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TECHNICAL MANUAL

for

RADIO-FREQUENCY PRESELECTOR-AMPLIFIER AM-4823/U

DEPARTMENT OF THE NAVY

NAVAL ELECTRONICS SYSTEMS COMMAND

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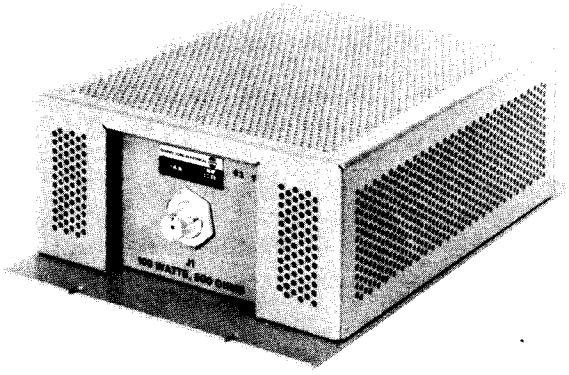

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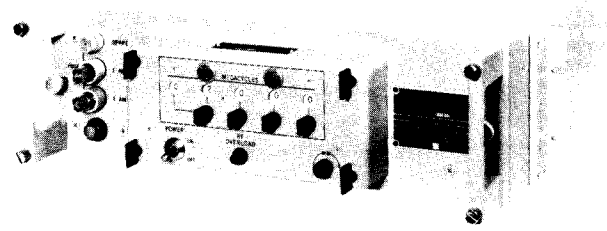

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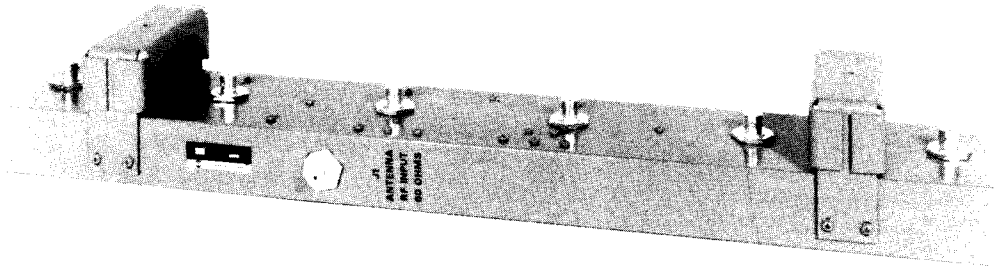

ANTENNA
COUPLER
CU-1901/U

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Figure 1-1. Radio-Frequency Preselector-Amplifier AM-4823/U and Associated Equipment

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This technical manual describes Radio-Frequency Preselector-Amplifier AM-4823/U, Dummy Load DA-607/U, and Antenna Coupler CU-1901/U. This technical manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

1-2. GENERAL DESCRIPTION.

Radio-Frequency Preselector-Amplifier AM-4823/U (figure 1-1) is an automatically tuned, sharply selective, active bandpass filter with integral linear rf amplifiers. The AM-4823/U has a frequency range of 2.000 to 31.999 MHz and is used between a receive antenna and a communications receiver. The purpose of the AM-4823/U is to allow normal operation of communications receivers in the presence of strong off-frequency rf antenna voltages that may be caused by the proximity of shipboard hf transmitters, radar equipment, etc. Desired weak signals in the passband are amplified and fed to the connected receiver. Signals that are off frequency, such as those from nearby transmitters, are sharply attenuated by the filter circuits and do not distort the desired weak signals. The AM-4823/U eliminates cross modulation and intermodulation commonly associated with receiver operation in a strong-signal environment. If the amplitude of input rf signals inside or outside the passband exceeds safe limits, protective circuits provide positive protection for the AM-4823/U and the connected receiver.

A detachable control unit (C-7715/U) provides power on-off, frequency selection, and overload override. The control unit has a lighted frequency readout panel and contains an indicator lamp that lights when rf overloads occur. Frequency readout is in direct reading digital form. The C-7715/U unit normally is mounted on the front of the AM-4823/U. However the C-7715/U may be removed and operated from a remote site (up to 150 feet away from the AM-4823/U) by connecting a control cable between the two units.

Antenna Coupler CU-1901/U (figure 1-1) is a passive impedance matching network which permits six or less AM-4823/U's to be connected to one antenna. When CU-1901/U is used, Dummy Load DA-607/U (figure 1-1) is connected in the receive antenna feedline to prevent excessive voltages due to strong induced voltages from nearby transmitters.

1-3. REFERENCE DATA.

Frequency range . . .	2.0 to 31.999 MHz; continuously tuned in 1-kHz steps (four internally switched bands of 2.0 to 3.999 MHz, 4.0 to 7.999 MHz, 8.0 to 15.999 MHz, and 16.0 to 31.999 MHz).
Power requirements .	115 volts ac ±10 percent, 50 to 60 or 400 Hz, single-phase.
Selectivity	Bandwidth at -6 db within ±1 percent of resonant frequency; bandwidth at -60 db within 10 times bandwidth at -6 db.
Sensitivity	3.66 uv for 20-db signal-to-noise ratio in 3-kHz bandwidth.
Desensitization	
In-band	Not more than 1-db reduction in gain for on-frequency input of 1.0 volt rms from 50-ohm source.
Out-of-band . . .	Not more than 6 db degradation in sensitivity for 50-volt rms input at ±15 percent from operating frequency.
Distortion	
Second order intermodulation .	40 db down from either of two input signals of 0.25 volts rms.
Third order intermodulation .	50 db down from either of two input signals of 0.25 volts rms.
Gain	8 db minimum.
Input/output impedance	50 ohms nominal, unbalanced.
Weight	40 pounds.
Input rf strong signal.	Withstands 200 volts rms at any frequency, 500 volts rms at ±10 percent or greater frequency separation.
RF overload circuit .	Protects internal components from damage. Operates at not less than 500 volts rms rf input ±10 percent off frequency. Automatically resets when strong rf signal is removed.

1-4. EQUIPMENT SUPPLIED.

a. Radio-Frequency Preselector-Amplifier AM-4823/U, 17.18 inches wide, 14 inches deep, 5.22 inches high (with mating connectors)

b. C-7715U Control, Preselector-Amplifier (A5) mounting panel (for remote location of C-7715/U)

c. Relay rack mounting brackets

d. Dummy Load DA-607/U, 11.51 inches wide, 3.65 inches deep, 7.98 inches high

e. Antenna Coupler CU-1901/U, 5.48 inches wide, 4.28 inches deep, 28.51 inches high

f. Technical manual for Radio-Frequency Preselector-Amplifier AM-4823/U

1-5. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Table 1-1 lists the equipment required but not supplied.

TABLE 1-1. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	CHARACTERISTICS
	NAME	DESIGNATION		
1	Signal generator	AN/URM-25( ) or CAQI-606A	Troubleshooting and maintenance procedures	50 kHz to 65 MHz ±1 percent. Modulation: AM 0.4/1 kHz ±1 percent. External, 0 to 20 kHz, 100 percent. Output: 0.1 uv to 3 volts, Z: 50 ohms.
1	Multitester	AN/USM-116 or CAQI-410B	Troubleshooting and maintenance procedures	0 to 1000 volts dc and 0 to 300 volts ac at 122 megohms. Accuracy: ±3 percent.
1	Electronic voltmeter	CCVO-91C	Maintenance procedures	300 uv to 3 volts rf. 0 to 70 db. Accuracy: ±5 percent to 400 MHz and ±10 percent to 1200 MHz. 200-ma meter.
1	True rms voltmeter	Ballantine 320A or CAQI-400H	Maintenance procedures	100 uv to 300 volts; freq range: 5 Hz to 4 MHz (2 Hz to 7 MHz for 3-db bandwidth). Input Z: 10-megohms shunted by 11 pf or 27 pf.
1	Voltohmmeter	AN/PSM-4 or CSV-260	Troubleshooting	Ranges: dc volts, 0 to 4000 at 20 K/volts; ac volts, 0 to 1000 at 1K/volts; ohms, 0 to 10,000; megohms, 0 to 100. Accuracy: 3 percent.
1	Rf attenuator	Daven 551-50	Maintenance procedures	10, 10, 20, 20, 20; 80 db total. Freq range: dc to 225 MHz. 50 ohms impedance.
1	Radio receiver	R-390A/URR or Collins type 51S-1A	Maintenance procedures	Freq range: 0.5 to 32 MHz; CW, MCW, AM, FSK, SSB; continuous tuning. If. selectivity: 100 Hz to 16 kHz bandwidth. Audio power out: 600 ohms unbalanced, 500 mw min; 600 ohms balanced, 10 mw min; headphones, 1 mw min.

TABLE 1-1. (Continued)

QTY PER EQUIP	NOMENCLATURE		REQUIRED USE	CHARACTERISTICS
	NAME	DESIGNATION		
1	Digital voltmeter	HP-3440	Troubleshooting	100-mv to 1000-volt dc range. Accuracy: ±0.05 percent.
1	Range unit (for digital voltmeter)	HP-3443A	Troubleshooting	
1	Power supply	Kepco ABC 30-0.3M	Troubleshooting	0 to 30 volts dc.

SECTION 2

INSTALLATION

2-1. POWER REQUIREMENTS.

The Radio-Frequency Preselector-Amplifier AM-4823/U operates on 115-volt ac, 50- to 60- or 400-Hz, single-phase input power. Power consumption of the AM-4823/U is 50 watts. Refer to figure 5-3 for the primary power distribution.

2-2. INSTALLATION REQUIREMENTS.

The AM-4823/U can be mounted on a desk top, in a standard 19-inch rack, or in an Equipment Cabinet CY-4516. Optionally, the front panel-mounted control unit may be removed to a remote side and cable connected to the rear of the equipment chassis. Refer to table 2-1 for list of installation material. Figure 2-2 is an outline and mounting drawing for the AM-4823/U, DA-607/U, and CU-1901/U. Figure 2-3 is a pictorial drawing for the AM-4823/U, DA-607/, and CU-1901/U.

Notes

1. It is imperative that the following installation instructions be strictly followed to ensure proper performance of the installation. Adapters UG-642A/U must be used to connect J2 through J7 of the CU-1901/U to J1 of the AM-4823/U. Adapter UG-566A/U must be connected directly to J1 on the DA-607/U. The electrical length of these connections is critical to proper operation of the equipment.
2. For the installation of Antenna Coupler CU-1901/U, six AM-4823/U's must be mounted vertically. The vertical distance between the centers of rf input jacks J1 on the AM-4823/U must be 5.250 inches. If this distance is not correct, jacks J2 through J7 on the CU-1901/U will not mate with jack J1 on each AM-4823/U.

To install Antenna Coupler CU-1901/U and Dummy Load DA-607/U, proceed as follows:

a. Remove the AM-4823/U chassis from cases located at bottom and second from top of the six vertically mounted AM-4823/U's.

b. Drill a 0.312-inch diameter hole in the rear of these empty cases above J1 as follows:

(1) Locate hole center 4.015 ±0.008 inches from bottom of each case.

(2) Locate hole center 2.390 ±0.008 inches from left side (viewed from rear) of each case.

Note

Measure and carefully mark hole before drilling.

c. Loosen the four screws holding the mounting brackets on the CU-1901/U.

d. Connect jacks J2 through J7 of the CU-1901/U to jack J1 on each AM-4823/U using connector adapter UG-642A/U.

e. Fasten the CU-1901/U mounting brackets to each of the AM-4823/U cases drilled in step b using a 10-32 screw (with flat washer under head) at each location.

f. Tighten mounting brackets on the CU-1901/U.

g. Using RG-214/U coaxial cable, connect J1 of the CU-1901/U to one arm of the UG-566A/U T-connector attached to Dummy Load DA-607/U. Connect the other arm of this UG-566A/U to the antenna using the RG-214/U coaxial cable.

h. Replace the two AM-4823/U chassis removed in step a.

2-3. CABLE ASSEMBLY.

If the C-7715/U is removed to a remote site, the cable assembly shown in figure 2-1 must be fabricated to provide connection between the C-7715/U and the rear connector on the AM-4823/U (connectors are furnished). Remove the RFI cap from the rear of the AM-4823/U, and place it over connector J5 in the front of the AM-4823/U.

2-4. POSTINSTALLATION INSPECTION.

a. Connect Electronic Voltmeter CCVO-91C (with 50-ohm termination) to rf output connector J2 on the AM-4823/U.

b. Connect the Signal Generator AN/URM-25( ) output to the AM-4823/U rf input connector J1.

c. Set AM-4823/U POWER switch to ON, and adjust MEGACYCLES controls for a frequency of

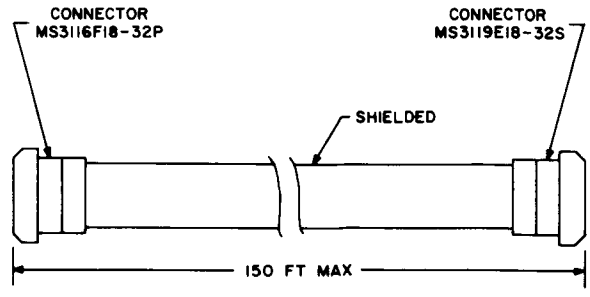


Figure 2-1. Control Cable Assembly

2.200; observe that neon pilot light (on chassis) and panel lamps are lit. The RF OVERLOAD indicator will momentarily light when power is turned on.

d. Set signal generator output level to 0.25 volt at 2.2 MHz; observe approximately 1.0-volt ac indication on voltmeter.

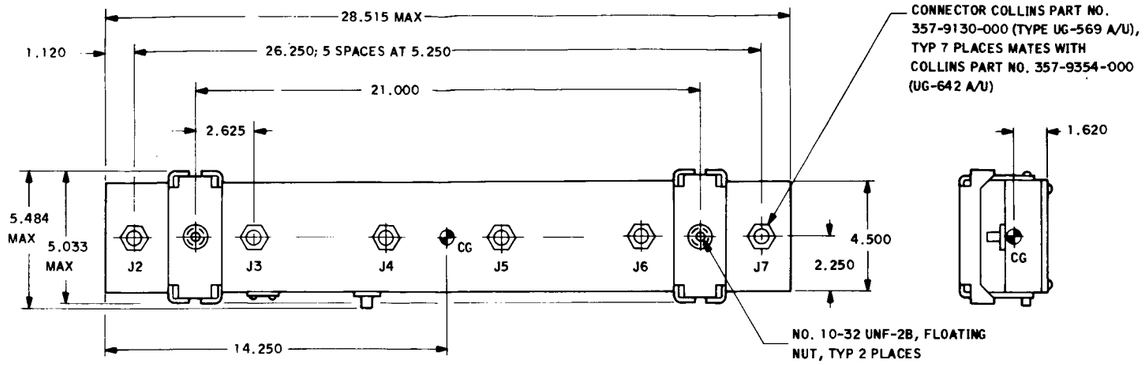
e. Set the AM-4823/U and the signal generator to the following frequencies, and observe that the voltmeter indication remains at approximately 1.0 volts ac. The frequencies are 3.999, 4.400, 7.999, 8.800, 15.999, 16.000, and 31.999 MHz.

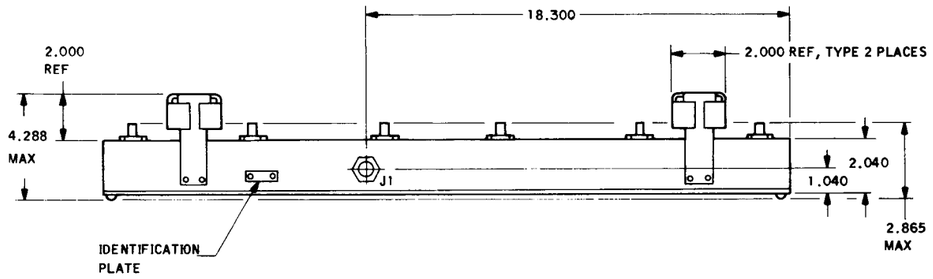
f. Press the RF OVERLOAD indicator pushbutton and note that the indicator will light.

TABLE 2-1. RADIO FREQUENCY PRESELECTOR-AMPLIFIER AM-4823/U AND ASSOCIATED EQUIPMENT, LIST OF INSTALLATION MATERIAL

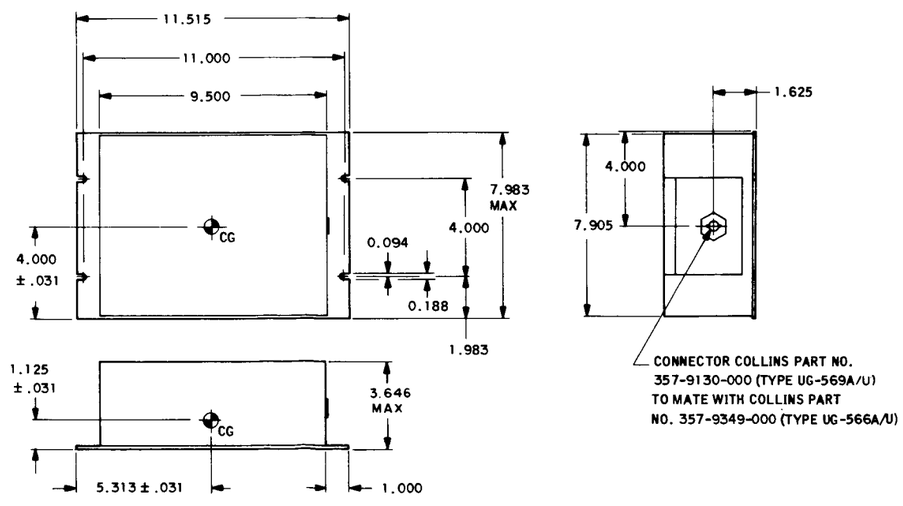
ITEM	QUANTITY		NOMENCLATURE	PART, TYPE, OR MODEL NUMBER	REMARKS
	GF	CF			
1		1	Radio-Frequency Preselector Amplifier AM-4823/U	522-4986-001	
2		1	Dummy Load DA-607/U	2Z5985-168-8938	
3		1	Antenna Coupler CU-1901/U	2Z5820-168-8935	
4	1		Cable, rf input from antenna to DA-607/U	RG-214/U	
5	1		Cable, rf output from DA-607/U to J1 of CU-1901/U	RG-214/U	
6	1		Cable, rf output from J2 of AM-4823/U, captive	RG-214/U	Use UG-573B coaxial connector.
7	1		Cable, main ac power to J4 of AM-4823/U, captive		Wire size and length determined by equipment location. Use MS3116F-12-3S mating connector.
8	1		Cable, remote control application only		Use connectors MS3116F18-32P and MS3116F18-32S
9	6		Adapter, UG-642A/U		Used to connect J2, J3, J4, J5, J6 and J7 of CU-1901/U to J1 of AM-4823/U
10	1		Adapter, UG-566A/U		Connect to J1 on DA-607/U.
HARDWARE FOR RACK MOUNTING AM-4823/U					
11	4		No 12-24-UNC-2A screw		
12	4		No 12 lockwasher		
13	4		No 1/4-20-UNC-2A screw		
14	4		No 1/4-20-UNC-3B nut		
15	4		No 1/4 lockwasher		
HARDWARE FOR MOUNTING CU-1901/U					
16	2		10/32 screw		
17	2		Flat washer		
HARDWARE FOR MOUNTING DA-607/U					
18	4		No 12-24-UNC-2A screw		
19	4		No 12 lockwasher		

ANTENNA COUPLER CU-1901/U

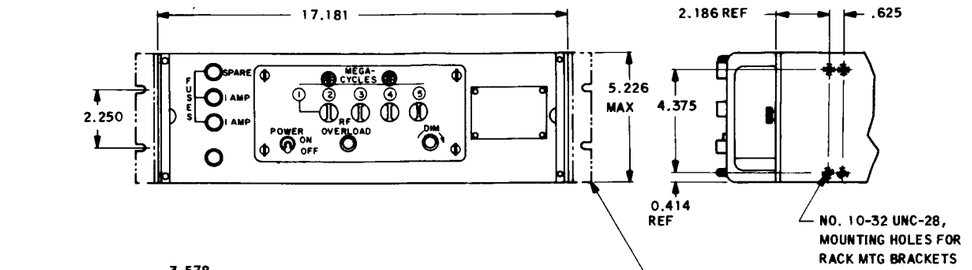


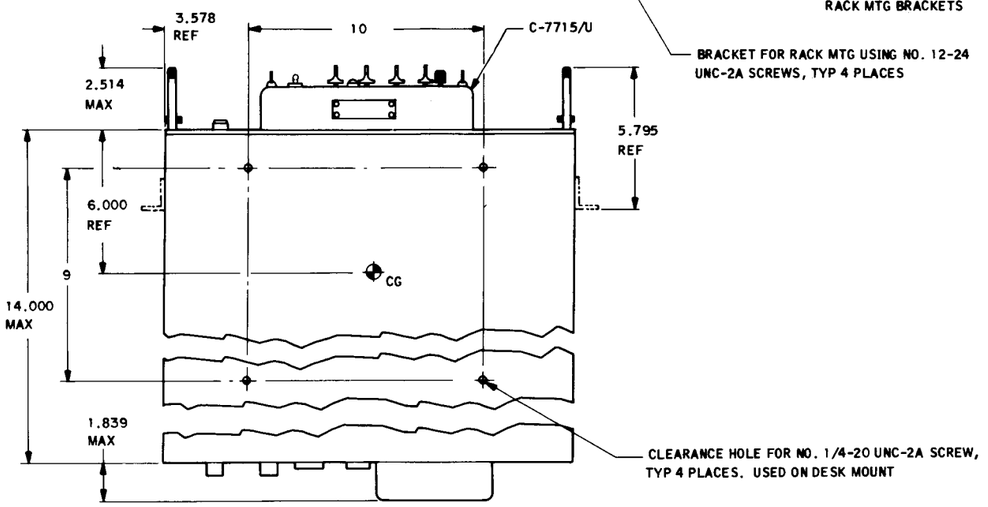


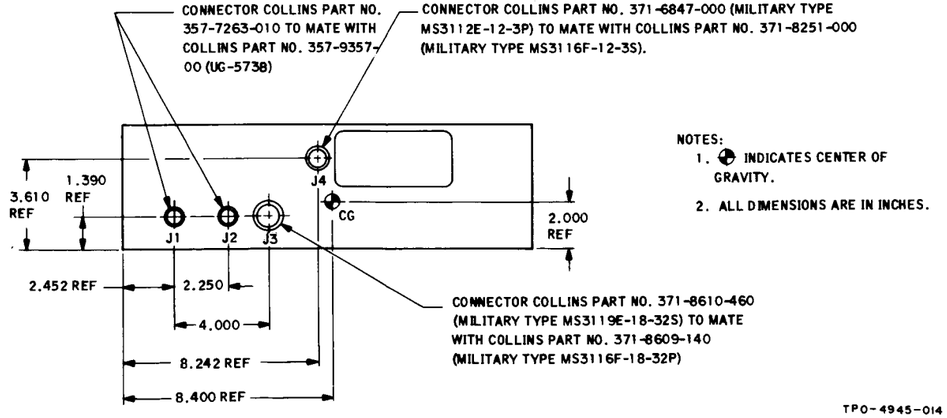
DUMMY LOAD DA-607/U



RF PRESELECTOR-AMPLIFIER AM-4823/U







NOTES:
1. ⊕ INDICATES CENTER OF GRAVITY.
2. ALL DIMENSIONS ARE IN INCHES.

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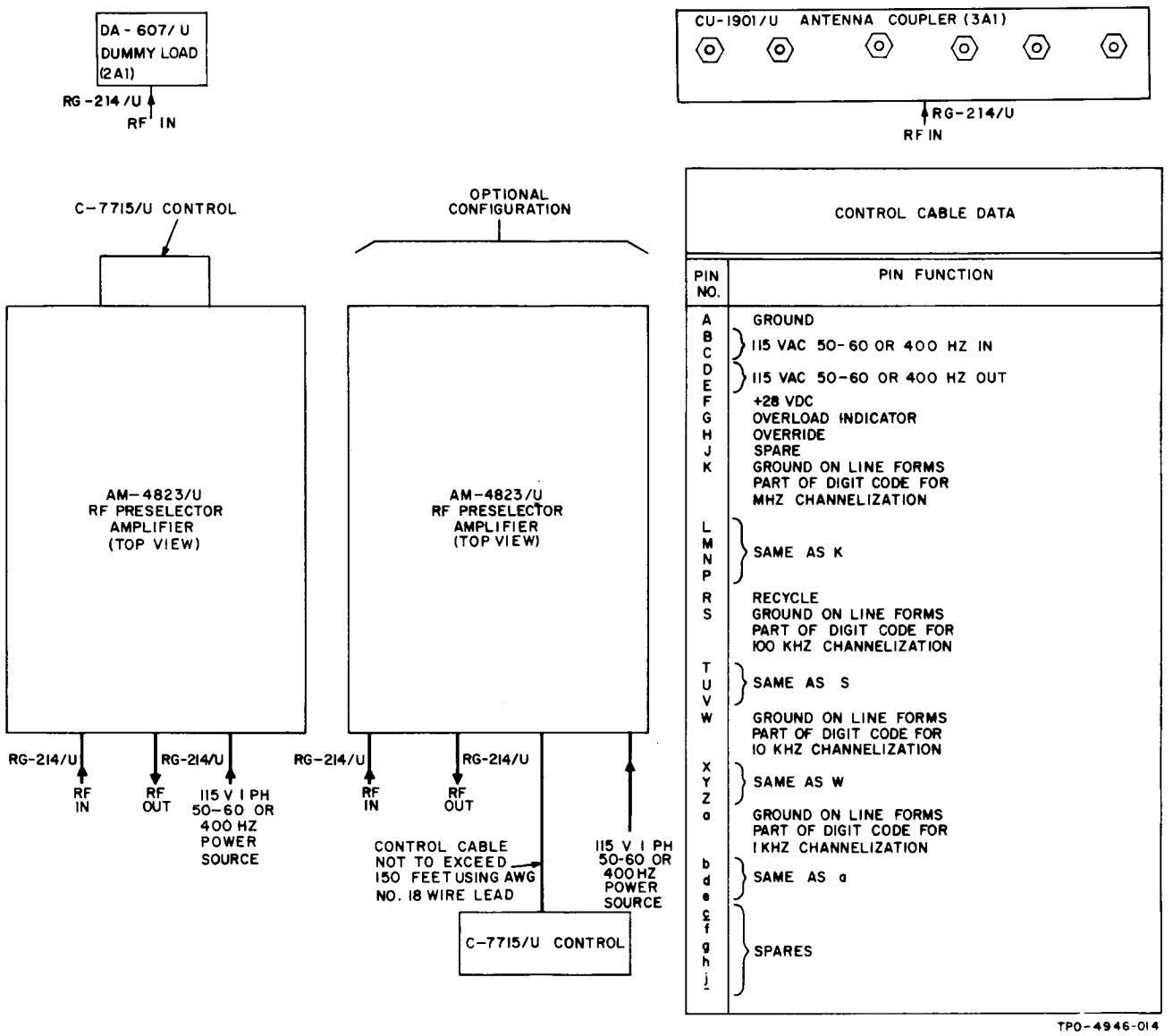


Figure 2-3. Radio-Frequency Preselector-Amplifier AM-4823/U and Associated Equipment, Pictorial Drawing

SECTION 3

OPERATION

3-1. FUNCTIONAL OPERATION.

The Radio-Frequency Preselector-Amplifier AM-4823/U is an automatically tuned active bandpass filter used between a receive antenna and a communications receiver. Front panel controls provide continuous tuning from 2.000 MHz to 31.999 MHz, in 1-kHz increments. The rf filter circuits tune this frequency range in four octave bands of 2.0 to 3.999 MHz, 4.0 to 7.999 MHz, 8.0 to 15.999 MHz, and 16.0 to 31.999 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 repositions the multigang tuning capacitor whenever the frequency controls are changed. Two double-tuned bandpass circuits provide the necessary selectivity.

The AM-4823/U provides a narrow bandpass centered on the selected frequency. The bandpass filter allows receiving and transmitting antennas to be located in close proximity to each other if the transmitting frequency is removed from the receive frequency by at least 10 percent and the input rf is no more than 500 volts. Signals in the passband are amplified by two low-distortion amplifiers which provide a minimum gain of 8 db.

Radio-frequency protection circuits prevent damage to internal components of the AM-4823/U when strong rf signals are present at the antenna input terminal. They also signal the operator by means of the RF OVERLOAD indicator on the C-7715/U when such an overload occurs. When internal rf voltages approach damaging levels, protection is provided by opening a relay at the antenna input. This action takes place at rf voltages which exceed 500 volts at 10-percent off frequency or approximately 20 volts on frequency. In addition, an overload is indicated when the on-frequency input exceeds 2 volts, which overloads the rf amplifiers, even though the antenna input relay is not opened.

3-2. OPERATING PROCEDURES.

The AM-4823/U is operated by the C-7715/U at the front panel of the AM-4823/U, or from a remote location up to 150 feet away from the AM-4823/U. To operate the AM-4823/U, the operator sets the POWER switch to ON and sets the frequency controls to the desired operating frequency. After allowing 10 seconds for the AM-4823/U to tune automatically, the AM-4823/U is ready to receive at the desired frequency. If an rf overload occurs, the RF OVERLOAD indicator will light, then automatically go out when the cause of the rf overload is removed. In certain situations it is possible that the rf overload circuit will try to reset when the overload condition still exists. In these cases, the overload circuit will attempt to reset several times, then automatically disconnect the AM-4823/U from the rf overload (the RF OVERLOAD indicator will remain lit). Momentarily pressing the RF OVERLOAD indicator pushbutton will turn off the indicator light and restore normal operation. During normal operation the cycling action described is very unlikely. Refer to figure 3-1 and table 3-1 for a description of the controls and indicators of the AM-4823/U.

3-3. OPERATOR MAINTENANCE.

Operator maintenance of the AM-4823/U is limited to observation of the indicators on the control panel. When the power switch is on, the neon pilot light (in main chassis) and panel lamps on the C-7715/U should be lit. If all front panel indicators go out, the trouble may be due to the loss of primary ac power. Fuses F1 and F2 (figure 3-1) should be checked if this condition occurs. If only the panel lamps go out, the trouble may be due to the absence of primary dc power. If this occurs, the failure should be reported immediately.

TABLE 3-1. RADIO-FREQUENCY PRESELECTOR-AMPLIFIER AM-4823/U, CONTROLS AND INDICATORS

CONTROL OR INDICATOR	FUNCTION
POWER	A two-position toggle switch that turns the AM-4823/U on and off.
RF OVERLOAD	A pushbutton with a built-in indicator. The indicator lights when an rf overload is present. Pressing the pushbutton will restore normal operation providing that the rf overload condition is no longer present.

TABLE 3-1. (Continued)

CONTROL OR INDICATOR	FUNCTION
DIM	A variable resistor that controls the brightness of the panel light indicators.
Megahertz control	A 32-position rotary switch that selects AM-4823/U frequency from 2 to 32 megahertz in 1-MHz increments.
100-kilohertz control	A 10-position rotary switch that selects AM-4823/U frequency from 0.0 to 0.9 megahertz in 10-kHz increments.
10-kilohertz control	A 10-position rotary switch that selects AM-4823/U frequency from 0.00 to 0.09 megahertz in 10-kHz increments.
1-kilohertz control	A 10-position rotary switch that selects AM-4823/U frequency from 0.000 to 0.009 megahertz in 1-kHz increments.
MEGACYCLES	Indicates frequency, in megahertz, selected by the frequency selector controls.
1 AMP FUSE	1-ampere fuses for input line voltage.
Pilot light	Lights when POWER switch is set to ON.

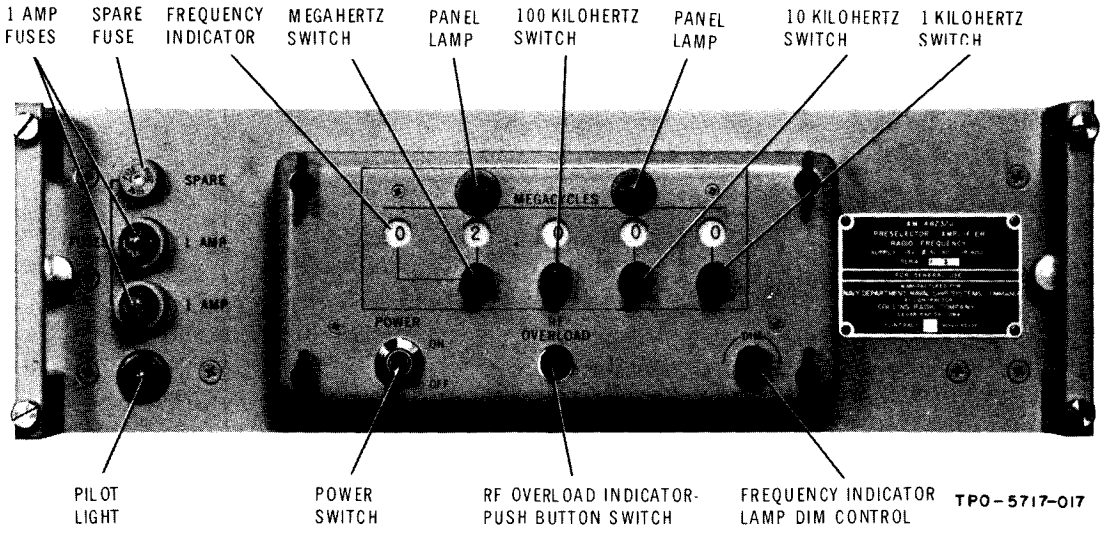


Figure 3-1. Radio-Frequency Preselector-Amplifier AM-4823/U, Controls and Indicators

SECTION 4

TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING.

a. SYMPTOM RECOGNITION. - The first step in the troubleshooting procedure is based on a complete knowledge and understanding of equipment operating characteristics. The functions of the AM-4823/U are such that if trouble occurs, the symptoms will be apparent because the majority of circuits are switching and control circuits which function on a go/no-go basis. Not-so-apparent troubles, such as decreased sensitivity or selectivity, usually are discovered while performing the preventive maintenance procedures of section 5.

b. SYMPTOM ELABORATION. - After an equipment trouble has been recognized, all the available aids designed into the equipment should be used to elaborate further on the original trouble symptom. Use of front panel controls and other built-in indicating aids provide better identification of the original trouble symptom. Checking or manipulating the front panel controls may eliminate the trouble.

c. LISTING PROBABLE FAULTY FUNCTION. - The next step in logical troubleshooting is to formulate a number of logical choices as to the probable cause and likely location (functional section) of the trouble. Logical choices are decisions which are based on knowledge of the equipment operation, a full identification of the trouble symptom, and information contained in this manual. Refer to the overall functional description and associated block diagram when selecting a possible faulty functional section. Due to the nature of the AM-4823/U, the information contained in this section is divided into four functional sections. The overall function description explains the relationship between the functional sections. This information will enable a technician to select one of the major functional sections as the possible faulty section.

d. LOCALIZING THE FAULTY FUNCTION. - For the greatest efficiency in localizing trouble, the functional sections which have been selected as the possible cause of the trouble should be tested in the order that requires the least time. If the tests prove that the first selected functional section is not malfunctioning, then the next selection should be tested. As aids in this process, functional section descriptions and an overall servicing block diagram are included at significant test points to aid in isolating the faulty functional section. Also, test data, such as information on control settings and test equipment required, are supplied to augment the functional descriptions and the servicing block diagram.

e. LOCALIZING TROUBLE TO THE CIRCUIT. - After the faulty functional section has been isolated, it is often necessary to make additional logical choices as to which group of circuits or circuit is at fault. Where possible circuit descriptions, simplified schematics, and pertinent test data for individual circuits or groups of circuits are placed together in one paragraph. Information which is too extensive to be grouped in one paragraph is referenced readily from the test data portion of the troubleshooting information.

f. FAILURE ANALYSIS. - After the apparent cause of trouble has been determined, but prior to performing corrective maintenance, review the logical troubleshooting procedure to determine why the fault caused the trouble symptoms which were observed. This review usually is necessary to determine that the fault discovered is actually the cause of malfunction and not the result of malfunction.

4-2. OVERALL FUNCTIONAL DESCRIPTION.

The AM-4823/U is an automatically tuned active bandpass filter with a frequency range of 2.000 to 31.999 MHz. Desired input signals from a receive antenna are amplified by two low-distortion amplifiers and applied to a connected receiver. Signals which are off frequency, such as those from nearby transmitters, are sharply attenuated by filter circuits and do not distort weak desired signals. Functionally, the AM-4823/U is divided into four sections: rf circuits, control circuits, protection circuits, and power supply circuits (refer to block diagram, figure 4-1).

a. RF CIRCUITS. - The rf circuits consist of an input double-tuned circuit, an input rf amplifier, a second double-tuned circuit, and an output rf amplifier. The rf circuits provide a narrow passband which is tunable from 2 to 32 MHz. The passband to the -6-db points is less than ±1 percent of the operating frequency. Off-frequency signals are attenuated as shown in figure 4-2.

The bandpass filter covers the 2- to 32-MHz range in four bands: 2.000 to 3.999 MHz, 4.000 to 7.999 MHz, 8.000 to 15.999 MHz, and 16.000 to 31.999 MHz.

The first double-tuned circuit is coupled to the antenna through a variable capacitor which matches a low antenna impedance to the high circuit impedance. This coupling technique provides a high input impedance to the AM-4823/U for frequencies other than the selected operating frequency and permits simultaneous operation of six Radio-Frequency Preselector-Amplifiers AM-4823/U from the same antenna. An impedance-matching capacitive divider network couples signals from the first double-tuned circuit to the rf input amplifier. Rf input amplifier A9 is a linear, parallel, 3-stage field effect transistor amplifier (Q1-Q5) which affords enough gain for good sensitivity to weak signals. The linearity of the input rf amplifier and the selectivity of the high Q first double-tuned circuit combine to produce a low-distortion output regardless of very strong rf inputs off the tuned frequency.

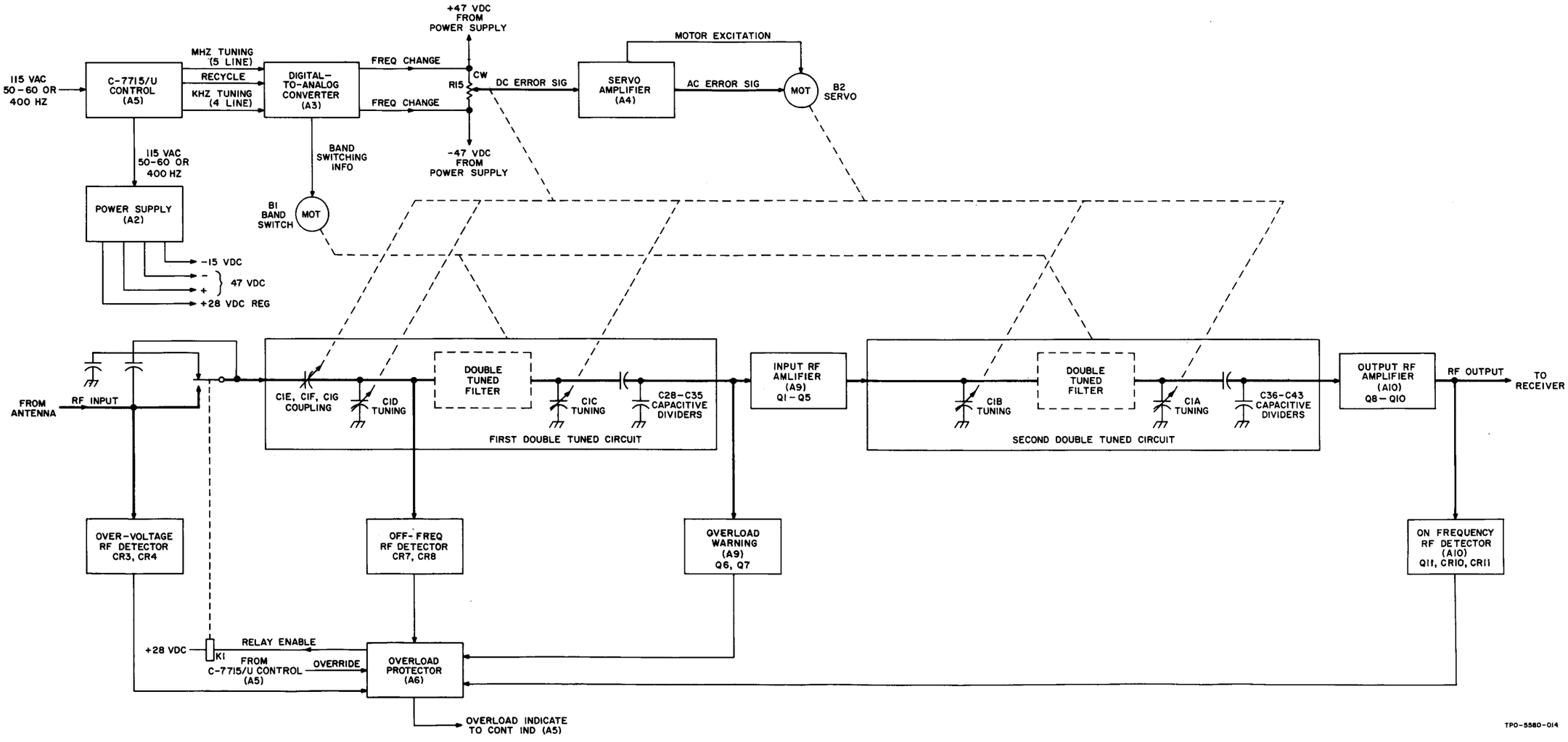


Figure 4-1. Radio-Frequency Preselector-Amplifier AM-4823/U, Block Diagram

The second double-tuned circuit filters signals from rf input amplifier A9, and another capacitive divider couples the signal to rf output amplifier A10. The rf output amplifier (Q8, Q9, and Q10) provides additional gain.

b. CONTROL CIRCUITS. - The control circuits contain the necessary circuits to tune the AM-4823/U on command to the desired frequency. The circuits include the C-7715/U, digital to analog converter A3, servo amplifier A4, band-switch motor B1, and servo motor B2. The information input to the control circuit is a modified binary code. Two coded binary systems are used to provide the digital frequency information; a 5-bit code is coded so that 1, 2, 3, 4, or 5 of the five wires associated with each frequency decimal digital is grounded; and the remaining wires, if any, are open. A 4-bit code is coded so that 1, 2, or 3 of the four wires associated with each frequency decimal digit is grounded and the others are open. The 5-bit group represents the megahertz digits, and the 4-bit group represents the kilohertz digits. Each time a new frequency is selected, a recycle command is applied to the digital to analog converter. This recycle command triggers a timing circuit that will apply 28 volts dc to the servo system for approximately 15 seconds. During the first 10 seconds of the 15-second time period, the AM-4823/U will complete tuning to a new frequency.

In the servo system, tuning capacitor C1 is coupled mechanically to follow variable resistor R15 and servo motor B2. Input digital frequency information controls the top and bottom values of two resistive legs, in digital to analog converter A3, that form two legs of a resistive bridge. Resistor R15 makes up the remaining two legs. Capacitor C1 has a linear frequency characteristic and rotates through its entire range in each of the four tuning bands. Resistor R15 is a linear variable resistor which also runs through its entire range in each of the four bands.

The action of the top and bottom values of the resistive bridge, taken together, is the same as that of a conventional variable resistor except that changes in resistance are made in steps. The smallest step corresponds to the smallest frequency change, which is 1 kHz. Relays controlled by the BCD digital frequency information make the resistance changes. The bridge, formed by the top and bottom resistive legs in the digital to analog converter with R15, will be unbalanced by a change in frequency, causing an error voltage to appear at the input to the servo amplifier. In the servo amplifier, the dc error signal is converted to a 400-Hz error signal, amplified, and applied to servo motor B2. The polarity of the dc error signal determines whether the ac error signal leads or lags the motor excitation voltage and the consequent direction of rotation of the servo motor. As variable resistor R15 is driven toward bridge balance, the error voltage decreases in magnitude, and the torque developed by servo motor B2 decreases. When the error voltage is reduced to zero, tuning capacitor C1 has reached the proper position, and the AM-4823/U is tuned to the selected frequency.

c. PROTECTION CIRCUITS. - The protection circuits prevent damage to the AM-4823/U and the associated receiver which might result from strong rf input signals accidentally applied too close to the operating frequency. The AM-4823/U will operate normally in the presence of very strong off-frequency input signals. Protection is necessary if, for example, a strong signal 10 percent away from the operating frequency exceeds 500 volts. Strong signals closer to the operating frequency than 10 percent will trigger the protection circuits at less than 500 volts. Signals directly in-band will operate the protection circuits when they are in excess of approximately 25 volts. When an overload occurs, rf detector circuits trigger rf overload control module A6. Operation of the protection circuits opens relay K1 and reduces the filter side of the antenna input by approximately 40 db.

The protection circuits sample the rf level at the four frequency bands. If the rf voltage across the input coils reaches a level that could damage the coils, rf detectors CR7 and CR8 trigger the overload protect circuit. Two other rf sampling networks, at the antenna input and at the output amplifier, keep the protective circuit triggered until the rf input decreases to a safe operating level. An overload warning circuit consisting of transistors A9Q6 and A9Q7 lights the RF OVERLOAD indicator when the on frequency rf input exceeds approximately 2 volts.

d. POWER SUPPLY CIRCUIT. - Power for the AM-4823/U is controlled by the C-7715/U. The 115-volt ac, 50- to 60- or 400-Hz input is switched through A5 to power supply A2 where it is rectified and provided as four dc voltages to various stages in the AM-4823/U. Figure 5-3 shows the primary power distribution circuits.

e. AM-4823/U OVERALL TEST DATA. - The following test data is required to perform overall trouble isolation in the AM-4823/U.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is a voltohmmeter (AN/PSM-4 or equivalent), Signal Generator AN/URM-25( ), Multitester AN/USM-116, and a true rms voltmeter (Ballantine 320A or equivalent).

