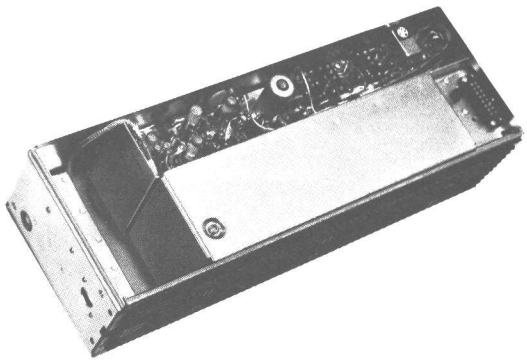
MOBILE RADIO

MASTR *Imperial*

450-470 MHz, 30 WATT TRANSMITTER MODEL 4KT16B10



KT-16-B

SPECIFICATIONS *

FCC Filing Designation	KT-16-B
Frequency Range	450-470 MHz
Power Output	30 Watts (Adjustable from 10 to 30 Watts)
Crystal Multiplication Factor	36
Frequency Stability	±.0002% (-30°C to +60°C)
Spurious and Harmonic Radiation	At least 70 dB below rated power output
Modulation	Adjustable from 0 to ±5 kHz swing with instantaneous modulation limiting.
Audio Frequency Characteristics	Within +1 dB to -3 dB of a 6-dB/ octave pre-emphasis from 300 to 3000 Hz per EIA standards. Post limiter filter per FCC and EIA.
Distortion	Less than 3%
Modulation Sensitivity	50 to 100 Millivolts
Maximum Frequency Spacing	±0.2%
Duty Cycle	EIA 20% Intermittent

*These 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 voltage or RF power; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

Transmitter Model 4KT16B10 is a crystal controlled, frequency modulated transmitter designed for one through four-frequency operation in the 450 to 470 megahertz band. The transmitter consists of the following assemblies:

- Exciter Board A101
  Transistorized audio, oscillator, modulator, amplifier and multiplier stages.
- Transistorized PA Assembly
  Amplifier/tripler, drivers and PA, low-pass filter and antenna relay.

CIRCUIT ANALYSIS

The transmitter 4KT16B10 provides a power output of 30 Watts in the 450 to 470 MHz range. The frequency is determined by plug-in ICOM modules with ranges from approximately 12.5 to 13.6 megahertz, which is multiplied 36 times.

A centralized metering jack (J102) is provided for use with GE Test Set Models 4EX3A10 (Rev. A or later) or 4EX8K11. The test set meters the amplifiers, multipliers, driver PA stage, and PA supply voltages. The metering jack also provides access to receiver audio, microphone and push-to-talk leads.

All input leads to the transmitter are individually filtered by the 20-pin feed-through by-pass connector J101. Supply voltage, metering and control functions for the exciter board are connected from the PA assembly to jacks J1 through J18 on the exciter board.

EXCITER

ICOM MODULE

ICOM module Model 4EG25A10 consists of a crystal-controlled Colpitts oscillator, a voltage regulator, a Channel Guard tone modulator and a buffer output stage. The entire module (including crystal) is enclosed in a dust-proof aluminum can, with the ICOM frequency and the transmitter

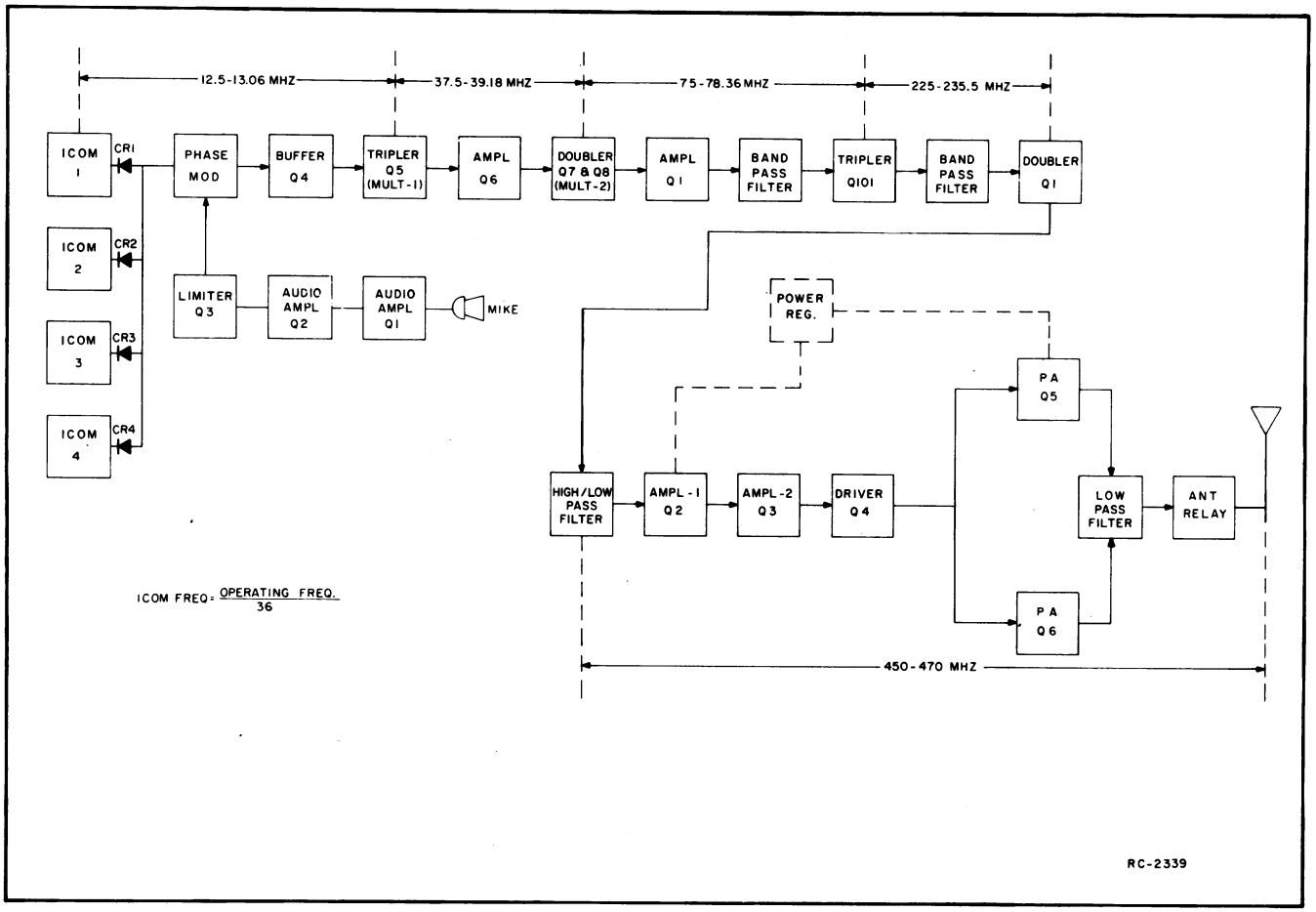


Figure 1 - Transmitter Block Diagram

operating frequency printed on the top. Access to the oscillator trimmer is obtained by prying off the plastic GE decal on the top of the can.

The oscillator frequency is temperature-compensated at both ends of the temperature range to provide instant frequency compensation, with a frequency stability of ±.0002%.

In single-frequency transmitters, a keying jumper (from R38 on the exciter board) connects the ICOM to ground. Keying the transmitter applies +10 Volts to the ICOM, turning it on. With the ICOM operating, diode CR1 is forward biased and the oscillator output is applied to the modulator stage.

In multi-frequency transmitters, up to three additional ICOM modules can be plugged into the exciter board. The single-frequency keying jumper is removed, and the proper frequency is selected by switching the ICOM keying lead to ground by means of a frequency selector switch on the control unit.

CAUTION

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

AUDIO AMPLIFIERS AND LIMITER

The audio section of the transmitter consists of direct-coupled feedback amplifiers Q1, Q2 and Q3. Q3 also acts as a limiter at high audio input levels. Audio from the microphone is coupled through an input network (C2 and R1) to the audio stages. The input network, in conjunction with the feedback circuit, provides the audio gain and a 6-dB/octave pre-emphasis.

The output of limiter Q3 is connected through Modulation Adjust potentiometer R8 to a de-emphasis network for 6-dB/octave de-emphasis and post limiter roll-off. The network consists of C7, C8, C9, R15, R16 and R17. Modulation adjust R8 determines the maximum signal level applied to the modulator circuit, and is normally set for ±4.5 kHz (narrow band).

