

Tipton Police
Customer _____

G. E. Req. No. _____

Customer Order No. _____

Install 4-19-74



MAINTENANCE MANUAL

for

25-50 MHz

MOTORCYCLE

TWO-WAY FM RADIOS

LBI-3679A

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL  ELECTRIC

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EQUIPMENT INDEX

EQUIPMENT	MODEL NUMBER	
	SINGLE-FREQUENCY	TWO-FREQUENCY
FM TRANSMITTER		
25-33 MHz	4ET61A10	4ET61A11
33-42 MHz	4ET61A12	4ET61A13
42-50 MHz	4ET61A14	4ET61A15
FM RECEIVER		
25-33 MHz	4ER43A10	4ER43A11
33-42 MHz	4ER43A12	4ER43A13
42-50 MHz	4ER43A14	4ER43A15
1st Oscillator (One-Freq.)	4EG19A10	4EG19A11
1st Oscillator (Two-Freq.)		
CONTROL UNIT	4EC66A10	4EC66A11
ANTENNA	MODEL NUMBER	
	2 WHEEL MOTORCYCLE	3 WHEEL MOTORCYCLE
25-29 MHz	4EY22A10	4EY22A10
29-33 MHz	4EY22A11	4EY22A11
33-36 MHz	4EY22A12	
33-39 MHz		4EY22A15
36-42 MHz	4EY22A13	
39-45 MHz		4EY22A16
42-50 MHz	4EY22A14	
45-50 MHz		4EY22A17
POWER/CONTROL CABLE	19C303829G1	19C303828G2
FRAME MOUNTING KIT	19A122146G1	19A121826G3
POWER SUPPLIES		
6 volt \pm ground	4EP48A10	
12 volt - ground	4EP47A11	
TRANSMITTER-RECEIVER CASE	19B204501G2	
MICROPHONE	4EM25C10	
ALIGNMENT TOOLS		
Hex Slug Type	4033530G2	
Slotted Screw Type	4038831P1	
MOUNTING FRAME ASSEMBLY	19D402520G2	
CONTROL UNIT MOUNTING KIT	19A122010G1	
MOUNTING FRAME COVER	19C303898G1	
10-WATT AUDIO AMPLIFIER	19B205165G1	
NOISE SUPPRESSION KIT	19A122253G1	

OPTIONAL EQUIPMENT

EQUIPMENT	OPTION NUMBER	MODEL NUMBER
Power Supply Extension Cable (3 ft.)	5505	19B204289G1
Control Unit Mounting Kit (For Harley-Davidson 1958-59 Models)	5583	19A122252G1
Microphone Mounting Kit	5585	19A122485G1
Steering Damper Adapter Kit	5584	19A122469G1

SPECIFICATIONS ***GENERAL**

FREQUENCY RANGE	25-50 MHz
OPERABLE TEMPERATURE RANGE	-30°C (-22°F) to +65°C (+149°F)

TRANSMITTER

MINIMUM RF POWER OUTPUT	15 Watts (25-42 MHz) 12 Watts (42-50 MHz)
CRYSTAL MULTIPLICATION	8
SPURIOUS & HARMONICS	-53 dB
FREQUENCY STABILITY	<u>±</u> .002% (-30°C to +65°C)
MODULATION	<u>±</u> 5 KHz
AUDIO RESPONSE	Within +1 dB and -3 dB of a 6 dB/octave pre-emphasis from 300 to 3000 Hz (1000 Hz reference) per EIA standards
AUDIO DISTORTION	Less than 10%
DUTY CYCLE	20%
MAXIMUM FREQUENCY SEPARATION	0.4%

RECEIVER

SENSITIVITY	
12 dB SINAD	0.25 μ v
20 dB Quieting	0.35 μ v
SELECTIVITY (EIA)	-60 dB
SPURIOUS RESPONSE	-75 dB
MODULATION ACCEPTANCE	<u>±</u> KHz (Minimum)
INTERMODULATION (EIA)	-55 dB
AUDIO CHARACTERISTICS	Within +2 and -8 dB of a 6 dB/octave de-emphasis curve from 300 to 3000 Hz (1000 Hz reference) per EIA standards.

SPECIFICATIONS* (CONT'D)

FREQUENCY STABILITY	$\pm .002\%$
AUDIO OUTPUT	10 watts with less than 10% distortion
SQUELCH SENSITIVITY	0.2 μv minimum 2 x SINAD (1.0 μv maximum)
MAXIMUM FREQUENCY SEPARATION	0.5%

POWER SUPPLIES (Typical Readings)

	MODEL 4EP47A11	MODEL 4EP48A10
	12-VOLT NEGATIVE GROUND	6-VOLT, \pm GROUND
DUTY CYCLE	20%	20%
PRIMARY VOLTAGE LIMITS	+ 20%	$\pm 20\%$
INPUT POWER		
Standby	13.8 v @ 0.10 a	6.5 v @ 0.80 a
Receiver	13.8 v @ 1.50 a	6.5 v @ 4.00 a
Transmitter	1.38 v @ 5.00 a	6.5 v @ 12.00 a
OUTPUT POWER		
Standby	13.8 v @ 0.10 a	13.8 v @ 0.10 a
Receiver	13.8 v @ 1.50 a	13.8 v @ 1.50 a
Transmitter	24.0 v @ 0.50 a 32.0 v @ 1.00 a	25.0 v @ 0.33 a 32.0 v @ 0.80 a

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

MODULATION LEVEL ADJUSTMENT

The MOD ADJUST was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter.

TEST EQUIPMENT

1. An audio oscillator
2. A frequency modulation monitor
3. An output meter or a VTVM

PROCEDURE

1. Connect the audio oscillator and the meter across J5 (Mike High) and J8 (Mike Low) on the transmitter board.
2. Apply a 0.5-volt signal at 1000 Hz across J5 and J8.
3. Set MOD ADJUST R48 for a 5-kilohertz swing with the deviation polarity + or - (whichever gives the highest reading) as indicated on the frequency modulation monitor.

PA POWER INPUT

For FCC purposes, the PA power input can be determined by measuring the Collector Voltage and the Collector Current indication, and using the following formula:

$$P_i = \frac{\text{Collector Voltage} \times \text{Collector Current Indication}}{0.51}$$

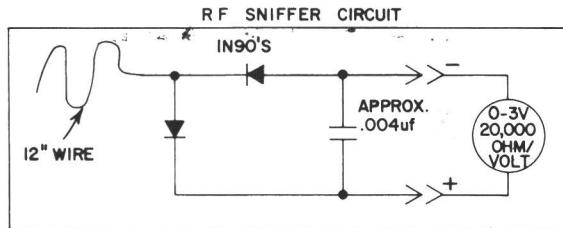
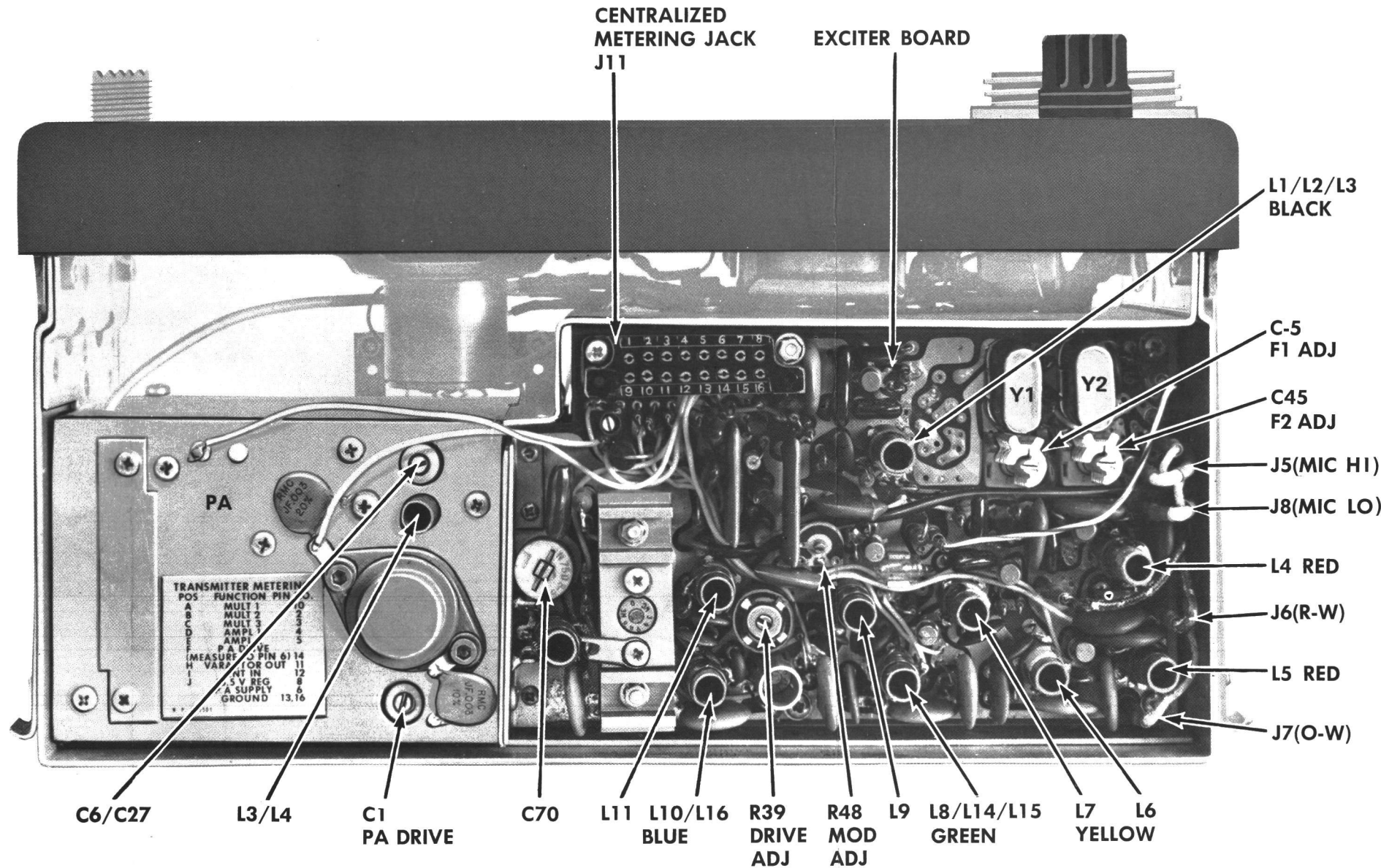
Where:

P_i is the power input in watts.

Collector voltage is measured between J11-14 and J11-13 with external leads of G-E Test Set using the 100-volt scale, or with multimeter.

Collector current indication is measured with G-E Test Set in position F, using the TEST 1 scale (or measured from J11-6 to J11-14 with multimeter).

0.51 is the value of the collector current metering resistor in ohms.



TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

1. General Electric Centralized Metering Test Set Model 4EX3A10, or a 200,000 ohms-per-volt Multimeter.
2. Wattmeter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Turn DRIVE ADJUST R39 (on Exciter Board) all the way to the right, and then turn it back two-thirds of the way to the left. Set crystal trimmer C5 (and C45 for two-frequency) to mid-capacity.
2. Turn PA DRIVE ADJUST C1 and C6 (on PA Assembly) all the way to the right.
3. Set all slugs in Exciter Board coils to bottom of coil form. Use the first response as slugs are tuned up from bottom of coil.
4. Key the transmitter and check for 32 volts at J6 and for 24 volts at J7.
5. Connect Test Set Model 4EX3A10 to the Transmitter Centralized Metering Jack J11. If using Multimeter, connect the negative lead to J11-13 (Ground) except for Steps 6, 9, and 11.

ALIGNMENT PROCEDURE

STEP	METERING POSITION		TUNING CONTROL	METER READING	PROCEDURE
	TEST SET	Multimeter + at J11			
EXCITER BOARD					
1.	A MULT-1	Pin 10	L1/L2/L3 and L4	See Procedure	Key the transmitter and tune L1/L2/L3 for maximum meter reading. Then tune L4 for minimum meter reading. For transmitters with Channel Guard, this is a critical adjustment.
2.	B MULT-2	Pin 2	L5, L4 and L6	See Procedure	Key the transmitter and tune L5 and then L4 for maximum meter reading. Then tune L6 for minimum meter reading.
3.	C MULT-3	Pin 3	L7,L6 and L8/L14/L15	See Procedure	Key the transmitter and tune L7 and then L6 for maximum meter reading. Then tune L8/L14/L15 for minimum meter reading.
4.	D AMPL-1	Pin 4	L9,L8/L14/L15 and L10/L16	See Procedure	Key the transmitter and tune L9 and L8/L14/L15 for maximum meter reading. Then tune L10/L16 for minimum meter reading.
5.	E AMPL-2	Pin 5	L11, L10/L16 and C70	See Procedure	Key the transmitter and tune L11 and L10/L16 for maximum meter reading. Then tune C70 for minimum meter reading.
PA ASSEMBLIES					
6.	F PA DRIVE	Pin 14(-) and Pin 6 (+)	C1 (PA DRIVE), C70 (on Exciter Board) and C6/C27	See Procedure	Key the transmitter and tune C1 and C70 for maximum meter reading. Then tune C6/C27 for a dip reading.
7.	I ANT IN	Pin 12	C70 (on Exciter Board), and C1	See Procedure	Key the transmitter and tune C70 (on Exciter Board) and C1 for maximum meter reading. (Use wattmeter for more accurate reading).
FINAL ADJUSTMENT					
8.					Turn DRIVE ADJUST R39 all the way to the left.
9.	F PA DRIVE	Pin 14(-) and Pin 6 (+)	L3/L4 and C6/C27	See Procedure	Check meter reading. If meter reads less than 0.4 volts, tune L3/L4 counterclockwise and redip C6/C27. Repeat if necessary. If meter reads more than 0.45 volts, tune L3/L4 clockwise and redip C6/C27. Repeat if necessary. <div>NOTE If power output is low, repeak L8/L14/L15, L9, L10/L16, L11, C70 and C1. Then retune L3/L4 and C6/C27 as indicated above.</div>
10.					Let PA/MULT ASSEMBLY cool to room temperature
11.	F	Pin 14			Key the transmitter and repeat Step 9.
FREQUENCY ADJUSTMENT					
12.					With no modulation key the transmitter and adjust C5 (and C45 for two-frequency) for correct frequency. <div>NOTE For proper frequency control of the transmitter, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90°F.</div>
ANTENNA LOADING (PORTABLE ONLY)					
13.					Replace wattmeter (or 50-ohm load) with antenna.
14.			Antenna Loading Coil	Maximum	Place the unit on a conductive surface such as a metal-topped table. Tune the Antenna Loading Coil for maximum meter reading on an RF indicator (use a grid dip meter or the RF Sniffer Circuit as shown). Keep the indicator meter as far from antenna as possible.
					<div>WARNING Do not touch the antenna while keying the transmitter, as this may result in an RF burn.</div>

ALIGNMENT PROCEDURE

25—50 MHz TRANSMITTER
TYPE ET-61-A

(RC-1302B)

TRANSMITTER TEST PROCEDURES

The Transmitter Test Procedures are designed to assist you in servicing a transmitter that is operating — but not properly. Problems encountered could be low power output, low B plus, tone and voice deviation, defective audio sensitivity and modulator adjust control set too high. By following the sequence of test steps starting with

Step 1, the defect can be quickly localized. Once a defect is pin-pointed, refer to the "Service Check" and the additional corrective measures included in the Transmitter Trouble-shooting Procedure. Before starting with the Transmitter Test Procedures, be sure the transmitter is tuned and aligned to the proper operating frequency.

TEST EQUIPMENT REQUIRED

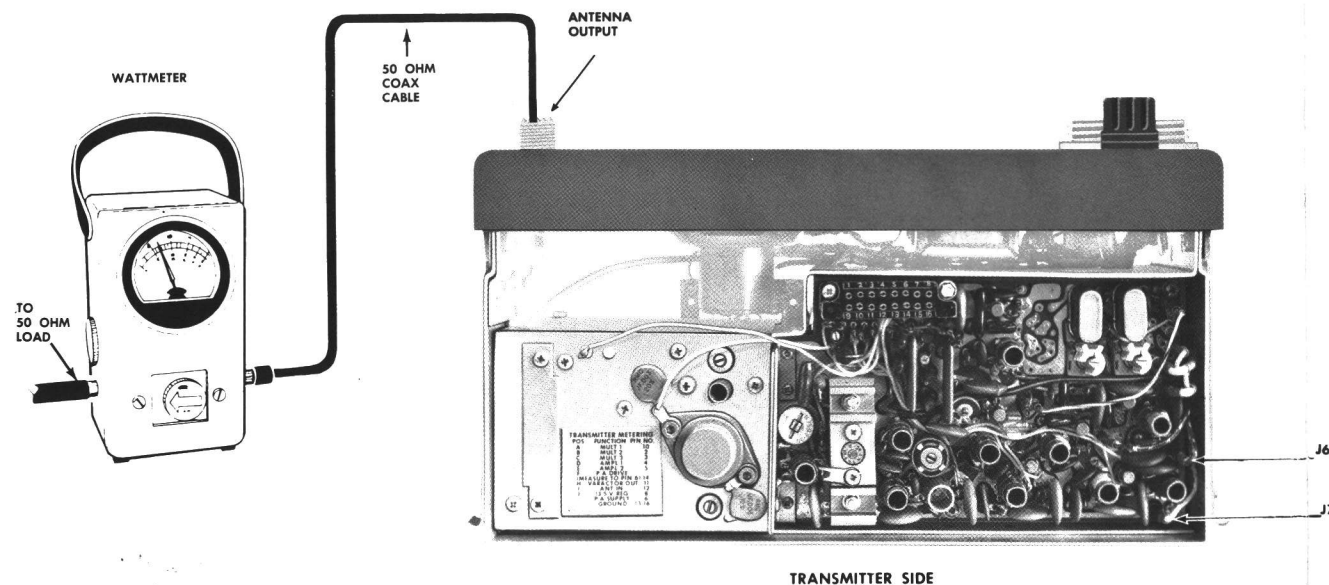
for test hookup as shown:

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

STEP 1

POWER MEASUREMENT TEST PROCEDURE

1. Connect transmitter output to wattmeter as shown below:



2. Key transmitter and check wattmeter for minimum reading of 15 watts (25–43 MHz) or 12 watts (43–50 MHz).

SERVICE CHECK

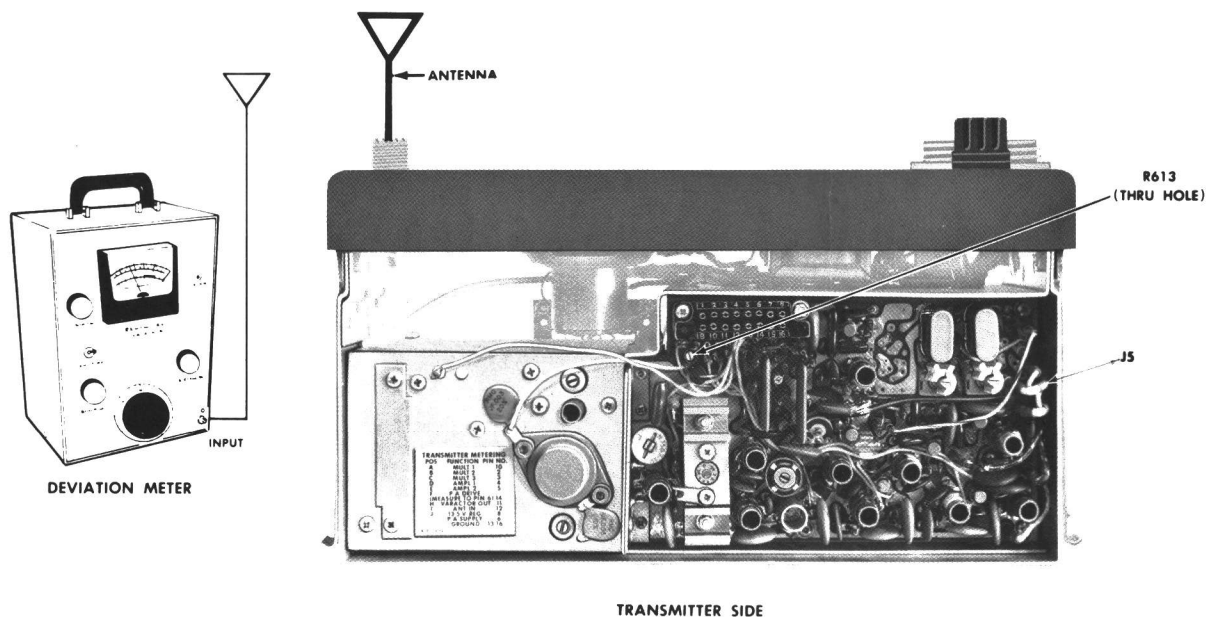
Check the following if the above readings are not obtained:

1. Disconnect red wire from J6 (32-V) and orange wire from J7 (24-V) from the Transmitter Exciter Board as shown, and check power supply voltages for:
A. 32 volts at J501-2 on power supply.
B. 24 volts at J501-1 on power supply.
2. Refer to Power Supply Troubleshooting Steps on Troubleshooting Procedure Sheet.

STEP 2

TONE DEVIATION WITH CHANNEL GUARD TEST PROCEDURE

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



2. Unplug the MIC HI terminal from J5 on Transmitter Exciter Board.
3. Key transmitter and check for 0.75 kHz deviation. If reading is low or high, adjust Tone Deviation Control (R613) for a reading of 0.75 kHz.

NOTES:

1. On units supplied with "Tone Squelch," the Phase Modulator Tuning should be peaked carefully to insure proper performance. (Refer to Step 1 in the Transmitter Alignment Chart on reverse side of page).
2. The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

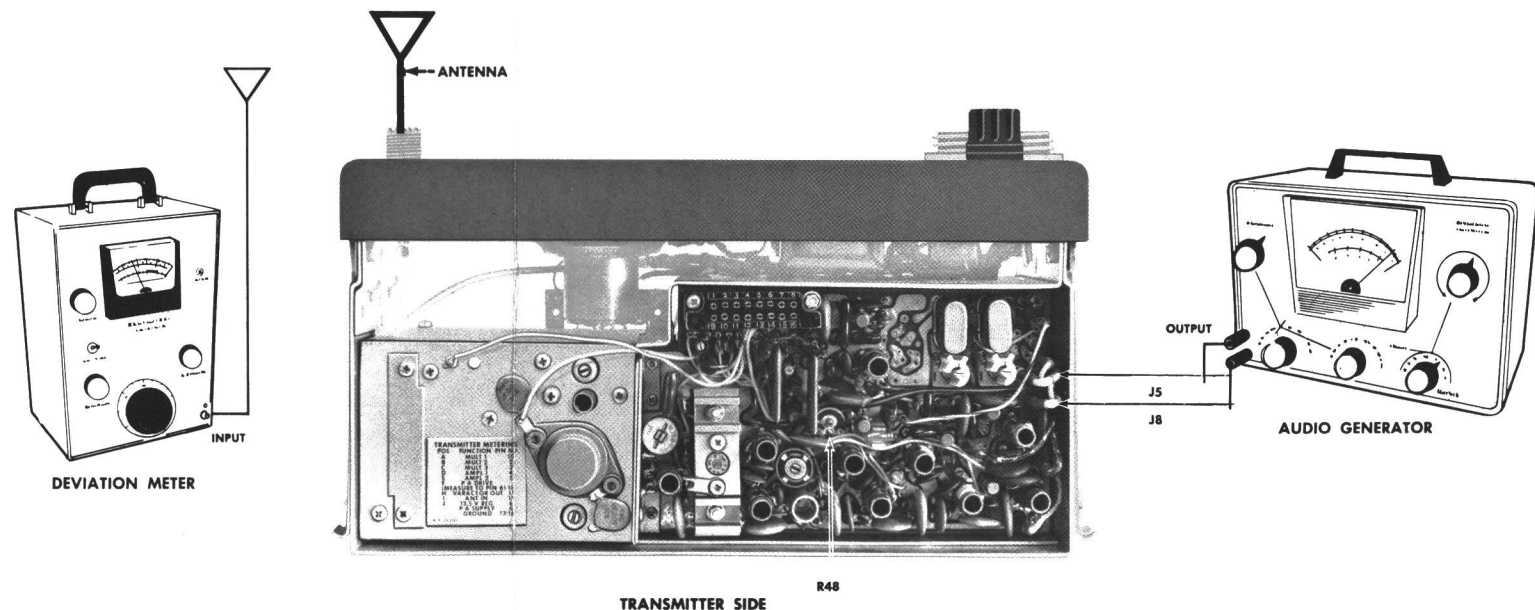
SERVICE CHECK

If the 0.75 kHz deviation is not obtainable when adjusting R613, replace the Tone Transmitter reed.

STEP 3

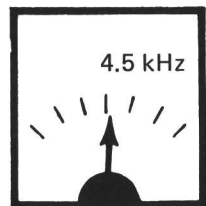
VOICE DEVIATION AND SYMMETRY TEST PROCEDURE

1. Unplug the High and Low Mike leads from the Exciter Board Jacks J5 and J8.
2. Connect test equipment to transmitter as shown below:



3. Set the generator output to 0.5 VOLTS RMS, and frequency to 1 kHz.
4. Key the transmitter and adjust Deviation Meter to carrier frequency.
5. Deviation reading should be ± 4.5 kHz.
6. Adjust "Modulator Adjust Control" R48 until deviation reads 4.5 kHz on plus (+) or minus (–) deviation, whichever is greater.

