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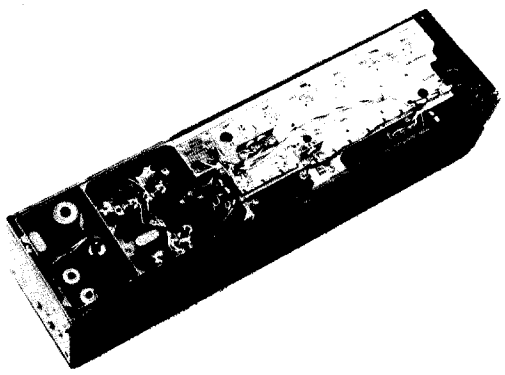
communications

MASTR Progress Line

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



Maintenance Manual LBI-3621A

ER-42-B

SPECIFICATIONS *

	ER-42-B	
FCC Filing Designation		
Frequency Range	406-420 & 450-470 MC	
Audio Output	2 watts at less than 10% distortion (using Speaker Model 4EX16A10)	
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 KC channels)	
20-db Quieting Method	-100 db at ±35 KC	
Spurious Response	-100 db	
Frequency Stability	±.0005% (-30°C to +60°C)	
Modulation Acceptance	±17 KC	
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 cps (1000-cps reference)	

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

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

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

DESCRIPTION

General Electric MASTR Progress Line Receiver double-conversion, superheterodyne FM receiver designed for operation on the 406-420 and 450-470 megacycle bands. Two versions are available! A standard receiver and an ultra-high sensitivity receiver.

Both 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.

CIRCUIT ANALYSIS

The unit is completely transistorized, using a total of 24 silicon transistors. Input leads to the receiver are individually filtered by the 20-pin feed-through by-pass connector J443.

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

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

RF AMPLIFIER (A410)

RF Amplifier A410 is used only in the ultra-high sensitivity (UHS) receivers, and consists of two tuned helical resonators and an RF amplifie r 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 (A415-A420)

The receiver 1st oscillator is a transistorized Colpitts oscillator. The oscillator crystal operates in a fundamental mode at a frequency of approximately 16 to 19 megacycles. The crystal is cut to provide temperature compensation at the high end of the temperature range and is thermistor compensated at low temperatures. This provides instant warm-up with a frequency stability of .0005% without crystal ovens or warmers.

In single-frequency receivers, a jumper from J2 to R5 connects the regulated 10 volts to the crystal circuit, which forward biases diode CR1. Forward biasing the diode reduces its impedance, and the crystal frequency is applied to the base of oscillator transistor Q1. Feedback for the oscillator is developed across C47. The oscillator output is fed through C45 to the base of 1st multiplier Q2.

