halves of the power and control cable connector. If Case CS–79–(*) is to be used, insert Adapter RS–259 (part of Maintenance Equipment ME–13–(*) and Alignment Equipment ME–73–(*)) between Battery BA–39 and its plug. Adapter RS–259 places a 500–ohm resistor in series with the high-voltage lead to protect the transmitter tubes while making adjustments. If Plate Supply Unit PE–97–(*) is to be used, the adapter is not necessary because of the voltage regulation characteristics of this plate supply unit.

b. PROCEDURE. The procedure from this point depends upon the maintenance equipment used. After presetting, *when tactical considerations will permit,* put the set on the air and make an operating test to be sure that it has been tuned to the correct frequencies and is getting out. Contact another set that is functioning properly on the same channels. Separate the two sets at least 300 to 500 yards.

15. Presetting Procedure using Volt-Ohmmeter I–107–(*) or Other Electronic Voltmeter

a. Set up and calibrate Voltohmmeter I–107–(*) as directed in TM 11–306. Connect the common lead alligator clip to the chassis, *not*

to the front panel of Radio Receiver and Transmitter BC–620–(*). The front panel is insulated from the chassis and cannot be as a return.

b. Set panel meter switch to CHECK. Rotate VOLUME control fully clockwise (to the right). Set CHAN switch to A or B, whichever is to be the lower frequency channel. *Remember that the lower frequency channel must be preset first.*

c. The following steps preset the *receiver.* Do not press the microphone switch.

(1) To check crystal activity, insert the meter probe in pin jack No. 1 of metering socket. A meter reading of approximately —15 volts indicates a good crystal.

(2) Insert probe in pin jack No. 2 of metering socket, and tune A1 (or B1 if channel B is to be set first) for maximum meter reading.

(3) Tune A3 (B3) for maximum noise in the handset.

(4) Tune A6 (B6) for maximum noise in the handset. However, if the noise peak cannot be distinguished, leave A6 (B6) at the approximate table setting.

d. The following steps preset the *transmitter.* Press the microphone switch *only* while making adjustments.

(1) Insert probe in pin jack No. 3 of metering socket. *Slowly* tune A2 (B2) about its approximate setting. More than one peak will be found. Choose the *highest* peak *near* the approximate setting and adjust A2 (B2) for maximum.

(2) Insert probe in pin jack No. 4 of metering socket, press microphone switch, and note the reading on the electronic voltmeter. Then *very carefully and slowly* make a *slight* readjustment of A2 (B2) in the direction that brings the meter reading to —6 volts. Listen in the handset while making the adjustment. If a rushing background noise comes up, A2 (B2) has been moved too far. Go back to step (1) and get back on the correct peak again. Check that it is now possible to hear your voice in the phones when speaking into the microphone.

(3) Insert probe in pin jack No. 5 of metering socket, and tune A4 (B4) for maximum meter reading.

(4) Check that the panel meter switch is at CHECK. The rest of these adjustments will be made using the panel meter.

(5) Set SW10 to ON. Tune A5 (B5) for maximum reading on the panel meter.

(6) Set SW11 to ON. Turn panel meter switch to OPER. Quickly tune A6 (B6) for minimum on the panel meter.

Caution: Do not press microphone switch until the adjustment can be made swiftly, as it is easy to ruin the power-amplifier tube during this adjustment.

Note the setting of A6 (B6). If it still is not near the approximate table setting, go back to step (1) and start over.

e. The lower frequency channel is now completely preset. Set SW10 and SW11 to OFF, panel meter switch to CHECK, and CHAN switch to the other channel. Preset this channel in the same manner, tuning the other set of trimmers.

f. Check that SW 10 and SW11 are ON, restore the set to its case, and connect the antenna. Recheck A6 (B6) for minimum. There is a covered opening at the rear top of the case for this purpose. The panel meter should now read between 1.8 and 3 (OPER).

16. Presetting Procedure using Adapter M–394

a. Adapter M–394 converts the receiver power-amplifier stage and panel meter into an electronic voltmeter. Before using the adapter for presetting it is necessary that its proper functioning be checked. Set the adapter switch to ALIGN, VOLUME control full on, and note the panel meter reading. Turn the VOLUME control all the way back, to the left from full on, and note change in the meter reading. If the change is more than one division, try other Tubes VT–185 in the adapter socket (Radio Receiver and Transmitter BC–620–(*) has four) until one is found that is satisfactory. Normal tubes should satisfy this condition and should give a meter reading between 1.5 and 2.5. Next turn the VOLUME control on. Note the meter reading with the probe free (held away from the set). Then ground the probe to the *chassis,* and if the meter reading does not increase at least five divisions Tube VT–185, Battery BA–40, or BA–41 is weak. Replace as necessary.

b. Set Adapter M–394 switch to ALIGN. Set the panel meter switch to CHECK. Rotate VOLUME control *fully* clockwise (to the right); Set CHAN switch to A or B, whichever is to be the lower frequency channel. *Remember that the lower frequency channel will be preset first.*

c. The following steps preset the *receiver.* Do not press the microphone switch. (1) To check crystal activity, insert probe in pin jack No. 1 of metering socket. With VOLUME control fully clockwise (to the right), the meter reading should be approximately zero for good crystals.

(2) Insert probe in pin jack No. 2 of metering socket, and tune A1 (B1) for minimum on the meter.

(3) Tune A3 (B3) for maximum noise in the handset.

(4) Tune A6 (B6) for maximum noise in the handset. However, if the noise peak cannot be found, leave at A6 (B6) at the approximate table setting.

d. The following steps preset the *transmitter.* Press the microphone switch only while making adjustments.

(1) Insert probe in pin jack No. 3 of metering socket. *Slowly* tune A2 (B2) about its approximate setting. There will be more than one peak. Choose the peak that will give the *minimum* reading on the meter and still be near the approximate setting. Tune A2 (B2) accurately for *minimum* on this peak.

(2) Before the next presetting step it is necessary to calibrate the meter. A Battery BA–41 that is known to be good *must* be in the set. Note the meter reading with the probe free (held away from the set). Then note the reading with the probe grounded to the *chassis.* Reduce the VOLUME control setting until the difference between the two readings is exactly 4½ divisions. *Do not disturb the volume control setting during the following operations.*

(3) Press microphone switch and note the reading with the probe free. Insert probe in pin jack No. 4 of metering socket. Then very carefully and slowly make a *slight* readjustment of A2 (B2) in the direction that brings the meter reading to *exactly one division* less than what it was with the probe free. Listen in the phones while making this adjustment. If a rushing background noise comes up A2 (B2) has been moved too far. Go back to step (1) and get back on the correct peak again. Check that it is now possible to hear the voice in the phones when speaking into the microphone.

(4) Insert probe in pin jack No. 5 of metering socket, and tune A4 (B4) for minimum on the meter.

(5) Set Adapter M–394 switch to OFF. Check that panel meter switch is at CHECK. The rest of these adjustments will be made using the panel meter in its normal circuits.

(6) Set SW10 to ON. Tune A5 (B5) for maximum reading on the panel meter.

(7) Set SW11 to ON. Turn panel meter switch to OPER. *Quickly* tune A6 (B6) for minimum on the panel meter.

Caution: Don't press microphone switch until the adjustment can be made swiftly, as it is easy to ruin the power-amplifier tube during this adjustment.

Note the setting of A6 (B6). If it still is not near the approximate (table) setting, go back to step (1) and start over.

e. The lower frequency channel is now completely preset. Set SW10 and SW11 to OFF, panel meter switch to CHECK, and CHAN switch to the other channel. Preset this channel in the same manner, tuning the other set of trimmers.

f. Check that SW10 and SW11 are ON, restore the set to its case, and connect the antenna. Recheck A6 (B6) for minimum. There is a covered opening at the rear top of the case for this purpose. The panel meter should now read between 1.8 and 3 (OPER).

17. I-F and Discriminator Alignment

a. In addition to the equipment mentioned, a means of generating a signal at the intermediate frequency (2.88 megacycles) is required. Maintenance Equipment ME–13–(*) includes Oscillator VO–4–(*). Alignment Equipment ME–73–(*) includes a 2.88-megacycle crystal that is used in the receiver oscillator circuit.

b. Set up equipment as in steps (1), (2), and (7) in paragraph 28*g.* Remove both crystals from the set.

c. The following alignment procedure using Maintenance Equipment ME–13–(*) is based on the use of Voltohmmeter I–107–(*) as an indicator. However, any other available voltmeter will serve equally well.

(1) Set up and calibrate Voltohmmeter I–107–(*) as indicated in TM 11–306. Connect the common lead alligator clip to the *chassis* of Radio Receiver and Transmitter BC–620–(*).

(2) Set up Oscillator VO–4–(*) as indicated in TM 11–306 and set its switch to 2.88 megacycles. Turn ATTENUATION control clock-

wise (to the right) only enough to turn Oscillator VO-4-(*) on.

Note. During i-f alignment, reduce the output of Oscillator VO-4-(*) whenever possible, turning the ATTENUATION control still further to the right. Work with as weak a signal as possible.

(3) Turn Radio Receiver and Transmitter BC-620-(*) on (VOLUME control). Do not connect microphone.

(4) Connect the *hot* lead of Oscillator VO-4-(*) to pin No. 4 of the mixer Tube VT-178 (V6) (See Fig. 26.)

(5) Insert probe in pin jack No. 3 of metering socket. Adjust secondary (bottom) and primary (top) of i-f transformers T5, T4, and T3 in that order for maximum on the voltmeter (See Fig. 3 and 26.)

(6) Readjust primary and secondary of T3, T4, and T5 in that order. The i-f amplifier is now aligned.

(7) Insert probe in pin jack No. 7 of metering socket. Using full output of Oscillator VO-4-(*) and lowest range of voltmeter, adjust discriminator transformer T6 secondary (fig. 3) for zero volts (*with alignment tool removed*).

(8) Connect the probe, with a 1-megohm resistor in series, to the junction of R36 and R37. (See fig. 26.) Adjust T6 primary for maximum on the voltmeter.

(9) Check secondary of T6 as in step (7) and readjust to zero if necessary. Discriminator is now aligned.

(10) Turn set off, disconnect test equipment, and replace crystals. Be sure crystals are inserted in the proper channel sockets.

(11) Check presetting adjustments for both channels.

d. The following alignment procedure uses Alignment Equipment ME-73 and Adapter M-394.

(1) Check for proper functioning of the adapter circuit as in paragraph 162.

(2) Insert a 2.88-megacycle crystal (part of Maintenance Equipment ME-73-(*)) in either crystal socket and set CHAN switch accordingly. Set adapter switch to ALIGN.

(3) Rotate VOLUME control of Radio Receiver and Transmitter BC-620-(*) fully clockwise (to the right).

(4) Insert probe in pin jack No. 3 of metering socket. Adjust secondary (bottom) and primary (top) of i-f transformers T5, T4 and T3 in that order for minimum on the panel meter. (See fig. 3 and 26.)

(5) Readjust primary and secondary of T3, T4, and T5 in that order. The i-f amplifier is now aligned.

(6) Note the panel meter reading with the probe grounded to the chassis. (VOLUME full on). This is a zero voltage reading.

(7) Insert probe in pin jack No. 7 of metering socket. Adjust discriminator transformer T6 secondary (fig. 3) until the meter indication is the same (*with alignment tool removed*) as in step (6).

(8) Connect the probe, with a short wire and 1-megohm resistor in series, to the junction of R36 and R37. (See fig. 26.) Adjust T6 primary for minimum on panel meter.

(9) Check secondary of T6 as in step (7) and readjust to zero volts if necessary. Discriminator is now aligned.

(10) Turn set off, set adapter switch to OFF, and remove 2.88-megacycle crystal. Replace the channel crystals in their proper sockets.

(11) Check presetting adjustments for both channels.

18. Neutralization

a. Neutralization of the final power-amplifier stage should not be necessary unless the original setting of the neutralizing capacitors has been accidentally changed. The adjustment screws are painted red on the top side of the chassis for identification. Do not move them unless it actually becomes necessary to reneutralize the final power-amplifier stage.

b. To check neutralization:

(1) Remove set from case. Turn panel meter switch to CHECK. Set SW11 to OFF and CHAN switch to A.

(2) Press microphone switch and tune A6 through its range, watching for a dip on the panel meter.

(3) Repeat steps (1) and (2) for channel B.

(4) If the dip is more than one division, the stage must be neutralized.

c. To neutralize:

(1) Set CHAN switch to the higher frequency channel.

(2) Adjust C4 and C5 (figs. 3 and 26) equally in small steps, checking between adjustments for dip as in *b*(2) above until the

dip is less than one division. Settings of C4 and C5 must be kept approximately equal. Check by observing the mesh of the plates.

(3) Check dip on the other channel. The same adjustment of C4 and C5 must serve for both channels.

d. Set SW11 to ON and panel meter switch to OPER. Restore set to its case.

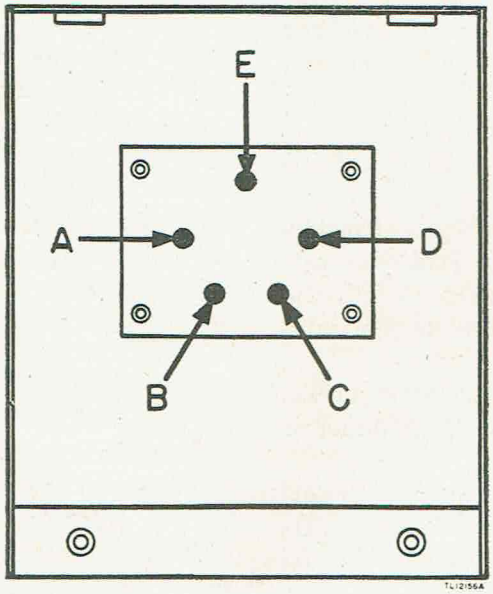


Figure 11. Pin view of internal battery box plug.

SECTION VI

DETAILED TROUBLE-SHOOTING PROCEDURES

19. Signal Substitution

a. GENERAL. If the set is inoperative or has weak output when aligned, the trouble may be localized to a particular stage by signal tracing or signal substitution. Such a system is outlined in this section.

b. TEST EQUIPMENT. The following equipment is necessary: one audio-frequency signal generator (400 to 1000 cycles per second (cps)) and an r-f signal generator covering at least 3.0 to 30.0 megacycles. Maintenance Equipment ME-13-(*), includes Oscillator VO-4-(*), this may be substituted for the r-f signal generator. Alignment Equipment ME-73-(*) includes a 2.88-megacycle crystal that is used for receiver oscillator circuit. An electronic voltmeter for measuring voltages at the metering socket which may be:

(1) Voltohmmeter I-107-(*) part of Maintenance Equipment ME-13-(*). See TM 11-306.

(2) The panel meter of Radio Receiver and Transmitter BC-1620-(*) in conjunction with Adapter M-394.

(3) Any other electronic voltmeter, such as Hickok model 202.

c. PROCEDURE. With the aid of figure 12 and table V inject the signal within a particular stage. Apply the *hot* lead of the signal generator to the lug of the tube socket in accordance with figure 12. A signal should be heard in the phones or read on an output meter. See table VI for type of signal generator, frequency, and input voltage. After trouble has been localized to a particular stage make a resistance and voltage check of individual components using tables VII to XIX to locate the faulty part.

20. Normal Point-to-Point Resistance Values

a. GENERAL. Normal resistance values obtained by point-to-point measurements on Radio Receiver and Transmitter BC-620-(*) in a satisfactory condition are indicated in the following charts. Use of this data in connection with similar measurements on faulty equipment, combined with a logical circuit analysis, will frequently disclose the source of trouble in an improperly operating or dead receiver and transmitter. The readings should be taken under the following conditions, and these must be followed exactly if comparison measurements on a faulty unit are to be of value.

(1) *Remove all tubes.* In addition to causing an incorrect reading, tube filaments can be burned out by the high ohmmeter current used in some ohmmeters.

(2) *Set meter switch at OPER.* This position affords the meter the greatest degree of protection (prevents high ohmmeter current from flowing through meter) and prevents incorrect readings by removing the shunting effect.

(3) *Remove battery BA-41.* Besides providing false ohmmeter readings, the ohmmeter may be damaged by battery current.

(4) Turn the volume knob control fully clockwise, (to the right). This turns the power switch on and the volume control to maximum.

(5) The channel switch may be at A or B. Check that SW10 and SW11 are on.

(6) Both the microphone and headphone must be disconnected from set.

(7) All readings can be taken on the volt-ohmmeter unit of Test Set I-56-(*). The meter scale used should give the greatest usable deflection.

b. POWER AND CONTROL CABLE PLUG POINT-TO-POINT RESISTANCE VALUES. All measurements made between plug pins and chassis. Pins on plug are identified by letters.

Pin No.	*Resistance to chassis*
A	Open circuit
B	Open circuit
C	Open circuit

Pin No.	*Resistance to chassis*
D	Open circuit
E	Open circuit
F	1-megohm minimum (depends on current leakage through electrolytic capacitor C31).
G	Open circuit
H	0 ohm

c. INTERNAL BATTERY PLUG (FOR BATTERY BA–41) RESISTANCE VALUES. All measurements made as indicated in chart below. Pins are identified by letters as shown. (See fig. 11.) The pin-identifying letters do not appear on the plug.

Reading between	*Resistance*
Pin A and chassis	Open circuit
Pin B and chassis	Open circuit
Pin C and chassis	Open circuit
Pin D and chassis	0 ohm
Pin E and chassis	Open circuit
Pin A and pin B	1 megohm

d. NORMAL CHOKE, COIL, AND TRANSFORMER D-C RESISTANCE VALUES.

