AINTENANCE MANUAL

25-50 MHz, 50-WATT STATION TRANSMITTER



ASSEMBLY



PA **ASSEMBLY**

SPECIFICATIONS

FCC Filing Designation

KT-56-A, C Extended local control; Intermittent Duty Extended local/DC & Tone Remote KT-57-A, C

DC Remote/Tone Remote; Intermittent Duty

KT-58-A, C All controls; Continuous Duty

Frequency Range

25-50 MHz

Power Output

50 Watts (Adjustable from 15 to 50 Watts)

Crystal Multiplication Factor

Frequency Stability 5C-ICOM with EC ICOM

 $\pm 0.0005\%$ (-30°C to +60°C) $\pm 0.0002\%$ (0°C to +55°C)

EC-ICOM or 5C-ICOM 2C-ICOM

 $\pm 0.0002\%$ (-30°C to +60°C)

Spurious and Harmonic Emission

At least 85 dB below full rated

power output

Modulation

Adjustable from 0 to $\pm 5~\mathrm{kHz}$ 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 2% (1000 Hz) Less than 3% (300 to 3000 Hz)

Deviation Symmetry

0.5 kHz maximum

Maximum Frequency Spread: (2 to 4 channels)

Full Specifications

1 dB Degradation

25-30 MHz 30-36 MHz 0.16 MHz 0.20 MHz

0.32 MHz 0.40 MHz

36-42 MHz

0.24 MHz

0.47 MHz

42-50 MHz

0.28 MHz

0.54 MHz

Duty Cycle

EIA 20% Intermittent (KT-56-A, C & KT-57-A, C) Continuous (KT-58-A, C)

RF Output Impedance

50 ohms

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



TABLE OF CONTENTS

SPECIFICATIONS C	Cover
DESCRIPTION	1
CIRCUIT ANALYSIS	1
Exciter ICOMs Audio Preamplifier Audio IC	1 1 3 3
Frequency Divider IC	4 4
Power Amplifier	5 5 6
MAINTENANCE	6
Disassembly PA Transistor Replacement Alignment Procedure Test Procedures Power Output Tone Deviation Voice Deviation	6 7 9 10 10 10
Troubleshooting	11
OUTLINE DIAGRAMS	
Intermittent and Continuous Duty Exciter & PA Boards; Intermittent Duty PA Assembly	12 13 14
SCHEMATIC DIAGRAMS (with voltage readings)	
Exciter Power Amplifier (Intermittent Duty) Power Amplifier (Continuous Duty)	16 17 19
PARTS LIST AND PRODUCTION CHANGES	
Exciter	15 18 20
ILLUSTRATIONS	
Figure 1 - Block Diagram Figure 2 - Typical Crystal Characteristics Figure 3 - Equivalent ICOM Circuit Figure 4 - Simplified Audio IC Figure 5 - Access to Exciter (Front View) Figure 6 - Access to Power Amplifier (Rear View) Figure 7 - PA Board Removal Figure 8 - PA Transistor Lead Identification Figure 9 - PA Transistor Lead Forming Figure 10 - Frequency Characteristics Vs. Temperature	1 2 3 4 6 6 7 8 8

- WARNING -

Although the highest DC voltage in the MASTR II station transmitter is the 12 VDC supply voltage, high currents may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits! High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. KEEP AWAY FROM THESE CIRCUITS WHEN THE TRANSMITTER IS ENERGIZED!

DESCRIPTION

Transmitter Types KT-56-A, C, KT-57-A, C & KT-58-A, C are crystal-controlled, phase modulated transmitters designed for one-through four-frequency operation in the 25 to 50 megahertz band. The solid state transmitter utilizes both integrated circuits (ICs) and discrete components, and consists of the following assemblies:

- Exciter Board; with audio, modulator, amplifier and multiplier stages.
- Power Amplifier Assembly; with amplifier, driver, PA, power control, filter and antenna switch.

CIRCUIT ANALYSIS

EXCITER

The exciter uses nine transistors and two integrated circuits to drive the PA assembly. The exciter can be equipped with up to four Integrated Circuit Oscillator Modules (ICOMs). The ICOM crystal frequency ranges from approximately 8.33 to 16.67 megahertz, and the crystal frequency is multiplied three times (divided by four and multiplied by 12 for a multiplication of three).

Audio, supply voltages and control functions are connected through P902.

Centralized metering jack J103 is provided for use with GE Test Set Model 4EX3All or Test Kit 4EX3K12. The test set meters the modulator, multiplier and amplifier stages.

ICOMS

Three different types of ICOMs are available for use in the exciter. Each of the ICOMs contains a crystal-controlled Colpitts oscillator, and two of the ICOMs contain compensator ICs. The different ICOMs are:

- 5C-ICOM contains an oscillator and a 5 part-per-million (±0.0005%) compensator IC. Provides compensation for EC-ICOMs.
- EC-ICOM contains an oscillator only. Requires external compensation from a 5C-ICOM.
- 2C-ICOM contains an oscillator and a 2 PPM (±0.0002%) compensator IC. Will not provide compensation for an EC-ICOM.

The ICOMs are enclosed in an RF shielded can with the type ICOM (5C-ICOM, EC-ICOM or 2C-ICOM) printed on the top of the can. Access to the oscillator trimmer is obtained

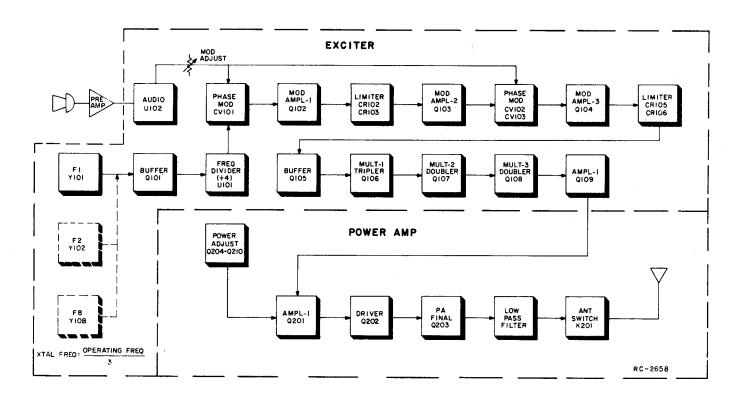


Figure 1 - Transmitter Block Diagram

by prying up the plastic tab on the top of the can. The tabs can also be used to pull the ICOMs out of the radio.

Frequency selection is accomplished by switching the ICOM keying lead (termianl 6) to A-. The oscillator is turned on by applying a keyed +10 Volts to the external oscillator load resistor.

— CAUTION —

All ICOMs are individually compensated at the factory and cannot be repaired in the field. Any attempt to repair or change an ICOM frequency will void the warranty.

In transmitter types KT-56-A, C using EC-ICOMs, at least one 5C-ICOM must be used. The 5C-ICOM is normally used in the receiver Fl position, but can be used in any transmit or receive position. One 5C-ICOM can provide compensation for up to 8 EC-ICOMs in the transmit and receiver. Should the 5C-ICOM compensator fail in the open mode, the EC-ICOMs will still maintain 2 PPM frequency stability from 0°C to 55°C (+32°F to 131°F) due to the regulated compensation voltage (5 Volts) from the 10-Volt regulator IC. In transmitter types KT-57-A, C and KT-58-A, C at least one 5C ICOM is required for the transmitter and at least one 5C-ICOM is required for the receiver. If desired, up to 8 5C-ICOMs may be used in the station.

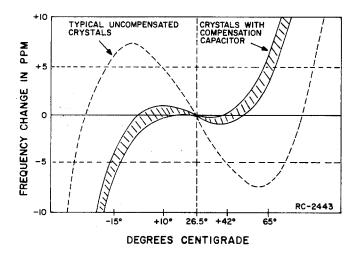


Figure 2 - Typical Crystal Characteristics

The 2C-ICOMs are self-compensated at 2 PPM and will not provide compensation for EC-ICOMs.

Oscillator Circuit

The quartz crystals used in ICOMs exhibit the traditional "S" curve characteristics of output frequency versus operating temperature.

At both the coldest and hottest temperatures, the frequency increases with increasing temperature. In the middle temperature range (approximately 0° C to $+55^{\circ}$ C), frequency decreases with increasing temperature.

Since the rate of change is nearly linear over the mid-temperature range, the output frequency change can be compensated by choosing a parallel compensation capacitor with a temperature coefficient approximately equal and opposite that of the crystal.

Figure 2 shows the typical performance of an uncompensated crystal as well as the typical performance of a crystal which has been matched with a properly chosen compensation capacitor.

At temperatures above and below the midrange, additional compensation must be introduced. An externally generated compensation voltage is applied to a varactor (voltage-variable capacitor) which is in parallel with the crystal.

In transmitter types KT-56-A, C a constant bias of 5 Volts (provided from Regulator IC U901 in parallel with the compensator) establishes the varactor capacity at a constant value over the entire mid-temperature range. With no additional compensation, all of the oscillators will provide 2 PPM frequency stability from 0°C to 55°C (+32°F to 131°F).

Compensator Circuits

Both the 5C-ICOMs and 2C-ICOMs are temperature compensated at both ends of the temperature range to provide instant frequency compensation. An equivalent ICOM circuit is shown in Figure 3.

The cold end compensation circuit does not operate at temperatures above 0°C. When the temperature drops below 0°C, the circuit is activated. As the temperature decreases, the equivalent resistance decreases and the compensation voltage increases.

The increase in compensation voltage decreases the capacity of the varactor in the oscillator, increasing the output frequency of the ICOM.

The hot end compensation circuit does not operate at temperatures below $+55^{\circ}$ C. When the temperature rises above $+55^{\circ}$ C, the circuit is activated. As the temperature

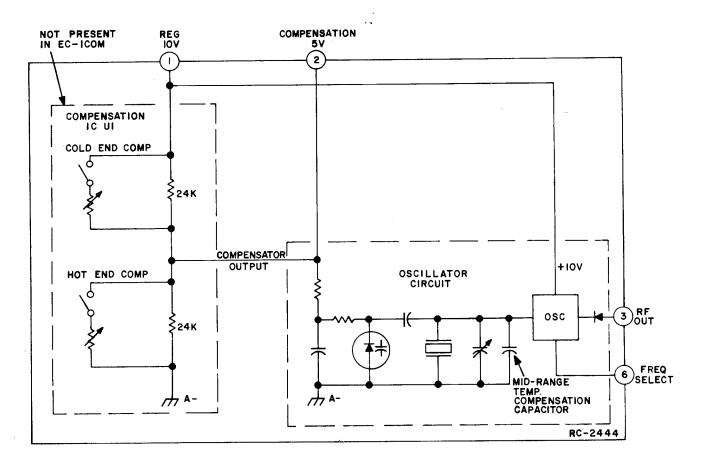


Figure 3 - Equivalent ICOM Circuit

increases, the equivalent resistance decreases and the compensation voltage decreases. The decrease in compensation voltage increases the capacity of the varactor, decreasing the output frequency of the ICOM.

SERVICE NOTE: Proper ICOM operation is dependent on the closely-controlled input voltages from the 10-Volt regulator. Should all of the ICOMs shift off frequency, check the 10-Volt regulator module or check output of 5C-ICOM.

AUDIO PREAMPLIFIER

The transmitter Audio Preamplifier is not part of the transmitter and is covered in the station Maintenance Manual.

AUDIO IC

The transmitter audio circuitry is contained in audio IC-UlO2. A simplified drawing of the audio IC is shown in Figure 4.

Audio from the Station Preamplifier at pin 12 is coupled through capacitor C1 to the base of Q1 in the operational amplifier-limiter circuit.

The operational amplifier-limiter circuit consists of Q1, Q2 and Q3. Q3 provides limiting at high signal levels. The gain of the operational amplifier circuit is fixed by negative feedback through R19, R20 and the resistance in the network (pin 9).

The output of Q3 is coupled through a de-emphasis network (R10 and C3) to an active post-limiter filter consisting of C4, C5, C6, R11, R12, R13, R15, R17 and Q4.

Following the post-limiter filter is class A amplifier Q5. The output of Q5 is coupled through MOD ADJUST potentiometer R127 to the phase modulators.

SERVICE NOTE: If the DC voltages to the Audio IC are correct and no audio output can be obtained, replace Ul02.

For radios equipped with Channel Guard, tone from the encoder is applied to the phase modulators through CHANNEL GUARD MOD ADJUST potentiometer R128, and resistors R110, R121 and R124. Instructions for setting R128 and station gain Control R14 on the Audio Preamplifier are contained in the modulation adjustment section of the Transmitter Alignment Procedure.

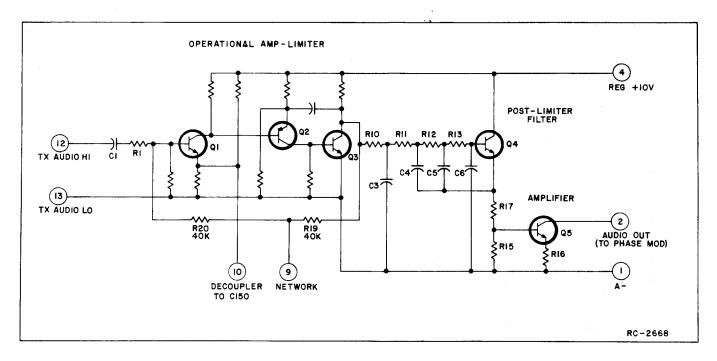


Figure 4 - Simplified Audio IC

FREQUENCY DIVIDER IC

The output at pin 3 of the selected ICOM is coupled through buffer amplifier Q101 to frequency divider U101, which divides the oscillator frequency by 4. The divider consists of two J-K flip-flops connected as a binary counter.

When the transmitter is not keyed (no ICOMs on), Q101 is saturated (turned on) with its collector voltage near zero. Keying the transmitter starts one of the ICOMs, and its output cuts Q101 on and off once each cycle. As Q101 turns off during each cycle, the drop in collector voltage causes the left flip-flop to change state. Assume the flip-flop was in the "0" state (the output at "Q" near A-). The first cycle of the oscillator output causes it to switch to the "1" stage (output at "Q" approximately 5 Volts). The second cycle will cause the flip-flop to switch back to the "0" state. Therefore, it requires two oscillator cycles to switch the left flip-flop through one complete cycle from "0" to "1" and back to "0".

When the left flip-flop switches from "1" to "0", it causes the right flip-flop to change state. It requires two cycles of the left flip-flop to switch the right flip-flop from "0" to "1" and back to "0". Therefore, four cycles of the oscillator output are required for each cycle of output from pin 9 of UlO1.

If U101 was operating into a pure resistive load, its output would be a square wave. However, the modulator circuit pre-

sents a tuned load to the IC, so that harmonics are filtered out and the waveform at the junction of ClO2 and ClO3 (modulator input) is essentially a sine wave at one-fourth the oscillator frequency. The output of the frequency divider is coupled through DC blocking capacitor ClO2 to the first modulator stage.

PHASE MODULATORS, AMPLIFIER & MULTIPLIERS

The first phase modulator is varactor (voltage-variable capacitor) CV101 in series with tunable coil L101. This network appears as a series-resonant circuit the RF output of the oscillator. An audio signal applied to the modulator circuit through blocking capacitor C115 varies the bias of CV101, resulting in a phase modulated output. A voltage divider network (R108 and R109) provides the proper bias for varactors CV101, CV102 and CV103.

The output of the first modulator is coupled through blocking capacitor Cl06 to the base of Class A amplifier Ql02. The first modulator stage is metered through a metering network consisting of Rl15, Rl50, Cl07 and CR101. Diodes CR102 and CR103 remove any amplitude modulation in the modulator output.

Following Q102 is another Class A Amplifier, Q103. The output of Q103 is applied to the second modulator stage. The second modulator consists of two cascaded modulator circuits consisting of CV102, L102, L103 and CV103. Following the second modulator is a Class A amplifier Q104. The output of the second modulator stage is metered through

R133, R145, C117 and CR104, and is applied to the base of buffer Q105. Diodes CR105 and CR106 remove any amplitude modulation in the second modulator output.

Buffer Q105 is saturated when no RF signal is present. Applying an RF signal to Q105 provides a sawtooth waveform at its collector to drive the class C tripler, Q106. The tripler stage is metered through R146. The output of Q106 is coupled through tuned circuits T101, T102 and T103 to the base of dobuler Q107, T101, T102 and T103 are tuned to one-fourth of the operating frequency. The doubler stage is metered through R147.

The output of Q107 is coupled through tuned circuits T104 and T105 to the base of second doubler Q108. T104 and T105 are tuned to one-half the operating frequency. Q108 is metered through R148.

The output of Q108 is coupled through three tuned circuits (T106, T107 and T108) to the base of amplifier Q109. The circuits are tuned to the transmitter operating frequency.

Q109 is a class C amplifier with a collector feed network consisting of C139, C141, L104, L108 and R143. The stage is metered through R149. The amplifier collector circuit consists of C142, C143, C146 and L105, and matches the amplifier output to the input of the power amplifier assembly.

POWER AMPLIFIER

The PA assembly uses three RF power transistors and seven transistors in the Power Control circuitry to provide a power output of 50 Watts. The broadband PA has no adjustments other than Power Control potentiometer R216.

