LBI30462D
(DF3165)

MAINTENANCE MANUAL

806—825 MHz, Executive II EXCITER BOARD 19D424068G1 & G2

AND OSCILLATOR BOARDS 19C327269G1 & 19C328081G1 & G2

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DESCRIPTION

The exciter is a crystal controlled, frequency modulated exciter designed for one through four frequency operation in the 806-825 MHz frequency band. Both integrated circuits and discreet components are used to provide a nominal 65 milliwatts of RF Power to the PA assembly or 25 milliwatts to the receiver. In the receive mode the exciter provides the injection frequency for the local oscillator input to the 1st IF mixer stage.

The exciter includes the audio processor, oscillator module with up to eight FM ICOMS and five frequency multipliers. The FM ICOMS plug into the oscillator module which in turn plugs into the exciter.

The operating frequency is selected by the position of the channel selector switch on the control unit and is determined by the FM ICOM associated with the selected channel. The crystal frequencies range from approximately 16.7 to 17.2 MHz and are multiplied 48 times to generate the RF carrier frequency. Oscillator stability is maintained within ±0.0002% by individual temperature compensating circuits in each ICOM.

Audio, power supply voltage, and control functions are connected from the SAS board to the exciter through P902.

Centralized metering jack J103 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The Test Set meters all multiplier stages and the relative receiver L.O. RF output power.

CIRCUIT ANALYSIS

References to symbol numbers mentioned in the text are found on the Schematic Diagram, Outline Diagram and Parts List.

OSCILLATOR MODULE

The oscillator module contains a 10 Volt regulator, space for up to eight FM ICOMS, and a tuned output circuit.

The 10 Volt regulator receives its input from the system filtered A+ line at P904-8 and provides regulated +10 V to the FM ICOMS, the audio processor, and FET Amplifier on the exciter board.

Turning on the radio applies the A+ input voltage through input filter L2601, C2601, C2602 and C2610 to Pin 1 of the regulator and to the emitter of pass transistor Q2601. Bias voltage for Q2601 is established internally by the 10 Volt regulator and varies with changes in output load requirements. Thus, the voltage drop across Q2601 varies inversely as the load requirements vary to maintain a closely regulated +10 Volt output. The 10 Volt output is filtered by C2607 and C2608 and supplied to external circuitry through J2602-2.

FM ICOMS (FREQUENCY MODULATED)

Each ICOM is enclosed in an RF shielded can with the type ICOM (2C-FM ICOM) printed on the top of the can. These FM ICOMS are not interchangeable with other type ICOMS. Each 2C-FM ICOM contains a crystal controlled Colpitts oscillator and a 2 PPM (±0.0002%) compensated IC.

Frequency selection is accomplished by switching the ICOM keying lead (terminal 8) to A- by means of the channel selector

switch on the control unit. In single-frequency radios, a jumper from H9 to H10 in the control unit permanently connects terminal 8 of the F1 FM ICOM to A-. The selected oscillator is on all the time.

The audio output from the audio processor is applied to the FM ICOMs through J2602-3 and modulates the crystal frequency. A tuned circuit consisting of T2601, C2613 and C2615 selects the 3rd harmonic of the crystal frequency (approximately 50.37 MHz to 51.56 MHz) and applies the harmonic frequency to FET amplifier Q103 on the exciter board through J2602-5.

The FM ICOMs receive audio from the audio processor circuit. Therefore, with audio modulation present, the output frequency of the FM ICOM varies at the audio rate.

CAUTION

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

The 2C-FM ICOMs are individually compensated and will maintain 2 PPM frequency stability from -30°C to +60°C (-22°F to 140°F).

Oscillator Circuit

Quartz crystals used in ICOMs exhibit the traditional "S" curve characteristic 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 to and opposite that of the crystal.

Figure 1 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) connected in parallel with the crystal. Refer to Figure 2 for a simplified diagram of the FM ICOM.

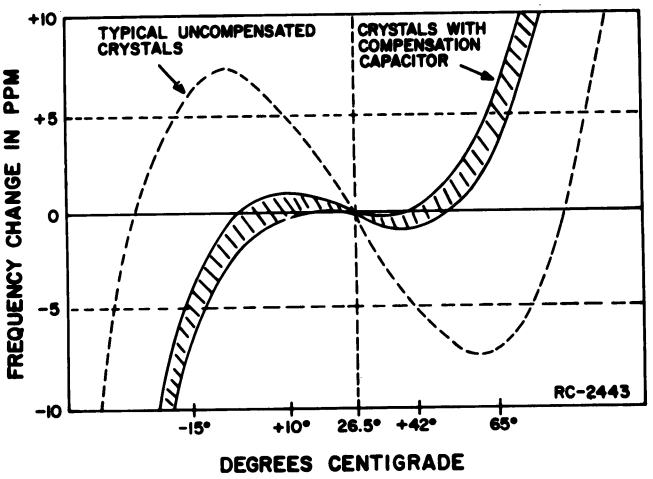


Figure 1 - Typical Crystal Characteristics

Modulation is accomplished with a hyperabrupt varicap connected in series with the crystal feedback capacitors. The varicap impedance is the dominant impedance in the loop. This allows large swings of load capacity with modulation, therefore, large frequency shifts are achieved for the modulated input. Biasing for the modulation varicap is provided by a voltage divider, R1 and R2, connected across the 10 volt regulator input on the oscillator board. A bias voltage of 6.2 volts is applied to pin 6 of all ICOMs.

Compensator Circuits

The 2C-FM ICOMs are temperature compensated at both ends of the temperature range to provide instant frequency compensation.

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.

An increase in compensation voltage decreases the capacitance of the varactor in the oscillator, thereby compensating for the cold crystal characteristics and maintains a constant output frequency from 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, compensating for the hot crystal characteristics and maintains a constant output frequency from the ICOM.