	Description		*D-c resistance*
CH1	choke, low L r-f		0.13 ohm
CH2	choke, r-f		40 ohms
CH3	choke, r-f		40 ohms
CH4	choke, low L r-f		0.13 ohm
CH5	choke, r-f		40 ohms
CH6	choke, microphone hash		500 ohms
CH7	choke, high L r-f		8 ohms
CH8	choke, r-f		40 ohms
CH9	choke, filament		0.13 ohm
L6	coil and shield, receiver oscillator		
L1	coil and shield, antenna loading		
		1–8	0.02 ohm
L2	coil and shield, p-a grid		
		1–2	0.006 ohm
		1–3	2,700 ohms
		3–chassis	100 ohms
L3	coil and shield, buffer grid		
		1–2	0.039 ohm
		1–chassis	22,000 ohms
L4	coil and shield, transmitter oscillator		
		4–1	0.021 ohm
		4–2	0.038 ohm
		4–3	0.05 ohm
L5	coil and shield, mixer grid		0.019 ohm
		1–2	0.019 ohm
T1	transformer, p-a plate		
		3–1	0.010 ohm
		2–4	0.003 ohm
		3–5	0.010 ohm
T2	transformer, microphone		
		1–2	3 ohms
		3–4	2,600 ohms
T3	transformer and shield, 1st i-f		
		1–2	4.5 ohms
		3–4	3.5 ohms
T4	transformer and shield, 2d i-f		
		1–2	4 ohms
		3–4	4 ohms
T5	transformer and shield, 3d i-f		
		1–3	3.5 ohms
		3–2	100,000 ohms
		3–6	1 megohm
		4–5	3.5 ohms
T6	transformer and shield discriminator		
		1–2	2.5 ohms
		5–3	1.5 ohms
		5–4	1.5 ohms
T7	transformer, output		
		1–2	850 ohms
		3–4	1,200 ohms

Table V. Conditions for signal substitution

Set	Set placed upside down, panel toward operator, case removed.
Power	Battery connected. Volume control *ON*.
Channel	Channel switch turned to either A or B.
Receiver transmitter	Set operating as a receiver.
Signal generator	Outside shield or cable (marked ground) of outside cable connected to set chassis (not front panel).
Meter switch	Meter switch is turned to OPER.

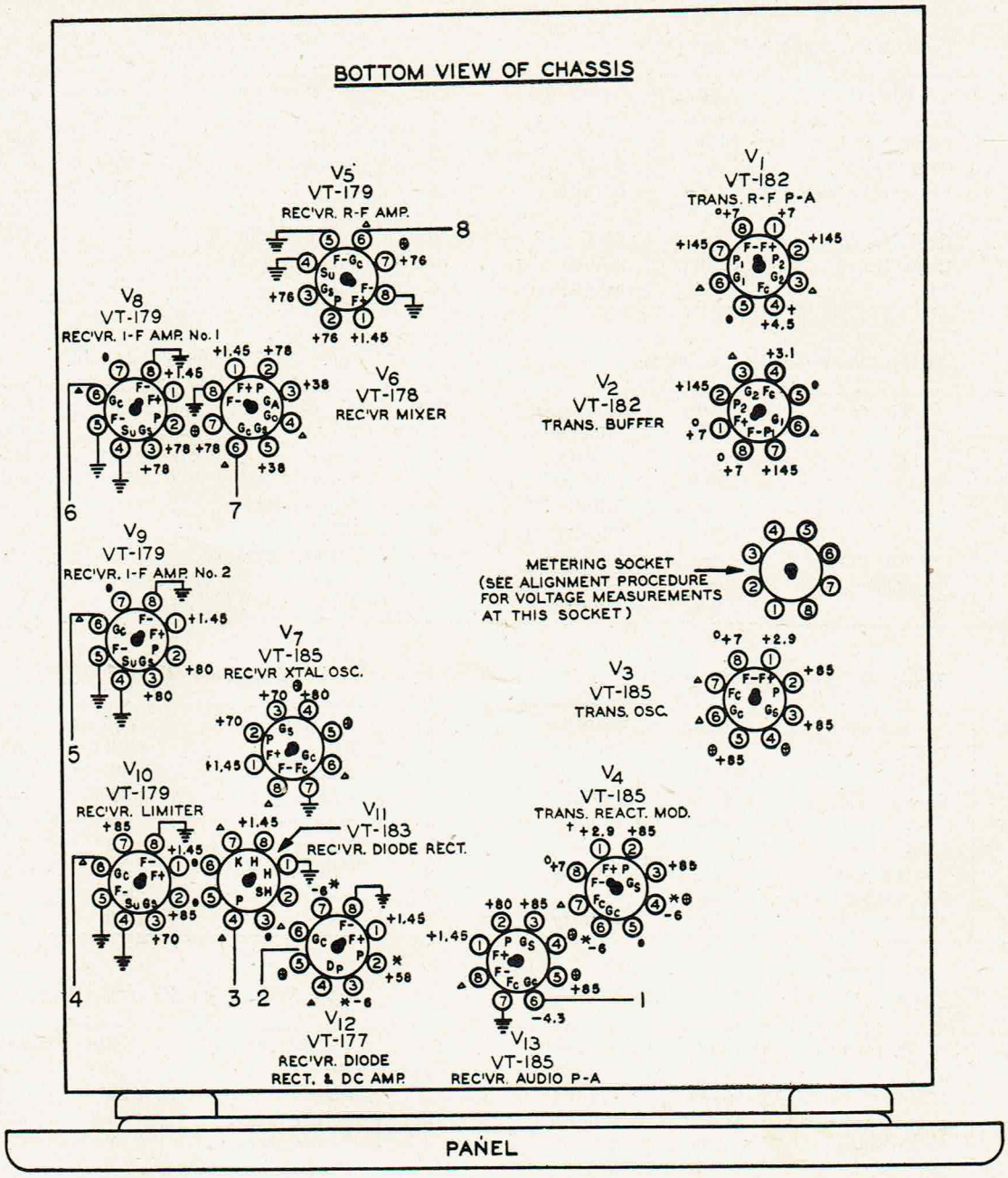
Table VI. Signal substitution steps.

Step	Signal generator connected to	Frequency	Input
1	Audio grid	1,000 or 400 cps	1 v
2	D-c amplifier grid	1,000 or 400 cps	1 v
3	Receiver diode	1,000 or 400 cps	1 v
4	Limiter grid	2.88 mc	0.01 v
5	2d i-f amplifier grid	2.88 mc	0.01 v
6	1st i-f amplifier grid	2.88 mc	0.01 v
7	Mixer grid*	r-f	0.001 v
8	R-f grid*	r-f	0.001 v

* Radio frequency of channel used.

Table VII. Tube VT-182-(VI)

Pin	Element	Volts	Resistance
1	Fil	+6.2 v	1 meg
2	Plate No. 1	125 v	infinity
3	Grid No. 1	—	2,800 ohms
4	Fil center tap	4.8 v	infinity
5	—	—	—
6	Grid No. 2	—	2,800 ohms
7	Plate No. 2	125 v	infinity
8	Fil	6.2 v	1 meg



NOTE:- VOLTAGES MEASURED IN 'RECEIVE' POSITION, EXCEPT WHERE NOTED. ALL VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINAL INDICATED, VALUES ARE IN DC VOLTS.

VOLUME CONTROL FULL ON.

METER SWITCH ON 'OPERATE'.

CHANNEL SWITCH 'A' OR 'B'.

VOLTAGES SHOWN ARE OBTAINED BY USING FRESH BATTERIES.

VOLTAGES MEASURED WITH TUBE VOLTMETER R.C.A. VOLT OHMYST, STOCK NO.-165 HICKOK-202 OR EQUIVALENT.

* WITH ZERO DISCRIMINATOR VOLTS.

\+ WITH TRANSMITTER SWITCH ON 7 V. WITH TRANSMITTER SWITCH OFF.

° WITH TRANSMITTER SWITCH OFF.

• NO EXTERNAL CONNECTION.

Δ NOT MEASURED.

● SOCKET TERMINAL USED AS TIE OR DUMMY LUG ONLY. NO TUBE ELEMENT CONNECTS TO THIS LUG.

ALL VALUES SHOWN ARE NOMINAL. TL19062

Figure 12. Bottom view of chassis with step-by-step signal substitution, Radio Receiver and Transmitter BC-620-(*).

Table VIII. Tube VT 182 (V2).

Pin	Element	Volts	Resistance
1	Fil	+4.8 v	infinity
2	Plate No. 1	+130	infinity
3	Grid No. 1	—	22 M
4	Fil center tap	+3.3 v	infinity
5	—	—	—
6	Grid No. 2	—	22 M
7	Plate No. 2	+130	infinity
8	Fil	+48 v	infinity

Table IX. Tube VI-185-(V3).

Pin	Element	Volts	Resistance
1	Fil	+3.3 v	infinity
2	Plate	+80 v	infinity
3	Screen	+80 v	infinity
4	—	—	infinity
5	—	+80 v	infinity
6	Control grid	—	infinity
7	Fil center tap	—	—
8	Fil	0 v	infinity

Table X. Tube VT-185-(V4).

Pin	Element	Volts	Resistance
1	Fil	3.3 v	infinity
2	Plate	87.0 v	infinity
3	Screen	82.0 v	infinity
4	—	—	infinity
5	—	—	—
6	Control grid	—	infinity
7	Fil center tap	—	—
8	Fil	0 v	infinity

Table XI. Tube VT-179-(V5).

Pin	Element	Volts	Resistance
1	Fil	1.3 v	infinity
2	Plate	+75 v	infinity
3	Screen	+75 v	infinity
4	Suppressor	0	0
5	Fil	0	0
6	Control grid	—	1 meg
7	—	75 v	infinity
8	Fil	0	0

Table XII. Tube VT-178-(V6).

Pin	Element	Volts	Resistance
1	Fil	1.3 v	infinity
2	Plate	75 v	infinity
3	Oscillator anode	33 v	infinity
4	Oscillator grid	—	270 M
5	Screen	+35 v	infinity
6	Control grid	—	0
7	—	75 v	infinity
8	Fil	0	0

Table XIII. Tube VT-185-(V7).

Pin	Element	Volts	Resistance
1	Fil	+1.30 v	infinity
2	Plate	+70 v	infinity
3	Screen	+70 v	infinity
4	—	+80 v	infinity
5	—	—	1.47 meg
6	Control grid	—	470 M
7	Fil center tap	0	0
8	Fil	—	—

Table XIV. Tube VT-179-(V8).

Pin	Element	Volts	Resistance
1	Fil	+1.3 v	infinity
2	Plate	+78 v	infinity
3	Screen	+78 v	infinity
4	Suppressor	0	0
5	Fil	0	0
6	Control grid	—	3.5 M
7	—	—	—
8	Fil	0	0

Table XV. Tube VT-179-(V9).

Pin	Element	Volts	Resistance
1	Fil	+1.3 v	infinity
2	Plate	+80 v	infinity
3	Screen	+80 v	infinity
4	Suppressor	0	0
5	Fil	0	0
6	Control grid	—	3.6 M
7	—	—	—
8	Fil	0	0

Table XVI. Tube VT-179-(V10).

Pin	Element	Volts	Resistance
1	Fil	+1.3 v	infinity
2	Plate	+85 v	infinity
3	Screen	+66 v	infinity
4	Suppressor	0	0
5	Fil	0	0
6	Control grid	—	100 M
7	—	+85 v	infinity
8	Fil	0	0

Table XVII. Tube VT-183-(V11).

Pin	Element	Volts	Resistance
1	Fil	0	0
2	Shield	—	—
3	—	—	—
4	Plate	—	270 M
5	—	—	—
6	—	—	—
7	Cathode	—	540 M
8	Fil	+1.3 v	infinity

Table XVIII. Tube VT-177-(V12).

Pin	Element	Volts	Resistance
1	Fil	+1.3 v	infinity
2	Plate	+58 v	infinity
3	—	—	infinity
4	Diode	—	270 M
5	—	—	540 M
6	Control grid	—	810 M
7	—	—	infinity
8	Fil	0	0

Table XIX. VT-185-(V13).

Pin	Element	Volts	Resistance
1	Fil	+1.3 v	infinity
2	Plate	+82 v	infinity
3	Suppressor	+85 v	infinity
4	—	—	infinity
5	—	+85 v	infinity
6	Control grid	—4.3 v	infinity
7	Fil center tap	0	0
8	Fil	—	—

SECTION VII

FINAL TESTING

21. Moistureproofing, Fungiproofing, and Refinishing

After the set has been repaired and is functioning correctly a check should be made of date of last moistureproofing and fungiproofing. If new treatment is required see TB SIG 13 and TM 11-605 for the method of application. If the equipment has been scarred or chipped, remove any rough spots with sandpaper and touch up spots with a small brush and approved paint. If the case is sufficiently scarred and scratched to warrant complete refinishing, remove chassis from case and mask or remove parts which are not to be refinished and spray entire case with the proper paint authorized by existing regulations.

22. Alignment Check

Although the unit was correctly aligned during the repair procedure a recheck of set alignment is necessary after moistureproofing and fungiproofing have been completed. Check alignment as shown in section V. After the alignment has been checked, make over-all performance tests as outlined in the following paragraphs.

23. I-F Selectivity Test

a. PROCEDURE. (1) Adjust signal generator to 2.88 mc and connect to pin 6 of the converter tube.

(2) Adjust output of signal generator to give 1.5 volts at pin 3 of the metering socket.

b. BANDWIDTH DETERMINATION. (1) Double the output voltage of signal generator.

(2) Shift the frequency of the signal generator above and below 2.88 mc in turn until at each side of 2.88 mc the output of pin 3 of the metering socket reads 1.5 volts. Note frequency of the signal generator at each of these points.

(3) Bandwidth is the difference in frequency readings. The bandwidth should be between 40 and 55 kc.

(4) Repeat same procedure with the signal generator voltage output 10 times value in (2) above. The bandwidth should not be more than 95 kc.

(5) Repeat same procedure at 100 times the signal generator voltage of (2) above. The bandwidth should not be more than 150 kc.

(6) Repeat same procedure at 1,000 times the signal generator voltage of (2) above. The bandwidth should not be more than 230 kc.

24. I-F Rejection Ratio

a. Proceed as follows to obtain i-f rejection ratio:

(1) Connect signal generator to antenna post through a 30-ohm resistor.

(2) Connect chassis of receiver to ground.

(3) Tune receiver to 27.9 mc.

b. Set signal generator at the intermediate-frequency (2.88 mc). Adjust the generator voltage to 1.2 volts output.

c. Record voltage reading at pin 3 of the meter socket. This reading is V in *e* below.

d. Set signal generator to 27.9 mc, and adjust voltage output of the signal generator so that it reads the same on pin 3 as in (*c*) above. Again record signal generator output. This reading is V2 in *e* below.

e. The ratio $\frac{V}{V2}$ of the signal generator output voltages is the i-f rejection ratio. It shall be greater than 40,000 to 1. Formula: I-f rejection ratio $= \frac{V}{V2}$.

25. D-C Amplifier Gain

Proceed as follows to obtain d-c amplifier gain:

a. Connect signal generator to pin 6 of converter tube, and set to 2.88 mc.

b. Adjust generator to give minus 6 volts on

pin 4 of metering socket. Read and note voltage at pin 7.

c. Shift siignal generator frequency until voltage at pin 7 changes by 0.1 volt.

d. Measure voltage at pin 4. Difference between the readings of voltages on pin 4 multiplied by 10, is the d-c gain. It should not be less than 20.

26. Image Rejection Ratio

Proceed as follows to obtain image rejection ratio:

a. Connect signal generator as in paragraph 24.

b. With signal generator set to 22.14 mc, adjust generator output to 10 mv. Set receiver to 27.9 mc. Note voltage on pin 3 of metering socket. This reading is G in *e* below.

c. Set signal generator to 27.9 mc and adjust voltage input of signal generator to give the same reading as at pin 3 as in *b* above. This reading is G2.

d. The ratio $\frac{G1}{G2}$ of the two signal generator voltages is the image rejection ratio. It should not be less than 2,000 to 1.

27. Receiving Sensitivity

Proceed as follows to obtain receiving sensitivity:

a. Connect signal generator as in paragraph 24.

b. Adjust signal generator output to give 1 volt at pin 3 of meter socket at following frequencies: 20.0 mc, 23.5 mc, and 27.9 mc.

c. Readings should not exceed 20 mv.

28. Audio-Frequency Response

a. PROCEDURE. (1) Connect audio oscillator to pin 7 of the meter socket.

(2) Adjust it so that 2.7 volts is applied.

b. MEASUREMENT OF AUDIO OUTPUT. The receiver audio output is measured with audio output meter having an impedance of 4,000 ohms. Limits for acceptance should be as listed in table XX.

Table XX. Frequency response.

Frequency setting (cps)	Minimum output in volts
250	11
1,000	18.5
3,000	18.5

29. Transmitter Power Output

a. Proceed as follows to obtain transmitter power output: Check power output of the transmitter at 20.0 mc, 27.9 mc, and 25.9 mc.

(1) Use a 86-ohm carbon resistor in series with an 0 to 250 milliampere r-f milliameter, connected across antenna post and chassis.

(2) This simulates the equivalent radiation resistance of a half-wave vertical antenna.

b. MINIMUM OUTPUT SHOULD BE 105 MA OR ON ALL FREQUENCIES.

30. Transmitter Neutralization

Proceed as follows to neutralize transmitter:

a. Turn final amplifier switch OFF.

b. See that plate check operate switch, on front panel, is at CHECK.

c. Tune final amplifier capacitor through resonance.

d. Observe panel meter. It should not deflect more than 1 division.

e. Conduct this test at 20.0 mc, 25.5 mc, and 27.9 mc.

SECTION VIII

INDIVIDUAL STAGE AND CIRCUIT REPAIR DATA

31. Filament Circuit

The filament circuit, because of the many by-pass capacitors, can give troubles which will be indicated as shorts or leaks in the power cable plug. Check for power resistance values.

Table XXI. Filament trouble location.

