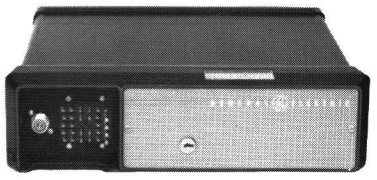
MOBILE RADIO

MASTR
PROGRESS LINE
Executive Series

MAINTENANCE MANUAL



Mobile Radio

Control Unit

25—50 MHz

TWO-WAY FM
MOBILE COMBINATIONS

LBI-3748C

Speaker

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

EQUIPMENT INDEX

EQUIPMENT	MODEL OR TYPE NUMBER
FM TRANSMITTER	ET-72-A, B
FM RECEIVER	ER-46-A, B
CONTROL UNITS	
Trunk-Mount	EC-67-A
Front-Mount	EC-68-A
POWER SUPPLY	4EP50A10
4-FREQ. OSC. BOARD	4EG22A10
CHANNEL GUARD BOARD	4EK14B10
SPEAKER	4EZ20A11
TRUNK-MOUNT POWER/CONTROL CABLE	
1- or 2-Frequency	19C303910-G2
3- or 4-Frequency	19C303910-G4
FRONT-MOUNT POWER CABLE	19C303982-G2
MOUNTING HARDWARE	
Trunk-Mount	19A122244-G2
Front-Mount	19A122244-G1
CONTROLLED RELUCTANCE MICROPHONE	19B209102-P2
Microphone Bracket	7141414-G2
KEY	5491682-P8
ALIGNMENT TOOLS	
Hex Slug Type	4038831-P2
Slotted Screw Type	4033530-G2
25-50 MHZ ANTENNA	
Base, Spring & Cable	4033101-G1
Whip	7491074-P1
Loading Coil (25-30 MHz)	4KY9A1
Lock Assembly	
Key	5491682-P8
Lock	5491682-P14

OPTIONAL EQUIPMENT

10-WATT SPEAKER (Option 8003)	4EZ18A11
WINDOW MOUNTING KIT (Option 8011)	19A121879-G3
WEATHERPROOF BOX (Option 8013)	
Box	19D402674-G1
Cable Entry Kit	19A122244-G4
Hardware	19A122244-G3
HANDSET (Option 8024)	4EM26C10
Hookswitch	19B204867-G4
CARRIER CONTROL TIMER (Option 8306)	19A127875-G3

SPECIFICATIONS *

GENERAL

FREQUENCY RANGE	25 - 50 MHz
DIMENSIONS (H x W x D)	
Trunk-Mount	4" x 12 3/4" x 12 1/4"
Front-Mount	4" x 12 3/4" x 12 1/2"
WEIGHT (including accessories)	28 pounds
BATTERY DRAIN	
Receiver (at 13.8 VDC)	
Standby (squelched)	55 mA
Standby (unsquelched)	0.6 amp
Transmitter	
Transmitter Filaments On (receiver squelched)	0.95 amps
Transmit (at 13.6 VDC)	12 amps
OPERABLE TEMPERATURE RANGE	-30°C to +60°C (-22°F to 140°F)
DUTY CYCLE	Transmit: 20% Receive: 100%
MAXIMUM FREQUENCY SPACING	0.4%

TRANSMITTER

TYPE NUMBER	ET-72-A (Narrow Band) ET-72-B (Wide Band)
POWER OUTPUT	50 watts
FREQUENCY STABILITY	±.002% (-30°C to +60°C, +25°C reference)
SPURIOUS AND HARMONIC RADIATION	-60 dB.
MODULATION	Adjustable from 0 to ±5 kHz (Narrow Band) and 0 to ±15 kHz (Wide Band) swing with instantaneous modulation limiting
AUDIO FREQUENCY CHARACTERISTICS	Within +1 and -3 dB of a 6 dB/octave pre-emphasis from 300 to 3000 Hz per EIA standards
DISTORTION	Less than 5%
DEVIATION SYMMETRY	0.6 kHz maximum (Narrow Band) 1.5 kHz maximum (Wide Band)
CRYSTAL MULTIPLICATION FACTOR	12

RECEIVER

TYPE NUMBER	ER-46-A (Narrow Band) ER-46-B (Wide Band)
AUDIO OUTPUT	2 watts at less than 6% distortion 3 watts at less than 15% distortion
SENSITIVITY	
12-dB SINAD (EIA Method)	0.25 µV (NB), 0.35 µV (WB)
20-dB Quieting Method	0.35 µV (NB), 0.45 µV (WB)
SELECTIVITY	
EIA Two-Signal Method	-75 dB-adjacent channel 20 kHz channels (NB) -65 dB-adjacent channel 40 kHz channel (WB)
20-dB Quieting Method	-100 dB at ±20 kHz (NB) -120 dB at ±40 kHz (WB)
SPURIOUS RESPONSE	-90 dB
FIRST OSCILLATOR STABILITY	±.002% (-30°C to +60°C, +25°C reference)
MODULATION ACCEPTANCE	±6 kHz (NB), ±15 kHz (WB)
INTERMODULATION	-60 dB (NB); -55 dB (WB)
FREQUENCY RESPONSE	+1 and -8 dB of a standard 6-dB per octave de-emphasis curve from 300 to 3000 Hz
SQUELCH SENSITIVITY	
Critical Squelch	4 dB SINAD (0.1 µV typical).
Maximum Squelch	Greater than 20 dB quieting.

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

DESCRIPTION

MASTR Progress Line Executive Series Mobile Radio Combinations are attractively styled, ruggedly constructed units that are designed to meet the most stringent requirements in the field of two-way FM radio.

The combination is contained in a "slide-rail" mounting frame and is designed for either Front-Mount or Trunk-Mount installations. The radio is tamperproof when locked in the mounting frame. When unlocked, the unit can be easily pulled out of its frame for servicing.

Both the transmitter exciter board and the receiver are fully transistorized. Silicon transistors are used for added reliability.

Battery drain in standby operation is so low (only 55 milliamps) that the radio never has to be turned off.

All major modules and tuning adjustments are accessible from the top of the unit (Figure 1). Both the transmitter and receiver are equipped with centralized metering jacks for simplified alignment and troubleshooting.

The transmitter and receiver may be used interchangeably in mobile and station installations. No modifications are required when transferring the units from one type of operation to another.

TRANSMITTER

The transmitter assembly consists of the transistorized exciter board and the power amplifier section. The transmitter uses only two tubes in the power amplifier. The standard transmitter may be equipped with:

- One through four frequencies
- Channel Guard

RECEIVER

The fully transistorized receiver is mounted on a single printed wiring board for increased reliability. A copper-plated housing and metal cover that completely encloses the receiver provides excellent shielding. The standard receiver may be equipped with:

- One through four frequencies
- Channel Guard
- Noise Blanker

POWER SUPPLY

The transistorized mobile power supply was designed for operation in 12-volt, negative-ground vehicle systems. An optional polarity converter is required to operate the radio in positive-ground vehicle systems.

CONTROL UNITS

Two different Control Units are available for use with the radio. In Front-Mount applications, the Control Unit is attached to the front panel of the two-way radio. In Trunk-Mount applications, the Control Unit is normally mounted on the underside of the instrument panel near the operator.

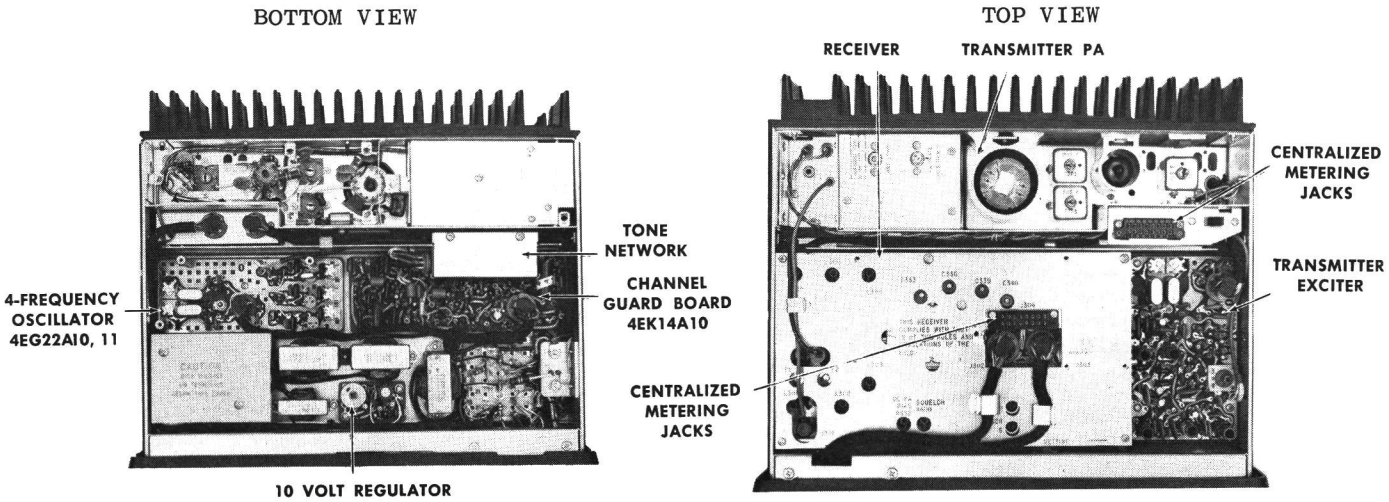


Figure 1 - Module Layout

INITIAL ADJUSTMENT

After the MASTR Executive Series mobile combination has been installed (as described in the INSTALLATION Manual), the following adjustments should be made by an electronics technician who holds a 1st or 2nd Class FCC Radiotelephone license. Alignment tools are provided with the radio.

Make sure that a RADIO TRANSMITTER IDENTIFICATION form (FCC Form 452-C or General Electric Form ECP-82) has been filled out and attached to the transmitter.

TRANSMITTER ADJUSTMENT

The initial adjustment for the transmitter includes loading the power amplifier into the antenna, and checking the frequency and modulation. For the Initial Adjustment procedure, refer to the transmitter ALIGNMENT PROCEDURE.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes zeroing the receiver to the system operating frequency, and matching the antenna transformer to the antenna. For the initial adjustment procedure, refer to the FRONT END ALIGNMENT PROCEDURE.

OPERATION

Complete operating instructions for the Two-Way Radio are provided in the separate OPERATOR'S MANUAL (LBI-3731). The basic procedures for receiving and transmitting messages follows:

TO RECEIVE A MESSAGE

1. Turn the radio on by turning the OFF-VOLUME control halfway to the right.
2. Press in the MONITOR button and adjust the VOLUME control for a comfortable listening level.

The radio is now ready to receive messages from other radios in the system.

TO TRANSMIT A MESSAGE

1. Apply power to the transmitter by turning the OFF-VOLUME control to the ON position. Let the unit warm up for 30 seconds.
2. Press the push-to-talk button on the microphone and speak across the face of the microphone in a normal (or softer) voice. Release the button as soon as the message has been given. The red GE signal light on the control panel will glow each time the microphone button is pressed, indicating that the transmitter is on the air. The receiver is muted whenever the transmitter is keyed.

MAINTENANCE

PREVENTIVE MAINTENANCE

To insure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routine checks should be made of all mechanical and electrical parts at regular intervals. This preventive maintenance should include the maintenance checks listed on the following page.

TEST AND TROUBLESHOOTING PROCEDURES

Whenever difficult servicing problems occur, the test procedure for transmitter and receiver can be used by the serviceman to compare the actual performance of the unit against the specifications met by the unit when shipped from the factory. The test procedures are located on the back of the applicable Alignment Procedure.

In addition, specific troubleshooting procedures are available for the transmitter, receiver, noise blanker and power supply (refer to the Table of Contents). For best results, the test procedures should be used in conjunction with the troubleshooting procedures.

DISASSEMBLY

To gain access to the unit for servicing:

1. Unlock the radio (see Fig. 2).
2. Loosen the two captive screws shown in Fig. 2.
3. Pull the radio forward about two inches out of mounting frame, and lift off top cover.
4. To gain access to the bottom side, pull the radio all the way out of mounting frame.

MAINTENANCE CHECKS	INTERVAL	
	6 Months	As Required
CONNECTIONS - Check power and ground connections periodically for tightness. Loose or poor connections to the power source will cause excessive voltage drops and faulty operation.	X	
GENERATOR AND REGULATOR - Check the generator and voltage regulator periodically to keep the generating system within safe and economical operating limits. If generator voltage is excessive, tubes, lights, etc., may burn out periodically. This condition is indicated when the battery loses water rapidly. Usage of 1 or 2 ounces of water per cell per week is acceptable for batteries in continuous operation.		X
MECHANICAL INSPECTION - Since mobile units are subject to constant shock and vibration, check for loose plugs, nuts, screws, and parts to make sure that nothing is working loose.	X	
RELAY CONTACTS - Examine the relay contacts. Where contacts carry little or no current, the contacts do not clean themselves and an insulating coating is apt to form. When contacts become coated, remove the film with a suitable solvent applied with a non-metallic brush, such as a toothbrush. Current-carrying contacts are subject to pitting and should be burnished from time to time. Dust and particles should be removed by a clean, dry, non-metallic brush.	X	
ANTENNA - Keep the antenna, antenna base and all contacts clean and free from dirt or corrosion. If the antenna or its base should become coated or poorly grounded, loss of radiation and a weak signal will result.	X	
ALIGNMENT - Check the transmitter and receiver meter readings periodically, and "touch-up" the alignment when necessary. Refer to the applicable ALIGNMENT PROCEDURE and Troubleshooting Sheet for typical voltage readings.		X
FREQUENCY CHECK - Check transmitter frequency and deviation as required by FCC. Normally, these checks are made when the unit is first put into operation, after the first six months, and once a year thereafter.		X

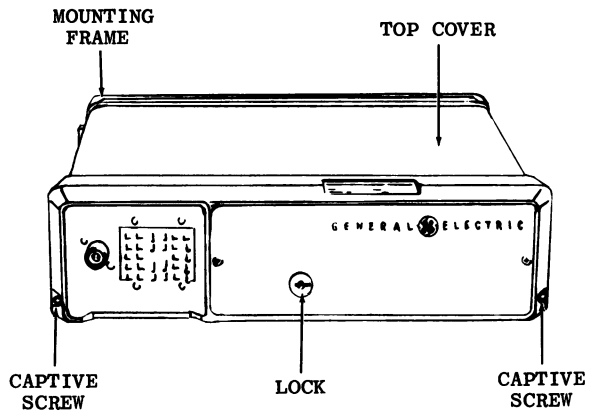


Figure 2 - Disassembly

CIRCUIT ANALYSIS

TRANSMITTER

Transmitter Types ET-72-A and ET-72-B are crystal-controlled, phase modulated transmitters designed for one-, two- or four frequency operation in the 25-50 megahertz band in mobile or station applications. The transmitter consists of the following modules:

- Transistorized Exciter Board - Audio, oscillator, modulator and multiplier stages
- PA Assembly - Multiplier/driver, power amplifier, low-pass filter and antenna relay.

The model number and number of frequencies of each module is shown in the following chart.

FREQ RANGE	PA ASSEMBLY	EXCITER BOARD		NO. OF FREQS
		Without Channel Guard	With Channel Guard	
25-33 MHz	4EF32A10	4EG21A10 (NB)	4EG21A11	1-Freq
		4EG21A12 (NB)	4EG21A13	2-Freq
		4EG21A14 (WB)		1-Freq
		4EG21A15 (WB)		2-Freq
33-42 MHz	4EF32B10	4EG21B10 (NB)	4EG21B11	1-Freq
		4EG21B12 (NB)	4EG21B13	2-Freq
		4EG21B14 (WB)		1-Freq
		4EG21B15 (WB)		2-Freq
42-50 MHz	4EF32C10	4EG21C10 (NB)	4EG21C11	1-Freq
		4EG21C12 (NB)	4EG21C13	2-Freq
		4EG21C14 (WB)		1-Freq
		4EG21C15 (WB)		2-Freq

The transmitter uses a total of 7 transistors and 2 tubes to provide a minimum power output of 50 watts. The crystals used range from 2.08 to 4.17 megahertz, and the crystal frequency is multiplied 12 times.

A centralized metering jack (J201) is provided for use with GE Test Set Model 4EX3A10. The test set meters the phase modulator, multipliers, driver and PA stage, as well as the B-plus and regulated supply voltages. The metering jack also provides access to receiver audio, microphone and push-to-talk leads.

POWER INPUTS

All supply voltages are connected from the power supply to the transmitter through two 7-pin miniature connectors (J202 and J203). Voltages for the PA assembly are connected through J202, and are filtered by feed-through capacitors C222 through C229. Supply voltage, metering and control functions for the exciter board are connected from the PA assembly through a 9-pin miniature connector (J105). Supply voltages for the transmitter are shown in the following chart.

Connection	Voltage	Use
J202-1	+600 VDC	PA B-plus
J202-2	+300 VDC	multiplier B-plus
J202-3	ground	
J202-4	-55 VDC	PA bias
J202-5	+12 VDC	relay supply
J202-6 & -7		filament
J105-2	+10 VDC reg.	Exciter supply

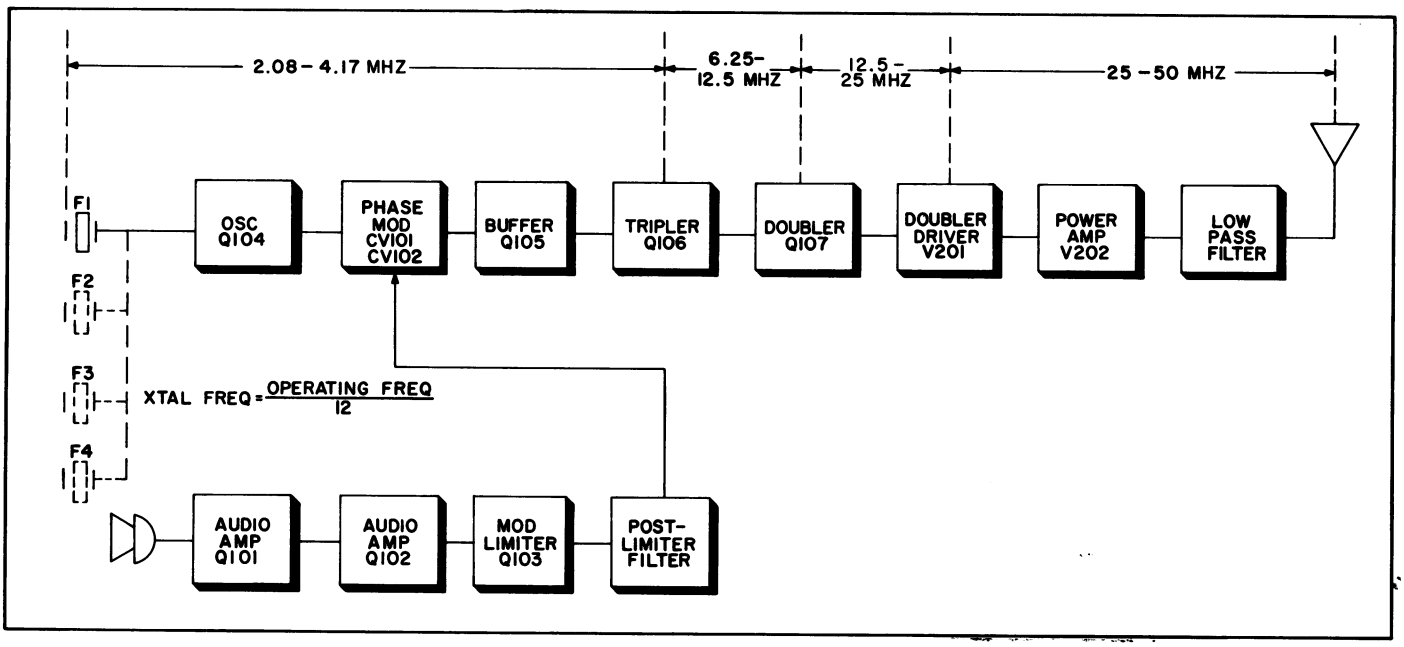


Figure 3 - Transmitter Block Diagram RC-1342A

EXCITER BOARD

OSCILLATOR

A transistorized Colpitts oscillator (Q104) is used in the transmitter. The oscillator provides a frequency stability of +.002% without crystal ovens or warmers. Feedback for the oscillator is developed across C115.

In single-frequency transmitters, a jumper connects the F1 crystal keying lead to ground and the crystal frequency is applied to the base of oscillator Q104. The oscillator frequency is adjusted by trimmer C107. The oscillator output is applied to the anode of phase modulator CV101.

In two-frequency transmitters, the single oscillator transistor is used, and an additional crystal circuit and two diodes (CR101 and CR102) are added. The keying jumper is removed, and the proper crystal frequency is selected by switching the crystal keying lead to ground by means of a frequency selector switch on the Control Unit. This forward biases the diode in the crystal circuit, reducing its impedance, so that the selected crystal frequency is applied to the base of oscillator Q104.

For four-frequency transmitters, oscillator board Model 4EG22A10 is added. The oscillator board contains two crystal circuits (F3 and F4) identical to the F1 and F2 circuits. In four-frequency transmitters, F3 and F4 crystals are also switched by means of diode biasing. The output of the oscillator board is connected through J2603 to the base of Q104.

AUDIO AMPLIFIERS AND LIMITER

The audio section of the transmitter consists of DC-coupled feedback amplifiers Q101, Q102 and Q103. Q103 also acts as a limiter at high audio input levels. Audio from the microphone is coupled through an input network (C104 and R104) to the audio stages. The input network, in conjunction with the feedback circuit, provides the audio gain and a 6-dB/octave pre-emphasis.

The output of limiter Q103 is connected through modulation adjust potentiometer R115 to a de-emphasis network for a 6-dB/octave de-emphasis and post limiter roll-off. The network consists of C101, C137, R101 and R127. Modulation adjust R115 determines the maximum signal level applied to the modulator circuit, and is normally set for ±4.5 kHz (narrow band) or ±13.5 kHz (wide band).

PHASE MODULATOR

The phase modulator uses varactor CV101 (a voltage-variable capacitor) in an R-L-C network that includes R126 and L113. An audio signal applied to the modulator through L112 varies the capacitance of CV101, resulting in a phase modulated output. The modulator output is fed to the base of buffer Q105.

In Channel Guard applications, tone from Channel Guard board Model 4EK14A10 is fed to the modulator circuit through J103 (tone high) and J104(ground).

BUFFER AND MULTIPLIERS

Buffer stage Q105 isolates the modulator from the loading effects of the tripler stage, and provides some amplification The output is DC coupled to the tripler.

Following Q105 are two L-C coupled Class C multiplier stages (Q106 and Q107). Q106 is a tripler stage with the collector tank tuned to three times the crystal frequency. The stage is metered at J201. Resistors R132 and R134 are for metering the tripler stage.

Q107 operates as a doubler stage, with the collector tank tuned to six times the crystal frequency. Resistors R136 and R137 are for metering the doubler stage at centralized metering jack J201.

PA ASSEMBLY

MULTIPLIERS

The output of the transistorized exciter is link-coupled through T201 to the grid of beam pentode V201. This stage operates as a doubler driver with T202 tuned to 12 times the crystal frequency. The grid of C201 is metered across R201 at J201.

POWER AMPLIFIER

The output of V201 is transformer-coupled to the grid of compactron beam power amplifier V202. The grid is tuned by T203 and current is metered at J201-6 and J201-14 by measuring the voltage drop across R208. Bias voltage (-55 volts) is applied to the PA grid through R208 and T203.

Plate current is metered from J201-1 to J201-9 across metering resistor R209. Plate voltage is supplied through L207, and the PA plate tank is series-tuned by capacitor C213. The screen grid dropping resistor is R207.

WARNING

The meter leads are at plate potential (high B+) when metering the PA plate at J201-1 and J201-9.

Placing TUNE-OPERATE switch S201 in the OPERATE position effectively shorts R211 out of the circuit, and applies 300 volts to grid dropping resistor R207 for normal operation of the stage. Placing the switch in the TUNE position applies the screen voltage to dropping resistor R211 and shunt resistor R210 to drop the screen voltage. This reduces the plate dissipation while tuning the transmitter.

PA loading is achieved by ANTENNA LOADING capacitor C215.

RF from the antenna coil is fed through the low-pass filter to antenna changeover relay K201, and then to the antenna.

RECEIVER

Receiver Types ER-46-A and ER-46-B are double conversion, superheterodyne FM receivers designed for one-, two- or four-frequency operation on the 25-50 megahertz band in mobile or station applications.

The receiver is of single-unit construction and is housed in a copper-plated casting for maximum shielding and rigidity. The unit is completely transistorized, using a total of 20 silicon transistors. Frequency ranges and the number of frequencies for each receiver model are shown in the chart at the bottom of this page.

A regulated +10 volts is used for all receiver stages except the audio driver and audio PA stages, which operate from the 12-volt system supply. The audio PA stage and output transformer are mounted on the underside of the system frame behind the power supply.

Centralized metering jack J304 is provided for use with GE Test Set Model 4EX3A10. The test set meters the oscillator, 1st and 2nd limiters, discriminator and audio PA as well as the voice coil, regulated 10 volts and 12-volt supply.

RF AMPLIFIERS

RF signals from the antenna are fed to the base of RF amplifier Q301 through two tuned pre-selector circuits. The output signal is inductively coupled through two tuned circuits to the base of 1st mixer Q304.

OSCILLATOR

Q302 is a Colpits oscillator operating in the 12 to 19 megahertz range. Trimmer capacitor C311 permits the oscillator frequency to be shifted slightly for setting the receiver on the system operating frequency.

For 25 to 33 megahertz operation, collector coil L305 is tuned to two times the crystal frequency with high-side injection. For 33 to 42 megahertz operation, L305 is tuned to two times the crystal frequency with low-side injection For 42 to 50 megahertz operation, L305 is tuned to three times the crystal frequency with low-side injection.

For two-frequency operation, a second oscillator stage is added. Channels are selected by grounding the emitter of the desired oscillator by means of a two-frequency switch on the control unit.

For four-frequency operation, four-frequency oscillator board Model 4EG22A10 is added. The oscillator board contains three oscillator circuits (F2, F3 and F4) that are similar to the F1 oscillator circuit. The output lead of the oscillator board is plugged into crystal socket XY402, and the F2 oscillator board is modified so that Q303 can be used as an amplifier stage. Channels are selected by grounding the emitter of the desired oscillator by means of a four-frequency switch on the Control Unit.

1ST MIXER AND CRYSTAL FILTER

The RF signal from the RF amplifier and the injection voltage from the oscillator are applied to the base of 1st Mixer Q304. The 5.3 megahertz High IF output is coupled through three tuned circuits (L307 and C333, L308 and C336, L309 and C339) which provide Hi-IF selectivity and impedance matching to the crystal filter.

The Hi-IF crystal filter has ample selectivity to prevent adjacent channel signals from overloading the 2nd Mixer, and

NO. OF FREQS.	FREQUENCY RANGE					
	25-33 MHz		33-42 MHz		42-50 MHz	
	Without Noise Blanker	With Noise Blanker	Without Noise Blanker	With Noise Blanker	Without Noise Blanker	With Noise Blanker
1-Freq	4ER46A10 (NB) 4ER46B10 (WB)	4ER46A12 (NB) 4ER46B12 (WB)	4ER46A14 (NB) 4ER46B14 (WB)	4ER46A16 (NB) 4ER46B16 (WB)	4ER46A18 (NB) 4ER46B18 (WB)	4ER46A20 (NB) 4ER46B20 (WB)
2-Freq	4ER46A11 (NB) 4ER46B11 (WB)	4ER46A13 (NB) 4ER46B13 (WB)	4ER46A15 (NB) 4ER46B15 (WB)	4ER46A17 (NB) 4ER46B17 (WB)	4ER46A19 (NB) 4ER46B19 (WB)	4ER46A21 (NB) 4ER46B21 (WB)
4-Freq	4ER46A22 (NB) 4ER46B22 (WB)	4ER46A23 (NB) 4ER46B23 (WB)	4ER46A24 (NB) 4ER46B24 (WB)	4ER46A25 (NB) 4ER46B25 (WB)	4ER46A26 (NB) 4ER46B26 (WB)	4ER46A27 (NB) 4ER46B27 (WB)

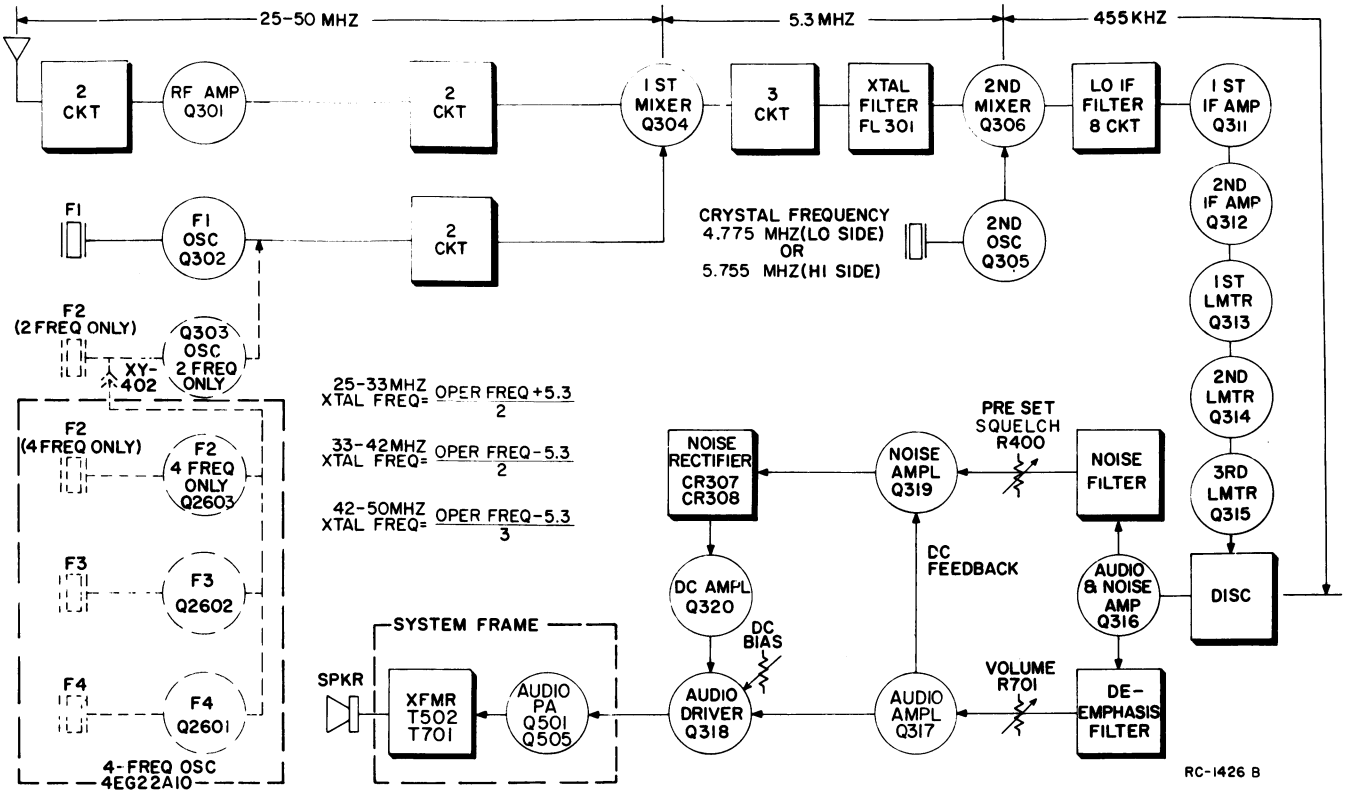


Figure 4 - Receiver Block Diagram

to reduce intermodulation spurious responses.

2ND OSCILLATOR AND MIXER

Hi-IF from the crystal filter is applied to the base of 2nd Mixer Q306 with the 2nd Oscillator output to produce the 455-kHz Lo-IF.

The 455-kHz Lo-IF is coupled to an eight-coil Lo-IF filter which provides the main receiver selectivity.

LO-IF AMPLIFIERS AND LIMITERS

Following the Lo-IF filter are two R-C coupled Lo-IF amplifiers (Q311 and Q312). Their amplified output is fed to three R-C coupled limiter stages consisting of Q313, Q314 and Q315, operating as over-driven amplifiers. The lst and 2nd limiter stages are metered at centralized metering jack J304 thru metering diodes CR302 and CR303.

DISCRIMINATOR

The 3rd limiter output is applied to the Foster-Seely type discriminator, where the audio voltages are recovered from the 455-kHz Lo-IF. A low-pass filter, made up of C422, C423, C424, R377/R479, R379 and R380, removes any 455-kHz signal from the discriminator output.

AUDIO AMPLIFIER AND DRIVER

The audio signal is fed to the base of audio-noise amplifier Q316. Following Q316 is an audio de-emphasis network consisting of C426, C427, C428, R383, R384 and R385.

After the de-emphasis network, the audio signal is fed to the base of audio amplifier Q317 through the VOLUME control mounted on the control unit. The VOLUME control is used to set the amount of drive to audio amplifier Q317, audio driver Q318, and audio PA Q505. DC BIAS trimmer R392 sets the bias on Q318 and Q505, and is adjusted for a 280 millivolt (500 milliamps) reading at metering jack J304-9. The output of Q505 drives the loudspeaker.

