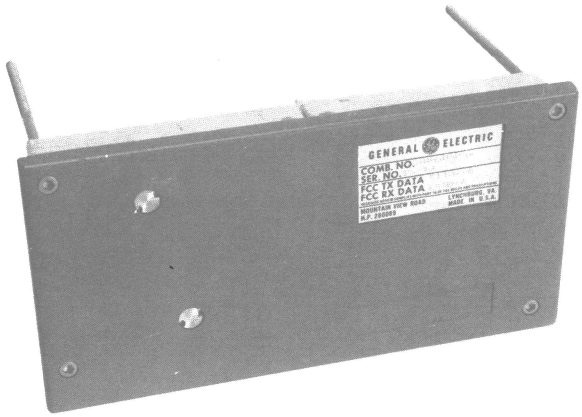
MOBILE RADIO

Porta-Mobile II™

138-174 MHz TRANSMITTER TYPES KT-132-A/B

Maintenance Manual LBI30229G
DATAFILE FOLDER DF3167



SPECIFICATIONS *

Type Numbers	KT-132-A	KT-132-B
Power Output	Adjustable from 5 to 20 Watts	Adjustable from 6 to 30 Watts
Current Drain (Less Options)	6.5 Amperes (at 20 Watts)	7 Amperes (at 30 Watts)
Spurious		
Radiated	-57 dB	-58 dB
Conducted	-57 dB	-58 dB
Modulation Deviation	0 to ±5 kHz	
Audio Response	Within +1 and -3 dB of a 6-dB/octave pre-emphasis from 300 to 3000 Hz except for an additional 6-dB/octave roll-off from 2500 to 300 Hz per EIA.	
Audio Distortion	Less than 8%	
Crystal Multiplication	12	
RF Load Impedance	50 ohms	
Modulation Sensitivity	18 to 54 millivolts (at mic jack)	

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

KT-132-A/B

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

Although the highest DC voltage in Porta•Mobile II™ Equipment is supplied by a portable or vehicular battery, high currents may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits! High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. Keep away from these circuits when the transmitter is energized!

DESCRIPTION

Porta•Mobile II™ transmitter types KT-132-A and KT-132-B are crystal controlled, phase modulated transmitters for one- through twelve-frequency operation in the 138-174 MHz band. The transmitters are single unit construction in the rear cover for the Porta•Mobile II case assembly and utilize both discrete components and integrated circuit modules.

Each transmitter consists of exciter board 19D423591 and power amplifier 19D423599. The exciter board consists of audio module A101, oscillator modules A104 through A115, compensator module A102, modulator module A103, optional compressor module A116, exciter module 4EG29A10 or 4EG29A11 and exciter PA module 4EF39A10 or 4EF39A11.

The application of each transmitter type is shown in the following chart:

Transmitter Type No.	Exciter Board No.	Exciter Module No.	Exciter PA No.	PA No.	Frequency Range	Number Frequencies	Power Output
KT-132-A	19D423591G1	4EG29A10	4EF39A10	19D423599G1	138-150.8 MHz	12	20
	19D423591G1	4EG29A11	4EF39A11	19D423599G1	150.8-174 MHz	12	20
KT-132-B	19D423591G1	4EG29A10	4EF39A10	19D423599G2	138-150.8 MHz	12	30
	19D423591G1	4EG29A11	4EF39A11	19D423599G2	150.8-174 MHz	12	30

Operating voltages for the transmitter are provided by a 10-Volt battery pack or a 13.8-Volt vehicle battery, a 7.5 Volt regulator circuit and a 5.4 Volt regulator circuit. The battery voltage is applied directly to the power amplifier circuit and also to the 7.5 volt regulator circuit and power amplifier circuit through POWER OFF-ON switch S701 on the case assembly. The 7.5 Volt regulator is part of the receiver audio amplifier and is interfaced by the system board to the transmitter. A keyed 7.5 volts is connected to the power adjust circuit in the power amplifier, and the modulator module and 5.4 volt regulator circuit on the transmitter exciter board. The 5.4 volt regulator circuit provides voltage for the audio module, compensator module and the optional compressor module.

References to symbol numbers mentioned in the following text are found on the Schematic Diagram, Outline Diagrams and Parts List (see Table of Contents). The typical, simplified circuit diagrams used in the test are representative of the circuits in the IC modules. A block diagram of the transmitter is shown in Figure 1.

CIRCUIT ANALYSIS

OSCILLATOR MODULES (A104 through A115)

Oscillator Model 4EG27A10 consists of a crystal-controlled Colpitts oscillator and a Channel Guard tone modulator. The entire oscillator is contained in a metal can with the transmitter operating frequency printed on the top. The crystal frequency ranges from 11.5 to 14.5 MHz, and the crystal frequency is multiplied 12 times.

The oscillator frequency is temperature compensated to provide instant frequency compensation, with a frequency stability of ±.0002% from 0°C to +55°C and ±.0005% from -30°C to +60°C. The temperature compensation network is contained in Compensator module A102.

A typical oscillator circuit is shown in Figure 2.

In single-frequency transmitters, a jumper from Hole 39 to Hole 78 on the System Board connects the keyed 5.4 Volt supply voltage to the oscillator modules. The oscillator output is applied to Compensator A103.

In multi-frequency transmitters, the single-frequency supply jumper is removed, and the proper frequency is selected by connecting 5.4 Volts to the selected oscillator module through frequency selector switch S704 on the control unit.

For Channel Guard applications, tone from the Channel Guard encoder is applied to the oscillator module. The tone is applied through Pin 3 to the voltage-variable capacitor on the oscillator module, frequency modulating the oscillator output.

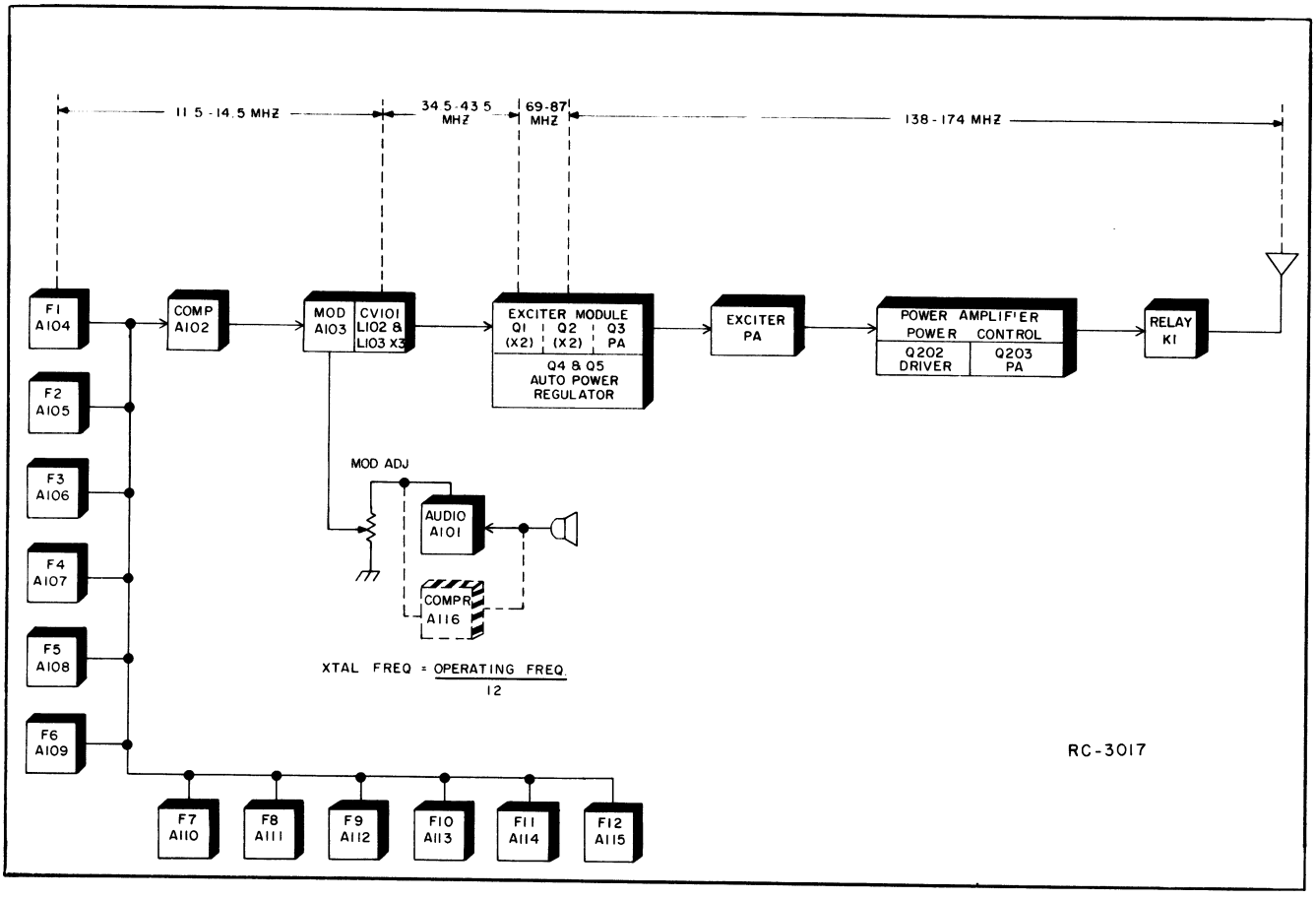

Figure 1 - Block Diagram

NOTE

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

COMPENSATOR MODULE A102

Compensator module A102 contains a buffer-amplifier, and the temperature compensating network for the oscillator. A typical compensator circuit is shown in Figure 3.

RF from the oscillator at Pin 7 of the compensator module, is coupled through a DC-blocking capacitor to the base of buffer-amplifier Q1. This stage isolates the oscillator from the modulator. The output of Q1 connects from Pin 9 to Pin 1 of modulator module A103.

In the compensation network, the keyed 5.4 Volts at Pin 2 is applied to a thermistor-compensated voltage divider. The output at Pin 3 (2.35 Volts measured with a VTVM) is applied to Pin 3 and to the voltage-variable capacitor in the selected oscillator module. At temperatures below -10°C, the compensated voltage increases to maintain the proper voltage on the oscillator voltage-variable capacitor.

Service Note: An abnormally low VTVM reading (or no reading) at Pin 3 of the oscillator may indicate a short or leakage path in the oscillator. This can be checked by unsoldering Pin 3, raising it off the printed board and taking another reading. If this reading is normal the problem is in the oscillator module. If the reading remains low (or zero) the problem is in the Compensator.