DEVIATION METER

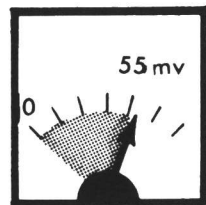


SERVICE CHECK

If the deviation reading plus (+) and minus (–) differs by more than 1 kHz, check the following:

1. Recheck Step 1 as shown in the Transmitter Alignment Chart.
2. Check Audio Sensitivity by reducing generator output until deviation falls to 3.3 kHz. Voltage should be LESS than 55 millivolts.

METER



FRONT END ALIGNMENT

These instructions are for tuning the oscillator and RF stages of the receiver and may be used when changing the receiver crystal or frequency. When necessary to realign the entire receiver, refer to the COMPLETE RECEIVER ALIGNMENT.

EQUIPMENT REQUIRED

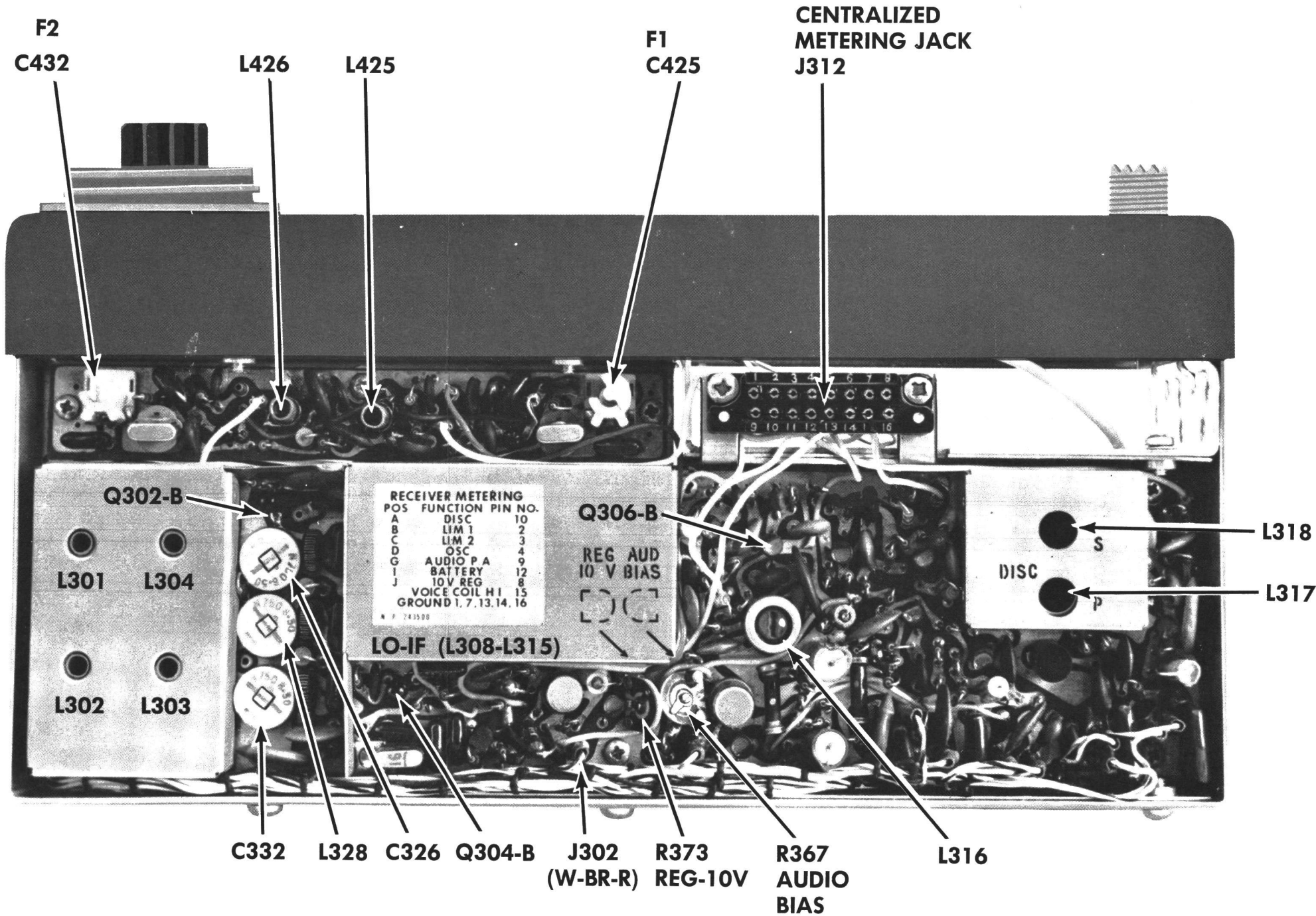
- 1. GE Test Set Model 4EX3A10 (or 20,000 ohms-per-volt Multimeter).
- 2. A 25-50 MHz Signal Source. Keep signal level below saturation.

PRELIMINARY CHECKS AND ADJUSTMENTS

- 1. Plug in the Test Set 4EX3A10 to the receiver centralized metering jack J312. Set Meter Polarity Switch on + and Meter Sensitivity Switch to 1. If using Multimeter, connect the negative lead to J312-13 (Ground).
- 2. Switch Test Set to Position "I" (or measure at J302 with Multimeter). Reading should be at least 12 volts.
- 3. Switch to Position "J" (or measure across R373 with Multimeter) and adjust Voltage Regulation Potentiometer R373 for a reading of 10 volts.
- 4. Turn SQUELCH control fully clockwise and VOLUME control to minimum. Switch to Position "G" (or measure at J312-9 with Multimeter) and adjust Audio Bias Potentiometer R367 to a reading of 0.25 volt.

ALIGNMENT PROCEDURE

STEP	METERING POSITION		TUNING CONTROL	METER READING	PROCEDURE
	4EX3A10	Multimeter + at J312			
1.	D OSC	Pin 4	C425 (and C432 for two-frequency), L425 and L426	See Procedure	Tune C425 (and C432 for two-frequency) and L425 for maximum meter reading. Then tune L426 for minimum meter reading. NOTE Start tuning procedure with the slugs fully in on 25-42 MHz units and fully out on 42-50 MHz units.
2.	C LIM-2	Pin 3	L301 thru L304	Maximum	Apply an on-frequency signal to Antenna Jack and tune L301 through L304 for maximum meter reading.
3.			L301 and L302	See Procedure	While receiving a weak on-frequency signal at the Antenna, tune L301 and L302 for maximum quieting.
4.	A DISC	Pin 10	C425 (and C432 for two-frequency)	Zero	Apply an on-frequency signal to Antenna Jack and tune C425 (and C432 for two-frequency) for zero discriminator reading.



COMPLETE RECEIVER ALIGNMENT

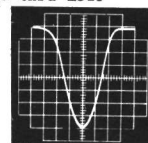
EQUIPMENT REQUIRED

- 1. G-E Test Set Model 4EX3A10 (or 20,000 ohms-per-volt Multimeter).
- 2. A 455 kHz, a 5.26 MHz and a 25-50 MHz Signal Source. Couple the 455 kHz signal through a small capacitor (approximately 10C pf). Couple the 5.26 MHz signal through a .01 uF capacitor. Keep signal levels below saturation.

PRELIMINARY CHECKS AND ADJUSTMENTS

- 1. Plug in the Test Set 4EX3A10 to the receiver centralized metering jack J312. Set Meter Polarity Switch on + and Meter Sensitivity Switch to TEST 1. If using Multimeter, connect the negative lead to J312-13 (Ground).
- 2. Switch Test Set to Position "I" (or measure at J302 with Multimeter). Reading should be at least 12 volts.
- 3. Switch to Position "J" (or measure across R373 with Multimeter) and adjust Voltage Regulation Potentiometer R373 for a reading of 10 volts.
- 4. Turn SQUELCH control fully clockwise and VOLUME control to minimum. Switch to Position "G" (or measure at J312-9 with Multimeter) and adjust Audio Bias Potentiometer R367 for a reading of 0.25 volt.

ALIGNMENT PROCEDURE

METERING POSITION					
STEP	TEST SET 4EX3A10	MULTIMETER + at J312	TUNING CONTROL	METER READING	PROCEDURE
DISCRIMINATOR					
1.	C LIM-2	Pin 3		0.3 volt (1.1 v with Multimeter)	Apply a 455 kHz signal to the base of Q306 and adjust signal level for 0.3 volt meter reading (to saturate limiters).
2.	A DISC	Pin 10	L318	Zero	Apply a 455 kHz signal as above and adjust L318 (disc secondary) for zero meter reading.
3.	A DISC	Pin 10	L317 & L318	0.65 v (1.6 v with Multimeter)	Alternately apply a 445 kHz and 465 kHz signal while adjusting L317 and L318 for readings of at least 0.65 volt. Both read- ings should be within 10%.
4.	B LIM-1	Pin 2	L316	Maximum	Apply a 455 kHz signal as above, and tune L316 for maximum meter reading.
OSCILLATOR AND MULTIPLIER					
5.	D OSC	Pin 4	C425 (and C432 for two- frequency), L425 and L426	See Procedure	Tune C425 (and C432 for two-frequency) and L425 for maximum meter reading. Then tune L426 for minimum meter reading. <div>NOTE Start tuning procedure with the slugs fully in on 25-42 MHz units and fully out on 42-50 MHz units.</div>
HI IF					
6.	C LIM-2	Pin 3	C326, C328 and C332	Maximum	Apply a 5.26 MHz signal to the base of Q302 or an on-frequency signal to Antenna Jack. Tune C326, C328 and C332 for maximum meter reading.
LOW IF*					
7.	A DISC	Pin 10		Zero	Apply a 5.26 MHz signal to the base of Q304. Adjust the signal generator for discriminator zero.
8.	C LIM-2	Pin 3	L308 thru L315	Maximum	Apply signal as above. Peak L308 through L315 for maximum meter reading, keeping signal below saturation.
9.			L308 thru L315 		Connect oscilloscope to Pin 2 and Pin 13 (Ground) of centraliz- ed metering jack J312. Modulate signal generator with at least ±30 KC deviation with 60 hertz (or less). Tune L308 through L315 for filter pattern as shown, keeping signal level below saturation. The above filter alignment should result in the center of the bandpass at 455 kHz ±1 kHz (±0.7 volt reading with meter in Position A), with an EIA modulation acceptance of ±6 to ±10 kHz.
RF					
10.	C LIM-2	Pin 3	L301 thru L304	Maximum	Apply an on-frequency signal to Antenna Jack and tune L301 through L304 for maximum meter reading.
11.			L301 and L302	See Procedure	While receiving a weak on-frequency signal at the Antenna, tune L301 and L302 for maximum quieting.
FREQUENCY ADJUSTMENT					
12.	A DISC	Pin 10	C425 (and C432 for two- frequency)	Zero	Apply an on-frequency signal to Antenna Jack and tune C425 (and C432 for two-frequency) for zero discriminator reading. <div>NOTE For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90° F.</div>

* NOTE -- Low IF coils L308 through L315 have been set at the factory and will normally require no further adjustment. Do NOT realign the filter unless there is positive evidence of a defective filter. For location of IF coils, refer to the Receiver Service sheet.

ALIGNMENT PROCEDURE

25-50 MHz RECEIVER
TYPE ER-43-A

RC-1304A

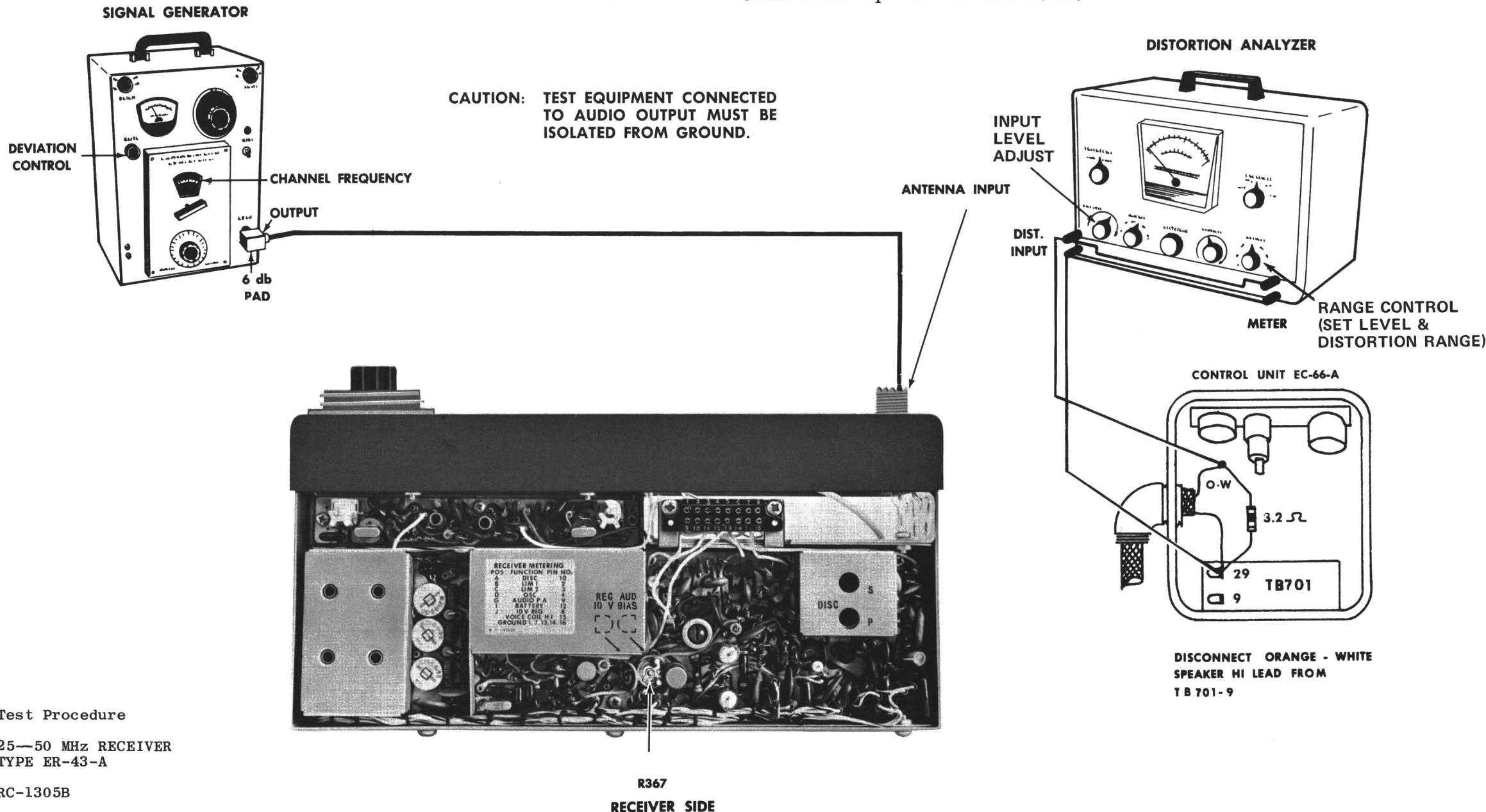
RECEIVER TEST PROCEDURES

The Receiver 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.

- Distortion Analyzer similar to Heath IM-12
- Signal Generator similar to: Measurements M-560.
- 6-dB attenuation pad, and 3.2 ohm, 10-watt resistor.

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



STEP 1

AUDIO POWER OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

- A. Connect a 1,000-microvolt test signal modulated by 1,000 Hertz ± 3.3 kHz deviation to the antenna jack.
- B. Disconnect the Speaker Hi lead from the terminal board. Hook up to 3.2-ohm load resistor in Control Unit as shown. Connect Distortion Analyzer input across the 3.2-ohm resistor.
- C. Set VOLUME Control for 5.65 VRMS, using the Distortion Analyzer as a VTVM.
- D. Make distortion measurements according to manufacturer's instructions. Reading should be less than 10%. If the receiver sensitivity is to be measured, leave all controls and equipment as they are.

SERVICE CHECK

If the distortion is more than 10%, or maximum audio output is less than ten watts, make the following checks:

- E. Battery and regulator voltage - low voltage will cause distortion. (Refer to Receiver Service Sheet for voltages.)
- F. Audio Bias Adjust (R367) - low current will cause distortion.
- G. Audio Gain (Refer to Step 2A and 2B of Receiver Troubleshooting Procedure.
- H. Discriminator Alignment (Refer to receiver Alignment on reverse side of page).

STEP 2

USABLE SENSITIVITY (12 db SINAD)

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

- A. Apply a 1000-microvolt, on-frequency signal modulated by 1000 Hz with 3.3 kHz deviation to the antenna jack.
- B. Place the RANGE switch on the Distortion Analyzer in the 200 to 2000-Hz distortion range position (1000-Hz filter in the circuit). Tune the filter for minimum reading or null on the lowest possible scale (100%, 30%, etc.)
- C. Place the RANGE switch to the SET LEVEL position (filter out of the circuit) and adjust the input LEVEL control for a +2 dB reading on a mid range (30%).
- D. While reducing the signal generator output, switch the RANGE control for SET LEVEL to the distortion range until a 12-dB difference (+2 dB to -10 dB) is obtained between the SET LEVEL and distortion range positions (filter out and filter in).
- E. The 12-dB difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. The sensitivity should be less than rated 12 dB SINAD specifications with an audio output of at least one half the rated power output specification. For the ten watt receiver this would be 5 watts (4 volts RMS across the 3.2-ohm receiver load using the Distortion Analyzer as a VTVM.
- F. Leave all controls as they are and all equipment connected if the Modulation Acceptance Bandwidth test is to be performed.

SERVICE CHECK

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

STEP 3

MODULATION ACCEPTANCE BANDWIDTH (IF BANDWIDTH)

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

- A. Set the Signal Generator output for twice the microvolt reading obtained in the 12-dB SINAD measurement.
- B. Set the RANGE control on the Distortion Analyzer in the SET LEVEL position (1000-Hz filter out of the circuit), and adjust the input LEVEL control for a +2 dB reading on the 30% range.
- C. While increasing the deviation of the Signal Generator, switch the RANGE control from SET LEVEL to distortion range until a 12-dB difference is obtained between the SET LEVEL and distortion range readings (from +2 dB to -10 dB).
- D. The deviation control reading for the 12-dB difference is the Modulation Acceptance Bandwidth of the receiver. It should be more than +6 kHz (typical value is ± 9 kHz).

SERVICE CHECK

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

PARTS LIST

LBI-3499D

25-50 MHz TRANSMITTER
MODELS 4ET61A10-21
19C303610G1-G12

SYMBOL	GE PART NO.	DESCRIPTION
		EXCITER BOARD ASSEMBLY 4ET61A10 (19D402440G1) 1-Freq 25-33 MHz 4ET61A11 (19D402440G2) 2-Freq 25-33 MHz 4ET61A12 (19D402440G3) 1-Freq 33-42 MHz 4ET61A13 (19D402440G4) 2-Freq 33-42 MHz 4ET61A14 (19D402440G5) 1-Freq 42-50 MHz 4ET61A15 (19D402440G6) 2-Freq 42-50 MHz 4ET61A16 (19D402440G7) 1-Freq 25-33 MHz 4ET61A17 (19D402440G8) 2-Freq 25-33 MHz 4ET61A18 (19D402440G9) 1-Freq 33-42 MHz 4ET61A19 (19D402440G10) 2-Freq 33-42 MHz 4ET61A20 (19D402440G11) 1-Freq 42-50 MHz 4ET61A21 (19D402440G12) 2-Freq 42-50 MHz
		----- CAPACITORS -----
C1 and C2	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C3*	5496219P846	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -1500 PPM. In Models 4ET61A16-19 of REV B thru G: In Models 4ET61A20-21 of REV B thru F:
	5496219P850	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -1500 PPM.
		In Models 4ET61A16-21 earlier than REV A:
	5496219P853	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C4	5496219P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM.
C5	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 850 v peak; sim to EF Johnson 189.
C6	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C7	5496219P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM.
C8	5496372P382	Ceramic disc: 1000 pf ±5%, 500 VDCW, temp coef -4700 PPM.
C9	5496372P474	Ceramic disc: 680 pf ±5%, 500 VDCW, temp coef -5600 PPM.
C10	5491870P680K	Silver mica: 680 pf ±10%, 300 VDCW; sim to Electro Motive Type DM-15.
C11	5490008P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C12	4029003P12	Silver mica: .0015 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.
C13	4029003P10	Silver mica: .0012 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.
C14	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C15	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C16	5490008P139	Silver mica: 330 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C17	5490008P137	Silver mica: 270 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C18	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C19	5490008P131	Silver mica: 150 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C20	7491827P5	Ceramic disc: 0.1 µf +80%-30%, 50 VDCW; sim to Sprague 36C.
C21	5490008P11	Silver mica: 22 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-20.
C22	7491827P5	Ceramic disc: 0.1 µf +80%-30%, 50 VDCW; sim to Sprague 36C.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
C23	7491393P2	Ceramic disc: .01 µf +100% -0%, 500 VDCW; sim to Sprague 1219C4.
C24	5496218P261	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -80 PPM.
C25	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C26	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C27	5494481P15	Ceramic disc: .003 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C28	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C29	5496219P261	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -80 PPM.
C30	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C31	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C32	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C33	5496219P459	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -220 PPM.
C34	5496219P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C35	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C36	5494481P13	Ceramic disc: .002 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C37	5494481P107	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C38	5496219P459	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -220 PPM.
C39	5496219P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C40	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C41	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C42	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C43*	5496219P846	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -1500 PPM. In Models 4ET61A16-19 of REV B thru G: In Models 4ET61A20-21 of REV B thru F:
	5496219P850	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -1500 PPM.
		In Models 4ET61A16-21 earlier than REV A:
	5496219P853	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C44	5496219P44	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef 0 PPM.
C45	5491271P106	Variable, subminiature: approx 2.1-12-7 pf, 850 v peak; sim to EF Johnson 189.
C46	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C47	5496219P50	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef 0 PPM.
C48 and C49	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C50	5496219P453	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -220 PPM.
C51	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C52	5496219P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C53*	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF. In Models 4ET61A10-15 earlier than REV A; or REV B of 4ET61A16-21:
	5494481P113	Ceramic disc: .002 pf ±20%, 1000 VDCW; sim to RMC Type JF.

SYMBOL	GE PART NO.	DESCRIPTION
C54	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C55	5490008P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C56	5496219P452	Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -220 PPM.
C57	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C58	5496219P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C59 and C60	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C61	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C62	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C63	5496219P242	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -80 PPM.
C64	5494481P107	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C65	5490008P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C66	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C67	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C68	5496219P242	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -80 PPM.
C69	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C70	5490446P1	Variable, ceramic: approx 8-50 pf, 350 VDCW, temp coef -750 PPM; sim to Erie Style 557-36.
C71	19A116080P3	Polyester: 0.022 µf ±20%, 50 VDCW.
C72	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C73	5496267P1	Tantalum: 6.8 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C74	7161189P2	Disc type: 0.1 µf +80% -30%, 50 VDCW; sim to Sprague 36C.
C75	7491827P5	Ceramic disc: 0.1 µf +80%-30%, 50 VDCW; sim to Sprague 36C.
C76	5494481P113	Ceramic disc: .002 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C77	5494481P111	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C78	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C79	5494481P117	Ceramic disc: .004 pf ±20%, 1000 VDCW; sim to RMC Type JF.
C82* thru C84*	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added to 4ET61A10-13 by REV G, Added to 4ET61A14-15 by REV F, Added to 4ET61A16-19 by REV J, Added to 4ET61A20-21 by REV H.
		----- DIODES AND RECTIFIERS -----
CR1 and CR2	19A115603P1	Silicon.
CR3	4036887P10	Silicon, Zener.
CV1*	5495769P3	Varactor, silicon: 7 ±1/2 pf at 4 VDC; sim to Pacific Semiconductors Varicap Type V-590. In Models 4ET61A16-19 of REV B thru G: In Models 4ET61A20-21 of REV B thru F:
	5495769P4	Varactor, silicon: 7 pf ±10% at 4 VDC; sim to Pacific Semiconductors Varicap Type V-591.
CV2	5495769P13	Varactor, silicon: 100 pf ±20% at 4 VDC; sim to Pacific Semiconductors Varicap Type V-100.
CV3*	5495769P3	Varactor, silicon: 7 ±1/2 pf at 4 VDC; sim to Pacific Semiconductors Varicap Type V-590. In Models 4ET61A16-19 of REV B thru G: In Models 4ET61A20-21 of REV B thru F:
	5495769P4	Varactor, silicon: 7 pf ±10% at 4 VDC; sim to Pacific Semiconductors Varicap Type V-591.

CONNECTION TABLE		
FROM	TO	WIRE
H38	H39	WHITE
+ H19	H22	WHITE
H18	H24	RG196 U CONDUCTOR
H5	H22	WHITE
H6	H16	WHITE
H7	H15	WHITE
H8	H14	WHITE
H10	H9	WHITE
H36	H25	WHITE
H27	H17	WHITE
H13	H12	WHITE
H4	E10 ON PA	BROWN
H1	J11-5	RED
H11	J11-8	GREEN
H42	H26	WHITE
H28	H29	RG196 U SHIELD
H30	J11-10	BUS (UNINSULATED)
H31	J11-2	BUS (UNINSULATED)
H32	J11-3	BUS (UNINSULATED)
H33	J11-4	BUS (UNINSULATED)
H34	J11-6	YELLOW
H35	J11-14	BROWN
■ H40	H41	WHITE
● H41	H46	BUS (UNINSULATED)
▲ H13	H20	WHITE
* H44	H45	BUS (UNINSULATED)
+ H45	H47	BUS (UNINSULATED)
○ J1	J9	WHITE
J11-12	E7-2 ON FL2	WHITE
J11-13	J11-16	BUS (UNINSULATED)
J11-16	H48	BUS (UNINSULATED)

- ▲ IN 4ET61A11, A13, A15, A17, A19, & A21.
● IN 4ET61A11, A13, & A15.
* IN 4ET61A10, A11, A12, A13, A14, & A15.
■ IN 4ET61A17, A19, & A21.
+ IN 4ET61A15, A17, A18, A19, A20, & A21.
○ IN 4ET61A10, A12, A14, A16, A18, & A20.

