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TECHNICAL MANUAL

MAINTENANCE INSTRUCTIONS

for

CONVERTER-BLOWER CV-2455/PRC-47

DEPARTMENT OF THE NAVY

U. S. MARINE CORPS

DEPARTMENT OF THE NAVY
Headquarters, U.S. Marine Corps
Washington, D. C. 20380

9 April 1969

1. This Manual is effective upon receipt and provides installation, operation, troubleshooting, and maintenance instructions and a parts list for the Converter-Blower, CV-2455/PRC-47.

2. Notice of discrepancies and suggested changes to this Manual should be submitted to the Commandant of the Marine Corps (Code CSY).

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

OFFICIAL

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PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Original
ii to viii	Original
1-1 to 1-4	Original
2-1 to 2-4	Original
3-1 to 3-3	Original
4-0 to 4-10	Original
5-1 to 5-18	Original
6-1 to 6-8	Original
	Original

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

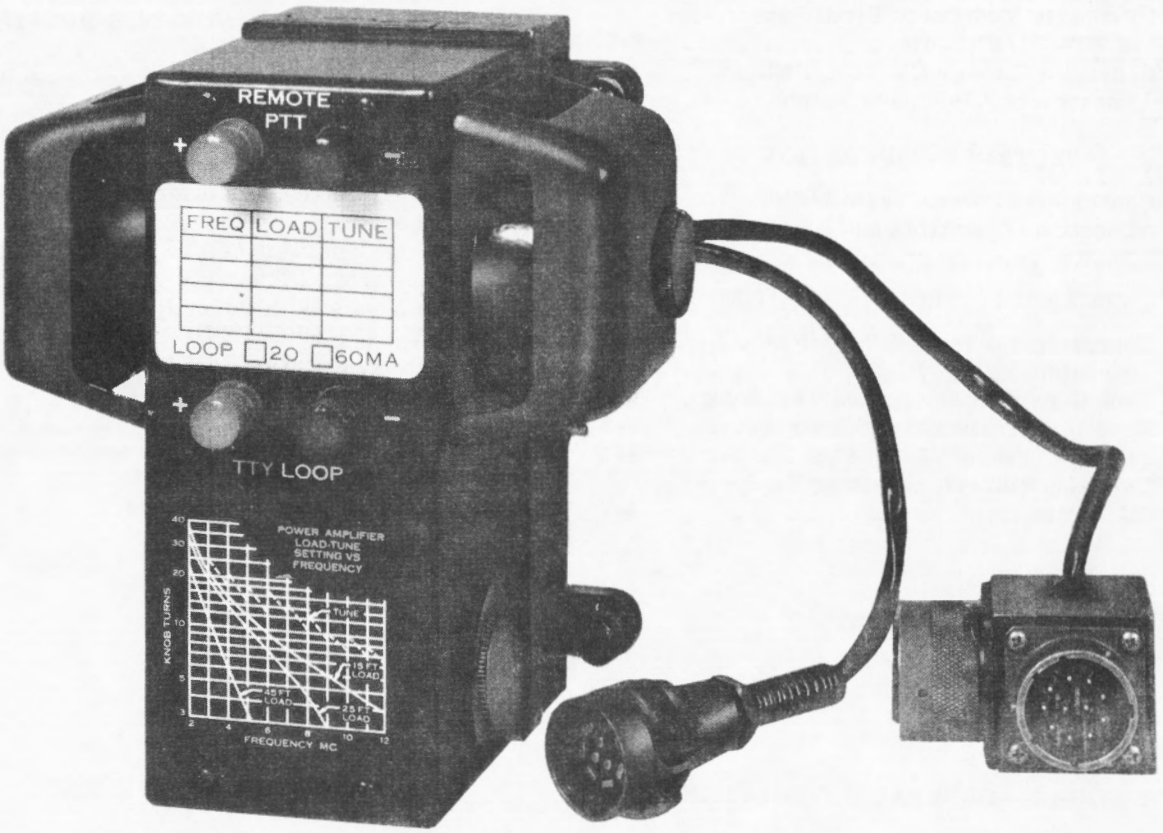

Figure 1-1. Converter-Blower CV-2455/PRC-47

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This technical manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2. GENERAL DESCRIPTION.

Converter-Blower CV-2455/PRC-47 (figure 1-1, referred to as the CV-2455), provides a single channel, half-duplex teletypewriter communication using the single-sideband circuit of Radio Receiver-Transmitter RT-671/PRC-47 (referred to as the RT-671). The CV-2455 is designed for use with the RT-671 only. The CV-2455 contains a blower equipped with an air filter to provide heat dissipation for the RT-671, and thus allow continuous duty transmit operation in either HI or LO power condition. In transmit mode, the CV-2455 converts the binary output of the teletypewriter to one of two audio signal tones for modulating the transmitter. In receive mode, the CV-2455 converts FSK (frequency-shift keying) signals in the audio range to dc binary levels for operation of up to a 100-wpm (word per minute) teletypewriter. A power supply within the CV-2455 provides the TTY LOOP current source. The CV-2455 is installed on the front panel of the RT-671.

1-3. REFERENCE DATA.

Reference data for the CV-2455 is provided in table 1-1.

1-4. EQUIPMENT SUPPLIED.

The CV-2455 is supplied as a single complete unit, including basic chassis, air baffles, and external cables and connectors.

1-5. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The equipment and publications necessary to operate and maintain the CV-2455 are listed in table 1-2.

1-6. FACTORY OR FIELD CHANGES.

Effective the date of this technical manual, no factory or field changes have been made to the CV-2455.

TABLE 1-1. REFERENCE DATA

ITEM	DESCRIPTION
Input power	
Receive	115 volts 400 Hz, 6 watts, or 26.5 volts dc, 4.5 watts. Power is obtained from RT-671.
Transmit	115 volts 400 Hz, 17.5 watts (includes blower power); or 26.5 volts dc, 25.5 watts (includes blower power). Power is obtained from RT-671.
Signal input-audio	
Frequency	Mark 2425 Hz; space 1575 Hz.
Sensitivity	50 mw minimum into 300 ohms.
Frequency accuracy	Input tones within ±50 Hz.
Signal output-audio	
Frequency	Mark 2425 Hz; space 1575 Hz.
Output	0.2 volt rms minimum into 50 ohms.
Frequency accuracy	±15 Hz at temperature extremes.
Signal input-dc binary	
Option 1	60-ma ±10 percent mark, 0-ma space.
Option 2	20-ma ±10 percent mark, 0-ma space.

TABLE 1-1. (Continued)

ITEM	DESCRIPTION
Signal output-dc binary Option 1 Option 2	 60-ma ±10 percent mark, 0-ma space. 20-ma ±10 percent mark, 0-ma space.
Ambient temperature range	-40 to +140 °F (-40 to +60 °C).
Ambient humidity range	95 percent at 140 °F (+60 °C) for 72 hours.
Altitude Operating Nonoperating	 Sea level to 12,000 feet. Sea level to 30,000 feet.
Shock conditions	10 g average and 20 g peak on LAB package tester with unit mounted rigidly to adapter plate.
Vibration	10 to 55 Hz at 5 g or 0.060-inch total excursion, whichever is the limiting value with unit rigidly mounted.
Type of service	Continuous duty.

TABLE 1-2. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Radio Receiver-Transmitter	RT-671/PRC-47	Single-sideband communications facility.	
1	Teletypewriter or Teleprinter	AN/TGG-14A(V)	TTY (teletype) communications facility.	
3	Power supply	Kepco K045-30M	Supplies operating voltages to CV-2455 under test.	Output: 0 to 45 Vdc. Ripple: 20 mV. Regulation: less than 1 percent.
1	Variable transformer	General Radio M10	Supplies variable 400-Hz power to CV-2455 under test.	Output: 0 to 135 Vac variable, single-phase, 400 ±20 Hz.
1	Audio voltmeter	Ballantine 300	Tests CV-2455 audio output.	Voltage range: 100 uV to 300 V. Frequency range: 10 Hz to 6 MHz. Accuracy: 2 percent

TABLE 1-2. (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Vtvm	Hewlett-Packard 410B	Tests CV-2455 TTY loop.	Ac range: 1 to 300 volts. Frequency: 20 Hz to 700 MHz. Input impedance: 10 megohms at 1.5 pF. Dc range: 1 to 1000 volts. Input resistance: 122 megohms. Ohmmeter range: 0.2 ohm to 500 megohms. Accuracy: 3 percent.
1	Multimeter	Triplett 630	Tests CV-2455 loop current. Use dc voltage measurement procedure.	
1	Audio oscillator	Hewlett-Packard 200AB	Used to excite CV-2455 for test purposes.	Frequency range: 20 Hz to 40 kHz. Accuracy: 2 percent Output: 1 watt or 24.5 volts into a 600-ohm load.
1	Frequency counter	Hewlett-Packard 5245	Tests CV-2455 input and output frequencies.	Frequency range: 0 to 50 MHz. Accuracy: ±1 count. Sensitivity: 100 mV rms. Input impedance: 100 kV.
1	Oscilloscope	Tektronix 545B	Tests CV-2455 audio output.	Frequency range: dc to 33 MHz. Calibrated sweep range: 0.1 microsecond/cm to 5 seconds/cm.
1	Preamplifier	Tektronix Type B	Used in conjunction with oscilloscope to check CV-2455 audio output.	Deflection factor: 50 mV/cm to 20 V/cm. Bandwidth: dc to 20 MHz. Rise time: 18 nanoseconds.
1	Ammeter		Checks CV-2455 TTY LOOP current.	Range: 0 to 100 ma.
1	Dummy load	Bird Model 82	Dummy load for RT-671.	Input impedance: 50 ohms. Power: 100 watts.
1	Dummy antenna	P/o AN/PRA-4 kit	Used with dummy load for RT-671/PRC-47.	Simulated 15-foot whip antenna.
1	Junction box	To be fabricated. Refer to paragraph 5-2a(4).	Provides input power and test equipment connections to CV-2455.	

TABLE 1-2. (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	EQUIPMENT CHARACTERISTICS
	NAME	DESIGNATION		
1	Resistor		Used in test circuits.	220 ohms, 2 watts.
1	Cable	CX-8393/PRC-47.	Supplies ac power to RT-671 and CV-2455.	
1	Cable	CX-8394/PRC-47.	Supplies dc power to RT-671 and CV-2455.	
2	Switch		Used in test circuits.	Spst.
1	Instruction book for Radio Receiver-Transmitter RT-671/PRC-47	TM 03817A-35/2		
1	Instruction book for Teletypewriter AN/TGG-14A(V)			

SECTION 2

INSTALLATION

2-1. POWER REQUIREMENTS.

All electrical power requirements for the CV-2455 are provided by the RT-671.

2-2. INSTALLATION REQUIREMENTS.

Outline and mounting dimensions for the CV-2455 are shown in figure 2-1. The CV-2455 is mounted to the front panel of the RT-671 as shown in figure 2-2. Install CV-2455 on RT-671 front panel as follows:

a. Remove eight flathead screws from two metal cover plates located near center of RT-671 front panel. Remove two plates and associated gaskets.

Note

Do not remove the power amplifier tube heat sink exposed by removal of bottom cover plate and gasket.

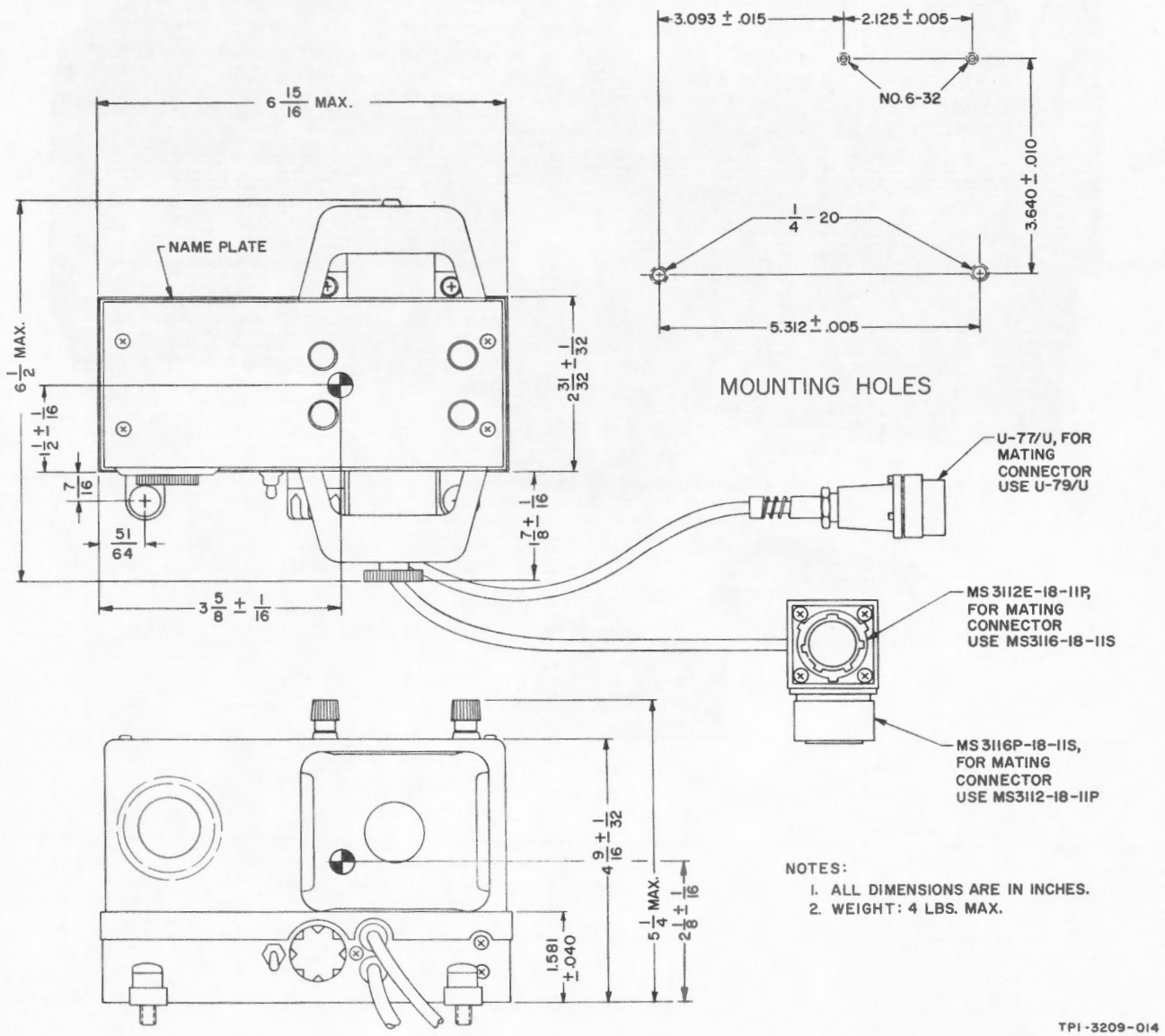

Figure 2-1. Converter-Blower CV-2455/PRC-47, Outline and Mounting Dimensions

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Figure 2-2. Converter-Blower CV-2455/PRC-47, Properly Mounted to Front Panel of RT-671/PRC-47

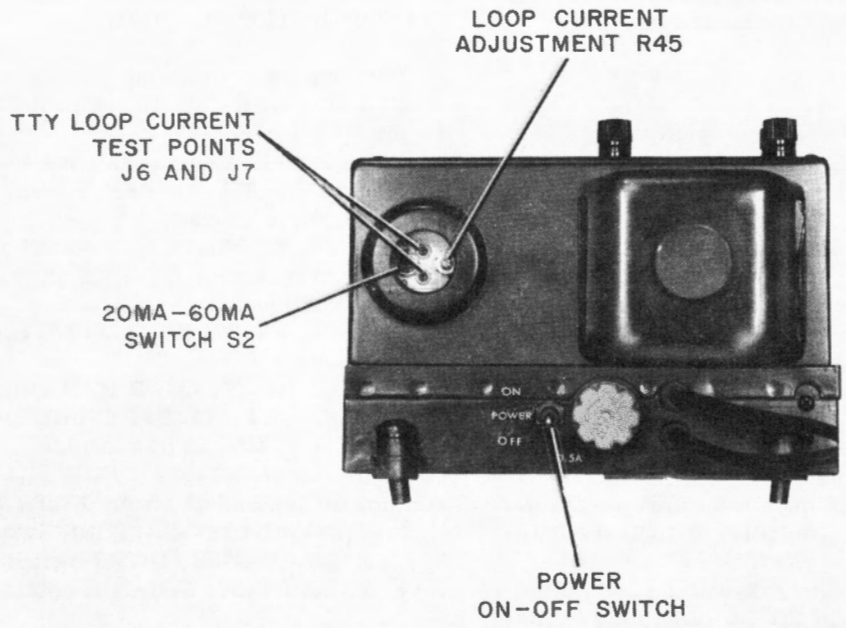


Figure 2-3. Converter/Blower CV-2455/PRC-47, Location of Adjustment Points

b. Obtain four 6-32 x 3/8 panhead screws from CV-2455 loose equipment bag to secure power amplifier tube heat sink to bottom hole on RT-671 front panel.

c. Store two metal plates, gaskets, and eight flathead screws in CV-2455 loose equipment bag for future use.

d. Place CV-2455 over RT-671 front panel openings aligning four captive mounting screws on CV-2455 with tapped holes in RT-671 front panel.

e. Secure CV-2455 to RT-671 front panel by tightening four captive mounting screws.

Note

Screwdriver access to the captive mounting screws is possible through the air intake manifolds on either side of the CV-2455.

f. Connect audio cable connector P2 of CV-2455 to AUDIO connector P2 or P3 on RT-671 front panel.

g. Remove existing power cable from RT-671 POWER connector P1. Connect CV-2455 power cable adapter connector P1 to RT-671 POWER connector P1.

h. Connect power cable removed in step g to connector J1 on CV-2455 power cable adapter.

i. Connect two teletypewriter wires to TTY LOOP binding posts on CV-2455, observing correct polarity (positive to positive and negative to negative).

Note

If remote teletypewriter lines are to be used, they may be up to 1 mile in length (2-mile loop) of number 20 AWG wire. Resistance of loop shall be less than 110 ohms.

j. If remote ptt operation is used, connect two remote switch wires to REMOTE PTT binding posts on CV-2455.

Note

Remote leads may be up to 1 mile in length (2-mile loop) of number 20 AWG wire. Resistance of loop shall be less than 110 ohms.

2-3. INSPECTION AND ADJUSTMENT.

Perform inspection and adjustment procedure as follows (see figure 2-3).

Note

Prior to performing the following procedure, ensure RT-671 is set up for receive mode of operation only.

a. Set RT-671 POWER switch to ON.
b. Set CV-2455 POWER switch to ON.
c. Unscrew and remove access plug on right-hand side of CV-2455. The following is exposed:
(1) Switch S2; selects 20- or 60-ma loop current operation.
(2) Potentiometer R45; adjusts loop current to proper value.
(3) Test points J6 and J7; used to measure loop current by dc voltage measurement procedure.
d. Set switch S2 to correct position (either 20 or 60 ma) for teletypewriter used.
e. Connect dc voltmeter to test points, and observe correct polarity (J6 negative and J7 positive).
f. Set dc voltmeter controls to indicate 0 to 2.5 volts dc.
g. Adjust R45 to obtain 0.2-volt dc indication on dc voltmeter with S2 in 20-ma position or 0.6-volt dc indication with S2 in 60-ma position.

Note

Loop current also may be properly adjusted by connecting an ammeter in series with TTY loop. This method is outlined below.

h. Remove TTY wire connection at +TTY LOOP binding post on CV-2455.
i. Connect + terminal on ammeter to +TTY LOOP binding post on CV-2455.
j. Connect TTY wire removed in step h to - terminal on ammeter.
k. Adjust R45 to obtain correct value of loop current as indicated on ammeter (20 or 60 ma, depending on setting of S2).
l. Set CV-2455 POWER switch to OFF.
m. Set RT-671 POWER switch to OFF.
n. Mark appropriate square (20 or 60 ma) on CV-2455 cover to indicate settings of loop current switch S2 and loop current potentiometer R45 for future reference.

2-4. OPERATIONAL CHECKS.

Perform the operational checks as follows:
a. Perform adjustment procedures as outlined in paragraph 2-3.
b. Connect dummy antenna to ANTENNA connector on RT-671; connect dummy load to 50-ohm jack on dummy antenna.
c. Set RT-671 POWER switch to ON.
d. Ensure that CV-2455 POWER switch is set to OFF position.
e. Set RT-671 KILOCYCLE controls to any desired frequency.
f. Set RT-671 XMTR PWR switch to LO.
g. Set RT-671 OPR/TUNE switch to TUNE. Blower in CV-2455 shall energize.
h. Adjust RT-671 TUNE and LOAD controls for maximum indication on XMTR OUTPUT meter.
i. Set RT-671 OPR/TUNE switch to OPR.
j. Set CV-2455 POWER switch to ON.
k. Set RT-671 VOLUME control full CW.

