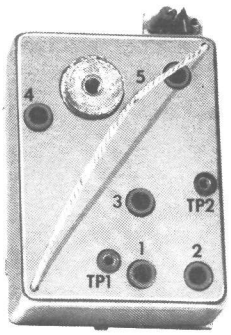
MOBILE RADIO

MASTR® Personal Series

PROGRESS LINE

PE MODELS

29.7-50 MHz, 5 WATT TRANSMITTER TYPE KT-152-A/B



SPECIFICATIONS *

Type Numbers	KT-152-A/B
Power Output	5 Watts
Modulation Deviation	0 to ±5 kHz
Spurious	
Radiated	-50 dB
Conducted	-50 dB
Audio Response	Within +1 and -3 dB of a 6-dB/ octave pre-emphasis from 300 to 3000 Hz except for an additional 6-dB/octave roll-off from 2500 to 3000 Hz per EIA.
Audio Distortion	Less than 8%
Crystal Multiplication Factor	3
RF Load Impedance	50 ohms
Modulation Sensitivity	2 millivolts

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

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ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS!

DESCRIPTION

Transmitter Types KT-152-A/B are 5-Watt, crystal controlled, frequency modulated transmitters for one- through eight-frequency operation in the 29.7-50 MHz band. The transmitter utilizes both discrete components and Intergrated Circuit Modules (IC's). The application of each transmitter type is shown in the following chart:

Type No.	Exciter/PA Model No.	Frequency Range	No. Frequencies	Power Output
KT-152-A	4EF51A10	29.7 - 36 MHz	2	5 Watts
	4EF51A11	36 - 42 MHz		
	4EF51A12	42 - 50 MHz		
KT-152-B	4EF51A10	29.7 - 36 MHz	8	5 Watts
	4EF51A11	36 - 42 MHz		
	4EF51A12	42 - 50 MHz		

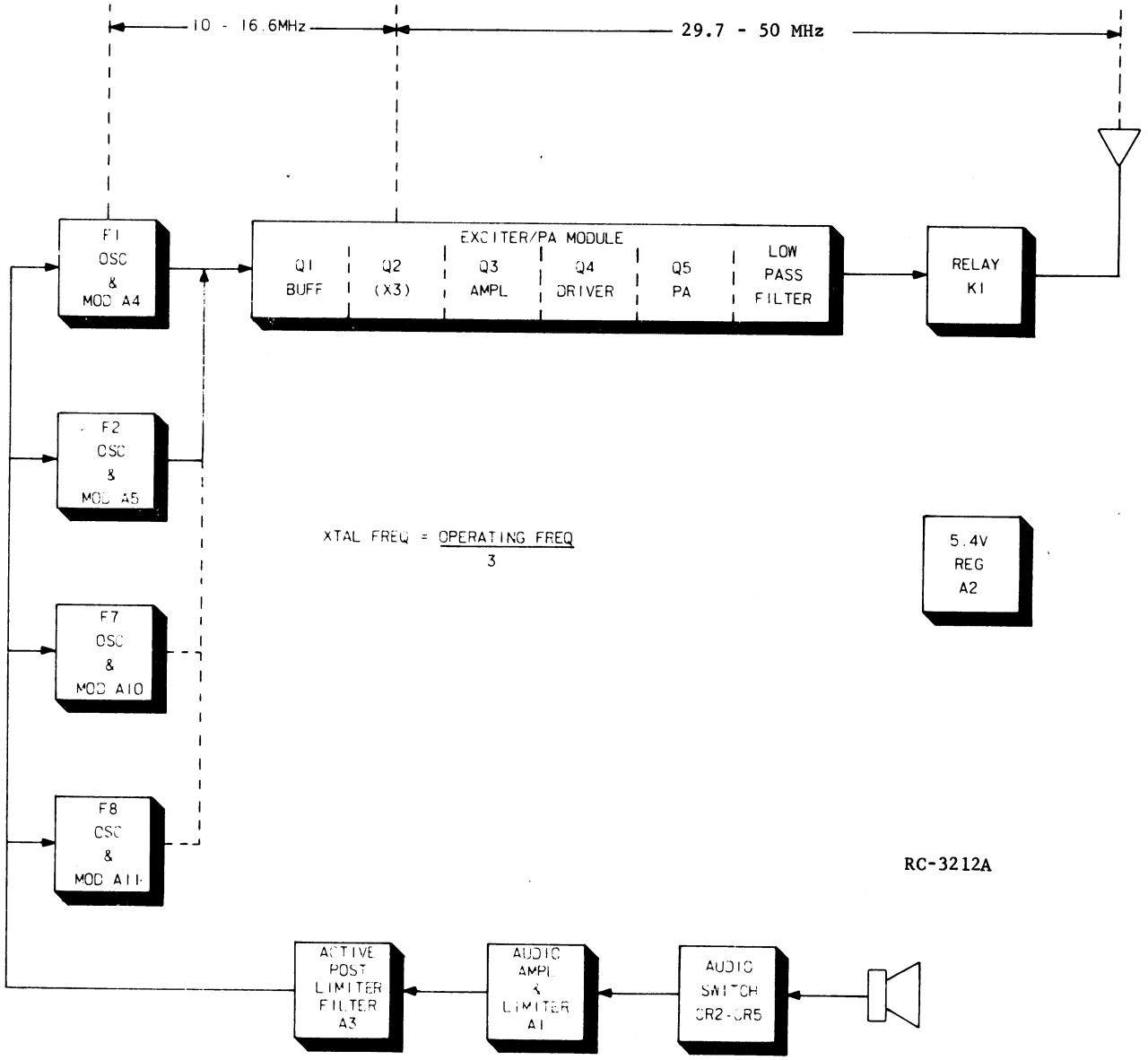

Figure 1 - Transmitter Block Diagram

The transmitter consists of the audio, regulator, oscillator/modulator and plug-in Exciter/PA modules. All transmitter modules are mounted on the System Board. Supply voltages for the transmitter are provided by the battery and Regulator. The different transmitter voltages are shown in the following chart:

Voltage	Used for:
Continuous 7.5 Volts	Regulator Module
Keyed 7.5 Volts	Regulator 5.4-Volt keying, Exciter and PA module.
Keyed 5.4 Volts	Oscillator/Modulator.