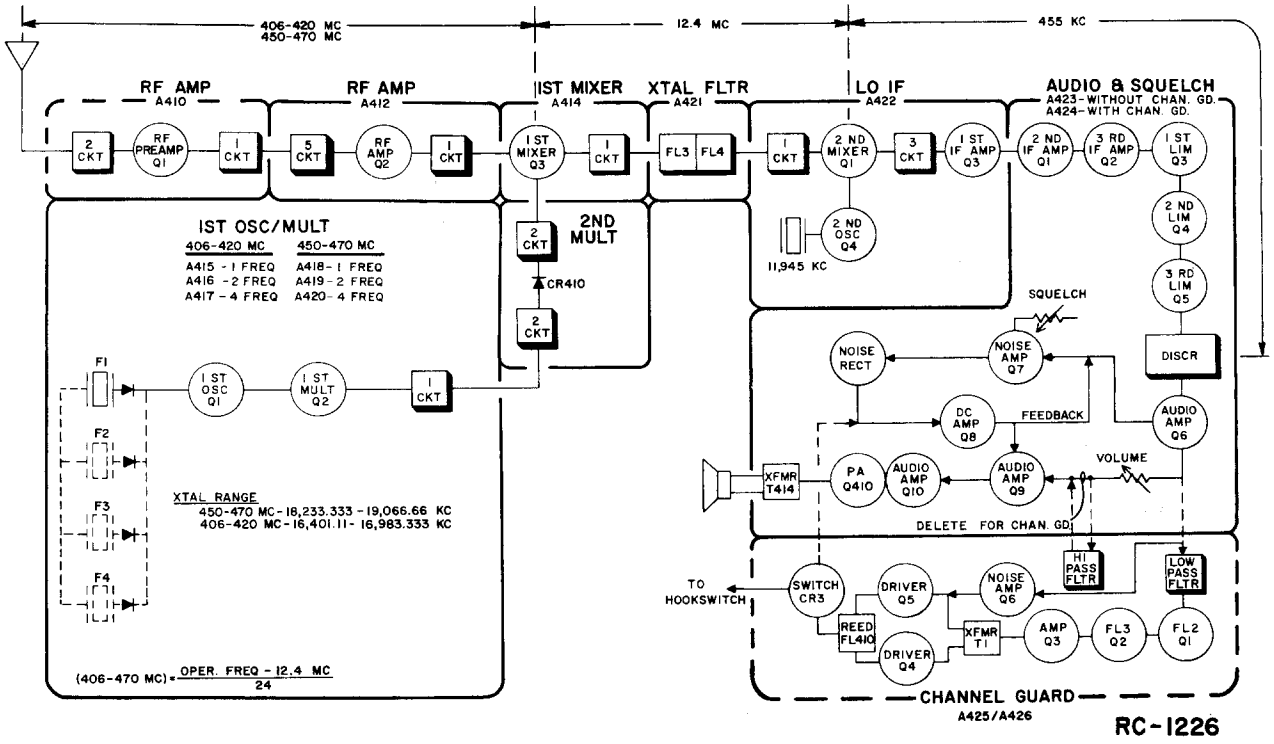


Figure 1 - Receiver Block Diagram

In multi-frequency receivers, the single oscillator transistor is used, and up to three additional crystal circuits, identical to the F1 crystal circuit, 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.

The output of the 1st multiplier (Q2) is fed through three tuned circuits (T7/T8, T410/T412, and T411/T413) to the 2nd multiplier assembly. The 1st multiplier circuits are tuned to four times the crystal frequency. This stage is metered at centralized metering jack J442-4 through metering network CR6, R17 and R18.

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 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 KC, 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 KC 2nd mixer output is fed to three tuned low IF circuits (L7, 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 A424-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 J442-4 through G13, 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 KC 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 R33 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.

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.