Note

If excessive chattering of the teletypewriter occurs (random noise pickup by RT-671), reduce the VOLUME control setting to two-thirds full CW setting.

l. Set RT-671 VOICE/CW-FSK switch to CW-FSK, or actuate remote ptt switch.
m. Refer to teletypewriter instruction book for teletypewriter operating procedures.
n. Operate teletypewriter key board with personnel at another receiving station monitoring transmission. Receiving personnel shall indicate satisfactory transmission.
o. Set RT-671 VOICE/CW-FSK switch to VOICE or release remote ptt switch. Have personnel at another receiving station send teletypewriter signals. Observe correct operation of teletypewriter when signals are being received.

SECTION 3

OPERATION

3-1. FUNCTIONAL OPERATION.

The functional operation of the CV-2455 is described in paragraph 1-2, general description.

3-2. OPERATING PROCEDURES.

The following paragraphs describe the controls and operation of the CV-2455.

a. DESCRIPTION OF CONTROL AND HOOKUP POINTS. - The CV-2455 controls and hookup points are shown in figure 3-1, and their functions are listed in table 3-1.

b. LOCAL OPERATION. - Prepare CV-2455 for local operation as follows:

(1) Ensure that RT-671 is terminated with correct antenna, and CV-2455 is properly mounted on RT-671 front panel and connected to teletypewriter.

TABLE 3-1. FUNCTION OF CONTROLS AND HOOKUP POINTS

CONTROL	FUNCTION
POWER ON-OFF switch	2-position toggle switch that controls power to transmit and receive frequency shift keying (FSK) circuits. See figure 2-3.
20ma/60ma switch S2	2-position toggle switch that selects loop current mode for requirements of teletypewriter being used. This switch is located beneath cover access plug. See figure 2-3.
Potentiometer R45	Loop current adjustment associated with 20MA-60MA toggle switch. Adjusts teletypewriter loop current flow for 20 or 60 ma and is located beneath cover access plug. See figure 2-3.
TTY LOOP binding post terminals	Allows for easy hookup of teletypewriter loop wires to CV-2455. Connects input/output of the teletypewriter being used to the CV-2455.
REMOTE PTT binding post terminals	Allows for easy hookup of remote ptt (push-to-talk) switch. When closed, places RT-671 in transmit mode.
Loop current test points	Permits determination of amount of loop current flow using dc voltage measurement. These test points are located beneath the cover access plug. See figure 2-3.

(2) Set RT-671 POWER switch to ON.

(3) Set CV-2455 POWER switch to ON.

(4) Set RT-671 KILOCYCLE controls to desired frequency.

(5) Set RT-671 XMTR-PWR switch to either LO or HI as desired, and set VOLUME control within two-thirds of fully CW. Refer to paragraph 2-4.

(6) Set RT-671 OPR/TUNE switch to TUNE, and adjust TUNE and LOAD controls for maximum indication on XMTR OUTPUT meter.

(7) Set RT-671 OPR/TUNE switch to OPR.

(8) Refer to teletypewriter instruction book for teletypewriter operating procedures.

Note

Equipment is now ready to transmit and/or receive FSK signals.

(9) To transmit, set RT-671 VOICE/CW-FSK switch to CW-FSK, and operate teletypewriter keyboard.

(10) To receive, set RT-671 VOICE/CW-FSK switch to VOICE, and observe operation of teletypewriter when FSK signals are being received.

Note

The CV-2455 blower allows continuous duty transmit operation of the RT-671 and runs only when high voltage is applied to the RT-671 transmitting circuits.

c. REMOTE OPERATION. - Remote operation of CV-2455 is as outlined in step b with this exception: teletypewriter and REMOTE PTT switch (SPST) are operated at remote station 1-mile limit from RT-671 and CV-2455). Telephone cable MX-306A/G (WD-1/TT or equivalent) is used to connect REMOTE PTT switch and teletypewriter to CV-2455. Teletypewriter loop current shall be adjusted after telephone cable is installed in loop. To transmit, close REMOTE PTT switch, and operate teletypewriter keyboard. To receive, open REMOTE PTT switch, and observe operation of teletypewriter when receiving FSK signals.

3-3. OPERATOR'S MAINTENANCE.

The operator, in addition to performing the maintenance procedure outlined in paragraph 2-3, must clean the air filter element weekly if operating under normal conditions. If operation is under adverse atmospheric conditions, the air filter element must be cleaned daily.

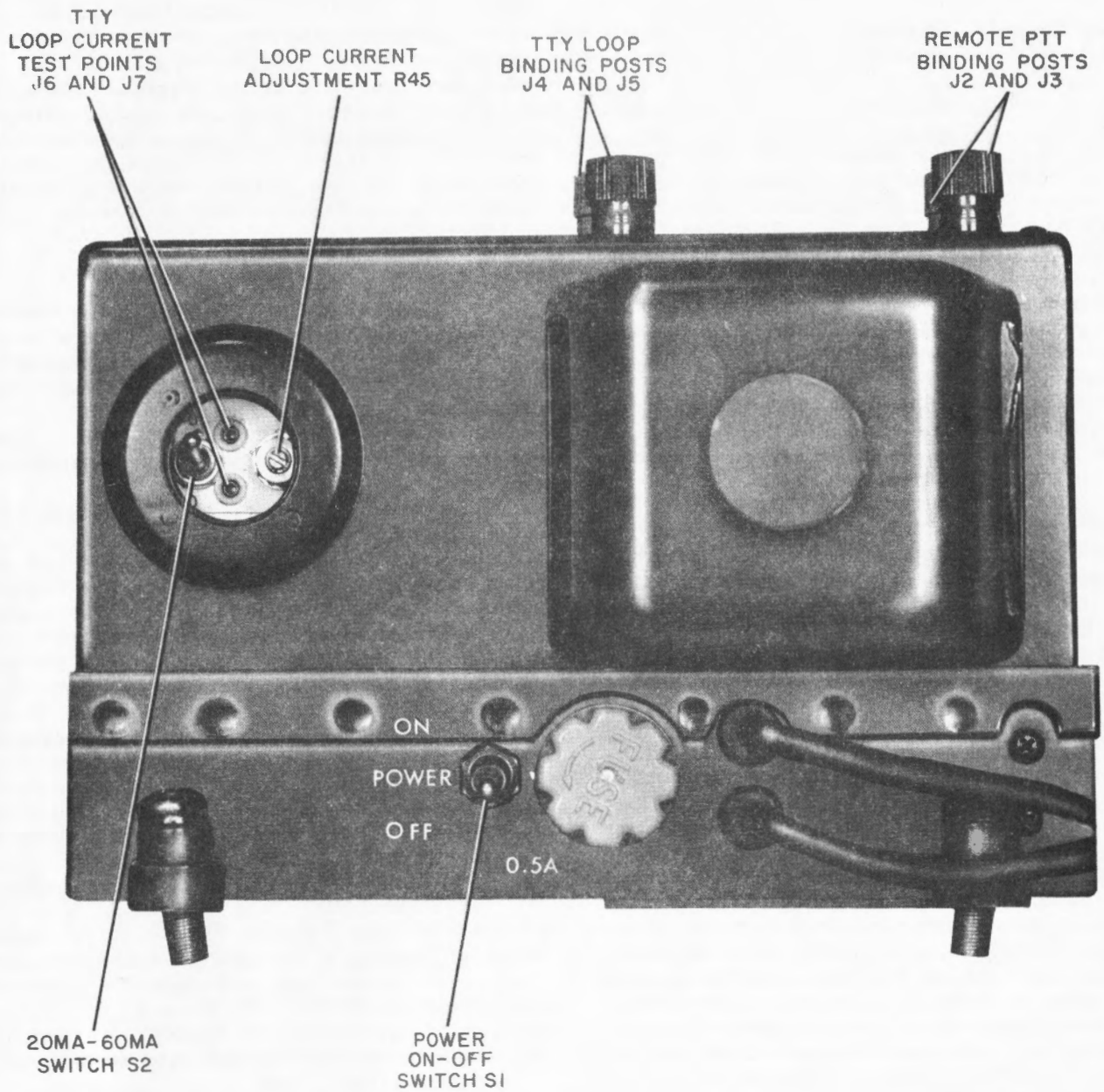


Figure 3-1. Converter-Blower CV-2455/PRC-47, Location of Controls and Hookup Points

SECTION 4

TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING.

When adequate historical data is not available, troubleshooting procedures should be based on the following logical steps for the CV-2455.

a. SYMPTOM RECOGNITION. - This is the first step in troubleshooting procedure and is based on a complete knowledge and understanding of equipment operating characteristics. All equipment troubles are not the direct result of component failure. Therefore, a trouble in an equipment is not always easy to recognize since all conditions of less than peak performance are not always apparent. This type of equipment trouble is usually discovered while performing preventive maintenance procedures. It is important that the not-so-apparent troubles, as well as apparent troubles, be recognized.

b. SYMPTOM ELABORATION. - After an equipment trouble has been recognized, all the available aids designed into the equipment should be used to elaborate further on the original trouble symptom.

c. LISTING PROBABLE FAULTY FUNCTION. - The next step in logical troubleshooting is to formulate a number of logical choices as to cause and location (functional section) of the trouble. Logical choices are decisions based on knowledge of the equipment operation, a full identification of the trouble symptom, and information contained in this manual. The overall functional description and its associated block diagram should be referred to when selecting possible faulty functional sections.

d. LOCALIZING THE FAULTY FUNCTION. - For the greatest efficiency in localizing the trouble, functional sections which have been selected by the logical choice method should be tested in the order that will require the least time. Determine which section to test first. Selection should be based on the validity of the logical choice and the difficulties in making the necessary tests. If tests do not prove the functional section to be at fault, the next selection should be tested, and so on until the faulty functional section is located. As an aid in this process, this manual contains a functional description and a servicing block diagram. Waveforms (or other pertinent indications) are included at significant checkpoints on the servicing block diagram to aid in isolating the faulty section.

e. LOCALIZING TROUBLE TO THE CIRCUIT. After the faulty functional section has been isolated, it is often necessary to make additional logical choices as to which group of circuits or circuit (within the functional section) is at fault. The servicing block diagram provides signal flow and test location information needed to bracket and then isolate the faulty circuit. Functional descriptions and pertinent test data for individual circuits or groups of circuits comprising the functional section are provided in one area of the manual. Information which is too lengthy in nature to be included in this arrangement is referenced from the test data portion of the troubleshooting information.

f. FAILURE ANALYSIS. - After the trouble (faulty component, misalignment, etc) has been located, but prior to performing corrective action, the procedures followed up to this point should be reviewed to determine why the fault affected the equipment in the manner it did. This review is usually necessary to make certain that the fault discovered is actually the cause of the malfunction, and not a result of the malfunction.

4-2. OVERALL FUNCTIONAL DESCRIPTION.

The CV-2455 is composed of five circuits mounted on three circuit boards and a blower mounted on the chassis. Figure 4-1 is an overall block diagram of the CV-2455 and illustrates the overall relationship of the circuit boards and input and output signals.

a. POWER CONNECTOR ADAPTER. - The power connector adapter supplies all necessary power for operation of the CV-2455.

b. POWER. - In ac mode of operation, 115-volt, 400-Hz power is converted to +24-volt dc power by chassis-mounted stepdown transformer T3 and the power supply mounted on TB2. The +24 volts supplies power for the teletypewriter loop current source. In dc mode of operation, +24-volt dc input power bypasses the ac to dc power supply and directly provides the teletypewriter loop current source. The +24-volt dc power is regulated to +15-volt dc power for operation of the CV-2455. Relay K1 controls the 115-volt ac, 400-Hz input power for blower operation and applies the output of the +15-volt dc regulator to the discriminator in the receive mode and to the tone generator in the transmit mode. The output of the +15-volt dc regulator is applied to the dc amplifier at all times, regardless of mode of operation.

c. AUDIO CONNECTOR. - An audio connector, extending from the CV-2455, connects RT-671 audio output to the input of the CV-2455 audio amplifier. This audio connector also connects the CV-2455 tone generator output (2425 or 1575 Hz) to RT-671 microphone input circuit. CV-2455 REMOTE PTT binding posts are connected directly through the audio connector to the RT-671 ptt switch.

d. TTY LOOP. - The TTY LOOP binding posts are connected to the last stage of the dc amplifier and to +24.0 volts dc at the power supply. Resistor R45 provides adjustment for teletypewriter loop current.

e. POWER CONTROL CIRCUIT. - The power control circuit mounted on TB2 controls operation of transmit-receive control relay K1. Transmit-receive control relay K1 controls operation of the blower, tone generator, and discriminator.

f. AUDIO AMPLIFIER. - In receive mode, the audio amplifier amplifies the audio input signal from

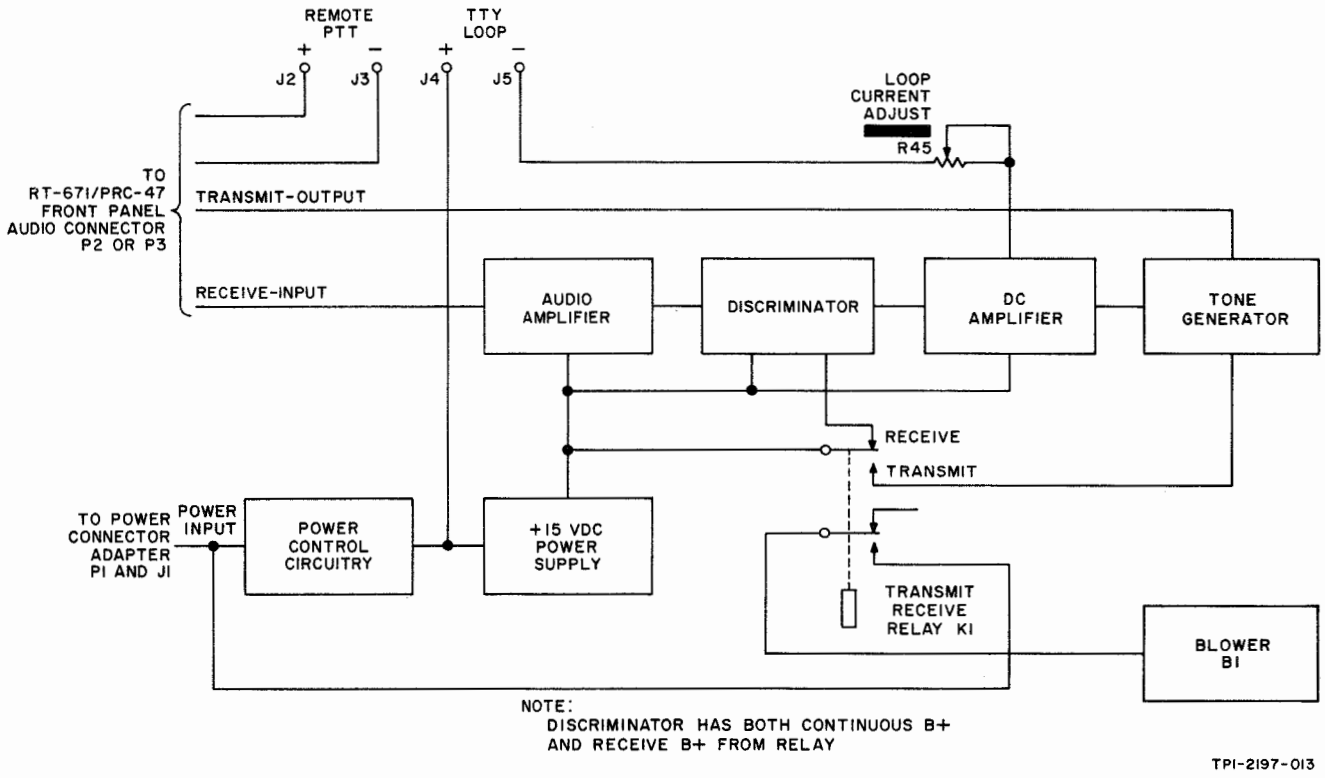


Figure 4-1. Converter-Blower CV-2455/PRC-47, Functional Block Diagram

the RT-671 (either 1575 or 2425 Hz) and feeds the amplified audio signal to the discriminator.

g. DISCRIMINATOR. - The discriminator provides a positive output when a 1575-Hz signal is received from the audio amplifier and a negative output when a 2425-Hz signal is received from the audio amplifier. Discriminator positive and negative output signals are fed to the dc amplifier in receive mode.

h. DC AMPLIFIER. - The dc amplifier provides two output signals: a mark signal when the discriminator output signal is negative, and a space signal when the discriminator output signal is positive. These two signals are fed to the teletypewriter. A mark signal consists of a 60- or 20-ma loop current flow, and a space signal consists of 0-ma loop current flow.

i. TONE GENERATOR. - The tone generator provides two audio frequency tones used to modulate RT-671 in transmit mode. The teletypewriter keyboard controls the two audio frequency outputs of the tone generator. When the teletypewriter closes the loop current circuit, the tone generator modulates RT-671 with a 2425-Hz audio tone. When the loop current circuit is open, the tone generator modulates RT-671 with a 1575-Hz audio tone.

4-3. FUNCTIONAL SECTION DESCRIPTION.

a. OVERALL FUNCTIONAL SECTION DESCRIPTION. - The overall functional section description of the CV-2455 is given in paragraph 4-2.

b. OVERALL FUNCTIONAL SECTION TEST DATA. - The overall functional section performance of the CV-2455 is checked by performing the procedures outlined in paragraph 4-3b(2).

(1) TEST EQUIPMENT REQUIRED. - Test equipment required to check the overall section performance of the CV-2455 is listed in table 1-2.

(2) OVERALL FUNCTIONAL SECTION PERFORMANCE TEST. - Perform the overall functional section performance test as follows:

Note

If any results specified in the following procedure are not attained, see the CV-2455 servicing block diagram, figure 4-5. Troubleshoot faulty circuit and correct trouble before proceeding.

(a) Install CV-2455 on RT-671 front panel as outlined in paragraph 2-2.

(b) Connect equipment as shown in figure 4-2 using 22- to 28-volt dc variable power supply and dc power cable CX-8394/PRC-47.

(c) Set all external test equipment power switches to on.

1. Adjust 22- to 28- volt dc variable power supply for 24 volts dc.

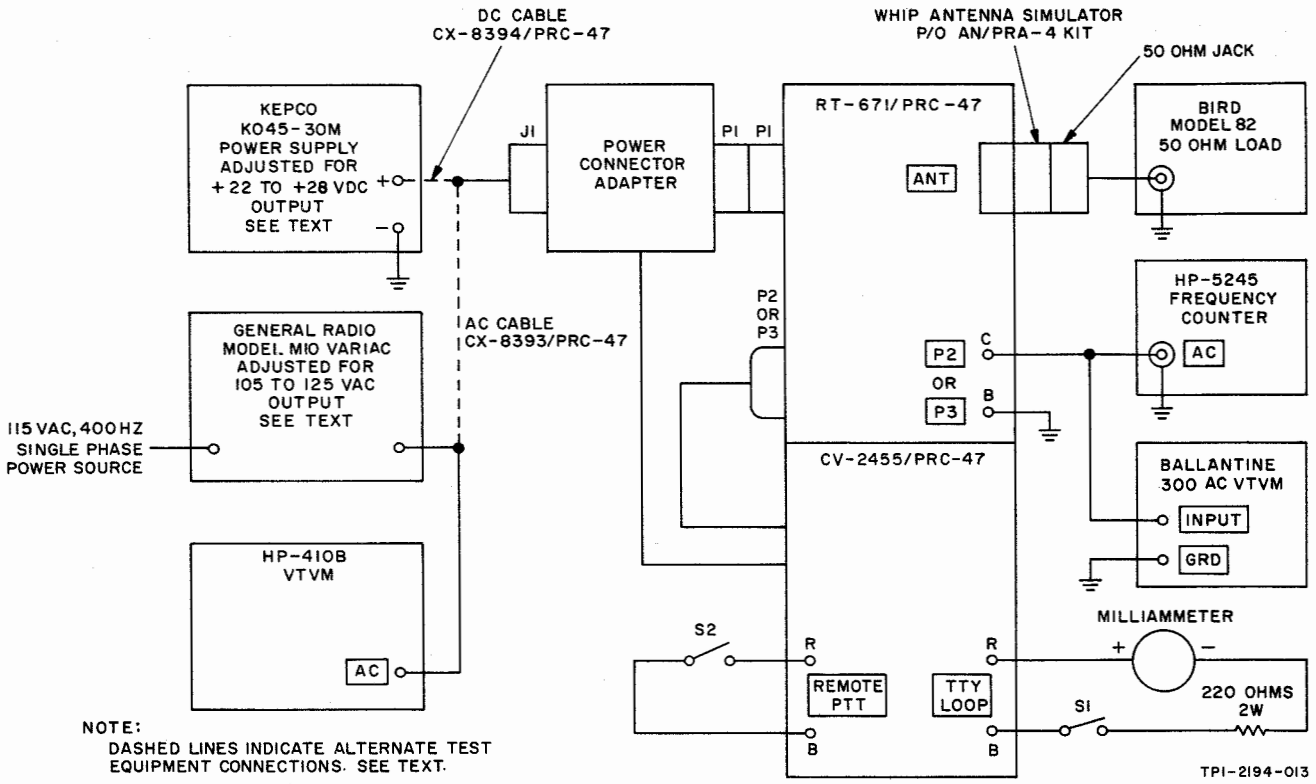


Figure 4-2. Tone Generator Operation, Test Setup

2. Set RT-671 OPR/TUNE switch to OPR.

3. Set RT-671 XMTR PWR switch to LO.

4. Set RT-671 KILOCYCLES knobs to desired frequency.

5. Preset RT-671 TUNE knob and LOAD knob to the indicated number of turns shown in POWER AMPLIFIER LOAD-TUNE VS FREQUENCY chart on the CV-2455 cover.

