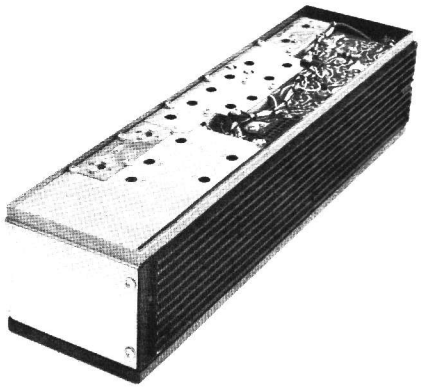
MOBILE RADIO

MASTR Progress Line

25-50 MHz RECEIVER MODELS 4ER39A37-45 & 4ER39A55-63 (WITH NOISE BLANKER & CHANNEL GUARD)

Maintenance Manual LBI-3593D
****

ER-39-A NOISE BLKR & CHAN GD



SPECIFICATIONS *

FCC Filing Designation	**ER-39-A**
Frequency Range	25-50 KHz
Audio Output	2 watts at less than 10% distortion
Sensitivity	
12-db SINAD (EIA Method)	0.25 μv
20-db Quieting Method	0.35 μv
Selectivity	
EIA Two-Signal Method	-85 db (adjacent channel, 20 KHz channels)
20-db Quieting Method	-100 db at ±15 KHz
Spurious Response	-100 db
First Oscillator Stability	±.0005% (-30°C to +60°C)
Modulation Acceptance	±6 KHz (narrow-band)
Squelch Sensitivity	
Critical Squelch	0.15 μv
Maximum Squelch	Greater than 20 db quieting (less than 2 μv)
Intermodulation (EIA)	-60 db
Maximum Frequency Separation	0.4%
Frequency Response	+1 and -8 db of a standard 6-db per octave de-emphasis curve from 300 to 3000 Hz (1000-Hz reference)

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

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.

DESCRIPTION

General Electric MASTR Progress Line Receiver Type ER-39-A is a double conversion, superheterodyne FM receiver designed for operation on the 25-50 megahertz band.

The receiver is of single-unit construction and is completely housed in an aluminum casting for maximum shielding and rigidity. The top compartment of the casting contains the RF, oscillator, converter, high IF and 1st low IF amplifier, and noise blanker. The bottom portion of the casting contains the audio squelch board and the Channel Guard board.

CIRCUIT ANALYSIS

The MASTR Progress Line Receiver is completely transistorized, using a total of 31 silicon transistors. Input leads to the receiver are individually filtered by the 20-pin feed-through by-pass connector J443.

A regulated +10 volts is used for all receiver stages except the audio PA stage which operates from the 12-volt system supply.

Centralized metering jack J442 is provided for use with General Electric Test Set, Model 4EX3A10, for ease of alignment and servicing. The Test Set meters the oscillator, multiplier, and limiter stages as well as the discriminator, audio PA, voice coil and regulated 10 volts.

1ST RF AMPLIFIER (A341)

The 1st RF Amplifier consists of two high-Q helical resonators and an RF amplifier stage (Q1). The RF signal from the antenna is coupled by RF cable W441 to a tap on L341/L343/L345. The tap is positioned to insure the proper impedance match to the antenna. RF energy is coupled through the two coils by an opening in the shield wall to the base of 1st RF Amplifier Q1. The coils are tuned to the incoming frequency by air trimmer capacitors C341 and C342. The output of Q1 is coupled through four tuned circuits to the base of the 2nd RF Amplifier A344-Q1.

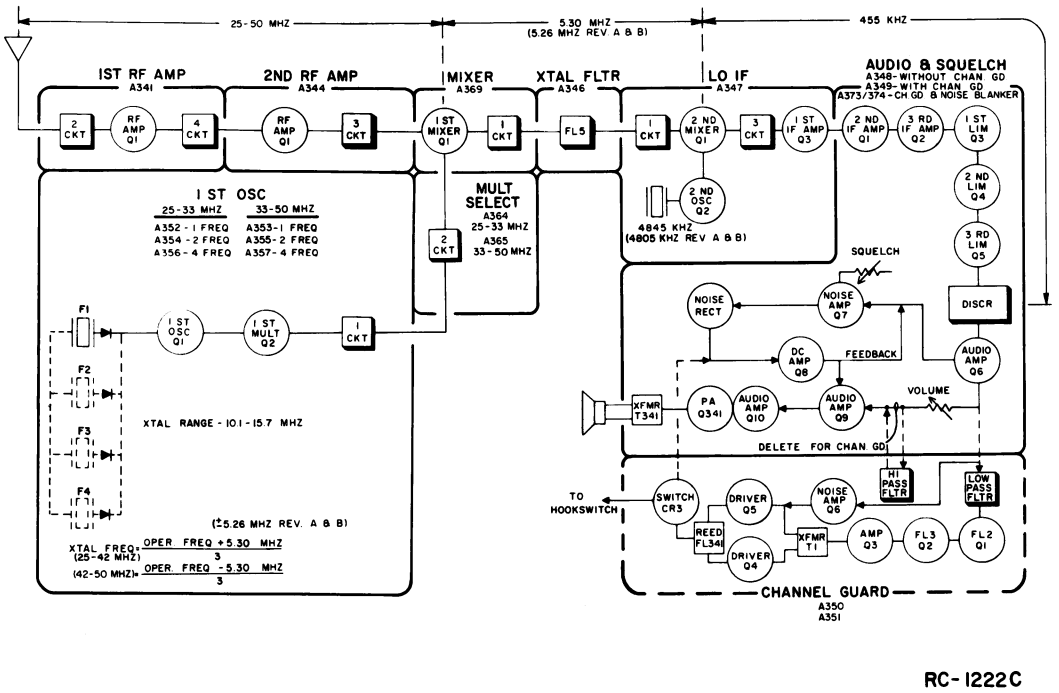
2ND RF AMPLIFIER (A344)

The output of the 2nd RF Amplifier is coupled through three tuned circuits to the base of 1st Mixer A369-Q2.

1ST OSCILLATOR AND MULTIPLIER (A352-A357)

The receiver 1st oscillator operates in a transistorized Colpitts oscillator circuit. The oscillator crystal operates in a fundamental mode at a frequency of approximately 10 to 15 megahertz. The crystal

is cut to provide temperature compensation at the high end of the temperature range and is thermistor compensated at low temperatures. This provides ±.0005% frequency stability as soon as the receiver is energized—without the warm-up time required by crystal ovens or warmers.



RC-1222C

Figure 1 - Receiver Block Diagram

In single frequency receivers, bias for the oscillator is obtained by a jumper from C363 to P304.

In multi-frequency receivers, a diode is connected in series with the crystal, and up to three additional crystal circuits can be added. The 10-volt jumper is removed and the proper frequency is selected by switching the desired crystal circuit to +10 volts by means of a frequency selector switch on the control unit.

Switching the +10 volts to the crystal circuit forward biases the diode and reduces its impedance. This applies the crystal frequency to the base of oscillator transistor Q1. Feedback for the oscillator is developed across C21/C22. The output is coupled to the base of 1st multiplier Q2.

The output of the 1st multiplier (tripler Q2) is transformer-coupled (T3/T4) to multiplier selectivity assembly A364/A365. The multiplier tank is tuned to three times the crystal frequency. The stage is metered at centralized metering jack J442-4 through metering network CR1, R1, C5 and C6.

MULTIPLIER SELECTIVITY ASSEMBLY (A364/A365)

Following the 1st multiplier tank (T3/T4) are two additional tuned circuits (A364/A365-L1, L2 and L3. Capacitor C12/C16 couples the multiplier selectivity output to the base of the first mixer.

1ST MIXER (A369) AND CRYSTAL FILTER (A346)

The RF signal from the RF amplifiers and the injection voltage from the 1st multiplier are applied to the base of 1st mixer A369-Q2. The mixer collector tank (L2 and C3) is tuned to 5.3 megahertz (5.26 MHz in Rev. A and B receivers) and provides impedance matching to the high IF filter and the Noise Blanker RF Level Switch (A376).

The highly selective crystal filter following the 1st mixer provides the major selectivity for the receiver. The output of the filter is fed through impedance matching transformer A347-T1 to the base of the 2nd mixer.

2ND OSCILLATOR, 2ND MIXER AND 1ST IF AMPLIFIER (A347)

The 2nd oscillator A347-Q2 operates in a Colpitts oscillator circuit, with feedback supplied through C2. Crystal Y1 maintains the oscillator frequency at 4845 KHz (4805 KHz in Rev. A and B receivers). The low-side injection voltage is fed to the base of the 2nd mixer.

The Hi-IF signal from the filter is fed to the base of 2nd mixer Q1 with the 2nd oscillator output. The 455 KHz 2nd mixer output is fed to three tuned low IF circuits (L1, L2, L3). L1, L2 and L3 are required for shaping the nose of the IF waveform and provide some additional selectivity.

Capacitor C14 couples the low IF signal to the base of the 1st low IF amplifier, A347-Q3. The output of Q3 is RC coupled to the base of the 2nd IF amplifier.

2ND IF AMPLIFIERS AND LIMITERS (A374)

Following A347-Q3 are two additional RC coupled low IF amplifiers (A374-Q1 and -Q2). The 2nd IF amplifier stage is metered at J442-2 through metering network C8, CR1 and R12.

After the IF amplifiers are three RC coupled limiter stages (A374-Q3, -Q4 and -Q5). The 1st limiter is metered at J442-3 through metering network C13, CR2, R18 and C15.

DISCRIMINATOR (A374)

The receiver utilizes a Foster-Seely type discriminator. The output of the 3rd limiter is connected to a tap on the primary tuned circuit of discriminator T1. This allows the discriminator to operate at a higher level. Diodes CR5 and CR6 rectify the 455 KHz IF signals to recover the audio. The stage is metered at J442-10 through metering network R27 and C22.

1ST AUDIO AMPLIFIER (A374)

The output of the discriminator is fed to the 1st audio amplifier (Q6). This stage operates as an emitter follower to match the impedance of the discriminator to the noise amplifier stage and VOLUME control. Q6 also provides some power gain.

AUDIO AMPLIFIERS (A374)

When audio is present in the incoming signal, it is taken off the emitter of Q6 and connected to the VOLUME control through A374-J9. The VOLUME control arm connects to A373-J8 which feeds the audio signal to the base of the 2nd audio amplifier, Q9. C34, C37 and L4 make up the de-emphasis network. The collector current of Q9 should be adjusted to 650 milliamps by potentiometer R47 as indicated by a reading of 0.65 volts at metering jack J442-1. This adjustment should be made with the VOLUME control fully counterclockwise. Thermistor RT1 keeps the output current constant over wide variations in temperature after R47 has been set.

Following Q9 is a Darlington circuit, which consists of compound-connected transistors Q10 and Q341. The Darlington circuit provides a higher input impedance than is normally encountered in transistor amplifiers. Also, this circuit has a more linear operation, with less distortion at maximum power output.

The output of the amplifier stage is coupled by audio transformer T341 to the loudspeaker. Audio high and low are present at the centralized metering jack (J442). When the General Electric Test Set is connected to J442, these leads are connected to the black and green jacks for sensitivity, frequency response, distortion, power output and other measurements.

SQUELCH

Noise from audio amplifier Q6 is used to operate the squelch circuit. When no carrier is present in the receiver, noise is coupled to the base of noise amplifier Q7. The gain of the noise amplifier is determined by the SQUELCH control, which varies the bias on the base of Q7.

The noise amplifier output is fed through a high-pass filter (C52 and L1) which attenuates frequencies below 3 KHz. Thermistor RT2 keeps the critical squelch constant over wide variations in temperature.

Noise from the high-pass filter is rectified by CR3 and CR4, and the negative DC output of the noise rectifiers is fed to the base of DC amplifier Q8.

DC amplifier Q8 acts as a squelch switch. A negative output from the noise rectifiers cuts off the DC amplifier. When cut off, the collector is at the +10 volt supply potential. This positive voltage is fed to the base of Q9, a PNP transistor, cutting it off. Since audio stages Q9, Q10 and Q341 are DC coupled, Q10 and Q341 are cut off also. The positive voltage from the collector circuit of the DC amplifier is used as feedback through R34 to the base of noise amplifier Q7, causing it to conduct more heavily. This feedback helps to sharply cut off Q8, providing sharp, rapid switching action.

When the receiver is quieted by a signal, noise voltage from the noise rectifiers is reduced and the DC amplifier conducts. While conducting, the collector potential of Q8 is negative and negative feedback to the base of noise amplifier Q7 causes it to conduct less.

This negative voltage is applied to the base of PNP transistor Q9 causing it to conduct. Now, all the audio stages are turned on and sound is heard at the loudspeaker.

With the receiver squelched, the final audio amplifiers are cut off; and the receiver drain is less than 50 milliamps in 12-volt systems.

It should be noted that the feedback through R62 in the Noise Amplifier circuit results in a hysteresis effect in the squelch circuit and, as a result, the squelch does not operate in the same manner as other conventional squelch circuits. The circuit is designed so that a weak signal will open the squelch. The signal may be reduced by 3 to 5 db without the squelch closing. This limits squelch "flutter" or "picket-fence" operation.

NOISE BLANKER (A370/A372 - Figure 2)

An RF signal and noise pulse from the antenna is fed simultaneously to the Noise Blanker 1st RF Amplifier and the receiver 1st RF amplifier sections. The signal and noise is transformer coupled through T1/T2/T3 to the base of the first of two RF amplifier stages. The amplifier stages (Q1, Q2) raise the level of the noise pulse which is coupled through T10/T11/T12 and L10 to the base of the pulse detector Q3. A metering network consisting of R22, C21, C17 and R2 permits the blanker to be metered at centralized metering jack J442-11.

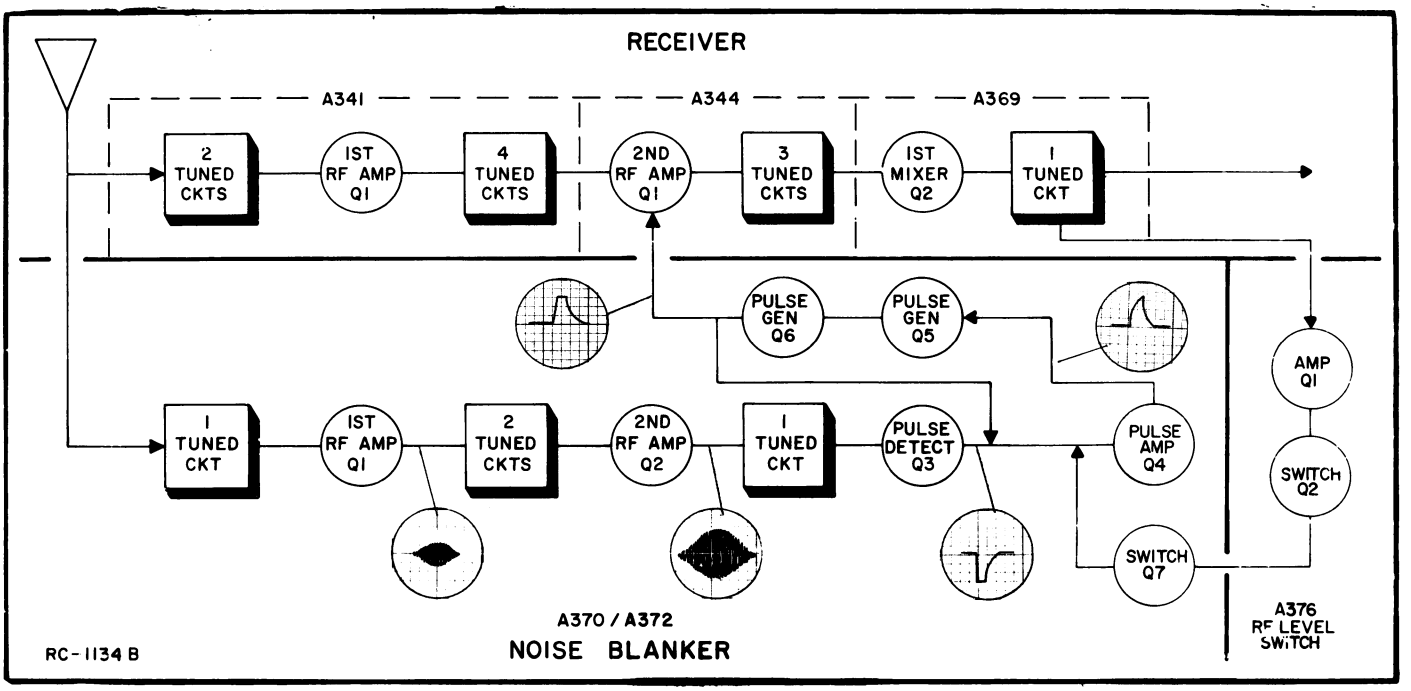


Figure 2 - Noise Blanker Block Diagram

Base bias for the pulse detector is established by R9 and CR1. CR1 is normally conducting, which keeps Q3 in a barely conducting state. A noise pulse applied to the base of Q3 causes it to conduct heavily. This results in a negative pulse at the output (collector) of Q3. Following Q3 is a low-pass RF filter consisting of C18, C22 and L5.