RESISTANCE READINGS

ALL READINGS ARE TYPICAL READINGS MEASURED FROM TRANSISTOR PINS TO J11-13 (GND) WITH A 20,000 OHM-PER-VOLT METER, AND WITH THE TRANSMITTER UNKEYED. + OR - SIGNS SHOW METER PROBE GROUNDED. USE THE SCALE AS SHOWN BELOW:

FOR READINGS OF:	USE METER SCALE:
1-50Ω	X 1
51-500Ω	X 10
501-50K	X 1,000
51K-∞	X 100,000

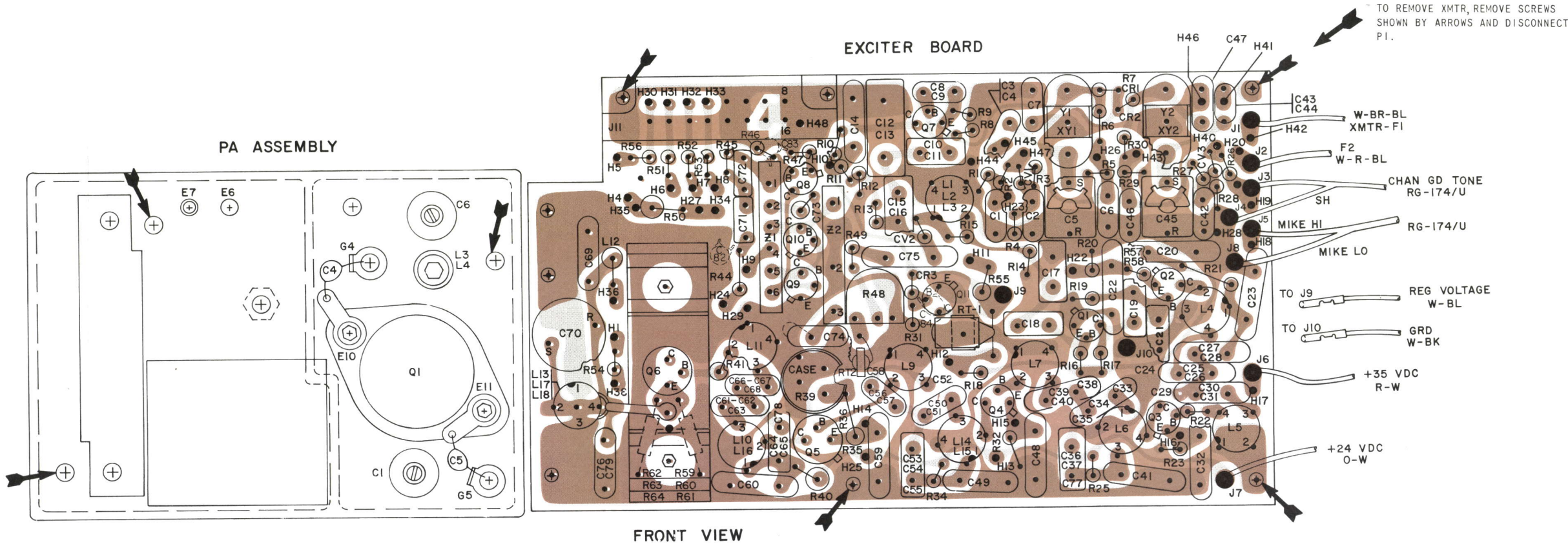
TRANSISTOR	EMITTER		BASE		COLLECTOR	
	+	-	+	-	+	-
EXCITER						
Q1	0	0	50K	3K	8K	7K
Q2	220Ω	260Ω	11K	3.4K	2.8K	4.8K
Q3	140Ω	325Ω	110Ω	100Ω	2.3K	6K
Q4	11Ω	220Ω ⁽¹⁾	0	0	2.2K	5.25K
Q5	6Ω	16Ω ⁽²⁾	0	0	2.2K	5.0K
Q6	4.6Ω	5Ω ⁽³⁾	2.8Ω	2.8Ω	2.2K	5.0K
Q7	1.0K	1.0K	18K	4.4K	2.3K	5.0K
Q8	620Ω	620Ω	14K	3.6K	15K	3.0K
Q9	0	0	15K	3.0K	19K	3.0K
Q10	0	0	19K	3.0K	16K	22K
Q11	0	0	1.0K	1.0K	2.1K	5.0K
PA						
Q1	0	0	0	0	2.2K	∞

NOTES: (1) 325Ω FOR 25-33 MC UNITS
(2) 33Ω FOR 25-33 MC UNITS
(3) 7.5Ω FOR 42-50 MC UNITS

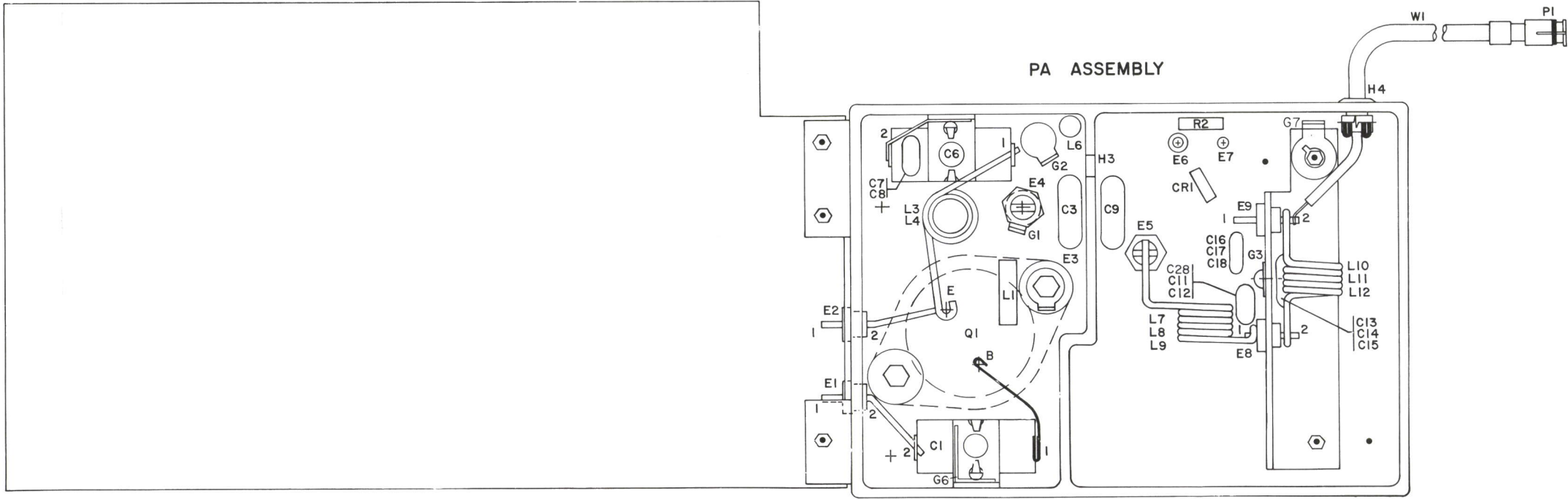
SERVICE SHEET

25—50 MHZ TRANSMITTER
TYPE ET-61-A

(RC-1140D, Sheet 1)

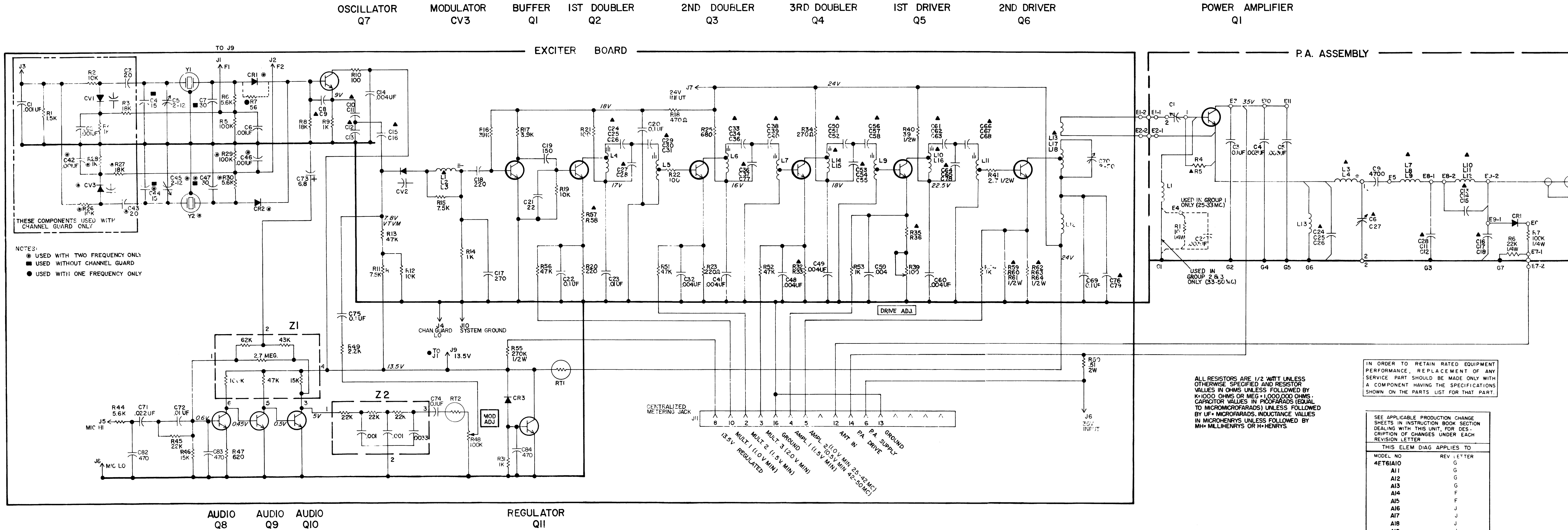


EXCITER BOARD



BACK VIEW

(19D402561, Rev. 6)
(19C303596, Sh. 1, Rev. 4)
(19C303596, Sh. 2, Rev. 3)



NOTE: ▲ THESE COMPONENTS CHANGE WITH FREQUENCY RANGE AS SHOWN:

P. A. ASSEMBLY		
PL19C303592G1	PL19C303592G2	PL19C303592G3
25-33 MC	33-42 MC	42-50 MC
R1 = 10 L3 L7 L10	R1 = NOT USED L4 L8 L11	R1 = NOT USED L4 L9 L12
C2 = .003 MFD C24 = 180 PF C25 = 100 PF C13 = 47 PF C16 = 47 PF R4 = 27	C2 = NOT USED C11 = 75 PF C14 = 33 PF C17 = 39 PF C6 = 56	C2 = NOT USED C25 = 56 PF C12 = 68 PF C15 = 27 PF C18 = 27 PF R4 = 27 C27

EXCITER BOARD		
PL19D402440G1,G2,G7,G8	PL19D402440G3,G4,G9,G10	PL19D402440G5,G6,G11,G12
25-33 MC	33-42 MC	42-50 MC
C8 = 1000 PF C10 = 680 PF C12 = 1500 PF C15 = 1000 PF C24 = 82 PF C27 = 3000 PF C29 = 82 PF C33 = 68 PF C36 = 2000 PF C38 = 68 PF C50 = 39 PF C53 = 1000 PF C56 = 36 PF C61 = 33 PF C64 = 470 PF C66 = 33 PF C79 = 4000 PF R32 = 220 OHM R35 = 33 OHM R59 = 12 OHM 1/2W R62 = 12 OHM 1/2W R57 = 22 OHM L1 L15 L13	C9 = 680 PF C11 = 330 PF C13 = 1200 PF C16 = 330 PF C26 = 47 PF C28 = 1000 PF C30 = 47 PF C34 = 39 PF C37 = 1000 PF C39 = 39 PF C51 = 22 PF C54 = 1000 PF C57 = 22 PF C62 = 22 PF C65 = 220 PF C67 = 22 PF C76 = 2000PF R33 = 220 OHM R36 = 4.7 OHM 1/2W R60 = 10 OHM 1/2W R63 = 10 OHM 1/2W R58 = 33 OHM L2 L14 L17	C9 = 680 PF C11 = 330 PF C13 = 1200 PF C16 = 330 PF C26 = 33 PF C28 = 1000 PF C31 = 33 PF C35 = 22 PF C37 = 470 PF C40 = 22 PF C52 = 15 PF C55 = 100 PF C58 = 15 PF C63 = 12 PF C65 = 100 PF C68 = 12 PF C76 = 2000PF R33 = 220 OHM R36 = 4.7 OHM 1/2W R61 = 4.7 OHM 1/2W R64 = 4.7 OHM 1/2W R57 = 22 OHM L3 L15 L18

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

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

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4ET61A10	G
A11	G
A12	G
A13	G
A14	F
A15	F
A16	J
A17	J
A18	J
A19	J
A20	H
A21	H

SERVICE SHEET

25-50 MHZ TRANSMITTER
TYPE ET-61-A

(RC-1140E, Sheet 2)

(Cont'd from front of Sh. 1)

SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
		----- JACKS AND RECEPTACLES -----									
J1 thru J10	4033513P4	Pin, contact: sim to Bead Chain L93-3.	R11	3R77P752J	Composition: 7500 ohms $\pm 5\%$, 1/2 w.						
J11	19B205689G2	Jack: includes (16) 19A115853PI contacts.	R12	3R77P103K	Composition: 10,000 ohms $\pm 10\%$, 1/2 w.	RT1	4034664P1	----- THERMISTORS -----	C18	7489162P113	Silver mica: 27 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.
		----- INDUCTORS -----	R13	3R77P473K	Composition: 47,000 ohms $\pm 10\%$, 1/2 w.	RT2*	5490082P23	Lamp, incandescent: 28 v, .04 amp. GE Type 2148.	C24*	5490008P33	Silver mica: 180 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
L1	19B204773G1	Coil Assembly. Includes tuning slug 5491798P8.	R14	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.			Thermistor: 3600 ohms $\pm 10\%$, color code black; sim to Global Type 432H-4.	C25*	5490008P27	Silver mica: 100 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
L2	19B204773G2	Coil Assembly. Includes tuning slug 5491798P8.	R15	3R77P752J	Composition: 7500 ohms $\pm 5\%$, 1/2 w.			Added to Models 4ET61A10-13, 20, 21 by REV D, Added to Models 4ET61A14 and 15 by REV C, Added to Models 4ET61A16-19 by REV E.			
L3	19B204773G3	Coil Assembly. Includes tuning slug 5491798P8.	R16	3R77P393K	Composition: 39,000 ohms $\pm 10\%$, 1/2 w.			----- SOCKETS -----	C26*	5490008P21	Silver mica: 56 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
L4	19A121493G1	Coil Assembly. Includes tuning slug 5491798P3.	R17	3R77P392K	Composition: 3900 ohms $\pm 10\%$, 1/2 w.	XY1 and XY2		Refer to Mechanical Parts (RC-1106).			
L5	19A121495G1	Coil Assembly. Includes tuning slug 5491798P3.	R18	3R77P471K	Composition: 470 ohms $\pm 10\%$, 1/2 w.			----- CRYSTALS -----	C27*	19A115282P2	Variable, mica: approx 16-141 pf, 150 VDCW; sim to Elenco Type 42.
L6	19A121503G1	Coil Assembly. Includes tuning slug 5491798P3.	R19	3R77P103K	Composition: 10,000 ohms $\pm 10\%$, 1/2 w.			When reordering give GE Part Number and specify exact frequency needed.			
L7	19A121492G1	Coil Assembly. Includes tuning slug 5491798P3.	R20	3R77P221K	Composition: 220 ohms $\pm 10\%$, 1/2 w.			Crystal Frequency = (OF \div 8).	C28*	7489162P127	Silver mica: 100 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.
L9	19A121482G1	Coil Assembly. Includes tuning slug 5491798P3.	R21 and R22	3R77P101K	Composition: 100 ohms $\pm 10\%$, 1/2 w.	Y1 and Y2	19B2006275P1	Quartz: antiresonant, freq range 3125-8750 KHz.			
L10	19A121474G1	Coil Assembly. Includes tuning slug 5491798P3.	R23*	3R77P221K	Composition: 220 ohms $\pm 10\%$, 1/2 w.			----- SUBASSEMBLIES -----			
L11	19A121470G1	Coil Assembly. Includes tuning slug 5491798P3.			In Models 4ET61A10-15 earlier than REV A; In Models 4ET61A16-21 earlier than REV B:	Z1	19B209118P1	Resistor Assembly. 1/2 w max.	CR1	5494922P2	Silicon; sim to Type 1N456.
R41	7147161P5	Composition: 2.7 ohms $\pm 10\%$, 1/2 w.	R25	3R77P681J	Composition: 680 ohms $\pm 5\%$, 1/2 w.	Z2	19B209117P1	High Pass-Low Pass Filter Assembly. 0.4 w max per filter.			
L12	7488079P42	Choke, RF: 8.2 μ h $\pm 10\%$, 1150 ma max, 0.25 ohm max; sim to Jeffers 4422-3K.	R26	3R77P103K	Composition: 10,000 ohms $\pm 10\%$, 1/2 w.			----- TERMINALS -----			
L13	19B204777G1	Coil Assembly.	R27	3R77P183K	Composition: 18,000 ohms $\pm 10\%$, 1/2 w.			Refer to Mechanical Parts (RC-1106).			
L14	19A121489G1	Coil Assembly. Includes tuning slug 5491798P3.	R28	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.			----- CAPACITORS -----			
L15*	19A121489G2	Coil Assembly. Includes tuning slug 5491798P3. Added in Models 4ET61A10, 11 by REV A, Added in Models 4ET61A16, 17 by REV B.	R29	3R77P104K	Composition: 0.10 megohm $\pm 10\%$, 1/2 w.	C1	19A115282P3	Variable, mica (compression trimmer): approx 37-235 pf, 150 VDCW; sim to Elenco Type 42.			
			R30	3R77P562K	Composition: 5600 ohms $\pm 10\%$, 1/2 w.	C2	5494481P15	Ceramic disc: .003 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.	L3	19B204771G1	Coil Assembly.
L16	19A121474G2	Coil Assembly. Includes tuning slug 5491798P3.	R31	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.	C3	19A116080P7	Polyester: 0.1 pf $\pm 20\%$, 50 VDCW.	L4*	19B204771G2	Coil Assembly.
L17	19B204777G2	Coil Assembly.	R32*	3R77P221K	Composition: 220 ohms $\pm 10\%$, 1/2 w.	C4 and C5	5494481P15	Ceramic disc: .003 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.	L5*	19B204771G3	Coil Assembly.
L18	19B204777G3	Coil Assembly.			In Models 4ET61A10-15 earlier than REV A; In Models 4ET61A16-21 earlier than REV B:	C6*	19A115282P3	Variable, mica (compression trimmer): approx 37-235 pf, 150 VDCW; sim to Elenco Type 42. Deleted in Models 4ET61A14, 15 by REV B, Deleted in Models 4ET61A20, 21 by REV C.	L6*	7488079P2	Choke, RF: 0.22 μ h $\pm 20\%$, 2800 ma max, .04 ohm max; sim to Jeffers 4411-2M.
		----- PLUGS -----			Composition: 330 ohms $\pm 10\%$, 1/4 w.			Deleted in Models 4ET61A10-15 by REV B, Deleted in Models 4ET61A20, 21 by REV C.	L7	19A121497P1	Coil.
P1 and P2	4029840P2	Contact, electrical; sim to Amp 42827-2.	R33	3R77P221K	Composition: 220 ohms $\pm 10\%$, 1/2 w.	C7*	7489162P129	Silver mica: 120 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	L8	19A121497P2	Coil.
		----- TRANSISTORS -----	R34	3R77P271K	Composition: 270 ohms $\pm 10\%$, 1/2 w.			Deleted in Models 4ET61A10, 11 by REV B, Deleted in Models 4ET61A16, 17 by REV C.	L9	19A121497P3	Coil.
Q1	19A115330P1	Silicon, NPN; sim to Type 2N3053.	R35	3R77P330K	Composition: 33 ohms $\pm 10\%$, 1/2 w.	C8*	7489162P127	Silver mica: 100 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	L10	19A121498P1	Coil.
Q2* thru Q4	19A115328P1	Silicon, NPN.	R36	7147161P12	Composition: 4.7 ohms $\pm 10\%$, 1/2 w.			Deleted in Models 4ET61A10, 11 by REV B, Deleted in Models 4ET61A16, 17 by REV C.	L11	19A121498P2	Coil.
			R39	5492251P2	Variable, composition: 100 ohms $\pm 20\%$, 0.25 w; sim to Allen-Bradley Type "F".			Deleted in Models 4ET61A10-15 by REV B, Deleted in Models 4ET61A16, 17 by REV C.	L12	19A121498P3	Coil.
			R40	3R77P390K	Composition: 39 ohms $\pm 10\%$, 1/2 w.	C9	7147203P124	Silver mica: 4700 pf $\pm 10\%$, 300 VDCW; sim to Electro Motive Type DM-20.	L13*	7488079P1	Choke, RF: 0.15 μ h $\pm 20\%$, 0.03 ohms DC res max; sim to Jeffers 4411-1M.
Q5	19A115315P1	Silicon, NPN; sim to Type 2N708.	R44	3R77P562K	Composition: 5600 ohms $\pm 10\%$, 1/2 w.	C10*	7489162P129	Silver mica: 120 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.			
Q6	19A115294P2	Silicon, NPN.	R45	3R77P223K	Composition: 22,000 ohms $\pm 10\%$, 1/2 w.			Deleted in Models 4ET61A10, 11 by REV B, Deleted in Models 4ET61A16, 17 by REV C.	Q1	19A115269P1	Silicon, NPN.
Q7	19A115304P1	Silicon, NPN.	R46	3R77P153K	Composition: 15,000 ohms $\pm 10\%$, 1/2 w.	C12	7489162P123	Silver mica: 68 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	R1	3R152P100K	Composition: 10 ohms $\pm 10\%$, 1/4 w.
Q8	19C300114P1	Silicon, NPN; sim to Type 2N706.	R47	3R77P621J	Composition: 620 ohms $\pm 5\%$, 1/2 w.	C13	7489162P119	Silver mica: 47 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	R2*	3R152P153K	Composition: 15,000 ohms $\pm 10\%$, 1/4 w.
Q9 and Q10	19A115889P1	Silicon, NPN; sim to Type 2N2712.	R48	19B201969P9	Variable, carbon film: 0.1 megohms $\pm 20\%$, 0.1 w; sim to Centralab Series 4.	C14	7489162P115	Silver mica: 33 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.			
			R49	3R77P222K	Composition: 2200 ohms $\pm 10\%$, 1/2 w.	C15	7489162P113	Silver mica: 27 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	R4*	3R77P270J	Composition: 27 ohms $\pm 5\%$, 1/2 w.
Q11	19A115123P1	Silicon, NPN; sim to Type 2N2712.	R50	19B209022P8	Wirewound: 0.51 ohm $\pm 5\%$, 2 w; sim to IRC Type BWH.	C16	7489162P119	Silver mica: 47 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.	R5*	3R77P560J	Composition: 56 ohms $\pm 5\%$, 1/2 w.
			R51 and R52	3R77P473K	Composition: 47,000 ohms $\pm 10\%$, 1/2 w.	C17	7489162P117	Silver mica: 39 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.			
		----- RESISTORS -----	R53 and R54	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.			----- TRANSISTORS -----			
R1	3R77P152K	Composition: 1500 ohms $\pm 10\%$, 1/2 w.			In Models 4ET61A12, 13 of REV B and earlier; In Models 4ET61A18, 19 of REV C and earlier:			----- RESISTORS -----			
R2	3R77P103K	Composition: 10,000 ohms $\pm 10\%$, 1/2 w.	R55	3R77P274J	Composition: 0.27 megohm $\pm 5\%$, 1/2 w.						
R3	3R77P183K	Composition: 18,000 ohms $\pm 10\%$, 1/2 w.	R56	3R77P473K	Composition: 47,000 ohms $\pm 10\%$, 1/2 w.	C18	7489162P123	Silver mica: 68 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.			
R4	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.	R57	3R77P220K	Composition: 22 ohms $\pm 10\%$, 1/2 w.	C19	7489162P115	Silver mica: 47 pf $\pm 10\%$, 500 VDCW; sim to Electro Motive Type DM-15.			
R5	3R77P104K	Composition: 0.1 megohm $\pm 10\%$, 1/2 w.	R58	3R77P330K	Composition: 33 ohms $\pm 10\%$, 1/2 w.						
R6	3R77P562K	Composition: 5600 ohms $\pm 10\%$, 1/2 w.	R59	3R77P120K	Composition: 12 ohms $\pm 10\%$, 1/2 w.						
R7	3R77P560K	Composition: 56 ohms $\pm 10\%$, 1/2 w.	R60	3R77P100K	Composition: 10 ohms $\pm 10\%$, 1/2 w.						
R8	3R77P183K	Composition: 18,000 ohms $\pm 10\%$, 1/2 w.	R61	7147161P12	Composition: 4.7 ohms $\pm 10\%$, 1/2 w.						
R9	3R77P102K	Composition: 1000 ohms $\pm 10\%$, 1/2 w.	R62	3R77P120K	Composition: 12 ohms $\pm 10\%$, 1/2 w.						
R10	3R77P101K	Composition: 100 ohms $\pm 10\%$, 1/2 w.	R63	3R77P100K	Composition: 10 ohms $\pm 10\%$, 1/2 w.						
			R64	7147161P12	Composition: 4.7 ohms $\pm 10\%$, 1/2 w.						

