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Operation and Maintenance Instructions

Identification Table of Parts and Illustrated Parts Breakdown for Command Signal Decoder KY-681/GGC

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(Supersession Notice Inside Cover)

SUPERSESSION NOTICE

This manual supersedes the following two documents:

1. Operation and Maintenance Manual for Command Signal Decoder KY-681/GGC, dated 1 July 1970 with the following publication numbers:

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CHAPTER 1

DESCRIPTION OF EQUIPMENT

I - CLASSIFICATION

1-1. CLASSIFICATION OF EQUIPMENT. - The KY=681/GGC, Command Signal Decoder, and this technical manual are unclassified.

II - GENERAL DESCRIPTION

1-2. PURPOSE OF EQUIPMENT. - The purpose of the KY=681/GGC (Figure l-l & l-2) is to decode programmed character sequences and provide command signals.

1-3. FUNCTIONAL DESCRIPTION. - See Figure l-3* System Block Diagram. The KY_681/GGC wiII continuously monitor four independent data lines, decode and recognize programmed sequences transmitted over those lines and generate command signals upon recognition of a programmed sequence. The data lines can operate at independent data rates of 75×2^n (where n equals zero or a positive integer) up to 4800 baud. An internal clock is provided for asychrononous operation at 75 baud. At all other modulation rates external clock must be provided at twice the data rate, i.e., for 4800 baud data external clock must be provided at 9600 baud. The KY-681/GGC can be programmed to reoognize up to 12 sequences of 10 characters or less on each of the data lines. Recognition of a programmed sequence results in a pulse output. Each sequence has a separate output line. The monitored data must be in International Telegraph Alphabet #2, American Version. In synchronous operation the input data character interval must consist of a start bit and five data bits. A stop element is not required but, if present, must consist of an integral multiple of the unit interval. For asynchronous operation the character interval must consist of a start bit, five data bits and a stop bit of at least 0.6 of a unit interval duration.

III - PHYSICAL DESCRIPTION

1-4. EQUIPMENT DESCRIPTION. - The KY=681/GGC consists of a single drawer of circuit card assemblies (Figure l-4). The physical dimensions of the equipment as well as the equipment supplied are listed in Table l-l. Other equipment required, but not supplied as part of the KY-681/GGC, is found in Table l-2.

a- Construction. - The KY-681/GGC consists of 19 circuit card assemblies which plug into a printed wiring motherboard. There are four differenttypes of printed circuit card assemblies. Table l-3 lists the circuit card assemblies and their locations. Each type of card is keyed to match the proper connector in the chassis to prevent inserting cards into the wrong connector. An extender card is supplied with each equipment and is stored in a connector mounted on the motherboard. All external connections are made at four connectors mounted on the rear of the chassis. The chassis is designed for 19-inch rack mounting with or without the use of slides (slides are provided but not mounted). The 19-inch rack mounting brackets are removable allowing the drawer to be mounted in a rack-mounted enclosure.

* This drawing appears in the Appendix

QUANTITY	FIGURE REFERENCE	ITEM	DIMENSION W	H	D	WEIGHT (lbs) (Uncrated)
1	1-1, 2-1	KY-681/GGC	19	5-¼	15-3/8	30
4		0N150450 Connector (Winchester P/N XAC75PD3A300)				
144		0N150452-1 Terminal, Pin (Winchester P/N 100-1024P)				
16		0N150452-2 Terminal, Pin (Winchester P/N 100-1016P)				
1 Pr.		0N150449 Slide (Grant P/N 329-18)				
960		JAN1N914 Diodes				
4		No. 8-32 x 3/8 Flat Head Screw (82°)				
4		No. 8-32 Nut				
4		No. 8 Lock Washer				

Table 1-1. -Equipment Supplied

QUANTITY	ITEM
1	Regulated Power Source of +6 VDC ±1V @ 6.0 AMP
1	Regulated Power Source of -6 VDC ±1V @ 0.7 AMP
1	Regulated Power Source of -12 VDC ±1V @ 0.1 AMP

Table 1-2. -Equipment Required but not Supplied

Qty.	Assembly Ref. Designation	Location	Part Number
4	A1, A2, A3, A4	XA1, XA2, XA3, XA4	ON150438
1	A5	XA5	ON160442
4	A6, A7, A8, A9	XA6, XA7, XA8, XA9	ON150440
10	A10 through A19	XA10 through XA19	ON15044

Table 1-3. -Circuit Card Assembly Location

IV - QUICK REFERENCE DATA

1-5. QUICK REFERENCE TABLE. - Table l-4 lists the electrical and environmental characteristics of the KY-681/GGC.

Electrical Characteristics:	
Operating Power Requirements	+6 VDC ±1V @ 6.0 AMP –6 VDC ±1V @ 0.7 AMP –12 VDC ±1V @ 0.1 AMP ground connection
Input Signals –	
Current	Greater than ±15 microamperes
Impedance	68K ohm load
Frequency	75 – 4800 baud
Output Signals –	
Voltage	±6V ±10% polar
Impedance (Source)	Less than 100 ohms
Pulse Width	Equals one unit interval at the input data modulation rate
Environmental Characteristics:	
Ambient Temperature –	
Operating	0ºC to 55ºC
Non-operating	–62ºC to 75ºC
Heat Dissipation	45 watts
Air Conditioning	Not required
Humidity	95% relative humidity
Altitude	Continuous operation to 10,000 feet

Table 1-4. -Quick Reference Table

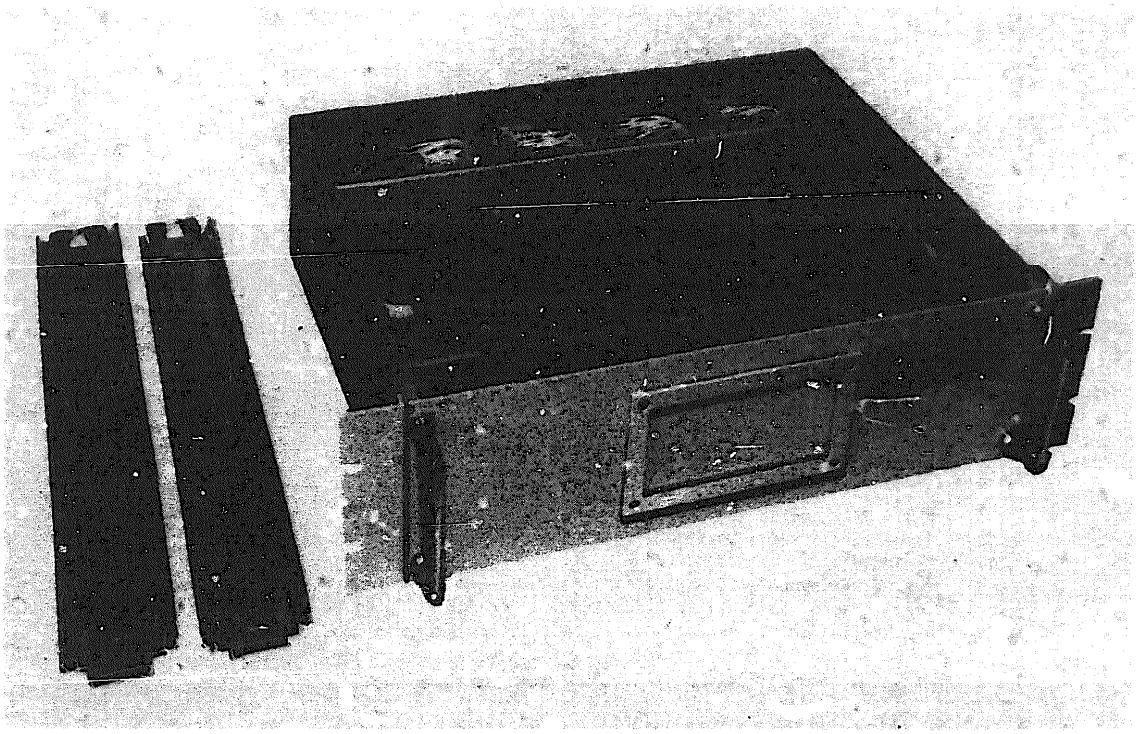


Figure 1-1. - KY- 68l/GGC

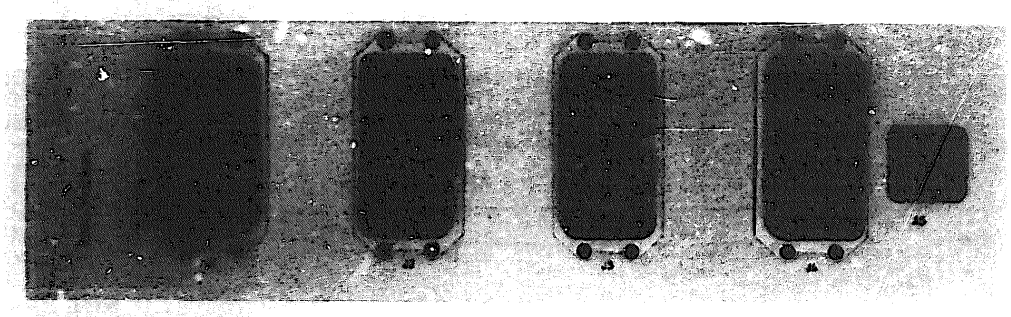


Figure 1-2. - KY-68l/GGC Connector Panel

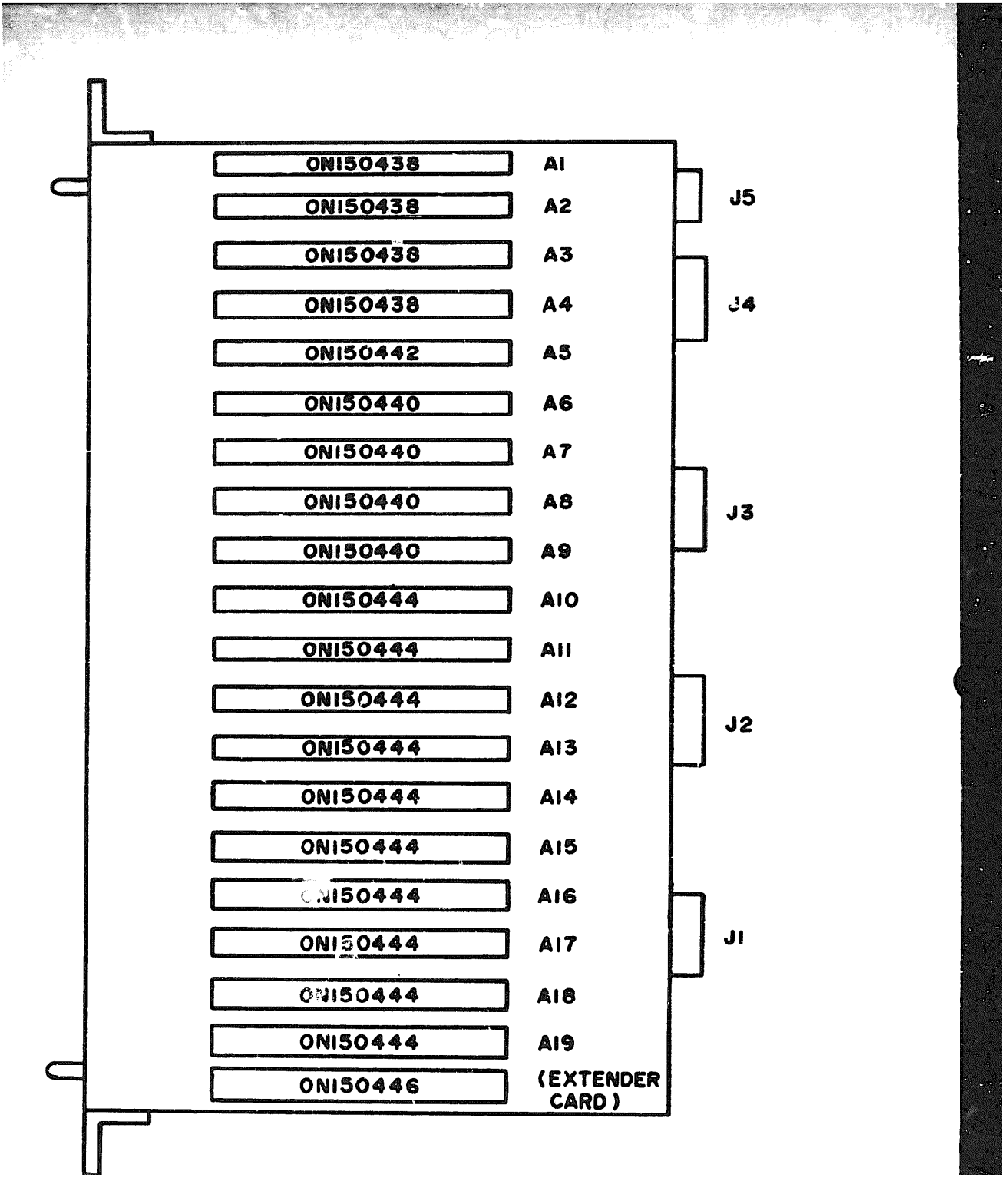


Figure 1-4. Card Layout

CHAPTER 2

INSTALLATION

I- UNPACKING AND INSPECTION

2-1. UNPACKING. Unpacking should be done near the area where the equipment is to be installed. No special equipment is required.

a. Packaging Data. The KY-681/GCC is packed in individual corrugated cartons with protective filler. The programming diodes, connector pins, and slides are individually wrapped and are included in the corrugated carton. The carton is approximately 7 inches high, 20 inches wide, 20 inches deep. The uncrated weight for each unit is approximately 40 lbs.

2-2. INSPECTION PROCEDURE. Inspect the equipment for completeness as listed on the packing slip and for damage incurred during shipment. If a packing slip is not available check the equipment against Table 1-1.

2-3. DAMAGE REPORT. - Damages or shortages should be reported in accordance with those instructions issued by the custodial department or agency.

II- INSTALLATION PROCEDURES

2-4. GENERAL. - The KY-681/GGC is constructed for mounting either in a standard 19 inch rack or in an enclosure with the chassis slides supplied.

2-5. TOOLS AND TEST EQUIPMENT. - No special test equipment is required. Table 2-1 lists the special tools required for crimping the connector terminals to the connecting cable.

2-6. LOCATING THE EQUIPMENT. - The KY-681/GGC should be installed allowing a minimum access of 24 inches between the rear of the equipment and 30 inches between the front panel of the unit and other equipment in the area.

MS Part Number	Winchester Part Number	Nomenclature
MS-3191-2	107-0970	Crimp Tool
MS-3191-20B	107-0976	Positioner
MS 3191-16B	107-0977	Positioner
- - -	107-1015	Contact Insertion Tool
	107R-1001	Contact Removal Tool

Table 2-1. -Special Tools

2-7. MOUNTING THE EQUIPMENT. - The KY-681/GGC has two methods of mounting.

a. Fixed Rack Mounting. - The KY-681/GGC is provided with removable mounting brackets which permit the unit to be fixed mounted in an RR197 rack. There are four mounting screw slots that will align with mounting screw holes in the RR197 rack. The slots are standard EIA dimension for a 5-1/4 inch panel.

b. Slide Mounting. - A set of unmounted accessory slides is provided with each unit. The slides are normally used when the equipment is to be mounted in an enclosure. Attach the slides to the KY-681/GGC chassis using #8-32 x 3/8 inch flat head screws, #8-32 nuts and #8 lockwashers (Table 1-1).. If the mounting brackets are not required they should be detached from the chassis by removing four screws.

2-8. WIRING AND CABLING. - All external cabling terminates on the four connectors (Winchester P/N XAC75PD3A300). There is one connector for each of the four channels (J1, J2, J3, J4). Prefabricated cables are not supplied with the unit However, the cable terminating pins and connectors are supplied.

a. Preparation. - Remove the connector body from the connector hood by removing the four attaching screws. (It is not necessary to remove the jack screws.) The cable should be fed through the connector hood cable clamp. The hood should be placed at least one foot from the wire end and left loose until the wire terminations are completed.

b. Wire Table Usage. - Table 2-2 lists the signal names and connector pin numbers of the input/output wiring. The table applies to J1, J2, J3 and J4, since the signal names and pin numbers are the same for each channel. Use #24 AWG wire unless otherwise noted in the table.

c. Typical Wiring Procedure. - Tools required for terminating wires in the XAC75PD3A300 connector are wire cutters, wire strippers and those special tools listed in Table 2-1. Crimp tool MS3191-2 is used with MS3191-20B to crimp #24 AWG and with MS3191-16B to crimp #16 AWG wire. Wire #24 AWG is crimped into 0N150452-1 terminal pins and #16 AWG wire is crimped into 0N150452-2 terminal pins. To crimp a terminal pin on a wire, first strip 3/16 of an inch of insulation from the end of the wire. Then, insert the stripped end into the barrel of the terminal pin until the wire bottoms in the pin. Crimp the pin onto the wire using the proper positioner with the crimp tool. After crimping, insert the pin into the proper location in the connector block. Insert the pin from the back (hood side) of the connector block. Use the insertion tool, Winchester P/N 107-1015, to press the pin into its locked position. To remove a pin from the connector block use the contact removal tool, Winchester P/N 107R-1001. Insert the removal tool in the proper location in the front of the connector block. Apply constant pressure until the pin is released. After all wires and pins have been crimped and inserted into the connector block, reassemble the connector block and hood and tighten the cable clamp. When the chassis is to be slide-mounted, leave sufficient slack in the cable to permit full withdrawal of the chassis on the slides.

2-9. PROGRAMMING. - The KY-681/GGC contains two levels of programming. The first level selects proper interface modes and is implemented by means of wire

Signal Name		Connector Pin No.
Sequence No.	1 polar	1
	1 neutral	2
	2 polar	3
	2 neutral	4
	3 polar	5
	3 neutral	7
	4 polar	8
	4 neutral	10
	5 polar	11
	5 neutral	12
	6 polar	13
	6 neutral	14
	7 polar	15
	7 neutral	16
	8 polar	17
	8 neutral	18
	9 polar	20
	9 neutral	21
	10 polar	22
	10 neutral	23
	11 polar	24
	11 neutral	25
	12 polar	26
Sequence No.	12 neutral	27
Data In		28
Data Return		29
Clock In		30
Clock Return		31
Polar Data Bias		37
Data Bias In		38
Neutral Data Bias		39
Polar Clock Bias		40
Clock Bias In		41
Neutral Clock Bias		42
External Clock Select		43
Clock Select In		44
Internal Clock Select		45
Pulse Width Select In		47
4800 p w Select		49
2400 p w Select		50
1200 p w Select		51
600 p w Select		52
300 p w Select		53
150 p w Select		54
75 p w Select		55
+6 VDC (No. 16 AWG)		65
–6 VDC (No. 16 AWG)		66
–12 VDC (No. 16 AWG)		67
GND (No. 16 AWG)		70

Table 2-2. -Wire Table

jumpers on the rear connectors (Jl, J2, J3 and J4). The second **level of programming** is for recognition of sequences and is implemented by positioning diodes on the Register/Program Cards (A10 through A19).

a. **Interface Programming-. - The** following description is for programming one rear connector (J1) which is associated with a single input line. The **other** three connectors (J2, J3, J4) are programmed in a similar manner.