References to symbol numbers mentioned in the following text are found on the Schematic Diagrams, Outline Diagrams and Parts List (see Table of Contents). The typical, simplified circuit diagrams used in the text are representative of the circuits in the IC modules. A block diagram of the transmitter is shown in Figure 1.

CIRCUIT ANALYSIS

REGULATOR A2

The Regulator module operates from the 7.5-Volt from the battery, and provides a continuous, regulated 5.4 Volts and a switched 5.4 Volts for operating the transmitter, receiver and tone options. A typical regulator circuit is shown in Figure 2.

Turning on the radio applies the battery voltage to Pin 2 of the Regulator, causing Q2 and Q1 to conduct. When conducting, the continuous 5.4 Volts at the collector of Q1 is taken from Pin 4 and applied to the receiver Compensator and Oscillator modules.

Regulation is provided by Q2 and Q3, which operate as a differential amplifier. If the output of Q1 starts to increase, Q3 conducts harder, causing Q2 to conduct less. This causes Q1 to conduct less, keeping its output at 5.4 Volts. If the output of Q1 starts to decrease, Q3 conducts less, causing Q2 to conduct harder. This causes Q1 to conduct harder, keeping the output constant.

Q4 and Q5 operate as a DC switch. Keying the transmitter applies the battery voltage to Pin 7 and to the base of Q5, turning it on. This turns on PNP transistor Q4, so that the regulated 5.4 Volts at Pin 6 is applied to the transmitter oscillator/Modulator, and audio modules and multi-frequency switch S1 for frequency selection.

OSCILLATOR/MODULATORS

Oscillator Model 4EG31A10 consists of a crystal-controlled Colpitts oscillator, and an Audio/Channel Guard tone modulator. The entire oscillator is contained in a metal can with the transmitter operating frequency printed on the top. The crystal frequency ranges from 10 to 16.6 MHz, and the crystal frequency is multiplied 3 times. A typical oscillator/modulator is shown in Figure 3.

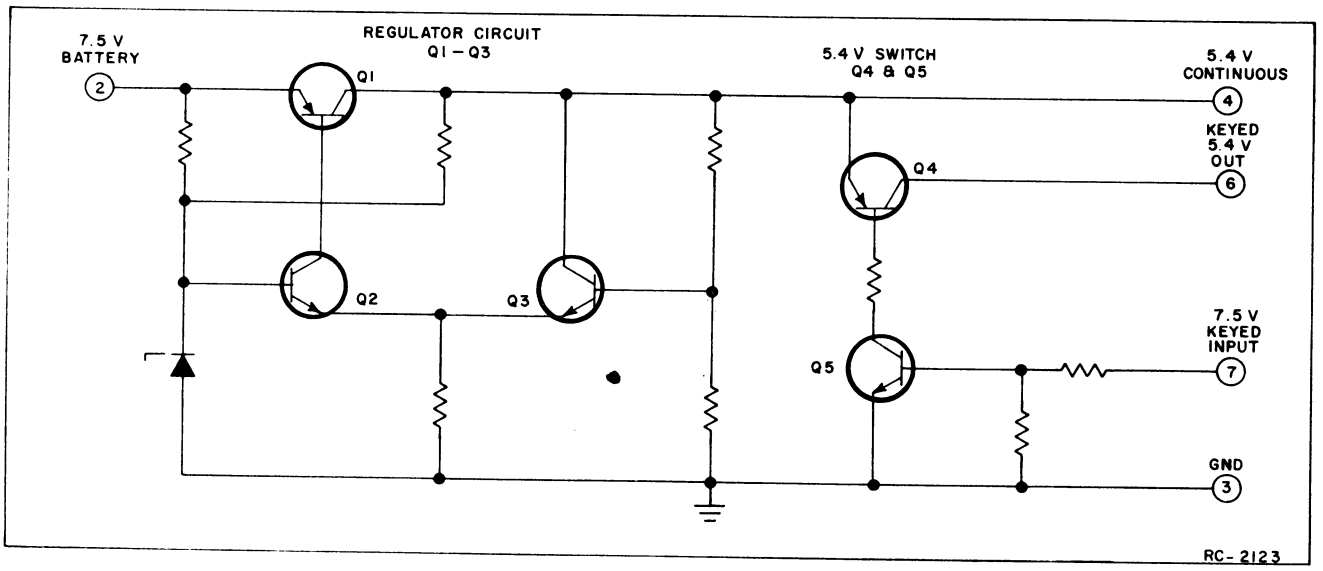

Figure 2 - Typical Regulator Circuit

The oscillator frequency is temperature compensated to provide instant frequency compensation, with a frequency stability of ±.002% from -30°C to +60°C.

In single-frequency transmitters, a jumper from Hole 20 to Hole 21 on the System Board connects the keyed 5.4 Volt supply voltage to the oscillator/modulator modules. Keying the transmitter applies the supply voltage to the oscillator, turning it on. The oscillator output is applied to the Buffer Amplifier on the Exciter Module.

For Channel Guard applications, tone from the Channel Guard encoder is applied to the oscillator module. The tone is applied through Pin 2 to the voltage-variable capacitor on the oscillator module, which frequency modulates the oscillator output.

NOTE

All oscillator modules are individually compensated at the factory and cannot be repaired in the field. Any attempt to remove the oscillator cover will void the warranty.

