TECHNICAL MANUAL

for

REMOTE CONTROL GROUP
MODEL COPB-2

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

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NOTICE

FOREWORD

Communications Control Console, AN/URA-63 is designed to control the following single- and dual-memory receivers:

Single Memory Receivers

1. Single receiver, AN/URR-63(V)1.
2. Each half of dual-diversity receiver, AN/FRR-85(V)1.

Dual Memory Receivers

1. Dual-diversity receiver, AN/URR-63(V)2.
2. Dual-diversity receiver, DDRR-10M2.
3. Single receiver, DDRR-10K2 (uses "A" half of double memory)

The text in this manual refers to "AN/URR-63(V)1" as a typical single memory receiver and "AN/URR-63(V)2" as a typical dual-memory receiver.

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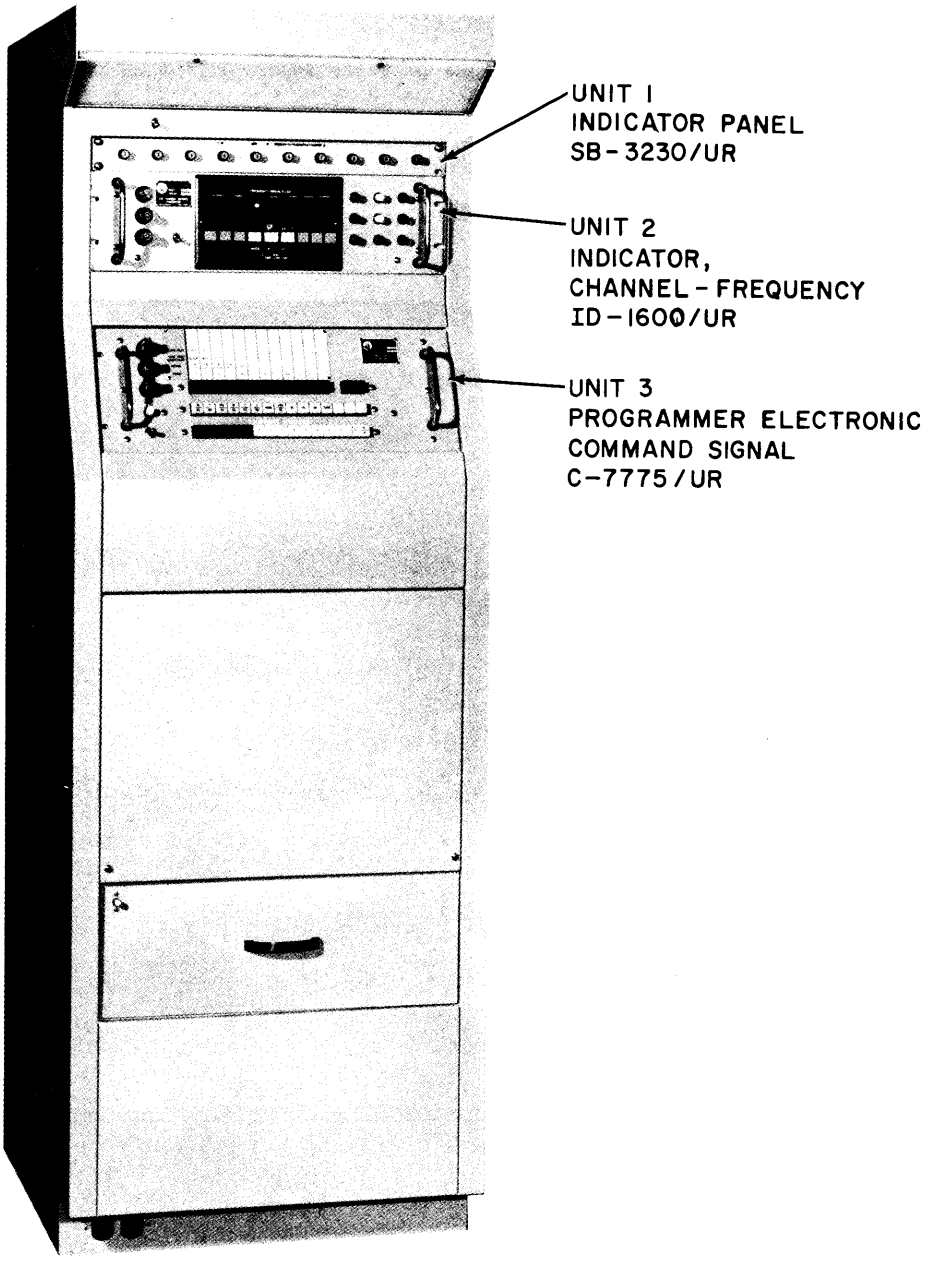


Figure 1-1. Communications Control Console, AN/URA-63

SECTION I
GENERAL INFORMATION

1-1. SCOPE

The context of this manual covers Communications Control Console, AN/URA-63 as used in association with Radio Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2.

1-2. GENERAL DESCRIPTION. (See figure 1-1.)

Communications Control Console AN/URA-63 is a control programming and monitoring unit for the remote teletype signal control of Radio Receiving Sets AN/URR-63(V)1 and AN/URR-63(V)2. Remote tuning of the receiver is accomplished by programming receiver control settings on a pushbutton keyboard. 5-level binary codes generated from the keyboard reach the receiver memory (code storage) section via associated teletype linkage. A readback indicator in the AN/URA-63 receives receiver control position readback codes, in similar coding, from teletype linkage, and displays the settings by digital indicators and projection screens.

The AN/URA-63 may be used for remote control and monitoring of a series of AN/URR-63(V)1 and/or AN/URR-63(V)2 receivers, using the same programmer and readback indicator. Equipment selection buttons on the programmer (in five letters and ten numerals) can be combined to select and tune up to 50 receivers. This arrangement is for five blocks of receivers with ten single receivers or five dual diversity receivers to a block. A light indicator display works with the readback indicator to reveal which receiver is associated with the current control position readback.

The AN/URA-63 comprises modular units (described in paragraph 1-3) mounted in a slope front cabinet. All circuitry is a solid state design, with encapsulated binary logic modules on printed circuit plug-in cards throughout. The overall cabinet dimensions are 65 inches high x 22 inches wide x 24 inches deep. The programmer and readback modules are on tilt-lock component slides and lock in the up or down position for servicing and these units contain their own power supplies. The readback module is forced air cooled with a removable air filter mounted on the rear panel. Cabinet and modules are finished in light gray enamel per MIL-E-15090.

1-3. DESCRIPTION OF MODULAR UNITS

a. ELECTRONIC COMMAND SIGNAL PROGRAMMER, C-7775/UR. The C-7775/UR contains the pushbutton keyboard marked with receiver controls for programming a teletype tuning message to be sent to the receiver. It includes a CLEAR button for correcting errors and a TUNE button for energizing the receiver tuning controls to respond to the message. A row of EQUIPMENT SELECTION buttons are included and provide a selection of five 10-receiver blocks for address. The contact keying code output is in CCIT 5-level teletype pattern at 75-baud speed. Shift register timing is such as to allow transmission with 8-level pattern equipment if necessary.

b. CHANNEL/FREQUENCY INDICATOR, ID-1600/UR. The ID-1600/UR displays a readback of control positions from a continuous cycling of teletype codes from the receiver. Code input is through an isolation keyer and can be connected directly to any standard teletype current loop in 5-level through 8-level equipment. The frequency to which the receiver is tuned appears in a lighted digital display down to the .1 kHz component. Control positions are projected onto individual indicator screens. Receiver status and warning signals are on a light panel.

c. INDICATOR PANEL SB-3230/UR. The SB-3230/UR is a light indicator panel operating in conjunction with Channel/Frequency Indicator ID-1600/UR to identify which receiver (of a block of receivers) is represented in the ID-1600/UR display. Lights enable an identification of up to ten receivers. The SB-3230/UR is a passive device and works from a signal input from Channel/Frequency Indicator ID-1600/UR.

1-4. REFERENCE DATA

Table 1-1 lists quick-reference technical data on the Communications Control and includes the nominal specifications defining this equipment. Table 1-2 lists teletype output codes for receiver controls, resulting from specific buttons on the C-7775/UR keyboard. Table 1-3 lists readback code inputs required to energize specific displays in the ID-1600/UR indicator panel.

TABLE 1-1. TECHNICAL SPECIFICATIONS, AN/URA-63

TUNING CODE OUTPUT:	5-bit codes in serial teletype wet (mercury) contact keying from polar relay. 5-level codes (adaptable up to 8-level* transmission equipment) with 74.2-baud transmission speed. Codes per table 1-2.
READBACK CODE INPUT:	From teletype loop, 60 ma or 20 ma, neutral or polar. 5-level codes (adaptable up to 8-level* transmission equipment) with 74.2-baud transmission speed. Codes per table 1-3.

*In 6-, 7- or 8- level pattern, code is in first 5 bits.

TABLE 1-1. TECHNICAL SPECIFICATIONS, AN/URA-63 (cont)

POWER SUPPLY REQUIREMENTS:	115/230 VAC, 50/60 cps, single phase 168 watts maximum consumption.
AMBIENT TEMPERATURE AND HUMIDITY:	0 to 50°C and up to 95% relative humidity.
OVERALL DIMENSIONS:	65 inches high x 22 inches wide x 24 inches deep.

TABLE 1-2. PUSHBUTTON CODES

Pushbutton (C-7775/UR, figure 3-1)	5-Bit Code, 12345	Equivalent CCIT TTY Character
FUNCTION:		
SYNTH	01000	Line Feed
AFC	00100	Space
AGC TIME CONSTANT:		
SLOW	01000	Line Feed
MEDIUM	00100	Space
FAST	01100	I
MODE:		
AM 2.5 kHz	01000	Line Feed
AM 6 kHz	00100	Space
CW 2.5 kHz	01100	I
CW 6 kHz	00010	Carriage Return
ISB	01010	R
FREQ:		
0	01000	Line Feed
1	00100	Space
2	01100	I
3	00010	Carriage Return
4	01010	R
5	00110	N
6	01110	C
7	00001	T

TABLE 1-2. PUSHBUTTON CODES (cont)

Pushbutton (C-7775/UR, figure 3-1)	5-Bit Code, 12345	Equivalent CCIT TTY Character
FREQ: (cont)		
8	01001	L
9	00101	H
TUNE	10000	E
CLEAR	01111	V
FUNCTION:		
10 MHz	11000	A
1 MHz	10100	S
100 kHz	11100	U
10 kHz	10010	D
1 kHz	11010	J
.1 kHz	10110	F
MODE	11110	K
SYM/B2	10001	Z
B1	11001	W
A1	10101	Y
A2	11101	Q
FUNC	10011	B
EQUIPMENT SELECTION:		
A	10101	Y
B	10110	F
C	11010	J
D	11001	W
E	10011	B
1	00010	Carriage Return
2	01010	R
3	01100	I
4	01000	Line Feed
5	00100	Space
6	01101	P
7	00101	H
8	00011	O
9/A	00111	M
10/B	01011	G

TABLE 1-3. READBACK CODES

Character Reception Order	Display (ID-1600/UR, figure 3-1)	Indication	Code Bit 1	Code Bit 2345
1	Resets indicator for new cycle		1	0000
2	FREQUENCY/MEGACYCLES 10-MHz digit	0		1111
		1		0111
		2		1011
		3		0011
	Receiver READY/TUNING/FAULT lamps	See Note*.		
3	FREQUENCY/MEGACYCLES 1-MHz digit	0		1111
		1		0111
		2		1011
		3		0011
		4		1101
		5		0101
		6		1001
		7		0001
		8		1110
		9		0110
	Receiver READY/TUNING/FAULT lamps	See Note*.		
4	FREQUENCY/MEGACYCLES 100-kHz digit	0-9, same as for 1-MHz digit.		
	EQUIPMENT SELECTED lamp	on	1	
		out	0	
5	FREQUENCY/MEGACYCLES 10-kHz digit	0-9, same as for 1-MHz digit.		
	DECODER POWER lamp	on	1	
		out	0	

*Readback for READY/TUNING/FAULT lamps is contained in bit #1 of codes #2 and #3 combined:

Bit #1		
Code #2	Code #3	Lamp
1	0	READY
0	1	TUNING
1	1	FAULT

TABLE 1-3. READBACK CODES (cont)

Character Reception Order	Display (ID-1600/UR, figure 3-1)	Indication	Code Bit 1	Code Bit 2345
6	FREQUENCY/MEGACYCLES 1-kHz digit	0-9, same as for 1-MHz digit.		
	NON AUTOMATIC lamp	on	1	
		out	0	
7	FREQUENCY/MEGACYCLES .1-kHz digit	0-9, same as for 1-MHz digit.		
	AFC ALARM lamp	on	1	
		out	0	
8	SYNTH/FUNCTION	on	1	1000
		out	0	1000
9	AFC/FUNCTION lamp	on	1	1000
		out	0	1000
10	BLANK			
11	MODE display	2.5 kHz AM	0	1111
		6 kHz AM	0	0111
		2.5 kHz CW	0	1011
		6 kHz CW	0	0011
		ISB	0	1101
12	AGC TIME CONSTANT display, SYM B2 and B1	SLOW and SLOW	0	1111
		SLOW and MED	0	1101
		SLOW and FAST	0	1110
		MED and SLOW	0	0111
		MED and MED	0	0101
		MED and FAST	0	0110
		FAST and SLOW	0	1011
		FAST and MED	0	1001
		FAST and FAST	0	1010

TABLE 1-3. READBACK CODES (cont)

Character Reception Order	Display (ID-1600/UR, figure 3-1)	Indication	Code Bit 1	2345
13	AGC TIME CONSTANT display, A2 and A1	SLOW and SLOW	0	1111
		SLOW and MED	0	1101
		SLOW and FAST	0	1110
		MED and SLOW	0	0111
		MED and MED	0	0101
		MED and FAST	0	0110
		FAST and SLOW	0	1011
		FAST and MED	0	1001
		FAST and FAST	0	1010
14	BLANK			
15	BLANK			
16	BLANK			
	DISPLAY, (SB-3230/UR, figure 3-1)			
17	1-10 lamps (readback receiver identification)	1	0	1111
		2	0	0111
		3	0	1011
		4	0	0011
		5	0	1101
		6	0	0101
		7	0	1001
		8	0	0001
		9	0	1110
		10	0	0110

1-5. EQUIPMENT SUPPLIED

Table 1-4 lists all major components in Communications Control Console AN/URA-63.

TABLE 1-4. EQUIPMENT SUPPLIED, AN/URA-63

Qty. Per Equip.	Nomenclature		Unit No.	Overall Dimensions (in.)			Volume (cu. ft.)	Weight (lb)
	Name	Designation		Height	Width	Depth		
1	Indicator Panel	SB-3230/UR	1	1.75	19	2	.04	?
1	Channel Frequency Indicator	ID-1600/UR	2	5.25	19	17	.98	37
1	Electronic Command Signal Programmer	C-7775/UR	3	7	19	15	1.15	26
1	Electrical Equipment Cabinet	CY-6538/URA-63	4	65	22	24	19.86	

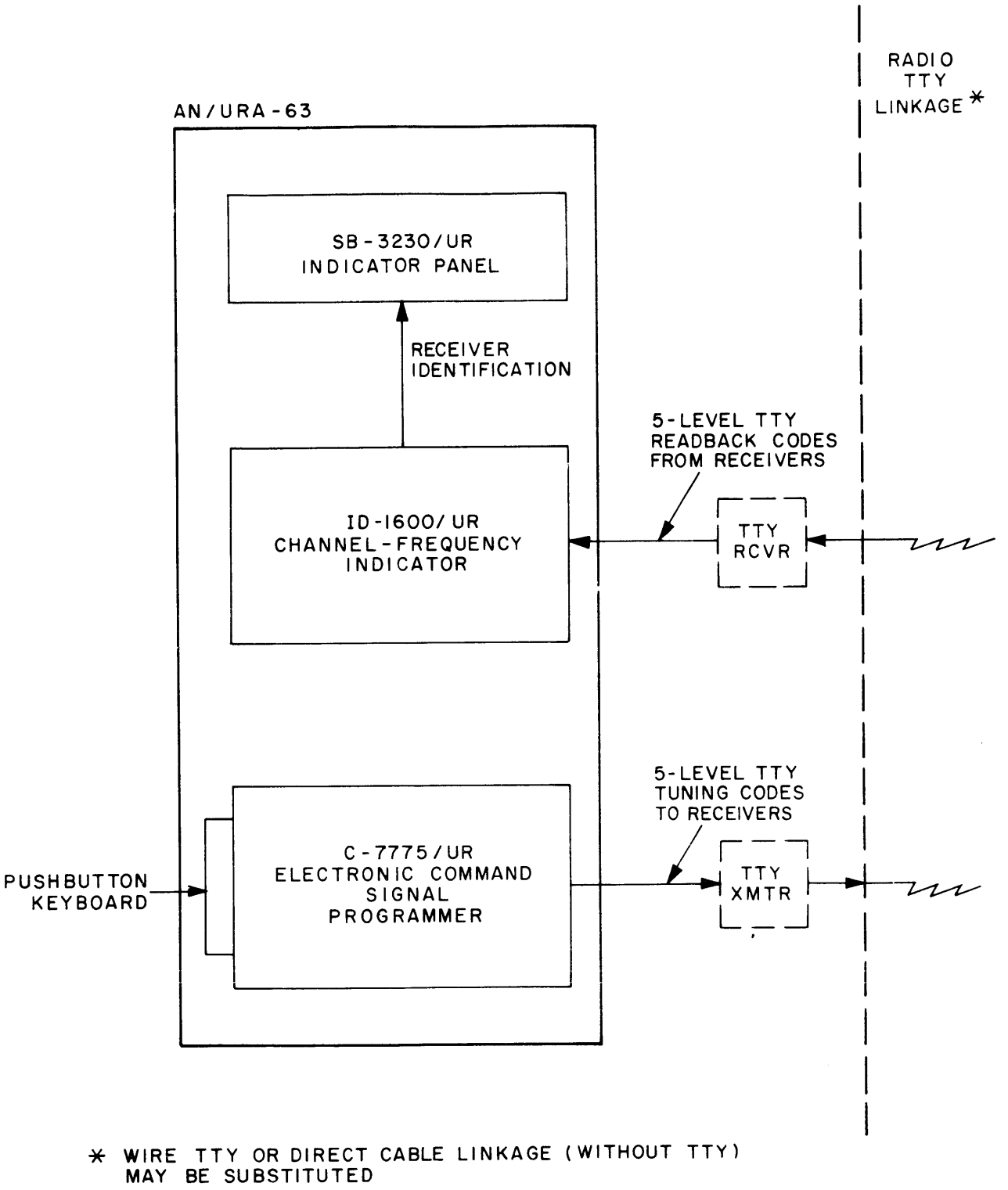


Figure 1-2. Functional Block Diagram, Communications Control Console

SECTION II
INSTALLATION

2-1. UNPACKING AND HANDLING

Inspect the AN/URA-63 packing cases for possible damage when they arrive at the operating site. With respect to damage to equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. POWER REQUIREMENTS

Each console leaves the factory wired to operate from a 115-vac, 50/60-cps, single phase power source. The console can be rewired for operation from a 220-vac, 50/60-cps, single phase source by changing transformer primary winding jumper leads in each rack modular unit. Refer to figure 2-1 for typical primary connections. In units containing a blower, ensure that 115 vac is maintained across the blower as shown.

2-3. SITE SELECTION

The Console (figure 1-1) may be located in any enclosure (room, deck or van) with sufficient clearances as depicted in figure 2-2. Allow a minimum of 2 feet above the Console for adequate heat dissipation and to prevent back pressure in the cooling air exhaust stream. The Console is designed for fixed station, transportable or ship installation. Remote readback into the Console is by means of conventional teletype linkage by a cable from the teletype loop current supply. The connector for this cable (INPUT J2) is located on the Channel Frequency Indicator rear panel. The length of the cable should be consistent with the loop current supply, so as to prevent line drop. (See paragraph 2-4b (3)C.)

2-4. INSTALLATION REQUIREMENTS

a. ASSEMBLY OF CONSOLE. Install modular units and blank panels into the console as shown in figure 1-1. Connect modular unit power supply inputs to a-c power strip in console as shown in figure 5-1. Modular units ID-1600/UR and C-7775/UR are slide-mounted on tilt-lock drawer slides. The external part of the slide-mount arrives preinstalled in the cabinet; the internal part arrives preinstalled on the modular unit. To install a unit, refer to figure 2-3 and proceed as follows:

(1) Pull the center section of cabinet-mounted (external) portion of slide-mount out until it locks in an extended position.

(2) Position unit-mounted (internal) portion of slide-mount in tracks of external portion and ease modular unit into cabinet until release buttons engage holes in track.

(3) Depress release buttons and slide modular unit completely into rack.

(4) Secure modular unit front panel to rack flange with machine screws and fiber washers supplied in shipment.

b. EXTERNAL WIRING CONNECTIONS. All system wiring shall be connected at the rear panels of Channel-Frequency Indicator ID-1600/UR and Electronic Command Signal Programmer C-7775/UR. See figure 5-1. Figure 2-4 contains wire-run information for constructing individual cable to each connector. Since the readback input requirements may vary, due to the quantity and types of the remote receivers, an analysis should be made as to necessary connections before proceeding to make up the cables. This analysis may be made from information contained in the following subparagraphs.

(1) Programming Output. The Console is capable of controlling up to fifty remote single receivers or twenty-five remote dual-diversity receivers. This remote equipment may be arranged as one single receiver, or an array of up to fifty single receivers, one dual-diversity receiver, or an array of up to twenty-five dual-diversity receivers. In all cases, one single teletype code channel output (DC LOOP, J2) from the C-7775/UR controls all of the receivers in an arrangement. Single and dual-diversity receivers may be combined in an arrangement as long as receivers and receiver-halves do not exceed fifty when totaled up.

(2) Readback Input. Readback information from each receiver, however, comes back on a separate teletype channel. Cable connections to the ID-1600/UR may therefore vary in accordance with the particular arrangement. ID-1600/UR contains a single input (INPUT J2) on its rear panel. Some varieties of receivers contain a device in which a readback is triggered by the EQUIPMENT SELECTION code pushbuttons on the C-7775/UR keyboard; in this case only one teletype channel is required for the readback input at the Console. For Receiving Sets AN/URR-63-(V)1 and 2, however, there are no triggering devices and the readback comes back on a separate teletype channel for each receiver or receiver "A" and "B" half. For this purpose, a selector switch should be installed at the signal input to the Channel-Frequency Indicator.

(3) Variations in Teletype Linkage Equipment

(a) General. Although the programming output and readback input circuitries in the Console are designed to operate with 75 baud (100 WPM) teletype linkages, these circuits are designed to adapt to a variety of baud ratings, current loops, and code levels in the teletype linkage equipment.

(b) Baud Rating

Not

Baud (or WPM) rating capacity of the Console is based on the clock timing circuit in the remote readback input. The timing circuit is designed to match pulse widths within each code. The readback codes themselves may enter at any speed up to 60 WPM.

The baud rating at the readback input is determined by plug-in P/C board A9 in the ID-1600/UR; that of the programming output is determined by plug-in P/C board A3 in the C-7775/UR. In Communication Control Console AN/URA-63, these boards are designed for a 75-baud operation; 45-baud (60 WPM) P/C boards are also available.

(c) Current Loop. In the readback input, the teletype equipment output current loop operates through isolation keyer P/C board A2 in the Channel-Frequency Indicator. The keyer will operate from a 20 ma or 60 ma loop. When working from a 60 ma loop, however, bypass resistor R5 on P/C board A2 by adding a strap around it at terminals provided on the board.

(d) Code Levels. Although the AN/URA-63 uses a 5-level code, programming code output and readback code input circuitry contains shift registers paced for adaptability up to an 8-level teletype linkage equipment. No adjustments are necessary for the adaptation.

2-5. CABLE ASSEMBLIES

Wire the programming output cable and the readback input cable in accordance with wire-run information in figure 2-4.