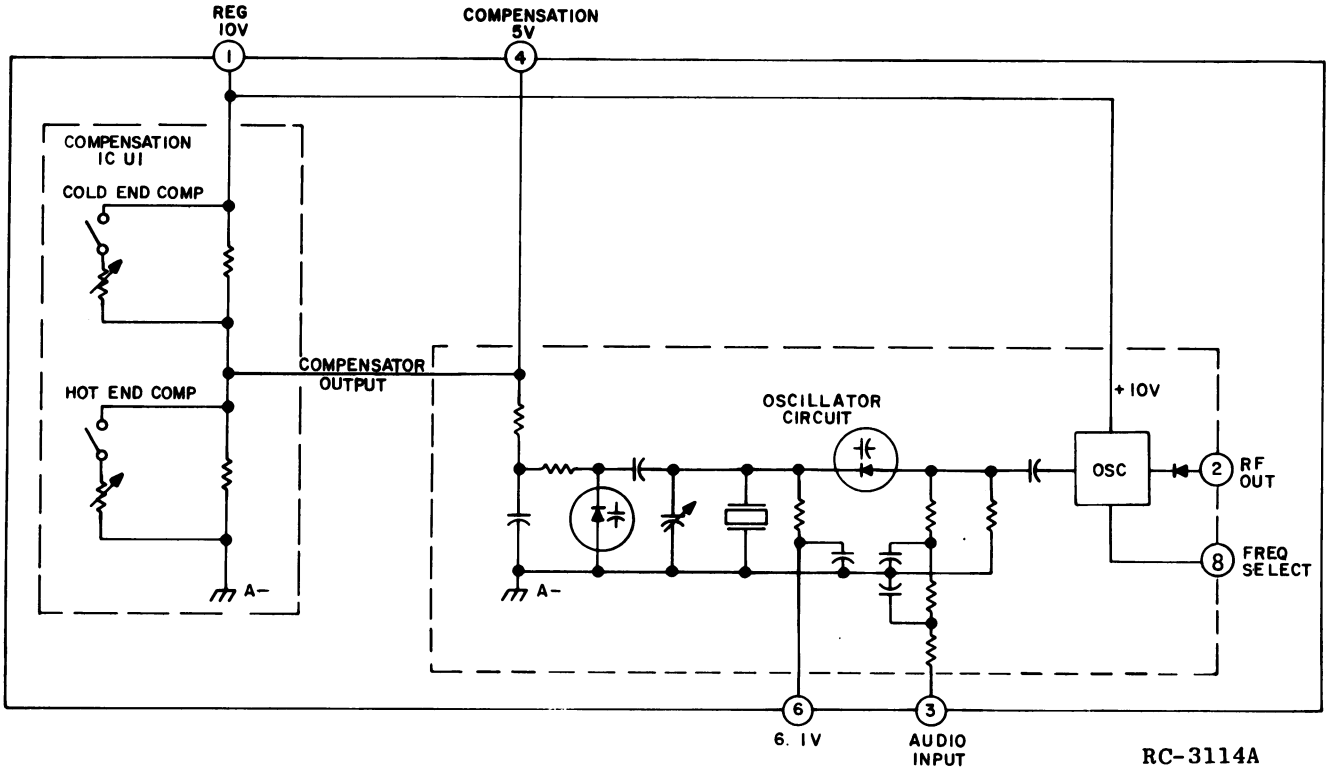


Figure 2 - Equivalent FM-ICOM Circuit

SERVICE NOTE

Proper ICOM operation is dependent on the closely-controlled input voltages for the 10-Volt regulator. Should all of the ICOMs shift off frequency, check the 10-Volt regulator module.

AUDIO PROCESSOR A101

The transmitter audio processor contains audio circuitry consisting of two operational amplifiers, AR101-A and -B, a pre-emphasis circuit with amplitude limiting and a post limiter filter. A total gain of approximately 24 dB is realized through the audio processor. Twenty dB is provided by AR101-B and 4 dB by AR101-A.

The 10-Volt regulator in the oscillator module powers the audio processor and applies regulated +10 V through XA101-6 to a voltage divider consisting of R108 and R110 in the audio processor. The +5 V output from the voltage divider establishes the operating reference point for both operational amplifiers. C107 provides decoupling to remove any noise transients from the 10-Volt regulator output.

Resistors R105, R106, and R107 and diodes CR101 and CR102 provide limiting for AR101-B. Diodes CR101 and CR102 are reverse biased by +5 VDC on AR101B-6 and voltage divider network R105, R106 and R107. The voltage divider network provides +7 VDC at the cathode of CR101 and +3 VDC at the anode of CR102. C102 and C103 permit a DC level change between AR101B-7 and the voltage divider network for diode biasing.

When the input signal to AR101B-1 is of a magnitude such that the amplifier output at AR101B-7 does not exceed 4 volts PP. The amplifier provides a nominal 20 dB gain. When the audio signal level at AR101B-7 exceeds 4 volts PP, diodes CR101 and CR102 conduct on the positive and negative half cycles providing 100% negative feedback to reduce the amplifier gain to 1. This limits the audio amplitude at AR101B-7 to 5 volts PP.

Resistors R102, R103 and R104 and C104 comprise the audio pre-emphasis network that enhances the signal to noise ratio. R104 and C104 control the pre-emphasis curve below limiting. R103 and C104 control the cut-off point for high frequency pre-emphasis. As high frequencies are attenuated, the gain of AR101 is increased.

Audio from the microphone is applied to the audio processor at XA101-1 and coupled to the input of operational amplifier AR101-B through R101 and C101.

The amplified output of AR101-B is coupled through XA101-4 audio MOD ADJ control R103, C106, R112 and R113 to a second operational amplifier AR101-A. Audio MOD ADJ control is set for a deviation of 4.5 kHz.

The Channel Guard tone input is applied to the audio processor through P902-9 and a filter consisting of R101 and C104 and then through CG MOD ADJ R102 to A101-5. The CG tone is then coupled through C105 and R111 to AR101A-2 where it is combined with the microphone audio. AR101-A provides a signal gain of approximately 4 dB.

A post limiter filter consisting of AR101A, R112-R114, C108, and C109 provide 12 dB per octave roll off. R109 and C111 provide an additional 6 dB per octave roll off for a total of 18 dB.

SERVICE NOTE

R112-R114 are 1% resistors. This tolerance must be maintained to assure proper operation of the post limiter filter. Use exact replacements.

The output of the post limiter filter is coupled through C110 and XA101-9 to temperature compensating network RT101 and R117 to the input of the oscillator module at P102-3 on the exciter board.

FREQUENCY MULTIPLIERS

The third harmonic of the crystal frequency is applied to gate 1 of input of FET amplifier Q103 from the oscillator module through P102-5. Source voltage for Q103 is supplied by the 10-volt regulator in the oscillator module through P102-2. Q103 is metered through R131 with test set on position B.

The output of Q103 is coupled through tuned circuits T101, T102 and C128 to the base of first doubler Q104. T101 and T102 are tuned to three times the crystal frequency. Collector voltage for Q104 is supplied through collector feed network R136, C132 and T103. Q104 is metered through R135 with test set on position C.

The output of first doubler Q104 is coupled through tuned circuits T103, T104 and C138 to the base of second doubler Q105. T103 and T104 are tuned to six times the crystal frequency. Collector voltage for Q105 is supplied through collector feed network R142 and L104. Q105 is metered through R141 with test set on position D.

The output of second doubler Q105 is coupled through tuned circuits T105, T106 and C149 to the base of third doubler Q106. T105 and T106 are tuned to 12 times the crystal frequency. Collector voltage for Q106 is supplied through collector feed network R147 and L105. Q106 is metered through R145 with test set on position F.

The output of third doubler Q106 is coupled to the base of fourth doubler Q107 through impedance matching circuitry and a double tuned circuit tuned to the 24th harmonic of the crystal frequency (403-412.5 MHz). These circuits also contribute to the rejection of spurious and harmonic output. These circuits consist of L105-L107, C156-C159 and C163.

C156 and L106 form a high pass filter that matches the collector impedance of Q106 to the impedance of the first tuned circuit consisting of L106 and C157. Coupling capacitor C158 couples the signal to the second tuned circuit consisting of L107 and C159. These double tuned circuits are tuned to one-half the output frequency within the range of 403-412.5 MHz. The signal from the second tuned circuit is applied to the base of fourth doubler Q107 through a second high pass filter consisting of L107 and C163. L107 and C163 match the impedance of the second tuned circuit to the input impedance of Q107. Bias for Q107 is supplied from the 10-Volt line through a biasing network consisting of R159, C171 and CR1. C171 provides decoupling. CR1 establishes the quiescent biasing level of Q107 at approximately 0.6VDC through R148. The emitter current of Q107 is metered through R149 with the test set in position G.

