MOBILE RADIO

MASTR Progress Line

406-470 MHZ RECEIVER MODELS 4ER42B10-45 & 4ER42D10-45

Maintenance Manual LBI-3621-E
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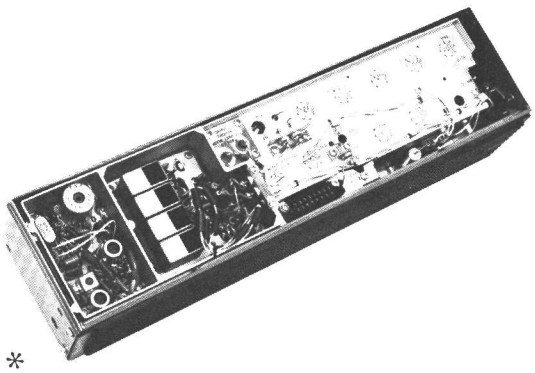
DF-1086



SPECIFICATIONS *

ER-42-B & D

FCC Filing Designation	
Frequency Range	406-420 & 450-470 MHz
Audio Output	2 watts at less than 10% distortion (using Speaker Model 4EZ16A10)
Sensitivity	

	Standard Receiver	Ultra-High Sensitivity Receiver
12-db SINAD (EIA Method)	0.45 μv	0.30 μv
20-db Quieting Method	0.65 μv	0.40 μv

Selectivity	
EIA Two-Signal Method	-85 db (adjacent channel, 50 KHz channels)
20-db Quieting Method	-100 db at ±35 KHz
Spurious Response	-100 db
First Oscillator Stability	
Type ER-42-B Receivers	±.0005% (-30°C to +60°C)
Type ER-42-D Receivers	±.0002% (-30°C to +60°C)
Modulation Acceptance	±17 KHz
Squelch Sensitivity	
Critical Squelch	
Standard Receiver	0.3 μv
UHS Receiver	0.2 μv
Maximum Squelch	Greater than 20 db quieting (less than 3 μv)
Intermodulation (EIA)	-60 db
Maximum Frequency Separation	0.4%
Frequency Response	+1 and -8 db of a standard 6-db per octave de-emphasis curve from 300 to 3000 Hz (1000-Hz reference)

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

ER-42-B & D

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

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

DESCRIPTION

General Electric MASTR Progress Line Receivers Types ER-42-B & D are double-conversion, superheterodyne FM receivers designed for operation on the 406-420 and 450-470 megahertz bands. The Type ER-42-B Receivers contain a standard oscillator with a frequency stability of ±0.0005% while the Type ER-42-D Receivers contain an Integrated Circuit Oscillator Module (ICOM) with a frequency stability of ±0.0002%. Standard and ultra-high sensitivity versions are available for both types.

The receivers are of single-unit construction and are 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. The bottom portion of the casting contains the audio squelch board and the optional Channel Guard board.

CIRCUIT ANALYSIS

The unit is completely transistorized. 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.

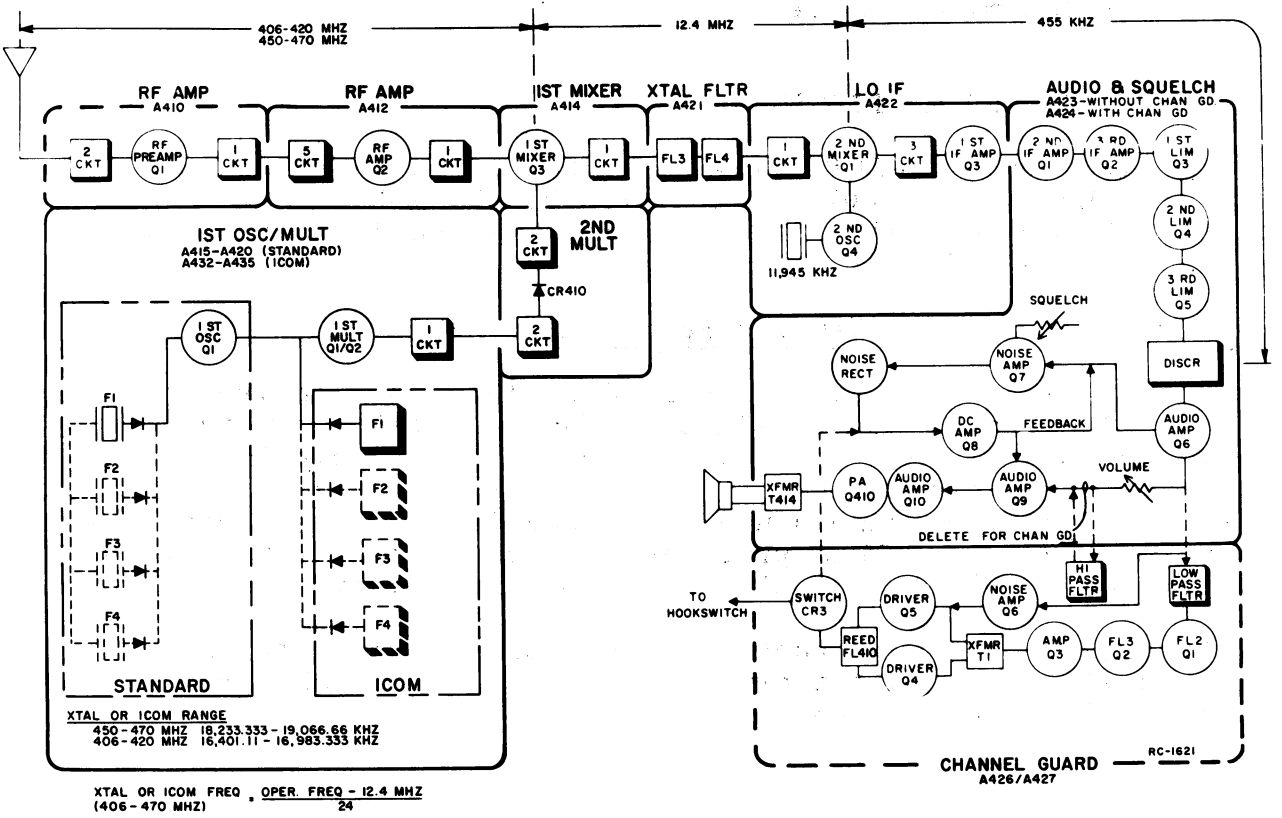


Figure 1 - Receiver Block Diagram

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 AMPLIFIER (A410)

RF Amplifier A410 is used only in the ultra-high sensitivity receivers, and consists of two tuned helical resonators and an RF amplifier stage.

The RF signal from the antenna is coupled through RF cable W444 to a tap on L410/L412. The tap is positioned to provide the proper impedance match to the antenna. RF energy is coupled through the second coil through an opening in the shield wall, and then to the base of RF preamp Q1. Diode CR1 protects Q1 from damage by high signal levels. The output of Q1 is developed across tuned circuit L1 and C3, and is coupled through five helical resonators to RF Amplifier A412-Q2.

RF AMPLIFIER (A412)

RF Amplifier A412 is used in both the standard and ultra-high sensitivity receivers, and consists of five tuned helical resonators and an RF amplifier stage. In standard receivers, the RF signal from the antenna is fed by RF cable W441 to a tap on L414/L419. RF energy is then coupled through the five coils by openings in the shield walls to the base of RF Amplifier Q2. The output of Q2 is loop-coupled to the base of 1st mixer (A414).

1ST OSCILLATOR AND MULTIPLIER

Receiver Models 4ER42B10-45 are equipped with standard Oscillator/Multiplier Boards A415-A420. Receiver Models 4ER42D10-45 are equipped with Oscillator/Multiplier Boards which use the Integrated Circuit Oscillator Module (ICOM).

Standard Oscillator/Multiplier Board (A415-A420)

The oscillator in the standard Oscillator/Multiplier Board is a transistorized Colpitts oscillator. The oscillator crystal operates in a fundamental mode at a frequency of approximately 16 to 19 megahertz. The crystal is cut to provide temperature compensation at the high end of the temperature range and is thermistor compensated at low temperatures. This provides instant warm-up with a frequency stability of ±0.0005% without crystal ovens or warmers.

In single-frequency receivers, a jumper from H1 to H2 connects regulated +10 volts to the crystal circuit. Feedback for the oscillator is developed across C47.

In multi-frequency receivers, a diode is connected in series with the crystal and up to three additional crystal circuits can be added. The 10-volt jumper is removed, and the proper frequency is selected by switching the desired crystal circuit to +10 volts by means of a frequency selector switch on the control unit. Switching the +10 volts to the crystal circuit forward biases the diode in series with the desired crystal and the crystal frequency is applied to the base of oscillator transistor Q1. The oscillator output is fed through C45 to the base of 1st Multiplier Q2.

The 1st multiplier circuits are tuned to four times the crystal frequency and provide an output through three tuned circuits (T7/T8, T410/T412, and T411/T413) to the 2nd multiplier. The 1st multiplier stage is metered at centralized metering jack J442-4 through metering network C38, CR6, R17 and R18.

Oscillator/Multiplier Board With ICOM (A432-A435)

Oscillator/Multiplier Boards A432-A435 contain a Model 4EG26A10 ICOM module. The ICOM module consists of a crystal-controlled Colpitts oscillator, a voltage regulator, and a buffer output stage. The entire module (including crystal) is enclosed in a dust-proof aluminum can, with the ICOM frequency and the receiver operating frequency printed on the top. Access to the oscillator trimmer is obtained by prying off the plastic GE decal on the top of the can.

The oscillator frequency is temperature-compensated at both ends of the temperature range to provide instant frequency compensation, with a frequency stability of ±0.0002% without crystal ovens or warmers.

In single-frequency receivers, +10 volts for operating the ICOM is obtained by a jumper from H1 to H2. With the ICOM operating, diode CR1 is forward biased and the oscillator output is applied to the 1st multiplier Q1.

The 1st multiplier circuits are tuned to four times the crystal frequency and provide an output through three tuned circuits (T7/T8, T410/T412, T411/T413) to the 2nd multiplier. The 1st multiplier stage is metered at centralized metering jack J442-4 through metering network C4, CR5, R5, and R6.

In multi-frequency receivers, up to three additional ICOM modules can be plugged into the board. The 10-volt jumper is removed and the proper frequency is selected by switching the desired ICOM to +10 volts by means of a frequency selector switch on the control unit.

CAUTION

All ICOM modules are individually compensated at the factory, and connot be repaired in the field. Any attempt to remove the ICOM cover will void the warranty.

2ND MULTIPLIER

The 1st multiplier output is applied to the anode of multiplier diode CR410. Two helical resonator circuits follow CR410 and are tuned to six times the 1st Multiplier frequency for a total multiplication of 24 times the crystal frequency. The 2nd multiplier output is fed through C434 to the emitter of the 1st mixer.

1ST MIXER (A414) AND CRYSTAL FILTER (A421)

The RF signal from the RF amplifier is applied to the base of the 1st mixer and the injection voltage from the 2nd multiplier is applied to the emitter. The mixer collector tank (L3 and C9) is tuned to 12.4 megacycles and provides impedance matching to the high IF crystal filter.

The highly selective, two-stage crystal filter (A421) following the 1st mixer provides the major selectivity for the receiver. The output of the filter is fed through impedance matching transformer A422-T2 to the base of the 2nd mixer.

2ND OSCILLATOR, 2ND MIXER AND 1ST IF AMP (A422)

The 2nd oscillator Q4 operates in a Colpitts oscillator circuit, with feedback supplied through C20. The oscillator frequency is 11,945 KHz, 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 with the 2nd oscillator output. The 455 KHz 2nd mixer output is fed to three tuned low IF circuits (L5, L2, L6). The three tuned circuits are required for shaping the nose of the IF waveform, and provide some additional selectivity.

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

2ND IF AMPS AND LIMITERS (A423)

Following the 1st IF amplifier (A422-Q3) are two additional RC coupled low IF amplifiers A423-Q1 and -Q2. The 2nd IF amplifier stage is metered at J442-2 through metering network C8, CR1 and R12. The 3rd IF amplifier is metered at J442-3 through C13, CR2 and R18.

After the IF amplifiers are three RC coupled limiter stages, A423-Q3, -Q4 and -Q5.

DISCRIMINATOR (A423)

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 are for rectifying the 455 KHz IF signals to recover the audio. The stage is metered at J442-10 through metering network R27 and C22.

1ST AUDIO AMPLIFIER (A423)

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 (A423)

When audio is present in the incoming signal, it is taken off the emitter of Q6 and connected to the VOLUME control through J9. The VOLUME control arm connects to J8 which feeds the audio signal to the base of the 2nd audio amplifier, Q9. De-emphasis is provided by C34, C37, C53 and L4. Potentiometer R47 is used to adjust the collector current to 650 milliamps 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 Q410. 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 T414 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 amp 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 (C64 and L1) 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 turned off, the collector potential is at the +10 volt supply. This positive voltage is fed to the base of Q9, a PNP transistor, cutting it off. As audio stages Q9, Q10 and Q401 are DC coupled, all of them are cut off. The positive voltage from the collector circuit of the DC amplifier is used as feedback through R64 to the base of noise amplifier Q7, causing it to conduct more heavily. The feedback helps to cut Q8 off sharply, resulting in sharp, quick-acting switching.

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

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

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

It should be noted that the feedback through R64 in the noise amplifier circuit results in a hysteresis effect in the squelch circuit and, as a result, the squelch does not operate in the same manner as other conventional squelch circuits. The circuit is designed so that a weak signal will open the squelch . The signal may be reduced by 3 to 5 db without the squelch closing. This limits squelch "flutter" or "picket fence" operation.

CHANNEL GUARD (A426/A427)

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

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

Operation

Audio, tone and noise is picked up in the emitter circuit of audio amplifier A431-Q6 and is fed through A431-J9 to the VOLUME control and then to a high-pass filter (C20, C21, C22, C23, C30 and L1) on the Channel Guard board through A431-J8, decoupling resistor R61 and A431-J12. The high-pass filter removes the tone from the audio amplifier A431-Q9.

To operate the Channel Guard Decoder, audio, tone and noise is picked up in the emitter circuit of A431-Q6 and is fed through A424-J18 to the base of the first low-pass filter stage (A426/A427-Q1) through a 250-Hz band-pass filter consisting of R1, R2, R3, C1, C2 and C3. Following Q1 is a second low-pass filter stage, Q2. The filter output is amplified by Q3 and coupled to the push-pull driver stage (Q4 and Q5) through T1. Q4 and Q5 drive the reed decoder, FL410. Noise amplifier Q6 picks up and amplifies any high frequency (in the 5 kHz range) and feeds it back to the driver stage to decrease the sensitivity of the reed and prevent noise pulsing.

FL410 is resonant at the correct tone frequency and the reed contacts open and close at the tone frequency. When the CHANNEL GUARD-OFF switch is in the CHANNEL GUARD position, the opening and closing of the reed contacts charges capacitor C19, which applies noise squelch circuit continues to operate normally until a carrier quiets the receiver.

Placing the CHANNEL GUARD-OFF switch in the OFF position (or removing the microphone from its hanger in hoodswitch options) opens the circuit to A426/A427-J5, which forward biases diode CR3. This causes current to flow in the circuit, bypassing the decoder reed. However, the receiver noise squelch circuit will operate until a carrier is received.

NOTE

If, the Two-Way Radio is mounted on its side, rotate the decoder reed 90° in its mounting bracket so that the label showing the GE Drawing and Part Number is facing the receiver heat sink. No change is required if the unit is mounted vertically. See Figure 3 for the location of the decoder reed.

MAINTENANCE

DISASSEMBLY

To service the receiver from the top:

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

To service the receiver from the bottom:

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

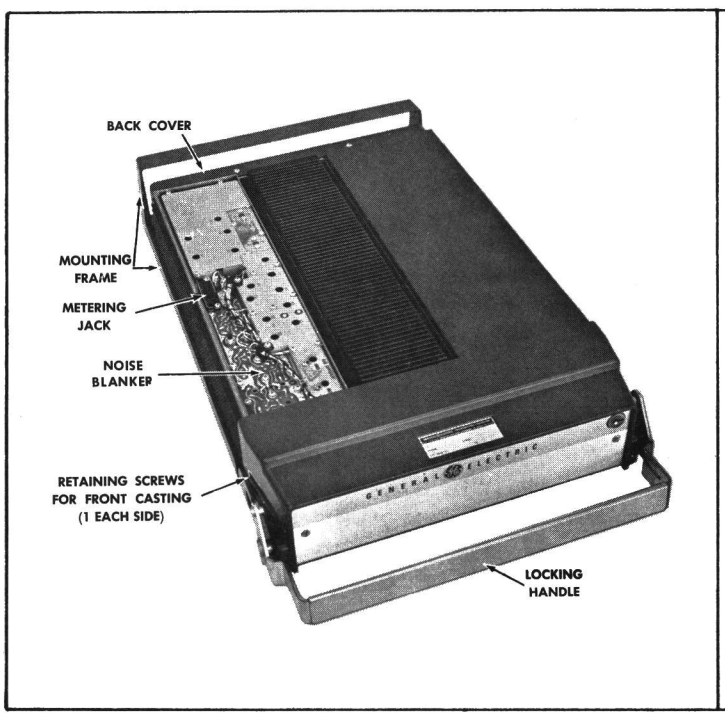


Figure 2 - Top Cover Removed

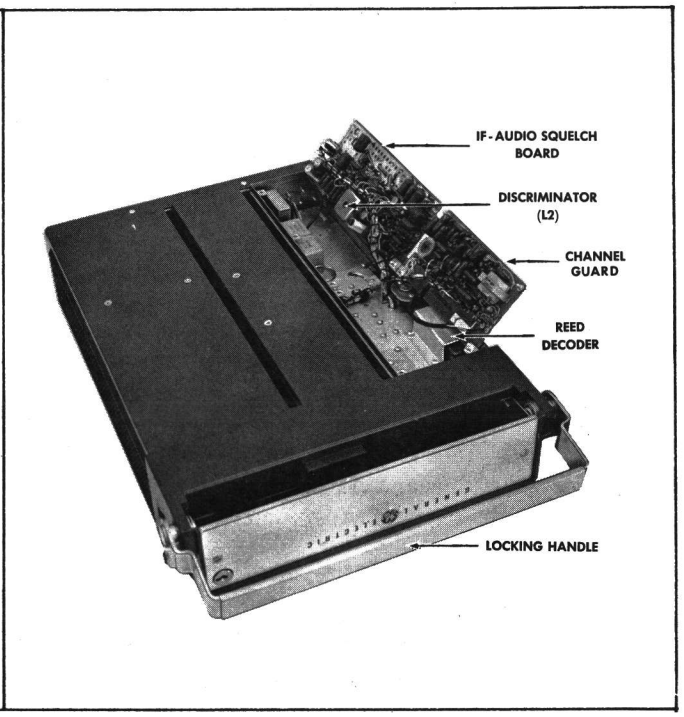


Figure 3 - Bottom Cover Removed

To remove the receiver from the system frame --

1. Loosen the two Phillips-head retaining screws in front casting (see Figure 2), 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.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR5 and CR6	19A115250P1	Silicon.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L2 and L3	19A121532G1	Coil.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R56	3R152P331J	Composition: 330 ohms ±5%, 1/4 w.
R57 and R58	3R152P473J	Composition: 47,000 ohms ±5%, 1/4 w.
A425* thru A427*		CHANNEL GUARD A425 19C303550G1 (Used in early models) A426 19C303550G2 REV E A427 19C303550G3 (Replaces A425 in later models)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C3	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C4	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
C5 and C6	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C7	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
C8*	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
		In A426 of REV C and earlier:
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW.
C9 and C10	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C11*	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
		In A426 of REV C and earlier:
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW.
C12	5495670P14	Electrolytic: 5 µf +75% -10%, 25 VDCW; sim to Sprague Type 30D.
C13	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C14 and C15	19A116080P101	Polyester: 0.01 µf ±10%, 50 VDCW.
C16 and C17	5491459P110	Polyester: 0.0015 µf ±10%, 50 VDCW.
C18	5491459P111	Polyester: 0.0033 µf ±10%, 50 VDCW.
C19*	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
		In A426 of REV C and earlier:
	5491459P109	Polyester: 0.33 µf ±10%, 50 VDCW.
C20	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C21*	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
		In A426 of REV B and earlier:
	5491459P104	Polyester: 0.068 µf ±10%, 50 VDCW.
C22	19A116080P110	Polyester: 0.33 µf ±10%, 50 VDCW.
C23*	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
		In A426 of REV C and earlier:
	5491459P112	Polyester: 0.47 µf ±10%, 50 VDCW.
C24 and C25	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C26 and C27	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
C28	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C29	19A116080P104	Polyester: 0.033 µf ±10%, 50 VDCW.
C30*	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW. Added to A426 by REV D.
C31*	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW. Added to A426 by REV D.
		- - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1 and CR2	4038055P1	Germanium.
CR3	19A115250P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - -
J3 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J8 thru J10	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1*	19A115690P2	Coil.
		In A423 of REV C and earlier:
	19B204554G1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 thru Q6	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P752J	Composition: 7500 ohms ±5%, 1/2 w.
R3	3R77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R4 and R5	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R6	3R77P560J	Composition: 56 ohms ±5%, 1/2 w.
R7	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R8 and R9	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R10	3R77P752J	Composition: 7500 ohms ±5%, 1/2 w.
R11	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R12	3R77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R13	3R77P271J	Composition: 270 ohms ±5%, 1/2 w.
R14	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R15 and R16	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R17	3R77P822J	Composition: 8200 ohms ±5%, 1/2 w.
R18	3R77P823J	Composition: 82,000 ohms ±5%, 1/2 w.
R19	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R20	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R21	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R22 and R23	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R24*	3R77P331J	Composition: 330 ohms ±5%, 1/2 w. Added to A426 by REV E.
R25	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R26*	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w. Deleted from A426 by REV E.
R27	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R28	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R29	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.
R30 and R31	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R32 and R33	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R35	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R36	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R37	3R77P184J	Composition: 0.18 megohm ±5%, 1/2 w.
R38	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R39*	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w. Added to A426 by REV E.
R40	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - -
T1	5490525P2	Audio freq: 100 to 10,000 Hz, Pri: 35,000 ohms ±10% imp, 1200 ohms ±15% DC res, Sec 1: 2000 ohms imp, 250 ohms ±10% DC res, Sec 2: 2000 ohms imp, 250 ohms ±10% DC res.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	19A121920G2	Reed, mica-filled phen: 7 pins rated at 1 amp at 500 VRMS.
		CHANNEL GUARD REEDS
FL410		Reed, detector: coil - 600 ohms ±10%, standard 7-pin tube socket mounting.
	19C307140P719	71.9 Hz
	19C307140P770	77.0 Hz
	19C307140P825	82.5 Hz
	19C307140P885	88.5 Hz
	19C307140P948	94.8 Hz
	19C307140P1000	100.0 Hz
	19C307140P1035	103.5 Hz
	19C307140P1072	107.2 Hz
	19C307140P1109	110.9 Hz
	19C307140P1148	114.8 Hz
	19C307140P1188	118.8 Hz
	19C307140P1230	123.0 Hz
	19C307140P1273	127.3 Hz
	19C307140P1318	131.8 Hz
	19C307140P1365	136.5 Hz
	19C307140P1413	141.3 Hz
	19C307140P1462	146.2 Hz
	19C307140P1514	151.4 Hz
	19C307140P1567	156.7 Hz
	19C307140P1622	162.2 Hz
	19C307140P1679	167.9 Hz
	19C307140P1738	173.8 Hz
	19C307140P1799	179.9 Hz
	19C307140P1862	186.2 Hz
	19C307140P1928	192.8 Hz
	19C307140P2035	203.5 Hz
A432 thru A435		COMPONENT BOARD (ICOM) A432 19C311726G1 (4ER42D10, 16, 22, 28, 34, 40) A433 19C311726G2 (4ER42D14, 20, 26, 32, 38, 44) A434 19C311726G3 (4ER42D11, 17, 23, 29, 35, 41) A435 19C311726G4 (4ER42D15, 21, 27, 33, 39, 45)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C3	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C5	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6		(Part of T1).
C7		(Part of T2).
C8*	5496219P238	Ceramic disc: 7 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
		Earlier than REV A:
	5491601P130	Phenolic: 3.3 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C9	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C10 thru C13	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.

SYMBOL	GE PART NO.	DESCRIPTION
C14*	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		Earlier than REV A:
	5496219P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR5	19A115250P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J15 and J16	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	7488079P16	Choke, RF: 10 µh ±10%, 0.6 ohm DC res max; sim to Jeffers 4421-7K.
L5		(Part of T1 or T2).
L6*	7488079P35	Choke, RF: 2.20 µh ±10%, 0.50 ohms DC res max; sim to Jeffers 4412-9K. Added by REV A.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1*	19A115440P1	Silicon, NPN.
		In REV A and earlier:
	19A115330P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R2	3R152P151J	Composition: 150 ohms ±5%, 1/4 w.
R3	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R5 and R6	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R7	3R77P272K	Composition: 2700 ohms ±10%, 1/2 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1 and T2		COIL ASSEMBLY T1 19B204950G1 T2 19B204950G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C6	5496218P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L5	19A121728P1	Coil. Includes tuning slug 5491798P7.
		OSCILLATORS
		NOTE: When reordering specify ICOM Frequency. ICOM Freq = Operating Freq -12.4 MHz ÷ 24.
	4EG26A10	Integrated Circuit Oscillator Module (ICOM).
	19D413070P1	Cap, decorative.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY1 thru XY4	19B216043G1	Socket.
		CHASSIS AND RF CIRCUIT 19E50086G5 thru G8
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C410 and C411		Refer to Mechanical Parts (RC-1598).

SYMBOL	GE PART NO.	DESCRIPTION
C412 and C413	5493392P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C414 thru C418		Refer to Mechanical Parts (RC-1598).
C419 thru C422	5493392P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C423 and C424		Refer to Mechanical Parts (RC-1598).
C425 thru C427	5493392P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C428	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C429	19A115680P4	Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C430	5496218P755	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -750 PPM.
C432	5491601P25	Phenolic: 2 pf ±10%, 500 VDCW.
C433	5493392P3	Ceramic, feed-thru: 47 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C434	594481P12	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C435	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C436	7774750P6	Ceramic disc: .002 µf +100% -0%, 500 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR401*	4037822P1	Silicon. Added by REV A.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J441	19B205634G3	Connector, coaxial: includes cable (W441), approx 5 inches long.
J442	19B205689G2	Connector: 18 contacts rated at 5 amps min at 1000 VDC max.
J443	19C303426G1	Connector: 20 pin contacts.
J444	19B205634G7	Connector, coaxial: includes cable (W444), approx 7 inches long.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L410	19B204938G7	Coil.
L411	19B204938G9	Coil.
L412	19B204938G8	Coil.
L413	19B204938G10	Coil.
L414	19B204938G11	Coil.
L415 thru L417	19B204936P1	Coil.
L418	19B204938G5	Coil.
L419	19B204938G12	Coil.
L420 thru L422	19B204936P2	Coil.
L423	19B204938G6	Coil.
L424	19B204938G3	Coil.
L425	19B204938G1	Coil.
L426	19B204938G4	Coil.
L427	19B204938G2	Coil.
L428 and L429	7468079P18	Choke, RF: 15 µh ±10%, 1.2 ohms DC res; sim to Jeffers 4421-9K.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P305 thru P308	4029840P2	Contact, electrical: sim to Amp 42827-2.
P310	4029840P1	Contact, electrical: sim to Amp 41854.

SYMBOL	GE PART NO.	DESCRIPTION
P311 thru P320	4029840P2	Contact, electrical: sim to Amp 42827-2.
P321	4029840P1	Contact, electrical: sim to Amp 41854.
P322 thru P337	4029840P2	Contact, electrical: sim to Amp 42827-2.
P410 and P411	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q410	19A115527P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R410 thru R413	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - -
T410		COIL ASSEMBLY 19B204946G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
	5491798P7	Tuning slug.
T411		COIL ASSEMBLY 19B204944G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5494481P3	Ceramic disc: 220 pf ±10%, 1000 VDCW.
C4	5491601P120	Phenolic: 1.0 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A121975P1	Silicon, capacitive.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P152J	Composition: 1500 ohms ±5%, 1/4 w.
R2	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
	5491798P7	Tuning slug.
T412		COIL ASSEMBLY 19B204946G2
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C2	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
	5491798P7	Tuning slug.
T413		COIL ASSEMBLY 19B204944G2
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C2	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5494481P3	Ceramic disc: 220 pf ±10%, 500 VDCW.
C4	5491601P120	Phenolic: 1.0 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A121975P1	Silicon, capacitive, low frequency.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P152J	Composition: 1500 ohms ±5%, 1/4 w.
R2	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
	5491798P7	Tuning slug.

SYMBOL	GE PART NO.	DESCRIPTION
T414	19B209083P2	Audio freq: 300 to 3000 Hz, 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	7487424P2	Miniature, phen: 1 terminal.
TB2 and TB3	7487424P24	Miniature, phen: 3 terminals.
		- - - - - - - - - - - CABLES - - - - - - - - - -
W441	19B205634G3	(Part of J441).
W444	19B205634G7	(Part of J444).
W445	19A122550G1	RF: 50 ohm imp, approx 4 inches.
		MULTI - FREQUENCY HARNESS 19A127136G1
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P301 thru P304	4029840P1	Contact, electrical: sim to AMP 42827-2.
	19A115700P2	Toroidal: ferrite, sim to Fair-Rite SL207.
		MECHANICAL PARTS (SEE RC-1598)
1	19C303396G4	Bottom Cover. (Station)
	19C303385G1	Bottom Cover. (Mobile)
2	19A121674P1	Angle support. (Used with C427).
3	19C303394G1	Heat sink.
4	19A121723P1	Angle support.
5	4033089P1	Clip. (Part of XY1-4).
6	19B200525P9	Rivet. (Part of XY1-4).
7	19A115793P1	Electrical contact. (Part of XY1-4).
8	4039307P1	Crystal socket. (Part of XY1-4).
9	4034252P5	Can. (Part of T2).
10	19C303389G1	Chassis.
11	19A121722P1	Plate.
12	19A121724P1	Angle support.
13	7145451P1	Cable clamp.
14	19E500814P1	RF chassis.
15	4036765G5	Screw. (Part of C410, 411, 414-418, 423, 424).
16	7137968P8	Stop nut: thd size No. 6-32; sim to Palnut T0932005. (Part of C410, 411, 414-418, 423, 424).
17	19B204583G3	Hinge.
18	4035439P1	Heat sink, transistor; sim to Birtcher 3AL-635-2R. (Used with Q10).
19	4036555P1	Washer, insulator: nylon. (Used with Q9, 10).
20	4032187P1	Can. (Part of T1 on A430, 431).
21	4035306P11	Fiber washer. (Used with L1 on A410, A412).
22	19B204583G1	Hinge.
23	19A115784P1	Insulator, mica. (Used with Q410).
24	19A121989P1	Bushing.
25	19A121229G1	Reed support. (Used with FL410).
26	19B204583G2	(Not Used).
27	19A121676P1	Guide pin: 4-40 mounting thread.
28	19C303495G3	Top Cover. (Station- except Repeaters and VM).
	19C303676G2	Top Cover. (Station- Repeater and VM only).
	19C303385P2	Top Cover. (Mobile).
29	19A121297P2	Angle support. (Mounts cover).
30	7160861P4	Nut, spring clip: sim to Tinnerman C6452-8Z-157.
31	19B204940P1	RF plate.
32	19A115461P2	Spring washer: sim to Shakeproof 3597-04-00. (Located on board mounting screws).

PRODUCTION CHANGES

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

CHASSIS 19E500816-G1 -G36

REV. A - To utilize improved transistor and to eliminate shorting of audio transformer terminals. Changed Q410 and T414.

REV. B - To eliminate feedback within receiver cabling. Added C435 and C436.

REV. C - To eliminate oscillations in multiplier circuit. Changed C3 in the T411/T413 assembly.

First Oscillator Assembly A415 & A418

REV. A - To incorporate value improvements in single frequency receivers. Deleted CR1 and R5 and added R20.

Second Mixer Assembly A422

REV. A - To decrease 2nd Oscillator injection voltage and to widen 455 KHz bandwidth. Changed C19, C23 and C24.

REV. B - To provide better temperature compensation for low IF circuits. Changed C10, C11 and C22.

REV. C - To improve temperature characteristics. Changed C4, C5, C10, C15, C20, C24, L2, L7 to L5, L6, L8 to L7, deleted C6, & C16, and added C7.

IF/Audio Assembly A423 & A424

REV. A - To reduce variation in discriminator output and reduce audio rumble produced when volume control is at minimum and squelch near critical. Changed Q4 & Q5, deleted R46 and added R74, R75 and C71.

REV. B - (A423) To improve 3000 Hz audio response. Added C76, C77 & R79 and deleted C53 & R32.

REV. B - (A424)
REV. C - (A423) To improve circuit DC bias stability of AUDIO AMP Q10. Added R80.

REV. C - (A424)
REV. D - (A423) To improve receiver squelch hysterisis and audio squelch tail. Changed R64.

REV. D - (A424)
REV. E - (A423) To improve audio sensitivity. Changed R43.

REV. F - (A423) To standardize manufacturing procedure. Deleted C77, changed C76 and added C53.

REV. G - (A423 & A424) To eliminate capacitor failures in positive ground installations. Added C20 and changed C62.

Channel Guard Board (A425, A426)

REV. A,B- (A426)
REV. A,B & C- (A425) Incorporated in initial shipments.

REV. C - (A426)
REV. D - (A425) To allow for variations in audio response. Changed C21.

REV. D - (A426)
REV. E - (A425) To facilitate procurement of parts. Changed C8, C11, C19 & C23, and added C30, C31 and L1. Added C28 to A425 only.

REV. E - (A426) To reduce noise falsing. Added R24 & R39 and deleted R26.

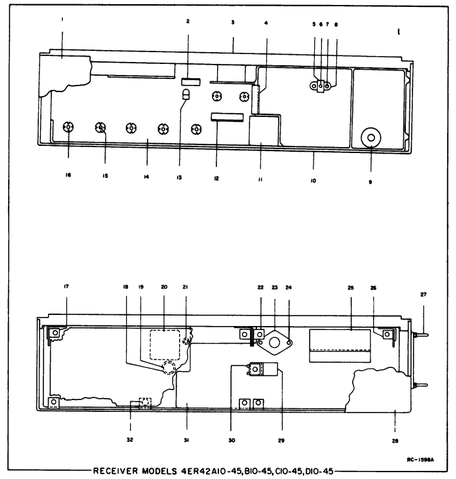
IF/Audio Assembly A423 & A424

REV. H - To eliminate high frequency oscillation in receiver P.A. caused by the use of a higher gain P A transistor. Added C78.

Chassis 19E500866-G1 - G8 (Replaces chassis 19E500816G1 - G36

REV.A - To protect the audio PA transistor (Q410) from negative voltage spikes. Added CR401.

REV.B - To incorporate a new transistor, changed Q2 in A410/A412 assembly and Q3 in A414 assembly.



RECEIVER MODELS 4ER42A10-45,B10-45,C10-45,D10-45

COMPLETE RECEIVER ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A10, Station Meter Switching Panel, or 20,000 ohms-per-volt multimeter.
2. A 455-kHz (GE Test Set 4EX7A10 or equivalent) and a 406-470 MHz signal source. Connect a one-inch piece of insulated wire no larger than .065 inch to generator output probe.
3. Two 39,000-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 (A415/A420 only) 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 500 kHz, align the unit on channel F1. If the frequency spacing is greater than 500 kHz, align the receiver on the center frequency.
4. With VOLUME control fully counterclockwise and Test Set in Position G, adjust R47 on the IF-AUDIO & SQUELCH board for a reading of 0.55 volts. If using Multimeter, connect leads to J442-1 (AUDIO-PA) and J442-8 (System Negative).

NOTE

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

5. With Test Set in position J, check for regulated +10 volts. If using Multimeter, measure from C425 to C426.
6. If using Multimeter for the alignment, connect the positive lead to J442-16 (ground).
7. Disable the Channel Guard.