PHASE MODULATOR

The phase modulator uses varactor CV1 (a voltage-variable capacitor) in a R-L-C network that includes R20 and L1. An audio signal applied to the modulator through L1 varies the capacitance of CV1, resulting in a phase modulated output. The modulator output is coupled through C13 to the base of buffer Q4.

BUFFER, AMPLIFIER AND MULTIPLIERS

Buffer stage Q4 isolates the modulator from the loading effects of the tripler stage, and provides some amplification. The output is direct-coupled to the base of Q5.

Q5 operates as a tripler (MULT-1) with the collector tank (T1) tuned to three times the ICOM frequency. The tripler is metered at J102 through R36. Following the tripler is amplifier Q6. This stage is metered at J102 through R35. The output of Q6 is capacitive-coupled from T1 to T3, and then to the base of Q7 and Q8.

Q7 and Q8 operate as a class C, push-pull doubler (MULT-2) with the collector tank (T4) tuned to six times the ICOM frequency. The doubler stage is metered at J102 through R34.

POWER AMPLIFIER ASSEMBLY

The Power Amplifier Assembly consists of a 75 MHz amplifier and band-pass filter, a tripler and a 225 MHz band-pass filter, a doubler, a high/low-pass filter, two UHF amplifiers, a driver, a final P.A. stage, and a low pass filter. The assembly is completely solid state, and the band pass-filters are tuned prior to assembly. No tuning adjustments are required to the Power Amplifier Assembly.

WARNING

The stud mounted RF Power Transistors used in the transmitter contain Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

AMPLIFIER/TRIPLER A102

The exciter output is coupled to the base of 75-78.36 MHz amplifier A102-Q1. This stage operates as a common-emitter broad band amplifier and is coupled to pretuned 75-78.36 MHz band-pass filter FL101. The output of this filter is metered at centralized metering jack J102 through voltage divider R6 and R7.

Following the 75-78.36 MHz band-pass filter is tripler A102-Q101. Q101 is a common-emitter amplifier with its collector coupled to pretuned 225-235 MHz band-pass filter FL102. The output of this filter is metered through R2 on Power Amplifier board A103.

POWER AMPLIFIER A103

CAUTION

The length, width, and bonding of the micro strips and the placement of components on the P.A. assembly boards is critical to the performance of the transmitter. Alteration of these parameters should be avoided.

The output of the 225-235 band-pass filter is coupled to doubler A103-Q1. Q1 is a common-emitter amplifier with its output applied to a high/low-pass filter. This doubler stage increases the frequency to 36 times the ICOM frequency, which after filtering is applied to the base of the 1st UHF Amplifier A103-Q2. Q2, the 2nd UHF Amplifier A103-Q3 and the driver amplifier A103-Q4, are common-emitter operated broad band amplifiers. The output of driver Q4 is capacitive-coupled through a power splitting circuit to the bases of final transistors A103-Q5 and Q6. The combined collector current of Q3 and Q4 is metered with the GE Test Set in position F.

Q5 and Q6 are separate common-emitter broad band power amplifiers. An equal amount of power from driver A103-Q4 is applied through the power splitting circuit to their respective inputs. The power from their collectors is additively combined and is coupled through low-pass filter FL103 to antenna relay K901. Antenna relay K901 transfers power from the transmitter to the antenna when the transmitter is keyed.

The combined collector current of Q5 and Q6 is metered on the one Volt scale (10 amperes full scale) with the GE Test Set in Position G, and with the HIGH SENSITIVITY button pressed.

CARRIER CONTROL TIMER

The Carrier Control Timer option shuts off the transmitter on each transmission after a one-minute timing cycle, and alerts the operator that the transmitter is off by means of an alert tone in the speaker. The transmitter can be turned on again by releasing and rekeying the push-to-talk switch on the microphone.

The timing cycle (transmitter keyed time) is normally set at the factory for a duration of one minute. An optional potentiometer is available that permits the timing cycle to be adjusted from 15 seconds to 5 minutes. Complete instructions for the Carrier Control Timer are contained in Maintenance Manual LBI-4138.

ANTENNA CUTTING INSTRUCTIONS

Install antenna Model 4EY12A13 according to instructions provided with the antenna. Cut the whip for 450-470 MHz operation as directed on the cutting chart.

MAINTENANCE

DISASSEMBLY

To service the transmitter from the top (Figure 2):

1. Pull locking handle down and pull radio about one inch out of mounting frame.
2. Pry up cover at rear of transmitter.
3. Slide cover back and lift off.

To service the transmitter from the bottom (Figure 3):

1. Pull locking handle down. Pull radio out of mounting frame.
2. Remove two screws in bottom cover. Pry up at back of transmitter.
3. Slide cover back and lift off.

To remove transmitter from system frame:

1. Loosen the two retaining screws in the front casting (see Figure 2) and pull casting away from the system frame.
2. Remove the four screws in the back cover.
3. Remove the two screws holding the transmitter at each end of the system frame.
4. Disconnect the antenna plug and receiver plug in front of the transmitter and the 20-pin feedthrough connector at the back of the transmitter, and slide the unit out of the system frame.

PA TRANSISTOR REPLACEMENT

WARNING

The stud mounted RF Power Transistors used in the transmitter contain Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

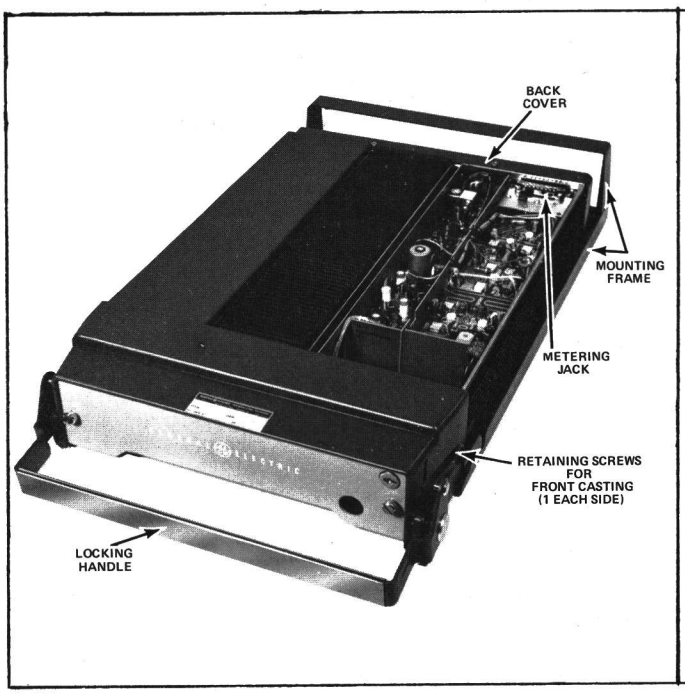


Figure 2 - Top Cover Removed

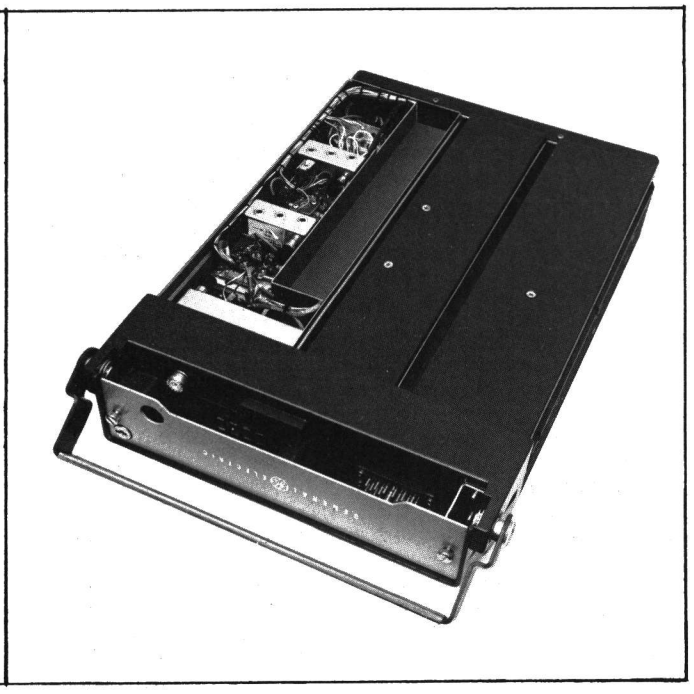


Figure 3 - Bottom Cover Removed

To replace the PA transistors (Q1 through Q6 on A103):

1. Remove the Amplifier/Tripler board A102 from the transmitter. To remove A102 it is necessary to remove the two screws holding Q101, the screws holding A102 to the heat sink and leads connected to A102.