The output of the filter is fed to the base of pulse amplifier Q4. This stage is biased by CR3, R12 and R13 so that it is just conducting. The negative-going pulse from the pulse detector cuts CR3 off, which biases Q4 on, and a positive pulse appears at the output of pulse amplifier Q4.

Q5 and Q6 form part of the one-shot multivibrator circuit. Bias voltage through R17 keeps Q5 normally turned on. The positive voltage at the collector of Q5 keeps Q6 turned off. The amplifier positive-going pulse from the pulse amplifier (Q4) is fed to the base of Q5, cutting the stage off. As Q5 cuts off, Q6 is turned on; and the output is a positive-going blanking pulse. The positive blanking pulse is fed to the emitter of 2nd RF Amplifier Q344-Q1, which cuts off that stage for the duration of the noise pulse.

The positive blanking pulse to the emitter off the 2nd RF amplifier A344-Q1 is controlled by the RF Level Shut-off Switch A376. The output of the 1st Mixer is fed through a low-pass filter network in the RF level switch circuit to the base of the high IF level amplifier Q1. When the antenna signal input level is over 1,000 micro-volts, the high IF level output of Q1 is sufficient to turn ON level sensitive switch Q2. The output of Q2 is filtered through C7, C8, L2 and then turns ON the Noise Blanker (A370/A372) switch Q7. The conduction of Q7 changes the bias to the 1st Pulse Amplifier Q4 and shorts the blanking pulse to ground.

The high IF output level amplified by Q1 is not sufficient to turn Q2 ON, when the antenna signal input is below 1,000 micro-volts. As a result, Q7 does not turn ON, and the positive blanking pulse is fed to the emitter of the 2nd RF Amplifier A344-Q1.

The blanking pulse width is determined by R17 and C27. Diode CR6 keeps the output pulse a square wave. CR5 prevents oscillation at temperature extremes.

At the same time the blanking pulse is fed to the receiver, samples of the pulse are fed to the automatic repetition rate switch consisting of C30, C24, CR4, R13, R14 and R20. The pulse sample is coupled through C30 and rectified by CR4. This voltage charges C24, and then discharges through R13 and R14, turning off pulse amplifier Q4. The time constant of C24, R13 and R14 are selected so that output pulses from Q6 will never exceed two kilocycles. This prevents blanking the receiver for a long enough time to keep the desired signal from being heard.

As the noise signal from the antenna is applied to the Noise Blanker the RF signal is applied to the receiver RF amplifier (A341). The six tuned circuits in the receiver front end provide a time delay for the RF signal, which enables the blanking pulse from the Noise Blanker to cut off the RF amplifier in the receiver before the noise pulse can get there.

CHANNEL GUARD (A350/A351)

General Electric Channel Guard Decoder is designed to eliminate all calls that are not tone coded for the Channel Guard frequency. As long as the CHANNEL GUARD-OFF switch on the control unit is left in the CHANNEL GUARD position, all signals are locked out except those from transmitters that are continuously tone coded for positive identification by the receiver.

Placing the CHANNEL GUARD-OFF switch in the OFF position instantly disables the Channel Guard operation so that all calls on the channel can be heard. When the hookswitch option is used, lifting the microphone from its hanger disables the Channel Guard circuit.

The audio, tone and noise is picked up in the emitter circuit of Audio Amplifier A374-Q6 and is fed through A374-J9 to the VOLUME control and then to a high-pass filter (C20, C21, C22, C23, and L1) on the Channel Guard board through A374-J8, decoupling resistor R61 and A374-J12 high-pass filter removes the tone from the audio signal, and the audio is then fed through A374-J13 to the base of Audio Amplifier A374-Q9.

To operate the Channel Guard/Decoder, audio, tone and noise is picked up in the emitter circuit of A374-Q6 and is fed through A374-J18 to the base of the first low-pass filter stage (Q1) through a 250-Hz band pass filter consisting of R1, R2, R3, C1, C2, and C3. Following Q1 is a second low-pass filter stage Q2. The filter output is amplified by Q3 and coupled to the push-pull driver stage (Q4 and Q5) through T1, Q4 and Q5 drive the reed decoder, FL341. Noise Amplifier Q6 picks up and amplifies any high frequency (in the 5 KC range) and feeds it back to the driver stage to decrease the sensitivity of the reed and prevent noise pulsing.

FL341 is resonant at the correct tone frequency and the reed contacts open and close at the tone frequency. When the CHANNEL GUARD-OFF switch is in the CHANNEL GUARD position, the opening and closing of the reed contacts charges capacitor C19, which applies a limited current to the base of DC amplifier A374-Q8. The receiver noise squelch circuit continues to operate normally until a carrier quiets the receiver.

Placing the CHANNEL GUARD-OFF switch in the OFF position (or removing the microphone from its hanger in hookswitch options) opens the circuit to A350/A351-J5, which forward biases diode CR3. This causes current to flow in the circuit, by-passing the decoder reed (FL341). However, the receiver noise squelch circuit will operate until a carrier is received.

NOTE

If the Two-Way Radio is mounted on its side, rotate the decoder reed 90°C in its mounting bracket so that the label showing the G-E Drawing and Part Number is facing the receiver heat sink. No change is required if the unit is mounted vertically. See Figure 4 for the location of the decoder reed and channel guard board.

MAINTENANCE

DISASSEMBLY

To service the receiver from the top—

1. Pull locking handle down and pull radio about one inch out of mounting frame.
2. Pry up cover at rear of receiver.
3. Slide cover back and lift off.

To service the receiver from the bottom—

1. Pull locking handle down. Pull radio out of mounting frame.
2. Remove screws in bottom cover. Pry up cover at back of receiver.
3. Slide cover back and lift off.

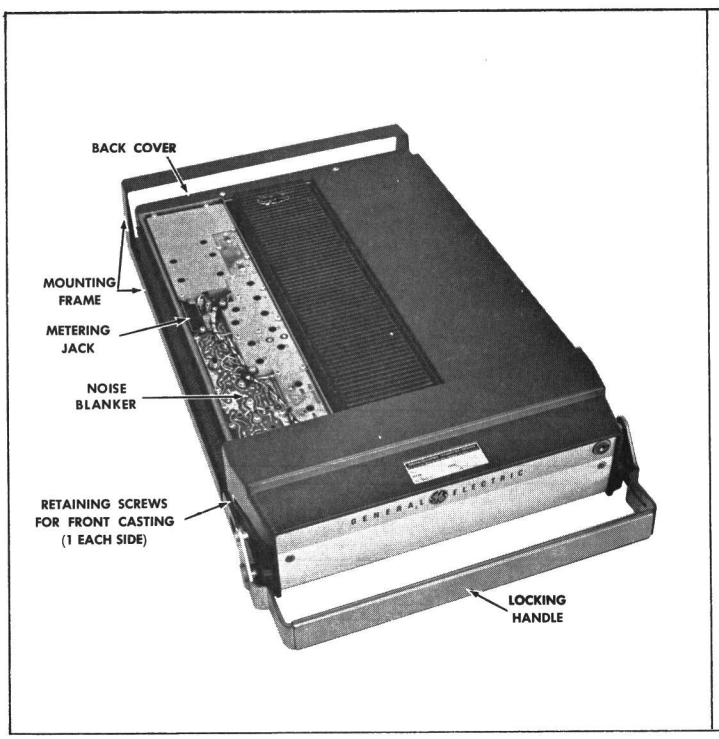


Figure 3 - Removing Top Cover

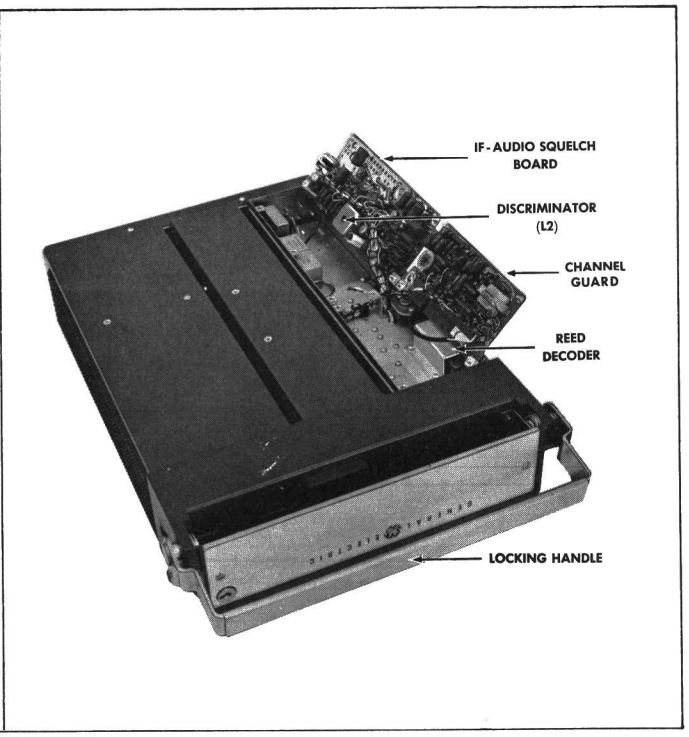


Figure 4 - Removing Bottom Cover

To remove the receiver from the system frame—

1. Loosen the two Phillips-head retaining screws in front casting (see Figure 3), and pull casting away from system frame.
2. Remove the four screws in the back cover.
3. Remove the two screws holding the receiver at each end of the system frame.
4. Disconnect the antenna jack and the 20-pin connector from the front of the receiver, and slide the unit out of the system frame.

FRONT END ALIGNMENT

EQUIPMENT REQUIRED

1. G-E Test Set Model 4EX3A10, Station Meter Switching Panel, or 20,000 ohms-per-volt Multimeter with a 1-volt scale.
2. A 455 KHz and 25-50 MHz signal source. Connect a one-inch piece of insulated wire no larger than .065-inch diameter to generator output probe.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set Model 4EX3A10 to Receiver Centralized Metering Jack J442 and set meter sensitivity switch to the TEST 1 position.
2. With VOLUME control fully counterclockwise and SQUELCH control fully clockwise (receiver unsquelched) and Test Set in Position G, adjust R47 on IF-ADUIO & SQUELCH board for a reading of 0.55 volts. If using Multimeter, connect leads to J442-1 (AUDIO PA) and J442-8 (System Negative).

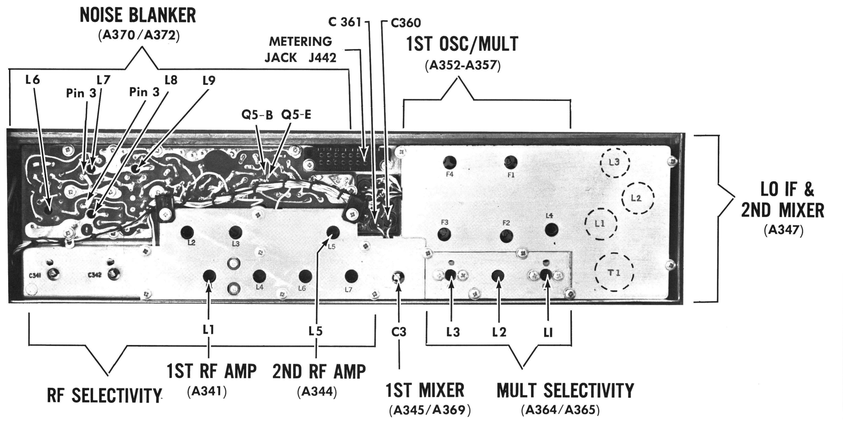
NOTE

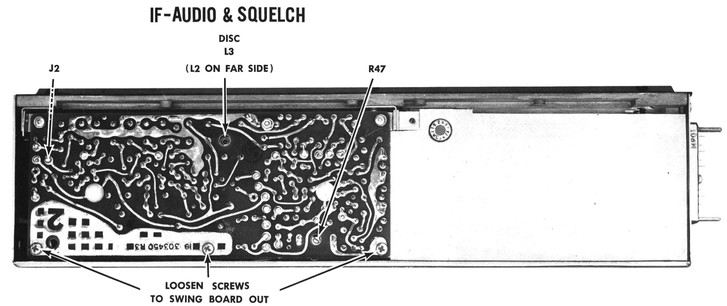
The adjustment of R47 should be made within 20 seconds after power is applied to the receiver. This results in a reading of approximately 0.65 volts after the unit is fully warmed up.

3. With Test Set in Position J, check for regulated +10 volts. If using Multimeter, measure from C360 to C361.
4. If using Multimeter, connect the positive lead to J442-16 (Ground).
5. Disable Channel Guard.

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			OSCILLATOR/MULTIPLIER		
1.	D (MULT-1)	Pin 4	L4 (on 1st OSC/MULT) and L1, L2 and L3 (on MULT SELECTIVITY)	See Procedure	Tune L4 on 1st OSC/MULT and L1 on MULT SELECTIVITY for maximum meter reading. Tune L2 for minimum meter reading. Then tune L3 for maximum meter reading. Change voltage scale if necessary. Repeat Step 1.
			RF AMPLIFIER & SELECTIVITY		
2.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal adjacent to L7. Adjust the signal generator for discriminator zero.
3.	B (2ND IF AMP)	Pin 2	C341, C342, and L1 thru L7 (RF SELECTIVITY)	Maximum	Apply an on-frequency signal to antenna jack, keeping below saturation. Tune C341, C342, and L1 thru L7 for maximum meter reading.
4.	"	"	L3 (MULT SELECTIVITY)	Maximum	Apply an on-frequency signal as above, keeping below saturation. Tune L2 and L3 on MULT SELECTIVITY for maximum meter reading
			FREQUENCY ADJUSTMENT		
5.	A (DISC)	Pin 10	C9 on 1st OSC (C10, C11 or C12 for multi-frequency)	Zero	Apply an on-frequency signal to the antenna jack. Tune C9 for zero discriminator reading. In multi-frequency units, tune C10, C11 or C12 as required. NOTE For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90°F.





