communications

MASTR Progress Line

132-174 MC RECEIVER MODELS 4ER41A22-27 (WITH NOISE BLANKERS)

Maintenance Manual LBI-3595B

DF-1085

SPECIFICATIONS *

FCC Filing Designation	**ER-41-A**
Frequency Range	132-174 MC
Audio Output	2 watts at less than 10% distortion (using Speaker Model 4EZ16A10)
Sensitivity	
12-db SINAD (EIA Method)	0.35 μv
20-db Quieting Method	0.5 μv
Selectivity	
EIA Two-Signal Method	-85 db (adjacent channel, 30 KC channels)
20-db Quieting Method	-100 db at ±15 KC
Spurious Response	-100 db
First Oscillator Stability	±.0005% (-30°C to +60°C)
Modulation Acceptance	±6 KC (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 cps (1000-cps reference)

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

ER-41-A WITH NOISE BLKR

GENERAL ELECTRIC

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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.

DESCRIPTION

General Electric MASTR Progress Line Receiver Type ER-41-A is a double conversion, superheterodyne FM receiver designed for operation on the 132-174 megacycle band.

The receiver is of single-unit construction and is completely housed in an aluminum casting for maximum shielding and rigidity. The top part of the casting contains the front end through the 1st Low IF Amplifier stages and the Noise Blanker Board. The bottom portion of the casting contains the Audio Squelch Board and the optional Channel Guard Board.

CIRCUIT ANALYSIS

The MASTR Progress Line Receiver is completely transistorized, using a total of 26 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.

RF AMPLIFIERS (A323/A324 and A303/A304)

The 1st RF Amplifier A323 (132-150.8 MC) or A324 (150.8-74 MC) consists of three tuned helical resonators and an RF amplifier stage (Q2). The RF signal from the antenna is coupled by RF cable to a tap on L301/L304. The tap is positioned to insure the proper impedance match to the antenna. RF energy is coupled through the three coils by openings in the shield walls, to the base of RF amplifier Q2. The output of Q2 is coupled through C8 to helical resonators L307/L309 and L308/L310, and then to a second RF amplifier stage A303 (132-150.8 MC) or A304 (150.8-174 MC).

The output of the A303/A304-Q1 is coupled through transformer T1/T2 to helical resonator L112/L113, and then to the base of the 1st mixer (A334-Q1).

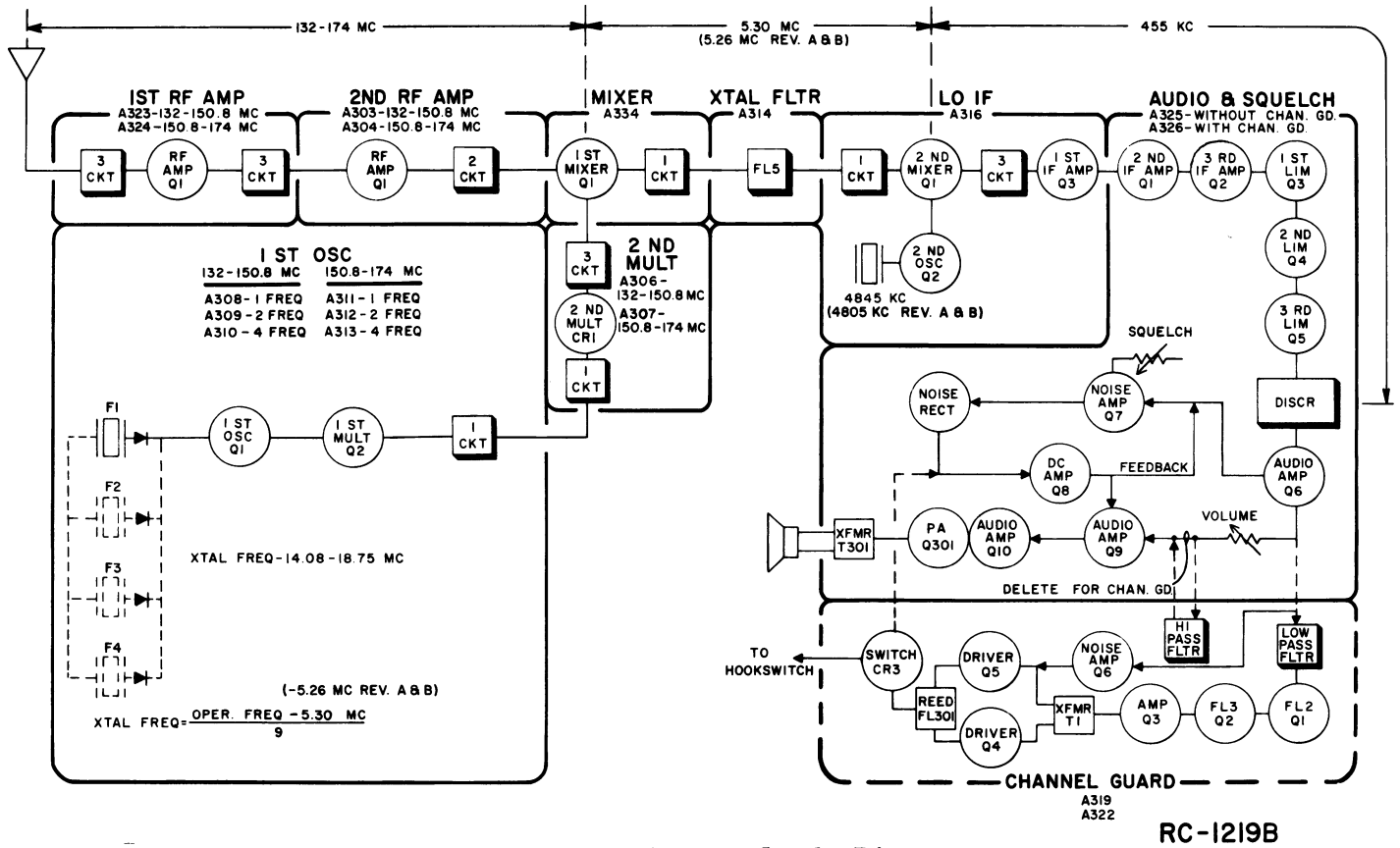


Figure 1 - Receiver Block Diagram

1ST OSCILLATOR AND MULT-1 (A308-A313)

The receiver 1st oscillator operates in a transistorized Colpitts oscillator circuit. The oscillator crystal operates in a fundamental mode at a frequency of approximately 14 to 18 megacycles. 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.

In single frequency receivers, bias for the oscillator transistor is obtained by a jumper from C311 to P304.

In multi-frequency receivers, a diode is connected in series with the crystal, and up to three addition 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. The output is coupled to the base of 1st multiplier Q2.

The output of the 1st multiplier (tripler Q2) is transformer-coupled (T1/T2) to the 2nd multiplier assembly. The 1st multiplier tank is tuned to three times the crystal frequency. This stage is metered at centralized metering jack J442-4 through metering network CR5, R16, R303 and C32.

2ND MULTIPLIER (A306/A307)

Coupling from the 1st multiplier tank is through A306-T1/T2 to the anode of multiplier diode A306-CR1. Three resonant LC circuits (T3/T4, T5/T6 and T7/T8) follow CR1 and are tuned to nine times the crystal frequency. The 2nd multiplier output is fed through C13 to the base of the first mixer.

1ST MIXER (A305) AND CRYSTAL FILTER (A314)

The RF signal from the RF amplifiers and the low-side injection voltage from the 2nd multiplier are applied to the base of 1st mixer A305-Q1. The mixer collector tank (L1 and C3) is tuned to 5.30 megacycles (5.26 MC in Revision A and B receivers), and provides impedance matching to the high IF filter.

The highly selective crystal filter (A314) following the 1st mixer provides the major selectivity for the receiver. The output of the filter is fed through impedance matching transformer A316-T1 to the base of the 2nd mixer.

2ND OSCILLATOR, 2ND MIXER AND 1ST IF AMPLIFIER (A316)

The 2nd oscillator A316-Q2 operates in a Colpitts oscillator circuit, with feedback supplied through C2. The oscillator frequency is 4845 KC (4805 KC in Revision A and B receivers) with the low-side injection voltage fed to the base of the 2nd mixer.

The Hi IF signal from the filter is fed to the base of 2nd mixer A316 (Q1) with the 2nd oscillator output. The 455 KC 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 also reject the undesired output frequencies from the mixer.

The Low IF signal is coupled through C14 to the base of the 1st Low IF amplifier A316-Q3. The output of A316-Q3 is RC coupled to the base of the 2nd IF amplifier.

2ND IF AMPLIFIERS AND LIMITERS (A325)

Following A316-Q3 are two additional RC coupled low IF amplifiers (A325-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 (A325-Q3, -Q4 and -Q5). First limiter metering is provided at J442-3 through metering network C13, CR2, R18 and C15.

DISCRIMINATOR (A325)

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 KC IF signals to recover the audio. The stage is metered at J442-10 through metering network R27 and C22.

1ST AUDIO AMPLIFIER (A325)

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

When audio is present in the incoming signal, it is taken off the emitter of Q6 and connected to the VOLUME control through A325-J9. The VOLUME control arm connects to A325-J8 which feeds the audio signal to the base of the 2nd audio amplifier, Q9. C34, C35, 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 Q301. 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 T301 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 which attenuates frequencies below 3 KC. 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 Q301 are DC coupled, Q10 and Q301 are cut off also. The positive voltage from the collector circuit of the DC amplifier is used as feedback 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 a hysteresis effect was designed into 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 (A320/A321 - FIGURE 2)

An RF signal and noise pulse from the antenna is fed simultaneously to the Noise Blanker and receiver RF amplifier section. The signal and noise is transformer coupled through T1/T2 to the base of the first of three RF amplifier stages. The three amplifier stages (Q1, Q2 and Q3) raise the level of the noise pulse which is coupled through T9/T10 and L13 to the base of pulse detector Q4. A metering network consisting of R13, C21, C22 and CR2 permits the blanker to be metered at centralized metering jack J442-11.

Base bias for the pulse detector is established by R12 and CR1. CR1 is normally conducting, which keeps Q4 in a barely conducting state. A noise pulse applied to the base of Q4 causes it to conduct heavily. This results in a negative pulse at the output (collector) or Q4. Following Q4 is a low-pass RF filter (C23 and L14).