2. Using a 50 Watt soldering iron lift the two emitter leads of the transistor to be replaced off the printed wire board. Hold the leads away from printed wire board pattern until the solder cools.

3. Remove the transistor hold-down nut and spring-washer through the hole in the heatsink with an 11/32-inch nut-driver.

4. Heat the base and collector leads simultaneously and lift out the transistor.

5. Remove the old solder from the printed circuit board with a desoldering tool such as a SOLDA PULLT.® Special care should be taken to prevent damage to the printed circuit board runs.

6. Trim the new transistor leads (if required) to the lead length of the removed transistor. Cut the collector lead at a 45° angle for future identification (see Figure 4). The letter "C" on the top of the transistor indicates the collector.

7. Apply a coating of silicone grease around the transistor mounting surface, and place the transistor in the mounting hole. Align the leads as shown in the Outline Diagram. Then hold the body of the transistor and replace the holding-down nut and spring-washer, using moderate torque (6-8-inch-pounds). A torque wrench must be used for this adjustment since transistor damage can result if too little or too much torque is used.

8. Make sure that the transistor leads are formed as shown in Figure 5 so that the leads can be soldered to the printed circuit pattern, starting from the inner edge of the mounting hole

9. Solder the leads to the printed circuit pattern. Start at the inner edge of mounting hole and solder the remaining length of transistor lead to the board. Use care not to use excessive heat that causes the printed wire board runs to lift up from the board. Check for shorts and solder bridges before applying power.

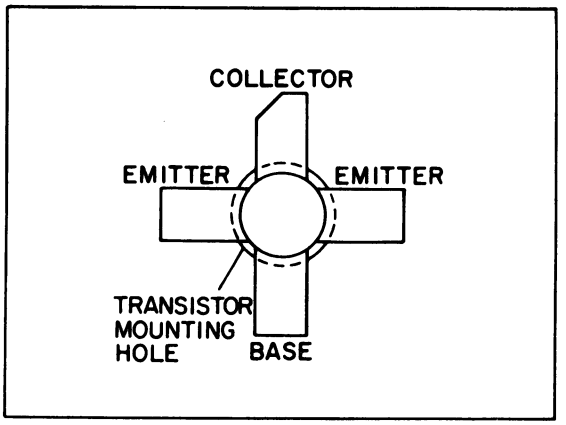


Figure 4 - Lead Identification

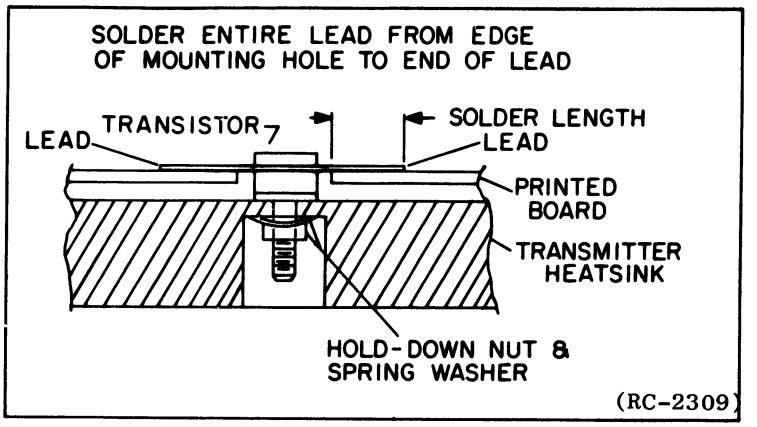


Figure 5 - Lead Forming

CAUTION

Failure to solder the transistor leads as directed may result in the generation of RF loops that could damage the transistor or may cause low power output.

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. An audio oscillator (GE Model 4EX6A10)
2. A frequency modulation monitor
3. An output meter or a VTVM
4. GE Test Set Models 4EX3A10 or 4EX8K10

PROCEDURE

1. Connect the audio oscillator and the meter across audio input terminals J5 (Green-Hi) and J6 (Black-Lo) on GE Test Set or across J1 (Mike High) and J2 (Mike Low) on the Exciter Board.
2. Apply a 0.75-Volt signal at 1000 Hz to Test Set or across J1 and J2 on Exciter Board.
3. For transmitters without Channel Guard, set the MOD ADJUST (R8) for a 4.5-kilohertz swing with the deviation polarity which gives the highest reading as indicated on the frequency modulation monitor.
4. For transmitters with Channel Guard, set the Channel Guard MOD ADJUST (R25) for 0.75 kHz tone deviation. Remove the tone to the transmitter by unplugging leads to J8 and J9 on Exciter Board, or by switching to a non-Channel Guard frequency in multifrequency units. Next, apply a 0.75-Volt signal at 1000 Hz and set MOD ADJUST (R8) for a 3.75 kHz deviation (4.5 kHz minus 0.75 kHz tone deviation).
5. For multi-frequency transmitters, set the deviation as described in Steps 3 and 4 on the channel producing the largest amount of deviation.

PA POWER INPUT

For FCC purposes, the PA power input can be determined by measuring the PA supply voltage and PA current, and using the following formula:

P_i = PA voltage x PA current

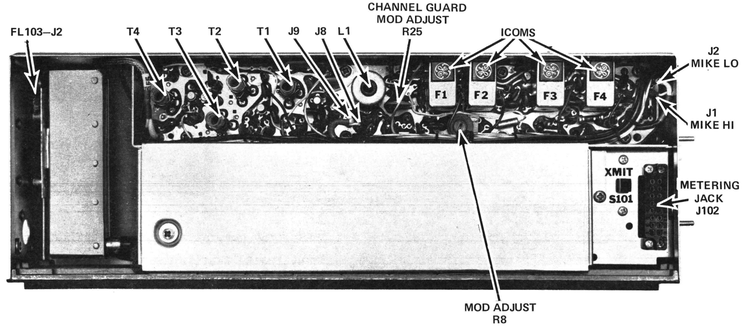
Where:

P_i is the power input in Watts,

PA voltage is measured with the GE Test Set in Position G on the 15 Volt scale, and the polarity switch in (-) position.

PA current is measured with the Test Set in Position G in the Test 1 position, and with the HIGH SENSITIVITY button pressed (10 amperes full scale).

Example: P_i = 12.6 Volts x 5.0 amperes = 63 Watts



TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A10 (Revision A or later), or Model 4EX8K11.
2. A 50-ohm wattmeter connected to FL103-J2.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Place ICOM (s) in proper socket (ICOM frequency = operating frequency ÷ 36). Do not adjust ICOM trimmer.
2. Set the channel selector switch to the F1 position.
3. Turn the power adjust potentiometer R13 on the power regulator board fully clockwise.
4. Turn the slugs in the Exciter coils L1, T1, T2, T3, and T4 to the bottom of the coil. When tuning these coils, select the first resonance as the tuning slug is rotated counter-clockwise out of the coil.
5. Connect the GE Test Set to Receiver Metering Jack J442 and check for +10 Volts at Position J. If reading is not 10 Volts, refer to the Power Regulator Outline Diagram and set R28 for +10 Volts.
6. Connect GE Test Set to Metering Jack J102. Set the test polarity to + and set the range to the Test 1 (or 1-Volt position for 4EX8K11).
7. All adjustments are made with the transmitter keyed and supplied with 13.6V at the battery end of the Power Cable. Unkey the transmitter between steps to avoid unnecessary heating.