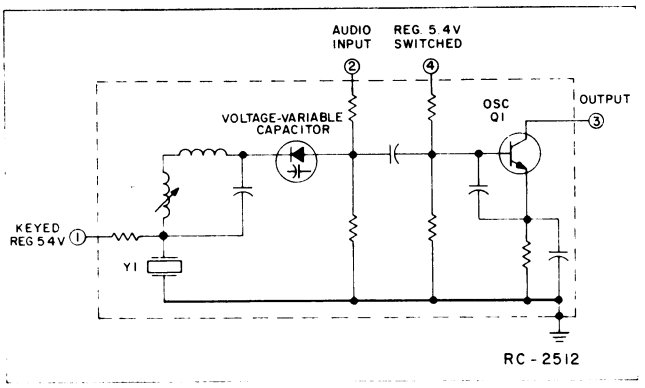

Figure 3 - Typical Oscillator/ Modulator Circuit

AUDIO AMPLIFIER AND LIMITER A1

Audio from the speaker/microphone is coupled through the audio switching circuit to Pin 2 of Audio Amplifier and limiter module A1 (See Figure 4). Pin 1 is connected to the base of emitter-follower Q1. The output from the emitter of Q2 is direct coupled to the base of amplifier Q2. The collector of Q2 is direct coupled to limiting transistor Q3. Limiting transistor Q4 conducts as a function of Q3. The collector of Q4 is connected to Pin 6.

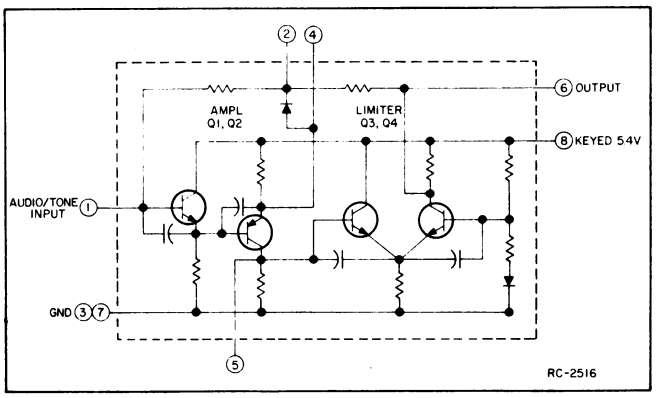

Figure 4 - Typical Audio Amplifier and Limiter

ACTIVE POST LIMITER FILTER A3

The output of Audio Amplifier and Limiter module A1 connects to Pin 9 of Active Post Limiter Filter A3. The output of A3 is coupled through Mod Adjust potentiometer R8 to oscillator/modulator modules A4 and A5. A typical Active Post Limiter Filter is shown in Figure 5.

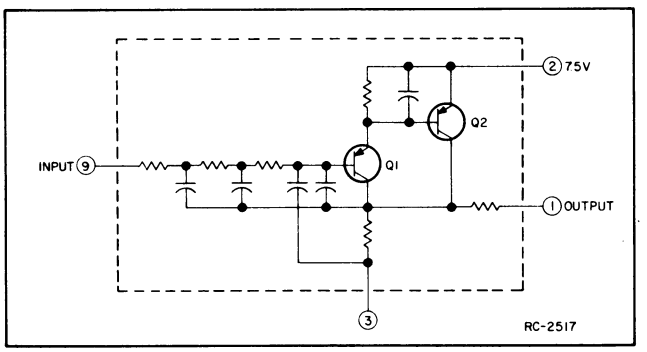

Figure 5 - Typical Active Post Limiter Filter

EXCITER/PA

Exciter/PA modules 4EF51A10 through 12 consist of a buffer stage, a tripler stage, a Class C amplifier and driver stage, and a PA stage.

Buffer and Tripler Stages

The oscillator/modulator output is coupled through C1 to the base of Buffer Q1.

Buffer Q1 isolates the modulator from the loading effects of the following tripler stage, and provides some amplification. The output of Q1 is coupled to the base of Tripler Q2. L3 is tuned to three times the crystal frequency. The output of the Tripler stage is metered at TP1. Following the Tripler stage is an impedance-matching network coupling the RF Signal to the base of Amplifier stage Q3.

Amplifier and Driver Stages

The output of Amplifier Q3 is coupled to the base of driver Q4.

Tripler Q2, Amplifier Q3, and Driver Q4 are tuned by measuring the total current drain of the radio. An ammeter with a one ampere full scale meter is used in series with the radio 7.3 Volt supply. GE Test Regulator Model 4EX19A10 and Test Set Model 4EX3A11 may be used in place of the ammeter.

Driver Q4 delivers approximately 500 milliwatts to the PA stage.

PA Stage

The PA stage will deliver 5 watts in the 30-50 MHz range. The output of the Driver is coupled through a tuned circuit to the base of Class C amplifier Q5. The amplifier output is applied through a series-tuned circuit to the low-pass filter. The filter output is fed to system switching relay K1 and then coupled through a 50-ohm antenna matching network to the Antenna/Loading Coil.

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

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U.S.A.

MODULATION LEVEL ADJUSTMENT

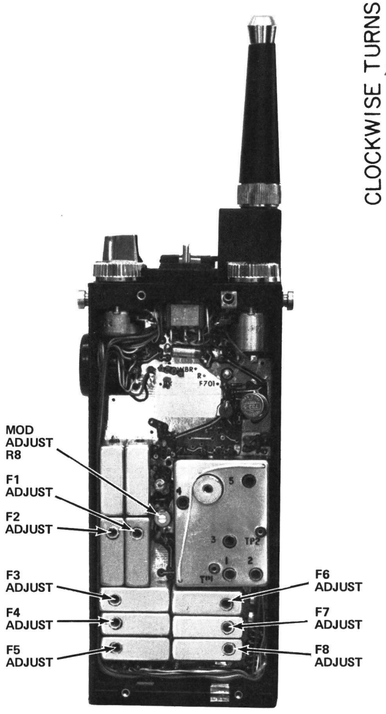
The MOD ADJUST (R8) was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter. The limiter, in conjunction with the de-emphasis network, instantaneously limits the slope of the audio wave to the modulator, thereby preventing overmodulation while preserving intelligibility.