(2) TEST SETUP. - Perform the procedures of table 4-2 with the AM-4823/U connected to a 115-volt, 50- to 60- or 400-Hz source.

(3) TEST POINTS. - Radio-Frequency Preselector-Amplifier AM-4823/U test points are identified on figure 5-5 and on the servicing block diagram, figure 4-8. Information available at test points is contained in table 4-1. The star test points are used to isolate faulty functional sections, and the circled test-point symbols are helpful in isolating trouble to a subassembly or to a circuit within the AM-4823/U.

(4) OVERALL TROUBLE-ISOLATION PROCEDURE. - When the AM-4823/U is known to be malfunctioning or if preventive maintenance tests indicate that the performance is less than adequate, isolate the trouble to one of the subassemblies or to the circuits of the main chassis. Trouble isolation can be accomplished by using the servicing block diagram (figure 4-8) or by performing the steps of table 4-2. Before beginning the trouble-isolation procedure, inspect the AM-4823/U for loose cables, charred or discolored insulation, broken wires, or other evidence of equip-

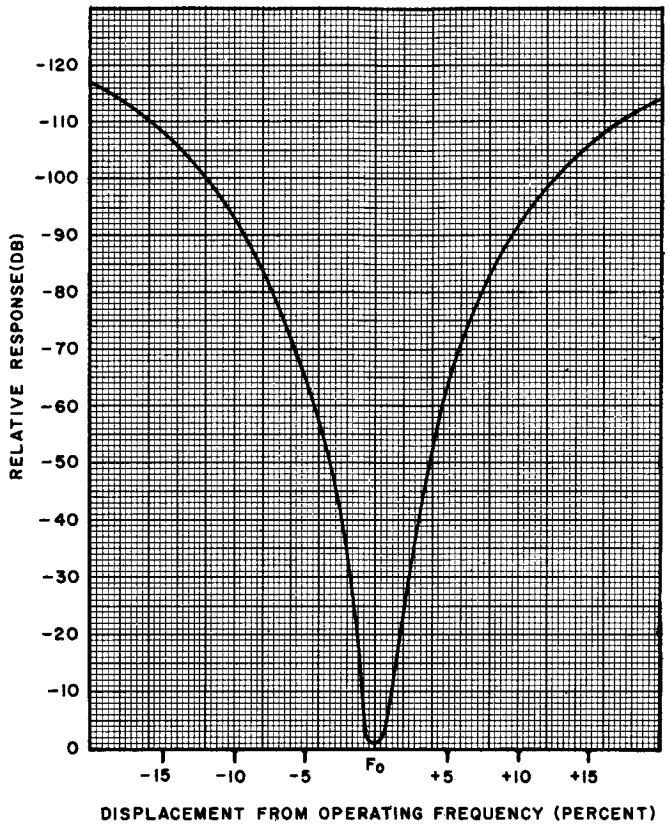


Figure 4-2. Typical AM-4823/U RF Passband, Graph Display

ment malfunction. Make certain that primary power is available to the equipment.

4-3. RF CIRCUITS - FUNCTIONAL DESCRIPTION.

a. GENERAL. - The rf circuits allow desired signals to pass through to the associated receiver with enough gain to maintain overall receive system sensitivity while rejecting off-frequency signals. The rf circuits accomplish this function without distorting the received signal or degrading the receive system performance.

b. FIRST DOUBLE-TUNED CIRCUIT. - The rf input signal is applied from the receive antenna to the AM-4823/U through a coaxial connector at the rear of the unit. Relay K1 is normally energized, closing contacts which carry the rf input signal (refer to figure 4-3). If an rf overload occurs, relay K1 is deenergized, and the input rf is attenuated 40 db. Refer to paragraph 4-5 for the conditions which de-energize K1.

Under normal receiving conditions, energized relay K1 applies the rf input signal to coupling capacitors C1E, C1F, and C1G and to capacitors C2 and C3. Switches S1K and S1L select coupling capacitors singly or in combination as appropriate for each of the tuning bands. Switches S1K and S1L select capacitors C1F and C1G in parallel for the 2.000- to 3.999-MHz band, capacitor C1G for the 4.000- to 7.999-MHz band, capacitor C1E for the 8.000- to 15.999-MHz band, and capacitor C1F for the 16.000- to 31.999-MHz band. Band-switch motor B1 drives switches S1K and S1L to the proper position. The coupling capacitors, in series with the antenna input, couple the antenna to the first double-tuned circuit. The input rf signal then is applied to tuning capacitor C1D and to band switches S1H and S1J. These switches select the double-tuned circuit appropriate for the selected frequency and ground the unused tuning circuits to prevent interferences with the selected circuit. For the 2.000- to 3.999-MHz band, the input double-tuned circuit components are inductors L1, L2, and L3 and trimmer capacitors C10 and C11. Capacitors C1C and C1D tune the circuit. The tuned circuits are inductively coupled to maintain constant coupling when tuning across an entire band. Variable resistor R15, and the servo system described in paragraph 4-4d, position tuning capacitors C1C and C1D and coupling capacitors C1E, C1F, and C1G to produce resonance in the double-tuned circuit at the desired frequency. The output of the first tuned circuit is applied to band switch S1G and through a capacitive voltage divider to S1F, where band selection and grounding of unused circuits again takes place.

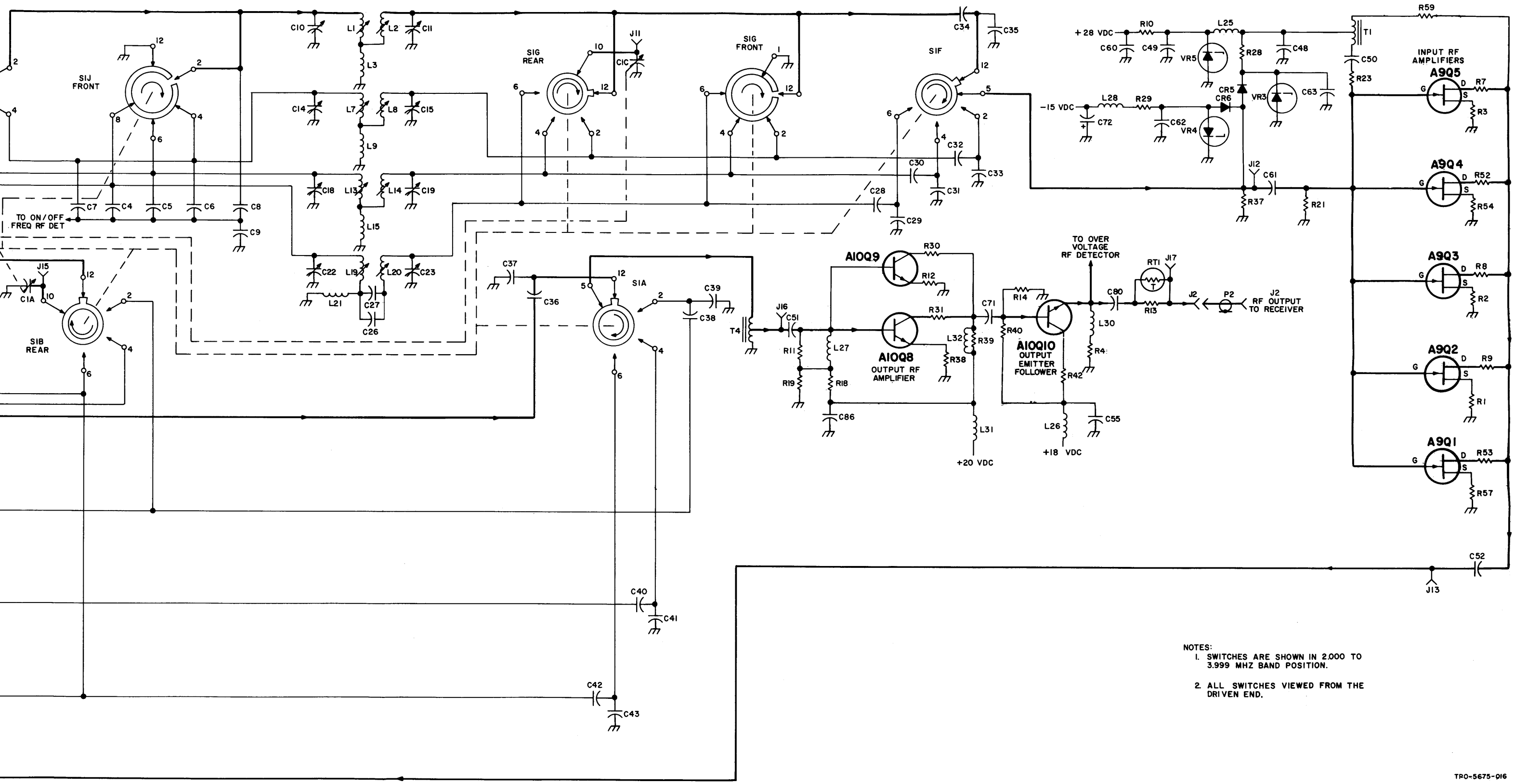


Figure 4-3. RF Circuits, Simplified Schematic Diagram

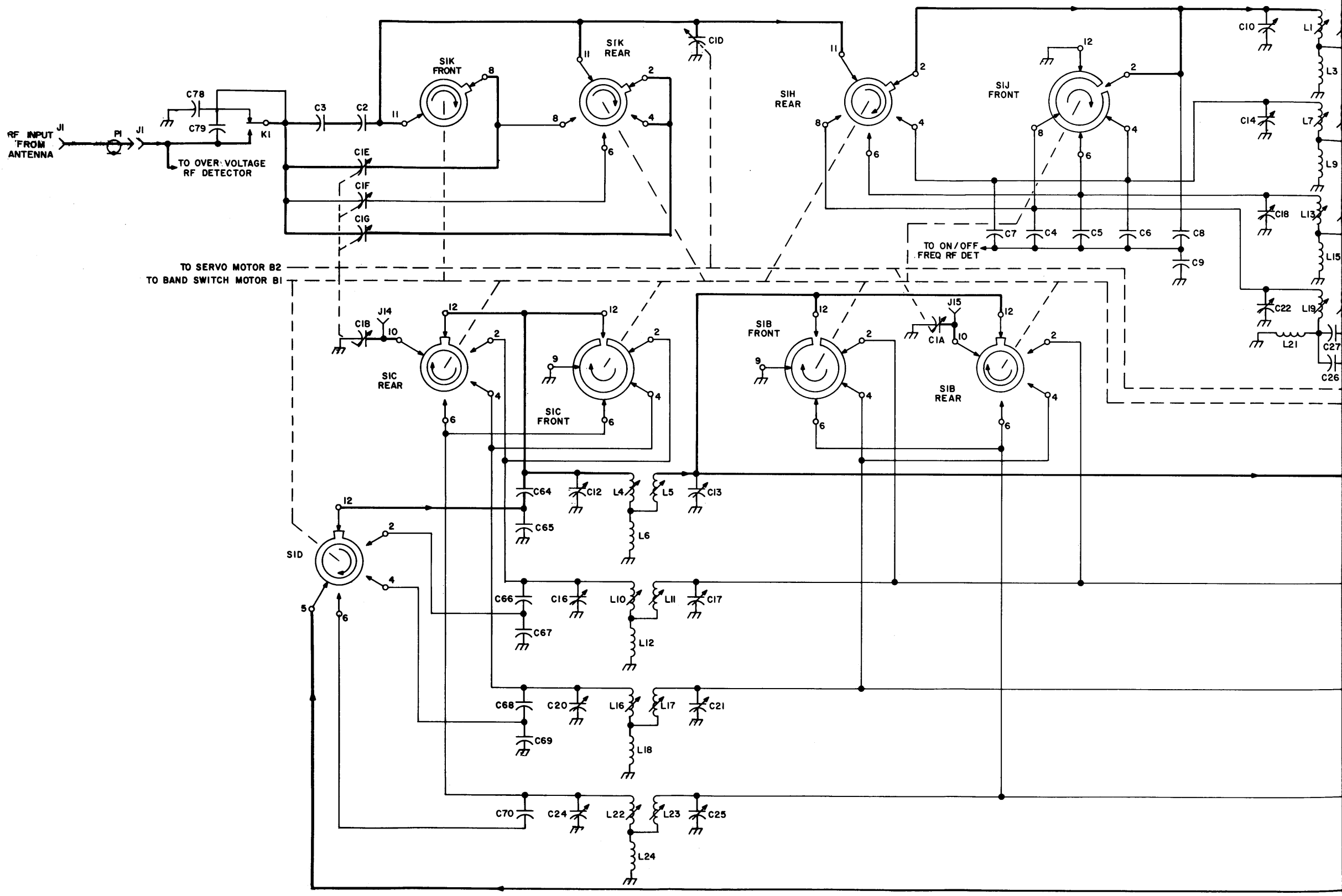

RF INPUT FROM ANTENNA
J1
P1
J1
C78
C79
K1
C3
C2
TO OVER VOLTAGE RF DETECTOR
SIK FRONT
SIK REAR
CID
CIE
CIF
CIG
SIH REAR
SIJ FRONT
C10
L1
L3
C14
L7
L9
C18
L13
L15
C7
C4
C5
C6
C8
C9
TO ON/OFF FREQ RF DET
TO SERVO MOTOR B2
TO BAND SWITCH MOTOR B1
J14
CIB
SIC REAR
SIC FRONT
SIB FRONT
J15
CIA
SIB REAR
C22
L19
L21
C27
C26
C64
C12
L4
L5
C13
C65
L6
S1D
C66
C16
L10
L11
C17
C67
L12
C68
C20
L16
L17
C21
C69
L18
C70
C24
L22
L23
C25
L24

TABLE 4-1. TEST-POINT DATA

TEST POINT	LOCATION	FIGURE REF	INDICATIONS AND CONDITIONS REQUIRED TO OBTAIN INDICATIONS	CIRCUITS TESTED
1	A4J5 and A4J6 on servo amplifier A4	4-8	0 to 36 volts ac when tuning to new frequency (10 seconds maximum).	Control circuits consisting of servo amplifier A4, digital to analog converter A3, and the C-7715/U.
2	A1J17 on AM-4823/U chassis	4-8	0 to 5.5 volts rf, depending upon band selection, when input rf is the desired frequency.	First and second double-tuned circuits and rf amplifiers A9Q1 through A9Q5, and A10Q8 through A10Q10.
3	A6J3 on rf overload control A6	4-8	+28 volts dc during normal operation; ground when an overload condition exists.	Rf overload control A6 and rf detector networks.
A	Panel lamps on C-7715/U	4-8	Lit when POWER switch is ON.	Power supply A2.
B	A2J1 and A2J2 on power supply A2		115 volts, 50 to 60 or 400 Hz when POWER switch is ON.	Ac input.
C	A2J3 on power supply A2	4-8	-15 volts dc when POWER switch is ON.	The unregulated -15-volt dc supply of power supply A2.
D	A2J5 and A2J6 on power supply A2	4-8	47 volts dc when POWER switch is ON.	The floating 47-volt dc supply of power supply A2.
E	A2J4 on power supply A2	4-8	+28 volts dc when POWER switch is ON.	The regulated +28-volt dc supply of power supply A2.
F	A4J4 of servo amplifier A4	4-8	Up to -45 or +45 volts dc when tuning to new frequency (10 seconds maximum); 0 volt after tuning is complete.	Variable resistor R15, digital to analog converter A3, or the C-7715/U.
G	A3J1 and A3J2 on digital to analog converter A3	4-8	45 volts dc.	Digital to analog converter A3 and power supply A2.
H	A4J3 on servo amplifier A4	4-8	28 volts dc when tuning to new frequency; 0 volt after 23 seconds, maximum.	Timing circuit A3Q4, A3Q5, and A3K20 of digital to analog converter A3.
I	A3J3 on digital to analog converter A3	4-8	28 volts dc when tuning to new frequency; 0 volt after 23 seconds, maximum.	Timing circuit A3Q4, A3Q5, and A3K20 of digital to analog converter A3.
J	A4J1 and A4J2 on servo amplifier A4	4-8	36 volts ac when tuning to new frequency; 0 volt after 23 seconds, maximum.	400-Hz oscillator of servo amplifier A4 or timing circuit of digital to analog converter A3.

TABLE 4-1. (Continued)

TEST POINT	LOCATION	FIGURE REF	INDICATIONS AND CONDITIONS REQUIRED TO OBTAIN INDICATIONS	CIRCUITS TESTED
(K)	A1J16 on AM-4823/U chassis	4-8	0 to 4 volts depending on input frequency and signal level.	First and second double-tuned circuits and input rf amplifier.
(L)	A1J11 on AM-4823/U chassis	4-8	0 to 60 volts depending on input frequency and signal level.	Tuning capacitors C1C and C1D and first tuned filter circuit.
(M)	A1J12 on AM-4823/U chassis	4-8	0 to 3 volts depending on input frequency and signal level.	Same as (L) plus capacitive dividers C28 through C35.
(N)	A1J13 on AM-4823/U chassis	4-8	0 to 15 volts depending on input frequency and signal level.	Input rf amplifiers A9Q1 through A9Q5.
(O)	A1J14 on AM-4823/U chassis	4-8	0 to 50 volts depending on input frequency and signal level.	Tuning capacitor C1B.
(P)	A1J15 on AM-4823/U chassis	4-8	0 to 50 volts depending on input frequency and signal level.	Tuning capacitor C1A and second tuned filter circuit.
(Q)	A6J1 on rf overload control A6	4-8	0 to 5.6 volts during normal operation; momentary 5.6 volts dc if off-frequency input exceeds 500 volts or on-frequency input exceeds 25 volts.	Rf detector C73, CR7, R43 and CR8; voltage divider C4 through C9.
(R)	A6J2 on rf overload control A6	4-8	2.2 volts dc if rf input at J1 is approximately 135 volts.	Rf detector C56, C57, CR3, and CR4.
(S)	A6J5 on rf overload control A6	4-8	0 to 5 volts during normal operation depending on the on-frequency input voltage.	Rf detector A10Q11, CR10, and CR11.
(T)	A6J4 on rf overload control A6	4-8	1 volt dc during normal operation. 0 volt when RF OVERLOAD pushbutton is pressed.	Pushbutton-indicator S7 on the C-7715/U.
(U)	RF OVERLOAD indicator	4-8	Is lit when an rf overload condition exists.	Rf overload control A6 and rf detector networks.

TABLE 4-2. OVERALL TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Connect voltohmmeter (AN/PSM-4) to test jacks A2J1 and A2J2. Make certain that POWER switch is ON.	Meter indicates 115 ±5 volts ac, C-7715/U panel lamps are lit.	Refer to table 4-9.
2	Connect voltohmmeter to test jack A2J3.	Meter indicates -15 ±3 volts dc.	Refer to table 4-9.
3	Connect voltohmmeter across test jacks A2J5 and A2J6.	Meter indicates 47 ±4 volts dc.	Refer to table 4-9.
4	Connect voltohmmeter to test jack A2J4.	Meter indicates 28 ±0.3 volts dc.	Refer to table 4-9.
5	Connect an ungrounded voltohmmeter across test jacks A4J5 and A4J6. Change AM-4823/U frequency to 3.000 MHz.	Meter indicates 0 to 36 volts ac for 10 seconds, maximum.	Proceed to step 9.
6	Change AM-4823/U frequency to 6.000 MHz.	Meter indicates 0 to 36 volts ac for 10 seconds, maximum.	Proceed to step 9.
7	Change AM-4823/U frequency to 12.000 MHz.	Meter indicates 0 to 36 volts ac for 10 seconds, maximum.	Proceed to step 9.
8	Change AM-4823/U frequency to 24.000 MHz.	Meter indicates 0 to 36 volts ac for 10 seconds, maximum.	Proceed to step 9.
9	Connect voltohmmeter to test jack A4J4. Change AM-4823/U frequency to 3.000 MHz.	Meter indicates -45 to +45 volts dc for 10 seconds, maximum.	If indications are abnormal refer to table 4-5.
	Change AM-4823/U frequency to 24.000 MHz.	Meter indicates -45 to +45 volts dc for 10 seconds, maximum.	
10	Connect Signal Generator AN/URM-25( ) to rf input connector to J1. Set signal generator and AM-4823/U frequency to 3.000 MHz. Set generator output to 0.25 volt. Connect AN/USM-116 to test jack J17.	Vtvm indicates approximately 1.5 volts ac. (Allow 10 seconds for tuning.)	Refer to table 4-3.
	Set signal generator and AM-4823/U to the following frequencies: 6.000 MHz, 12.000 MHz, and 24.000 MHz.	Vtvm indicates approximately 1.7 volts ac at 6.000 MHz, 1.5 volts ac at 12.000 MHz, 1.4 volts ac at 24.000 MHz.	Refer to table 4-3.
11	Set signal generator and AM-4823/U to 2 MHz. Connect signal generator to test jack J12. Connect CCVO-91C to test jack J12. Set signal generator output to maximum.	RF OVERLOAD indicator is lit. Vtvm indicates 3.3 volts ac maximum.	Refer to table 4-8.
	Decrease signal generator output to zero volt.	RF OVERLOAD indicator goes out.	Refer to table 4-8.
12	Connect power supply (Kepco ABC 30-0.3M) to test jack A6J1. Set power supply output to 6 volts dc.	RF OVERLOAD indicator is lit.	Refer to table 4-8.

TABLE 4-2. (Continued)

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
13	After 5 seconds of operation at 6 volts dc, decrease power supply output to 0.	RF OVERLOAD indicator remains lit. Press the indicator and the light will go out.	Refer to table 4-8.
14	Connect the power supply to test jack A6J2. Set power supply output to 6 volts dc. Momentarily apply 6 volts dc to test jack A6J1.	RF OVERLOAD indicator is lit.	Refer to table 4-8.
15	Remove 6 volts dc from test jack A6J2.	RF OVERLOAD indicator goes out after 1/2 second delay.	Refer to table 4-8.
16	Connect power supply to test jack A6J5. Set power supply output to 6 volts dc. Momentarily apply 6 volts dc to test jack A6J1.	RF OVERLOAD indicator is lit.	Refer to table 4-8.
17	Remove 6 volts dc from test jack A6J5.	RF OVERLOAD indicator goes out after 1/2 second delay.	Refer to table 4-8.

A capacitive voltage divider, consisting of combinations of capacitors C28 through C35 in parallel with tuning capacitor C1C, provide impedance matching to the input rf amplifier. Band-switch motor B1 drives S1F to select the proper band voltage divider.

c. RF INPUT AMPLIFIER A9. - The output of band switch S1F is applied across coupling capacitor C61 to linear low-noise field effect transistors (fet's) Q1, Q2, Q3, Q4, and Q5 connected in parallel. A limiting network, consisting of diodes CR5 and CR6 and zener diodes VR3 and VR4 at the input to Q1, Q2, Q3, Q4, and Q5, prevents the input rf from exceeding 3.3 volts. Zener diode VR3 is normally conducting, clamping the cathode of diode CR5 at +3.3 volts, and conducting VR4 clamps the anode of CR6 at -3.3 volts; therefore, any rf signal exceeding 3.3 volts is clipped by CR5 and CR6. Diode VR5, a 15-volt zener, provides approximately +0.6-volt dc bias to the high-input impedance gates of Q1, Q2, Q3, Q4, and Q5. Resistors R23 and R59, capacitor C50, and autotransformer T1 act as a neutralizing network to stabilize the gain of the amplifier stage. The overall gain of the amplifier stage is approximately 6 db, which is sufficient to overcome rf signal losses in the first double-tuned circuit. Capacitors C49 and C60 and inductor L25, on the +28-volt dc line, and inductor L28 and capacitors C62 and C72, on the -15-volt dc line, are rf suppression networks which eliminate undesired rf transients.

d. SECOND DOUBLE-TUNED CIRCUIT. - The output of rf input amplifiers A9Q1 through A9Q5 is applied to band switch S1D. Switch S1D selects the proper band components of the second double-tuned filter, and band switches S1C and S1B (front) ground the remaining band circuits to prevent interference with the selected band. From S1D, the rf signal is coupled through capacitor C64, C66, C68, or C70, depending upon the band selected, to tuning capacitor C1B. The second double-tuned band circuits are electrically identical to the first double-tuned circuits described in paragraph 4-3b, except the overall circuit Q is higher. The output of the second double-tuned circuit is applied to a capacitive voltage divider consisting of capacitors C36 through C43. This combination of capacitors reduces the overall input to the output rf amplifier stage.

e. RF OUTPUT AMPLIFIER A10. - The rf output amplifier stage consists of amplifiers Q8 and Q9 and emitter follower Q10. Common emitter amplifiers Q8 and Q9 provide high voltage and power gain. Resistor R19, along with emitter resistors R12 and R38, provide temperature stabilization. Inductor L27, swamped by resistor R11, maintains the proper base bias for Q8-Q9. Emitter follower Q10 provides impedance matching to the rf output. Thermistor RT1 provides temperature compensation for the final rf output stage.

f. RF CIRCUITS TEST DATA. - The following test data is required to perform trouble isolation in the rf circuits of the AM-4823/U.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is Multitester AN/USM-116 and Signal Generator AN/URM-25( ).

(2) TROUBLE-ISOLATION PROCEDURE. - Trouble isolation can be accomplished using the servicing block diagram (figure 4-8) or by performing the steps of table 4-3. Figure 4-3 is a simplified schematic diagram of the rf circuits.

4-4. CONTROL CIRCUITS - FUNCTIONAL DESCRIPTION.

a. GENERAL. - The control circuits of the AM-4823/U tune the filter circuits automatically to the frequency selected by the frequency controls on

TABLE 4-3. RF CIRCUITS, TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Connect AN/USM-116 to test jack J11. Connect AN/URM-25( ) to rf input J1; set generator output to 0.25 volt, and set AM-4823/U and signal generator to the following frequencies: 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	Note The rf circuits become slightly detuned due to the AN/USM-116 probe capacitance; therefore, the voltage readings may not be exactly as specified. AN/USM-116 indicates: 3 volts 2 volts 2 volts 1 volt	Note If the RF OVERLOAD indicator should light during the performance of these tests, refer to table 4-8. Check band components associated with switches S1G, S1H, S1J, S1K, and S1L (figure 4-3).
2	Same conditions as step 1, except connect AN/USM-116 to test jack J12. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 0.4 volt 0.4 volt 0.4 volt 0.4 volt	Check band components associated with switches S1G (front) and S1F.
3	Same conditions as step 1, except connect AN/USM-116 to test jack J13. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 2 volts 1.7 volts 1 volt 1.2 volts	Check rf input amplifiers A9Q1 through A9Q5, and associated components.
4	Same conditions as step 1, except connect AN/USM-116 to J14. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 6.5 volts 6 volts 3.4 volts 2.5 volts	Check band components associated with switches S1C and S1D.
5	Same conditions as step 1, except connect AN/USM-116 to test jack J15. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 6.4 volts 6 volts 3.6 volts 2.5 volts	Check band components associated with switch S1B.
6	Same conditions as step 1, except connect AN/USM-116 to test jack J16. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 0.3 volt 0.35 volt 0.32 volt 0.4 volt	Check band components associated with switch S1A, and check transformer A10T4.

TABLE 4-3. (Continued)

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
7	Same conditions as step 1, except connect AN/USM-116 to test jack J17. 3.000 MHz (band 1) 6.000 MHz (band 2) 12.000 MHz (band 3) 24.000 MHz (band 4)	AN/USM-116 indicates: 1.5 volts 1.5 volts 1.5 volts 1.5 volts	Check rf output amplifiers A10Q8, A10Q9, A10Q10, and associated components.

the control indicator module. The control circuits convert the modified binary frequency input information to the corresponding mechanical position of the variable tuning capacitor shaft. The digital frequency information is first converted to a dc analog voltage; the analog voltage, in turn, controls a servo mechanism which drives the tuning capacitor.

b. DIGITAL FREQUENCY INFORMATION. - Frequency information reaches the control circuits in digital form as described in paragraph 4-2b. The digital to analog converter is activated by a change in frequency. The relays (figure 4-4) in the digital to analog converter set up to the new frequency instantaneously. Inside the digital to analog converter, megahertz information goes to relays K1 through K7, 100-kHz information goes to relays K8 through K11, 10-kHz information goes to relays K12 through K15, and 1-kHz information goes to relays K16 through K19. For those digits that change with the new frequency selection, the controlling switch wafer in the C-7715/U grounds terminal 1 of the associated relay in digital to analog converter A3. Grounding of relay terminal 1 energizes the relay associated with the new frequency. Resistors A3R1 through A3R43 form two adjacent legs of a resistive bridge (figure 4-4); variable resistor R15 makes up the remaining two legs of the bridge. The relay energized by the change in frequency shorts out or inserts the appropriate resistors to give the two adjacent legs of the resistive bridge, formed by A3R1 through A3R43, the resistance values corresponding to the selected frequency. The action of the two adjacent legs just described, taken together, is the same as that of a conventional variable resistor except that changes in resistance are made in steps. The bridge formed by A3R1 through A3R43 and variable resistor R15 will be unbalanced by a change in digital frequency information inputs, causing an error voltage to appear at the input to servo amplifier A4.

A step change in selected frequency always results in the same step resistance change regardless of the band being used. Hence, a 1-kHz frequency change always causes a 2-ohm resistance change. The sum of A3R1 through A3R43 is constant within any one of the four frequency bands. The 2.000- to 3.999-MHz band requires 2000 1-kHz steps; therefore, the sum of A3R1 through A3R43 is 4000 ohms. Similarly, the 4.000- to 7.999-MHz band requires 4000 1-kHz steps and 8000 ohms; the 8.000- to 15.999-MHz band requires 8000 1-kHz steps and 16,000 ohms; and the 16.000- to 31.999-MHz band requires 16,000 1-kHz steps and 32,000 ohms.

The total effect of relays A3K1 through A3K19 is to place more resistance in half the bridge and simultaneously to remove resistance from the other half of the bridge. This occurs in similar fashion for each of the four frequency bands. Figure 4-4 shows the relays in a deenergized position. If, for example, the bridge were set up to 12.645 MHz, table 4-4 shows that ground would be applied to relays A3K2, A3K3, A3K4, A3K5, A3K8, A3K10, A3K12, A3K16, and A3K19. These energized relays insert resistors A3R4, A3R20, A3R24, A3R28, A3R37, and A3R43 in the top half of the bridge, and simultaneously short out resistors A3R19, A3R23, A3R27, A3R36, and A3R42 in the bottom half of the bridge. The net result is 9290 ohms in the top half of the bridge and 6710 ohms in the bottom half. Note that the sum of the two resistances is 16,000 ohms as required for the 8.000- to 15.999-MHz band (table 4-6 may be used to compute resistance values in the top half and bottom half of the bridge at any frequency).

c. BAND-SWITCHING CIRCUITS. - Figure 4-5 is a simplified schematic diagram of the band control circuits. Switch wafers A5S1B-B and A5S1B-F are controlled by the megahertz digital frequency information. As the megahertz control on the C-7715/U is positioned to the desired frequency, transistor switch A3Q1, A3Q2, or A3Q3 applies a ground to one contact of open seeking switch S1E, energizing relay K2. Motor B1 drives the band-switch shaft until S1E opens the ground, deenergizing relay K2. When relay K2 deenergizes, it closes contacts 4 and 6 to provide dynamic braking by shorting out the motor armature winding.

The operation of transistors A3Q1, A3Q2, and A3Q3 is as follows: If band 1 (2.000 to 3.999 MHz) is selected, the transistor switching network does not receive an input from A5S1 as can be seen by referring to table 4-4 and figure 4-5. In this condition, the +28 volts across resistor A3R9 starts current flowing through A3R12, A3VR1, A3CR40, and A3R9. This places approximately 5.1 volts on the base of A3Q1

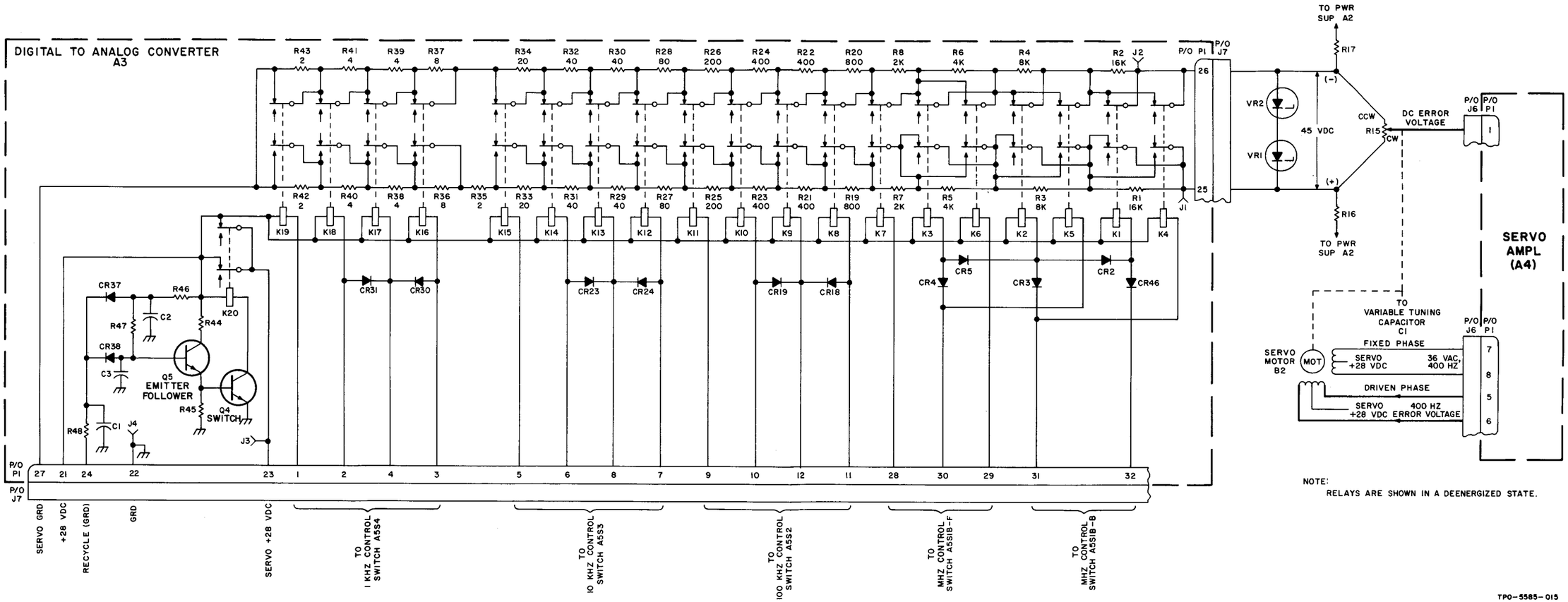


Figure 4-4. Frequency Selection Circuits, Simplified Schematic Diagram

TABLE 4-4. TUNING INFORMATION

DIGIT SWITCH POSITION	C-7715/U (MODULE A5) PIN NO.	DIGITAL TO ANALOG CONVERTER A3 PIN NO.	BAND 1		BAND 2				BAND 3								BAND 4															
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
MHz	J3 or J5-P	J7-28		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
	-N	-29	X	X			X	X			X	X			X	X			X	X			X	X			X	X			X	X
	-M	-30			X	X	X	X					(X)	X	X	X					X	X	X	X					X	X	X	X
	-L	-31							X	X	X	X	(X)	X	X	X									X	X	X	X	X	X	X	X
	-K	-32															X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

			0	1	2	3	4	5	6	7	8	9
100-kHz	J3 or J5-V	J7-9		X		X		X		X		X
	-U	-10			X	X			(X)	X		
	-T	-11					X	X	(X)	X		
	-S	-12									X	X
10-kHz	-Z	-5		X		X		X		X		X
	-Y	-6			X	X			X	X		
	-X	-7					(X)	X	X	X		
	-W	-8									X	X
1-kHz	-e	-1		X		X		(X)		X		X
	-d	-2			X	X			X	X		
	-b	-3					X	(X)	X	X		
	-a	-4									X	X

NOTE:

1. (X) indicates that at 12.645 MHz, a ground appears at J7-30 and J7-31 (for 12 MHz); J7-10 and J7-11 (for 600 kHz); J7-7 (for 40 kHz); J7-1 and J7-3 (for 5 kHz).
2. X indicates ground on line.

due to the breakdown of zener diode A3VR1. Turned-on A3Q1 switches a ground out A3P1-17 to S1E and also applies a ground to the cathodes of diodes A3CR39 and A3CR45. Forward-biased diodes A3CR39 and A3CR45 apply a ground to the anodes of A3CR42 and A3CR43 thereby holding A3Q2 and A3Q3 in a nonconducting state. If band 2 (4.000 to 7.999 MHz) is selected, a ground is applied through A3P1-30 to A3CR13. Forward-biased A3CR13 applies a ground to the anode of CR40, holding A3Q1 cut off. Transistor A3Q2 is conducting due to the +28 volts across A3R10. Ground from conducting A3Q2 is applied through A3P1-18 to S1E and also to the cathode of diode A3CR41; foward-biased A3CR41 holds A3Q3 cut off. If band 3 (8.000 to 15.999 MHz) is selected, ground is applied to A3P1-31 or to A3P1-30 and A3P1-31 (table 4-4). In either case, A3Q1 and A3Q2 are cut off and A3Q3 is conducting. If band 4 (16.000 to 31.999 MHz) is selected, ground is applied to A3P1-32. The ground at A3P1-32 is coupled through diode A3CR12 to S1E, and it also forward biases diodes A3CR44, A3CR17, and A3CR15 which hold A3Q1, A3Q2, and A3Q3 cut off.

d. ANALOG BRIDGE AND SERVO-SYSTEM OPERATION. - Figure 4-6 is a simplified schematic diagram of the servo system. Ten-turn precision variable resistor R15 and resistors A3R1 through A3R43 form the resistance bridge that controls the position of tuning capacitor C1. Power supply A2 produces a floating 47 volts dc which is applied across the resistance bridge. Zener diodes VR1 and VR2 hold the bridge reference voltage constant at 45 volts dc because voltage variations would affect the positioning accuracy of the servo mechanism. To unbalance the bridge and obtain an output voltage, resistors are shorted and unshorted by relays located in the digital to analog converter (paragraph 4-4b). The error voltage output from the bridge, taken at the variable resistor wiper arm, is applied to servo amplifier A4. A lag network, consisting of resistors A4R19 and A4R20 and capacitors A4C13 and A4C14 at the servo amplifier input, eliminates hunting in the servo system. The network applies a canceling voltage to chopper A4Q6 if the variable resistor arm overshoots the zeroing point of the bridge. Diodes A4CR2 and A4CR3 limit the voltage buildup across A4Q6 to approximately 0.5 volt. Transistor A4Q6, a field effect transistor (fet), acts as a chopper to convert the dc output of the bridge to a 400-Hz signal which is applied to a servo amplifier. A 400-Hz signal from a push-pull oscillator is applied to the gate of chopper A4Q6. The chopper converts the dc signal to a synchronous 400-Hz voltage whose magnitude is proportional to that of the dc signal and whose phase relationship to the reference ac voltage is either 90 degrees leading or lagging, depending upon the polarity of the dc signal. The output of A4Q6 is fed through dc blocking capacitor A4C15 to the servo amplifier, A4Q7 through A4Q12. A 400-Hz signal from A4Q14 is shifted 90 degrees by A4R13, A4R14, A4C9, and A4C10 before being applied to the gate of A4Q6. The output signal from the servo amplifier will now be 90 degrees out of phase with the 36-volt 400-Hz reference voltage on the fixed phase winding of servo motor B2. These voltages cause the monitor to operate, driving tuning capacitor C1 and the arm of variable resistor R15 in the direction which reduces the dc error voltage. When the dc error voltage is reduced to zero, the bridge is again balanced.

e. TIMING CIRCUIT. - The frequency selection switches on the C-7715/U cause a timing circuit in digital to analog converter A3 to operate and activate the servo system for 13 to 20 seconds. Each time a new frequency is selected, the timing circuit is energized. A change in frequency applies a momentary ground through A3P1-24 to diodes A3CR37 and A3CR38 (figure 4-4). These diodes, along with capacitors A3C2 and A3C3, resistors A3R46 and A3R47, transistors A3Q4 and A3Q5, and relay A3K20 form a timing circuit to activate the servo system. When the AM-4823/U is turned on, +28 volts dc is applied through contacts of deenergized relay A3K20 to activate the servo system for approximately 15 seconds. The servo system requires a maximum time of 10 seconds to complete its cycle. From the +28-volt dc source, capacitors A3C2 and A3C3 gradually accumulate a charge through resistors A3R46 and A3R47 until the voltage across A3C3 reaches approximately 1.0 volt. Transistor A3Q5 then conducts and turns on transistor A3Q4, switching a ground to relay A3K20. This energizes A3K20, opening contacts 4 and 6 and 2 and 8 to turn off the servo system. Transistor switch A3Q4 will continue to conduct and hold A3K20 energized until capacitors A3C2 and A3C3 discharge. This occurs at the start of the next tuning cycle as a result of the recycle command (ground) applied through A3P1-24 to A3CR37 and A3CR38.

f. CONTROL CIRCUITS TEST DATA. - The following test data is required to perform trouble isolation in the AM-4823/U control circuits.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is a voltohmmeter (AN/PSM-4 or equivalent), Multitester AN/USM-116, a digital voltmeter (HP-3440 or equivalent) with a range unit (HP-3443A or equivalent).

(2) TROUBLE-ISOLATION PROCEDURE. - Perform the procedures of table 4-5 with the AM-4823/U connected to a 115-volt, 50- to 60- or 400-Hz source. If the procedures of table 4-5 indicate a malfunction in digital to analog converter module A3, perform the procedure contained in paragraph 4-4f(3).

(3) DIGITAL TO ANALOG CONVERTER MEASUREMENTS. - These measurements are provided as an aid to troubleshooting the control circuits. The bridge resistors have a very small tolerance and should be checked only on a resistance bridge having an accuracy of 0.01 percent or better. Table 4-6 may be used to determine the resistance in the bridge network at any possible frequency setting. The following procedure outlines the method required to obtain the voltage measurements. If a measurement is incorrect, refer to table 4-6 to determine the resistors associated with the frequency at which the measurement was made.

(a) Set AM-4823/U POWER switch to ON, and set frequency to 2.000 MHz.

(b) Using a digital voltmeter with plug-in range unit, measure the voltage between A3J1 and

TABLE 4-5. CONTROL CIRCUITS, TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Extend AM-4823/U so that connector CP3 on rear of chassis is accessible. Change frequency of AM-4823/U from 2.000 to 31.999 MHz and, using a voltohmmeter (AM/PSM-4), check for ground on the connector pins associated with the frequency selected (table 4-4).	Ground.	Replace control indicator A5.
2	Connect voltohmmeter to test jack A3J3. Change frequency of AM-4823/U.	28 volts dc for 15 to 23 seconds.	Check timing circuit consisting of A3Q4, A3Q5, A3K20, and associated components.
3	Set AM-4823/U frequency to 2.000 MHz. Set AM-4823/U frequency to 3.999 MHz.	Tuning capacitor C1 within 9 degrees of fully closed. Tuning capacitor C1 within 9 degrees of fully open.	Check motor B1. Refer to paragraph 4-4f(3).
4	Set AM-4823/U frequency to 4.000 MHz.	C1 within 9 degrees of fully closed.	Refer to paragraph 4-4f(3). Proceed to steps 7 through 9.
5	Set AM-4823/U frequency to 8.000 MHz. Set AM-4823/U frequency to 15.999 MHz.	C1 within 9 degrees of fully closed. C1 within 9 degrees of fully open.	Refer to paragraph 4-4f(3). Proceed to steps 7 through 9.
6	Set AM-4823/U frequency to 16.000 MHz. Set AM-4823/U frequency to 31.999 MHz.	C1 within 9 degrees of fully closed. C1 within 9 degrees of fully open.	Refer to paragraph 4-4f(3). Proceed to steps 7 through 9.
7	Connect voltohmmeter to test jack A4J4. Change AM-4823/U frequency to 3.000 MHz.	Vom should indicate between -45 and +45 volts dc for 10 seconds.	Check B2 and R15. Proceed to step 8.
8	Connect ungrounded voltohmmeter across test jack A4J5 and A4J6. Change AM-4823/U frequency from 16.000 to 31.999 MHz.	Vom should indicate between 0 and 36 volts ac for 10 seconds.	Replace servo amplifier A4.
9	Connect ungrounded voltohmmeter across test jacks A4J1 and A4J2. Change AM-4823/U frequency.	Vom should indicate 36 volts ac for 10 seconds.	Check A4Q1, A4Q2, A4T1, A4Q3, A4Q4, A4Q13, and A4Q14.