AUDIO AMPLIFIER MODULE A101

Audio from the microphone is coupled to Pin 1 of Audio Amplifier Module A101 and then to the base of audio amplifier transistor Q1 (see Figure 4). In Type 90 encoder applications, the encode tone is applied to the amplifier at Pin 2.

The amplifier output is applied directly to the limiter stage (Q2). Following the limiter is a combined post-limiter filter and de-emphasis network. The filter output at Pin 8 is coupled through Mod Adjust potentiometer R103 to the modulator module A103.

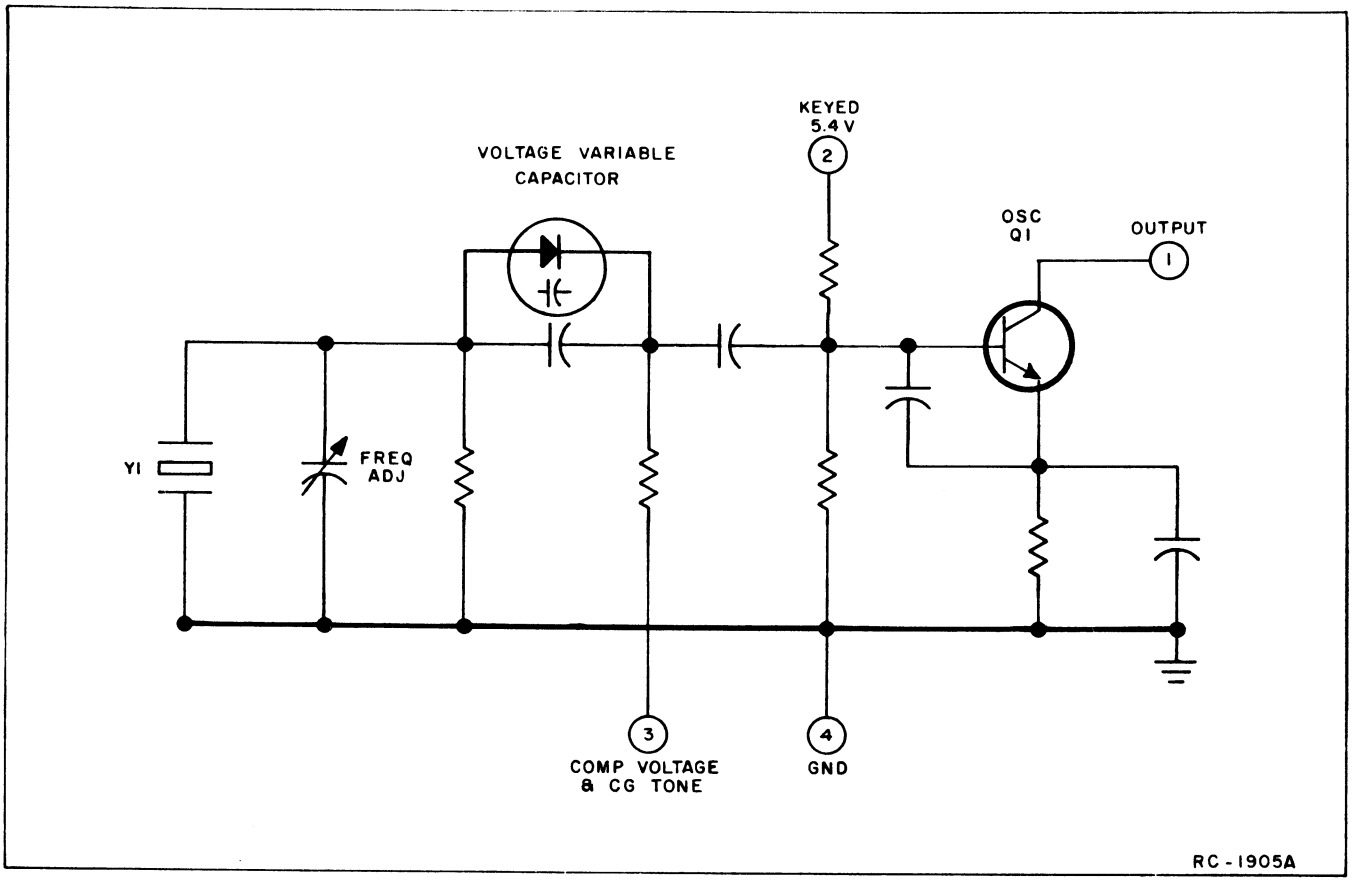

Figure 2 - Typical Oscillator Circuit

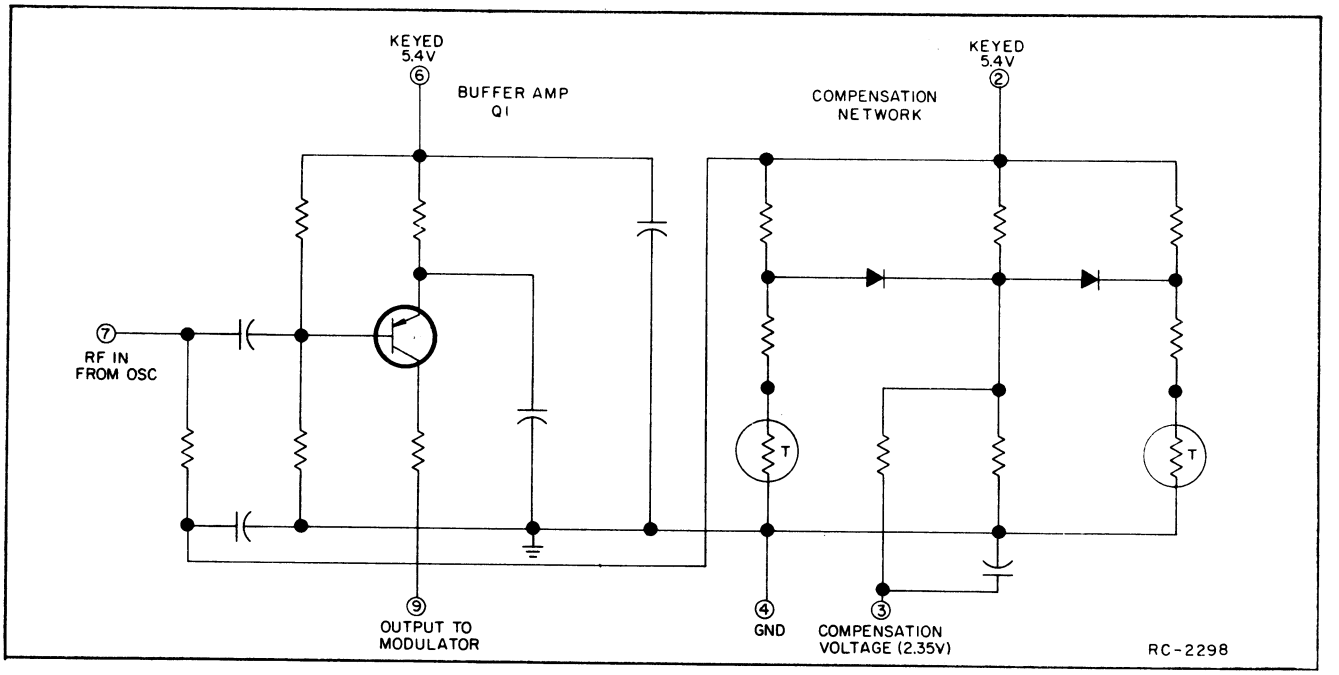

Figure 3 - Typical Compensator Circuit

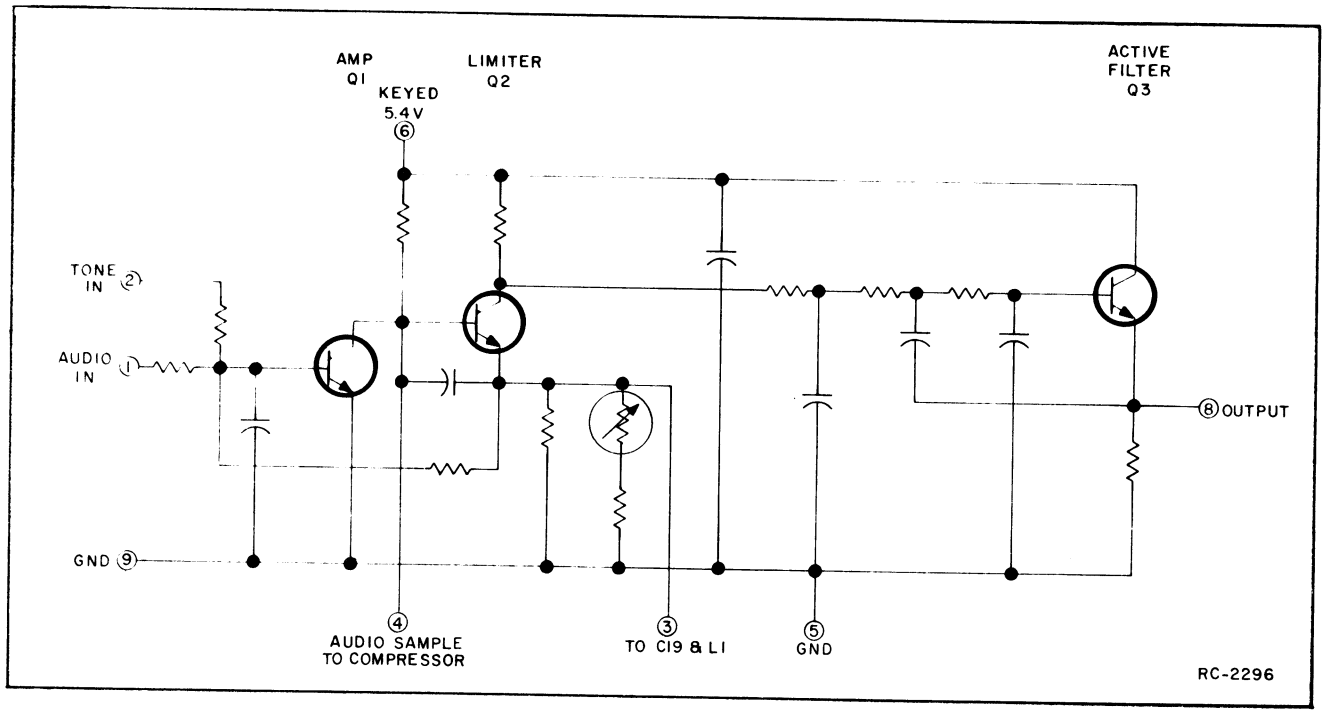

Figure 4 - Typical Audio Amplifier Circuit

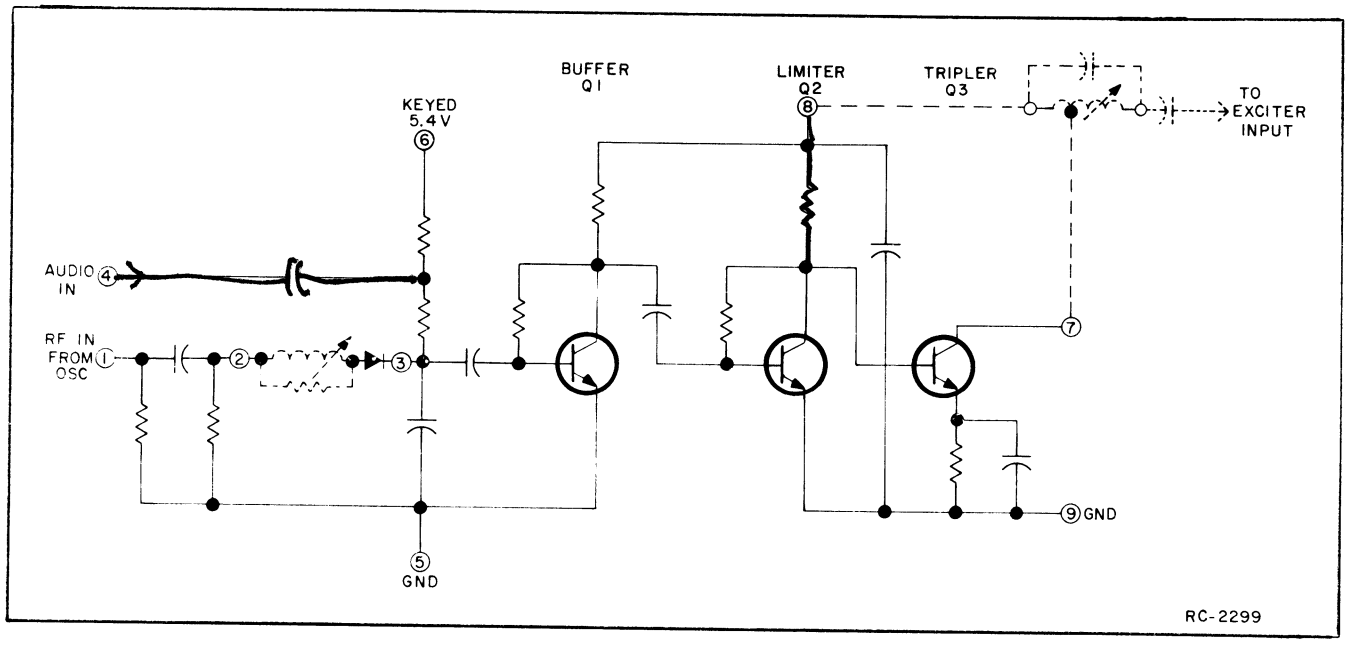

Figure 5 - Typical Phase Modulator Circuit

MODULATOR MODULE A103

The phase modulator circuit consists of modulator module A103, voltage-variable capacitor CV101 and tuneable coil L102. A typical modulator circuit is shown in Figure 5.

With CV101 in series with L102, the network is a series-resonate circuit when RF from the compensator is applied to Pin 1 of modulator module A103. Applying audio to Pin 4 of A103 varies the bias of CV1, resulting in a phase modulated output.

Buffer Q1 isolates the modulator from the loading effects of the following multiplier stage, and also provides some amplification. Following the buffer stage is tripler Q2. The output of Q2 is coupled through L103 to the exciter module. L103 is tuned to three times the crystal frequency.

EXCITER MODULE 4EG29A10/4EG29A11

Exciter Board Model 4EG29A10 (138-150.8 MHz) and Model 4EG29A11 (150.8-174 MHz) consists of two class C doubler stages, a class C amplifier stage, and an Automatic Power Level Control (APLC) circuit.

Doubler & Amplifier Stages

The modulator output is coupled through T1 to the base of 1st doubler Q1. The 1st doubler stage as well as the modulator stage is metered at TP1. The 1st doubler output is coupled through T2 to the base of 2nd doubler Q2. T2 is tuned to six times the crystal frequency.

Following the 2nd doubler is an impedance-matching network consisting of C14, C16, C17, C19 and L2. The network matches the high impedance 2nd doubler output to the low impedance amplifier input. L2 is tuned to 12 times the crystal frequency.

A constant-K, DC collector feed network consisting of L1, L7, C4 and C12 provides improved 2nd doubler stability. Similar collector-feed networks are used in the amplifier and exciter PA stages.

The output of amplifier Q3 is applied to the exciter PA module.

APLC Circuit

The APLC circuit (Q4 and Q5) provides a more constant transmitter power output by controlling the output of the 1st and 2nd doubler. The circuit also extends the battery life by regulating the current to amplifier Q3.

When Q3 starts to conduct harder and draw more collector current, the voltage drop across R7 increases, causing Q4 to conduct harder. This increases the voltage at the base of Q5. Increasing the voltage at the base of Q5 causes it to conduct less, which increases the voltage drop across Q5 and reduces the collector voltage of Q1 and Q2. This reduces the drive to amplifier Q3 and reduces the collector current.

EXCITER PA MODULE 4EF39A10/4EF39A11

In exciter PA modules 4EF39A10 (138-150.8 MHz) and 4EF39A11 (150.8-174 MHz) the output of the exciter is coupled through a tuned circuit to the base of Class C amplifier Q1. The amplifier output is applied through a series-tuned circuit to the input of the transmitter PA board.

POWER AMPLIFIER BOARD 19D422599G1 & G2

Driver

RF power from the exciter is coupled through impedance matching network C208, C210, C211, C212, L206 and L207 to the base of driver transistor Q202 on power amplifier board 19D423599 (see Schematic Diagram). The collector voltage of Q202 is controlled by the power control circuit, limiting the drive to the base of PA transistor Q203 in reduced power operation.

PA

RF is coupled from the collector of Q202 through impedance matching network C214 through C219, L210, L211 and L212 to the base of PA transistor Q203. The RF output at the collector of Q203 is coupled through matching network C225, C226, L213, Low Pass Filter C227, C228, C229, L216, L217, L218, L219 and system relay K1 to the antenna.