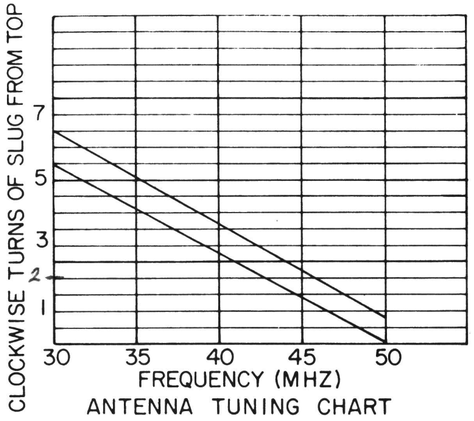
TEST EQUIPMENT

1. Audio oscillator Model 4EX6A10
2. A deviation meter
3. An output meter or a VTVM
4. Test Adaptor Model 4EX12A10
5. Tuning meter Heath Model PM-2 or equivalent

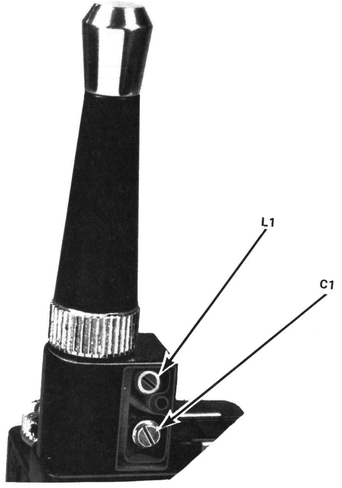
PROCEDURE

1. Connect the equipment as shown in the Test Procedure on the back of this page.
2. Apply a 140 millivolt signal at 1000 Hz to the Test Adaptor. If the Test Adaptor is not used, apply a 14 millivolt signal to Pin 4 (Mike Hi) and Pin 1 of Accessory Jack J701.
3. For transmitters without Channel Guard, set MOD ADJUST R8 for a 4.5-kHz swing with the deviation polarity which gives the highest reading as indicated on the frequency modulation monitor.
4. For transmitters with Channel Guard, check the Channel Guard modulation for 0.5 - 1.0 kHz.





RC-2528



5 WATT TRANSMITTER ALIGNMENT

EQUIPMENT NEEDED:

GE Test Set Model 4EX3A11 (or 4EX8K11) or equivalent 20,000 ohm-per-volt meter.

GE Test Regulator Model 4EX18A10, or an ammeter capable of measuring 2 ampere.

A 50-ohm terminating wattmeter connected to external antenna jack J702 thru RF adaptor cable 19C317633G2 (Option 4466).

A frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. In 2-frequency transmitters, set the channel selector switch to the highest channel frequency. In multi-frequency transmitters, set the channel selector switch to the highest channel frequency.
2. Set the slugs in Tuning Controls 1 and 2 even with the top of the can. When properly aligned, the slugs will be between the top of the can and the coil.
3. If using Test Set 4EX3A11 and Test Regulator 4EX19A10, connect the Test Set to the metering jack on the Test Regulator, and set the Regulator for 7.5 Volts. Switch the Test Set range to the Test 1 position. Place the test selector switch on position "I" to check the supply voltage (read on the 1-Volt scale as 10-Volts full scale.) Switch to position "G" for current drain readings (read on the 1-Volt scale as 1 ampere full scale or on the 3-Volt scale as 3 amperes full scale).
4. Test Point meter reading made with the (+) meter lead to TP1 and the (-) lead to system ground.
5. All adjustments made with the transmitter keyed.

ADJUSTMENT PROCEDURE

STEP	TUNING CONTROL	TYPICAL METER READING	PROCEDURE
1	F1 and F2	Maximum Volts	Adjust each oscillator slug for peak meter reading at TP1.
2	1	Dip in Volts	Adjust tuning control 1 for a dip in meter reading at TP1.
3	2	Maximum mA	Adjust tuning control 2 for maximum transmitter current.
4	3	Maximum mA	Adjust tuning control 3 for maximum transmitter current.
5	4	Maximum mA	Adjust tuning control 4 for maximum transmitter current.
6	5	Maximum Power Output	Adjust tuning control 5 for maximum power output.
7	4 and 5	Maximum Power Output	Re-adjust tuning controls 4 and 5 for maximum power output.
8	5	Rated Power Output	Turn tuning control 5 clockwise for 5 Watts rated power output.
FREQUENCY ADJUSTMENT			
9			With no modulation, adjust F1 through F8 crystal trimmers for proper oscillator frequencies. Next, refer to the Modulation Adjustment. NOTE: It is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 60°F to 90°F.
ANTENNA LOADING			
10	L1		Pre-set L1 from Antenna Tuning Chart (RL-2528). The two lines are limits.
11	C1	Maximum meter reading	With the antenna fully extended, key the transmitter and radiate a signal into the tuning meter. Set C1 for a maximum meter reading with C1 on the maximum capacitive slope.

TEST PROCEDURES

These Test Procedures are designed to assist you in servicing a transmitter that is operating-- but not properly. Problems encountered could be low power output, tone and voice deviation, defective audio sensitivity and modulator adjust control set too high. By following the sequence of test steps starting with Step 1, the defect can be quickly localized.

Once a defect is pin-pointed, refer to the "Service Check" and the additional corrective measures included in the Transmitter Troubleshooting Procedure. Before starting with the Transmitter Test Procedures, be sure the transmitter is tuned and aligned to the proper operating frequency.

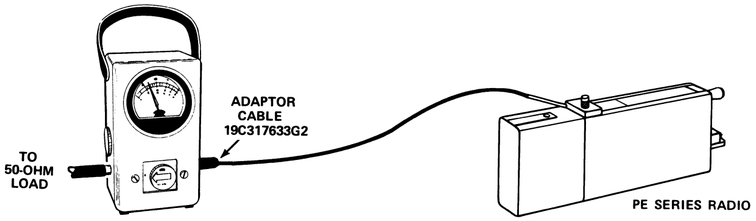
TEST EQUIPMENT REQUIRED
for test hookup shown:

1. Wattmeter similar to:
   Bird # 43
2. VTVM similar to:
   Triplett # 850
   Heath # 1M-21
3. Audio Generator similar to:
   GE Model 4EX6A10 or
   Heath # IG-72
4. Deviation Meter (with a .75 kHz scale) similar to:
   Measurements # 140
   Lampkin # 205A
5. GE Test Adaptor Model 4EX12A10.