SQUELCH

Noise from audio-noise amplifier Q316 is used to operate the squelch circuit. When no carrier is present in the receiver, this noise is coupled through a noise filter (which attenuates any audio frequencies) to the base of noise amplifier Q319. The noise filter consists of C345, C346, C347 and L331. The noise level fed to the noise amplifier is set by SQUELCH control R400. The output of noise amplifier Q319 is rectified by diodes CR307 and CR308, and filtered by C441 and C442 to produce a positive DC voltage. This DC voltage turns on DC amplifier Q320, causing it to conduct. When con-

duct. When conducting, the collector voltage of the DC amplifiers drops to near ground potential, which lowers the bias on audio stages Q317 and Q318, turning them off.

As audio amplifier Q317 is being turned off, its emitter potential decreases. This results in a positive DC feedback through R406 to the emitter of noise amplifier Q319 which causes an increase in the gain. As the gain of Q319 increases, the positive DC voltage to the DC amplifiers increases, quickly turning the audio stages off.

When the receiver is quieted by a signal, less noise is present in the circuit and the DC amplifiers stay off. The audio stages are allowed to conduct, and audio is heard from the speaker. When audio amplifier Q317 is conducting, a positive voltage appears across R406 which helps reduce the gain of noise amplifier Q319. This positive feedback causes a quick, positive switching action in the squelch circuit.

NOISE BLANKER

The noise blanker is used to prevent impulse noise spikes from decreasing the readability of weak signals. The blanker consists of a pulse generator and a blanking gate circuit. No tuned circuits are used in the blanker; therefore no adjustments are required. Aligning the receiver Hi-IF stages provides the correct voltages. A simplified diagram of the noise blanker is shown in Figure 5.

Pulse Generator

An RF signal and noise pulse is taken from the output of the 1st mixer (Q304) and is coupled through C451 to the pulse generator. The first two stages of the pulse generator consist of RF amplifiers Q451 and Q452. The amplifier stages raise the level of the noise pulse which is fed to the base of pulse generator Q453.

Bias on Q453 is such that it is normally not conducting. Applying a noise pulse to the base of Q453 turns the stage on, and the noise pulse is rectified to produce a DC, negative-going pulse at the collector. Q453 also acts as an RF level shut-off switch. When the carrier amplitude at the base of the stage exceeds 150 microvolts, the transistor saturates and no pulses are produced.

The output of Q453 is fed to an automatic repetition rate switch consisting of C459, CR459 and R475. The time constant of the network is selected so that pulses exceeding 12 to 15 kHz will not be fed to Q454. This prevents degradation of receiver performance due to intermodulation products resulting from two strong signals on adjacent channels.

Following the rep rate switch, the noise pulse is amplified and shaped by pulse squarer stages Q454 and Q455. The output of Q455 is approximately a negative 10 to 12 volt, 20-microsecond square wave blanking pulse.

Blanking Gate

The blanking gate circuit consists of CR451, CR452 and C467. The diodes are not normally conducting due to a positive bias from voltage divider network R473 and R474.

Applying a negative 10-volt blanking pulse to the cathodes of the blanking diodes causes them to conduct. When conducting, they provide an RF short through C467 for Hi-IF L308 and L309 for the duration of the blanking pulse.

POWER SUPPLY

Transistorized Power Supply Model 4EP50A10 is used with MASTR Progress Line Executive Series mobile combinations. The power supply is mounted in the front casting which acts as a heat sink for the power

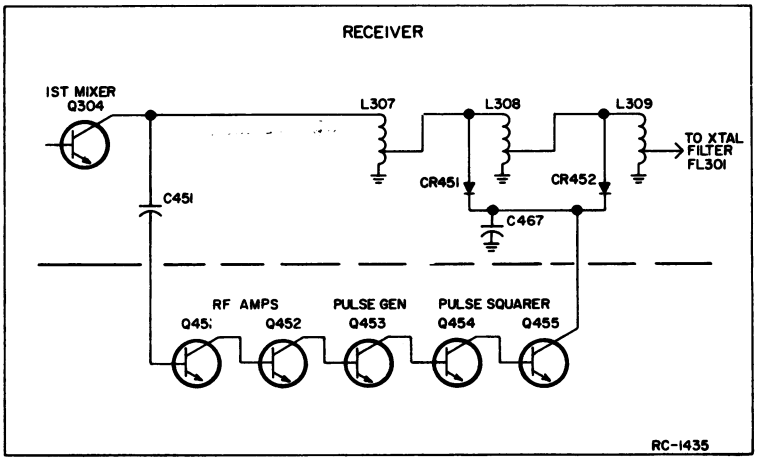


Figure 5 - Simplified Noise Blanker Diagram

transistors. Output filters and the 10-volt regulator are mounted on the main chassis.

The fully transistorized power supply uses highly efficient silicon rectifiers for reliable operation. Polyester capacitors in the output filters provide additional reliability with good performance at low temperatures. Regulation of critical transmitter and receiver supply voltages provides improved operation over the wide range of input voltages encountered in mobile communications. The power supply provides:

- Plate, screen and bias voltages for the transmitter multiplier and power-amplifier stages,
- Regulated +10 volts for the transistorized transmitter exciter board,
- Regulated +10 volts for the receiver and for the four-frequency board.

Low voltage for the transmitter filaments, push-to-talk and antenna relays, receiver audio amplifiers and the 10-volt regulator is taken directly from the vehicle battery.

The power supply is designed for operation in 12-volt, negative-ground systems. For positive-ground systems, a DC-to-DC converter (Model 4EP54A10) must be used with a mobile combination. Figure 6 is a simplified power distribution and switching diagram.

MULTIVIBRATOR CIRCUIT

The power supply uses transistors Q501 and Q502 as switches in an inductively-coupled multivibrator circuit. These switches connect the battery voltage across alternate halves of the transformer primary, resulting in alternating square waves. The output of the multivibrator circuit (square wave generator) is stepped up by power transformer T501, then rectified and filtered to supply B-plus and bias voltage for the transmitter. The two transistors conduct alternately at a frequency of approximately 2,000 hertz.

RECTIFIER AND FILTER CIRCUITS

Negative Bias Supply

The AC voltage developed across secondary windings 13 and 15 of transformer T501 is rectified by full-wave rectifiers CR501 and CR502. It is then filtered by C505, L501 and C506 to supply a negative 55 volts for the control grid of the transmitter power amplifier. The bias voltage is present as a protective measure to limit cathode current in the PA tube while the PA is untuned, or in the case of loss of drive to the PA. R504 is a bleeder resistor.

Multiplier B-Plus (Figure 7)

The AC voltage developed across the high voltage secondary windings of T501 is rectified by a full-wave bridge rectifier circuit.

During one-half of each AC cycle, the voltage across TB501-2 and -3 of the high voltage output winding is rectified by CR507 and CR509. During the second half of the cycle, the voltage is rectified by CR508 and CR510.

Filtering is provided by L-C filter C501, L503 and C502. Relatively small values of L and C are required because of the high frequency and the square wave characteristics of the AC voltage.

Power Amplifier B-Plus (Figure 7)

High B-Plus for the power amplifier is provided by the PA rectifier circuit and the multiplier rectifier circuit connected in series.

In high band mobile combinations, a jumper is connected from TB4-8 to TB4-10, and the AC voltage developed across TB501-5 and -6 is rectified by CR504 and CR505. This output, in series with the multiplier output, supplies 450 volts DC high B-plus.

In low band mobile combinations, the jumper is connected from TB4-8 to TB4-11, and the AC voltage is rectified by a bridge rectifier circuit consisting of CR503, CR504, CR505 and CR506. This output, in series with the multiplier output, supplies 600 volts DC high B-plus.

The PA filter consists of C503, L502 and C504. R503 is a bleeder resistor.

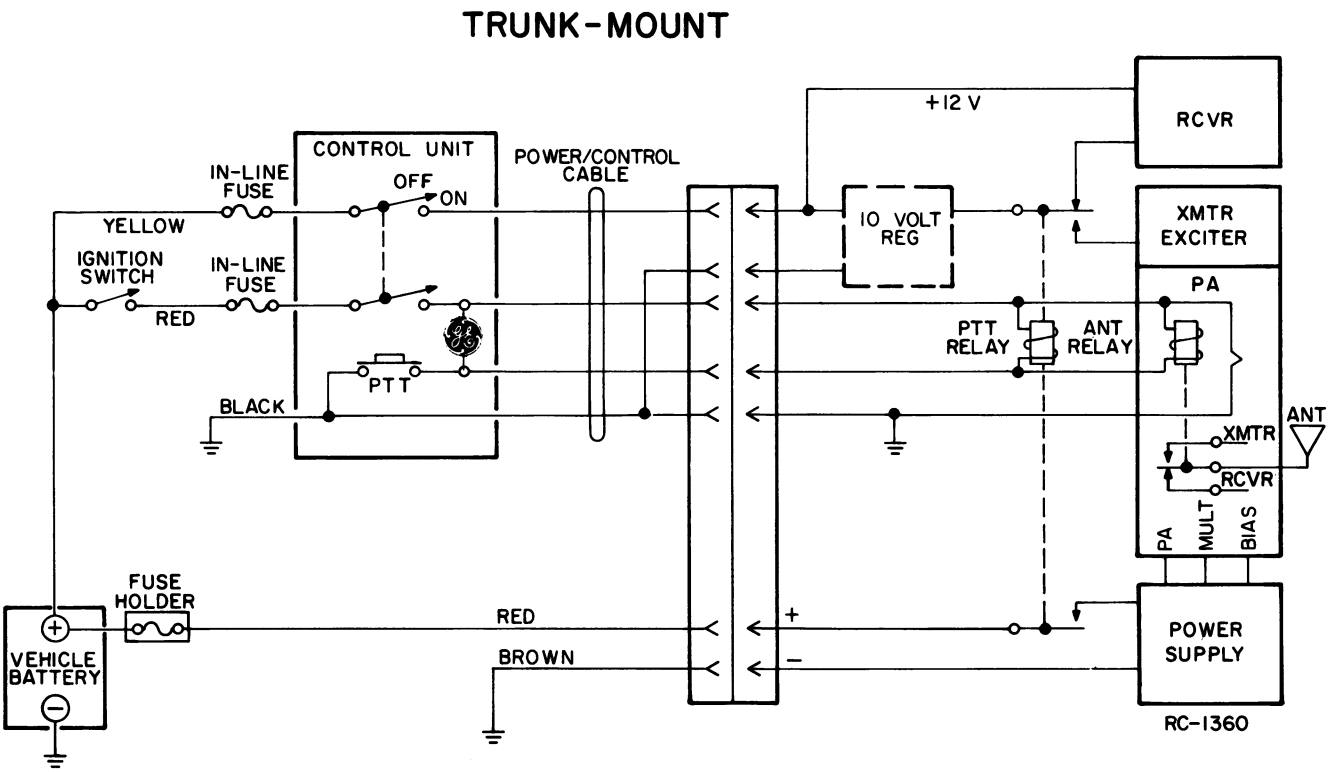
+10 VOLT REGULATOR (A501)

The 10-volt regulator provides a closely controlled supply voltage for the transmitter exciter, receiver and four-frequency oscillator board.

When the output voltage at the emitter of Q1 tries to increase, the voltage at the base of Q2 tends to become more positive. This makes Q2 conduct more heavily, causing the voltage at the base of Q1 to become more negative. With less base bias, Q1 conducts less and the voltage drop across the transistor is larger, keeping the output voltage constant.

When the output voltage tries to decrease, Q2 conducts less and the base bias on Q1 increases. This causes Q1 to conduct more heavily, reducing the voltage drop across the transistor and keeping the output constant.

Potentiometer R3 and resistor R4 form



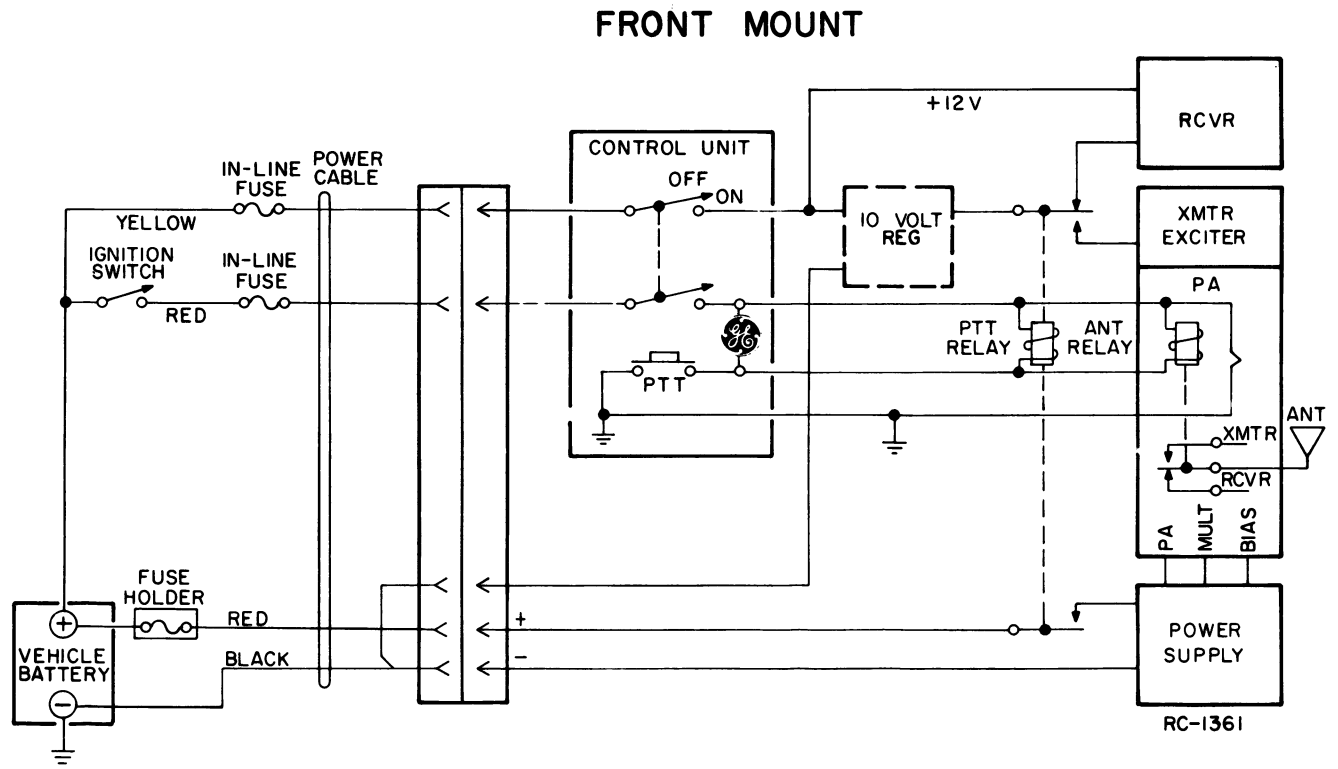


Figure 6 - 12-Volt, Negative-Ground Power Distribution Diagrams

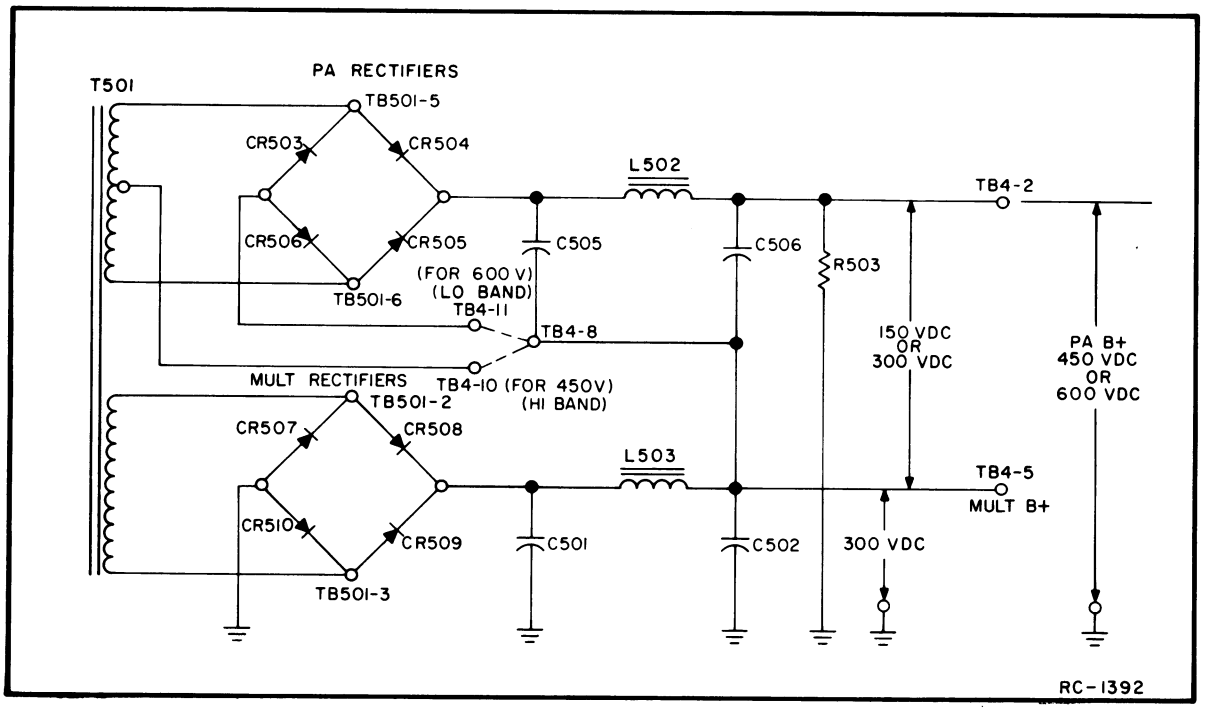


Figure 7 - Multiplier and PA B-Plus circuits

a voltage divider so that R3 can be adjusted for a +10 volt output. Zener diode VR1 provides a voltage reference for the regulator. The output can be metered at the transmitter and receiver centralized metering jacks.

HEAT SINK SERVICING

Since the metal envelopes of the transistors are at collector potential, they must be electrically isolated from ground. However, there must be a good path for heat from the transistors to reach the cast aluminum radiator (heat sink) in which they are mounted, so that the heat will be dissipated by the heat sink. The anodized aluminum spacers used between the transistors and their mounting plate not only isolate the transistors electrically, but also provide a good thermal conductor to conduct heat away from them.

Silicon grease is used between the metal parts in the heat sink to improve the thermal contact between them and allow the heat to be transferred more readily.

NOTE

Always make sure that there is sufficient silicon grease on each side of the anodized aluminum washer whenever one of the power transistors is removed and replaced.

REINSTALLATION

If the mobile combination in which the power supply is mounted is ever moved to a different vehicle, be sure to check the battery polarity of the new system and, if necessary, install the DC-to-DC converter in positive-ground vehicles to maintain current polarity.

CONTROL UNITS

Six different models of control units are available for use with Executive Series mobile combinations. Three of the models are used with Trunk-Mount radios, and three with Front-Mount radios.

All models of the Control Unit have an OFF-VOLUME control, a MONITOR pushbutton and a red Transmit light. In addition, control units in multi-frequency combinations are equipped with a frequency-selector switch. The application of the different model control units is shown in the following chart.

TRUNK-MOUNT MODELS	FRONT-MOUNT MODELS	NO. OF FREQUENCIES
4EC67A10	4EC68A10	One
4EC67A11	4EC68A11	Two
4EC67A12	4EC68A12	Three or Four

CONTROLS

Off-Volume Control (S701/R701)

The OFF-VOLUME control normally determines whether or not the transmitter and receiver are operative. (Refer to section on Ignition Switch connections.) Turning the switch On applies filament voltage to the transmitter, activates the push-to-talk (PTT) circuit, and applies +12 volts to the receiver.

Pushing the PTT button on the microphone energizes the system relay and the antenna changeover relay. The system relay starts the power supply; and the antenna relay switches the antenna and mutes the receiver. Keying the transmitter also lights the red pilot light.

Monitor Pushbutton (S702)

Pressing in the MONITOR button disables the noise squelch circuit in the receiver. In radios equipped with Channel Guard, pressing the MONITOR button also disables the receiver Channel Guard.

Multi-Frequency Switches (S703 and S704)

In multi-frequency applications, a frequency-selector switch selects the channel desired for both transmit and receive. S703 is used in two-frequency control units, and S704 is used in three- or four-frequency control units.

The switch connects the emitter of the receiver first oscillator and the transmitter oscillator-switching diode to ground, so that the radio will operate on the frequency determined by the selected crystal-controlled oscillators. In multi-frequency radios, the transmitter and receiver Channel Guard operates on all frequencies.

IGNITION SWITCH CABLE CONNECTIONS

The ignition switch cables may be connected for three different modes of operation, depending on the way the cables are connected in the vehicle system. The black ignition switch cable (in Trunk-Mount control units only) provides the receiver ground connection. The yellow fused lead provides the receiver positive. The red fused lead provides the hot connection for the transmitter filaments. The three types of operation are:

1. Ignition Switch Standby - For this type of operation, the red fused lead (transmitter filament voltage) is connected to the ACCESSORY or ON terminal of the ignition switch. The yellow fused lead (receiver hot) is connected to the hot side of the ignition switch, and the black lead connects to vehicle ground. With the ignition switch OFF, the receiver automatically reverts to STBY, ready to receive messages. Turning the ignition switch to the ON or ACCESSORY position supplies transmitter filament voltage. Turning the OFF-VOLUME switch to OFF removes all power to the Two-Way Radio.

2. Ignition Switch Control - For ignition switch control, the yellow and red fused leads are connected to the ACCESSORY or ON terminal of the ignition switch. The transmitter and receiver will operate only when the ignition switch is in the ACCESSORY or ON position. Turning the ignition switch OFF removes all power to the radio.

3. Ignition Switch Bypass - For ignition switch bypass, the yellow and red fused leads connect to the "hot" side of the ignition switch or the vehicle fuse block assembly. Both the transmitter and receiver operate independently of the ignition switch and can be turned on and off only by the OFF-VOLUME switch on the Control Unit.

CHANNEL GUARD

Channel Guard Board Model 4EK14B10 is a fully transistorized encoder-decoder for use with MASTR Executive Series mobile combinations.

The tone frequencies are controlled by plug-in tone networks that are made with precision components for excellent stability and reliability. The tone frequencies range from 71.9 to 203.5 Hz.

Complete instructions for the encoder-decoder are contained in Maintenance Manual LBI-4143.

CARRIER CONTROL TIMER

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

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

MODULATION LEVEL ADJUSTMENT

The MOD ADJUST (R115) 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 over-modulation are clipped by the modulation limiter, in conjunction with the de-emphasis network, instantaneously limits the slope of the audio wave to the modulator, thereby preventing over-modulation while preserving intelligibility.

TEST EQUIPMENT

1. Audio Oscillator Model 4EX6A10
2. Frequency Modulation Monitor
3. AC VTVM or output meter
4. GE Test Set Model 4EX3A10 (TM11 or TM12)

PROCEDURE

Transmitters without CHANNEL GUARD

1. Connect the audio signal generator and the meter across audio input terminals J5 (green-hi) and J6 (black-lo) on G E Test Set, or across J201-15 (mike hi) and J201-7 (mike lo) on the Centralized Metering Jack.
2. Apply a 1.0 volt signal at 1000 Hz to Test Set or across J201-15 and J201-7 on the Centralized Metering Jack.
3. Set MOD ADJUST (R115) for a 4.5 kHz (Narrow Band) or 13.5 kHz (Wide Band) polarity which gives the highest reading as indicated on the frequency modulation monitor.

Transmitters with CHANNEL GUARD

1. Set the Channel Guard TONE ADJUST (R643) for 0.75 kHz tone deviation.
2. Follow Steps 1 thru 3 described above.

Multi-frequency Transmitters

Check all channels for deviation as described in Steps above.

PA POWER INPUT

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

$$P_i = \frac{\text{Plate Voltage} \times \text{Plate Current Indication}}{4.3}$$

where

P_i is the power input in watts.

Plate voltage is measured with GE Test Set in Position G, using the 1000-volt scale (or measured from J201-1 to -16 with multimeter).

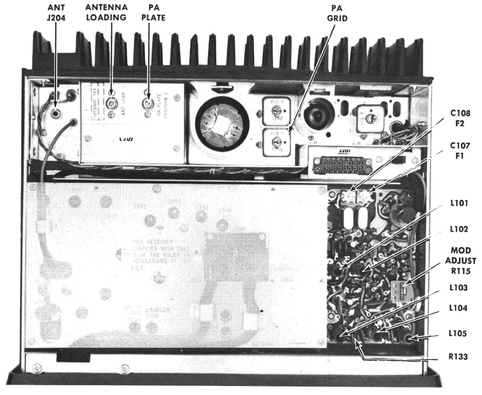
Plate current indication is measured with G E Test Set in Position G, using the TEST 1 scale (or measured from J201-1 to -9 with multimeter).

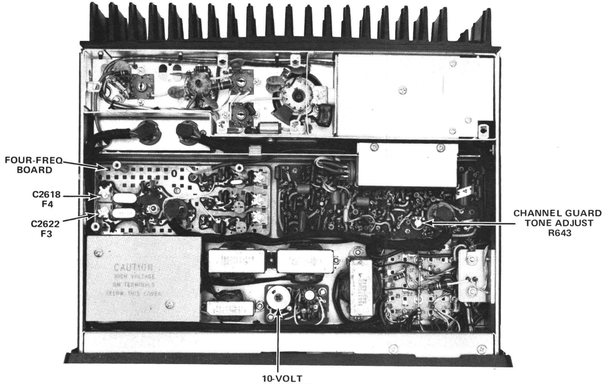
4.3 is the value of the plate current metering resistor in ohms.

TAP SETTING CHART FOR L202

FOR OPERATING FREQ OF:	USING PA	SET SLIDER TO TAP NO.
25-26 MHz	4EF32A10	2
26-28 MHz		3
28-30 MHz		4
30-31 MHz		5
31-33 MHz		6
33-35 MHz	4EF32B10	7
35-38 MHz		8
38-42 MHz		9
42-43 MHz	4EF32C10	8
43-50 MHz		9

NOTE: With some antennas, the tap settings for L202 as shown in the chart may not allow the PA to be loaded properly. If the ANTENNA LOADING cannot be reduced to 0.7 volt by adjusting the ANTENNA LOADING capacitor (C215), lower the tap setting one number. If the reading cannot be increased to 0.7 volt, raise the tap setting one number.





TRANSMITTER ALIGNMENT

When changing frequency, adjust the slider on L202 for proper tap setting as shown in the Tap Setting Chart.

EQUIPMENT REQUIRED

1. General Electric Test Set Model 4EX3A10, or a 20,000 ohms-per-volt Multimeter with a 1-volt scale, 50-ohm wattmeter, and a frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Place crystal(s) in crystal socket(s). (Crystal frequency = operating frequency ÷ 12).
2. Set ANTENNA LOADING to maximum capacitance (slot in shaft towards J204) and set crystal trimmer C107 to mid-capacity.
3. For multi-frequency transmitters, set all trimmers to mid-capacity and set the Control Unit CHANNEL SELECTOR Switch to the highest frequency channel.
4. Place the TUNE-OPERATE Switch (S201) in the TUNE position.
5. For a large change in frequency or a badly mis-aligned transmitter, turn the slugs in the Exciter coils (L101 thru L105) to the bottom of the coil. Set the T201 slug to the top of the coil.
6. Connect TEST SET Model 4EX3A10 to the Transmitter Centralized Metering Jack J201. Turn the test set polarity switch to (+) and set the range to TEST 1. If using a multimeter, connect the leads as shown below.
7. Connect wattmeter to J204.
8. With TEST SET in position I, key the transmitter and check for 10 volts (as read on 15-volt scale). With multimeter, measure from top of R133 to ground. If voltage is not correct, adjust 10-volt regulator potentiometer R3 for 10-volts. Then move TEST SET plug to receiver metering jack and check 10-volts at Position J. If reading is not approximately 10 volts, refer to the Power Supply Troubleshooting Procedure.
9. All adjustments are made with the transmitter keyed and the TEST SET on the 1-volt TEST scale.

TRANSMITTER ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION MULTIMETER AT J201	TUNING CONTROL	TYPICAL METER READING	PROCEDURE
			EXCITER BOARD		
1.	A MULT-1	Pin 10 (+) Pin 16 (-)	L101 & L102	Maximum	Carefully tune L101 for maximum meter reading. For transmitters with Channel Guard, alternately tune L101 and L102 for maximum meter reading.
2.	A MULT-1	Pin 10 (+) Pin 16 (-)	L103	Minimum	Tune L103 for a small dip in meter reading. If two dips occur, use the dip with the slug nearest the center of the coil.
3.	B MULT-2	Pin 2 (+) Pin 16 (-)	L104, L103 and L105	See Procedure	Tune L104 and L103 for maximum meter reading, and then tune L105 for minimum meter reading.
			DOUBLER/DRIVER AND POWER AMPLIFIER		
4.	E MULT-3	Pin 16 (+) Pin 5 (-)	T201 & L105	Maximum	Switch meter polarity to (-), and adjust T201 for maximum meter reading. Then re-adjust L105 and T201 for maximum meter reading.
5.	E MULT-3	Pin 16 (+) Pin 5 (-)	T202	Maximum	Adjust T202 for a small dip in meter reading.
6.	F PA GRID	Pin 14 (+) Pin 6 (-)	T203 and T202	Maximum	Tune T203 for maximum meter reading. Then re-adjust T202 for maximum meter reading.
7.	G PA PLATE	WARNING High B+ on pins 1 & 9			Carefully tune PA PLATE for minimum meter reading.
		Pin 1 (+) Pin 9 (-)	PA PLATE	Minimum	
8.					Place TUNE/OPERATE Switch S201 in the OPERATE position.
9.	G PA PLATE	Pin 1 (+) Pin 9 (-)	PA PLATE		Carefully re-tune PA PLATE for minimum meter reading.
10.	G PA PLATE	Pin 1 (+) Pin 9 (-)	ANT LOADING	0.7 volts	Adjust ANTENNA LOADING for meter reading of 0.7 volts. (See note following Tap Setting Chart).
11.	G PA PLATE	Pin 1 (+) Pin 9 (-)	ANT LOADING & PA PLATE	See Procedure	Alternately adjust ANT LOADING for 0.7 volt and PA PLATE for minimum until minimum PA PLATE reading is 0.7 volt.
12.					Repeat STEP 6 and STEP 11.
			FREQUENCY ADJUSTMENT		
13.			C107 (C108 in 2-freq. units, and C2619 or C2622 in multi-freq. units.		Loosely couple frequency counter to output and adjust C107 for proper frequency output. (Switch to F2 and adjust C108 on 2-frequency units. In 3- or 4-frequency units, adjust C2619 or C2622 as required. ———NOTE——— For proper frequency control of the transmitter, it is recommended that all frequency adjustments be made when the equipment is at a temp. of approximately 75° F. In no case should frequency adjustments be made when the equipment is outside the temp. range of 50° to 90° F.

ALIGNMENT PROCEDURE

25—50 MHz TRANSMITTER
TYPE ET-72-A

RC-1427C

TEST PROCEDURES

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

TEST EQUIPMENT REQUIRED

for test hookup as shown:

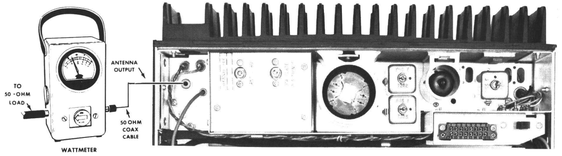
1. Wattmeter similar to:
   Bird #43
   Jones #711N
2. VTVM similar to:
   Triplett #850
   Heath #1M-21
3. Audio Generator similar to:
   GE MODEL 4EX6A10 or
   Heath #1G-72
4. Deviation Meter (with a .75 KC scale) similar to:
   Measurements #140
   Lampkin #205A
5. Multimeter similar to:
   GE METERING TEST SET MODEL 4EX3A10 or Triplett #631 or 20,000 ohms-per-volt voltmeter

STEP 1

POWER MEASUREMENT

TEST PROCEDURE

1. Connect transmitter output to wattmeter as shown below:



2. Key transmitter and check wattmeter for minimum reading of 50 watts.

SERVICE CHECK

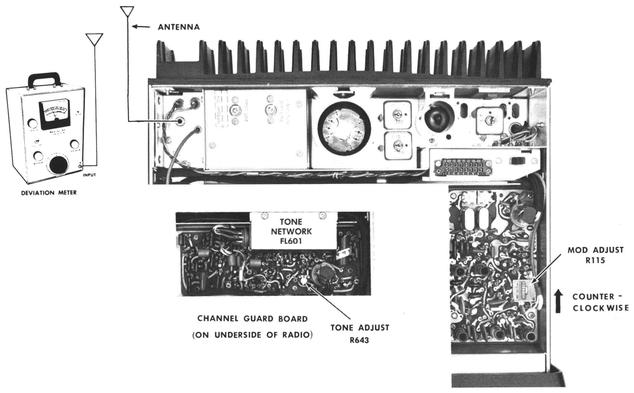
Refer to Service Hints on Transmitter Troubleshooting Procedure.