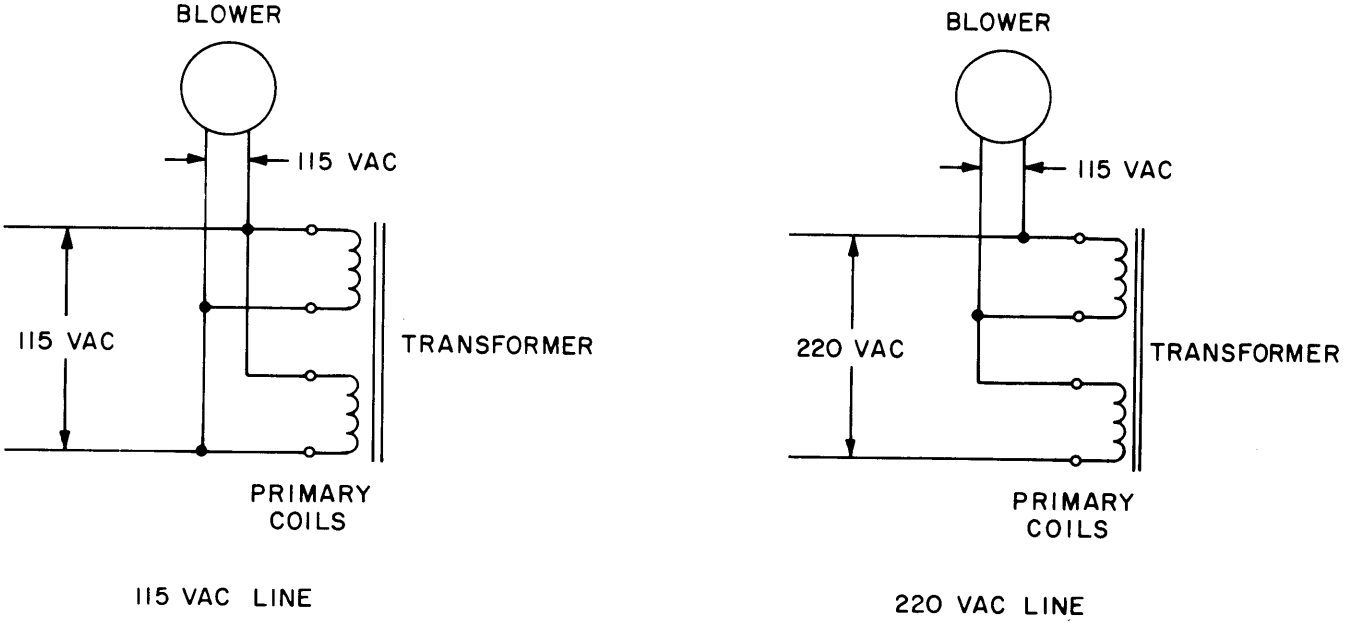


Figure 2-1. 115-220 VAC Conversion

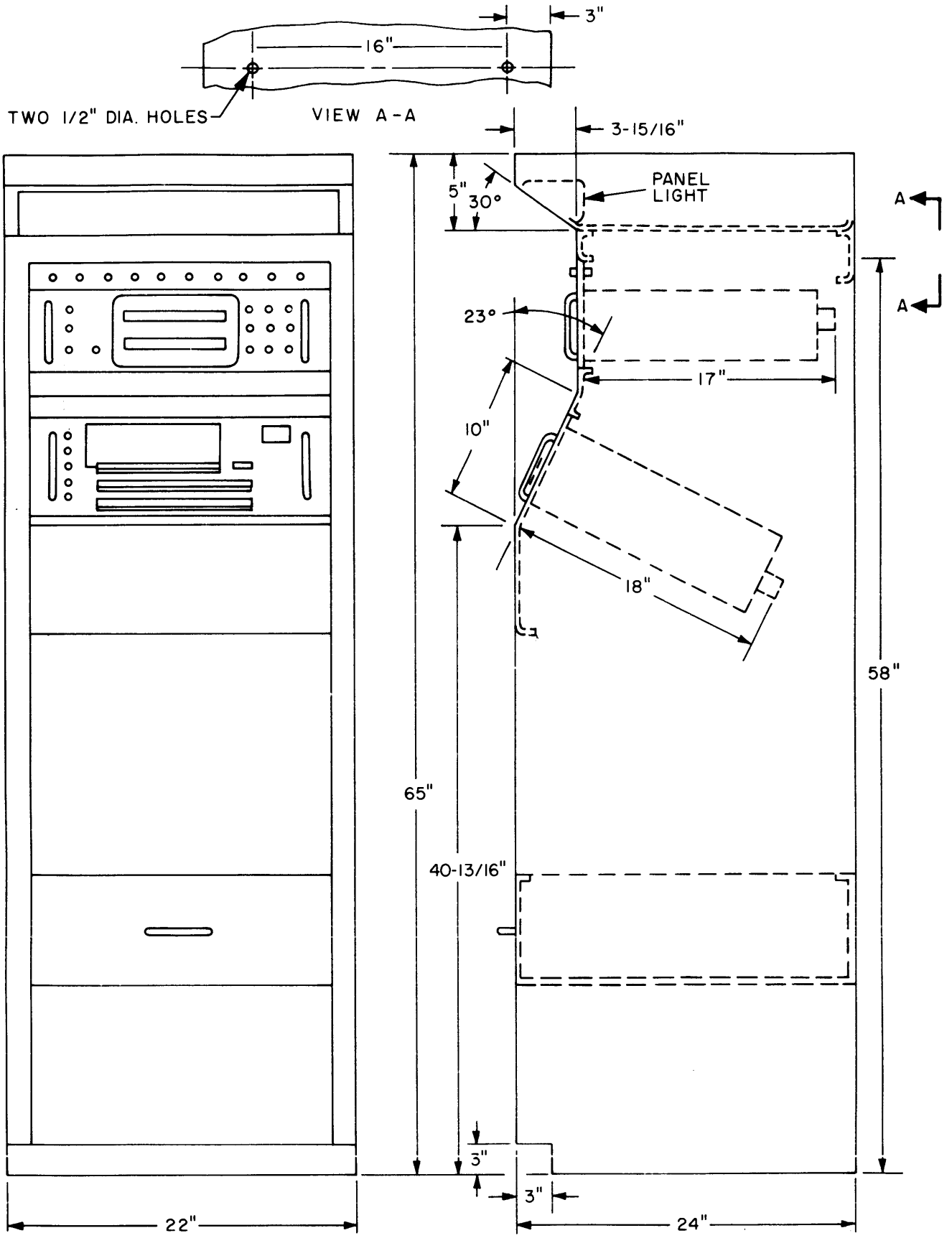


Figure 2-2. Outline and Dimensions of Console

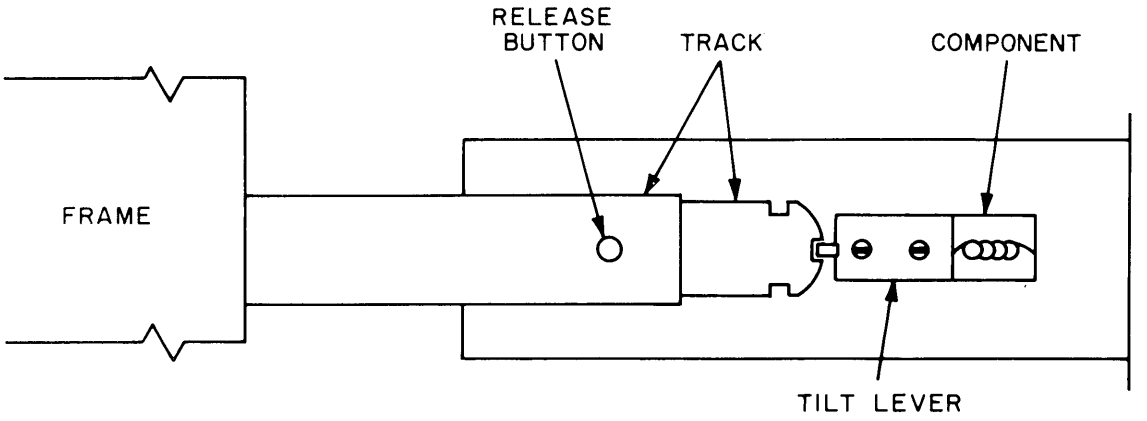
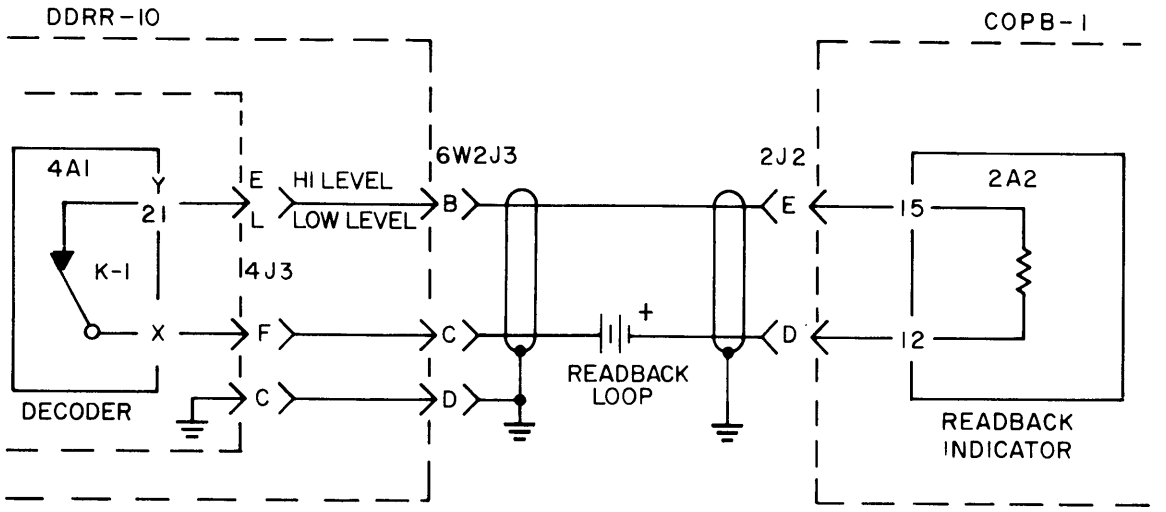


Figure 2-3. Slide Mount Details



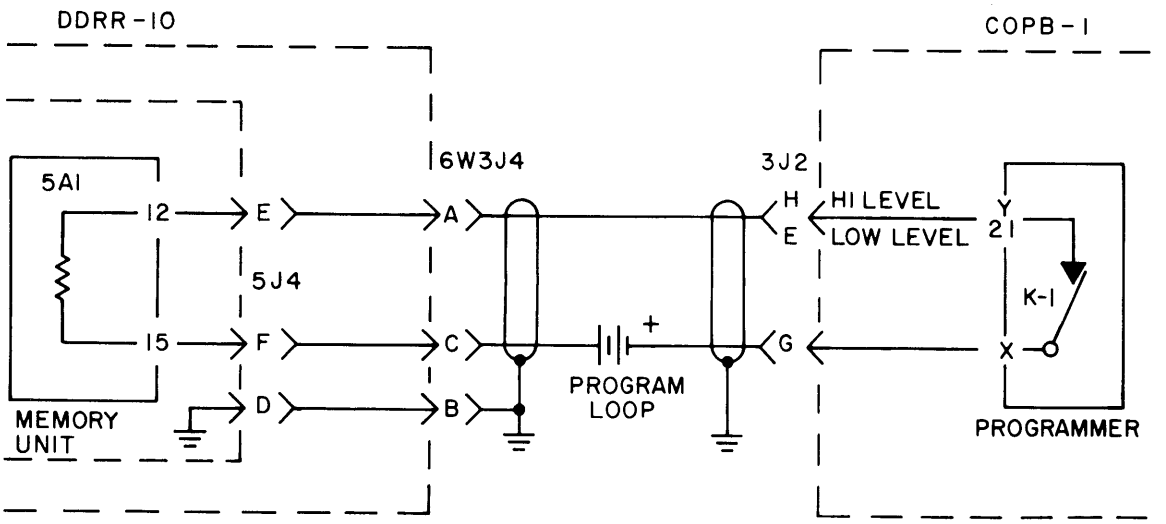


Figure 2-4. External Wiring Connections, AN/URA-63

SECTION III
OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION

a. GENERAL. Communications Control Console AN/URA-63 functions as a pushbutton control unit for the tuning of a remote receiver by teletype code. (See figure 1-1.) The console includes a readback indicator for the readback of receiver control positions.

b. CAPABILITIES. The AN/URA-63 can tune the remote receiver for a variety of reception modes and one console can control and monitor up to fifty single receivers. It is specifically designed for use with Radio Receiving Sets AN/URR-63(V)1 (a single receiver) and AN/URR-63(V)2 (a dual diversity receiver). Up to twenty-five AN/URR-63(V)2 receivers can be controlled by the AN/URA-63 console.

(1) Reception Modes. There are two channel reception modes and two frequency control modes for which the remote receiver may be tuned. These are:

Channel reception modes:
- 4-channel ISB (independent sideband)
- symmetrical channel (AM or CW)

Frequency control:
- synthesized
- AFC

(2) Multiple Receiver Control. The pushbutton control unit can be used to separately tune up to fifty AN/URR-63(V)1 receivers by utilizing an EQUIPMENT SELECTION row of buttons on Electronic Signal Command Programmer C-7775/UR. (See figure 3-1.) Buttons, numbered A, B, C, D and E and 1 thru 10 provide a selection of five blocks (A thru E) of receivers with ten receivers (1 thru 10) in each block. While a receiver within a block is being programmed, a continuous readback is issued to Channel Frequency Indicator ID-1600/UR from the receiver if desired. Contained in the readback (besides receiver control position codes) is a code indicating which of the ten receivers is represented. This causes one of the 1-10 lamps on Indicator Panel SB-3230/UR to light. EQUIPMENT SELECTION buttons used for the AN/URR-63(V)2 diversity receivers are A thru E and 1 thru 5 for a selection of five blocks of receivers with five receivers in each block. Buttons "A" and "B" at the right end of the row are for the separate tuning of the halves of the diversity receiver.

c. CHANNEL RECEPTION MODES. 4-channel ISB reception is for two direct sideband channels (A1 and B1) and two translated channels (A2 and B2) transmitted on a single carrier reference Fc. The procedure is to tune the receiver to Fc (in the 2-32 MHz range) and set it for 4-channel reception. This prepares the receiver not only for 4-channel reception but also for three-channel ISB, two-channel ISB, or one-channel SSB. There are individual channel controls for three AGC attack-and-decay speeds.

Symmetrical channel reception is for AM, CW or MCW transmission. In AM reception, the receiver is set for reception of the entire 6-kHz width of frequencies, symmetrical about Fc and one channel of audio appears in the output. In CW reception, controls are set to receive a 2.5-kHz width, symmetrical about Fc. Setting controls for AM routes the signal into an envelope detector to produce audio; a CW setting processes the signal through a product detector, and in this case a preset BFO control is used to produce audio. For MCW (carrier modulated by a keyed audio tone), the controls are positioned for AM reception at 2.5-kHz width to produce the audio. As in the sideband channel mode, there is a selection of three AGC attack-and-decay speeds.

d. FREQUENCY CONTROL MODES. In synthesized mode, receiver frequencies are held stable by a 1-MHz standard in a Reference Signal Generator (0-1510/URR). In this mode, the 0-1510/URR is set for the carrier frequency (in .1-kHz steps) by the TTY codes and an RF Tuner (TN-511/URR) is automatically tuned to synchronize with the 0-1510/URR. When the synchronization point has been reached, the 0-1510/URR locks the receiver frequencies to the same stability (within 1 part in 10^8) as its 1-MHz standard or to an external standard of higher stability, if used. For AFC control, receiver frequencies are made to track the drift in the incoming carrier from the transmitter. This is possible in a transmission containing a partial (30 db suppressed) carrier and is generally required if the transmitter frequencies are unstabilized (as in non-synthesized transmitter operation). The result of the tracking action is to maintain fidelity and stability in the audio output frequencies.

e. READBACK. Readback display is in the same terminology as that of programmer pushbuttons and also includes receiver tuning status information. A READY light indicates that the receiver is ready to tune. An EQUIPMENT SELECTED light indicates, after C-7775/UR EQUIPMENT SELECTION buttons have been pushed, that the receiver memory section (in Signal Data Converter-Storer CV-2520(V)/URC) has opened and is ready for the tuning message. A TUNING indication is received while the receiver is in the process of tuning from the programmed message; a READY indication arrives again when tuning is complete.* A FAULT signal signifies failure of the receiver to synchronize or tune as programmed. An AFC ALARM signal is sent if, after tuning the receiver for AFC, the carrier component from the transmitter commences to drift outside the capture range of the receiver's AFC circuit. A NON

*In the case of a rapid tuning (and due to the length of the readback cycle) the operator may often have a steady READY indication throughout a tuning.

AUTOMATIC light indicates that the receiver's controls have not been set for an automatic (or therefore a remote) tuning. A DECODER POWER light indicates that the receiver memory (CV-2520(V)/URC) power input has been disconnected and remote tuning is therefore not possible. The lighted lamp in the Indicator Panels "1-10" group indicates which receiver is represented in the readback. If a readback selector switch is used in conjunction with the AN/URA-63, a specific readback may be selected at any time.

3-2. OPERATING PROCEDURES

a. DESCRIPTION OF CONTROLS. Table 3-1 lists controls, pushbuttons and readback indicators, and the function of each item. Reference is made to these items as they appear in figure 3-1, Front Panel Controls, AN/URA-63. On the C-7775/UR programming panel, yellow FUNCTION buttons are used to select a receiver control and the row of twelve blank blue buttons, directly above, are used to position the selected control in accordance with the printed chart above the blank buttons.

TABLE 3-1. CONTROL FUNCTIONS, AN/URA-63

Module	Control	Function
SB-3230/UR	Lamps 1 thru 10	Light indicates which receiver in a block of 10 is represented in the ID-1600/UR display.
ID-1600/UR	POWER switch	Connects a-c line voltage to ID-1600/UR.
	FREQUENCY/MEGACYCLES digital display	Indicates 2.0000-to 32.0000-MHz frequency to which receiver is tuned.
	MODE display	Indicates channel reception mode for which receiver is set. ISB indicates a 4-Channel mode. AM 2.5 kHz, AM 6 kHz, CW 2.5 kHz or CW 6 kHz indicates a symmetrical channel mode and width.
	SYM-B2 AGC TIME CONSTANT display	Indicates AGC attack-and-decay speed selection for either SYMmetrical channel or B2 channel (depending on channel mode indicated by MODE display).
	B1 AGC TIME CONSTANT display	Indicates AGC attack-and-decay speed selection for B1 channel.
	A1 AGC TIME CONSTANT display	Indicates AGC attack-and-decay speed selection for A1 channel.
	A2 AGC TIME CONSTANT display	Indicates AGC attack-and-decay speed selection for A2 channel.
	READY lamp (green)	Indicates receiver tuning is complete.
	TUNING lamp (yellow)	Indicates receiver is in the process of tuning from a programmed message or from a local tuning.
	FAULT lamp (red)	Indicates receiver has failed to synchronize to frequency indicated on FREQUENCY MHz display or has been moved off of the synchronization point.
	EQUIPMENT SELECTED lamp (green)	Indicates intended receiver has opened memory section for tuning message.
	NON AUTOMATIC lamp (yellow)	Indicates receiver cannot be tuned due to disconnecting of automatic tuning section.
	DECODER POWER lamp (red)	Indicates receiver cannot be tuned due to disconnection of memory POWER input.
	SYNTH FUNCTION lamp (green)	Indicates receiver is set for synthesized frequency control tuning.*

*If neither lamp is lit, the receiver is set for local (oscillator) frequency control.

TABLE 3-1. CONTROL FUNCTIONS, AN/URA-63 (cont)

Module	Control	Function
ID-1600/UR (cont)	AFC FUNCTION lamp (green)	Indicates receiver is set for AFC tuning. *
	AFC ALARM lamp (red)	Indicates that transmitted signal into receiver has drifted out of its AFC capture range.
C-7775/UR	POWER lamp	Light indicates C-7775/UR is receiving line voltage.
	POWER switch	Connects a-c line voltage to C-7775/UR.
	Twelve blank buttons (blue)	FREQ — 0-9 selection for 10 MHz, 1 MHz, 100 kHz, 10 kHz, 1 kHz and .1 kHz components in receiver carrier frequency.
		MODE — Selects ISB (4-channel) mode or selects AM or CW mode for symmetrical channel reception, with 2.5-kHz or 6-kHz bandpass.
		AGC TIME CONSTANT — Attack-and-decay speed selection for B2, B1, A1 or A2 channel AGC. Speed selection for SYM channel AGC.
		FUNCTION — Selects SYNTH(esized) or AFC control.
	TUNE button (green)	Energizes receiver to tune to programmed message.
	CLEAR button (red)	Used for correction of error in a programming message (before TUNE button). Erases codes in receiver memory section.
	FUNCTION buttons (yellow)	Selects receiver control for positioning by blue buttons.
	10 MHz	Selects 10-MHz frequency component control.
	1 MHz	Selects 1-MHz frequency component control.
	100 kHz	Selects 100-kHz frequency component control.
	10 kHz	Selects 10-kHz frequency component control.
	1 kHz	Selects 1-kHz frequency component control.
	.1 kHz	Selects .1-kHz frequency component control.
	MODE	Selects control for selection within SYMmetrical or ISB channel mode.
	SYM-B2	Selects SYM-B2 channel control for SYMmetrical or B2 AGC TIME CONSTANT.
	B1	Selects B1 channel control for B1 AGC TIME CONSTANT.
	A1	Selects A1 channel control for A1 AGC TIME CONSTANT.
	A2	Selects A2 channel control for A2 AGC TIME CONSTANT.
	FUNC	Selects control for synthesized or AFC operation.

*If neither lamp is lit, the receiver is set for local (oscillator) frequency control.

TABLE 3-1. CONTROL FUNCTIONS, AN/URA-63 (cont)

Module	Control	Function
C-7775/UR (cont)	EQUIPMENT SELECTION buttons	A thru E (black) selects receiver block. 1 thru 10 (white) selects receiver within block (for AN/URR-63(V)1) 1 thru 5 (white) selects receiver within block (for AN/URR-63(V)2) A and B (white) selects diversity half (for AN/URR-63(V)2)

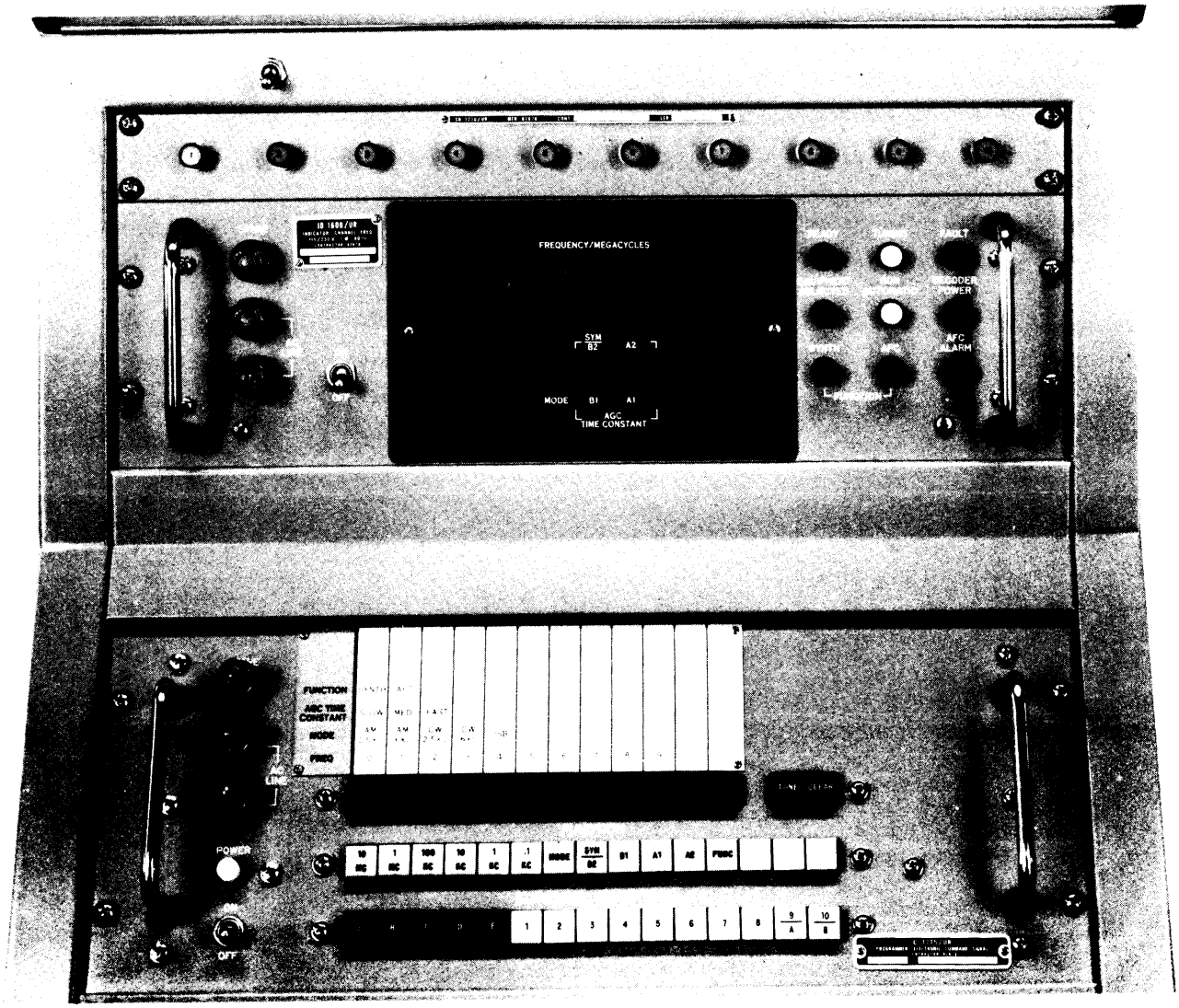


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Figure 3-1. Front Panel Controls, AN/URA-63

b. SEQUENCE OF OPERATION. In general, remote tuning is to:

(1) Select the receiver by C-7775/UR EQUIPMENT SELECTION buttons.

(2) Check ID-1600/UR readback display for indication that receiver is ready for a remote tuning.

(3) Check ID-1600/UR readback display for present receiver settings.

(4) Determine which controls require repositioning and program new settings by C-7775/UR keyboard buttons.

(5) Energize receiver's automatic tuning system (C-7775/UR TUNE button).

(6) Check new control positions on ID-1600/UR readback indicator.

When formulating a programming message on the C-7775/UR keyboard, the operator should keep in mind that although the receiver's memory storage (30 code capacity) is more than adequate for the 12 control code pairs (24 codes) from the C-7775/UR, any "repeats" during any one message should be limited so as not to overrun the code capacity. For correcting errors, during programming, the C-7775/UR CLEAR button may be used; this "erases" any previous codes in the receiver's memory.

Note

Neither the EQUIPMENT SELECTION codes nor the CLEAR code become stored in the receiver memory. Codes that are stored are the tuning codes (yellow and blue buttons) and the TUNE code.

3-3. SUMMARY OF OPERATING PROCEDURES

a. GENERAL. Table 3-2 lists, as an example, step-by-step procedures for remote tuning of a single (AN/URR-63(V)1) receiver (#1 receiver in "A" block). Receiver operation, in this example, is to be:

(1) 23.9657 MHz frequency.

(2) 4-Channel independent sideband.

(3) AGC attack-and-decay speeds per channel:

Channel B2, fast
Channel B1, slow
Channel A1, medium
Channel A2, slow

(4) Frequency control, synthesized

TABLE 3-2. TYPICAL REMOTE TUNING FOR SINGLE RECEIVER

Step	Controls	Operation
1	C-7775/UR EQUIP. SELECTION buttons.	Push "A" button, then "1" button.
2	ID-1600/UR light indicator panel and SB-3230/UR light indicator panel.	Observe lights for receiver's condition to receive message. If the receiver is ready SB-3230/UR "1" lamp will light and the ID-1600/UR EQUIPMENT SELECTED and READY lights will be on. If, however, either the NON-AUTOMATIC or DECODER POWER lights are on, the receiver has not been properly set up for a remote tuning.
3	ID-1600/UR indicator and light readings.	When step 2 observations indicate receiver is ready, check display on ID-1600/UR center panel and the FUNCTION SYNTH and AFC lamps. The FREQUENCY/MEGACYCLES digital reading is the 2.0000 to 32.0000 MHz frequency to which receiver "A1" is presently tuned. If the SYNTH lamp is on, the receiver is locked to this frequency by its synthesizer. If the AFC lamp is on, the receiver is tuned to the frequency but with AFC rather than synthesized frequency control. If the AFC ALARM lamp is on, there is either no incoming signal for the AFC to lock onto or the incoming signal has drifted to an extreme. Check MODE and AGC TIME CONSTANT display for present settings.
4	C-7775/UR yellow (FUNCTION) and blue buttons.	Assuming that all the receiver controls require changing for the new tuning, proceed to push buttons in the following sequence: FUNCTION "10 MHz" button Blue FREQ "2" MHz" button FUNCTION "1 MHz" button Blue FREQ "3" button FUNCTION "100 kHz" button Blue FREQ "9" button

TABLE 3-2. TYPICAL REMOTE TUNING FOR SINGLE RECEIVER (cont)

Step	Controls	Operation
4 (cont)	C-7775/UR yellow (FUNCTION) and blue buttons. (cont)	FUNCTION "10 kHz" button Blue FREQ "6" button FUNCTION "1 kHz" button Blue FREQ "5" button FUNCTION ".1 kHz" button Blue FREQ "7" button FUNCTION "MODE" button Blue MODE "ISB" button FUNCTION "SYM/B2" button Blue AGC TIME CONSTANT "FAST" button FUNCTION "B1" button Blue AGC TIME CONSTANT "SLOW" button FUNCTION "A1" button Blue AGC TIME CONSTANT "MED" button FUNCTION "A2" button Blue AGC TIME CONSTANT "SLOW" button FUNCTION "FUNC" button Blue FUNCTION "SYNTH" button
5	C-7775/UR	After the receiver has been programmed (step 4), energize the receiver's automatic tuning system by pushing the C-7775/UR "TUNE" button. This will cause the receiver to draw the tuning instruction codes out of its memory and tune accordingly.
6	ID-1600/UR	Observe the readback display. The new readings should come up quickly (within 4 seconds). The ID-1600/UR READY light and EQUIPMENT SELECTED light should go out as soon as the C-7775/UR TUNE button is pushed, and while the receiver is tuning, the ID-1600/UR TUNING light will be on. When it has finished tuning, the READY light will replace the TUNING light again. The FREQUENCY/MEGACYCLES reading should be changed to "23.9657", MODE should be "ISB", in the AGC TIME CONSTANT. Display SYM/B2 should read "FAST", B1 "SLOW", A1 "MED" and A2 "SLOW", and the "SYNTH" light should be on.

The same procedure is followed in the tuning of a dual diversity receiver (AN/URR-63(V)2). This receiver has a double memory (one memory storage section for each of the two receivers). Each receiver may be programmed separately, by pushing either the "A" or "B" button at the end of the C-7775/UR EQUIPMENT SELECTION row after pushing the A-E letter and 1-5 numeral.

Example: To program the "A" half of dual diversity receiver #4 in "D" block, push the "D", the "4" and the "9/A" buttons in that sequence. Then proceed to program as shown in steps 2 through 6 in table 3-2.

Instead of programming each receiver half separately, if it is preferred, the operator may program the receiver halves alternately in the same message by merely preceding with an EQUIPMENT SELECTION "9/A" or "10/B" button before each control positioning. When the programming is finished in this manner, pushing the TUNE button will tune both receivers simultaneously.

SECTION IV
PRINCIPLES OF OPERATION

4-1. FUNCTIONAL SECTION DESCRIPTIONS

a. INTRODUCTION. The following text is a description of the functioning of major plug-in assemblies and is divided into the programming and readback functions of the AN/URA-63. The programming function is entirely contained in Electronic Command Signal Programmer C-7775/UR. The readback function is contained in Channel-Frequency Indicator ID-1600/UR and Indicator Panel SB-3230/UR. All circuitry (with the exception of the power supplies) is in encapsulated binary logic networks with binary d-c inputs and outputs at each network.

4-2. FUNCTIONAL DESCRIPTION OF ELECTRONIC COMMAND SIGNAL PROGRAMMER (C-7775/UR)

The C-7775/UR is primarily a teletype code generator. Components of the generator consist of keyboard assembly A6, code register A5, shift register A3, gating circuit A4 and output keyer A2. Power supply A1 furnishes the logic voltages for all the components.

Keyboard assembly A6 consists of three rows of pushbuttons all with a common mechanical linkage. The linkage is arranged so as to hold a pushed-in button down until the next button is pushed in. The two exceptions to this are the CLEAR button (A6S13) and the TUNE button (A6S14). Although they also release previously pushed-in buttons, they are momentary-contact types and pop up (breaking contact) when released. Each button forms a switch closure with ground and the ground is extended to code register A5.

When a ground reaches a particular input on A5, a 5-bit code is set up. (See table 1-2.) The bits of this code appear simultaneously (parallel bits) at pins 15, 3, Y, B and F of A5. These bits are then brought over to gating circuit A4.

The arrival of the bits of each code at A4 generates a pulse to pin C of shift register A3, starting a clock (timing generator) in A3. The clock energizes a shift register (in A3) and this proceeds to shift each bit of the code (one-by-one) over to output keyer A2. The code appears at the output of A2 in the form of contact keying from a polarized relay. Depending on the TTY equipment to be run, either a high level or a low level output may be used; the high level output offers more resistance in the line.