6. Set CV-2455 POWER switch to OFF.

7. Set RT-671 PWR switch to ON, and allow a normal warmup period.

8. Set RT-671 OPR/TUNE switch to TUNE, and adjust TUNE and LOAD controls for maximum indication on XMTR OUTPUT meter.

9. Blower motor shall operate. Set RT-671 OPR/TUNE switch to OPR. Blower motor shall stop.

10. Adjust 22- to 28-Volt dc variable power supply to 22 volts dc, and repeat steps 8 and 9 above. Results shall be same.

11. Disconnect dc power cable from power connector adapter, and connect ac power cable CX-8693/PRC-47 to power connector adapter. Adjust variac for 105 volts, and repeat steps 8 and 9 above. Results shall be same.

12. Adjust Variac for 125 Volts, and repeat steps 8 and 9 above. Results shall be same.

13. Reconnect variable 22- to 28-Volt dc power supply to power connector adapter using dc power cable.

14. Adjust variable 22- to 28-Volt dc power supply for 24.0 volts dc.

15. Set CV-2455 POWER switch to ON.

16. Close external switch S2 connected to CV-2455 REMOTE PTT binding post terminals. This shall key the RT-671 to transmit mode, and CV-2455 blower motor shall operate.

17. Set external switch S2 to open position.

18. Remove access plug on CV-2455 (figure 2-3) to gain access to loop current adjusting potentiometer R45, and 20MA-60MA loop current switch S2.

19. Place 20MA-60MA switch S2 in the 60MA position. Close external switches S1 and S2, and adjust loop current potentiometer R45 for 60-ma loop current as indicated on 0- to 100-milliampere meter.

20. Open external switch S1 (S2 remains closed). Frequency counter shall indicate 1575 ±15 Hz, and audio voltmeter shall indicate between 0.2 and 0.6 volt ac.

21. Close external switches S1 and S2. Frequency counter shall indicate 2425 ±15 Hz, and audio voltmeter shall indicate between 0.2 and 0.6 volt ac.

22. Set 20MA-60MA loop current switch S2 to the 20MA position. With external switches S1 and S2 in closed position, adjust loop current potentiometer R45 for 20-ma loop current as indicated on 0- to 100-milliampere meter.

23. With external switches S1 and S2 closed, frequency counter shall indicate 2425 ±15 Hz, and audio voltmeter shall indicate between 0.2 and 0.6 volt ac.

24. Open external switch S1 (S2 remains closed). Frequency counter shall indicate 1575 ±15 Hz, and audio voltmeter shall indicate between 0.2 and 0.6 volt ac.

25. Disconnect dc power cable from power adapter, and reconnect ac power cable. Adjust Variac for 115 vac. Repeat steps 23 and 24. Results shall be the same.

26. Close external switches S1 and S2. Use multimeter to measure voltage across J6 and J7 test points in access hole. Voltage shall be 0.2 volt ±10 percent with 20-ma loop current flow. Both meter leads shall be isolated from ground.

27. Set RT-671 PWR switch to OFF, and CV-2455 POWER switch to OFF.

28. Connect equipment as shown in figure 4-3, and connect dc power cable to power connector adapter. Set all test equipment power switches to ON. Adjust variable dc power supply for 24-volt dc output.

29. Set CV-2455 POWER switch to ON, and RT-671 PWR switch to ON.

30. Adjust audio oscillator for 1575 Hz at 4 volts. Monitor frequency with frequency counter. Loop current as indicated on the 0- to 100-milliampere meter shall be zero.

31. Increase frequency of audio oscillator above 1575 Hz until 0- to 100-milliampere meter indicates loop current. Note frequency at which loop current occurs. Lower frequency of audio oscillator below 1575 Hz until 0- to 100-milliampere meter again indicates loop current. Bandwidth between frequency noted in first case and present frequency of audio oscillator is space bandwidth and shall be not less than 285 Hz.

32. Disconnect dc power cable from power connector adapter. Connect ac power cable to power connector adapter. Adjust Variac for 115 volts ac, and repeat step 31 above. Space bandwidth shall be not less than 285 Hz.

33. Set CV-2455 POWER switch to OFF and RT-671 PWR switch to OFF.

34. Connect equipment as shown in figure 4-4.

35. Set all external test equipment power switches to ON.

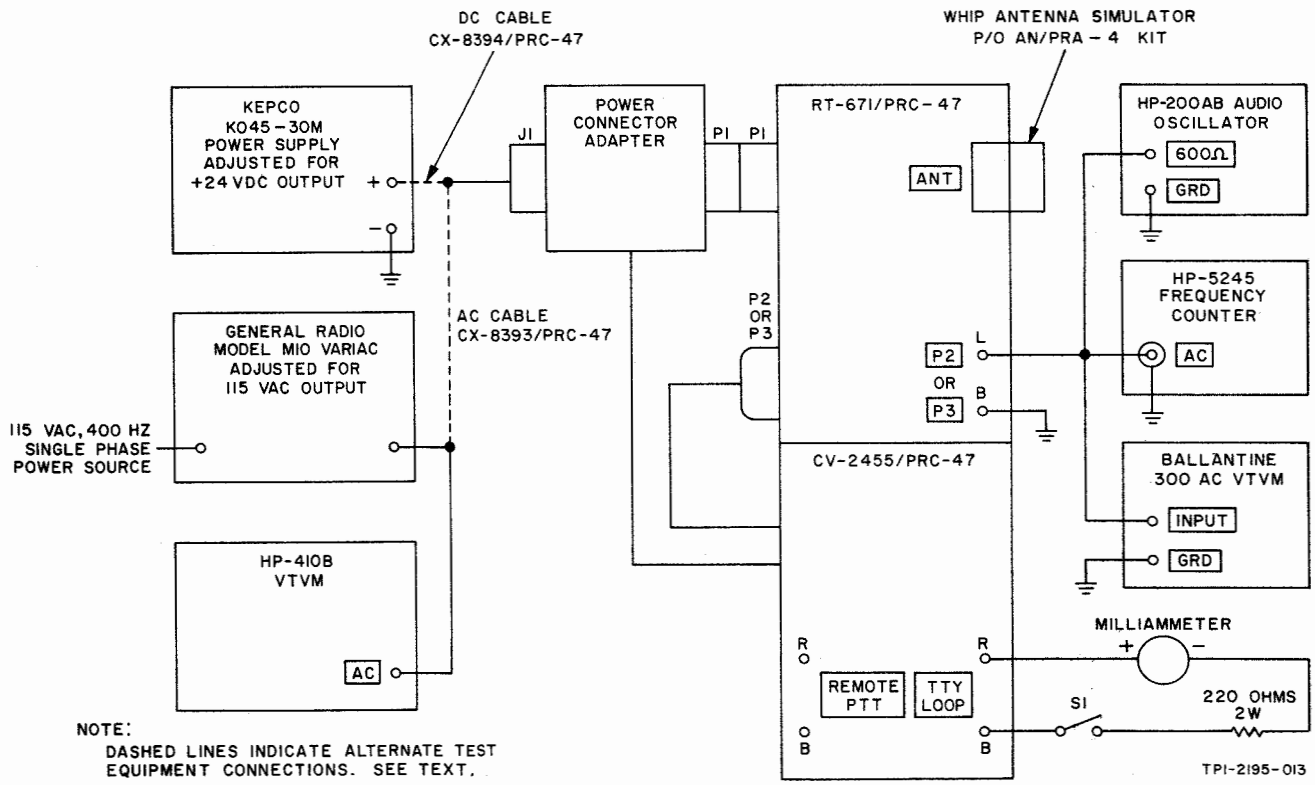


Figure 4-3. Receive Operation, Test Setup

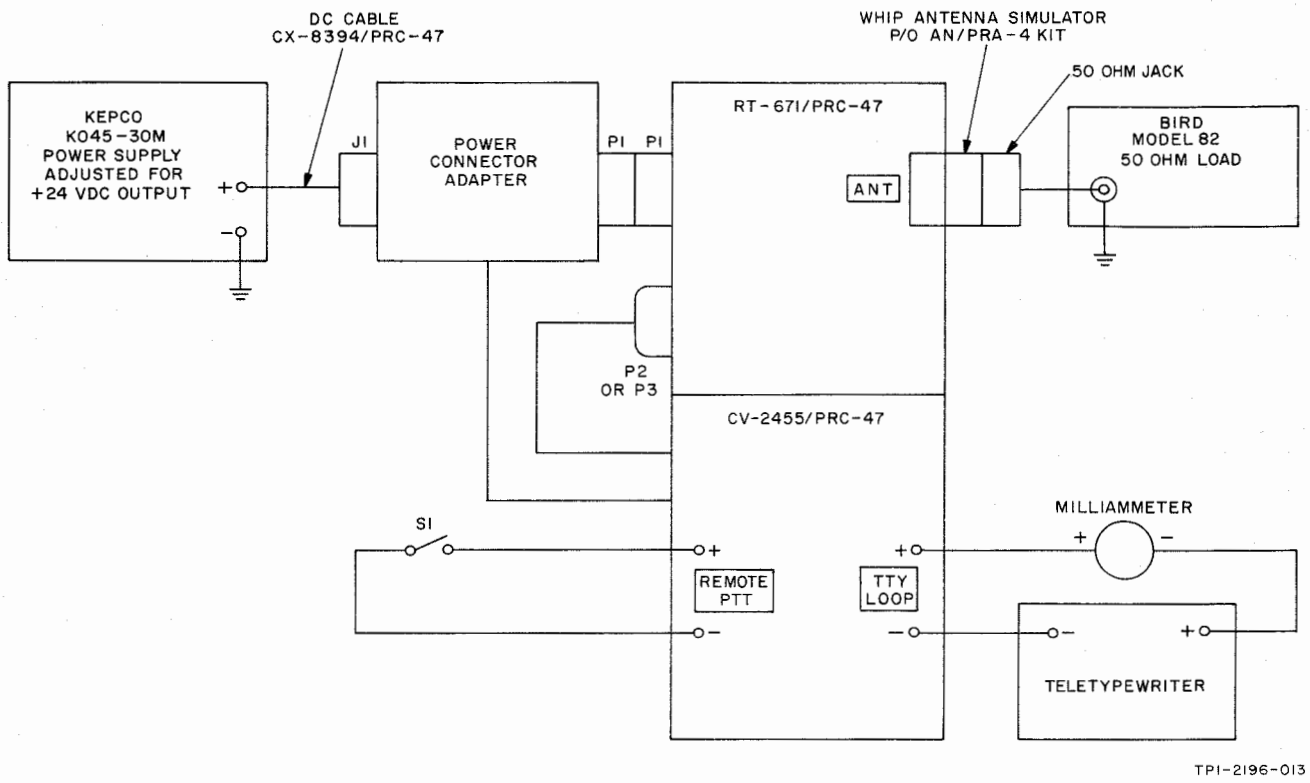


Figure 4-4. System Checkout, Test Setup

36. Set CV-2455 POWER switch to ON and RT-671 PWR switch to ON. Adjust variable dc power supply for 24- volt dc output.

37. Set 20MA-60MA loop current switch S2 in current position required by teletypewriter in use. Adjust potentiometer R45 for required value of loop current as indicated on 0- to 100-milliampere meter.

38. With RT-671 OPR/TUNE switch in OPR, observe operation when signals are being received from another FSK station. Set external switch S1 in closed position, and check transmission by operating teletypewriter keyboard and monitoring reception at another station. Corresponding messages to and from another FSK station shall agree.

4-4. CIRCUIT (STAGE) DESCRIPTION.

a. FUNCTIONAL DESCRIPTION. - The following paragraphs contain essential information on the functional operation of circuits within the CV-2455.

(1) POWER CONTROL CIRCUIT. - Refer to the schematic diagram of CV-2455, figure 5-5. The power control circuit is located on TB2. Incoming power is obtained as explained in paragraphs 4-2a and b. When the RT-671 high voltage is applied (transmit mode), a control voltage of 26.5 volts ac (when using 115- volt ac, 400-Hz primary power) or a 26.5 square-wave voltage (when using 24- volt dc primary power) is present across bridge rectifier CR13 through CR16. Output of this bridge rectifier energizes transmit-receive control relay K1. A set of normally open contacts on this relay completes the 115-volt, 400-Hz path to blower motor B1. Fuse F1 protects incoming 115-volt, 400-Hz power from overload conditions. POWER switch S1 controls the alternate voltages which can be applied to the input of the +24-volt power supply +15-volt regulator. Depending on the external input to RT-671 (ac or dc), switch S1 controls a positive 24.0 volts dc to the power supply/regulator or 115 volts, 400 Hz to the primary of transformer T3. The secondary of transformer T3 supplies 26 volts, 400 Hz to the power supply. Either positive 24.0 volts dc or 115 volts, 400 Hz will enable the power supply/regulator to produce the required +15-volt output. The second set of contacts on relay K1 applies a +15-volt B+ voltage to the tone generator in transmit mode and to the discriminator in receive mode.

(2) AUDIO AMPLIFIER. - The audio amplifier is located on TB1. See figure 5-5.

(a) Transistors Q1 and Q2, operated in common emitter configurations, form a 2-stage audio amplifier. Audio signals from RT-671 enter the CV-2455 FSK circuit at pin L of audio connector P2. The audio input signal, either 1575 Hz or 2425 Hz, is fed to the audio amplifier. Capacitor C1 couples the incoming audio to the base of transistor Q1, and

capacitor C2 couples the output of transistor Q1 to the base of transistor Q2. Output of the audio amplifier appears across the primary windings of series-connected audio transformers T1 and T2 in the collector circuit of Q2. The +15 volts applied to the collector circuit of transistor Q2 is present only in receive mode and is controlled by transmit-receive relay K1.

(b) Diodes CR1 and CR2 clip undesirable voltage peaks that can be present on the incoming audio line. The emitter-base junctions of Q1 and Q2 are forward biased by voltage dividers consisting of resistors R3, R4, R7, and R8. Resistor R6 is an emitter-bias resistor for Q1 to provide a small amount of degenerative feedback current, cancelling any audio frequency distortion that might be present. Resistor R9 provides emitter-bias for transistor Q2. Capacitor C3 bypasses the audio variations around resistor R9, eliminating any degenerative feedback at R9.

(3) DISCRIMINATOR. - The CV-2455 utilizes two discriminators which are located on terminal board TB1. See figure 5-5.

(a) In receive mode, the double discriminator network in the discriminator section provides a positive output when a 1575-Hz signal is present at the secondaries of transformers T1 and T2 and provides a negative output when a 2425-Hz signal is present at the secondaries of the transformers. Parallel combination of capacitors C8, C9, C10 and coil L1 in the first discriminator is resonant at 2425-Hz audio frequency. The second discriminator circuit is nonresonant at this frequency and virtually shorts out the secondary of transformer T2. Audio voltage across the resonant combination in the first discriminator is coupled to a rectifier network by capacitors C4 and C5. The rectifier network consists of diodes CR3, CR4, CR5, CR6, capacitors C14 and C15, and resistors R11 and R12. This network produces a negative voltage (with respect to ground) that appears across resistor R11. This negative voltage is applied through resistor R10 to switching transistor Q7 in the dc amplifier. Capacitors C18 and C19 effectively remove any form of ripple at the dc output point.

(b) The second discriminator circuit functions with a 1575-Hz audio signal in the same manner as the first discriminator. Parallel combination of capacitors C11, C12, C13 and coil L2 is resonant at 1575 Hz. The parallel combination in the first discriminator circuit is nonresonant at this frequency and virtually shorts out the secondary of T1. Audio voltage across the resonant combination in the second discriminator is coupled to a rectifier network by capacitors C6 and C7. The rectifier network consists of diodes CR7, CR8, CR9, and CR10, capacitors C16 and C17, and resistors R14 and R15. This network produces a positive voltage (with respect to ground) that appears across resistor R14. This positive voltage is applied through resistor R13 to switching transistor Q7 in the dc amplifier. Capacitors C20 and C21 effectively remove any form of ripple at the dc output point.

(4) DC AMPLIFIER. - See figure 5-5.

(a) The dc amplifier consists of transistors Q7 through Q11 and is mounted on terminal board TB2. Output of this amplifier is either a mark (representing a negative input to the dc amplifier from the discriminator) or a space (representing a positive input to the dc amplifier from the discriminator). These two conditions, mark and space, are recognized at the external teletypewriter by a 20- or 60-ma loop current flow through Q11 for mark, and 0-ma loop current for space.

(b) Transistors Q7 and Q8 are operated in a Darlington pair configuration for good stability and high dc gain. The emitter circuit of Q7 is connected through resistor R34 to the base of transistor Q8. The base circuit of transistor Q7 is connected to the discriminator section. The regulated +15 volts from the power supply is applied at all times to the dc amplifier during FSK operation. Transistors Q9 and Q11 are operated in common emitter configurations. Transistor Q10 is operated in common collector configuration. Transistor Q8 shares common emitter resistor R39 with transistor Q9. Resistor R39 provides temperature compensation for transistors Q7, Q8, and Q9. Conduction through transistor Q8 is controlled by switching transistor Q7. When input to the dc amplifier is a negative or zero voltage, transistors Q7 and Q8 are effectively turned off (biased to the point where little or no current flows). This condition has very little effect on the forward bias on transistor Q9 emitter-base junction. Forward bias on transistor Q9 is established by the voltage divider network consisting of resistors R35, R36, and R37 across the +15-volt line and causes conduction of Q9. Conduction of transistor Q9 establishes a forward bias through resistors R38 and R40 on the emitter-base junction of transistor Q10 resulting in conduction of Q10. Conduction of transistor Q10, in turn, establishes a forward-biased condition through resistors R42 and R43 on the emitter-base junction of loop current switching transistor Q11.

(c) Loop current through transistor Q11 will be either 20 or 60 ma depending on the requirements of the teletypewriter being used. This current is controlled by switch S2 and series adjusting potentiometer R45. With switch S2 in the 60MA position, the emitter resistor of transistor Q11 is the parallel combination of R18 and R33, and with switch S2 in the 20MA position, the emitter resistor is R18. When the loop current is either 20 or 60 ma, the emitter voltage to ground of transistor Q11 will be approximately the same due to the values of resistors R18 and R33. Potentiometer R45 provides an adjustment for the value of loop current required. Loop current line filters, consisting of L8, C38, L9, and C39, are provided internally at the TTY LOOP binding post terminals. Test points J6 and J7 are provided to determine the value of loop current flow by the dc voltage measured across resistor R44.

(d) In the preceding discussion, dc amplifier switching transistor Q7 was receiving either a 0-voltage input or a negative voltage input from the discriminator section. A negative voltage input represents the reception of a 2425-Hz signal input resulting in loop current flow through transistor Q11 and causing a mark condition at the teletypewriter unit.

The 0-voltage input is actually a rest condition when no signals are being received, and is considered a mark condition at the teletypewriter. In the case where a 1575-Hz signal is being received, output of the discriminator section is a positive voltage. This positive voltage is applied to the base of dc amplifier switching transistor Q7, resulting in a large forward-bias condition on the emitter-base junction causing conduction of Q7. The emitter current of Q7 flowing through resistor R34 results in a forward-bias condition on emitter-base junction of Q8. Transistor Q8 conducts at saturation, resulting in a large voltage drop across collector-load resistor R35. The voltage divider network, consisting of resistors R36 and R37, creates a reverse-bias condition across the emitter-base junction of transistor Q9. Transistor Q9 is now cut off, resulting in no voltage drop across collector load resistor R38. This results in the emitter and base voltages of transistor Q10 being equal, cutting off Q10. When Q10 is cut off, no current flows through collector load resistor R42. This results in no forward bias on the emitter-base junction of loop current switching transistor Q11, which stops loop current output to the teletypewriter. The 1575-Hz signal input is recognized at the teletypewriter as a space.

(5) TONE GENERATOR. - See figure 5-5. The tone generator consists of oscillator transistor Q4, oscillator control transistor Q3, and amplifier transistors Q5 and Q6 and is mounted on terminal board TB3.

(a) During transmit mode, +15 volts from the regulator is removed from the final stage of the audio amplifier, disabling the output of the audio amplifier and discriminator circuits. Input to dc amplifier switching transistor Q7 is now zero voltage, causing loop current transistor Q11 to be forward biased and able to conduct whenever the external teletypewriter closes the loop current line. The +15 volts from the regulator is applied to the tone generator section which produces two audio frequency tones for modulation of the RT-671.

