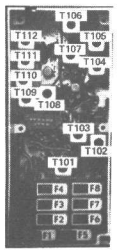
MOBILE RADIO

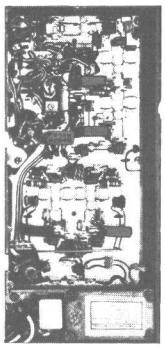
# MASTR II MAINTENANCE MANUAL

## 138-174 MHz STATION TRANSMITTER






EXCITER ASSEMBLY



PA ASSEMBLY

## SPECIFICATIONS *

| | | |
|---|---|---|
| FCC Filing Designation | KT-42-A,C<br>KT-45-A,C<br>KT-48-A,C | Extended Local Control<br>Extended Local/DC & Tone Remote<br>DC Remote/Tone Remote<br>All Controls |
| Power Output | 65 Watts (Adjustable from 20 to 65 Watts) | |
| Frequency Stability | | |
| (-30°C to +60°C) | ±0.0005% | (KT-42-A, KT-45-A, KT-48-A) |
| ( 0°C to +55°C) | ±0.0002% | (KT-42-A, KT-45-A, KT-48-A) |
| (-30°C to +60°C) | ±0.0002% | (KT-42-C, KT-45-C, KT-48-C) |
| Spurious and Harmonic Emission | At least 85 dB below full rated power output. | |
| Modulation | Adjustable from 0 to ±5 kHz swing with instantaneous modulation limiting. | |
| Audio Frequency Characteristics | Within +1 dB to -3 dB of a 6-dB/octave pre-emphasis from 300 to 3000 Hz per EIA standards. Post limiter filter per FCC and EIA. | |
| Distortion | Less than 2% (1000 Hz)<br>Less than 3% (300 to 3000 Hz) | |
| Deviation Symmetry | 0.5 kHz maximum | |
| Maximum Frequency Spread (2 to 4 channels) | Full Specification | 1dB Degradation |
| 138-155 MHz | 1.8 MHz | 2.75 MHz |
| 150.8-174 MHz | 2.0 MHz | 3.0 MHz |
| Duty Cycle | EIA 20% Intermittent (KT-42-A,C & KT-45-A,C)<br>Continuous (KT-48-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.

138-174 MHz EXCITER 19D416859G1-4
INTERMITTENT DUTY 65-WATT PA ASSEMBLY 19C320414G2
CONTINUOUS DUTY 65-WATT PA ASSEMBLY 19D417524G1

GENERAL ELECTRIC

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ILLUSTRATIONS



**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, watchband, 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-42-A,C; KT-45-A, C and KT-48-A,C are crystal-controlled, phase modulated transmitters designed for one through four frequency operation in the 138 to 174 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 one integrated circuit 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 11.5 to 14.5 megahertz, and the crystal frequency is multiplied 12 times.

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

Centralized metering jack J103 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The test set meters the modulator, multiplier and amplifier stages, and the regulated 10-Volts.

### 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 a dustproof, 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 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.

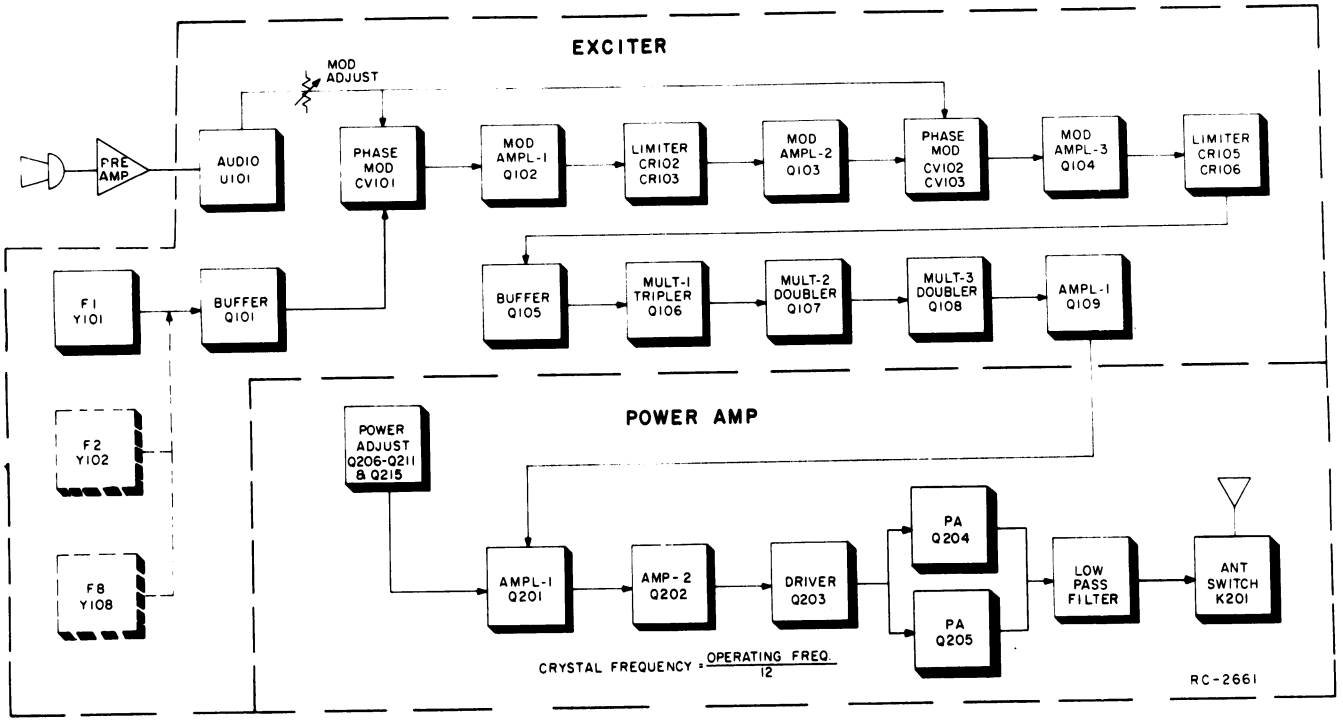



Figure 1 - Transmitter Block Diagram

Frequency selection is accomplished by switching the ICOM keying lead (terminal 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-42-A,C using EC-ICOMs, at least one 5C-ICOM must be used. The 5C-ICOM is normally used in the receiver F1 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-45-A,C and KT-48-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.

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°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 mid-range, 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.

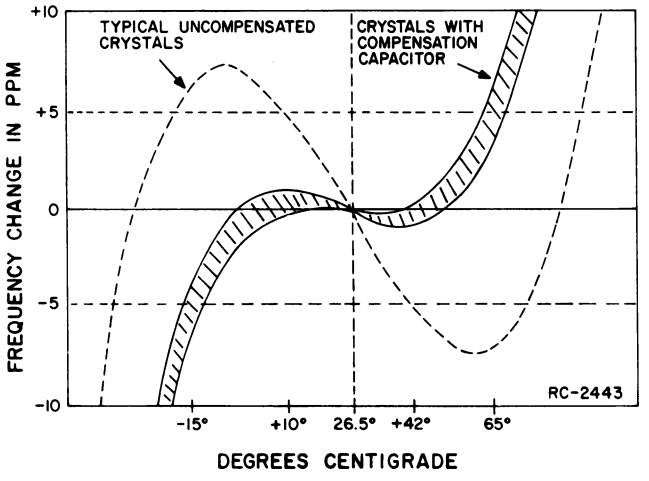



Figure 2 - Typical Crystal Characteristics

In transmitter types KT-52-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°C. When the temperature rises above +55°C, the circuit is activated. As the temperature 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.

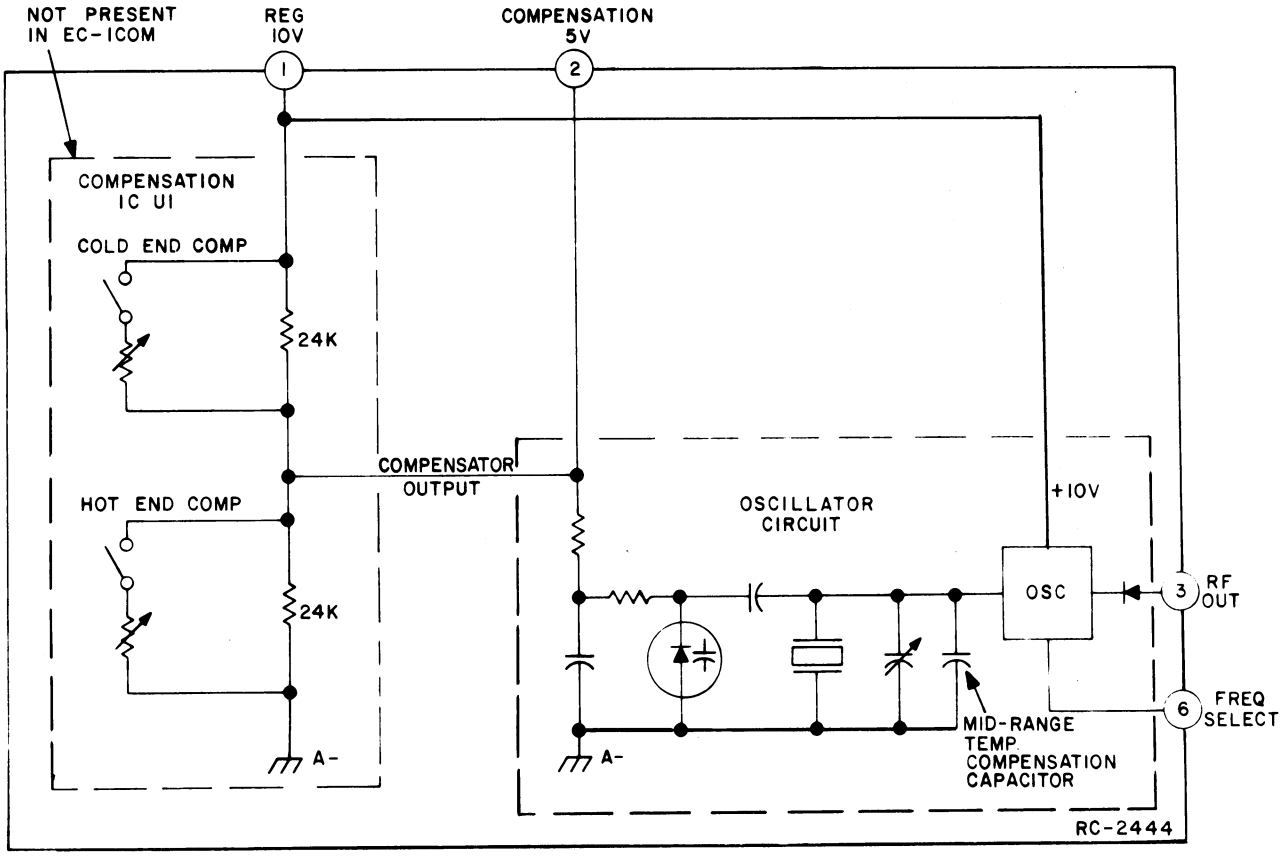



Figure 3 - Equivalent ICOM Circuit

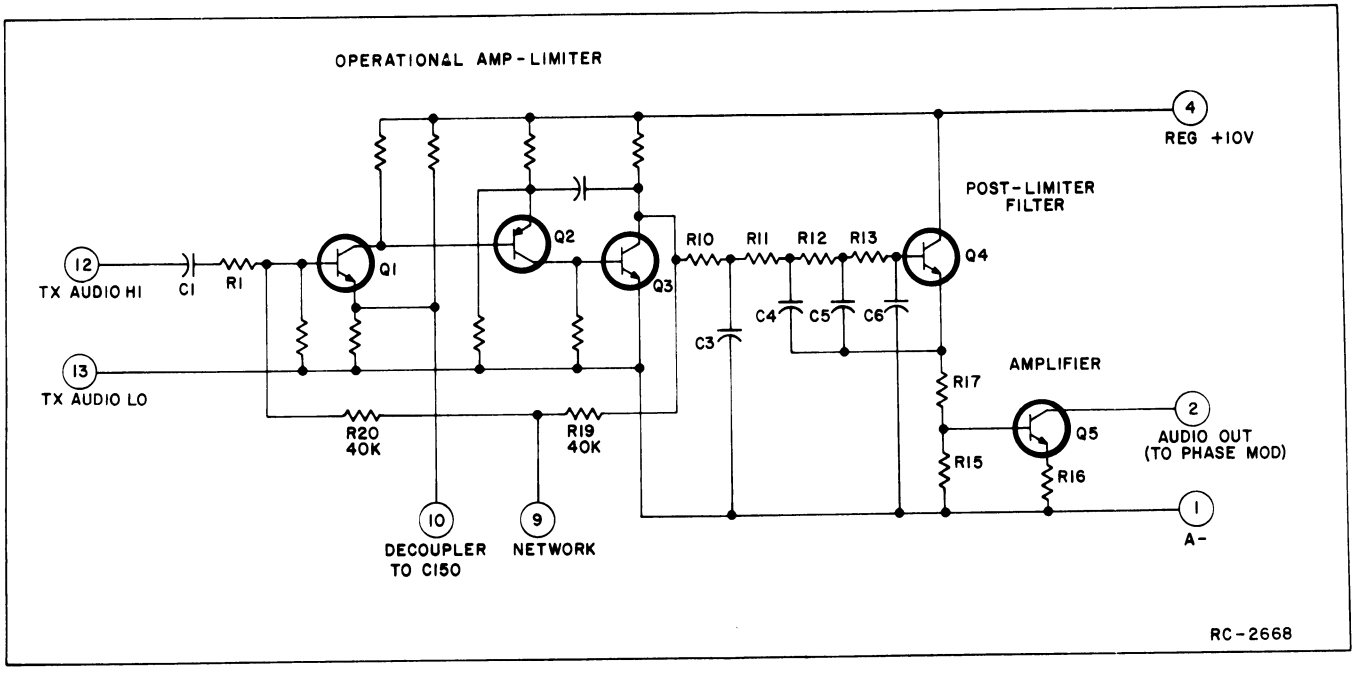



Figure 4 - Simplified Audio IC

AUDIO IC

The transmitter audio circuitry is contained in audio IC U101. A simplified drawing of the audio IC is shown in Figure 4.