PRODUCTION CHANGES

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

REV. A - (Models 4ET61A16-21 only)

To improve ease of tuning on transmitters with Channel Guard. Changed C3 and C43.

REV. B - (Models 4ET61A10-15 only)

To prevent detuning of transmitter when assembled in case. Changed C53, R23, R32 and added C21.

REV. C - (Models 4ET61A10-15 only)

REV. D - (Models 4ET61A16-21 only)

To prevent low frequency oscillations from damaging the output transistor. In Models 4ET61A10, 16, 17: Deleted C7 & L6, and added C24, L13, and R4.

In Models 4ET61A12, 13, 18, 19: Deleted C8 & L6, and added C25, L13, and R5.

In Models 4ET61A14, 15, 20, 21: Deleted C6, L5 & L6, and added C26, C27, L4, L13 and R4.

REV. C - (Models 4ET61A10, 11 only)

REV. D - (Models 4ET61A16, 17 only)

To increase power output at the high end of the band. Deleted C10 and added C28.

REV. C - (Models 4ET61A12, 13 only)

REV. D - (Models 4ET61A18, 19 only)

To increase power output. Changed C11.

REV. D - (Models 4ET61A10-13, 20, 21 only)

REV. C - (Models 4ET61A14, 15 only)

REV. E - (Models 4ET61A16-19 only)

To stabilize modulation limiting over the temperature range. Added thermistor RT2.

REV. E - (Models 4ET61A10-13, 20, 21 only)

REV. D - (Models 4ET61A14, 15 only)

REV. F - (Models 4ET61A16-19 only)

To simplify tuning by eliminating scale change on test-sets. Deleted R2 and added R6 and R7.

REV. F - (Models 4ET61A10-13, 20, 21 only)

REV. E - (Models 4ET61A14, 15 only)

REV. G - (Models 4ET61A16-19 only)

To incorporate a different transistor. Changed Q2, Q3, and Q4.

REV. G - (Models 4ET61A20, 21 only)

REV. H - (Models 4ET61A16-19 only)

To improve Channel Guard encoder performance.

In models 4ET61A16-21: Changed C3

In models 4ET61A17, 19, 21: Changed C43

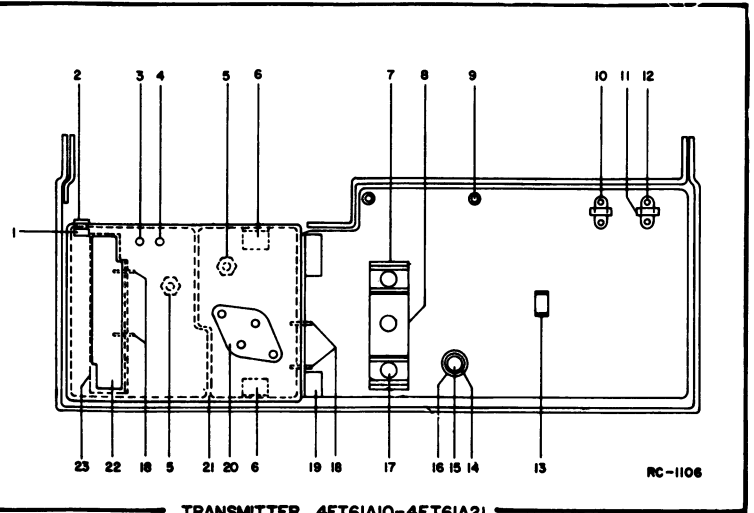
REV. G - (Models 4ET61A10-13)

REV. F - (Models 4ET61A14-15)

REV. J - (Models 4ET61A16-19)

REV. H - (Models 4ET61A20-21)

To improve RF bypassing of the audio stages. Added C82, C83 and C84.



PARTS LIST

LBI-3493E

25-50 MHz
RECEIVER MODELS 4ER43A10-15

SYMBOL	GE PART NO.	DESCRIPTION
		RECEIVER BOARDS 19D402429G1 25-33 MHz (4ER43A10 and 11) 19D402429G2 33-42 MHz (4ER43A12 and 13) 19D402429G3 42-50 MHz (4ER43A14 and 15)
		----- CAPACITORS -----
C301	5490008P24	Silver mica: 75 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C302	5490008P19	Silver mica: 47 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C303	5490008P13	Silver mica: 27 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C304	7130348P4	Molded, phen: 2.2 pf ± 0.11 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C305	5490008P24	Silver mica: 75 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C306	5490008P19	Silver mica: 47 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C307	5490008P13	Silver mica: 27 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C308	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C309	5494481P115	Ceramic disc: .003 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.
C310	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C311	5490008P24	Silver mica: 75 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C312	5490008P19	Silver mica: 47 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C313	5490008P13	Silver mica: 27 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C314	7130348P3	Molded, phen: 1 pf ± 0.05 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C315	5490008P21	Silver mica: 56 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C316	5490008P17	Silver mica: 39 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C317	5490008P11	Silver mica: 22 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C318	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C319*	5490008P21	Silver mica: 56 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15. In Models earlier than REV B:
	5490008P27	Silver mica: 100 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C320	5490008P17	Silver mica: 39 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C321	5490008P13	Silver mica: 27 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C322	5494481P115	Ceramic disc: .003 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.
C323	19A116080P7	Polyester: 0.1 μ f $\pm 20\%$, 50 VDCW.
C324	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C325*	5491870P140J	Mica: 140 pf $\pm 5\%$, 300 VDCW; sim to Electro Motive Type DM-15. Earlier than REV H in G1, REV G, in G2, G3.
	5490008P29	Silver mica: 120 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.

SYMBOL	GE PART NO.	DESCRIPTION
C326	5490446P1	Variable, ceramic: approx 8-50 pf, 350 VDCW, temp coef -750 PPM; sim to Erie Style 557-36.
C327	7130348P1	Molded, phen: 0.47 pf ± 0.047 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C328	5490446P1	Variable, ceramic: approx 8-50 pf, 350 VDCW, temp coef -750 PPM; sim to Erie Style 557-36.
C329*	5491870P140J	Mica: 140 pf $\pm 5\%$, 300 VDCW; sim to Electro Motive Type DM-15. Earlier than REV H in G1, REV G, in G2, G3.
	5490008P29	Silver mica: 120 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C330	7130348P1	Molded, phen: 0.47 pf ± 0.047 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C331*	5491870P140J	Mica: 140 pf $\pm 5\%$, 300 VDCW; sim to Electro Motive Type DM-15. Earlier than REV H in G1, REV G, in G2, G3.
	5490008P29	Silver mica: 120 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C332	5490446P1	Variable, ceramic: approx 8-50 pf, 350 VDCW, temp coef -750 PPM; sim to Erie Style 557-36.
C333	5494481P115	Ceramic disc: .003 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.
C334*	19A116080P1	Polyester: 0.01 μ f $\pm 20\%$, 50 VDCW. On Receiver Board 19D402429G1 before REV E or on Receiver Board 19D402429G2, G3 before REV D.
	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C335 and C336	5492638P107	Ceramic disc: 0.1 μ f +80% -20%, 12 VDCW; sim to Sprague 20C202.
C337	5490008P33	Silver mica: 180 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C338*	19A116080P1	Polyester: 0.01 μ f $\pm 20\%$, 50 VDCW. On Receiver Board 19D402429G1 before REV E or on Receiver Board 19D402429G2, G3 before REV D.
	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C339 and C340	5490008P35	Silver mica: 220 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C341	7130348P9	Molded: 0.22 pf ± 0.022 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C342	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C343	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C344	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C345	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C346	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C347	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C348	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C349	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C350	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C351	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C352	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C353	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C354	5496219P41	Ceramic disc: 10 pf $\pm 5\%$, 500 VDCW, temp coef 0 PPM.
C355	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C356	7491930P3	Polyester: .0047 μ f $\pm 20\%$, 100 VDCW; sim to GE Type 61F.
C357*	19A116080P3	Polyester: 0.022 μ f $\pm 20\%$, 50 VDCW. Earlier than REV H in G1, REV G in G2, G3.
	5492638P101	Ceramic disc: 0.1 μ f +100%-0%, 3 VDCW; sim to Sprague 54C23.
C358	5494481P112	Ceramic disc: .001 pf $\pm 10\%$, 1000 VDCW; sim to RMC Type JF.
C359	5496219P367	Ceramic disc: 150 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C360*	19A116080P3	Polyester: 0.022 μ f $\pm 20\%$, 50 VDCW. Earlier than REV H in G1, REV G in G2, G3.
	5492638P101	Ceramic disc: 0.1 μ f +100%-0%, 3 VDCW; sim to Sprague 54C23.
C361	5494481P112	Ceramic disc: .001 pf $\pm 10\%$, 1000 VDCW; sim to RMC Type JF.
C362*	19A116080P3	Polyester: 0.022 μ f $\pm 20\%$, 50 VDCW. Earlier than REV H in G1, REV G in G2, G3.
	5492638P101	Ceramic disc: 0.1 μ f +100%-0%, 3 VDCW; sim to Sprague 54C23.
C363	7491393P1	Ceramic disc: .001 μ f +100%-0%, 500 VDCW; sim to Sprague 1219C4.
C364	5494481P112	Ceramic disc: .001 pf $\pm 10\%$, 1000 VDCW; sim to RMC Type JF.
C365*	19A116080P3	Polyester: 0.022 μ f $\pm 20\%$, 50 VDCW. Earlier than REV H in G1, REV G in G2, G3.
	5492638P101	Ceramic disc: 0.1 μ f +100%-0%, 3 VDCW; sim to Sprague 54C23.
C366	7491393P1	Ceramic disc: .001 μ f +100%-0%, 500 VDCW; sim to Sprague 1219C4.
C367	5494481P112	Ceramic disc: .001 pf $\pm 10\%$, 1000 VDCW; sim to RMC Type JF.
C368*	19A116080P1	Polyester: 0.01 μ f $\pm 20\%$, 50 VDCW. On Receiver Board 19D402429G1 before REV D or on Receiver Board 19D402429G2, G3 before REV C:
	7491827P2	Ceramic disc: .01 μ f +80% -30%, 50 VDCW; sim to Sprague 19C180.
C369	5496219P369	Ceramic disc: 180 pf $\pm 5\%$, 500 VDCW, temp coef -150 PPM.
C370	5492638P107	Ceramic disc: 0.1 μ f +80% -20%, 12 VDCW; sim to Sprague 20C202.
C371 and C372	5490008P37	Silver mica: 270 pf $\pm 5\%$, 500 VDCW; sim to Electro Motive Type DM-15.
C373	5492638P107	Ceramic disc: 0.1 μ f +80% -20%, 12 VDCW; sim to Sprague 20C202.
C374 and C375	5494481P111	Ceramic disc: .001 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.
C376	5492638P108	Ceramic disc: 0.22 μ f +80% -20%, 12 VDCW; sim to Sprague 44C70.
C377*	5494481P11	Ceramic disc: .001 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF. Earlier than REV G in G1, REV F in G2, G3.
	5494481P107	Ceramic disc: 470 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF.
C378	19A116080P5	Polyester: 0.047 μ f $\pm 20\%$, 50 VDCW.
C379*	5492638P8	Ceramic disc: 0.22 μ f +80 -20%, 12 VDCW; sim to Sprague 44C. In Models earlier than REV A:
	5492638P107	Ceramic disc: 0.1 μ f +80% -20%, 12 VDCW; sim to Sprague 20C202.
C380*	19A116080P8	Polyester: 0.15 μ f $\pm 20\%$, 50 VDCW. In Models earlier than REV A:
	5491189P106	Polyester: 0.1 μ f $\pm 20\%$, 50 VDCW.
C381	19A116080P7	Polyester: 0.1 μ f $\pm 20\%$, 50 VDCW.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

F2
W-Y-R

OSC. METERING
G-R

F1
W-Y-BR

OSC OUTPUT (INJ)
W

10V
RED

TO J428 TO J427

TO J425 TO J429

TO J426

(19D402549, Rev. 8)
(19B204750, Sh. 1, Rev. 1)
(19B204750, Sh. 2, Rev. 1)

RESISTANCE READINGS

RESISTANCE READINGS ARE TYPICAL READINGS
MEASURED TO J312-13 (GROUND), AND WITH
ALL POWER REMOVED FROM THE CHASSIS.

MEASURED FROM	NEGATIVE (-) PROBE TO GND	POSITIVE (+) PROBE TO GND
* J302	5K	3.7K
J305	11K	1.8K
J312-2	1.5 MEG OHMS	60K
J312-3	2.0 MEG OHMS	60K
J312-4	2.0 MEG OHMS	6.3K
J312-8	280K	280K
J312-9	1Ω	1Ω
J312-10	170K	170K

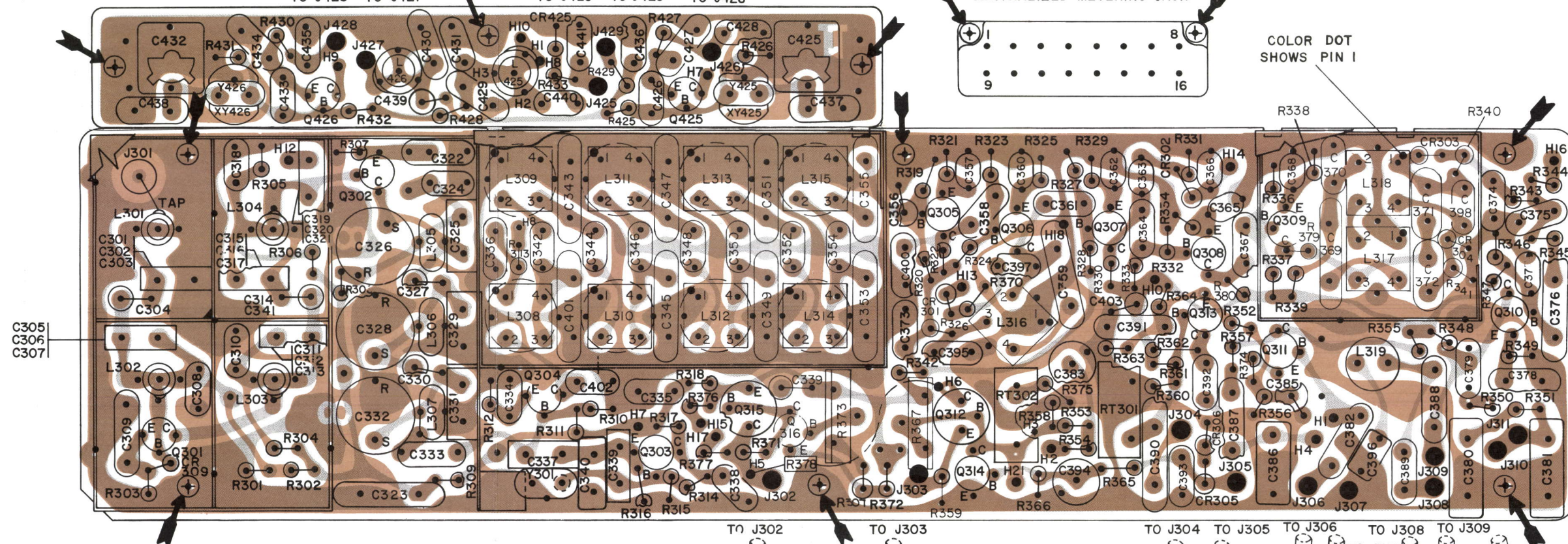
* MEASURED WITH POWER SUPPLY LEAD P712
(+12V) DISCONNECTED.

J312

CENTRALIZED METERING JACK

COLOR DOT
SHOWS PIN 1

TO REMOVE RECEIVER AND OSCILLATOR BOARDS
FROM SHIELD, REMOVE SCREWS SHOWN BY
ARROWS. ALSO DISCONNECT GREEN AND BLACK
SLEEVED INLINE CONNECTORS BEHIND J312.



TO J311

TO TONE
REJECTION FILTER
W-BK-BL

TO J302

TO J303

TO J304

TO J305

TO J306

TO J307

TO J308

TO J309

TO J310

+12V
W-BR-R

AUDIO OUT
ORANGE

SQUELCH ARM
W-BK-BR

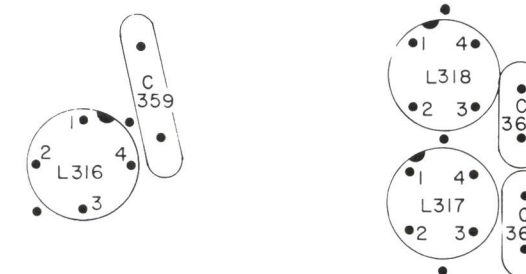
CHAN. GD
CONT. VLTG.
W-G-BL

VOL. ARM
W-BR-G

SQL. HI
W-BK-R

CHAN. GD.
TONE
W-BK-G

VOL. HI
W-O-BR

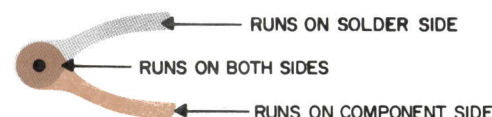


ALTERNATE FOR COILS L316, L317 & L318

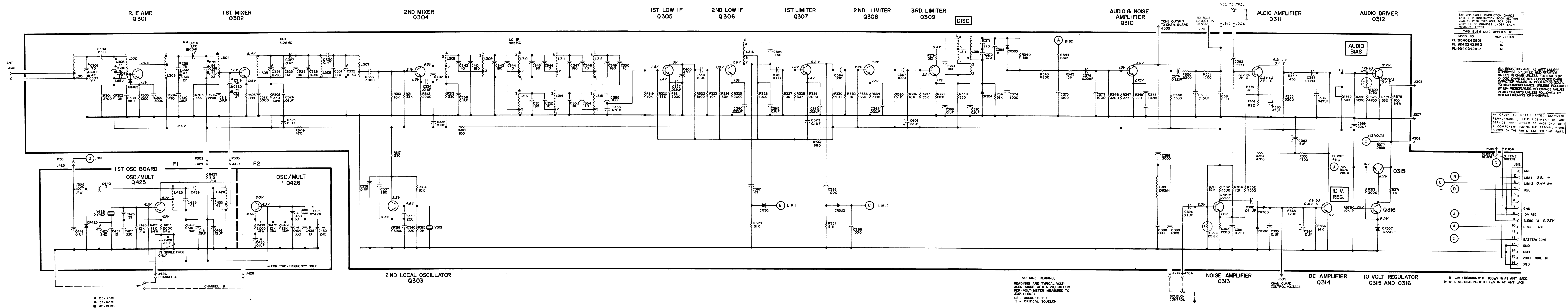
SERVICE SHEET

25—50 MHz RECEIVER MODELS 4ER43A10-15
RECEIVER BOARD 19D402429-G1, REV. J
RECEIVER BOARD 19D402429-G2 & 3, REV. H
OSCILLATOR BOARDS 4EG19A10 & 11

(RC-1141G, Sheet 1)



(19D402549, Rev. 8)
(19C303581, Sh. 1, Rev. 8)
(19C303581, Sh. 2, Rev. 8)



(19R020718, Rev. 19)

SERVICE SHEET

25-50 MHz RECEIVER MODELS 4ER43A10-15
 RECEIVER BOARD 19D402429-G1, REV. J
 RECEIVER BOARD 19D402429-G2 & 3, REV. H
 OSCILLATOR BOARDS 4EG19A10 & 11

(RC-1141G, Sheet 2)

SYMBOL	GE PART NO.	DESCRIPTION
C382	5492638P108	Ceramic disc: 0.22 μ f +80%-20%, 12 VDCW; sim to Sprague 44C70.
C383	5495670P3	Electrolytic: 5 μ f +75% -10%, 6 VDCW; sim to Sprague 30D125A1.
C384*	5494481P114	Ceramic disc: .002 pf \pm 10%, 1000 VDCW; sim to RMC Type JF. Deleted by REV A.
C385	5496267P2	Tantalum: 47 μ f \pm 20%, 6 VDCW; sim to Sprague 150D.
C386*	19A116080P5	Polyester: .047 μ f \pm 20%, 50 VDCW. In Models earlier than REV A:
	5491189P105	Polyester: 0.068 μ f \pm 20%, 50 VDCW.
C387	5492638P108	Ceramic disc: 0.22 μ f +80%-20%, 12 VDCW; sim to Sprague 44C70.
C388	5494481P116	Ceramic disc: .003 pf \pm 10%, 1000 VDCW; sim to RMC Type JF.
C389	5494481P112	Ceramic disc: .001 pf \pm 10%, 1000 VDCW; sim to RMC Type JF.
C390	7491827P5	Ceramic disc: 0.1 μ f +80%-30%, 50 VDCW; sim to Sprague 36C172.
C391	5492638P108	Ceramic disc: 0.22 μ f +80%-20%, 12 VDCW; sim to Sprague 44C70.
C392*	19A116080P1	Polyester: 0.01 μ f \pm 20%, 50 VDCW. On Receiver Board 19D402429G1 before REV D or on Receiver 19D402429G2, G3 before REV C:
	7491827P2	Ceramic disc: .01 μ f +80%-30%, 50 VDCW; sim to Sprague 19C180.
C393	5492638P107	Ceramic disc: 0.1 μ f +80%-20%, 12 VDCW; sim to Sprague 20C202.
C394	5495670P13	Electrolytic: 2 μ f +75% -10%, 25 VDCW; sim to Sprague 30D176A1.
C395	5492638P107	Ceramic disc: 0.1 μ f +80%-20%, 12 VDCW; sim to Sprague 20C202.
C396	19A116080P201	Polyester: 0.01 μ f \pm 5%, 50 VDCW.
C397	5496203P117	Ceramic disc: 47 pf \pm 10%, 500 VDCW, temp coef -350 PPM.
C398	5496219P656	Ceramic disc: 51 pf \pm 5%, 500 VDCW, temp coef -470 PPM.
C399	5496267P10	Tantalum: 22 μ f \pm 20%, 15 VDCW; sim to Sprague 150D.
C400	5496219P817	Ceramic disc: 47 pf \pm 10%, 500 VDCW, temp coef -1500 PPM.
C401	5496219P369	Ceramic disc: 180 pf \pm 5%, 500 VDCW, temp coef -150 PPM.
C402	5490008P11	Silver mica: 22 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.
C403	5496267P10	Tantalum: 22 μ f \pm 20%, 15 VDCW; sim to Sprague 150D.
C404*	7489162P139	Silver mica: 330 pf \pm 10%, 500 VDCW; sim to Electro Motive Type DM-15. Added by REV C to Receiver Board 19D402429G1 and by REV B to 19D402429G2, G3. Deleted in G1 by REV K, G2, G3 by REV J.
CR301 and CR302	7777146P3	Germanium; sim to Type 1N90.
CR303 and CR304	19A115250P1	Silicon.
CR305 and CR306	7777146P3	Germanium; sim to Type 1N90.
CR307	4036887P6	Silicon, Zener.
CR308*	4036887P3	Silicon, Zener. Deleted in G1 by REV K, G2, G3 by REV J.
CR309*	4038642P1	Germanium. Added to G1 by REV D; G2, G3 by REV C.
J301	5496078P3	Receptacle, push-on: Teflon; sim to FXR 27-3.

SYMBOL	GE PART NO.	DESCRIPTION
J302 thru J311	4033513P4	Pin, contact: sim to Bead Chain L93-3.
J312	19B206586G2	Connector: 16 contacts.
L301	19C303583G3	Coil Assembly. Includes:
	19B200497P2	Tuning slug.
L302	19C303583G4	Coil Assembly. Includes:
	19B200497P2	Tuning slug.
L303	19C303583G2	Coil Assembly. Includes:
	19B200497P2	Tuning slug.
L304	19C303583G1	Coil Assembly. Includes:
	19B200497P2	Tuning slug.
	19B204932G2	Coil Assembly.
L305 and L306		
L307	19B204932G1	Coil Assembly.
L308* thru L315*	19A115711P1	Freq: 455 KHz; sim to Automatic Mfg EX12670.
	19C303062G6	Earlier than REV J in G1, REV H in G2, G3:
	4038368P1	Coil Assembly. Includes:
L316*	19A115711P2	Freq: 455 KHz; sim to Automatic Mfg EX12671.
	19C303062G6	Earlier than REV J in G1, REV H in G2, G3:
	4038368P1	Coil Assembly. Includes:
L317*	19A115711P6	Freq: 455 KHz; sim to Toko PEFCN-14733 CX12.
	19C303062G4	Earlier than REV J in G1, REV H in G2, G3:
	4038368P1	Coil Assembly. Includes:
L318*	19A115711P7	Freq: 455 KHz; sim to Toko PEFCN-14734 BNL2.
	19C303062G5	Earlier than REV J in G1, REV H in G2, G3:
	4038368P1	Coil Assembly. Includes:
L319	5491736P2	Inductor: 240 mh \pm 10% ind at 0.5 v, 270 ohms max DC res; sim to Aladdin 33-161.
P301 thru P303	4029840P2	Contact, electrical: sim to Amp 42827-2.
P304 and P305	7147199P1	Connector: 1 male contact; sim to Winchester Electronics 21803.
Q301 and Q302	19A115342P1	Silicon, NPN.
Q303	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q304	19A115342P1	Silicon, NPN.
Q305 thru Q309	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q310 and Q311	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q312	19A115300P4	Silicon, NPN; sim to Type 2N3053.
Q313 and Q314	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q315	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q316	19A115123P1	Silicon, NPN; sim to Type 2N2712.

