

# RF-551A PRESELECTOR

# RF-551A POSTSELECTOR

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**RF-551A SPECIFICATIONS**

<b>Frequency Range:</b>	2.000 to 29.999 MHz in four octave bands
<b>Tuning:</b>	Front panel switches or remote (1500 feet maximum, optional)
<b>Tuning Accuracy:</b>	Better than 1%, typically better than 0.5%
<b>Selectivity:</b>	60 dB nominal attenuation at frequencies 10% removed from tuned frequencies, increasing to better than 100 dB at greater separation
<b>Noise Figure:</b>	≤ 15 dB nominal
<b>Overall Gain:</b>	High gain 8 dB, nominal; Low gain -24 dB, nominal
<b>Impedance:</b>	50 ohms nominal, input and output
<b>Desensitization:</b>	Less than 1 dB for a 0.5 V signal within the passband
<b>Intermodulation:</b>	Third order, IM products for two equal 100 mV signals will be at least 60 dB below the level of either signal
<b>Cross Modulation:</b>	Cross modulation due to a 3.0 V, 30% modulated signal 10% removed in frequency from a 100 mV desired signal will be down at least 20 dB
<b>Overdrive Protection:</b>	Set to open at 100 W of RF power nominal
<b>Input Power:</b>	115/230 Vac, ± 10%, 50-400 Hz, 45 W maximum consumption
<b>Weight:</b>	35 pounds (15.9 kg)
<b>Dimensions:</b>	5.25 H x 19.0 W x 16.0 D inches (13.3 H x 48.3 W x 40.6 D cm)



## ABOUT THIS MANUAL

This manual contains general introductory information, installation procedures, and operating and maintenance instructions for the RF-551A Preselector and the RF-551A Postselector. The differences between the RF-551A Preselector and the RF-551A Postselector are covered in the text and by notes on diagrams. All common functions will be referred to as being for the RF-551A.

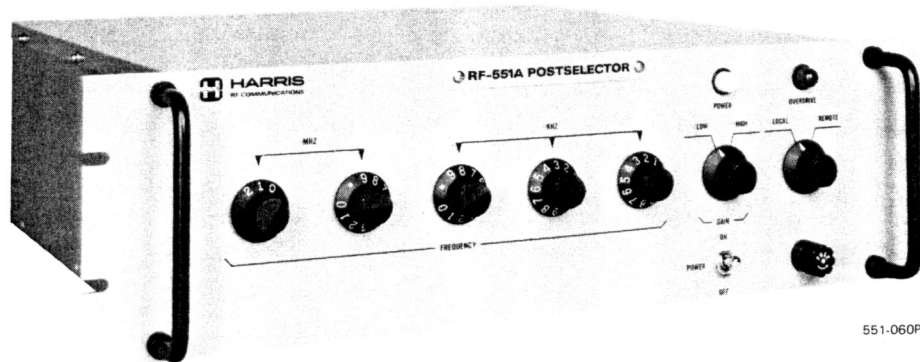
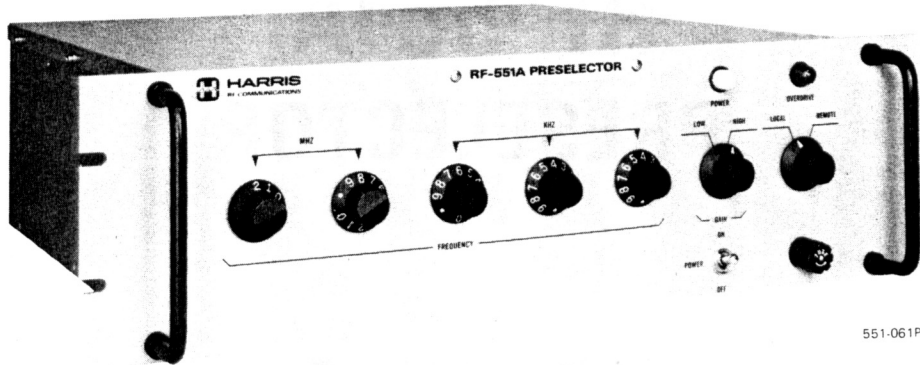
The manual is divided into the following sections:

- Introduction
- Installation
- Operation
- Maintenance
- Functional Description
- RF-552 Remote Control Option



# **RF-551A PRESELECTOR**

# **RF-551A POSTSELECTOR**



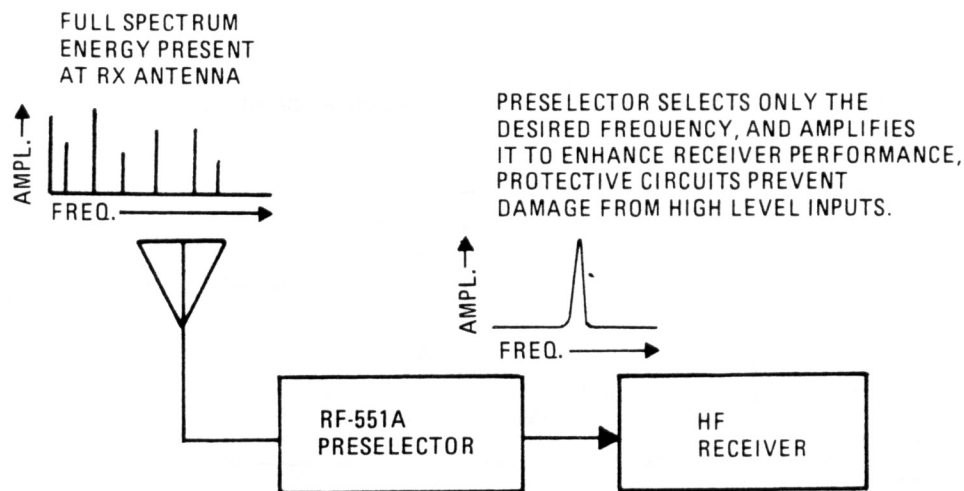
RF-551A Preselector (Top) and RF-551A Postselector (Bottom)

SECTION 1  
INTRODUCTION

1.1 INTRODUCTION

This manual provides complete user information for the RF-551A Preselector and RF-551A Postselector. (Addition of an external 6 dB pad and adjustment of a limiter potentiometer allows the RF-551A to be used as a postselector.) The RF-551A was designed and manufactured by Harris Corporation, RF Communications Group, 1680 University Avenue, Rochester, New York, 14610, USA.

Detailed information for the main chassis and for all component subassemblies is covered in this manual. Figures 1-1 and 1-2 show typical applications of the RF-551A.



551-003(1)

Figure 1-1. RF-551A Preselector Typical Application Block Diagram

1.2 GENERAL DESCRIPTION

The RF-551A is a locally/remotely tunable, highly-selective bandpass filter that can be used as a preselector or as a postselector. The frequency range is 2.000 to 29.999 MHz. Figure 1-3 is a typical application block diagram of the RF-551A. Figure 1-4 is the RF-551A signal flow diagram.

1.2.1 RF-551A Preselector

The RF-551A Preselector provides the extra receive selectivity required when operating in the presence of strong off-frequency RF signals. Such signals could be caused by the close proximity of shipboard HF transmitters, radar equipment, etc. Weak signals in the preselector passband are amplified and fed to the receiver. Signals that are off-frequency, such as those from nearby transmitters, are sharply attenuated by the filter circuits in the preselector, and do not distort weaker signals. If the amplitude of input RF signals inside or outside the passband exceeds safe limits, protective circuits provide positive protection for the RF-551A Preselector and the receiver.

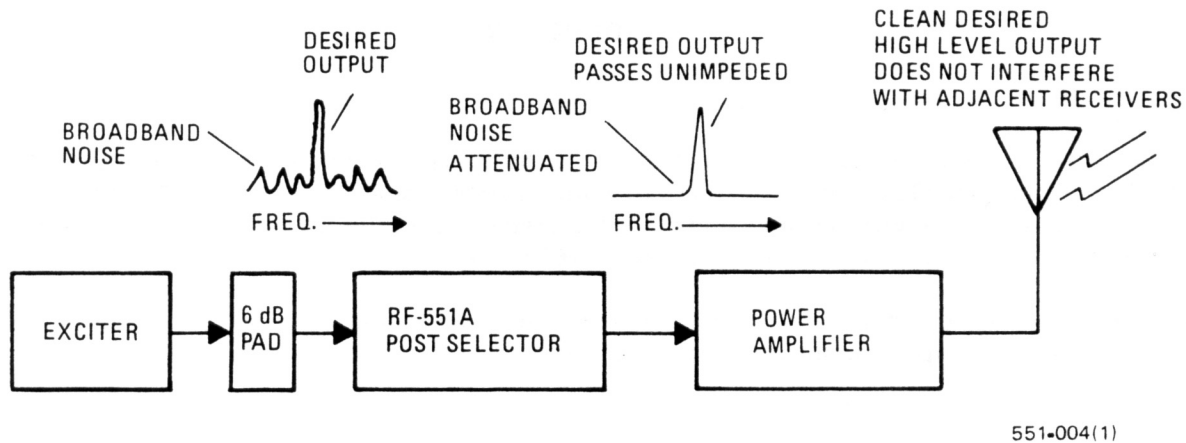


Figure 1-2. RF-551A Postselector Typical Application Block Diagram

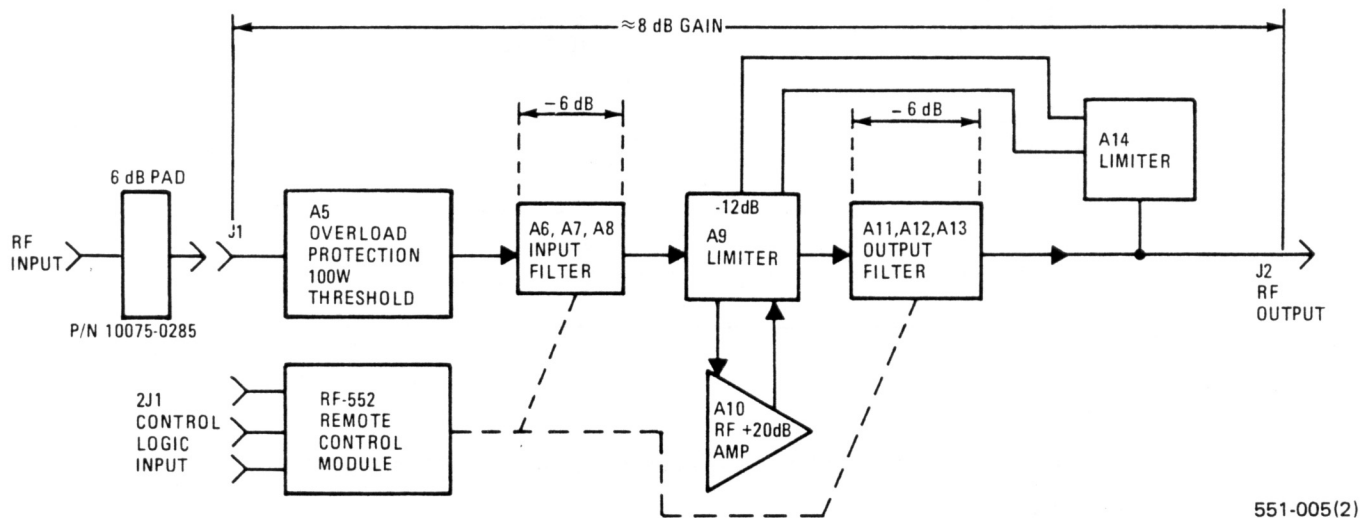


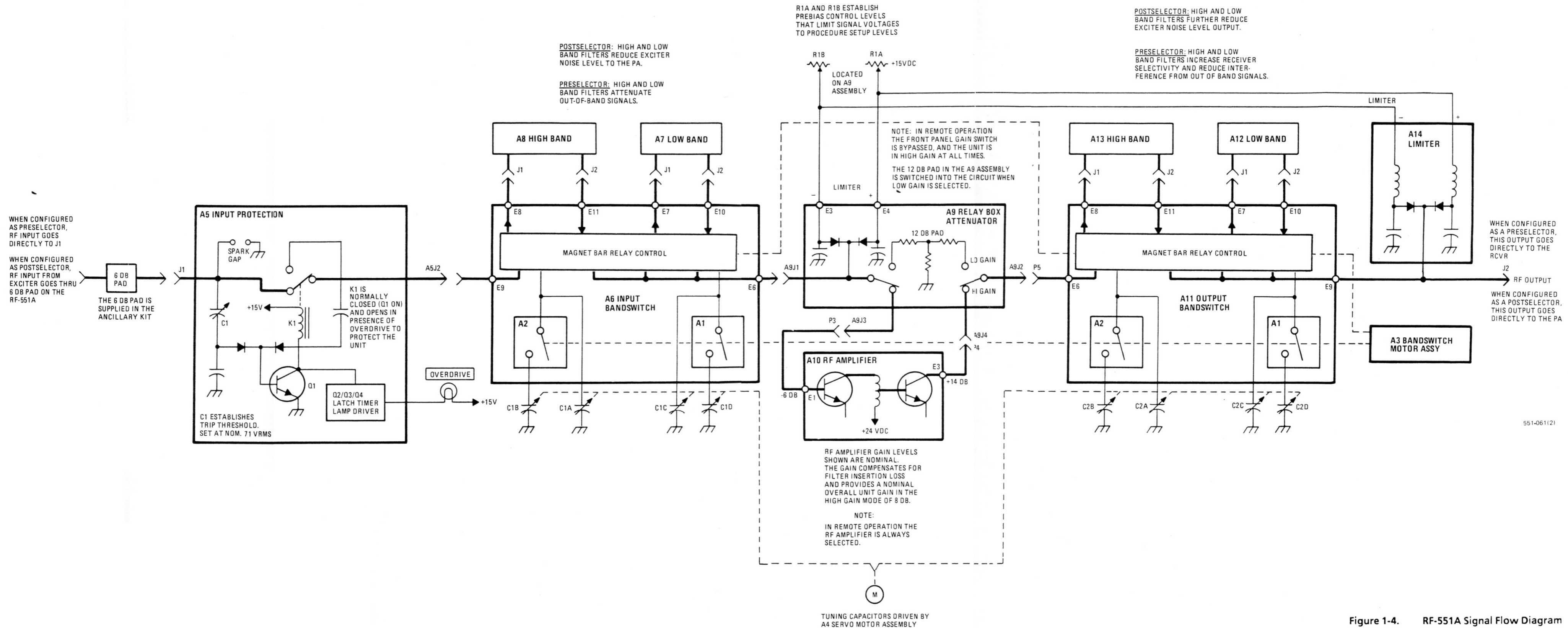
Figure 1-3. RF-551A Preselector/Postselector RF and Control Line Block Diagram

### 1.2.2 RF-551A Postselector

The RF-551A Postselector provides highly-selective bandpass filtering of the exciter output, to reduce broadband noise output.

### 1.3 FREQUENCY SELECTION

Frequency is selected by using front panel switches, or by the optional RF-552 Remote Control Module. Switch positions generate a BCD code that is converted to an analog voltage proportional to the selected frequency. This voltage drives the servo motor to tune C1 and C2 to the proper capacitance for the selected frequency.



551-061(2)

Figure 1-4. RF-551A Signal Flow Diagram

An optional RF-552 Remote Control Module is available for remote automatic frequency selection. When the RF-552 is used, the GAIN switch is disabled and the unit is in HIGH GAIN at all times.

#### 1.4 BAND SELECTION

Band selection is controlled by the 10 MHz and 1 MHz frequency switches on the front panel. When the 10 MHz and 1 MHz frequency switches are positioned to the desired frequency, the slider bars located on the input and output bandswitch circuits (A6, A11) select the proper band components for the desired frequency band. Refer to table 1-1, figure 1-5, and figure 1-6.

Table 1-1. Position Table for Slider Bars

Frequency Range MHz	Band	Bar A	Bar B	Bar C	Bar D
2.000 to 3.999	1	FWD	FWD	FWD	FWD
4.000 to 7.999	2	FWD	BACK	BACK	FWD
8.000 to 15.999	3	BACK	FWD	FWD	BACK
16.000 to 29.999	4	BACK	BACK	BACK	BACK

See figure 4-3 for slider bar location.

FWD = Slider Bar moved towards the front of the unit.  
BACK = Slider Bar moved towards the back of the unit.

#### 1.5 RF SELECTIVITY

Two sets of mutually-coupled, double-tuned bandpass circuits provide 60 dB nominal attenuation to signals 10 percent removed from the selected frequency.

#### 1.6 RF AMPLIFIER

The A10 RF Amplifier is a linear, broadband amplifier. Its nominal 20 dB gain compensates for the approximate 12 dB insertion loss of the two double-tuned bandpass filters and provides 8 dB of overall gain to enhance receiver performance.

#### 1.7 PRESELECTOR INPUT PROTECTION/LIMITER

In the Preselector, the input protection circuit prevents damage to internal receiver components when excessive RF signals are present at input connector J1. It also signals the operator, by means of the OVERDRIVE indicator, when such an overload occurs. Protection is provided by opening the RF signal path when the input voltage exceeds  $71 V_{rms}$ . Additional protection is provided by two limiters. One limiter is located in the A9 RF Relay Box Attenuator Assembly before the RF amplifier. The other is located at the output of the preselector.

#### 1.8 ITEMS SUPPLIED WITH THE RF-551A

The RF-551A Preselector or Postselector-Packed, Part No. 905-0000, is made up of RF-551A Preselector or Postselector, Part No. 905-0003, Technical Manual No. 10096-0006, and Ancillary Kit, Part No. 905-0041. Table 1-2 lists the contents of the ancillary kit.



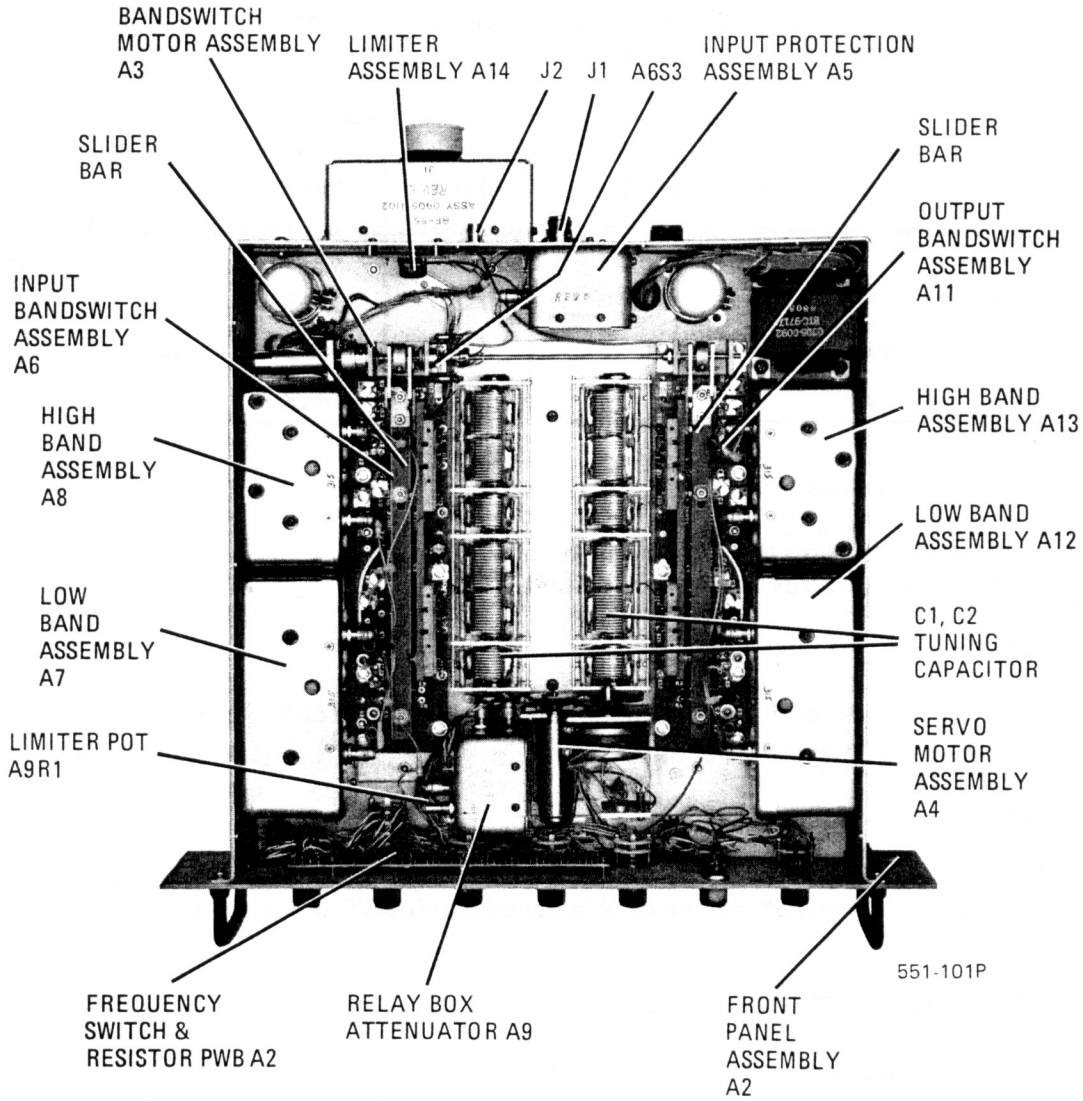


Figure 1-5. Slider Bar and Subassembly Locations (Top)

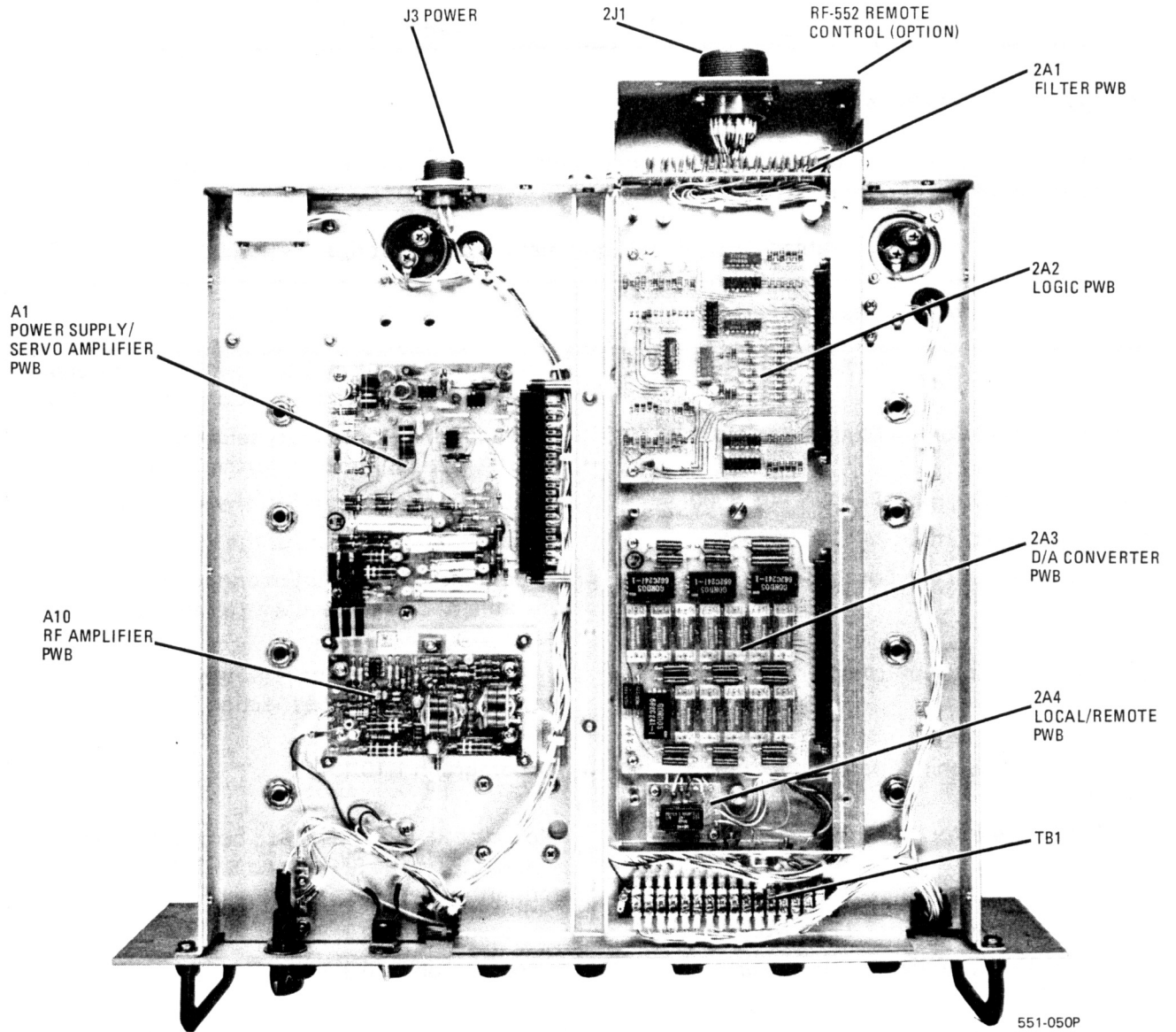


Figure 1-6. Subassembly Locations (Bottom)

Table 1-2. RF-551A Ancillary Kit, Part No. 905-0041, Contents

Qty.	Part No.	Description
5	F02A290V1/2AS	Fuse, Cartridge
5	F03-0002-019	Fuse, 1 Ampere
1	UG-201A/U	Adapter, N to BNC
1	724-0029	Line Cord Assembly

**1.9 OPTIONAL EQUIPMENT AND ACCESSORIES**

Table 1-3 lists the optional equipment and accessories available for use with the RF-551A. The equipment functions are described or referenced.

Table 1-3. Optional Equipment and Accessories

Option/Accessories and Part No.	Function
RF-551A/552 Interconnect Part No. 1920-0501 (RF-573)	Interconnects the RF-552 to the RF-590A Receiver for automatic frequency selection in the RF-551A.
RF-552 Remote Control Module Part No. 905-1100	Allows automatic frequency selection in the RF-551A. See Section 6 for further information.
RF-554 Stack Mount Kit Part No. 905-9000	Facilitates stack mounting of the RF-551A.
RF-555 Rack Mount Kit Part No. 905-9010	Facilitates rack mounting of the RF-551A.
RF-559 Cable Junction Box Part No. 905-9500	Provides the necessary interconnection points when the RF-551A is used with a remote control system.
RF-553-01 Remote Control Interface Part No. 10073-6910	Allows the RF-551A to be remotely controlled by the RF-590A receiver. See Section 6 for further information.
RF-551A/RSK Running Spares Kit Part No. 1001-0126	See paragraph 1.10.1.
RF-556 Postselector Kit Part No. 905-9100	Allows the RF-551A/RF-552 to be operated as a postselector in the RF-130 and RF-745 transmitting systems.
RF-551A/SSK Site Spares Kit Part No. 1001-0420	See paragraph 1.10.2.
RF-551A/ARK Assembly Repair Kit Part No. 1001-0128	See paragraph 1.10.3.
RF-551A/MRK Maintenance Repair Kit Part No. 1001-0129	See paragraph 1.10.4.

**1.10 SPARE PARTS KITS**

There are four spare parts kits available for the RF-551A. A brief description of each kit follows.

#### **1.10.1 Running Spares Kit (RSK) RF-551A/RSK, Part No. 1001-0126**

This kit contains items readily replaced in field operation by the operator, including those which are used during equipment installation and setup. The typical complement of parts includes fuses, lamps, etc. Each RSK will generally support a single piece of equipment for two to four years.

#### **1.10.2 Site Spares Kit (SSK), RF-551A/SSK, Part No. 1001-0420**

Site spares are those items which allow the equipment to be repaired at the highest practical level of assembly to minimize down time or off-the-air time. This type of kit includes a complete set of assemblies or subassemblies (if applicable); piece parts for those items which are impractical to repair by assembly replacement, including chassis and front panel parts; and a common hardware kit. With very little test equipment and some common tools, a technician should be able to replace one of these parts if they fail. Each SSK will generally support up to five pieces of equipment for a period of two to four years.

#### **1.10.3 Assembly Repair Kit (ARK), RF-551A/ARK, Part No. 1001-0128**

This kit contains all the parts required to repair defective assemblies or subassemblies. It supplements the Site Spares Kit to allow replaced assemblies to be repaired, as time permits, either at the equipment site or at a special depot facility. This kit can be properly utilized only with a well-equipped service shop and qualified technicians. Each ARK will generally support an SSK for a period of two to four years.

#### **1.10.4 Maintenance Repair Kit (MRK), RF-551A/MRK, Part No. 1001-0129**

In addition to the spares kits already mentioned, there is a kit that contains maintenance items unique to the RF-551A. The kit includes cables, tuning tools, and other special items required for maintaining the equipment.



## **SECTION 2**

### **INSTALLATION**

#### **2.1 GENERAL**

The following paragraphs provide installation and interface information for the RF-551A Postselector and RF-551A Preselector. Information relating to unpacking instructions, power requirements, and interconnection requirements are included.

#### **2.2 UNPACKING AND INSPECTION**

Carefully open the shipping carton and check the contents against the packing list secured to the outside of the container. Inspect all items for indications of damage. Immediately notify the carrier if any damage is noted. Save all packing material for possible reshipment.

#### **2.3 POWER REQUIREMENTS**

The RF-551A operates on 115/230 Vac, 50 to 400 Hz single-phase input power. Select proper line voltage at S9 on the rear panel. Power consumption is 45 watts.

#### **2.4 INSTALLATION REQUIREMENTS**

The RF-551A is mounted in a standard 19-inch (48.26 cm) rack. Typical installations are shown in figures 2-1 and 2-2. The following factors should be considered in determining the proper location for the RF-551A.

- Ease of operation
- Ease of maintenance, adjustment of equipment, and replacement and repair of defective parts or complete units.
- Possibility of interaction between units and other equipment in the vicinity
- Adequate heat dissipation
- Common chassis grounds when used in a system

#### **NOTE**

Strong magnetic fields may interfere with operation of unit.

Slides (optional P/N 905-2018) are available which enable the operator to pull the equipment from the rack for easy maintenance and alignment. Slides are provided with the RF-554 Stack Mounting Kit or RF-555 Rack Mounting Kit.

#### **2.5 INTERCONNECTION REQUIREMENTS**

The RF-551A Preselector is connected between an HF antenna and HF receiver that is equipped with an RF-553-01 Remote Control Adapter. See figure 2-3 for cable connection details. The RF-551A Postselector is connected between an exciter and a power amplifier. See figure 2-4 for cable connection details.

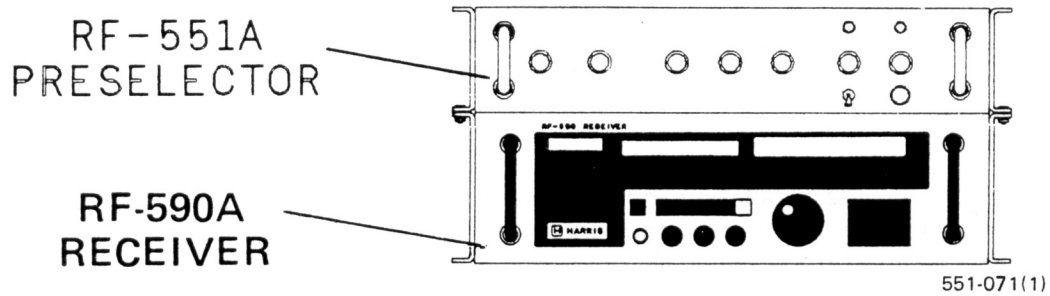


Figure 2-1. Typical RF-551A Stack Mount Configuration

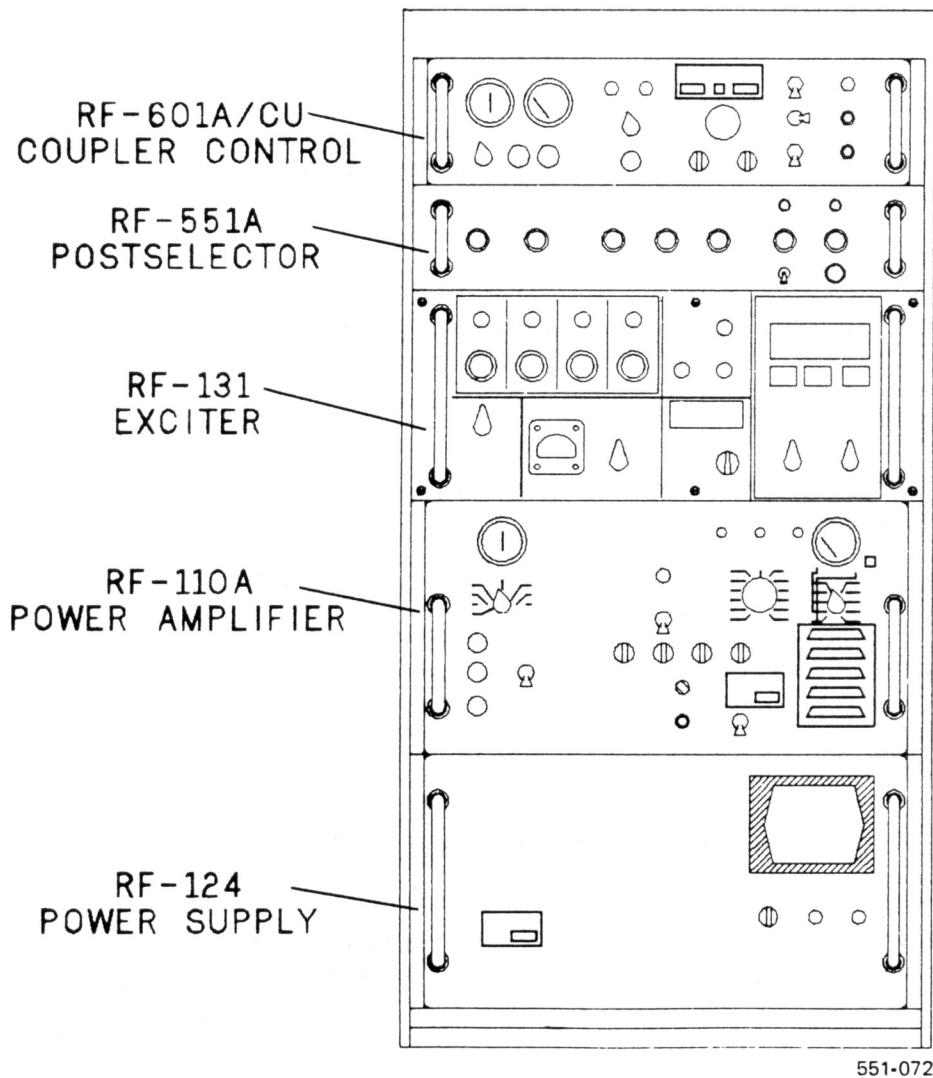
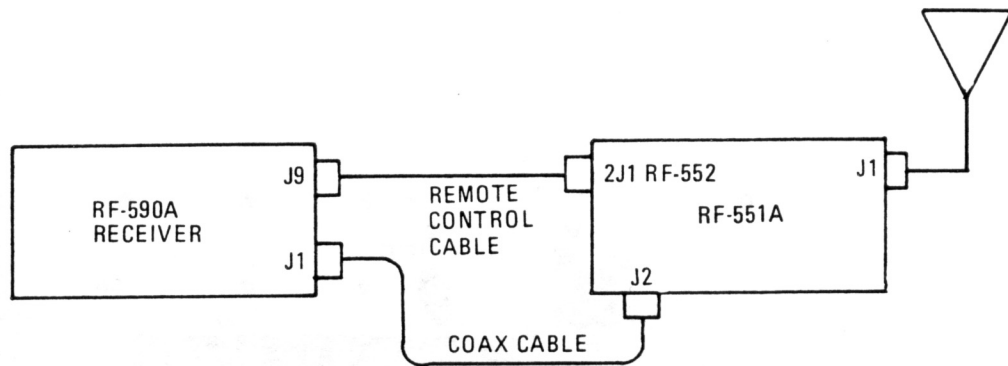
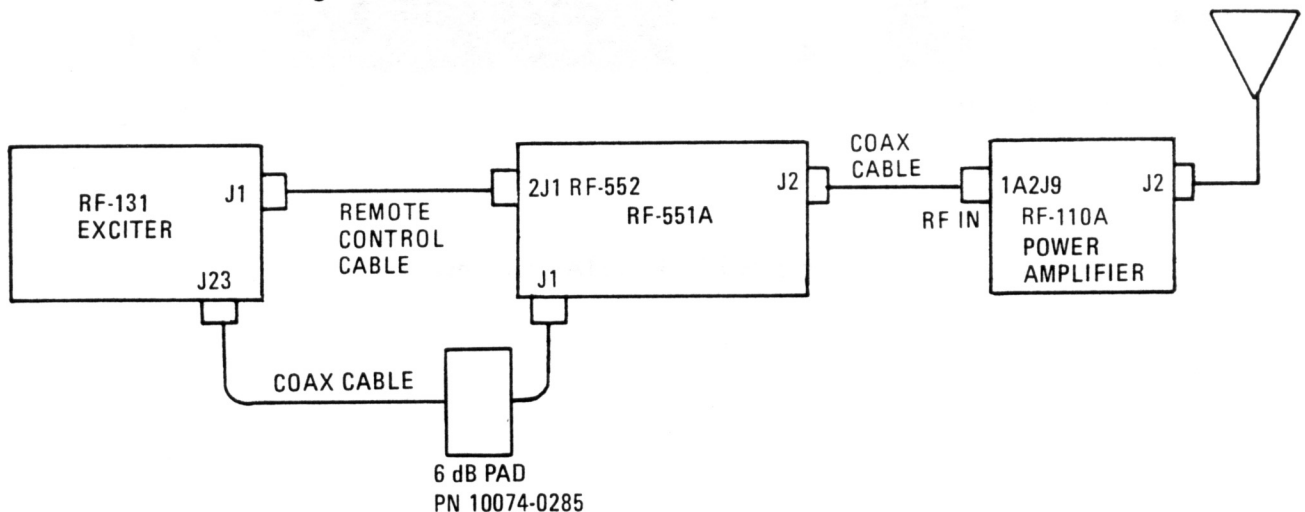


Figure 2-2. Typical RF-551A Rack Mount Configuration



551-001(2)

Figure 2-3. RF-551A Receiver System Cable Connections



551-002(2)

Figure 2-4. RF-131/RF-551A/RF-110A System Cable Connections

## 2.6 230 VAC OPERATION

The RF-551A can be operated on 230 Vac. The front panel fuse must have a 1/2 ampere rating and the rear panel slide switch S9 must be put in the 230 position before turning on unit. See figure 2-5 for a rear view of the RF-551A.