Pin C	Pin F and G
C 31	C 29
C 36	J
C 47	C 11
C 52	C 23
C 56	
C 61	

Note. Shorts or unusually high leakage in the below pin connections will indicate faulty components listed.

32. Receiver R-F Amplifier

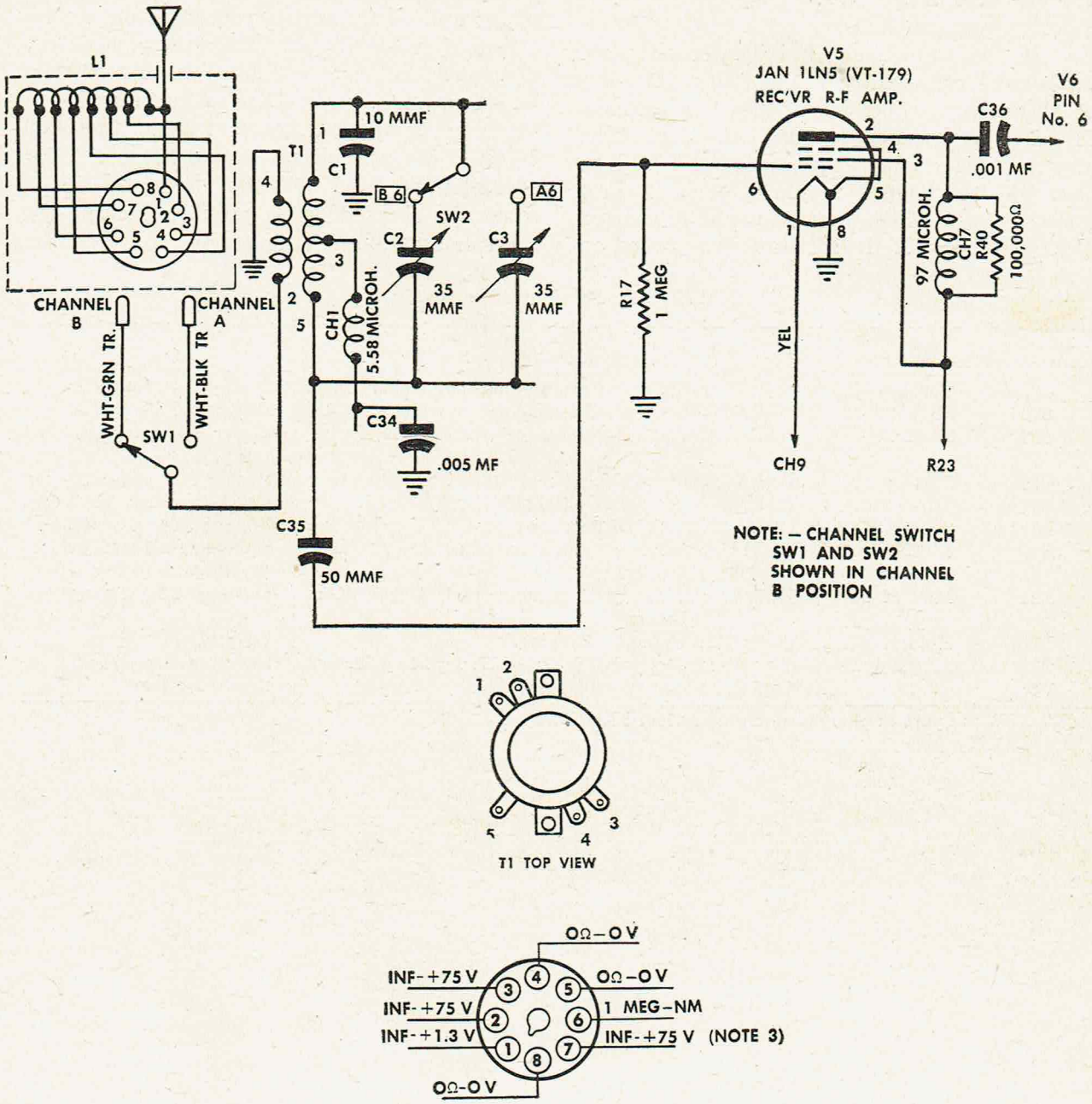
a. If in signal tracing the results indicate that the receiver r-f amplifier is inoperative, trouble may be readily located by referring to the voltage and resistance chart.

b. If there is an absence of plate voltage check CH7 and R40 for continuity. If voltages are found to be normal check C35 for open. This is usually done by placing a capacitor of approximately the same value in parallel with the component being tested. If trouble is not located in the above steps, the grid circuit and tuning components should be checked. C36 should be checked for open. Such a condition will prevent the injection of the r-f signal on the grid of V6. If capacitor C36 is shorted, the voltage on the grid pin 6 will be highly positive. See the transmitter r-f power-amplifier stage repair for tests on the tuning section.

Table XXII. Receiver R-F Amplifier (fig. 13).

Reference number	Signal Corps stock number	Name of part and description	Function
C1	3D9010-25	CAPACITOR: fixed; 10-mmf, ±10%.	Equalizing, T1
C2	3D9035V-4	CAPACITOR: variable; 35-mmf maximum.	Tuning T1, channel B
C3	3D9035V-2	CAPACITOR: variable; 35-mmf maximum.	Tuning T1, channel A
C35	3D9050-36	CAPACITOR: fixed; 50-mmf, ±5%; 300 vdcw.	Receiver antenna coupling
C36	3DA1-48	CAPACITOR: fixed; .001 mf, +4%, —6%; 300 vdcw.	Coupling, V5 to V6
CH1	3C362	CHOKE: low r-f; 5.58 μh at 4 mc.	Plate, V1
CH7	3C362-12	CHOKE: high L r-f; 97 μh at 1,000 kc.	Plate, V5
L1	2C5360A/A4	COIL AND SHIELD: antenna loading.	Adjustable antenna
R17	3Z6801-36	RESISTOR: fixed; carbon, insulated, 1-megohm ±10%; ½-watt.	Grid leak, V5
R40	2Z4550	RESISTOR: fixed; carbon; insulated, 100M ohms ±10%; ½-watt.	Loading, V5 plate choke
SW1	Note	SWITCH: channel changing.	Antenna loading taps
SW2	Note	SWITCH: channel changing.	Plate, V1
T1	2Z9978-7	TRANSFORMER: power-amplifier plate.	PA plate tank coil and antenna coupling
V5		TUBE: JAN-1LN5 (VT-179).	Receiver r-f amplifier

Note. SWI and SW2 are part of channel changing switch 3Z9825-24.



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM – Not measured. NC – Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM – Not measured. NC – Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

TL19063

Figure 13. Schematic wiring diagram, receiver r-f amplifier stage, Radio Receiver and Transmitter BC-620-(*).

33. Receiver Mixer Stage

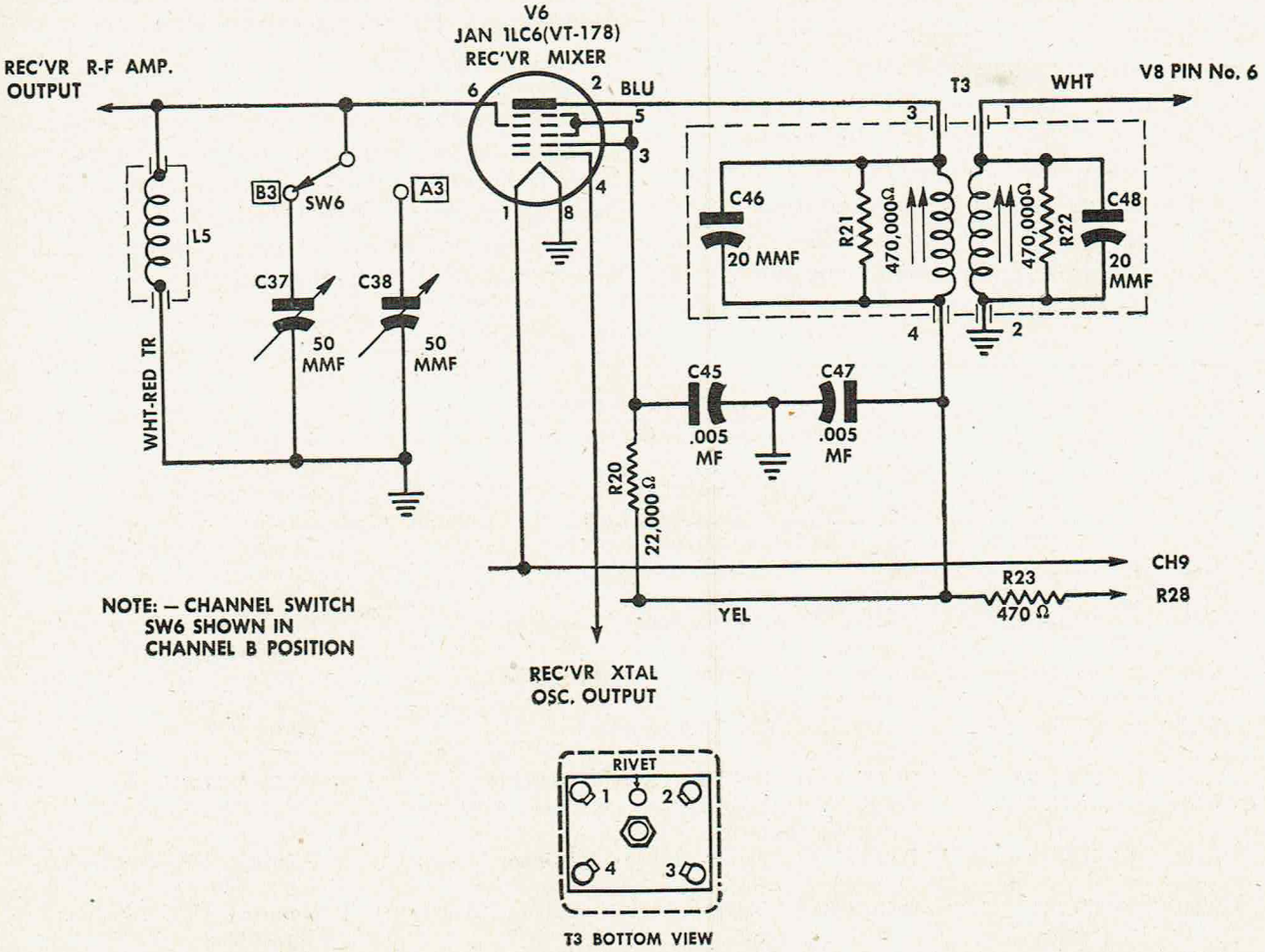
a. See paragraph 20.

b. If the voltage check indicates no plate voltage a check shall be made of the continuity of T3 primary. Low plate voltage would indicate C47 to be in a leaking condition. The screen voltage as measured on pin 5 will be absent if R20 is open or C45 is shorted. Low screen voltage will indicate a partially shorted (leaking) C45. If the resistance to ground on pin 4, the oscillator injection grid, is wrong see paragraph 34 for repair procedure on the receiver crystal oscillator. The absence of proper voltage at this point will not have too great an effect on the operation as an amplifier of the receiver mixer stage, however a thorough check of the grid circuit should be made. The operation of SW6 and the continuity of L5 should be checked before trouble shooting the receiver crystal-oscillator stage.

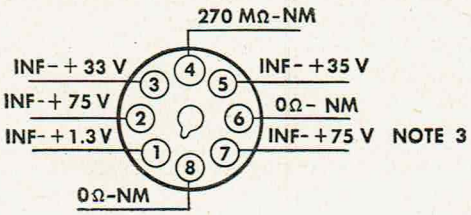
Table XXIII. Receiver Mixer (fig. 14).

Reference number	Signal Corps stock number	Name of part and description	Function
C37	3D9050V-30	CAPACITOR: variable; 50-mmf maximum.	Tuning, L5 channel B
C38	3D9050V-29	CAPACITOR: variable; 50-mmf maximum.	Tuning, L5 channel A
C45	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%.	Screen and anode grids r-f bypass, V6
C46	Part of T3	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T3 primary
C47	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%.	B+, r-f bypass, V5, V6
L5	2C5360A/A8	COIL AND SHIELD: mixer grid.	V6, control grid tuning
R20	3Z6622-2	RESISTOR: fixed; carbon insulated, 22,000-ohms ±10%; ½-watt.	Screen and anode grids voltage dropping, V6
R21	Part of T3	RESISTOR: fixed; carbon insulated, 470,000-ohm ±10%, ½-watt.	Loading, T3 primary
SW6	Note	SWITCH: channel changing.	V6 grid
T3	2C5360A/T2	TRANSFORMER AND SHIELD: 1st i-f; primary.	Interstage coupling
V6		TUBE, JAN-1LC6 (VT-178).	Receiver mixer

Note. SW6 is part of channel changing switch 3Z9825-24.



T3 BOTTOM VIEW



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

TLI9064

Figure 14. Schematic wiring diagram, receiver mixer stage, Radio Receiver and Transmitter BC-620-(*).

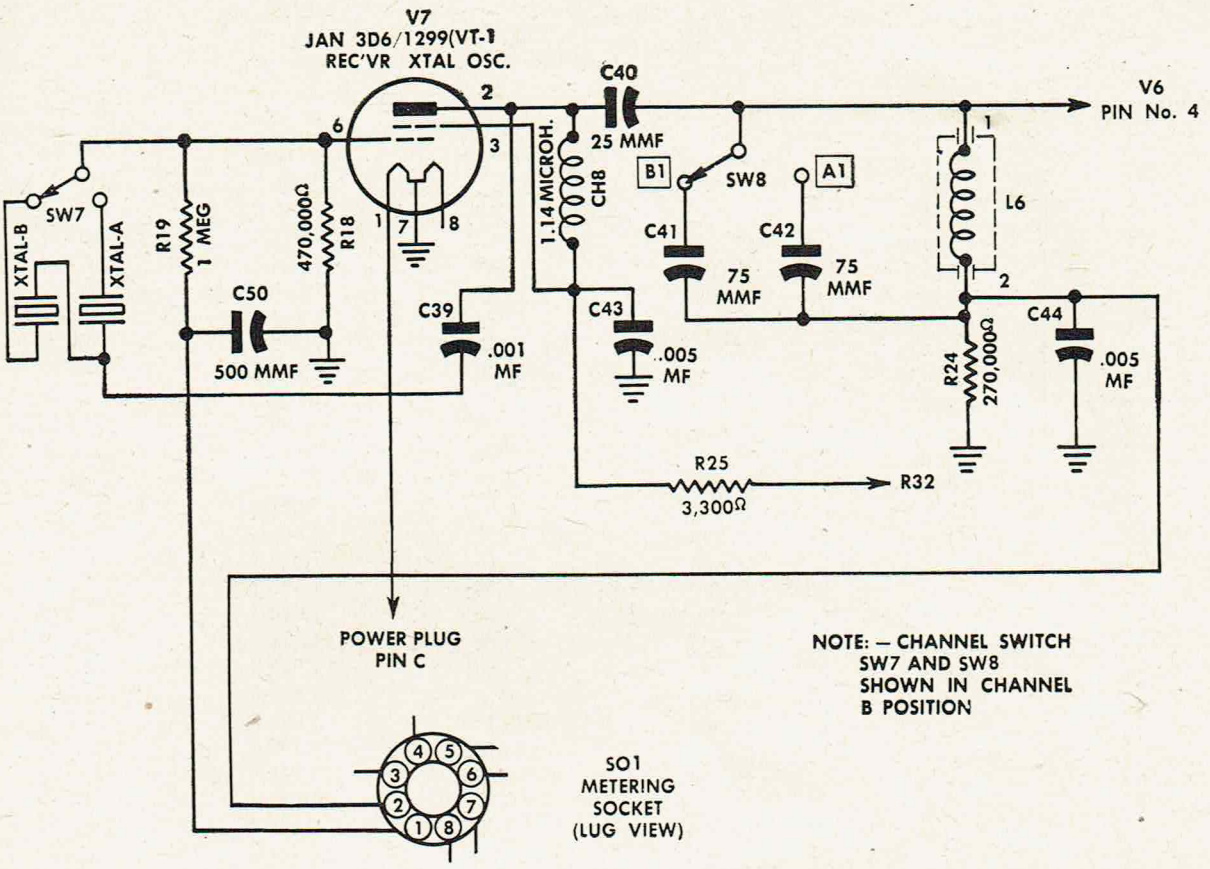
34. Receiver Crystal-Oscillator Stage

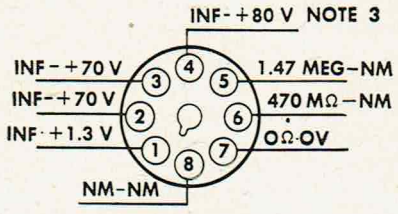
The first step in trouble shooting the receiver crystal-oscillator stage is to measure the crystal activity as described in section V. If after this test the crystals used for the A and B bands are found to give the proper activity, the tube socket voltages should be checked for proper values. If the plate voltage as measured on pin 2 is absent, check CH8 for continuity. If the plate voltage measured is low, check C43 for leakage. The screen voltage should be normal at all times for it uses a direct line from the power supply through the power cable. The voltage measured on pin 6 should be present if the receiver crystal oscillator is oscillating. If oscillation is not indicated, check C39 for open or short. If oscillation is not present, C40 should be checked for open also C41 and C42 should be checked for short.

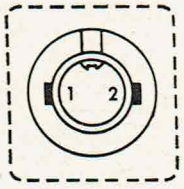
Table XXIV. Receiver crystal oscillator (fig. 15).