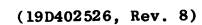
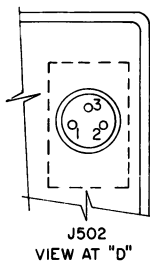
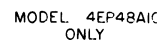
SYMBOL	GE PART NO.	DESCRIPTION
----- RESISTORS -----		
R301	3R77P272J	Composition: 2700 ohms \pm 5%, 1/2 w.
R302	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R303	3R77P102K	Composition: 1000 ohms \pm 10%, 1/2 w.
R304	3R77P471K	Composition: 470 ohms \pm 10%, 1/2 w.
R305	3R77P433J	Composition: 43,000 ohms \pm 5%, 1/2 w.
R306	3R77P224K	Composition: 220,000 ohms \pm 10%, 1/2 w.
R307	3R77P102J	Composition: 1000 ohms \pm 5%, 1/2 w.
R308	3R152P331K	Composition: 330 ohms \pm 10%, 1/4 w.
R309	3R77P471K	Composition: 470 ohms \pm 10%, 1/2 w.
R310	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R311	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R312	3R77P222K	Composition: 2200 ohms \pm 10%, 1/2 w.
R313	3R77P331K	Composition: 330 ohms \pm 10%, 1/2 w.
R314 and R315	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R316	3R77P392K	Composition: 3900 ohms \pm 10%, 1/2 w.
R317	3R77P331K	Composition: 330 ohms \pm 10%, 1/2 w.
R318	3R77P101K	Composition: 100 ohms \pm 10%, 1/2 w.
R319	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R320	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R321	3R77P202J	Composition: 2000 ohms \pm 5%, 1/2 w.
R322	3R77P512J	Composition: 5100 ohms \pm 5%, 1/2 w.
R323	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R324	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R325	3R77P202J	Composition: 2000 ohms \pm 5%, 1/2 w.
R326	3R77P102K	Composition: 1000 ohms \pm 10%, 1/2 w.
R327	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R328	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R329	3R77P202J	Composition: 2000 ohms \pm 5%, 1/2 w.
R330	3R77P512J	Composition: 5100 ohms \pm 5%, 1/2 w.
R331	3R77P513J	Composition: 51,000 ohms \pm 5%, 1/2 w.
R332	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R333	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R334	3R77P202J	Composition: 2000 ohms \pm 5%, 1/2 w.
R336	3R77P103K	Composition: 10,000 ohms \pm 10%, 1/2 w.
R337	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R338	3R77P102J	Composition: 1000 ohms \pm 5%, 1/2 w.
R339	3R77P331K	Composition: 330 ohms \pm 10%, 1/2 w.
R340 and R341	3R77P513K	Composition: 51,000 ohms \pm 10%, 1/2 w.
R342	3R77P681K	Composition: 680 ohms \pm 10%, 1/2 w.
R343	3R77P682K	Composition: 6800 ohms \pm 10%, 1/2 w.
R344	3R77P104K	Composition: 0.1 megohm \pm 10%, 1/2 w.
R345	3R77P153K	Composition: 15,000 ohms \pm 10%, 1/2 w.
R346	3R77P332K	Composition: 3300 ohms \pm 10%, 1/2 w.
R347	3R77P333K	Composition: 33,000 ohms \pm 10%, 1/2 w.
R348	3R77P332K	Composition: 3300 ohms \pm 10%, 1/2 w.
R349	3R77P221K	Composition: 220 ohms \pm 10%, 1/2 w.
R350	3R77P332J	Composition: 3300 ohms \pm 5%, 1/2 w.
R351	3R77P152J	Composition: 1500 ohms \pm 5%, 1/2 w.
R352	3R77P752J	Composition: 7500 ohms \pm 5%, 1/2 w.
R353 and R354	3R77P472K	Composition: 4700 ohms \pm 10%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R355*	3R77P332K	Composition: 3300 ohms \pm 10%, 1/2 w. In Models earlier than REV A:
	3R152P222K	Composition: 2200 ohms \pm 10%, 1/4 w.
R356*	3R77P621J	Composition: 620 ohms \pm 5%, 1/2 w. In Models earlier than REV A:
	3R152P431J	Composition: 430 ohms \pm 5%, 1/4 w.
R357	3R77P431J	Composition: 430 ohms \pm 5%, 1/2 w.
R358	3R77P622J	Composition: 6200 ohms \pm 5%, 1/2 w.
R359	3R77P331K	Composition: 330 ohms \pm 10%, 1/2 w.
R360*	3R77P104J	Composition: 0.1 megohm \pm 5%, 1/2 w. Deleted from Receiver Board 19D402409G1 by REV D and from 19D402429G2 and G3 by REV C.
R361*	3R77P823J	Composition: 82,000 ohms \pm 5%, 1/2 w. On Receiver Board 19D402429G1 before REV D or on Receiver Board 19D402429G2, G3 before REV C.
	3R152P753J	Composition: 75,000 ohms \pm 5%, 1/4 w.
R362	3R77P332J	Composition: 3300 ohms \pm 5%, 1/2 w.
R363	3R77P222J	Composition: 2200 ohms \pm 5%, 1/2 w.
R364	3R77P153J	Composition: 15,000 ohms \pm 5%, 1/2 w.
R365	3R77P472K	Composition: 4700 ohms \pm 10%, 1/2 w.
R366	3R77P243J	Composition: 24,000 ohms \pm 5%, 1/2 w.
R367*	19B209358P108	Variable, carbon film: approx 100 to 50,000 ohms \pm 10%, 0.25 w; sim to CTR Type X-201. Earlier than REV J in G1, REV H in G2, G3.
	19B204808G1	Resistor Assembly. Includes resistor, variable, carbon film: 50,000 ohms \pm 20%, 0.1 w.
R370	3R77P513J	Composition: 51,000 ohms \pm 5%, 1/2 w.
R371	3R77P102J	Composition: 1000 ohms \pm 5%, 1/2 w.
R372	3R77P202J	Composition: 2000 ohms \pm 5%, 1/2 w.
R373*	19B209358P106	Variable, carbon film: approx 75 to 10,000 ohms \pm 10%, 0.25 w; sim to CTR Type X-201. Earlier than REV J in G1, REV H in G2, G3.
	19B204808G2	Resistor Assembly. Includes resistor, variable, carbon film: 10,000 ohms \pm 20%, 0.1 w.
R374	3R152P300J	Composition: 30 ohms \pm 5%, 1/4 w.
R375	3R152P472J	Composition: 4700 ohms \pm 5%, 1/4 w.
R376 and R377	5495948P444	Deposited carbon: 0.28 megohm \pm 1%, 1/2 w; sim to Texas Inst CD1/2M.
R378*	3R152P101K	Composition: 100 ohms \pm 10%, 1/4 w. Added by REV P to 19D402429G1 and by REV E to 19D402429G2, G3.
R379*	3R152P511J	Composition: 510 ohms \pm 5%, 1/4 w. Added to G1 by REV I, to G2, G3 by REV K.
R380*	3R152P512J	Composition: 5100 ohms \pm 5%, 1/4 w. Added to G1 by REV K, added by G2, G3 by REV J.
RT301	5490828P29	Rod: 22,800 ohms \pm 5% res at 25°C, 1 w max input at 40°C; sim to Globar 723B-1.
RT302	5490828P28	Rod: 8750 ohms \pm 5% res at 25°C, 1 w max input at 40°C; sim to Globar 723F-2.
Y301	19B206356P1	Quartz: antiresonant, frequency 4805.00 KHz.
OSCILLATOR BOARDS		
	MODEL 4EQ19A10	1-Freq (19C303591G1)
	MODEL 4EQ19A11	2-Freq (19C303591G2)
----- CAPACITORS -----		
C425	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 850 v peak; sim to EF Johnson 189.
C426	5496218P653	Ceramic disc: 39 pf \pm 5%, 500 VDCW, temp coef -470 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C427	5490008P39	Silver mica: 330 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.
C428	7491827P2	Ceramic disc: .01 μ f +80%-30%, 50 VDCW; sim to Sprague 19C180.
C429 and C430	5496218P54	Ceramic disc: 43 pf \pm 5%, 500 VDCW, temp coef 0 PPM.
C431	7491827P2	Ceramic disc: .01 μ f +80%-30%, 50 VDCW; sim to Sprague 19C180.
C432	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 850 v peak; sim to EF Johnson 189.
C433	5496218P653	Ceramic disc: 39 pf \pm 5%, 500 VDCW, temp coef -470 PPM.
C434	5490008P39	Silver mica: 330 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.
C435 and C436	7491827P2	Ceramic disc: .01 μ f +80%-30%, 50 VDCW; sim to Sprague 19C180.
C437 and C438	5490008P6	Silver mica: 10 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.
C439	7130348P3	Molded: 1 pf \pm 0.05 pf, 500 VDCW, temp coef 0 PPM; sim to Jeffers Type JM-5/32.
C440	5496218P34	Ceramic disc: 3 pf \pm 0.25 pf, 500 VDCW, temp coef 0 PPM.
C441	7491827P2	Ceramic disc: .01 μ f +80%-30%, 50 VDCW; sim to Sprague 19C180.
CR425	7777146P3	Germanium; sim to Type 1N90.
----- DIODES AND RECTIFIERS -----		
J425 thru J429	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
L425	19B204752G2	Coil Assembly. Includes:
	7160519P1	Tuning slug.
L426	19B204752G1	Coil Assembly. Includes:
	7160519P1	Tuning slug.
Q425 and Q426	19A115245P1	Silicon, NPN.
----- TRANSISTORS -----		
R425 and R426	3R152P123J	Composition: 12,000 ohms \pm 5%, 1/4 w.
R427	3R152P202J	Composition: 2000 ohms \pm 5%, 1/4 w.
R428 and R429	3R152P511J	Composition: 510 ohms \pm 5%, 1/4 w.
R430	3R152P202J	Composition: 2000 ohms \pm 5%, 1/4 w.
R431 and R432	3R152P123J	Composition: 12,000 ohms \pm 5%, 1/4 w.
R433	3R152P472J	Composition: 4700 ohms \pm 5%, 1/4 w.
----- SOCKETS -----		
XY425 and XY426	5490277P1	Transistor: 4 contacts; sim to Elco 3303.
----- CRYSTALS -----		
		When reordering give GE Part Number and specify exact frequency needed.
		25-33 Mhz Crystal Frequency = (OF +5.26 Mhz) \pm 2
		33-42 Mhz Crystal Frequency = (OF -5.26 Mhz) \pm 2
		42-50 Mhz Crystal Frequency = (OF -5.26 Mhz) \pm 3
		Quartz: antiresonant, freq range 12-19 Mhz.

SYMBOL	GE PART NO.	DESCRIPTION
		MECHANICAL PARTS (SEE RC-1105)
1	19B204596G1	Shield Assembly.
2	19B204491P1	Cover. (Used with L308 thru L315).
3	4038844G1	Shield Assembly. (Used with L308 thru L318).
4	19B204442P2	Cover.
5	19B204612G1	Shield Assembly. (Used with L317 and L318).
6	19B204493G1	Shield Assembly.
7	4036555P1	Insulator, washer: nylon. (Used with Q312 and Q315).
8	19B204596G1	Shield Assembly. (Used with L308 thru L315).
9	19B204604P1	Cover.

RC-1105



(RC-1238D)

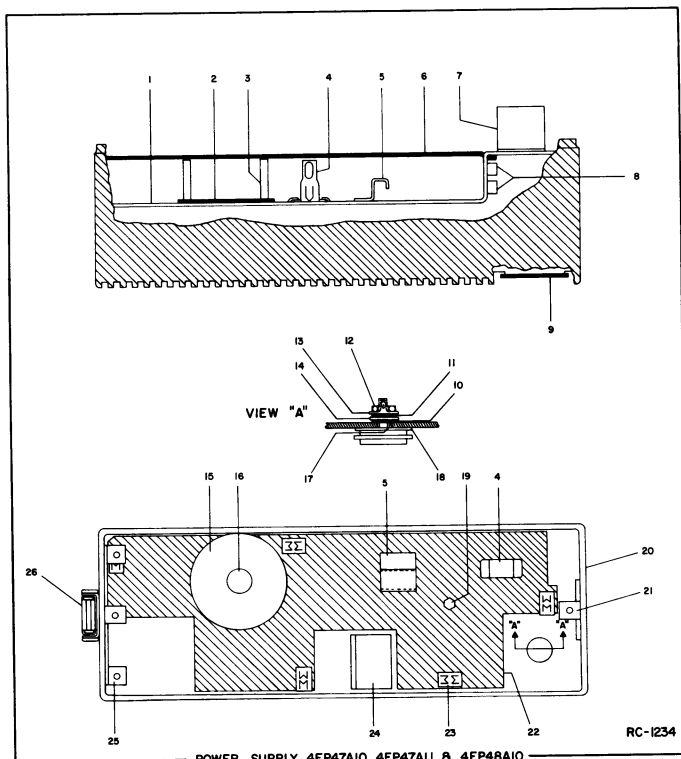
PARTS LIST

LBI-3635C
12 VOLT POWER SUPPLY
MODEL 4EP47A11
(19D402519-G2)
REV D

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - CAPACITORS - - - - -
C501	7489483-P17	Electrolytic: 50 μ f +75%-10%, 25 VDCW; sim to Sprague 30D186A1.
C502	7489483-P7	Electrolytic: 10 μ f +75%-10%, 25 VDCW; sim to Sprague 30D182A1.
C503	5491189-P7	Polyester: 0.15 μ f \pm 20%, 50 VDCW.
C504	7489483-P17	Electrolytic: 50 μ f +75%-10%, 25 VDCW; sim to Sprague 30D186A1.
C505*	19A115680-P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT.
	19B209283-P1	In REV B and earlier:
		Electrolytic: 50 μ f +75%-10%, 65 VDCW.
C506*	19A115680-P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT.
	7489483-P25	In REV B and earlier:
		Electrolytic: 50 μ f +75%-10%, 50 VDCW; sim to Sprague 30D200A1.
C507*	19A115680-P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT.
	5496267-P20	In REV B and earlier:
		Tantalum: 47 μ f \pm 20%, 35 VDCW; sim to Sprague Type 150D.
C508*	19A115680-P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT.
	19B209283-P1	In REV B and earlier:
		Electrolytic: 50 μ f +75%-10%, 65 VDCW.
C511	7489483-P27	Electrolytic: 10 μ f +75%-10%, 150 VDCW; sim to Sprague 30D218A1.
C512	7489162-P39	Silver mica: 330 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.
C515* and C516*	19A115680-P10	Electrolytic: 200 μ f +150%-10%, 18 VDCW; sim to Mallory Type TT. Added by REV D.
		- - - - - DIODES AND RECTIFIERS - - - - -
CR501*	4036887-P12	Silicon, Zener.
	5496365-P3	In Models earlier than REV A:
		Silicon, Zener.
CR502 and CR503	5494922-P6	Silicon; sim to Type 1N462.
CR504 thru CR509	4037822-P1	Silicon.
CR514	4037822-P1	Silicon.
CR518	4037822-P1	Silicon.
		- - - - - INDICATING DEVICES - - - - -
DS501	19C307037-P6	Lamp, incandescent: 28 v; sim to GE 1819.
		- - - - - FUSES - - - - -
F501	1R16-P2	Quick blowing: 3/4 amp at 250 v; sim to Littelfuse 312.750 or Bussmann AGC-3/4.
		- - - - - JACKS AND RECEPTACLES - - - - -
J501	19A121226-P1	Receptacle, phen: 8 female contacts; sim to HB Jones 261-32-08-000 (modified).
J502	4034405-P4	Receptacle, polarized: 3 male pins; sim to Cannon XLR-3-32.
		- - - - - RELAYS - - - - -
K501	19B209240-P2	Armature, open: 12 VDC nominal, 2 w max operating, 100 ohms \pm 10% coil res, 1 form C contact; sim to Magnecraft 88X-150A.

SYMBOL	GE PART NO.	DESCRIPTION
K503	19B209249-P1	Armature, open: 1 amp nominal, 1.1 w max operating, 0.5 ohm $\pm 20\%$ coil res, 1 form C contact rated at 1 amp at 28 VDC or 115 VAC; sim to RBM X95S9KT.
		- - - - - INDUCTORS - - - - -
L501	7143944-P2	Choke, RF: 120 μ h $\pm 10\%$, .064 ohm DC res max.
L503	19B209166-P1	Reactor: 0.9 mh min, 0.5 ohm DC res max, 50 v peak, 50 VDC operating.
L505*	19A115894-P1	Audio freq: 1.0 mh inductance, 0.35 ohms DC res. Added by REV D.
		- - - - - TRANSISTORS - - - - -
Q501 thru Q503	5490810-P1	Germanium, PNP.
		- - - - - RESISTORS - - - - -
R502	5493035-P6	Wirewound: 3 ohms $\pm 5\%$, 5 w; sim to Tru-Ohm Type X-60.
R503	3R77-P202J	Composition: 2000 ohms $\pm 5\%$, 1/2 w.
R504	19B209244-P1	Variable, wirewound: 1000 ohms $\pm 20\%$, 2 w; sim to CTS BL37463.
R506	5493035-P15	Wirewound: 130 ohms $\pm 5\%$, 10 w; sim to Tru-Ohm Type X-62.
R507	3R78-P102K	Composition: 1000 ohms $\pm 10\%$, 1 w.
R508	3R78-P100K	Composition: 10 ohms $\pm 10\%$, 1 w.
R511	3R77-P103K	Composition: 10,000 ohms $\pm 10\%$, 1/2 w.
		- - - - - TRANSFORMERS - - - - -
T502	19B205009-G2	Transformer.
		- - - - - TERMINAL BOARDS - - - - -
TB2	7775500-P7	Phenolic: 3 terminals.
TB5	7775500-P2	Phenolic: 3 terminals.
TB7	7487424-P1	Miniature, phen: 1 terminal.
TB8 and TB9	7487424-P7	Miniature, phen: 4 terminals.
TB10	7775500-P10	Phenolic: 4 terminals.
TB11	7487424-P1	Miniature, phen: 1 terminal.
TB12	7775500-P3	Phenolic: 4 terminals.
TB13	7775500-P9	Phenolic: 5 terminals.
TB15	7775500-P10	Phenolic: 4 terminals.
TB16*	7775500-P4	Phenolic: 2 terminals. Added by REV D.
TB17*	7775500-P1	Phenolic: 2 terminals. Added by REV D.
		- - - - - SOCKETS - - - - -
XD5S01	4032220-P1	Lampholder, miniature: sim to Drake N517.
XF501	19A121163-G3	Fuse clip: sim to Bushman Mfg Co 5678-14.
		POWER CABLE ASSEMBLY 19C303640-G3
	4034405-P3	Plug: 3 sockets; sim to Cannon XLR-3-11C.
	19A115776-P2	Fusholder: sim to Bussmann Type HHJ.
	7484390-P4	Fuse, quick blowing: 8 amps at 250 v; sim to Bussman ABC-10 or Littelfuse 314008.
	19B209260-P27	Terminal, solderless; sim to Amp 31828.
	19A115776-P4	Contact, electrical: sim to Littelfuse Co 904-87.
		MECHANICAL PARTS (SEE RC-1234)
1	19A121823-G1	Support.
2	19A121830-P1	(Not used).

SYMBOL	GE PART NO.	DESCRIPTION
3	7142162-P100	(Not used).
4	7118719-P4	Clip: sim to Prestole E-50005-038. (Used with L501, 503).
5	4038930-P1	Clip. (Used with R502, 506).
6	19B205010-P1	Cover.
7	19A121181-G1	Support. (Used with J501).
8	4035656-P14	(Not used).
9	19A121822-P1	Cover. (Used with Q501, 502).
10	4034214-P1	Mica washer: for 7/32 inch screw. (Used with Q501-503).
11	N405P9C13	Split washer: for 3/8 inch screw. (Used with Q501-503).
12	4032596-P1	Nut: 10-32. (Used with Q501-503).
13	4036835-P1	Terminal: sim to Shakeproof 2118-10-01-2520N. (Used with Q501-503).
14	4034225-P1	Flat washer: 10-32. (Used with Q501-503).
15	19A121168-P1	Washer. (Used with T501).
16	19A115316-P1	Cup washer: sim to Zierick 220. (Used with T501).
17	7147194-P11	Bushing. (Used with Q501-503).
18	4031291-P1	Insulator. (Used with Q501-503).
19	7142162-P99	Spacer.
20	19D402428-P1	Casting.
21	19A121825-P1	Support.
22	19B205007-G1	Plate.
23	7140578-P2	Speed nut: sim to Tinnerman C1691-017-67.
24	19A121821-P1	Support. (Used with Q503).
25	19B205011-G1	Support.
26	4029994-P3	Pull-down catch: sim to Nielsen Hardware SC-B-83314-2.



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 a more readily available component. Changed CR501.

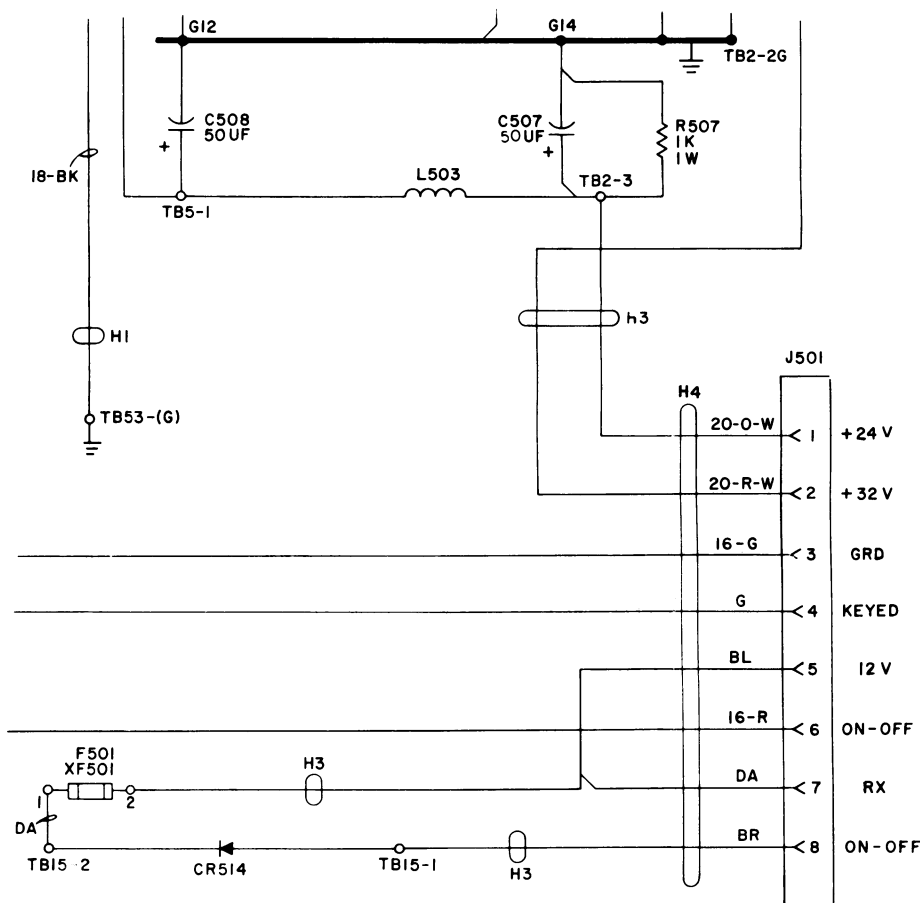
REV. B - To provide relay arc suppression. Added CR518.

REV. C - To improve filtering at low temperatures.