(b) The teletypewriter keyboard controls the frequency output of the tone generator. When the teletypewriter closes the loop current circuit, the tone generator modulates the RT-671 with a 2425-Hz audio tone; and when the loop current circuit is open, the tone generator modulates the RT-671 with a 1575-Hz audio tone.

(c) The tone generator consists of a basic audio oscillator circuit and associated audio amplifiers. The basic oscillator circuit includes transistor Q4 and a resonant circuit consisting of inductor L3 and capacitors C25, C26, C27. Capacitors C28 and C29 couple the resonant circuit to oscillator transistor Q4. The emitter-base bias of Q4 is established by the voltage divider, consisting of resistors R21 and R22. Output of the basic oscillator circuit is 2425 Hz. This output is taken from emitter resistor R24 and coupled by capacitors C30 and C31 to audio amplifier stage Q5 (operated as a common emitter for voltage gain). The output of Q5 is coupled by capacitor C32 to audio amplifier stage Q6 (operated as an emitter-follower for power gain). Output of audio amplifier stage Q6 is applied to pin C of audio connector P2 through coupling capacitor C33.

(d) Two conditions that control the tone generator output frequency are current flow in the loop current line (20 or 60 ma) and 0-current flow in the loop current line. Switching transistor Q3 performs the actual frequency change by adding capacitors C22, C23, and C24 to the basic oscillator circuit. This additional capacitance in the resonant circuit lowers the frequency output of the basic oscillator to 1575 Hz. The emitter-base circuit of transistor Q3 is reverse biased when loop current flows. The reverse-bias is provided by a voltage divider, consisting of resistors R16 and R17, and the emitter voltage developed across resistor R18. Depending on the setting of 20MA-60MA switch S2, the emitter voltage may be developed across the parallel combination of resistors R18 and R33. The result is a tone generator frequency output of 2425 Hz for a 20- or 60-ma loop current flow condition.

(e) When no loop current flows, the voltage divider, consisting of resistors R16 and R17, forward-biases the emitter-base junction of transistor switch Q3. This turns transistor Q3 on and adds capacitors C22, C23, and C24 to the basic resonant circuit, causing the oscillator to produce the lower frequency, 1575 Hz. The result is a tone generator frequency output of 1575 Hz for a zero-loop current flow condition. Tone generator output voltage at the higher frequency tends to be slightly greater than at the lower frequency. Diode switch CR11, operating when loop current flows, allows current to flow through voltage divider resistors R19 and R20. The bias voltage developed is applied to capacitors C30 and C31, thus limiting the oscillator voltage coupled to audio amplifier Q5. This compensates for higher oscillator voltage output at the higher frequency, resulting in an equal voltage output from amplifier stages Q5 and Q6 of the tone generator at either frequency.

b. FUNCTIONAL CIRCUIT (STAGE) TEST DATA. - Refer to section 5 for individual functional circuit test procedures.

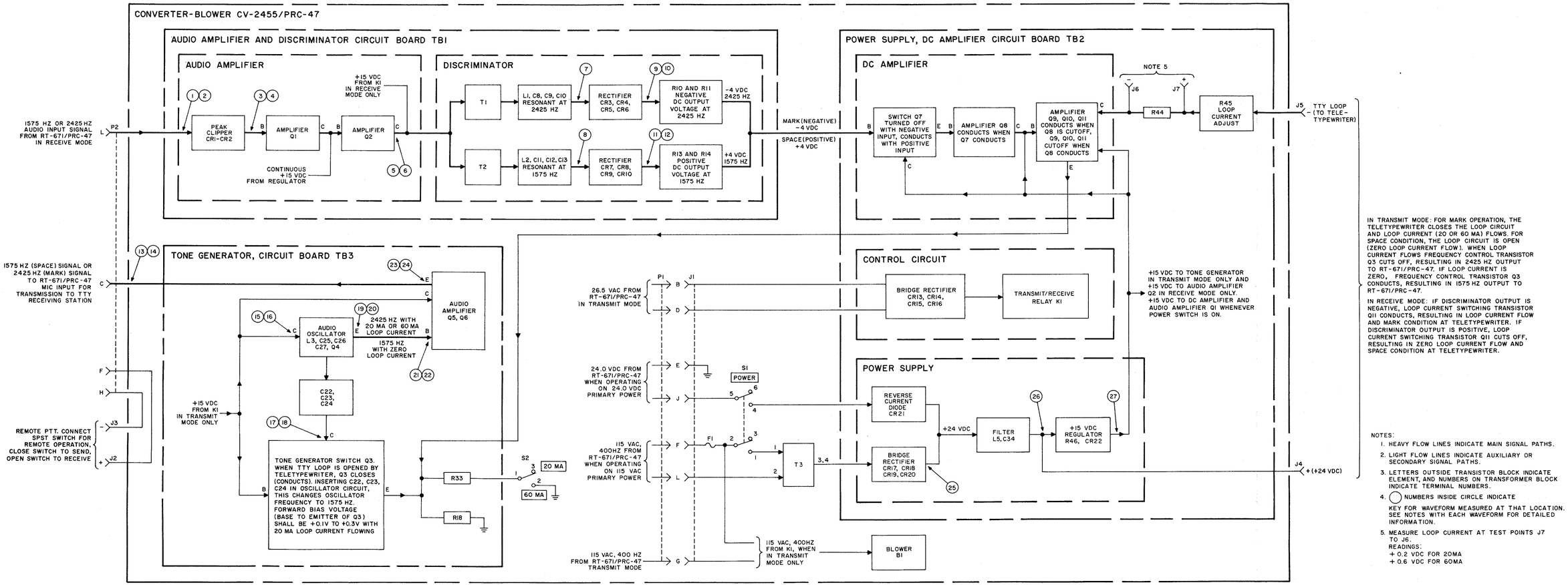


Figure 4-5. CV-2455/PRC-47, Servicing Block Diagram (Sheet 1 of 2)

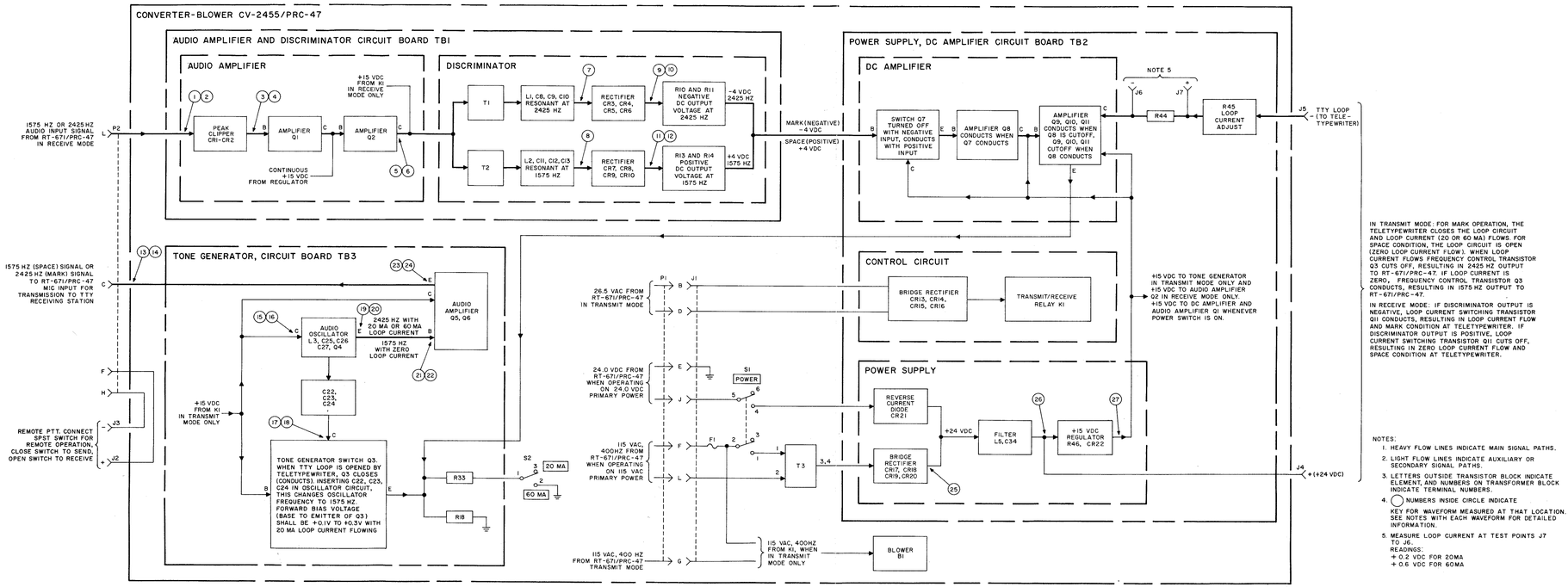
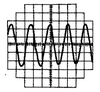
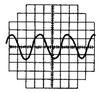
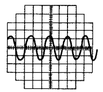
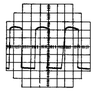
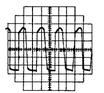
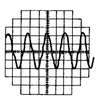
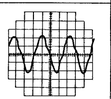
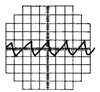
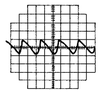
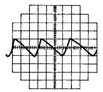
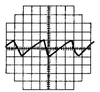
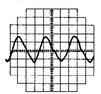
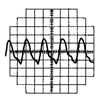
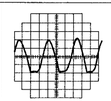
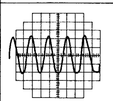
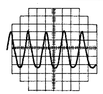
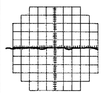
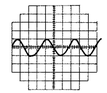
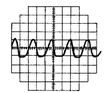
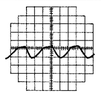
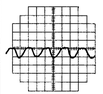
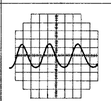
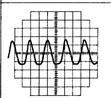


Figure 4-5. CV-2455/PRC-47, Servicing Block Diagram (Sheet 1 of 2)

KEY	WAVEFORM	CHARACTERISTICS	MODE	TEST POINT
①		AMPLITUDE – 11V PP FREQUENCY – 1575 HZ (AUDIO INPUT SIGNAL)	RECEIVE	
②		AMPLITUDE – 11V PP FREQUENCY – 2425 HZ (AUDIO INPUT SIGNAL)	RECEIVE	
③		AMPLITUDE – 1.5 PP FREQUENCY – 1575 HZ	RECEIVE	OUTPUT FROM CLIPPER (CR1, CR2) TO AUDIO AMPLIFIER Q1
④		AMPLITUDE – 1.5V PP FREQUENCY – 2425 HZ	RECEIVE	OUTPUT FROM CLIPPER (CR1, CR2) TO AUDIO AMPLIFIER Q1
⑤		AMPLITUDE – 15V PP FREQUENCY – 1575 HZ	RECEIVE	AUDIO AMPLIFIER OUTPUT AT COLLECTOR OF Q2
⑥		AMPLITUDE – 15V PP FREQUENCY – 2425 HZ	RECEIVE	AUDIO AMPLIFIER OUTPUT AT COLLECTOR OF Q2
⑦		AMPLITUDE – 24.5V PP FREQUENCY – 2425 HZ	RECEIVE	OUTPUT OF RESONANT CIRCUIT OF L1, C8, C9 AND C10. MINIMUM AMPLITUDE OUTPUT AT 1575 HZ (MEASURED ACROSS RESONANT CIRCUIT)
⑧		AMPLITUDE – 22.5V PP FREQUENCY – 1575 HZ	RECEIVE	OUTPUT OF RESONANT CIRCUIT OF L2, C11, C12, AND C13. MINIMUM AMPLITUDE OUTPUT AT 2425 HZ (MEASURED ACROSS RESONANT CIRCUIT)

KEY	WAVEFORM	CHARACTERISTICS	MODE	TEST POINT
⑨		AMPLITUDE – 4V PP FREQUENCY – 2425 HZ	RECEIVE	ANODE OF RECTIFIER CR3
⑩		AMPLITUDE- 4V PP FREQUENCY- 2425 HZ	RECEIVE	CATHODE OF RECTIFIER CR5
⑪		AMPLITUDE – 4V PP FREQUENCY- 1575 HZ	RECEIVE	CATHODE OF RECTIFIER CR7
⑫		AMPLITUDE – 4V PP FREQUENCY – 1575 HZ	RECEIVE	ANODE OF RECTIFIER CR9
⑬		AMPLITUDE – 1.5V PP FREQUENCY – 1575 HZ (SPACE) WITH 0 LOOP CURRENT	TRANSMIT	TONE GENERATOR OUTPUT
⑭		AMPLITUDE – 1.5V PP FREQUENCY – 2425 HZ (MARK) WITH 20/60 MA. LOOP CURRENT	TRANSMIT	TONE GENERATOR OUTPUT
⑮		AMPLITUDE – 22.5V PP FREQUENCY – 1575 HZ (SPACE) WITH 0 LOOP CURRENT	TRANSMIT	AUDIO OSCILLATOR OUTPUT AT TERMINAL 3 OF L3
⑯		AMPLITUDE – 22.5V PP FREQUENCY – 2425 HZ (MARK) WITH 20/60 MA. LOOP CURRENT	TRANSMIT	AUDIO OSCILLATOR OUTPUT AT TERMINAL 3 OF L3

KEY	WAVEFORM	CHARACTERISTICS	MODE	TEST POINT
⑰		AMPLITUDE – 22.5V PP FREQUENCY – 2425 HZ (MARK) WITH 20/60 MA. LOOP CURRENT	TRANSMIT	COLLECTOR OF TRANSISTOR SWITCH Q3
⑱		AMPLITUDE – 1.0 V PP FREQUENCY – 1575 HZ (SPACE) WITH 0 LOOP CURRENT	TRANSMIT	COLLECTOR OF TRANSISTOR SWITCH Q3
⑲		AMPLITUDE – 2.0V PP FREQUENCY – 1575 HZ (SPACE) WITH 0 LOOP CURRENT	TRANSMIT	AUDIO OSCILLATOR OUTPUT, TAKEN AT EMITTER OF Q4
⑳		AMPLITUDE – 2.5V PP FREQUENCY – 2425 HZ (MARK) WITH 20/60 MA. LOOP CURRENT	TRANSMIT	AUDIO OSCILLATOR OUTPUT, TAKEN AT EMITTER OF Q4
㉑		AMPLITUDE – 0.15V PP FREQUENCY – 1575 HZ (SPACE)	TRANSMIT	INPUT TO AMPLIFIER Q5, Q6 TAKEN AT BASE OF Q5
㉒		AMPLITUDE – 0.15V PP FREQUENCY – 2425 HZ (MARK)	TRANSMIT	INPUT TO AMPLIFIER Q5,Q6 TAKEN AT BASE OF Q5
㉓		AMPLITUDE – 1.5V PP FREQUENCY – 1575 HZ (SPACE) WITH 0 LOOP CURRENT	TRANSMIT	AUDIO AMPLIFIER OUTPUT, TAKEN AT EMITTER OF Q6
㉔		AMPLITUDE – 1.5V PP FREQUENCY – 2425 HZ (MARK) WITH 20/60 MA. LOOP CURRENT	TRANSMIT	AUDIO AMPLIFIER OUTPUT, TAKEN AT EMITTER OF Q6

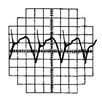
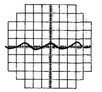
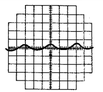
KEY	WAVEFORM	CHARACTERISTICS	MODE	TEST POINT
㉕		AMPLITUDE – 30V PP DURING AC OPERATION 24 VDC DURING DC OPERATION		BRIDGE RECTIFIER OUTPUT
㉖		AMPLITUDE – 1.0V PP (RIPPLE)		POWER SUPPLY OUTPUT DURING AC OPERATION
㉗		AMPLITUDE – 10MV PP		REGULATOR OUTPUT

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Figure 4-5. CV-2455/PRC-47, Servicing Block Diagram (Sheet 2 of 2)

SECTION 5

MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

The following paragraphs provide preventive maintenance procedures.

a. MAINTENANCE STANDARDS. - The following paragraphs provide procedures that indicate the relative performance of each functional circuit within the CV-2455. See figure 5-5 for an overall schematic diagram.

(1) TEST EQUIPMENT AND SPECIAL TOOLS. - Test equipment and special tools required to test the relative performance of each functional circuit within the CV-2455 are listed in table 1-2.

(2) SPECIAL PROCEDURES. - No special procedures are required as a prerequisite to performing maintenance standard test procedures.

(3) REFERENCE STANDARDS PROCEDURES. - Table 5-1 lists test procedures, subdivided by functional sections, which will indicate the relative performance of the individual functional circuit within the CV-2455.

Note

Procedures listed below consist of the minimum number of reference standards which will indicate, when completed, the relative performance of the set or system. Each group of tests represents a functional section of the set or system. Procedures are listed in the suggested sequence of performance; however, deviation from the listed order will in no way affect the unity or result of the reference standards, unless otherwise noted.

TABLE 5-1. REFERENCE STANDARDS PROCEDURES

SECTION	ACTION REQUIRED	REFERENCE
Tone generator	Check output frequencies and voltage amplitudes.	Paragraph 5-1a(5) (a).
Audio amplifier and discriminator	Check output voltage amplitudes.	Paragraph 5-1a(5) (b).

(4) PREVENTIVE MAINTENANCE PROCEDURES. - Table 5-2 lists the recommended periodic maintenance procedures to be performed to ensure satisfactory equipment operation. See figures 5-1 and 5-2 for a schematic diagram and suggested fabrication layout for the junction box used in maintenance procedures. The junction box is not supplied and must be fabricated by the user.

(5) TUNING AND ADJUSTMENT. - The following paragraphs provide alignment and adjustment procedures for the functional circuits of the CV-2455.

(a) TONE GENERATOR ALIGNMENT. - The tone generator is located on terminal board TB3. See figures 5-9 and 5-13. Disassemble CV-2455 according to disassembly procedures, paragraph 5-2.

1. Connect equipment as shown in figure 5-3. Optional primary power sources of 24 VDC or 115 VAC 400 Hz may be used; however, 26 VAC 400 HZ must be provided to energize transmit-receive relay K1 of CV-2455.

2. Set POWER switch S2 on junction box (see figures 5-1 and 5-2) to correct position for type of power in use. (AC position for 115 VAC 400 HZ or DC position for 24 VDC.)

3. Set FUNCTION switch S1 on junction box to SEND position.

4. Set loop current switch S2 on terminal board TB2 to 20 ma. Adjust loop current potentiometer R45 to read 20 ma as indicated on milliammeter.

5. Tone generator output frequency shall be 2425 ±15 Hz, as indicated on frequency counter.

6. If tone generator output is not within 2425 ±15 Hz limits specified, new values for capacitors C25, C26, and C27 shall be selected.

CAUTION

Care must be exercised when removing and replacing components on terminal boards. Use a 25-watt soldering iron and a heat sink to prevent damage to terminal board circuitry and plated component lead holes.