SERVICE NOTE

The values of the coupling capacitors and certain decoupling capacitors are critical to proper equipment operation. When replacing these components, be sure to use exact value replacement parts. The following capacitors are especially critical: C128, C138, C145, C146, C149, C153, C155, C156, C158, C163 and C165.

The output of the fourth doubler Q107 is coupled to the antenna through iris coupled, double tuned helical resonators, Z101 and Z102, relay K101, and output jack J101 when transmitting or to output jack J102 when receiving. Z101 and Z102 are tuned to the operating frequency. Collector voltage for Q107 is supplied through R152 and Z101 pins 1 & 3.

Relative power out of the exciter is metered through a metering network consisting of C174, CR102, R153, R154, C172 and C173 and is metered on position A of the test set. Relative power out (position A) is metered only in the receive mode.

TRANSMIT-RECEIVE CONTROL RELAY

The transmit-receive relay steers the exciter output to the PA in the transmit mode and to the receiver first mixer when in the receive mode. This circuit consists of relay control transistor Q101 and output control relay K101.

When operating in the receive mode, Q101 is turned off and relay K101 is de-energized. The exciter output is applied to the receiver first mixer as the local oscillator input through closed relay contacts 1 and 3, R155, R156 and J102. Closed relay contacts 5 and 7 shorts the audio input circuit of the oscillator module to ground (A-) in the receive mode. This prevents modulation of the FM ICOM and quietens the injection signal to the lst mixer.

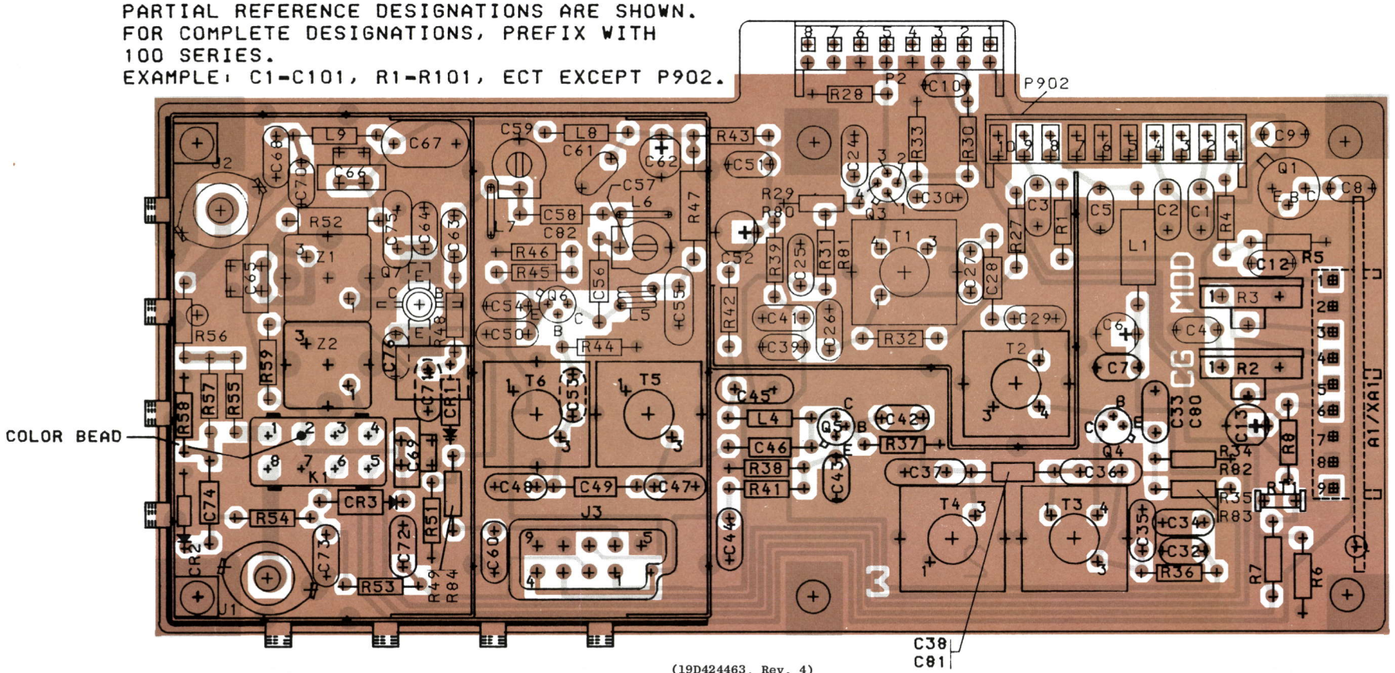
When operating in the transmit mode, +10 V is applied to the base of Q101 through P902-1 and R104, turning Q101 on. Q101 energizes K101 which removes the audio short from the audio input to the oscillator module, restoring modulation capability to the FM ICOM. Closed contacts 3 and 8 of K101 apply the exciter output directly to the PA assembly.

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

GENERAL ELECTRIC* U.S.A.

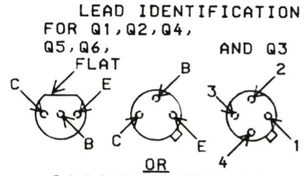
EXCITER

PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.
FOR COMPLETE DESIGNATIONS, PREFIX WITH
100 SERIES.
EXAMPLE: C1-C101, R1-R101, ECT EXCEPT P902.



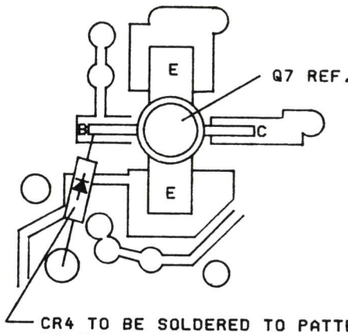
(19D424463, Rev. 4)
(19C327276, Sh. 1, Rev. 3)
(19C327276, Sh. 2, Rev. 2)

