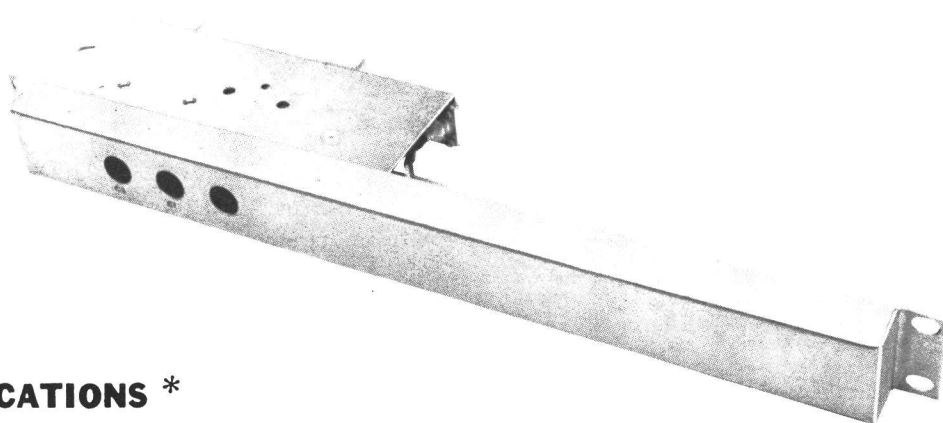


# MASTR

**PROGRESS LINE  
ANTENNA MATCHING UNIT  
MODELS 4KY13A10-A12, B11, C11**



## SPECIFICATIONS \*

Dimensions (HXWxD) 1-3/4 inches x 19 inches x 4-3/8 inches

Isolation Sufficient to prevent interaction when receiver antenna transformers are used.

Input Power 9 to 11 VDC at 30 mA

Ambient Temperature Range -30°C to +60°C (-22°F to +140°F)

	Model <u>4KY13A10</u>	Model <u>4KY13A11</u>	Model <u>4KY13A12</u>
Frequency Range	25-33 MHz	33-42 MHz	42-50 MHz
1 dB Bandwidth	500 KHz	500 KHz	500 KHz
	Model <u>4KY13B11</u>	Model <u>4KY13C11</u>	
	150.8-174 MHz	450-470 MHz	
	600 KHz	5 MHz	

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

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### WARNING

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

## DESCRIPTION

The General Electric Antenna Matching Units are designed to provide the gain necessary to match two or more (up to a total of four) receivers to a single antenna. The Antenna Matching Units may be operated with any receiver having an input impedance of approximately 50 ohms. The Antenna Matching Unit chassis is designed for standard rack mounting. The frequency range and other operating characteristics of the five models are listed in the following chart.

## CIRCUIT ANALYSIS

The RF filter in the 25-50 MHz matching units consists of two tuned circuits with two air variable capacitors (C1 and C2) for adjustment. The 150.8-174 MHz RF filter consists of three helical resonators with three variable capacitors (C1 and C2) for adjustment. Two helical resonators and two variable capacitors (C1 and C2) make up the UHF unit.

The amplifiers provided with the high band and low band matching units provide a gain of 0-5 dB. Amplifiers provided with the UHF band have a gain of 1.5 to 3.0 dB. RF energy from the antenna is coupled from a tap on the final filter coil to the base of transistor Q1 through capacitor C4. The output of the transistor amplifier is applied through capacitor C6 to the output connector P1 and to the input jack J1 on the first power divider. The two outputs of the first power divider are coupled to the input jacks of two other power dividers which, in turn, feed up to four receivers. Each power divider has a 3 1/2 dB loss and 20 dB isolation (15 dB in the 450-470 MHz unit) between output ports. The characteristic impedance of all four receiver output ports on the power dividers is 50 ohms to match the input impedance of the receivers.

Power requirements for the amplifier is 9 to 11 VDC at 30 mA. Two power leads are

provided with spade terminals for connecting to the EP-38-A or EP-39-A MASTR combination power supplies.

## ADJUSTMENT PROCEDURE

### Test Equipment Required

- Measurements 560 Signal Generator or equivalent.
- Boonton 91CA RF voltmeter (or equivalent) with 50 ohm load connector.
- Three RF 50 ohm loads. These can be assembled with a composition 51 ohms, 1/4 watt resistor soldered inside a phono connector. The resistor leads should be of short length.

### Procedure

1. Set the signal generator to the lowest frequency of the split or band to be adjusted and connect the generator to J1 of the Antenna Matching Unit.
2. Connect the RF voltmeter (with the 50 ohms load connector) to one of the power divider output jacks.
3. Connect a 50 ohm RF load to each of the unused power divider output jacks.
4. Set the signal generator to full output.
5. Tune the front-end tuned circuits (C1 and C2 in Models 4KY13A10-12 and C11, C1-C3 in Model 4KY13B11) for a maximum reading on the RF voltmeter.
6. Set the signal generator to the highest frequency of the split or band to be adjusted and adjust the tuned circuits for a maximum reading on the RF voltmeter.
7. Return the signal generator to the low frequency and repeat the adjustments