STEP 2

TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

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



2. Set MOD ADJUST control R115 fully counterclockwise.

3. Key transmitter and check for 0.75 kHz deviation. If reading is low or high, adjust Channel Guard TONE ADJUST (R643 on Channel Guard Board) for a reading of 0.75 kHz .

DEVIATION METER

NOTES:

1. On units supplied with Channel Guard, the Phase Modulator Tuning should be peaked carefully to insure proper performance. (Refer to Step 1 in the Transmitter Alignment Chart).

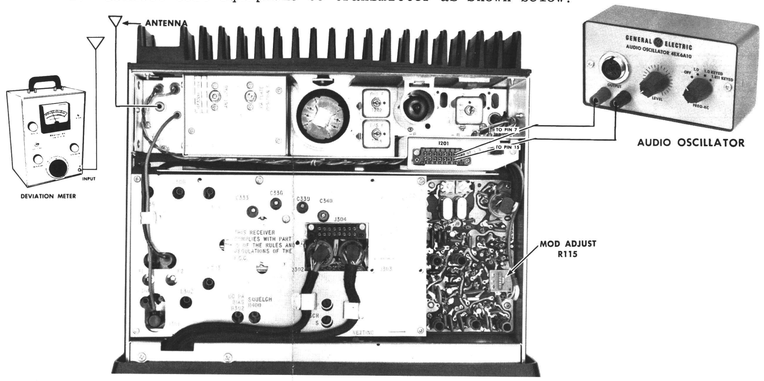
2. The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

STEP 3

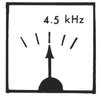
VOICE DEVIATION AND SYMMETRY

TEST PROCEDURE

1. Unplug the microphone.
2. Connect test equipment to transmitter as shown below:



3. Set the generator output to 1.0 VOLTS RMS and frequency to 1 kHz.
4. Key the transmitter by connecting a jumper from J201-18 to J201-16 (GRD). Then adjust Deviation Meter to carrier frequency.
5. Deviation reading should be ±4.5 kHz (Narrow Band) or ±13.5 kHz (Wide Band).
6. Adjust MOD ADJUST Control R115 until deviation reads 4.5 kHz (Narrow Band) or 13.5 kHz (Wide Band) on plus (+) or minus (-) deviation, whichever is greater. This adjustment should be made with the correct level of tone applied on Channel Guard transmitters.



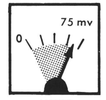
DEVIATION METER

NOTES: --These transmitters are adjusted for 4.5 kHz (13.5 kHz Wide Band) deviation at the factory. The factory adjustment will prevent the transmitter from deviating more than 5.0 kHz (15 kHz Wide Band) under the worst conditions of frequency, voltage and temperature.

If the deviation reading plus (+) and minus(-) differs by more than 0.5 kHz (1.5 kHz Wide Band) check the following:

1. Recheck Step 1 as shown in the Transmitter Alignment Chart.

2. Check Audio Sensitivity by reducing generator output until deviation falls to 3.0 kHz (10 kHz Wide Band). Voltage should be LESS than 90 millivolts (typically 75 mv).



METER

FRONT END ALIGNMENT

These instructions are for tuning the oscillator and RF stages of the receiver and may be used when changing the receiver crystal or frequency. When necessary to realign the entire receiver, refer to the COMPLETE RECEIVER ALIGNMENT. For receivers with Noise Blankers, refer to RC-1471 for Noise Blanker checks.

EQUIPMENT REQUIRED

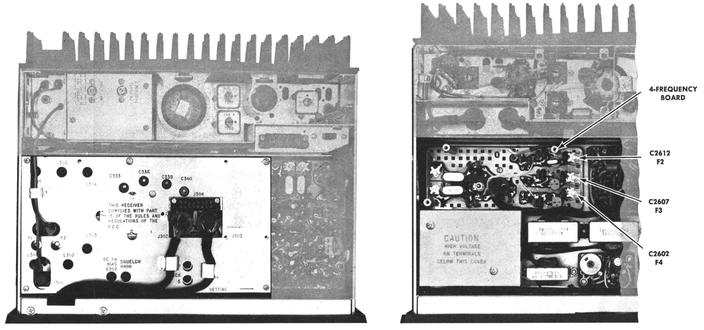
1. GE Test Set Model 4EX3A10 (or 20,000 ohms-per-volt Multimeter).
2. 25-50 MHz signal source (keep signal level below saturation).

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Plug Test Set 4EX3A10 into receiver centralized metering jack J304. Set meter polarity switch on + and meter sensitivity switch on 1. If using Multimeter, connect the negative lead to J304-13 (ground).
2. Turn SQUELCH control (R400) fully clockwise and VOLUME control to minimum. Switch to position "G" (or measure at J304-9 with Multimeter) and adjust PA Bias R392 for a reading of 0.28 volts (500 milliamps).

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	MULTIMETER + at J304	TUNING CONTROL	METER READING	PROCEDURE
1.	D OSC	pin 4	L305 and L306	See Procedure	Switch to F1, put in F1 crystal and tune L305 for maximum meter reading and L306 for minimum meter reading (0.28 v).
2.	D OSC	pin 4	L305 and L306	See Procedure	For multi-frequency receivers, adjust L305 for maximum and L306 for minimum meter reading. Adjust coils for equal readings on highest and lowest frequencies.
3.					Preset L301 thru L304 to approximate-frequency. (Slug at top of coil for highest frequency, and slug centered in coil for lowest frequency. Do not tune slugs below center of coil).
4.	C LIM 2	pin 3	L301 thru L304	Maximum	Apply on-frequency signal to J301. Tune L301 thru L304 for maximum meter reading. Keep signal below saturation at each stage and on discriminator zero.
5.			L301 and L302		While receiving a weak on-frequency signal from the antenna, tune L301 and L302 for best quieting.
6.	A DISC	pin 10	C311 (C316 for 2-freq, or C2612, C2607 and C2602 for 4-freq.)	Zero	Apply the exact channel frequency signal to J301 and tune C311 (C316 for 2-frequency) for zero discriminator reading. In 3- or 4-frequency units, tune C2612, C2607 and C2602 as required. ——NOTE—— For proper freq control of the receiver, it is recommended that all freq.adjustments be made when the equipment is at a temp of approx. 75° F. In no case should freq.adjustments be made when the equipment is outside the temp range of 50° to 90° F.
SQUELCH ADJUSTMENT					
7.				30°	Set SQUELCH Control (R400) to open with a 4 db SINAD signal. (Approximately 30° counterclockwise of critical squelch position).



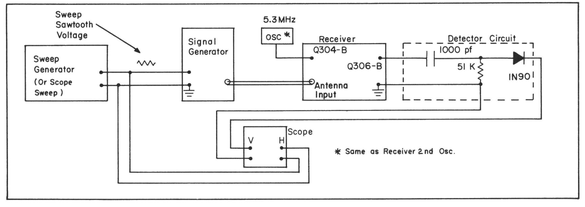


Figure 1 - High and Low IF FILTER TEST Circuit

COMPLETE RECEIVER ALIGNMENT

For receivers with Noise Blankers, refer to RC-1471 for Noise Blanker Checks.

EQUIPMENT REQUIRED

1. G E Test Set Model 4EX3A10 (or 20,000 ohms-per-volt Multimeter).
2. A 5.3 MHz ±200 Hz and a 25-50 MHz signal source. Couple the 5.3 MHz signal through a 0.01 µf capacitor. Keep signal levels below saturation.
3. For Alignment steps 4 thru 8 - Oscilloscope, sweep generator, 5.3 MHz marker generator and construct a detector circuit (see Figure 1 for circuitry).

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Plug Test Set Models 4EX3A10 into the receiver centralized metering jack J304. Set meter polarity switch on + and meter sensitivity switch to TEST 1. If using multimeter, connect the negative lead to J304-13 (ground).
2. Switch Test Set to Position "I" (or measure at collector of Q318 with multimeter). Reading should be a nominal 13.8 volts.
3. Switch to Position "J" (or measure at top of C443 with multimeter), and check for a reading of 10 volts. If reading is not correct, refer to STEP B of the Transmitter Preliminary Checks and Adjustment Procedure.
4. Turn SQUELCH control fully clockwise and VOLUME control to minimum. Switch to Position "G" (or measure at J304-9 with multimeter) and adjust PA Bias potentiometer R392 for a reading of 0.28 volts (500 milliamps).

ALIGNMENT PROCEDURE

STEP	METERING TEST SET 4EX3A10	POSITION MULTIMETER + at J304	TUNING CONTROL	METER READING	PROCEDURE
DISCRIMINATOR					
1.					Remove 1st oscillator crystal. Then apply a 5.3 MHz signal to the base of Q306.
2.	A DISC	pin 10	L329	See Procedure	Adjust L329 (discriminator primary) 1/2 turn up from bottom of range.
3.	A DISC	pin 10	L330	Zero	Tune L330 (discriminator secondary) for zero meter reading.
HIGH AND LOW IF FILTER (SEE NOTE 1)					
4.	B LIM 1	pin 2	L321 thru L328	Maximum	Tune L321 thru L328 for maximum meter reading.
5.	B LIM 1	pin 2	C333, C336, C339	Maximum	Tune C333, C336 and C339 for maximum meter reading.
6.			C333, C336 and C339		Disable the 2nd oscillator by grounding the base of Q305 through a 0.01 µf capacitor. Connect scope, signal generator and detector as shown in figure 1. Sweep RF ±50 kHz at 20 Hz. Connect 5.3 MHz marker to base of Q304. Tune C333, C336 and C339 for scope pattern shown. Keep marker signal centered between humps and signal level below saturation.
7.			L321 thru L328		Disconnect detector, remove short from base of Q305 and connect scope to 1st LIM test point. Adjust L321 thru L328 for symetrical wave form shown, with marker in center.
8.	A DISC	pin 10			Check to see that discriminator idling voltage is within 0.05 volts of zero with no signals applied and the modulation acceptance bandwidth is between 26 and 28 kHz (Narrow Band) or greater than ±15 kHz (Wide Band).
OSC/MULT					
9.	D OSC	pin 4	L305 & L306	See Procedure	Remove short from base of Q305, if present, then insert 1st oscillator crystal. Adjust L305 for maximum meter reading, and L306 for minimum meter reading (0.28 v).
10.	D OSC	pin 4	L305 & L306	Maximum	For multi-frequency receivers, adjust L305 for maximum meter reading and L306 for minimum meter reading. Adjust coils for equal meter readings on highest and lowest frequencies.
RF					
11.	C LIM 2	pin 3	L301, L302 L303 and L304	Maximum	Apply on-frequency signal to J301, then tune L301 thru L304 for maximum meter reading. Keep signal below saturation at each stage and on discriminator zero. For multi-frequency receivers, adjust coils for best performance on all frequencies.
12.			L301		While receiving a weak-on frequency signal from the antenna, tune L301 and L302 for best quieting.
FERQUENCY ADJUSTMENT					
13.	A DISC	pin 10	C311 (C316 for 2-freq, or C2612, C2607 and C2602 for four-freq.)	Zero	Apply the exact channel frequency signal to J301 and tune C311 (and C316 for 2-frequency) for zero discriminator reading. In 3- or 4-frequency units, tune C2612, C2607 or C2602 as required. ——NOTE 2—— For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temp, of approx. 75° F. In no case should frequency adjustments be made when the equipment is outside the temp. range of 50° to 90° F.
14.				30°	Set SQUELCH control (R400) to open with a 4 db SINAD signal. (Approximately 30° counterclockwise of critical squelch position.)

NOTE 1 -- High and Low IF coils and capacitors have been set at the factory and will normally require no further adjustment. Do not re-align unless there is positive evidence of a defective filter. For location of components, refer to the Receiver Outline Diagram.

ALIGNMENT PROCEDURE

25—50 MHZ RECEIVER

MODELS 4ER46A10-27 & 4ER46B10-27

RC-1428C

TEST PROCEDURES

These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect can be quickly localized. Once the defective stage is pin-pointed, refer to the "Service Check" list to correct the problem. Additional corrective measures are included in the Troubleshooting Procedure. Before starting with the Receiver Test Procedures, be sure the receiver is tuned and aligned to the proper operating frequency.

TEST EQUIPMENT REQUIRED

- Distortion Analyzer similar to:

  Heath IM-12

- Signal Generator similar to:

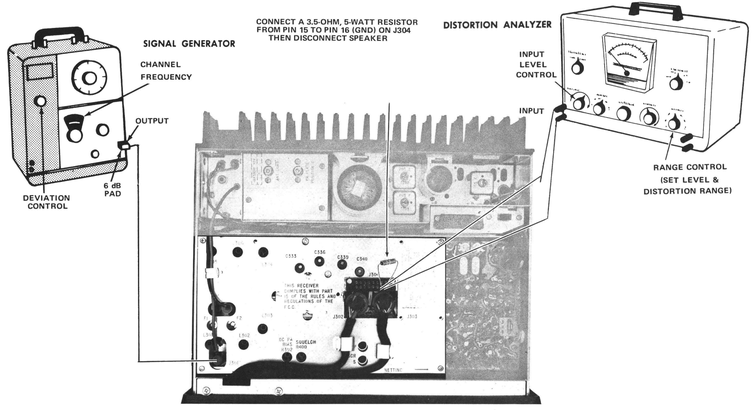
  Measurements M-800

- 6-dB attenuation pad, and 3.5 ohm,

  5-watt resistor

PRELIMINARY ADJUSTMENTS

1. Connect the test equipment to the receiver as shown for all steps of the receiver Test Procedure.
2. Turn the SQUELCH control fully clockwise for all steps of the Test Procedure.
3. Turn on all of the equipment and let it warm up for 20 minutes.



STEP 1

AUDIO POWER OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

A. Connect a 1,000-microvolt test signal modulated by 1,000 hertz with +3.0 kHz deviation to the antenna jack J301.

B. When speaker is used, disconnect speaker (and handset if present). Hook up a 3.5-ohm load resistor from J304-15 to J304-16 as shown.

C. Set VOLUME control for two-watt output (2.65 VRMS).

D. Make distortion measurements according to manufacturer's instructions. Reading should be less than 5%. If the receiver sensitivity is to be measured, leave all controls and equipment as they are.

SERVICE CHECK

If the distortion is more than 5%, or maximum audio output is less than two watts, make the following checks:

E. Battery and regulator voltage---low voltage will cause distortion. (Refer to Receiver Schematic Diagram for voltages).

F. DC Bias Adjust R392 (Position "G" on Test Set)---should be adjusted for 0.28 volts (500 milliamps). (Refer to Receiver Alignment on reverse side of page).

G. Audio Gain (Refer to Receiver Troubleshooting Procedure).

H. Discriminator Alignment (Refer to Receiver Alignment on reverse side of page).

STEP 2

USABLE SENSITIVITY (12-dB SINAD)

If STEP 1 checks out properly, measure the receiver sensitivity as follows:

A. Apply a 1000-microvolt, on-frequency signal modulated by 1000 Hz with 3.0-kHz deviation to J301.

B. Place the RANGE switch on the Distortion Analyzer in the 200 to 2000-Hz distortion range position (1000-Hz filter in the circuit). Tune the filter for minimum reading or null on the lowest possible scale (100%, 30%, etc.)

C. Place the RANGE switch to the SET LEVEL position (filter out of the circuit) and adjust the input LEVEL control for a +2 dB reading on a mid range (30%).

D. While reducing the signal generator output, switch the RANGE control from SET LEVEL to the distortion range until a 12-dB difference (+2 dB to -10 dB) is obtained between the SET LEVEL and distortion range positions (filter out and filter in).

E. The 12-dB difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. The sensitivity should be less than rated 12 dB SINAD specifications with an audio output of at least one watt (1.87 volts RMS across the 3.5-ohm receiver load using the Distortion Analyzer as a VTVM).

F. Leave all controls as they are and all equipment connected if the Modulation Acceptance Bandwidth test is to be performed.

SERVICE CHECK

If the sensitivity level is more than rated 12 dB SINAD specification, check the alignment of the RF stages as directed in the Alignment Procedure, and make the gain measurements as shown on the Troubleshooting Procedure.

STEP 3

MODULATION ACCEPTANCE BANDWITH (IF BANDWITH)

If STEPS 1 and 2 check out properly, measure the bandwidth as follows:

A. Set the Signal Generator output for twice the microvolt reading obtained in the 12-dB SINAD measurement.

B. Set the RANGE control on the Distortion Analyzer in the SET LEVEL position (1000-Hz filter out of the circuit), and adjust the input LEVEL control for a +2 dB reading on the 30% range.

C. While increasing the deviation of the Signal Generator, switch the RANGE control from SET LEVEL to distortion range until a 12-dB difference is obtained between the SET LEVEL and distortion range readings (from +2 dB to -10 dB).

D. The deviation control reading for the 12-dB difference is the Modulation Acceptance Bandwidth of the receiver. It should be more than ±8 kHz (but less than ±10 kHz).

SERVICE CHECK

If the Modulation Acceptance Bandwidth test does not indicate the proper width, make gain measurements as shown on the Receiver Troubleshooting Procedure.

PARTS LIST

25-50 MHz TRANSMITTER
TYPE ET-72-A NARROW BAND
TYPE ET-72-B WIDE BAND

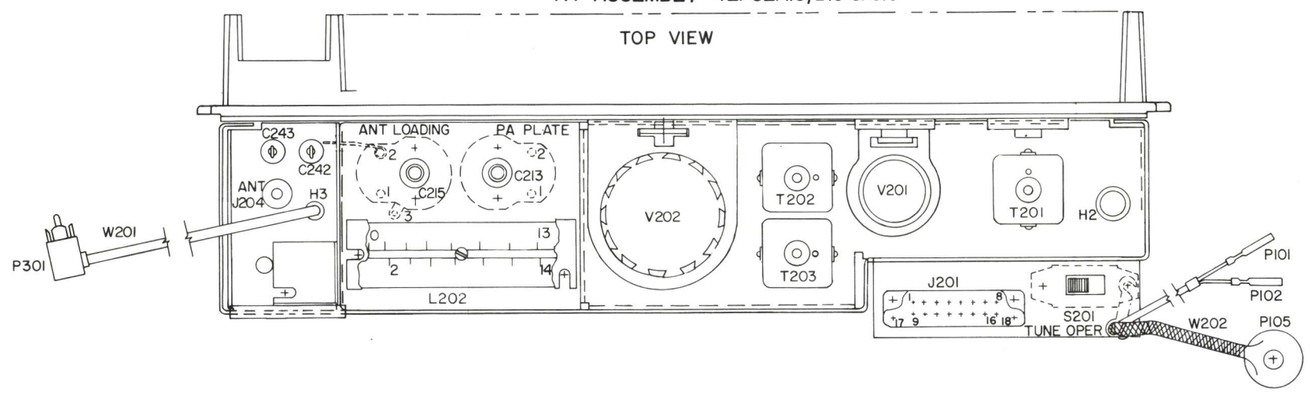
SYMBOL	G-E PART NO.	DESCRIPTION
		EXCITER BOARD
		NARROW BAND
		4EG21A10 (19C311008-G1) 25-33 MHz 1 Freq 4EG21A11 (19C311008-G2) 25-33 MHz 1 Freq CHAN GD 4EG21A12 (19C311008-G1) 25-33 MHz 2 Freq 4EG21A13 (19C311008-G2) 25-33 MHz 2 Freq CHAN GD 4EG21B10 (19C311008-G3) 33-42 MHz 1 Freq 4EG21B11 (19C311008-G4) 33-42 MHz 1 Freq CHAN GD 4EG21B12 (19C311008-G3) 33-42 MHz 2 Freq 4EG21B13 (19C311008-G4) 33-42 MHz 2 Freq CHAN GD 4EG21C10 (19C311008-G5) 42-54 MHz 1 Freq 4EG21C11 (19C311008-G6) 42-54 MHz 1 Freq CHAN GD 4EG21C12 (19C311008-G5) 42-54 MHz 2 Freq 4EG21C13 (19C311008-G6) 42-54 MHz 2 Freq CHAN GD
		WIDE BAND
		4EG21A14 (19C311008-G2) 25-33 MHz 1 Freq 4EG21A15 (19C311008-G2) 25-33 MHz 2 Freq 4EG21B14 (19C311008-G4) 33-42 MHz 1 Freq 4EG21B15 (19C311008-G4) 33-42 MHz 2 Freq 4EG21C14 (19C311008-G6) 42-50 MHz 1 Freq 4EG21C15 (19C311008-G6) 42-50 MHz 2 Freq
		CAPACITORS
C101	7491395-P114	Ceramic disc: .0022 µf ±10%, 500 VDCW; sim to RMC Type JL.
C102	19B209243-P5	Polyester: .047 µf ±20%, 50 VDCW.
C103	19B209243-P1	Polyester: .01 µf ±20%, 50 VDCW.
C104	7491395-P111	Ceramic disc: .0015 µf ±10%, 500 VDCW; sim to RMC Type JL.
C105	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C106	5496267-P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C107 and C108	5491271-P103	Variable, air: approx 1.54-6.9 pf, 750 v peak; sim to EF Johnson 189-3-5.
C109 and C110	5496219-P39	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C111 and C112	5496219-P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM.
C113 and C114	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C115A	5493366-P1000J	Silver mica: .001 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-15.
C115B	5493366-P680K	Silver mica: 680 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C116	19B209243-P1	Polyester: .01 µf ±20%, 50 VDCW.
C117A	5493366-P1000J	Silver mica: .001 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-15.
C117B	5493366-P680J	Silver mica: 680 pf ±5%, 100 VDCW; sim to Electro Motive Type DM-15.
C118A	5493367-P1500J	Silver mica: .0015 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-20.
C118B	5493367-P1000J	Silver mica: .001 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-20.
C119A	5496372-P350	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -4700 PPM.
C119B	5496372-P146	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -3300 PPM.
C120 and C121	5493366-P470J	Silver mica: 470 pf ±5%, 100 VDCW; sim to Electro Motive Type DM-15.
C122A	5496372-P350	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -4700 PPM.
C122B	5496372-P146	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -3300 PPM.
C123A	5493366-P390K	Silver mica: 390 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C123B	5493366-P330K	Silver mica: 330 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C124	5493366-P150K	Silver mica: 150 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C125A	5493367-P2200J	Silver mica: .0022 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-20.
C125B	5493367-P1000J	Silver mica: .001 µf ±5%, 100 VDCW; sim to Electro Motive Type DM-20.
C126	19B209243-P1	Polyester: .01 µf ±20%, 50 VDCW.
C127A	5493366-P470K	Silver mica: 470 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C127B	5493366-P330K	Silver mica: 330 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C127C	5493366-P220K	Silver mica: 220 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-15.
C128	5494481-P129	Ceramic disc: .0039 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C129	19B209243-P1	Polyester: .01 µf ±20%, 50 VDCW.
C130A	5496219-P265	Ceramic disc: 120 pf ±5%, 500 VDCW, temp coef -80 PPM.
C130B	5496219-P261	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -80 PPM.
C131A	5496219-P265	Ceramic disc: 120 pf ±5%, 500 VDCW, temp coef -80 PPM.
C131B	5496219-P261	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -80 PPM.
C132 and C133	5494481-P127	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C134A	5496219-P461	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -220 PPM.
C134B	5496219-P259	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -80 PPM.
C134C	5496219-P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C135	5494481-P112	Ceramic disc: .001 µf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C136	19B209243-P1	Polyester: .01 µf ±20%, 50 VDCW.
C137	7491395-P109	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JL.
C138	7130348-P3	Molded: 1 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
		DIODES AND RECTIFIERS
CR101 and CR102	19A115603-P1	Silicon.
CV101 and CV102	5495769-P9	Silicon, capacitive.
		JACKS AND RECEPTACLES
J101 thru J104	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J105	19B209303-P1	Connector, phen: 9 pins.
		INDUCTORS
L101A	19C303883-G1	Coil. Includes tuning slug 5491798-P1.
L101B	19C303883-G2	Coil. Includes tuning slug 5491798-P2.
L101C	19C303883-G3	Coil. Includes tuning slug 5491798-P2.
L102A	19C303883-G1	Coil. Includes tuning slug 5491798-P1.
L102B	19C303883-G2	Coil. Includes tuning slug 5491798-P2.
L102C	19C303883-G3	Coil. Includes tuning slug 5491798-P2.
L103A	19C303883-G4	Coil. Includes tuning slug 5491798-P3.
L103B	19C303883-G5	Coil. Includes tuning slug 5491798-P3.
L103C	19C303883-G6	Coil. Includes tuning slug 5491798-P3.
L104A	19C303883-G7	Coil. Includes tuning slug 5491798-P3.
L104B	19C303883-G8	Coil. Includes tuning slug 5491798-P3.
L104C	19C303883-G9	Coil. Includes tuning slug 5491798-P3.
L105A	19C303883-G10	Coil. Includes tuning slug 5491798-P5.
L105B	19C303883-G11	Coil. Includes tuning slug 5491798-P5.
L105C	19C303883-G12	Coil. Includes tuning slug 5491798-P5.
		TRANSISTORS
Q101	19A115889-P1	Silicon, NPN; sim to Type 2N2712.
Q102 and Q103	19A115123-P2	Silicon, NPN; sim to Type 2N2712.
Q104 and Q105	19A115330-P2	Silicon, NPN.
Q106 and Q107	19A115328-P2	Silicon, NPN.
		RESISTORS
R101	3R77-P563J	Composition: 56,000 ohms ±5%, 1/2 w.
R102	3R77-P623J	Composition: 62,000 ohms ±5%, 1/2 w.
R103	3R77-P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R104	3R77-P154K	Composition: 0.15 megohm ±10%, 1/2 w.
R105	3R77-P562K	Composition: 5600 ohms ±10%, 1/2 w.
R106	3R77-P683J	Composition: 68,000 ohms ±5%, 1/2 w.
R107	3R77-P433J	Composition: 43,000 ohms ±5%, 1/2 w.
R108	3R77-P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R109	3R77-P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R110	3R77-P681K	Composition: 680 ohms ±10%, 1/2 w.
R111	3R77-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R112	3R77-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R113	3R77-P565J	Composition: 5.6 megohms ±5%, 1/2 w.
R114	3R77-P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R115	19B209358-P106	Variable, carbon film: 75 to 10,000 ohms, 1/4 w; sim to CTS Type X-201.
R116 and R117	3R77-P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R118 and R119	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R120	3R77-P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R121	3R77-P101K	Composition: 100 ohms ±10%, 1/2 w.
R122	3R77-P681K	Composition: 680 ohms ±10%, 1/2 w.
R123	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R124A	3R154-P473K	Composition: 47,000 ohms ±10%, 1/4 w.
R124B	3R152-P393K	Composition: 39,000 ohms ±10%, 1/4 w.
R124C	3R152-P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R125A	3R152-P154K	Composition: 0.15 megohm ±10%, 1/4 w.
R125B	3R152-P124K	Composition: 0.12 megohm ±10%, 1/4 w.
R125C	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R126	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R127	3R77-P683K	Composition: 68,000 ohms ±10%, 1/2 w.
R128	3R77-P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R129	3R77-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R130	3R77-P102K	Composition: 1000 ohms ±10%, 1/2 w.
R131	3R77-P101K	Composition: 100 ohms ±10%, 1/2 w.

(Cont'd on back of Rc-1473)

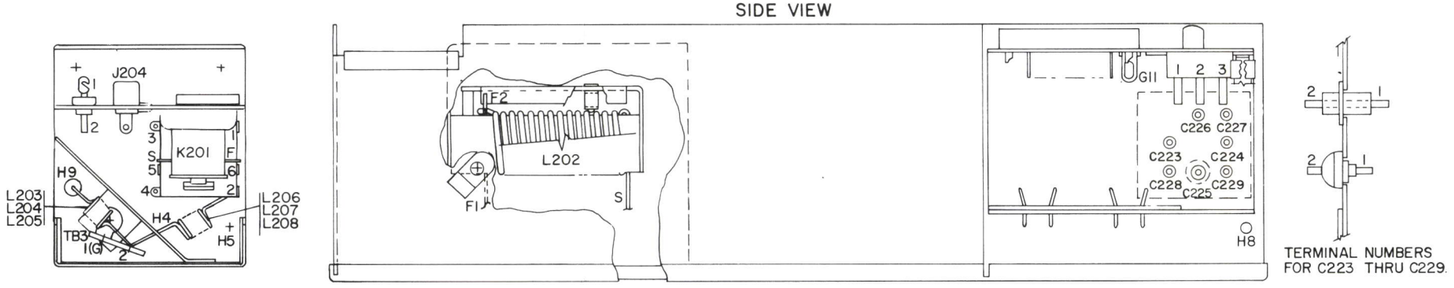
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PA ASSEMBLY 4EF32AIO, BIO & CIO

TOP VIEW

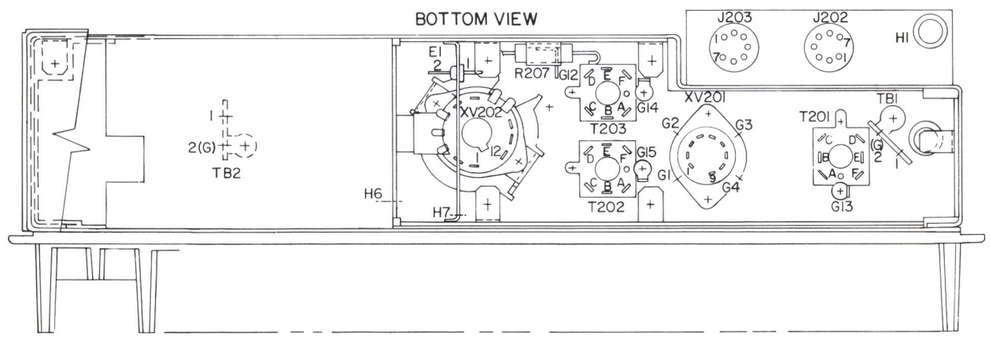


SIDE VIEW

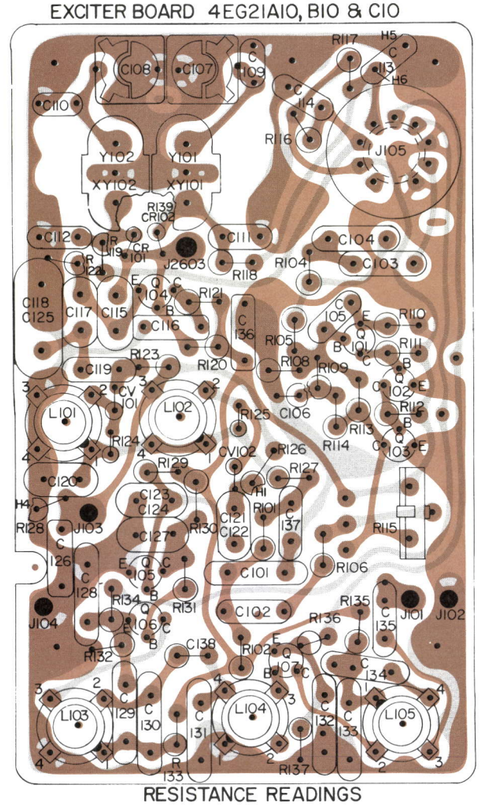


TERMINAL NUMBERS FOR C223 THRU C229.

BOTTOM VIEW



EXCITER BOARD 4EG21AIO, BIO & CIO



RESISTANCE READINGS

ALL READINGS ARE TYPICAL READINGS MEASURED FROM TRANSISTOR OR TUBE PINS TO GROUND WITH A 20,000 OHM-PER-VOLT METER, WITH ALL POWER TURNED OFF, AND WITH EXCITER +10V SHORTED FROM J105-2 TO CHASSIS, AND PA B+ LINES SHORTED FROM C225, C226 & C227 TO GROUND. + OR − SIGNS SHOW METER LEAD GROUNDED.