COMPLETE RECEIVER & NOISE BLANKER ALIGNMENT

LBI-3593

EQUIPMENT REQUIRED

1. G-E Test Set Model 4EX3A10, Station Meter Switching Panel, or 20,000 ohms-per-volt Multimeter with a 1-volt scale.
2. A 455 KHz and 25-50 MHz signal source. Connect a one-inch piece of insulated wire no larger than .065-inch diameter to generator output probe.
3. Two 33,000-ohm resistors for tuning low IF coils.*

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set Model 4EX3A10 to Receiver Centralized Metering Jack J442 and set meter sensitivity switch to the TEST 1 position.
2. Set crystal trimmer C9 to mid-capacity. In multi-frequency receivers, set C10, C11 or C12 to mid-capacity as required. Where the maximum frequency spread is greater than 200 KHz, align the unit on channel 71. If the frequency spacing is greater than 200 KHz, align the receiver on the center frequency.
3. With VOLUME control fully counterclockwise and SQUELCH control fully clockwise (receivers unsquelched) and Test Set in Position G, adjust R47 on IF-AUDIO & SQUELCH Board for a reading of 0.55 volts. If using Multimeter, connect leads to J442-1 (AUDIO PA) and J442-8 (System Negative).

NOTE

The adjustment of R47 should be made within 20 seconds after power is applied to the receiver. This results in a reading of approximately 0.65 volts after the unit is fully warmed up.

4. With Test Set in Position J, check for regulated +10 volts. If using Multimeter, measure from C360 to C361.
5. If using Multimeter, connect the positive lead to J442-16 (Ground).
6. Adjust all slugs on Noise Blanker to bottom of coil form, closest to printed wiring board.
7. Disable Channel Guard.

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			DISCRIMINATOR		
1.	A (DISC)	Pin 10	L2 (Bottom slug on IF-AUDIO & SQUELCH Board)	Zero	Apply a 455-KHz signal to J2 on IF-AUDIO & SQUELCH Board and adjust L2 (disc secondary) for zero meter reading.
2.	A (DISC)	Pin 10	L2 (top) and L3 (bottom) on IF-AUDIO & SQUELCH Board)	1.7 volts (+) maximal	Switch Test Set to TEST 3 position. Alternately apply a 445-KHz and 465-KHz signal to J2 and adjust L2 and L3 for meter readings of at least 1.7 volts, but not more than 2.1 volts. Both readings must be within 0.1 volt.
3.	D (MULT-1)	Pin 4	L4 (on 1st OSC/MULT) and L1, L2 & L3 (on MULT SELECTIVITY)	See Procedure	Tune L4 and L1 for maximum meter reading. Change voltage scale if necessary. Then tune L2 for minimum meter reading. Repeat Step 3.
			RF AMPLIFIER & SELECTIVITY		
4.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal adjacent to L6 (RF SELECTIVITY). Adjust the signal generator for discriminator zero.
5.	B (2nd IF AMP)	Pin 2	L7, L6, L4, L3 and L2 (RF SELECTIVITY) L5 (2nd RF AMP)	Maximum	Apply an on-frequency signal and tune as shown below, keeping signal below saturation. Apply Signal Generator Probe To: / Tune: L6 / L7 L4 / L6 and L5 L3 (1st RF AMP) / L4, L3 and L2
6.	B (2nd IF AMP)	Pin 2	C341, C342 (RF SELECTIVITY) and L1 (1st RF AMP)	Maximum	Apply an on-frequency signal to antenna jack J441. Tune C341, C342 and L1 for maximum meter reading, keeping signal below saturation.
7.	"	"	L7, L6, L4, L3, L2, C310 and C351 (RF SELECTIVITY), L5 (2nd RF AMP), L1 (1st RF AMP)	Maximum	Apply an on-frequency signal as above, keeping below saturation. Tune L7 on, L6, L4, L3, L2, L1, C342 and C341 for maximum meter reading.
8.	"	"	L3 on MULT SELECTIVITY	Maximum	Apply an on-frequency signal as above, keeping below saturation. Tune L2 and L3 on MULT SELECTIVITY Board for maximum meter reading.
			MIXER AND LO IPS*		
9.	"	"	C3 (1st MIXER)		C3 does not peak but provides impedance matching for the crystal filter input and should only be tuned when observing IF trace on oscilloscope.
10.	"	"	T1 (Lo IF & 2nd MIXER)	Maximum	Apply signal as above, and tune T1 for maximum meter reading, keeping signal below saturation.
11.	B (2nd IF AMP)	Pin 2	L1, L2 and L3 (Lo IF & 2nd MIXER)	Maximum	With one end of the 33,000-ohm resistors to ground, load and peak as follows: Load L2 at point B--Peak L1 and L3. Load L3 and L2 at points A and C--Peak L2.
			NOISE BLANKER		
12.	H (BLANKER)	Pin 11 (-) and Pin 16 (+)	L9, L8, L7 and L6 on NOISE BLANKER	Maximum	Apply a signal according to the following table: Receiver operating frequency / Frequency of applied signal 25-27 MHz / 4 MHz above operating freq. 27-33 MHz / 4 MHz below operating freq. 33-42 MHz / 4 MHz below operating freq. 42-50 MHz / 4 MHz above operating freq. Apply signal generator probe to: / Tune: Pin 3 of L8 / L9 (2nd peak) Pin 3 of L7 / L8 (1st peak) Antenna Jack / 25-33 MHz (L7, 1st, peak; L6 2nd peak) 33-50 MHz (L7 and L8) 1st peak)
13.	"	"	"	Maximum	Apply signal on blanker frequency to the antenna jack. Retune L6, L7, L8 and L9 for maximum meter reading.
14.	"	"	"	0.1 v	Apply a 1,000-microvolt signal on blanker frequency to antenna jack. Reading should be approximately 0.1 volt.
			FREQUENCY ADJUSTMENT		
15.	A (DISC)	Pin 10	C9 (1st OSC/MULT Board) (C10, C11 or C12 for multi-frequency)	Zero	Apply an on-frequency signal to antenna jack. Tune C9 for zero discriminator reading. In multi-frequency units, tune C10, C11 or C12 as required. NOTE For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90°F.

* NOTE -- The low IF coils have been aligned at the factory and will normally require no further adjustment. If alignment is necessary, refer to the RECEIVER OUTLINE DIAGRAM for location of resistor loading points A, B and C.

ALIGNMENT PROCEDURE

25 — 50 MHZ MASTR RECEIVER
MODELS 4ER39A37-45 & 55-63

TEST PROCEDURES

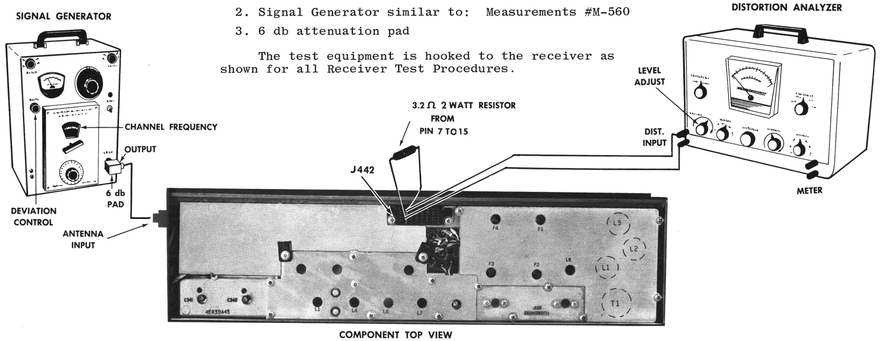
These Test Procedures are designed to help you service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect can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

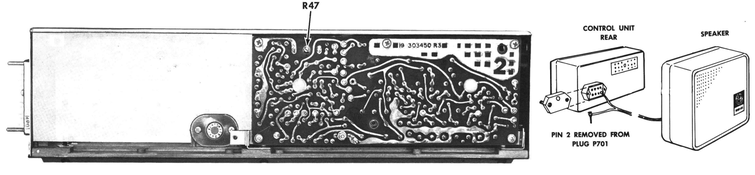
TEST EQUIPMENT REQUIRED

for test hookup shown:

1. Distortion Analyzer similar to: Heath #1M-12
2. Signal Generator similar to: Measurements #M-560
3. 6 db attenuation pad

The test equipment is hooked to the receiver as shown for all Receiver Test Procedures.





STEP 1

AUDIO POWER OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

1. Connect a 1,000-microvolt test signal modulated by 1,000 hertz ±3.3 kHz deviation to the antenna jack J441.
2. Two-Watt Speaker:
   When speaker is used, disconnect speaker lead pin from J701-2 (on rear of Control Unit). Hook up a 3.2-ohm load resistor from J442-15 to J442-7.

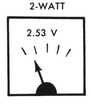
   OR

   Handset:
   When handset is used, lift handset off of hookswitch.
3. Two-Watt Speaker:
   Connect Distortion Analyzer input across the 3.2-ohm resistor as shown

   OR

   Handset:
   Connect Distortion Analyzer input from J442-15 to J442-7.
4. Two-Watt Speaker:
   Set volume control for two-watt output (2.53 VRMS):

VOLTMETER SCALE ON DISTORTION ANALYZER



5. Make distortion measurements according to manufacturer's instructions. Reading should be less than 10% (5% is typical).

SERVICE CHECK

If the distortion is more than 10%, or maximum audio output is less than two watts (for two-watt speaker) make the following checks:

1. Battery and regulator voltage---low voltage will cause distortion. (Refer to Receiver Schematic Diagram for voltages.)
2. Audio Bias Adjust (R47)---should be adjusted for 0.65 volts. (Refer to Receiver Alignment on reverse side of page.)
3. Audio Gain (Refer to Receiver Troubleshooting Procedure).
4. Discriminator Alignment (Refer to Receiver Alignment on reverse side of page).

STEP 2

USABLE SENSITIVITY (12 db SINAD)

TEST PROCEDURE

Measure sensitivity of the receiver modulated at the standard test modulation as follows:

1. Be sure Test Step 1 checks out properly.
2. Reduce the Signal Generator output from setting in Test Step 1.
3. Adjust Distortion Analyzer LEVEL control for a +2 db reading.
4. Set CONTROL from LEVEL to DISTORTION reading. Repeat Steps 1, 2 and 3 until difference in reading is 12 db (+2 db to -10 db).
5. The 12-db difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. Reading should be less than 0.35 microvolts with audio output at least one watt (1.83 volts RMS across the 3.2-ohm receiver load).

SERVICE CHECK

If the sensitivity level is more than 0.35 microvolts, make the following checks:

1. Alignment of RF stages (Refer to RF Alignment in Receiver Alignment on reverse side of page.)
2. Gain measurements as shown on the Receiver Troubleshooting Procedure.

STEP 3

MODULATION ACCEPTANCE BANDWIDTH (IF BANDWIDTH)

TEST PROCEDURE

1. Be sure Test Steps 1 and 2 check out properly.
2. Set Signal Generator output for twice the microvolt reading obtained in Test Step 2-4.
3. Increase Signal Generator frequency deviation.
4. Adjust LEVEL Control for +2 db.

DB SCALE ON DISTORTION ANALYZER

5. Set CONTROL from LEVEL to DISTORTION reading. Repeat Steps 3, 4 and 5 until difference between readings becomes 12 db (from +2 db to -10 db).

LEVEL DISTORTION ON DISTORTION ANALYZER

6. Deviation control reading for the 12-db difference is the Modulation Acceptance Bandwidth of the receiver. It should be more than ±7 kHz (but less than ±9 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.

STEP 1 - QUICK CHECKS

SYMPTOM	PROCEDURE
NO SUPPLY VOLTAGE	Check power connections and continuity of supply leads, and check fuse in power supply. If fuse is blown, check receiver for short circuits.
NO REGULATED 10 VOLTS	Check the 12-volt supply. Then check regulator circuit (See Troubleshooting Procedure for Power Supply).
LOW 2ND LIM READING	Check supply voltages and then check oscillator reading at J442-4 as shown in STEP 2. Make SIMPLIFIED VTVM GAIN CHECKS from 2nd Mixer through 2nd Limiter stages as shown in STEP 2.
LOW OSCILLATOR READING	Check alignment of Oscillator (Refer to Front End Alignment Procedure). Check voltage and resistance reading of 1st Oscillator/Multiplier Q1/Q2. Check crystal Y1.
LOW RECEIVER SENSITIVITY	Check Front End Alignment (Refer to Receiver Alignment Procedure). Check antenna connections, cable and relay. Check voltage and resistance readings of RF Amp and 1st and 2nd Mixers. Make SIMPLIFIED GAIN CHECKS (STEP 2).
LOW AUDIO	Check Audio PA (Q341) output current at J442-1. If reading is low-- a. Refer to Alignment Procedure for BIAS ADJ. b. Check Q341. Check unsquelched voltage readings in Audio section (Refer to Receiver Schematic Diagram). Check voltage and resistance readings on Channel Guard receiver.
IMPROPER SQUELCH OPERATION	Check voltage and resistance readings of Squelch circuit (Refer to Receiver Schematic Diagram).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	See if discriminator zero is on 455 KHz.

STEP 3- VOLTAGE RATIO READINGS

EQUIPMENT REQUIRED:

1. RF VOLTMETER (SIMILIAR TO BOONTON MODEL 91-CA OR MILLIVAC TYPE MV-18 C.
2. SIGNAL ON RECEIVER FREQUENCY (BELOW SATURATION). CORRECT FREQUENCY CAN BE DETERMINED BY ZEROING THE DISCRIMINATOR. USE 1,000 HERTZ SIGNAL WITH 3.3 KHZ DEVIATION FOR AUDIO STAGE.

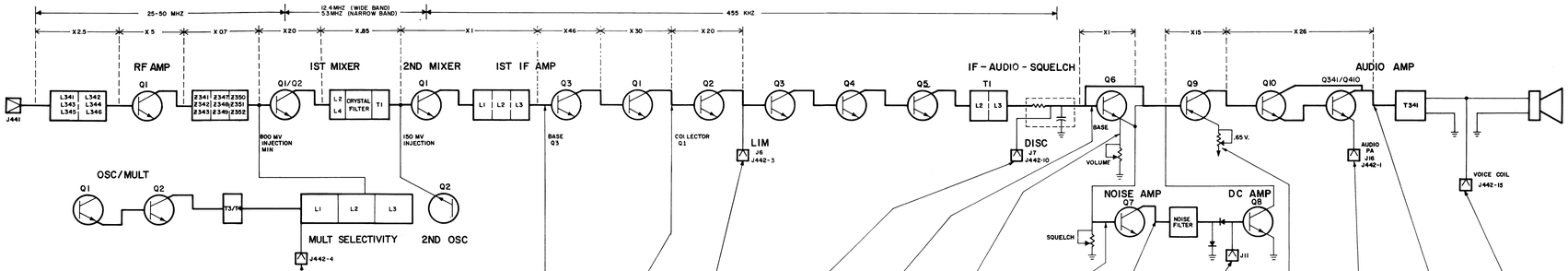
PROCEDURE:

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 MEANS OF THE FOLLOWING FORMULA.

$$\text{VOLTAGE RATIO} = \frac{E_2}{E_1}$$

4. CHECK RESULTS WITH TYPICAL VOLTAGE RATIOS SHOWN ON DIAGRAM.

* NOTE: ON 1ST MIXER, REMOVE CRYSTAL BEFORE MEASURING BASE VOLTAGE. REPLACE CRYSTAL TO MEASURE COLLECTOR VOLTAGE.
ON 2ND MIXER, INCREASE SIGNAL INPUT TO APPROX. 0.3 V TO OVERRIDE INJECTION VOLTAGE.