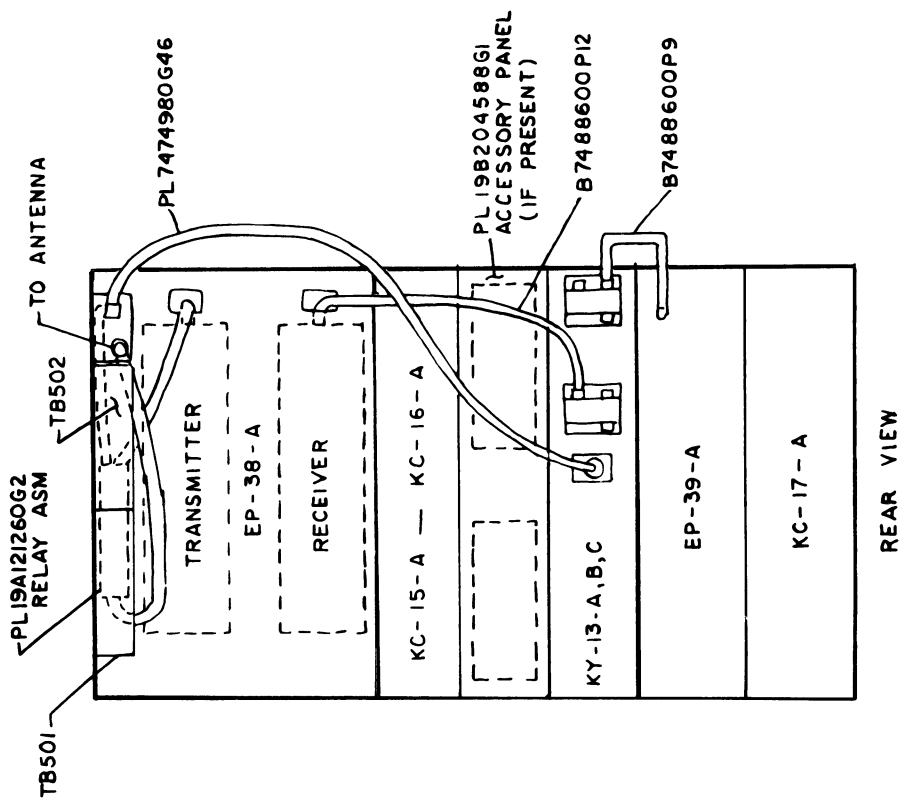
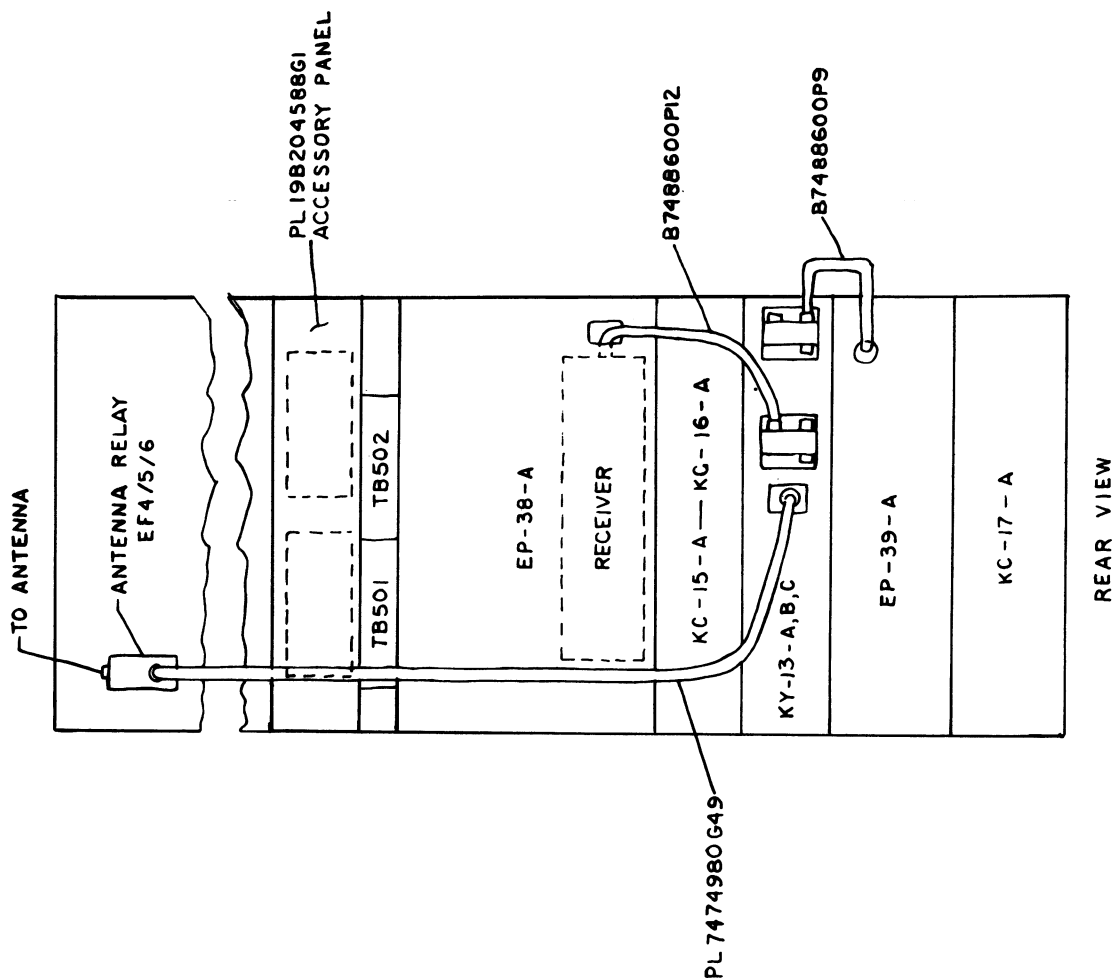
Model	4KY13A10	4KY13A11	4KY13A12	4KY13B11	4KY13C11
Frequency Range in Megahertz	25-33	33-42	42-50	150.8-174	450-470
1 dB Bandwidth	500 kHz	500 kHz	500 kHz	600 kHz	5 MHz
Amplifiers	A3	A4	A5	A2	A1
Power Dividers	Z1-Z2-Z3	Z1-Z2-Z3	Z1-Z2-Z3	Z1-Z2-Z3	Z4-Z5-Z6

until both frequencies peak at approximately the same level as read on the RF voltmeter.

8. If on Model No. 4KY13A10, 11 & 12 stagger tuning is necessary to meet the bandwidth and gain specification, do the following: Retune each capacitor for 1/2 dB less output from the multicoupler. One adjustment has to be increased and the other decreased in capacitance value.