(1) Polar/Neutral Input. - Polar or Neutral data and external clock may be used as input signals to the KY-681/GGC. The selection **for polar or neutral** operation is made by biasing the input interface circuit (A1MD9A and B) co accept the signals applied to the inputs. Table 2-3 lists the jumpers to be installed on the connector for selection of the bias voltage.

	Polar	Neutral
Data	Jumper pin 37 to 38	Jumper pin 38 to 39
Clock	Jumper pin 40 to 41	Jumper pin 41 to 42

Table 2-3. -Polar/Neutral Programming

(2) Internal/External Clock. - The KY-681/CGC may operate synchronously with external clock at data rates from 75 to 4800 baud or asynchronously at 75 baud only using internally derived clock. The connections for internal or external clock selection are listed in Table 2-4.

External Clock	Internal Clock
Jumper pin 43 to 44	Jumper pin 44 to 45

Table 2-4. -Clock Programming

(3) Output Pulse Width. - The output pulse width is programmable to be approximately one unit interval at the input modulation rate. The proqamming connections for data rates from 75 to 4800 baud in increments of 75 x 2 are **listed** in Table 2-5 where n is zero or a positive integer.

Data Rate (baud)	Jumper pin 47 to pin
4800	49
2400	50
1200	51
600	52
300	53
150	54
75	55

Table 2-5. -Pulse Width Programming

b. Sequence Programming. - **Up to 12 sequences** containing up to 10 characters **each may be programmed for each** of **the 4 input lines. The programming** of each character **requires the positioning of** two **diodes** on one of the Register/Program Cards. The first diode selects one of the eight possible combinations of the first **three bits (000, 001, 010, 011, 100, 101, 110, 111). The second diode selects** one of the **four possible combinations of bits four and five (00, 01, 10, 11). A Register/ Program Card contains the storage, decoding and programming points for one character** in each of 48 sequences, 12 for each of 4 lines. Therefore, ten cards (A10 through **A19) are required to program up to ten characters per** sequence. The 48 **character programming** sections are arranged in 12 groups of 4 with the groups numbered on the card. Each group represents one of the 12 possible sequences for a line with one section **for each of** the 4 input lines. When a ten-character group is **transferred** into the **Register/Program Cards** from an Input Card, the most recent **character received always is** located in the register on card Al0. The character **preceding that is located on card All, etc.,** with the oldest of the ten characters on card A19. **Therefore, when programming for any** sequence, the last character (N) must be programmed on card A10, next to last (N-1) on card All, etc. Only the **number of characters contained in a** sequence need to be programmed so that sequences of less than ten characters do not **require programming** on all ten cards. Since the last **character** (N) in any sequence is programmed on card Al0, this position is used as a **reference and the sequence is programmed** in reverse order (N, **N-l, N-2, N-3, etc.). For example,** the procedure for programming sequence AB(BLANK)C as sequence **1 of line 1 and** X8YZ as sequence 1 of line 2 is as follows: - (1) Make a **table** as shown in Table 2-6 listing all characters in reverse order with their binary equivalent; (2) **program** the last character of the two **sequences** C $\begin{Bmatrix} 54321 \\ 01110 \end{Bmatrix}$ **and** Z $\begin{Bmatrix} 54321 \\ 10001 \end{Bmatrix}$ on card **A10** as shown in Figure 2-2; (3) program the next to last **(N-l) character of each** sequence (BLANK and Y) on card All as shown in Figure 2-3; (4) program the (N-2) character of each sequence (33 and LTRS) as shown in Figure 2-4; (5) continue until all characters for both sequences are programmed (see **Figures** 2-5, 2-6 and 2-7). The non-printing letters and figures shift **characters must be programmed** as indicated in sequence 1, line 2, as shown in Table 2-6 **because they** appear as part of the sequence.

	CHARACTER (Card Location)									
	N(A10)	N-1(A11)	N-2(A12)	N-3(A13)	N-4(A14)	N-5(A15)	N-6(A16)	N-7(A17)	N-8(A18)	N-9(A19)
Bits	54 321	54 321	54 321	54 321	54 321	54 321	54 321	54 321	54 321	54 321
	C 01 110	BLANK 00 000	B 11 001	A 00 011						
	Z 10 001	Y 10 101	LTRS 11 111	8 00 110	FIGS 11 011	X 11 101				

Table 2-6. Programming Table

III - INITIAL OPERATION

2-10. INITIAL OPERATION AND TEST. - The KY-68l/GGC requires no preliminary adjustment or calibration before initial operation. Introduce test sequences following programming according to Section 2-9 for content, voltage levels, data rate, and clock source. Observe the waveforms of each used output for correct occurence, pulse width, and amplitude. A positive output pulse should begin near the middle to end of the fifth data bit of the last character in a sequence and be approximately one bit in duration. The normal state of the output signal should be near -6 volts and change to +6 volts (polar) or ground (neutral) upon activation.