LEAD IDENTIFICATION
FOR Q1,Q2,Q4,
Q5,Q6,
AND Q3



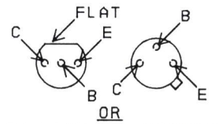
TOP VIEW

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



CR4 TO BE SOLDERED TO PATTERN AS SHOWN AND FLUSH TO BOARD ON SOLDER SIDE

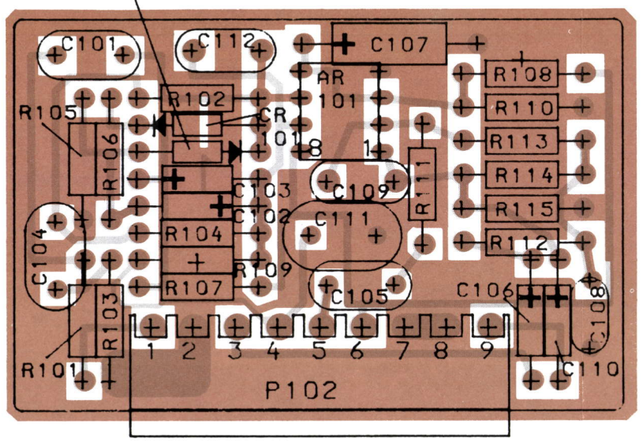
LEAD IDENTIFICATION
FOR Q1



TOP VIEW

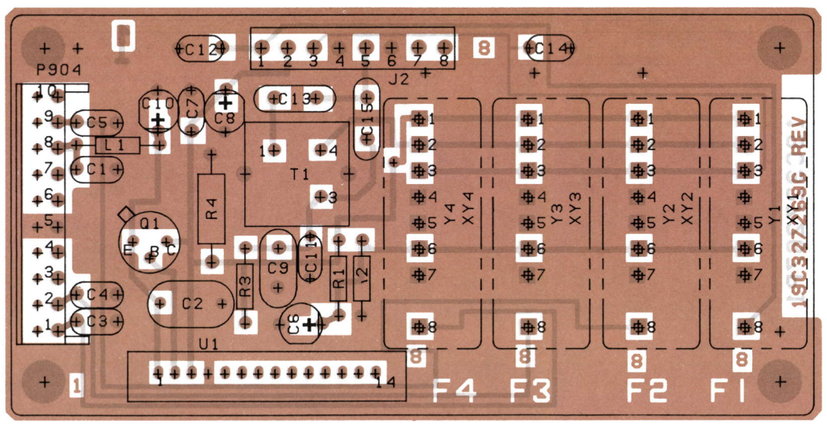
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACIOR FOR LEAD IDENTIFICATION.

AUDIO PROCESSOR



(19C327048, Rev. 2)
(19A130538, Sh. 1, Rev. 1)
(19A130538, Sh. 2, Rev. 1)

OSCILLATOR BOARD (I9C327269G1)



(19C327517, Rev. 1)
(19C327268, Sh. 1, Rev. 1)
(19C327268, Sh. 2, Rev. 1)

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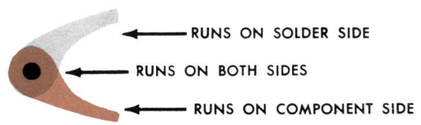
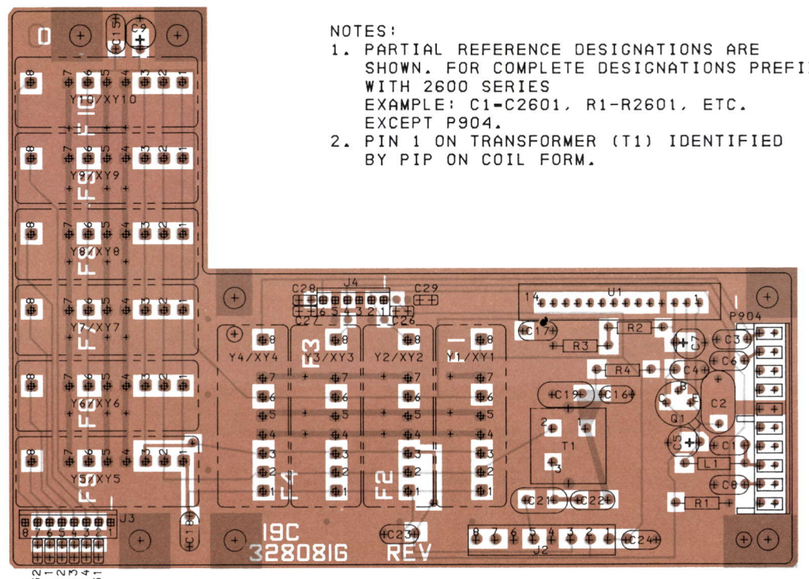


OSCILLATOR BOARD (I9C328081)

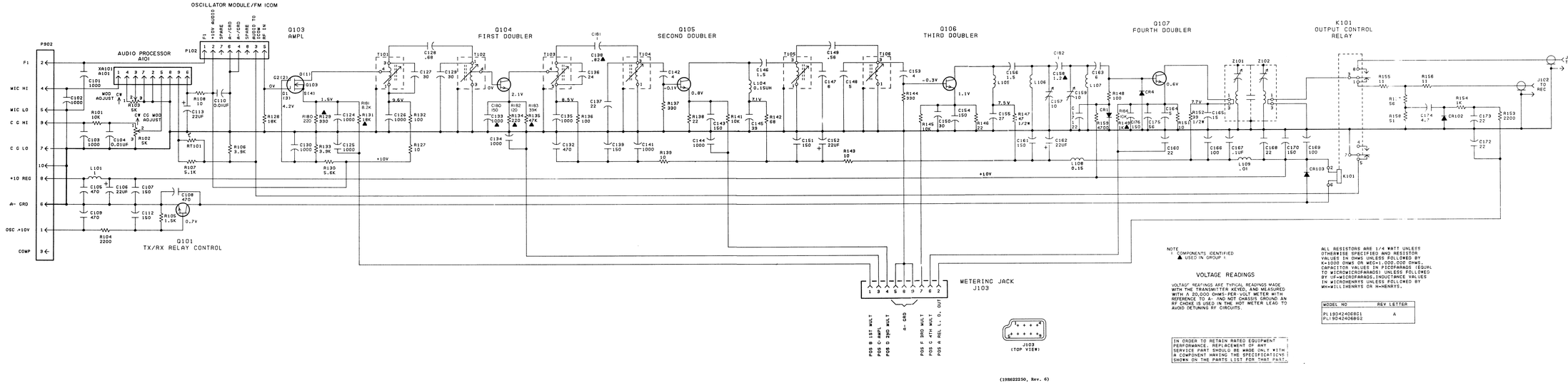
NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATIONS PREFIX WITH 2600 SERIES
   EXAMPLE: C1-C2601, R1-R2601, ETC. EXCEPT P904.
2. PIN 1 ON TRANSFORMER (T1) IDENTIFIED BY PIP ON COIL FORM.



(19C328083, Rev. 1)
(19A138476, Sh. 1, Rev. 1)
(19A138476, Sh. 2, Rev. 0)

OUTLINE DIAGRAMS

806—825 MHz, 35 WATT MOBILE
AND 25 WATT STATION



NOTE
1 COMPONENTS IDENTIFIED ▲ USED IN GROUP 1.