Reference number	Signal Corps stock number	Name of part and description	Function
C39	3DA1-48	CAPACITOR: fixed; 0.001-mf, +14%, —6%, 300 vdcw.	Crystal feedback coupling
C40	3D9025-20	CAPACITOR: fixed; 25-mmf, ±5%, 300 vdcw.	Plate blocking V7
C41	3D9075V-1	CAPACITOR: variable; 75-mmf, maximum.	Tuning, L6, channel B
C42	3D9075V-2	CAPACITOR: variable; 75-mmf, maximum.	Tuning, L6, channel A
C43	3DA5-24	CAPACITOR: fixed; 0.005-mf, +80%, —20%; 300 vdcw.	Screen grid bypass, V7
C44	3DA5-24	CAPACITOR: fixed; 0.005-mf, +80%, —20%; 300 vdcw.	R-f bypass, V7, output metering lead
C50	3D9500-46	CAPACITOR: fixed; 500-mmf, +14%, —6%; 400 vdcw.	R-F bypass, V7, grid metering lead
CH8	3C362-1	CHOKE: r-f; 1.14 μh at 300 kc.	Plate, V 7
L6	2C5360A/A9	COIL AND SHIELD: receiver oscillator.	V7, oscillator tank
R18	3Z6747-10	RESISTOR: fixed carbon, insulated; 470,000-ohm, ±10%; ½-watt.	Control grid bias, V7
R19	3Z6801-36	RESISTOR: fixed; carbon; insulated, 1-megohm ±10%; ½-watt.	Isolating V7, grid metering lead
R24	3Z6727	RESISTOR: fixed; carbon; insulated; 270,000-ohm ±10%, ½-watt.	Metering, V6, injection grid bias
R25	3Z6330-1	RESISTOR: fixed; carbon; insulated; 3,300-ohm, ±10%, ½-watt.	V7, B+ decoupling
SO2	2Z8678	SOCKET: 2-crystal receptacle.	Crystal socket
SW7	Note	SWITCH: channel changing.	Crystal changing
SW8	Note	SWITCH: channel changing.	V6 oscillator
V7		TUBE JAN-3D6/1299 (VT-185)	Receiver crystal oscillator
XTAL A	See table	CRYSTAL UNIT: channel A	Receiver stability
XTAL B	See table	CRYSTAL UNIT: channel B	Receiver stability

Note. SW7 and SW8 are part of channel changing switch 3Z9825-24.







L6 BOTTOM VIEW

NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

TLI9065

Figure 15. Schematic wiring diagram, receiver crystal oscillator stage, Radio Receiver and Transmitter BC-620-(*).

Table XXV. Radio Receiver and Transmitter BC-620-(*) Channel Numbers and Crystal Frequencies.

Channel number	Crystal fundamental frequency (Kc)	Receiver and transmitter (Kc)
0	5,706.7	20,000
1	5,740.0	20,100
2	5,773.3	20,200
3	5,806.7	20,300
4	5,840.0	20,400
5	5,873.3	20,500
6	5,906.7	20,600
7	5,940.0	20,700
8	5,973.3	20,800
9	6,006.7	20,900
10	6,040.0	21,000
11	6,073.3	21,100
12	6,106.7	21,200
13	6,140.0	21,300
14	6,173.3	21,400
15	6,206.7	21,500
16	6,240.0	21,600
17	6,273.3	21,700
18	6,306.7	21,800
19	6,340.0	21,900
20	6,373.3	22,000
21	6,406.7	22,100
22	6,440.0	22,200
23	6,473.3	22,300
24	6,506.7	22,400
25	6,540.0	22,500
26	6,573.3	22,600
27	6,606.7	22,700
28	6,640.0	22,800
29	6,673.3	22,900
30	6,706.7	23,000
31	6,740.0	23,100
32	6,773.3	23,200
33	6,806.7	23,300
34	6,840.0	23,400
35	6,873.3	23,500
36	6,906.7	23,600
37	6,940.0	23,700
38	6,973.3	23,800
39	7,006.7	23,900

Channel number	Crystal fundamental frequency (Kc)	Receiver and transmitter (Kc)
40	7,040.0	24,000
41	7,073.3	24,100
42	7,106.7	24,200
43	7,140.0	24,300
44	7,173.3	24,400
45	7,206.7	24,500
46	7,240.0	24,600
47	7,273.3	24,700
48	7,306.7	24,800
49	7,340.0	24,900
50	7,373.3	25,000
51	7,406.7	25,100
52	7,440.0	25,200
53	7,473.3	25,300
54	7,506.7	25,400
55	7,540.0	25,500
56	7,573.3	25,600
57	7,606.8	25,700
58	7,640.0	25,800
59	7,673.3	25,900
60	7,706.7	26,000
61	7,740.0	26,100
62	7,773.3	26,200
63	7,806.7	26,300
64	7,840.0	26,400
65	7,873.3	26,500
66	7,906.7	26,600
67	7,940.0	26,700
68	7,973.3	26,800
69	8,006.7	26,900
70	8,040.0	27,000
71	8,073.3	27,100
72	8,106.7	27,200
73	8,140.0	27,300
74	8,173.3	27,400
75	8,206.7	27,500
76	8,240.0	27,600
77	8,273.3	27,700
78	8,306.7	27,800
79	8,340.0	27,900

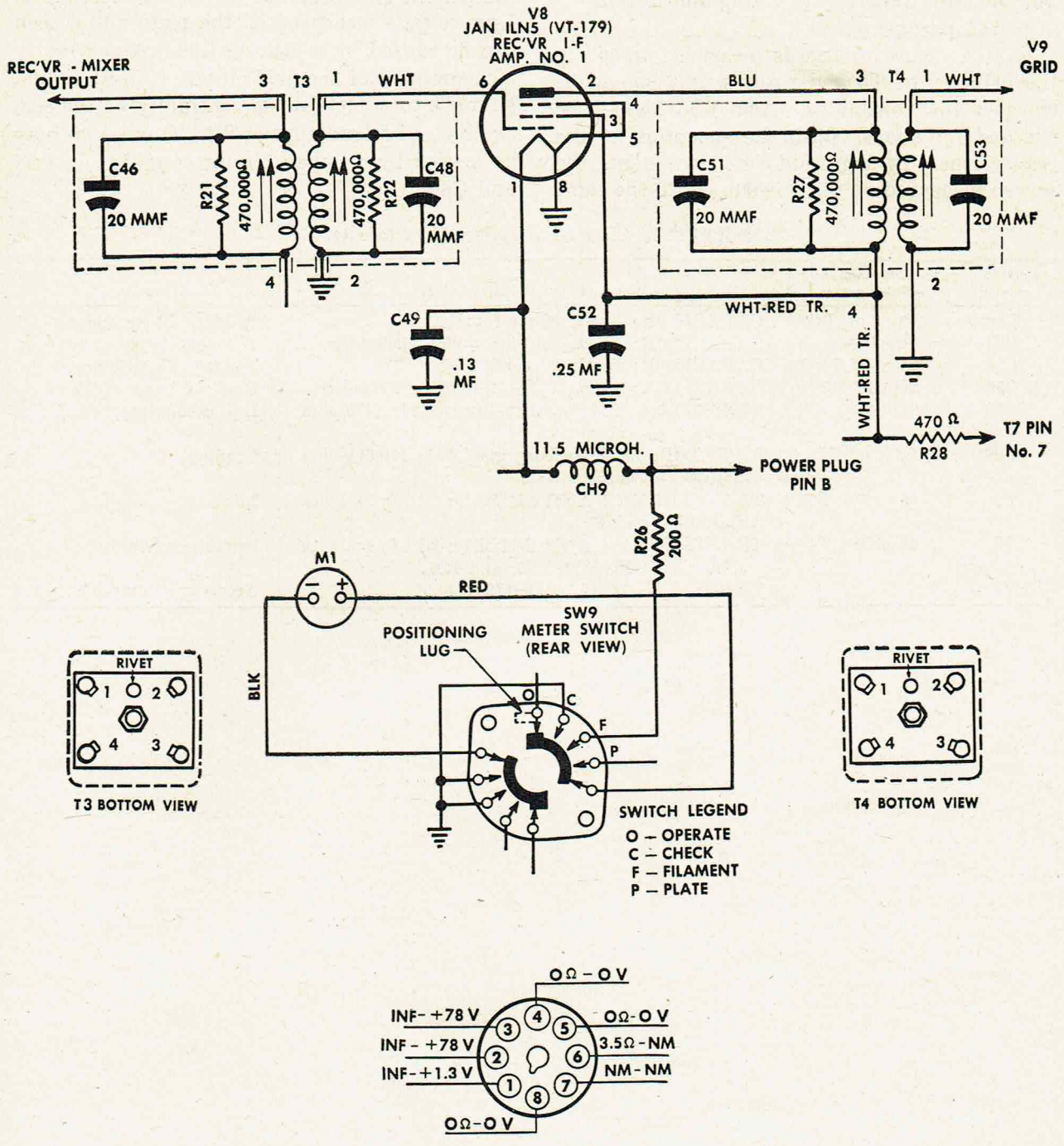
35. First Receiver I-F Amplifier Stage

a. See paragraph 20.

b. If the voltage as measured on pin 2 plate circuit is absent, check primary and R28 for continuity. C52 should be checked for short. If the voltage on the plate is low, check C52 for leakage. The voltage on the screen will be effected by the same component break-down as the plate. The resistance to ground on terminal (control grid), should be measured. This will determine the continuity of secondary T3. Oscillation in the i-f amplifier may be traced to an open C52 or C49.

Table XXVI. Receiver I-F Amplifier No. 1 (fig. 16).

Reference number	Signal Corps stock number	Name of part and description	Function
C48	Part of T3	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T3 secondary
C49	3DA130-1	CAPACITOR: fixed; 0.13-mf ±20%, 100-vdcw.	Filament bypass
C51	Part of T4	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T4 primary
C52	3DA250-17	CAPACITOR: fixed; 0.25-mf ±20%; 200 vdcw.	B+, r-f bypass, V8
R22	Part of T3	RESISTOR: fixed; carbon; insulated; 470,000-ohm ±10%; ½-watt.	Loading, T3 secondary
R23	3Z6047	RESISTOR: fixed; carbon; insulated; 470-ohm ±10%; ½-watt.	B+, decoupling, V5 and V6
R27	Part of T4	RESISTOR: fixed; carbon; insulated; 470,000-ohm ±10%; ½-watt.	Loading, T4
T3	2C5360A/T2	TRANSFORMER AND SHIELD: 1st i-f; includes C46, C48, R21, and R22.	Interchange coupling
T4	2C5360A/T3	TRANSFORMER AND SHIELD: 2d i-f; includes C51, C53, and R27.	Interchange coupling
V8		TUBE: JAN-1LN5 (VT-179).	Receiver i-f amplifier 1



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

TL19066

Figure 16. Schematic wiring diagram, first receiver amplifier, Radio Receiver and Transmitter BC-620-(*).

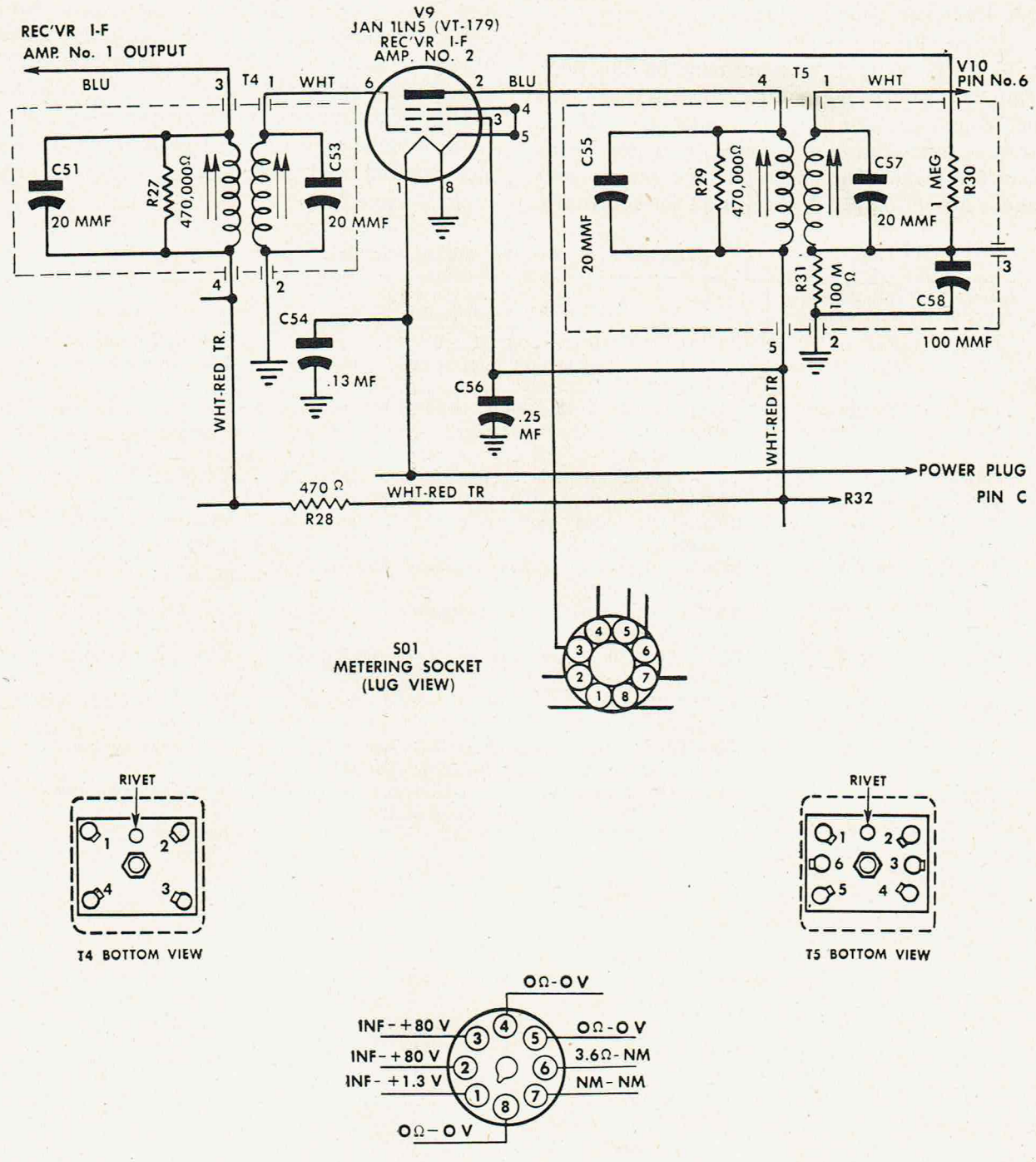
36. Second Receiver I-F Amplifier Stage

a. See paragraph 20.

b. If no plate voltage is measured on pin 2, the primary of T5 and resistor P32 should be checked for continuity. Also C56 should be checked for short. With the exception of the transformer T4 continuity measurement, the screen measured on pin 3 is subject to the same component failure if no voltage is measured. Low voltage measured on the plate and screen can be caused by a leaking C56. A continuity measurement of the grid circuit (pin 6) should be made to ascertain the continuity of the secondary of i-f transformer T4. Oscillation may be caused by an open circuit condition in C54 and C56.

Table XXVII. Receiver I-F Amplifier No. 2 (see fig. 17).

Reference number	Signal Corps stock number	Name of part and description	Function
C53	Part of T4	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T4 secondary
C54	3DA130-1	CAPACITOR: fixed; 0.13-mf ±20%, 100-vdcw.	Filament bypass
C55	Part of T5	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T5 primary
C56	3DA250-17	CAPACITOR: fixed; 0.25-mf ±20%; 200-vdcw.	B+, r-f bypass, V9
R28	3Z6047	RESISTOR: fixed; carbon, insulated; .470-ohm ±10%; ½-watt.	B+ decoupling, V8
R29	Part of T5	RESISTOR: fixed; carbon; insulated; 470,000-ohm ±10%; ½-watt.	Loading, T5
T4	2C5360A/T3	TRANSFORMER AND SHIELD: 2d i-f; includes C51, C53, and R27.	Interstage coupling
T5	2C5360A/T4	TRANSFORMER AND SHIELD: 3d i-f; includes C55, C57, C58, R29, R30, and R31.	Interstage coupling
V9		TUBE: JAN-1LN5 (VT-179).	Receiver i-f amplifier No. 2



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

TL19067

Figure 17. Schematic wiring diagram, second receiver i-f amplifier stage, Radio Receiver and Transmitter BC-620-(*).