Shift register A3 shifts ten times. The first shift creates the "start" pulse, the next five shifts move the bits out to the keyer, and the remaining four shifts give the C-7775/UR the ability to work with 7- or 8-level teletype sending equipment, if 5-level is not available. Shift rate is for a 100 WPM (or 75 baud) transmission. At the end of the cycle, the last shift turns off the clock. When the next button is pushed and the next code arrives at A4, the energizing pulse from A4 restarts the clock and the cycle is repeated.

4-3. FUNCTIONAL DESCRIPTION OF CHANNEL FREQUENCY INDICATOR (ID-1600/UR)

The ID-1600/UR is the display unit for continuous cycling of teletype readback codes from the remote receiver. (See table 1-3.) These codes represent specific receiver control positions and, in general, the receiver's status in a remote tuning operation. The last code to be received in each cycle is a receiver identification code. This represents a 1-10 number, signifying which receiver in a block of ten is represented in the readout. The signal for this is forwarded from the ID-1600/UR unit to one of the ten lamps on Indicator Panel SB-3230/UR, via the connection of ID-1600/UR receptacle J1 and SB-3230/UR plug P1.

As the serial teletype pulses of each code enter the ID-1600/UR, they are converted into parallel pulses. The serial pulses (figure 5-4) enter the ID-1600/UR at receptacle J2 and pins 12 and 15 of isolation keyer A2. Pulses are from a standard keyed teletype current loop and include a "start" pulse at the beginning and a "stop" pulse at the end. A keyer at the output of A2 keys a -12V logic voltage at the input of timing circuit A9. A9 converts these serial pulses into five parallel bit pulses (for each code) and routes them to timing circuit A8. A8 places bit #1 information on lamp driver A3 and bit #2-5 information simultaneously on frequency gating circuits A5 and A4 and positions driver cards A16, A15, A14 and A1. Readout will not occur from a particular driver or gating circuit, however, until it receives a gating pulse from the shift register.

The shift register (composed of P/C boards A7 and A6) produces sixteen gating pulses, one for each code. Gating outputs are connected to the various drivers and gating circuits so as to read out each code in a certain order. This is the predetermined order in which the cycle of codes arrives from the remote receiver readback transmitter. In this way the code that is intended to drive a particular display is read out on that display. A cycle of gating pulses appear in the following order:

(1) 10 MHz
(2) 1 MHz
(3) 100 kHz
(4) 10 kHz
(5) 1 kHz
(6) 0.1 kHz
(7) Function 1
(8) Function 2
(9) Function 3
(10) Function 4
(11) Function 5

(12) Function 6
(13) Function 7
(14) Function 8
(15) Function 9
(16) Function 10

The FREQUENCY/MEGACYCLES gating pulses are for reading out the six codes for the six digits on this front panel display. Function 1 through 10 gating pulses are for reading out a variety of codes and these vary from receiver to receiver. Specifically, for the ID-1600/UR, function #4, 5, 6, and 10 gating pulses are used; function #1, 2, 3, 7, 8 and 9 pulses are not used. Chassis wiring is of universal design and includes receptacles and sockets for the full complement of drivers and display units for all ten readout functions. At the beginning of the cycle, A7 produces eight shifts (or gating pulses) and triggers shift register A6. A6 then proceeds to produce eight more shifts to make the total sixteen.

There are three types of displays on the ID-1600/UR front panel: (1) a digital readout display, (2) lamp display, and (3) a projection readout display. The six digital readout (FREQUENCY/MEGACYCLES) displays (DS10, 11, 13, 14, 15 and 16) are driven by six BCD* decoders: ZX10, 11, 13, 14, 15 and 16. The decoders, in turn, receive a BCD input from the frequency gating circuits, A5 and A4. The resulting output from a decoder is one ground signal; this ground forms a return for +200V through a 0-9 digit-shaped filament in the indicator. Lamp DS12 forms the decimal point in this display and is on all the time. The nine-lamp display, to the right of the digital readout, is for a variety of information and panel lettering varies on different models. The specific panel lettering for the ID-1600/UR is shown in figure 5-4. Each lamp is individually controlled by a ground signal from lamp driver A3. Directly below the digital readout, on the front panel, is the projection readout display group. This group has spaces (and sockets) in it for nine indicator units, DS17 through DS25. Each indicator unit is driven by a P/C board driver (A11 through A19). Drivers and projection readout pairs may be a 12-position type (for a receiver control of up to 12 positions) or a dual 4-position type (for two receiver controls of up to 4 positions each). Panel lettering will also vary from model to model. Specifically, for the ID-1600/UR, three of the nine spaces are utilized; these are:

Function	Pos. Type	Driver	Readout Unit	Panel Lettering
4	12-pos.	A16	DS20	MODE
5	dual-4	A15	DS21	AGC TIME, CONSTANT SYM/B2-B1
6	dual-4	A14	DS22	AGC TIME, CONSTANT A1-A2

*binary coded digit

Drivers A11, 12, 13, 17, 18 and 19 and readout indicators DS17, 18, 19, 23, 24 and 25 are not included in the make-up of the ID-1600/UR, although sockets are present in the universal wiring. Each driver receives a code and (upon the receipt of its gating pulse) presents one ground signal to its indicator. The indicator contains a grid of lamps, one for each input. The lamp receiving the ground lights and (via an individual projection lens and film in front of it) casts the image of the film onto the indicator's projection screen.

The final code to arrive in the cycle (table 1-3) is for receiver identification. This code, representing a 1-10 figure, is gated from driver A1 (in the ID-1600/UR configuration) to produce a ground from one of its outputs to one of the ten lamps in Indicator Panel SB-3230/UR.

Information in one code is often for more than one display. The digital readouts always use bits #2-5. Bit #1 of these first six codes, however, drives other displays. Reference to table 1-3 will show these specific cases for the ID-1600/UR configuration. It may be seen, as in the case of the 10 MHz and 1 MHz code transmissions, that significant information is contained in the polarity relationship of bit #1 in two successive codes.

In the case of codes intended for dual 4-position indicators (the AGC TIME CONSTANT displays), one code contains information for two receiver controls. A two-bit code for each control depicts one of four possible positions for the control. In the SYM/B2-B1 display, bits #2 and 3 represent the SYM/B2 control and bits #4 and 5 represent the B1 control. In the same manner, in the A2-A1 display, bits #2 and 3 represent A2 and bits #4 and 5 represent A1.

The "E" teletype character (table 1-3) is the first to arrive in each readback cycle and functions to reset ID-1600/UR circuitry for the new cycle. The E code (10000) causes an "E" pulse to issue from pin 2 of A8 to pin R of shift-register A7, setting it for the new cycle.

The bit shift-register in timing circuit A9 is so arranged as to allow ten shifts (in a time interval of 135* milliseconds) for the passage of each code. This corresponds with the time required for a standard 8-level transmission and adapts the ID-1600/UR to operate from a 7-level or 8-level teletype linkage, if 5-level is not available. In all cases, pulse widths in the shift register are 13.5 milliseconds each, for receiving a 75-baud (100 WPM) transmission.

*220 and 22 milliseconds for 60 WPM equipment.

SECTION V
MAINTENANCE

5-1. LOGICAL TROUBLESHOOTING PROCEDURE

a. INTRODUCTION. The procedure described in this section is aimed at directing the troubleshooter to the faulty component, connection or wire by logical choice in as few steps as possible. The basis for the steps is the structure of the console. The console is divided into three modular units, each unit having a unique and independent function (i.e., programming or readback). The ID-1600/UR and C-7775/UR modular units are further subdivided into removable plug-in P/C (printed circuit) boards and other subassemblies. In the troubleshooting procedure, a faulty subassembly can be removed and replaced quickly, placing the AN/URA-63 back in operation. Troubleshooting and repair of the removed subassembly can then be continued at a different time or locality, if necessary. In troubleshooting an AN/URA-63, there are five basic steps to be taken. These are:

(1) Symptom recognition.
(2) Symptom elaboration.
(3) Determining the faulty modular unit.
(4) Localizing the faulty subassembly within the unit.
(5) Localizing the faulty component within the subassembly.

b. SYMPTOM RECOGNITION. At the first sign of trouble, it is important to determine whether or not it is the AN/URA-63 that is giving the trouble or some associated equipment (i.e., the remote receiver, teletype linkage, the readback transmitter in the remote receiver, etc.)

c. SYMPTOM ELABORATION. After it has been determined that the AN/URA-63 is at fault, the symptom should be examined more closely. Using the keyboard in the Programmer, and referring to the operating procedures in Section 3, experiment with all of the buttons in order to define which area is giving trouble.

d. DETERMINING THE FAULTY MODULAR UNIT. When the area of the trouble has been defined, refer to table 5-1, Troubleshooting Chart. This chart will serve as an aid to determine whether it is a programming or readback problem and in identifying the faulty modular unit.

e. LOCALIZING THE FAULTY SUBASSEMBLY WITHIN THE MODULAR UNIT. When the modular unit has been discovered, it may be left in the console for purposes of system troubleshooting or it may be removed for "bench test" troubleshooting. In either case, reference to either the "programming functional description" or the "readback functional description" in Section IV should reveal the faulty subassembly, P/C board, or wiring connection area. Subassemblies may be located by referring to major component location diagrams for each modular unit in Section 5.

It should be pointed out here, that a quick short-cut can be performed in this step by using spare plug-in subassemblies for a "substitution check" to reveal the faulty one.

f. LOCALIZING THE FAULTY COMPONENT WITHIN THE SUBASSEMBLY OR AREA. When the faulty subassembly has been discovered, it is generally expeditious at this time to replace it from the spares supply. Further troubleshooting of the subassembly may then be performed in a modular unit at a different site or time.

5-2. OPERATIONAL CHECK OF PROGRAMMER (C-7775/UR)

The programmer output codes are conventional teletype characters, therefore when a teletypewriter is coupled to the programming through a dc loop, the output codes may be observed, in the form of the equivalent ITY characters.

PROCEDURE:

(1) Remove remote dc loop plug, connected to jack J2.
(2) Connect local 20 ma or 60 ma dc loop (depending on the system) to dc loop jack J2.
(3) Connect appropriate teletypewriter to output of dc loop.
(4) Refer to table 1-2, pushbutton codes and, depress buttons on front panel of programmer. Check output codes on teletypewriter, by referring to equivalent CCIT TTY character column in table 1-2.

5-3. OPERATIONAL CHECK OF READBACK INDICATOR (ID-1600/UR)

The input codes to the readback indicator are also conventional teletype characters, therefore when the appropriate teletypewriter is coupled to the readback indicator (through a dc loop) the operation of the front panel displays may be observed.

PROCEDURE:

(1) Remove the dc loop connected to jack J2 of readback indicator.
(2) Connect a local 20 ma or 60 ma dc loop (depending on the system) to jack J2 of the readback indicator.
(3) Connect other end of dc loop to an appropriate teletypewriter.
(4) Refer to programming table 5-2 and depress the appropriate keys on the teletypewriter. The keys must be depressed in the numerical order shown in table 5-1, starting with character 1 and ending with character 17.
(5) Observe output display on front panel of the readback indicator.

5-4. FUSE REPLACEMENT

Front panel AC LINE indicator-fuse pairs are for instant notification of a short in the ac line input to each modular unit. A light in the fuse cartridge holder cap indicates a blown fuse. SPARE fuse holders on the front panel contain spare fuse cartridges for replacement. Power supply circuitry beyond the ac input (of each modular unit) includes a short proof feature, therefore the indicated short can only occur in the ac input section. Before replacing the fuse cartridge, pull out the unit on its drawer slides and inspect the POWER switch wiring and the power transformer for possible cause.

5-5. PREVENTIVE MAINTENANCE

In order to prevent equipment failure due to dust, dirt or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

At periodic intervals, the equipment should be removed from its mounting for cleaning and inspection. The wiring and all components should be inspected for dirt, dust, corrosion, grease or other harmful conditions. Remove dust with a soft brush or vacuum cleaner. Remove dirt or grease with any suitable cleaning solvent. Use of carbon tetrachloride should be avoided due to its highly toxic effects. Trichlorethylene or methylchloroform may be used, providing the necessary precautions are observed.

WARNING

When using toxic solvents, make certain that adequate ventilation exists. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with skin. Flammable solvents shall not be used on energized equipment or near any equipment from which a spark may be received. Smoking, "hot work", etc. is prohibited in the immediate area.

CAUTION

When using trichlorethylene, avoid contact with painted surfaces, due to its paint removing effects.

a. LUBRICATION OF PROGRAMMER (C-7775/UR). Inspect pushrods and linkage of the front panel buttons, monthly, to make sure no grease or dirt has accumulated. If grease or dirt is observed, clean thouroughly, with methylchloroform, using caution. After cleaning the linkage, apply a light machine oil sparingly. If the linkage remains free of grease and dirt for six months or more, apply a light machine oil sparingly at six month intervals. Lubricate slide of programmer and readback indicator drawers with a heavier grade of machine oil at six month intervals.

b. CLEANING OF AIR FILTER ON READBACK INDICATOR. Remove air filter from rear panel of readback indicator, and wash in a cleaning agent at about 3 month intervals. Make sure filter is dry and replace.

TABLE 5-1. TROUBLESHOOTING CHART, AN/URA-63

Symptom	Functional Section Indicated
DECODER POWER lamp is out but new programming of receiver fails to bring a change on display of ID-1600/UR panel.	Readback (ID-1600/UR)
Lamps 1-10 on SB-3230/UR panel all extinguished.	Readback (ID-1600/UR)
One lamp in 1-10 display on SB-3230/UR panel fails to light.	Readback (SB-3230/UR)
ID-1600/UR EQUIPMENT SELECTED lamp fails to light after C-7775/UR EQUIPMENT SELECTOR buttons are pushed.	Programming (C-7775/UR)
ID-1600/UR FAULT lamp does not light, although FREQUENCY/MEGACYCLES readback cannot be made to match programmed figures.	Readback (ID-1600/UR)
A particular pushbutton on the C-7775/UR fails to bring results as evidenced in the readback.	Programming (C-7775/UR)
ID-1600/UR EQUIPMENT SELECTED lamp lights but C-7775/UR TUNE pushbutton fails to precipitate tuning in receiver as evidenced in readback display.	Programming (C-7775/UR)

TABLE 5-2. READBACK TEST CODE CHART

1. Reset - 10000--E

*2. 10 MHz Switch
0-01111--V/Ltrs
1-00111--M/X
2-01011--G/Fig
3-00011--O/B

*3. 1 MHz Switch
0-01111--V/Ltrs
1-00111--M/X
2-01011--G/Fig
3-00011--O/B
4-01101--P/Q
5-00101--H/Y
6-01001--L/W
7-00001--T/Z
8-01110--C/K
9-00110--N/F

*Note: Receiver tune status is contained in codes for 10 and 1 MHz switches. Various Bit 1 combinations in the Codes for #2 and #3 will give the following indications.

#2	#3	Indication
1	0	Tuning
0	1	Ready
1	1	Fault

4. 100 kHz Switch (same codes as #3)
Bit 1 Information--Equip. Select
ON 1 OFF 0

5. 10 kHz Switch (same codes as #3)
Bit 1 Information--Decoder Power
ON 1 OFF 0

6. 1 kHz Switch (same codes as #3)
Bit 1 Information--Non Automatic
ON 1 OFF 0

7. .1 kHz Switch (same codes as #3)
Bit 1 Information--AFC Alarm
ON 1 OFF 0

8. HFRR Function
Synth--ON 11000--A
Synth--OFF 01110--C

9. AFC-ON 11000--A
AFC-OFF 01110--C

10. Blank

11. MSAR Mode
2.5 kHz AM-01111--V
6 kHz AM-00111--M
2.5 kHz CW-01011--G
6 kHz CW-00011--O
ISB -01101--P

12. MSAR AGC Time Constant

B2	B1	Code
Slow	Slow	01111--V
Slow	Med	01101--P
Slow	Fast	01110--C
Med	Slow	00111--M
Med	Med	00101--H
Med	Fast	00110--N
Fast	Slow	01011--G
Fast	Med	01001--L
Fast	Fast	01010--R

13. MSAR Time Constant
A2 A1
Same as #12

14. Blank on TTY CLEAR under normal operation

15. Blank on TTY CLEAR under normal operation

16. Blank on TTY CLEAR under normal operation

17. Receiver Identification (RSSA-10)
1-01111--V
2-00111--M
3-01011--G
4-00011--O
5-01101--P
6-00101--H
7-01001--L
8-00001--T
9-01110--C
10-00110--N