## 2.7 115 VAC OPERATION

The RF-551A can be operated on 115 Vac. The front panel fuse must have a 1 ampere rating and the rear panel slide switch S9 must be in the 115 position before turning on unit (see figure 2-5).

## 2.8 ADJUSTMENTS

For RF-551A Preselector operation, reasonable limiting of the input signals can be obtained by adjusting limiter potentiometer A9R1 (figure 1-5) fully clockwise (maximum limiting) and then 1/4 turn counterclockwise. For RF-551A Postselector operation, no limiting is desired and A9R1 should be adjusted fully counterclockwise.



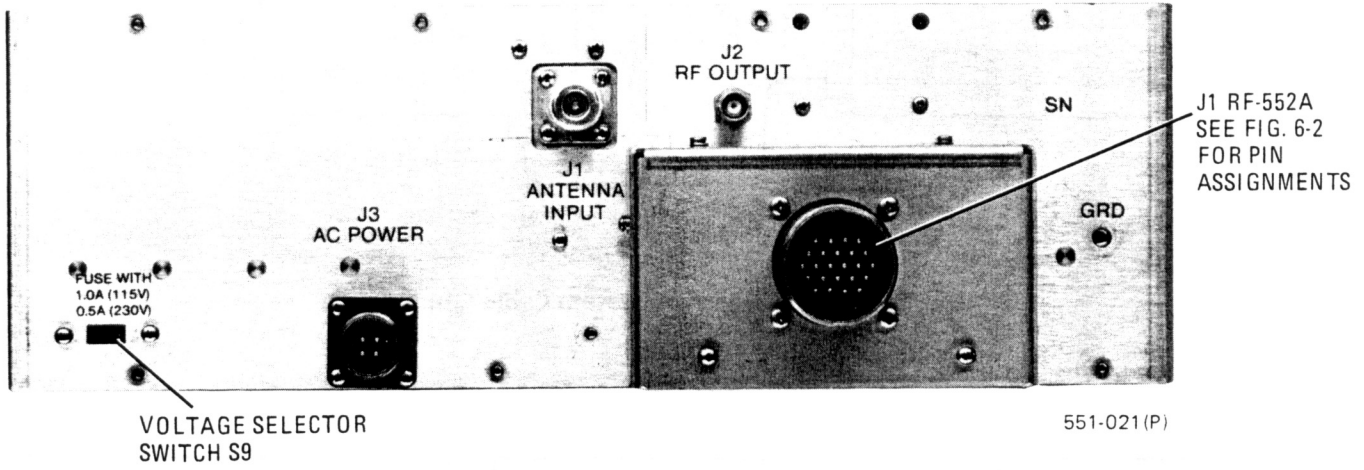


Figure 2-5. RF-551A Rear View

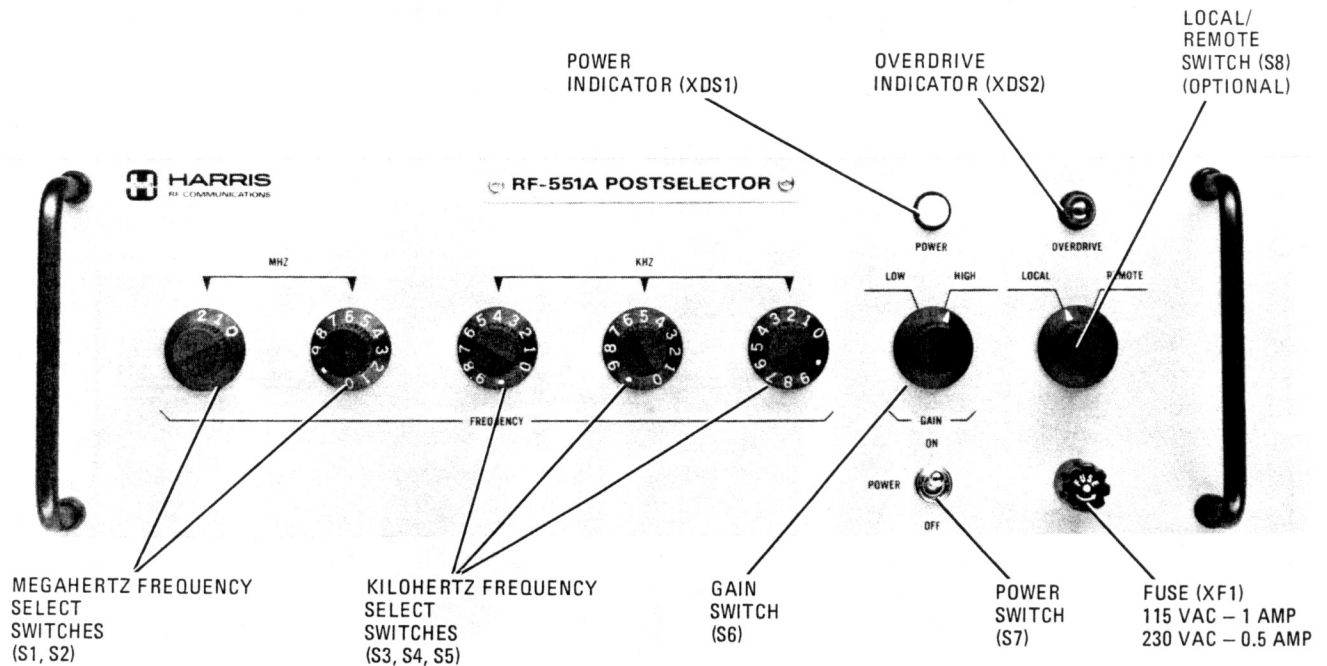
SECTION 3  
OPERATION

3.1 GENERAL DESCRIPTION

This section provides operating information for the RF-551A. Information about front panel controls and indicators is included.

3.2 OPERATING PROCEDURE

To operate the RF-551A, set the POWER switch to ON and the frequency controls to the desired operating frequency. Allow approximately three seconds for the RF-551A to tune. If an overload occurs, the OVERDRIVE indicator will illuminate. The indicator will automatically go out when the cause of the overload is removed. Refer to figure 3-1 and table 3-1 for front panel controls and indicator locations and their functions. Refer to figure 3-2 and table 3-2 for rear panel jack and switch locations and their functions.

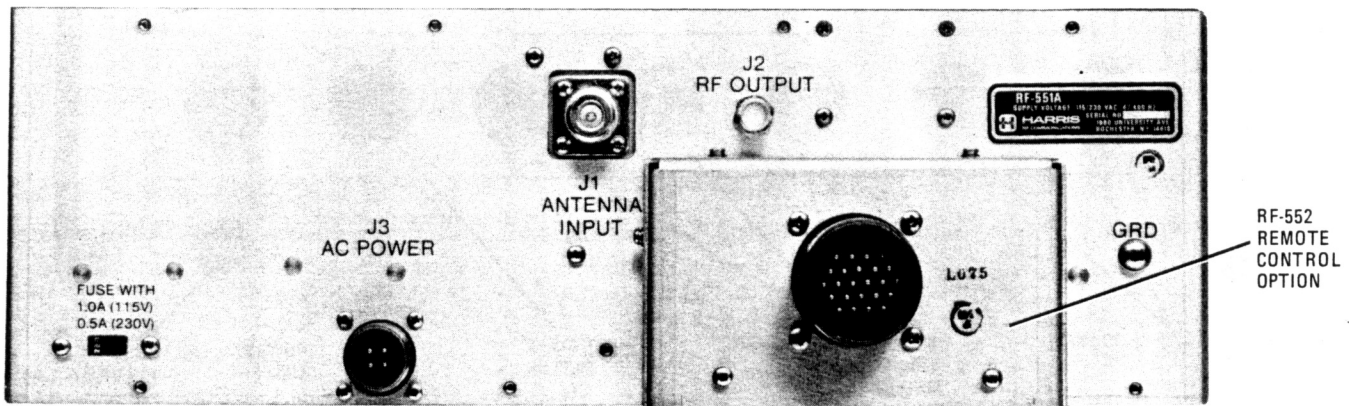


551-022P(1)

Figure 3-1. RF-551A Front Panel Controls and Indicators

Table 3-1. RF-551A Front Panel Controls and Indicators

Control or Indicator	Function
POWER switch	Turns RF-551A on or off.
POWER Indicator	Indicator illuminates when POWER switch is at ON position.
OVERDRIVE Indicator	Indicator illuminates when an RF overload occurs.
GAIN switch	When set to HIGH the RF signal is amplified; when set to LOW the RF signal is attenuated.
LOCAL/REMOTE (option)	turns on the RF-552 Remote Control option. (In REMOTE operation the GAIN switch is overridden and the unit is in HIGH gain.)
10 MEGAHERTZ switch	A three-position switch that selects frequency from 0 to 20 MHz in 10 MHz increments.
1 MEGAHERTZ switch	A ten-position switch that selects frequency from 1 to 9 MHz in 1 MHz increments.
100 KILOHERTZ switch	A ten-position switch that selects frequency from .1 to .9 MHz in 100 kHz increments.
10 KILOHERTZ switch	A ten-position switch that selects frequency from .01 to .09 MHz in 10 kHz increments.
1 KILOHERTZ switch	A ten-position switch that selects frequency from .001 to .009 MHz in 1 kHz increments.



551-052P

Figure 3-2. RF-551A Rear Panel Jacks and Switches

Table 3-2. RF-551A Rear Panel Jacks and Switches

Jack or Switch	Function
ANTENNA INPUT J1	J1 is used as antenna input (preselector) or exciter input (postselector).
RF OUTPUT J2	J2 is used as RF output.
AC POWER J3	J3 is used to connect Line Voltage to unit.
2J1 RF-552 Remote Control Assembly	All control lines from receiver or exciter are connected to 2J1.
Ac Voltage Select S9	S9 is set to input voltage 115 Vac or 230 Vac.



## SECTION 4

### MAINTENANCE

#### 4.1 GENERAL

This section provides maintenance, troubleshooting, and adjustment information for the RF-551A. Maintenance information is provided for routine items to ensure optimum equipment reliability. Troubleshooting aids are in the form of figures, tables, and procedures. All mechanical and electrical alignments have been completed at the factory, and should normally not require adjustment in the field. Alignment instructions are included to aid in the understanding of the operation of the unit. These instructions will also aid in troubleshooting frequency-related problems.

#### 4.2 LUBRICATION

Normally, the RF-551A does not require lubrication; however, inspect the bandswitch drive components and the Servo Motor Assembly A4 gears periodically. If lubrication is required, the following Dow Corning compounds are recommended:

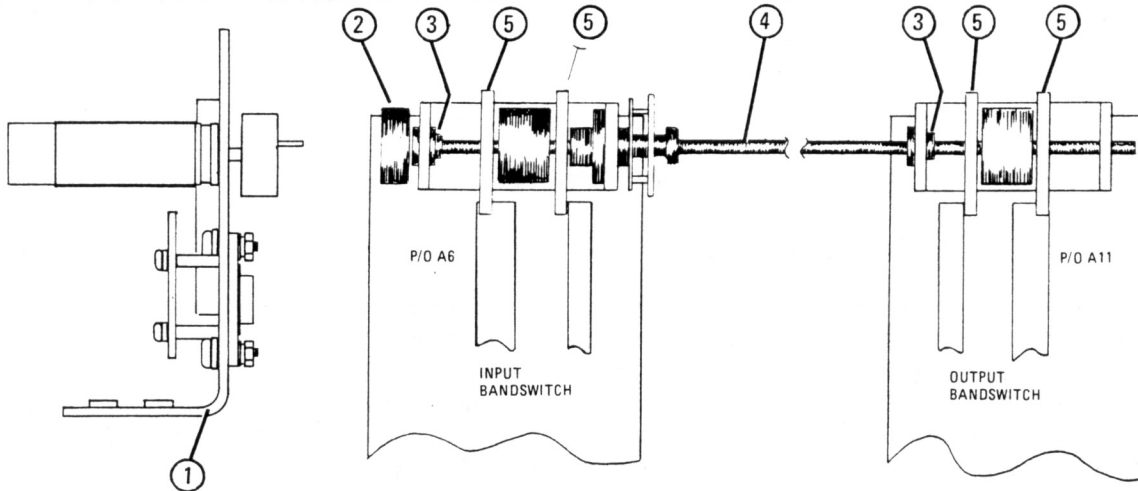
- DC-5 Compound
- Molykote G-N Paste

The lubrication points for the bandswitch drive components are accessed by removing both the top and bottom covers. Only the top cover has to be removed to access the servo motor gears. Turn power off before removing the top or bottom cover of the unit.

##### 4.2.1 Bandswitch Drive-Shaft Bushing Lubrication

Follow the procedures of this paragraph to lubricate the drive-shaft bushings. Figure 4-1 shows the location of the items.

- a. Remove the three screws on the bottom side of the chassis that secure the angle bracket to the Bandswitch Motor Assembly A3 and move the Bandswitch Motor Assembly to one side (item 1).
- b. Loosen the two allen screws on the motor coupling and remove the coupling (item 2).
- c. Remove the nuts and washers from the two bushings (item 3) and slide the hardware down the shaft (item 4).
- d. Remove the bushing from the Bandswitch Motor Assembly end of the shaft. Slide the bushing at the other end down the shaft until it comes in contact with the cam follower (item 5).
- e. Remove any remaining lubricant from the exposed areas of the shaft. Then use Molykote G-N paste to lubricate these areas.
- f. Reassemble the bushing hardware and remount the Bandswitch Motor Assembly.
- g. See paragraph 4.5 for proper mechanical alignment of the bandswitch.



ITEM	DESCRIPTION
1	- BANDSWITCH MOTOR ASSEMBLY A4
2	- MOTOR COUPLING
3	- BUSHING
4	- SHAFT
5	- CAM FOLLOWER

551-008(11)

**Figure 4-1. Bandswitch Drive Shaft Lubrication**

#### 4.2.2 Cam Follower Lubrication

Follow the procedures of this paragraph to lubricate the cam followers. Figure 4-1 shows the location of the items.

- a. Remove any remaining lubricant on the four cam followers (item 5).
- b. Apply a coating of DC-5 compound to each cam follower.

#### 4.2.3 Servo Motor Assembly A4 Lubrication

Figure 1-5 shows the location of the Servo Motor Assembly A4.

- a. Remove any remaining lubricant from the servo motor gear train.
- b. Turn power on and set the front panel frequency switches to 2.000 MHz.
- c. Turn power off and lubricate each of the four gears with Molykote G-N paste.
- d. Turn power on and set the front panel frequency switches to 3.999 MHz for complete rotation of the gears.
- e. Turn power off and replace the cover(s) on the unit.

### 4.3 TROUBLESHOOTING

#### 4.3.1 Reed Switch Troubleshooting

##### NOTE

Reed switches in the RF-551A are controlled by permanent magnets embedded in the slider bars. Figure 4-2 shows the location of slider bars, reed switches, and bandswitch assemblies A6 and A11. If a reed switch is not switching properly, use the following procedure and table 4-1.

- a. Select POWER OFF on the RF-551A and disconnect primary power.
- b. Visually inspect for loose or broken parts, poor solder joints, and loose hardware.
- c. Disconnect all wires and cables at the High Band and Low Band Assemblies. Insulate the wire ends to prevent shorting.
- d. Connect a continuity checker between the FROM and TO terminals specified in table 4-1 (see figure 4-2 for terminal locations). Reconnect ac power. Set POWER switch to ON position.
- e. Follow each step in table 4-1, operating the slider using front panel controls as outlined in table 4-2.
- f. Replace or repair defective components.

#### 4.4 BANDSWITCHING TROUBLESHOOTING

Use this procedure if there is a problem with bandswitching in the RF-551A.

- a. The unit must have primary power applied.
- b. Select frequencies in the Frequency Range MHz column of table 4-2, and note that the slider bars shown in figure 4-2 are in the proper position according to table 4-2.
- c. Refer to paragraph 4.5, Mechanical Alignment, as an aid to locating banding problems.

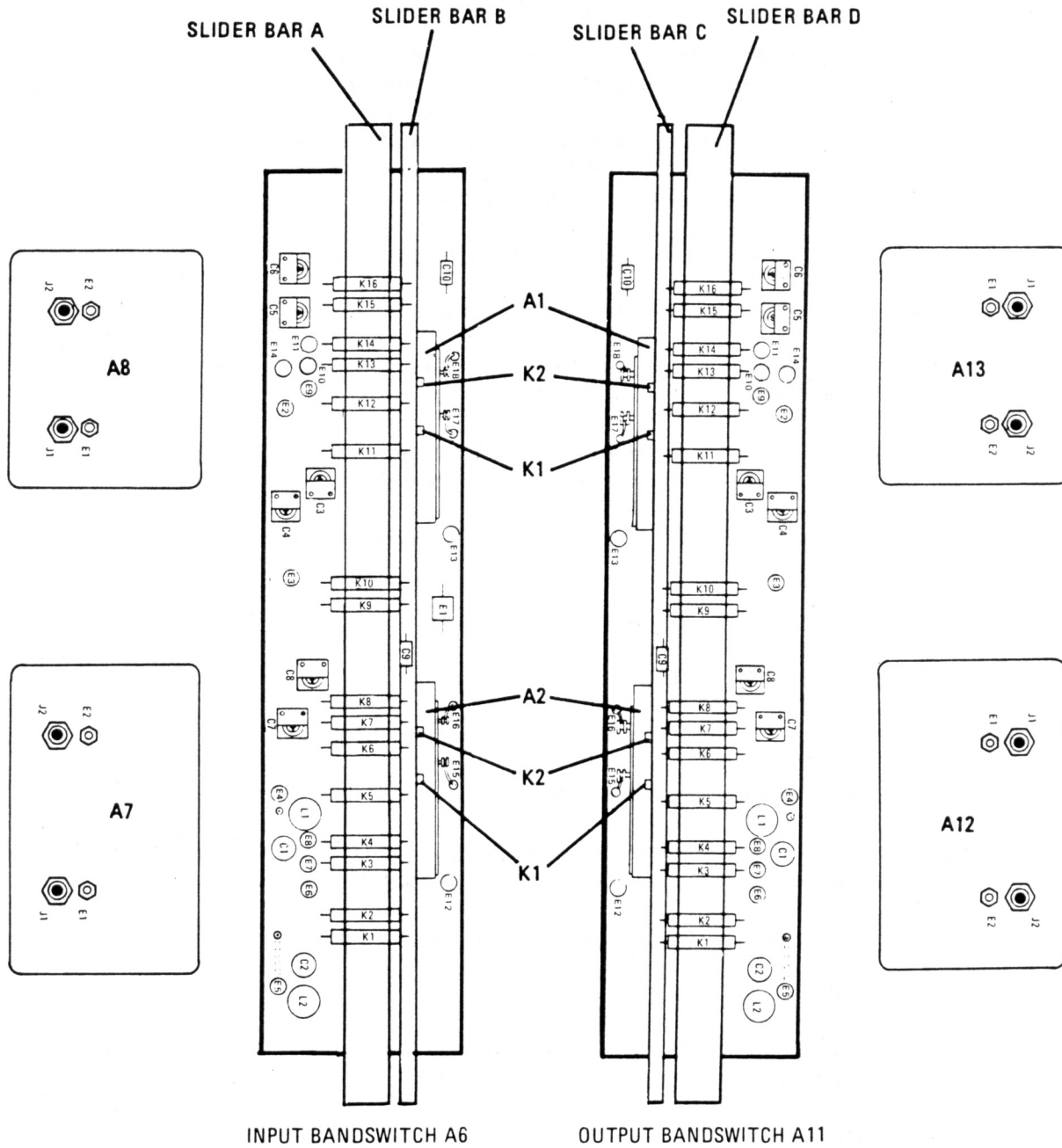
#### 4.5 MECHANICAL ALIGNMENT

Refer to figure 4-3 for component locations and identification. Mechanical alignment of the bandswitch is performed as outlined in the step by step procedure of table 4-3.

##### 4.5.1 A1 Servo Amplifier Zero

There are three balance potentiometers on the Power Supply/Servo Amplifier PWB A1 which adjust any offset or inherent error voltage in the operational amplifier integrated circuits. With the frequency set for 3 MHz, and the servo tuned to the frequency, turn off the power to the unit. Apply a ground on the output of the follower potentiometer A4R2, figure 4-6. Ground E18 on the A2A1 Resistor PWB. See figure 5-6, component location diagram, for A2A1 Resistor PWB. For TP locations, see figure 4-7. Also apply a ground to A1TP9 (black). Turn on power and measure output of A1U1 pin 6 (A1TP7, brown). Adjust potentiometer A1R44 until output is 0 volts. Similarly, adjust A1R43 until output of A1U3, pin 6 (A1TP6, orange) is also 0 volts. Finally,





INPUT BANDSWITCH A6

OUTPUT BANDSWITCH A11

DISCONNECT ALL WIRES AT E1 AND E2 OF A7, A8, A12, A13.  
DISCONNECT ALL JACKS FROM J1 AND J2 OF A7, A8, A12, A13.

551-014(1)

Figure 4-2. Locations of Reed Switches on A6 and A11 Assemblies

Table 4-1. Reed Switch Troubleshooting Table

Reed Switch Being Checked and Condition	Bar	Bar Position	From	To	Reading Open or Short
K1 OPENS	A or D	BACK	E12	E5	OPEN
K1 CLOSES	A or D	FORWARD	E12	E5	SHORT
K2 OPENS	A or D	FORWARD	E5	GND	OPEN
K2 CLOSES	A or D	BACK	E5	GND	SHORT
K3 OPENS	A or D	BACK	E6	E7	OPEN
K3 CLOSES	A or D	FORWARD	E6	E7	SHORT
K4 OPENS	A or D	FORWARD	E6	E8	OPEN
K4 CLOSES	A or D	BACK	E6	E8	SHORT
K5/6 OPENS	A or D	FORWARD	E15	E3	OPEN
K5/6 CLOSES	A or D	BACK	E15	E3	SHORT
K7 OPENS	A or D	BACK	E16	C7 STATOR	OPEN
K7 CLOSES	A or D	FORWARD	E16	C7 STATOR	SHORT
K8 OPENS	A or D	FORWARD	E16	C8 STATOR	OPEN
K8 CLOSES	A or D	BACK	E16	C8 STATOR	SHORT
K9 OPENS	A or D	BACK	E13	E4	OPEN
K9 CLOSES	A or D	FORWARD	E13	E4	SHORT
K10 OPENS	A or D	FORWARD	E4	GND	OPEN
K10 CLOSES	A or D	BACK	E4	GND	SHORT
K11/12 OPENS	A or D	FORWARD	E17	E2	OPEN
K11/12 CLOSES	A or D	BACK	E17	E2	SHORT
K13 OPENS	A or D	BACK	E9	E10	OPEN
K13 CLOSES	A or D	FORWARD	E9	E10	SHORT
K14 OPENS	A or D	FORWARD	E9	E11	OPEN
K14 CLOSES	A or D	BACK	E9	E11	SHORT
K15 OPENS	A or D	BACK	E18	C5 STATOR	OPEN
K15 CLOSES	A or D	FORWARD	E18	C5 STATOR	SHORT
K16 OPENS	A or D	FORWARD	E18	C6 STATOR	OPEN
K16 CLOSES	A or D	BACK	E18	C6 STATOR	SHORT
A1K1/2 OPENS	B or C	BACK	E18	E17	OPEN
A1K1/2 CLOSES	B or C	FORWARD	E18	E17	SHORT
A2K1/2 OPEN	B or C	BACK	E15	E16	OPEN
A2K1/2 CLOSES	B or C	FORWARD	E15	E16	SHORT

Table 4-2. Truth Table for Slider Bars

Frequency Range MHz	Band	Bar A	Bar B	Bar C	Bar D
2.000 to 3.999	1	FWD	FWD	FWD	FWD
4.000 to 7.999	2	FWD	BACK	BACK	FWD
8.000 to 15.999	3	BACK	FWD	FWD	BACK
16.000 to 29.999	4	BACK	BACK	BACK	BACK

adjust A1R18 until the servo output at A1TP8 (violet) is  $\approx 0$  volts. Turn off power and remove grounds applied to follower potentiometer output, E18 on the A2A1 and A1TP9.

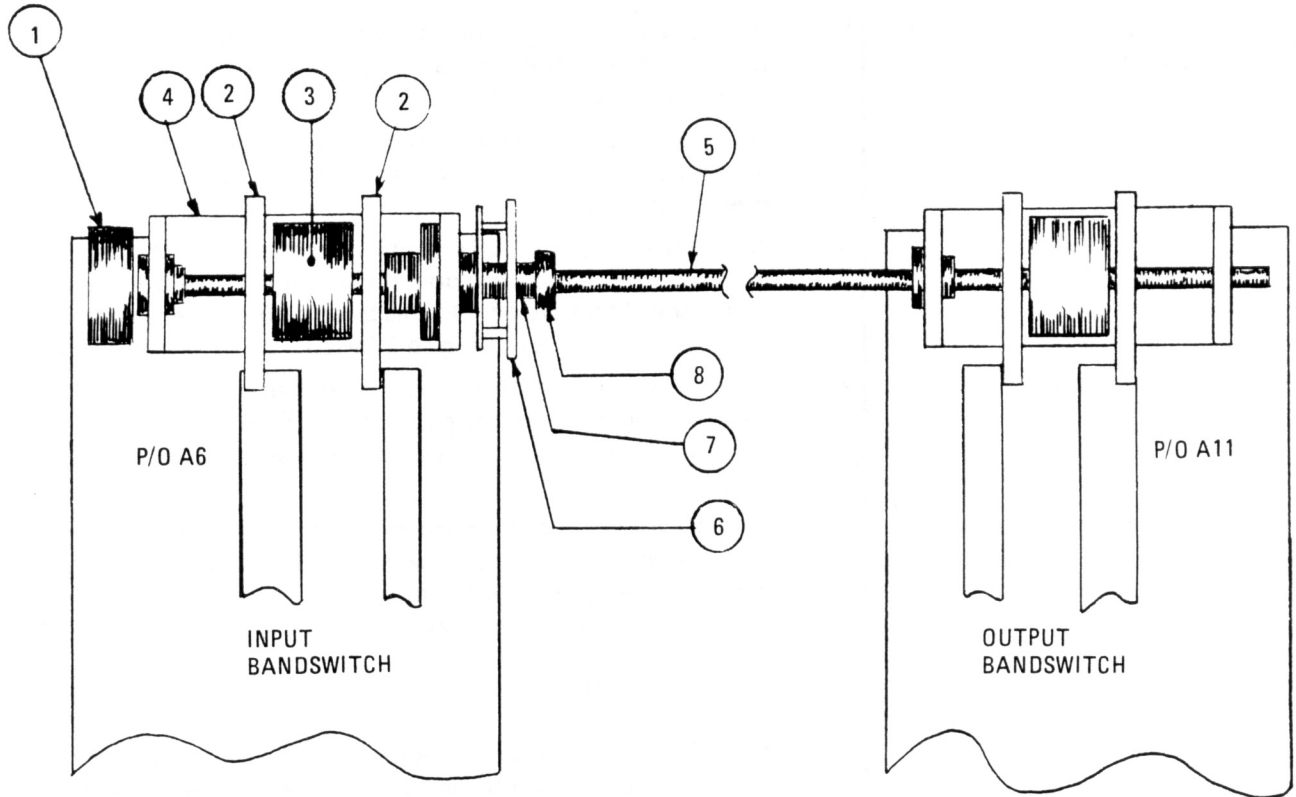
#### 4.5.2 A4 Servo Motor Assembly Alignment

- a. Remove Power Supply/Servo Amplifier PWB A1. Loosen spur gear setscrews on capacitors C1 and C2 so that gears are free to move on capacitor shafts. Attach the negative lead of a dc power supply to A4E1 and the positive lead to A4E2. Slowly increase power supply voltage (5 volts maximum) to drive servo motor until its end stop is reached. Carefully rotate capacitors C1 and C2 until both capacitors are in a fully meshed state. Tighten both capacitor spur gear setscrews. This is zero degrees reference. See figure 4-6 and figure 4-8.
- b. Remove lead wire from A4R2 clockwise terminal and loosen A4R2 mounting nut. Connect Simpson Model 260 VOM (or equivalent) between clockwise and counterclockwise terminals and adjust potentiometer to obtain  $200 \pm 10$  ohm indication.
- c. Adjust 1/8 turn (45 degrees) tension on A4R2 antibacklash gear. Tighten A4R2 mounting nut so that a final adjustment to the position of A4R2 can still be made. Reconnect VOM between A4R2 counterclockwise and clockwise terminals. Adjust A4R2 potentiometer for  $200 \pm 10$  ohm indication. Tighten A4R2 mounting nut.

#### NOTE

Adjustment should now leave both ganged capacitors C1 and C2 in a fully meshed state, A4R2 antibacklash gear with 1/8 turn tension applied, and potentiometer A4R2 set for  $200 \pm 10$  ohms and tightened securely.

- d. Reconnect lead wire to A4R2 clockwise terminal.



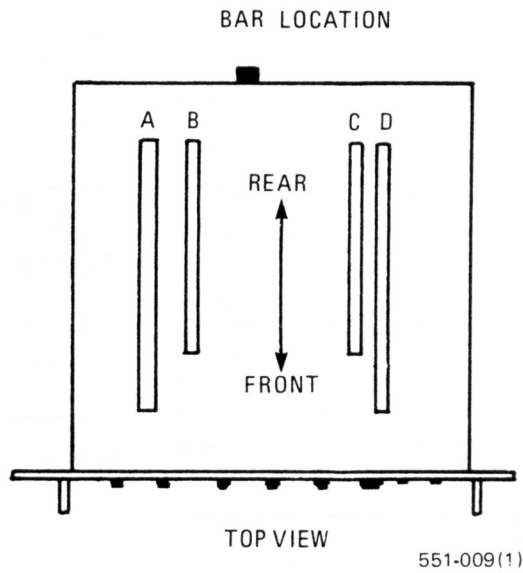
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ITEM	DESCRIPTION
1 -	MOTOR COUPLING
2 -	CAM FOLLOWER
3 -	CAM
4 -	SHAFT GUIDE
5 -	SHAFT
6 -	OPEN-SENSING SWITCH
7 -	SWITCH CLAMP

Figure 4-3. Bandswitch Drive Component Locations and Identification

Table 4-3. Mechanical Alignment of Bandswitch

Objective	Procedure
Expose bandswitch Lock open-sensing switch rotor to bandswitch shaft	a. Turn power off, and remove top cover from the RF-551A.
	b. With power off, align open-sensing switch clamps with switch rotor and tighten clamp lock (item 8, figure 4-3) using a small 1/16 Allen wrench.
Loosen bandswitch cams	c. Turn power on and select a frequency to expose the cam setscrews (two per cam). Loosen setscrews so that cams are free to rotate on shaft.
Stop shaft on band 1	d. With power on, select 2 MHz using front panel switches. (If 2 MHz was selected before power was applied, the bandswitch motor should be cycled. Do this by selecting a frequency above 4 MHz and returning to 2 MHz.) Turn power off.
Position cams to band 1	e. With power off, rotate each cam to position bars to band 1. Refer to figure 4-4 for bar position and figure 4-5 for cam position. Tighten setscrews when cams are positioned properly.
Check and/or adjust servo stops on band 1	f. Turn power on, and set frequency to 2 MHz (cycle as in step d). Note that all bars are forward, and that the cams have stopped exactly as shown in figure 4-5. If correction is required, proceed as follows:
	<ul style="list-style-type: none"> <li>• Turn power off.</li> </ul>
	<ul style="list-style-type: none"> <li>• Loosen setscrew on open-sensing switch clamp lock and rotate clamp and rotor in direction necessary to correct cam error.</li> </ul>
	<ul style="list-style-type: none"> <li>• Tighten setscrew on clamp lock.</li> </ul>
	<ul style="list-style-type: none"> <li>• Turn power on and cycle bandswitch motor; stop at 2 MHz, band 1.</li> </ul>
	<ul style="list-style-type: none"> <li>• Recheck cams per figure 4-5. If cams are properly adjusted, go to step g. If not, repeat step f.</li> </ul>
Check remaining bands	g. Turn power on, and select frequencies in remaining bands 2, 3, and 4. Note that positions agree with those given in figure 4-4. Alignment is complete.