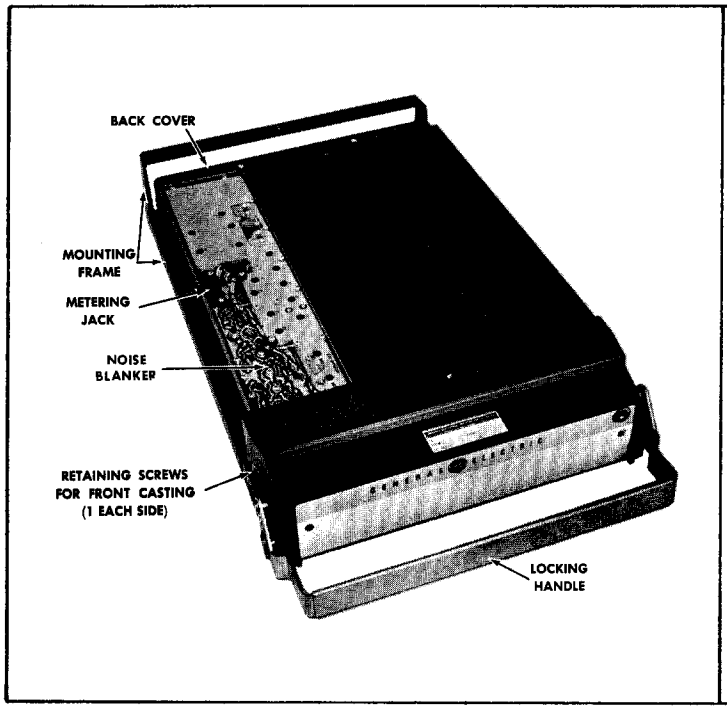


Figure 2 - Top Cover Removed

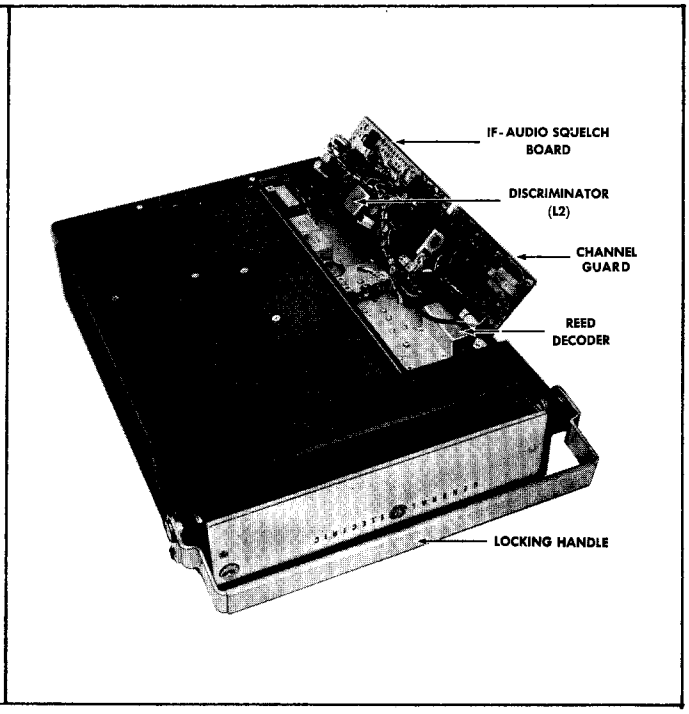


Figure 3 - Bottom Cover Removed

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.

FRONT END ALIGNMENT

EQUIPMENT REQUIRED

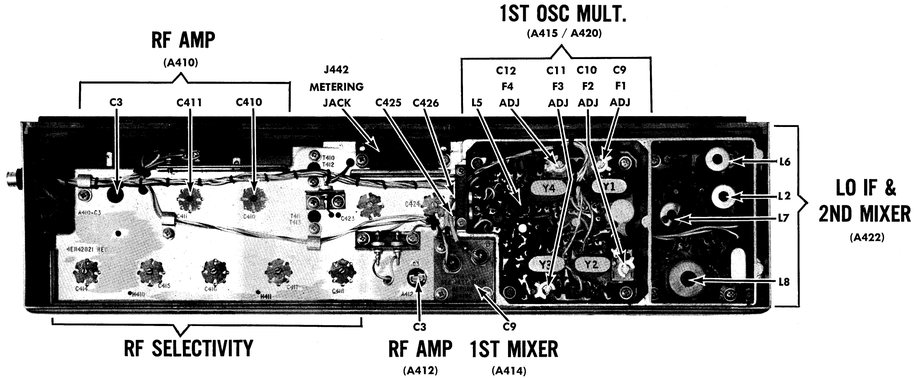
1. G-E Test Set Model 4EX3A10 Station Meter Switching Panel, or 20,000 ohms-per-volt multimeter.
2. A 406-470 MC signal source.

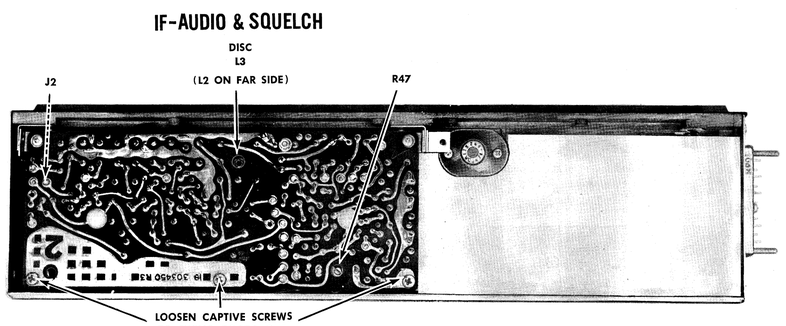
PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set Model 4EX3A10 to receive centralized metering jack J442.
2. In multi-frequency receivers where the maximum frequency spacing is less than 500 KC, align the unit on channel F1. If the frequency spacing is greater than 500 KC, align the receiver on the center frequency.
3. With VOLUME control fully counterclockwise and squelch in full clockwise position and Test Set in position G, adjust R47 on the IF-AUDIO & SQUELCH board for a reading of 0.65 volts. If using Multimeter, connect leads to J442-1 (AUDIO-PA) AND J442-8 (System Negative).
4. With Test Set in position 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).