Power Control Circuit

The Power Control Circuit maintains a constant current through PA transistor Q203 to control the transmitter power output when the supply voltage or load changes.

To maintain constant current through PA transistor Q203, a voltage regulator circuit regulates the supply voltage of PA driver transistor Q202. Initially, when the transmitter is keyed, 7.5 volts is applied to the base of transistor Q204 causing Q204 to conduct. Transistor Q204 conducting causes transistor Q205 to conduct. How hard Q205 conducts is determined by transistor Q206.

If there is an increase in the voltage on the collector of Q201, transistor Q206 will conduct harder causing Q205 to conduct less, increasing the base voltage of Q201. The increased voltage on the base of transistor Q201 causes Q201 to conduct less and reduce the collector voltage of PA transistor Q202. The reduced collector voltage on Q202 reduces the RF drive to Q203 proportionally, maintaining a constant current through Q203. If there is a decrease in the voltage on the collector of Q203, transistor Q206 will conduct less, causing Q205 to conduct harder, decreasing the base voltage of Q201. The decreased voltage on the base of Q201 causes Q201 to conduct harder, increasing the collector voltage on Q202. The drive to Q203 will be increased proportionally maintaining constant current through Q203.

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

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MODULATION LEVEL ADJUSTMENT

The MOD ADJUST (R103) was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter. The limiter, in conjunction with the de-emphasis network, instantaneously limits the slope of the audio wave to the modulator, thereby preventing overmodulation while preserving intelligibility.

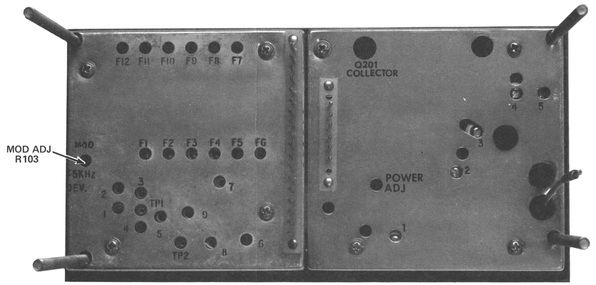
TEST EQUIPMENT

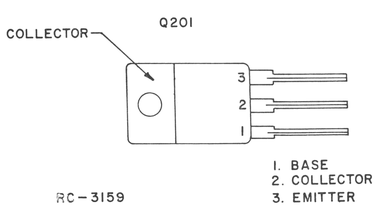
1. Audio oscillator Model 4EX6A10
2. Deviation meter
3. An output meter or VTVM
4. Transmitter Test Cable 19D424148G1

PROCEDURE

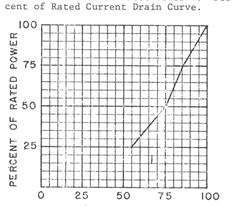
1. Connect the equipment as shown in the Test Procedure on the back of this page.
2. Set MOD ADJ R103 to mid range.
3. Apply a 1000 Hz, 18 to 54 millivolt signal to Pin 2 of microphone jack J701.
4. On the lowest frequency channel adjust tuning control 1 for maximum sine-wave deviation.
5. Increase the audio level to 1.3 Volts and set MOD ADJ R103 to 5 kHz deviation.
6. Re-peak tuning control 1 for the best symmetry.

EXCITER POWER AMPLIFIER





* If rated power output is not necessary to communicate, the power output may be reduced by the POWER ADJ control resulting in increased battery life. Refer to Percent of Rated Power V. Percent of Rated Current Drain Curve.



RC-3224

TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

- GE Test Set Model 4EX3A11 (or 4EX8K11) or equivalent 20,000 ohms-per-volt meter.
- Transmitter Test Cable 19D424148G1 connected between the transmitter and system board.
- An ammeter capable of measuring one ampere connected in place of the BLACK lead of transmitter test cable 19D424148G1. This ammeter measures current to the exciter.
- An ammeter capable of measuring seven amperes, as part of, or connected in series with an external power supply.
- An ammeter capable of measuring four amperes connected in place of the RED lead of transmitter test cable 19D424148G1. This ammeter measures current to PA Transistor Q203 and is not necessary for the actual tuning of the transmitter. The current drain for Q203 is approximately 3.3 amperes at 20 watts for KT-132-A and 4 amperes at 30 watts for KT-132-B.
- An RF wattmeter capable of measuring 25 watts for the KT-132-A or 40 watts for the KT-132-B.
- A Frequency Counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Set the channel selector switch to the lowest channel frequency.
2. Set all slugs in the exciter flush with the top of the exciter can. When tuned, these slugs must be between the top of the can and the coil.
3. Set tuning control 9 (R8) fully counterclockwise.
4. Set the POWER ADJUST fully clockwise.
5. Place the (+) lead of the test meter into test point TP1 and the (-) lead on system ground.
6. All adjustments made with the transmitter keyed.