FOR READINGS OF:
1−50Ω
51−500Ω
510−50K

USE METER SCALES:
X1
X10
X1000

EXCITER BOARD

TRANSISTOR SYMBOL #	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
Q101	680	680	13.7K	3.6K	13.5K	2.9K
Q102	0	0	13.5K	2.9K	15.5K	2.9K
Q103	0	0	15.5K	2.9K	7.5K	8.7K
Q104	680	680	15K	2.6K	100	100
Q105	0	0	39K	3.4K	1K	1K
Q106	71	175	1.1K	1.1K	39	39
Q107	10	NOTE-1	0	0	8.8	20

PA ASSEMBLY

SYMBOL NO	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12
V201	1K	180	NOTE-2	2,3	0	180	102K	NOTE-2	180			
V202	2,3	0	1	1	1	0	8.2K	0	0	NOTE-3	8.2K	0

NOTES:
1. 25 − 33MC 110Ω; 33 − 42MC 68Ω; 42 − 50MC 51Ω
2. 25 − 33MC 22K; 33 − 42MC 22K; 42 − 50MC 27K
3. METER PROBE GROUNDED (+) 13K (−) 4.2K

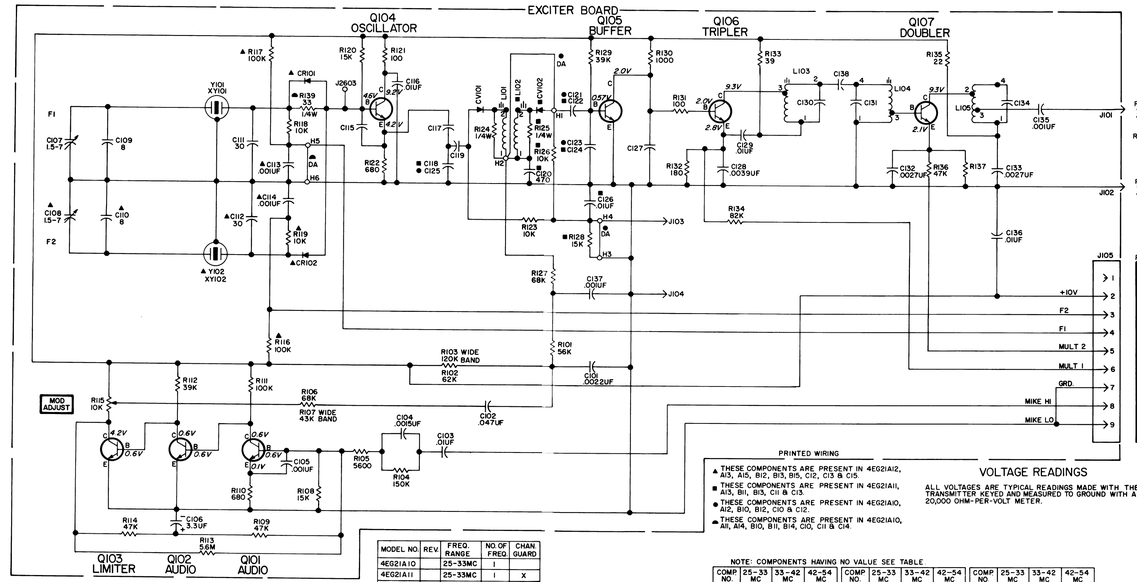
OUTLINE DIAGRAM

25—50 MHZ TRANSMITTER
TYPES ET-72-A, B

RC-1472B

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

(19D402819, Rev. 2)
(19B205449, Sh. 1, Rev. 0)
(19B205449, Sh. 2, Rev. 0)



MODEL NO.	REV.	FREQ. RANGE	NO. OF FREQ.	CHAN GUARD
4EG21A10		25-33MC	1	
4EG21A11		25-33MC	1	X
4EG21A12		25-33MC	2	
4EG21A13		25-33MC	2	X
4EG21B10		33-42MC	1	
4EG21B11		33-42MC	1	X
4EG21B12		33-42MC	2	
4EG21B13		33-42MC	2	X
4EG21C10		42-50MC	1	
4EG21C11		42-50MC	1	X
4EG21C12		42-50MC	2	
4EG21C13		42-50MC	2	X

(190402621, Rev. 2)

NOTE: COMPONENTS HAVING NO VALUE SEE TABLE.

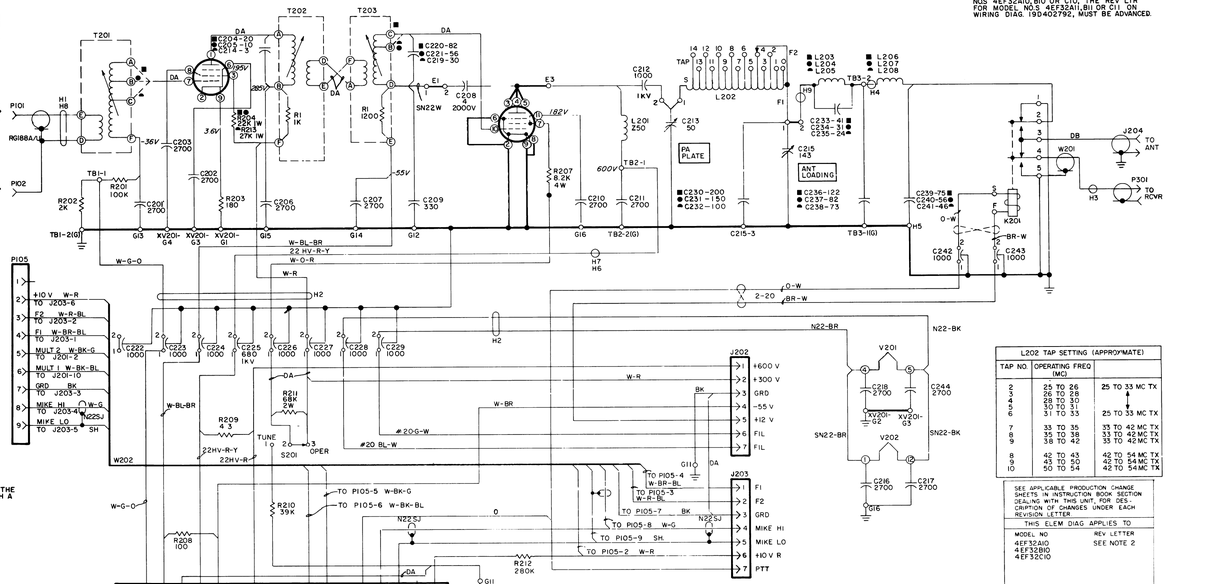
COMP NO	25-33 MC	33-42 MC	42-54 MC
C115	A-1000	A-1000	B-680
C117	A-1000	A-1000	B-680
C118	A-1500	A-1500	B-1000
C119	A-220	A-220	B-180
C121	470	470	470
C122	A-220	A-220	B-180
C123	A-390	B-330	B-330
C124	150	150	150
C125	A-2200	A-2200	B-1000
C127	A-470	B-330	C-220

COMP NO.	25-33 MC	33-42 MC	42-54 MC
C130	A-120	A-120	B-82
C131	A-120	A-120	B-82
C134	A-82	B-68	C-47
L101	A	B	C
L102	A	B	C
L103	A	B	C
L104	A	B	C
L105	A	B	C
R124	A-47K	B-39K	C-33K
R125	A-150K	B-120K	C-100K

COMP NO	25-33 MC	33-42 MC	42-54 MC
R137	A-100	B-68	C-51

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

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



(190402669, Rev. 5)

L202 TAP SETTING (APPROXIMATE)		
TAP NO.	OPERATING FREQ (MC)	
2	25 TO 26	25 TO 33 MC TX
3	26 TO 28	
4	28 TO 30	
5	30 TO 31	
6	31 TO 33	25 TO 33 MC TX
7	33 TO 35	33 TO 42 MC TX
8	35 TO 38	33 TO 42 MC TX
9	38 TO 42	33 TO 42 MC TX
8	42 TO 43	42 TO 54 MC TX
9	43 TO 50	42 TO 54 MC TX
10	50 TO 54	42 TO 54 MC TX

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EF32A10 4EF32B10 4EF32C10	SEE NOTE 2

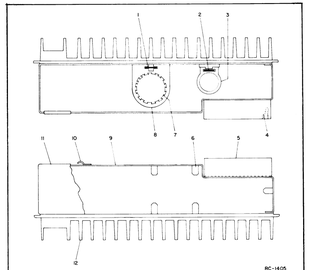
SCHEMATIC DIAGRAM

25—50 MHZ TRANSMITTER
TYPES ET-72-A, B

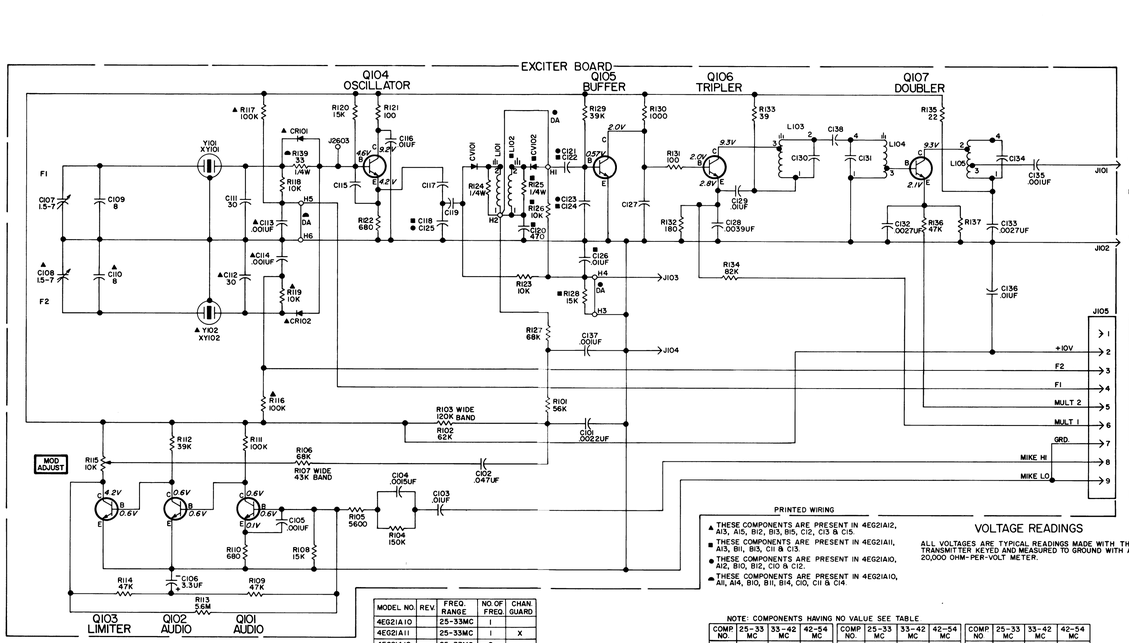
RC-1473C

(Cont'd from front of RC-1472)

SYMBOL	G-E PART NO	DESCRIPTION
R132	3877-P181K	Composition: 180 ohms ±10%, 1/2 w.
R133	3877-P390K	Composition: 39 ohms ±10%, 1/2 w.
R134	3877-P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R135	3877-P220K	Composition: 22 ohms ±10%, 1/2 w.
R136	3877-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R137A	3877-P101K	Composition: 100 ohms ±10%, 1/2 w.
R137B	3877-P680K	Composition: 68 ohms ±10%, 1/2 w.
R137C	3877-P510J	Composition: 51 ohms ±5%, 1/2 w.
R139	3877-P330K	Composition: 33 ohms ±10%, 1/2 w.
		SOCKETS
XY101 and XY102		Refer to Miscellaneous.
		CRYSTALS
		When reordering give GE Part Number and specify exact frequency needed.
		Crystal frequency = OF ÷ 12.
Y101 and Y102	19B206175-P11	Quartz: freq range 2083 to 2750 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P21	Quartz: freq range 2750 to 3500 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P31	Quartz: freq range 3500 to 4500 KHz, temp range -30°C to +85°C.
		MISCELLANEOUS
	4033088-P1	Clip. (Part of XY101 and XY102).
	19A115793-P1	Contact, electrical: sim to Malco 2700, (Part of XY101 and XY102).
	19C311172-P1	Socket: 4 contacts. (Part of XY101 and XY102).
	19B200525-P9	Rivet. (Part of XY101 and XY102).
		POWER AMPLIFIER
		MODEL 4EF33A10 (19D402637-G1) 25-33 MHz MODEL 4EF32B10 (19D402637-G2) 33-42 MHz MODEL 4EF32C10 (19D402637-G3) 42-54 MHz
		CAPACITORS
C201 thru C203	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C204	5496218-P246	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM.
C205	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C206 and C207	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C208	19B209330-P1	Silver mica: 4 pf ±1/2 pf, 2000 VDCW; sim to Electro Motive Type DM-20.
C209	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C210 and C211	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C212	19B209291-P1	Silver mica: .001 pf ±20%, 1000 VDCW; sim to Electro Motive Type DM-30.
C213	19B209290-P5	Variable, air: approx 6.5-50 pf; sim to ASP 519.
C214	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C215	19B209290-P2	Variable, air: approx 7.5-143.7 pf; sim to ASP 143G.
C216 thru C218	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C219	7489162-P14	Silver mica: 30 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C220	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C221	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C223 and C224	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C225	19B209282-P1	Ceramic, feed-thru: 680 pf ±20%, 1000 VDCW; sim to Sprague Type 544C.
C226 thru C229	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C230	19B209363-P3	Ceramic disc: 200 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type GJ.
C231	19B209363-P2	Ceramic disc: 150 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type GJ.
C232	19B209363-P1	Ceramic disc: 100 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type GJ.
C233	19B201420-P41J	Silver mica: 41 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C234	19B201420-P31J	Silver mica: 31 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C235	7489162-P12	Silver mica: 24 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C236	19B201420-P122J	Silver mica: 122 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C237	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C238	19B201420-P73J	Silver mica: 73 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C239	7489162-P24	Silver mica: 75 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241	19B201420-P46J	Silver mica: 46 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C242 and C243	5493392-P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C244	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		TERMINALS
E1 and E2	4029309-P1	Feed-thru: sim to Sealectro FT-38-27.
		JACKS AND RECEPTACLES
J201	19B205680-G1	Connector: 18 contacts.
J202 and J203	19B205219-P1	Connector: 7 pins.
J204	7104941-P16	Jack, phono type: coaxial.
		RELAYS
K201	19C307020-P4	Armature: 12 VDC nominal, 2.5 w max operating, 80 ohms ±15% coil res, 2 form C contacts.
		INDUCTORS
L201	7772834-P4	Choke, RF: 7 µh ±10%, 0.96 ohm DC res; sim to Ohmite Z-50.
L202	19B205306-G1	Coil.
L203	19A122128-P1	Coil.
L204	19A122127-P1	Coil.
L205	19A122126-P1	Coil.
L206	19A122131-P1	Coil.
L207	19A122130-P1	Coil.
L208	19A122129-P1	Coil.
P101	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P102	4028460-P1	Contact, electrical: sim to AMP 41654.
P301	7104941-P6	Phono: short; sim to Cinch 15M20175. (Part of W201).
		RESISTORS
R201	3877-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R202	3877-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R203	3877-P181K	Composition: 180 ohms ±10%, 1/2 w.
R204	3878-P273K	Composition: 27,000 ohms ±10%, 1 w.
R207	3B149-P822K	Composition: 8200 ohms ±10%, 4 w.
R208	3877-P101J	Composition: 100 ohms ±5%, 1/2 w.
R209	19B209022-P30	Wirewound: 4.3 ohms ±5%, 2 w; sim to IRC Type BWH.
R210	3877-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R211	3879-P683K	Composition: 68,000 ohms ±10%, 2 w.
R212	5495948-P444	Deposited carbon: 0.28 megohm ±1%, 1/2 w; sim to Texas Instrument Type CDL/2MR.
R213	3878-P273K	Composition: 27,000 ohms ±10%, 1 w.
R214	3B149-P153K	Composition: 15,000 ohms ±10%, 4 w.
		SWITCHES
S201	7145098-P3	Slide: SPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole 58-32.
		TRANSFORMERS
T201	19B205272-G1	Coil. Includes tuning slug 7142014-P29.
T202	19B205346-G1	Coil. Includes tuning slug 7142014-P29.
T203	19B205347-G1	Coil. Includes tuning slug 7142014-P20.
		TERMINAL BOARDS
TB1	7775500-P4	Phen: 2 terminals.
		TUBES
V201		Type 8106.
V202		Type 7984.
		CABLES
W201	5491689-P56	RF: approx 12 inches, includes plug (P301).
W202		**CABLE PL-19B205268-G1**
P105	19B209341-P2	**PLUGS** Socket: 9 contacts; sim to Elco 04-920-XX.
		SOCKETS
XY201	7480532-P8	Tube, phen: 9 pins; sim to Elco 04-903-84.
XY202	19C301007-P5	Tube: 12 pins; sim to Alcon Metal Products 371G.
		MECHANICAL PARTS (SEE RC-1405)
1	19A121195-P2	Support. (Used with Y202).
2	19B205622-P1	Spring. (Used with Y201).
3	19A121523-P3	Heat sink. (Used with Y201).
4	7147223-P3	Clip, loop: sim to Patton-MacGuyer 40. (Used with Y202).
5	19B205211-P1	Support.
6	4035017-P4	Support, angle: sim to Timberman C19185-020-24.
7	7165167-P7	Insert, tube shield: sim to Atlas 106-332-22. (Used with Y202).
8	19B204571-P1	Heat sink. (Used with Y202).
9	19C303875-G1	Chassis.
10	7763541-P2	Strap, retaining.
11	19C303874-P1	Cover, bottom.
12	19D402623-P1	Casting.



25-50 MC TRANSMITTER-TYPE ET-72-A



PRINTED WIRING

▲ THESE COMPONENTS ARE PRESENT IN 4EG21AI2, AI3, AI5, BI2, BI3, BI5, CI2, CI3 & CI5.

■ THESE COMPONENTS ARE PRESENT IN 4EG21AI1, AI3, BI3, CI1 & CI3.

● THESE COMPONENTS ARE PRESENT IN 4EG21AI0, AI2, BI0, BI2, CI0 & CI2.

◓ THESE COMPONENTS ARE PRESENT IN 4EG21AI0, AI1, AI4, BI0, BI1, BI4, CI0, CI1 & CI4.

VOLTAGE READINGS

ALL VOLTAGES ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED AND MEASURED TO GROUND WITH A 20,000 OHM-PER-VOLT METER.

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

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

MODEL NO.	REV	FREQ. RANGE	NO. OF FREQ.	CHAN. GUARD
4EG21A10		25-33MC	1	
4EG21A11		25-33MC	1	X
4EG21A12		25-33MC	2	
4EG21A13		25-33MC	2	X
4EG21B10		33-42MC	1	
4EG21B11		33-42MC	1	X
4EG21B12		33-42MC	2	
4EG21B13		33-42MC	2	X
4EG21C10		42-50MC	1	
4EG21C11		42-50MC	1	X
4EG21C12		42-50MC	2	
4EG21C13		42-50MC	2	X

(190402621, Rev. 2)

NOTE: COMPONENTS HAVING NO VALUE SEE TABLE

COMP NO.	25-33 MC	33-42 MC	42-54 MC
C115	A-1000	A-1000	B-680
C117	A-1000	A-1000	B-680
C118	A-1000	A-1500	B-1000
C119	A-220	A-220	B-180
C121	470	470	470
C122	A-220	A-220	B-180
C123	A-390	B-330	B-330
C124	150	150	150
C125	A-2200	A-2200	B-1000
C127	A-470	B-330	C-220
C130	A-120	A-120	B-82
C131	A-120	A-120	B-82
C134	A-82	B-68	C-47
L101	A	B	C
L102	A	B	C
L103	A	B	C
L104	A	B	C
L105	A	B	C
R124	A-47K	B-39K	C-33K
R125	A-150K	B-120K	C-100K
R137	A-100	B-68	C-51

DOUBLER/DRIVER
V201
XV201
8106

POWER AMP
V202
XV202
7984

■ PRESENT FOR 4EF32A10 ONLY
● PRESENT FOR 4EF32B10 ONLY
◓ PRESENT FOR 4EF32C10 ONLY

NOTES
1. ALL WIRES ARE N22 UNLESS OTHERWISE SPECIFIED.
2. WHEN ADVANCING THE REV LTR ON MODEL NOS 4EF32A10, B10 OR C10, THE REV LTR FOR MODEL NOS 4EF32A11, B11 OR C11 ON WIRING DIAG. 19D402792, MUST BE ADVANCED.

L202 TAP SETTING (APPROXIMATE)		
TAP NO.	OPERATING FREQ (MC)	
2	25 TO 26	25 TO 33 MC TX
3	26 TO 28	↑
4	28 TO 30	↑
5	30 TO 31	↑
6	31 TO 33	25 TO 33 MC TX
7	33 TO 35	33 TO 42 MC TX
8	35 TO 38	33 TO 42 MC TX
9	38 TO 42	33 TO 42 MC TX
8	42 TO 43	42 TO 54 MC TX
9	43 TO 50	42 TO 54 MC TX
10	50 TO 54	42 TO 54 MC TX

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO.	REV LETTER
4EF32A10 4EF32B10 4EF32C10	SEE NOTE 2

(190402669, Rev. 5)

SCHEMATIC DIAGRAM

25—50 MHZ TRANSMITTER
TYPES ET-72-A, B

RC-1473C

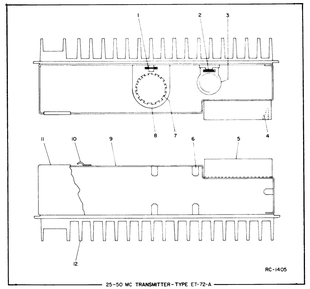
SYMBOL	G-E PART NO	DESCRIPTION
R132	3B77-P181K	Composition: 180 ohms ±10%, 1/2 w.
R133	3B77-P390K	Composition: 39 ohms ±10%, 1/2 w.
R134	3B77-P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R135	3B77-P220K	Composition: 22 ohms ±10%, 1/2 w.
R136	3B77-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R137A	3B77-P101K	Composition: 100 ohms ±10%, 1/2 w.
R137B	3B77-P680K	Composition: 68 ohms ±10%, 1/2 w.
R137C	3B77-P510J	Composition: 51 ohms ±5%, 1/2 w.
R139	3B77-P330K	Composition: 33 ohms ±10%, 1/2 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY101 and XY102		Refer to Miscellaneous.
		- - - - - - - - - - CRYSTALS - - - - - - - - - -
		When reordering give GE Part Number and specify exact frequency needed.
		Crystal frequency = OF ÷ 12.
Y101 and Y102	19B206175-P11	Quartz: freq range 2083 to 2750 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P21	Quartz: freq range 2750 to 3500 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P31	Quartz: freq range 3500 to 4500 KHz, temp range -30°C to +85°C.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	4033089-P1	Clip. (Part of XY101 and XY102).
	19A115793-P1	Contact, electrical: sim to Malco 2700. (Part of XY101 and XY102).
	19C311172-P1	Socket: 4 contacts. (Part of XY101 and XY102).
	19B200525-P9	Rivet. (Part of XY101 and XY102).
		POWER AMPLIFIER MODEL 4SF32A10 (19D402637-G1) 25-33 MHz MODEL 4SF32B10 (19D402637-G2) 33-42 MHz MODEL 4SF32C10 (19D402637-G3) 42-54 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C201 thru C203	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C204	5496218-P246	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM.
C205	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C206 and C207	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C208	19B209330-P1	Silver mica: 4 pf ±1/2 pf, 2000 VDCW; sim to Electro Motive Type DM-20.
C209	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C210 and C211	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C212	19B209291-P1	Silver mica: .001 µf ±20%, 1000 VDCW; sim to Electro Motive Type DM-30.
C213	19B209290-P3	Variable, air: approx 6.5-50 pf; sim to ASP 51P.
C214	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C215	19B209290-P2	Variable, air: approx 7.5-143.7 pf; sim to ASP 143C.
C216 thru C218	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C219	7489162-P14	Silver mica: 30 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.

SYMBOL	G-E PART NO	DESCRIPTION
C220	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C221	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C223 and C224	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C225	19B209282-P1	Ceramic, feed-thru: 680 pf ±20%, 1000 VDCW; sim to Sprague Type 544C.
C226 thru C229	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C230	19B209363-P3	Ceramic disc: 200 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C231	19B209363-P2	Ceramic disc: 150 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C232	19B209363-P1	Ceramic disc: 100 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C233	19B201420-P41J	Silver mica: 41 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C234	19B201420-P31J	Silver mica: 31 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C235	7489162-P12	Silver mica: 24 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C236	19B201420-P122J	Silver mica: 122 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C237	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C238	19B201420-P73J	Silver mica: 73 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C239	7489162-P24	Silver mica: 75 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241	19B201420-P46J	Silver mica: 46 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C242 and C243	5493392-P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C244	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
E1 and E2	4029309-P1	Feed-thru: sim to Sealectro FT-SM-27.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J201	19B205689-G1	Connector: 18 contacts.
J202 and J203	19B205219-P1	Connector: 7 pins.
J204	7104941-P16	Jack, phono type: coaxial.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K201	19C307020-P4	Armature: 12 VDC nominal, 2.5 w max operating, 80 ohms ±15% coil res, 2 form C contacts.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L201	7727834-P4	Choke, RF: 7 µh ±10%, 0.96 ohm DC res; sim to Ohmite Z-50.
L202	19B205306-G1	Coil.
L203	19A122128-P1	Coil.
L204	19A122127-P1	Coil.
L205	19A122126-P1	Coil.
L206	19A122131-P1	Coil.
L207	19A122130-P1	Coil.
L208	19A122129-P1	Coil.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - PLUGS - - - - - - - - - -
P101	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P102	4029840-P1	Contact, electrical: sim to AMP 41854.
P301	7104941-P6	Phono: short; sim to Cinch 15H20175. (Part of W201).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R201	3B77-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R202	3B77-P203J	Composition: 2000 ohms ±5%, 1/2 w.
R203	3B77-P181K	Composition: 180 ohms ±10%, 1/2 w.
R204	3B78-P273K	Composition: 27,000 ohms ±10%, 1 w.
R207	3B149-P822K	Composition: 8200 ohms ±10%, 4 w.
R208	3B77-P101J	Composition: 100 ohms ±5%, 1/2 w.
R209	19B209022-P30	Wirewound: 4.3 ohms ±5%, 2 w; sim to IRC Type BWH.
R210	3B77-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R211	3B79-P683K	Composition: 68,000 ohms ±10%, 2 w.
R212	5493948-P444	Deposited carbon: 0.28 megohm ±1%, 1/2 w; sim to Texas Instrument Type CDL/2MB.
R213	3B78-P273K	Composition: 27,000 ohms ±10%, 1 w.
R214	3B149-P153K	Composition: 15,000 ohms ±10%, 4 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S201	7145098-P3	Slide: SPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole SS-32.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T201	19B205272-G1	Coil. Includes tuning slug T142014-P29.
T202	19B205346-G1	Coil. Includes tuning slug T142014-P29.
T203	19B205347-G1	Coil. Includes tuning slug T142014-P20.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7775500-P4	Phen: 2 terminals.
		- - - - - - - - - - TUBES - - - - - - - - - -
V201		Type 8106.
V202		Type 7984.
		- - - - - - - - - - CABLES - - - - - - - - - -
W201	5491689-P56	RF: approx 12 inches, includes plug (P301).
W202		**CABLE** **PL-19B205268-G1**
P105	19B209341-P2	**- - - - - - - - - - PLUGS - - - - - - - - - -** Socket: 9 contacts; sim to Elco 04-920-XX.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XV201	7480522-P8	Tube, phen: 9 pins; sim to Elco 04-903-84.
XV202	19C301007-P5	Tube: 12 pins; sim to Alcom Metal Products 371G.

MECHANICAL PARTS
(SEE RC-1405)

1	19A121195-P2	Support. (Used with V202).
2	19B205622-P1	Spring. (Used with V201).
3	19A121523-P3	Heat sink. (Used with V201).
4	7147223-P3	Clip, loop: sim to Patton-Macguyer 40. (Used with V202).
5	19B205211-P1	Support.
6	4035017-P4	Support, angle: sim to Tinnerman C19185-020-24.
7	7165167-P7	Insert, tube shield: sim to Atlas 106-332-22. (Used with V202).
8	19B204571-P1	Heat sink. (Used with V202).
9	19C303875-G1	Chassis.
10	7763541-P2	Strap, retaining.
11	19C303874-P1	Cover, bottom.
12	19D402623-P1	Casting.



25-50 MC TRANSMITTER-TYPE ET-72-A

SYMBOL	GE PART NO.	DESCRIPTION
C432	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C433*	5490629P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C434*	5494481P14	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV B and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV A and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier:
	5490008P131	Silver mica: 150 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C435	19A116080P203	Polyester: 0.022 µf ±5%, 50 VDCW.
C436	19C300075P 56000J	Polyester: 5600 pf ±5%, 100 VDCW; sim to GE Type 61F.
C437	19C300075P 39000J	Polyester: 3900 pf ±5%, 100 VDCW; sim to GE Type 61F.
C438	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C439*	5494267P17	Tantalum: 100 µf ±20%, 35 VDCW; sim to Sprague Type 150D. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV L and earlier: In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 and 27 of REV N and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 and 27 of REV J and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV K and earlier:
	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C440	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C441	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C442*	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV K and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV J and earlier: In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 and 27 of REV A, B, C and D: Tantalum: 4.7 µf ±20%, 10 VDCW; sim to Sprague Type 150D. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
	5496267P5	
	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C443	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C451	7130348P14	Molded phenolic: 2.7 pf ±5%, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C452 and C453	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C454	5494481P107	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.

SYMBOL	GE PART NO.	DESCRIPTION
C455	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C456	5490008P15	Silver mica: 33 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C459 and C460	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C461	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C462	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C463	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C464	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C465	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C466	19A116080P6	Polyester: .068 µf ±20%, 50 VDCW.
C467	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C468	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C469 thru C473	5496219P46	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef 0 PPM.
C474	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C475	19C300075P 4700J	Polyester: 4700 pf ±5%, 100 VDCW; sim to GE Type 61F.
C476 and C477	5490008P37	Silver mica: 370 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C478	19C300075P 4700J	Polyester: 4700 pf ±5%, 100 VDCW; sim to GE Type 61F.
C479	5496219P34	Ceramic disc: 3.0 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C480	7489162P27	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C481	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C482*	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV A. Added in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV B. Added in Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV A.
C483*	5496267P5	Tantalum: 4.7 µf ±20%, 10 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV C. Added in Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV C. Added in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV D. Added in Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV E.
D8301	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-2T.
FL301	19C304219G2	Bandpass: 5.3 MHz.
J301	7104941P9	Jack, phono type: phen; sim to Cinch 14H2058.
J302 thru J303	19B209303P1	Connector, phen: 9 pins.
J304	19B205689G2	Connector: 16 contacts.
C484*	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 25, 27 by REV J. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26, by REV F. Added to Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C485*	5496267P228	Tantalum: 0.47 µf ±10%, 35 VDCW; sim to Sprague Type 150D. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.

SYMBOL	GE PART NO.	DESCRIPTION
C486*	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C487	19A116192P10	Ceramic: 1500 pf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR301	7707164P3	Germanium; sim to Type 1N90.
CR302 and CR303	4038056P1	Germanium.
CR304 and CR305	19A115250P1	Silicon.
CR306	5494922P1	Silicon; sim to Type 1N456.
CR307 thru CR308	19A115250P1	Silicon.
CR451 thru CR452	7707164P16	Germanium; sim to Type 1N68A.
CR453	7707164P3	Germanium; sim to Type 1N90.
CR454	19A115250P1	Silicon.
CR455*	19A115250P1	Silicon, Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
CR456*	4036687P6	Silicon, Zener. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH64B10, 11, 14, 15, 18, 19 by REV L. Added to Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV K. Added to Models 4EH64B22, 24, 26 by REV K. Added to Models 4EH64B23, 25, 27 by REV M.
		- - - - - - INDICATING DEVICES - - - - - -
DS301	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-2T.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL301	19C304219G2	Bandpass: 5.3 MHz.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J301	7104941P9	Jack, phono type: phen; sim to Cinch 14H2058.
J302 thru J303	19B209303P1	Connector, phen: 9 pins.
J304	19B205689G2	Connector: 16 contacts.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L301A	19C303960G1	Coil. Includes tuning slug 19B200497P2.
L301B	19C303960G6	Coil. Includes tuning slug 19B200497P2.
L301C	19C303960G6	Coil. Includes tuning slug 19B200497P2.
L302A	19C303960G11	Coil. Includes tuning slug 19B200497P2.
L302B	19C303960G5	Coil. Includes tuning slug 19B200497P2.
L302C	19C303960G7	Coil. Includes tuning slug 19B200497P2.
L303A	19C303960G1	Coil. Includes tuning slug 19B200497P2.
L303B	19C303960G6	Coil. Includes tuning slug 19B200497P2.
L303C	19C303960G6	Coil. Includes tuning slug 19B200497P2.

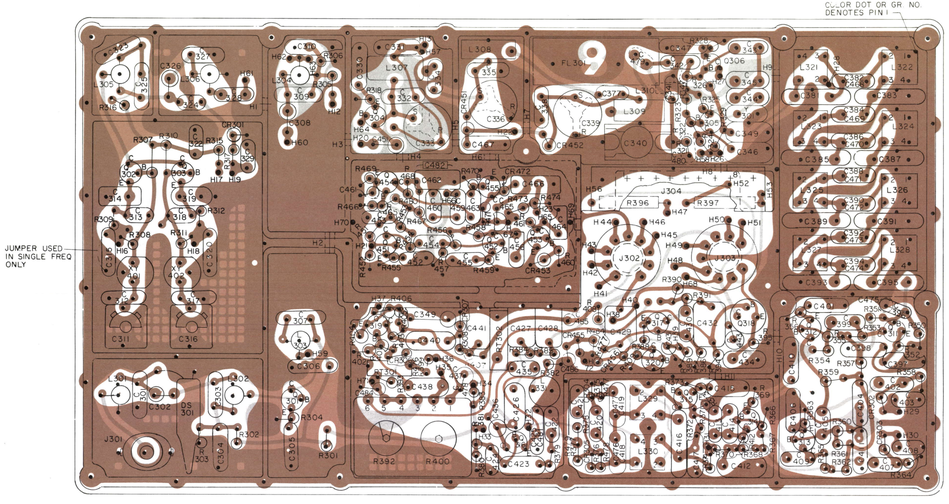
SYMBOL	GE PART NO.	DESCRIPTION
L304A	19C303960G2	Coil. Includes tuning slug 19B200497P2.
L304B	19C303960G3	Coil. Includes tuning slug 19B200497P2.
L304C	19C303960G8	Coil. Includes tuning slug 19B200497P2.
L305A	19C303960G3	Coil. Includes tuning slug 19B200497P2.
L305B	19C303960G3	Coil. Includes tuning slug 19B200497P2.
L305C	19C303960G9	Coil. Includes tuning slug 19B200497P2.
L306A	19C303960G4	Coil. Includes tuning slug 19B200497P2.
L306B	19C303960G4	Coil. Includes tuning slug 19B200497P2.
L306C	19C303960G10	Coil. Includes tuning slug 19B200497P2.
L307 thru L309	19B209522G1	Coil.
L310	19B204933G3	Coil.
L321* and L322*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12070. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV F and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV J and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV H and earlier:
L323*	19A115771P2	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12071. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L324*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12070. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L325*	19A115771P2	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12071. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L326*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12070. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:

SYMBOL	GE PART NO.	DESCRIPTION
L327*	19A115771P2	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12071. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
	19C303062G6	Coil. Includes tuning slug 403836P1.
L328*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12070. Deleted in 4EH64B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH64B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L329*	19A115771P6	Transformer, freq: 455 KHz; sim to TOKO PEFCW-14733-CB12. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L330*	19A115771P7	Transformer, freq: 455 KHz; sim to TOKO PEFCW-14734-DB12. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
L332* thru L333*	19C311181G16	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L334*	19C311181G15	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L335*	19C311181G15	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L336*	19C311181G15	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L337*	19C311181G16	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L338*	19C311181G15	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L339*	19C311181G16	Coil. Includes tuning slug 403836P1, added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q301*	19A116060P1	Silicon, NPN; sim to Type 2N4996. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV H and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV J and earlier:
	19A115343P1	Silicon, NPN.