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 discriminator 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 thru C418 and C3 (on RF AMP A412) for maximum quieting.
			FREQUENCY ADJUSTMENT		
5.	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.





COMPLETE RECEIVER ALIGNMENT

EQUIPMENT REQUIRED

1. G-E Test Set Model 4EX3A10, Station Meter Switching Panel, or 20,000 ohms-per-volt multimeter.
2. A 455-KC and 406-470 MC 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 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 KC, align the unit on channel F1. If the frequency spacing is greater than 500 KC, align the receiver on the center frequency.
4. With VOLUME control fully counterclockwise and squelch control fully clockwise (receiver unsquelched) and Test Set in position G, adjust R47 on the IF-AUDIO & SQUELCH board for a reading of 0.65 volts. If using Multimeter, connect leads to J442-1 (AUDIO-PA) and J442-8 (System Negative).
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).

ALIGNMENT PROCEDURE

STEP	METERING POSITION 4EX3A10	METERING POSITION Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			DISCRIMINATOR		
1.	A (DISC)	Pin 10	L3 (Bottom slug on IF-AUDIO SQUELCH board)	Zero	Apply a 455-KC signal to 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	Switch G-E Test Set to TEST 3 position. Alternately apply a 445-KC and 465-KC 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 (MULT-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 (MULT-2)	Pin 5	L5 (on 1st OSC/MULT) and T410/T412 and T411/T413.	Maximum	Tune L5, T410/T412 and T411/T413 for maximum meter reading.
5.	E (MULT-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), 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 411 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 on Ultra-High Sensitivity receivers only)	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 and C3 (on RF AMP A410), C414 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	T1 (on 2nd MIXER)	Maximum	Apply an on-frequency signal as above, and tune T1 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 L7. Load L7 & L6 at Points A & C—Peak L2. Load L2 at Point B—Peak L6.
			FREQUENCY ADJUSTMENT		
15.	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—The mixer and low IF coils have been aligned at the factory and will normally require no further adjustment. If alignment is necessary, refer to the RECEIVER OUTLINE DIAGRAM for location of resistor loading points A, B and C.

ALIGNMENT PROCEDURE

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

TEST PROCEDURES

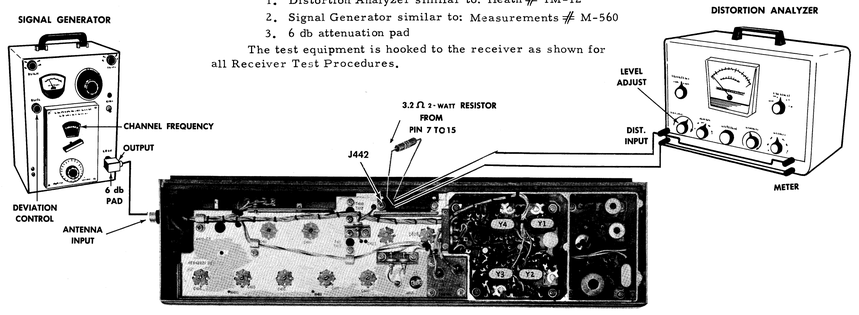
These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect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

TEST EQUIPMENT REQUIRED

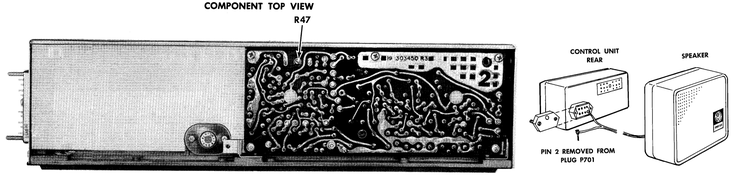
for test hookup shown:

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

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



COMPONENT BOARD WIRING VIEW



STEP 1

AUDIO POWER OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

1. Connect a 1,000-microvolt test signal modulated by 1,000 cycles ±10 KC deviation to the antenna jack J441.
2. Two- Watt Speaker:
   When speaker is used, disconnect speaker lead pin from J701-2 (on rear of Control Unit). Hook up a 3.2-ohm load resistor from J442-15 to J442-7

   OR

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

   OR

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

VOLTMETER SCALE ON DISTORTION ANALYZER

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

SERVICE CHECK

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

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

STEP 2

USABLE SENSITIVITY (12 db SINAD)

TEST PROCEDURE

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

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

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.

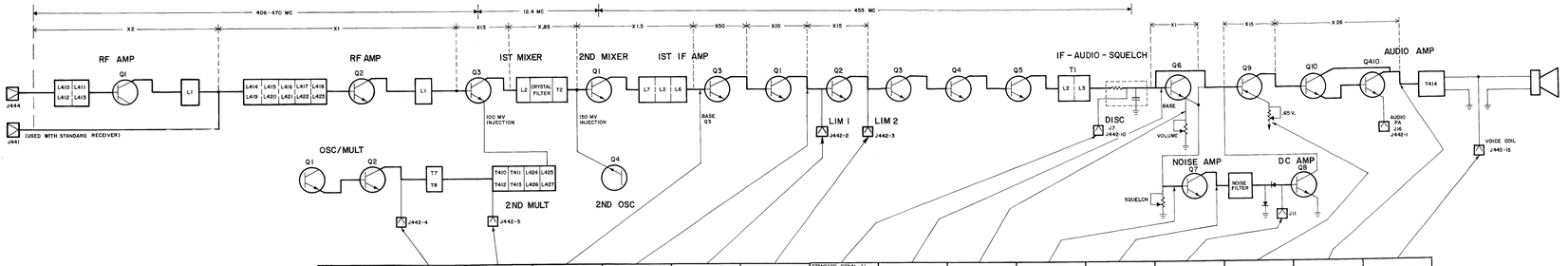
PROCEDURE

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.



SIGNAL GENERATOR INPUT. MAINTAIN SETTING AT DISCRIMINATOR ZERO			UNMODULATED	UNMODULATED	10 MICROVOLT UNMODULATED	.5 MICROVOLT UNMODULATED	STANDARD SIGNAL (1 MILLIVOLT AT RCVR 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 10 MICROVOLTS UNTIL VTVM READING DECREASES BY 5% DC *	INCREASE SIGNAL GENERATOR OUTPUT FROM 10 MICROVOLTS UNTIL READING DECREASES TO MINIMUM DC *									VOLUME CONTROL IN FULL COUNTER-CLOCKWISE POSITION		ADJUST VOLUME CONTROL FOR RATED 2 WATT OUTPUT ACROSS 3.2 OHM LOAD
READING	1.0 VDC	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.

(RC-1243)

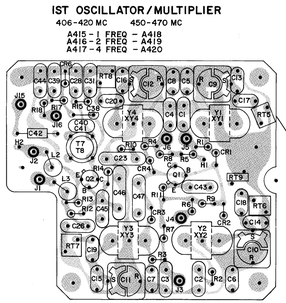
STEP 2- SIMPLIFIED VTVM GAIN CHECKS

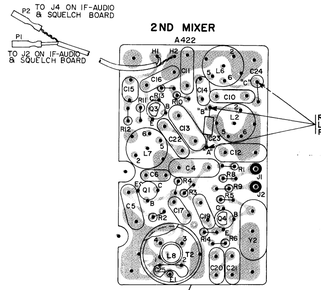
EQUIPMENT REQUIRED:

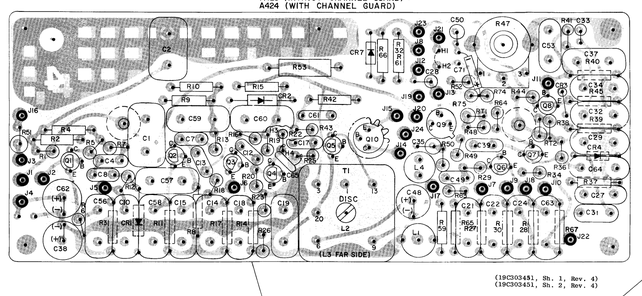
1. VTVM-AC & DC
2. SIGNAL GENERATOR (MEASUREMENTS M560 EQUIV.)