STEP 1
POWER MEASUREMENT

TEST PROCEDURE

A. Connect transmitter output to wattmeter as shown below. GE adaptor cable 19C317633G2 is recommended for accurate power output readings.



B. Key transmitter and check wattmeter for desired power output..

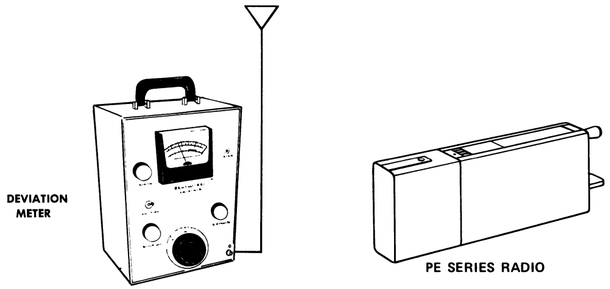
SERVICE CHECK

Refer to Service Hints on Transmitter Troubleshooting Procedure.

STEP 2
TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

A. Set up Deviation Meter and monitor output of transmitter as shown below:



B. Set MOD ADJUST R8 fully counterclockwise.

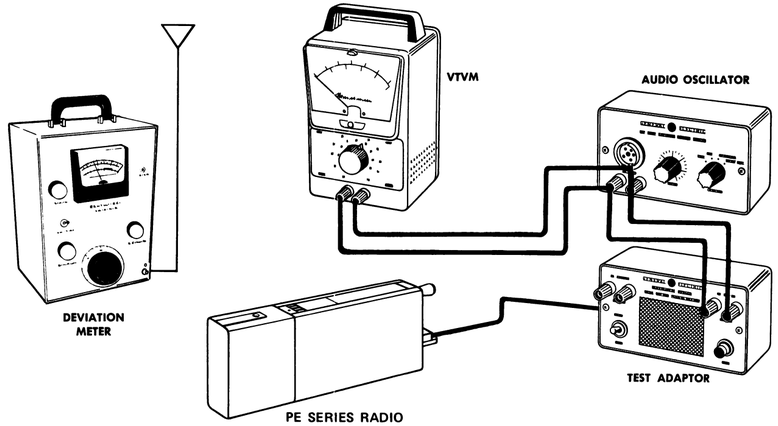
C. Key transmitter and check for approximately 0.75-kHz deviation. If reading is low or high, refer to the Channel Guard Troubleshooting Procedure (see Table of Contents)

NOTES--The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

STEP 3
VOICE DEVIATION AND SYMMETRY

TEST PROCEDURE

A. Connect test equipment to transmitter as shown below:



B. Set the generator output to 140 millivolts RMS and frequency to 1 kHz. If the Test Adaptor is not used, set the generator output for 14 millivolts.

C. Key the transmitter and adjust Deviation Meter to carrier frequency.

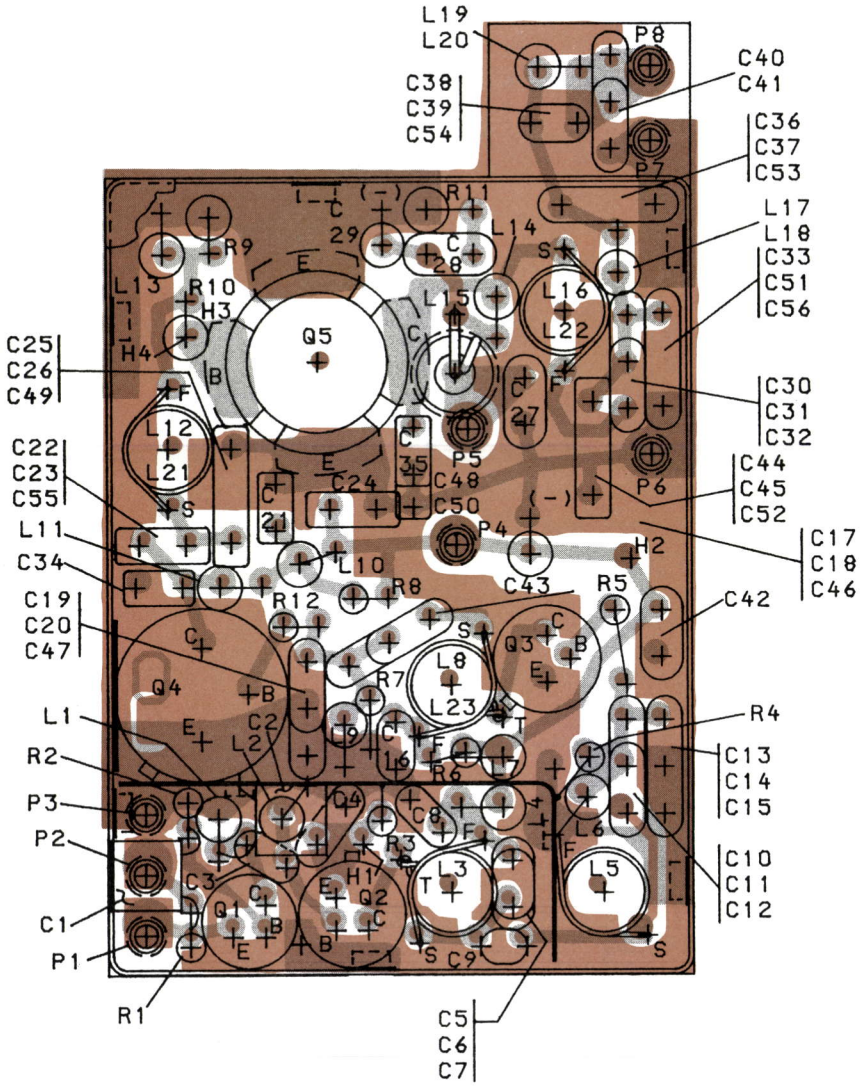
D. Deviation reading should be ±4.5 kHz. If the deviation is not 4.5 kHz, set the deviation as directed on the Transmitter Alignment Procedure (see Table of Contents).

NOTES --These transmitters are adjusted for 4.5 kHz deviation at the factory. The factory adjustment will prevent the transmitter from deviating more than 5.0 kHz under the worst conditions of frequency, voltage and temperature.