SYMBOL	GE PART NO.	DESCRIPTION
Q302* and Q303*	19A115330P1	Silicon, NPN. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 of REV D and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 of REV F and earlier:
Q304*	19A116060P1	Silicon, NPN; sim to Type 2N4996. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV H and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV J and earlier:
	19A115343P1	Silicon, NPN.
Q305	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q306*	19A115910P1	Silicon, NPN; sim to Type 2N3906.
		In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier:
		In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV K and earlier:
		In Models 4EH64B10, 11, 14, 15, 18, 19 of REV H and earlier;
		In Models 4EH64B12, 13, 16, 17, 20, 21 of REV K and earlier:
		In Models 4EH64B22, 24, 26 of REV G and earlier:
		In Models 4EH64B23, 25, 27 of REV J and earlier:
	19A115343P1	Silicon, NPN.
		Composition: 12,000 ohms ±5%, 1/2 w.
		Composition: 22,000 ohms ±5%, 1/2 w.
Q307*	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV D and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV F and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV H and earlier:
	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
		Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 of REV D and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 of REV F and earlier:
Q308*	3B77P223J	
	19A115233P1	Silicon, NPN; sim to Type 2N2712.
Q309	3B77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
Q310*	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV D and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV F and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV H and earlier:
	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q319*	19A116774P1	Silicon, NPN; sim to Type 2N5210.
		In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV H and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV E and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV H and earlier: In Models 4EH64B22, 24, 26 of REV J and earlier: In Models 4EH64B23, 25, 27 of REV K and earlier:
	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q320*	19A116774P1	Silicon, NPN; sim to Type 2N5210.
		In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV H and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV M and earlier: In Models 4EH64B22, 24, 26 of REV J and earlier: In Models 4EH64B23, 25, 27 of REV L and earlier:
	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q321*	19A115123P1	Silicon, NPN; sim to Type 2N2712. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.

SYMBOL	GE PART NO.	DESCRIPTION
Q451 and Q452	19A115326P1	Silicon, NPN.
Q453 thru Q455	19A115889P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R301	3B77P471J	Composition: 470 ohms ±5%, 1/2 w.
R302	3B77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R303*	3B77P473J	Composition: 47000 ohms ±5%, 1/2 w.
		In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV K and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV H and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV J and earlier:
	19A115342P1	Silicon, NPN.
		Composition: 2700 ohms ±5%, 1/2 w.
R304	3B77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R305	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R306	3B77P273J	Composition: 27000 ohms ±5%, 1/2 w.
R307*	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV D and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV F and earlier: In Models 4EH64B22, 24, 26 of REV G and earlier: In Models 4EH64B23, 25, 27 of REV H and earlier:
	3B77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R308*	3B77P223J	Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19, 22, 24, 26 of REV D and earlier: In Models 4EH64B12, 13, 16, 17, 20, 21, 23, 25, 27 of REV F and earlier:
R309	3B77P203J	Composition: 20000 ohms ±5%, 1/2 w.
R310*	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV E and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV G and earlier: In Models 4EH64B22, 24, 26 of REV J and earlier: In Models 4EH64B23, 25, 27 of REV L and earlier:
	3B77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R311*	3B77P223J	Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV H and earlier: In Models 4EH64B10, 11, 14, 15, 18, 19 of REV K and earlier; In Models 4EH64B12, 13, 16, 17, 20, 21 of REV H and earlier:
R312	3B77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R313	3B152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R314	3B152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R315*	3B77P331J	Composition: 330 ohms ±5%, 1/2 w. In Models earlier than REV A:
	3B152P511J	Composition: 510 ohms ±5%, 1/4 w.
R316*	3B77P681J	Composition: 680 ohms ±5%, 1/2 w. In Models earlier than REV A:
	3B152P511J	Composition: 510 ohms ±5%, 1/4 w.
R317	3B77P473J	Composition: 4700 ohms ±5%, 1/2 w.
R318	3B77P272J	Composition: 2700 ohms 155, 1/2 w.
R320*	3B77P223J	Composition: 22,000 ohms ±5%, 1/2 w. Deleted in Models 4EH64A10,11,14,15,18,19,22,24,26 by REV G. Deleted in Models 4EH64A12,13,16,17,20,21,23,25,27 by REV J. Deleted in Models 4EH64B10,11,14,15,18,19 by REV F. Deleted in Models 4EH64B12,13,16,17,20,21 by REV H. Deleted in Models 4EH64B22,24,26 by REV J. Deleted in Models 4EH64B23,25,27 by REV L.

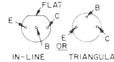
CONT'D ON 19B210768



(19D402821, Rev. 11)
(19D402665, Sh. 1, Rev. 9)
(19D402665, Sh. 2, Rev. 8)

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

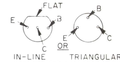
LEAD IDENTIFICATION FOR Q319 & Q320



IN-LINE TRIANGULAR
VIEW FROM LEAD END

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

LEAD IDENTIFICATION FOR Q307, Q31- Q317



IN-LINE TRIANGULAR
VIEW FROM LEAD END

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

OUTLINE DIAGRAM

25—50 MHZ RECEIVER
TYPES ER-46-A, B

RC-1474K

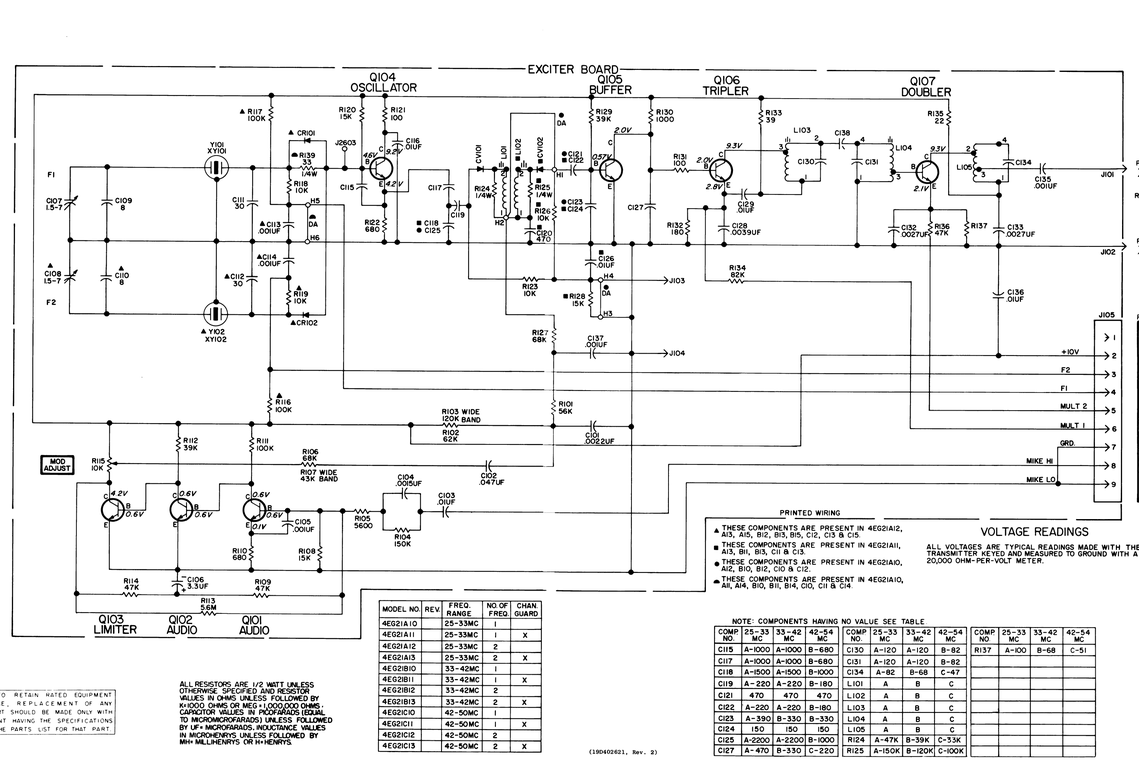
PARTS LIST

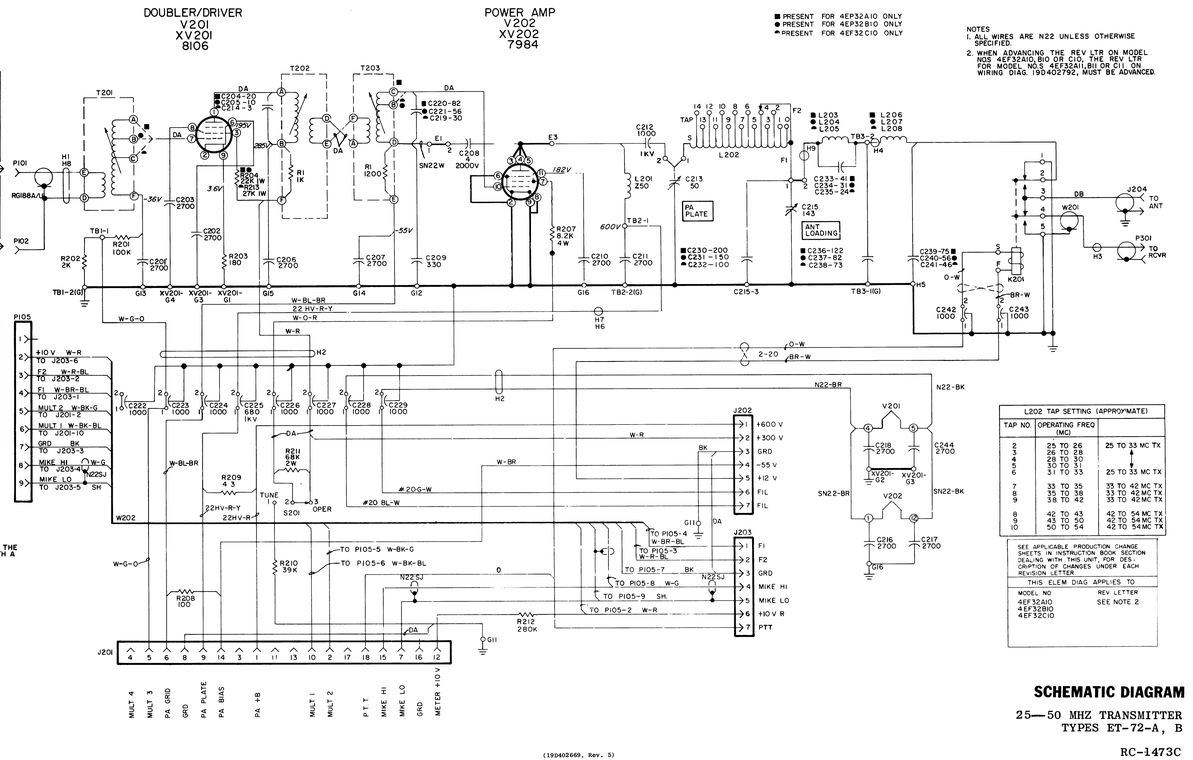
LBI-3725J

25-50 MHz RECEIVER
MODELS 4ER46A10-27 NARROW BAND
MODELS 4ER46B10-27 WIDE BAND

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C301A and C301B	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C301C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C302	7130348P3	Molded phenolic: 1 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JN-5/32.
C303A	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C303B	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C303C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C304 thru C306	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C307A and C307B	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C307C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C308A	7130348P4	Molded phenolic: 2.2 pf ±0.11 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JN-5/32.
C308B	7130348P12	Molded phenolic: 9.82 pf ±5%, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JN-5/32.
C308C	7130348P5	Molded phenolic 1.2 pf ±.06 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JN-5/32.
C309A and C309B	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C309C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C310	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C311	5491271P106	Variable, air: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C312	5490008P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C313	19A116656P39J7	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C314	5490008P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C315	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C316	5491271P106	Variable, air: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C317	5490008P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C318	19A116656P39J7	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C319	5490008P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C320 thru C323	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C324	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C325A	5496219P455	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -220 PPM.
C325B	5496219P457	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -220 PPM.
C325C	5496219P455	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -220 PPM.
C326	7130348P3	Molded phenolic: 1 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JN-5/32.
C327A	5496219P256	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -80 PPM.
C327B	5496219P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C327C	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C328A	5490008P27	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C328B	5490008P17	Silver mica: 39 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C328C	5490008P19	Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C329 and C330	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C331	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C332	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C333	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0; sim to Erie 557-36.
C334	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C335	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C336	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0; sim to Erie 557-36.
C337	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C338	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C339	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0 PPM; sim to Erie 557-36.
C340	19A115659P1	Variable: approx 16-141 pf, 150 VDCW; sim to El-Menco Type 42.
C341	5496219P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C342	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C343	5490008P15	Silver mica: 33 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C344	5490008P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C345	5490008P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C346	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C347	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C349	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C381	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C382	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C383	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C384	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C385	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C386	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C387	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C388	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C389	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C390	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C391	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C392	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C393	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C394	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C395	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C396	7491395P109	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JL.
C397	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C398	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C399	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C401	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C402	5490008P119	Silver mica: 47 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C403	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C404	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C405	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C406	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C407	7491393P1	Ceramic disc: .001 µf +100% -0%, 500 VDCW; sim to Sprague 121HC4.
C408	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C409	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C410	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C411	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C412	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C413	5494481P108	Ceramic disc: 470 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C414	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C415	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C416	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C417	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C418 and C419	5490008P137	Silver mica: 270 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C420	5496219P656	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -470 PPM.
C421 and C422	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C423	19A116080P109	Ceramic disc: 0.22 µf ±10%, 50 VDCW.
C424	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C425*	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV A and earlier; In Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24 and 26 earlier than REV A; In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV B and later; In Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 earlier than REV A;
	19D209243P5	Polyester: .047 µf ±20%, 50 VDCW.
C426	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C427 and C428	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C429	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C430	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C431	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES





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

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

MODEL NO.	REV.	FREQ. RANGE	NO. OF FREQ.	CHAN GUARD
4EG21A10		25-33MC	1	
4EG21A11		25-33MC	1	X
4EG21A12		25-33MC	2	
4EG21A13		25-33MC	2	X
4EG21B10		33-42MC	1	
4EG21B11		33-42MC	1	X
4EG21B12		33-42MC	2	
4EG21B13		33-42MC	2	X
4EG21C10		42-50MC	1	
4EG21C11		42-50MC	1	X
4EG21C12		42-50MC	2	
4EG21C13		42-50MC	2	X

(190402621, Rev. 2)

NOTE: COMPONENTS HAVING NO VALUE SEE TABLE.

COMP NO.	25-33 MC	33-42 MC	42-54 MC
C115	A-1000	A-1000	B-680
C117	A-1000	A-1000	B-680
C118	A-1500	A-1500	B-1000
C119	A-220	A-220	B-180
C121	470	470	470
C122	A-220	A-220	B-180
C123	A-390	B-330	B-330
C124	150	150	150
C125	A-2200	A-2200	B-1000
C127	A-470	B-330	C-220

COMP NO.	25-33 MC	33-42 MC	42-54 MC
C130	A-120	A-120	B-82
C131	A-120	A-120	B-82
C134	A-82	B-68	C-47
L101	A	B	C
L102	A	B	C
L103	A	B	C
L104	A	B	C
L105	A	B	C
R124	A-47K	B-39K	C-53K
R125	A-150K	B-120K	C-100K

COMP NO	25-33 MC	33-42 MC	42-54 MC
R137	A-100	B-68	C-51

(190402669, Rev. 5)

L202 TAP SETTING (APPROXIMATE)		
TAP NO.	OPERATING FREQ (MC)	
2	25 TO 26	25 TO 33 MC TX
3	26 TO 28	↑
4	28 TO 30	↓
5	30 TO 31	25 TO 33 MC TX
6	31 TO 33	
7	33 TO 35	33 TO 42 MC TX
8	35 TO 38	33 TO 42 MC TX
9	38 TO 42	33 TO 42 MC TX
8	42 TO 43	42 TO 54 MC TX
9	43 TO 50	42 TO 54 MC TX
10	50 TO 54	42 TO 54 MC TX

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
4EF32A10	SEE NOTE 2
4EF32B10	
4EF32C10	

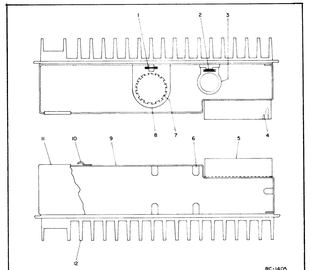
SCHEMATIC DIAGRAM

25—50 MHZ TRANSMITTER
TYPES ET-72-A, B

RC-1473C

(Cont'd from front of RC-1472)

SYMBOL	G-E PART NO	DESCRIPTION
R132	3877-P181K	Composition: 180 ohms ±10%, 1/2 w.
R133	3877-P390K	Composition: 39 ohms ±10%, 1/2 w.
R134	3877-P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R135	3877-P220K	Composition: 22 ohms ±10%, 1/2 w.
R136	3877-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R137A	3877-P101K	Composition: 100 ohms ±10%, 1/2 w.
R137B	3877-P680K	Composition: 68 ohms ±10%, 1/2 w.
R137C	3877-P510J	Composition: 51 ohms ±5%, 1/2 w.
R139	3877-P330K	Composition: 33 ohms ±10%, 1/2 w.
		SOCKETS
XY101 and XY102		Refer to Miscellaneous.
		CRYSTALS
		When reordering give GE Part Number and specify exact frequency needed.
		Crystal frequency = OF ÷ 12.
Y101 and Y102	19B206175-P11	Quartz: freq range 2083 to 2750 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P21	Quartz: freq range 2750 to 3500 KHz, temp range -30°C to +85°C.
Y101 and Y102	19B206175-P31	Quartz: freq range 3500 to 4500 KHz, temp range -30°C to +85°C.
		MISCELLANEOUS
	4037089-P1	Clip. (Part of XY101 and XY102).
	19A115793-P1	Contact, electrical: sim to Walco 2700. (Part of XY101 and XY102).
	19C311172-P1	Socket: 4 contacts. (Part of XY101 and XY102).
	19B200525-P9	Rivet. (Part of XY101 and XY102).
		POWER AMPLIFIER MODEL 4EF32A10 (19D402637-G1) 25-33 KHz; MODEL 4EF32B10 (19D402637-G2) 33-42 KHz; MODEL 4EF32C10 (19D402637-G3) 42-54 KHz
		CAPACITORS
C201 thru C203	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C204	5496218-P246	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -80 PPM.
C205	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C206 and C207	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C208	19B209330-P1	Silver mica: 4 pf ±1.2 pf, 2000 VDCW; sim to Electro Motive Type DM-20.
C209	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C210 and C211	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C212	19B209291-P1	Silver mica: .001 µf ±20%, 1000 VDCW; sim to Electro Motive Type DM-30.
C213	19B209290-P3	Variable, air: approx 6.5-50 pf; sim to ASP 31P.
C214	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C215	19B209290-P2	Variable, air: approx 7.5-143.7 pf; sim to ASP 143G.
C216 thru C218	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C219	7489162-P14	Silver mica: 30 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C220	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C221	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C223 and C224	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C225	19B209282-P1	Ceramic, feed-thru: 680 pf ±20%, 1000 VDCW; sim to Sprague Type 54GC.
C226 thru C229	7160807-P1	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW.
C230	19B209363-P3	Ceramic disc: 200 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C231	19B209363-P2	Ceramic disc: 150 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C232	19B209363-P1	Ceramic disc: 100 pf ±10%, 3000 VDCW, temp coef -750 PPM; sim to Centralab Type CJ.
C233	19B201420-P41J	Silver mica: 41 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C234	19B201420-P31J	Silver mica: 31 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C235	7489162-P12	Silver mica: 24 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C236	19B201420-P122J	Silver mica: 122 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C237	7489162-P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C238	19B201420-P73J	Silver mica: 73 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C239	7489162-P24	Silver mica: 75 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240	7489162-P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241	19B201420-P46J	Silver mica: 46 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C242 and C243	5493392-P7	Ceramic, feed-thru: 1000 pf +100% -0%, 300 VDCW; sim to Allen-Bradley Type FASC.
C244	5494481-P27	Ceramic disc: .0027 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		TERMINALS
E1 and E2	4029309-P1	Feed-thru: sim to Sealectro FT-SM-27.
		JACKS AND RECEPTACLES
J201	19B205689-G1	Connector: 18 contacts.
J202 and J203	19B205219-P1	Connector: 7 pins.
J204	7104941-P16	Jack, phono type: coaxial.
		RELAYS
K201	19C307020-P4	Armature: 12 VDC nominal, 2.5 w max operating, 80 ohms ±15% coil res, 2 form C contacts.
		INDUCTORS
L201	7772834-P4	Choke, RF: 7 µh ±10%, 0.96 ohm DC res; sim to Ohmite Z-50.
L202	19B205306-G1	Coil.
L203	19A122128-P1	Coil.
L204	19A122127-P1	Coil.
L205	19A122126-P1	Coil.
L206	19A122131-P1	Coil.
L207	19A122130-P1	Coil.
L208	19A122129-P1	Coil.
P101	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P102	4029840-P3	Contact, electrical: sim to AMP 41654.
P301	7104941-P6	Phono: short; sim to Cinch 15H20175. (Part of W201).
		RESISTORS
R201	3877-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R202	3877-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R203	3877-P181K	Composition: 180 ohms ±10%, 1/2 w.
R204	3878-P273K	Composition: 27,000 ohms ±10%, 1 w.
R207	38149-P822K	Composition: 8200 ohms ±10%, 4 w.
R208	3877-P101J	Composition: 100 ohms ±5%, 1/2 w.
R209	19B209022-P30	Wirewound: 4.3 ohms ±5%, 2 w; sim to IRC Type BWH.
R210	3877-P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R211	3879-P683K	Composition: 68,000 ohms ±10%, 2 w.
R212	5495948-P444	Deposited carbon: 0.28 megohm ±1%, 1/2 w; sim to Texas Instrument Type CDL/3RL.
R213	3878-P273K	Composition: 27,000 ohms ±10%, 1 w.
R214	38149-P153K	Composition: 15,000 ohms ±10%, 4 w.
		SWITCHES
S201	7145098-P3	Slide: SPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole 58-32.
		TRANSFORMERS
T201	19B205272-G1	Coil. Includes tuning slug 7142014-P29.
T202	19B205346-G1	Coil. Includes tuning slug 7142014-P29.
T203	19B205347-G1	Coil. Includes tuning slug 7142014-P20.
		TERMINAL BOARDS
TB1	7775500-P4	Phen: 2 terminals.
		TUBES
V201		Type 8106.
V202		Type 7984.
		CABLES
W201	5491689-P56	RF: approx 12 inches, includes plug (P301).
W202		**CABLE PL-19B205268-G1**
P105	19B209341-P2	**PLUGS** Socket: 9 contacts; sim to Elco 04-920-EE.
		SOCKETS
XY201	7480532-P8	Tube, phen: 9 pins; sim to Elco 04-903-84.
XY202	19C301007-P5	Tube: 12 pins; sim to Alcon Metal Products 371G.
		MECHANICAL PARTS (SEE RC-1405)
1	19A121195-P2	Support. (Used with V202).
2	19B205622-P1	Spring. (Used with V201).
3	19A121523-P3	Heat sink. (Used with V201).
4	7147223-P3	Clip, loop: sim to Patton-Macguyer 40. (Used with W202).
5	19B205211-P1	Support.
6	4035017-P4	Support, angle: sim to Tinnerman C19185-020-24.
7	7165167-P7	Insert, tube shield: sim to Atlas 106-332-22. (Used with V202).
8	19B204571-P1	Heat sink. (Used with V202).
9	19C303875-G1	Chassis.
10	7703541-P2	Strap, retaining.
11	19C303874-P1	Cover, bottom.
12	19D402623-P1	Casting.



25-50 WC TRANSMITTER-TYPE ET-72-A

SYMBOL	GE PART NO.	DESCRIPTION
C432	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C433*	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV J. Deleted in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV E.
C434*	5494481P14	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV B and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV A and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier:
	5490008P131	Silver mica: 150 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C435	19A116080P203	Polyester: 0.022 µf ±5%, 50 VDCW.
C436	19C900075P 56000J	Polyester: 5600 pf ±5%, 100 VDCW; sim to GE Type 61F.
C437	19C900075P 39000J	Polyester: 3900 pf ±5%, 100 VDCW; sim to GE Type 61F.
C438	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C439*	5496267P17	Tantalum: 100 µf ±20%, 35 VDCW; sim to Sprague Type 150D. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV B and earlier. In Models 4EH68B10, 11, 14, 15, 18, 19 of REV D and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV N and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C440	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C441	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C442*	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV D. Deleted in Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV E. Deleted in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV B. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV A, B, C and D: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV A, B, C and D:
	5496267P5	Tantalum: 4.7 µf ±20%, 10 VDCW; sim to Sprague Type 150D. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV F and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV B and earlier:
C443	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C451	7130348P14	Molded phenolic: 2.7 pf ±5%, 500 VDCW, temp coef approx 0 PPM; sim to Jeffrey Type JK-5/32.
C452 and C453	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C454	5494481P107	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.

SYMBOL	GE PART NO.	DESCRIPTION
C455	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C456	5490008P15	Silver mica: 33 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C459 and C460	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C461	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C462	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C463	19A116080P1	Polyester: .01 µf ±20%, 50 VDCW.
C464	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C465	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C466	19A116080P6	Polyester: .068 µf ±20%, 50 VDCW.
C467	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C468	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C469 thru C473	5496219P46	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef 0 PPM.
C474	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C475	19C900075P 470000J	Polyester: 4700 pf ±5%, 100 VDCW; sim to GE Type 61F.
C476 and C477	5490008P37	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C478	19C900075P 470000J	Polyester: 4700 pf ±5%, 100 VDCW; sim to GE Type 61F.
C479	5496219P34	Ceramic disc: 3.0 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C480	7489162P27	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C481	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C482*	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV F. Added in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV D. Added in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV A.
C483*	5496267P5	Tantalum: 4.7 µf ±20%, 10 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV D. Added in Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV C. Added in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV E. Added in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV E. Deleted in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H. Deleted in Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV H. Deleted in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C484*	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D. Added in Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV J. Added to Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C485*	5496267P228	Tantalum: 0.47 µf ±10%, 35 VDCW; sim to Sprague Type 150D. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.

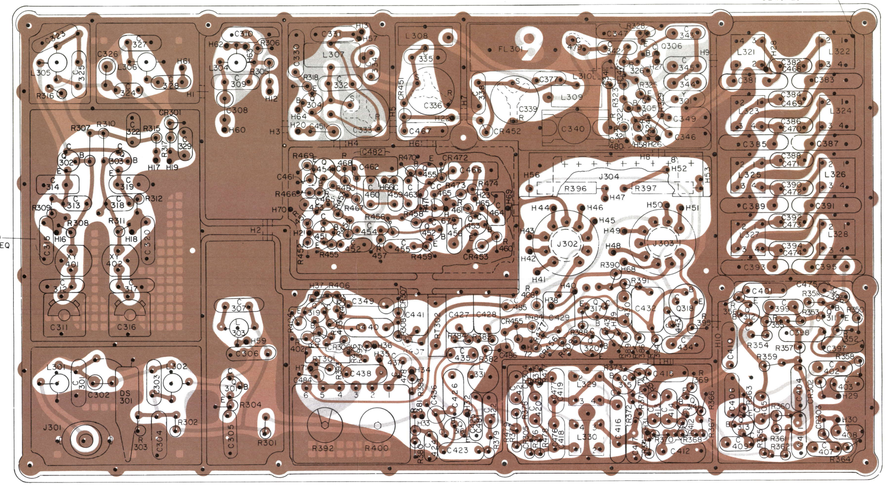
SYMBOL	GE PART NO.	DESCRIPTION
C486*	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
C487	19A116192P10	Ceramic: 1500 pf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR301	7777164P3	Germanium; sim to Type 1N90.
CR302 thru CR303	4038056P1	Germanium.
CR304 and CR305	19A115250P1	Silicon.
CR306	5494922P1	Silicon; sim to Type 1N456.
CR307 and CR308	19A115250P1	Silicon.
CR451 and CR452	7777164P16	Germanium; sim to Type 1N68A.
CR453	7777164P3	Germanium; sim to Type 1N90.
CR454	19A115250P1	Silicon.
CR455*	19A115250P1	Silicon. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
CR456*	4036887P6	Silicon, Zener. Added to Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV N. Added to Models 4EH68B10, 11, 14, 15, 18, 19 by REV L. Added to Models 4EH68B12, 13, 16, 17, 20, 21 by REV K. Added to Models 4EH68J27, 24, 26 by REV K. Added to Models 4EH68B23, 25, 27 by REV M.
		- - - - - - - INDICATING DEVICES - - - - - - -
DS301	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-27.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL301	19C304319G2	Bandpass: 5.3 MHz.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J301	7104941P9	Jack, phono type: phen; sim to Cinch 14H2058.
J302 and J303	19B209303P1	Connector, phen: 9 pins.
J304	19B205699G2	Connector: 16 contacts.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L301A	19C303960G11	Coil. Includes tuning slug 19B209497P2.
L301B	19C303960G4	Coil. Includes tuning slug 19B209497P2.
L301C	19C303960G6	Coil. Includes tuning slug 19B209497P2.
L302A	19C303960G11	Coil. Includes tuning slug 19B209497P2.
L302B	19C303960G5	Coil. Includes tuning slug 19B209497P2.
L302C	19C303960G7	Coil. Includes tuning slug 19B209497P2.
L303A	19C303960G1	Coil. Includes tuning slug 19B209497P2.
L303B	19C303960G4	Coil. Includes tuning slug 19B209497P2.
L303C	19C303960G6	Coil. Includes tuning slug 19B209497P2.

SYMBOL	GE PART NO.	DESCRIPTION
L304A	19C303960G2	Coil. Includes tuning slug 19B209497P2.
L304B	19C303960G3	Coil. Includes tuning slug 19B209497P2.
L304C	19C303960G8	Coil. Includes tuning slug 19B209497P2.
L305A	19C303960G3	Coil. Includes tuning slug 19B209497P2.
L305B	19C303960G3	Coil. Includes tuning slug 19B209497P2.
L305C	19C303960G9	Coil. Includes tuning slug 19B209497P2.
L306A	19C303960G4	Coil. Includes tuning slug 19B209497P2.
L306B	19C303960G4	Coil. Includes tuning slug 19B209497P2.
L306C	19C303960G10	Coil. Includes tuning slug 19B209497P2.
L307 thru L309	19B209224G1	Coil.
L310	19B204933G3	Coil.
L321* and L322*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12670. Deleted in 4EH68B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH68B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
L329*	19A115771P6	Transformer, freq: 455 KHz; sim to TOKO PEFCH-1073-CE3. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
	19C303062G6	Coil. Includes tuning slug 403836BP1.
L323*	19A115771P2	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12671. Deleted in 4EH68B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH68B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
	19C303062G4	Coil. Includes tuning slug 403836BP1.
L330*	19A115771P7	Transformer, freq: 455 KHz; sim to TOKO PEFCH-1073-CE3. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
	19C303062G5	Coil. Includes tuning slug 403836BP1.
L331	19B209405P1	Reactor, audio freq: 142 mh ±5%, at 0.1 v thru 6 v; sim to Aladdin 605-101.
L332* and L333*	19C311181G16	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L334*	19C311181G15	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
L335*	19C311181G16	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L336*	19C311181G15	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L337*	19C311181G16	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L338*	19C311181G15	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
L339*	19C311181G16	Coil. Includes tuning slug 403836BP1. Added to 4EH64B10, 11, 14, 15, 18, 19 by REV G. Added to 4EH64B12, 13, 16, 17, 20, 21 by REV J.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q301*	19A116066P1	Silicon, NPN; sim to Type 2N4996. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19 of REV H and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
	19A115342P1	Silicon, NPN.