Supply voltage for the PA is connected through power leads from the system board to feedthrough capacitors C297 and C298 on the bottom of the PA assembly. C297, C298 and C299, L296 and L297 prevent RF from getting on the Power leads. Diode CR295 will cause the main fuse in the fuse assembly to blow if the polarity of the power leads is reversed.

Centralized metering jack J205 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The Test Set meters the Ampl-1 drive (exciter output), Ampl-1 power control, Driver and PA current.

RF AMPLIFIERS

The exciter output is coupled through an RF cable to PA input jack J203. The RF is coupled through DC blocking capacitor C202 to the base of Class C amplifier Q201 through a matching network. The network

matches the 50-ohm input to the base of $\dot{Q}201$, and consists of C205, C206, C235, L201, L202 and L203.

Part of the RF input is rectified by CR201 and used to activate the Power Control circuit. Another portion of the rectified RF is applied to voltage dividers R223 and R224 for metering the Ampl-1 drive at J205.

Collector voltage to Q201 (Ampl-1) is controlled by the Power Control circuit, and is applied through a collector stabilizing network consisting of L224 and R225 and collector feed network L204 and C207. The collector voltage of Q201 is metered through R235 at J205.

The output of Q201 is applied to the base of Class C driver Q202 through a low-pass filter matching network (C209, C210, L205 and L206). Resistors R202, R203 and R204 lower the gain of Q202. Collector voltage to Q202 is coupled through a collector stabilizing network consisting of L225 and R233 and collector feed network L208 and C213.

Collector current for Q202 is metered across tapped manganin resistor R230 at J205 (Driver Current). The reading is taken on the one-Volt scale with the High Sensitivity button pressed, and read as 10 amperes full scale.

Following Q202 is an interstage coupling network (C214 through C221, L209 through L211, R206 and R207.) The output is applied to the base of the class C PA stage, Q203. Supply voltage is coupled through a collector stabilizing network consisting of L226 and R234 and collector feed network C222 and L212.

Collector current for Q203 is metered across tapped manganin resistor R231 at J205. The reading is taken on the one-Volt scale with the High Sensitivity buttom pressed, and read as 10 amperes full scale.

The PA output is coupled through an output matching network (C224, C225, C226, L213 and L214,) to an M-derived, constant K low-pass filter. C230 through C233 provides ground isolation. The filter output is applied to the antenna through antenna switch K201.

- 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.

POWER CONTROL CIRCUIT

When the transmitter is keyed, rectified RF from CR201 is applied to the base of switch Q204, turning it on. Turning on Q204 turns on voltage regulator Q206 which supplies a constant voltage to Power Adjust potentiometer R216.

Q208, Q209 and Q210 operate as an amplifier chain to supply voltage to the collector of Q201 (Ampl-1). The setting of R216 determines the voltage applied to the base of Q208. The higher the voltage at the base of Q208, the harder the amplifiers conduct, supplying more collector voltage to Q201. The lower the voltage at the base of Q208, the less collector voltage is supplied to Q201. Reducing the supply voltage to Q201 reduces the drive to Q202 and Q203, thereby reducing the power output of the PA. The power output can be adjusted by R216 from approximately 15 to 50 Watts.

Temperature protection is provided by Q205, Q207 and thermistor RT201 which is mounted in the PA heatsink. Under normal operating conditions, the circuit is inactive (Q205 is on and Q207 is off). When the heatsink temperature reaches approximately 100°C, the resistance of RT201 decreases. This increases the base voltage applied to Q205, turning it off. Turning off Q205 allows Q207 to turn on, decreasing the voltage at Power Adjust potentiometer R216. This reduces the base voltage to Q208 which causes Q209 and Q210 to conduct less, reducing the collector voltage to Q201 (Ampl-1). This reduces the transmitter output power, keeping the heatsink at a maximum of approximately 100°C. When the heatsink temperature decreases below 100°C, the temperature control circuit turns off. allowing the normal transmitter power output.

MAINTENANCE

DISASSEMBLY

For a more complete mechanical parts breakdown refer to the station manual. To service the transmitter exciter from the front:

- Turn the two latching knobs (A) counterclockwise to unlatch the Radio Panel Front Door. Refer to Figure 5.
- Swing the Radio Panel Front Door down as shown.
- 3. Remove covers.

To service the transmitter Power Amplifier from the rear:

1. Remove the top two screws (B) on the Intermittent or Continuous Duty Power Amplifier. Refer to Figure 6.

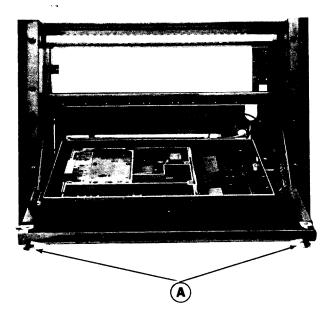


Figure 5 - Access To Exciter - Front View

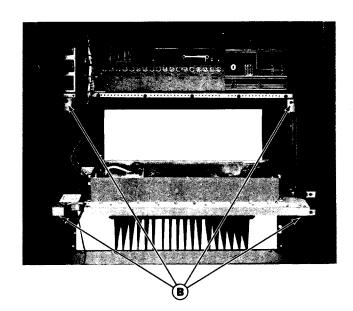


Figure 6 - Access To Power Amplifier - Rear View

Swing the Power Amplifier down as shown. Remove the top cover of the Power Amplifier.

-- NOTE ---

If the heatsink blower option is present, this blower must be removed before the Power Amplifier can be lowered.

To remove the PA board: Refer to Figure 7.

- 1. Remove the PA top cover and unplug the exciter/PA cable (B)
- 2. Unsolder the two feedthrough coils (E) and the thermistor leads (F).
- For Continuous Duty stations only, remove all heatsink sections from the heat dissapator plate.
- 4. Remove the PA transistor hold-down nuts and spring washer on the bottom of the PA assembly.
- 5. Remove the four PA board mounting screws G, the five screws in the filter casting H, and the retaining screw in Q210 J, and lift the board out.

PA TRANSISTOR REPLACEMENT

When replacing a power transistor where more than one are in parallel, make sure all the paralleled transistors are from the same manufacturer for proper operation.

-- 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.

To replace the PA RF transistors:

- 1. Unsolder one lead at a time with a 50-Watt soldering iron. Use a scribe to hold the lead away from the printed circuit board until the solder cools.
- 2. Turn the transmitter.

- NOTE -

If the transmitter has a continuous Duty Power Amplifier a section of Heat Sink may have to be removed to get to the transistor hold-down nuts. Apply a light coat of silicon grease when replacing the removed section of Heat Sink.

3. Hold the body of the transistor to prevent it from turning. Remove the transistor hold-down nut and spring washer through the hole in the heatsink with an 11/32-inch nut-driver. Lift out the old solder from the printed circuit board with a de-soldering tool such as a SOLDA PULLT. Special care should be taken to prevent damage to the printed circuit board runs.

4. 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 7). The letter "C" on the top of the transistor indicates the collector.

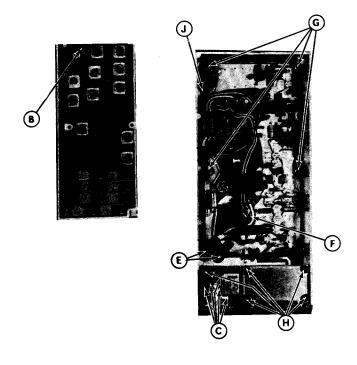
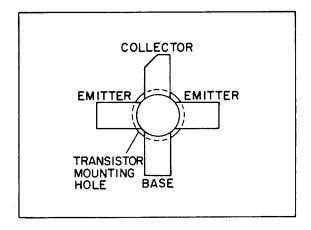


Figure 7 - PA Board Removal

- 5. Applying a coating of silicon 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 (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.
- 6. Make sure that the transistor leads are formed as shown in Figure 8 so that the leads can be soldered to the printed circuit pattern, starting from the inner edge of the mounting hole.
- 7. 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.

- 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.



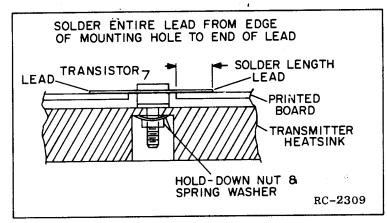


Figure 8 - Lead Identification

Figure 9 - Lead Forming

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502



MODULATION LEVEL ADJUSTMENT

The MOD ADJUST (R127) 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 aduio 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 Model 4EX3All or 4EX8Kl2

PROCEDURE

- 1. Set the station gain control R14 to its fully clockwise position.
- 2. Connect the audio oscillator and the meter through a 0.5 μF (or larger) DC blocking capacitor, across audio input terminals J10 (Green-Hi) and J11 (Black-Lo) on GE Test Set, and connect the Red Test set plug to the system Red metering plug.
- 3. Set the audio generator frequency to 1 kHz.
- A. In all station combinations except Local Control Intermittent Duty combinations, set the audio generator output to 30 millivolts RMS.
- B. In Local Control Intermittent Duty station combinations, set the audio generator output to 1.0 volt RMS.
- 4. For transmitters without Channel Guard, set MOD ADJUST R127 for a 4.5 kHz swing with the deviation polarity which gives the highest reading as indicated on the frequency modulation monitor.
- 5. For transmitters with Channel Guard set Channel Guard MOD ADJUST R105 for zero tone deviation. Next, with the 30 millivolts signal at 1000 Hz applied, set MOD ADJUST R104 for 3.75 kHz deviation. Then remove the signal from the audio oscillator and set Channel Guard MOD ADJUST R128 for 0.75 kHz tone deviation.
- 6. For multi-frequency transmitters, set the deviation as described in Steps 4 or 5 on the channel producing the largest amount of deviation.
- 7. Remove the audio oscillator and key the mike. While talking in a normal voice at a distance of four to six inches from the station microphone, adjust station gain control R14 for a deviation of 3 kHz as measured on the deviation monitor.

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; = PA voitage x PA current

where:

P; is the power input in Watts,

PA voltage is measured with Test Set Model 4EX3All in Position G on the 15-Volt range (read as 15 Volts full scale), and with the polarity switch in the (-) position. With Test Set Model 4EX8K12, use the B+ position and the 1-Volt range (read as 15 Volts full scale), with the HIGH SENSITIVITY button pressed and the polarity switch in the (-)

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

 $P_i = 12.6 \text{ Volts x 5.0 amperes} = 63 \text{ Watts.}$

ICOM FREQUENCY ADJUSTMENT

First, check the frequency to determine if any adjustment is required. The frequency should be set with a frequency meter or counter with an absolute accuracy that is 5 to 10 times better than the tolerance to be maintained, and with the entire radio as near as possible to an ambient temperature of 26.5°C (79.8°F).

MASTR II ICOMs should be reset only when the frequency shows deviations in excess of the following limits:

- A. ± 0.5 PPM, when the radio is at 26.5° C (79.8°F).
- B. ±2 PPM at any other temperature within the range of -5°C to +55°C
- C. The specification limit (± 2 PPM or ± 5 PPM) at any temperature within the ranges of -40° C to -5° C (-40° F to $+23^{\circ}$ F) or $+55^{\circ}$ C to $+70^{\circ}$ C $(+131^{\circ}F \text{ to } +158^{\circ}F)$.

If an adjustment is required, pry up the cover on the top of the ICOM to expose the trimmer, and use one of the following procedures:

If the radio is at an ambient temperature of 26.5°C (79.8°F), set the oscillator for the correct operating frequency.

If the radio is not at an ambient temperature of $26.5^{\circ}C$, setting errors can be minimized as follows:

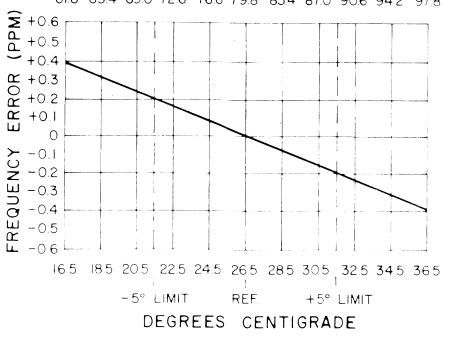
- A. To hold setting error to ± 0.6 PPM (which is considered reasonable for 5 PPM
- 1. Maintain the radio at 26.5°C ($\pm 5^{\circ}C$) and set the oscillator to desired frequency, or-
- 2. Maintain the radio at 26.5° C ($\pm 10^{\circ}$ C) and offset the oscillator, as a function of actual temperature, by the amount shown in Figure 9.
- B. To hold setting error to ± 0.35 PPM (which is considered reasonable for 2 PPM ICOMs): Maintain unit at 26.5°C (±5°C) and offset the oscillator. as a function of actual temperature, by the amount shown in Figure 9.

For example: Assume the ambient temperature of the radio is 18.5°C (65.4°F). At that temperature, the curve shows a correction factor of 0.3 PPM. (At 25 MHz, 1 PPM is 25 Hz. At 50 MHz, 1 PPM is 50 Hz).

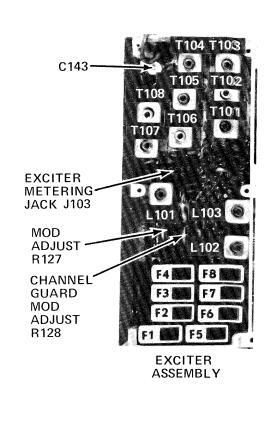
With an operating frequency of 50 MHz, set the oscillator for a reading of 15 Hz (0.3 x 50 Hz) higher than the licensed operating frequency. If a negative correction factor is obtained (at temperatures above 26.5° C), set the oscillator for the indicated PPM lower than the licensed operating frequency.

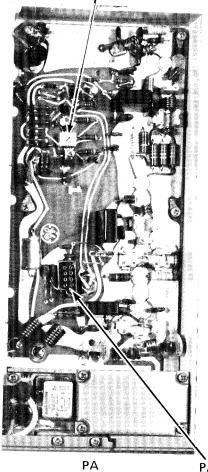
DEGREES FAHRENHEIT

61.8 65.4 69.0 72.6 76.6 79.8 83.4 87.0 90.6 94.2 97.8



RC-2453 Figure 9 - Frequency Characteristics Vs. Temperature



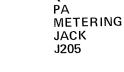


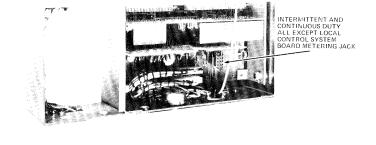
POWER

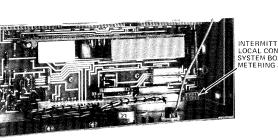
ADJUST

R216

ASSEMBLY



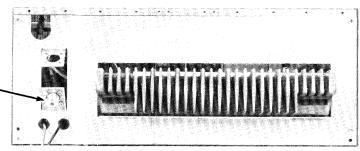






CONTINUOUS DUTY PA ANTENNA

JACK J243



TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

- 1. GE Test Set Model 4EX3All or Test Kit 4EX8K12.
- 2. A 50-ohm wattmeter connected to antenna jack J906
- 3. A frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

- 1. Place ICOMs on Exciter Board (crystal frequency = operating frequency ÷ 3).
- 2. For a large change in frequency or a badly mis-aligned transmitter, pre-set the slugs to T101 through T108, and L101, L102 and L103 to the

- NOTE ---

The tuning frequency for multi-frequency transmitters is determined by the operating frequency and the frequency spread between frequencies. Refer to the table below for maximum frequency spread.

3. For multi-frequency transmitters with a frequency spread less than that specified in column (1), tune the transmitters to the lowest

For frequency spread exceeding the limits specified in column (1), tune the transmitter using a center frequency tune up ICOM. Except the maximum frequency spread can be extended to the limits specified in column (3) with 1 dB degradation

For tuning L101, L102, L103, always tune L101, L102, L103 on the lowest frequency.

Multi-frequency Transmitter Tuning

Transmitter	MAXIMUM FREQUENCY SPREAD						
requency Range	(1) without center tuning	with center tuning	with center tuning (1 dB degradation)				
25-30 MHz	.080 MHz	.160 MHz	.320 MHz				
30-36 MHz	.100 MHz	.200 MHz	.400 MHz				
36-42 MHz	.120 MHz	.240 MHz	.470 MHz				
42-50 MHz	.140 MHz	.280 MHz	.540 MHz				

- 4. Connect the red plug on the GE Test Set to the System Board metering jack, and the black plug to the Exciter metering jack. Set the polarity to +, and set the range to the Test 1 position (1-Volt position for 4EX8K12) for all adjustments. NOTE: With the Test Set connected to the PA metering jack, the voltage reading at position "F" with the HIGH SENSITIVITY button pressed may be converted to driver collector current by reading the current as 10 amperes full scale. The voltage reading at position "G" with the HIGH SENSI-TIVITY button pressed may be converted to PA collector current by reading the current as 10 amperes full scale.
- 5. All adjustments are made with the transmitter keyed. Unkey the transmitter between steps to avoid unnecessary heating.