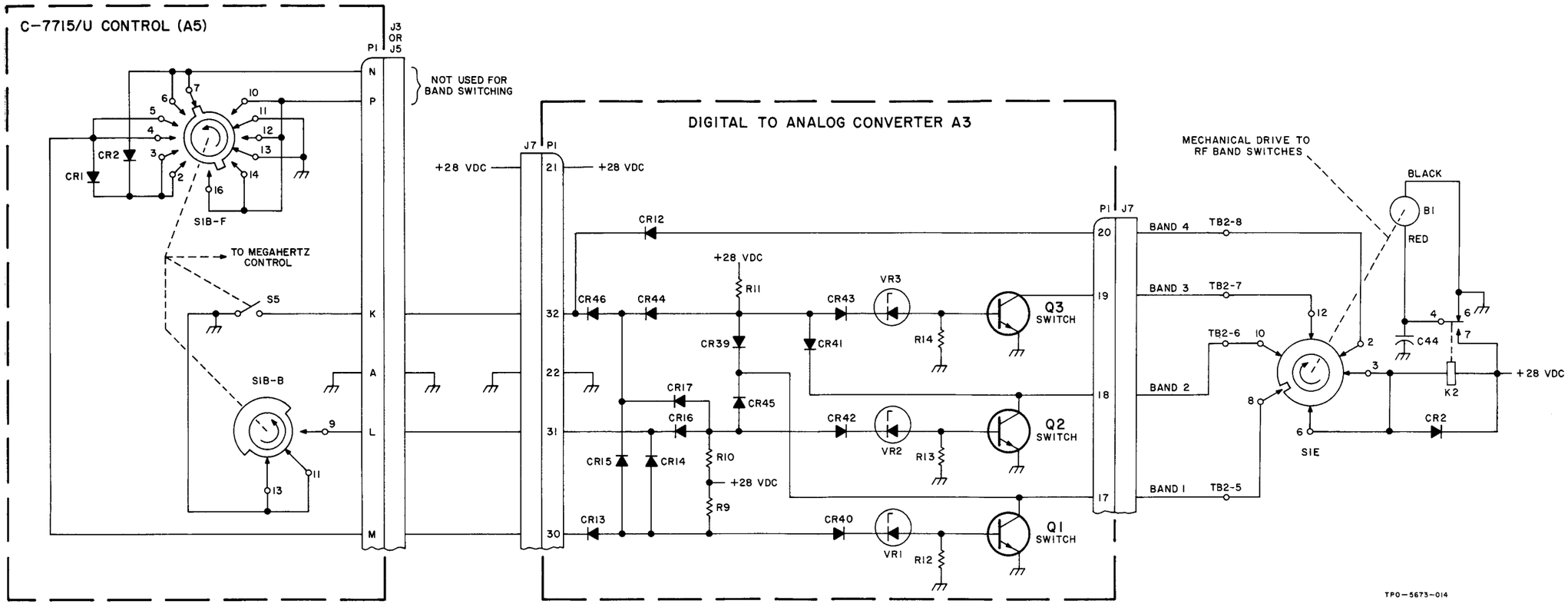


Figure 4-5. Band Control Circuit, Simplified Schematic Diagram

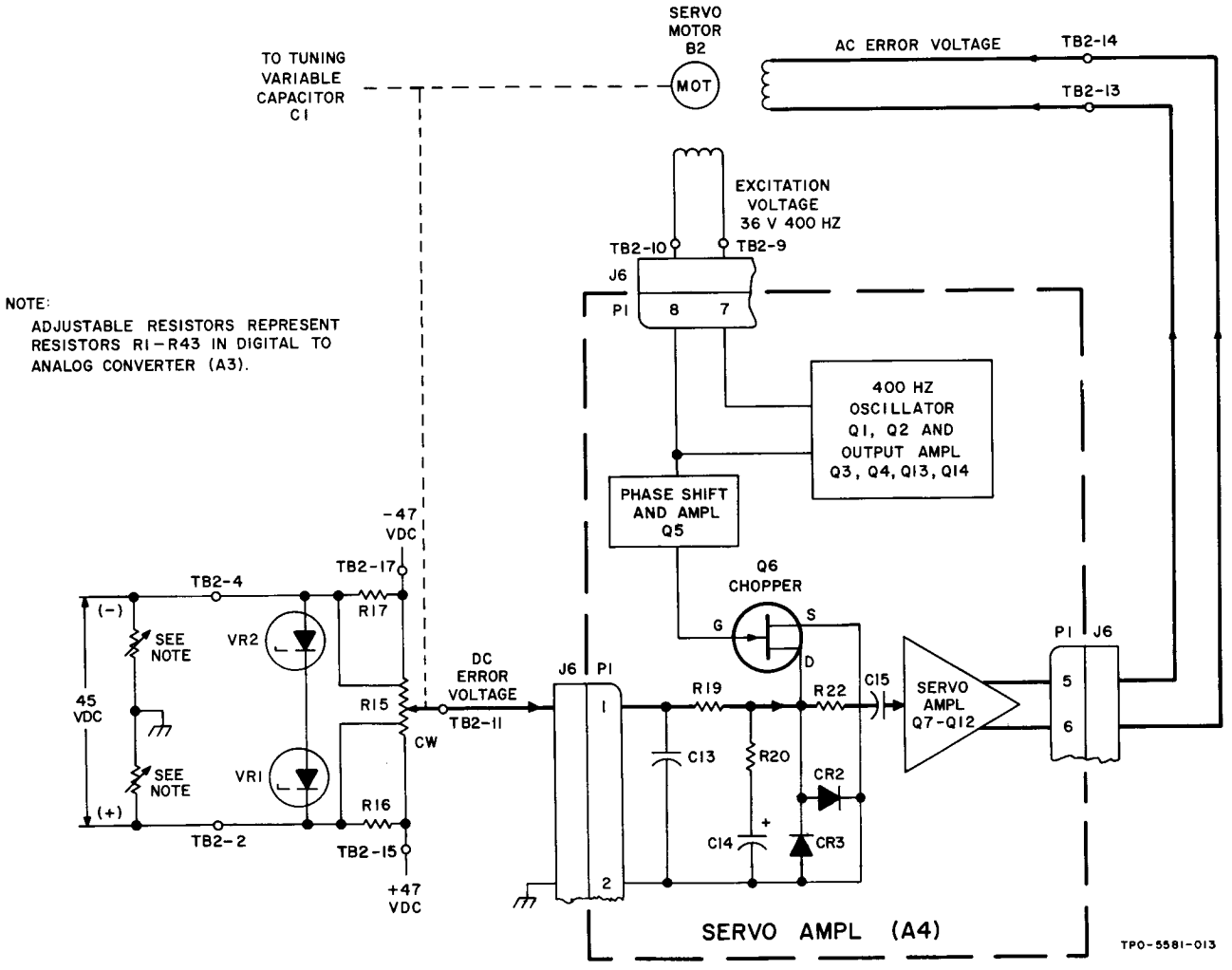


Figure 4-6. Servo Loop, Simplified Schematic Diagram

TABLE 4-6. FREQUENCY TUNING-RESISTANCE BRIDGE RELATIONSHIP

FREQUENCY (MHz only)	RESISTORS IN TOP OF BRIDGE (- LEG)				RESISTORS IN BOTTOM OF BRIDGE (+ LEG)				RESISTANCE	
	R2	R4	R6	R8	R1	R3	R5	R7	TOP	BOTTOM
2								X		2K
3				X					2K	
4							X	X		6K
5				X			X		2K	4K
6			X					X	4K	2K
7			X	X					6K	
8						X	X	X		14K
9				X		X	X		2K	12K
10			X			X		X	4K	10K
11			X	X		X			6K	8K
12		X					X	X	8K	6K
13		X		X			X		10K	4K
14		X	X					X	12K	2K
15		X	X	X					14K	
16					X	X	X	X		30K
17				X	X	X	X		2K	28K
18			X		X	X		X	4K	26K
19			X	X	X	X			6K	24K
20		X			X		X	X	8K	22K
21		X		X	X		X		10K	20K
22		X	X		X			X	12K	18K
23		X	X	X	X				14K	16K
24	X					X	X	X	16K	14K
25	X			X		X	X		18K	12K
26	X		X			X		X	20K	10K
27	X		X	X		X			22K	8K
28	X	X					X	X	24K	6K
29	X	X		X			X		26K	4K
30	X	X	X					X	28K	2K
31	X	X	X	X					30K	

X indicates resistors in bridge.

TABLE 4-6. (Continued)

FREQUENCY (MHz)		RESISTORS IN TOP OF BRIDGE (- LEG)												RESISTORS IN BOTTOM OF BRIDGE (+ LEG)												RESISTANCE (ohms)	
		R20	R22	R24	R26	R28	R30	R32	R34	R37	R39	R41	R43	R19	R21	R23	R25	R27	R29	R31	R33	R35	R36	R38	R40	R42	TOP	BOTTOM
100-kHz SELECTION ONLY	0.000																										0	1800
	0.100				X									X	X	X											200	1600
	0.200			X										X	X		X										400	1400
	0.300			X	X									X	X												600	1200
	0.400	X													X	X	X										800	1000
	0.500	X			X										X	X											1000	800
	0.600	X		X											X		X										1200	600
	0.700	X		X	X										X												1400	400
	0.800	X	X	X													X										1600	200
	0.900	X	X	X	X																						1800	0
1-kHz SELECTION ONLY	0.000																					X	X	X	X	X	0	20
	0.001												X									X	X	X	X		2	18
	0.002											X										X	X	X		X	4	16
	0.003											X	X									X	X	X			6	14
	0.004									X												X		X	X	X	8	12
	0.005									X			X									X		X	X		10	10
	0.006									X		X										X		X		X	12	8
	0.007									X		X	X									X		X			14	6
	0.008									X	X	X										X				X	16	4
	0.009									X	X	X	X									X					18	2
10-kHz SELECTION ONLY	0.000																										0	180
	0.010								X									X	X	X							20	160
	0.020							X										X	X		X						40	140
	0.030							X	X									X	X								60	120
	0.040					X													X	X	X						80	100
	0.050					X			X										X	X							100	80
	0.060					X		X											X		X						120	60
	0.070					X		X	X										X								140	40
	0.080					X	X	X													X						160	20
	0.090					X	X	X	X																		180	0

X indicates resistors in bridge.

TABLE 4-7. DIGITAL TO ANALOG CONVERTER OUTPUT MEASUREMENTS

A	B	C
FREQUENCY (MHz)	VOLTAGE FROM A3J2 TO GROUND (ADJUSTED)	DIFFERENCE FROM VOLTAGE AT PRECEDING FREQUENCY
2.000	-0.005	
2.001	-0.027	0.022
2.002	-0.049	0.022
2.003	-0.071	0.022
2.004	-0.093	0.022
2.005	-0.115	0.022
2.006	-0.137	0.022
2.007	-0.159	0.022
2.008	-0.181	0.022
2.009	-0.203	0.022
2.010	-0.226	0.023
2.020	-0.446	0.220
2.030	-0.666	0.220
2.040	-0.886	0.220
2.050	-1.106	0.220
2.060	-1.327	0.221
2.070	-1.547	0.220
2.080	-1.768	0.221
2.090	-1.988	0.220
2.100	-2.208	0.220
2.200	-4.412	2.204
2.300	-6.616	2.204
2.400	-8.820	2.204
2.500	-11.03	2.20
2.600	-13.23	2.21
2.700	-15.44	2.21
2.800	-17.64	2.20
2.900	-19.85	2.21
3.000	-22.06	2.21
4.000	-0.002	
5.000	-11.14	11.14
6.000	-22.29	11.15
7.000	-33.44	11.15
8.000	-0.001	
9.000	-5.60	5.60
10.000	-11.20	5.60
11.000	-16.80	5.60
12.000	-22.40	5.60
13.000	-28.01	5.61
14.000	-33.62	5.61

TABLE 4-7. (Continued)

A	B	C
FREQUENCY (MHz)	VOLTAGE FROM A3J2 TO GROUND (ADJUSTED)	DIFFERENCE FROM VOLTAGE AT PRECEDING FREQUENCY
15.000	-39.23	5.61
16.000	0.000	
17.000	-2.80	2.80
18.000	-5.60	2.80
19.000	-8.40	2.80
20.000	-11.20	2.80
21.000	-14.00	2.80
22.000	-16.80	2.80
23.000	-19.61	2.81
24.000	-22.42	
25.000	-25.23	2.81
26.000	-28.04	2.81
27.000	-30.86	2.82
28.000	-33.67	2.81
29.000	-36.49	2.82
30.000	-39.30	2.82
31.000	-42.12	2.82

A3J2. Voltage should be between 41.8 and 46.2 volts dc.

(c) Divide 44.1 by the voltage reading of step (b).

(d) Measure voltage between A3J2 and ground at each of the frequencies listed in table 4-7, column A.

(e) Multiply the voltage reading of step (d) by the result of step (c) and compare this adjusted value with that shown in table 4-7, column B, for the frequency selected.

(f) The difference between the adjusted voltage found in step (e) at each frequency and that found for the preceding frequency is shown in column C of table 4-7.

4-5. PROTECTION CIRCUITS - FUNCTIONAL DESCRIPTION.

a. GENERAL. - The protection circuits (figure 4-7) prevent damage to the AM-4823/U and the associated receiver due to strong rf input signals either directly on frequency or off frequency. Protection is achieved by operating relay K1 when damaging rf levels are present at the antenna input. Operation of K1 attenuates the rf input by approximately 40 db. The rf input is attenuated 40 db rather than completely removed so that in the event a very strong desired signal is received from a nearby ship it will not be lost. Relay K1 is also interlocked through band-switch control relay K2 so that it is opened during band switching to prevent arcing of the band switches.

b. OVERVOLTAGE PROTECTION. - The overvoltage protection circuit prevents extremely strong rf signals from damaging the rf input circuits. The rf signals are applied to the input circuits through relay K1. Normally, emitter follower A6Q9 and switch A6Q7 are not conducting. This allows emitter follower A6Q3 and switch A6Q2 to conduct and apply a ground at relay K1. Thus, relay K1 is normally energized or closed. The rf input is applied to coupling capacitors C1E, C1F, or C1G through band switches S1K, S1L, and S1H to voltage divider capacitors C4 through C8. Diodes CR7 and CR8 and capacitor C9, connected to the output of the voltage divider, form an rf detector to rectify the input rf for operation of the overload protect module. The dc output of CR7 is filtered by capacitor C73 and applied to high-voltage adjust variable resistor A6R23. Variable resistor A6R23 is adjusted to trigger emitter follower A6Q9 when the off-frequency input, removed from the center frequency by ±10 percent, is greater than 500 volts. Because the voltage is sampled in a resonant circuit, higher input voltages will be required to trigger A6Q9 at greater than 10-percent separation from the tuned frequency and lower voltages at less separation. Thermistor A6RT2 compensates for

changes in the operating voltages of A6R23 over the design temperature range. When transistor A6Q9 conducts, a positive voltage is applied to the base of switch A6Q7, causing A6Q7 to conduct. Switch A6Q7 applies a ground to the junction of resistors A6R6, A6R7, and A6R8. This turns off normally conducting A6Q3 and A6Q10, causing A6Q2 and A6Q4 to turn off and remove the ground from relay K1. As K1 deenergizes, the input rf is attenuated approximately 40 db by capacitors C78 and C79.

(1) The operator is warned of an overload by a ground placed on the overload indicate line by transistor switch A6Q1. The overload indicate line is connected to the RF OVERLOAD indicator on the C-7715/U. A ground on the overload indicate line causes the indicator to light. When transistor A6Q2 is turned off by the rf overload, the collector voltage of A6Q2 approaches the +28-volt dc supply voltage through the coil of deenergized relay K1. This turns on A6Q1 to apply a ground to the overload indicate line. As soon as the rf overload is removed, A6Q2 turns on again, causing A6Q1 to turn off and remove the ground from the overload indicate line.

(2) As stated above, normally A6Q10 and A6Q4 conduct and the base of emitter follower A6Q5 is clamped to ground by A6Q4. When A6Q10 and A6Q4 turn off, the collector voltage rises toward +28 volts dc, causing zener diode A6VR1 to break down at +20 volts. This +20 volts is applied to A6Q5, A6Q6, and A6Q8. As this occurs, capacitor A6C2 starts charging through resistor A6R17 and diode A6CR9. Initially the base current of A6Q7 is maximum due to charging of capacitor A6C2. However, as A6C2 becomes fully charged, the base current of A6Q7 decreases until A6Q7 cuts off. A6Q9 also turns off since K1 is now deenergized or open.

(e) The input at A6P1-1 is removed when relay K1 deenergizes; however, K1 is maintained in a deenergized condition by rf detectors at the antenna input or at the output of the final rf amplifier until the input decreases to a safe operating level. As the rf input exceeds approximately 130 volts, an rf detector, consisting of capacitors C56 and C57 and diodes CR3 and CR4 at the antenna input, rectifies the rf signal. The dc output of CR3 is filtered by capacitors C58 and A6C1 and applied to emitter follower A6Q5. This causes A6Q5 to conduct and turn on transistor switch A6Q6. Switch A6Q6 applies a ground through diode A6CR3 to the junction or resistors A6R6, A6R7, and A6R8 maintaining A6Q4, A6Q10, A6Q3, and A6Q2 cutoff. This in turn holds K1 deenergized until the rf signal is removed from the input or drops below approximately 130 volts. After a delay of approximately 1 second, caused by the time delay action of A6C4, A6R28, A6CR1, and A6CR12, relay K1 returns to its normally energized position.

When a signal of 25 volts or more is received on frequency, A6Q7 and A6Q9 will conduct causing A6Q2, A6Q3, A6Q4, and A6Q10 to turn off. Rf detectors A10CR10 and A10CR11 detect the on-frequency signal and apply it to the base of A6Q5. Switch A6Q6 now conducts and keeps A6Q3 and A6Q2 turned off. This holds relay K1 open or deenergized. If the rf input signal drops below approximately 5 volts, relay K1 will close, reverting to its normally energized position.

Additional protection is provided by neon lamps DS2, DS3, and DS4 at the output of the first double-tuned circuit. They prevent high voltage from damaging inductors L2, L8, L14, and L20. Diodes A9CR5 and A9CR6 will prevent an rf signal from exceeding 3.5 volts peak at the gates of amplifiers A9Q1 through A9Q5.

c. ON-FREQUENCY WARNING. - An on-frequency signal of 2 volts or higher will cause an excessive rf signal to be applied to amplifiers A9Q1 through A9Q5. In turn an amplifier gate current will flow and bias A9Q6 off. A9Q7 will conduct, turn on switch A6Q1, and place a ground on the overload indicate line. This causes the RF OVERLOAD indicator to light.

d. MANUAL RESET. - Normally the RF OVERLOAD indicator light will automatically turn off upon removal of the rf overload condition. However, the RF OVERLOAD indicator light will remain on when (1) an rf overload occurs at too low a level to activate the off-frequency reset circuit; (2) the rf overload was not close enough to the tuned frequency to activate the on-frequency reset circuit; or (3) failure of off-frequency detectors CR3 and CR4 or on-frequency detectors A10CR11 and A10CR10. These conditions can cause relay K1 to cycle on (open), due to the rf overload, and then immediately close, due to absence of either an on-frequency or off-frequency reset signal. During the cycling of relay K1, capacitor A6C3 will charge within a few seconds and cause a base current to flow at emitter follower A6Q8. A6Q8 turns on and will stay in conduction due to the +20 vdc applied to A6R20 by A6VR1 (circuit action previously described in paragraph b(2)). Relay K1 stays in a deenergized (open) position, and the RF OVERLOAD indicator light will remain on after the rf overload is removed. Pressing the RF OVERLOAD switch applies a ground to capacitor A6C3 and the base of A6Q5. This causes A6Q5 and A6Q8 to return to a normal cutoff condition, and A6Q3 to remain off. Upon releasing the RF OVERLOAD pushbutton; A6Q3 will turn on, allowing relay K1 to energize. The RF OVERLOAD indicator light will now go out.

e. PROTECTION CIRCUITS TEST DATA. - The following test data is required to perform trouble isolation in the protection circuits of the AM-4823/U.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is Multitester AN/USM-116, Signal Generator AN/URM-25( ), Electronic Voltmeter CCVO-91C, and dc power supply (Kepco ABC 30-0.3M or equivalent).

(2) TROUBLE-ISOLATION PROCEDURE. - Perform the steps of table 4-8. Figure 4-7 is a simplified schematic diagram of the protection circuits.

4-6. SERVO AMPLIFIER A4 - FUNCTIONAL DESCRIPTION.

a. GENERAL. - Servo amplifier A4 (figure 5-34) contains a 400-Hz oscillator to provide the fixed

TABLE 4-8. PROTECTION CIRCUITS TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Set the AN/URM-25( ) and AM-4823/U to 2 MHz. Connect signal generator to test jack J12. Connect CCVO-91C to test jack J12. Set signal generator output to maximum.	RF OVERLOAD indicator is lit. CCVO-91C indicates 3.3 volts ac maximum.	If indicator is not lit, check A6Q1, A9Q6, A9Q7, and associated components. If CCVO-91C indication is incorrect, also check A9CR5, A9CR6, A9VR3 and A9VR4 (figure 4-3).
2	Connect power supply (Kepco ABC 30-0.3M) to test jack A6J1. Set power supply output to 6 volts dc.	RF OVERLOAD indicator is lit.	If indicator is not lit, check A6Q1, A6Q2, A6Q3, A6Q4, A6Q7, A6Q9, A6Q10, and associated components.
3	After 5 seconds of operation at 6 volts dc, decrease power supply output to 0.	RF OVERLOAD indicator remains lit. Press indicator and light will go out.	If indication is abnormal, check A6Q8 and associated components.
4	Connect positive lead of power supply to test jack A6J2; set output to 6.0 volts. Connect another lead to the +28 VDC terminal of power supply A2, and momentarily (less than 1 second) apply lead to test jack A6J1.	RF OVERLOAD indicator is lit.	Check A6Q5, A6Q6, and associated components.
5	Disconnect power supply.	RF OVERLOAD indicator goes out after 1/2-second delay.	Check A6Q5, A6Q6, A6CR7, A6R32, and time delay circuit components A6C4, A6CR1, and A6CR12.
6	Connect power supply to test jack A6J5. Set power supply output to 6 volts dc. Momentarily (less than 1 second) apply 6 volts dc to A6J1.	RF OVERLOAD indicator is lit.	If indicator is not lit, check A6R25, A6R29, and A6CR2.
7	Disconnect power supply.	RF OVERLOAD indicator goes out after 1/2-second delay.	Check A6Q5, A6Q6, A6CR7, A6R32, and time delay circuit components A6C4, A6CR1, and A6CR12.
8	Connect signal generator to test jack J16; set generator output to 0.2 volts at 16 MHz. Momentarily (less than 1 second) apply positive lead of power supply to test jack A6J1.	RF OVERLOAD indicator is lit.	Check amplifiers A10Q8, A10Q9, A10Q11; diodes CR10 and CR11; and associated components.
9	Disconnect signal generator.	RF OVERLOAD indicator goes out.	Press RF OVERLOAD indicator.

phase excitation voltage to servo motor B2 and a servo-amplifier stage for amplification of the error voltage which drives motor B2

b. 400-Hz OSCILLATOR. - Transistors A4Q1 and A4Q2, in conjunction with transformer A4T1, and the parallel tuned tank circuit, consisting of inductor L1 and capacitor C5, form a 400-Hz push-pull oscillator. The tank circuit and the primary of T1 provide a high-impedance load to the collectors of A4Q1 and A4Q2 with maximum impedance occurring at the 400-Hz resonant frequency of the tank circuit. Oscillations begin in the circuit when 28 volts dc is applied to connector P1-4. For frequency stability, the supply voltage for A4Q1 and A4Q2 is held constant at +15 volts by zener diode A4VR1. The amplitude of current flow in the oscillator will increase steadily due to the regenerative feedback coupled from the secondary of transformer A4T1 to the base of A4Q1 or A4Q2. Assuming the feedback to A4Q1 is regenerative, a point is reached when the collector current can no longer increase. Transistor A4Q1 becomes saturated, the collector current decreases, causing the induced feedback voltage to reverse and the emitter current of A4Q1 to decrease. Due to the polarity reversal in the secondary of A4T1, the feedback to A4Q1 is now degenerative and the feedback to A4Q2 is regenerative, A4Q1 is driven to cutoff, and A4Q2 is driven into saturation. Once the feedback to A4Q1 again reverses, the circuit reverts to its original state, with A4Q1 conducting and A4Q2 cut off. The time for change from saturation to cutoff is determined by the tank circuit which, in turn, determines the frequency of oscillation. The 400-Hz output of A4T1 is applied to a push-pull amplifier stage consisting of transistors A4Q3, A4Q4, A4Q13, and A4Q14. Biasing diodes A4CR4 and A4CR5 provide approximately a 0.8-volt bias voltage to the bases of A4Q13 and A4Q14. The output of A4Q13 and A4Q14 is direct coupled to A4Q3 and A4Q4. A second output, from the collector of A4Q14, is applied as the modulating signal to chopper A4Q6. The output of push-pull amplifier A4Q3 and A4Q4 is a 36-volt, 400-Hz signal which is applied as the excitation voltage to servo motor B2.

The 400-Hz output from the collector of A4Q14 is fed through coupling capacitor A4C8 to the base of amplifier A4Q5. A phase lag network, consisting of resistors A4R13 and A4R14 and capacitors A4C9 and A4C10, shifts the phase of the 400-Hz signal 90 degrees. Chopper A4Q6 is modulated at a 400-Hz rate, alternately charging and discharging capacitor A4C15 to a level determined by the amplitude of the dc error signal applied to the drain terminal of A4Q6. The polarity of the dc error signal determines the direction of rotation of servo motor B2.

c. SERVO AMPLIFIER. - First amplifier A4Q7 amplifies the square-wave output of chopper A4Q6 and feeds the amplified signal to the base of amplifier A4Q8 through coupling zener diode A4VR3. The breakdown voltage of A4VR3 acts as a bias voltage between the high-collector voltage of A4Q7 and the low-base voltage of A4Q8. A dc current flows through A4VR3 under static conditions. The signal voltage appearing across collector resistor A4R26 causes the diode current to vary, providing coupling between the collector of A4Q7 and the base of A4Q8. The amplified output of A4Q8 is applied through transformer A4T2 to a push-pull amplifier stage consisting of transistors A4Q9 through A4Q12. The breakdown voltage of zener diode A4VR2 provides a constant bias through the primary of A4T2 to the collector of A4Q8. Additionally, A4VR2 in conjunction with the temperature sensitive network consisting of resistors A4R33, A4R34, and A4R35 and thermistor A4RT1, provides both bias and temperature stabilization for the push-pull output stage. Resistor A4R29 is a stabilizing resistor which applies a portion of the dc voltage at the emitter of A4Q8 back to the base of A4Q7. The amplifier gain is further stabilized by feedback from the collector of A4Q11 to the base of A4Q7.

4-7. POWER SUPPLY A2 - FUNCTIONAL DESCRIPTION.

a. GENERAL. - Power supply A2 (figure 5-32) converts the 115-volt, 50- to 60- or 400-Hz input to three dc voltages: -15 volts dc, a floating 47 volts dc, and a regulated +28 volts dc. Spark gap V1 across the input ac protects the power supply against high-voltage transients in excess of 3.5 times the nominal line voltage.

b. 28-VOLT DC REGULATED SUPPLY. - The regulated 28-volt dc, 2-ampere supply is a series regulator with a current limiting circuit to protect the regulator against overloads. Regulation of the 28-volt output is accomplished by fixing the base voltage of regulator A2Q1 at a desired level by means of 10-volt zener diode A2VR1 and regulator A2Q3. Zener diode A2VR1 and A2Q3 control the base-to-emitter voltage of amplifier A2Q2 which, in turn, controls the base current of A2Q1. Amplifier A2Q2 conducts heavily when the output voltage is below the nominal regulated value, while the opposite is true if the output is more than 28 volts. Assuming that the output exceeds the regulated value, the increased voltage appears at the emitter of A2Q3, causing increased conduction in the pnp transistor. The base of amplifier A2Q4 becomes more positive lowering the base voltage of amplifier A2Q5. Decreased current flow in A2Q5 causes the base of A2Q2 to become more positive, decreasing the collector current. The base current of A2Q1 is decreased, causing a decrease in the collector current and output voltage. Opposite action takes place in A2Q1 through A2Q5 if the output is less than the regulated value.

Current limiters A2Q6 and A2Q7 provide protection for the regulator stage. As a result of a short circuit, an increased current will flow through A2R2, A2R3, and A2R4. This causes the emitter of A2Q7 to be driven more negative, which cuts off the base current at A2Q6. As A2Q6 cuts off, diode A2CR1 becomes forward biased causing current to flow into resistor A2R21 from A2R13. This will raise the base voltage of A2Q4. The heavy conduction in A2Q4 will decrease the collector current of A2Q1 as described in the

previous paragraph. Thus, the short-circuit current is less than the full-load current of 2 amperes.

c. POWER SUPPLY CIRCUITS TEST DATA. - The following test data is required to perform trouble isolation in the AM-4823/U power supply.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is a voltohmmeter (AN/PSM-4 or equivalent).

(2) TROUBLE-ISOLATION PROCEDURE. - Perform the steps of table 4-9 with the AM-4823/U connected to a 115-volt, 50- to 60- or 400-Hz source.

TABLE 4-9. POWER SUPPLY CIRCUITS TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Make certain that POWER switch is on. Connect voltohmmeter to test jacks A2J1 and A2J2.	C-7715/U panel lamps are lit. Meter indicates 115 ±5 volts dc.	Check fuses F1 and F2; switch A5S6; and lamps A5DS1 and A5DS2. Spark gap V1.
2	Connect voltohmmeter to test jack A2J3.	Meter indicates -15 ±3 volts dc.	Check rectifier diodes CR4 and CR5 and transformer T1.
3	Connect voltohmmeter to test jacks A2J5 and A2J6.	Meter indicates 47 ±4 volts dc.	Check rectifier diodes CR6, CR7, CR8, and CR9 and transformer T1.
4	Connect voltohmmeter to test jack A2J4.	Meter indicates 28 ±0.3 volts dc.	Adjust R1 to obtain 28 volts dc. If abnormal, check rectifiers CR2 and CR3; regulators Q1, Q3, and VR1; amplifiers Q2 and Q5; current limiters Q6 and Q7; and transformer T1.

4-8. DUMMY LOAD DA-607/U, FUNCTIONAL DESCRIPTION.

a. GENERAL. - Dummy Load DA-607/U (figure 5-39) consists of three 1500-ohm resistors (R1, R2, and R3) connected in parallel to form a 500-ohm resistive element. Inductors L1 and L2 are placed in series with the resistors to provide uniform impedance over a frequency range of 2 to 30 MHz.

b. DUMMY LOAD DA-607/U TEST DATA. - The following test data is required to perform trouble isolation in Dummy Load DA-607/U.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is a voltohmmeter (AN/PSM-4 or equivalent).

(2) TROUBLE-ISOLATION PROCEDURE. - Perform step 1 of table 4-10 with the DA-607/U disconnected from all rf power sources.

4-9. ANTENNA COUPLER CU-1901/U, FUNCTIONAL DESCRIPTION.

a. GENERAL. - Antenna Coupler CU-1901/U (figure 5-38) consists of a series of L-section impedance matching networks. Inductors L1, L2, and L3 and capacitors C1 through C8 are the components of the L sections. The coupler permits six or less AM-4823/U's to be connected to one receive antenna.

b. ANTENNA COUPLER CU-1901/U TEST DATA. - The following test data is required to perform trouble isolation in Antenna Coupler CU-1901/U.

(1) TEST EQUIPMENT REQUIRED. - The test equipment required is a voltmeter (AN/PSM-4 or equivalent).

(2) TROUBLE-ISOLATION PROCEDURE. - Perform steps 2 and 3 of table 4-10 with the CU-1901/U disconnected from all rf power sources.

TABLE 4-10. DUMMY LOAD DA-607/U AND ANTENNA COUPLER CU-1901/U TROUBLE ISOLATION

STEP	PRELIMINARY INSTRUCTIONS	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	On Dummy Load DA-607/U, connect voltohmmeter between J1 and ground.	Meter indicates 500 ohms.	Check L1, L2, R1, R2, and R3.
2	On Antenna Coupler CU-1901/U, connect voltohmmeter between J1 and J2, J3, J4, J5, J6, or J7.	Meter indicates between 0 and 2 ohms.	Check L1, L2, and L3.
3	On Antenna Coupler CU-1901/U, connect voltohmmeter between any jack and ground.	Meter indicates extremely high resistance.	Check C1 through C8.

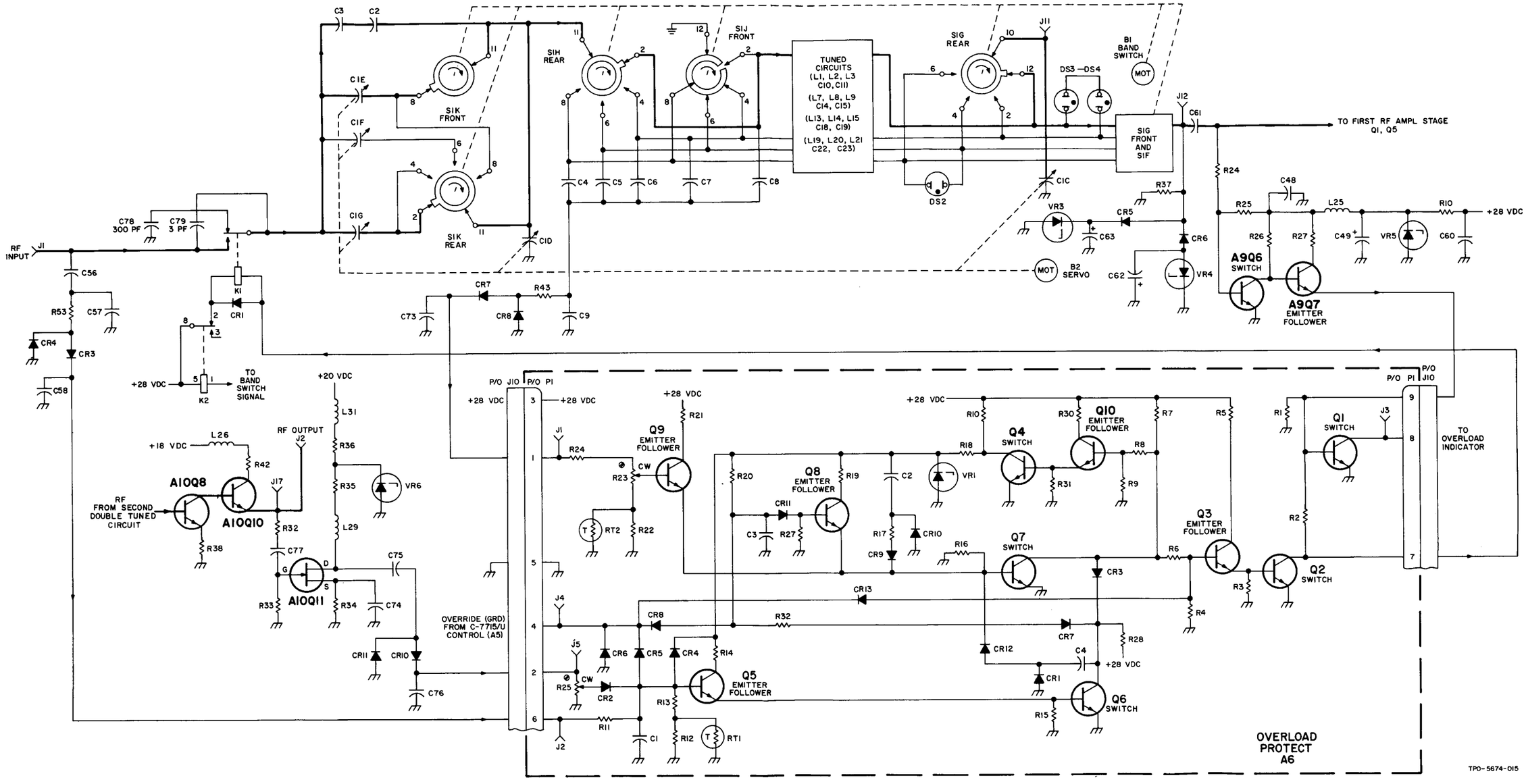


Figure 4-7. RF Protection Circuits, Simplified Schematic Diagram

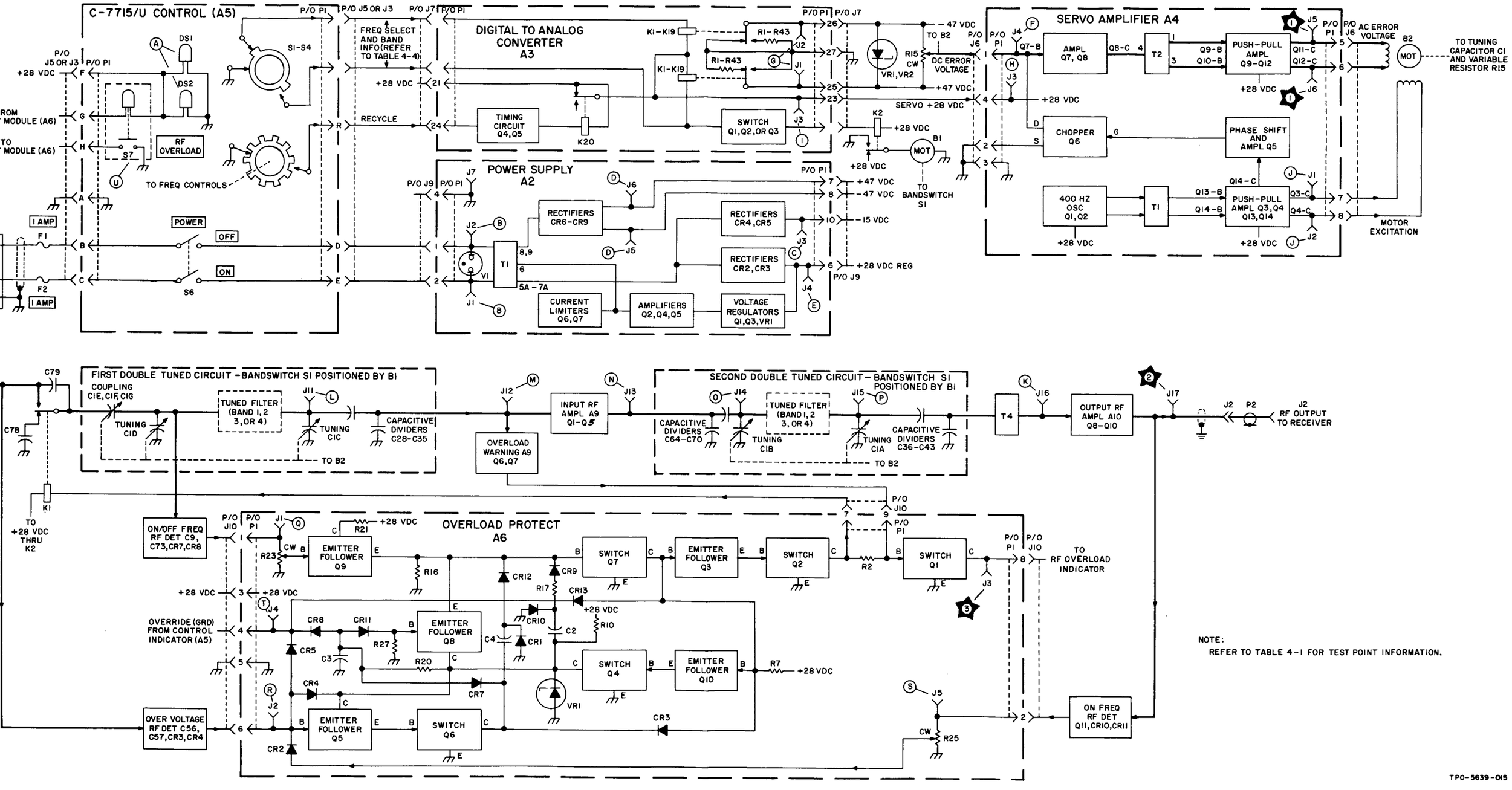


Figure 4-8. AM-4823/U, Servicing Block Diagram

SECTION 5

MAINTENANCE

5-1. FAILURE, AND PERFORMANCE AND OPERATIONAL REPORTS.

Note

Failure reports are not required for all equipments. Failure Reports and Operational Reports are to be accomplished for designated equipments (refer to Electronics Installation and Maintenance Book, NavShips 0967-000-000, only to the extent required by existing directives. All failures shall be reported for those equipments requiring the use of Failure Reports.

5-2. PREVENTIVE MAINTENANCE.

a. INSPECTION AND CLEANING. - At regular intervals, as determined by experience and environmental conditions, inspect the complete AM-4823/U for dust accumulation. Remove the covers, and remove accumulated dust with a vacuum cleaner and a soft-bristled brush. Do not use an air hose to blow dust from the unit as dust may be blown between capacitor plates, shorting them out. Capacitor C1 top covers should be removed periodically, and all dirt and dust accumulations should be removed by low air pressure blown directly on the capacitor plates. This cleaning should be accomplished with the capacitor fully closed and also with the capacitor fully open.

CAUTION

Capacitor damage and improper operation will result if capacitor plates are bent by mishandling. Do not allow tools or other instruments to come in contact with capacitor plates. Clean with forced air only.

Check to be sure the equipment is securely fastened and that excessive vibration or improper mounting has not caused damage.

b. MAINTENANCE PROCEDURES. - The procedures contained in paragraphs 5-2b(2) through 5-2b(6) are the minimum number of reference standards which will indicate, when completed, the relative performance of the AM-4823/U.

(1) TEST EQUIPMENT REQUIRED. - Table 5-1 lists the test equipment required to perform the maintenance procedures. Refer to table 1-1 for test equipment characteristics.

(2) SERVO-POSITIONING CHECK.

(a) With the POWER switch set to OFF, set the AM-4823/U to 3.000 MHz, and observe the rotor position of tuning capacitor sections C1A and C1B (figure 5-6).

(b) Set POWER switch to ON, and observe that the capacitor rotor plates position to approximately one-half mesh with respect to the stator plates. Apply slight finger pressure to the pinion of variable resistor R15 (figure 5-8). The gear should resist all efforts to move.

(c) Set the AM-4823/U to 2.000 MHz, and observe that the capacitor rotor positions to within approximately 9 degrees from being fully meshed with the stator.

(d) Set the AM-4823/U to 3.999 MHz, and observe that the capacitor rotor positions to within approximately 9 degrees from the fully open position.

(e) Change the AM-4823/U frequency to 2.000 MHz, and measure the tuning time from the open position to the 9-degree closed position; tuning time should not exceed 10 seconds.

(3) TUNING ACCURACY AND BANDPASS MEASUREMENT.

(a) Connect an electronic voltmeter (CCVO-91C with 50-ohm termination) through a 50-ohm attenuator to rf output connector J2.

(b) Connect Signal Generator AN/URM-25( ) to rf input connector J1.

(c) Set signal generator frequency and AM-4823/U to 2.000 MHz, and adjust the signal generator output for 0.1-volt indication on vtvm.

TABLE 5-1. EQUIPMENT REQUIRED FOR MAINTENANCE PROCEDURES

ITEM	DESIGNATION	ITEM	DESIGNATION
Radio receiver	R-390A/URR	Multitester	AN/USM-116
Signal generator	AN/URM-25( )	Electronic voltmeter	CCVO-91C
True rms voltmeter	Ballantine 320A	Rf attenuator	Daven 551-50

(d) Monitor the signal generator output with a R-390A/URR receiver.

(e) Change the signal generator frequency above and below the preset frequency until the vtvm indication drops 3 db; record the frequencies indicated on the receiver above and below the preset frequency. Subtract the smallest frequency deviation from the largest and divide by two. The resultant frequency should not exceed 0.25 percent of the nominal or preset frequency.

(f) Set the signal generator and AM-4823/U to each of the following frequencies, and repeat step (3)(e): 2.830, 3.999, 4.000, 5.650, 7.999, 8.000, 11.300, 15.999, 16.000, and 31.999 MHz.

(4) SELECTIVITY MEASUREMENT.

(a) Connect Signal Generator AN/URM-25( ) to AM-4823/U rf input connector J1.

(b) Connect an electronic voltmeter (CCVO-91C with 50-ohm termination) through a 50-ohm attenuator to rf output connector J2.

(c) Set the signal generator and AM-4823/U to 3.999 MHz; insert 60 db of attenuation in the 50-ohm attenuator, and adjust signal generator output for 1.0-millivolt indication on vtvm.

(d) Monitor the signal generator output with an R-390A/URR.

(e) Change the signal generator frequency above and below 3.999 MHz until the vtvm indication drops -6-db points; record the frequencies indicated on the receiver above and below 3.999 MHz. The frequency difference between the nominal frequency and each -6-db point should be no more than 40 kHz.

(f) Move signal generator of the 3.999-MHz frequency, and remove 60-db attenuation from the 50-ohm attenuator.

(g) While maintaining the signal generator output level constant, change the signal generator frequency above and below 3.999 MHz until the vtvm indication reaches -60-db points; record the frequencies indicated on the receiver above and below 3.999 MHz. The frequency difference between the nominal frequency and each -60-db point should be no more than 10 times the -6-db bandwidth (step (4)(e) above).

(h) Repeat steps (4)(c) through (4)(g), except set signal generator and AM-4823/U to 7.999 MHz (not more than 80-kHz frequency difference at -6-db points), 15.999 MHz (not more than 160-kHz frequency difference at -6-db points), and 31.999 MHz (not more than 320-kHz frequency difference at -6-db points).

(5) SENSITIVITY MEASUREMENT.

Note

The following sensitivity test should be performed only when an interference-free environment is apparent.

(a) Using a receiver having the characteristics of an R-390A/URR, connect the if. output of the receiver to a true rms vtvm, and connect the local audio output of the receiver to a speaker.

(b) Connect the output of Signal Generator AN/URM-25( ) through a 6-db pad to rf input connector J1 on the AM-4823/U.

(c) Connect rf output connector J2 through a 50-ohm attenuator to the input of the receiver.

(d) Set the signal generator and receiver to 2.000 MHz.

(e) Set the receiver controls as follows: BFO to OFF, bandwidth to 4 kHz, function switch to MGC, limiter to OFF.

(f) Disconnect the 50-ohm attenuator input from rf output connector J2 on the AM-4823/U.

(g) Adjust the rf gain control on the receiver so that the if. output of the receiver is about 0.01 volt, as measured by the rms vtvm.

(h) Connect the signal generator to the input of the 50-ohm attenuator.

(i) Set signal generator output to 30 microvolts at 2-MHz frequency.