SYMBOL	GE PART NO.	DESCRIPTION
Q302* and Q303*	19A115330P1	Silicon, NPN. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 of REV D and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19, 22, 24, 26 of REV D and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 of REV F and earlier:
	19A115245P1	Silicon, NPN.
Q304*	19A116860P1	Silicon, NPN; sim to Type 2N4996.
L328*	19A115771P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12670. Deleted in 4EH68B10, 11, 14, 15, 18, 19 by REV G. Deleted in 4EH68B12, 13, 16, 17, 20, 21 by REV J. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV D and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV C and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier:
L307 thru L309	19B209224G1	Coil.
	19A115342P1	Silicon, NPN.
Q305	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q306*	19A115910P1	Silicon, NPN; sim to Type 2N3906. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV H and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV K and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV H and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH68J27, 24, 26 of REV G and earlier: In Models 4EH68B23, 25, 27 of REV J and earlier:
	19A115245P1	Silicon, NPN.
Q311 thru Q315	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q316 and Q317	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q318*	19A115300P4	Silicon, NPN; sim to Type 2N3053. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19 of REV E and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV C and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q319*	19A116774P1	Silicon, NPN; sim to Type 2N5210. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV N and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV N and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q320*	19A116774P1	Silicon, NPN; sim to Type 2N5210. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV N and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV N and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
Q321*	19A115123P1	Silicon, NPN; sim to Type 2N2712. Deleted in Models 4EH64A10,11,14,15,18,19,22,24,26 by REV E. Deleted in Models 4EH64A12,13,16,17,20,21,23,25,27 by REV J. Deleted in Models 4EH68B10,11,14,15,18,19, 22, 24, 26 by REV F. Deleted in Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.

SYMBOL	GE PART NO.	DESCRIPTION
Q451 and Q452	19A115245P1	Silicon, NPN.
Q453 thru Q455	19A115889P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - RESISTORS - - - - - - - - -
R301	3B779471J	Composition: 470 ohms ±5%, 1/2 w.
R302	3B779105J	Composition: 10,000 ohms ±5%, 1/2 w.
R303*	3B779472J	Composition: 4700 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV J and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV L and earlier: In Models 4EH68B10, 11, 14, 15, 18, 19 of REV J and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH68J27, 24, 26 of REV G and earlier: In Models 4EH68B23, 25, 27 of REV J and earlier:
	3B779272J	Composition: 2700 ohms ±5%, 1/2 w.
R304	3B779102J	Composition: 1000 ohms ±5%, 1/2 w.
R305	3B779153J	Composition: 15,000 ohms ±5%, 1/2 w.
R306	3B779272J	Composition: 2700 ohms ±5%, 1/2 w.
R307*	3B779153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 of REV K and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV H and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV K and earlier: In Models 4EH68J27, 24, 26 of REV G and earlier: In Models 4EH68B23, 25, 27 of REV J and earlier:
	3B779123J	Composition: 12,000 ohms ±5%, 1/2 w.
R308*	3B779223J	Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 of REV G and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV D and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21, 23, 25, 27 of REV F and earlier:
	3B779203J	Composition: 2000 ohms ±5%, 1/2 w.
R309	3B779153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV H and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV H and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
R310*	3B779153J	Composition: 15,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24, 26 of REV G and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25, 27 of REV J and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV F and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV H and earlier: In Models 4EH68J27, 24, 26 of REV J and earlier: In Models 4EH68B23, 25, 27 of REV L and earlier:
	3B779123J	Composition: 12,000 ohms ±5%, 1/2 w.
R311*	3B779223J	Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV E and earlier: In Models 4EH64A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV G and earlier: In Models 4EH68A10, 11, 14, 15, 18, 19 of REV D and earlier: In Models 4EH68B12, 13, 16, 17, 20, 21 of REV F and earlier:
	3B779123J	Composition: 12,000 ohms ±5%, 1/2 w.
R312	3B779202J	Composition: 2000 ohms ±5%, 1/2 w.
R313	3B152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R314	3B152P103J	Composition: 1000 ohms ±5%, 1/4 w.
R315*	3B779331J	Composition: 330 ohms ±5%, 1/2 w. In Models earlier than REV A:
	3B152P511J	Composition: 510 ohms ±5%, 1/4 w.
R316*	3B779681J	Composition: 680 ohms ±5%, 1/2 w. In Models earlier than REV A:
	3B152P511J	Composition: 510 ohms ±5%, 1/4 w.
R317	3B779472J	Composition: 4700 ohms ±5%, 1/2 w.
R318	3B779273J	Composition: 27000 ohms ±5%, 1/2 w.
R320*	3B779223J	Composition: 22,000 ohms ±5%, 1/2 w. In Models 4EH64A10,11,14,15,18,19,22,24,26 by REV F. In Models 4EH64A12,13,16,17,20,21,23,25,27 by REV H. Deleted in 4EH68B10,11,14,15,18,19 by REV E. Deleted in 4EH68B12,13,16,17,20,21 by REV W. Deleted in 4EH68B23,24,26 by REV J. Deleted in 4EH68B23,25,27 by REV L.

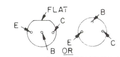
CONT'D ON 19B620768



(19D402821, Rev. 11)
(19D402665, Sh. 1, Rev. 9)
(19D402665, Sh. 2, Rev. 8)

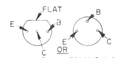
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

LEAD IDENTIFICATION FOR Q319 & Q320



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

LEAD IDENTIFICATION FOR Q307, Q311 - Q317



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

OUTLINE DIAGRAM

25—50 MHZ RECEIVER
TYPES ER-46-A, B

RC-1474K

PARTS LIST

LBI-3723J

25-50 MHz RECEIVER
MODELS 4ER46A10-27 NARROW BAND
MODELS 4ER46B10-27 WIDE BAND

SYMBOL	GE PART NO.	DESCRIPTION
		---------- CAPACITORS ----------
C301A and C301B	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C301C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C302	7130348P3	Molded phenolic: 1 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C303A	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C303B	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C303C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C304 thru C306	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C307A and C307B	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C307C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C308A	7130348P4	Molded phenolic: 2.2 pf ±0.11 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C308B	7130348P12	Molded phenolic: 9.82 pf ±5%, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C308C	7130348P5	Molded phenolic: 1.2 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C309A and C309B	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C309C	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C310	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C311	5491271P106	Variable, air: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C312	5490008P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C313	19A116656P39J7	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C314	5490008P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C315	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C316	5491271P106	Variable, air: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C317	5490008P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C318	19A116656P39J7	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C319	5490008P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C320 thru C323	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C324	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C325A	5496219P455	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -220 PPM.
C325B	5496219P457	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -220 PPM.
C325C	5496219P455	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -220 PPM.
C326	7130348P3	Molded phenolic: 1 pf ±.05 pf, 500 VDCW, temp coef approx 0 PPM; sim to Jeffers Type JM-5/32.
C327A	5496219P256	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -80 PPM.
C327B	5496219P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C327C	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C328A	5490008P27	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C328B	5490008P17	Silver mica: 39 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C328C	5490008P19	Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C329 and C330	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C331	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C332	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C333	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0; sim to Erie 557-36.
C334	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C335	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C336	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0; sim to Erie 557-36.
C337	5496219P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C338	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C339	5490446P2	Variable, ceramic: approx 5-25 pf, 350 VDCW, temp coef 0 PPM; sim to Erie 557-36.
C340	19A115659P1	Variable: approx 16-141 pf, 150 VDCW; sim to El-Menco Type 42.
C341	5496219P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C342	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C343	5490008P15	Silver mica: 33 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C344	5490008P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C345	5490008P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C346	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C347	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C349	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C381	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C382	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C383	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C384	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C385	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C386	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C387	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C388	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C389	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C390	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C391	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C392	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C393	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C394	5496219P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C395	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C396	7491393P109	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JL.
C397	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C398	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C399	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C401	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C402	5490008P119	Silver mica: 47 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C403	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C404	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C405	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C406	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C407	7491393P1	Ceramic disc: .001 pf +100% -0%, 500 VDCW; sim to Sprague 1219C4.
C408	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C409	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C410	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C411	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C412	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C413	5494481P108	Ceramic disc: 470 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C414	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C415	19A116080P1	Polyester: .01 uf ±20%, 50 VDCW.
C416	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C417	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C418 and C419	5490008P137	Silver mica: 270 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C420	5496219P636	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -470 PPM.
C421 and C422	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C423	19A116080P109	Ceramic disc: 0.22 uf ±10%, 50 VDCW.
C424	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C425*	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV A and earlier; In Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24 and 26 earlier than REV A; In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV B and earlier; In Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 earlier than REV A)
	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW.
C426	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C427 and C428	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C429	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C430	5494481P113	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C431	5496207P2	Tantalum: 47 uf ±20%, 6 VDCW; sim to Sprague Type 150D.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

(DF-1088)

MODEL NO	REV	FREQ RANGE (MHZ)	NO OF	NOISE BLANKER
4ER46A10	L	25-33	1	
4ER46A11	L	25-33	2	
4ER46A12	N	25-33	1	X
4ER46A13	N	25-33	2	X
4ER46A14	L	33-42	1	
4ER46A15	L	33-42	2	
4ER46A16	N	33-42	1	X
4ER46A17	N	33-42	2	X
4ER46A18	L	42-50	1	
4ER46A19	L	42-50	2	
4ER46A20	N	42-50	1	X
4ER46A21	N	42-50	2	X
4ER46A22	L	25-33	4	
4ER46A23	N	25-33	4	X
4ER46A24	L	33-42	4	
4ER46A25	N	33-42	4	X
4ER46A26	L	42-50	4	
4ER46A27	N	42-50	4	X

MODEL NO	REV	FREQ RANGE (MHZ)	NO OF FREQ	NOISE BLANKER
4ER46B10	L	25-33	1	
4ER46B11	L	25-33	2	
4ER46B12	N	25-33	1	X
4ER46B13	N	25-33	2	X
4ER46B14	L	33-42	1	
4ER46B15	L	33-42	2	
4ER46B16	N	33-42	1	X
4ER46B17	N	33-42	2	X
4ER46B18	L	42-50	1	
4ER46B19	L	42-50	2	
4ER46B20	N	42-50	1	X
4ER46B21	N	42-50	2	X
4ER46B22	K	25-33	4	
4ER46B23	M	25-33	4	X
4ER46B24	K	33-42	4	
4ER46B25	M	33-42	4	X
4ER46B26	K	42-50	4	
4ER46B27	M	42-50	4	X

NOTES
1. JUMPERS USED FOR 1 FREQ ONLY.
2. CONNECTIONS TO H18 USED FOR 2 FREQ ONLY
CONNECTIONS TO H16 USED FOR 2 & 4 FREQ ONLY.
3. ALL COMPONENTS MARKED WITH ASTERISK (*) ARE NOT USED FOR ONE FREQUENCY RECEIVER.
4. COMPONENT NO SUFFIX
A = 25-33 MHZ
B = 33-42 MHZ
C = 42-50 MHZ
5. JUMPER FOR 4 FREQ ONLY.
6. ▲COMPONENTS MARKED THUS ARE PRESENT IN 4ER46B10-27 ONLY. (WIDE BAND)
7. ■COMPONENTS MARKED THUS ARE PRESENT IN 4ER46A10-27 ONLY.

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MEASURED TO GROUND WITH TEST SET MODEL 4EX3A10 OR A 20,000 OHM-PER-VOLT METER, AND WITH SQUELCH CONTROL R400 FULLY COUNTER-CLOCKWISE. READINGS TAKEN WITH F1 OPERATING

S = NO SIGNAL (SQUELCHED)
US = WITH A 1 MILLIVOLT UNMODULATED ON-FREQUENCY SIGNAL (UNSQUELCHED).

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

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

SCHEMATIC DIAGRAM

25—50 MHZ RECEIVER
TYPES ER-46-A, B

19R620768, Rev. 26

SYMBOL	GE PART NO.	DESCRIPTION
R321	3R77P681J	Composition: 680 ohms ±5%, 1/2 w.
R322	3R77P393J	Composition: 39,000 ohms ±5%, 1/2 w.
R323	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R324	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R325	3R77P392J	Composition: 3900 ohms ±5%, 1/2 w.
R326	3R77P333J	Composition: 33,000 ohms ±5%, 1/2 w.
R327	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R328*	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV G and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV J and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19 of REV G and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21 of REV J and earlier: In Models 4ER46B22, 24, 26 of REV F and earlier: In Models 4ER46B23, 25, 27 of REV H and earlier:
	3R77P122J	Composition: 1200 ohms ±5%, 1/2 w.
R329	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R350	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R351	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R352	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R353	3R77P562K	Composition: 5600 ohms ±10%, 1/2 w.
R354	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R355	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R356	3R152P222K	Composition: 2200 ohms ±10%, 1/4 w.
R357	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R358	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R359	3R77P562K	Composition: 5600 ohms ±10%, 1/2 w.
R360	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R361	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R362	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R363	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R364	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R365	3R77P562K	Composition: 5600 ohms ±10%, 1/2 w.
R366	3R77P123K	Composition: 12,000 ohms ±10%, 1/2 w.
R367	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R368	3R152P181K	Composition: 180 ohms ±10%, 1/4 w.
R369	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R370	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R371	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R372	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R373	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R374	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R375 and R376	3R77P513J	Composition: 51,000 ohms ±5%, 1/2 w.
R377	3R77P682K	Composition: 6800 ohms ±10%, 1/2 w.
R378	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R379	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R380	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R381	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R382	3R152P221J	Composition: 220 ohms ±5%, 1/4 w.
R383*	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w. Deleted in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV L. Deleted in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV N. Deleted in Models 4ER46B10, 11, 14, 15, 18, 19 by REV L. Deleted in Models 4ER46B12, 13, 16, 17, 20, 21 by REV N. Deleted in Models 4ER46B22, 24, 26 by REV K. Deleted in Models 4ER46B23, 25, 27 by REV M.
R384	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
R385	3R152P152K	Composition: 1500 ohms ±10%, 1/4 w.
R386*	3R77P163J	Composition: 16,000 ohms ±5%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21 of REV M and earlier: In Models 4ER46B22, 24, 26 of REV J and earlier: In Models 4ER46B23, 25, 27 of REV L and earlier:
	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R387*	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w. Deleted in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
R388	3R77P300J	Composition: 30 ohms ±5%, 1/2 w.
R389*	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21 of REV M and earlier: In Models 4ER46B22, 24, 26 of REV J and earlier: In Models 4ER46B23, 25, 27 of REV L and earlier:
	3R77P681J	Composition: 680 ohms ±5%, 1/2 w.
R390	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w.
R391	3R77P431J	Composition: 430 ohms ±5%, 1/2 w.
R392	19B209320P1	Resistor assembly. Variable, carbon film, includes: (R392) 20,000 ohms ±20%, 0.25 w; (R400) 5000 ohms ±20%, 0.25 w; sim to Centralab Series 5 (Type 71-2).
R393*	3R77P202K	Composition: 2000 ohms ±10%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21 of REV M and earlier: In Models 4ER46B22, 24, 26 of REV J and earlier: In Models 4ER46B23, 25, 27 of REV L and earlier:
	3R77P392K	Composition: 3900 ohms ±10%, 1/2 w.
R394	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R395	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
R396 and R397	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R399	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R400		(See R392).
R401	19A116278P357	Metal film: 38,300 ohms ±2%, 1/2 w.
R402	19A116278P313	Metal film: 13,300 ohms ±2%, 1/2 w.
R403	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R404	19A116278P233	Metal film: 2150 ohms ±2%, 1/2 w.
R405	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R406*	3R152P512J	Composition: 5100 ohms ±5%, 1/4 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV K and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV M and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19 of REV K and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21 of REV M and earlier: In Models 4ER46B22, 24, 26 of REV J and earlier: In Models 4ER46B23, 25, 27 of REV L and earlier:
	3R152P332J	Composition: 3300 ohms ±5%, 1/4 w.
R407	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R408	3R77P822J	Composition: 8200 ohms ±5%, 1/2 w.
R409	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R410*	3R77P182J	Composition: 1800 ohms ±5%, 1/2 w. Deleted in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV C and earlier: In Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24 and 26 of REV B and earlier: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV E and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV D and earlier:
	3R152P362J	Composition: 3600 ohms ±5%, 1/4 w.
R411*	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w. Deleted in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
R412	3R77P561K	Composition: 560 ohms ±10%, 1/2 w.
R451	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R452	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R453	3R77P221J	Composition: 220 ohms ±5%, 1/2 w.
R454	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R455	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R456	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R457	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R458	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R459	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R460	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R461	3R77P104J	Composition: 0.1 megohm ±5%, 1/2 w.
R465*	3R77P912J	Composition: 9100 ohms ±5%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 earlier than REV A: In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 of REV A and earlier: In Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 earlier than REV A:
	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R466	3R77P272J	Composition: 2700 ohms ±5%, 1/2 w.
R467	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R468	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R469	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R470	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R471	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R472	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R473	3R77P433J	Composition: 43,000 ohms ±5%, 1/2 w.
R474	3R77P562J	Composition: 5600 ohms ±5%, 1/2 w.
R475	3R77P105J	Composition: 1 megohm ±5%, 1/2 w.
R476	3R77P911J	Composition: 910 ohms ±5%, 1/2 w.
R477 and R478	3R77P273J	Composition: 27,000 ohms ±5%, 1/2 w.
R479	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R480*	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w. Added in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV A. Added in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV B. Added in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV A.
R481*	3R77P152J	Composition: 1500 ohms ±5%, 1/2 w. Added in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV D. Added in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV F. Added in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25 and 27 by REV E. Added in Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24 and 26 by REV C. Deleted in Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Deleted in Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Deleted in Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Deleted in Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
R482*	3R77P273J	Composition: 27,000 ohms ±5%, 1/2 w. In Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, and 26 of REV G-K. In Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, and 27 of REV J-M. In Models 4ER46B10, 11, 14, 15, 18, 19 of REV F-K. In Models 4ER46B12, 13, 16, 17, 20, 21 of REV H-M. In Models 4ER46B22, 24, 26 of REV F-J. In Models 4ER46B23, 25, 27 of REV H-L.
	3R77P433J	Composition: 43,000 ohms ±5%, 1/2 w. Added to Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
R483*	3R77P564J	Composition: 0.56 megohm ±5%, 1/2 w. Added to Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
R484*	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w. Added to Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 by REV G. Added to Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27 by REV J. Added to Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26 by REV F. Added to Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27 by REV H.
		THERMISTORS
RT301	5490828P38	Rod: 1400 ohms ±5%, 0.38 w max; sim to Globar Type 492H.
RT302	5490828P35	Rod: 3800 ohms ±5%, 1 w max; sim to Globar Type 723B-4.
		SOCKETS
XY401 and XY402	5490277P1	Transistor, phen: 4 contacts; sim to Elco 3303.
		CRYSTALS
Y301	19B206356G4	Quartz: freq 5755.00 KHz, temp range -30°C to +85°C. NOTE: When reordering, give GE Part number and specify exact frequency needed. 25-33 MHz crystal frequency = (OF +5.3) ÷ 2. 33-42 MHz crystal frequency = (OF -5.3) ÷ 2. 42-50 MHz crystal frequency = (OF -5.3) ÷ 3.
Y401 and Y402	19B206357P1	Quartz: freq range 12 to 20 MHz, temp range -30°C to +85°C.
		MISCELLANEOUS
	19B205369G2	Top cover.
	4036555P1	Insulator, washer: nylon. (Used with Q318).
	4035306P62	Washer, fiber. (Used with Y301, FL301).

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 - Models 4ER46A10-27

To prevent operation of oscillator F1 when F2, F3 and F4 is selected. Changed R315 and R316.

REV. A - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. B - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To eliminate audio coupling into the noise blanker from +12 volt supply line - Changed R465, and added C482 and R480.

REV. A - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. B - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26 &
Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. C - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To increase maximum squelch sensitivity. Changed C442. In 4ER46A10-27, C425 was also changed.

REV. C - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. D - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To facilitate noise blanker disable function for test purposes. Added white wire from junction of R467-R468 (on Blanker Pulse Generator) to J302-4 (receiver jack).

REV. B - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. C - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. D - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. E - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To eliminate high frequency oscillations in the receiver PA caused by use of a higher gain PA transistor. Changed C434.

REV. C - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. D - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. E - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. F - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To eliminate undesirable squelch thump that occurs when carrier is received. Changed C442 and R410. Added C483 and R481.

REV. D - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. E - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. F - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. G - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To permit use of different IF coils. Changed printed wiring board and L321 thru L330.

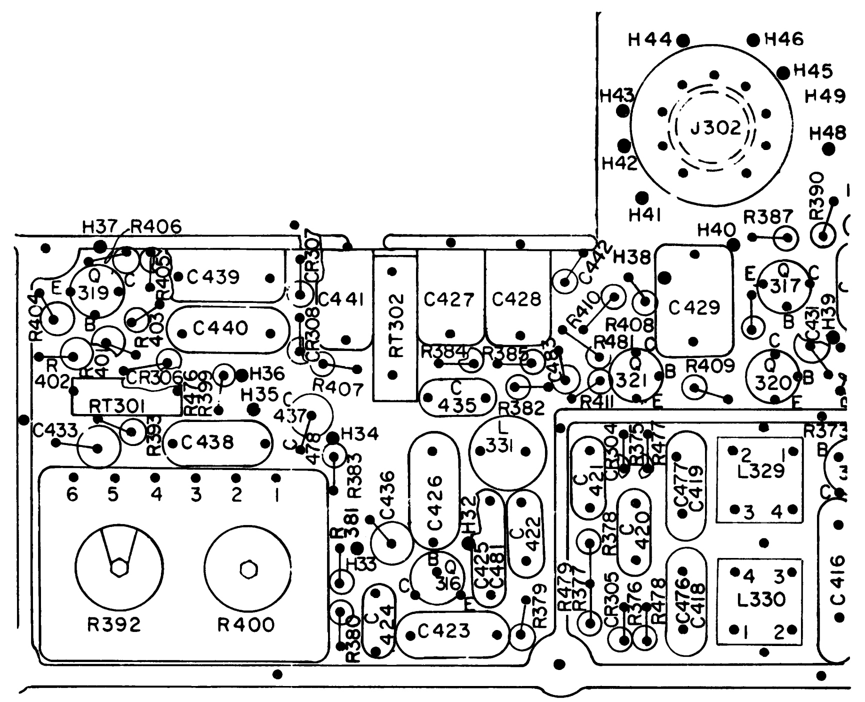
REV. E - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. F - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. G - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. H - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To increase oscillator output. Changed Q302, Q303, R307, R308, R310 and R311.

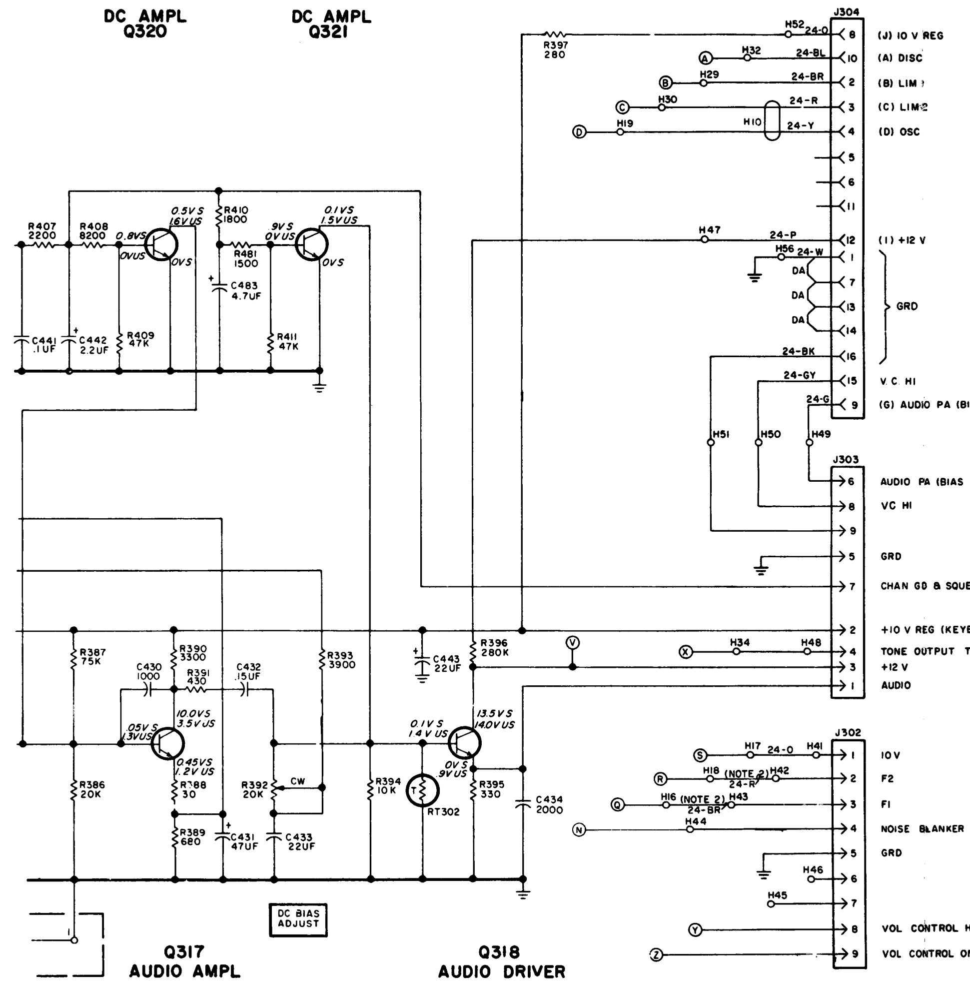
REV. F - Models 4ER46B10, 11, 14, 15, 18, 19, 22, 24, 26
REV. G - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. H - Models 4ER46B12, 13, 16, 17, 20, 21, 23, 25, 27
REV. J - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27

To eliminate objectionable squelch thump. Deleted R387, R410, R411, C433, C442, R481, C483 and Q321. Added C484, C485, C486, CR455, R482, R483 and R484.

Outline Diagram Was:



Schematic Diagram Was:



REV. G - Models 4ER46B10, 11, 14, 15, 18, 19

REV. J - Models 4ER46B12, 13, 17, 20, 21

To increase IF bandwidth. Changed L321, L322, L324, L326 and L328 to L332, L333, L335, L337 and L339. Changed L323, L325 and L327 to L334, L336, and L338. Changed C468 and C474. Changed C422 to C487.

REV. H - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. K - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27
REV. H - Models 4ER46B10, 11, 14, 15, 18, 19
REV. K - Models 4ER46B12, 13, 16, 17, 20, 21
REV. G - Models 4ER46B22, 24, 26
REV. J - Models 4ER46B23, 25, 27

To improve audio fidelity. Changed R328.

REV. J - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. L - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27
REV. J - Models 4ER46B10, 11, 14, 15, 18, 19
REV. L - Models 4ER46B12, 13, 16, 17, 20, 21
REV. H - Models 4ER46B22, 24, 26
REV. K - Models 4ER46B23, 25, 27

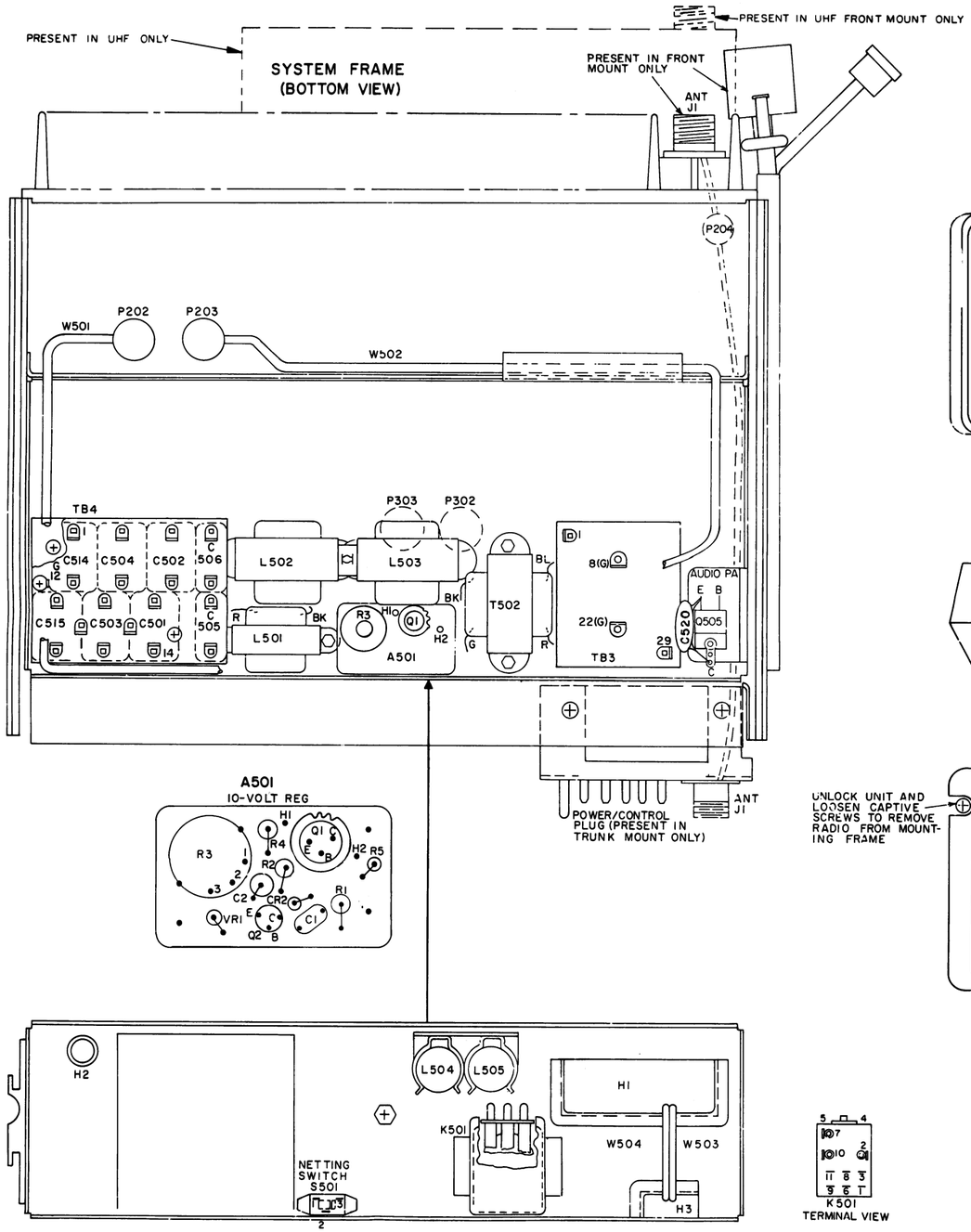
To incorporate new transistors. Changed Q301, Q304, and Q306.

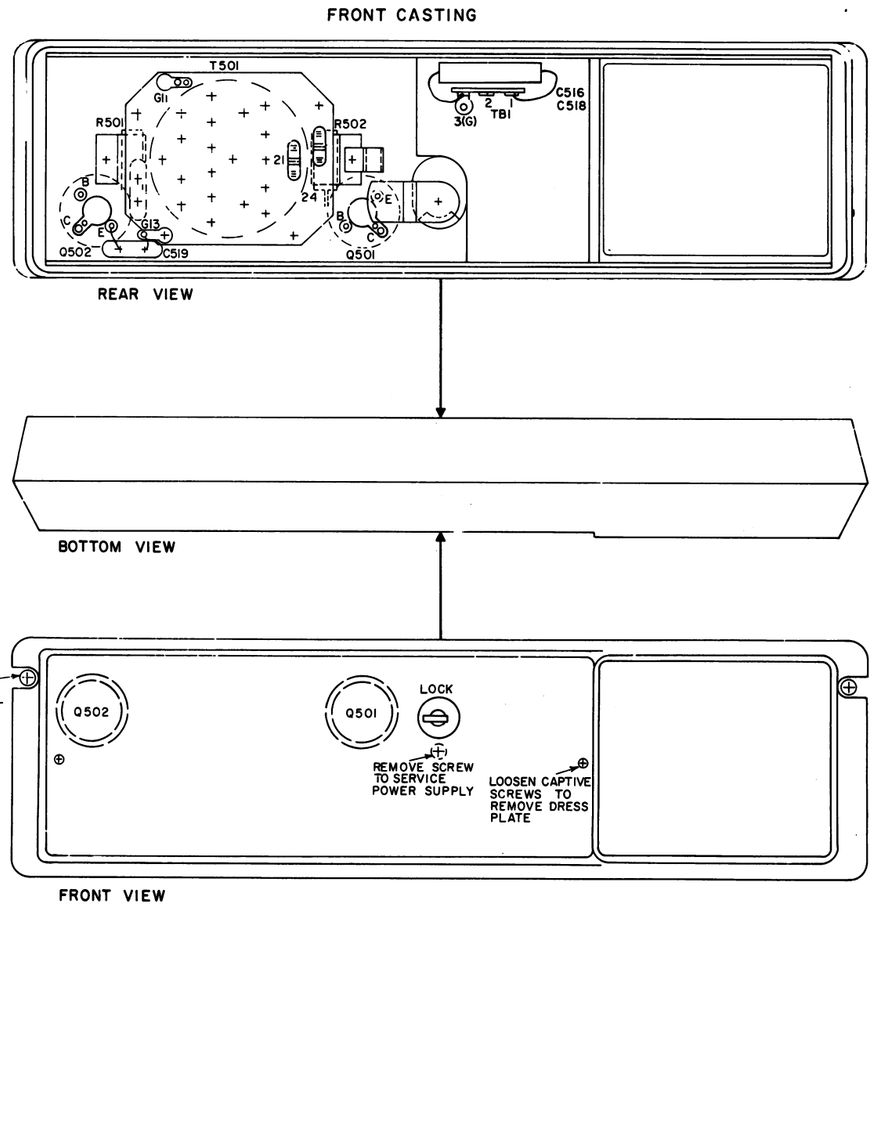
REV. K - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. M - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27
REV. K - Models 4ER46B10, 11, 14, 15, 18, 19
REV. M - Models 4ER46B12, 13, 16, 17, 20, 21
REV. J - Models 4ER46B22, 24, 26
REV. L - Models 4ER46B23, 25, 27

To improve receiver sensitivity. Deleted R320 and changed R303.