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 IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

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 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. ALL CAPACITORS ARE 50 VOLTS UNLESS EQUAL TO WITH MICROFARADS ( ) UNLESS FOLLOWED BY MFD=MICROFARADS, INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

MODEL NO.	REV LETTER
PLI9D4240681	A
PLI9D4240682	

PARTS LIST

LBI30463D

806-825 MHz EXCITER BOARD
19D426068G1, G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101 thru C103	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C104	19A116080P1	Polyester: 0.01 µF ±20%, 50 VDC.
C105	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C106	19A134020P6	Tantalum: 22 µF ±20%, 15 VDCW.
C107	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C108 and C109	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C110	19A116080P1	Polyester: 0.01 µF ±20%, 50 VDC.
C112	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C113	19A134020P6	Tantalum: 22 µF ±20%, 15 VDCW.
C124 thru C126	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C127	19A116656P2028	Ceramic disc: 30 pF ±5%, 500 VDCW, temp coef -80 PPM.
C128	54916019P117	Phenolic: 0.68 pF ±5%, 500 VDCW.
C129	19A116656P3028	Ceramic disc: 30 pF ±5%, 500 VDCW, temp coef +80 PPM.
C130	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C132	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C133 thru C135	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C136	19A116656P2428	Ceramic disc: 24 pF ±5%, 500 VDCW, temp coef -80 PPM.
C137	19A116656P2228	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C138	54916019P19	Phenolic: 0.82 pF ±5%, 500 VDCW.
C139	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C141	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C142	19A116656P4J0	Ceramic disc: 4 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C143	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C144	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C145	7489162917	Silver mica: 39 pF ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C146	54916019P123	Phenolic: 1.5 pF ±5%, 500 VDCW.
C147	19A116656P6J8	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp coef +80 PPM.
C148	19A116656P5J8	Ceramic disc: 5 pF ±0.5 pF, 500 VDCW, temp coef +80 PPM.
C149	54916019P115	Phenolic: 0.56 pF ±5%, 500 VDCW.
C150	19A116656P3028	Ceramic disc: 30 pF ±5%, 500 VDCW, temp coef +80 PPM.
C151	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.

SYMBOL	GE PART NO.	DESCRIPTION
C152	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C153	19A116656P4J0	Ceramic disc: 4 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C154	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C155	19A134666P3	Silver mica: 27 pF ±5%, 500 VDCW; sim to Electro Motive Type DM15AC5.
C156	54916019P123	Phenolic: 1.5 pF ±5%, 500 VDCW.
C157	19B209544P2	Variable: 2.04 to 9.9 pF, 250 V peak; sim to EF Johnson Type T 187-4106-005.
C158	54916019P123	Phenolic: 1.2 pF ±5%, 500 VDCW.
C159	19B209544P2	Variable: 2.04 to 9.9 pF, 250 V peak; sim to EF Johnson Type T 187-4106-005.
C160	19A116656P222J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C161	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C162	19A134020P6	Tantalum: 22 µF ±20%, 15 VDCW.
C163	19A116656P6J0	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C164	19A116656P5J0	Ceramic disc: 5 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C165	19A116079P15K	Metallized teflon: 15 pF ±10%, 250 VDC.
C166	19A116079P100K	Mica: 100 pF ±10%, 250 VDC.
C167	19A116080P7	Polyester: 0.1 µF ±20%, 50 VDC.
C168	19A116656P222J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C169	19A116079P100K	Mica: 100 pF ±10%, 250 VDC.
C170	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C171 thru C173	19A116656P222J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C174	54916019P132	Phenolic: 4.7 pF ±5%, 500 VDCW.
C175	7489162921	Silver mica: 56 pF ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C176	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C180	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C181 and C182	54916019P120	Phenolic: 1.0 pF ±5%, 500 VDC.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115775P1	Silicon.
CR2	19A116053P2	Silicon, hot carrier: Fwd drop .410 v. max.
CR3	4037832P1	Silicon, 1000 mA, 400 PIV.
CR4*	19A116053P2	Silicon, hot carrier: Fwd drop .410 v. max. Added by REV A.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J101 and J102	19A130924G1	Connector, receptacle: coaxial, jack type; sim to Cinch 16M1181.
J103	19B219374G1	Connector: 9 contacts.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K101	19B209558P1	Hermetic sealed: 150 to 1k ohms coil res, 2 form C contacts, 8.0 to 10.3 VDC; sim to GE 3SAY176042.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L101	7488079P6	Choke, RF: 1.00 µh ±10%, 0.30 ohms DC res max; sim to Jeffers 4411-4K.
L104	19B209420P103	Coil, RF: 0.15 µh ±10%, 0.10 ohms DC res max; sim to Jeffers 4416-3K.
L105	19A130255P3	Coil.
L106	19A130443P8	Coil.
L107	19A130443P7	Coil.