Audio from the station preamplifier at pin 12 is coupled through pre-emphasis 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 R104 and resistors R108 and R125 to the phase modulators.

SERVICE NOTE: If the DC voltages to the Audio IC are correct and no audio output can be obtained, replace U101.

For radios equipped with Channel Guard, tone from the encoder is applied to the phase modulators through CHANNEL GUARD MOD ADJUST potentiometer R105, and resistors R112, R123 and R127. Instructions for setting R128 are contained in the modulation adjustment section of the Transmitter Alignment Procedure.

BUFFER, PHASE MODULATORS & AMPLIFIERS

The output at pin 3 of the selected ICOM is coupled through buffer-amplifier Q101 to the first modulator stage. The first phase modulator is varactor (voltage-variable capacitor) CV101 in series with tunable coil T101. This network appears as a series-resonant circuit to the RF output of the oscillator. An audio signal applied to the modulator circuit through blocking capacitor C107 varies the bias of CV101, resulting in a phase modulated output. A voltage divider network (R110 and R111) provides the proper bias for varactors CV101, CV102 and CV103.

The output of the first modulator is coupled through blocking capacitor C113 to the base of Class A amplifier Q102. The first modulator stage is metered through a metering network consisting of C115, R118 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, T102, T103 and CV103. Following the second modulator is a Class A amplifier, Q104. The output of the second modulator stage is metered through C123, R132 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, MULTIPLIERS & AMPLIFIER

Buffer Q105 is saturated when no RF signal is present. Applying and RF signal to Q105 provides a sawtooth waveform at its collector to drive the class C tripler, Q106. The tripler stage is metered through R138. The output of Q106 is coupled through tuned circuits T104 and T105 to the base of doubler Q107. T104 and T105 are tuned to one-fourth of the operating frequency. The doubler stage is metered through R141.

The output of Q107 is coupled through tuned circuits T106 and T107 to the base of second doubler Q108. T106 and T107 are tuned to one-half the operating frequency. Q108 is metered through R146.

The output of Q108 is coupled through three tuned circuits (T108, T109 and T110) to the base of amplifier Q109. The circuits are tuned to the transmitter operating frequency.

Q109 is a class C amplifier, and is metered through R148. The amplifier collector circuit consists of T111, C154, C155, T112 and C157, and matches the amplifier output to the input of the power amplifier assembly.

## POWER AMPLIFIER

The PA assembly uses five RF power transistors and seven transistors in the Power Control circuitry to provide a power output of 65 Watts. The broadband PA has no adjustment other than Power Control potentiometer R222.

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, C299, L295 and L296 prevent RF from getting on the Power leads. Diode CR295 (on the intermittent duty PA only) will cause the main fuse in the fuse assembly to blow if the polarity of the power leads is reversed, providing reverse voltage protection for the radio.

Centralized metering jack J205 is provided for use with GE Test Set Model 4EX3A11 of 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 J201. The RF is coupled through a matching network to the base of Class C amplifier Q201. The network matches the 50-ohm input to the base of Q201, and consists of T201, C204, C205 and L202. R201, L201 and C206 are a stabilizing network in the base circuit of Q201.

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 R203 and R231 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 (L203, R204 and C209) and collector feed network T202 and C286. The collector voltage of Q201 is metered through R212 at J205.

The output of Q201 is coupled to the base of the second class C amplifier (Q202) through a matching network consisting of T203, C214 and C215. Collector voltage to Q202 is applied through collector stabilizing network Z201 and collector feed network L204 and C218.

The output of Q202 is applied to the base of Class C driver Q203 through a low-pass filter matching network (L216, C219, C221 and C222). Collector voltage to Q203 is coupled through collector stabilizing network Z202 and collector feed network L205 and C226.

Collector current for Q203 is metered across tapped manganin resistor R213 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 Q203 is a matching network (L217, C228, T204 and C229) that matches the output of Q203 to the 50-ohm microstrip impedance (W206) to the input of power divider Z205.

The power amplifier stages consist of two identical paralleled Class C PA circuits (Q204 and Q205). One output of Z205 is applied to the base of Q204 through an impedance matching network (T206, C233 and C237). C234, L207 and R208 are a stabilizing network in the base of Q204.

Supply voltage for Q204 coupled through collector stabilizing network Z203, and collector feed network L208 and C252.

Collector current for Q204 and Q205 is metered across paralled tapped manganin resistors R210 and R211. The reading is taken on the one-volt scale with the High Sensitivity button pressed, and read as 30 amperes full scale.

The output of Q204 is coupled through a matching network (L218, C242 and T208), and added to the output of Q205 in power combiner Z206. Following Z206 is impedance matching transformer T210 that matches the combiner output to the 50-ohm microstrip (W207). Capacitors C270 through C287 provides ground isolation for ± ground operation. The PA output is coupled through a low-pass filter to the antenna through antenna switch K201.

**WARNING**

The stud mount 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 re-placing transistors of this type.

## POWER CONTROL CIRCUIT

When the transmitter is keyed, rectified RF from CR201 is applied to the base of switch Q206, turning it on. Turning on Q206 turns on voltage regulator Q207, supplying a constant voltage to Power Adjust potentiometer R222.

Q210, Q211 and Q215 operate as an amplifier chain to supply voltage to the collector of Q201 (Ampl-1). The setting of R222 determines the voltage applied to the base of Q210. The higher the voltage at the base of Q210, the harder the amplifiers conduct, supplying more collector voltage to Q201. The lower the voltage at the base of Q210, 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 R222 from approximately 20 to 65 Watts.

Temperature protection is provided by Q208, Q209, and themistor RT201 which is mounted in the PA heatsink. Under normal operating conditions, the circuit is inactive (Q208 is on and Q209 is off). When the heatsink temperature reaches approximately 100°C, the resistance of RT201 decreases. This increases the base voltage applied to Q208, turning it off. Turning off Q208 allows Q209 to turn on, decreasing the voltage at Power Adjust potentiometer R222. This reduces the base voltage to Q210 which causes Q211 and Q215 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:

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

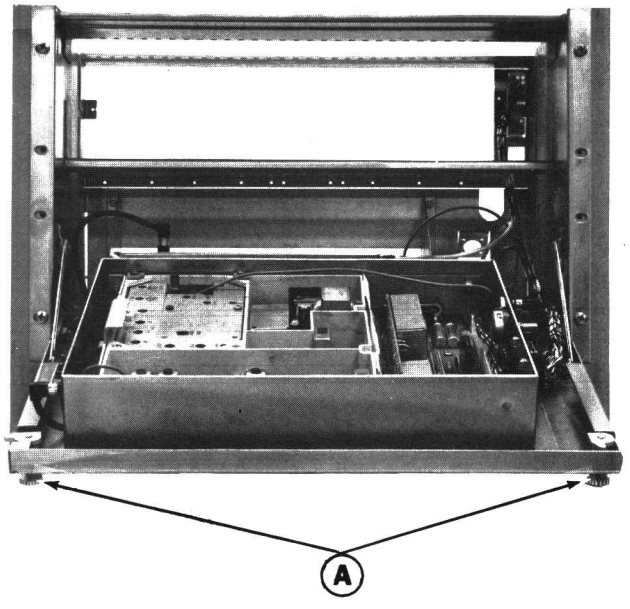



Figure 5 - Access to Exciter, Front View

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.
2. 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.

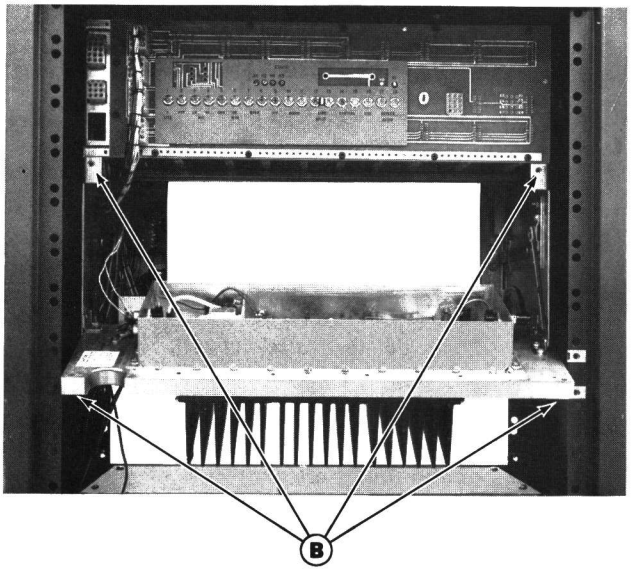



Figure 6 - Access to Power Amplifier, Rear View

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).
3. In continuous duty stations only, remove all heatsink sections from the heat dissipator plate.
4. Remove the PA transistor hold-down nuts and spring washers 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.

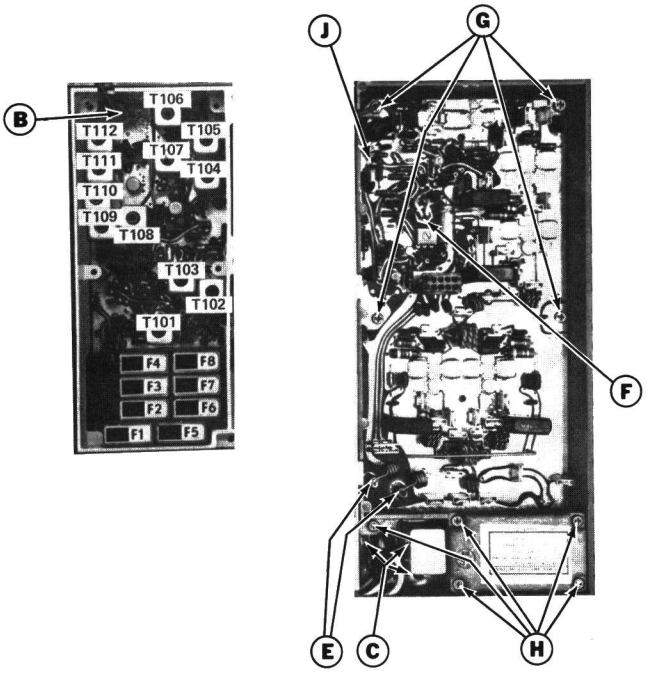



Figure 7 - PA Board Removal

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. To gain access to the transistor hold down nuts, 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 8). The letter "C" on the top of the transistor indicates the collector.
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 9 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 or 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.

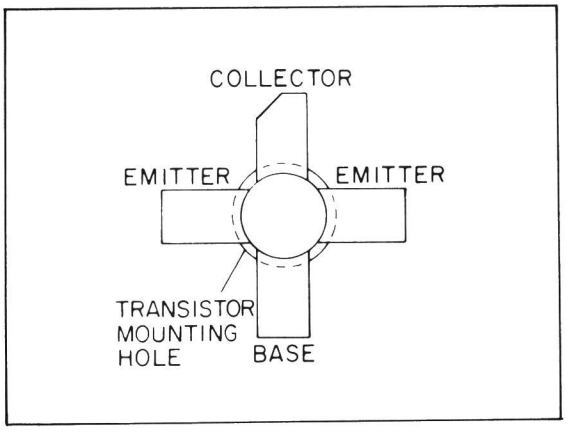



Figure 8 - Lead Identification

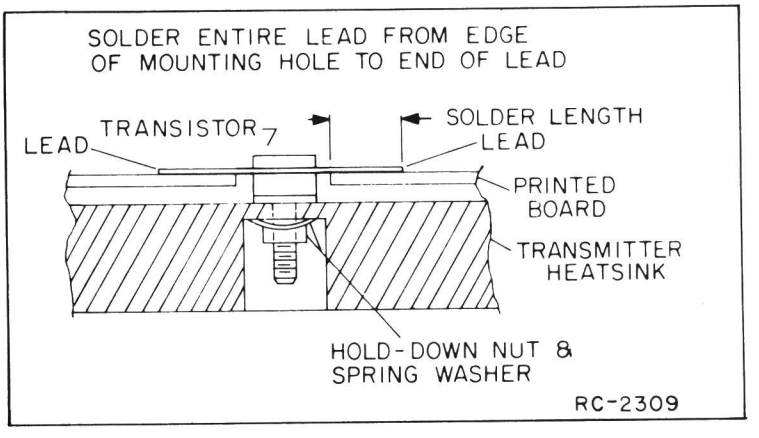



Figure 9 - Lead Forming

## MODULATION LEVEL ADJUSTMENT

The MOD ADJUST (R104) was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter. The limiter, in conjunction with the de-emphasis network, instantaneously limits the slope of the audio wave to the modulator, thereby preventing overmodulation while preserving intelligibility.

TEST EQUIPMENT

1. An audio oscillator (GE Model 4EX6A10)
2. A frequency modulation monitor
3. An output meter or a VTVM
4. GE Test Set Models 4EX3A11 or 4EX8K12

PROCEDURE

1. Set the station gain control R14 to the full clockwise position.
2. Connect the audio oscillator and the meter across audio input terminals J10 (Green-Hi) and J11 (Black-Lo) on GE Test Set, or across J952-13 (Mike High) through a 0.5 microfarad (or larger) DC blocking capacitor, and J952-14 (Mike-Low) on the System Board.
3. Adjust the audio oscillator for 30 Millivolts RMS at 1000 Hz.
4. For transmitters without Channel Guard, set MOD ADJUST R104 for a 4.5-kilohertz 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 R105 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 3kHz 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:

$$P_i = \text{PA voltage} \times \text{PA current}$$

where:

$P_i$ is the power input in Watts,

PA voltage is measured with Test Set Model 4EX3A11 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 (-) position.