ADJUSTMENT PROCEDURE

STEP	TUNING CONTROL	COMPONENT NO.	TYPICAL METER READING	PROCEDURE
		EXCITER		
1	1	L102	Maximum mA	Adjust tuning control 1 for maximum transmitter current (approximately 100 milliamps).
2	2	L103	Minimum mA	Adjust tuning control 2 for minimum transmitter current.
3	1, 2 & 3	L102, L103 & T1	0.8 Volts	Adjust tuning controls 1, 2 & 3 for maximum voltage at TP1. Repeat the adjustments until no further increase in meter reading is obtained.
4	4	T2	Minimum Voltage	Adjust tuning control 4 for minimum voltage at TP1
5	5 & 7	L2 & L1	Maximum mA	Adjust tuning controls 5 and 7 for maximum current.
6	8, 6, 7 & 5	C9, C115, L1 & L2	Maximum Current	Tune tuning controls 8, 6, 7 and 5 for maximum current and tuning control 4 for minimum voltage at TP1.
7	1, 2, 3 and 4	L102, L103, T1 and T2		Repeat steps 3 and 4.
		POWER AMPLIFIER		
8	1, 2, 3, 4 & 5	C211, C214, C218, C225 & C226	Maximum Current or Maximum Power	Tune tuning controls 1, 2 & 3 for maximum current or power output. Tune tuning controls 4 & 5 for maximum power output.
9	2 & 3	C214 & C218	Maximum Power	Alternately tune tuning controls 2 and 3 for maximum power out.
10	6 & 7 (on Exciter)	C115 & L1 (on Exciter)	Maximum Power	Tune 6 & 7 on Exciter for maximum power output.
11	4 & 5	C225 & C226	Maximum Power	Alternately tune tuning controls 4 and 5 for maximum power out. Repeat steps 8 and 11 if necessary.
12	7 (on Exciter)	L1 (on Exciter)	Maximum Power	Adjust tuning control 7 on the Exciter for maximum power out. Repeat steps 6 and 9 through 11 if required.
13	POWER ADJ.	R208	5-20 watts for KT-132-A 6-30 watts for KT-132-B	Set POWER ADJ to the desired power output.*
		FREQUENCY ADJUSTMENT		
14				With no modulation, adjust the F1 (and F1 thru F12) crystal trimmer for proper oscillator frequency. Next, refer to the Modulation Adjustment. NOTE: It is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 60°F to 90°F.

TEST PROCEDURES

These Test Procedures are designed to assist you in servicing a transmitter that is operating--but not properly. Problems encountered could be low power output, tone and voice deviation, defective audio sensitivity and modulator adjust control set too high. By following the sequence of test steps starting with Step 1, the defect can be quickly localized. Once a defect is pin pointed, refer to the "Service Check" and the additional corrective measures included in the Transmitter Troubleshooting Procedure. Before starting with the Transmitter Test Procedures, be sure the transmitter is tuned and aligned to the proper operating frequency.

TEST EQUIPMENT REQUIRED

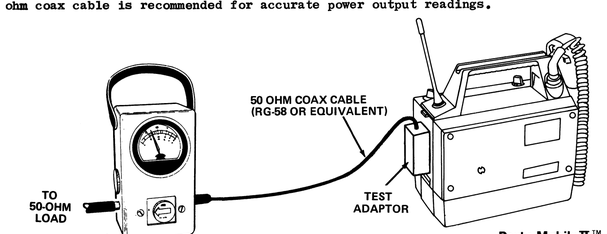
for test hookup shown:

1. Wattmeter similar to:
   Bird # 43
2. VTVM similar to:
   Triplett # 850
   Heath # 1M-21
3. Audio Generator similar to:
   GE Model 4EX6A10 or
   Heath # IG-72
4. Deviation Meter (with a .75 kHz scale) similar to:
   Measurements # 140
   Lampkin # 205A
5. Test Cable
   19D424148G1
6. Test Adaptor
   19B227389G1

STEP 1
POWER MEASUREMENT

TEST PROCEDURE

A. Connect transmitter output to wattmeter as shown below. GE adaptor 19B227389G1 and a 50 ohm coax cable is recommended for accurate power output readings.



B. Key transmitter and check wattmeter for desired power output..

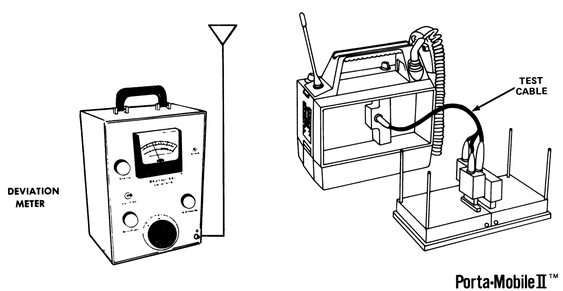
SERVICE CHECK

Refer to Service Hints on Transmitter Troubleshooting Procedure.

STEP 2
TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

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



B. Set MOD ADJUST R103 fully counterclockwise.

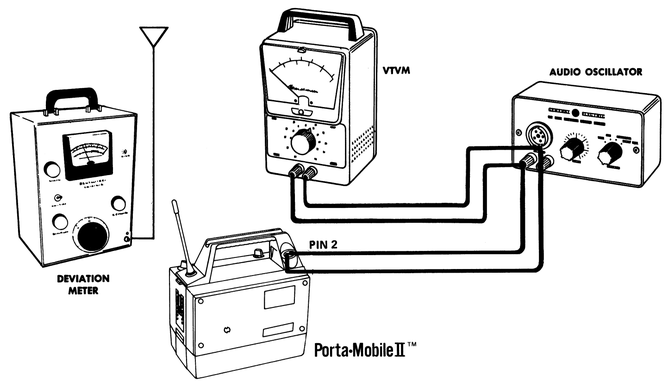
C. Key transmitter and check for approximately 0.75-kHz deviation. If reading is low or high, refer to the Channel Guard Troubleshooting Procedure (see Table of Contents)

NOTES--The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

STEP 3
VOICE DEVIATION AND SYMMETRY

TEST PROCEDURE

A. Connect test equipment to transmitter as shown below:



B. Set the generator output to 18-54 millivolts and frequency to 1 kHz.

C. Key the transmitter and adjust Deviation Meter to carrier frequency.

D. Deviation reading should be ±4.5 kHz. If the deviation is not 4.5 kHz, set the deviation as directed on the Transmitter Alignment Procedure (see Table of Contents).

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

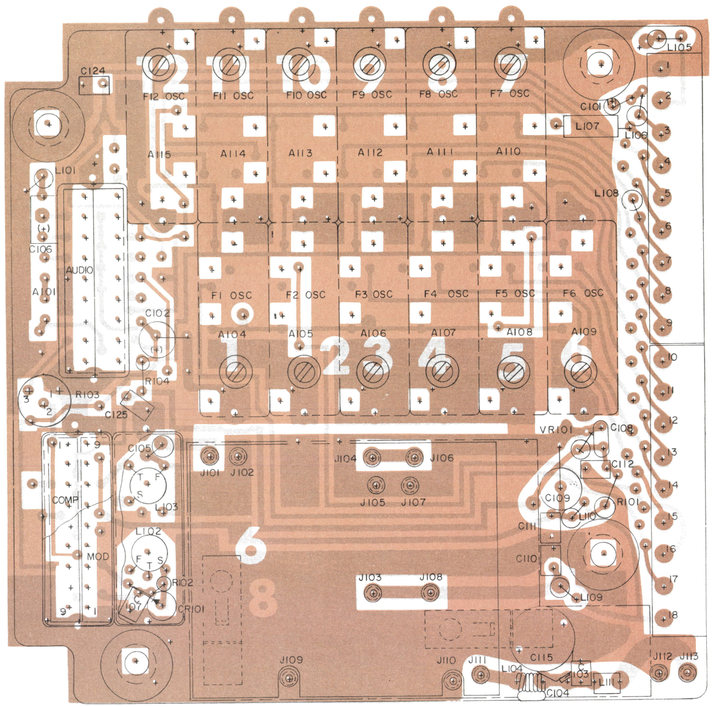
If the deviation reading plus (+) or minus (-) differs by more than 0.5 kHz:

E. Refer to the Modulation Adjustment on the Transmitter Alignment Procedure.

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

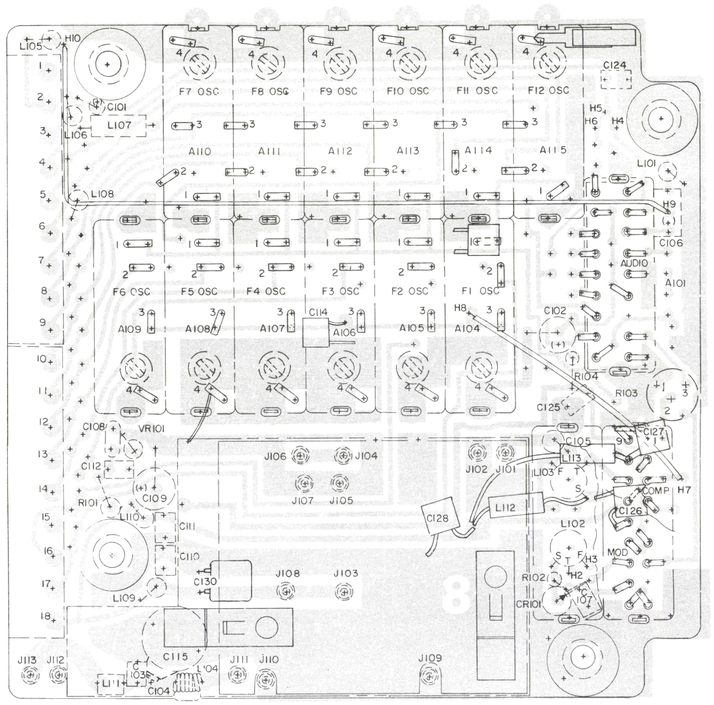
EXCITER MODULES

COMPONENT SIDE

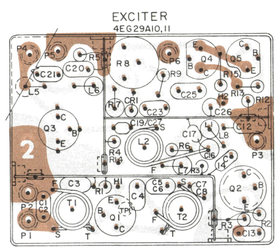


(19D423593, Sh. 2, Rev. 8)
(19D423593, Sh. 3, Rev. 6)