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-kHz signal to J2 on IF-AUDIO & SQUELCH board and adjust L3 (disc secondary) for zero meter reading.
2.	A (DISC)	Pin 10	L2 (Top Slug) and L3 (Bottom slug on IF-AUDIO & SQUELCH board)	±1.8 v Typical	Loosen screws and swing IF-AUDIO & SQUELCH board open and switch GE Test Set to TEST 3 position. Alternately apply a 455-kHz and 465-kHz signal while adjusting L2 and L3 for readings of at least 1.5 volts, but not more than 2.1 volts. Both readings must be within 0.1 volt.
			OSCILLATOR AND MULTIPLIERS		
3.	D (MULTI-1)	Pin 4	L5 (on 1st OSC/MULT) and T410/T412	See Procedure	Tune L5 for maximum meter reading. Then tune T410/T412 for minimum meter reading.
4.	E (MULTI-2)	Pin 5	L5 (on 1st OSC/MULT) T410/T412 and T411/T413	Maximum	Tune L5, T410/T412 and T411/T413 for maximum meter reading.
5.	E (MULTI-2)	Pin 5	C423	See Procedure	Adjust C423 for a small change in meter reading.
6.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal into Hole 411. Adjust the signal generator for discriminator zero.
7.	B (2nd IF AMP)	Pin 2	C423 and C424	Maximum	Apply an on-frequency signal as above. Tune C423 and C424 for maximum meter reading, keeping signal below saturation.
			RF AMPLIFIERS AND SELECTIVITY		
8.	B (2nd IF AMP)	Pin 2	C3 (on RF AMP A412), C418 C417, C416 and C415	Maximum	Apply an on-frequency signal into holes as shown below, keeping below saturation. Tune for maximum meter reading as shown below: Insert Signal Generator Probe In: — Tune: 1. Hole 415 — C3, C418 & C417 2. Hole 410 — C415, C416 & C417
9.	B (2nd IF AMP)	Pin 2	C414, C415, C416, C417, C418 C423 & C424, C3 (on RF AMP A412)	Maximum	Apply an on-frequency signal to the antenna jack. Tune C414 through C418, C3, C423 and C424 for maximum meter reading, keeping signal below saturation.
10.	B (2nd IF AMP)	Pin 2	C410, C411 and C3 (on RF AMP A410)	Maximum	On Ultra-High Sensitivity Receivers, apply an on-frequency signal as above, and tune C410, C411 and C3 on RF AMP A410 for maximum meter reading.
11.	B (2nd IF AMP)	Pin 2	C410, C411, C3 (on RF AMP A410 through C418 and C3 (on RF AMP A412)	See Procedure	Apply an on-frequency signal as above, and tune C410, C411, C3 (on RF AMP A410), C414 through C418 and C3 (on RF AMP A412) for maximum quieting.
			MIXERS AND LO IF*		
12.	B (2nd If AMP)	Pin 2	C9 (on 1st MIXER)	Maximum	Apply an on-frequency signal to the antenna jack and tune C9 for maximum meter reading, keeping signal below saturation.
13.	B (2nd IF AMP)	Pin 2	T2 (on 2nd MIXER)	Maximum	Apply an on-frequency signal as above, and tune T2 for maximum meter reading, keeping signal below saturation.
14.	B (2nd IF AMP)	Pin 2	L1, L2 and L3 (on 2nd MIXER)	Maximum	With one of the 39,000-ohm resistors to ground, load and peak as follows: Load L2 at Point B-Peak L6 & L5. Load L5 & L6 at Points A & C-Peak L2.

* NOTE - The mixer and low IF coils have been aligned at the factory and will normally require no further adjustment. If alignment is necessary, the best procedure is the Double Trace Sweep Method described in Datafile Bulletin 1000-6. An alternate method is provided by Steps 12, 13, and 14 of the COMPLETE RECEIVER ALIGNMENT.

FREQUENCY ADJUSTMENT

STANDARD OSCILLATOR

METERING POSITION 4EX3A10	METERING POSITION Multi-meter -at J442	TUNING CONTROL	METER READING	PROCEDURE
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 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°F - 90°F.

ICOM MODULE

Due to the high stability of the ICOM module, it is not recommended that zero discriminator be used as the indication for setting the oscillator frequency. Instead, measure the ICOM frequency as described in the following procedure.

EQUIPMENT REQUIRED:

1. Frequency Counter capable of measuring the 70-80 MHz frequency range. (The counter should have an accuracy of 0.4 part-per million.)
2. Coaxial cable with test loop as described in Figure 4.
3. Mercury thermometer.

PROCEDURE:

1. Check the ICOM temperature by taping the mercury thermometer to the side of the ICOM.
2. Connect the frequency counter to L5 (on the OSC/MULT) using the 4-turn test loop and cable shown in Figure 4.
3. If the ICOM tempeature is 80°F (±4°F) or 26.5°C (±2°C), the frequency indication on the counter should be 4 times the frequency stenciled on the ICOM case. Adjust the ICOM trimmer (if necessary) to obtain this frequency.
4. If the temperature is not within the 80°F (±4°F) or 26.5°C (±2°C) range, use the correction curves of Figure 5 for setting the ICOM frequency as follows:
   a. Check the color dot beneath the GE emblem and select the matching curve to determine the correction factor in parts-per-million (PPM).
   b. Multiply the frequency stenciled on the ICOM by 4 and then multiply this figure by the correction factor (from Figure 5) observing the sign (±) given to the correction factor.
   c. The frequency measured at L5 should be 4 times the ICOM frequency ± the correction factor. Adjust the ICOM trimmer (if required) to obtain this frequency.

FOR EXAMPLE

ICOM Frequency - 18.233333 MHz
ICOM Color Dot - Green
Ambient Temperature - 35°C (95°F)
Correction Factor - -1.15 PPM
(From Figure 5)

Multiply ICOM Frequency by 4: (18.233333 MHz x 4 = 72.933332 MHz)

Multiply preceding figure by correction factor; (72.933 MHz x -1.15 PPM = 83.87 hertz (or -84 hertz)

Set the frequency measured at L5 for 72.933248 MHz;

72.933332 MHz
- .000084 MHz
72.933248 MHz

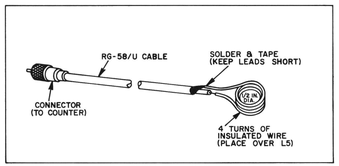


Figure 4 - Coaxial Cable and Test Loop

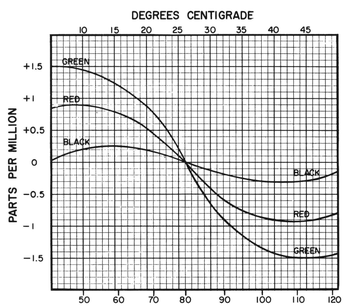
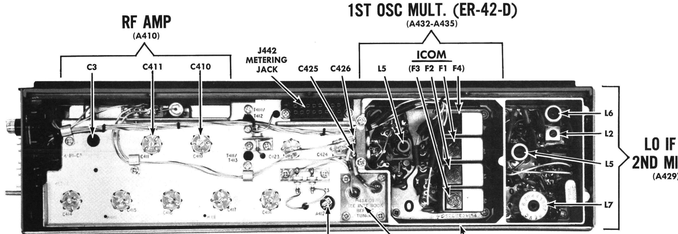
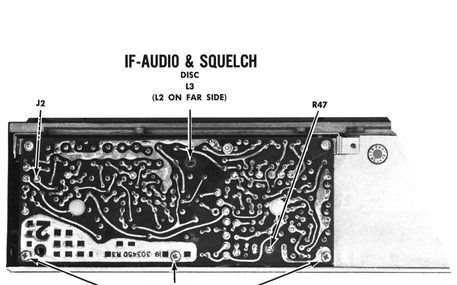
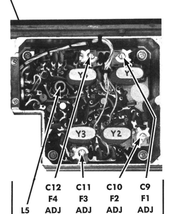


Figure 5 - ICOM Correction Curves







FRONT END ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A10, Station Meter Switching Panel, or 20,000 ohms-per-volt multimeter.
2. A 406-470 MHz signal source.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set Model 4EX3A10 to receiver centralized metering jack J442.
2. In multi-frequency receivers where the maximum frequency spacing is less than 500 kHz, align the unit on channel F1. If the frequency spacing is greater than 500 kHz, align the receiver on the center frequency.
3. With VOLUME control fully counterclockwise and Test Set in position G, adjust R47 on the IF-AUDIO & SQUELCH board for a reading of 0.55 volts. If using Multimeter, connect leads to J442-1 (AUDIO-PA) and J442-8 (System Negative).

NOTE

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

4. With Test Set in postlion J, check for regulated +10 volts. If using Multimeter, measure from C425 to C426.
5. If using Multimeter for the alignment, connect the positive lead to J442-16 (ground).
6. Disable the Channel Guard.

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			OSCILLATOR AND MULTIPLIERS		
1.	E (MULT-2)	Pin 5	L5 (on 1st OSC/MULT) T410/T412 and T411/T413	Maximum	Tune L5, T410/T412 and T411/T413 for maximum meter reading.
2.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal into antenna jack. Adjust the signal generator for discrimination zero.
3.	B (2nd IF AMP)	Pin 2	C423 and C424	Maximum	Apply an on-frequency signal as above. Tune C423 and C424 for maximum meter reading keeping signal below saturation.
			RF AMPLIFIERS AND SELECTIVITY		
4.	B (2nd IF AMP)	Pin 2	C410, C411, C3 (on RF AMP A410), C414 thru C418, C3 (on RF AMP A412)	See Procedure	Apply an on-frequency signal as above, and tune C410, C411, C3 (on RF AMP A410), C414 through C418 and C3 (on RF AMP A412) for maximum quieting.
			FERQUENCY ADJUSTMENT		
5.	Refer to appropriate procedure for ICOM or Standard Oscillator.				

ALIGNMENT PROCEDURE

406 — 470 MHZ MASTR RECEIVERS
MODELS 4ER42B10-45 & 4ER42D10-45

TEST PROCEDURES

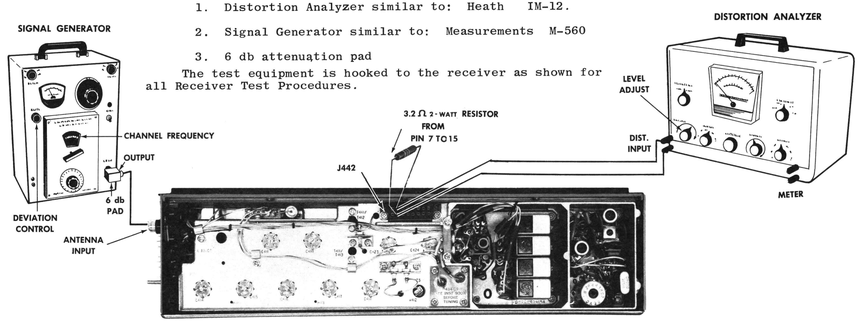
These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encounted could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect can be quickly localized. Once the defective stage is pinpointed, 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

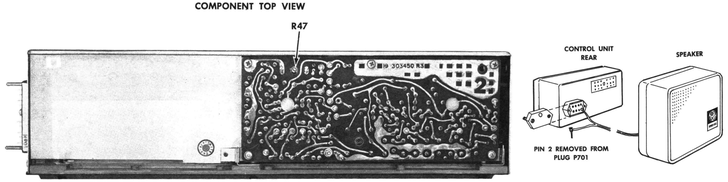
for test hookup shown:

1. Distortion Analyzer similar to: Heath IM-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 TOP VIEW



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 Hertz ±10 kHz deviation to the antenna jack J441.
2. Two-Watt Speaker:

   When speaker is used, disconnect speaker lead pin from J701-2 (on rear of Control Unit). Hook up a 3.2-ohm load resistor from J442-15 to J442-7.

   OR

   Handset:

   When handset is used, lift handset off of hookswitch.
3. Two-Watt Speaker:

   Connect Distortion Analyzer input across the 3.2-ohm resistor as shown.

   OR

   Handset:

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

VOLTMETER SCALE ON DISTORTION ANALYZER

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

SERVICE CHECK

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

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

STEP 2

USABLE SENSITIVITY (12 db SINAD)

TEST PROCEDURE

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

1. Be sure Test Step 1 checks out properly.
2. Reduce the Signal Generator output from setting in Test Step 1.
3. Adjust Distortion Analyzer LEVEL control for a +2 db reading.
4. Set CONTROL from LEVEL to DISTORTION reading. Repeat Steps 1, 2 and 3 until difference in reading is 12 db (+2 db to -10 db).
5. The 12-db difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. Reading should be less than 0.45 microvolts on standard receivers, and 0.3 microvolts on Ultra-High Sensitivity receivers, 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 0.45 microvolts on standard receivers, and 0.3 microvolts on Ultra-High Sensitivity receivers, 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 ±17 kHz (but less than ±20 kHz).

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 & -5 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 (Q410) 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 Q410. Check unsquelched voltage readings in Audio section (Refer to Receiver Schematic Diagram). Check voltage and resistance readings on Channel Guard receiver.
IMPROPER SQUELCH OPERATION	Check voltage and resistance readings of Squelch circuit (Refer to Receiver Schematic Diagram).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	See if discriminator zero is on 455 kHz

STEP 3- VOLTAGE RATIO READINGS

EQUIPMENT REQUIRED:

1. RF VOLTMETER (SIMILAR 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.
3. AC-VTVM FOR AUDIO STAGES, WITH SIGNAL GENERATOR SET FOR ONE MILLIVOLT MODULATED BY 1 kHz WITH 10 kHz DEVIATION.

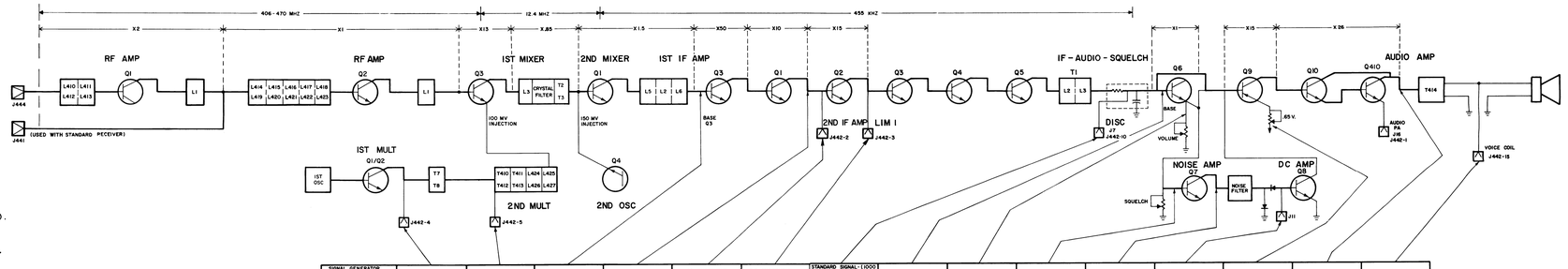
PROCEDURE

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

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

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

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



STEP 2- SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

1. VTVM-AC & DC
2. SIGNAL GENERATOR (MEASUREMENTS M560 EQUIV.)

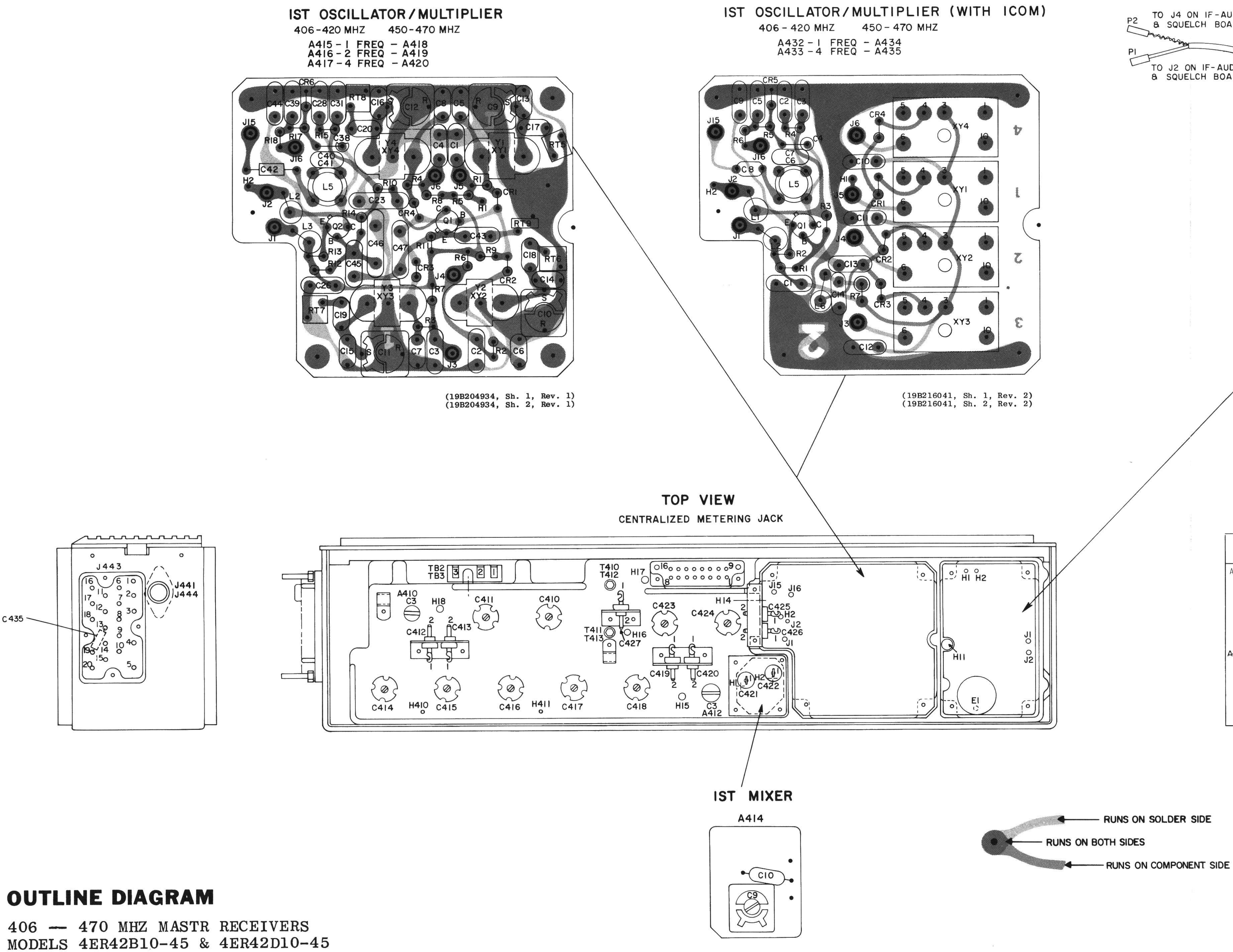
PRELIMINARY STEPS:

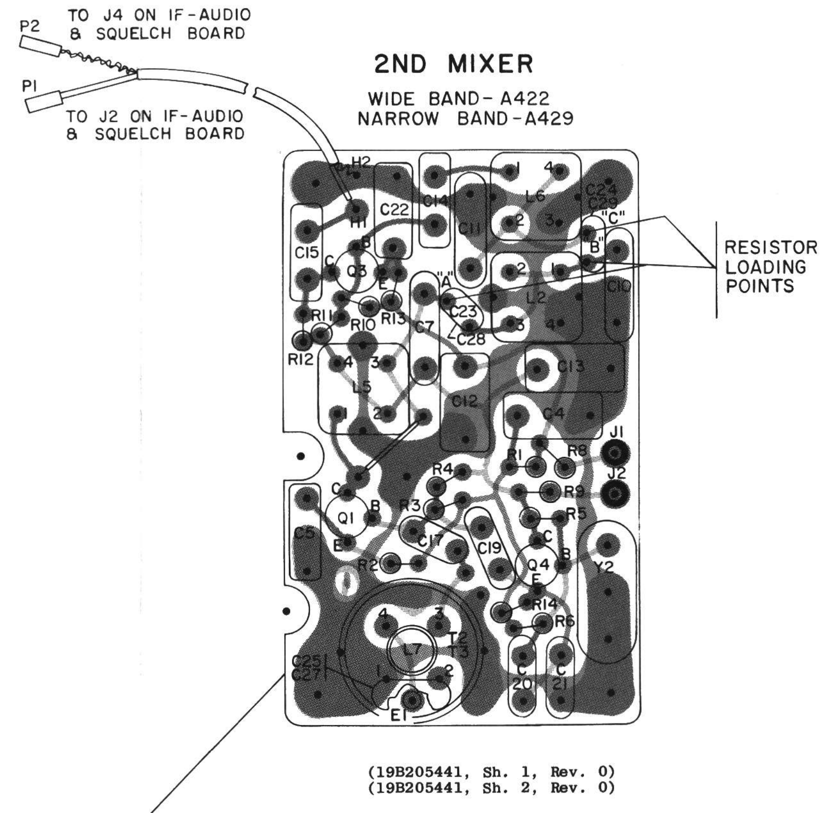
1. SET VOLUME CONTROL FULLY CLOCKWISE.
2. SET SQUELCH CONTROL FULLY COUNTERCLOCKWISE.
3. RECEIVER SHOULD BE PROPERLY ALIGNED.
4. CONNECT SIGNAL GENERATOR TO ANTENNA JACK.
5. VTVM CONNECTS BETWEEN GROUND AND POINTS INDICATED BY ARROWS.

