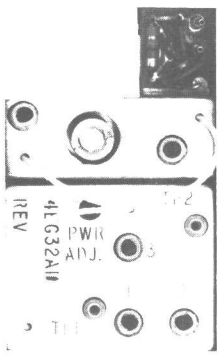
MOBILE RADIO

MASTR Personal Series
PROGRESS LINE

PE MODELS
30-50 MHz, 2 WATT TRANSMITTER TYPE KT-18-A



SPECIFICATIONS *

Type Number	KT-18-A
Power Output	2 Watts
Modulation Deviation	0 to ±5 kHz
Spurious	
Radiated	-47 dB
Conducted	-47 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%
Cyrstal Multiplication Factor	3
RF Load Impedance	50 ohms
Modulation Sensitivity	2 millivolts
Maximum Frequency Spacing	0.4% of highest frequency no degradation 0.8% 1 dB degradation in power output

KT-18-A

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

GENERAL ELECTRIC

TABLE OF CONTENTS

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 KT-18-A is a 2-Watt, crystal controlled frequency modulated transmitter for three through eight frequency operation in the 30-50 MHz band. The transmitter utilizes both discrete components and Intetrated Circuit Modules (IC's).

The transmitter consists of the audio, regulator, oscillator/modulator and plug-in Exciter and PA modules. All transmitter modules are mounted on System Board A714. 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, Audio and Optional Compressor Modules.

References to symbol numbers mentioned in the following test 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.

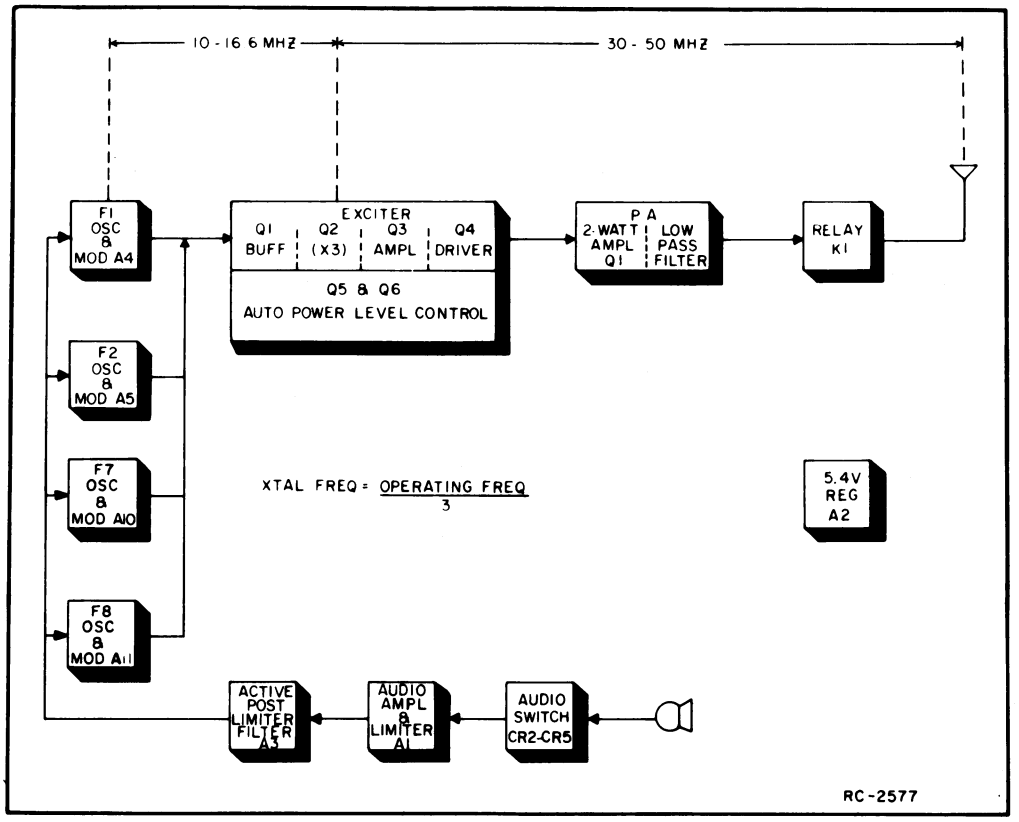


Figure 1 - Transmitter Block Diagram

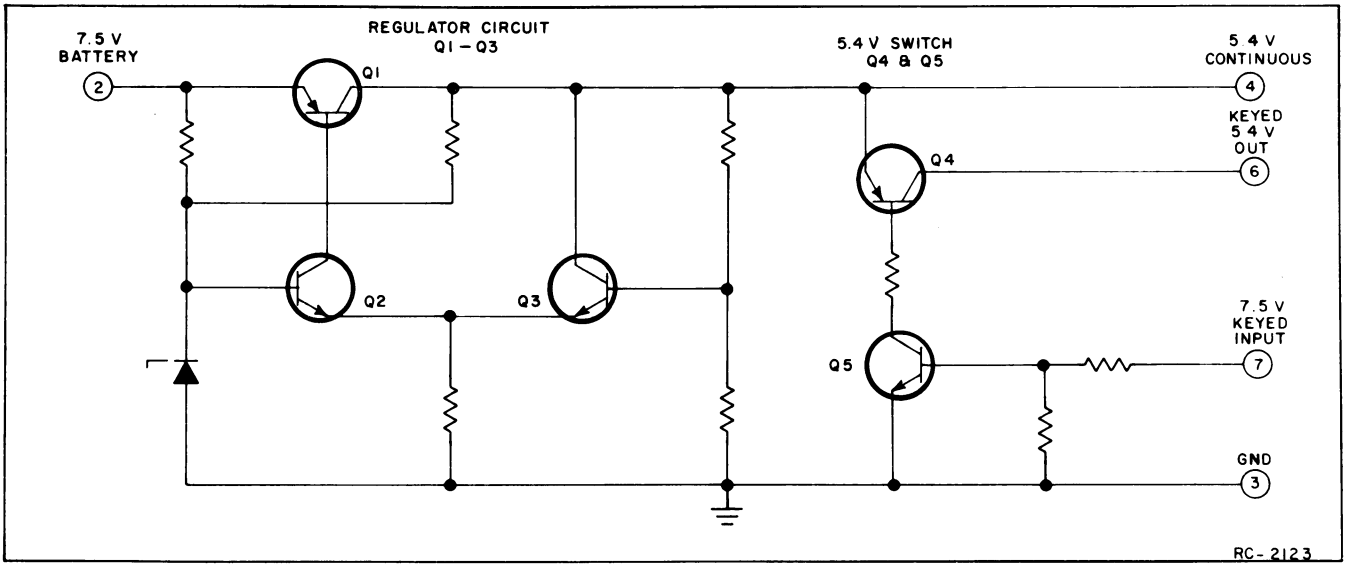


Figure 2 - Typical Regulator Circuit

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 to the optional Compressor module 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 MHz to 16.6 MHz, and the crystal frequency is multiplied 3 times. A typical oscillator/modulator is shown in Figure 3.