Changed C505, C506, C507 and C508:

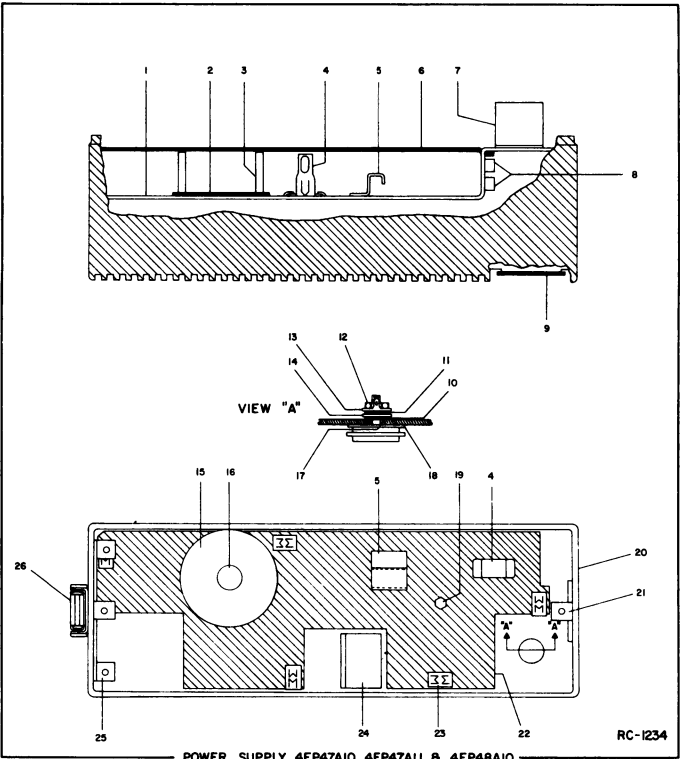
SCHEMATIC DIAGRAM WAS:

SCHEMATIC DIAGRAM WAS:



*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST			SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
LBI-3636D 6-VOLT POWER SUPPLY MODEL 4EP48A10 (19D402519G3)								
SYMBOL	GE PART NO.	DESCRIPTION						
----- CAPACITORS -----								
C501	7489483P17	Electrolytic: 50 μ f +75%-10%, 25 VDCW; sim to Sprague 30D.	J501	19A121226P1	----- JACKS AND RECEPTACLES ----- Receptacle, phen: 8 female contacts; sim to HB Jones 261-32-08-000 (modified).	TB11	7487424P1	Miniature, phen: 1 terminal.
C502	7489483P7	Electrolytic: 10 μ f +75%-10%, 25 VDCW; sim to Sprague 30D.	J502	4034405P4	Receptacle, polarized: 3 male pins; sim to Cannon XLR-3-32.	TB12	7775500P3	Phen: 4 terminals.
C503	19A116080P8	Polyester: 0.15 μ f \pm 20%, 50 VDCW.			----- RELAYS -----	TB13	7775500P9	Phen: 5 terminals.
C504	7489483P17	Electrolytic: 50 μ f +75%-10%, 25 VDCW; sim to Sprague 30D.	K502	19C300957P2	Armature, enclosed: 185 ohms \pm 10% coil res, 12 VDC, 1.5 w, 4 form C contacts; sim to Allied Control T154X-316.	TB14	7487424P5	Miniature, phen: 3 terminals.
C505*	19A115680P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT. In REV D and earlier:	K503	19B209249P1	Armature, open: 1 amp nominal, 1.1 w max operating, 0.5 ohm \pm 20% coil res, 1 form C contact; sim to RBM X9559KT.	TB16*	7775500P7	Phen: 4 terminals. Added by REV C.
	19B209283P1	Electrolytic: 50 μ f +75%-10%, 65 VDCW.	K504	19B209240P1	Armature, open: 6 VDC nominal, 2 w max operating, 25 ohms \pm 10% coil res, 1 form C contact; sim to Magnecraft 88X-149.	TB17*	7487424P22	Miniature, phen: 1 terminal. Added by REV A.
C506*	19A115680P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT. In REV D and earlier:	L502	19A115392P1	----- INDUCTORS ----- Choke, RF: 50 μ h \pm 10%, .02 ohm DC res max.			----- SOCKETS -----
	7489483P25	Electrolytic: 50 μ f +75%-10%, 50 VDCW; sim to Sprague 30D.	L503 and L504	19B209166P1	Reactor: 0.9 mh min, 0.5 ohm DC res max, 50 VDC operating.	XDS501 and XDS502	4032220P1	Lampholder: sim to Drake NS17.
C507*	19A115680P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT. In REV D and earlier:	Q501 thru Q503	5490810P1	----- TRANSISTORS ----- Germanium, PNP.	XF501	19A121163G3	Fuse clip; sim to Bussman Mfg Co 5678-14.
	5496267P20	Tantalum: 47 μ f \pm 20%, 35 VDCW; sim to Sprague Type 150D.	Q504*	19A116118P3	Silicon, NPN. In REV F and earlier:	XF502	19A115164P2	Fuseholder, phen: 30 amps max; sim to Littelfuse 350284.
C508*	19A115680P6	Electrolytic: 50 μ f +150%-10%, 50 VDCW; sim to Mallory Type TT. In REV D and earlier:		19A115527P1	Silicon, NPN. Added by REV C.	XK502	5491595P5	Relay: 16 contacts; sim to Allied Control 30054-2.
	19B209283P1	Electrolytic: 50 μ f +75%-10%, 65 VDCW.			----- RESISTORS -----			POWER CABLE ASSEMBLY 19C303640G4
C509 and C510	7489483P17	Electrolytic: 50 μ f +75%-10%, 25 VDCW; sim to Sprague 30D.	R502*	5493035P6	Wirewound: 3 ohms \pm 5%, 5 w; sim to Tru-Ohm Type X-60. In Models of REV B or earlier:		4034405P3	Plug: 3 sockets; sim to Cannon XLR-3-11C.
C511	7489483P27	Electrolytic: 10 μ f +75%-10%, 150 VDCW; sim to Sprague 30D.		5493035P1	Wirewound: 5 ohms \pm 5%, 5 w; sim to Tru-Ohm Type X-60.		19A115776P2	Fuseholder: sim to Bussmann Type HHJ.
C512	7489162P39	Silver mica: 330 pf \pm 5%, 500 VDCW; sim to Electro Motive Type DM-15.	R504	19B209244P1	Variable, wirewound: 1000 ohms \pm 20%, 2 w; sim to CTS Type 117.		7484390P3	Fuse, quick blowing: 15 amps at 250 v; sim to Bussman ABC-15 or Littelfuse 314015.
		----- DIODES AND RECTIFIERS -----	R506	5493035P15	Wirewound: 130 ohms \pm 5%, 10 w; sim to Tru-Ohm Type X-62.		19B209260P27	Terminal, solderless; sim to Amp 31828.
CR502 and CR503	5494922P6	Silicon; sim to Type 1N462.	R507	3R78P102K	Composition: 1000 ohms \pm 10%, 1 w.		19A115776P4	Contact, electrical: sim to Littelfuse Co 904-87.
CR504 thru CR513	4037822P1	Silicon.	R508	3R78P100K	Composition: 10 ohms \pm 10%, 1 w.			MECHANICAL PARTS (SEE RC-1234)
CR515* and CR516*	4036887P51	Silicon, Zener.	R510	3R78P301J	Composition: 300 ohms \pm 5%, 1 w.	1	19A121823G1	Support.
	4036887P5	Silicon, Zener.	R512	3R77P102K	Composition: 1000 ohms \pm 10%, 1/2 w.	2	19A121830P1	(Not Used).
CR517*	4037822P1	Silicon. Added by REV A. Deleted by REV C.	R513*	5493035P17	Wirewound: 63 ohms \pm 5%, 5 w; sim to Tru-Ohm Type X-60. Added by REV A. Deleted by REV C.	3	7142162P100	(Not Used).
CR518*	4037822P1	Silicon. Added by REV B.	R514*	3R78P221J	Composition: 220 ohms \pm 5%, 1 w. Added by REV C.	4	7118719P4	Clip: sim to Prestole E-50005-038. (Used with L503, 504).
CR519*	19A115528P6	Silicon, Zener. Added by REV C.	R515*	3R77P102J	Composition: 1000 ohms \pm 5%, 1/2 w. Added by REV C.	5	4038930P1	Clip. (Used with R502, 506).
CR520*	4037822P1	Silicon. Added by REV D.			----- TRANSFORMERS -----	6	19B205010P1	Cover.
		----- INDICATING DEVICES -----	T503*	19B205009G4	Transformer.	7	19A121181G1	Support. (Used with J501).
DS501	19C307037P6	Lamp, incandescent: 28 v; sim to GE 1819.		19B205009G3	In Models of REV B or earlier:	8	4035656P14	(Not Used).
DS502	19C307037P5	Lamp, incandescent: 28 v; sim to GE 1829.	TB1	7775500P1	Transformer.	9	19A121822P1	Cover. (Used with Q501, 502).
		----- FUSES -----	TB2	7775500P7	----- TERMINAL BOARDS -----	10	4034214P1	Mica washer: for 7/32 inch screw. (Used with Q501-503).
F501 thru F503	1R16P2	Quick blowing: 3/4 amp at 250 v; sim to Littelfuse 312.750 or Bussmann AGC-3/4.	TB4	7775500P1	Phen: 2 terminals.	11	N405P9C13	Split washer: for 3/8 inch screw. (Used with Q501-503).
			TB5	7775500P2	Phen: 3 terminals.	12	4032596P1	Nut: 10-32. (Used with Q501-503).
			TB6	7117710P2	Phen: 2 terminals; sim to Clinch 1781.	13	4036835P1	Terminal: sim to Shakeproof 2118-10-01-2520N. (Used with Q501-503).
			TB7	7487424P1	Miniature, phen: 1 terminal.	14	4034225P1	Flat washer: approx 1/2 inch dia. (Used with Q501-503).
			TB8 and TB9	7487424P7	Miniature, phen: 4 terminals.	15	19A121168P1	Washer: approx 2 inches dia. (Used with T501).
			TB10	7775500P10	Phen: 4 terminals.	16	19A115316P1	Cup washer: approx 9/16 inch dia; sim to Zierick 220. (Used with T501).
						17	7147194P11	Bushing: approx 1/8 x 1/4 inch dia. (Used with Q501-503).
						18	4031291P1	Insulator. (Used with Q501-503).
						19	7142162P99	Spacer: approx 1-5/16 inches long.
						20	19D402428P1	Casting.
						21	19A121825P1	Support.
						22	19B205007G1	Plate.
						23	7140578P2	(Not Used).
						24	19A121821P1	Support. (Used with Q503).
						25	19B205011G1	Support.
						26	4029994P3	Pull-down catch: sim to Nielsen Hardware SC-B-83314-2.



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 description of parts affected by these revisions.

REV. A - To improve performance of tone squelch. Added CR517, R513 and TB17.

REV. B - To provide relay arc suppression. Added CR518.

REV. C - To provide a more stable 12-Volt supply for both transmit and receive conditions. Added CR519, Q504, R514, and R515; changed R502 and T503; and deleted CR517 and R513.

REV. D - To isolate transmitter from 12 Volt supply during receive operation. Added CR520.

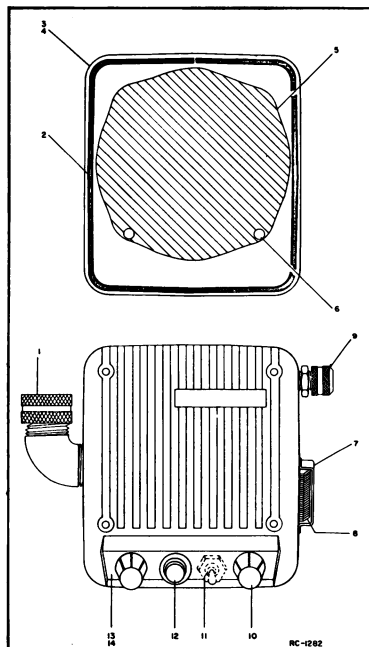
REV. E - To improve filtering at low temperatures - Changed C505, C506, C507 and C508.

REV. F - To increase output voltage adjustment range. Changed CR515 and CR516.

REV. G - To incorporate new transistor. Changed Q504.

PARTS LIST

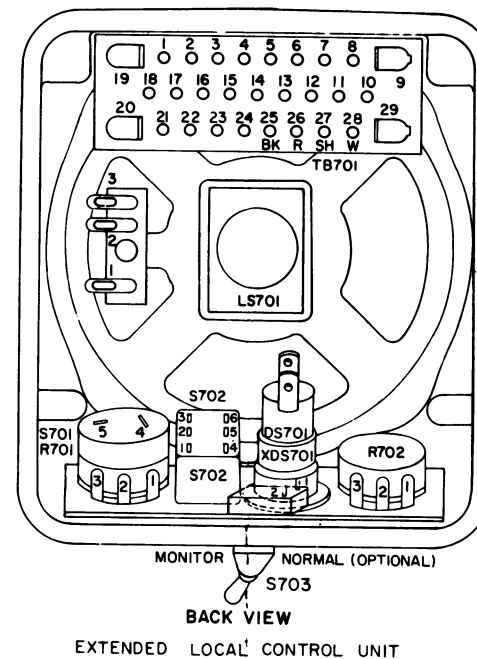
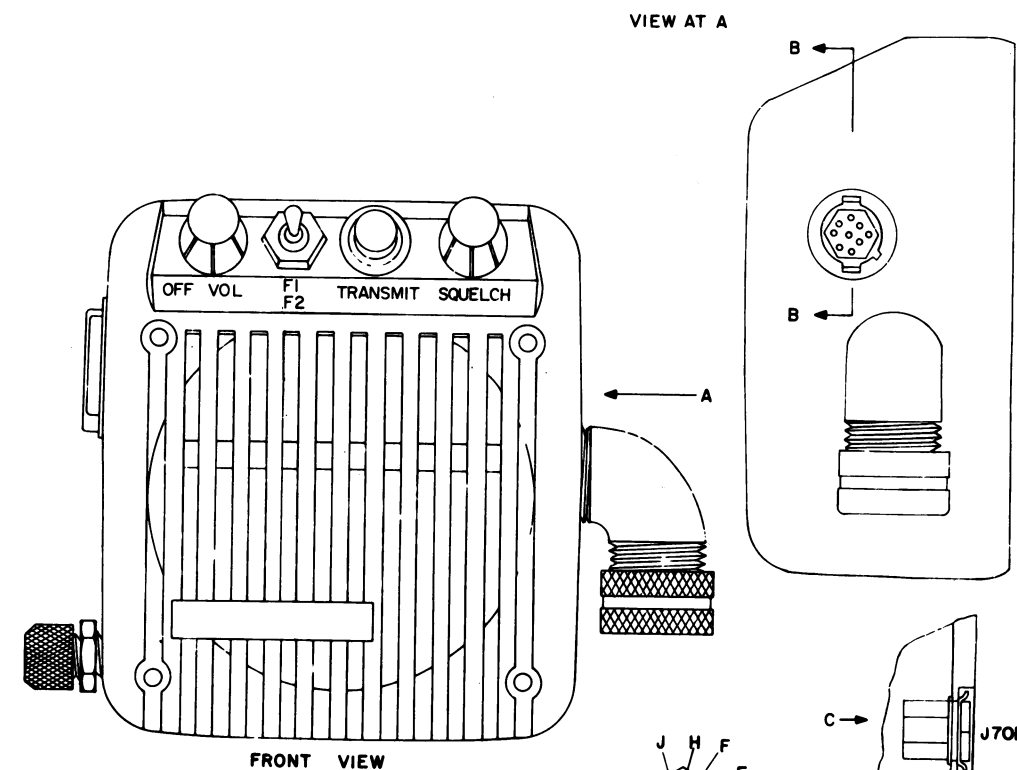
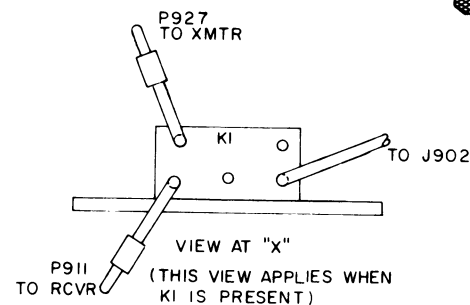
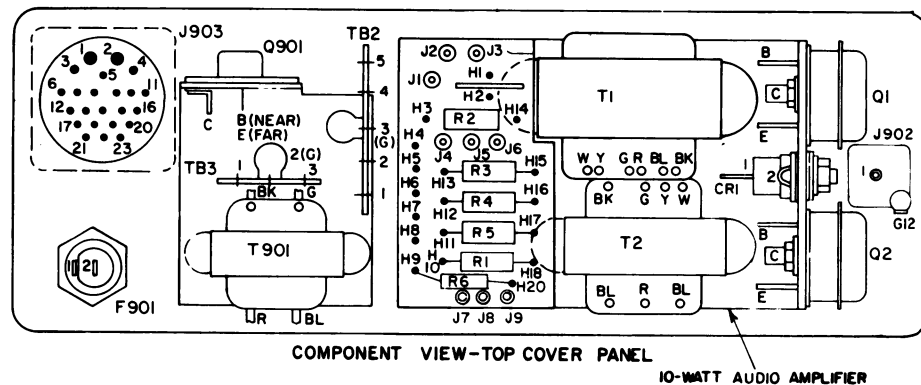
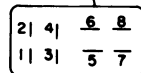
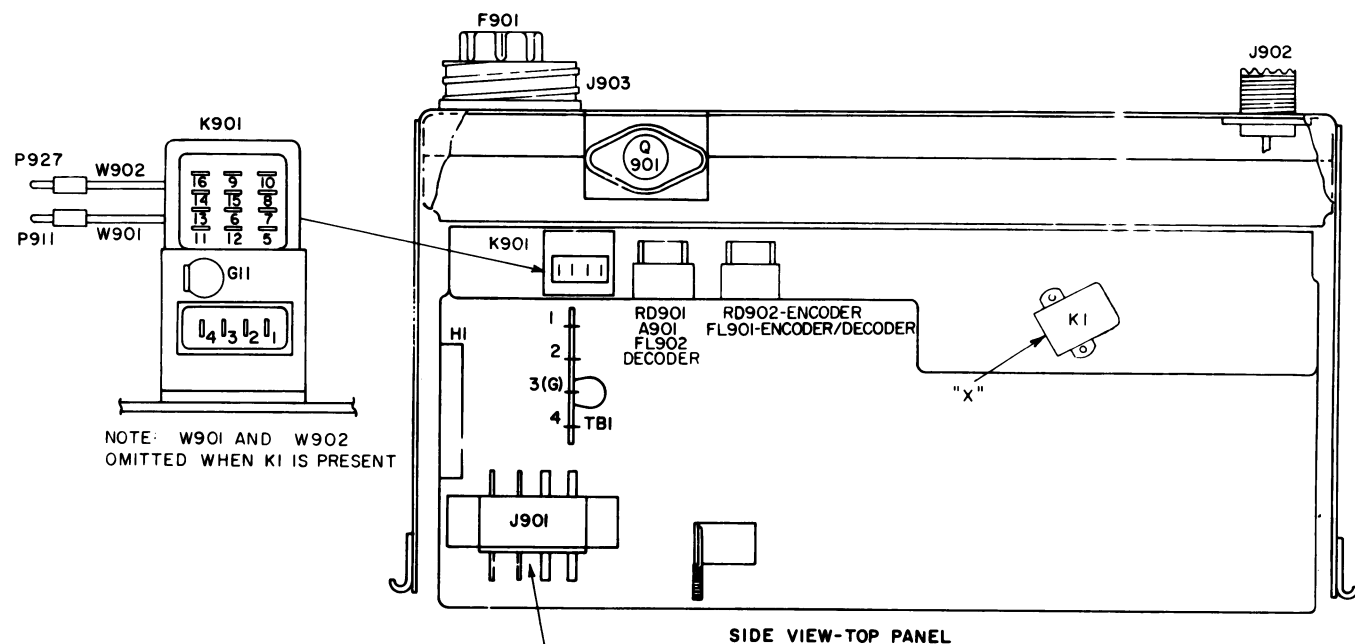
CONTROL UNIT MODEL 4EC66A10 (PL-19D402603-G1) (1 freq)
CONTROL UNIT MODEL 4EC66A11 (PL-19D402603-G2) (2 freq)
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G1
AND
ASSOCIATED ASSEMBLIES

SYMBOL	G-E PART NO.	DESCRIPTION
- - - - - INDICATING DEVICES - - - - -		
DS701	19C307037-P4	Lamp, incandescent: 14 v \pm 0.1 v; sim to G-E 1815.
- - - - - LOUDSPEAKERS - - - - -		
LS701	5491260-P7	Permanent magnet, 5-inch: 3.2 ohms \pm 10% voice coil imp, 15 w max operating, 385 cps \pm 15% resonance, paper dust cap; sim to Jensen Model P5-VAS12761.
- - - - - RESISTORS - - - - -		
R701	19B209256-P2	Resistor/switch: includes Resistor, variable, 5000 ohms \pm 20%, 0.25 w; Switch (S701), rotary, SPST, 15 amps at 10 v; sim to CTS Series 45.
R702	19B209256-P1	Variable, carbon film: 5000 ohms \pm 20%, 0.5 w, linear taper; sim to CTS Series 45.
- - - - - SWITCHES - - - - -		
S701		(Part of R701).
S702	5491899-P6	Toggle: DPDT, 3 amps at 250 v; sim to Cutler-Hammer 8363K7. (Used in Model 4EC66A11).
- - - - - TERMINAL BOARDS - - - - -		
TB701	PL-19B205152-G1	Terminal board: 25 contacts.
- - - - - SOCKETS - - - - -		
XDS701	7141855-P15	Lamp; sim to Dialight 95-410-975 (modified).
MECHANICAL PARTS		
(SEE RC-1282)		
1	19A122065-P1	Bushing: 3/4-14; sim to Pyle-National DB-1191690 (modified).
2	4032574-P2	Gasket, cover, neoprene: approx 27-3/4 inches.
3	19D402601-P1	Casting. (Used in Model 4EC66A10).
4	19D402601-P2	Casting. (Used in Model 4EC66A11).
		
- EXTENDED LOCAL CONTROL UNIT-4EC66A10.11		

SYMBOL	G-E PART NO	DESCRIPTION
MECHANICAL PARTS (Cont'd)		
5	19B205162-P1	Diaphragm: approx 2-3/8 inches dia.
6	19A121990-P1	Spacer: 3/4 inch hex. (Used with TB701).
7	4031457-P1	Support. (Used with microphone).
8	4031458-P1	Spring. (Used with microphone).
9	19A122066-P1	Bushing: 1/4-18; sim to Pyle-National DB-44516 (modified).
10	5490135-P4	Boot: 15/32-32; sim to APM-Hexseal N-1030-B. (Used with S702 in Model 4EC66A11).
11	19A115040-P9	Lens, panel light: red lens; sim to Dialight 81-331. (Used with DS701).
12	PL-4039182-G1	Knob. (Used with R701, 702).
13	NP248843	Nameplate. (Used in Model 4EC66A11).
14	NP248844	Nameplate. (Used in Model 4EC66A10).
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G1		
----- CAPACITORS -----		
C901	7489162-P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C902	5494481-P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
----- FUSES -----		
F901	7102673-P2	Quick blowing: 15 amps at 32 v; sim to Littelfuse 311015 or Bussmann AGC-15.
----- JACKS AND RECEPTACLES -----		
J901	7473192-P31	Connector, phen: 8 terminals; sim to HB Jones 261-31-08-000.
J902	2R22-P3	Receptacle, panel, coaxial. Signal Corps SO-239 or sim to Amphenol 83-1R.
J903	19B200010-P2	Receptacle: 23 contacts; sim to Cannon Electric NK-L23-32S.
----- RELAYS -----		
K901	19C307010-P5	Armature: 12 VDC nominal, 130 ohms ±10% coil res, 4 form C contacts; sim to Allied Control T154-X-413.
----- PLUGS -----		
P901 and P902	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P905	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P906 thru P908	4029840-P1	Contact, electrical: sim to AMP 41854.
P909	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P910	4029840-P1	Contact, electrical: sim to AMP 41854.
P912 thru P914	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P916 thru P918	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P920	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P922 and P923	4029840-P2	Contact, electrical: sim to AMP 42827-2.
P924 and P925	7147199-P2	Connector: female contact; sim to Winchester Electronics 21804.
P926	4029840-P2	Contact, electrical: sim to AMP 42827-2.
----- TRANSISTORS -----		
Q901	19A115527-P1	Silicon, NPN.

SYMBOL	G-E PART NO	DESCRIPTION
----- RESISTORS -----		
R901	19B209022-P115	Wirewound: 1 ohm ±10%, 2 w; sim to IRC Type BWH.
R902	3R77-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
----- TRANSFORMERS -----		
T901	19B209079-P1	Audio frequency: 0.3-3 KC freq range, Pri: 55 ohms ±10% imp, 0.895 ohm ±10% DC res, Sec: 3.2 ohms imp, 0.168 ohm DC res.
----- TERMINAL BOARDS -----		
TB1	7775500-P8	Phen: 4 terminals.
TB2	7775500-P11	Phen: 5 terminals.
TB3	7775500-P7	Phen: 3 terminals.
----- CABLES -----		
CABLE ASSEMBLY PL-19A121176-G1		
----- PLUGS -----		
P911	5496078-P1	Push-on, coaxial: Teflon®; sim to FXR 27-1.
----- MISCELLANEOUS -----		
	19B209044-P11	Cable, RF: approx 6 inches; sim to Amphenol 21-598.
CABLE ASSEMBLY PL-19A121176-G2		
----- PLUGS -----		
P927	5496078-P3	Receptacle, push-on, coaxial: Teflon®; sim to FXR 27-3.
----- MISCELLANEOUS -----		
	19B209044-P13	Cable, RF; approx 4 inches; sim to Amphenol 421-105.
----- SOCKETS -----		
XF901	19B209265-P3	Fuseholder: 15 amps at 250 v; sim to Littelfuse 342006.
XK901	5491595-P5	Relay: 16 contacts; sim to Allied Control 30054-2.
MECHANICAL PARTS		
	PL-19B205129-G1	Cover. (Mounts J902, 903).
	19B205127-P1	Support: approx 5-1/4 x 1 inches. (Mounts locking latch).
	4029994-P1	Catch, pull-down. (Mates with catch on power supply to keep unit intact).
	4037158-P7	Channel, rubber: approx 1-3/8 inches; sim to Atlantic India Rubber X661. (Located above J901).
	4032574-P2	Gasket, cover, neoprene: approx 27-3/4 inches.
	PL-19A121981-G1	Chassis. (Mounts T901, TB2, 3).
	7763541-P5	Clip, cable. (Located between F901 and J903).
	19A121178-P1	Support. (Used with J901).
	5491595-P9	Clip, relay; sim to Allied Control 30040-2. (Used with K901).
	7763541-P3	Clip, cable. (Located by XK901).
	PL-19B204532-G1	Chassis.
	19A122071-P1	Grommet: approx 1-1/4 inches. (Located by K901).
----- ASSOCIATED ASSEMBLIES -----		
	PL-19A122010-G1	Control Mounting Kit.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



- NOTES:
1. S703 USED ONLY IN MODELS 4EC66A12, 13.
 2. S702 USED ONLY IN MODELS 4EC66A11, 13.
 3. J701 USED ONLY IN MODELS 4EC66A14-17.

