REGCO

TECHNICAL MANUAL
RG-5500
VHF/UHF RECEIVER

specialists in electronic

equipment and systems

The R. E. GRIMM COMPANY
16000 Industrial Drive
Gaithersburg, Maryland 20760

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REVISION A

RG-5500 VHF/UHF RECEIVER

TECHNICAL MANUAL

INTRODUCTION

This manual provides information on the operation and maintenance of the RG-5500 VHF/UHF Receiver. Parts lists and a complete set of schematic drawings are included.

Chapter 1, Description of Equipment, presents a physical and functional description of the receiver. A complete list of specifications is also provided.

Chapter 2, Installation, describes equipment inspection, mounting, and installation procedures. All rear-panel controls and connectors are described.

Chapter 3, Operation, identifies all front-panel controls, indicators, and connectors and describes procedures for receiver operation.

Chapter 4, Principles of Operation, functionally describes the operation of the receiver, keyed to block and schematic diagrams.

Chapter 5, Alignment, describes alignment procedures and operational checks.

Chapter 6, Parts Lists, itemizes the electrical components, integrated circuit modules, and electro-mechanical parts referenced to layout diagrams.

Chapter 7, Drawings, contains interconnection, power, and schematic diagrams. A table listing signal mnemonics is also included.

Chapter 8, Integrated Circuit Data, lists and describes all integrated circuits used in the receiver.

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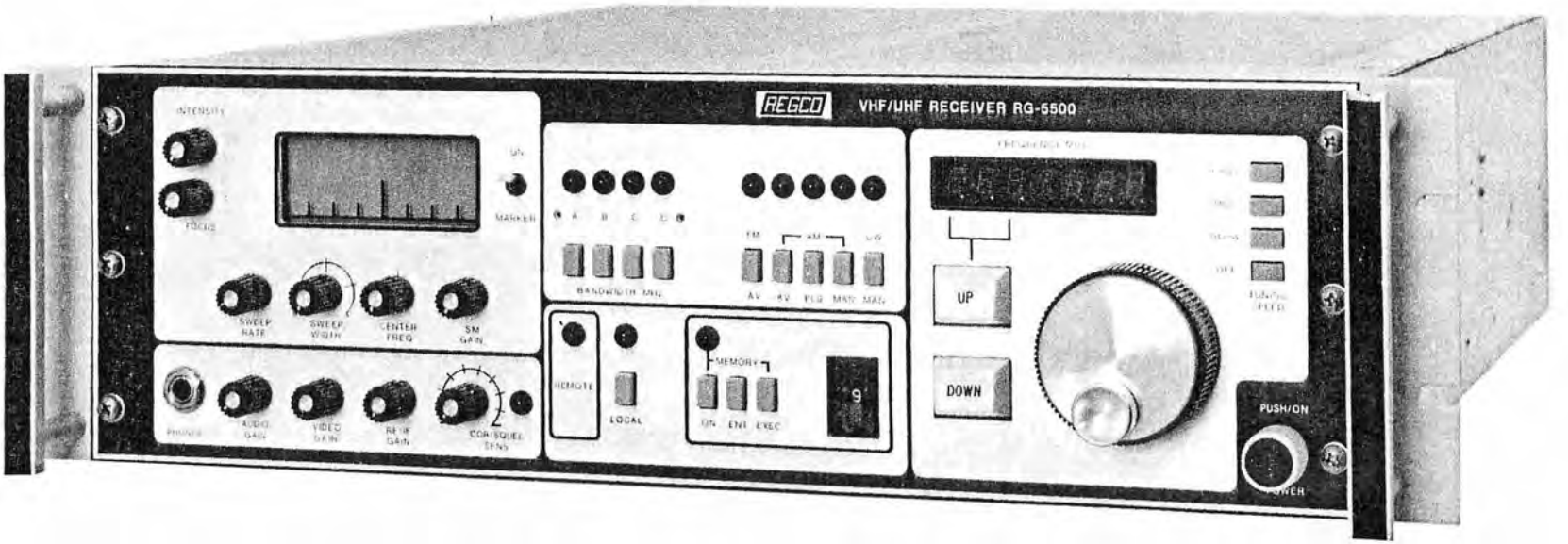


Figure 1-1. RG-5500 VHF/UHF Receiver

CHAPTER 1

DESCRIPTION OF EQUIPMENT

1-1. INTRODUCTION. The RG-5500 VHF/UHF Receiver (figure 1-1) is a fully synthesized, digitally controlled, solid-state receiver. The receiver operates in the range of 20 to 1000 MHz, and provides AM, FM, CW, and Pulse reception with a resolution of 100 Hz. The receiver is controlled by either the local, remote, or memory modes of operation provided, with the front panel display indicating the status. Four IF bandwidth options are selected in addition to an optional spectrum monitor unit.

1-2. PHYSICAL DESCRIPTION. The RG-5500 VHF/UHF Receiver mounts in a standard 19-inch equipment rack and has a panel height of 5 1/4-inches. The RF, IF, synthesizer, and digital control assemblies together with the AGC section, power supply, and optional spectrum monitor are located in the receiver top portion (figure 1-2). The remote control interface assembly and battery supply are located in the bottom portion. All input/output connectors, including the 24-pin remote control connection, are located on the chassis rear panel. These connections are described in chapter 2. All operator accessable controls and connectors are located on the chassis front panel, and are described in chapter 3.

1-3. SPECIFICATIONS. Specifications for the RG-5500 VHF/UHF Receiver are as follows:

Characteristics	Specification
Frequency Range	20 to 999.9999 MHz
Frequency Resolution	100 Hz
RF Input Impedance	50 ohms, nominal
RF Input VSWR	2.5:1, maximum from 20 to 510 MHz; 3.0:1, maximum from 510 to 1000 MHz
RF Input Noise Figure	8 dB, maximum from 20 to 510 MHz; 10 dB, maximum from 510 to 1000 MHz

Intermodulation Intercept Points:	
2nd Order, in-band referenced to RF Input	0 dBm, nominal
3rd Order, in-band referenced to RF Input	-10 dBm, nominal
RF Input Dynamic Range	From maximum sensitivity of receiver to -5 dBm
Synthesizer Step Time	Less than 100 microseconds per step
External Reference Standard Input Frequency Source	5 MHz, 0 dBm nominal into 50 ohms, rear panel access
Image Rejection	85 dB, minimum from 20 to 510 MHz; 60 dB, minimum from 510 to 1000 MHz
Residual AM	Using a 1 kHz sinewave amplitude modulating the carrier 30% in the passband of the receiver, the residual AM will be greater than or equal to 32 dB down
Predetection IF Output	21.400 MHz center frequency, bandwidth selected
Internally Generated Spurious	-107 dBm, maximum
Gain Control Modes	Manual, automatic
AGC Stability	6 dB, maximum from AGC threshold to a level 60 dB above AGC threshold

RF Input Sensitivity ..... A function of IF bandwidth and noise figure as given below:

Receiver AM, FM, Sensitivity in -dBm at given IF Bandwidths

	10 kHz	20 kHz	40 kHz	50 kHz	75 kHz	100 kHz	300 kHz	500 kHz	1 MHz	2 MHz	3 MHz	4 MHz
20 - 510 MHz N.F. = 8 dB	107	104	101	100	98	97	92	90	87	84	82	81
510 - 1000 MHz N.F. = 10 dB	105	102	99	98	96	95	90	88	85	82	80	79

AM The specified input signal level in dBm, AM modulated 50 percent by a 1-kHz tone, will produce a minimum 10 dB (S+N)/N ratio at the IF output.

FM The specified input signal level in dBm, FM modulated at a 1-kHz rate with a deviation equal to 30 percent of the IF bandwidth, will produce a minimum 17 dB (S+N)/N ratio at the IF output. (400-Hz modulation is used for the 5-kHz and 10-kHz IF bandwidths.)

Spurious Rejection ..... 60 dB, minimum; except at 330 MHz rejection is 40 dB, minimum with receiver gain maximum

LO Level at RF Input ..... 1 microvolt maximum from 20 to 510 MHz; 5 microvolts maximum from 510 to 1000 MHz

Demodulation Modes ..... AM, FM, CW, PULSE

IF Bandwidth ..... A choice of any four of the following: 10 kHz, 20 kHz, 40 kHz, 50 kHz, 75 kHz, 100 kHz, 300 kHz, 500 kHz, 1 MHz, 2 MHz, 3 MHz, 4 MHz

Video Output .....

AM
1 volt rms into 50 ohms minimum at rated sensitivity

FM
1 volt rms into 50 ohms minimum at rated sensitivity

Audio Frequency Response	+1 dB, maximum from 200 Hz to 15 kHz
Audio Output Level	1V rms into 600 ohms load, minimum at rated sensitivity
AM Output Level	DC coupled, 200 mV rms, minimum into 10,000 ohms at rated sensitivity
Headphone Audio Level	Continuously adjustable from zero to 10 mW into 600 ohm load, nominal
Audio Harmonic Distortion	Less than 5% at rated power
Carrier Operated Relay (COR)	SPDT contacts brought out to terminal strip on back panel
COR Rating	2A @ 28 Vdc or 115 Vac resistive
COR Attack Time	5 milliseconds, nominal
COR Decay Time	0.5 second or 5 seconds, rear panel select
COR Range/Sensitivity	Adjustable from maximum sensitivity of receiver to -40 dBm RF input
COR Activity	a. Front panel light indication
	b. 1 line indication on multipin connector with "low" indicating relay contacts closed

Operation Modes	a. Remote (IEEE-488-1975, address internally selectable) b. Local (front panel control) c. Memory (active on local only)
Spectrum Monitor (Optional)	
Sweep Width	0-4 MHz, continuously adjustable
Resolution	10 kHz, nominal
Sweep Rate	25 Hz, nominal
Response Variation	±1 dB
Marker	21.400 MHz center frequency
CRT Display	1 x 3 inch nominal dimensions
Other Controls	a. Intensity b. Focus c. Center Frequency d. Gain
Temperature	Receiver will operate from 0 to 50°C
Vibration	Receiver will withstand normal mailing and handling procedures; normal rack-mounted vibrations will not affect operation
Size	5.25 inches high 16.75 inches wide 18.5 inches deep
Weight	Approximately 45 pounds
AC Power Input	115/230 Vac, 48-62 Hz

Power Consumption	70 watts, approximately

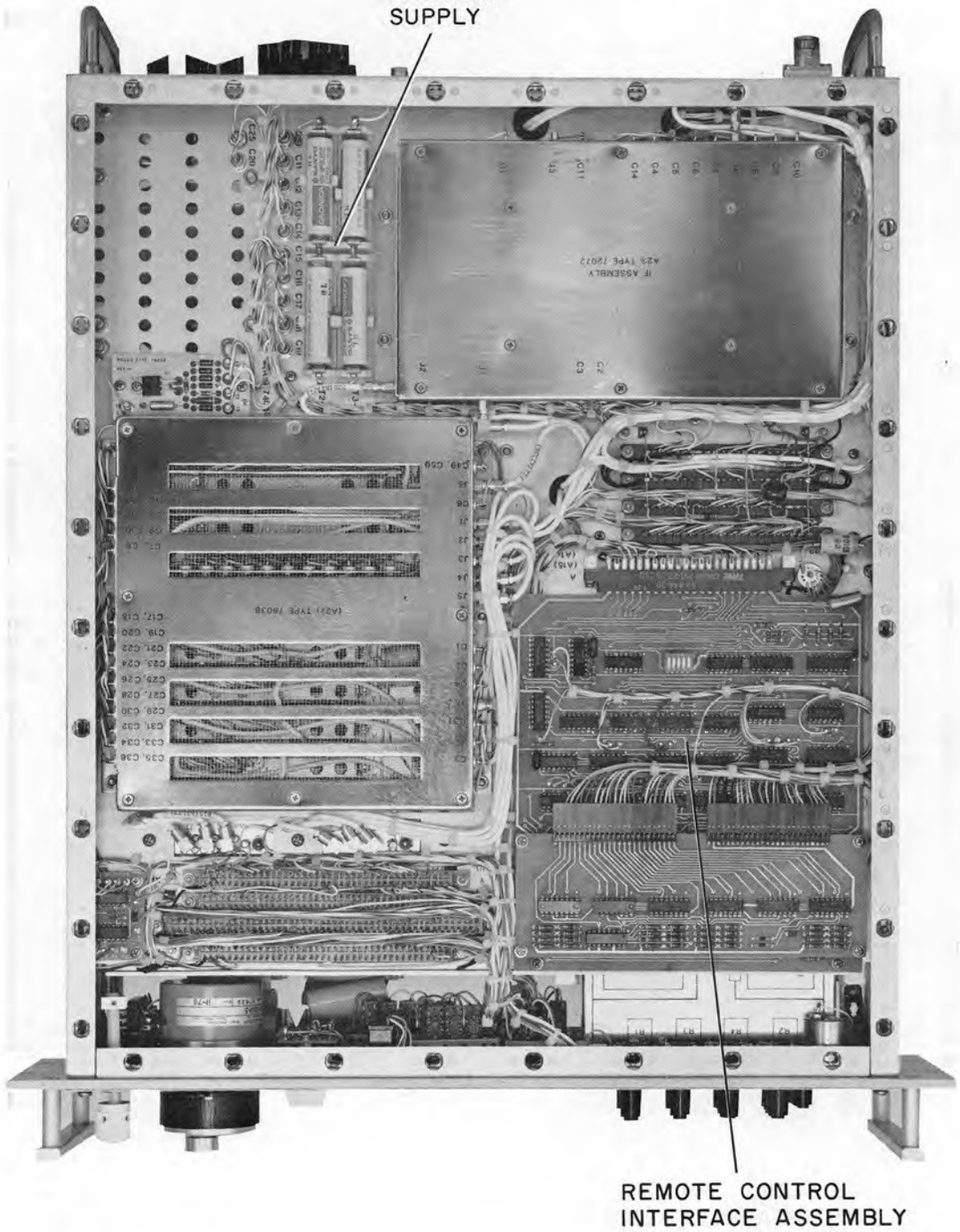
1-4. FUNCTIONAL DESCRIPTION. The RG-5500 VHF/UHF Receiver (figure 1-3) is operated by using front panel controls or by using a remote control device connected at the rear panel. The frequency, IF bandwidth, demodulation mode, and gain information applied to the digital control section is routed to the various receiver sections. This information can also be applied to or accessed from the 16-location, nonvolatile memory located within the digital control section. The front-panel display indicates the status of this information.

The frequency control information applied to the synthesizer section controls the generation of the first and second local oscillator frequencies. These frequencies are phase and frequency locked to a 5-MHz reference frequency.

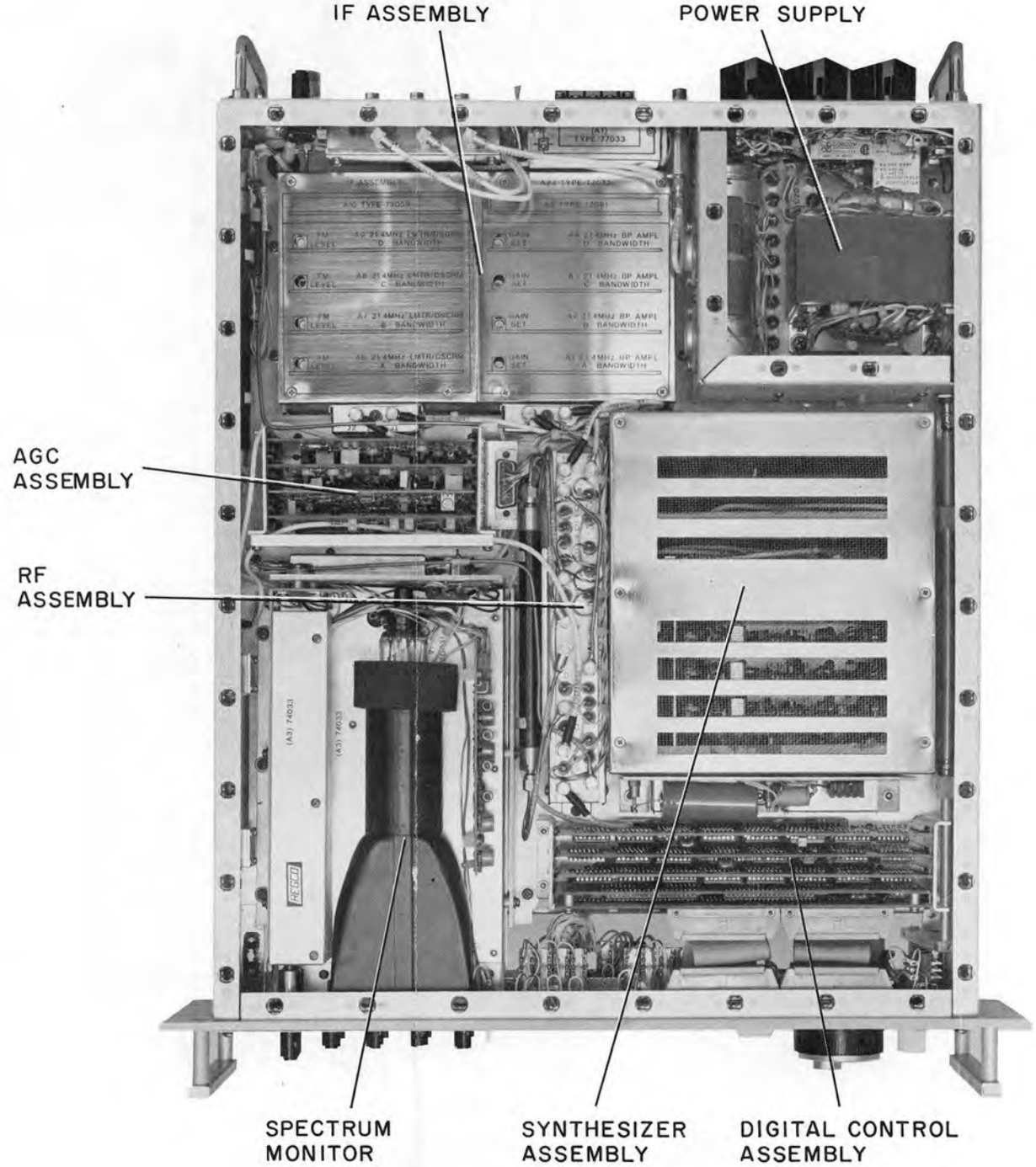
The two LO frequencies are applied one to each of the two mixer stages in the RF section. These mixer stages convert the 20 to 1000 MHz RF input frequency to the 21.4 MHz IF. The RF section gain is AGC controlled.

The AGC section generates AGC control voltages which are applied to the receiver RF and IF sections. The gain commands from the digital control section, and the detected AM from the IF section determine the magnitude of the AGC voltages.

The IF section converts the 21.4 MHz IF output of the RF section to the audio and video demodulated signals applied to the receiver output. AM, FM, CW, or Pulse detection can be selected in conjunction with any one of four bandwidth options. The IF section gain is AGC controlled.



BOTTOM VIEW



TOP VIEW

Figure 1-2. RG-5500 Assembly Locations

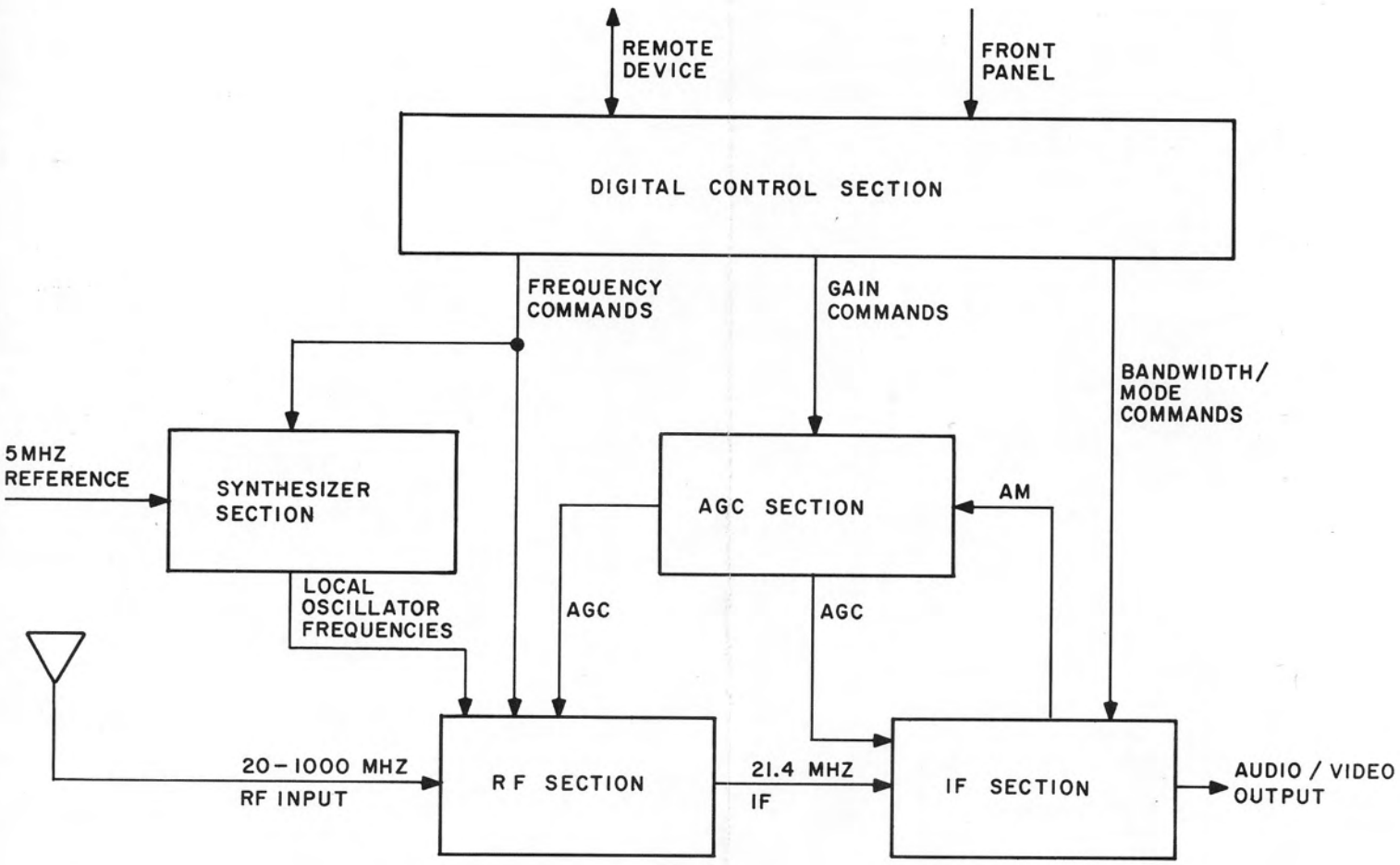


Figure 1-3. RG-5500 VHF/UHF Receiver Simplified Block Diagram

CHAPTER 2

INSTALLATION

2-1. PRELIMINARY CHECKS. Before installing the receiver perform the following:

a. Inspection. Inspect all external controls, indicators, and connectors for visible damage. Check all controls and switches for proper mechanical action.

b. AC Voltage Check. Verify that receiver is set to operate at the proper AC line voltage. The voltage selector switch/indicator is located behind the AC line fuse on rear panel. To change voltage setting perform the following:

(1) Disconnect power cord from J1.

(2) Slide fuse cover to left and remove. Remove fuse.

(3) Remove transformer tap located behind fuse holder and reinsert making sure required operating voltage is visible.

(4) Install fuse of proper amperage as indicated below fuse holder. Replace fuse cover.

c. Receiver Remote Control Address Set. The receiver is assigned a 5-bit binary address used by the controller in the remote mode. No two receivers on the same controller should have the same address. An address of decimal 31 should not be used. The receiver is shipped with the address set at 1. To change the receiver address perform the following:

(1) Remove receiver bottom cover.

(2) Locate the five-position DIP switch on assembly A15 (figure 2-1).

(3) Beginning with the most significant bit labeled position five, set the switches to OPEN when the corresponding bit is a zero, and closed when it is a 1.

Example:

Decimal	Binary	Switch Setting				
		S5	S4	S3	S2	S1
7	00111	Open	Open	Closed	Closed	Closed

CHAPTER 3

OPERATION

3-1. CONTROLS, INDICATORS, AND CONNECTORS. All controls, indicators, and connectors required for operating and monitoring the RG-5500 VHF/UHF Receiver are located on the front panel (figure 3-1). Table 3-1 lists these controls, indicators, and connectors and describes their functions.

3-2. OPERATING PROCEDURES. The receiver can be operated in any one of three modes: local, memory, and remote. Each mode of operation, as well as operation of the optional Spectrum Monitor, is described below.

a. Local Mode Operation. In the local mode the front-panel controls are enabled for selection of demodulation mode, IF bandwidth, and RF frequency. Information displayed on the front-panel indicators is also entered into the memory. To operate in local mode:

(1) Activate POWER switch.

(2) If LOCAL indicator is not lit, press LOCAL switch.

(3) Select desired demodulation mode.

(4) Select desired IF bandwidth.

(5) Select desired RF frequency using either of the following methods:

(a) Continuous tuning with a 100-Hz resolution provided by the tuning knob in conjunction with tuning speed switches.

(b) 1-MHz incremental tuning provided by the UP and DOWN switches.

(6) Depress TUNING SPEED OFF switch to disable tuning knob, preventing accidental mistuning.

(7) Enter displayed information into memory by:

(a) Rotating thumbwheel switch to desired memory location address.

(b) Depressing MEMORY ENT switch.

(8) Repeat steps (3) through (7) to program memory as required.

(9) Rotate VIDEO GAIN control for proper level as required.

(10) Rotate RF/IF GAIN control for proper level when AM MAN or CW MAN demodulation mode has been selected.

(11) Connect 600 ohms impedance headphones to PHONES jack and adjust AUDIO GAIN for a convenient level if desired.

(12) Rotate COR/SQUEL SENS squelch control to desired level. COR/SQUEL indicator lamp is off when audio output signal is squelched.

b. Memory Mode Operation. In the memory mode the front-panel demodulation mode, IF bandwidth, and RF frequency controls are disabled. To access any one of the 16 programmed memory locations:

(1) Activate POWER switch.

(2) Depress MEMORY ON switch. Memory indicator lights.

(3) Rotate thumbwheel switch to select desired memory location. Mode, bandwidth, and frequency information from memory is displayed on front panel.

(4) Depress MEMORY EXEC switch to tune receiver to selected channel.

(5) Perform steps a(9) thru a(12) as required.

c. Remote Mode Operation. In the remote mode the front-panel frequency, demodulation mode, and bandwidth controls are disabled. Local control is regained by depressing the LOCAL switch on the front panel.

(1) Remote Addressing the Receiver. The remote address must always contain two digits from 00 to 30. If the receiver address has been set to decimal 8, the complete receiver address is 08.

(2) Command Format.

(a) Remote tuned frequency control. The command format is:

$$F \; D_1 \; D_2 \; D_3 \; D_4 \; D_5 \; D_6 \; D_7 \; D_8 \; E \quad (LF \text{ or } CR)$$

where D is a frequency digit 0-9, D_1 is the most significant digit, and (LF or CR) is a line feed or carriage return (detection of either is jumper-selectable in receiver).

NOTE

The controlling device has the responsibility to check that lower frequency limit of 20.0000 MHz is not passed, and that eight digits are present in command. The digits must be in fixed point notation. A decimal point occurring before the digits will be ignored. D_8 is ignored.

(b) Remote IF bandwidth control. The command format is:

I D_1 E (LF or CR).

D_1 is a digit 0 through 3 where:

0 is the 1st selectable IF bandwidth
1 is the 2nd selectable IF bandwidth
2 is the 3rd selectable IF bandwidth
3 is the 4th selectable IF bandwidth

(c) Remote mode control. The command format is:

M D_1 E (LF or CR).

D1 is a digit from 0 through 4 where:

0 is AM Average Mode
1 is AM Pulse Mode
2 is AM Manual Mode
3 is CW Manual Mode
4 is FM Average Mode

(d) Reading receiver status. The receiver reflects the last commands sent over the IEEE-STD-488 Bus. It does not contain current receiver status if the receiver has been manually changed in the local mode after the remote command has been sent. The status format is:

D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 X I M

where D is a frequency digit 0-9, D_1 is the most significant digit, D8 is always zero, X is not used, I is the bandwidth digit, as in (b) above, and M is the mode digit, as in (c) above.

d. Spectrum Monitor. To operate the Spectrum Monitor, tune receiver as described in 3.2a, b, or c:

(1) Rotate INTENSITY adjust for desired brightness of CRT display.

(2) With a received signal or internal marker displayed, rotate FOCUS adjust for maximum sharpness of CRT trace.

(3) Rotate SM GAIN adjust to vary magnitude of displayed signal.

(4) Rotate SWEEP WIDTH adjust to vary total width of spectrum displayed from 0 to 4 MHz.

(5) Rotate SWEEP RATE adjust to vary scanning rate from 5 to 25 Hz.

(6) Switch MARKER to ON to produce a precise 21.4-MHz marking signal to which the input signal can be referenced.

(7) With MARKER to ON and SWEEP WIDTH adjusted to a low value, rotate CENTER FREQ adjust to center trace at 21.4 MHz.

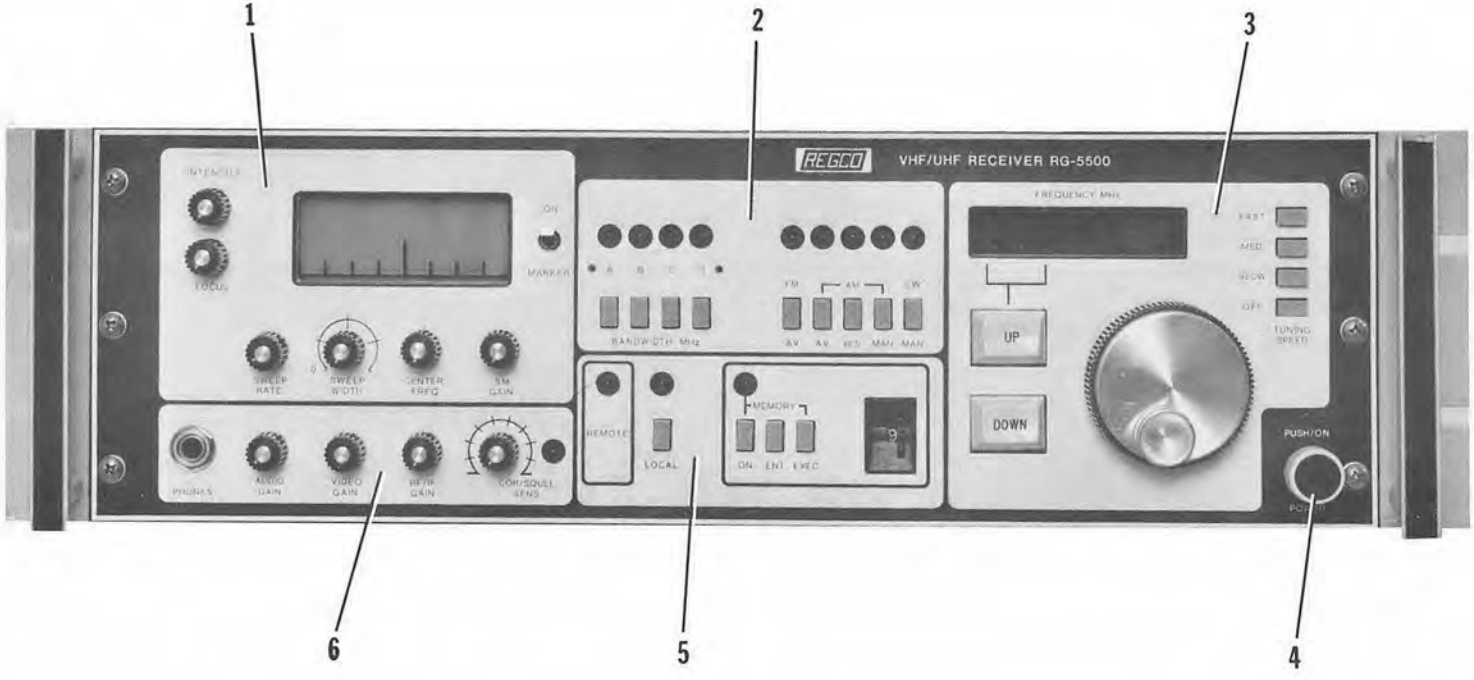


Figure 3-1. Front Panel Controls, Indicators, and Connectors

Table 3-1. Front Panel Controls, Indicators, and Connectors

FIG. AND INDEX NO.	CONTROL/INDICATOR	FUNCTION
3-1		
-1	SPECTRUM MONITOR	
	FOCUS adjust (R7)	Controls sharpness of display.
	INTENSITY adjust (R11)	Controls brightness of display.
	MARKER ON switch (S1)	21.4 MHz marker control.
	SM GAIN adjust (R1)	Controls amplitude of display.
	CENTER FREQ adjust (R3)	Centers 21.4 MHz on monitor.
	SWEEP WIDTH adjust (R4)	Adjust bandwidth 0 to 8 MHz.
	SWEEP RATE adjust (R2)	Varies scan rate from 5 Hz to 25 Hz.
-2	BANDWIDTH/MODE SELECT	
	BANDWIDTH MHz	
	Indicators	Indicate IF bandwidth option selected.
	A (DS1)	
	B (DS2)	
	C (DS3)	
	D (DS4)	
	Switches	Provide selection of IF bandwidth options.
	A (A5S1)	
	B (A5S2)	
	C (A5S3)	
	D (A5S4)	
	Mode	
	Indicators	Indicate demodulation mode selected.
	FM AV (DS5)	
	AM	
	AV (DS6)	
	PLS (DS7)	
	MAN (DS8)	
	CW MAN (DS9)	

Table 3-1. Front Panel Controls, Indicators, and Connectors - Continued

FIG. AND INDEX NO.	CONTROL/INDICATOR	FUNCTION
3-1-2 Continued	Switches	Provide selection of demodulation mode.
	FM AV (A5S5)	
	AM	
	AV (A5S6)	
	PLS (A5S7)	
	MAN (A5S8)	
	CW MAN (A5S9)	
-3	FREQUENCY MHz	
	Display (A10)	7-digit readout.
	TUNING SPEED	Controls incrementing speed of tuning knob U8.
	FAST (A6S1)	
	MED (A6S2)	
	SLOW (A6S3)	
	OFF (A6S4)	Disables tuning knob U8.
	Tuning knob (U8)	
	Increment switches	Provide rapid counting of displayed frequency in 1-MHz increments.
	UP (A7S1)	
	DOWN (A7S2)	
-4	POWER, PUSH/ON (S1)	Applies ac power to unit.
-5	Operating Mode	
	REMOTE indicator (DS10)	Indicates remote control operation.
	LOCAL	
	Indicator (DS11)	Indicates selection of local mode.
	Switch (A4S1)	Selects local mode.
	MEMORY	
	Indicator	
	ON (DS12)	Indicates selection of memory mode.
	Switches	
	ON (A3S1)	Selects memory mode.
	ENT (A3S2)	Enters displayed information into memory.

Table 3-1. Front Panel Controls, Indicators, and Connectors - Continued

FIG. AND INDEX NO.	CONTROL/INDICATOR	FUNCTION
3-1-5 Continued	EXEC (A3S3)	Executes commands displayed from memory.
	Thumbwheel switch (S2)	Permits addressing of the 16 memory locations.
-6	Receiver Controls	
	PHONES jack (A29J1)	Allows monitoring of audio signal.
	AUDIO GAIN adjust (R1)	Adjusts gain of audio signal at PHONES jack.
	VIDEO GAIN adjust (R2)	Permits adjustment of demodulated video signal.
	RF/IF GAIN adjust (R5)	Permits adjustment of received signal level in CW or AM MAN modes.
	COR/SQUEL SENS Adjust (R3) Indicator (DS13)	Permits adjustment of Squelch and Carrier Operated Relay sensitivity. Lights when squelch/COR energized.

CHAPTER 4

PRINCIPLES OF OPERATION

4-1. INTRODUCTION. This chapter describes the operation of the RG-5500 VHF/UHF Receiver on two levels. A simplified functional description, keyed to figure 4-1, is presented first. This is followed by a detailed functional description referenced to the block diagrams in this chapter and the schematic diagrams in chapter 7.

4-2. SIMPLIFIED FUNCTIONAL DESCRIPTION. The receiver can be functionally divided into five major sections (figure 4-1). Each of these sections is described below.

a. Digital Control Section. The commands provided by the digital section control the operation of the receiver. A switching capability is provided which selects any one of the three sources for this information: the front panel, remote device, or memory. When the front panel is accessed in local mode, the selected frequency, demodulation mode, and IF bandwidth information is applied to the input/output board. There the information is converted to digital commands and routed through the switching circuit to the front-panel display and to the other sections of the receiver. The information from the I/O board can also be entered into any one of the 16 memory locations provided. Selection of the remote mode enables the remote device and disables the front-panel controls. The information from the device is converted to digital commands by the remote control interface and applied through the switching circuit to the front-panel display and other sections of the receiver. In memory mode the information stored in the various memory locations can be viewed without changing the status of the receiver. With the execute command the receiver will be retuned as directed by the memory location selected.

b. Synthesizer Section. The 5-MHz frequency reference, either internally or externally supplied, provides the basis for the frequency synthesizer. Digital frequency commands from the control section are mixed with a base frequency within the synthesizers to produce a first local oscillator frequency of 670 to 1169.9999 MHz. A second local oscillator frequency of 138.600 or 638.600 MHz is provided by the second LO.

c. RF Section. At the input to the RF section the 20- to 1000-MHz signal is applied to a switch/preamplifier/filter circuit. Tuning control and AGC voltages provide selective filtering and level adjustment to prepare the RF signal for the first stage of mixing. The tuning control voltage produced in the preselector is derived from the digital frequency commands from the control section. Within the first mixer, the RF frequency is combined with the corresponding first LO frequency. The resultant difference frequency is selected by a bandpass filter and applied to the second mixer stage. Here the second LO frequency is combined with the signal to produce the 21.4-MHz IF.

d. AGC Section. The AGC amplifier produces a control voltage in response to the gain commands from the control section. The detected AM output from the IF section is used as a reference signal for the gain control circuit. When the AM reference level drops below a threshold established by the squelch sensitivity adjust, a squelching voltage is produced and applied to the audio/video amplifier in the IF section, shutting off the audio output. An external relay contact is also energized.

e. IF Section. The mode and bandwidth commands from the digital section are applied as control signals to a switching circuit within the IF section. This switch enables one of the four bandpass amplifiers and provides selection of the corresponding FM discriminator output thereby determining the bandwidth of the detected FM signal. The AM detected signal is also applied to the switch for selection in AM mode. The selected signal mode, AM or FM, is applied through an audio/video amplifier to the receiver output.

4-3. DETAILED FUNCTIONAL DESCRIPTION. This section describes in detail the functional operation of the RG-5500 VHF/UHF Receiver.

a. Digital Control Section. The digital control section provides the means to input, store, and execute receiver functions via the front-panel controls and the remote control devices. This section is composed of the digital control assembly and the remote control interface assembly.

(1) Digital Control Assembly. The digital control assembly (figure 4-2) is composed of A13 I/O board, A11 memory board, A12 hold register board, A8 display register board, A9 display driver board, and A32 trigger generator.