The output of the filter is fed to the base of pulse amplifier, Q5. This stage is biased by CR3, R16 and R18 so that it is just conducting. The negative-going pulse from the pulse detector cuts CR3

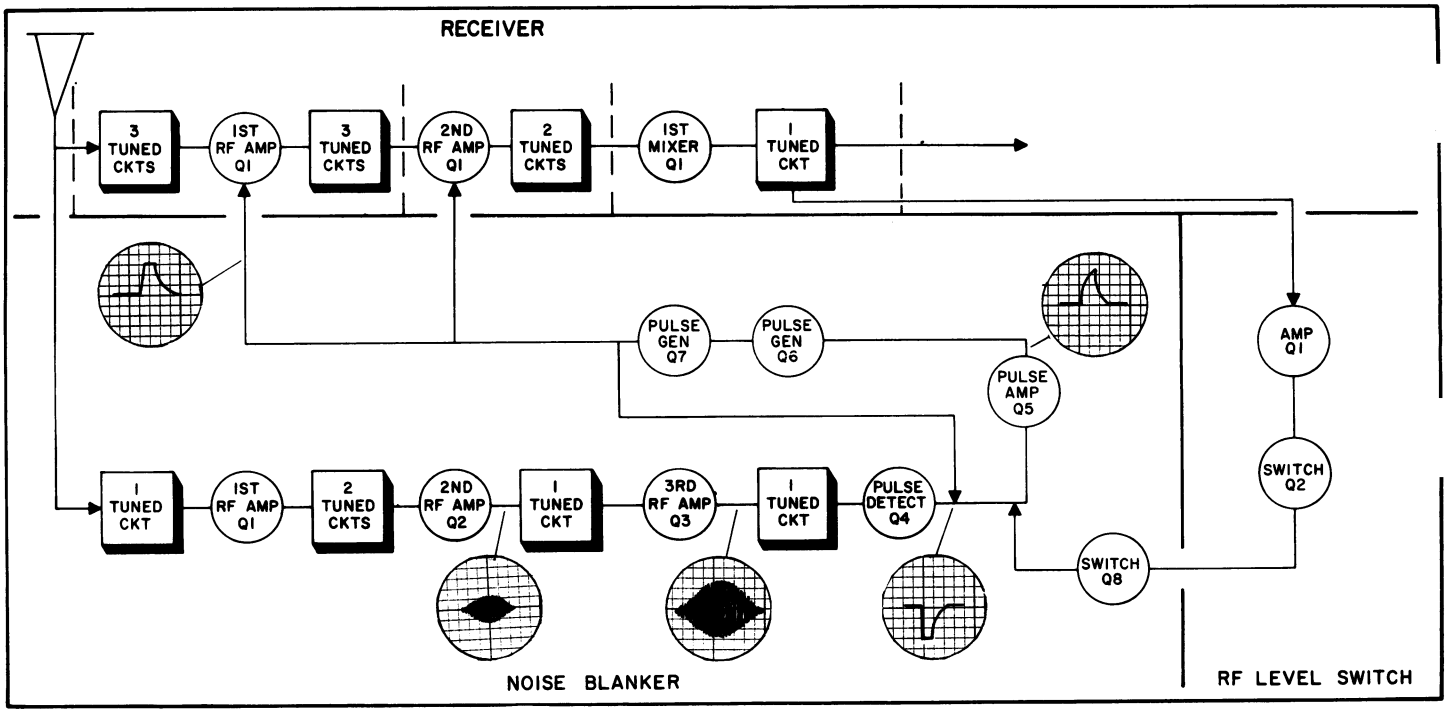


Figure 2 - Noise Blanker Block Diagram

off, which biases Q5 on, and a positive pulse appears at the output of Q5.

Q6 and Q7 form part of the one-shot multivibrator circuit. Bias voltage through R24 keeps Q6 normally turned on. The positive voltage at the collector of Q6 keeps Q7 turned off. The amplified positive-going pulse from the pulse amplifier (Q5) is fed to the base of Q6, cutting the stage off. As Q6 cuts off, Q7 is turned on; and the output is a positive-going blanking pulse. The positive blanking pulse is simultaneously fed to the emitters of A323/A324-Q1 and A303/A304-Q1, cutting off both stages for the duration of the noise pulse.

The positive blanking pulse which is fed to the emitter of 2nd RF Amplifier A303/A304-Q1 is controlled by RF Level Shut-Off Switch A333. The output of the 1st Mixer is connected through a low-pass filter network in the RF level switch circuit to the base of high IF level amplifier Q1. When the antenna signal input level exceeds 500 microvolts, the high IF level output of Q1 is sufficient to turn on level switch Q2. The output of Q2 is filtered through C7, L2 and C8 and turns on Noise Blanker (A320/A321) Switch Q8. The conduction of Q8 changes the bias of pulse amplifier Q5 and shorts the blanking pulse to ground.

When the antenna signal input is below 500 microvolts, the high IF level output of Q1 is not sufficient to turn on Q2. In this case, Noise Blanker Switch Q8 does not operate and the positive blanking pulse is fed to the emitter of the 2nd RF Amplifier (A303/A304-Q1).

The blanking pulse width is determined by R24 and C34. 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 C29, C33, CR4, R17, R18 and R21. The pulse sample is coupled through C33 and rectified by CR4. This voltage charges C29 and then discharges through R17 and R18, turning off pulse amplifier Q5. The time constant of C29, R17 and R18 are selected so that output pulses from Q7 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 amplifiers (A323/A324 and A303/A304). The six tuned circuits in the receiver provide a time delay for the RF signal, which enables the blanking pulse from the Noise Blanker to cut off both of the RF amplifiers in the receiver before the noise pulse can get there.

MAINTENANCE

MOBILE DISASSEMBLY

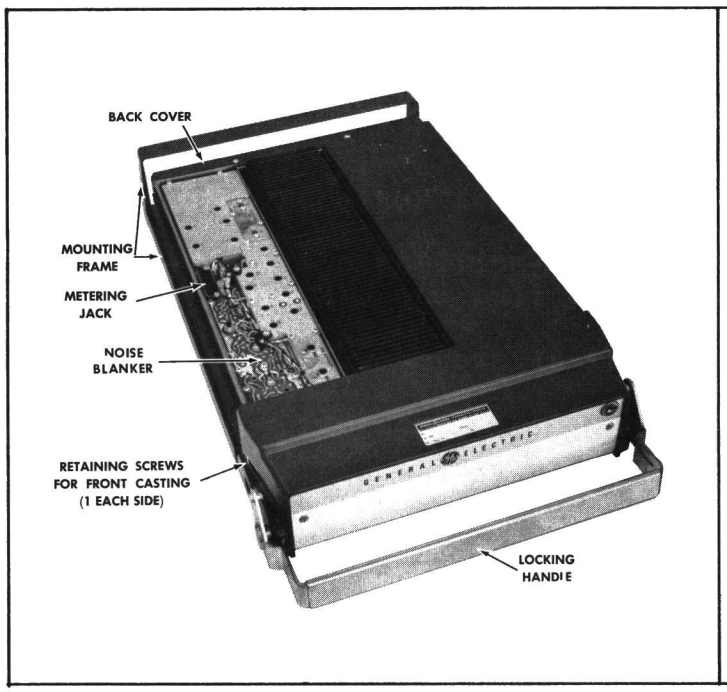


Figure 3 - Removing Top Cover

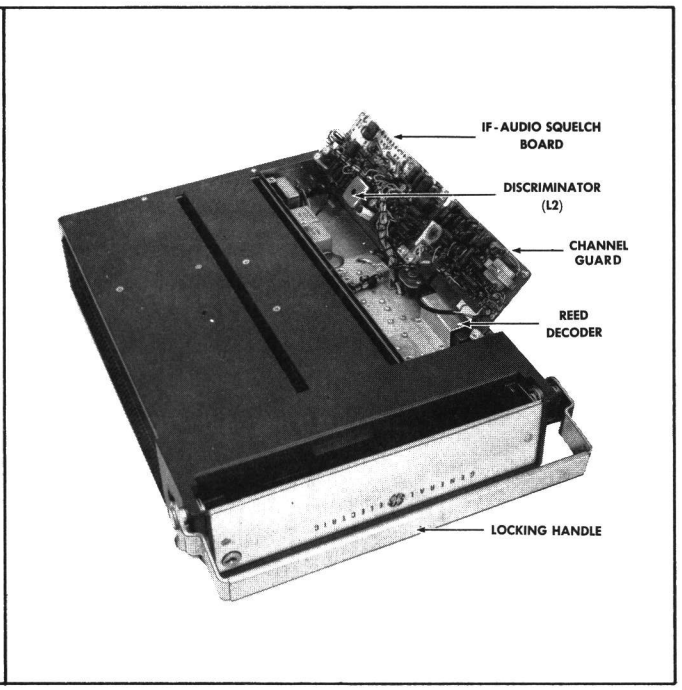


Figure 4 - Removing Bottom Cover

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.

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

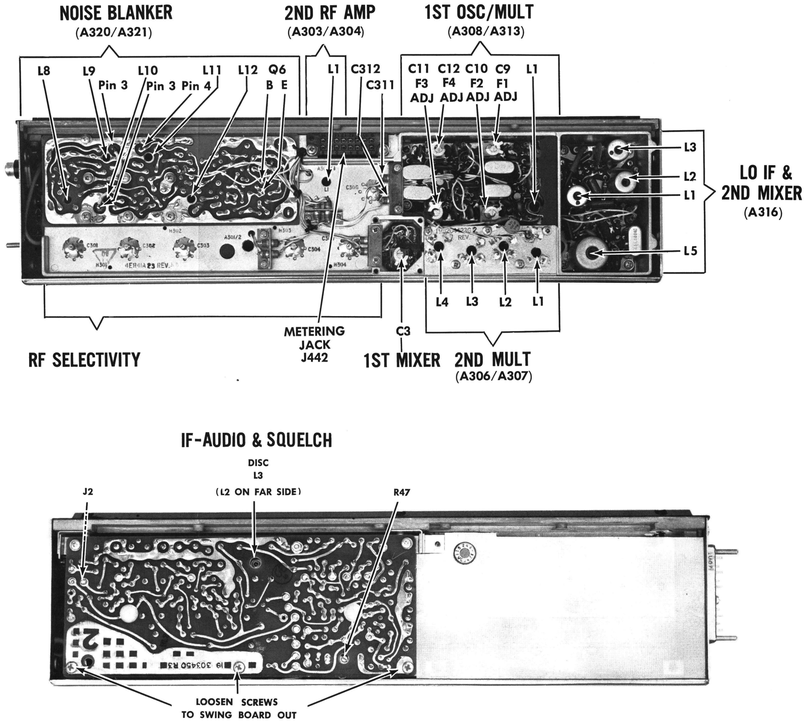
1. G-E Test Set Model 4EX3A10 (or 20,000 ohms-per-volt multimeter).
2. A 132-174 MC signal source. Connect a one-inch piece of insulated wire no larger than .065 inch to generator output probe.

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 full counterclockwise and Test Set in position G, adjust R47 on IF-AUDIO & SQUELCH BOARD for reading of 0.65 volts. If using Multimeter, connect leads to J442-1 (AUDIO-PA) and J442-8 (System Negative).
3. With Test Set in position J, check for regulated +10 volts. If using Multimeter, measure from C311 to C312.
4. If using Multimeter, connect the positive lead to J442-16 (ground).

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			OSCILLATOR AND MULTIPLIERS		
1.	D (MULT-1)	Pin 4	L1 (on 1st OSC/MULT) and L1 (on 2nd MULT)	See Procedure	Tune L1 (1st OSC/MULT) for maximum meter reading. Then tune L1 (2nd MULT) for minimum meter reading.
2.	E (MULT-2)	Pin 5	L1 (on 1st OSC/MULT) and L1 (on 2nd MULT)	Maximum	Tune L1 (1st OSC/MULT) and L1 (2nd MULT) for maximum meter reading.
3.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal into Hole 304. Adjust the signal generator for discriminator zero.
4.	B (2nd IF AMP)	Pin 2	L2, L3 and L4 (on 2nd MULT)	Maximum	Apply an on-frequency signal as above. Tune L2, L3 and L4 for maximum meter reading, keeping signal below saturation.
			RF AMPLIFIER		
5.	B (2nd IF AMP)	Pin 2	C301, C302, C303, C304 and C305	Maximum	Apply an on-frequency signal to the antenna jack. Tune C301 through C305 for maximum meter reading, keeping signal below saturation.
			FREQUENCY ADJUSTMENT		
6.	A (DISC)	Pin 10	C9 on 1st OSC/MULT (C10, C11 and 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 and 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

EQUIPMENT REQUIRED

1. G-E Test Set Model 4EX3A10 (or 20,000 ohms-per-volt multimeter).
2. A 455 KC and 132-174 MC signal source. Connect a one-inch piece of insulated wire no larger than .065 inch to generator output probe.
3. Two 22,000-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 on 1ST OSC/MULT Board to mid-capacity. In multi-frequency receivers, set C10, C11 or C12 to mid-capacity as required.
3. In multi-frequency receivers where the maximum frequency spacing is less than 200 KC, align the unit on channel F1. If the frequency spacing is greater than 200 KC, align the receiver on the center frequency.
4. Adjust all slugs on Noise Blanker (A320/A321) to bottom of coil (closest to printed wiring board)
6. With VOLUME control fully counterclockwise and Test Set in position G, adjust R47 on IF-AUDIO & SQUELCH Board for reading of 0.65 volts. If using multimeter, connect leads to J442-1 (Audio PA) and J442-8 (System Negative).
7. With Test Set in position J, check for regulated +10 volts. If using multimeter, measure from C311 to C312.
8. If using multimeter, connect the positive lead to J442-16 (ground).
9. After alignment is completed, refer to Noise Blanker troubleshooting sheet for performance check.