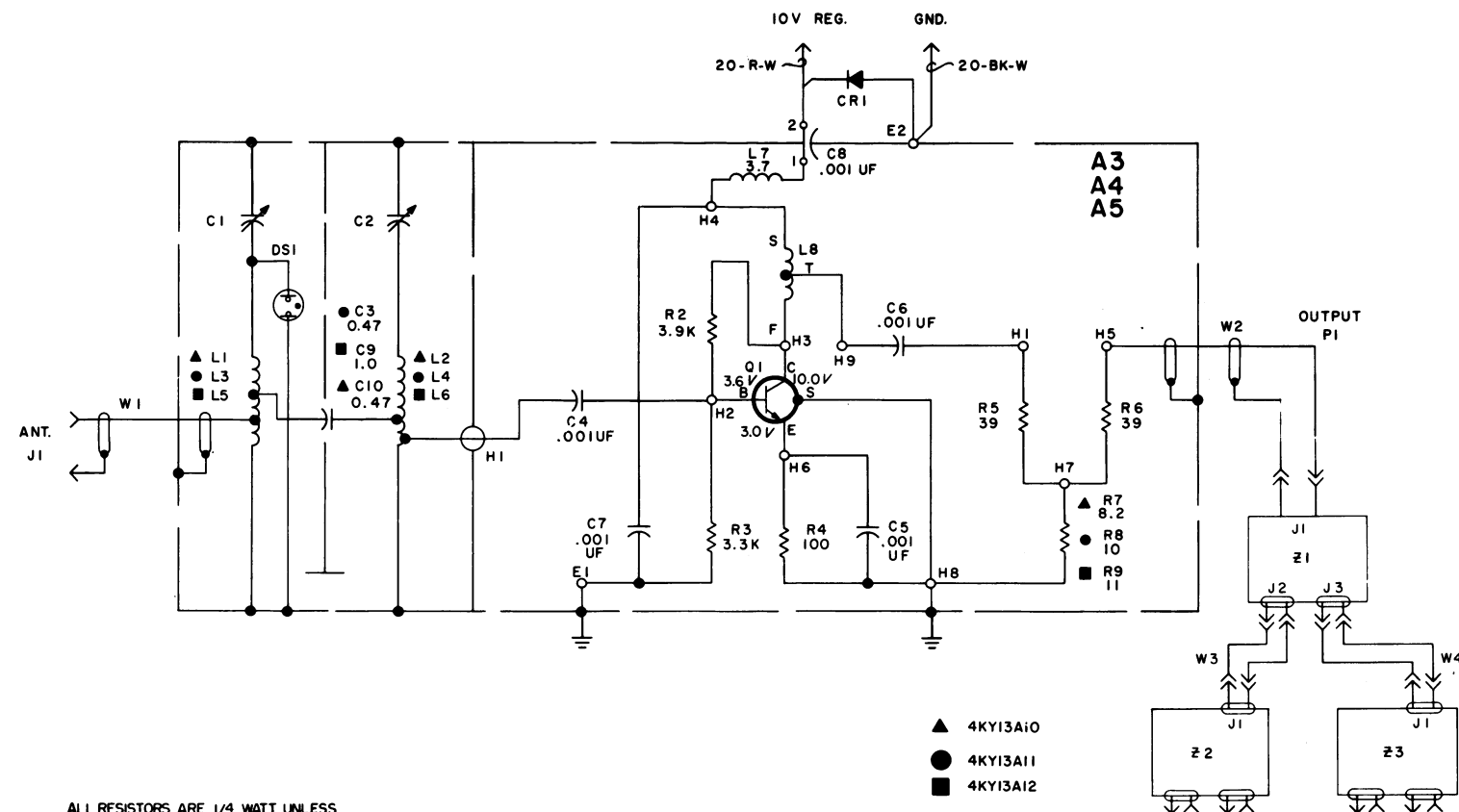
## TEST PROCEDURE

1. Connect the RF voltmeter to the generator output and set the generator output level to 10 millivolts AC.
2. Connect the generator to J1 on the Antenna Matching Unit and connect the RF voltmeter to one of the power divider outputs.
3. The output should read 10 to 18 millivolts AC for low band and high band, and 8.4 to 18 millivolts AC for UHF.



(19D402651, Rev. 4)