PA current is measured with the Test Set in Position G in the Test 1 position, and with the HIGH SENSITIVITY button pressed (30 amperes full scale).

Example:

$P_i$ = 12.6 Volts x 5.0 amperes = 63 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 deviation 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 (+23°F to +131°F).

C. The specification limit (±2PPM or ±5 PPM) at any temperature within the ranges of -40°C to -5°C (-40°F to +23°F) or +55°C to +70°C (+131°F to +158°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°C, setting errors can be minimized as follows:

A. To hold the setting error to ±0.6 PPM (which is considered reasonable for 5 PPM ICOMs) :

1. Maintain the radio at 26.5°C (±5°C) and set the oscillator to desired frequency, or-
2. Maintain the radio at 26.5°C (±10°C) and offset the oscillator, as a function of actual temperature, by the amount shown in Figure 10.

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 10.

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 138 MHz, 1 PPM is 138 Hz. At 174 MHz, 1 PPM is 174 Hz).

With an operating frequency of 150 MHz, set the oscillator for a reading of 45 Hz (0.3 x 150 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.

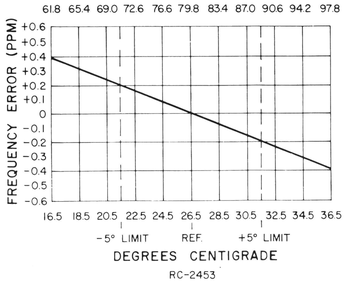
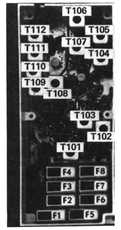
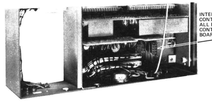
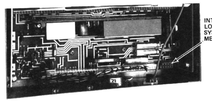


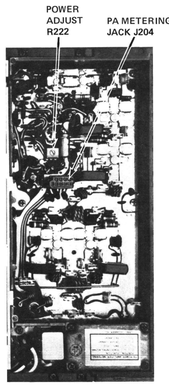

Figure 10 - Frequency Characteristics Vs. Temperature



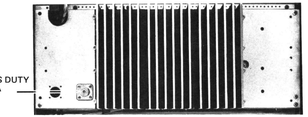

EXCITER ASSEMBLY

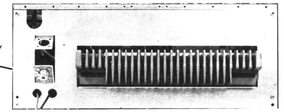



PA ASSEMBLY




## TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A11 or Test Kit 4EX8K12.
2. A 50-ohm wattmeter connected to antenna jack J201 or J243.
3. A frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Place ICOMs on Exciter Board (crystal frequency = operating frequency ÷ 12).
2. For a large change in frequency or a badly mis-aligned transmitter, pre-set the slugs in T104 and T105 to the bottom of the coil form. Pre-set all of the other slugs to the top of the coil form.
3. For multi-frequency transmitters with a frequency spacing less than .900 MHz for frequencies between 138-155 MHz or less than 1.00 MHz for frequencies between 150.8-174 MHz tune the transmitter on the lowest frequency.

   For multi-frequency transmitters with a frequency spacing up to 1.8 MHz for frequencies between 138-155 MHz or 2.0 MHz for frequencies between 150.8-174 MHz, tune the transmitter using a center frequency tune-up ICOM. These limits can be extended to 2.75 MHz and 3.0 MHz respectively with 1 dB degradation in power output.
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 SENSITIVITY button pressed may be converted to PA collector current by reading the current as 30 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. | A (MOD-1) | T101 | Maximum | Tune T101 for maximum meter reading on the lowest frequency. |
| 2. | B (MOD-2) | T102 & T103 | Maximum | Tune T102 and then T103 for the maximum meter reading on the lowest frequency. |
| 3. | C (MULT-1) | T104 | Minimum | Tune T104 for a dip in meter reading. |
| 4. | D (MULT-2) | T105, T104 & T106 | 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. |
| 5. | F (MULT-3) | T107, T106, T108 & T109 | See Procedure | Tune T107 for maximum meter reading and re-adjust T106 for maximum meter reading. Then tune T108 for a dip in meter reading and T109 for maximum meter reading. |
| 6. | G (AMPL-1) | T110, T108 & T109 | Maximum | Tune T110 for maximum meter reading, and then re-adjust T108 and T109 for maximum meter reading. |
| 7. | D (AMPL-1 DRIVE on PA) | T111 & T112 | Maximum | Move the black metering plug to the Power Amplifier metering jack and tune T111 and then T112 for maximum meter reading. Alternately tune T111 and T112 for maximum meter reading. |
| 8. | G (AMPL-1) | T108, T109 & T110 | Maximum | Move the black metering plug back to the exciter metering jack and re-adjust T108, T109 and T110 for maximum meter reading. |
| 9. | D (AMPL-1 DRIVE on PA) | T111 & T112 | Maximum | Move the black metering plug back to the Power Amplifier metering jack and re-adjust T111 and T112 for maximum meter reading. |
| 10. | | R219 | | Set Power Adjust potentiometer R219 on the PA board for the desired power output (from 10 to 35 Watts). |
| ADDITIONAL STEPS FOR TRANSMITTERS USING CENTER FREQUENCY TUNE-UP ICOM | | | | |
| 11. | D (MULT-2) | T105 | See Procedure | Move the black metering plug to the exciter metering jack and re-adjust T105 for equal drive on the highest and lowest frequency. |
| 12. | G (AMPL-1) | T110 & T108 | Maximum | Re-adjust T110 and then T108 for maximum meter reading on the lowest frequency. |

## ALIGNMENT PROCEDURE

138—174 MHz, 65-WATT STATION TRANSMITTER

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

### TEST EQUIPMENT REQUIRED

for test hookup as shown:

1. Wattmeter similar to:
   Bird # 43
   Jones # 711N
2. VTVM similar to:
   Triplett # 850
   Heath # IM-21
3. Audio Generator similar to:
   GE Model 4EX6A10
4. Deviation Meter (with a .75 kHz scale) similar to:
   Measurements # 720
5. Multimeter similar to:
   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 (R222).

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 R105 for zero tone deviation.
3. Set the Audio generator output to 30 Millivolts RMS and frequency to 1 kHz.
4. Key the transmitter and adjust Deviation Meter to carrier frequency.
5. Deviation reading should be ±4.5 kHz in radios without Channel Guard, and ±3.75 kHz in radios with Channel Guard.
6. If necessary, adjust MOD ADJUST control R104 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.

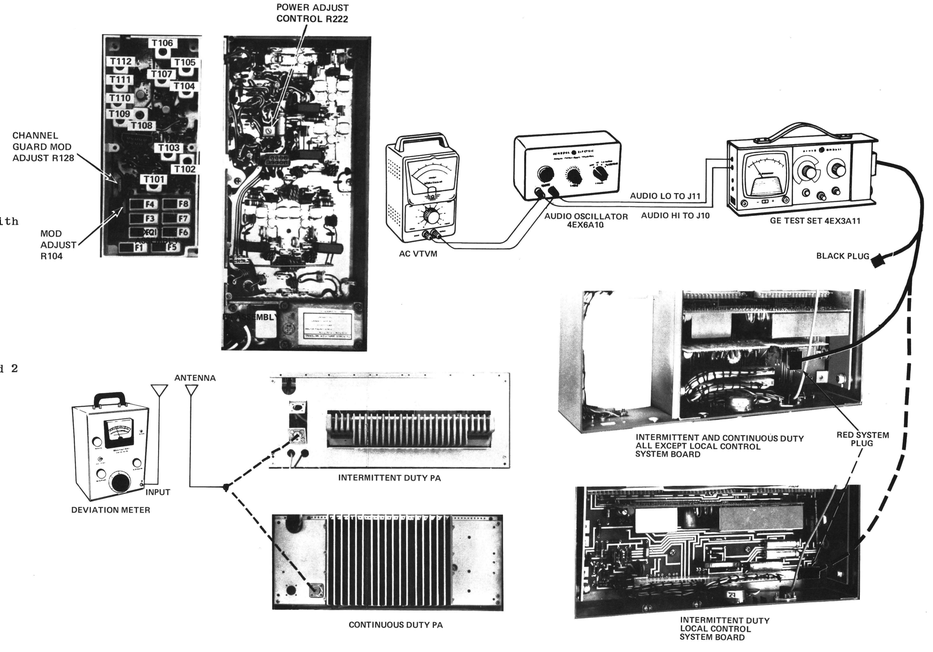
## TONE DEVIATION WITH CHANNEL GUARD

### 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 R105 for a reading of 0.75 kHz.

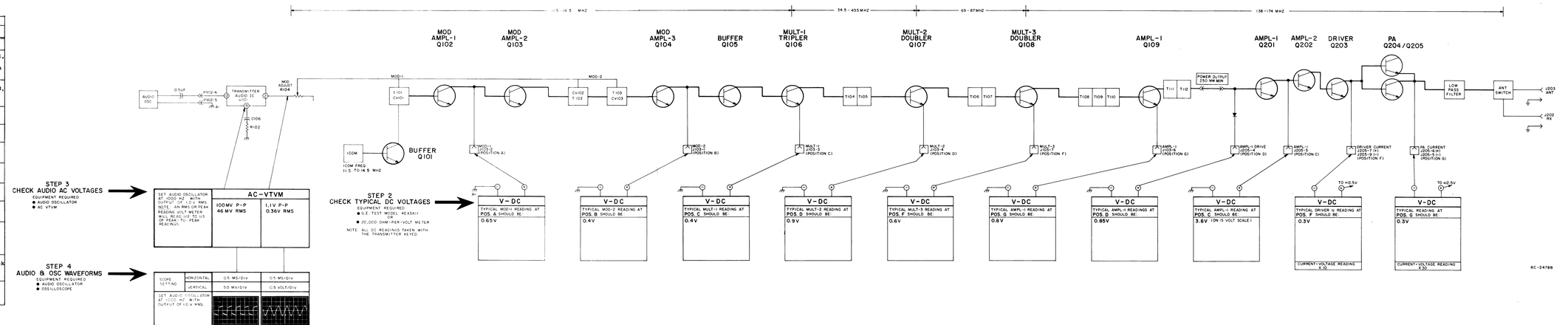
### NOTES:

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



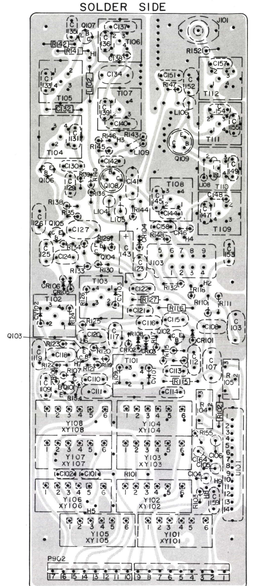
## STEP I - QUICK CHECKS

| METER POSITION OR TEST SET | PROBABLE DEFECTIVE STAGE: HIGH METER READING | LOW METER READING | ZERO METER READING |
|---|---|---|---|
| | EXCITER | | |
| A (MOD-1 | Q102, 10-Volt Regulator | Q102, CV101, T101, 10-Volt regulator | ICOM, Q101, Q102, CR101, 10-Volt regulator or Channel Selector switch ground. |
| B (MOD-2) | Q104, 10-Volt regulator | Q103, T102, CV102, T103, CV103, CR104, Q104 | Q103, T102, CV102, T103, CV103, CR104, Q104 |
| C (MULT-1 | Q105, Q106 T104 | Q105, Q106 | Q105, Q106, T104 |
| D (MULT-2) | Q107, T106 | T104, T105, Q107 | T104, T105, Q107, T106 |
| F (MULT-3) | Q108, T108 | T106, T107, Q108 | T106, T107, Q108, T108 |
| "G (AMPL-1) | Q109, C157, | T108, T109 T110, Q109 | T108, T109, T110, Q109, L108 |
| | POWER AMPLIFIER | | |
| "D" (AMPL-1 DRIVE) | | Low Output from Exciter | No output from Exciter, CR201 |
| "C" (AMPL-1 POWER CONTROL VOLTAGE) | Q215 | Q215 | No Exciter output, Q215, Q206, CR201 |
| "B" (DRIVER CURRENT) | Q203 | Q203, Low Output from Q201, Q202 | Q203, Q202, Q201. Check Pos. D & C |
| "D" (PA CURRENT) | Q204, Q205 | Q201, Q202, Q203, Q204, Q205 | Q205, Q204, Q203, Q202, Q201, Q215 |



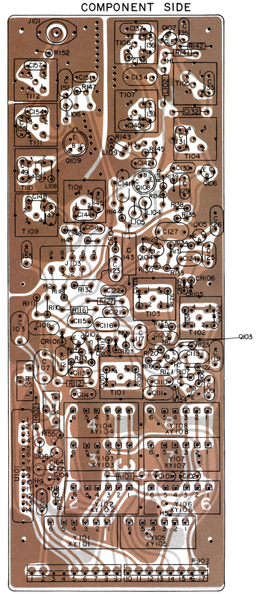
EXCITER BOARD

SOLDER SIDE



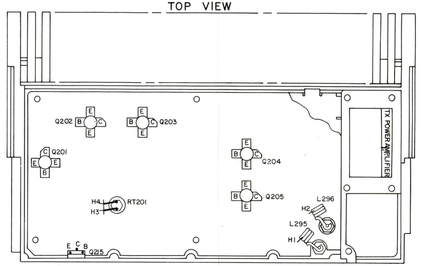
(19D416850, Sh. 2, Rev. 3)