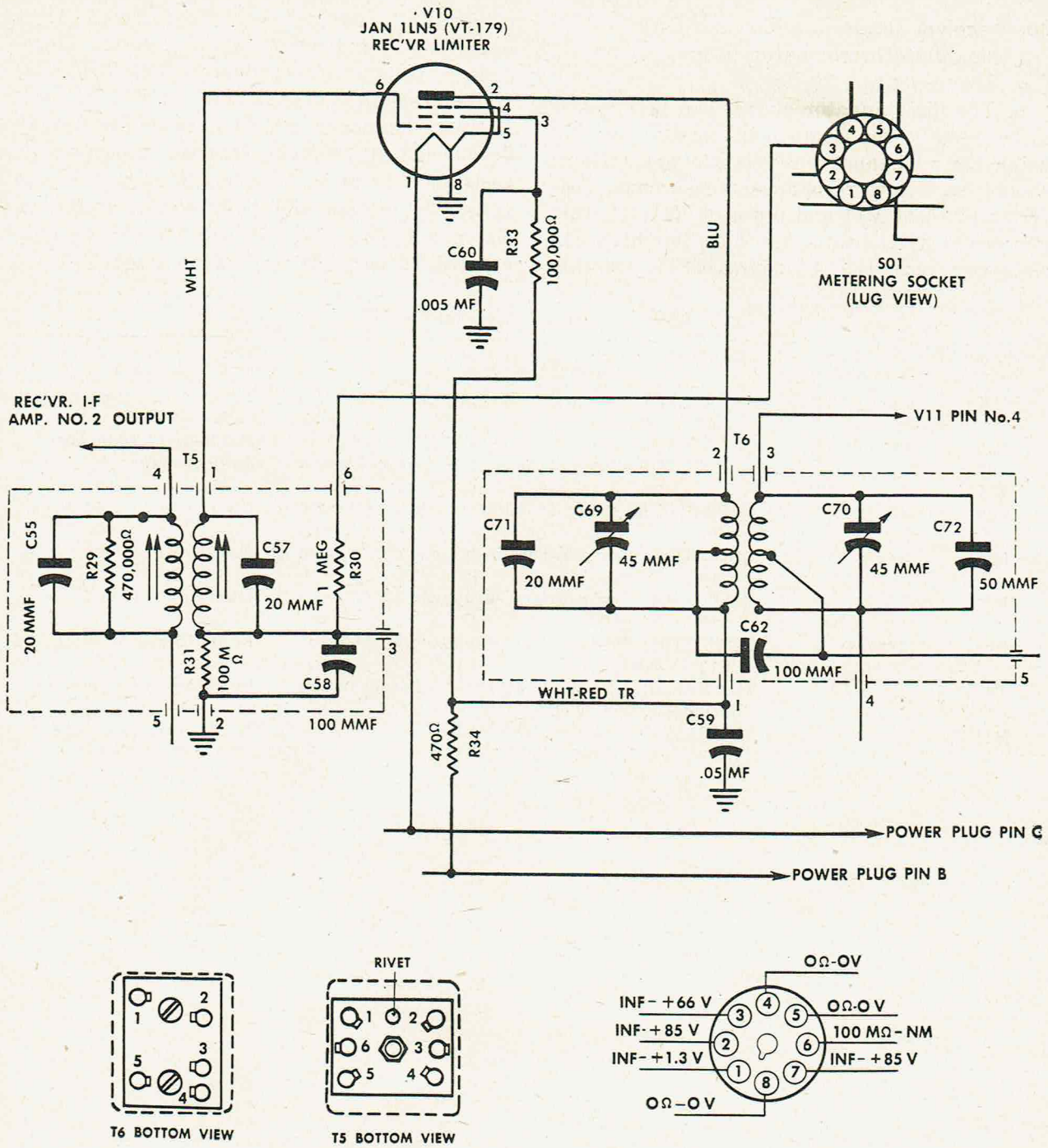
37. Receiver Limiter Stage

a. See paragraph 20.

b. If the voltage measurement on the plate (pin 2) produces no reading, check the primary of T6 and resistor R34 for continuity. If the voltage is measured and found to be low, check C59 for leakage or short. If the screen voltage is absent on pin 3, check R33 for continuity and C60 for short. If the voltage is low, check C60 for leakage or short. A continuity measurement should be made of the secondary of T5 and R31 to ascertain a complete grid circuit. See the resistance chart for proper ohmic value because leakage of C58 will produce an erroneous reading and improper operation of the limiter stage.

Table XXVIII. Receiver limited (fig. 18).

Reference number	Signal Corps stock number	Name of part and description	Function
C57	Part of T5	CAPACITOR: fixed; 20-mmf ±5%.	Padder, T5 secondary
C58	Part of T5	CAPACITOR: fixed; 100-mmf +14%, —6%; 400 vdcw.	Bias resistor bypass, V10
C59	3DA50-43	CAPACITOR: fixed; 0.05-mf ±20%; 600 vdcw.	B+, r-f bypass, V10
C60	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300 vdcw.	Screen grid bypass, V10
C61	Part of T6	CAPACITOR; variable; 28-mmf 60-mmf maximum.	Tuning, T6 primary
C62	Part of T6	CAPACITOR: fixed; 100-mmf ±5%; 300 vdcw.	T6, coupling
R30	Part of T6	RESISTOR: fixed; carbon; insulated; 1-megohm, ±10%; ½-watt.	Isolating, V3, grid metering lead
R31	Part of T5	RESISTOR: fixed; carbon; insulated, 100,000-ohm ±10%; ½-watt.	Grid bias, V10
R32	3Z6047	RESISTOR: fixed; carbon; insulated; 470-ohms ±10%; ½-watt.	B+, decoupling, V9
R33	3Z4550	RESISTOR: fixed; carbon; insulated, 100,000-ohm ±10%; ½-watt.	Screen grid dropping, V10
R34	3Z6047	RESISTOR: fixed; carbon; insulated; 470-ohms ±10%; ½-watt.	B+, decoupling, V10
T5	2C5360A/T4	TRANSFORMER AND SHIELD: 3rd i-f; includes C55, C57, C58, R29, R30, and R31.	Interstage coupling
T6		TRANSFORMER AND SHIELD: discriminator; includes C62, C69, C70, C71, and C72.	Interstage coupling
V10		TUBE: JAN-1LN5 (VT-179).	Receiver limiter



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM – Not measured. NC – Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM – Not measured. NC – Not connected.

TL19068

Figure 18. Schematic wiring diagram, receiver limiter stage, Radio Receiver and Transmitter BC-620-(*).

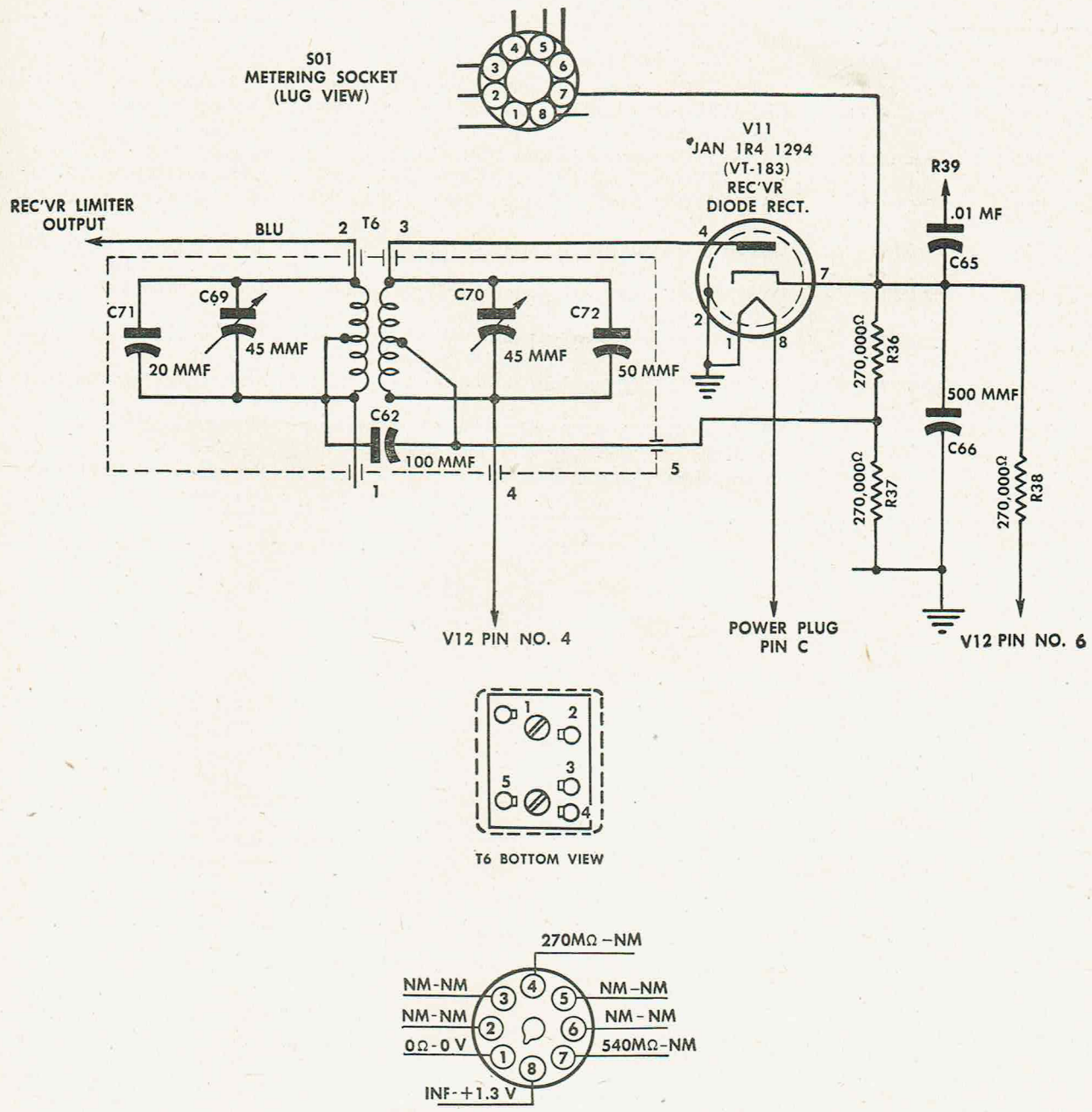
38. Receiver Diode Rectifier and D-C Amplifier (Discriminator) Stage

a. See paragraph 20.

b. The discriminator circuit can be checked more readily for component break-down by using the resistance analysis method. There should be a low resistance measurement between pin 4 of V11 and pin 4 of V12. If this measurement indicates an open or high resistance circuit the secondary of T6, the discriminator transformer, is defective. If a dead short is indicated, C72 is defective. Measure the resistance to ground on pin 7 of V11. If the resistance is high, R37 or R36 is open. If the resistance is low, C66 can be assumed to be shorted or partially shorted. Measure the resistance to ground on pin 6, V13. If the resistance is high, R38 is defective. If the resistance is low, C67 is shorted or partially shorted. Check C65 for open or short.

Table XXIX. Receiver Diode Rectifier (fig. 19).

Reference number	Signal Corps stock number	Name of part and description	Function
C63	Part of T6	CAPACITOR: variable; 28-mmf, minimum; 60-mmf, maximum.	Tuning, T6 secondary
C64	Part of T6	CAPACITOR: fixed; 25-mmf, ±5%.	Padding, T6 secondary
C65		CAPACITOR: fixed; 0.01-mf, ±20%; 300 vdcw.	Audio coupling V11 to V13
C66	3D9500-46	CAPACITOR: fixed; 500-mmf, +14%, —6%; 400 vdcw.	Discriminator load bypass
R36	3Z6727	RESISTOR: fixed; carbon; insulated; 270,000-ohm ±10%; ½-watt.	Discriminator load
R37	3Z6727	RESISTOR: fixed; carbon; insulated; 270,000-ohm ±10%; ½-watt.	Discriminator load
R38	3Z6727	RESISTOR: fixed; carbon; insulated; 270,000-ohm ±10%; ½-watt.	Audio frequency filter V12
T6		TRANSFORMER AND SHIELD: discriminator; includes C62, C69, C70, C71, and C72.	Interstage coupling
V11		TUBE: JAN-1R4/1294 (VT-183).	Receiver diode rectifier



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM – Not measured. NC – Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

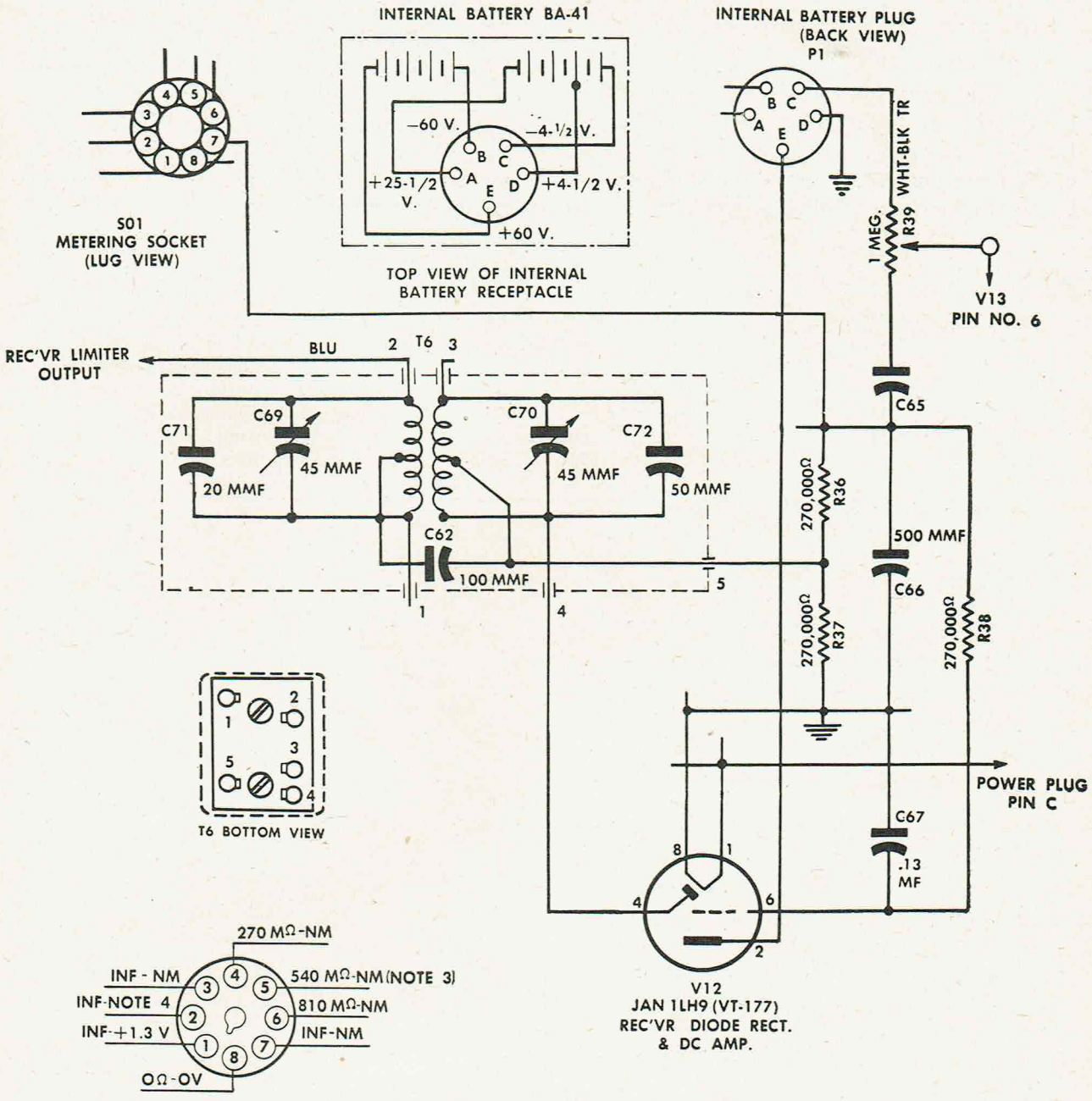
NM – Not measured. NC – Not connected.

TL19069

Figure 19. Schematic wiring diagram, receiver diode rectifier stage, Radio Receiver and Transmitter BC-620-(*).

Table XXX. Receiver Diode Rectifier and d-c amplifier (fig. 20).

Reference number	Signal Corps stock number	Name of part and description	Function
C62	Part of T6	CAPACITOR: fixed; 100-mmf ±5%; 300 vdcw.	T6 coupling
C63	Part of T6	CAPACITOR: variable; 28-mmf minimum; 60-mmf, maximum.	Tuning, T6 secondary
C64	Part of T6	CAPACITOR: fixed; 25-mmf ±5%.	Padding T6 secondary
C65		CAPACITOR: fixed; 0.01 mf ±20%; 300 vdcw.	Audio coupling V11 to V13
C66	3D9500-46	CAPACITOR: fixed; 500-mmf +14%, —6%; 400 vdcw.	Discriminator load bypass
C67	3DA130-1	CAPACITOR: fixed; 0.13-mf ±20%; 100 vdcw.	Audio bypass, V12, control grid
R36	3Z6727	RESISTOR: fixed; carbon; insulated, 270,000-ohm ±10%; ½-watt.	Discriminator load
R37	3Z6727	RESISTOR: fixed; carbon; insulated, 270,000-ohm ±10%; ½-watt.	Discriminator load
R38	3Z6727	RESISTOR: fixed; carbon; insulated, 270,000-ohm ±10%; ½-watt.	Audio-frequency filter V12
T6		TRANSFORMER AND SHIELD: discriminator; includes C62, C69, C70, C71, and C72.	Interstage coupling
V12		TUBE: JAN-1LH4 (VT-177).	Receiver diode rectifier and d-c amplifier



NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

NOTE 4: +58v with zero volts at pin 7 of metering socket.

TL19070

Figure 20. Receiver diode rectifier, d-c amplifier schematic wiring diagram, Radio Receiver and Transmitter BC-620-(*).