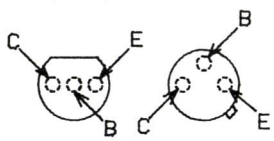
If the deviation reading plus (+) or minus (-) differs by more than 0.5 kHz:

E. Refer to the Modulation Adjustment on the Transmitter Alignment Procedure.

F. Check Audio Sensitivity by reducing generator output until deviation falls to 3 kHz. Voltage should be LESS than 14 millivolts.



LEAD IDENTIFICATION
FOR Q1



IN-LINE OR TRIANGULAR
TOP VIEW

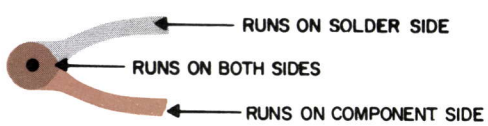
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

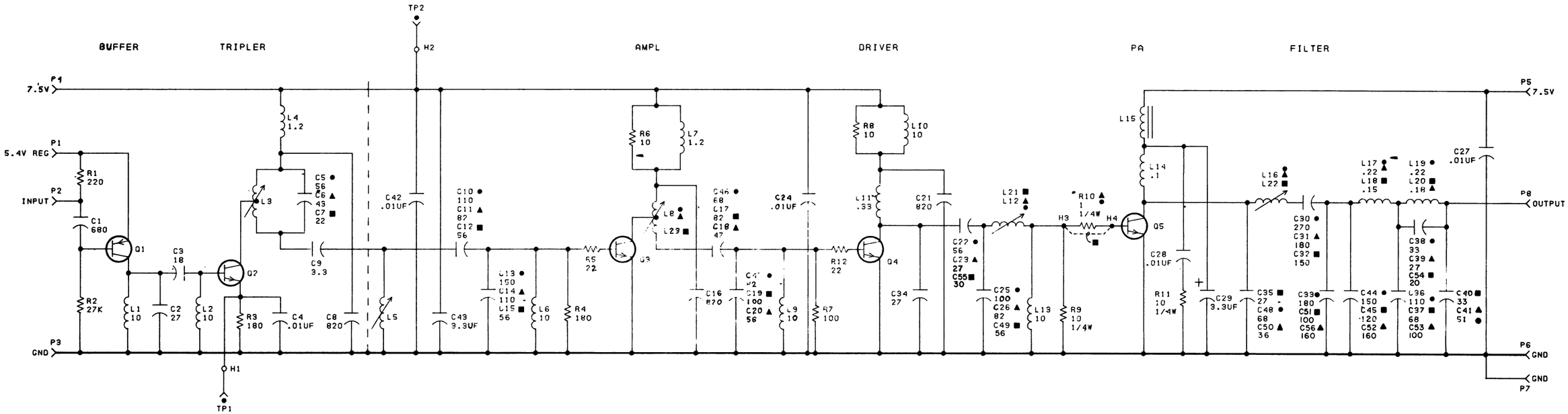
PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH 100 SERIES. EXAMPLE: C1- C101, R1- R101, ETC.

(19D424532, Rev. 2)
(19A136929, Sh. 1, Rev. 0)
(19A136929, Sh. 2, Rev. 0)

OUTLINE DIAGRAM

30—50 MHz TRANSMITTER
EXCITER/PA MODULE





MODEL NO	REV LETTER
4EF51A10	
4EF51A11	A
4EF51A12	B

ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

● LOW - 30-36 MHZ (4EF51A10)
▲ MID - 36-42 MHZ (4EF51A11)
■ HI - 42-50 MHZ (4EF51A12)

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOU D BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

(19R622301, Rev. 5)