COMPONENT SIDE

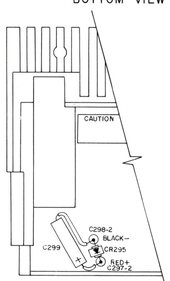


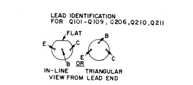
(19D416850, Sh. 2, Rev. 3)
(19D416850, Sh. 3, Rev. 3)

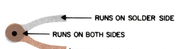
PA ASSEMBLY
TOP VIEW




BOTTOM VIEW

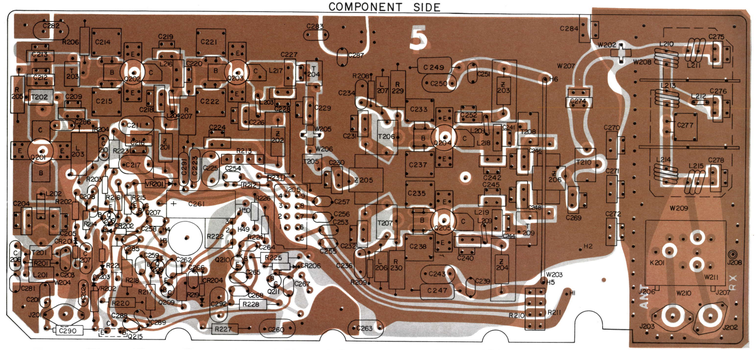


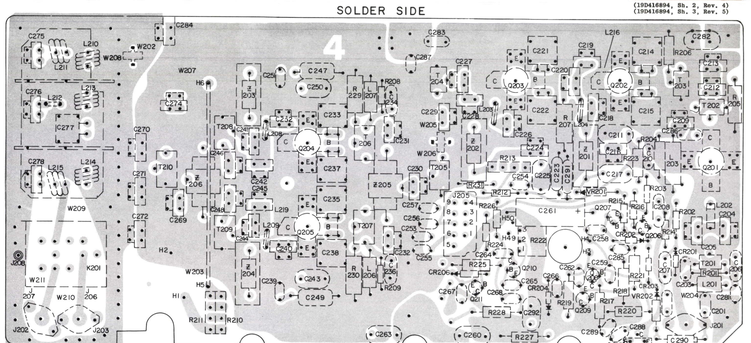

(19B622039, Rev. 8)

PA BOARD
COMPONENT SIDE




(19D416894, Sh. 2, Rev. 4)
(19D416894, Sh. 3, Rev. 5)

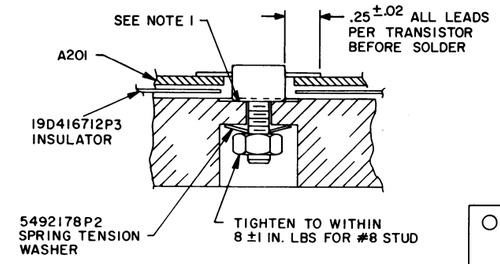
SOLDER SIDE



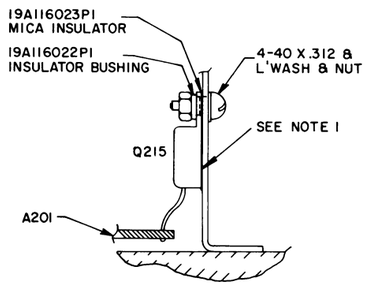

(19D416894, Sh. 2, Rev. 4)

## OUTLINE DIAGRAM

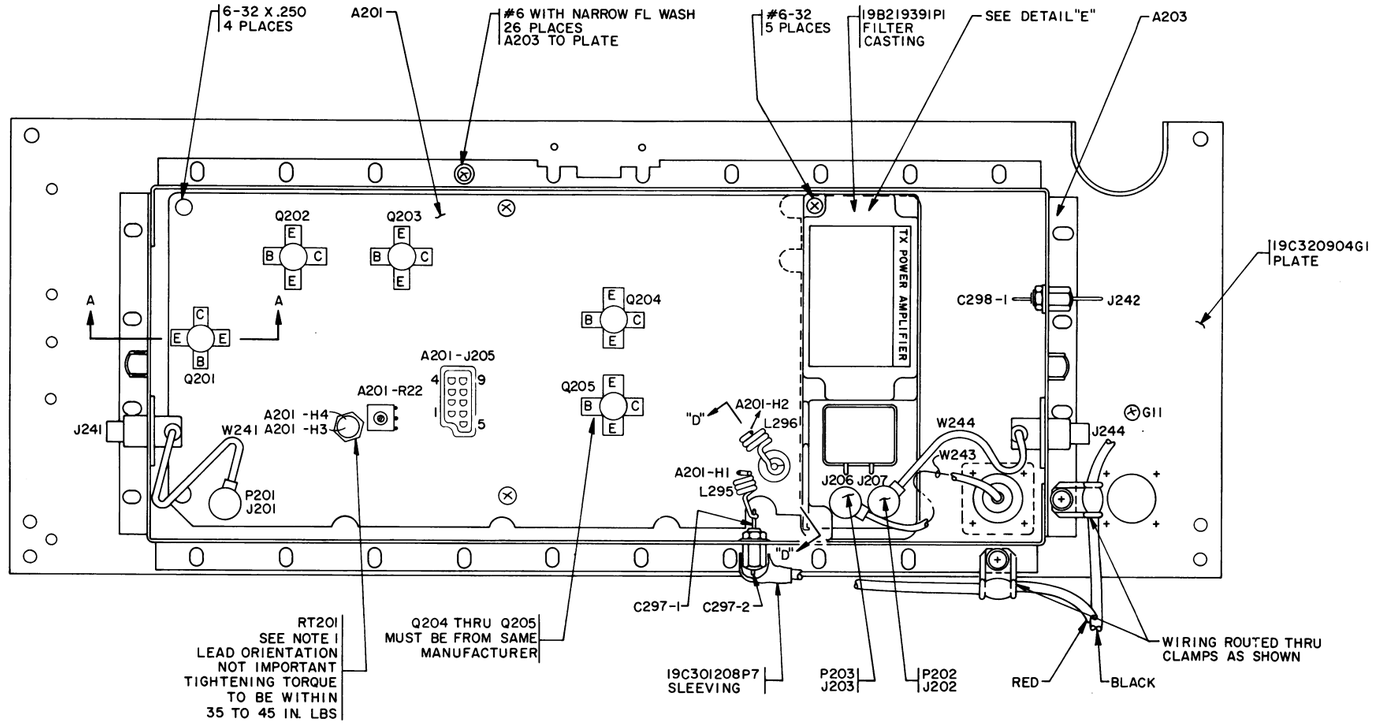
138—174 MHz, 65-WATT STATION TRANSMITTER
INTERMITTENT & CONTINUOUS DUTY EXCITER & PA BOARDS;
INTERMITTENT DUTY PA ASSEMBLY

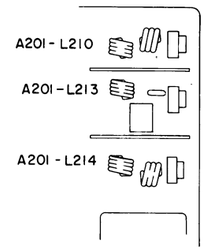



SECTION A-A
TYP MTG FOR Q201 THRU Q205

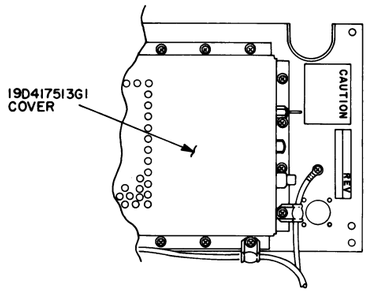



SECTION B-B

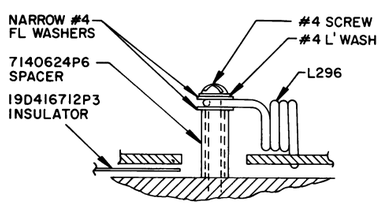


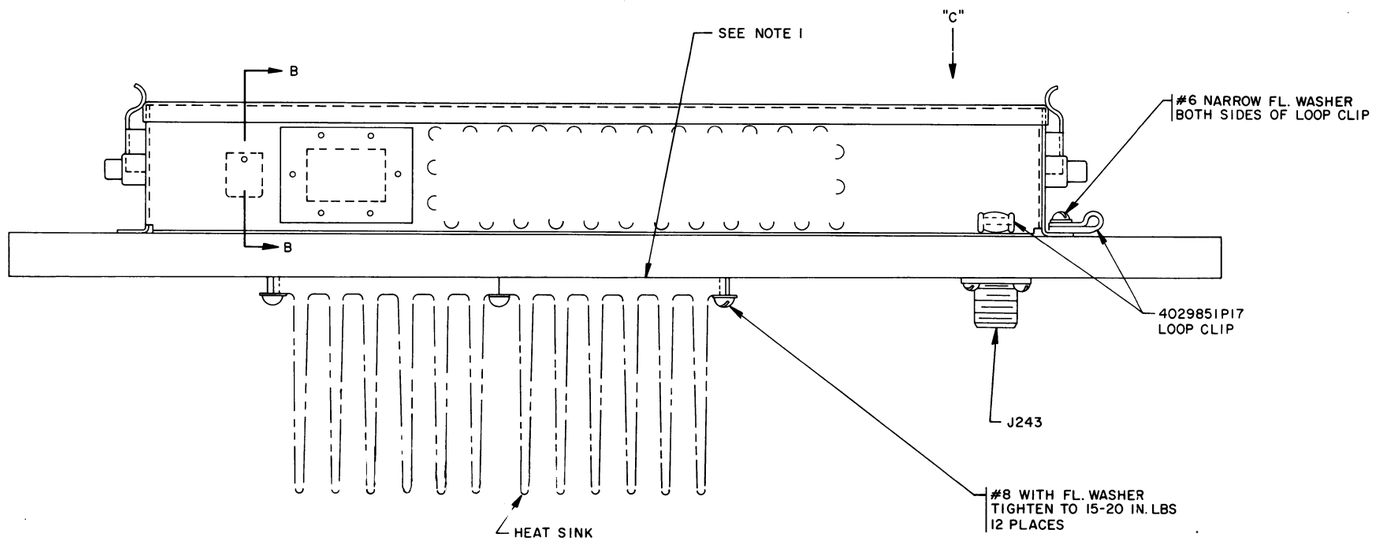

DETAIL "E"
(VIEW OF A201 WITH COVER REMOVED)




VIEW AT "C"




SECTION D-D



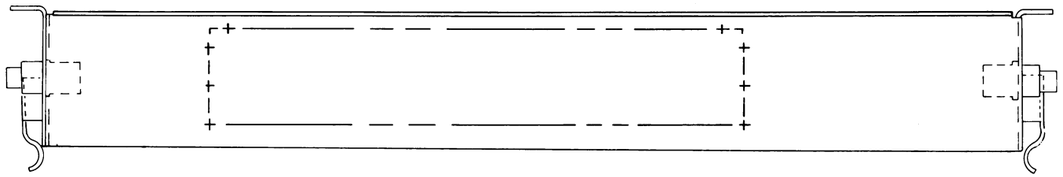

NOTES:

1. APPLY SILICONE GREASE TO BOTH SIDES OF MICA INSULATOR TO MOUNTING SURFACE OF Q201 THRU Q205 & RT201 AND UNPAINTED FLAT SURFACE OF HEAT SINKS.
   NO GREASE ALLOWED ON THE THREADED PORTION OF THE MTG STUD.

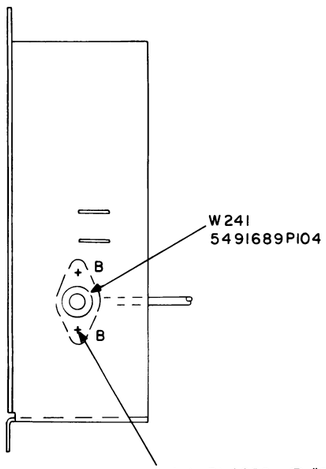
(19D423086, Rev. 0)