STEP	METER POSITION	TUNING CONTROL	METER READING	PROCEDURE
1.	5103- A MOD-1	L101	Maximum	Tune L101 for maximum meter reading.
2.	Slor B	L102 & L103	Maximum	Tune L102 and then L103 for the maximum meter reading.
3.	JWY C MULT-1	T101 & T102	See Procedure	Tune T101 for a dip in meter reading, and then tune T102 for maximum meter reading.
4.	J103-4 D 3103-4	T103, T102, T101 & T104	See Procedure	Tune T103 for maximum meter reading and re-adjust T102 and T101 for maximum meter reading. Then tune T104 for a dip in meter reading.
5.	MULT-3 F - 71 6 3-7	T105, T104, T106 & T107	See Procedure	Tune T105 for maximum meter reading and re-adjust T104 for maximum meter reading. Then tune T106 for a dip in meter reading and T107 for maximum meter reading.
6.	SW AMPL-1	T108, T107 & T106	Maximum	Tune T108 for maximum meter reading, and then re-adjust T107 and T106 for maximum meter reading.
7.	AMPL-1 DRIVE (on PA)	C143, C156	Maximum	Move the black metering plug to the Power Amplifier metering jack and tune C143 and C156 for maximum meter reading.
8.		R216		Set Power Adjust potentiometer R216 on the PA board for the desired power output (from 15 to 50 Watts).

ALIGNMENT PROCEDURE

LBI-4732

25-50 MHz, 50-WATT STATION TRANSMITTER INTERMITTENT & CONTINUOUS DUTY

Issue 2

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. Once a de-

fect 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

4. Deviation Meter (with a 5. Multimeter similar to: .75 kHz scale) similar to: Measurements # 720

2. VTVM similar to:

3. Audio Generator similar to:

Triplett # 850 Heath # IM-21

GE Model 4EX6Al0

GE TEST SET MODEL 4EX3A11. MODEL 4EX8K12 or 20,000 ohms-per-Volt voltmeter

POWER MEASUREMENT

TEST PROCEDURE

- 1. Connect transmitter output from the antenna jack to the wattmeter through a 50-ohm coaxial cable. Make sure the wattmeter is terminated into a 50-ohm load.
- 2. Key the transmitter and check the wattmeter for the desired power output.

SERVICE CHECK

Check the setting of the Power Adjust Control (R216).

Refer to the QUICK CHECKS on the Transmitter Troubleshooting Procedure.

VOICE DEVIATION AND SYMMETRY

TEST PROCEDURE

- 1. Connect the test equipment to the transmitter as shown.
- 2. In radios with Channel Guard, set Channel Guard Mod Adjust R128 for zero tone deviation.
- 3. Set the audio generator frequency to 1 kHz.
 - A. In all station combinations except Local Control Intermittent Duty combinations, set the audic generator output to 30 millivolts RMS.
 - B. In Local Control Intermittent Duty station combinations, set the audio generator output to 1.0 volt RMS.
- 4. Key the transmitter and adjust Deviation Meter to carrier frequency.
- 5. Deviation reading should be ± 4.5 kHz in radios without Channel Guard, and ± 3.75 kHz in radios with Channel Guard.
- 6. If necessary, adjust MCD ADJUST control R127 for the proper deviation on plus (+) or minus (-) deviation, whichever is greater.

NOTES: MASTR II station 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.

7. If the deviation reading plus (+) or minus (-) differs by more than 0.5 kHz, recheck Steps 1 and 2 as shown in the Transmitter Alignment Chart.

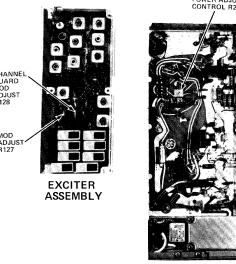
TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

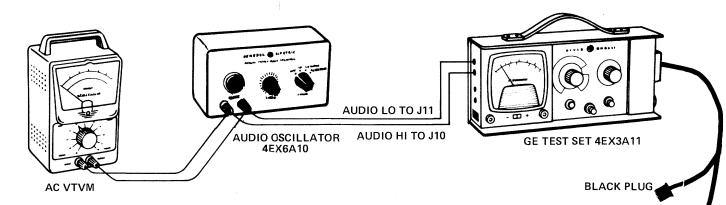
- 1. Set up the Deviation Meter and monitor the output of the transmitter.
- 2. Remove the 1000 Hz signal from the audio generator.
- 3. Key the transmitter and check for 0.75 kHz deviation. If the reading is low or high, adjust Channel Guard MOD ADJUST R128 for a reading of 0.75 kHz.

NOTES: --

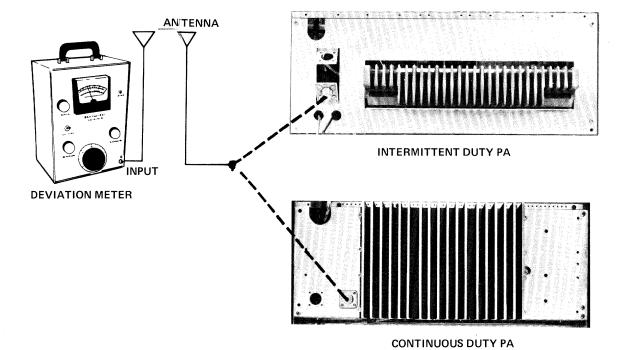
- 1. On units supplied with Channel Guard, the Phase Modulator Tuning should be adjusted carefully to insure proper performance. (Refer to Step 1 in the Transmitter Alignment Chart).
- 2. The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

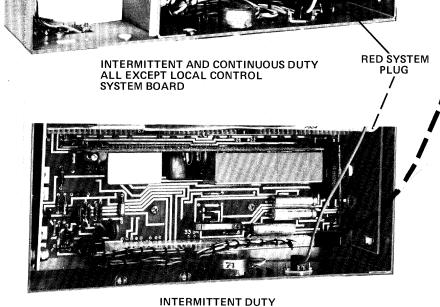






PA ASSEMBLY

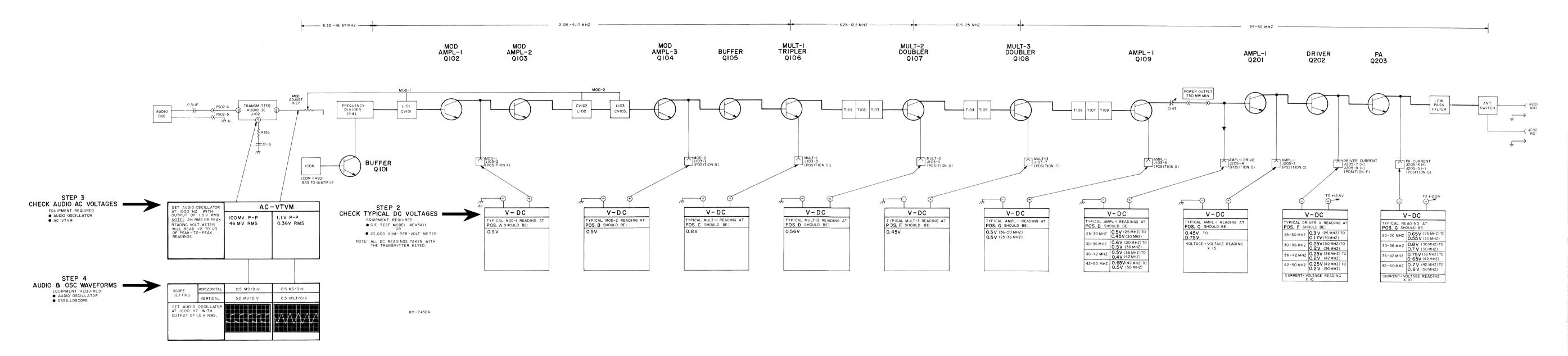




LOCAL CONTROL SYSTEM BOARD

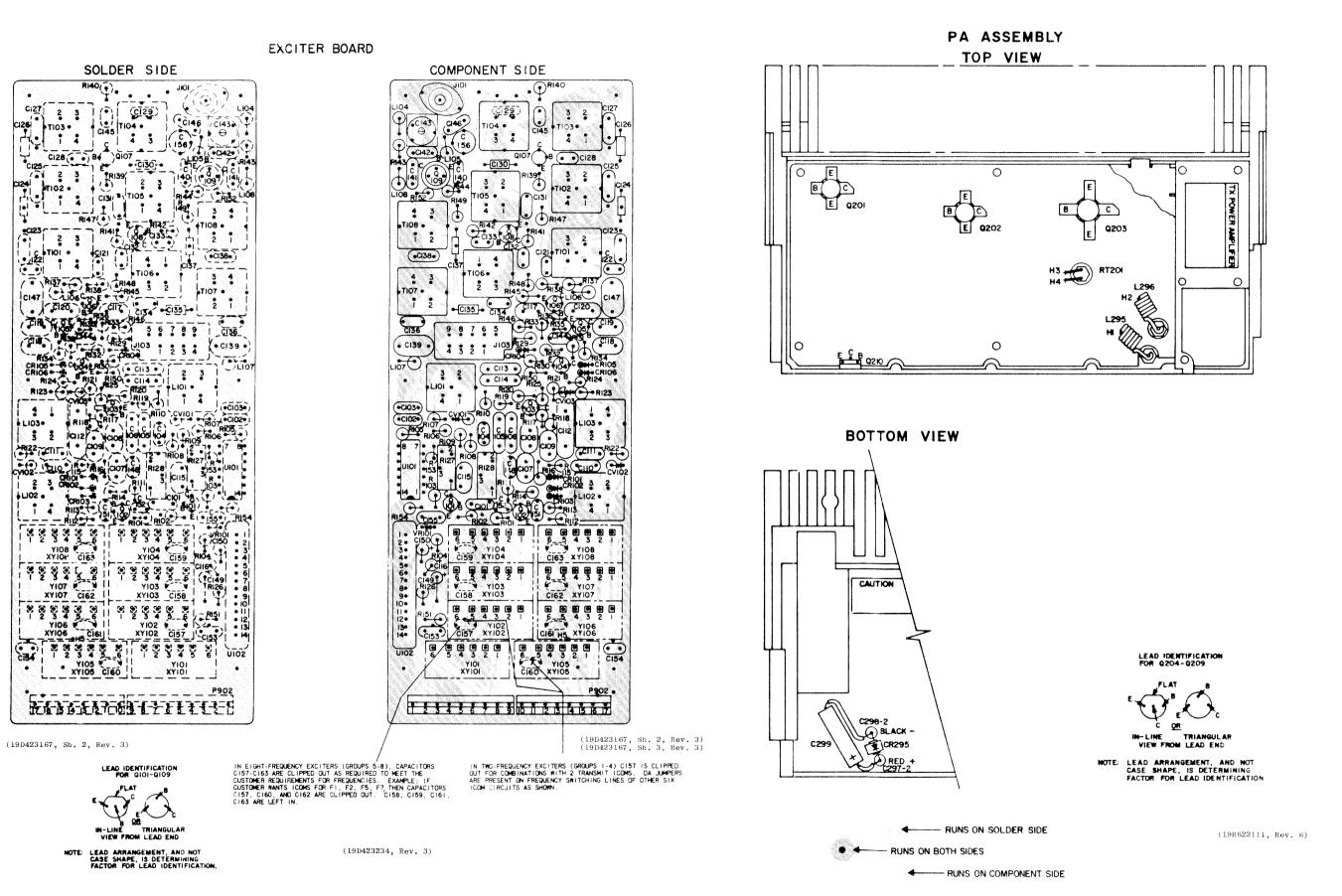
STEP I - QUICK CHECKS

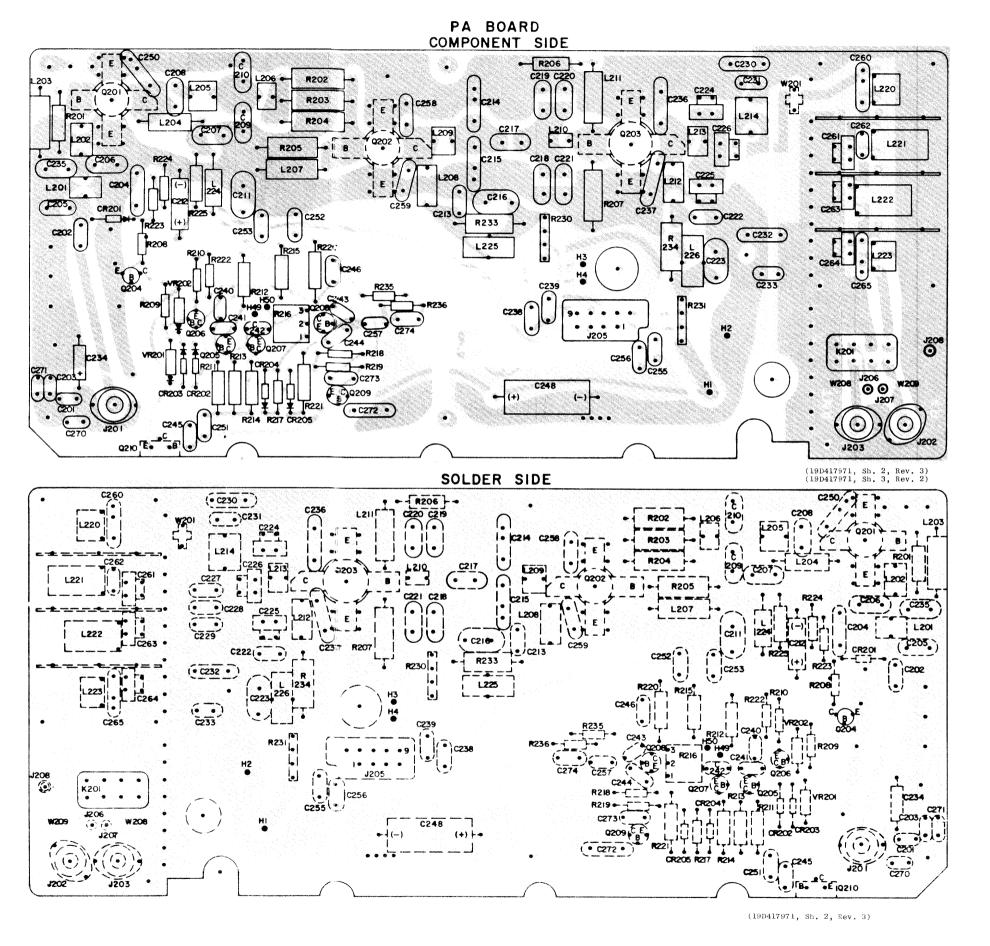
METER		PROBABLE DEFECTI	VE STAGE
POSITION GE TEST SET	HIGH METER READING	LOW METER READING	ZERO METER READING
		EXCITER	
A (MOD-1)	Q102, 10- Volt regulator	Q102, CV101, L101, 10-Volt regulator	ICOM, Q101, U101, L101, Q102, CR101, 10-Volt regulator or Channel Selector switch ground.
B (MOD-2)	Q104, 10- Volt regulator	Q103, L102, L103, CV102, CV103, Q104	Q103, L102, CV102, L103, CV103, CR104, Q104
C (MULT-1)	Q105, Q106 T101	Q105, Q106	Q105, Q106, T101
D (MULT-2)	Q107, T104	T101, T102, T103, Q107	T101, T102, T103, Q107, T104
F (MULT-3)	Q108, T106	T104, T105, Q108	T104, T105, Q108, T106
G (AMPL-1)	Q109, C146, R144	T106, T107, T108, Q109, L108	T106, T107, T108, Q109, L104, L107
	P	OWER AMPLIFIER	
"D" (AMPL-1 DRIVE)		Low Output from Exciter	No output from Exciter, CR201
"C" (AMPL-1 POWER CONTROL VOLT- AGE)	Q210	Q210	No Exciter output, Q210, Q204, CR201
"F" (DRIVER CURRENT)	Q202	Q202, Low Output from Q201	Q202, Q201, Check Pos. D & C
"G" (PA CURRENT)	Q203	Q201, Q202, Q203	Q203, Q202, Q201, Q210