SCHEMATIC DIAGRAM

29.7—50 MHz TRANSMITTER EXCITER/PA MODULE

PARTS LIST

LB130519A

EXCITER/PA MODULE
4EF51A10 30-36 MHz 19D424502G1
4EF51A11 36-42 MHz 19D424502G2
4EF51A12 42-50 MHz 19D424502G3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101	19A116192P8	Ceramic: 680 pf ±10%, 50 VDCW; sim to Erie 8111-A050-W5R-681K.
C102	19A116114P2043	Ceramic: 27 pf ±10%, 100 VDCW; temp coef -80 PPM.
C103	19A116114P37	Ceramic: 18 pf ±10%, 100 VDCW; temp coef 0 PPM.
C104	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
C105	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C106	19A116114P2051	Ceramic: 43 pf ±5%, 100 VDCW; temp coef -80 PPM.
C107	19A116114P2041	Ceramic: 22 pf ±5%, 100 VDCW; temp coef -80 PPM.
C108	19A116192P9	Ceramic: 820 pf ±10%, 50 VDCW; sim to Erie 8111-A050-W5R-821K.
C109	19A116114P2011	Ceramic: 3.3 pf ±10%, 100 VDCW; temp coef -80 PPM.
C110	19A116114P2066	Ceramic: 110 pf ±5%, 100 VDCW; temp coef -80 PPM.
C111	19A116114P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C112	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C113	19A116114P6071	Ceramic: 150 pf ±5%, 100 VDCW; temp coef -470 PPM.
C114	19A116114P2066	Ceramic: 110 pf ±5%, 100 VDCW; temp coef -80 PPM.
C115	19A116114P2056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
C116	19A116192P9	Ceramic: 820 pf ±10%, 50 VDCW; sim to Erie 8111-A050-W5R-821K.
C117	19A11611<P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C118	19A116114P2053	Ceramic: 47 pf ±5%, 100 VDCW; temp coef -80 PPM.
C119	19A116114P2064	Ceramic: 100 pf ±10%, 100 VDCW; temp coef -80 PPM.
C120	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C121	19A116192P9	Ceramic: 820 pf ±10%, 50 VDCW; sim to Erie 8111-A050-W5R-821K.
C122	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C123*	19A116114P2043	Ceramic: 27 pf ±10%, 100 VDCW; temp coef -80 PPM. Deleted in 4EF51A12 by REV A.
C124	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
C125	19A116114P2064	Ceramic: 100 pf ±10%, 100 VDCW; temp coef -80 PPM.
C126	19A116114P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C127 and C128	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
C129	5491674P36	Tantalum: 3.3 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C130	19A116114P7080	Ceramic: 270 pf ±5%, 100 VDCW; temp coef -750 PPM.
C131*	19A116114P6073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -750 PPM.
		Earlier than REV A:
	19A116114P7076	Ceramic: 220 pf ±10%, 100 VDCW; temp coef -750 PPM.
C132*	19A116114P6071	Ceramic: 150 pf ±5%, 100 VDCW; temp coef -470 PPM.
		Earlier than REV A:
	19A116114P6073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -470 PPM.
C133*	19A116114P6073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -470 PPM. Deleted in 4EF51A11, A12 by REV A.
C134 and C135	19A116114P20<3	Ceramic: 27 pf ±10%, 100 VDCW; temp coef -80 PPM.
C136*	19A116114P2066	Ceramic: 110 pf ±5%, 100 VDCW; temp coef -80 PPM. Deleted in 4EF51A11 by REV A.
C137	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C138*	19A116114P2047	Ceramic: 33 pf ±5%, 100 VDCW; temp coef -80 PPM.
		Earlier than REV A:
	19A116114P2048	Ceramic: 36 pf ±5%, 100 VDCW; temp coef -80 PPM.
C139*	19A116114P2043	Ceramic: 27 pf ±10%, 100 VDCW; temp coef -80 PPM.
		In 4EF51A11 earlier than REV A:
	19A116114P2042	Ceramic: 24 pf ±5%, 100 VDCW; temp coef -80 PPM. Deleted in 4EF51A12 by REV A.
C140*	19A116114P2047	Ceramic: 33 pf ±5%, 100 VDCW; temp coef -80 PPM. Added to G3 by REV A.
	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM. Deleted in G2 by REV A.
C141*	19A116114P2054	Ceramic: 51 pf ±5%, 100 VDCW; temp coef -80 PPM. Deleted in G3 by REV A. Added to G2 by REV A.
C142	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
C143	5491674P36	Tantalum: 3.3 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C144	19A116114P6071	Ceramic: 150 pf ±5%, 100 VDCW; temp coef -470 PPM.
C145*	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
		In REV A & earlier:
	19A116114P2064	Ceramic: 100 pf ±10%, 100 VDCW; temp coef -80 PPM.
C146	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C147	19A116114P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C148	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C149	19A116114P2056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
C150	19A116114P2048	Ceramic: 36 pf ±5%, 100 VDCW; temp coef -80 PPM.
C151*	19A116114P2065	Ceramic: 100 pf ±5%, 100 VDCW; temp coef -80 PPM. Added to 4EF51A12 by REV A.
C152*	19A116114P4072	Ceramic: 160 pf ±5%, 100 VDCW; temp coef -220 PPM. Added to 4EF51A11 by REV A.
C153*	19A116114P2065	Ceramic: 100 pf ±5%, 100 VDCW; temp coef -80 PPM. Added to 4EF51A11 by REV A.
C154*	19A116114P2039	Ceramic: 20 pf ±5%, 100 VDCW; temp coef -80 PPM. Added to 4EF51A12 by REV A.
C155*	19A116114P2045	Ceramic: 30 pf ±5%, 100 VDCW; temp coef -80 PPM. Added to 4EF51A12 by REV A.
C156*	19A116114P4072	Ceramic: 160 pf ±5%, 100 VDCW; temp coef -220 PPM. Added to 4EF51A11 by REV A.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L101 and L102	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
L103	19B219766G1	Coil.
L104	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1K.
L105	19B219765G1	Coil.
L106 and L107	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
L108	19B219766G1	Coil.
L109 and L110	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
L111	19B209420P107	Coil, RF: 0.33 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4416-7K.
L112	19B232114G1	Coil.
L113	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
L114	19B209420P101	Coil, RF: 0.10 µh ±10%, 0.08 ohms DC res max; sim to Jeffers 4416-1K.
L115	19A129773G4	Coil.
L116	19B232114G1	Coil.
L117	19B209420P105	Coil, RF: 0.22 µh ±10%, 0.14 ohms DC res max; sim to Jeffers 4416-5K.
L118	19B209420P103	Coil, RF: 0.15 µh ±10%, 0.10 ohms DC res max; sim to Jeffers 4416-3K.
L119	19B209420P105	Coil, RF: 0.22 µh ±10%, 0.14 ohms DC res max; sim to Jeffers 4416-5K.
L120	19B209420P104	Coil, RF: 0.18 µh ±10%, 0.12 ohms DC res max; sim to Jeffers 4416-4K.
L121 and L122	19B232114G2	Coil.
L123	19B219766G2	Coil.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P101 thru P108	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q101	19A116223P1	Silicon, PNP; sim to 2N3640.
Q102	19A115328P1	Silicon, NPN.
Q103	19A116201P3	Silicon, NPN.
Q104	19A115304P1	Silicon, NPN.
Q105	19B227818G7	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101	3R151P221J	Composition: 220 ohms ±5%, 1/8 w.
R102	3R151P273J	Composition: 27K ohms ±5%, 1/8 w.
R103 and R104	3R151P181J	Composition: 180 ohms ±5%, 1/8 w.
R105	3R151P220J	Composition: 22 ohms ±5%, 1/8 w.
R106	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R107	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R108	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R109	3R152P100J	Composition: 10 ohms ±5%, 1/4 w.
R110	19A116216P1R0K	Deposited carbon: 1.0 ohms ±10%, 1/4 w; sim to Amperex Type B803104 Style CR25.
R111	3R152P100J	Composition: 10 ohms ±5%, 1/4 w.
R112	3R151P220J	Composition: 22 ohms ±5%, 1/8 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	19A130341P1	Heat sink. (Used with Q105).
	4035306P11	Washer, fiber. (Used with Q102 and Q103).
	4036555P1	Insulator, washer: nylon. (Used with Q104).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit included all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