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			DISCRIMINATOR		
1.	A (DISC)	Pin 10	L3 (Bottom slug on IF-AUDIO & SQUELCH Board)	Zero	Apply a 455-KC signal to A317/A318-J2 and adjust L3 (disc secondary) for zero meter reading.
2.	A (DISC)	Pin 10	L2 (top) and L3 (bottom slug on IF-AUDIO & SQUELCH Board)	1.7 v (2.1 v max)	Switch Test Set to TEST 3 position. Then alternately apply a 445-KC and 465-KC signal while adjusting L2 and L3 for readings of at least 1.7 volts, but not more than 2.1 volts. Both readings must be within 0.1 volt.
			OSCILLATOR AND MULTIPLIERS		
3.	D (MULT-1)	Pin 4	L1 (1ST OSC/MULT) and L1 (2ND MULT)	See Procedure	Tune L1 on 1ST OSC/MULT for maximum meter reading. Then tune L1 on 2ND MULT for minimum meter reading.
4.	E (MULT-2)	Pin 5	L1 (1ST OSC/MULT) and L1 (2ND MULT)	Maximum	Tune L1 on 1ST OSC/MULT and L1 on 2nd MULT for maximum meter reading.
5.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal to Hole 304. Adjust the signal generator for discriminator zero.
6.	B (2nd IF AMP)	Pin 2	L2, L3 and L4 (2ND MULT)	Maximum	Apply signal as above. Tune L2, L3 and L4 for maximum meter reading, keeping signal below saturation.
			RF AMPLIFIER & SELECTIVITY		
7.	B (2ND IF AMP)	Pin 2	L1 (2ND RF AMP) C301, C302, C303, C304, C305 and C306 (RF SELECTIVITY)	Maximum	Apply an on-frequency through RF probe and tune circuits as shown below, keeping signal below saturation. Apply Signal Generator Probe To: / Tune: Hole 304 — C306, L1 (2ND RF AMP) and C305 Hole 303 — C304 Hole 302 — C303 Hole 301 — C302, C301
8.	B (2nd IF AMP)	Pin 2	C301 through C306, L1 (2ND RF AMP)	Maximum	Apply an on-frequency signal to antenna jack J441. Tune C301 through C306, and L1 (2ND RF AMP) for maximum meter reading, keeping signal below saturation.
			MIXERS AND LO IF*		
9.	B (2nd IF AMP)	Pin 2	C5 (1ST MIXER)	Maximum	Apply signal as above, and tune C5 for maximum meter reading, keeping signal below saturation.
10.	"	"	L5 (2ND MIXER)	Maximum	Apply signal as above, and tune T5 for maximum meter reading, keeping signal below saturation.
11.	B (2nd IF AMP)	Pin 2	L1, L2 and L3 (Lo IF MIXER)	Maximum	With one end of the 22,000-ohm resistors to ground, load and peak as follows: Load L2 at point B--Peak L1 and L2. Load L1 and L2 at Points A and C--Peak L2.
			NOISE BLANKER		
12.	H (BLANKER)	Pin 11 (+) and Pin 16 (+)	L8, L9, L10, L11 and L12 (on NOISE BLANKER)	Maximum	Connect a probe to a signal generator and touch probe to pin 4 of L11. Adjust generator frequency to 10 MC above receiver operating frequency in the 132 - 148 MC range, to 20 MC above receiver operating frequency in the 148 - 158 MC range, to receiver operating frequency in the 158 - 158 MC range, and arbitrarily to 154 MC in the 164-174 MC receiver frequency range. Peak all circuits as follows: Apply Signal Generator Probe To: / Tune: Pin 4 of L11 — L12 (2nd peak) Pin 3 of L10 — L11 (1st peak) Pin 3 of L9 — L10 (1st peak) Antenna Jack J441 — L9 and L8 (1st peak)
13.	"	"	"	"	Apply signal as above to antenna jack J441. Retune L8 through L12 for maximum meter reading.
14.	"	"	"	.05 v	Apply a 1,000-microvolt signal on blanker frequency to antenna jack J441. An indication should be observed on the test set.
			FREQUENCY ADJUSTMENT		
15.	A	Pin 10	C9 (on 1ST OSC/MULT) C10, C11 and C12 for multi-frequency	Zero	Apply an on-frequency signal to antenna jack J441. 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.

TEST PROCEDURES

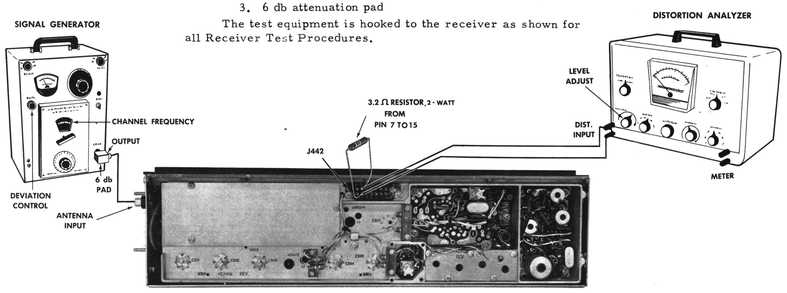
These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect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

TEST EQUIPMENT REQUIRED

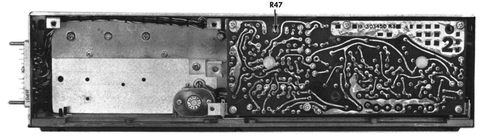
for test hookup shown:

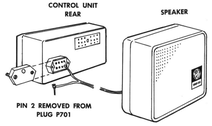
1. Distortion Analyzer similar to: Heath # 1M-12
2. Signal Generator similar to: Measurements # M-560
3. 6 db attenuation pad

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



COMPONENT BOARD WIRING VIEW





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 cycles ±3.3 KC 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 ±6 KC (but less than ±9 KC).

SERVICE CHECK

If the Modulation Acceptance Bandwidth test does not indicate the proper width, check the following:

1. Make gain measurements as shown on the Receiver Troubleshooting Procedure.
2. Voltage reading of Limiter (Q4) should read 0.4 volts RMS with a one-microvolt input signal on Test Set Meter or 0.9 volts with voltmeter. (Measure at J442-2).

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 Q301 output current at J442-1. If reading is low-- a. Check BIAS ADJ for 0.65 VDC at J442-1 and -8 (STEP 2). b. Check Q301. 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 KC.

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 CYCLE SIGNAL WITH 2.3 KC 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.

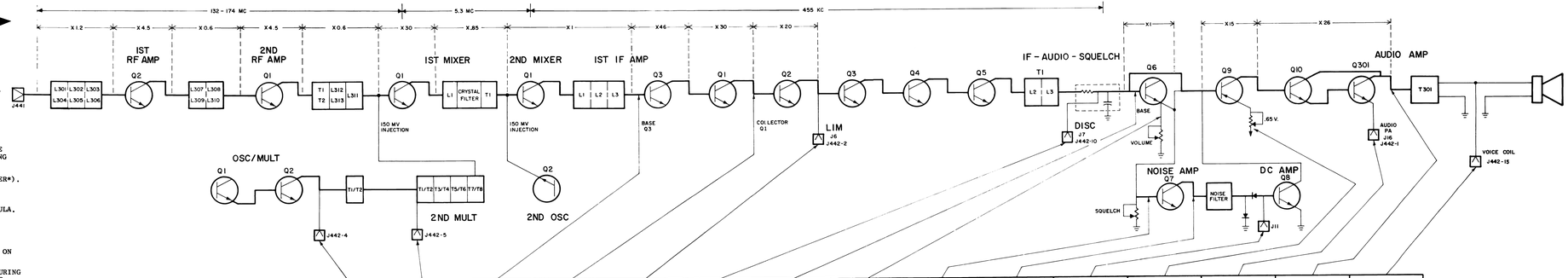
STEP 2- SIMPLIFIED VTVM GAIN CHECKS

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.

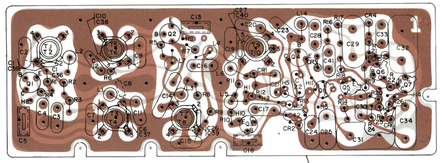


SIGNAL GENERATOR INPUT: MAINTAIN SETTING AT DISCRIMINATOR ZERO			UNMODULATED	UNMODULATED	0.5 MICROVOLT UNMODULATED	STANDARD SIGNAL-(1 MILLIVOLT AT RCVR FREQ. MODULATED BY 1KC WITH 3.5KC DEVIATION)	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	NO SIGNAL	NO SIGNAL	STANDARD SIGNAL	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 IN FULL COUNTER-CLOCKWISE POSITION			ADJUST VOLUME CONTROL FOR RATED 2 WATT OUTPUT ACROSS 3.2 OHM LOAD
READING	1.0 VDC	0.4 VDC	GENERATOR OUTPUT SHOULD BE APPROX. 150 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX. 30 MICROVOLTS	2.5 VDC	0.1 VAC	0.5 VAC	0.5 VAC	0.07 VAC	2.5 VDC	2.0 VDC	ADJUST FOR 0.65VDC WITH VTVM ON J442-1 AND J442-8	0.65 VDC	8.5 VAC	2.53 VAC

RC-1330B

NOISE BLANKER

A320 (132-150.8 MC)
A321 (150.8-174 MC)

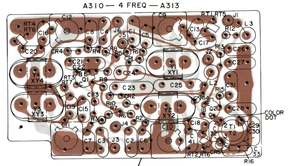


(198204405, Sh. 1, Rev. 1)
(198204405, Sh. 2, Rev. 1)

TRANSISTOR	EMITTER		BASE		COLLECTOR	
A320/321	—	+	—	+	—	+
Q1	20Ω	36Ω	1.6K	36Ω	36Ω	500Ω
Q2	100Ω	36Ω	1.5K	65Ω	30Ω	36Ω
Q3	200Ω	36Ω	1.6K	36Ω	36Ω	500Ω
Q4	100Ω	100Ω	11K	2.6K	5K	6K
Q5	1K	1K	3.3K	75K	3.3K	3.3K
Q6	0	0	3K	16.5K	330Ω	600Ω
Q7	4Ω	260Ω	330Ω	600Ω	370Ω	200Ω

1ST OSCILLATOR/MULTIPLIER

132-150.8MC 150.8-174MC
A308 — 1 FREQ — A311
A309 — 2 FREQ — A312
A310 — 4 FREQ — A313



(198204412, Sh. 1, Rev. 1)
(198204412, Sh. 2, Rev. 1)

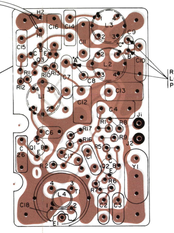
TO J4 ON IF-AUDIO & SQUELCH BOARD

P2
P1

TO J5 ON IF-AUDIO & SQUELCH BOARD

2ND MIXER

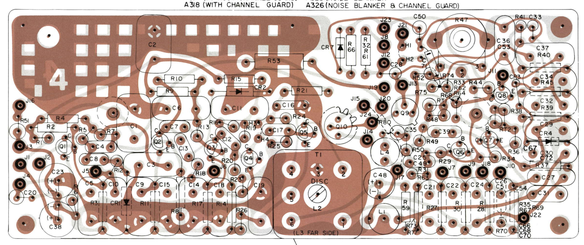
A316



(198204441, Sh. 1, Rev. 0)
(198204441, Sh. 2, Rev. 0)

IF-AUDIO & SQUELCH BOARD

A317 (WITHOUT CHANNEL GUARD) A325 (NOISE BLANKER
A318 (WITH CHANNEL GUARD) A326 (NOISE BLANKER & CHANNEL GUARD)



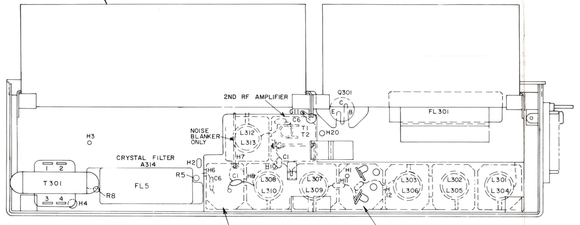
(19C303451, Sh. 1, Rev. 4)
(19C303451, Sh. 2, Rev. 4)

TRANSISTOR	EMITTER		BASE		COLLECTOR	
A308 313-01	—	+	—	+	—	+
A308 313-02	1K	1K	6.1K	2.8K	100Ω	100Ω
A325-01	730Ω	153Ω	1K	160Ω	100Ω	100Ω
A326/327-01	2.7K	2.7K	7.5K	3.8K	8.6K	1.6K
A326/327-02	2900Ω	270Ω	2900Ω	2900Ω	100Ω	100Ω
A316-01	3.8K	5.3K	8.1K	2.9K	200Ω	200Ω
A316-02	2.7K	6.8K	9.1K	2.7K	200Ω	200Ω
A316-03	2.2K	2.3K	2.3K	2.2K	2.7K	3.2K
A317-01	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A317-02	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A317-03	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A317-04	2.1K	2K	13.5K	4.1K	4.1K	5.2K
A317-05	1.0K	1.0K	12.1K	2.8K	350Ω	350Ω
A317-06	∞1.2K	MEG	36.0K	2.5K	0	0
A317-07	1.7K	1.7K	11.0K	4.0K	7.0K	10K
A317-08	180Ω	180Ω	100K	2.8K	11.0K	15K
A317-09	2.2K	2.2K	6.1K	45K	2.3K	2.3K
A317-010	90Ω	35Ω	2.2K	2.3K	90Ω	36Ω
A30/323-Q30	1Ω	1Ω	40Ω	35Ω	40Ω	36Ω

* READINGS MAY VARY DUE TO DIFFERENCES IN TRANSISTORS.