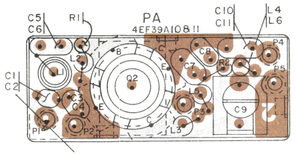
SOLDER SIDE



(19D423593, Sh. 2, Rev. 8)



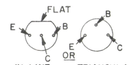
(19C321760, Sh. 2, Rev. 2)
(19C321760, Sh. 3, Rev. 2)



(19C321333, Sh. 2, Rev. 3)
(19C321333, Sh. 3, Rev. 2)

(19B219346, Rev. 6)

LEAD IDENTIFICATION FOR EXCITER 8D



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

(19D424243, Rev. 6

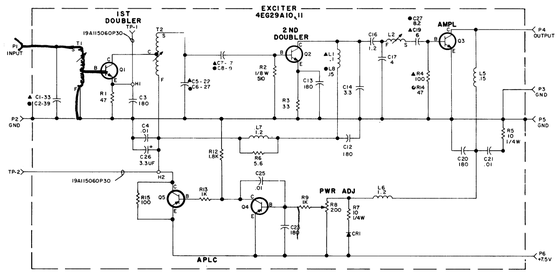
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

OUTLINE DIAGRAM

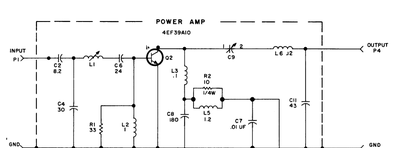
138—174 MHz EXCITER BOARD

10 Issue 6

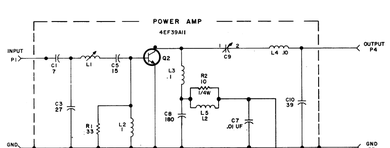
EXCITER MODULES



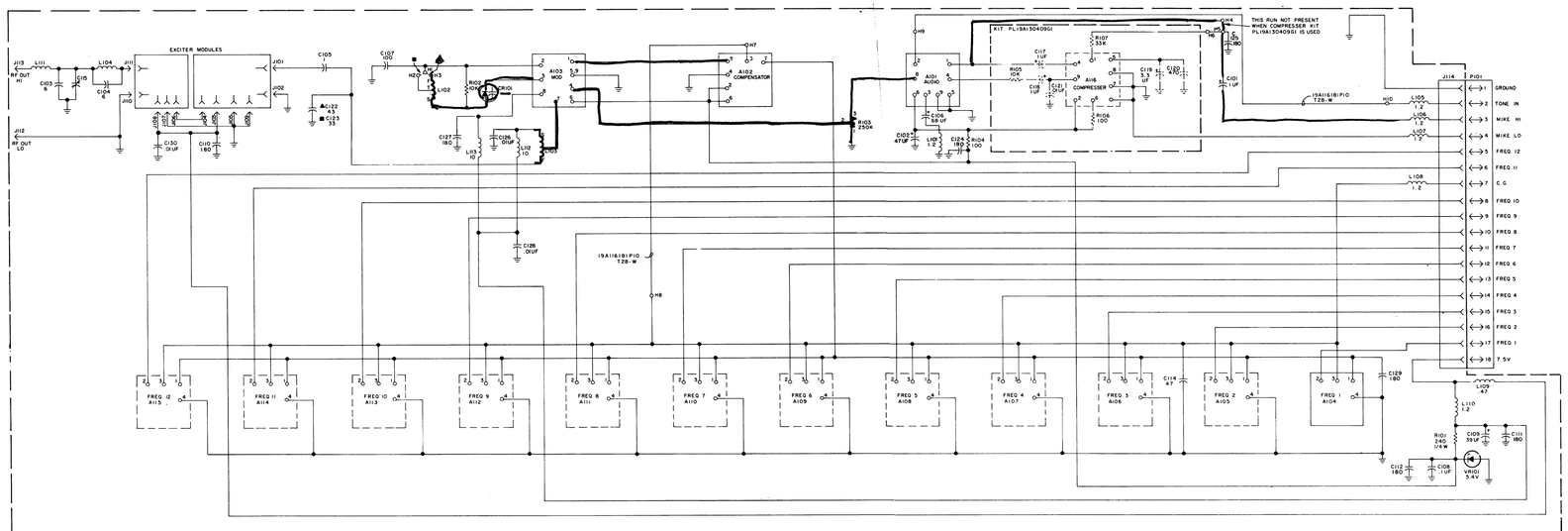
(19C317404, Rev. 10)



(19B216893, Rev. 8)



(19B226695, Rev. 2)



(19B622204, Rev. 8)

ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS, OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (DECIMAL FUNCTION VALUES TO MICROFARADS UNLESS FOLLOWED BY UF= MICROFARADS, INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS, OR H=HENRYS.

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

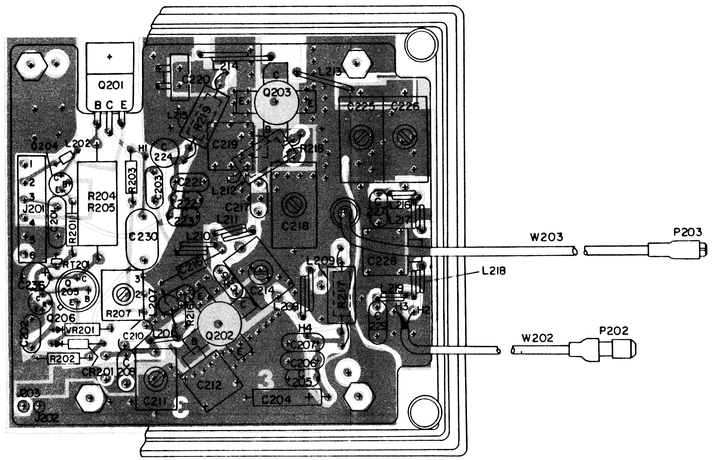
NOTES:
1. ▲ USED IN LO SPLIT 138-154 MHZ
2. ■ USED IN HI SPLIT 150-174 MHZ
3. PIN 1 OF P101 NOT PRESENT IN HIGH BAND UNITS

MODEL NO	REV LETTER
PL19D423591G1	D
PL19A130409G1	B

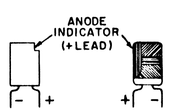
SCHEMATIC DIAGRAM

138—174 MHz EXCITER BOARD

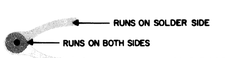
Issue 5

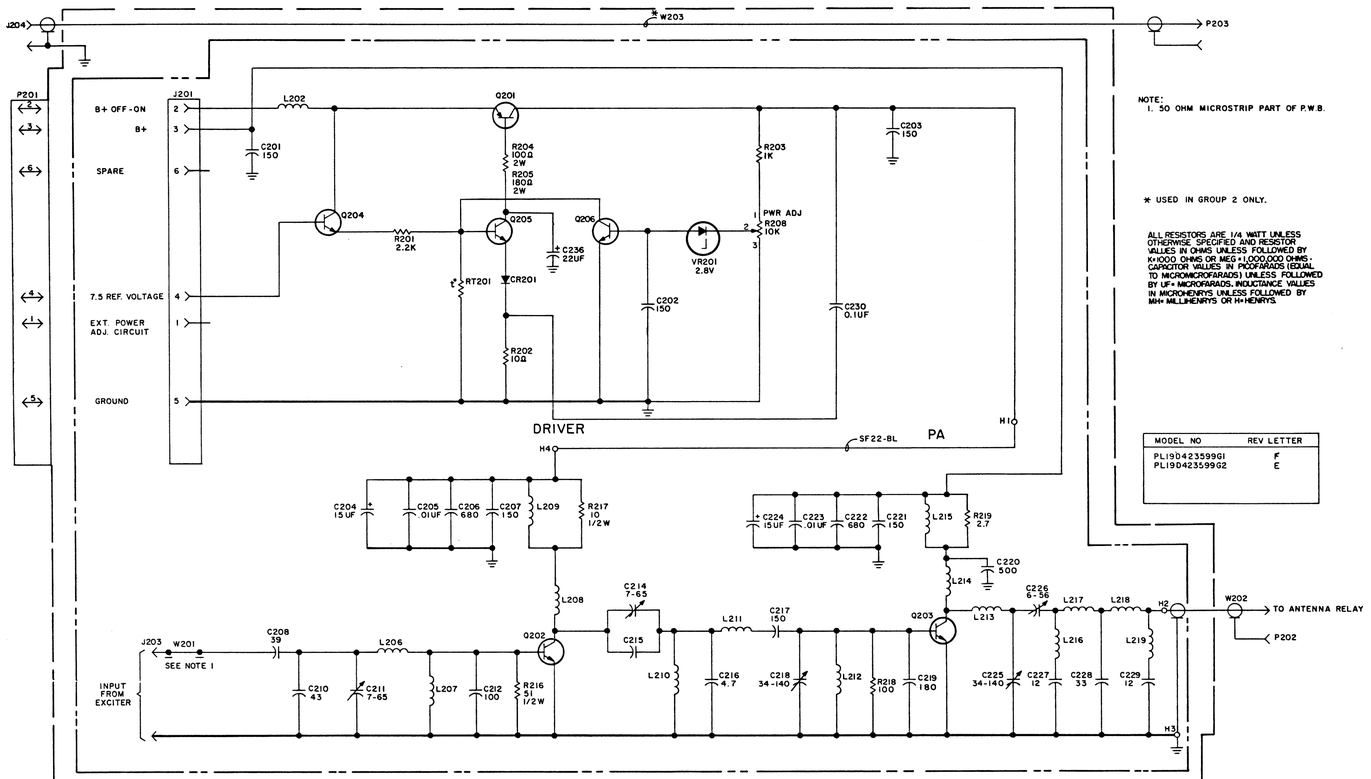


(19C327397, Rev. 7)
(19C330590, Sh. 2, Rev. 3)
(19C330590, Sh. 3, Rev. 3)



POLARITY FOR C224





NOTE:
1. 50 OHM MICROSTRIP PART OF P.W.B.

* USED IN GROUP 2 ONLY.