SIGNAL GENERATOR INPUT. MAINTAIN SETTING AT DISCRIMINATOR ZERO			UNMODULATED	UNMODULATED	10 MICROVOLT UNMODULATED	0.5 MICROVOLT UNMODULATED	STANDARD SIGNAL-1 (1000 MICROVOLTS, 30 PCNT FREQ MOD BY 1 KHZ AT 3.3 KHZ AND 0R 12 PCT FREQ MOD BY 1 KHZ AT 15 KHZ)	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	NO SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL
PROCEDURE			INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READS 1.5 VDC INCREASES BY 0.2 VDC *	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING INCREASES 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	1.0 VDC	GENERATOR OUTPUT SHOULD BE APPROX. 2000 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX. 300 MICROVOLTS	1.5 VDC	1.5 VDC	0.1 VAC	1.5 VAC	1.5 VAC	0.07 VAC	2.5 VAC	2.0 VDC	ADJUST FOR 0.65 VDC (SEE ALIGNMENT PROCEDURE)	8.5 VAC	2.53 VAC

* NEG LEAD OF VTVM TO -10V.

RC-12438

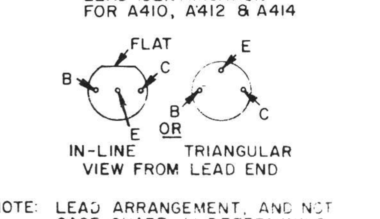




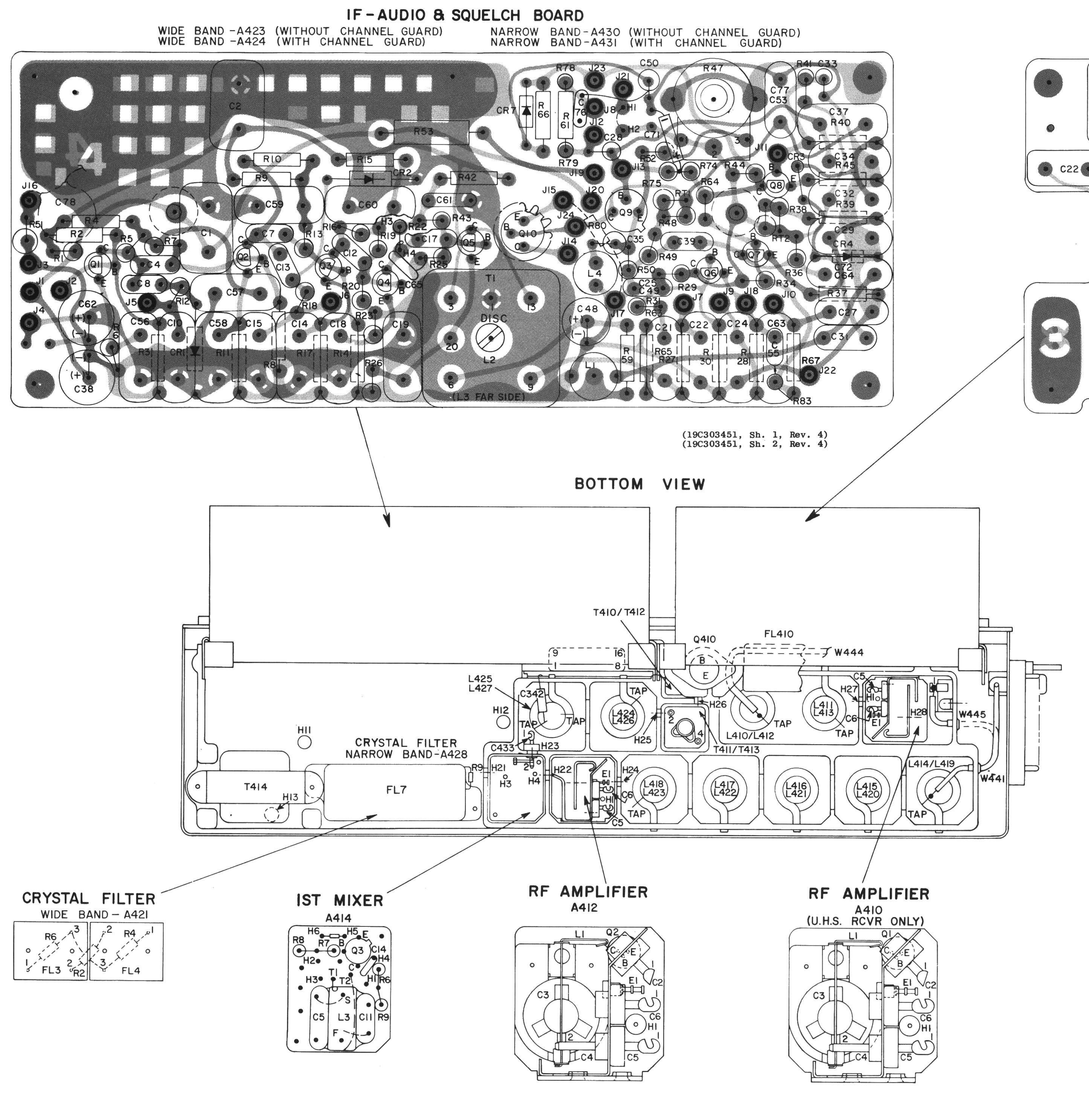
TRANSISTOR	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
A423, A424, A430, A431-Q1	2K	2K	13.5K	4.1K	4.1K	4.9K
-Q2	2K	2K	13.5K	4.1K	4.1K	5.2K
-Q3	2K	2K	13.5K	4.1K	4.1K	5.2K
-Q4	2K	2K	13.5K	4.1K	4.1K	5.2K
-Q5	350Ω	300Ω	13.5K	3.0K	1.0K	1.0K
-Q6	3.5K	3.5K	40.0K	7.5K	6K	2 MEG
-Q7	2K	2K	13.0K	5.0K	11K	19.0K
-Q8	180Ω	180Ω	1.5MEG	3.2K	13K	17.0K
-Q9	2.2K	2.2K	5K	50.0K	2.3K	2.3K
-Q10	100Ω	10Ω	2.2K	2.2K	1Ω	1Ω *
A423, A424, A430, A431-Q410	2Ω	2Ω	100Ω	10Ω	1Ω	1Ω *
A415/A420-Q1	470Ω	1K	10.5K	250Ω	110Ω	110Ω
A415/A420-Q2	2800Ω	140Ω	100Ω	100Ω	70Ω	150Ω
A410-Q1/A412-Q2	200Ω	400Ω	600Ω	350Ω	190Ω	225Ω
A414-Q3	3.9K	10K	1.6K	1.6K	500Ω	600Ω
A422 A429-Q1	430Ω	5.5K	8.5K	430Ω	200Ω	200Ω
A422 A429-Q3	2.2K	2.3K	2.2K	2.1K	2.8K	3.3K
A422 A429-Q4	400Ω	10K	5.3K	430Ω	200Ω	200Ω
A432 A435-Q1	2800Ω	140Ω	100Ω	100Ω	70Ω	150Ω

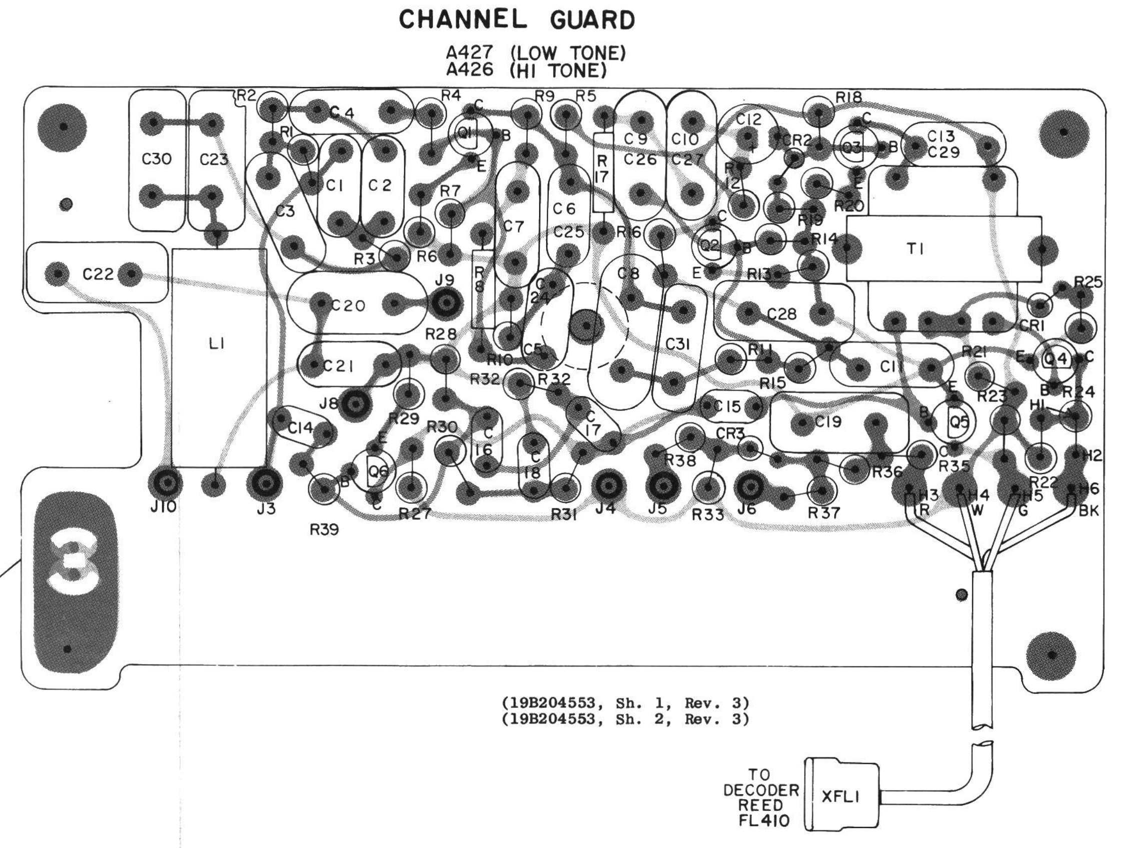
* JUMPER FROM T414 PIN #1 TO C425-C426

(19R621218, Rev. 4)



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





TRANSISTOR	EMITTER		BASE		COLLECTOR	
A427/A426	−	+	−	+	−	+
Q1	56Ω	56Ω	8.3K	145Ω	6.8K	9.0K
Q2	270Ω	270Ω	8K	500Ω	6.5K	5.0K
Q3	1K	1K	75K	3.5K	2.5K	2.5K
Q4	1Ω	1Ω	14K	10Ω	2.3K	2.3K
Q5	1Ω	1Ω	14K	10Ω	2.3K	2.3K
Q6	22Ω	22Ω	4.5K	90Ω	3.4K	3.4K

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 C425-1 (+10V) TO C426-1 (−10), AND ARE MEASURED FROM TRANSISTOR PINS TO C425-1. + OR — SIGNS SHOW METER LEAD TO C425-1.

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

OUTLINE DIAGRAM

406 — 470 MHZ MASTR RECEIVERS
MODELS 4ER42B10-45 & 4ER42D10-45

SYM. NO	PARTS LISTS	REV LETTER
	PL19E500866G5	B
	PL19E500866G6	B
	PL19E500866G7	B
	PL19E500866G8	B
A426	PL19C303550G2	F
A427	PL19C303550G3	A
A422	PL19B204438G2	D
A423	PL19D402327G5	H
A424	PL19D402327G6	H

SYM NO	PARTS LIST	REV LETTER
A415	PL19B204419G19	A
A416	PL19B204419G20	
A417	PL19B204419G21	
A418	PL19B204419G22	A
A419	PL19B204419G23	
A420	PL19B204419G24	

MODELS WITH DISCRETE CIRCUIT OSCILLATOR	MODELS WITH ICOM OSCILLATOR	NO. OF FREQS.	FREQ RANGE 406-420=LO 450-470=HI	CHANNEL GUARD TONE FREQ RANGE	U. H. S. RECEIVER A410 PRESENT
4ER42B10	4ER42D10	1	LO		
4ER42B11	4ER42D11	1	HI		
4ER42B12		2	LO		
4ER42B13		2	HI		
4ER42B14	4ER42D14	4	LO		
4ER42B15	4ER42D15	4	HI		
4ER42B16	4ER42D16	1	LO	LO	
4ER42B17	4ER42D17	1	HI	LO	
4ER42B18		2	LO	LO	
4ER42B19		2	HI	LO	
4ER42B20	4ER42D20	4	LO	LO	
4ER42B21	4ER42D21	4	HI	LO	
4ER42B22	4ER42D22	1	LO		X
4ER42B23	4ER42D23	1	HI		X
4ER42B24		2	LO		X
4ER42B25		2	HI		X
4ER42B26	4ER42D26	4	LO		X
4ER42B27	4ER42D27	4	HI		X
4ER42B28	4ER42D28	1	LO	LO	X
4ER42B29	4ER42D29	1	HI	LO	X
4ER42B30		2	LO	LO	X
4ER42B31		2	HI	LO	X
4ER42B32	4ER42D32	4	LO	LO	X
4ER42B33	4ER42D33	4	HI	LO	X
4ER42B34	4ER42D34	1	LO	HI	
4ER42B35	4ER42D35	1	HI	HI	
4ER42B36		2	LO	HI	
4ER42B37		2	HI	HI	
4ER42B38	4ER42D38	4	LO	HI	
4ER42B39	4ER42D39	4	HI	HI	
4ER42B40	4ER42D40	1	LO	HI	X
4ER42B41	4ER42D41	1	HI	HI	X
4ER42B42		2	LO	HI	X
4ER42B43		2	HI	HI	X
4ER42B44	4ER42D44	4	LO	HI	X
4ER42B45	4ER42D45	4	HI	HI	X

■ LOW TONE CHAN. GUARD — 71.9 TO 156.7 HZ
✚ HIGH TONE CHAN. GUARD — 162.2 TO 203.5 HZ
⊗ NON CHAN. GUARD
⊠ CHAN. GUARD

NOTES:

1. RF AMPLIFIER A410 IS PRESENT ONLY IN ULTRA-HIGH SENSITIVITY RECEIVERS. IN U.H.S. RECEIVERS J444 IS THE ANTENNA INPUT JACK AND W445 CONNECTS THE OUTPUT OF A410 TO THE RECEIVER. J441 IS NOT PRESENT IN THESE RECEIVERS. IN NON U.H.S. RECEIVERS USE J441 AS THE ANTENNA INPUT JACK.

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

CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H= HENRYS.

VOLTAGE READINGS

ALL READINGS ARE TYPICAL VOLTAGES MADE WITH A 20,000 OHM-PER-VOLT METER, MEASURED TO J442-8 (NEG.)
S=SQUELCH CONTROL FULLY COUNTER-CLOCKWISE.
US=SQUELCH CONTROL FULLY CLOCKWISE.