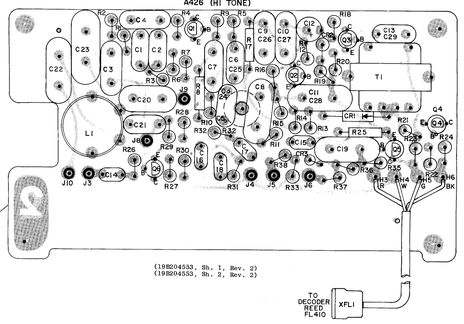
PRELIMINARY STEPS:

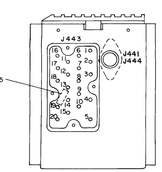
1. SET VOLUME CONTROL FULLY CLOCKWISE.
2. SET SQUELCH CONTROL FULLY COUNTERCLOCKWISE.
3. RECEIVER SHOULD BE PROPERLY ALIGNED.
4. CONNECT SIGNAL GENERATOR TO ANTENNA JACK.
5. VTVM CONNECTS BETWEEN GROUND AND POINTS INDICATED BY ARROWS.

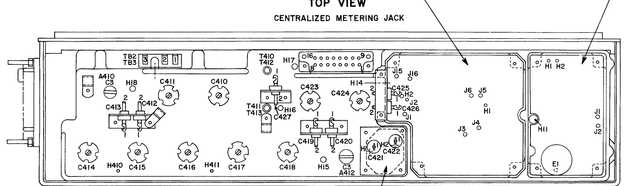


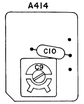








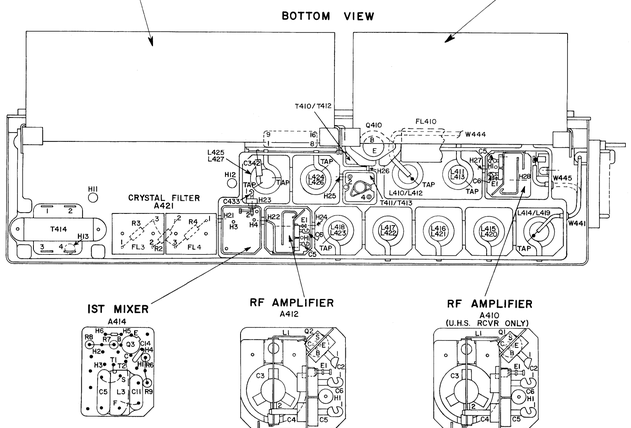




TRANSISTOR	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
A424-Q1	2K	2K	13.5K	4.1K	4.1K	4.9K
A424-Q2	2K	2K	13.5K	4.1K	4.1K	5.2K
A424-Q3	2K	2K	13.5K	4.1K	4.1K	5.0K
A424-Q4	2K	2K	13.5K	4.1K	4.1K	5.2K
A424-Q5	350Ω	300Ω	14.0K	7.5K	6K	2 MEG
A424-Q6	3.5K	3.5K	MEG.OK	7.5K	6K	2 MEG
A424-Q7	5K	5K	13.0K	5.5K	11K	19.0K
A424-Q8	180Ω	180Ω	1.5MEG	2.2K	12K	17.0K
A424-Q9	2.2K	2.2K	5K	50.0K	2.3K	2.3K
A424-Q10	100Ω	100Ω	2.2K	2.2K	1Ω	1Ω *
A424-Q410	2Ω	2Ω	100Ω	10Ω	1Ω	1Ω *
AA15/AA20-Q1	470Ω	1K	10.5K	250Ω	110Ω	110Ω
AA15/AA20-Q2	2800Ω	1KΩ	100Ω	150Ω	70Ω	150Ω
AA10-Q1/AA12-Q2	200Ω	400Ω	600Ω	350Ω	190Ω	225Ω
AA14-Q3	3.9K	10K	1.6K	1.6K	500Ω	600Ω
AA22-Q1	430Ω	5.5K	8.5K	430Ω	200Ω	200Ω
AA22-Q3	2.2K	2.3K	2.2K	2.1K	2.8K	3.3K
AA22-Q4	400Ω	10K	5.3K	430Ω	200Ω	200Ω