TROUBLESHOOTING PROCEDURE

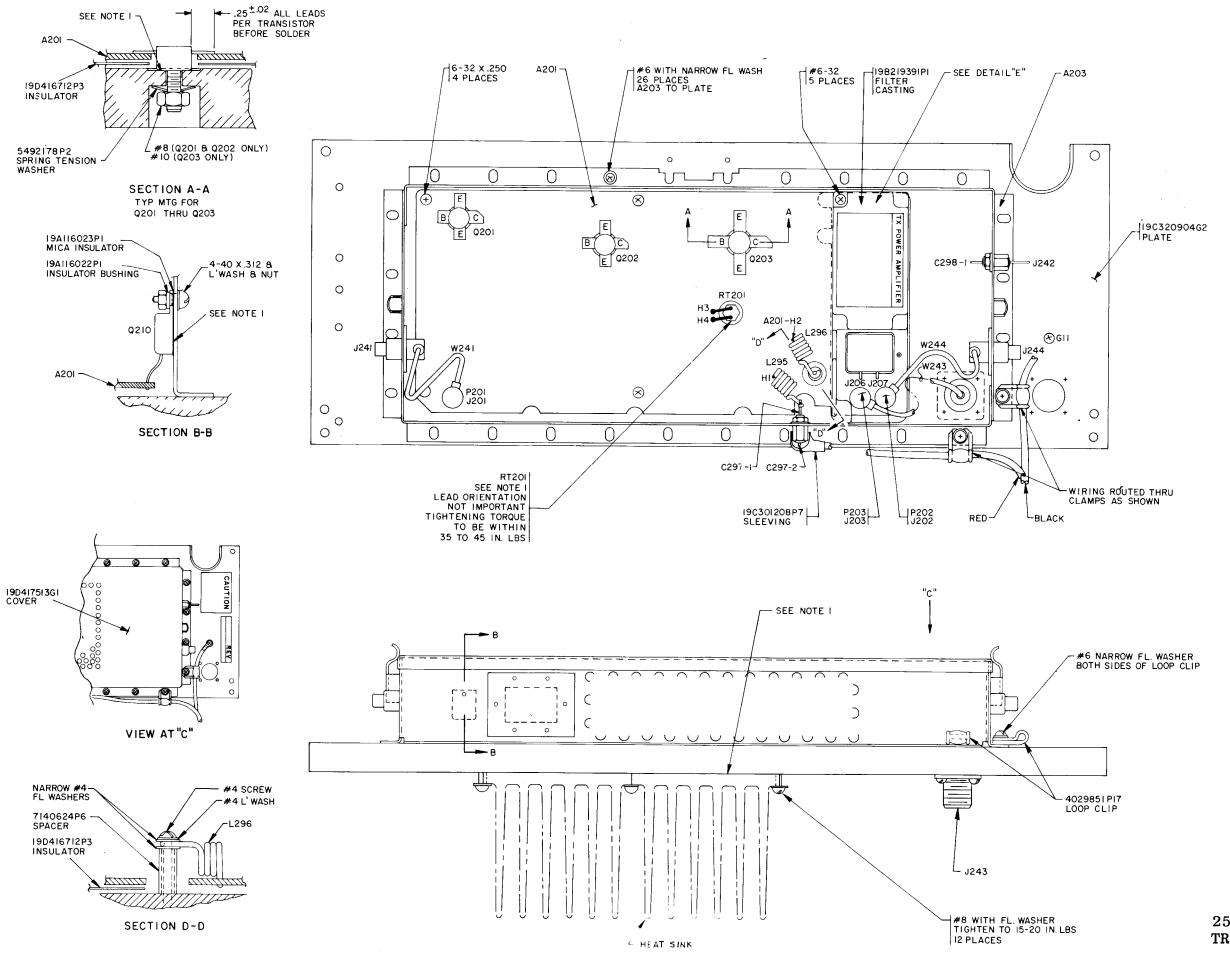
25-50 MHz, 50-WATT STATION TRANSMITTER INTERMITTENT & CONTINUOUS DUTY

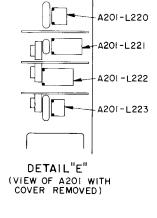




OUTLINE DIAGRAM

25-50 MHz, 50-WATT STATION TRANSMITTER





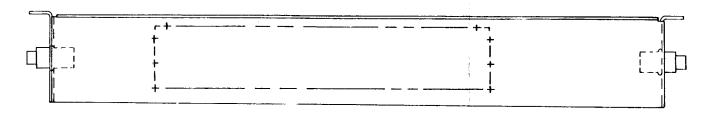
NOTES:

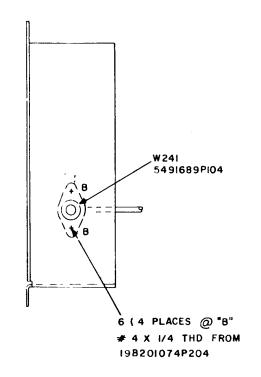
I.APPLY SILICONE GREASE TO BOTH SIDES OF MICA INSULATOR TO MOUNTING SURFACE OF Q201 THRU Q203 & RT201 AND UNPAINTED FLAT SURFACE OF HEAT SINKS.

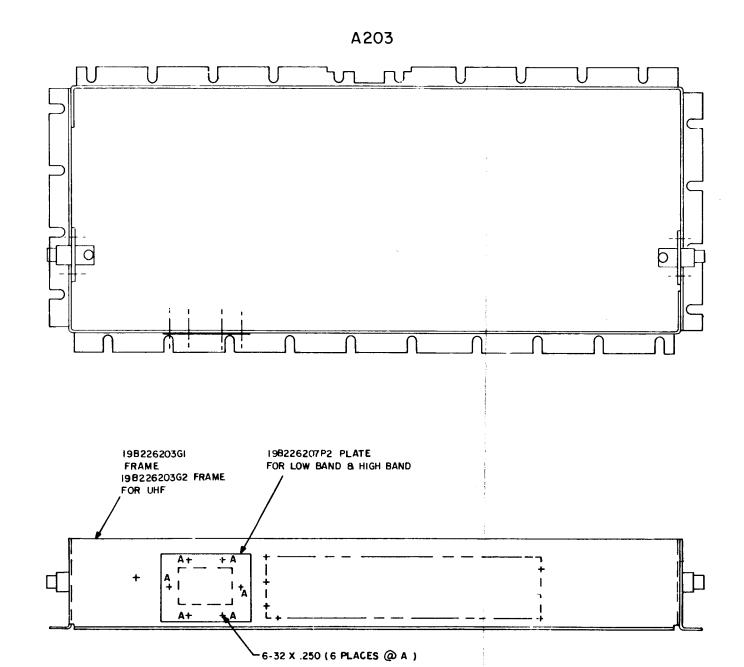
NO GREASE ALLOWED ON THE THREADED PORTION OF THE MTG STUD.

OUTLINE DIAGRAM

25-50 MHz, 50-WATT STATION TRANSMITTER CONTINUOUS DUTY







(19D423098, Rev. 1)

W244 5491689P104

OUTLINE DIAGRAM

FRAME ASSEMBLY FOR INTERMITTENT AND CONTINUOUS DUTY TRANSMITTERS

REV. A - D - Exciter Board 19D416659G1-8

Incorporated in initial shipment

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 includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

PRODUCTION CHANGES

	Theorporated in initial aniphent
REV. E	- To increase audio sensitivity. Changed R126.
REV. F	- To eliminate possible shorting of shield to wire runs on printed wire board. Changed T104LL, T104L, T104M and T104H. Deleted shield (19B219619P1), C129LL, C129L, C129M and C129H.
l	Exciter Board 19D416659G4 & 8
REV. G	 To improve multi-frequency spread performance in cold temperatures.
	Exciter Board 19D416659G3 & G7

REV. G - To improve performance over two-frequency spread. Changed C130M and C130H to 5491601P109. Was 5491601P107. Phenolic: 0.27 pF ±5% 500 VDCW. To attenuate 3/2 spurious by changing PA input circuit to a high pass type. C141M was 5490008P123, 68 pF ±10% 500 VDCW.
 R143M was 3R77P820K, 82 ohms ±10%, 1/2 w.

Exciter Board 19D416659G1, 2, 5, 6

REV. G - To increase power output; changed Q109 from 19A115329P2 to 19A116868P1 NPN transistor.

Exciter Board 19D416659G4, 8
REV. H - Same as above. Exciter Board 19D416659G3, G7

REV. J - Same as above.

Exciter Board 19D416659G1, G5

REV. H

To improve Channel Guard at low end of 25-30 MHz split, changed following resistors: R107LL, R107L, R107M, R107H, Added R119, R120, R121, R122LL, R122L, R122M, R123L, R123L, R123H. Deleted R122, R123.

REV. J - To meet symmetry specifications: R107LL, R122LL, R123LL were C3R77P303J, 30,000 ohms.

Exciter Board 19D416659G3, G7

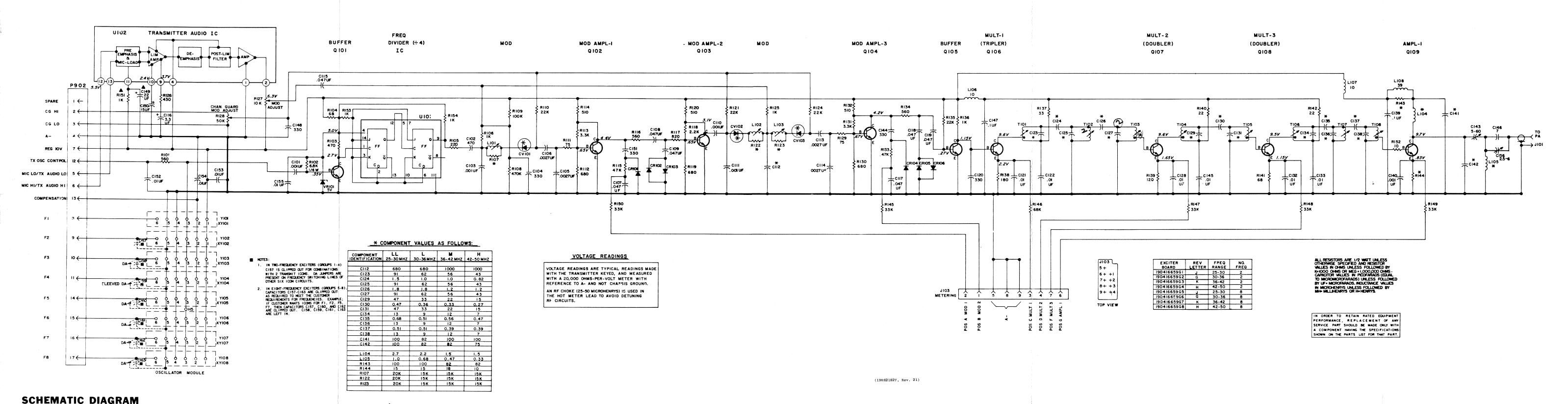
REV. K - To improve stability of 36-42 MHz split: changed C141, R143, R144, L104, L108.