(19D413090, Rev. 1)

(19R621210, Rev. 7)

SCHEMATIC DIAGRAM

406 — 470 MHZ MASTR RECEIVERS
MODELS 4ER42B10-45 & 4ER42D10-45

Issue 6

PARTS LIST

LBI-3541E

406 - 470 MHz RECEIVER
MODEL 4ER42B10-45 (STANDARD)
MODEL 4ER42D10-45 (ICOM)

SYMBOL	GE PART NO.	DESCRIPTION
A410 and A412		RF AMPLIFIER ASSEMBLY 19C303671G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496218P755	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -750 PPM.
C2	5493392P105	Ceramic stand-off: 220 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type SS5D.
C3	7484389P2	Variable, ceramic: approx 3-12 pf, 500 VDCW, temp coef 0 PPM; sim to Erie Style 503.
C4	5493392P7	Ceramic feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C5 and C6	5493392P107	Ceramic stand-off: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type SS5D.
		- - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4038642P1	Germanium.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A121716P1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q2*	19A116032P1	Silicon, NPN.
		In REV A and earlier:
	19A115440P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P362J	Composition: 3600 ohms ±5%, 1/4 w.
R2	3R152P122J	Composition: 1200 ohms ±5%, 1/4 w.
R3	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
A414		FIRST MIXER ASSEMBLY 19B204430G3
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C5	5494481P114	Ceramic disc: 2000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C6	5494481P12	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C9	5491271P103	Variable, subminiature: approx 1.7-8.3 pf, 750 v peak; sim to EF Johnson 189.
C10	5496218P236	Ceramic disc: 5 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C11	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C14	5494481P8	Ceramic disc: 470 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L3	19A121082G3	Toroidal coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q3*	19A116032P1	Silicon, NPN.
		In REV A and earlier:
	19A115440P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - - -
R6	3R152P472J	Composition: 4700 ohms ±5%, 1/4 w.
R7	3R152P222J	Composition: 2200 ohms ±5%, 1/4 w.
R8	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R9	3R152P471K	Composition: 470 ohms ±10%, 1/4 w.
A415 thru A420		FIRST OSCILLATOR ASSEMBLY (STANDARD) A415 19B204419G19 (4ER42B10,16,22,28,34,40) REV A A416 19B204419G20 (4ER42B12,18,24,30,36,42) A417 19B204419G21 (4ER42B14,20,26,32,38,44) A418 19B204419G22 (4ER42B11,17,23,29,35,41) REV A A419 19B204419G23 (4ER42B13,19,25,31,37,43) A420 19B204419G24 (4ER42B15,21,27,33,39,45)
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C4	5494481P112	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C5 thru C8	5496219P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C9 thru C12	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C13 thru C16	5496219P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17 thru C20	19C300685P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C23	5494481P114	Ceramic disc: 2000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C26	5494481P112	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C28	5494481P112	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C31	5494481P112	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C38	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
C39	5494481P112	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C42	5491601P130	Phenolic: 3.3 pf ±5%, 500 VDCW.
C43	5496219P53	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef 0 PPM.
C44	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C45	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C46	5496219P563	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -330 PPM.
C47	5496219P767	Ceramic disc: 150 pf ±5%, 500 VDCW, temp coef -750 PPM.
		- - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1* thru CR3*	19A115603P1	Silicon. Deleted CR1 from A415 and A418 by REV A.
CR6	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J15 and J16	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - - INDUCTORS - - - - - - - - - -
L2 and L3	7488079P16	Choke, RF: 10 µh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7K.
		- - - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115330P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - - -
R1 thru R4	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R5* thru R8	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w. Deleted R5 from A415 and A418 by REV A.
R9	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R13	3R152P151J	Composition: 150 ohms ±5%, 1/4 w.
R14	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R17 and R18	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R20*	3R152P270K	Composition: 27 ohms ±10%, 1/4 w. Added R20 to A415 and A418 by REV A.
		- - - - - - - - - - THERMISTORS - - - - - - - - -
RT5 thru RT8	19B209284P7	Disc: 62 ohms res nominal at 25°C, color code violet.
RT9	19B209284P8	Disc: 945 ohms res nominal at 25°C, color code gray.
		- - - - - - - - - - - TRANSFORMERS - - - - - - -
T7 and T8		COIL ASSEMBLY T7 19B204950G1 T8 19B204950G2
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C40	5496218P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C41	5496218P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - - INDUCTORS - - - - - - - - - -
L5	19A121728P1	Coil. Includes tuning slug 5491798P5.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XY1 thru XY4		Refer to Mechanical Parts (RC-1598).
		- - - - - - - - - - - CRYSTALS - - - - - - - - - - -
		When reordering give GE Part No. and specify exact freq needed.
		Crystal freq = (OF -12.4 MHz) ÷ 24.
Y1 thru Y4	19B206576P6	Quartz: freq range 16401.11 to 16983.333 KHz, temp range -30°C to +85°C.
A421		CRYSTAL FILTER ASSEMBLY 19B204616G2
		- - - - - - - - - - - - FILTERS - - - - - - - - - - -
FL3	19C304094G2	Bandpass filter.
FL4	19C304094G3	Bandpass filter.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R2	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w.
R4	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R6	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
A422		SECOND MIXER ASSEMBLY 19B204438G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C4*	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
		In Boards of REV A and earlier:
	5491189P106	Polyester: 0.1 µf ±20%, 50 VDCW.
C5*	19A116080P4	Polyester: .033 µf ±20%, 50 VDCW.
		In Boards of REV A and earlier:
	5491189P103	Polyester: .033 µf ±20%, 50 VDCW.
C7*	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM. Added by REV B.
C10* and C11*	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
		In Boards of REV A and earlier:
	5496219P666	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -470 PPM.
C12* and C13*	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
		In Boards of REV A and earlier:
	5491189P106	Polyester: 0.1 µf ±20%, 50 VDCW.
C14* and C15*	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
	5491189P101	Polyester: 0.01 µf ±20%, 50 VDCW.
C16*	19B209243P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C17	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C19*	5490008P1	Silver mica: 5 pf ±0.5 pf, 500 VDCW; sim to Electro Motive Type DM-15.
		In Boards earlier than REV A:
	5490008P7	Silver mica: 12 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C20*	5493366P82G	Silver mica: 82 pf ±20%, 500 VDCW.
		In Boards of REV A and earlier:
	5490008P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C21*	5493366P47G	Silver mica: 47 pf ±20%, 500 VDCW.
		In Boards of REV A and earlier:
	5490008P19	Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C22*	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW.
		In Boards of REV A and earlier:
	5496219P664	Ceramic disc: 110 pf ±5%, 500 VDCW.
C23* and C24*	5496218P41	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW.
		In Boards earlier than REV A:
	5496218P39	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW.
		In Boards earlier than REV A:
	5496218P38	Ceramic disc: 7 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
E1	4038104P1	Lug: solder dipped brass.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J1 and J2	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - - INDUCTORS - - - - - - - - - -
L2*	19A115711P3	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12672.
		In Boards of REV A and earlier:
	19C303464G2	Coil. Includes tuning slug 7160519P2.
L5	19C311181G8	Coil. Includes tuning slug 7160519P2.
L6*	19C311181G9	Coil. Includes tuning slug 7160519P2.
		In Boards of REV A and earlier:
	19C303464G4	Coil.
L7		(Part of T2).
		- - - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	4029840P2	Contact, electrical: sim to Amp 42827-2.
P2	4029840P1	Contact, electrical: sim to Amp 41854.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115245P1	Silicon, NPN.
Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115245P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - - -
R1	3R152P152K	Composition: 1500 ohms ±10%, 1/4 w.
R2	3R152P392K	Composition: 3900 ohms ±10%, 1/4 w.
R3	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R4	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R5 and R6	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R8 and R9	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R10	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R11	3R152P622J	Composition: 6200 ohms ±5%, 1/4 w.
R12	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R13	3R152P202J	Composition: 2000 ohms ±5%, 1/4 w.
R14	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - -
T2		COIL ASSEMBLY 19B204414G2
		- - - - - - - - - - - CAPACITORS - - - - - - - - -
C25	5496218P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
	5491798P3	Tuning slug.
		- - - - - - - - - - - CRYSTALS - - - - - - - - - -
Y2	19A110398G1	Quartz: freq 11945.00 KHz ±.002% at 25°C, temp range -30° to +75°C.
A423 and A424		IF/AUDIO ASSEMBLY A423 19D402327G5 A424 19D402327G6
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115028P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C2	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C4	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C8	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C10	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C12	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C13	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C14	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C15	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C17	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C18 and C19	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C20*	19A115680P103	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TT. Added by REV G.
C21	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C22	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C24	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C27	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C28	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C29	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C31	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C32	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C33	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C34	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C35	5496267P6	Tantalum: 33 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C37	19A115028P305	Polyester: .0068 µf ±10%, 200 VDCW.
C38	19A115680P107	Electrolytic: 100 µf +150% -10%, 15 VDCW; sim to Mallory Type TT.
C39	5490008P143	Silver mica: 470 pf ±10%, 300 VDCW; sim to Electro Motive Type DM-15.
C48	5495670P9	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
C49	5496219P822	Ceramic disc: 120 pf ±10%, 500 VDCW, temp coef -1500 PPM.
C50	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C53*	19A115028P315	Polyester: 0.15 µf ±10%, 200 VDCW. Deleted by REV A . Added to G5 by REV F.
C56	19A115028P102	Polyester: .0022 µf ±20%, 200 VDCW.
C57	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C58	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C59 thru C61	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C62*	5491000P1	Electrolytic: 30 µf +75% -10%, 25 VDCW; sim to Sprague D25379.
		In Boards of REV F and earlier:
	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C63	19A115028P103	Polyester: .0033 µf ±20%, 200 VDCW.
C64	4029003P8	Silver mica: 1000 pf ±5%, 500 VDCW; sim to Electro Motive Type DM20.
C65	5496218P821	Ceramic disc: 100 pf ±10%, 500 VDCW, temp coef -1500 PPM.
C71*	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW. Added by REV A.
C76*	19A116080P3	Polyester: 0.022 µf ±20%, 50 VDCW.
		In A423 of REV B thru REV E:
	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C77*	19B209243P7	Polyester: 0.1 µf ±20%, 50 VDCW. Added by REV B. Deleted by REV F.
C78*	5494481P114	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV H.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	4038056P1	Germanium.
CR3 and CR4	19A115250P1	Silicon.
CR7	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J24	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	4031476G1	Choke. Includes tuning slug 7773023P25.
L4	5491736P6	Choke: 3.5 mh ±10% ind at 1 KHz, 2.5 ohms DC res max; sim to Aladdin 33-494.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4* and Q5*	19A115552P1	Silicon, NPN; sim to Type 2N2712.
		In Boards earlier than REV A:
	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q6	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q7	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q8	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q9	19A115247P1	Silicon, PNP; sim to Type 2N1024.
Q10	19A115300P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P330K	Composition: 33 ohms ±10%, 1/2 w.
R2	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R3	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R4	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R5	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R6	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R7	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R8	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R9	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R10	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R11	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R12	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R13	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R14	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R15	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R16	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R17	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R18	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R19	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R20	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R22	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R23	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R25	3R77P183J	Composition: 18,000 ohms ±5%, 1/2 w.
R26	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R27	3R77P683K	Composition: 68,000 ohms ±10%, 1/2 w.
R28	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R29 and R30	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R32*	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w. Deleted by REV B.
R34	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R36	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R37	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R38	3R77P751J	Composition: 750 ohms ±5%, 1/2 w.
R39	3R77P562J	Composition: 5600 ohms ±5%, 1/2 w.
R40	3R77P113J	Composition: 11,000 ohms ±5%, 1/2 w.
R41	3R77P204J	Composition: 0.20 megohm ±5%, 1/2 w.
R42	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R43*	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
		In A423 of REV D and earlier: In A424 of REV C and earlier:
	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
R44	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R45	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R46*	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w. Deleted by REV A.
R47	19B209115P1	Variable, carbon film: 5000 ohms ±20%, 0.15 w; sim to CTS Type UPE-70.
R48	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R49	3R77P821K	Composition: 820 ohms ±10%, 1/2 w.
R50	3R77P392K	Composition: 3900 ohms ±10%, 1/2 w.
R51	19B209022P15	Wirewound: 1 ohm ±5%, 2 w; sim to IRC Type BWH.
R52	3R77P152K	Composition: 1500 ohms ±10%, 1/2 w.
R53	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R59	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R61	3R77P221K	Composition: 220 ohms ±10%, 1/2 w.
R63*	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
		In A423 of REV D and earlier: In A424 of REV C and earlier:
	3R77P623J	Composition: 62,000 ohms ±5%, 1/2 w.
R64*	3R77P184K	Composition: 0.18 megohm ±10%, 1/2 w.
		In A423 of REV C and earlier: In A424 of REV B and earlier:
	3R77P224K	Composition: 0.22 megohm ±10%, 1/2 w.
R65	3R77P123K	Composition: 12,000 ohms ±10%, 1/2 w.
R66	3R77P223K	Composition: 22,000 ohms ±10%, 1/2 w.
R67	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R74*	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w. Added by REV A.
R75*	3R77P183K	Composition: 18,000 ohms ±10%, 1/2 w. Added by REV A.
R78* and R79*	3R152P102K	Composition: 1000 ohms ±10%, 1/4 w. Added by REV B.
R80*	3R152P511J	Composition: 510 ohms ±5%, 1/4 w. Added to A423 by REV C. Added to A424 by REV B.
		- - - - - - - - - - - THERMISTORS - - - - - - - -
RT1	19B209143P2	Rod: 4000 ohms ±10% res, 1 w max; sim to Globar Type 789F-12.
RT2	19B209143P3	Rod: 850 ohms ±10% res, 1 w max; sim to Globar Type 789F.
		- - - - - - - - - - - TRANSFORMERS - - - - - - - -
T1		DISCRIMINATOR ASSEMBLY 19C303612G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C41 and C42	19B209196P1	Ceramic disc: 280 pf ±5%, 500 VDCW, temp coef -115 ±30 PPM.
C45	7489162P43	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C46	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C47	5491189P4	Polyester: .047 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.

 *COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 & -5 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 (Q410) 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 Q410. 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 (SIMILAR 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.
3. AC-VTVM FOR AUDIO STAGES, WITH SIGNAL GENERATOR SET FOR ONE MILLIVOLT MODULATED BY 1 KC WITH 10 KC DEVIATION.

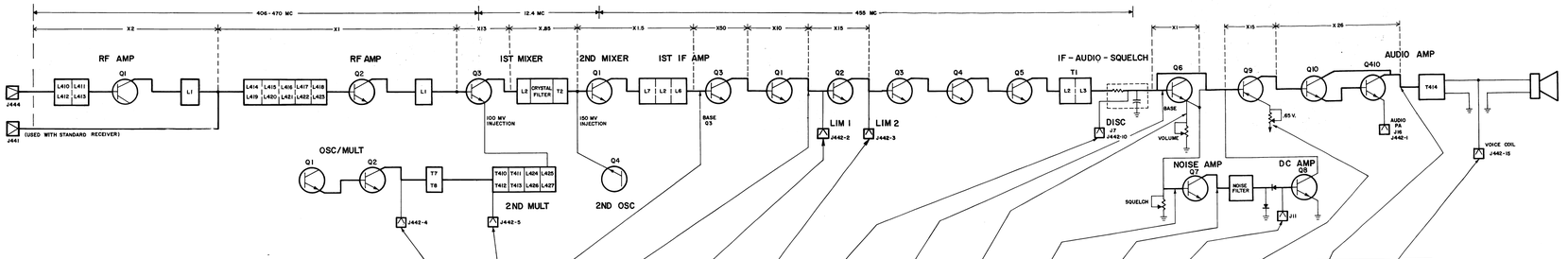
PROCEDURE

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 MEASUREMENTS SETTING AT DISCRIMINATOR ZERO			UNMODULATED	UNMODULATED	10 MICROVOLT UNMODULATED	.5 MICROVOLT UNMODULATED	STANDARD SIGNAL (1 MICROVOLT AT 30 MC, FREQ. MODULATED BY 1KC WITH 10 KC DEVIATION)	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	NO SIGNAL	NO SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL
PROCEDURE			INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES BY 0.5 DC *	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES TO MINIMUM DC *									VOLUME CONTROL IN FULL COUNTERCLOCKWISE POSITION		ADJUST VOLUME CONTROL FOR RATED 2 WATT OUTPUT ACROSS 3.2 OHM LOAD
READING	1.0 VDC	1.0 VDC	GENERATOR OUTPUT SHOULD BE APPROX. 2000 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX. 300 MICROVOLTS	1.5 VDC	1.5 VDC	0.1 VAC	1.5 VAC	1.5 VAC	0.07 VAC	2.5 VAC	2.0 VDC	ADJUST FOR 0.65VDC WITH VTVM ON J442-1 AND J442-8	8.5 VAC	2.53 VAC

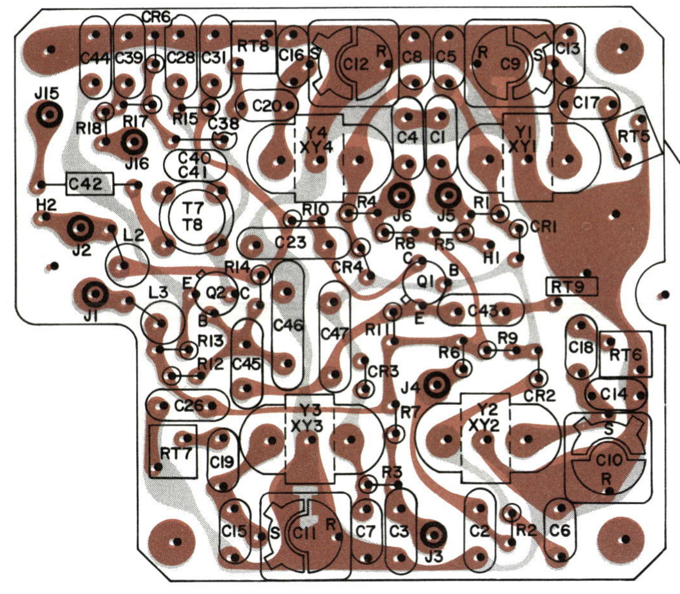
* NEG LEAD OF VTVM TO -10V.

(BC-1243)

12-10-84

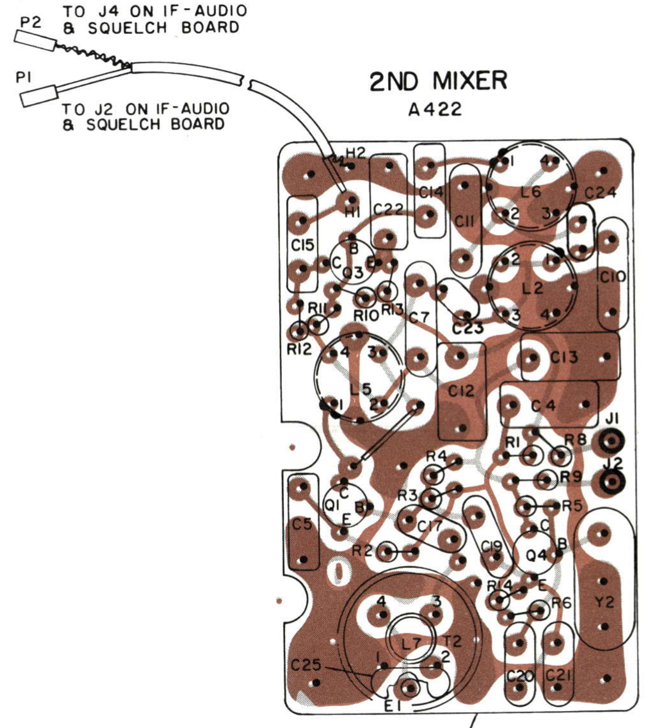
IST OSCILLATOR/MULTIPLIER

406-420 MC   450-470 MC
A415-1 FREQ - A418
A416-2 FREQ - A419
A417-4 FREQ - A420



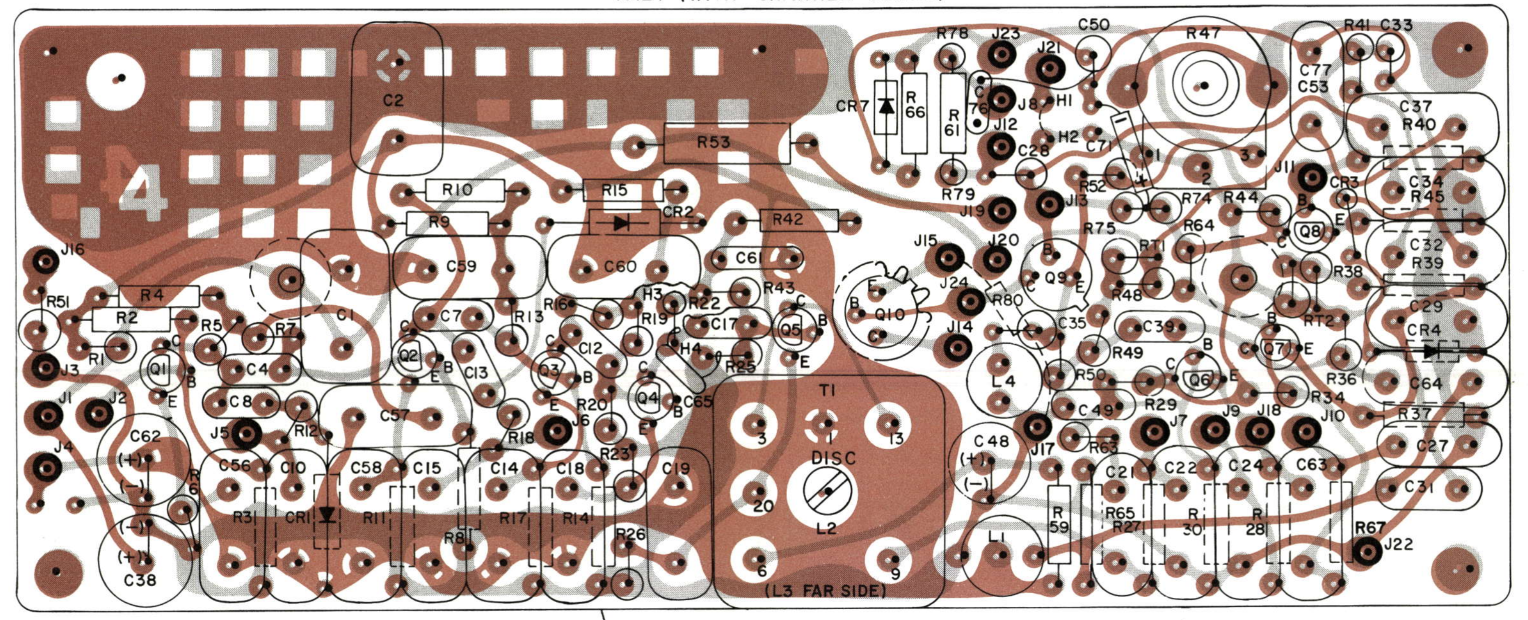
(19B204934, Sh. 1, Rev. 1)
(19B204934, Sh. 2, Rev. 1)