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.

In multi-frequency transmitters, additional Oscillator Modules are mounted on the board. The single-frequency supply jumper is removed, and the proper frequency is selected by connecting the keyed 5.4 Volts to the selected oscillator module through frequency selector switch S1 on the control unit.

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.

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 or Q4 is connected to Pin 6.

When the Audio Compressor option is used, audio from the microphone is coupled through the compressor and then applied to the audio amplifier stage. An audio sample

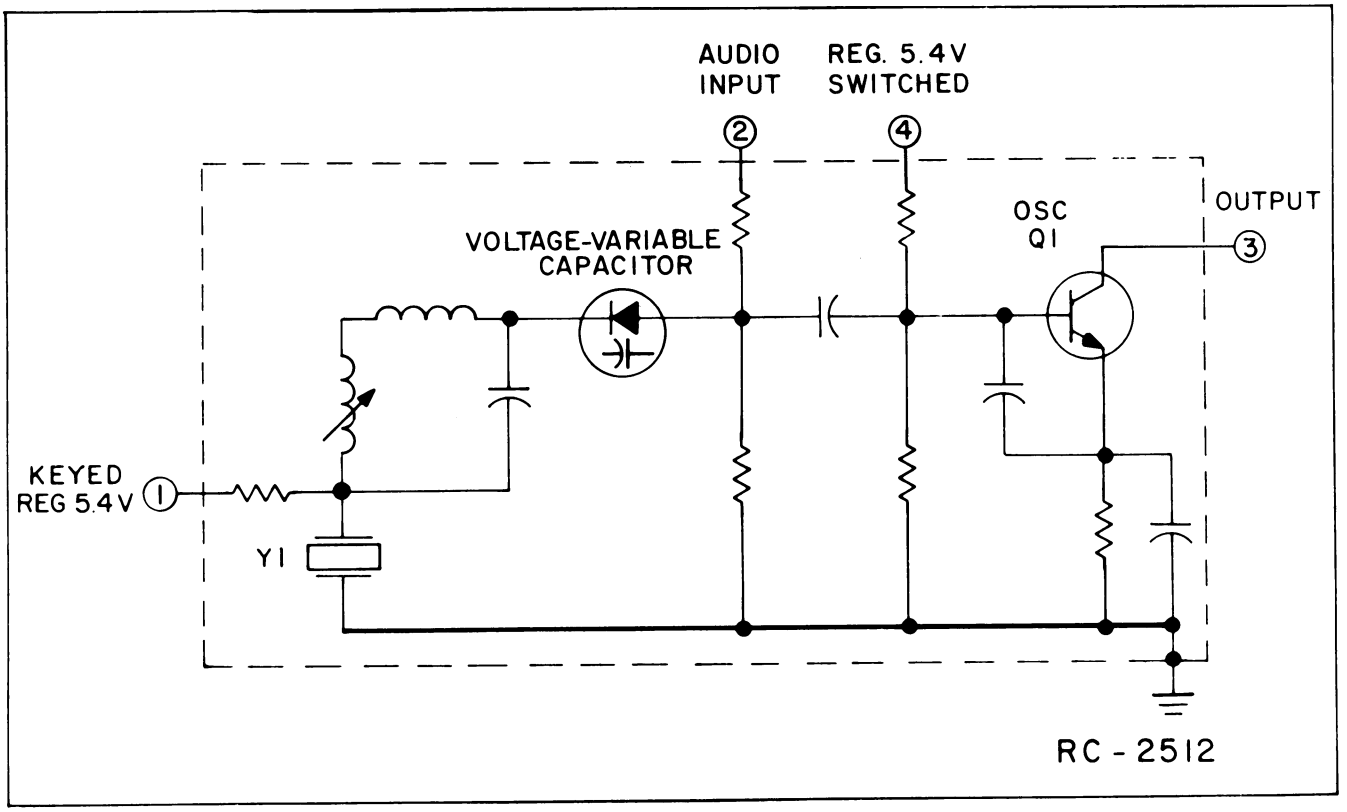


Figure 3 - Typical Oscillator/Modulator Circuit

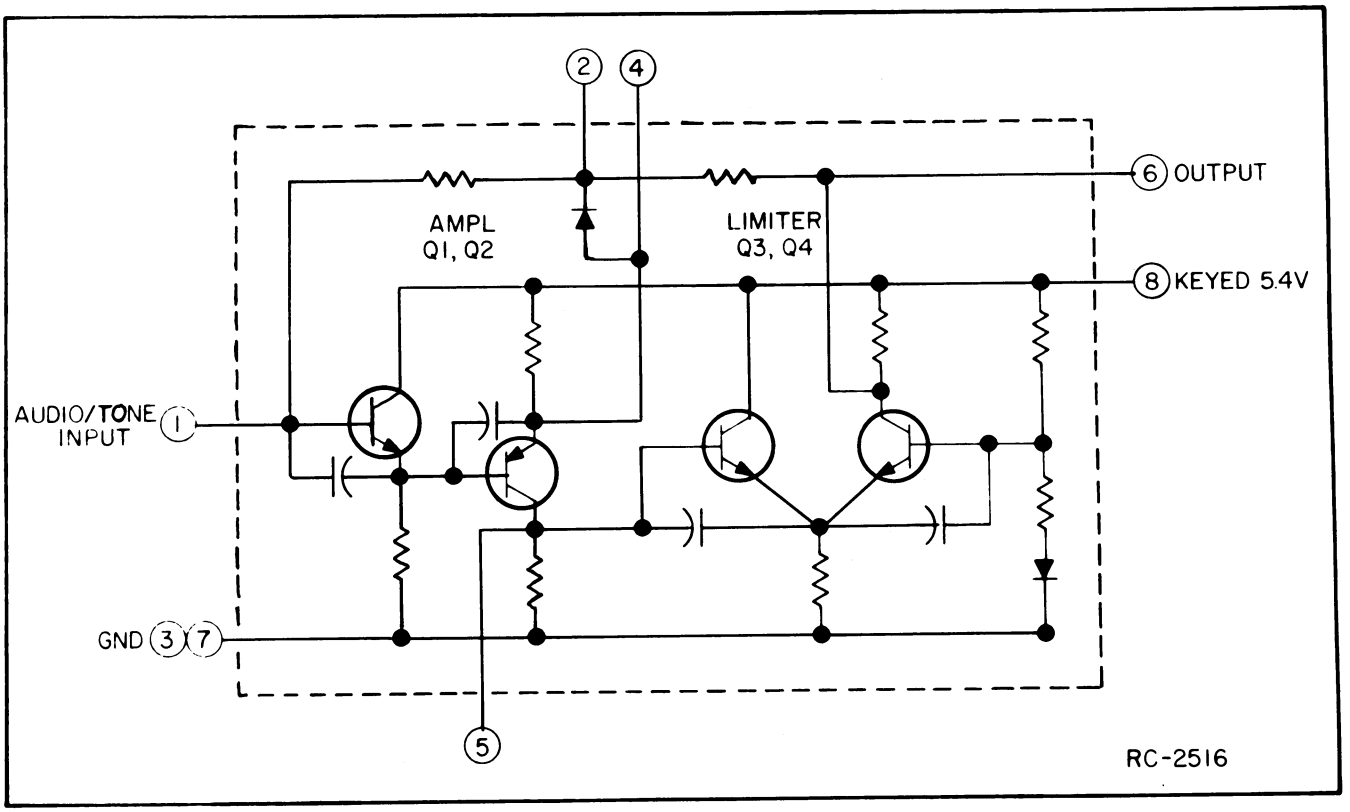


Figure 4 - Typical Audio Amplifier and Limiter

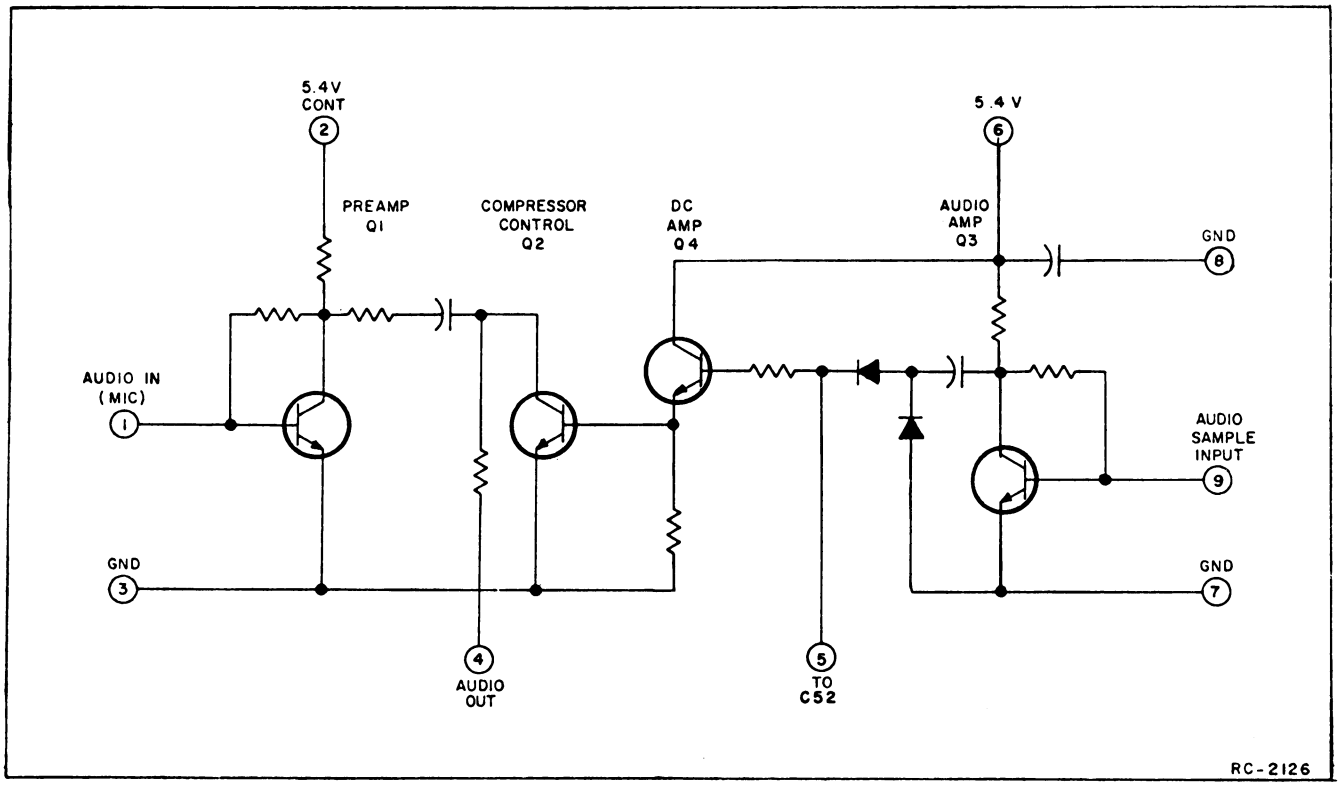


Figure 5 - Typical Audio Compressor Circuit

from the collector of amplifier Q2 is connected from Pin 5 to the compressor circuit, keeping the audio output to the oscillator/ modulator constant.

AUDIO COMPRESSOR A50

The optional Audio Compressor Module provides a relatively constant audio output to the Audio Amplifier-Limiter module over a 30 dB change in input level. The compressor module also provides a 13 dB additional gain for increased microphone sensitivity. A typical diagram of the Compressor is shown in Figure 5.

Audio from the microphone is coupled through R52 on the System Board to Pin 1 of the Compressor. The audio is applied to pre-amplifier Q1 which provides the 13 dB gain. The pre-amplifier output at Pin 4 is coupled through C50 to Pin 1 of Amplifier-Limiter module A1.

At the same time, an audio sample voltage from Audio module A1 is applied to Pin 9 and to audio amplifier Q3 in the Compressor module. The output of Q3 is rectified by the two diodes, and the resultant voltage applied to the base of DC amplifier Q4. The DC output of Q4 controls the operation of the compressor-control transistor Q2.