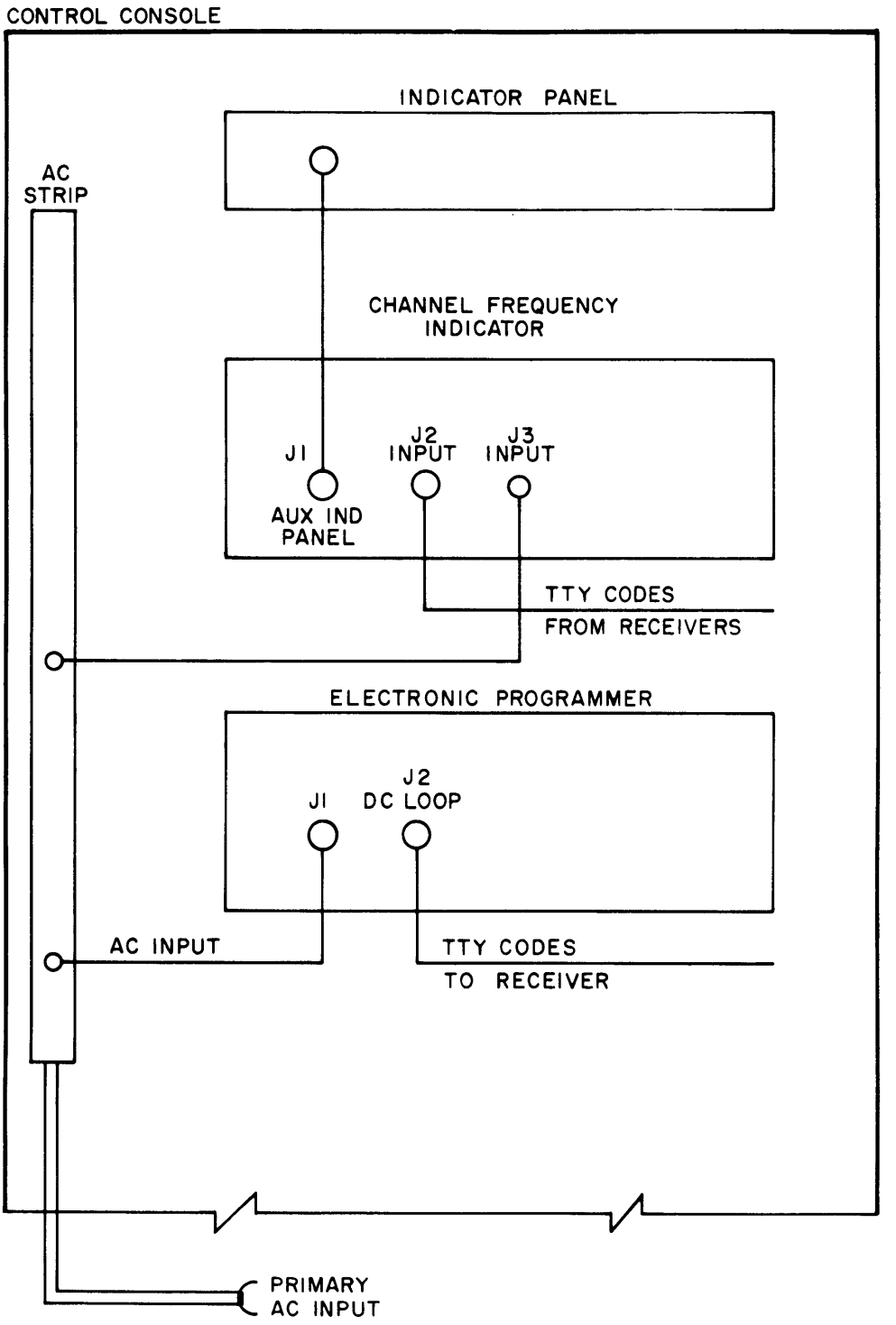


Figure 5-1. Cable Connecting Diagram of Communications Control Console

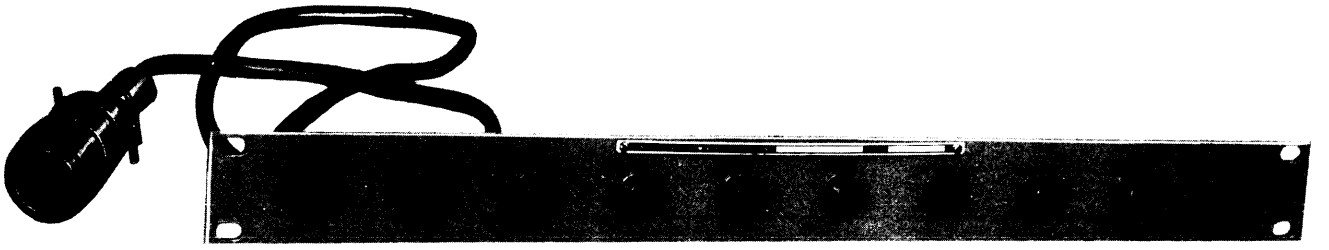


Figure 5-2. Component Locations, Front View of Indicator Panel, SB-3230/UR

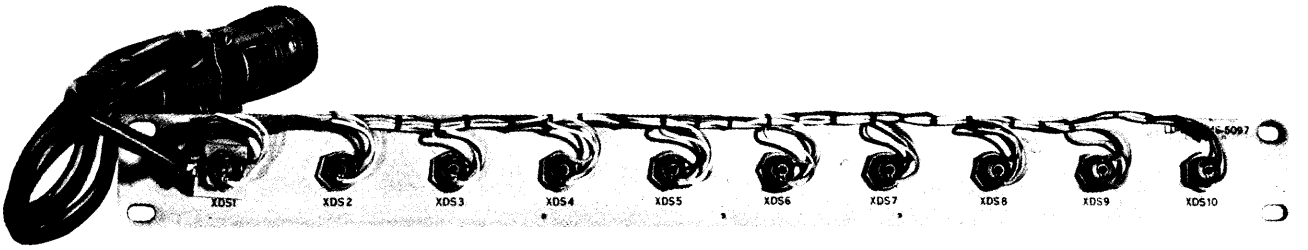


Figure 5-3. Component Locations, Rear View of Indicator Panel, SB-3230/UR

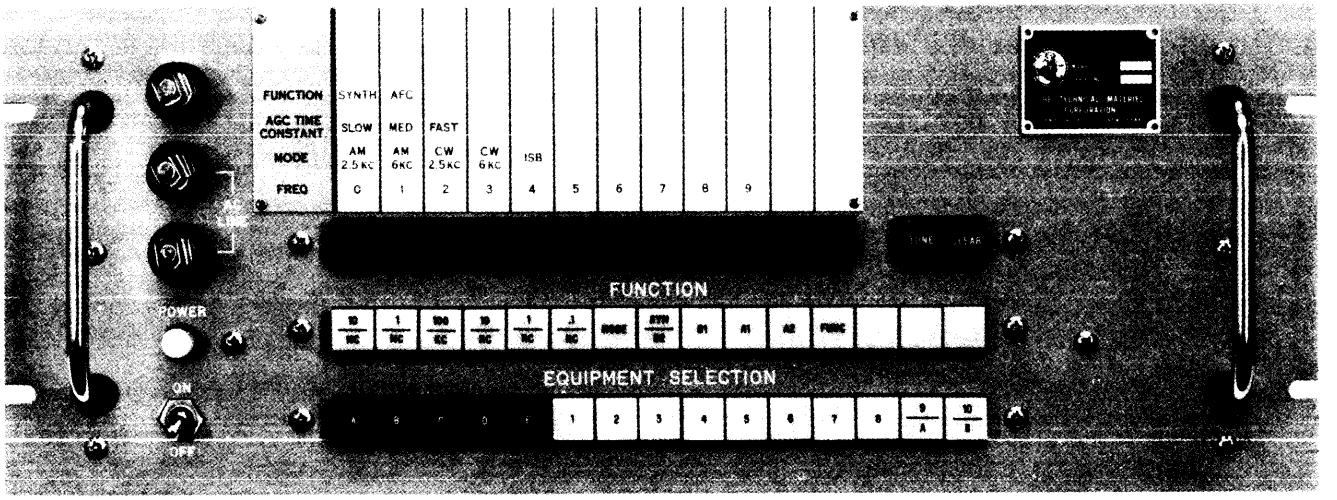


Figure 5-4. Component Locations, Front Panel of Programmer, C-7775/UR

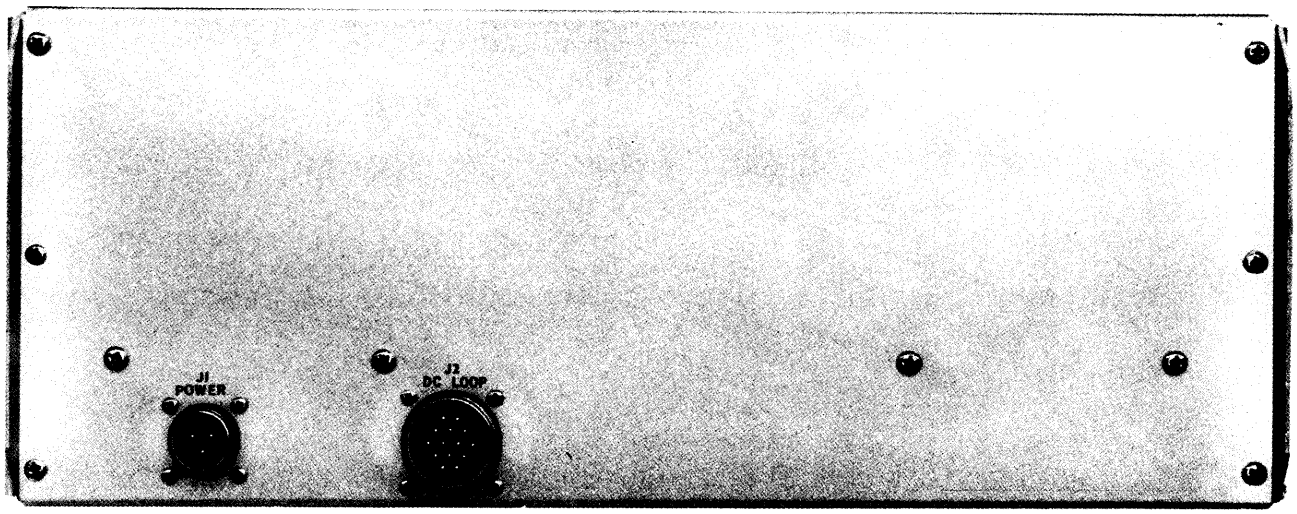


Figure 5-5. Component Locations, Rear Panel View of Programmer, C-7775/UR

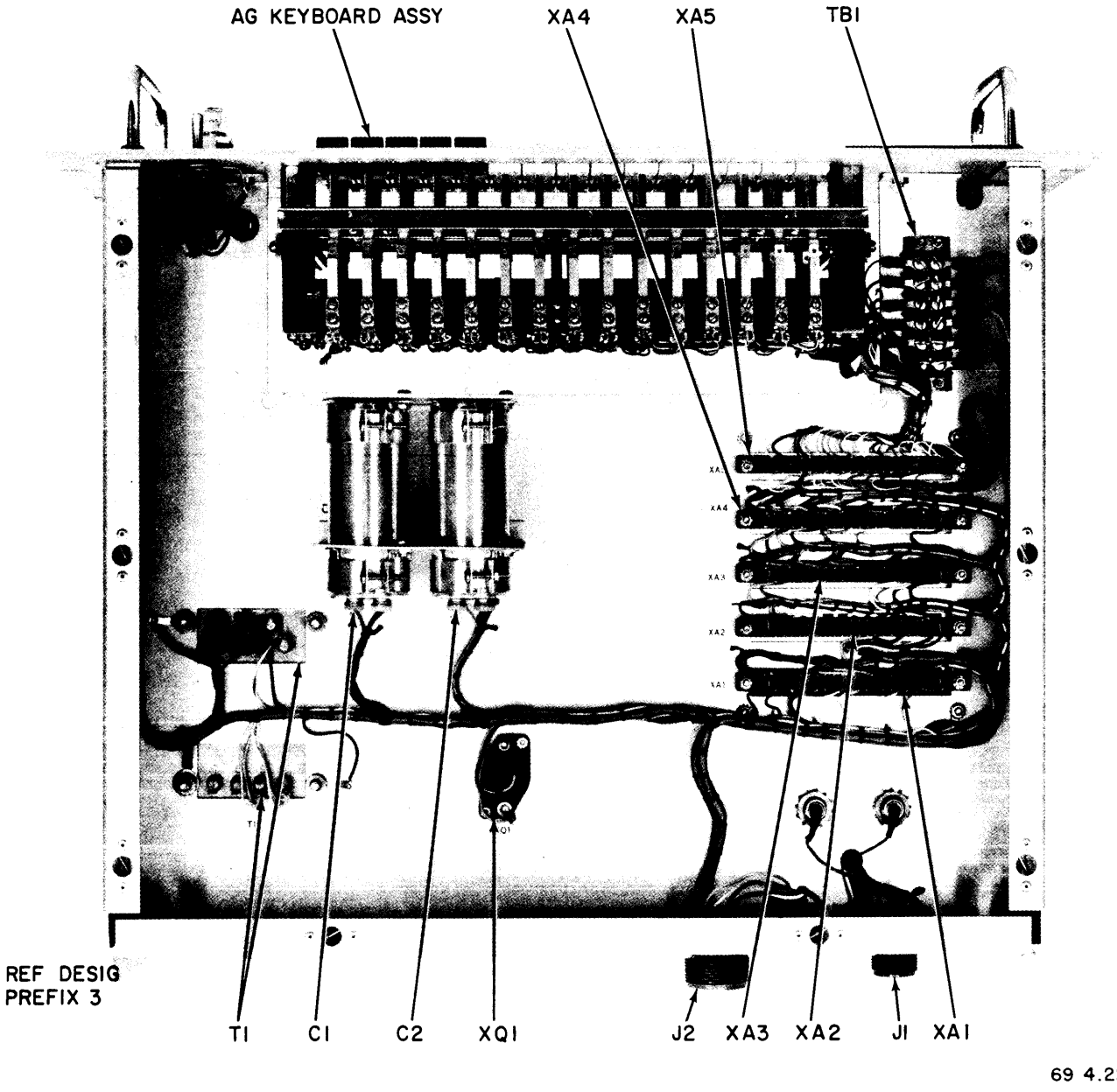


Figure 5-6. Component Locations, Bottom View of Programmer, C-7775/UR

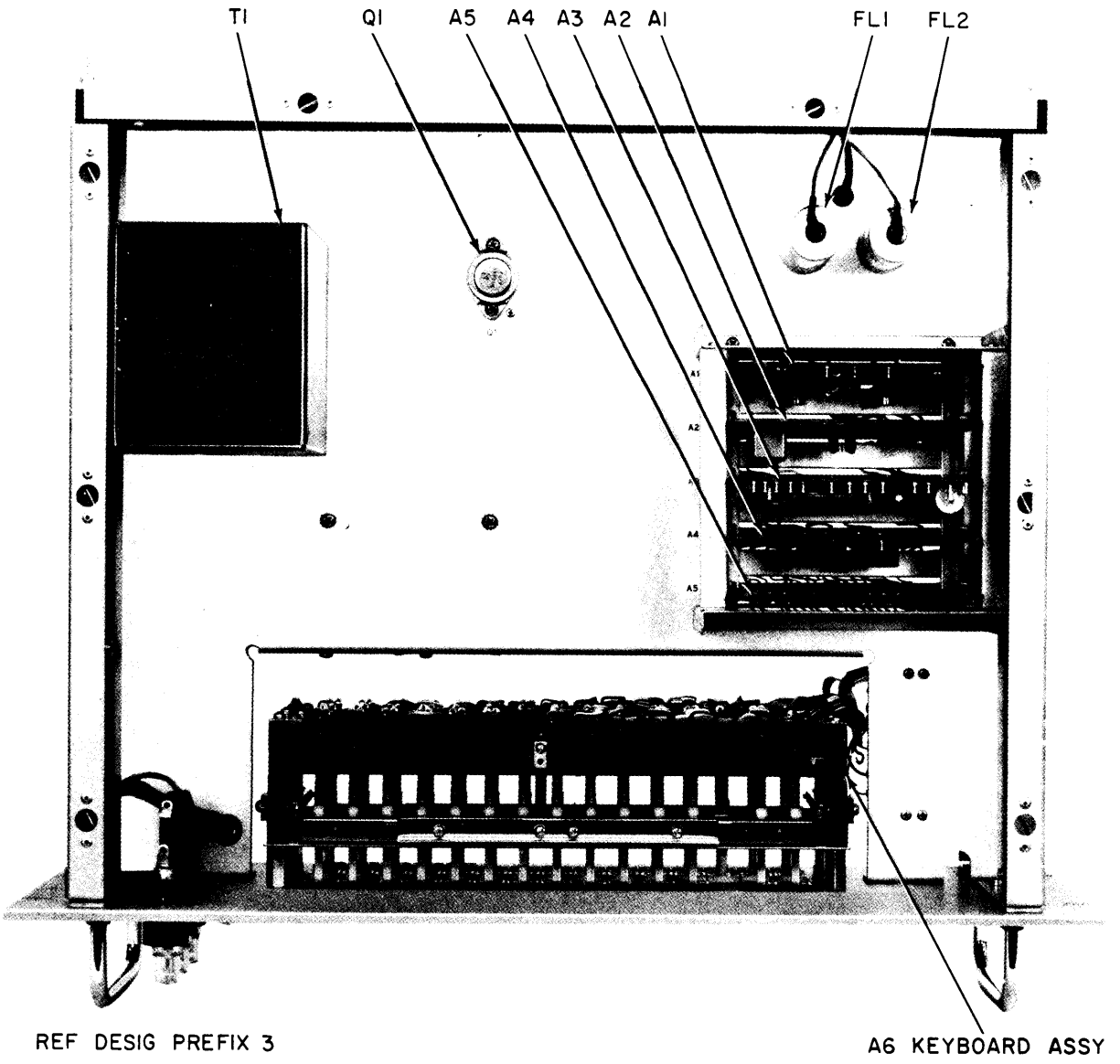


Figure 5-7. Component Locations, Top View of Programmer, C-7775/UR

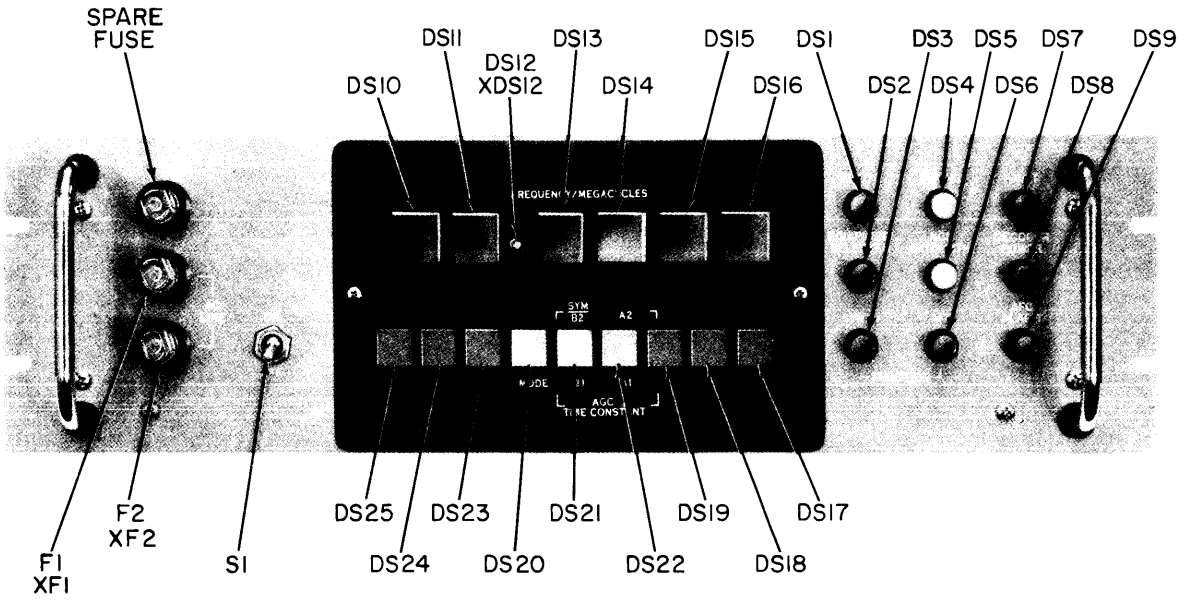


Figure 5-8. Component Locations, Front Panel View of Readback Indicator, ID-1600/UR

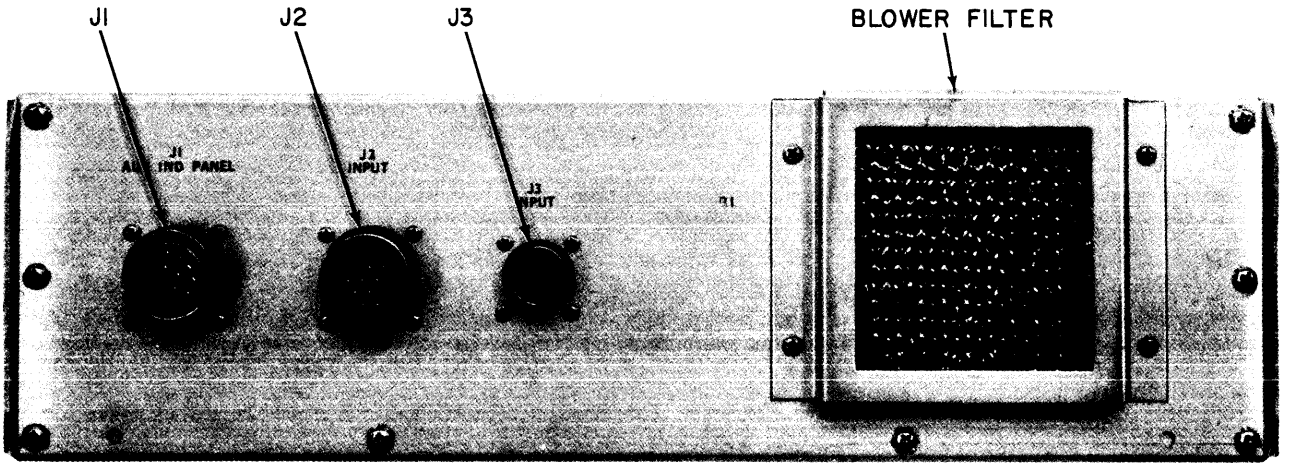


Figure 5-9. Component Locations, Rear Panel View of Readback Indicator, ID-1600/UR

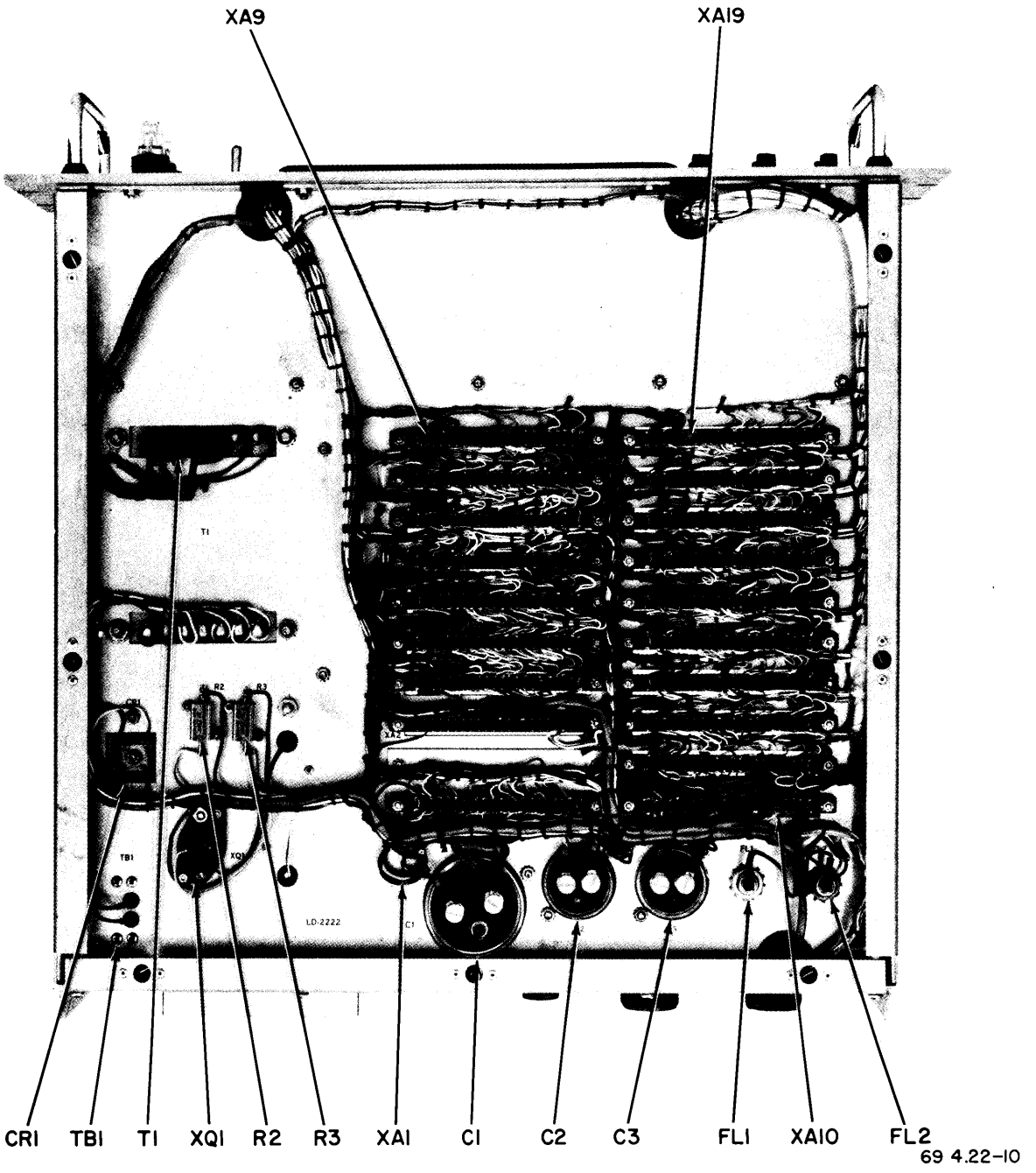
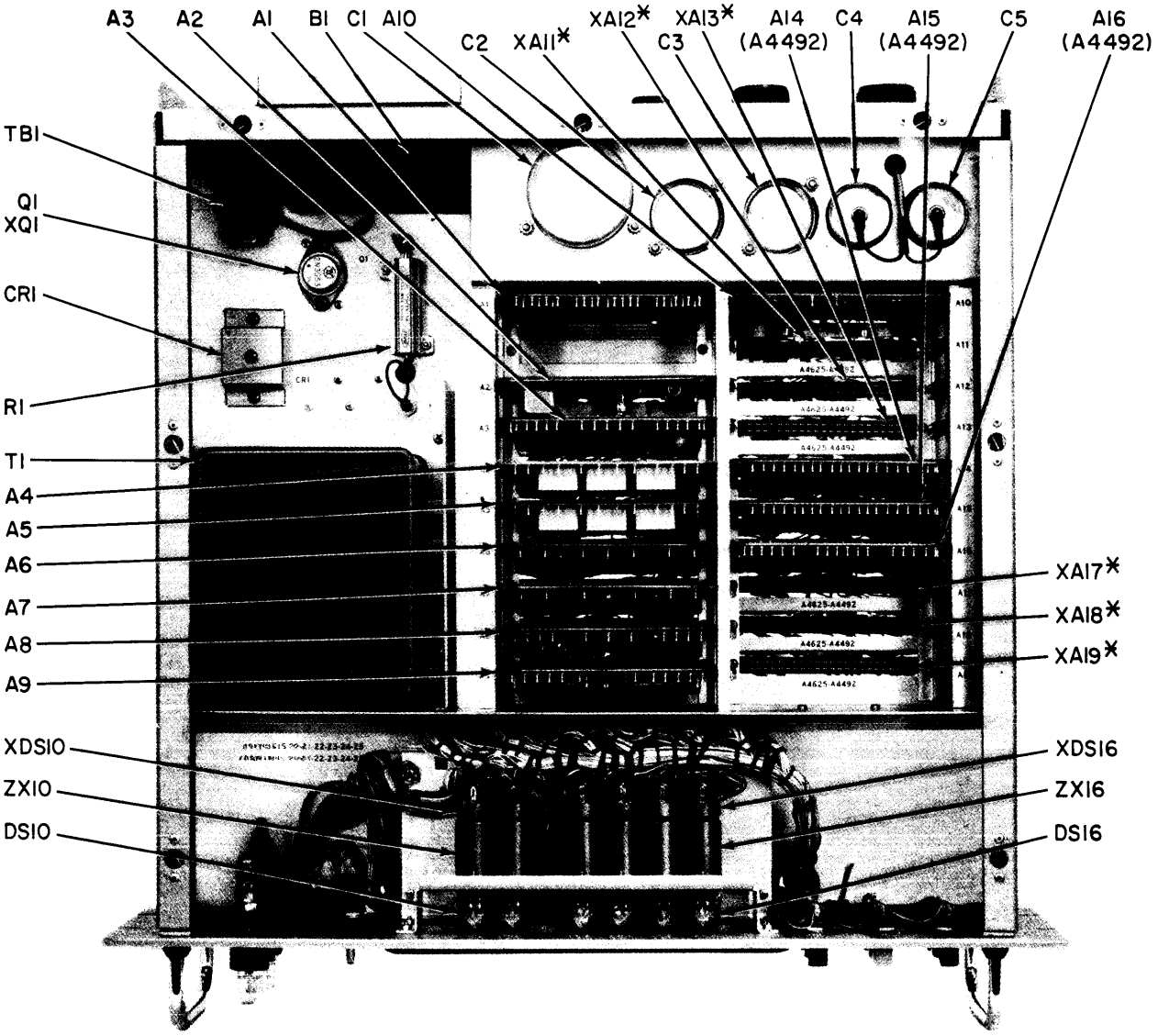


Figure 5-10. Component Locations, Bottom View of Readback Indicator, ID-1600/UR



REF DESIG PREFIX 2 * SOCKET NOT USED

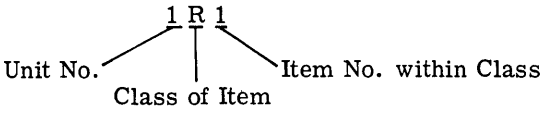
Figure 5-11. Component Locations, Top View of Readback Indicator, ID-1600/UR

SECTION VI
PARTS LIST

6-1. INTRODUCTION

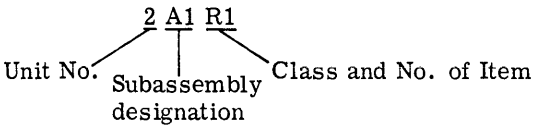
a. REFERENCE DESIGNATIONS. The unit numbering method of assigning reference designations has been used to identify units, assemblies, subassemblies and parts of the AN/URA-63 Communications Control Console. This method has been expanded as much as necessary to adequately cover the various degrees of subdivision of the equipment. Examples of this unit numbering method and typical expansions of the same are illustrated by the following:

Example 1:



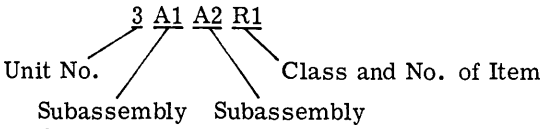
Read as: First (1) resistor (R) of first unit (1) of AN/URA-63.

Example 2:



Read as: First (1) resistor (R) of first (1) subassembly (A) of second (2) unit of AN/URA-63.

Example 3:



Read as: First (1) resistor (R) of second (2) subassembly (A) of first (1) subassembly (A) of third (3) unit of AN/URA-63.

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

6-2. LIST OF UNITS

Table 6-1 is a listing of the modular units comprising Control Console AN/URA-63. The units are listed by unit numbers in numerical order for each set. Thus when the complete reference designation of a part is known, the table will furnish the identification of the unit in which the part is located, since the first number of a complete reference designation identifies the unit. Table 6-1 also provides the following information for each unit listed: (1) quantity per equipment, (2) official name, (3) designation, (4) colloquial name, and (5) location of the first page of its parts listing in table 6-2.

6-3. MAINTENANCE PARTS LIST

Table 6-2 is a listing of maintenance parts in each modular unit. Parts are listed in unit numbering order. Where an identical unit is used more than once, one table serves for all units. The complete reference designations are listed in the REF DESIG column, with the omission of the unit prefix number. The unit prefix number(s) are shown at the head of each unit list.

Some small subassemblies are recommended by the manufacturer as non-reparable from a labor or re-alignment cost analysis comparison to the cost of replacing the subassembly. These subassemblies are so noted in the NAME AND DESCRIPTION column and their parts are not included in the list. Other subassemblies are partially reparable, from this point of view. Partially reparable subassemblies are symbolized as "PR" in the NOTES column; their parts are included in the list. Parts that are replaceable are symbolized "R"; parts that are not replaceable are symbolized "NR".

TABLE 6-1. LIST OF UNITS

Unit	Qty	Name of Unit	Designation	Colloquial Name	Page
1	1	Indicator Panel	SB-3230/UR	Indicator Panel, Model RSSA-10	6-3
2	1	Indicator, Channel-Frequency	ID-1600/UR	Channel-Frequency Indicator, Model RTIH-3	6-4
3	1	Programmer, Electronic Command Signal	C-7775/UR	Programmer, Model RTPH-3	6-14

TABLE 6-2. MAINTENANCE PARTS LIST

(To Be Supplied)