# OUTLINE DIAGRAM

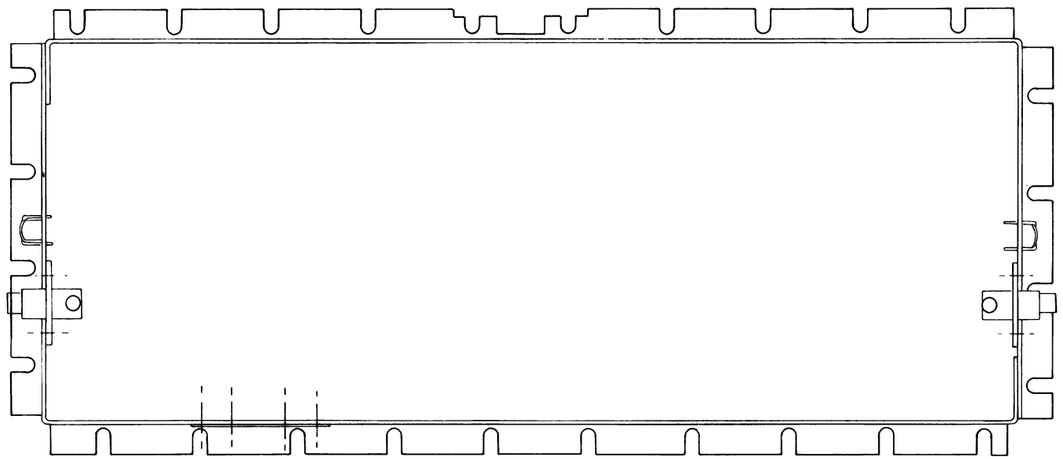
138—174 MHz, 65-WATT STATION TRANSMITTER
CONTINUOUS DUTY PA

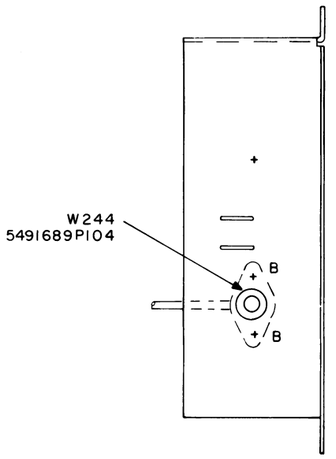


A203




6 ( 4 PLACES @ "B"
# 4 X 1/4 THD FROM
19B201074P204

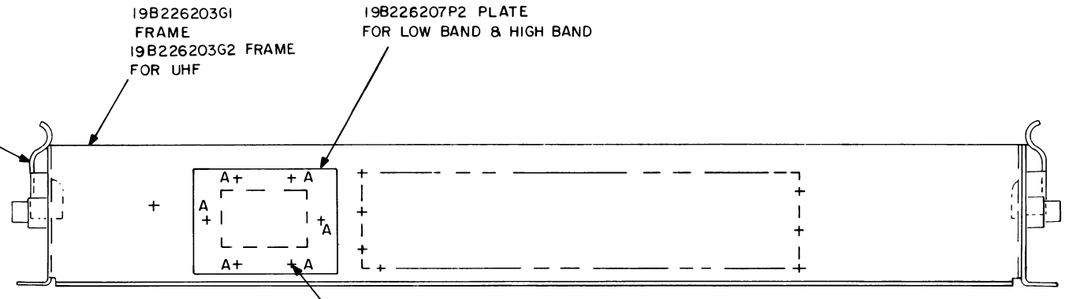





19B226203G1
FRAME
19B226203G2 FRAME
FOR UHF

19B226207P2 PLATE
FOR LOW BAND & HIGH BAND

19A116972P1
SPRING TENSION
CLIP ( EACH SIDE)




6-32 X .250 ( 6 PLACES @ A )

## OUTLINE DIAGRAM

FRAME ASSEMBLY FOR INTERMITTENT &
CONTINUOUS DUTY STATION TRANSMITTERS

(19D423098, Rev. 0)

3156

# 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 - Exciter Board 19D416859G1, G4

To improve operation. Changed C132, C137, C138, C141, C145, C148, R134, R139, R144, R145, Q108, Q109, and added L108.

REV. B - Exciter Board 19D416859G1, G3

To improve operation. Deleted C136L, Changed C136H, C127, C144L, C145, C146, CV103 and added C137L, C145L, C146L, L105, L106 and R152.

REV. C - Exciter Board 19D416859G1, G3

To improve drive to modulator stage. Changed Q101 and R106.

REV. D - To Exciter Board 19D416859G1, G3

To reduce transmitter noise. Changed C109.

REV. B - Exciter Board 19D416859G2, G4

To improve drive to modulator stage. Changed Q101 and R106.

REV. C - Exciter Board 19D416859G2, G4

To reduce transmitter noise. Changed C109.

REV. D - Exciter Board 19D416859G2,4

REV. E - Exciter Board 19D416859G13

To improve operation. Changed CV101, CV102, CV103, C159, and R105. Added R154.

REV. E - Exciter Board 19D416859G2,4

REV. F - Exciter Board 19D416859G1,3

To reduce attenuation noise and improve operation. Changed R107. Added C164 and R155.

REV. F - Exciter Board 19D416859G2, 4

REV. G - Exciter Board 19D416859G1, 3

To increase audio sensitivity. Changed R102.

REV. G - Exciter Board 19D416859G2, 4

To reduce conducted spurious in transmitter output. Delete C143H. Added C165, C166 and C167.

REV. H - Exciter Board 19D416859G1-4

To improve band-end tuning. Changed T201 from 19D416843G9 to 19D416843G10

## PARTS LIST

LBI-4554G

138-174 MHz EXCITER BOARD
19D416859G1-G4

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| | | 19D416859G1 2 FREQ 138-155 MHz (L)<br>19D416859G2 2 FREQ 150.8-174 MHz (H)<br>19D416859G3 8 FREQ 138-155 MHz (L)<br>19D416859G4 8 FREQ 150.8-174 MHz (H) |
| | | - - - - - - - - - - CAPACITORS - - - - - - - - - - |
| C101 and C102 | 19A116080P1 | Polyester: 0.01 µf ±20%, 50 VDCW. |
| C103 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C104 | 5496267P10 | Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D. |
| C105 | 5496267P14 | Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C106 | 5496267P9 | Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D. |
| C107 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C108 | 54844B1P107 | Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C109* | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW.<br>Used in G1, G3 of REV C and earlier;<br>in G2, G4 of REV B and earlier: |
| | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C110 | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C111 | 54944B1P112 | Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C112 | 54944B1P107 | Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C113 thru C117 | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C118 and C119 | 54944B1P112 | Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C120 | 7489162P43 | Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15. |
| C121 | 54944B1P112 | Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C122 | 54944B1P107 | Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C123 thru C125 | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C126 | 7489162P27 | Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C127 | 19A116080P107 | Polyester: 10 µf ±10%, 50 VDCW. |
| C129 and C130 | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C131L | 54962192P249 | Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C131H | 54962192P248 | Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C132* | 54916012P118 | Phenolic: 0.75 pf ±5%, 500 VDCW.<br>Earlier than REV A: |
| | 54916012P117 | Phenolic: 0.68 pf ±5%, 500 VDCW. |
| C133L | 54962192P249 | Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C133H | 54962192P248 | Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C134 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C135 | 19A116080P105 | Polyester: 0.047 µf ±10%, 50 VDCW. |
| C136* | 54962192P246 | Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV B. |

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

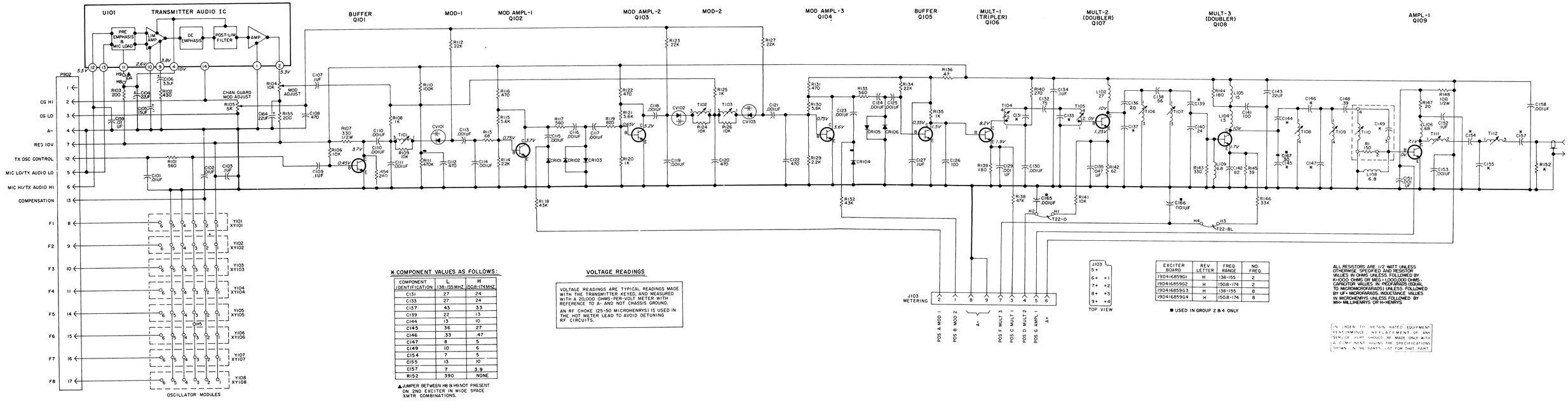
| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| C136L* | 54962192P348 | Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -150 PPM. Deleted by REV B. |
| C136H* | 54962192P246 | Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV B. |
| C137* | 54962192P251 | Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV B.<br>Earlier than REV A: |
| | 54962192P249 | Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C137L* | 54962192P254 | Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV B. |
| C137H* | 54962192P251 | Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV B. |
| C138* | 54916012P115 | Phenolic: 33 pf ±5%, 500 VDCW.<br>Earlier than REV B: |
| | 54916012P113 | Phenolic: 0.47 pf ±5%, 500 VDCW. |
| C139L | 54962192P247 | Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C139H | 54962192P243 | Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C140 | 54962192P348 | Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -150 PPM. |
| C141* | 54900088P127 | Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.<br>Earlier than REV A: |
| | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C142 | 7489162P25 | Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C143 | 5496267P10 | Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D. |
| C144L* | 54962192P243 | Ceramic disc: 13 pf ±1%, 500 VDCW, temp coef -80 PPM.<br>In REV A and earlier: |
| | 54962192P244 | Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C144H | 54962192P241 | Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C145* | 54962192P249 | Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV B.<br>Earlier than REV A: |
| | 54962192P246 | Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C145L* | 54962192P252 | Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV B. |
| C145H* | 54962192P249 | Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV B. Deleted by REV G. |
| C146* | 54916012P113 | Phenolic: 0.47 pf ±5%, 500 VDCW. Deleted by REV B.<br>Earlier than REV A: |
| | 54916012P117 | Phenolic: 0.68 pf ±5%, 500 VDCW. |
| C146L* | 54916012P109 | Phenolic: 0.33 pf ±5%, 500 VDCW. Added by REV B. |
| C146H* | 54916012P113 | Phenolic: 0.47 pf ±5%, 500 VDCW. Added by REV B. |
| C147L | 54962192P239 | Ceramic disc: 8.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C147H | 54962192P236 | Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C148* | 54916012P111 | Phenolic: 0.39 pf ±5%, 500 VDCW.<br>Earlier than REV A: |
| | 54916012P117 | Phenolic: 0.68 pf ±5%, 500 VDCW. |
| C149L | 54962192P241 | Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C149H | 54962192P237 | Ceramic disc: 6.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C151 | 19A116655P19 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C152 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C153 | 19A116655P19 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C154L | 54962192P238 | Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C154H | 54962192P236 | Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| C155H | 54962192P241 | Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C155L | 54962192P243 | Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM. |
| C157L | 54962192P238 | Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C157H* | 54916013P31 | Phenolic: 3.9 pf ±10%, 500 VDCW.<br>In REV F and earlier: |
| | 54962192P236 | Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. |
| C158 | 19A116655P19 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C159* | 19A116080P1 | Polyester: 0.01 µf ±20%, 50 VDCW.<br>In 19D416859G1, G3 of REV D and earlier;<br>in 19D416859G2, G4 of REV B and earlier: |
| | 19A116655P19 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C164* | 54962672P10 | Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.<br>Added to 19D416859G1, G3 by REV F.<br>Added to 19D416859G2, G4 by REV E. |
| C165* and C166* | 54944B1P111 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV G. |
| C167* | 54962192P250 | Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM. Added by REV G. |
| | | - - - - - - DIODES AND RECTIFIERS - - - - - - |
| CR101 thru CR106 | 19A115250P1 | Silicon. |
| CV101* and CV102* | 5495769P9 | Silicon, capacitive: 33 pf ±10%, at 4 VDC.<br>In 19D416859G1, G3 of REV D and earlier:<br>In 19D416859G2, G4 of REV C and earlier: |
| | 5495769P8 | Silicon, capacitive: 33 pf ±20%, at 4 VDC. |
| CV103* | 5495769P9 | Silicon, capacitive: 33 pf ±10%, at 4 VDC. Added to G2, G4 by REV D; to G1, G3 by REV E. |
| | 5495769P8 | Silicon, capacitive: 33 pf ±20%, at 4 VDC. Deleted by REV D. |
| CV103L* | 5495769P9 | Silicon, capacitive: 33 pf ±10%, at 4 VDC. Added by REV B. Deleted by REV D. |
| CV103H* | 5495769P8 | Silicon, capacitive: 33 pf ±20%, at 4 VDC. Added by REV B. Deleted by REV D. |
| | | - - - - - - - - JACKS AND RECEPTACLES - - - - - - - - |
| J101 | 19A130924G1 | Receptacle, coaxial: sim to Cinch 14B11613. |
| J103 | 19B219374G1 | Connector. Includes: |
| | 19A116651P1 | Contacts, (9). |
| | | - - - - - - - - - - INDUCTORS - - - - - - - - - - |
| L102 | 19B209420P130 | Coil, RF: 27.0 µh ±10%, 3.60 ohms DC res max; sim to Jeffers 4413S-5. |
| L104 | 7488079P7 | Choke, RF: 1.50 µh ±10%, 0.50 ohms DC res max; sim to Jeffers 4411-10K. |
| L105 | 7488079P18 | Choke, RF: 15.0 µh ±10%, 1.20 ohms DC res max; sim to Jeffers 4421-8K. |
| L106 | 7488079P5 | Choke, RF: 0.68 µh ±10%, 0.15 ohms DC res max; sim to Jeffers 4411-5K. |
| L108* | 19B209420P123 | Coil, RF: 6.80 µh ±10%, 1.80 ohms DC res max; sim to Jeffers 4446-2. Added to low split by REV B. |
| L109* | 19B209420P123 | Coil, RF: 6.80 µh ±10%, 1.80 ohms DC res max; sim to Jeffers 4446-2. Added by REV A. |
| | | - - - - - - - - - - PLUGS - - - - - - - - - - |
| P902 | | Includes: |
| | 19B219594P2 | Contact strip: 8 pins. |
| | 19B219594P3 | Contact strip: 9 pins. |
| | | - - - - - - - - - - TRANSISTORS - - - - - - - - - - |
| Q101* | 19A115330P1 | Silicon, NPN.<br>In G1, G3 of REV B and earlier;<br>in G2, G4 of REV A and earlier: |
| | 19A115910P1 | Silicon, NPN; sim to Type 2N3904. |