An increase in the audio sample voltage increases the DC voltage applied to Q2. This reduces the AC impedance of Q2, which decreases the audio output voltage at Pin 4. A decrease in the audio sample voltage decreases the DC voltage applied to Q2. This increases the AC impedance of Q2, and increases the audio output voltage at Pin 4.

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 6.

EXCITER

Exciter modules 4EG32A10 through 12 consist of a buffer stage, a tripler stage, an Automatic Power Level Control (APLC) circuit.

Buffer and Tripler Stages

The oscillator/modulator output is coupled through C2 to the base of Buffer Q1. Buffer Q1 isolates the modulator from

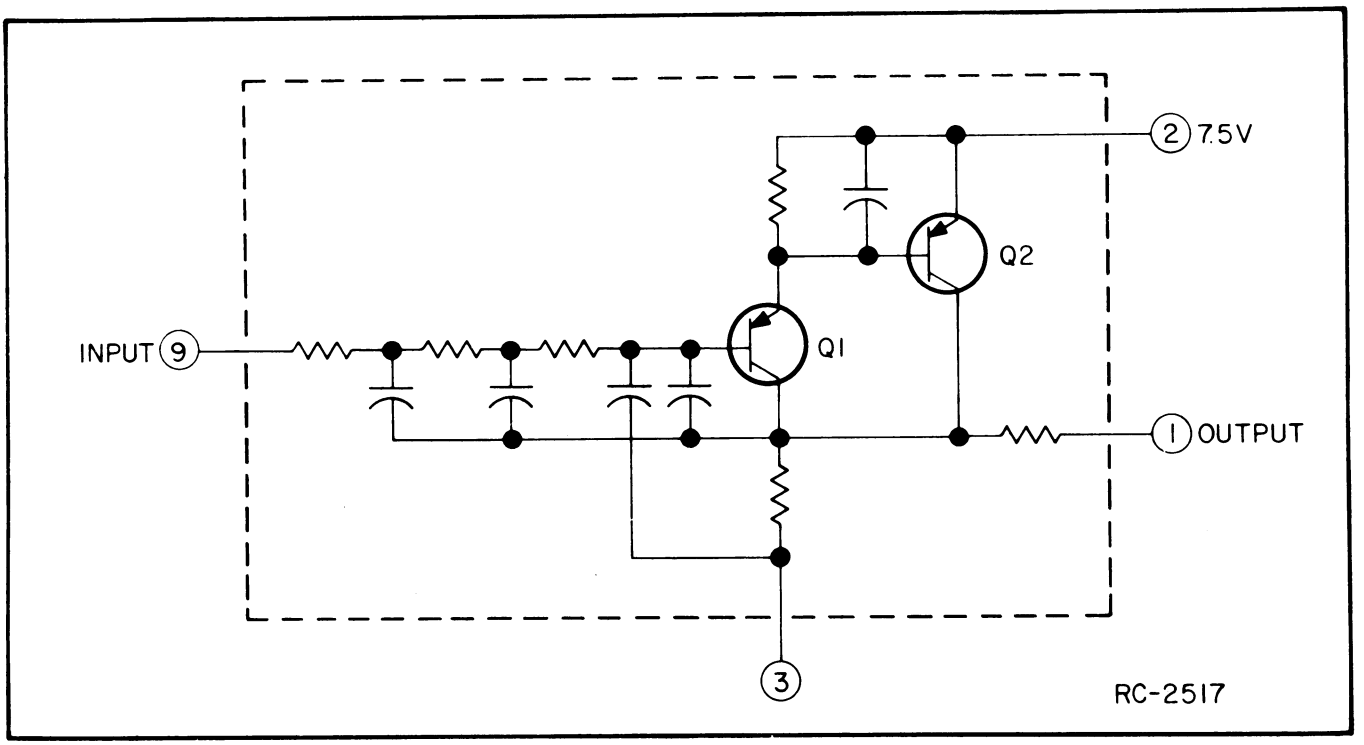


Figure 6 - Typical Active Post Limiter Filter

the loading effects of the following tripler stage, and provides some amplification. The output of Q1 is coupled to the base of Tripler Q2. L4 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 between TP1 and TP2. An ammeter with a one ampere full scale meter is used in series with the radio 7.3 Volt supply. GE Test Regulator Model 4EX18A10 and Test Set Model 4EX3A11 may be used in place of the ammeter.

Driver Q4 delivers 250 milliwatts to the PA module.

APLC Circuit

The APLC circuit (Q5 and Q6) provides a more constant transmitter power output by controlling the output of the Tripler and Amplifier. The circuit also extends the battery life by regulating current to Amplifier Q4.

When Q4 starts to conduct harder and draw more collector current, the voltage drop across R14 increases, causing Q6 to conduct harder. This increases the voltage at the base of Q5. Increasing the voltage at the base of Q5 causes it to conduct less, which increases the voltage drop across Q5 and reduces the collector voltage of Q2 and Q3. This reduces the drive to amplifier Q4 and reduces the collector current.

Power Adjust Potentiometer R13 is used to set the power output in 2-Watt transmitters, R13 can be used to limit the maximum power output.

PA MODULE

PA Modules 4EF45A10 through 12 deliver two-Watts in the 30-50 MHz range. The output of the exciter is coupled through a tuned circuit to the base of Class C amplifier Q1. 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 Anetnna/Loading Coil.

REDUCED POWER OPERATION

3-Watt Input

In some services, FCC regulations do not permit the use of the two-watt rated output. In addition, operating at a reduced power output will extend the battery life in those applications where the two-watt output is not required. After completing Step 13 of the two-watt Alignment Procedure, reduce the output power as follows:

1. Remove jumper on system board between H50 and H51. Replace with a 1 ampere DC ammeter and a 4.7 µh choke in series.
2. Adjust Pwr. Adj. control for rated current (400 mA). If the current is still too high, readjust tuning control 5 to obtain rated current.