* JUMPER FROM TH14 PIN #1 TO C425-CR26

(19B620748, Rev. 3)



TRANSISTOR A425/A426	EMITTER		BASE		COLLECTOR	
	−	+	−	+	−	+
Q1	96Ω	96Ω	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	1MK	10Ω	2.3K	2.3K
Q5	1Ω	1Ω	1MK	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 (+8VX) 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

NOTES:

1. RF AMPLIFIER A410 IS PRESENT ONLY IN ULTA-HIGH SENSITIVITY RECEIVERS MODEL 4ER42B22-B27. 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. RECEIVER MODEL NUMBERS 4ER42B10-B15 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 ON 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 COUNTERCLOCKWISE.
US= SQUELCH CONTROL FULLY CLOCKWISE.

MODEL NUMBER	REV.	FREQUENCY RANGE (MC)	NO. OF FREQ'S.	STANDARD RECEIVER	U.H.S. RECEIVER
4ER42B10	D	406-420 MC	1	X	
4ER42B11	D	450-470 MC	1	X	
4ER42B12	D	406-420 MC	2	X	
4ER42B13	D	450-470 MC	2	X	
4ER42B14	D	406-420 MC	4	X	
4ER42B15	D	450-470 MC	4	X	
4ER42B22	D	406-420 MC	1		X
4ER42B23	D	450-470 MC	1		X
4ER42B24	D	406-420 MC	2		X
4ER42B25	D	450-470 MC	2		X
4ER42B26	D	406-420 MC	4		X
4ER42B27	D	450-470 MC	4		X

(19B620728, REV. 17)

SCHEMATIC DIAGRAM

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

PARTS LIST

LBI-3541A
406-470 MC RECEIVER
MODELS 4ER42B10-15, 22-27 REV. D

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, cclor 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.
R4	3R152-P682K	Fixed composition: 6800 ohms ±10%, 1/4 w.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
A422		SECOND MIXER ASSEMBLY PL-19B204438-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C4	5491189-P106	Mylar® dielectric, dipped epoxy: radial leads, 0.1 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C5	5491189-P103	Mylar® dielectric, dipped epoxy: radial leads, .033 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C6	5496219-P47	Ceramic disc: temp-comp, radial leads, 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C10* and C11*	5496219-P566	Ceramic disc: temp-comp, radial leads, 130 pf, ±5%, 500 VDCW, temp coef, -330 PPM. Used in REV. C and earlier:
	5496219-P666	Ceramic disc: temp-comp, radial leads, 130 pf ±5%, 500 VDCW, temp coef -470 PPM.
C12 and C13	5491189-P106	Mylar® dielectric, dipped epoxy: radial leads, .01 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C14 and C15	5491189-P101	Mylar® dielectric, dipped epoxy: radial leads, .01 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C16	5491189-P104	Mylar® dielectric, dipped epoxy: radial leads, .047 µf ±20%, 50 VDCW; sim to Good-All Type 601PE.
C17	5494481-P112	Ceramic disc: radial leads, .001 µf ±10%, 500 500 VDCW; sim to RMC Type JF Discap.
C19*	5490008-P1	Silver mica, dipped phen, radial leads, 5 pf, ±5%, 500 VDCW. In Models of REV. B and earlier:
	5490008-P7	Silver mica, dipped phen: radial leads, 12 pf, ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C20	5490008-P25	Silver mica, dipped phen: radial leads, 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C21	5490008-P19	Silver mica, dipped phen: radial leads, 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C22*	5496219-P564	Ceramic disc: 110 pf, ±5%, 500 VDCW, temp coef -330 PPM. In REV. C and earlier:
	5496219-P664	Ceramic disc: temp-comp, radial leads, 110 pf ±5%, 500 VDCW, temp coef -470 PPM.
C23* and C24*	5496218-P39	Ceramic disc: temp-comp, radial leads, 8 pf, ±5%, N.PO. In REV. B and earlier:
	5496218-P38	Ceramic disc: temp-comp, radial leads, 7 pf, ±0.25 pf, 500 VDCW, temp coef 0 PPM.
		- - - - - - - - - - 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	PL-19C303464-G2	Coil. Includes:
	7160519-P2	Tuning slug.
L6	PL-19C303464-G4	Coil. Includes:
	7160519-P2	Tuning slug.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - INDUCTORS(Cont'd) - - - - -
L7	PL-19C303464-G5	Coil. Includes:
	•7160519-P2	Tuning slug.
L8		(Part of T2).
		- - - - - - - - - - - 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 and C2	19A115028-P116	Mylar® dielectric, dipped phen: radial leads, 0.22 µf ±20%, 200 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	5495670-P10	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.