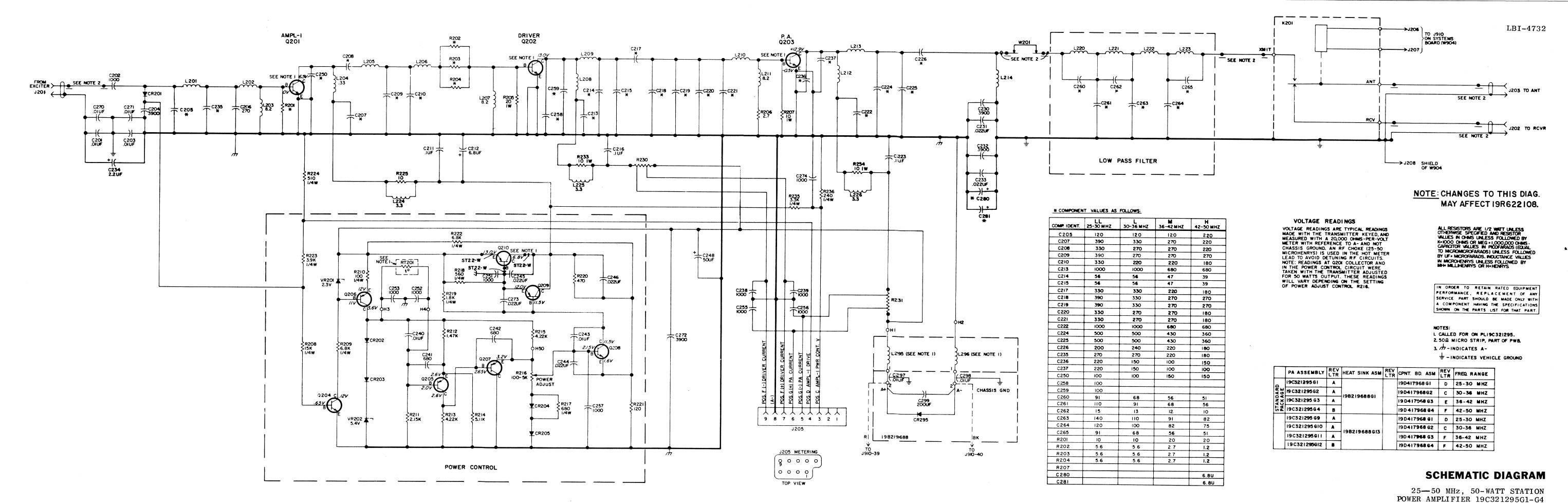
		PARTS LIST	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
		LBI4440P	C125M	5496219P257	Ceramic disc: 56 pF ±5%, 500 VDCW, temp coef	C137M	19A700013P8	Phenolic: 0.39 pF +5%, 500 VDCW.			JACKS AND RECEPTACLES	R102*	19A700106P83	Composition: 6.8K ohms +5%, 1/4 w.	R142	19A700113P23	Composition: 22 ohms ±5%, 1/2 w.	T104H*	19D416635G22	Coil			
		25-50 MHz EXCITER			-80 PPM.			Phenolic: 0.39 pr ±5%, 500 VDCW. Phenolic: 0.39 pF ±5%, 500 VDCW.	J101	19A700049P2	Connector, receptacle: 500 VDC maximum; sim to	1102	154.55100165	Composition: over onne tow, 1/1 wi	1	3R77P101K	Composition: 100 ohms $\pm 10\%$, 1/2 w.	110411	100110000022	In REV E & earlier:			ASSOCIATED ASSEMBLIES
		19D416659G1-G8	C125H	5496219P254	Ceramic disc: 43 pF ±5%, 500 VDCW, temp coef -80 PPM.		5496219P243	Ceramic disc: 13 pF ±5%, 500 VDCW, temp coef	J103	19B219374G1	NTTF-1058. Connector, Includes:		3R77P393K	1	R143L	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.		19D416635G5	Coil. Includes:			
			C126LL	5491601P124	Phenolic: 1.8 pF <u>+</u> 5%, 500 VDCW.	C1381	5496219P240	-80 PPM. Ceramic disc: 9.0 pF ±5%, 500 VDCW, temp coef		19A116651P1	Contact, electrical; sim to Malco XO-2864.	R103	19A700113P55	composition. 470 onms 10%, 1/2 w.	R143M	19A700113P37	Composition: 82 ohms ±5%, 1/2 w.		5493185P13	Tuning slug			NOTE: When reordering, specify ICOM Frequency.
Т			C126L	5491601P124	Phenolic: 1.8 pF ±5%, 500 VDCW.			-80 PPM.				R104	19A700113P35	Composition. So Stand Low, 1/2 W.	R143H	19A700113P37	Composition 82 ohms ±5%, 1/2 w.	T105LL	19D416635G13	Coil. Includes:			ICOM Freq = (Operating Freq)
SYMBOL	GE PART NO.	DESCRIPTION	C126M C126H	19A700013P14 19A700013P14	Phenolic: 1.20 pF ±5%, 500 VDCW.	C138M	5496219P242	Ceramic disc: 12 pF ±5%, 500 VDCW, temp coef -80 PPM.	L101LL	19D416635G9	TRANSFORMERS	R105	19A700113P47	Composition. 220 oning too, 1/2 w	R144LL R144L	19A700113P19 19A700113P19	Composition: 15 ohms ±5%, 1/2 w. Composition: 15 ohms ±5%, 1/2 w.	m105*	5493185P13	Tuning slug.	5		3
			C126H C127LL	5496219P262	Phenolic: 1.20 pF ±5%, 500 VDCW. Ceramic disc: 91 pF ±5%, 500 VDCW, temp coef	C138H	5496219P238	Ceramic disc: 7.0 pF ±5%, 500 VDCW, temp coef	L101L	19D416635G17	Coil.	R106	19A700113P63 3R77P303J	Composition: in ones low, 1/2 w	R144L R144M	19A700113P19	Composition: 18 ohms ±5%, 1/2 w.	T105L	19D416635P13 5493185P13	Coil. Includes: Tuning slug.	Y101 thru	19A129393G13	Compensated: 2 PPM, 25-50 MHz.
		19D416659G1 2 FREQ 25-30 MHz (LL) 19D416659G2 2 FREQ 30-36 MHz (L)			-80 PPM.	C139	19A116080P107	-80 PPM. Polyester: 0.1 uF +10%, 50 VDCW.	L101M	19D416635G1	Coil.	R107LL R107L	19A700113P91	Composition. Ook onmo low, 1/2 w	1	1	Composition: 10 ohms ±5%, 1/2 w.	T105M	19D416635G5	Coil. Includes:	Y108 Y101	19A129393G16	Externally Compensated: 5 PPM, 25-50 MHz.
		19D416659G3 2 FREQ 36-42 MHz (M) - REV K 19D416659G4 2 FREQ 42-50 MHz (H)	C127L	5496219P258	Ceramic disc: 62 pF ±5%, 500 VDCW, temp coef -80 PPM.		19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC	L101H	19D416635G18	Coil.	R107M	19A700113P91	- 11	R145	19A700113P99	Composition: 33K ohms ±5%, 1/2 w.		5493185P13	Tuning slug.	thru Y108	10.1120000010	TIM, 40 00 MILE.
		19D416659G5 8 FREQ 25-30 MHz (LL) 19D416659G6 8 FREQ 30-36 MHz (L) 19D416659G7 8 FREQ 36-42 MHz (M) - REV K	C127M	5496219P257	Ceramic disc: 56 pF <u>+</u> 5%, 500 VDCW, temp coef -80 PPM.	014333	54000082107	Type JF Discap.	L102LL	19D416635G9	Coil.	R107H	19A700113P91	1	R146	19A700113P107	Composition: 68K ohms ±5%, 1/2 w.	T105H	19D416635G5	Coil. Includes:			
		19D416659G8 8 FREQ 42-50 MHz (H)	C127H	5496219P254	Ceramic disc: 43 pF ±5%, 500 VDCW, temp coef	C141LL	5490008P127	Silver mica: 100 pF $\pm 10\%$, 500 VDCW, sim to Electro Motive Type D \overline{M} -15.	L102L	19D416635G17	Coil.	R108	3R77P474J	Composition: 470K ohms ±5%, 1/2 w.	R147 thru	19A700113P99	Composition: 33K ohms ±5%, 1/2 w.		5493185P13	Tuning slug.			
		+			-80 PPM.	C141L	5490008P125	Silver mica: 82 pF ±10%, 500 VDCW; sim to Electro Motive Type DM-15.	L102M	19D416635G1	Coil.	R109	3R77P104K	Composition. 0.10 megonm -100, 1/2 w.	R150		0 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	T106LL	19D416635G14	Coil. Includes:			1
C101	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC	C128	19A116080P1 5496219P255	Polyester: 0.01 uF ±20%, 50 VDCW. Ceramic disc: 47 pF +5%. 500 VDCW. temp coef	C141M*	5490008P127	Silver mica: 100 pF ±10%, 500 VDCW, sim to Electro	L102H L103LL	19D416635G18 19D416635G9	Coil.	R110	19A700113P95	Composition: But online 2021, 2/2 11			Composition: 1K ohms ±5%, 1/2 w. Composition: 10 ohms ±5%, 1/2 w.		5493185P13	Tuning slug.			
C102	19A116655P13	Type Jr Discap. Ceramic disc: 470 pF +20%, 1000 VDCW; sim to RMC	C(28PP+	9490219F200	-80 PPM. Deleted by REV F.			Motive Type DM-15.	L103LL	19D416635G9	Coil.	R111	19A700113P36	COMPOSITION: 10 SAMS _011, 172 11	R152	1	Composition: 16 ohms ±5%, 1/2 w.	T106L	19D416635G14 5493185P13	Coil. Includes:			
		Type JF Discap.	1	5496219P251	Ceramic disc: 33 pF ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV F.		5490008P123	In REV G & earlier: Silver mica: 68 pF +10%, 500 VDCW, sim to Electro	L103M	19D416635G1	Coil.	R112 R113	19A700113P59 19A700113P75	Composition: Ooo onmo tox, 1/2 w	and R154			T106M	19D416635G6	Tuning slug. Coil. Includes:			
C103	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	C129M*	5496219P247	Ceramic disc: 22 pF +5%, 500 VDCW, temp coef		51000001120	Motive Type DM-15.	L103H	19D416635G18	Coil.	R114	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.				1 2 3 3 3 4	5493185P13	Tuning slug.			
C104	5494481P105	Ceramic disc: 330 pF ±20%, 1000 VDCW; sim to Type JF Discap.	C120H*	5496219P244	-80 PPM. Deleted by REV F.	С141Н	5490008P127	Silver mica: 100 pF <u>+</u> 10%, 500 VDCW, sim to Electro Motive Type DM-15.	L104LL	19A700000P16	Coil, RF: 2.7 uH 010%; sim to Jeffers 4411-13K.	R115	3R77P473K	- 11	T101LL	19D416635G10	Coil. Includes:	T106H	19D416635G6	Coil. Includes:			
C105	19A116655P21	Ceramic disc: 2700 pF ±20%, 1000 VDCW; sim to RMC	C128fi*	J450217F244	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef -80 PPM.	C142LL	5490008P27	Silver mica: 100 pF ±5%, 500 VDCW, sim to Electro	L104L	19A700000P15	Coil, RF: 2.2 uH ±10%; sim to Jeffers 4411-12K.	R116	19A700113P57	Composition: 560 ohms ±5%, 1/2 w.		5493185P13	Tuning slug.		5493185P13	Tuning slug.			
and C106		Type JR Discap.	C130LL	19A700013P9	Phenolic: 0.47 pF ±5%, 500 VDCW.	C142L	5490008P25	Motive Type DM-15. Silver mica: 82 pF +5%, 500 VDCW, sim to Electro	L104M*	19A700000P14	Coil, RF: 1.5 uH ±10%; sim to Jeffers 4411-10K.	R117	19A700113P61	Composition: 820 ohms <u>+</u> 5%, 1/2 w.	R101L	19D416635G10	Coil. Includes:	T107LL	19D416635G15	Coil. Includes:			
C107	19A116080P105	Polyester: 0.047 uF ±10%, 50 VDCW.	C130L	5491601P110	Phenolic: 0.36 pF ±5%, 500 VDCW.			Motive Type DM-15.		740007007	In REV G & earlier:	R118	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.	m1011	5493185P13	Tuning slug.		5493185P13	Tuning slug.			
thru C109			C130M*	19A700013P7	Phenolic: 0.33 pF ±5%, 500 VDCW. In REV F & earlier:	C142M	5490008P25	Silver mica: 82 pF ±5%, 500 VDCW; sim to Electro Motive Type DM-15.		7488079P7	Coil, RF: 1.5 uH 10%, .50 ohms DC res. max; sim. to Jeffers 4411-10.	R119	19A700113P59	Composition. Goo onms tox, 1/2 w.	T101M	19D416635G2 5493185P13	Coil. Includes: Tuning slug.	T107L	19D416635G15	Coil. Includes:			
C110 and	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.		5491601P107	Phenolic: 0.27 pF ±5%, 500 VDCW.	C142H	5490008P24	Silver mica: 75 pF ±5%, 500 VDCW, sim to Electro	L104H	19A700000P14	Coil, RF: 1.5 uH +10%; sim to Jeffers 4411-10K.	R120	3R77P511J 19A700113P95	Composition: 510 ohms ±5%, 1/2 w. Composition: 22K ohms ±5%, 1/2 w.	Т101Я	19D416635G2	Coil. Includes:	T107M	5493185P13 19D416635G7	Tuning slug. Coil. Includes:			
C111			С130Н8	19A700013P6	Phenolic: 0.27 pF ±5%, 500 VDCW.	C143	19A116163P5	Motive Type DM-15. Variable: approx. 5-60 pF, 250 VDCW; sim to Mepco	L105LL	19A700000P12	Coil, RF: 1.0 uH ±10%; sim to Jeffers 4411-8K.	R121	3R77P303J	Composition: 30K ohms ±5%, 1/2 w.		5493185P13	Tuning slug.	110/M	5493185P13	Tuning slug.			
C112LL	4029003P104	Silver mica: 680 pF ±10%, 500 VDCW, sim to Electro Motive Type DM-20.			In REV F & earlier:			Electra 2222-809-08003.	1 11000	19A700000P10 19A700000P8	Coil, RF: 680 nH ±10%; sim to Jeffers 4411-6K. Coil, RF: 470 nH ±12%; sim to Jeffers 4411-4K.	R122L	19A700113P91	Composition: 15K ohms ±5%, 1/2 w.	T102LL	19D416635G11	Coil. Inc udes:	Т107Н	19D416635G7	Coil. Includes:			
C112L	4029003P104	Silver mica: 680 pF ±10%, 500 VDCW, sim to Electro Motive Type DM-20.		5491601P105	Phenolic: 0.22 pF <u>+</u> 5%, 500 VDCW.	C144	5494481P105	Ceramic disc: 330 pF ±20%, 1000 VDCW; sim to Type JF Discap.	L105M L105H	19A700000P8	Coil, RF: 470 nH ±12%; sim to Jeffers 4411-4K. Coil, RF: 330 nH ±20%; sim to Jeffers411-3.	R122M	19A700113P91	Composition: 15K ohms ±5%, 1/2 w.		5493185P13	Tuning slug.		5493185P13	Tuning slug.			
C112M	5493367P1000K	Mica: 1000 pF ±10%, sim to Electro Motive Type	C131LL	5496219P255	Ceramic disc: 47 pF ±5%, 500 VDCW, temp coef -80 PPM.	C145	19A116080P1	Polyester: 0.01 uF <u>+</u> 20%, 50 VDCW.	L106	19A700000P0	Coil, RF: 10 uH ±10%; sim to Jeffers 4421-7K.	R122H	19A700113P91	Composition: 15K ohms ±5%, 1/2 w.	T102L	19D416635G11	Coil. Includes:	T108LL	19D416635G16	Coil. Includes:			
		DM-20.	C131L	5496219P251	Ceramic disc: 33 pF ±5%, 500 VDCW, temp coef	C146*	5496219P238	Ceramic disc: 7.0 pF ±0.25 pF, 500 VDCW, temp coef -80 PPM. Added by REV B.	and L107		10.00	R123LL	3R77P303J	Composition: 30K ohms ±5%, 1/2 w.		5493185P13	Tuning sluc.		5493185P13	Tuning slug.			
С112Н	5493367P1000K	Mica: 1000 pF ±10%, sim to Electro Motive Type DM-20.			-80 PPM.	C146LL*	19A116656P12J8	Ceramic: 12 pF ±5%, 500 VDCW; temp coef -80 PPM.	L108	7488079P50	Coil, RF: 39 uH 10%, 2.0 ohms DC res. max; sim. to Jeffers 4422-11.	R123L	19A700113P91	Composition. for ones to, 1/2 "	T102M	19D416635G3	Coil. Includes:	T108L	19D416635G16	Coil. Includes:			
C113	19A116655P21	Ceramic disc: 2700 pF ±20%, 1000 VDCW; sim to RMC Type JR Discap.	C131M	5496219P247	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.			Deleted by REV B.			octigis 4470-11.	R123M	19A700113P91	Composition: 15K ohms ±5%, 1/2 w.	T102H	5493185P13 19D416635G3	Tuning slut. Coil. Includes:	m100"	5493185P13	Tuning slug.			
C114			С131Н	5496219P244	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef -80 PPM.	C146L*	19A116656P12J8	Ceramic: 12 pF ±5%, 500 VDCW; temp coef -80 PPM. Deleted by REV B.				R123H R124	19A700113P91 19A700113P95	Composition: 15K ohms ±5%, 1/2 w. Composition: 22K ohms ±5%, 1/2 w.	110211	5493185P13	Tuning slu.	T108M	19D416635G8 5493185P13	Coil. Includes: Tuning slug.			
C115	19A116080P105	Polyester: 0.047 uF ±10%, 50 VDCW.	C132	19A116080P1	Polyester: 0.01 uF <u>+</u> 20%, 50 VDCW.	C146M*		Ceramic: 13 pF ±5%, 500 VDCW; temp coef -80 PPM. Deleted by REV B.	P902	10001050	Includes:	R124	I	1	T103LL	19D416635G12	Coil. Includes:	T108H	19D416635G8	Coil.			
C116	5496267P9	Tantalum: 3.3 uF ±20%, 15 VDCW; sim to Sprague Type 150D.	and C133			C146H*		Ceramic: 12 pF ±5%, 500 VDCW; temp coef -80 PPM.		19B219594P2	Contact, electrical: 8 pins. Contact, electrical: 9 pins.	R126*		Composition: 430 ohms ±5%, 1/2 w.		5493185P13	Tuning slue.		5493185P13	Tuning slug.			
C117 thru	19A116080P105	Polyester: 0.047 uF ±10%, 50 VDCW.	C134LL	5496219P243	Ceramic disc: 13 pF ±5%, 500 VDCW, temp coef -80 PPM.			Deleted by REV B.		10001000400				In REV D & earlier:	T103L	19D416635G12	Coil. Includes:			INTEGRATED CIRCUITS			
C119			C134L	5496219P240	Ceramic disc: 9.0 pF ±5%, 500 VDCW, emp coef			Polyester: 0.1 uF ±10%, 50 VDCW. Ceramic disc: 330 pF ±20%, 1000 VDCW: sim to Type					3R77P391K	Composition: 390 ohms ±10%, 1/2 w.		5493185P13	Tuning slug.	U101	19A116842P1	Digital, High Speed TTL: Dual J-K Master-Slave			
C120		Silver mica: 330 pF ±10%, 500 VDCW, sim to Electro Motive Type DM-15.			-80 PPM.	0.140	2454401LIND	Ceramic disc: 330 pF $\pm 20\%$, 1000 VDCW; sim to Type JF Discap.	Q101*	19A115330P1	1	R127	19B209358P106	Variable, carbon film: approx 300 to 10K ohms ±10%, 1/4 w; sim to CTS Type X-201.	T103M		Coil. Includes:			Flip Flop; sim to SM54H73N.			
C121	19A116080P1	Polyester: 0.01 uF ±20%, 50 VDCW.	C134M	5496219P242	Ceramic disc: 12 pF ±5%, 500 VDCW, temp coef -80 PPM.	C149	5496267P10	Tantalum: 22 uF ±20%, 15 VDCW; sim to Sprague Type 150D.		19411591001	In REV C & earlier: Silicon, NPN; sim to Type 2N3904.	R128	19B209358P108	Variable, carbon film: approx 2K to 50K ohms	T102U	5493185P13 19D416635G4	Tuning sluk. Coil. Includes:	U102	19A702868G2	Audio Amplifier.			
C122			С134Н	5496219P238	Ceramic disc: 7.0 pF ±5%, 500 VDCW, temp coef -80 PPM.	C150	5496267P14	Tantalum: 15 uF +20%, 20 VDCW; sim to Sprague	Q102		Silicon, NPN.	P120	19A700113P36	±10%, 1/4 w; sim to CTS Type X-201. Composition: 75 ohms ±5%, 1/2 w.	11038	5493185P13	Tuning slug.						
C123LL	5496219P262	Ceramic disc: 91 pF ±5%, 500 VDCW, temp coef -80 PPM.	C135LL	19A700013P11	Phenolic: 0.68 pF ±5%, 500 VDCW.	C151	5494481P105	Type 150D. Ceramic disc: 330 pF ±20%, 1000 VDCW; sim to Type	thru Q106			R129 R130	19A700113P36	- 11	T104LL*	19D416635G19	1 1	VR101	4036887P56	Zener: 500 mW, 5.0 v. nominal.			
C123L	5496219P258	Ceramic disc: 62 pF ±5%, 500 VDCW, temp coef	C135L	5491601P114	Phenolic: 0.51 pF ±5%, 500 VDCW.			JF Discap.	Q107*	19A115328P1	Silicon, NPN.	R131	19A700113P75	Composition: 3.3K ohms ±5%, 1/2 w.			In REV E & earlier:						
C123M	5496219P257	-80 PPM. Ceramic disc: 56 pF ±5%, 500 VDCW, temp coef	C135M	19A700013P10	Phenolic: 0.56 pF ±5%, 500 VDCW.	thru	19A116080P1	Polyester: 0.01 uF <u>+</u> 20%, 50 VDCW.			Earlier than REV A:	R132	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.		19D416635G13	Coil. Includes:			NOTE: When reordering, specify quantity.			
		-80 PPM.	С135Н	19A700013P9	Phenolic: 0.47 pF ±5%, 500 VDCW.	C155	1041100077	Veriable: 2 5-6 pp 100 UDOW2 - 1 00 mayee co		19A115330P1	Silicon, NPN.	R133	3R77P473K	Composition: 47K ohms ±10%, 1/2 w.		5493185P13	Tuning slug.	XY101	19A701785P1	Contact, electrical; sim to Molex 08-50-0404.			
С123Н	5496219P254	Ceramic disc: 43 pF ±5%, 500 VDCW, temp coef -80 PPM.	C136LL	5496219P243	Ceramic disc: 13 pF ±5%, 500 VDCW, temp coef -80 PPM.	C156*	19A116867P1	Variable: 2.5-6 pF, 160 VDCW; sim to 7S-TRIKO-02. Added by REV B.	Q108	19A115328P1	Silicon, NPN.	R134	19A700113P57	Composition: 560 ohms ±5%, 1/2 w.	T104L*	19D416635G20		XY108					
C124LL	19A700013P15	Phenolic: 1.50 pF ±5%, 500 VDCW.	C136L	5496219P240	Ceramic disc: 9.0 pF ±5%, 500 VDCW, temp coef	thru	19A116080P1	Polyester: 0.01 uF <u>+</u> 20%, 50 VDCW. Added by REV C.	Q109*	19A116868P1	Silicon, NPN; sim to Type 2N4427.	R135	19A700113P95	Composition: 22K ohms ±5%, 1/2 w.		100416695616	In REV E & earlier:			MISCELLANEOUS			
C124L	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.	C136M	5496219P242	-80 PPM. Ceramic disc: 12 pF ±5%, 500 VDCW, temp coef	C163*					In G1, G2, G5, G6 of REV F & earlier: In G3, G7 of REV H & earlier: In G4, G8 REV G & earlier:	R136	19A700113P63	Composition: 1K ohms ±5%, 1/2 w.		19D416635G13 5493185P13	Coil. Includes: Tuning slug.		19A701887P1	Heat sink. (Used with Q109).			
C124M	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.	1		-80 PPM.	CP101	1041150500*	DIODES AND RECTIFIERS		19A115329P2	Silicon, NPN.	R137 R138	19A700113P27 3R77P181K	Composition: 33 ohms ±5%, 1/2 w. Composition: 180 ohms +10%, 1/2 w.	T104M*	19D416635G21			19A701544P10 19A701332P4	Can. (Used with Ti01-T108 & L101-L103). Insulator, washer: nylon. (Used with Q109).			
C124H		- I	С136Н	5496219P238	Ceramic disc: 7.0 pF ±5%, 500 VDCW, temp coef -80 PPM.	CR101 thru CR106	198119290b1	Silicon, fast recovery, 225 mA, 50 PIV.				R138 R139	3R77P181K 19A700113P41	Composition: 180 onms ±10%, 1/2 w. Composition: 120 ohms ±5%, 1/2 w.			In REV E & earlier:		19A701332P4 19A701990P2	Clip, compression: sim to Tinnerman Products			
C125LL	5496219P262	Ceramic disc: 91 pF ±5%, 500 VDCW, temp coef -80 PPM.	C137LL	5491601P114	Phenolic: 0.51 pF ±5%, 500 VDCW.		5495769P12	Diode, silicon.	P101	104700110055	Composition: 560 object 55 1/2 m	R140	19A700113P23	Composition: 22 ohms ±5%, 1/2 w.		19D416635G5	Coil. Includes:			C5426-014-24. (Used with Q109).			
C125L	5496219P258		C137L	5491601P114	Phenolic: 0.51 pF ±5%, 500 VDCW.	thru CV103			R101	198700113257	Composition: 560 ohms ±5%, 1/2 w.	R141		Composition: 68 ohms ±5%, 1/2 w.		5493185P13	Tuning slug.						
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*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