SERVICE SHEET

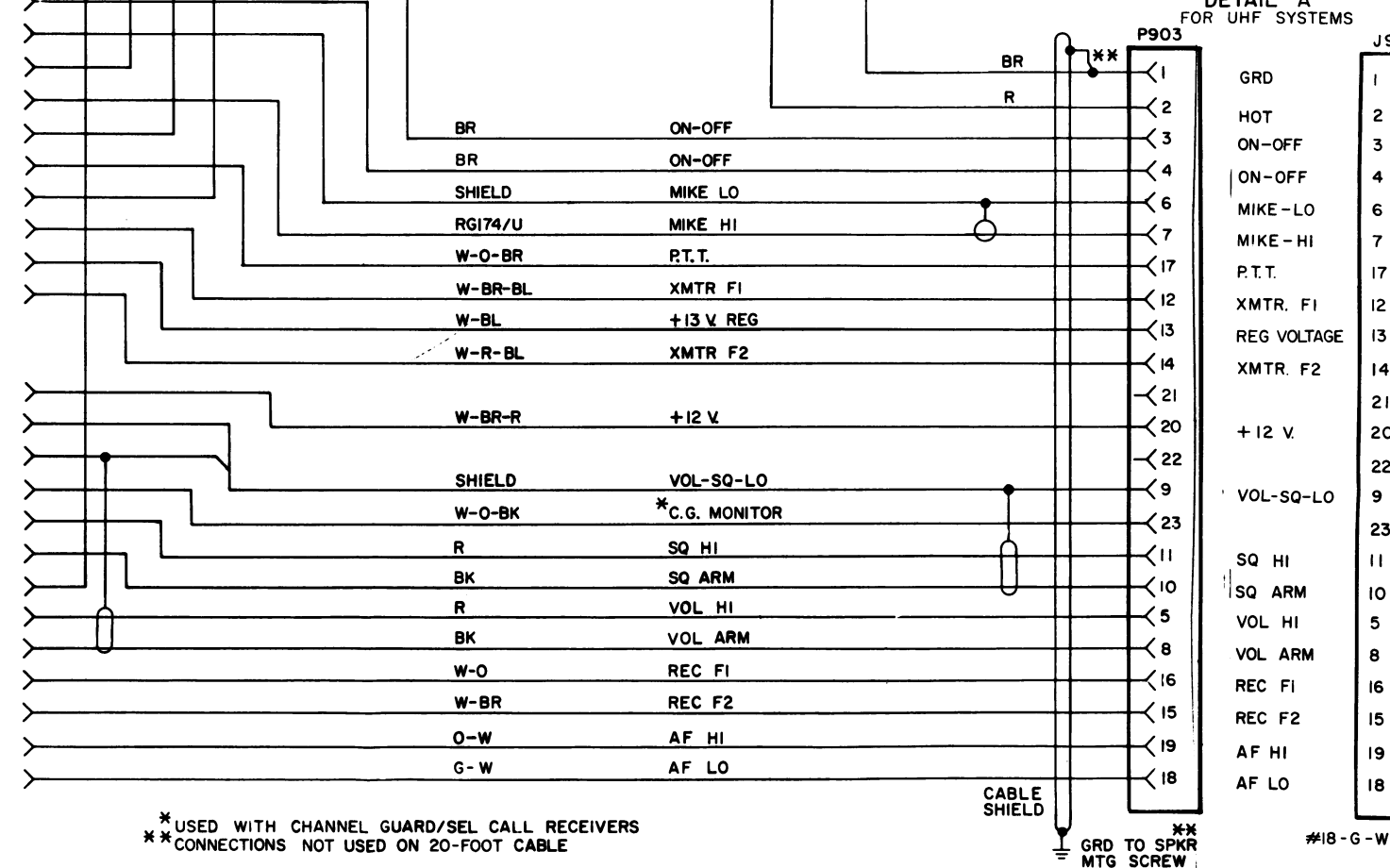
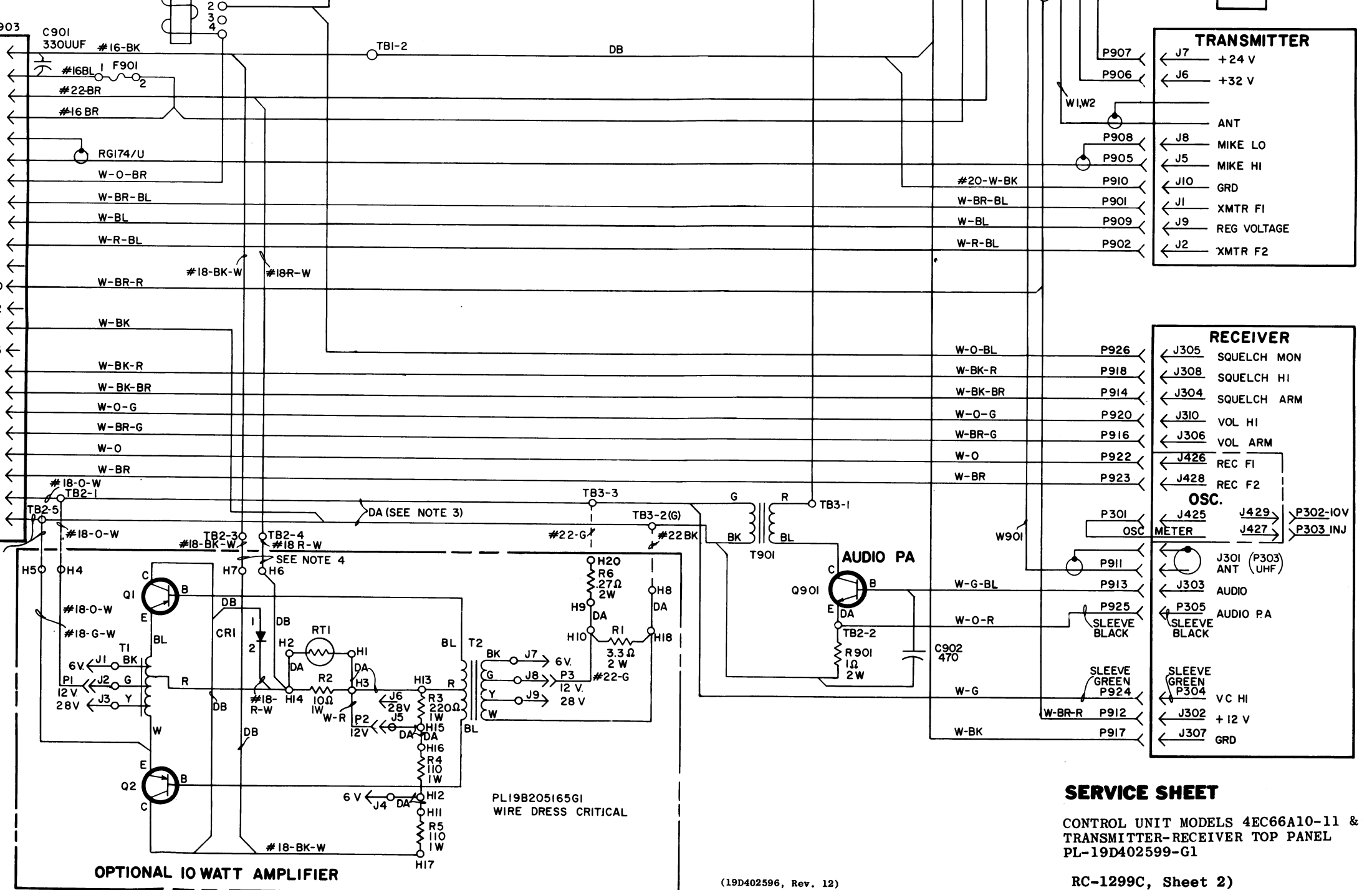
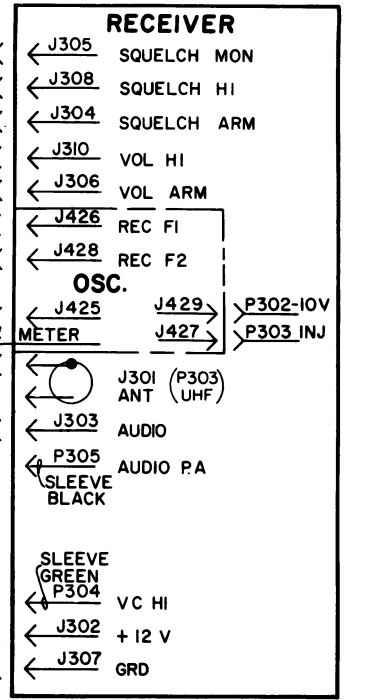
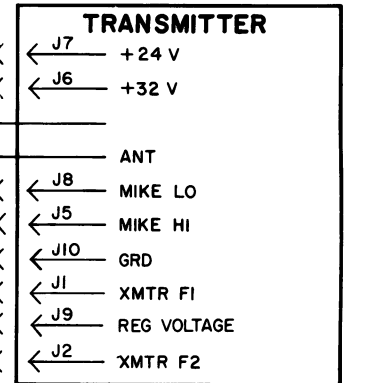
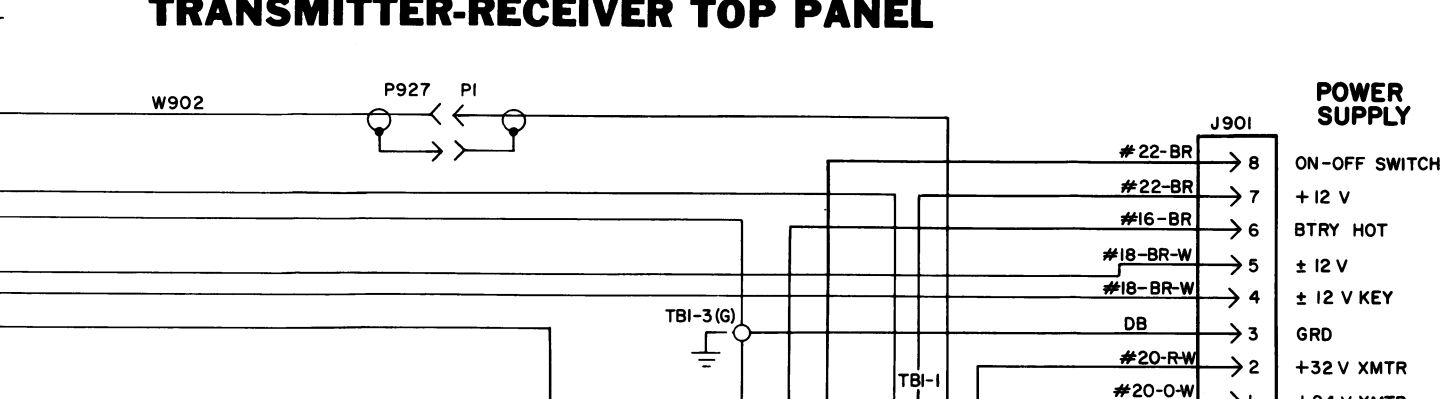
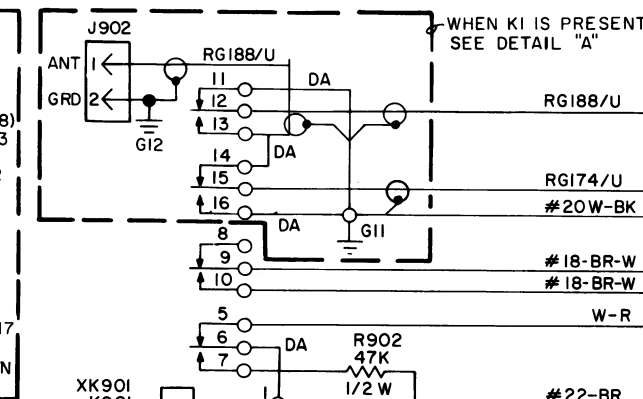
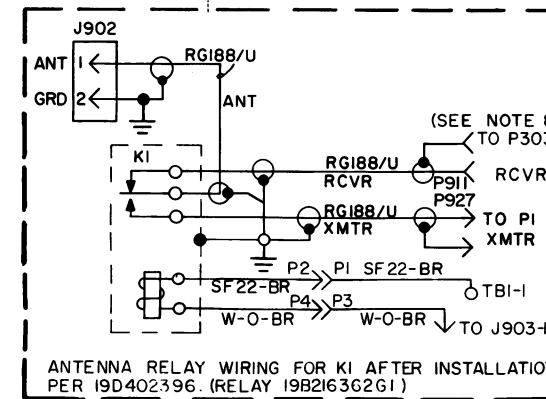
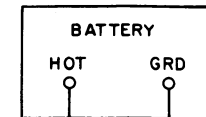
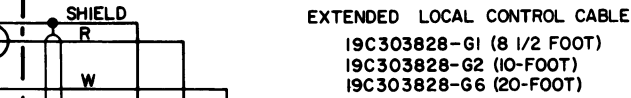
CONTROL UNIT MODELS 4EC66A10, 11 &
TRANSMITTER-RECEIVER TOP PANEL
PL-19D402599-G1

(RC-1299B, Sheet 1)

(19D402695, Rev. 6)

CONTROL CABLE

POWER SUPPLY



- NOTES:
1. ALL WIRES ARE SF24 EXCEPT AS NOTED.
2. ALL DASHED LINES ARE OPTION.
3. DELETE WIRES BETWEEN TB2-1 & TB3-3, ALSO BETWEEN TB2-5 & TB3-2. WHEN USING 10 WATT AMPLIFIER.
4. FOR POSITIVE GROUND CHANGE WIRE FROM HG TO TB2-3 & WIRE FROM N7 TO TB2-4
5. FOR 10 WATT AMPLIFIER OPTION WHEN USING 6 OR 20 VOLTS CHANGE P1, P2 & P3 TO APPROPRIATE JACK.
6. FOR SINGLE FREQUENCY UNITS REMOVE JUMPER BETWEEN J1 & J9 ON TRANSMITTER
7. CONNECTION BETWEEN RECEIVER AND OSCILLATOR DO NOT EXIST ON UHF RECEIVERS.
8. P303 - UHF SYSTEMS
9. J301 - HIGH POWER HIGH BAND SYSTEMS
10. FOR HIGH POWER HIGH BAND SYSTEMS J301 CONNECTS TO P311 WITH CABLE 19A12H766G.

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.

(19D402596, Rev. 12)

SERVICE SHEET

CONTROL UNIT MODELS 4EC66A10-11 &
TRANSMITTER-RECEIVER TOP PANEL
PL-19D402599-G1

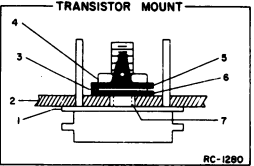
RC-1299C, Sheet 2)

(Cont'd from front of Sheet 1) (LBI-3671)		
SYMBOL	G-E PART NO	DESCRIPTION
	19C311006-P1	25-50 MHz ANTENNA MODEL 4EY22A10-17 Antenna (2 and 3 wheel motorcycle): 4EY22A10, 25-35 MHz; sim to Antenna Specialists ASP-494GE.
	19C311006-P1	Antenna (2 and 3 wheel motorcycle): 4EY22A11, 25-35 MHz; sim to Antenna Specialists ASP-494GE.
	19C311006-P3	Antenna (2 wheel motorcycle): 4EY22A12, 33-36 MHz; sim to Antenna Specialists ASPB-494GE.
	19C311006-P4	Antenna (2 wheel motorcycle): 4EY22A13, 36-42 MHz; sim to Antenna Specialists ASPC-494GE.
	19C311006-P5	Antenna (2 wheel motorcycle): 4EY22A14, 42-50 MHz; sim to Antenna Specialists ASPD-494GE.
	19C311006-P6	Antenna (3 wheel motorcycle): 4EY22A15, 33-39 MHz; sim to Antenna Specialists ASPE-494GE.
	19C311006-P7	Antenna (3 wheel motorcycle): 4EY22A16, 39-45 MHz; sim to Antenna Specialists ASPF-494-GE.
	19C311006-P8	Antenna (3 wheel motorcycle): 4EY22A17, 45-50 MHz; sim to Antenna Specialists ASPG-494GE.
		132-174 MHz HIGH GAIN ANTENNA MODEL 4EY23A10
	19C311007-P1	----- MISCELLANEOUS ----- Antenna, includes 41 inch stainless steel rod, lockwasher, cap, bent tube, base and hardware; sim to Antenna Specialists Model ASP-429-GE.
		MICROPHONE MODEL 4EM25C10
1		Cable clamp. Shure Brothers RP21. (Includes parts 3 and 8).
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP21. (Includes parts 1 and 8).
4		Switch button: red plastic. Shure Brothers RP25.
5		Spring. Shure Brothers RP16. (Includes miscellaneous hardware).
6		Shield. Shure Brothers RP23.
7		Cartridge, magnetic controlled.
8		Case (front): plastic. Shure Brothers RP21. Includes parts 1 and 3.
9		Cable: approx 6 feet.
		POWER CONTROL CABLE 19C303828-G1 (2-wheel)
		----- MISCELLANEOUS -----
	19A115067-P1	Cable, 2 conductor, approx 8-1/2 feet; sim to Belden 31713.
	19B200010-P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CONTROL CABLE 19C303828-G2 (3-wheel)
		----- MISCELLANEOUS -----
	19A115067-P1	Cable, 2 conductor: approx 10 feet; sim to Belden 31713.
	19B200010-P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		NOISE SUPPRESSION KIT 19A122253-G1
		----- MISCELLANEOUS -----
C1	19A115667-P1	Polyester, metal case, mounting tab, 0.1 µf ±10%, 100 VDC; sim to Gen. Products Corp 07-20071.
C2	19A115667-P2	Polyester, metal case, mounting tab, 0.5 µf ±10%, 100 VDC; sim to Gen. Products Corp 07-20070.
		POWER SUPPLY EXTENSION CABLE 19B204289-G1
		----- MISCELLANEOUS -----
	7473192-P19	Receptacle: 8 terminals; sim to HB Jones 261-32-08-030.
	7473192-P26	Plug: 8 terminals; sim to HB Jones 261-31-08-030.
	7162441-P23	Sleeving, electrical: approx 7/16 inch dia.

LBI-3669C

PARTS LIST

10-WATT POWER AMPLIFIER
PL-19B205165-G1
REV A

SYMBOL	G-E PART NO.	DESCRIPTION
CR1	19A115617-P1	----- DIODES AND RECTIFIERS ----- Silicon.
J1 thru J9	4033513-P4	----- JACKS AND RECEPTACLES ----- Contact, electrical: sim to Bead Chain L93.3.
P1 thru P3	4029840-P2	----- PLUGS ----- Contact, electrical: sim to AMP 42827-2.
Q1 and Q2	5490810-P1	----- TRANSISTORS ----- Germanium, PNP.
R1*	19B209022-P27	----- RESISTORS ----- Wirewound, phen: 3.3 ohms ±5%, 2 w; sim to IRC Type BWH.
	19B209022-P137	In Models earlier than Rev A: Wirewound: 8.2 ohms ±10%, 2 w; sim to IRC BWH.
R2	3R78-P100J	Composition: 10 ohms ±5%, 1 w.
R3	3R78-P221J	Composition: 220 ohms ±5%, 1 w.
R4 and R5	3R78-P111J	Composition: 110 ohms ±5%, 1 w.
R6*	19B209022-P1	Wirewound: 0.27 ohms ±5%, 2 w; sim to IRC Type BWH. (Added by REV A).
		----- THERMISTORS -----
RT1	19C300048-P3	Disc: 1 ohm ±10% res at 25°C.
		----- TRANSFORMERS -----
T1	19B209218-P1	Audio freq: 0.3-3 kHz freq range nominal, 0.3 ohm DC res max.
T2	19B209218-P1	Audio freq: 0.3-3 kHz freq range nominal, Pri: 0.17 ohm DC res max. Sec: 5.5 ohms DC res max.
		MECHANICAL PARTS
		(SEE RC-1280)
1	4031291-P1	Insulator, disc.
2	PL-19B205142-G1	Chassis.
3	4034225-P1	Flat washer: approx 1/2 inch dia. (For 10-32 screw).
4	4032596-P1	Nut: 10-32.
5	4036835-P1	Terminal, solder: sim to Shakeproof 2118-10-01- 2520N.
6	19A115221-P3	Washer, mica: approx 9/16 inch dia.
7	4034215-P1	Bushing.
		

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 pre-
vious revisions. Refer to the Parts List for descriptions of parts af-
fected by these revisions.

REV. A - POWER AMPLIFIER 19B205161-G1

To improve audio response. Changed R1 and added R6 on 10-Watt
Audio Amplifier.

REV. A - TOP PANEL 19D402599-G1

To incorporate an improved relay. Changed K901.

REV. A - CONTROL UNITS 4EC66A10 & 11

To eliminate noise in receiver when used in positive ground
systems. Deleted jumper between TB701-14 & TB701-17 and
jumper between TB701-1 & TB701-17.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

STEP 1-QUICK CHECKS

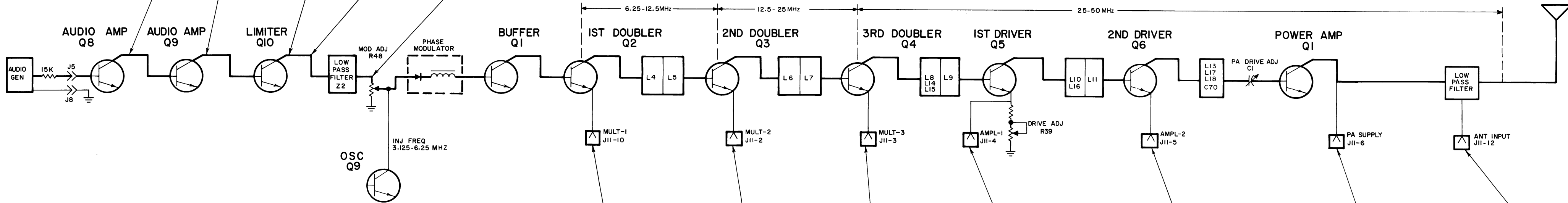
SYMPTOM	PROCEDURE
	Before making any other checks, measure for approximately 24 VDC on heat sink of Q6. Then check for 35 volts with rechargeable battery supply & 24 volts with dry battery supply on collector of Q1 in PA Assembly. Also check for orange glow on RT7.
A. NO MULT. 1 READING, BULB RT1 AT FULL BRIGHTNESS	Check for short on 13.5-volt line. Check for defective regulator transistor Q11.
B. NO MULT. 1 READING, BULB RT1 OUT	Check bulb RT1 & Zener diode CR6.
C. NO MULT. 1 READING, BULB RT1 NORMAL	Check for 13.5 volts on J1 or J2. Check tuning of L1/L2/L3.
NO MODULATION	Check setting of Mod. Adj. R48 (Refer to Transmitter Alignment Procedure). Check mike & mike cable. Check voltages on Q8, Q9 & Q10.
LOW OR NO POWER OUTPUT	Check metering jack readings on all stages. Check relay RF contacts. Check Transmitter alignment.

STEP 2-CHECK AUDIO STAGES

EQUIPMENT REQUIRED

- HIGH IMPEDANCE AC-DC-VTVM
- AUDIO GENERATOR
- 15,000 Ω RESISTOR (SHOWN BELOW)

V-DC	V-DC	V-DC	AC-VTVM	AC-VTVM
WITH THE TRANS-MITTER KEYED, READING AT COLLECTOR OF Q8 SHOULD BE APPROX 0.45 VDC	WITH THE TRANS-MITTER KEYED, READING AT COLLECTOR OF Q9 SHOULD BE APPROX 0.5 VDC	WITH THE TRANS-MITTER KEYED, READING AT COLLECTOR OF Q10 SHOULD BE 5.0 VDC	ADJUST AUDIO GENERATOR FOR AN OUTPUT OF 400 MILLIVOLTS AT 1 KHz	
			WITH THE TRANS-MITTER KEYED, READING AT COLLECTOR OF Q10 SHOULD BE APPROX. 4 VAC	WITH THE TRANS-MITTER KEYED, READING AT MOD. ADJUST. (R48) SHOULD BE APPROX. 2.1 VAC



STEP 3-CHECK TYPICAL VOLTAGES

EQUIPMENT REQUIRED

- 20,000 OHM-PER-VOLT DC METER

V-DC	V-DC	V-DC	V-DC	V-DC	V-DC	V-DC
WITH TRANSMITTER KEYED, READING AT J11-10 (MULT-1) SHOULD BE APPROX 1.0 VDC MIN.	WITH TRANSMITTER KEYED, READING AT J11-2 (MULT-2) SHOULD BE APPROX 1.5 VDC MIN.	WITH TRANSMITTER KEYED, READING AT J11-3 (MULT-3) SHOULD BE APPROX 2.0 VDC MIN.	SET R39 FULLY COUNTERCLOCKWISE. WITH TRANSMITTER KEYED, READING AT J11-4 (AMPL-4) SHOULD BE APPROX 1.5 VDC MIN.	WITH TRANSMITTER KEYED, READING AT J11-5 (AMPL-2) SHOULD BE APPROX 1.0 VDC MIN. (25-42 MHz) 0.5 VDC MIN. (42-50 MHz)	WITH TRANSMITTER KEYED, READING AT J11-6 (PA SUPPLY) SHOULD BE APPROX 0.35 VDC	WITH TRANSMITTER KEYED, READING AT J11-12 (VARACTOR) SHOULD BE APPROX 5.0 VDC

TROUBLESHOOTING PROCEDURE

25 - 50 MHz TRANSMITTER

TYPE ET-61-A

(RC-1142D)

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. Make resistance reading of 12-volt supply. Reading from J302 to ground (with power supply lead disconnected) should be 5.5 K ohms with negative meter probe to ground, or 4 K ohms with positive meter lead to ground.
NO REGULATED 10 VOLTS	Check the 12-volt supply. Then check regulator Q315 and regulator circuit. Resistance reading of 10-volt supply from the emitter of Q315 to ground should be 2 K ohms.
LOW 2ND LIM READING	Check supply voltages and then check oscillator reading at J312-4 as shown in STEP 2A. Make SIMPLIFIED VTVM GAIN CHECKS from 2nd Mixer through 2nd Limiter stages as shown in STEP 2A.
LOW OSCILLATOR READING	Check alignment of Oscillator (Refer to Front End Alignment Procedure). Check voltage and resistance reading of Oscillator Q425. Check crystal Y425.
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 2A).
LOW AUDIO	Check Audio PA (Q701) output current at J312-9. If reading is low-- a. Check BIAS ADJ for 0.25 VDC at J312-9 (STEP 2A). b. Check Q701. Make SIMPLIFIED GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch stages. Check unsquelched voltage readings in Audio section (Refer to Receiver Service Sheet). Check voltage and resistance readings on Channel Guard receiver.
IMPROPER SQUELCH OPERATION	Make GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch stages. Check voltage and resistance readings of Squelch circuit (Refer to Receiver Service Sheet).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	See if discriminator zero is in the center of IF bandpass.