(a) A13 I/O Board (figure 7-10). The I/O board acts as an interface between the front-panel controls and the other boards in the digital assembly. The input frequency tuning information is applied to frequency updater/overflow protector U6C, U11A, U12B, U12C, U13A, and U13B. The frequency update output is applied to A11 memory board, and any overflow information from A11 is transformed into a inhibit signal applied to the trigger. Address comparator U6B and U16 compares the thumbwheel memory address selector with the memory address location in A11. Parity information is applied to any action detector U7-U11. Information from the LOCAL and MEMORY switches A3S1-3 and A4S1 and the parity signal from the address comparator are detected by this circuit, which enables the trigger. The trigger, composed of U8D, U14, U15, U21, U23, and U24, provides synchronization for the digital control assembly. In local operation the priority encoder U1-U5 selects the parallel demodulation mode and bandwidth information from the front-panel controls and converts it to serial data. It also stores the front-panel information when memory mode is selected. This serial data is then applied to Tristate switch U3F, U5F and shift register U17. This circuit selects and converts to parallel data either the input from the priority encoder in LOCAL (MEM is logic 0), or FD OUT from the memory

unit in MEMORY + EXECUTE ($\overline{\text{MEM}}$ is logic 0). The output of the Tristate switch is applied to the data buss.

(b) A11 Memory Board (figure 7-8). The memory board permits the storage and recall of operating information via front-panel controls. Memory interface U1 accesses the memory address indicated by thumbwheel switch S2 on the front panel and provides the read/write enable signal to the memory unit. Memory unit U2-U6, U19-U23 provides the capability to read, store, and access 16 memory locations containing frequency, demodulation mode, and IF bandwidth information. Serial mode and bandwidth information FD IN is read into the memory from the Tristate switch in A13 and read out as FD OUT to A13 I/O board and A8 display register board. The frequency information is read in as serial data from registers U7-U10 and read out as 1D, 2D, 4D, 8D OUT to the switch and to A8 display register board. Accumulator U12, U14, U15, U17, U26, U30 interprets the frequency update information from A13 I/O board and provides an overflow indication to A13 when the frequency is outside the range of 20 MHz to 999.9999 MHz. The accumulator also adds the update information to the serial output of the registers and applies the sum to one input of the switch. Switch U11 selects either the 1D, 2D, 4D, 8D OUT from the memory with MEM enabled or the output of the accumulator with $\overline{\text{MEM}}$ enabled. The output of the switch is applied to registers U7-U10, which when enabled in local mode provide a parallel data output to the buss. The serial output of the registers is applied to the memory and the accumulator.

(c) A12 Hold Register Board (figure 7-9). The hold register board interfaces the digital control section with the other major sections of the receiver. Storage register U1-U6 is controlled by TRIG HOLD REG clock from A32 trigger generator. When clocked the storage register switches the parallel mode/bandwidth information from the buss to the mode detector and the parallel frequency information to A22 synthesizer and the high band/offset detector. Gain/mode detector U8B, U9A, B, U16 provides gain selection information to A25 AGC amplifier assembly and mode information to A23 IF assembly. High band/offset detector U9D-U12, U16D monitors the tuned RF frequency and provides a high band control signal to A16 RF assembly when the frequency is 510 MHz or greater. It also applies the most significant digit information of the tuned frequency as an offset signal to A22 synthesizer assembly. Bandwidth decoder U7, U8A switches bandwidth data $\overline{\text{IFA}}$-$\overline{\text{IFD}}$ from the parallel mode/bandwidth buss to A23 IF assembly. Mode/bandwidth indicator decoder U13-U15 switches information from the parallel buss to the mode and bandwidth indicator lights on the front panel.

(d) A8 Display Register (figure 7-5). The display register interfaces the memory unit with the parallel mode/bandwidth and frequency busses. Frequency display register U5-U8, enabled in memory mode via A32 triggers generator, converts the 1D, 2D, 4D, 8D OUT frequency data from the memory into parallel form and applies it to the frequency data buss. Mode/bandwidth display register U9 functions identically with the FD OUT mode and bandwidth data, applying it to the parallel data buss.

(e) A9 Display Driver Board (figure 7-6). The display driver board receives the frequency information from the parallel data buss and applies it through buffer amplifiers U9-U14 to display drivers U1-U7. The output of the drivers controls the frequency display on the front panel.

(f) A32 Trigger Generator (figure 7-58). The trigger generator acts as a switch enabling the storage register in A12 in the LOCAL or MEMORY + EXECUTE operation modes. The operation of the display registers in the display register board is controlled by the MBE enable signal generated by the circuit in MEMORY mode.

(2) Remote Control Interface Assembly. The remote control interface assembly (figure 4-3) conforms to IEEE Standard 488-1978. It is composed of A14 remote control I/O board, A15 remote control interface board, and P/O A8 display register board.

(a) A14 Remote Control I/O Board (figure 7-11). The remote control board provides the input/output ports to transfer data, control, and management information between the remote control device and the receiver. Management control port U6 and U7 pins 4 and 6 provides input drivers for EOI, IFC, ATN, and REN management signals. Transfer control port U4, U5, and U7 provides input and output drivers for DAV, NRFD, and NDAC signals from A15 to the bidirectional buss. Data port U1-U3, U5E, U5F provides input and switchable output drivers for D1-D7 and D10-D40 data lines and DIO 1-8 bidirectional data buss, as controlled by the DAVO (data valid out) signal from A15.

(b) A15 Remote Control Interface Board (figure 7-12). The remote control interface board controls the bidirectional data flow between the digital control assembly and the remote control device. Address decoder U30, U31, U3 compares the address requested by the remote control device with the receiver address preset by DIP switch S1. When the two are identical, the parity output enables the command controller. Thus enabled, command controller U25-U28, U33, U34 generates and applies OTA and UNL to the remote control switch. Within the command controller the presence of demodulation mode, IF bandwidth, or frequency information on the D1-D7 input lines is detected. The presence of mode or bandwidth causes a clock signal to be applied to the corresponding circuit in the mode/bandwidth decoder, transferring that data to the parallel buss. The frequency data clock is enabled when

frequency information is detected by the controller. The ACDS (accept data) signal from the listen decoder generates an enable which is applied to the remote data decoder. Remote control switch U5A, U18, U19A, U19B, U21-U23 monitors the management control signals from A14 and provides a remote enable condition to A8 and to the REMOTE indicator light when remote operation is selected. The OTA (other talk address) and UNL (unlisten) signal inputs to the switch produce enabling control outputs to the talk and listen decoder circuits. Listen decoder U12-U17 enabled by the remote control switch monitors the DAVI (data valid in) signal from A14 and provides transfer control messages NDACO (not data accepted out) and NRFDO (not ready for data out) to the input/output port and ACDS to the command controller as instructed by the remote switch. Talk decoder U1-U3, U6-U10 monitors the NDACI and NRFDI signals from A14 and provides transfer control messages DAVO (data valid out) to the transfer control port and the data port, and T·$\overline{\text{ATN}}$ (transmit attention) to the frequency data clock. Frequency data clock U40, U41, when enabled by the talk decoder and command controller, provides a clock pulse to the remote data decoder. Mode/bandwidth decoder U37-U39 recovers the demodulation mode and IF bandwidth information from the incoming data lines and applies it to the remote data decoder. Remote data decoder U35, U42, U43, has as inputs the D1-D7 data lines from A14 and the detected mode and bandwidth data from the decoder. Controlled by the command controller, the data decoder converts the frequency information from parallel to serial and, clocked by the input from the data clock, shifts it out on lines R1-R8 to the remote data register in A8. It then transfers the bandwidth and mode information out as parallel data to the data buss. The mode and bandwidth information is also shifted within the decoder to be combined with the frequency acknowledgement information from A8. This information is then clocked out on lines D1O-D4O to the input/output data port in A14 and on to the remote control device to indicate receiver status.

(c) A8 P/O Display Register Board (figure 7-5). The remote data register contained in the display register board converts the serial frequency input data to parallel. When enabled by the remote enable signal from A15, the frequency data is applied to the data buss. A serial data output is also used to return the frequency information to A15 on lines T1-T8.

b. Synthesizer Section. The synthesizer section (figure 4-4) generates the 1st and 2nd local oscillator frequencies required by the RF section. These frequencies are determined by the tuned RF frequency of the receiver. The synthesizer section is composed of A22 synthesizer assembly, A20 and A21 voltage controlled oscillators, and A34 and A35 local oscillator amplifiers.

(1) A22 Synthesizer Assembly (figure 7-15). The synthesizer assembly is composed of A22A6 reference generator, A22A5 base synthesizer, A22A1-A4 iterative synthesizers, A22A7 steering synthesizer, A22A8 output tracking oscillator, A22A9 138.600 MHz phase-locked local oscillator, A22A10 638.600 MHz phase-locked local oscillator and A22A11 2ND LO switch.

(a) A22A6 Reference Generator (figure 7-20). The 5-MHz internal reference frequency in the synthesizer module is generated by temperature-compensated crystal oscillator (TCXO) U2. Rear-panel connector J5 provides the option of using an external 5-MHz source in place of the TCXO. Selector switch S3, also located on the rear panel, switches the +Vcc and selects the desired frequency source. Setting the switch to INT will switch on the TCXO and switch off input amplifier U4 for the external 5 MHz and also connect the TCXO output to the frequency divider circuits. Similarly, the external 5-MHz input amplifier will be enabled and the TCXO disabled and the external reference frequency selected when the switch is set to EXT. The selected 5 MHz is applied to the inputs of two frequency divider circuits, a divide by four U6, and a divide by five U7. The 1.25 MHz divide by four output is applied to A22A7 steering synthesizer and the 1.00 MHz divide by five output is applied through individual buffer amplifiers U8 and U9, to A22A1-A4 interative synthesizers, A22A5 base synthesizer, and A22A9 and A10 crystal oscillators.

(b) A22A5 Base Synthesizer (figure 7-19). The base synthesizer produces an output of 2.500 to 2.750 MHz varying in relation to the number of 100 Hz in the tuned RF frequency. To accomplish this the 1.00 to 1.09 MHz output from VCO Q2 is applied as a clock to programmable divider U3-U7. The number of 100 Hz, the least significant digit in the tuned RF frequency, establishes a preset and determines the division factor of the divider. Each 100 Hz of tuned frequency produces a 10-kHz change in the 1.00-MHz nominal output frequency of the programmable divider, for a maximum of 90 kHz. This 1.00 to 1.09 MHz signal is applied to phase-frequency detector U1 where it is compared with the 1.00 MHz reference frequency from A22A6 reference generator. The output of U1 is applied to differential amplifier U2, where it is converted into a dc tuning voltage. This tuning voltage is applied to PIN diode CR1 in the tank circuit of the VCO. The resistance of CR1 and, therefore, the resonant frequency of the tank circuit is dependent upon the bias voltage applied to CR1. Any change in the tuning voltage will thus change the resonant frequency of the tank circuit retuning the VCO within the range of 100 to 109 MHz. The output of the VCO is applied to a divide by 40 circuit composed of U8 and U9 and appears at the output of the base synthesizer as a 2.500- to 2.750-MHz signal.

(c) A22A1-A4 Iterative Synthesizers (figure 7-16). In a circuit similar to that in the base synthesizer, each of the four iterative synthesizers produce a 22.50- to 24.75-MHz signal which varies in relation to the tuned RF frequency digit information applied. To accomplish this, VCO Q1 generates a 90- to 99-MHz output which is applied as a clock to the programmable divider circuit, U1-U5. The division factor of the divider is determined by the digit information applicable to each module. The modules are connected in cascade, and the controlling digit is always the next most significant in the tuned frequency. The first stage, A22A4 iterative synthesizer, is controlled by the 1-kHz digit, A22A3 by the 10-kHz digit, A22A2 by the 100-kHz digit, and A22A1 by the 1-MHz digit. The output of the programmable divider, a 1.00- to 1.09-MHz signal, is compared with the 1.0-MHz reference frequency in

phase-frequency detector U6. The detector output, applied through differential amplifier U7, appears as a tuning voltage at PIN diode CR1 in the tank circuit of the VCO. Responding to the bias change, the resistance of CR1 changes, retuning the VCO. The 90- to 99-MHz VCO output is divided by four and amplified by U8 and Q2 and applied as a 22.5- to 24.75-MHz signal to one side of mixer U9. In the case of A22A4, the first iterative synthesizer, the second input to the mixer is the 2.50- to 2.75-MHz signal from A22A5 base synthesizer. For A22A3-A1 iterative synthesizers, the output of the preceding module is applied to the mixer. The sum frequency output of the mixer is selected by a bandpass filter composed of C29-C48 and L6-L11 (filter module A1 is used in the final iterative synthesizer stage), and applied to a divide by 10 circuit made up of U10 and U11. The resulting 2.50- to 2.75-MHz output is connected to either the next iterative synthesizer stage or, in the case of A22A1, to A22A8 output tracking synthesizer. The important result of the mixer action is that because the frequency of the present stage is greater than that of the preceding stage by a factor of 10, the information encoded in that frequency becomes more significant in the mixer output also by a factor of 10. Throughout all four iterative synthesizer stages this weighting occurs until at the output of A22A1 the 2.50- to 2.75-MHz signal can be analyzed as follows:

Frequency Digit	Frequency Change at A22A1
100 Hz	2.5 Hz
1 kHz	25 Hz
10 kHz	250 Hz
100 kHz	2.5 kHz
1 MHz	25 kHz

(d) A22A7 Steering Synthesizer (figure 7-21). The 560- to 1060-MHz output from steering VCO A20 is applied as a clock to programmable divider U1-U12. The division factor of the divider is determined by the number of 10 MHz and 100 MHz in the tuned RF frequency. This information, representing the two most significant digits of the RF, establishes a preset for the divider and determines its output frequency in the range of 1.25 to 1.3749 MHz. The output of the divider is compared with the 1.25-MHz reference frequency from A22A6 reference generator in phase-frequency detector U13. The detector output is converted to a dc tuning voltage by differential amplifier U14 and filtered to eliminate the 1.25 MHz by notch filter L3. It is then applied to the VCO to retune the oscillator in 10-MHz steps. A -1-Vdc tuning voltage will tune the VCO for 560 MHz; -12 Vdc will produce a 1060-MHz frequency output of the VCO A20.

(e) A22A8 Output Tracking Synthesizer (figure 7-22). The 670- to 1169.9999-MHz output from A21 VCO is coupled to mixer U3 in A22A8 output tracking synthesizer, where it is combined with the 560- to 1059.9999-MHz output from A20 steering VCO. The resulting difference frequency of 100 to 109.0000 MHz is selected and amplified

by tuned amplifier Q1 and applied to a divide by 40 circuit composed of U1 and U2. The 2.5000- to 2.7499-MHz output of the divider is compared with the 2.500- to 2.7499-MHz reference output of A22A1 iterative synthesizer in phase-frequency detector U4. The detector output is converted to a dc tuning voltage by differential amplifier U5 and filtered to eliminate the reference frequency by notch filter L6, L7. This tuning voltage is added to the coarse tuning voltage at the input to summing amplifier U8. The coarse tuning voltage is developed by the circuit composed of digital-to-analog converter U6 and operational amplifier U7. The number of 10-MHz and 100-MHz digits in the tuned RF frequency is applied to the input of U6, producing a dc voltage at the output representing these two most significant digits of the RF. This signal is applied to U7, where it is inverted and amplified and then applied to the input of U8. These two signals appearing at the input to U8 are combined in a ratio of 15 to 1, with the output of U7 being the larger. The coarse tuning circuit will tune A21 VCO to within 50 MHz of the selected frequency. The output of U8 is a -1V to -12-Vdc tuning voltage which is applied to A21 VCO. The 670- to 1169.9999-MHz output of A21 is amplified by A35 1ST local oscillator amplifier and applied to A16A3 first converter switch in the RF tuner module.

(f) A22A9 138.6000 MHz Phase-Locked Crystal Oscillator (figure 7-23). The 46.200-MHz output of voltage controlled crystal oscillator Q3, Y1 is selected and amplified by buffer amplifier Q4. This signal is then applied through TTL buffer Q5 to one side of digital mixer U3. The second input to the mixer is the 500-kHz output at pin 6 of divide by two/divide by five circuit U1, derived from the 1.00-MHz output of A22A6 reference generator. The 100-kHz output of the mixer at pin 9 is compared with the 100-kHz output at pin 12 of divider U1 by phase-frequency detector U2. The output of U2 is applied to a low-pass filter/integrating amplifier composed of Q1 and Q2, which filters out the 100 kHz and produces a sine wave control signal as applied to the input of the VCXO. The output frequency of the VCXO is phase-locked to the input control signal by the action of PIN diode CR1. As the signal varies, the resistance of CR1 varies, affecting the charge time of the capacitive circuit within the oscillator. This causes a phase shift of the 46.200-MHz output synchronizing it with the control signal. The oscillator output is applied through buffer amplifier Q4 to amplifier/tripler Q6, Q7 and then to A22A11 2ND LO switch module.

(g) A22A10 638.600 MHz Phase-Locked Crystal Oscillator (figure 7-24). The 15.965-MHz output of the voltage controlled crystal oscillator (VCXO) Q3 is selected and amplified by buffer amplifier Q4. This signal is then applied through differential amplifier Q5, Q6, which acts as a TTL buffer, to one side of digital mixer U5. The second input to the mixer is the 40-kHz output at pin 12 of the divide by 25/divide by two circuit U1 and U2, derived from the 1-MHz output of A22A5 reference generator. The 5-kHz output of the mixer at pin 5 is compared with the 5-kHz output at pin 9 of divide by four circuit U3 by phase-frequency detector U4. The output of the detector is applied to a low-pass filter/integrating amplifier composed of Q1 and Q2, which filters out the 5 kHz and produces a sine wave control signal as applied to the input

of the VCXO. The output frequency of the VCXO is phase-locked to the input control signal by the action of PIN diode CR1 as in A22A9. The oscillator output is applied through buffer amplifier Q3 to A22A10A1 frequency multiplier module. In the frequency multiplier the 15.965 MHz from Q3 is applied to a multiply by 20 circuit composed of A22A10A1A1 and U1. The 319.3-MHz output is applied to three-stage bandpass filter L1-L3 which selects the first harmonic of 638.600 MHz. This signal is then amplified by A22A10A1A2 RF amplifier and applied to A22A11 2ND LO switch moudle.

(h) A22A11 2ND LO Switch (figure 7-26). The 2ND LO switch is controlled by the low-band and high-band switch control voltages generated in A18 RF preselector driver. When the receiver is tuned to a frequency in the range of 20 to 509.9999 MHz, these control voltages forward bias switching diodes CR 1 and CR4 and reverse bias diodes CR 2 and CR3. This selects the 638.600-MHz low-band 2nd local oscillator frequency and applies it to the output. For tuned frequencies in the range of 510 to 999.9999 MHz, diodes CR 2 and CR3 are forward biased and CR 1 and CR4 are reverse biased. This selects the 138.600-MHz high-band 2nd local oscillator frequency and applies it to the output.

(2) A20 and A21 Voltage Controlled Oscillators. The voltage controlled oscillators provide steering frequencies for their associated synthesizers.

(a) A20 Steering VCO. This VCO receives its tuning voltage from steering synthesizer A7. It is tunable in the range of 560 to 1060 MHz.

(b) A21 Steering VCO. This VCO receives its tuning voltage from A22A8 output tracking synthesizer. It is tunable in the range 670 to 1170 MHz.

(3) A34 and A35 Local Oscillator Amplifiers (figures 7-60, 7-61). The 1ST and 2ND LO amplifiers provide level matching to the RF section.

c. RF Section. The RF section (figure 4-5) is composed of A33 RF input switch, A16 RF assembly, and A18 RF preselector driver and PIN diode switch drivers.

(1) A33 RF Input Switch (figure 7-59). The 20- to 1000-MHz RF input signal at coaxial connector J2 on the rear panel is applied to the RF tuner module through A33 RF input switch. Controlled by the HB/LB digital signal from A12, the RF switch selects the proper RF tuner module input determined by the tuned frequency of the receiver. For frequencies between 20 and 509.9999 MHz, the low-band preamplifier is selected; for frequencies between 510 and 999.9999 MHz, the high-band preamplifier is selected.

(2) A16 RF Assembly (figure 7-13). The RF assembly translates the 20- to 999.9999-MHz RF input signal to the 21.4-MHz IF. To accomplish this the RF input spectrum is divided into a low band (LB) from 20 to 509.9999 MHz and a high band (HB) from 510 to 999.9999 MHz.

(a) A16A5 High Band Preamplifier No. 1. In high band preamplifier no. 1, the 510- to 999.9999-MHz input signal is filtered by L1 and L2 and applied to AGC controlled attenuator CR1-CR3. As the AGC voltage increases, the amount of attenuation decreases. The signal is then applied to amplifier U1 which is turned on only when a high-band signal is detected by A18 RF preselector driver module. The signal is then routed through an attenuator to voltage tuned filter no. 1.

(b) Voltage Tuned Filters Nos. 1 and 2. A tuning voltage generated by the PIN diode drivers in module A18 provides the means for tuning these filters. As the tuning voltage increases, the reverse biasing of the PIN diodes within the filters increases, raising the frequency cutoff point. Separated by high band preamplifier no. 2, similar to switched amplifier U1 in A5, the two voltage-tuned filters aid in image rejection and improve selectivity in the high band.

(c) A16A4 Low Band Preamplifier and Switch. Low-band frequencies selected by A33 RF input switch are applied through FL1 510-MHz low-pass filter to the low band preamplifier and switch. The preamplifier is composed of two-staged amplifier/attenuator U1, U2 which is switched on when a low-band signal is detected by A18 RF preselector driver. AGC controlled attenuator CR1-CR3 follows, identical in operation to its counterpart in the high-band section. At this point, the high-band and low-band signal paths are connected to the inputs of selector switch CR4-CR7. Responding to control voltages generated in A16A3 first converter switch, the switch selects one of the signal paths and applies it to A16A3.

(d) A16A3 First Converter Switch. The RF signal selected by A16A4 is applied to one input of mixer U1 in the first converter switch. Within the mixer, this RF signal is combined with the corresponding first local oscillator frequency to produce the first IF. In low-band operation the local oscillator frequency is 660 MHz above the tuned frequency which, when mixed with the RF signal, produces a first IF of 660 MHz. In high-band operation the local oscillator frequency is 160 MHz above the tuned frequency, similarly producing a first IF of 160 MHz. This output from the mixer is applied through amplifier/attenuator U2 to the input of diode switch CR1, CR2. The action of the switch is to couple the first IF signal to either A16FL1 160-MHz bandpass filter, or A16FL2 660-MHz bandpass filter, as required. (The control voltages for this diode switch, as well as the selector switches located in A16A1 and A16A4, are generated by operational amplifiers U3A and U3B in A16A3. Starting with the HB/LB control signal from A12 hold register, they generate the +10V enable and -10V disable control voltages required.) FL1 has a 8-MHz bandwidth centered at the high-band IF frequency of 160 MHz. FL2 has a 10-MHz bandwidth centered at the low-band IF frequency of 660 MHz.

(e) A16A1 Second Converter Switch. The outputs of FL1 and FL2 are connected to the inputs of diode switch CR1-CR4 in the second converter switch. Controlled by the ±10V from U3 in A16A3, the switch selects either the high-band or low-band path and applies it to amplifier/attenuator U1 in preparation for the second stage of mixing. In mixer U2 the first IF (160 or 660 MHz) is mixed with the corresponding second local oscillator frequency (138.600 or 638.600 MHz), as selected in A22A11 2ND local oscillator switch. The 21.4-MHz second IF output from the mixer is then amplified by Q1 and applied as an output to A23 IF assembly.

(3) A18 RF Preselector Driver and PIN Diode Switch Drivers (figure 7-14). The input to A18 contains the digit information for the three most significant digits of the tuned RF frequency. This information is applied through buffer amplifiers U1 and U2 to digital-to-analog converter U3. The output of the converter varies from 0 Vdc when the digits reflect a frequency of 510 MHz to +5 Vdc for a frequency of 999.9999 MHz. This output is applied to two parallel adjustable amplifiers U4 and U6 and then as a tuning voltage to filters no. 1 and 2 in A16 RF tuner module. A second input to A18 is the high-band/low-band (HB/LB) control signal from A12 hold register. This signal, a logic "1" for HB or a logic "0" for LB, is applied to two amplifier switches U5B and U5C. These switches provide a +15-Vdc or -15-Vdc control signal to A22A11 2ND LO switch in the synthesizer assembly. Through the HB and LB output jacks a logic "1" input will produce a +15 Vdc at HB out and -15 Vdc at LB out. The +15-Vdc HB and LB switch control signal for the high band preamplifiers no. 1 and 2 A16A1 and A2 and the low band preamplifier and switch A16A4 in the RF tuner module is also generated in A18 module. This is accomplished by applying the HB/LB input signal through amplifiers U5D and Q1 to relay U7. Depending upon the logic input state, U7 switches +15 Vdc to one or the other of the switch control outputs.

d. AGC Section. The AGC section (figure 4-6) is composed of A25 AGC amplifier A28 COR/squelch amplifier, and A31 carrier operated relay.

(1) A25 AGC Amplifier (figure 7-51). The AGC amplifier provides gain control voltages for A23 and A16 IF and RF assemblies. These voltages are derived from the AM output of A23A5 21.4 MHz output amplifier and AM detector in the IF assembly. This AM signal is coupled through buffer amplifier Q1 to the inputs of operational amplifier U1 and differentiator U2. Depending upon the mode of operation, AV, PLS, or MAN, selected by front-panel switches A5S5-S9, the output of either U1 (AV), U2 (PLS), or RF/IF GAIN adjust R5 on the front-panel (MAN) is selected by digital switch U3. The output of U3 is negative limited and buffered by U4A and then applied to IF no. 1, IF no. 2, and RF AGC circuits, and as an output to A28 COR/squelch amplifier module. In the IF no. 1 circuit the output of U4A is amplified by Q2, buffered by U7 and applied to A23A10 IF switching board. The IF no. 2 circuit applies the U4A output through threshold limiter CR3 to A23A5 output amplifier in the IF assembly. To generate the RF AGC output, the signal at the output of U4A is applied through non-inverting amplifier Q3 to variable gain amplifier/limiter U6. The AGC voltage is then applied through emitter follower Q4, Q5 to A16 RF assembly.

(2) A28 COR/Squelch Amplifier (figure 7-54). The AM input from A23 IF amplifier is applied through inverter U1 to differential amplifier U2 and diode limiter CR1, CR2. U2 compares the AM signal level with a -12V reference and applies the difference as a control voltage to transistor switch Q1. In normal operation the output of U2 reverse biases Q1 and the AGC voltage from A25 AGC amplifier is added to the detected AM input signal at the output of U1. COR/SQUEL SENS adjust R3 on the front panel controls the amount of AGC voltage added to the AM signal. When the amplitude of the AM signal is too low for AGC action to compensate, the difference output of U2 forward biases Q1, squelching the AGC. Diodes CR1, CR2 limit the summed input signal to approximately ±0.5 volt and apply it to differentiator U3. In normal operation the output level of U3 is sufficient to bias transistor switch Q2 to shut off and Q3 to conduct. Q3 then provides a ground to A27 audio amplifier. Q2 applies a biasing voltage to comparator/driver Q4-Q6, U4, causing Darlington amplifier Q4, Q5 to conduct. The output of Q4, Q5 is compared with a +10V reference by U4, and the difference output level is sufficient to forward bias driver Q6, and the carrier operated relay (COR) is energized. When the output of U3 goes negative, as a result of the front-panel sensitivity adjust or the squelching of the AGC voltage, transistor switches Q2 and Q3 change state. Q3 then removes the ground applied to A27 and Q2 applies a ground to amplifier Q4, Q5. The output of U4 reverse biases Q6 deenergizing the COR relay. The switching speed of the relay is controlled by COR delay switch S4 on the rear panel.

e. IF Section. The IF section (figure 4-7) is composed of A23 IF assembly, A27 audio/video amplifier, A29 phone jack assembly, and A30 output filter.

(1) A23 IF Assembly (figure 7-27). Within the IF assembly the audio and video information contained in the 21.4-MHz IF is recovered. The demodulation mode, as well as the bandwidth, may be selected using front-panel controls. The IF assembly is composed of four 21.4-MHz bandpass amplifiers and their corresponding 21.4-MHz limiter/discriminators, a 21.4-MHz output amplifier and AM detector, and an IF switching board.

(a) A23A1-A4 21.4 MHz Baseband Amplifier. The IF input signal is paralleled to the input of the four baseband amplifiers. Depending upon the bandwidth selected by switches A5S1-S4 on the front panel, one of the modules is turned on by the AGC control voltage from A23A10 IF switching board. Three different circuit configurations are available, covering the range from 10 kHz to 4 MHz.

1 10 kHz to 100 kHz (figure 7-28). In this bandpass amplifier the 21.4-MHz input IF is applied to AGC controlled amplifier Q1. A -12V on the AGC control line will switch off the amplifier. An inductively-tuned tank at the output of the amplifier provides matching to crystal filter FL1. The output of the crystal filter is applied through an inductively-tuned high-pass filter to a second AGC controlled amplifier, Q2. Variable gain amplifier Q3 provides level matching to the next stage.

The output of the module is transformer coupled to A23A5 21.4-MHz output amplifier and detector.

2 300 kHz and 500 kHz (figures 7-29, 7-30). This version differs from the 10 kHz to 100 kHz configuration in the use of two capacitively-tuned L - C filters instead of the crystal filter. The filters are connected on either side of the second AGC controlled amplifier, Q2, and are adjusted for the proper bandwidth.

3 1 MHz to 4 MHz (figures 7-31 through 7-34). The increased bandwidth of this version is obtained through the use of two inductively-tuned L - C filters in place of the capacitively-tuned filters in the 300 kHz and 500 kHz version.

(b) A23A5 21.4 MHz Output Amplifier and AM Detector (figure 7-35). The output of the selected bandpass amplifier is transformer coupled to the input of the 21.4-MHz output amplifier and AM detector. At the output of transformer T1 the IF signal is applied to two-stage AGC controlled amplifier Q1 and Q2. The output tank circuits of these stages are peaked for 19.0 MHz and 24.0 MHz, respectively, providing a broad, flat frequency response compatible with all bandpass amplifier options. The signal is then applied to amplifier/mixer Q3. In AM and FM modes Q3 functions as an amplifier. With its tank circuit peaked at 21.3 MHz, it provides gain across the bandpass preparing the IF signal for the next stage of detection. When the CW mode is selected, however, beat frequency oscillator (BFO) Q6 is switched on by A22A10. The 21.4-MHz crystal-controlled output of the BFO is applied to Q3 which, functioning as a mixer, detects the CW modulation and applies it to 21.4-MHz output no. 1 jack J3. The CW mode is provided as a tuning aid only. In AM and FM modes the IF signal is applied to AM detector CR1. The detected AM intelligence is then applied both as an output to AM DET OUT J3 on the rear panel and to A22A10. In addition, the output of Q3 is routed in parallel as 21.4-MHz output no. 2 to A23A6-A9 limiter/discriminators.

(c) A23A6-A9 21.4 MHz Limiter/Discriminators. The limiter/discriminators are matched in bandwidth to the corresponding A22A1-A4 bandpass amplifiers. Unlike the amplifiers, however, all of these modules are in continuous operation. Two basic configurations for the limiter/discriminators are available, covering the range from 10 kHz to 4 MHz.

1 10 kHz to 100 kHz (figure 7-36). The input IF is level adjusted and filtered by U1-U3 and appears as a broad, flat signal at the input to crystal discriminator U5. At the output of the discriminator the recovered intelligence is applied through voltage follower U4 to variable gain amplifier U6. The signal is then applied to low-pass filter L6 which blocks the 21.4 MHz and then on to A23A10.

2 300 kHz to 4 MHz (figures 7-37 through 7-42). The basic difference in this version is the use of a Foster/Sealy discriminator in place of the crystal discriminator found in the 10 kHz to 100 kHz version. With this exception, the two configurations are functionally equivalent.

(d) A23A10 IF Switching Board (figure 7-43). The two basic functions of the IF switching board, mode and bandwidth selection, are performed by an arrangement of digital switches U1-U5. Responding to inputs from A12 hold register in the digital control section, these switches regulate the operation of the bandpass amplifiers and select the corresponding FM discriminator output. They also control the operation of the BFO in CW mode and provide switched filtering for the AM detector output. The selected signal is applied to A27 audio/video amplifier.

(2) A27 Audio Video Amplifier (figure 7-53). In the audio section the input from A23 is applied to squelch-controlled amplifier U1. Forward biased by a ground on the squelch input from A28, the amplifier applies the audio to amplifier/emitter follower U2, Q6, Q7. Q6 and Q7 are in a push-pull configuration to produce a low impedance output. The video section provides gate control through VIDEO GAIN adjust R2 on the front panel to differential amplifier Q1, Q2. The output of Q1, Q2 is applied to direct coupled amplifier/emitter follower Q3-Q5. Q4 and Q5 are also in a push-pull configuration, providing a low impedance output. The audio output is applied to A29 phone assembly through AUDIO GAIN adjust R1 on the front panel for head phone monitoring and through Audio Gain adjust R15 on the rear panel to A30 output filter. The video output is also applied to A30, which provides low-pass filters for the output signals.

4-4. POWER SUPPLY CIRCUITS (figures 7-2 through 7-4). The receiver contains a main power supply that provides regulated and unregulated voltages to the various circuits and indicators. The power supply controlled by PUSH/ON switch S1 on the front panel is strappable for 115/230-Vac, 48- to 62-Hz operation. A regulated +5V, +15V, and -15 Vdc and an unregulated +23V, -23V, and +180 Vdc are generated. In addition, control circuit A2 and nickel cadmium batteries BT1 to BT4 provide a +5V protected voltage to A11 memory board independent of power applied.

4-5. A24 SPECTRUM MONITOR (figure 4-8). The spectrum monitor displays the receiver IF with a bandwidth adjustable from 0 to 4 MHz. At the input to the spectrum monitor the 21.4-MHz IF frequency from A23 IF assembly is applied through A24A1 input bandpass filter to A24A2 amplifier/mixer.

a. A24A2 Amplifier, Mixer, IF Amplifier (figure 7-46). Within A24A2 the IF signal is amplified and filtered by Q1 and Q2 and transformer coupled to the first mixer stage. In mixer U1 the IF is combined with the 34.4-MHz VCO output from A24A3. A switchable 21.4-MHz marker from A24A3 is also inserted at the mixer input to provide an accurate frequency reference in the video display. The 13-MHz

difference frequency output of the mixer is amplified and selected by Q3 and then applied to the second mixer stage Q4. Q4 combines the 13 MHz with a 15-MHz output from A24A3. The resultant 2 MHz is selected by filter L7-L9 and applied to two-stage amplifier Q5-Q6. This amplifier provides the gain and selectivity necessary to prepare the 2-MHz signal for detection by CR1. The detector output is a dc pulse which is routed to A24A5 deflection amplifier.

b. A24A3 Sweep Generator/VCO/Marker (figure 7-47). This module provides the mixer and marker frequencies required by A24A2 and the sawtooth wave to drive the horizontal deflection amplifier in A24A5. The linear sawtooth is generated by C1, Q1, Q2. SWEEP RATE adjust R2 on the front panel controls the charge time of C1 and therefore the frequency of the sawtooth. The signal is then applied through buffer amplifier U1, U2 to the 34.4-MHz voltage controlled oscillator Q3, CR1. The frequency of the VCO is determined by the action of the sawtooth signal on PIN diode CR1. SWEEP WIDTH adjust R4 on the front panel controls the frequency shift up to a maximum of ±2 MHz. CENTER FREQ adjust R3 on the front panel adjusts the VCO center frequency to 34.4 MHz. The VCO output is amplified by Q4 and transformer coupled to the first mixer stage in A24A2. Two crystal controlled oscillators, Q5, Y1, and Q6, Y2 are also located in this module. Q5 provides the 15-MHz second mixer frequency and Q6, controlled by MARKER switch S1 on the front-panel, generates the 21.4-MHz marker pulse. Both of these frequencies are applied to A24A2.

c. A24A5 Deflection Amplifier (figure 7-49). The deflection amplifier is composed of two direct coupled balanced amplifier circuits. The +210V supply voltage makes it possible to obtain up to 400V p-p output from these circuits. The detector output from A24A2 is applied to amplifier Q1 and Q2 which provides the vertical deflection for the CRT. Horizontal deflection amplifier Q3 and Q4 is driven by the sawtooth wave from A24A3 producing a sweep signal applied to the CRT. Regulation of the second anode voltage is provided by Q5.

d. A24A4 DC/DC Converter (figure 7-48). The DC/DC converter supplies the heater filament and high voltages required for the CRT and the -20 Vdc used by other circuits. Q1, Q2, T1, and T2 form a push-pull, two-transformer oscillator operating at a frequency of 20 to 25 kHz. The filament voltage is coupled to the CRT from the low voltage secondary of T2 and is referenced to 2000V above ground. The high voltage is developed by voltage multiplier CR2-CR6 and a secondary of T2. The high voltage is applied through INTENSITY adjust R7 and FOCUS adjust R11 on the front panel to the CRT. The +210 Vdc required by the deflection amplifier is developed by half-wave rectifier CR7 from the high voltage secondary of T2. The -20 Vdc is developed by half-wave rectifier CR8 from a separate low voltage winding of T2. This voltage is applied to U1 of A24A6 (figure 7-50) where it is regulated to -15 Vdc.