RC-2072

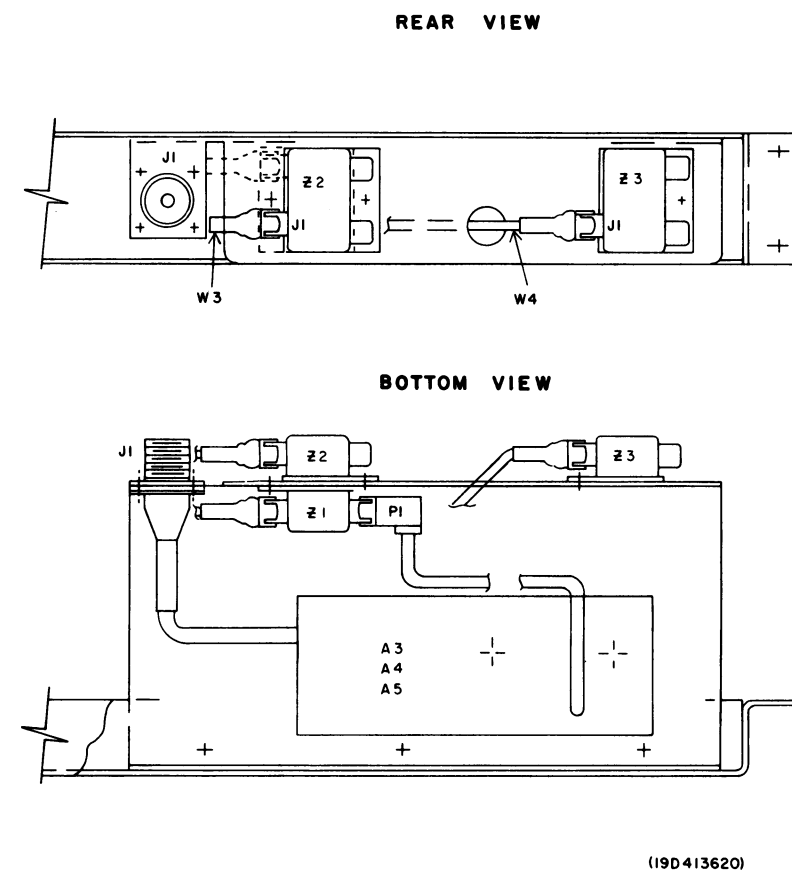


ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

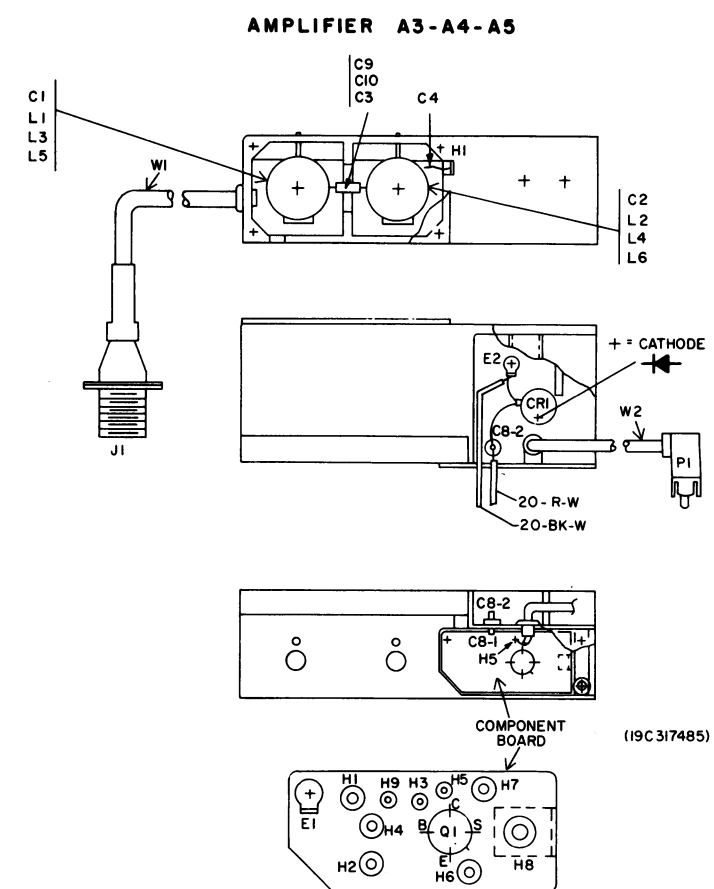
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

▲ 4KY13A10  
● 4KY13A11  
■ 4KY13A12

(19C317490, Rev. 2)



(19D413980, Rev. 0)



## SCHEMATIC & OUTLINE DIAGRAM

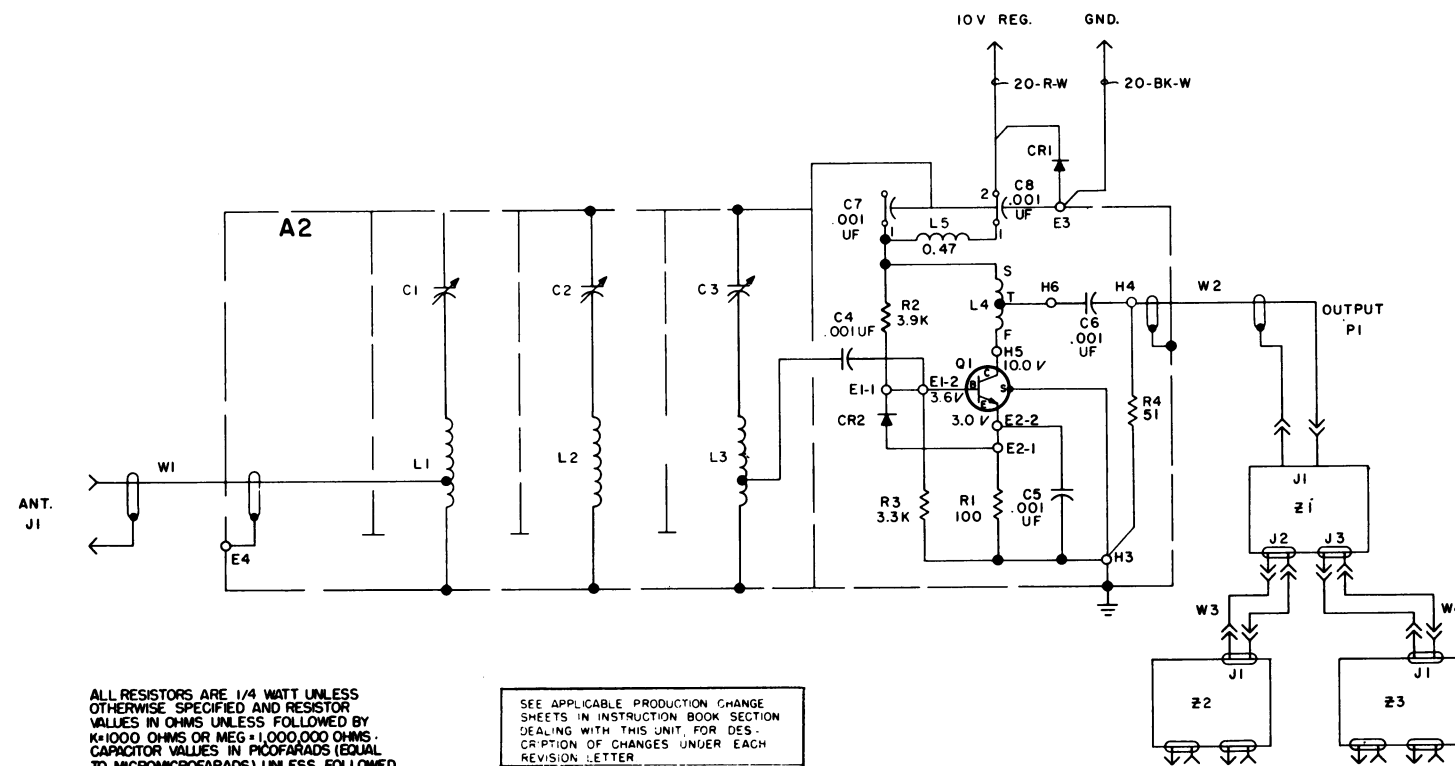
ANTENNA MATCHING UNITS  
MODELS 4KY13A10 - A12