STEP 3- GAIN-PER-STAGE READINGS-

EQUIPMENT REQUIRED:

- RF VOLTMETER (SIMILAR TO BOONTON MODEL 91-CA OR MILLIVAC TYPE MV-18 C).
- SIGNAL ON RECEIVER FREQUENCY (BELOW SATURATION). CORRECT FREQUENCY CAN BE DETERMINED BY ZEROING THE DISCRIMINATOR.

PROCEDURE

- APPLY PROBE TO INPUT OF STAGE (FOR EXAMPLE, BASE OF RF AMP). PEAK RESONANT CIRCUIT OF STAGE BEING MEASURED AND TAKE VOLTAGE READING (E₁).
- MOVE PROBE TO INPUT OF FOLLOWING STAGE (1ST MIXER). REPEAT FIRST RESONANT CIRCUIT THEN PEAK CIRCUIT BEING MEASURED AND TAKE READING (E₂).
- CONVERT READINGS (BY SUBTRACTING E₁ FROM E₂ ON THE DB SCALE OF RF VOLTMETER, OR) BY MEANS OF THE FOLLOWING FORMULA:
$$\text{AMP FACTOR} = \frac{E_2}{E_1}$$

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

- CHECK RESULTS WITH TYPICAL GAINS SHOWN ON DIAGRAM.

- USE PROCEDURE LISTED ABOVE TO FIND GAIN OF EACH STAGE.

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

STEP 2A- SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

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

PRELIMINARY STEPS:

- SET VOLUME CONTROL FULLY CLOCKWISE.
- SET SQUELCH CONTROL FULLY COUNTERCLOCKWISE.
- RECEIVER SHOULD BE PROPERLY ALIGNED.

STEP 2B-AUDIO & SQUELCH WAVEFORMS

EQUIPMENT REQUIRED:

- OSCILLOSCOPE
- SIGNAL GENERATOR (MEASUREMENTS M560 OR EQUIVALENT).

SCOPE SETTING	HORIZONTAL	0.5 MS/DIV (APPROX 200 Hz)	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	2 MS/DIV (500 Hz)	0.5 MS/DIV		0.5 MS/DIV	0.5 MS/DIV		0.5 MS/DIV	0.5 MS/DIV
	VERTICAL	1 VOLT/DIV	100 MILLIVOLTS/DIV	1 VOLT/DIV	100 MILLIVOLTS/DIV	1 VOLT/DIV	100 MILLIVOLTS/DIV		1 VOLT/DIV	1 VOLT/DIV		10 VOLTS/DIV	1 VOLT/DIV
PEAK-TO-PEAK VOLTAGE		1.6 V P-P	0.3 V P-P	2.1 V P-P	0.4 V P-P	2.5 V P-P	0.24 V P-P		3.1 V P-P	1.8 V P-P		26 V P-P	5 V P-P
NOISE WAVE FORM													
STANDARD SIGNAL (1 MILLIVOLT AT RECEIVER FREQ MODULATED BY 1 KHz WITH 3.3 KHz DEVIATION)													

TROUBLESHOOTING PROCEDURE

25 - 50 MHz RECEIVER
TYPE ER-43-A

(RC-1143C)

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. Make resistance reading of 12-volt supply. Reading from J302 to ground (with Power Supply lead disconnected) should be 5.5 K ohms with negative meter probe to ground, or 4 K ohms with positive meter lead to ground.
NO REGULATED 10 VOLTS	Check the 12-volt supply. Then check regulator Q315 and regulator circuit. Resistance reading of 10-volt supply from the emitter of Q315 to ground should be 2 K ohms.
LOW 2ND LIM READING	Check supply voltages and then check oscillator reading at J312-4 as shown in STEP 2A. Make SIMPLIFIED VTVM GAIN CHECKS from 2nd Mixer through 2nd Limiter stages as shown in STEP 2A.
LOW OSCILLATOR READING	Check alignment of Oscillator (Refer to Front End Alignment Procedure). Check voltage and resistance reading of Oscillator Q425. Check crystal Y425.
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 2A).
LOW AUDIO	Check Audio PA (Q901) output current. If reading is low-- a. Check BIAS ADJ for 0.25 VDC at J312-9 (STEP 2A). b. Check Q901. Make SIMPLIFIED GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch stages. Check unsquelched voltage readings in Audio section (Refer to Receiver Service Sheet).
IMPROPER SQUELCH OPERATION	Make GAIN and WAVEFORM CHECKS (STEPS 2A and 2B) of Audio and Squelch stages. Check voltage and resistance readings of Squelch circuit (Refer to Receiver Service Sheet).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	See if discriminator zero is in the center of IF bandpass.

STEP 3- GAIN-PER-STAGE READINGS-

EQUIPMENT REQUIRED:

1. RF VOLT METER (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.

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). REPEAT FIRST RESONANT CIRCUIT THEN PEAK CIRCUIT BEING MEASURED AND TAKE READING (E_2).
3. CONVERT READINGS (BY SUBTRACTING E_1 FROM E_2 ON THE DB SCALE OF RF VOLT METER, OR) BY MEANS OF THE FOLLOWING FORMULA.

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

4. CHECK RESULTS WITH TYPICAL GAINS SHOWN ON DIAGRAM.

5. USE PROCEDURE LISTED ABOVE TO FIND GAIN OF EACH STAGE.

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

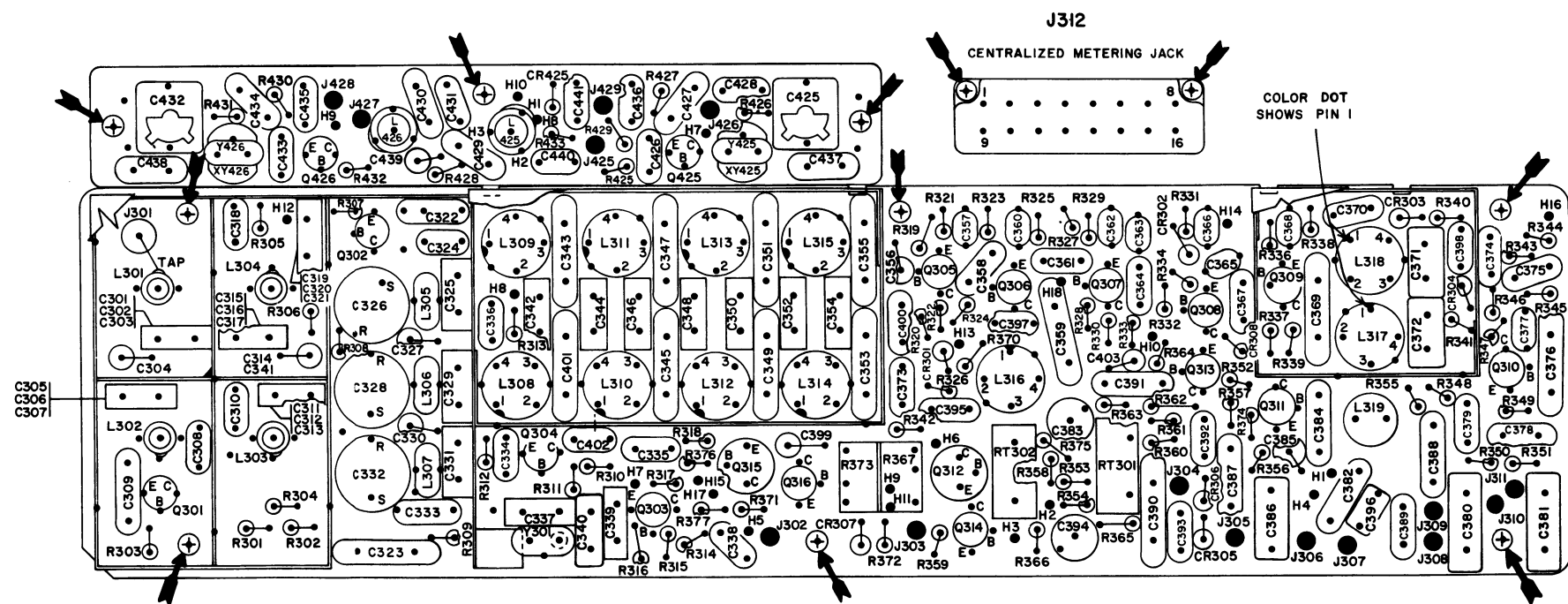
STEP 2A- SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

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

PRELIMINARY STEPS:

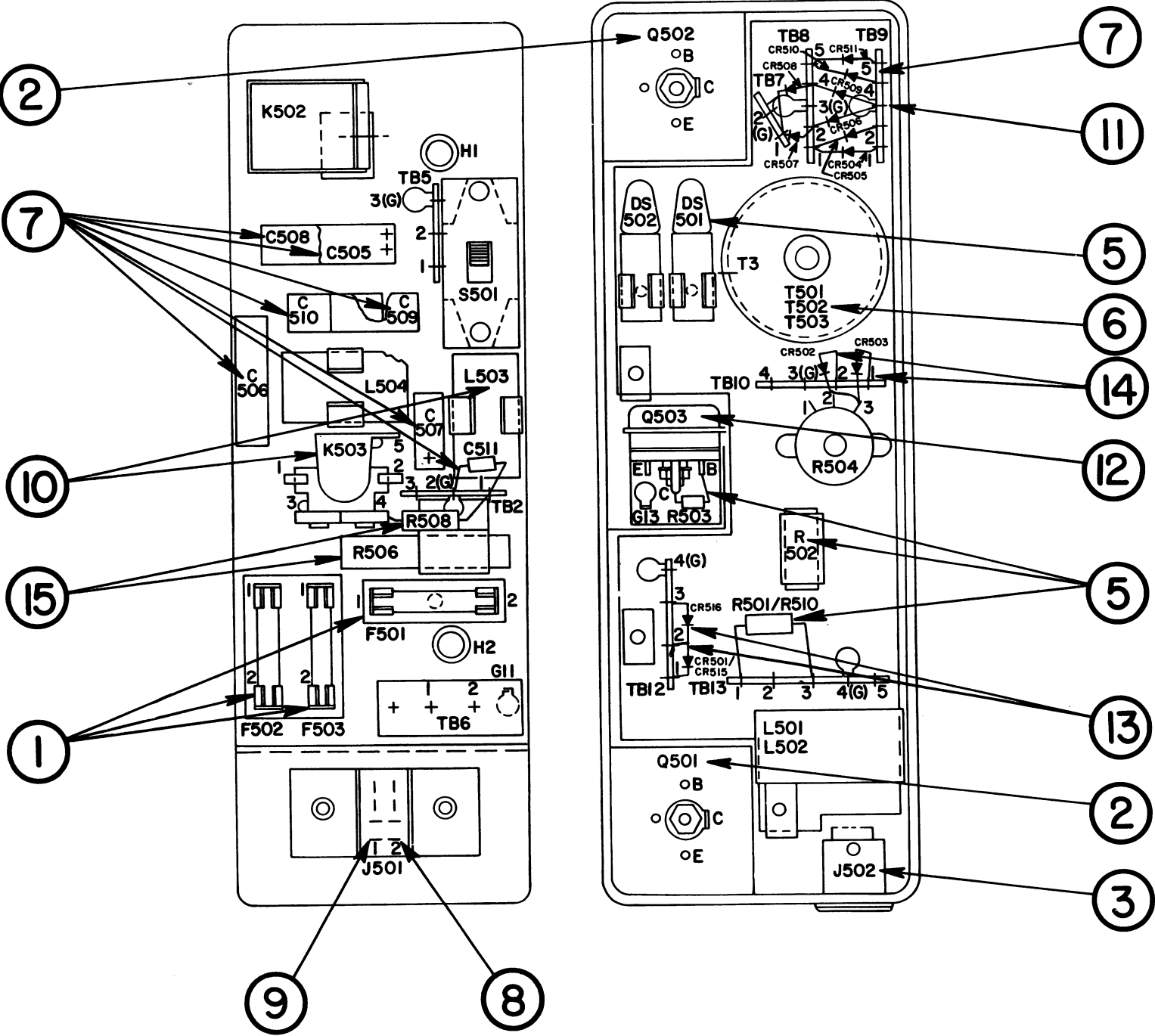
1. SET VOLUME CONTROL FULLY CLOCKWISE.
2. SET SQUELCH CONTROL FULLY COUNTERCLOCKWISE.
3. RECEIVER SHOULD BE PROPERLY ALIGNED.



QUICK CHECKS

MULTIVIBRATOR CIRCUIT	
SYMPTOM	CHECK THE FOLLOWING: (Circled number refers to component location on diagram)
Power Supply does not start	All fuses ①
	Q501 and Q502 for collector-to-emitter short ②
	Input voltage to power supply, J502-1-2 (J502-1-3 on 4EP48A10) ③
	Transistor collector-to-emitter voltage. Readings should be approximately equal to supply voltage ②
	R501/R510, R502, R503, and DS501 for opens or shorts ⑤
	Continuity of transformer primary and secondaries. (See Power Supply Service Sheet) ⑥
	Transformer for shorted turns or shorts between windings (disconnect loads from secondary windings before checking) ⑥
	Turn unit ON, if unit does not start, transformer is probably defective ⑥
	If unit starts, check the following:
	Excessive load in secondary
Output voltages below normal with input supply voltage normal	Shorts or opens in diodes and capacitors in transformer secondary ⑦
	Normal high B+ load: (ET-61-A, ET-62-A and ET-88-A) 4EP47A10-11 - 32 volts @ 1 amp at J501-2 ⑧ 4EP48A10 - 32 volts @ 800 mA at J501-2 ⑧
	Normal low B+ load: (ET-61-A, ET-62-A and ET-88-A) 4EP47A10-11 - 24 volts @ 0.5 amp at J501-1 ⑨ 4EP48A10 - 24 volts @ 330 mA at J501-1 ⑨
	Normal B+ load (ET-77-A and ET-78-A) 4EP47A10-11 & 4EP48A10 24 volts @ 360 mA at J501-1 ⑨
	Continuity of K503 winding and L503 ⑩
High voltage (32 v) much lower than normal, and low voltage (24 v) negative with respect to ground	TB9-3 for open ground to diode bridge and other wires connected to ground at TB9-3 ⑪
Output voltages below normal	DS501/R503 for open circuit ⑤
	Q503 for open collector-emitter circuit ⑫
	CR501/CR515 and CR516 for shorts ⑬
	CR502 and CR503 for open ⑭
Output voltages above normal	DS501/R503 for shorts ⑤
	Q503 for collector-emitter short ⑫
	CR501/CR515 and CR516 for open ⑬
	CR502 and CR503 for open and short ⑭
	R506 and R508 for open and short ⑮

NOTE -- 4EP47A10 and 4EP48A10
If K502 chatters when transmitter is keyed, check for a short to ground in one of the B+ circuits.

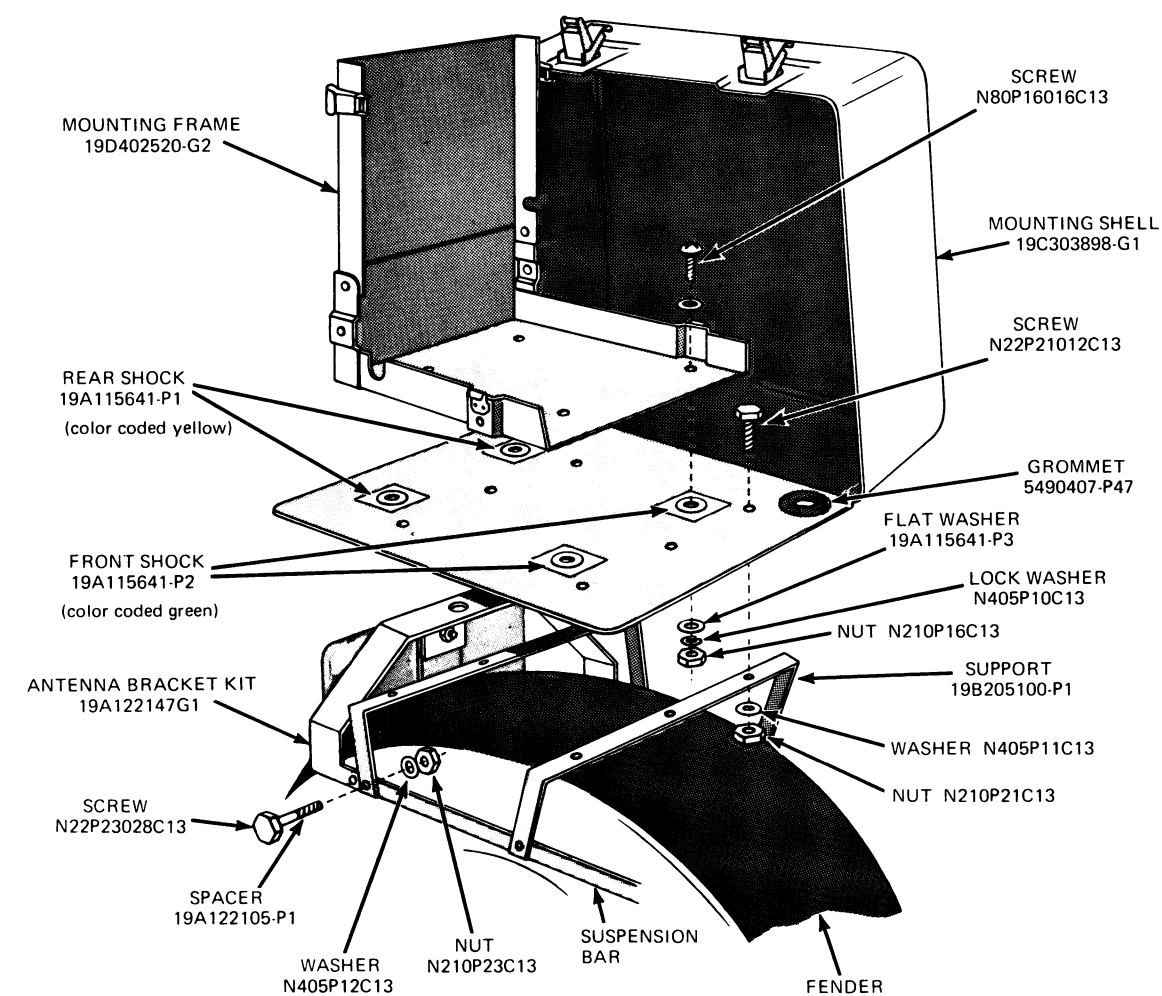


TROUBLESHOOTING PROCEDURE

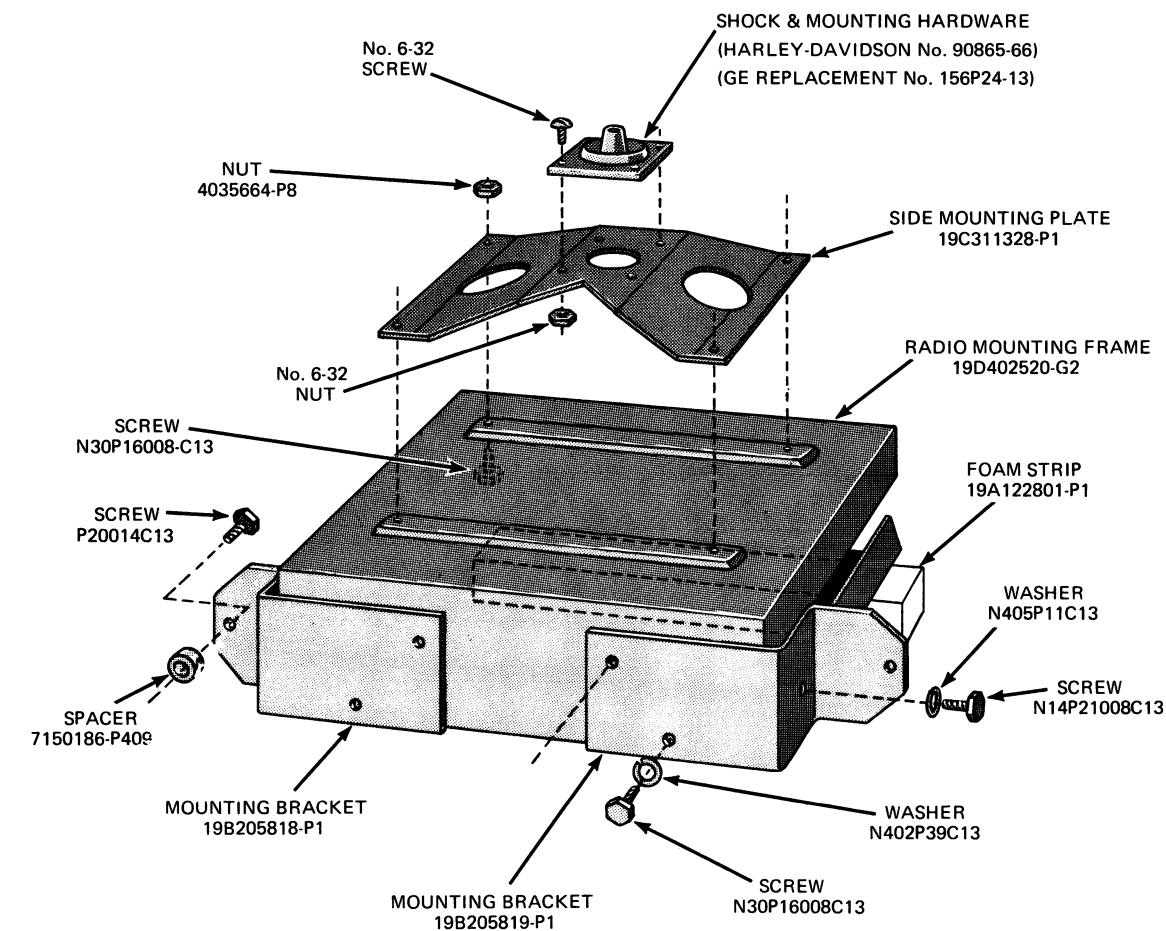
POWER SUPPLY
MODELS 4EP47A10, 11 & 4EP48A10

(RC-1237B)

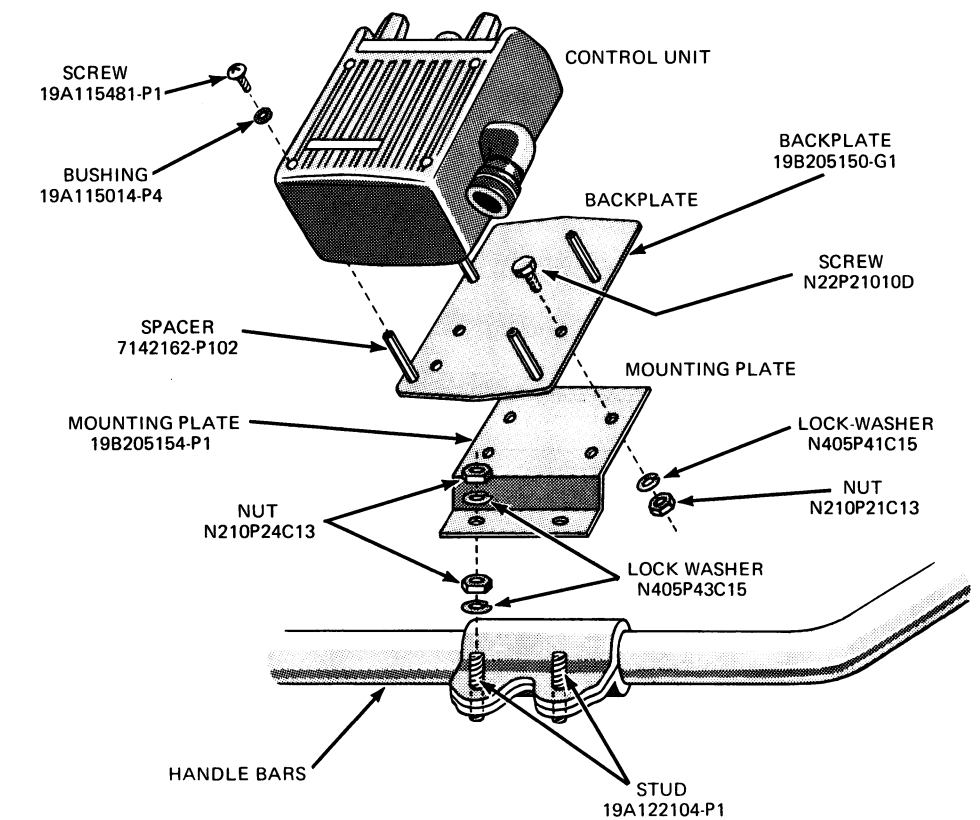
FENDER MOUNTING HARDWARE



SADDLE BAG MOUNTING HARDWARE



CONTROL UNIT MOUNTING HARDWARE



MOUNTING HARDWARE BREAKDOWN

RC-2006A