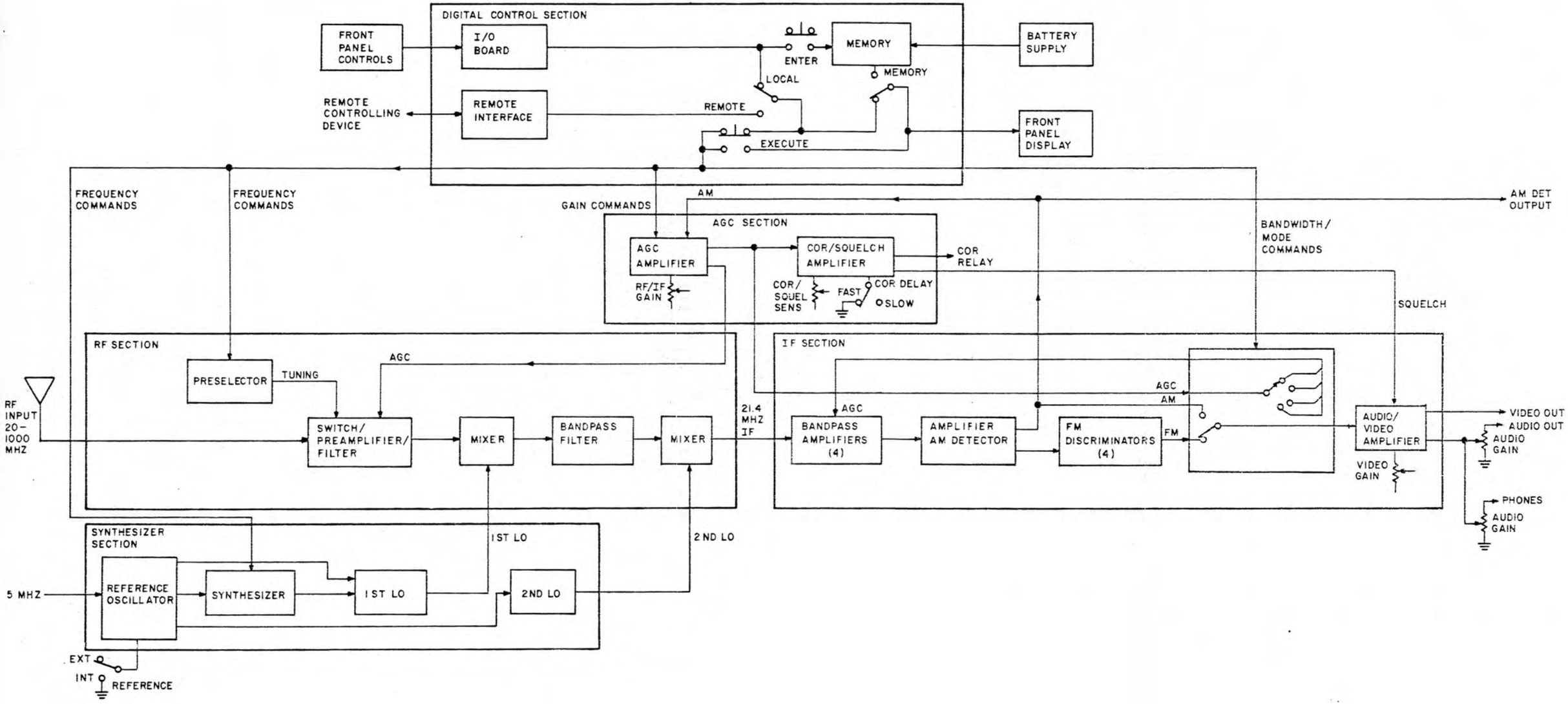


Figure 4-1. RG-5500 Receiver Functional Block Diagram

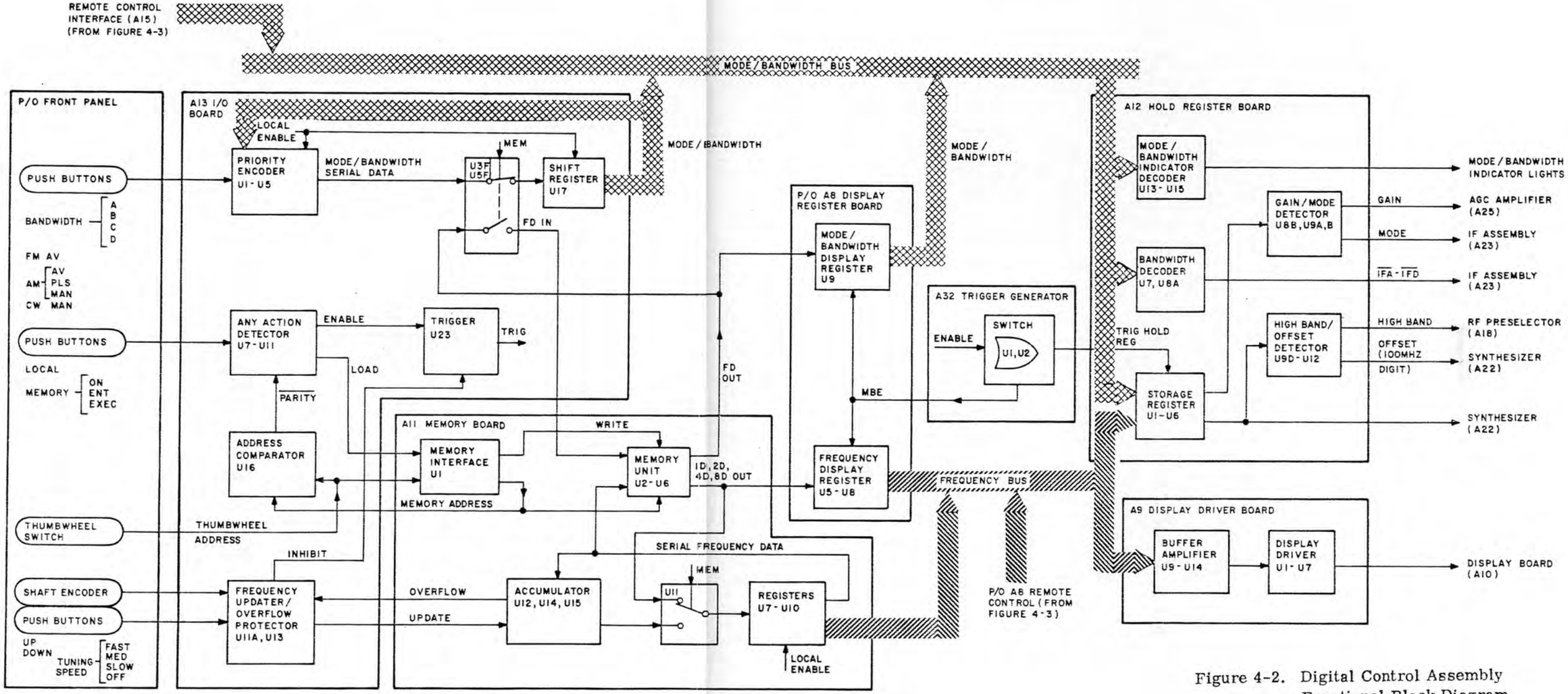


Figure 4-2. Digital Control Assembly Functional Block Diagram

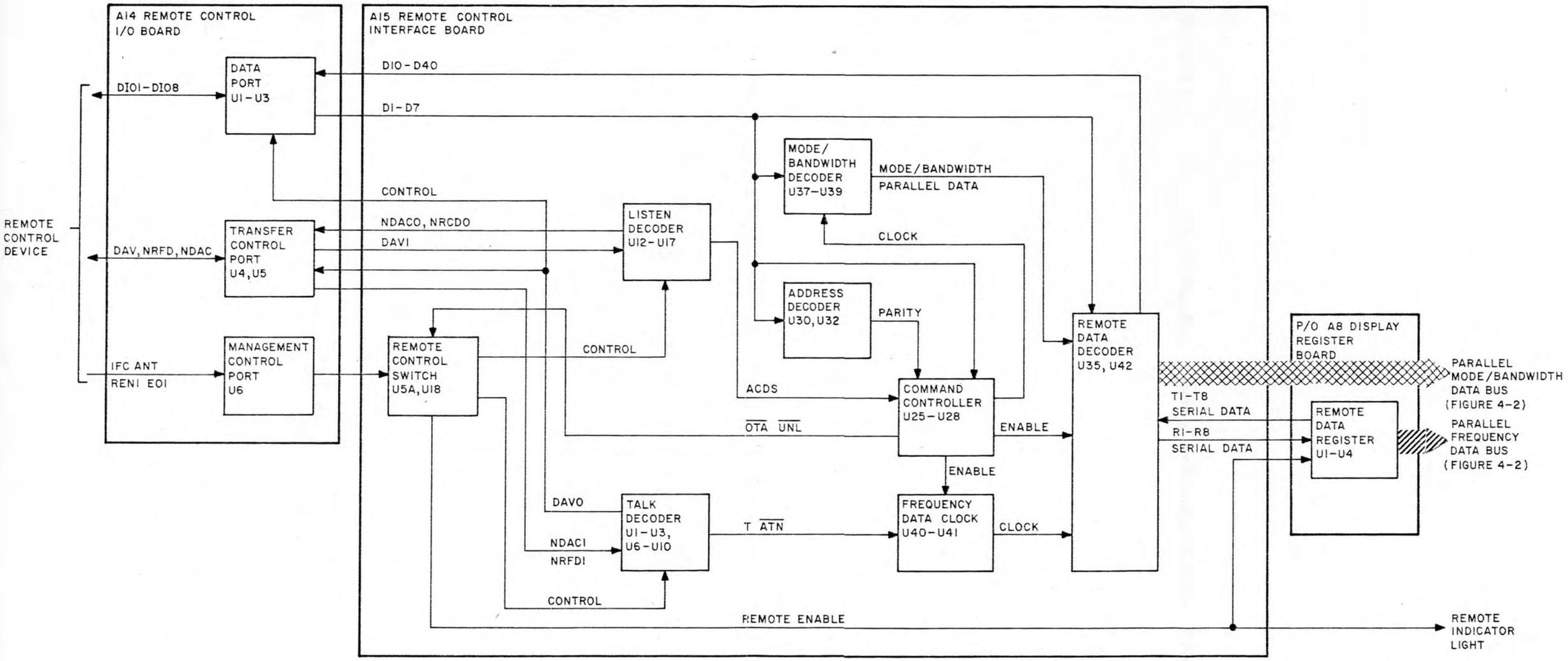


Figure 4-3. Remote Control Interface Assembly Functional Block Diagram

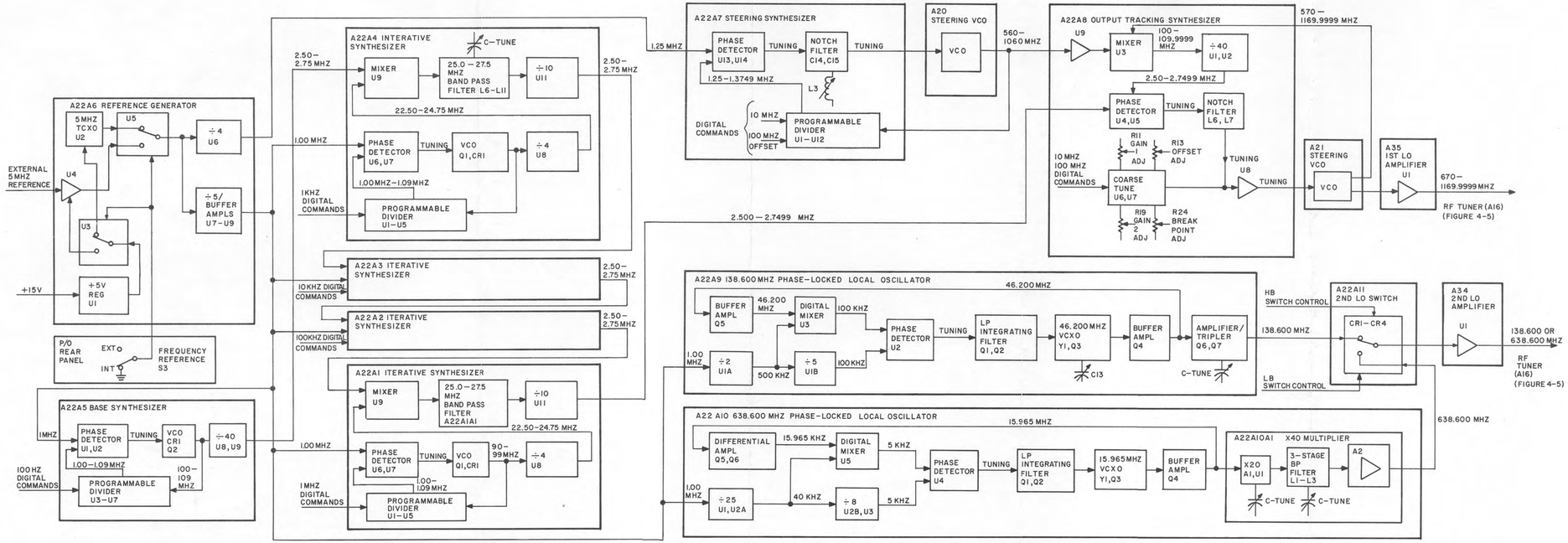


Figure 4-4. Synthesizer Section Functional Block Diagram

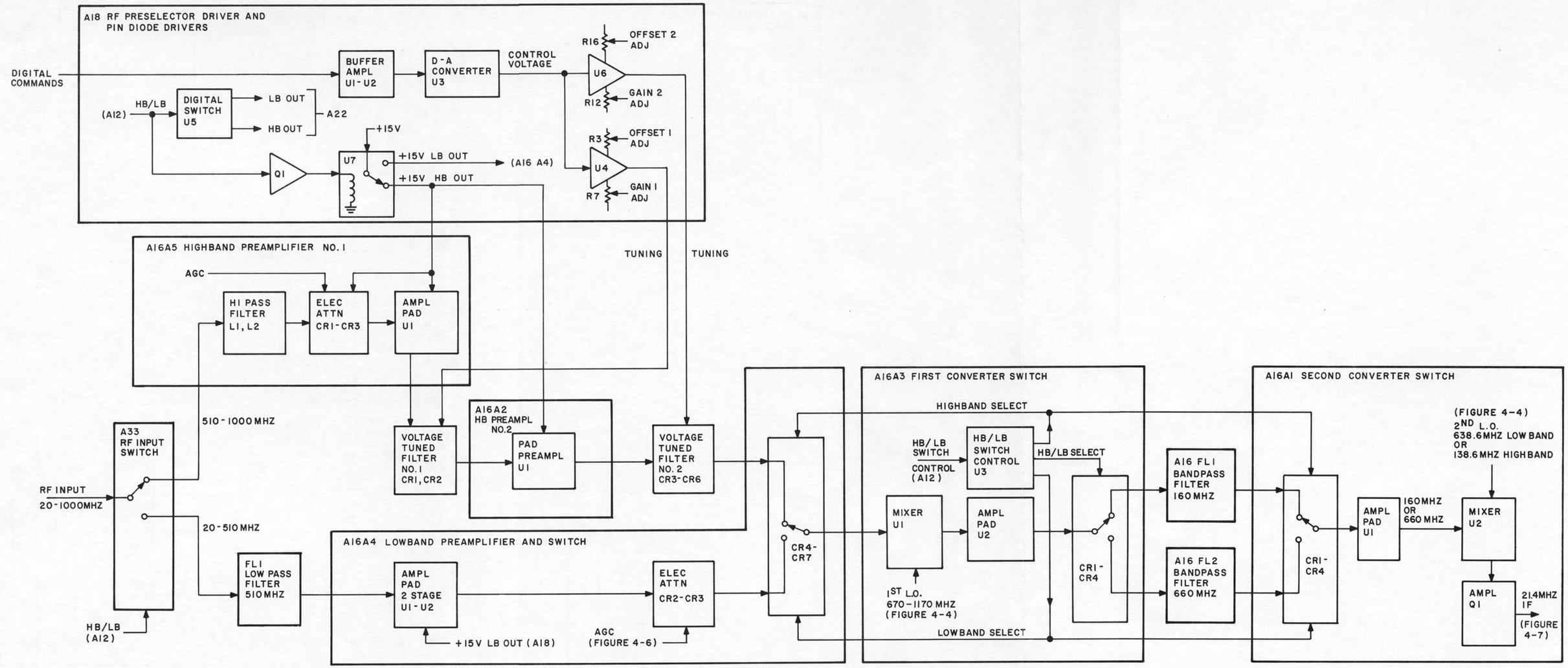


Figure 4-5. RF Tuner Section Functional Block Diagram

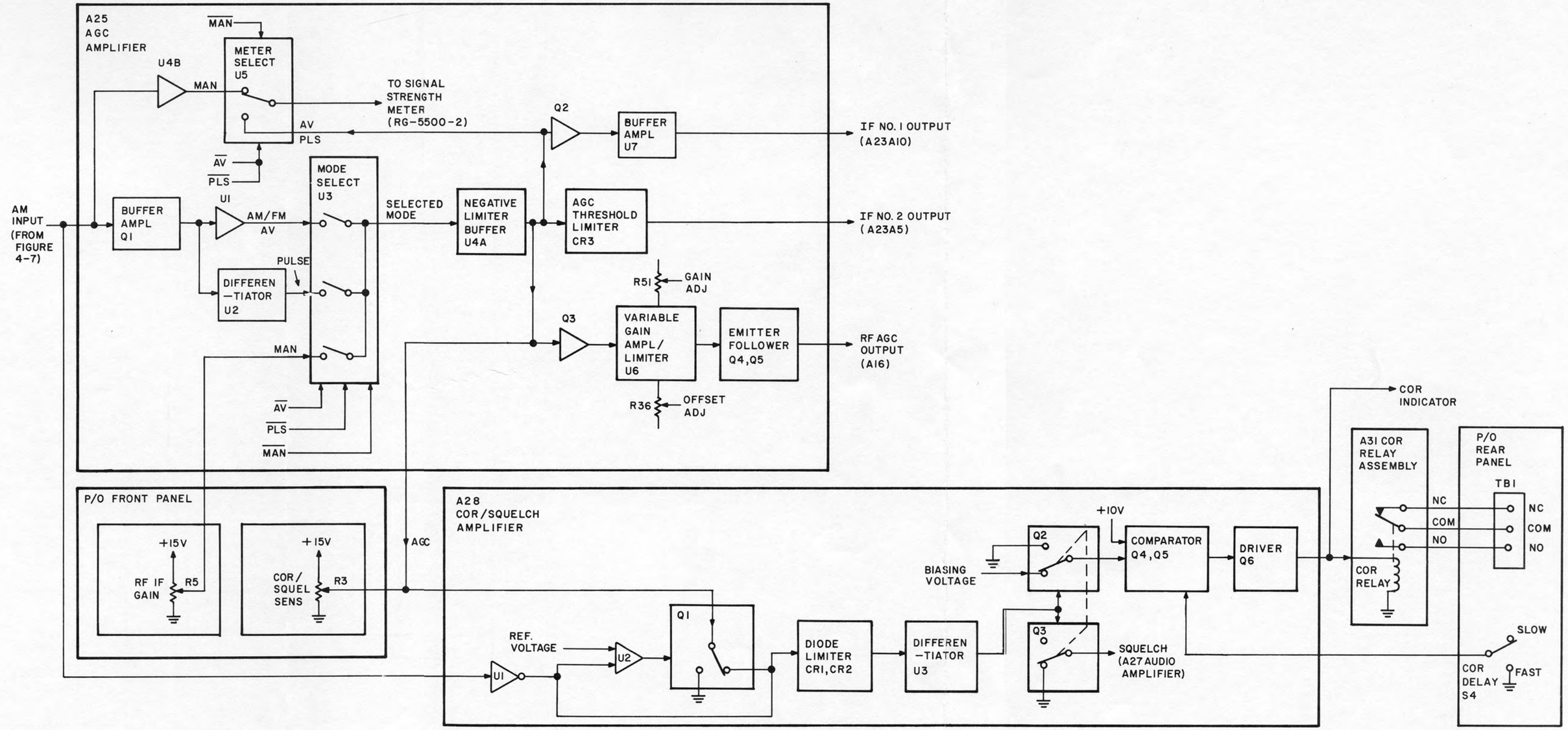


Figure 4-6. AGC Section Functional Block Diagram

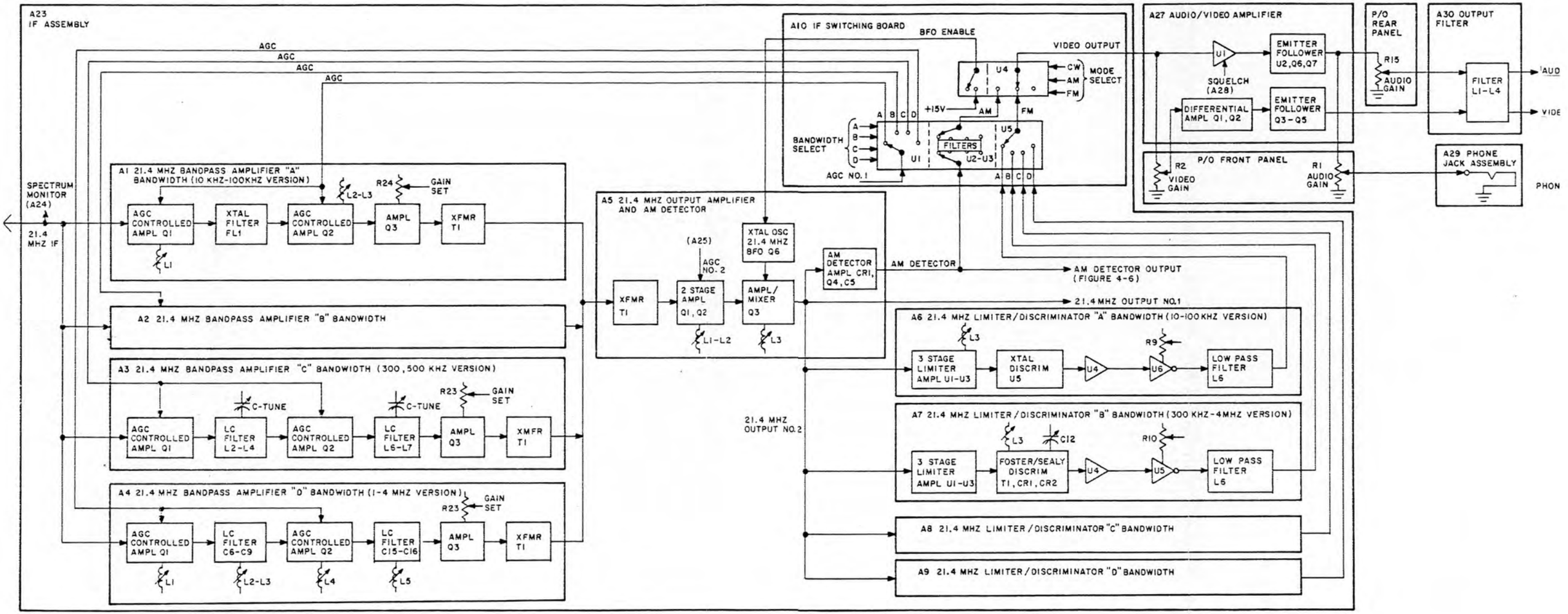


Figure 4-7. IF Amplifier Section Functional Block Diagram

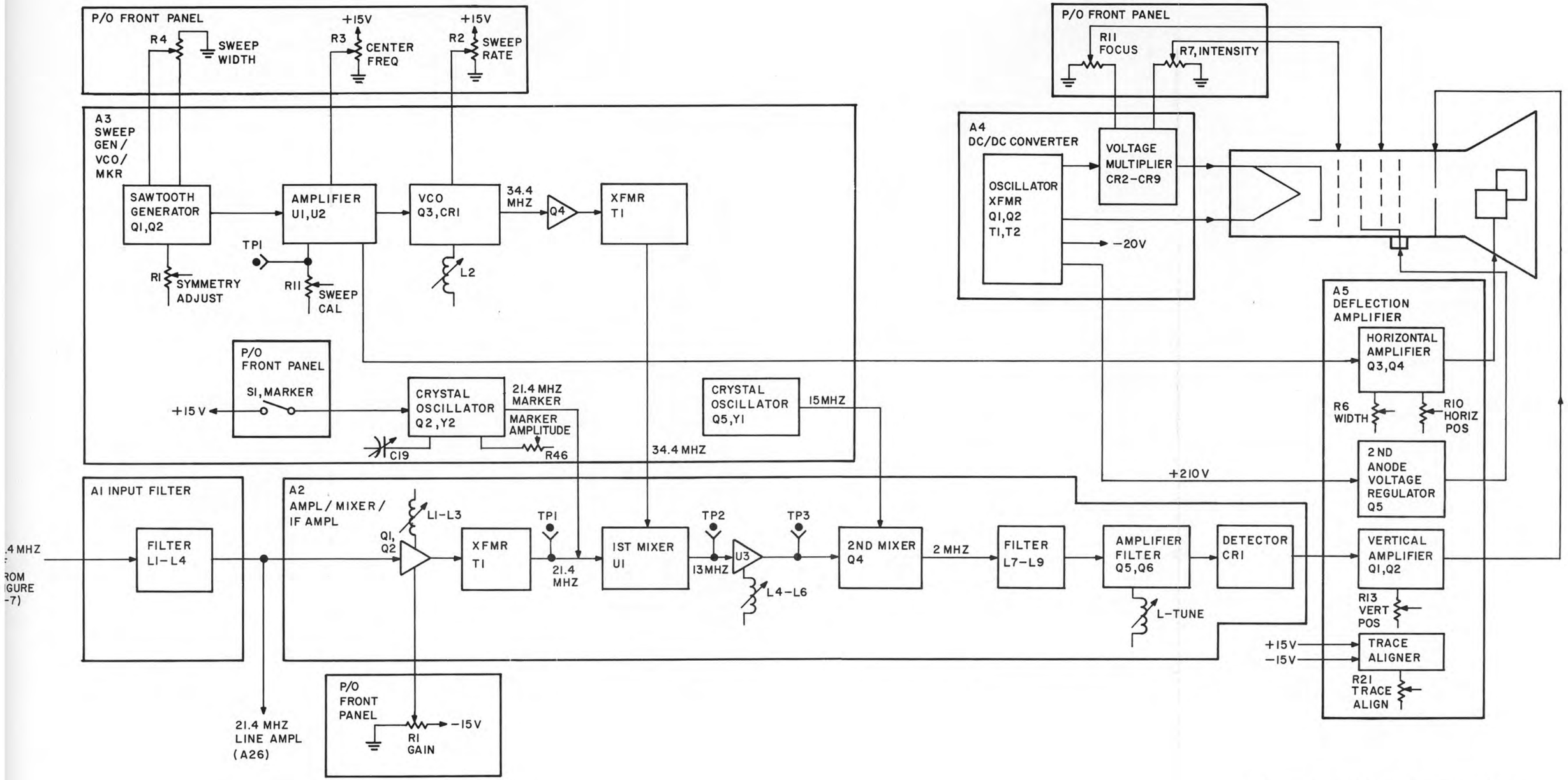


Figure 4-8. A24 Spectrum Monitor Functional Block Diagram

CHAPTER 5

ALIGNMENT

5-1. INTRODUCTION. This chapter contains alignment procedures for the RG-5500 Receiver. Under normal operating conditions the receiver will maintain factory alignment over a long period of time. Realignment should only be performed, therefore, following the replacement of components which affect the alignment or where a known misalignment exists. Should it be necessary to realign the receiver, perform the procedures presented in this chapter.

5-2. TEST EQUIPMENT. Test equipment required is as follows:

a. Oscilloscope, Hewlett-Packard HP1200A, or equivalent.

b. Sweeping Signal Generator, Hewlett-Packard HP675A, or equivalent.

c. Signal Generator, Hewlett-Packard HP8640B, or equivalent.

d. Digital Voltmeter, Fluke Model 8000A, or equivalent.

e. RF Voltmeter, Hewlett-Packard HP3406A, or equivalent.

5-3. RECEIVER DISASSEMBLY AND REASSEMBLY. A degree of dismantling is necessary to gain access to certain areas of the receiver.

NOTE

To eliminate the effects of stray radiation, subassembly covers should not be removed except when access is required for a particular adjustment.

After alignment, ensure that all modules are correctly reassembled and all shielding covers properly replaced.

5-4. POWER SUPPLY VOLTAGE CHECKS. The power supply contains two circuit board assemblies, A1 and A2. Assembly A1 supplies the regulated +5 Vdc and ±15 Vdc and the unregulated ±23 Vdc and +180 Vdc. Assembly A2 supplies the protected and unprotected +5 Vdc. The power supply output voltages are not adjustable but can be verified by performing the following:

a. Remove bottom cover of receiver.

b. Apply ac power.

c. Connect digital voltmeter between ground and each of the following locations and measure voltage indicated:

Location	Voltage
C10	regulated +5V ±. 5V
C11	regulated +5V ±. 5V
C12	regulated +5V ±. 5V
C13	regulated +5V ±. 5V
C14	unregulated +20V
C15	regulated +15V ±1V
C17	unregulated -20V
C18	regulated -15V ±1V
C25	unregulated +9V
C20	unregulated +170V
A2E3	unprotected +5V ±. 5V
A2E4	protected +5V ±. 5V with ac power disconnected

d. Disconnect test equipment and replace bottom cover.

5-5. A34 AND A35 FIRST AND SECOND LOCAL OSCILLATOR AMPLIFIER OUTPUT CHECK. Adjustment of A22 synthesizer assembly is beyond the scope of this manual. To verify correct operation of the synthesizer, check the output of A34 and A35 LO amplifiers by performing the following:

a. Remove receiver top cover.

b. Apply ac power.

c. Disconnect cable attached to J2 of A35 1ST LO amplifier.

d. Connect RF voltmeter to J2.

e. Vary receiver frequency through tuning range from 20 to 1000 MHz and measure +7 dBm into 50 ohms minimum at all frequencies.

f. Disconnect voltmeter from J2 and reconnect cable.

g. Repeat steps c. through f. for A34 2ND LO amplifier.

h. Disconnect test equipment and replace top cover.

5-6. A23A5 IF ASSEMBLY OUTPUT AMPLIFIER ALIGNMENT PROCEDURES. The output amplifier is a three-stage stagger-tuned arrangement with inductive tuning. Alignment is accomplished by peaking each stage to its specified frequency and then checking the overall response with a sweep generator. Because there is some response change at maximum gain, this check is made 10 to 15 dB below maximum level.

a. A23A5 Output Amplifier. To align the output amplifier perform the following:

(1) Remove A23 IF assembly top and bottom covers.

(2) Apply ac power to receiver.

(3) Remove four A23A1-A4 bandpass amplifiers from assembly noting their original locations.

(4) Connect test equipment as shown on figure 5-1.

(5) Set signal generator output level to -40 dBm.

(6) Set receiver RF/IF GAIN adjust on front panel fully clockwise and push AM MAN mode selector.

(7) Set oscilloscope sensitivity to 0.2V/cm in dc coupled mode.

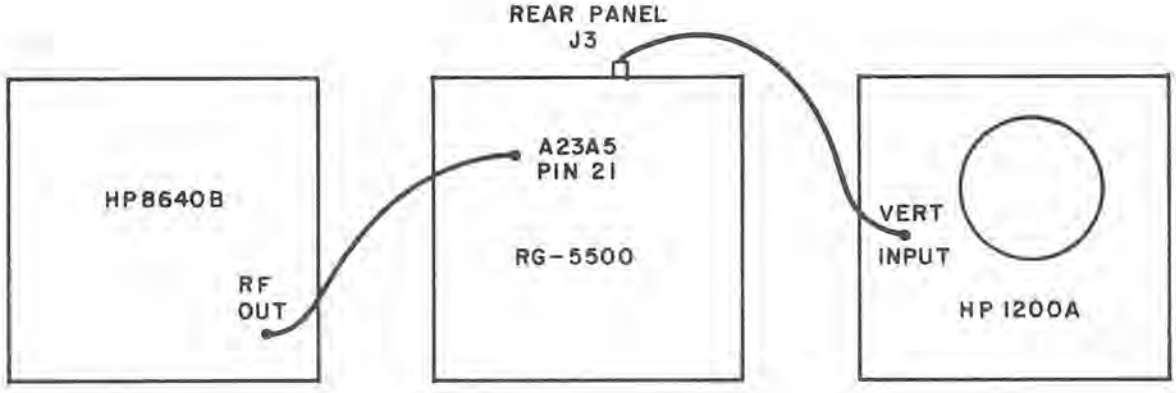


Figure 5-1. A23A5 21.4 MHz Output Amplifier Alignment Test Setup

(8) Set signal generator frequency to 21.300 MHz and adjust L3 for maximum slope deflection.

(9) Set signal generator frequency to 24.000 MHz and adjust L2 for maximum slope deflection.

(10) Set signal generator frequency to 19.000 MHz and adjust L1 for maximum slope deflection.

(11) Connect test equipment as shown on figure 5-2.

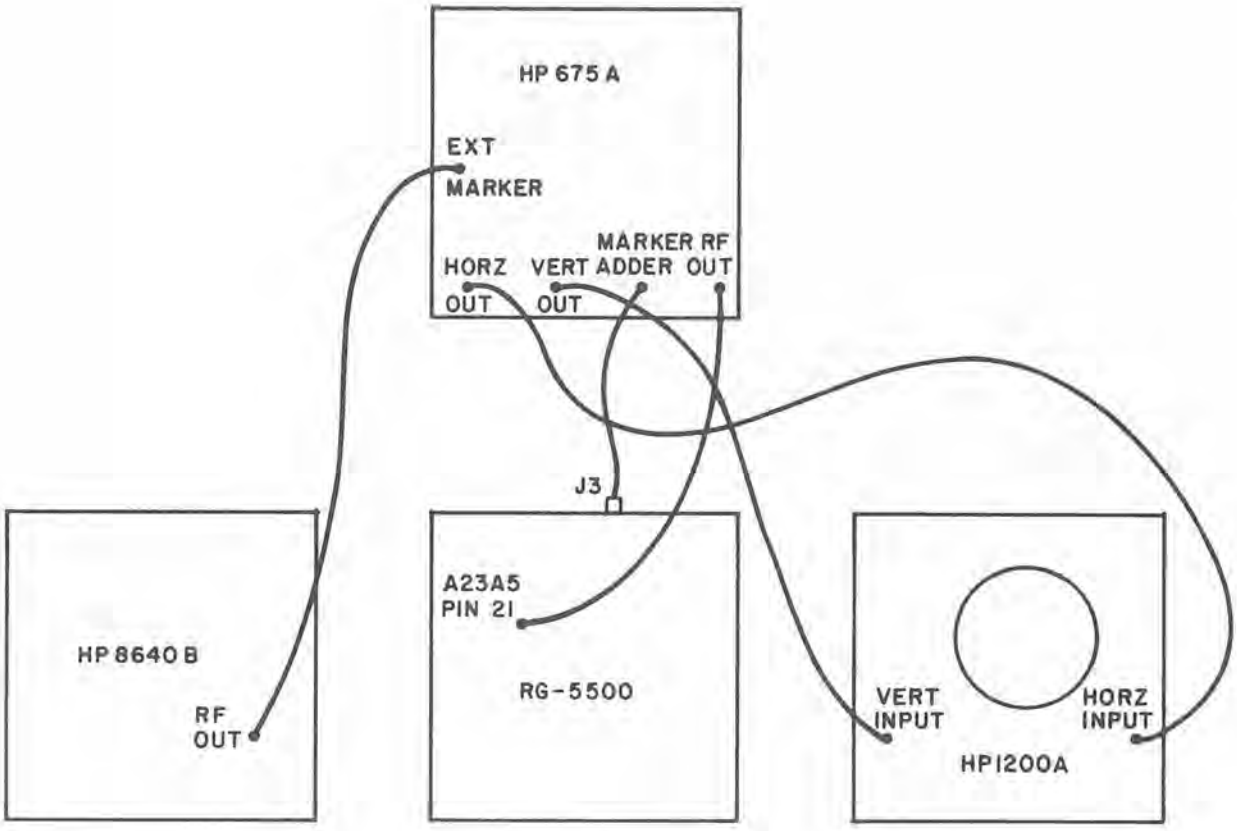


Figure 5-2. A23A5 21.4 MHz Output Amplifier Frequency Response Test Setup

(12) Set sweep generator center frequency to 21.400 MHz and sweep width to 10 MHz.

(13) Set generator output to -40 dBm and set RF/IF GAIN adjust on front panel to produce a 5 cm deflection. Observe a flat top bandpass response 4 MHz wide at top and 6 MHz wide at 0.6V level (3 cm deflection).

(14) Check for proper action of gain control by observing response at other input levels.

(15) Disconnect all test equipment, reinstall four bandpass amplifiers in their original positions and replace all covers.

b. Beat Frequency Oscillator. The BFO is not adjustable. To check its operation perform the following:

(1) Remove A23 IF assembly top cover.

(2) Apply ac power to receiver.

(3) Remove four A23A1-A4 bandpass amplifiers from assembly noting their original locations.

(4) Connect J3 AM detector output jack on rear panel to vertical input of oscilloscope.

(5) Set oscilloscope sensitivity to 0.2V/cm in dc coupled mode.

(6) Push CW MAN mode selector.

(7) Observe output level on oscilloscope of approximately 0.7V (3.5 cm deflection).

(8) Disconnect all test equipment, reinstall four bandpass amplifiers in their original positions and replace all covers.

5-7. A23A1-A4 IF ASSEMBLY 21.4 MHz BANDPASS AMPLIFIERS. Frequency response and gain adjustments are provided in all three bandpass amplifier configurations. See figure 5-3 for adjustment locations.

a. To align the frequency response of the bandpass amplifiers complete paragraph 5-6 and then perform the following:

(1) Remove A23 IF assembly top cover.

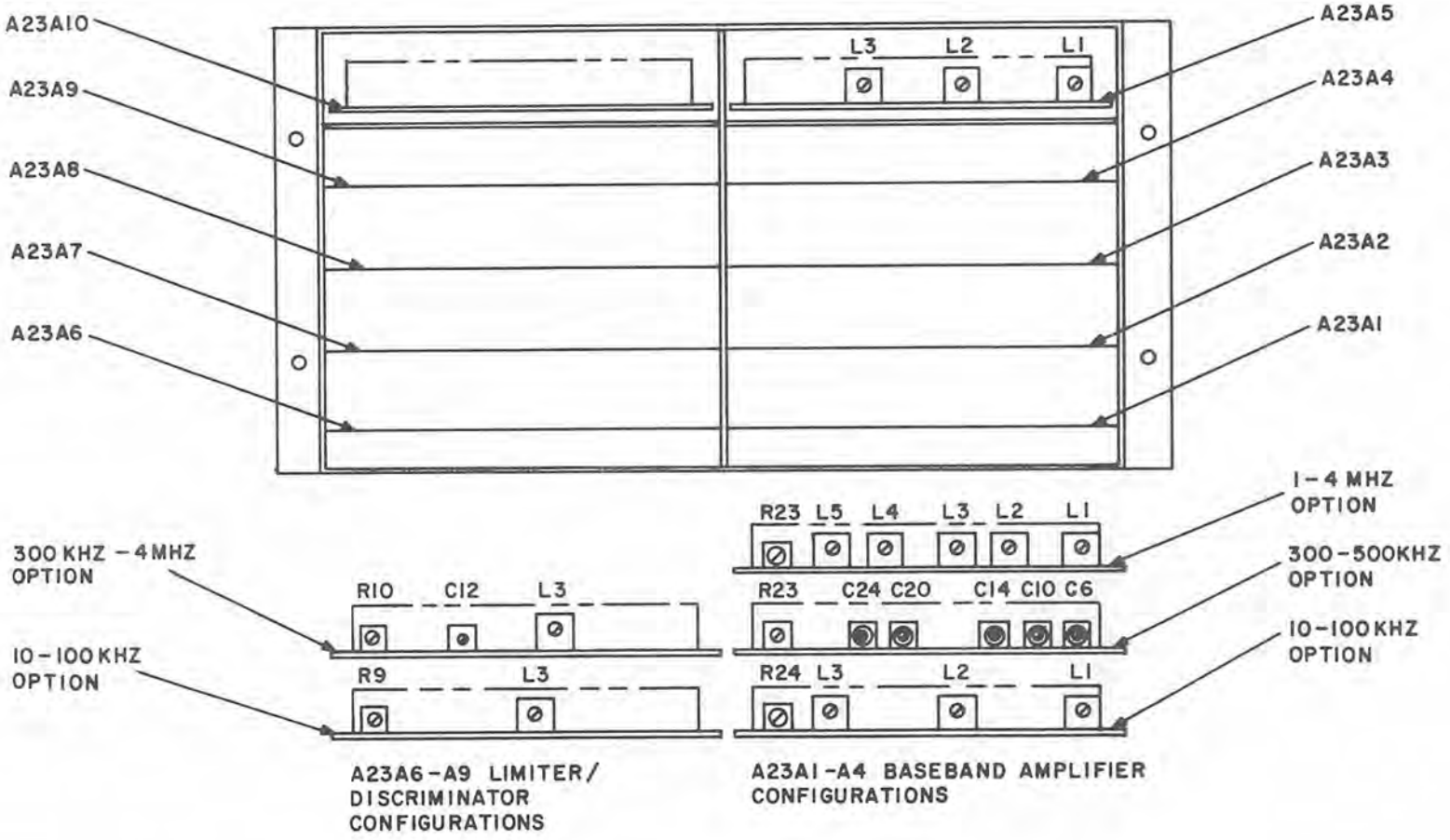


Figure 5-3. A23 IF Assembly Adjustment Locations

(2) Apply ac power to receiver.

(3) Connect test equipment as shown on figure 5-4.

(4) Set receiver RF/IF GAIN adjust on front panel fully clockwise and push AM MAN mode selector.

(5) Set oscilloscope sensitivity to 0.2V/cm.

(6) Tune receiver to 20.0000 MHz and push Bandwidth MHz on front panel to select narrowest bandwidth.

(7) Set sweep generator frequency to 20 MHz and sweep width to a convenient value two to four times the bandwidth of amplifier under test.

(8) Set sweep generator output level to obtain a 5 cm deflection of oscilloscope (additional attenuation at generator output may be necessary).