Note

If the receiver bandwidth to the -3-db points is other than 3 kHz as determined by measurement, adjust the 30-microvolt output of the signal generator by:

$$es = 30\sqrt{\frac{BW\ (kHz)}{3}}$$

where es is the signal generator output to be used, and BW is the actual bandwidth of the receiver in kHz.

(j) Adjust the signal generator to peak the receiver if. output as determined by the rms vtvm.

(k) Adjust the 50-ohm attenuator until the receiver if. output to the rms vtvm is exceeded by 20 db.

(l) Decrease the signal generator output to zero and note that the if. output still is 0.01 volt. If it is not, readjust the receiver rf gain control and repeat the procedure described in steps (5)(h) through (5)(k).

(m) Disconnect the signal generator from the 50-ohm attenuator and reconnect the signal generator through the 6-db pad to rf input connector J1 on the AM-4823/U.

(n) Reconnect the 50-ohm attenuator to rf output connector J2 on the AM-4823/U.

(o) Reduce the signal generator output to zero, note the if. level, then gradually increase signal generator output to a level where the if. output is increased 20 db. If necessary, slightly adjust the signal generator frequency to peak the if. output. Note that signal generator output does not exceed 3.66 microvolts (when the receiver bandwidth to -3-db points is 3 kHz or the output value (es) computed by the formula following step (5)(i).).

(p) Repeat steps (5)(d) through (5)(o) except use frequencies of 4.000, 8.000, 16.000, and 31.999 MHz.

(6) GAIN MEASUREMENT.

(a) Connect the output of Signal Generator AN/URM-25( ) through a 50-ohm attenuator to a CCVO-91C with 50-ohm termination and set attenuator for minimum attenuation.

(b) Set the signal generator output to 2.000 MHz at 0.1 volt as measured on the vtvm.

(c) Without changing the signal generator output, connect the signal generator and 50-ohm attenuator to the AM-4823/U rf input connector J1.

(d) Connect the vtvm with 50-ohm load to rf output connector J2, and set the AM-4823/U to 2.000 MHz.

(e) Increase the attenuation of the 50-ohm attenuator until the vtvm indication drops to 0.1 volt.

(f) Record the gain in db as indicated by the change in the attenuator setting.

(g) Repeat steps (6)(a) through (6)(f), except set signal generator and AM-4823/U to 3.000 MHz and 3.999 MHz.

(h) Subtract the lowest gain measured from the highest; gain variation not to exceed 8 db.

(i) Repeat steps (6)(a) through (6)(h) for band 2, at frequencies of 4.000, 6.000, and 7.999 MHz.

(j) Repeat steps (6)(a) through (6)(h) for band 3, at frequencies of 8.000, 12.000, and 15.999 MHz.

(k) Repeat steps (6)(a) through (6)(h) for band 4, at frequencies of 16.000, 20.000, 24.000, and 31.999 MHz.

c. ALIGNMENT AND ADJUSTMENT. - Table 5-2 is a list of the test equipment required to align and adjust the AM-4823/U. Figures 5-5, 5-6, and 5-7 show the location of test points and adjustments.

(1) RF ALIGNMENT. - The following procedures align the four band circuits to obtain band tracking. Two-point tracking is obtained by adjusting inductive trimmers at the low end of a band and capacitive trimmers at the high band end.

(a) Remove 20 screws holding the cover over switches S1H, S1J, and S1K.

(b) BAND 1 ALIGNMENT. - Connect a CCVO-91C vtvm with 50-ohm termination through a 50-ohm attenuator to rf output connector J2. Connect a Signal Generator AN/URM-25( ) to rf input connector J1.

1. Set the AM-4823/U and signal generator frequency to 2.000 MHz.

2. Increase the signal generator output until the vtvm indicates an output from the AM-4823/U (do not exceed a 0.3-volt level at the vtvm).

3. Connect 2.2K swamping resistors from test points J11 and J15 (figure 5-5) to ground. Adjust inductors L1 and L4 for a peak indication on vtvm (do not allow indication to exceed 0.03 volt).

4. Remove the swamping resistors from J15 and J11. Connect one of the 2.2K swamping resistors from test point J14 to ground, and the other resistor from capacitor C1D to ground. Adjust inductors L2 and L5 for a peak indication on the vtvm.

5. Set the signal generator and the AM-4823/U to 3.999 MHz and adjust capacitors C11 and C13 for peak indication on vtvm (do not allow indication to exceed 0.3 volt).

6. Remove the swamping resistors from capacitor C1D and test point J14.

7. Connect one of the 2.2K swamping resistors from test point J11 to ground, and the other resistor from test point J15 to ground. Adjust capacitors C10 and C12 for peak indication on the vtvm (do not exceed 0.3 volt).

8. Repeat steps (b)1 through (b)7 until adjustment procedures produce no further peak indications on vtvm; last adjustment to be made at 3.999 MHz.

(c) BAND 2 ALIGNMENT. - Use the test equipment setup described in step (1)(b) and perform the following steps.

1. Set the AM-4823/U and signal generator frequency to 4.000 MHz.

2. Increase the signal generator output until the vtvm indicates an output from the AM-4823/U (do not exceed a 0.3-volt level at the vtvm).

3. Connect 2.2K swamping resistors from test points J14 and J11 to ground. Adjust inductors L7 and L8 for a peak indication on vtvm (do not allow indication to exceed 0.3 volt).

4. Remove the swamping resistors from J14 and J11. Connect one of the 2.2K resistors

TABLE 5-2. TEST EQUIPMENT REQUIRED FOR ALIGNMENT AND ADJUSTMENT

ITEM	DESIGNATION	ITEM	DESIGNATION
Electronic voltmeter	CCVO-91C	Power supply	Kepco ABC 30-0.3M
Signal generator	AN/URM-25( )	Multitester	AN/USM-116
Rf attenuator	Daven 551-50		

from test point J14 to ground and the other resistor from capacitor C1D to ground. Adjust inductors L10 and L11 for a peak indication on the vtvm.

5. Set the signal generator and the AM-4823/U to 7.999 MHz, and adjust capacitors C14 and C15 for peak indication on vtvm (do not allow indication to exceed 0.3 volt).

6. Remove the swamping resistors from J14 and capacitor C1D.

7. Connect one of 2.2K swamping resistors from test point J11 to ground and the other resistor from test point J15 to ground. Adjust capacitors C16 and C17 for peak indication on the vtvm (do not exceed 0.3 volt).

8. Repeat steps (c)1 through (c)7 until adjustment procedures produce no further peak indications on vtvm; last adjustment to be made at 7.999 MHz.

(d) BAND 3 ALIGNMENT. - Use the test equipment setup described in step (1)(b) and perform the following steps.

1. Set the AM-4823/U and signal generator frequency to 8.000 MHz.

2. Increase the signal generator output until the vtvm indicates an output from the AM-4823/U (do not exceed a 0.3-volt level at the vtvm).

3. Connect 680-ohm swamping resistors from test points J14 and J11 to ground. Adjust inductors L13 and L14 for a peak indication on vtvm (do not allow indication to exceed 0.3 volt).

4. Remove the swamping resistors from J14 and J11. Connect one of the 680-ohm resistors from test point J14 to ground and the other resistor from capacitor C1D to ground. Adjust inductors L16 and L17 for a peak indication on the vtvm.

5. Set the signal generator and the AM-4823/U to 15.999 MHz, and adjust capacitors C18 and C19 for peak indication on vtvm (do not allow indication to exceed 0.3 volt).

6. Remove the swamping resistors from J14 and capacitor C1D.

7. Connect one of the 680-ohm swamping resistors from test point J11 to ground and the other resistor from test point J15 to ground. Adjust capacitors C20 and C21 for peak indication on the vtvm (do not exceed 0.3 volt).

8. Repeat steps (d)1 through (d)7 until adjustment procedures produce no further peak indications on vtvm; last adjustment to be made at 15.999 MHz.

(e) BAND 4 ALIGNMENT. - Use the test equipment setup described in step (1)(b) and perform the following steps.

1. Set the AM-4823/U and signal generator frequency to 16.000 MHz.

2. Increase the signal generator output until the vtvm indicates an output from the AM-4823/U (do not exceed a 0.3-volt level at the vtvm).

3. Connect 680-ohm swamping resistors from test points J14 and J11 to ground. Adjust inductors L19 and L20 for a peak indication on vtvm (do not allow indication to exceed 0.3 volt).

4. Remove the swamping resistors from J14 and J11. Connect one of the 680-ohm resistors from test point J14 to ground and the other resistor from capacitor C1D to ground. Adjust inductors L22 and L23 for peak indication on the vtvm.

5. Set the signal generator and the AM-4823/U to 31.999 MHz, and adjust capacitors C22 and C23 for peak indication on vtvm (do not allow indication to exceed 0.3 volt).

6. Remove the swamping resistors from J14 and capacitor C1D.

7. Connect one of the 680-ohm swamping resistors from test point J11 to ground and the other resistor from test point J15 to ground. Adjust capacitors C24 and C25 for peak indication on the vtvm (do not exceed 0.3 volt).

8. Repeat steps (e)1 through (e)7 until adjustment procedures produce no further peak indications on vtvm; last adjustment to be made at 31.999 MHz.

(f) Replace the cover over switches S1H, S1J, and S1K.

(g) Connect a 2.2K swamping resistor between test jack J11 and ground.

(h) Set the signal generator and AM-4823/U to 3.999 MHz and adjust capacitor C10 for peak indication on vtvm (do not allow indication to exceed 0.3 volt).

(2) OFF-FREQUENCY PROTECTION ADJUSTMENT.

(a) Apply primary power to the AM-4823/U.

(b) Ground the negative lead of the 0-30 volt power supply to the chassis of the AM-4823/U.

(c) Connect the positive lead of the power supply to A6J1.

(d) Using an AN/USM-116 to measure the output of the power supply, increase the output voltage to 5.7 volts dc.

(e) Adjust A6R23 (figure 5-23) until the protection circuit operates at 5.7 volts dc.

(3) ON-FREQUENCY PROTECTION ADJUSTMENT.

(a) Connect a CCVO-91C with 50-ohm termination to rf output connector J2 through a 50-ohm attenuator.

(b) Connect Signal Generator AN/URM-25 to rf input connector J1.

(c) Set signal generator and AM-4823/U frequency at 2.000 MHz, and adjust signal generator output to 0 volt.

(d) Increase the signal generator output voltage above 2 volts and RF OVERLOAD indicator will light on the C-7715/U.

(e) Decrease the signal generator output voltage below 2 volts and note that the RF OVERLOAD indicator light turns off.

(f) Repeat steps (3)(c) through (3)(e) at frequencies of 3.999, 4.000, 8.000, 15.999, 16.000, and 31.999 MHz.

(4) MECHANICAL ADJUSTMENT OF CAPACITOR C1 DRIVE GEAR. - Mechanical adjustment of the capacitor drive gear involves the adjustment of the eccentric collar which positions the rear gearplate. The correct positioning of the rear gearplate removes backlash between the follow potentiometer drive gear and the capacitor drive gear. Under normal operating conditions, no adjustment should be required. If it is necessary to remove gear backlash, perform steps (a) through (e) below. If the gear train has been disassembled in order to replace a part, perform steps (f) through (o).

(a) Remove variable tuning capacitor C1 and gear train assembly from the bandpass filter chassis.

(b) Loosen the four screws in the rear gearplate marked A in figure 5-1.

(c) Rotate the eccentric collar to provide minimum backlash.

CAUTION

Do not rotate the eccentric collar unnecessarily or a great amount of gear-mesh pressure will be developed. Such pressure will cause extensive gear and bearing wear.

(d) Tighten the four screws in the rear gearplate and reassemble.

(e) Follow the alignment procedures of paragraphs 5-2c(1)(b) through 5-2c(1)(e) to realign all four bands.

(f) To begin reassembly of the gear train, mount the rear gearplate with the screws marked A in figure 5-1. Leave the screws loose.

(g) Rotate the eccentric collar so that the thickest part of the collar is nearest the potentiometer gear bearing.

(h) Rotate capacitor C1 rotor until it is fully meshed with the stator.

(i) Mount the capacitor drive gear with the punch mark nearest the potentiometer drive gear bearing as shown in figure 5-1 and with 1/32 of an inch clearance between gear and gearplate.

(j) Mount follow potentiometer R15 to front gearplate and rotate potentiometer drive gear fully counterclockwise (facing shaft).

(k) Rotate tuning capacitor C1 so that the upper edges of the rotor blades are flush with the upper edges of the stator blades.

(l) Assemble the front gearplate on the rear gearplate, being careful not to disturb the setting of C1 or R15.

Note

If meshing the gear teeth to perform step (l) disturbs the setting of R15 or C1, loosen the two mounting screws and rotate R15 so that it is in the full counterclockwise position (facing shaft) while C1 is fully meshed. Tighten the mounting screws.

(m) Adjust the eccentric collar for minimum backlash.

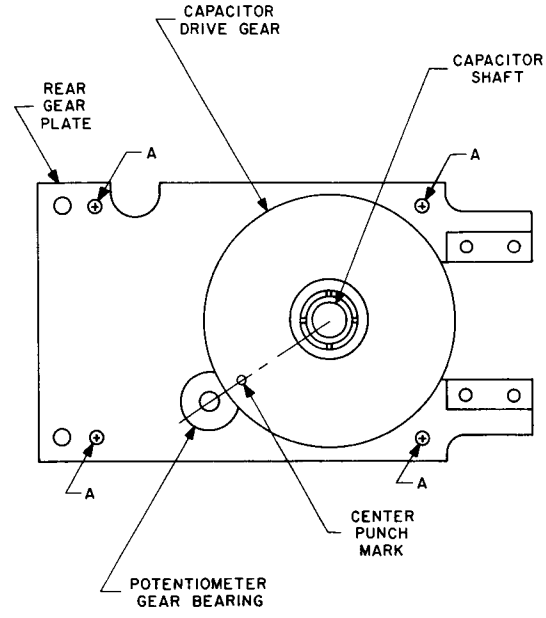


Figure 5-1. Capacitor Drive Gear, Alignment Diagram

(n) Tighten screws in the rear gearplate and reassemble. Liquid stake screws not provided with lockwashers, but use staking material sparingly.

(o) Realign all four bands according to the procedures of paragraphs 5-2c(1)(b) through 5-2c(1)(e) and check for correct brake alignment.

(5) MECHANICAL ADJUSTMENT OF CAPACITOR C1 GEAR DRIVE BRAKE ASSEMBLY. - Mechanical adjustment of the capacitor gear drive brake assembly is required only if the capacitor gear drive assembly has been disassembled for repair or if the brake allows the capacitor to slip when the servo motor is not energized. The slip brake helps to prevent capacitor rotation during shock or vibration when the servo motor is not energized. The brake is released when the servo motor is energized. Refer to figure 5-2 and adjust the brake as follows:

(a) Use a Bristol wrench to adjust setscrew A until the plate actuator is approximately parallel with the positioning plate. Access to setscrew A is provided through the hole in the bottom cover of the bandpass filter which is closer to the front panel.

(b) Energize the actuator relay K3 with +28 volts dc.

(c) Adjust setscrew B so that the plate actuator travels 0.010 to 0.018 inch when energized. Access to setscrew B is provided through the hole in the bottom cover which is closer to the rear of the bandpass filter.

5-3. REMOVAL OF SUBASSEMBLIES.

Most of the subassemblies in the AM-4823/U are removed by loosening four retaining screws (painted red) on each subassembly and lifting the subassembly out of the AM-4823/U chassis. Procedures for removal of other subassemblies are as follows:

a. CAPACITOR AND DRIVE GEAR SUBASSEMBLY.

(1) Tag each wire in the main cable at terminal board TB2 and disconnect the wiring, (item 1, figure 5-6).

(2) Remove cover from capacitors C1A through C1G.

(3) Disconnect wiring from seven stator soldering lugs on capacitors C1A through C1G (item 2, figure 5-6).

(4) Disconnect wiring from the end of capacitor C1G (item 3, figure 5-6).

(5) Disconnect bus wires from ground post next to capacitors C1C and C1A (item 4, figure 5-6).

(6) Remove the retaining ring from the end of the switch shaft (item 5, figure 5-6) and extract the shaft from the AM-4823/U chassis.

(7) On the bottom of the chassis, remove the nine screws holding the capacitor and drive gear subassembly.

(8) Remove the capacitor and drive gear subassembly from the AM-4823/U chassis.

b. RF OUTPUT AMPLIFIER SUBASSEMBLY A10.

(1) Remove cover from subassembly A10.

(2) Disconnect the bus wire from the ground lug (item 1, figure 5-29).

(3) Disconnect the coaxial cable from the side of subassembly A10 (item 2, figure 5-29).

(4) On the bottom of the chassis, disconnect four wires from subassembly A10.

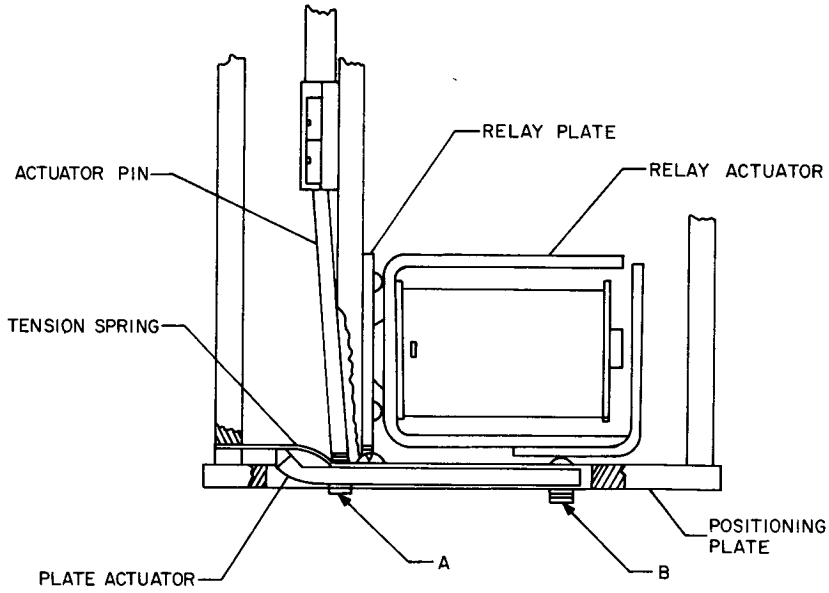


Figure 5-2. Relay K3 Brake Adjustment Points

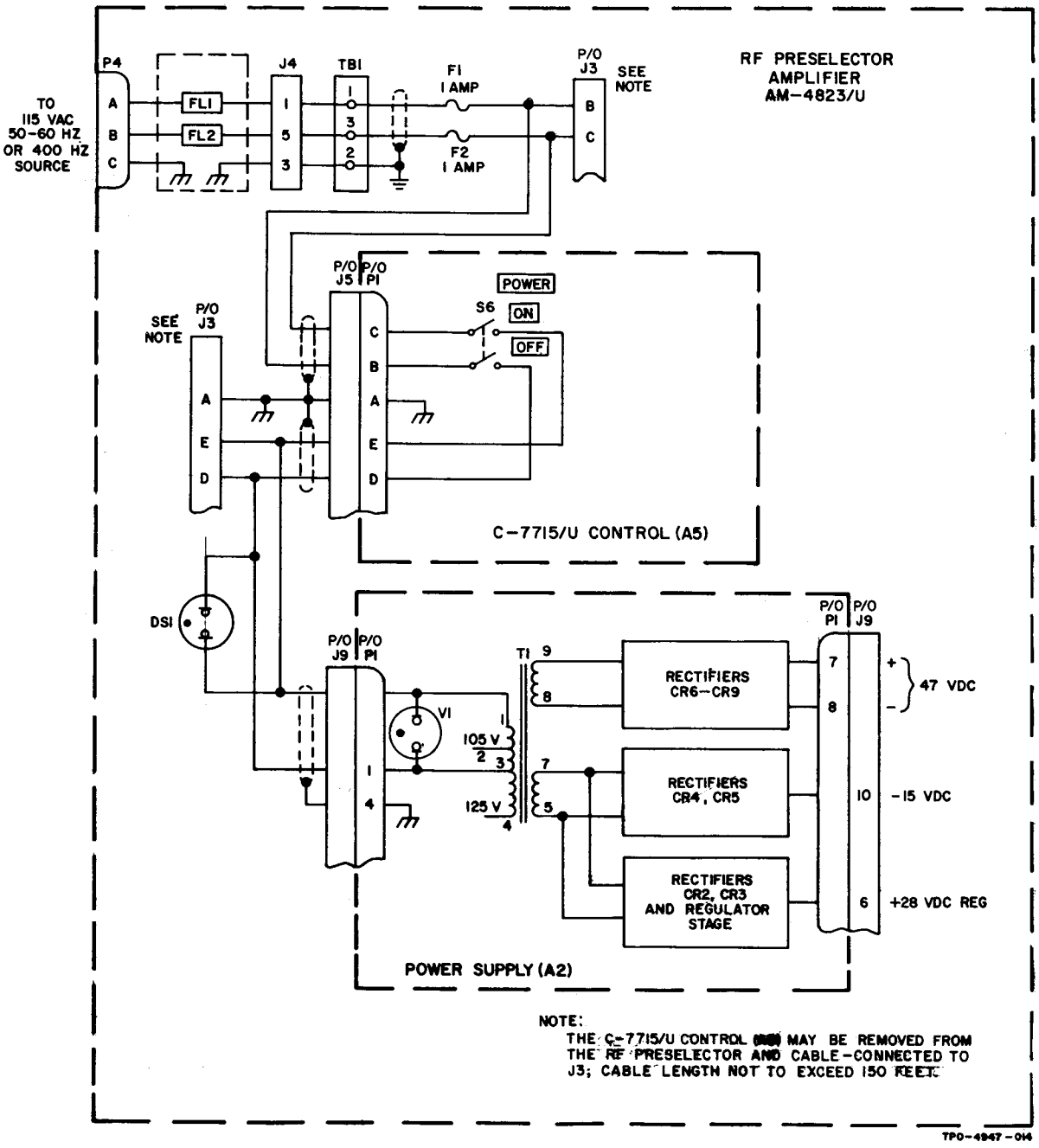


Figure 5-3. Primary Power Distribution

(5) On the bottom of the chassis, remove the four screws holding subassembly A10, and lift the subassembly out of the AM-4823/U chassis.

c. RF INPUT AMPLIFIER SUBASSEMBLY A9.

(1) Remove the cover from subassembly A9.

(2) Disconnect wiring from ground lugs (item 1, figure 5-27).

(3) On the bottom of the chassis, disconnect four wires from subassembly A9.

(4) On the bottom of the chassis, remove the three screws holding subassembly A9, and lift the subassembly out of the AM-4823/U chassis.

d. RF COIL SUBASSEMBLY NO. 1.

(1) Remove the cover from rf coil subassembly no. 1.

(2) Disconnect seven bus wires from terminal posts, ground lugs, and switch (item 1, figure 5-11).

(3) Remove the retaining ring from the end of the switch shaft (item 5, figure 5-6) and extract the shaft from the AM-4823/U chassis.

(4) On the chassis bottom, remove the four screws holding the rf coil subassembly, and lift the subassembly out of the AM-4823/U chassis.

e. RF COIL SUBASSEMBLY NO. 2.

(1) Remove the cover from rf coil subassembly no. 2.

(2) Disconnect four bus wires from ground lugs and switches (item 1, figure 5-12).

(3) Remove the retaining ring from the end of the switch shaft (item 5, figure 5-6) and extract the shaft from the AM-4823/U chassis.

(4) On the chassis bottom, remove the four screws holding the rf coil subassembly and lift the subassembly out of the AM-4823/U chassis.

5-4. REPLACEMENT OF SUBASSEMBLIES.

Replacement of subassemblies in the AM-4823/U chassis is essentially the reverse of removal.

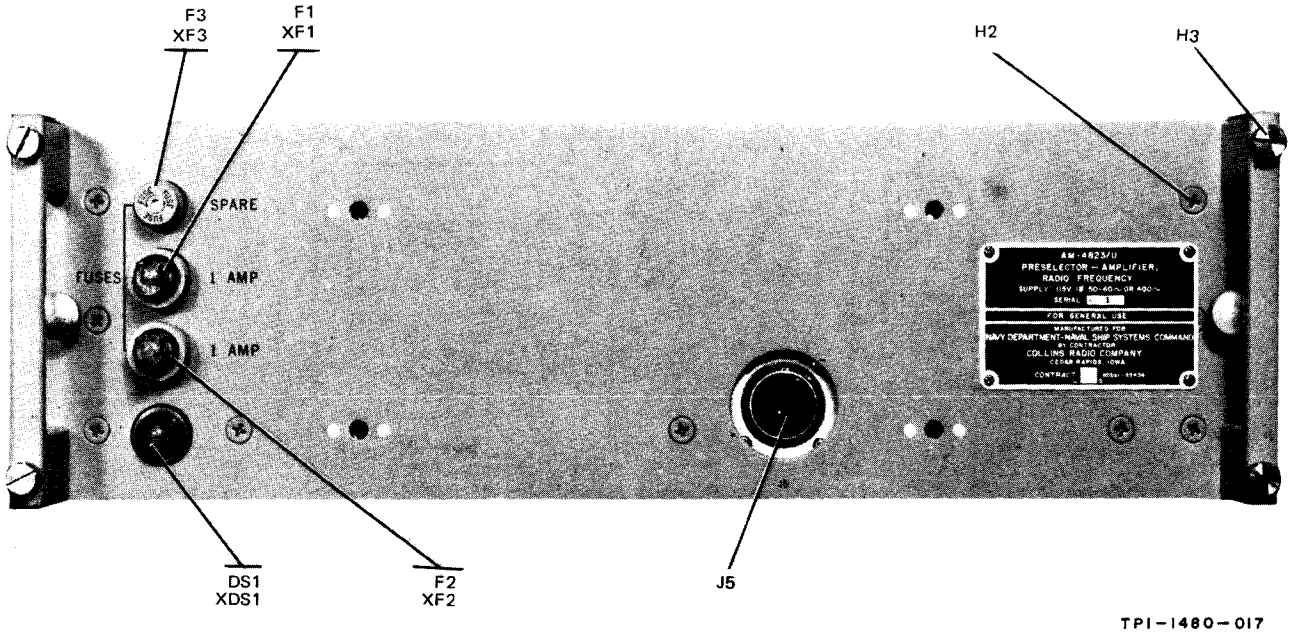


Figure 5-4. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Front View, Parts Location (C-7715/U Removed)

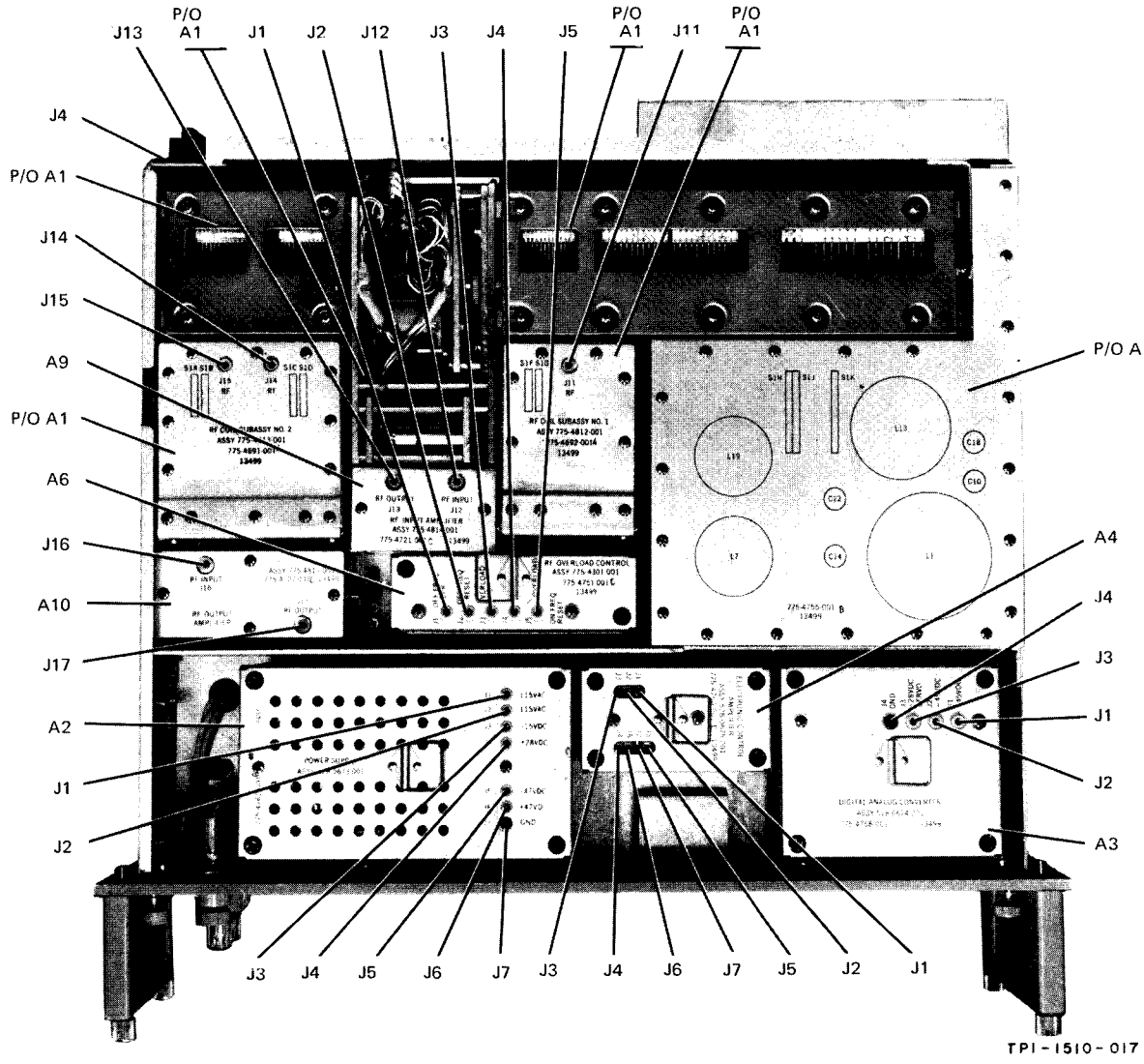


Figure 5-5. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Top View, Parts and Test-Point Locations

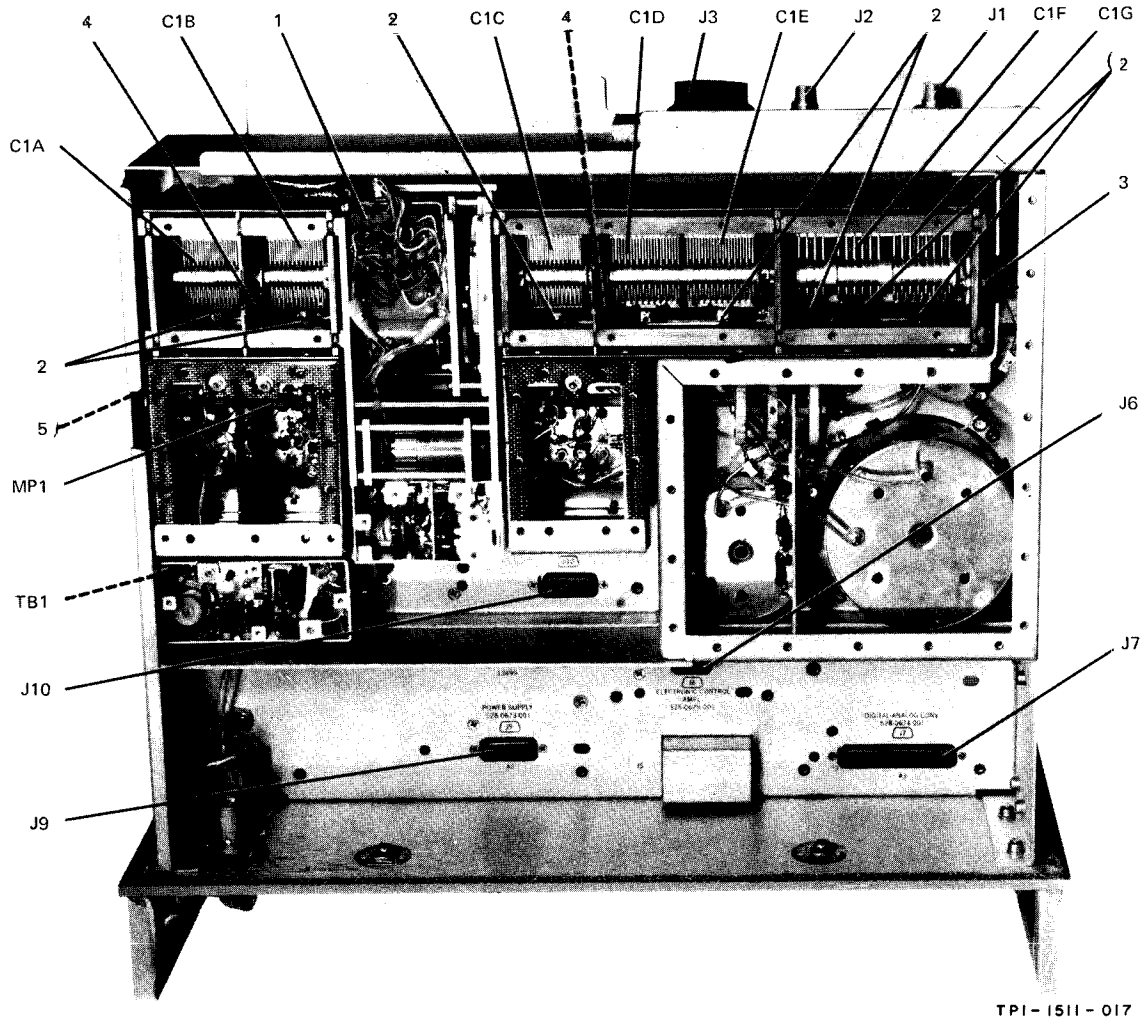


Figure 5-6. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Top View, Modules and Covers Removed, Parts Location

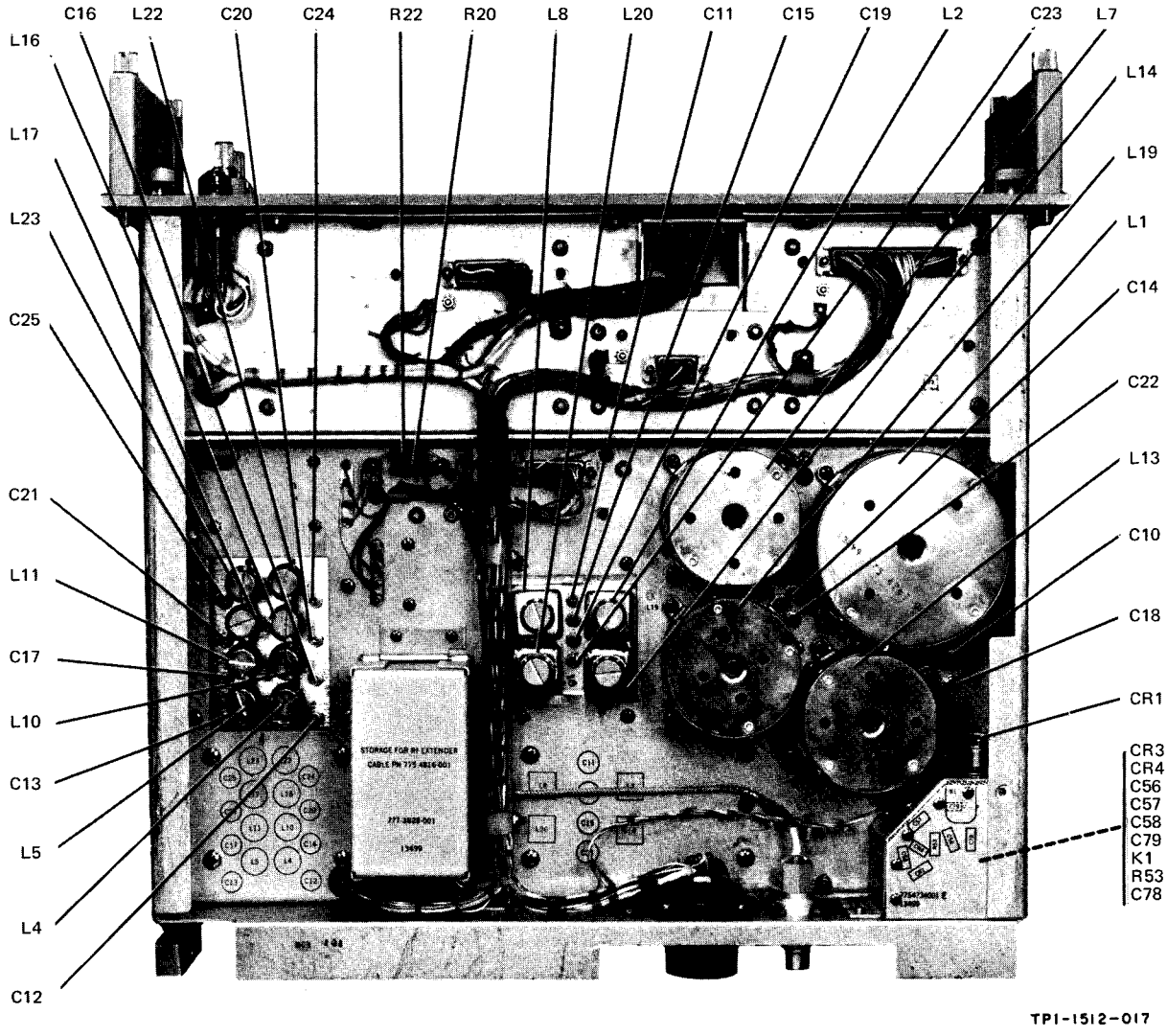


Figure 5-7. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Bottom View, Parts Location

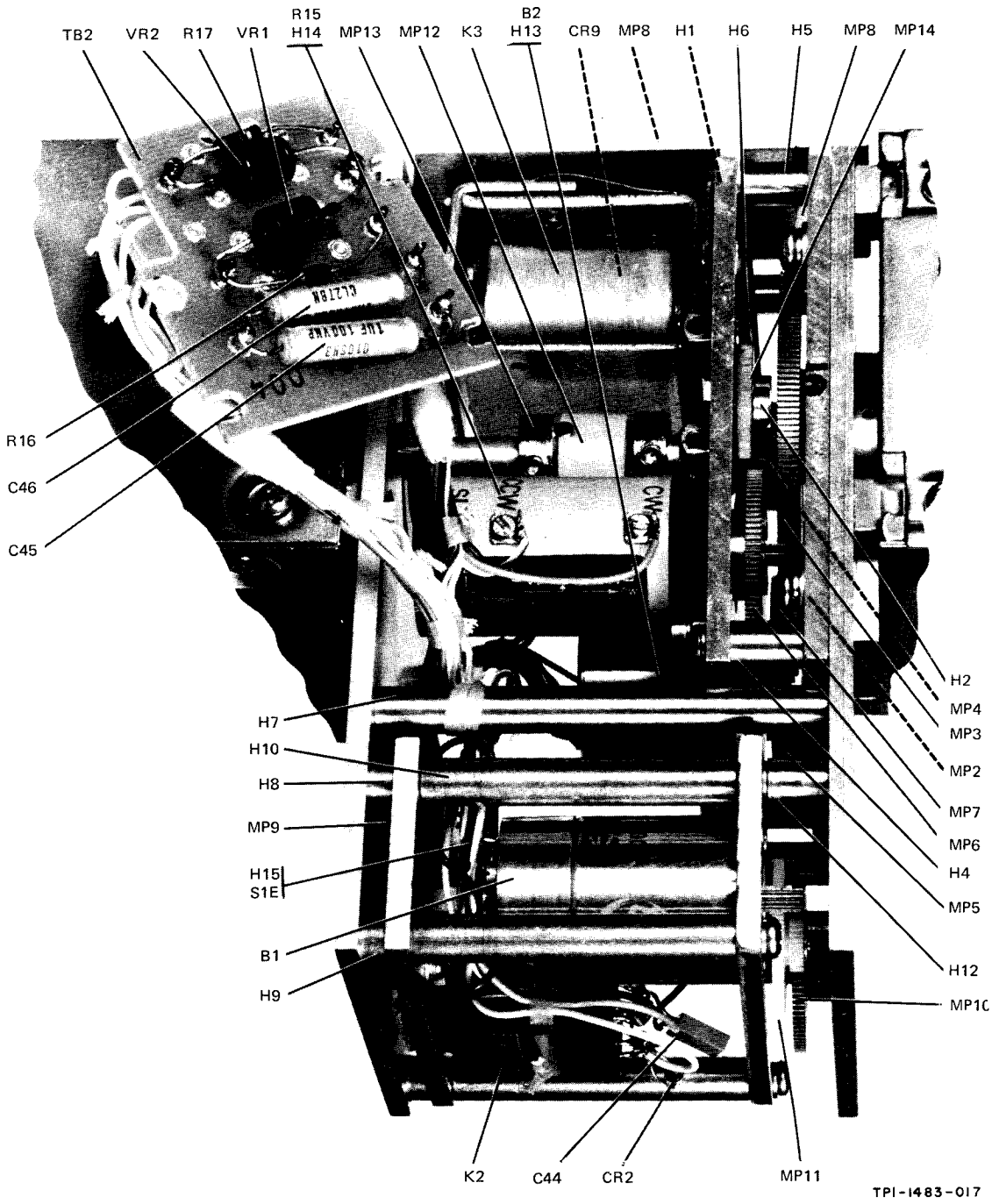


Figure 5-8. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Capacitor C1 Drive Gear and Brake Assembly, Parts Location

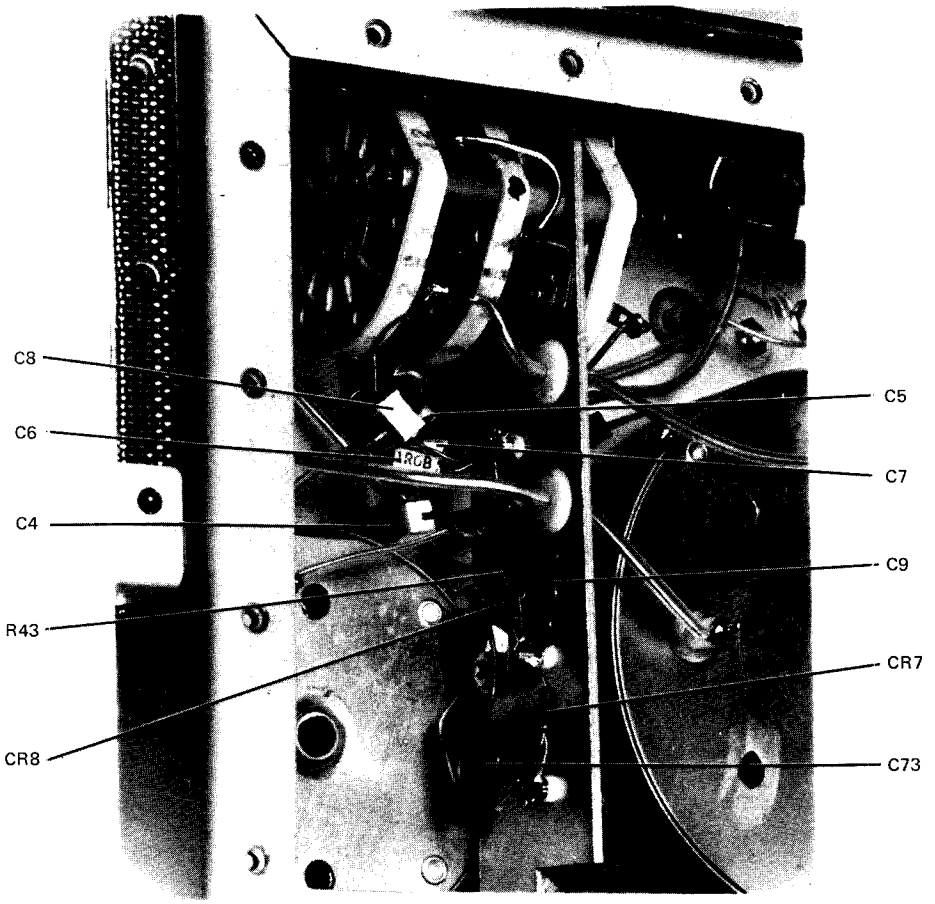


Figure 5-9. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Band-Switch Assembly, Right Side View, Parts Location

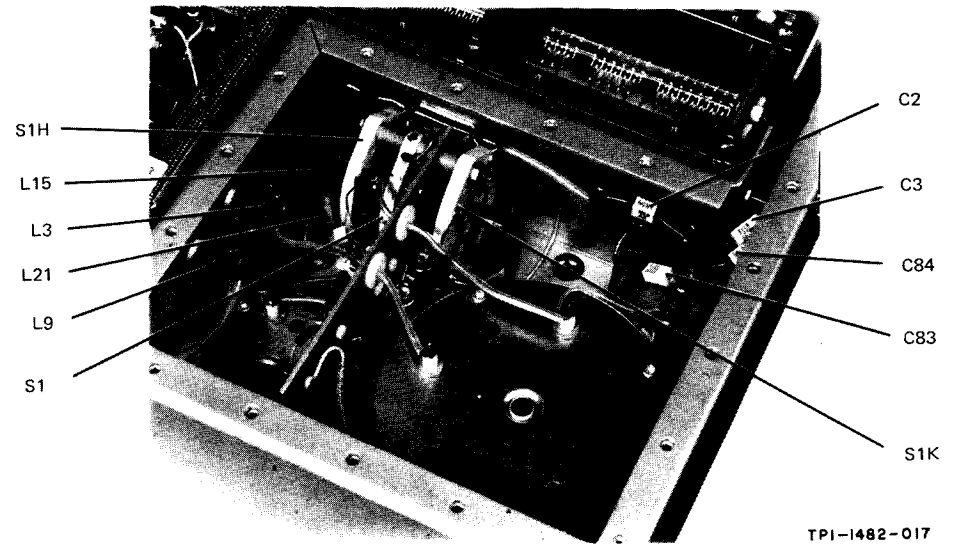


Figure 5-10. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, Band-Switch Assembly, Left Side View, Parts Location