TRANSMITTER ALIGNMENT PROCEDURE

STEP	METER POSITION	TUNING CONTROL	METER READING	PROCEDURE
			EXCITER BOARD	
1.	A MULT-1	L1 & T1	See Procedure	Carefully tune L1 for maximum meter reading. Tune T1 for a small change in meter reading.
2.	B AMP-1	T1 & T2	See Procedure	Tune T1 for maximum meter reading. Tune T2 for a dip in meter reading.
3.	C MULT-2	T3, T2 & T4	See Procedure	Adjust T3 for maximum meter reading. Re-adjust T2 for maximum meter reading. Then adjust T4 for minimum meter reading.
4.	D AMP-2	T4	See Procedure	Carefully tune T4 for maximum meter reading.
			POWER AMPLIFIER	
5.		R13		Turn potentiometer R13 on the power regulator to set the transmitter power out for the desired power (between 10 and 30 watts).
			NOTE:	Coils A105-L8 (Amplifier/Tripler) and A103-L4 (Power Amplifier) have been adjusted at the factory and normally require no further adjustment. If in some way L8 or L4 is bent the following procedure should be used.
6.				Disconnect cable W2 and connect a 50-ohm wattmeter (1.2 Watt scale) to FL102-J2.
7.				Repeat preliminary steps 2 and 3.
8.		L8		If the power output of A105 is less than 0.4 Watt, slightly spread or compress coil A105-L8 to obtain 0.4 W minimum
9.				Remove the wattmeter from FL102-J2 and re-connect cable W2.
10.		L4		If the transmitter power output is less than 30 Watts, spread or compress A103-L4 until 30 Watts minimum is obtained.
11.				Repeat step 5.

FREQUENCY ADJUSTMENT

First, check the transmitter frequency to determine if any adjustment is required. The frequency should be checked with a frequency meter or counter having an accuracy of 0.4 part-per-million (PPM), and with the ICOM inside at 80° F (±4°F) or 26.5°C (±2°C) when possible. The ICOM temperature can be determined by taping a mercury thermometer to the side of the ICOM.

NOTE: To prevent radiated RF from causing the electronic counter to malfunction, the transmitter must be shielded or the counter must be approximately 10 feet from the transmitter.

CAUTION

The ICOM case is at +10 Volts DC. Be careful not to short the case to ground.

If an adjustment is required, use one of the following procedures:

If the ICOM is stabilized at 80° F, pry off the GE emblem and adjust the ICOM trimmer for correct transmitter operating frequency.

If the ICOM is not stabilized at 80° F, pry off the GE emblem and check for a color dot on the top of the can. This color dot indicates which correction curve to use in setting the unit on frequency (see Figure 6). Next, tape a thermometer to the ICOM and check the temperature when the thermometer is stabilized. Then proceed as shown in the following example:

1. Assume that the ICOM is marked with a green color dot and the temperature reading is 50° F. At that temperature, the green curve shows a correction factor of approximately +1.5 PPM. (At 450 MHz, 1 PPM is 450 Hz. At 470 MHz, 1 PPM is 470 Hz.)
2. With a transmitter operating frequency of 450 MHz, adjust the ICOM trimmer for a reading of +675 Hz (+1.5 x 450) higher than the licensed operating frequency.
3. If a negative correction factor is obtained (at temperatures above 80° F), adjust the ICOM trimmer for the indicated PPM lower than the operating frequency.

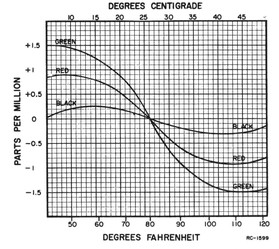


Figure 6 - ICOM Frequency Correction Curve

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, low B plus, 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 as shown:

1. Wattmeter similar to:
   - Bird # 43
   - Jones # 711N
2. VTVM similar to:
   - Triplett # 850
   - Heath # 1M-21
3. Audio Generator similar to:
   - GE Model 4EX6A10 or
   - Heath # 1G-72
4. Deviation Meter (with a .75 kHz scale) similar to:
   - Measurements # 140
   - Lampkin # 205A
5. Multimeter similar to:

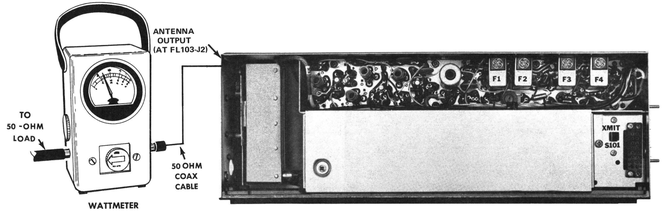
   GE TEST SET MODEL 4EX3A10,
   MODEL 4EX8K11 or
   20,000 ohms-per-volt voltmeter

STEP 1

POWER MEASUREMENT

TEST PROCEDURE

1. Connect transmitter output to wattmeter as shown below:



2. Key transmitter and check wattmeter for minimum reading of 30 Watts when power adjust pot R13 is fully clockwise.

SERVICE CHECK

Refer to Service Hints on Transmitter Troubleshooting Procedure.

NOTE

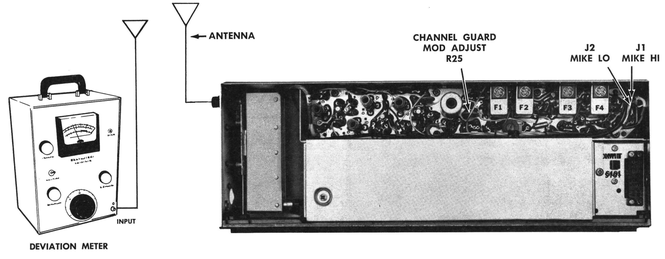
Coax cables and connectors are lossy at UHF frequencies. Insure low power out is not caused by excessive loss in connections from transmitter to wattmeter. Use good, short, 50 ohm cables with properly installed connectors.

STEP 2

TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

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



2. Unplug the MIC HI terminal from J1 on Transmitter Exciter Board.
3. Key transmitter and check for 0.75-kHz deviation. If reading is low or high, adjust Channel Guard MOD ADJUST (R25) for a reading of 0.75-kHz.

NOTES: --The Channel Guard MOD ADJUST (R25) may be adjusted for deviations up to 1.0 kHz maximum for all tone frequencies.

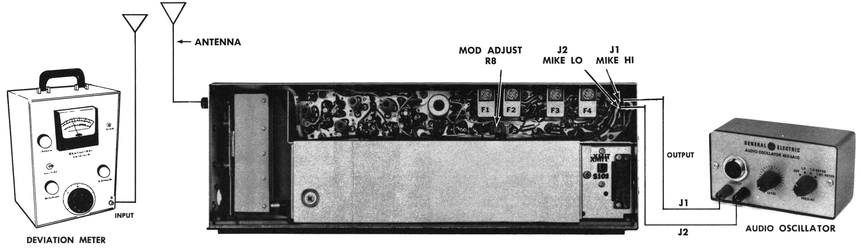
1. On units supplied with Channel Guard, the Phase Modulator Tuning should be peaked carefully to insure proper performance. (Refer to Steps 1 in the Transmitter Alignment Chart).
2. The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

STEP 3

VOICE DEVIATION AND SYMMETRY

TEST PROCEDURE

1. Unplug the High and Low Mike leads from the Exciter Board Jacks J1 and J2.
2. Connect test equipment to transmitter as shown below:

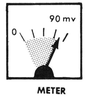


3. Set the generator output to 0.75 VOLTS RMS and frequency to 1 kHz.
4. Key the transmitter and adjust Deviation Meter to carrier frequency.
5. Deviation reading should be ±4.5 kHz.
6. Adjust Modulation Adjust Control R8 until deviation reads 4.5 kHz on plus (+) or minus (-) deviation, whichever is greater. This adjustment should be made with the correct level of tone applied on Channel Guard transmitters.

NOTES: --MASTR 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.

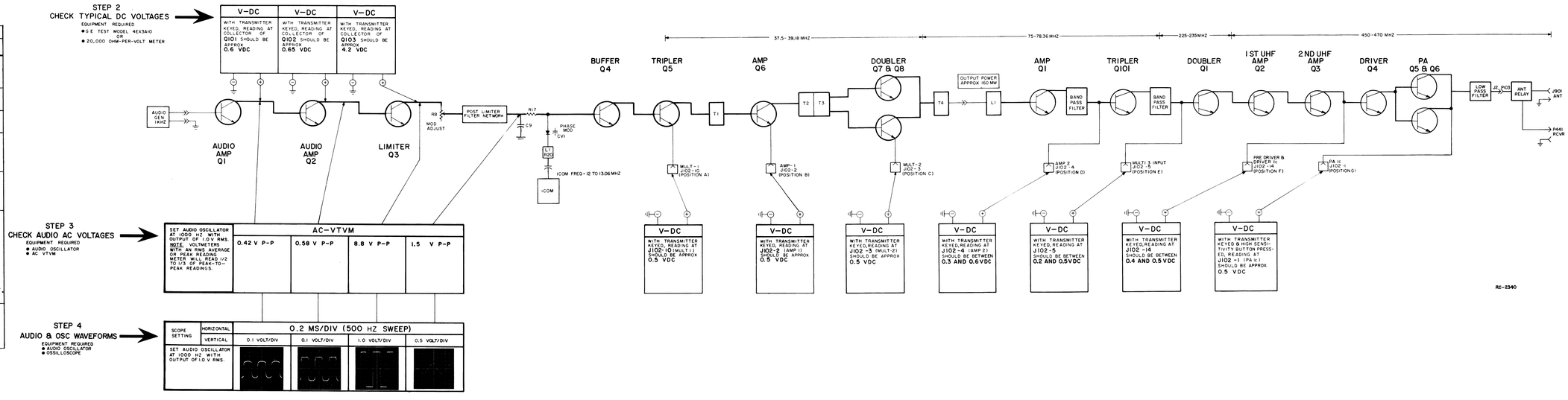
If the deviation reading plus (+) or minus (-) differs by more than 0.5 kHz, check the following:

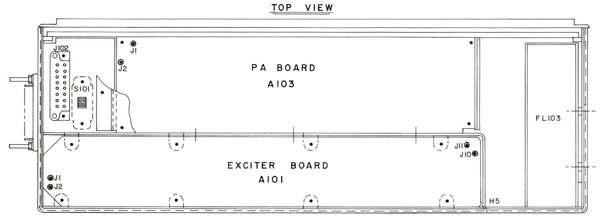
1. Recheck Step 1 as shown in the Transmitter Alignment Chart.
2. Check Audio Sensitivity by reducing generator output until deviation falls to 3.0 kHz. Voltage should be LESS than 100 millivolts.

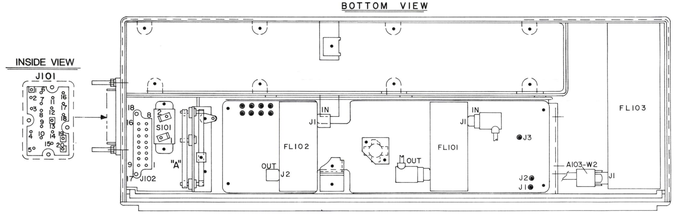


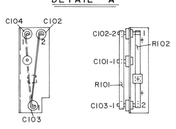
STEP 1 - QUICK CHECKS

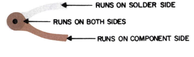
METER POSITION	PROBABLE DEFECTIVE STAGE OR COMPONENT		
	HIGH METER READING	LOW METER READING	ZERO METER READING
A (MULT-1)	Q4 or Q5 (BOARD A101)	Q4 or open L1 (BOARD A101)	10V REGULATOR ICOM, CV1, Q4, Q5(BOARD A101)
B (AMP 1)	Q6, T2 (BOARD A101)	Q6, T1 (BOARD A101)	T1, Q6, T2 (BOARD A101)
C (MULT-2)	Q7, Q8, T4 (BOARD A101)	Q7, Q8, T3 (BOARD A101)	Q7, Q8, T3, T4 (BOARD A101)
D (AMP-2)	Q101 (BOARD A102)	Q1 (BOARD A102) KEYED 12.5V A101-T4, FL101, W1, W2	KEYED 12.5V Q1 DIODE CR1 on (A102 BOARD) W1, W2
E (MULT-3)		COIL L8 MIS-ALIGNED, Q101 (BOARD A102) A102-W3, FL102, A103-W1	Q101, KEYED 12.5V (A102 BOARD) A102-W3, FL102, A103-W1
F (Pre Dr. + DRIVER IC)	Q3, Q4 COLLECTORS SHORTING TO GROUND C29, C35 SHORTING TO GROUND	L4 MISALIGNED POWER REGULATOR NOT SET RIGHT OR FAULTY - Q1, Q2, Q3, Q4	(C7, C9, C55, C10, C11, C13, C14, C15, C16, C51, C17, C53, C52, C18, C20, C24, C25, C26, C31, C30, C29) OPEN OR SHORT BASES OF Q2, Q3 SHORTING TO GROUND, POWER REGULATOR FAULTY. KEYED 12.5V
G PA IC	Q5, Q6 COLLECTORS SHORTING TO GROUND, C42, C49 SHORTING TO GROUND	Q5 or Q6 FAULTY	Q5 and Q6 KEYED 12.5V





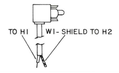




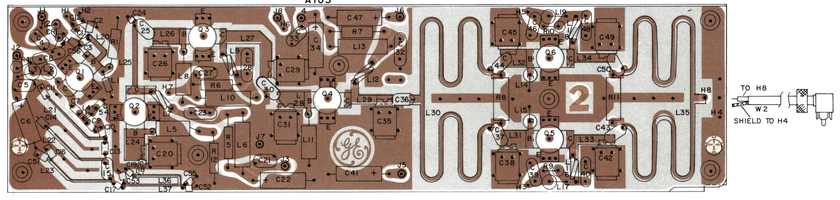


OUTLINE DIAGRAM

450—470 MHz, 30-WATT TRANSMITTER
MODEL 4KT16B10

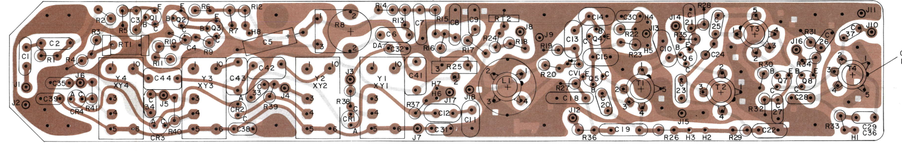


PA BOARD
(19D416466G1)
A103

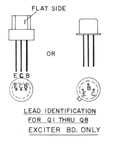


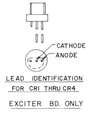
(19D416514, Sh. 1, Rev. 2)
(19D416514, Sh. 2, Rev. 2)

EXCITER BOARD
(19D402921G6)
A101



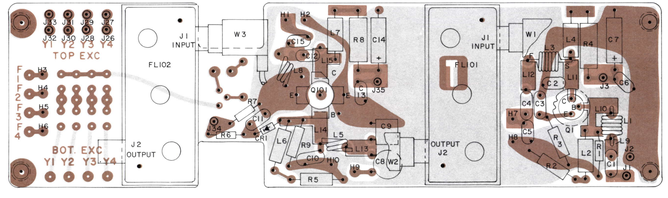
(19D402939, Sh. 1, Rev. 1)
(19D402939, Sh. 2, Rev. 1)