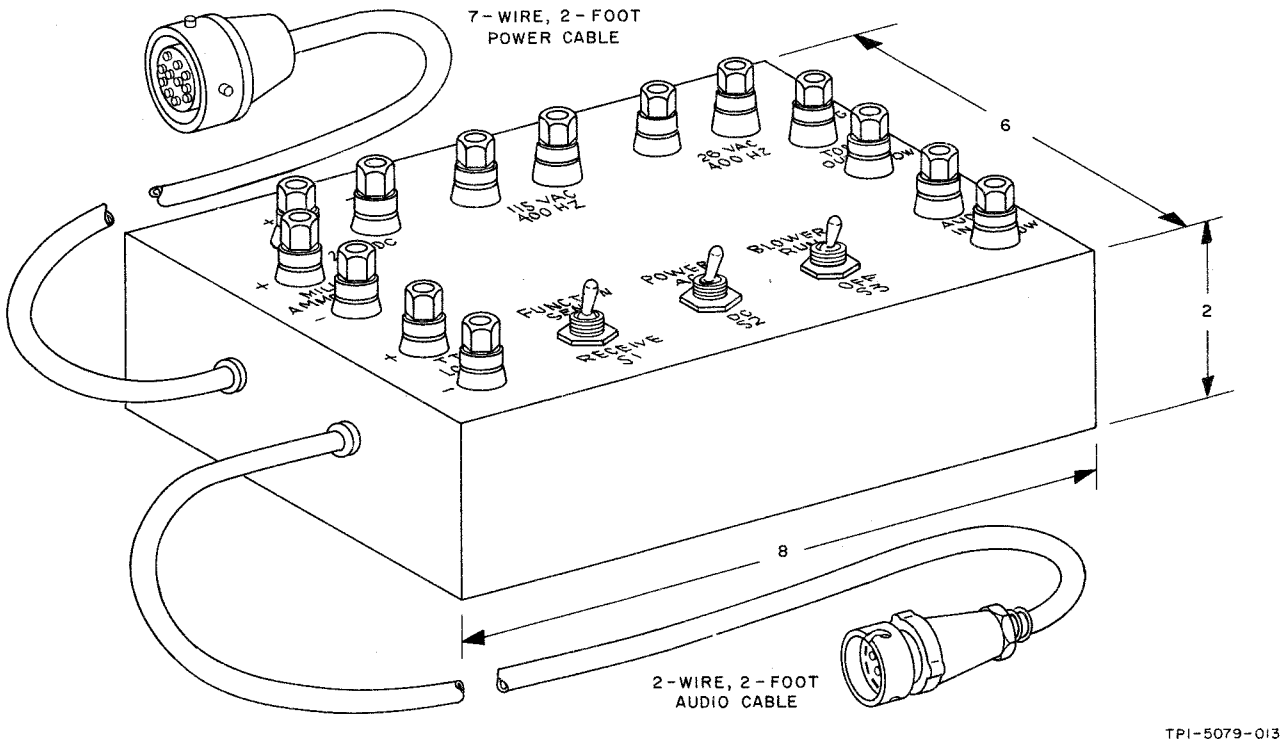

Figure 5-1. Suggested Fabrication Layout For Junction Box to Test Converter-Blower CV-2455/PRC-47

TABLE 5-2. RECOMMENDED PERIODIC MAINTENANCE SCHEDULE

STEP NO.	ACTION REQUIRED	SECTION
1	Under adverse atmospheric conditions, clean air filter daily. A weekly schedule may be used for normal conditions, and a monthly schedule used for extremely clean operating conditions. (Refer to paragraph 5-1c.)	Blower
2	Clean the air discharge baffle screen monthly. Make a visual inspection for any accumulation of residue around screen mesh which could impair air flow. (Refer to paragraph 5-1c.)	Blower
3	Perform operational checks monthly, as outlined in paragraph 2-4.	CV-2455
4	Perform overall functional section performance test semiannually, as outlined in paragraph 4-3b(2).	CV-2455
5	Check blower operation semiannually, as outlined in paragraph 5-1b.	Blower
6	Check output frequencies and voltage amplitudes annually, as outlined in paragraph 5-1a(5) (a).	Tone generator
7	Check output voltage amplitudes annually as outlined in paragraph 5-1a(5) (b).	Audio amplifier and discriminator

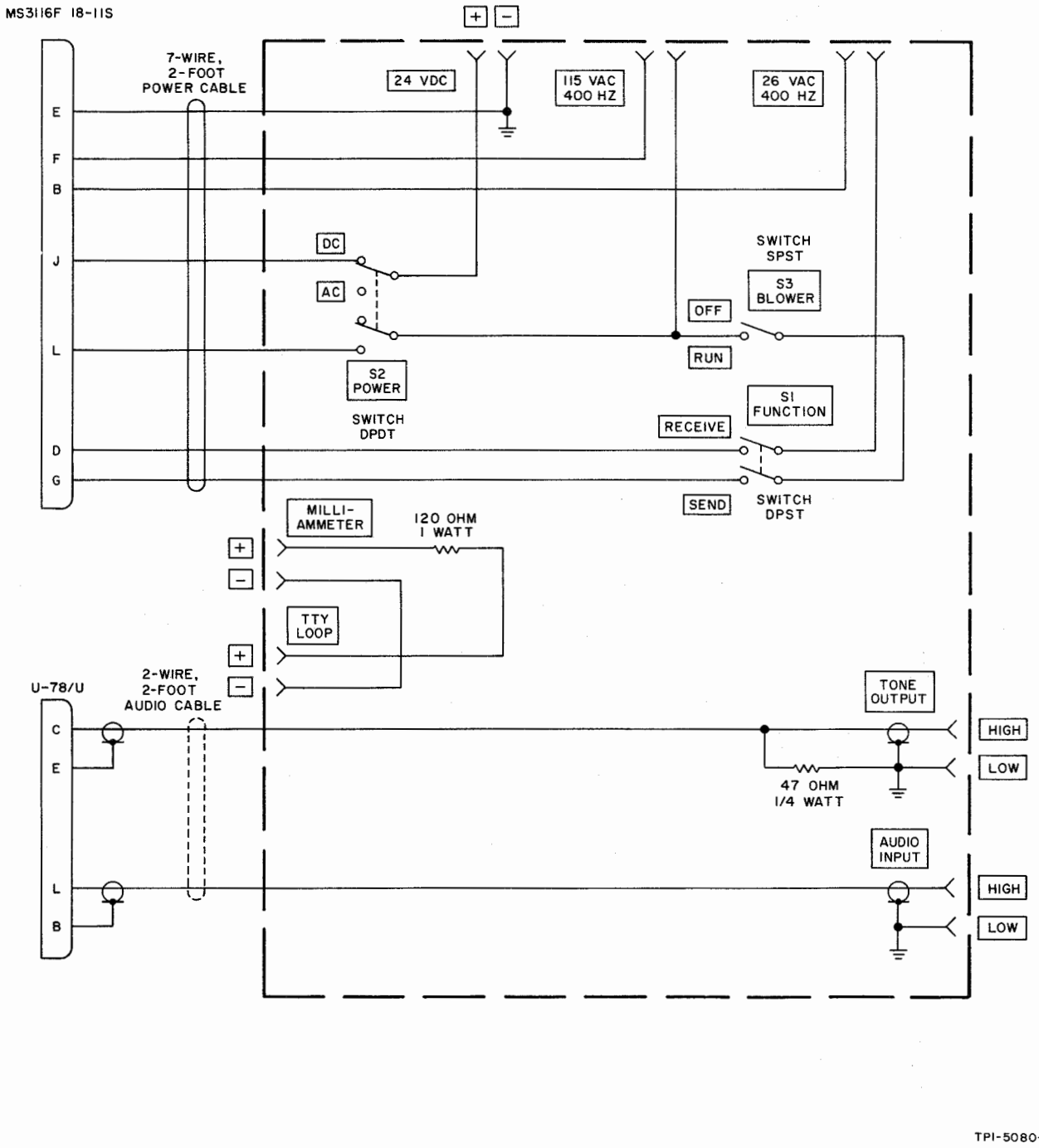

Figure 5-2. Junction Box, Schematic Diagram

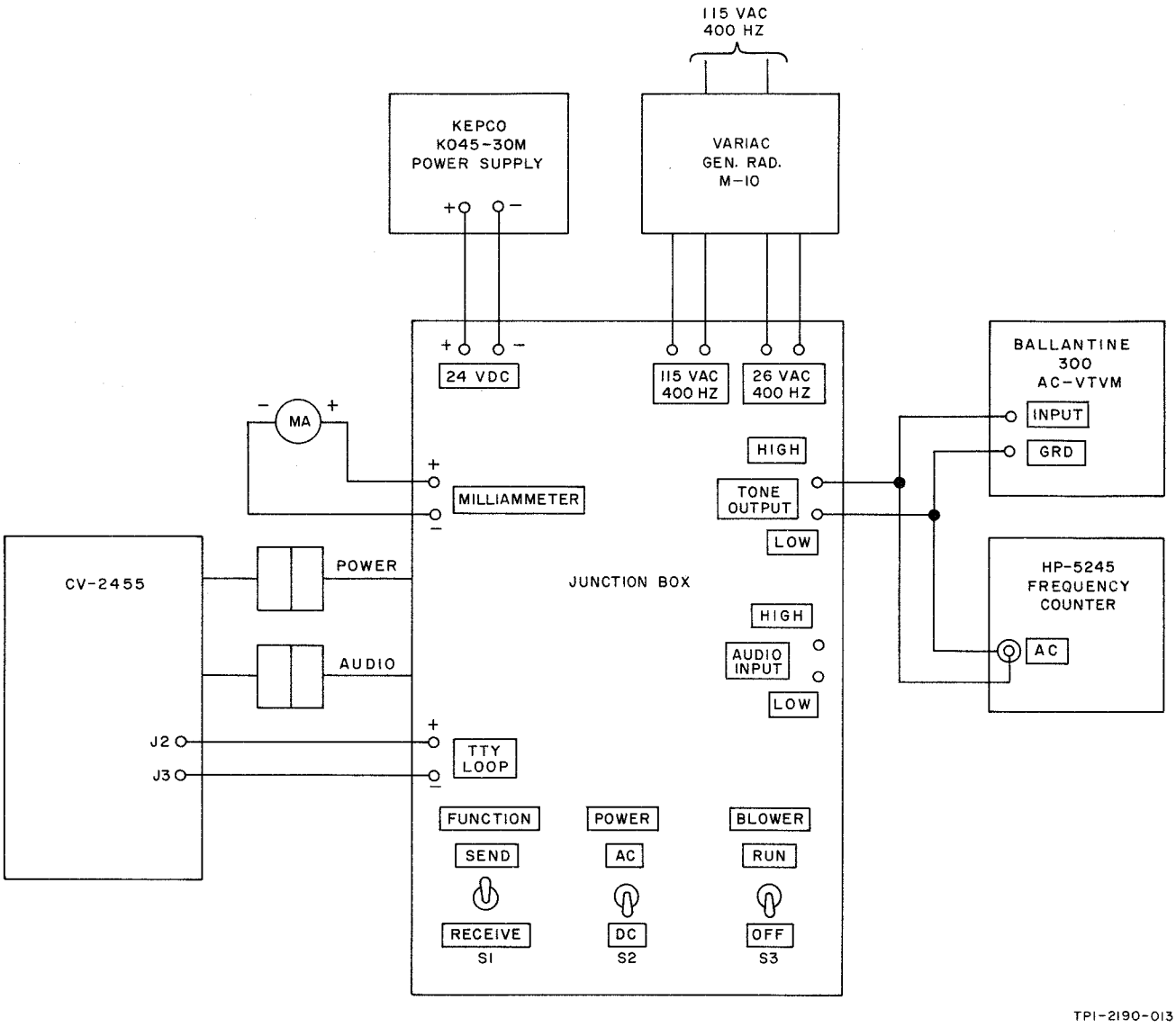

Figure 5-3. Tone Generator, Maintenance Setup

7. Select new values for capacitors C25, C26, and C27 as required to obtain specified tone generator output frequency of 2425 ±5 Hz, as indicated on frequency counter.

Note

Tuning of the mark tone generator frequency can usually be accomplished by selecting new values for capacitors C26 and C27. If proper frequency is obtained with only capacitors C25 and C26 in the circuit, it is allowable to omit capacitor C27.

8. Disconnect positive milliammeter lead from junction box. This opens loop current circuit and causes tone generator to shift to space frequency.

9. Tone generator output frequency shall be 1575 ±15 Hz, as indicated on frequency counter.

10. If tone generator output is not within 1575 ±15 Hz limits specified, new values for capacitors C22, C23, and C24 shall be selected.

CAUTION

Care must be exercised when removing and replacing components on terminal boards. Use a 25-watt soldering iron and a heat sink to prevent damage to terminal board circuitry and plated component lead holes.

11. Select new values for capacitors C22, C23, and C24 as required to obtain the specified tone generator output frequency of 1575 ±15 Hz, as indicated on frequency counter.

Note

Tuning of the space tone frequency can usually be accomplished by selecting new values for capacitors C23 and C24. If proper frequency is obtained with only capacitors C22 and C23 in the circuit, it is allowable to omit capacitor C24.

12. Note amplitude of space frequency tone generator output on ac vtvm. Ac vtvm shall indicate between 0.2 and 0.6 volt ac.

13. Connect positive milliammeter lead to junction box. Note amplitude of mark frequency tone generator output on ac vtvm. Ac vtvm shall indicate between 0.2 and 0.6 volt ac. Mark frequency indication of 0.2 to 0.6 volt shall differ not more than 10 percent from space frequency indication.

14. If mark frequency tone generator output is not within limits specified in step 13 above, select new value for resistor R19 to obtain specified limits.

15. Measure dc voltage on resistors R17 and R18 with vtvm. See figure 5-9. One end of either resistor is connected to ground potential. Voltage measured on resistor R17 shall be 0.1 to 0.3 volt dc greater than voltage measured on resistor R18.

16. If voltage measured on R17 is not within limits specified in step 15 above, select new value for R17 to obtain specified limits.

17. Set loop current switch S2 to position required (20 or 60 ma) by teletypewriter used with CV-2455.

18. Adjust loop current potentiometer R45 to provide desired loop current (20 or 60 ma) as indicated on milliammeter.

19. Disconnect test equipment and reassemble CV-2455. Refer to reassembly procedures outlined in paragraph 5-3.

(b) AUDIO AMPLIFIER AND DISCRIMINATOR ALIGNMENT. - The audio amplifier and discriminator are located on terminal board TB1. See figures 5-7 and 5-13. Disassemble the CV-2455 according to disassembly procedures outlined in paragraph 5-2.

1. Connect equipment as shown in figure 5-4. (Optional primary power sources of either 24 VDC or 115 VAC 400 HZ may be used.)

2. Set POWER switch S2 on junction box to correct position for type of power in use. (AC position for 115 VAC 400 HZ or DC position for 24 VDC.)

3. Set function switch S1 on junction box to RECEIVE position.

4. Adjust audio oscillator for 4-volt output at 1575 Hz, as indicated on vtvm and frequency counter.

5. With vtvm, monitor dc voltage at common point between resistors R10 and R13. See figure 5-7.

6. Vary audio oscillator frequency above and below 1575 Hz. Monitored dc voltage (step 5) shall be not less than +4.0 volts with maximum positive indication obtained within ±15 Hz of 1575 Hz.

7. If discriminator output is not within limits specified in step 6, new values for capacitors C11, C12, and C13 shall be selected.

CAUTION

Care must be exercised when removing and replacing components on terminal boards. Use a 25-watt soldering iron and a heat-sink to prevent damage to terminal board circuitry and plated component lead holes.

8. Select new values as required for capacitors C11, C12, and C13 to obtain specified limits of step 6.

Note

Tuning of the space frequency discriminator can usually be accomplished by selecting new values for capacitors C12 and C13. If proper results are obtained with only capacitors C11 and C12 in the circuit, it is allowable to omit capacitor C13.

9. Adjust audio oscillator for 4-volt output at 2425 Hz, as indicated on vtvm and frequency counter.

10. Set vtvm for negative dc voltage.

11. Vary audio oscillator frequency above and below 2425 Hz. Monitored dc voltage (refer to step 5) shall be not less than -4.0 volts with maximum negative indication obtained within ±15 Hz of 2425 Hz.

12. If discriminator output is not within limits specified in step 11, select new values for capacitors C8, C9, and C10.

CAUTION

Care must be exercised when removing and replacing components on terminal boards. Use a 25-watt soldering iron and a heat-sink to prevent damage to terminal board circuitry and plated component lead holes.

13. Select new values as required for capacitors C8, C9, and C10 to obtain results specified in step 11.

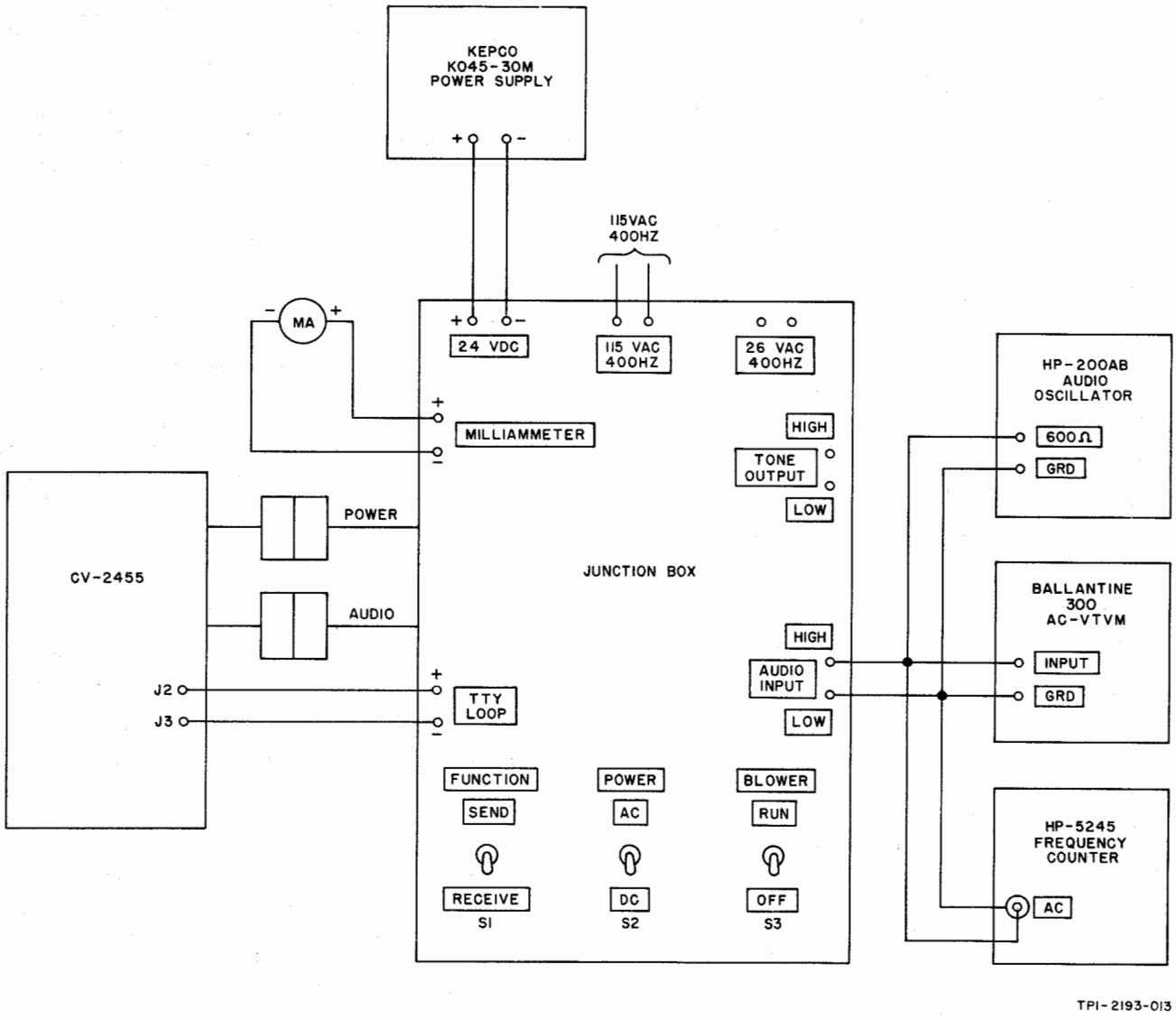

Figure 5-4. Audio Amplifier and Discriminator, Maintenance Setup

Note

Tuning of the mark frequency discriminator can usually be accomplished by selecting new values for capacitors C9 and C10. If proper results are obtained with only capacitors C8 and C9 in the circuit, it is allowable to omit capacitor C10.

14. Loop current shall flow as indicated on milliammeter. Value of loop current depends on setting of loop current switch S2 (20 or 60 ma) and loop current potentiometer R45.

15. Set loop current switch S2 to proper position (20 or 60 ma) for teletypewriter in use with CV-2455.

16. Adjust loop current potentiometer R45 to provide desired loop current (either 20 or 60 ma) as indicated on milliammeter.

17. Disconnect equipment and reassemble CV-2455. Refer to reassembly procedures, paragraph 5-3.

b. BLOWER MOTOR OPERATION. - Perform periodic check of blower motor as follows:

(1) Connect equipment as shown in figure 5-3. Source voltages of 115 VAC 400 HZ and 26 VAC 400 Hz shall be used.

(2) Set POWER switch S2 on junction box to AC position.

(3) Set FUNCTION switch S1 on junction box to SEND position.

(4) Set BLOWER switch S3 on junction box to RUN position.

(5) Blower shall operate and force air from the air intake manifold assemblies through unit and out opening on side mating with RT-671 front panel.

(6) Blower speed is approximately 23,000 r/min and normally emits a high-pitched tone when energized.

c. LUBRICATION AND CLEANING. - The CV-2455 requires no lubrication. Blower motor B1 is lubricated for life of the equipment. Periodic cleaning of the air filter element should be performed at specified intervals indicated in table 5-2. This cleaning should be performed more often when equipment has been operating under adverse atmospheric conditions where dust and other particles are present.

CAUTION

The filter element should be removed from the unit and cleaned in a mild detergent and water solution. Do not wring or compress the filter to remove moisture from washing or filtering action will be destroyed. Shake all excess moisture from the filter before reinstalling. Ends of filter shall meet to form a cylinder inside the filter cage when reinstalling.

5-2. DISASSEMBLY PROCEDURES.

a. Remove air intake manifold assemblies (MP-12 and MP13) by loosening thumbscrew (MP11) on right air intake manifold assembly (MP12). See figures 5-6 and 5-10.

b. Remove filter cage (MP20) and filter element (MP8) through right side cover opening. See figure 5-10.

c. To remove converter cover (MP15), remove four roundheaded retaining seal-screws (two on either end of cover). See figures 5-6 and 5-10. The O-ring gasket seals under screws must be inspected before reassembly. If seals are damaged, reassemble with new screws to ensure watertightness of unit.

d. Remove six flathead screws holding cover retaining bracket and terminal post support (MP18 and MP17). Remove bracket and post support. See figure 5-10.

e. Remove four studs and eight spacers attaching terminal boards TB1, TB2, and TB3 to chassis. See figure 5-13. Components on terminal boards are now accessible.