REF DESIG	NOTES	NAME AND DESCRIPTION	FIC NO.
1		RSSA-10, PANEL, INDICATOR: SB 3230/UR Model RSSA-10 is used in conjunction with RTIH-3 to identify specific receivers represented in the RTIH-3.	
DS1		LAMP, INCANDESCENT: Single contact, T-1-3/4 base, 28 v ac or dc, 0.04 amps. 82679 Dwg BI110-7, 08806 P/N 327.	
DS2 thru DS10		SAME AS DS1.	
XDS1		LIGHT, INDICATOR: white lens cap, engraved black "1", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W1B.	
XDS2		LIGHT, INDICATOR: white lens cap, engraved black "2", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS107R1W2B.	
XDS3		LIGHT, INDICATOR: white lens cap, engraved black "3", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg 82679 P/N TS187R1W3B.	
XDS4		LIGHT, INDICATOR: white lens cap, engraved black "4", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W4B.	
XDS5		LIGHT, INDICATOR: white lens cap, engraved black "5", hole mounting socket solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W5B.	
XDS6		LIGHT, INDICATOR: white lens cap, engraved black "6", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W6B.	
XDS7		LIGHT, INDICATOR: whie lens cap, engraved black "7", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W7B.	
XDS8		LIGHT, INDICATOR: white lens cap, engraved black "8", hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W8B.	
XDS9		LIGHT, INDICATOR: white lens cap, engraved black "9" , hole mounting socket with solder lug terminals. 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W9B.	
XDS10		LIGHT, INDICATOR: white lens cap, engraved black "10", hole mounting socket with solder lug terminals 0.550 in. dia by 1.279 in. lg. 82679 P/N TS187R1W10B.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
2		RTIH-3, INDICATOR, CHANNEL-FREQUENCY: ID-1600/UR. Monitor unit for remote tuning system which has control positions.	
A1		CIRCUIT CARD ASSEMBLY: 4 capacitors, 11 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4494.	
A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 relay, 1 transistor, 4 semiconductors, plug-in type; 4.375 in. lg by 4.125 in. wd by 0.375 in. hg. 82679 P/N A4494.	
A3		CIRCUIT CARD ASSEMBLY: 1 resistor, 1 capacitor, 14 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4531.	
A4		CIRCUIT CARD ASSEMBLY: 15 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4493.	
A5		SAME AS A4.	
A6		CIRCUIT CARD ASSEMBLY: 12 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4493.	
A7		SAME AS A6.	
A8		CIRCUIT CARD ASSEMBLY: 2 capacitors, 1 resistor, 14 integrated circuits, 4 semiconductors, plug-in type; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 A4530.	
A9		CIRCUIT CARD ASSEMBLY: 5 resistors, 3 capacitors, 10 integrated circuits, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4496.	
A10		CIRCUIT CARD ASSEMBLY: 17 resistors, 4 capacitors, 2 integrated circuits, 4 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4545.	
A11		NOT USED.	
A12		NOT USED.	
A13		NOT USED.	
A14		CIRCUIT CARD ASSEMBLY: 4 capacitors, 9 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4625.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
J3		CONNECTOR: MIL type MS3102A16S5P.	
Q1		TRANSISTOR: MIL type 2N3055.	
R1		RESISTOR: MIL type RE75GR2501.	
R2		RESISTOR: MIL type RE65GR2501.	
R3		SAME AS R2.	
S1		SWITCH: MIL type ST22K.	
T1		TRANSFORMER, POWER, STEP-UP, STEP DOWN: primary; 115/230V, 50/60 cps, 1 phase: secondary; 20v, 6A DC, 20v, 600 MADC, 280v CT, 25 MADC, 15v, 65 MADC. Hermatically sealed metal case, stud mounted. 13 solder stud terminals. 5.000 in. lg by 4.375 in. wd by 3.750 in. hg. 82679 P/N TF355.	
TB1		TERMINAL BOARD: barrier type; two 6-32 thd single screw lugs. Phenolic body 0.406 in. by 0.875 in. by 1.500 in. Dwg TM100-2, 86178 P/N 2-164YD.	
XA1		CONNECTOR, RECEITACLE, ELECTRICAL: 22 double sided female contacts rated at 5 amps and 1,800 v RMS. Phenolic housing with floating bushing and eyelet termianls. Accepts printed circuit board thickness of 0.054 in.. to 0.071 in. 82679 P/N JJ319-22-DFE.	
XA2 thru XA19		SAME AS XA1.	
XDS1		LIGHT INDICATOR: Green lens. 1.35 to 28v. T=1-3/4 lamp base. 2 terminals. 0.437 in. dia by 1.500 in. lg. Dwg TS153-9, 72619 P/N 162-8430-1472-502.	
XDS2		SAME AS XDS1.	
XDS3		SAME AS XDS1.	
XDS4		LIGHT, INDICATOR: yellow lens, 1.35 to 28v. T-1-3/4 lamp base, 2 terminals. 0.437 in. dia by 1.500 in. lg. Dwg TS153-10, 72619 P/N 162-8430-1473-502.	
XDS5		SAME AS XDS4.	
XDS6		SAME AS XDS1.	
XDS7		LIGHT, INDICATOR: Red lens. 1.35 to 28V. T=1-3/4 lamp base. 2 terminals. 0.437 in. dia by 1.500 in. lg. Dwg TS153-502, 72619 P/N 162-8430-1471-502.	
XDS8		SAME AS XDS7.	
XDS9		SAME AS XDS7.	
XDS10		SOCKET, ELECTRON TUBE: 14 silver plated beryllium copper contacts. 1.562 in. lg by 0.750 in. wd by 0.646 in. hg. Dwg TS192, 83594 P/N SK136.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A15		SAME AS A14.	
A16		SAME AS A14.	
B1		FAN, AXIAL: 115 VAC, 50/60 Hz, CMF=45 at 60 Hz free delivery. Plastic blade, aluminum housing with black enamal finish. 3.625 in. by 3.625 in. by 1.500 in. o/a. 82679 P/N BL131.	
C1		CAPACITOR, FIXED, ELECTROLYTIC: 1200 uf, 40 wvdc, 2.063 in. dia by 4.500 in. lg. Dwg CE112-12, 80183 P/N 36D123G040BC2A.	
C2		CAPACITOR, FIXED, ELECTROLYTIC: 2600 uf, 50 wvdc, 1.438 in. dia by 3.500 in. lg. Dwg CE112-6, 80183 P/N36D262G050AB6B.	
C3		CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, 450 wvdc, 1.438 in. dia by 3.500 in. lg. Dwg CE112-13, 80183 P/N 36D101G450AB6A.	
CR1		NOT USED.	
CR2		SEMICONDUCTOR DEVICE, DIODE: MIL type 1N3015B.	
DS1		LAMP, INCANDESCENT: single contact, T- 1 3/4 base, 28 v ac or dc, 0.04 amps. Dwg BI110-7, 08806 P/N 327.	
DS2 thru DS8		SAME AS DS1.	
DS9		NOT USED.	
DS10		INDICATOR, DIGITAL DISPLAY: displays numerals 0 thru 9, minimum supply voltage 170 vdc, 14 pin type terminals. 1.020 in. dia by 1.120 in. hg from mtg surface. 82679 P/M BI118.	
DS11		SAME AS DS10.	
DS12		LAMP, GLOW: 110-125 vac, cylindrical clear lens. 0.284 in. dia by 1.328 in. lg. Dwg BI119-HL7. 72619 P/N 507-3836-1531-600.	
DS13 thru DS16		SAME AS DS10.	
F1		FUSE, CARTRIDGE TYPE: 0.5 amp, 125 v. 0.250 in. dia by 1.250 in. lg. Dwg FU102-.5, 71400 P/N MDL-1 1/2.	
F2		SAME AS F1.	
J1		CONNECTOR: MIL type MS3102A20-29S.	
J2		CONNECTOR: MIL type MS3102A20-27P.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
XDS11 thru XDS16		SAME AS XDS10.	
XF1		FUSEHOLDER, LAMP INDICATING: 15 amps, neon lamp, clear knob, accomocates 1/4 in. dia by 1.250 in. lg fuse. Dwg FH104-3, 71400 P/N HKL-X.	
XF2		SAME AS XF1.	
Z1		VOLTAGE REGULATOR: input voltage 40 v; output voltage 30 v; power dissipation 400 ma. 0.330 in. dia by 0.500 in. lg. 82679 P/N VR104.	
Z2		SAME AS Z1.	
ZX1 thru ZX9		NOT USED.	
ZX10		INTEGRATED CIRCUIT, DECODER: 200 $\pm$ 10VDC a6 4.0 ma. Provides circuitry for indicator, digital display. 12 pins. 0.989 in dia by 1.641 in. lg. 82679 P/N IC104.	
ZX11 thru ZX16		SAME AS ZX10.	
A10		CIRCUIT CARD ASSEMBLY: 17 resistors, 4 capacitors, 2 integrated circuits, 4 transistors, 2 semiconductors, plu-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4545.	
A10C1		NOT USED.	
A10C2		NOT USED.	
A10C3		CAPACITOR, FIXED, MICA: 47 uuf, $\pm$ 2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM11E470G5S.	
A10C4		SAME AS A10C3.	
A10CR1		RECTIFIER, SEMICONDUCTOR DEVICE: peak reverse v, 260 v. 1.50 vdc output current, 0.688 in. wd by 0.469 in. hg by 0.250 in. thk. 82679 P/N DD130-200-1.5.	
A10CR2		RECITFIER, SEMICONDUCTOR DEVICE: 1.5 vdc output current, peak reverse v, 600 v. 0.688 in. hg by 0.250 in. thk. 82679 P/N DD130-600-1.5.	
A10Q1		TRANSISTOR: MIL type 2N1485.	
A10Q2		TRANSISTOR: MIL type 2N4036.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A10Q3		SAME AS A10Q1.	
A10Q4		SAME AS A10Q2.	
A10R1		RESISTOR: MIL type RC20GF680J.	
A10R2		RESISTOR: MIL type RC20GF560J.	
A10R3		RESISTOR: MIL type RNG0D1802F.	
A10R4		RESISTOR: MIL type RC20GF471J.	
A10R5		RESISTOR: MIL type TC60D2701F.	
A10R6		RESISTOR: MIL type RC20GF101J.	
A10R7		SAME AS A9R5.	
A10R8		RESISTOR: MIL type RC32GF104J.	
A10R9		SAME AS A10R3.	
A10R10		SAME AS A10R5.	
A10R11		SAME AS A10R1.	
A10R12		SAME AS A10R2.	
A10R13		RESISTOR: MIL type RC20GF561J.	
A10R14		RESISTOR, FIXED, WIRE WOUND: 3 ohms, ± 5% tol, 5 watts. 0.250 in. dia by 1.000 in. lg,wire lead mounted. 82679 P/N RR114-3W.	
A10R15		SAME AS A2R6.	
A10R16		RESISTOR: MIL type RC20GF1R0J.	
A10R17		SAME AS A10R16.	
A2		CIRCUIT CARD ASSEMBLY: 6 resistors, 3 capacitors, 1 relay, 1 transistor, 4 semiconductors, plug-in type; 4.375 in. lg by 4.125 in. wd by 0.375 in. hg. 82679 P/N A4494.	
A2C1		CAPACITOR, FIXED, MICA: 1,000 uuf, ± 1/2% tol, 100 wvdc. 0.640 in. lg by 0.591 in. wd by 0.198 in. thk. 82679 P/N CM11F102D1S.	
A2C2		CAPACITOR: MIL type RL65BG101KP3.	
A2C3		SAME AS A2C2.	
A2CR1		SEMICONDUCTOR DEVICE: MIL type 1N4245.	
A2CR2		SAME AS A2CR1.	
A2CR3		SAME AS A2CR1.	
A2CR4		RECTIFIER, SEMICONDUCTOR DEVICE: 1.5 vdc output current, 200 peak reverse v. 0.688 in. wd by 0.469 in. hg by 0.250 in. thk. 82679 P/N DD130-200-1.5.	
A2K1		RELAY, ARMATURE: mercury wetted contacts rated at 2 amps mac, 500 v max. 2 windings rated at 250 ohms each ± 10%. 2.063 in. lg by 0.625 in. hg by 0.625 in. wd. wire lead mounted. 82679 P/N RL167.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A2Q1		TRANSISTOR: MIL type 2N3013.	
A2R1		RESISTOR: MIL type RC20GF472J.	
A2R2		RESISTOR: MIL type RC20GF271J.	
A2R3		SAME AS A2R1.	
A2R4		RESISTOR, VARIABLE, COMPOSITION: 1,000 ohms, ± 10% tol, clockwise modified log tape. 0.500 in. lead mounted. 82679 P/N RV111-U-102A.	
A2R5		RESISTOR: MIL type RC32GF101J.	
A2R6		RESISTOR: MIL type RC42GF221J.	
A3		CIRCUIT CARD ASSEMBLY: 1 resistor, 1 capacitor, 14 integrated circuits; plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4531.	
A3C1		CAPACITOR, FIXED, ELECTROLYTIC: 20 uf, - 10% + 150% at 125 cps, 25°C, 50 wvdc. 0.312 in. dia by 0.750 in. lg. Dwg CE105-20-50, 14655 P/N NLW20-50.	
A3R1		RESISTOR: MIL type RC07GF182J.	
A3Z1 thru A3Z6		SAME AS A1Z1.	
A3Z7		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12v. 0.1875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-24.	
A3Z8		SAME AS A1Z1.	
A3Z9		INTEGRATED CIRCUIT, DIGITAL INVERTER: 11 pins, plastic case; supply voltage; variable by usage. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW150-4.	
A3Z10		SAME AS A1Z1.	
A3X11		SAME AS A1Z6.	
A3Z12		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-34.	
A3Z13		SAME AS A1Z6.	
A3Z14		INTEGRATED CIRCUIT, DIGITAL NOR GATE: 11 pins, plastic case; supply voltage, + and -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW145-61.	
A4		CIRCUIT CARD ASSEMBLY: 15 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4495.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A4Z1 thru A4Z15		SAME AS A1Z6.	
A6		CIRCUIT CARD ASSEMBLY: 12 integrated circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4493.	
A6Z1 thru A6Z8		SAME AS A1Z1.	
A6Z9		SAME AS A3Z7.	
A6Z10		INTEGRATED CIRCUIT, DIGITAL POSITIVE EMITTER FOLLOWER: 12 pins, plastic case; -6 vdc input, -6.7 output. 0.865 in. lg by 0.678 in. wd by 0.495 in. hg. 82679 P/N NW148.	
A6Z11		SAME AS A6Z10.	
A6Z12		SAME AS A3Z7.	
A7		SAME AS A6.	
A8		CIRCUIT CARD ASSEMBLY: 1 resistor, 1 capacitor, 14 integrated circuits; plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4531.	
A8C1		CAPACITOR, FIXED, MICA: 3,900 uuf, ± 2% tol, 500 wvdc, 0.680 in. lg by 0.540 in. wd by 0.270 in. thk. 82679 P/N CM112F392G5S.	
A8C2		CAPACITOR, FIXED, MICA: 1,000 uuf, ± 1% tol, 100 wvdc, 0.790 in. lg by 0.570 in. wd by 0.340 in. thk. 82679 P/N CM112F102F1S.	
A8R1		SAME AS A2R1.	
A8Z1		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW141-91.	
A8Z2 thru A8Z6		SAME AS A1Z1.	
A8Z7		INTEGRATED CIRCUIT, DIGITAL, SINGLE SHOT GENERATOR: 11 pins, plastic case; supply voltage, + and -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW153.	
A8Z8		INTEGRATED CIRCUIT, COMPLEMENTARY EMITTED FOLLOWER: 11 pins, plastic case; supply voltage; -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW147-2.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A8Z9		SAME AS A6Z10.	
A8Z10		SAME AS A1Z1.	
A8Z11 thru A8Z14		SAME AS A6Z10.	
A9		CIRCUIT CARD ASSEMBLY: 5 resistors, 3 capacitors, 10 integrated circuits, 4 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4496.	
A9C1		CAPACITOR, FIXED, PLASTIC: 1.8 uf, ± 5% tol, 0.656 in. dia by 1.250 in. lg. 82679 P/N CN112A185J.	
A9C2		SAME AS A9C1.	
A9C3		CAPACITOR, FIXED, MICA: 1500 pf, ± 1/2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679 P/N CM112F152D5S.	
A9CR1		SEMICONDUCTOR DEVICE: MIL type 1N914.	
A9CR2		SAME AS A9CR1.	
A9CR3		SAME AS A9CR1.	
A9CR4		SAME AS A9CR1.	
A9R1		RESISTOR, VARIABLE, WIRE WOUND: 500 ohms, ± 10% tol, 1/2 watt. 1.250 in. lg by 0.250 in. wd by 0.313 in. hg. wire lead mounted. 82679 P/N RV121-1-501.	
A9R2		RESISTOR: MIL type RC07GF472J.	
A9R3		RESISTOR: MIL type RC07GF122J.	
A9R4		SAME AS A9R3.	
A9R5		RESISTOR: MIL type RC32GF331J.	
A9Z1		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-34.	
A9Z2		SAME AS A1Z1.	
A9Z3		INTEGRATED CIRCUIT, DIGITAL DUAL INVERTER: 11 pins, plastic case; supply voltage, + an -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW150-2.	
A9Z4		SAME AS A8Z7.	
A9Z5		SAME AS A1Z1.	
A9Z6		SAME AS A1Z1.	
A9Z7		SAME AS A1Z1.	
A9Z8		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-43.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A9Z9		SAME AS A9Z8.	
A9Z10		SAME AS A9Z8.	
A1		CIRCUIT CARD ASSEMBLY: 4 capacitors, 11 integrated, circuits, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4492.	
A1C1		CAPACITOR, FIXED, CERAMIC: 1,000 uuf, GMV, 500 wvdc, 0.310 in. dia by 0.156 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-29.	
A1C2		SAME AS A1C1.	
A1C3		SAME AS A1C1.	
A1C4		SAME AS A1C1.	
A1Z1		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-34.	
A1Z2		SAME AS A1Z1.	
A1Z3		SAME AS A1Z1.	
A1Z4		SAME AS A1Z1.	
A1Z5		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW142-44.	
A1Z6		INTEGRATED CIRCUIT, DIGITAL FLIP-FLOP: 11 pins, plastic case; -4.5 v input, -9.5v output. 0.895 in. lg by 0.678 in. hg. 82679 P/N NW151.	
A1Z7		SAME AS A1Z5.	
A1Z8		SAME AS A1Z6.	
A1Z9		SAME AS A1Z6.	
A1Z10		SAME AS A1Z6.	
A1Z11		SAME AS A1Z5.	
A14		CIRCUIT CARD ASSEMBLY: 4 capacitors, 9 integrated circuits, plyg-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4625.	
A14C1		SAME AS A1C1.	
A14C2		SAME AS A1C1.	
A14C3		SAME AS A1C1.	
A14C4		SAME AS A1C1.	
A14Z1		SAME AS A1Z1.	
A14Z2		SAME AS A1Z1.	
A14Z3		SAME AS A1Z1.	
A13Z4		SAME AS A3Z7.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A14Z5		SAME AS A3Z7.	
A14Z6		SAME AS A3Z7.	
A14Z7		SAME AS A1Z1.	
A14Z8		SAME AS A1Z1.	
A14Z9		SAME AS A1Z6.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
3		RTPH-3, PROGRAMMER, ELECTRONIC COMMAND SIGNAL C-7775/UR. Model RTPH-3 allows one control location to take command over many receiver systems. Instructions are programmed by means of push buttons on the front of the unit. By various codes, systems are selected and their frequency tuned over a 2 to 32 Mhz range, accuracy to 100 cyles. Signal mode, AGC Time Constant are at the command of the control panel; selection of symmetrical mode, CW or independent sideband operation can be set by the RTPH unit.	
A1		CIRCUIT CARD ASSEMBLY: 22 resistors, 7 capacitors, 2 integrated circuits, 3 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4601.	
A2		CIRCUIT CARD ASSEMBLY: 7 resistors, 2 capacitors, 1 relay, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4516.	
A3		CIRCUIT CARD ASSEMBLY: 2 resistors, 2 capacitors, 9 integrated circuits, 1 coil, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4518.	
A4		CIRCUIT CARD ASSEMBLY: 1 resistor, 2 integrated circuits, 5 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4598.	
A5		CIRCUIT CARD ASSEMBLY: 80 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.375 in. hg. 82679 P/N A4453.	
A6		SWITCH ASSEMBLY: 3 Banks of 15 ea. push-button switches. 3.125 in. hg by 11.125 in. wd by 3750 in. deep. 82679 P/N SW479.	
C1		CAPACITOR, FIXED, ELECTROLYTIC: 2600 uf, 50 wvdc. 1.438 in. dia by 3.500 in. lg. Dwg CE112-6, 80183 P/N 36D262G050AB6B.	
C2		SAME AS C1.	
DS1		LAMP INCANDESCENT: Single contact, T-1-3/4 base, 28 vac or dc, 0.04 amps. Dwg BI110-7, 08806 P/N 327	
F1		FUSE CARTRIDGE TYPE: lamp 125 v. 0.250 in. dia 1.250 in. lg. Dwg FU102-1, 71400 P/N MDL-1.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
F2		SAME AS F1.	
FL		FILTER, RADIO INTERFERENCE: current, 5 amps; voltage rating, 500 vdc; 250 vac at 60 cps. 1.000 in. dia by 2.688 in. lg. Dwg FI105-2, 80183 P/N 5JX100.	
FL2		SAME AS FL1.	
J1		CONNECTOR: MIL type MS3102A14S1P.	
Q1		TRANSISTOR: MIL type 2N3055.	
S1		SWITCH: MIL type ST22K.	
T1		TRANSFORMER, POWER, STEP DOWN: Primary, 115/230 V, 50/60 hz, 1 phase. Secondary, 18 v, 30 madc; 20v, 200 madc; 18v, 2 adc. Hermetically sealed metal case, stud mtd. 3.875 in. hg by 3.937 in. lg by 3.375 in. wd. 82679 P/N TF376.	
XA1		CONNECTOR, RECEPTACLE, ELECTRICAL: 22 double sided female contacts rated at 5 amps and 1800 volts, RMS. Phenolic housing with floating bushing and eyelet terminals. Accepts printed circuit board thickness of 0.054 in. to 0.071 in. 82679 P/N JJ319-22-DFE.	
XA2		SAME AS XA1.	
XA3		SAME AS XA1.	
XA5		SAME AS XA1.	
XDS1		LIGHT, INDICATOR: transulecent white lens. 1.35 to 28 V T-1-3/4 lamp base. 2 terminals. 0.437 in. dia by 1.500 in. lg. Dwg TS153-12, 72619 P/N 162-8430-1475-502.	
XF1		FUSEHOLDER, LAMP INDICATING: 90-250 v, 15 amps, neon lamp, clear knob, accomodates 1/4 in. dia by 1 1/4 in. lg fuse. Dwg FH104-3, 71400 P/N HKL-X.	
XF2		SAME AS XF1.	
XQ1		SOCKET, SEMICONDUCTOR DEVICE: 2 pin contact accommodation, 0.040 in. or 0.050 in. dia; polarized; 1 terminal lug grounding strap; 1.578 in. lg, 1.000 in. wd 0.172 in. thk. Dwg TS166-1, 91506 P/N 8038-1G1.	
A1		CIRCUIT CARD ASSEMBLY: 22 resistors, 7 capacitors, 2 integrated circuits, 3 transistors, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4601.	
A1C1		CAPACITOR, FIXED, ELECTROLYTIC: 4.7uf, 10% tol, 35 wvdc, 0.175 in. dia by 0.438 in. lg. 82679 P/N CE123-475-35B2.	
A1C3	A1C2	SAME AS C1.	
A1C3		CAPACITOR, FIXED, ELECTROLYTIC: 100 uf, ±10% tol, 20 wvdc, 0.341 ind. dia by 6.750 in. lg. 82679 P/N CE123-107-2052.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A1C4		CAPACITOR, FIXED, MICA: 47uuf, ± 2% tol, 500 wvdc. 0.440 in. lg by 0.473 in. wd by 0.170 in. thk. 82679, P/N CM111E470G5S.	
A1C5		SAME AS A1C4.	
A1C6		CAPACITOR, FIXED, CERAMIC: 10,000 uuf, +80% - 20% tol, 25 wvdc; 0.385 in. dia by 0.156 in. thk, 0.250 in. lead spacing. 82679 P/N CC100-41.	
A1C7		Same as A1C6.	
A1CR1		RECTIFIER, SEMICONDUCTOR DEVICE: peak reverse v, 260 v. - 0.688 in. wd, 0.469 in. hg, 0.250 in. thk. 82670 P/N DD130-200-1.5.	
A1Q1		TRANSISTOR: MIL type 2N1485.	
A1Q2		TRANSISTOR: MIL type 2N4036.	
A1Q3		SAME AS A1Q2.	
A1R1		RESISTOR: MIL type RC20GF680J.	
A1R2		RESISTOR: MIL type RC20GF560J.	
A1R3		RESISTOR: MIL type RC20GF561J.	
A1R4		RESISTOR: MIL type RN60D2701F.	
A1R5		RESISTOR: MIL type RN60D1802F.	
A1R6		RESISTOR, FIXED, WIRE WOUND: 3 ohms, ± 5% tol, 5 watts. 0.250 in. dia by 1.000 in. lg, wire lead mounted. 82679 P/N RR114-3W.	
A1R7		RESISTOR: MIL type RC20GF1R0J.	
A1R8		SAME AS A1R7.	
A1R9		RESISTOR: MIL type RC32GF271J.	
A1R10		RESISTOR: MIL type RC20GF272J.	
A1R11		RESISTOR: MIL type RC20GF122J.	
A1R12		SAME AS A1R5.	
A1R13		SAME AS A1R10.	
A1R14		RESISTOR, FIXED, WIRE WOUND: 1 ohm, ±5% tol, 5 watts. 0.250 in. dia by 1.000 in. lg, wire lead mounted. 82679, P/N RR114-1W.	
A1R15		SAME AS A1R1.	
A1R16		SAME AS A1R2.	
A1R17		RESISTOR: MIL type RC20GF361J.	
A1R18		RESISTOR: MIL type RC42GF471J.	
A1R19		SAME AS A1R7.	
A1R20		SAME AS A1R7.	
A1R21		SAME AS A1R8.	
A1R22		SAME AS A1R7.	
A2		CIRCUIT CARD ASSEMBLY: 7 resistors, 2 capacitors, 1 relay, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4516.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A2C1		CAPACITOR, FIXED, MICA: 1,000 uuf, ±1% tol, 500 wvdc, -- 0.640 in. lg, 0.591 in. wd by 0.198 in. thk. 82679, P/N CM111F102F5S.	
A2C2		SAME AS A2C1.	
A2K1		RELAY, ARMATURE: mercury wetted contacts rated at 2 amps max, 500 v max. 2 windings rated at 250 ohms each ± 10%. - 2.063 in. lg by 0.625 in. hg by 0.625 in. wd, wire lead mounted. 82679 P/N RL167.	
A2R1		RESISTOR: MIL type RC20GF471J.	
A2R3		RESISTOR: MIL type RC20GF681J.	
A2R4		RESISTOR: MIL type RC20GF4R7J.	
A2R5		SAME AS A2R4.	
A2R6		RESISTOR: MIL type RC20GF101J.	
A2R7		SAME AS A2R6.	
A2R8		NOT USED.	
A2R9		RESISTOR: MIL type RC32GF271J.	
A3		CIRCUIT CARD ASSEMBLY: 2 resistors, 2 capacitors, 9 integrated circuits, 1 coil, 2 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82579 P/N A4518.	
A3C1		CAPACITOR, FIXED, PLASTIC: 1.8 uf, ±5% tol. 0.406 in. dia by 0.813 in. lg. 82679 P/N CN112A185J.	
A3C2		SAME AS A3C1.	
A3C3 thru A3C5		NOT USED.	
A3C6		CAPACITOR, FIXED, ELECTROLYTIC: 4.7 uf, 35 wvdc, 0.450 in. hg by 0.450 in. wd by 0.250 in. thk. Dwg CE121-4R7-35. 80183 P/N 196D475X0035FB.	
A3C7		SAME AS A3C6.	
A3CR2		SAME AS A3CR1.	
A3L1		COIL, RF, FIXED: 1000 uh, ±10%, 17.5 ohms max dc res. 0.157 dia, 0.450 in. lg. 82679 P/N CL275-102.	
A3R1		RESISTOR, VARIABLE, WIRE WOUND: 500 ohms, ±10% tol, 1/2 watt. 1.250 in. lg by 0.250 in. wd by 0.313 in. hg, wire lead mounted. 82679 P/N RV121-1-501.	
A3R2		RESISTOR: MIL type RC07GF122J.	
A3Z1		INTEGRATED CIRCUIT, DIGITAL TIMING GENERATOR: 11 pins, plastic case; -8v output voltage. 0.895 in. lg by 0.678 in. wd by 0.495 in. hg. 82679 P/N NW152.	
A3Z2		INTEGRATED CIRCUIT, DIGITAL FLIP FLOP: 11 pins, plastic case; -4.5v input voltage, -9.5 v output voltage. 0.895 in. lg by 0.678 in. wd by 0.495 in. hg. 82679 P/N NW 151.	
A3Z3		SAME AS A3Z2.	

REF DESIG	NOTES	NAME AND DESCRIPTION	FIG NO.
A3Z4		SAME AS A3Z2.	
A3Z5		SAME AS A3Z2.	
A3Z6		INTEGRATED CIRCUIT, DIGITAL AND GATE: 11 pins, plastic case; supply voltage, - 12 v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW141-42.	
A3Z7		SAME AS A3Z6.	
A3Z8		SAME AS A3Z6.	
A3Z9		INTEGRATED CIRCUIT, DIGITATL NOR GATE: 11 pins, plastic case; supply voltage, + and -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW150-2.	
A4		CIRCUIT CARD ASSEMBLY: 1 resistor, 2 integrated circuits, 5 semiconductors, plug-in item; 4.375 in. lg by 4.125 in. wd by 0.750 in. hg. 82679 P/N A4598	
S4CR1 THRU A4CR5		SAME AS A3CR1.	
A4R1		RESISTOR: MIL type RC07GF681J.	
A4Z1		INTEGRATED CIRCUIT, DIGITAL DUAL INVERTER: 11 pins, plastic case; supply voltage, + and -12v. 0.875 in. lg by 0.625 in. wd by 0.438 in. hg. 82679 P/N NW150-2.	
A4Z2		SAME AS A3CR1.	
A5		CIRCUIT CARD ASSEMBLY: 80 Semiconductors, plug-in item, 4.375 in. lg by 4.125 in. wd by 0.375 in. hg. 82679 P/N A4453.	
A5CR1 THRU A5CR80		SAME AS A3CR1.	
A6		SWITCH ASSEMBLY: 3 banks of 15 each push button switches. 3.125 in. hg by 11.125 in. wd by 3.750 in. deep. 82679 P/N SW479.	

SECTION VII
DRAWINGS

7-1. INDEX

7-2. The following schematic diagrams are contained in this section:

Figure	Title
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7-2	Wiring Diagram of Channel Frequency Indicator, ID-1600/UR
7-3	Schematic Diagram of Isolation Keyer 2A2
7-4	Schematic Diagram of Timing Circuit 2A9
7-5	Schematic Diagram of Timing Circuit 2A8
7-6	Schematic Diagram of Shift Register 2A6, and 2A7
7-7	Schematic Diagram of Lamp Driver 2A3
7-8	Schematic Diagram of Frequency Gating Circuit 2A4, and 2A5
7-9	Schematic Diagram of Memory Gating Circuit 2A1, and 2A16
7-10	Schematic Diagram of Memory Gating Circuit 2A14, and 2A15
7-11	Schematic Diagram of Power Supply 2A10
7-12	Wiring Diagram of Electronic Programmer, C-7775/UR
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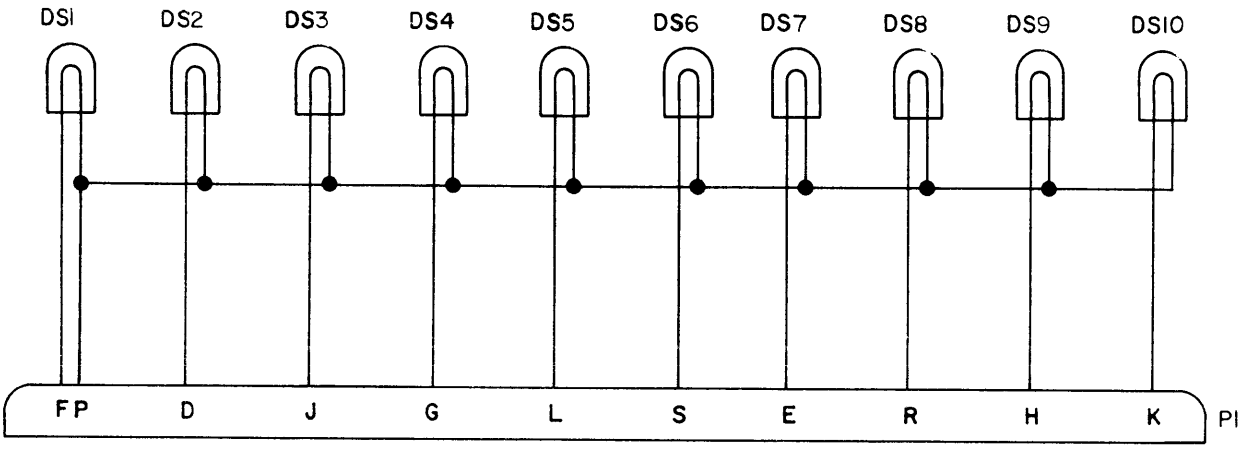
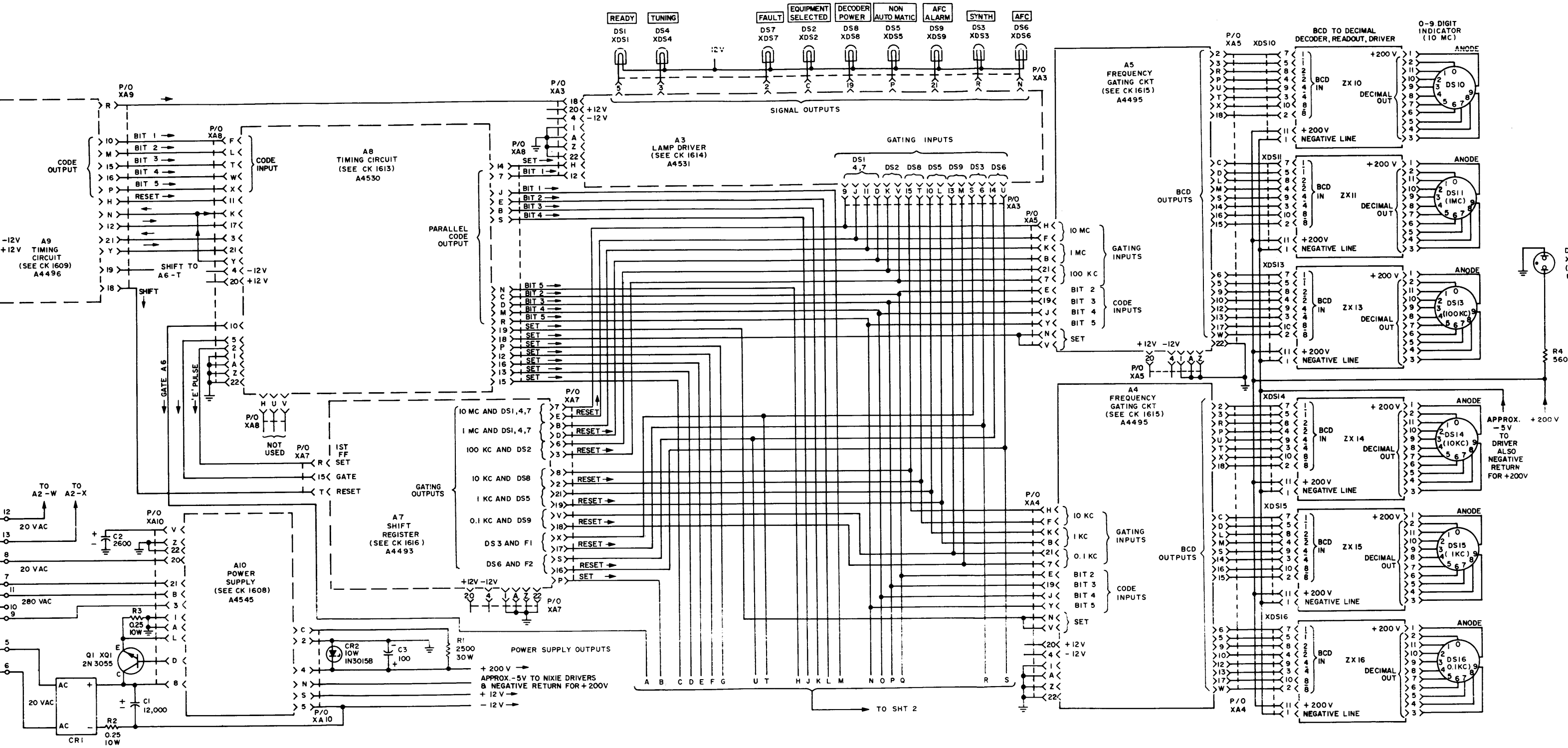
7-14	Schematic Diagram of Gating Circuit 3A4
7-15	Schematic Diagram of Shift Register 3A3
7-16	Schematic Diagram of Power Supply 3A1
7-17	Schematic Diagram of Keyer 3A2