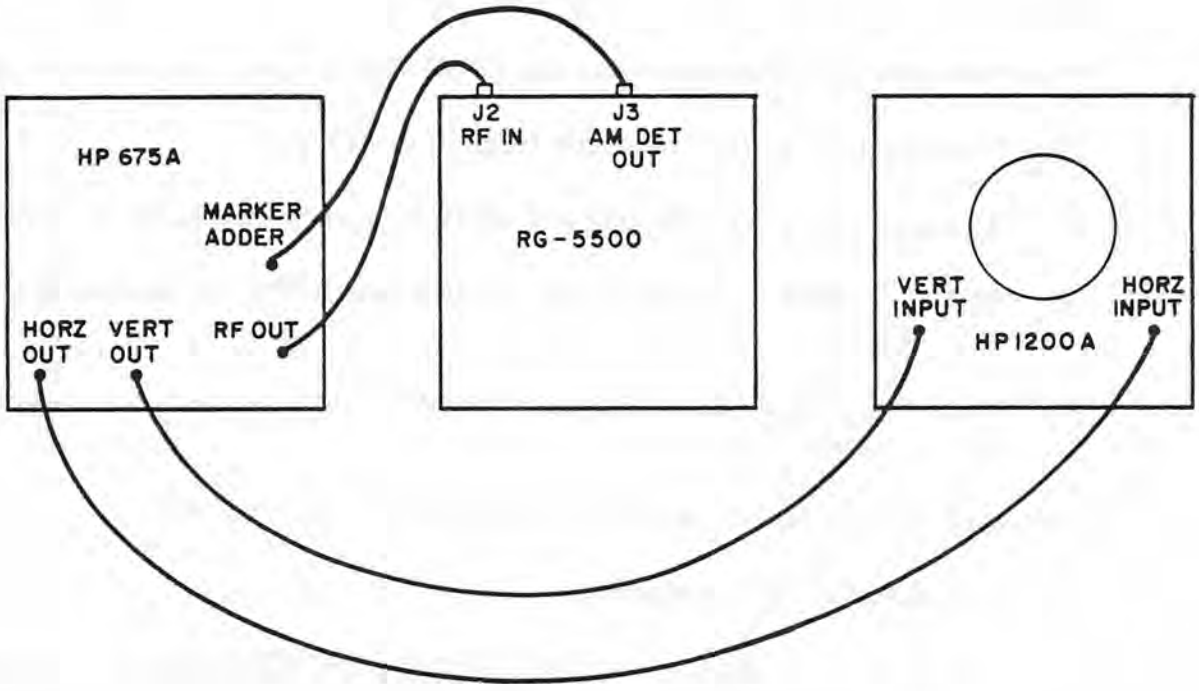


Figure 5-4. A23A1-A4 21.4 MHz Bandpass Amplifier Frequency Response Alignment Test Setup

(9) Adjust inductor and capacitor tuning of amplifier under test for a symmetrical response centered at 20.000 MHz. Response curve should be flat at 3 dB points (figure 5-5).

(10) Repeat steps (7) through (9) for remaining amplifiers.

NOTE

The amplifiers should be aligned in order of increasing bandwidth.

(11) Increase output level of generator in 10-dB steps while decreasing RF/IF GAIN adjust to check for response changes at different gain levels.

(12) Disconnect all test equipment and replace top cover.

b. To adjust the gain of the bandpass amplifiers perform the following:

(1) Apply ac power to receiver.

(2) Connect test equipment as shown on figure 5-6.

(3) Push CW MAN mode selector and BANDWIDTH option "A" on front panel.

(4) Tune receiver to any frequency from 20 to 510 MHz.

(5) Set signal generator frequency to same frequency chosen in (4), above.

(6) Set signal generator output level to rated sensitivity for bandwidth under test (table 5-1).

(7) Adjust GAIN SET R23 or R24 as applicable for maximum as measured with digital voltmeter.

(8) Repeat steps (4) through (7) for options "B", "C", and "D".

(9) Disconnect all test equipment.

5-8. A23A6-A9 IF ASSEMBLY 21.4 MHz LIMITER/DISCRIMINATORS. Frequency response and FM gain adjustments are provided in both the crystal and L-C discriminator configurations. See figure 5-3 for adjustment locations.

a. To align the frequency response of the limiter/discriminators, complete procedures in paragraphs 5-6 and 5-7 and then perform the following:

(1) Remove A23 IF assembly top cover.

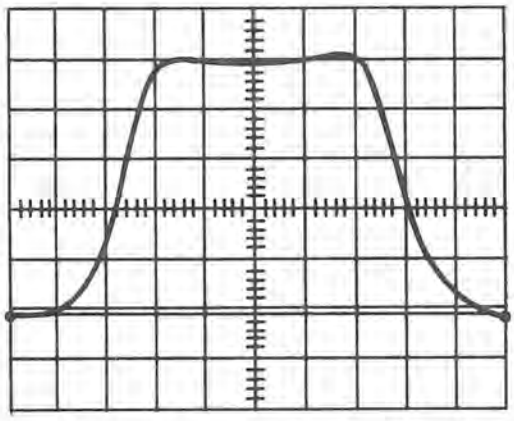


Figure 5-5. Typical Bandpass Amplifier Response Curve

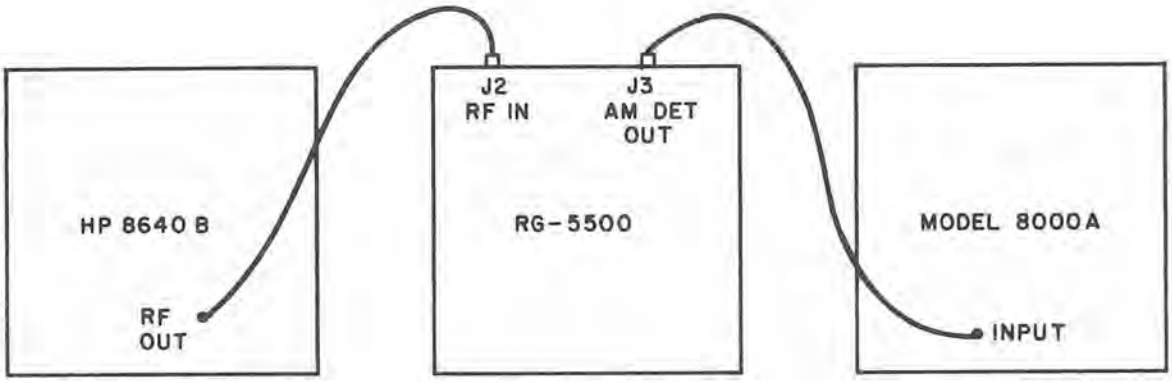


Figure 5-6. A23A1-A4 21.4 MHz Bandpass Amplifier Gain Adjust Test Setup

Table 5-1. Receiver AM, FM, Sensitivity in -dBm at Given IF Bandwidths

	10 kHz	20 kHz	40 kHz	50 kHz	75 kHz	100 kHz	300 kHz	500 kHz	1 MHz	2 MHz	3 MHz	4 MHz
20 to 510 MHz	107	104	101	100	98	97	92	90	87	84	82	81

(2) Apply ac power to receiver.

(3) Connect test equipment as shown on figure 5-7.

(4) Set sweep generator frequency to 21.4 MHz and generator output to -20 dBm.

(5) Adjust sweep width to display entire "S" curve on oscilloscope. Sweep rate must be kept low to prevent distortion of curve.

(6) For L-C discriminators:

(a) Adjust C12 for zero crossover at 21.400 MHz.

(b) Adjust L3 for symmetrical response.

(c) Substitute signal generator output for sweep generator at A23A6 pin 21.

(d) Reduce oscilloscope sweep width to IF bandwidth specified for module under test.

(e) Adjust C12 for zero output.

(7) For crystal discriminators adjust L3 for maximum amplitude.

NOTE

There is no crossover adjustment for crystal discriminators. Crossover is determined by crystal characteristics.

(8) Repeat steps (5) through (7) for remaining modules.

(9) Disconnect all test equipment and replace top cover.

b. To adjust the FM gain of the limiter/discriminators perform the following:

(1) Apply ac power to receiver.

(2) Connect test equipment as shown on figure 5-8.

(3) Push FM AV mode selector and BANDWIDTH option "A" on front panel.

(4) Tune receiver to any frequency between 20 and 510 MHz.

(5) Set signal generator frequency to same frequency chosen in (4) above, FM modulated with 30% BW deviation at a 1 kHz rate.

(6) Set signal generator output level to 10 dB above rated sensitivity for bandwidth under test to ensure limiting (table 5-1).

(7) Adjust FM GAIN R9 or R10 as applicable for a 1 volt rms minimum as measured with rms voltmeter.

(8) Repeat steps (4) through (7) for options "B", "C", and "D".

(9) Disconnect all test equipment.

5-9. A25 AGC ASSEMBLY ALIGNMENT. To align the AGC assembly perform the procedures below. See figure 5-9 for adjustment locations.

a. Remove receiver top cover.

b. Rotate gain adjust R51 and offset adjust R36 fully clockwise.

c. Replace top cover.

5-10. RF TUNER SECTION ALIGNMENT. The adjustments for the RF tuner section are located in A18 RF preselector driver and PIN diode switch drivers board. See figure 5-9 for adjustment locations. To align A18 RF preselector driver and PIN diode switch drivers, perform the following:

a. Remove receiver top cover.

b. Apply ac power.

c. Tune receiver to 550 MHz.

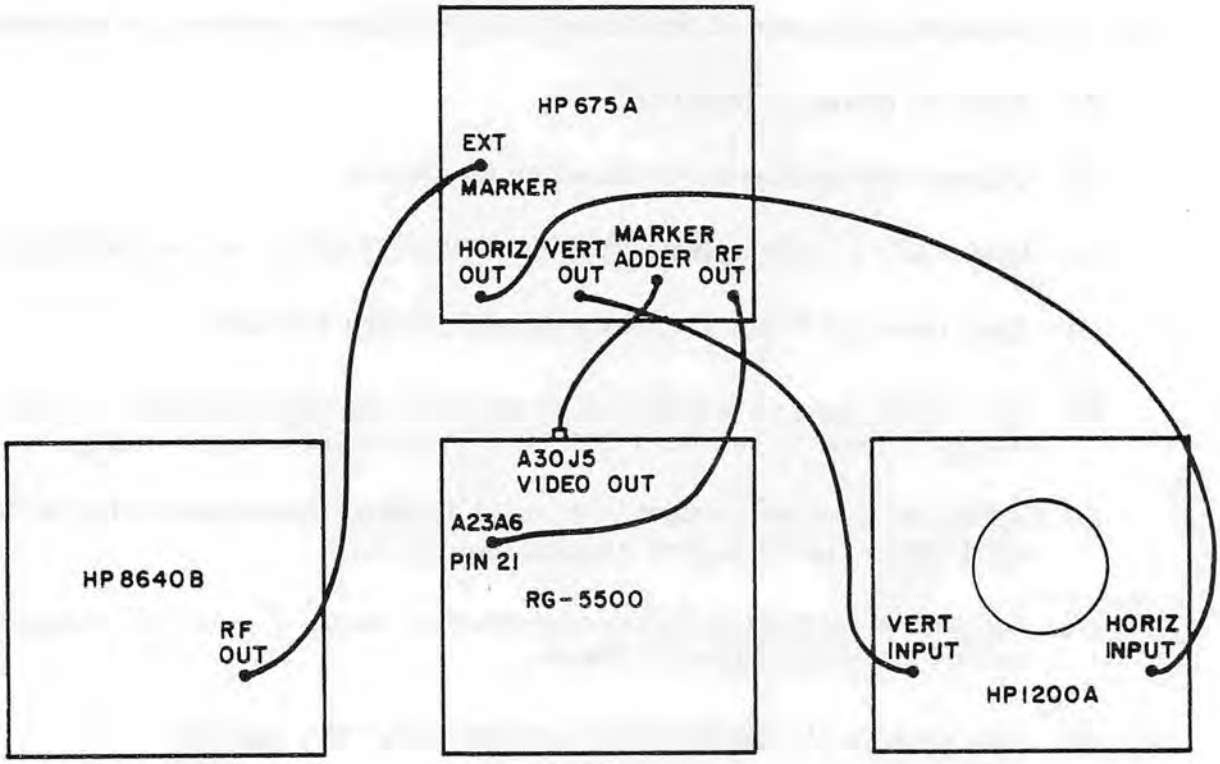


Figure 5-7. A23A6-A9 21.4 MHz FM Limiter/Discriminator Frequency Response Alignment Test Setup

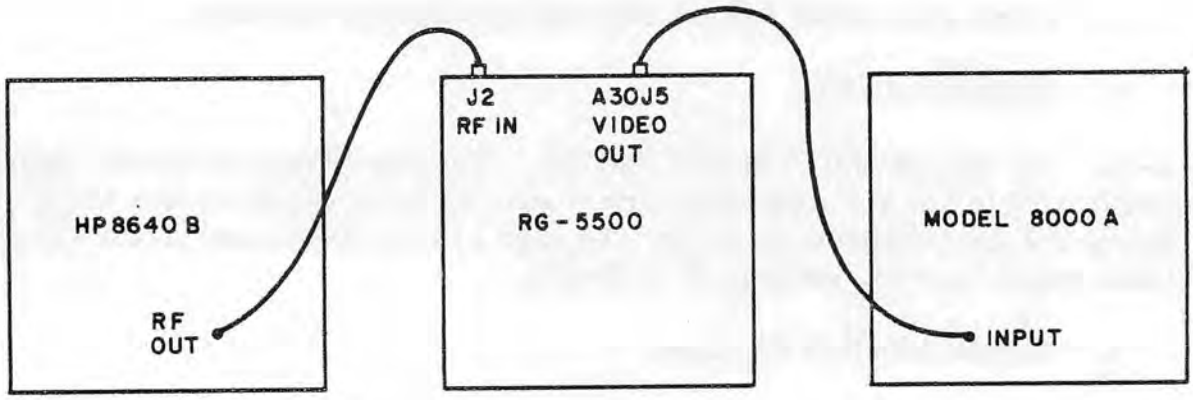


Figure 5-8. A23A6-A9 21.4 MHz FM Limiter/ Discriminator Gain Adjust Test Setup

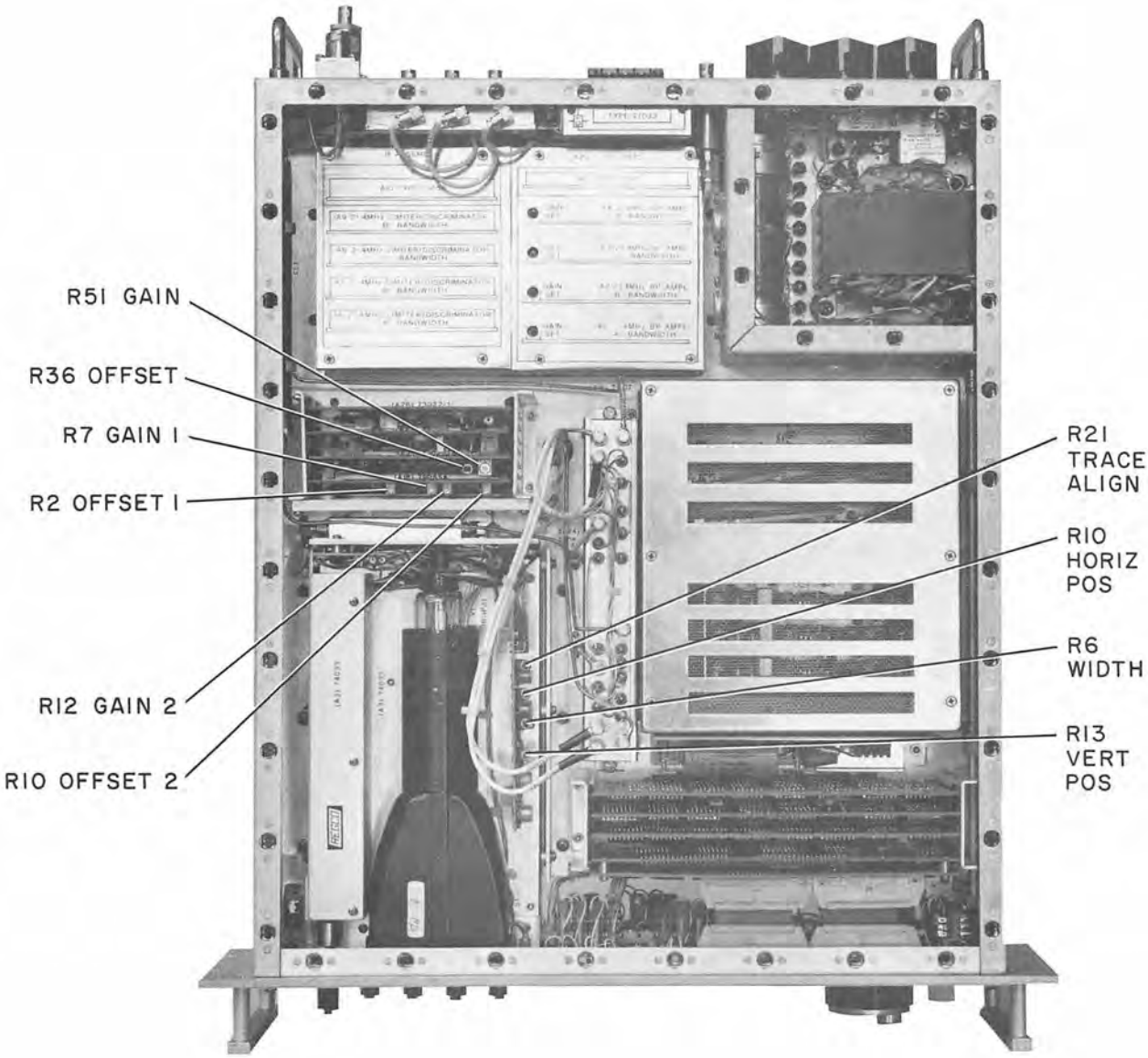


Figure 5-9. AGC Assembly, RF Section, and Spectrum Monitor Adjustment Locations

d. Set receiver RF/IF GAIN adjust on front panel fully clockwise and push AM MAN mode selector.

e. Connect signal generator to RF INPUT jack J3 on rear panel.

f. Set generator for CW and adjust level to obtain a good display on spectrum monitor.

g. Adjust OFFSET 1 (R2) and OFFSET 2 (R10) on A18 for maximum peak on monitor.

h. Tune receiver for 850 MHz.

i. Set signal generator for 850-MHz unmodulated signal.

j. Adjust GAIN 1 (R7) and GAIN 2 (R12) for maximum peak on monitor.

k. Repeat steps f. through j., as necessary, to obtain maximum peak signal level.

l. Disconnect test equipment and replace top cover.

5-11. A24A2 SPECTRUM MONITOR AMPL/MIXER/IF AMPL. Frequency response adjustments are provided in all three stages of the amplifier module. The spectrum monitor must be removed from the receiver before alignment. See figure 5-10 for adjustment locations.

a. To align the frequency response of the 21.4 MHz input amplifier perform the following:

(1) Apply +20 Vdc to C1 on rear panel.

(2) Connect test equipment as shown on figure 5-11.

(3) Set sweep generator frequency to 21.4 MHz, sweep width to 10 MHz, and output level to -30 dBm.

(4) Set oscilloscope sensitivity to 5 mV/cm.

(5) Adjust SM GAIN adjust R1 on front panel to produce a 5-division deflection on oscilloscope.

(6) Adjust in turn L1, L2, and L3 for a flat top, symmetrical response, centered at 21.4 MHz.

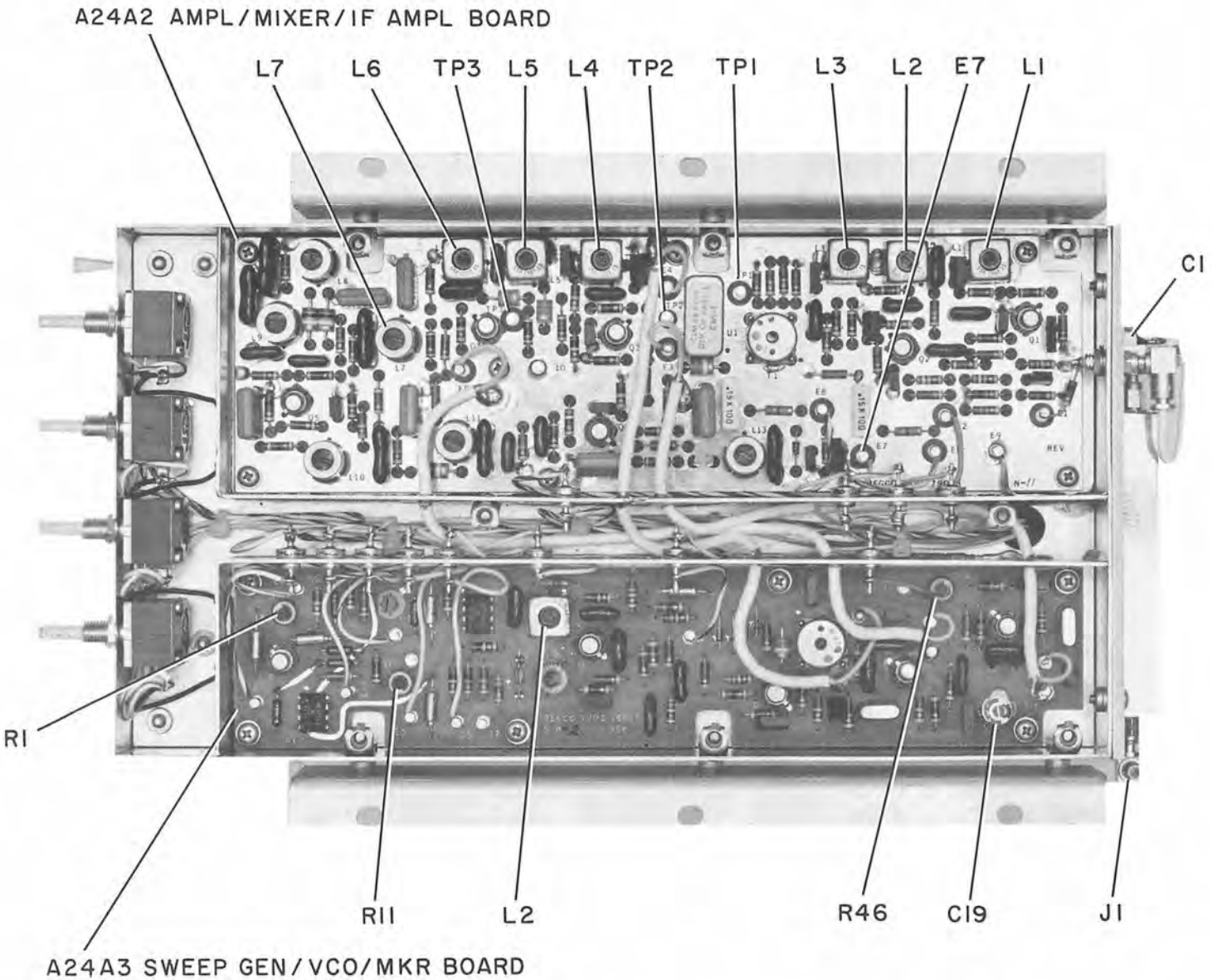


Figure 5-10. A24 Spectrum Monitor Bottom View Adjustment and Test Point Locations

(7) Set SM GAIN to maximum and adjust generator output to produce a 5-division deflection on oscilloscope. An output level of approximately -37 dBm should be observed.

(8) Disconnect all test equipment.

b. To align the frequency response of the 13 MHz IF amplifier perform the following:

(1) Apply +20 Vdc to C1 on rear panel.

(2) Connect test equipment as shown on figure 5-12.

(3) Set oscilloscope sensitivity to 50 mV/cm.

(4) Set sweep generator frequency to 13 MHz, sweep width to 300 kHz, and sweep rate to 5 sweeps/second.

(5) Adjust in turn L4, L5, and L6 for maximum output as seen on oscilloscope. The sensitivity should be sufficient to produce a 0.2V p-p trace with generator output at about -62 dBm.

(6) Disconnect all test equipment.

c. To align the frequency response of the 2 MHz IF amplifier perform the following:

(1) Apply +20 Vdc to C1 on rear panel.

(2) Connect test equipment as shown on figure 5-13.

(3) Set oscilloscope sensitivity to 50 mV/cm.

(4) Set sweep generator frequency to 2 MHz, sweep width to 300 kHz, and sweep rate to 5 sweeps/second.

(5) Set signal generator frequency to 2 MHz.

(6) Adjust in turn L7, L8, L9, L10, L11, and L13 for maximum output as seen on oscilloscope. The sensitivity should be sufficient to produce a 0.2V p-p trace with generator output at about -47 dBm. The bandwidth at the 3-dB points should be 10 kHz.

(7) Disconnect all test equipment.

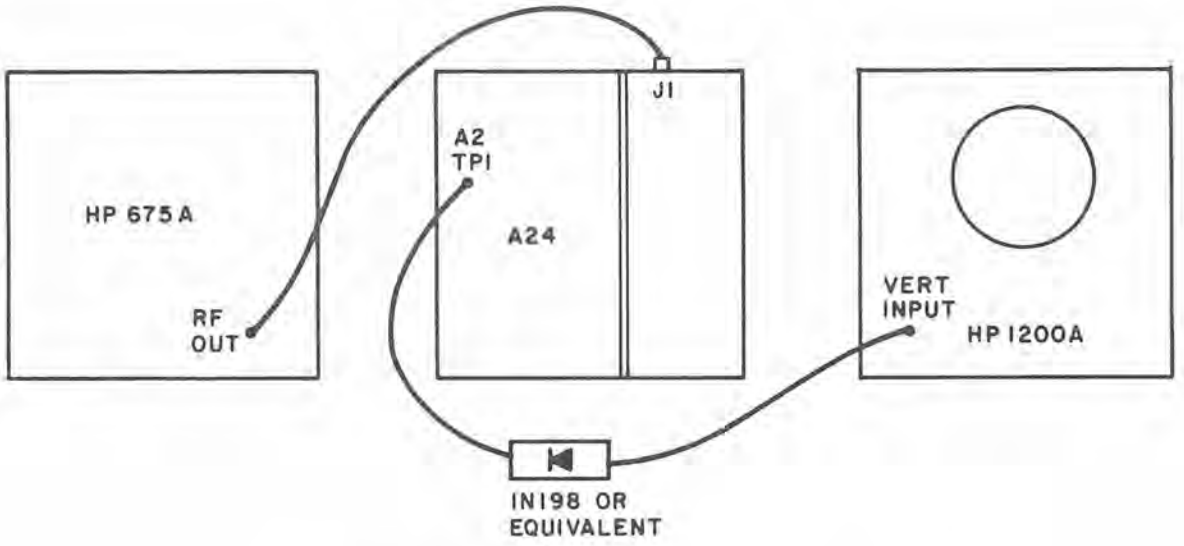


Figure 5-11. A24 Spectrum Monitor 21.4 MHz
Input Amplifier Alignment Test Set

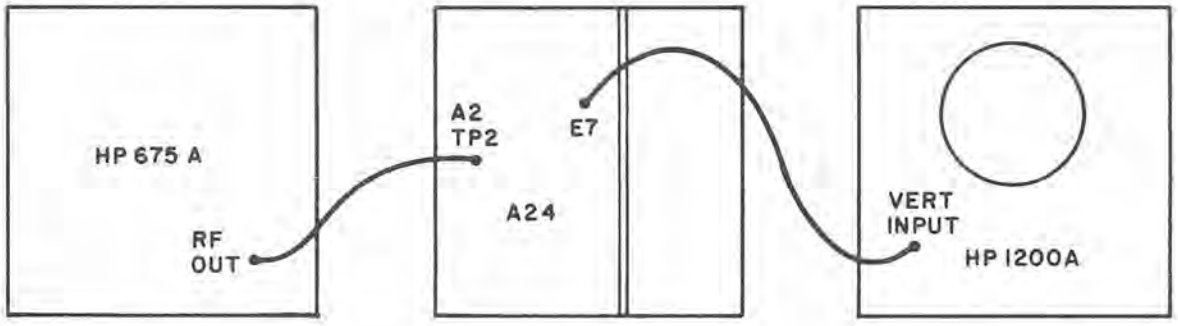


Figure 5-12. A24 Spectrum Monitor 13 MHz
IF Amplifier Alignment Test Setup

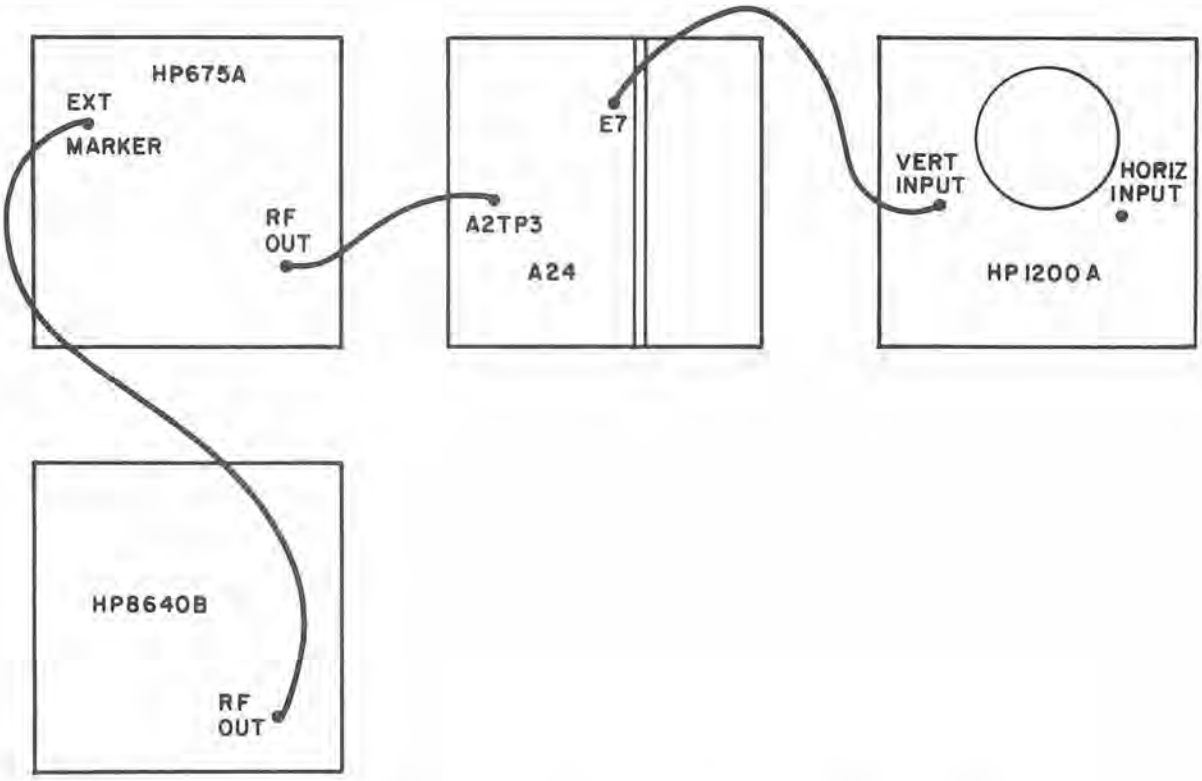


Figure 5-13. A24 Spectrum Monitor 2 MHz IF Amplifier Alignment Test Setup

5-12. A24A3 SPECTRUM MONITOR SWEEP GEN/VCO/MKR. Alignment adjustments are provided for the sweep generator, VCO, and marker generator circuits. The spectrum monitor must be removed from the receiver before alignment. See figure 5-10 for adjustment locations.

a. To align the sweep generator perform the following:

(1) Apply +20 Vdc to C1 on rear panel.

(2) Connect digital voltmeter between TP1 and ground.

(3) Rotate SWEEP RATE adjust R2 on front panel fully clockwise.

(4) Adjust sweep symmetry control R1 for 0 Vdc as measured on voltmeter.

(5) Connect RF signal generator to J1 input on rear panel.

(6) Set SM GAIN R1, SWEEP RATE R2, and CENTER FREQ R3 on front panel to midrange and rotate SWEEP WIDTH R4 fully clockwise.

(7) Set signal generator frequency to 21.400 MHz, and adjust output level to produce one-half screen deflection.

(8) Rotate CENTER FREQ adjust R3 to position signal in exact center of screen.

(9) Increase generator frequency to 23.400 MHz.

(10) Adjust sweep calibrate control R11 to position trace at extreme edge of screen.

(11) Disconnect all test equipment.

b. To align the marker generator perform the following:

(1) Apply +20 Vdc to C1 on rear panel.

(2) Set MARKER switch S1 on front panel to ON.

(3) Set SM GAIN R1, and SWEEP WIDTH R4 adjusts to midrange.

(4) Adjust marker amplitude control R46 to produce one-half screen deflection.

(5) Connect RF signal generator to J1 input on rear panel.

(6) Set signal generator frequency to 21.4 MHz ±100 Hz.

(7) Set MARKER to off and rotate CENTER FREQ adjust R3 on front panel to center trace.

(8) Rotate SWEEP WIDTH adjust R4 on front panel to produce a vertical trace one-quarter screen width.

(9) Rotate SM GAIN to produce one-half screen deflection.

(10) Set MARKER to ON.

(11) Adjust marker frequency control C19 to produce zero beat with signal generator input.

(12) Disconnect all test equipment.

5-13. A24A5 SPECTRUM MONITOR DEFLECTION AMPLIFIER. To align the deflection amplifier perform the following:

a. Remove receiver top cover to expose alignment adjustments to right of CRT (figure 5-9).

b. Apply ac power to receiver.

c. Rotate width adjust R6 until ends of trace are deflected just beyond edge of screen.

d. Adjust vert pos control R13 to position baseline just above bottom edge of screen.

e. Rotate SWEEP WIDTH adjust R4 on front panel until both ends of trace are visible.

f. Adjust horiz pos control R10 to center horizontal trace.

g. Adjust trace align control R21 to produce a true horizontal trace.

h. Replace top cover.

CHAPTER 6

PARTS LIST

6-1. Tables 6-1 through 6-56 identify electric and electronic components in the receiver by reference designation, name and description of part, manufacturer (Federal Supply Code), manufacturer part number, and total number of each part used in the unit. A listing of manufacturers' names and addresses and their federal supply codes precedes the parts list.