(CONT'D ON PAGE 13)

*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.
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.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	7777146-P3	Germanium; sim to Type 1N90.
CR3 and CR4	19A11250-P1	Silicon.
CR7	19A11250-P1	Silicon.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J24	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	PL-4031476-G1	Choke. Includes:
	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.
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-P224K	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.
		- - - - - - - - - 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-P11	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-P11	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 rex 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).

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(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).
18	4033986-P6	Plug button: approx 7/16 inch dia; sim to United-Carr Fastener BS-48199.
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, 10).
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).

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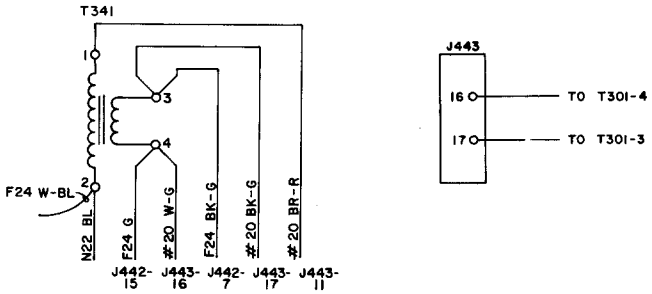
PRODUCTION CHANGES

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.

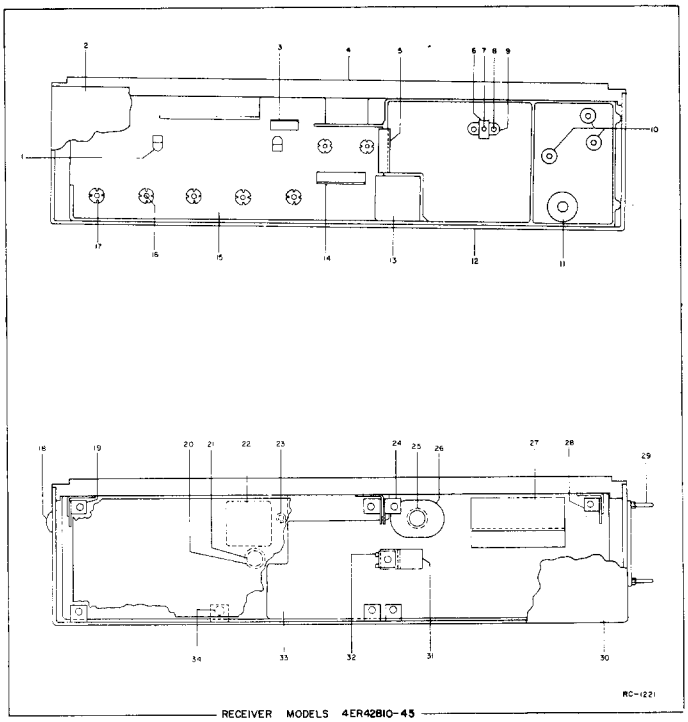
A - To incorporate value improvements in single-frequency receivers. Deleted CR1 and R5. Added R20 on 1st Oscillator Board A415/A420. To utilize improved transistor and to eliminate shorting of audio transformer terminals. Changed Q410 and T414.



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.



RECEIVER MODELS 4ER42B10-45