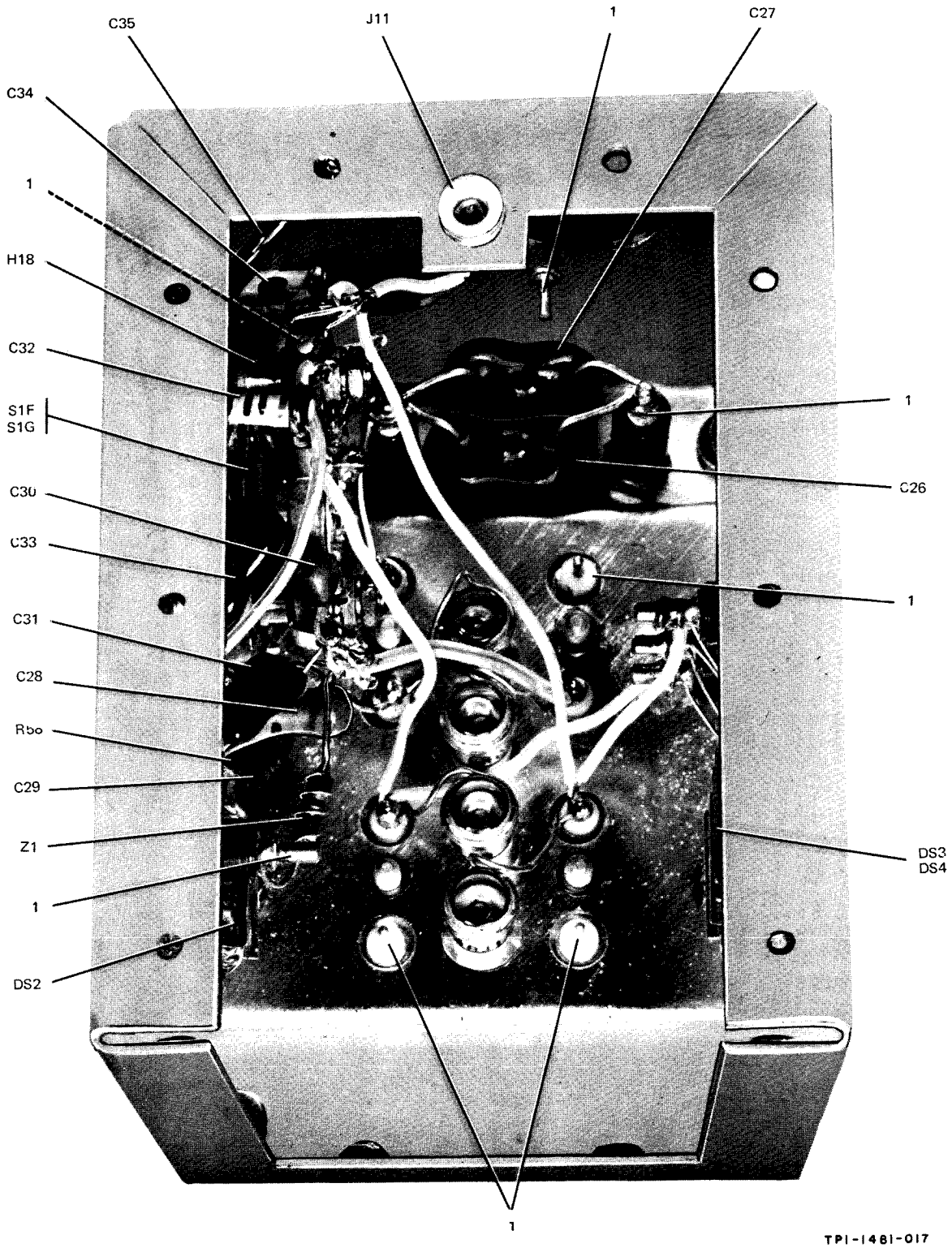


Figure 5-11. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, RF Coil Subassembly No. 1, Parts and Test-Point Locations

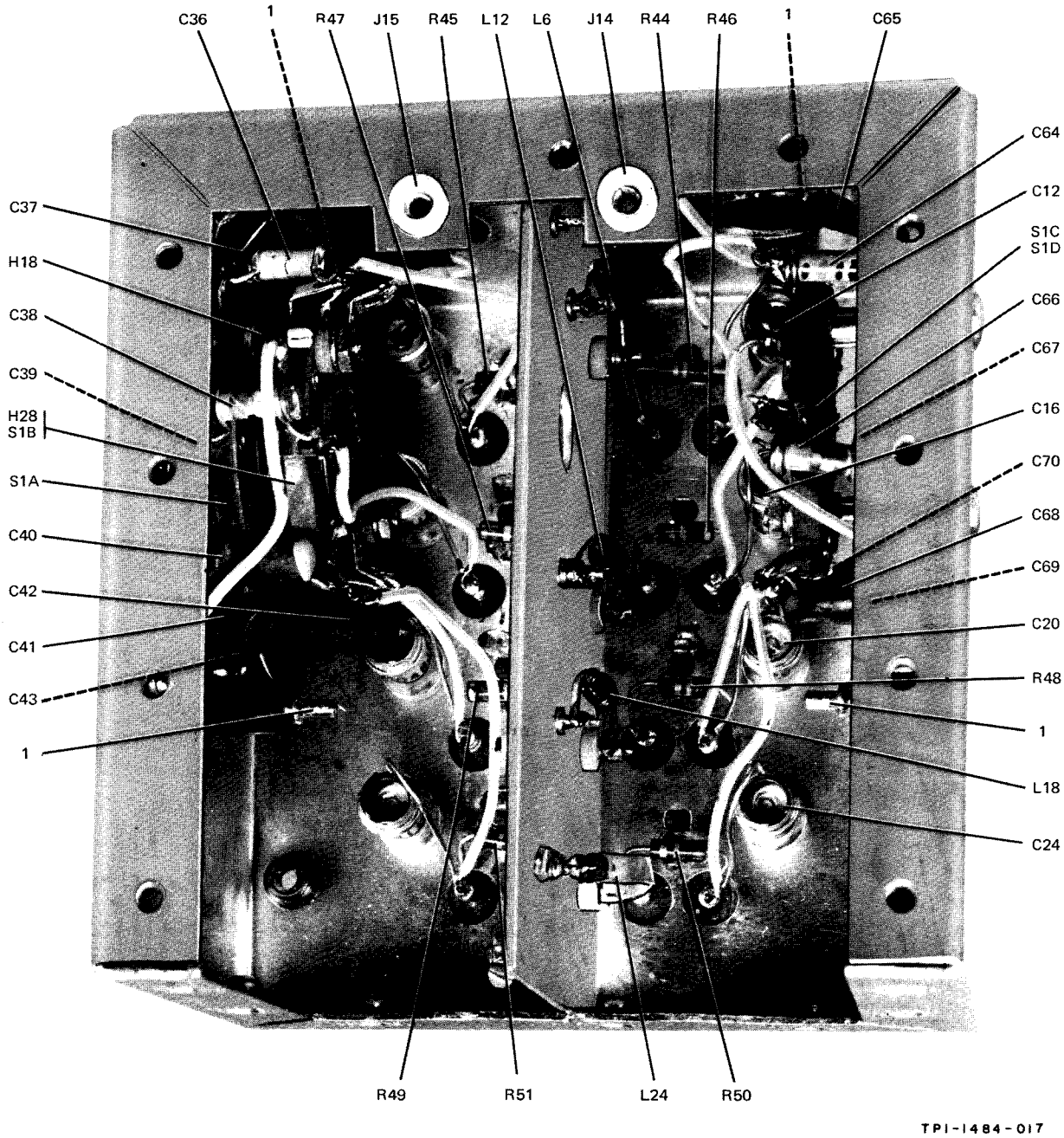


Figure 5-12. Radio-Frequency Preselector-Amplifier AM-4823/U, Chassis A1, RF Coil Subassembly No. 2, Parts and Test-Point Locations

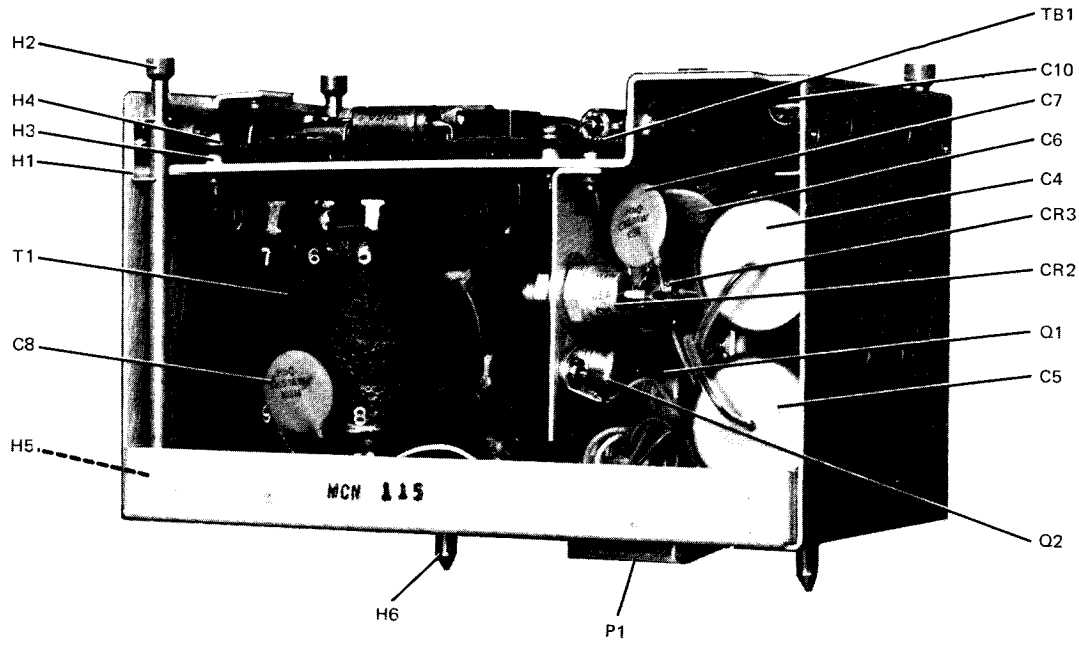


Figure 5-13. Power Supply A2, Parts Location

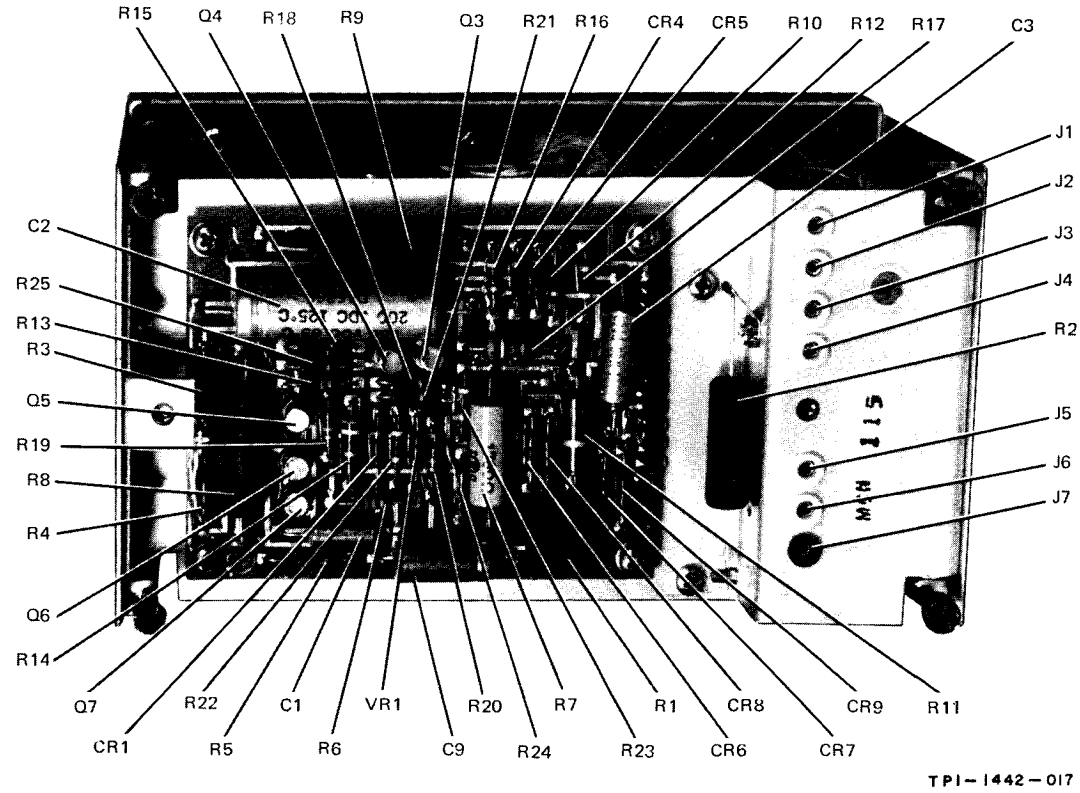


Figure 5-14. Power Supply A2, Top View, Parts and Test-Point Locations

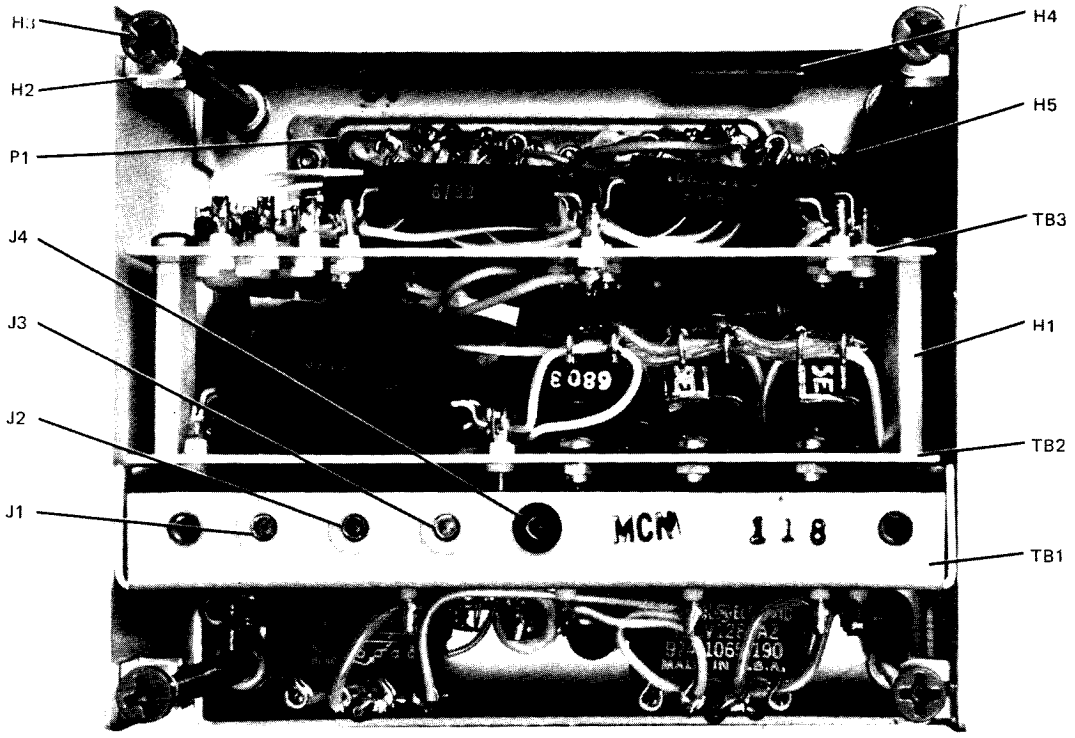


Figure 5-15. Digital to Analog Converter A3, Top View, Parts and Test-Point Location

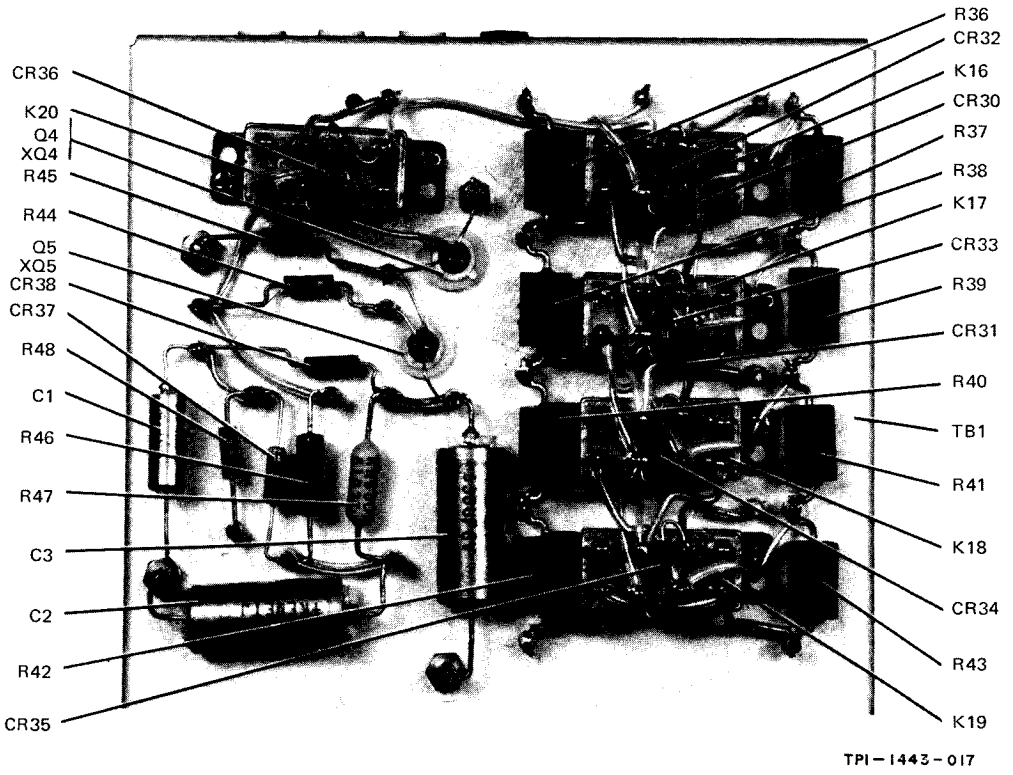


Figure 5-16. Digital to Analog Converter A3, Terminal Board TB1, Parts Location

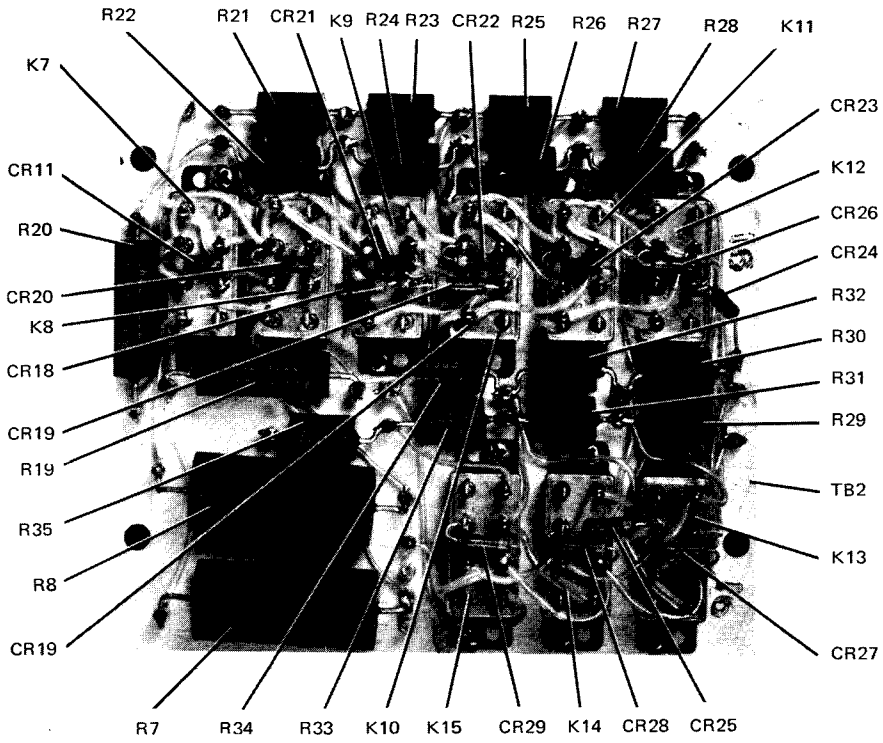


Figure 5-17. Digital to Analog Converter A3, Terminal Board TB2, Parts Location

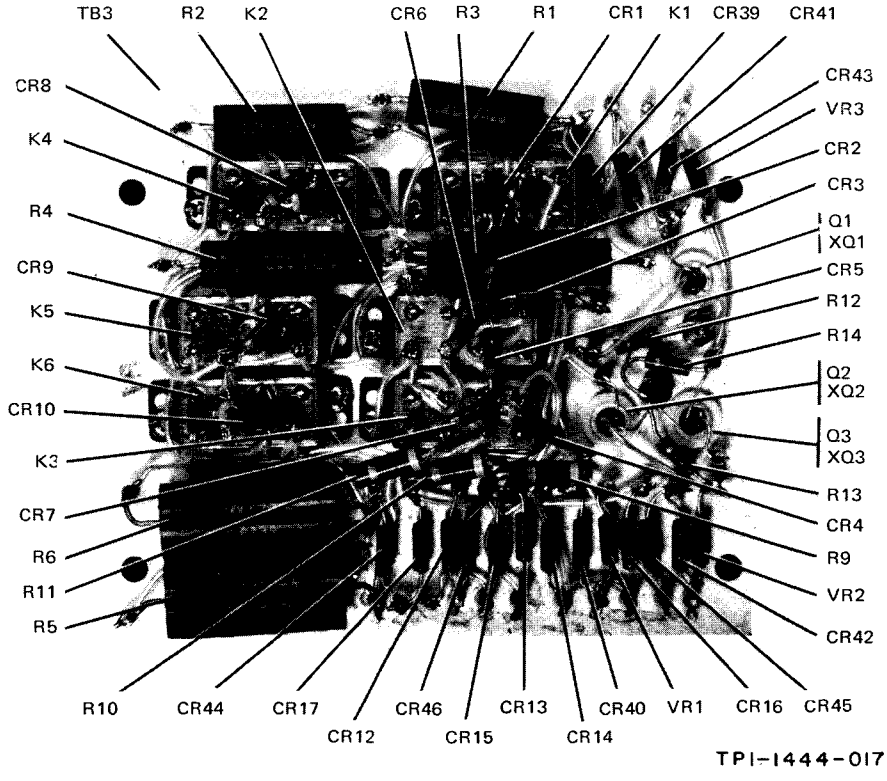


Figure 5-18. Digital to Analog Converter A3, Terminal Board TB3, Parts Location

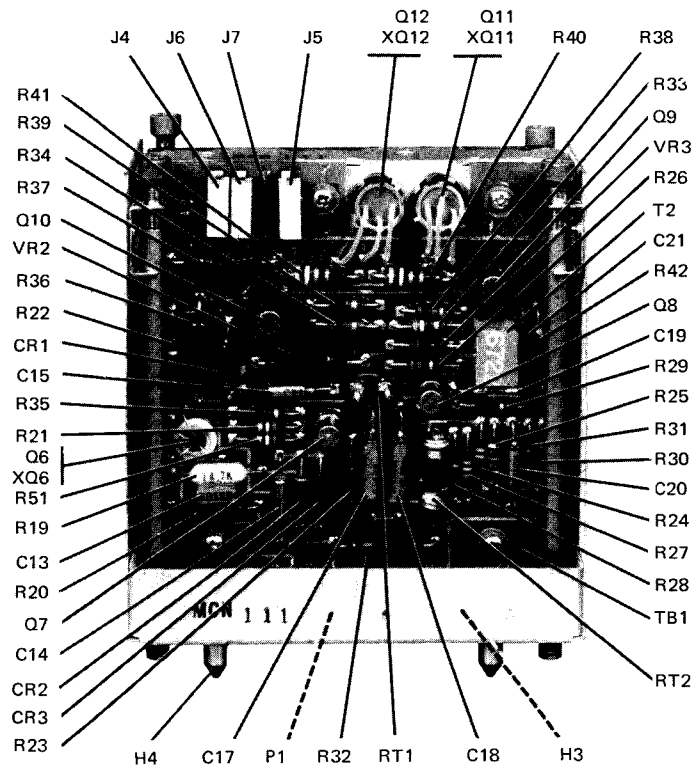


Figure 5-19. Servo Amplifier A4, Terminal Board TB1, Parts and Test-Point Locations

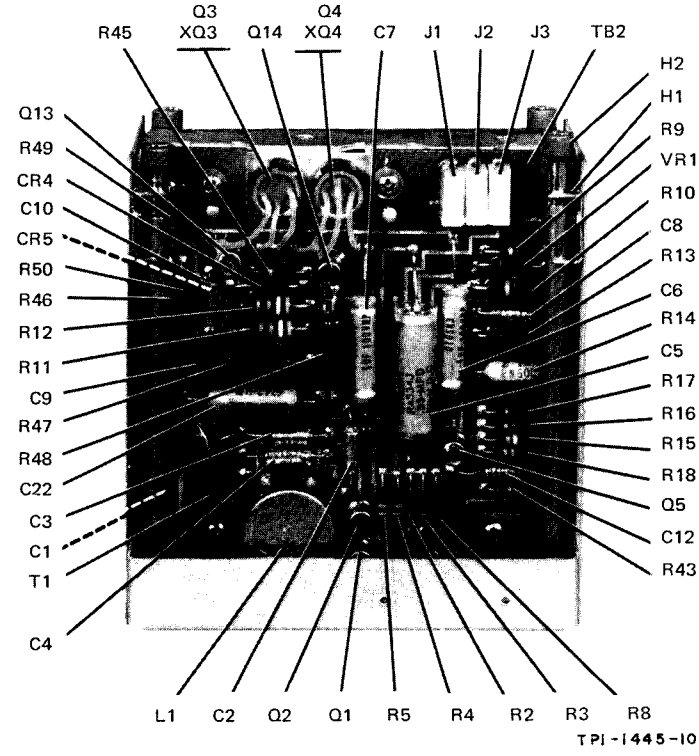


Figure 5-20. Servo Amplifier A4, Terminal Board TB2, Parts and Test-Point Locations

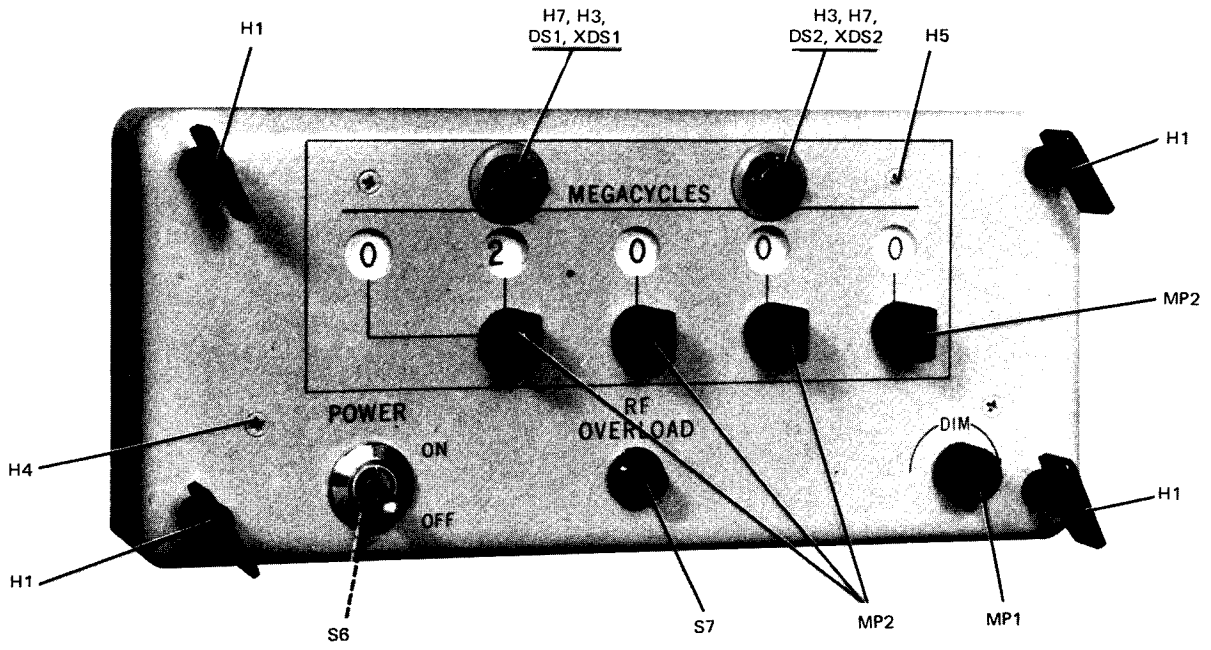


Figure 5-21. C-7715/U Control, Preselector-Amplifier (A5), Parts Location

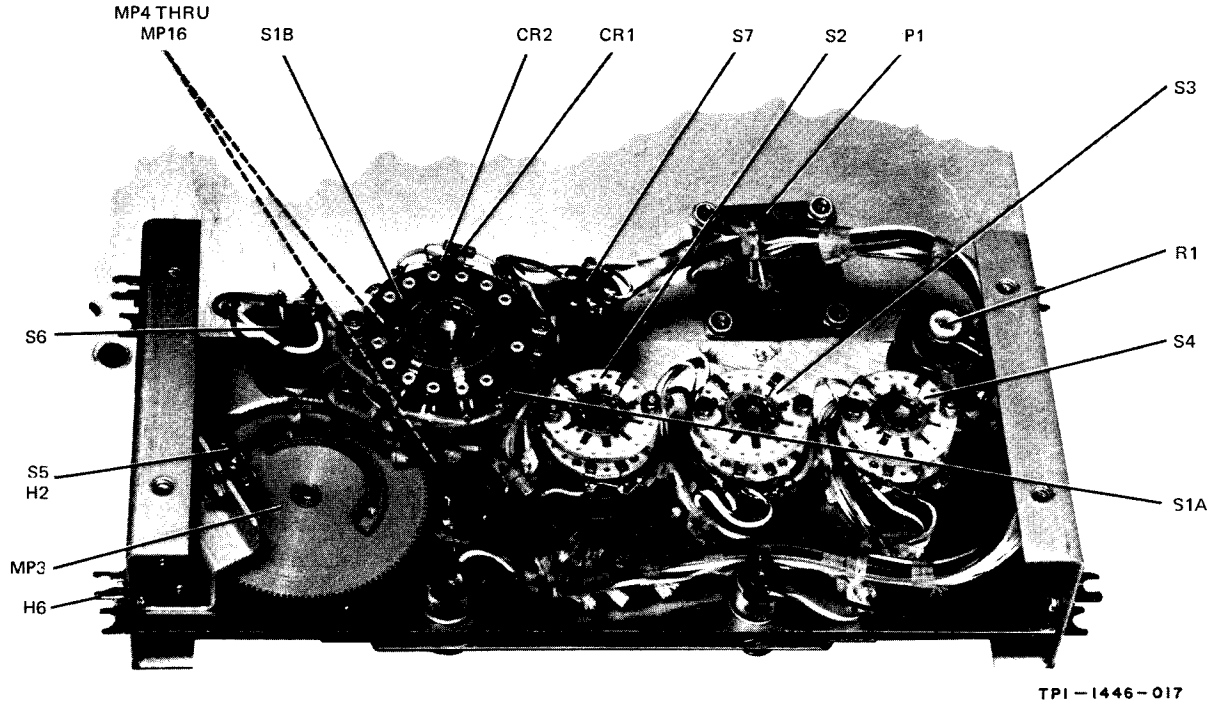


Figure 5-22. C-7715/U Control, Preselector-Amplifier (A5), Cover Removed, Parts Location