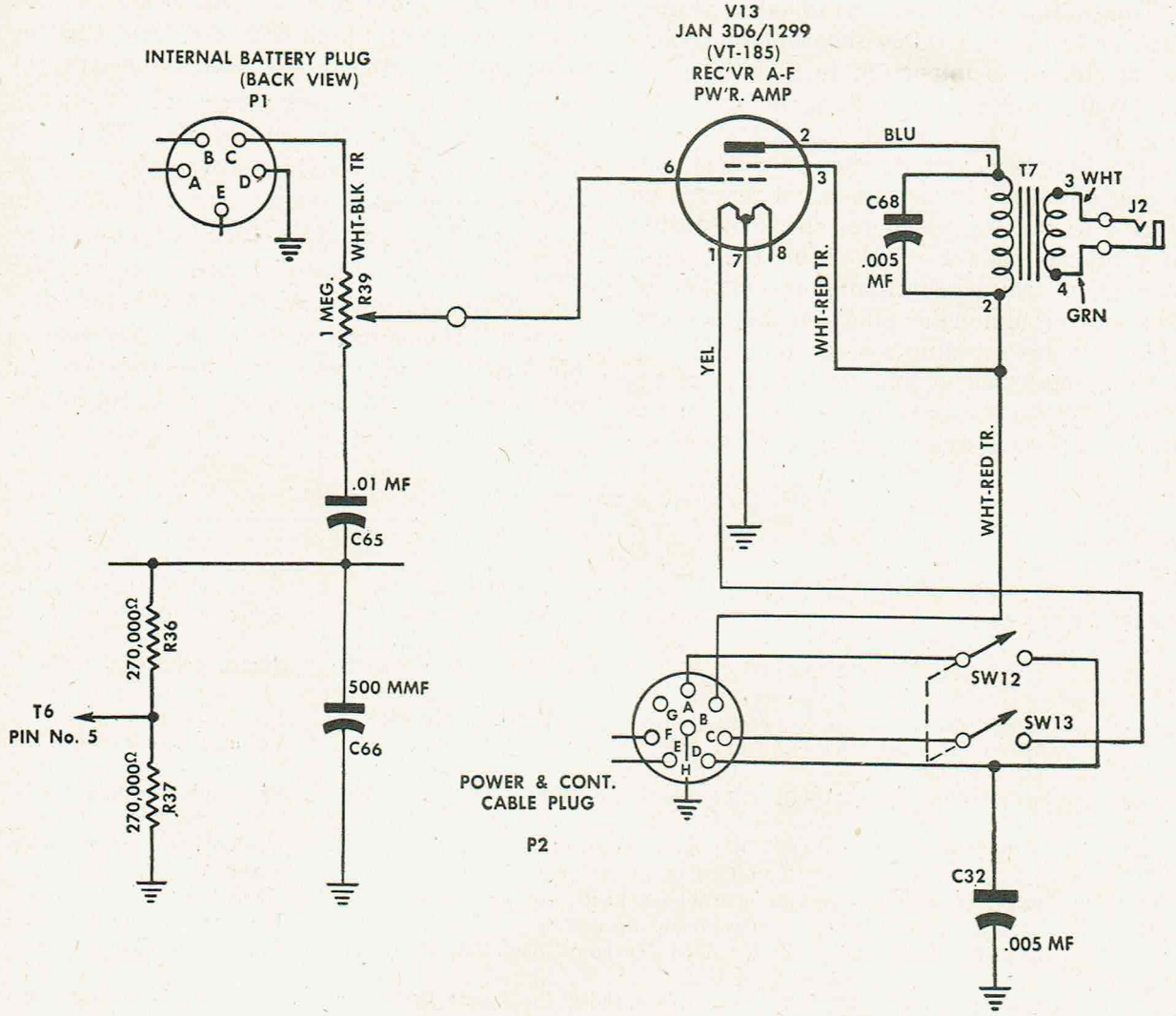
39. Receiver Audio-Frequency Power-Amplifier Stage

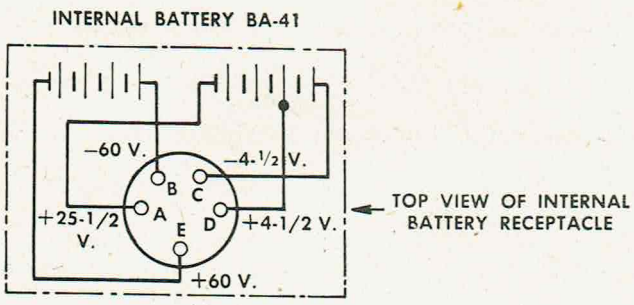
a. See paragraph 20.

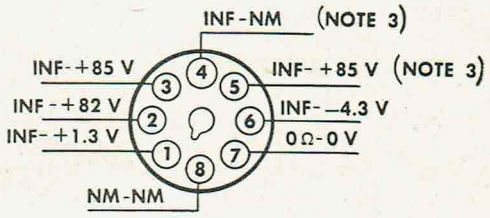
b. If in measuring the plate voltage on pin 2 no voltage is apparent, check primary of T7 for open. If the voltage is low, check primary of T7 for higher resistance circuit. There will be no trouble in obtaining proper screen voltage as measured on pin 3. Check voltage on pin 6. This voltage provides grid bias to the audio-frequency amplifier and is supplied by a 4½-volt battery in the internal battery of the set. Check connection on plug pin C if voltage is not apparent. Also check continuity of R39. If the voltage checks do not indicate correctable trouble, check the secondary of audio transformer T7 for continuity.

Table XXXI. Receiver Power Amplifier (fig. 21).

Reference number	Signal Corps stock number	Name of part and description	Function
C68		CAPACITOR: fixed; 0.005-mmf.	Audio compensation
J2	2Z5570	JACK: phone.	Headphone plug receptacle
P1	2Z7229	PLUG: 5-pin.	Battery BA-41 connector
R39	2Z7262.2	POTENTIOMETER: 1-megohm.	Volume control
T7	2Z9662	TRANSFORMER: output.	Audio output
V13		TUBE: JAN-3B7/1291 (VT-182).	Receiver a-f power amplifier







NOTE 1: Voltages are nominal DC and are measured in receive position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in.

NM — Not measured. NC — Not connected.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

TL19071

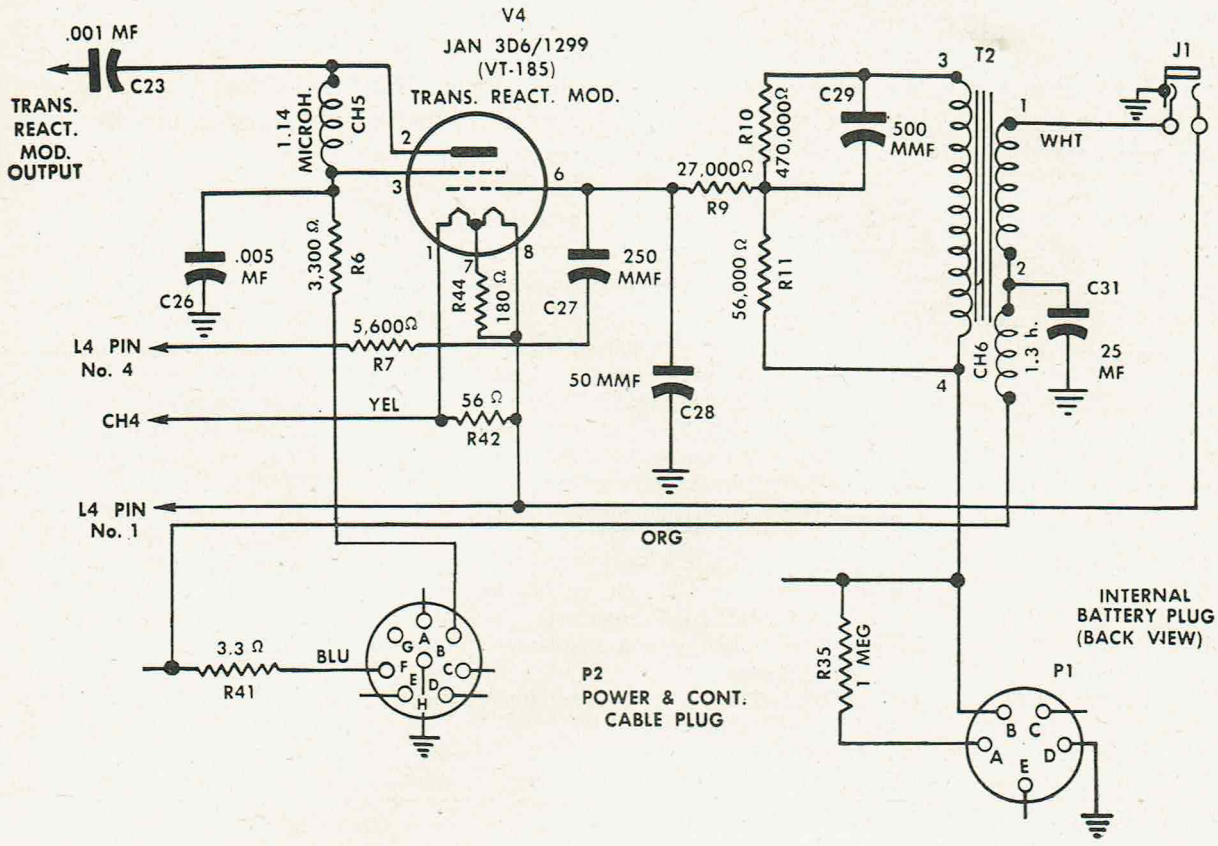
Figure 21. Schematic wiring diagram, receiver audio frequency power-amplifier stage, Radio Receiver and Transmitter BC-620-(*).

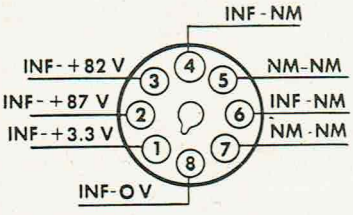
40. Transmitter Reactance Modulator Stage

The first step in trouble shooting the reactance modulator is important to find the presence of audio-frequency voltage on the grid, pin 6, of tube V4. This will verify the operation of microphone transformer T2 and accompanying circuits. If voltage is not present on the grid as mentioned above, check operation and contacts made by jack 1 on the microphone plug. Check continuity of primary of T2 by placing ohmmeter plugs on the jack end of the primary winding and ground. If continuity is measured, it will show as a high resistance. If resistance is low, continuity of the primary is present and capacitor C31 is leaking or is shorted. If trouble is not located at this point in the test, check C29, C27, and C28 for short circuit. Check R9, R10, and R11 for proper value. Recheck the audio-frequency voltage applied to the grid of V4. This is to be done with a low-voltage alternating-current electronic voltmeter. Other circuit troubles can be located by check of the tube voltages. If no plate voltage is present on pin 2, check CH5 and R6 for continuity. Also check C26 for short circuit. The screen voltage as measured on pin 3 will be subject to the same checks as the plate circuit with the exception of the continuity check of CH5.

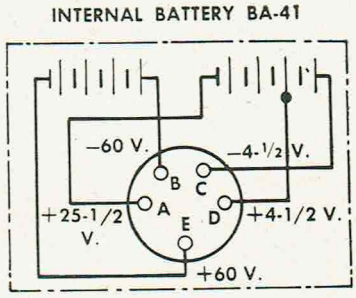
Table XXXII. Transmitter Reactance Modulator (fig. 22).

Reference number	Signal Corps stock number	Name of part and description	Function
C23	3DA1-81	CAPACITOR: fixed; 0.001-mf ±5%; 200-vdcw.	Coupling, V4 to V3
C25	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300-vdcw.	Filament bypass
C26	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300-vdcw.	Screen grid bypass, V4
C27	3D9250-25	CAPACITOR: fixed; 250-mmf ±5%; 300-vdcw.	D-c blocking
C28	3D9050-36	CAPACITOR: fixed; 50-mmf ±5%; 300-vdcw.	Osc-mod phase shift network
C29	3D9500-46	CAPACITOR: fixed; 500-mmf +14%, —6% 400-vdcw.	Pre-emphasis capacitor
C31	3DB25-12	CAPACITOR: electrolytic; 25-mf; 25-vdcw.	Microphone current filter
CH5	3C362-1	CHOKE: r-f; 1.14 μh at 300-kc.	Plate, V4
CH6	3C549	CHOKE: microphone hash; 1.3 μh at 60-cycles.	Hash filter
J1	2Z5572	JACK: microphone, 3-contact.	Microphone plug receptacle
R6	3Z6330-1	RESISTOR: fixed; carbon; insulated; 3,300-ohm ±10%; ½-watt.	B+, decoupling V4
R7	3Z6506-3	RESISTOR: fixed; carbon; insulated; 5,000-ohm ±10%; ½-watt.	Osc-mod phase shift
R8	3Z6010-18	RESISTOR: fixed; wire-wound insulated; 100-ohm ±10%; ½-watt.	Filament equalizing
R9	3Z6627-1	RESISTOR: fixed; carbon; insulated; 27,000-ohm ±10%; ½-watt.	R-f filter, V4 grid
R10	3Z6747-10	RESISTOR: fixed; carbon; insulated; 470,000-ohm ±10%; ½-watt.	Voltage divider, T2
R11	3Z6656-1	RESISTOR: fixed; carbon; insulated; 56,000-ohm ±10%; ½-watt.	Voltage divider, T2
T2	2Z966A	TRANSFORMER: C-66-H.	Microphone input
V4		TUBE: JAN-3D6/1299 (VT-185).	Transmitter reactance modulator





TOP VIEW OF INTERNAL BATTERY RECEPTACLE →



NOTE 1: Voltages are nominal DC and are measured in transmit position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in and push-to-talk switch in "talk" position.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected. TL19072

Figure 22. Transmitter reactance modulator stage, schematic wiring diagram, Radio Receiver and Transmitter BC-620-(*).

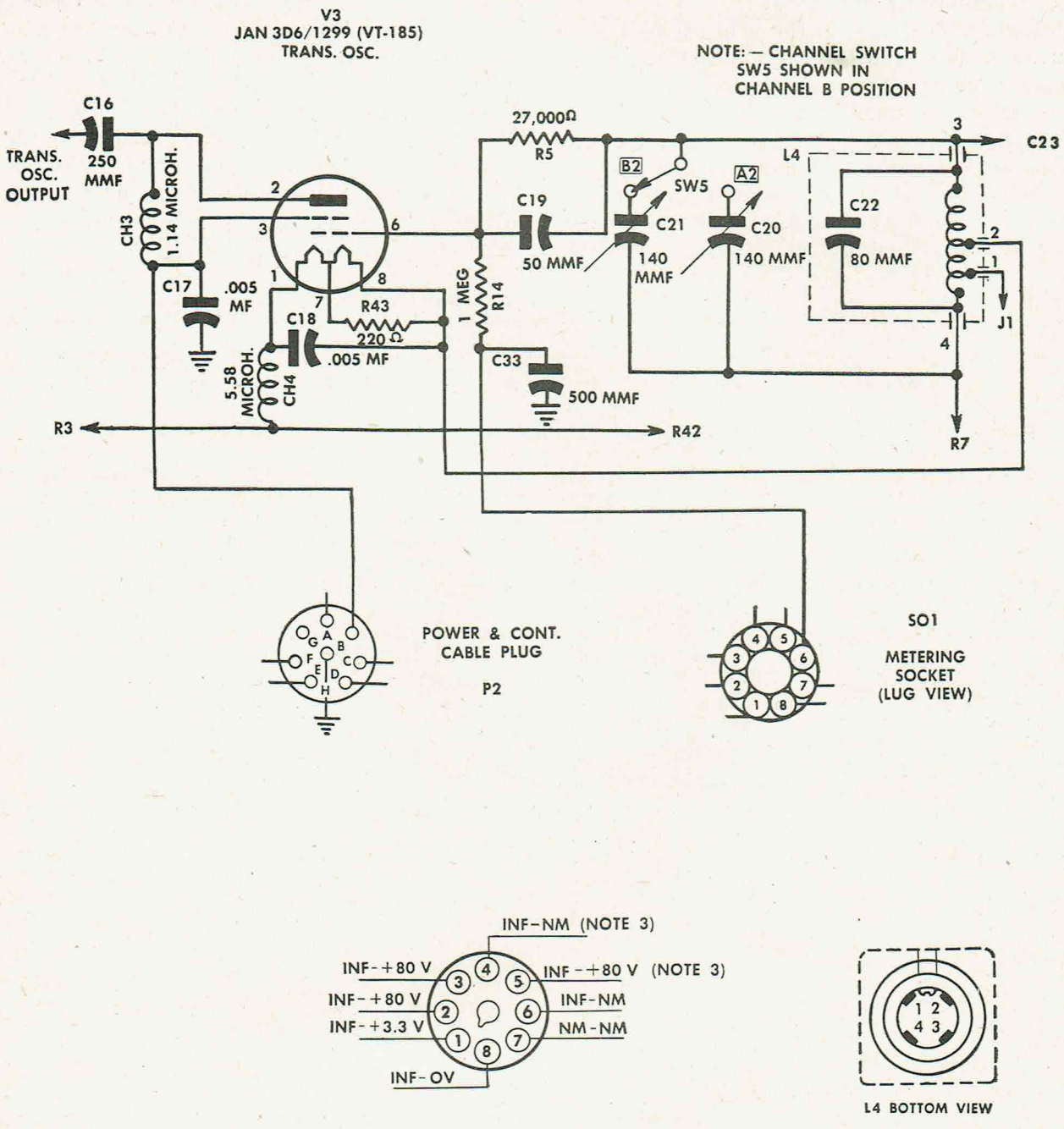
41. Transmitter Oscillator Stage

Measure the voltage on pin 6. If it is positive, check C23 for short. If voltage on pin 6 is not negative, as proper operation would indicate, check R14 for continuity, and check C19 for either short or open. Trouble in these components prevents oscillation. If oscillation is indicated but is weak, check switch operation SW5 and C22 for open or short. Coil L3 should have continuity and resistance value as indicated on table. If no plate voltage is measured on pin 2, check CH3 for continuity. The screen voltage as measured on pin 3 is directly connected to B+.

Table XXXIII. Transmitter Oscillator (fig. 23).

Reference number	Signal Corps stock number	Name of part and description	Function
C16	3D9250-24	CAPACITOR: fixed; 250-mmf +14%, —6%.	Coupling V3 to V2
C17	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%.	Screen grid bypass, V3
C18	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%.	Filament bypass
C19	3D950-35	CAPACITOR: fixed; 50-mmf +14%, —6%.	Grid leak bypass, V3
C20	3D9140V-5	CAPACITOR: variable; 140-mmf, maximum.	Tuning L4, channel A
C21	3D9140V-6	CAPACITOR: variable; 140-mmf, maximum.	Tuning L4, channel B
C22	Part of L4	CAPACITOR: fixed; 80-mmf ±2%.	Padding L4
C33	3D9500-46	CAPACITOR: fixed; 500-mmf +14%, —6%.	R-f bypass, V3, grid metering lead
CH3	3C362-1	CHOKE: r-f; 1.14 mh at 300 kc.	Plate, V3
CH4	3C362-1	CHOKE: low r-f; 1.14 mh at 300 kc.	Plate, V4
L4	2C5360/A7	COIL AND SHIELD: transmitter oscillator.	Oscillator V3, tank coil
R5	3Z6627-1	RESISTOR: fixed; carbon insulated, 27,000-ohm ±10%; ½-watt.	Grid leak, V3
R14	3Z6801-36	RESISTOR: fixed; carbon insulated, 1-megohm ±10%; ½-watt.	Isolating, V3, grid metering lead
SW5	Note	SWITCH: channel changing.	V3 grid
V3		TUBE: JAN-3D6/1299 (VT-185).	Transmitter oscillator

Note. SW5 is part of channel changing switch 3Z9825-24.