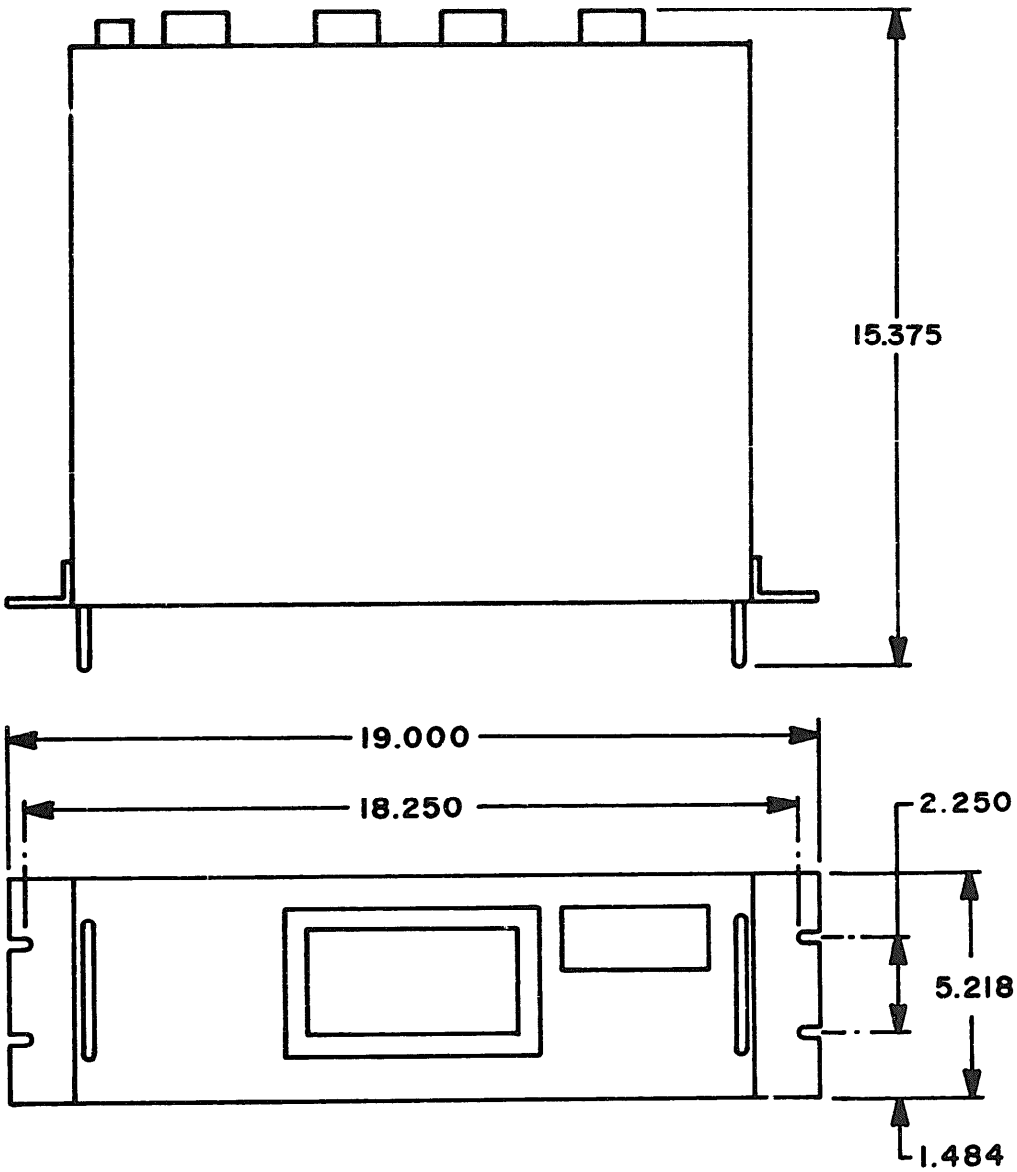


Figure 2-1. - Equipment Dimensions

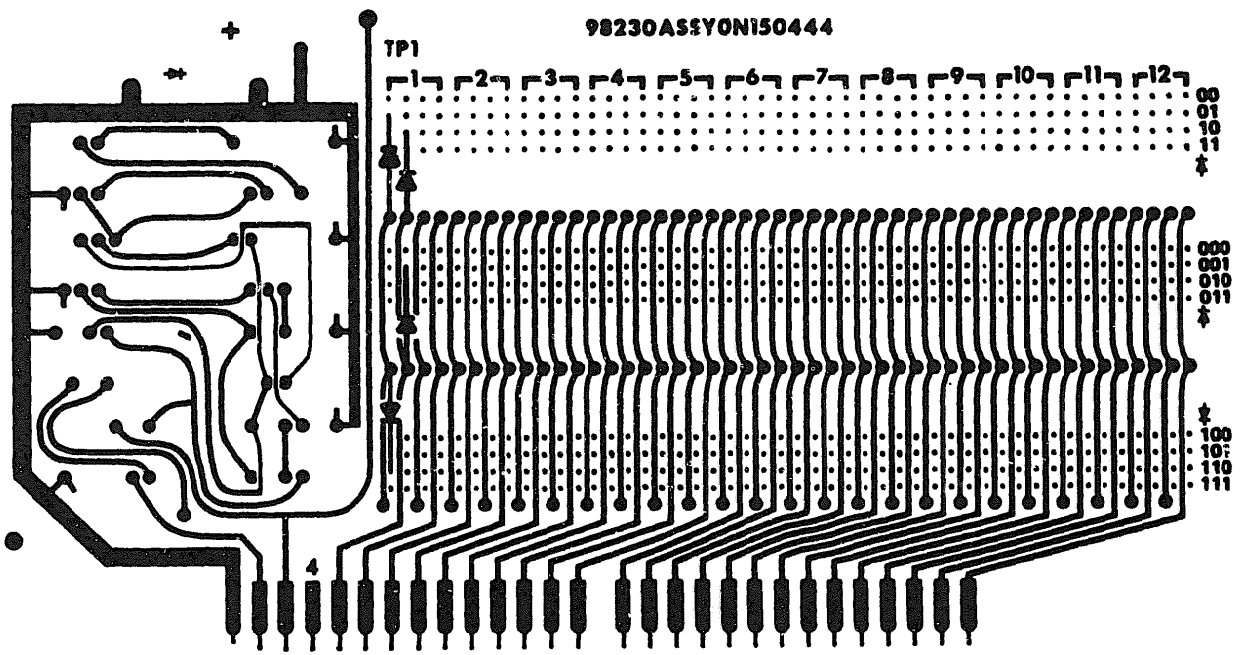


Figure 2-2.-A10 Program Example

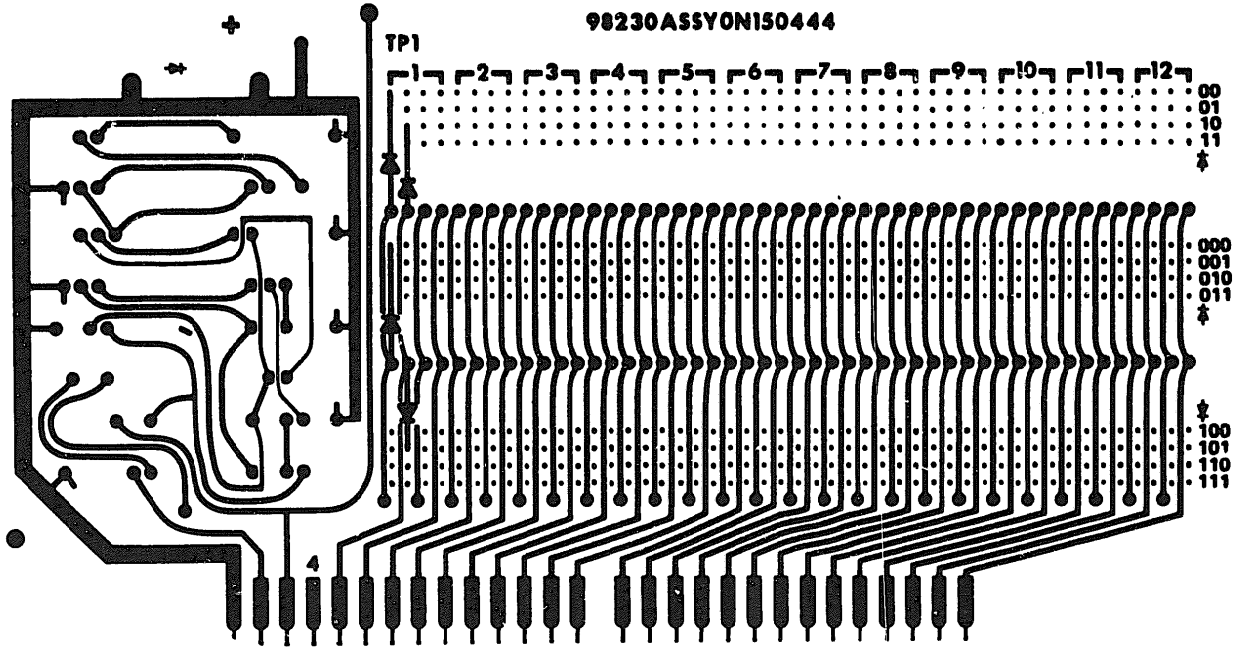


Figure 2-3.-A11 Program Example

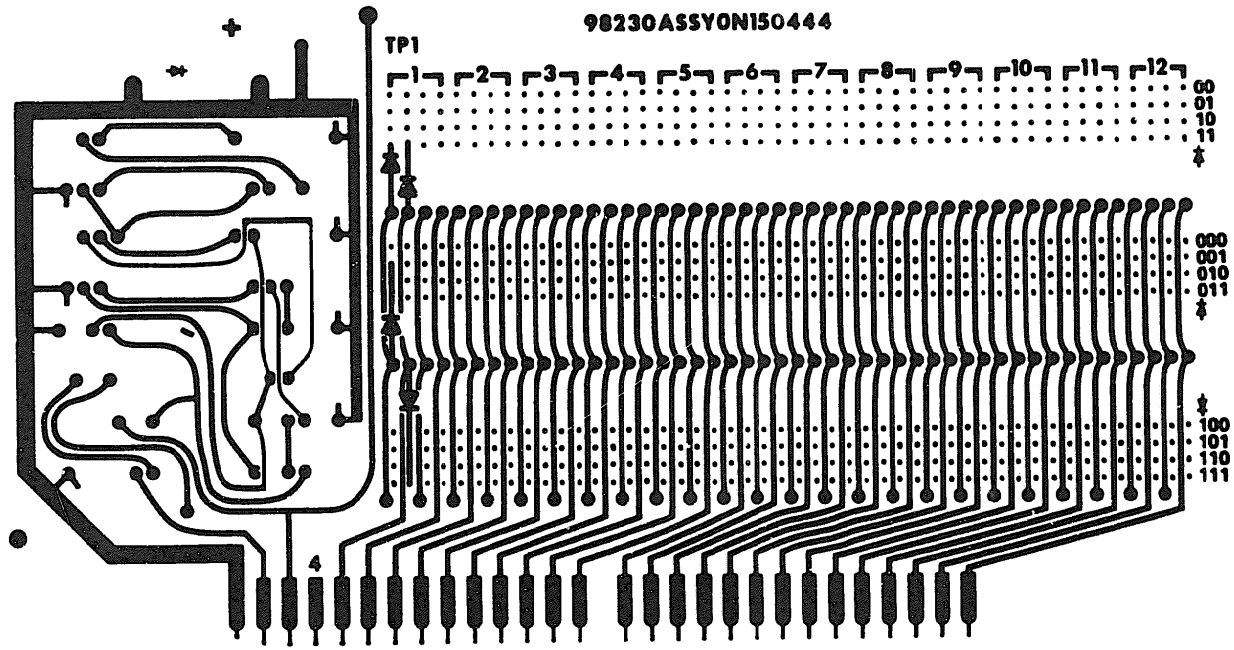


Figure 2-4.-A12 Program Example

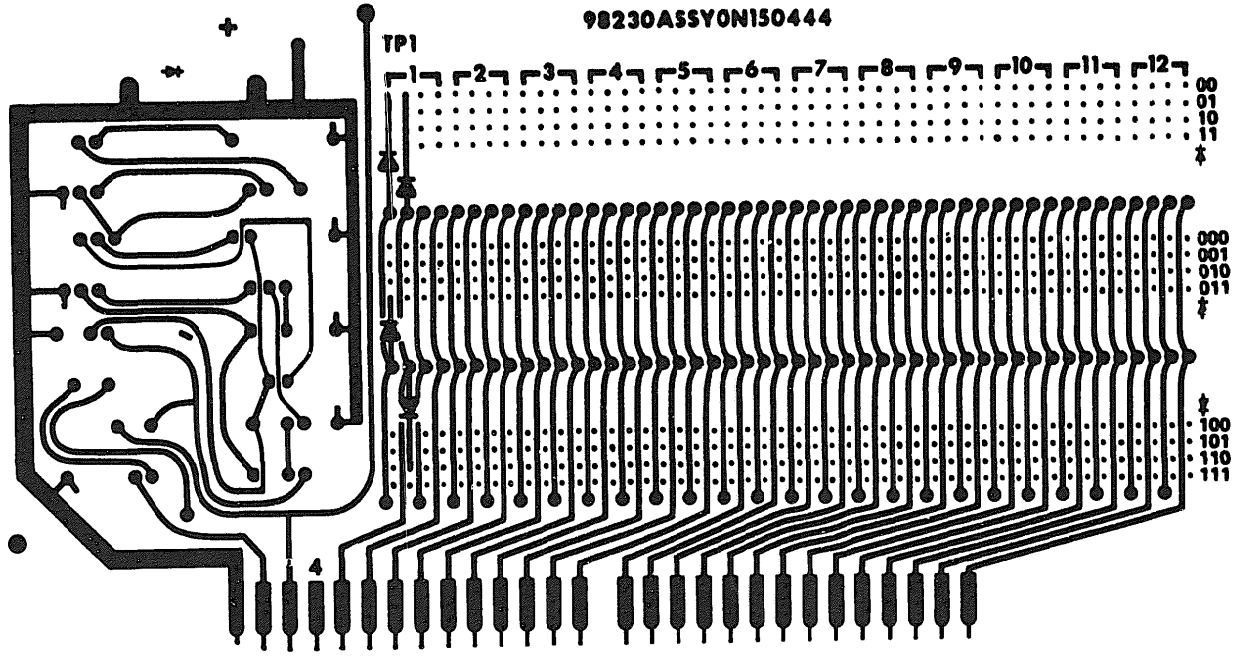


Figure 2-5.-A13 Program Example

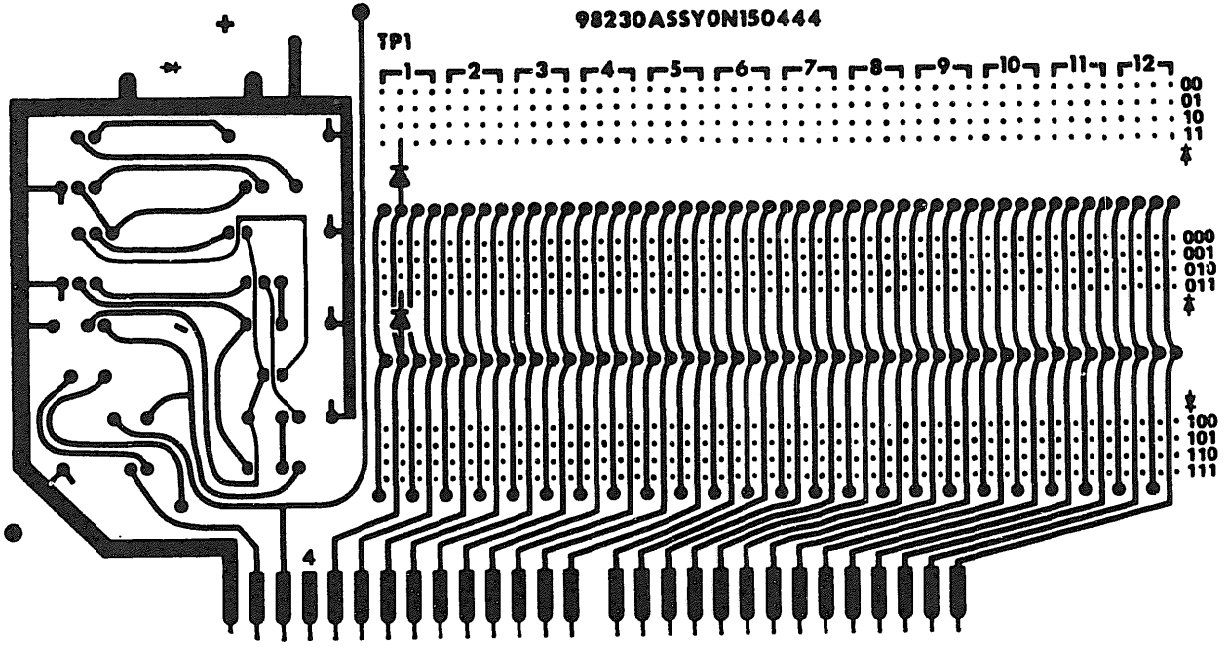


Figure 2-6.-A14 Program Example

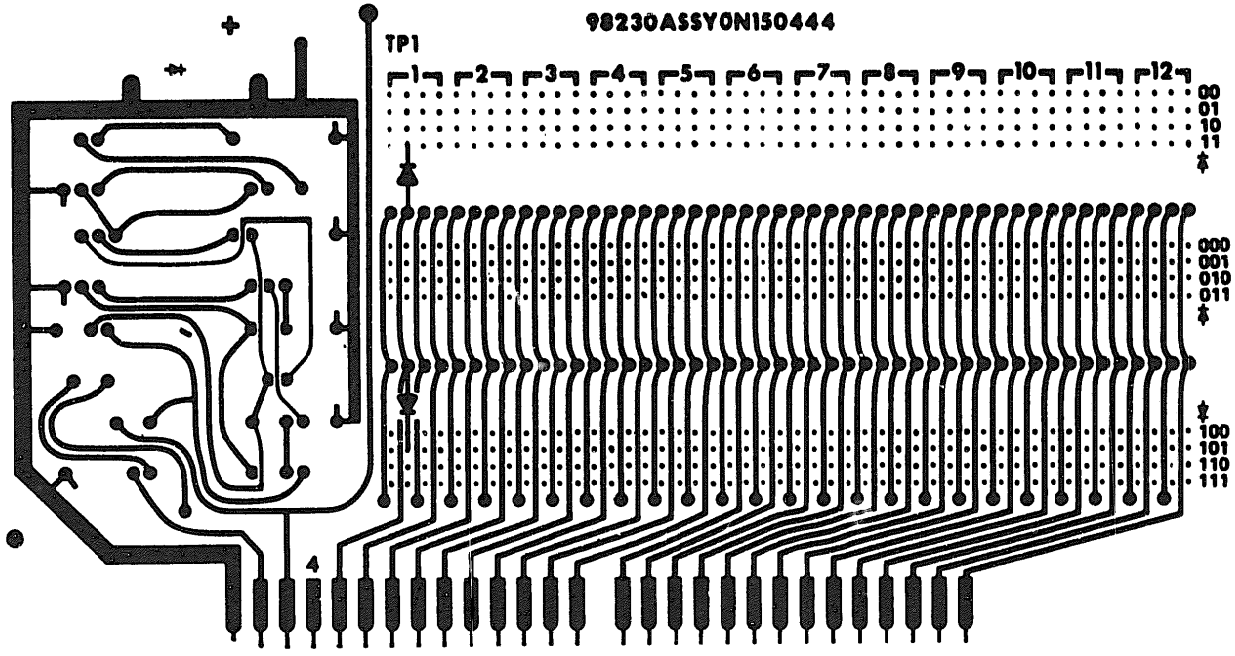


Figure 2-7.-A15 Program Example

CHAPTER 3

OPERATING INSTRUCTIONS

I - OPERATING PROCEDURE

3-1. OPERATOR CONTROLS. - The KY=68l/GGC has no front panel controls and requires no operator intervention.

3-2. POWER TURN-ON. - Power turn-on should be a maintenance function. There are no special start/stop instructions for the KY=681/GGC. Synchronization is automatic after power turn-on.

CHAPTER 4

PRINCIPLES OF OPERATION

I - BASIC PRINCIPLES

4-1. **GENERAL. - The KY-681/GGC c**ontains circuitry which monitors the data **on four independent lines and provides** an output signal for each programmed **sequence that is recognized. The logic circuits** used are integrated circuit modules **packaged in 14 and 16 pin dual in-line cas**es. They are grouped according to func**tion on circuit card assemblies which** are then interconnected by a printed wiring motherboard.

II-FUNCTIONAL DESCRIPTION

4-2. KY-681/GGC. - The KY-681/GGC **is** a digital data line monitor which provides the **capability of** continuously monitoring the data on **four** independent lines. The data lines can be operating at the same or different modulation rates up to and **including** 4800 **baud** when accompanied by clock at twice the data rate. (For example, a 4800 **baud** data line **requires a** square **wave** 9600 baud clock.) Also, internal clock **is** provided **for asynchronous operation at 75 baud.** The unit can be programmed to **detect as many as 12 sequences of ten characters** or less per line (48 sequences total). **Recognition of a sequence causes an output** pulse to be produced which is approxi**mately one unit interval in width at the incoming** data modulation rate. Twenty-four **outputs (both polar and neutral for e**ach **of twelve** sequences) are individually avail.. **able for each of the four data lines.** All characters recognized must be in five bit **format, ITA #2, American version.** Also, for asynchronous operation they must be **accompanied by a unit interval start bit** and a stop bit of at least 0.6 unit interval. **When operating synchronously with exte**rnal clock, the stop bit may or may not be present. When present it must be an integral multiple of a unit interval. Refer to Figure l-3,* KY-681/GGC System Block Diagram as a reference for the following discussion **of the function of each of the major** sections.

a. ON150442 Timing Card Assembly. - The Timing Card Assembly contains timing circuits for generating system clock control signals, and the combiner for time division multiplexing the outputs of the four Input Card Assemblies for entry **of data into the Register/Program** Card Assemblies.

b. ON150438 Input Card Assembly. - The Input Card Assembly contains three types of circuits: character synchronizer circuits, storage and control circuits, and reset counter circuits. The character synchronization circuits provide character framing of the incoming data for removal of start and stop bits and to permit operation with variable length stop bits. They also provide internal clock synchronization when operating asynchronously at 75 baud. The storage and control circuits store the most recent ten characters of incoming data (less start and stop bits) in a storage register. After each new character is accumulated in the storage register (replacing the oldest one), the ten character group is transferred non-destructively by the control circuits into the Register/Program Card Assemblies where it is examined for the presence of programmed sequences. Recognition of a sequence initiates an output pulse. The reset counter determines the output pulse width for a detected sequence. It accepts clock at 8 times the data rate and produces a reset signal at the end of a count of eight clock transitions which resets any output storage flip-flops that were previously set upon recognition of a sequence.

* This drawing appears in the Appendix

c. 0N150444 Register/Program Card Assembly. - The Register/Program Card Assembly contains a single character shift register, decoder circuits, 48 character program positions (one for each sequence) and a divide-by-two circuit. Ten of these Card Assemblies are necessary for the storage and programming of sequences containing up to ten characters. The character register stores a five bit character while the program detects the desired characters. The decoder circuits simplify the programming of each character by partially decoding the outputs of the character register. The 48 outputs of the program section for each card are combined with the identical outputs of the 9 other Register/Program Cards in 48 common bus lines. The 48 bus lines (12 for each data input line) are distributed to the Output Card Assemblies where a detected sequence is used to enable a storage flip-flop. The divide-by-two circuit on the Register/Program Card Assembly is used in conjunction with signals from the Timing Card Assembly to provide the programmable clock signals for the reset counter circuit. Also, a 1200 Hz clock is derived for internal clocking of asynchronous data.

d. 0N150440 Output Card Assembly. - The Output Card Assembly contains 12 flip-flop storage elements and polar and neutral drivers for the output signals. Each flip-flop is connected to a separate bus line from the Register/Program Card Assembly and is enabled by a detected sequence signal on the bus line. Set and reset pulses from the associated Input Card Assembly then cause the flip-flop to produce a pulse of one bit duration at the incoming data modulation rate. The polar interface circuits meet the low level requirements of MIL-STD-188B and the neutral circuits are capable of driving a FLYBALL logic input. Both types of outputs are available for simultaneous use.

III - CIRCUIT DESCRIPTION

4-3. LOGIC DIAGRAMS. - The logic diagrams for the KY-681/GGC are Figures 4-1*,4-2*,4-3*, and 4-4*. They describe the system and unit function in a left-to-right signal flow wherever possible. The modules are identified by an MD number and stages within a module are referenced by an alpha character following the MD number (e.g., MD1A). Also, a number referencing the figure number of the module schematic is included in the logic symbol. Since all module schematics are located in Chapter 4, a single number is used and the chapter number is understood to be Chapter 4.

4-4. DETAILED CIRCUIT DESCRIPTION.

a. System Clock. - See Figure 4-3.* Internal timing for the KY-681/GGC is derived from an 8 MHz crystal oscillator located on the Timing Card Assembly (A5). The oscillator consists of module A5MD1, an 8 MHz crystal A5Y1, and drive limiting resistor A5R2. The 8 MHz clock is divided by flip-flops A5MD2B, MD2A and MD3B to a frequency of 1 MHz, which is the basic frequency for transferring data between registers in the system. The 1 MHz clock is power amplified by inverter A5MD6A and distributed through A5-H to the Input Card Assemblies (Figure 4-2)*A1, A2, A3, A4-H. Modules A5MD3A, 4B, 5B and 5A divide the 1 MHz frequency by 14 which is then applied through A5-2 and A13-B to module MD5B on card A13 (Figure 4-1)*for division by two. Further division takes place on the Register/Program Cards A14, A15, A16, A17, A18 and A19. Modules A5MD3A, 4B, 4A and 5B and 5A are preset to a count of two (0010) by a pulse from

* These drawings appear in the Appendix

A5MD5A at the beginning of each cycle. Therefore, two counts (0000 and 0001) are skipped which causes the counter to divide by 14 instead of its normal 16. Flip-flop A5MD5A is set when the counter advances from 1111 to 0000. The output of A5MD5A then causes A5MD4B to set and change the count to 0010. A5MD5A is reset 250 nanoseconds later by the 2 MHz clock from A5MD2A. The output of A13MD5B is amplified and inverted by A5MD7B and serves as the 8 times clock for 4800 baud operation. Similarly, module MD5B on cards A14, A15, A16, A17, A18 and A19 provides 8 times clocks for 2400, 1200, 600, 300, 150 and 75 baud respectively. These clock rates are routed to J1, J2, J3 and J4 for programming to the reset counter located on the Input Card Assemblies. (See paragraph 2-9 for programming instructions.) The output of card A18-2 also serves as the 16 times clock for internal clocking of asynchronous data. It is applied to the Input Cards (A1-A4) through pin N of each card.

b. Data Input. - See Figure 4-1.* The operation of the Input Card Assemblies (A1-A4) is identical and only A1 is discussed in detail.

(1) Character Synchronization. - Character synchronization of the KY-681/GGC with incoming data is necessary in order to strip off the start and stop bits, and to operate with variable length stop bits. It is also necessary when operating with 75 baud asynchronous data because it allows resynchronization of data and internal clock on each character.

(a) External Clock Operation. - (See paragraph 2-9 for external clock programming instructions.) External clock and data enter the KY-681/GGC via the polar/neutral low level interface modules A1MD9A and A1MD9B respectively. The system is designed to synchronize on the repetitive start bit (SPACE) in each character. Therefore, the data must contain either a letter shift character or a random pattern of other characters to achieve synchronization. The data output of interface module A1MD9B is inverted by A1MD4B so that a SPACE level enables the set gate of flip-flop A1MD5A. The negative transitions of the clock are differentiated and amplified by C1, R1 and A1MD2B. These pulses, which occur near the center of the data bits, are applied to the clock input of A1MD5A. Therefore, if the flip-flop (A1MD5A) has been previously reset, the occurrence of a SPACE (when in synchronization this would be the start bit) in the data will cause it to be set. Its output then enables the counter, consisting of modules A1MD13A, MD14B and MD14A. The next four clock pulses (in time with data bits 1, 2, 3 and 4 when in synchronization) are then counted which causes the last counter stage A1MD14A to be set. The output of A1MD14A enables the reset gate of flip-flop A1MD5A. Flip-flop A1MD5A is then reset by the clock pulse which normally occurs in time with the fifth data bit after synchronization has been derived. The output of MD5A then resets the counter and prepares it for the next cycle. The next SPACE bit will cause flip-flop the cycle. Since it must wait for SPACE bits to occur, the synchronization cycle will slip until A1MD5A is always set during the start bit and reset during the fifth data bit when a letter shift or random sequence of characters is being received. This is true because the start bit is always the next SPACE bit following the fifth data bit, regardless of the length of the stop bit which is a MARK.

(b) Internal Clock Operation. - (See paragraph 2-9 for internal clock programming instruction.) Internal clock is used only when operating with 75 baud asynchronous data. A 1200 hertz timing signal derived from the crystal clock is received at input AI-N. It is then divided down to 75 hertz by a counter consisting of flip-flops AlMDllB, MDllA, MDl2B and MDl2A. SPACE bits in

* This drawing appears in the Appendix

the data stream pass gate AlMDl0C and enable gate AlMD10A. Gate AlMD10A allows the 1200 hertz clock to enter the counter. This gate is also enabled by flip-flop A1MD5A, so that once a synchronization cycle has started, the 1200 hertz clock will continue to enter the counter until the end of the cycle. When flip-flop AlMD5A is reset, it stops the clock and causes the counter to await the next SPACE bit before repeating this cycle. Therefore, the counter is resynchronized at the beginning of each character. The counter is set to an initial count by a signal from flip-flop AlMD15A after each cycle. This insures that the first negative transition of the counter. output occurs near the center of the SPACE bit at the beginning of the next cycle. The counter output is then used exactly like the external clock of paragraph 4.4. b. 1 to clock the input data and achieve character synchronization.

(2) Character Storage. - After synchronization has been obtained, flip-flop AlMD5A enables flip-flop AlMD13B during each character cycle. AlMDl3B is then set by the clock pulse which occurs during each of the five data bits. The output of flip-flop AlMDl3B then enables the set side of flip-flop AlMD6B. The next 1 MHz clock pulse sets AlMD6B which in turn resets AlMDl3B. This causes flip-flop AlMD13B to then enable the reset side of flip-flop AlMD6B which is then reset on the following 1 MHz clock pulse. Therefore, the output of flip-lop AlMD6B is a one microsecond pulse. This pulse is used to sample the five data bits for entry into a storage register. The storage register (AlMDl) is a metal-oxide semiconductor (MOS) integrated circuit which consists of two 32-bit static shift registers in one package. These are connected in series for a total of 64 bits of storage. However, only the first 50 bits of this register are useful to the operation of the KY-681/GGC (10 characters of 5 bits each).The one microsecond pulses pass gate A1MD2D and are amplified by a discrete component circuit consisting of Ql, C5, R6, R2 and R3 for driving the clock line of the MOS register. The input data is presented to the register input through gate AlMD3B. A new bit is entered during each sample pulse and the oldest bit is shifted out the end and discarded. However, since the sample pulses only occur during the five data bits after synchronization has been obtained, the start and stop bits are not sampled, which prevents them from being stored.

c. Data Transfer. - When flip-flop AlMD5A is enabled and reset during the fifth data bit, flip-flop AlMD5B is enabled and set. The purpose of flip-flop AlMD5B is to indicate that a complete new character has been accumulated in the MOS storage register. The new character, along with the 9 previous characters are now ready for transfer from the MOS register to the 50-bit shift register located on the Register/Program Cards Al0-A19. The output of flip-flop AlMD5B is delayed by flip-flop AlMD7B to insure that the fifth data bit is entered into the MOS register before the transfer begins. Flip-flop AlMD7B enables one input of gate AlMDl0B. This gate is fully enabled when the commutating counter (see Figure 4-l,* Modules A5MD9A, MDl0B and MDl0A) reaches the count which gate AlMDl0B is wired to decode. Modules A5MDl0B and A5MDl0A divide by four and the four states of this counter are decoded by gate MDl0B on the four Input Card Assemblies (Al-A4). Since each card decodes a different state or combination, only one can be enabled at a time. Therefore, if two or more inputs have data ready for transfer at the same time, the counter will cause them to wait their turn. The output of gate AlMDl0B disables data entry gate AlMD3B and enables recirculation gate AlMD3D and transfer gate AlMD3A through inverter AlMD4D. The output of AlMD4D is passed through inverter AlMD3C to output PThis output is combined, by a collector-wired OR, with the equivalent output from the other

* This drawing appears in the Appendix

three Input **Cards A2-A4.** However, the commutator allows only one input to this OR to be active at any one time. This signal enters card A5-13 (Figure 4-l,* Logic Diagram Timing Diagram), disables the commutator counter, and enables gate **A5MD6**B through inverter A5MD6C. By stopping the counter, the commutator is forced to lock onto the input line and wait until the data for that line is transferred before continuing to search for another line that is ready. Enabled gate **A5MD6B** allows **1 MHz** clock to pass and enter the shift registers on the Register/Program Cards through A5-D and Al0D through A19D. Simultaneously, gate AlMD2A is enabled by inverter AlMD4D and allows 1 MHz clock to enter the MOS storage register. Therefore, both the MOS register and the shift register start shifting at the same time. The data from the MOS register passes gate AlMD3A which is combined, by a collector-wired OR, with similar outputs from the other three Input **Cards (A2-A4)** and is transferred to inverter A5MD6D through Al-J and A5-8. The data from A5MD6 continues to the first Register/ Program Card A10 through A5-C and A10-C. One bit of data is transferred by each 1 MHz clock pulse SC that after 64 pulses, the entire contents of the MOS register have been entered into the shift register. Simultaneously, the data is reentered into the MOS register via gate AlMD3D so that no data is lost during the transfer. While the data is shifting, the 1 MHZ clock is divided by 64 by a six stage counter consisting of MD5B on cards A10, All, Al2 and MD7A, MD7B, MD8B on card A5. A one-microsecond pulse is generated by flip-flops A5MD8A and A5MD9B at the end of the count. This pulse from flip-flop A5MD9B enables gate AlMD4C through A5-14 and Al-R. The other input to this gate was previously enabled at the beginning of the transfer by inverter AlMD4D. The output of gate AlMD4C enables the set input of flip-flop AlMD6A through inverter AlMD4A. Flip-flop AlMD6A is then set by the next 1 MHZ pulse. This is the same clock pulse which transfers the 64th bit. The output of flip-flop AlMD6A then resets flip-flops AlMD5B and AlMD7B. This causes the output of flip-flop AlMD7B to disable gate AlMDl0B which stops the transfer of data and enables the commutator. However, flip-flop A5MD9A forces the commutator to wait two microseconds so that the contents of the shift register can be examined for sequences before advancing to another input line.