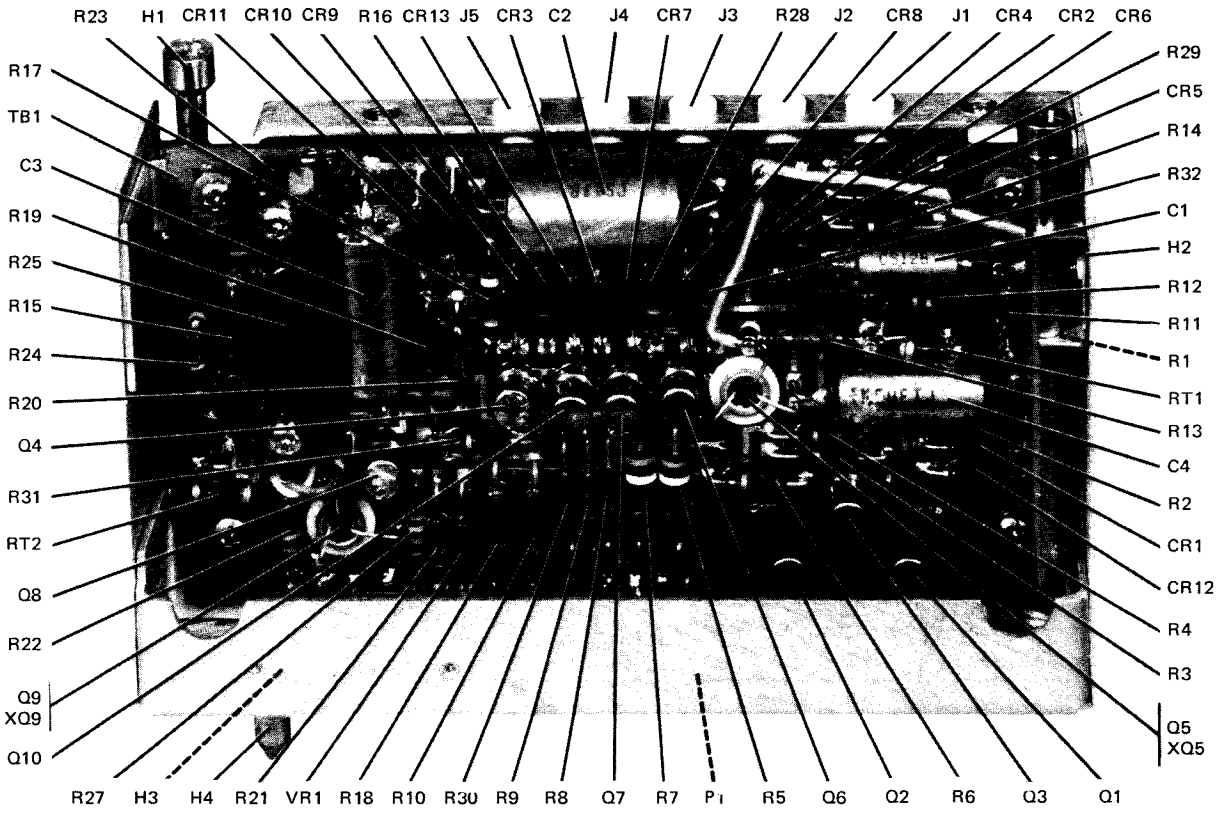


Figure 5-23. RF Overload Control A6, Parts and Test-Point Locations

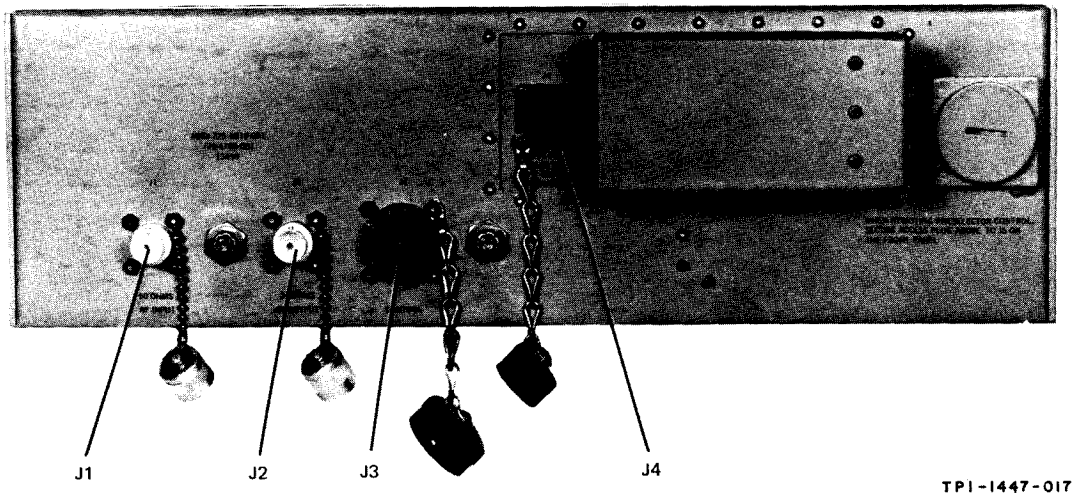


Figure 5-24. AM-4823/U, Case A7, Rear View, Parts Location

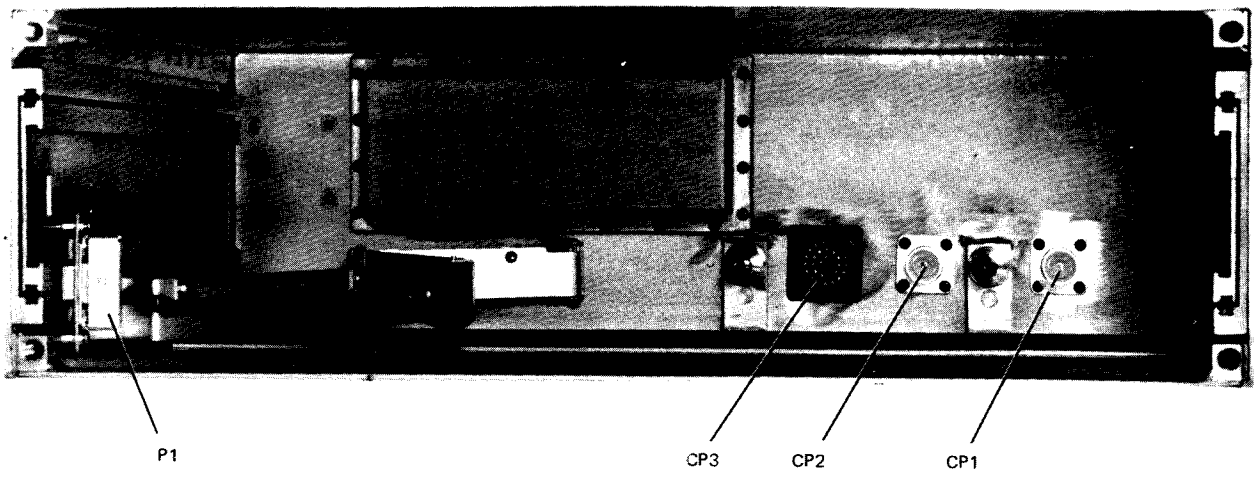


Figure 5-25. AM-4823/U, Case A7, Front View, Parts Location

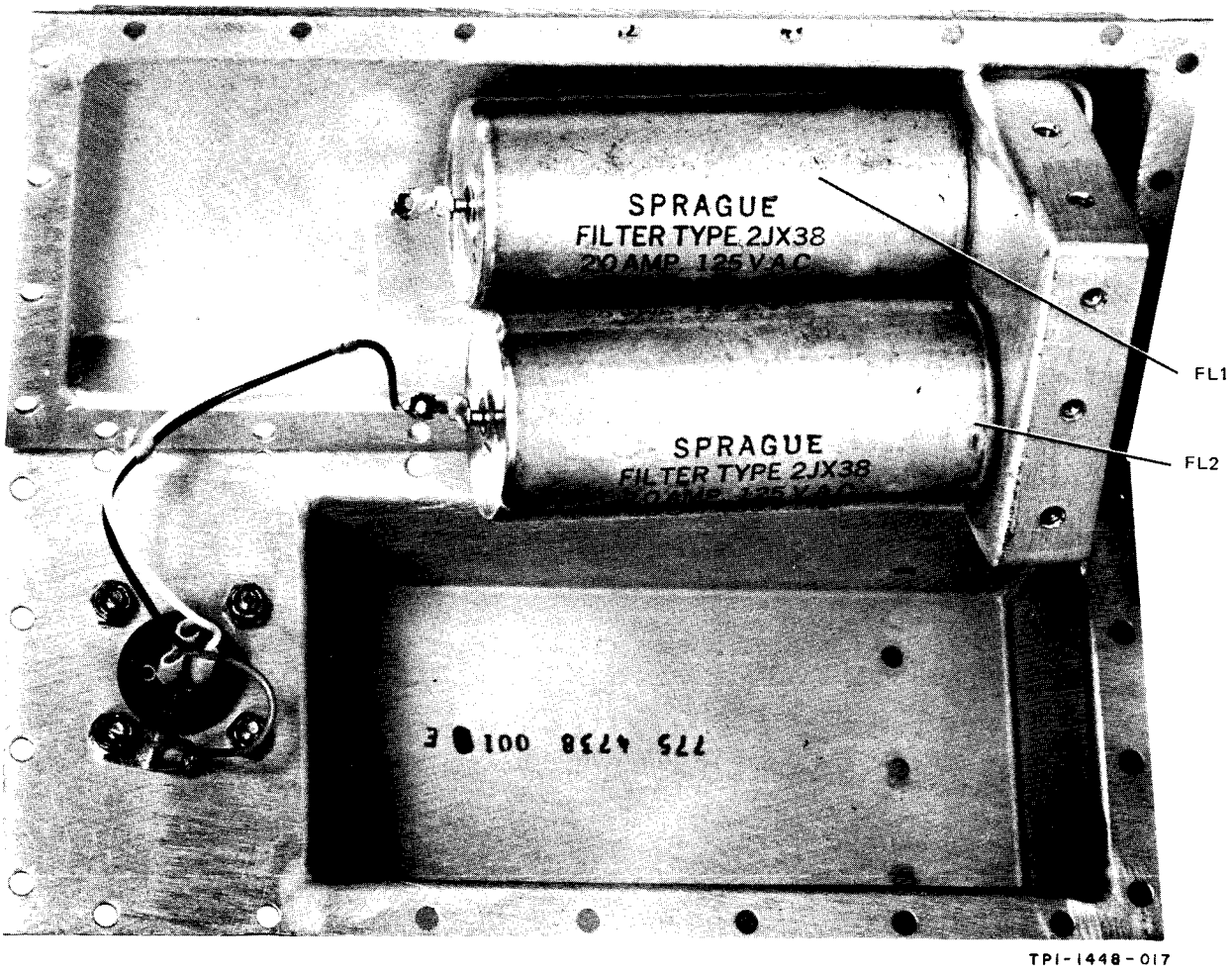


Figure 5-26. AM-4823/U, Case A7, Filters FL1 and FL2

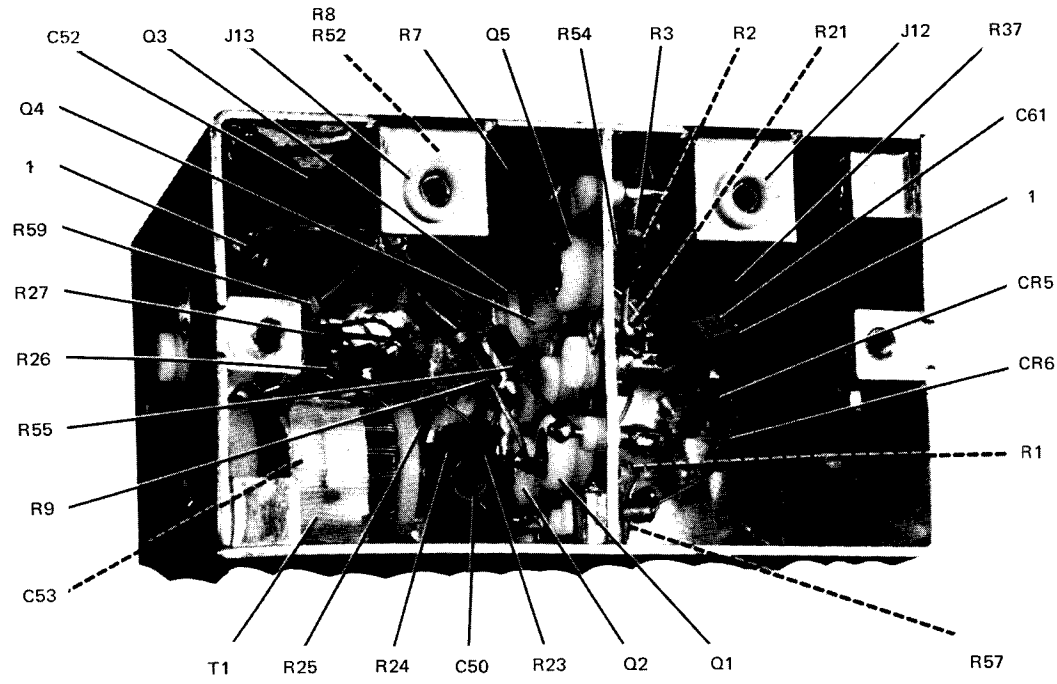


Figure 5-27. RF Input Amplifier A9, Top View, Parts and Test-Point Locations

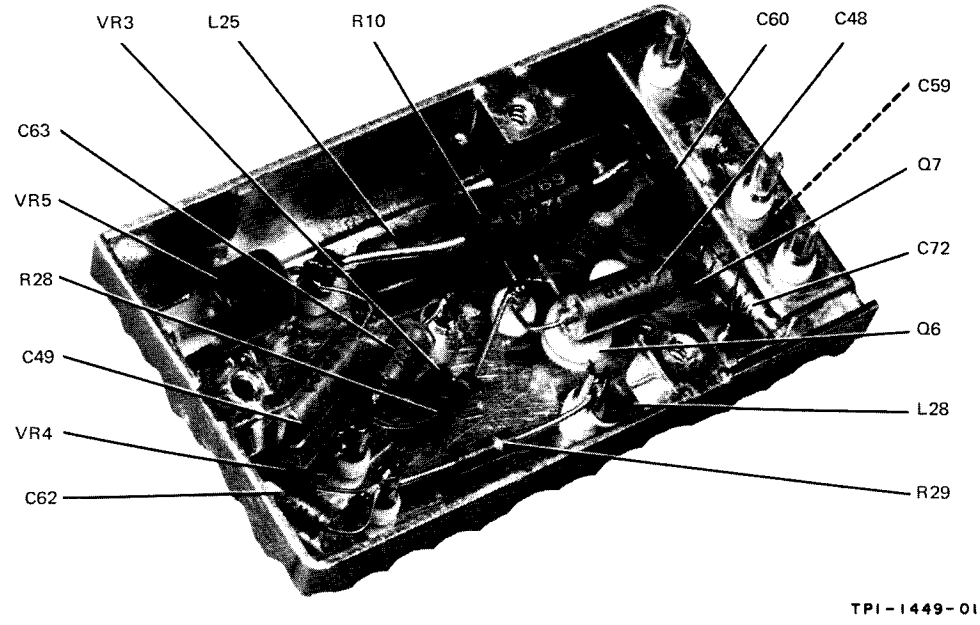


Figure 5-28. RF Input Amplifier A9, Bottom View, Parts Location

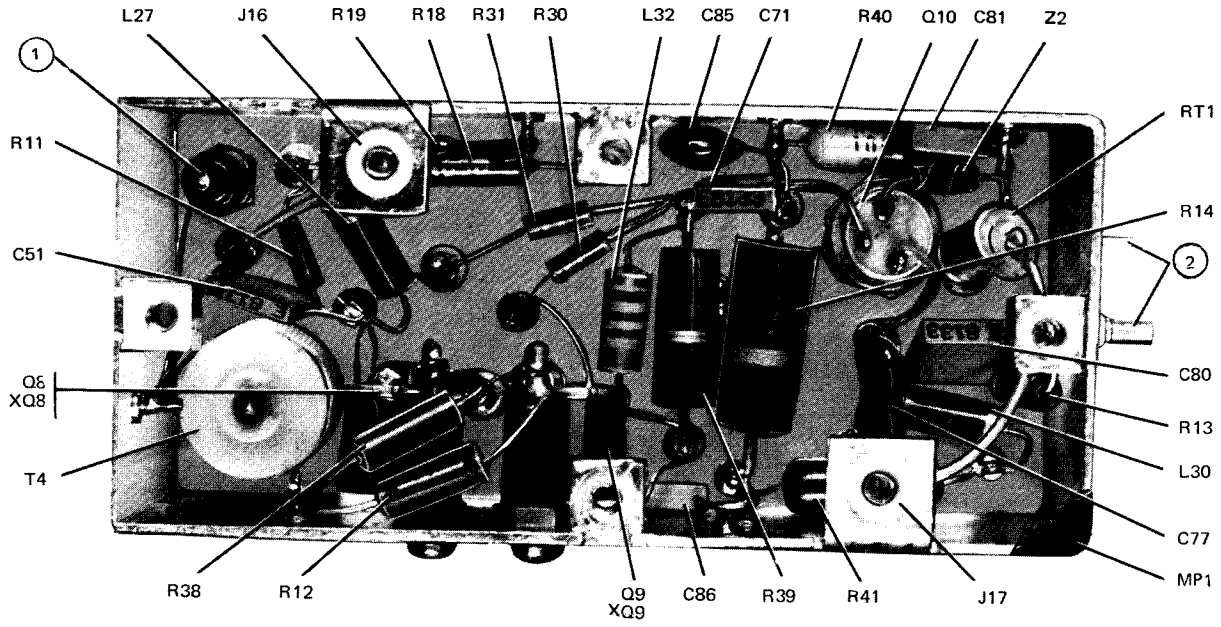


Figure 5-29. RF Output Amplifier A10, Top View, Parts and Test-Point Locations

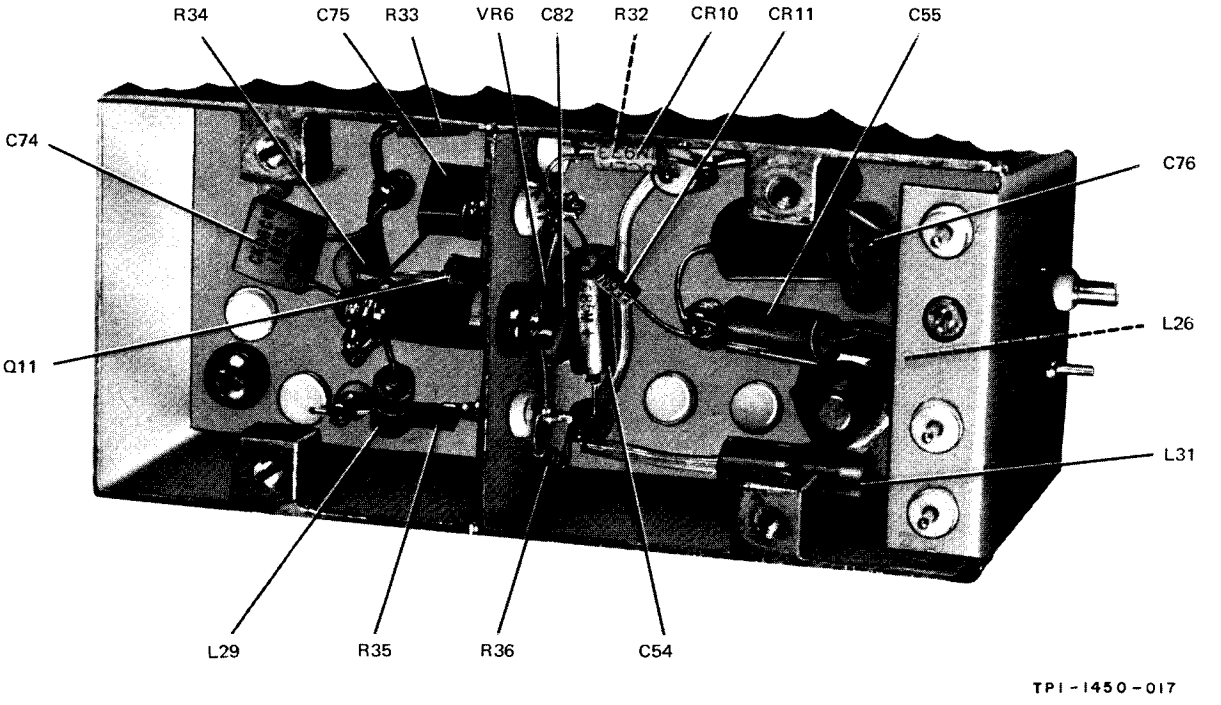
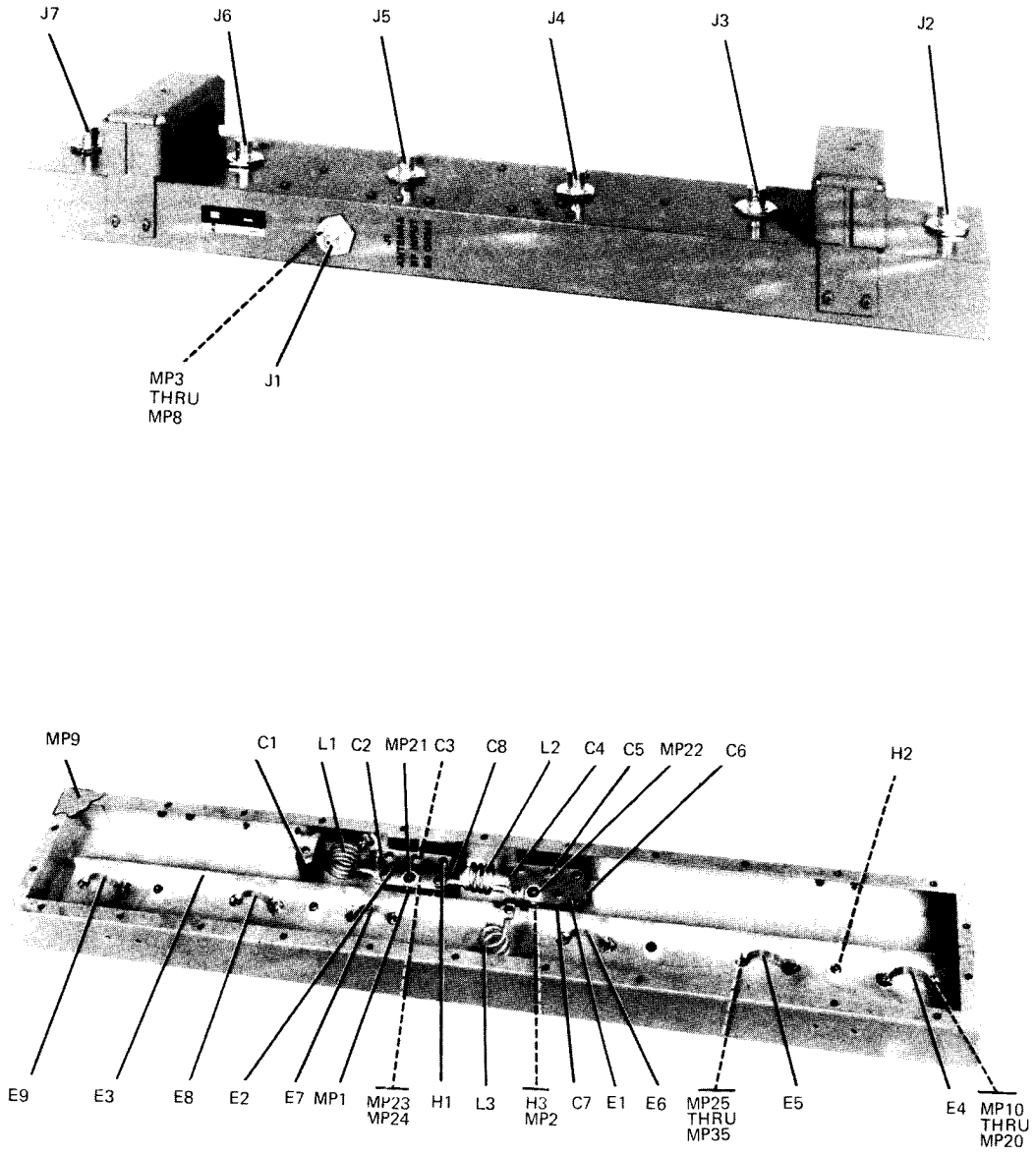


Figure 5-30. RF Output Amplifier A10, Bottom View, Parts Location



TP2-8700-017

Figure 5-30A. Antenna Coupler CU-1901/U, Parts Location

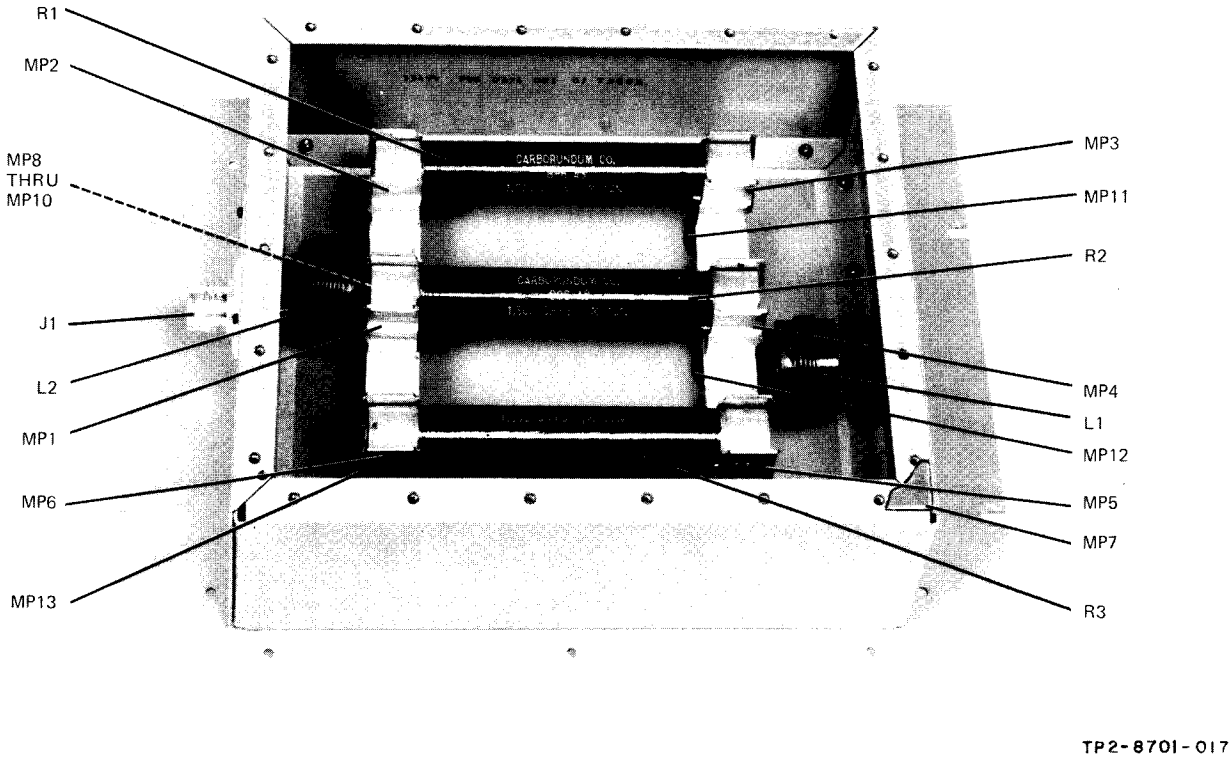
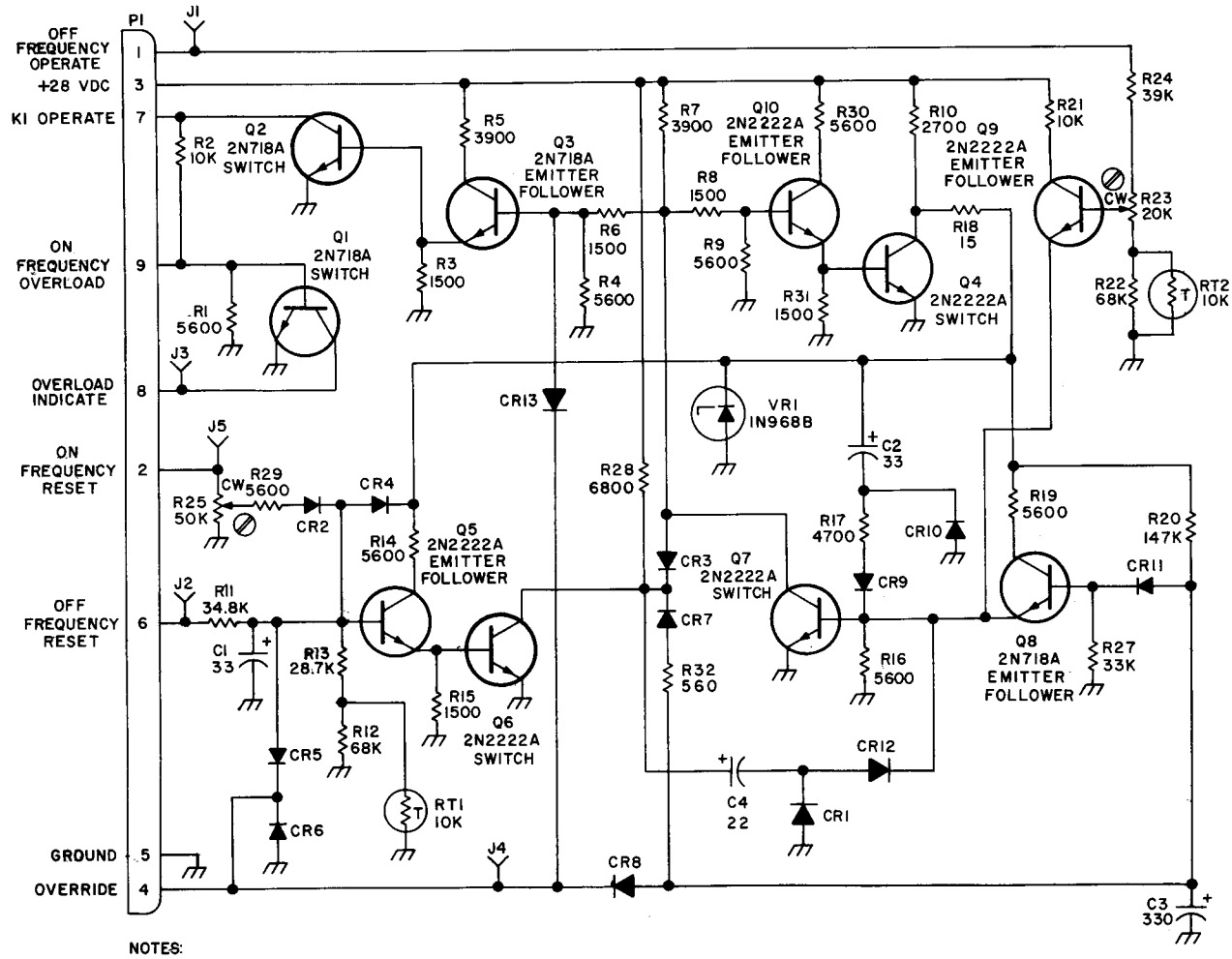


Figure 5-30B. Dummy Load DA-607/U, Top View, Parts Location



NOTES:
1. UNLESS SPECIFIED ALL DIODES ARE TYPE IN645.
2. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, AND CAPACITANCE VALUES ARE IN MICROFARADS.
3. CW INDICATES CLOCKWISE ROTATION AS VIEWED FROM SHAFT END OF CONTROL.

775-4335-001

Figure 5-36. RF Overload Control A6, Schematic Diagram

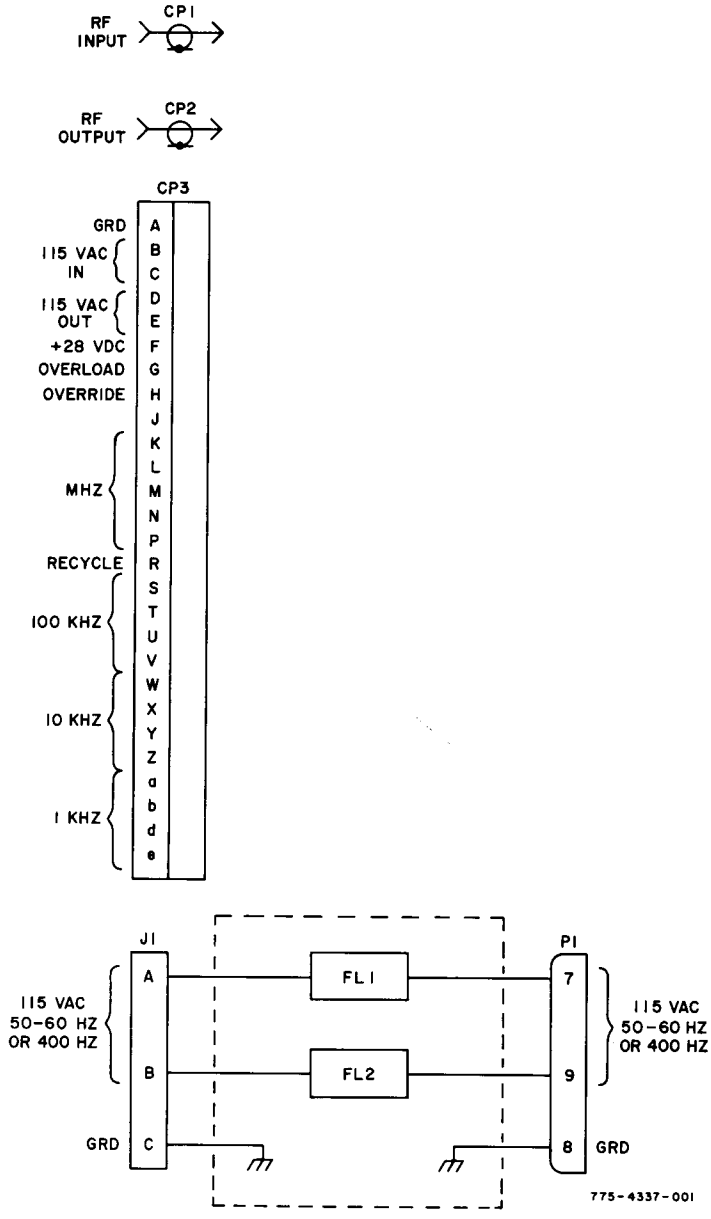


Figure 5-37. AM-4823/U, Case A7, Schematic Diagram

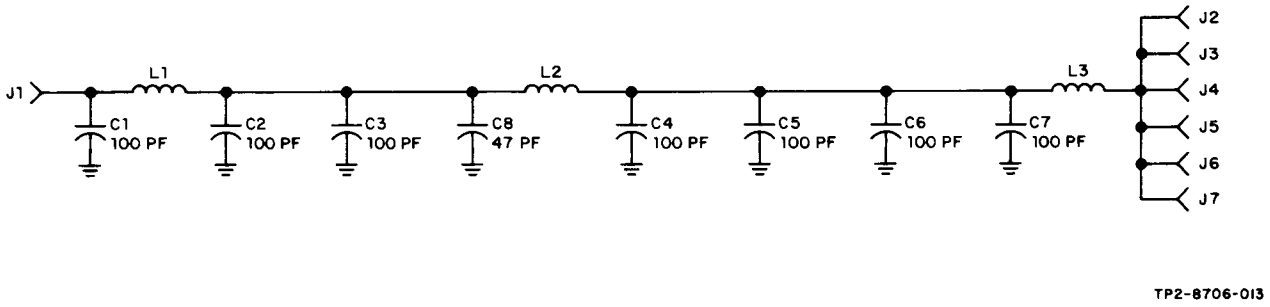


Figure 5-38. Antenna Coupler CU-1901/U, Schematic Diagram

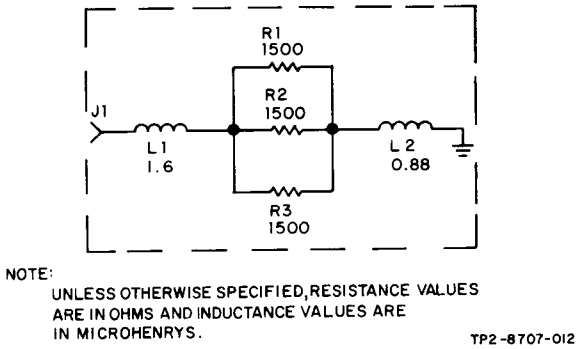


Figure 5-39. Dummy Load DA-607/U, Schematic Diagram

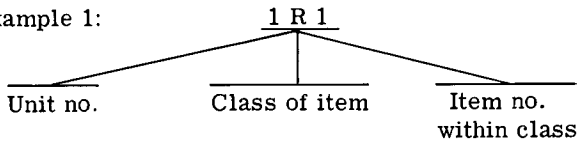
SECTION 6

PARTS LIST

6-1. INTRODUCTION.

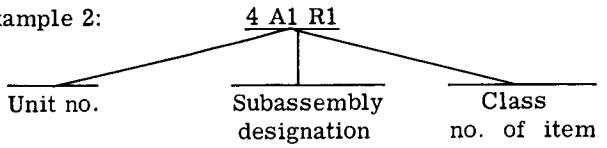
a. REFERENCE DESIGNATION. - The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies, and parts. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions of the same are illustrated by the following:

Example 1:



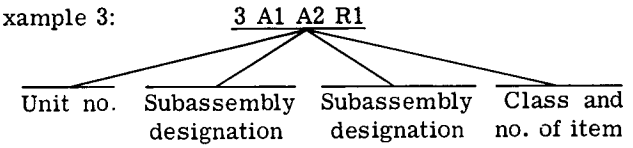
Read as: First (1) resistor (R) of the first unit (1).

Example 2:



Read as: First (1) resistor (R) of first (1) subassembly (A) of fourth (4) unit.

Example 3:



Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) subassembly (A) of third (3) unit.

b. REF DESIG PREFIX. - Partial reference designations are used on the equipment and illustrations. The partial reference designations consist of the class letter(s) and the identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on illustrations following the notation "REF DESIG PREFIX."

6-2. LIST OF UNITS.

Table 6-1 is a listing of the units comprising the equipment. The units are listed by unit numbers in numerical order. Thus, when the complete reference designation of a part is known, this table will furnish the identification of the unit in which the part is located, since the first number of a complete reference designation identifies the unit. Table 6-1 also provides the following information for each unit listed: (1) quantity per equipment, (2) official name, (3) designation, and (4) location of the first page of its parts listing in table 6-2.

6-3. MAINTENANCE PARTS LIST.

Table 6-2 lists all of the units and their maintenance parts. The units are listed in numerical sequence. Maintenance parts for each unit are listed alphabetically-numerically by the class of the part following the unit designation. Thus, the parts for each unit are grouped together. Table 6-2 provides the following information: (1) the complete reference designation of each unit, assembly, subassembly, or part, (2) noun name and brief description, and (3) identification of the illustration which pictorially locates the part.

Printed circuit boards, assembly boards, modules, etc, are listed first as individual items in the maintenance parts list. In addition, at the completion of a parts listing for each unit, the individual circuit board, module, etc, is then broken down by components into separate parts listings. When there is a redundancy of such electronic assemblies in subsequent units, reference is made to the parts breakdown previously listed.

Note

Classified parts are designated by the following classification symbols placed in the NOTES column (in addition to any numerically identified notes) of the Maintenance Parts List: "C" Confidential, "CMH" Confidential-Modified Handling, "S" Secret, "TS" Top Secret. A brief description is given for all key parts (parts differing from any parts previously listed in this table) and subkey parts (Parts identical to a key part but appearing for the first time for a unit). The names and descriptions are omitted for other parts, but reference is made to the key or subkey part for the data. Unless otherwise indicated, all drawing numbers apply to equipment manufacturer and all type numbers apply to part manufacturer.

6-4. STOCK NUMBER IDENTIFICATION.

Allowance Parts List (APL) issued by the Electronics Supply Office (ESO) include Federal Stock Numbers and Source Maintenance and Recoverability Codes. Therefore, reference should be made to the APL prepared for the equipment for stock numbering information.

TABLE 6-1. LIST OF UNITS

UNIT NO.	QTY	NAME OF UNIT	DESIGNATION	PAGE
1	1	Chassis assembly	A1	6-2
2	1	Power supply	A2	6-9
3	1	Digital to analog converter	A3	6-11
4	1	Amplifier, Servo	A4	6-12
5	1	C-7715/U Control, Preselector-Amplifier	A5	6-16
6	1	Rf overload control	A6	6-17
7	1	Preselector case	A7	6-19
8	1	Amplifier RF Input	A9	6-19
9	1	Amplifier RF Output	A10	6-21
10	1	DA-607/U Load, Dummy	2A1	6-23
11	1	CU-1901/U Coupler, Antenna	3A1	6-23

TABLE 6-2. MAINTENANCE PARTS LIST

AM-4823/U RADIO-FREQUENCY PRESELECTOR-AMPLIFIER: COLLINS RADIO CO. PART NO. 522-4986-001

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
A1		CHASSIS ASSY: COLLINS RADIO CO. PART NO. 775-4818-001	
B1		MOTOR: GLOBE INDUSTRIES PART NO. 41A205	5-8
B2		MOTOR: CONTROL DATA CORP. PART NO. S10070	5-8
CR1, CR2		SEMICOND DEVICE: JAN TYPE JAN1N645	5-7, 5-8
CR3, CR4		SEMICOND DEVICE: MIL TYPE USN1N3064	5-7
CR5, CR6		NOT USED	
CR7, CR8		SEMICOND DEVICE: MIL TYPE USN1N3064	5-8
CR9		SEMICOND DEVICE: JAN TYPE JAN1N645	5-8
C1A		CAPACITOR, VAR, AIR DIELECTRIC: 2 SEC., 0 TO 150PF, 5%, 600V; TRW ELECTRONIC PART NO. 921-0030-010	5-6
C1B		P/O C1A	
C1C		CAPACITOR, VAR, AIR DIELECTRIC: 5 SECT. 0 TO 156PF, 3500V; TRW ELECTRONIC PART NO. 921-0031-010	5-6
C1D THRU C1G		P/O C1C	
C2		CAPACITOR, FXD, GLASS DIELECTRIC: 1.5PF, 0.1PF, 500V; VITRAMON, INC. PART NO. VY81C1R5B	5-10

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
C3		CAPACITOR, FXD, GLASS DIELECTRIC: 3PF, 0.25PF, 500V; MIL TYPE CY12C3R0C	5-10
C4		CAPACITOR, FXD, GLASS DIELECTRIC: 5.1PF, 0.25PF, 500V; MIL TYPE CY12C5R1C	5-9
C5		CAPACITOR, FXD, GLASS DIELECTRIC: 3PF, 0.1PF, 500V; VITRAMON, INC. PART NO. VY81C3R0B	5-9
C6, C7		CAPACITOR, FXD, GLASS DIELECTRIC: 1PF, 0.1PF, 500V; VITRAMON, INC. PART NO. VY81C1R0B	5-9
C8		CAPACITOR, FXD, GLASS DIELECTRIC: 1.5PF, 0.1PF, 500V; VITRAMON, INC. PART NO. BY81C1R5B	5-9
C9		CAPACITOR, FXD, MICA DIELECTRIC: 470PF, 5%, 500V; MIL TYPE CM06FD471J03	5-9
C10		CAPACITOR, VAR, QTZ DIELECTRIC: 0.8PF TO 16PF, 1250V; MIL TYPE PC38Q160	5-7
C11 THRU C13		CAPACITOR, VAR, GLASS DIELECTRIC: 0.8 PF TO 11PF, 1250V; MIL TYPE PC48J110	5-7
C14		CAPACITOR, VAR, QTZ DIELECTRIC: 0.8PF TO 16PF, 1250V; MIL TYPE PC38Q160	5-7
C15 THRU C17		CAPACITOR, VAR, GLASS DIELECTRIC: 0.8PF TO 11PF, 1250V; MIL TYPE PC48J110	5-7
C18		CAPACITOR, VAR, QTZ DIELECTRIC: 0.8PF TO 16PF, 1250V; MIL TYPE PC38Q160	5-7
C19 THRU C21		CAPACITOR, VAR, GLASS DIELECTRIC: 0.8PF TO 11PF, 1250V; MIL TYPE PC48J110	5-7
C22		CAPACITOR, VAR, QTZ DIELECTRIC: 0.8PF TO 16PF, 1250V; MIL TYPE PC38Q160	5-7
C23 THRU C25		CAPACITOR, VAR, GLASS DIELECTRIC: 0.8PF TO 11PF, 1250V; MIL TYPE PC48J110	5-7
C26, C27		CAPACITOR, FXD, MICA DIELECTRIC: 4700PF, 5%, 500V; MIL TYPE CM06FD472J03	5-11
C28		CAPACITOR, FXD, CER DIELECTRIC: 27PF, 5%, 500V; MIL TYPE CC22SH270J	5-11
C29		CAPACITOR, FXD, MICA DIELECTRIC: 150PF, 5%, 500V; MIL TYPE CM05F151J03	5-11
C30		CAPACITOR, FXD, CER DIELECTRIC: 22PF, 5%, 500V; MIL TYPE CC22SH220J	5-11
C31		CAPACITOR, FXD, MICA DIELECTRIC: 200PF, 5%, 500V; MIL TYPE CM05F201J03	5-11
C32		CAPACITOR, FXD, CER DIELECTRIC: 20PF, 5%, 500V; MIL TYPE CC20SH200J	5-11
C33		CAPACITOR, FXD, MICA DIELECTRIC: 330PF, 5%, 500V; MIL TYPE CM05F331J03	5-11
C34		CAPACITOR, FXD, CER DIELECTRIC: 20PF, 5%, 500V; MIL TYPE CC20SH200J	5-11
C35		CAPACITOR, FXD, MICA DIELECTRIC: 430PF, 5%, 500V; MIL TYPE CM06F431J03	5-11
C36		CAPACITOR, FXD, CER DIELECTRIC: 18PF, 5%, 500V; MIL TYPE CC20UJ180J	5-12
C37		CAPACITOR, FXD, MICA DIELECTRIC: 180PF, 5%, 500V; MIL TYPE CM05F181J03	5-12
C38		CAPACITOR, FXD, CER DIELECTRIC: 20PF, 5%, 500V; MIL TYPE CC20TH200J	5-12

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
C39		CAPACITOR, FXD, MICA DIELECTRIC: 120PF, 5%, 500V; MIL TYPE CM05F121J03	5-12
C40		CAPACITOR, FXD, CER DIELECTRIC: 27PF, 5%, 500V; MIL TYPE CC22PH270J	5-12
C41		CAPACITOR, FXD, MICA DIELECTRIC: 82PF, 5%, 500V; MIL TYPE CM05E820J03	5-12
C42		CAPACITOR, FXD, CER DIELECTRIC: 36PF, 5%, 500V; MIL TYPE CC27PH360J	5-12
C43		CAPACITOR, FXD, MICA DIELECTRIC: 39PF, 5%, 500V; MIL TYPE CM05E390J03	5-12
C44		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-8
C45, C46		CAPACITOR, FXD, ELECT.: 1UF, M15%P30%, 100V; MIL TYPE CL27BN010SN3	5-8
C47 THRU C55		NOT USED	
C56		CAPACITOR, FXD, GLASS DIELECTRIC: 1.5PF, 0.1PF, 500V; VITRAMON, INC. PART NO. VY81C1R5B	5-7
C57		CAPACITOR, FXD, MICA DIELECTRIC: 150PF, 5%, 500V; MIL TYPE CM05F151J03	5-7
C58		CAPACITOR, FXD, CER DIELECTRIC: 10,000 PF, 20%, 200V; MIL TYPE CK06CW103M	5-7
C59 THRU C63		NOT USED	
C64		CAPACITOR, FXD, CER DIELECTRIC: 18PF, 5%, 500V; MIL TYPE CC20UJ180J	5-12
C65		CAPACITOR, FXD, MICA DIELECTRIC: 150PF, 5%, 500V; MIL TYPE CM05F151J03	5-12
C66		CAPACITOR, FXD, CER DIELECTRIC: 20PF, 5%, 500V; MIL TYPE CC20TH200J	5-12
C67		CAPACITOR, FXD, MICA DIELECTRIC: 68PF, 5%, 500V; MIL TYPE CM05E680J03	5-12
C68		CAPACITOR, FXD, CER DIELECTRIC: 30PF, 5%, 500V; MIL TYPE CC22PH300J	5-12
C69		CAPACITOR, FXD, MICA DIELECTRIC: 62PF, 5%, 500V; MIL TYPE CM05E620J03	5-12
C70		CAPACITOR, FXD, CER DIELECTRIC: 36PF, 5%, 500V; MIL TYPE CC27PH360J	5-12
C71, C72		NOT USED	
C73		CAPACITOR, FXD, MICA DIELECTRIC: 2700PF, 5%, 500V; MIL TYPE CM06FD272J03	5-11
C74 THRU C77		NOT USED	
C78		CAPACITOR, FXD, MICA DIELECTRIC: 300PF, 5%, 500V; MIL TYPE CM05F301J03	5-7
C79		CAPACITOR, FXD, GLASS DIELECTRIC: 6.8PF, 5%, 500V; MIL TYPE CY12C6R8J	5-7
C80 THRU C82		NOT USED	
C83, C84		CAPACITOR, FXD, GLASS DIELECTRIC: 8.2PF, 0.25PF, 500V; MIL TYPE CY12C8R2C	5-10

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
DS1		LAMP: GENERAL ELECTRIC CO. LARGE LAMP DEPT. PART NO. NE51H	5-4
DS2 THRU DS4		LAMP: GENERAL ELECTRIC CO. MINIATURE LAMP DEPT. PART NO. NE83	5-11
F1 THRU F3		FUSE: MIL TYPE F02A250V1AS	5-4
H1		SETSCREW: COLLINS RADIO CO. PART NO. 757-8706-001	5-8
H2		SCREW, SHOULDER: COLLINS RADIO CO. PART NO. 757-8467-001	5-8
H3		THUMBSCREW, CHASSIS: COLLINS RADIO CO. PART NO. 775-4715-001	5-4
H4		POST, LOCATOR: COLLINS RADIO CO. PART NO. 554-9358-002	5-8
H5		NUT, PLAIN, RD: COLLINS RADIO CO. PART NO. 763-3936-001	5-8
H6		PIN, STR, HDLS: COLLINS RADIO CO. PART NO. 757-8465-001	5-8
H7		POST, LOCATOR: COLLINS RADIO CO. PART NO. 554-9359-002	5-8
H8		BUSHING, LOCATOR: COLLINS RADIO CO. PART NO. 554-9357-002	5-8
H9		BUSHING, SLV: COLLINS RADIO CO. PART NO. 554-9360-002	5-8
H10		POST, SPACING: COLLINS RADIO CO. PART NO. 554-9362-002	5-8
H11		SPACER: OAK MFG. CO. PART NO. 8980-2 3-16	5-11, 5-12
H12		POST, LOCATOR: COLLINS RADIO CO. PART NO. 554-9361-002	5-8
H13		CLAMP, RIM CLENCHING: COLLINS RADIO CO. PART NO. 554-9369-002	5-8
H14		CLAMP, RIM CLENCHING: COLLINS RADIO CO. PART NO. 554-9376-002	5-8
H15		SPACER, SLV: COLLINS RADIO CO. PART NO. 541-5975-002	5-8
J1, J2		CONNECTOR: AUTOMATIC METAL PRODUCTS CORP. PART NO. RF02792S	5-6
J3		CONNECTOR: ELCO WEBSTER CORP. PART NO. PW6A18-32S8009	5-6
J4		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DEM9PA160C37	5-5
J5		CONNECTOR: ELCO WEBSTER CORP. PART NO. PW6A18-32S8010	5-4
J6		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DEMF9SA160C37	5-6
J7		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DCMF37SA160C37	5-6
J8		NOT USED	
J9, J10		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DAMF15SA160C37	5-6
J11		JACK, TIP: YEL; SEALECTRO CORP. PART NO. SKT41YEL	5-11

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
J12, J13		NOT USED	
J14, J15		JACK, TIP: YEL; SEALECTRO CORP. PART NO. SKT41YEL	5-12
K1		RELAY: JENNINGS RADIO MFG. CORP. PART NO. RBIE26N300	5-7
K2		RELAY:GENERAL ELECTRIC CO. PART NO. 3SAF1241	5-8
K3		ACTUATOR: AMERICAN MONARCH PART NO. 530011	5-8
L1		COIL, 2 TO 4MHZ: COLLINS RADIO CO. 775-4859-001	5-7
L2		COIL, RF: 32UH; COMMUNICATIONS COIL CO. PART NO. A114	5-7
L3		COIL, RF: COLLINS RADIO CO. PART NO. 777-4146-001	5-10
L4, L5		COIL, RF: 35UH; COMMUNICATIONS COIL CO. PART NO. A119	5-7
L6		COIL, RF: COLLINS RADIO CO. PART NO. 777-4148-001	5-12
L7		COIL, 4 TO 8MHZ: COLLINS RADIO CO. 775-4860-001	5-7
L8		COIL, RF: 8.1UH; COMMUNICATIONS COIL CO. PART NO. A115	5-7
L9		COIL, RF: COLLINS RADIO CO. PART NO. 777-4149-001	5-10
L10, L11		COIL, RF: 8.1UH; COMMUNICATIONS COIL CO. PART NO. A120	5-7
L12		COIL, RF: COLLINS RADIO CO. PART NO. 777-4147-001	5-12
L13		COIL, 8 TO 16MHZ: COLLINS RADIO CO. PART NO. 775-4861-001	5-7
L14		COIL, RF: 2UH; COMMUNICATIONS COIL CO. PART NO. A116	5-7
L15		INDUCTANCE COUPLING: COLLINS RADIO CO. PART NO. 554-9400-002	5-10
L16, L17		COIL, RF: 1.95UH; COMMUNICATIONS COIL CO. PART NO. A121	5-7
L18		COIL, RF: COLLINS RADIO CO. PART NO. 777-4145-001	5-12
L19		COIL, 16 TO 32MHZ: COLLINS RADIO CO. PART NO. 775-4862-001	5-7
L20		COIL, RF: 0.46UH; COMMUNICATIONS COIL CO. PART NO. A117	5-7
L21		COIL ASSY, RF: COLLINS RADIO CO. PART NO. 777-4144-001	5-10
L22, L23		COIL, RF: 0.46UH; COMMUNICATIONS COIL CO. PART NO. A122	5-7
L24		COIL, RF: COLLINS RADIO CO. PART NO. 777-4346-001	5-12
MP1		SHAFT, SHOULDERED: COLLINS RADIO CO. PART NO. 775-4736-001	5-6
MP2		BEARING: MINIATURE PRECISION BEARINGS, INC. PART NO. S618FCHHP37LO-2	5-8
MP3		GEAR, SPUR: 200 TEETH; COLLINS RADIO CO. PART NO. 554-9446-003	5-8
MP4		COLLAR, DRIVE GEAR: COLLINS RADIO CO. PART NO. 554-9368-002	5-8
MP5		GEAR CLUSTER, SPUR: 94 AND 25 TEETH; COLLINS RADIO CO. PART NO. 554-9578-001	5-8

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
MP6		GEAR CLUSTER, SPUR: 94 AND 25 TEETH; COLLINS RADIO CO. PART NO. 554-9577-001	5-8
MP7		GEAR, SPUR: 94 TEETH; COLLINS RADIO CO. PART NO. 554-9444-003	5-8
MP8		PLATE, ACTUATOR: COLLINS RADIO CO. PART NO. 757-8470-001	5-8
MP9		GEAR, SPUR: 88 TEETH; COLLINS RADIO CO. PART NO. 554-9439-003	5-8
MP10		GEAR, SPUR: 90 TEETH; COLLINS RADIO CO. PART NO. 554-9437-003	5-8
MP11		GEAR CLUSTER, SPUR: 25 AND 109 TEETH; COLLINS RADIO CO. PART NO. 546-6795-002	5-8
MP12		COUPLING, SHAFT: COLLINS RADIO CO. PART NO. 554-9373-002	5-8
MP13		COUPLING: RENBRANDT, INC. PART NO. A201-94	5-8
MP14		STOP, GEAR: COLLINS RADIO CO. PART NO. 757-8469-001	5-8
R1 THRU R14		NOT USED	
R15		RESISTOR, VAR, WW: 100K, 3%, 3W; SPECTROL ELECTRONICS CORP. PART NO. 500-1269	5-8
R16, R17		RESISTOR, FXD, COMP: 120 OHMS, 10%, 1/4W; MIL TYPE RC07GF121K	5-8
R18, R19		NOT USED	
R20		RESISTOR, FXD, WW: 47 OHMS, 5%, 3W; MIL TYPE RW69V470	5-7
R21		NOT USED	
R22		RESISTOR, FXD, WW: 62 OHMS, 5%, 3W; MIL TYPE RW69V620	5-7
R23 THRU R42		NOT USED	
R43		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-9
R44, R45		RESISTOR, FXD, COMP: 120K, 10%, 1/4 W; MIL TYPE RC07GF124K	5-12
R46		RESISTOR, FXD, COMP: 47K, 10%, 1/4W; MIL TYPE RC07GF473K	5-12
R47		RESISTOR, FXD, COMP: 68K, 10%, 1/4W; MIL TYPE RC07GF683K	5-12
R48		RESISTOR, FXD, COMP: 15K, 10%, 1/4W; MIL TYPE RC07GF153K	5-12
R49		RESISTOR, FXD, COMP: 47K, 10%, 1/4W; MIL TYPE RC07GF473K	5-12
R50		RESISTOR, FXD, COMP: 15K, 10%, 1/4W; MIL TYPE RC07GF153K	5-12
R51		RESISTOR, FXD, COMP: 22K, 10%, 1/4W; MIL TYPE RC07GF223K	5-12
R52		NOT USED	
R53		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-7

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R54 THRU R57		NOT USED	
R58		RESISTOR, FXD, COMP: 1K, 10%, 1/4W; MIL TYPE RC07GF102K	5-11
R59		NOT USED	
S1A		SWITCH SECTION: OAK MFG. CO. PART NO. 264671FX	5-12
S1B		SWITCH SECTION: OAK MFG. CO. PART NO. 263775FX	5-12
S1C		SWITCH SECTION: OAK MFG. CO. PART NO. 264670FX	5-12
S1D		SWITCH SECTION: OAK MFG. CO. PART NO. 264671FX	5-12
S1E		SWITCH SECTION: OAK MFG. CO. PART NO. 237141F	5-8
S1F		SWITCH SECTION: OAK MFG. CO. PART NO. 264671FX	5-11
S1G		SWITCH SECTION: OAK MFG. CO. PART NO. 263775FX	5-11
S1H		SWITCH SECTION: OAK MFG. CO. PART NO. 237243HC	5-10
S1J		SWITCH SECTION: OAK MFG. CO. PART NO. 237252HC	5-10
S1K		SWITCH SECTION: OAK MFG. CO. PART NO. 264673HC	5-10
TB1		TERMINAL BOARD: MIL TYPE 37TB3	5-6
TB2		TERMINAL BOARD: COLLINS RADIO CO. PART NO. 554-9505-004	5-8
VR1, VR2		SEMICOND DEVICE: MIL TYPE 1N3028B	5-8
XDS1		LAMPHOLDER AND LENS: DIALIGHT CORP. PART NO. 350-0408-01-273	5-4
XF1, XF2		FUSEHOLDER: MIL TYPE FHL17G	5-4
XF3		FUSEHOLDER: MIL TYPE FHN26G	5-4
Z1		SUPPRESSOR, PARASITIC: COLLINS RADIO CO. PART NO. 778-3560-001	5-11