PARTS LIST

LBI-4208  
ANTENNA MATCHING UNIT  
MODELS 4KY13A10-12  
19D413620-G3 THRU G5

SYMBOL	GE PART NO.	DESCRIPTION
A3 thru A5		RF PREAMPLIFIER A3 19C317485-G1 A4 19C317485-G2 A5 19C317485-G3
C1		- - - - - CAPACITORS - - - - - Part of L1.
C2		Part of L2.
C3	5491601-P113	Tubular, molded: 0.47 pf ±5%, 500 VDCW; sim to Quality Component Type MC.
C4 thru C7	5494481-P12	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Typ> JF Discap.
C8	5493392-P7	Ceramic, feed-thru: .001 pf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
C9	5491601-P120	Tubular, molded: 1.0 pf ±5%, 500 VDCW; sim to Quality Component Type MC.
C10	5491601-P113	Tubular, molded: 0.47 pf ±5%, 500 VDCW; sim to Quality Component Type MC.
CR1	19A116062-P2	- - - - - DIODES AND RECTIFIERS - - - - - Selenium.
DS1		- - - - - INDICATING DEVICES - - - - - Part of L1, L3, and L5.
E1 and E2	7878455-P2	- - - - - TERMINALS - - - - - Terminal, lug.
J1		- - - - - JACKS AND RECEPTACLES - - - - - Part of W1.
L1		- - - - - INDUCTORS - - - - - COIL ASSEMBLY 19B219021-G5
C1	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
DS1	19B209067-P1	- - - - - INDICATING DEVICES - - - - - Lamp, glow: 0.3 ma; sim to GE NE-2T.
L2		COIL ASSEMBLY 19B219021-G6
C2	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
L3		COIL ASSEMBLY 19B219021-G1
C1	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
DS1	19B209067-P1	- - - - - INDICATING DEVICES - - - - - Lamp, glow: .03 ma; sim to GE NE-2T.

SYMBOL	GE PART NO.	DESCRIPTION
L4		COIL ASSEMBLY 19B219021-G2
C2	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
L5		COIL ASSEMBLY 19B219021-G3
C1	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
DS1	19B209067-P1	- - - - - INDICATING DEVICES - - - - - Lamp, glow: 0.3 ma; sim to GE NE-2T.
L6		COIL ASSEMBLY 19B219021-G4
C2	19B209159-P3	- - - - - CAPACITORS - - - - - Variable, air, sub-miniature: 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.
L7	7488079-P38	Choke, RF: 3.90 µh ±10%, 1.50 ohms DC res max; sim to Jeffers 4412-12K.
L8	19A127108-G1	Coil.
P1		- - - - - PLUGS - - - - - Part of W2.
Q1	19A116435-P1	- - - - - TRANSISTORS - - - - - Silicon, NPN.
R2	3R152-P392J	- - - - - RESISTORS - - - - - Composition: 3900 ohms ±5%, 1/4 w.
R3	3R152-P332J	Composition: 3300 ohms ±5%, 1/4 w.
R4	3R152-P101J	Composition: 100 ohms ±5%, 1/4 w.
R5 and R6	3R152-P390J	Composition: 39 ohms ±5%, 1/4 w.
R7	19A116216-P8R2J	Deposited carbon: 8.2 ohms ±5%, 1/4 w; sim to AmpereX Type B803104.
R8	3R152-P100J	Composition: 10 ohms ±5%, 1/4 w.
R9	3R152-P180J	Composition: 18 ohms ±5%, 1/4 w.
W1	19A127854-G3	- - - - - CABLES - - - - - Cable: approx 6 inches long. Includes J1.
W2	19A127861-G1	Cable: approx 7-1/2 inches long. Includes P1.
W3	19A127855-G1	- - - - - CABLES - - - - - Cable: approx 4 inches long.
W4	19A127855-G2	Cable: approx 7 inches long.
Z1 thru Z3	19C317281-G1	- - - - - COUPLERS - - - - - Power Divider.