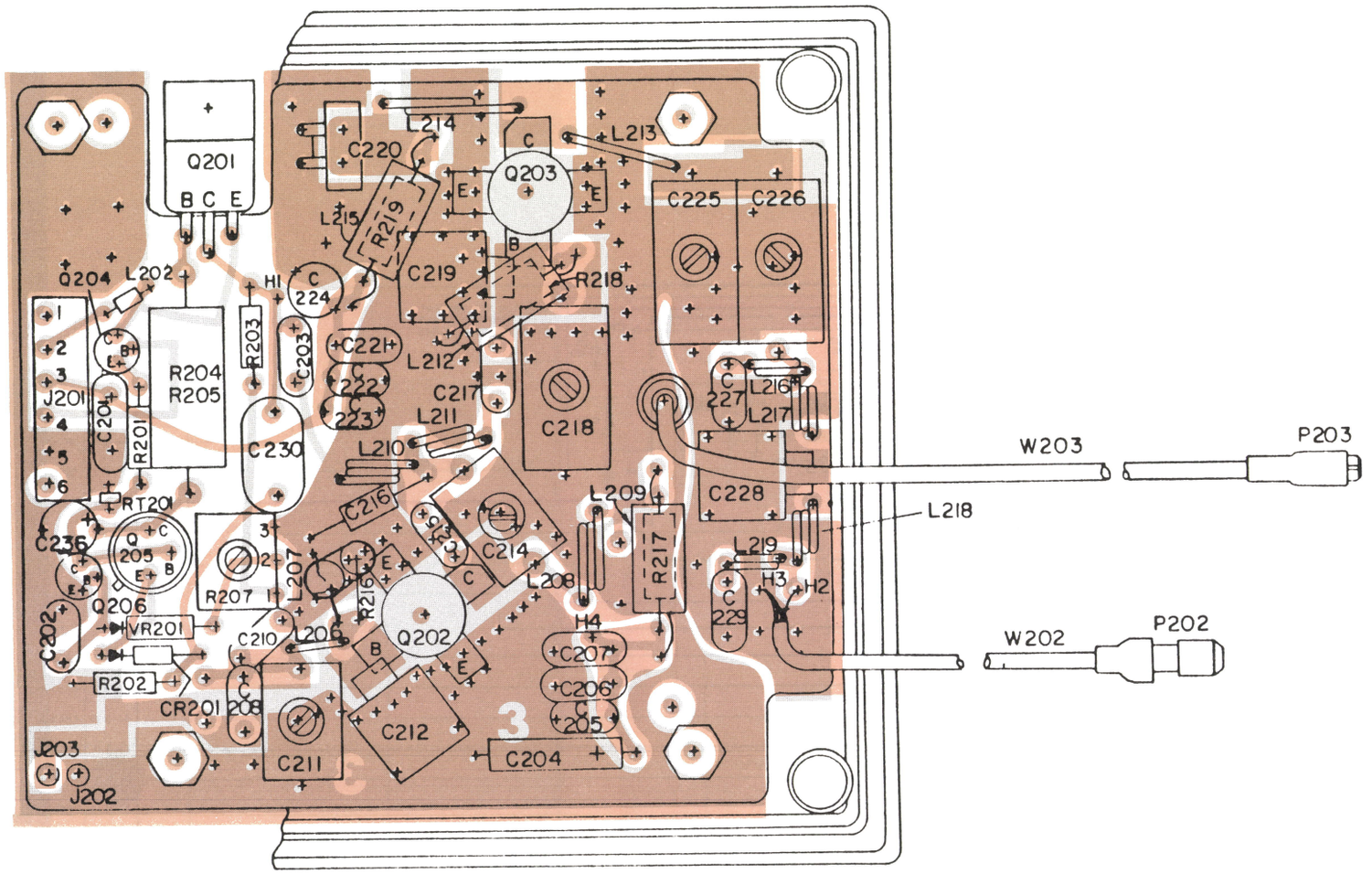
ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

MODEL NO	REV LETTER
PL19D423599G1	F
PL19D423599G2	E

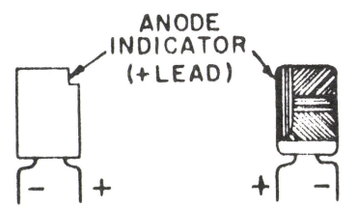
(19D423609, Rev. 12)

OUTLINE & SCHEMATIC DIAGRAM

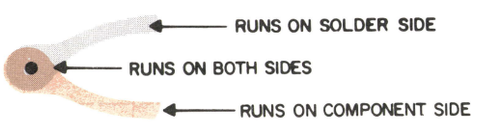
138—174 MHz POWER AMPLIFIER



(19C327397, Rev. 7)
(19C330590, Sh. 2, Rev. 3)
(19C330590, Sh. 3, Rev. 3)



POLARITY FOR C224



OUTLINE & SCHEMATIC DIAGRAM

138—174 MHz POWER AMPLIFIER

PARTS LIST

LBI30228E

TRANSMITTER
KT-132-A/B

SYMBOL	GE PART NO.	DESCRIPTION
		EXCITER BOARD 19D423591G1
A101	19C320062G1	Transmitter Audio Module.
A102	19C320060G1	Oscillator Compensator Module.
A103	19C320084G1	Modulator Module.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C102	5491674P42	Tantalum: 47 uF ±20%, 6 VDCW; sim to Sprague Type 162D.
C103 and C104	19A116114P20	Ceramic: 6 pF ±5%, 100 VDCW; temp coef 0 PPM.
C105	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.
C106	19C307102P19	Tantalum: 68 uF ±20%, 4 VDCW.
C107	19A700227P65	Ceramic: 100 pF ±5%, 100 VDCW, temp coef -1500 PPM.
C108	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C109	5491674P30	Tantalum: 39 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C110 thru C112	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C114	19A700221P53	Ceramic: 47 pF ±5%, 100 VDCW, temp coef -80 PPM.
C115	19A700012P2	Variable, ceramic: 2.5 to 20 pF 200 VDCW, temp coef -250 -700 PPM; sim to Panasonic ECX1ZW20X32.
C124 and C125	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C126*	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
		In REV B:
	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
C127*	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM. Added by REV B.
C128*	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special. Added by REV B.
C129*	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM. Added by REV B.
C130*	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special. Added by REV D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR101	549576999	Silicon, capacitive.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J101 thru J113		(Part of printed board 19B227108G1).
J114	19A130856G2	Connector: 9 contacts. (Quantity 2).
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L101	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L102	19A127798G1	Coil: 6.05-6.50 uH. Includes:
	19B209436P1	Tuning slug.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
L103	19B216910G1	Coil. Includes:
	19B209436P1	Tuning slug.
L104	19B216320P3	Coil.
L105 thru L108	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L109	19A700024P9	Coil, RF: 470 nH ±10%.
L110	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L111	19B216320P3	Coil.
L112* and L113*	19A700024P25	Coil, RF: 10.0 uH ±10%, 3.70 ohms DC res max. Added by REV B.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P101	19A116659P72	Connector, printed wiring: 18 contacts rated at 5 amps. (Part of Exciter Can).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101	3R152P241J	Composition: 240 ohms ±5%, 1/4 w.
R102	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R103	19A116412P4	Variable, cermet: 250K ohms ±10%, 1/2 w; sim to Helipot Model 62 PR.
R104	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR101	4036887P5	Zener: 500 mW, 5.4 v. nominal.
		EXCITER MODULE 4EF39A10 19B216913G2 132-150.8 MHz 4EF39A11 19B216913G1 150.8-174 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116114P24	Ceramic: 7 pF ±5%, 100 VDCW, temp coef 0 PPM.
C2	19A700219P24	Ceramic: 8.2 pF ±5%, 100 VDCW, temp coef 0 PPM.
C3	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
C4	19A700221P45	Ceramic: 30 pF ±5%, 100 VDCW, temp coef -80 PPM.
C5	19A700219P33	Ceramic: 15 pF ±5%, 100 VDCW, temp coef 0 PPM.
C6	19A700221P42	Ceramic: 24 pF ±5%, 100 VDCW, temp coef -80 PPM.
C7	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C8	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C9	19A116462P3	Variable: less than 2 pF to more than 20 pF, 100 VDCW, temp coef -320 PPM.
C10	19A700219P50	Ceramic: 39 pF ±5%, 100 VDCW, temp coef 0 PPM.
C11	19A700221P51	Ceramic: 43 pF ±5%, 100 VDCW, temp coef -80 PPM.
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B216921G1	Coil. Includes:
	19B209436P1	Tuning slug.
L2	19A700024P13	Coil, RF: 1.0 uH ±10%.
L3 and L4	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L5	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L6	19B209420P2	Coil, RF: .12 uH ±5%, .09 ohms DC res max; sim to Jeffers 4416-2J.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P5	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2	19B227818G3	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P330J	Composition: 33 ohms ±5%, 1/8 w.
R2*	19A134564P4	Metal film: 10 ohms ±5%, 1/4 w.
		In REV C & earlier:
	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
		EXCITER PA 4EG29A10 19C317450G2 132-150.8 MHz 4EG29A11 19C317450G1 150.8-174 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A700221P47	Ceramic: 33 pF ±5%, 100 VDCW, temp coef -80 PPM.
C2	19A700221P50	Ceramic: 39 pF ±5%, 100 VDCW, temp coef -80 PPM.
C3	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C4	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C5	19A700221P41	Ceramic: 22 pF ±5%, 100 VDCW, temp coef -80 PPM.
C6	19A700221P45	Ceramic: 30 pF ±5%, 100 VDCW, temp coef -80 PPM.
C7	19A116114P24	Ceramic: 7 pF ±5%, 100 VDCW, temp coef 0 PPM.
C8	19A116114P30	Ceramic: 9 pF ±5%, 100 VDCW, temp coef 0 PPM.
C12 and C13	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C14	19A700219P14	Ceramic: 3.3 pF ±5%, 100 VDCW, temp coef 0 PPM.
C16	19A700013P14	Phenolic: 1.20 pF ±5%, 500 VDCW.
C17	19A116114P14	Ceramic: 4 pF ±5%, 100 VDCW, temp coef 0 PPM.
C19	19A116114P20	Ceramic: 6 pF ±5%, 100 VDCW, temp coef 0 PPM.
C20	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C21	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C23	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C25	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C26	5491674P36	Tantalum: 3.3 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C27	19A700219P24	Ceramic: 8.2 pF ±5%, 100 VDCW, temp coef 0 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L2	19B216935G1	Coil. Includes:
	19B209436P1	Tuning slug.
L5	19B209420P103	Coil, RF: .15 uH ±10%, .10 ohms DC res max; sim to Jeffers 4416-2K.
L6 and L7	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L8	19B209420P103	Coil, RF: .15 uH ±10%, .10 ohms DC res max; sim to Jeffers 4416-3K.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P6	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A115328P1	Silicon, NPN.
Q2	19A116201P3	Silicon, NPN.
Q3	19A116201P1	Silicon, NPN.
Q4 and Q5	19A700022P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P470J	Composition: 47 ohms ±5%, 1/8 w.
R2	3R151P511J	Composition: 510 ohms ±5%, 1/8 w.
R3	3R151P330J	Composition: 33 ohms ±5%, 1/8 w.
R4	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R5*	19A134564P4	Metal film: 10 ohms ±5%, 1/4 w.
		In 4EG29A10 or REV E & earlier: In 4EG29A11 or REV D & earlier:
	3R151P100J	Composition: 10 ohms ±5%, 1/8 w.
R6	3R151P5R6J	Composition: 5.6 ohms ±5%, 1/8 w.
R7*	19A134564P4	Metal film: 10 ohms ±5%, 1/4 w.
		In 4EG29A10 or REV D & earlier: In 4EG29A11 or REV D & earlier:
	3R152P100J	Composition: 10 ohms ±5%, 1/4 w.
R8	19A116412P1	Variable, cermet: 200 ohms ±10%, 1/2 w; sim to Helipot Model 62 PR.
R9	3R151P102J	Composition: 1K ohms ±5%, 1/8 w.
R12	3R151P182J	Composition: 1.8K ohms ±5%, 1/8 w.
R13	3R151P102J	Composition: 1K ohms ±5%, 1/8 w.
R14	3R151P470J	Composition: 47 ohms ±5%, 1/8 w.
R15	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	19B216910G2	Coil. Includes:
	19B209436P1	Tuning slug.
T2	19B216934G1	Coil. Includes:
	19B209436P1	Tuning slug.
		PA BOARD 19D423599G1 PORTABLE 19D423599G2 MOTORCYCLE
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
AR201*	19A116297P2	Linear; TO 99 Package. Deleted in G1 by REV D, G2 by REV C.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C201	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C202*	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
		In G1 of REV C & earlier, G2 of REV B & earlier:
	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C203	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C204	5496267P14	Tantalum: 15 uF ±20%, 20 VDCW; sim to Sprague Type 150D.
C205	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C206	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C207	5494481P101	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C208	19A116656P39J2	Ceramic disc: 39 pF ±5%, 500 VDCW, temp coef 0 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C10	19A116656P43J8	Ceramic disc: 43 pF ±5%, 500 VDCW; temp. coef -80 PPM.
C211	19A134276P4	Variable: 7 to 65 pF, 175 VDCW; sim to El-Menco C40042X.
C212	19A116952P100	Silver mica: 100 pF ±2%, 250 VDCW.
C214	19A134276P4	Variable: 7 to 65 pF, 175 VDCW; sim to El-Menco C40042X.
C215	19A116656P12J2	Ceramic disc: 12 pF ±5%, 500 VDCW, temp coef -220 PPM.
C216	5491601P32	Phenolic: 4.7 pF ±10%, 500 VDCW.
C217	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C218	19B209408P6	Variable, mica: 37-140 pF, 400 VDCW.
C219	19A700014P35	Metallized teflon: 180 pF ±5%, 250 VDCW.
C220	19A116679P500J	Silver Mica: 500 pF ±5%, 250 VDCW.
C221	5494481P101	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C222	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C223	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C224	19A134202P8	Tantalum: 15 uF ±20%, 20 VDCW.
C225	19B209408P6	Variable, mica: 37-140 pF, 400 VDCW.
C226	19B209408P3	Variable, mica: 7-50 pF, 400 VDCW.
C227	19A116656P12G8	Ceramic disc: 12 pF ±2%, 500 VDCW, temp coef -80 PPM.
C228	19A116952P33	Metallized teflon: 33 pF ±2%, 250 VDCW.
C229	19A116656P12G8	Ceramic disc: 12 pF ±2%, 500 VDCW; temp coef -80 PPM.
C230*	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		In G1 REV C, G2 REV B:
	5494481P101	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C231* and C232*	5494481P101	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added to G2 by REV B. Added to G2 by REV C. Deleted in G2 by REV C. Deleted in G1 by REV D.
C233*	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM. Added to G2 by REV B. Added to G1 by REV C. Deleted in G1 by REV D, G2 by REV C.
C234* and C235*	5494481P101	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added to G2 by REV B. Added to G1 by REV C. Deleted in G1 by REV D, G2 by REV C.
C236*	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW. Added to G1 by REV E, G2 by REV D.
CR201* and CR202*	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV. Deleted in G1 by REV D, G2 by REV C.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J201	19A130856G1	Connector: 6 contacts.
J202 and J203		(Part of printed board 19A130799G1).
J204		(Part of W203).
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L202	19A129773G2	Coil.
L203* thru L205*	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K. Deleted in G1 by REV D, G2 by REV C.
L206	19A130800P1	Coil.
L207	19A130803G2	Coil.
L208	19C321853P5	Coil.
L209	19A130802G1	Coil.