Manufacturers' Codes

Federal Supply Code	Name and Address
00629	Eby Sales Company, Incorporated, of New York 148-05 Archer Avenue Jamaica, New York 11435
00779	Amp, Incorporated Post Office Box 3608 Harrisburg, Pennsylvania 17105
01121	Allen Bradley Company 1201 2nd Street Milwaukee, Wisconsin 53212
01295	Texas Instruments, Incorporated Components Group Post Office Box 5012 13500 North Central Expressway Dallas, Texas 75222
01852	Thomas Electronics, Incorporated 100 Riverview Drive Wayne, New Jersey 07470
02114	Ferroxcube Corporation Post Office Box 359 Mount Marion Road Saugerties, New York 12477
02735	RCA Corporation Solid State Division Route 202 Somerville, New Jersey 08876
03888	Pyrofilm Corporation 60 South Jefferson Road Whippany, New Jersey 07981
04009	Arrow-Hart, Incorporated 103 Hawthorne Street Hartford, Connecticut 06106

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
04013	Taurus Corporation 1 Academy Hill Lambertville, New Jersey 08530
04213	Caddell-Burns Manufacturing Company, Incorporated 40 East Second Street Mineola, New York 11501
04713	Motorola, Incorporated Semiconductor Products Division 5005 East McDowell Road Phoenix, Arizona 85008
05245	Components Corporation 2857 North Halsted Street Chicago, Illinois 60657
05375	Vari-L Company, Incorporated 3883 Monaco Parkway Denver, Colorado 80207
05820	Wakefield Engineering, Incorporated Audubon Road Wakefield, Massachusetts 01880
06848	The Bendix Corporation Energy Controls Division 717 North Bendix Drive South Bend, Indiana 46620
07263	Fairchild Semiconductor A Division of Fairchild Camera and Instrument Corporation 464 Ellis Street Mountain View, California 94040
07381	The Eastern Company 19 Readington Road North Branch, New Jersey 08876

Federal Supply Code	Name and Address
08333	Avery Adhesive Products, Limited 35 McLachlan Drive Rexdale, Ontario, Canada
09353	C and K Components, Incorporated 103 Morse Street Watertown, Massachusetts 02172
11532	Teledyne Relays 3155 West El Segundo Boulevard Hawthorne, California 90250
12457	Merrimac Research and Development, Incorporated 41 Fairfield Place West Caldwell, New Jersey 07006
13919	Burr-Brown Research Corporation Post Office Box 11400 Tucson, Arizona 85706
14099	Semtech Corporation 652 Mitchell Road Newbury Park, California 91320
14482	Watkins-Johnson Company 3333 Hillview Avenue Palo Alto, California 94304
15686	Disc Instruments, Incorporated 2701 South Halliday Street Santa Ana, California 92705
15717	Corry Micronics, Incorporated Route 6, West Roosevelt Highway Corry, Pennsylvania 16407
17856	Siliconix, Incorporated 2201 Laurelwood Road Santa Clara, California 95050

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
18324	Signetics Corporation 811 East Arques Sunnyvale, California 94086
18714	RCA Corporation Solid State Division Fostoria Road Findlay, Ohio 45840
19396	Illinois Tool Works, Incorporated Paktron Division 1321 Leslie Avenue Alexandria, Virginia 22301
19505	Applied Engineering Products Division of Samarius, Incorporated 26 East Main Street Ansonia, Connecticut 06401
19701	Electra/Midland Corporation A North American Phillips Company Post Office Box 760 Mineral Wells, Texas 76067
21377	Cir-Q-Tel, Incorporated 10504 Wheatley Street Kensington, Maryland 20795
21912	Anzac Electronics Division of Adams-Russell Company, Incorporated 39 Green Street Waltham, Massachusetts 02154
25088	Siemens America, Incorporated 350 Fifth Avenue New York, New York 10001
27014	National Semi-Conductor Corporation 2950 San Ysidro Way Santa Clara, California 95051

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
28480	Hewlett-Packard Company Corporate Headquarters 1501 Page Mill Road Palo Alto, California 94304
28489	Texberry Container Company 6040 Donoho Post Office Box 33367 Houston, Texas 77033
29990	American Technical Ceramics Division of Phase Industries 1 Norden Lane Huntington Station, New York 11746
31356	J-B-T Instruments, Incorporated 424 Chapel Street Post Office Box 1818 New Haven, Connecticut 06508
31889	Sensitak Instrument Corporation Manchester, New Hampshire
33256	Hybrid Systems Corporation 95 Terrace Hall Avenue Burlington, Massachusetts 01803
34335	Advanced Micro Devices 901 Thompson Place Sunnyvale, California 94086
34371	Harris Semiconductor Division of Harris-Intertype Corporation Post Office Box 883 Melbourne, Florida 32901
50140	K and L Microwave, Incorporated 203 Newton Street Salisbury, Maryland 21801

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
51979	Solid State Technology 3650 Charles Street Santa Clara, California 95050
54805	R.E. Grimm Company 16000 Industrial Drive Gaithersburg, Maryland 20760
56289	Sprague Electric Company North Adams, Massachusetts 01247
71279	Cambridge Thermionic Corporation 445 Concord Avenue Cambridge, Massachusetts 02138
71400	Bussman Manufacturing Division of McGraw-Edison Company 2536 West University Street St. Louis, Missouri 63107
71468	ITT Cannon Electric 666 East Dyer Road Santa Ana, California 92702
71590	Centralab Electronics Division of Globe-Union, Incorporated 5757 North Green Bay Avenue Milwaukee, Wisconsin 53201
71785	TRW Electronic Components Cinch Division 1501 Morse Avenue Elk Grove Village, Illinois 60007
72136	The Electro Motive Manufacturing Company, Incorporated South Park and John Streets Willimantic, Connecticut 06226

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
72982	Erie Technological Products, Incorporated 644 West 12th Street Erie, Pennsylvania 16512
73138	Beckman Instruments, Incorporated Helipot Division 2500 Harbor Boulevard Fullerton, California 92634
73445	Amperex Electronic Corporation 230 Duffy Avenue Hicksville, Long Island, New York 11802
73899	J F D Electronics Corporation 15th at 62nd Street Brooklyn, New York 11219
74868	Bunker Ramo Corporation Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810
75037	Minnesota Mining and Manufacturing Company Electro Products Division 3M Center St. Paul, Minnesota 55101
78277	Sigma Instruments, Incorporated 170 Pearl Street South Braintree, Massachusetts 02185
78290	Struthers-Dunn, Incorporated Lambs Road Pitman, New Jersey 08071
80053	Beckman Instruments, Incorporated Electronic Instruments Division 3900 North River Road Schiller Park, Illinois 60176

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
80058	Joint Electronic Type Designation System
80294	Bourns, Incorporated 1200 Columbia Avenue Riverside, California 92507
81073	Grayhill, Incorporated 561 Hillgrove Avenue LaGrange, Illinois 60525
81349	Military Specifications Promulgated By Military Departments/Agencies Under Authority of Defense Standardization Manual 4120 3-M
86425	Pearson Berlinghof, Incorporated Newtown, Pennsylvania 18940
89030	Symington Wayne Corporation Symington Division Depew, New York 14013
91293	Johanson Manufacturing Company Post Office Box 329 Boonton, New Jersey 07005
94152	Tedford Crystal Laboratories, Incorporated 4914 Gray Road Cincinnati, Ohio 45232
94271	Weston Instruments, Incorporated Weston Components Division Kennedy Drive Archbald, Pennsylvania 18403
95121	Quality Components, Incorporated Post Office Box 113 St. Marys, Pennsylvania 15857

Manufacturers' Codes - Continued

Federal Supply Code	Name and Address
95275	Vitramon, Incorporated Box 544 Bridgeport, Connecticut 06601
96431	Devere Manufacturing Company Division Bosley, Incorporated 1220 Washington Avenue Racine, Wisconsin 53403
96954	National Capacitor Company Quincy, Massachusetts
98291	Sealectro Corporation 225 Hoyt Mamaroneck, New York 10544
-	MCL, Incorporated 10 North Beach LaGrange, Illinois 60525

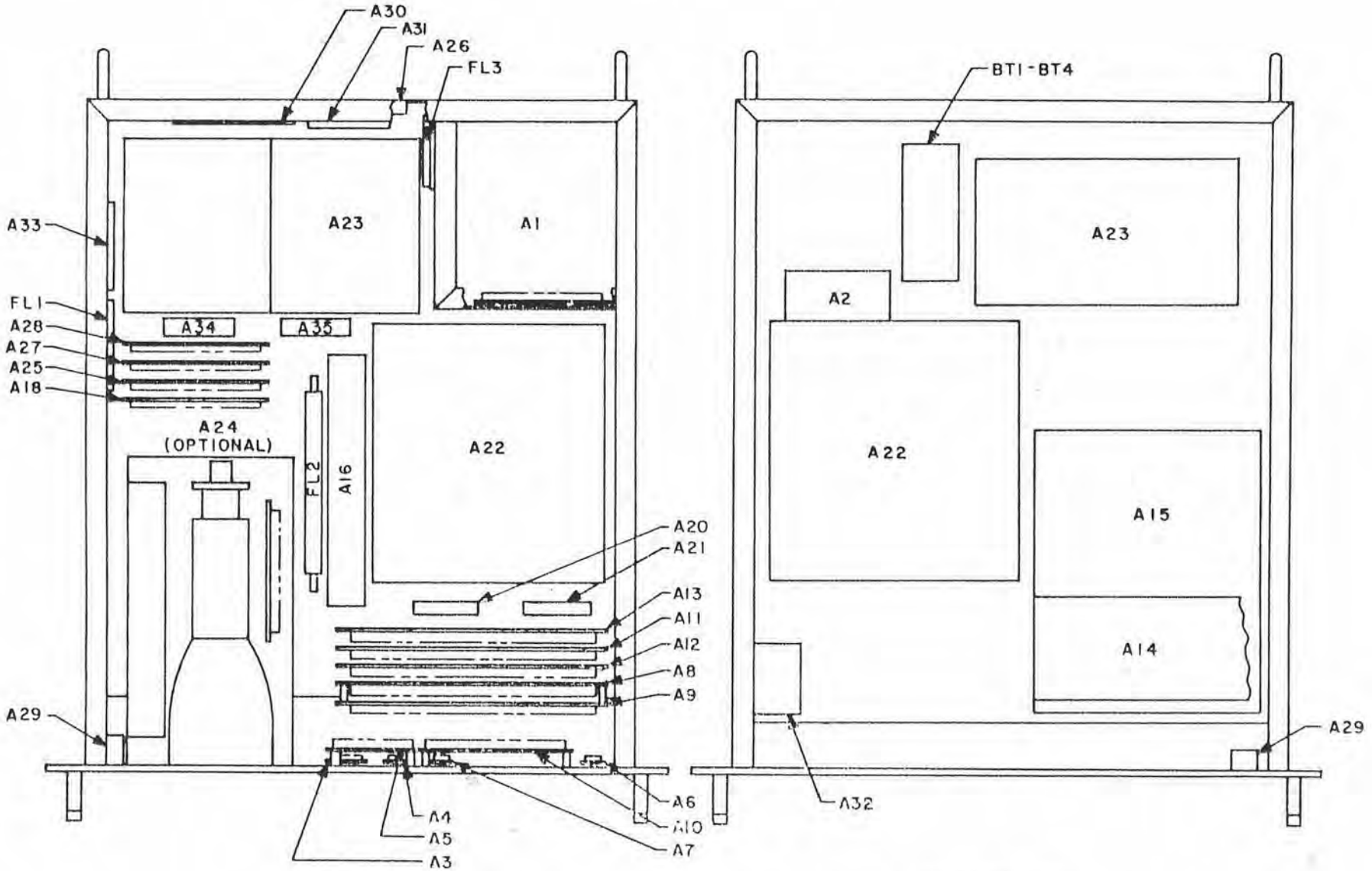


Figure 6-1. RG-5500 VHF/UHF Receiver Component Locations

Table 6-1. RG-5500 VHF/UHF Receiver Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A1	RECTIFIER BOARD, FSC 54805, P/N 74037. (See table 6-2.)	A1		1
A2	CONTROL CIRCUIT POWER SUPPLY, FSC 54805, P/N 74036. (See table 6-3.)	A2		1
A3	SWITCH ASSEMBLY, FSC 54805, P/N C-5441-001.	A3		1
A4	SWITCH ASSEMBLY, FSC 54805, P/N C-5444-001.	A4		1
A5	SWITCH ASSEMBLY, FSC 54805, P/N C-5445-001.	A5		1
A6	SWITCH ASSEMBLY, FSC 54805, P/N C-5442-001.	A6		1
A7	SWITCH BOARD, FSC 54805, P/N 79068. (See table 6-4.)	A7		1
A8	DISPLAY REGISTER, FSC 54805, P/N 76028. (See table 6-5.)	A8		1
A9	DISPLAY DRIVER, FSC 54805, P/N 76027. (See table 6-6.)	A9		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A10	DISPLAY, FSC 54805, P/N 76016. (See table 6-7.)	A10		1
A11	MEMORY, FSC 54805, P/N 76021. (See table 6-8.)	A11		1
A12	HOLD REGISTER, FSC 54805, P/N 76022. (See table 6-9.)	A12		1
A13	I/O BOARD, FSC 54805, P/N 76023. (See table 6-10.)	A13		1
A14	REMOTE CONTROL I/O BOARD, FSC 54805, P/N 76024. (See table 6-11).	A14		1
A15	REMOTE CONTROL INTERFACE, FSC 54805, P/N 76025. (See table 6-12.)	A15		1
A16	RF TUNER MODULE, FSC 54805, P/N 71007. (See table 6-13.)	A16		1
A17	NOT USED.			
A18	RF PRESELECTOR DRIVER & PIN DIODE SWITCH DRIVERS, FSC 54805, P/N 79065A. (See table 6-19.)	A18		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A19	NOT USED.			
A20	VCO ASSEMBLY, FSC 51979, P/N SSV/0736.	A20		1
A21	VCO ASSEMBLY, FSC 51979, P/N SSV/0737.	A21		1
A22	SYNTHESIZER ASSEMBLY, FSC 54805, P/N 78038. (See table 6-20.)	A22		1
A23	IF ASSEMBLY, FSC 54805, P/N 72072. (See table 6-34.)	A23		1
A24	SPECTRUM MONITOR, FSC 54805, P/N 79054. (See table 6-39.)	A24		1
A25	AGC AMPLIFIER, FSC 54805, P/N 73021. (See table 6-46.)	A25		1
A26	21.4 MHz LINE AMPL. MODULE, FSC 54805, P/N 75041. (See table 6-47.)	A26		1
A27	AUDIO/VIDEO AMPLIFIER, FSC 54805, P/N 73023. (See table 6-48.)	A27		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A28	COR/SQUELCH AMPLIFIER, FSC 54805, P/N 73022. (See table 6-49.)	A28		1
A29	PHONE JACK ASSEMBLY, FSC 54805, P/N 79057. (See table 6-50.)	A29		1
A30	OUTPUT FILTER ASSEMBLY, FSC 54805, P/N 79056. (See table 6-51.)	A30		1
A31	COR MODULE, FSC 54805, P/N 77026. (See table 6-52.)	A31		1
A32	TRIGGER GENERATOR, FSC 54805, P/N 76032. (See table 6-53.)	A32		1
A33	RF INPUT SWITCH, FSC 54805, P/N 79073. (See table 6-54.)	A33		1
A34	2ND LO AMPLIFIER MODULE, FSC 54805, P/N 79074. (See table 6-55.)	A34		1
A35	1ST LO AMPLIFIER MODULE, FSC 54805, P/N 79076. (See table 6-56.)	A35		1
BT1 thru BT4	BATTERY CELL, Nickel, Cadmium 1.2V, FSC SANYO, P/N N500AA.	BT1 thru BT4		4

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, Electrolytic, 11000 uF, 25V, FSC 56289, P/N 36D113G025AE2A.	C1		1
C2, C3, C28	CAPACITOR, Electrolytic, 1700 uF, 30V, FSC 56289, P/N 39D178G030HP4.	C2, C3, C28		3
C4 thru C9, C21, C22, C24	CAPACITOR, Tantalum, 6.8 uF, 35V, FSC 81349.	C4 thru C9, C21, C22, C24	CS13BF685K	9
C10 thru C20, C25	CAPACITOR, Feedthrough 1500 pF, 500V, FSC 72982, P/N 327-010-X5U0-152M.	C10 thru C20, C25		12
C23	CAPACITOR, Dipped, 390 pF, 5%, FSC 81349.	C23	CM05FD391J03	1
C26	CAPACITOR, Tantalum, 100 uF, 10V, FSC 56289, P/N CS13BC107K.	C26		1
C27	CAPACITOR, Electrolytic, 1300 uF, 50V, FSC 96954, P/N 85CX132U050HL4.	C27		1
DS1 thru DS13	LED, Red, FSC 28489, P/N 5082-4655.	DS1 thru DS13		13

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
F1	FUSE, For 115 VAL Operation, FSC 71400, P/N MDL 1 AMP.	F1		1
F2	FUSE, For 230VAC Operation, FSC 71400, P/N MDL 1/2 AMP.	F2		1
FL1	10-520 MHz LOW PASS FILTER, FSC 50140, P/N 10L120-550-0.	FL1		1
FL2	FILTER, FSC 21377, P/N DFT/2-100/ 50-28A/28A.	FL2		1
FL3	30 MHz LOW PASS FILTER, FSC 54805, P/N ALP-30-49.	FL3		1
J1	POWER LINE ASSEMBLY, FSC 05245, P/N 6J4.	J1		1
J2	JACK, Type "N" Flange Mount, FSC 74868, P/N 901-268.	J2		1
J3	JACK, FSC 06848, P/N 86425.	J3		1
J4	RECEPTACLE, 24 Pin, Bail Mount, FSC 00779, P/N 552474-1.	J4		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
J5	JACK, P/O FL3, FSC 06848, P/N 86425.	J5		1
L1	NOT USED.			
L2, L3	COIL, 250 uH, 10%, FSC 04213, P/N 6310-9.	L2, L3		2
L4	COIL, 3.3 uH, 10%, FSC 81349.	L4	MS75084-06	1
P1, P8, P35, P39	PLUG, Right Angle Cable, SMA, FSC 19505, P/N 60-0921-085.	P1, P8, P35, P39		4
P2, P3, P37, P38 P40, P49	PLUG, Straight Cable, SMA, FSC 19505, P/N 60-0931-085.	P2, P3, P37, P38, P40, P49		6
P4	NOT USED.			
P5	NOT USED.			
P6	NOT USED.			
P7	NOT USED.			
P9, P10, P36	PLUG, Right Angle, FSC 19505, P/N 62-0921-003.	P9, P10, P36		3

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
P11 thru P16, P24, P25, P27 thru P34	PLUG, FSC 81349.	P11 thru P16, P24, P25, P27 thru P34	UG-1466	16
P17 thru P23, P26	PLUG, FSC 81349.	P17 thru P23, P26	UG-1465	8
P41 thru P44	PLUG, 20 PIN, FSC 00779, P/N 3-87499-7.	P41 thru P44		4
P45 thru P48	PLUG, 34 PIN, FSC 75037, P/N 3414-0000.	P45 thru P48		4
P50, P51	PLUG, 25 PIN, FSC 81349.	P50, P51	4-87499-7	2
R1, R2, R15	RESISTOR, Variable, 1K, 10%, 2W, FSC 01121, P/N 70A1N056L102U.	R1, R2, R15		3
R3, R5	RESISTOR, Variable, 10K, 10%, 2W, FSC 01121, P/N 70A1N056L103U.	R3, R5		2
R4	RESISTOR, Fixed, Composition, 8.2K, 5%, 1/4W, FSC 81349.	R4	RCR07G822JS	1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R6	RESISTOR, Fixed, Composition, 10K, 5%, 1/4W, FSC 81349.	R6	RCR07G103JS	1
R7, R8, R12, R13, R14	RESISTOR, Fixed, Composition, 100 ohms, 5%, 1/4W, FSC 81349.	R7, R8, R12, R13, R14	RCR07G101JS	5
R9	RESISTOR, Fixed, Composition, 47K, 5%, 1/4W, FSC 81349.	R9	RCR07G473JS	1
R10, R11	RESISTOR, Fixed, Composition, 3.3K, 5%, 1/4W, FSC 81349.	R10, R11	RCR07G332JS	2
R16	RESISTOR, Fixed, Composition, 470 ohms, 5%, 1/4W, FSC 81349.	R16	RCR07G471JS	1
S1	SWITCH, Pushbutton, FSC 04009, P/N 82403.	S1		1
S2	SWITCH, Thumbwheel, P/N 3720-1000.	S2		1
S3, S4	SWITCH, Toggle, SPST, FSC 09353, P/N LFH-123.	S3, S4		2
T1	TRANSFORMER, Power, FSC 54805, P/N C-5605-001.	T1		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U1	INTEGRATED CIRCUIT, Bridge Rectifier, FSC 04713, P/N MDA-980-2.	U1		1
U2 thru U5	INTEGRATED CIRCUIT, +5V Regulator, FSC 27014, P/N LM340K-5.	U2 thru U5		4
U6	INTEGRATED CIRCUIT, +15V Regulator, FSC 27014, P/N LM340K-15.	U6		1
U7	INTEGRATED CIRCUIT, -15V Regulator, FSC 27014, P/N LM320K-15.	U7		1
U8	SHAFT ENCODER, FSC 15686, P/N ED82-1000-5.	U8		1
U9	INTEGRATED CIRCUIT, -15V Regulator, FSC 04713, P/N MC7915CP.	U9		1
W1	CABLE ASSEMBLY, FSC 54805, P/N B-3564-001.	W1		1
W2	CABLE ASSEMBLY, FSC 54805, P/N B-3565-001.	W2		1
W3	CABLE ASSEMBLY, FSC 54805, P/N B-3566-001.	W3		1

Table 6-1. RG-5500 VHF/UHF Receiver Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
W4	NOT USED.			
W5	NOT USED.			
W6	CABLE ASSEMBLY, FSC 54805, P/N B-3567-001.	W6		1
W7	CABLE ASSEMBLY, FSC 54805, P/N B-3568-001.	W7		1
W8	NOT USED.			
W9, W10	CABLE ASSEMBLY, FSC 54805, P/N C-5142-032.	W9, W10		2
XA8, XA11, XA13	CONNECTOR, (80 Pin), FSC 91662, P/N 6064-80-061-001.	XA8, XA11, XA13		3
XA12	CONNECTOR, (100 Pin), FSC 91662, P/N 6064-100-061-001.	XA12		1

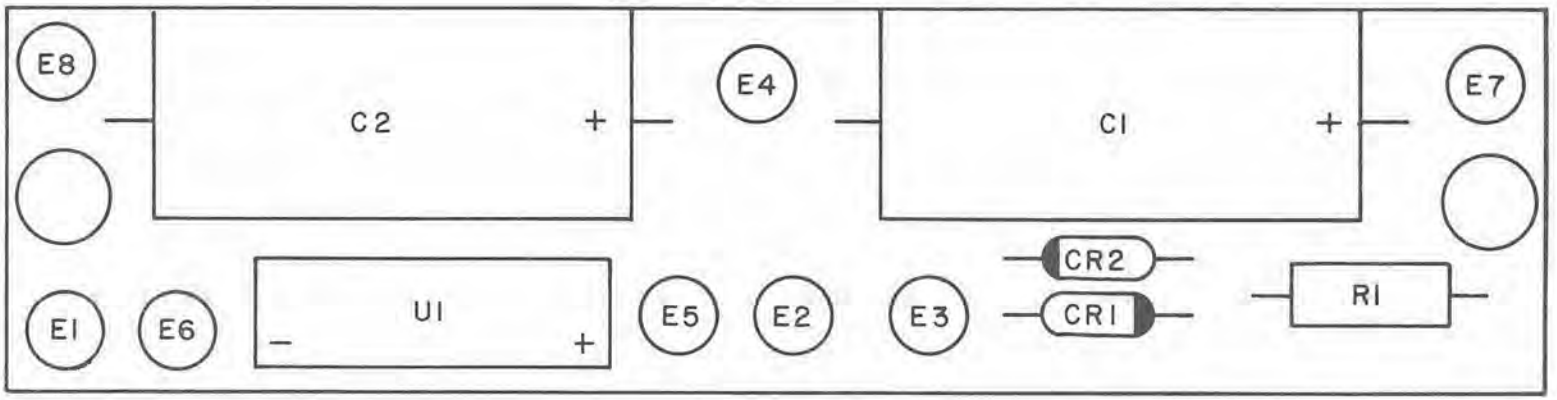


Figure 6-2. Rectifier Board A1 Parts Location Diagram

Table 6-2. Rectifier Board A1 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C2	CAPACITOR, Electrolytic tubular, FSC 56289, P/N 39D106F150EE4.	C1, C2		2
CR1, CR2	DIODE, Silicon, FSC 80058, P/N 1N4004.	CR1, CR2		2
R1	RESISTOR, Fixed Composition, 200K, 5%, 1/2W, FSC 81349.	R1	RCR20G204JS	1
U1	INTEGRATED CIRCUIT, Bridge Rectifier, FSC 04713, P/N MDA-970-2.	U1		1

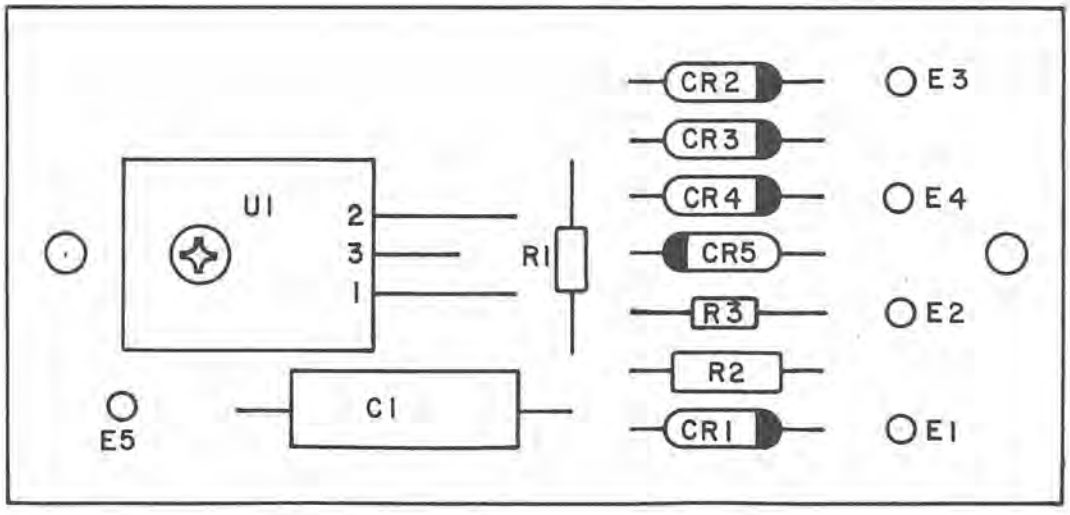


Figure 6-3. Control Circuit Power Supply A2 Parts Location Diagram

Table 6-3. Control Circuit Power Supply A2 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, Tantalum, 6.8 nF, 10%, 35V, FSC 81349.	C1	CS13BF685K	1
CR1, CR2 CR3, CR4	DIODE, Silicon, FSC 01295, P/N 1N4001	CR1, CR2, CR3, CR4		4
CR5	DIODE, Silicon Zener, 4.6V, 5%, 500 mW, FSC 01295, P/N 1N5232B.	CR5		1
R1, R3	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/4W, FSC 81349.	R1, R3	RCR07G471JS	2
R2	RESISTOR, Fixed Composition, 150 ohms, 5%, 1/2W, FSC 81349.	R2	RCR20G151JS	1
U1	VOLTAGE REGULATOR, +5V, FSC 04713, P/N MC7805CP.	U1		1

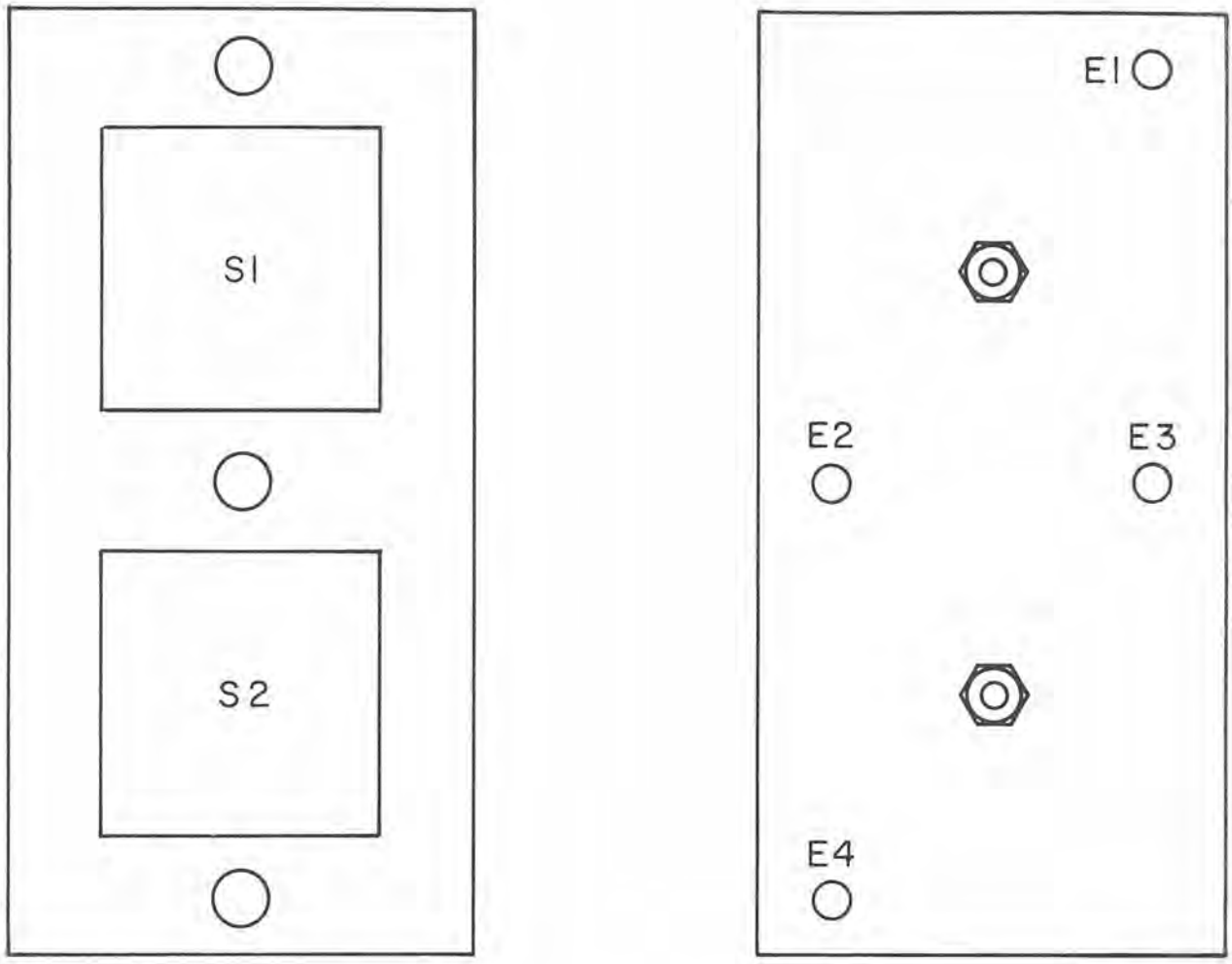


Figure 6-4. Switch Board A7 Parts Location Diagram

Table 6-4. Switch Board A7 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
E1, E2, E3, E4	TERMINAL, Turret, FSC 71279, P/N 1026-2.	E1, E2, E3, E4		4
S1	P.C. MOUNTED PUSHBUTTON SWITCH, FSC 54805, P/N C-5519-001.	S1		1
S2	P.C. MOUNTED PUSHBUTTON SWITCH, FSC 54805, P/N C-5519-002.	S2		1

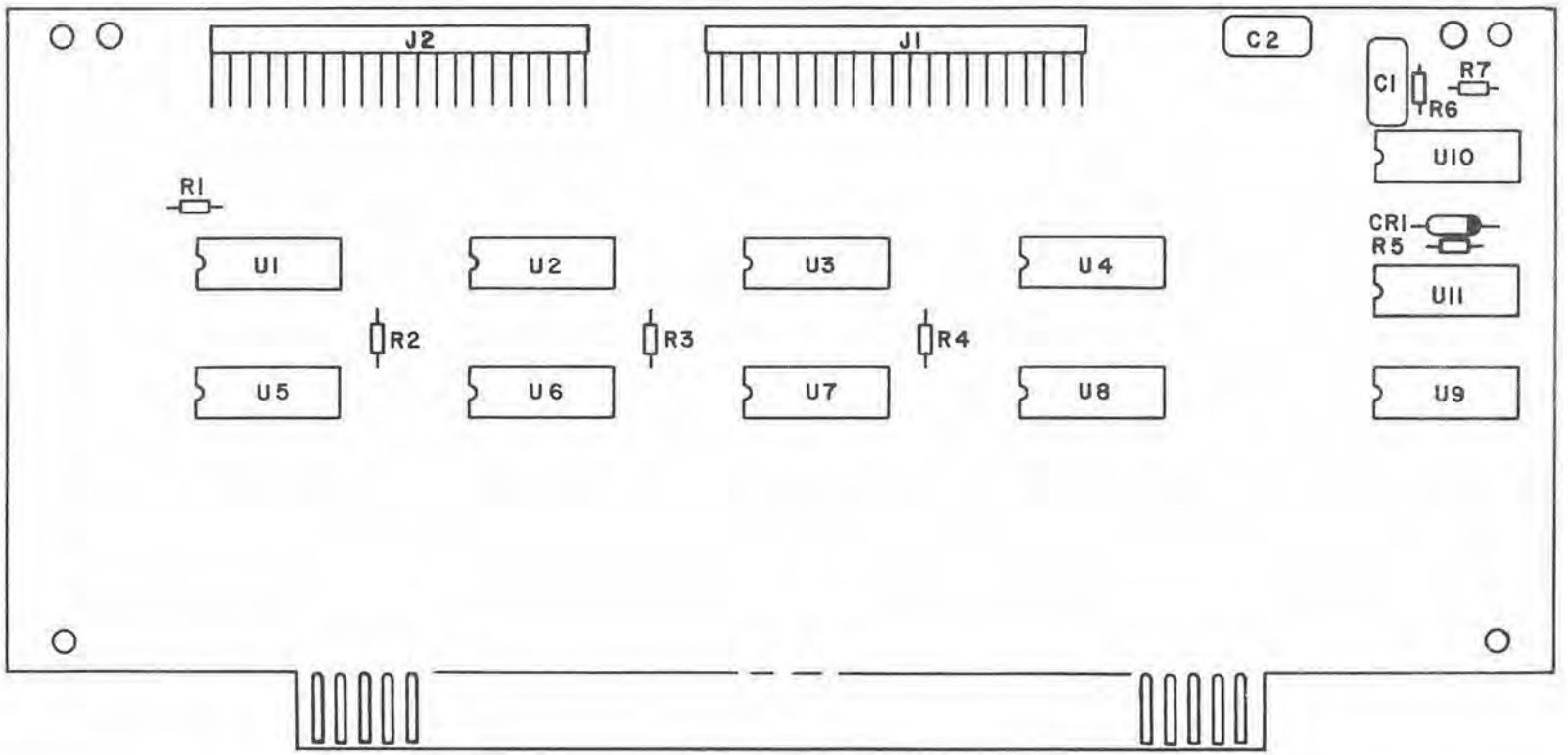


Figure 6-5. Display Register A8 Parts Location Diagram

Table 6-5. Display Register A8 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, Dipped Mica, 47 pF, 5%, 500V, FSC 81349.	C1	CM05FD470J03	1
C2	CAPACITOR, Dipped Mica, 100 pF, 5%, 500V, FSC 81349.	C2	CM05FD101J03	1
CR1	DIODE, Silicon, FSC 80058, P/N 1N462A.	CR1		1
J1, J2	HEADER, Right Angle, 20 Pin, FSC 00779, P/N 2-87233-0.	J1, J2		2
R1 thru R7	RESISTOR, Fixed, Composition, 47K, 5%, 1/8W, FSC 81349.	R1 thru R7	RCR05G473JS	7
U1 thru U9	INTEGRATED CIRCUIT, FSC 02735, P/N CD4094BE.	U1 thru U9		9
U10	INTEGRATED CIRCUIT, FSC 04713, P/N MC14001CP.	U10		1
U11	INTEGRATED CIRCUIT, FSC 04713, P/N MM 80C98.	U11		1

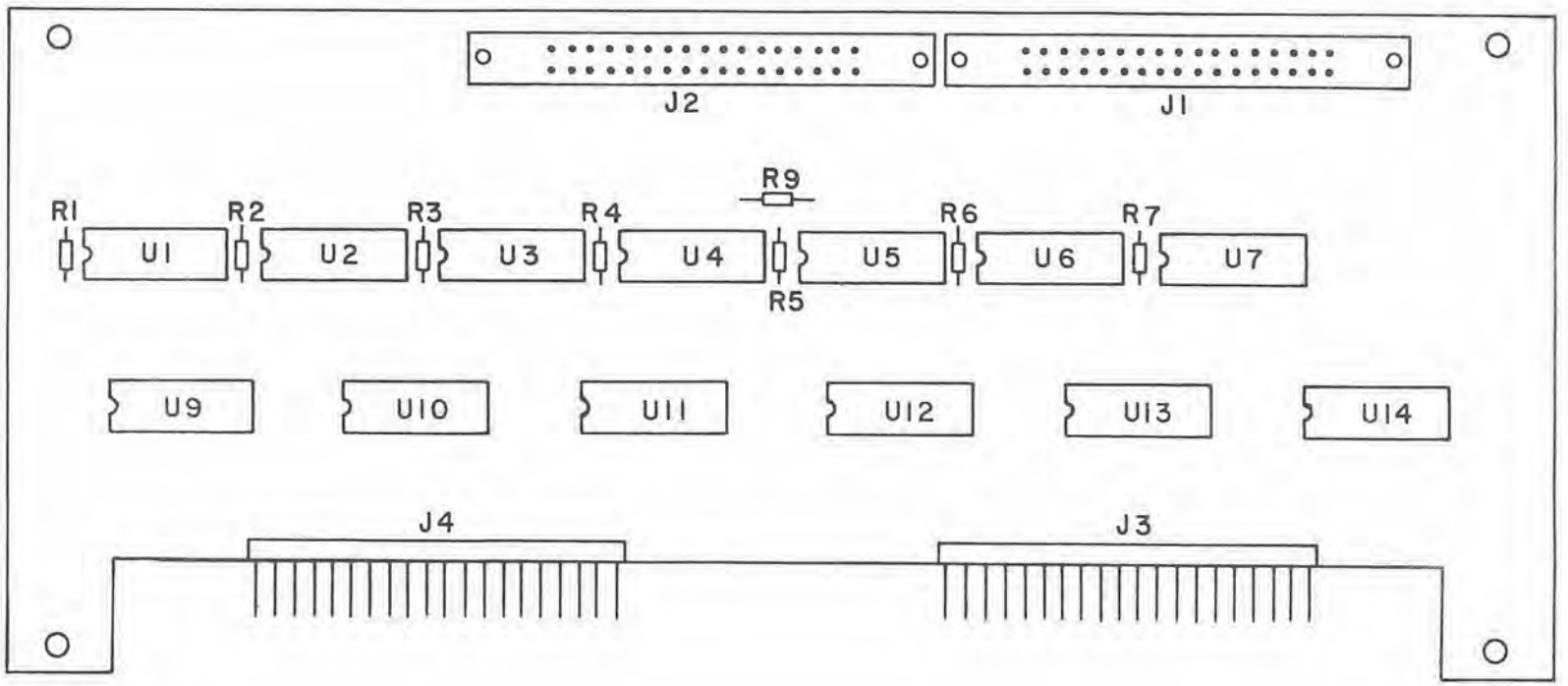


Figure 6-6. Display Driver A9 Parts Location Diagram

Table 6-6. Display Driver A9 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
J1, J2	CONNECTOR, FSC 75037, P/N 3431-2002.	J1, J2		2
J3, J4	HEADER ASSEMBLY, FSC 00779, P/N 2-87233-0.	J3, J4		2
R1 thru R7	RESISTOR, Fixed Composition, 20K, 5%, 1/8W, FSC 81349.	R1 thru R7	RCR05G203JS	7
R8	NOT USED.			
R9	RESISTOR, Fixed Composition, 330K, 5%, 1/8W, FSC 81349.	R9	RCR05G334JS	1
U1 thru U7	INTEGRATED CIRCUIT, Display Driver, FSC 73138, P/N DD-700.	U1 thru U7		7
U8	NOT USED.			
U9 thru U14	INTEGRATED CIRCUIT, FSC 27014, P/N MM80C97.	U9 thru U14		6

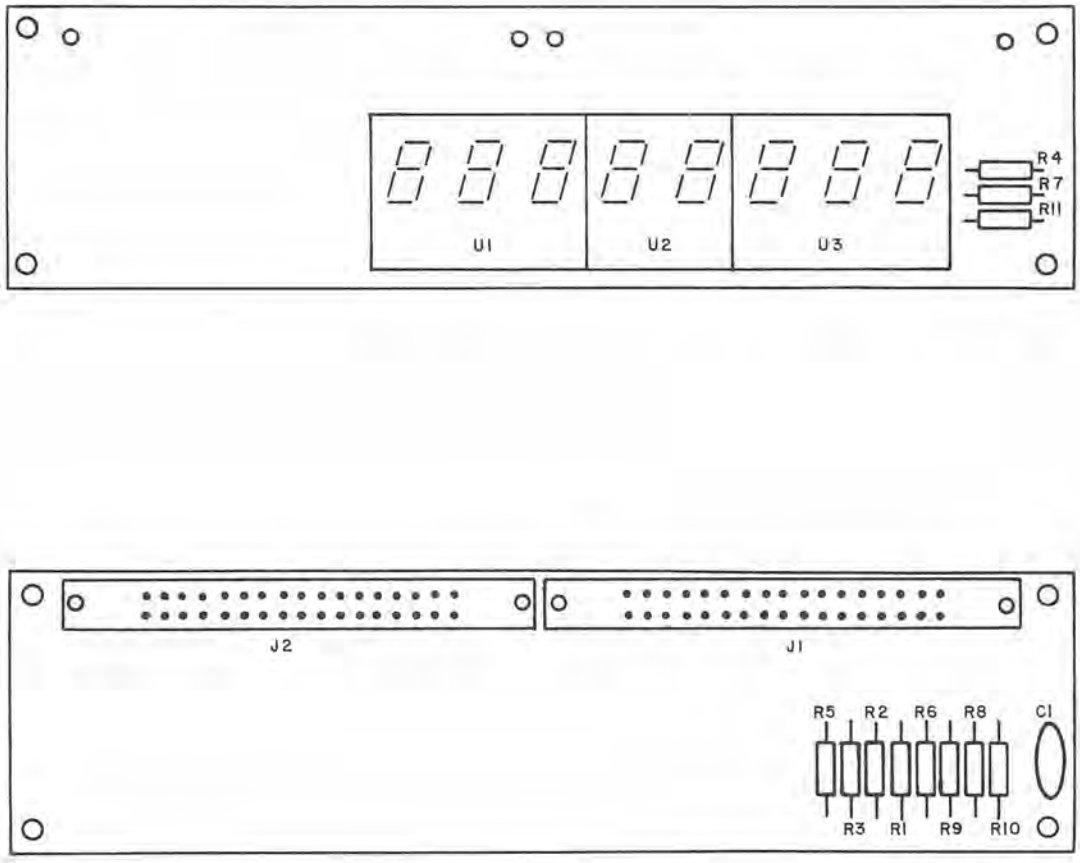


Figure 6-7. Display Board A10 Parts Location Diagram

Table 6-7. Display Board A10 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, 1000 pF, 1000V, FSC 71590, DD-102.	C1		1
J1, J2	CONNECTOR, FSC 75037, P/N 3431-2002.	J1, J2		2
R1, R2, R3, R5, R6, R8, R9, R10	RESISTOR, Fixed Composition, 2.2K, 5%, 1/4W, FSC 81349.	R1, R2, R3, R5, R6, R8, R9, R10	RCR07G222JS	8
R4, R7, R11	RESISTOR, Fixed Composition, 910K, 5%, 1/4W, FSC 81349.	R4, R7, R11	RCR07G914JS	3
U1, U3	3 DIGIT DISPLAY, FSC 73138, P/N SP-333.	U1, U3		2
U2	2 DIGIT DISPLAY, FSC 73138, P/N SP-332.	U2		1