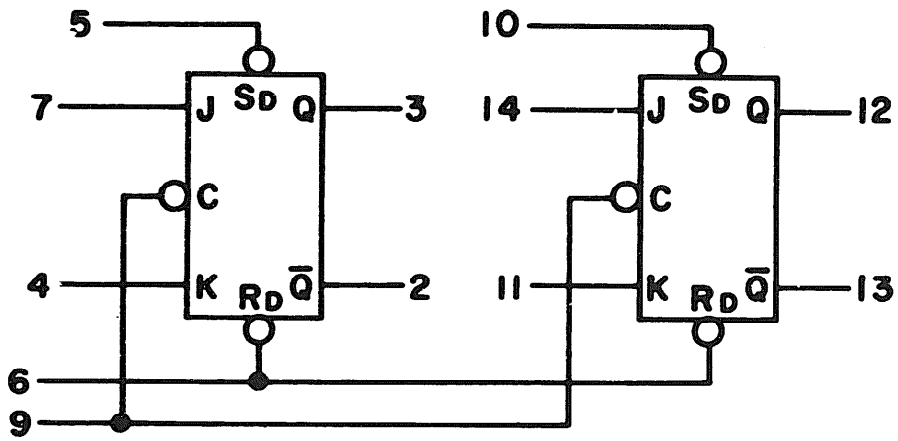
d. Sequence Recognition. - (See paragraph 2-9 for sequence programming instructions.) The contents of the shift register on the Register/Program Cards Al0-A19 are examined for programmed sequence by diode matrices. Each Register/Program Card (see Figure 4-4*) contains a single character register (5 bits) consisting of flip-flops MDlB, MDlA, MD3B, MD3A and MD5A. This character register is divided into two sections with flip-flops MDlB and MDlA in one section and MD3B, MD3A and MD5A in the other. The 4 and 8 combinations respectively of the two sections are then completely decoded. This partial decoding technique simplifies the programming. The decoding of data bits 1, 2 and 3 (located in flip-flops MD5A, MD3A and MD3B respectively) is done by gates MD4B(000), MD4C(00l), MDSA(0l0), MD6B(0ll), MD6C(l00), MD8A(l0l), MD8B(ll0) and MD8C(111). The numbers in parentheses are the binary equivalents of the three data bits where a '1' represents a MARK and a '0' represents a SPACE. Likewise, data bits 4 and 5 located in flip-flops MDlA and MDlB respectively are decoded by gates MD2A(00), MDBB(0l), MD2C(10) and MD4A(ll). Only one output of each decoding matrix needs to be selected for each character that is programmed instead of selecting from either the '1' or '0' output of each register stage. The programmed diodes for each sequence are bussed together. When all characters in a programmed sequence (for example, sequence 1) are located in the appropriate

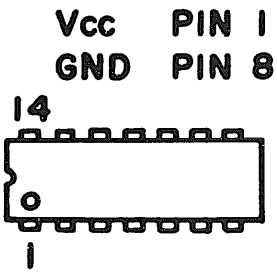
* This drawing appears in the Appendix

character registers, a gate is enabled on the Output Card Assembly that is associated with the Input Card Assembly for that line. The card associations are (input and output) Al and A6, A2 and A7, A3 and A8, A4 and A9.

e. **Output Signal Generations**. - (See Figure 4-2.*) The operation of the Output Card Assemblies (A6-A9) is identical and only A6 is discussed in detail. Gate A6MD13F is enabled by the recognition of programmed sequence 1. Its output then enables one input of gate A6MD4A. A pulse from flip-flop AlMD6A, via AlMDl6C and 16B, passes through Al-14 and A6-14 and inverter A6MD14A to enabled gate A6MD4A. The pulse passes on through gate A6MD4A and sets the R-S flip-flop formed by cross-coupled gates A6MD3C and A6MD3D. A pulse from flip-flop A1MD6A also resets flip-flop AlMD8B, AlMD8B enables the counter consisting of AlMDl5A, MDl5B and MD8A and allows it to start counting the 8 times clock at its input. This clock is operating at 8 times the input data modulation rate (see paragraph 2-9 for programming instructions.) After 8 pulses are counted, flip-flop APMD8B is set. The output of flip-flop AlMD8B then passes through Al-15 and A6-S, and is inverted by A6MD14B, and resets flip-flop AGMD3C-D. Therefore, flip-flop A6MD3C-D remains in the set condition for a period approximately equal to one unit interval at the incoming data modulation rate. This positive output pulse from flip-flop AGMD3C-D is amplified by polar interface circuit A6MD12A and shaped by resistor R24 and capacitor C8. Also, a neutral signal is provided by clipping the top off the polar signal with resistor R25 and diode CR6. The polar and neutral outputs are then routed through A6-N and A6-P respectively to Jl-1 and 51-2.

* This drawing appears in the Appendix



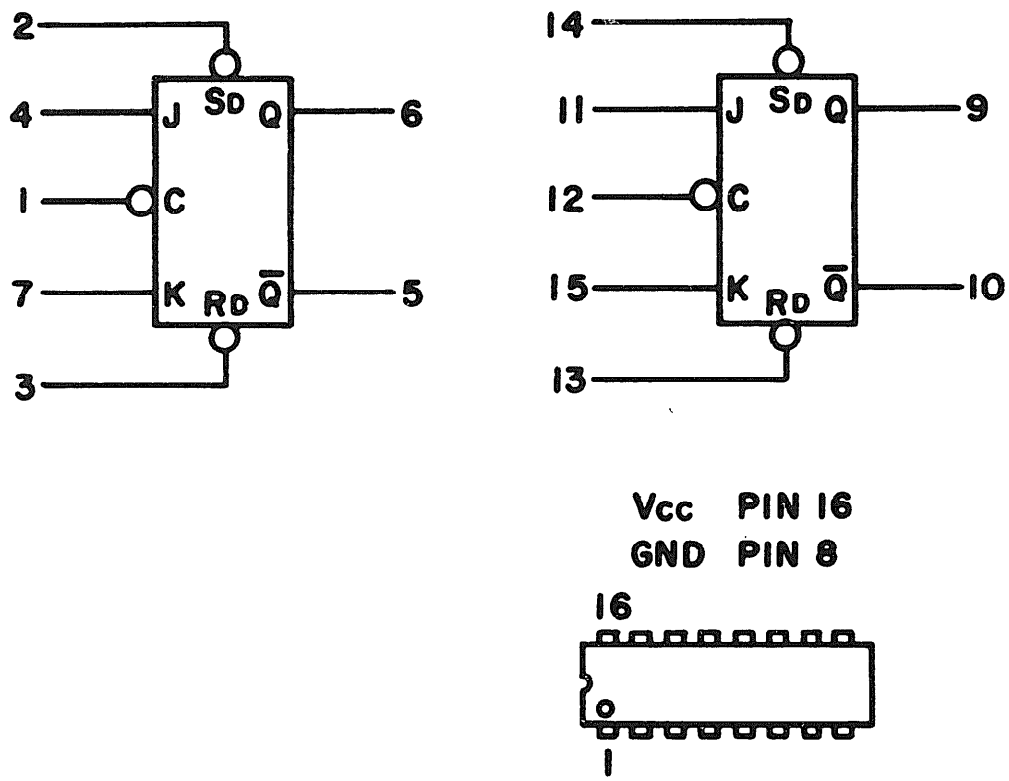


J	K	Q_{N+1}
0	0	Q_N
1	0	1
0	1	0
1	1	$\bar{Q}_N$

S	R	Q
0	0	*
1	0	0
0	1	1
1	1	NO CHG

* BOTH Q_N AND $\bar{Q}_N$ IN "1" STATE

Figure 4-5. - Logic Diagram J-K Binary

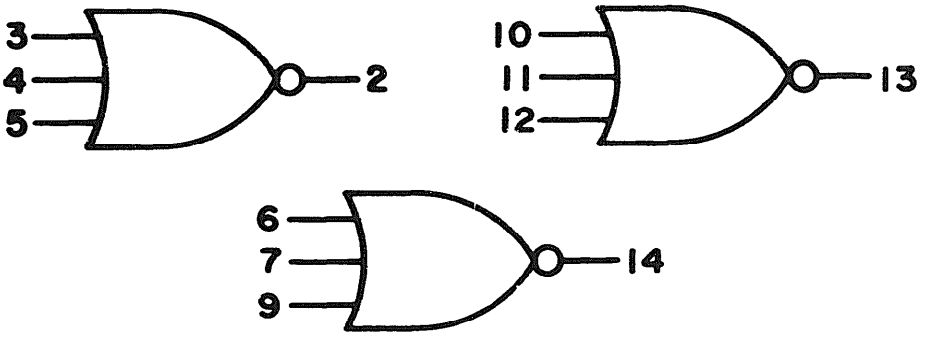


J	K	Q_{N+1}
0	0	Q_N
1	0	1
0	1	0
1	1	$\overline{Q}_N$

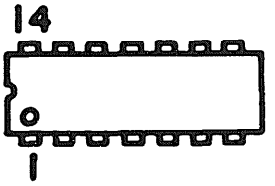
SD	RD	Q
0	0	*
1	0	0
0	1	1
1	1	NO CHG

* BOTH Q AND $\overline{Q}$ IN "1" STATE

Figure 4-6. Logic Diagram J-K Binary

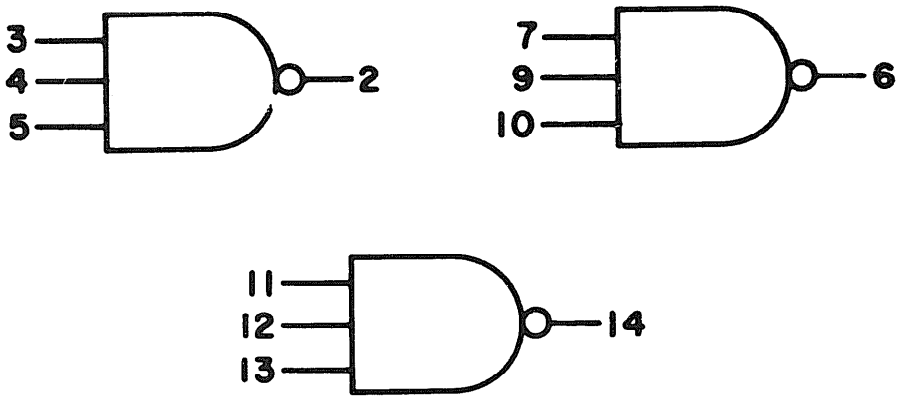


Vcc PIN 8
GND PIN 1



INPUT			OUTPUT
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

Figure 4-7. Logic Diagram 3-Input NOR Gate



INPUT			OUTPUT
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

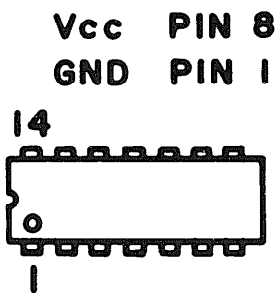
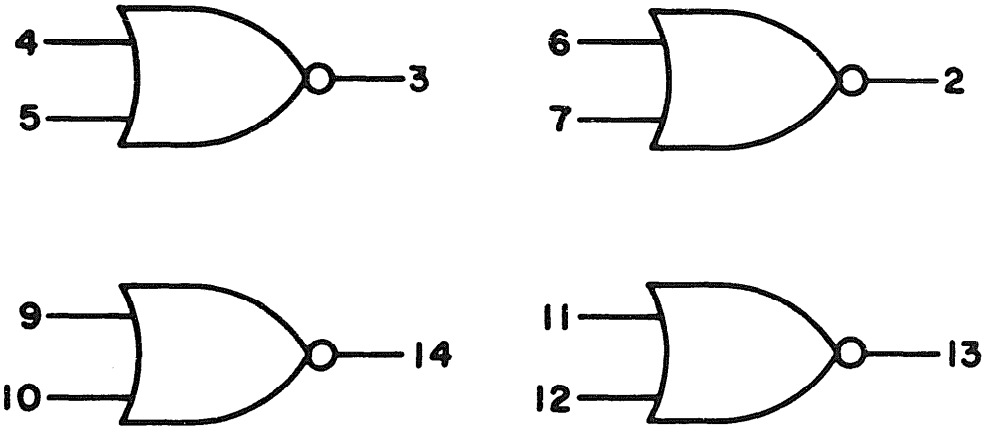


Figure 4-8. - Logic Diagram 3-Input NAND Gate



INPUT		OUTPUT
0	0	1
0	1	0
1	0	0
1	1	0

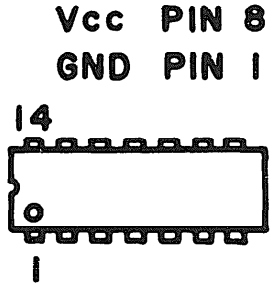
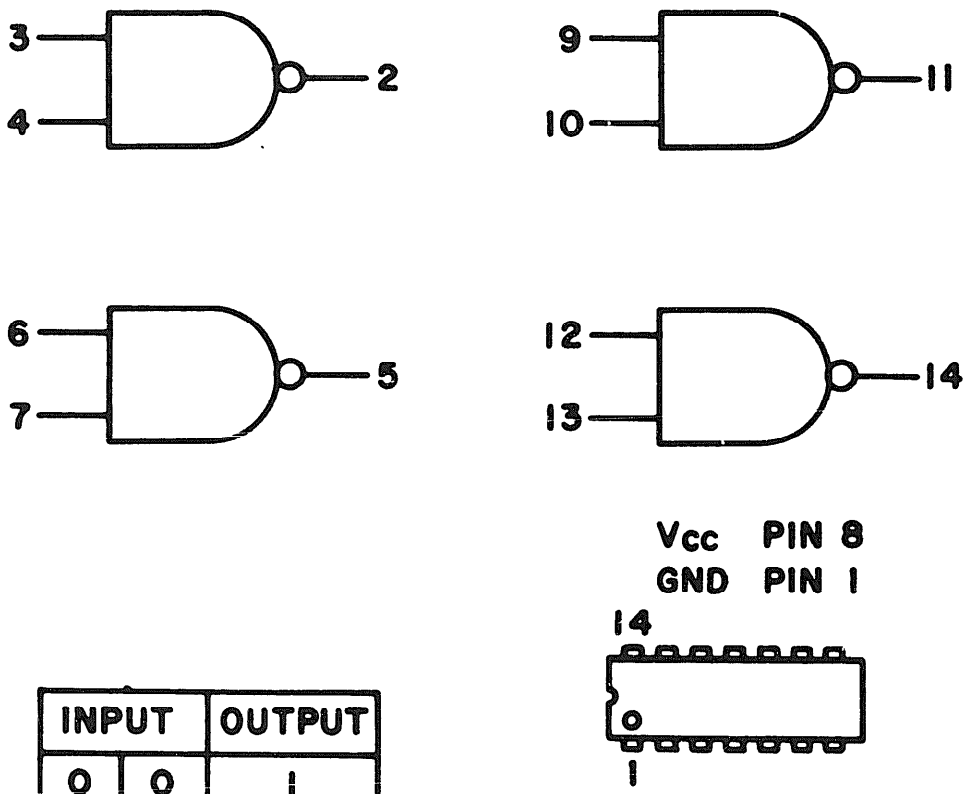
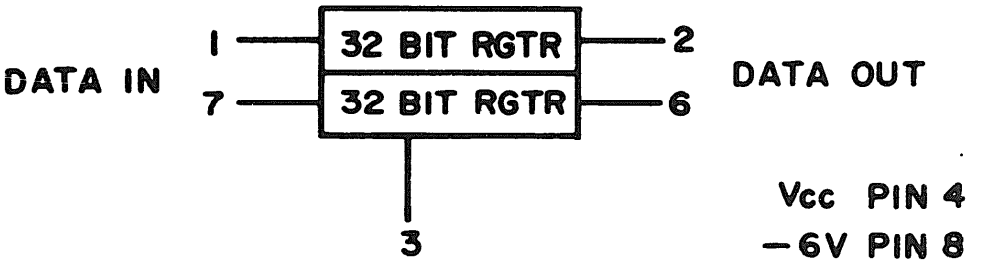