(198620737, Rev. 28)

BOTTOM VIEW



TRANSISTOR	EMITTER		BASE		COLLECTOR	
A319/322	—	+	—	+	—	+
Q1	56Ω	56Ω	8.3K	1650Ω	6.5K	8.3K
Q2	270Ω	270Ω	8K	500Ω	5K	5.5K
Q3	1K	1K	75K	3K	1K	1K
Q4	0	0	11K	450Ω	1K	1K
Q5	0	0	11K	45Ω	1K	1K
Q6	20Ω	20Ω	4.5K	85Ω	2K	2K

TOP VIEW

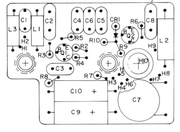
CENTRALIZED METERING JACK

A305/A334

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

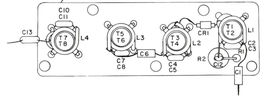
LEVEL SHUT OFF SWITCH

A333



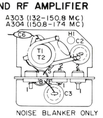
2ND MULTIPLIER

A306 (132-150.8MC)
A307 (150.8-174 MC)



2ND RF AMPLIFIER

A303 (132-150.8 MC)
A304 (150.8-174 MC)



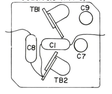
NOISE BLANKER ONLY

1ST MIXER

A334/A335

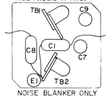
1ST RF AMPLIFIER

A301 (132-150.8MC)
A302(150.8-174 MC)



1ST RF AMPLIFIER

A323 (132-150.8MC)
A324 (150.8-174MC)



NOISE BLANKER ONLY

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 C311-1 (+12V) TO C312-1 (-12), AND ARE MEASURED FROM TRANSISTOR PINS TO C311-1, + OR — SIGNS SHOW METER LEAD TO C311-1.

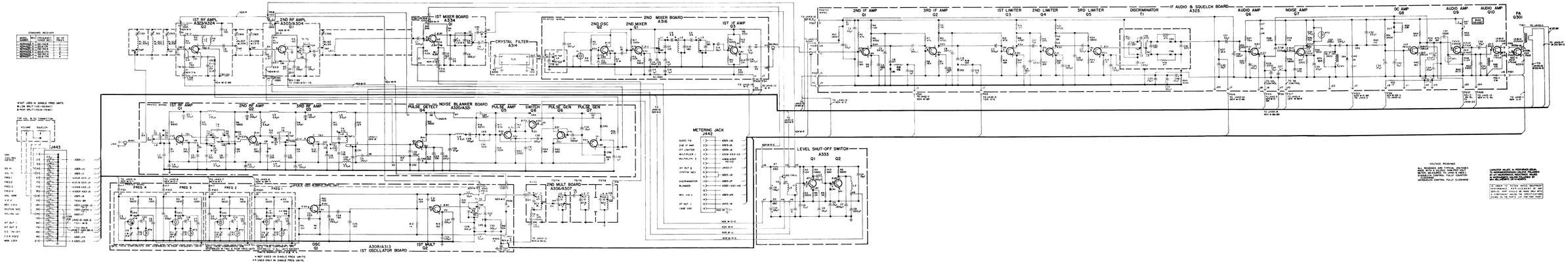
CAUTION

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:
1-100 Ω	X 1
100-1K Ω	X 10
1K-50K Ω	X 1,000
50K Ω	X 100,000

OUTLINE DIAGRAM

132 — 174 MC RECEIVER
MODELS 4ER41A22-33 &
MODELS 4ER41A40-45



SCHEMATIC DIAGRAM

132 — 174 MC RECEIVER
MODELS 4ER41A22-27
(WITH NOISE BLANKER)