5-3. REASSEMBLY PROCEDURES.

a. Replace four threaded studs and eight spacers mounting three printed circuit boards (TB1, TB2, and TB3). See figures 5-10 and 5-13.

b. Replace terminal post support and cover retaining bracket (MP17 and MP18). Use liquid staking compound to secure six flathead screws.

c. Place converter cover (MP15) in position, and secure with four roundheaded seal-screws. Apply sufficient torque to ensure compression of cover gasket and O-ring gaskets on each screw. See figures 5-6 and 5-10.

CAUTION

Carefully inspect the O-ring gaskets on each seal-screw and the two large O-ring gaskets (MP16 and MP19) for the air intake manifold assemblies. If any physical damage is detected, replace the gaskets to ensure unit maintains a watertight seal. Apply a thin film of silicon grease to any new gaskets required.

d. Position large O-ring gasket (MP19) near right end of the air filter cage (MP20). Ensure that ends of filter element (MP8) meet and form cylinder. Insert filter cage (MP20) and element (MP8) into position through transition box (MP21) opening on right side of CV-2455. See figure 5-10.

e. Position small O-ring gasket (MP16) around throat of left air intake manifold assembly (MP13). See figures 5-6 and 5-10.

f. Insert long hexagon post (attached to left air intake manifold assembly MP13) into opening on left side of CV-2455. Seat the air intake manifold assembly squarely against cover (MP15). Center long hexagon post in transition box (MP21) opening on right side of CV-2455, through which post protrudes.

g. Position right air intake manifold assembly (MP12) over hexagon post, centering throat of intake manifold assembly in filter element (MP8).

Note

A deep countersink is provided in the right end of the long hexagon post to aid in blind alignment of the post and thumbscrew(MP11).

h. Align thumbscrew (MP11) in hexagon post, and gradually tighten thumbscrew. Ensure that O-rings (MP16 and MP19) and air intake manifold assemblies are positioned correctly while tightening thumbscrew. Apply sufficient torque on thumbscrew to compress the O-rings, ensuring a watertight seal. Intake manifold assemblies shall not override gasket retaining lip on base assembly.

i. Ensure that appropriate square (either 20 or 60 ma) on CV-2455 cover (MP15) is marked, indicating settings of loop current switch S2 and loop current potentiometer R45.

5-4. PARTS LOCATION.

Refer to section 6 and figures 5-6 through 5-13 for parts location for the CV-2455.

REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC	REF DESIG	LOC
B1	17E	CR2	5B	L1	9A	R17	3G
		CR3	11A	L2	9C	R18	4H
C1	5A	CR4	11A	L3	7F	R19	5G
C2	7A	CR5	11B	L4	8F	R20	6H
C3	8B	CR6	11B	L5	21C	R21	8F
C4	11A	CR7	11C	L6	2A	R22	8G
C5	11B	CR8	11C	L7	2B	R23	9F
C6	11C	CR9	11D	L8	24C	R24	8G
C7	11D	CR10	11D	L9	24H	R25	10F
C8	10A	CR11	5G			R26	10G
C9	10A	CR12	22H	P1	23A	R27	11F
C10	11A	CR13	20E	P2	2C	R28	10G
C11	10C	CR14	19E			R29	11F
C12	10C	CR15	20F	Q1	6A	R30	11G
C13	11C	CR16	19F	Q2	8A	R31	12F
C14	12A	CR17	20C	Q3	4G	R32	12G
C15	12B	CR18	19C	Q4	8F	R33	13H
C16	12C	CR19	20C	Q5	10F	R34	18G
C17	12D	CR20	19C	Q6	12F	R35	19F
C18	13A	CR21	19D	Q7	18G	R36	19G
C19	13B	CR22	20E	Q8	19G	R37	20G
C20	13C			Q9	20G	R38	20F
C21	13D	E1	2A	Q10	21G	R39	20G
C22	4F	E2	2B	Q11	22G	R40	21G
C23	4F	E3	23C			R41	21F
C24	5F	E4	23H	R1	3B	R42	21G
C25	5F	E5	17E	R2	4A	R43	22G
C26	6F	E6	16E	R3	5B	R44	23G
C27	6F			R4	6B	R45	23H
C28	7E	F1	14C	R5	7B	R46	21D
C29	7G			R6	6B	R47	18F
C30	9F	J1	14A	R7	7B		
C31	9F	J2	1A	R8	7B	T1	9A
C32	11G	J3	1B	R9	8B	T2	9C
C33	12G	J4	24C	R10	13A	T3	16C
C34	21E	J5	24H	R11	12A		
C35	19E	J6	24G	R12	12B	TB1	5A
C36	2B	J7	24G	R13	13C	TB2	19C
C37	2B			R14	12C	TB3	4E
C38	24D	K1	15F	R15	13D		
C39	24H			R16	3G		
CR1	4B						

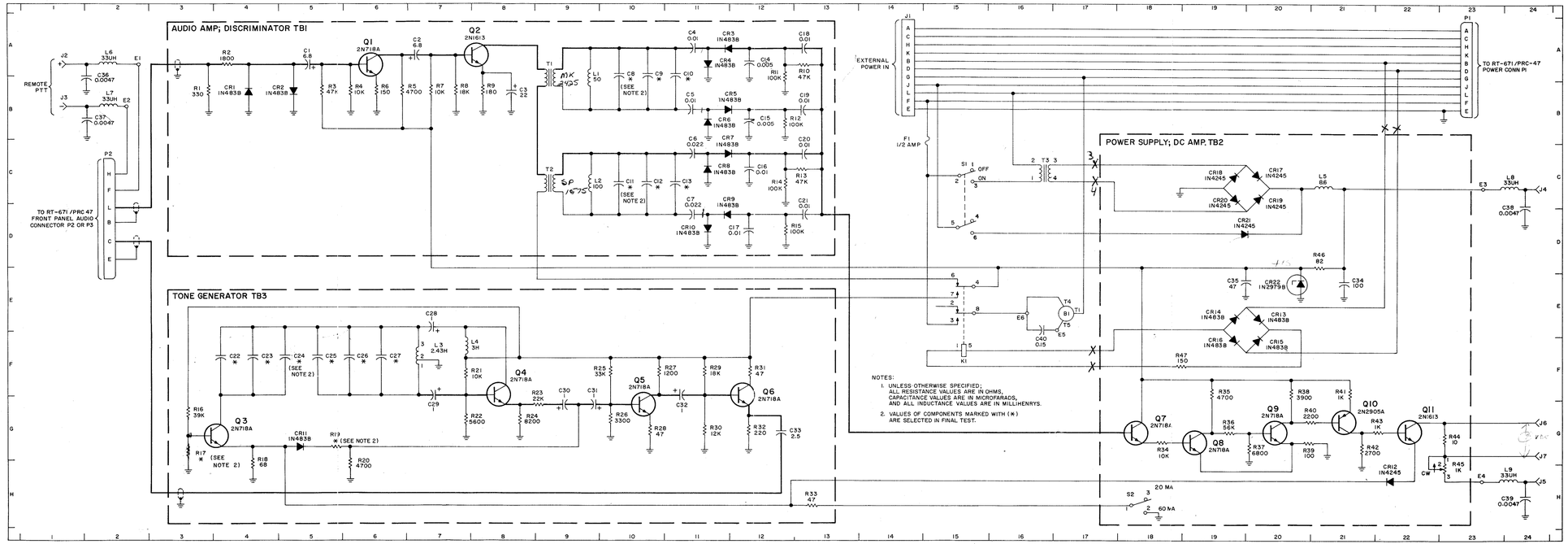

Figure 5-5. Converter-Blower CV-2455/PRC-47, Schematic Diagram

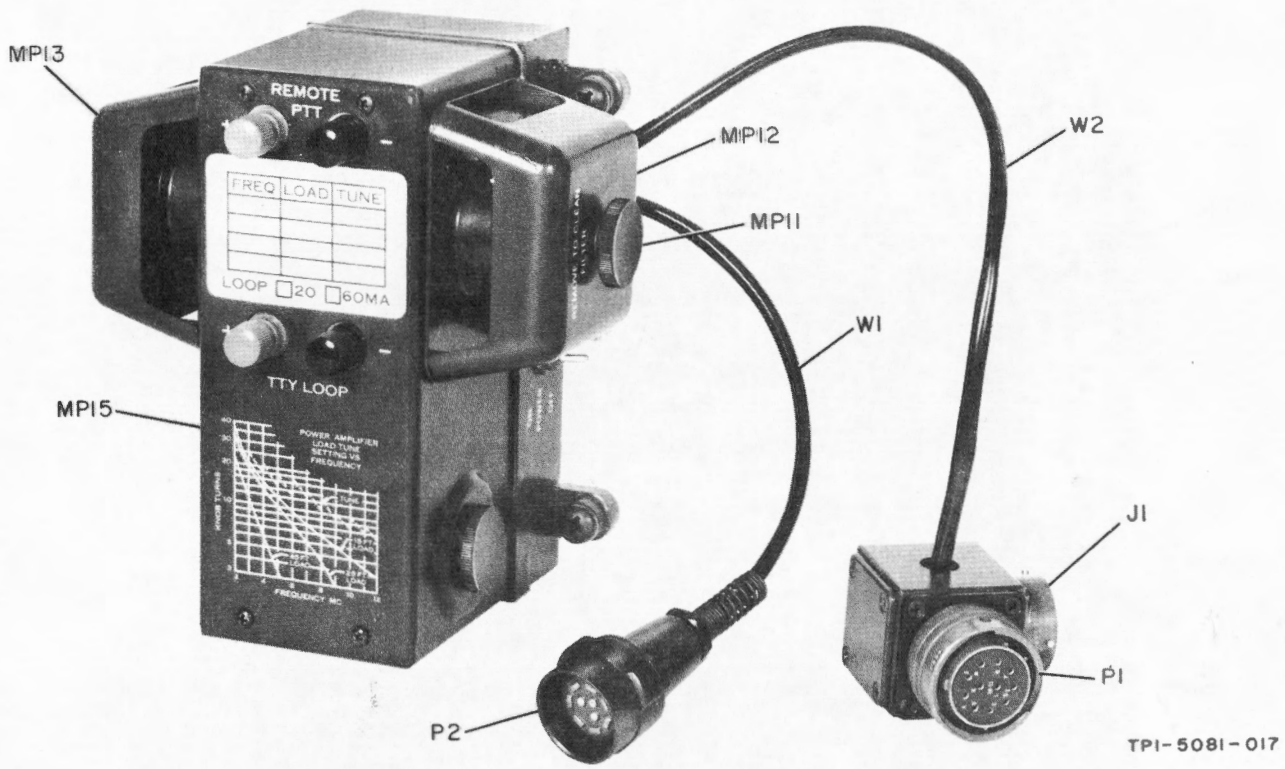

Figure 5-6. CV-2455/PRC-47, External Connection Identification

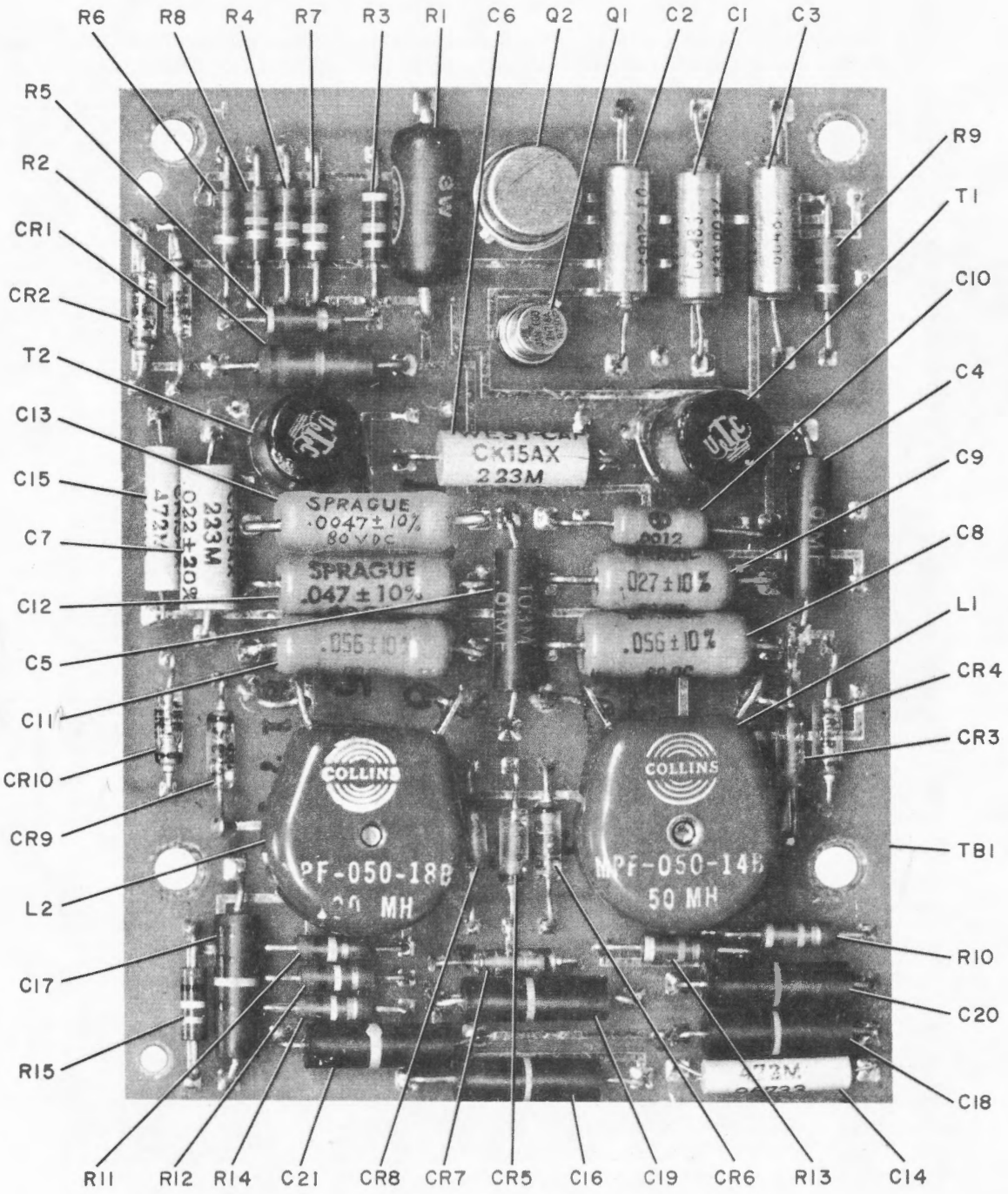

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Figure 5-7. Amplifier Discriminator (TB1), Parts Location

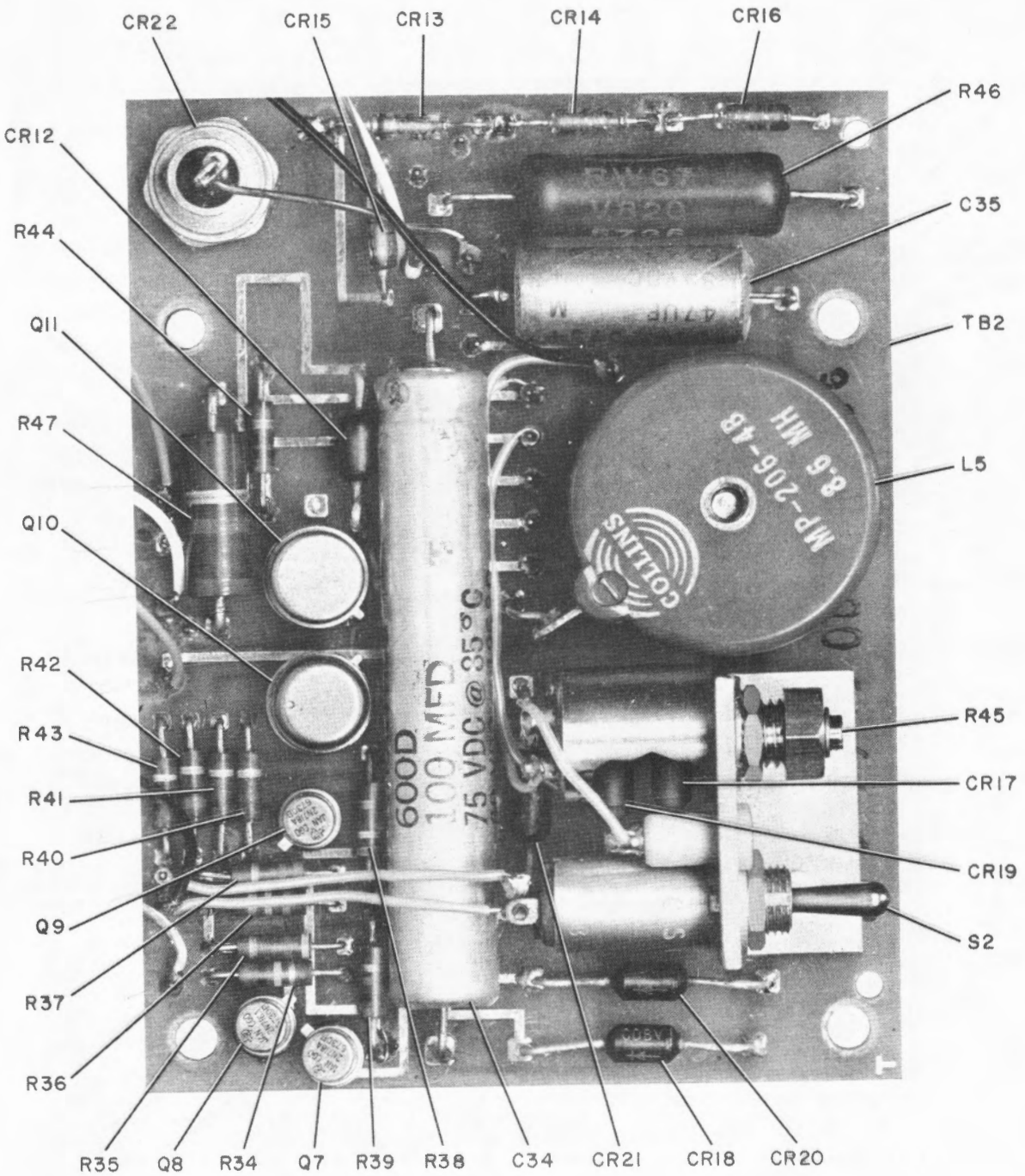

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Figure 5-8. Power Supply Amplifier (TB2), Parts Location