STEP 2- SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

1. VTVM-AC & DC
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.
4. CONNECT SIGNAL GENERATOR TO ANTENNA JACK.
5. VTVM CONNECTS BETWEEN GROUND AND POINTS INDICATED BY ARROWS.

SIGNAL GENERATOR INPUT: MAINTAIN SETTING AT DISCRIMINATOR ZERO		UNMODULATED	UNMODULATED	10 MICROVOLT UNMODULATED	STANDARD SIGNAL - 1000 MICROVOLTS AT RCVR FREQ MOD BY 1 KHZ AT 3.3 KHZ DVBD OR 10 KHZ DVBD DEV	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	NO SIGNAL	NO SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL
PROCEDURE		INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES BY 5% DC *	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES TO MINIMUM DC *								VOLUME CONTROL FULLY COUNTERCLOCKWISE AND SQUELCH FULLY CLOCKWISE		ADJUST FOR 2 WATT OUTPUT ACROSS 3.2 OHM LOAD
READING	2.4 VDC	GENERATOR OUTPUT SHOULD BE APPROX. 1000 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX. 300 MICROVOLTS	2 VDC	0.1 VAC	0.5 VAC	0.5 VAC	0.07 VAC	2.5 VAC	2.0 VDC	ADJUST FOR 0.65 VDC (SEE ALIGNMENT PROCEDURE)	0.65 VDC (SEE ALIGNMENT PROCEDURE)	7.0 VAC	2.53 VAC

* NEG. LEAD OF VTVM TO -10 V.

RC-1207C

(19B204655, Sh. 1, Rev. 4)
(19B204655, Sh. 2, Rev. 4)

NOISE BLANKER
A370 (25-33 MHZ)
A371 (33-42 MHZ)
A372 (42-50 MHZ)

NOISE LEVEL SHUT-OFF
A376

1ST OSCILLATOR/MULTIPLIER
25-33 MHZ 33-50 MHZ
A352 — 1 FREQ — A353
A354 — 2 FREQ — A355
A356 — 4 FREQ — A357

(19B204412, Sh. 1, Rev. 3)
(19B204412, Sh. 2, Rev. 3)

TO J4 ON IF-AUDIO & SQUELCH BOARD

TO J4 ON IF-AUDIO & SQUELCH BOARD

2ND MIXER
A347

(19B204441, Sh. 1, Rev. 0)
(19B204441, Sh. 2, Rev. 0)

TRANSISTOR	EMITTER		BASE		COLLECTOR	
A??V-?2	+	−	+	−	+	−
Q1	200Ω	360Ω	1.6K	360Ω	360Ω	500Ω
Q2	100Ω	360Ω	1.5K	65Ω	30Ω	30Ω
Q3	200Ω	360Ω	1.6K	360Ω	360Ω	500Ω
Q4	100Ω	100Ω	1.1K	2.6K	5K	6K
Q5	1K	1K	3.3K	75K	3.3K	3.3K
Q6	0	0	3K	16.5K	330Ω	600Ω
Q7	1K	1K	3.5K	6K	3.5K	5K
A376-Q1	2K	2K	3K	3K	3.5K	6K
A376-Q2	0	0	1K	3K	3.5K	6K

TOP VIEW

*NOISE BLANKER ONLY

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

1ST RF AMP
A341

2ND RF AMP
A344

(NOISE BLANKER ONLY)

1ST MIXER
A369/A345

MULTIPLIER-SELECTIVITY
A364 (25-33 MHZ)
A365 (33-50MHZ)

OUTLINE DIAGRAM

25 — 50 MHZ MASTR RECEIVER
MODELS 4ER39A37-45 & 55-63

TRANSISTOR	EMITTER		BASE		COLLECTOR	
	+	−	+	−	+	−
A352/363-Q1	1K	1K	4.5K	2.8K	120Ω	170Ω
A352/363-Q2	55Ω	80Ω	1K	1K	110Ω	110Ω
A345-Q1	2.7K	2.7K	7.5K	3.8K	600Ω	600Ω
A34?-Q1	450Ω	270Ω	800Ω	450Ω	350Ω	350Ω
A347-Q1	3.8K	5.3K	8.5K	2.9K	200Ω	200Ω
A347-Q2	2.7K	6.8K	5.5K	2.7K	200Ω	200Ω
A347-Q3	2.2K	2.3K	2.3K	2.2K	2.7K	3.2K
A348/374-Q1	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A348/374-Q2	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A348/374-Q3	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A348/374-Q4	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A348/374-Q5	1.0K	1.0K	7K	2.8K	350Ω	350Ω
A348/374-Q6	✱3.2K	✱2 MEG	36.0K	2.5K	0	0
A348/374-Q7	1.7K	1.7K	11.0K	4.0K	7.0K	16K
A348/374-Q8	180Ω	180Ω	100K	2.8K	11.0K	1MK
A348/374-Q9	2.2K	2.2K	9.1K	45K	2.2K	2.3K
A348/374-Q10	✱40Ω	35Ω	2.3K	2.3K	40Ω	36Ω
Q34?	✱1Ω	1Ω	40Ω	35Ω	40Ω	36Ω

✱READINGS MAY VARY DUE TO DIFFERENCES IN TRANSISTORS.

(19B620741, Rev. 23)

IF-AUDIO & SQUELCH BOARD
A348(WITHOUT CHANNEL GUARD) A373 (NOISE BLANKER
A349(WITH CHANNEL GUARD) A374 (NOISE BLANKER & CHANNEL GUARD)

(19C303451, Sh. 1, Rev. 4)
(19C303451, Sh. 2, Rev. 4)

BOTTOM VIEW

CRYSTAL FILTER
A346

CHANNEL GUARD
A350 (HI TONE)
A351 (LOW TONE)

(19B204553, Sh. 1, Rev. 3)
(19B204553, Sh. 2, Rev. 3)

TO DECODER REED FL34?

TRANSISTOR	EMITTER		BASE		COLLECTOR	
A350/351	+	−	+	−	+	−
Q1	56Ω	56Ω	8.3K	4?5Ω	6.5K	8.3K
Q2	270Ω	270Ω	8K	500Ω	5K	5.5K
Q3	1K	1K	75K	3K	1K	1K
Q4	0	0	1MK	4?5Ω	1K	1K
Q5	0	0	1MK	4?5Ω	1K	1K
Q6	20Ω	20Ω	4.5K	85Ω	2K	2K

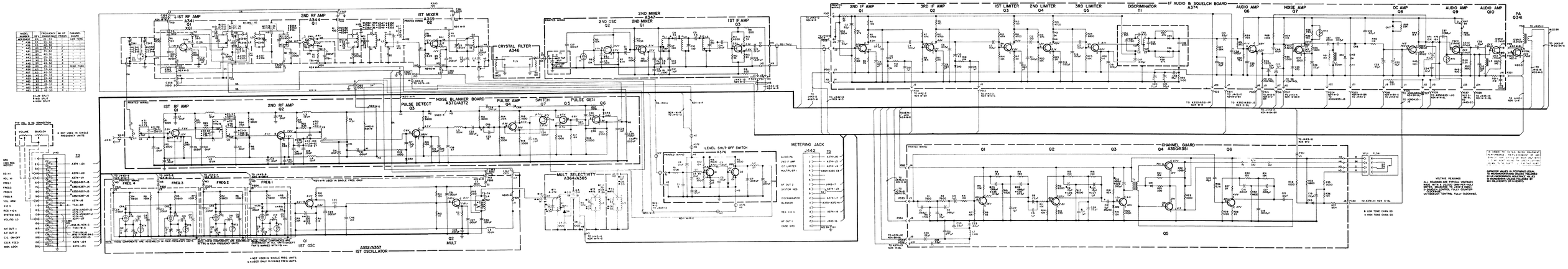
RESISTANCE READINGS

ALL READINGS ARE TYPICAL READINGS MEASURED WITH A 20,000 OHM-PER-VOLT METER, AND WITH CONTROL CABLE DISCONNECTED (OR IN STATIONS, PLUG TO J443 DISCONNECTED). READINGS ARE MADE WITH A SHORTING JUMPER CONNECTED FROM C361 (+40V) TO C360 (−10), AND ARE MEASURED FROM TRANSISTOR PINS TO C361. ✱ OR — SIGNS SHOW METER LEAD TO C361.

CAUTION

ALWAYS REMOVE THE SHORTING JUMPER AFTER MAKING RESISTANCE READINGS. APPLYING POWER WITH THE SHORTING JUMPER CONNECTED MAY DAMAGE THE UNIT

FOR READINGS OF:	USE SCALE:
1-100Ω	X 1
100-1K Ω	X 10
1K-50K Ω	X 1,000
50K Ω	X 100,000



(19RG20719, Rev. 46)

SCHEMATIC DIAGRAM

25 — 50 MHZ MASTR RECEIVER
MODELS 4ER39A37-45 & 55-63

PARTS LIST

LBI-3585D
25-50 MHz RECEIVER
(WITH NOISE BLANKER AND CHANNEL GUARD)

4EB39437-45 (19BD500809G28-36)
4EB39455-63 (19BD500809G46-54)

SYMBOL	GE PART NO.	DESCRIPTION
A341		RF AMPLIFIER ASSEMBLY 19BD504770G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C2	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C3	5494127P106	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5494127P106	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7	5494127P106	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C8	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C9	5494127P106	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C10	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C11	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C12	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C13	5494127P106	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C14	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C15	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C16	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C17	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C18	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW; temp coef -80 PPM.
	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
		In REV U thru REV XA in Models 4EB39455-63. In REV V thru REV XB in Models 4EB39437-45.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1*	4038642P1	Germanium. (Deleted by REV C).
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115342P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R152P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R2	3R152P903J	Composition: 3000 ohms ±5%, 1/4 w.
R3	3R152P103K	Composition: 1000 ohms ±10%, 1/4 w.
R4	3R152P391K	Composition: 390 ohms ±10%, 1/4 w.
		- - - - - - - - SOCKETS - - - - - - - -
XQ1	5490277P1	Transistor, mica-filled phen: 4 contacts rated at 1 amp at 400 VRMS; sim to Elco 3303.
A344		RF AMPLIFIER ASSEMBLY 19BD504770G2
		- - - - - - - - CAPACITORS - - - - - - - -
C1	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C2*	19C301346P1	Variable, ceramic: approx 3-8 pf, 350 VDCW, temp coef -470 PPM; sim to Erie Style 538. Deleted by REV T in 4EB39455-63. Deleted by REV U in 4EB39437-45.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1*	4038056P1	Germanium.
		In Models 4EB39455-63 REV S and earlier. In Models 4EB39437-45 REV T and earlier.
	4038642P1	Germanium.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1*	19A115342P1	Silicon, NPN.
		In Models 4EB39455-63 REV S and earlier. In Models 4EB39437-45 REV T and earlier.
	19A115269P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1*	3R152P432K	Composition: 4300 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
R2*	3R152P103K	Composition: 1000 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Added by REV XC in Models 4EB39437-45.
R7*	3R152P563K	Composition: 5600 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Added by REV XC in Models 4EB39437-45.
TB1	7487434P19	Miniature, phen: 3 terminals.

SYMBOL	GE PART NO.	DESCRIPTION
A345*		FIRST MIXER ASSEMBLY 19BD504430G2 Deleted by REV P in Models 4EB39455-63 Deleted by REV E in Models 4EB39437-45
		- - - - - - - - CAPACITORS - - - - - - - -
C2	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C3	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C4*	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV U in 4EB39455-63. Deleted by REV V in 4EB39437-45.
C5	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C18*	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW; temp coef -80 PPM.
		In REV U thru REV XA in Models 4EB39455-63. In REV V thru REV XB in Models 4EB39437-45.
	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - TERMINALS - - - - - - - -
E1	4038104P1	Lug: solder dipped brass.
		- - - - - - - - INDUCTORS - - - - - - - -
L2	19A121082G2	Toroidal coil.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q2	19A115245P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R152P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R2	3R152P823J	Composition: 8200 ohms ±5%, 1/4 w.
R3	3R152P203J	Composition: 2000 ohms ±5%, 1/4 w.
R4*	3R152P103J	Composition: 1000 ohms ±5%, 1/4 w. Deleted by REV N in Models 4EB39455-63. Deleted by REV P in Models 4EB39437-45.
R5*	3R152P390J	Composition: 39 ohms ±5%, 1/4 w. Deleted by REV N in Models 4EB39455-63. Deleted by REV P in Models 4EB39437-45.
R9*	3R152P471K	Composition: 470 ohms ±10%, 1/4 w. Added by REV N in Models 4EB39455-63. Added by REV P in Models 4EB39437-45.
A346*		CRYSTAL FILTER ASSEMBLY 19BD504516G2 Added by REV C
		- - - - - - - - FILTERS - - - - - - - -
FL5*	19B206692G1	Bandpass filter.
		In Models 4EB39455-63 of REV XA and earlier. In Models 4EB39437-45 of REV XB and earlier.
	19C304094G6	Bandpass filter.
FL6*	19C304094G6	Bandpass filter. Deleted by REV XB in Models 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
		- - - - - - - - RESISTORS - - - - - - - -
		Composition: 4300 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
		Composition: 1000 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
		Composition: 5600 ohms ±10%, 1/4 w. Deleted by REV XB in Model 4EB39455-63. Added by REV XC in Models 4EB39437-45.