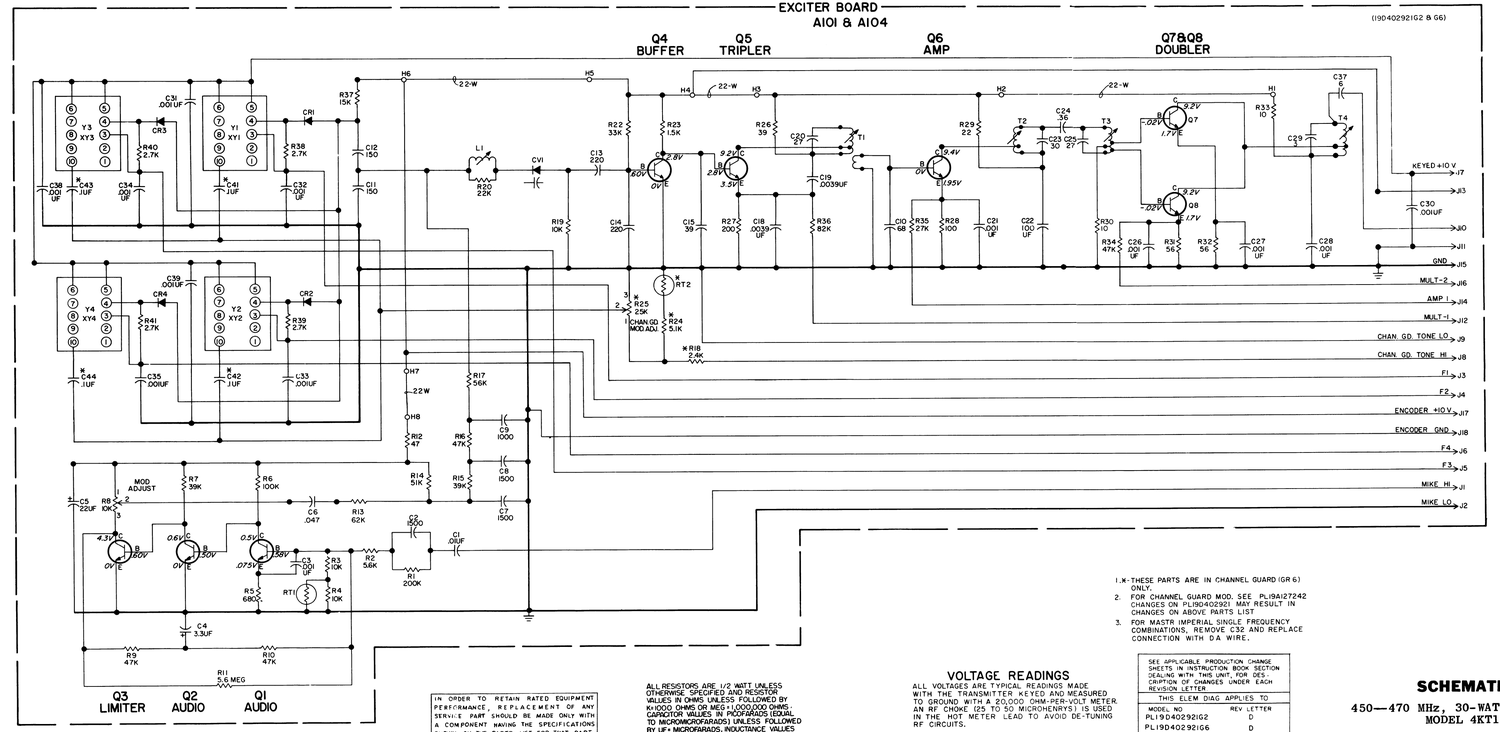


(19R621941, Rev. 1)

AMPLIFIER / TRIPLER
(19D416460G1)
A102



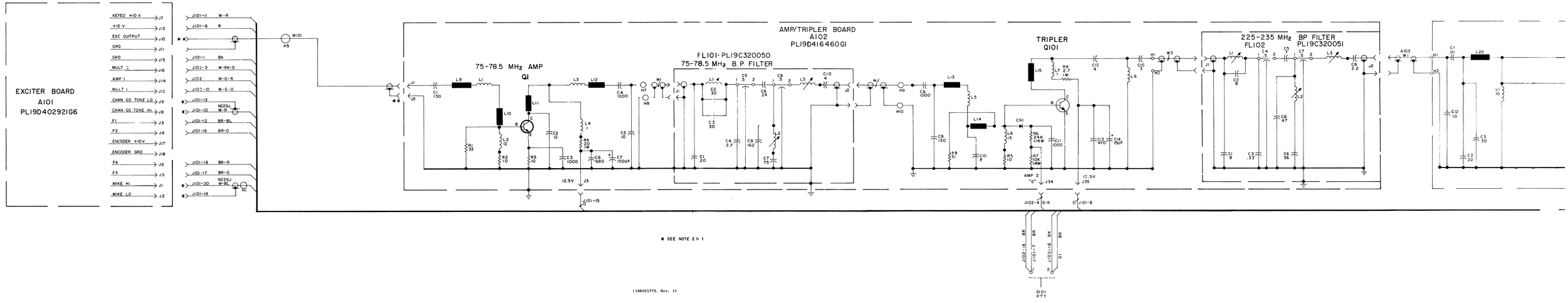
(19D416450, Sh. 1, Rev. 1)
(19D416450, Sh. 2, Rev. 1)



SCHEMATIC DIAGRAM

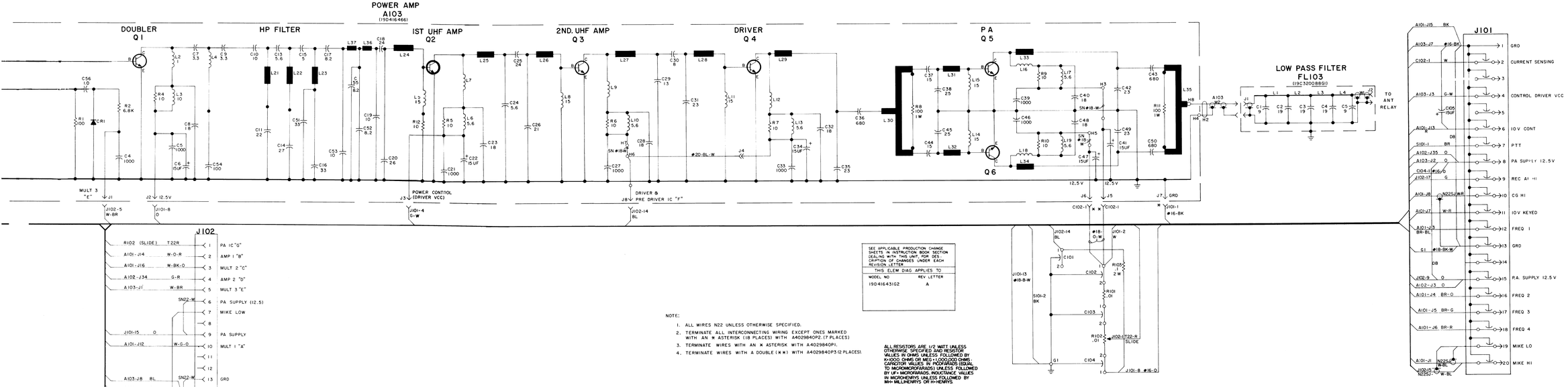
450—470 MHz, 30-WATT TRANSMITTER
MODEL 4KT16B10 EXCITER)

Issue 2



SCHEMATIC DIAGRAM

450—470 MHz, 30-WATT TRANSMITTER
MODEL 4KT16B10 (PA)



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
19D416431G2	A

NOTE:

1. ALL WIRES N22 UNLESS OTHERWISE SPECIFIED.
2. TERMINATE ALL INTERCONNECTING WIRING EXCEPT ONES MARKED WITH AN * ASTERISK (18 PLACES) WITH A4029840P2. (7 PLACES)
3. TERMINATE WIRES WITH AN * ASTERISK WITH A4029840P1.
4. TERMINATE WIRES WITH A DOUBLE (**) WITH A4029840P3 (2 PLACES).

(19R621773, Rev. 1)

ALL RESISTORS ARE 1/2 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.

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.

SCHEMATIC DIAGRAM

450—470 MHz, 30-WATT TRANSMITTER
MODEL 4KT16B10(PA)