SYMBOL	GE PART NO.	DESCRIPTION
L108	19B209420P103	Coil, RF: 0.15 µh ±10%, 0.10 ohms DC res max; sim to Jeffers 4416-3K.
L109	19B209420P101	Coil, RF: 0.10 µh ±10%, 0.08 ohms DC res max; sim to Jeffers 4416-1K.
		- - - - - - - - PLUGS - - - - - - - -
P102	19A116659P3	Connector, printed wiring: 8 contacts; sim to Molex 09-52-3082.
P902	19A116659P2	Connector, printed wiring: 10 contacts; sim to Molex 09-52-3102.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q101	19A115330P2	Silicon, NPN; sim to Type 2N3053.
Q103	19A116818P1	N Channel, field effect.
Q104	19A115328P1	Silicon, NPN.
Q105 and Q106	19A116201P3	Silicon, NPN.
Q107	19A134430P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101	3815329103J	Composition: 10K ohms ±5%, 1/4 w.
R102 and R103	19B209358P105	Variable, carbon film: approx 200 to 5000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
R104	3815229222J	Composition: 2.2K ohms ±5%, 1/4 w.
R105	3815329152J	Composition: 1.5K ohms ±5%, 1/4 w.
R106	3815329392J	Composition: 3.9K ohms ±5%, 1/4 w.
R107	3815329512J	Composition: 5.1K ohms ±5%, 1/4 w.
R108	3815329103J	Composition: 10 ohms ±5%, 1/4 w.
R127	3815329100J	Composition: 10 ohms ±5%, 1/4 w.
R128	3815329183J	Composition: 18K ohms ±5%, 1/4 w.
R129	3815329331J	Composition: 330 ohms ±5%, 1/4 w.
R130	3815329562J	Composition: 5.6K ohms ±5%, 1/4 w.
R131	3815329183J	Composition: 18K ohms ±5%, 1/4 w.
R132	3815329101J	Composition: 100 ohms ±5%, 1/4 w.
R133	3815329392J	Composition: 3.9K ohms ±5%, 1/4 w.
R134	3815329221J	Composition: 220 ohms ±5%, 1/4 w.
R135	3815329473J	Composition: 47K ohms ±5%, 1/4 w.
R136	3815329101J	Composition: 100 ohms ±5%, 1/4 w.
R137	3815329331J	Composition: 330 ohms ±5%, 1/4 w.
R138	3815329220J	Composition: 22 ohms ±5%, 1/4 w.
R139	3815329100J	Composition: 10 ohms ±5%, 1/4 w.
R141	3815329103J	Composition: 10K ohms ±5%, 1/4 w.
R142	3815329680J	Composition: 68 ohms ±5%, 1/4 w.
R143	3815329100J	Composition: 10 ohms ±5%, 1/4 w.
R144	3815329331J	Composition: 330 ohms ±5%, 1/4 w.
R145	3815329103J	Composition: 10K ohms ±5%, 1/4 w.
R146	19A116310P39	Composition: 22 ohms ±5%, 0.25 w; sim to Allen-Bradley CB.
R147	3R77P470J	Composition: 47 ohms ±5%, 1/2 w.
R148	3815329101J	Composition: 100 ohms ±5%, 1/4 w.
R149	3815329102J	Composition: 1K ohms ±5%, 1/4 w.
R151	19A116310P35	Composition: 10 ohms ±5%, 0.25 w; sim to Allen-Bradley CB.
R152	3R77P390J	Composition: 39 ohms ±5%, 1/2 w.
R153	3815329222J	Composition: 2.2K ohms ±5%, 1/4 w.
R154	3815329102J	Composition: 1K ohms ±5%, 1/4 w.
R155 and R156	3815329110J	Composition: 11 ohms ±5%, 1/4 w.
R157	3815329560J	Composition: 56 ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R158	3815329510J	Composition: 51 ohms ±5%, 1/4 w.
R159	3815329472J	Composition: 4.7K ohms ±5%, 1/4 w.
R160	3815329220J	Composition: 22 ohms ±5%, 1/4 w.
R161	3815329823J	Composition: 8.2K ohms ±5%, 1/4 w.
R162	3815329121J	Composition: 120 ohms ±5%, 1/4 w.
R163	3815329393J	Composition: 39K ohms ±5%, 1/4 w.
R164	3815329103J	Composition: 10K ohms ±5%, 1/4 w.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT101	5490828P55	Thermistor: 2.2K ohms ±5%, color code yellow; sim to Carborundum Type U325-29-144.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T101 and T102	19C307170P309	Coil, RF: wire size No. 20 AWG; sim to Paul Smith 100375-08-3.
T103	19C307169P202	Coil, RF: wire size No. 20 AWG; sim to Paul Smith 095374-08-6.
T104	19C307169P203	Coil, RF: wire size No. 20 AWG; sim to Paul Smith 095374-08-5.
T105 and T106	19C307169P204	Coil, RF: wire size No. 20 AWG; sim to Paul Smith 100374-08-8.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XA101	19A116777P1	Contact, electrical: sim to Molex 08-50-0404. (Quantity 9).
		- - - - - - - - - - NETWORKS - - - - - - - - - -
Z101 and Z102	19D424303G2	Helical Resonator.
		ASSOCIATED ASSEMBLIES
A101		AUDIO PROCESSOR 19C315343G1
AR101*	19A116754P2	Integrated circuit, linear: sim to MC1458P1 High Slew Rate OP AMP.
	19A116754P1	In REV A and earlier: Integrated circuit, linear: Dual In-Line 8-Pin Minidip Package; sim to TI, Sn72558 NSC.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101	19A116080P204	Polyester: 0.033 µF ±5%, 50 VDCW.
C102 and C103	5491674P36	Tantalum: 3.3 µF ±20%, 10 VDC; sim to Sprague Type 162D.
C104	19A116080P205	Polyester: 0.047 µF ±5%, 50 VDCW.
C105	19A116080P204	Polyester: 0.033 µF ±5%, 50 VDCW.
C106	5491674P28	Tantalum: 1.0 µF ±20%, 25 VDCW; sim to Sprague Type 162D.
C107	5496267P9	Tantalum: 3.3 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C108	19A116080P216	Polyester: .0068 µF ±5%, 50 VDCW.
C109	19A116655P20	Ceramic disc: 1000 pF ±10%, 1000 VDCW; sim to EMC Type JF Discap.
C110	5491674P36	Tantalum: 3.3 µF ±20%, 10 VDCW; sim to Sprague Type 162D.
C111	19A116080P206	Polyester: 0.068 µF ±5%, 50 VDCW.
C112*	5496218P37	Ceramic disc: 8.0 pF ±0.25 pF, 500 VDCW, temp coef 0 PPM. Added by REV B.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR101 and CR102	19A115325G91	Silicon, fast recovery, 225 mA, 50 PIV.
P102	19A116659P26	Connector, printed wiring: 9 contacts; sim to Molex 09-52-3091.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101	19A134231P223J	Deposited carbon: 22K ohms ±5%, 1/8 w; sim to Mepco/Electra Type CR16.
R102	3815329233J	Composition: 23K ohms ±5%, 1/4 w.
R103*	3815329471J	Composition: 470 ohms ±5%, 1/4 w. In REV A & earlier:
	3815329681J	Composition: 680 ohms ±5%, 1/4 w.
R104	19C314256P53112	Metal film: 51.1K ohms ±1%, 1/4 w.
R105	19C314256P21052	Metal film: 10.5K ohms ±1%, 1/4 w.
R106	19C314256P21272	Metal film: 12.7K ohms ±1%, 1/4 w.
R107	19C314256P21052	Metal film: 10.5K ohms ±1%, 1/4 w.
R108	19C314256P25111	Metal film: 5.11K ohms ±1%, 1/2 w.
R109	3815329132J	Composition: 1.3K ohms ±5%, 1/4 w.
R110	19C314256P25111	Metal film: 5.11K ohms ±1%, 1/4 w.
R111	3815329153J	Composition: 15K ohms ±5%, 1/4 w.
R112*	19C314256P22492	Metal film: 24.9K ohms ±1%, 1/4 w. Earlier than REV A:
	19C314256P24T2	Metal film: 24.7K ohms ±1%, 1/4 w.
R113	19C314256P21152	Metal film: 11.5K ohms ±1%, 1/4 w.
R114	19C314256P23012	Metal film: 30.1K ohms ±1%, 1/4 w.
R115	3815329272J	Composition: 2.7K ohms ±5%, 1/4 w.
		OSCILLATOR BOARD 19C327269G1, G2
		- - - - - - - - CAPACITORS - - - - - - - - - -
C2601	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2602	19A116080P7	Polyester: 0.1 µF ±20%, 50 VDCW.
C2603 thru C2605	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2606	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2607	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2608	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2609	7489162940	Silver mica: 360 pF ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2610	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2611	19A116080P1	Polyester: 0.01 µF ±20%, 50 VDCW.
C2612	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2613	19A116656P4728	Ceramic disc: 47 pF ±5%, 500 VDCW, temp coef -80 PPM.
C2614	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2615	19A116656P4728	Ceramic disc: 47 pF ±5%, 500 VDCW, temp coef -80 PPM.
C2616	7489162939	Silver mica: 330 pF ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2617	19A116656P6828	Ceramic disc: 68 pF ±5%, 500 VDCW, temp coef -80 PPM.
C2618	19A116656P2728	Ceramic disc: 27 pF ±5%, 500 VDCW, temp coef -80 PPM.
J2602	19A116659P40	- - - - - - - - JACKS AND RECEPTACLES - - - - - - - Connector, printed wiring: 8 contacts; sim to Molex 09-64-1087.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L2601	19B209420P115	Coil, RF: 1.50 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4436-2K.
L2602	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.