MODULATION LEVEL ADJUSTMENT

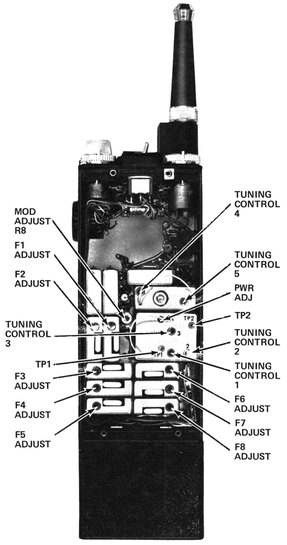
The MOD ADJUST (R8) was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter. The limiter, in conjunction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

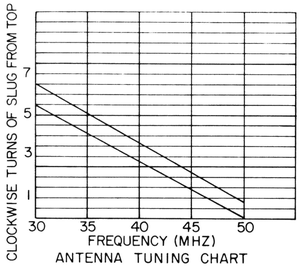
TEST EQUIPMENT

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

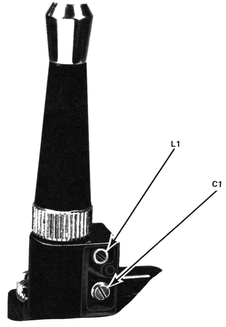
PROCEDURE

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



2 WATT TRANSMITTER ALIGNMENT (KT-18-A)

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 1 ampere.

A 50-ohm terminating wattmeter connected to external antenna jack J702 thru RF adaptor cable 19C317633G (Option 4466).

A frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. In Multi-frequency transmitters, set the channel selector switch to the lowest 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. Set Tuning Control (PWR ADJ) fully clockwise.
4. If using Test Set 4EX3A11 and Test Regulator 4EX18A10, 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 "O" for current drain readings (read on the 1-Volt scale as 1 ampere full scale).
5. Test Point meter reading made with the (+) meter lead to TP1 and the (-) lead to system ground.
6. 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	Adjsut 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	Pwr Adj	Decrease in Volts	Turn Pwr Adj Control counterclockwise until a decrease in meter reading at TP2.
8	1, 2 and 3	Minimum Volts	Readjust tuning control 1, 2, and 3 for minimum meter reading at TP2.
9	Pwr Adj 4 and 5	Maximum Power Output	Turn Pwr Adj control clockwise for maximum power output. Readjust tuning controls 4 and 5 for maximum power output.
10	Pwr Adj	Rated Power Output	Turn Pwr Adj control for 2 Watts rated power output.
11	FREQUENCY ADJUSTMENT		
11			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		
12	L1		Pre-set L1 from Antenna Tuning Chart (RC-2528). The two lines are limits.
13	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

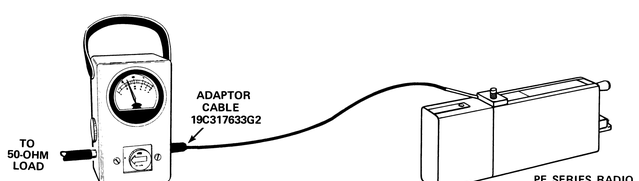
for test hookup shown:

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..

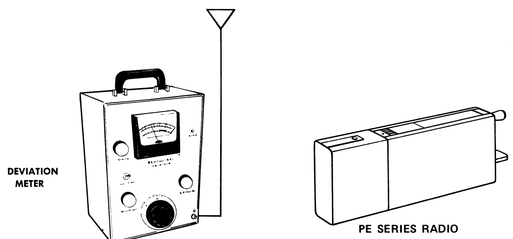
SERVICE CHECK

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.

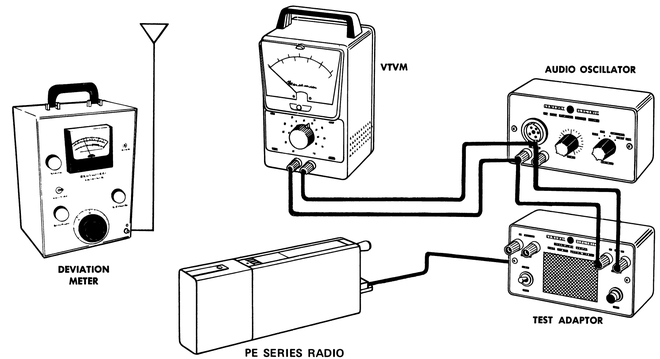
C. Key transmitter and check for approximately 0.75-kHz deviation. If reading is low or high, refer to the Channel Guard Troubleshooting Procedure (see Table of Contents)

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).

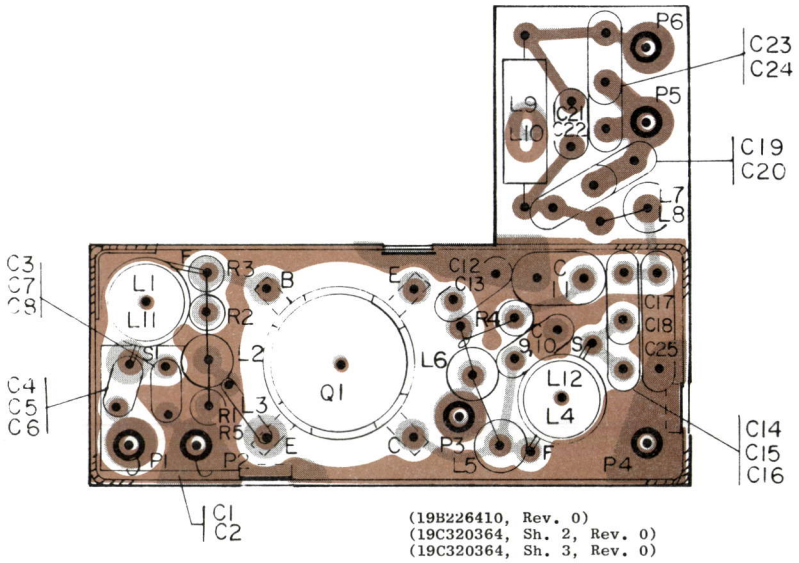
NOTES --These transmitters are adjusted for 4.5 kHz deviation at the factory. The factory adjustment will prevent the transmitter from deviating more than 5.0 kHz under the worst conditions of frequency, voltage and temperature.

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.