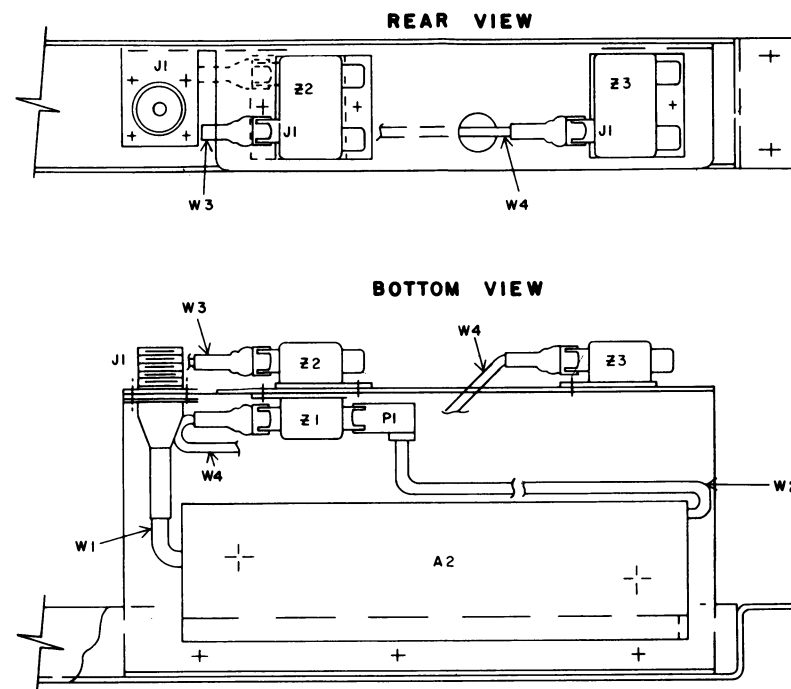


ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

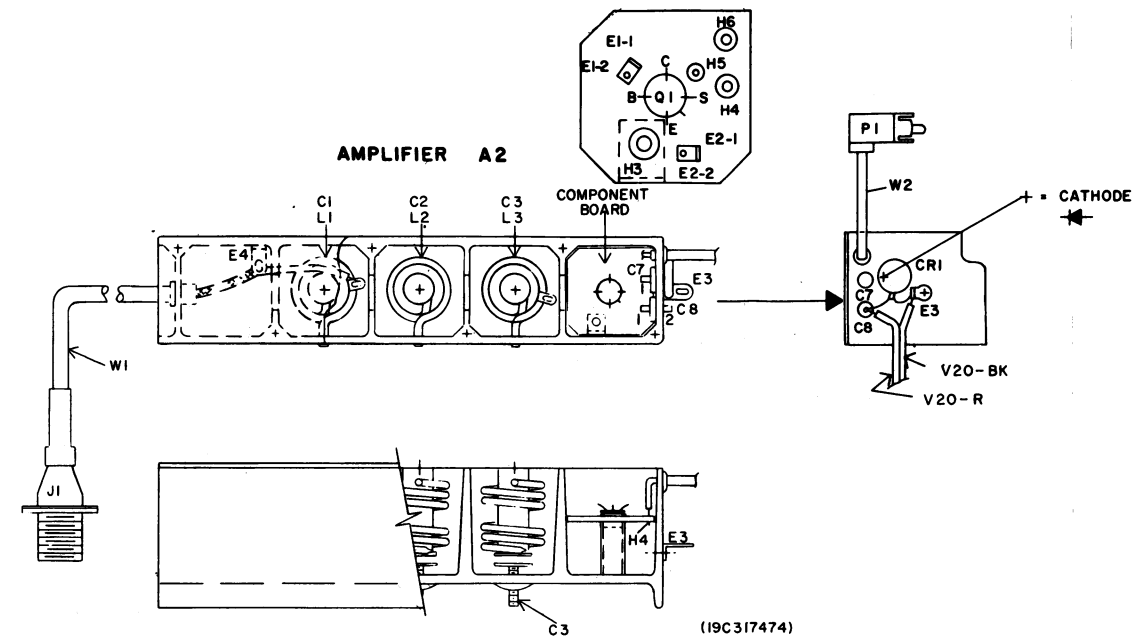
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT. FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.	
THIS ELEM DIAG APPLIES TO	
MODEL NO 4KY13B11	REV LETTER A

(19C317282, Rev. 3)



(19D413620)



(19D413979, Rev. 1)