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
A2		POWER SUPPLY: COLLINS RADIO CO. PART NO. 528-0673-001	
CR1		SEMICOND DEVICE: JAN TYPE JAN1N645	5-14
CR2, CR3		SEMICOND DEVICE: JAN TYPE JAN1N1202	5-13
CR4, CR5		SEMICOND DEVICE: JAN TYPE JAN1N645	5-14
CR6 THRU CR9		SEMICOND DEVICE: JAN TYPE JAN1N647	5-14
C1		CAPACITOR, FXD, ELECT.: 4.7UF, 20%, 50V; MIL TYPE CS13BG475M	5-14
C2		CAPACITOR, FXD, ELECT.: 10UF, M10%P50%, 250V; MIL TYPE M39018-01-0264	5-14
C3		CAPACITOR, FXD, ELECT.: 22UF, 20%, 35V; MIL TYPE CS13BF226M	5-14
C4, C5		CAPACITOR, FXD, ELECT.: 1000UF, M10%P75%, 50V; SPRAGUE ELECTRIC CO. PART NO. 601D108G050JL4	5-13
C6 THRU C8		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 500V; MIL TYPE CK63AW103M	5-13
C9		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 50V; MIL TYPE CSR13G685ML	5-14
C10		CAPACITOR, FXD, ELECT.: 2UF, 20%, 100V; MIL TYPE CL31CN020MP3	5-13
H1		RETAINER, MTG SCR: COLLINS RADIO CO. PART NO. 549-0945-003	5-13
H2		SCREW, ASSEMBLED WASHER: COLLINS RADIO CO. PART NO. 549-0939-003	5-13
H3		SPACER, SLV: COLLINS RADIO CO. PART NO. 541-5962-002	5-13
H4		WASHER, FLAT: COLLINS RADIO CO. PART NO. 502-1515-002	5-13
H5		CLIP, SPG, TENS: COLLINS RADIO CO. PART NO. 546-6128-002	5-13
H6		PIN, LOCATING: COLLINS RADIO CO. PART NO. 540-7764-002	5-13
J1 THRU J7		JACK, TIP: WHT; SEALECTRO CORP. PART NO. SKT41WHT	5-14
P1		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DAM15PA160C37	5-13
Q1		TRANSISTOR: JEDEC TYPE 2N3442	5-13
Q2		TRANSISTOR: JEDEC TYPE 2N3741	5-13
Q3		TRANSISTOR: JAN TYPE JAN2N2907	5-14
Q4 THRU Q7		TRANSISTOR: JAN TYPE JAN2N718A	5-14
R1		RESISTOR, VAR, WW: 10K, 5%, 3/4W; MIL TYPE RT22C2P103	5-14
R2		RESISTOR, FXD, WW: 1 OHM, 5%, 6.5W; MIL TYPE RW67V1R0	5-14
R3		RESISTOR, FXD, FILM: 12.1 OHMS, 1%, 1/8W; MIL TYPE RN55D12R1F	5-14
R4		RESISTOR, FXD, FILM: 90.9 OHMS, 1%, 1/8W; MIL TYPE RN55D90R9F	5-14

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R5		RESISTOR, FXD, FILM: 100 OHMS, 1%, 1/8W; MIL TYPE RN55D1000F	5-14
R6		RESISTOR, FXD, COMP: 33K, 10%, 1/4W; MIL TYPE RC07GF333K	5-14
R7		RESISTOR, FXD, FILM: 1.78K, 1%, 3/4W; MIL TYPE RN70D1781F	5-14
R8, R9		RESISTOR, FXD, WW: 2K, 5%, 6.5W; MIL TYPE RW67V202	5-14
R10		RESISTOR, FXD, COMP: 1.8K, 10%, 1/4W; MIL TYPE RC07GF182K	5-14
R11		RESISTOR, FXD, COMP: 560 OHMS, 10%, 1W; MIL TYPE RC32GF561K	5-14
R12		RESISTOR, FXD, COMP: 4.7K, 10%, 1/4W; MIL TYPE RC07GF472K	5-14
R13		RESISTOR, FXD, COMP: 22K, 10%, 1/4W; MIL TYPE RC07GF223K	5-14
R14		RESISTOR, FXD, COMP: 3.9K, 10%, 1/2W; MIL TYPE RC20GF392K	5-14
R15		RESISTOR, FXD, COMP: 270 OHMS, 10%, 1/4W; MIL TYPE RC07GF271K	5-14
R16		RESISTOR, FXD, COMP: 47 OHMS, 10%, 1/4W; MIL TYPE RC07GF470K	5-14
R17		RESISTOR, FXD, COMP: 3.9 OHMS, 10%, 1/2W; MIL TYPE RC20GF3R9K	5-14
R18		RESISTOR, FXD, COMP: 5.6K 10%, 1/4W; MIL TYPE RC07GF562K	5-14
R19		RESISTOR, FXD, COMP: 22K, 10%, 1/4W; MIL TYPE RC07GF223K	5-14
R20		RESISTOR, FXD, COMP: 10K, 10%, 1/4W; MIL TYPE RC07GF103K	5-14
R21		RESISTOR, FXD, COMP: 1.2K, 10%, 1/4W; MIL TYPE RC07GF122K	5-14
R22, R23		RESISTOR, FXD, COMP: 4.7K, 10%, 1/4W; MIL TYPE RC07GF472K	5-14
R24		RESISTOR, FXD, COMP: 8.2K, 10%, 1/4W; MIL TYPE RC07GF822K	5-14
R25		RESISTOR, FXD, COMP: 10 OHMS, 10%, 1/4W; MIL TYPE RC07GF100K	5-14
TB1		PRINTED WIRING BOARD: COLLINS RADIO CO. PART NO. 600-8164-001	5-13
T1		TRANSFORMER: BALLASTRAN CORP. PART NO. BC3564	5-13
VR1		SEMICOND DEVICE: JAN TYPE JAN1N758A	5-14
V1		ELECTRON TUBE: VICTOREEN INSTRUMENT CO. PART NO. SGSP250	

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
A3		CONVERTER, DIGITAL TO ANALOG: COLLINS RADIO CO. PART NO. 528-0674-001	
CR1 THRU CR46		SEMICOND DEVICE: JAN TYPE JAN1N645	5-16, 5-17, 5-18
C1		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 35V; MIL TYPE CS13BF685M	5-16
C2, C3		CAPACITOR, FXD, ELECT.: 330UF, 20%, 6V; MIL TYPE CS13BB337M	5-16
H1		POST, ELECTRICAL-MECHANICAL EQUIP.: COLLINS PART NO. 540-9051-003	5-15
H2		RETAINER, MTG SCR: COLLINS RADIO CO. PART NO. 549-0945-003	5-15
H3		SCREW, ASSEMBLED WASHER: COLLINS RADIO CO. PART NO. 549-0943-003	5-15
H4		CLIP, SPG, TENS: COLLINS RADIO CO. PART NO. 546-6128-002	5-15
H5		PIN, LOCATING: COLLINS RADIO CO. PART NO. 540-7764-002	5-15
J1 THRU J4		JACK, TIP: WHT; SEALECTRO CORP. PART NO. SKT41WHT	5-15
K1 THRU K20		RELAY: GENERAL ELECTRIC CO. PART NO. 3SAV1280A2	5-16, 5-17, 5-18
P1		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DCM37PA16DC37	5-15
Q1 THRU Q5		TRANSISTOR: JAN TYPE JAN2N718A	5-16, 5-18
R1, R2		RESISTOR, FXD, WW: 16K, 0.05%, 1/4W; THOMAS A. EDISON INDUSTRIES PART NO. 1195-16KPORM01PCT	5-18
R3, R4		RESISTOR, FXD, WW: 8K, 0.01%, 1/4W; THOMAS A. EDISON INDUSTRIES PART NO. 1192-8KPORM01PCT	5-18
R5, R6		RESISTOR, FXD, WW: 4K, 0.01%, 1-1/4W; THOMAS A. EDISON INDUSTRIES PART NO. 1172A4KPORM01PCT	5-18
R7, R8		RESISTOR, FXD, WW: 2K, 0.01%, 1-1/4W; THOMAS A. EDISON INDUSTRIES PART NO. 1172A2KPORM01PCT	5-17
R9 THRU R11		RESISTOR, FXD, COMP: 4.7K, 10%, 1/2W; MIL TYPE RC20GF472K	5-18
R12 THRU R14		RESISTOR, FXD, COMP: 1.8K, 10%, 1/4W; MIL TYPE RC07GF182K	5-18
R15 THRU R18		NOT USED	
R19, R20		RESISTOR, FXD, WW: 800 OHMS, 0.05%, 1/4W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2087-020	5-17
R21 THRU R24		RESISTOR, FXD, WW: 400 OHMS, 0.05%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-080	5-17
R25, R26		RESISTOR, FXD, WW: 200 OHMS, 0.05%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-070	5-17
R27, R28		RESISTOR, FXD, WW: 80 OHMS, 0.1%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-060	5-17
R29 THRU R32		RESISTOR, FXD, WW: 40 OHMS, 0.1%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-050	5-17

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R33, R34		RESISTOR, FXD, WW: 20 OHMS, 0.1%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-040	5-17
R35		RESISTOR, FXD, WW: 2 OHMS, 1/2%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-010	5-17
R36, R37		RESISTOR, FXD, WW: 8 OHMS, 1/2%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-030	5-16
R38 THRU R41		RESISTOR, FXD, WW: 4 OHMS, 1/2%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-020	5-16
R42, R43		RESISTOR, FXD, WW: 2 OHMS, 1/2%, 1/8W; THOMAS A. EDISON INDUSTRIES PART NO. C8-2090-010	5-16
R44, R45		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-16
R46		RESISTOR, FXD, FILM: 422K, 1%, 1/4W; MIL TYPE RN60D4223F	5-16
R47		RESISTOR, FXD, FILM: 61.9K, 1%, 1/4W; MIL TYPE RN60D6192F	5-16
R48		RESISTOR, FXD, COMP: 4.7 OHMS, 5%, 1/4W; MIL TYPE RC07GF4R7J	5-16
TB1		TERMINAL BOARD, NO. 1: COLLINS RADIO CO. PART NO. 775-4429-001	5-16
TB2		TERMINAL BOARD, NO. 2: COLLINS RADIO CO. PART NO. 775-4433-001	5-17
TB3		TERMINAL BOARD, NO. 3: COLLINS RADIO CO. PART NO. 775-4436-001	5-18
VR1 THRU VR3		SEMICOND DEVICE: JAN TYPE JAN1N751A	5-18
XQ1 THRU XQ5		HOLDER: SEALECTRO CORP. PART NO. T1533	5-16, 5-18
A4		AMPLIFIER SERVO: COLLINS RADIO CO. PART NO. 528-0675-001	
CR1		SEMICOND DEVICE: JAN TYPE JAN1N645	5-19
CR2, CR3		SEMICOND DEVICE: MIL TYPE USN1N3064	5-19
CR4, CR5		SEMICOND DEVICE: JAN TYPE JAN1N645	5-20
C1, C2		CAPACITOR, FXD, ELECT.: 0.047UF, 10%, 100V; MIL TYPE CS13BJ473K	5-20
C3, C4		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 6V; MIL TYPE CS13BB685M	5-20
C5		CAPACITOR, FXD, PAPER DIELECTRIC: 0.33UF, 5%, 50V; MIL TYPE CH09A1RA334J	5-20
C6, C7		CAPACITOR, FXD, ELECT.: 1UF, M15%P30%, 100V; MIL TYPE CL27BN010SN3	5-20
C8		CAPACITOR, FXD, ELECT.: 0.47UH, 20%, 35V; MIL TYPE CS13BF474M	5-20
C9, C10		CAPACITOR, FXD, CER DIELECTRIC: 100,000PF, 10%, 100V; MIL TYPE CKR06CW104KM	5-20
C11		NOT USED	

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
C12		CAPACITOR, FXD, ELECT.: 0.47UF, 20%, 35V; MIL TYPE CS13BF474M	5-20
C13		CAPACITOR, FXD, CER DIELECTRIC: 100,000PF, 10%, 100V; MIL TYPE CKR06CW104KM	5-19
C14		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 6V; MIL TYPE CS13BB685M	5-19
C15		CAPACITOR, FXD, ELECT.: 0.33UF, 20%, 35V; MIL TYPE CS13BF334M	5-19
C16		NOT USED	
C17, C18		CAPACITOR, FXD, ELECT.: 33UF, 20%, 10V; MIL TYPE CS13BC336M	5-19
C19		CAPACITOR, FXD, ELECT.: 0.15UF, 20%, 75V; MIL TYPE CS13BH154M	5-19
C20		CAPACITOR, FXD, ELECT.: 4.7UF, 10%, 10V; MIL TYPE CS13BC475K	5-19
C21		CAPACITOR, FXD, CER DIELECTRIC: 4700PF, 20%, 200V; MIL TYPE CK06CW472M	5-19
C22		CAPACITOR, FXD, ELECT.: 27UF, 10%, 20V; MIL TYPE CS13BE276K	5-20
H1		RETAINER, MTG SCR: COLLINS RADIO CO. PART NO. 549-0945-003	5-20
H2		SCREW, ASSEMBLED WASHER: COLLINS RADIO CO. PART NO. 549-0943-003	5-20
H3		CLIP, SPG, TENS: COLLINS RADIO CO. PART NO. 546-6128-002	5-19
H4		PIN, LOCATING: COLLINS RADIO CO. PART NO. 540-7764-002	5-19
J1 THRU J6		JACK, TIP: YEL; JOHNSON, E.F.,CO. PART NO. 105-737-100	5-19, 5-20
J7		JACK, TIP: BLK; JOHNSON, E.F.,CO. PART NO. 105-733-100	5-19
L1		REACTOR: 500MH; TOROTEL, INC. PART NO. 17779	5-20
P1		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DEM9PA160C37	5-19
Q1, Q2		TRANSISTOR: JAN TYPE JAN2N718A	5-20
Q3, Q4		TRANSISTOR: JEDEC TYPE 2N657A	5-20
Q5		TRANSISTOR: JAN TYPE JAN2N718A	5-20
Q6		TRANSISTOR: JEDEC TYPE 2N4220	5-19
Q7 THRU Q10		TRANSISTOR: JAN TYPE JAN2N2222A	5-19
Q11, Q12		TRANSISTOR: JEDEC TYPE 2N657A	5-19
Q13, Q14		TRANSISTOR: JAN TYPE JAN2N718A	5-20
R1		NOT USED	
R2, R3		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-20
R4, R5		RESISTOR, FXD, COMP: 27K, 10%, 1/4W; MIL TYPE RC07GF273K	5-20
R6, R7		NOT USED	
R8		RESISTOR, FXD, COMP: 68 OHMS, 10%, 1/4W; MIL TYPE RC07GF680K	5-20

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R9		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-20
R10		RESISTOR, FXD, COMP: 1.5K, 10%, 1/2W; MIL TYPE RC20GF152K	5-20
R11, R12		RESISTOR, FXD, COMP: 3 9 OHMS, 5%, 1/2W; MIL TYPE RC20GF3R9J	5-20
R13		RESISTOR, FXD, FILM: 46.4K, 1%, 1/4W; MIL TYPE RN60D4642F	5-20
R14		RESISTOR, FXD, FILM: 348 OHMS, 1%, 1/4W; MIL TYPE RN60D3480F	5-20
R15		RESISTOR, FXD, COMP: 220K, 10%, 1/4W; MIL TYPE RC07GF224K	5-20
R16		RESISTOR, FXD, COMP: 10K, 10%, 1/4W; MIL TYPE RC07GF103K	5-20
R17		RESISTOR, FXD, COMP: 1K, 10%, 1/4W; MIL TYPE RC07GF102K	5-20
R18		RESISTOR, FXD, COMP: 27K, 10%, 1/4W; MIL TYPE RC07GF273K	5-20
R19		RESISTOR, FXD, FILM: 14.7K, 1%, 1/4W; MIL TYPE RN60D1472F	5-19
R20		RESISTOR, FXD, FILM: 21.5K, 1%, 1/4W; MIL TYPE RN60D2152F	5-19
R21		RESISTOR, FXD, COMP: 560K, 10%, 1/4W; MIL TYPE RC07GF564K	5-19
R22		RESISTOR, FXD, COMP: 39K, 10%, 1/4W; MIL TYPE RC07GF393K	5-19
R23		RESISTOR, FXD, COMP: 2.2K, 10%, 1/4W; MIL TYPE RC07GF222K	5-19
R24		RESISTOR, FXD, COMP: 27K, 10%, 1/4W; MIL TYPE RC07GF273K	5-19
R25		RESISTOR, FXD, FILM: 91K, 2%, 1/4W; MIL TYPE RL07S913G	5-19
R26		RESISTOR, FXD, COMP: 6.8K, 10%, 1/4W; MIL TYPE RC07GF682K	5-19
R27		RESISTOR, FXD, COMP: 56K, 10%, 1/4W; MIL TYPE RC07GF563K	5-19
R28		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-19
R29		RESISTOR, FXD, COMP: 1 MEGO, 10%, 1/4W; MIL TYPE RC07GF105K	5-19
R30		RESISTOR, FXD, FILM: 160 OHMS, 2%, 1/4W; MIL TYPE RL07S161G	5-19
R31		RESISTOR, FXD, COMP: 1.8K, 10%, 1/4W; MIL TYPE RC07GF182K	5-19
R32		RESISTOR, FXD, WW: 560 OHMS, 5%, 3W; MIL TYPE RW69V561	5-19
R33		RESISTOR, FXD, COMP: 3.9K, 10%, 1/4W; MIL TYPE RC07GF392K	5-19
R34		RESISTOR, FXD, COMP: 820 OHMS, 10%, 1/4W; MIL TYPE RC07GF821K	5-19

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R35		RESISTOR, FXD, COMP: 150 OHMS, 10%, 1/4W; MIL TYPE RC07GF151K	5-19
R36, R37		RESISTOR, FXD, WW: 560 OHMS, 5%, 3W; MIL TYPE RW69V561	5-19
R38, R39		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-19
R40, R41		RESISTOR, FXD, COMP: 3.9 OHMS, 5%, 1/2W; MIL TYPE RC20GF3R9J	5-19
R42		RESISTOR, FXD, FILM: 47K, 2%, 1/4W; MIL TYPE RL07S473G	5-19
R43		RESISTOR, FXD, COMP: 10K, 10%, 1/4W; MIL TYPE RC07GF103K	5-20
R44		NOT USED	
R45, R46		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-20
R47, R48		RESISTOR, FXD, WW: 560 OHMS, 5%, 3W; MIL TYPE RW69V561	5-20
R49, R50		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-20
R51		RESISTOR, FXD, COMP: 560K, 10%, 1/4W; MIL TYPE RC07GF564K	5-19
RT1		RESISTOR, THRM, 500 OHMS, 10%, 1/2W; THE CARBORUNDUM CO. PART NO. 997F20	5-19
RT2		RESISTOR, THRM, 1K, 10%, 1W; THE CARBORUNDUM CO. PART NO. 763H6	5-19
TB1		PRINTED WIRING BOARD: COLLINS RADIO CO. PART NO. 600-8163-002	5-19
TB2		PRINTED WIRING BOARD: COLLINS RADIO CO. PART NO. 600-8173-012	5-20
T1		TRANSFORMER: UNITED TRANSFORMER CO. PART NO. ER500	5-20
T2		TRANSFORMER: TRIAD TRANSFORMER CORP. PART NO. SP21	5-19
VR1		SEMICOND DEVICE: MIL TYPE 1N965B	5-20
VR2		SEMICOND DEVICE: MIL TYPE 1N3024B	5-19
VR3		SEMICOND DEVICE: JAN TYPE JAN1N754A	5-19
XQ1, XQ2		NOT USED	
XQ3, XQ4		HOLDER: INTERNATIONAL ELECTRONIC RESEARCH CORP. PART NO. TXB2P032-037-3B	5-20
XQ5		NOT USED	
XQ6		HOLDER: SEALECTRO CORP. PART NO. T1533	5-19
XQ7 THRU XQ10		NOT USED	
XQ11, XQ12		HOLDER: INTERNATIONAL ELECTRONIC RESEARCH CORP. PART NO. TXB2P032-037-3B	5-19

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
A5		C-7715/U CONTROL, PRESELECTOR-AMPLIFIER: COLLINS RADIO CO. PART NO. 528-0672-001	
CR1, CR2		SEMICOND DEVICE: JAN TYPE JAN1N645	5-22
DS1, DS2		LAMP INCANDESCENT: MS TYPE MS18209-387	5-21
H1		THUMBSCREW: COLLINS RADIO CO. PART NO. 775-4695-001	5-21
H2		SPACER, SLV: COLLINS RADIO CO. PART NO. 775-4713-001	5-22
H3		SPACER, SLV: COLLINS RADIO CO. PART NO. 775-4714-001	5-21
H4		SCREW, MACH.: COLLINS RADIO CO. PART NO. 777-3820-001	5-21
H5		SCREW, MACH.: COLLINS RADIO CO. PART NO. 777-3821-001	5-21
H6		RETAINER, MTG SCR: COLLINS RADIO CO. PART NO. 549-0945-003	5-21
H7		WASHER, FLAT: COLLINS RADIO CO. PART NO. 775-4706-001	5-21
MP1		KNOB: MS TYPE MS91528-0N1B	5-21
MP2		KNOB: COLLINS RADIO CO. PART NO. 775-4705-001	5-21
MP3		GEAR, IDLER, 64 TEETH: COLLINS RADIO CO. PART NO. 775-4709-001	5-22
MP4		GEAR, SPUR, 124 TEETH: COLLINS RADIO CO. PART NO. 775-4700-001	5-22
MP5		SHAFT, STR: COLLINS RADIO CO. PART NO. 775-4698-001	5-22
MP6		GEAR, SPUR, 40 TEETH: COLLINS RADIO CO. PART NO. 775-4699-001	5-22
MP7		POSITIONER, GEAR: COLLINS RADIO CO. PART NO. 775-4701-001	5-22
MP8		BEARING: HARTFORD STEEL BALL CO. PART NO. 1-8SSBALLTYPE440GR100	5-22
MP9		SPRING, FLAT: COLLINS RADIO CO. PART NO. 777-4349-001	5-22
MP10		SHAFT, STR: COLLINS RADIO CO. PART NO. 775-4718-001	5-22
MP11		SHAFT, STR: COLLINS RADIO CO. PART NO. 775-4708-001	5-22
MP12		GEAR, SPUR: 64 TEETH; COLLINS RADIO CO. PART NO. 775-4704-001	5-22
MP13		BEARING: CHRYSLER CORP. PART NO. F346MILL6085A	5-22
MP14		PLATE, GEAR: COLLINS RADIO CO. PART NO. 775-4725-001	5-22
MP15		SHAFT, SHOULDERED: COLLINS RADIO CO. PART NO. 775-4702-001	5-22
MP16		SHAFT, SHOULDERED: COLLINS RADIO CO. PART NO. 775-4703-001	5-22
P1		CONNECTOR: MS TYPE MS3112E18-32P	5-22

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R1		RESISTOR, VAR: COLLINS RADIO CO. PART NO. 779-2067-001	5-22
S1A		SWITCH SECTION: OAK MFG. CO. PART NO. 263770EK	5-22
S1B		SWITCH SECTION: OAK MFG. CO. PART NO. 263769EK	5-22
S2 THRU S4		SWITCH: OAK MFG. CO. PART NO. 263771BA2	5-22
S5		SWITCH: MS TYPE MS24547-1	5-22
S6		SWITCH: CUTLER-HAMMER, INC. PART NO. 8869K7	5-22
S7		SWITCH: TRANSISTOR ELECTRONICS CORP. PART NO. RBL4336A2	5-21, 5-22
XDS1, XDS2		LIGHT: MS TYPE MS25010C16B	5-21
A6		CONTROL, OVERLOAD, RF: COLLINS RADIO CO. PART NO. 775-4301-001	
CR1 THRU CR13		SEMICOND DEVICE: JAN TYPE JAN1N645	5-23
C1		CAPACITOR, FXD, ELECT.: 33UF, 20%, 10V; MIL TYPE CS13BC336M	5-23
C2		CAPACITOR, FXD, ELECT.: 33UF, 20%, 35V; MIL TYPE CS13BF336M	5-23
C3		CAPACITOR, FXD, ELECT.: 330UF, 20%, 6V; MIL TYPE CS13BB337M	5-23
C4		CAPACITOR, FXD, ELECT.: 22UF, 20%, 35V; MIL TYPE CS13BF226M	5-23
C5		NOT USED	
H1		SCREW, ASSEMBLED WASHER: COLLINS RADIO CO. PART NO. 549-0940-003	5-23
H2		RETAINER, MTG SCR: COLLINS RADIO CO. PART NO. 549-0945-003	5-23
H3		CLIP, SPG, TENS: COLLINS RADIO CO. PART NO. 546-6128-002	5-23
H4		PIN, LOCATING: COLLINS RADIO CO. PART NO. 540-7764-002	5-23
J1 THRU J5		JACK, TIP: WHT; SEALECTRO CORP. PART NO. SKT41WHT	5-23
P1		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DAM15PA160C37	5-23
Q1, Q2		TRANSISTOR: JAN TYPE JAN2N718A	5-23
Q3 THRU Q10		TRANSISTOR: JAN TYPE JAN2N2222A	5-23
RT1, RT2		RESISTOR, THRM, 10K, 10%, 1/2W; THE CARBORUNDUM CO. PART NO. 997F14	5-23
R1		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R2		RESISTOR, FXD, COMP: 10K, 10%, 1/4W: MIL TYPE RC07GF103K	5-23
R3		RESISTOR, FXD, COMP: 1.5K, 10%, 1/4W; MIL TYPE RC07GF152K	5-23
R4		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R5		RESISTOR, FXD, COMP: 3.9K, 10%, 1/2W; MIL TYPE RC20GF392K	5-23

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R6		RESISTOR, FXD, COMP: 1.5K, 10%, 1/4W; MIL TYPE RC07GF152K	5-23
R7		RESISTOR, FXD, COMP: 3.9K, 10%, 1/2W; MIL TYPE RC20GF392K	5-23
R8		RESISTOR, FXD, COMP: 1.5K, 10%, 1/4W; MIL TYPE RC07GF152K	5-23
R9		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R10		RESISTOR, FXD, COMP: 2.7K, 10%, 1/2W; MIL TYPE RC20GF272K	5-23
R11		RESISTOR, FXD, FILM: 34.8K, 1%, 1/8W; MIL TYPE RN55D3482F	5-23
R12		RESISTOR, FXD, COMP: 68K, 10%, 1/4W; MIL TYPE RC07GF683K	5-23
R13		RESISTOR, FXD, FILM: 28.7K, 1%, 1/8W; MIL TYPE RN55D2872F	5-23
R14		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R15		RESISTOR, FXD, COMP: 1.5K, 10%, 1/4W; MIL TYPE RC07GF152K	5-23
R16		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R17		RESISTOR, FXD, COMP: 4.7K, 10%, 1/4W; MIL TYPE RC07GF472K	5-23
R18		RESISTOR, FXD, COMP: 15 OHMS, 10%, 1/2W; MIL TYPE RC20GF150K	5-23
R19		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R20		RESISTOR, FXD, FILM: 147K, 1%, 1/8W; MIL TYPE RN55D1473F	5-23
R21		RESISTOR, FXD, COMP: 10K, 10%, 1/4W; MIL TYPE RC07GF103K	5-23
R22		RESISTOR, FXD, COMP: 68K, 10%, 1/4W: MIL TYPE RC07GF683K	5-23
R23		RESISTOR, VAR, WW: 20K, 5%, 3/4W; MIL TYPE RT12C2L203	5-23
R24		RESISTOR, FXD, COMP: 39K, 10%, 1/4W; MIL TYPE RC07GF393K	5-23
R25		RESISTOR, VAR: 50K, 10%, 1/4W; MIL TYPE RJ11BL503	5-23
R26		NOT USED	
R27		RESISTOR, FXD, COMP: 33K, 10%, 1/4W; MIL TYPE RC07GF333K	5-23
R28		RESISTOR, FXD, COMP: 6.8K, 10%, 1/4W; MIL TYPE RC07GF682K	5-23
R29, R30		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-23
R31		RESISTOR, FXD, COMP: 1.5K, 10%, 1/4W; MIL TYPE RC07GF152K	5-23
R32		RESISTOR, FXD, COMP: 560 OHMS, 10%, 1/2W; MIL TYPE RC20GF561K	5-23

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
TB1		PRINTED WIRING BOARD: COLLINS RADIO CO. PART NO. 600-8106-005	5-23
VR1		SEMICOND DEVICE: MIL TYPE 1N968B	5-23
XQ1 THRU XQ4		NOT USED	
XQ5		HOLDER: SEALECTRO CORP. PART NO. T1533	5-23
XQ6 THRU XQ8		NOT USED	
XQ9		HOLDER: SEALECTRO CORP. PART NO. T1533	5-23
A7		PRESELECTOR CASE: COLLINS RADIO CO. PART NO. 775-4819-001	
CP1, CP2		P/O J1, J2	5-25
CP3		P/O J3	5-25
FL1, FL2		FILTER: SPRAGUE ELECTRIC CO. PART NO. 2JX38	5-26
H1		SCREW, MACH.: COLLINS RADIO CO. PART NO. 777-3831-001	5-25
H2		SCREW, MACH.: COLLINS RADIO CO. PART NO. 777-3826-001	5-24
H3		SCREW, MACH.: COLLINS RADIO CO. PART NO. 777-3820-001	5-24
H4		INSERT, SCR THD: COLLINS RADIO CO. PART NO. 777-3838-001	5-25
J1, J2		ADAPTER: AUTOMATIC METAL PRODUCTS CORP. PART NO. RF02803	5-24
J3		ADAPTER: MS TYPE MS3119E18-32	5-24
J4		CONNECTOR: MS TYPE MS3112E12-3P	5-24
MP1		GASKET, FIL: COLLINS RADIO CO. PART NO. 777-4217-001	5-25
P1		CONNECTOR: ITT CANNON ELECTRIC, INC. PART NO. DEM9SA160C37	5-25
A8		NOT USED	
A9		AMPLIFIER, RF INPUT: COLLINS RADIO CO. PART NO. 775-4814-001	
CR1 THRU CR4		NOT USED	
CR5, CR6		SEMICOND DEVICE: TRANSITRON ELECTRONIC CORP. PART NO. TSW31S	5-27
C1 THRU C47		NOT USED	
C48, C49		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 35V; MIL TYPE CS13BF685M	5-28
C50		CAPACITOR, FXD, CER DIELECTRIC: 5PF, 1/2PF, 500V; MIL TYPE CC20CH050D	5-27
C51		NOT USED	
C52, C53		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-27
C54 THRU C58		NOT USED	
C59		CAPACITOR, FXD, ELECT.: 1UF, 20%, 35V; MIL TYPE CS13BF105M	5-28
C60, C61		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-27, 5-28
C62, C63		CAPACITOR, FXD, ELECT.: 1UF, 20%, 35V; MIL TYPE CS13BF105M	5-28

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
C64 THRU C71		NOT USED	
C72		CAPACITOR, FXD, ELECT.: 1UF, 20%, 35V; MIL TYPE CS13BF105M	5-28
J1 THRU J11		NOT USED	
J12, J13		JACK, TIP: YEL; SEALECTRO CORP. PART NO. SKT41YEL	5-27
L1 THRU L24		NOT USED	
L25		COIL, RF: 1000UH; MS TYPE MS90539-15	5-28
L26, L27		NOT USED	
L28		COIL, RF: 1000UH; MS TYPE MS90539-15	5-28
MP1		GASKET, INPUT AMPL: COLLINS RADIO CO. PART NO. 777-4213-001	
Q1 THRU Q5		TRANSISTOR: UNION CARBIDE CORP. PART NO. F1394	5-27
Q6, Q7		TRANSISTOR: JAN TYPE JAN2N718A	5-28
R1 THRU R3		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-27
R4 THRU R6		NOT USED	
R7 THRU R9		RESISTOR, FXD, COMP: 22 OHMS, 10%, 1/4W: MIL TYPE RC07GF220K	5-27
R10		RESISTOR, FXD, WW: 270 OHMS, 5%, 3W; MIL TYPE RW69V271	5-28
R11 THRU R20		NOT USED	
R21		RESISTOR, FXD, COMP: 10K, 10%, 1/4W: MIL TYPE RC07GF103K	5-27
R22		NOT USED	
R23		RESISTOR, FXD, COMP: 150 OHMS, 10%, 1/4W: MIL TYPE RC07GF151K	5-27
R24		RESISTOR, FXD, FILM: 78.7K, 1%, 1/8W; MIL TYPE RN55D7872F	5-27
R25		RESISTOR, FXD, FILM: 511K, 1%, 1/4W; MIL TYPE RN60D5113F	5-27
R26		RESISTOR, FXD, COMP: 39K, 10%, 1/4W; MIL TYPE RC07GF393K	5-27
R27		RESISTOR, FXD, COMP: 2.7K, 10%, 1/4W; MIL TYPE RC07GF272K	5-27
R28, R29		RESISTOR, FXD, COMP: 5.6K, 10%, 1/4W; MIL TYPE RC07GF562K	5-28
R30 THRU R36		NOT USED	
R37		RESISTOR, FXD, COMP: 100K, 10%, 1/4W; MIL TYPE RC07GF104K	5-27
R38 THRU R51		NOT USED	
R52		RESISTOR, FXD, COMP: 22 OHMS, 10%, 1/4W; MIL TYPE RC07GF220K	5-27
R53		NOT USED	
R54		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-27
R55		RESISTOR, FXD, COMP: 22 OHMS, 10%, 1/4W; MIL TYPE RC07GF220K	5-27
R56		NOT USED	
R57		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-27

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
R58		NOT USED	
R59		RESISTOR, FXD, COMP: 4.7 OHMS, 5%, 1/4W; MIL TYPE RC07GF4R7J	5-27
T1		TRANSFORMER, RF: COLLINS RADIO CO. PART NO. 777-4209-001	5-27
VR1, VR2		NOT USED	
VR3, VR4		SEMICOND DEVICE: JAN TYPE JAN1N746A	5-28
VR5		SEMICOND DEVICE: MIL TYPE 1N3024B	5-28
A10		AMPLIFIER, RF OUTPUT: COLLINS RADIO CO. PART NO. 775-4817-001	
CR1 THRU CR9		NOT USED	
CR10, CR11		SEMICOND DEVICE: JAN TYPE JAN1N933	5-30
C1 THRU C50		NOT USED	
C51		CAPACITOR, FXD, CER DILECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-29
C52, C53		NOT USED	
C54, C55		CAPACITOR, FXD, ELECT.: 6.8UF, 20%, 35V; MIL TYPE CS12BF685M	5-30
C56 THRU C70		NOT USED	
C71		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-29
C72, C73		NOT USED	
C74, C75		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-30
C76		CAPACITOR, FXD, ELECT.: 10UF, 20%, 35V; MIL TYPE CS13BF106M	5-30
C77		CAPACITOR, FXD, MICA DIELECTRIC: 300PF, 5%, 500V; MIL TYPE CM05F301J03	5-29
C78, C79		NOT USED	
C80 THRU C82		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-29, 5-30
C83, C84		NOT USED	
C85		CAPACITOR, FXD, MICA DIELECTRIC: 10PF, 10%, 500V; MIL TYPE CM05C100K03	5-29
C86		CAPACITOR, FXD, CER DIELECTRIC: 10,000PF, 20%, 200V; MIL TYPE CK06CW103M	5-29
J1 THRU J15		NOT USED	
J16, J17		JACK, TIP: YEL; SEALECTRO CORP. PART NO. SKT41YEL	5-29
L1 THRU L25		NOT USED	
L26		COIL, RF: 33UH; MS TYPE MS16222-19	5-30
L27		COIL, RF: 56UH; MS TYPE MS90538-06	5-29
L28		NOT USED	
L29		COIL, RF: 4.7UH; MS TYPE MS18130-16	5-30
L30		COIL, RF: 33UH; MS TYPE MS18130-26	5-29
L31		COIL, RF: 33UH; MS TYPE MS16222-19	5-30
L32		COIL, RF: 82UH; MS TYPE MS90538-10	5-29
MP1		GASKET, OUTPUT AMPLIFIER: COLLINS RADIO CO. PART NO. 777-4214-001	5-29
Q1 THRU Q7		NOT USED	

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
Q8, Q9		TRANSISTOR: RADIO CORP. OF AMERICA PART NO. 2N5109	5-29
Q10		TRANSISTOR: JEDEC TYPE 2N3375	5-29
Q11		TRANSISTOR: UNION CARBIDE CORP. PART NO. F1394	5-30
RT1		RESISTOR, THRM, 100 OHMS, 10%, 1W; THE CARBORUNDUM CO. PART NO. 763F93	5-29
R1 THRU R10		NOT USED	
R11		RESISTOR, FXD, COMP: 270 OHMS, 10%, 1/4W; MIL TYPE RC07GF271K	5-29
R12		RESISTOR, FXD, FILM: 28.7 OHMS, 1%, 1/4W; MIL TYPE RN60D28R7F	5-29
R13		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/2W; MIL TYPE RC20GF101K	5-29
R14		RESISTOR, FXD, COMP: 200 OHMS, 5%, 2W; MIL TYPE RC42GF201J	5-29
R15 THRU R17		NOT USED	
R18		RESISTOR, FXD, FILM: 1.47K, 1%, 1/2W; MIL TYPE RN65D1471F	5-29
R19		RESISTOR, FXD, FILM: 196 OHMS, 1%, 1/8W; MIL TYPE RN55D1960F	5-29
R20 THRU R29		NOT USED	
R30, R31		RESISTOR, FXD, COMP: 4.7 OHMS, 5%, 1/4W; MIL TYPE RC07GF4R7J	5-29
R32		RESISTOR, FXD, COMP: 180 OHMS, 10%, 1/4W; MIL TYPE RC07GF181K	5-30
R33		RESISTOR, FXD, COMP: 47K, 10%, 1/4W; MIL TYPE RC07GF473K	5-30
R34		RESISTOR, FXD, COMP: 100 OHMS, 10%, 1/4W; MIL TYPE RC07GF101K	5-30
R35		RESISTOR, FXD, COMP: 1K, 10%, 1/4W; MIL TYPE RC07GF102K	5-30
R36		RESISTOR, FXD, COMP: 680 OHMS, 10%, 1/4W; MIL TYPE RC07GF681K	5-30
R37		NOT USED	
R38		RESISTOR, FXD, FILM: 28.7 OHMS, 1%, 1/4W; MIL TYPE RN60D28R7F	5-29
R39		RESISTOR, FXD, COMP: 680 OHMS, 10%, 1W; MIL TYPE RC32GF681K	5-29
R40		RESISTOR, FXD, FILM: 1K, 1%, 1/2W; MIL TYPE RN65D1001F	5-29
R41		RESISTOR, FXD, FILM: 10 OHMS, 1%, 1/2W; MIL TYPE RN65D10R0F	5-29
T1 THRU T3		NOT USED	
T4		TRANSFORMER, RF: COLLINS RADIO CO. PART NO. 777-4209-001	5-29
VR1 THRU VR5		NOT USED	
VR6		SEMICOND DEVICE: JAN TYPE JAN1N758A	5-30
XQ1 THRU XQ7		NOT USED	
XQ8, XQ9		HEAT SINK: INTERNATIONAL ELECTRONIC RESEARCH CORP. PART NO. TXP0508B	5-29
Z1		NOT USED	
Z2		SUPPRESSOR, PARASITIC: COLLINS RADIO CO. PART NO. 779-2590-001	5-29

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
2A1		DA-607/U LOAD, DUMMY: COLLINS RADIO CO. PART NO. 787-6625-001	
J1		CONNECTOR, RCPT, ELEC: JETDS TYPE UG569AU	5-30B
L1		COIL, RF: COLLINS RADIO CO. PART NO. 790-0683-001	5-30B
L2		COIL, RF: COLLINS RADIO CO. PART NO. 790-0680-001	5-30B
MP1 THRU MP6		FUSE, CLIP: MULTI ELECTRICAL MANUFACTURING, INC. PART NO. 2022SILPL001	5-30B
MP7		COVER, DUMMY LOAD: COLLINS RADIO CO. PART NO. 790-0677-001	5-30B
MP8 THRU MP13		POST, ELECTRICAL-MECHANICAL EQUIP: COLLINS RADIO CO. PART NO. 790-0681-001	5-30B
R1 THRU R3		RESISTOR, FXD, COMP: 1.5K, 5%, 30W; CARBORUNDUM CO. PART NO 876AS1	5-30B
3A1		CU-1901/U COUPLER, ANTENNA: COLLINS RADIO CO. PART NO. 787-6620-001	
C1 THRU C7		CAPACITOR, FXD, CER DIELECTRIC: 100PF, 5%, 5000V; GLOBE-UNION, INC. PART NO. 850S100N	5-30A
C8		CAPACITOR, FXD, CER DIELECTRIC: 47PF, 5%, 5000V; GLOBE-UNION, INC. PART NO. 850S47Z	5-30A
E1		LEAD, ELEC: COLLINS RADIO CO. PART NO. 790-0660-001	5-30A
E2		LEAD, ELEC: COLLINS RADIO CO. PART NO. 790-0661-001	5-30A
E3		LEAD, ELEC: COLLINS RADIO CO. PART NO. 790-0662-001	5-30A
E4 THRU E9		LEAD, ELEC: COLLINS RADIO CO. PART NO. 790-0667-001	5-30A
H1		SCREW, MACH: COLLINS RADIO CO. PART NO. 790-0654-001	5-30A
H2		SCREW, MACH: COLLINS RADIO CO. PART NO. 790-0666-001	5-30A
H3		SCREW, MACH: COLLINS RADIO CO. PART NO. 790-0669-001	5-30A
J1 THRU J7		CONNECTOR, RCPT, ELEC: JETDS TYPE UG569AU	5-30A
L1		COIL, RF: COLLINS RADIO CO. PART NO. 790-0665-001	5-30A
L2		COIL, RF: COLLINS RADIO CO. PART NO. 790-0668-001	5-30A
L3		COIL, RF: COLLINS RADIO CO. PART NO. 790-0670-001	5-30A
MP1, MP2		INSULATOR, SEMICOND DEVICE: NATIONAL BERYLLIA CORP. PART NO. 30032-1	5-30A
MP3 THRU MP8		ADAPTER, CONNECTOR: MS TYPE MS35287-642	5-30A
MP9		COVER, CHASSIS: COLLINS RADIO CO. PART NO. 777-3795-001	5-30A

TABLE 6-2. (Continued)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG. NO.
MP10 THRU MP20		INSULATOR, BUSHING: COLLINS RADIO CO. PART NO. 790-0657-001	5-30A
MP21, MP22		INSULATOR, BUSHING: COLLINS RADIO CO. PART NO. 790-0657-002	5-30A
MP23, MP24		HEATSINK, ELEC: COLLINS RADIO CO. PART NO. 790-0658-001	5-30A
MP25 THRU MP35		INSULATOR, STANDOFF: COLLINS RADIO CO. PART NO. 790-0659-001	5-30A