NOTE 1: Voltages are nominal DC and are measured in transmit position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in and push-to-talk switch in "talk" position.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Socket terminal used as tie or dummy lug only. No tube element connects to this lug.

TL19073

Figure 23. Schematic wiring diagram, transmitter oscillator stage, Radio Receiver and Transmitter BC-620-(*).

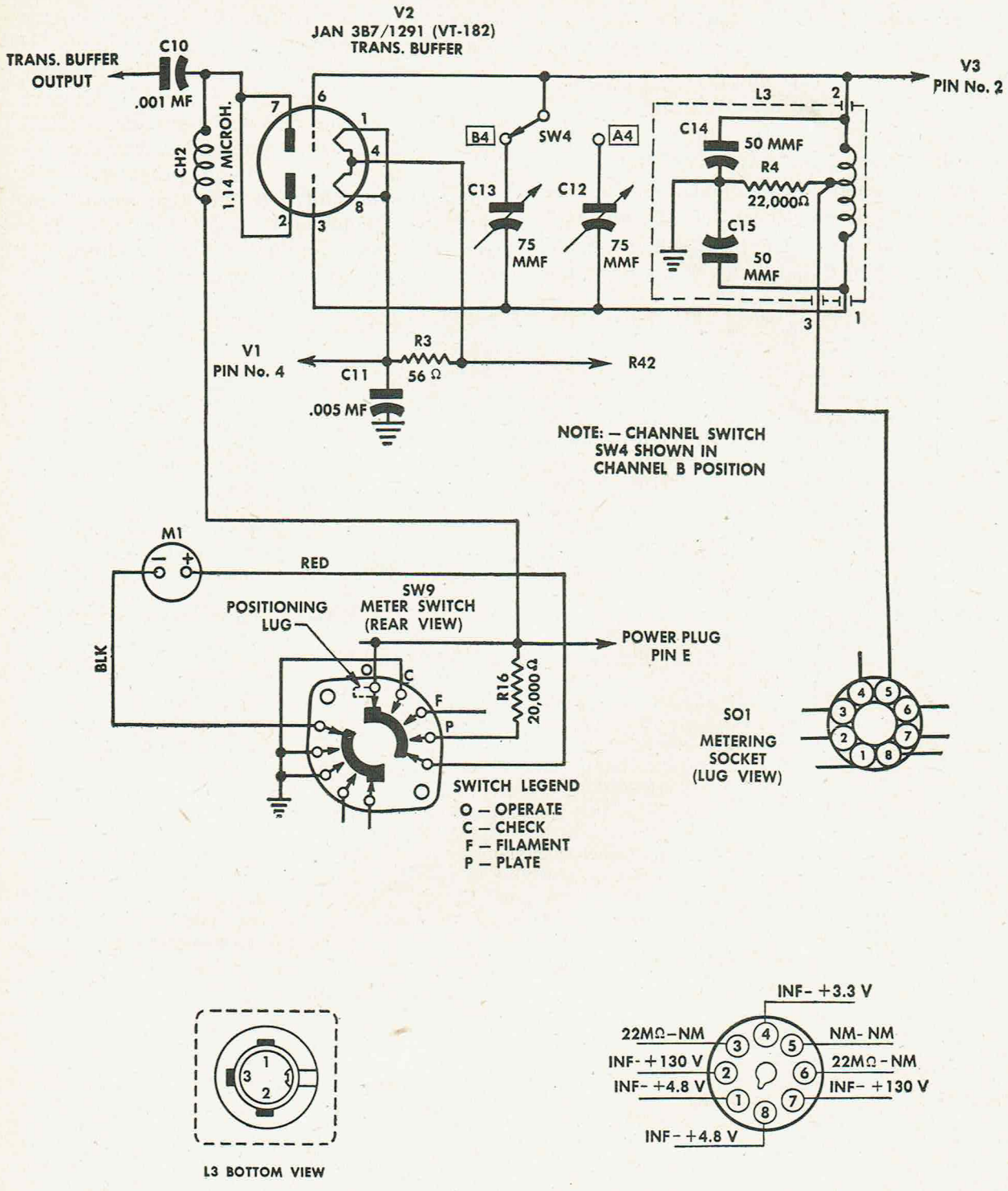
42. Transmitter Buffer Stage

Measure the voltage on the grid of the transmitter buffer (pin 3 or 6). If the voltage is positive, check C16 for short circuit. Measure the voltage of the plate circuit pin 2 or 7. If no voltage is present, check CH2 for continuity. If an electronic a-c voltmeter designed for the measurement of radio frequencies is available, determine whether a-c voltage is present between the plate of the buffer tube and ground. If a-c voltage is present, swing variable capacitor C12 or 13, depending on channel used, to determine the operation of the grid tube circuits. Check C14, C15, C13, and C12 for short if tuning cannot be accomplished. The continuity of coil L4 should be checked also. If grid voltage as measured on pin 3 of the buffer tube or at pin 5 on the metering socket is not of the proper value as indicated on the voltage chart, check R4 for proper value.

Table XXXIV. Transmitter Buffer (fig. 24).

Reference number	Signal Corps stock number	Name of part and description	Function
C10	3DA1-48	CAPACITOR: fixed; 0.001-mf +14%, —6%; 300-vdcw.	Coupling V2 to V1
C11	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300-vdcw.	Filament bypass
C12	3D9075V-1	CAPACITOR: variable; 75-mmf, maximum.	Tuning L3, channel A
C13	3D9075V-2	CAPACITOR: variable; 75-mmf, maximum.	Tuning L3, channel B
C14	Part of L3	CAPACITOR: fixed; 50-mmf ±5%.	Padding L3
C15	Part of L3	CAPACITOR: fixed; 50-mmf ±5%.	Padding L3
CH2	3C362-1	CHOKE: r-f; 1.14 μh at 300-kc.	Plate V2
L3	2C5360A/A6	COIL AND SHIELD: buffer grid; includes C14, C15, and R4.	V2, grid tank coil
R3	3Z6005A-6	RESISTOR: fixed; wire-wound, insulated, 56-ohm ±10%; ½-watt.	Filament equalizing
R4	Part of L3	RESISTOR: fixed; carbon, insulated; 22,000-ohm ±10%; ½-watt.	Grid bias, V2
SW4	Note	SWITCH: channel changing.	V2 grid
V2		TUBE: JAN-3B7/1291 (VT-182).	Transmitter buffer

Note. SW4 is part of channel changing switch 3Z9825-24.



NOTE 1: Voltages are nominal DC and are measured in transmit position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in and push-to-talk switch in "talk" position.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM – Not measured. NC – Not connected.

TL19074

Figure 24. Schematic wiring diagram, transmitter buffer stage, Radio Receiver and Transmitter BC-620-(*).

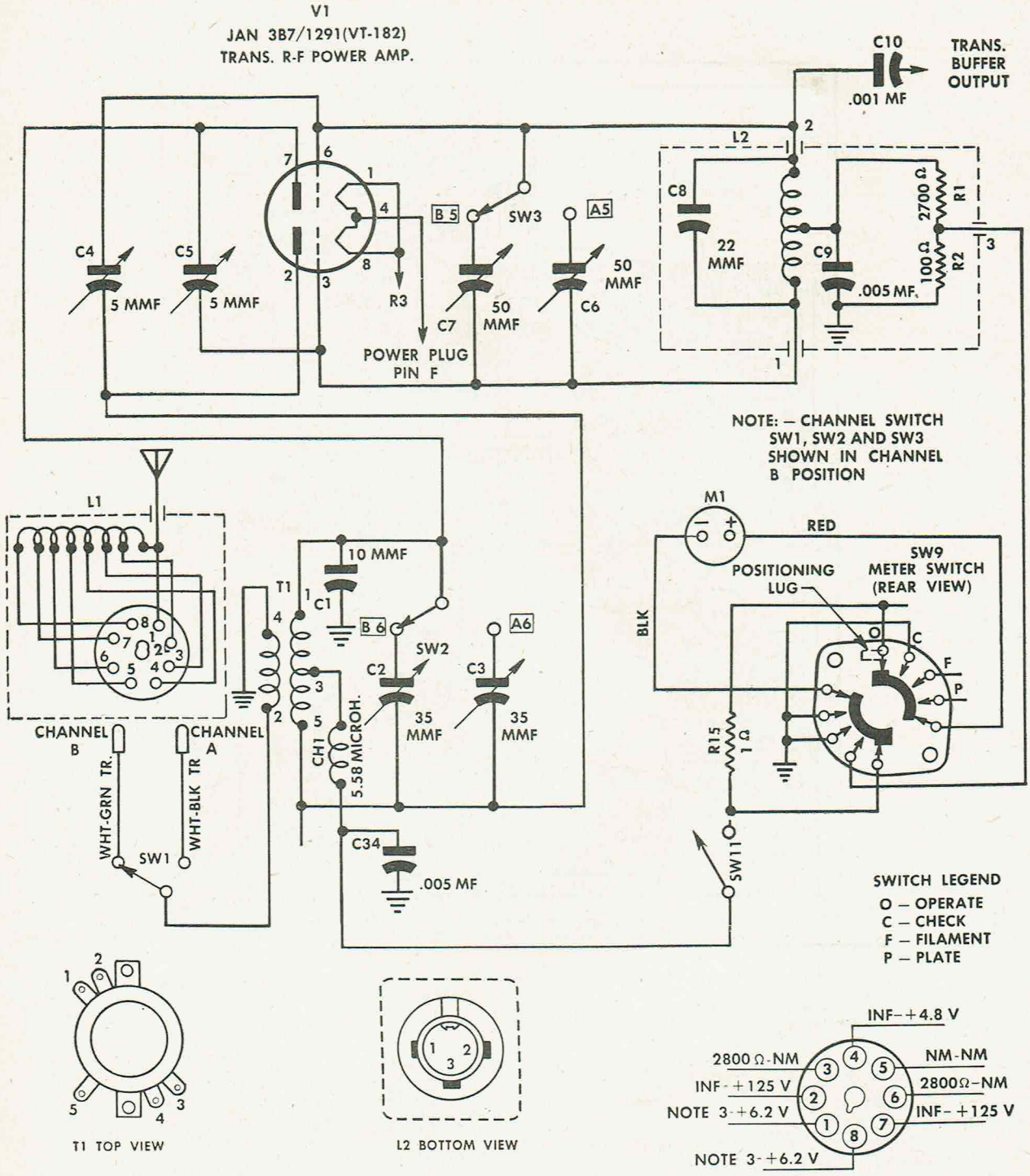
43. Transmitter R-F Power-Amplifier Stage

Determine whether capacitor C4 or C5 is shorted. Measure the voltage on grids of V1 (pins 3 and 6). If voltage is measured and found to be positive, check C10 for short. With the proper operation of the transmitter buffer, the grid voltage should be as indicated on the tube voltage chart. If not, check R1, R2, and C10 for opens and shorts. The plate voltage should be present on pins 2 and 7. If no plate voltage is present, check CH1 and R16 for open circuit conditions. Also check L2 for open circuit. If the antenna terminal has a positive voltage, capacitor C1 is shorted. If the final power amplifier does not draw the proper current, check all tuning capacitors and inductances for trouble. If the r-f voltage supplied to the antenna is unusually low and other circuit constants are normal, check C35 for leakage. This capacitor would produce a loading effect and severely attenuate the output r-f signal.

Table XXXV. Transmitter R-F Power Amplifier (fig. 25).

Reference number	Signal Corps stock number	Name of part and description	Function
C1	3D9010-25	CAPACITOR: fixed; 10-mmf ±10%.	Equalizing, T1
C2	3D9035V-4	CAPACITOR: variable; 35-mmf maximum.	Tuning T1, channel B
C3	3D90035V-2	CAPACITOR: variable; 35-mmf maximum.	Tuning T1, channel A
C4	3D9005V-2	CAPACITOR: variable; 5-mmf maximum.	Neutralizing V1
C5	3D9005V-2	CAPACITOR: variable; 5-mmf maximum.	Neutralizing V1
C6	3D9050V-30	CAPACITOR: variable; 50-mmf maximum.	Tuning L2, channel A
C7	3D9050V-29	CAPACITOR: variable; 50-mmf maximum.	Tuning L2, channel B
C8	Part of L2	CAPACITOR: fixed; 22-mmf ±5%.	Padding L2
C9	Part of L2	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300-volts.	Filament bypass
C10	3DA1-48	CAPACITOR: fixed; 0.001-mf +14%, —6%; 300-volts.	Coupling V2 to V1
C34	3DA5-24	CAPACITOR: fixed; 0.005-mf +80%, —20%; 300-volts.	B+ r-f bypass, V1
CH1	3C362	CHOKE: low; r-f; 5.58 μh at 4 mc.	Plate V1
L1	2C5360A/A4	COIL ASSEMBLY: antenna loading.	Adjustable antenna
L2	2C5360A/A5	COIL ASSEMBLY: power-amplifier grid.	V1, grid tank coil
R1	Part of L2	RESISTOR: fixed; carbon; insulated; 2,700 ohm ±10%; ½-watt.	Grid bias V1
R2	Part of L2	RESISTOR: fixed; carbon; insulated; 100-ohm ±5%; ½-watt.	Meter shunt
SW1	Note	SWITCH: channel changing.	Antenna loading taps
SW2	Note	SWITCH: channel changing.	V1 plate
SW3	Note	SWITCH: channel changing.	V1 grid
T1	2Z9978-7	TRANSFORMER: power-amplifier plate.	Pa plate tank coil and antenna coupling
V1		TUBE: JAN-1R4/1294 (VT-183).	

Note 1. SW1, SW2, and SW3 are part of channel changing switch 3Z9825-24.



NOTE 1: Voltages are nominal DC and are measured in transmit position with a vacuum tube voltmeter between point indicated and chassis. Set connected to PE-97-(*) with fully charged 12v storage battery. Fresh Battery BA-41 installed and tubes in place. VOLUME control full on. Meter switch at OPERATE. Channel switch at A or B. Switches SW-10 and SW-11 at ON. Handset plugged in and push-to-talk switch in "talk" position.

NOTE 2: Resistance values are nominal and are measured between point indicated and chassis. VOLUME control full on. Switches SW-10 and SW-11 at ON. Channel switch at A or B. Meter switch at OPERATE. Handset and power cable disconnected. All tubes and BA-41 removed.

NM — Not measured. NC — Not connected.

NOTE 3: Value depends upon leakage thru C31, should be 1 MEG minimum.

TL19075

Figure 25. Schematic wiring diagram, transmitter r-f power-amplifier stage, Radio Receiver and Transmitter BC-620-(*).

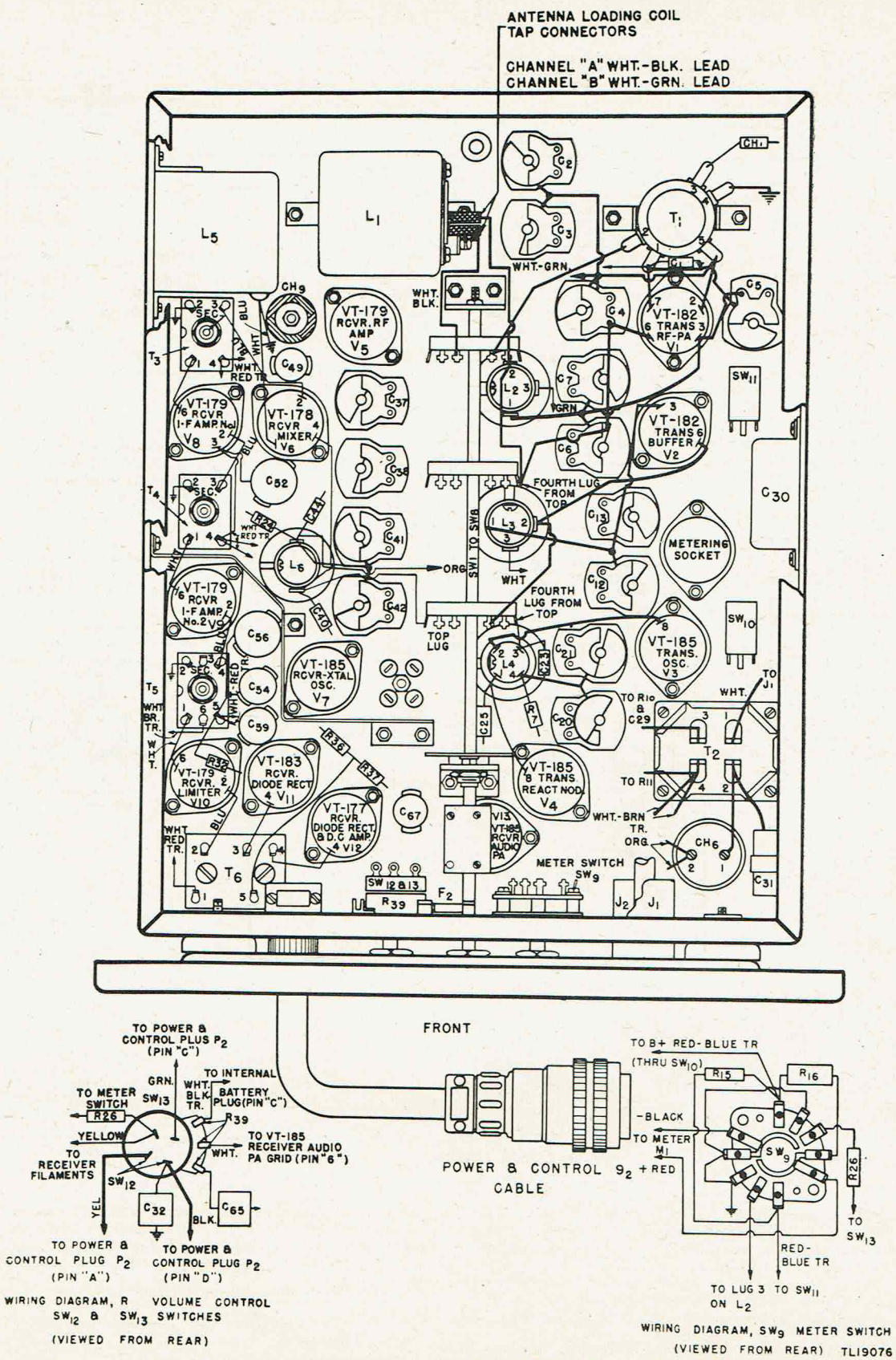


Figure 26. Component parts bottom of chassis, Radio Receiver and Transmitter BC-620-(*).