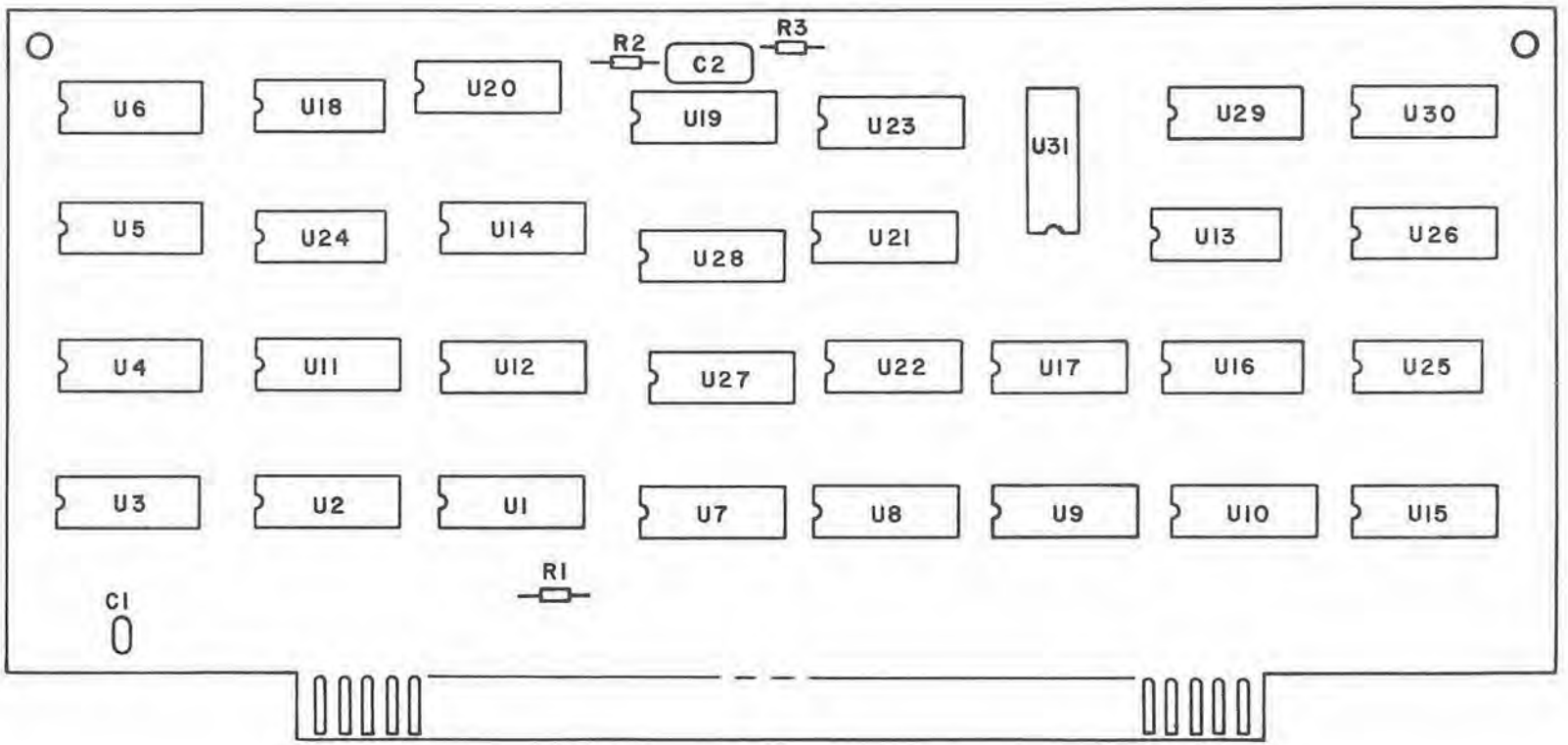


Figure 6-8. Memory Board A11 Parts Location Diagram

Table 6-8. Memory Board A11 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, Ceramic, 0.1 pF, 10%, 50V FSC 81349.	C1	CK05BX104K	1
C2	CAPACITOR, Dipped Mica, 62 pF, 5%, 500V, FSC 81349.	C2	CM05ED620G03	1
R1	RESISTOR, Fixed Composition, 47K, 5%, 1/4W, FSC 81349.	R1	RCR07G473JS	1
R2	RESISTOR, Fixed Composition, 1.2K, 5%, 1/4W, FSC 81349.	R2	RCR07G122JS	1
R3	RESISTOR, Fixed Composition, 91K, 5%, 1/4W, FSC 81349.	R3	RCR07G913JS	1
U1, U15	INTEGRATED CIRCUIT, FSC 27014, P/N MM74C174N.	U1, U15		2
U2, U3, U4, U5, U6	INTEGRATED CIRCUIT, FSC 04713, P/N MCM14537.	U2, U3, U4, U5, U6		5
U7, U8, U9, U10, U26, U30	INTEGRATED CIRCUIT, FSC 02735, P/N CD4094BE.	U7, U8, U9, U10, U26, U30		6

Table 6-8. Memory Board A11 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U11	INTEGRATED CIRCUIT, FSC 04713, P/N MC14519CP.	U11		1
U12, U27	INTEGRATED CIRCUIT, FSC 04713, P/N MC14560CP.	U12, U27		2
U13	INTEGRATED CIRCUIT, FSC 04713, P/N MC14071CP.	U13		1
U14	INTEGRATED CIRCUIT, FSC 04713, P/N MC14561CP.	U14		1
U16	INTEGRATED CIRCUIT, FSC 04713, P/N MC14081CP.	U16		1
U17	INTEGRATED CIRCUIT, FSC 04713, P/N MC14512CP.	U17		1
U18, U29	INTEGRATED CIRCUIT, FSC 04713, P/N MC14001CP.	U18, U29		2
U19, U24	INTEGRATED CIRCUIT, FSC 04713, P/N MC14011CP.	U19, U24		2
U20, U23	INTEGRATED CIRCUIT, FSC 04713, P/N MC14022CP.	U20, U23		2

Table 6-8. Memory Board A11 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U21, U22	INTEGRATED CIRCUIT, FSC 04713, P/N MC14002CP.	U21, U22		2
U25	INTEGRATED CIRCUIT, FSC 04713, P/N MC14068BCP.	U25		1
U28	INTEGRATED CIRCUIT, FSC 04713, P/N MC14013CP.	U28		1
U31	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049CP.	U31		1

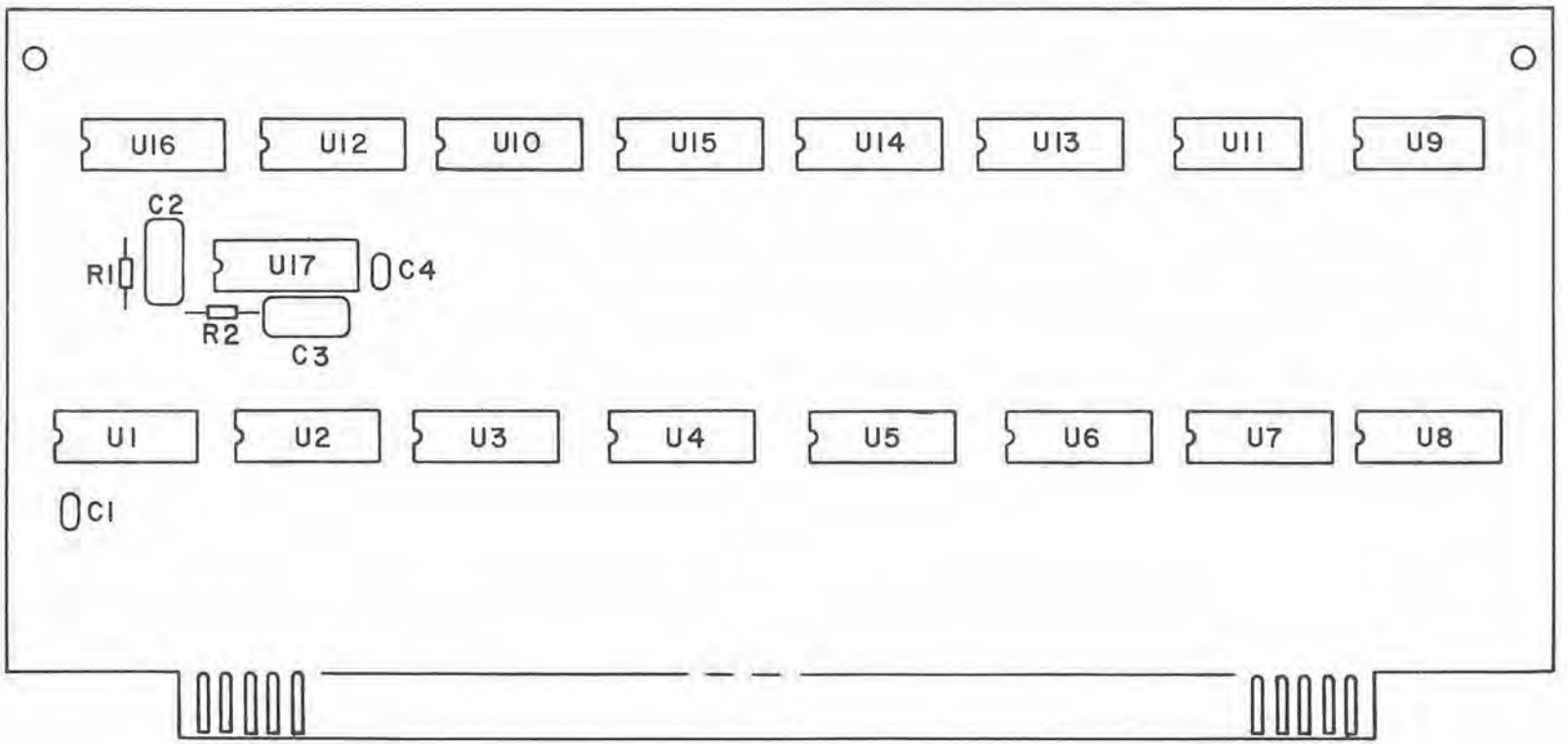


Figure 6-9. Hold Register A12 Parts Location Diagram

Table 6-9. Hold Register A12 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C4	CAPACITOR, Ceramic, 0.1 pF, 10%, 50V, FSC 81349.	C1, C4	CK05BX104K	2
C2, C3	CAPACITOR, Dipped Mica, 100 pF, 5%, 500V, FSC 81349.	C2, C3	CM05FD101J03	2
R1	RESISTOR, Fixed Composition, 47K, 5%, 1/8W, FSC 81349.	R1	RCR05G473JS	1
R2	RESISTOR, Fixed Composition, 1M, 5%, 1/8W, FSC 81349.	R2	RCR05G105JS	1
U1, U2, U3, U4, U5, U6 U7	INTEGRATED CIRCUIT, FSC 27014, P/N MM74C174N.	U1, U2, U3, U4, U5, U6, U7		7
U8	INTEGRATED CIRCUIT, FSC 04713, P/N MC14556CP.	U8		1
U9	INTEGRATED CIRCUIT, FSC 04713, P/N MC14081CP.	U9		1
U10	INTEGRATED CIRCUIT, FSC 04713, P/N MC14560CP.	U10		1

Table 6-9. Hold Register A12 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U11	INTEGRATED CIRCUIT, FSC 04713, P/N MC14001CP.	U11		1
U12	INTEGRATED CIRCUIT, FSC 04713, P/N MC14585CP.	U12		1
U13	INTEGRATED CIRCUIT, FSC 04713, P/N MC14555CP.	U13		1
U14, U15	INTEGRATED CIRCUIT, FSC 27014, P/N MM80C97N.	U14, U15		2
U16	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049CP.	U16		1
U17	INTEGRATED CIRCUIT, FSC 02735, P/N CD4098BE.	U17		1

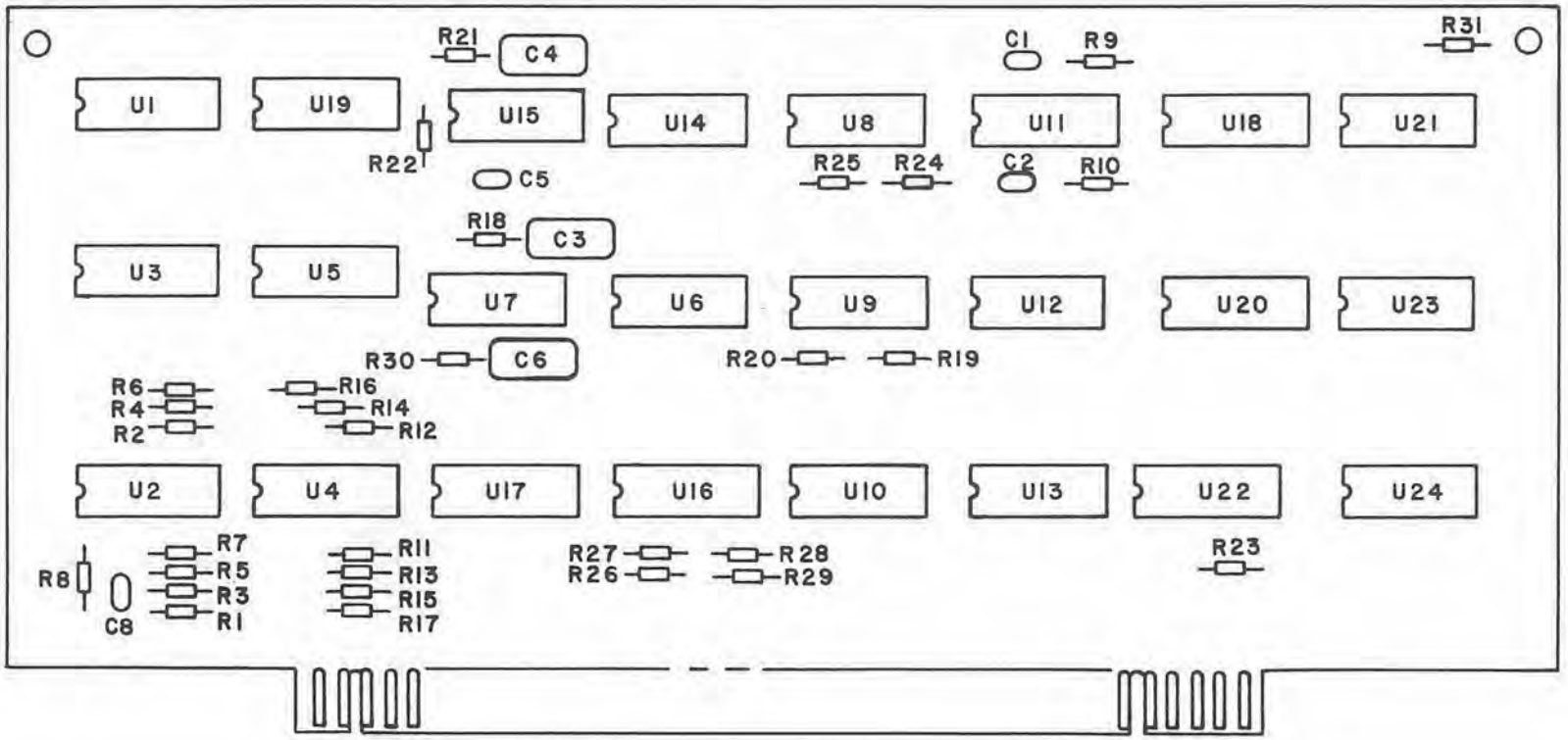


Figure 6-10. I/O Board A13 Parts Location Diagram

Table 6-10. I/O Board A13 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C2, C8	CAPACITOR, Ceramic, 0.1 uF, 10%, 50V, FSC 81349.	C1, C2, C8	CK05BX104K	3
C3, C6	CAPACITOR, Dipped Mica, 47 pF, 2%, 200V, FSC 81349.	C3, C6	CM05ED470G03	2
C4	CAPACITOR, Dipped Mica, 47 pF, 2%, 200V, FSC 81349.	C4	CM05FD221G03	1
C5	CAPACITOR, Ceramic 0.01 uF, 10%, 100V, FSC 81349.	C5	CK05BX103K	1
C7	NOT USED.			
R1, R3 R5, R7, R8, R11, R13, R15, R17, R19, R20, R24, R25	RESISTOR, Fixed Composition, 2.2K, 5%, 1/8W, FSC 81349.	R1, R3, R5, R7, R8, R11, R13, R15, R17, R19, R20, R24, R25	RCR05G222JS	13

Table 6-10. I/O Board A13 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R2, R4, R6, R12, R14, R16, R18, R23, R26 thru R31	RESISTOR, Fixed Composition, 47K, 5%, 1/8W, FSC 81349.	R2, R4, R6, R12, R14, R16, R18, R23, R26 thru R31	RCR05G473JS	14
R9, R10	RESISTOR, Fixed Composition, 680K, 5%, 1/8W, RSC 81349.	R9, R10	RCR05G684JS	2
R21	RESISTOR, Fixed Composition, 3.6M, 5%, 1/8W, FSC 81349.	R21	RCR05G365JS	1
R22	RESISTOR, Fixed Composition, 510K, 5%, 1/8W, FSC 81349.	R22	RCR05G514JS	1
U1	INTEGRATED CIRCUIT, FSC 04713, P/N MC14021CP.	U1		1
U2, U4	INTEGRATED CIRCUIT, FSC 04713, P/N MC14532CP.	U2, U4		2
U3, U5	INTEGRATED CIRCUIT, FSC 27014, P/N MM80C97.	U3, U5		2

Table 6-10. I/O Board A13 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U6	INTEGRATED CIRCUIT, FSC 18714, P/N CD4075BE.	U6		1
U7, U13, U14, U23	INTEGRATED CIRCUIT, FSC 04713, P/N MC14013CP.	U7, U13, U14, U23		4
U8, U12, U24	INTEGRATED CIRCUIT, FSC 04713, P/N MC14001CP.	U8, U12, U24		3
U9	INTEGRATED CIRCUIT, FSC 04713, P/N MC14081CP.	U9		1
U10	INTEGRATED CIRCUIT, FSC 04713, P/N MC14078CP.	U10		1
U11	INTEGRATED CIRCUIT, FSC 18714, P/N CD4098BE.	U11		1
U15, U21	INTEGRATED CIRCUIT, FSC 04713, P/N MC14011CP.	U15, U21		2
U16	INTEGRATED CIRCUIT, FSC 04713, P/N MC14585CP.	U16		1
U17	INTEGRATED CIRCUIT, FSC 04713, P/N MC14094CP.	U17		1

Table 6-10. I/O Board A13 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U18, U22	INTEGRATED CIRCUIT, FSC 04713, P/N MC14161BCP.	U18, U22		2
U19	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049BCP.	U19		1
U20	INTEGRATED CIRCUIT, FSC 04713, P/N MC14015CP.	U20		1

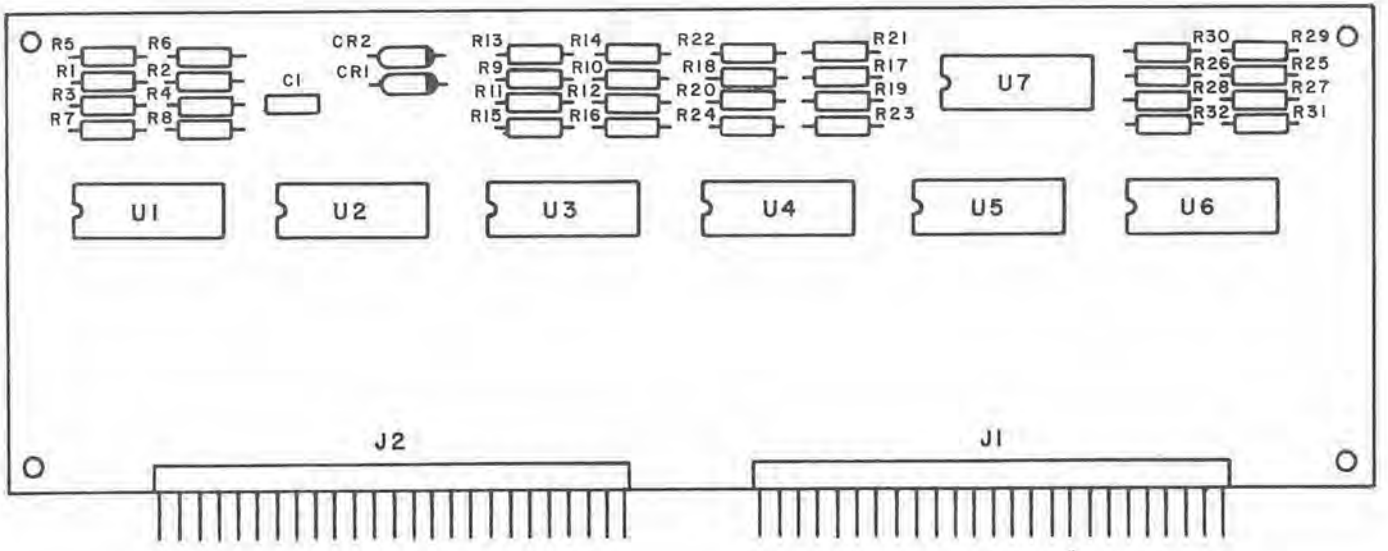


Figure 6-11. Remote Control I/O Board A14 Parts Location Diagram

Table 6-11. Remote Control I/O Board A14 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	CAPACITOR, Ceramic, 0.1 uF, 10%, 50V, FSC 81349.	C1	CK05BX104K	1
CR1, CR2	DIODE, Silicon, FSC 80058, P/N 1N462A	CR1, CR2		2
J1, J2	HEADER, Right Angle, 25 Pin, FSC 00779, P/N 2-87233-5.	J1, J2		2
R1, R3, R5, R7, R9, R11, R13, R15, R18, R20, R22, R24, R26, R28, R30, R32	RESISTOR, Fixed Composition, 3K, 5%, 1/4W, FSC 81349.	R1, R3, R5, R7, R9, R11, R13, R15, R18, R20, R22, R24, R26, R28, R30, R32	RCR07G302JS	16
R2, R4, R6, R8, R10, R12, R14, R16, R17, R19, R21, R23, R25, R27, R29, R31	RESISTOR, Fixed Composition, 6.2K, 5%, 1/4W, FSC 81349.	R2, R4, R6, R8, R10, R12, R14, R16, R17, R19, R21, R23, R25, R27, R29, R31	RCR07G622JS	16

Table 6-11. Remote Control I/O Board A14 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U1, U3, U4, U6	INTEGRATED CIRCUIT, FSC 27014, P/N DS8838N.	U1, U3, U4, U6		4
U2, U5	INTEGRATED CIRCUIT, FSC 27014, P/N MM80C97N.	U2, U5		2
U7	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049CP.	U7		1

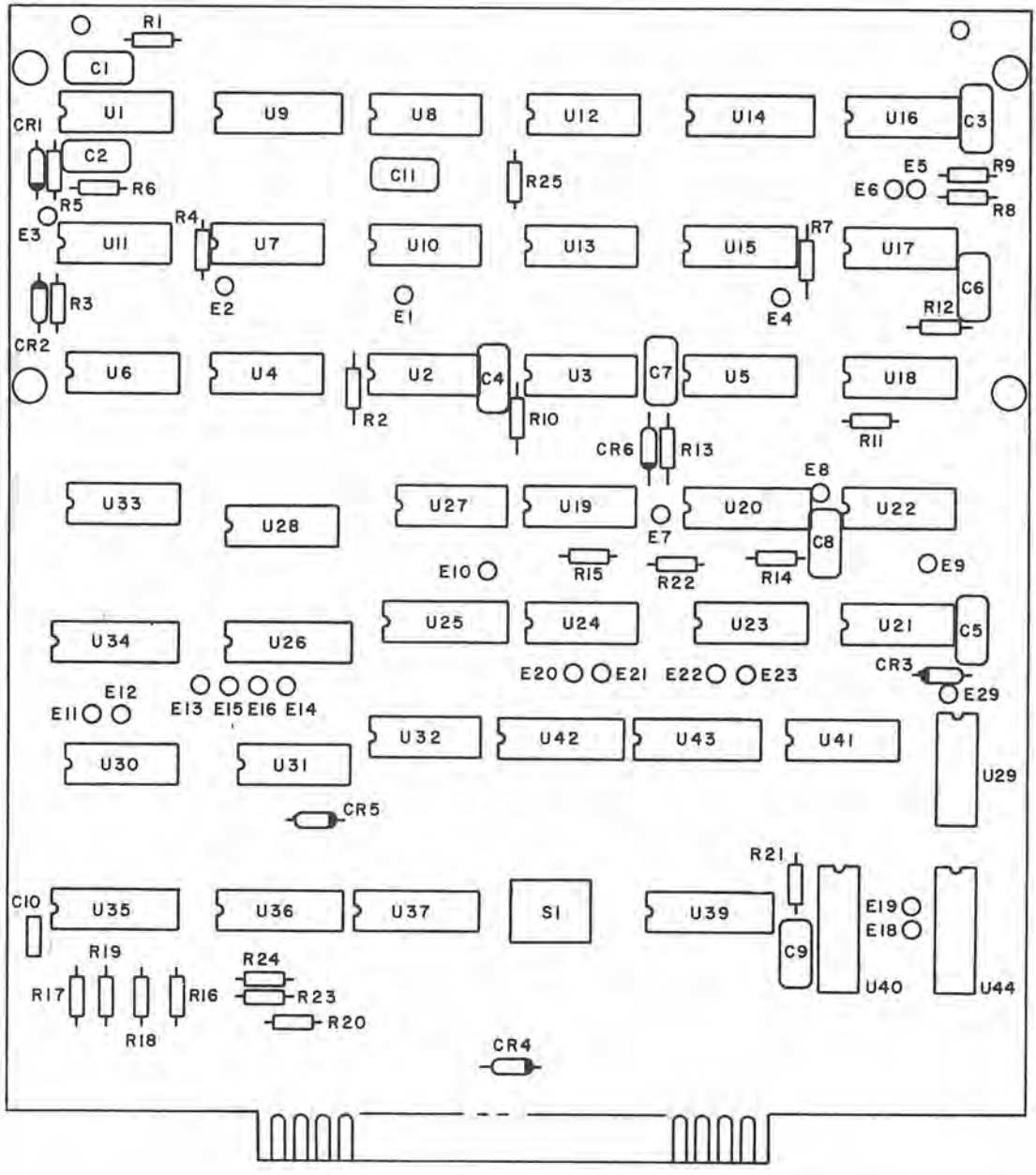


Figure 6-12. Remote Control Interface A15 Parts Location Diagram

Table 6-12. Remote Control Interface A15 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C2, C3, C4, C7, C8, C9	CAPACITOR, Dipped Mica, 27 pF, 5%, 500V, FSC 81349.	C1, C2, C3, C4, C7, C8, C9	CM05ED270J03	7
C5, C6	CAPACITOR, Dipped Mica, 10 pF, ±0.5 pF, 200V, FSC 81349.	C5, C6	CM05CD100G03	2
C10	CAPACITOR, Ceramic, 0.1 uF, ±10%, 50V, FSC 81349.	C10	CK05BX104K	1
C11	CAPACITOR, Dipped Mica, 47 pF, 5%, 500V, FSC 81349.	C11	CM05FD470J03	1
CR1 thru CR6	DIODE, Silicon, FSC 80058, P/N 14449.	CR1 thru CR6		6
R1, R3, R5, R9, R10, R11, R12, R13, R14, R21, R22, R23, R24, R25	RESISTOR, Fixed Composition, 47K, 5%, 1/4W, FSC 81349.	R1, R3, R5, R9, R10, R11, R12, R13, R14, R21, R22, R23, R24, R25	RCR07G473JS	14
R2, R8	RESISTOR, Fixed Composition, 470K, 5%, 1/4W, FSC 81349.	R2, R8	RCR07G474JS	2

Table 6-12. Remote Control Interface A15 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R4, R6, R7, R15, R16, R17, R18, R19, R20	RESISTOR, Fixed Composition, 3.3K, 5%, 1/4W, FSC 81349.	R4, R6, R7, R15, R16, R17, R18, R19, R20	RCR07G332JS	9
S1	SWITCH, Rocker Dip, SPST, 5 Positions, FSC 81073, P/N 76B05.	S1		1
U1, U6, U7, U15, U16, U22, U23, U27, U33, U41	INTEGRATED CIRCUIT, FSC 04713, P/N MC14011CP.	U1, U6, U7, U15, U16, U22, U23, U27, U33, U41		10
U2, U17, U24	INTEGRATED CIRCUIT, FSC 04713, P/N MC14001CP.	U2, U17, U24		3
U3	INTEGRATED CIRCUIT, FSC 04713, MC14025CP.	U3		1
U4, U5	INTEGRATED CIRCUIT, FSC 04713, P/N MC14012CP.	U4, U5		2
U8, U10, U12, U13, U21	INTEGRATED CIRCUIT, FSC 04713, P/N MC14013CP.	U8, U10, U12, U13, U21		5

Table 6-12. Remote Control Interface A15 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U9, U14, U25	INTEGRATED CIRCUIT, FSC 04713, P/N MC14028CP.	U9, U14, U25		3
U11, U19	INTEGRATED CIRCUIT, FSC 04713, P/N MC14071CP.	U11, U19		2
U18	INTEGRATED CIRCUIT, FSC 04713, P/N MC14081CP.	U18		1
U20, U44	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049CP.	U20, U44		2
U26	INTEGRATED CIRCUIT, FSC 04713, P/N MC14555CP.	U26		1
U28, U29	INTEGRATED CIRCUIT, FSC 04713, P/N MC14023CP.	U28, U29		2
U30, U32	INTEGRATED CIRCUIT, FSC 04713, P/N MC14070CP.	U30, U32		2
U31	INTEGRATED CIRCUIT, FSC 04713, P/N MC14068CP.	U31		1
U34, U36	INTEGRATED CIRCUIT, FSC 27014, P/N MM74C174.	U34, U36		2

Table 6-12. Remote Control Interface A15 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U35	INTEGRATED CIRCUIT, FSC 27014, P/N MM80C97.	U35		1
U37, U39	INTEGRATED CIRCUIT, FSC 04713, P/N MC14076CP.	U37, U39		2
U38	NOT USED.			
U40	INTEGRATED CIRCUIT, FSC 07623, P/N F40161CP.	U40		1
U42, U43	INTEGRATED CIRCUIT, FSC 04713, P/N MC14539CP.	U42, U43		2

Table 6-13. RF Tuner Module A16 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A1	SECOND CONVERTER SWITCH, FSC 54805, P/N 75044. (See table 6-14.)	A1		1
A2	HIGH BAND PREAMPL NO.2, FSC 54805, P/N 75048. (See table 6-15.)	A2		1
A3	FIRST CONVERTER SWITCH, FSC 54805, P/N 75043. (See table 6-16.)	A3		1
A4	LOW BAND PREAMPL & SWITCH, FSC 54805, P/N 75042. (See table 6-17.)	A4		1
A5	HIGH BAND PREAMPL NO. 1, FSC 54805, P/N 75049. (See table 6-18.)	A5		1
C1 thru C20, C23	CAPACITOR, Feed thru, 1000 pF, FSC 33095, P/N 54-794-002-102P.	C1 thru C20, C23		21
C21	NOT USED.			
C22	CAPACITOR, Ceramic, Tubular, 2.0 pF, 10%, 500V, FSC 95121, P/N QC2.0pFK.	C22		1
CR1 thru CR6	DIODE, Varactor, FSC 25088, P/N BB-105B.	CR1 thru CR6		6

Table 6-13. RF Tuner Module A16 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
FB1	FERRITE BEAD, FSC 02114, P/N 56-590-65-4A.	FB1		1
FL1	160 MHz BANDPASS FILTER, FSC 50140, P/N 5B120-160/X8-0.	FL1		1
FL2	660 MHz BANDPASS FILTER, FSC 50140, P/N X6M-C10-660/10-0.	FL2		1
J1 thru J9	JACK, Bulkhead Mount, FSC 98291, P/N 50-645-0000-31.	J1 thru J9		9
J10, J11	JACK, Straight Bulkhead, FSC 19505, P/N 60-0910,085.	J10, J11		2
L1, L3	BUSS STRAP NO. 2, FSC 54805, P/N A-0409-001.	L1, L3		2
L2	RESONATOR NO. 2, FSC 54805, P/N A-0363-001.	L2		1
L4	COIL, Fixed, 3.3 UH, FSC 81349.	L4	MS75084-06	1
L5 thru L8	NOT USED.			
L9, L13	BUSS STRAP NO. 3, FSC 54805, P/N A-0436-001.	L9, L13		2

Table 6-13. RF Tuner Module A16 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
L10	RESONATOR NO. 1, FSC 54805, P/N A-0362-001.	L10		1
L11	BUSS STRAP NO. 2, FSC 54805, P/N A-0380-001.	L11		1
L12	P/O L10	L12		
P1, P3	PLUG, Straight, FSC 19505, P/N 60-0931-085.	P1, P3		2
P2, P4 thru P8	PLUG, Right Angle, FSC 19505, P/N 60-0921-085.	P2, P4 thru P8	60-0921-085	6
P9	CONNECTOR, Multipin, FSC 71468, P/N DAM15P.	P9		1
R1, R2, R3	RESISTOR, Fixed Composition, 10K, 5%, 1/4W, FSC 81349.	R, R2, R3	RCR07G103JS	3
R4	RESISTOR, Fixed Composition, FSC 81349.	R4	Factory Select	1
R5	RESISTOR, Fixed Composition, FSC 81349.	R5	Factory Select	1
R6	RESISTOR, Fixed Composition, 12 ohms, 5%, 1/8W, FSC 81349.	R6	RCR05G120JS	1

Table 6-13. RF Tuner Module A16 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R7	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R7	RCR05G471JS	1
R8, R10, R11	RESISTOR, Fixed Composition, 12 ohms, 5%, 1/8W, FSC 81349.	R8, R10, R11	RCR05G120JS	3
R9	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R9	RCR05G471JS	1
W1	CABLE ASSEMBLY, FSC 54805, P/N B-3560-001.	W1		1
W2	CABLE ASSEMBLY, FSC 54805, P/N B-3561-001.	W2		1
W3	CABLE ASSEMBLY, FSC 54805, P/N B-3562-001.	W3		1
W4	CABLE ASSEMBLY, FSC 54805, P/N B-3563-001.	W4		1
W5	CABLE ASSEMBLY, FSC 54805, P/N C-5646-001.	W5		1

Table 6-14. Second Converter Switch A16A1 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1 thru C13	CAPACITOR, Chip, 1000 pF, 10%, 50V, FSC 29990, P/N ATC100B102KP50K.	C1 thru C13		13
CR1 thru CR4	DIODE, Pin, FSC 96431, P/N MA47120.	CR1 thru CR4		4
L1	INDUCTOR, Fixed, 1.0 uH, FSC 81349.	L1	MS75083-13	1
L2	INDUCTOR, Fixed, 0.15 uH, FSC 81349.	L2	MS75083-03	1
L3	NOT USED.			
L4	INDUCTOR, Fixed, 6.8 uH, 10%, FSC 81349.	L4	MS75084-10	1
Q1	TRANSISTOR, NPN, FSC 80058, P/N 2N5109.	Q1		1
R1 thru R3	RESISTOR, Fixed, Composition, 1.1K, 5%, 1/8W, FSC 81349.	R1 thru R3	RCR05G112JS	3
R4	RESISTOR, Fixed Composition, 33 ohms, 5%, 1/8W, FSC 81349.	R4	RCR05G330JS	1
R5, R7	RESISTOR, Fixed, Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R5, R7	RCR05G471JS	2

Table 6-14. Second Converter Switch A16A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R6	RESISTOR, Fixed Composition, 12 ohms, 5%, 1/8W, FSC 81349.	R6	RCR05G120JS	1
R8, R10	RESISTOR, Fixed Composition, 330 ohms, 5%, 1/8W, FSC 81349.	R8, R10	RCR05G331JS	2
R9	RESISTOR, Fixed Composition, 18 ohms, 5%, 1/8W, FSC 81349.	R9	RCR05G180JS	1
R11	RESISTOR, Fixed Composition, 1K, 5%, 1/8W, FSC 81349.	R11	RCR05G102JS	1
R12	RESISTOR, Fixed Composition, 2.7K, 5%, 1/8W, FSC 81349.	R12	RCR05G272JS	1
R13	RESISTOR, Fixed Composition, 18 ohms, 5%, 1/4W, FSC 81349.	R13	RCR07G180JS	1
R14	RESISTOR, Fixed Composition, 240 ohms, 5%, 1/8W, FSC 81349.	R14	RCR05G241JS	1
R15	RESISTOR, Fixed Composition, 10 ohms, 5%, 1/8W, FSC 81349.	R15	RCR05G100JS	1
R16	RESISTOR, Fixed Composition, 68 ohms, 5%, 1/4W, FSC 81349.	R16	RCR07G680JS	1

Table 6-14. Second Converter Switch A16A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
RA1	HEAT SINK, FSC 05820, P/N 205CB.	RA1		1
U1	IC AMPLIFIER, FSC 14482, P/N A65	U1		1
U2	IC MIXER, FSC 21912, P/N MD-149.	U2		1

Table 6-15. High Band Preamplifier No. 2 A16A2 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	NOT USED.			
C2	CAPACITOR, Chip, 1000 pF, 10%, 50V, FSC 29990, P/N ATC100B102KP50K.	C2		1
R1, R3,	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R1, R3	RCR05G471JS	2
R2, R4	NOT USED.			
R5	RESISTOR, Fixed Composition, 33 ohms, 5%, 1/8W, FSC 81349.	R5	RCR05G330JS	1
U1	IC AMPLIFIER, FSC 14482, P/N A15.	U1		1

Table 6-16. First Converter Switch A16A3 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1 thru C10, C12	CAPACITOR, Chip, 1000 pF, 10%, 50V, FSC 29990, P/N ATC100B102KP50K.	C1 thru C10, C12		11
C11	CAPACITOR, Composition, Tubular, 1.0 pF 500V, 10%, FSC 95121, P/N QC 1.0pFK.	C11		1
CR1 thru CR4	DIODE, Pin, FSC 96431, P/N MA47120.	CR1 thru CR4		4
L1 thru L3	INDUCTOR, Fixed, 220 uH, FSC 54805, P/N C-5160-016.	L1 thru L3		3
R1, R3	RESISTOR, Fixed Composition, 33 ohms, 5%, 1/8W, FSC 81349.	R1, R3	RCR05G331JS	2
R2	RESISTOR, Fixed Composition, 18 ohms, 5%, 1/8W, FSC 81349.	R2	RCR05G180JS	1
R4, R6	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R4, R6	RCR05G471JS	2
R5	RESISTOR, Fixed Composition, 12 ohms, 5%, 1/8W, FSC 81349.	R5	RCR05G120JS	1
R7 thru R9	RESISTOR, Fixed Composition, 750 ohms, 5%, 1/8W, FSC 81349.	R7 thru R9	RCR05G751JS	3

Table 6-16. First Converter Switch A16A3 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R10, R13	RESISTOR, Fixed Composition, 470K, 5%, 1/8W, FSC 81349.	R10, R13	RCR05G474JS	2
R11	RESISTOR, Fixed Composition, 12K, 5%, 1/8W, FSC 81349.	R11	RCR05G123JS	1
R12	RESISTOR, Fixed Composition, 4.7M, 5%, 1/8W, FSC 81349.	R12	RCR05G475JS	1
R14	RESISTOR, Fixed Composition, 2.4K, 5%, 1/8W, FSC 81349.	R14	RCR05G242JS	1
R15, R19, R21	RESISTOR, Fixed Composition, 24K, 5%, 1/8W, FSC 81349.	R15, R19, R21	RCR05G243JS	3
R16, R20, R22	RESISTOR, Fixed Composition, 33K, 5%, 1/8W, FSC 81349.	R16, R20, R22	RCR05G333JS	3
R17, R18, R23	RESISTOR, Fixed Composition, 15K, 5%, 1/8W, FSC 81349.	R17, R18, R23	RCR05G153JS	3
U1	IC MIXER, FSC 21912, P/N MD-149.	U1		1
U2	IC AMPLIFIER, FSC 14482, P/N A15.	U2		1
U3	IC AMPLIFIER, FSC 34371, P/N HA4741.	U3		1