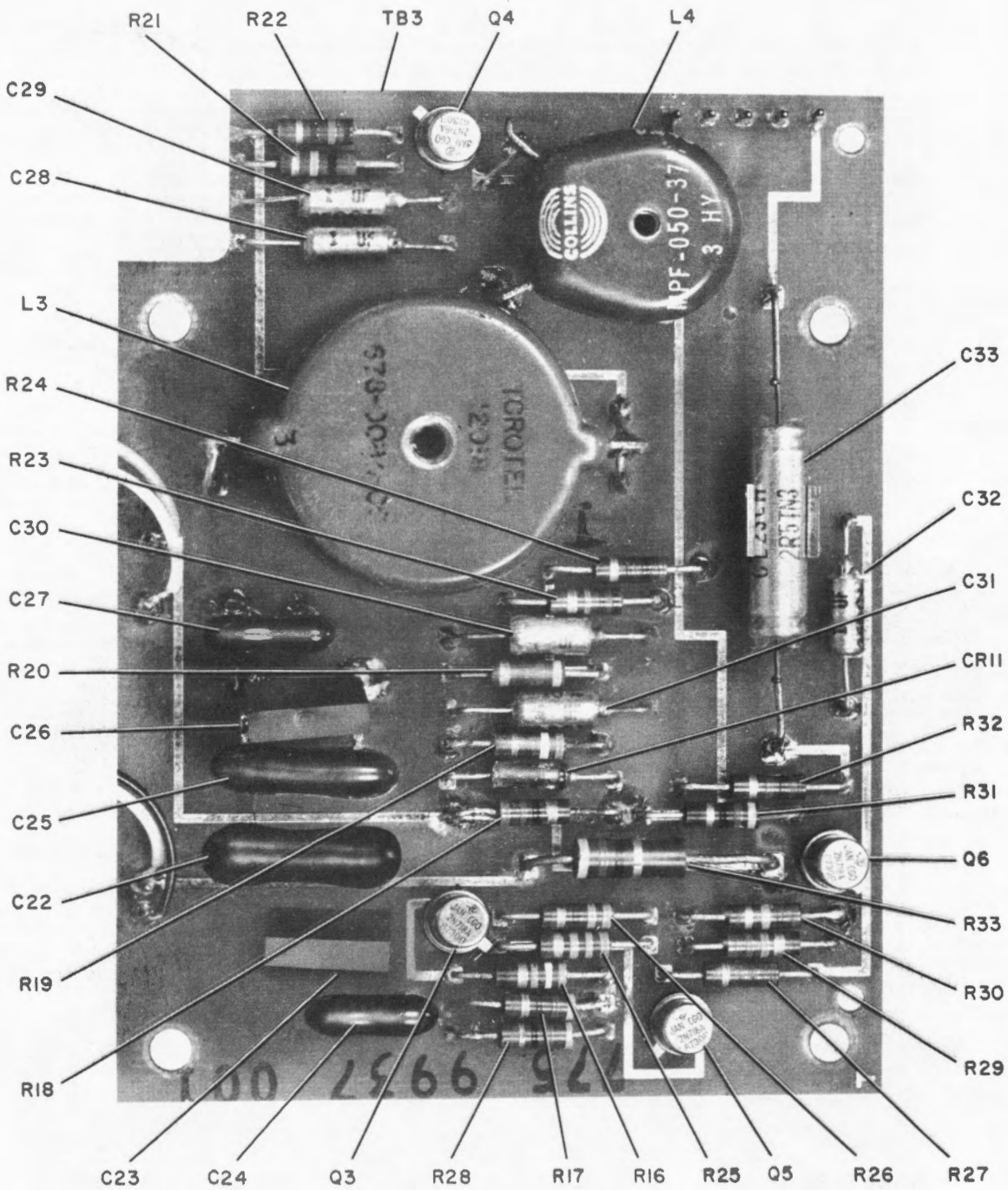

Figure 5-9. Tone Generator (TB3), Parts Location

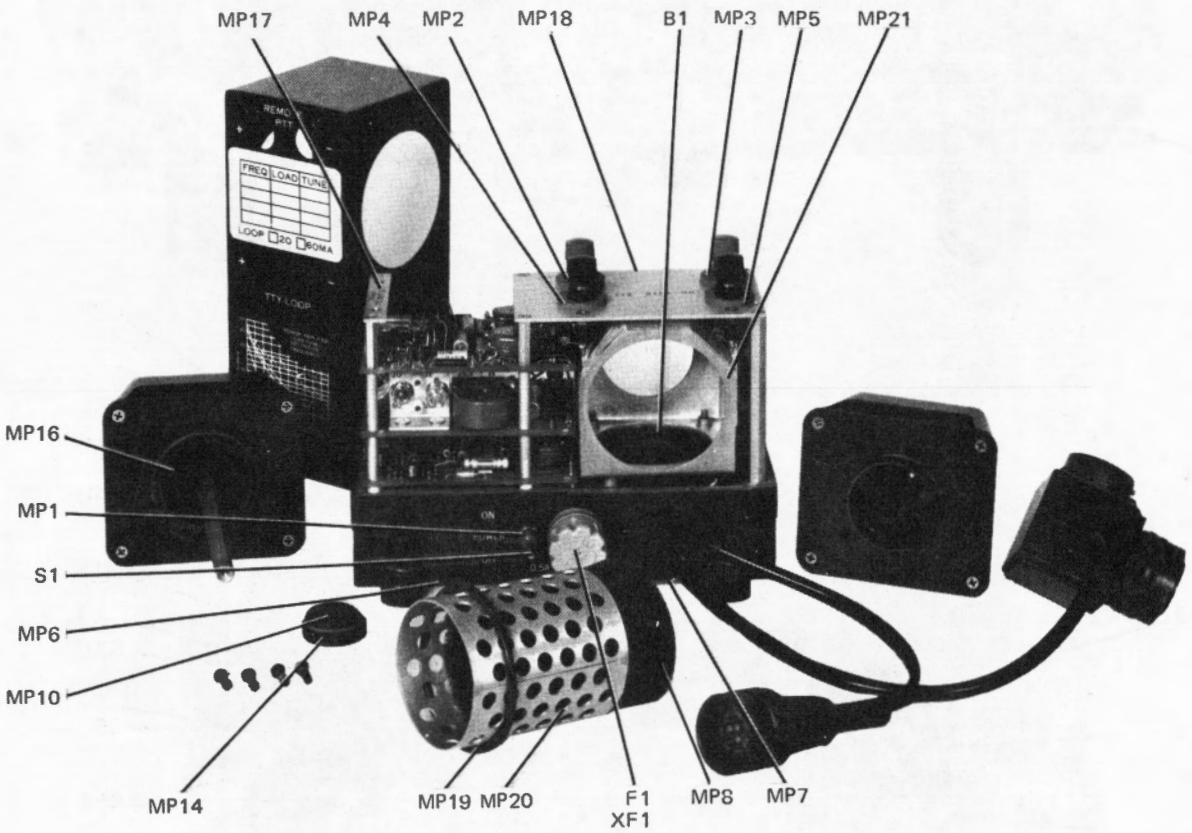

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Figure 5-10. Converter/Blower CV-2455/PRC-47, Chassis With Cover Removed

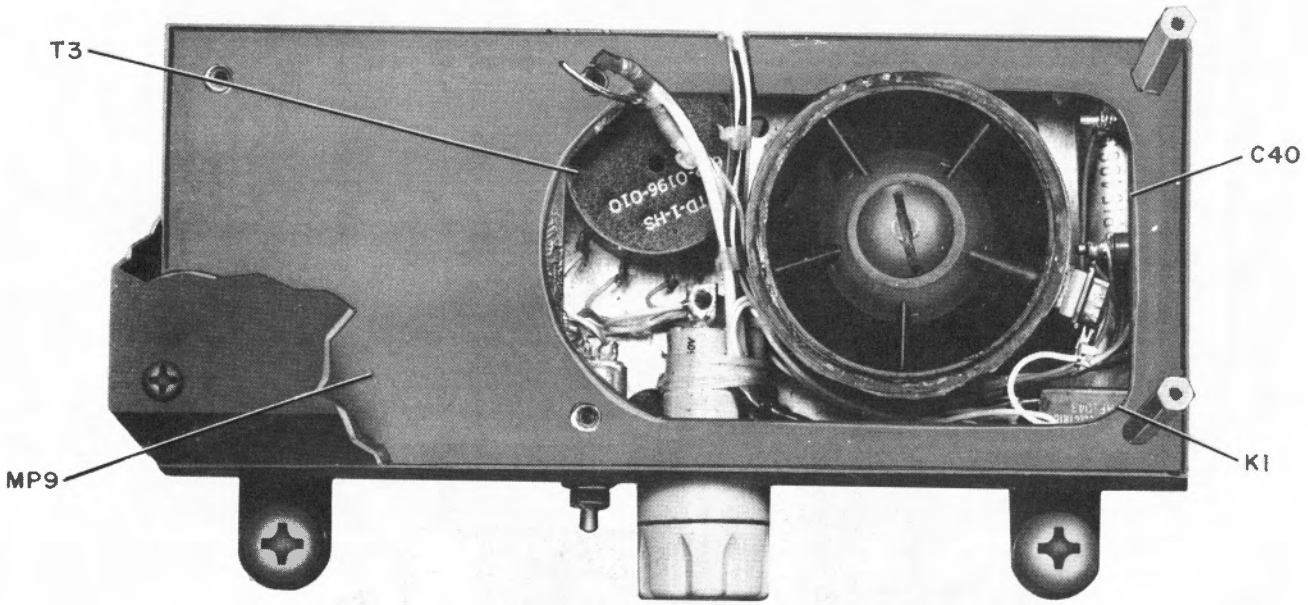

Figure 5-11. CV-2455/PRC-47, Disassembled Chassis, Parts Location

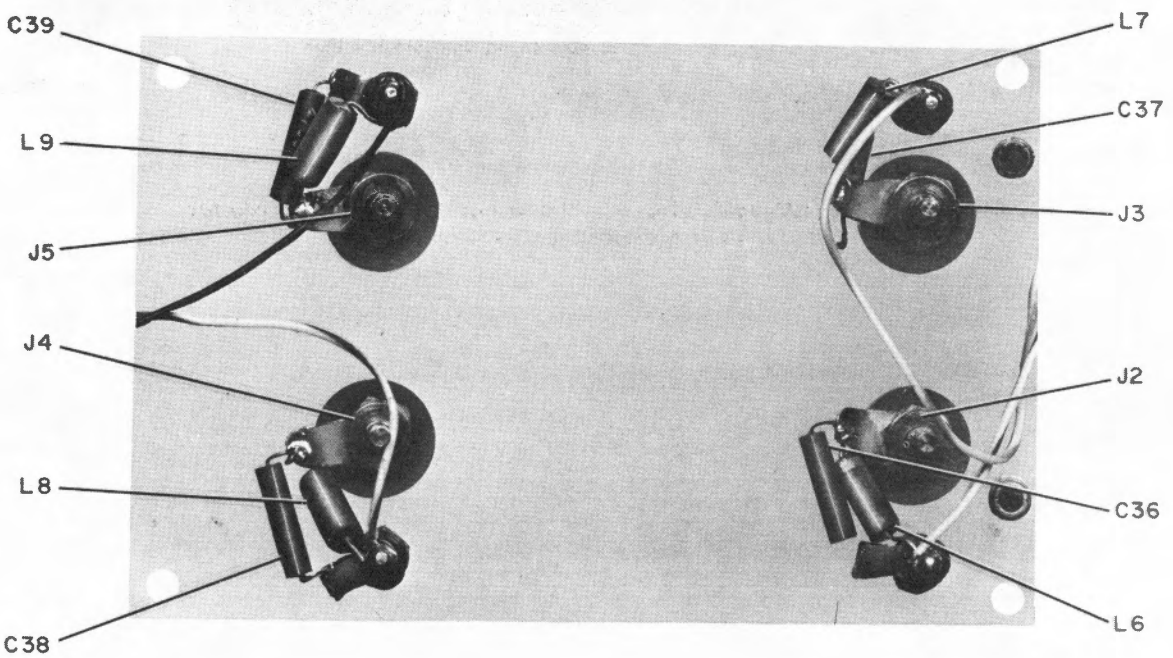

Figure 5-12. Terminal Post Support, Rear View, Chassis, Parts Location

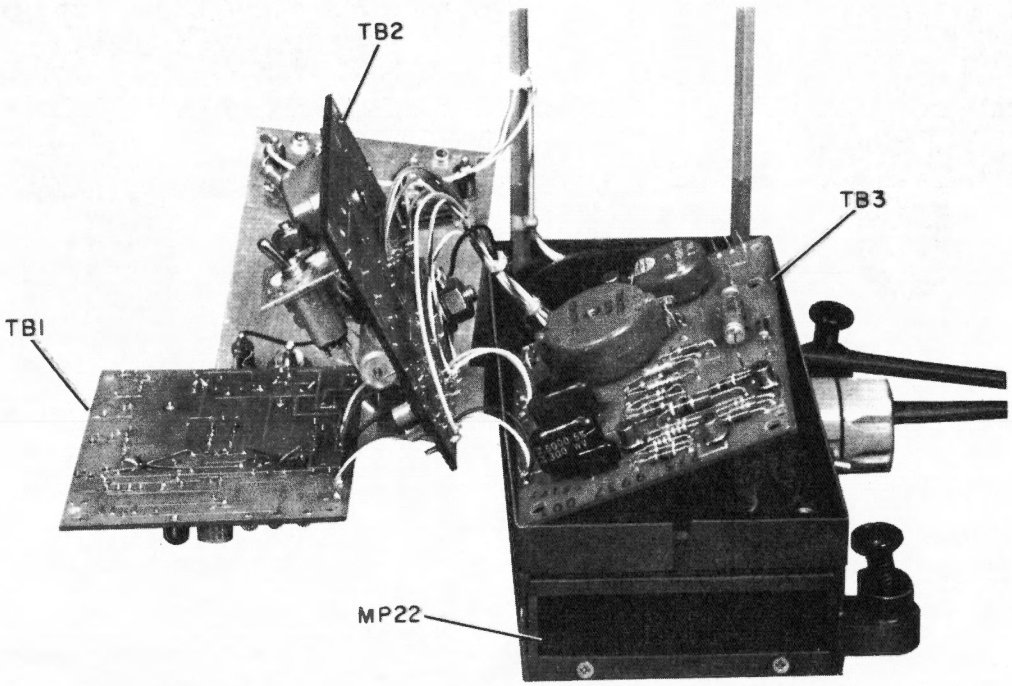

Figure 5-13. CV-2455/PRC-47, Disassembled Circuit Boards for Periodic Maintenance Procedures

SECTION 6

PARTS LIST

6-1. INTRODUCTION.

a. REFERENCE DESIGNATIONS. - Reference designations for the CV-2455 employ only the class and item number.

b. REFERENCE DESIGNATION PREFIX. - Reference designation prefixes are not applicable.

6-2. LIST OF UNITS.

Table 6-1 is a listing of the major assemblies comprising the CV-2455. They are listed in reference designation order. Table 6-1 provides reference designation, colloquial name, location of the first page of each assembly listing in table 6-2, and reference to the applicable parts location illustration.

6-3. MAINTENANCE PARTS LIST.

Table 6-2 lists all major assemblies and their maintenance parts. The assemblies are listed in reference designation order, and the parts are listed in alphanumerical reference designation order following each assembly. Table 6-2 provides a reference designation for each maintenance part, noun name and brief description, and a reference to the applicable parts location illustration.

6-4. LIST OF MANUFACTURERS.

Table 6-3 lists the manufacturers of parts used in the CV-2455. The table includes the manufacturer's code, as listed in table 6-2, and the manufacturer's name and address.

TABLE 6-1. LIST OF UNITS

REFERENCE DESIGNATION	COLLOQUIAL NAME	PAGE	PARTS LOCATION FIGURES
	Chassis		5-6, 5-10, 5-11, 5-12
TB1	Amplifier-Discriminator		5-7
TB2	Power Supply Amplifier		5-8
TB3	Tone Generator		5-9

TABLE 6-2. MAINTENANCE PARTS LIST

CHASSIS

REF DESIG	NAME AND DESCRIPTION	FIG NO
B1	FAN, VANEAXIAL: Mfr code 82877 part no AO-19446	5-10
C36 THRU C39	CAPACITOR, FXD: 4700 pF 20%, 100 vdcw; MIL type CK13AX472M	5-12
C40	CAPACITOR, FXD: 0.15 uF 20%, 600 vdcw; mfr code 56289 part no 118P15406S4	5-11
F1	FUSE, CARTRIDGE: MIL type F02B250V1-2AS	5-10

TABLE 6-2. (Continued)

CHASSIS

REF DESIG	NAME AND DESCRIPTION	FIG NO
J1	CONNECTOR, RECP: MS type MS3112E-18-11P	5-6
J2	POST, BINDING: Mfr code 83330 part no 378R	5-12
J3	POST, BINDING: Mfr code 83330 part no 378B	5-12
J4	POST, BINDING: Same as J2	5-12
J5	POST, BINDING: Same as J3	5-12
K1	RELAY, ARM.: Mfr code 01526 part no 3SAF1043	5-11
L6 THRU L9	COIL, RF: 33 uH; mfr code 99800 part no 1537-52	5-12
MP1	BOOT, DUST: Mfr code 97539 part no N5030B	5-10
MP2 THRU MP5	GASKET: Mfr code 13499 part no 772-8167-001	5-10
MP6	GASKET: Mfr code 13499 part no 772-8170-001	5-10
MP7	GASKET: Mfr code 13499 part no 772-8171-001	5-10
MP8	FILTER: Mfr code 13499 part no 772-8168-001	5-10
MP9	GASKET: Mfr code 13499 part no 772-8177-001	5-11
MP10	GASKET, O-RING: Mfr code 02697 part no 2-19 COMPS383-7	5-10
MP11	THUMBSCREW ASSY: Mfr code 13499 part no 772-7243-001	5-6
MP12	MANIFOLD ASSY, RH: Consists of mfr code 13499 part no 772-8165-001 and 772-8166-001	5-6
MP13	MANIFOLD ASSY, LH: Same as MP12	5-6
MP14	PLUG, ACCESS: Mfr code 13499 part no 772-7245-001	5-10
MP15	COVER, CONVERTER: Mfr code 13499 part no 772-8160-001	5-6
MP16	GASKET, O-RING: Mfr code 02697 part no ARP568-222	5-10
MP17	PLATE, COVER, MTG: Mfr code 13499 part no 772-8158-001	5-10
MP18	PLATE, MTG: Mfr code 13499 part no 772-8156-001	5-10
MP19	GASKET, O-RING: Mfr code 02697 part no ARP568-227	5-10
MP20	CAGE, FILTER: Mfr code 13499 part no 772-8161-001	5-10
MP21	TRANSITION, BLOWER MANIFOLD: Mfr code 13499 part no 772-8154-001	5-10
MP22	SCREEN, EXHAUST: Mfr code 13499 part no 767-1980-001	5-13
P1	CONNECTOR, PLUG: MS type MS3116P-18-11S	5-6
P2	CONNECTOR, PLUG: Mfr code 02660 part no 164-28	5-6
S1	SWITCH, TOGGLE: Mfr code 09353 part no 7201S	5-10
T3	TRANSFORMER, PWR: Mfr code 04879 part no TTD1HS	5-11
W1	WIRING HARNESS: Mfr code 13499 part no 772-8173-001 (includes P2)	5-6
W2	WIRING HARNESS: Mfr code 13499 part no 772-8174-001 (includes J1 and P1)	5-6
XF1	FUSEHOLDER: MIL type FHM26W	5-10

AMPLIFIER-DISCRIMINATOR, 775-9935-001

C1	CAPACITOR, FXD: 6.8 uF 20%, 35 vdcw: MIL type CSR13F685ML	5-7
C2	CAPACITOR, FXD: Same as C1	5-7
C3	CAPACITOR, FXD: 22 uF 20%, 15 vdcw; MIL type CSR13D226ML	5-7
C4	CAPACITOR, FXD: 10,000 pF 20%, 100 vdcw; MIL type CK14AX103M	5-7
C5	CAPACITOR, FXD: Same as C4	5-7
C6	CAPACITOR, FXD: 22,000 pF 20%, 100 vdcw; MIL type CK15AX223M	5-7
C7	CAPACITOR, FXD: Same as C6	5-7

TABLE 6-2. (Continued)