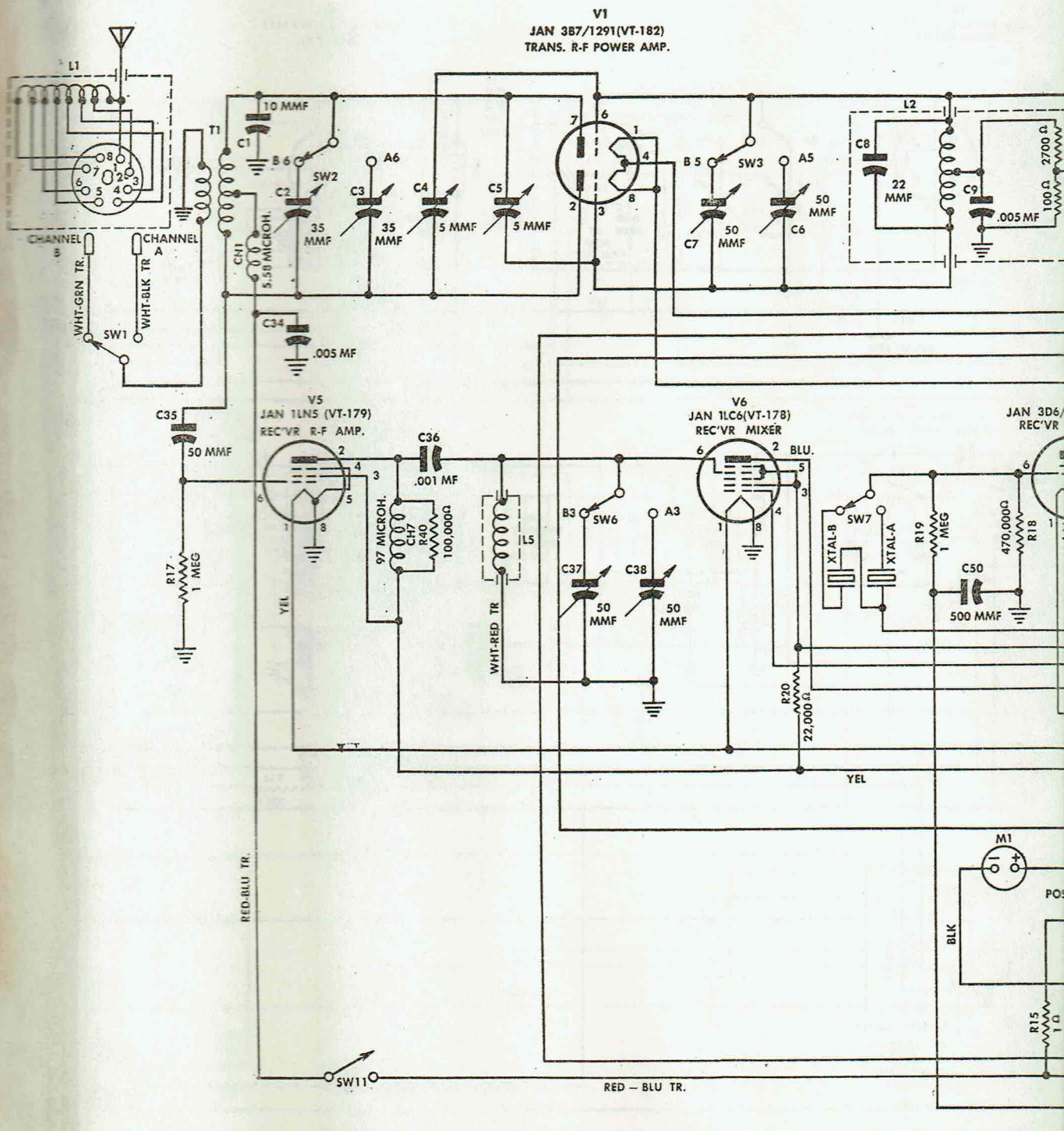
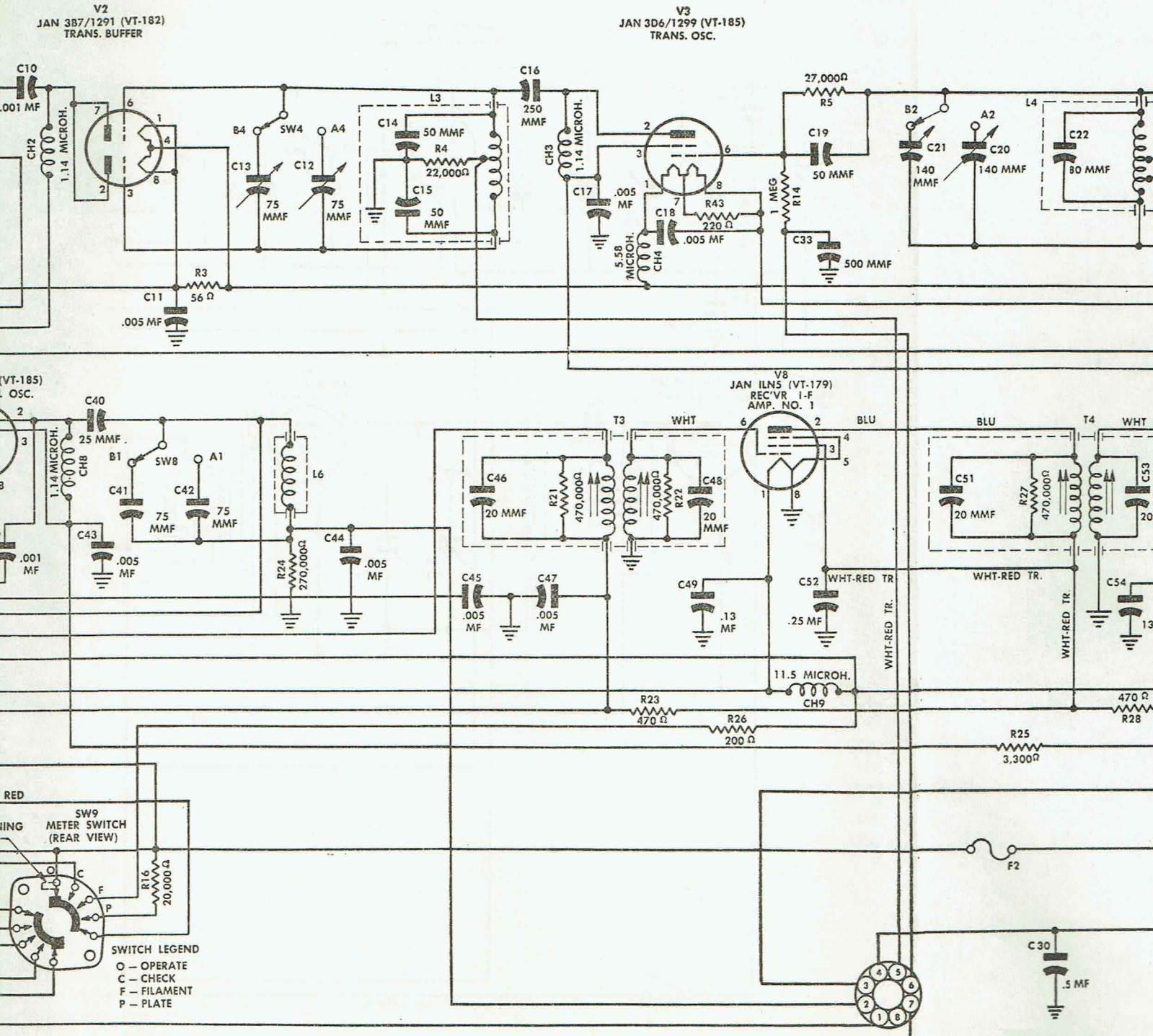
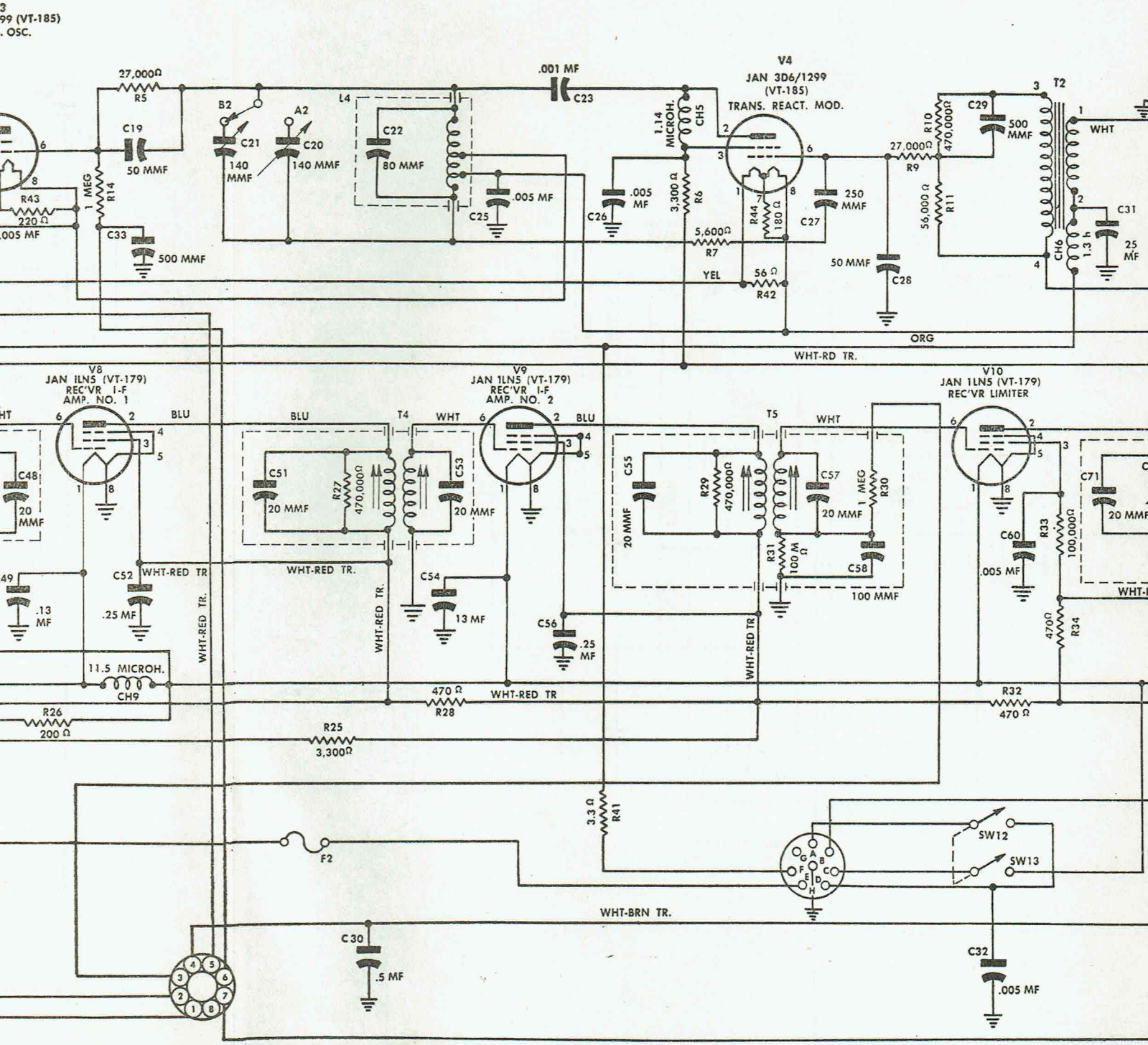


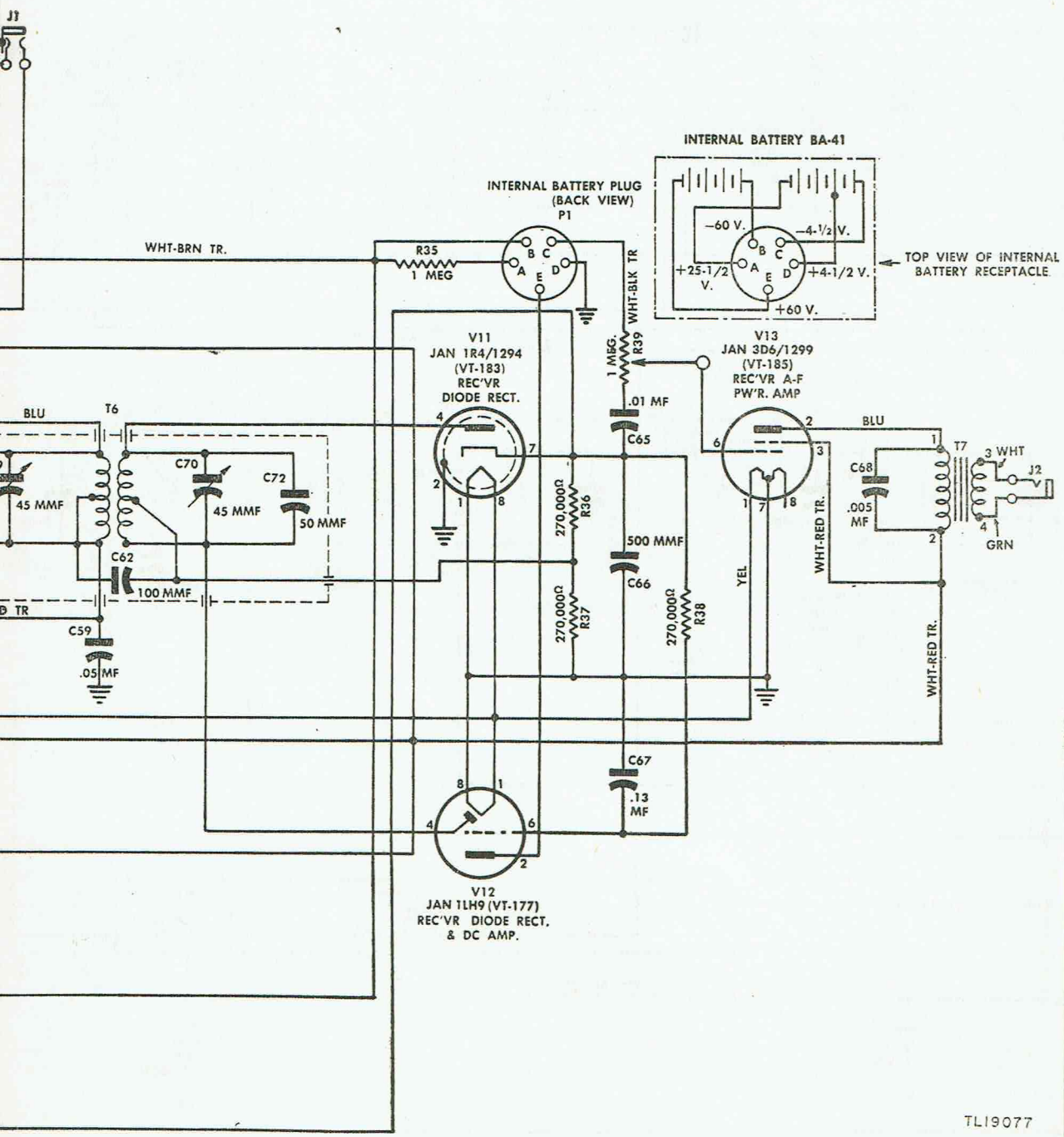
Figure 27. Over-all s



natic wiring diagram, Radio Receiver and Transmitter BC-620-(*). (Sets prior to serial No. 533, Order No. 19917-Phila-43, R43 and R4



to serial No. 533, Order No. 19917-Phila-43, R43 and R44 are not in circuit, R8 (100 r) is used in place of R42, and R12 (22 r) is used


INTERNAL BATTERY BA-41
INTERNAL BATTERY PLUG (BACK VIEW) P1
−60 V.
−4-½ V.
+25-1/2 V.
+4-1/2 V.
+60 V.
TOP VIEW OF INTERNAL BATTERY RECEPTACLE
WHT-BRN TR.
R35 1 MEG
WHT-BLK TR
1 MEG. R39
.01 MF
C65
V11 JAN 1R4/1294 (VT-183) REC'VR DIODE RECT.
V13 JAN 3D6/1299 (VT-185) REC'VR A-F PW'R. AMP
BLU
T6
C70
C72
45 MMF
45 MMF
50 MMF
C62
100 MMF
C59
.05 MF
270,000Ω R36
270,000Ω R37
270,000Ω R38
500 MMF
C66
YEL
WHT-RED TR.
C68
.005 MF
T7
3 WHT
J2
4 GRN
C67
.13 MF
V12 JAN 1LH9 (VT-177) REC'VR DIODE RECT. & DC AMP.
WHT-RED TR.
TL19077

n p'ace of R41.)