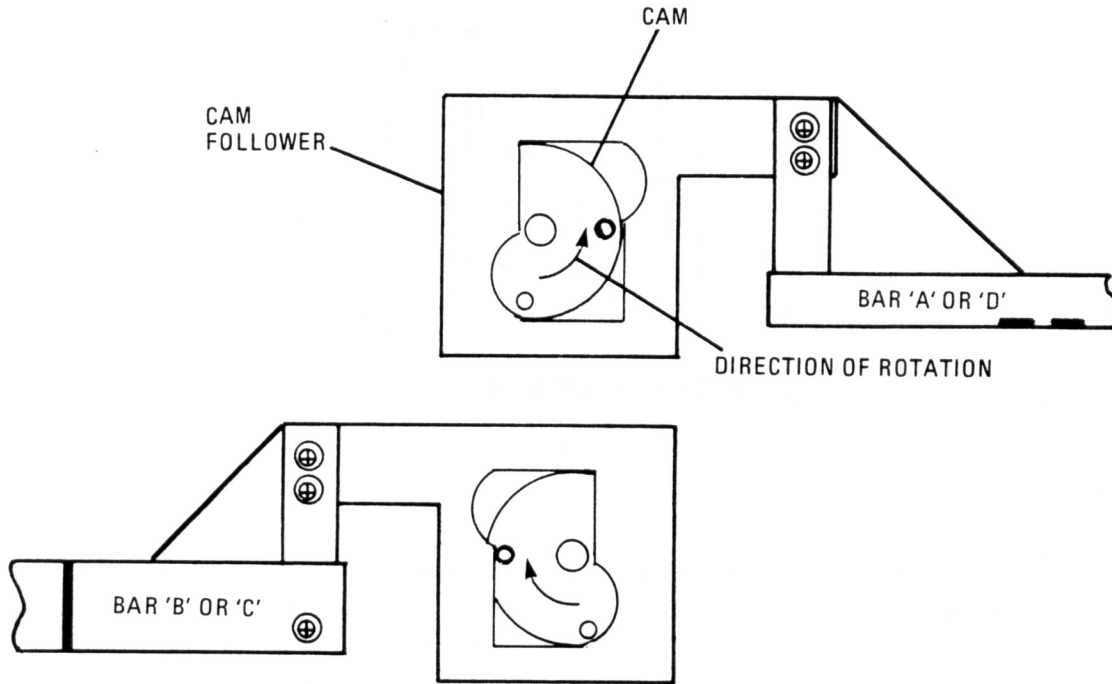


FREQ. RANGE	BAND	BAR A	BAR B	BAR C	BAR D
2 – 3.9999	1	F	F	F	F
4 – 7.9999	2	F	B	B	F
8 – 15.9999	3	B	F	F	B
16 – 29.9999	4	B	B	B	B

F – FORWARD OR FRONT

B – BACK OR REAR

Figure 4-4. Slider Bar Positions



NOTES:

1. ROTATE CAMS TO POSITION WHERE ALL BARS ARE FORWARD.
2. CAM IS PROPERLY POSITIONED ONLY WHEN CAM PINS ARE POSITIONED AS SHOWN.

551-010(2)

Figure 4-5. Cam Positions

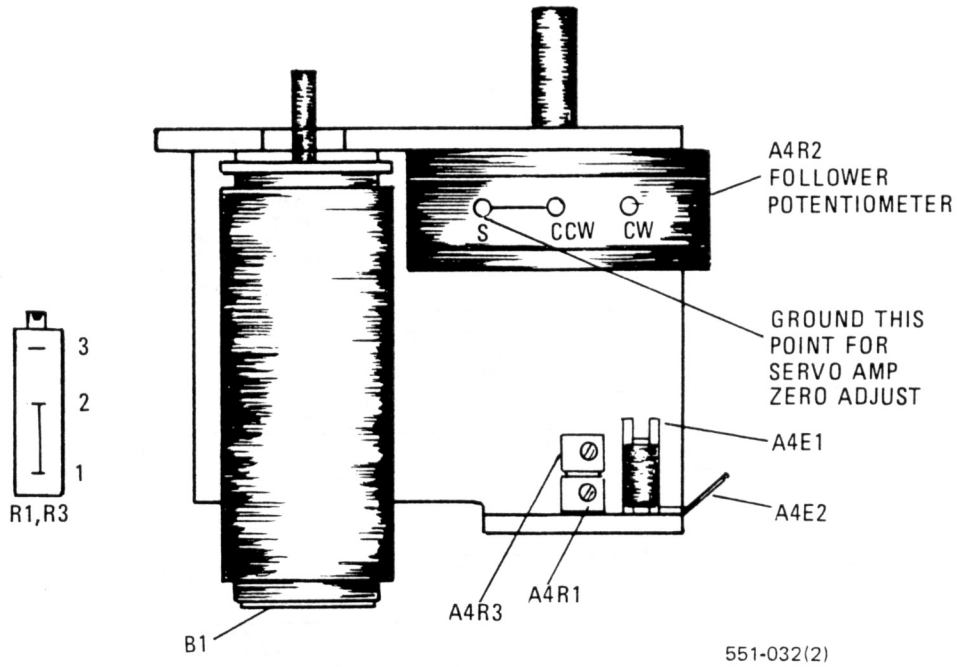


Figure 4-6. Locations of Connections on A4 Assembly

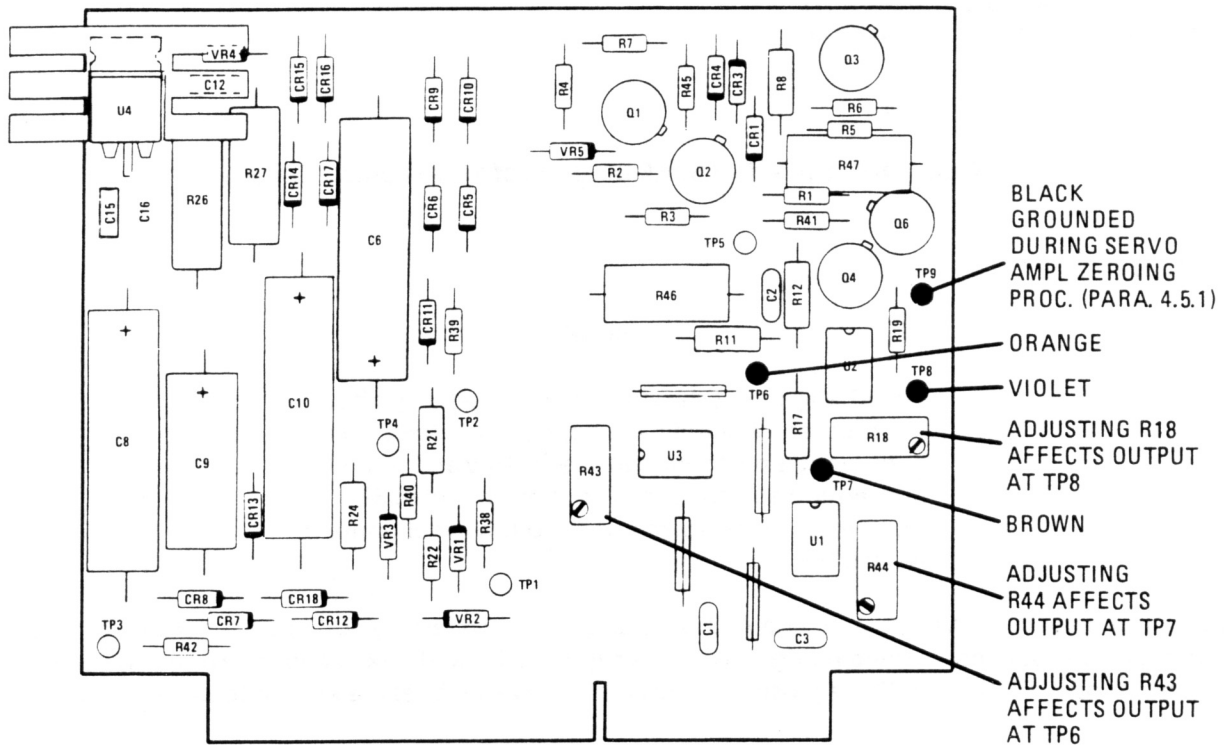
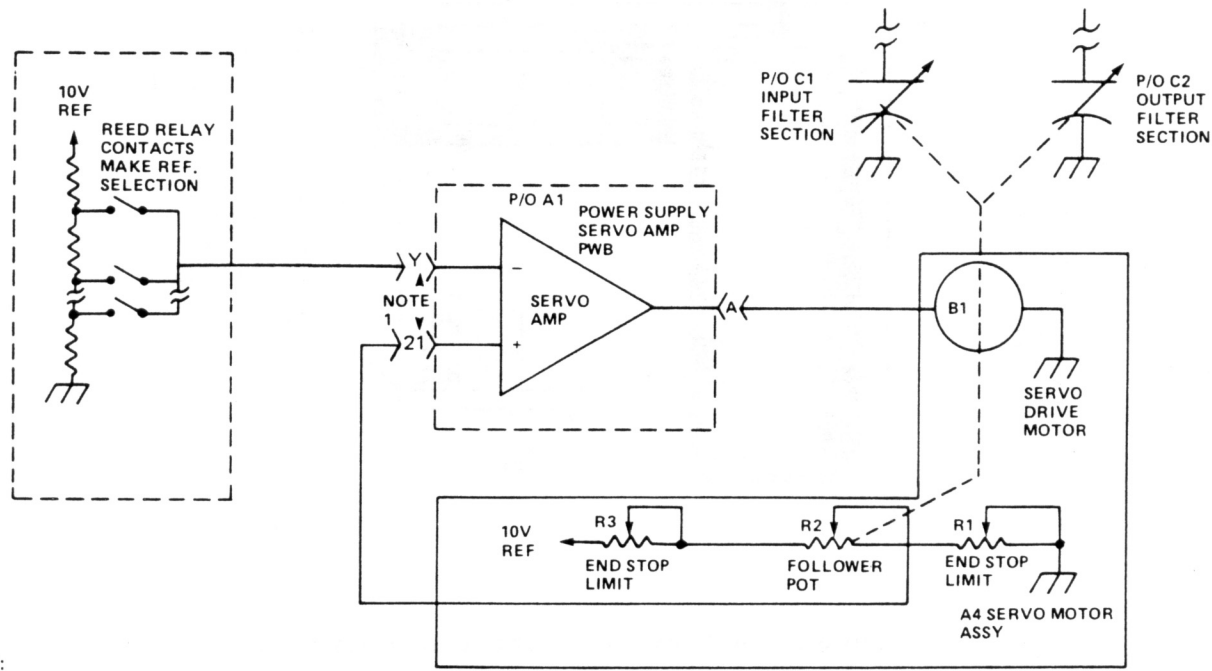


Figure 4-7. TP Locations on A1 PWB Power Supply/Servo Amplifier

591-16





NOTE:  
1. MOTOR WILL CONTINUE TO RUN UNTIL VOLTAGES AT PINS Y & 21 ARE EQUAL CAUSING THE OUTPUT AT PIN A TO BE 0 VOLTS.

551-015

Figure 4-8. Simplified Block Diagram of Servo Control Circuits

#### 4.6 RF ALIGNMENT

##### NOTE

The RF alignment should be performed only after the mechanical alignment has been verified. This alignment is performed at the factory and should not require adjustment. The recommended RF input level for performing the following alignment is -10 dBm.

The resonator assemblies A7, A8, A12, and A13 were aligned in the factory. Due to the nature of these assemblies, they should never need realignment. It is suggested that the skirt and insertion loss portion of this alignment, steps 6, 13, 18, and 22, be passed over unless these assemblies are known to be out of alignment.

Table 4-4 contains alignment procedures for setup and alignment of the RF-551A. Figure 4-9 shows locations of adjustments. Figures 4-10 and 4-11 are shown with table 4-4.

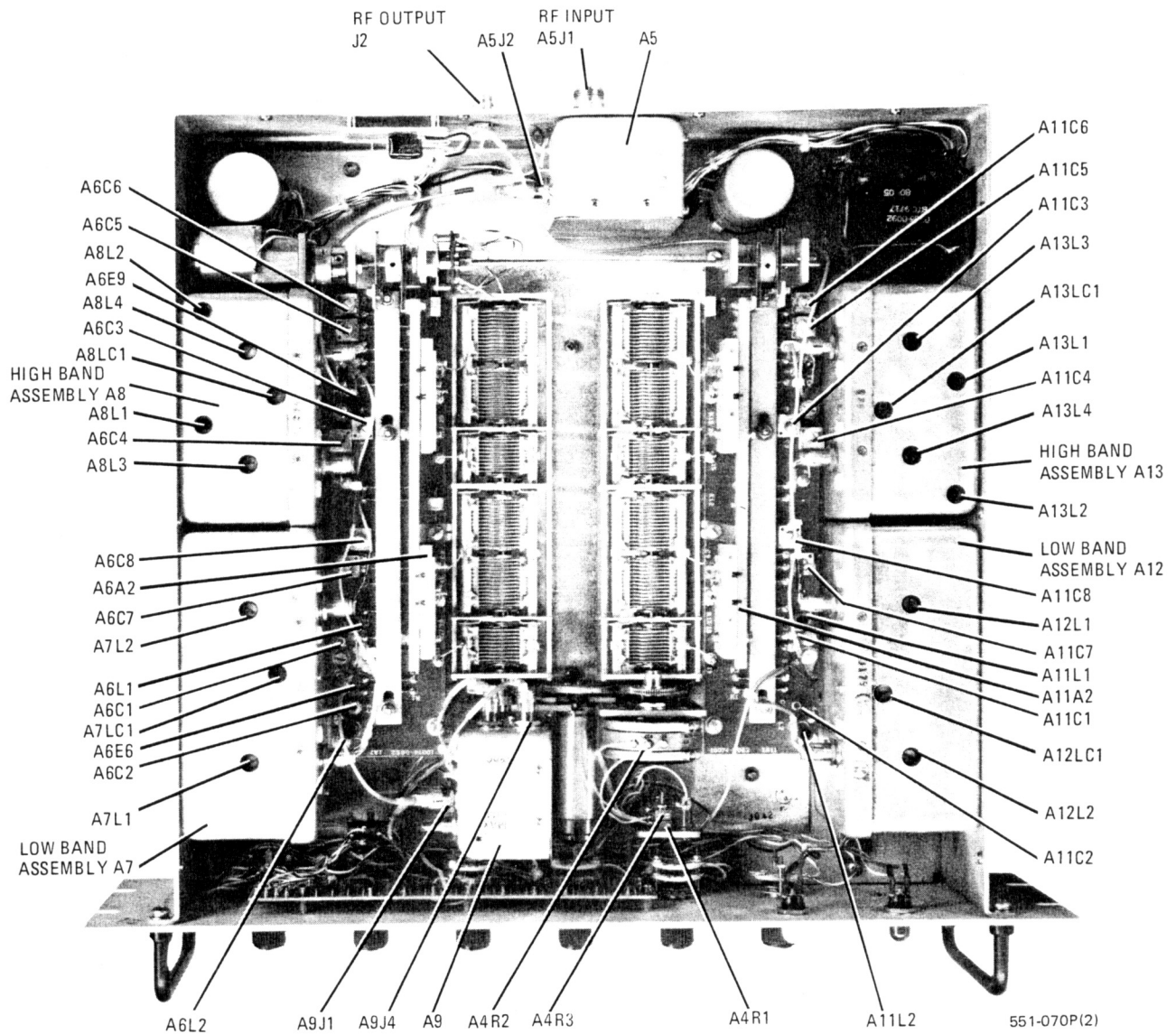


Figure 4-9. Adjustment Locations for Alignment

#### 4.6.1 Test Equipment

The following equipment is used to align the RF section of the RF-551A.

- a. Simpson Multimeter, Model 260.
- b. 100 watt RF amplifier.
- c. RF Voltmeter.
- d. Dc variable power supply, 0 to 30 Vdc adjustable.
- e. Spectrum analyzer and tracking generator.



Table 4-4. RF-551A Alignment Procedure

Frequency	Adjust	Adjust For	See Note	Repeat Steps
CONNECT EQUIPMENT AS SHOWN				
ANY	A6C1	Full counterclockwise	1	
2.000.0	A4R3	C1/C2 closed mesh - $\approx 10^\circ$ (slightly off end stop)	2, 3	
3.900.0	A4R1	C1/C2 open mesh - $\approx 10^\circ$ (slightly off end stop)	2, 3	Repeat step 3
2.000.0	A6L1, A6L2	Single Peak, Max Output	4	
2.000.0	A7L1, A7L2, A7LC1	Insertion loss, skirts	5	Repeat step 5
7.800.0	A6C2	Single peak, Max output	4	
2.200.0	A4R3	On frequency @ 2.200.0 MHz		
7.500.0	A4R1	On frequency @ 7.500.0 MHz	6, 7	Repeat step 8
3.500.0	A6C5, A6C7	On frequency @ 3.500.0 MHz insertion loss -6 dB		

Step	Frequency	Adjust	Adjust For	See Note	Repeat Steps
11	500.0	A6C1, A6C2	On frequency @ 7.500.0 MHz insertion loss -6 dB		Repeat steps 8 through 10
12	400.0	A8L1, A8L2	Max Out @ 8.400.0 MHz		
13	400.0	A8L3, A8L4, A8LC1	Insertion loss, skirts	8	Repeat step 12
14	1.000.0	A6C6, A6C8	On frequency @ 15.000.0 MHz insertion loss -6 dB		
15	1.000.0	A6C3, A6C4	On frequency @ 29.000.0 MHz insertion loss -6 dB		Repeat steps 12 through 14
16	CONNECT EQUIPMENT AS SHOWN				
17	200.0	A11L1, A11L2	Max output @ 2.200 MHz		
18	200.0	A12L1, A12L2, A12LC1	Insertion loss, skirts	5	Repeat step 17
19	500.0	A11C1, A11C2	On frequency @ 7.500 MHz insertion loss -6 dB		
20	500.0	A11C5, A11C7	On frequency @ 3.500 MHz insertion loss -6 dB		Repeat steps 17 and 19
21	400.0	A13L1, A13L2	Max output @ 8.400 MHz		

Step	Frequency	Adjust	Adjust For	See Note	Repeat Steps
22	8.400.0	A13L3, A13L4, A13LC1	Insertion loss, skirts	8	Repeat step 21
23	15.000.0	A11C6, A11C8	On frequency @ 15.000 MHz insertion loss -6 dB		
24	29.000.0	A11C3, A11C4	On frequency @ 29.000 MHz insertion loss -6 dB		Repeat step 21
25	CONNECT EQUIPMENT AS SHOWN				
26	2.200.0	A6L1, A6L2, A11L1, A11L2	Centered Frequency and Overall Gain of 5 to 12 dB		
27	3.500.0	A6C5, A6C7, A11C5, A11C7			
28	7.500.0	A6C1, A6C2, A11C1, A11C2			
29	8.400.0	A8L1, A8L2, A13L1, A13L2			
30	15.000.0	A6C6, A6C8, A11C6, A11C8			
31	29.000.0	A6C3, A6C4, A11C3, A11C4			

NOTES:

These notes refer to table 4-4.

- Glass variable capacitors A6C1, A6C2, A11C1, and A11C2 break very easily when jammed against their end stop. Rotate carefully and stop when a higher torque is encountered.
- Minus approximately 10 degrees ( $\approx 10^\circ$ ).
- Repeat steps 3 and 4 of the alignment procedure several times because these adjustments interact.

CAUTION

Do not allow servo to jam against end stops for a prolonged period or damage may result.

- Do not attempt to adjust output to proper frequency. Adjust for maximum peaked output while keeping A6L1 and A6L2 as close to electrical center as possible.
- On low band assembly A7 or A12, the three adjustments are used to obtain the wave shape in figure 4-9. Adjust for wave shape and insertion loss only.

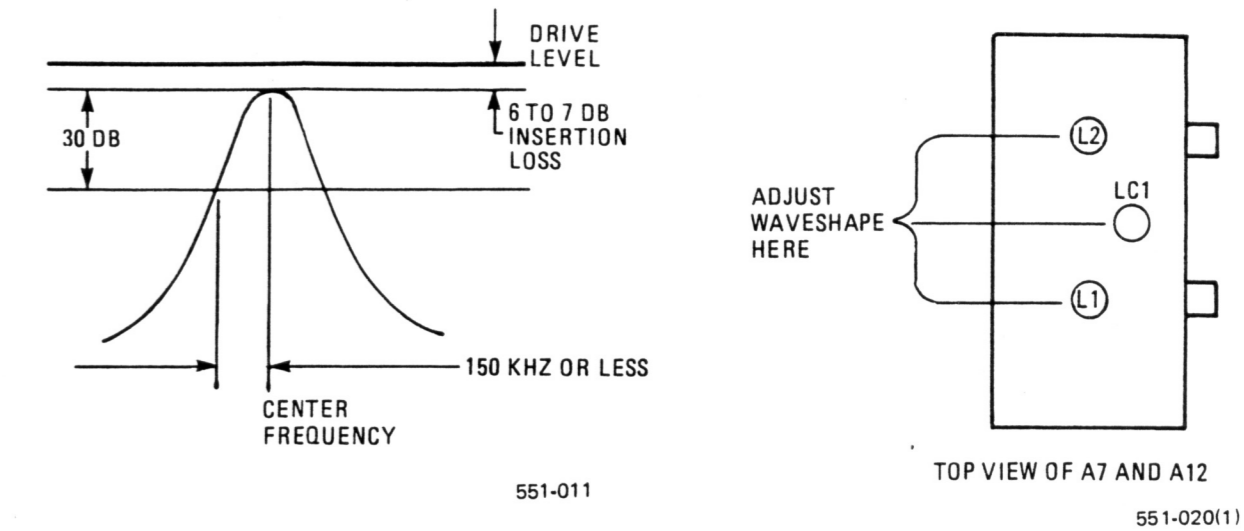


Figure 4-10. Low Band Assembly Wave Shape Adjustment

- Steps 8 and 9 interact and need to be repeated several times before going to next step.
- Connect a voltmeter (VOM or equivalent) across servo motor. Dial 7.9999 and check that voltage drops below 1 volt when motor stops. Dial 2.000 and repeat motor voltage test. This checks that servo is not jammed against end stop. If it does, some component in the RF path is out of tolerance and C1/C2 position is trying to compensate for the error. Troubleshoot before proceeding.
- On high band assembly A8 and A13, the three adjustments shown are used to obtain the wave shape shown in figure 4-10.

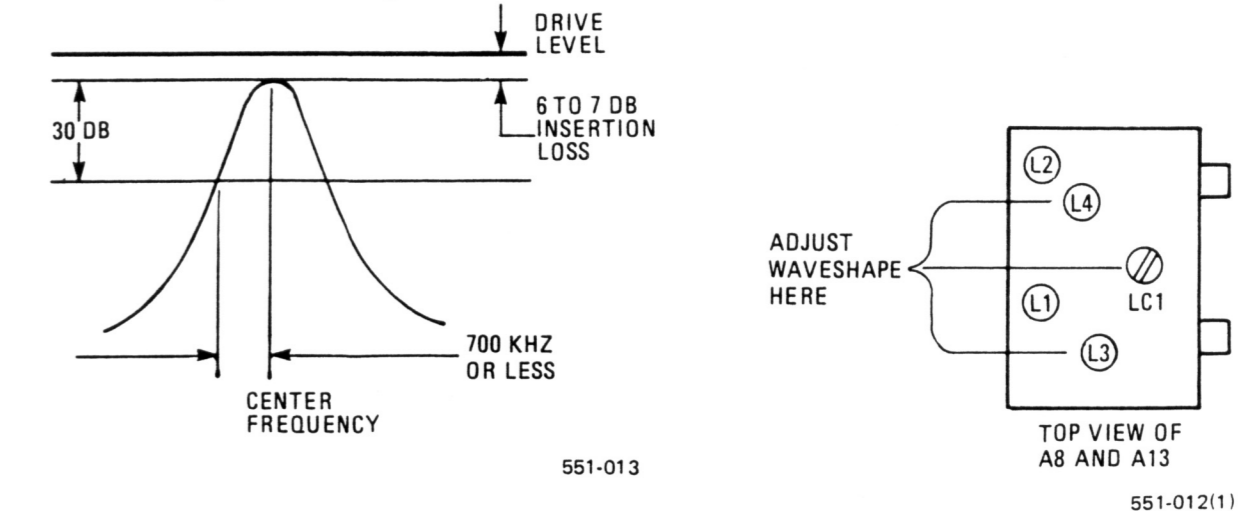


Figure 4-11. High Band Assembly Wave Shape Adjustment

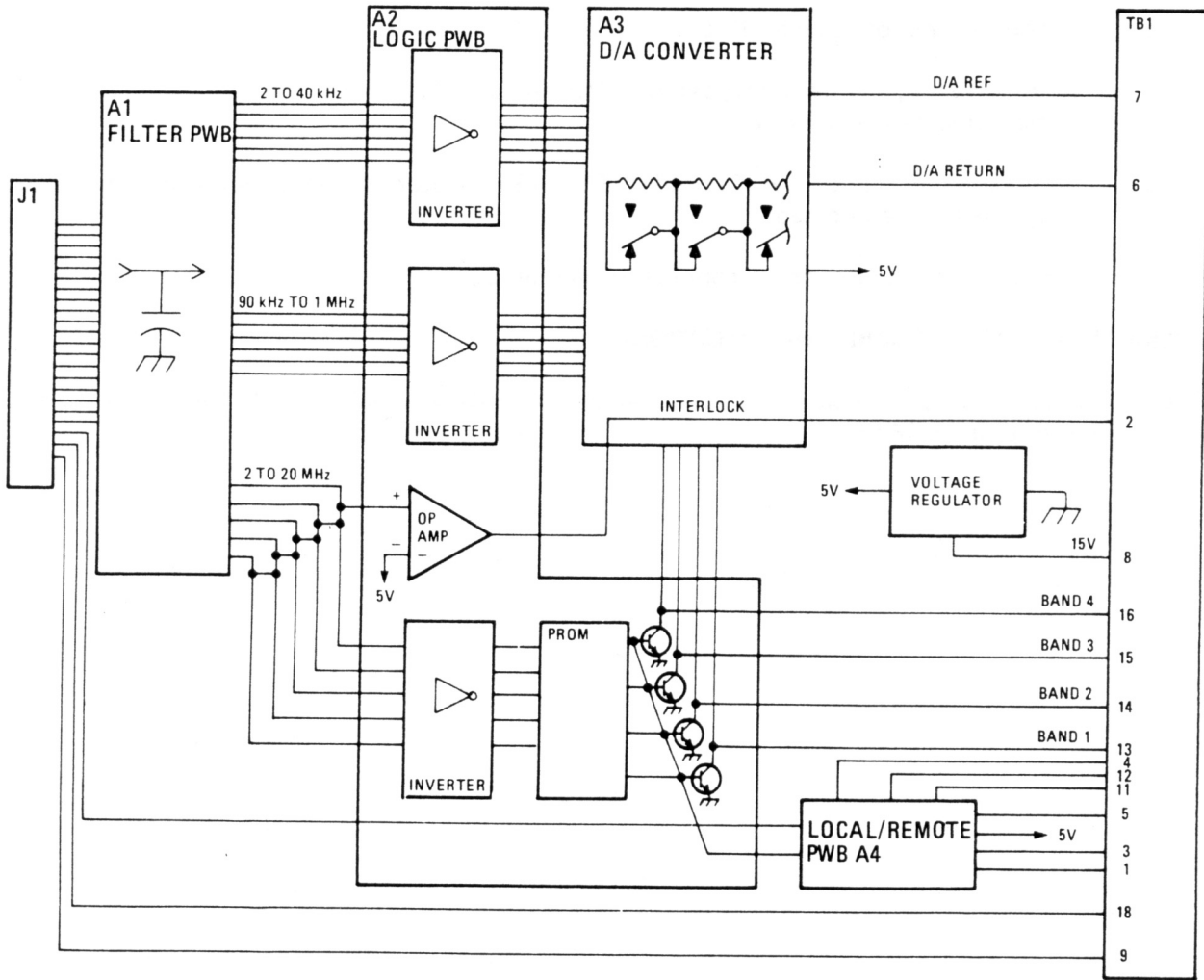
#### 4.7 OVERLOAD PROTECTION ADJUSTMENT

Proceed as follows to adjust the overload protection threshold.

- a. Remove coaxial cable from A5J2 and terminate J2 into 50 ohms.
- b. Connect output of 100 watt RF amplifier to A5J1.
- c. With power on, and frequency set to 10 MHz, adjust RF level until the voltage at A5J1 is 71 V<sub>rms</sub> as measured with an RF voltmeter.
- d. Adjust trimmer capacitor A5C1 until OVERDRIVE indicator on front panel is illuminated, and relay A5K1 is deenergized.
- e. Turn off power source and reconnect coaxial cables.

#### 4.8 REMOTE CONTROL ASSEMBLY RF-552 (OPTIONAL)

Figure 4-12 contains a simplified block diagram of Remote Control Assembly RF-552. This can be used as an aid in troubleshooting the RF-552.



551-007

Figure 4-12. Simplified Block Diagram of the Remote Control Assembly RF-552 (Optional)

## SECTION 5

### FUNCTIONAL DESCRIPTION

#### 5.1 GENERAL

This section contains RF-551A circuit descriptions, schematics, parts lists, and component locations. Assemblies covered in this section are as follows:

- RF-551A Interconnect Diagram
- A1 Power Supply/Servo Amplifier PWB
- A2 Front Panel
- A2A1 Resistor PWB
- A3 Bandswitch Motor Assembly
- A4 Servo Motor Assembly
- A5 Input Protection Assembly
- A6 and A11 Input and Output Bandswitch Assemblies
- A7 and A12 Low Band Assemblies
- A8 and A13 High Band Assemblies
- A9 RF Relay Box Attenuator
- A10 RF Amplifier PWB
- A14 Output Limiter Assembly

#### 5.2 OVERALL FUNCTIONAL DESCRIPTION

The RF-551A is a locally or remotely tuned active bandpass filter. Front panel controls provide tuning from 2.000 to 29.999 MHz in 1 kHz increments. The bandswitch circuits, A6 and A11, tune this frequency range in four octave bands; 2.000 to 3.999 MHz, 4.000 to 7.999 MHz, 8.000 to 15.999 MHz, and 16.000 to 29.999 MHz. Band changes are made automatically as the front panel frequency controls are changed. Tuning of the RF circuits is accomplished by a servo mechanism which automatically positions the multigang tuning capacitor whenever a new frequency is selected. Two sets of mutually coupled, double-tuned bandpass circuits (A7, A8, A12, and A13), provide the necessary selectivity.

The RF-551A provides a narrow bandpass centered on the selected frequency. The bandpass filter allows receiving and transmitting antennas to be located near each other, if the transmitting frequency is removed from the receive frequency by at least 10%, and the RF voltage is no more than  $71 V_{rms}$  on the receive antenna. Signals in the passband may be amplified by a low distortion RF amplifier (A10) that provides a nominal gain of 20 dB. Overall circuit gain is then 8 dB nominal.

An input RF protection circuit prevents damage to internal receiver components when excessive RF signals are present at antenna input connector J1. It also signals the operator, by means of the OVERDRIVE indicator, when such an overload occurs. This action takes place when RF voltages exceed  $71 V_{rms}$ . Protection is provided by opening a relay in the RF signal path.

Attenuation or amplification of the RF signal within the passband is selected by the GAIN switch. When the GAIN switch is set to HIGH, RF amplifier A10 is connected in series with the RF signal path that provides an overall gain of 8 dB nominal. When set to LOW, the RF signal is attenuated by the relay box attenuator A9, causing an overall attenuation of 24 dB.

Although RF amplifier A10 and the receiver will withstand moderate overloads for prolonged periods, additional protection is provided before the RF amplifier in the relay box attenuator A9 and at the RF output of the preselector. These limiters consist of two diodes of opposite polarities connected across a 50 ohm line. Each may be prebiased by potentiometers A9R1A and R1B. Thus, the maximum RF voltage may be limited over a range of approximately 0.5 to 15.0 volts.

### 5.3 RF-551A INTERCONNECT DIAGRAM

Refer to figure 5-1, RF-551A Interconnect Diagram. See table 5-1 for main frame parts lists.

### 5.4 POWER SUPPLY/SERVO AMPLIFIER PWB A1

See figure 5-2 for PWB A1 component locations and figure 5-3 for the schematic diagram. See table 5-2 for parts list information.

The power supply section of the Power Supply/Servo Amplifier PWB A1 converts the 115/230 volt, 50 to 400 Hz input to + 15 volts regulated, + 15 volts unregulated, -15 volts regulated, -15 volts unregulated, and + 24 volts regulated.

Diodes A1CR5, A1CR6, A1CR9, A1CR10 provide full-wave rectification for the + 15 V regulated and unregulated supply. Zener diode VR1 provides regulation of the + 15 volt regulated output. Zener diode VR2 regulates the D/A REF output at + 10 Vdc.

Diodes A1CR7, A1CR8, A1CR12, and A1CR18 provide full-wave rectification for the -15 volt regulated and unregulated supply. Regulation for the -15 volt regulated output is provided by Zener diode A1VR3.

The + 24 volt regulated supply has two outputs. One supplies the operating voltage for the RF amplifier PWB A10 and the other supplies all other + 24 volt loads such as the relays on the A5 assembly and that of the remote assembly. Full-wave rectification is provided by diodes A1CR14, A1CR15, A1CR16, and A1CR17. The + 24 volt regulated supply to the RF amplifier PWB is provided by a + 24 volt, 3-terminal regulator U4. Output current is internally limited at 1 ampere.

The servo amplifier section of Power Supply/Servo Amplifier PWB A1 essentially consists of three operational amplifiers (A1U1, A1U2, and A1U3) and two drive transistors (A1Q4 and A1Q6). Other components include potentiometers A1R18, A1R43, and A1R44, which allow adjustment of the op amps for any offset or inherent error voltage; and transistors A1Q1, A1Q2, and A1Q3, which are used to provide a ground on pin Z while the servo is running.



NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. THIS SCHEMATIC REPRESENTS THE RF-551A.
3. UNLESS OTHERWISE SPECIFIED:
  - A.) ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
  - B.) ALL CAPACITOR VALUES ARE IN MICROFARADS.