PARTS LIST

LBI-3584B

132-174 MC RECEIVER WITH NOISE BLANKER
MODELS 42EA11A22 - 42EA11A27
(PL-19E500810 G13-18)
REV Y

SYMBOL	G-E PART NO.	DESCRIPTION
A301*		RF AMPLIFIER ASSEMBLY
	A301*	PL-19C303414-G1 (42EA11A22, 24, 26) DELETED BY REV X
	A302*	PL-19C303414-G2 (42EA11A23, 25, 27) DELETED BY REV X
		- - - - - - - - - CAPACITORS - - - - - - - -
C1	7489162-P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C2 and C3	5493392-P107	Ceramic, stand-off: .001 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type 535A.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4038642-P1	Germanium.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115342-P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R152-P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R2	3R152-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R3	3R152-P471J	Composition: 470 ohms ±5%, 1/4 w.
R4	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1 and T2		COIL ASSEMBLY
	T1	PL-19A121087-G1 (42EA11A22, 24, 26)
	T2	PL-19A121076-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C4	5496218-P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A22, 24 and 26).
C5	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A23, 25 and 27).
C6	5496218-P238	Ceramic disc: 7 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - IF AMPLIFIER TRANSFORMERS - - - - - - - -
L1	19A121086-P1	Coil. Includes tuning slug 5491798-P5.
A305*		FIRST MIXER ASSEMBLY PL-19B202440-G1 Deleted by Rev U
		- - - - - - - - CAPACITORS - - - - - - - -
C1 and C2	5494481-P14	Ceramic disc: .002 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C3	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf 750 v peak; sim to EF Johnson 189-6-5.
C4	5496218-P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C5	5494481-P14	Ceramic disc: .002 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C6	5494481-P12	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C7	5496219-P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - TERMINALS - - - - - - - -
E1	4038104-P1	Lug: solder dipped brass.
		- - - - - - - - INDUCTORS - - - - - - - -
L1	PL-19A121082-G1	Toroidal coil.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115342-P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R2	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
C7*	19C301246-P1	Variable, ceramic dielectric: approx 2-8 pf, temp coef 0 PPM, 350 VDCW; sim to Erie Style 538. Deleted by Rev J.
		- - - - - DIODES AND RECTIFIERS - - - - -
CR1*	4038056-P1	Germanium: sim to G-E Dwg 44A231600 Rev 3.
	4038643-P1	In Models earlier than Rev E: Germanium.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1*	19A115666-P1	Silicon, In Rev J and earlier: Silicon, NPN.
	19A115342-P1	
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w.
R2	3R152-P222J	Composition: 2200 ohms ±5%, 1/4 w.
R3	3R153-P470K	Composition: 47 ohms ±10%, 1/4 w.
R4	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R5*	3R152-P200J	Composition: 20 ohms ±5%, 1/4 w. Deleted by Rev K.
R6*	3R152-P562K	Composition: 5600 ohms ±10%, 1/4 w. Added by Rev K. Deleted by Rev X.
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1 and T2		COIL ASSEMBLY
	T1	PL-19A121087-G1 (42EA11A22, 24, 26)
	T2	PL-19A121076-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C4	5496218-P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A22, 24 and 26).
C5	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A23, 25 and 27).
C6	5496218-P238	Ceramic disc: 7 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
L1	19A121086-P1	Coil. Includes tuning slug 5491798-P5.
A306 and A307		MULTIPLIER ASSEMBLY
	A306	PL-19B204423-G1 (42EA11A22, 24, 26)
	A307	PL-19B204423-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C1	5491601-P120	Tubular: 1 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C6	5491601-P107	Tubular: 0.27 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C12	5493392-P7	Ceramic, feed-thru: .003 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type 535C.
C13	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - CAPACITORS - - - - - - - -
C1	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C2	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap. (Used in Models 42EA11A26-27).
C3 and C4	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap. (Used in Models 42EA11A26 and 27).
C5	5496219-P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C6	5496219-P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM. (Used in Models 42EA11A26-27).
C7 and C8	5496219-P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM. (Used in Models 42EA11A26 and 27).
C9	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C10	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5. (Used in Models 42EA11A26-27).
C11 and C12	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5. (Used in Models 42EA11A26 and 27).
C13	5496219-P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C14	5496219-P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 42EA11A26-27).
C15 and C16	5496219-P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 42EA11A26 and 27).
C17	19C300685-P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C18	19C300685-P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 42EA11A26-27).
C19 and C20	19C300685-P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 42EA11A26 and 27).
C21	5496219-P771	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -750 PPM.
C23	5494481-P114	Ceramic disc: .002 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C24	5490008-P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C25	5496219-P467	Ceramic disc: 150 pf ±5%, 500 VDCW, temp coef -220 PPM.
C26 thru C28	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C31	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
L1	19A121094-P1	Coil. Includes tuning slug 5491798-P5.
T5* and T6		COIL ASSEMBLY
	T5	PL-19A121097-G1 (42EA11A22, 24, 26)
	T6	PL-19A121097-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C7	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A22, 24 and 26).
C8	5496218-P238	Ceramic disc: 7 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A23, 25 and 27).
		- - - - - - - - INDUCTORS - - - - - - - -
L3	19A121096-P1	Coil. Includes tuning slug 5491798-P5.
R3*	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w. Deleted by Rev L.
R4	3R152-P103J	Composition: 1000 ohms ±5%, 1/4 w.
R10*	3R152-P243J	Composition: 24K ±5%, 1/4 w. In Rev K and earlier:
	3R152-P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R11*	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w. Added by Rev L.
A306 and A307		MULTIPLIER ASSEMBLY
	A306	PL-19B204423-G1 (42EA11A22, 24, 26)
	A307	PL-19B204423-G2 (42EA11A23, 25, 27)
		- - - - - - - - INDUCTORS - - - - - - - -
L4	19A121110-P1	Coil. Includes tuning slug 5491798-P5.
A308 thru A313		FIRST OSCILLATOR ASSEMBLY
	A308	PL-19B204419-G1 (42EA11A22)
	A309	PL-19B204419-G2 (42EA11A24)
	A310	PL-19B204419-G3 (42EA11A25)
	A311	PL-19B204419-G4 (42EA11A23)
	A312	PL-19B204419-G5 (42EA11A26)
	A313	PL-19B204419-G6 (42EA11A27)
L2 and L3	7488079-P16	Choke, RF: 10 µh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7.
Q1 and Q2	19A115330-P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R153-P563J	Composition: 5600 ohms ±5%, 1/4 w.
R2	3R153-P562J	Composition: 5600 ohms ±5%, 1/4 w. (Used in Models 42EA11A26-27).
R3 and R4	3R152-P562J	Composition: 5600 ohms ±5%, 1/4 w. (Used in Models 42EA11A26 and 27).
R5*	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. Deleted from Models 42EA11A22 and 23 by Rev H.
R6	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 42EA11A22-23).
R7 and R8	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 42EA11A24-27).
R9	3R153-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R13	3R153-P103J	Composition: 1000 ohms ±5%, 1/4 w.
R12	3R153-P151J	Composition: 150 ohms ±5%, 1/4 w.
R14	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R19*	3R152-P360J	Composition: 36 ohms ±5%, 1/4 w. Added to Models 42EA11A22 and 23 by Rev H.
		- - - - - - - - THERMISTORS - - - - - - - -
RT1	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green.
RT2	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green. (Used in Models 42EA11A24-27).
RT3 and RT4	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green. (Used in Models 42EA11A26 and 27).
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1 and T2		COIL ASSEMBLY
	T1	PL-19B204421-G1 (42EA11A22, 24, 26)
	T2	PL-19B204421-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C29	5496218-P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A22, 24 and 26).
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1*	19A115348-P1	Silicon, Deleted from Models 42EA11A22 and 23 by Rev N.
CR2	19A115348-P1	Silicon. (Used in Models 42EA11A24-27).
CR3 and CR4	19A115348-P1	Silicon. (Used in Models 42EA11A26 and 27).
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J1 and J2	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J3 and J4	4033513-P4	Contact, electrical: sim to Bead Chain L93-3. (Used in Models 42EA11A24-27).
J5	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J6	4033513-P4	Contact, electrical: sim to Bead Chain L93-3. (Used in Models 42EA11A24-27).
XY1		Refer to Mechanical Parts (MC-1167).
XY2		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A24-27).
XY3 and XY4		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A26 and 27).
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1 and Q2	19A115330-P1	Silicon, NPN.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R153-P563J	Composition: 5600 ohms ±5%, 1/4 w.
R2	3R153-P562J	Composition: 5600 ohms ±5%, 1/4 w. (Used in Models 42EA11A26-27).
R3 and R4	3R152-P562J	Composition: 5600 ohms ±5%, 1/4 w. (Used in Models 42EA11A26 and 27).
R5*	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. Deleted from Models 42EA11A22 and 23 by Rev H.
R6	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 42EA11A22-23).
R7 and R8	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 42EA11A24-27).
R9	3R153-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R13	3R153-P103J	Composition: 1000 ohms ±5%, 1/4 w.
R12	3R153-P151J	Composition: 150 ohms ±5%, 1/4 w.
R14	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R19*	3R152-P360J	Composition: 36 ohms ±5%, 1/4 w. Added to Models 42EA11A22 and 23 by Rev H.
		- - - - - - - - THERMISTORS - - - - - - - -
RT1	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green.
RT2	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green. (Used in Models 42EA11A24-27).
RT3 and RT4	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green. (Used in Models 42EA11A26 and 27).
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1 and T2		COIL ASSEMBLY
	T1	PL-19B204421-G1 (42EA11A22, 24, 26)
	T2	PL-19B204421-G2 (42EA11A23, 25, 27)
		- - - - - - - - CAPACITORS - - - - - - - -
C29	5496218-P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A22, 24 and 26).
C30	5496218-P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A23, 25 and 27).
C32	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C33	5494481-P12	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
C85	5491705-P2	Silicon.
		- - - - - - - - INDUCTORS - - - - - - - -
L1	19A121093-P1	Coil. Includes tuning slug 5491798-P5.
		- - - - - - - - RESISTORS - - - - - - - -
R16	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w.
		- - - - - - - - SOCKETS - - - - - - - -
XY1		Refer to Mechanical Parts (MC-1167).
XY2		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A24-27).
XY3 and XY4		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A26 and 27).
		- - - - - - - - CRYSTALS - - - - - - - -
		When reordering give G-E Part No, and specify exact freq needed.
C4*	19B209243-P7	Polyester dielectric: 0.1 pf ±20%, 40 VDCW. In Rev N and earlier:
	5491189-P106	Polyester dielectric:0.1 pf ±20%, 50 VDCW.
C5*	19B209243-P4	Polyester dielectric: .033 pf ±20%, 40 VDCW. Deleted by Rev S. In Rev N and earlier:
	5491189-P103	Polyester dielectric: .033 pf ±20%, 50 VDCW.
C6	5496219-P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C7*	5496219-P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef 150 PPM. In Models of Rev M:
	5496219-P566	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -330 PPM. In Rev L and earlier:
	5496219-P667	Ceramic disc: 120 pf ±5%, 500 VDCW, temp coef -470 PPM.
C8* and C9*	5491601-P140	Tubular, molded: 3.6 pf ±5%, 500 VDCW. In Rev N and earlier:
	5491601-P28	Tubular, molded: 2.7 pf ±10%, 500 VDCW.
C10* and C11*	5496219-P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef 150 PPM. In Models of Rev M:
	5496219-P566	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -330 PPM. In Rev L and earlier:
	5496219-P666	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -470 PPM.
C12* and C13*	19B209243-P7	Polyester dielectric: 0.1 pf ±20%, 40 VDCW. In Rev N and earlier:
	5491189-P106	Polyester dielectric: 0.01 pf ±20%, 50 VDCW.
C14* and C15*	19B209243-P1	Polyester dielectric: 0.01 pf ±20%, 40 VDCW. In Rev N and earlier:
	5491189-P101	Polyester dielectric: 0.01 pf ±20%, 50 VDCW.
C16*	19B209243-P5	Polyester dielectric: .047 pf ±20%, 40 VDCW. In Rev N and earlier:
	5491189-P104	Polyester dielectric: .047 pf ±20%, 50 VDCW.
C17	5494481-P112	Ceramic disc: .001 pf ±10%, 500 VDCW.
C26*	19A115028-P104	Polyester: .0047 pf ±20%, 200 VDCW. Deleted by Rev Y.
R5	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w.
A314*		CRYSTAL FILTER ASSEMBLY PL-19B204616-G3 In Models of Rev C thru Rev K
		- - - - - - - - FILTERS - - - - - - - -
FL5 and FL6	PL-19C304094-G4	Bandpass filter.
J1 and J2	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
C30	5496218-P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 42EA11A23, 25 and 27).
C32	5496218-P34	Ceramic disc: 3 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C33	5494481-P12	Ceramic disc: .001 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
C85	5491705-P2	Silicon.
		- - - - - - - - INDUCTORS - - - - - - - -
FL1 and FL2	PL-19C304094-G1	Bandpass filter.
L1	19A121093-P1	Coil. Includes tuning slug 5491798-P5.
		- - - - - - - - RESISTORS - - - - - - - -
R16	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w.
		- - - - - - - - SOCKETS - - - - - - - -
XY1		Refer to Mechanical Parts (MC-1167).
XY2		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A24-27).
XY3 and XY4		Refer to Mechanical Parts (MC-1167). (Used in Models 42EA11A26 and 27).
		- - - - - - - - CRYSTALS - - - - - - - -
		When reordering give G-E Part No, and specify exact freq needed.
Y1	19B206576-P4	Quartz: freq range 14082.222 to 16171.111 KC, temp range -30°C to +65°C. (Used in Models 42EA11A22, 24 and 26).
Y1	19B206576-P5	Quartz: freq range 16171.111 to 18748.888 KC, temp range -30°C to +65°C. (Used in Models 42EA11A23, 25 and 27).
Y2	19B206576-P4	Quartz: freq range 14082.222 to 16171.111 KC, temp range -30°C to +65°C. (Used in Models 42EA11A24 and 26).
Y2	19B206576-P5	Quartz: freq range 16171.111 to 18748.888 KC, temp range -30°C to +65°C. (Used in Models 42EA11A23-27).
Y3 and Y4	19B206576-P4	Quartz: freq range 14082.222 to 16171.111 KC, temp range -30°C to +65°C. (Used in Models 42EA11A27).
Y3 and Y4	19B206576-P5	Quartz: freq range 16171.111 to 18748.888 KC, temp range -30°C to +65°C. (Used in Model 42EA11A27).
A314*		CRYSTAL ASSEMBLY PL-19B204616-G4 Added by Rev L
		- - - - - - - - FILTERS - - - - - - - -
FL5*	PL-19B206692-G1	Bandpass filter.
	PL-19C304094-G4	In Models earlier than Rev Y: Bandpass filter.
FL6*	PL-19C304094-G4	Bandpass filter. (Deleted by Rev Y).
		- - - - - - - - RESISTORS - - - - - - - -
R2*	3R152-P102K	Composition: 10000 ohms ±10%, 1/4 w. Deleted by Rev Y.
R5	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w.
A314*		CRYSTAL FILTER ASSEMBLY PL-19B204616-G3 In Models of Rev C thru Rev K
		- - - - - - - - FILTERS - - - - - - - -
FL5 and FL6	PL-19C304094-G4	Bandpass filter.
J1 and J2	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
L1*	19C311181-G5	Coil, In Rev W and earlier:
	PL-19C303464-G1	Coil, Includes tuning slug 7160519-P2.
L2*	19C311181-G6	Coil, In Rev W and earlier:
	19C303464-G2	Coil, Includes tuning slug 7160519-P2.
L3*	19C311181-G7	Coil, In Rev W and earlier:
	19C303464-G3	Coil, Includes tuning slug 7160519-P2.
L4*		(Part of L3). Deleted by Rev N.
L5*		(Part of T1). Changed by Rev N to: (Part of T1).
L6		
		- - - - - - - - - PLUGS - - - - - - - - -
P1	4029840-P2	Contact, electrical: sim to Amp 42827-2.
P2	4029840-P1	Contact, electrical: sim to Amp 41854.
		- - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115245-P1	Silicon, NPN.
Q2 and Q3	19A115123-P1	Silicon, NPN: sim to Type 2N2712.
		- - - - - - - - RESISTORS - - - - - - - -
R1	3R152-P153K	Composition: 1500 ohms ±10%, 1/4 w.
R2	3R152-P393K	Composition: 3900 ohms ±10%, 1/4 w.
R3*	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w. Deleted by Rev D.
R4*	3R152-P333K	Composition: 33,000 ohms ±10%, 1/4 w. Deleted by Rev D.
R5 and R6	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R7	3R152-P513J	Composition: 5100 ohms ±5%, 1/4 w.
R8	3R152-P392J	Composition: 3900 ohms ±5%, 1/4 w.
R9	3R152-P302J	Composition: 3000 ohms ±5%, 1/4 w.
R10	3R152-P302J	Composition: 3000 ohms ±5%, 1/4 w.
R11	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w.
R12	3R152-P302J	Composition: 3000 ohms ±5%, 1/4 w.
R13	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R15*	3R152-P153K	Composition: 15,000 ohms ±10%, 1/4 w. Added by Rev D. Deleted by Rev Y.
R16*	3R152-P104K	Composition: 100,000 ohms ±10%, 1/4 w. Added by Rev D.
R17*	3R152-P394K	Composition: 390,000 ohms ±10%, 1/4 w. Added by Rev D.
		- - - - - - - - TRANSFORMERS - - - - - - - -
T1		COIL ASSEMBLY PL-19B204414-G1
		- - - - - - - - CAPACITORS - - - - - - - -
C18	5496219-P261	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -80 PPM.
	5491799-P3	Tuning slug.
		- - - - - - - - CRYSTALS - - - - - - - -
Y1*	19A110192-P3	Quartz: freq 4845 KCS ±100 cps at 25°C, temp range -30° to +75°C. In Models of Rev B or earlier:
	19A110192-P1	Quartz: freq 4805 KCS ±100 cps at 25°C, temp range -30° to +75°C.

*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.

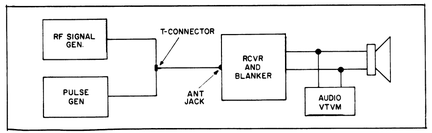


Figure 1 - Equipment Connection Diagram

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 cps and adjust the output level control on pulse generator until receiver sensitivity is degraded as much as possible (approximately 25 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 J441. 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 Q6 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-KC 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 with an oscilloscope. The repetition rate of the pulse generator (on noise blanker) should not increase over 2 KC or decrease under 1 KC. (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.