SYMBOL	GE PART NO.	DESCRIPTION
P904	19A116659P2	- - - - - - - - - - PLUGS - - - - - - - - - - Connector, printed wiring: 10 contacts; sim to Molex 09-52-3102.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2601	19A115562P2	Silicon, PNP; sim to Type 2N2904A.
Q2602	19A116201P3	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2601	19C314256P23831	Metal film: 3.83K ohms ±1%, 1/4 w.
R2602	19C314256P20191	Metal film: 6.19K ohms ±1%, 1/4 w.
R2603	3815329561J	Composition: 560 ohms ±5%, 1/4 w.
R2604	3R77P391K	Composition: 390 ohms ±10%, 1/2 w.
R2605	3815329561J	Composition: 560 ohms ±5%, 1/4 w.
R2606	3815329223J	Composition: 22K ohms ±5%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T2601	19C307170P309	Coil, RF: wire size No. 20 AWG; sim to Paul Smith 100375-08-3.
		- - - - - - - - - - INTEGRATED CIRCUITS - - - - - - - - - -
U2601*	19D416564G4	Regulator, 10 v. Earlier than REV A:
	19D416564G3	Regulator, 10 v.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY2601 thru XY2604	19A116779P6	Contact, electrical: sim to Molex 08-50-0410. (Quantity 8 each socket).
		- - - - - - - - - - OSCILLATORS - - - - - - - - - - NOTE: When reordering specify FX ICOM Frequency. FX ICOM = Operating Frequency / 4.8
Y2601 thru Y2604	19A130605G7	Internally Compensated: ±2 PPM, 806-825 MHz.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19C327303G1	Shield. (Located by J103).
	19B227831P1	Shield. (Located by C163).
	19C327313P1	Exciter cover.
	19B227619P1	Oscillator shield.
	4036555P1	Insulator, washer: nylon. (Used with Q101, Q2601).
	19A116707P3	Insulator. (Used with Q103-Q106).
	19A119434G2	Can. (Used with T101-T106, T2601).
	19B227624G1	Can. (Used with Z101, Z102).
	19B210749P203	Tap screw, Phillips POZIDRIV: No. 4-40 x 3/16. (Located on 19B227831P1 shield- Quantity 3).
	19B227619G1	Oscillator board shield. (MASTR Executive II Station only).
	19A134814P1	Plate mt.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

800 MHz MULTI-FREQUENCY OSCILLATOR BOARD
19C328083G1 4 FREQ
19C328083G2 8 FREQ
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2601	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2602	19A116080P7	Polyester: 0.1 µF ±20%, 50 VDC.
C2603	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2604	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2605	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2606	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2607	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2608	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2609	19A134202P6	Tantalum: 22 µF ±20%, 15 VDCW.
C2611 thru C2614	19A116189P2	Ceramic: 470 pF ±20%, 50 VDCW; sim to Erie 8111-4050-458-471K.
C2615	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2616	19A116080P1	Polyester: 0.01 µF ±20%, 50 VDCW.
C2617 and C2618	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2619	7489162P139	Silver mica: 330 pF ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C2621	7489162P139	Silver mica: 330 pF ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C2622	19A116656P2428	Ceramic disc: 24 pF ±5%, 500 VDCW, temp coef -80 PPM.
C2623 and C2624	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to EMC Type JF Discap.
C2626	19A116189P2	Ceramic: 470 pF ±20%, 50 VDCW; sim to Erie 8111-4050-458-471K.
J2602	19A116659P40	- - - - - - - - JACKS AND RECEPTACLES - - - - - - - Connector, printed wiring: 8 contacts; sim to Molex 09-64-1087.
J2603	19A134152P103	Connector, printed wiring: sim to Molex 22-27-2081.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L2601	19B209420P115	Coil, RF: 1.50 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4436-2K.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P904	19A116659P2	Connector, printed wiring: 10 contacts; sim to Molex 09-52-3102.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2601	19A115562P2	Silicon, PNP; sim to Type 2N2904A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2601	3815329102J	Composition: 1K ohms ±5%, 1/4 w.
R2602	19C314256P23831	Metal film: 3.83K ohms ±1%, 1/4 w.
R2603	19C314256P20191	Metal film: 6.19K ohms ±1%, 1/4 w.
R2604	3815329561J	Composition: 560 ohms ±5%, 1/4 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T2601	19C307170P312	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith Co. Design No. 120778-08-1.
		- - - - - - - - - - REGULATORS - - - - - - - - - -
U2601	19D416564G4	Regulator, 10 v.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY2601 thru XY2608	19A116779P6	Contact, electrical: sim to Molex 08-50-0410. (Quantity 8 each socket).
		- - - - - - - - - - OSCILLATORS - - - - - - - - - - FX ICOM = Operating Frequency / 4.8
	19A119434G2	Can. (Used with T1).
	4036555P1	Insulator, washer: nylon. (Used with Q1).

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.

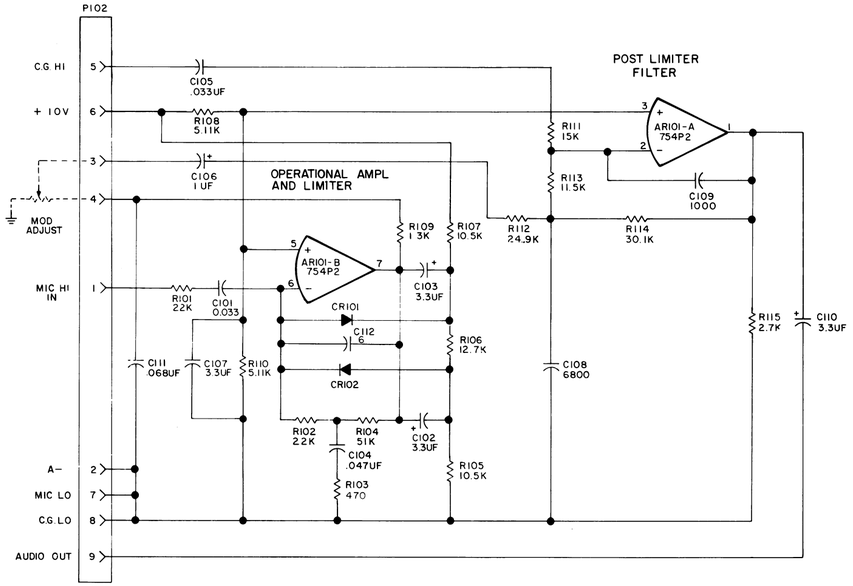
REV. A - Audio Processor 19C315343G1
To standardize components. Changed R112.

REV. B/C - To improve audio response. Changed AR101 and R103. Added C112.

REV. A - Oscillator Board 19C327269G1
To incorporate new 10-Volt regulator. Changed U2601.

REV. A - Exciter Board 19D426068G1
To provide reverse voltage clamping. Added CR4.