Table 6-17. Low Band Preamplifier and Switch A16A4 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C2	CAPACITOR, Dipped Mica, 51 pF, 5%, 200V, FSC 81349.	C1, C2	CM05ED510J03	2
C3, C5 thru C15	CAPACITOR, Chip, 1000 pF, 10%, 50V, FSC 29990, P/N ATC100B102KP50X.	C3, C5 thru C15		12
C4	NOT USED.			
CR1 thru CR3	DIODE, Pin, FSC 96431, P/N MA47111.	CR1 thru CR3		3
CR4 thru CR7	DIODE, Pin, FSC 96431, P/N MA47120.	CR4 thru CR7		4
R1, R3, R4	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, FSC 81349.	R1, R3, R4	RCR05G471JS	3
R2, R5	RESISTOR, Fixed Composition, 12 ohms, 5%, 1/8W, FSC 81349.	R2, R5	RCR05G120JS	2
R6	RESISTOR, Fixed Composition, 3K, 5%, 1/8W, FSC 81349.	R6	RCR05G302JS	1
R7, R9	RESISTOR, Fixed Composition, 560 ohms, 5%, 1/8W, FSC 81349.	R7, R9	RCR05G561JS	2

Table 6-17. Low Band Preamplifier and Switch A16A4 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R8, R10	RESISTOR, Fixed Composition, 22 ohms, 5%, 1/8W, FSC 81349.	R8, R10	RCR05G220JS	2
R11, R12	RESISTOR, Fixed Composition, 5.1K, 5%, 1/8W, FSC 81349.	R11, R12	RCR05G512JS	2
R13	RESISTOR, Fixed Composition, 2.7K, 5%, 1/8W, FSC 81349.	R13	RCR05G272JS	1
R14, R16, R17	RESISTOR, Fixed Composition, 750 ohms, 5%, 1/8W, FSC 81349.	R14, R16, R17	RCR05G751JS	3
R15, R18	RESISTOR, Fixed Composition, 10K, 5%, 1/8W, FSC 81349.	R15, R18	RCR05G103JS	2
U1	INTEGRATED CIRCUIT, FSC 14482, P/N A58.	U1		1
U2	INTEGRATED CIRCUIT, Mixer, FSC 34335, P/N AM103.	U2		1

Table 6-18. High Band Preamplifier No. 1 A16A5 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1	NOT USED.			
C2	CAPACITOR, Chip, 5.6 pF, ±.5 pF, FSC 95275, P/N VJ08D5A5R6DF.	C2		1
C3 thru C7, C9, C10	CAPACITOR, Chip, 1000 pF, 10%, 50V, FSC 29990, P/N ATC100B102KP50K.	C3 thru C-7, C9, C10		7
C8	NOT USED.			
CR1 thru CR3	DIODE, Pin, FSC 96431, P/N MA47110.	CR1 thru CR3		3
L1, L2	INDUCTOR, Fixed, 8 nH, FSC 54805, P/N C-5159-034.	L1, L2		2
R1, R7	RESISTOR, Fixed Composition, 560 ohms, 5%, 1/8W, FSC 81349.	R1, R7	RCR05G561JS	2
R2, R4	RESISTOR, Fixed Composition, 5.1K, 5%, 1/8W, FSC 81349.	R2, R4	RCR05G512JS	2
R3	RESISTOR, Fixed Composition, 2.7K, 5%, 1/8W, FSC 81349.	R3	RCR05G272JS	1

Table 6-18. High Band Preamplifier No. 1 A16A5 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R5, R6	RESISTOR, Fixed Composition, 22 ohms, 5%, 1/8W, RSC 81349.	R5, R6	RCR05G220JS	2
R8	NOT USED.			
R9	RESISTOR, Fixed Composition, 470 ohms, 5%, 1/8W, RSC 81349.	R9	RCR05G471JS	1
R10	NOT USED.			
U1	IC AMPLIFIER, FSC 14482, P/N A63.	U1		1

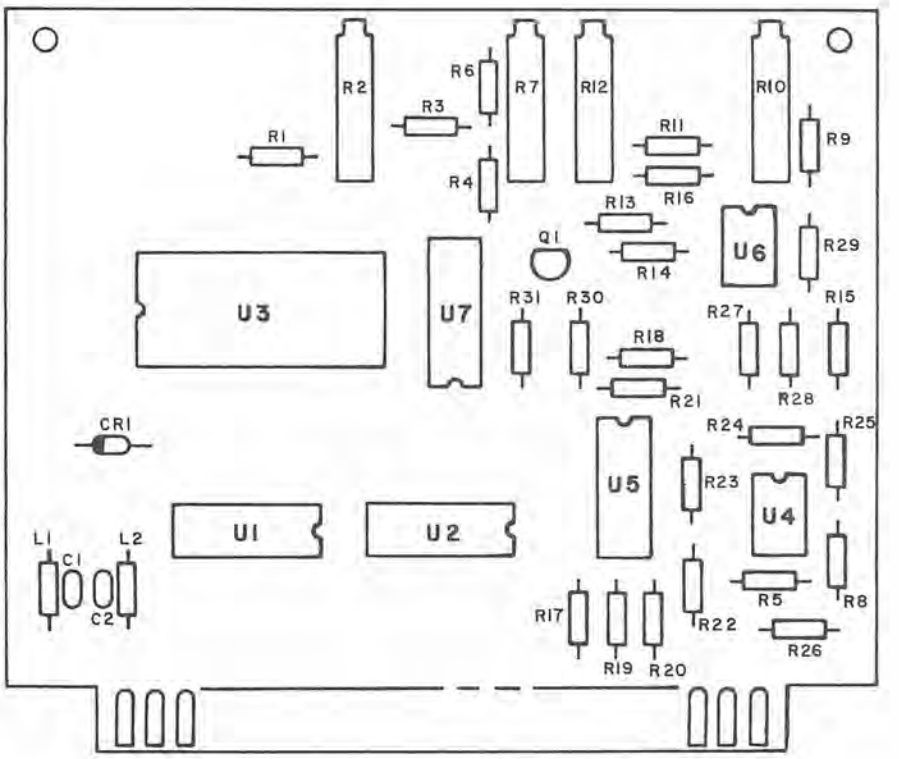


Figure 6-13. RF Preselector Driver and Pin Diode Switch Drivers A18 Parts Location Diagram

Table 6-19. RF Preselector Driver and Pin Diode Switch Drivers A18 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C2	CAPACITOR, Ceramic, 0.1 uF, 10%, 50V, FSC 81349.	C1, C2	CK05BX104K	2
CR1	DIODE, ZENER, 10V, ±5%, 400 mW, FSC 80058, P/N 1N758A.	CR1		1
L1	INDUCTOR, Fixed, Molded, 1.5 uH, ±10%, FSC 81349.	L1	MS75084-02	1
L2	INDUCTOR, Fixed, Molded, 27 uH, ±10%, FSC 81349.	L2	MS75084-17	1
Q1	TRANSISTOR, NPN, FSC 80058, P/N 2N3904.	Q1		1
R1, R9	RESISTOR, Fixed, Composition, 39K, 5%, 1/4W, FSC 81349.	R1, R9	RCR07G393JS	2
R2, R10	RESISTOR, Variable, 2K, 314W, FSC 73138, P/N 89PR2K.	R2, R10		2
R3, R16, R17, R18, R24, R27, R30	RESISTOR, Fixed, Composition, 10K, 5%, 1/4W, FSC 81349.	R3, R16, R17, R18, R24, R27, R30	RCR07G103JS	7

Table 6-19. RF Preselector Driver and Pin Diode Switch Drivers A18 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R4, R13	RESISTOR, Fixed Composition, 30K, 5%, 1/4W, FSC 81349.	R4, R13	RCR07G303JS	2
R5, R14	RESISTOR, Fixed Composition, 8.2K, 5%, 1/4W, FSC 81349.	R5, R14	RCR07G822JS	2
R6, R11	RESISTOR, Fixed Composition, 56K, 5%, 1/4W, FSC 81349.	R6, R11	RCR07G563JS	2
R7, R12	RESISTOR, Variable, 10K, 3/4W, FSC 73138, P/N 89PR10K.	R7, R12		2
R8, R15	RESISTOR, Fixed Composition, 3.3K, 5%, 1/4W, FSC 81349.	R8, R15	RCR07G332JS	2
R19, R20	RESISTOR, Fixed Composition, 100 ohms, 5%, 1/4W, FSC 81349.	R19, R20	RCR07G101JS	2
R21	RESISTOR, Fixed Composition, 33K, 5%, 1/4W, FSC 81349.	R21	RCR07G333JS	1
R22	RESISTOR, Fixed Composition, 43K, 5%, 1/4W, FSC 81349.	R22	RCR07G433JS	1
R23	RESISTOR, Fixed Composition, 6.8K, 5%, 1/4W, FSC 81349.	R23	RCR07G682JS	1

Table 6-19. RF Preselector Driver and Pin Diode Switch Drivers A18 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R25, R28	RESISTOR, Fixed Composition, 12K, 5%, 1/4W, FSC 81349.	R25	RCR07G123JS	2
R26, R29	RESISTOR, Fixed Composition, 5.1K, 5%, 1/4W, FSC 81349.	R26, R29	RCR07G512JS	2
R31	RESISTOR, Fixed Composition, 240 ohms, 5%, 1/4W, FSC 81349.	R31	RCR07G241JS	1
U1, U2	INTEGRATED CIRCUIT, FSC 04713, P/N MC14049BCP.	U1, U2		2
U3	INTEGRATED CIRCUIT, FSC 13919, P/N DAC80-CCD-V.	U3		1
U4, U6	INTEGRATED CIRCUIT, FSC 01295, P/N TL082CP.	U4, U6		2
U5	INTEGRATED CIRCUIT, FSC 34371, P/N HA-4741-5.	U5		1
U7	RELAY, FSC 31889, P/N MRR1CDL12VDC.	U7		1

Table 6-20. Synthesizer Assembly A22 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A1	ITERATIVE SYNTHESIZER, FSC 54805, P/N 78041-1. (See table 6-21.)	A1		1
A2, A3, A4	ITERATIVE SYNTHESIZER, FSC 54805, P/N 78041. (See table 6-23.)	A2, A3, A4		3
A5	BASE SYNTHESIZER, FSC 54805, P/N 78042. (See table 6-24.)	A5		1
A6	REFERENCE GENERATOR, FSC 54805, P/N 78055. (See table 6-25.)	A6		1
A7	STEERING SYNTHESIZER, FSC 54805, P/N 78043. (See table 6-26.)	A7		1
A8	OUTPUT TRACKING SYNTHESIZER, FSC 54805, P/N 78044. (See table 6-27.)	A8		1
A9	138.600 MHz PHASE-LOCKED LO, FSC 54805, P/N 78037. (See table 6-28.)	A9		1
A10	638.600 MHz PHASE-LOCKED LO, FSC 54805, P/N 74051. (See table 6-29.)	A10		1
A11	2ND LO SWITCH, FSC 54805, P/N 77034. (See table 6-33.)	A11		1

Table 6-20. Synthesizer Assembly A22 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1 thru C50	CAPACITOR, Feedthru, 1000 pF, FSC 33095, P/N 54-794-002-102P.	C1 thru C50		50
C51 thru C58	CAPACITOR, Ceramic, .1 uF, 10%, 50V, FSC 81349.	C51 thru C58	CK05BX104K	8
C59	NOT USED.			
C60	CAPACITOR, Ceramic Disk, 0.01 uF, 100V, 10%, FSC 81349.	C60	CK05BX103K	1
FB1 thru FB8	FERRITE BEAD, FSC 02114, P/N 56590-65/4B.	FB1 thru FB8		8
J1 thru J6	JACK, Straight, Male Bulkhead, FSC 19505, P/N UG-1468/U.	J1 thru J6		6
J7	JACK, Straight, Male, FSC 19505, P/N UG-1464/U.	J7		1
L1 thru L4	COIL, 2506 uH, 10%, FSC 04213, P/N 6310-9.	L1 thru L4		4
L5, L6	INDUCTOR, Air wound, 0.12 uH, FSC 81349.	L5, L6	MS75083-2	2
L7	INDUCTOR, 2.2 uH, ±10%, FSC 71279, P/N MS75084-04.	L7		1

Table 6-20. Synthesizer Assembly A22 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
P1 thru P3, P5	PLUG, Straight, Female, FSC 19505, P/N 102/188.	P1 thru P3, P5		4
P4, P6	PLUG, Right Angle, Female, FSC 19505, P/N 105/188.	P4, P6		2
R1	RESISTOR, Fixed Composition, 47 ohms, 5%, 1/4W, FSC 81349.	R1	RCR07G470JS	1
R2	RESISTOR, Fixed Composition, 2.2K, 5%, 1/4W, FSC 81349.	R2	RCR07G222JS	1
W1	CABLE ASSEMBLY, FSC 54805, P/N C-5142-026.	W1		1
W2	CABLE ASSEMBLY, FSC 54805, P/N C-5142-027.	W2		1
W3	CABLE ASSEMBLY, FSC 54805, P/N C-5143-028.	W3		1
W4	CABLE ASSEMBLY, FSC 54805, P/N C-5143-029.	W4		1
W5	CABLE ASSEMBLY, FSC 54805, P/N C-5143-030.	W5		1

Table 6-21. Iterative Synthesizer A22A1 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
A1	FILTER MODULE, FSC 54805, P/N 77040. (See table 6-22.)	A1		1
C1 thru C5, C7	CAPACITOR, Ceramic, .1 uF, 10%, 50V, FSC 81349.	C1 thru C5, C7	CK05BX104K	6
C6	CAPACITOR, Ceramic, .47 uF, 20%, 50V, FSC 72982, P/N 8131-050-651-474M.	C6		1
C8, C9, C10, C13, C15, C16, C19, C20, C22, C23, C24, C27, C29, C53	CAPACITOR, Ceramic,1000 pF, 10%, 200V, FSC 81349.	C8, C9, C10, C13, C15, C16, C19, C20, C22, C23, C24, C27, C29, C53	CK05BX102K	14
C11, C12	CAPACITOR, Fixed, Film, .01 uF, 5%, 200V, FSC 19396, P/N ITWPP-.01-200V, ±5%.	C11, C12		2
C14, C21, C49, C50, C51, C52	CAPACITOR, Ceramic, .01 uF, 10%, 100V, FSC 81349.	C14, C21, C49, C50, C51, C52	CK05BX103K	6
C17, C18	CAPACITOR, Dipped, Mica, 43 pF, 2%, 500V, FSC 81349.	C17, C18	CM05ED430G03	2

Table 6-21. Iterative Synthesizer A22A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C25	CAPACITOR, Dipped Mica, 100 pF, 2%, 500V, FSC 81349.	C25	CM05FD101G03	1
C26	CAPACITOR, Dipped Mica, 12 pF, 5%, 500V, FSC 81349.	C26	CM05CD120J03	1
C28	CAPACITOR, Dipped Mica, 2700 pF, 2%, 500V, FSC 81349.	C28	CM06FD272G03	1
C30 thru C48	NOT USED.			
C54	CAPACITOR, Dipped Mica, 10 pF, 2%, 500V, FSC 81349.	C54	CM05CD100G03	1
C55	CAPACITOR, Chip, Ceramic, 1000 pF, 10%, 100V, FSC 71590, P/N W100BC102K.	C55		1
CR1	DIODE, Varactor, FSC 25088, P/N BB-109-Y.	CR1		1
L1, L2	INDUCTOR, Fixed, Molded, 27 uH, 10%, FSC 81349.	L1, L2	MS75084-17	2
L3	INDUCTOR, Fixed, 100 uH, 10%, FSC 04213, P/N 6310-8.	L3		1

Table 6-21. Iterative Synthesizer A22A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
L4	INDUCTOR, Fixed, Molded, .18 uH, 10%, FSC 81349.	L4	MS75083-04	1
L5	INDUCTOR, Fixed, Molded, 2.7 uH, 10%, FSC 81349.	L5	MS75084-05	1
L6 thru L11	NOT USED.			
Q1	TRANSISTOR, FSC 80058, P/N 2N2857.	Q1		1
Q2	TRANSISTOR, FSC 18714, P/N 3N211.	Q2		1
R1, R2	RESISTOR, Fixed Composition, 200 ohms, 5%, 1/4W, FSC 81349.	R1, R2	RCR07G201JS	2
R3, R4	RESISTOR, Fixed Composition, 1.6K, 5%, 1/4W, FSC 81349.	R3, R4	RCR07G162JS	2
R5, R6, R27	RESISTOR, Fixed Composition, 2.4K, 5%, 1/4W, FSC 81349.	R5, R6, R27	RCR07G242JS	3
R7	RESISTOR, Fixed Composition, 2K, 5%, 1/4W, FSC 81349.	R7	RCR07G202JS	1
R8, R9	RESISTOR, Fixed Composition, 10K, 5%, 1/4W, FSC 81349.	R8, R9	RCR07G103JS	2

Table 6-21. Iterative Synthesizer A22A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R10	RESISTOR, Fixed Composition, 100 ohms, 5%, 1/4W, FSC 81349.	R10	RCR07G101JS	1
R11	RESISTOR, Fixed Composition, 750 ohms, 5%, 1/4W, FSC 81349.	R11	RCR07G751JS	1
R12	RESISTOR, Fixed Composition, 15K, 5%, 1/4W, FSC 81349.	R12	RCR07G153JS	1
R13	RESISTOR, Fixed Composition, 270K, 5%, 1/4W, FSC 81349.	R13	RCR07G271JS	1
R14 thru R17, R29, R30	RESISTOR, Fixed Composition, 560 ohms, 5%, 1/4W, FSC 81349.	R14 thru R17, R29, R30	RCR07G561JS	6
R18	RESISTOR, Fixed Composition, 130K, 5%, 1/4W, FSC 81349.	R18	RCR07G134JS	1
R19	RESISTOR, Fixed Composition, 100K, 5%, 1/4W, FSC 81349.	R19	RCR07G104JS	1
R20	RESISTOR, Fixed Composition, 62K, 5%, 1/4W, FSC 81349.	R20	RCR07G623JS	1
R21	RESISTOR, Fixed Composition, 22 ohms, 5%, 1/4W, FSC 81349.	R21	RCR07G220JS	1

Table 6-21. Iterative Synthesizer A22A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R22	RESISTOR, Fixed Composition, 390 ohms, 5%, 1/4W, FSC 81349.	R22	RCR07G391JS	1
R23, R24	RESISTOR, Fixed Composition, 47 ohms, 5%, 1/4W, FSC 81349.	R23, R24	RCR07G470JS	2
R25, R26,	RESISTOR, Fixed Composition, 51 ohms, 5%, 1/4W, FSC 81349.	R25, R26	RCR07G510JS	2
R28	RESISTOR, Fixed Composition, 1.2K, 5%, 1/4W, FSC 81349.	R28	RCR07G122JS	1
U1	INTEGRATED CIRCUIT, FSC 04713, P/N MC14050CP.	U1		1
U2, U3	INTEGRATED CIRCUIT, FSC 01295, P/N SN74LS102N.	U2, U3		2
U4	INTEGRATED CIRCUIT, FSC 04713, P/N MC12013P.	U4		1
U5	INTEGRATED CIRCUIT, FSC 04713, P/N MC12014P.	U5		1
U6	INTEGRATED CIRCUIT, FSC 04713, P/N MC4044P.	U6		1

Table 6-21. Iterative Synthesizer A22A1 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
U7	INTEGRATED CIRCUIT, FSC 01295, P/N TL081CP.	U7		1
U8	INTEGRATED CIRCUIT, FSC 04713, P/N MC10131P.	U8		1
U9	MIXER, DOUBLE BALANCED, FSC MCL, P/N SRA-1.	U9		1
U10	INTEGRATED CIRCUIT, FSC 18324, P/N NE529A.	U10		1
U11	INTEGRATED CIRCUIT, FSC 18324, P/N N82S90N.	U11		1

Table 6-22. Filter Module A22A1A1 Parts List

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1, C10, C11, C20	CAPACITOR, Dipped Mica, 43 pF, 2% , 500V, FSC 81349.	C1, C10, C11, C20	CM05ED430G03	4
C2, C8, C12, C18	CAPACITOR, Dipped Mica, 100 pF, 5%, 500V, FSC 81349.	C2, C8, C12, C18	CM05FD101J03	4
C3, C6, C9, C13, C16, C19	CAPACITOR, Trimmer, .8-10 pF, 250V, FSC 91293, P/N 5702.	C3, C6, C9, C13, C16, C19		6
C4, C7, C14, C17	CAPACITOR, Ceramic, 12 pF, 10%, FSC 95121, P/N QC 12.0pFK.	C4, C7, C14, C17		4
C5, C15	CAPACITOR, Dipped Mica, 130 pF, 5%, 500V, FSC 81349.	C5, C15	CM05FD131J03	2
L1 thru L6	INDUCTOR, Toroid, .24 uH, 5%, FSC 54805, P/N B-3595.	L1 thru L6		6
R1	RESISTOR, Fixed Composition, 82 ohms, 5%, 1/8W, FSC 81349.	R1	RCR05G820JS	1

Table 6-23. Iterative Synthesizer A22A2, A3, A4

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C1 thru C5, C7	CAPACITOR, Ceramic .1 uF, 10%, 50V, FSC 81349.	C1 thru C5, C7	CK05BX104K	6
C6	CAPACITOR, Ceramic .47 uF, 20%, 50V, FSC 72982, P/N 8131-050-651-474M.	C6		1
C8, C9, C10, C13, C15, C16, C19, C20, C22, C23, C24, C27, C53	CAPACITOR, Ceramic 1000 pF, 10%, 200V, FSC 81349.	C8, C9, C10, C13, C15, C16, C19, C20, C22, C23, C24, C27, C53	CK05BX102K	13
C11, C12	CAPACITOR, Fixed Film, .01 uF, 5%, 200V, FSC 19396, P/N ITWPP-.01-200V, ±5%.	C11, C12		2
C14, C21, C49, C50, C51, C52	CAPACITOR, Ceramic, .01 uF, 10%, 100V, FSC 81349.	C14, C21, C49, C50, C51, C52	CK05BX103K	6
C17, C18, C29, C38, C39, C48	CAPACITOR, Dipped Mica, 43 pF, 2%, 500V, FSC 81349.	C17, C18, C29, C38, C39, C48	CM05ED430G03	6

Table 6-23. Iterative Synthesizer A22A2, A3, A4 - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
C25	CAPACITOR, Dipped Mica, 100 pF, 2%, 500V, FSC 81349.	C25	CM05FD101G03	1
C26, C32, C35, C42, C45	CAPACITOR, Dipped Mica, 12 pF, 5%, FSC 81349.	C26, C32, C35, C42, C45	CM05CD120J03	5
C28	CAPACITOR, Dipped Mica, 2700 pF, 5%, 500V, FSC 81349.	C28	CM06FD272J03	1
C30, C36, C40, C46	CAPACITOR, Dipped Mica, 91 pF, 2%, 500V, FSC 81349.	C30, C36, C40, C46	CM05FD910G03	4
C31, C34, C37, C41, C44, C47	CAPACITOR, Variable, 2.3-20 pF, FSC 73899, P/N DVJ300A.	C31, C34, C37, C41, C44, C47		6
C33, C43	CAPACITOR, Dipped Mica, 130 pF, 2%, 500V, FSC 81349.	C33, C43	CM05FD131G03	2
C54	CAPACITOR, Dipped Mica, 10 pF, 2%, 500V, FSC 81349.	C54	CM05CD100G03	1
C55	CAPACITOR, Chip, Ceramic 1000 pF, 10%, 100V, FSC 71590, P/N W100BC102K.	C55		1

Table 6-23. Iterative Synthesizer A22A2, A3, A4 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
CR1	DIODE, Varactor, FSC 25088, P/N BB-109-Y.	CR1		1
L1, L2	INDUCTOR, Fixed, Molded, 27 uH, 10%, FSC 81349.	L1, L2	MS75084-17	2
L3	INDUCTOR, Fixed, 100 uH, 10%, FSC 04213, P/N 6310-8.	L3		1
L4	INDUCTOR, Fixed, Molded, .18 uH, 10%, FSC 81349.	L4	MS75083-04	1
L5	INDUCTOR, Fixed, Molded, 2.7 uH, 10%, FSC 81349.	L5	MS75084-05	1
L6 thru L11	INDUCTOR, Toroid, .26 uH, 10%, FSC Cad, P/N TPI-2.	L6 thru L11		6
Q1	TRANSISTOR, FSC 80058, P/N 2N2857.	Q1		1
Q2	TRANSISTOR, FSC 18714, P/N 3N211.	Q2		1
R1, R2	RESISTOR, Fixed, Composition, 200 ohms, 5%, 1/4W, FSC 81349.	R1, R2	RCR07G201JS	2
R3, R4	RESISTOR, Fixed Composition, 1.6K, 5%, 1/4W, FSC 81349.	R3, R4	RCR07G162JS	2

Table 6-23. Iterative Synthesizer A22A2, A3, A4 Parts List - Continued

REFERENCE SYMBOL OR PART NUMBER	NAME OF PARTS AND DESCRIPTION	ALL SYMBOLS AND PART NUMBERS INVOLVED	JAN OR MIL TYPE NUMBER	TOTAL NUMBER PARTS PER END ITEM
R5, R6, R27	RESISTOR, Fixed Composition, 2.4K, 5%, 1/4W, FSC 81349.	R5, R6, R27	RCR07G242JS	3
R7	RESISTOR, Fixed Composition, 2K, 5%, 1/4W, FSC 81349.	R7	RCR07G202JS	1
R8, R9	RESISTOR, Fixed Composition, 10K, 5%, 1/4W, FSC 81349.	R8, R9	RCR07G103JS	2
R10, R23	RESISTOR, Fixed Composition, 100 ohms, 5%, 1/4W, FSC 81349.	R10, R23	RCR07G101JS	2
R11	RESISTOR, Fixed Composition, 750 ohms, 5%, 1/4W, FSC 81349.	R11	RCR07G751JS	1
R12	RESISTOR, Fixed Composition, 15K, 5%, 1/4W, FSC 81349.	R12	RCR07G153JS	1
R13	RESISTOR, Fixed Composition, 270 ohms, 5%, 1/4W, FSC 81349.	R13	RCR07G271JS	1
R14, R15, R16, R17, R29, R30	RESISTOR, Fixed Composition, 560 ohms, 5%, 1/4W, FSC 81349.	R14, R15, R16, R17, R29, R30	RCR07G561JS	6

NOTES: 1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS OHMS, 5%, 1/4W.
b) CAPACITANCE IS IN pF.
2. ○ DENOTE FRONT PANEL CONTROL.
3. □ DENOTE REAR PANEL CONTROL.

HIGHEST REF. DESIG		REF. DESIG NOT USED	
A35	L3	A17	P6
B14	P57	A19	P7
C26	R16	L1	W4
DS13	S4	P4	W5
F1	T3	P5	W8
FL3	U9	P35	W6
J5	W10	P39	

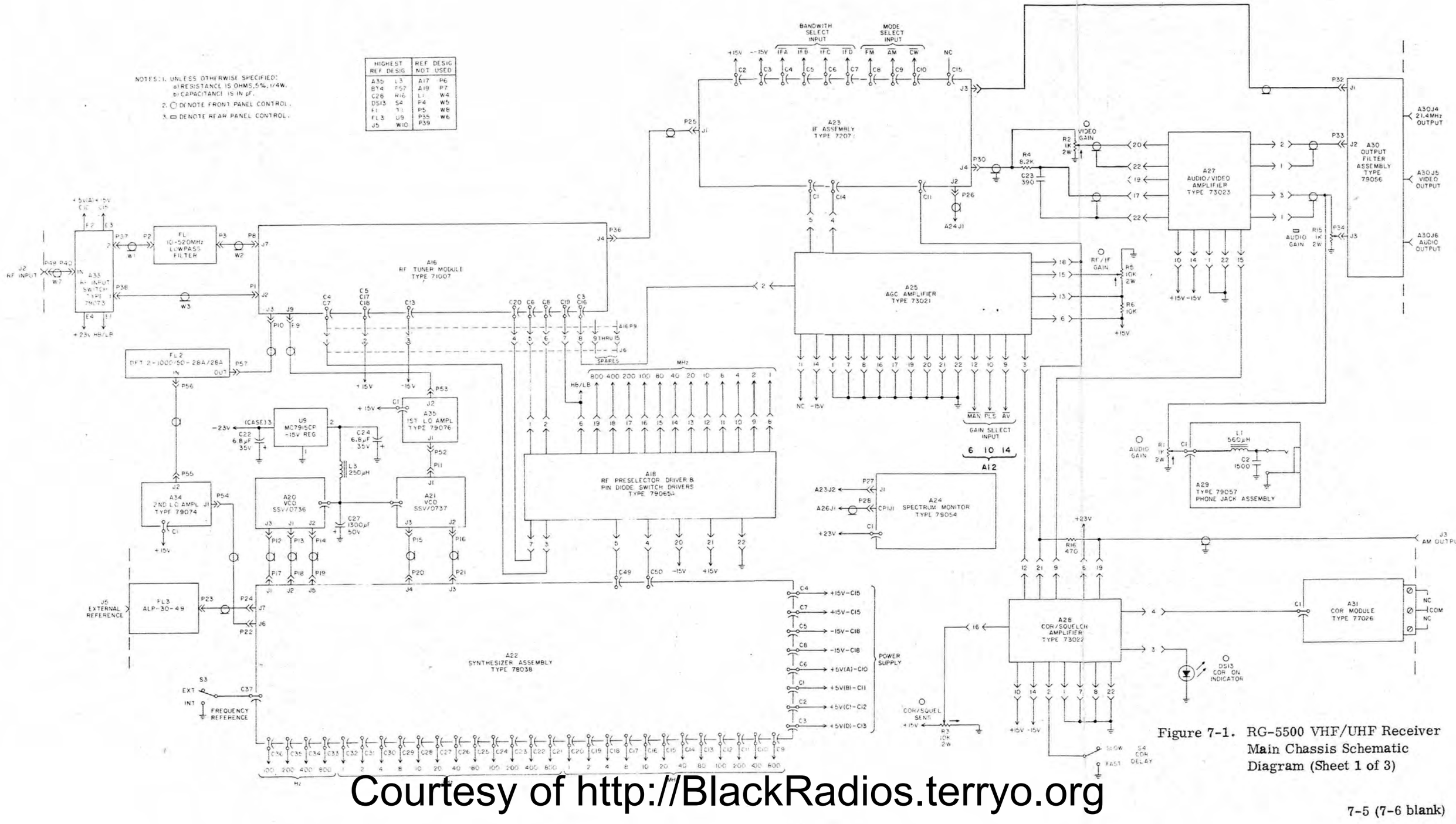


Figure 7-1. RG-5500 VHF/UHF Receiver Main Chassis Schematic Diagram (Sheet 1 of 3)

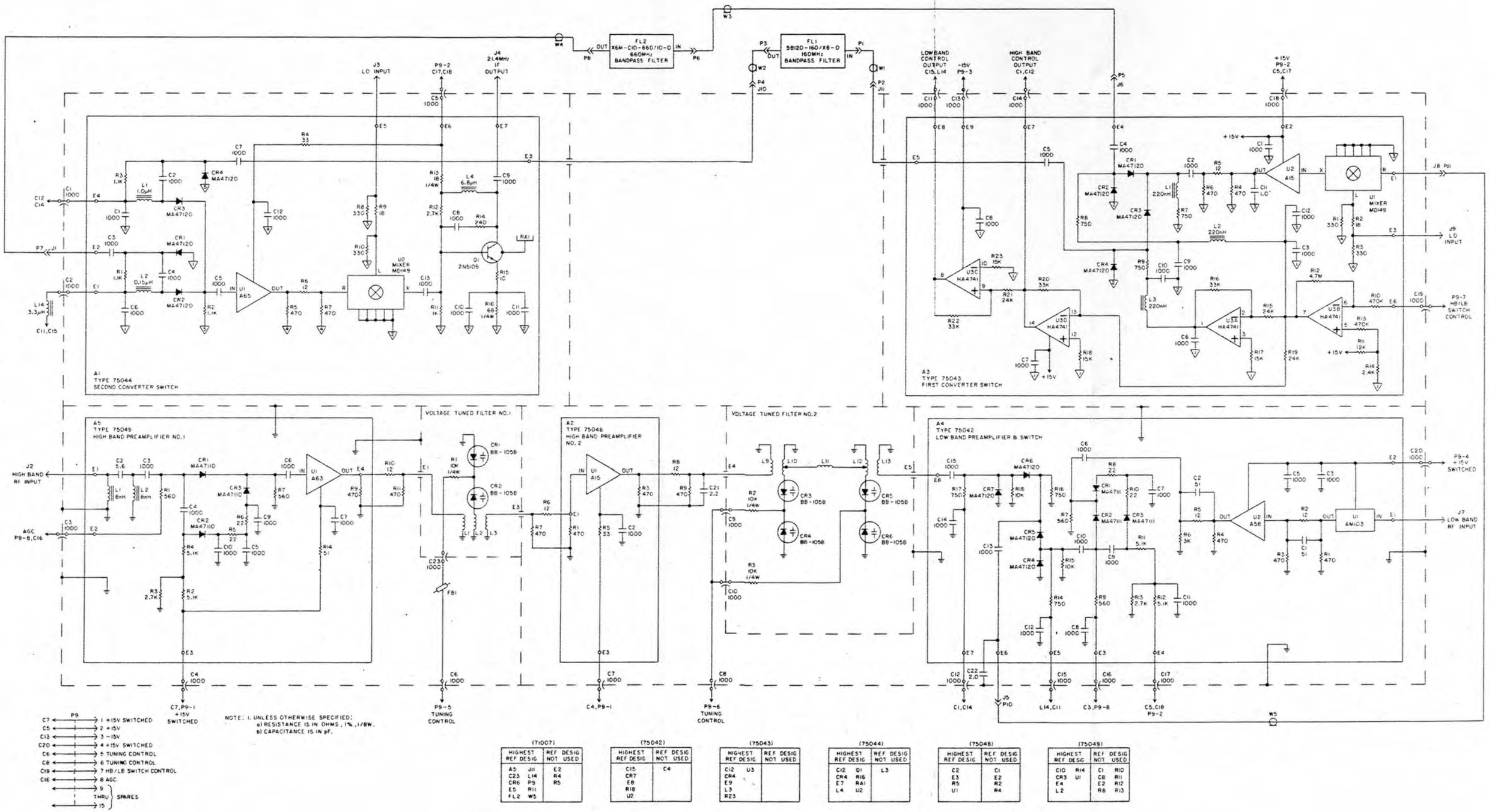
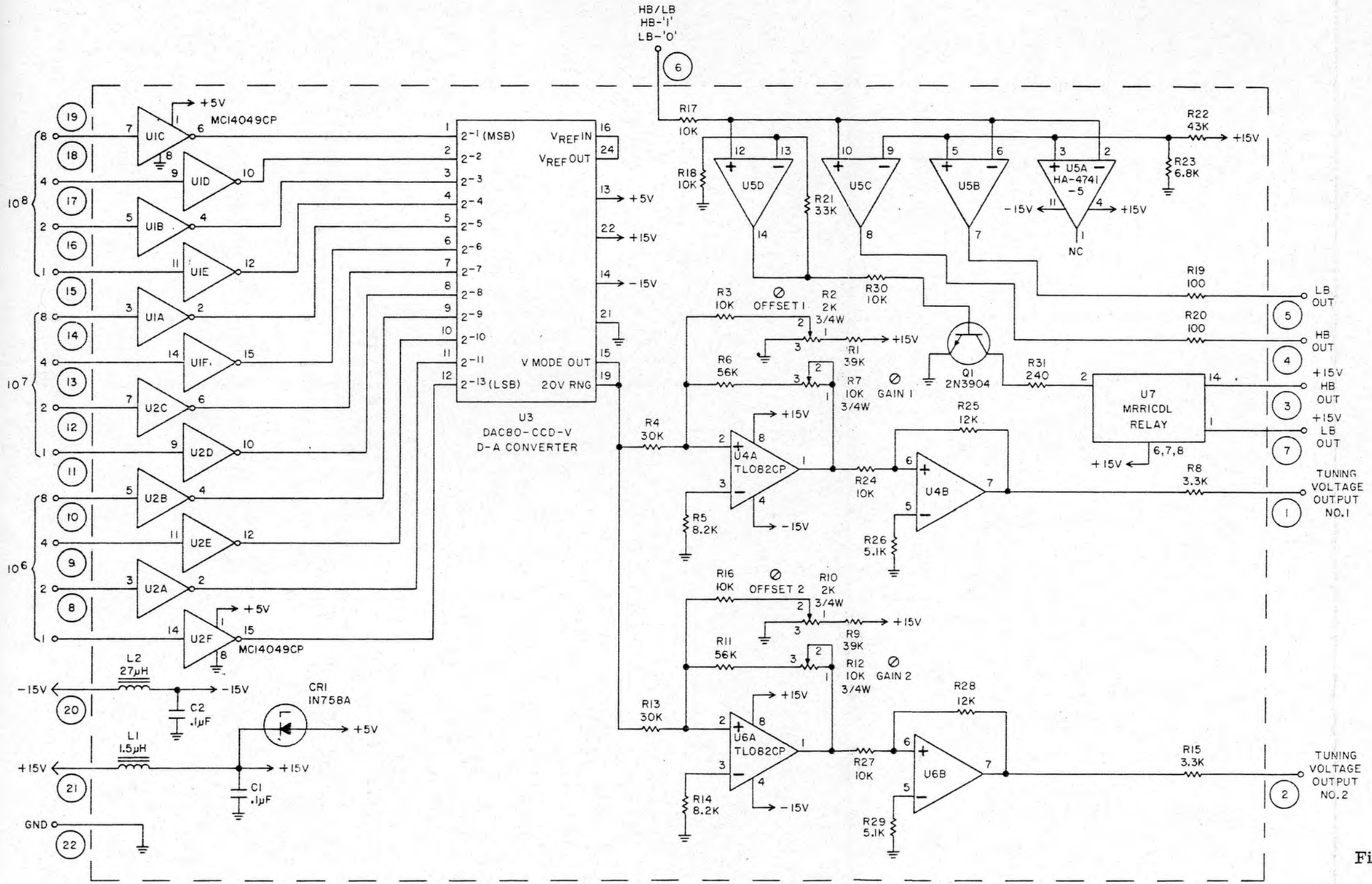


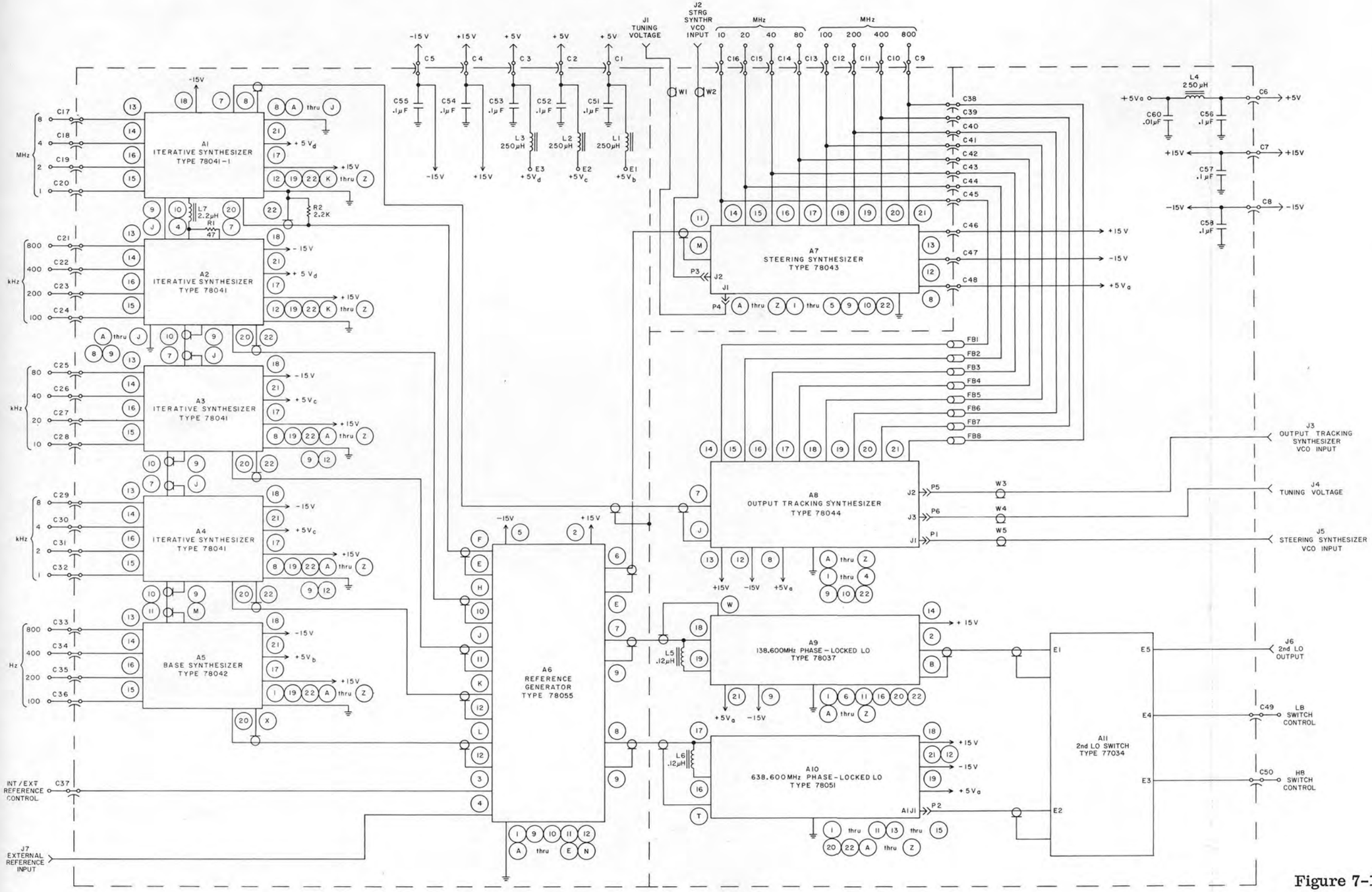
Figure 7-13. A16 RF Tuner Module Schematic Diagram



HIGHEST REF DESIG		REF DESIG NOT USED
C2	Q1	
CR1	R31	
L2	U7	

NOTES: 1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
b) CAPACITANCE IS IN μF.
2. ⊘ DENOTES SCREWDRIVER ADJUST.