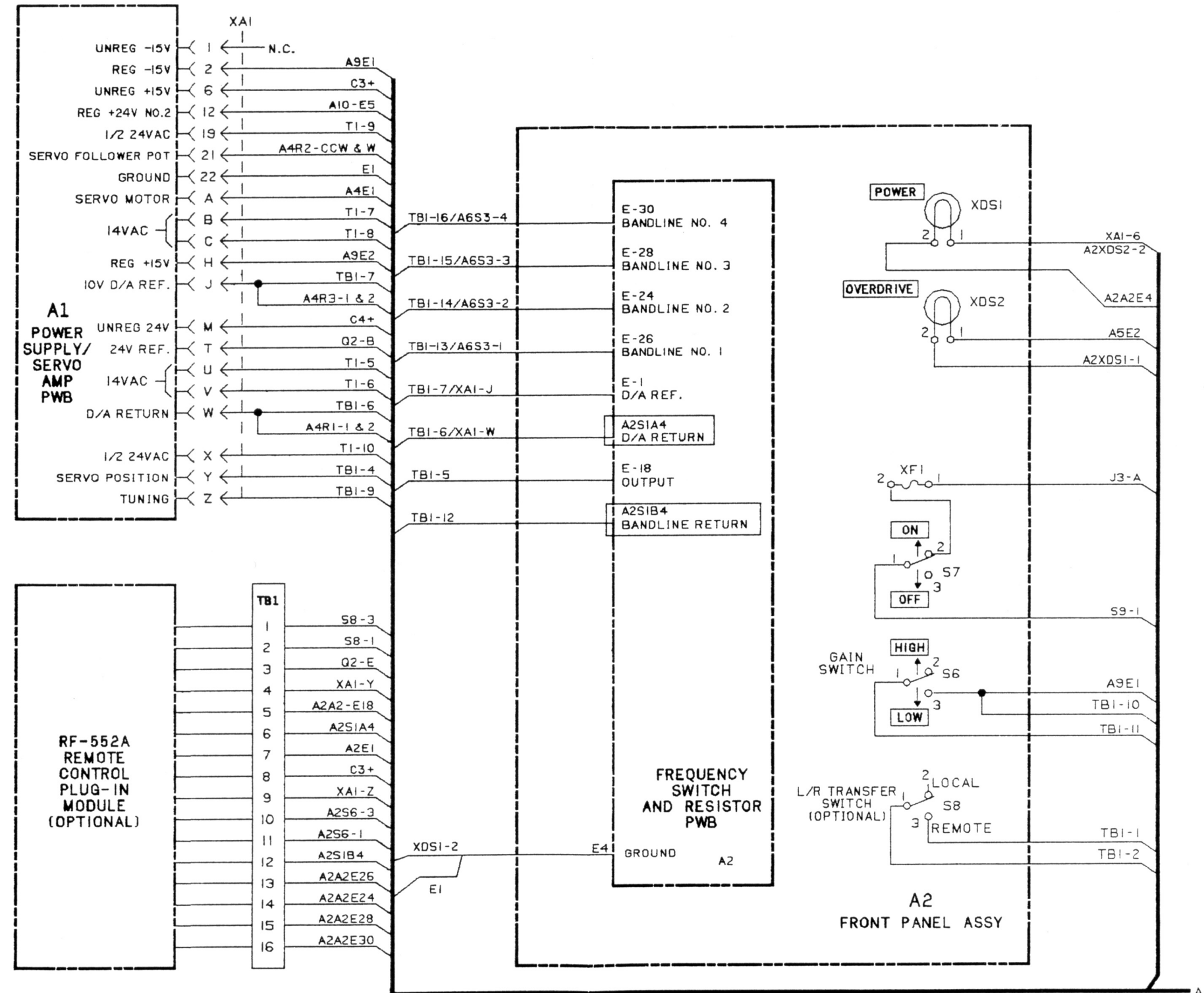
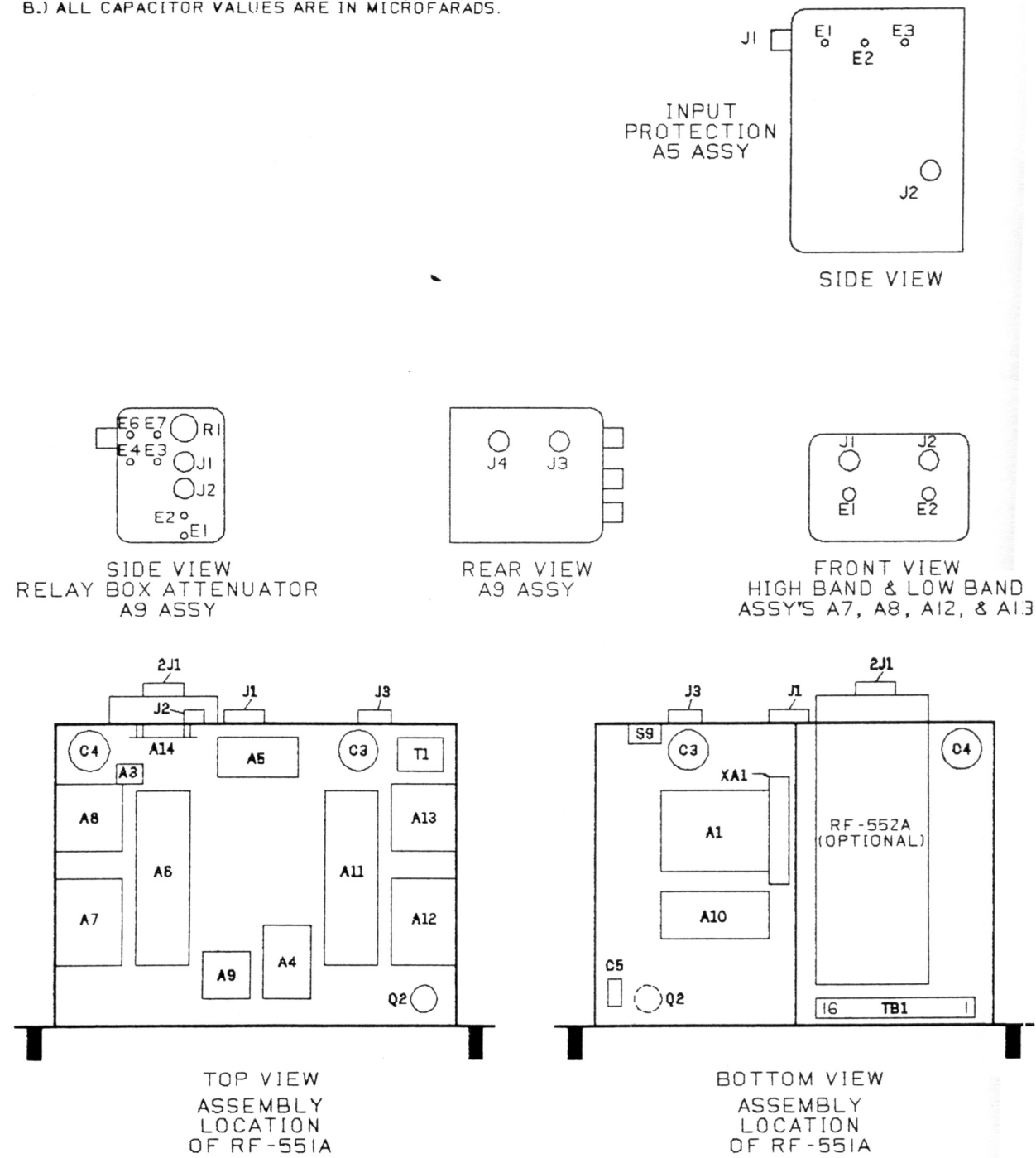


Figure 5-1. RF-551A Interconnect Diagram (10096-0025, Rev. C) (Sheet 1 of 3)

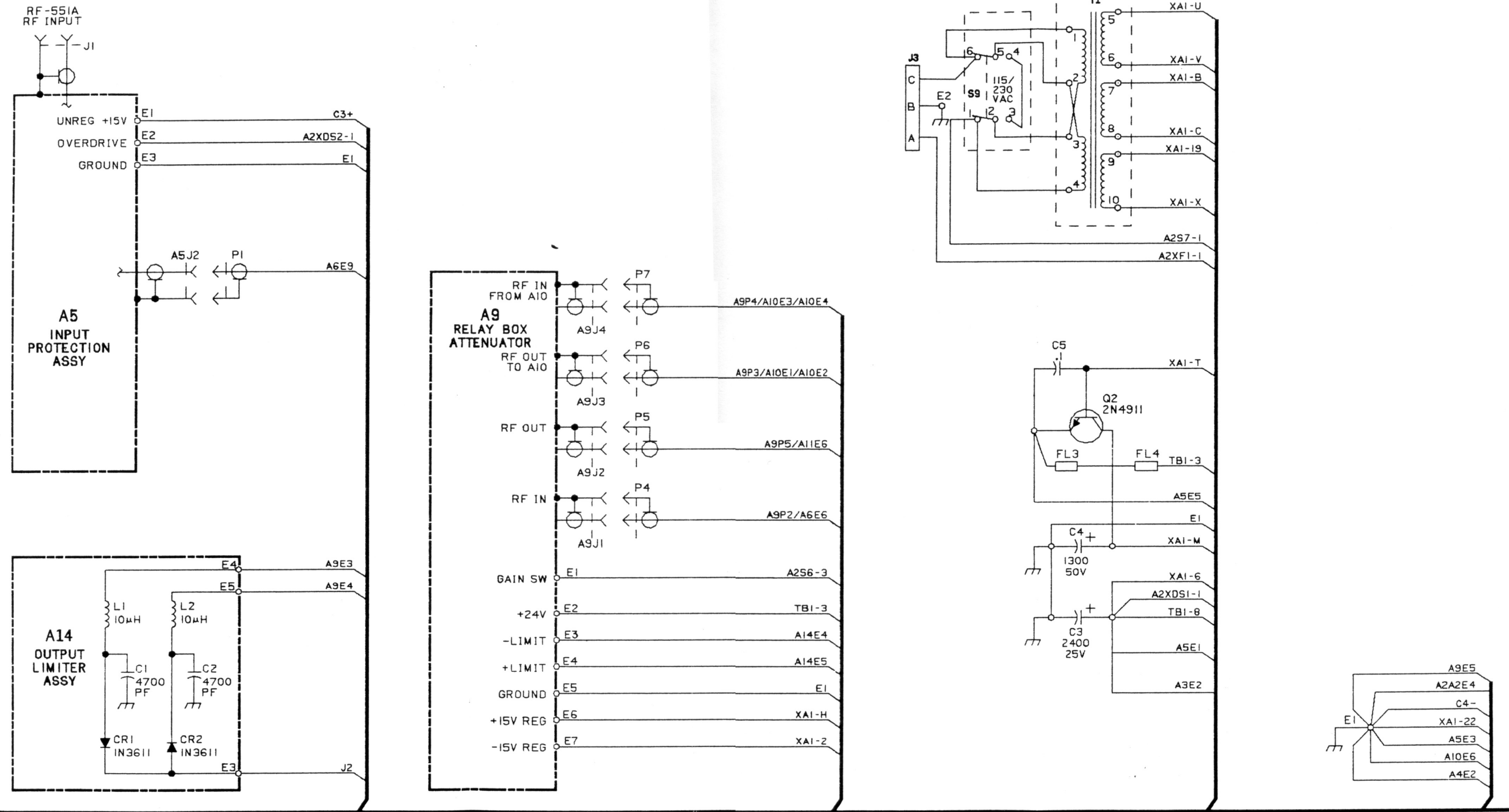


Figure 5-1. RF-551A Interconnect Diagram (10096-0025, Rev. C) (Sheet 2 of 3)

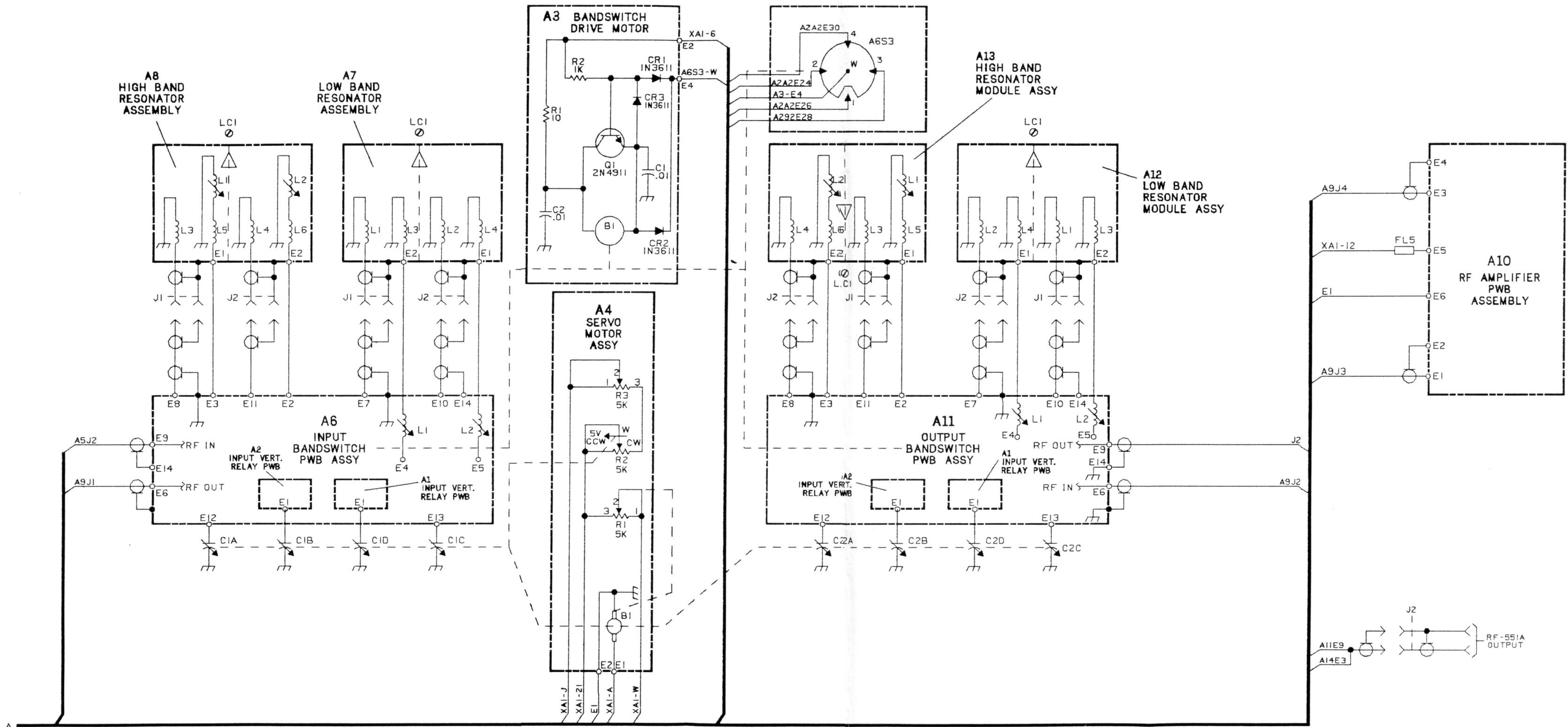


Figure 5-1. RF-551A Interconnect Diagram (10096-0025, Rev. C) (Sheet 3 of 3)

Table 5-1. RF-551A Main Frame (905-0000, Rev. F) Parts List

Ref. Desig.	Part Number	Description
---	905-0003	PRESELECTOR ASSY
1A1	6705-0020	POWER SPLY/SERVO AMP PWB
1A2	905-1000	FRONT PANEL ASSY
1A3	6748-0070	BANDSWITCH MOTOR ASSY
1A4	6705-5000	SERVO MOTOR ASSY
1A5	905-4000	INPUT PROTECTION ASSY
1A6	10074-1650	INPUT BANDSWITCH PWB ASSY
1A7	905-2000	LOW BAND ASSY
1A8	905-3000	HIGH BAND ASSY
1A9	6705-7000	RELAY BOX ATTENUATOR
1A10	10096-0030	RF AMPLIFIER PWB ASSY
1A11	10074-1640	OUTPUT BANDSWITCH PWB ASSY
1A12	905-2000	LOW BAND ASSY
1A13	905-3000	HIGH BAND ASSY
1A14	905-7050	OUTPUT LIMITER ASSY
C1	905-8002	CAP., VARIABLE
C2	905-0002	CAP., VARIABLE
C3	905-8003	CAP., ELECT., 3000UF, 25V
C4	905-8004	CAP., ELECT., 1600UF, 50V
C5	C11-0005-104	CAP, CER, .1UF, 50V
FL3	L50-0001-003	BEADS, FERRITE
FL4	L50-0001-003	BEADS, FERRITE
FL-5	L50-0001-003	BEADS, FERRITE
J1	UG-58A/U	CONN, ANTENNA INPUT, N-TYPE
J2	UG-625B/U	CONN, RF OUTPUT, BNC
J3	MS3102A-14S-2P	CONN, AC POWER
P1	10075-0254	CONN, PHONE PLUG
P4	10075-0254	CONN, PHONE PLUG
P5	10075-0254	CONN, PHONE PLUG
P6	10075-0254	CONN, PHONE PLUG
P7	10075-0254	CONN, PHONE PLUG
P8	10075-0254	CONN, PHONE PLUG
P9	10075-0254	CONN, PHONE PLUG
P10	10075-0254	CONN, PHONE PLUG
P11	10075-0254	CONN, PHONE PLUG
P12	10075-0254	CONN, PHONE PLUG
P13	10075-0254	CONN, PHONE PLUG
P14	10075-0254	CONN, PHONE PLUG
P15	10075-0254	CONN, PHONE PLUG
P16	10075-0254	CONN, PHONE PLUG
Q2	2N4911	XSTR, PWR
S3	905-8005	SWITCH, OPEN SENSING
S9	10075-0221	SWITCH, SLIDE, DPST
TB1	E31-0009-006	TERMINAL STRIP
T1	905-0092	XSFMR PWR
XA1	10075-0253	CONN, CARD EDGE

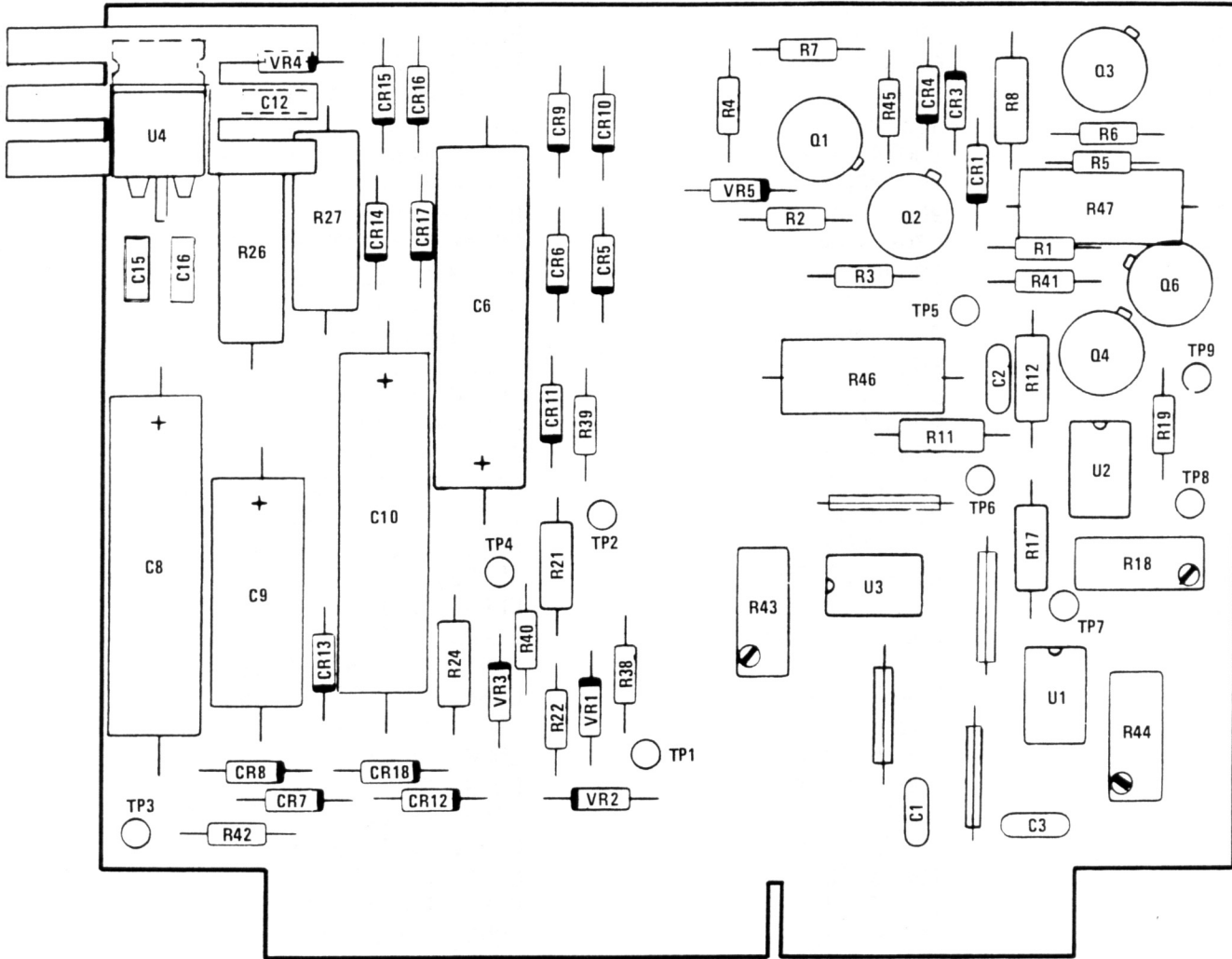


Figure 5-2. Power Supply/Servo Amplifier PWB A1 Component Locations (6705-0020, Rev. F)

NOTES:

1. UNLESS OTHERWISE INDICATED:

A. ALL RESISTORS ARE IN OHMS,  
1/4 W, 10%.

B. ALL DIODES ARE 1N3611.

C. ALL CAPACITORS ARE IN  
MICROFARADS.

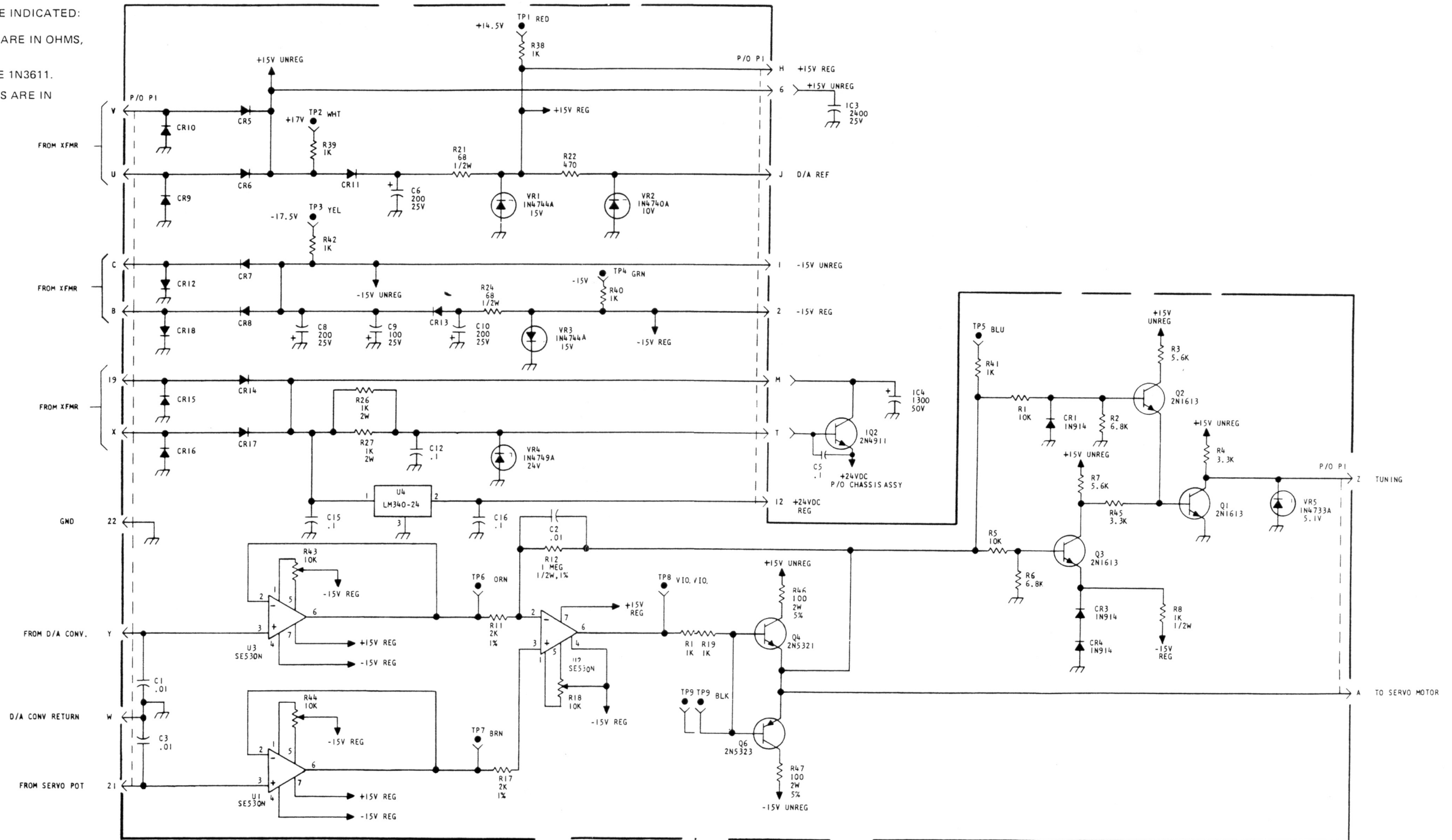


Figure 5-3. Power Supply/Servo Amplifier PWB A1 Schematic Diagram (6705-0022, Rev. D)

Table 5-2. Power Supply/Servo Amplifier PWB Assembly A1 (6705-0020, Rev. P) Parts List

Ref. Desig.	Part Number	Description
A1	6705-0020	POWER SUPPLY/SERVO AMP PWB
C1	M39014/01-1535	CAP .01UF
C2	M39014/01-1535	CAP .01UF
C3	M39014/01-1535	CAP .01UF
C6	10075-0216	CAPACITOR
C8	10075-0216	CAPACITOR
C9	10075-0215	CAPICITOR
C10	10075-0216	CAPACITOR
C12	M39014/01-1553	CAP, CERAMIC .10F
C15	M39014/01-1553	CAP, CERAMIC .10F
C16	M39014/01-1553	CAP, CERAMIC .10F
CR1	1N914	DIODE
CR3	1N914	DIODE
CR4	1N914	DIODE
CR5	CR-0034	DIODE, 3A 1KV
CR6	CR-0034	DIODE, 3A 1KV
CR7	CR-0034	DIODE, 3A 1KV
CR8	CR-0034	DIODE, 3A 1KV
CR9	CR-0034	DIODE, 3A 1KV
CR10	CR-0034	DIODE, 3A 1KV
CR11	CR-0034	DIODE, 3A 1KV
CR12	CR-0034	DIODE, 3A 1KV
CR13	CR-0034	DIODE, 3A 1KV
CR14	CR-0034	DIODE, 3A 1KV
CR15	CR-0034	DIODE, 3A 1KV
CR16	CR-0034	DIODE, 3A 1KV
CR17	CR-0034	DIODE, 3A 1KV
CR18	CR-0034	DIODE, 3A 1KV
Q1	2N1613	XSTR, SS/GP
Q2	2N1613	XSTR, SS/GP
Q3	2N1613	XSTR, SS/GP
Q4	2N5321	XSTR, SS/GP
Q6	2N5323	XSTR, SS/GP
R1	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R2	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R3	RCR07G562JM	RES,5.6K 5% 1/4W CAR COMP
R4	RCR07G332JM	RES,3.3K 5% 1/4W CAR COMP
R5	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R6	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R7	RCR07G562JM	RES,5.6K 5% 1/4W CAR COMP
R8	RCR20G102JM	RES,1.0K 5% 1/2W CAR COMP
R11	RN60C2001F	RES
R12	RN60C1004F	RES
R17	RN60C2001F	RES
R18	R30-0008-103	RES,VAR,PCB 10K 1/2W 10%
R19	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP

Table 5-2. Power Supply/Servo Amplifier PWB Assembly A1 (6705-0020, Rev. P) Parts List (Cont.)

Ref. Desig.	Part Number	Description
R21	RCR20G680JM	RES,68 5% 1/2W CAR COMP
R22	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R24	RCR20G680JM	RES,68 5% 1/2W CAR COMP
R26	RCR42G102JM	RES,1.0K 5% 2W CAR COMP
R27	RCR42G102JM	RES,1.0K 5% 2W CAR COMP
R38	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R39	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R40	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R41	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R42	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R43	R30-0008-103	RES,VAR,PCB 10K 1/2W 10%
R44	R30-0008-103	RES,VAR,PCB 10K 1/2W 10%
R45	RCR07G332JM	RES,3.3K 5% 1/4W CAR COMP
R46	RCR42G101JM	RES,100 5% 2W CAR COMP
R47	RCR42G101JM	RES,100 5% 2W CAR COMP
TP1	J-0066	TIP JACK, RED
TP2	J-0065	TIP JACK, WHITE
TP3	J-0070	TIP JACK, YELLOW
TP4	J-0068	TIP JACK, GREEN
TP5	J-0072	TIP JACK, BLUE
TP6	J-0069	TIP JACK, ORANGE
TP7	J-0071	TIP JACK, BROWN
TP8	J-0073	TIP JACK, VIOLET
TP9	J-0067	TIP JACK, BLACK
U1	10075-0246	IC,OP-AMP,SE530N
U2	10075-0246	IC,OP-AMP,SE530N
U3	10075-0246	IC,OP-AMP,SE530N
U4	I11-0001-008	IC VR 7824 +24V 1.5A 4%
VR1	1N4744A	DIODE 15V 5% 1W ZENER
VR2	1N4740A	DIODE 10V 5% 1W ZENER
VR3	1N4744A	DIODE 15V 5% 1W ZENER
VR4	1N4749A	DIODE 24V 5% 1W ZENER
VR5	1N4733A	DIODE 5.1V 5% 1W ZENER



Both A1U1 and A1U3 have uniform gains of "1". In A1U2, the D/A converter input is compared with the servo potentiometer input. A1U2 will generate a positive or negative output as a function of the polarity of the error voltage from the follower potentiometer on the tuning servo. A positive output from A1U2 will turn on A1Q4, applying a positive voltage to the tuning servo motor. A negative output from A1U2 will turn on A1Q6, applying a negative voltage to the tuning servo motor. In this way, the servo motor can be made to run in either direction until the precise balance point is found, where the follower potentiometer wiper voltage equals the reference voltage from the remote control module.

## 5.5 FRONT PANEL ASSEMBLY A2

Front panel assembly A2 (see table 5-3 for the parts list and figure 5-4 for the schematic diagram) consists of front panel switches S1 through S8 and Resistor PWB A2A1. This assembly, in conjunction with the servo amplifier section of A1, Bandswitch Motor Assembly A3, and Servo Motor Assembly A4, provides the control which tunes the RF-551A to the desired frequency.

Band selection is controlled by the 10 MHz and 1 MHz frequency switches (S1-B and S2-E) on the front panel. As the 10 MHz and 1 MHz frequency switches are positioned to the desired frequency, a ground is applied to one contact of open-seeking switch A6S3. Bandswitch motor A3B1 rotates while A6S3 seeks an open. When an open is found, the reed switches located in the input and output bandswitch circuits (A6/A11) have selected the proper band components for the desired frequency band. Refer to table 4-1 for a reed switch troubleshooting table.

Frequency selection is accomplished by use of a BCD to analog converter. The resistance between terminals E1 and E18 on Resistor PWB A2A1 is directly proportional to the frequency selected. For example, if the selected frequency was 21.754 MHz, the resistance between terminals E1 and E18 would be 21,754 ohms.

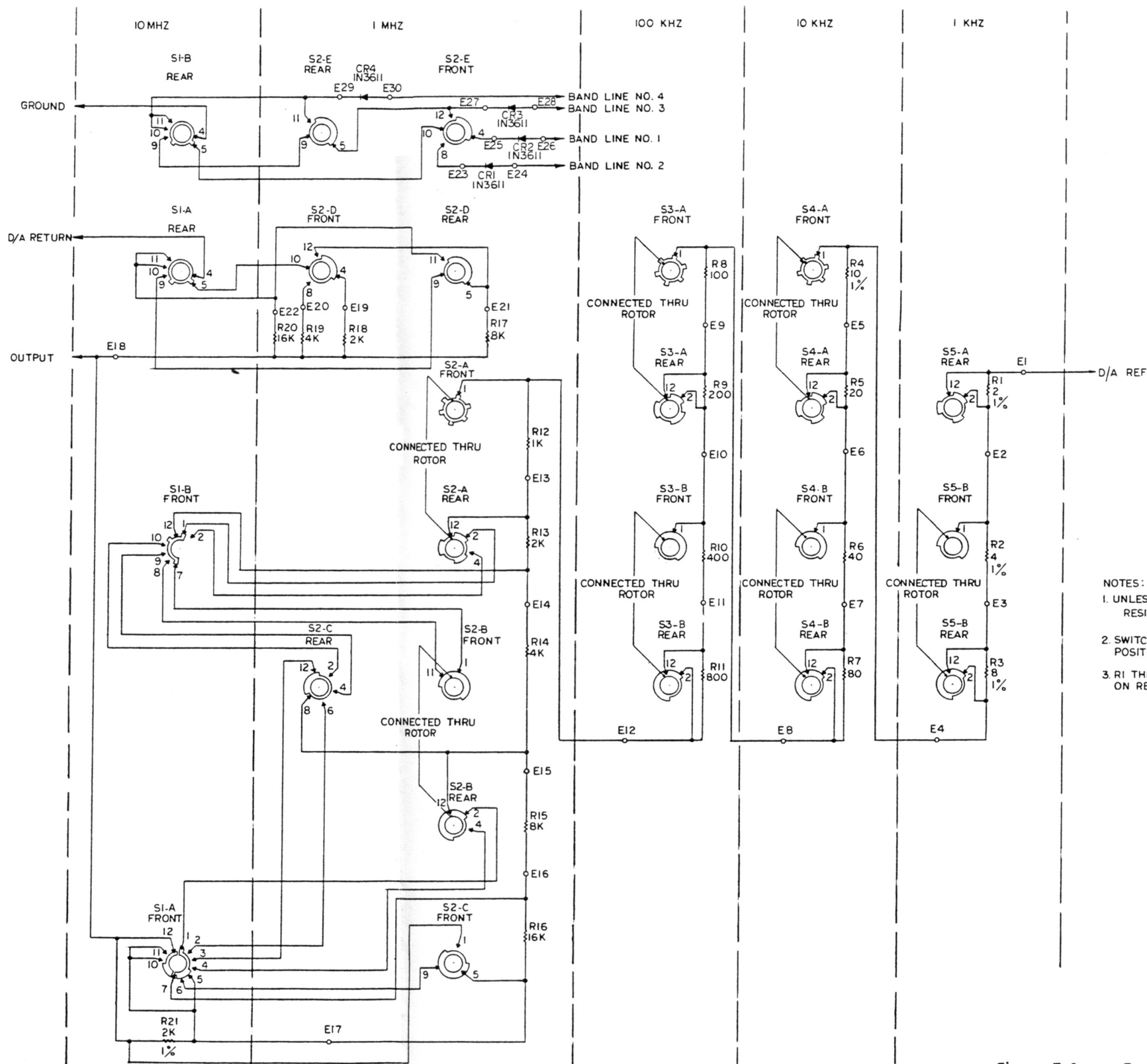
The resistance between the D/A return and terminal E18 is either 2000, 4000, 8000, or 16000 ohms depending upon whether band 1, 2, 3, or 4 is being used. This logic is performed by the interlocking switching of S1-A rear and S2-D. The largest resistor in use locks out any lower value so only one resistor will be connected. The resulting network is shown in simplified form in figure 5-5. The resistance between terminals E1 and E18 of the Resistor PWB is broken into two components:  $R_a$ , which is equal to the minimum frequency of the band selected, and a series variable resistance having a maximum of  $R_a$  and a minimum value of zero ohms. Then, by applying a reference voltage across the total network, the output voltage will swing from  $E_{ref}/2$  to  $E_{ref}/3$  linearly with frequency. The net result is an analog voltage proportional to the position of the selected frequency in the band.