SYMBOL	GE PART NO.	DESCRIPTION
R8*	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w. Added by REV XB in Models 4EB39455-63. Added by REV XC in Models 4EB39437-45.
A346*		CRYSTAL FILTER ASSEMBLY 19BD504516G1 Deleted by REV C
		- - - - - - - - FILTERS - - - - - - - -
FL1 and FL2	19C304094G1	Bandpass filter.
	5491189P104	Polyester: .047 µf ±20%, 50 VDCW.
C17	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26*	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P101	Polyester: .01 µf ±20%, 50 VDCW.
C16*	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P104	Polyester: .047 µf ±20%, 50 VDCW.
C17	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26*	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
R1	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w.
R2	3R152P682J	Composition: 6800 ohms ±5%, 1/4 w.
R3	3R152P103J	Composition: 1000 ohms ±5%, 1/4 w.
R4	3R152P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R5	3R152P223J	Composition: 22,000 ohms ±5%, 1/4 w.
R6	3R152P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R7	3R152P683J	Composition: 68,000 ohms ±5%, 1/4 w.
R8	3R152P104J	Composition: 100,000 ohms ±5%, 1/4 w.
R9*	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R10	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R11	3R152P622J	Composition: 6200 ohms ±5%, 1/4 w.
R12	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R13	3R152P203J	Composition: 20000 ohms ±5%, 1/4 w.
R15*	3R152P153K	Composition: 15,000 ohms ±10%, 1/4 w. (Added by REV B). Deleted by REV XB in Models 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
R16*	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w. (Added by REV E).
R17*	3R152P394K	Composition: 0.39 megohm ±10%, 1/4 w. (Added by REV E).
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1		COIL ASSEMBLY 19BD504414G1
		- - - - - - - - INDUCTORS - - - - - - - -
L1*	19A115711P4	Transformer, freq: 455 KHz; sim to Automatic Mfg EX13973. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P106	Polyester: 0.1 µf ±20%, 50 VDCW.
	19C303464G1	Coil.
	7160519P2	Tuning slug.
L2*	19A115711P3	Transformer, freq: 455 KHz; sim to Automatic Mfg EX13972. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P103	Polyester: .033 µf ±20%, 50 VDCW.
C6	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C7*	5496219P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM. In Models 4EB39455-63 of REV P, In Models 4EB39437-45 of REV R.
	5496219P566	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -330 PPM. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5496219P666	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -470 PPM.
C8* and C9*	5491601P140	Phenolic: 3.6 pf ±5%, 500 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
L4*		(Part of L3).
L5*		(Part of T1). Deleted by REV R in Model 4EB39455-63. Deleted by REV S in Model 4EB39437-45.
	5491601P28	Phenolic: 2.7 pf ±5%, 500 VDCW.
C10* and C11*	5496219P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM. In Models 4EB39455-63 of REV P, In Models 4EB39437-45 of REV R.
	5496219P566	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -330 PPM. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5496219P666	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -470 PPM.
C12* and C13*	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P106	Polyester: .01 µf ±20%, 50 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C14* and C15*	19B209243P1	Polyester: .01 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P101	Polyester: .01 pf ±20%, 50 VDCW.
C16*	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
	5491189P104	Polyester: .047 µf ±20%, 50 VDCW.
C17	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26*	19B209243P5	Polyester: .047 µf ±20%, 50 VDCW. In Models 4EB39455-63 of REV P and earlier. In Models 4EB39437-45 of REV R and earlier.
R13	3R152P203J	Composition: 20000 ohms ±5%, 1/4 w.
R15*	3R152P153K	Composition: 15,000 ohms ±10%, 1/4 w. (Added by REV B). Deleted by REV XB in Models 4EB39455-63. Deleted by REV XC in Models 4EB39437-45.
C20	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C21*	5491459P108	Polyester: .047 µf ±10%, 200 VDCW; sim to Good-All Type 601PE. In Models 4EB39455-63 of REV K and earlier. In Models 4EB39437-45 of REV L and earlier.
	5491459P104	Polyester: .068 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C22	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C23*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
	5491459P112	Polyester: 0.47 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C24 and C25	5491459P108	Polyester: .047 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C26 and C27	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
	19A110189P1	Xtal assembly of REV B or earlier:
	19A110189P21	Quartz: freq 4805 KHz ±100 Hz at 25°C, temp range -30° to +75°C.
		CHANNEL GUARD A350 19C303550G1 (4EB39437-45) A351 19C303550G2 (4EB39455-63)
		- - - - - - - - CAPACITORS - - - - - - - -
C1 and C2	5491459P104	Polyester: .068 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C3	5491459P102	Polyester: 0.15 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C4	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C5 and C6	5491459P104	Polyester: .068 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C7	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C8*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. In Models 4EB39455-63 of REV Y or earlier. In Models 4EB39437-45 of REV W or earlier.
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C9 and C10	5491459P102	Polyester: 0.15 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C11*	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. In Models 4EB39455-63 of REV Y or earlier:
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C12	5495670P14	Electrolytic: 5 µf +75% -10%, 25 VDCW; sim to Sprague 30D.

SYMBOL	GE PART NO.	DESCRIPTION
C13	5491459P104	Polyester: .068 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C14 and C15	5491459P106	Polyester: .01 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C16 and C17	5491459P110	Polyester: .0015 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C18	5491459P111	Polyester: .0033 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C19*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. In Models 4EB39455-63 of REV Y or earlier. In Models 4EB39437-45 of REV W or earlier.
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C20	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C21*	5491459P108	Polyester: .047 µf ±10%, 200 VDCW; sim to Good-All Type 601PE. In Models 4EB39455-63 of REV K and earlier. In Models 4EB39437-45 of REV L and earlier.
	5491459P104	Polyester: .068 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C22	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C23*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
	5491459P112	Polyester: 0.47 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C24 and C25	5491459P108	Polyester: .047 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C26 and C27	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
	19A110189P1	Xtal assembly of REV B or earlier:
	19A110189P21	Quartz: freq 4805 KHz ±100 Hz at 25°C, temp range -30° to +75°C.
C28*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. Added in Models 4EB39437-45 by REV XA.
C29	5491459P101	Polyester: .033 µf ±10%, 50 VDCW; sim to Good-All Type 601PE.
C30*	5491459P103	Polyester: 0.22 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. Added by REV N in Models 4EB39455-63. Added by Rev XA in Models 4EB39437-45.
C31*	5491459P105	Polyester: 0.1 µf ±10%, 50 VDCW; sim to Good-All Type 601PE. Added by REV N in Models 4EB39455-63. Added by REV XA in Models 4EB39437-45.
CR1 and CR2	4038056P1	Germanium.
CR3	19A115250P1	Silicon.
J3 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L83-3.
J8 thru J10	4033513P4	Contact, electrical: sim to Bead Chain L83-3.
		- - - - - - - - INDUCTORS - - - - - - - -
L1*	19A115690P2	Coil.
	19B204554G1	Coil.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1 thru Q5	19A115123P1	Silicon, NPN; sim to Type 2N2712.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - RESISTORS - - - - - - - -
R1 and R2	3R77P753J	Composition: 7500 ohms ±5%, 1/2 w.
R3	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R4 and R5	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R6	3R77P560J	Composition: 56 ohms ±5%, 1/2 w.
R7	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R8 and R9	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R10	3R77P753J	Composition: 7500 ohms ±5%, 1/2 w.
R11	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R12	3R77P623J	Composition: 62000 ohms ±5%, 1/2 w.
R13	3R77P271J	Composition: 270 ohms ±5%, 1/2 w.
R14	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R15 and R16	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R17	3R77P822J	Composition: 8200 ohms ±5%, 1/2 w.
R18	3R77P823J	Composition: 82,000 ohms ±5%, 1/2 w.
R19	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R20	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R21	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R22 and R23	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R24*	3R77P331J	Composition: 330 ohms ±5%, 1/2 w. Added in Models 4EB39437-45 by REV XA. Added in Models 4EB39455-63 by REV ZD.
	3R77P511J	Composition: 510 ohms ±5%, 1/2 w. (Deleted by REV D).
R25	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R26*	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w. (Used in Models 4EB39437-45 of REV D, E, F). Added by REV P in Models 4EB39455-63 of REV R, F, G).
	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w. (Used in Models 4EB39437-45 of REV A, B, C, G, H). Added by REV P in Models 4EB39455-63 of REV A,B, C).
R27	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R28	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R29	3R77P104J	Composition: 20 ohms ±5%, 1/2 w.
R30 and R31	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R32 and R33	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R35	3R77P303J	Composition: 3000 ohms ±5%, 1/2 w.
R36	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R37	3R77P184J	Composition: 0.18 megohm ±5%, 1/2 w.
R38	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R39*	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w. Added by REV G in Models 4EB39437-45. Added by REV ZD in Models 4EB39455-63.
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1	5490525P2	Audio freq: freq range 100 to 10,000 Hz. Pri: 35,000 ohms ±10% imp, 1300 ohms ±15% DC res. Sec 1: 2000 ohms imp, 250 ohms ±10% DC res. Sec 2: 2000 ohms imp, 250 ohms ±10% DC res.
		- - - - - - - - SOCKETS - - - - - - - -
XFL1	19A121930G2	Reed, mica-filled phen: 7 pins rated at 1 amp at 500 VRMS with 3-11/32 inches of cable.

SYMBOL	GE PART NO.	DESCRIPTION
A352 thru A357		FIRST OSCILLATOR ASSEMBLY A352 19BD504419G13 (4EB39437, 55) A353 19BD504419G16 (4EB39455, 56, 57) A354 19BD504419G15 (4EB39437, 42, 59, 60) A355 19BD504419G17 (4EB39455, 62) A356 19BD504419G15 (4EB39455, 61) A357 19BD504419G18 (4EB39444, 45, 62, 63)
		- - - - - - - - CAPACITORS - - - - - - - -
C1 thru C4	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5 thru C8	5496218P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C9 thru C12	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C13 thru C16	5496219P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17 thru C20	19C300685P63	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C21	5496219P771	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -750 PPM.
C22	5496219P773	Ceramic disc: 270 pf ±5%, 500 VDCW, temp coef -750 PPM.
C23	5494481P114	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C24*	5490068P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. Deleted by REV N in Models 4EB39455-63. Deleted by REV P in Models 4EB39437-45.
C25*	5496219P667	Ceramic disc: 150 pf ±5%, 500 VDCW, temp coef -220 PPM. Deleted by REV N in Models 4EB39455-63. Deleted by REV P in Models 4EB39437-45.
C26 thru C28	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C30	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C31	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C45*	5490068P25	Silver mica: 100 pf ±5%, 500 VDCW. Added by REV N in Models 4EB39455-63. Added by REV P in Models 4EB39437-45.
C46*	5496219P563	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -30 PPM. Added by REV P in Models 4EB39455-63. Added by REV P in Models 4EB39437-45.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1*	19A115603P1	Silicon. Deleted by REV N in Models 4EB39455-57. Deleted by REV J in Models 4EB39437-39.
CR2 thru CR4*	19A115603P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L83-3.
		- - - - - - - - INDUCTORS - - - - - - - -
L2 and L3	7488079P16	Choke, RF: 10 µh ±10%, 0.6 ohm DC res; sim to Jeffers 4421-7K.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1 and Q2	19A115330P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1 thru R4	3R152P563J	Composition: 5600 ohms ±5%, 1/4 w.
R5*	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w. Added by REV N in Models 4EB39455-57. Deleted by REV P in Models 4EB39437-39.
R6 thru R8	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

TROUBLESHOOTING PROCEDURE

Before starting the Noise Blanker troubleshooting procedure, make sure the receiver is operating properly. Align the Noise Blanker as described on the ALIGNMENT PROCEDURE Sheet. Then make the following Troubleshooting checks:

STEP 1—PERFORMANCE CHECK

Equipment Required:

RF Signal Generator coupled through a 6 db pad.

Pulse Generator with repetition rate and level controls (similar to General Electric Model 4EX4A10)

AC VTVM

Procedure:

1. Connect Pulse Generator and RF Signal Generator to receiver antenna jack through a T-connector and connect VTVM to receiver output as shown in Figure 1.

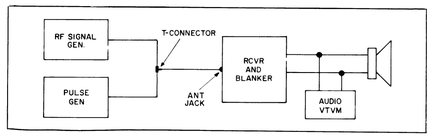


Figure 1 - Equipment Connection Diagram RC-1388

2. Apply an unmodulated RF Signal and check the 20 db quieting sensitivity of the receiver. (Measure with Model 4EX4A10 Pulse Generator connected but turned off).

3. Disable pulse section of the noise blanker by shorting Q4 base to emitter. (A yellow dot is located between the base and emitter connections on solder side of the noise blanker board).

4. Set the pulse generator (Model 4EX4A10) repetition rate to 1500 Hz and adjust the output level control on pulse generator until receiver sensitivity is degraded as much as possible (approximately 45 db).

5. Remove base-emitter short from Q4. The receiver sensitivity should restore to within 5 db of 20 db quieting level obtained in step 2 above.

STEP 2—QUICK CHECKS

Equipment Required:

Audio Voltmeter (VTVM)
Audio Oscillator (sine wave)

SYMPTOMS	PROCEDURE
No regulated 10-volts	Check the 12-volt supply. Then check regulator circuit. (Refer to troubleshooting procedure for power supply.)
No blanking	Check waveforms (STEP 3) and voltage ratios (STEP 4).
Partial or no blanking	a. Check RF attenuation as follows: Connect signal generator to Antenna Jack. Adjust the output of the signal generator for 0.2 volts on the 2nd IF amplifier (position B on test set) and note the signal generator reading. Short the Q5 base to emitter pattern (identified by red ink dot) and increase the signal generator output until the same 2nd IF amplifier reading is obtained. Signal level must increase 60 db or more.
	b. Check repetition rate switch. Connect a 6-KHz sine wave signal from audio oscillator through a 0.33-μf capacitor to point "A" located on the noise blanker board. Adjust the output of the audio oscillator for 2-volts, peak-to-peak. Observe the output of the pulse generator (on noise blanker) with an oscilloscope. The repetition rate of the pulse generator should not increase over 2 KHz or decrease under 1 KHz. (This is true for sine wave inputs like intermodulation in the blanker channel but not for strong impulse noise from antenna.)
	c. Check vehicle ignition system. Worn-out points, bad spark plugs, or breaks in ignition wiring can cause a "dirty" ignition pulse to be generated causing the blanker to operate incorrectly.

STEP 4—VOLTAGE RATIO READINGS

Equipment Required:

RF Voltmeter (similar to Boonton Model 91-CA or Millivac Type MV-18 C)

Procedure

1. Apply probe to input of stage (for example, base of 1st RF Amp). Peak resonant circuit of stage being measured and take voltage reading (E_1).

2. Move probe to input of following stage (2nd RF Amp). Repeak first resonant circuit. Then peak circuit being measured and take reading (E_2).

3. Convert readings by means of the following formula.

$$\text{Voltage Ratio} = \frac{E_2}{E_1}$$

4. Check results with typical voltage ratios shown on diagram for each stage.

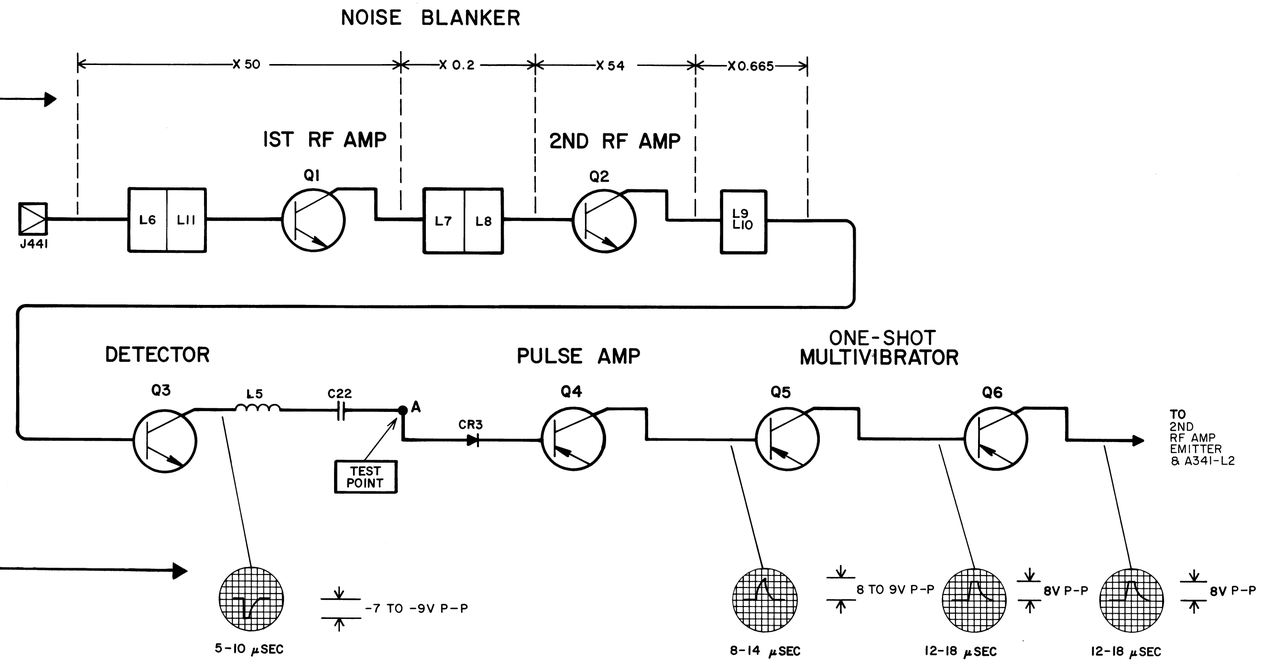
STEP 3—WAVE FORMS

Equipment Required:

Oscilloscope
Noise Generator

Procedure:

Adjust noise generator for maximum output level and observe waveforms on oscilloscope at the indicated points.