REV. L - Models 4ER46A10, 11, 14, 15, 18, 19, 22, 24, 26
REV. N - Models 4ER46A12, 13, 16, 17, 20, 21, 23, 25, 27
REV. L - Models 4ER46B10, 11, 14, 15, 18, 19
REV. N - Models 4ER46B12, 13, 16, 17, 20, 21
REV. K - Models 4ER46B22, 24, 26
REV. M - Models 4ER46B23, 25, 27

To improve squelch operation and improve audio quality. Changed C439, R386, R389, R393, R406, R482, Q318, Q319, Q320. Deleted R483 and added CR456.



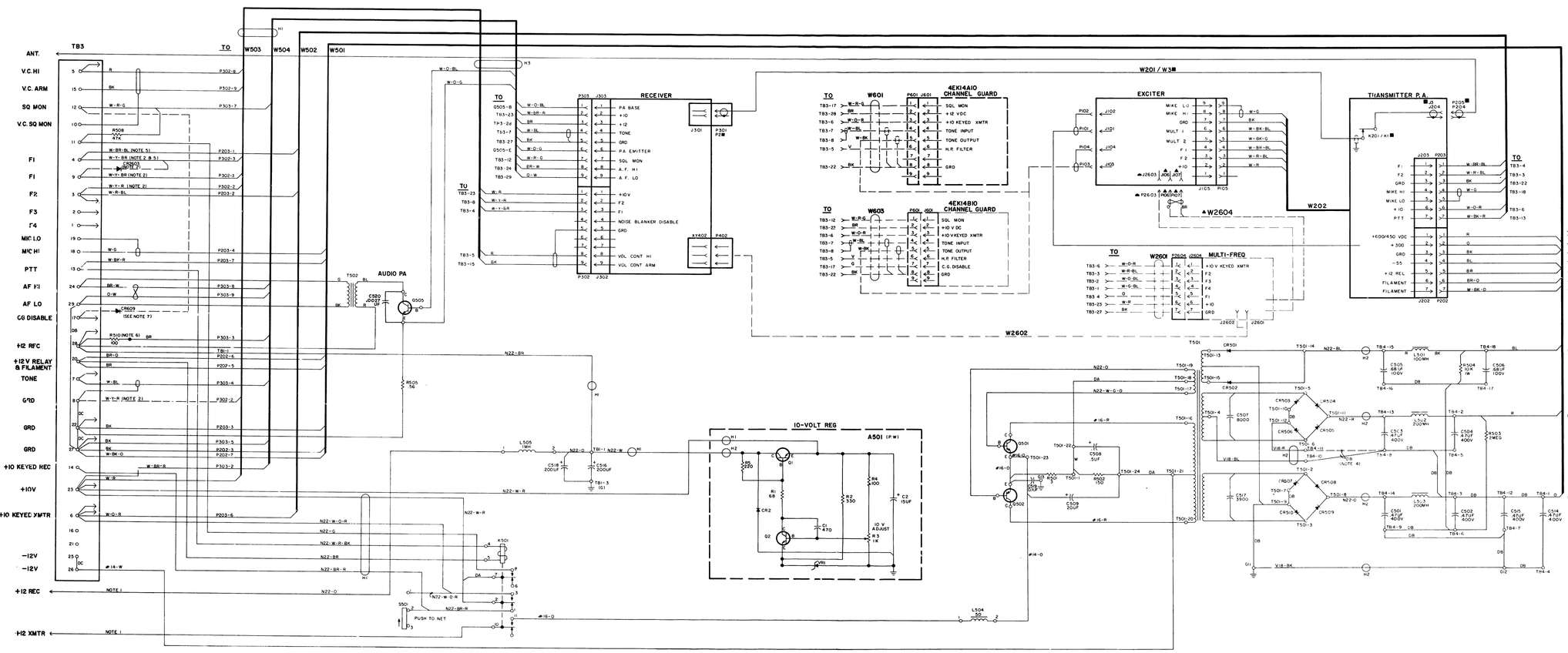


OUTLINE DIAGRAM

POWER SUPPLY MODEL 4EP50A10

19D402813, Rev. 9

(DF-0062)



(DF-0062)

NOTES:

1. PART OF PL19820539G1 (FRONT MOUNT) OR PL19820526G1 (TRUNK MOUNT).
2. IN HIGH BAND AND LOW BAND MULTI-FREQ UNITS ONLY CR2603 ADDED, W-Y-BR WIRE TERMINATED AT TB3-9 INSTEAD OF TB3-4, W-Y-R WIRE TERMINATED AT TB3-8 INSTEAD OF AT TB3-3.
3. WHEN ADVANCING THE REV LTR ON MODEL 4EP50A10, THE REV LTR FOR MODEL 4EP50A12, 4EP50A14, 4EP50A16, AND 4EP50A18 MUST BE ADVANCED, AND THE REV LTR FOR MODEL 4EP50A13 ON WIRING DIAG 19R640736 MUST ALSO BE ADVANCED.
4. CONNECTION FROM TB4-8 TO TB4-10 FOR HI BAND. CONNECTION FROM TB4-8 TO TB4-10 FOR LO BAND.
5. FOR HIGH AND LOW BAND UNITS AND 450 MHZ CRYSTAL RX ONLY, ONE FREQ REC MOVE THE W-Y-BR WIRE FROM TB3-9 TO TB3-8, W-BR-BL WIRE FROM TB3-4 TO TB3-9. FOR TWO FREQ XMT, ONE FREQ REC MOVE THE W-Y-BR WIRE FROM TB3-4 TO TB3-8.
6. WRAP AND SLEEVE RESISTOR-WIRE CONNECTION
7. FOR UNITS WITH 4EG4A0 CHANNEL GUARD ONLY, CR1609 ADDED.
8. COMPONENTS MARKED WITH "A" ARE PRESENT IN 450 MHZ MULTI-FREQ WITH TX (COM ONLY). COMPONENTS MARKED WITH "B" ARE PRESENT IN HIGH BAND AND LOW BAND MULTI-FREQUENCY AND 450 MHZ MULTI-FREQ UNITS WITHOUT TX (COM.
9. COMPONENTS MARKED WITH "B" ARE PRESENT IN 450 MHZ UNITS ONLY.
10. FOR 450 MHZ SINGLE FREQ (COM RX ONLY, CONNECT ORANGE WIRE OF CABLE W2601 TO TB3-5.

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO.	REV LETTER
4EP50A10(NOTE 3)	M

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART THAT IS MADE ONLY WITH A CONTROLLED VALUE MUST BE WITH A PART HAVING VALUE SHOWN ON THE PARTS LIST FOR THAT PART.

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=KILOHMS. ALL CAPACITORS ARE MICROFARAD CAPACITOR VALUES IN MICROFARADS (MFD) UNLESS TO MICROMICROFARADS) UNLESS FOLLOWED BY MF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

SCHEMATIC DIAGRAM

POWER SUPPLY MODEL 4EP50A10

19R640707, Rev. 33

PARTS LIST

LBI-3717K

MOBILE POWER SUPPLY
MODEL 4EP50A10
19D402638G1

SYMBOL	GE PART NO.	DESCRIPTION
A501		**10 VOLT REGULATOR** 19B205255G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5494481P107	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C3 and C4	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
		- - - - - DIODES AND RECTIFIERS - - -
CR1*	4037822P1	Silicon. Deleted by REV F.
CR2*	4037822P1	Silicon. Added by REV F.
		- - - - - - INDICATING DEVICES - - - - - -
DS1*	4034664P1	Lamp, incandescent: 28 v; sim to GE 2148. Deleted by REV J.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q2*	19A116755P1	Silicon, NPN; sim to Type 2N3947.
		In REV K and earlier:
	19A115123P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - -
R1*	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
		In Models earlier than REV C:
	3R77P161J	Composition: 160 ohms ±5%, 1/2 w.
R2	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R3	19A115681P1	Variable, wirewound: 1000 ohms ±20%, 3 w; sim to CTS Series 115.
R4	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R5*	3R152P221K	Composition: 220 ohms ±10%, 1/4 w. Added by REV J.
		- - - - - - VOLTAGE REGULATORS - - - - -
VR1	4036887P6	Silicon, Zener.
		- - - - - - - - - CAPACITORS - - - - - - - -
C501 thru C504	19A115028P59	Polyester: 0.47 µf ±20%, 400 VDCW.
C505* and C506*	19A115028P30	Polyester: 0.68 µf ±20%, 100 VDCW.
		In Models earlier than REV B:
	19A115028P19	Polyester: 0.47 µf ±20%, 100 VDCW.
C507	5490825P2	Ceramic disc: 8000 pf ±10%, 2000 VDCW; sim to RMC Type JF Discap.
C508	19A115680P2	Electrolytic: 5 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C509	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C514 and C515	19A115028P59	Polyester: 0.47 µf ±20%, 400 VDCW.
C516*	19A115680P10	Electrolytic: 200 µf +150% -10%, 25 VDCW.
		In Models earlier than REV A:
	19A115680P5	Electrolytic: 100 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C517	5494481P29	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C518*	19A115680P10	Electrolytic: 200 µf +150% -10%, 25 VDCW. Added by REV A.
C519*	19A115028P14	Polyester: 0.1 µf ±20%, 200 VDCW. Added by REV D.
C520*	5494481P27	Ceramic disc: 2700 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV E. Deleted by REV G.
		- - - - - DIODES AND RECTIFIERS - - -
CR501 thru CR510	4037822P2	Silicon.
CR509	5494922P1	Silicon; sim to Type 1N456.
CR2603	4037822P1	Silicon.
		- - - - - - - - - RELAYS - - - - - - - - -
K501	19B209240P5	Armature, open: 12 VDC nominal, 2 w max operating, 100 ohms ±10% coil res, 3 form C contacts; sim to Magnecraft 88X-156.
		- - - - - - - - - INDUCTORS - - - - - - - -
L501	19B200777P1	Reactor: 0.1 h min, 12 ohms ±10% DC res, 300 VDC operating.
L502 and L503	19B209236P1	Reactor: 200 mh min, 16 ohms DC res max, 700 VDC VDC operating.
L504	19A115392P1	Choke, RF: 50 µh ±10%, .02 ohm DC res max.
L505*	19A115894P1	Choke, RF: 1 mh min, 0.35 ohms DC res max.
		In Models earlier than REV A:
	7488079P43	Choke, RF: 10 µh ±10%, 0.3 ohm DC res max; sim to Jeffers 4422-4K.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q501 and Q502	5490810P1	Germanium, PNP.
Q505*	19A116741P1	Silicon, NPN.
		In REV G-L:
	19A116203P3	Silicon, NPN.
		Earlier than REV G:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - -
R501	5493035P6	Wirewound: 3 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R502	5493035P21	Wirewound: 150 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R503	3R77P205J	Composition: 2 megohms ±5%, 1/2 w.
R504	3R76P103K	Composition: 10,000 ohms ±10%, 1 w.
R505	19B209022P109	Wirewound: 0.56 ohm ±10%, 2 w; sim to IRC Type BWH.
R508	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R510*	3R77P101K	Composition: 100 ohms ±10%, 1/2 w. Added by REV A.
		- - - - - - - - - SWITCHES - - - - - - - -
S501	19B209040P7	Slide: SPDT, 0.5 amp at 125 v; sim to Continental-Wirt Type G-J32.
		- - - - - - - TRANSFORMERS - - - - - - -
T501	19C303893G1	Transformer.
T502	19A115612P1	Audio freq: 0.3-3 KHz, Pri: 24.5 ohms ±5% imp, 1.38 ohms DC res, Sec: 3.3 ohms imp, 0.18 ohm DC res.
		- - - - - - TERMINAL BOARDS - - - - - -
TB1	7775500P2	Phen: 3 terminals.
TB3	19B205258G1	Board: 27 terminals.
TB4	19B205237G1	Board: 18 terminals.
		- - - - - - - - - CABLES - - - - - - - - -
W501		**CABLE** 19B205266G1 (Used in Transmitter)
		- - - - - - - - - PLUGS - - - - - - - - -
P202	19B209341P1	Socket: 7 contacts; sim to Elco 04-720-XX. Includes:
	19A122138P1	Knob.
	19A134048P1	Wood screw, phillips head.
W502		**CABLE** 19B205267G1 (Used in Transmitter)
		- - - - - - - - - PLUGS - - - - - - - - -
P203	19B209341P1	Socket: 7 contacts; sim to Elco 04-720-XX. Includes:
	19A122138P1	Knob.
	19A134048P1	Wood screw, phillips head.
W503		**CABLE** 19B205285G1 (Used in Receiver)
		- - - - - - - - - PLUGS - - - - - - - - -
P302	19B209341P2	Socket: 9 contacts; sim to Elco 04-920-XX. Includes:
	19A122138P1	Knob.
	19A134048P1	Wood screw, phillips head.
W504		**CABLE** 19B205264G1 (Used in Receiver)
		- - - - - - - - - PLUGS - - - - - - - - -
P303	19B209341P2	Socket: 9 contacts; sim to Elco 04-920-XX. Includes:
	19A122138P1	Knob.
	19A134048P1	Wood screw, phillips head.
		- - - - - - - MISCELLANEOUS - - - - - - -
	4035439P1	Heat sink, transistor: sim to Birtcher 3AL-635-2R. (Used with Q1 in 19B205255G1).
	4036555P1	Insulator, washer: nylon. (Used with Q1 in 19B205255G1).
	19C303871P1	Cover. (Used with K501 in 19D402638G1).
	4038930P1	Clip. (Used with R501, 502 in 19D402638G1).
	5491682P11	Lock: sim to Yale and Towne Lock F670I. (Used in 19D402638G1).
	5491682P12	Cam: sim to Yale and Towne Lock 18. (Used in 19D402638G1).
	4031529P1	Clip: sim to Tinnerman C20213-017. (Used with W502 in 19D402638G1).
	4029387P2	Nut: sim to Tinnerman C410-632-3. (Mounts L502, L503 in 19D402638G1).
	19A122251P1	Clip, cable. (Located by T501 in 19D402638G1).
		ASSOCIATED ASSEMBLIES
		POWER/ANTENNA CONNECTOR 25-50 MHz and 132-174 MHz 19B205260G1
		- - - - JACKS AND RECEPTACLES - - - -
J1	19C303775P1	Connector, phenolic: 28 contacts.
		- - - - - - - MISCELLANEOUS - - - - - - -
	19A122133G2	Antenna Cable: approx 12 inches long. Include J2 and P204.
		POWER/ANTENNA CONNECTOR 450 MHz 19B205260G7
		- - - - JACKS AND RECEPTACLES - - - -
J1	19C303775P1	Connector, phenolic: 28 contacts.
		- - - - - - - MISCELLANEOUS - - - - - - -
	19A122133G10	Antenna Cable. Includes J2 and P205.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

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 - To provide additional filtering for alternator noise and voltage spikes on incoming power leads, changed C516 and L505, and added C518 and R510.

REV. B - To improve filtering of bias supply, changed C505, and C506.

REV. C - To improve operation of 10-volt regulator, changed R1 on A501.

REV. D - To reduce transistor switching noise. Add C519.

REV. E - To eliminate receiver PA instability. Added C520 between the collector and emitter of Q505.

REV. F - To provide reverse polarity protection. Added CR2 and deleted CR1 in the collector circuit of Q2 on 10-volt regulator A501.

REV. G - To replace audio output transistor that is no longer available. Changed Q505 and deleted C520.

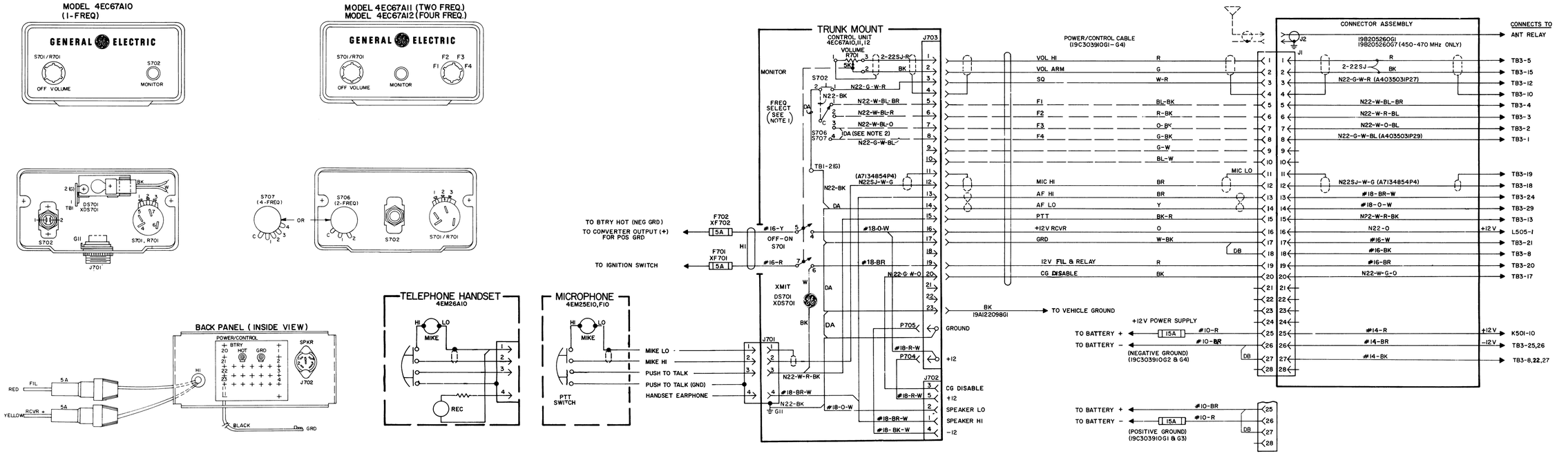
REV. H - To eliminate keying thump in receiver. Moved the white-brown-red wire from TB3-14 to TB3-23.

REV. J - To improve procurement. Deleted DS1 and added R5.

REV. K - To improve regulator performance. Deleted C3 and C4.

REV. L - To incorporate a new transistor. Changed Q2.

REV. M - To improve stability. Changed Q205 and added C520.



(19C311222, Rev. 3)

(19R620756, Rev. 22)

NOTES

1. S706 IN 4EC67A11 ONLY.
   S707 IN 4EC67A12 ONLY.
   FOUR FREQ KIT PL19A122220G7.
2. REMOVE N22-G-W-BL WIRE FROM S707-4 & ADD JUMPER IN 4EC67A12 FOR THREE FREQ OPERATION.

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SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
4EC67A10	E
4EC67A11	E
4EC67A12	E
PL19B205260G1	C
PL19B205260G7	

SCHEMATIC & OUTLINE DIAGRAM

TRUNK MOUNT CONTROL UNIT
MODEL 4EC67A10-12

RC-1416J

(DF-4075)

PARTS LIST

LBI-3713E

TRUNK MOUNT CONTROL UNIT

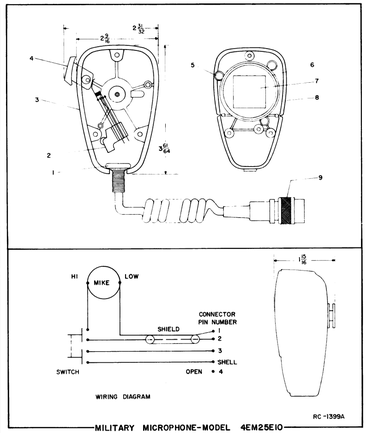
MODEL 4EC67A10 (19C303901G1) (1 Frequency)
MODEL 4EC67A11 (19C303901G2) (2 Frequency)
MODEL 4EC67A12 (19C303901G2) (4 Frequency)
(19A122220G7)

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - **INDICATING DEVICES** - - - - - - -
DS701	19C307037P14	Lamp, incandescent: 18 v; sim to GE 1445.
		- - - - - - - - - - **FUSES** - - - - - - - - - -
F701 and F702	1R16P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
		- - - - - - - **JACKS AND RECEPTACLES** - - - - - - -
J701*		Connector. Includes:
	19A116061P2	Receptacle: 4 female contacts; sim to Amphenol 91-PM4F-1000.
	19A116061P4	Lockwasher.
	19A116061P5	Nut, knurled.
		In Models earlier than REV D:
	7117934P5	Connector, chassis: 4 female contacts; sim to Amphenol 91-PC4F.
J702*	5493018P1	Connector, 5 contacts; sim to Cinch 203-41-05-081.
		In Models earlier than REV A:
	19B209340P5	Connector, phen: 4 contacts; sim to Alcon Metal M3101.
J703	19A122095G1	Board: 27 contacts.
		- - - - - - - - - - **PLUGS** - - - - - - - - - -
P704 and P705	4029840P3	Contact, electrical: sim to AMP 42101-2.
		- - - - - - - - - - **RESISTORS** - - - - - - - - -
R701		(Part of S701).
		- - - - - - - - - - **SWITCHES** - - - - - - - - - -
S701	5496870P13	Resistor/switch: includes Resistor (R701), variable, carbon film, 5000 ohms ±20%, 0.5 w; Switch, rotary, DPDT, 6 amps at 125 VAC; sim to Mallory LC(5K)0AC-2.
S702	19B209165P4	Pushbutton, white: SPST, momentary contact, normally open, 1 amp at 115 VAC; sim to Grayhill 30-17B.
S706	19B200394P7	Rotary: 1 pole, 2 positions, non-shorting, 36° indexing contacts, 1 amp at 115 VAC/VDC; sim to Grayhill Series 24.
		- - - - - - - - **TERMINAL BOARDS** - - - - - - -
TB1	7775500P4	Phen: 2 terminals.
		- - - - - - - - - **SOCKETS** - - - - - - - - -
XDS701	4032220P1	Lampholder, miniature: sim to Drake N517.
XF701		**FUSE LEAD** 19A122111G1
		- - - - - - - - - **MISCELLANEOUS** - - - - - - -
	19A115776P2	Fuseholder, phenolic: sim to Bussmann Type HHJ.
XF702		**FUSE LEAD** 19A122111G2
		- - - - - - - - - **MISCELLANEOUS** - - - - - - - -
	19A115776P2	Fuseholder, phenolic: sim to Bussmann Type HHJ.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		MODIFICATION KIT 19A122220G7 (Used in Model 4EC67A12)
		- - - - - - - - - - **SWITCHES** - - - - - - - - - -
S707	19B204441G1	Rotary: 1 pole, 4 positions, non-shorting contacts, 1 amp at 115 VDC; sim to Grayhill Series 24 (modified).
		ASSOCIATED ASSEMBLIES
		POWER/CONTROL CABLES
	19C303910G1	2 Freq, positive ground.
	19C303910G2	2 Freq, negative ground.
	19C303910G3	4 Freq, positive ground.
	19C303910G4	4 Freq, negative ground.
	19C311411G1	Screw, self captivating: No. 8-32 x 2-1/4. (Used with Connector cover).
		FUSE ASSEMBLY 19B216021G4
	19D413045P1	Base.
	19D413046P1	Cover.
	19B205950P1	Fuse clip.
		POWER/ANTENNA CONNECTOR 25-50 MHz and 132-174 MHz 19B205260G1
		- - - - - - - **JACKS AND RECEPTACLES** - - - - - -
J1	19C303775P1	Connector, phenolic: 28 contacts.
		- - - - - - - - - **MISCELLANEOUS** - - - - - - -
	19A122133G2	Antenna Cable. Includes J2 and P204.
		POWER/ANTENNA CONNECTOR 450 MHz 19B205260G7
		- - - - - - - **JACKS AND RECEPTACLES** - - - - - -
J1	19C303775P1	Connector, phenolic: 28 contacts.
		- - - - - - - - - **MISCELLANEOUS** - - - - - - -
	19A122133G10	Antenna Cable. Includes J2 and P205.
		MILITARY MICROPHONE MODELS 4EM25E10, F10 19B209102P2 (SEE MC-1399)
		MODEL 4EM25E10 - SHURE BROTHERS
1		Cable clamp, front and back case. Shure Brothers RP96.
2		Switch. Shure Brothers RP26.
3		(See item 1).
4		Switch button. Shure Brothers RP97. (Quantity 5 only).
5		Spring and internal hardware. Shure Brothers RP16.
6		Shield. Shure Brothers RP23. (Quantity 5 only).
7		Magnetic controlled cartridge, grille cloth, screen and resonator. Shure Brothers RP13.
8		(See item 1).
9		Cable and plug: approx 6 feet long. Shure Brothers RP14.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - **MISCELLANEOUS** - - - - - - - -
	19B205216P1	Jewel: red. (Used with DS701 in 19C303901G1,2).
	4039182G3	Knob. (Used with S701 in 19C303901G1, 2). (Used with S703 in 19C303901G2).
	19A121521G1	Mounting support. (Used in 19C303901G1, 2).
	19A129617G1	Mounting support. (Mounts DS701 in 19C303901G1,2).
	NP248987	Nameplate. (Used in Model 4EC67A10).
	NP248988	Nameplate. (Used in Model 4EC67A11, 12).
	19B216271G2	Housing.



MILITARY MICROPHONE-MODEL 4EM25E10

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 - Models 4EC67A10,11 & 12
To incorporate improved speaker jack. Changed J702.

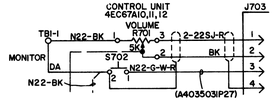
REV. A - Connector Assembly 19B205260-G1
To permit the addition of Channel Guard hookswitch option, added a green-white-orange wire from J1-20 to TB3-17.

REV. B - Models 4EC67A10, 11 & 12
To permit the addition of Channel Guard hookswitch option, added a green-white-orange wire from J702-3 to J703-20.

REV. B - Connector Assembly 19B205260-G1
To reduce alternate noise, removed #14 Black wire from J1-27.

REV. C - Models 4EC67A10,11 & 12
To make control head compatible with Royal Executive Systems. Changed wiring of R701.

Schematic was:

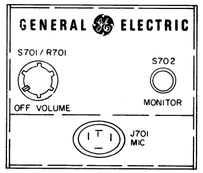


REV. C - Connector Assembly 19B205260-G1
To reduce transmitter noise in the region of 30-150 kHz from carrier. Added #14 BK wire between J1-27 and TB3-8, 22, 27. Added jumper from pin 26 to 27 on power cable plug in negative ground applications. Added jumper from pin 25 to 27 on power cable plug is positive ground applications.

REV. D - Models 4EC67A10, 11, 12
To ground microphone jack. Changed J701. Added #18 BK-W wire from J703 (ground) to G11.

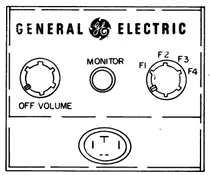
REV. E - Models 4EC67A10, 11, 12
Changed control unit housing from metal to Lexans.

MODEL 4EC68A10(1-FREQ.)

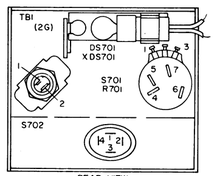


FRONT VIEW

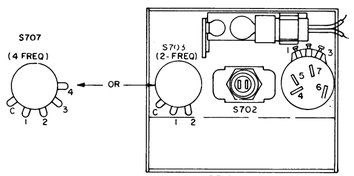
MODEL 4EC68A11 (2-FREQ)
MODEL 4EC68A12 (4-FREQ)



FRONT VIEW

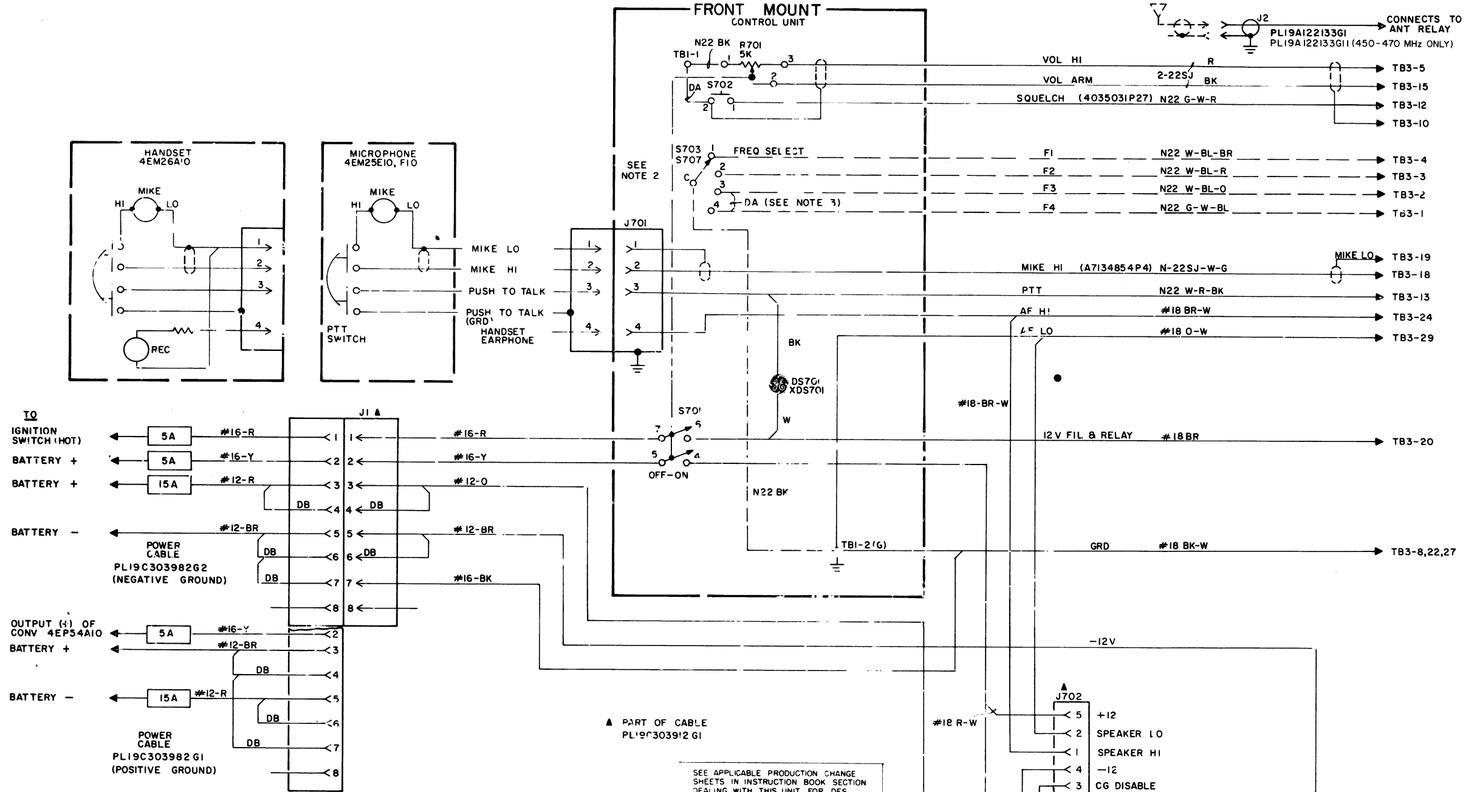


REAR VIEW



REAR VIEW

(19C311221, Rev. 2)



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THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EC68A10 4EC68A11 4EC68A12	

(19D402670, Rev. 14)

(DF-4075)

SCHEMATIC & OUTLINE DIAGRAM

FRONT MOUNT CONTROL UNIT
MODEL 4EC68A10-12

RC-1417H

PARTS LIST

LBI-3714C

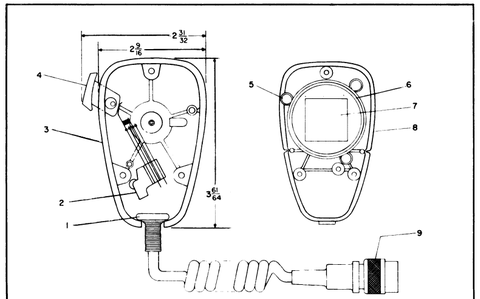
FRONT MOUNT CONTROL UNIT

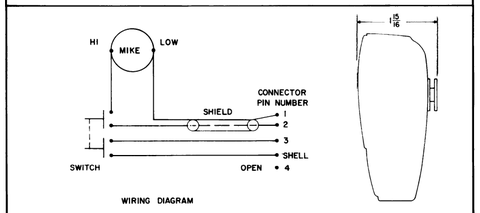
MODEL 4EC68A10 (19C303907G1) (1 Frequency)
MODEL 4EC68A11 (19C303907G2) (2 Frequency)
MODEL 4EC68A12 (19C303907G2) (4 Frequency)
(19A122220G7)

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - **INDICATING DEVICES** - - - - - - - -
DS701	19C307037P14	Lamp, incandescent: 18 v; sim to GE 1445.
		- - - - - - **JACKS AND RECEPTACLES** - - - - - -
J701		Connector. Includes:
	19A116061P2	Receptacle: 4 female contacts; sim to Amphenol Type 91-PN4F-1000.
	19A116061P4	Lockwasher.
	19A122600P1	Nut, knurled.
		- - - - - - - - - - **RESISTORS** - - - - - - - - - -
R701		(Part of S701).
		- - - - - - - - - - **SWITCHES** - - - - - - - - - -
S701	5496870P13	Resistor/switch: includes Resistor (R701), variable, carbon film, 5000 ohms ±20%, 0.5 w; Switch, rotary, DPST, 6 amps at 125 VAC; sim to Mallory LC(5K)OAC-2.
S702	19B209165P4	Pushbutton, white: SPST, momentary contact, normally open, 1 amp at 115 VAC; sim to Grayhill 30-17B.
S703	19B200394P3	Rotary: 1 pole, 2 positions, non-shorting contacts, 1 amp at 115 VAC or 28 VDC; sim to Grayhill Series 24.
		- - - - - - - - **TERMINAL BOARDS** - - - - - - -
TB1	7775500P4	Phen: 2 terminals.
		- - - - - - - - - - **SOCKETS** - - - - - - - - - -
XDS701	4032220P2	Lampholder, miniature: sim to Drake N517.
		MODIFICATION KIT 19A122220G7 (Used in Model 4EC68A12)
		- - - - - - - - - - **SWITCHES** - - - - - - - - - -
S704	19B204441G1	Rotary: 1 pole, 4 positions, non-shorting contacts, 1 amp at 115 VDC; sim to Grayhill Series 24 (modified).
		ASSOCIATED ASSEMBLIES
		POWER CABLE 19C303982G2 (Negative Ground)
	7473192P35	Receptacle, phen: 8 contacts; sim to H.B. Jones 261-32-08-033 (S-308-CCT-K).
	1R16P8	Fuse, quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
	19A122111G1	Fuseholder: with red wire; sim to Bussman Type HHJ.
	19A122111G2	Fuseholder: with yellow wire; sim to Bussman Type HHJ.
	7102673P2	Fuse, cartridge: 15 amps at 32 v; sim to Littelfuse 311015 or Bussmann AGC-15.
	7007522P1	Fuseholder: 15 amps; sim to Littelfuse 356001.
		POWER CABLE 19C303982G1 (Positive Ground)
	7473192P35	Receptacle: phenolic, 8 contacts; sim to H.B. Jones 261-32-08-033 (S-308-CCT-K).