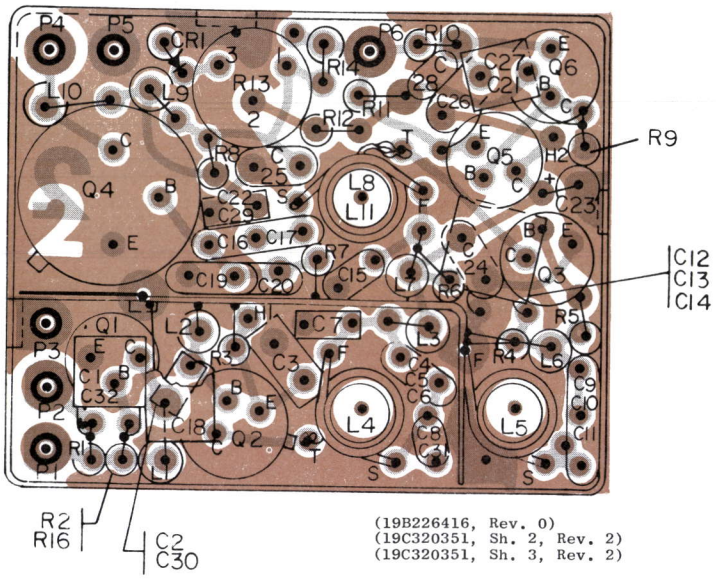
F. Check Audio Sensitivity by reducing generator output until deviation falls to 3 kHz. Voltage should be LESS than 14 millivolts.

PA BOARD



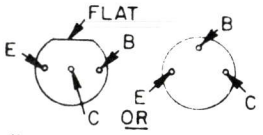
(19B226410, Rev. 0)
(19C320364, Sh. 2, Rev. 0)
(19C320364, Sh. 3, Rev. 0)

EXCITER BOARD



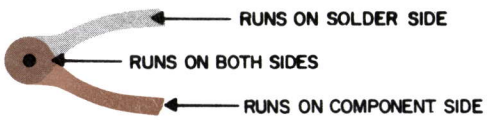
(19B226416, Rev. 0)
(19C320351, Sh. 2, Rev. 2)
(19C320351, Sh. 3, Rev. 2)

LEAD IDENTIFICATION
FOR Q1 - Q6



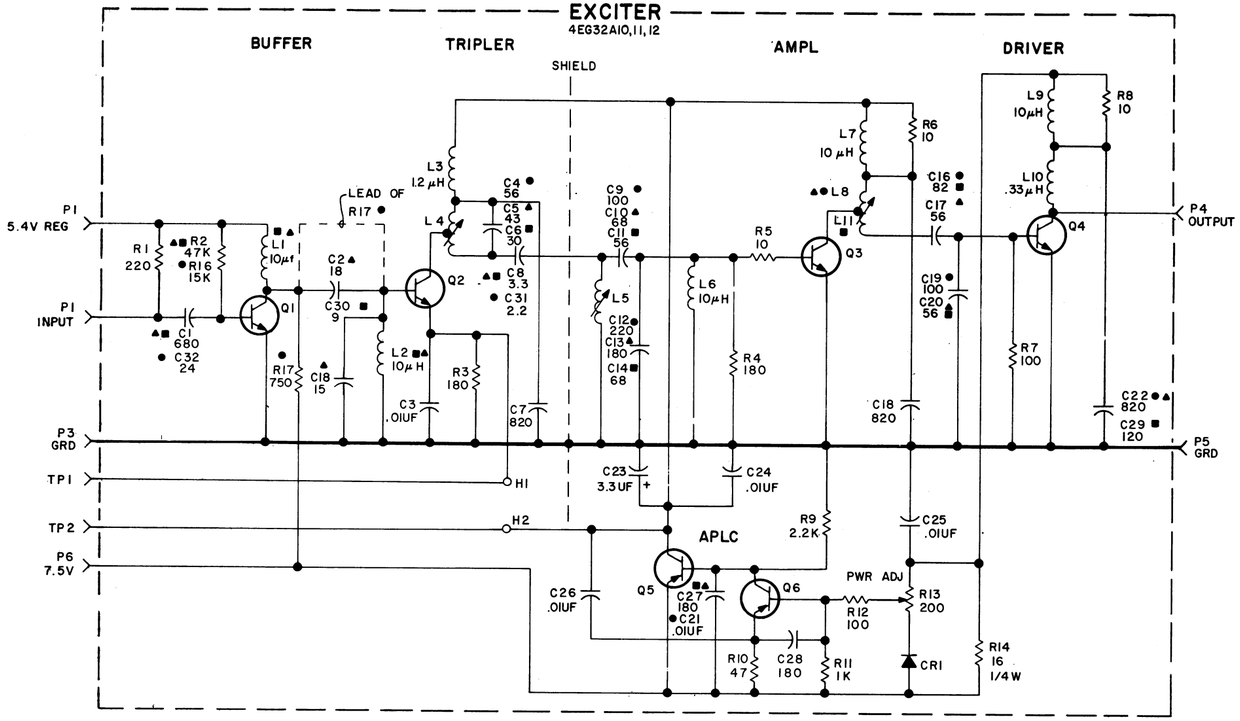
IN-LINE TRIANGULAR
VIEW FROM LEAD END

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



OUTLINE DIAGRAM

30—50 MHz TRANSMITTER
EXCITER/PA ASSEMBLY



SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

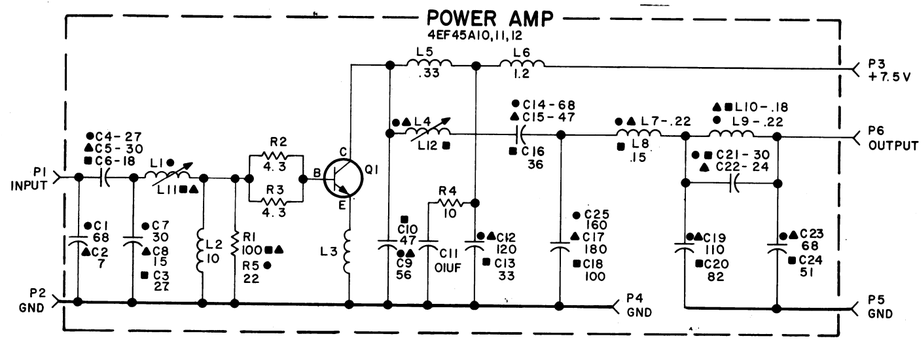
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EG32A10	
4EG32A11	
4EG32A12	

- ● LOW SPLIT (30-36 MHz) G1
- ▲ MID SPLIT (36-42 MHz) G2
- ■ HI SPLIT (42-50 MHz) G3

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

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.