Figure 4-9. - Logic Diagram 2-Input NOR Gate



INPUT		OUTPUT
0	0	1
0	1	1
1	0	1
1	1	0

Figure 4-10. Logic Diagram 2-Input NAND Gate



INPUT	QN +32
1 0	1 0

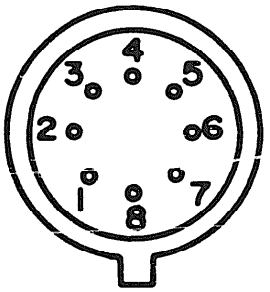


Figure 4-11. - Logic Diagram 32 Bit Static Register

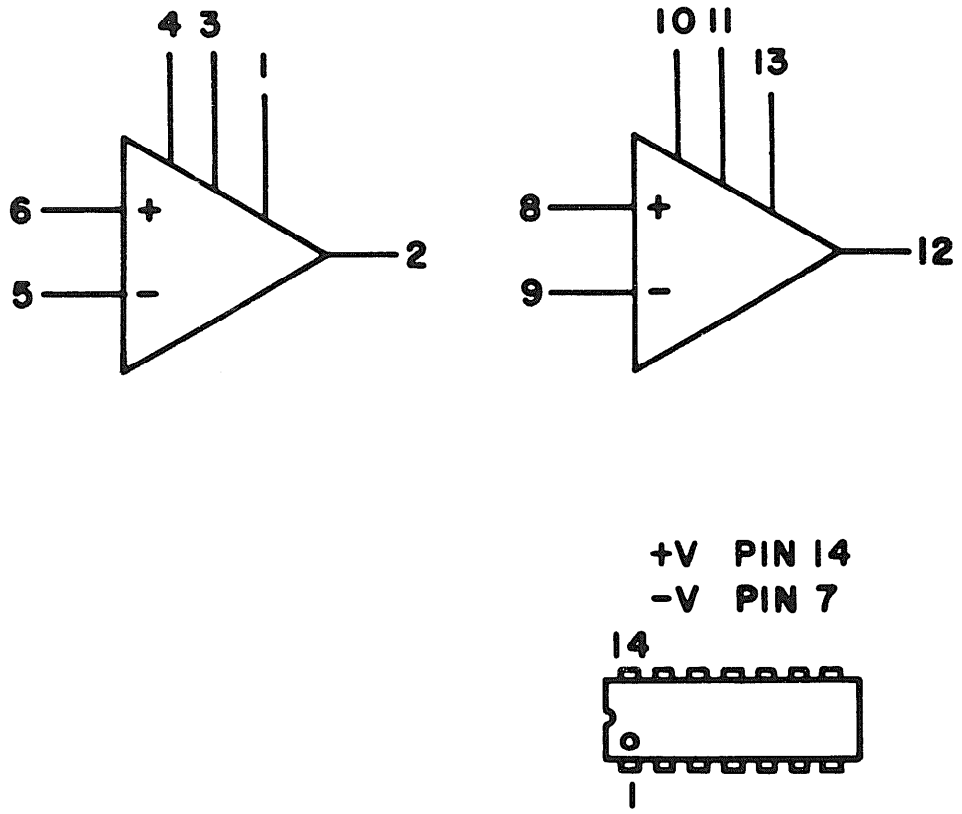
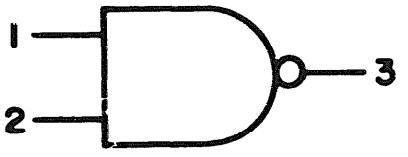
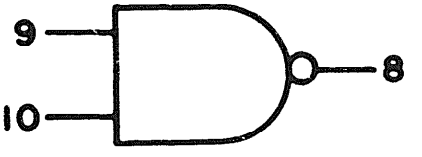
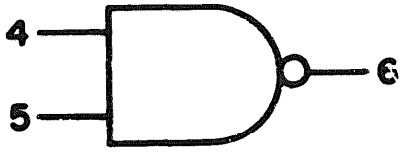
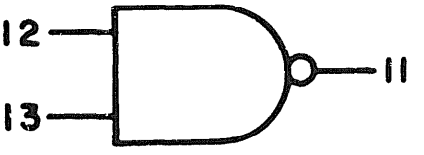


Figure 4-12. Logic Diagram Operational Amplifier

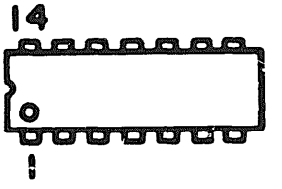






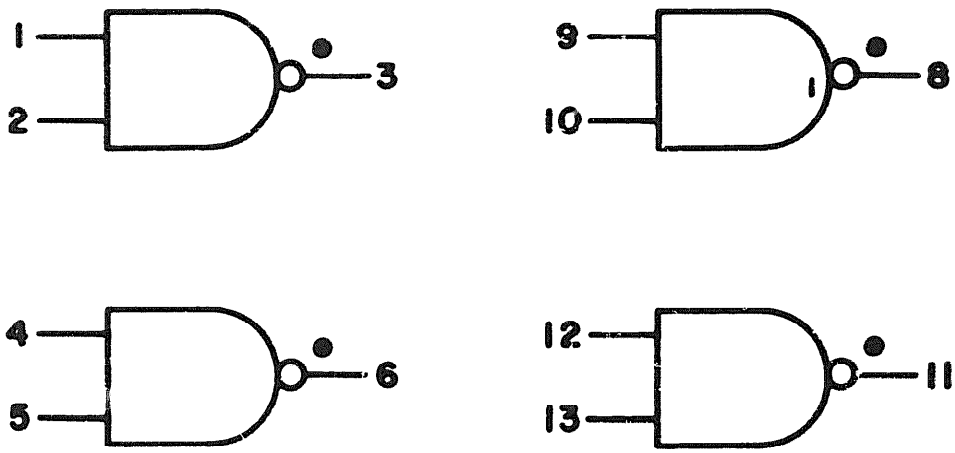


Vcc PIN 14
GND PIN 7



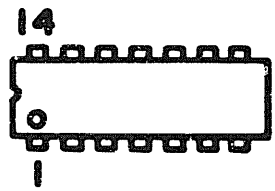
INPUT		OUTPUT
0	0	1
0	1	1
1	0	1
1	1	0

Figure 4- 13. - Logic Diagram 2-Input NAND Gate



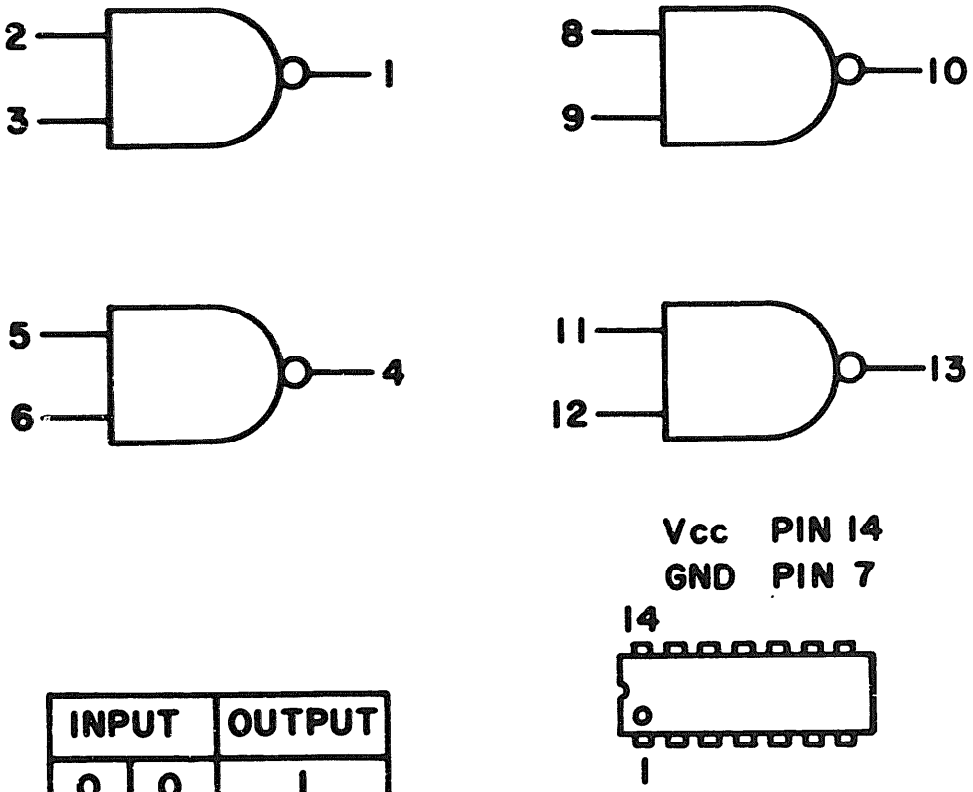
● NO PULL-UP PROVIDED

Vcc PIN 14
GND PIN 7



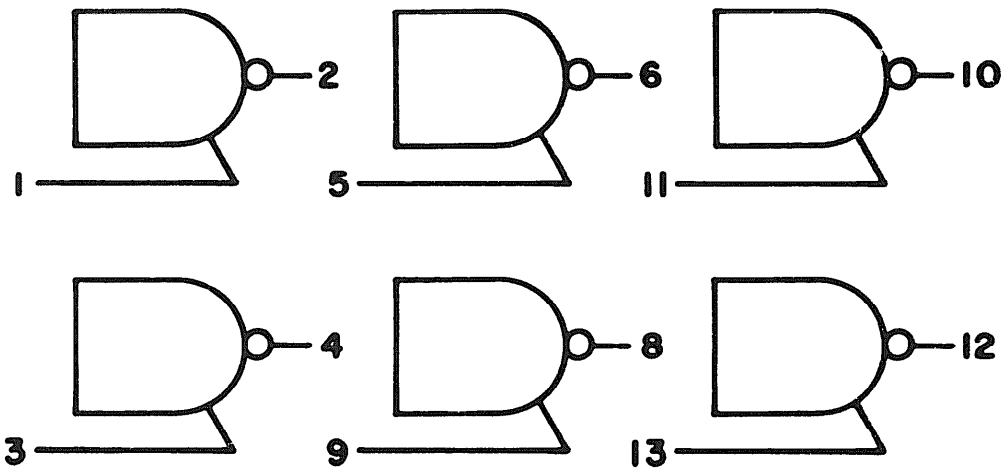
INPUT		OUTPUT
0	0	1
0	1	1
1	0	1
1	1	0

Figure 4-14. - Logic Diagram 2-Input NAN.D Gate

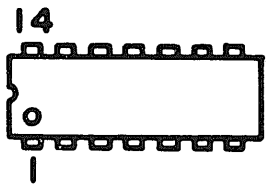


INPUT		OUTPUT
0	0	1
0	1	1
1	0	1
1	1	0

Figure 4-15. Logic Diagram 2-Input NAND Gate



Vcc PIN 14
GND PIN 7



* INPUT	OUTPUT
0	1
1	0

* INPUT APPLIED THROUGH A DIODE (ANODE SIDE)

Figure 4-16. - Logic Diagram Inverter

CHAPTER 5

PREVENTIVE MAINTENANCE

I - PREVENTIVE MAINTENANCE PROCEDURES

5-1. GENERAL. - Extensive preventive maintenance is not required for the KY-681/GGC, since there are no moving parts or blowers which require periodic servicing. Suggested preventive maintenance procedures are presented in the following paragraphs.

5-2. PROCEDURES. - There are no special tools or equipment required for these procedures.

a. Weekly. - The following procedures should be performed weekly unless otherwise directed by station procedures.

(1) Cleaning- Clean equipment by removing dust and other foreign matter with a dry cloth or dust brush.

(2) Power Supply. - Measure the ±5 VDC and -12 VDC power to insure a tolerance no greater than ±1 VDC.

5-3. REPLACEMENT OF MINOR PARTS. - There are no parts in the minor parts category. Therefore, there is no replacement procedure.

II - OPERATIONAL TEST AND OPTIMUM PEREORMANCE

5-4. OPERATIONAL TESTS. - Operational tests consist of entering the various sequences which are programmed and checking that a pulse is received when the sequences are recognized. See paragraph 2-10 for details of the output pulse. Other types of tests may be used to insure correct operation of the KY-68l/GGC. Since the KY-681/GGC will be utilized as a component of a large system, tests may be designed which will not only insure proper operation of the KY-681/GGC but other components of the system as well. These system tests have to be designed by the system design group, since there are various ways the KY-681/GGC is utilized.

5-5. OPTIMUM PERFORMANCE CRITERIA. - Table 5-l references the waveform data that shall be present at each test point for optimum performance of the KY-681/GGC. This table lists the circuit card assembly by reference.

a. Waveforms. - The waveforms are shown on the figures referenced in Table 5-l labeled by assembly reference designation and test point. Horizontal (T/CM) and vertical (V/CM) oscilloscope settings with applicable notes are shown adjacent to each waveform.

b. Test Set-up. - A Tektronix 531 or equivalent oscilloscope is recommended for these tests. The oscilloscope ground terminal is connected to the GND terminal of the unit. The oscilloscope probe is clipped to the card test points, which are plated-through holes.

c. Logic Levels. - The logic levels shown on the waveforms are defined as follows:

Logic Level	Voltage Range
"1"	+3.0 to +5.6 VDC
"0"	0.0 to +0.6 VDC

Circuit Card Assembly	Test Point		Waveform Fig. Ref.
A1, A2, A3, A4	TP1		4-1
	TP2		4-1
	TP3		4-I
A5	TP1		4-3
	TP2		4-3
	TP3		4-3
A10 through A19	TP1		4-4

Table 5-1. -Optimum Performance Criteria

CHAPTER 6

CORRECTIVE MAINTENANCE

I- GENERAL

6-1. CORRECTIVE MAINTENANCE. - Corrective maintenance consists of the repair, or replacement, of damaged or unserviceable components necessary to return the equipment to operational status.

6-2. RECOMMENDED TEST EQUIPMENT. - Table 6-l lists equipment recommended for maintenance of the KY-681/GGC.

Oscilloscope, Tektronix 531, with type B preamplifier, or equivalent
VOM, Simpson 260 or equivalent

Table 6-1. Recommended Test Equipment

6-3. PROCEDURES. - Corrective maintenance procedures are described in the following paragraphs.

a.- Circuit Card Assembly Substitution. - Substitution of circuit card assemblies can frequently expedite the return of equipment to operational status. Circuit card assemblies can be replaced by any other card having the same part number except for Register/Program Cards ON150444. Substitution of these cards is possible only if they have been programmed identically. Each assembly is keyed so that only the correct circuit card assembly for a particular location can be inserted in the card position. Table l-3 indicates the circuit card assemblies and their applicable location.

Note: - It is not necessary to remove power from the KY-681/GGC when extracting or inserting circuit card assemblies.

b.- Circuit Tracing. - The following types of equipment drawings are supplied in the manual to support corrective maintenance procedures: system block diagram, circuit card assembly logic diagrams, the motherboard and connector wiring diagrams, and the circuit card assembly w ‘ring diagrams.

(1) System Block Diagram. - (See Figure l-3.*) The system block diagram shows the signal flow between the elements of the unit. The alpha/numerics are the connector pin numbers of the individual circuit card assemblies. Connections between the Register/Program cards and the individual output card are noted on the individual circuit card assemblies.

(2) Circuit Card Assembly Logic Diagrams. - (See Figures 4-1,* 4-2,* 4-3*and 4-4*.) There are four types of circuit card assemblies in the KY-681/GGC. Three of the card assembly types have multiple usage. Connector pin numbers of

* These drawings appear in the Appendix

the "TO" terminal connection are not shown in Figures 4-l*and 4-3,* since these terminations change with card location. Figure 1-3* should be consulted for these terminations.

(3) Motherboard and Connector Wiring Diagrams. - (See Figure 6-l*and 6-2*.) These wiring diagrams indicate all connections between circuit card assembly connectors (XAl through XA19) and the input/output connectors Jl through J4.

(4) Circuit Card Assembly Wiring Diagrams. - These wiring diagrams, Figures 6-3* through 6-6,* show the interconnection between the components located on each of the printed wiring boards. The track side of the printed wiring card is shown in one view and the component side of board is shown in a separate view.

c. Extender Board Use. - To test a circuit card assembly in the equipment, use extender card, ON150446 supplied with each unit. The extender board is inserted into the applicable con&&or and the circuit card assembly to be tested is inserted into the extender board. This provides access to all terminals of the circuit card assembly.

d. Module Pin Numbering. - Individual module pin layouts are shown in Figure 4-5 through 4-16. The pins are numbered clockwise, looking at the track side of the cards, with pin one identified by an index mark near the pin. Emitters of transistors are similarly identified. The shift register module on the input circuit card (ON150438) is housed in an eight-pin TO-5 case with a tab identifying pin eight on the module and a corresponding index mark on the card.

e. Circuit Card Assembly Repair. - The modular construction of the circuit card assemblies facilitates repair when proper tools and repair techniques are used and normal precaution exercised.

(1) Tools. - Recommended tools are a vise, a pencil-type soldering iron with a capacity of 25 to 40 watts, small side-cutters, small needlenose pliers, and a desoldering tool.

(2) Procedure. -

(a) For dual in-line modules the leads should be cut on the module side of the circuit card assembly as close to the module as possible.

CAUTION: - Do not overheat solder joints; circuit cards may be damaged. Do not use acid core solder. Do not use an AC soldering iron without an isolating transformer in the line.

The individual pins should then be removed by heating the joint and pulling the pin from the module side of the card. The soldering iron should be placed on the track side of the card. Since module holes are plated-through the heat will be transmitted through the hole.

(b) For transistors and TO-5 type modules the leads should be cut on the track side of the circuit card assembly. The soldering iron should be

* These drawings appear in the Appendix

placed on the track side and the lead removed from the same side. These lead holes are not plated-through holes. The leads are soldered to pads adjacent to the holes.

(c) For capacitors, diodes and resistors the lead should be cut on the component side of the circuit card assembly. The lead should be removed by pulling the lead from the track side of the card. The soldering iron should be placed on the track side of the card.

(d) Replace components by bending and cutting the leads to fit where required. Care should be taken to insure that the orientation of the component is correct.

II - TROUBLE ANALYSIS

6-4. ORGANIZATION OF TROUBLE ANALYSIS PROCEDURES. - The first step in trouble analyzing the KY-681/GGC is to localize the malfunction to the defective circuit card assembly. The second step is to locate the faulty component on the circuit card assembly. Refer to procedures described in Paragraph 5-5 and Table 5-l. Once the malfunctioning circuit card assembly has been isolated, it is recommended that it be replaced with a serviceable spare and isolation and replacement of faulty components be accomplished at a circuit card assembly repair facility.

6-5. TROUBLE ANALYSIS TABLE. - Trouble analysis procedures for the KY-681/GGC are presented in Table 6-2. Check the circuit card assemblies associated with any line for which a fault exists to insure that they are all seated firmly in their chassis connectors. Before replacing a suspected circuit card assembly, remove the suspected circuit card assembly and re-insert it to see if the trouble is caused by a bad contact between the circuit card assembly and motherboard connector.

Symptoms	Probable Causes	Action
1. No sequences recognized.	a. Clock Failures.	Replace circuit card A5.
	b. Shift register stage failure.	Beginning with circuit card A10, check test point 1 on Register/Program cards (A10 - A19) for presence of signals while data is coming in on one or more lines. Replace any defective cards (A10 - A19).
2. None of the sequences recognized on one line only.	MOS register or associated circuitry failure.	Replace Input Circuit card (A1 - A4) associated with that line.
3. One sequence not recognized.	a. Programming in error.	Check programming of Register/Program cards (A10 - A19) for that sequence.
	b. Output driver failure.	Replace output circuit card (A6 - A9) associated with that line.
4. Short sequences recognized, but not long sequences.	Shift register stage failure.	See 1 b.