AUDIO PROCESSOR



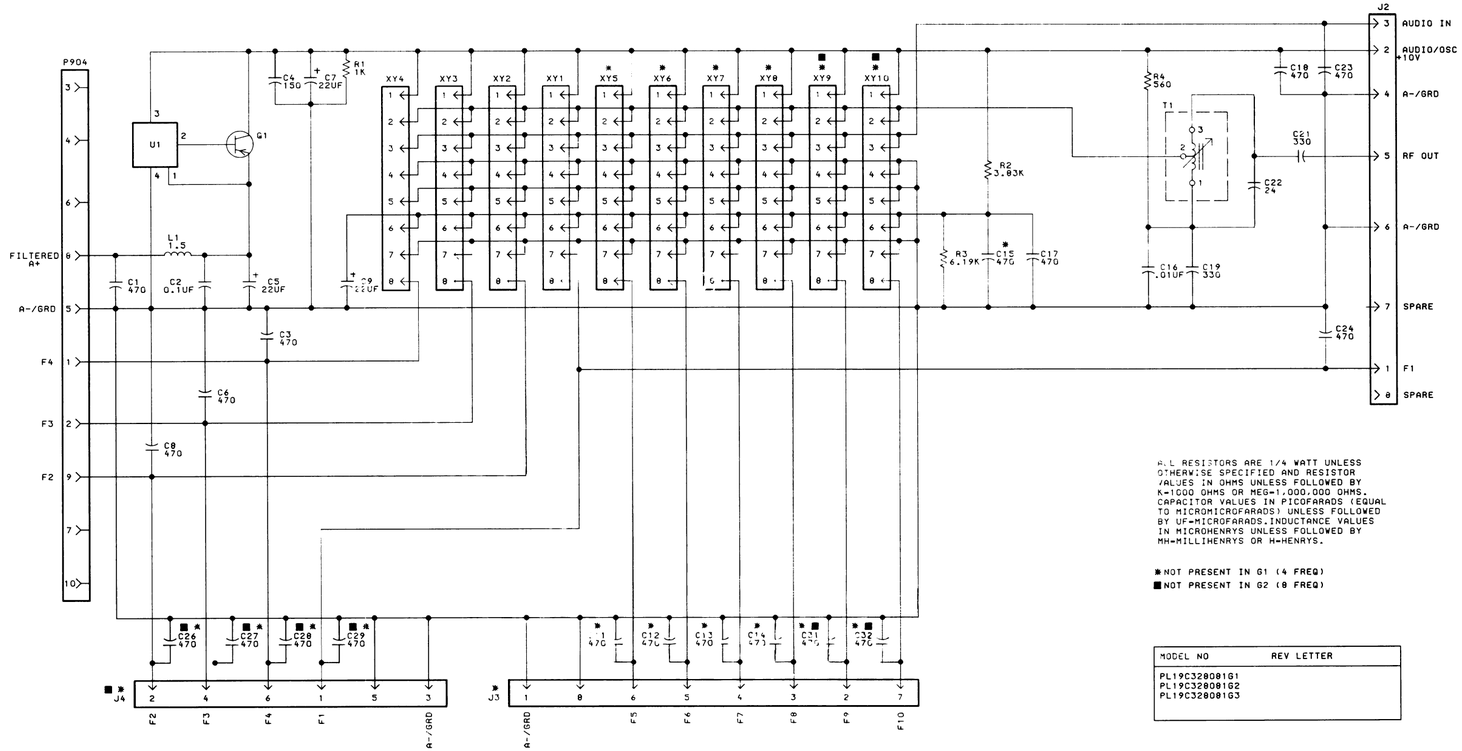
MODEL NO	REV LETTER
PL19C321542G1	C

NOTES:
1. CONNECT GRD TO PIN 4 ON AR101, CONNECT VCC (+10V) TO PIN 8 ON AR101

ALL RESISTORS ARE 1/4 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.

(19C321854, Rev. 5)

OSCILLATOR BOARD



ALL RESISTORS ARE 1/4 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.

✱ NOT PRESENT IN G1 (4 FREQ)
■ NOT PRESENT IN G2 (8 FREQ)

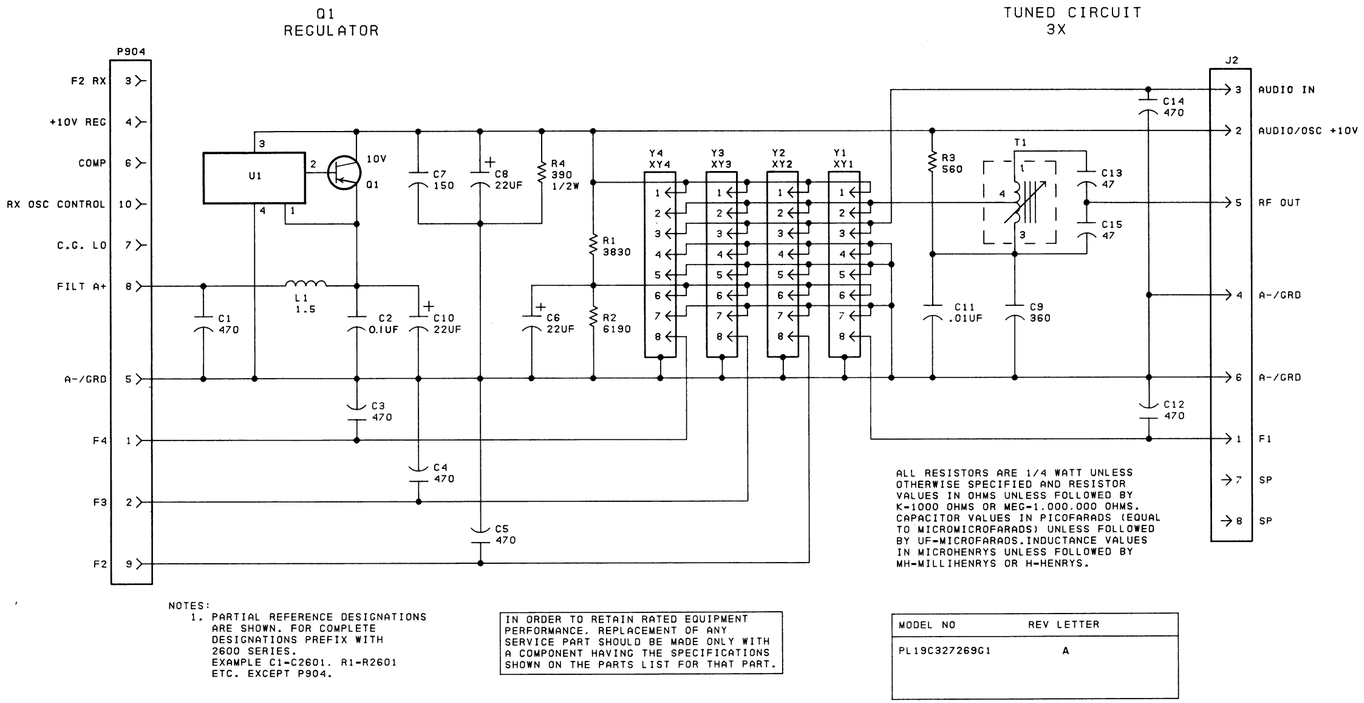
MODEL NO	REV LETTER
PL19C328081G1	
PL19C328081G2	
PL19C328081G3	

NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATIONS PREFIX WITH 2600 SERIES. EXAMPLE: C1=C2601, R1=R2601, ETC. EXCEPT P904.

(19D430486, Rev. 1)

SCHEMATIC DIAGRAMS

AUDIO PROCESSOR
AND OSCILLATOR BOARD



NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATIONS PREFIX WITH 2600 SERIES. EXAMPLE C1-C2601. R1-R2601 ETC. EXCEPT P904.

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.

MODEL NO	REV LETTER
PL19C327269G1	A

(19D424294, Rev. 3)

SCHEMATIC DIAGRAM

OSCILLATOR BOARD