AMPLIFIER-DISCRIMINATOR, 775-9935-001

REF DESIG	NAME AND DESCRIPTION	FIG NO
*C8	CAPACITOR, FXD: 0.047 uF 10%, 80 vdcw; mfr code 56289 part no 192P4739R8	5-7
*C8	CAPACITOR, FXD: 0.068 uF 10%, 80 vdcw; mfr code 56289 part no 192P6839R8	5-7
*C8	CAPACITOR, FXD: 0.1 uF 10%, 80 vdcw; mfr code 56289 part no 192P1049R8	5-7
*C8	CAPACITOR, FXD: 0.039 uF 10%, 80 vdcw; mfr code 56289 part no 192P3939R8	5-7
*C8	CAPACITOR, FXD: 0.056 uF 10%, 80 vdcw; mfr code 56289 part no 192P5639R8	5-7
*C8	CAPACITOR, FXD: 0.082 uF 10%, 80 vdcw; mfr code 56289 part no 192P8239R8	5-7
*C9	CAPACITOR, FXD: 0.027 uF 10%, 80 vdcw; mfr code 56289 part no 192P2739R8	5-7
*C9	CAPACITOR, FXD: 0.0047 uF 10%, 80 vdcw; mfr code 56289 part no 192P4729R8	5-7
*C9	CAPACITOR, FXD: 0.0068 uF 10%, 80 vdcw; mfr code 56289 part no 192P6829R8	5-7
*C9	CAPACITOR, FXD: 0.01 uF 10%, 80 vdcw; mfr code 56289 part no 192P1039R8	5-7
*C9	CAPACITOR, FXD: 0.015 uF 10%, 80 vdcw; mfr code 56289 part no 192P1539R8	5-7
*C9	CAPACITOR, FXD: 0.022 uF 10%, 80 vdcw; mfr code 56289 part no 192P2239R8	5-7
*C9	CAPACITOR, FXD: 0.033 uF 10%, 80 vdcw; mfr code 56289 part no 192P3339R8	5-7
*C9	CAPACITOR, FXD: 0.0012 uF 10%, 80 vdcw; mfr code 56289 part no 192P1229R8	5-7
*C9	CAPACITOR, FXD: 0.0015 uF 10%, 80 vdcw; mfr code 56289 part no 192P1529R8	5-7
*C9	CAPACITOR, FXD: 0.0027 uF 10%, 80 vdcw; mfr code 56289 part no 192P2729R8	5-7
*C9	CAPACITOR, FXD: 0.0039 uF 10%, 80 vdcw; mfr code 56289 part no 192P3929R8	5-7
*C9	CAPACITOR, FXD: 0.0056 uF 10%, 80 vdcw; mfr code 56289 part no 192P5629R8	5-7
*C10	CAPACITOR, FXD: 0.0047 uF 10%, 80 vdcw; mfr code 56289 part no 192P4729R8	5-7
*C10	CAPACITOR, FXD: 0.0068 uF 10%, 80 vdcw; mfr code 56289 part no 192P6829R8	5-7
*C10	CAPACITOR, FXD: 0.0039 uF 10%, 80 vdcw; mfr code 56289 part no 192P3929R8	5-7
*C10	CAPACITOR, FXD: 0.0056 uF 10%, 80 vdcw; mfr code 56289 part no 192P5629R8	5-7
*C11	CAPACITOR, FXD: 0.068 uF 10%, 80 vdcw; mfr code 56289 part no 192P6839R8	5-7
*C11	CAPACITOR, FXD: 0.1 uF 10%, 80 vdcw; mfr code 56289 part no 192P1049R8	5-7
*C11	CAPACITOR, FXD: 0.082 uF 10%, 80 vdcw; mfr code 56289 part no 192P8239R8	5-7
*C12	CAPACITOR, FXD: 0.027 uF 10%, 80 vdcw; mfr code 56289 part no 192P2739R8	5-7
*C12	CAPACITOR, FXD: 0.0047 uF 10%, 80 vdcw; mfr code 56289 part no 192P4729R8	5-7
*C12	CAPACITOR, FXD: 0.0068 uF 10%, 80 vdcw; mfr code 56289 part no 192P6829R8	5-7
*C12	CAPACITOR, FXD: 0.01 uF 10%, 80 vdcw; mfr code 56289 part no 192P1039R8	5-7
*C12	CAPACITOR, FXD: 0.015 uF 10%, 80 vdcw; mfr code 56289 part no 192P1539R8	5-7
*C12	CAPACITOR, FXD: 0.033 uF 10%, 80 vdcw; mfr code 56289 part no 192P3339R8	5-7
*C12	CAPACITOR, FXD: 0.047 uF 10%, 80 vdcw; mfr code 56289 part no 192P4739R8	5-7
*C12	CAPACITOR, FXD: 0.0039 uF 10%, 80 vdcw; mfr code 56289 part no 192P3929R8	5-7
*C12	CAPACITOR, FXD: 0.0056 uF 10%, 80 vdcw; mfr code 56289 part no 192P5629R8	5-7
*C12	CAPACITOR, FXD: 0.039 uF 10%, 80 vdcw; mfr code 56289 part no 192P3939R8	5-7
*C12	CAPACITOR, FXD: 0.056 uF 10%, 80 vdcw; mfr code 56289 part no 192P5639R8	5-7
C13	CAPACITOR, FXD: Same as C9	5-7
C14	CAPACITOR, FXD: Same as C36	5-7
C15	CAPACITOR, FXD: Same as C36	5-7
C16 THRU C21	CAPACITOR, FXD: Same as C4	5-7
CR1 THRU CR10	SEMICOND DEVICE: JAN type JAN1N483B	5-7
L1	REACTOR: 50 mH; mfr code 07388 part no 13080	5-7
L2	REACTOR: 100 mH; mfr code 07388 part no 13084	5-7
Q1	TRANSISTOR: JAN type JAN2N718A	5-7

*Select at Test

TABLE 6-2. (Continued)

AMPLIFIER-DISCRIMINATOR, 775-9935-001

REF DESIG	NAME AND DESCRIPTION	FIG NO
Q2	TRANSISTOR: JAN type JAN2N1613	5-7
R1	RESISTOR, FXD: 330 ohms 5%, 3 w; MIL type RW69V331	5-7
R2	RESISTOR, FXD: 1800 ohms 10%, 1/2 w; MIL type RC20GF182K	5-7
R3	RESISTOR, FXD: 47,000 ohms 10%, 1/4 w; MIL type RC07GF473K	5-7
R4	RESISTOR, FXD: 10,000 ohms 10%, 1/4 w; MIL type RC07GF103K	5-7
R5	RESISTOR, FXD: 4700 ohms 10%, 1/4 w; MIL type RC07GF472K	5-7
R6	RESISTOR, FXD: 150 ohms 10%, 1/4 w; MIL type RC07GF151K	5-7
R7	RESISTOR, FXD: Same as R4	5-7
R8	RESISTOR, FXD: 18,000 ohms 10%, 1/4 w; MIL type RC07GF183K	5-7
R9	RESISTOR, FXD: 180 ohms 10%, 1/4 w; MIL type RC07GF181K	5-7
R10	RESISTOR, FXD: Same as R3	5-7
R11	RESISTOR, FXD: 0.1 megohm 10%, 1/4 w; MIL type RC07GF104K	5-7
R12	RESISTOR, FXD: Same as R11	5-7
R13	RESISTOR, FXD: Same as R3	5-7
R14	RESISTOR, FXD: Same as R11	5-7
R15	RESISTOR, FXD: Same as R11	5-7
T1	TRANSFORMER AF: Mfr code 80223 part no D0T24	5-7
T2	TRANSFORMER AF: Same as T1	5-7

POWER SUPPLY AMPLIFIER, 775-9945-001

C34	CAPACITOR, FXD: 100 uF P75M10%, 75 vdcw; mfr code 56289 part no 600D107G075DL4	5-8
C35	CAPACITOR, FXD: 47 uF 20%, 35 vdcw; MIL type CSR13F476ML	5-8
CR12	RECTIFIER, SEMICOND: JAN type JAN1N4245	5-8
CR13 THRU CR16	SEMICOND DEVICE: Same as CR1	5-8
CR17 THRU CR21	RECTIFIER, SEMICOND: Same as CR12	5-8
CR22	SEMICOND DEVICE: JAN type JAN1N 2979B	5-8
L5	COIL, RF: 8.6 mH; mfr code 11402 part no MR2A03	5-8
Q7 THRU Q9	TRANSISTOR: Same as Q1	5-8
Q10	TRANSISTOR: JAN type JAN2N2905A	5-8
Q11	TRANSISTOR: Same as Q2	5-8
R34	RESISTOR, FXD: Same as R4	5-8
R35	RESISTOR, FXD: Same as R5	5-8
R36	RESISTOR, FXD: 56,000 ohms 10%, 1/4 w; MIL type RC07GF563K	5-8
R37	RESISTOR, FXD: 6800 ohms 10%, 1/4 w; MIL type RC07GF682K	5-8
R38	RESISTOR, FXD: 3900 ohms 10%, 1/4 w; MIL type RC07GF392K	5-8
R39	RESISTOR, FXD: 100 ohms 10%, 1/4 w; MIL type RC07GF101K	5-8
R40	RESISTOR, FXD: 2200 ohms 10%, 1/4 w; MIL type RC07GF222K	5-8
R41	RESISTOR, FXD: 1,000 ohms 10%, 1/4 w; MIL type RC07GF102K	5-8
R42	RESISTOR, FXD: 2700 ohms 10%, 1/4 w; MIL type RC07GF272K	5-8
R43	RESISTOR, FXD: Same as R41	5-8
R44	RESISTOR, FXD: 10 ohms 10%, 1/4 w; MIL type RC07GF100K	5-8

TABLE 6-2. (Continued)

POWER SUPPLY AMPLIFIER, 775-9945-001

REF DESIG	NAME AND DESCRIPTION	FIG NO
R45	RESISTOR, VAR: 1000 ohms 5%, 2 w; mfr code 12697 part no 57M9	5-8
R46	RESISTOR, FXD: 82 ohms 5%, 6.5 w; MIL type RW67V820	5-8
R47	RESISTOR, FXD: 150 ohms 10%, 1 w; MIL type RC32GF151K	5-8
S2	SWITCH, TOGGLE: Mfr code 09353 part no 7101S	5-8

TONE GENERATOR, 775-9937-001

*C22	CAPACITOR, FXD: 3600 pF 5%, 500 vdcw; MIL type CM06F362J03	5-9
*C22	CAPACITOR, FXD: 4300 pF 5%, 500 vdcw; MIL type CM06F432J03	5-9
*C22	CAPACITOR, FXD: 5000 pF 5%, 300 vdcw; mfr code 72136 part no DM19F502J03	5-9
*C22	CAPACITOR, FXD: 4700 pF 5%, 500 vdcw; MIL type CM06F472J03	5-9
*C23	CAPACITOR, FXD: 430 pF 10%, 150 vdcw; mfr code 90634 part no TC430-16	5-9
*C23	CAPACITOR, FXD: 470 pF 10%, 150 vdcw; mfr code 90634 part no TC470-39	5-9
*C23	CAPACITOR, FXD: 510 pF 10%, 150 vdcw; mfr code 90634 part no TC510-19	5-9
*C23	CAPACITOR, FXD: 560 pF 10%, 150 vdcw; mfr code 90634 part no TC560-14	5-9
*C23	CAPACITOR, FXD: 620 pF 10%, 150 vdcw; mfr code 90634 part no TC620-6	5-9
*C23	CAPACITOR, FXD: 680 pF 10%, 150 vdcw; mfr code 90634 part no TC680-19	5-9
*C23	CAPACITOR, FXD: 750 pF 10%, 150 vdcw; mfr code 90634 part no TC750-11	5-9
*C23	CAPACITOR, FXD: 820 pF 10%, 150 vdcw; mfr code 90634 part no TC820-10	5-9
*C23	CAPACITOR, FXD: 910 pF 10%, 150 vdcw; mfr code 90634 part no TC910-4	5-9
*C23	CAPACITOR, FXD: 820 pF 5%, 500 vdcw; MIL type CM06FD821J03	5-9
*C23	CAPACITOR, FXD: 910 pF 5%, 500 vdcw; MIL type CM06FD911J03	5-9
*C24	CAPACITOR, FXD: 10 pF 5%, 500 vdcw; MIL type CM05CD100D03	5-9
*C24	CAPACITOR, FXD: 20 pF 5%, 500 vdcw; MIL type CM05ED200J03	5-9
*C24	CAPACITOR, FXD: 30 pF 5%, 500 vdcw; MIL type CM05ED300J03	5-9
*C24	CAPACITOR, FXD: 39 pF 5%, 500 vdcw; MIL type CM05ED390J03	5-9
*C24	CAPACITOR, FXD: 47 pF 5%, 500 vdcw; MIL type CM05ED470J03	5-9
*C24	CAPACITOR, FXD: 56 pF 5%, 500 vdcw; MIL type CM05ED560J03	5-9
*C24	CAPACITOR, FXD: 68 pF 5%, 500 vdcw; MIL type CM05ED680J03	5-9
*C24	CAPACITOR, FXD: 75 pF 5%, 500 vdcw; MIL type CM05ED750J03	5-9
*C24	CAPACITOR, FXD: 82 pF 5%, 500 vdcw; MIL type CM05ED820J03	5-9
*C24	CAPACITOR, FXD: 91 pF 5%, 500 vdcw; MIL type CM05FD910J03	5-9
*C24	CAPACITOR, FXD: 100 pF 5%, 500 vdcw; MIL type CM05F101J03	5-9
*C24	CAPACITOR, FXD: 110 pF 5%, 500 vdcw; MIL type CM05F111J03	5-9
*C24	CAPACITOR, FXD: 120 pF 5%, 500 vdcw; MIL type CM05F121J03	5-9
*C24	CAPACITOR, FXD: 130 pF 5%, 500 vdcw; MIL type CM05F131J03	5-9
*C24	CAPACITOR, FXD: 150 pF 5%, 500 vdcw; MIL type CM05F151J03	5-9
*C24	CAPACITOR, FXD: 160 pF 5%, 500 vdcw; MIL type CM05F161J03	5-9
*C24	CAPACITOR, FXD: 180 pF 5%, 500 vdcw; MIL type CM05F181J03	5-9
*C24	CAPACITOR, FXD: 200 pF 5%, 500 vdcw; MIL type CM05F201J03	5-9
*C24	CAPACITOR, FXD: 220 pF 5%, 500 vdcw; MIL type CM05F221J03	5-9
*C24	CAPACITOR, FXD: 240 pF 5%, 500 vdcw; MIL type CM05F241J03	5-9
*C24	CAPACITOR, FXD: 270 pF 5%, 500 vdcw; MIL type CM05F271J03	5-9
*C24	CAPACITOR, FXD: 300 pF 5%, 500 vdcw; MIL type CM05F301J03	5-9
*C24	CAPACITOR, FXD: 330 pF 5%, 500 vdcw; MIL type CM05F331J03	5-9
*C24	CAPACITOR, FXD: 360 pF 5%, 500 vdcw; MIL type CM05F361J03	5-9
*C24	CAPACITOR, FXD: 390 pF 5%, 500 vdcw; MIL type CM05F391J03	5-9

*Select at test

TABLE 6-2. (Continued)

TONE GENERATOR, 775-9937-001

REF DESIG	NAME AND DESCRIPTION	FIG NO
*C25	CAPACITOR, FXD: 1,000 pF 5%, 500 vdcw; MIL type CM06FD102J03	5-9
*C25	CAPACITOR, FXD: 1500 pF 5%, 500 vdcw; MIL type CM06FD152J03	5-9
*C25	CAPACITOR, FXD: 2000 pF 5%, 500 vdcw; MIL type CM06FD202J03	5-9
*C25	CAPACITOR, FXD: 2500 pF 5%, 500 vdcw; mfr code 72136 part no DM19F252J03	5-9
*C25	CAPACITOR, FXD: 3000 pF 5%, 500 vdcw; MIL type CM06FD302J03	5-9
*C26	CAPACITOR, FXD: Same as C23	5-9
*C27	CAPACITOR, FXD: Same as C24	5-9
C28 THRU C32	CAPACITOR, FXD: 1 uF 10%, 35 vdcw; mfr code 56289 part no 150D105X9035A2	5-9
C33	CAPACITOR, FXD: 2.5 uF P50M15%, 30 vdcw; mfr code 56289 part no 123D255C5030E1	5-9
CR11	SEMICOND DEVICE: Same as CR1	5-9
L3	REACTOR: 2.43 H; mfr code 07388 part no 12018	5-9
L4	REACTOR: 3000 mH; mfr code 07388 part no 13103	5-9
Q3 THRU Q6	TRANSISTOR: Same as Q1	5-9
R16	RESISTOR, FXD: 39,000 ohms 10%, 1/4 w; MIL type RC07GF393K	5-9
*R17	RESISTOR, FXD: 4700 ohms 10%, 1/4 w; MIL type RC07GF472K	5-9
*R17	RESISTOR, FXD: 5600 ohms 10%, 1/4 w; MIL type RC07GF562K	5-9
*R17	RESISTOR, FXD: 5100 ohms 5%, 1/4 w; MIL type RC07GF512J	5-9
*R17	RESISTOR, FXD: 6200 ohms 5%, 1/4 w; MIL type RC07GF622J	5-9
R18	RESISTOR, FXD: 68 ohms 10%, 1/4 w; MIL type RC07GF680K	5-9
*R19	RESISTOR, FXD: 1500 ohms 10%, 1/4 w; MIL type RC07GF152K	5-9
*R19	RESISTOR, FXD: 1600 ohms 5%, 1/4 w; MIL type RC07GF162J	5-9
*R19	RESISTOR, FXD: 1800 ohms 5%, 1/4 w; MIL type RC07GF182J	5-9
*R19	RESISTOR, FXD: 1800 ohms 10%, 1/4 w; MIL type RC07GF182K	5-9
*R19	RESISTOR, FXD: 2000 ohms 5%, 1/4 w; MIL type RC07GF202J	5-9
*R19	RESISTOR, FXD: 2200 ohms 5%, 1/4 w; MIL type RC07GF222J	5-9
*R19	RESISTOR, FXD: 2200 ohms 10%, 1/4 w; MIL type RC07GF222K	5-9
*R19	RESISTOR, FXD: 2400 ohms 5%, 1/4 w; MIL type RC07GF242J	5-9
*R19	RESISTOR, FXD: 2700 ohms 5%, 1/4 w; MIL type RC07GF272J	5-9
*R19	RESISTOR, FXD: 2700 ohms 10%, 1/4 w; MIL type RC07GF272K	5-9
*R19	RESISTOR, FXD: 3000 ohms 5%, 1/4 w; MIL type RC07GF302J	5-9
*R19	RESISTOR, FXD: 3300 ohms 5%, 1/4 w; MIL type RC07GF332J	5-9
*R19	RESISTOR, FXD: 3300 ohms 10%, 1/4 w; MIL type RC07GF332K	5-9
*R19	RESISTOR, FXD: 3600 ohms 5%, 1/4 w; MIL type RC07GF362J	5-9
*R19	RESISTOR, FXD: 3900 ohms 5%, 1/4 w; MIL type RC07GF392J	5-9
*R19	RESISTOR, FXD: 3900 ohms 10%, 1/4 w; MIL type RC07GF392K	5-9
*R19	RESISTOR, FXD: 4300 ohms 5%, 1/4 w; MIL type RC07GF432J	5-9
*R19	RESISTOR, FXD: 4700 ohms 5%, 1/4 w; MIL type RC07GF472J	5-9
*R19	RESISTOR, FXD: 4700 ohms 10%, 1/4 w; MIL type RC07GF472K	5-9
*R19	RESISTOR, FXD: 5100 ohms 5%, 1/4 w; MIL type RC07GF512J	5-9
*R19	RESISTOR, FXD: 5600 ohms 5%, 1/4 w; MIL type RC07GF562J	5-9
*R19	RESISTOR, FXD: 5600 ohms 10%, 1/4 w; MIL type RC07GF562K	5-9
*R19	RESISTOR, FXD: 6200 ohms 5%, 1/4 w; MIL type RC07GF622J	5-9
*R19	RESISTOR, FXD: 6800 ohms 5%, 1/4 w; MIL type RC07GF682J	5-9
*R19	RESISTOR, FXD: 6800 ohms 10%, 1/4 w; MIL type RC07GF682K	5-9

*Select at test

TABLE 6-2. (Continued)

TONE GENERATOR, 775-9937-001

REF DESIG	NAME AND DESCRIPTION	FIG NO
*R19	RESISTOR, FXD: 7500 ohms 5%, 1/4 w; MIL type RC07GF752J	5-9
*R19	RESISTOR, FXD: 8200 ohms 5%, 1/4 w; MIL type RC07GF822J	5-9
*R19	RESISTOR, FXD: 8200 ohms 10%, 1/4 w; MIL type RC07GF822K	5-9
*R19	RESISTOR, FXD: 9100 ohms 5%, 1/4 w; MIL type RC07GF912J	5-9
*R19	RESISTOR, FXD: 10,000 ohms 5%, 1/4 w; MIL type RC07GF103J	5-9
*R19	RESISTOR, FXD: 10,000 ohms 10%, 1/4 w; MIL type RC07GF103K	5-9
R20	RESISTOR, FXD: Same as R5	5-9
R21	RESISTOR, FXD: Same as R4	5-9
R22	RESISTOR, FXD: 5600 ohms 10%, 1/4 w; MIL type RC07GF562K	5-9
R23	RESISTOR, FXD: 22,000 ohms 10%, 1/4 w; MIL type RC07GF223K	5-9
R24	RESISTOR, FXD: 8200 ohms 10%, 1/4 w; MIL type RC07GF822K	5-9
R25	RESISTOR, FXD: 33,000 ohms 10%, 1/4 w; MIL type RC07GF333K	5-9
R26	RESISTOR, FXD: 3300 ohms 10%, 1/4 w; MIL type RC07GF332K	5-9
R27	RESISTOR, FXD: 1200 ohms 10%, 1/4 w; MIL type RC07GF122K	5-9
R28	RESISTOR, FXD: 47 ohms 10%, 1/4 w; MIL type RC07GF470K	5-9
R29	RESISTOR, FXD: Same as R8	5-9
R30	RESISTOR, FXD: 12,000 ohms 10%, 1/4 w; MIL type RC07GF123K	5-9
R31	RESISTOR, FXD: Same as R28	5-9
R32	RESISTOR, FXD: 220 ohms 10%, 1/4 w; MIL type RC07GF221K	5-9
R33	RESISTOR, FXD: 47 ohms 10%, 1 w; MIL type RC32GF470K	5-9

TABLE 6-3. LIST OF MANUFACTURERS

MFR CODE	NAME	ADDRESS
01526	General Electric Co., Specialty Control Dept.	Waynesboro, Va.
02660	Amphenol Corp	Broadview, Ill.
02697	Parker Seal Co.	Cleveland, Ohio
04879	Arnold Magnetics Corp	Los Angeles, Calif.
07388	Torotel, Inc	Grandview Mo.
09353	C and K Components, Inc	Newton, Mass.
11402	Hisonic, Inc	Olathe, Kansas
12697	Clarostat Mfg Co., Inc	Dover, N.H.
13499	Collins Radio Co.	Cedar Rapids, Ia.
56289	Sprague Electric Co.	North Adams, Mass.
72136	Electro Motive Mfg Co., Inc	Willimantic, Conn.
80223	United Transformer Co.	New York, N.Y.
82877	Rotron Mfg Co., Inc	Woodstock, N.Y.
83330	Herman H. Smith, Inc	Brooklyn, N.Y.
90634	Gulton Industries, Inc	Metuchen, N.J.
97539	APM-Hexseal Corp	Englewood N.J.
99800	Delevan Electronics Corp	East Aurora, N.Y.

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