Table 6-2. -KY-681/GGC Trouble Analysis

CHAPTER 7
IDENTIFICATION TABLE OF PARTS

AND

ILLUSTRATED PARTS BREAKDOWN

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-581/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
Fig. 1.	DECODER, command signal, KY-681/GGC: aluminum chassis; steel front panel; gray enamel finished front panel; 14-1/2 in. lg by 19 in. wide by 5-7/32 in. high overall dimensions; input and output signal interfaces per low level requirements of MIL-STD-188B; requires 6 volts DC and -12 volts DC power sources; accessory slides provided; NSA drawing 0N150423	Unit detects up to twelve (12) sequences of up to ten (10) characters each on four (4) independent data lines. Detection of a sequence results in an output pulse one (1) unit interval long on the appropriate output line									1
A1	CIRCUIT CARD ASSEMBLY: epoxy glass board with printed wiring both sides; 7.40 in. wide by 3.75 in. high by 0.063 in. thick; principal components mounted on board are 8 capacitors, 12 resistors, 1 transistor, 1 zener diode and 16 integrated circuits; NSA part no. 0N150438	Provides storage and control functions for input data	A1, A2, A3 A4								4
A1C1	CAPACITOR, fixed, ceramic dielectric (general purpose): 680 pf, 200 WVDC; Spec. MIL-C-11015D	Differentiation of clock pulse	A1C1, A2C1, A3C1, A4C1	CK05BX681K							4
A1C2	CAPACITOR, fixed, ceramic dielectric: 0.01 mfd, 50 WVDC; 0.320 in. dia. by 0.15 in. thick disc; NSA drawing 0N150471; Centralab type HK 103	Bypass for -12 VDC supply voltage	A1C2, A1C4, A1C7, A2C2, A2C4, A2C7, A3C2, A3C4, A3C7, A4C2, A4C4, A4C7, A5C2, A5C4, A6C2, A7C2, A8C2, A9C2, A10C2, A11C2, A12C2, A13C2, A14C2, A15C2, A16C2, A17C2, A18C2, A19C2								28
A1C3	CAPACITOR, fixed, electrolytic: 1 mfd, 35 VDC; tantalum electrolytic; 0.286 in. lg, by 0.135 in. dia; formerly type CS13BF105M per MIL-C-26655B; NSA drawing 0N150475; Sprague type 150D105X0035A2	Same as A1C2	A1C3, A1C6, A1C8, A2C3, A2C6, A2C8, A3C3, A3C6, A3C8, A4C3, A4C6, A4C8, A5C1, A5C3, A6C1, A7C1, A8C1, A9C1, A10C1, A11C1, A12C1, A13C1, A14C1, A15C1, A16C1, A17C1, A18C1, A19C1								28
A1C4	CAPACITOR, same as A1C2	Bypass for +5 VDC supply voltage									
A1C5	CAPACITOR, fixed, ceramic dielectric (general purpose): 220 pf, 200 WVDC; Spec. MIL-C-11015D	Pulse coupling	A1C5, A2C5, A3C5, A4C5	CK05BX221K							4
A1C6	CAPACITOR, same as A1C3	Same as A1C4									

FORM 14736 MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A1C7	CAPACITOR, same as A1C2	Bypass for -6 VDC supply voltage									
A1C8	CAPACITOR, same as A1C3	Same as A1C7									
A1MD1	INTEGRATED CIRCUIT, shift register-dual 32 bit register, serial input and output; .370 in. dia. by .185 in. high, with 8 leads .500 in. min. length; NSA drawing 0N15-0458; National Semiconductor Corp. type MM505	Input data storage	A1MD1, A2MD1, A3MD1, A4MD1								4
A1MD2	INTEGRATED CIRCUIT, logic gate: logical "1", 3.5v min; logical "0", .6v max. 14 pin dual-in-line package, .75 in. long by .25 wide by .12 high; leads project .15 in; NSA drawing 0N15-0464; Signetics Corporation type SF387A	Quadruple 2-input NAND gate	A1MD2, A1MD4, A2MD2, A2MD4, A3MD2, A3MD4, A4MD2, A4MD4, A5MD6, A6MD14, A7MD14, A8MD14, A9MD14, A10MD7, A11MD7, A12MD7, A13MD7, A14MD7, A15MD7, A16MD7, A17MD7, A18MD7, A19MD7								23
A1MD3	INTEGRATED CIRCUIT, logic gate: logical "1", 3.4v min; logical "0", .35v max; 14 pin dual-in-line package, .75 in. lg by .25 in. wd by .12 in. high; leads project .15 in; NSA drawing 0N15-0466; Signetics Corporation type N8481A	Quadruple 2-input NAND gate for "collector logic" functions	A1MD3, A2MD3, A3MD3, A4MD3								4
A1MD4	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A1MD5	INTEGRATED CIRCUIT, flip flop: dual "J-K" flip flop with common clock and reset inputs; logical "1", 3.8v min; logical "0", .6v max; 14 pin dual-in-line package, .75 in. lg by .25 in. wd by .12 in. high; leads project .15 in; NSA drawing 0N15-0459; Signetics Corporation type SF231A.	Synchronization and counting	A1MD5, A1MD6, A1MD7, A1MD8, A1MD11, A1MD12, A1MD13, A1MD14, A1MD15, A2MD5, A2MD6, A2MD7, A2MD8, A2MD11, A2MD12, A2MD13, A2MD14, A2MD15, A3MD5, A3MD6, A3MD7, A3MD8, A3MD11, A3MD12, A3MD13, A3MD14, A3MD15, A4MD5, A4MD6, A4MD7, A4MD8, A4MD11, A4MD12, A4MD13, A4MD14, A4MD15, A5MD2, A5MD3, A5MD4, A5MD5, A5MD7, A5MD8, A5MD9, A5MD10, A12MD1, A12MD3, A11MD1, A11MD3, A12MD1, A12MD3, A13MD1, A13MD3, A14MD1, A14MD3, A15MD1, A15MD3, A16MD1, A16MD3, A17MD1, A17MD3,								64

REV MAR 69 (Supersedes J4736 FEB 63 which is obsolete)

FORM J4735 F

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF SYM OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
			A1MD1, A1MD3, A1MD1, A1MD3								
A11CD5	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD7	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD8	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD9	INTEGRATED CIRCUIT, operational amplifier: open circuit gain = 45,000; output impedance 30 ohms; 14 pin dual-in-line package, .75 in. lg by .25 in. wd. by .12 in high: leads project .15 in; NSA drawing 8N15#469; Motorola type MC1437L	Data and clock input amplifier	A1MD9, A2MD9, A3MD9, A4MD9, A5MD1#, A5MD11, A5MD12, A5MD16, A5MD17, A5MD15, A7MD1#, A7MD11, A7MD12, A7MD16, A7MD17, A7MD1#, A#MD1#, A8MD11, A8MD12, A8MD16, A8MD17, A9MD16, A9MD1#, A9MD11, A9MD12, A9MD16, A9MD17, A9MD18								28
A1MD10	INTEGRATED CIRCUIT, logic gate: logical "1", 3.5v min; logical "0", .6v max; 14 pin dual-in-line package, .75 in. lg by .25 in. wd, by .12 in. high; leads project .15 in; NSA drawing 8N15#462; Signetics Corporation type SP377A	Triple 3-input NAND gate	A1MD1#, A2MD1#, A3MD1#, A4MD1#								4
A1MDll	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD12	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD13	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A1MD14	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
AlMD15	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
AlMD16	INTEGRATED CIRCUIT, logic gate: logical "1", 3.6v min; logical "0", .35v max; 14 pin dual-in-line package, .75 in. lg by .25 in. wd by .12 in. high; leads project .15 in; NSA drawing 8N15#465; Signetics Corporation type N849#A	Quadruple 2-input NAND gate, high input impedance	A1MD16, A2MD16, A3MD16, A4MD16								4
AlQ1	TRANSISTOR: PNP silicon transistor; 30v collector to emitter; injection molded plastic package, .19# in. dia. (flatted) by .185 in high, leads .50 in. long; NSA drawing 8N15#457; Motorola type 2N4126	Shift register clock driver	A1Q1, A2Q1, A3Q1, A4Q1								4

FORM 147#6 REV MAR 69 (Supersedes 14736 / EB 43 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A1R1	RESISTOR, fixed, composition (insulated): 3000 ohms ±5%, 1/4 watt; Specification MIL-R-11	Discharge path for clock differentiation circuit	A1R1, A2R1, A3R1, A4R1	RC07GF302J							4
A1R2	RESISTOR, fixed, composition (insulated): 1000 ohms ±5%, 1/4 watt; Specification MIL-R-11	Collector load resistor for shift register clock driver	A1R2, A2R2, A3R2, A4R2, A5R4, A5R5	RC07GF102J							6
A1R3	RESISTOR, fixed, composition (insulated): 47 ohms ±5%, 1/4 watt; Specification MIL-R-11	Emitter bias resistor for shift register clock driver	A1R3, A2R3, A3R3, A4R3	RC07GF470J							4
A1R4	RESISTOR, fixed, composition (insulated): 18,000 ohms ±5%, 1/4 watt; Specification MIL-R-11	Collector load resistor for "collector logic" gates	A1R4, A2R4, A3R4, A4R4	RC07GF183J							4
A1R5	RESISTOR, fixed, composition (insulated): 7500 ohms ±5%, 1/4 watt; Specification MIL-R-11	Collector resistor for shift register output	A1R5, A2R5, A3R5, A4R5	RC07GF752J							4
A1R6	RESISTOR, fixed, composition (insulated): 8200 ohms ±5%, 1/4 watt; Specification MIL-R-11	Base current limiting resistor for shift register clock driver	A1R6, A2R6, A3R6, A4R6	RC07GF822J							4
A1R7	RESISTOR, fixed, composition (insulated): 2.2 ohms ±5%, 1/2 watt; Specification MIL-R-11	Voltage dropping to provide +5 VDC logic power supply	A1R7, A2R7, A3R7, A4R7	RC20GF2R2J							4
A1R8	RESISTOR, fixed, composition (insulated): 820 ohms ±5%, 1/4 watt; Specification MIL-R-11	Logic gate input protection	A1R8, A2R8, A3R8, A4R8	RC07GF821J							4
A1R9	RESISTOR, fixed, composition (insulated): 750,000 ohms ±5%, 1/4 watt; Specification MIL-R-11	Amplifier feedback	A1R9, A1R10, A2R9, A2R10, A3R9, A3R10, A4R9, A4R10	RC07GF754J							8
A1R10	RESISTOR, same as A1R9	Same as A1R9									
A1R11	RESISTOR, fixed, composition (insulated): 68,000 ohms ±5%, 1/4 watt; Specification MIL-R-11	Input circuit build-out resistor	A1R11, A1R12, A2R11, A2R12, A3R11, A3R12, A4R11, A4R12	RC07GF683J							8
A1R12	RESISTOR, same as A1R11	Same as A1R11									
A1R13	RESISTOR, fixed, composition (insulated): 6,800 ohms ±5%, 1/4 watt; Specification MIL-R-11	Part of clock circuit differentiator	A1R13, A2R13, A3R13, A4R13	RC07GF682J							19
A1VR1	SEMICONDUCTOR DEVICE, diode: 5.1 volt ±10% zener diode; 1 watt power rating; .256 in. lg by .187 in. dia; 1.1 in. long leads; NSA drawing 5962-00N15470; Motorola type 1N4733.	Voltage regulation for +5 VDC logic power supply	A1VR1, A2VR1, A3VR1, A4VR1, A5VR1, A6VR1, A7VR1, A8VR1, A9VR1, A10VR1, A11VR1, A12VR1, A13VR1, A14VR1, A15VR1, A16VR1, A17VR1, A18VR1, A19VR1								
A2	ASSEMBLY, CIRCUIT CARD, same as A1	Same as A1									
A2C1	CAPACITOR, same as A1C1	Same as A1C1									

FORM 1473B (REV MAR 68 (Supersedes 1473A FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A2C2	CAPACITOR, same as A1C2	Same as A1C2									
A2C3	CAPACITOR, same as A1C3	Same as A1C2									
A2C4	CAPACITOR, same as A1C1	Same as A1C4									
A2C5	CAPACITOR, same as A1C5	Same as A1C5									
A2C6	CAPACITOR, same as A1C3	Same as A1C4									
A2C7	CAPACITOR, same as A1C2	Same as A1C7									
A2C8	CAPACITOR, same as A1C3	Same as A1C7									
A2MD1	INTEGRATED CIRCUIT, same as A1MD1	Same as A1MD1									
A2MD2	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A2MD3	INTEGRATED CIRCUIT, same as A1MD3	Same as A1MD3									
A2MD4	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A2MD5	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD6	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD7	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD8	INTEGRATED CIRCUIT, same as A1MD8	Same as A1MD8									
A2MD9	INTEGRATED CIRCUIT, same as A1MD9	Same as A1MD9									
A2MD10	INTEGRATED CIRCUIT, same as A1MD16	Same as A1MD16									
A2MD11	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD12	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD13	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD14	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD15	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A2MD16	INTEGRATED CIRCUIT, same as A1MD16	Same as A1MD16									

FORM 14726 REV MAR 69 (Supersedes 14726 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB53-69-C-0375

REF. SYM. O. R. PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A2Q1	TRANSISTOR, same as A1Q1	Same as A1Q1									
A2R1	RESISTOR, same as A1R1	Same as A1R1									
A2R2	RESISTOR, same as A1R2	Same as A1R2									
A2R3	RESISTOR, same as A1R3	Same as A1R3									
A2R4	RESISTOR, same as A1R4	Same as A1R4									
A2R5	RESISTOR, same as A1R5	Same as A1R5									
A2R6	RESISTOR, same as A1R6	Same as A1R6									
A2R7	RESISTOR, same as A1R7	Same as A1R7									
A2R8	RESISTOR, same as A1R8	Same as A1R8									
A2R9	RESISTOR, same as A1R9	Same as A1R9									
A2R10	RESISTOR, same as A1R9	Same as A1R9									
A2R11	RESISTOR, same as A1R11	Same as A1R11									
A2R12	RESISTOR, same as A1R11	Same as A1R11									
A2R13	RESISTOR, same as A1R13	Same as A1R13									
A2VR1	SEMICONDUCTOR DEVICE, DIODE, same as A1VR1	Same as A1VR1									
A3	ASSEMBLY, CIRCUIT CARD, same as A1	Same as A1									
A3C1	CAPACITOR, same as A1C1	Same as A1C1									
A3C2	CAPACITOR, same as A1C2	Same as A1C2									
A3C3	CAPACITOR, same as A1C3	Same as A1C2									
A3C4	CAPACITOR, same as A1C1	Same as A1C4									
A3C5	CAPACITOR, same as A1C5	Same as A1C5									
A3C6	CAPACITOR, same as A1C3	Same as A1C4									
A3C7	CAPACITOR, same as A1C2	Same as A1C7									
A3C8	CAPACITOR, same as A1C3	Same as A1C7									
A3MD1	INTEGRATED CIRCUIT, same as A1MD1	Same as A1MD1									

FORM J4725 REV MAR 69 *(Supersedes J4724 FEB 63 which is obsolete)*

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A3MD2	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A3MD3	INTEGRATED CIRCUIT, same as A1MD3	Same as A1MD3									
A3MD4	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A3MD5	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A3MD6	INTEGRATED CIRCUIT, same as A1MD6	Same as A1MD6									
A3MD7	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD6									
A3MD8	INTEGRATED CIRCUIT, same as A1MD8	Same as A1MD8									
A3MD9	INTEGRATED CIRCUIT, same as A1MD9	Same as A1MD9									
A3MD10	INTEGRATED CIRCUIT, same as A1MD10	Same as A1MD10									
A3MD11	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A3MD12	INTEGRATED CIRCUIT, same as A1MD6	Same as A1MD5									
A3MD13	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A3MD14	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A3MD15	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A3MD16	INTEGRATED CIRCUIT, same as A1MD16	Same as A1MD16									
A3Q1	TRANSISTOR, same as A1Q1	Same as A1Q1									
A3R1	RESISTOR, same as A1R1	Same as A1R1									
A3R2	RESISTOR, same as A1R2	Same as A1R2									
A3R3	RESISTOR, same as A1R3	Same as A1R3									
A3R4	RESISTOR, same as A1R4	Same as A1R4									
A3R5	RESISTOR, same as A1R5	Same as A1R5									
A3R6	RESISTOR, same as A1R6	Same as A1R6									
A3R7	RESISTOR, same as A1R7	Same as A1R7									
A3R8	RESISTOR, same as A1R8	Same as A1R8									

FORM 1473B RE V MAR 68 (Supersedes 1473A FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.
CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A3R9	RESISTOR, same as A1R9	Same as A1R9									
A3R10	RESISTOR, same as A1R9	Same as A1R9									
A3R11	RESISTOR, same as A1R11	Same as A1R11									
A3R12	RESISTOR, same as A1R11	Same as A1R11									
A3R13	RESISTOR, same as A1R13	Same as A1R13									
A3VR1	SEMICONDUCTOR DEVICE, DIODE, same as A1VR1	Same as A1VR1									
A4	ASSEMBLY CIRCUIT CARD, same as A1	Same as A1									
A4C1	CAPACITOR, same as A1C1	Same as A1C1									
A4C2	CAPACITOR, same as A1C2	Same as A1C2									
A4C3	CAPACITOR, same as A1C3	Same as A1C2									
A4C4	CAPACITOR, same as A1C1	Same as A1C4									
A4C5	CAPACITOR, same as A1C5	Same as A1C5									
A4C6	CAPACITOR, same as A1C3	Same as A1C4									
A4C7	CAPACITOR, same as A1C2	Same as A1C7									
A4C8	CAPACITOR, same as A1C3	Same as A1C7									
A4MD1	INTEGRATED CIRCUIT, same as A1MD1	Same as A1MD1									
A4MD2	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A4MD3	INTEGRATED CIRCUIT, same as A1MD3	Same as A1MD3									
A4MD4	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A4MD5	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD6	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD7	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD8	INTEGRATED CIRCUIT, same as A1MD8	Same as A1MD8									
A4MD9	INTEGRATED CIRCUIT, same as A1MD9	Same as A1MD9									
A4MD10	INTEGRATED CIRCUIT, same as A1MD10	Same as A1MD10									

REV MAR 63 (Supersedes 14734 FEB 63 which is obsolete)
FORM 14735 I

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A4MD11	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD12	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD13	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD14	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD15	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A4MD16	INTEGRATED CIRCUIT, same as A1MD16	Same as A1MD16									
A4Q1	TRANSISTOR, same as A1Q1	Same as A1Q1									
A4R1	RESISTOR, same as A1R1	Same as A1R1									
A4R2	RESISTOR, same as A1R2	Same as A1R2									
A4R3	RESISTOR, same as A1R3	Same as A1R3									
A4R4	RESISTOR, same as A1R4	Same as A1R4									
A4R5	RESISTOR, same as A1R5	Same as A1R5									
A4R6	RESISTOR, same as A1R6	Same as A1R6									
A4R7	RESISTOR, same as A1R7	Same as A1R7									
A4R8	RESISTOR, same as A1R8	Same as A1R8									
R4R9	RESISTOR, same as A1R9	Same as A1R9									
A4R10	RESISTOR, same as A1R9	Same as A1R9									
A4R11	RESISTOR, same as A1R11	Same as A1R11									
A4R12	RESISTOR, same as A1R11	Same as A1R11									
A4R13	RESISTOR, same as A1R13	Same as A1R13									
A4VR1	SEMICONDUCTOR DEVICE, DIODE, same as A1VR1	Same as A1VR1									
A5	CIRCUIT CARD ASSEMBLY: epoxy glass board with printed wiring both sides; 7.45 in. wd by 3.75 in. high by 0.064 in. thick; principal components mounted on board are 4 capacitors, 7 resistors, 1 zener diode, 1 crystal, and 10 integrated circuits; NSA part number 9N155442	Generation of timing pulses and controls common to all input lines	A5								1