25-50 MHz, EXCITER BOARD 19D416659G1-G8

Issue 3





PARTS LIST

LBI4897B

25-50 MHz, 50 WATT POWER AMPLIFIER

SYMBOL	GE PART NO.	DESCRIPTION	0
		19C321295G1, G9 25-30 MHz (LL) 19C321295G2, G10 30-36 MHz (L) 19C321295G3, G11 36-42 MHz (M) 19C321295G4, G11 42-50 MHz (H) - REV B	C
C280 and C281	19A134202P15		a c
L295 and L296	19A129356P1	Coil.	a C
		TRANSISTORS	0
Q201	19A116965P1	Silicon, NPN.	C
Q202	19A116839P2	Silicon, NPN.	Ĉ
Q203	19A116839P3	Silicon, NPN.	С
Q210	19A116375P1	Silicon, PNP.	c
			١.
RT201	19A129379G1	Thermistor: 40K ohms $\pm 20\%$, color code white; sim to Carborundum Type M0806J-5.	C
		POWER AMPLIFIER BOARD	
		19D417968G1 25-30 MHz 19D417968G2 30-36 MHz	
		19D417968G3 36-42 MHz 19D417968G4 42-50 MHZ - REV F	c
C201	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.	
C202	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to	C
		RMC Type JF Discap.	Ĉ
C203 C204	19A116080P101 19A116655P23	Polyester: 0.01 uF ±10%, 50 VDCW. Ceramic disc: 3900 pF ±20%, 1000 VDCW; sim to	C
C204	198110035723	RMC Type JF Discap.	c
C205LL	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.	
C205L	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.	a C
C205M	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.	
С205Н	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	
C206	19A700105P46	Mica: 270 pF +5%, 500 VDCW.	Ca
C207LL	7489162P41	Silver mica: 390 pF ±5%, 500 VDCW; sim to Sprague Type 118.	С
C207L	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C
C207M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	1
C207H	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	Ca
C208LL	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C
C208L and C208M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C a C
C208H	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	c
C209LL	7489162P41	Silver mica: 390 pF ±5%, 500 VDCW; sim to Sprague Type 118.	a C
C209L	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C
C209M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C a
С209Н	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C
			c

SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
C210LL	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C225LL and C225L	19A116679P500J	Silver Mica: 500 pF ±5%, 250 VDCW.
C210L and	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	C225M	19A700015P44	Metallized teflon: 430 pF ±5%, 250
C210M			C225H	19A700015P42	Metallized teflon: 360 pF ±5%, 250
С210Н	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.	C226LL	19A700015P36	Teflon/Mica: 200 pF ±5%, 250 VDCW.
C211	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.	C226L	19A700015P38	Teflon/Mica: 240 pF ±5%, 250 VDCW.
C212	5496267P18	Tantalum: 6.8 uF ±20%, 35 VDCW; sim to Sprague Type 150D.	C226M	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C213LL	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to	С226Н	19A700015P35	Teflon/Mica: 180 pF ±5%, 250 VDCW.
and C213L		RMC Type JF Discap.	C230	19A116655P23	Ceramic disc: 3900 pF ±20%, 1000 VD RMC Type JF Discap.
C213M and	19A116655P17	Ceramic disc: 680 pF $\pm 20\%$, 1000 VDCW; sim to RMC Type JF Discap.	C231	19A116080P103	Polyester: 0.022 uF ±10%, 50 VDCW.
C213H C214LL and	19A116656P56J0	Ceramic disc: 56 pF ±5%, 500 VDCW; temp coef 0 PPM.	C232	19A116655P23	Ceramic disc: 3900 pF ±20%, 1000 VD RMC Type JF Discap.
C214L			C233	19A116080P103	Polyester: 0.022 uF ±10%, 50 VDCW.
C214M	19A116656P47J0	Ceramic disc: 47 pF ±5%, 500 VDCW; temp coef 0 PPM.	C234	5496267P13	Tantalum: 2.2 uF ±20%, 20 VDCW; sim Type 150D.
C214H	19A116656P39J0	Ceramic disc: 39 pF ±5%, 500 VDCW, temp coef 0 PPM.	C235LL and C235L	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.
C215LL and	19A116656P56J0	Ceramic disc: 56 pF ±5%, 500 VDCW; temp coef 0 PPM.	C235M	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.
C215L			C235H	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.
C215M	19A116656P47J0	Ceramic disc: 47 pF ±5%, 500 VDCW; temp coef 0 PPM.	C236LL	19A116656P220J4	Ceramic disc: 220 pF ±5%, 500 VDCW; -470 PPM.
C215H	19A116656P39J0	Ceramic disc: 39 pF ±5%, 500 VDCW, temp coef 0 PPM.	C236L	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, -150 PPM.
C216 C217LL	19A116080P107 7489162P39	Polyester: 0.1 uF ±10%, 50 VDCW. Silver mica: 330 pF ±5%, 500 VDCW; sim to	C236M	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, -150 PPM.
and C217L		Sprague Type 118.	С236Н	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, -150 PPM.
C217M	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	C237LL	19A116656P220J4	Ceramic disc: 220 pF ±5%, 500 VDCW; -470 PPM.
C217H C218LL	19A700105P41 7489162P41	Mica: 180 pF ±5%, 500 VDCW. Silver mica: 390 pF ±5%, 500 VDCW; sim to	C237L	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, -150 PPM.
C218L	7489162P39	Sprague Type 118. Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C237M and	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, -150 PPM.
C218M and	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C237H C238	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VD
C218H C219LL	7489162P41	Silver mica: 390 pF ±5%, 500 VDCW; sim to	and C239		RMC Type JF Discap.
		Sprague Type 118.	C240	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.
C219L	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C241 and C242	19A116655P17	Ceramic disc: 680 pF ±20%, 1000 VDC Type JF Discap.
C219M and	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C243	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.
C219H C220LL	7489162P39	Silver mica: 330 pF °±5%, 500 VDCW; sim to	C244 thru C246	19A116080P103	Polyester: 0.022 uF ±10%, 50 VDCW.
C220L and	19A700105P46	Sprague Type 118. Mica: 270 pF <u>+</u> 5%, 500 VDCW.	C248	19A115680P4	Electrolytic: 50 uF +150% -10%, 25 Mallory Type TTX.
C220M C220H	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.	C250	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, -150 PPM.
C221LL	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C250M and	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, -150 PPM.
C221L and C221M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.	C250H C251 thru	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VD RMC Type JF Discap.
C221H	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.	C253 C255	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VD
C222LL and C222L	19A116655P19	Ceramic disc: 1000 pF <u>+</u> 20%, 1000 VDCW; sim to RMC Type JF Discap.	thru C257	104110000110	RMC Type JF Discap.
C222H C222M and	19A116655P17	Ceramic disc: 680 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	C258LL	19A116656P100K4	Ceramic disc: 100 pF ±10%, 500 VDCW -470 PPM.
C222H C223	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.	C259LL	19A116656P100K4	Ceramic disc: 100 pF ±10%, 500 VDCW -470 PPM.
C224LL and	19A116679P500J	Silver Mica: 500 pF ±5%, 250 VDCW.	C260LL*	19A116656P91J2	Ceramic disc: 91 pF ±5%, 500 VDCW; -220 PPM.
C224L					In 19D417968G1 of REV A and earlier:
C224M	19A700015P44	Metallized teflon: 430 pF ±5%, 250 VDCW.		19A116656P82J1	Ceramic disc: 82 pF. ±5%, 500 VDCW, -150 PPM.
C224H	19A700015P42	Metallized teflon: 360 pF ±5%, 250 VDCW.			

	SYMBOL	GE PART NO.	DESCRIPTION
	C260L	19A116656P68J1	Ceramic disc: 68 pF ±5%, 500 VDCW, temp coef -150 PPM.
VDCW.	C260M	19A116656P56J1	Ceramic disc: 56 pF ±5%, 500 VDCW; temp coef -150 PPM.
VDCW.	C260H	19A116656P51J1	Ceramic disc: 51 pF ±5%, 500 VDCW; temp coef -150 PPM.
	C261LL	19A700015P30	-150 PPM. Silver mica: 110 pF +5%, 250 VDCW.
	C261L	19A700015P28	Teflon/Mica: 91 pF ±5%, 250 VDCW.
	C261M	19A700015P25	Silver mica: 68 pF ±5%, 250 VDCW.
; sim to	C261H	19A700015P23	Teflon/Mica: 56 pF ±5%, 250 VDCW.
, 52 00	C262LL	19A116656P15J1	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef -150 PPM.
; sim to	C262L	19A116656P13J1	Ceramic disc: 13 pF ±5%, 500 VDCW, temp coef -150 PPM.
	C262M	19A116656P12J1	Ceramic disc: 12 pF ±5%, 500 VDCW; temp coef -150 PPM.
Sprague	С262Н	19A116656P10J1	Ceramic disc: 10 pF ±5%, 500 VDCW; temp coef -150 PPM.
	C263LL	19A116679P140J	Silver Mica: 140 pF <u>+</u> 5%, 250 VDCW.
	C263L	19A700015P30	Silver mica: 110 pF ±5%, 250 VDCW.
	C263M	19A700015P28	Teflon/Mica: 91 pF ±5%, 250 VDCW.
	C263H	19A700015P27	Silver mica: 82 pF ±5%, 250 VDCW.
np coef	C264LL	19A700015P31	Teflon/Mica: 120 pF ±5%, 250 VDCW.
np coef	C264L	19A700015P29	Teflon/Mica: 100 pF ±5%, 250 VDCW.
np coef	C264M	19A700015P27	Silver mica: 82 pF ±5%, 250 VDCW.
	C264H	19A700015P26	Teflon/Mica: 75 pF ±5%, 250 VDCW.
coef	C265LL*	19A116656P91J2	Ceramic disc: 91 pF ±5%, 500 VDCW; temp coef -220 PPM.
coef			In 19D417968G1 of REV A and earlier:
p coef		19A116656P82J1	Ceramic disc: 82 pF ±5%, 500 VDCW, temp coef -150 PPM.
coef	C265L	19A116656P68J1	Ceramic disc: 68 pF ±5%, 500 VDCW, temp coef -150 PPM.
p coer	C265M	19A116656P56J1	Ceramic disc: 56 pF <u>+</u> 5%, 500 VDCW; temp coef150 PPM.
im to	C265H	19A116656P51J1	Ceramic disc: 51 pF ±5%, 500 VDCW; temp coef -150 PPM.
im to RMC	C270 and C271	19A116080P101	Polyester: 0.01 uF <u>+</u> 10%, 50 VDCW.
Jan to mit.	C272	19A116655P23	Ceramic disc: 3900 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
*	C273	19A116080P103	Polyester: 0.022 uF +10%, 50 VDCW.
	C274	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
sim to			DIODES AND RECTIFIERS
coef	CR201*	19A116052P2	Silicon, fast recovery; sim to Hewlett Packard 5082-2811.
coef			Earlier than REV A:
İ		19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
m to	CR202 thru CR205	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
im to			JACKS AND RECEPTACLES
np coef	J201 thru J203	19A700049P2	Connector, receptacle; 500 VDCW maximum; sim t NTTF-1058.
	J205	19B219374G1	Connector, Includes:
mp coeż		19C317957P1	Shell.
coef		19A116651P1	Contact, electrical.
	J206 and	19A134263P2	Contact, electrical: sim to Selectro 229-1071.
pef	J207		
	J208	4033513P4	Contact, electrical: sim to Bead Chain L93-3.

DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYM
ramic disc: 68 pF ±5%, 500 VDCW, temp coef			RELAYS	L221L
50 PPM. ramic disc: 56 pF ±5%, 500 VDCW; temp coef	K201	19A700061P1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare	L221M
50 PPM. ramic disc: 51 pF ±5%, 500 VDCW; temp coef			HFW-1201558, or Potter-Brumfield HCM6160.	L221H
50 PPM. lver mica: 110 pF +5%, 250 VDCW.				L222L
flon/Mica: 91 pF +5%, 250 VDCW.	L201LL	19A129347P2	Coil.	L222M
lver mica: 68 pF +5%, 250 VDCW.	L201L	19A129347P1	Coil.	L222H
flon/Mica: 56 pF +5%, 250 VDCW.	L201M	19A129347P3	Coil.	L223L
ramic disc: 15 pF ±5%, 500 VDCW, temp coef	L201H	19A129347P5 19A129352P9	Coil.	L223L
50 PPM.	L202LL L202L	19A129352P9 19A129354P4	Coil.	L223M
ramic disc: 13 pF ±5%, 500 VDCW, temp coef 50 PPM.	L202E	19A129354P4	Coil.	L223H
ramic disc: 12 pF ±5%, 500 VDCW; temp coef	L202M	19A129352P8	Coil.	L224
50 PPM.	L203	19A700000P122	Coil, RF: 8.2 uH ±10%; sim to Jeffers 4422-3K.	L225 and
ramic disc: 10 pF ±5%, 500 VDCW; temp coef 50 PPM.	L203	19A700000P122	Coil, RF: 330 nH ±20%; sim to Jeffers 411-3.	L226
lver Mica: 140 pF <u>+</u> 5%, 250 VDCW.	L205LL	19A129351P3	Coil.	
lver mica: 110 pF <u>+</u> 5%, 250 VDCW.	and L205L	10412330113		Q204
flon/Mica: 91 pF <u>+</u> 5%, 250 VDCW.	L205M	19A129351P2	Coil.	Q205 thru
lver mica: 82 pF <u>+</u> 5%, 250 VDCW.	L205H	19A129351P2	Coil.	Q207
flon/Mica: 120 pF ±5%, 250 VDCW.	L206LL	19A129351F2	Coil.	Q208
flon/Mica: 100 pF ±5%, 250 VDCW.	L206L	19A129352P1	Coil.	Q209
lver mica: 82 pF <u>+</u> 5%, 250 VDCW.	L206E	19A129352P1	Coil.	
flon/Mica: 75 pF ±5%, 250 VDCW.	L206H	19A129332F3	Coil	R201L
ramic disc: 91 pF ±5%, 500 VDCW; temp coef	L207	19A700000P122	Coil, RF: 8.2 uH +10%; sim to Jeffers 4422-3K.	and R201L
20 PPM.	L207	19A700000P122	Coil.	R201M
19D417968G1 of REV A and earlier: ramic disc: 82 pF ±5%, 500 VDCW, temp coef 50 PPM.	and L208L	198129349F1		and R201H
ramic disc: 68 pF ±5%, 500 VDCW, temp coef	L208M and L208H	19A129349P2	Coil.	R202L and R202L
ramic disc: 56 pF +5%, 500 VDCW; temp coef	L209LL	19A129355P1	Coil.	R202M
ramic disc: 51 pF ±5%, 500 VDCW; temp coef	L209L and L209M	19A129352P4	Coil.	R202H R203L
50 PPM.	L209H	19A129352P2	Coil.	and R203L
lyester: 0.01 uF ±10%, 50 VDCW.	L210LL	19A129352F2	Coil	R203M
D. COO. D. COO. VIDOW	L210LL		Coil.	R203H
ramic disc: 3900 pF ±20%, 1000 VDCW; sim to C Type JF Discap.	L210L	19A129359P1 19A129357P1	Coil.	R204L
lyester: 0.022 uF ±10%, 50 VDCW.	L210H	19A129357P1	Coil.	and R204L
ramic disc: 1000 pF ±20%, 1000 VDCW; sim to	L210H	19A700000P122	Coil, RF: 8.2 uH ±10%; sim to Jeffers 4422-3K.	R204M
C Type JF Discap.	L212LL	19A700000F122	Coil.	R204H
DIODES AND RECTIFIERS	and	19412934991	COII.	R205
licon, fast recovery; sim to Hewlett Packard	L212L L212M	19A129349P2	Coil.	R206
82-2811.	and L212H	19412934992		R207
rlier than REV A:	L213LL	19A129351P1	Coil.	R208
licon, fast recovery, 225 mA, 50 PIV.		19A129351F1	Coil.	R209
licon, fast recovery, 225 mA, 50 PIV.	L213L L213M	19A129355P3	Coil	R210
			Coil.	R211
JACKS AND RECEPTACLES	L213H	19A129351P4		R212
nnector, receptacle; 500 VDCW maximum; sim to FF-1058.	L214LL	19A129353P3	Coil.	R213
	L214L	19A129355P5	Coil.	R214
nnector, Includes:	L214M	19A129355P4	Coil.	R215
ell.	L214H	19A129352P10	Coil.	R216
ntact, electrical.	L220LL	19A129360P9	Coil.	
ntact, electrical: sim to Selectro 229-1071.	L220L	19A129360P6	Coil.	R217
	L220M	19A129360P4	Coil.	R218
ntact, electrical: sim to Bead Chain L93-3.	L220H L221LL	19A129360P1	Coil.	R219
		19A129360P10	Coil.	

SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE F \RT NO
L221L	19A129360P7	Coil.	R221	19A700 13P41
L221M	19A129360P3	Coil.	R222	19A700:06P83
L221H	19A129360P2	Coil.	R223	19A700106P77
L222LL	19A129360P11	Coil.	R224	3R152P511J
L222L	19A129360P8	Coil.	R225	19A700113P15
L222M	19A129360P5	Coil.	R230	19C850605P2
L222H	19A129360P3	Coil.	and R231	
L223LL	19A129360P9	Coil.	R233 and	19A700112P15
L223L	19A129360P6	Coil.	R234	
L223M	19A129360P4	Coil.	R235	19A700106P75
L223H	19A129360P1	Coil.	R236	3R152P241J
L224	19A700000P17	Coil, RF: 3.3 uH ±10%; sim to Jeffers 4421-1K.		
L225	19A129346G1	Coil.	VR201	4036887P1
and L226			VR202	4036887P5
		TRANSISTORS	VR202	403000123
Q204	19A115910P1	Silicon, NPN; sim to Type 2N3904.		
Q205	19A115768P1	Silicon, PNP; sim to Type 2N3702.	W201	19A129571P1
thru Q207				
Q208	19A115910P1	Silicon, NPN; sim to Type 2N3904.		
Q209	19A129187P1	Silicon, PNP.		
		RESISTORS	C297 and	19A116708P1
R201LL and	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.	C298	
201L 201M nd	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.	C299	19A115680P10
201H 202LL 1d	19A700112P9	Composition: 5.6 ohms ±5%, 1 w.	CR295	19A116783P1
202L	•			
R202M	19A700112P1	Composition: 2.7 ohms ±5%, 1 w.		
R202H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.		19D416275P2
R203LL and R203L	19A700112P9	Composition: 5.6 ohms ±5%, 1 w.		19D416712P1 5492178P2
R203M	19A700112P1	Composition: 2.7 ohms ±5%, 1 w.		19A702782P5
R203H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.		19870278293
R204LL and R204L	19A700112P9	Composition: 5.6 ohms ±5%, 1 w.		N207P15C6
R204E	19A700112P1	Composition: 2.7 ohms +5%, 1 w.		19A700068P1
R204H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.		19A116023P1
R205	3R78P200J	Composition: 20 ohms ±5%, 500 VDCW, 1 w.		19A129361P1
R206	19A700113P1	Composition: 2.7 ohms ±5%, 1/2 w.		19A129361P2
R207	19A700112P15	Composition: 10 ohms ±5%, 1 w.		
R208	19A700112P13	Composition: 15K ohms ±5%, 1/4 w.		
R209	19A700106P83	Composition: 6.8K ohms ±5%, 1/4 w.		
R210	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.		
R211	19A116278P233	Metal film: 2150 ohms ±2%, 1/2 w.		
R212	19A116278P217	Metal film: 1470 ohms ±2%, 1/2 w.		
R213	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.		
R214	19A116278P269	Metal film: 5110 ohms ±2%, 1/2 w.		
R215	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.		
R216	19A116559P102	Variable cermet: 5000 ohms ±20%, 1/2 w; sim to		7
		CTS Series 360.		
R217	19A700106P59	Composition: 680 ohms ±5%, 1/4 w.		
R218	19A700106P57	Composition: 560 ohms ±5%, 1/4 w.		
R219	19A700106P69	Composition: 1.8K ohms ±5%, 1/4 w.		
R220	19A700113P55	Composition: 470 ohms ±5%, 1/2 w.	1	

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 includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - PA Board 19D417968G1-4

DESCRIPTION

Composition: 120 ohms +5%, 1/2 w.

Composition: 6.8K ohms ±5%, 1/4 w.

Composition: 3.9K ohms +5%, 1/4 w.

Composition: 510 ohms ±5%, 1/4 w.

Composition: 10 ohms ±5%, 1/2 w.

Composition: 10 ohms +5%, 1 w.

Zener: 500 mW, 2.3 v. nominal.

Zener: 500 mW, 5.4 v. nominal.

Composition: 3.3K ohms $\pm 5\%$, 1/4 w.

Composition: 240 ohms $\pm 5\%$, 1/4 w.

- - - - - - - - - CABLES - - - - - - - -

HEAT SINK ASSEMBLY
19B219688G1 M MODEL & INTERMITTANT DUTY STATION
19B219688G13 E MODEL

Ceramic: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Erie 327050X5W0103P.

Electrolytic: 200 uF +150-10%, 18 VDCW; sim to Mallory Type TTX.

- - - - - DIODES AND RECTIFIERS - - - - -Rectifier, silicon: 100 VDC blocking, 6 amp; sim to MR751.

----- MISCELLANEOUS ------

nsulator. (Located under printed wiring board). Washer, spring tension: sim to Wallace Barnes 375-20.

out, hex, brass: No. 8-32. (Used with Q201 and

Hex nut: No. 10-32. (Used with Q203).

nsulator, bushing. (Used with Q210).

Shield. (Located between L221-L222 and

nsulator, plate. (Used with Q210).

Shield. (Located between L220-L221).

Shunt resistor.

Wire Strap.

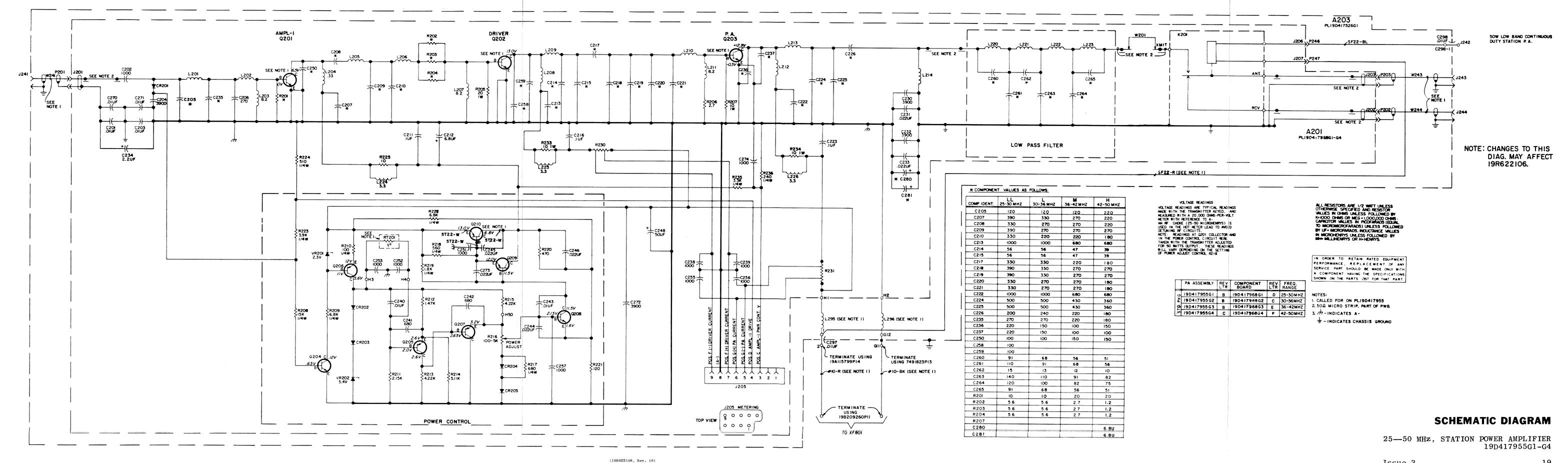
Filter casting.

- To improve operation in cold temperature environments with wide frequency spacing. Changed CR201.
- REV. B PA Board 19D417968G1
 - To improve stopband attenuation in the 25-30 MHz range. Changed C260 and C265.
 - PA Board 19D417968G2-G4
- REV. B To attenuate 3/2 conducted spurious by changing PA input; swapped positions of L201 and C205.
 - PA Board 19D417968G3-G4
- REV. C To stabilize Q203 by reducing base resistance; R207 changed from 3R78200J to 3R78100J.
 - PA Board 19D417968G3
- REV. D To increase power output at low end of 36 to 42 MHz split. Changed C217M from 7489162P37 (270 pF) to 7489162P35 (220 pF) and C250M from 194116656P100J1 (100 PF) to 194116656P150J1 (150 pF).
 - PA Board 19D417968G4
- REV. D To increase power output and stability at low end of band.

 Changed C205 from 7489162P29 (120 pF) to 7489162P35 (220 uF).

 Changed C217H from 7489162P35 (220 pF) to 7489162P33 (180 pF).

 Changed C236H and C237H from 194116656P56J0 (56 pF) to 194116656P68J0 (68 pF).
 - PA Assembly 19C321295G2 & G10
- REV. A To increase power output; deleted Q201 (19A116839P1). Added
 - PA Assembly 19C321295G1-G4, G9-G12
- REV. A To increase power output. Changed Q201 from 19A116839P1 to 19A116965P1.
- PA Assembly 19C321295G4, G12
- REV. B To improve operation of power control on 42-50 MHz, 50-Watt PA. Added C280 and C281.



LBI-4732

PARTS LIST

LBI4744B

25-50 MHz, 50 WATT CONTINUOUS DUTY POWER AMPLIFIER
19D417955G1 25-30 MHz (LL)

	_	
SYMBOL	GE PART NO.	DESCRIPTION
A201		POWER AMPLIFIER BOARD 19D41796861 25-30 MHz (LL) 19D41796862 30-36 MHz (L) 19D41796863 36-42 MHz (M) 19D41796864 42-50 MHz (H)
C201	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.
C202	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C203	19A116080P101	Polyester: 0.01 uF <u>+</u> 10%, 50 VDCW.
C204	19A116655P23	Ceramic disc: 3900 pF $\pm 20\%$, 100 VDCW; sim to RMS Type JF Discap.
C205LL	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.
C205L	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.
C205M	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.
C205H	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.
C206	19A700105P46	Mica: 270 pF ±5%, 500 VDCW. Silver mica: 390 pF +5%, 500 VDCW; sim to
C207LL	7489162P41	Sprague Type 118.
C207L	7489162P39	Sprague Type 118.
C207M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW. Mica: 220 pF ±5%, 500 VDCW.
C207H	19A700105P44 7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to
C208LL	7469162F39	Sprague Type 118.
C208L and C208M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.
С208Н	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.
C209LL	7489162P41	Silver mica: 390 pF ±5%, 500 VDCW; sim to Sprague Type 118.
C209L	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.
C209M	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.
С209Н	19A700105P46	Mica: 270 pF ±5%, 500 VDCW.
C210LL	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.
C210L and C210M	19A700105P44	Mica: 220 pF ±5%, 500 VDCW.
C210H	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.
C211	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C212	5496267P18	Tantalum: 6.8 uF ±20%, 35 VDCW; sim to Sprague Type 150D.
C213LL and C213L	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C213M and C213H	19A116655P17	Ceramic disc: 680 pF ±20%, 1000 VDCW; sim to RM4 Type JF Discap.
C214LL and C214L	19A116656P56J0	Ceramic disc: 56 pF ±5%, 500 VDCW; temp coef 0 PPM.
C214M	19A116656P47J0	Ceramic disc: 47 pF ±5%, 500 VDCW; temp coef 0 PPM.
C214H	19A116656P39J0	Ceramic disc: 39 pF ±5%, 500 VDCW, temp coef 0 PPM.
C215LL and C215L	19A116656P56J0	Ceramic disc: 56 pF ±5%, 500 VDCW; temp coef 0 PPM.

SYMBO	L GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
C215M	19A116656P47J0	Ceramic disc: 47 pF +5%, 500 VDCW; temp coef	С235Н	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.	C263H	19A700015P27	Teflon/Mica: 82 pF ±5%, 250 V
CZISH	15411000014100	O PPM.	C236LL	19A116656P220J4	Ceramic disc: 220 pF ±5.%, 500 VDCW; temp coef	C264LL	19A700015P31	Teflon/Mica: 120 pF ±5%, 250
€215#	19A116656P39J0	Ceramic disc: 39 pF ±5%, 500 VDCW, temp seef 0 ppm.			-470 PPM.	C264L	19A700015P29	Teflon/Mica: 100 pF ±5%, 250
C216	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.	C236L	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, temp coef -150 PPM.	C264M	19A700015P27	Silver mica: 82 pF ±5%, 250 V
C217L	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C236M	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, temp coef -150 PPM.	C264H	19A700015P26	Teflon/Mica: 75 pF ±5%, 250 V
and C217L	101900105744		C236H	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, temp coef	C265LL*	19A116656P91J2	Ceramic disc: 91 pF ±5%, 500 -220 PPM.
C217M C217H	19A700105P44 19A700105P41	Mica: 220 pF ±5%, 500 VDCW. Mica: 180 pF ±5%, 500 VDCW.	C237LL	19A116656P220J4	Ceramic disc: 220 pF +5%, 500 VDCW; temp coef			In REV A and earlier:
C217H		Silver mica: 390 pF +5%, 500 VDCW; sim to			-470 PPM.		19A116656P82J1	Ceramic disc: 82 pF ±5%, 500 -150 PPM.
C218L	7489162P39	Sprague Type 118. Silver mica: 330 pF ±5%, 500 VDCW; sim to	C237L	19A116656P150J1	Ceramic disc: 150 pF ±5%, 500 VDCW, temp coef -150 PPM.	C265L	19A116656P68J1	Ceramic disc: 68 pF ±5%, 500 -150 PPM.
		Sprague Type 118.	C237M and	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, temp coef -150 PPM.	C265M	19A116656P56J1	Ceramic disc: 56 pF ±5%, 500
C218M and C218H		Mica: 270 pF ±5%, 500 VDCW.	C237H C238	19A116655P19	Ceramic disc: 1000 pF <u>+</u> 20%, 1000 VDCW; sim to	С265Н	19A116656P51J1	Ceramic disc: 51 pF ±5%, 500
C219L		Silver mica: 390 pF ±5%, 500 VDCW; sim to Sprague Type 118.	and C239		RMC Type JF Discap.	C270	19A116080P101	-150 PPM. Polyester: 0.01 uF ±10%, 50 V
C219L	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to	C240	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.	and C271		
		Sprague Type 118.	C241 and C242	19A116655P17	Ceramic disc: 680 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	C272	19A116655P23	Ceramic disc: 3900 pF ±20%, 1 Type JF Discap.
C219M and C219H	i	Mica: 270 pF ±5%, 500 VDCW.	C242	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.	C273	19A116080P103	Polyester: 0.022 uF ±10%, 50
C219H		Silver mica: 330 pF ±5%, 500 VDCW; sim to	C244	19A116080P103	Polyester: 0.022 uF ±10%, 50 VDCW.	C274	19A116655P19	Ceramic disc: 1000 pF +20%, 1
		Sprague Type 118.	thru C246					RMC Type JF Discap.
C220L and C220M	ı	Mica: 270 pF ±5%, 500 VDCW.	C248	19A115680P4	Electrolytic: 50 uF +150% -10%, 25 VDCW; sim to Mallory Type TTX.			DIODES AND RECTI
C220H	i	Mica: 180 pF ±5%, 500 VDCW.	C250	19A116656P100J1	Ceramic disc: 100 pF ±5%, 500 VDCW, temp coef	CR201*	19A116052P2	Silicon, fast recovery; sim to 5082-2811.
C221L	L 7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.	C250M	19A116656P150J1	-150 PPM. Ceramic disc: 150 pF +5%, 500 VDCW, temp coef			Earlier than REV A:
C221L	19A700105P46	Mica: 270 pF +5%, 500 VDCW.	and C250H		-150 PPM.		19A115250P1	Silicon, fast recovery, 225 mA
and C221M	1	^ <u>-</u> '	C251	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	CR202 thru CR205	19A115250P1	Silicon, fast recovery, 225 mA
C221H	19A700105P41	Mica: 180 pF ±5%, 500 VDCW.	and C253		nate type of biscap.	CHZOS		JACKS AND RECEPT
C222I and C222I		Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	C255 thru C257	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.	J201 thru	19A700049P2	Connector, receptacle; 500 VE
C2221		Ceramic disc: 680 pF ±20%, 1000 VDCW; sim to RMC	C258LL	19A116656P100K4	Ceramic disc: 100 pF ±10%, 500 VDCW, temp coef	J203	10001027461	Connector, Includes:
and C222F	г	Type JF Discap	C259LL	19A116656P100K4	-470 PPM. Ceramic disc: 100 pF ±10%, 500 VDCW, temp coef	J205	19B219374G1 19C317957P1	Shell.
C223	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.	CZSSIII		-470 PPM.		19A116651P1	Contact, electrical.
C224I and	1	Silver Mica: 500 pF <u>+</u> 5%, 250 VDCW.	C260LL*	19A116656P91J1	Ceramic disc: 91 pF ±5%, 500 VDCW, temp coef -150 PPM.	J206 and	19A134263P2	Contact, electrical: sim to S
C2241 C2241	1	Metallized teflon: 430 pF ±5%, 250 VDCW.			In REV A and earlier:	J207		
C224F		Metallized teflon: 360 pF ±5%, 250 VDCW.		19A116656P82J1	Ceramic disc: 82 pF ±5%, 500 VDCW, temp coef -150 PPM.	J208	4033513P4	Contact, electrical: sim to E
C2251		Silver Mica: 500 pF <u>+</u> 5%, 250 VDCW.	C260L	19A116656P68J1	Ceramic disc: 68 pF ±5%, 500 VDCW, temp coef -150 PPM.			RELAYS -
and C2251			C260M	19A116656P56J1	Ceramic disc: 56 pF ±5%, 500 VDCW, temp coef	K201	19A700061P1	Hermetic sealed: 180 to 341 c 8-16.3 VDC; sim to GE 3SAV1760
C225N		Metallized teflon: 430 pF ±5%, 250 VDCW.			-150 PPM.			HFW-1201558, or Potter-Brumfie (Includes J206 and J207).
C225F	1	Metallized teflon: 360 pF ±5%, 250 VDCW.	С260Н	19A116656P51J1	Ceramic disc: 51 pF ±5%, 500 VDCW, temp coef -150 PPM.			
C2261	1	Teflon/Mica: 200 pF ±5%, 250 VDCW. Teflon/Mica: 240 pF ±5%, 250 VDCW.	C261LL	19A700015P30	Silver mica: 110 pF ±5%, 250 VDCW.	L201LL	19A129347P2	Coil.
C2261	1	Teflon/Mica: 220 pF ±5%, 250 VDCW.	C261L	19A700015P28	Teflon/Mica: 91 pF ±5%, 250 VDCW.	L201L	19A129347P1	Coil.
C226I	l	Teflon/Mica: 180 pF ±5%, 250 VDCW.	C261M	19A700015P25	Silver mica: 68 pF ±5%, 250 VDCW.	L201M	19A129347P3	Coil.
C230	19A116655P23	Ceramic disc: 3900 pF ±20%, 100 VDCW; sim to RMS	C261H	19A700015P23	Teflon/Mica: 56 pF ±5%, 250 VDCW.	L201H	19A129347P5	Coil.
		Type JF Discap. Polyester: 0.022 uF ±10%, 50 VDCW.	C262LL	19A116656P15J1	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef -150 PPM.	L202LL	19A129352P9	Coil.
C231	19A116080P103 19A116655P23	Ceramic disc: 3900 pF ±20%, 100 VDCW; sim to RMS	C262L	19A116656P13J1	Ceramic disc: 13 pF ±5%, 500 VDCW, temp coef -150 PPM.	L202L	19A129354P4	Coil.
	138110000120	Type JF Discap.	C262M	19A116656P12J1	Ceramic disc: 12 pF ±5%, 500 VDCW, temp coef	L202M	19A129352P8	Coil.
C233	19A116080P103	Polyester: 0.022 uF ±10%, 50 VDCW.	202011	10411665601011	-150 PPM.	L202H L203	19A129352P7 19A700000P122	Coil. Coil, RF: 8.2 uH +10%; sim to
C234	5496267P13	Tantalum: 2.2 uF ±20%, 20 VDCW; sim to Sprague Type 150D.	C262H	19A116656P10J1	Ceramic disc: 10 pF ±5%, 500 VDCW, temp coef -150 pPM.	L203	19A700000P122	Coil, RF: 330 nH +20%; sim to
C235	LL 19A700105P46	Mica: 270 pF <u>+</u> 5%, 500 VDCW.	C263LL	19A116679P140J	Silver Mica: 140 pF ±5%, 250 VDCW.	L205LL	19A129351P3	Coil.
C235	L		C263L	19A700015P30	Silver mica: 110 pF ±5%, 250 VDCW.	L205L	19A129351P3	Coil.
C235	M 19A700105P44	Mica: 220 pF ±5%, 500 VDCW.	C263M	19A700015P28	Teflon/Mica: 91 pF ±5%, 250 VDCW.	L205M	19A129351P2	Coil.