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| Q102 thru Q106 | 19A115330P1 | Silicon, NPN. |
| Q107 | 19A115328P1 | Silicon, NPN. |
| Q108* and Q109* | 19A115329P2 | Silicon, NPN.<br>Earlier than REV A: |
| | 19A115329P1 | Silicon, NPN. |
| | | - - - - - - - - - - RESISTORS - - - - - - - - - - |
| R101 | 3R152P561K | Composition: 560 ohms ±10%, 1/4 w. |
| R102* | 3R77P431J | Composition: 430 ohms ±5%, 1/2 w.<br>In 19D416859G1, G3 of REV F and earlier;<br>in 19D416859G2, G4 of REV E and earlier: |
| | 3R152P391K | Composition: 390 ohms ±10%, 1/4 w. |
| R103* | 3R152P201J | Composition: 200 ohms ±5%, 1/4 w.<br>In 19D416859G1, G3 of REV D and earlier;<br>in 19D416859G2, G4 of REV C and earlier: |
| | 3R152P102K | Composition: 1000 ohms ±10%, 1/4 w. |
| R104 | 19B209358P106 | Variable, carbon film: approx 75 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201. |
| R105* | 19B209358P105 | Variable, carbon film: approx 200 to 5000 ohms ±10%, 0.25 w; sim to CTS Type X-201.<br>In 19D416859G1, G3 of REV D and earlier;<br>in 19D416859G2, G4 of REV C and earlier: |
| | 19B209358P108 | Variable, carbon film: approx 100 to 50,000 ohms ±10%, 0.25 w; sim to CTS Type X-201. |
| R106* | 3R152P103K | Composition: 10,000 ohms ±10%, 1/4 w.<br>In G1, G3 of REV B and earlier;<br>in G2, G4 of REV A and earlier: |
| | 3R152P393K | Composition: 39,000 ohms ±10%, 1/4 w. |
| R107* | 3R77P331K | Composition: 330 ohms ±10%, 1/2 w.<br>In 19D416859G1, G3 of REV E and earlier;<br>in 19D416859G2, G4 of REV D and earlier: |
| | 3R152P331K | Composition: 330 ohms ±10%, 1/4 w. |
| R108 | 3R152P103K | Composition: 1000 ohms ±10%, 1/4 w. |
| R109 | 3R152P103K | Composition: 10,000 ohms ±10%, 1/4 w. |
| R110 | 3R152P104K | Composition: 0.10 megohm ±10%, 1/4 w. |
| R111 | 3R152P474K | Composition: 0.47 megohm ±10%, 1/4 w. |
| R113 | 3R152P223K | Composition: 22,000 ohms ±10%, 1/4 w. |
| R113 | 3R152P680K | Composition: 68 ohms ±10%, 1/4 w. |
| R114 | 3R152P222K | Composition: 2200 ohms ±10%, 1/4 w. |
| R115 | 3R152P562K | Composition: 5600 ohms ±10%, 1/4 w. |
| R116 | 3R152P471K | Composition: 470 ohms ±10%, 1/4 w. |
| R117 | 3R152P561K | Composition: 560 ohms ±10%, 1/4 w. |
| R118 | 3R152P433J | Composition: 43,000 ohms ±5%, 1/4 w. |
| R119 | 3R152P821K | Composition: 820 ohms ±10%, 1/4 w. |
| R120 | 3R152P103K | Composition: 1000 ohms ±10%, 1/4 w. |
| R121 | 3R152P562K | Composition: 5600 ohms ±10%, 1/4 w. |
| R122 | 3R152P471K | Composition: 470 ohms ±10%, 1/4 w. |
| R123 | 3R152P223K | Composition: 22,000 ohms ±10%, 1/4 w. |
| R124 | 3R152P103K | Composition: 10,000 ohms ±10%, 1/4 w. |
| R125 | 3R152P103K | Composition: 1000 ohms ±10%, 1/4 w. |
| R126 | 3R152P103K | Composition: 10,000 ohms ±10%, 1/4 w. |
| R127 | 3R152P223K | Composition: 22,000 ohms ±10%, 1/4 w. |
| R129 | 3R152P222K | Composition: 2200 ohms ±10%, 1/4 w. |
| R130 | 3R152P562K | Composition: 5600 ohms ±10%, 1/4 w. |
| R131 | 3R152P471K | Composition: 470 ohms ±10%, 1/4 w. |
| R132 | 3R152P433J | Composition: 43,000 ohms ±5%, 1/4 w. |

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| R133 | 3R152P561K | Composition: 560 ohms ±10%, 1/4 w. |
| R134* | 3R152P223K | Composition: 22,000 ohms ±10%, 1/4 w.<br>Earlier than REV A: |
| | 3R152P333K | Composition: 33,000 ohms ±10%, 1/4 w. |
| R135 | 3R152P102K | Composition: 1000 ohms ±10%, 1/4 w. |
| R136 | 3R152P470K | Composition: 47 ohms ±10%, 1/4 w. |
| R138 | 3R152P47RK | Composition: 47,000 ohms ±10%, 1/4 w. |
| R139* | 3R152P181K | Composition: 180 ohms ±10%, 1/4 w.<br>Earlier than REV A: |
| | 3R152P301J | Composition: 300 ohms ±5%, 1/4 w. |
| R140 | 3R152P271K | Composition: 270 ohms ±10%, 1/4 w. |
| R141 | 3R152P103K | Composition: 10,000 ohms ±10%, 1/4 w. |
| R142 | 3R152P62GJ | Composition: 62 ohms ±5%, 1/4 w. |
| R143 | 3R152P331K | Composition: 330 ohms ±10%, 1/4 w. |
| R144* | 3R152P181K | Composition: 180 ohms ±10%, 1/4 w.<br>Earlier than REV A: |
| | 3R152P331K | Composition: 330 ohms ±10%, 1/4 w. |
| R145* | 3R152P390K | Composition: 39 ohms ±10%, 1/4 w.<br>Earlier than REV A: |
| | 3R152P470J | Composition: 47 ohms ±5%, 1/4 w. |
| R146 | 3R152P333K | Composition: 33,000 ohms ±10%, 1/4 w. |
| R147 | 3R152P20GJ | Composition: 20 ohms ±5%, 1/4 w. |
| R148 | 3R77P100J | Composition: 10 ohms ±5%, 1/2 w. |
| R152* | 3R152P391K | Composition: 390 ohms ±10%, 1/4 w. Added by REV B. |
| R154* | 3R152P241J | Composition: 240 ohms ±5%, 1/4 w.<br>Added to 19D416859G1, G3 by REV E.<br>Added to 19D416859G2, G4 by REV D. |
| R155* | 3R152P20GJ | Composition: 200 ohms ±5%, 1/4 w.<br>Added to 19D416859G1, G3 by REV F.<br>Added to 19D416859G2, G4 by REV E. |
| | | - - - - - - - - - - TRANSFORMERS - - - - - - - - - - |
| T101* | 19D416843G10 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| | | In REV G and earlier: |
| | 19D416843G6 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T102 and T103 | 19D416843G1 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T104 | 19D416843G3 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T105 | 19D416843G2 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T106 and T107 | 19D416843G7 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T108 and T109 | 19D416843G5 | Coil. Includes: |
| | 5493185P13 | Tuning slug. |
| T110 | | COIL ASSEMBLY<br>19D416843G8 |
| | | - - - - - - - - - - RESISTORS - - - - - - - - - - |
| R1 | 3R152P151K | Composition: 150 ohms ±10%, 1/4 w. |
| | | - - - - - - - - - - MISCELLANEOUS - - - - - - - - - - |
| | 5493185P13 | Tuning slug. |
| T111 | 19D416843G4 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |
| T112 | 19D416843G6 | Coil. Includes: |
| | 5493185P12 | Tuning slug. |

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| | | - - - - - - - - INTEGRATED CIRCUITS - - - - - - - - |
| U101 | 19D416542G2 | Audio Transmitter. |
| | | - - - - - - - - - - SOCKETS - - - - - - - - - - |
| XY101 thru XY108 | 19A116779P1 | Socket. Part of Mechanical Construction. Includes:<br>Contact, electrical: sim to Molex 08-54-0404. Quantity (6) with each. |
| | | - - - - - - - - - - OSCILLATORS - - - - - - - - - - |
| Y101 thru Y108 | 19A129393G17 | NOTE: When reordering specify ICOM Frequency.<br>ICOM Freq = Operating Frequency / 12<br>Externally compensated, ±5 PPM, 138-174 MHz. |
| Y101 thru Y108 | 19A129393G14 | Internally compensated, ±2 PPM, 138-174 MHz. |
| | | MECHANICAL PARTS |
| | 19A129424G2 | Can. (Used with T101-T112). |
| | 403655P1 | Insulator, washer: nylon. (Used with Q108, Q109). |
| | 19B227611G1 | Exciter PA Interconnecting Cable. (Used in G2, G4 only). |




## SCHEMATIC DIAGRAM

138—174 MHz, STATION EXCITER BOARD
19D416859G1-G4

(19B621902, Rev. 16)

* COMPONENT VALUES AS FOLLOWS:

| COMPONENT IDENTIFICATION | L 138-155 MHZ | H 150.8-174MHZ |
|---|---|---|
| C131 | 27 | 24 |
| C133 | 27 | 24 |
| C137 | 43 | 33 |
| C139 | 22 | 13 |
| C144 | 13 | 10 |
| C145 | 36 | 27 |
| C146 | 33 | 47 |
| C147 | 8 | 5 |
| C149 | 10 | 6 |
| C154 | 7 | 5 |
| C155 | 13 | 10 |
| C157 | 7 | 3.9 |
| R152 | 390 | NONE |

▲JUMPER BETWEEN H8 & H9 NOT PRESENT ON 2ND EXCITER IN WIDE SPACE XMTR COMBINATIONS.

### VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED, AND MEASURED WITH A 20,000 OHMS-PER-VOLT METER WITH REFERENCE TO A- AND NOT CHASSIS GROUND.

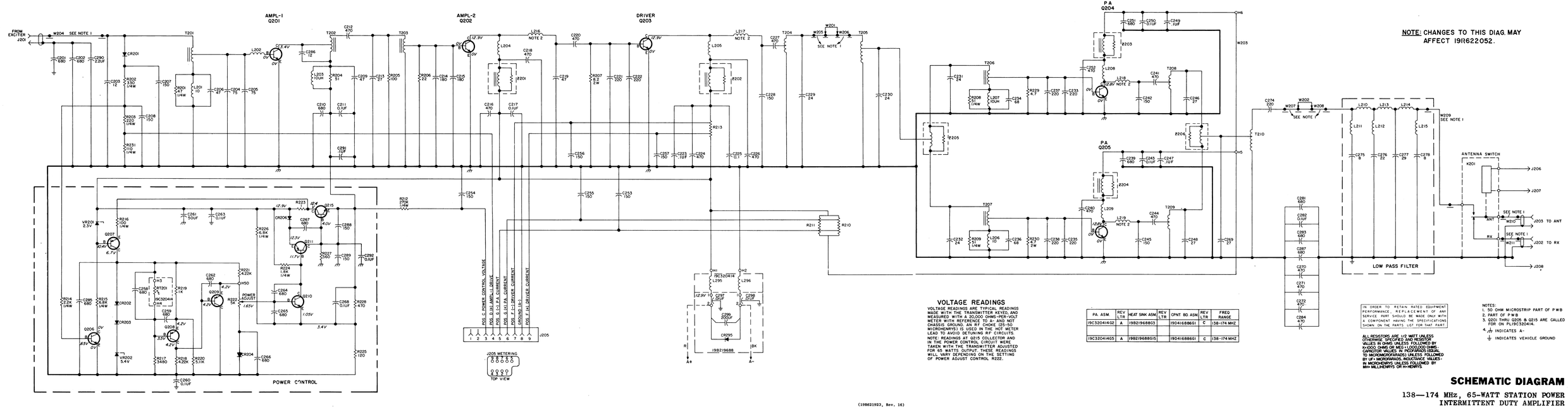
AN RF CHOKE (25-50 MICROHENRYS) IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

| EXCITER BOARD | REV LETTER | FREQ RANGE | NO. FREQ |
|---|---|---|---|
| 19D416859G1 | H | 138-155 | 2 |
| 19D416859G2 | H | 150.8-174 | 2 |
| 19D416859G3 | H | 138-155 | 8 |
| 19D416859G4 | H | 150.8-174 | 8 |

■ USED IN GROUP 2 & 4 ONLY

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1,000 OHMS, OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS EQUAL TO MICROMICROFARADS UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

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




| PA ASM. | REV LTR | HEAT SINK ASM | REV LTR | CPNT BD ASM | REV LTR | FREQ RANGE |
|---|---|---|---|---|---|---|
| 19C320414G2 | A | 19B219688G3 | | 19D416886G1 | C | 138-174 MHZ |
| | | | | | | |
| 19C320414G5 | A | 19B219688G15 | | 19D416886G1 | C | 138-174 MHZ |

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

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG =1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

NOTES:
1. 50 OHM MICROSTRIP PART OF P WB
2. PART OF P W B
3. Q201 THRU Q205 & Q215 ARE CALLED FOR ON PL19C320414.
4. ⏚ INDICATES A-
⏚ INDICATES VEHICLE GROUND

(19B621923, Rev. 16)