(19C320360, Rev. 4)



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MODEL NO	REV LETTER
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(19B219782, Rev. 2)

SCHEMATIC DIAGRAM

30—50 MHz TRANSMITTER
EXCITER & PA ASSEMBLY

PARTS LIST

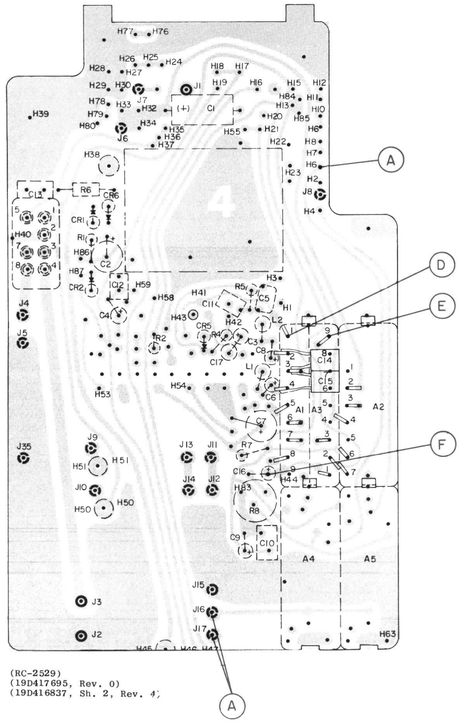
LBI-4594

EXCITER/PA MODULE
EXCITER 4EG32A10-12
PA MODULE 4EF45A10-12

SYMBOL	GE PART NO.	DESCRIPTION
		EXCITER 4EG32A10 (19C320357G1) 30-36 MHz 4EG32A11 (19C320357G2) 36-42 MHz 4EG32A12 (19C320357G3) 42-50 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116192P8	Ceramic: 680 pf ±20%, 50 VDCW; sim to Erie 8111-050-W5R.
C2	19A116114P37	Ceramic: 18 pf ±10%, 100 VDCW; temp coef 0 PPM.
C3	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
C4	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C5	19A116114P2051	Ceramic: 43 pf ±5%, 100 VDCW; temp coef -80 PPM.
C6	19A116114P2045	Ceramic: 30 pf ±5%, 100 VDCW; temp coef -80 PPM.
C7	19A116192P9	Ceramic: 820 pf ±20%, 50 VDCW; sim to Erie 8111-050-W5R.
C8	19A116114P2011	Ceramic: 3.3 pf ±10%, 100 VDCW; temp coef -80 PPM.
C9	19A116114P64	Ceramic: 100 pf ±10%, 100 VDCW; temp coef 0 PPM.
C10	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C11	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C12	19A116114P7076	Ceramic: 220 pf ±10%, 100 VDCW; temp coef -750 PPM.
C13	19A116114P6073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -470 PPM.
C14	19A116114P4059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -220 PPM.
C15	19A116192P9	Ceramic: 820 pf ±20%, 50 VDCW; sim to Erie 8111-050-W5R.
C16	19A116114P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C17	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C18	19A116114P36	Ceramic: 15 pf ±5%, 100 VDCW; temp coef 0 PPM.
C19	19A116114P2064	Ceramic: 100 pf ±10%, 100 VDCW; temp coef -80 PPM.
C20	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C21	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
C22	19A116192P9	Ceramic: 820 pf ±20%, 50 VDCW; sim to Erie 8111-050-W5R.
C23	5491674P36	Tantalum: 3.3 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C24 thru C26	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
C27 and C28	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM.
C29	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
C30	19A116114P2030	Ceramic: 9 pf ±5%, 100 VDCW; temp coef -80 PPM.
C31	19A116114P2007	Ceramic: 2.2 pf ±10%, 100 VDCW; temp coef -80 PPM.
C32	19A116114P2042	Ceramic: 24 pf ±5%, 100 VDCW; temp coef -80 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115250P1	Silicon.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1 and L2	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4.
L3	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
L4	19B219766G1	Coil.
L5	19B219765G1	Coil.
L6 and L7	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4.
L8	19B219766G1	Coil.
L9	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4.
L10	19B209420P107	Coil, RF: 0.33 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4416-7.
L11	19B219766G2	Coil.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P6	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115330P1	Silicon, NPN.
Q2	19A115328P1	Silicon, NPN.
Q3	19A115330P1	Silicon, NPN.
Q4	19A115294P2	Silicon, NPN.
Q5 and Q6	19A115768P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P221J	Composition: 220 ohms ±5%, 1/8 w.
R2	3R151P473J	Composition: 47,000 ohms ±5%, 1/8 w.
R3 and R4	3R151P181J	Composition: 180 ohms ±5%, 1/8 w.
R5 and R6	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R7	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R8	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R9	3R151P222J	Composition: 2200 ohms ±5%, 1/8 w.
R10	3R151P470J	Composition: 47 ohms ±5%, 1/8 w.
R11	3R151P102J	Composition: 1000 ohms ±5%, 1/8 w.
R12	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R13	19A116412P6	Variable, cermet: 20,000 ohms ±10%, 1/2 w; sim to Helipot Model 62 PF.
R14	3R152P160J	Composition: 16 ohms ±5%, 1/4 w.
R15	3R151P47C*	Composition: 47 ohms ±5%, 1/8 w.
R16	3R151P153J	Composition: 15,000 ohms ±5%, 1/8 w.
R17	3R151P751J	Composition: 750 ohms ±5%, 1/8 w.
		PA MODULE 4EF45A10 (19C320371G1) 30-36 MHz 4EF45A11 (19C320371G2) 36-42 MHz 4EF45A12 (19C320371G3) 42-50 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C2	19A116114P24	Ceramic: 7 pf ±5%, 100 VDCW; temp coef 0 PPM.
C3 and C4	19A116114P2043	Ceramic: 27 pf ±10%, 100 VDCW; temp coef -80 PPM.
C5	19A116114P2045	Ceramic: 30 pf ±5%, 100 VDCW; temp coef -80 PPM.
C6	19A116114P37	Ceramic: 18 pf ±10%, 100 VDCW; temp coef 0 PPM.
C7	19A116114P2045	Ceramic: 30 pf ±5%, 100 VDCW; temp coef -80 PPM.
C8	19A116114P2036	Ceramic: 15 pf ±5%, 100 VDCW; temp coef -80 PPM.
C9	19A116114P3056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -150 PPM.
C10	19A116114P2053	Ceramic: 47 pf ±5%, 100 VDCW; temp coef -80 PPM.
C11	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
C12	19A116114P7068	Ceramic: 120 pf ±5%, 100 VDCW; temp coef -750 PPM.
C13	19A116114P46	Ceramic: 33 pf ±10%, 100 VDCW; temp coef 0 PPM.
C14	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C15	19A116114P2053	Ceramic: 47 pf ±5%, 100 VDCW; temp coef -80 PPM.
C16	19A116114P2048	Ceramic: 36 pf ±5%, 100 VDCW; temp coef -80 PPM.
C17	19A116114P6073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -470 PPM.
C18	19A116114P2064	Ceramic: 100 pf ±10%, 100 VDCW; temp coef -80 PPM.
C19	19A116114P2066	Ceramic: 110 pf ±5%, 100 VDCW; temp coef -80 PPM.
C20	19A116114P2062	Ceramic: 82 pf ±5%, 100 VDCW; temp coef -80 PPM.
C21	19A116114P2045	Ceramic: 30 pf ±5%, 100 VDCW; temp coef -80 PPM.
C22	19A116114P2042	Ceramic: 24 pf ±5%, 100 VDCW; temp coef -80 PPM.
C23	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
C24	19A116114P3054	Ceramic: 51 pf ±5%, 100 VDCW; temp coef -150 PPM.
C25	19A116114P4072	Ceramic: 160 pf ±5%, 100 VDCW; temp coef -220 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	19B219774G2	Coil. Includes:
	19B209436P1	Tuning slug.
L2	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4.
L3	19A129518P1	Coil.
L4	19B219774G1	Coil. Includes:
	19B209436P1	Tuning slug.
L5	19B209420P107	Coil, RF: 0.33 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4416-7.
L6	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1.
L7	19B209420P105	Coil, RF: 0.22 µh ±10%, 0.14 ohms DC res max; sim to Jeffers 4416-5.
L8	19B209420P103	Coil, RF: 0.15 µh ±10%, 0.10 ohms DC res max; sim to Jeffers 4416-3.
L9	19B209420P105	Coil, RF: 0.22 µh ±10%, 0.14 ohms DC res max; sim to Jeffers 4416-5.
L10	19B209420P104	Coil, RF: 0.18 µh ±10%, 0.12 ohms DC res max; sim to Jeffers 4416-4.
L11	19B219774G3	Coil. Includes:
	19B209436P1	Tuning slug.
L12	19B219774G4	Coil. Includes:
	19B209436P1	Tuning slug.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P6	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116876P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R2 and R3	3R151P4R3J	Composition: 4.3 ohms ±5%, 1/8 w.
R4	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R5	3R151P220J	Composition: 22 ohms ±5%, 1/8 w.
		MISCELLANEOUS
	19C320558P1	Can (Exciter).
	4036555P1	Insulator, disc. (Used with Q4).
	4035306P11	Washer, fiber. (Used with Q2).
	19B219772P1	Can (PA Module).
	19A127337P2	Nut. (Used with Q1 on PA Module).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SOLDER SIDE