RC-1281B

SYMBOL	GE PART NO.	DESCRIPTION
R9	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152P103J	Composition: 1000 ohms ±5%, 1/4 w.
R13*	3R152P151J	Composition: 150 ohms ±5%, 1/4 w. Deleted by REV N in Models 4ER39A55-63. Deleted by REV P in Models 4ER39A37-45.
R14	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R19*	3R152P360J	Composition: 36 ohms ±5%, 1/4 w. Added by REV N in Models 4ER39A55-63. Added by REV J in Models 4ER39A37-45.
R21*	3R152P750J	Composition: 75 ohms ±5%, 1/4 w. Added by REV N in Models 4ER39A55-63. Added by REV P in Models 4ER39A37-45.
		---------- THERMISTORS ----------
RT1 thru RT4	19B209284P5	Disc: 43 ohms res nominal at 25°C, color code green; sim to GE 3D2115.
		---------- TRANSFORMERS ----------
T3*		COIL ASSEMBLY 19B205416G1 Added in Models 4ER39A37,40 and 43 by REV P Added in Models 4ER39A55,58 and 61 by REV N
		---------- CAPACITORS ----------
C34	5496218P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
		---------- INDUCTORS ----------
L4	19A121464P2	Coil.
	5491798P2	Tuning slug.
T3*		COIL ASSEMBLY 19B204763G1 Deleted in Models 4ER39A37,40 and 43 by REV P. Deleted in Models 4ER39A55,58 and 61 by REV N.
		---------- CAPACITORS ----------
C34	5496218P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
		---------- INDUCTORS ----------
L4	19A121464P1	Coil.
	5491798P2	Tuning slug.
T4*		COIL ASSEMBLY 19B205416G2 Added in Models 4ER39A38,39,41,42,44 and 45 by REV P. Added in Models 4ER39A56,57,59,60,62 and 63 by REV N.
		---------- CAPACITORS ----------
C35	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
		---------- INDUCTORS ----------
L4	19A121464P2	Coil.
	5491798P2	Tuning slug.
T4*		COIL ASSEMBLY 19B204763G2 Deleted in Models 4ER39A38,39,41,42,44 and 45 by REV P. Deleted in Models 4ER39A56,57,59,60,62 and 63 by REV N.
		---------- CAPACITORS ----------
C35	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		---------- INDUCTORS ----------
L4	19A121464P1	Coil.
	5491798P2	Tuning slug.

SYMBOL	GE PART NO.	DESCRIPTION
		---------- SOCKETS ----------
XY1 thru XY4		Refer to Mechanical Parts (RC-1199).
		---------- CRYSTALS ----------
		When reordering give GE Part No. and specify exact freq needed. 25-42 MHz crystal freq = (OF +5.30 MHz) ÷ 3. 42-50 MHz crystal freq = (OF -5.30 MHz) ÷ 3.
Y1 thru Y4	19B206576P1	Quartz: freq range 10086.666 to 12766.666 KHz, temp range -30°C to +85°C. (25-33 MHz).
Y1 thru Y4	19B206576P2	Quartz: freq range 12766.667 to 15765.666 KHz, temp range -30°C to +85°C. (33-42 MHz).
Y1 thru Y4	19B206576P3	Quartz: freq range 12233.333 to 16233.333 KHz, temp range -30°C to +85°C. (42-50 MHz).
A364* and A365*		MULTIPLIER SELECTIVITY ASSEMBLY A364 19B204782G1 (4ER39A37,40,43,55,58,61) A365 19B205326G2 (4ER39A38, 39, 41, 42, 44, 45, 56, 57, 59, 60, 62, 63) Added in Models 4ER39A55-63 by REV N. Added in Models 4ER39A37-45 by REV P.
C1 and C2	5496218P252	Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4 and C5	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C6	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7 and C8	5493392P107	Ceramic feed-thru: 470 pf +100%, -0%, 500 VDCW; sim to Allen Bradley Type S55A.
C9	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
C10	5491601P117	Phenolic: 0.68 pf ±5%, 500 VDCW.
C11	5491601P118	Phenolic: 0.75 pf ±5%, 500 VDCW.
C12	5491601P132	Phenolic: 4.7 pf ±5%, 500 VDCW.
C13	5491601P137	Phenolic: 0.91 pf ±5%, 500 VDCW.
C14	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C15	5491601P115	Phenolic: 0.56 pf ±5%, 500 VDCW.
C16	5491601P130	Phenolic: 3.3 pf ±5%, 500 VDCW.
CR1	4038056P1	Germanium.
		---------- RESISTORS ----------
R1	3R152P473K	Composition: 47,000 ohms ±10%, 1/4 w.
		---------- TRANSFORMERS ----------
T1	19B205325G2	Coil. Includes:
	5491798P4	Tuning slug.
T2 and T3	19B205325G1	Coil. Includes:
	5491798P4	Tuning slug.
T4	19B205325G2	Coil. Includes:
	5491798P4	Tuning slug.
T5 and T6	19B205325G1	Coil. Includes:
	5491798P4	Tuning slug.

SYMBOL	GE PART NO.	DESCRIPTION
A364* and A365*		MULTIPLIER SELECTIVITY ASSEMBLY A364 19B204782G1 (4ER39A37,40,43,55,58,61) A365 19B204782G2 (4ER39A38, 39, 41, 42, 44, 45, 56, 57, 59, 60, 62, 63) Deleted in Models 4ER39A55-63 by REV N. Deleted in Models 4ER39A37-45 by REV P.
C5 and C6	5493392P7	Ceramic feed-thru: .001 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C7 and C8	5491601P115	Phenolic: 0.56 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C10 and C11	5491601P117	Phenolic: 0.68 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C13 and C14	5491601P130	Phenolic: 3.3 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		---------- DIODES AND RECTIFIERS ----------
CR1	7777146P3	Germanium; sim to Type 1N90.
		---------- RESISTORS ----------
R1	3R152P392K	Composition: 3900 ohms ±10%, 1/4 w.
		---------- TRANSFORMERS ----------
T1 thru T4		COIL ASSEMBLY T1 19B204780G1 T2 19B204780G2 T3 19B204780G3 T4 19B204780G4
		---------- CAPACITORS ----------
C1 and C2	5496218P252	Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3 and C4	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		---------- INDUCTORS ----------
L1	19A121510P1	Coil. Includes:
	5491798P4	Tuning slug.
L2	19A121510P2	Coil. Includes:
	5491798P4	Tuning slug.
A369*		FIRST MIXER ASSEMBLY 19B204430G6 Added in Models 4ER39A55-63 by REV P. Added in Models 4ER39A37-45 by REV R.
		---------- CAPACITORS ----------
C2	5494481P114	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C3	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C4*	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV U in Models 4ER39A55-63. Deleted by REV Y in Models 4ER39A37-45.
C5	5494481P114	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C17	5496218P237	Ceramic disc: 6 pf ±5%, 500 VDCW, temp coef -80 PPM.
C18*	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. Added in Models 4ER39A55-63 by REV U. Added in Models 4ER39A37-45 by REV Y. Deleted in Models 4ER39A55-63 by REV XB. Deleted in Models 4ER39A37-45 by REV XC.
C19*	5496218P243	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM. Added in Models 4ER39A55-63 by REV XB. Added in Models 4ER39A37-45 by REV XC.

SYMBOL	GE PART NO.	DESCRIPTION
L2	19A121082G2	Toroidal coil.
		---------- TRANSISTORS ----------
Q2	19A115245P1	Silicon, NPN.
		---------- RESISTORS ----------
R1	3R152P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R2	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R3	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R9	3R152P471K	Composition: 470 ohms ±10%, 1/4 w.
R12	3R152P750J	Composition: 75 ohms ±5%, 1/4 w.
A370 thru A372		NOISE BLANKER A370 19C303540G1 (4ER39A37,40,43,55,58,61) A371 19C303540G2 (4ER39A38,41,44,56,59,62) A372 19C303540G3 (4ER39A39,42,45,57,60,63)
		---------- CAPACITORS ----------
C5	5491601P28	Phenolic: 2.7 pf ±10%, 500 VDCW; sim to Quality Components Type MC.
C7 and C8	7491827P2	Ceramic disc: .01 pf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C9	7491827P3	Ceramic disc: .025 pf +80% -20%, 50 VDCW; sim to Sprague 29C187.
C12 and C13	7491827P2	Ceramic disc: .01 pf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C14	7491827P3	Ceramic disc: .025 pf +80% -20%, 50 VDCW; sim to Sprague 29C187.
C17	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C18	5496219P55	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C19	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C20*	19A116080P7	Polyester: 0.1 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P107	Polyester: 0.15 pf ±20%, 50 VDCW; sim to Good-all Type 601PE.
C21 and C22	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C23	5496219P51	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef 0 PPM.
C24*	19A116080P5	Polyester: .047 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV P thru REV S. In Models 4ER39A37-45 REV R thru REV T.
	19B209243P9	Polyester: 0.22 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P108	Polyester: 0.22 pf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C25*	19A116080P7	Polyester: 0.1 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P106	Polyester: 0.1 pf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C26	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C27*	4029003P8	Silver mica: 1000 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20. In Models 4ER39A55-63 REV S and earlier. In Models 4ER39A37-45 REV T and earlier.
	4029003P4	Silver mica: 680 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.

SYMBOL	GE PART NO.	DESCRIPTION
C28*	19A116080P7	Polyester: 0.1 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P106	Polyester: 0.1 pf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C29	5494481P114	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C30*	19A116080P1	Polyester: 0.01 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P101	Polyester: .01 pf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C39*	19A116080P1	Polyester: 0.01 pf ±20%, 50 VDCW. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	5491189P101	Polyester: .01 pf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C40	5491601P23	Phenolic: 1.5 pf ±10%, 500 VDCW; sim to Quality Components Type MC.
C41	5491601P22	Phenolic: 1.2 pf ±10%, 500 VDCW; sim to Quality Components Type MC.
C42	5494481P116	Ceramic disc: .003 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C43*	7491827P2	Ceramic disc: .01 pf +80% -30%, 50 VDCW; sim to Sprague Type 19C180. Added in Models 4ER39A55-63 by REV T. Added in Models 4ER39A37-45 by REV U.
		---------- DIODES AND RECTIFIERS ----------
CR1*	19A115775P1	Silicon. In Models 4ER39A55-63 REV S and earlier. In Models 4ER39A37-45 REV T and earlier.
	19A115250P1	Silicon.
CR2 thru CR4	4038056P1	Germanium.
CR5	19A115250P1	Silicon.
CR6	4038056P1	Germanium.
CR7*	4038056P1	Germanium. Added in Models 4ER39A55-63 by REV P. Added in Models 4ER39A37-45 by REV R.
		---------- INDUCTORS ----------
L1 thru L5	7488079P17	Choke, RF: 12 µh ±10%, 1 ohm DC res; sim to Jeffers 4421-8K.
		---------- TRANSISTORS ----------
Q1* thru Q3*	19A115342P1	Silicon, NPN. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	19A115249P1	Silicon, NPN.
Q4*	19A115768P1	Silicon, PNP; sim to Type 2N3702. In Models 4ER39A55-63 REV P thru REV S.
	19A115706P1	Silicon, PNP; sim to Type 2N3638.
Q5* and Q6*	19A115393P1	Silicon, PNP. In Models 4ER39A55-63 REV N and earlier. In Models 4ER39A37-45 REV P and earlier.
	19A115393P1	Silicon, PNP.
Q7*	19A115706P1	Silicon, PNP; sim to Type 2N3638. Added in Models 4ER39A55-63 by REV P. Added in Models 4ER39A37-45 by REV R.