SYMBOL	GE PART NO.	DESCRIPTION
L210	19C321852P8	Coil.
L211	19C321852P1	Coil.
L212	19A130802G1	Coil.
L213	19A130801P1	Coil.
L214	19C321852P6	Coil.
L215	19A130802G1	Coil.
L216	19C321852P1	Coil.
L217	19C321852P3	Coil.
L218	19C321852P4	Coil.
L219	19C321852P2	Coil.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P202		(Part of W202).
P203		(Part of W203).
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q201	19A116942P1	Silicon, PNP.
Q202	19B232644G3	Silicon, NPN; power output 17 watts.
Q203	19B232644G4	Silicon, NPN; power output 40 watts.
Q204*	19A700023P1	Silicon, NPN; sim to Type 2N3904. Added to G1 by REV D, G2 by REV C.
Q205*	19A115300P2	Silicon, NPN; sim to Type 2N3053. Added to G1 by REV D, G2 by REV C.
Q206*	19A700023P1	Silicon, NPN; sim to Type 2N3904. Added to G1 by REV D, G2 by REV C.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R201*	19A700106P71	Composition: 2.2K ohms ±5%, 1/4 w.
		In G1 of REV C & earlier: In G2 of REV B & earlier:
	19C314256P28061	Metal film: 8060 ohms ±1%, 1/4 w.
R202*	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
		In G1 of REV C & earlier: In G2 of REV B & earlier:
	19C314256P21003	Metal film: 100K ohms ±1%, 1/4 w.
R203*	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
		In G1 of REV C & earlier: In G2 of REV B & earlier:
	19C314256P27152	Metal film: 71.5K ohms ±1%, 1/4 w.
R204*	19A700111P39	Composition: 100 ohms ±5%, 2 w.
		In G1 of REV C & earlier:
	19C314256P22499	Metal film: 24.9 ohms ±1%, 1/4 w.
R205*	19A700111P45	Composition: 180 ohms ±5%, 2 w.
		In G2 of REV B & earlier:
	19A134225P1	Resistance wire. Deleted in G1 by REV D.
R206*	19C314256P21003	Metal film: 100K ohms ±1%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
R207	19A116559P108	Variable cermet: 10K ohms ±20%, 1/2 w; sim to CTS Series 360.
R208*	19C314256P27152	Metal film: 71.5K ohms ±1%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
R209*	19C314256P23240	Metal film: 324 ohms ±1%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
R210*	19C314256P21002	Metal film: 10K ohms ±1%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
R211*	19A116559P108	Variable cermet: 50K ohms ±20%, 1/2 w; sim to CTS Series 360. Deleted in G1 by REV D, G2 by REV C.
R212* and R213*	19A700106P87	Composition: 10K ohms ±5%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.

SYMBOL	GE PART NO.	DESCRIPTION
R214*	19A700106P31	Composition: 47 ohms ±5%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
		Earlier than REV A:
	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
R215*	3R152P112J	Composition: 1.1K ohms ±5%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
R216	19A700113P32	Composition: 51 ohms ±5%, 1/2 w.
R217	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R218	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R219	19A700113P1	Composition: 2.7 ohms ±5%, 1/2 w.
R220*	3R152P204J	Composition: 200K ohms ±5%, 1/4 w. Deleted in G1 by REV D, G2 by REV C.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT201*	19C300048P7	Thermister: 50K ohms ±10%; sim to NL Industries 1D103.
		In G1 of REV C & earlier: G2 of REV B & earlier:
	19C300048P6	Disc: 50K ohms ±10%; sim to NL Ind. 4D 103.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR201*	4036887P2	Silicon, zener: sim to 1N5223B.
		In G1 of REV C & earlier, G2 of REV B & earlier:
	4036887P1	Zener: 500 mW, 2.3 v. nominal.
VR203*	4036887P11	Silicon, zener. Deleted in G1 by REV C, G2 by REV C.
		- - - - - - - - - - CABLES - - - - - - - - - -
W201		(Part of printed board 19A130799G1).
W202	19A130432G3	Cable assembly, RF: coaxial sim to Solitron/ Microwave 8100-0003. Included (P202).
W203	19A130432G4	Cable assembly, RF: coaxial; sim to Solitron/ Microwave 8120-003. Includes (P203).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C311491P3	Cam. (Used with A101-A103 on Exciter Board).
	19A127337P2	Hex nut: No. 8-32. (Used with Q1 on Exciter Module).
	19B216899P1	Shield. (Located by C3 on Exciter PA).
	19A127781P1	Shield. (Located by C12 on Exciter PA).
	19A127853P1	Shield. (Located by R5 on Exciter PA).
	4035306P11	Washer, fiber: 1/8 dia. (Used with Q2 on Exciter PA).
	19C320921G2	Back cover. (PA Board - PORTABLE).
	19D423486G2	Back cover. (PA Board - MOTORCYCLE).
	19B226408P1	Nut: thread size No. 8-32. (Used with Q202 & Q203 on PA Board).
	19A116022P1	Insulator, bushing. (Used with Q201 on PA Board).
	19A116023P1	Insulator, plate. (Used with Q201 on PA Board).
	19B226409P2	Spacer. (Located on PA Board).
	19A134542P1	Gasket. (Located on back cover).
	19A130151P4	Gasket. (Used with J204).
	4036555P1	Insulator, washer: Nylon. (Used with Q205).
		ASSOCIATED ASSEMBLIES
		- - - - - - - - - OSCILLATOR MODULES - - - - - -
		NOTE: When reordering, give GE Part Number and specify exact frequency needed.
		Crystal Freq. = Fo / 12
A104 thru A115	4BG27A10	Oscillator Module.