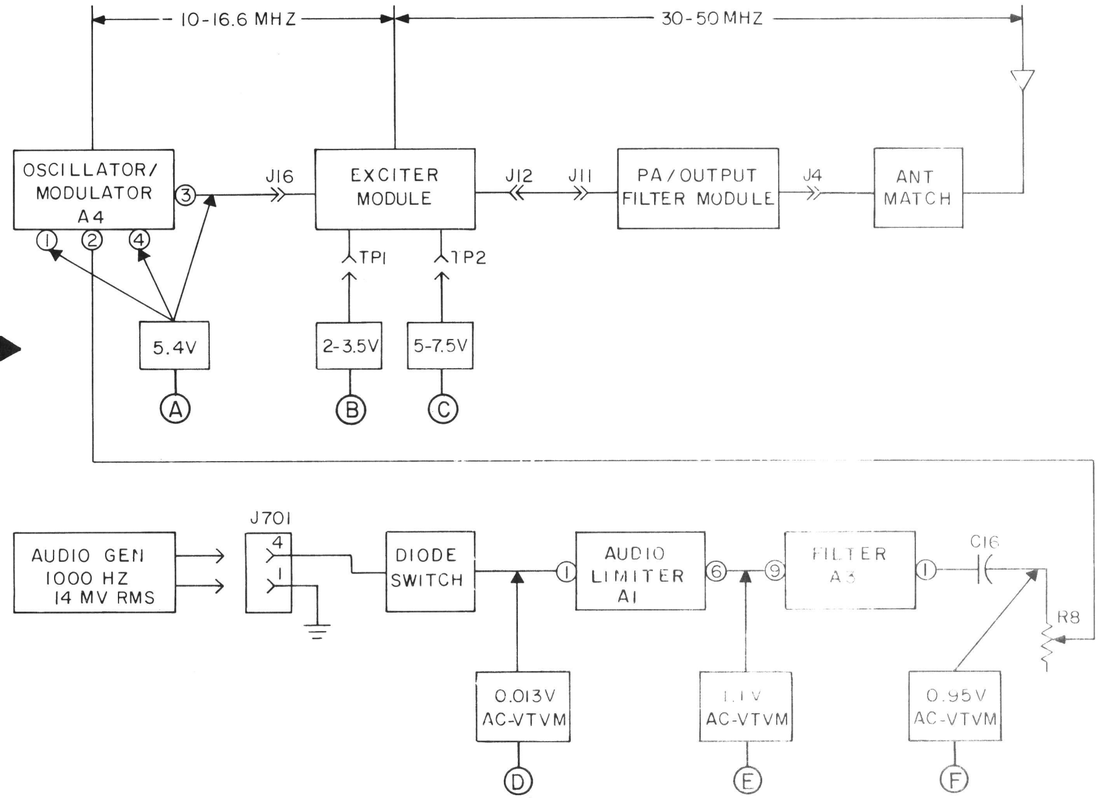


(RC-2529)
(19D417695, Rev. 0)
(19D416837, Sh. 2, Rev. 4)

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-2515

STEP I - QUICK CHECKS

SYMPTOM	QUICKCHECK
Now Power Output	1. Check voltage reading at TP1 & TP2. 2. If TP2 reading can be varied by PWR. ADJ., replace PA module. 3. If TP1 reading is zero, check readings at Ⓐ . If Ⓐ readings are correct replace oscillator/modulator. 4. If TP1 reading is correct and TP2 reading can not be varied, replace Exciter 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 Ⓓ , Ⓔ & Ⓕ 2. Improper setting of Mod Adjust R8. 3. Bad microphone.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service Parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

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MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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