SYMBOL	GE PART NO.	DESCRIPTION
		---------- RESISTORS ----------
R1	3R152P682K	Composition: 6800 ohms ±10%, 1/4 w.
R2	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R3	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R4	3R152P391K	Composition: 390 ohms ±10%, 1/4 w.
R5	3R152P682K	Composition: 6800 ohms ±10%, 1/4 w.
R6	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R7	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R8	3R152P391K	Composition: 390 ohms ±10%, 1/4 w.
R9*	3R152P432J	Composition: 4300 ohms ±5%, 1/4 w. In Models 4ER39A55-63 REV S and earlier. In Models 4ER39A37-45 REV T and earlier.
	3R152P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11	3R152P562K	Composition: 5600 ohms ±10%, 1/4 w.
R12	3R152P822K	Composition: 8200 ohms ±10%, 1/4 w.
R13	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R14	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w.
R15	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
R16	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
R17	3R152P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R18	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R19 and R20	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
R21	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R22	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
		---------- SWITCHES ----------
S1*	7481654P7	Pushbutton: single pole, normally closed, 1/10 amp at 115 VAC; sim to Grayhill 30-2. Deleted in Models 4ER39A55-63 by REV P. Deleted in Models 4ER39A37-45 by REV R.
		---------- TRANSFORMERS ----------
T1 thru T3		COIL ASSEMBLY T1(19B204694G1) T2(19B204694G2) T3(19B204694G3)
		---------- CAPACITORS ----------
C1	5496218P62	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C6	19B209170P2	Ceramic disc: .01 pf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C31	5496218P256	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -80 PPM.
C35	5496218P49	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef 0 PPM.
		---------- INDUCTORS ----------
L6	19A121393P1	Coil.
	5491798P4	Tuning slug. (Used with T1 and T2).
	5491798P5	Tuning slug. (Used with T3).
T4 thru T6		COIL ASSEMBLY T4(19B204695G1) T5(19B204695G2) T6(19B204695G3)
		---------- CAPACITORS ----------
C2	5496218P61	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C10	19B209170P2	Ceramic disc: .01 pf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C32	5496218P55	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C36*	5496218P46	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef 0 PPM. In Models 4ER39A55-63 REV S and earlier. In Models 4ER39A37-45 REV T and earlier.
	5496218P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L7	19A121394P1	Coil.
	5491798P4	Tuning slug. (Used with T4 and T5).
	5491798P5	Tuning slug. (Used with T6).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R23	3R152P752K	Composition: 7500 ohms ±10%, 1/4 w.
T7 thru T9		COIL ASSEMBLY T7(19B204696G1) T8(19B204696G2) T9(19B204696G3)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C3	5496218P62	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C11	19B209170P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C33	5496218P256	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -80 PPM.
C37	5496218P48	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L8	19A121395P1	Coil.
	5491798P4	Tuning slug. (Used with T7 and T8).
	5491798P5	Tuning slug. (Used with T9).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R24	3R152P752J	Composition: 7500 ohms ±5%, 1/4 w.
T10 thru T12		COIL ASSEMBLY T10(19B204697G1) T11(19B204697G2) T12(19B204697G3)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C4	5496218P63	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef 0 PPM.
C15 and C16	19B209170P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C34	5496218P58	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef 0 PPM.
C38*	5496218P49	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef 0 PPM. In Models 4ER39A55-63 REV S and earlier. In Models 4ER39A37-45 REV T and earlier.
	5496218P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L9	19A121396P1	Coil.
	5491798P4	Tuning slug. (Used with T10 and T11).
	5491798P5	Tuning slug. (Used with T12).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R25	3R152P822K	Composition: 8200 ohms ±10%, 1/4 w.
A374		IF/AUDIO ASSEMBLY 19D402327G10
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115028P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C2	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C3	19A115028P111	Polyester: .047 µf ±20%, 200 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C4	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C6	19A115028P111	Polyester: .047 µf ±20%, 200 VDCW.
C7	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C8	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C9	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C10	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C11	19A115028P111	Polyester: .047 µf ±20%, 200 VDCW.
C12	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C13	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C14	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C15	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C16	5496219P421	Ceramic disc: 100 pf ±10%, 500 VDCW, temp coef -220 PPM.
C17	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C18 and C19	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C20*	19A115680P103	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TT. In Models 4ER39A55-63 REV XD and earlier. In Models 4ER39A37-45 REV XD and earlier.
	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C21	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C22	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C23	5491000P1	Electrolytic: 30 µf +75% -10%, 25 VDCW; sim to Sprague D25379.
C24	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C25	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C27	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C29	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C31	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C32	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C33	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C34	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C35	5496267P6	Tantalum: 33 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C37*	19A115028P305	Polyester: .0068 µf ±10%, 200 VDCW. In Models 4ER39A55-63 REV F or earlier. In Models 4ER39A37-45 REV G or earlier.
	19A115028P303	Polyester: .0033 µf ±10%, 200 VDCW.
C38	19A115680P107	Electrolytic: 100 µf +150% -10%, 15 VDCW; sim to Mallory Type TT.
C39	5490008P143	Silver mica: 470 pf ±10%, 300 VDCW; sim to Electro Motive Type DM-15.
C48	5495670P9	Phenolic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
C50	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C52*	4029003P16	Silver mica: .0022 µf ±5%, 500 VDCW; sim to Electro Motive Type DM-20. Deleted by REV F.
C53*	19A115028P315	Polyester: 0.15 µf ±10%, 200 VDCW. In Models 4ER39A37-45 of REV G or earlier: In Models 4ER39A55-63 of REV F or earlier:
	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C54*	7491930P3	Polyester: .0047 µf ±20%, 100 VDCW; sim to GE Type 61F. Deleted by REV F.
C66*	19A115028P307	Polyester: .01 µf ±10%, 200 VDCW. Added by REV F.
C67*	4029003P205	Silver mica: 2000 pf ±2%, 500 VDCW; sim to Electro Motive Type DM-20. Added by REV F.
C71*	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW. Added to Models 4ER39A55-63 by REV M. Added to Models 4ER39A37-45 by REV N.
C78*	5494481P114	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. Added to Models 4ER39A37-45,55-61,63 by REV XG. Added to Model 4ER39A62 by REV XF.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	4038056P1	Germanium.
CR3 and CR4	19A115250P1	Silicon.
CR7	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J24	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	4031476G1	Choke. Includes tuning slug 7773023P25.
L4	5491736P6	Choke: 3.5 mh ±10%, 2.5 ohms DC res max; sim to Aladdin 33-494.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q1 thru Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4* and Q5*	19A11555-P1	Silicon, NPN; sim to Type 2N2714. In Models 4ER39A55-63 REV L and earlier. In Models 4ER39A37-45 REV M and earlier.
	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q6	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q7	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q8	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q9	19A115247P1	Silicon, PNP; sim to Type 2N1024.
Q10	19A115300P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77P330K	Composition: 33 ohms ±10%, 1/2 w.
R2	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R3	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R4	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R5	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R6	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R7	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R8	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R9	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R10	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R11	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R12	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R13	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R14	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R15	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R16	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R17	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R18	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R19	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R20	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R21	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R23	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R24	3R77P682K	Composition: 6800 ohms ±10%, 1/2 w.
R25	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R26	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R27	3R77P683K	Composition: 68,000 ohms ±10%, 1/2 w.
R28	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R29 and R30	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R31	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R34	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R36	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R37	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R38	3R77P751J	Composition: 750 ohms ±5%, 1/2 w.
R39	3R77P562J	Composition: 5600 ohms ±5%, 1/2 w.
R40	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R44	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R45	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R46*	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w. Deleted in Models 4ER39A55-63 by REV M. Deleted in Models 4ER39A37-45 by REV N.
R47	19B209115P1	Variable: 5000 ohms ±20%, 0.15 w; sim to CTS Type UPE-70.
R48	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R49	3R77P821K	Composition: 820 ohms ±10%, 1/2 w.
R50	3R77P392K	Composition: 3900 ohms ±10%, 1/2 w.
R51	19B209022P15	Wirewound: 1 ohm ±5%, 2 w; sim to IRC Type BWH.
R52	3R77P152K	Composition: 1500 ohms ±10%, 1/2 w.
R53	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R59	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R61	3R77P221K	Composition: 220 ohms ±10%, 1/2 w.
R62*	3R77P823J	Composition: 82,000 ohms ±5%, 1/2 w. Deleted in Models 4ER39A55-63 by REV R. Deleted in Models 4ER39A37-45 by REV S.
R65*	3R77P123K	Composition: 12,000 ohms ±10%, 1/2 w. Deleted by REV F.
R66	3R77P223K	Composition: 22,000 ohms ±10%, 1/2 w.
R68*	3R77P134J	Composition: 130,000 ohms ±5%, 1/2 w. Added in Models 4ER39A55-63 by REV R. Added in Models 4ER39A37-45 by REV S.
R70*	3R77P471J	Composition: 470 ohms ±5%, 1/2 w. Deleted by REV F.
R72	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R74*	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w. Added in Models 4ER39A55-63 by REV M. Added in Models 4ER39A37-45 by REV N.
R75*	3R77P183K	Composition: 18,000 ohms ±10%, 1/2 w. Added in Models 4ER39A55-63 by REV M. Added in Models 4ER39A37-45 by REV N.
R80*	3R152P511J	Composition: 510 ohms ±5%, 1/4 w. Added in Models 4ER39A55-63 by REV V. Added in Models 4ER39A37-45 by REV W.
R81*	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w. Added in Models 4ER39A37-45 by REV XD. Added in Models 4ER39A55-63 by REV XC.
		- - - - - - - - - THERMISTORS - - - - - - - -
RT1	19B209143P2	Rod: 4000 ohms ±10% res, 1 w max; sim to Globar Type 789F-12.

SYMBOL	GE PART NO.	DESCRIPTION
RT2	19B209143P3	Rod: 850 ohms ±10% res, 1 w max; sim to Globar Type 789F.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1		DISCRIMINATOR ASSEMBLY 19C303612G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C41 and C42	19B209196P1	Ceramic disc: 280 pf ±5%, 500 VDCW, temp coef -115 ±30 PPM.
C45	7489162P43	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C46	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C47	5491189P4	Polyester: .047 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR5 and CR6	19A115250P1	Silicon.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R56	3R152P331J	Composition: 330 ohms ±5%, 1/4 w.
R57 and R58	3R152P473J	Composition: 47,000 ohms ±5%, 1/4 w.
A376*		NOISE LEVEL SHUT-OFF ASSEMBLY 19C303985G1 Added to Models 4ER39A55-63 by REV P Added to Models 4ER39A37-45 by REV R
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496219P237	Ceramic disc: 6 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C2	19B209243P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C3	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4 thru C6	7491827P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C7	7774750P11	Ceramic disc: .005 µf +100% -0%, 500 VDCW.
C8	19B209243P3	Polyester: .022 µf ±20%, 50 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4038056P1	Germanium.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1*	19C307007P3	Choke, RF: 39 µh ±10%, 1.8 ohms DC res; sim to Delevan 1537-727. In Models 4ER39A55-63 of REV S and earlier. In Models 4ER39A37-45 of REV T and earlier.
	7488079P50	Choke, RF: 39 µh ±10%, 2 ohms DC res; sim to Jeffers 4422-11K.
L2	7488079P48	Choke, RF: 27 µh ±10%, 1.4 ohms DC res; sim to Jeffers 4422-9K.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115245P1	Silicon, NPN.
Q2	19A115123P1	Silicon, NPN; sim to 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
R2	3R152P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R3	3R152P392K	Composition: 3900 ohms ±10%, 1/4 w.
R4	3R152P562K	Composition: 5600 ohms ±10%, 1/4 w.
R5	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R6*	3R152P562K	Composition: 5600 ohms ±10%, 1/4 w. Added in Models 4ER39A55-63 by REV P. Added in Models 4ER39A37-45 by REV R.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C358 thru C365	5493392P7	Ceramic, feed-thru: .001 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C367 and C368	5493392P7	Ceramic, feed-thru: .001 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C371*	5491601P116	Phenolic: 0.62 pf ±5%, 500 VDCW; sim to Quality Components Type MC. Deleted in Models 4ER39A55-63 by REV P. Deleted in Models 4ER39A37-45 by REV N.
C372	5491601P110	Phenolic: 0.36 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C373	5491601P116	Phenolic: 0.62 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C377*	5491601P117	Phenolic: 0.68 pf ±5%, 500 VDCW; sim to Quality Components Type MC. Deleted in Models 4ER39A37, 40, 43 by REV P. Deleted in Models 4ER39A55, 58, 61 by REV N.
C378	5491601P110	Phenolic: 0.36 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C379	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C380	5491601P115	Phenolic: 0.56 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C381	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C382	5491601P110	Phenolic: 0.36 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C385*	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW. Added in Models 4ER39A55-63 by REV J. Added in Models 4ER39A37-45 by REV K.
C386*	5491601P119	Phenolic: 0.82 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR301*	4037822P1	Silicon. Added to Models 4ER39A37-45, 55-63 by REV XF.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL341		Reed, detector: coil - 600 ohms ±10%, standard 7-pin tube socket mounting.
	19C307140P719	71.9 Hz
	19C307140P770	77.0 Hz
	19C307140P825	82.5 Hz
	19C307140P885	88.5 Hz
	19C307140P948	94.8 Hz
	19C307140P1000	100.0 Hz
	19C307140P1035	103.5 Hz
	19C307140P1072	107.2 Hz
	19C307140P1109	110.9 Hz
	19C307140P1148	114.8 Hz
	19C307140P1188	118.8 Hz
	19C307140P1230	123.0 Hz
	19C307140P1273	127.3 Hz
	19C307140P1318	131.8 Hz
	19C307140P1365	136.5 Hz
	19C307140P1413	141.3 Hz
	19C307140P1462	146.2 Hz
	19C307140P1514	151.4 Hz
	19C307140P1567	156.7 Hz
	19C307140P1622	162.2 Hz
	19C307140P1679	167.9 Hz
	19C307140P1738	173.8 Hz
	19C307140P1799	179.9 Hz
	19C307140P1862	186.2 Hz
	19C307140P1928	192.8 Hz
	19C307140P2035	203.5 Hz
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J441	19B209122P3	Connector, coaxial: includes cable (W441), approx 5 inches long.
J442	19B205689G2	Connector: 16 contacts.
J443	19C303426G1	Connector: 20 pin contacts.

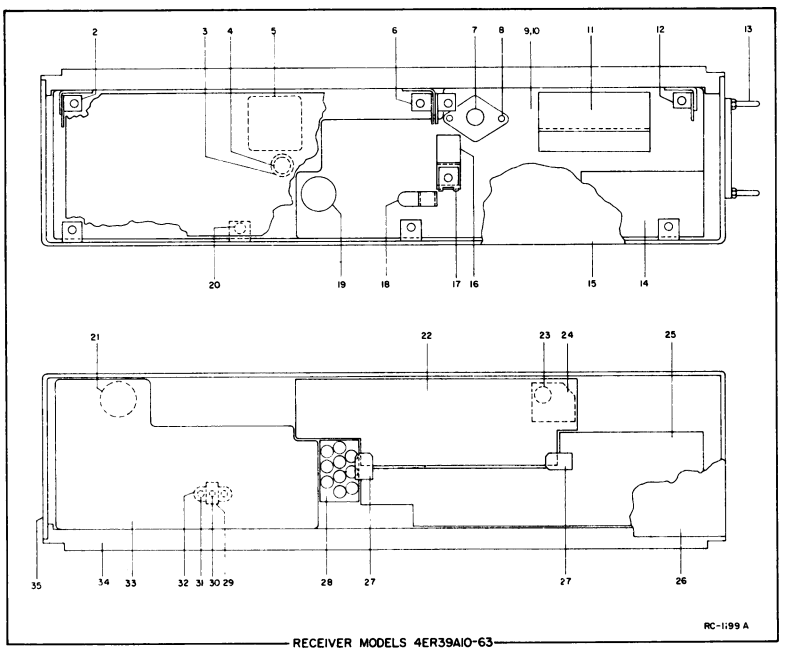
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - INDUCTORS - - - - - - - - -
L341 thru L346		COIL ASSEMBLY L341 19B204820G5, L342 19B204820G6 L343 19B204820G1, L344 19B204820G2 L345 19B204820G3, L346 19B204820G4
		- - - - - - - - - CAPACITORS - - - - - - - - -
C341 and C342	19B209159P3	Variable, subminiature: approx 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS301*	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-2T. Added in Models 4ER39A55-63 by REV K. Added in Models 4ER39A37-45 by REV L.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P304 thru P309	4029840P2	Contact, electrical; sim to Amp 42827-2.
P310	4029840P1	Contact, electrical; sim to Amp 41854.
P311 thru P320	4029840P2	Contact, electrical; sim to Amp 42827-2.
P321	4029840P1	Contact, electrical; sim to Amp 41854.
P325	4029840P2	Contact, electrical; sim to Amp 42827-2.
P327 thru P337	4029840P2	Contact, electrical; sim to Amp 42827-2.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q341*	19A115527P1	Silicon, NPN. In Models 4ER39A55-63 REV G and earlier. In Models 4ER39A37-45 REV H and earlier.
	19A115246P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R341	3R152P822K	Composition: 8200 ohms ±10%, 1/4 w.
R342	3R152P222K	Composition: 2200 ohms ±10%, 1/4 w.
R343* and R344*	3R152P101K	Composition: 100 ohms ±10%, 1/4 w. Added in Models 4ER39A55-63 by REV N. Added in Models 4ER39A37-45 by REV P.
		- - - - - - - - - TRANSFORMERS - - - - - - -
T341*	19B209083P2	Audio freq: Pri 1: 19 ohms ±10% imp at 3 w, 0.866 ohm DC res max, Sec 1: 3.5 ohms ±10% imp at 3 w, 0.222 ohm DC res max. In Models 4ER39A55-63 REV G and earlier. In Models 4ER39A37-45 REV H and earlier.
	19B209083P1	Audio freq: Pri 1: 19 ohms ±10% imp at 3 w, 0.866 ohm DC res max, Sec 1: 3.5 ohms ±10% imp at 3 w, 0.222 ohm DC res max.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
T81	7487424P7	Miniature, phen: 4 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W441	19B205634G2	(Part of J441).
		- - - - - - - - TUNED CIRCUITS - - - - - - - -
Z341 thru Z343		COIL ASSEMBLY Z341 19B204786G1, Z342 19B204786G2 Z343 19B204786G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1*	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM. In Models 4ER39A55, 58, 61 REV M and earlier. In Models 4ER39A37, 40, 43 REV N and earlier.
	5496218P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used with Z341).
	5491798P4	Tuning slug. (Used with Z342).
	5491798P5	Tuning slug. (Used with Z343).
Z347 thru A349		COIL ASSEMBLY Z347 19B204767G1, Z348 19B204767G2 Z349 19B204767G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1*	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM. In Models 4ER39A55,58,61 REV M and earlier. In Models 4ER39A37,40,43 REV N and earlier.
	5496218P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used with Z347).
	5491798P4	Tuning slug. (Used with Z348).
	5491798P5	Tuning slug. (Used with Z349).
Z350* thru Z352*		COIL ASSEMBLY Z350 19B204784G4, Z351 19B204784G5 Z352 19B204784G6 Added in Models 4ER39A55-63 by REV N. Added in Models 4ER39A37-45 by REV P.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C7 and C8	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C9	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C10	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used with Z350).
	5491798P4	Tuning slug. (Used with Z351).
	5491798P5	Tuning slug. (Used with Z352).
Z350* thru Z352*		COIL ASSEMBLY Z350 19B204784G1, Z351 19B204784G2 Z352 19B204784G3 Deleted in Models 4ER39A55-63 by REV N. Deleted in Models 4ER39A37-45 by REV P.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	5496218P262	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3 and C4	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C5 and C6	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug.