REV MAR 69 (Supersedes J4736 FEB 65 which is obsolete)
FORM J4736

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAABØ3-69-C-Ø375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A5C1	CAPACITOR, same as A1C3	Oscillator voltage input bypass									
A5C2	CAPACITOR, same as A1C2	Same as A5C1									
A5C3	CAPACITOR, same as A1C3	Same as A1C4									
A5C4	CAPACITOR, same as A1C4	Same as A1C4									
A5MD1	INTEGRATED CIRCUIT, logic gate: logical "1", 2.6v min; logical "0", Ø.4Øv max; 14 pin dual-in-line package, Ø.75 in. lg by Ø.25 in. wd by Ø.12 in. high; leads project Ø.15 in; NSA drawing ØN15Ø467; Signetics Corporation type N888ØA	Quadruple 2-input NAND gate	A5MD1								1
A5MD2	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD4	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD5	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD6	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A5MD7	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD9	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5MD10	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A5R1	RESISTOR, fixed, composition (insulated): 11Ø ohms ±5%, 1/4 watt; Spec. No. MIL-R-11	Dropping resistor for crystal oscillator voltage input	A5R1	RCØ7GF111J							1
A5R2	RESISTOR, fixed, composition (insulated): 2ØØØ ohms ±5%, 1/4 watt; Spec. No. MIL-R-11	Crystal drive current limiting resistor	A5R2	RCØ7GF2Ø2J							1
A5R3	RESISTOR, fixed, composition (insulated): 2.7 ohms ±5%, 1/2 watt; Spec. No. MIL-R-11	Same as A1R7	A5R3	RC2ØGF2R7J							1
A5R4	RESISTOR, same as A1R2	Same as A1R4									
A5R5	RESISTOR, same as A1R2	Same as A1R4									
A5R6	RESISTOR, fixed, composition (insulated): 2Ø ohms ±5%, 1/2 watt; Spec. No. MIL-R-11	Part of voltage divider to derive bias voltage for use with neutral input signals	A5R6	RC2ØGF2ØØJ							1

FORM 14735 REV MAR 68 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A5R7	RESISTOR, fixed, composition (insulated): 68 ohms ±5%, 1/2 watt; Spec. No. MIL-R-11	Same as A5R6	A5R7	RC20GF680J							1
A5VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A5Y1	CRYSTAL UNIT, quartz: 8.000 MC ±0.002%; fundamental mode; 2 mw drive; 0.380 in. dia. by 0.250 in. high with 1 in. leads. NSA drawing #N15#473. Reeves-Hoffmann type RHA5A30 8.000 MC.	Source of timing signals	A5Y1								1
A6	ASSEMBLY, circuit card: epoxy glass board with printed wiring both sides; 7.40 in. wd by 3.75 in. high by 0.064 in. thick; principal components mounted on board are 14 capacitors, 12 diodes, 37 resistors, 1 zener diode, and 18 integrated circuits; NSA drawing number #N15#44#	Storage and output interface circuits for 12 sequences	A6, A7, A8, A9								4
A6C1	CAPACITOR, same as A1C3	Same as A1C4									
A6C2	CAPACITOR, same as A1C2	Same as A1C4									
A6C3	CAPACITOR, fixed, ceramic dielectric: 0.02 mfd, 50 WVDC; 0.400 in. dia by 0.15 in. thick disc; NSA drawing number #N15#472; Centralab type #HK20#3	Output rise time shaping capacitor	A6C3, A6C4, A6C5, A6C6, A6C7, A6C8, A6C9, A6C10, A6C11, A6C12, A6C13, A6C14, A7C3, A7C4, A7C5, A7C6, A7C7, A7C8, A7C9, A7C10, A7C11, A7C12, A7C13, A7C14, A8C3, A8C4, A8C5, A8C6, A8C7, A8C8, A8C9, A8C10, A8C11, A8C12, A8C13, A8C14, A9C3, A9C4, A9C5, A9C6, A9C7, A9C8, A9C9, A9C10, A9C11, A9C12, A9C13, A9C14								48
A6C4	CAPACITOR, same as A6C3	Same as A6C3									
A6C5	CAPACITOR, same as A6C3	Same as A6C3									
A6C6	CAPACITOR, same as A6C3	Same as A6C3									
A6C7	CAPACITOR, same as A6C3	Same as A6C3									
A6C8	CAPACITOR, same as A6C3	Same as A6C3									
A6C9	CAPACITOR, same as A6C3	Same as A6C3									

FORM 1473S REV MAR 69 *(Supersedes 1473S FEB 63 which is obsolete)*

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A6C10	CAPACITOR, same as A6C3	Same as A6C3									
A6C11	CAPACITOR, same as A6C3	Same as A6C3									
A6C12	CAPACITOR, same as A6C3	Same as A6C3									
A6C13	CAPACITOR, same as A6C3	Same as A6C3									
A6C14	CAPACITOR, same as A6C3	Same as A6C3									
A6CR1	SEMICONDUCTOR DEVICE, diode: 1.5v forward drop at 1$ ma; 75v peak reverse voltage; Specification No. MIL-S-19500	Output clipping for neutral output	A6CR1, A6CR2, A6CR3, A6CR4, A6CR5, A6CR6, A6CR7, A6CR8, A6CR9, A6CR10, A6CR11, A6CR12, A7CR1, A7CR2, A7CR3, A7CR4, A7CR5, A7CR6, A7CR7, A7CR8, A7CR9, A7CR10, A7CR11, A7CR12, A8CR1, A8CR2, A8CR3, A8CR4, A8CR5, A8CR6, A8CR7, A8CR8, A8CR9, A8CR10, A8CR11, A8CR12, A9CR1, A9CR2, A9CR3, A9CR4, A9CR5, A9CR6, A9CR7, A9CR8, A9CR9, A9CR10, A9CR11, A9CR12 plus 96$ diodes not bearing reference designation used for programming circuit card assemblies A1$ through A19	1N914							1000
A6CR2	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR3	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR4	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR5	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR6	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR7	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR8	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR9											

REV MAR 68 (Supersedes DD FORM 1473 FEB 63 which is obsolete)

FORM 1473 1

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. O R PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR EIA TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A6CR10	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR11	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6CR12	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A6MD1	INTEGRATED CIRCUIT, logic gate: logical "1", 3.8v min; logical "0", ø.6v max; 14 pin dual-in-line package, ø.75 in. lg by ø.25 in. wd by ø.12 in. high; leads project ø.15 in; NSA drawing øN15ø463; Signetics Corporation type 8P38øA	Quadruple 2-input NOR gate wired as dual R-S flip flop for output storage	A6MD1, A6MD2, A6MD3, A6MD4, A6MD5, A6MD6, A6MD7, A6MD8, A6MD9, A7MD1, A7MD2, A7MD3, A7MD4, A7MD5, A7MD6, A7MD7, A7MD8, A7MD9, A8MD1, A8MD2, A8MD3, A8MD4, A8MD5, A8MD6, A8MD7, A8MD8, A8MD9, A9MD1, A9MD2, A9MD3, A9MD4, A9MD5, A9MD6, A9MD7, A9MD8, A9MD9							36
A6MD2	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A6MD3	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A6MD4	INTEGRATED CIRCUIT, same as A6MD1	Quadruple 2-input NOR gate									
A6MD5	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A6MD6	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A6MD7	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A6MD8	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A6MD9	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A6MD10	INTEGRATED CIRCUIT, same as A1MD9	Output interface driver									
A6MD11	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MDløø									
A6MD12	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MDløø									
A6MD13	INTEGRATED CIRCUIT, logic gate: logical "1", 2.6v min; logical "0", ø.4v max; 14 pin dual-in-line package, ø.75 in. lg by ø.25 in. wd by ø.12 in. high; leads project ø.15 in; NSA drawing øN15ø468 Fairchild type U6A993559X	Hex inverter	A6MD13, A6MD15, A7MD13, A7MD15, A8MD13, A8MD15, A9MD13, A9MD15								8

FORM J4736 REV MAR 69 (Supersedes J4736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.
CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A6MD14	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A6MD15	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A6MD16	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD1#									
A6MD17	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD1#									
A6MD18	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD1#									
A6R1	RESISTOR, fixed, composition (insulated): 75# ohms ±5%, 1/4 watt; Spec. No. MIL-R-11	Output interface drive balance	A6R1, A6R2, A6R3, A6R4, A6R5, A6R6, A6R7, A6R8, A6R9, A6R1#, A6R11, A6R12, A7R1, A7R2, A7R3, A7R4, A7R5, A7R6, A7R7, A7R8, A7R9, A7R1#, A7R11, A7R12, A8R1, A8R2, A8R3, A8R4, A8R5, A8R6, A8R7, A8R8, A8R9, A8R1#, A8R11, A8R12, A9R1, A9R2, A9R3, A9R4, A9R5, A9R6, A9R7, A9R8, A9R9, A9R1#, A9R11, A9R12	RC#7GF751J						48
A6R2	RESISTOR, same as A6R1	Same as A6R1									
A6R3	RESISTOR, same as A6R1	Same as A6R1									
A6R4	RESISTOR, same as A6R1	Same as A6R1									
A6R5	RESISTOR, same as A6R1	Same as A6R1									
A6R6	RESISTOR, same as A6R1	Same as A6R1									
A6R7	RESISTOR, same as A6R1	Same as A6R1									
A6R8	RESISTOR, same as A6R1	Same as A6R1									
A6R9	RESISTOR, same as A6R1	Same as A6R1									
A6R10	RESISTOR, same as A6R1	Same as A6R1									
A6R11	RESISTOR, same as A6R1	Same as A6R1									
A6R18	RESISTOR, same as A6R1	Same as A6R1									
A6R13	RESISTOR, fixed, composition (insulated): 3.3 ohms ±5%, 1/2 watt; Spec. No. MIL-R-11	Same as A1R7	A6R13, A7R13, A8R13, A9R13	RC2#GF3R3J							4

REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)
FORM 14736 F

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A6R14	RESISTOR, fixed, composition (insulated): 15ØØ ohms ±5%, 1/4 watt; Spec. No. MIL-R-11	Limiting resistor for neutral outputs	A6R14, A6R17, A6R18, A6R21, A6R22, A6R25, A6R26, A6R29, A6R3Ø, A6R33, A6R34, A6R37, A7R14, A7R17, A7R18, A7R21, A6R22, A7R25, A7R26, A7R29, A7R3Ø, A7R33, A7R34, A7R37, A8R14, A8R17, A8R18, A8R21, A8R22, A8R25, A8R26, A8R29, A8R3Ø, A8R33, A8R34, A8R37, A9R14, A9R17, A9R18, A9R21, A9R22, A9R25, A9R26, A9R29, A9R3Ø, A9R33, A9R34, A9R37	RCØ7GF152J						48
A6R15	RESISTOR, fixed, composition (insulated): 75 ohms ±5%, 1/4 watt; Spec. No. MIL-R-11	Limiting resistor for polar outputs	A6R15, A6R16, A6R19, A6R2Ø, A6R23, A6R24, A6R27, A6R28, A6R31, A6R32, A6R35, A6R36, A7R15, A7R16, A7R19, A7R20. A7R23. A7R24, A7R27, A7R28, A7R31, A7R32, A7R35, A7R36, A8R15, A8R16, A8R19, A8R2Ø, A8R23, A8R24, A8R27, A8R28, A8R31, A8R32, A8R35, A8R36, A9R15, A9R16, A9R19, A9R2Ø, A9R23, A9R24, A9R27, A9R28, A9R31, A9R32, A9R35, A9R36	RCØ7GF75ØJ						48
A6R16	RESISTOR, same as A6R15	Same as A6R15									
A6R17	RESISTOR, same as A6R14	Same as A6R14									
A6R18	RESISTOR, same as A6R14	Same as A6R14									
A6R19	RESISTOR, same as A6R15	Same as A6R15									
A6R20	RESISTOR, same as A6R15	Same as A6R15									
A6R21	RESISTOR, same as A6R14	Same as A6R14									
A6R22	RESISTOR, same as A6R14	Same as A6R14									

FORM 14732 REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A6R23	RESISTOR, same as A6R15	Same as A6R15									
A6R24	RESISTOR, same as A6R15	Same as A6R15									
A6R25	RESISTOR, same as A6R14	Same as A6R14									
A6R26	RESISTOR, same as A6R14	Same as A6R14									
ARR27	RESISTOR, same as A6R15	Same as A6R15									
A6R28	RESISTOR, same as A6R15	Same as A6R15									
A6R29	RESISTOR, same as A6R14	Same as A6R14									
A6R30	RESISTOR, same as A6R14	Same as A6R14									
A6R31	RESISTOR, same as A6R15	Same as A6R15									
A6R32	RESISTOR, same as A6R15	Same as A6R15									
A6R33	RESISTOR, same as A6R14	Same as A6R14									
A6R34	RESISTOR, same as A6R14	Same as A6R14									
A6R35	RESISTOR, same as A6R15	Same as A6R15									
A6R36	RESISTOR, same as A6R15	Same as A6R15									
A6R37	RESISTOR, same as A6R14	Same as A6R14									
A6VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A7	CIRCUIT CARD ASSEMBLY, same as A6										
A7C1	CAPACITOR, same as A1C3	Same as A1C4									
A7C2	CAPACITOR, same as A1C2	Same as A1C4									
A7C3	CAPACITOR, same as A6C3	Same as A6C3									
A7C4	CAPACITOR, same as A6C3	Same as A6C3									
A7C5	CAPACITOR, same as A6C3	Same as A6C3									
A7C6	CAPACITOR, same as A6C3	Same as A6C3									
A7C7	CAPACITOR, same as A6C3	Same as A6C3									

FORM 14726 REV MAR 68 (Supersedes 14726 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A7C8	CAPACITOR, same as A6C3	Same as A6C3									
A7C9	CAPACITOR, same as A6C3	Same as A6C3									
A7C10	CAPACITOR, same as A6C3	Same as A6C3									
A7C11	CAPACITOR, same as A6C3	Same as A6C3									
A7C12	CAPACITOR, same as A6C3	Same as A6C3									
A7C13	CAPACITOR, same as A6C3	Same as A6C3									
A7C14	CAPACITOR, same as A6C3	Same as A6C3									
A7CR1	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR2	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR3	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR4	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR5	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR6	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR7	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR8	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR9	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR10	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR11	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7CR12	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A7MD1	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD2	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD3	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD4	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A7MD5	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									

FORM J473B REV MAR 69 (Supersedes J473A FEB 67 which is obsolete.

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A7MD6	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A7MD7	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD8	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD9	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A7MD10	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7MD11	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7MD12	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7MD13	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A7MD14	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A7MD15	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A7MD16	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7MD17	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7MD18	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A7R1	RESISTOR, same as A6R1	Same as A6R1									
A7R2	RESISTOR, same as A6R1	Same as A6R1									
A7R3	RESISTOR, same as A6R1	Same as A6R1									
A7R4	RESISTOR, same as A6R1	Same as A6R1									
A7R5	RESISTOR, same as A6R1	Same as A6R1									
A7R6	RESISTOR, same as A6R1	Same as A6R1									
A7R7	RESISTOR, same as A6R1	Same as A6R1									
A7R8	RESISTOR, same as A6R1	Same as A6R1									
A7R9	RESISTOR, same as A6R1	Same as A6R1									
A7R10	RESISTOR, same as A6R1	Same as A6R1									
A7R11	RESISTOR, same as A6R1	Same as A6R1									

FORM 14736 REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | PROCUREMENT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A7R12	RESISTOR, same as A6R1	Same as A6R1									
A7R13	RESISTOR, same as A6R13	Same as A1R7									
A7R14	RESISTOR, same as A6R14	Same as A6R14									
A7R15	RESISTOR, same as A6R15	Same as A6R15									
A7R16	RESISTOR, same as A6R15	Same as A6R15									
A7R17	RESISTOR, same as A6R14	Same as A6R14									
A7R18	RESISTOR, same as A6R14	Same as A6R14									
A7R19	RESISTOR, same as A6R15	Same as A6R15									
A7R20	RESISTOR, same as A6R15	Same as A6R15									
A7R21	RESISTOR, same as A6R14	Same as A6R14									
A7R22	RESISTOR, same as A6R14	Same as A6R14									
A7R23	RESISTOR, same as A6R15	Same as A6R15									
A7R24	RESISTOR, same as A6R15	Same as A6R15									
A7R25	RESISTOR, same as A6R14	Same as A6R14									
A7R26	RESISTOR, same as A6R14	Same as A6R14									
A7R27	RESISTOR, same as A6R15	Same as A6R15									
A7R28	RESISTOR, same as A6R15	Same as A6R15									
A7R29	RESISTOR, same as A6R14	Same as A6R14									
A7R30	RESISTOR, same as A6R14	Same as A6R14									
A7R31	RESISTOR, same as A6R15	Same as A6R15									
A7R32	RESISTOR, same as A6R15	Same as A6R15									
A7R33	RESISTOR, same as A6R14	Same as A6R14									
A7R34	RESISTOR, same as A6R14	Same as A6R14									
A7R35	RESISTOR, same as A6R15	Same as A6R15									

FORM J4736 REV MAR 69 (Supersedes J4736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A7R36	RESISTOR, same as A6R15	Same as A6R15									
A7R37	RESISTOR, same as A6R14	Same as A6R14									
A7VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A8	CIRCUIT CARD ASSEMBLY, same as A6										
A8C1	CAPACITOR, same as A1C3	Same as A1C4									
A8C2	CAPACITOR, same as A1C2	Same as A1C4									
A8C3	CAPACITOR, same as A6C3	Same as A6C3									
A8C4	CAPACITOR, same as A6C3	Same as A6C3									
A8C5	CAPACITOR, same as A6C3	Same as A6C3									
A8C6	CAPACITOR, same as A6C3	Same as A6C3									
A8C7	CAPACITOR, same as A6C3	Same as A6C3									
A8C8	CAPACITOR, same as A6C3	Same as A6C3									
A8C9	CAPACITOR, same as A6C3	Same as A6C3									
A8C10	CAPACITOR, same as A6C3	Same as A6C3									
A8C11	CAPACITOR, same as A6C3	Same as A6C3									
A8C12	CAPACITOR, same as A6C3	Same as A6C3									
A8C13	CAPACITOR, same as A6C3	Same as A6C3									
A8C14	CAPACITOR, same as A6C3	Same as A6C3									
A8CR1	SEMICONDUCTOR DEVICE same as A6CR1	Same as A6CR1									
A8CR2	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR3	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR4	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR5	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR6	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									

FORM 14736 REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A8CR7	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR8	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR9	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR10	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR11	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8CR12	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A8MD1	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD2	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD3	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD4	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A8MD5	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A8MD6	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A8MD7	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD8	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD9	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A8MD10	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A8MD11	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A8MD12	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A8MD13	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A8MD14	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A8MD15	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A8MD16	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A8MD17	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A8MD18	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									