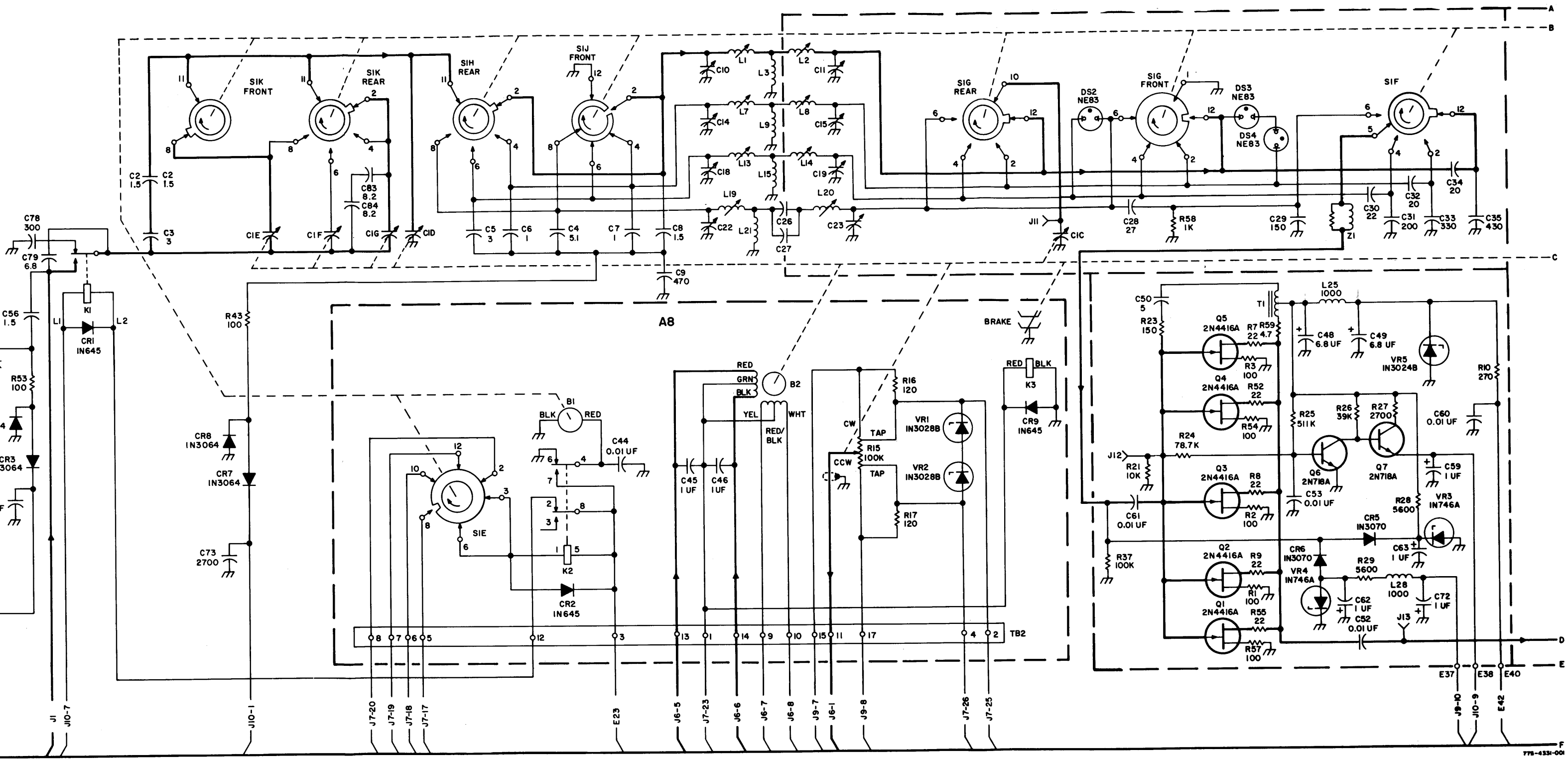
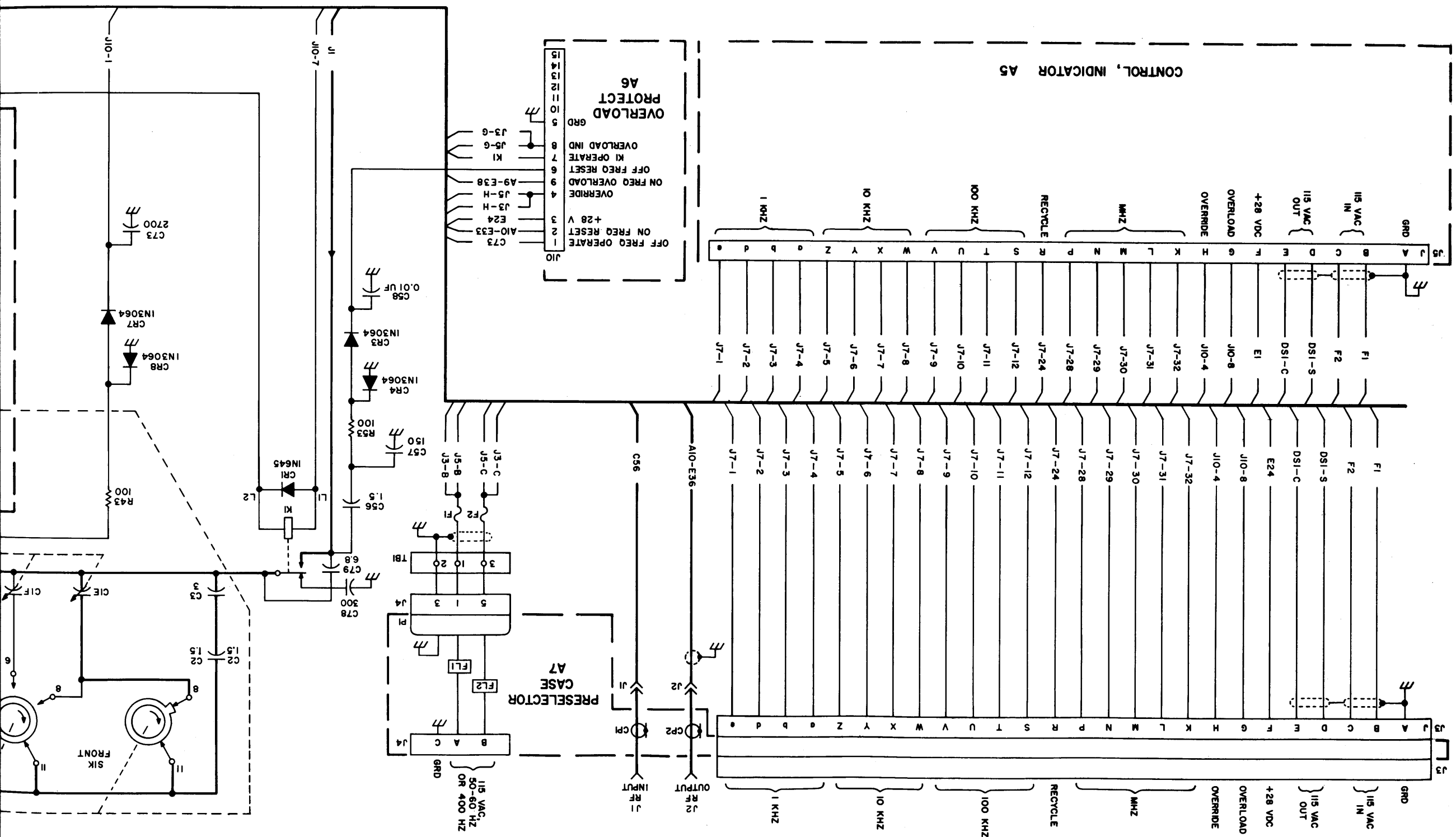
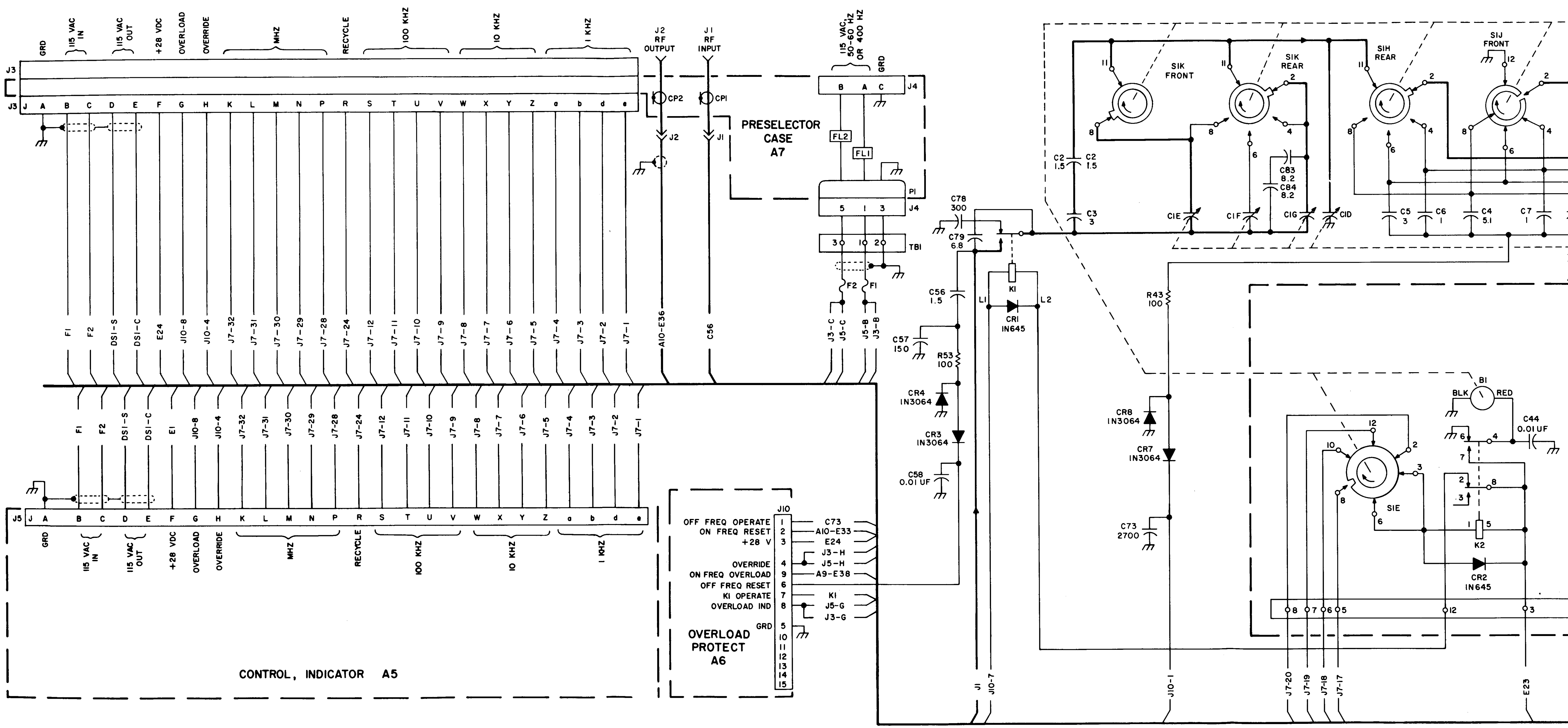


Figure 5-31. Radio-Frequency Preselector-Amplifier AM-4823/U, Schematic Diagram (Sheet 1 of 2)


CONTROL, INDICATOR A5
J5
GRD
115 VAC IN
115 VAC OUT
+28 VDC
OVERLOAD
OVERRIDE
MHZ
RECYCLE
100 KHZ
10 KHZ
1 KHZ
J7-1
J7-2
J7-3
J7-4
J7-5
J7-6
J7-7
J7-8
J7-9
J7-10
J7-11
J7-12
J7-24
J7-28
J7-29
J7-30
J7-31
J7-32
J10-4
J10-8
E24
DS1-C
DS1-S
F2
F1
J3
GRD
115 VAC OUT
115 VAC IN
+28 VDC
OVERLOAD
OVERRIDE
1 KHZ
10 KHZ
100 KHZ
RECYCLE
MHZ
J2 RF OUTPUT
J1 RF INPUT
CP2
CP1
PRESELECTOR CASE A7
J4
J3-C
J5-C
J5-B
J3-B
F2
F1
TB1
P1
FL1
FL2
GRD
115 VAC, 50-60 HZ OR 400 HZ
C56
AIO-E36
J1
J2
OVERLOAD PROTECT A6
J10
OFF FREQ OPERATE
ON FREQ RESET
+28 V
OVERRIDE
ON FREQ OVERLOAD
OFF FREQ RESET
K1 OPERATE
OVERLOAD IND
GRD
C73
AIO-E33
E24
J3-H
J5-H
A9-E38
J5-G
K1
J5-G
J3-G
J10-1
J1
J10-7
C73 2700
CR7 IN3064
CR8 IN3064
R43 100
C58 0.01 UF
CR3 IN3064
CR4 IN3064
R53 100
C57 150
C56 1.5
CR1 IN645
K1
L1
L2
C79 6.8
C78 300
C3
C2 1.5
C1E
C1F
SIK FRONT
6
8
11



CONTROL, INDICATOR A5
OVERLOAD PROTECT A6
PRESELECTOR CASE A7
J3
J5
J4
J10
J2 RF OUTPUT
J1 RF INPUT
115 VAC, 50-60 HZ OR 400 HZ
GRD
115 VAC IN
115 VAC OUT
+28 VDC
OVERLOAD
OVERRIDE
MHZ
RECYCLE
100 KHZ
10 KHZ
1 KHZ
OFF FREQ OPERATE
ON FREQ RESET
+28 V
ON FREQ OVERLOAD
OFF FREQ RESET
K1 OPERATE
OVERLOAD IND
S1K FRONT
S1K REAR
S1H REAR
S1J FRONT
S1E
K1
K2
B1
BLK
RED
CR1 IN645
CR2 IN645
CR3 IN3064
CR4 IN3064
CR7 IN3064
CR8 IN3064
C78 300
C79 6.8
C56 1.5
C57 150
C58 0.01 UF
C73 2700
C44 0.01UF
R53 100
R43 100
C2 1.5
C3 3
C83 8.2
C84 8.2
C5 3
C6 1
C4 5.1
C7 1
A10-E36
A10-E33
A9-E38
E23
E24
J10-1
J10-7

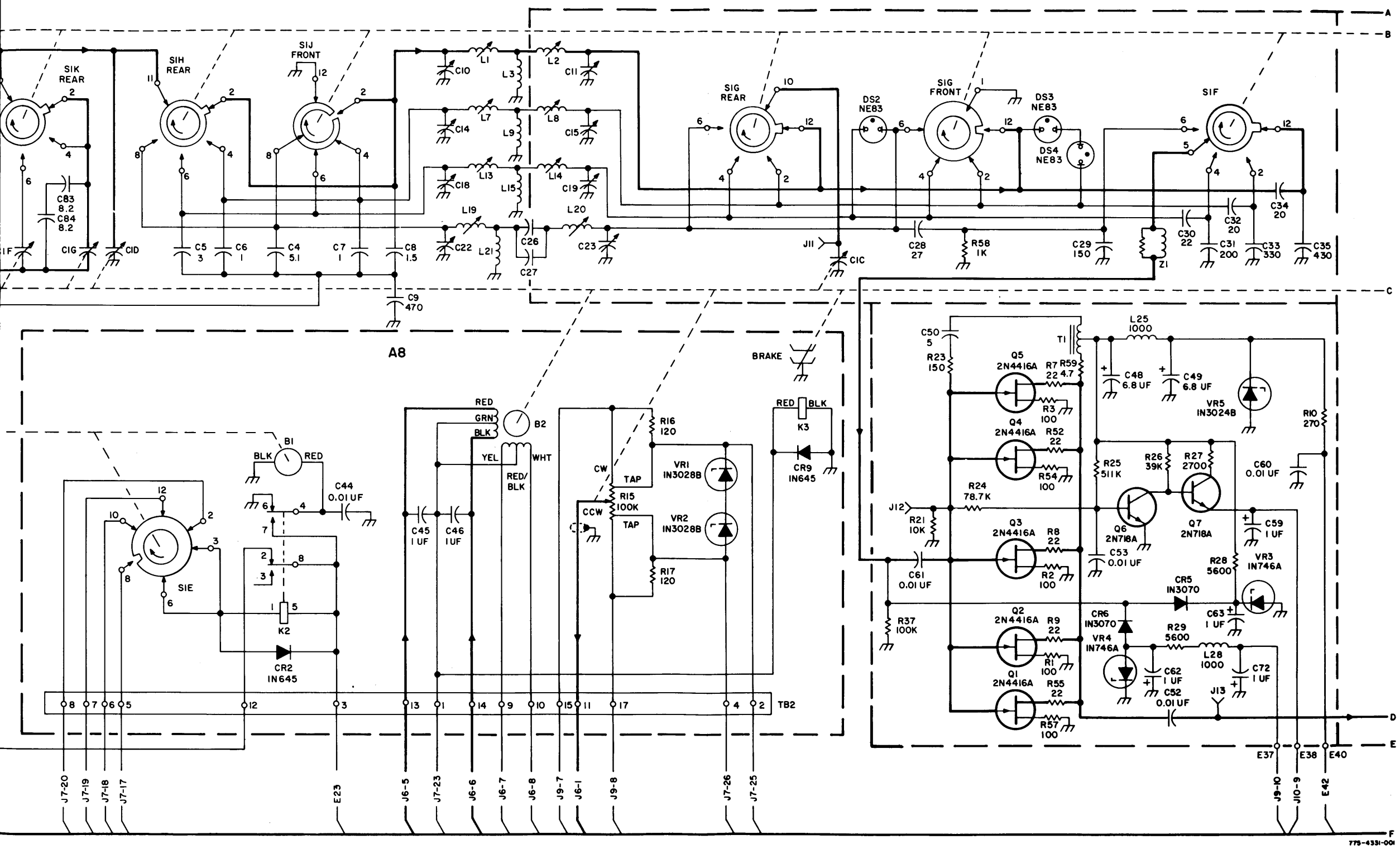


Figure 5-31. Radio-Frequency Preselector-A

NOTES:
1. UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN PICOFARADS AND INDUCTANCE VALUES ARE MICROHENRYS.
2. ROTARY SWITCHES SHOWN IN 2.000 TO 3.999 MHZ BAND POSITION.

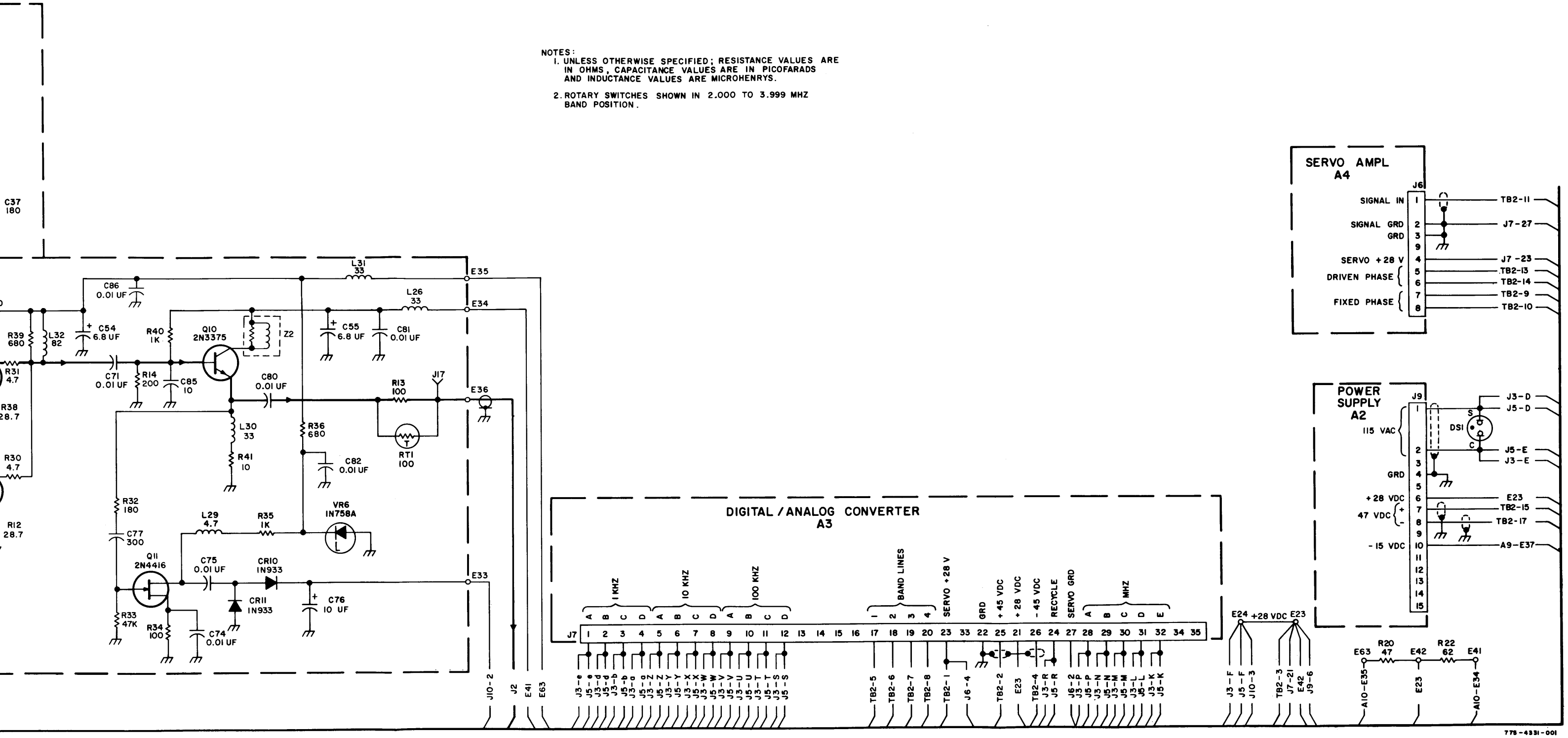
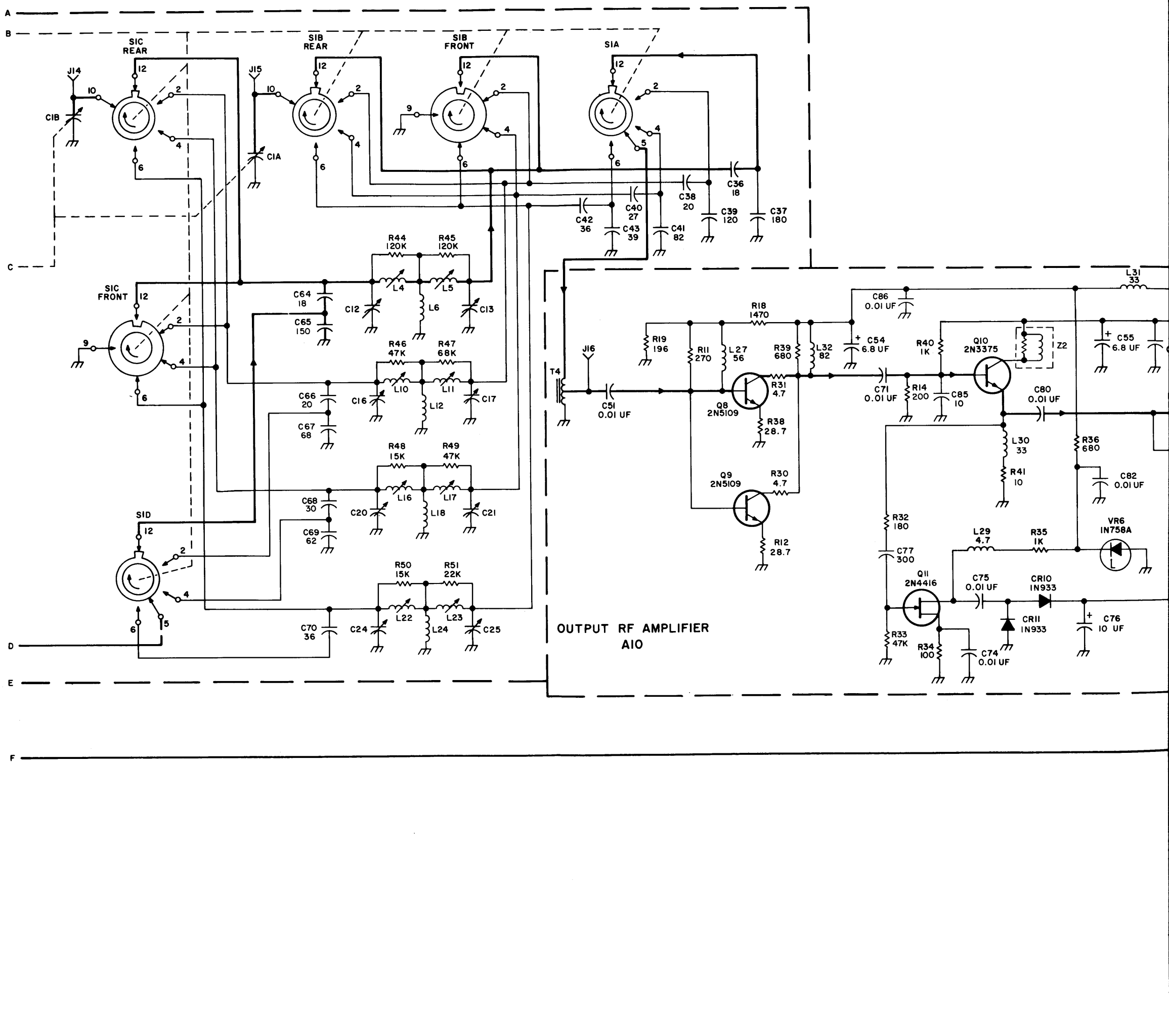


Figure 5-31. Radio-Frequency Preselector-Amplifier AM-4823/U, Schematic Diagram (Sheet 2 of 2)


A
B
C
D
E
F
SIC REAR
SIB REAR
SIB FRONT
SIA
SIC FRONT
SID
J14
J15
J16
C1B
C1A
C12
C13
C16
C17
C20
C21
C24
C25
L4
L5
L6
L10
L11
L12
L16
L17
L18
L22
L23
L24
R44 120K
R45 120K
R46 47K
R47 68K
R48 15K
R49 47K
R50 15K
R51 22K
C64 18
C65 150
C66 20
C67 68
C68 30
C69 62
C70 36
C36 18
C37 180
C38 20
C39 120
C40 27
C41 82
C42 36
C43 39
T4
C51 0.01 UF
R18 1470
R19 196
R11 270
L27 56
R39 680
L32 82
C86 0.01 UF
C54 6.8 UF
R40 1K
Q10 2N3375
Z2
L31 33
C55 6.8 UF
C71 0.01 UF
R14 200
C85 10
C80 0.01 UF
Q8 2N5109
R31 4.7
R38 28.7
Q9 2N5109
R30 4.7
R12 28.7
L30 33
R41 10
R36 680
C82 0.01 UF
R32 180
C77 300
L29 4.7
R35 1K
VR6 IN758A
Q11 2N4416
C75 0.01 UF
CR10 IN933
CR11 IN933
C76 10 UF
R33 47K
R34 100
C74 0.01 UF
OUTPUT RF AMPLIFIER
A10

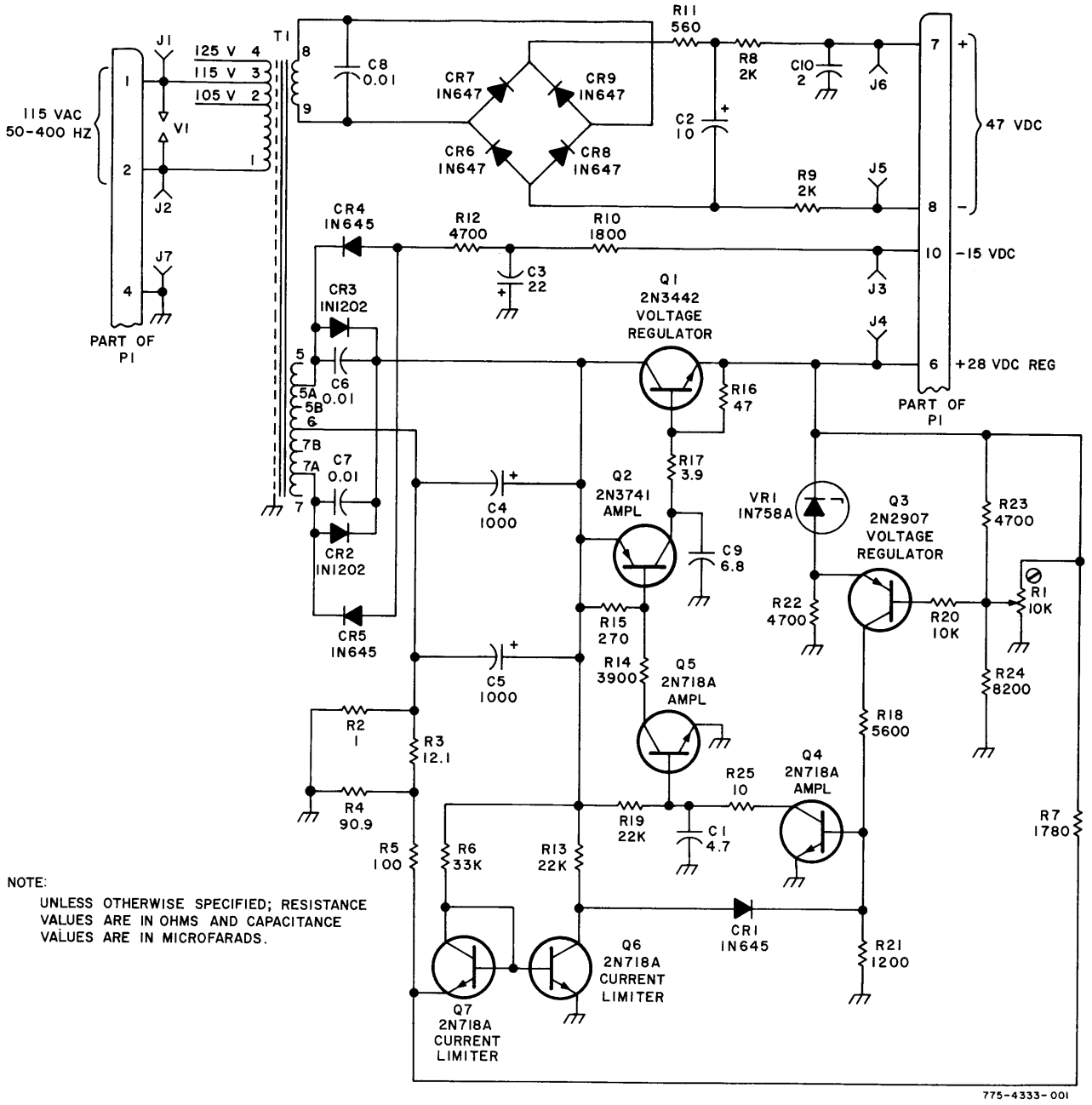


Figure 5-32. Power Supply A2, Schematic Diagram

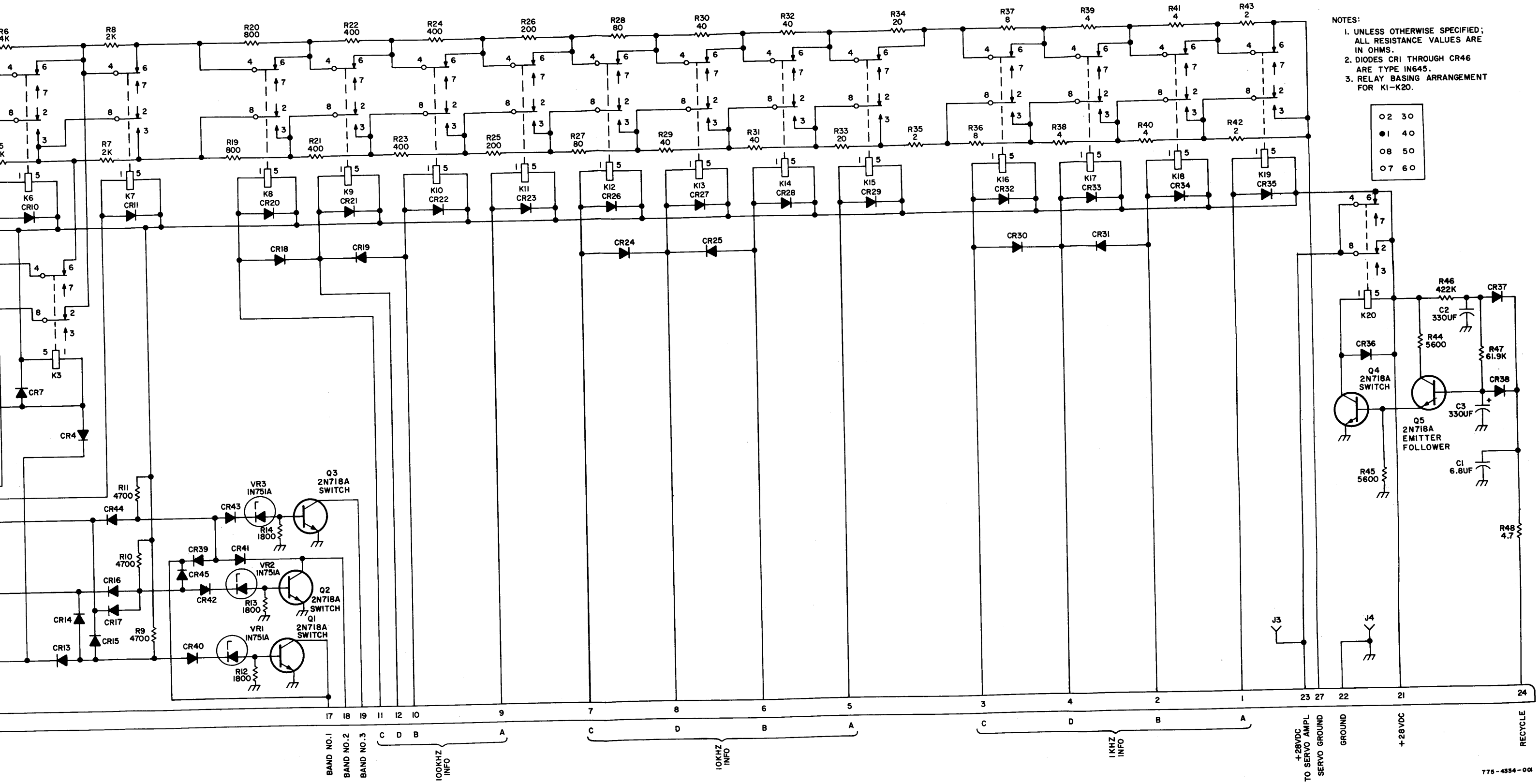
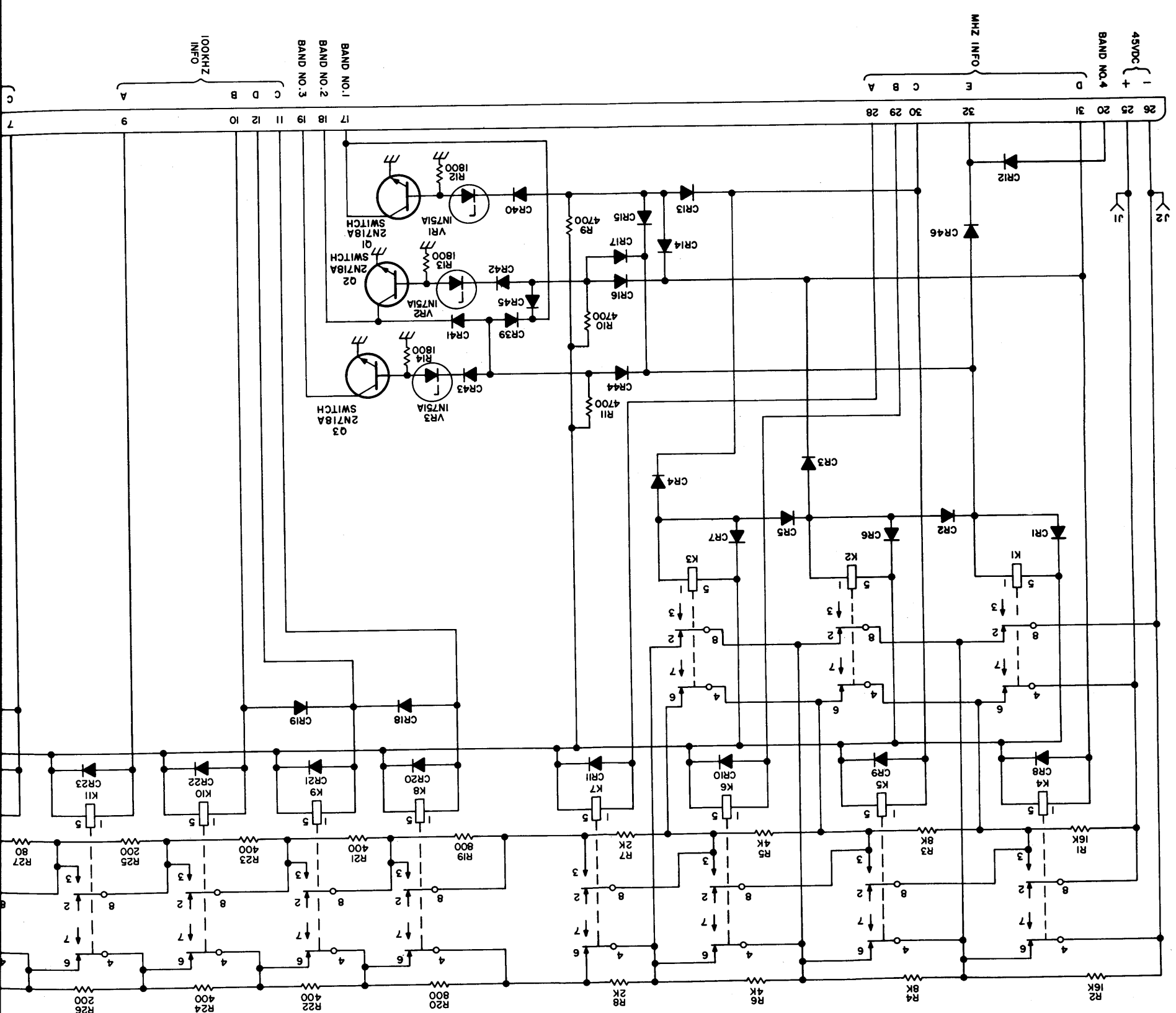


Figure 5-33. Digital to Analog Converter A3, Schematic Diagram


45VDC
+
-
J1
J2
BAND NO.4
MHZ INFO
A
B
C
D
E
BAND NO.1
BAND NO.2
BAND NO.3
100KHZ INFO
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
CR18
CR19
CR20
CR21
CR22
CR23
CR39
CR40
CR41
CR42
CR43
CR44
CR45
CR46
K1
K2
K3
K4
K5
K6
K7
K8
K9
K10
K11
R1 16K
R2 16K
R3 8K
R4 8K
R5 4K
R6 4K
R7 2K
R8 2K
R9 4700
R10 4700
R11 4700
R12 1800
R13 1800
R14 1800
VR1 IN754A
VR2 IN754A
VR3 IN754A
Q1 2N718A SWITCH
Q2 2N718A SWITCH
Q3 2N718A SWITCH
R19 800
R21 400
R23 400
R25 200
R27 80
R20 800
R22 400
R24 400
R26 200

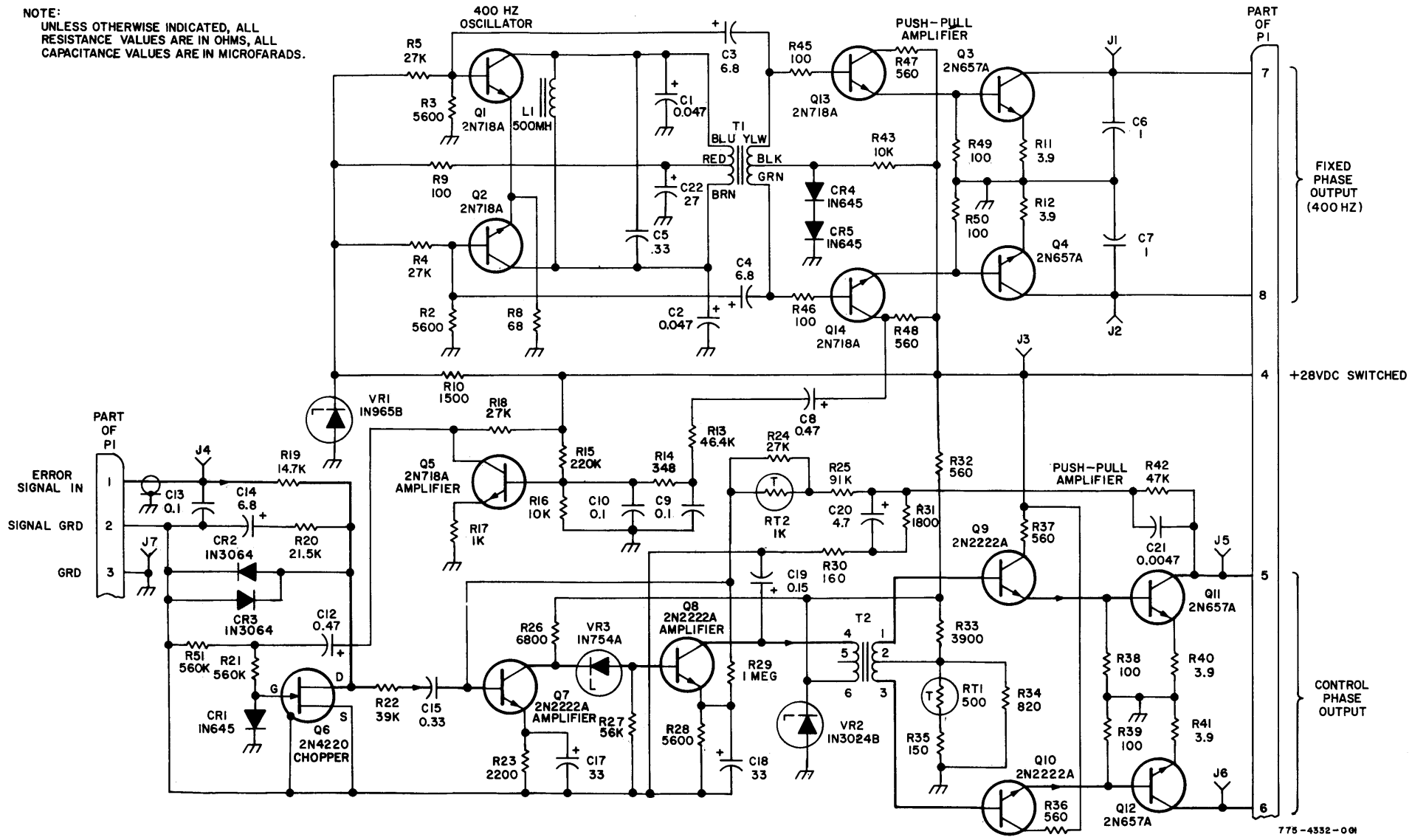
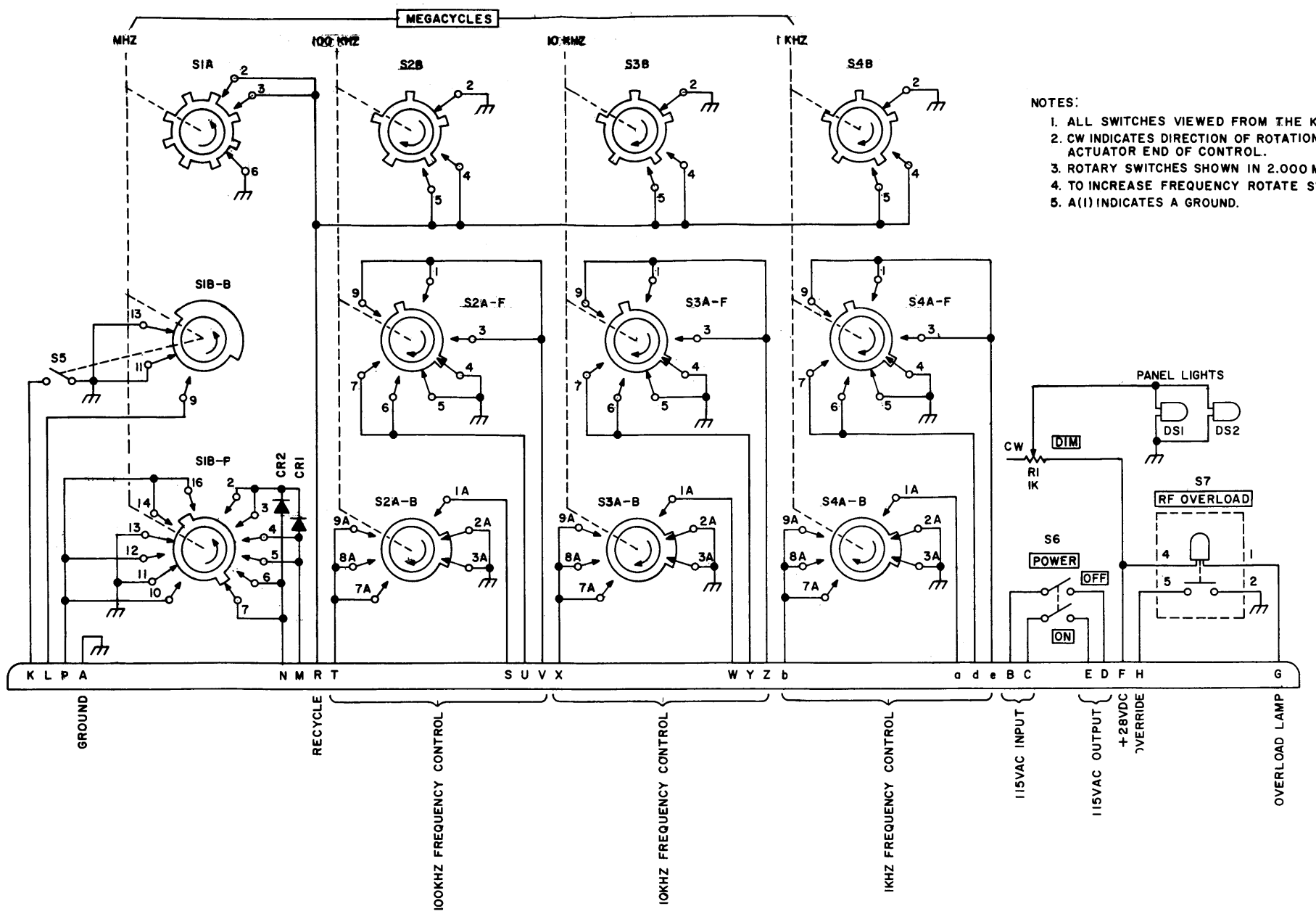


Figure 5-34. Servo Amplifier A4, Schematic Diagram



NOTES:

1. ALL SWITCHES VIEWED FROM THE KNOB OR DRIVEN END.
2. CW INDICATES DIRECTION OF ROTATION AS VIEWED FROM ACTUATOR END OF CONTROL.
3. ROTARY SWITCHES SHOWN IN 2.000 MHZ POSITION.
4. TO INCREASE FREQUENCY ROTATE SWITCH AS INDICATED.
5. A(1) INDICATES A GROUND.

MEGAHERTZ CONTROL (SEE NOTE 5)

PIN NUMBERS	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
P	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
N	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
M	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
L	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

PIN NUMBERS 100KHZ	10KHZ	1KHZ	KILOHERTZ CONTROL (SEE NOTE 5) 0	1	2	3	4	5	6	7	8	9
V	Z	e	0	1	0	1	0	1	0	1	0	1
U	Y	d	0	0	1	1	0	0	1	1	0	0
T	X	b	0	0	0	0	1	1	1	1	0	0
S	W	a	0	0	0	0	0	0	0	0	1	1

775-4336-001

Figure 5-35. C-7715/U Control, Preselector-Amplifier (A5), Schematic Diagram