SYMBOL	GE PART NO.	DESCRIPTION
Z353*		COIL ASSEMBLY 19B204767G1
		Deleted in Models 4ER39A55-63 by REV P. Deleted in Models 4ER39A37-45 by REV N.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798P1	Tuning slug.
Z354* and Z355*		COIL ASSEMBLY Z354 19B204767G4, Z355 19B204767G5
		Added in Models 4ER39A55-63 by REV T. Added in Models 4ER39A37-45 by REV U.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4 and C5	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	7777146P3	Germanium; sim to Type 1N90.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R2	3R152P183K	Composition: 18,000 ohms ±10%, 1/4 w.
		- - - - - - - - MISCELLANEOUS- - - - - - - - -
	5491798P4	Tuning slug. (Used with Z354).
	5491798P5	Tuning slug. (Used with Z355).
Z354* and Z355*		COIL ASSEMBLY Z354 19B204767G2, Z355 19B204767G3
		Deleted in Models 4ER39A55-63 by REV T. Deleted in Models 4ER39A37-45 by REV U.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug. (Used with Z354).
	5491798P5	Tuning slug. (Used with Z355).
Z356* thru Z358*		COIL ASSEMBLY Z356 19B204783G1
		Deleted in Models 4ER39A37,40,43 by REV P. Deleted in Models 4ER39A55,58,61 by REV N.
		Z357 19B204783G2, Z358 19B204783G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug. (Used with Z357).
	5491798P5	Tuning slug. (Used with Z356 and Z358).

SYMBOL	GE PART NO.	DESCRIPTION
Z359 thru Z361		COIL ASSEMBLY Z359 19B204785G1, Z360 19B204785G2 Z361 19B204785G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1*	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
		In Models 4ER39A55-63 REV M and earlier. In Models 4ER39A37-45 REV N and earlier.
	5496218P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used with Z359).
	5491798P4	Tuning slug. (Used with Z360).
	5491798P5	Tuning slug. (Used with Z361).
Z362 thru Z364		COIL ASSEMBLY Z362 19B204787G1, Z363 19B204787G2 Z364 19B204787G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1*	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
		In Models 4ER39A55-63 REV M and earlier. In Models 4ER39A37-45 REV N and earlier.
	5496218P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481P14	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P431J	Composition: 430 ohms ±5%, 1/4 w.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used with Z362).
	5491798P4	Tuning slug. (Used with Z363).
	5491798P5	Tuning slug. (Used with Z364).
		MECHANICAL PARTS (SEE RC-1199)
2	19B204583G3	Hinge.
3	4035439P1	Transistor heat sink; sim to Birtcher 3AL-635-2R. (Used with Q10 in A374).
4	4036555P1	Washer, insulator: nylon. (Used with Q9 and Q10 in A374).
5	4032187P1	Can. (Used with T1 in A374).
6	19B204583G1	Hinge.
7	19A115784P1	Mica insulator: (Used with Q341).
8	19A121989P1	Transistor support. (Used with Q341).
9	19E500812P1	Chassis. (Used in Models 4ER39A38, 39, 41, 42, 44, 45, 56, 57, 59, 60, 62, 63).
10	19E500812P2	Chassis. (Used in Models 4ER39A37, 40, 43, 55, 58, 61).
11	19A121229G1	Hinge.
12	19B204583G2	Hinge.
13	19A121676P1	Guide pin: with 4-40 mounting thread.

SYMBOL	GE PART NO.	DESCRIPTION
14	19B204673P1	Cover.
15	19C303385P1	Mobile Receiver bottom cover.
	19C303495G4	Station Receiver bottom cover.
16	19A121297P1	Angle.
17	7160861P4	Nut, spring clip: sim to Tinnerman C6452-8Z-157.
18	4029851P6	(Not Used).
19	N529P38C	Plug button.
20	19A115461P2	(Not Used).
21	4034252P5	Can; sim to Hudson Tool and Die HV-1236-2. (Used with T1 in A347).
22	19B204672P1	Cover.
23	7162414P1	Mounting ring, transistor socket; sim to Elco 757. (Used with Q1 in A341).
24	19B204917P2	Support. (Used with A341).
25	19B204719P1	(Not Used).
26	19C303385P2	Mobile Receiver top cover.
	19C303495G3	Station Receiver top cover (except Repeaters and Vertical Mount Stations).
	19C303676G2	Station Receiver top cover (Repeaters and VM Stations).
27	4029851P3	Cable clamp: nylon; sim to Weckesser 1/8-4.
28	19A121383P1	Support.
29	4033089P1	Clip. (Part of XY1-4 in A352-357).
30	19B200525P9	Rivet. (Part of XY1-4 in A352-357).
31	19A115793P1	Electrical contact. (Part of XY1-4 in A352-357).
32	4039307P1	Crystal socket. (Part of XY1-4 in A352-357).
33	19C303547P1	Cover.
34	19C303394G1	Heat sink.
35	19C303389G1	Chassis.



RECEIVER MODELS 4ER39A10-63

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 & B — These revisions were incorporated into initial shipments.

REV. C — To minimize chance or interference, changed IF frequency from 5.26 MC to 5.30 MC, changed FL1 and FL2 to FL5 and FL6 on crystal filter board A346, changed Y1 on 2nd Mixer Board A347. Deleted CR1 from RF Amplifier Assembly 19B204772-G1.

REV. D — To improve channel guard reliability, replaced R24 with a jumper and changed R26 on Channel Guard circuit board A350/351.

REV. E — To improve receiver performance in areas of high signal level, deleted R3, R4, and added R15, R16, and R17 on the 2nd Mixer Board A347.

REV. F — To raise maximum squelch sensitivity, replaced R70 and C54 with C66, C52 with C67 and deleted R65 on the IF and Audio Board A374.

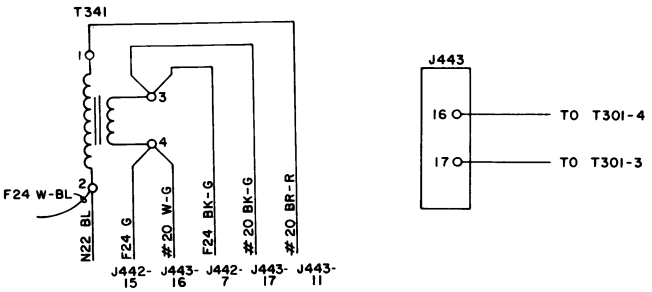
REV. G — (Models 4ER39A37-45 only)
To reduce noise falsing, changed R26, replaced jumper from Q4 collector to H6 with R24 on the Channel Guard Board A350.

REV. G — (Models 4ER39A55-63 only)
REV. H — (Models 4ER39A37-45 only)
To improve audio response, changed C37 and C53 on IF and Audio Board A374.

REV. H — (Models 4ER39A55-63 only)
REV. J — (Models 4ER39A37-45 only)

On single frequency units, deleted CR1, R5 and added R19 to 1st Oscillator Board A352/A357. To incorporate improved transistor and transformer. Changed Q341 and T341.

T341 WAS



REV. J — (Models 4ER39A55-63 only)
REV. K — (Models 4ER39A37-45 only)

To eliminate audio howling caused by feedback within receiver cabling. Added C385.

REV. K — (Models 4ER39A55-63 only)
REV. L — (Models 4ER39A37-45 only)

To improve RF burnout protection of front-end air capacitor and RF transistor. Added neon lamp DS301 across L341/L343/L345 in 1st RF Amplifier A341.

REV. L — (Models 4ER39A55-63 only)
REV. M — (Models 4ER39A37-45 only)

To allow for variations in audio response caused by the tone filter. Changed C21 on Channel Guard Board A350/A351.

REV. M — (Models 4ER39A55-63 only)
REV. N — (Models 4ER39A37-45 only)

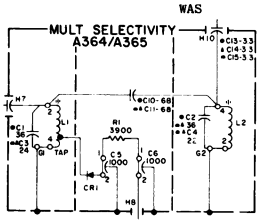
To provide better temperature compensation for low IF circuitry. Changed C7, C10 and C11 on 2nd Mixer Board A347. To reduce variation in discriminator output and reduce audio rumble produced when volume control is at minimum and squelch near critical. Changed Q4 and Q5. Deleted R46. Added R74, R75, and C71 on IF/Audio Board A374.

REV. N — (Models 4ER39A55-63 only)
REV. P — (Models 4ER39A37-45 only)

To improve spurious rejection. Changed C1 on coil assemblies Z341, Z347, Z359, Z362. Changed core on coil assemblies Z341, Z342, Z347, Z348, Z354, Z357, Z359, Z360, Z362, Z363. Changed coil assemblies Z350, Z351, Z352. Added R343 and R344. Changed R4 to R9 and R5 to R12 on 1st Mixer Board A345. Changed C24 to C45, C25 to C46, R13 to R21, T3 andT4 on 1st Oscillator Assembly A352/A357. Deleted Z353, Z356, C371, C377, and added C386 to the 25-33 MC Noise Blanker models. Changed Multiplier Selectivity Board A364/A365.

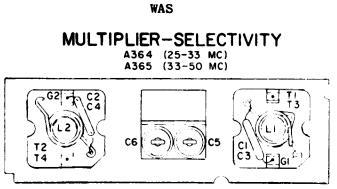
Multiplier Selectivity Schematic

WAS



Multiplier Selectivity Outline Diagram

WAS



Changed RF Alignment. Front End Alignment Step 1 and Complete Receiver and Noise Blanker Alignment Step 3. Tuning Control was "L4 (on 1st OSC/MULT) and L1 and L2 (on MULT SELECTIVITY)", and Procedure was "Tune L4 on 1st OSC/MULT and L1 on MULT SELECTIVITY for maximum meter reading. Tune L2 for minimum meter reading. Change voltage scale if necessary". Front End Alignment Step 4 and Complete Receiver and Noise Blanker Alignment Step 8 Tuning Control was "L4 (1st OSC/MULT) and L1 as above, keeping below saturation. Tune L4 (on 1st OSC/MULT) and L1 and L2 (on MULT SELECTIVITY) for maximum meter reading.

REV. P — (Models 4ER39A55-63 only)
REV. R — (Models 4ER39A37-45 only)

To improve blanker performance during hi-level signals. Deleted S1, added Q7 and CR7, changed C20, C24, C28, C30, C39, Q1 thru Q6 on Noise Blanker Board A370/A372. Added Noise Level shut-off Board A376. Changed 1st Mixer Board to A369. To improve RF burnout protection of 1st RF Noise Blanker Transistor.

REV. R - (Models 4ER39A55-63 only)
REV. S - (Models 4ER39A37-45 only)

To improve temperature characteristics. Changed C4, C5, C7 through C16, L1, L2, L3, deleted L4, and changed L5 to L4 on 2nd Mixer Board.

REV. S - (Models 4ER39A55-63 only)
REV. T - (Models 4ER39A37-45 only)

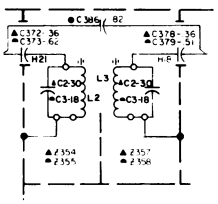
To improve squelch sensitivity. Changed R62 to R68.

REV. T - (Models 4ER39A55-63 only)
REV. U - (Models 4ER39A37-45 only)

To improve noise blanker performance. Changed CR1, C24, C27, C36, C38, Q4 & R9 and added C43 on Noise Blanker Board A370/A372. Changed L1 on Level Shut-Off Switch A376. Added CR1, C4, C5, R1 & R2 to RF Coil Z354/Z355. Deleted C2 and changed CR1 & Q1 on 2nd RF Amplifier A344.

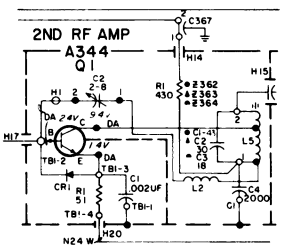
Z354/Z355 Schematic

Was



2nd RF Amp Schematic

Was



RF ALIGNMENT FOR MODELS EARLIER THAN ABOVE

Perform steps 4 thru 8 of ALIGNMENT procedure. Then while applying signal as in step 8, short base to emitter of Q5 in noise blanker. Increase signal level until a slight increase in meter reading is observed. Tune C2 (on 2nd RF AMP) for minimum meter reading at J442-2.

REV. U - (Models 4ER39A55-63 only)
REV. V - (Models 4ER39A37-45 only)

To provide mid-range tuning of tank circuit on Fist Mixer Assembly A369. Deleted C4 and added C18.

REV. V - (Models 4ER39A55-63 only)
REV. W - (Models 4ER39A37-45 only)

To improve circuit DC bias stability of Audio Amp Q10. Added R80 to A348.

REV. W - (Models 4ER39A55-63 only)
REV. XA- (Models 4ER39A37-45 only)

To facilitate procurement of parts. Changed C8, C19, and C23 in A350 and A351. Changed C11 in A350. Added C28 to A350. Added C30, C31 and L1 to A350 and A351.

REV. XA- (Models 4ER39A55-63 only)
REV. XB- (Models 4ER39A37-45 only)

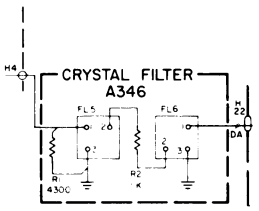
To reduce receiver lock-up in areas of high RF signal level. Deleted C5 and added C26 on 2nd Mixer Board A347.

REV. XB- (Models 4ER39A55-63 only)
REV. XC- (Models 4ER39A37-45 only)

To facilitate procurement of parts. Deleted C18 & added C19 in lst Mixer A369. Deleted R15 in 2nd Mixer A347. Changed FL5, deleted FL6, R1 & R2 and added R7 & R8 in Crystal Filter A346.

Crystal Filter Schematic

WAS



REV. XC- (Models 4ER39A55-63 only)
REV. XD- (Models 4ER38A37-45 only)

To improve squelch clipping. Added R81 to IF Audio Assembly A374.

REV. XD- (Models 4ER39A55-63 only)

To reduce noise falsing. Deleted R26 and added R24 & R39 to A351.

REV. XE- (Models 4ER39A55-63 only)
(Models 4ER38A37-45 only)

To eliminate capacitor failure in positive ground installations. Changed C20 on IF Audio Assembly A374.

REV. XF - (Models 4ER39A55-63 only)
(Models 4ER39A37-45 only)

To protect the audio output transistor (Q341) from negative voltage spikes. Added CR301 in the 12-Volt supply line.

REV. XG - Models 4ER39A55-63 only)
Models 4ER39A37-45 only)

To eliminate high frequency oscillation in the receiver PA caused by the use of a higher gain PA transistor. Added C78 from A374 - J16 to ground.

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 G-E Part Number.

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

1. G-E 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-3593

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

PRINTED IN U.S.A.

DF-1083