2ND MIXER
A422



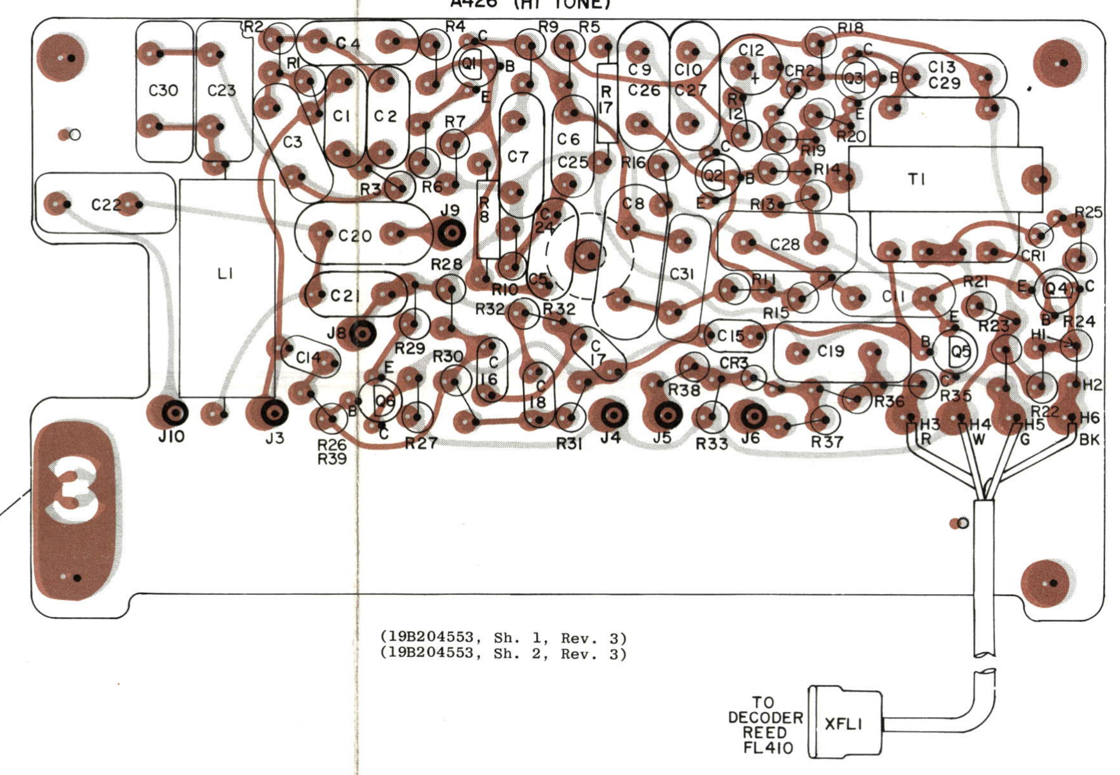
(19B205441, Sh. 1, Rev. 0)
(19B205441, Sh. 2, Rev. 0)

IF-AUDIO & SQUELCH BOARD
A423 (WITHOUT CHANNEL GUARD)
A424 (WITH CHANNEL GUARD)



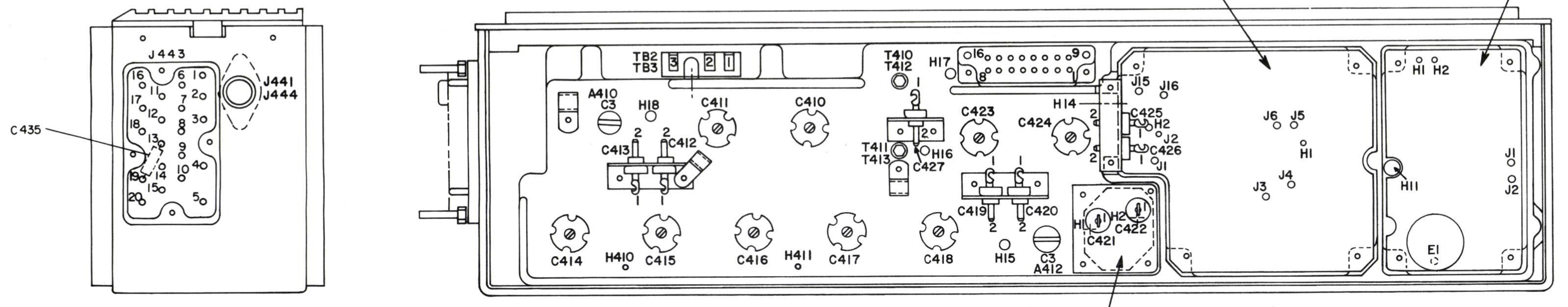
(19C303451, Sh. 1, Rev. 4)
(19C303451, Sh. 2, Rev. 4)

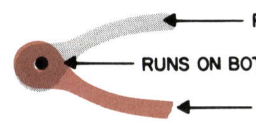
CHANNEL GUARD
A425 (LOW TONE)
A426 (HI TONE)



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

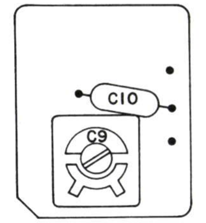
TOP VIEW
CENTRALIZED METERING JACK





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

IST MIXER
A414

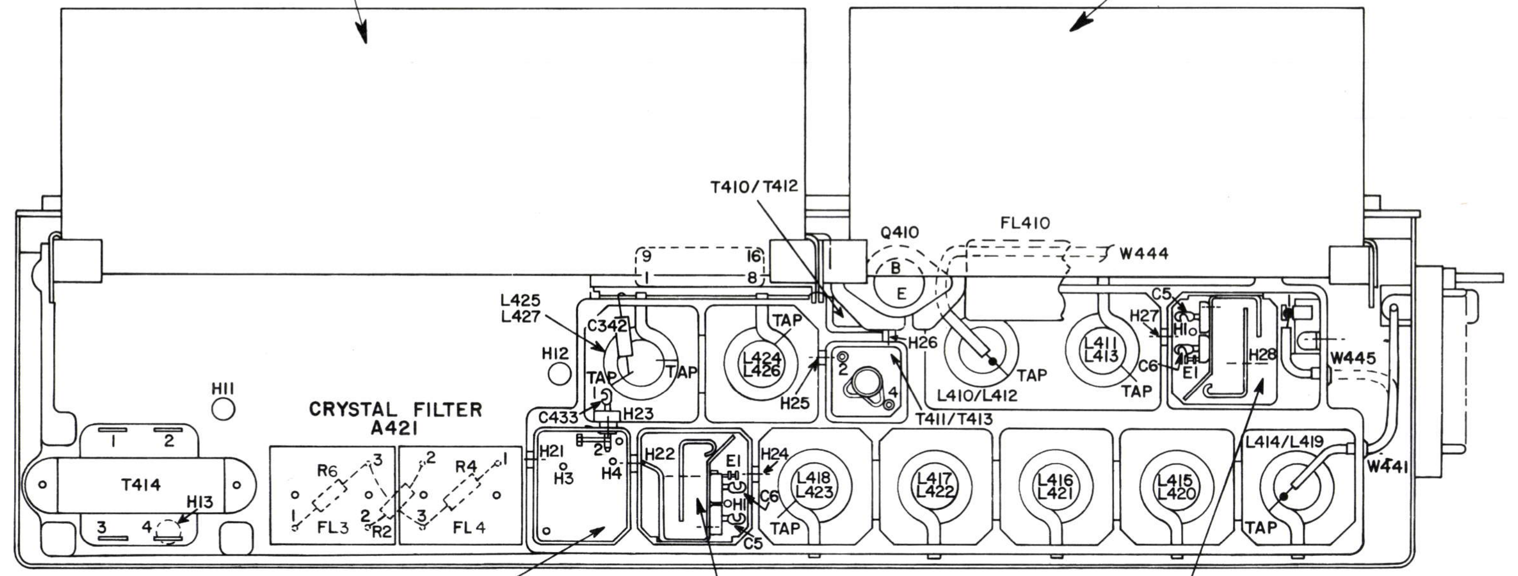


TRANSISTOR	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
A424-Q1	2K	2K	13.5K	4.1K	4.1K	4.9K
A424-Q2	2K	2K	13.5K	4.1K	4.1K	5.2K
A424-Q3	2K	2K	13.5K	4.1K	4.1K	5.2K
A424-Q4	2K	2K	13.5K	4.1K	4.1K	5.2K
A424-Q5	350Ω	300Ω	13.5K	3.0K	1.0K	1.0K
A424-Q6	3.5K	3.5K	40.0K	7.5K	6K	2 MEG
A424-Q7	2K	2K	13.0K	5.0K	11K	19.0K
A424-Q8	180Ω	180Ω	1.5MEG	3.2K	13K	17.0K
A424-Q9	2.2K	2.2K	5K	50.0K	2.3K	2.3K
A424-Q10	100Ω	10Ω	2.2K	2.2K	1Ω	1Ω *
A424-Q410	2Ω	2Ω	100Ω	10Ω	1Ω	1Ω *
A415/A420-Q1	470Ω	1K	10.5K	250Ω	110Ω	110Ω
A415/A420-Q2	2800Ω	140Ω	100Ω	100Ω	70Ω	150Ω
A410-Q1/A412-Q2	200Ω	400Ω	600Ω	350Ω	190Ω	225Ω
A414-Q3	3.9K	10K	1.6K	1.6K	500Ω	600Ω
A422-Q1	430Ω	5.5K	8.5K	430Ω	200Ω	200Ω
A422-Q3	2.2K	2.3K	2.2K	2.1K	2.8K	3.3K
A422-Q4	400Ω	10K	5.3K	430Ω	200Ω	200Ω

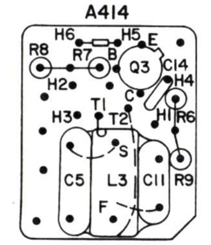
* JUMPER FROM T414 PIN #1 TO C425-C426

(19B620748, Rev. 8)

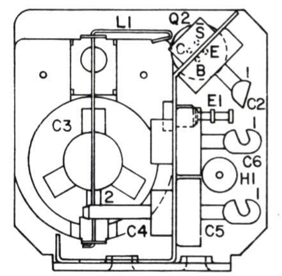
BOTTOM VIEW



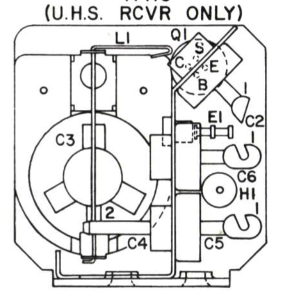
IST MIXER
A414



RF AMPLIFIER
A412



RF AMPLIFIER
A410
(U.H.S. RCVR ONLY)



TRANSISTOR A425/A426	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
Q1	56Ω	56Ω	8.3K	145Ω	6.8K	9.0K
Q2	270Ω	270Ω	8K	500Ω	6.5K	5.0K
Q3	1K	1K	75K	3.5K	2.5K	2.5K
Q4	1Ω	1Ω	14K	10Ω	2.3K	2.3K
Q5	1Ω	1Ω	14K	10Ω	2.3K	2.3K
Q6	22Ω	22Ω	4.5K	90Ω	3.4K	3.4K

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 C425-1 (+10V) TO C426-1 (−10), AND ARE MEASURED FROM TRANSISTOR PINS TO C425-1. + OR — SIGNS SHOW METER LEAD TO C425-1.

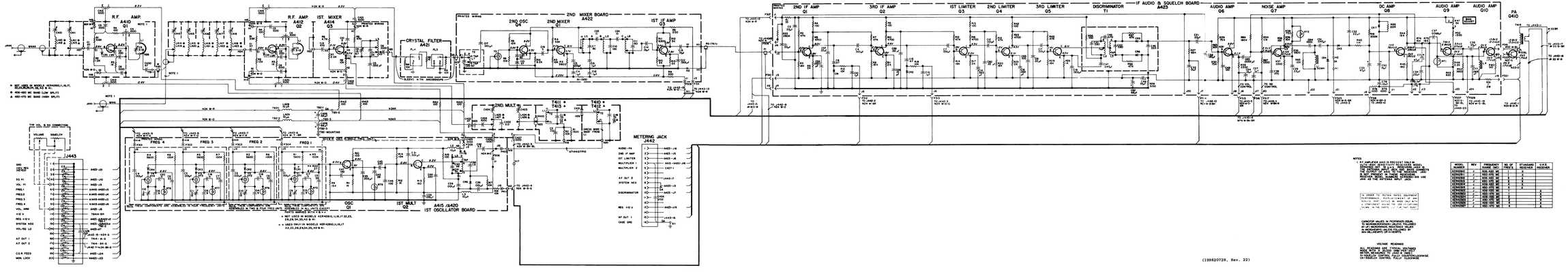
— CAUTION —

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

OUTLINE DIAGRAM

406 — 470 MC, MASTR RECEIVER
MODELS 4ER42B10-15 &
MODELS 4ER42B22-27



(19962072B, Rev. 22)

MODEL	REV	FREQUENCY RANGE (MHz)	NO. OF FREQS	ST.ANDARD RECEIVER	U-H-F RECEIVER
4ER42B10	J	406-420 MC	4	X	
4ER42B11	J	406-420 MC	8	X	
4ER42B12	J	406-420 MC	4		X
4ER42B13	J	406-420 MC	8		X
4ER42B14	J	406-420 MC	16	X	X
4ER42B15	J	406-420 MC	16		X
4ER42B22	J	450-470 MC	4	X	
4ER42B23	J	450-470 MC	8	X	
4ER42B24	J	450-470 MC	4		X
4ER42B25	J	450-470 MC	8		X
4ER42B26	J	450-470 MC	16	X	X
4ER42B27	J	450-470 MC	16		X

SCHEMATIC DIAGRAM

406-420 MC & 450-470 MC MASTER
RECEIVER MODELS 4ER42B10-15 &
MODELS 4ER42B22-27

PARTS LIST

LBI-3541B
406-470 MC RECEIVER
MODELS 4ER42B10-15, 22-27

4ER42B10-15 (19E500816 G1-6)
4ER42B22-27 (19E500816 G13-18)