SYMBOLS	
LAST	MISSING
DS10 P1	

CK1213

Figure 7-1. Schematic Diagram, SB-3230/UR



CK1563

Figure 7-2. Wiring Diagram of Channel Frequency Indicator, ID-1600/UR (Sheet 1)

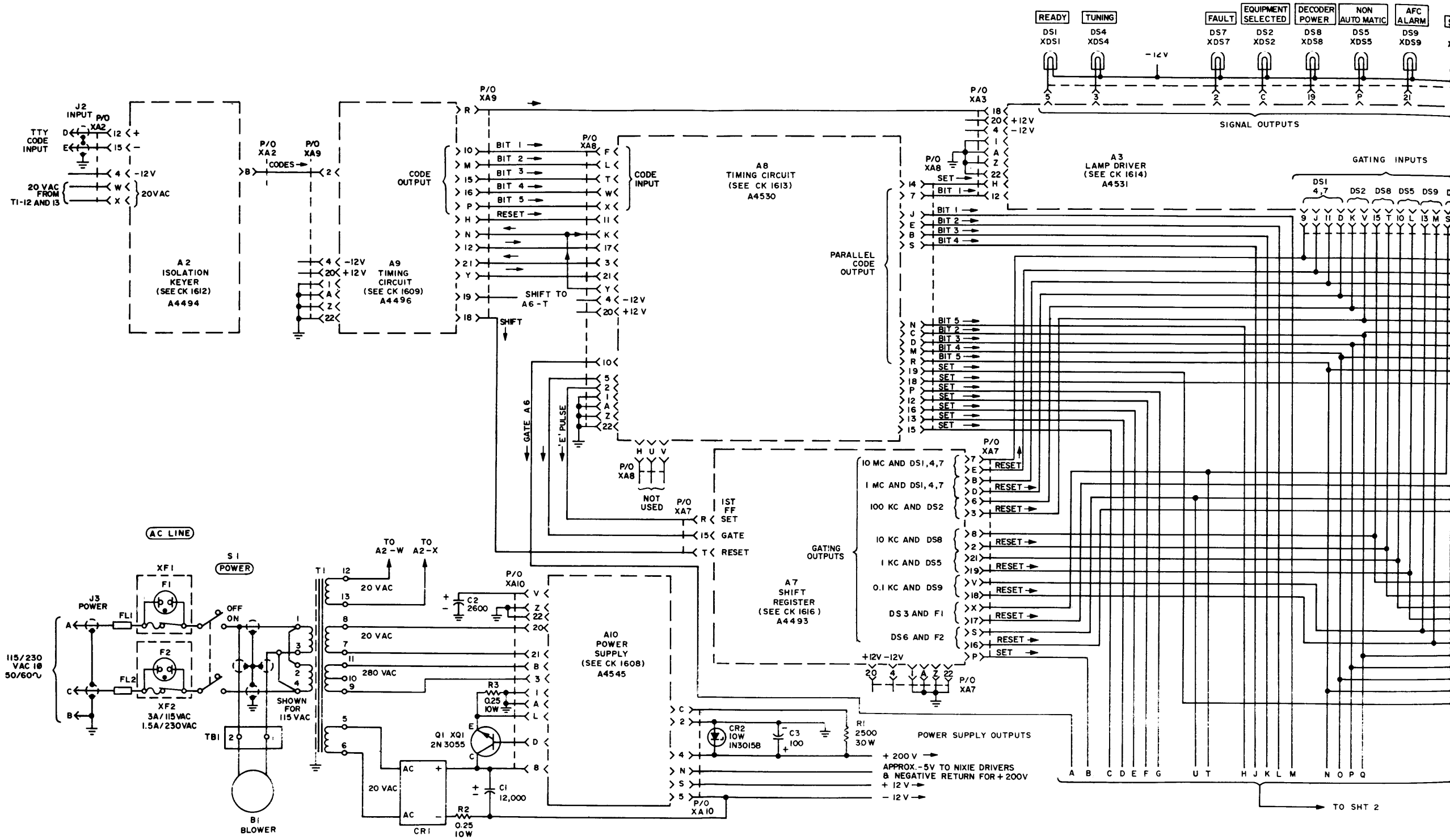

READY
DS1
XDS1
TUNING
DS4
XDS4
-12V
FAULT
DS7
XDS7
EQUIPMENT SELECTED
DS2
XDS2
DECODER POWER
DS8
XDS8
NON AUTO MATIC
DS5
XDS5
AFC ALARM
DS9
XDS9
SIGNAL OUTPUTS
GATING INPUTS
J2 INPUT
P/O XA2
TTY CODE INPUT
D
E
12 +
15 -
4 -12V
20 VAC FROM T1-12 AND 13
W
X
20VAC
A2 ISOLATION KEYER (SEE CK 1612) A4494
P/O XA2
CODES
B
P/O XA9
2
4 -12V
20 +12V
1
A
Z
22
A9 TIMING CIRCUIT (SEE CK 1609) A4496
CODE OUTPUT
R
10
M
15
16
P
H
N
12
21
Y
19
18
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
RESET
SHIFT
SHIFT TO A6-T
P/O XA8
F
L
T
W
X
11
K
17
3
21
Y
4 -12V
20 +12V
CODE INPUT
A8 TIMING CIRCUIT (SEE CK 1613) A4530
P/O XA3
18
20 +12V
4 -12V
I
A
Z
22
H
P/O XA8
SET
BIT 1
12
14
7
PARALLEL CODE OUTPUT
J
E
B
S
BIT 1
BIT 2
BIT 3
BIT 4
A3 LAMP DRIVER (SEE CK 1614) A4531
DS1 4,7
DS2
DS8
DS5
DS9
9
J
11
D
K
V
15
T
10
L
13
M
S
N
C
D
M
R
19
18
P
12
16
13
15
BIT 5
BIT 2
BIT 3
BIT 4
BIT 5
SET
SET
SET
SET
SET
SET
SET
GATE A6
'E' PULSE
10
5
2
1
A
Z
22
H U V
P/O XA8
NOT USED
P/O XA7
R
15
T
SET
GATE
RESET
IST FF
A7 SHIFT REGISTER (SEE CK 1616) A4493
GATING OUTPUTS
10 MC AND DS1,4,7
1 MC AND DS1,4,7
100 KC AND DS2
10 KC AND DS8
1 KC AND DS5
0.1 KC AND DS9
DS 3 AND F1
DS6 AND F2
7
E
B
D
6
3
8
2
21
19
V
18
X
17
S
16
P
RESET
RESET
RESET
RESET
RESET
RESET
RESET
SET
+12V -12V
20
4
A
22
P/O XA7
AC LINE
S1
POWER
XF1
F1
FL1
F2
FL2
XF2
3A/115VAC
1.5A/230VAC
J3 POWER
A
C
B
115/230 VAC 1Φ 50/60~
OFF
ON
1
3
2
4
SHOWN FOR 115 VAC
TB1
2
1
B1 BLOWER
T1
12
13
20 VAC
8
7
20 VAC
11
10
9
280 VAC
5
6
20 VAC
TO A2-W
TO A2-X
P/O XA10
V
Z
22
20
21
B
3
I
A
L
D
8
C2 2600
R3 0.25 10W
Q1 XQ1 2N3055
E
C
C1 12,000
AC
AC
CR1
R2 0.25 10W
A10 POWER SUPPLY (SEE CK 1608) A4545
C
2
4
N
S
5
P/O XA10
CR2 10W IN3015B
C3 100
R1 2500 30W
POWER SUPPLY OUTPUTS
+ 200 V
APPROX. -5V TO NIXIE DRIVERS & NEGATIVE RETURN FOR + 200V
+ 12 V
- 12 V
A B C D E F G U T H J K L M N O P Q
TO SHT 2

TABLE "A" READOUT FUNCTIONS

READOUT FUNCTION	REFERENCE SYMBOL	RTIH-3 (ID-1600/UR) POS TYPE	TMC P/N	DS PANEL MARKING
10	A1	12	A4492	———
9	A11	NONE	———	———
8	A12	NONE	———	———
7	A13	NONE	———	———
6	A14	DUAL-4	A4625	———
5	A15	DUAL-4	A4625	———
4	A16	12	A4492	———
3	A17	NONE	———	———
2	A18	NONE	———	———
1	A19	NONE	———	———
1	A17	NONE	———	———
2	A18	NONE	———	———
3	A19	NONE	———	———
4	A20	12	IC 105-2	MODE
5	A21	DUAL-4	IC 105-1	AGC TIME CONSTANT, SYM/B2, B1
6	A22	DUAL-4	IC 105-1	AGC TIME CONSTANT, A2-A1
7	A23	NONE	———	———
8	A24	NONE	———	———
9	A25	NONE	———	———

NOTES:
1. PARTIAL REFERENCE DESIGNATIONS SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION AS APPLICABLE
2. LAST SYMBOLS USED; A19, C3, CR2, DS25, F2, FL2, J3, Q1, S1, T1, TB1, XA19, XDS25, ZX16, XQ1, R4, B1
3. MISSING SYMBOLS: ZX1 THRU ZX9, & ZX12
4. UNLESS OTHERWISE SPECIFIED: ALL RESISTOR VALUES ARE IN OHMS, ALL CAPACITOR VALUES ARE IN MICROFARADS.
5. USAGE OF PLUG-IN ASSEMBLIES A1, A11 THRU A19 AND DS17 THRU DS25 WILL VARY. REFER TO TABLE "A"

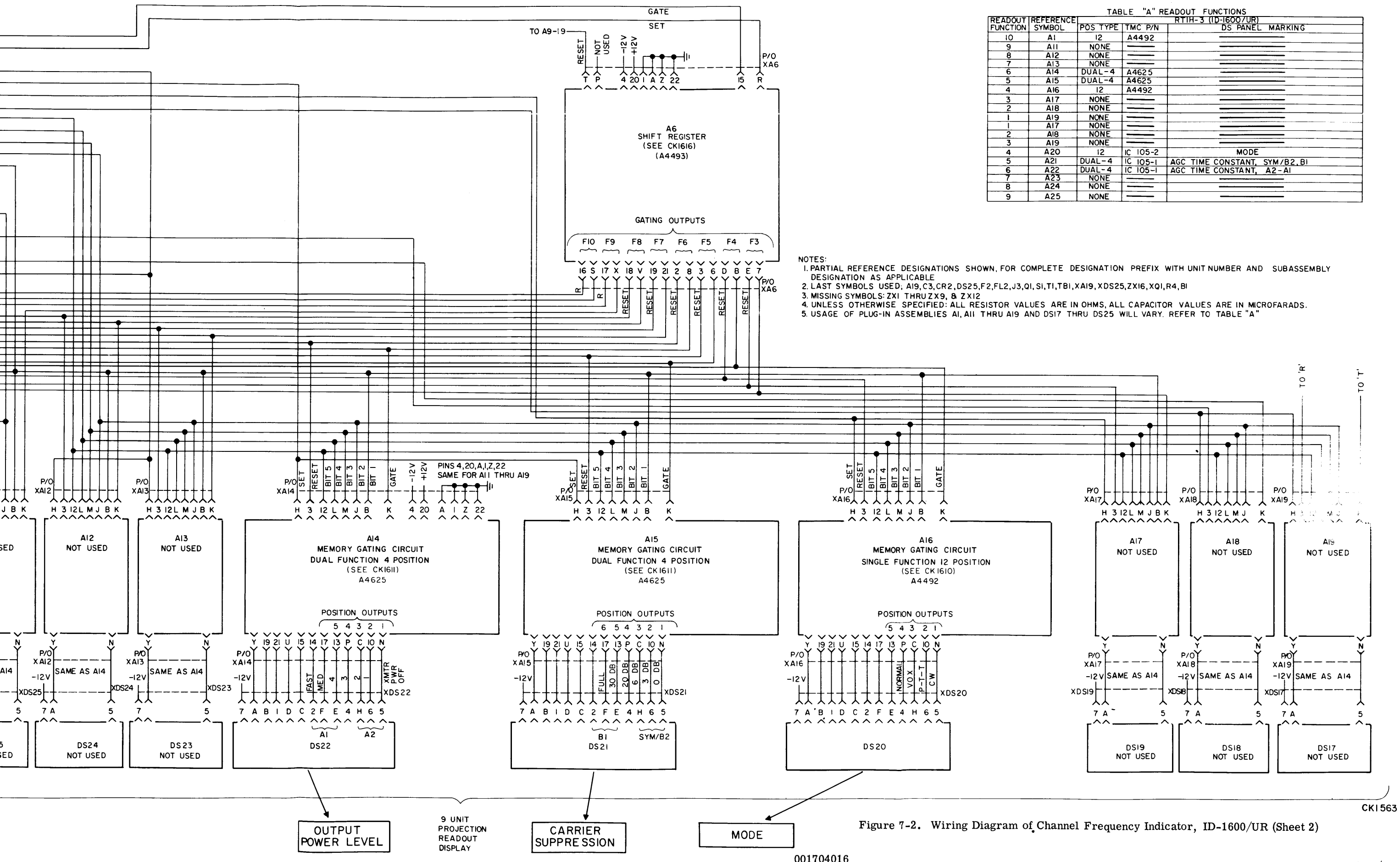
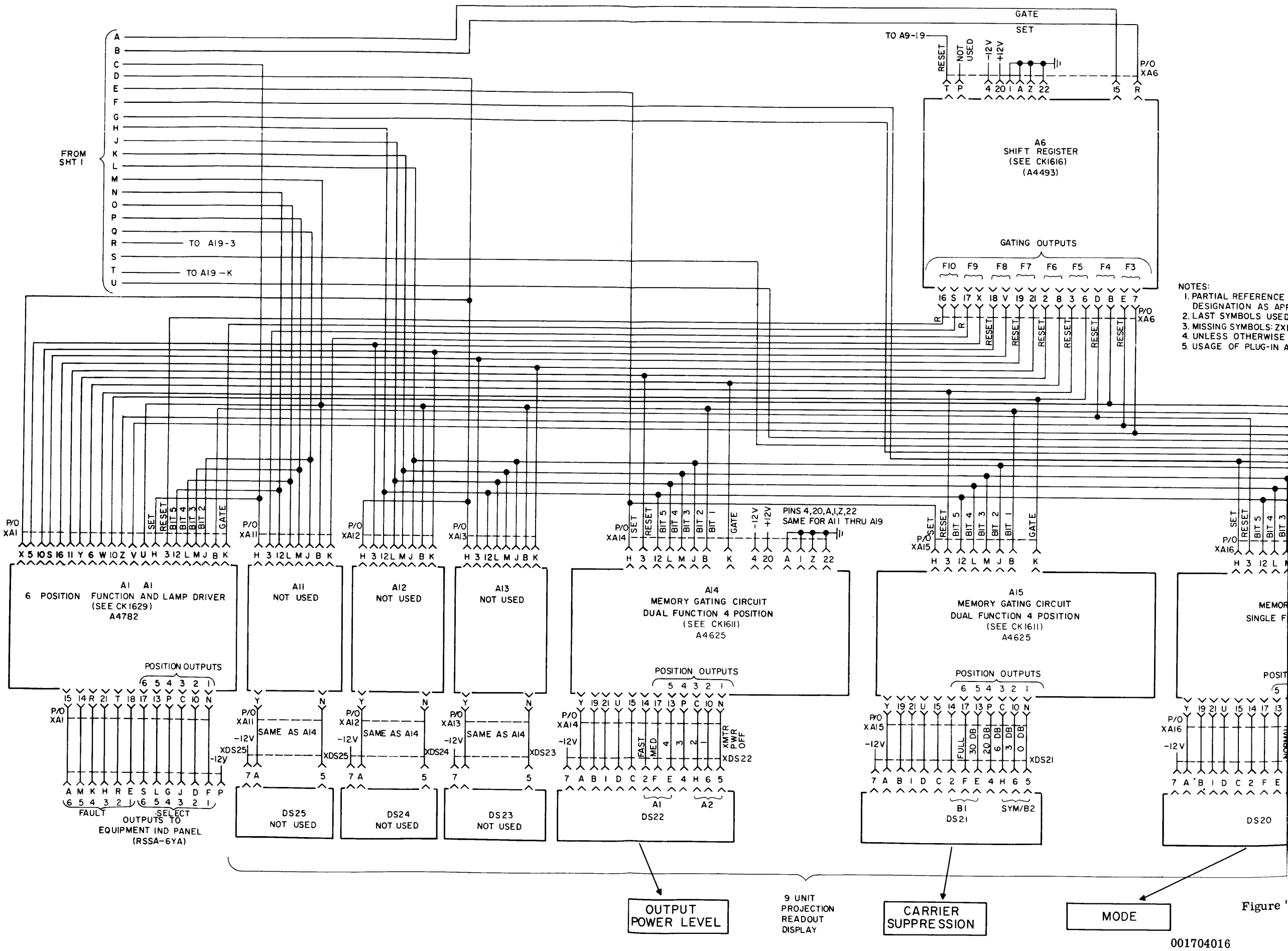
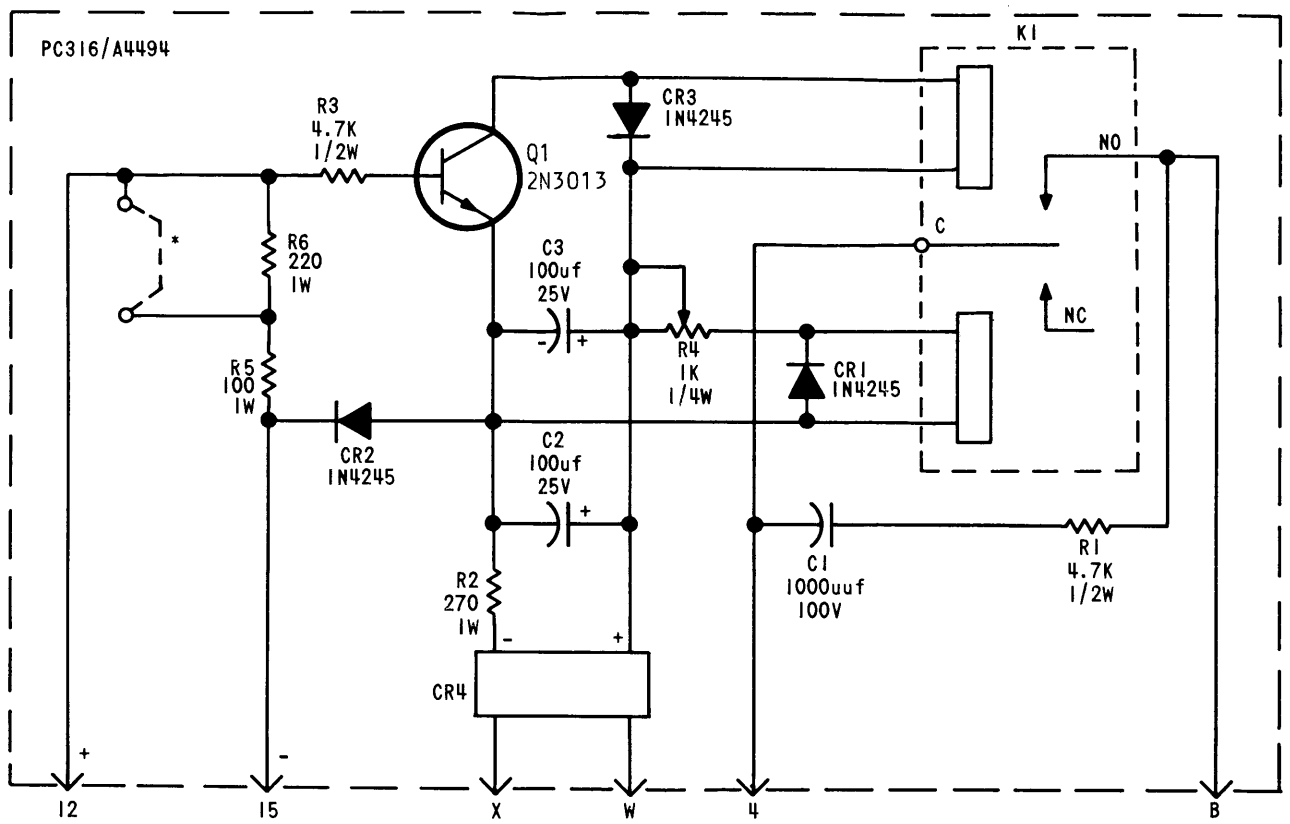


Figure 7-2. Wiring Diagram of Channel Frequency Indicator, ID-1600/UR (Sheet 2)



Figure

001704016



LAST SYMBOL	MISSING SYMBOL
R6 C3 CR4 K1 Q1	

NOTES

1. PARTIAL REFERENCE DESIGNATIONS AS SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION (S) AS APPLICABLE
* 2. STRAP IS INCLUDED WHEN 60mA LOOP IS USED STRAP IS NOT INCLUDED WHEN 20mA OR 6 VOLT LOOPS ARE USED.

CK1612

Figure 7-3. Schematic Diagram of Isolation Keyer 2A2

MODULE VOLTAGE & GND CHART			
SYMBOL	PIN CONNECTION +12V	-12V	GND
Z1,Z?	10		5
Z2,Z4,Z5,Z6,Z7	10	?	5
Z?	10	2,9	4,5
Z8,Z9		?	

LAST SYMBOL	MISSING SYMBOL
C5	
CR4	
R5	
TP12	
Z10	

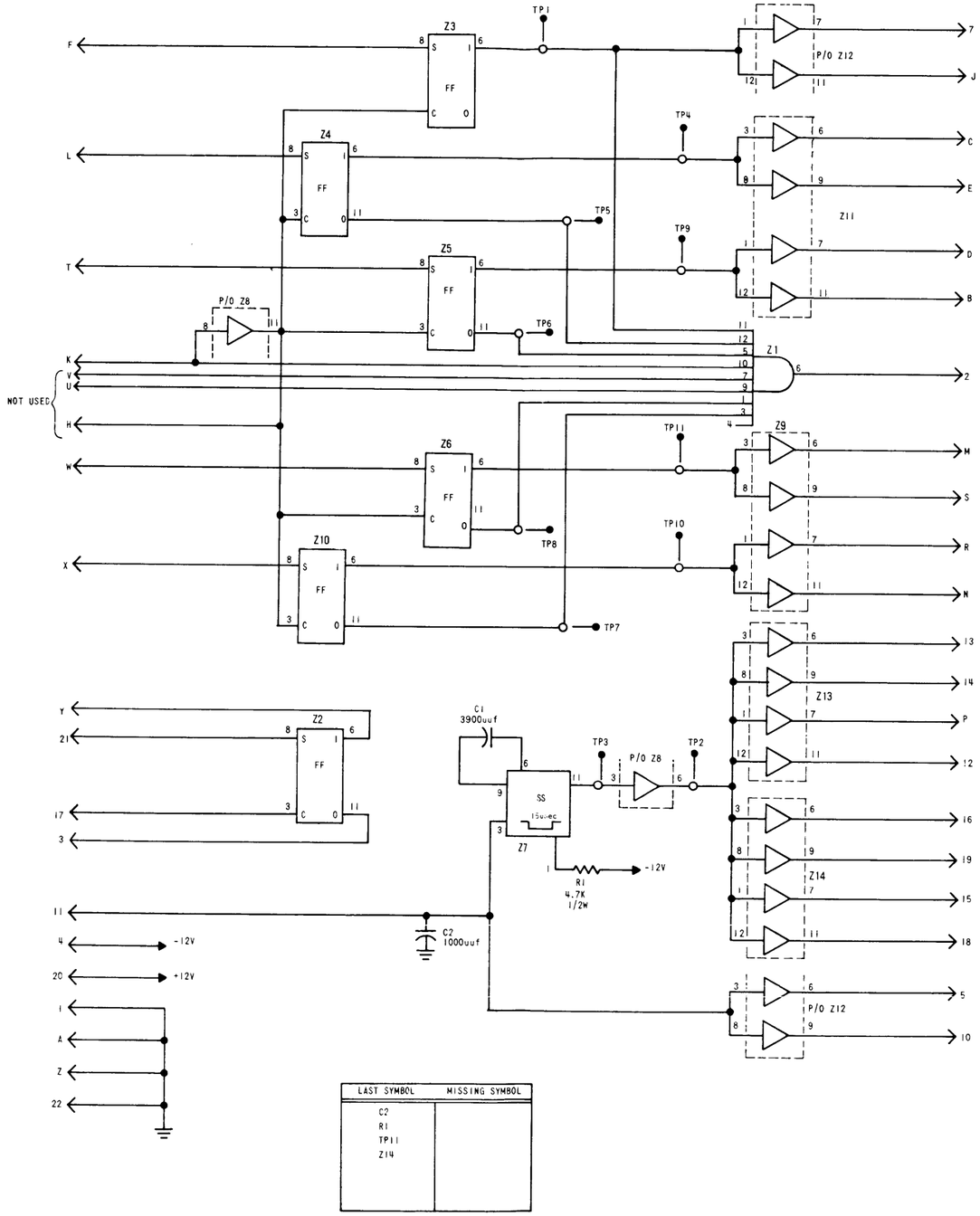
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTANCE VALUES ARE IN OHMS. 1/4 WATT

PC318/A4496

NOTES:
1. FOR 60 WPM ADD C4 AND C5
   FOR 100 WPM DELETE C4 AND C5
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE.