PARTS LIST

LBI-4385L

430-470 MHz TRANSMITTER
MODEL 4M10H50

SYMBOL	GE PART NO.	DESCRIPTION
A101		ELECTRE BOARD 19D902211G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116080P1	Polyester: 0.01 µf 250%, 50 VDCW.
C2	7491395P111	Ceramic disc: 1500 pf 10%, 500 VDCW; sim to SMC Type JL.
C3	5493645P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C4	5490397P9	Tantalum: 3.3 µf 250%, 15 VDCW; sim to Sprague Type 150D.
C5	5490397P50	Tantalum: 22 µf 250%, 15 VDCW; sim to Sprague Type 150D.
C6	19A116080P5	Polyester: 0.047 µf 250%, 50 VDCW.
C7 and C8	7491395P111	Ceramic disc: 1500 pf 10%, 500 VDCW; sim to SMC Type JL.
C9	7491395P109	Ceramic disc: 1000 pf 10%, 500 VDCW; sim to SMC Type JL.
C10	5493645P66	Mica: 68 pf 10%, 100 VDCW; sim to Electro Motive Type DM-15.
C11	5493645P150J	Mica: 150 pf 15%, 100 VDCW; sim to Electro Motive Type DM-15.
C12	5493645P150K	Mica: 150 pf 10%, 100 VDCW; sim to Electro Motive Type DM-15.
C13 and C14	5493645P220K	Mica: 220 pf 10%, 100 VDCW; sim to Electro Motive Type DM-15.
C15	5493645P39K	Mica: 39 pf 10%, 100 VDCW; sim to Electro Motive Type DM-15.
C16	5494641P120	Ceramic disc: 3900 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C17 and C19	19A116055P19	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C18	5496318P68	Ceramic disc: 68 pf 10%, 500 VDCW; sim to SMC Type JL.
C20	5496318P69	Ceramic disc: 37 pf 15%, 500 VDCW, temp coef -80 PPM.
C21	5494641P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C22	5490008P137	Silver mica: 100 pf 10%, 500 VDCW; sim to Electro Motive Type DM-15.
C27	5496318P50	Ceramic disc: 30 pf 15%, 500 VDCW, temp coef -80 PPM.
C24	5491801P110	Phenolic: 0.36 pf 25%, 500 VDCW.
C25	19B209358P107	Variable, carbon film: approx 3 to 25,000 ohms 250%, 0.25 w; sim to CTS Type X-201.
C26 and C27	5496318P39K	Ceramic disc: 39 pf 10%, 500 VDCW; sim to SMC Type JL.
C28 and C29	5493645P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C30	5496318P39J	Ceramic disc: 3.0 pf 10.25 pf, 500 VDCW, temp coef -30 PPM.
C31	5496641P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C32 and C33	5493645P150J	Ceramic disc: 150 pf 15%, 500 VDCW, temp coef -80 PPM.
C34	5493645P150K	Ceramic disc: 150 pf 10%, 500 VDCW, temp coef -80 PPM.
C35	5493645P220K	Ceramic disc: 220 pf 10%, 500 VDCW; sim to SMC Type JL.
C36	5496641P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C37	5496641P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C38	5493645P33	Ceramic disc: 33 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C39	5496641P111	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C40	5493645P47	Ceramic disc: 47 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C41	5493645P56	Ceramic disc: 56 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C42	5493645P68	Ceramic disc: 68 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C43	5493645P82	Ceramic disc: 82 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C44*	5496318P68	Ceramic disc: 68 pf 10%, 500 VDCW; sim to SMC Type JL.
C45	5493645P100	Ceramic disc: 100 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C46	5496641P11	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C47	5493645P47	Ceramic disc: 47 pf 15%, 20 VDCW; sim to Sprague Type 150D.
C48	7491852P9	Silver mica: 18 pf 10%, 500 VDCW; sim to Electro Motive Type DM-15.
C49	19A116052P23	Silver mica: 23 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C50	5494641P9	Ceramic disc: 680 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C51	19A116114P9047	Ceramic: 9.3 pf 15%, 100 VDCW, temp coef 0 PPM.
C52	19A116114P68	Ceramic: 6.8 pf 15%, 100 VDCW, temp coef 0 PPM.
C53	19A116114P33	Ceramic: 33 pf 15%, 100 VDCW, temp coef 0 PPM.
C54	19A116308P57	Ceramic: 100 pf 15%, 300 VDCW; sim to Erie 8121-200-COG-101J.
C55	19A116114P39	Ceramic: 3.9 pf 15%, 100 VDCW, temp coef 0 PPM.
C56	5491601P130	Phenolic: 1.0 pf 15%, 500 VDCW.
CR1	19A115250P1	Silicon.
J1 thru J3	4033513P4	Contact, electrical: sim to Bead Chain LB3-3.
J8	4033513P6	Contact, electrical: sim to Bead Chain LB3-3.
L1	19B209438P135	Coil, RF. 10.0 µh 210%, 3.10 ohms DC res max; sim to Jeffers 4446-4.
L2	7488078P6	Choke, RF. 1.00 µh 210%, 0.30 ohms DC res max; sim to Jeffers 4431-8E.
L3	7488078P16	Choke, RF. 10.0 µh 210%, 0.60 ohms DC res max; sim to Jeffers 4431-7E.
L4	19A129233P1	Coil.
L5	7488078P18	Choke, RF. 15.0 µh 210%, 1.30 ohms DC res max; sim to Jeffers 4431-9E.
L6	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L7	19B214457P3	Coil.
L8	7488078P18	Choke, RF. 15.0 µh 210%, 1.30 ohms DC res max; sim to Jeffers 4431-9E.
L9	19B214457P3	Coil.
L10	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L11	7488078P18	Choke, RF. 15.0 µh 210%, 1.30 ohms DC res max; sim to Jeffers 4431-9E.
L12	19B214457P3	Coil.
L13	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L14 and L15	7488078P18	Choke, RF. 15.0 µh 210%, 1.30 ohms DC res max; sim to Jeffers 4431-9E.
L16	19B214457P3	Coil.
L17	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L18	19B214457P3	Coil.
L19	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L20 thru L37	19D416151P1	(Part of printed wiring board).
Q1 and Q2	19A129283P1	Silicon, NPN.
Q3	19A129283P2	Silicon, NPN.
Q4	19A129283P3	Silicon, NPN.
Q5 and Q6	19A129283P4	Silicon, NPN.
R1	19A116042G10	Composition: 10 ohms 25%, 1/2 w.
R2	19A129234P1	Composition: 47,000 ohms 25%, 1/2 w.
R3 and R10	19A116042G10	Composition: 10 ohms 25%, 1/2 w.
R4 thru R7	3377P100J	Composition: 10 ohms 25%, 1/2 w.
R8	3378P101J	Composition: 100 ohms 25%, 1 w.
R9 and R10	3377P100J	Composition: 10 ohms 25%, 1/2 w.
R11	3378P101J	Composition: 100 ohms 25%, 1 w.
R13	3377P100J	Composition: 10 ohms 25%, 1/2 w.
W1	19A129346G10	Assembled: includes 2 inch cable (19B209064P28).
W2	19A129234P1	RF. 500 VDC. Includes 5-1/2 inch cable (19B209064P22).
C101	5493639Z107	Ceramic, stand off: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type 5000.
C102 thru C104	5493639P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDC; sim to Allen-Bradley Type 5KSC.
C105	5496367P14	Tantalum: 15 µf 250%, 20 VDCW; sim to Sprague Type 150D.
FL101	19C900050G1	Bandpass.
FL102	19C900051G1	Bandpass.
FL103	19C900056G1	Lowpass.
J101	19C903439G1	Connector: 20 pin contacts.
J102	19B900549G1	Jack: 16 contacts, includes (16) 19A115463P1 contacts.
Q101	19A129181P1	Silicon, NPN.
R101	19A127071P1	Fixed: 1 megohm 25%, 1/2 w.
R102	19A127071P5	Strap, item 22.
R103	19A127037P1	Slide, item 19.
R104	19B209032P99	Wirewound: 0.1 ohms 25%, 2 w; sim to IRC Type BWH.
S101	4031922P1	ROTY, normally open, 1/2 amp at 13 VDC; sim to Stackpole Type SR-15.
W101	19B209232G1	RF: approx 18 inches long.
1	19A115783P1	Contact electrical. (Used with J101).
2	19A131167P1	Guide pin. (Used with J101).
3	4036535P6	Solderless terminal: sim to Shakeproof 2177-04-000.
4	7160861P6	Nut, steel spring: sim to Tinnerman C6432-SZ-6T.
5	19A115063P1	Clip, spring tension.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