If a potentiometer of the range  $0 - R_p$  is placed in series with two other resistors ( $R_p$ ) having fixed values, and the potentiometer (A4R2) ganged to variable capacitors C1 and C2, the capacitors can be made to move in the same linear manner as the frequency. Because the useful range of the capacitor is less than  $180^\circ$ , small differences in R1, R2, and R3 on servo assembly A4 are necessary.

Refer to figure 5-6 for Resistor PWB A2A1 component locations. A parts list for assembly A2A1 is given in table 5-4.

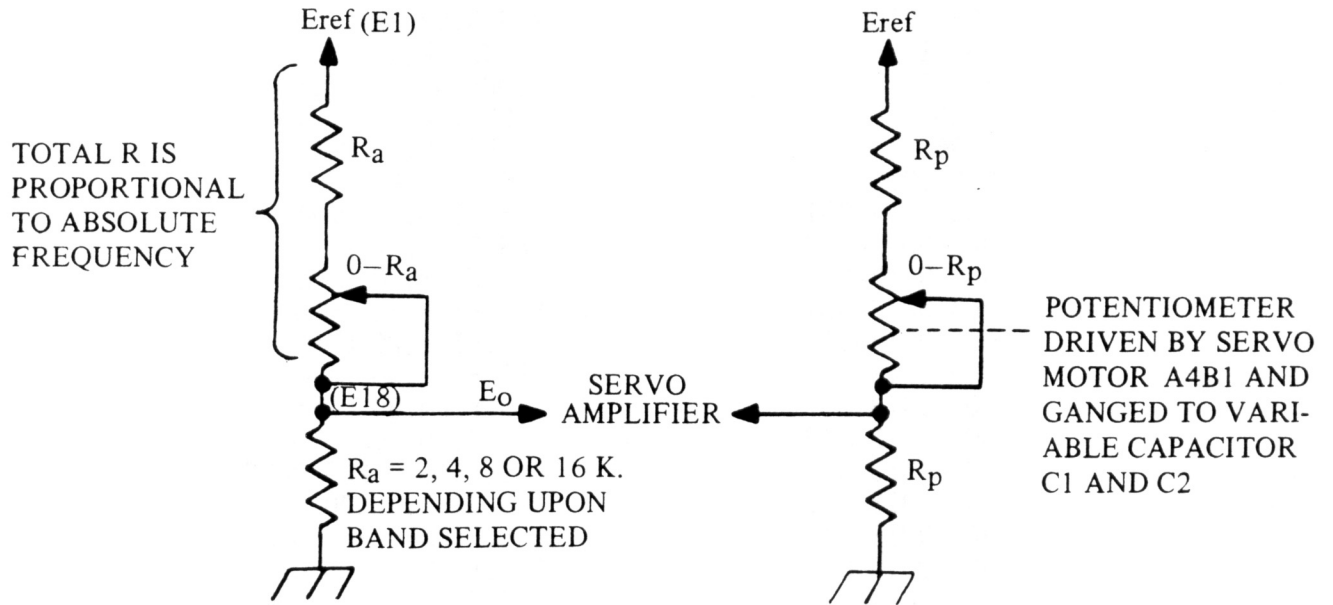
Table 5-3. Front Panel Assembly A2 (905-1000, Rev. G) Parts List

Ref. Desig.	Part Number	Description
A2	905-1000	FRONT PANEL ASSY
A2A1	905-0010	RESISTOR PWB ASSY
DS1	LC12YT	YELLOW LENS
DS2	LC12RT	RED LENS
F1	F02A250V1/2A	FUSE 1/2A QA 250V 3AG
S1	905-0094	SWITCH, 10 MHZ
S2	905-0093	SWITCH, 1 MHZ
S3	724-0015	SWITCH
S4	724-0015	SWITCH
S5	724-0015	SWITCH
S6	724-0017	SWITCH
S7	10075-0031	TOGGLE SWITCH, SPST
XDS1	LH73/1	LAMPHOLDER
XDS2	LH73/1	LAMPHOLDER
XF1	X-0006	FUSE HOLDER
	724-0193	KNOB, 0-2
	724-0194	CHANNEL KNOB
	MS91528-1F2B	KNOB



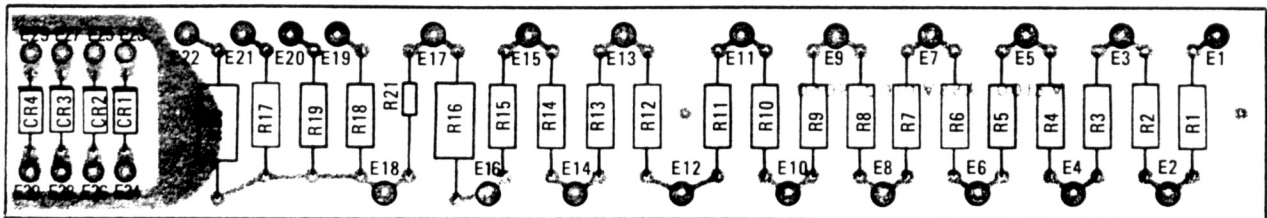
- NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, 0.1%.
  2. SWITCHES ARE SHOWN IN EXTREME CCW POSITION (ZERO FREQUENCY)
  3. R1 THRU R21 AND E1 THRU E22 ARE LOCATED ON RESISTOR ASSY 0905-0010

Figure 5-4. Front Panel Assembly A2 and Resistor PWB A2A1 Schematic Diagram (905-0011, Rev. A2)



551-031

Figure 5-5. Simplified Tuning System



COMPONENT VIEW SHOWING REVERSE SIDE TRACES

Figure 5-6. Resistor PWB A2A1 Component Locations (905-0010, Rev. A)

Table 5-4. Resistor PWB Assembly A2A1 (905-0010, Rev. B) Parts List

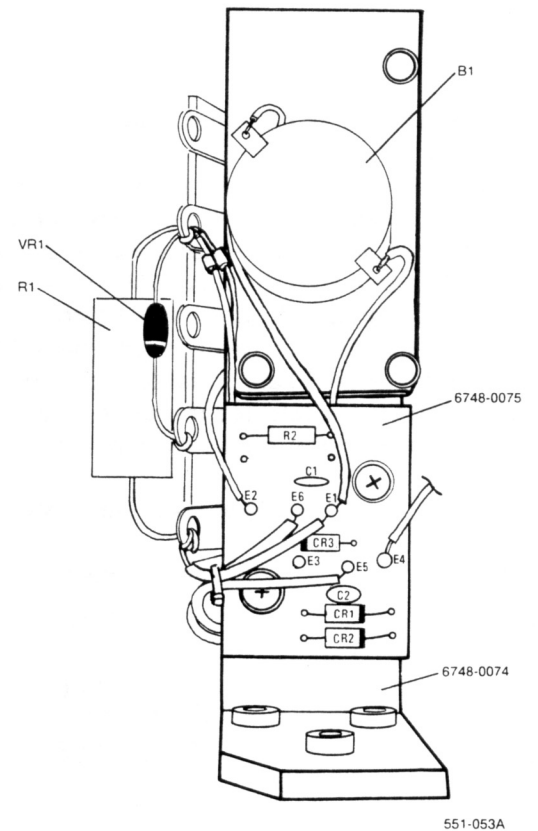
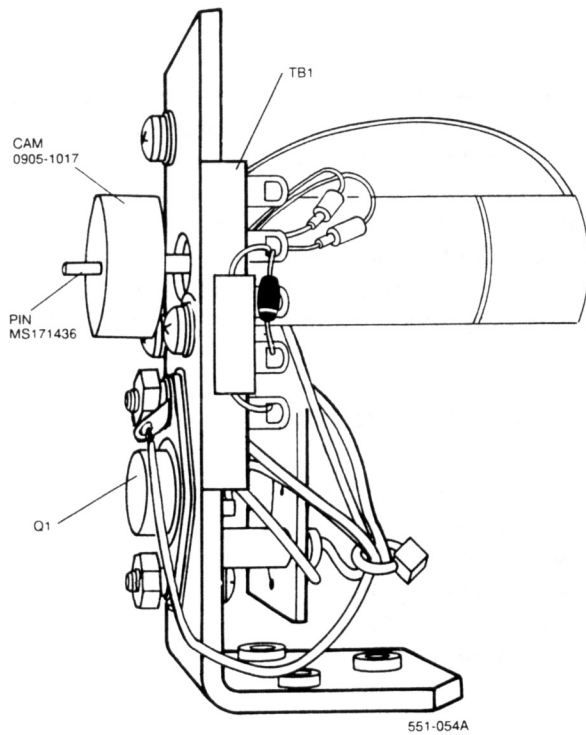
Ref. Desig.	Part Number	Description
A2A1	905-0010	RESISTOR PWB ASSY
CR1	1N3611	DIODE,GP,1A,200V
CR2	1N3611	DIODE,GP,1A,200V
CR3	1N3611	DIODE,GP,1A,200V
CR4	1N3611	DIODE,GP,1A,200V
MP1	905-0012	RESISTOR PC BD
R1	905-0013-001	RES,FILM, 2 OHMS
R2	905-0013-002	RES,FILM, 4 OHMS
R3	905-0013-003	RES,FILM, 8 OHMS
R4	905-0013-004	RES,FILM,10 OHMS
R5	905-0013-005	RES,FILM,20 OHMS
R6	905-0013-006	RES,FILM,40 OHMS
R7	905-0013-007	RES,FILM,80 OHMS
R8	905-0013-008	RES,FILM,100 OHMS
R9	905-0013-009	RES,FILM, 200 OHMS
R10	905-0013-010	RES,FILM, 400 OHMS
R11	905-0013-011	RES,FILM, 800 OHMS
R12	905-0013-012	RES,FILM, 1K OHMS
R13	905-0013-013	RES,FILM, 2K OHMS
R14	905-0013-014	RES,FILM, 4K OHMS
R15	905-0013-015	RES,FILM, 8K OHMS
R16	905-0013-016	RES,FILM, 16K OHMS
R17	905-0013-015	RES,FILM, 8K OHMS
R18	905-0013-013	RES,FILM, 2K OHMS
R19	905-0013-014	RES,FILM, 4K OHMS
R20	905-0013-016	RES,FILM, 16K OHMS
R21	RN60C2001F	RES

**5.6 BANDSWITCH MOTOR ASSEMBLY A3**

Bandswitch Motor Assembly A3 consists of motor A3B1, transistor Q1, and diodes CR1, CR2, and CR3. Motor A3B1 drives bandswitches A6 and A11 through a cam arrangement. It is controlled by open-seeking switch A6S3. Transistor Q1 acts as a dynamic brake to quickly stop motor rotation once an open has been found by A6S3. A parts list for A3 is given in table 5-5. Refer to figures 5-7 and 5-8 for component locations and schematic diagram.

**Table 5-5. Bandswitch Motor Assembly A3 (6748-0070, Rev. F) Parts List**

Ref. Desig.	Part Number	Description
A3	6748-0070	BANDSWITCH MOTOR ASSY
B1	905-1015	MOTOR ASSY
Q1	2N4911	XSTR, PWR
A3A1	6748-0075	PWB ASSY. BAND SWITCH MTR
C1	M39014/01-1535	CAP, .01UF
C2	M39014/01-1535	CAP, .01UF
CR1	1N3611	DIODE
CR2	1N3611	DIODE
CR3	1N3611	DIODE
R1	RCR42G390JM	RES, 39 5% 2W CAR COMP
R2	RCR07G102JM	RES, 1K, 1/4W, 5%
VR1	CR-0290	DIODE, ZENER, 5 WATT



**Figure 5-7. Bandswitch Motor Assembly A3 Component Locations**

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
  - A. ALL RESISTORS ARE IN OHMS, 1/4W,  $\pm 10\%$ .
  - B. ALL CAPACITORS ARE IN MICROFARADS.
2. PREFIX ALL REFERENCE DESIGNATORS WITH 1A3 AND APPLICABLE SUB-ASSEMBLY DESIGNATOR.

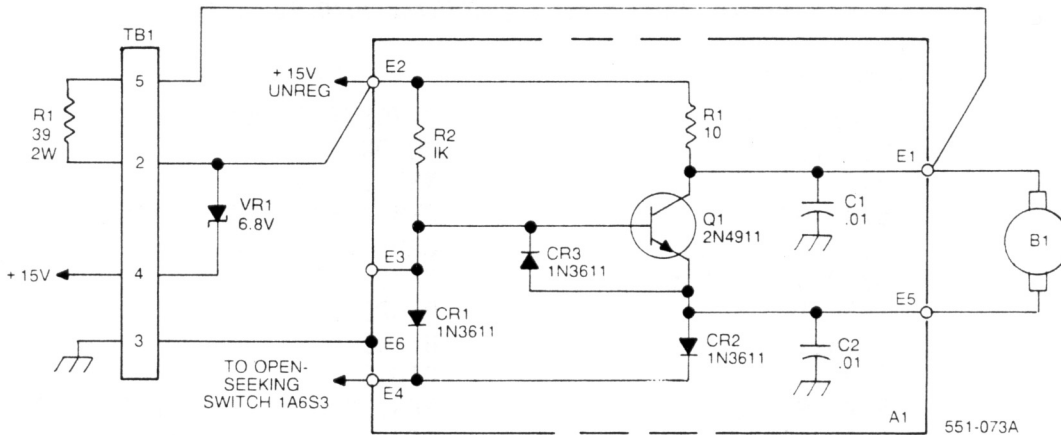


Figure 5-8. Bandswitch Motor Assembly A3 Schematic Diagram

5.7 SERVO MOTOR ASSEMBLY A4

For information on Front Panel control refer to paragraph 5.5 The following description refers to the control of the A4 Servo Motor Assembly by the RF-552 Remote Control Unit (optional). This servo motor is controlled by the selection of divider networks on the resistor PWB (A2A1). The output of the D/A Converter (pin Y) drives the servo amplifier in the RF-551A which in turn drives the servo motor B1. The servo motor is ganged to potentiometer A4R2 and the SLF (Straight Line Frequency) capacitors C1 and C2. The servo motor will rotate C1 and C2 until the output of the D/A Converter in the Remote Control Module and the output of potentiometer A4R2 are equal to each other. When the outputs are equal, capacitors C1 and C2 are positioned for the selected frequency. See table 5-6 for the A4 Assembly parts list and figures 5-9 and 5-10 for the component locations and schematic diagram.

Table 5-6. Servo Motor Assembly A4 (6705-5000, Rev. J) Parts List

Ref. Desig.	Part Number	Description
A4	6705-5000	SERVO MOTOR ASSY
B1	6705-5025	MOTOR ASSEMBLY
R1	10075-0006	RES, VAR, CERMET, 5K
R2	10075-0222	RES, VAR, CERMET
R3	10075-0006	RES, VAR, (CERMET 5K)

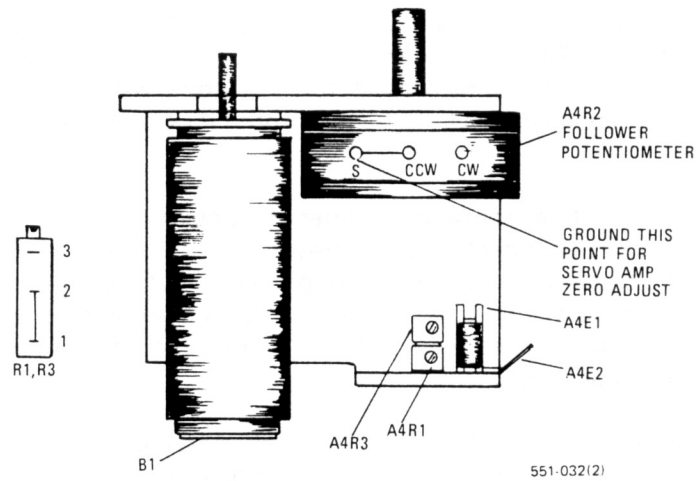
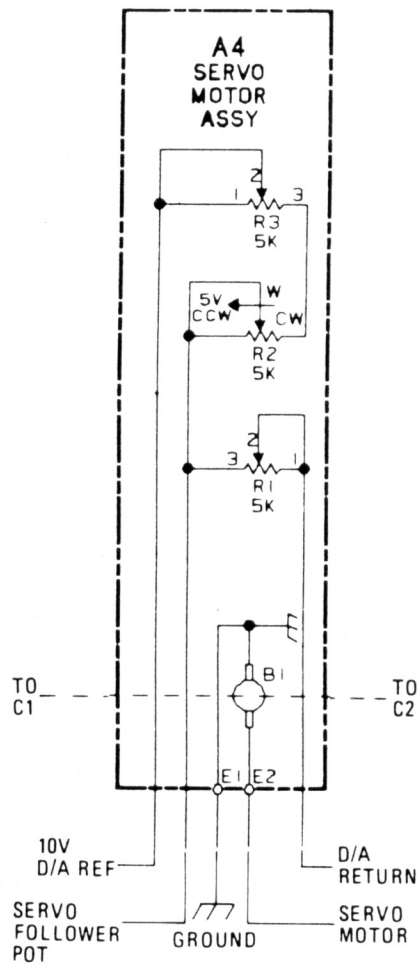


Figure 5-9. Servo Motor Assembly A4 Component Locations



551-036

Figure 5-10. Servo Motor Assembly A4 Schematic Diagram



## 5.8 INPUT PROTECTION ASSEMBLY A5

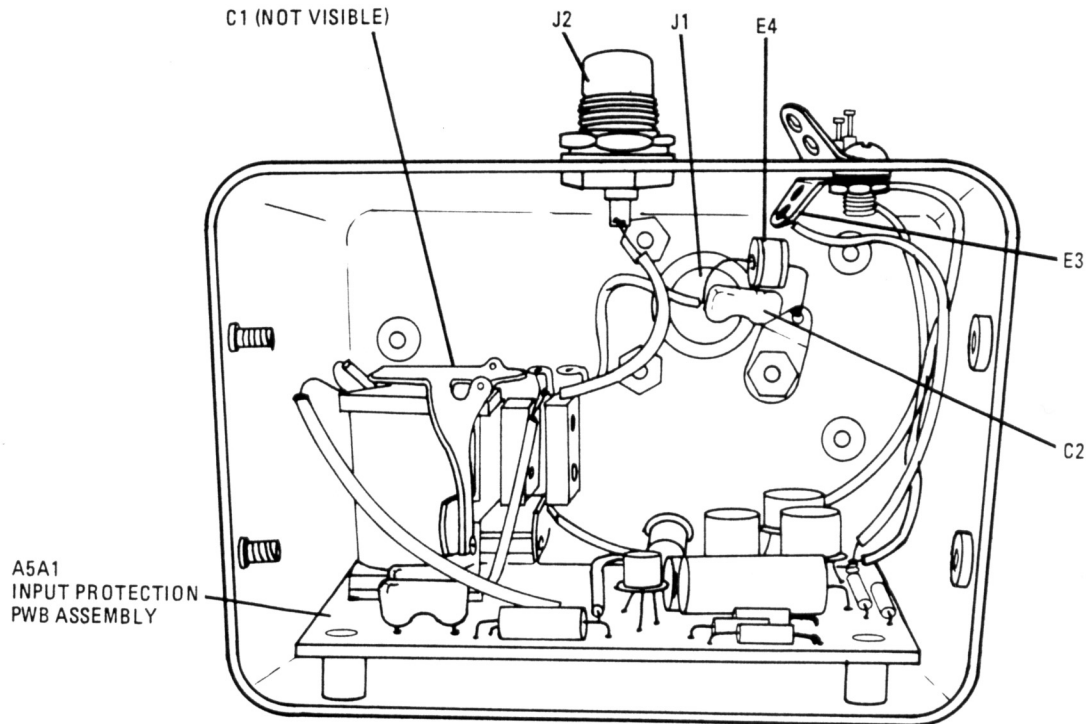
As the RF input signal level reaches  $71 V_{rms}$ , the overdrive sensing diode A5CR1 will develop a sufficient voltage to turn on the indication lamp. This causes A5K1 on the Protection PWB Assembly to deenergize. This opens the signal path and prevents damage to the preselector. The signal will be routed to E2 on the Overdrive Protection A5A1 PWB where it continues to be monitored for a high level condition through capacitors C3 and C4 and diode CR2.

Depending on impedance and the length of transmission lines, it is possible to have the voltage change from its maximum rms voltage with the input connected to the preselector to no voltage when the input is open circuited. Such a condition would cause A5K1 to chatter. To prevent this, feedback resistors A5A1R4 and A5A1R5 latch A5A1Q1 on, once A5K1 is deenergized. Then, in approximately three seconds, unijunction transistor A5A1Q3 will turn on, shorting the feedback voltage. If no detected RF is present, A5A1Q1 will turn off and return the circuit to normal operation.

If a detected RF signal is present, the voltage holds A5A1Q1 on until A5A1Q3 turns off again. At this point, the feedback from A5A1Q3 latches the circuit again. This sampling occurs every three seconds until the overload is removed, at which time the protection circuit will automatically reconnect the preselector to the RF input. Table 5-7 is the Input Protection Assembly parts list. Figures 5-11 and 5-12 are the Input Protection Assembly schematic and component locations diagrams.

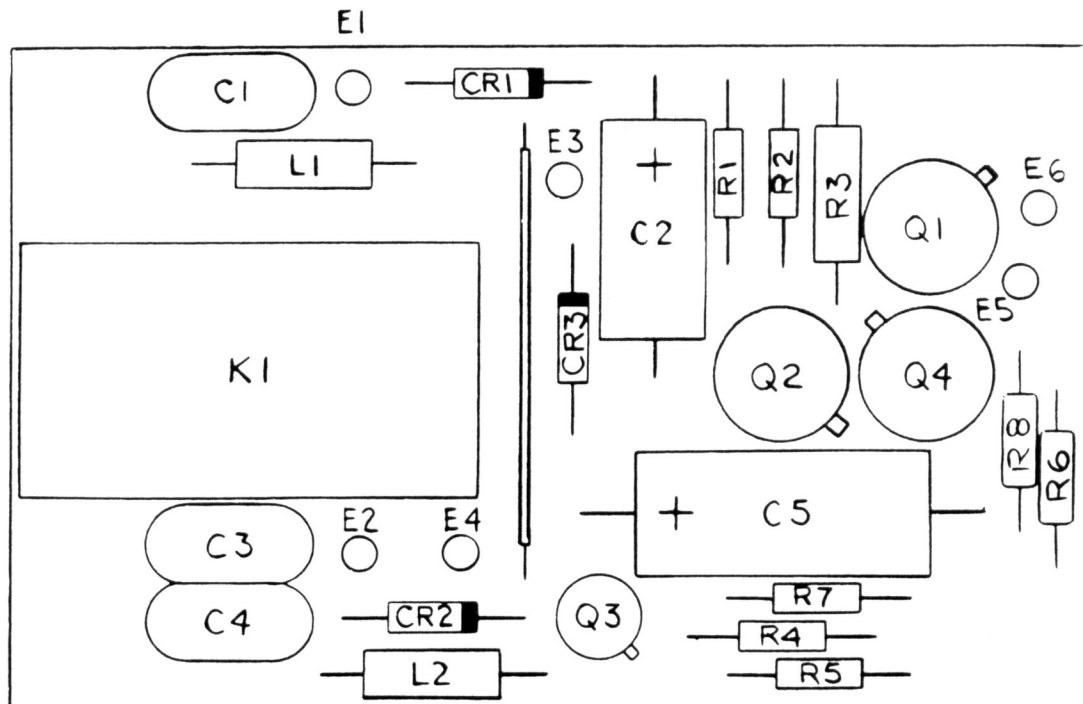
Table 5-7. Input Protection Assembly A5 (905-4000, Rev. C) Parts List

Ref. Desig.	Part Number	Description
A5	905-4000	INPUT PROTECTION ASSY
C1	10075-0225	CAPACITOR
C2	CM05CD050D03	CAP 5PF +- .5PF 500V MICA
E4	10075-0224	SURGE ARRESTOR, 23
J1	UG-58A/U	JACK, PANEL, N-F
J2	10075-0273	PHONE JACK
A5A1	905-4010	PC BD ASSY INPUT PROT CKT
C1	CM05FD121J03	CAP 120PF 5% 50
C2	10075-0212	CAP, FXD, ELECT
C3	CM05CD010K03	CAP MICA
C4	CM05CD120K03	CAP MICA
C5	10075-0214	CAP, FXD, ELECT
CR1	1N914	DIODE
CR2	1N914	DIODE
CR3	1N3611	DIODE, GP, 1A, 200V
K1	10075-0218	RLY, 12VDC
L1	L10-0006-750	CHOKE, 75UH
L2	L10-0006-750	CHOKE, 75UH
Q1	2N1613	XSTR, SS/GP
Q2	2N1613	XSTR, SS/GP
Q3	2N4851	XSTR, UJT
Q4	2N1613	XSTR, SS/GP
R1	RCR07G102JM	RES, 1.0K 5% 1/4W C
R2	RCR07G331JM	RES, 330 5% 1/4W C
R3	RCR20G152JM	RES, 1.5K 5% 1/2W C
R4	RCR07G472JM	RES, 4.7K 5% 1/4W C
R5	RCR07G472JM	RES, 4.7K 5% 1/4W C
R6	RCR07G332JM	RES, 3.3K 5% 1/4W C
R7	RCR07G331JM	RES, 100K 5% 1/4W C
R8	RCR07G102JM	RES, 1.0K 5% 1/4W C



551-058(2)

DETAIL A. ASSEMBLY COMPONENT DIAGRAM



551-073

DETAIL B. INPUT PROTECTION PWB COMPONENT LOCATION DIAGRAM

Figure 5-11. Input Protection Assembly A5 Component Locations



NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. UNLESS OTHERWISE SPECIFIED:
  - A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
  - B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

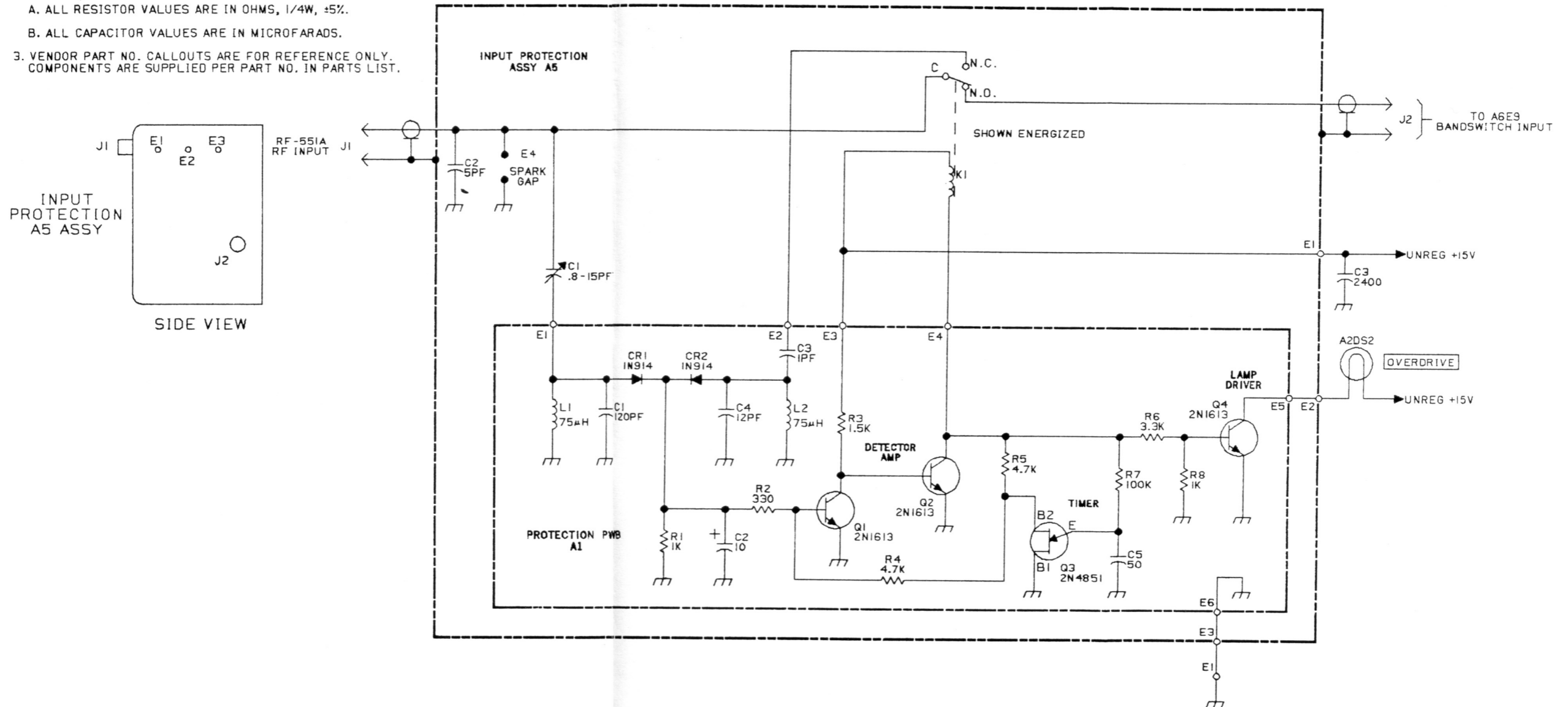


Figure 5-12. Input Protection Assembly A5 Schematic Diagram (905-4001, Rev. E)

**5.9 INPUT BANDSWITCH PWB ASSEMBLY A6**

The slider bar is moved by the selection of a frequency at the front panel of the RF-551A. This causes the reed switch to be activated and select the proper resonator assembly and connect it with the proper sections of C1 and C2.

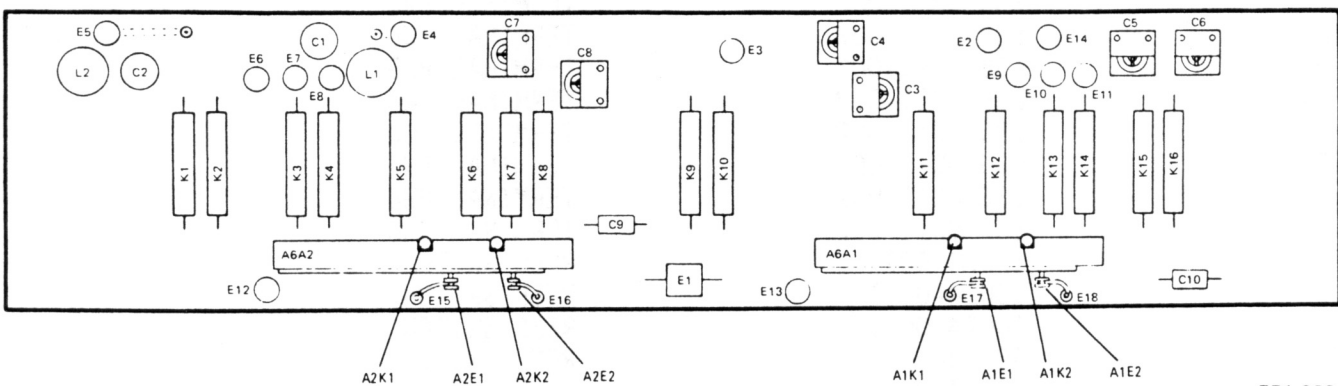
Table 5-8 is a parts list for the Input Bandswitch PWB Assembly A6. Figures 5-13 and 5-14 are the component location diagram and schematic diagram of the input bandswitch.

**Table 5-8. Input Bandswitch PWB Assembly A6 (10074-1650, Rev. D) Parts List**

Ref. Desig.	Part Number	Description
A6	10074-1650	INPUT BANDSWITCH PWB ASSY
C1	10075-0223	CAPACITOR, TRIMMER
C2	10075-0223	CAPACITOR, TRIMMER
L1	10074-0013	TRIMMER COIL ASSY
L2	10074-0013	TRIMMER COIL ASSY
---	10074-2500	PWB ASSY, INPUT BANDSW.
C3	C-4643	CAPACITOR, VARIABLE, 1.5-11.6 PF
C4	C-4643	CAPACITOR, VARIABLE, 1.5-11.6 PF
C5	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C6	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C7	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C8	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C9	10075-0217	CAPACITOR, PORC., 47 PF
C10	10075-0217	CAPACITOR, PORC., 47 PF
E1	10075-0224	SURGE ARRESTOR
E2	E36-0011-002	TERMINAL PWB
E3	E36-0011-002	TERMINAL PWB
E4	E36-0011-002	TERMINAL PWB
E5	E36-0011-002	TERMINAL PWB
E6	E36-0011-002	TERMINAL PWB
E7	E36-0011-002	TERMINAL PWB
E8	E36-0011-002	TERMINAL PWB
E9	E36-0011-002	TERMINAL PWB
E10	E36-0011-002	TERMINAL PWB
E11	E36-0011-002	TERMINAL PWB
E12	E36-0011-002	TERMINAL PWB
E13	E36-0011-002	TERMINAL PWB
E14	E36-0011-002	TERMINAL PWB
K1	10074-0011	REED SWITCH
K2	10074-0011	REED SWITCH
K3	10074-0011	REED SWITCH
K4	10074-0011	REED SWITCH
K5	10074-0011	REED SWITCH
K6	10074-0011	REED SWITCH
K7	10074-0011	REED SWITCH
K8	10074-0011	REED SWITCH
K9	10074-0011	REED SWITCH
K10	10074-0011	REED SWITCH
K11	10074-0011	REED SWITCH
K12	10074-0011	REED SWITCH
K13	10074-0011	REED SWITCH

Table 5-8. Input Bandswitch PWB Assembly A6 (10074-1650, Rev. D) Parts List (Cont.)

Ref. Desig.	Part Number	Description
K14	10074-0011	REED SWITCH
K15	10074-0011	REED SWITCH
K16	10074-0011	REED SWITCH
A6A1	10074-0700	INPUT VERTICAL RELAY PWB
A6A2	10074-0700	INPUT VERTICAL RELAY PWB
E1	E36-0011-002	TERMINAL
E2	E36-0011-002	TERMINAL
K1	10074-0011	SW, REED, .1A-3A, GLASS AXIA
K2	10074-0011	SW, REED, .1A-3A, GLASS AXIA.



551-099

Figure 5-13. Input Bandswitch PWB Assembly A6 Component Locations

NOTE: UNLESS OTHERWISE SPECIFIED:

- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
- RELAYS ARE SHOWN WITH BARS A & B IN THE BACK POSITION. WHEN BAR MOVES FORWARD ALL RELAYS ASSOCIATED WITH PARTICULAR BAR WILL SWITCH TO OPPOSITE POSITION SHOWN.