# SCHEMATIC DIAGRAM

138—174 MHz, 65-WATT STATION POWER INTERMITTENT DUTY AMPLIFIER
19C320414G2 & G5

## PARTS LIST

LBI-4555B

POWER AMPLIFIER
138-174 MHz, 65 WATT
19C320414G2, G5

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| | | - - - - - - - - - - INDUCTORS - - - - - - - - - - |
| L295 and L296 | 19A129562P1 | Coil. |
| | | - - - - - - - - - - TRANSISTORS - - - - - - - - - - |
| Q201* | 19A134060P1 | Silicon, NPN. |
| | | Earlier than Rev A: |
| | 19A129181P1 | Silicon, NPN. |
| Q203* | 19A134060P2 | Silicon, NPN. |
| | | Earlier than Rev A: |
| | 19A129181P3 | Silicon, NPN. |
| Q203A* | 19A134060P3 | Silicon, NPN. |
| | | Earlier than Rev A: |
| | 19A129181P4 | Silicon, NPN. |
| Q204* and Q205* | 19A134060P3 | Silicon, NPN. |
| | | Earlier than Rev A: |
| | 19A129181P4 | Silicon, NPN. |
| Q215 | 19A116742P1 | Silicon, NPN. |
| | | - - - - - - - - - - THERMISTORS - - - - - - - - |
| RT201 | 19A129379G1 | Thermistor. |
| | | POWER AMPLIFIER BOARD 19D416886G1 |
| | | - - - - - - - - - - CAPACITORS - - - - - - - - - - |
| C201 and C202 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C203 | 748916297 | Silver mica: 12 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C204 and C205 | 19A116679P75J | Mica: 75 pf ±5%, 250 VDCW. |
| C206 | 7489162P19 | Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C207 and C208 | 7489162P131 | Silver mica: 150 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C209 | 19A116679P47K | Mica: 47 pf ±10%, 250 VDCW. |
| C210 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C211 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C212 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C213 | 19A116679P27J | Mica: 27 pf ±5%, 250 VDCW. |
| C214 and C215 | 19A116795P180J | Mica: 180 pf ±5%, 250 VDCW. |
| C216 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C217 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C218 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C219 | 19A116679P47J | Mica: 47 pf ±5%, 250 VDCW. |
| C220 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C221 and C222 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C223* | 19A116966P107 | Metallized polyester: .1 µf ±10%, 50 VDCW. In REV A and earlier: |
| | 5496207P13 | Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C224 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C225 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C226 and C227 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C228 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C229 thru C232 | 19A116679P24J | Mica: 24 pf ±5%, 250 VDCW. |
| C233 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C234 | 7489162P23 | Silver mica: 68 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C235 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C236 | 7489162P23 | Silver mica: 68 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C237 and C238 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C239 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C240 and C241 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C242 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C243 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C244 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C245 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C246 | 19A116679P27J | Mica: 27 pf ±5%, 250 VDCW. |
| C247* | 19A116966P107 | Metallized polyester: .1 µf ±10%, 50 VDCW. In REV A and earlier: |
| | 5496267P13 | Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C248 | 19A116679P27J | Mica: 27 pf ±5%, 250 VDCW. |
| C249* | 19A116966P107 | Metallized polyester: .1 µf ±10%, 50 VDCW. In REV A and earlier: |
| | 5496267P13 | Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C250 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C251 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C252 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C253 thru C257 | 19A116655P8 | Ceramic disc: 150 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C258 and C259 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C260 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C261 | 19A116680P4 | Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TTL. |
| C262 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C263 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C264 thru C267 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C268 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C269 | 19A116679P27J | Mica: 27 pf ±5%, 250 VDCW. |
| C270 thru C272 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C274 | 19A116679P220K | Mica: 220 pf ±10%, 250 VDCW. |
| C275 | 19A116679P8D | Mica: 8 pf ±.5 pf, 250 VDCW. |
| C276 | 19A116679P22J | Mica: 22 pf ±5%, 250 VDCW. |
| C277 | 19A116795P20J | Mica: 20 pf ±5%, 250 VDCW. |
| C278 | 19A116679P8D | Mica: 8 pf ±.5 pf, 250 VDCW. |
| C281 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C282 | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. |
| C283 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C284 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C285 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C286 | 7489162P7 | Silver mica: 12 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C287 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C288 and C289 | 19A116655P8 | Ceramic disc: 150 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C290 | 5496267P13 | Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C291* | 19A116966P107 | Metallized polyester: .1 µf ±10%, 50 VDCW. In REV A: |
| | 5496267P13 | Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Added by REV A. |
| C292* | 19A116080P107 | Polyester: 0.1 µf ±10%, 50 VDCW. Added by REV A. |
| | | - - - - - - - - DIODES AND RECTIFIERS - - - - - - - |
| CR201* | 19A116052P2 | Silicon. In REV B and earlier: |
| | 19A115250P1 | Silicon. |
| CR202 thru CR204 | 19A115250P1 | Silicon. |
| CR206 | 19A115250P1 | Silicon. |
| | | - - - - - - - JACKS AND RECEPTACLES - - - - - - - |
| J201 thru J203 | 19A116832P1 | Receptacle, coaxial: sim to Cinch 14S11613. |
| J205 | 19B210374G1 | Connector, includes (9) 19A116651P1 contacts. |
| J206 and J207 | | (Part of K201). |
| J208 | 403551394 | Contact, electrical: sim to Bead Chain L63-3. |
| | | - - - - - - - - - - RELAYS - - - - - - - - - - |
| K201 | 19A116722P1 | Relay, hermetic sealed: 125 ohms ±20%, 1 form C contact, 9.6 to 15.8 VDC (over the temp range indicated). |
| | | - - - - - - - - - - INDUCTORS - - - - - - - - - - |
| L201 | 7488079P16 | Choke, RF: 10.0 µh ±10%, 0.60 ohms DC res max; sim to Jeffers 4431-7. |
| L202 | 19A129616P1 | Strap. |
| L203 | 7488079P43 | Choke, RF: 10.0 µh ±10%, 0.30 ohms DC res max; sim to Jeffers 4432-4E. |
| L204 and L205 | 19A129561P1 | Coil. |
| L206 and L207 | 7488079P16 | Choke, RF: 10.0 µh ±10%, 0.60 ohms DC res max; sim to Jeffers 4431-7E. |
| L208 and L209 | 19A129561P1 | Coil. |
| L210 | 19A129569P1 | Coil. |
| L211 | 19A129570P1 | Coil. |
| L212 | 19A129575P1 | Coil. |
| L213 and L214 | 19A129569P1 | Coil. |
| L215 | 19A129570P1 | Coil. |
| L216 thru L219 | | (Part of printed wiring board, 19D416894P1). |
| | | - - - - - - - - - - TRANSISTORS - - - - - - - - - - |
| Q206 | 19A115910P1 | Silicon, NPN; sim to Type 2N3906. |
| Q207 and Q209 | 19A115706P1 | Silicon, PNP; sim to Type 2N3702. |
| Q210 | 19A115910P1 | Silicon, NPN; sim to Type 2N3904. |
| Q211 | 19A115779P1 | Silicon, PNP; sim to Type 2N3251. |
| | | - - - - - - - - - - RESISTORS - - - - - - - - - - |
| R201 | 3R152P470J | Composition: 47 ohms ±5%, 1/4 w. |
| R202 | 3R152P331J | Composition: 330 ohms ±5%, 1/4 w. |
| R203 | 3R152P221J | Composition: 220 ohms ±5%, 1/4 w. |
| R204 | 3R77P510J | Composition: 51 ohms ±5%, 1/2 w. |
| R205 | 3R76P101J | Composition: 100 ohms ±5%, 1 w. |
| R206 | 3R77P220J | Composition: 22 ohms ±5%, 1/2 w. |
| R207 | 19B209022P137 | Wirewound: 8.2 ohms ±10%, 2 w; sim to IRC Type BWH. |
| R208 and R209 | 3R152P510J | Composition: 51 ohms ±5%, 1/4 w. |
| R210 and R211 | 19C330212P1 | Shunt. |
| R212 | 3R152P274J | Composition: 0.27 megohm ±5%, 1/4 w. |
| R213 | 19C330212P2 | Shunt. |
| R214 | 3R152P222J | Composition: 2200 ohms ±5%, 1/4 w. |
| R215 | 3R152P682J | Composition: 6800 ohms ±5%, 1/4 w. |
| R216 | 3R152P101J | Composition: 100 ohms ±5%, 1/4 w. |
| R217 | 19A116278P253 | Metal film: 3480 ohms ±2%, 1/2 w. |
| R218 | 19A116278P261 | Metal film: 4220 ohms ±2%, 1/2 w. |
| R219 | 19A116278P201 | Metal film: 1000 ohms ±2%, 1/2 w. |
| R220 | 19A116278P269 | Metal film: 5110 ohms ±2%, 1/2 w. |
| R221 | 19A116278P261 | Metal film: 4220 ohms ±2%, 1/2 w. |
| R222 | 19A116559P102 | Variable, cermet: 5000 ohms ±20%, .5 w; sim to CTS Series 360. |
| R223 | 7147161P19 | Composition: 1.0 ohms ±5%, 1/2 w. |
| R224 | 3R152P182J | Composition: 1800 ohms ±5%, 1/4 w. |
| R225 | 3R77P121J | Composition: 120 ohms ±5%, 1/2 w. |
| R226 | 3R152P682J | Composition: 6800 ohms ±5%, 1/4 w. |
| R227 | 3R77P561J | Composition: 560 ohms ±5%, 1/2 w. |
| R228 | 3R77P471J | Composition: 470 ohms ±5%, 1/2 w. |
| R229 and R230 | 19B209022P131 | Wirewound: 4.7 ohms ±10%, 2 w; sim to IRC Type BWH. |
| R231 | 3R152P111J | Composition: 110 ohms ±5%, 1/4 w. |
| | | - - - - - - - - - - TRANSFORMERS - - - - - - - - - - |
| T201 thru T203 | 19A129564G1 | Coil. |
| T204 | 19A129574G1 | Coil. |
| T205 | 19A129566G1 | Coil. |
| T206 and T207 | 19A129564G1 | Coil. |
| T208 and T209 | 19A129574G1 | Coil. |
| T210 | 19A129566G1 | Coil. |
| | | - - - - - - - - VOLTAGE REGULATORS - - - - - - - - |
| VR201 | 403688791 | Silicon, Zener. |
| VR202 | 403688795 | Silicon, Zener. |
| | | - - - - - - - - - - CABLES - - - - - - - - - - |
| W201 and W202 | 19A129571P1 | Cable, strap. |
| W203 | 19B219851P1 | Jumper. |
| W204 thru W211 | | (Part of printed wiring board, 19D416894P1). |
| | | - - - - - - - - - - FILTERS - - - - - - - - - - |
| Z201 thru Z204 | 19B219648G1 | Filter. |
| | | - - - - - - - - - - TRANSFORMERS - - - - - - - - |
| Z205 and Z206 | 19A129563G1 | Hybrid Transformer. |
| | | HEAT SINK CASTING 19B219686G2, STANDARD 19B219686G15 SYSTEM |
| | | - - - - - - - - - - CAPACITORS - - - - - - - - - - |
| C297 and C298 | 19A116708P1 | Ceramic, feed-thru: 0.01 µf +100% -0%, 500 VDCW; sim to Erie Style 327. |
| C299 | 19A115680P10 | Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TTZ. |
| | | - - - - - - - - DIODES AND RECTIFIERS - - - - - - |
| CR295 | 19A116783P1 | Silicon. |
| | | - - - - - - - - - - MISCELLANEOUS - - - - - - - - |
| | 4035306P59 | Washer, fiber. (Used with T204, T208, T209, Z205, Z206). |
| | 19A129361P2 | Shield. (Located on each side of C276 on component board). |
| | 19B219767P1 | Solder mask. (Used on component board). |
| | 19B219688G3 | Heat sink, casting. (Includes C297-C299, CR295). |
| | 19B219688G15 | Heat sink, casting. (Includes C297-C299, CR295). |
| | 19D416712P3 | Insulator. (Located under component board). |
| | 5492178P2 | Washer, spring tension. (Used with Q201-Q203). |
| | X207P150S | Nut, hex: No. 8-32, (Used with Q201-Q203). |
| | 19A116022P1 | Insulator, bushing. (Used with Q215). |
| | 19A116023P1 | Insulator, plate. (Used with Q215). |
| | 19A129661P1 | Insulator. (Located under component board at L295 and L296). |
| | N5602P015 | "O" ring. (Used with Q215). |
| | X402P7C6 | Flat washer: No. 6. (Used with Q215). |
| | 19A129888P1 | Insulator. (Used with Q215). |

## 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 Assembly 19C320414G2, G5
Component Board 19D416866G1
Incorporated into initial shipment.

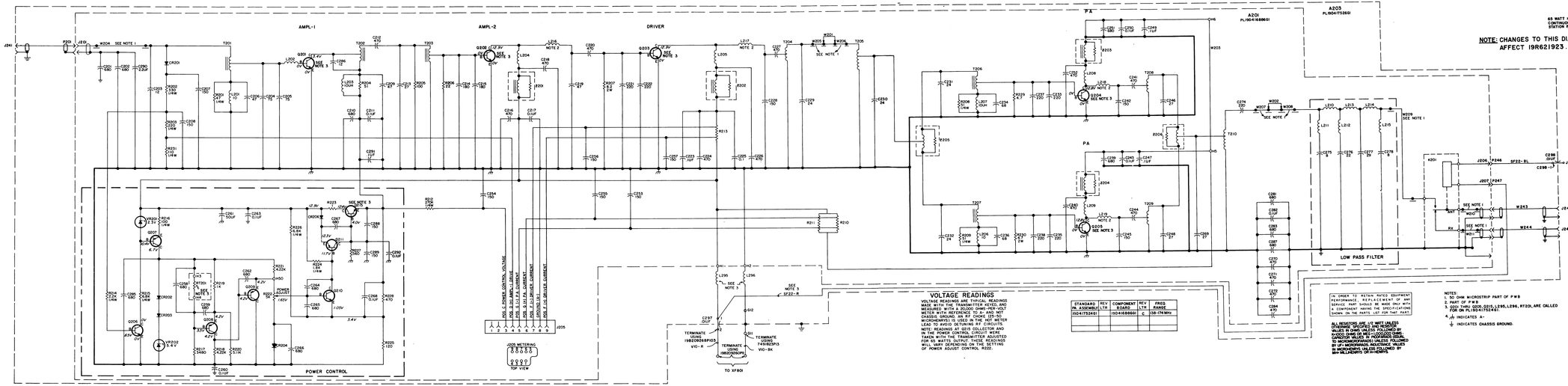
Power Amplifier Board 19D416886G1

REV. B - To incorporate new capacitors.
Changed C223, C247, C249 and C291.