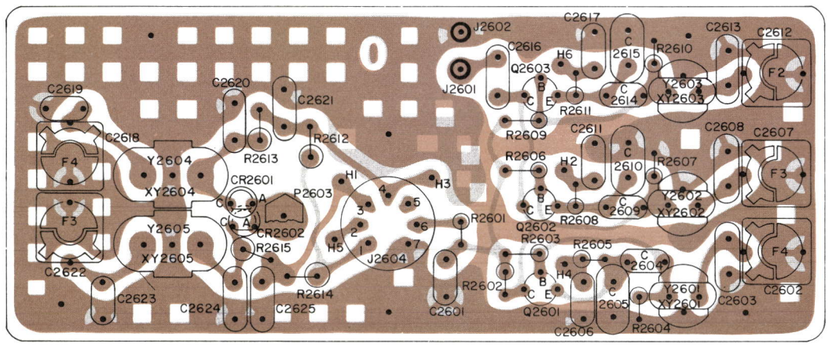
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
	1R16P8	Fuse, quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
	19A122111G1	Fuseholder: with red wire; sim to Bussman Type HHJ.
	19A122111G2	Fuseholder: with yellow wire; sim to Bussman Type HHJ.
	7102673P2	Fuse, cartridge: 15 amps at 32 v; sim to Littelfuse 311015 or Bussmann AGC-15.
	7007522P1	Fuseholder: 15 amps; sim to Littelfuse 356001.
		CABLE ASSEMBLY 19C303912G1
J1	7473192P34	Plug, phen: 8 contacts; sim to H.B. Jones 261-31-08-032.
J702	5493018P5	Connector: 5 contacts, molded black phenolic, (Less Saddle); sim to Cinch Mfg Co 203-31-05-031.
	5491563P3	Cap: (Used with J702): sim to Methode C850-1V.
		MILITARY MICROPHONE MODELS 4EM25E10 19B209102P2 (SEE RC-1399A) MODEL 4EM25E10 - SHURE BROTHERS
1		Cable clamp, front and back case. Shure Brothers RP96.
2		Switch. Shure Brothers RP26.
3		(See item 1).
4		Switch button. Shure Brothers RP97. (Quantity 5 only).
5		Spring and internal hardware. Shure Brothers RP16.
6		Shield. Shure Brothers RP23. (Quantity 5 only).
7		Magnetic controlled cartridge, grille cloth, screen and resonator. Shure Brothers RP13.
8		(See item 1).
9		Cable and plug: approx 6 feet long. Shure Brothers RP14.
		- - - - - - - - **MISCELLANEOUS** - - - - - - - -
	NP248936	Nameplate. (Used in Model 4EC68A10).
	NP248938	Nameplate. (Used in Model 4EC68A11, 12).
	19B205216P1	Jewel: red. (Used with DS701 in 19C303907G1,2).
	4039182G3	Knob. (Used with S701 in 19C303907G1, 2). (Used with S703 in 19C303907G2).
	4032248P1	Clip: spring tension; sim to Augat Brothers 6185-1A. (Mounts DS701 in 19C303907G1, 2).





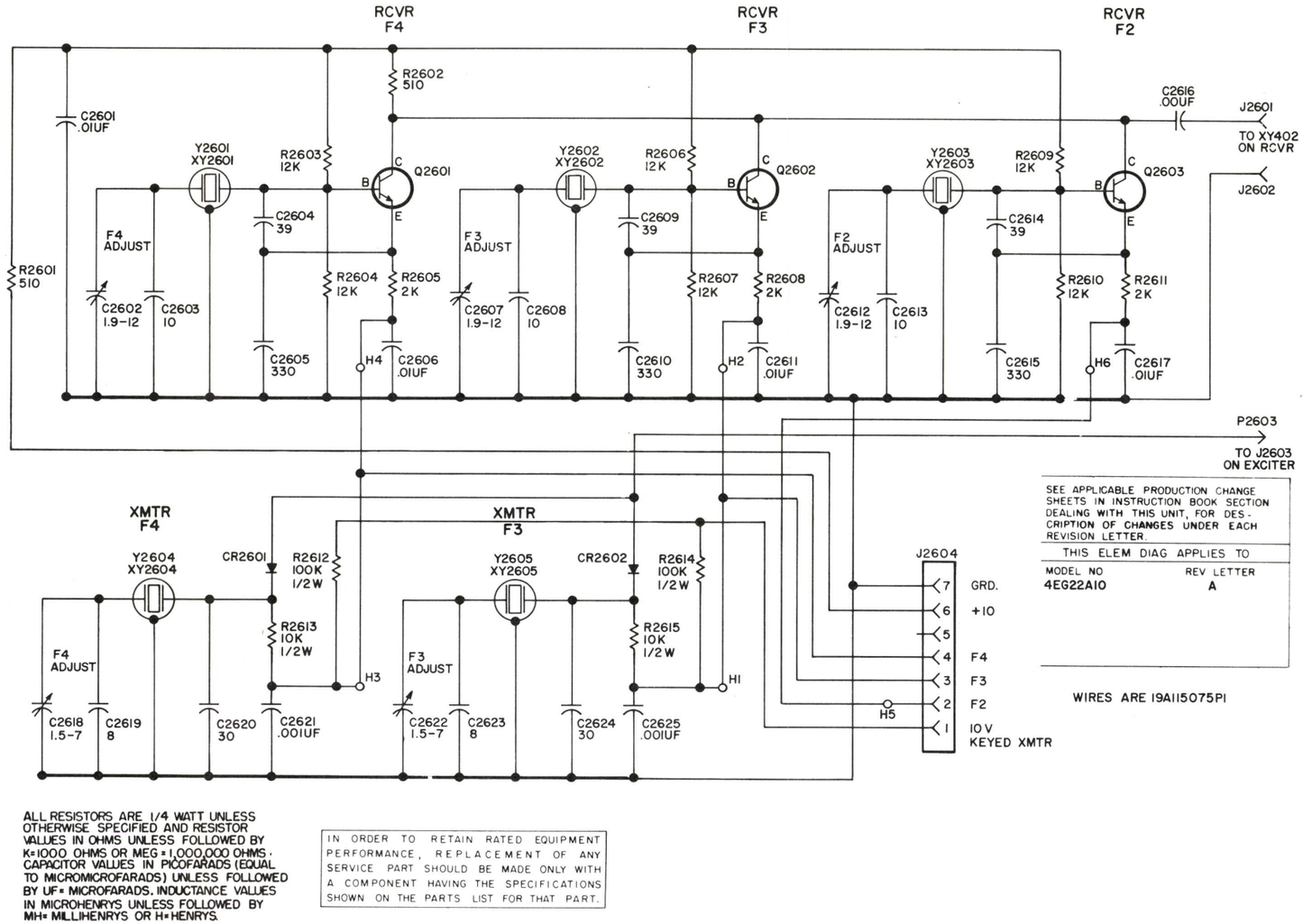
MILITARY MICROPHONE-MODEL 4EM25E10



(19C311233, Rev. 1)
(19B205122, Sh. 1, Rev. 0)
(19B205122, Sh. 2, Rev. 0)

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

(DF-8407)



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(19C303968, Rev. 2)

SCHEMATIC & OUTLINE DIAGRAM

FOUR-FREQUENCY OSCILLATOR BOARD
MODEL 4EG22A10

RC-1477C

PARTS LIST

25-50 MHz FOUR FREQUENCY OSCILLATOR BOARD
MODEL 4EG22A10
(PL-19C303962-G1)
REV A

SYMBOL	G-E PART NO.	DESCRIPTION
		CAPACITORS
C2601	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C2602	5491271-P106	Variable, air: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C2603	5490008-P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2604	5496219-P753	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C2605	5490008-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2606	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C2607	5491271-P106	Variable, air: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C2608	5490008-P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2609	5496219-P753	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C2610	5490008-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2611	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C2612	5491271-P106	Variable, air: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C2613	5490008-P6	Silver mica: 10 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2614	5496219-P753	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -750 PPM.
C2615	5490008-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C2616	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2617	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C2618	5491271-P103	Variable, air: approx 1.54-6.9 pf, 750 v peak; sim to EF Johnson 189-3-5.
C2619	5496219-P39	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C2620	5496219-P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM.
C2621	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2622	5491271-P103	Variable, air: approx 1.54-6.9 pf, 750 v peak; sim to EF Johnson 189-3-5.
C2623	5496219-P39	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C2624	5496219-P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM.
C2625	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		DIODES AND RECTIFIERS
CR2601 and CR2602	19A115603-P1	Silicon.
CR2603	4037822-P1	Silicon.
		JACKS AND RECEPTACLES
J2601 and J2602	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J2604	19B209303-P2	Connector, phen: 7 pins.
		PLUGS
P2603	4029093-P1	Banana type: sim to Ucinite 155296.
		TRANSISTORS
Q2601 thru Q2603	19A115245-P2	Silicon, NPN.
		RESISTORS
R2601	3R152-P511J	Composition: 510 ohms ±5%, 1/4 w.
R2602*	3R152-P511J	Composition: 510 ohms ±5%, 1/4 w.
	3R152-P241J	In Models earlier than Rev A: Composition: 240 ohms ±5%, 1/4 w.
R2603 and R2604	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R2605	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R2606 and R2607	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R2608	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R2609 and R2610	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R2611	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R2612	3R77-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R2613	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R2614	3R77-P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R2615	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
		CABLES
W2601		**CABLE PL-19B205275-G1**
		MISCELLANEOUS
	19B209341-P1	Socket: 7 contacts; sim to Elco 04-720-XX.
W2602		**CABLE PL-19B205263-G2**
		MISCELLANEOUS
	4029840-P1	Contact, electrical: sim to AMP 41854. (2)
		SOCKETS
XY2601 thru XY2603	5490277-P1	Transistor, phen: 4 contacts; sim to Elco 3303.
XY2604 and XY2605		(See Miscellaneous).
		CRYSTALS
		When reordering give GE Part Number and specify exact frequency needed.
Y2601 thru Y2603	19B206357-P1	Quartz: freq range 12 to 20 MHz, temp range -30°C to +80°C. (Receiver). 25-33 MHz crystal frequency = (OF +5.3 MHz) ÷ 2. 33-42 MHz crystal frequency = (OF -5.3 MHz) ÷ 2. 42-50 MHz crystal frequency = (OF -5.3 MHz) ÷ 2.
Y2604 and Y2605	19B206175-P31	Quartz: freq range 3500 to 4500 KHz, temp range -30°C to +85°C. (Transmitter). Crystal frequency = OF ÷ 12.
		MISCELLANEOUS
	19C311172-P1	Socket: 4 contacts. (Part of XY2604, 2605).
	19A115793-P1	Contact, electrical: sim to Malco 2700. (Part of XY2604, 2605).
	4033089-P1	Clip. (Part of XY2604, 2605).
	19B200525-P8	Rivet. (Part of XY2604, 2605).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 - To increase the output level of the multi-frequency oscillator. Changed R2602.

PARTS LIST

LBI-4273A

HANDSET MODEL 4EM26A10
HANDSET MODEL 4EM26C10
AND
HOOKSWITCH 19B204867G4
(Refer to RC-1398)

SYMBOL	GE PART NO.	DESCRIPTION
		HANDSET MODEL 4EM26A10 19B209100P2 **HANDSET MODEL 4EM26C10 19B209100P3**
1		Self tap screw, bind head: No. 4 x 5/16. Shure Brothers 30C640C.
2		Cable clamp. Shure Brothers 53A532.
3		Shield. Shure Brothers RP19.
4		Switch. Shure Brothers RP81.
5		Case. Shure Brothers RP49. (Used in 4EM26A10).
		Case. Shure Brothers 21RP899F. (Used in 4EM26C10).
6		Adapter. Shure Brothers 65A230.
7		Magnetic controled cartridge. Shure Brothers RP41.
8	3R77P222K	Resistor, composition: 2200 ohms ±10%, 1/2 w.
9		Receiver cap. (Part of item 5).
10		Washer. Shure Brothers 34A321.
11		Escutcheon. Shure Brothers 53A536A.
12		Actuator. Shure Brothers 53A556.
13		Spring. Shure Brothers 44A140.
14		Plunger bar. Shure Brothers RP82.
15		Flat head screw, socket cap: No. 4-40 x 1/4. Shure Brothers 30C557B.
16		Transmitter cap. (Part of item 5).
17		Washer. Shure Brothers 34A309.
18		Magnetic controled cartridge, Transmitter. Shure Brothers RP13.
19		Cable and plug. Shure Brothers RP48. (Used in 4EM26A10).
		Cable and plug. Shure Brothers 21RP738F. (Used in 4EM26C10).
		HOOKSWITCH ASSEMBLY **19B204867G4**
20	4029851P5	Cable clamp; sim to Weckesser 2/16-4.
21	19A121612P1	Holder and switch: thermoplastic case, contact rating 1 amp at 125 v.
22	19B205661G1	Cable: approx 8-1/2 feet long.
23	5493035P10	Resistor, wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Tru-Ohn Type X-50.
24	7775500P55	Terminal board, phen: 5 terminals.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

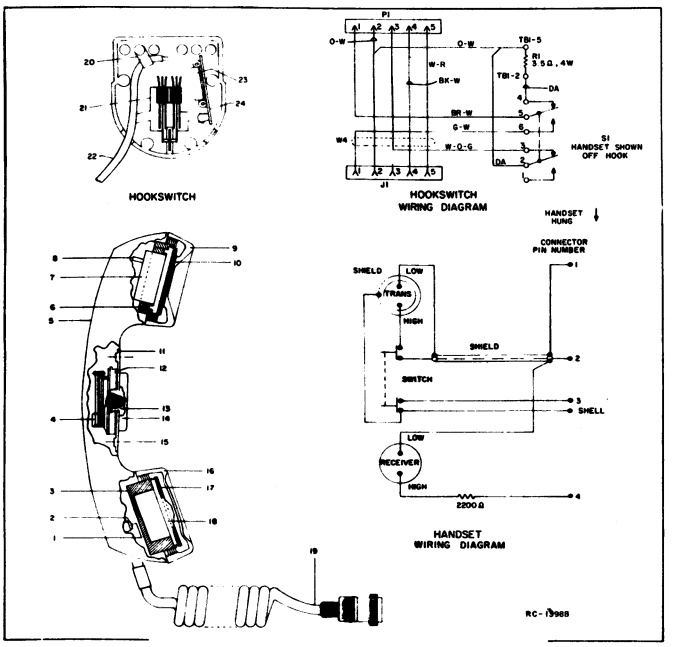
PARTS LIST

LBI-4866

SPEAKER
MODEL 4EZ20A11
19C320302G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS2	19A116910P1	Permanent magnet: 5 inch, 3.2 ohms ±15% imp, 5 w max operating; sim to Pioneer 002009.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W2		CABLE 19A122167G1
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P702	5493018P2	Connector, phenolic: 5 contacts; sim to Cinch 204-31-05-010.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A116986P108	Screw, thread forming, assembled washer: Phillips Pozidriv , HI-LO thread, No. 7-19 x 1/2. (Mount speaker).
	19A116986P112	Screw, thread forming, assembled washer: Phillips Pozidriv , HI-LO thread, No. 7-19 x 3/4. (Housing to grille).
	N130P1710C13	Tap screw. (Secures housing to wall).
	19A116985P1	Screw, hex head-slotted: double lead thread, with internal tooth washer, No. 13-16 x 3/4. (Mounts bracket to housing).
	19C320016P2	Mounting bracket.
	19D416396P2	Housing.
	19B219692G2	Grille.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



DF-8385

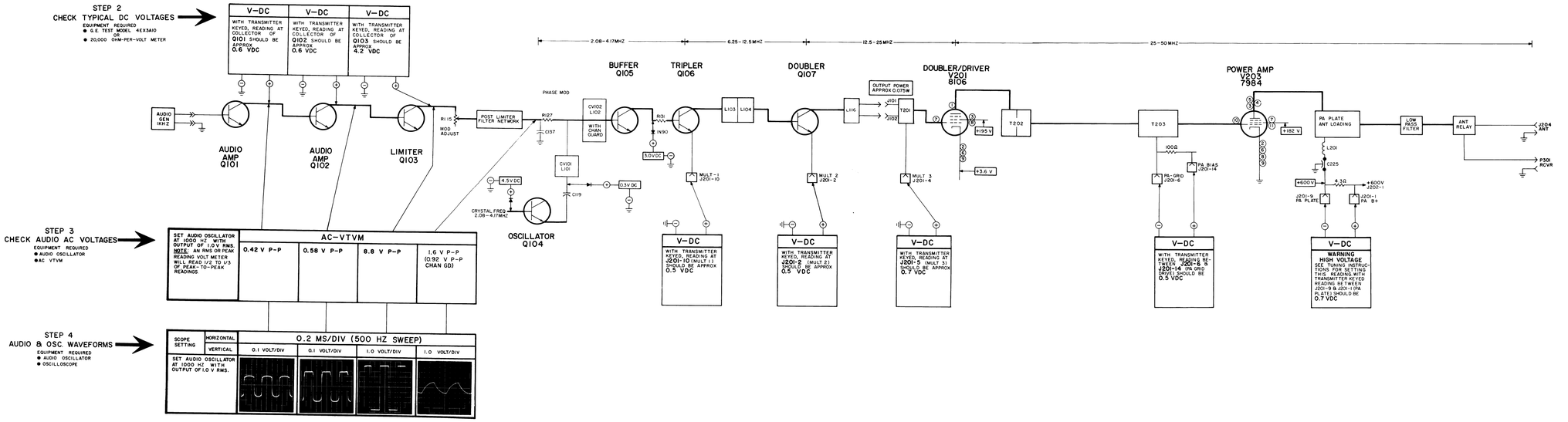
SCHEMATIC & OUTLINE DIAGRAM

HANDSET MODEL 4EM26A10 & C10
HOOKSWITCH 19B204867G4
SPEAKER MODEL 4EZ20A11

RC-1420E

STEP 1 - QUICK CHECKS

SYMPTOM	CHECKS
Low or No Power Output	All Jack Readings, Ant. Relay contacts, V202, V202 DC Voltages, Low Pass Filter.
PA Grid Jack Reading Low	Preceding Jack Readings, V201, V201 DC voltages, T202 & T203 Tuning.
Mult-3 Jack Reading Low	Preceding Jack Reading, check V201, T201 & L105 Tuning.
Mult-2 Jack Reading Low	Mult. 1 Jack Reading, L103 & L104 Tuning, Q107.
Mult-2 Jack Reading over 1 volt	Q107
Mult-1 Jack Reading Low	10-volt DC Supply, RF voltage on collector of Q105, Q106.
Mult-1 Jack Reading over 1 volt	Defective Q106, or Q105.
RF voltage low on Q105	RF output of Osc. (Q104) at C119, L101, (L102) tuning. CV101, CV102, Q105.
Low or zero Osc. (Q104) output at C119	RF voltages on Osc. (Q104) base & emitter, F1 or F2 keying leads for improper ground, crystal, CR101, CR102, Q104.



STEP 1 - QUICK CHECKS

SYMPTOM	PROCEDURE
NO SUPPLY VOLTAGE	Check power connections and continuity of supply leads, and check fuses. If fuse is blown, check for short circuits by disconnecting all plugs in the unit. Reconnect plugs one at a time until a fuse blows.
NO REGULATED 10 VOLTS	Check the 12-volt supply. Then check Q1 in 10-volt regulator and regulator circuit. Disconnect all plugs from the receiver, exciter board and option boards, and take resistance readings from jack pins to ground (Refer to Outline Diagrams).
LOW 2ND LIM READING	Check supply voltages and then check oscillator reading at J304-4 as shown in STEP 2A. Make SIMPLIFIED VTVM GAIN CHECKS from 2nd Mixer through 2nd Limiter stages as shown in STEP 2A. Check receiver RF alignment (refer to Receiver Alignment Procedure).
LOW OSCILLATOR READING	Check alignment of Oscillator (Refer to Front End Alignment Procedure). Check voltage readings of Q302 and Q303. Check resistance readings on J302-1, -2 and -3. Check crystals Y401 and Y402.
LOW RECEIVER SENSITIVITY	Check Front End Alignment (Refer to Receiver Alignment Procedure). Check input signal required for 0.2-volt reading at LIM-1. Reading should be less than 20 uv. Check antenna connections, cable and relay. Check voltage readings of 1st and 2nd RF Amps and 1st and 2nd Mixers. Make SIMPLIFIED GAIN CHECKS (STEP 2A).
LOW AUDIO	Check Audio PA (Q505) output current at J304-9. If reading is low -- a. Check BIAS ADJ for 0.28 VDC at J304-9. If incorrect, set for 0.28 v with R401 (Position on Test Set). b. If correct, check Audio Amp Q317. Make SIMPLIFIED GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch Stages. Check unsquelched D-C voltage readings in Audio section (Refer to Receiver Service Sheet). Check voltage readings on Channel Guard receiver. Check setting of SQUELCH control R400 (Refer to Receiver Alignment Procedure).
IMPROPER SQUELCH OPERATION	Make GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch stages. Check voltage readings of Squelch circuit (Refer to Receiver Service Sheet).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	See if discriminator zero is in the center of IF bandpass.

STEP 3- GAIN-PER-STAGE READINGS-

EQUIPMENT REQUIRED:

1. RF VOLTMETER (SIMILIAR TO BOONTON MODEL 91-CA OR MILLIVAC TYPE MV-16 C.
2. SIGNAL OR RECEIVER FREQUENCY (BELOW SATURATION). CORRECT FREQUENCY CAN BE DETERMINED BY ZEROING THE DISCRIMINATOR.

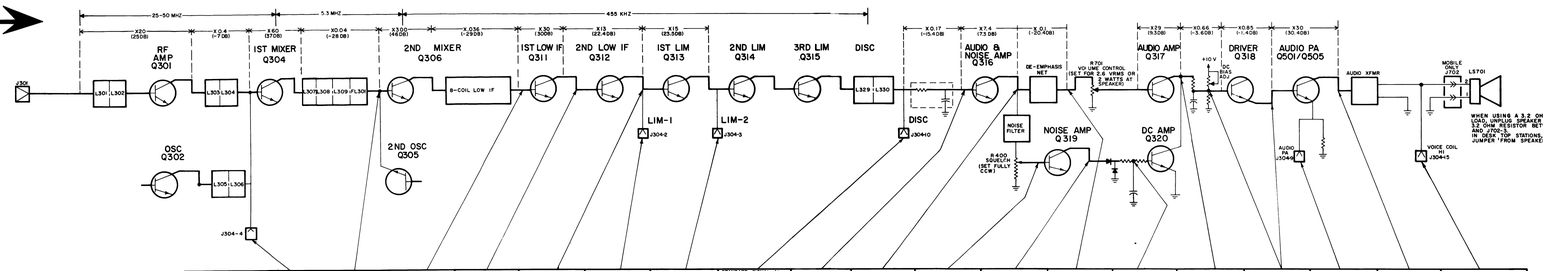
PROCEDURE

1. APPLY PROBE TO INPUT OF STAGE (FOR EXAMPLE, BASE OF RF AMP). PEAK RESONANT CIRCUIT OF STAGE BEING MEASURED AND TAKE VOLTAGE READING (E_1).
2. MOVE PROBE TO INPUT OF FOLLOWING STAGE (1ST MIXER). REPEAK FIRST RESONANT CIRCUIT THEN PEAK CIRCUIT BEING MEASURED AND TAKE READING (E_2).
3. CONVERT READINGS (BY SUBTRACTING E_1 FROM E_2 ON THE DB SCALE OF RF VOLTMETER, OR) BY MEANS OF THE FOLLOWING FORMULA.

   AMP FACTOR $= \frac{E_2}{E_1}$

4. CHECK RESULTS WITH TYPICAL GAINS SHOWN ON DIAGRAM BELOW.
5. USE PROCEDURE LISTED ABOVE TO FIND GAIN OF EACH STAGE.

※ NOTE: REMOVE CRYSTAL OR SHORT OUT OSC. BASE BEFORE MEASURING MIXER STAGES TO ELIMINATE INJECTION VOLTAGE



STEP 2A- SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

1. VTVM-ACADC
2. SIGNAL GENERATOR (MEASUREMENTS M560 EQUIV.)

PRELIMINARY STEPS:

1. SET VOLUME CONTROL FULLY CLOCKWISE.
2. SET SQUELCH CONTROL FULLY COUNTERCLOCKWISE.
3. RECEIVER SHOULD BE PROPERLY ALIGNED.

SIGNAL GENERATOR INPUT AT J320. MAINTAIN SETTING AT DISCRIMINATOR ZERO		UNMODULATED	UNMODULATED	UNMODULATED	UNMODULATED	10 MICROVOLTS UNMODULATED	1 MICROVOLT UNMODULATED	STANDARD SIGNAL (1 MILLIVOLT AT INPUT FREQ. MODULATED BY 1KHZWITH 3.5KHZDEVIATION)	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL
PROCEDURE		INCREASE GENERATOR OUTPUT UNTIL VTVM READS 0.2 V. READ GENERATOR OUTPUT	INCREASE SIGNAL GENERATOR OUTPUT FROM 50 MV TO 400 MICROVOLTS INCREASES BY 5%	INCREASE SIGNAL GENERATOR OUTPUT FROM 400 MICROVOLTS TO 70 MICROVOLTS INCREASES BY 5%	INCREASE SIGNAL GENERATOR OUTPUT FROM 70 MICROVOLTS TO 5 MICROVOLTS INCREASES BY 5%														AFTER CHECKING WAVEFORMS ADJUST VOLUME CONTROL FOR RATED 1 WATT OUTPUT ACROSS 3.2 Ω LOAD
READING	0.28 VDC EX-3-A .08 VDC MULTMTR .01 VDC	GENERATOR OUTPUT SHOULD BE APPROX 3 MILLIVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 400 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 70 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 5 MICROVOLTS	0.82 VDC EX-3-A 0.2 VDC MULTMTR 0.4 VDC	1.6 VDC EX-3-A 0.4 VDC MULTMTR 0.8 VDC	0.57 VAC	0.05 VAC	0.89 VAC	0.045 VAC	1.2 VAC	.03 VAC	0.56 VDC	0.34 VAC	0.2 VAC	0.28 VDC EX-3-A 0.28 VDC MULTMTR 0.28 VDC	8 VAC	2.6 VAC

STEP 2B-AUDIO & SQUELCH WAVEFORMS

EQUIPMENT REQUIRED:

1. OSCILLOSCOPE
2. SIGNAL GENERATOR (MEASUREMENTS M560 OR EQUIVALENT).

SCOPE SETTING	HORIZONTAL	0.5 MS/DIV (APPROX 500 HZ)	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV		0.5 MS/DIV	0.5 MS/DIV		0.5 MS/DIV	0.5 MS/DIV
	VERTICAL	0.5 VOLT/DIV	100 MILLIVOLTS/DIV	1 VOLT/DIV	100 MILLIVOLTS/DIV	1 VOLT/DIV	100 MILLIVOLTS/DIV		200 MILLIVOLTS/DIV	200 MILLIVOLTS/DIV		5 VOLTS/DIV	1 VOLT/DIV
PEAK-TO-PEAK VOLTAGE		2.1 V P-P	240 MV P-P	2.6 V P-P	0.4 V P-P(NOISE)	3.0 V P-P (NOISE)	0.24 V P-P		1.2 V P-P	900 MV P-P		22 V P-P	7.2 V P-P
NOISE WAVE FORM													
STANDARD SIGNAL (1 MILLIVOLT AT RECEIVER FREQ MODULATED BY 1 KHZ WITH 3.5 KHZ DEVIATION)													

EQUIPMENT REQUIRED:

RF Signal Generator
Pulse Generator Model 4EX4A10
DC-VTVM
Oscilloscope

CHECK FOR THE FOLLOWING	PROCEDURE
Check for noise blanker operation	1. Connect the signal generator and pulse through a tee connector to the receiver antenna jack. 2. Set the signal generator for on onfrequency, one microvolt unmodulated output, and set the pulse generator for a 1.5 kHz output. 3. Disable the blanker by shorting J302-4 to ground (see Outline Diagram), and listen for noise in the receiver output. 4. Remove the short from J302-4 and listen for noise blanking.
IF BLANKER IS NOT OPERATING:	
Check DC voltages	Check voltage readings on Q451 through Q455, and bias voltage on CR451 and CR452 (refer to the Receiver Schematic Diagram). NOTE To avoid damaging the casting, use a heavy-duty soldering iron to melt the the solder connections as quickly as possible. Then insert a knife blade and carefully pry lid off of blanker compartment.
Check RF amplifier and pulse generator stages	1. With no signal in, check the collector of Q453 for a reading of 13 volts DC. 2. Apply an on-frequency signal to the antenna jack. Increase the signal level until the meter reading at Q453 collector drops rapidly to zero. This should occur with a signal input of 100 to 150 microvolts.
Check pulse squarer stages	1. Connect the pulse generator to the receiver antenna jack and set the output for 1.5 kHz. 2. Check with oscilloscope at the collector of Q455 for negative square wave pulses from 10 to 12 volts.

QUICK CHECKS

MULTIVIBRATOR CIRCUIT	
SYMPTOM	PROCEDURE
POWER SUPPLY WON'T START	1. Check following: A. All fuses B. For collector-to-emitter short in Q501 and Q502.
	2. Check the following voltages: A. Supply voltage. B. Collector-to-emitter voltages of Q501 and Q502 with transmitter keyed. Readings should be approximately equal to supply voltage.
	3. Check starting network R501 and R502 for opens or shorts.
	4. Make continuity check of primary and feedback circuits.
	5. Check for shorted turns or shorts between windings of T501. To check, disconnect all secondary windings from their loads. Key the transmitter. If unit starts, go to step 6. If unit does not start, T501 is probably defective.
	6. Check for excessive load in secondary. A. Check for shorted capacitors or diodes. B. Check for shorts to ground of wiring to the transmitter.
OUTPUT VOLTAGES BELOW NORMAL - SUPPLY VOLTAGES NORMAL	7. Check for excessive load in secondary. A. Check for shorted capacitors or diodes. B. Check continuity of L501, L502, and L503.
10-VOLT REGULATOR	
NO OUTPUT	Check: A. For 12 V at input of regulator. B. For C to E open circuit in Q1. C. For open DS1/R5. D. For short between emitter of Q1 and ground.
OUTPUT TOO HIGH - CANNOT ADJUST WITH R3	Check for: A. Open in VR1 or Q2. B. Defective R3.
OUTPUT EQUALS INPUT	Q1 is shorted.
REGULATION POOR BUT OUTPUT IS ADJUSTABLE WITH R3	Q1 is probably defective and should be replaced.

TROUBLESHOOTING PROCEDURE

POWER SUPPLY MODEL 4EP50A10

RC-1425

ORDERING SERVICE PARTS

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

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

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

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

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

MAINTENANCE MANUAL

LBI-3748

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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