BAND NUMBER/FREQUENCY/BAR POSITION/RELAY CORRELATION

BAND NO.	FREQUENCY (MHZ)	BAR POSITION		FILTER SELECTED	RELAYS ENERGIZED		
		BAR A	BAR B		A6	A6A1	A6A2
1	2 TO 3.999	FORWARD	FORWARD	LOW BAND	K1, K3, K7, K9, K13, K15	K1, K2	K1, K2
2	4 TO 7.999	FORWARD	BACK	LOW BAND	K1, K3, K7, K9, K13, K15	NONE	NONE
3	8 TO 15.999	BACK	FORWARD	HIGH BAND	K2, K4, K5, K6, K8, K10, K11, K12, K14, K16	K1, K2	K1, K2
4	16 TO 29.999	BACK	BACK	HIGH BAND	K2, K4, K5, K6, K8, K10, K11, K12, K14, K16	NONE	NONE

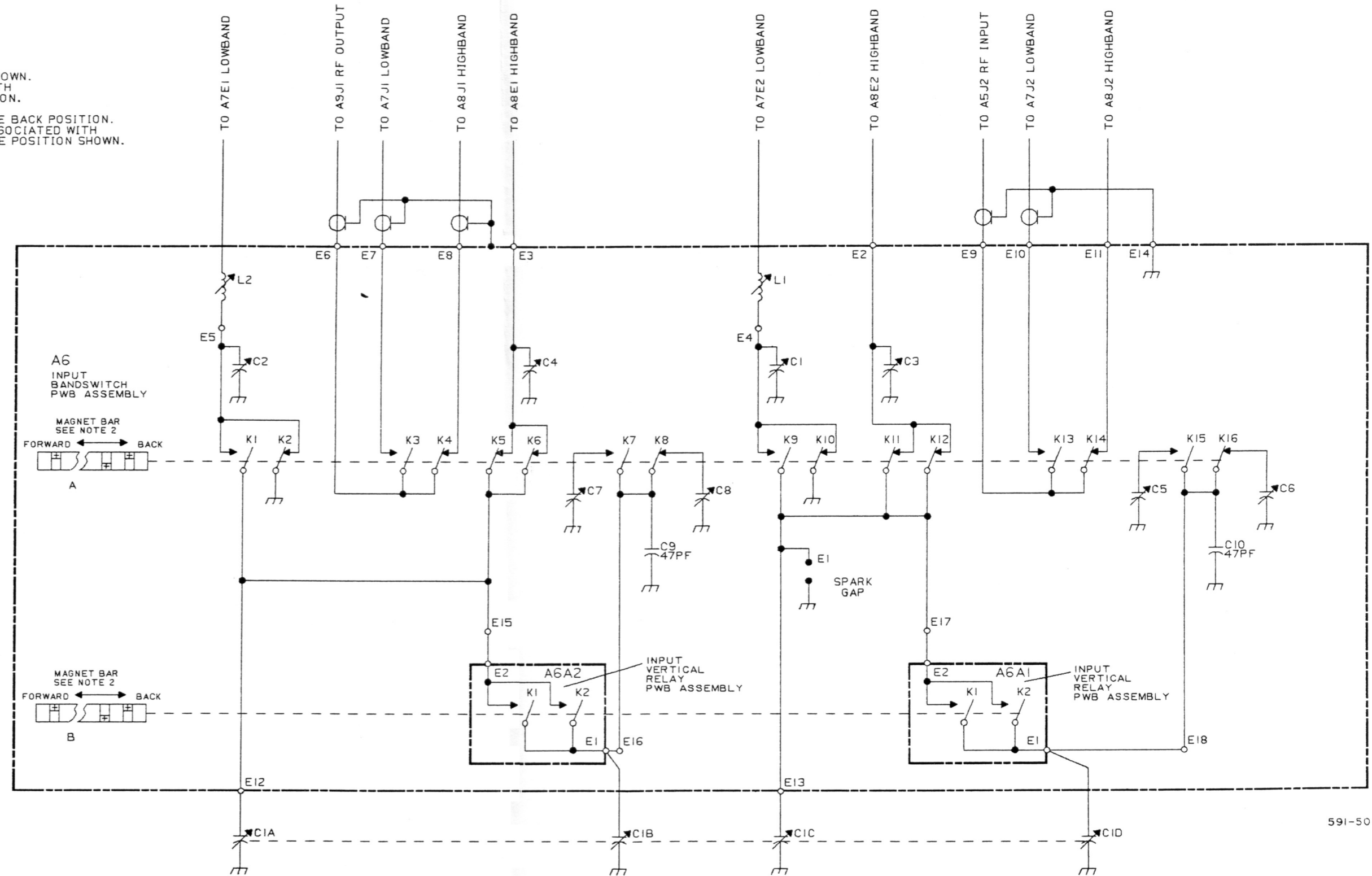


Figure 5-14. Input Bandswitch PWB A6 Schematic Diagram

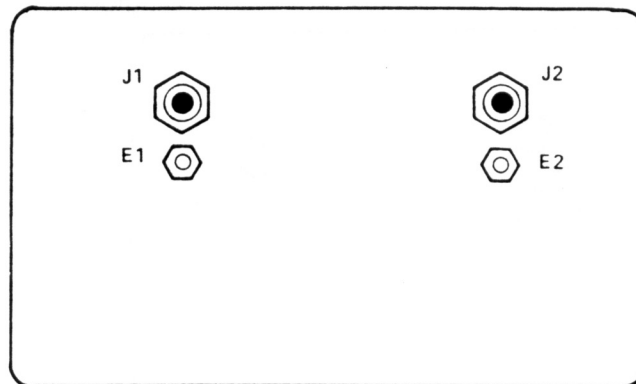
591-50

**5.10 LOW BAND RESONATOR MODULE ASSEMBLY A7**

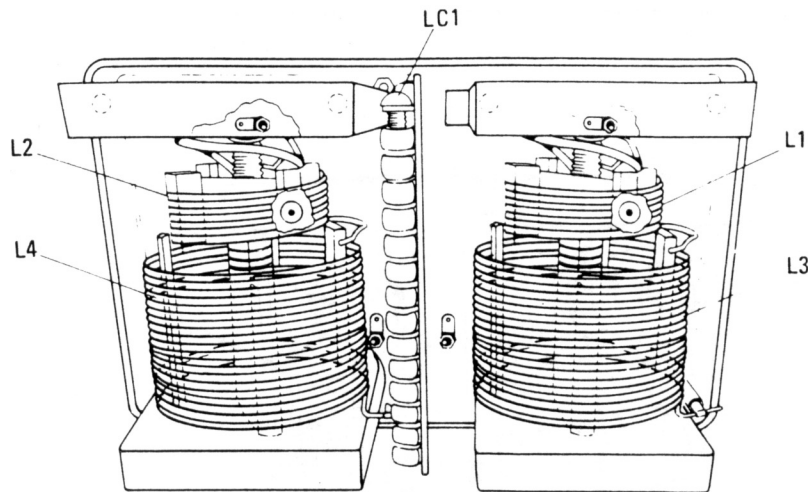
Low Band Resonator Module A7 is not likely to fail in the field and cannot be field repaired. Table 5-9 is the parts list of the assembly. Figure 5-15 shows component locations. Figure 5-1 shows the schematic diagram for the assembly.

**Table 5-9. Low Band Resonator Module Assembly A7 (905-2000, Rev. G) Parts List**

Ref. Desig.	Part Number	Description
A7	905-2000	LOW BAND RESONATOR MODULE
E1	10075-0274	FEED-THRU
E2	10075-0274	FEED-THRU
J1	10075-0273	PHONE JACK
J2	10075-0273	PHONE JACK
LC1	905-2010	SHIELD ASSY
L1	905-2013	RESONATOR COIL, LOW BAND
L2	905-2013	RESONATOR COIL, LOW BAND
L3	905-2013	RESONATOR COIL, LOW BAND
L4	905-2013	RESONATOR COIL, LOW BAND



551-035



551-056

**Figure 5-15. Low Band Resonator Module Assembly A7 Component Locations**

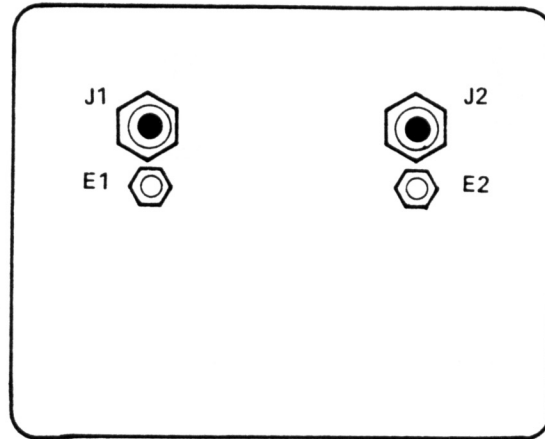


**5.11 HIGH BAND RESONATOR MODULE ASSEMBLY A8**

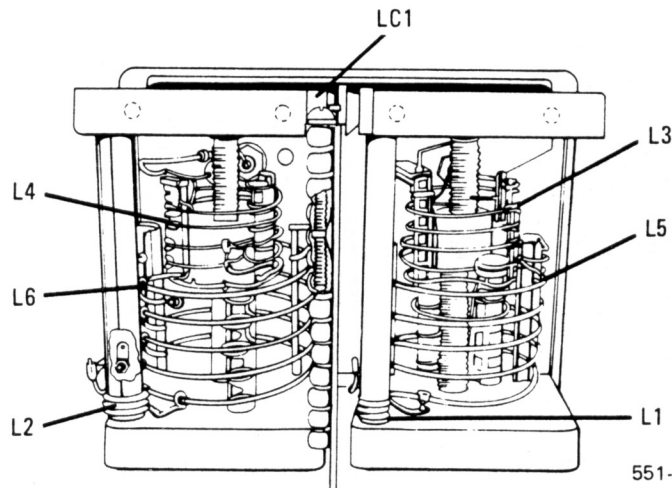
High Band Resonator Module Assembly A8 is not likely to fail in the field and cannot be field repaired. Table 5-10 is the parts list for the assembly. Figure 5-16 shows the component locations. Figure 5-1 shows the schematic diagram for the assembly.

**Table 5-10. High Band Resonator Module Assembly A8 (905-3000, Rev. G) Parts List**

Ref. Desig.	Part Number	Description
A8	905-3000	HIGH BAND RESONATOR MODULE
E1	10075-0274	FEED-THRU
E2	10075-0274	FEED-THRU
J1	10075-0273	PHONE JACK
J2	10075-0273	PHONE JACK
LC1	905-2010	SHIELD ASSY
L1	905-3050	TRIMMER COIL-HIBAND
L2	905-3050	TRIMMER COIL-HIBAND
L3	905-3013	COIL, RESONATOR, HIGH BAND
L4	905-3013	COIL, RESONATOR, HIGH BAND
L5	905-3013	COIL, RESONATOR, HIGH BAND
L6	905-3013	COIL, RESONATOR, HIGH BAND



551-034



551-055(1)

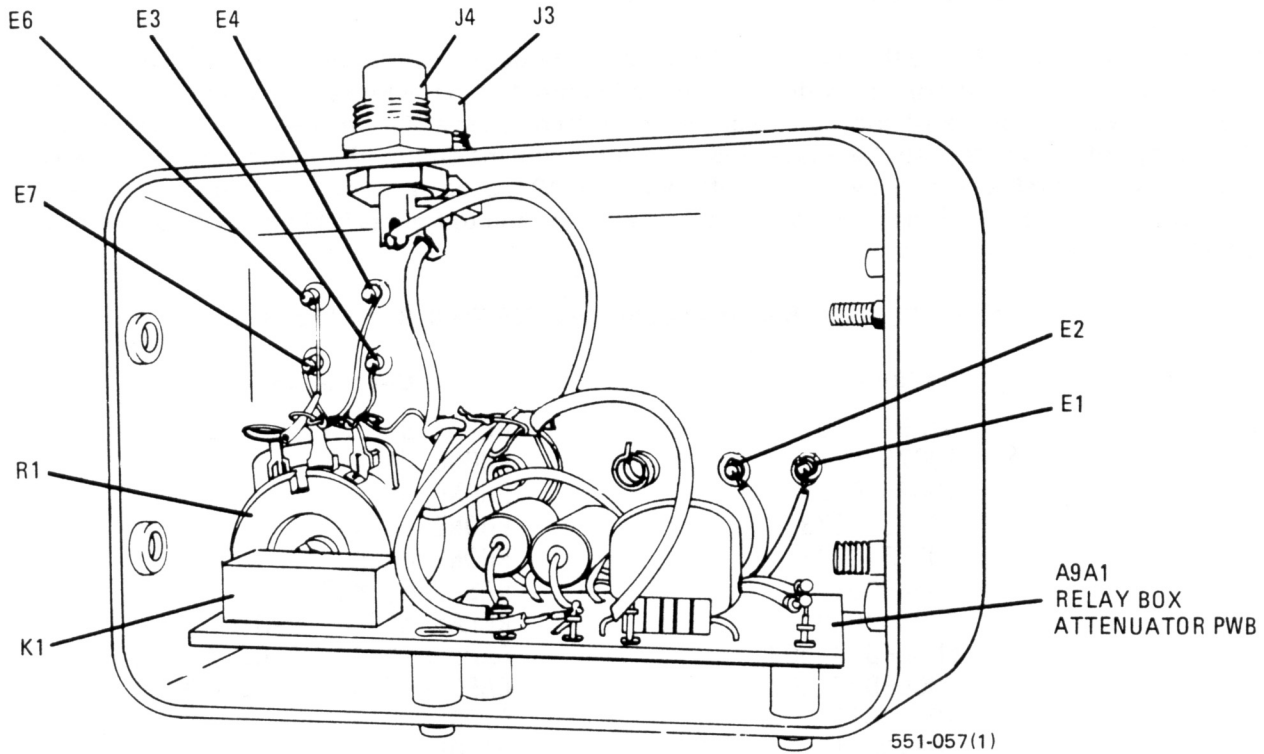
**Figure 5-16. High Band Resonator Module Assembly A8 Component Locations**

**5.12 RELAY BOX ATTENUATOR A9**

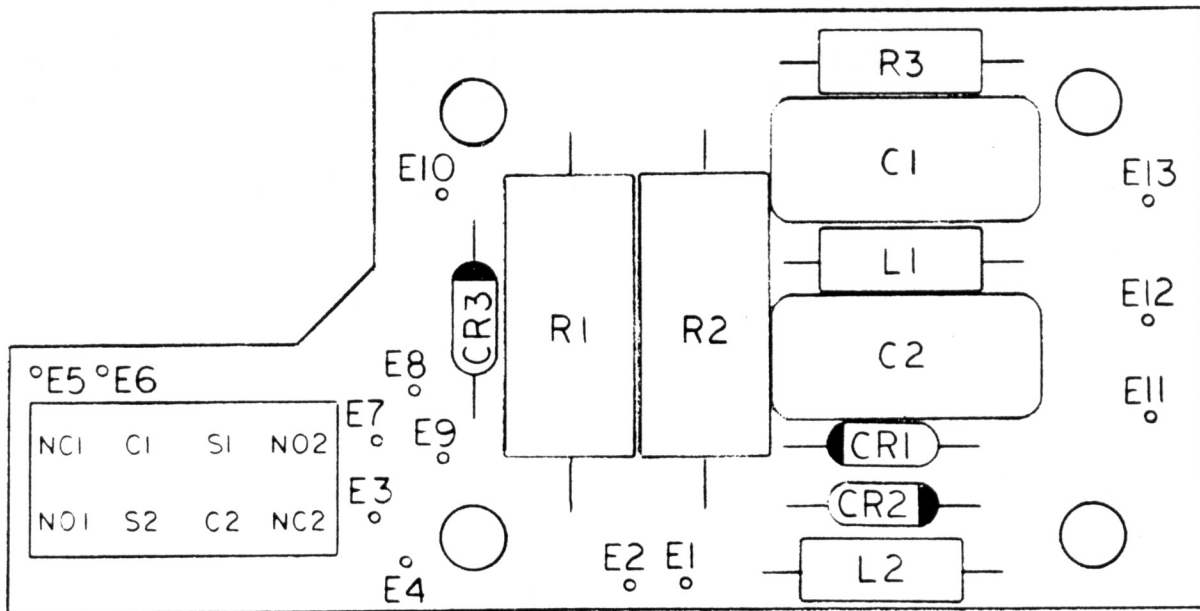
Although RF Amplifier A10 and the receiver will withstand moderate overloads for prolonged periods, additional protection (limiting) is provided before the RF amplifier in the Relay Box Attenuator A9. This limiter consists of two diodes of opposite polarities connected across a 50-ohm line. The diodes on A9 may be prebiased by potentiometers A9R1A and A9R1B. Therefore, the maximum RF voltage may be limited over a range of approximately 0.5 to 15.0 volts. The attenuator in A9 is bypassed when the GAIN switch is set to HIGH. Refer to table 5-11 for the parts list of the A9 assembly, and to figures 5-17 and 5-18 for the component locations and schematic diagram.

**Table 5-11. Relay Box Attenuator A9 (6705-7000, Rev. C) Parts List**

Ref. Desig.	Part Number	Description
A9	6705-7000	RELAY BOX ATTENUATOR
J1	10075-0273	PHONE JACK
J2	10075-0273	PHONE JACK
J3	10075-0273	PHONE JACK
J4	10075-0273	PHONE JACK
R1	905-8001	RES,VAR,2K,DUAL
9A1	6705-7010	RELAY ATTEN. PWB
C1	CM06FD472J03	CAP, FIXED, MICA, 4700PF
C2	CM06FD472J03	CAP, FIXED, MICA, 4700PF
CR1	905-3611	DIODE
CR2	905-3611	DIODE
CR3	1N3611	DIODE
K1	6705-7003	RELAY, RF, DPDT, 24 VDC
L1	L10-0007-100	INDUCTOR, CHOKE, 10 UH
L2	L10-0007-100	INDUCTOR, CHOKE, 10 UH
R1	RCR42G330JM	RES, FIXED, COMP, 33 OHMS, 2W,5%
R2	RCR42G330JM	RES, FIXED, COMP, 33 OHMS, 2W,5%
R3	RCR20G180JM	RES, FIXED, COMP, 18 OHMS, 2W,5%



DETAIL A. ASSEMBLY COMPONENT DIAGRAM



551-075

DETAIL B. RELAY BOX ATTENUATOR PWB A9A1 COMPONENT LOCATION DIAGRAM

Figure 5-17. Relay Box Attenuator A9 Component Locations

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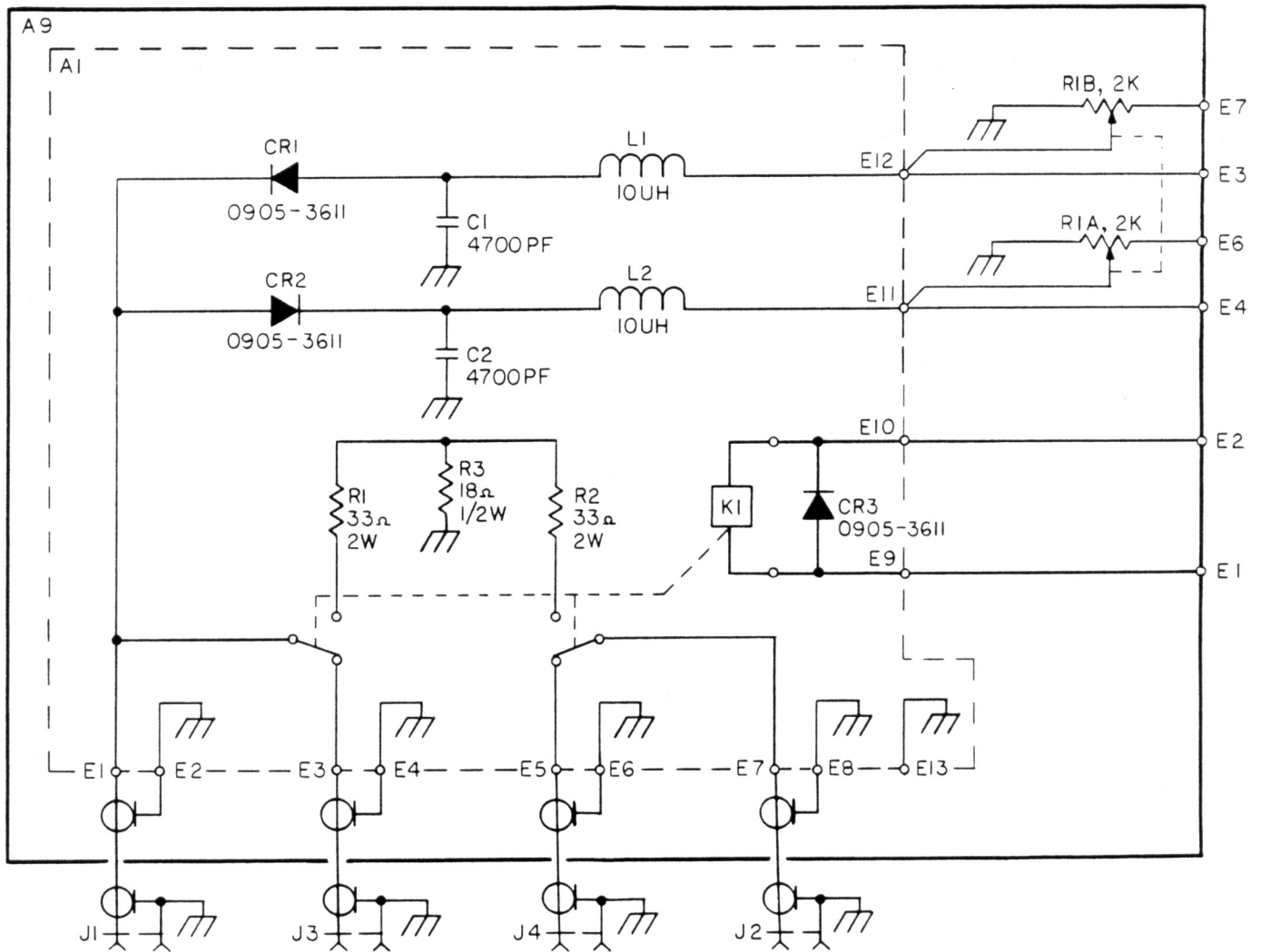


Figure 5-18. Relay Box Attenuator A9 Schematic Diagram (6705-7010, Rev. A)



### 5.13 RF AMPLIFIER PWB A10

RF Amplifier A10 is a linear, broadband two-stage transistor amplifier. Amplifiers A10Q1 and A10Q2 provide amplification. Resistor A10R8 and the combination of A10R12 through A10R15 stabilize the amplification of A10Q1 and provide a 12.5-ohm input impedance. The input impedance of the A10Q1 stage is transformed to a 50-ohm input impedance of the RF amplifier by A10T1.

Transformer A10T2 is used to reduce the current swing of A10Q1 by stepping up the input impedance of the A10Q2 stage. Resistor A10R7 and the combination of A10R17 through A10R19 stabilize the second stage as well as provide a 50-ohm output impedance.

The combination of A10U1B and A10Q4 provide current biasing for A10Q1 by monitoring the voltage at A10Q1 emitter. This in turn determines the amount of base drive that can be applied to A10Q1 in order to keep a constant collector current. A10U1A and A10Q3 provide a similar function in controlling A10Q2s collector current.

A parts list for RF Amplifier PWB A10 is given in table 5-12. Refer to figures 5-19 and 5-20 for component locations and schematic diagram.

Operation of the RF Amplifier Assembly A10 can be confirmed by a static (no signal applied) test and an active (gain) test. The static tests require applying + 24 volts, and then monitoring the various test points. TP2 should measure  $\approx 0.35$  volts during operation and TP3 should measure between 0.35 and 0.36 volts if Q1 is operating properly. The Q2 state is adjustable to select the optimum operating point. Adjust R22 for 0.78 volts at TP6.

To check the gain of the amplifier, connect A9P3 to a signal generator set to 8.0 MHz. Adjust the applied signal level to -20 dBm. Connect A9P4 to the spectrum analyzer and confirm that a gain of 18 - 22 dB does exist. If both the static and active tests are passed, the amplifier is operating properly.

**Table 5-12. RF Amplifier PWB A10 (10096-0030, Rev. H) Parts List**

Ref. Desig.	Part Number	Description
A10	10096-0030	RF AMPLIFIER PWB
C1	C11-0005-104	CAP, CER, .1UF, 50V
C2	C11-0005-104	CAP, CER, .1UF, 50V
C3	C11-0005-104	CAP, CER, .1UF, 50V
C4	C11-0005-104	CAP, CER, .1UF, 50V
C5	C11-0005-474	CAP, CER, .47UF, 50V
C6	C11-0005-104	CAP, CER, .1UF, 50V
C7	C11-0005-474	CAP, CER, .47UF, 50V
C8	C11-0005-104	CAP, CER, .1UF, 50V
C9	C11-0005-104	CAP, CER, .1UF, 50V
C10	C11-0005-104	CAP, CER, .1UF, 50V
C11	C11-0005-104	CAP, CER, .1UF, 50V
C12	C26-0050-100	CAP,FXD,ELCTLT,10 UF,50
C13	C11-0005-104	CAP, CER, .1UF, 50V
C14	C11-0005-104	CAP, CER, .1UF, 50V
C15	C11-0005-104	CAP, CER, .1UF, 50V
C16	C11-0005-104	CAP, CER, .1UF, 50V
L1	MS14046-5	COIL, RF 12 UH 10%
L2	MS14046-5	COIL, RF 12 UH 10%
Q1	Q25-0014-000	XSTR, RF PWR
Q2	Q25-0016-000	XSTR, RF PWR

Table 5-12. RF Amplifier PWB A10 (10096-0030, Rev. H) Parts List (Cont.)

Ref. Desig.	Part Number	Description
Q3	2N2222A	XSTR, SS/GP, NPN
Q4	2N2222A	XSTR, SS/GP, NPN
R1	R80-0004-004	RES,MET.FLM,110,5%,3W.
R2	R80-0004-003	RES,MET.FLM,22,5%,3W.
R3	RCR42G331JM	RES,330 5% 2W CAR COMP
R4	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R5	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R6	R65-0003-100	RES,10 5% 1/4W CAR FILM
R7	R65-0004-121	RES,120 5% 1/2W CAR FILM
R8	R65-0004-121	RES,120 5% 1/2W CAR FILM
R9	RCR32G182JM	RES,1.8K 5% 1W CAR COMP
R10	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R11	R65-0003-151	RES,150 5% 1/4W CAR FILM
R12	R65-0003-150	RES,15 5% 1/4W CAR FILM
R13	R65-0003-150	RES,15 5% 1/4W CAR FILM
R14	R65-0003-150	RES,15 5% 1/4W CAR FILM
R15	R65-0003-150	RES,15 5% 1/4W CAR FILM
R16	R65-0003-151	RES,150 5% 1/4W CAR FILM
R17	R65-0003-100	RES,10 5% 1/4W CAR FILM
R18	R65-0003-100	RES,10 5% 1/4W CAR FILM
R19	R65-0003-100	RES,10 5% 1/4W CAR FILM
R20	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R21	RN55D4322F	RES,43.2K 1% 1/8W MET FLM
R22	R-2205	RES,VAR,PCB 500 .5 20%
R23	RN55D1001F	RES,1000 1% 1/8W MET FLM
R24	RN55D3012F	RES,30.1K 1% 1/8W MET FLM
R25	RN55D1691F	RES,1690 1% 1/8W MET FLM
R26	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R27	RCR07G101JM	RES,100 5% 1/4W CAR COMP
R28	RCR07G101JM	RES,100 5% 1/4W CAR COMP
T1	10079-1460	TRANSFORMER
T2	10096-0035	XMFR ASSY (T2)
TP1	J-0071	TIP JACK, BROWN
TP2	J-0066	TIP JACK, RED
TP3	J-0069	TIP JACK, ORANGE
TP4	J-0070	TIP JACK, YELLOW
TP5	J-0068	TIP JACK, GREEN
TP6	J-0072	TIP JACK, BLUE
U1	I30-0020-103	IC 358 OP AMP PLASTIC
VR1	1N4736A	DIODE 6.8V 5% 1W ZENER

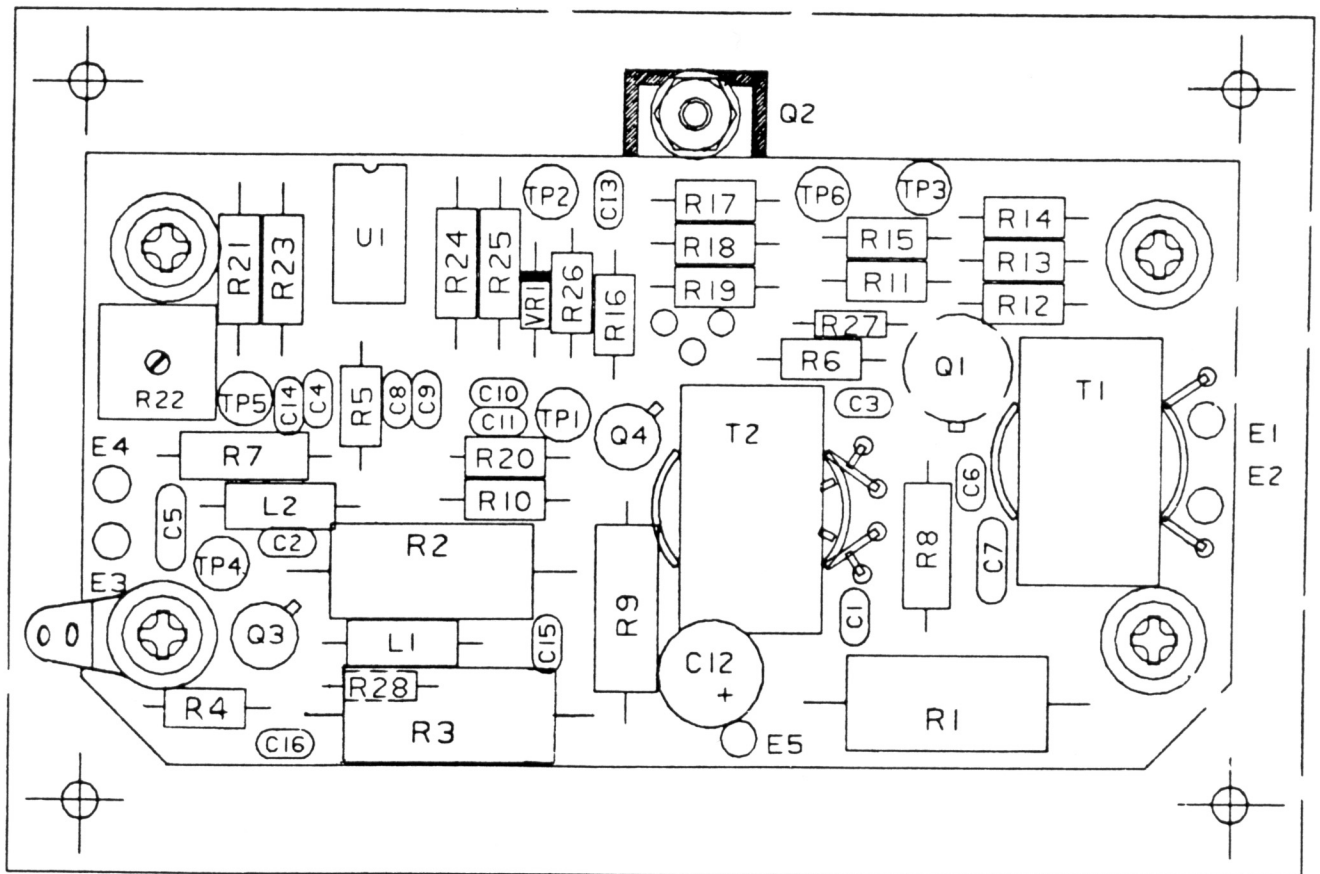


Figure 5-19. RF Amplifier PWB A10 Component Locations (10096-0030, Rev. F)



NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

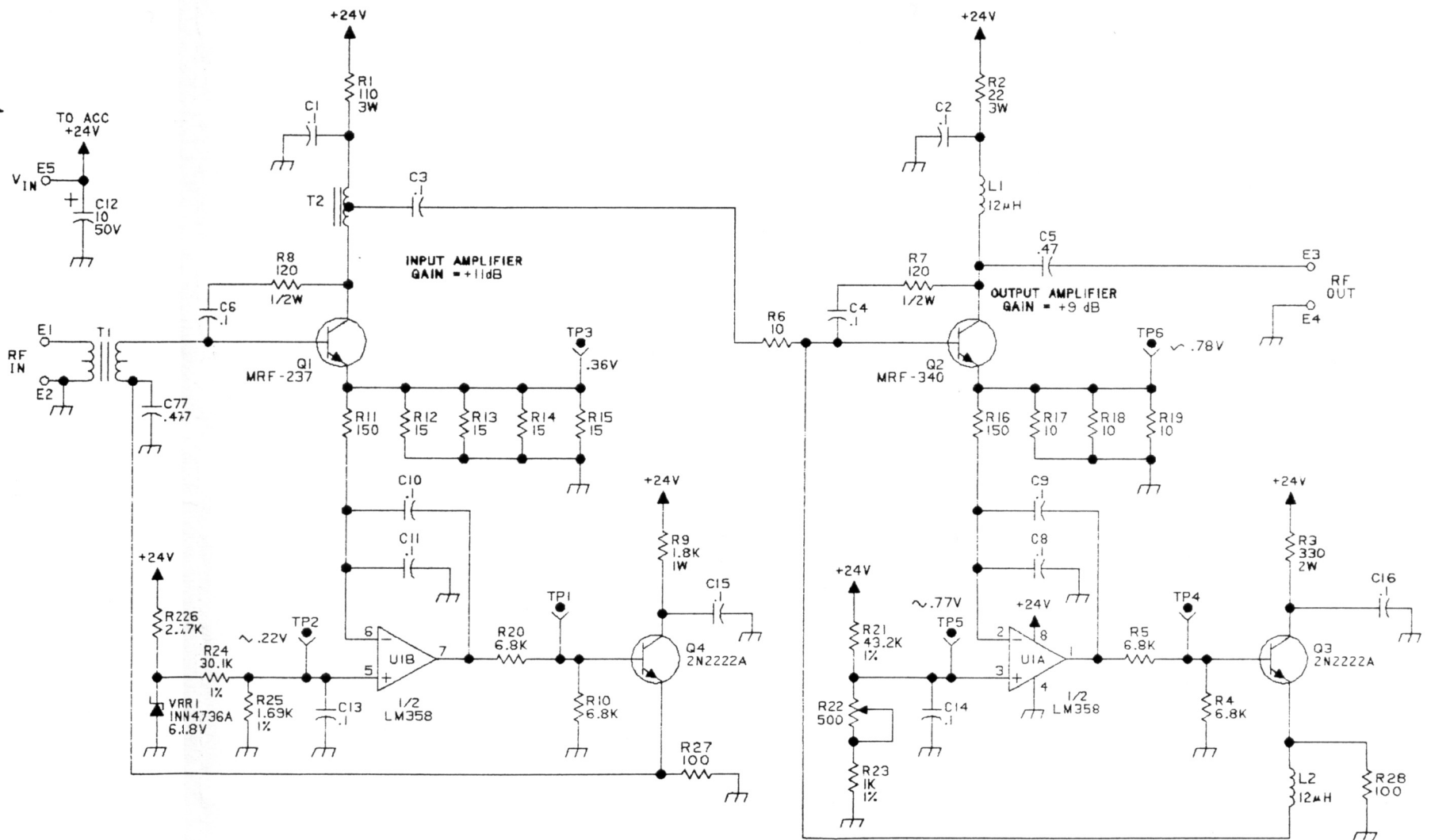


Figure 5-20. RF Amplifier PWB A10 Schematic Diagram (10096-0031, Rev. D)

**5.14 OUTPUT BANDSWITCH ASSEMBLY A11**

The slider bar is moved by the selection of a frequency at the front panel of the RF-551A. This causes the reed switches to be activated and select the proper resonator assembly and connect it with the proper sections of C1 and C2.