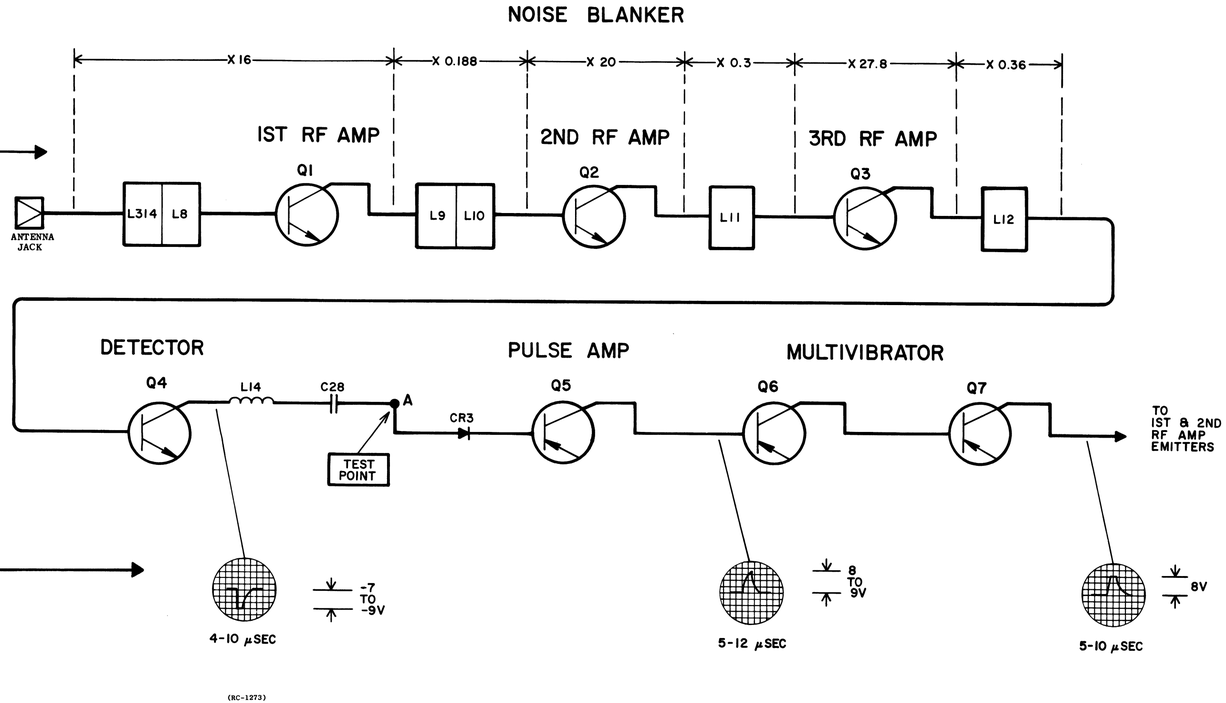
STEP 3—WAVE FORMS

Equipment Required:

Oscilloscope
Noise Generator

Procedure:

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



SYMBOL	G-E PART NO	DESCRIPTION
		NOISE BLANKER
A320 and A321		A320 PL-19C303408-G1 (4EA41A22, 24, 26) A321 PL-19C303408-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C3 and C4	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C5	5492056-P3	Uncased silver mica: 250 pf ±10%, 500 VDCW; sim to Underwood Type J-1-HF.
C8	5491601-P23	Tubular: 1.5 pf ±10%, 500 VDCW; sim to Quality Components Type MC.
C11 and C12	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C13	5492056-P3	Uncased silver mica: 250 pf ±10%, 500 VDCW; sim to Underwood Type J-1-HF.
C14	5496219-P21	Ceramic disc: 100 pf ±10%, 500 VDCW, temp coef 0 PPM.
C16 and C17	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C18	5492056-P3	Uncased silver mica: 250 pf ±10%, 500 VDCW; sim to Underwood Type J-1-HF.
C20 thru C22	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C23	5496219-P17	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef 0 PPM.
C24	5490008-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C25	5491189-P104	Polyester: .047 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C28	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C29	5491189-P108	Polyester: 0.22 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C30	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C31 and C32	19A115028-P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C33	5491189-P101	Polyester: .01 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C34	4029003-P4	Silver mica: 680 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.
C41	5490008-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C42*	5496219-P237	Ceramic disc: 6 pf ±5%, 500 VDCW, temp coef -80 PPM. (Added by Rev U).
		- - - - - - DIODES AND RECTIFIERS - - - - -
CR1*	19A115250-P1 5491705-P2	Silicon. In Rev J and earlier: Silicon.
CR2* thru CR4*	4038056-P1 7777146-P3	Germanium: sim to Type 1N90. In Rev J and earlier: Germanium; sim to Type 1N90.
CR5*	19A115250-P1 5491705-P2	Silicon. In Rev J and earlier: Silicon.
CR6*	4038056-P1 7777146-P3	Germanium: sim to Type 1N90. In Rev J and earlier: Germanium; sim to Type 1N90.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1 thru L7	7488079-P8	Choke, RF: 2.2 µh ±10%, 1 ohm DC res; sim to Jeffers 4411-12.
L14	7488079-P8	Choke, RF: 2.2 µh ±10%, 1 ohm DC res; sim to Jeffers 4411-12.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 thru Q4	19A115342-P1	Silicon, NPN.

SYMBOL	G-E PART NO	DESCRIPTION
Q5 thru Q7	19A115706-P1	Silicon, PNP; sim to Type 2N3638.
Q8*	19A115706-P1	Silicon, PNP. Added by Rev U.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P202K	Composition: 2000 ohms ±10%, 1/4 w.
R2	3R152-P682K	Composition: 6800 ohms ±10%, 1/4 w.
R3	3R152-P511K	Composition: 510 ohms ±10%, 1/4 w.
R4	3R152-P391K	Composition: 390 ohms ±10%, 1/4 w.
R5	3R152-P682K	Composition: 6800 ohms ±10%, 1/4 w.
R6	3R152-P202K	Composition: 2000 ohms ±10%, 1/4 w.
R7	3R152-P391K	Composition: 390 ohms ±10%, 1/4 w.
R8	3R152-P682K	Composition: 6800 ohms ±10%, 1/4 w.
R9	3R152-P202K	Composition: 2000 ohms ±10%, 1/4 w.
R10	3R152-P391K	Composition: 390 ohms ±10%, 1/4 w.
R11	3R152-P511K	Composition: 510 ohms ±10%, 1/4 w.
R12	3R152-P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R13	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R14	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R15	3R152-P562K	Composition: 5600 ohms ±10%, 1/4 w.
R16	3R152-P822K	Composition: 8200 ohms ±10%, 1/4 w.
R17	3R152-P203K	Composition: 20,000 ohms ±10%, 1/4 w.
R18	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R19	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R20	3R152-P332K	Composition: 3300 ohms ±10%, 1/4 w.
R21	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R22	3R152-P681K	Composition: 680 ohms ±10%, 1/4 w.
R24	3R152-P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R25*	3R152-P102K 3R152-P471K	Composition: 1,000 ohms ±10%, 1/4 w. In Rev J and earlier: Composition: 470 ohms ±10%, 1/4 w.
R26*	3R152-P471K	Composition: 470 ohms ±10%, 1/4 w. Added by Rev K.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7481654-P7	Pushbutton: single pole, normally closed, 1/10 amp at 115 VAC; sim to Grayhill 30-2. Deleted by Rev K.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 and T2		COIL ASSEMBLY T1 PL-19B204424-G1 (4EA41A22, 24, 26) T2 PL-19B204424-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218-P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A22, 24 and 26).
C2	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C36	5496218-P46	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A23, 25 and 27).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L8	PL-19A121756-G1	Coil. Includes tuning slug 5491798-P5.
T3 and T4		COIL ASSEMBLY T3 PL-19B204425-G1 (4EA41A22, 24, 26) T4 PL-19B204425-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C6	5496218-P48	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A22, 24 and 26).

SYMBOL	G-E PART NO	DESCRIPTION
C7	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C37	5496218-P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A23, 25 and 27).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L9	PL-19A121755-G1	Coil. Includes tuning slug 5491798-P5.
T5 and T6		COIL ASSEMBLY T5 PL-19B204426-G1 (4EA41A22, 24, 26) T6 PL-19B204426-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C9	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C10	5496218-P48	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A22, 24 and 26).
C38	5496218-P45	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A23, 25 and 27).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L10	PL-19A121750-G1	Coil. Includes tuning slug 5491798-P5.
T7 and T8		COIL ASSEMBLY T7 PL-19B204427-G1 (4EA41A22, 24, 26) T8 PL-19B204427-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C15	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C26	5496218-P46	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER51A22, 24 and 26).
C39	5496218-P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A23, 25 and 27).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L11	PL-19A121752-G1	Coil. Includes tuning slug 5491798-P5.
T9 and T10		COIL ASSEMBLY T9 PL-19B204428-G1 (4EA41A22, 24, 26) T10 PL-19B204428-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C19	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C27	5496218-P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER51A22, 24 and 26).
C40	5496218-P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM. (Used in Models 4EA41A23, 25 and 27).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L12	PL-19A121751-G1	Coil. Includes tuning slug 5491798-P5.
L13	19A121104-P1	Coil.
A323* and A324*		RF AMPLIFIER ASSEMBLY PL-19C303414-G6 Changed by Rev P
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	7489162-P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C7	5493392-P7	Ceramic, feed-thru: .001 µf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
C8	7489162-P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C9	5493392-P7	Ceramic, feed-thru: .001 µf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4038642-P1	Germanium.
CR2	4038056-P1	Germanium: sim to G-E Dwg. 44A231600 Rev. 3.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2	7488079-P7	Choke, RF: 1.5 µh ±10%, 0.5 ohm DC res max; sim to Jeffers 4411-10.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A115666-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R5	3R152-P153K	Composition: 15,000 ohms ±10%, 1/4 w.
R6	3R152-P512J	Composition: 5100 ohms ±5%, 1/4 w.
R7	3R152-P751J	Composition: 750 ohms ±5%, 1/4 w.
R8	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R9	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1 and TB2	7487424-P15	Miniature, phen: 2 terminals.
A323* and A324*		RF AMPLIFIER ASSEMBLY A323* PL-19C303414-G3 (4EA41A22, 24, 26) Used in Rev K thru N A324* PL-19C303414-G4 (4EA41A23, 25, 27) Used in Rev K thru N
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	7489162-P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C2 and C3	5493392-P107	Ceramic, stand-off: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type S35A.
C18 and C19	19A115028-P109	Polyester: .022 µf ±20%, 200 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4038642-P1	Germanium.
CR2	4038056-P1	Germanium: sim to G-E Dwg. 44A231600 Rev. 3.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115342-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R2	3R152-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R3	3R152-P471J	Composition: 470 ohms ±5%, 1/4 w.
R4	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 and T2		COIL ASSEMBLY T1 PL-19A121076-G1 (4EA41A22, 24, 26) T2 PL-19A121076-G2 (4EA41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C4	5496218-P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 4EA41A22,24 and 26).
C5	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. (Used in Models 4EA41A23, 25 and 27).
C6	5496218-P239	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	PL-19A121078-G1	Coil. Includes tuning slug 5491798-P5.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7487424-P15	Miniature, phen: 2 terminals.
		- - - - - - - - - SOCKETS - - - - - - - - -
XQ1	5490277-P5	Transistor, phen: 3 contacts rated at 1 amp at 400 VRMS; sim to Alcon 1213LL2.