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
A410 and A412		RF AMPLIFIER ASSEMBLY A410 19C303671-G1 (4ER42B22-27) A412 19C303671-G2 (4ER42B10-15, 22-27)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496218-P755	Ceramic disc: temp-comp, radial leads, 47 pf ±5%, 500 VDCW, temp coef -750 PPM.
C2	5493392-P105	Ceramic dielectric, stand-off: 220 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type SS5A.
C3	7484389-P2	Variable, ceramic dielectric: temp-comp, approx 3-12 pf, 500 VDCW, temp coef 0 PPM; sim to Erie Style 503.
C4	5493392-P7	Ceramic dielectric, feed-thru: .001 μf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C5 and C6	5493392-P107	Ceramic dielectric, stand-off: .001 μf +100% -0%, 500 VDCW; sim to Allen-Bradley Type SS5A.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4038642-P1	Germanium.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A121716-P1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115441-P1	Silicon, NPN. (Used in Models 4ER42B22-27).
Q2	19A115440-P1	Silicon, NPN. (Used in Models 4ER42B10-15, 22-27).
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152-P362J	Fixed composition: 3600 ohms ±5%, 1/4 w.
R2	3R152-P122J	Fixed composition: 1200 ohms ±5%, 1/4 w.
R3	3R152-P102J	Fixed composition: 1000 ohms ±5%, 1/4 w.
R4	3R152-P101K	Fixed composition: 100 ohms ±10%, 1/4 w.
A414		FIRST MIXER ASSEMBLY PL-19B204430-G3
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C5	5494481-P14	Ceramic disc: radial leads, .002 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C6	5494481-P12	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - CAPACITORS(Cont'd) - - - - -
C9	5491271-P104	Variable, air dielectric, subminiature: approx 1.65-8.7 pf, 750 v peak; sim to EF Johnson 189-4-5.
C10	5496218-P236	Ceramic disc: temp-comp, radial leads, 5 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C11	5496218-P248	Ceramic disc: temp-comp, radial leads, 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C14	5494481-P8	Ceramic disc: radial leads, 470 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L3	PL-19A121082-G3	Toroidal coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q3	19A115440-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R6	3R152-P472J	Fixed composition: 4700 ohms ±5%, 1/4 w.
R7	3R152-P222J	Fixed composition: 2200 ohms ±5%, 1/4 w.
R8	3R152-P103J	Fixed composition: 10,000 ohms ±5%, 1/4 w.
R9	3R152-P471K	Fixed composition: 470 ohms ±10%, 1/4 w.
A415 thru A420		FIRST OSCILLATOR ASSEMBLY A415 19B204419-G19 (4ER42B10, 22) A416 19B204419-G20 (4ER42B12, 24) A417 19B204419-G21 (4ER42B14, 26) A418 19B204419-G22 (4ER42B11, 23) A419 19B204419-G23 (4ER42B13, 25) A420 19B204419-G24 (4ER42B15, 27)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C2	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap. (Used in Models 4ER42B12-15, 24-27).
C3 and C4	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap. (Used in Models 4ER42B14, 15, 26, 27).
C5	5496219-P751	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C6	5496219-P751	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -750 PPM. (Used in Models 4ER42B12-15, 24-27).
C7 and C8	5496219-P751	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -750 PPM. (Used in Models 4ER42B14, 15, 26, 27).
C9	5491271-P106	Variable, air dielectric, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C10	5491271-P106	Variable, air dielectric, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5. (Used in Models 4ER42B12-15, 24-27).
C11 and C12	5491271-P106	Variable, air dielectric, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5. (Used in Models 4ER42B14, 15, 26, 27).
C13	5496219-P40	Ceramic disc: temp-comp, radial leads, 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - CAPACITORS(Cont'd) - - - - -
C14	5496219-P40	Ceramic disc: temp-comp, radial leads, 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER42B12-15, 24-27).
C15 and C16	5496219-P40	Ceramic disc: temp-comp, radial leads, 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER42B14, 15, 26, 27).
C17	19C300685-P93	Ceramic disc: temp-comp, radial leads, 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C18	19C300685-P93	Ceramic disc: temp-comp, radial leads, 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER42B12-15, 24-27).
C19 and C20	19C300685-P93	Ceramic disc: temp-comp, radial leads, 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM. (Used in Models 4ER42B14, 15, 26, 27).
C23	5494481-P114	Ceramic disc: radial leads, .002 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C26	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C28	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C31	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C38	5491601-P123	Tubular, molded: axial leads, 1.5 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C39	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C42	5491601-P130	Tubular, molded: axial leads, 3.3 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C43	5496219-P53	Ceramic disc: temp-comp, radial leads, 39 pf ±5%, 500 VDCW, temp coef 0 PPM.
C44	5490008-P135	Silver mica, dipped phen: radial leads, 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C45	5490008-P35	Silver mica, dipped phen: radial leads, 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C46	5496219-P563	Ceramic disc: temp-comp, radial leads, 100 pf ±5%, 500 VDCW, temp coef -330 PPM.
C47	5496219-P767	Ceramic disc: temp-comp, radial leads, 150 pf ±5%, 500 VDCW, temp coef -750 PPM.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1*	19A115348-P1	Silicon. Deleted by REV. A from 19B204419-G19 and -G22.
CR2	19A115348-P1	Silicon. (Used in Models 4ER42B12-15, 24-27).
CR3 and CR4	19A115348-P1	Silicon. (Used in Models 4ER42B14, 15, 26, 27).
CR6	19A115250-P1	Silicon.
		- - - - - - 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 4ER42B12-15, 24-27).
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 4ER42B12-15, 24-27).
J15	4033513-P4	Contact, electrical: sim to Bead Chain L93-3. (Used in Models 4ER42B11, 13-15, 23, 25-27).
J16	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L2 and L3	7488079-P16	Choke, RF: 10 μh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115330-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152-P562J	Fixed composition: 5600 ohms ±5%, 1/4 w.
R2	3R152-P562J	Fixed composition: 5600 ohms ±5%, 1/4 w. (Used in Models 4ER42B12-15, 24-27).
R3 and R4	3R152-P562J	Fixed composition: 5600 ohms ±5%, 1/4 w. (Used in Models 4ER42B14, 15, 26, 27).
R5*	3R152-P104K	Fixed composition: 0.1 megohm ±10%, 1/4 w. Deleted by REV. A from 19B204419-G19 and G22.
R6	3R152-P104K	Fixed composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 4ER42B12-15, 24-27).
R7 and R8	3R152-P104K	Fixed composition: 0.1 megohm ±10%, 1/4 w. (Used in Models 4ER42B14, 15, 26, 27).
R9	3R152-P153J	Fixed composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152-P101K	Fixed composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152-P102J	Fixed composition: 1000 ohms ±5%, 1/4 w.
R13	3R152-P151J	Fixed composition: 150 ohms ±5%, 1/4 w.
R14	3R152-P103J	Fixed composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152-P101K	Fixed composition: 100 ohms ±10%, 1/4 w.
R17 and R18	3R152-P103K	Fixed composition: 10,000 ohms ±10%, 1/4 w.
R20*	3R152-P270K	Fixed composition: 27 ohms, ±10%, 1/4 w. Added by REV. A to 19B204419-G19 and -G22.
		- - - - - - - - - - THERMISTORS - - - - - - - -
RT5	19B209284-P7	Disc: 62 ohms res nominal at 25°C, color code violet.
RT6	19B209284-P7	Disc: 62 ohms res nominal at 25°C, color code violet. (Used in Models 4ER42B12-15, 24-27).
RT7 and RT8	19B209284-P7	Disc: 62 ohms res nominal at 25°C, color code violet. (Used in Models 4ER42B14, 15, 26, 27).
RT9	19B209284-P8	Disc: 945 ohms res nominal at 25°C, color code gray.
		- - - - - - - - - - TRANSFORMERS - - - - - - -
T7 and T8		COIL ASSEMBLY T7 19B204950-G1 (4ER42B10, 12, 14, 22, 24, 26) T8 19B204950-G2 (4ER42B11, 13, 15, 23, 25, 27)
		- - - - - - - - - - CAPACITORS - - - - - - - -
C40	5496218-P253	Ceramic disc: temp-comp, radial leads, 39 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - CAPACITORS(Cont'd) - - - - -
C41	5496218-P251	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -80 PPM. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L5	19A121728-P1	Coil.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798-P5	Tuning slug.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY1		Refer to Mechanical Parts (RC-1221).
XY2		Refer to Mechanical Parts (RC-1221). (Used in Models 4ER42B12-15, 24-27).
XY3 and XY4		Refer to Mechanical Parts (RC-1221). (Used in Models 4ER42B14, 15, 26, 27).
		- - - - - - - - - - CRYSTALS - - - - - - - -
		When reordering give G-E Part No. and specify exact freq needed. Crystal freq = (OF -12.4 MC) ÷ 24).
Y1	19B206576-P6	Quartz: freq range 16401.11 to 16983.333 KC temp range -30°C to +85°C. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
Y1	19B206576-P7	Quartz: freq range 18233.333 to 19066.66 KC temp range -30°C to +85°C. (Used in Models 4ER42B11, 13, 15, 17, 23, 25, 27).
Y2	19B206576-P6	Quartz: freq range 16401.11 to 16983.333 KC temp range -30°C to +85°C. (Used in Models 4ER42B12, 14, 24, 26).
Y2	19B206576-P7	Quartz: freq range 18233.333 to 19066.66 KC temp range -30°C to +85°C. (Used in Models 4ER42B13, 15, 25, 27).
Y3 and Y4	19B206576-P6	Quartz: freq range 16401.11 to 16983.333 KC temp range -30°C to +85°C. (Used in Models 4ER42B14, 26).
Y3 and Y4	19B206576-P7	Quartz: freq range 18233.333 to 19066.66 KC temp range -30°C to +85°C. (Used in Models 4ER42B15, 27).
A421		CRYSTAL FILTER ASSEMBLY PL-19B204616-G2
		- - - - - - - - - - FILTERS - - - - - - - - -
FL3	PL-19C304094-G2	Bandpass
FL4	PL-19C304094-G3	Bandpass
		- - - - - - - - - - RESISTORS - - - - - - - - -
R2	3R152-P102K	Fixed composition: 1000 ohms ±10%, 1/4 w.
R3*	3R152-P512K	Fixed composition: 5100 ohms ±10%, 1/4 w. Deleted by Rev. F.
R4*	3R152-P103K 3R152-P682K	Fixed composition: 10,000 ohms ±10%, 1/4 w. In Rev. E and earlier: Fixed composition: 6800 ohms ±10%, 1/4 w.
R6*	3R152-P103K	Fixed composition: 10,000 ohms ±10%, 1/4 w. Added by Rev. F.
		- - - - - - -SUBASSEMBLIES(Cont'd) - - - - - - -
A422		SECOND MIXER ASSEMBLY PL-19B204438-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C4*	19B209243-P7 5491189-P106	Polyester dielectric, 0.1 uf., ±20%, 40 VDCW. In REV. D and earlier: Mylar® dielectric, 0.1 uf., ±20%, 50 VDCW.
C5*	19B209243-P4 5491189-P103	Polyester dielectric, .033 uf., ±20%, 40 VDCW. In REV. D and earlier: Mylar® dielectric, .033 uf., ±20%, 50 VDCW.
C6*	5496219-P47	Ceramic disc, 22 pf., ±5%, 500 VDCW temp coef 0 PPM. Deleted by REV. E.
C7*	5496219-P369	Ceramic disc, 180 pf., ±5%, 500 VDCW., temp coef 150 PPM. Added by REV. E.
C10* and C11*	5496219-P369 5496219-P566 5496219-P666	Ceramic disc, 180 pf., ±5%, 500 VDCW, temp coef 150 PPM. In REV. D: Ceramic disc, 130 pf., ±5%, 500 VDCW, temp coef -330 PPM. In REV. F and earlier: Ceramic disc, 130 pf., ±5%, 500 VDCW., temp coef -470 PPM.
C12* and C13*	19B209243-P7 5491189-P106	Polyester dielectric, 0.1 uf., ±20%, 40 VDCW. In REV. D and earlier: Mylar® dielectric, .01 uf., ±20%, 50 VDCW.
C14* and C15*	19B209243-P1 5491189-P101	Polyester dielectric, 0.01 uf, ±20%, 40 VDCW. In REV. D and earlier: Mylar® dielectric, .01 uf., ±20%, 50 VDCW.
C16*	5491189-P104	Mylar® dielectric, .047 uf., ±20%, 50 VDCW. Deleted by REV. E.
C17	5494481-P112	Ceramic disc, .001 uf., ±10%, 500 VDCW.
C19	5490008-P7	Silver mica, 12 pf., ±5%, 500 VDCW.
C20*	5493366-P82 5490008-P25	Silver mica, 82 pf., ±20%, 500 VDCW. In REV. D and earlier: Silver mica, 82 pf., ±5%, 500 VDCW.
C21*	5493366-P47 5490008-P19	Silver mica, 47 pf, ±20%, 500 VDCW. In REV. D and earlier: Silver mica, 47 pf, ±5%, 500 VDCW.
C22*	19B209243-P6 5496219-P564 5496219-P664	Polyester dielectric, .068 uf, ±20%, 40 VDCW. In REV. D Ceramic disc, 110 pf, ±5%, 500 VDCW. In REV. C and earlier: Ceramic disc, 110 pf, ±5%, 500 VDCW.
C23* and C24*	5496218-P41 5496218-P38	Ceramic disc, 10 pf, ±5%, 500 VDCW. In REV. D and earlier Ceramic disc, 7 pf, ± .25 pf, 500 VDCW.
		- - - - - - - - - - - TERMINALS - - - - - - - - - -
E1	4038104-P1	Lug: solder dipped brass.
		- - - - - - -JACKS AND RECEPTACLES - - - - - - -
J1 and J2	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - -INDUCTORS - - - - - - - - - -
L2*	19C303062-G8 19C303464-G2	Coil, includes tuning slug 7160519-P2. In REV. D and earlier: Coil, includes tuning slug 7160519-P2.
L5* L7	19C303062-G10 19C303464-G5	Coil, includes slug 7160519-P2. In REV. D and earlier: Coil, includes slug 7160519-P2.
L6*	19C303062-G11 19C303464-G4	Coil, includes slug 7160519-P2. In REV. D and earlier: Coil, includes slug 7160519-P2.
L7* L8		Part of T2. In REV. D and earlier: Part of T2.
		- - - - - - -SUBASSEMBLIES(Cont'd) - - - - - - -
		- - - - - - - - - - - -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.
Q3	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115245-P1	Silicon, NPN.
		- - - - - - - - - - -RESISTORS - - - - - - - - - -
R1	3R152-P152K	Fixed composition: 1500 ohms ±10%, 1/4 w.
R2	3R152-P392K	Fixed composition: 3900 ohms ±10%, 1/4 w.
R3	3R152-P103K	Fixed composition: 10,000 ohms ±10%, 1/4 w.
R4	3R152-P333K	Fixed composition: 33,000 ohms ±10%, 1/4 w.
R5 and R6	3R152-P103K	Fixed composition:10,000 ohms ±10%, 1/4 w.
R8 and R9	3R152-P201J	Fixed composition: 200 ohms ±5%, 1/4 w.
R10	3R152-P302J	Fixed composition: 3000 ohms ±5%, 1/4 w.
R11	3R152-P622J	Fixed composition: 6200 ohms ±5%, 1/4 w.
R12	3R152-P302J	Fixed composition: 3000 ohms ±5%, 1/4 w.
R13	3R152-P202J	Fixed composition: 2000 ohms ±5%, 1/4 w.
R14	3R152-P822J	Fixed composition: 8200 ohms ±5%, 1/4 w.
		- - - - - - - - - -TRANSFORMERS - - - - - - - - - -
T2		COIL ASSEMBLY PL-19B204414-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C25	5496218-P259	Ceramic disc: temp-comp, radial leads, 68 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - -MISCELLANEOUS - - - - - - - - -
	5491798-P3	Tuning slug.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - - CRYSTALS - - - - - - - - - -
Y2	19A110398-P1	Quartz: freq 11945.00 KCS ±.002% at 25°C, temp range -30° to +75°C.
A423		IF/AUDIO ASSEMBLY PL-19D402327-G5
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115028-P116	Mylar® dielectric, dipped phen: radial leads, 0.22 μf ±20%, 200 VDCW.
C2	5491189-P108	Polyester dielectric, radial leads, 0.22 uf ±20%, 50 VDCW.
C4	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C7	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C8	5496219-P717	Ceramic disc: temp-comp, radial leads, 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C10	19A115028-P114	Mylar® dielectric, dipped phen: radial leads, 0.1 μf ±20%, 200 VDCW.
C12	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C13	5496219-P717	Ceramic disc: temp-comp, radial leads, 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C14	19A115028-P109	Mylar® dielectric, dipped phen: radial leads, .022 μf ±20%, 200 VDCW.
C15	19A115028-P114	Mylar® dielectric, dipped phen: radial leads, 0.1 μf ±20%, 200 VDCW.
C17	5494481-P112	Ceramic disc: radial leads, .001 μf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C18 and C19	19A115028-P109	Mylar® dielectric, dipped phen: radial leads, .022 μf ±20%, 200 VDCW.
C21	19B209243-P9	Polyester dielectric: radial leads, 0.22 μf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C22	19A115028-P107	Mylar® dielectric, dipped phen: radial leads, .01 μf ±20%, 200 VDCW.
C24	19A115028-P107	Mylar® dielectric, dipped phen: radial leads, .01 μf ±20%, 200 VDCW.
C27	19B209243-P7	Polyester dielectric: radial leads, 0.1 μf ±20%, 40 VDCW; sim to Amperex C280AA/P100K.
C28	5496267-P17	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 1 μf ±20%, 35 VDCW; sim to Sprague 150D105X0035A2.
C29	19B209243-P9	Polyester dielectric: radial leads, 0.22 μf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C31	19B209243-P5	Polyester dielectric: radial leads, .047 μf ±20%, 40 VDCW; sim to Amperex C280AA/P47K.
C32	19B209243-P9	Polyester dielectric: radial leads, 0.22 μf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C33	5496267-P28	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 0.47 μf ±20%, 35 VDCW; sim to Sprague 150D474X0035A2.
C34	19B209243-P9	Polyester dielectric: radial leads, 0.22 μf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C35	5496267-P6	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 33 μf ±20%, 10 VDCW; sim to Sprague 150D336X0010B2.
C37	19A115028-P305	Mylar® dielectric, dipped phen: radial leads, .0068 μf ±10%, 200 VDCW.
C38	19A115680-P107	Tubular, hermetically sealed, electrolytic: axial leads, 100 μf +75% -10%, 15 VDCW; sim to Sprague 30D172A1.
C39	5490008-P143	Silver mica, dipped phen: radial leads, 470 pf ±10%, 300 VDCW; sim to Electro Motive Type DM-15.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

(CONT'D FROM PAGE 12) (LBI-3541)

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - CAPACITORS(Cont'd) - - - - -
C48	5495670-P9	Tubular, hermetically sealed, electrolytic: axial leads, 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D169A1.
C49	5496219-P822	Ceramic disc: temp-comp, radial leads, 120 pf ±10%, 500 VDCW, temp coef -1500 PPM.
C50	5496267-P14	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 15 µf ±20%, 20 VDCW; sim to Sprague 150D156X0020B2.
C53*	19A115028-P315	Mylar® dielectric, dipped phen: radial leads, 0.15 µf ±10%, 200 VDCW. Deleted by REV. G.
C56	19A115028-P102	Mylar® dielectric, dipped phen: radial leads, .0022 µf ±20%, 200 VDCW.
C57	19B209243-P9	Polyester dielectric: radial leads, 0.22 µf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C58	19A115028-P107	Mylar® dielectric, dipped phen: radial leads, .01 µf ±20%, 200 VDCW.
C59 thru C61	19B209243-P9	Polyester dielectric: radial leads, 0.22 µf ±20%, 40 VDCW; sim to Amperex C280AA/P220K.
C62	5496267-P11	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C63	19A115028-P103	Mylar® dielectric, dipped phen: radial leads, .0033 µf ±20%, 200 VDCW.
C64	4029003-P8	Silver mica, dipped phen: radial leads, .001 µf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.
C65	5496218-P821	Ceramic disc: temp-comp, radial leads, 100 pf ±10%, 500 VDCW, temp coef -1500 PPM.
C71*	5496267-P28	Tubular, hermetically sealed, 0.47 µf ±20%, 35 VDCW. Added by REV. D.
C76*	19B209243-P7	Polyester: 0.1 uf ±20%, 40 VDCW. Added by REV. G.
C77*	19B209243-P6	Polyester: 0.068 uf ±20%, 40 VDCW. Added by REV. G.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	7777146-P3	Germanium; sim to Type 1N90.
CR3 and CR4	19A115250-P1	Silicon.
CR7	19A115250-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:
	7773023-P25	Tuning slug.
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	Silicon, NPN; sim to Type 2N2712. Changed by REV. D.
Q6 thru Q8	19A115123-P1	Silicon, PNP; sim to Type 2N2712.
Q9	19A115247-P1	Silicon, PNP; sim to Type 2N1024.
Q10	19A115300-P1	Silicon, NPN; sim to Type 2N3053.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77-P330K	Fixed composition: 33 ohms ±10%, 1/2 w.
R2	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R3	3R77-P183J	Fixed composition: 18,000 ohms ±5%, 1/2 w.
R4	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w.
R5	3R77-P472K	Fixed composition: 4700 ohms ±10%, 1/2 w.
R6	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R7	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R8	3R77-P183J	Fixed composition: 18,000 ohms ±5%, 1/2 w.
R9	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w.
R10	3R77-P472K	Fixed composition: 4700 ohms ±10%, 1/2 w.
R11	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R12	3R77-P103K	Fixed composition: 10,000 ohms ±10%, 1/2 w.
R13	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R14	3R77-P183J	Fixed composition: 18,000 ohms ±5%, 1/2 w.
R15	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w.
R16	3R77-P472K	Fixed composition: 4700 ohms ±10%, 1/2 w.
R17	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R18	3R77-P103K	Fixed composition: 10,000 ohms ±10%, 1/2 w.
R19	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R20	3R77-P183J	Fixed composition: 18,000 ohms ±5%, 1/2 w.
R22	3R77-P472K	Fixed composition: 4700 ohms ±10%, 1/2 w.
R23	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R25	3R77-P183J	Fixed composition: 18,000 ohms ±5%, 1/2 w.
R26	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w.
R27	3R77-P683K	Fixed composition: 68,000 ohms ±10%, 1/2 w.
R28	3R77-P222J	Fixed composition: 2200 ohms ±5%, 1/2 w.
R29 and R30	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R32*	3R77-P102J	Fixed composition: 1000 ohms ±5%, 1/2 w. Deleted by REV. G.
R34	3R77-P113K	Fixed composition: 11,000 ohms ±10%, 1/2 w.
R36	3R77-P153K	Fixed composition: 15,000 ohms ±10%, 1/2 w.
R37	3R77-P222J	Fixed composition: 2200 ohms ±5%, 1/2 w.
R38	3R77-P751J	Fixed composition: 750 ohms ±5%, 1/2 w.
R39	3R77-P562J	Fixed composition: 5600 ohms ±5%, 1/2 w.
R40	3R77-P113K	Fixed composition: 11,000 ohms ±10%, 1/2 w.
R41	3R77-P204K	Fixed composition: 0.2 megohm ±10%, 1/2 w.
R42	3R77-P101K	Fixed composition: 100 ohms ±10%, 1/2 w.
R43	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R44	3R77-P153K	Fixed composition: 15,000 ohms ±10%, 1/2 w.
R45	3R77-P181K	Fixed composition: 180 ohms ±10%, 1/2 w.
R46*	3R77-P33K	Fixed composition: 33,000 ohms ±10%, 1/2 w. Deleted by REV. D.
R47	19B209115-P1	Variable, carbon film: 5000 ohms ±20%, 0.15 w, linear taper; sim to CTS Type UPE-70.
R48	3R77-P222J	Fixed composition: 2200 ohms ±5%, 1/2 w.
R49	3R77-P821K	Fixed composition: 820 ohms ±10%, 1/2 w.
R50	3R77-P392K	Fixed 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	Fixed composition: 1500 ohms ±10%, 1/2 w.