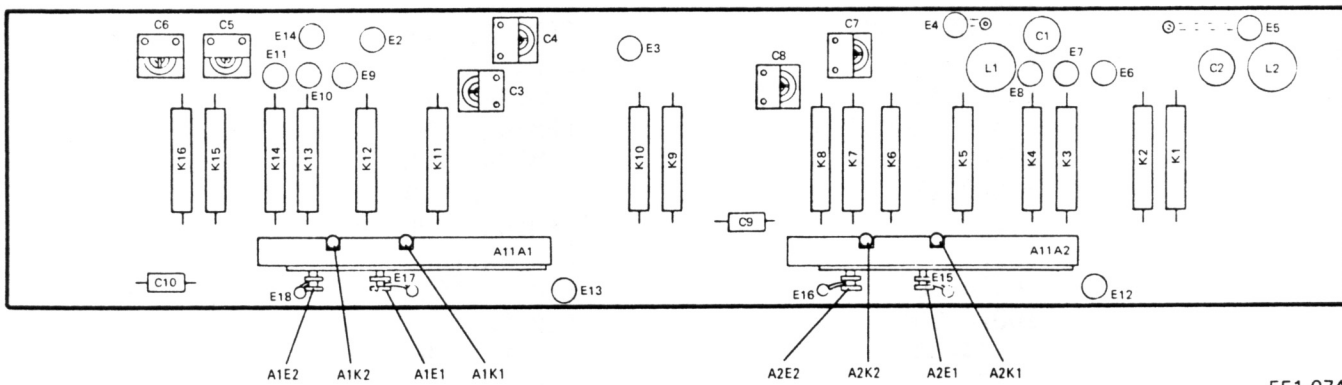
Table 5-13 is a parts list for the Output Bandswitch PWB Assembly A11. Figures 5-21 and 5-22 are the component location diagram and schematic diagram of the output bandswitch.

**Table 5-13. Output Bandswitch PWB Assembly A11 (10074-1640, Rev. D) Parts List**

Ref. Desig.	Part Number	Description
A11	10074-1640	OUTPUT BANDSWITCH PWB ASSY
C1	10075-0223	CAPACITOR, TRIMMER
C2	10075-0223	CAPACITOR, TRIMMER
L1	10074-0013	TRIMMER COIL ASSY
L2	10074-0013	TRIMMER COIL ASSY
---	10074-2600	PWB ASSY, OUTPUT BANDSW.
C3	C-4643	CAPACITOR, VARIABLE, 1.5-11.6 PF
C4	C-4643	CAPACITOR, VARIABLE, 1.5-11.6 PF
C5	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C6	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C7	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C8	C4646	CAPACITOR, VARIABLE, 2.0-19.3 PF
C9	10075-0217	CAPACITOR, PORC., 47 PF
C10	10075-0217	CAPACITOR, PORC., 47 PF
E2	E36-0011-002	TERMINAL PWB
E3	E36-0011-002	TERMINAL PWB
E4	E36-0011-002	TERMINAL PWB
E5	E36-0011-002	TERMINAL PWB
E6	E36-0011-002	TERMINAL PWB
E7	E36-0011-002	TERMINAL PWB
E8	E36-0011-002	TERMINAL PWB
E9	E36-0011-002	TERMINAL PWB
E10	E36-0011-002	TERMINAL PWB
E11	E36-0011-002	TERMINAL PWB
E12	E36-0011-002	TERMINAL PWB
E13	E36-0011-002	TERMINAL PWB
E14	E36-0011-002	TERMINAL PWB
K1	10074-0011	REED SWITCH
K2	10074-0011	REED SWITCH
K3	10074-0011	REED SWITCH
K4	10074-0011	REED SWITCH
K5	10074-0011	REED SWITCH
K6	10074-0011	REED SWITCH
K7	10074-0011	REED SWITCH
K8	10074-0011	REED SWITCH
K9	10074-0011	REED SWITCH
K10	10074-0011	REED SWITCH
K11	10074-0011	REED SWITCH

Table 5-13. Output Bandswitch PWB Assembly A11 (10074-1640, Rev. D) Parts List (Cont.)

Ref. Desig.	Part Number	Description
K12	10074-0011	REED SWITCH
K13	10074-0011	REED SWITCH
K14	10074-0011	REED SWITCH
K15	10074-0011	REED SWITCH
K16	10074-0011	REED SWITCH
A11A1	10074-0800	OUTPUT VER RELAY PWB ASSY
A11A2	10074-0800	OUTPUT VER RELAY PWB ASSY
E1	E36-0011-002	PWB TERMINAL
E2	E36-0011-002	PWB TERMINAL
K1	10074-0011	REED SWITCH
K2	10074-0011	REED SWITCH



551-074

Figure 5-21. Output Bandswitch PWB A11 Component Locations

IS OTHERWISE SPECIFIED:

REFERENCE DESIGNATIONS ARE SHOWN.  
ELEMENT DESIGNATION, PREFIX WITH  
BOARD OR ASSEMBLY NO. DESIGNATION.

IS SHOWN WITH BARS C & D IN THE BACK POSITION.  
MOVES FORWARD ALL RELAYS ASSOCIATED WITH  
BOARD WILL SWITCH TO OPPOSITE POSITION SHOWN.

BAND NUMBER/FREQUENCY/BAR POSITION/RELAY CORRELATION

BAND NO.	FREQUENCY (MHZ)	BAR POSITION		FILTER SELECTED	RELAYS ENERGIZED		
		BAR C	BAR D		A11	A11A1	A11A2
1	2 TO 3.999	FORWARD	FORWARD	LOW BAND	K1, K3, K7, K9, K13, K15	K1, K2	K1, K2
2	4 TO 7.999	BACK	FORWARD	LOW BAND	K1, K3, K7, K9, K13, K15	NONE	NONE
3	8 TO 15.999	FORWARD	BACK	HIGH BAND	K2, K4, K5, K6, K8, K10, K11, K12, K14, K16	K1, K2	K1, K2
4	16 TO 29.999	BACK	BACK	HIGH BAND	K2, K4, K5, K6, K8, K10, K11, K12, K14, K16	NONE	NONE

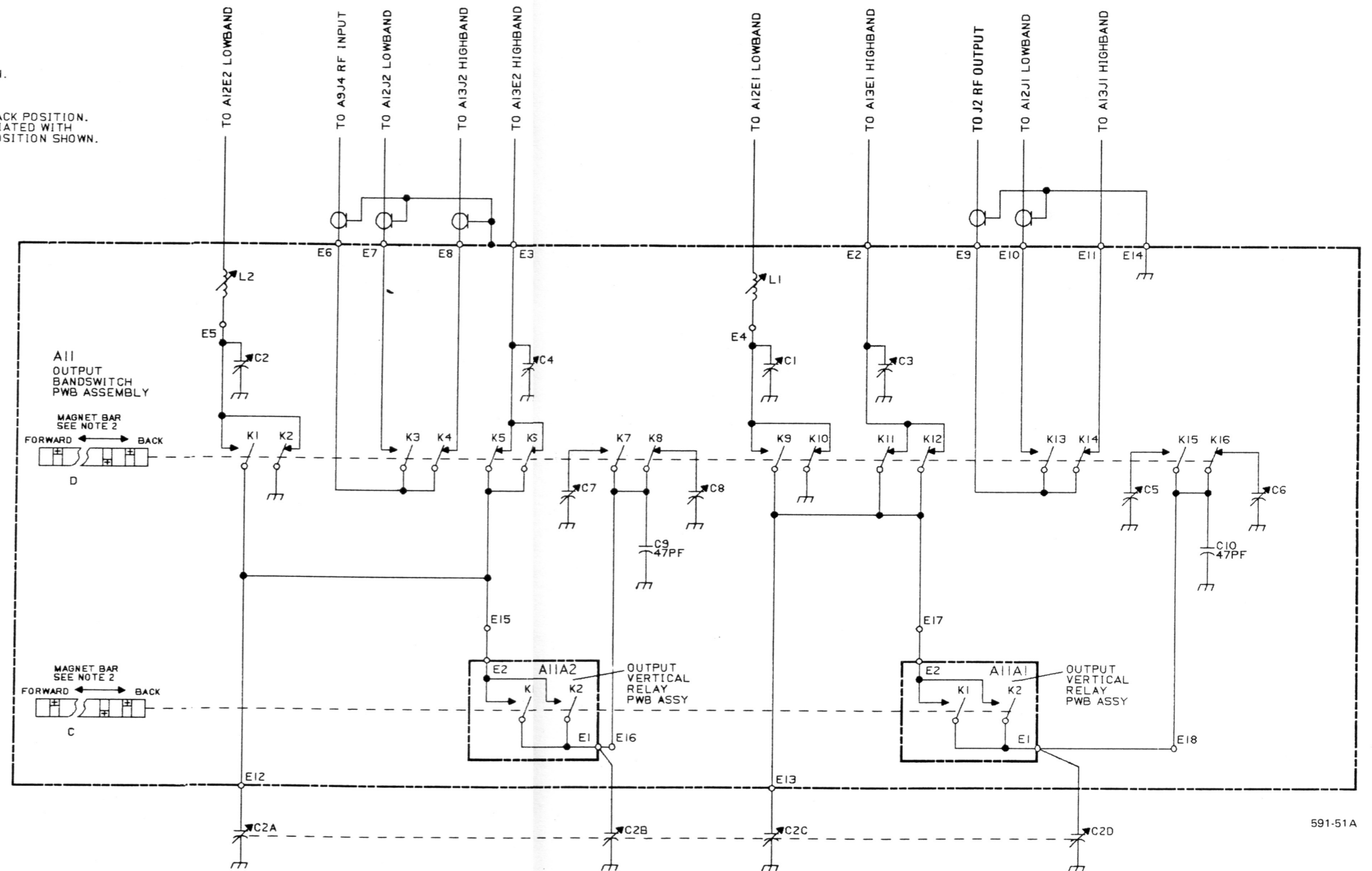


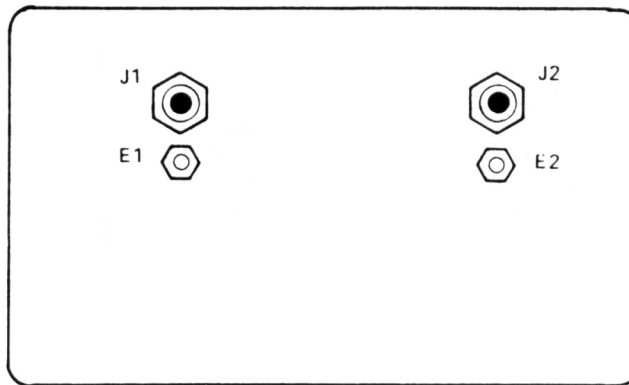
Figure 5-22. Output Bandswitch PWB A11 Schematic Diagram

**5.15 LOW BAND RESONATOR MODULE ASSEMBLY A12**

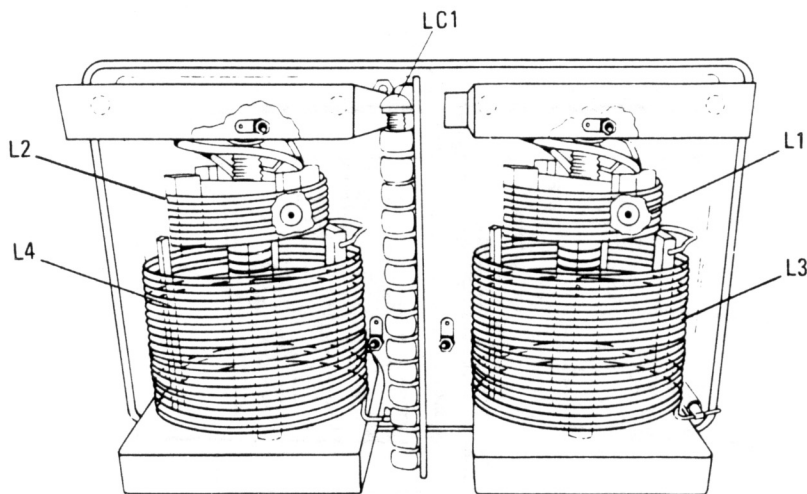
Low Band Resonator Module A12 is not likely to fail in the field and cannot be field repaired. Table 5-14 is the parts list of the assembly. Figure 5-23 shows component locations. Figure 5-1 shows the schematic diagram for the assembly.

**Table 5-14. Low Band Resonator Module Assembly A12 (905-2000, Rev. G) Parts List**

Ref. Desig.	Part Number	Description
A12	905-2000	LOW BAND RESONATOR MODULE
E1	10075-0274	FEED-THRU
E2	10075-0274	FEED-THRU
J1	10075-0273	PHONE JACK
J2	10075-0273	PHONE JACK
LC1	905-2010	SHIELD ASSY
L1	905-2013	RESONATOR COIL, LOW BAND
L2	905-2013	RESONATOR COIL, LOW BAND
L3	905-2013	RESONATOR COIL, LOW BAND
L4	905-2013	RESONATOR COIL, LOW BAND



551-035



551-056

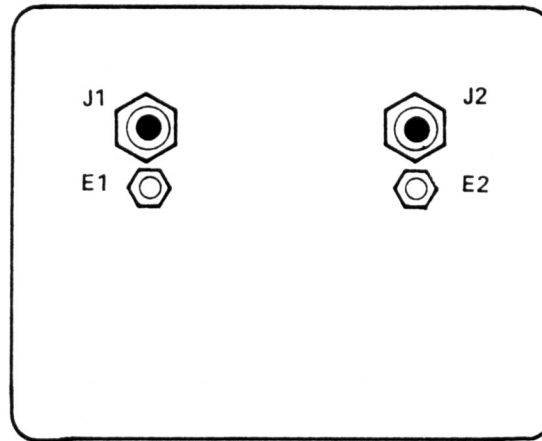
**Figure 5-23. Low Band Resonator Module Assembly A12 Component Locations**

**5.16 HIGH BAND RESONATOR MODULE ASSEMBLY A13**

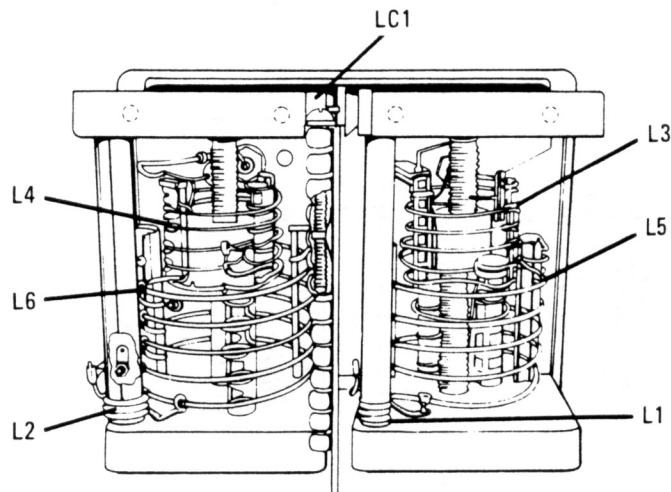
High Band Resonator Module Assembly A13 is not likely to fail in the field and cannot be field repaired. Table 5-15 is the parts list for the assembly. Figure 5-24 shows the component locations. Figure 5-1 shows the schematic diagram for the assembly.

**Table 5-15. High Band Resonator Module Assembly A13 (905-3000, Rev. G) Parts List**

Ref. Desig.	Part Number	Description
A13	905-3000	HIGH BAND RESONATOR MODULE
E1	10075-0274	FEED-THRU
E2	10075-0274	FEED-THRU
J1	10075-0273	PHONE JACK
J2	10075-0273	PHONE JACK
LC1	905-2010	SHIELD ASSY
L1	905-3050	TRIMMER COIL-HIBAND
L2	905-3050	TRIMMER COIL-HIBAND
L3	905-3013	COIL, RESONATOR, HIGH BAND
L4	905-3013	COIL, RESONATOR, HIGH BAND
L5	905-3013	COIL, RESONATOR, HIGH BAND
L6	905-3013	COIL, RESONATOR, HIGH BAND



551-034



551-055(1)

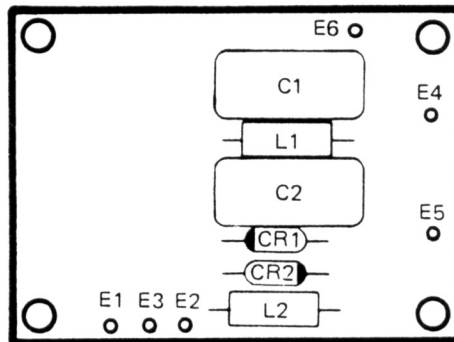
**Figure 5-24. High Band Resonator Module Assembly A13 Component Locations**

5.17 LIMITER ASSEMBLY A14

This limiter consists of two diodes of opposite polarities connected across a 50-ohm line. The diodes on A14 are prebiased by potentiometers A9R1A and A9R1B. The RF voltage limiting level may be set between 0.5 and 15.0 volts. Table 5-16 contains parts list information. Figures 5-25 and 5-26 show the component location and schematic diagrams.

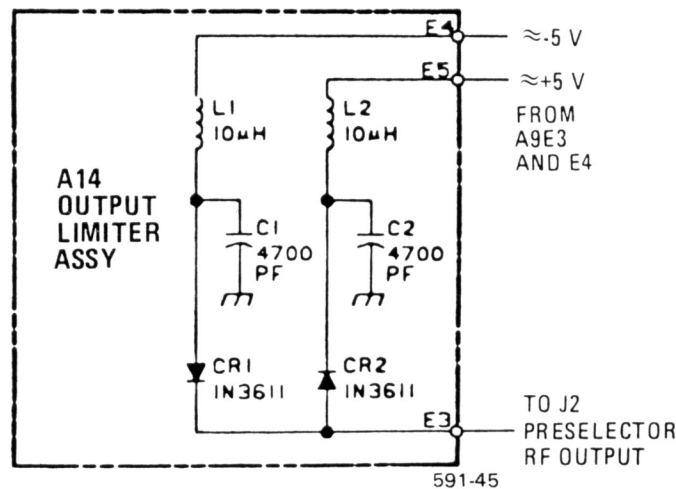
Table 5-16. Output Limiter PWB A14 (905-7050, Rev. B) Parts List

Ref. Desig.	Part Number	Description
A14	905-7050	OUTPUT LIMITER PWB
C1	CM06FD472J03	CAP 4700PF 5% 500V MICA
C2	CM06FD472J03	CAP 4700PF 5% 500V MICA
CR1	905-3611	LIMITER DIODE
CR2	905-3611	LIMITER DIODE
L1	L10-0007-100	INDUCTOR
L2	L10-0007-100	INDUCTOR



591-44

Figure 5-25. Output Limiter Assembly A14 Component Locations



591-45

Figure 5-26. Output Limiter Assembly A14 Schematic Diagram





**SECTION 6****RF-552 REMOTE CONTROL OPTION****6.1 GENERAL**

This section contains information about the RF-552 Remote Control Module for the RF-551A.

**6.2 RF-552 REMOTE CONTROL MODULE**

The Remote Control Module, shown in figure 6-1, allows automatic frequency selection of the preselector or postselector up to 1500 feet away (457.2 m). The module contains the following four major PWBs.

- Filter PWB 2A1
- Logic PWB 2A2
- D/A Converter PWB 2A3
- Local/Remote Relay 2A4

See table 6-1 for the parts list. See figure 6-2 for the Remote Control Assembly Schematic Diagram.

The BCD frequency inputs are supplied to the Logic PWB, where the high order bits (2 MHz through 20 MHz) are converted to binary form. The resulting binary information is supplied to the D/A Converter PWB. This information is then converted to an analog voltage, proportional to the position of the selected frequency in the band. The analog output of the D/A Converter PWB drives the servo amplifier in the preselector, which drives the servo motor. The servo motor positions the ganged tuning capacitor to the required position.

The Local/Remote Relay PWB transfers bandline information and D/A analog voltage from the control unit to the Remote Control Module. See figure 6-2 for the Remote Control Assembly Schematic Diagram.

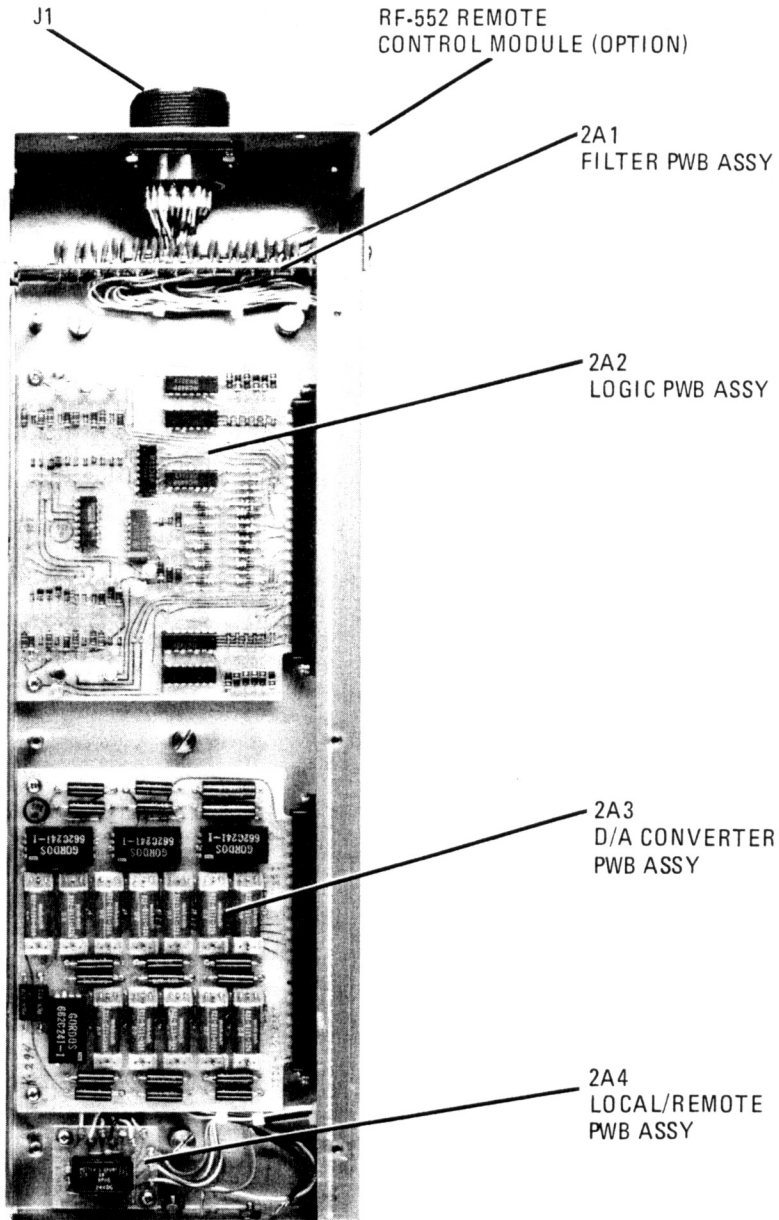
To operate the unit using the Remote Control Module, place front panel LOCAL-REMOTE switch in REMOTE position. Frequency is now controlled from the remote source.

**6.2.1 Filter PWB Assembly 2A1**

All frequency data lines run through Filter PWB Assembly 2A1. The frequency data lines are decoupled with 0.01 uF capacitors to ground. Refer to table 6-2 for the parts list. See figures 6-3 and 6-4 for Filter PWB component locations and schematic diagram.

Table 6-1. RF-552 Remote Control Module (905-1100, Rev. C) Parts List

Ref. Desig.	Part Number	Description
--	905-1100	REMOTE CONTROL MODULE
--	905-1102	REM. CONT. MODULE ASSY
2A1	905-1130	FILTER PWB ASSY
2A2	905-1110	LOGIC PWB ASSY
2A3	905-1120	D/A CONVERTER ASSY
2A4	905-1140	LOCAL/REMOTE PWB ASSY
FL1	L50-0001-003	FERRITE BEAD
FL2	L50-0001-003	FERRITE BEAD
FL3	L50-0001-003	FERRITE BEAD
FL4	L50-0001-003	FERRITE BEAD
FL5	L50-0001-003	FERRITE BEAD
FL6	L50-0001-003	FERRITE BEAD
FL7	L50-0001-003	FERRITE BEAD
FL8	L50-0001-003	FERRITE BEAD
FL9	L50-0001-003	FERRITE BEAD
FL10	L50-0001-003	FERRITE BEAD
FL11	L50-0001-003	FERRITE BEAD
FL12	L50-0001-003	FERRITE BEAD
FL13	L50-0001-003	FERRITE BEAD
FL14	L50-0001-003	FERRITE BEAD
FL15	L50-0001-003	FERRITE BEAD
FL16	L50-0001-003	FERRITE BEAD
FL17	L50-0001-003	FERRITE BEAD
FL18	L50-0001-003	FERRITE BEAD
FL19	L50-0001-003	FERRITE BEAD
FL20	L50-0001-003	FERRITE BEAD
FL21	L50-0001-003	FERRITE BEAD
FL22	L50-0001-003	FERRITE BEAD
FL23	L50-0001-003	FERRITE BEAD
J1	MS3102A24-28P	CONNECTOR
S8	724-0017	SWITCH
U1	10075-0233	IC, LM323K
XA1	10075-0253	CONNECTOR
XA2	10075-0253	CONNECTOR
--	905-1103	CABLE ASSY



551-051P

Figure 6-1. RF-552 Remote Control Module Assembly Location

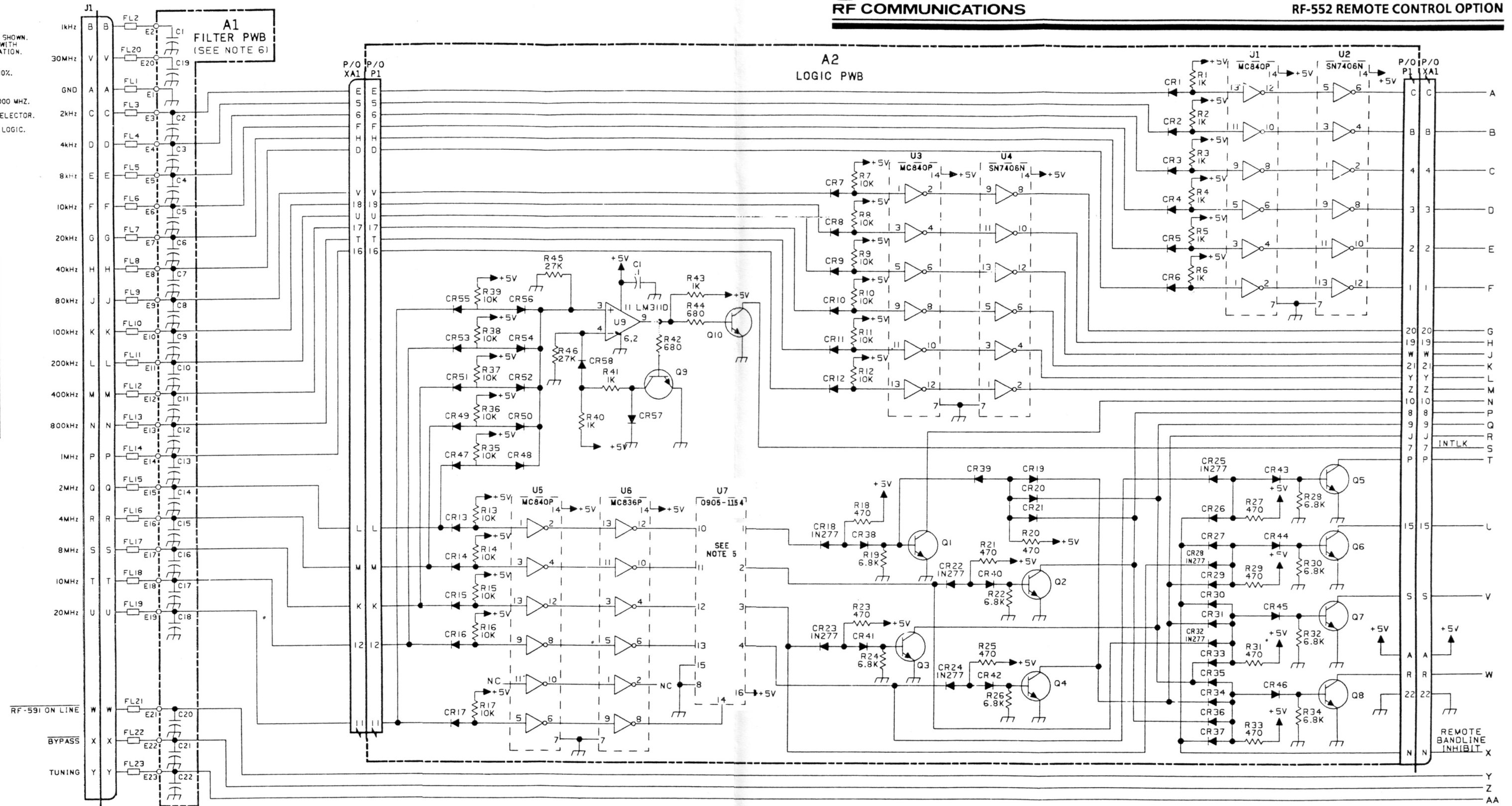


NOTES:

- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
- UNLESS OTHERWISE SPECIFIED:
  - ALL RESISTORS ARE IN OHMS, 1/4W, 10%.
  - ALL DIODES ARE IN34.
  - ALL TRANSISTORS ARE 2N718A.
- VOLTAGE MEASUREMENTS TAKEN AT 2.0000 MHZ.
- TERMINAL BOARD PART OF RF-551 PRESELECTOR.
- REFER TO TRUTH TABLE FOR 0905-1154 LOGIC.
- FILTER PWB AT C1-C22 ARE .01UF, 150V.
- VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

TRUTH TABLE FOR U7 (0905-1154, POSITIVE LOGIC)

INPUT PINS				OUTPUT PINS			
14	13	12	11	10	4	3	2
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
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1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	0	0	0
1	1	0	0	1	0	0	0
1	1	0	1	0	0	0	0
1	1	0	1	1	0	0	0
1	1	1	0	0	0	0	0
1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0



10074-0202 REMOTE CONTROL MODULE				
HIGHEST REFERENCE DESIGNATION				
E5	FL23	J1	TBI	UI
XA2				
REFERENCE DESIGNATIONS NOT USED				
E1	E2	E3	E4	

A1 FILTER PWB	
HIGHEST REFERENCE DESIGNATION	
C22	E23
REFERENCE DESIGNATIONS NOT USED	

A2 LOGIC PWB				
HIGHEST REFERENCE DESIGNATION				
CR58	PI	Q10	R46	U9
C1				
REFERENCE DESIGNATIONS NOT USED				
U8				

A3 D/A CONVERTER PWB			
HIGHEST REFERENCE DESIGNATION			
CR16	K16	PI	R20
REFERENCE DESIGNATIONS NOT USED			

A4 LOCAL/REMOTE PWB		
HIGHEST REFERENCE DESIGNATION		
CR3	E10	K1
REFERENCE DESIGNATIONS NOT USED		

Figure 6-2. RF-552 Remote Control Module Schematic Diagram (10074-0202, Rev. C) (Sheet 1 of 2)

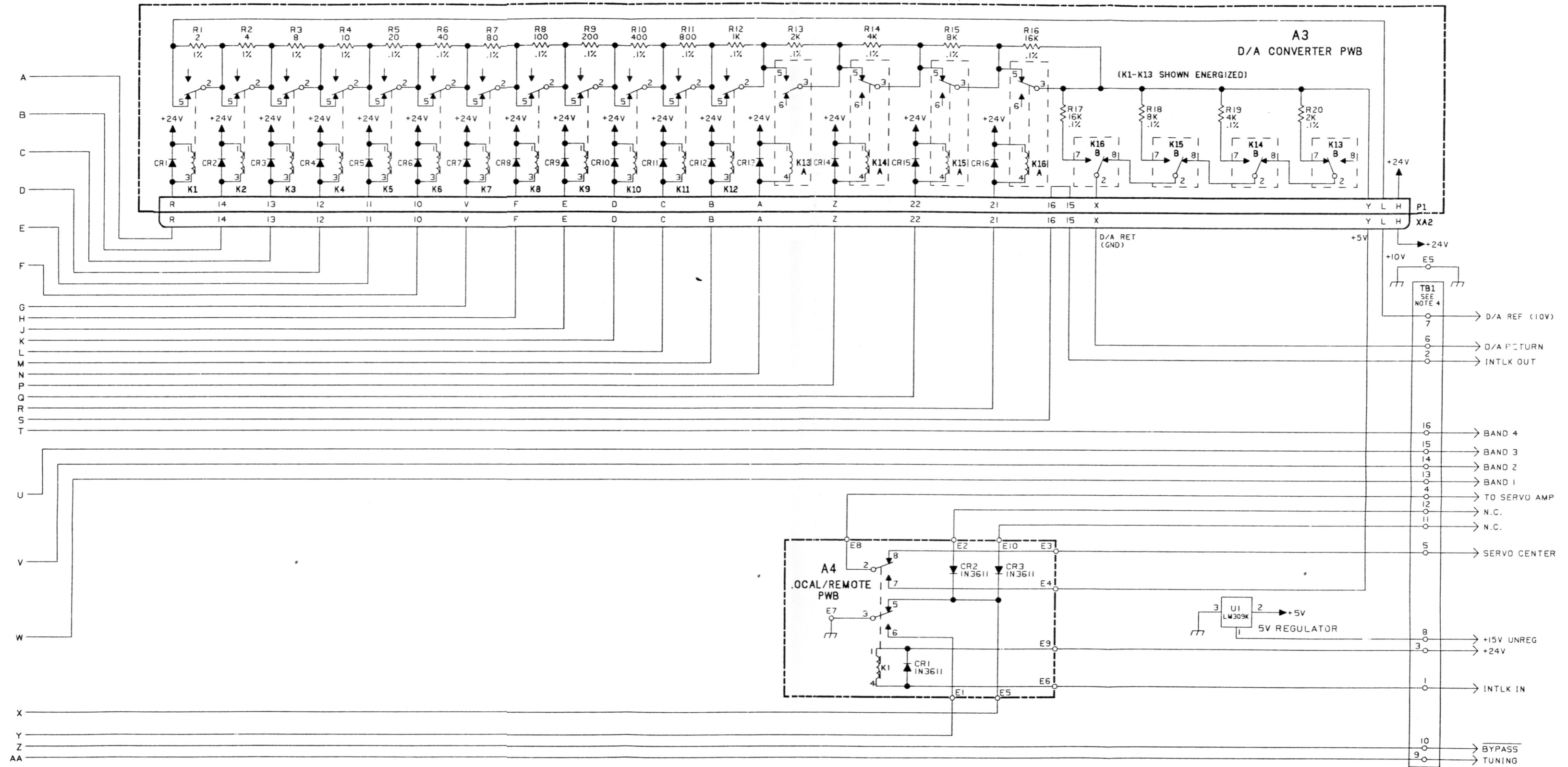
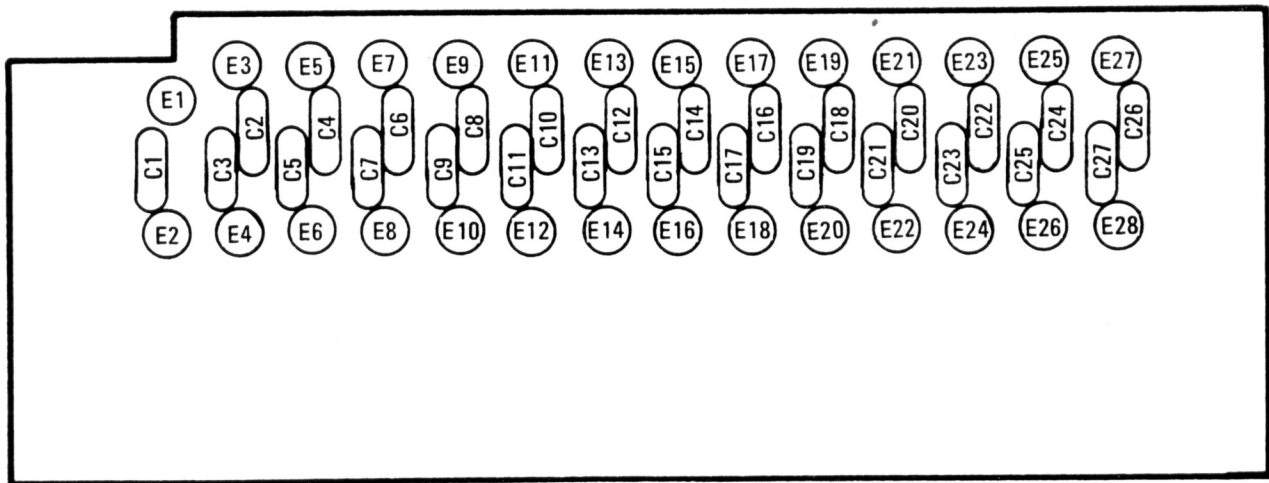