Figure 7-14. A18 RF Preselector Drivers and PIN Diode Switch Drivers Schematic Diagram



NOTES: 1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
b) CAPACITANCE IS IN pF.
2. C1 THRU C50 ARE 1000pF.

HIGHEST REF DESIG	REF DESIG NOT USED
A11 L7 C60 P6 E4 R2 FB8 W5 J7	C59

Figure 7-15. A22 Synthesizer Assembly Schematic Diagram

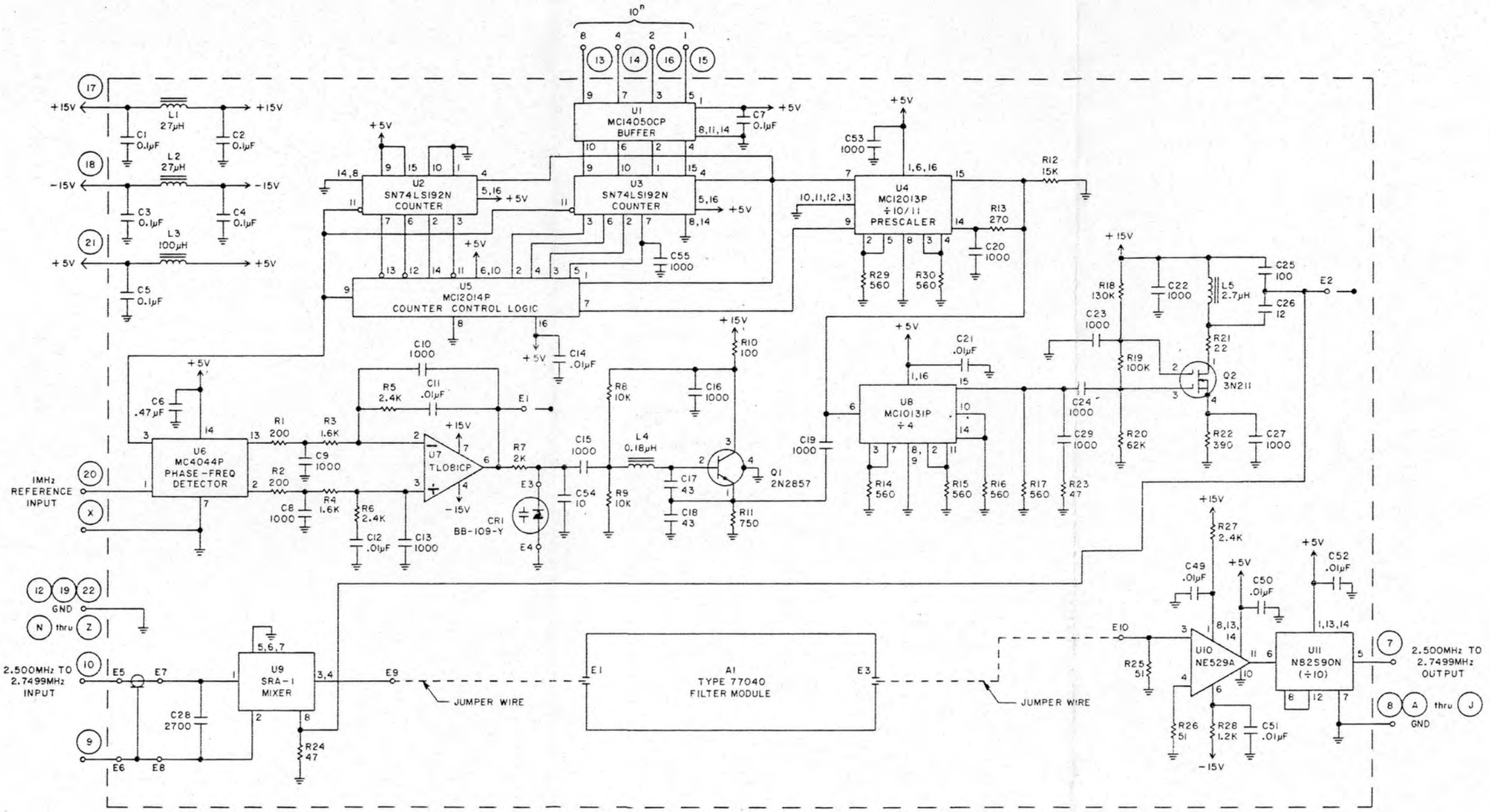


Figure 7-16. A22A1 Iterative Synthesizer Schematic Diagram

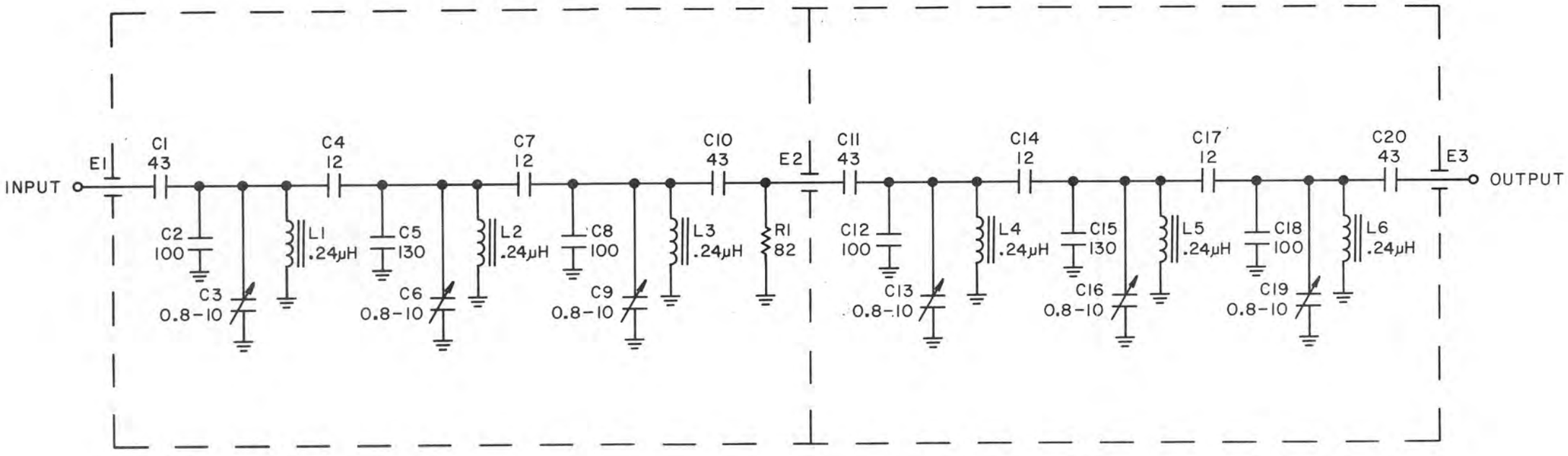


Figure 7-17. A22A1A1 Filter Module Schematic Diagram

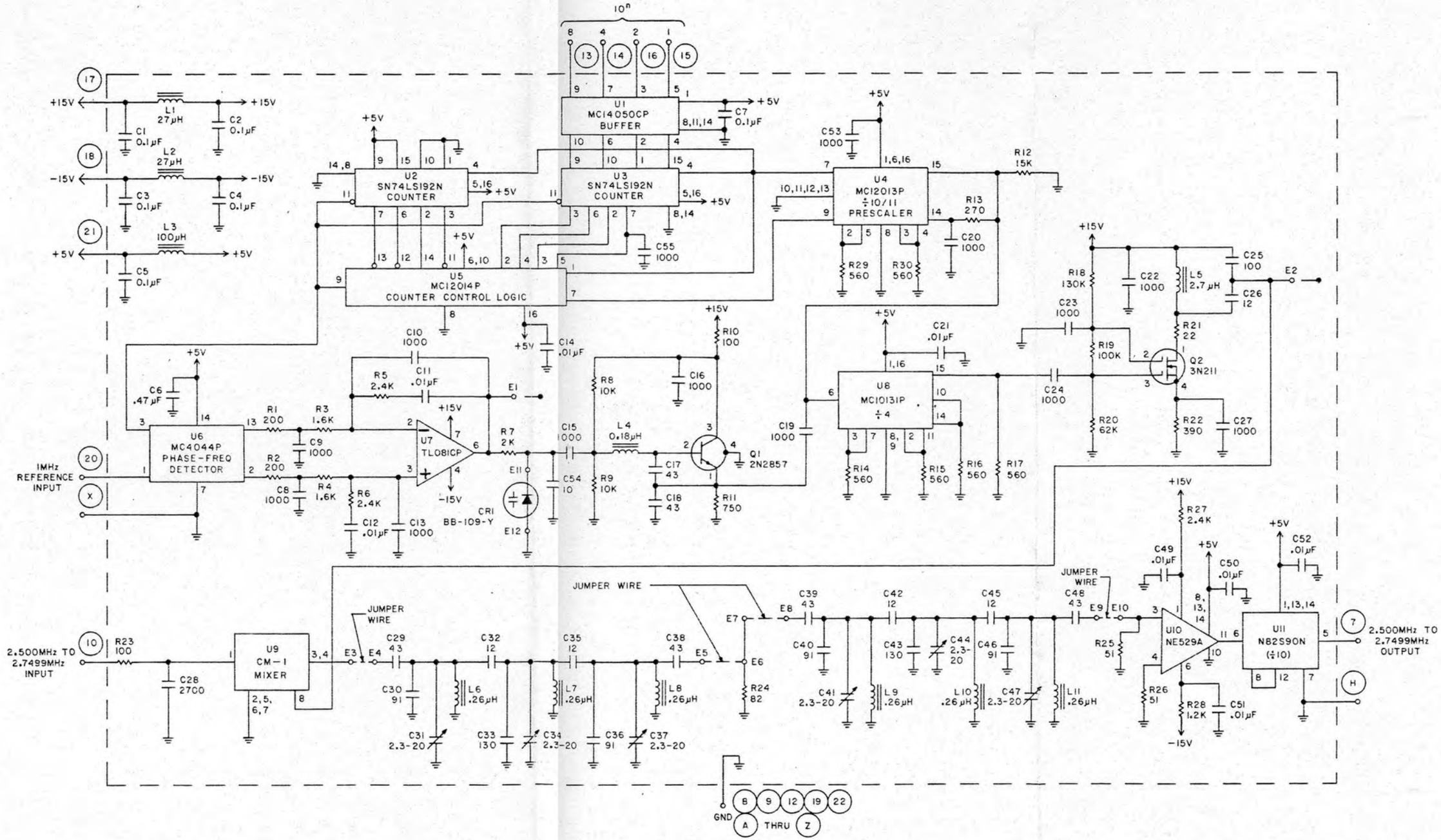


Figure 7-18. A22A2, A3, A4 Iterative Synthesizer Schematic Diagram

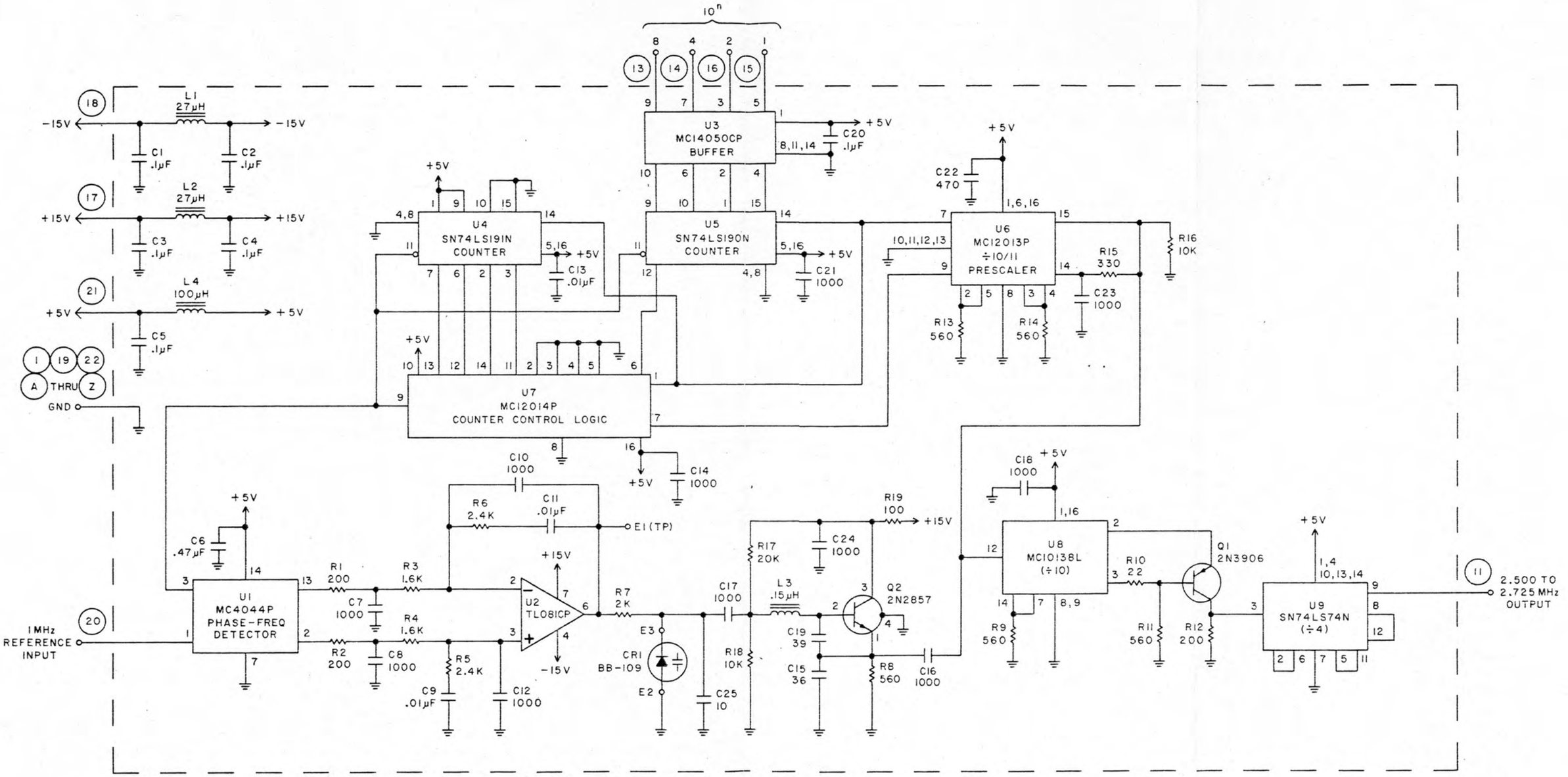


Figure 7-19. A22A5 Base Synthesizer Schematic Diagram

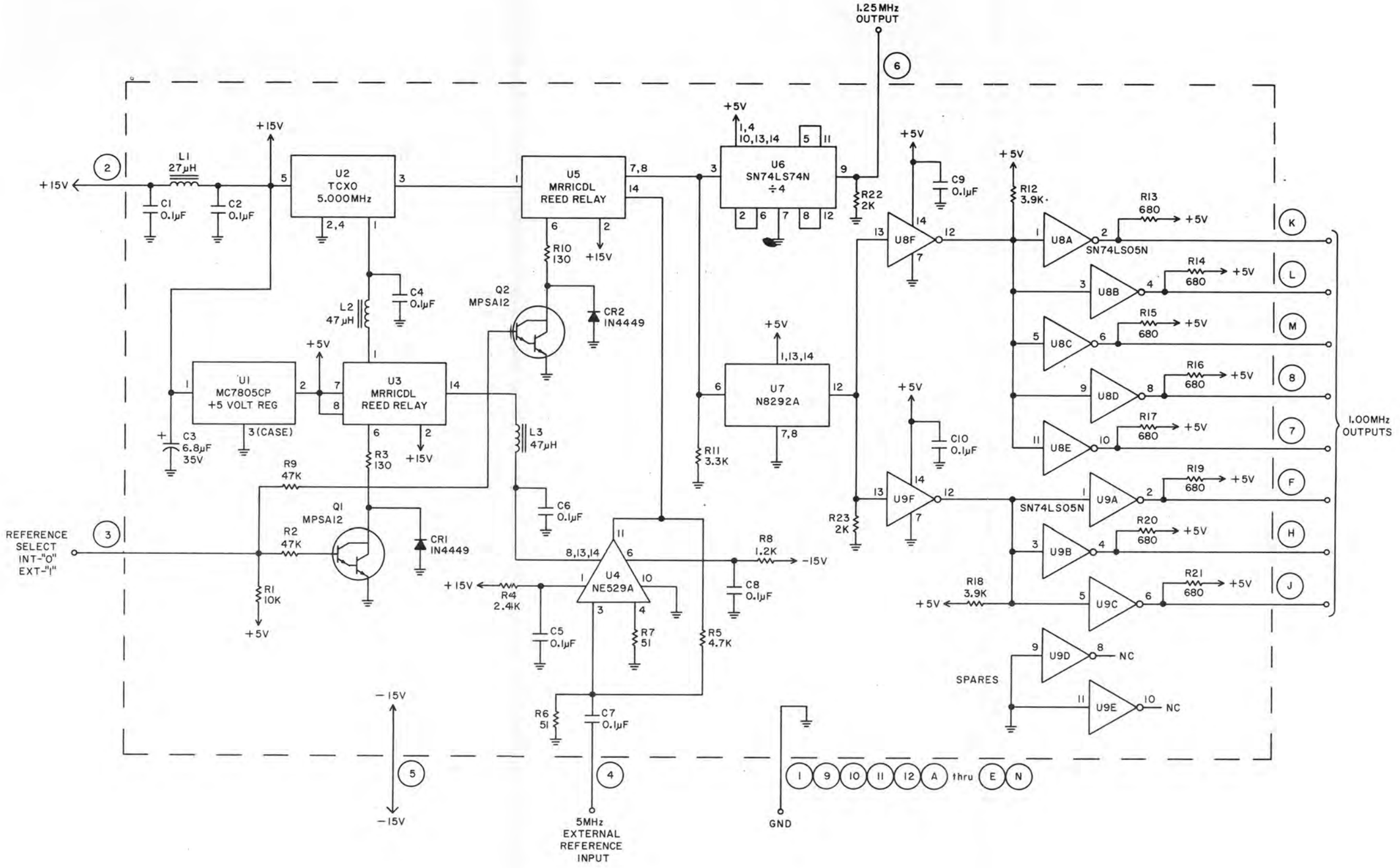


Figure 7-20. A22A6 Reference Generator Schematic Diagram

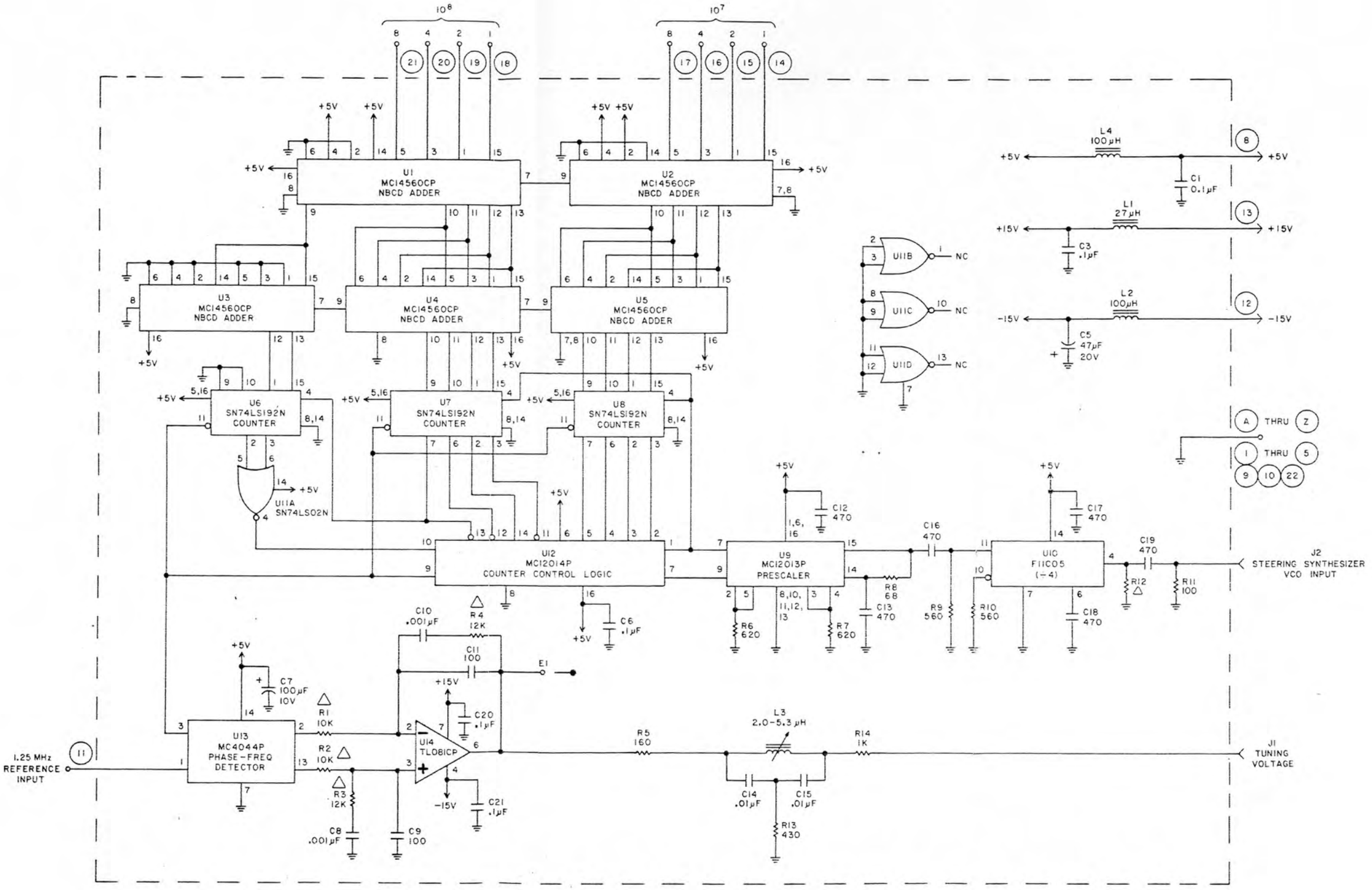


Figure 7-21. A22A7 Steering Synthesizer Schematic Diagram

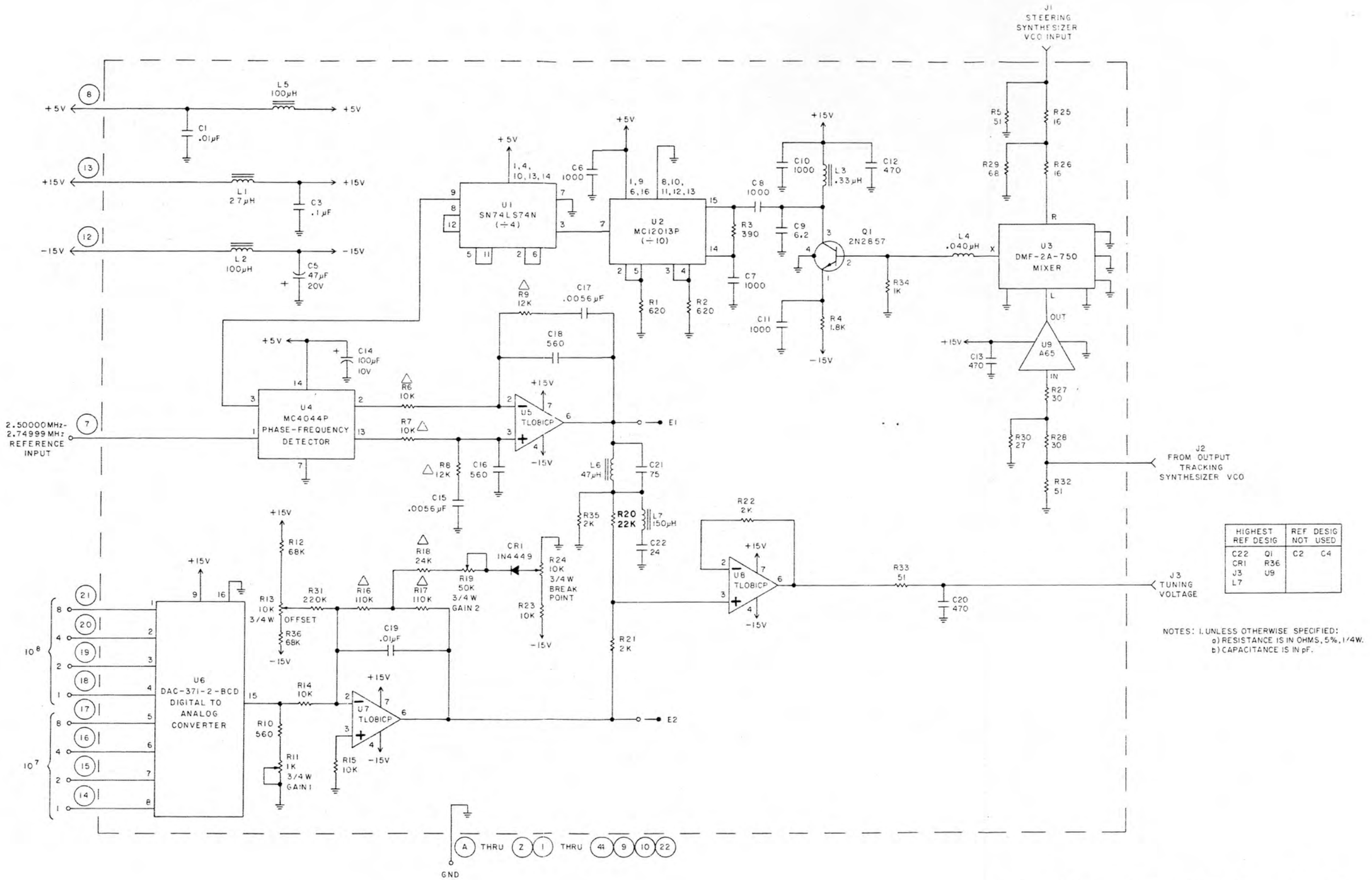


Figure 7-22. A22A8 Output Tracking Synthesizer Schematic Diagram

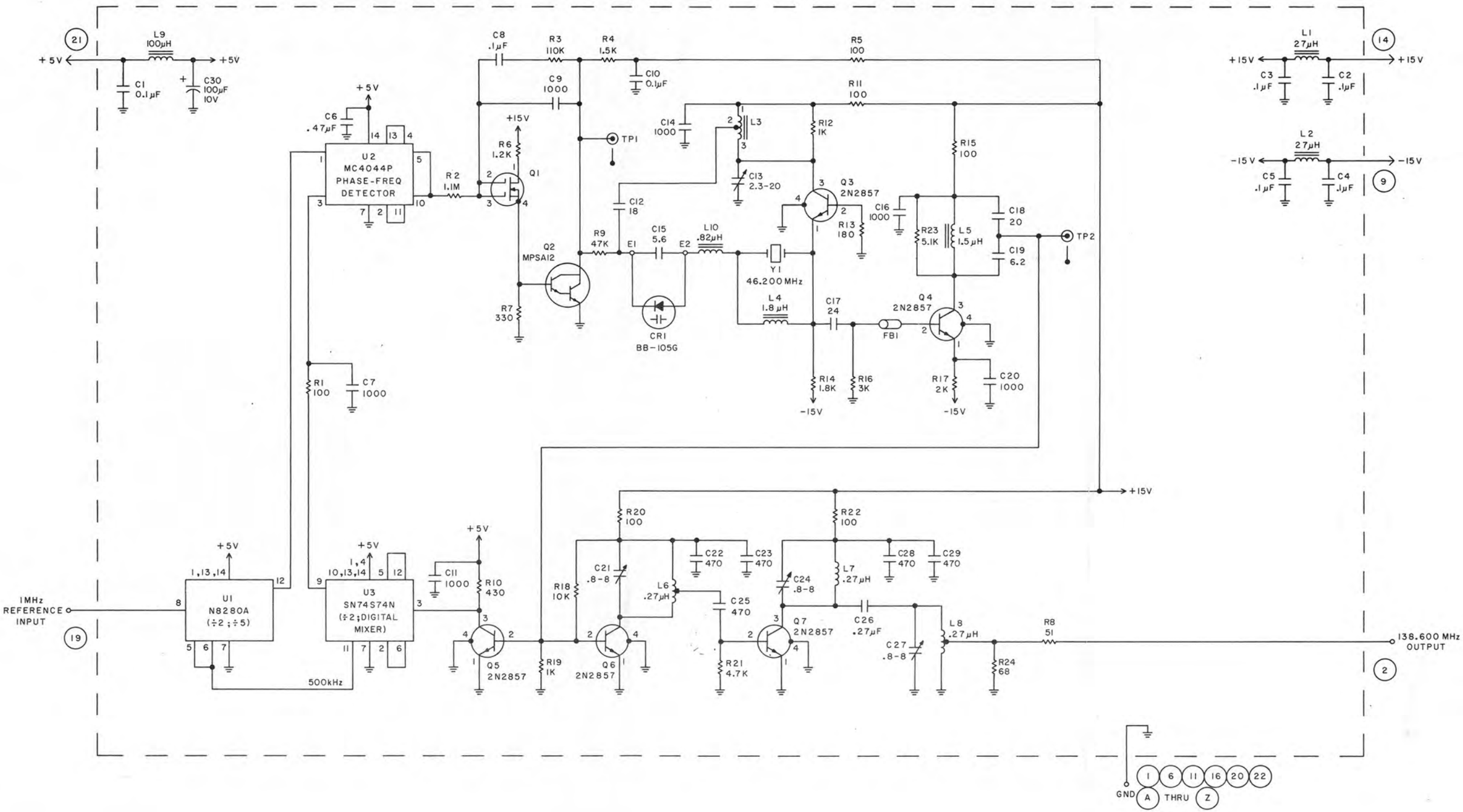
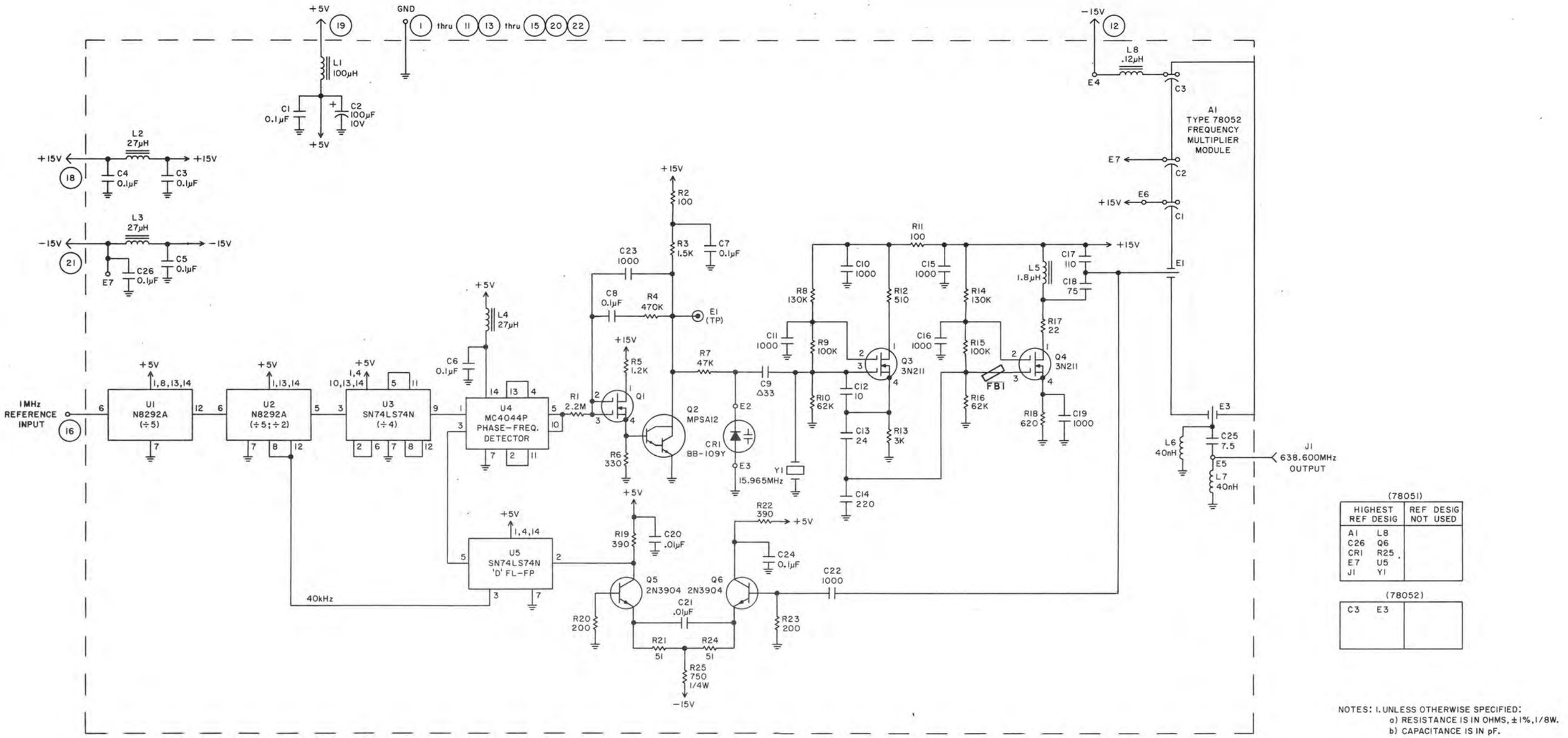


Figure 7-23. A22A9 138.600 MHz Phase-Locked Local Oscillator Schematic Diagram



(78051)

HIGHEST REF DESIG		REF DESIG NOT USED
A1	L8	
C26	Q6	
CR1	R25	
E7	U5	
J1	Y1	

(78052)

C3	E3	

NOTES: 1. UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±1%, 1/8W.
b) CAPACITANCE IS IN pF.

Figure 7-24. A22A10 638.600 MHz Phase-Locked Local Oscillator Schematic Diagram

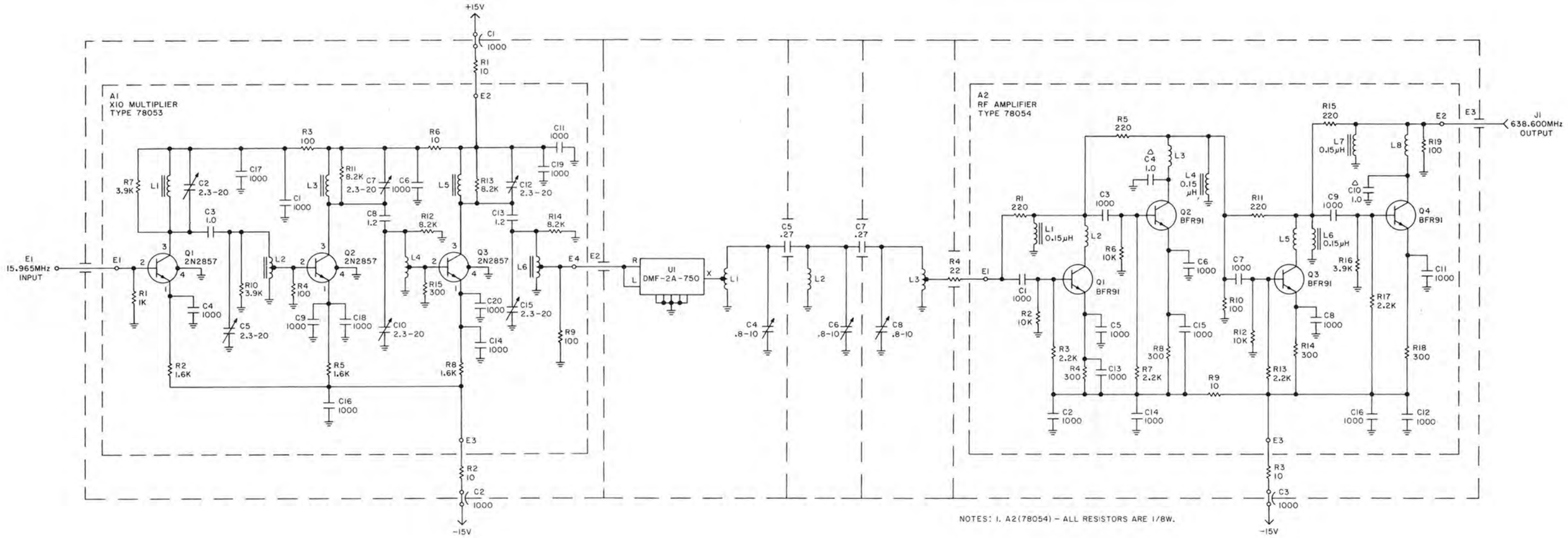


Figure 7-25. A22A10A1 Frequency Multiplier Module Schematic Diagram