SYMBOL	GE PART NO.	DESCRIPTION
		COMPRESSOR KIT 19A130409G1
A116	19C311907G2	Audio Compressor.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C117 and C118	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C119	5491674P36	Tantalum: 3.3 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C120	19A116192P2	Ceramic: 470 pF ±20%, 50 VDCW; sim to Erie 811-A050-W5R-471M.
C121	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R105	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R106	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R107*	3R151P333J	Composition: 33K ohms ±5%, 1/8 w.
		In REV A & earlier:
	3R151P153J	Composition: 15K ohms ±5%, 1/8 w.
R108	3R151P433J	Composition: 43K ohms ±5%, 1/8 w.
R109*	3R151P623J	Composition: 62K ohms ±5%, 1/8 w. Added by REV A.
		CAPACITOR KIT 19A130378G3 138-154 MHz 19A130378G4 150-174 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C122	19A116114P2051	Ceramic: 43 pF ±5%, 100 VDCW; temp coef -80 PPM.
C123	19A116114P2047	Ceramic: 33 pF ±5%, 100 VDCW; temp coef -80 PPM.
		VHF HARDWARE KIT 19A130460G2
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R9	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
		COMPONENT BOARD 19A130756G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A130440G3	Can. (Power Amplifier).
	19A130440G4	Can. (Exciter).
	19B226409P3	Spacer. (Used to secure Exciter Board).
	N80P9003C6	Screw, phillips: No. 4-40 x 3/16. (Used to secure Exciter & Power Amplifier Boards).
	N404P11C6	Lockwasher, internal: No. 4. (Used to secure Exciter & Power Amplifier Boards).
	19A130519G1	Cap screw: No. 8-32 x 4. (Secures Power Amplifier to housing).
	4036979P3	Washer, non-metallic: .250 ID. (Secures Power Amplifier to housing).
	N193P15C6	Retaining ring, steel: external type. (Located on mounting screw for Power Amplifier).
	19A115834P4	Contact, electrical: sim to AMP 2-332070-9. (P303 & P304).
	19A143644G1	Pad. (Located between printed board & casting).
	19A115185P5	Retainer strap: sim to Panduit Corp. SST-1. (Ties all wires to harness).
	19A115060P30	Wire, solder: wire size No. 26. (Located at P303 & P304).
	4038593P4	Insulated sleeving. (Located at P303 & P304).

PRODUCTION CHANGES

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

REV. A - PA Board 19D423599G1 & G2
To improve low voltage and temperature operation of current control.
Deleted C85. Added jumper between H85 and H86.
Added C241 and changed R214.

REV. B - To improve operation of power control circuit.
Added C230 through C235.

REV. A - Exciter Board 19D423591G1
To improve deviation symmetry.
Added note 3 to drawing 19R622204.

REV. A - Compressor Kit 19A130409G1
To improve operation.
Added R109 to replace R107 in Low Band applications.

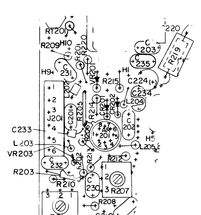
REV. B - To improve deviation.
Changed R107.

REV. D - Exciter Modules 4EF39A10 & 11
To provide flame-proof resistors.
Changed R2.

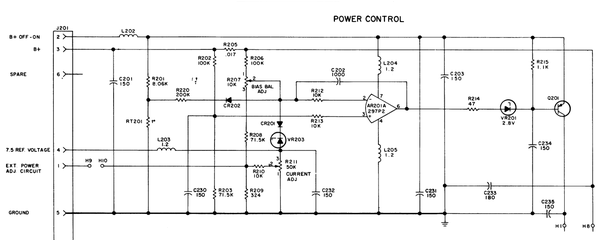
REV. C - PA Board 19D423599G1
To improve operation of power control circuit.
Added C230 through C235.
Deleted * from wiring diagram.

REV. D - PA Board 19D423599G1
REV. C - PA Board 19D423599G2
To improve ability to adjust RF power output.
Deleted AR201, C231, C232, C233, C234, C235, CR202, CR203, L203, L204, L205, R206, R208, R209, R210, R211, R212, R213, R214, R215, R230, VR202 and VR203. Changed C202, C230, R201, R202, R203, RT201 and VR201.
Added Q204, Q205, and Q206.
Deleted R205 and changed R204 on 19D423599G1. Deleted R204 and changed R205 on 19D423599G2.

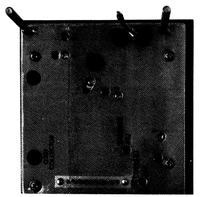
Outline Diagram was:



Schematic Diagram was:



Alignment Procedure was:



* If rated power output is not necessary to communicate, the power output may be reduced by the CURRENT ADJ control resulting in increased battery life. Refer to Percent of Rated Power V. Percent of Rated Current Drain Curve.

4. Set the BIAS BALANCE ADJUST fully counterclockwise.
5. Set the CURRENT ADJUST fully clockwise.
6. Place the (+) lead of the test meter into test point TP1 and the (-) lead on system ground.
7. All adjustments made with the transmitter keyed.

13.	CURRENT ADJ.	R211		Turn current ADJ fully counterclockwise.
14.	Bias Bal ADJ	R207	1 Volt	Meter the collector of Q201 and adjust BALANCE ADJ for a reading as close to zero as possible without going negative.
15.	CURRENT ADJ.	R211	5-20 watts for KT-132-A 6-30 watts for KT-132-B	Set CURRENT ADJ to the desired power output.*

REV. E - PA Board 19D423599G1
REV. D - PA Board 19D423599G2
To improve stability of power control.
Added C324.

REV. B - Exciter Board 19D423591G1
To improve RF filtering.
Added C124 through C129.
Added L112 and L113.

REV. C - To improve tuning of tripler coil L103.
Changed C126.

REV. D - To improve modulation symmetry.
Added C130.

REV. F - Exciter PA Module 4EX29A10
REV. E - Exciter PA Module 4EX29A11
To improve incorporate flame-proof resistors.
Changed R5 and R7.

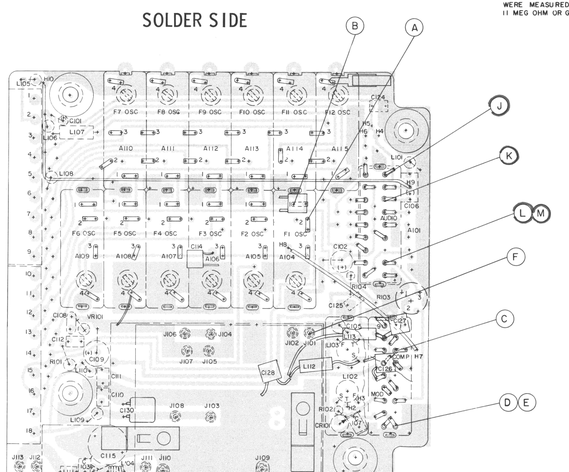
REV. F - PA Board 19D423599G1
REV. E - PA Board 19D423599G2

To improve operation. Removed contact spring located near W202.

STEP 1- QUICK CHECKS

SYMPTOM	QUICKCHECK
No Power Output	1. Check the current drain. 2. If the current is approximately normal or higher, check the antenna relay, internal/external antenna switch, PA board coaxial cable output connector, or transmitter alignment. 3. If current is much lower than normal check, all of the above; check to see that transmitter is plugged properly to system (i.e. that all pins are in the proper holes). Check for proper voltages to exciter board and PA board.
Low Power Output	1. Low battery voltage (refer to Battery Checks in Maintenance Manual LBI-30083). 2. Check the transmitter alignment. 3. As heat sink temperature increases power out decreases. Check the heat sink for excessive heat. The thermal cutback feature will cut the transmitter off altogether if the heat sink temperature is greater than approximately 70°C.
* Distorted or no audio with normal RF output	1. Check voltage readings at (J), (K), (L), and (M). 2. Improper setting of Mod Adjust R103. 3. Check Mod coil L103. 4. Shorted C102 or C106. 5. Bad microphone.
No reading at TP1	Check voltage readings at (A), (B), (D), (E) and (F).

SOLDER SIDE

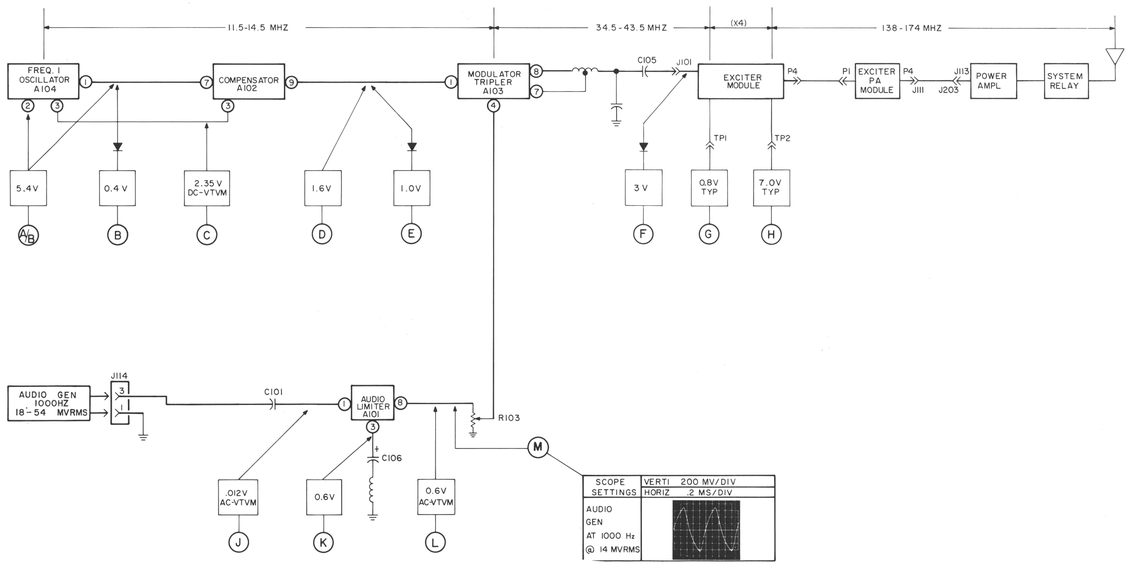


(RC-2944)
(190424243, Rev. 6)
(190423593, Sh. 2, Rev. 8)

STEP 2 - TYPICAL VOLTAGE READINGS

DC READINGS MADE WITH GE TEST SET MODEL 4EX3A10 OR EQUIVALENT. READINGS SHOWN IN SERIES WITH A DIODE ARE RF READINGS TAKEN WITH RF PROBE 19C311370-G1 AND TEST SET MODEL 4EX3A10 ON 3 VOLT SCALE.

EXCEPTION: READINGS FOLLOWED BY VTVM WERE MEASURED WITH A VTVM WITH 11 MEG OHM OR GREATER METER INPUT.



RC-3018B

TROUBLESHOOTING PROCEDURE

138--174 MHz TRANSMITTER
TYPE KT-132 A/B