Figure 6-2. RF-552 Remote Control Module Schematic Diagram (10074-0202, Rev. C) (Sheet 2 of 2)

Table 6-2. Filter PWB 2A1 (905-1130, Rev. B) Parts List

Ref. Desig.	Part Number	Description
2A1	905-1130	FILTER PWB ASSY
C1	C-0065	CAP, 150V .01UF CER
C2	C-0065	CAP, 150V .01UF CER
C3	C-0065	CAP, 150V .01UF CER
C4	C-0065	CAP, 150V .01UF CER
C5	C-0065	CAP, 150V .01UF CER
C6	C-0065	CAP, 150V .01UF CER
C7	C-0065	CAP, 150V .01UF CER
C8	C-0065	CAP, 150V .01UF CER
C9	C-0065	CAP, 150V .01UF CER
C10	C-0065	CAP, 150V .01UF CER
C11	C-0065	CAP, 150V .01UF CER
C12	C-0065	CAP, 150V .01UF CER
C13	C-0065	CAP, 150V .01UF CER
C14	C-0065	CAP, 150V .01UF CER
C15	C-0065	CAP, 150V .01UF CER
C16	C-0065	CAP, 150V .01UF CER
C17	C-0065	CAP, 150V .01UF CER
C18	C-0065	CAP, 150V .01UF CER
C19	C-0065	CAP, 150V .01UF CER
C20	C-0065	CAP, 150V .01UF CER
C21	C-0065	CAP, 150V .01UF CER
C22	C-0065	CAP, 150V .01UF CER
C23	C-0065	CAP, 150V .01UF CER
C24	C-0065	CAP, 150V .01UF CER
C25	C-0065	CAP, 150V .01UF CER
C26	C-0065	CAP, 150V .01UF CER
C27	C-0065	CAP, 150V .01UF CER



551-059

Figure 6-3. Filter PWB Assembly 2A1 Component Locations (905-1130)

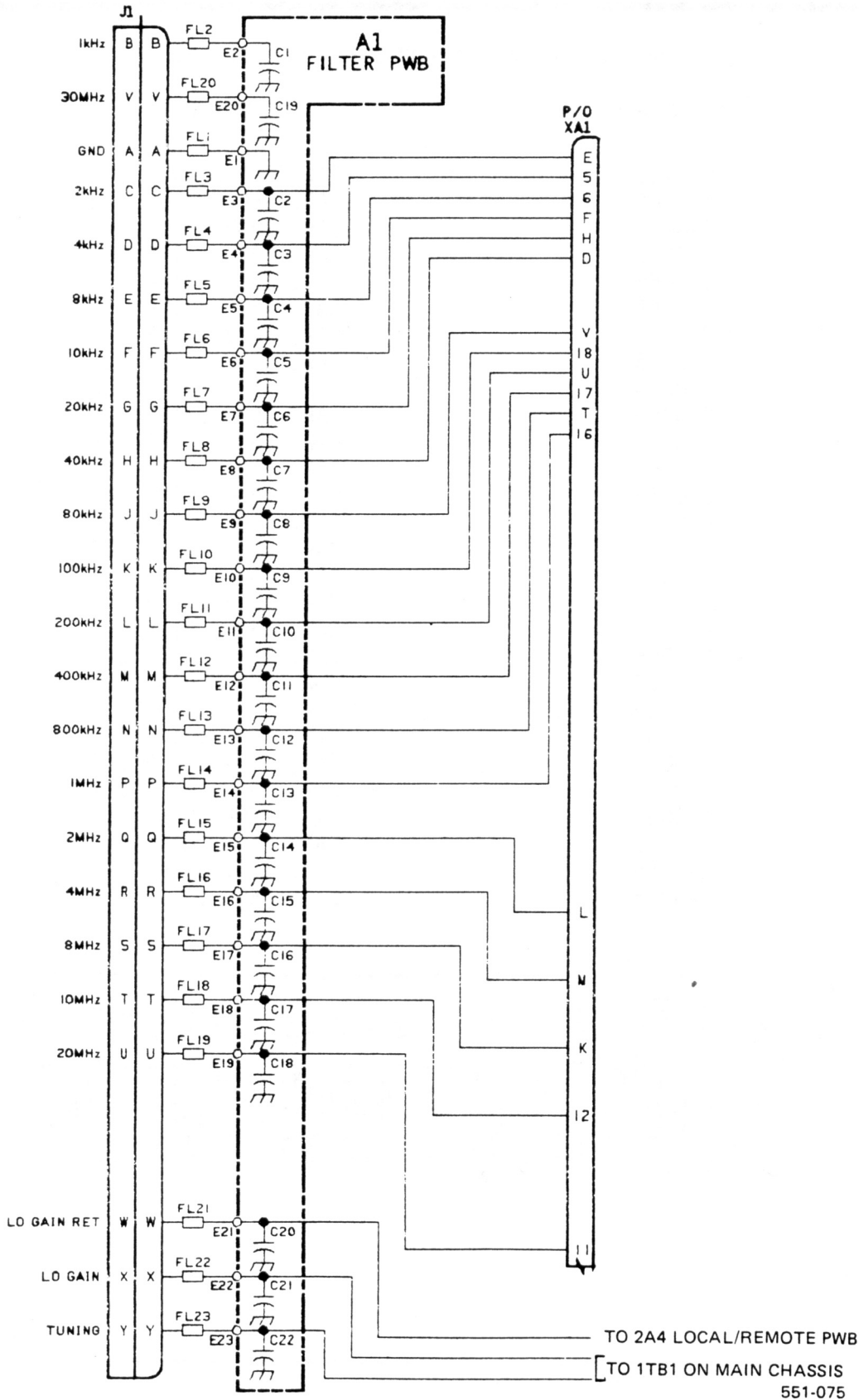


Figure 6-4. Filter PWB Assembly 2A1 Schematic Diagram



### 6.2.2 Logic PWB Assembly 2A2

The BCD frequency input information to the Logic PWB is buffered by inverters A2U1, A2U3, and A2U5 with external diodes A2CR1 through A2CR17 which protect the unit from transients. Another set of inverters, A2U2, and A2U4, convert the 2 kHz to 1 MHz logic information from integrated circuits A2U1 and A2U3. A2U2 and A2U4 drive relays A2K1 through A2K12 on the D/A Converter PWB 2A3.

Two MHz through 20 MHz logic information from A2U5 is inverted by A2U6, and is then converted to straight binary by BCD-to-Binary converters A2U7.

The binary outputs of A2U7 are used to turn off transistors A2Q1 through A2Q8. Transistors A2Q1 through A2Q4 drive relays A2K13, A2K14, A2K15, and A2K16 on the D/A Converter PWB. Transistors A2Q5 through A2Q8 generate band information for the bandswitch in the RF-551A.

Table 6-3 is the parts list. Refer to figures 6-5 and 6-6 for component locations and schematic diagram.

**Table 6-3. Logic PWB Assembly 2A2 (905-1110, Rev. E) Parts List**

Ref. Desig.	Part Number	Description
2A2	905-1110	LOGIC PWB ASSY
C1	M39014/02-1310	CAP .1 UF
CR1	1N914	DIODE
CR2	1N914	DIODE
CR3	1N914	DIODE
CR4	1N914	DIODE
CR5	1N914	DIODE
CR6	1N914	DIODE
CR7	1N914	DIODE
CR8	1N914	DIODE
CR9	1N914	DIODE
CR10	1N914	DIODE
CR11	1N914	DIODE
CR12	1N914	DIODE
CR13	1N914	DIODE
CR14	1N914	DIODE
CR15	1N914	DIODE
CR16	1N914	DIODE
CR17	1N914	DIODE
CR18	1N277	DIODE,GERMANIUM
CR19	1N914	DIODE
CR20	1N914	DIODE
CR21	1N914	DIODE
CR22	1N277	DIODE,GERMANIUM
CR23	1N277	DIODE,GERMANIUM
CR24	1N277	DIODE,GERMANIUM
CR25	1N277	DIODE,GERMANIUM
CR26	1N914	DIODE
CR27	1N914	DIODE
CR28	1N277	DIODE,GERMANIUM
CR29	1N914	DIODE
CR30	1N914	DIODE
CR31	1N914	DIODE
CR32	1N277	DIODE,GERMANIUM

Table 6-3. Logic PWB Assembly 2A2 (905-1110, Rev. E) Parts List (Cont.)

Ref. Desig.	Part Number	Description
CR33	1N914	DIODE
CR34	1N914	DIODE
CR35	1N914	DIODE
CR36	1N914	DIODE
CR37	1N914	DIODE
CR38	1N914	DIODE
CR39	1N914	DIODE
CR40	1N914	DIODE
CR41	1N914	DIODE
CR42	1N914	DIODE
CR43	1N914	DIODE
CR44	1N914	DIODE
CR45	1N914	DIODE
CR46	1N914	DIODE
CR47	1N914	DIODE
CR48	1N914	DIODE
CR49	1N914	DIODE
CR50	1N914	DIODE
CR51	1N914	DIODE
CR52	1N914	DIODE
CR53	1N914	DIODE
CR54	1N914	DIODE
CR55	1N914	DIODE
CR56	1N914	DIODE
CR57	1N914	DIODE
CR58	1N914	DIODE
Q1	2N718A	XSTR
Q2	2N718A	XSTR
Q3	2N718A	XSTR
Q4	2N718A	XSTR
Q5	2N718A	XSTR
Q6	2N718A	XSTR
Q7	2N718A	XSTR
Q8	2N718A	XSTR
Q9	2N718A	XSTR
Q10	2N718A	XSTR
R1	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R2	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R3	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R4	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R5	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R6	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R7	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R8	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R9	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R10	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R11	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R12	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R13	RCR07G103JM	RES,10K 5% 1/4W CAR COMP

Table 6-3. Logic PWB Assembly 2A2 (905-1110, Rev. E) Parts List

Ref. Desig.	Part Number	Description
R14	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R15	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R16	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R17	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R18	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R19	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R20	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R21	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R22	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R23	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R24	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R25	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R26	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R27	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R28	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R29	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R30	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R31	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R32	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R33	RCR07G471JM	RES,470 5% 1/4W CAR COMP
R34	RCR07G682JM	RES,6.8K 5% 1/4W CAR COMP
R35	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R36	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R37	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R38	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R39	RCR07G103JM	RES,10K 5% 1/4W CAR COMP
R40	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R41	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R42	RCR07G681JM	RES,680 5% 1/4W CAR COMP
R43	RCR07G102JM	RES,1.0K 5% 1/4W CAR COMP
R44	RCR07G681JM	RES,680 5% 1/4W CAR COMP
R45	RCR07G273JM	RES,27K 5% 1/4W CAR COMP
R46	RCR07G273JM	RES,27K 5% 1/4W CAR COMP
U1	10075-0053	I.C.
U2	I02-0004-000	IC 7406 PLASTIC TTL
U3	10075-0053	I.C.
U4	I02-0004-000	IC 7406 PLASTIC TTL
U5	10075-0053	I.C.
U6	10075-0235	I.C.
U7	905-1155	PROGRAMMED PROM
U9	I20-0002-000	IC LM311 COMPARATOR CER

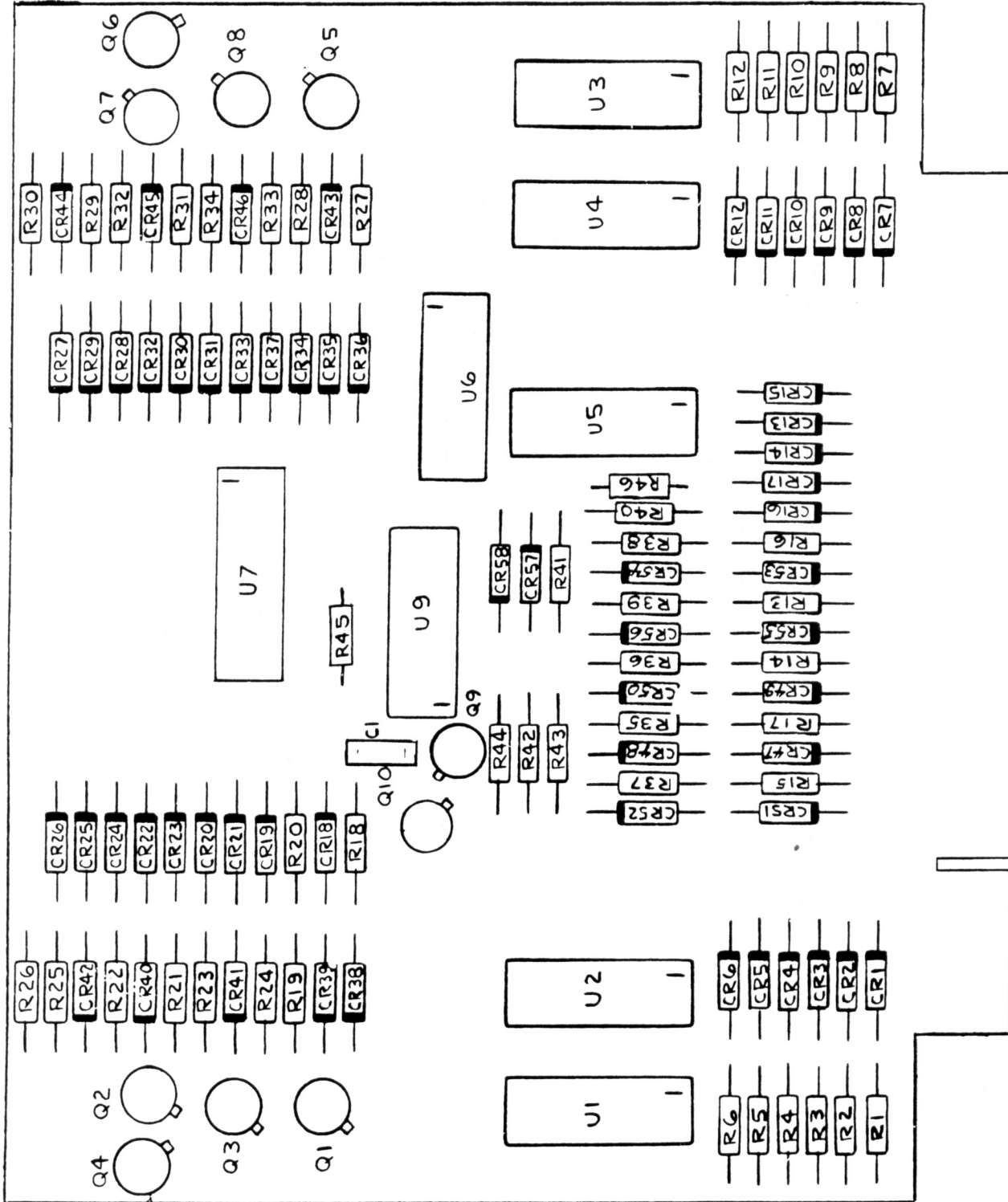
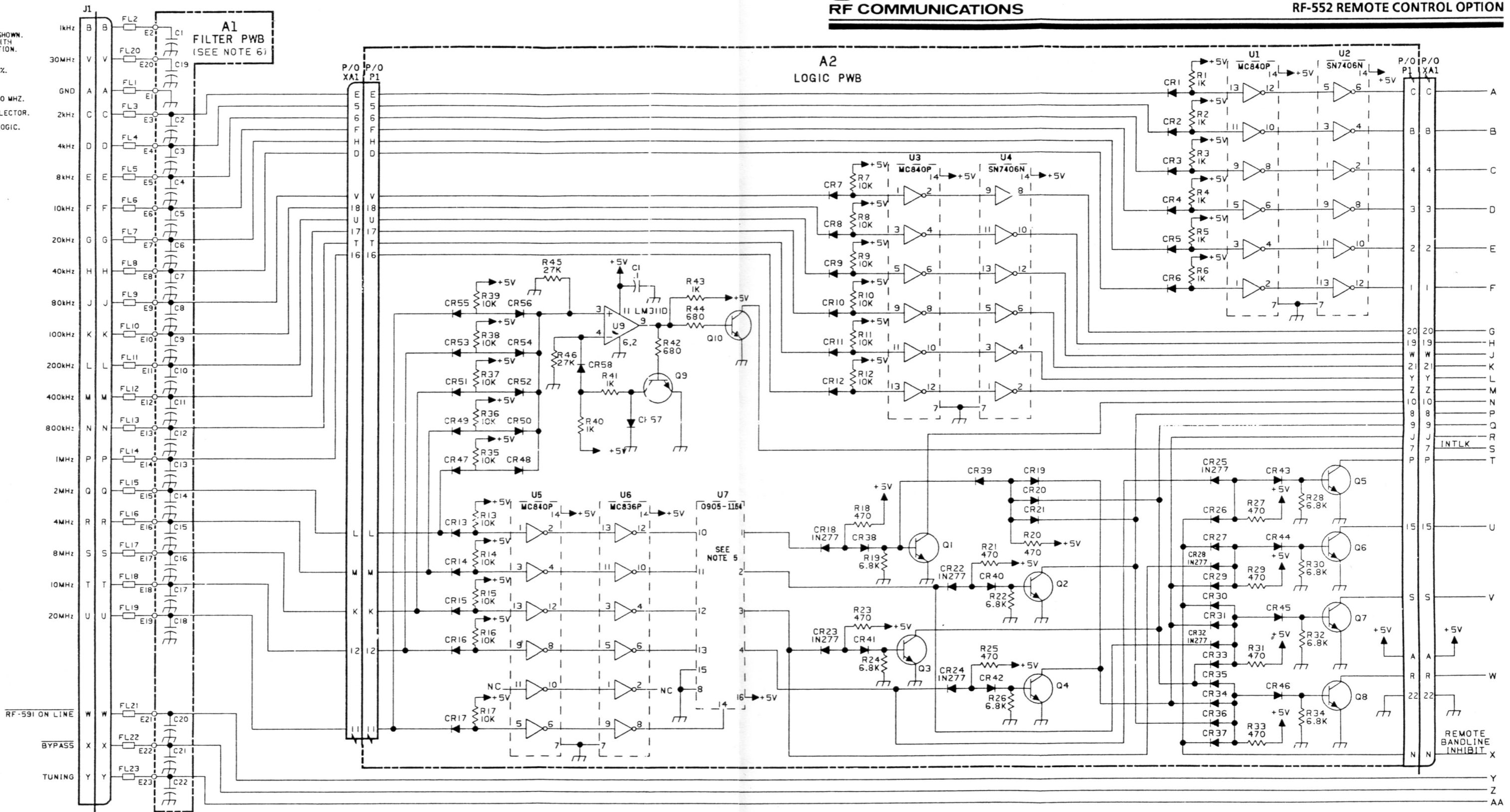


Figure 6-5. Logic PWB Assembly 2A2 Component Locations (905-1110, Rev. C)

- NOTES:
- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
  - UNLESS OTHERWISE SPECIFIED:  
A. ALL RESISTORS ARE IN OHMS, 1/4W, 10%.  
B. ALL DIODES ARE IN914.  
C. ALL TRANSISTORS ARE 2N718A.
  - VOLTAGE MEASUREMENTS TAKEN AT 2.0000 MHZ.
  - TERMINAL BOARD PART OF RF-551 PRESELECTOR.
  - REFER TO TRUTH TABLE FOR 0905-1154 LOGIC.
  - FILTER PWB AT C1-C22 ARE .01UF, 150V.
  - VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

TRUTH TABLE FOR U7 (0905-1154, POSITIVE LOGIC)

INPUT PINS				OUTPUT PINS			
14	13	12	11	10	4	3	2
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0
0	0	0	1	0	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0
0	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0
0	1	0	1	0	0	0	0
0	1	0	1	1	0	0	0
0	1	1	0	0	0	0	0
0	1	1	0	1	0	0	0
0	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
1	0	0	1	0	0	0	0
1	0	0	1	1	0	0	0
1	0	1	0	0	0	0	0
1	0	1	0	1	0	0	0
1	0	1	1	0	0	0	0
1	0	1	1	1	0	0	0
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1	1	1	0	1	0	0	0
1	1	1	1	0	0	0	0
1	1	1	1	1	0	0	0



10074-0202 REMOTE CONTROL MODULE				
HIGHEST REFERENCE DESIGNATION				
E5	FL23	J1	TB1	U1
XA2				
REFERENCE DESIGNATIONS NOT USED				

A1 FILTER PWB	
HIGHEST REFERENCE DESIGNATION	
C22	E23
REFERENCE DESIGNATIONS NOT USED	

A2 LOGIC PWB			
HIGHEST REFERENCE DESIGNATION			
CR58	P1	Q10	R46
C1			
REFERENCE DESIGNATIONS NOT USED			

A3 D/A CONVERTER PWB			
HIGHEST REFERENCE DESIGNATION			
CR16	K16	P1	R20
REFERENCE DESIGNATIONS NOT USED			

A4 LOCAL/REMOTE PWB		
HIGHEST REFERENCE DESIGNATION		
CR3	E10	K1
REFERENCE DESIGNATIONS NOT USED		

Figure 6-6. Logic PWB Assembly 2A2 Schematic Diagram

### 6.2.3 D/A Converter PWB Assembly 2A3

The D/A Converter PWB Assembly 2A3 converts the BCD and binary information from the Logic PWB 2A2 to an analog voltage which is proportional to the position of the selected frequency in the band. The D/A Converter consists of relays A3K1 through A3K16 and a resistive network A3R1 through A3R20.

A regulated + 10 V provides a reference for the resistive network. Relays A3K1 through A3K12, A3K13A, A3K14A, A3K15A, and A3K16A are energized by the selected frequency information from the Logic PWB. For a selected frequency of 2.000 MHz, relay A3K13A will be energized, removing the short on R13. A resistance of 2000 ohms will appear between pin L and Y of the D/A Converter. In this manner, the total resistance between pin L and Y is always proportional to the frequency selected.

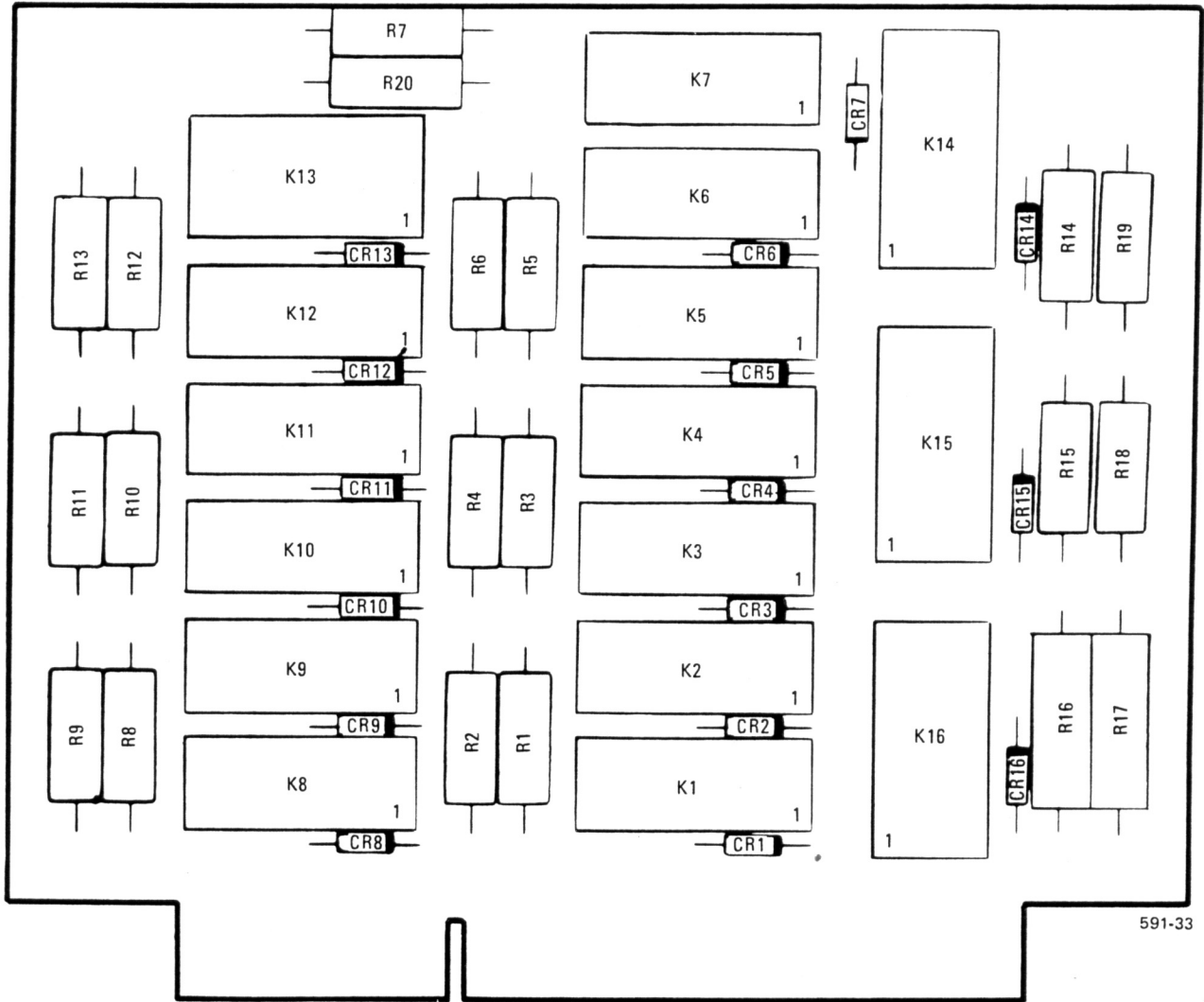
The resistance between pins X and Y is either 2000, 4000, 8000, or 16000 ohms, which is equal to the minimum frequency of the band selected. The output of the D/A Converter (pin Y) drives the servo motor, servo potentiometer A4R2, and SLF (Straight Line Frequency) capacitors C1 and C2. In this manner, the servo motor will move C1 and C2 until the output of the D/A Converter in the Remote Control and the output of potentiometer A4R2 equal each other. When the outputs are equal, capacitors C1 and C2 are positioned for the selected frequency. See table 6-4 for the D/A Converter PWB Assembly 2A3 parts list. Refer to figures 6-7 and 6-8 for component locations and schematic diagrams.

**Table 6-4. D/A Converter Assembly 2A3 (905-1120, Rev. C) Parts List**

Ref. Desig.	Part Number	Description
2A3	905-1120	D/A CONVERTER PWB ASSY
CR1	1N914	DIODE
CR2	1N914	DIODE
CR3	1N914	DIODE
CR4	1N914	DIODE
CR5	1N914	DIODE
CR6	1N914	DIODE
CR7	1N914	DIODE
CR8	1N914	DIODE
CR9	1N914	DIODE
CR10	1N914	DIODE
CR11	1N914	DIODE
CR12	1N914	DIODE
CR13	1N914	DIODE
CR14	1N914	DIODE
CR15	1N914	DIODE
CR16	1N914	DIODE
K1	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K2	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K3	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K4	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K5	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K6	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K7	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K8	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K9	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K10	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K11	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K12	905-8010	RLY, 24VDC, SPNO, REED, PC MT
K13	905-8011	RLY, 24VDC, DPDT, REED, PC MT

Table 6-4. D/A Converter Assembly 2A3 (905-1120, Rev. C) Parts List (Cont.)

Ref. Desig.	Part Number	Description
K14	905-8011	RLY,24VDC,DPDT,REED,PC MT
K15	905-8011	RLY,24VDC,DPDT,REED,PC MT
K16	905-8011	RLY,24VDC,DPDT,REED,PC MT
R1	905-0013-001	RES,FILM, 2 OHMS
R2	905-0013-002	RES,FILM, 4 OHMS
R3	905-0013-003	RES,FILM, 8 OHMS
R4	905-0013-004	RES,FILM,10 OHMS
R5	905-0013-005	RES,FILM,20 OHMS
R6	905-0013-006	RES,FILM,40 OHMS
R7	905-0013-007	RES,FILM,80 OHMS
R8	905-0013-008	RES,FILM,100 OHMS
R9	905-0013-009	RES,FILM, 200 OHMS
R10	905-0013-010	RES,FILM, 400 OHMS
R11	905-0013-011	RES,FILM, 800 OHMS
R12	905-0013-012	RES,FILM, 1K OHMS
R13	905-0013-013	RES,FILM, 2K OHMS
R14	905-0013-014	RES,FILM, 4K OHMS
R15	905-0013-015	RES,FILM, 8K OHMS
R16	905-0013-016	RES,FILM, 16K OHMS
R17	905-0013-016	RES,FILM, 16K OHMS
R18	905-0013-015	RES,FILM, 8K OHMS
R19	905-0013-014	RES,FILM, 4K OHMS
R20	905-0013-013	RES,FILM, 2K OHMS

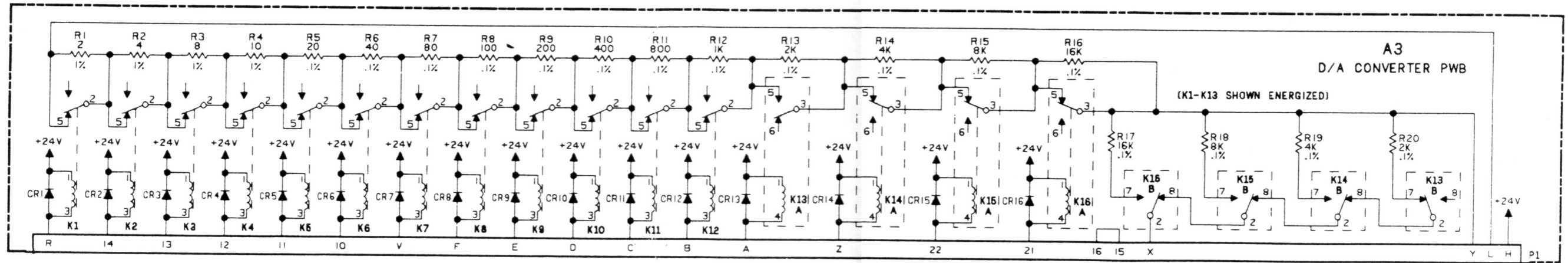


591-33

Figure 6-7. D/A Converter PWB Assembly 2A3 Component Locations







551-077

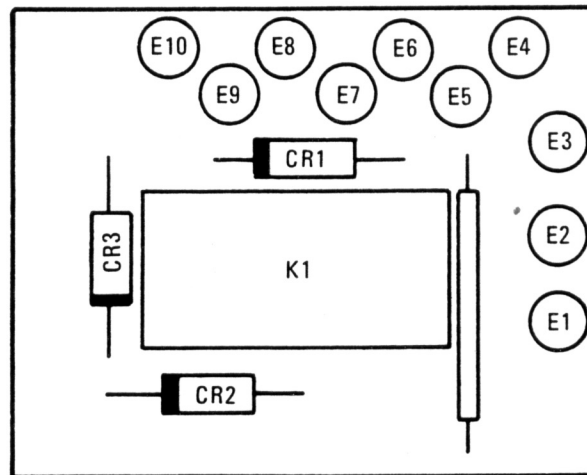
Figure 6-8. D/A Converter PWB Assembly 2A3 Schematic Diagram

**6.2.4 Local/Remote PWB Assembly 2A4**

Local/Remote PWB Assembly 2A4 transfers the bandline information and D/A analog voltage from the control unit to the 2A3 module. To accomplish this, the interlock line must be grounded by the presence of both the Logic and D/A PWBs on their proper connectors, and that the voltage on at least one of the 1-20 MHz control lines is greater than + 3 V. Otherwise, the relay A2K1 will keep the control in the local condition. Table 6-5 contains a parts list for the Local/Remote PWB 2A4 Assembly. Refer to figures 6-9 and 6-10 for component locations and schematic diagram.

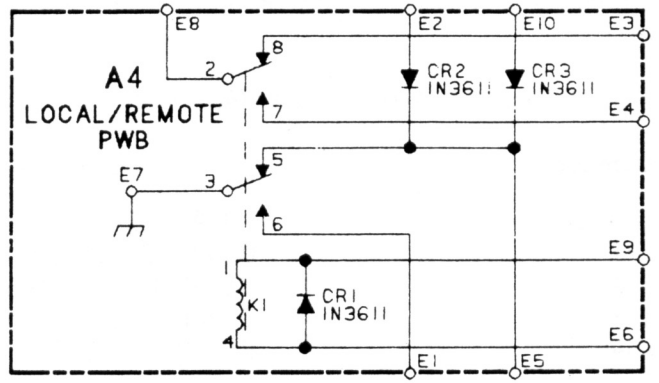
**Table 6-5. Local/Remote PWB Assembly 2A4 (905-1140, Rev. B) Parts List**

Ref. Desig.	Part Number	Description
2A4	905-1140	LOCAL/REMOTE PWB ASSY
CR1	1N3611	DIODE,GP,1A,200V
CR2	1N3611	DIODE,GP,1A,200V
CR3	1N3611	DIODE,GP,1A,200V
K1	10075-0234	RLY,24VDC,DPDT,ENC,PC MNT



551-060

**Figure 6-9. Local/Remote PWB Assembly 2A4 Component Location**



551-078

Figure 6-10. Local/Remote PWB Assembly 2A4 Schematic Diagram