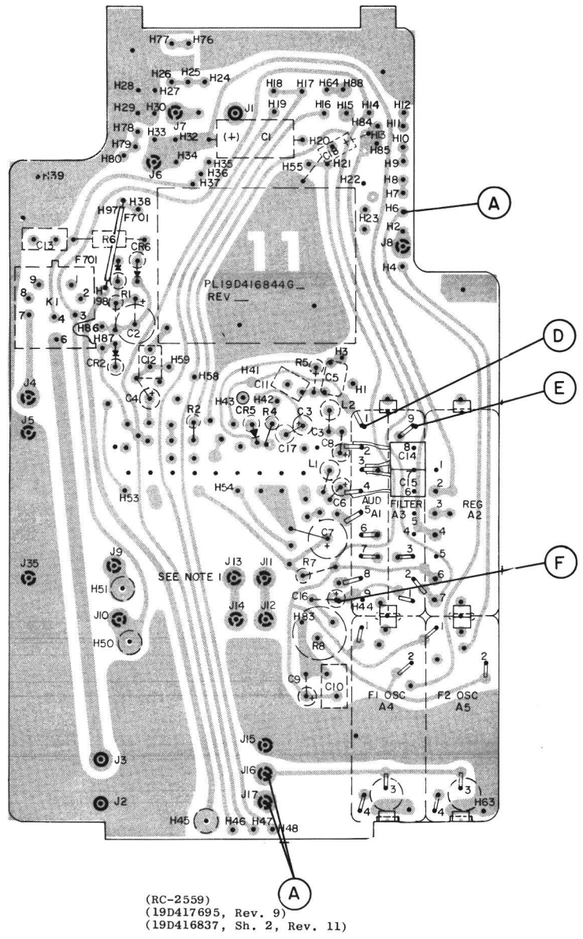
REV. A - 4EF51A11 & 12

To improve performances.
Deleted C123, C133, C136, C139, C140, C141,and C145.
Changed C131, C132, C138, C139, C140 and C149.
Added C140, C141, C145, C151, C152, C153, C154, C155 and C156.
Current drain changed to 1.75 amps.

REV. B 4EF51A12

To improve performance.
Changed C45.

SOLDER SIDE

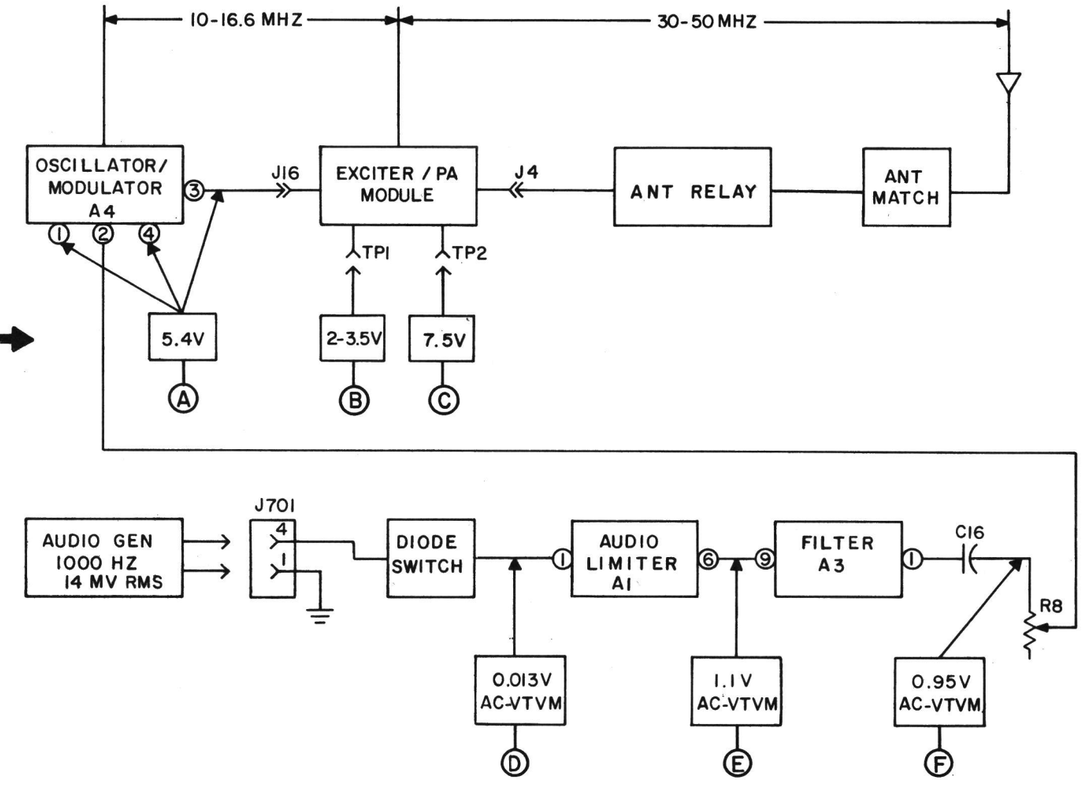


(RC-2559)
(19D417695, Rev. 9)
(19D416837, Sh. 2, Rev. 11)

STEP 2- TYPICAL VOLTAGE READINGS

DC READINGS MADE WITH GE TEST SET MODEL 4EX3A11 OR EQUIVALENT.

EXCEPTION: READINGS FOLLOWED BY VTVM WERE MEASURED WITH A VTVM WITH 11 MEG OHM OR GREATER METER INPUT.



RC-3233

STEP 1 - QUICK CHECKS

SYMPTOM	QUICKCHECK
No Power Output	1. Check voltage reading at TP1 & TP2. 2. If TP1 reading is zero, check readings at (A). If (A) readings are correct replace oscillator/modulator. 3. If TP1 & TP2 readings are correct, replace Exciter/PA module.
Low Power Output	1. Low Battery voltage 2. Check transmitter alignment.
Distorted or no Audio with normal RF output	1. Check voltage readings at (D), (E) & (F) 2. Improper setting of Mod Adjust R8. 3. Bad microphone.

TROUBLESHOOTING PROCEDURE

29.7—50 MHz TRANSMITTER
TYPES KT-152-A/B