(CONT'D ON PAGE 14)

(CONT'D FROM PAGE 13) (LBI-3541)

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - RESISTORS(Cont'd) - - - - -
R53	5495948-P444	Deposited carbon, epoxy coated: 0.28 megohm ±1%, 1/2 w; sim to Texas Instruments Type CD1/2MR.
R59	3R77-P512K	Fixed composition: 5100 ohms ±10%, 1/2 w.
R63	3R77-P623J	Fixed composition: 62,000 ohms ±5%, 1/2 w.
R64*	3R77-P184K	Fixed composition: 0.18 megohm, ±10%, 1/2 w.
	3R77-P224K	In REV. H and earlier: Fixed composition: 0.22 megohm ±10%, 1/2 w.
R65	3R77-P123K	Fixed composition: 12,000 ohms ±10%, 1/2 w.
R66	3R77-P223K	Fixed composition: 22,000 ohms ±10%, 1/2 w.
R67	3R77-P332J	Fixed composition: 3300 ohms ±5%, 1/2 w.
R74*	C377-P153K	Fixed composition: 15,000 ohms, ±10%, 1/2 w. Added by REV. D.
R75*	C377-P183K	Fixed composition: 18,000 ohms, ±10%, 1/2 w. Added by REV. D.
R78* and R79*	3R152-P102K	Fixed composition: 1000 ohms ±10%, 1/4 w. Added by REV. G.
R80*	3R152-P511J	Fixed composition: 510 ohms ±5%, 1/4 w. Added by REV. H.
		- - - - - - - - - THERMISTORS - - - - - - - -
RT1	19B209143-P2	Rod: axial leads, 4000 ohms ±10% res, 1 w max; sim to Globar Type 789F-12.
RT2	19B209143-P3	Rod: axial leads, 850 ohms ±10% res, 1 w max; sim to Globar Type 789F.
		- - - - - - - - - TRANSFORMERS - - - - - - -
T1		DISCRIMINATOR ASSEMBLY PL-19C303612-G1
		- - - - - - - - - CAPACITORS - - - - - - - -
C41 and C42	19B209196-P1	Ceramic disc: temp-comp, radial leads, 280 pf ±5%, 500 VDCW, temp coef -115 ±30 PPM.
C45	7489162-P43	Silver mica, dipped phen: radial leads, 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C46	7489162-P35	Silver mica, dipped phen: radial leads, 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C47	5491189-P4	Mylar® dielectric, dipped epoxy: radial leads, .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	Fixed composition: 330 ohms ±5%, 1/4 w.
R57 and R58	3R152-P473J	Fixed composition: 47,000 ohms ±5%, 1/4 w.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - CAPACITORS - - - - - - - -
C412 and C413	5493392-P7	Ceramic dielectric, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C. (Used in Models 4ER42B22-27).
C419 thru C422	5493392-P7	Ceramic dielectric, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C425 thru C427	5493392-P7	Ceramic dielectric, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C428 and C429	5496267-P11	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 68 µf ±20%, 15 VDCW; sim to Sprague 150D686X0015R2.
C430	5496218-P755	Ceramic disc: temp-comp, radial leads, 47 pf ±5%, 500 VDCW, temp coef -750 PPM. (Used in Models 4ER42B22-27).
C431	5491601-P120	Tubular, molded: axial leads, 1 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C434	5494481-P12	Ceramic disc: radial leads, .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C435*	7774750-P4	Ceramic disc: .001 µf, +100% -0%, 500 VDCW. Added by REV. B.
C436*	7774750-P6	Ceramic disc, .002 µf, +100% -0%, 500 VDCW. Added by REV. B.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR410	19A121975-P1	Silicon, capacitive.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J441	19B209122-P1	Connector, coaxial: includes cable (W441), approx 5 inches long. (Used in Models 4ER42B10-15).
J442	19B209125-P2	Connector: 18 contacts rated at 5 amps min at 1000 VDC max.
J443	PL-19C303426-G1	Connector: 20 pin contacts.
J444	19B209122-P2	Connector, coaxial: includes cable (W444), approx 7 inches long. (Used in Models 4ER42B22-27).
		- - - - - - - - - INDUCTORS - - - - - - - -
L428 and L429	7488079-P18	Choke, RF: 15 µh ±10%, 1.2 ohms DC res; sim to Jeffers 4421-9.
		- - - - - - - - - PLUGS - - - - - - - - -
P301 thru P303	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2. (Used in Models 4ER42B12-15, 24-27).
P304 thru P309	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2.
P310	4029840-P1	Contact, electrical: solder coated brass; sim to Amp 41854.
P311 thru P320	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2.
P321	4029840-P1	Contact, electrical: solder coated brass; sim to Amp 41854.
P325	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2.
P329	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2.
P337	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2. (Used in Models 4ER42B12-15, 24-27).
P410 and P411	4029840-P2	Contact, electrical: solder coated brass; sim to Amp 42827-2.

(CONT'D ON PAGE 15)

(CONT'D FROM PAGE 14) (LBI-3541)

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q410*	19A115527-P1	Silicon, NPN.
	19A115527-P1	In Models earlier than REV. A: Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R410 and R411	3R152-P101K	Fixed composition: 100 ohms ±10%, 1/4 w.
R412 and R413	3R152-P101K	Fixed composition: 100 ohms ±10%, 1/4 w. (Used in Models 4ER42B22-27).
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T410		COIL ASSEMBLY PL-19B204946-G1 (Used in Models 4ER42B10, 12, 14, 22, 24, 26)
		- - - - - - - - - CAPACITORS - - - - - - - -
C1	5496218-P251	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121725-P1	Coil.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P7	Tuning slug.
T411		COIL ASSEMBLY PL-19B204944-G1 (Used in Models 4ER42B10, 12, 14, 22, 24, 26)
		- - - - - - - - - CAPACITORS - - - - - - - -
C1	5496218-P251	Ceramic disc: temp-comp, radial leads, 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3*	5494481-P3	Ceramic disc: 220 pf ±10%, 500 VDCW.
	5494481-P11	In REV. E and earlier: Ceramic disc: radial leads, .001 µf ±20%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121715-P1	Coil.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P152J	Fixed composition: 1500 ohms ±5%, 1/4 w.
R2	3R152-P103K	Fixed composition: 10,000 ohms ±10%, 1/4 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P7	Tuning slug.

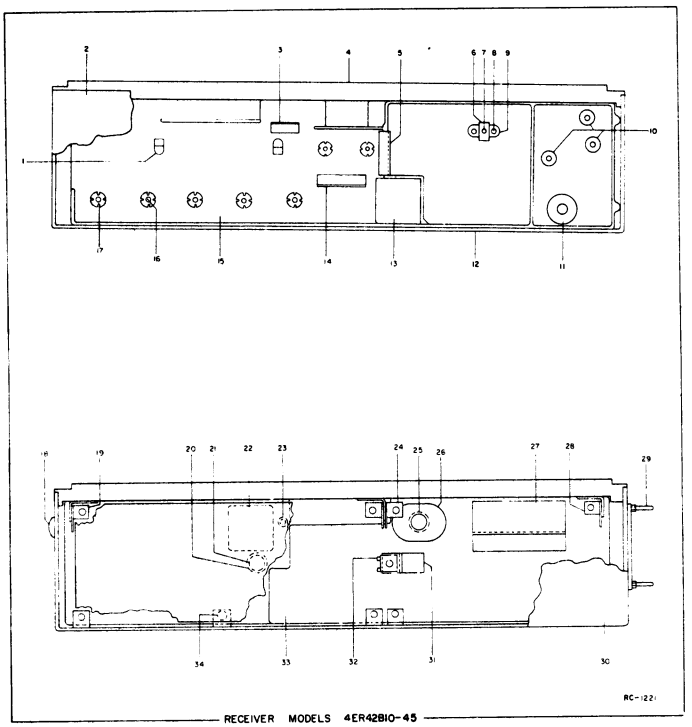
SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - TRANSFORMERS(Cont'd) - - - -
T412		COIL ASSEMBLY PL-19B204946-G2 (Used in Models 4ER42B11, 13, 15, 23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - -
C2	5496218-P249	Ceramic disc: temp-comp, radial leads, 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121725-P1	Coil.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P7	Tuning slug.
T413		COIL ASSEMBLY PL-19B204944-G2 (Used in Models 4ER42B11, 13, 15, 23, 25, 27)
		- - - - - - - - - CAPACITORS - - - - - - - -
C2	5496218-P249	Ceramic disc: temp-comp, radial leads, 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3*	5494481-P3	Ceramic disc: 220 pf ±10%, 500 VDCW.
	5494481-P11	In REV. E and earlier: Ceramic disc: radial leads, .001 µf ±20%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121715-P1	Coil.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P152J	Fixed composition: 1500 ohms ±5%, 1/4 w.
R2	3R152-P103K	Fixed composition: 10,000 ohms ±10%, 1/4 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P7	Tuning slug.
T414*	19B209082-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	Used in Models earlier than REV. A: 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-P2	Miniature, phen: 1 terminal. (Used in Models 4ER42B22-27).
TB2 and TB3	7487424-P24	Miniature, phen: 3 terminals.
		- - - - - - - - - CABLES - - - - - - - - -
W441		(Part of J441). (Used in Models 4ER42B10-15).
W444		(Part of J444). (Used in Models 4ER42B22-27).

(CONT'D ON PAGE 16)

(CONT'D FROM PAGE 15) (LBI-3541)

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - CABLES(Cont'd) - - - - - -
W445	19B209044-P19	RF: 50 ohm imp, approx 4 inches. (Used in Models 4ER42B22-27).
		RF CIRCUIT ASSEMBLY
		PL-19C303673-G1 (4ER42B22, 24, 26) PL-19C303673-G2 (4ER42B23, 25, 27) PL-19C303673-G3 (4ER42B10, 12, 14) PL-19C303673-G4 (4ER42B11, 13, 15)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C410 and C411		Refer to Mechanical Parts (RC-1221). (Used in Models 4ER42B22-27).
C414 thru C418		Refer to Mechanical Parts (RC-1221).
C423 and C424		Refer to Mechanical Parts (RC-1221).
C432	5491601-P25	Tubular, molded: axial leads, 2 pf ±10%, 500 VDCW sim to Quality Components Type MC.
C433	5493392-P3	Ceramic dielectric, feed-thru: 47 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L410	PL-19B204938-G7	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L411	PL-19B204938-G9	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L412	PL-19B204938-G8	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L413	PL-19B204938-G10	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L414	PL-19B204938-G11	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L415 thru L417	19B204936-P1	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L418	PL-19B204938-G5	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L419	PL-19B204938-G12	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L420 thru L422	19B204936-P2	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L423	PL-19B204938-G6	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L424	PL-19B204938-G3	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L425	PL-19B204938-G1	Coil. (Used in Models 4ER42B10, 12, 14, 22, 24, 26).
L426	PL-19B204938-G4	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).
L427	PL-19B204938-G2	Coil. (Used in Models 4ER42B11, 13, 15, 23, 25, 27).

SYMBOL	G-E PART NO	DESCRIPTION
		MECHANICAL PARTS (SEE RC-1221)
1	7145451-P1	Cable clamp.
2	19C303495-G4	Station Receiver bottom cover.
	19C303385-P1	Mobile Receiver bottom cover.
3	19A121674-P1	Angle support: approx 3/4 x 3/8 x 5/16 inches. (Used with C427).
4	PL-19C303394-G2	Heat sink: approx 14-9/16 x 3-7/32 x 13/32 inches thick.
5	19A121723-P1	Angle support: approx 1-1/4 x 5/16 x 1/4 inches.
6	4033089-P1	Clip. (Part of XY1-4).
7	19B200525-P8	Rivet. (Part of XY1-4).
8	4033751-P1	Electrical contact: sim to Methode 752V(PB). (Part of XY1-4).
9	4039307-P1	Crystal socket. (Part of XY1-4).
10	4029739-P2	Can: approx 7/8 x 1/2 inch dia. (Part of L2, 4, 7).
11	4034252-P5	Can: approx 1-3/16 x 3/4 inches dia. (Part of T2).
12	PL-19C303389-G1	Chassis: approx 14-1/2 x 3-1/2 x 3-7/32 inches.
13	19A121722-P1	Plate: approx 1-1/8 x 1-3/16 x 1/32 inches thick.
14	19A121724-P1	Angle support.
15	19E500814-P1	RF chassis: approx 13-3/4 x 3-1/4 x 2 inches.
16	PL-4036765-G5	Screw. (Part of C410, 411, 414-418, 423, 424).
17	7117825-P1	Spring washer: approx 15/32 inch dia; sim to Tinnerman C4578B-632-24. (Part of C410, 411, 414-418. 423, 424).
19	PL-19B204583-G3	Hinge.
20	4035439-P1	Heat sink, transistor: approx 1/4 x 1/2 inches dia; sim to Birtcher 3AL-635-2R. (Used with Q10).
21	4036555-P1	Washer, insulator: nylon. (Used with Q9, 19).
22	4032187-P1	Can: approx 1-1/8 x 1-1/8 x 1-1/8 inches. (Part of T1 on A423, 424).
23	4035306-P11	Fiber washer: approx 7/32 inch dia. (Used with L1).
24	PL-19B204583-G1	Hinge.
25	19A121284-P1	Insulator: approx 11/16 inch dia, mica. (Used with Q410).
26	19A121283-P1	Support. (Used with Q410).
27	PL-19A121229-G1	(Not used).
28	PL-19B204583-G2	(Not used).
29	19A121676-P1	Guide pin: approx 1 x 1/8 inches dia with 4-40 mounting thread.
30	19C303495-G3	Station Receiver top cover (except Repeaters and VM's).
	19C303676-G2	Station Receiver top cover (Repeater and VM's only).
31	19A121297-P1	Angle support. (Mounts cover).
32	7160861-P4	Nut, spring clip: sim to Tinnerman C6452-8Z-157.
33	19B204940-P1	RF plate.
34	19A115461-P2	Spring washer: approx 1/4 dia; sim to Shakeproof 3597-04-00. (Located on board mounting screws).

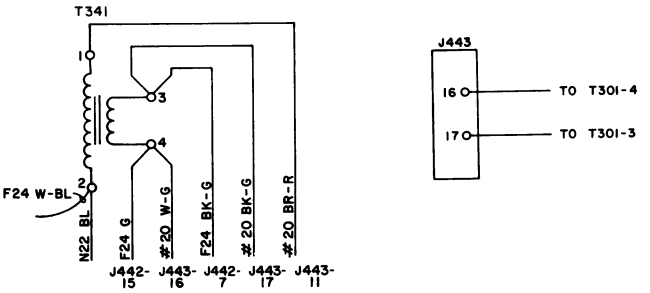


RECEIVER MODELS 4ER42B10-45

PRODUCTION CHANGES

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

REV. A - To incorporate value improvements in single-frequency receivers. Deleted CR1 and R5. Added R20 on 1st Oscillator Board A415/A420 To utilize improved transistor and to eliminate shorting of audio transformer terminals. Changed Q410 and T414.



REV. B - To eliminate feedback within receiver cabling. Added C435 and C436.

REV. C - To decrease 2nd oscillator injection voltage and to widen 455 KC bandwidth. Changed C19, C23, and C24 on 2nd Mixer Assembly A422.

REV. D - 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 C10, C11, and C22 on 2nd Mixer board A422. Changed Q4 and Q5, deleted R46, and added R74, R75, and C71 on IF/Audio board A423.

REV. E - To improve temperature characteristics. Changed C4, C5, C10 thru C15, C20 thru C24, L2, L7 to L5, L6, L8 to L7, deleted C6 and C16, added C7 on 2nd Mixer Board A422.

REV. F - To eliminate oscillations in multiplier circuit. Changed C3 in the T411/T413 assembly.

REV. G - To improve 3000 cps audio response of IF/AUDIO BOARD A423. Added C76, C77, R78, and R79. Deleted C53 and R32.

REV. H - To improve circuit DC bias stability of AUDIO AMP Q10. Added R80.

REV. J - To improve receiver squelch hysteresis and audio squelch tail. Changed R64 in A423.

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-3621

DF-1086

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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