SYMBOL	G-E PART NO	DESCRIPTION
A325		IF/AUDIO ASSEMBLY PL-19D102327-G7
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115028-P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C2	5491189-P108	Polyester: 0.22 µf ±20%, 50 VDCW.
C3	19A115028-P111	Polyester: .047 µf ±20%, 200 VDCW.
C4	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C5	19A115028-P109	Polyester: .022 µf ±20%, 200 VDCW.
C6	19A115028-P111	Polyester: .047 µf ±20%, 200 VDCW.
C7	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW: sim to RMC Type JF Discap.
C8	5496219-P17	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C9	19A115028-P109	Polyester: .022 µf ±20%, 200 VDCW.
C10	19A115028-P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C11	19A115028-P111	Polyester: .047 µf ±20%, 200 VDCW.
C12	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C13	5496219-P17	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C14	19A115028-P109	Polyester: .022 µf ±20%, 200 VDCW.
C15	19A115028-P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C16	5496219-P421	Ceramic disc: 100 pf ±10%, 500 VDCW, temp coef -220 PPM.
C17	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW: sim to RMC Type JF Discap.
C18 and C19	19A115028-P109	Polyester: .022 µf ±20%, 200 VDCW.
C20	5496267-P14	Tubular, tantalum: 15 µf ±20%, 20 VDCW: sim to Sprague 150D156X0020B2.
C21	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C22	19A115028-P107	Polyester: .01 µf ±20%, 200 VDCW.
C23	5491000-P1	Tubular: 30 µf +75% -10%, 25 VDCW; sim to Sprague S45553.
C24	19A115028-P107	Polyester: .01 µf ±20%, 200 VDCW.
C25	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW: sim to RMC Type JF Discap.
C27	19B209243-P7	Polyester: 0.1 µf ±20%, 40 VDCW: sim to Amperex C280AA/P100K.
C28	5496267-P17	Tubular, tantalum: 1 µf ±20%, 35 VDCW: sim to Sprague 150D105X0035A2.
C29	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW: sim to Amperex C280AA/P220K.
C31	19B209243-P5	Polyester: .047 µf ±20%, 40 VDCW: sim to Amperex C280AA/P47K.
C32	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW: sim to Amperex C280AA/P220K.
C33	5496267-P28	Tubular, tantalum: 0.47 µf ±20%, 35 VDCW: sim to Sprague 150D474X0035A2.
C34	19B209243-P9	Polyester: 0.22 µf ±20%, 40 VDCW: sim to Amperex C280AA/P220K.
C35	5496267-P6	Tubular, tantalum: 33 µf ±20%, 10 VDCW; sim to Sprague 150D336X0010B2.
C37*	19A115028-P305 19A115028-P303	Polyester: .0068 µf ±10%, 200 VDCW. In REV K and earlier: Polyester: .0033 µf ±10%, 200 VDCW.
C38	19A115680-P107	Electrolytic: 100 µf +150% -10%, 15 VDCW; sim to Mallory Type TT.
C39	5490008-P143	Silver mica: 470 pf ±10%, 300 VDCW; sim to Electro Motive Type DM-15.
C48	5495670-P9	Tubular: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D169A1.
C50	5496267-P14	Tubular, tantalum: 15 µf ±20%, 20 VDCW: sim to Sprague 150D156X0020B2.

SYMBOL	G-E PART NO	DESCRIPTION
C52*	4029003-P16	Silver mica: .0022 µf ±5%, 500 VDCW; sim to Electro Motive Type DM-20. Deleted by Rev G.
C53*	19A115028-P315 5491189-P106	- - - - - - - - - CAPACITORS - - - - - - - - - Polyester: 0.15 µf ±10%, 200 VDCW. In Rev E and earlier: Polyester: 0.1 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C54*	7491930-P3	Tubular, polyester: .0047 µf ±20%, 100 VDCW; sim to G-E Type 61F. Deleted by Rev G.
C67*	4029003-P205	Mica: 2,000 pf ±2%. Added in Model 4EA41A22-27 by Rev G.
C68*	19A115028-P110	Polyester: .033 µf ±20%, 200 VDCW. Added by Rev G.
C71*	5496267-P28	Tubular, tantalum: 0.47 µf ±20%, 35 VDCW. Added by Rev N.
		- - - - - - DIODES AND RECTIFIERS - - - - -
CR1 and CR2	4038056-P1	Germanium; sim to G-E Dwg 44A231600 Rev 3.
CR3 and CR4	19A11250-P1	Silicon.
CR7	19A11250-P1	Silicon.
		- - - - - - JACKS AND RECEPTACLES - - - - -
J1 thru J24	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	PL-4031476-G1	Choke. Includes tuning slug 7773023-P25.
L4	5491736-P6	Choke: 3.5 mh ±10% ind at 1 KC, 2.5 ohms DC res max; sim to Aladdin 33-494.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 thru Q3	19A115123-P1	Silicon, NPN: sim to Type 2N2712.
Q4* and Q5*	19A115552-P1 19A115123-P1	Silicon NPN. In Rev L and earlier: Silicon, NPN.
Q6 thru Q8	19A115123-P1	Silicon, NPN.
Q9	19A115247-P1	Silicon, PNP; sim to Type 2N1024.
Q10	19A115300-P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77-P330K	Composition: 33 ohms ±10%, 1/2 w.
R2	3R77-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R3	3R77-P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R4	3R77-P101K	Composition: 100 ohms ±10%, 1/2 w.
R5	3R77-P472K	Composition: 4700 ohms ±10%, 1/2 w.
R6	3R77-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R7	3R77-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R8	3R77-P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R9	3R77-P101K	Composition: 100 ohms ±10%, 1/2 w.
R10	3R77-P472K	Composition: 4700 ohms ±10%, 1/2 w.
R11	3R77-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R12	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R13	3R77-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R14	3R77-P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R15	3R77-P101K	Composition: 100 ohms ±10%, 1/2 w.
R16	3R77-P472K	Composition: 4700 ohms ±10%, 1/2 w.
R17	3R77-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R18	3R77-P103K	Composition: 10,000 ohms ±10%, 1/2 w.

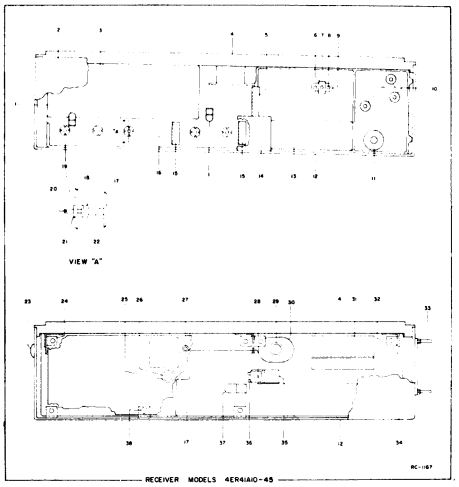
SYMBOL	G-E PART NO	DESCRIPTION
R19	3R77-P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R20	3R77-P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R21	3R77-P472K	Composition: 4700 ohms ±10%, 1/2 w.
R23	3R77-P202J	Composition: 2000 ohms ±5%, 1/2 w.
R24	3R77-P682K	Composition: 6800 ohms ±10%, 1/2 w.
R25	3R77-P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R26	3R77-P102J	Composition: 1000 ohms ±5%, 1/2 w.
R27	3R77-P683K	Composition: 68,000 ohms ±10%, 1/2 w.
R28	3R77-P222J	Composition: 2200 ohms ±5%, 1/2 w.
R29 and R30	3R77-P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R31	3R77-P512J	Composition: 5100 ohms ±5%, 1/2 w.
R32	3R77-P102J	Composition: 1000 ohms ±5%, 1/2 w.
R34	3R77-P113K	Composition: 11,000 ohms ±10%, 1/2 w.
R35*	3R77-P362J	Composition: 3600 ohms ±5%, 1/2 w. Added by Rev G.
R36	3R77-P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R37	3R77-P222J	Composition: 2200 ohms ±5%, 1/2 w.
R38	3R77-P751J	Composition: 750 ohms ±5%, 1/2 w.
R39	3R77-P562J	Composition: 5600 ohms ±5%, 1/2 w.
R40	3R77-P113K	Composition: 11,000 ohms ±10%, 1/2 w.
R41	3R77-P204K	Composition: 0.2 megohm ±10%, 1/2 w.
R44	3R77-P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R45	3R77-P181K	Composition: 180 ohms ±10%, 1/2 w.
R46*	3R77-P333K	Composition: 33,000 ohms ±10%, 1/2 w. Deleted by Rev M.
R47	19B209115-P1	Variable, carbon film: 5000 ohms ±20%, 0.15 w; sim to CTS Type UPE-70.
R48	3R77-P222J	Composition: 2200 ohms ±5%, 1/2 w.
R49	3R77-P821K	Composition: 820 ohms ±10%, 1/2 w.
R50	3R77-P392K	Composition: 3900 ohms ±10%, 1/2 w.
R51	19B209022-P15	Wirewound, phen: 1 ohm ±5%, 2 w; sim to IRC Type BWH.
R52	3R77-P152K	Composition: 1500 ohms ±10%, 1/2 w.
R53	5495948-P444	Deposited carbon: 0.28 megohm ±1%, 1/2 w; sim to Texas Instruments Type CD1/2MR.
R59	3R77-P512K	Composition: 5100 ohms ±10%, 1/2 w.
R65*	3R77-P123K	Composition: 12,000 ohms ±10%, 1/2 w. Deleted by Rev G.
R66	3R77-P223K	Composition: 22,000 ohms ±10%, 1/2 w.
R68	3R77-P134J	Composition: 0.13 megohm ±5%, 1/2 w.
R69*	3R77-P392J	Composition: 3900 ohms ±5%, 1/2 w. Deleted by Rev G.
R70*	3R77-P471J	Composition: 470 ohms ±5%, 1/2 w. Deleted by Rev G.
R73*	3R77-P203J	Composition: 20,000 ohms ±5%, 1/2 w. Added by Rev G.
R74*	3R77-P153K	Composition: 15,000 ohms ±10%, 1/2 w. Added by Rev M.
R75*	3R77-P183K	Composition: 18,000 ohms ±10%, 1/2 w. Added by Rev M.
R80*	3R152-P511J	Composition: 510 ohms ±5%, 1/4 w. Added by Rev R.
		- - - - - - - - - THERMISTORS - - - - - - -
RT1	19B209143-P2	Rod: 4000 ohms ±10% res, 1 w max; sim to Globar Type 789F-12.
RT2	19B209143-P3	Rod: 850 ohms ±10% res, 1 w max; sim to Globar Type 789F.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - TRANSFORMERS - - - - - - -
T1		DISCRIMINATOR ASSEMBLY PL-19C303612-G1
		- - - - - - - - - CAPACITORS - - - - - - - -
C41 and C42	19B209196-P1	Ceramic disc: 280 pf ±5%, 500 VDCW, temp coef -115 ±30 PPM.
C45	7489162-P43	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C46	7489162-P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C47	5491189-P4	Polyester: .047 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR5 and CR6	19A11250-P1	Silicon.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2 and L3	PL-19A121532-G1	Coil.
		- - - - - - - - - RESISTORS - - - - - - - - -
R56	3R152-P331J	Composition: 330 ohms ±5%, 1/4 w.
R57 and R58	3R152-P473J	Composition: 47,000 ohms ±5%, 1/4 w.
A333*		COMPONENT BOARD PL-19C303985-G2 Added by Rev U
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496219-P237	Ceramic disc: 6 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	19B209243-P1	Polyester: .01 µf ±20%, 40 VDCW.
C3	5494481-P111	Ceramic disc: .001 µf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4 thru C6	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180.
C7	7774750-P11	Ceramic disc: .005 µf +100%-0%, 500 VDCW.
C8	19B209243-P3	Polyester: .022 µf ±20%, 40 VDCW.
C9 and C10	5496267-P11	Tantalum, dry solid: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4038056-P1	Germanium: sim to G-E Dwg. 44A231600 Rev. 3.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19C307007-P3	Coil, RF: 39 µh ±10%, 1.8 ohm DC res max; sim to Delevan 1537-727.
L2	7488079-P48	Choke, RF: 27 µh ±10%, 1.4 ohm DC res max; sim to Jeffers 4422-9.
L3	19C307007-P3	Coil, RF: 39 µh ±10%, 1.8 ohm DC res max; sim to Delevan 1537-727.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115245-P1	Silicon, NPN.
Q2	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	3R152-P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R3	3R152-P392K	Composition: 3900 ohms ±10%, 1/4 w.
R4	3R152-P562K	Composition: 5600 ohms ±10%, 1/4 w.
R5	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R6	3R152-P562K	Composition: 5600 ohms ±10%, 1/4 w.
R7 and R8	3R152-P681K	Composition: 680 ohms ±10%, 1/4 w.
R9	3R152-P302J	Composition: 3000 ohms ±5%, 1/4 w.
R10	3R152-P683J	Composition: 68,000 ohms ±5%, 1/4 w.