CKI609

Figure 7-4. Schematic Diagram of Timing Circuit 2A9



MODULE VOLTAGE AND GND CHART			
	PIN CONNECTIONS		
SYMBOL	+12V	-12V	GND
Z1		2	
Z1 THRU Z7,Z10	10	2	5
Z8,Z9,Z11 THRU Z14		2	5

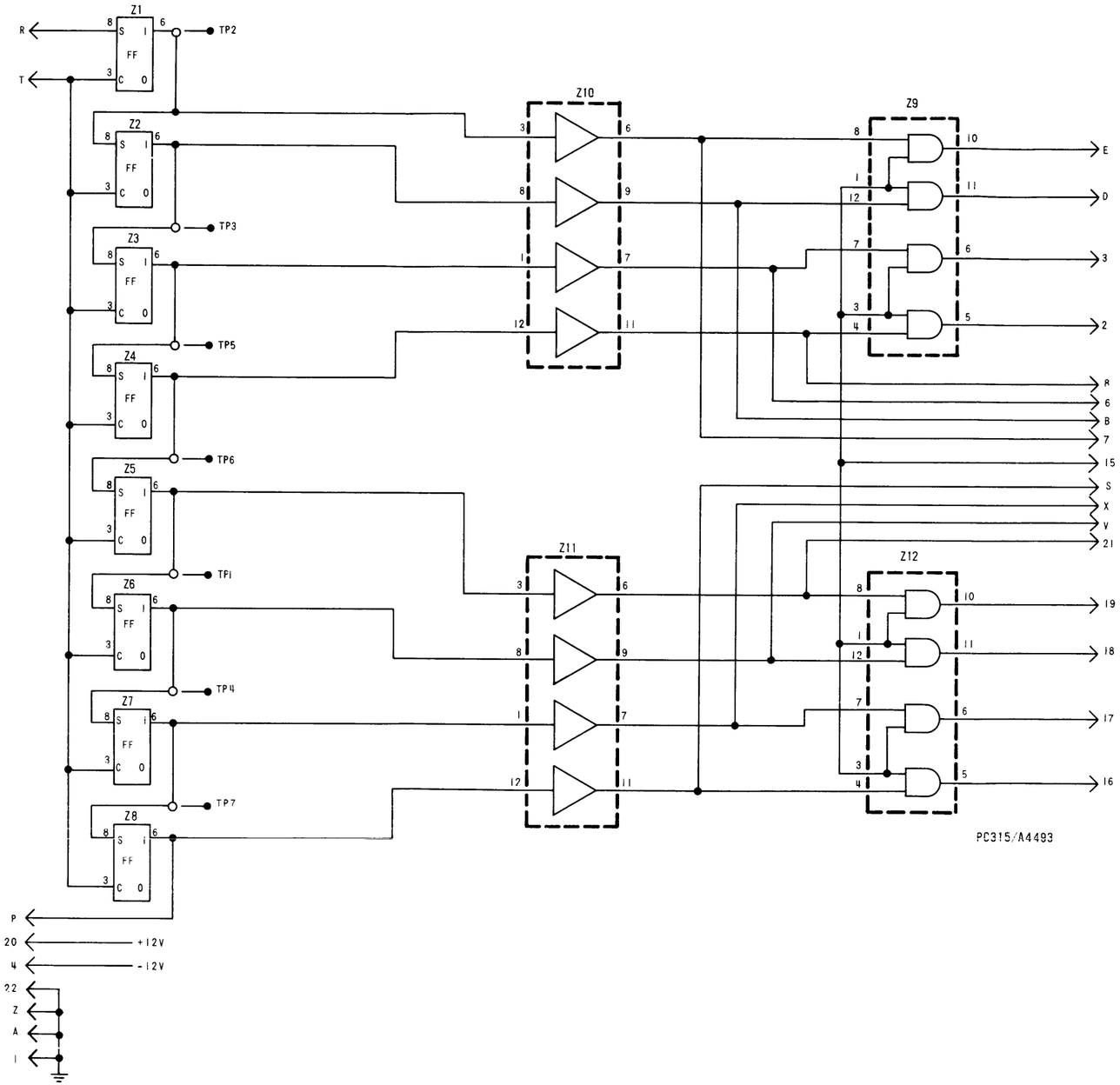
NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

LAST SYMBOL	MISSING SYMBOL
C2	
R1	
TP11	
Z14	

CK1613

Figure 7-5. Schematic Diagram of Timing Circuit 2A8



MODULE VOLTAGE & GND CHART			
SYMBOL	PIN CONNECTIONS		
	+12V	-12V	GND
Z1 THRU Z8	10	2	5
Z9, Z12		2	
Z10, Z11		2	5

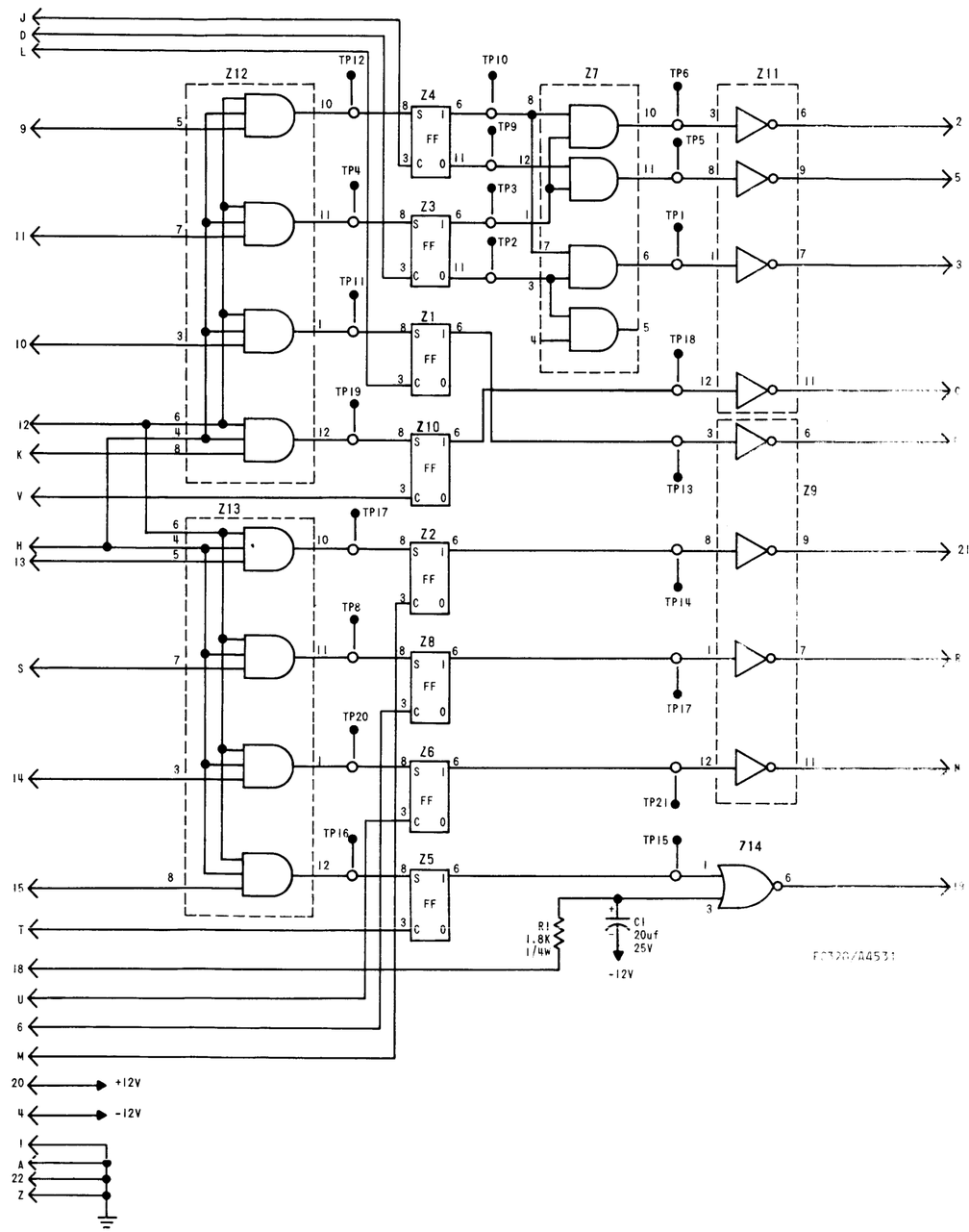
LAST SYMBOL	MISSING SYMBOL
TP7 Z12	

NOTE:

PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE.

CK1616

Figure 7-6. Schematic Diagram of Shift Register 2A6 and 2A7



	PIN CONNECTIONS		
	+12	-12V	GND
	10	2	5
		2	
	10		5

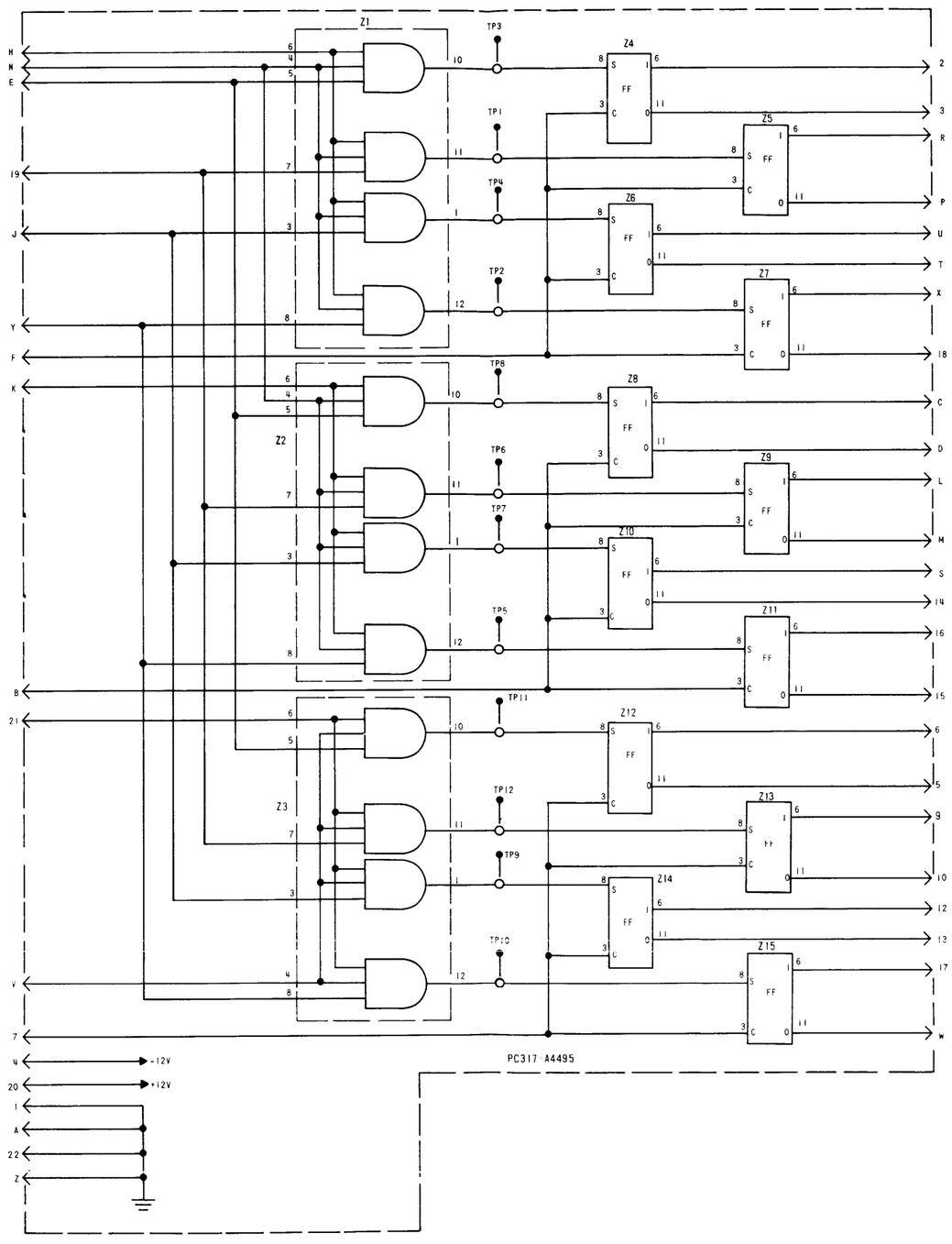
	MISSING SYMBOL

NOTE:

REFERENCE DESIGNATIONS ARE SHOWN: FOR
GNATION, PREFIX WITH UNIT NUMBER
SSY DESIGNATION(S) AS APPLICABLE

CK1614

Figure 7-7. Schematic Diagram of Lamp Driver A3



MODULE VOLTAGE & GND CHART			
SYMBOL	PIN CONNECTIONS		
	+12V	-12V	GND
Z1. Z2. Z3		2	
Z4 THRU Z15	10	2	5

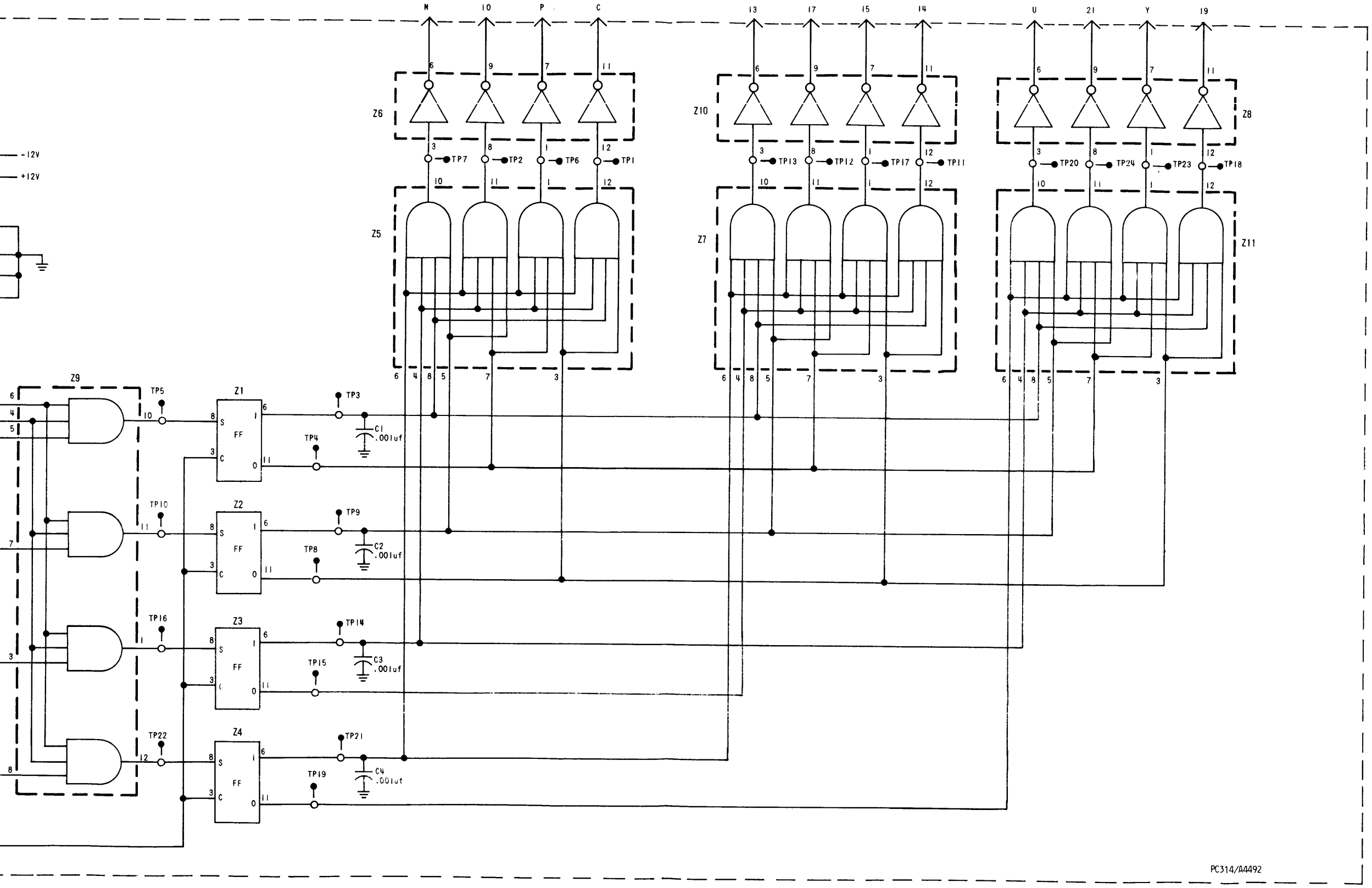
LAST SYMBOL	MISSING SYMBOL
TP12 Z15	

NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

CKI615

Figure 7-8. Schematic Diagram of Frequency Gating Circuit 2A4, and 2A5



LAST SYMBOL	MISSING SYMBOL
C4	
TP24	
Z11	

MODULE VOLTAGE AND GND CHART

SYMBOL	PIN CONNECTIONS +12V	GND
Z1 THRU Z4	10	7
Z5, Z7, Z9, Z11	10	7
Z6, Z8, Z10	10	7

NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

CK1610

Figure 7-9. Schematic Diagram of Memory Gating Circuit 2A1, and 2A16

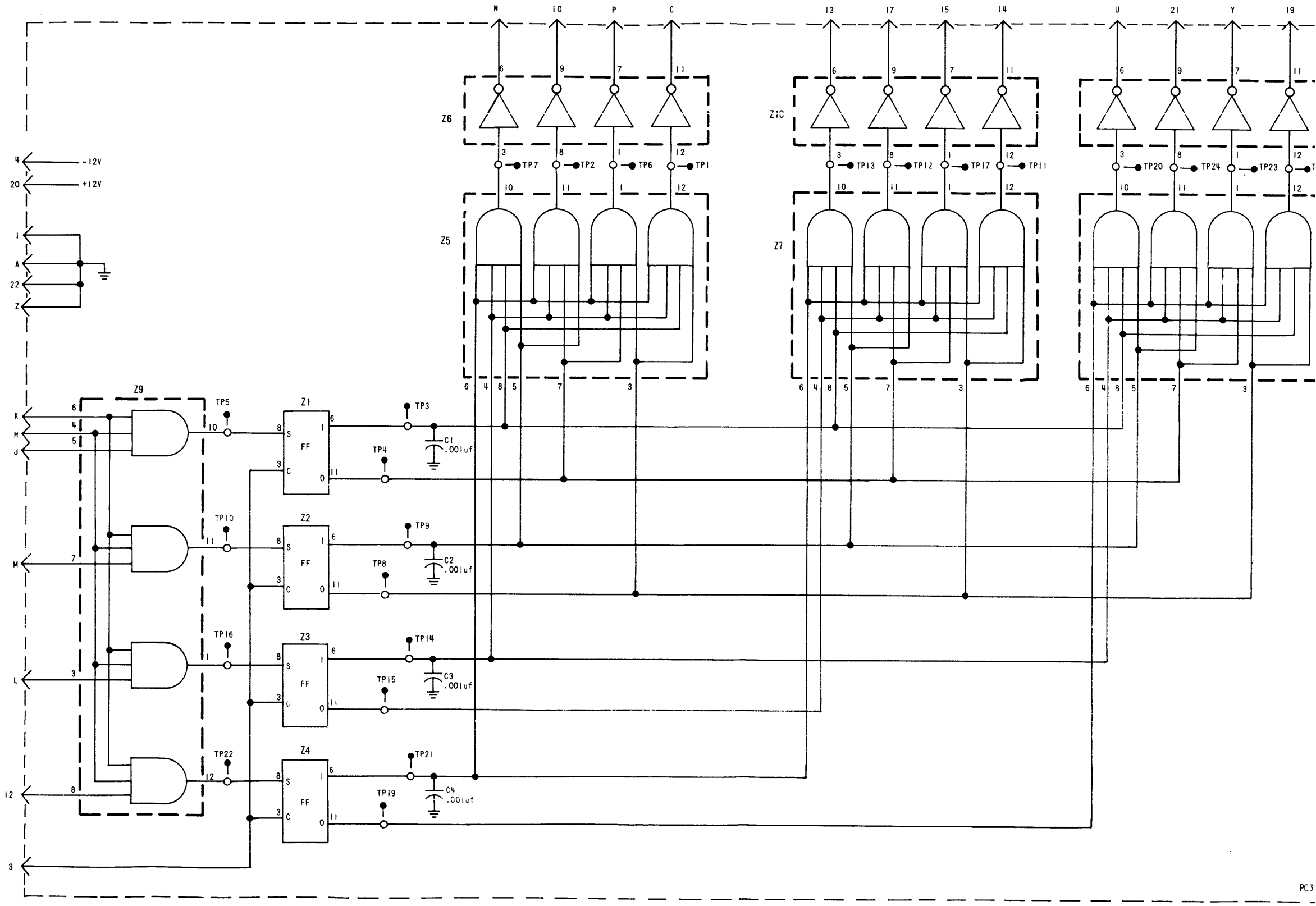
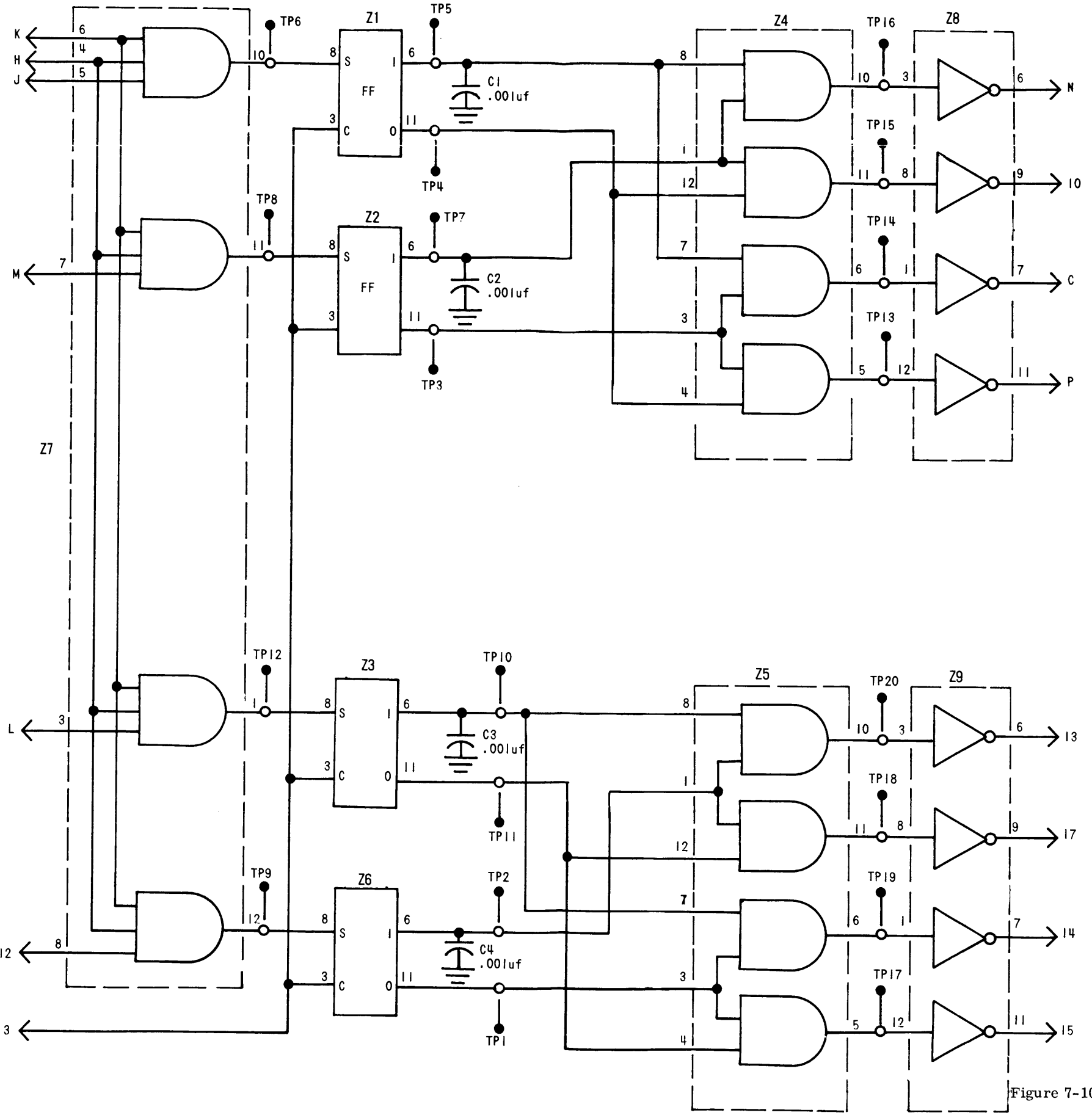


Figure 7-9. Schematic



MODULE VOLTAGE & GND CHART			
SYMBOL	PIN CONNECTIONS		
	+12V	-12V	GND
Z1, Z2, Z3, Z6	10	2	5
Z4, Z5, Z7		2	
Z8, Z9	10		5

LAST SYMBOL	MISSING SYMBOL
C4	
TP20	
Z9	

NOTE:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER ANS SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE.

PC396/A4625

CK1611

Figure 7-10. Schematic Diagram of Memory Gating Circuit 2A14, and 2A15

001704016

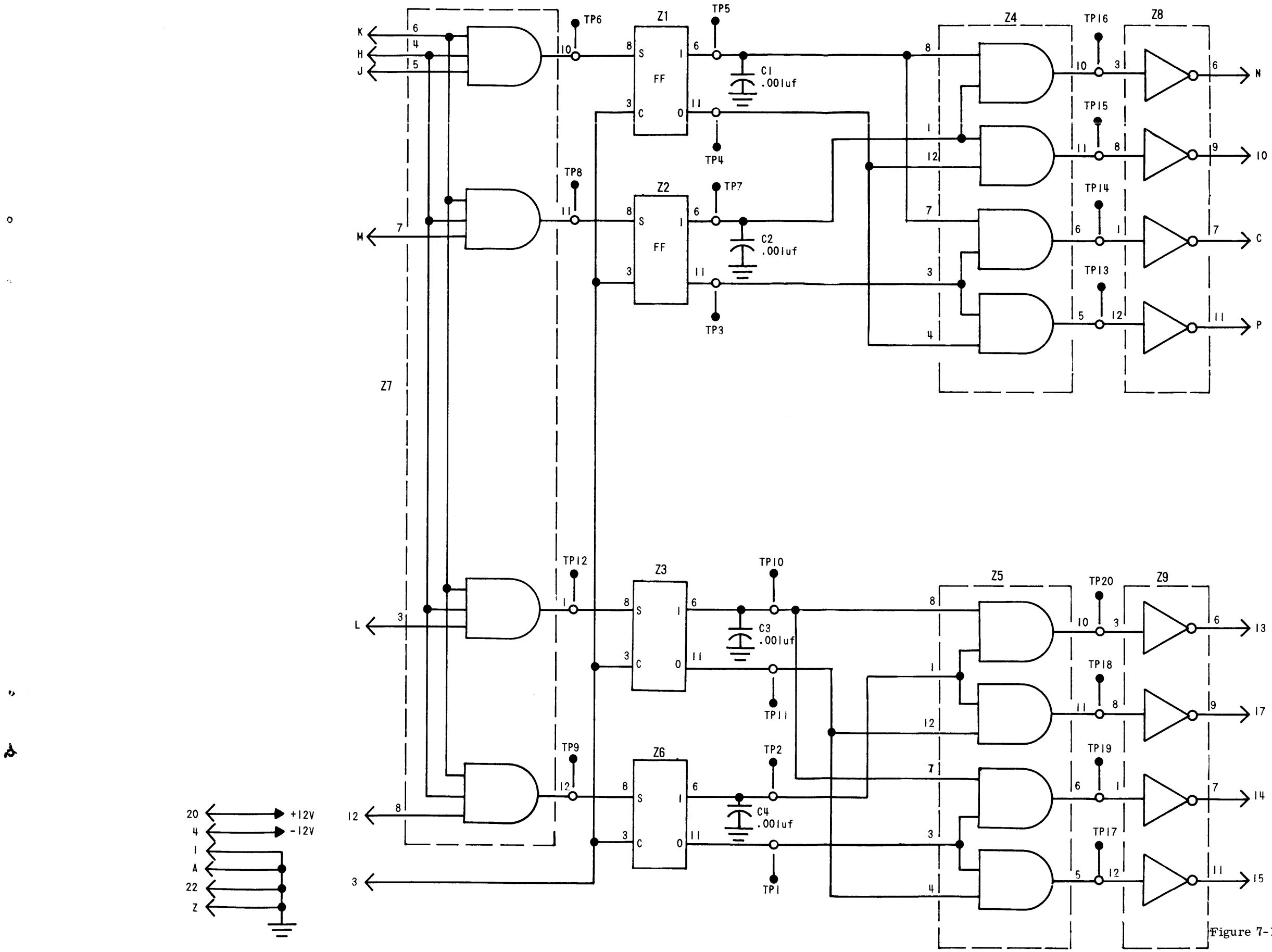
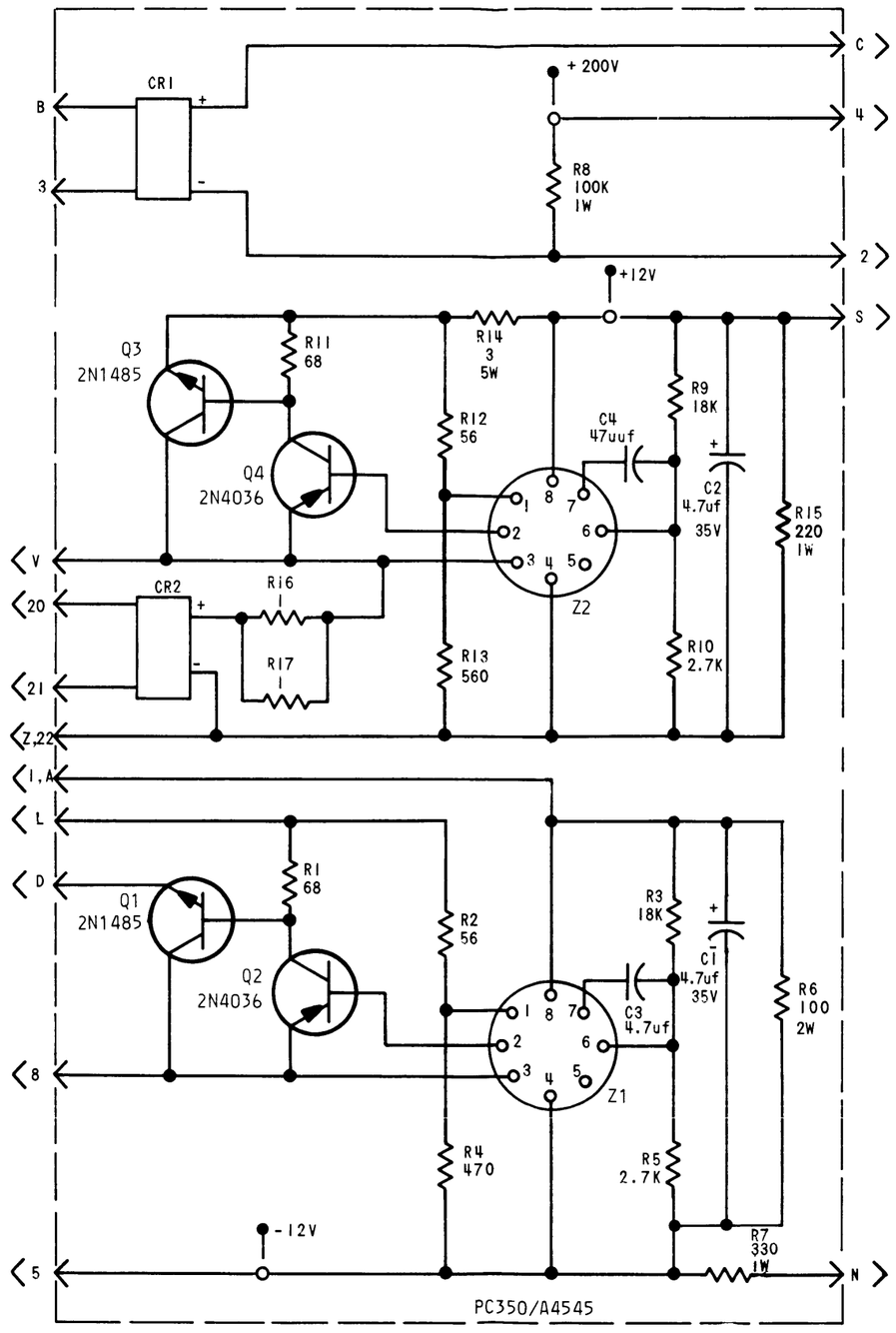