## SCHEMATIC & OUTLINE DIAGRAM

ANTENNA MATCHING UNITS  
MODEL 4KY13B11



PARTS LIST

LBI-4207A

ANTENNA MATCHING UNIT

MODEL 4KY13B11

19D413620G2

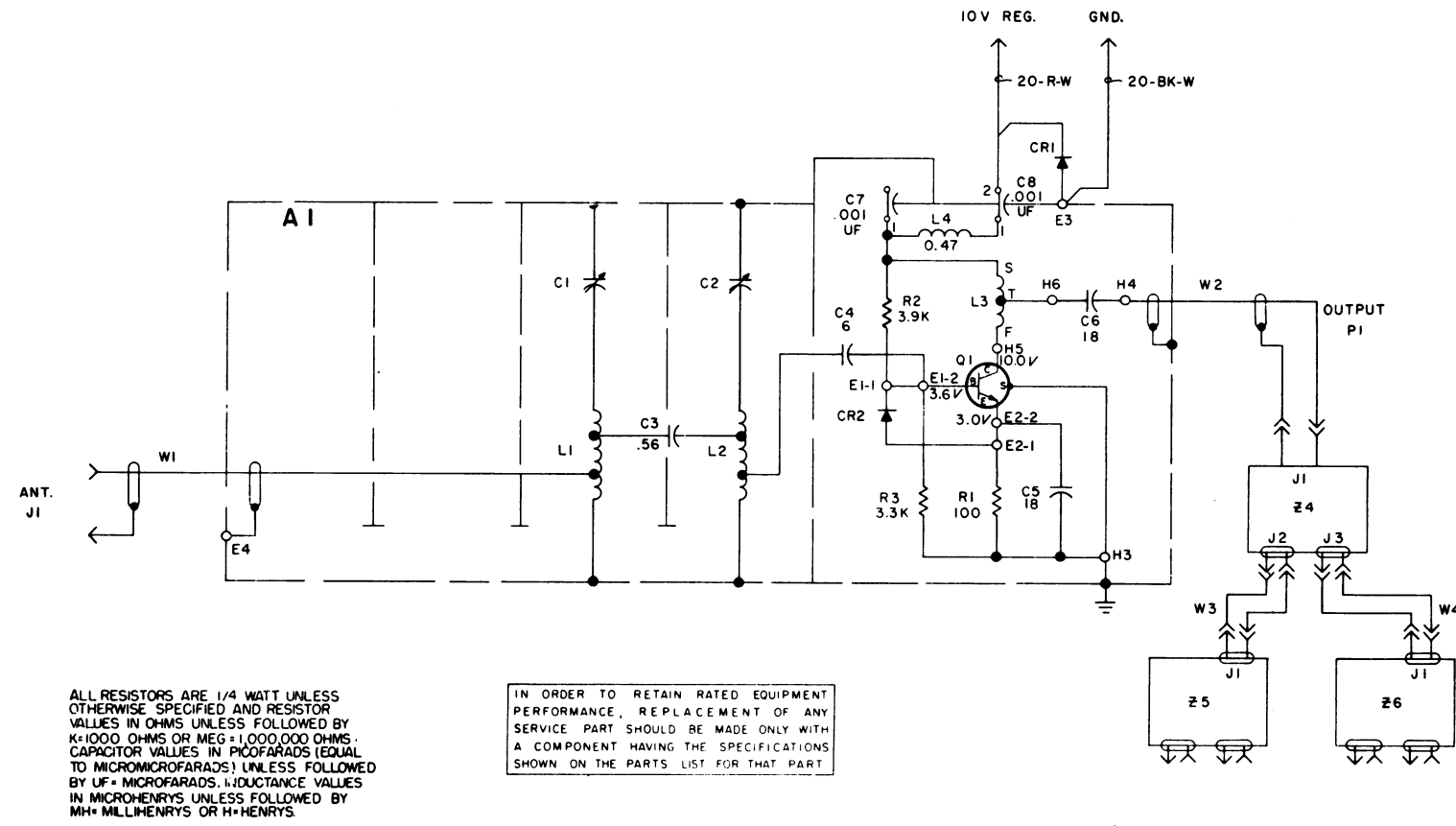
SYMBOL	GE PART NO.	DESCRIPTION
A2		RF PREAMPLIFIER 19C317474G1
		----- CAPACITORS -----
C1 thru C3		(See Miscellaneous).
C4 thru C6	5494481P12	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7	5493392P107	Ceramic, stand-off: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type SS5A.
C8	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
		----- DIODES AND RECTIFIERS -----
CR1	19A116062P2	Selenium.
CR2	4038642P1	Germanium.
		----- JACKS AND RECEPTACLES -----
J1		(Part of W1).
		----- INDUCTORS -----
L1	19B216112G9	Coil.
L2	19B216112G7	Coil.
L3	19B216112G3	Coil.
L4	19A127108G1	Coil.
L5	7488079P4	Choke, RF: 0.47 µh ±20%, 0.09 ohms DC res max; sim to Jeffers 4411-4M.
		----- PLUGS -----
P1		(Part of W2).
		----- TRANSISTORS -----
Q1	19A116435P1	Silicon, NPN.
		----- RESISTORS -----
R1	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
R2	3R152P392J	Composition: 3900 ohms ±5%, 1/4 w.
R3	3R152P332J	Composition: 3300 ohms ±5%, 1/4 w.
R4*	3R152P510J	Composition: 51 ohms ±5%, 1/4 w.
	3R152P200J	Earlier than REV A: Composition: 20 ohms ±5%, 1/4 w.
		----- CABLES -----
W1	19A127854G1	Cable: approx 7-1/4 inches long. Includes J1.
W2	19A127861G1	Cable: approx 7-1/2 inches long. Includes P1.
W10	19A127854G4	Cable: approx 8 inches long.
		----- CABLES -----
W3	19A127855G1	Cable: approx 4 inches long.
W4	19A127855G2	Cable: approx 7 inches long.
		----- COUPLERS -----
Z1 thru Z3	19C317281G1	Power divider.

SYMBOL	GE PART NO.	DESCRIPTION
	7137968P8	----- MISCELLANEOUS ----- Nut, stamped: thd size No. 6-32; sim to Palnut T0632005. (Part of C1-C3).
	4036765G4	Screw: 6-32. (Part of C1-C3).
	19A121252P4	Heat sink. (Used with Q1).