REV. C - To improve transmitter operation in cold temperature and wide frequency spacing applications. Changed CR201.



*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES




(19R622052, Rev. 6)

## SCHEMATIC DIAGRAM

138—174 MHz, 65-WATT STATION POWER AMPLIFIER
19D417524G1 CONTINUOUS DUTY

## PARTS LIST

LBI-4751A

POWER AMPLIFIER
132-174 MHz, 600 WATT
CONTINUOUS DUTY
19D417526G1

| SYMBOL | GE PART NO. | DESCRIPTION |
|---|---|---|
| A301 | | POWER AMPLIFIER BOARD 19D416886G1 |
| | | ---------- CAPACITORS ---------- |
| C201 and C202 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C203 | 7489162P7 | Silver mica: 12 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C204 and C205 | 19A116679P75J | Mica: 75 pf ±5%, 250 VDCW. |
| C206 | 7489162P19 | Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C207 and C208 | 7489162P131 | Silver mica: 150 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C209 | 19A116679P47E | Mica: 47 pf ±10%, 250 VDCW. |
| C210 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C211 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C212 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C213 | 19A116679P37J | Mica: 37 pf ±5%, 250 VDCW. |
| C214 and C215 | 19A116795P180J | Mica: 180 pf ±5%, 250 VDCW. |
| C216 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C217 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C218 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C219 | 19A116679P47J | Mica: 47 pf ±5%, 250 VDCW. |
| C220 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C221 and C222 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C223* | 19A116866P107 | Metallized polyester: 0.1 pf ±10%, 50 VDCW. |
| | | In REV A and earlier: |
| | 5496267P13 | Tantalum: 2.2 pf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C224 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C225 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C226 and C227 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C228 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C229 thru C232 | 19A116679P24J | Mica: 24 pf ±5%, 250 VDCW. |
| C233 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C234 | 7489162P33 | Silver mica: 68 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C235 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C236 | 7489162P33 | Silver mica: 68 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C237 and C238 | 19A116795P220J | Mica: 220 pf ±5%, 250 VDCW. |
| C239 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C240 and C241 | 19A116679P47E | Mica: 470 pf ±10%, 250 VDCW. |
| C242 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C243 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C244 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C245 | 19A116679P150J | Mica: 150 pf ±5%, 250 VDCW. |
| C246 | 19A116679P37J | Mica: 37 pf ±5%, 250 VDCW. |
| C247* | 19A116966P107 | Metallized polyester: 0.1 pf ±10%, 50 VDCW. |
| | | In REV A and earlier: |
| | 5496267P13 | Tantalum: 2.2 pf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C248 | 19A116679P97J | Mica: 97 pf ±5%, 250 VDCW. |
| C249* | 19A116966P107 | Metallized polyester: 0.1 pf ±10%, 50 VDCW. |
| | | In REV A and earlier: |
| | 5496267P13 | Tantalum: 2.2 pf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C250 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C251 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C252 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C253 thru C257 | 19A116655P8 | Ceramic disc: 150 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C258 and C259 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C260 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C261 | 19A115480P4 | Electrolytic: 50 pf +150% -10%, 25 VDCW; sim to Mallory Type TTX. |
| C262 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C263 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C264 thru C267 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C268 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C269 | 19A116679P37J | Mica: 37 pf ±5%, 250 VDCW. |
| C270 thru C272 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C274 | 19A116679P220K | Mica: 220 pf ±10%, 250 VDCW. |
| C275 | 19A116679P8D | Mica: 8 pf ±.5 pf, 250 VDCW. |
| C276 | 19A116679P22J | Mica: 22 pf ±5%, 250 VDCW. |
| C277 | 19A116795P29J | Mica: 29 pf ±5%, 250 VDCW. |
| C278 | 19A116679P8D | Mica: 8 pf ±.5 pf, 250 VDCW. |
| C281 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C282 | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. |
| C283 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C284 | 19A116679P470K | Mica: 470 pf ±10%, 250 VDCW. |
| C285 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C286 | 7489162P7 | Silver mica: 12 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. |
| C287 | 19A116655P17 | Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. |
| C288 and C289 | 19A116655P8 | Ceramic disc: 150 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. |
| C290 | 5496267P13 | Tantalum: 2.2 pf ±20%, 20 VDCW; sim to Sprague Type 150D. |
| C291* | 19A116966P107 | Metallized polyester: 0.1 pf ±10%, 50 VDCW. |
| | | In REV A: |
| | 5496267P13 | Tantalum: 2.2 pf ±20%, 20 VDCW; sim to Sprague Type 150D. Added by REV A. |
| C292* | 19A116080P107 | Polyester: 0.1 pf ±10%, 50 VDCW. Added by REV A. |
| CR201* | 19A116052P2 | Silicon. |
| | | In REV B and earlier: |
| | 19A115250P1 | Silicon. |
| CR202 thru CR204 | 19A115250P1 | Silicon. |
| CR206 | 19A115250P1 | Silicon. |
| J201 thru J203 | 19A130924G1 | ---------- JACKS AND RECEPTACLES ---------- Connector, receptacle: coaxial, jack type; sim to Cinch 14B11613. |
| J205 | 19B210374G1 | Connector, includes (9) 19A116651P1 contacts, |
| J206 and J207 | | (Part of E301). |
| J208 | 4033513P4 | Contact, electrical: sim to Brad Chain L83-3. |
| K201 | 19A116722P1 | ---------- RELAYS ---------- Relay, hermetic sealed: 125 ohms ±20%, 1 form C contact, 9.6 to 13.8 VDC (over the temp range indicated). |
| L201 | 7488079P16 | ---------- INDUCTORS ---------- Choke, RF: 10.0 uh ±10%, 0.60 ohms DC res max; sim to Jeffers 4623-7K. |
| L202 | 19A129616P1 | Strap. |
| L203 | 7488079P43 | Choke, RF: 10.0 uh ±10%, 0.30 ohms DC res max; sim to Jeffers 4623-4K. |
| L204 and L205 | 19A129561P1 | Coil. |
| L206 and L207 | 7488079P16 | Choke, RF: 10.0 uh ±10%, 0.60 ohms DC res max; sim to Jeffers 4623-7K. |
| L208 and L209 | 19A129561P1 | Coil. |
| L210 | 19A129569P1 | Coil. |
| L211 | 19A129570P1 | Coil. |
| L212 | 19A129575P1 | Coil. |
| L213 thru L214 | 19A129569P1 | Coil. |
| L215 | 19A129570P1 | Coil. |
| L216 thru L219 | | (Part of printed wiring board, 19D416894P1). |
| Q206 | 19A115910P1 | ---------- TRANSISTORS ---------- Silicon, NPN; sim to Type 2N3904. |
| Q207 thru Q209 | 19A115708P1 | Silicon, PNP; sim to Type 2N3702. |
| Q210 | 19A115910P1 | Silicon, NPN; sim to Type 2N3904. |
| Q211 | 19A115779P1 | Silicon, PNP; sim to Type 2N3251. |
| R201 | 3R152P470J | ---------- RESISTORS ---------- Composition: 47 ohms ±5%, 1/4 w. |
| R202 | 3R152P331J | Composition: 330 ohms ±5%, 1/4 w. |
| R203 | 3R152P221J | Composition: 220 ohms ±5%, 1/4 w. |
| R204 | 3R77P510J | Composition: 51 ohms ±5%, 1/2 w. |
| R205 | 3R78P101J | Composition: 100 ohms ±5%, 1 w. |
| R206 | 3R77P220J | Composition: 22 ohms ±5%, 1/2 w. |
| R207 | 19B209032P137 | Wirewound: 8.2 ohms ±10%, 2 w; sim to IRC Type BWH. |
| R208 and R209 | 3R152P51G | Composition: 51 ohms ±5%, 1/4 w. |
| R210 and R211 | 19C320212P1 | Shunt resistor. |
| R212 | 3R152P274J | Composition: 0.27 megohm ±5%, 1/4 w. |
| R213 | 19C320212P2 | Shunt resistor. |
| R214 | 3R152P222J | Composition: 2200 ohms ±5%, 1/4 w. |
| R215 | 3R152P682J | Composition: 6800 ohms ±5%, 1/4 w. |
| R216 | 3R152P101J | Composition: 100 ohms ±5%, 1/4 w. |
| R217 | 19A116278P253 | Metal film: 3480 ohms ±2%, 1/2 w. |
| R218 | 19A116278P261 | Metal film: 4220 ohms ±2%, 1/2 w. |
| R219 | 19A116278P201 | Metal film: 1000 ohms ±2%, 1/2 w. |
| R220 | 19A116278P269 | Metal film: 5110 ohms ±2%, 1/2 w. |
| R221 | 19A116278P261 | Metal film: 4220 ohms ±2%, 1/2 w. |
| R222 | 19A116559P102 | Variable, cermet: 5000 ohms ±20%, .5 w; sim to CTS Series 360. |
| R223 | 7147161P19 | Composition: 1.0 ohms ±5%, 1/2 w. |
| R224 | 3R152P182J | Composition: 1800 ohms ±5%, 1/4 w. |
| R225 | 3R77P12lJ | Composition: 120 ohms ±5%, 1/2 w. |
| R226 | 3R152P682J | Composition: 6800 ohms ±5%, 1/4 w. |
| R227 | 3R77P561J | Composition: 560 ohms ±5%, 1/2 w. |
| R228 | 3R77P471J | Composition: 470 ohms ±5%, 1/2 w. |
| R229 thru R230 | 19B209022P131 | Wirewound: 4.7 ohms ±10%, 2 w; sim to IRC Type BWH. |
| R231 | 3R152P111J | Composition: 110 ohms ±5%, 1/4 w. |
| T201 thru T203 | 19A129564G1 | ---------- TRANSFORMERS ---------- Coil. |
| T204 | 19A129574G1 | Coil. |
| T205 | 19A129566G1 | Coil. |
| T206 and T207 | 19A129564G1 | Coil. |
| T208 and T209 | 19A129574G1 | Coil. |
| T210 | 19A129566G1 | Coil. |
| VR201 | 4036887P1 | --------- VOLTAGE REGULATORS --------- Silicon, Zener. |
| VR202 | 4036887P5 | Silicon, Zener. |
| W201 and W202 | 19A129571P1 | ---------- CABLES ---------- Cable, strap. |
| W203 | 19B219851P1 | Jumper. |
| W204 thru W211 | | (Part of printed wiring board, 19D416894P1). |
| Z201 thru Z204 | 19B219649G1 | ---------- FILTERS ---------- Filter. |
| Z205 and Z206 | 19A129563G1 | ---------- TRANSFORMERS ---------- Hybrid Transformer. |
| A303 | | FRAME ASSEMBLY 19D417526G1 |
| W241 | 5491689P104 | ---------- CABLES ---------- Cable, RF: approx 3-5/8 inches long, 350 VRMS, 500 VDC operating voltage. |
| W244 | 5491689P104 | Cable, RF: approx 3-5/8 inches long, 350 VRMS, 500 VDC operating voltage. |
| C297 and C298 | 19A116708P1 | ---------- CAPACITORS ---------- Ceramic, feed-thru: 0.01 pf +100% -0%, 500 VDCW; sim to Erie Style 327. |
| L295 | 19A129562P3 | ---------- INDUCTORS ---------- Coil. |
| L296 | 19A129562P1 | Coil. |
| P246 and P247 | 4036634P1 | ---------- PLUGS ---------- Contact, electrical; sim to AMP 42428-2. |
| Q201 | 19A134060P1 | ---------- TRANSISTORS ---------- Silicon, NPN. |
| Q202 | 19A134060P2 | Silicon, NPN. |
| Q203A | 19A134060P3 | Silicon, NPN. |
| Q204 and Q205 | 19A134060P3 | Silicon, NPN. |
| Q215 | 19A116742P1 | Silicon, NPN. |
| RT201 | 19A129379G1 | ---------- THERMISTORS ---------- Thermistor. |
| W243 | 19A129312G6 | ---------- CABLES ---------- Cable, antenna: approx 10 inches long. |
| | 4035306P59 | ---------- MISCELLANEOUS ---------- Washer, fiber. (Used with T204, T208, T209, Z205, Z206). |
| | 19A129361P2 | Shield. (Located on each side of C276 on component board). |
| | 19B226212G1 | Heat sink, casting. |
| | 19D416712P3 | Insulator. (Located under component board). |
| | 5492178P2 | Washer, spring tension. (Used with Q201-Q205). |
| | X207P15C6 | Nut, hex: No. 8-32. (Used with Q201-Q205). |
| | 19A116032P1 | Insulator, bushing. (Used with Q215). |
| | 19A116023P1 | Insulator, plate. (Used with Q215). |

## 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.

POWER AMPLIFIER BOARD 19D416886G1

REV. A - Incorporated into initial shipment.

REV. B - To incorporate new capacitors. Changed C202, C247, C249 and C291.

REV. C - To improve transmitter operation in cold temperature and wide frequency spacing applications. Changed CR201.



*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

# ORDERING SERVICE PARTS

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

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

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

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

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

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MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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