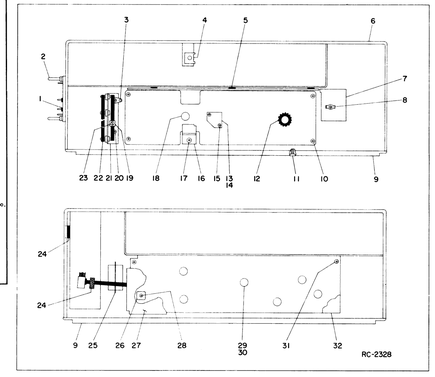
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J18	4033513P4	Contact, electrical: sim to Bead Chain LB3-3.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	5490828P60	Thermistor: 10,000 ohms 210%, color code red/white; sim to Global Type 782-S.
RT2	19C900048P8	Disc: 3500 ohms 210%; sim to GE 4D.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19D902080G22	Coil, Includes:
	5491769P2	Tuning slug.
T2	19D902080G21	Coil, Includes:
	5491769P3	Tuning slug.
T3	19D902080G23	Coil, Includes:
	5491769P5	Tuning slug.
T4	19D902080G24	Coil, Includes:
	5491769P6	Tuning slug.
		- - - - - - - - OSCILLATORS - - - - - - - -
		When recording, specify ICOM Frequency.
		ICOM Frequency = (OF ÷ 36).
Y1 thru Y4	482S5A10	Integrated Circuit Oscillator Module (ICOM).
	19D416307G91	Cap, decorative.
		- - - - - - - - SOCKETS - - - - - - - -
XY1 thru XY4	19B214043G1	Socket.
A102		AMPLIFIER TRIPLER BOARD 19D416060G5
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116114P69	Ceramic: 130 pf 15%, 100 VDCW, temp coef 0 PPM.
C2	19A116056P120	Ceramic disc: 12 pf 15%, 500 VDCW, temp coef 0 PPM.
C3 and C4	19A116055P19	Ceramic disc: 1000 pf 250%, 1000 VDCW; sim to SMC Type JF Discap.
C5	19A116056P100	Ceramic disc: 10 pf 10.5 pf, 500 VDCW, temp coef 0 PPM.
C6	19A116055P47	Ceramic disc: 680 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C7	5493639P14	Tantalum: 33 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C8	19A116055P19	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C9	19A116114P69	Ceramic: 130 pf 15%, 100 VDCW, temp coef 0 PPM.
C10	19A116056P600	Ceramic disc: 60 pf 10.5 pf, 500 VDCW, temp coef 0 PPM.
C11	19A116055P19	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C12	19A116056P400	Ceramic disc: 40 pf 10.5 pf, 500 VDCW, temp coef 0 PPM.
C13	19A116055P13	Ceramic disc: 470 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C14	5493639P14	Tantalum: 15 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C15	19A116056P200	Ceramic disc: 3 pf 10.5 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J3	4033513P4	Contact, electrical: sim to Bead Chain LB3-3.
J34 thru J35	4033513P6	Contact, electrical: sim to Bead Chain LB3-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19B219456P1	Coil.
L2	7488078P17	Choke, RF. 12.0 µh 210%, 1.00 ohms DC res max; sim to Jeffers 4431-8.
L3	19B219456P2	Coil.
L4	7488078P6	Choke, RF. 1.00 µh 210%, 0.30 ohms DC res max; sim to Jeffers 4431-8E.
L5	19B219457P1	Coil.
L6	7488078P18	Choke, RF. 15.0 µh 210%, 1.30 ohms DC res max; sim to Jeffers 4431-9E.
L7	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L8	19B219457P3	Coil.
L9	7488078P40	Choke, RF. 5.60 µh 210%, 0.15 ohms DC res max; sim to Jeffers 4432-1E.
L10 thru L15	19D416151P1	(Part of printed wiring board).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A129283P1	Silicon, NPN.
Q3	19A129283P2	Silicon, NPN.
Q4	19A129283P3	Silicon, NPN.
Q5 and Q6	19A129283P4	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3377P153J	Composition: 100 ohms 25%, 1/2 w.
R2	3815329453J	Composition: 6800 ohms 25%, 1/4 w.
R3 and R4	3815329P453J	Composition: 45,000 ohms 25%, 1/4 w.
R5	3377P150J	Composition: 15 ohms 25%, 1/2 w.
R6	3815329243J	Composition: 24,000 ohms 25%, 1/4 w.
R7	3815329103J	Composition: 10,000 ohms 25%, 1/4 w.
R8	5493639R5	Composition: 5.1 ohms 25%, 1 w.
R9	3377P151J	Composition: 150 ohms 25%, 1/2 w.
		PA BOARD 19D416466G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116102P1	Ceramic: 0.01 µf 120%, 50 VDCW; sim to Erie 8121-000-X5R.
C2	19A116114P41	Ceramic: 22 pf 15%, 100 VDCW, temp coef 0 PPM.
C3	19A116149P645	Ceramic disc: 100 pf 15%, 500 VDCW, temp coef -80 PPM.
C4 and C5	5494641P11	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C6	5496367P14	Tantalum: 15 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C7	19A116114P12	Ceramic: 3.3 pf 15%, 100 VDCW, temp coef 0 PPM.
C8	7489102P9	Silver mica: 18 pf 15%, 500 VDCW; sim to Electro Motive Type DM-15.
C9	19A116114P13	Ceramic: 3.3 pf 15%, 100 VDCW, temp coef 0 PPM.
C10	19A116114P33	Ceramic: 10 pf 15%, 100 VDCW, temp coef 0 PPM.
C11	19A116114P41	Ceramic: 22 pf 15%, 100 VDCW, temp coef 0 PPM.
C12	19A116114P53	Ceramic: 10 pf 15%, 100 VDCW, temp coef 0 PPM.
C13	19A116114P141	Ceramic: 33 pf 15%, 100 VDCW, temp coef -30 PPM.
C14	19A116114P64	Ceramic: 27 pf 15%, 100 VDCW, temp coef 0 PPM.
C15	5496318P56	Ceramic disc: 5.0 pf 10.25 pf, 500 VDCW, temp coef 0 PPM.
C16	19A116114P2047	Ceramic: 33 pf 15%, 100 VDCW, temp coef -80 PPM.
C17	19A116114P59	Ceramic: 8.2 pf 15%, 100 VDCW, temp coef 0 PPM.
C18	5496318P68	Ceramic disc: 68 pf 15%, 500 VDCW, temp coef 0 PPM.
C19	19A116114P53	Ceramic: 10 pf 15%, 100 VDCW, temp coef 0 PPM.
C20	19A116093P26	Silver mica: 26 pf 125, 250 VDCW; sim to Underwood Type J18F.
C21	5494641P11	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C22	5496367P14	Tantalum: 15 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C23	19A116093P39	Silver mica: 39 pf 125, 250 VDCW; sim to Underwood Type J18F.
C24	19A116114P141	Ceramic: 33 pf 15%, 100 VDCW, temp coef -30 PPM.
C25	5496318P48	Ceramic disc: 34 pf 15%, 500 VDCW, temp coef 0 PPM.
C26	19A116093P21	Silver mica, 21 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C27	5494641P11	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C28	7489102P9	Silver mica: 18 pf 15%, 500 VDCW; sim to Electro Motive Type DM-15.
C29	19A116093P13	Silver mica: 13 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C30	5496318P39	Ceramic disc: 8.0 pf 10.25 pf, 500 VDCW, temp coef 0 PPM.
C31	19A116093P93	Silver mica: 93 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C32	19A116093P29	Silver mica: 29 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C33	7489102P9	Silver mica: 18 pf 15%, 500 VDCW; sim to Electro Motive Type DM-15.
C34	5496367P14	Tantalum: 15 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C35	19A116093P33	Silver mica: 33 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C36	5496641P9	Ceramic disc: 680 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C37*	5496318P64	Ceramic disc: 15 pf 15%, 500 VDCW, temp coef 0 PPM. Earlier than REV A:
	5496318P68	Ceramic disc: 7.0 pf 10.25 pf, 500 VDCW, temp coef 0 PPM.
C38	19A116093P35	Silver mica: 35 pf 125, 250 VDCW; sim to Underwood Type J18F.
C39	5494641P11	Ceramic disc: 1000 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C40	7489102P9	Silver mica: 18 pf 15%, 500 VDCW; sim to Electro Motive Type DM-15.
C41	5496367P14	Tantalum: 15 µf 120%, 20 VDCW; sim to Sprague Type 150D.
C42	19A116093P43	Silver mica: 43 pf 10.5 pf, 250 VDCW; sim to Underwood Type J18F.
C43	5496641P9	Ceramic disc: 680 pf 120%, 1000 VDCW; sim to SMC Type JF Discap.
C44*	5496318P64	Ceramic disc: 15 pf 15%, 500 VDCW, temp coef 0 PPM. Earlier than REV A:
	5496318P68	Ceramic disc: 7.0 pf 10.25 pf, 500 VDCW, temp coef 0 PPM.
Q1 and Q2	19A129283P1	Silicon, NPN.
Q3	19A129283P2	Silicon, NPN.
Q4	19A129283P3	Silicon, NPN.
Q5 and Q6	19A129283P4	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3377P153J	Composition: 100 ohms 25%, 1/2 w.
R2	3815329453J	Composition: 6800 ohms 25%, 1/4 w.
R3	3377P100J	Composition: 10 ohms 25%, 1/2 w.
R4	3815329P453J	Composition: 45,000 ohms 25%, 1/4 w.
R5	3377P150J	Composition: 15 ohms 25%, 1/2 w.
R6	3815329243J	Composition: 24,000 ohms 25%, 1/4 w.
R7	3815329103J	Composition: 10,000 ohms 25%, 1/4 w.
R8	5493639R5	Composition: 5.1 ohms 25%, 1 w.
R9	3377P151J	Composition: 150 ohms 25%, 1/2 w.

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 on the front panel. Each unit stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - PA Board 19D416431G1, 3
To improve power output at the low end of the band and to prevent emitter relay operation in unkeyed mode. Changed C37 and C44.

REV. B - PA Board 19D416431G2
To prevent flexwalk of the receiver due to feedback. Added CR202.



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 No.

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

MAINTENANCE MANUAL
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MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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