SYMBOL	G-E PART NO	DESCRIPTION
A334*		FIRST MIXER ASSEMBLY PL-19B204430-G10 Added by Rev U
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	5494481-P14	Ceramic disc: .002 µf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C3	5491271-P106	Variable: approx 1.98 to 12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C4	5496218-P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C5	5494481-P14	Ceramic disc: .002 µf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6	5494481-P12	Ceramic disc: .001 µf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7	5496218-P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C20	5496218-P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	PL-19A121082-G1	Toroidal coil.
		- - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A115342-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
R4	3R152-P102J	Composition: 1000 ohms ±5%, 1/4 w.
R10	3R152-P243J	Composition: 24,000 ohms ±5%, 1/4 w.
R11	3R152-P622J	Composition: 6200 ohms ±5%, 1/4 w.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C315* and C316*	5496267-P11	Tubular, tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague 150D686X0015R2. Deleted by Rev U.
C317	5494481-P12	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C318*	7774750-P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW. Added by Rev J.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J442	19B205689-G2	Connector: 18 contacts.
J443	PL-19C303426-G1	Connector: 20 pin contacts.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P301 thru P303	4029840-P2	Contact, electrical; sim to Amp 42827-2. (Used in Models 4ER41A24-27).
P304 thru P309	4029840-P2	Contact, electrical; sim to Amp 42827-2.
P310	4029840-P1	Contact, electrical; sim to Amp 41854.
P311 thru P320	4029840-P2	Contact, electrical; sim to Amp 42827-2.
P321	4029840-P1	Contact, electrical; sim to Amp 41854.
P325	4029840-P2	Contact, electrical; sim to Amp 42827-2.
P329	4029840-P2	Contact, electrical; sim to Amp 42827-2.
P337	4029840-P2	Contact, electrical; sim to Amp 42827-2. (Used in Models 4ER41A24-27).
		- - - - - - - - - TRANSISTORS - - - - - - -
Q301*	19A115527-P1 19A115246-P1	Silicon, PNP. In units of Rev G or earlier:

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - RESISTORS - - - - - - - -
R301* and R302*	3R152-P681K	Composition: 680 ohms ±10%, 1/4 w. Deleted by Rev U.
R303	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - -
T301*	19B209083-P2	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.
	19B209083-P1	In Models of Rev G or earlier: 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 - - - - - -
TB1	7487424-P7	Miniature, phen: 4 terminals.
		RF CIRCUIT ASSEMBLY PL-19C303472-G3 (4ER41A22, 24, 26) PL-19C303472-G4 (4ER41A23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C301 thru C306		Refer to Mechanical Parts (RC-1167).
C307 and C308	19B209135-P1	Tubular: feed-thru, 1000 pf +150% -0%, 500 VDCW.
C311 thru C314	19B209135-P1	Tubular: feed-thru, 1000 pf +150% -0%, 500 VDCW.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J441		(Part of W441).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L301	PL-19B204461-G4	Coil. (Used in Models 4ER41A22, 24 and 26).
L302	19B200616-P2	Coil. (Used in Models 4ER41A22, 24 and 26).
L303	PL-19B204461-G4	Coil. (Used in Models 4ER41A22, 24 and 26).
L304	PL-19B204461-G1	Coil. (Used in Models 4ER41A23, 25 and 27).
L305	19B200616-P1	Coil. (Used in Models 4ER41A23, 25 and 27).
L306	PL-19B204461-G1	Coil. (Used in Models 4ER41A23, 25 and 27).
L307*	PL-19B204461-G13	Coil. (Used in Models 4ER41A22, 24 and 26). In Models of Rev N and earlier:
	PL-19B204461-G4	Coil.
L308	PL-19B204461-G6	Coil. (Used in Models 4ER41A22, 24 and 26).
L309*	PL-19B204461-G14	Coil. (Used in Models 4ER41A23, 25 and 27). In Models of Rev N and earlier:
	PL-19B204461-G3	Coil.
L310	PL-19B204461-G5	Coil. (Used in Models 4ER41A23, 25 and 27).
L311	19A121385-P1	Coil.
L312	PL-19B204461-G6	Coil. (Used in Models 4ER41A22, 24 and 26).
L313	PL-19B204461-G5	Coil. (Used in Models 4ER41A23, 25 and 27).
L314	19A121289-P1	Coil.
		- - - - - - - - - - CABLES - - - - - - - - - -
W441	19B205634-G2	Connector, coaxial: includes cable jack (J441), approx 5 inches long.

SYMBOL	G-E PART NO	DESCRIPTION
		MECHANICAL PARTS
		(SEE RC-1167)
1	7145451-P1	Cable clamp.
2	19C303495-G3	Top cover, station receiver (except Repeaters and VM's).
	19C303676-G2	Top cover, station receivers (Repeater and VM's only).
	19C303385-P2	Top cover, mobile receiver.
3	19B204890-P1	(Not used).
4	PL-19C303394-G2	Heat sink.
5	19A121222-P1	Angle support. (Used with C311 and C312 in PL-19C303472-G3 and 4).
6	4033089-P1	Clip. (Part of XY1-4 in A308-313).
7	19B200525-P8	Rivet. (Part of XY1-4 in A308-313).
8	4033751-P1	Electrical contact: sim to Methode 752 V (PB). (Part of XY1-4 in A308-313).
9	4039307-P1	Crystal socket. (Part of XY1-4 in A308-313).
10	4029739-P2	Can. (Part of L1-3 in A316).
11	4034252-P5	Can. (Part of T1 in A316).
12	PL-19C303389-G1	Chassis.
13	19B204396-P1	Support. (Used in A306 and 307).
14	19A121071-P1	Plate.
15	19A121221-P1	Angle support. (Used with C307-310 in PL-19C303472-G3 and 4).
16	7162414-P1	Mounting ring, transistor socket: sim to Elco 757. (Used with Q1 in A301 and 302).
17	19B204397-P1	RF plate.
18	PL-4036765-G2	Screw. (Part of C301-305 in PL-19C303472-G3 - 4).
19	19C303562-P1	RF chassis. (Used in PL-19C303472-G3 and 4).
20	PL-4036765-G4	Screw. (Part of C301-305 in PL-19C303472-G3 and 4).
21	7117825-P1	Spring, washer; sim to Tinnerman C4578B-632-24. (Part of C301-305 in PL-19C303472-G3 and 4).
22	4036899-P4	Ceramic insulator: sim to Centralab 3BX845C. (Part of C301-305 in PL-19C303472-G3 and 4).
23	4033986-P6	(Not used).
24	PL-19B204583-G3	Hinge.
25	4035439-P1	Transistor heat sink; sim to Birtcher 3AL-635-2R. (Used with Q10 in A325).
26	4036555-P1	Washer insulator: nylon. (Used with Q9 and 10 in A325).
27	4035306-P11	Fiber washer. (Used with L1 in A325).
28	PL-19B204583-G1	Hinge.
29	19A121284-P1	Mica insulator. (Used with Q301).
30	19A121283-P1	Support. (Used with Q301).
31	PL-19A121229-G1	(Not used).
32	PL-19B204583-G2	(Not used).
33	19A121676-P1	Guide pin: with 4-40 mounting thread.
34	PL-19C303465-G4	Bottom cover, station receiver.
	PL-19C303385-G1	Bottom cover, mobile receiver.
35	19A121297-P1	Angle.
36	7160861-P4	Spring clip nut: sim to Tinnerman C6452-8Z-157.
37	4029851-P6	Cable clamp: nylon; sim to Weckesser 5/16-4.
38	19A115461-P2	Spring washer; sim to Shakeproof 3597-04-00.



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 of interference, IF frequency changed from 5.26 MC to 5.30 MC. Changed crystal filter A314 and A316-Y1.

REV. D - To improve receiver performance in areas of high signal level. Deleted R3 and R4, added R15, R16 and R17 on 2nd Mixer A316.

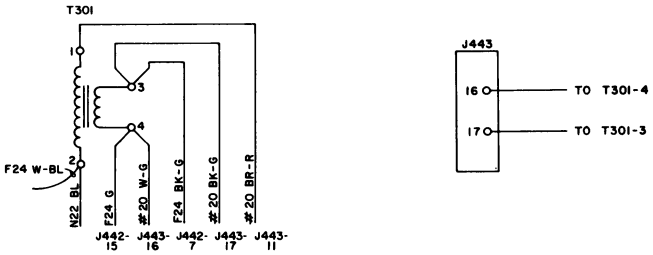
REV. E - To stabilize blanker RF amplifier. Added R6 on 2nd RF Amplifier A303/A304.

REV. F - To improve audio response. Changed C37 and C53 on IF Audio Board A325.

REV. G - To raise maximum squelch sensitivity. Deleted C52, C54, R65, R70, and R69. Added C67, C68, and R73 on IF Audio Board A325.

REV. H - To incorporate value improvements in single-frequency receivers. Deleted CR1 and R5. Added R19 on 1st Oscillator A308/A313. To utilize improved transistor and to eliminate shorting of audio transformer terminals. Changed Q301 and T301.

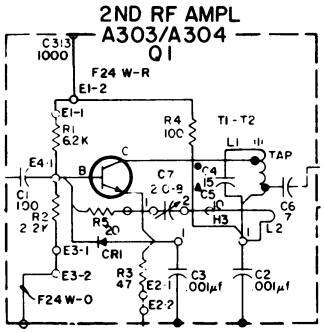
T301 CONNECTIONS WERE:



REV. J - To eliminate feedback within receiver cabling. Added C318.

REV. K - To improve noise blanker performance by applying blanking pulse to 1st and 2nd RF Amplifier stages. Added R26, deleted S1, changed R25 and CR1 through CR6 on Noise Blanker A320/A321. Replaced 1st RF Amplifier A301/A302 with A323/A324. Removed L2, C7, R5, R6, changed Q1 and collector tap of L1 on 2nd RF Amplifier A303/A304.

2nd RF Amplifier A303/A304 Was:



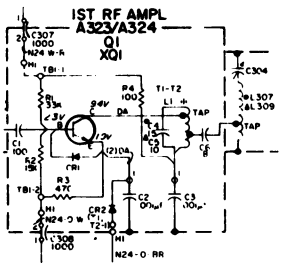
REV. L - To eliminate spurious responses and to optimize the input load on the crystal filter. Deleted R3, changed R10 and added R11 on 1st Mixer A305. Replaced R1 with R5 on Crystal Filter A314.

REV. M - To provide better temperature compensation for low IF circuitry. 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 A325. Changed C7, C10, and C11 on 2nd Mixer board A316.

REV. N - To improve temperature characteristics. Changed C4, C5, C7 through C16, L1, L2, L3. Deleted L4, and changed L5 to L4 on 2nd Mixer Assembly A316.

REV. P - To increase reliability of 1st RF Amplifier. Changed A323/A324 and L307/L309.

A323/A324 Was:



NOTE

Models REV. N and earlier: In Steps 7 and 8 of Alignment Procedure also tune L1 (on 1st RF Amp) for maximum.

REV. R - To improve circuit DC bias stability of Audio Amplifier Q10. Added R80 to A325.

REV. S - To reduce receiver lock-up areas of high RF signal level. Deleted C5 and added C26 on the 2nd Mixer Board A316.

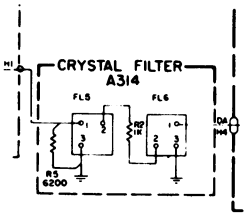
REV. T - No changes. Revision letter assignment for record purposes only.

REV. U - To improve performance at high signal levels. Changed A305 to A334. Added Q8 & C42 to A320/A321. Added Hi level Shut-off Switch A333.

REV. V - To facilitate procurement of parts. Changed FL5, deleted FL6 & R2 on Crystal Filter A314. Deleted R15 from 2nd Mixer A316.

To improve Intermodulation (EIA) performance changed C26 on 2nd Mixer A316.

Filter A314 Was:



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-3595

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