	SYMBOL	GE PART NO
2 pF ±5%, 250 VDCW.	L205H	19A129351P2
20 pF ±5%, 250 VDCW.	L206LL	19A129352P1
0 pF ±5%, 250 VDCW.	##∂ L206L	
e pF ±5%, 250 VDCW.	L206M	19A129352P3
pF ±5%, 250 VDCW.	L206H	19A129348P2
01 pF ±5%, 500 VDCW, temp coef	L207	19A700000P122
lier: 32 pF <u>+</u> 5%, 500 VDCW, temp coef	L208LL and L208L	19A129349P1
88 pF <u>+</u> 5%, 500 VDCW, temp coef	L208M and L208H	19A129349P2
66 pF <u>+</u> 5%, 500 VDCW, temp coef	L209LL	19A129355P1
51 pF ±5%, 500 VDCW, temp coef	L209L and L209M	19A129352P4
uF <u>+</u> 10%, 50 VDCW.	L209Н	19A129352P2
	L210LL	19A129358P1
3900 pF ±20%, 100 VDCW; sim to RMS	L210L	19A129359P1
22 uF +10%, 50 VDCW.	L210M	19A129357P1
1000 pF +20%, 1000 VDCW; sim to	L210H	19A129357P2
ODES AND RECTIFIERS	L211 L212LL and L212L	19A700000P122 19A129349P1
ecovery; sim to Hewlett Packard	L212M and L212H	19A129349P2
7 A:	L213LL	19A129351P1
ecovery, 225 mA, 50 PIV.	L213L	19A129358P2
ecovery, 225 mA, 50 PIV.	L213M	19A129355P3
ACKS AND RECEPTACLES	L213H	19A129351P4
ptacle; 500 VDCW maximum; sim to	L214LL	19A129353P3
	L214L	19A129355P5
udes:	L214 M	19A129355P4
	L214H	19A129352P10
ical.	L220LL	19A129360P9
ical: sim to Selectro 229-1071.	L220L L220M	19A129360P6 19A129360P4
	L220M	19A129360P4
ical: sim to Bead Chain L93-3.	L221LL	19A129360P10
RELAYS	L221L	19A129360P7
: 180 to 341 ohms coil res, to GE 3SAV1760A2, CP Clare	L221M	19A129360P3
Potter-Brumfield HCM6160.	L221H	19A129360P2
	L222LL	19A129360P11
INDUCTORS	L222L	19A129360P8
	L222M	19A129360P5
	L222H	19A129360P3
	L223LL	19A129360P9 19A129360P6
	L223L L223M	19A129360P6
ŕ	L223H	19A129360P1
	L224	19A700000P17
	L225	19A129346G1
uH ±10%; sim to Jeffers 4422-3K.	and L226	
nH <u>+</u> 20%; sim to Jeffers 411-3.		
	Q204	19A115910P1
	Q205 thru Q207	19A115768P1

GE PART NO.

DESCRIPTION	SYMBOL	GE PART NO.	
Coil.	Q208	194115910P1	Silicon, NPN; si
Coil.	Q209	19A129187P1	Silicon, PNP.
	.		
Coil.	R201LL	19A700113P15	Composition: 10
Coil.	and R201L	10.1100110110	Composition: 10
oil, RF: 8.2 uH <u>+</u> 10%; sim to Jeffers 4422-3K.	R201M	3R77P200J	Composition: 20
11.	and R201H	••	
1.	R202LL and R202L	19A700112P9	Composition: 5.6
11.	R202M	19A700112P1	Composition: 2.
1.	R202H	7147161P22	Composition: 1.2
	R203LL and R203L	19A700112P9	Composition: 5.6
1.	R203M	19A700112P1	Composition: 2.
1.	R203H	7147161P22	Composition: 1.2
1.	R204LL and	19A700112P9	Composition: 5.6
	R204L R204M	194700112P1	Composition: 2.3
l, RF: 8.2 uH <u>+</u> 10%; sim to Jeffers 4422-3K.	R204H	7147161P22	Composition: 1.2
	R205	3R78P200J	Composition: 20
	R206	19A700113P1	Composition: 2.
	R207	19A700112P15	Composition: 10
	R208	19A700106P91	Composition: 15
•	R209	19A700106P83	Composition: 6.8
	R210	19A700106P39	Composition: 100
	R211	19A116278P233	Metal film: 2150
	R212	19A116278P217	Metal film: 1470
·	R213	19A116278P261	Metal film: 4220
	R214	19A116278P269	Metal film: 5110
	R215	19A116278P261	Metal film: 4220
	R216	19A116559P102	Variable cermet: CTS Series 360.
	R217	19A700106P59	Composition: 680
	R218	19A700106P57	Composition: 560
	R219	19A700106P69	Composition: 1.8
	R220	19A700113P55	Composition: 470
•	R221	19A700113P41	Composition: 120
•	R222	19A700106P83	Composition: 6.
•	R223	19A700106P77	Composition: 3.9
•	R224 R225	3R152P511J 19A700113P15	Composition: 510
	R223	19C850605P2	Shunt resistor.
	and R231		
	R233	19A700112P15	Composition: 10
	and R234		
	R235	19A700106P75	Composition: 3.3
	R236	3R152P241J	Composition: 240
, RF: 3.3 uH <u>+</u> 10%; sim to Jeffers 4421-1K.			1
	VR201	4036887P1	Zener: 500 mW, 2
	VR201 VR202	4036887P1 4036887P5	Zener: 500 mw, 2
TRANSISTORS	1		20.01. 000,
icon, NPN; sim to Type 2N3904.			
icon, PNP; sim to Type 2N3702.	W201	19A129571P1	Strap.

SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
Q208	19A115910P1	Silicon, NPN; sim to Type 2N3904.			
Q209	19A129187P1	Silicon, PNP.	A203		FRAME ASSEMBLY 19D417526G1
		RESISTORS			
R201LL and R201L	19A700113P15	Composition: 10 ohms <u>+</u> 5%, 1/2 w.	W241	5491689P104	Cable, RF: approx 4 inches long, 350 VRMS, 500 VDC operating voltage.
R201M and R201H	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.	W244	5491689P104	Cable, RF: approx 4 inches long, 350 VRMS, 500 VDC operating voltage. (Includes P201, I
R202LL and R202L	19A700112P9	Composition: 5.6 ohms ±5%, 1 w.	C297 and	19A116708P1	
R202M	19A700112P1	Composition: 2.7 ohms ±5%, 1 w.	C298		
R202H	7147161P22	Composition: 1.2 ohms ±°5%, 1/2 w.			
R203LL and	194700112P9	Composition: 5.6 ohms ±5%, 1 w.	L295 L296	19A129356P2 19A129356P1	Coil.
R203L	10170011001		1200	15.112.000011	
R203M	19A700112P1	Composition: 2.7 ohms ±5%, 1 w.		400000475	Control Plantain I air to AND 42429-2
R203H R204LL	7147161P22 - 194700112P9	Composition: 1.2 ohms ±5%, 1/2 w. Composition: 5.6 ohms ±5%, 1 w.	P246 and	4036634P1	Contact, electrical; sim to AMP 42428-2.
and R204L	,	Composition. 5.6 onns 15%, 1 w.	P247		
R204M	194700112P1	Composition: 2.7 ohms ±5%, 1 w.	Q201	19A116965P1	Silicon, NPN.
R204H	7147161P22	Composition: 1.2 ohms +5%, 1/2 w.	Q202	19A116839P2	Silicon, NPN.
R205	3R78P200J	Composition: 20 ohms +5%, 500 VDCW, 1 w.	Q203	19A116839P3	Silicon, NPN.
R206	19A700113P1	Composition: 2.7 ohms ±5%, 1/2 w.	Q210	19A116758P1	Silicon, PNP.
R207	19A700112P15	Composition: 10 ohms ±5%, 1 w.			,
R208	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.			
R209	19A700106P83	Composition: 6.8K ohms ±5%, 1/4 w.	RT201	19A129379G1	Thermistor: 40K ohms ±20%, color code white to Carborundum Type M0806J-5.
R210	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.			
R211	19A116278P233	Metal film: 2150 ohms <u>+</u> 2%, 1/2 w.			
R212	19A116278P217	Metal film: 1470 ohms <u>+</u> 2%, 1/2 w.	W243		RF CABLE ASSEMBLY
R213	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.			19A129312G6
R214	19A116278P269	Metal film: 5110 ohms $\pm 2\%$, 1/2 w.			JACKS AND RECEPTACLES
R215	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.	J243		Includes:
R216	19A116559P102	Variable cermet: 5000 ohms ±20%, 1/2 w; sim to CTS Series 360.		19A700067P1	Receptacle, coax; sim to Amphenol 83-798.
R217	19A700106P59	Composition: 680 ohms ±5%, 1/4 w.		4029082P2	Adaptor.
R218	19A700106P57	Composition: 560 ohms <u>+</u> 5%, 1/4 w.			
R219	19A700106P69	Composition: 1.8K ohms ±5%, 1/4 w.	P203	5491689P108	Connector/cable: approx. 10 inches long, 50 operating voltage.
R220	19A700113P55	Composition: 470 ohms $\pm 5\%$, 1/2 w.			operating voltage.
R221	19A700113P41	Composition: 120 ohms ±5%, 1/2 w.			MISCELLANEOUS
R222	19A700106P83	Composition: 6.8K ohms $\pm 5\%$, $1/4$ w.		19D416275P2	Filter casting.
R223	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.		19D416712P1	Insulator. (Located under printed wiring bo
R224	3R152P511J	Composition: 510 ohms $\pm 5\%$, 1/4 w.		19A702782P5	Nut, hex, brass: No. 8-32. (Used with Q201 Q202).
R225	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.		N207P16C6	Hex nut: No. 10-32. (Used with Q203).
R230 and R231	19C850605P2	Shunt resistor.		19A129361P1	Shield. (Located between L221-L222 and L222 on A201).
R233 and R234	194700112P15	Composition: 10 ohms ±5%, 1 w.		19A129361P2 19B226212G1	Shield. (Located between L220-L221 on A201) Heat sink. (2).
R235	19A700106P75	Composition: 3.3K ohms ±5%, 1/4 w.		19D417513G1	PA Cover. (Frame assembly A203).
R236	3R152P241J	Composition: 240 ohms $\pm 5\%$, 1/4 w.		19A116972P1	Locking clip. (Secures A203 to plate).
				19C320904G2	Plate. (Mounts A201 and A203).
VR201	4036887P1	Zener: 500 mW, 2.3 v. nominal.		19B201074P204	Tap screw, phillips POZIDRIV®: No. 4-40 x 1 (Secures J243).
VR201	4036887P1 4036887P5	Zener: 500 mW, 5.4 v. nominal.		19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1
				19B209103P410	(Secures A203 to plate). Tap screw, hex head: No. 8-32 x 5/8. (Secu
W201	19A129571P1	Strap.		1902091031410	heat sink casting).

DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	
FRAME ASSEMBLY 19D417526G1		19B201074P214 19B201074P306	Tap screw, Phillips POZIDRIV*: No. 4-40 x 7/8. (Secures L296). Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures cable clips).	Change Letter," previou
		19A701863P17	Cable clamp.	
F: approx 4 inches long, 350 VRMS, operating voltage.		7140624P6	Spacer. (Used with L296).	REV.
F: approx 4 inches long, 350 VRMS, operating voltage. (Includes P201, P202).		5492178P2	Washer, spring tension: sim to Wallace Barnes 375-20. (Used with Q201-Q203).	
		19A702782P5	Nut, hex, brass: No. 8-32. (Secures C297, C298)	REV.
CAPACITORS		19A115222P3	Washer, shield. (Used with Q210).	
0.01 uF -0 +100%, 500 VDCW, rated sim to Erie 327050X5W0103P.	1000		·	REV.
INDUCTORS				REV.

Machine screw, phillips head: No. 6-32 x 1. (Secures filter casting).

N80P13016C6

PRODUCTION CHANGES

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

PA Board 19D417968G1-4

EV. A - To improve performance in cold temperature and wide frequency spacing. Changed CR201. PA Board 19D417968G1

EV. B - To improve stop 6 and attenuation in the 25-30 MHz range. Changed C260LL and C265LL. PA Board 19D417968G2-G4

EV. B - To attenuate 3/2 conducted spurious by changing PA input circuit; swapped positions of L201 and C205.

PA Board 19D417968G3-G4

EV. C - To stabilize Q203, base resistance was reduced: R207 changed from 3R78200J to 3R78100J. PA Board 19D417968G3

REV. D - To increase power output at low end of 36 to 42 MHz split.

Changed C217M from 7489162P37 (270 uF) to 7489162P35 (220 pF)
and C250M from 19A116656P100J1 (100 pF) to 19A116656P150J1 (150 pF).

PA Board 19D417968G4

REV. D - To increase power output at low end of band. Changed C205 from 7489162P29 (120 pF) to 7489162P35 (220 pF). Changed 217H from 7489162P35 (220 pF) to 7489162P33 (180 pF). Changed C236H and C237H from 19A116656P56J (56 pF) to 19A116656P68J (68 pF). PA Board 19D417968G1, Rev. D; G2, Rev. C; G3 & G4

REV. E - To improve stability, corrected exciter to PA interface. Swapped positions of C205 and L201.

PA Board 19D417968G4

REV. F - To prevent 3/2 frequency spurious, changed C236H from 19A116656P68J (69 pF) to 19A116656P150J (150 pF). Added C250H.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

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