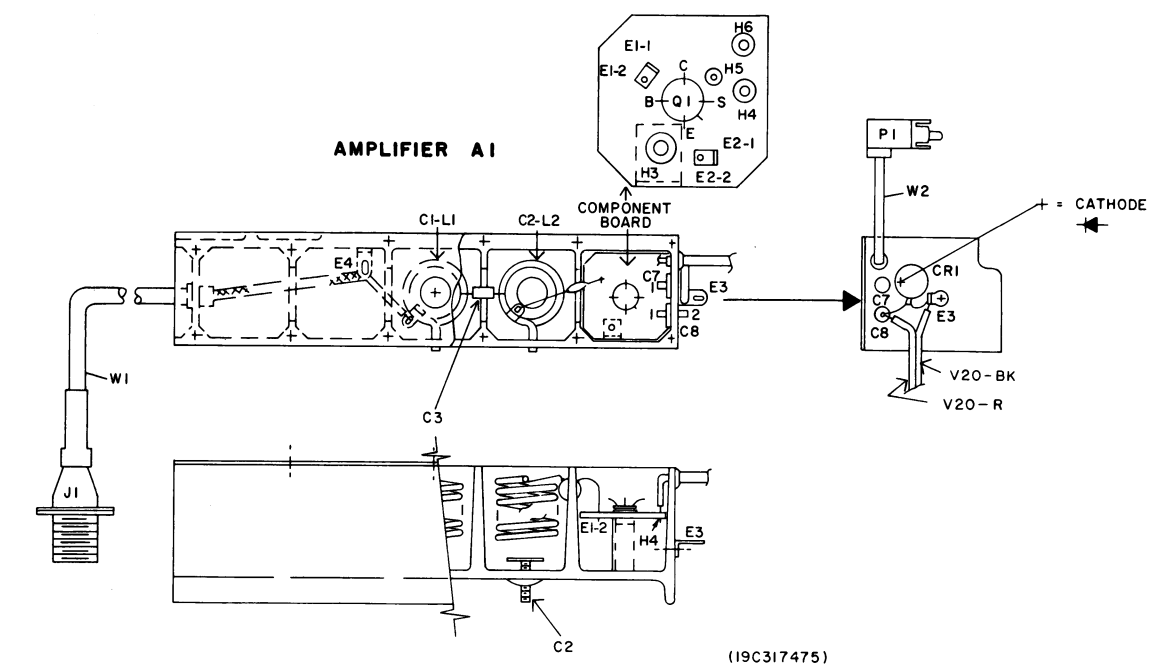
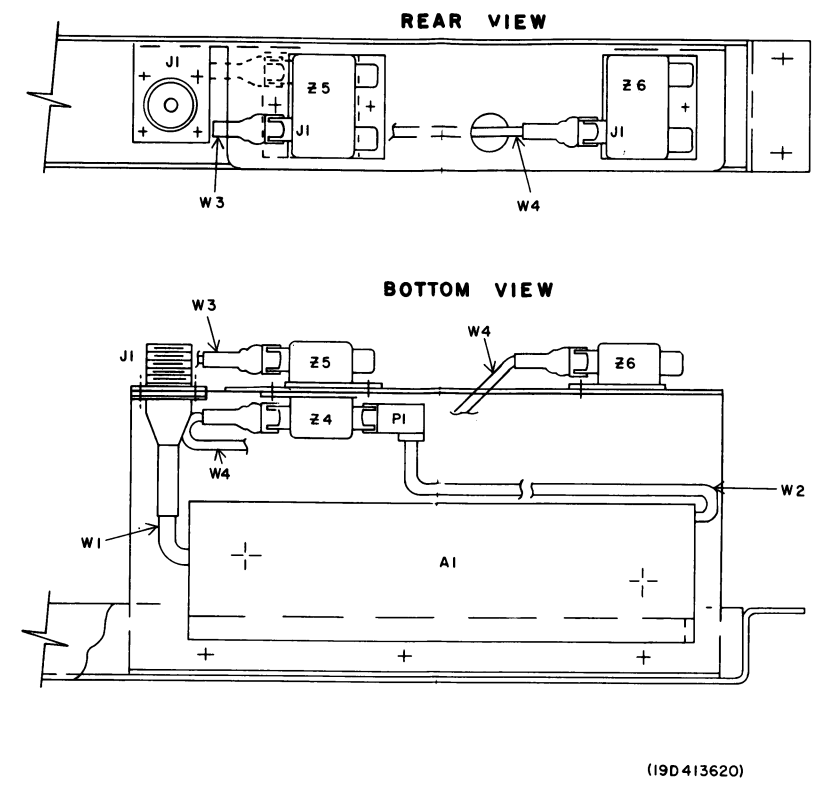
PRODUCTION CHANGES

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 - 4KY13B13  
To increase gain. Changed R4.



(19C317477, Rev. 2)



(19D413978, Rev. 1)

# **SCHEMATIC & OUTLINE DIAGRAM**

ANTENNA MATCHING UNITS  
MODEL 4KY13C11

PARTS LIST

LBI-4209  
ANTENNA MATCHING UNIT  
MODEL 4KY13C11  
19D413620-G1

SYMBOL	GE PART NO.	DESCRIPTION
A1		RF PREAMPLIFIER 19C317475-G1
		----- CAPACITORS -----
C1 and C2		(See Miscellaneous).
C3	5491601-P115	Tubular, molded: 0.56 pf ±5%, 500 VDCW; sim to Quality Component Type MC.
C4	5496218-P37	Ceramic disc: 6.0 pf ±5%, 500 VDCW, temp coef 0 PPM.
C5 and C6	5496218-P45	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef 0 PPM.
C7	5493392-P107	Ceramic, stand-off: .001 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type S55A.
C8	5493392-P7	Ceramic, feed-thru: .001 pf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
		----- DIODES AND RECTIFIERS -----
CR1	19A116062-P2	Selenium: sim to 6RS20VJ1BAA.
CR2	4038642-P1	Germanium.
		----- JACKS AND RECEPTACLES -----
J1		(Part of W1).
		----- INDUCTORS -----
L1	19B204938-G21	Coil.
L2	19B204938-G22	Coil.
L3	19A127108-G2	Coil.
L4	7488079-P4	Choke, RF: 0.47 µh ±20%, 0.09 ohms DC res max; sim to Jeffers 4411-4M.
		----- PLUGS -----
P1		(Part of W2).
		----- TRANSISTORS -----
Q1	19A116435-P1	Silicon, NPN: sim to A-430.
		----- RESISTORS -----
R1	3R152-P101J	Composition: 100 ohms ±5%, 1/4 w.
R2	3R152-P392J	Composition: 3900 ohms ±5%, 1/4 w.
R3	3R152-P332J	Composition: 3300 ohms ±5%, 1/4 w.
		----- CABLES -----
W1	19A127854-G2	Cable: approx 8 inches long. Includes J1.
W2	19A127861-G1	Cable: approx 7-1/2 inches long. Includes P1.
		----- CABLES -----
W3	19A127855-G1	Cable: approx 4 inches long.
W4	19A127855-G2	Cable: approx 7 inches long.
		----- COUPLERS -----
Z4 thru Z6	19C317352-G1	Power divider.

SYMBOL	GE PART NO.	DESCRIPTION
	7117825-P1	----- MISCELLANEOUS ----- Washer, spring tension. (Part of C1-C3).
	4036765-G4	Screw: 6-32. (Part of C1-C3).
	19A121252-P4	Heat sink. (Used with Q1).

\*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

## ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

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

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

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These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

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# **MAINTENANCE MANUAL**

**LBI-4216**

MOBILE RADIO DEPARTMENT  
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502



**PRINTED IN U.S.A.**

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