Figure 7-10. Schemati

001704016



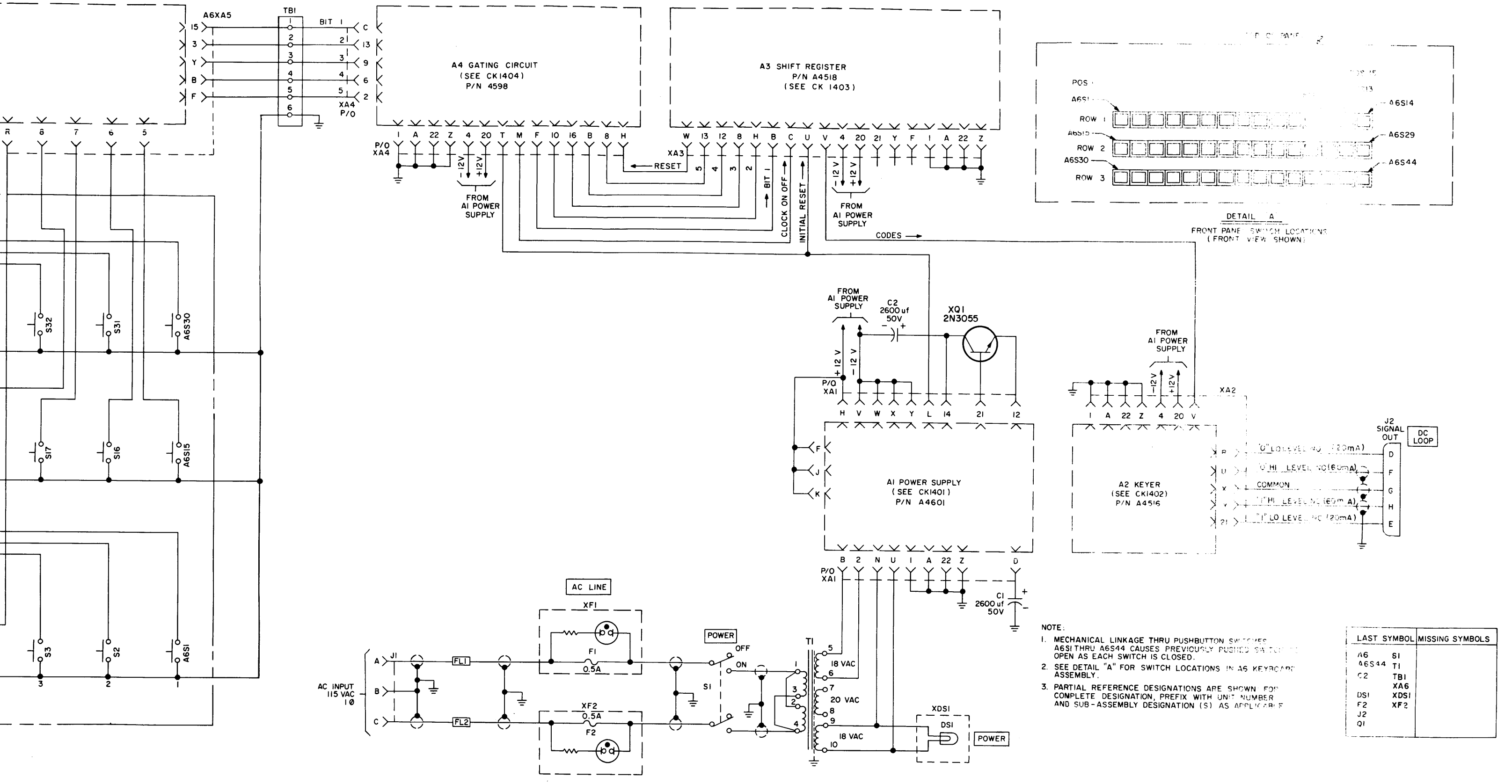
LAST SYMBOL	MISSING SYMBOL
C4	
CR2	
Q4	
R17	
Z2	

UNLESS OTHERWISE SPECIFIED

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/2 WATT
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

CK1608

Figure 7-11. Schematic Diagram of Power Supply 2A10



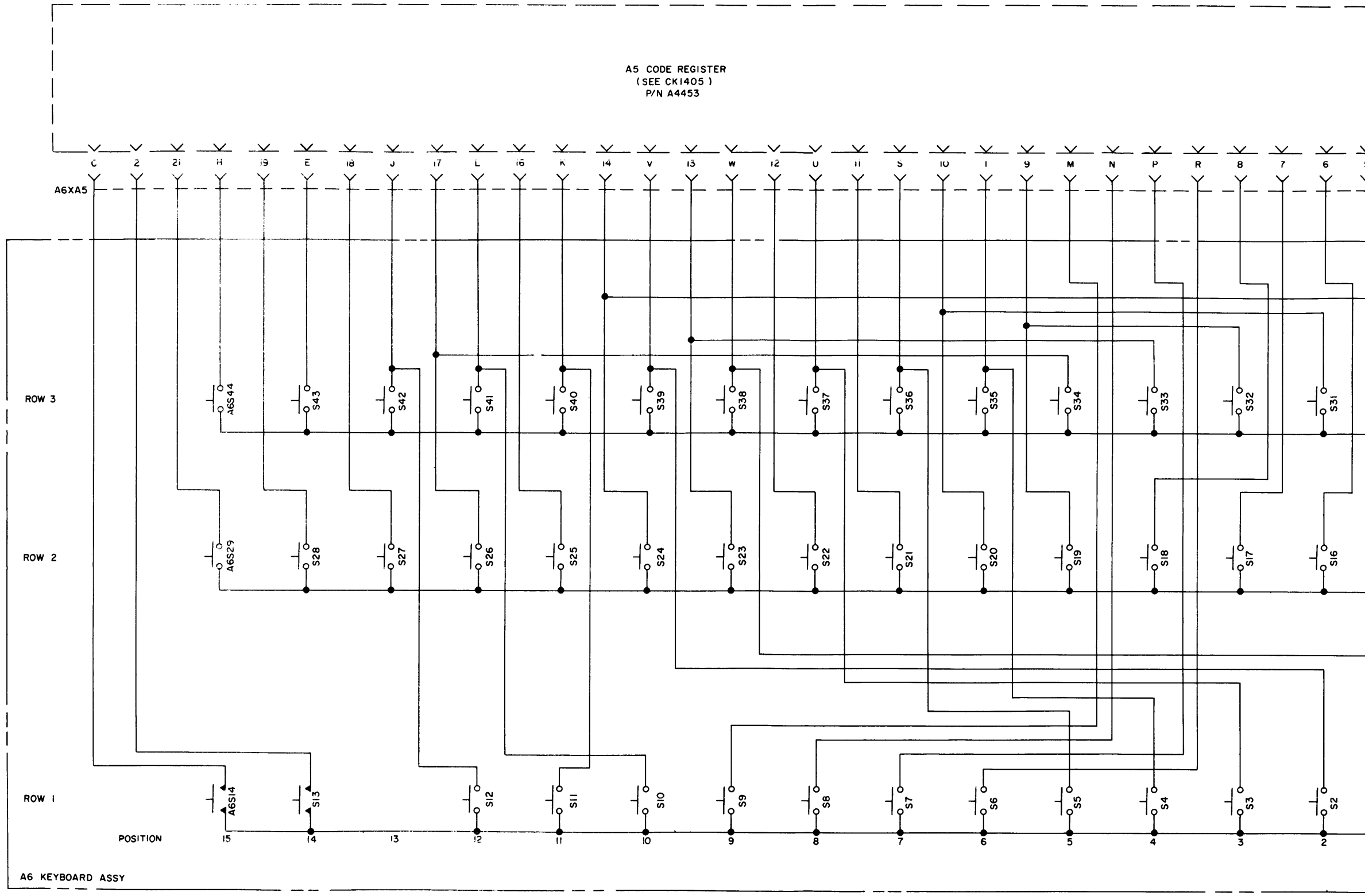
NOTE:

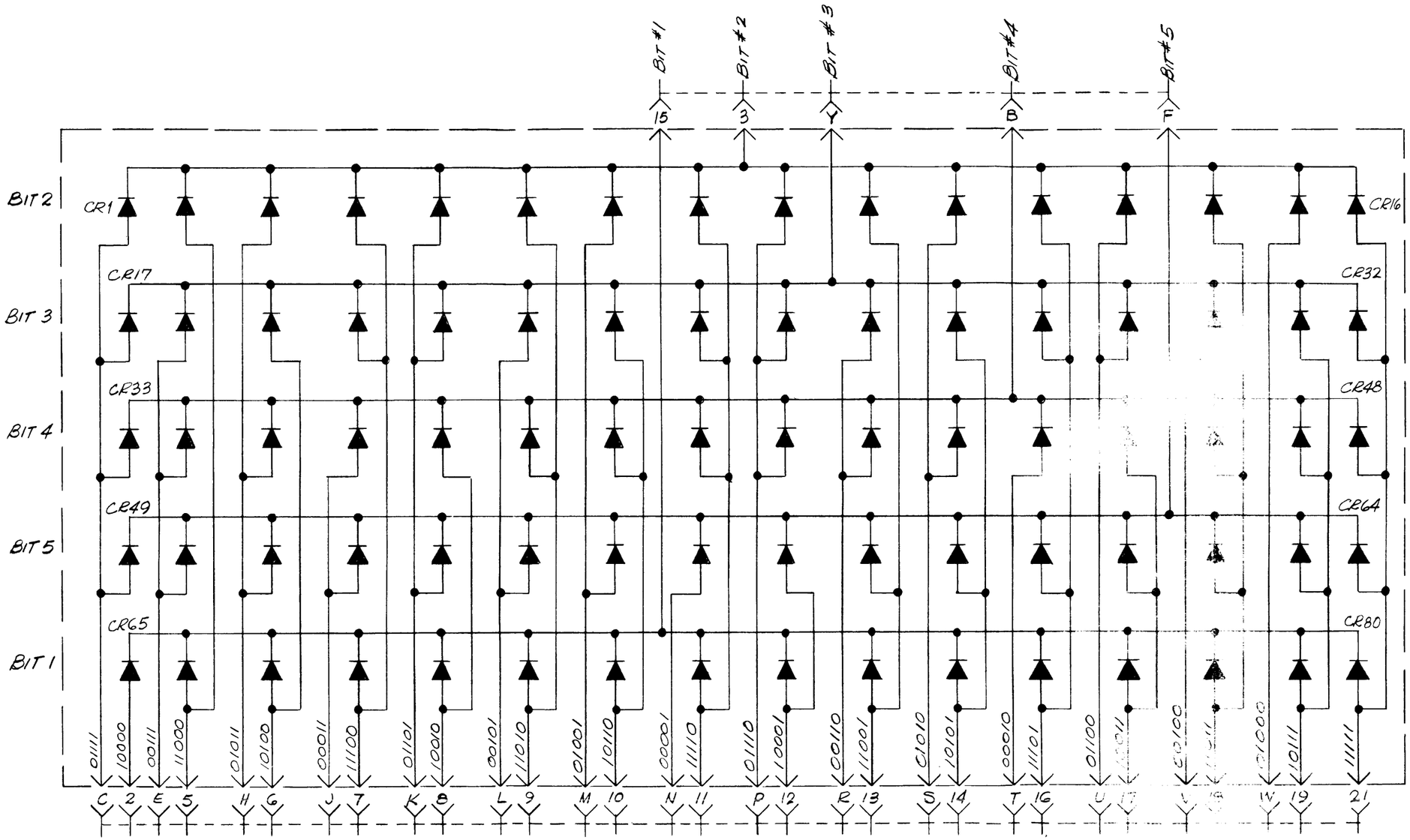
1. MECHANICAL LINKAGE THRU PUSHBUTTON SWITCHES A6S1 THRU A6S44 CAUSES PREVIOUSLY PUSHED SWITCH TO OPEN AS EACH SWITCH IS CLOSED.
2. SEE DETAIL "A" FOR SWITCH LOCATIONS IN A6 KEYBOARD ASSEMBLY.
3. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION (S) AS APPLICABLE

LAST SYMBOL	MISSING SYMBOLS
A6	S1
A6S44	T1
C2	TB1
	XA6
DS1	XDS1
F2	XF2
J2	
Q1	

CK1406

Figure 7-12. Wiring Diagram of Electronic Programmer, C-7775/UR


A5 CODE REGISTER
(SEE CK1405)
P/N A4453
A6XA5
C
2
21
H
19
E
18
J
17
L
16
K
14
V
13
W
12
U
11
S
10
1
9
M
N
P
R
8
7
6
ROW 3
A6S44
S43
S42
S41
S40
S39
S38
S37
S36
S35
S34
S33
S32
S31
ROW 2
A6S29
S28
S27
S26
S25
S24
S23
S22
S21
S20
S19
S18
S17
S16
ROW 1
A6S14
S13
S12
S11
S10
S9
S8
S7
S6
S5
S4
S3
S2
POSITION
15
14
13
12
11
10
9
8
7
6
5
4
3
2
A6 KEYBOARD ASSY



LAST SYMBOL - CR80

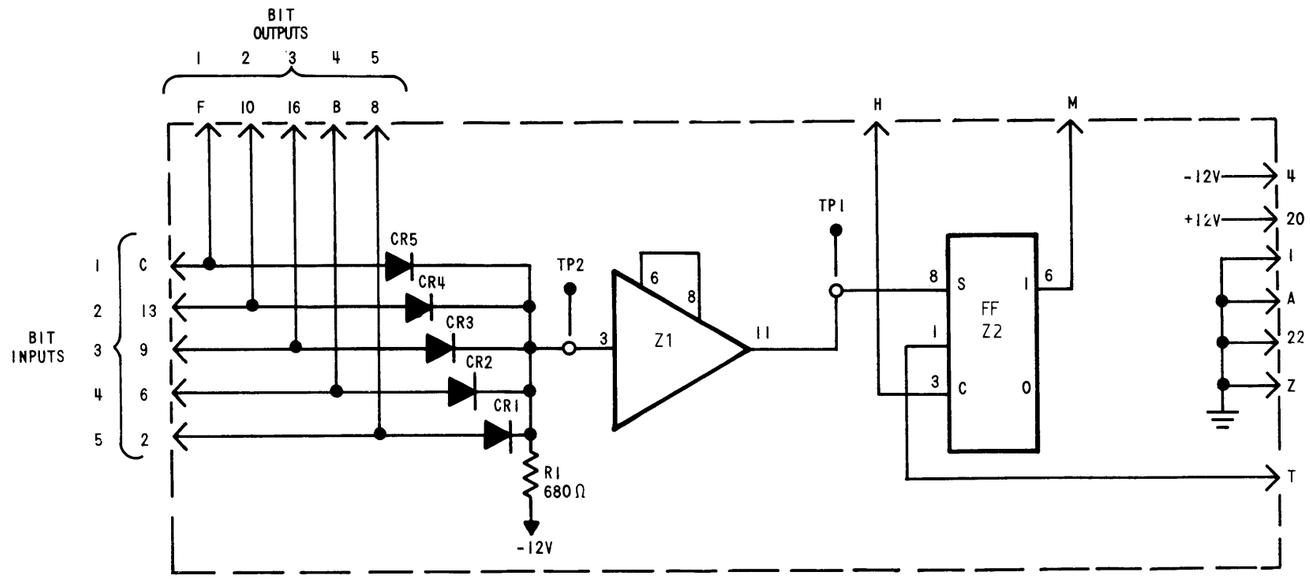
NOTE:

1- ALL DIODES ARE TYPE IN914

2- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION(S) AS APPLICABLE.

CK1405

Figure 7-13. Schematic Diagram of Code Register 3A1



MODULE VOLTAGE & GND CHART

SYMBOL	PIN CONNECTION +12V	-12V	GND
Z1	10	2 & 9	4 & 5
Z2	10	2	5

LAST SYMBOL	MISSING SYMBOL
CR5	
R1	
TP2	
Z2	

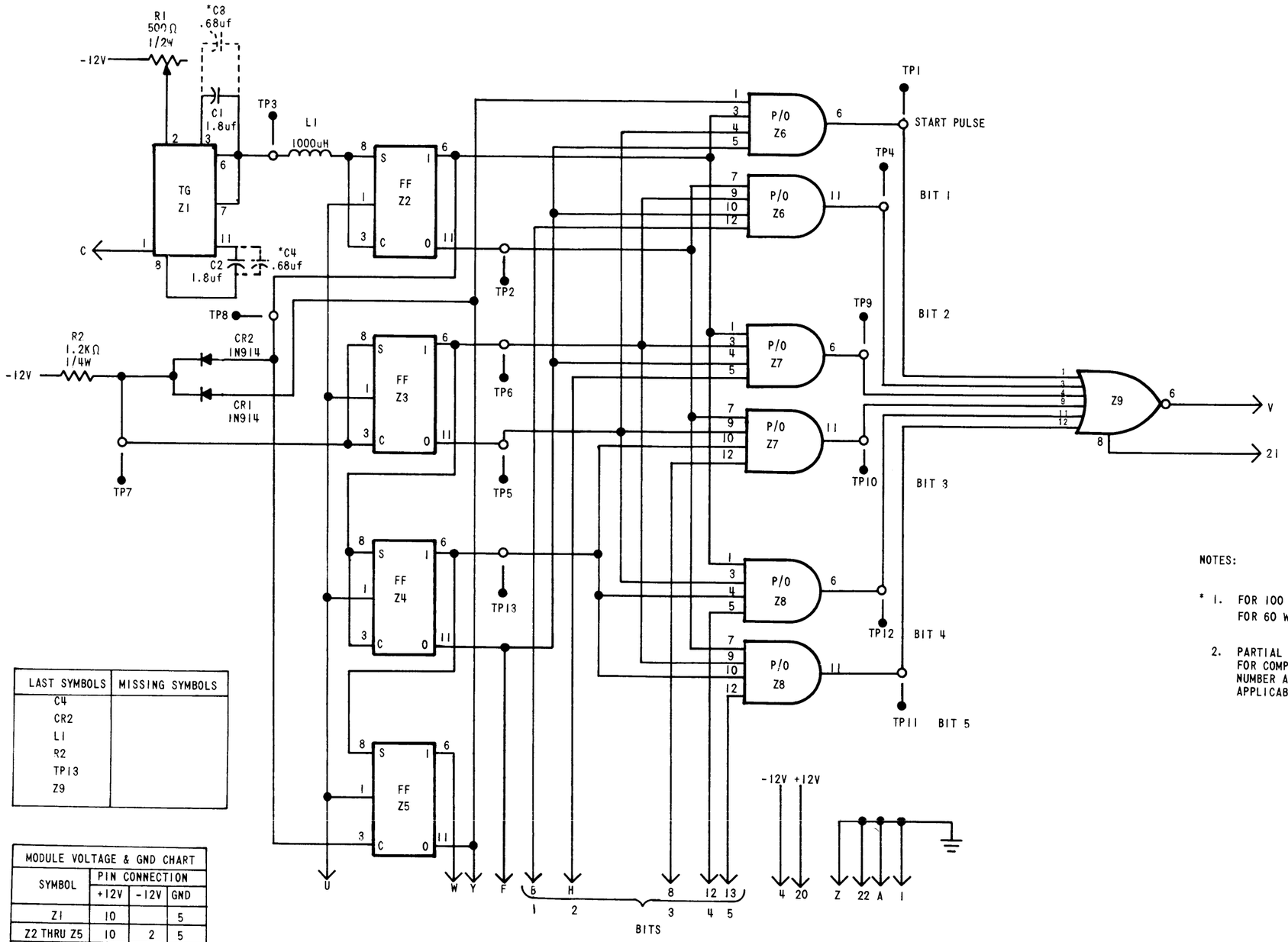
NOTES:

1- ALL DIODES ARE TYPE IN914.

2- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE.

CKI404

Figure 7-14. Schematic Diagram of Gating Circuit 3A4



LAST SYMBOLS	MISSING SYMBOLS
C4	
CR2	
L1	
R2	
TP13	
Z9	

MODULE VOLTAGE & GND CHART			
SYMBOL	PIN CONNECTION		
	+12V	-12V	GND
Z1	10		5
Z2 THRU Z5	10	2	5
Z6,7,8		2	
Z9	10	2	5

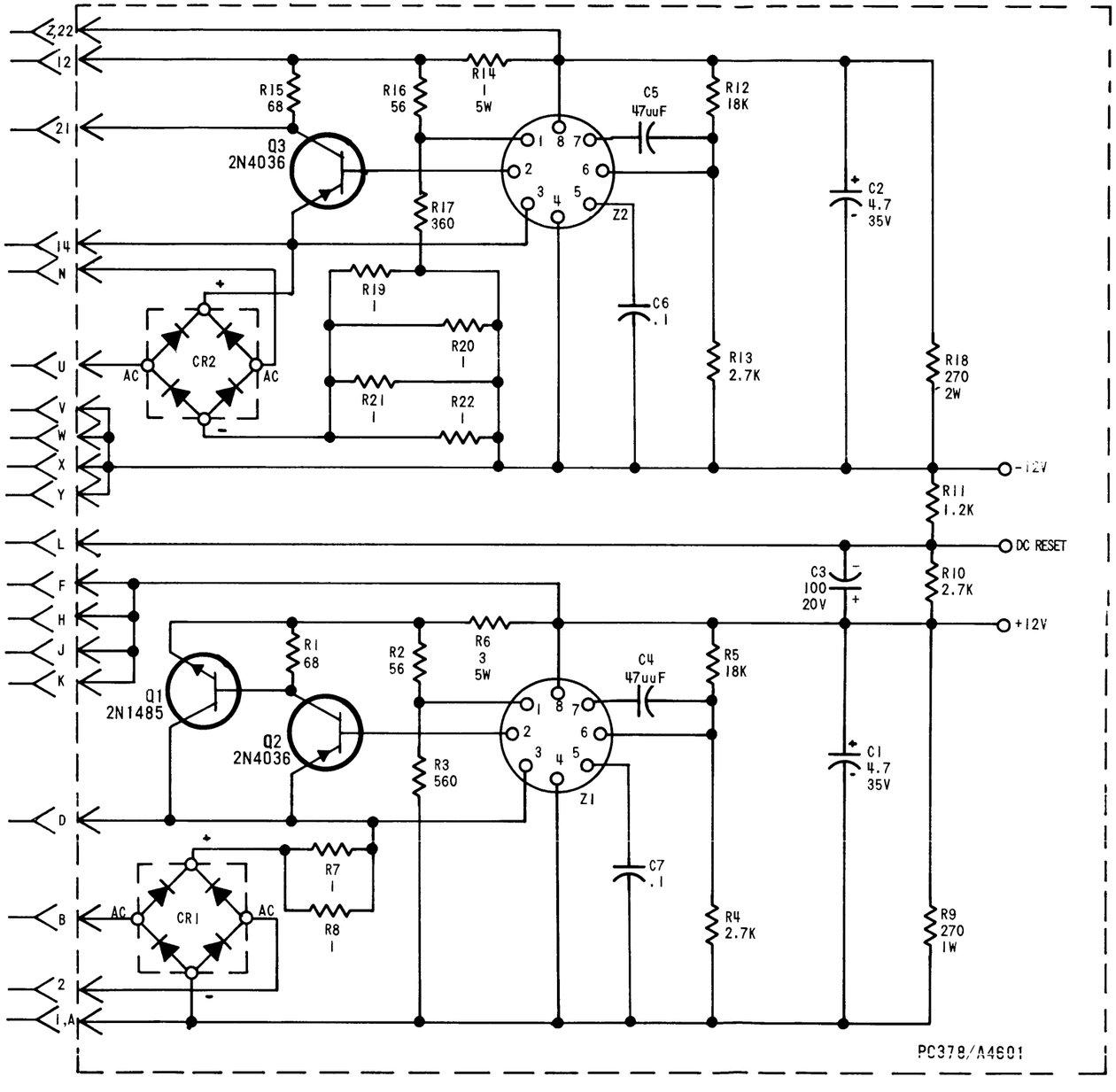
NOTES:

* 1. FOR 100 WPM OPERATION, DELETE C3 & C4
FOR 60 WPM OPERATION, ADD C3 & C4

2. PARTIAL REFERENCE DESIGNATION ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

CK1403

Figure 7-15. Schematic Diagram of Shift Register 3A3



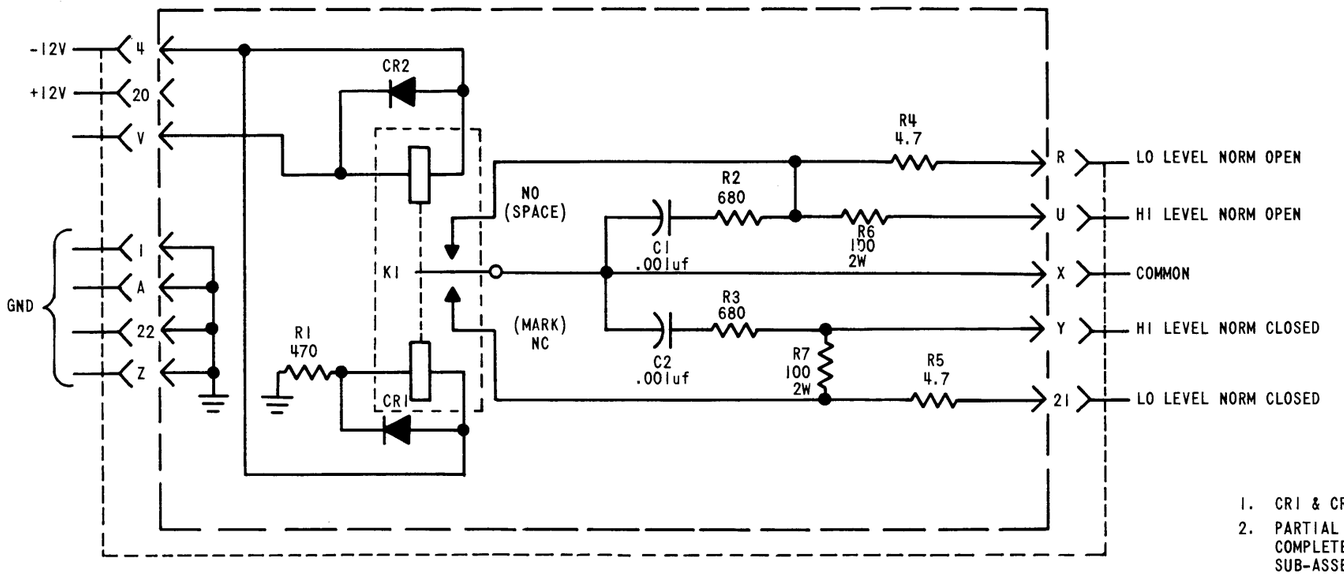
LAST SYMBOLS	MISSING SYMBOLS
C7	
CR2	
Q3	
R22	
Z2	

UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTANCE VALUES ARE IN OHMS, 1/2W
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER AND SUB ASSEMBLY DESIGNATION(S) AS APPLICABLE

CKI401

Figure 7-16. Schematic Diagram of Power Supply 3A1



NOTES

1. CR1 & CR2 ARE TYPE 1N4245
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER & SUB-ASSEMBLY DESIGNATION(S) AS APPLICABLE

UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 1/2 WATT

LAST SYMBOLS	MISSING SYMBOLS
C2	
CR2	
K1	
R7	

CK1402

Figure 7-17. Schematic Diagram of Keyer 3A2