FORM 14736 REV MAR 69 (Supersedes 14736 FEB 61 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.									CONTRACT NO.: DAAB03-69-C-0375	
REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A8R1	RESISTOR, same as A6R1	Same as A6R1									
A8R2	RESISTOR, same as A6R1	Same as A6R1									
A8R3	RESISTOR, same as A6R1	Same as A6R1									
A8R4	RESISTOR, same as A6R1	Same as A6R1									
A8R5	RESISTOR, same as A6R1	Same as A6R1									
A8R6	RESISTOR, same as A6R1	Same as A6R1									
A8R7	RESISTOR, same as A6R1	Same as A6R1									
A8R8	RESISTOR, same as A6R1	Same as A6R1									
A8R9	RESISTOR, same as A6R1	Same as A6R1									
A8R10	RESISTOR, same as A6R1	Same as A6R1									
A8R11	RESISTOR, same as A6R1	Same as A6R1									
A8R12	RESISTOR, same as A6R1	Same as A6R1									
A8R13	RESISTOR, same as A6R13	Same as A1R7									
A8R14	RESISTOR, same as A6R14	Same as A6R14									
A8R15	RESISTOR, same as A6R15	Same as A6R15									
A8R16	RESISTOR, same as A6R15	Same as A6R15									
A8R17	RESISTOR, same as A6R14	Same as A6R14									
A8R18	RESISTOR, same as A6R14	Same as A6R14									
A8R19	RESISTOR, same as A6R15	Same as A6R15									
A8R20	RESISTOR, same as A6R15	Same as A6R15									
A8R21	RESISTOR, same as A6R14	Same as A6R14									
A8R22	RESISTOR, same as A6R14	Same as A6R14									
A8R23	RESISTOR, same as A6R15	Same as A6R15									
A8R24	RESISTOR, same as A6R15	Same as A6R15									

FORM 14725 REV MAR 69 (Supersedes 14725 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A8R25	RESISTOR, same as A6R14	Same as A6R14									
A8R26	RESISTOR, same as A6R14	Same as A6R14									
A8R27	RESISTOR, same as A6R15	Same as A6R15									
A8R28	RESISTOR, same as A6R15	Same as A6R15									
A8R29	RESISTOR, same as A6R14	Same as A6R14									
A8R30	RESISTOR, same as A6R14	Same as A6R14									
A8R31	RESISTOR, same as A6R15	Same as A6R15									
A8R32	RESISTOR, same as A6R15	Same as A6R15									
A8R33	RESISTOR, same as A6R14	Same as A6R14									
A8R34	RESISTOR, same as A6R14	Same as A6R14									
A8R35	RESISTOR, same as A6R15	Same as A6R15									
A8R36	RESISTOR, same as A6R15	Same as A6R15									
A8R37	RESISTOR, same as A6R14	Same as A6R14									
A8VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A9	CIRCUIT CARD ASSEMBLY, same as A6										
A9C1	CAPACITOR, same as A1C3	Same as A1C4									
A9C2	CAPACITOR, same as A1C2	Same as A1C4									
A9C3	CAPACITOR, same as A6C3	Same as A6C3									
A9C4	CAPACITOR, same as A6C3	Same as A6C3									
A9C5	CAPACITOR, same as A6C3	Same as A6C3									
A9C6	CAPACITOR, same as A6C3	Same as A6C3									
A9C7	CAPACITOR, same as A6C3	Same as A6C3									
A9C8	CAPACITOR, same as A6C3	Same as A6C3									
A9C9	CAPACITOR, same as A6C3	Same as A6C3									

FORM 14736 REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC.									CONTRACT NO.: DAAB03-69-C-0375	
REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A9C10	CAPACITOR, same as A6C3	Same as A6C3									
A9C11	CAPACITOR, same as A6C3	Same as A6C3									
A9C12	CAPACITOR, same as A6C3	Same as A6C3									
A9C13	CAPACITOR, same as A6C3	Same as A6C3									
A9C14	CAPACITOR, same as A6C3	Same as A6C3									
A9CR1	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR2	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR3	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR4	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR5	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR6	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR7	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR8	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR9	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR10	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR11	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9CR12	SEMICONDUCTOR DEVICE, same as A6CR1	Same as A6CR1									
A9MD1	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A9MD2	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A9MD3	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A9MD4	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A9MD5	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A9MD6	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD4									
A9MD7	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									

FORM 4735 REV MAR 69 (Supersedes 4734 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL. TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A9MD8	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A9MD9	INTEGRATED CIRCUIT, same as A6MD1	Same as A6MD1									
A9MD10	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9MD11	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9MD12	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9MD13	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A9MD14	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A9MD15	INTEGRATED CIRCUIT, same as A6MD13	Same as A6MD13									
A9MD16	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9MD17	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9MD18	INTEGRATED CIRCUIT, same as A1MD9	Same as A6MD10									
A9R1	RESISTOR, same as A6R1	Same as A6R1									
A9R2	RESISTOR, same as A6R1	Same as A6R1									
A9R3	RESISTOR, same as A6R1	Same as A6R1									
A9R4	RESISTOR, same as A6R1	Same as A6R1									
A9R5	RESISTOR, same as A6R1	Same as A6R1									
A9R6	RESISTOR, same as A6R1	Same as A6R1									
A9R7	RESISTOR, same as A6R1	Same as A6R1									
A9R8	RESISTOR, same as A6R1	Same as A6R1									
A9R9	RESISTOR, same as A6R1	Same as A6R1									
A9R10	RESISTOR, same as A6R1	Same as A6R1									
A9R11	RESISTOR, same as A6R1	Same as A6R1									
A9R12	RESISTOR, same as A6R1	Same as A6R1									
A9R13	RESISTOR, same as A6R13	Same as A1R7									

FORM J4735 REV MAR 69 (Supersedes J4735 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CO. NAME: COMMUNICATIONS TECHNOLOGY, INC

CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A9R14	RESISTOR, same as A6R14	Same as A6R14									
A9R15	RESISTOR, same as A6R15	Same as A6R15									
A9R16	RESISTOR, same as A6R15	Same as A6R15									
A9R17	RESISTOR, same as A6R14	Same as A6R14									
A9R18	RESISTOR, same as A6R14	Same as A6R14									
A9R19	RESISTOR, same as A6R15	Same as A6R15									
A9R20	RESISTOR, same as A6R15	Same as A6R15									
A9R21	RESISTOR, same as A6R14	Same as A6R14									
A9R22	RESISTOR, same as A6R14	Same as A6R14									
A9R23	RESISTOR, same as A6R15	Same as A6R15									
A9R24	RESISTOR, same as A6R15	Same as A6R15									
A9R25	RESISTOR, same as A6R14	Same as A6R14									
A9R26	RESISTOR, same as A6R14	Same as A6R14									
A9R27	RESISTOR, same as A6R15	Same as A6R15									
A9R28	RESISTOR, same as A6R15	Same as A6R15									
A9R29	RESISTOR, same as A6R14	Same as A6R14									
A9R30	RESISTOR, same as A6R14	Same as A6R14									
A9R31	RESISTOR, same as A6R15	Same as A6R15									
A9R32	RESISTOR, same as A6R15	Same as A6R15									
A9R33	RESISTOR, same as A6R14	Same as A6R14									
A9R34	RESISTOR, same as A6R14	Same as A6R14									
A9R35	RESISTOR, same as A6R15	Same as A6R15									
A9R36	RESISTOR, same as A6R15	Same as A6R15									
A9R37	RESISTOR, same as A6R14	Same as A6R14									

FORM 14736 REV MAR 69 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)
A9VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1								
A10	CIRCUIT CARD ASSEMBLY: epoxy glass board with printed wiring both sides; 7.4ø in. wd by 3.75 in. high by ø.ø64 in. thick; principal components mounted on board are 2 capacitors, 1 resistor, 1 zener diode, and 8 integrated circuits; provision made for installation of up to 96 program diodes, exact number and placement dependent on desired sequence; NSA drawing number øN15ø444	Provides storage and decoding for one character in each of 48 sequences. Up to 96 program diodes may be installed for character selection	A1ø, A11, A12, A13, A14, A15, A16, A17, A18, A19							
A10C1	CAPACITOR, same as A1C3	Same as A1C4								
A10C2	CAPACITOR, same as A1C2	Same as A1C4								
A10MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5								
A10MD2	INTEGRATED CIRCUIT, logic gate: logical "1", 3.ø6v min; logical "ø", ø.6v max; 14 pin dual-in-line package, ø.75 in. lg by ø.25 in. wd by ø.12 in. high; leads project ø.15 in; NSA drawing øN15ø461; Signetics Corporation type SP37øA	Triple 3-input NOR gate	A1øMD2, A1øMD4, A1øMD6, A1øMD8, A11MD2, A11MD4, A11MD6, A11MD8, A12MD2, A12MD4, A12MD6, A12MD8, A13MD2, A13MD4, A13MD6, A13MD8, A14MD2, A14MD4, A14MD6, A14MD8, A15MD2, A15MD4, A15MD6, A15MD8, A16MD2, A16MD4, A16MD6, A16MD8, A17MD2, A17MD4, A17MD6, A17MD8, A18MD2, A18MD4, A18MD6, A18MD8, A19MD2, A19MD4, A19MD6, A19MD8							
A10MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5								
A10MD4	INTEGRATED CIRCUIT, same as A1øMD2	Same as A1øMD2								
A10MD5	INTEGRATED CIRCUIT, flip flop: dual J-K flip flop with separate clock and reset inputs; logical "1", 3.6v min; logical "ø", ø.6v max; 16 pin dual-in-line package, ø.75 in. lg by ø.25 in. wd by ø.12 in. high; leads project ø.15 in.; NSA drawing øN15ø46ø; Signetics Corporation type SP322B	Counting and storage	A1øMD5, A11MD5, A12MD5, A13MD5, A14MD5, A15MD5, A16MD6, A17MD5, A18MD5, A19MD5							
A10MD6	INTEGRATED CIRCUIT, same as A1øMD2	Same as A1øMD2								
A10MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2								

REV MAR 68 (Supersedes 14736 FEB 63 which is obsolete)

IDENTIFICATION TABLE OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. CONTRACT NO.: DAAB03-69-C-0375

REV. STA. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A10MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A10R1	RESISTOR, fixed, composition (insulated); 3.9 ohms ±5%, 1/2 watt; Specification MIL-R-11	Same as A1R7	A1ØR1, A11R1, A12R1, A13R1, A14R1, A15R1, A16R1, A17R1, A18R1, A19R1	RC2ØGF3R9J							1Ø
A10VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A11	ASSEMBLY, same as A1Ø	Same as A1Ø									
A11C1	CAPACITOR, same as A1C3	Same as A1C4									
A11C2	CAPACITOR, same as A1C2	Same as A1C4									
A11MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A11MD2	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A11MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A11MD4	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A11MD5	INTEGRATED CIRCUIT, same as A1ØMD5	Same as A1ØMD5									
A11MD6	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A11MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A11MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A11R1	RESISTOR, same as A1ØR1	Same as A1R7									
A11VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A12	ASSEMBLY, same as A1Ø	Same as A1Ø									
A12C1	CAPACITOR, same as A1C3	Same as A1C4									
A12C2	CAPACITOR, same as A1C2	Same as A1C4									
A12MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A12MD2	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A12MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A12MD4	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A12MD5	INTEGRATED CIRCUIT, same as A1ØMD5	Same as A1ØMD5									

REV MAR 69 (Supersedes DA736 FEB 63 which is obsolete)

REF. STD OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A12MD6	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A12MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A12MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A12R1	RESISTOR, same as A1ØR1	Same as A1R7									
A12VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A13	ASSEMBLY, same as A1Ø	Same as A1Ø									
A13C1	CAPACITOR, same as A1C3	Same as A1C4									
A13C2	CAPACITOR, same as A1C2	Same as A1C4									
A13MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A13MD2	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A13MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A13MD4	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A13MD5	INTEGRATED CIRCUIT, same as A1ØMD5	Same as A1ØMD5									
A13MD6	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A13MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A13MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A13R1	RESISTOR, same as A1ØR1	Same as A1R7									
A13VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A14	ASSEMBLY, same as A1Ø	Same as A1Ø									
A14C1	CAPACITOR, same as A1C3	Same as A1C4									
A14C2	CAPACITOR, same as A1C2	Same as A1C4									
A14MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A14MD2	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A14MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									

FORM 14728 REV MAR 69 *(Supersedes 14736 FEB 63 which is obsolete)*

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A14MD4	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A14MD5	INTEGRATED CIRCUIT, same as A1ØMD5	Same as A1ØMD5									
A14MD6	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A14MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A14MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A14R1	RESISTOR, same as A1ØR1	Same as A1R7									
A14VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A15	ASSEMBLY, same as A1Ø	Same as A1Ø									
A15C1	CAPACITOR, same as A1C3	Same as A1C4									
A15C2	CAPACITOR, same as A1C2	Same as A1C4									
A15MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A15MD2	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A15MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD6									
A15MD4	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A15MD5	INTEGRATED CIRCUIT, same as A1ØMD5	Same as A1ØMD5									
A15MD6	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A15MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A15MD8	INTEGRATED CIRCUIT, same as A1ØMD2	Same as A1ØMD2									
A15R1	RESISTOR, same as A1ØR1	Same as A1R7									
A15VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A16	ASSEMBLY, same as A1Ø	Same as A1Ø									
A16C1	CAPACITOR, same as A1C3	Same as A1C4									
A16C2	CAPACITOR, same as A1C2	Same as A1C4									
A16MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									

FORM J4736 REV MAR 69 *(Supersedes J4736 FEB 63 which is obsolete)*

IDENTIFICATION TABLES OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6)					FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
					ARMY	AF	AGENCY	NAVY	OTHER		
A16MD2	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A16MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A16MD4	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A16MD5	INTEGRATED CIRCUIT, same as A10MD5	Same as A10MD5									
A16MD6	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A16MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A16MD8	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A16R1	RESISTOR, same as A10R1	Same as A1R7									
A16VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A17	ASSEMBLY, same as A10	Same as A10									
A17C1	CAPACITOR, same as A1C3	Same as A1C4									
A17C2	CAPACITOR, same as A1C2	Same as A1C4									
A17MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A17MD2	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A17MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A17MD4	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A17MD5	INTEGRATED CIRCUIT, same as A10MD5	Same as A10MD5									
A17MD6	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A17MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A17MD8	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A17R1	RESISTOR, same as A10R1	Same as A1R1									
A17VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A18	ASSEMBLY, same as A10	Same as A10									
A18C1	CAPACITOR, same as A1C3	Same as A1C4									

FORM 14735 NEV MAR 69 (Supersedes 14735 FEB 65 which is obsolete)

IDENTIFICATION TABLES OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
A18C2	CAPACITOR, same as A1C3	Same as A1C4									
A18MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A18MD2	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A18MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A18MD4	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A18MD5	INTEGRATED CIRCUIT, same as A10MD5	Same as A10MD5									
A18MD6	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A18MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A18MD8	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A18R1	RESISTOR, same as A10R1	Same as A1R7									
A18VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									
A19	ASSEMBLY, same as A10	Same as A10									
A19C1	CAPACITOR, same as A1C3	Same as A1C4									
A19C2	CAPACITOR, same as A1C2	Same as A1C4									
A19MD1	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A19MD2	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A19MD3	INTEGRATED CIRCUIT, same as A1MD5	Same as A1MD5									
A19MD4	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A19MD5	INTEGRATED CIRCUIT, same as A10MD5	Same as A10MD5									
A19MD6	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A19MD7	INTEGRATED CIRCUIT, same as A1MD2	Same as A1MD2									
A19MD8	INTEGRATED CIRCUIT, same as A10MD2	Same as A10MD2									
A19H1	RESISTOR, same as A10R1	Same as A1R7									
A19VR1	SEMICONDUCTOR DEVICE, same as A1VR1	Same as A1VR1									

REV MAR 69 *(Supersedes TM 736 FEB 63 which is obsolete)*

IDENTIFICATION TABLES OF PARTS FOR DECODER, COMMAND SIGNAL KY-681/GGC

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
J1	CONNECTOR BODY, receptacle, electrical: 75 position; removable contacts; 3-47/64 in. lg by 1-51/64 wd by 11/16 in. high; NSA drawing 0N15 0451; Winchester type XAC75SF2A 016	Interface connections for data line number 1	J1, J2, J3, J4								4
J2	CONNECTOR BODY, same as J1	Interface connections for data line number 2									
J3	CONNECTOR BODY, same as J1	Interface connections for data line number 3									
J4	CONNECTOR BODY, same as J1	Interface connections for data line number 4									
XA1	CONNECTOR, receptacle, electrical: 5.36 in. lg by 0.44 in. wd by 0.51 in. high with 0.23 in. lg dip solder contacts; double row, 56 position; black glass-filled phenolic; NSA drawing 0N15 0454; Winchester type 8BD28D	Receptacle for A1	XA1, XA2, XA3, XA4, XA5, XA6, XA7, XA9, XA10, XA11, XA12, XA13, XA14, XA15, XA16, XA17, XA18, XA19, plus one connector for storage of extender board								20
XA2	CONNECTOR, same as XA1	Receptacle for A2									
XA3	CONNECTOR, same as XA1	Receptacle for A3									
XA4	CONNECTOR, same as XA1	Receptacle for A4									
XA5	CONNECTOR, same as XA1	Receptacle for A5									
XA6	CONNECTOR, same as XA1	Receptacle for A6									
XA7	CONNECTOR, same as XA1	Receptacle for A7									
XA8	CONNECTOR, same as XA1	Receptacle for A8									
XA9	CONNECTOR, same as XA1	Receptacle for A9									
XA10	CONNECTOR, same as XA1	Receptacle for A10									
XA11	CONNECTOR, same as XA1	Receptacle for A11									
XA12	CONNECTOR, same as XA1	Receptacle for A12									
XA13	CONNECTOR, same as XA1	Receptacle for A13									
XA14	CONNECTOR, same as XA1	Receptacle for A14									
XA15	CONNECTOR, same as XA1	Receptacle for A15									

FORM 1473B REV MAR 69 (Supersedes 1473A FEB 63 which is obsolete)

CONTRACTOR: COMMUNICATIONS TECHNOLOGY, INC. | CONTRACT NO.: DAAB03-69-C-0375

REF. SYM. OR PART NUMBER (1)	NAME OF PARTS AND DESCRIPTION (2)	FUNCTION (3)	ALL SYMBOLS AND PART NUMBERS INVOLVED (4)	JAN OR MIL TYPE NUMBER (5)	EQUIPMENT REPAIR PART KIT QUANTITIES PER SERVICE (6) ARMY	AF	AGENCY	NAVY	OTHER	FEDERAL STOCK NUMBER (7)	TOTAL NUMBER PARTS PER END ITEM (8)
XA16	CONNECTOR, same as XA1	Receptacle for A16									
XA17	CONNECTOR, same as XA1	Receptacle for A17									
XA18	CONNECTOR, same as XA1	Receptacle for A18									
XA19	CONNECTOR, same as XA1	Receptacle for A19									
	CONNECTOR BODY, plug, electrical: 75 position; removable contacts; 2.75 lg by 1.45 wd by 2.50 high; NSA drawing 0N1504500; Winchester type XAC 75PDSA300	Mating connectors for J1-J4, supplied with equipment									4
	CONTACT, electrical: Crimp removable contact for connector body, plug, electrical: accepts AWG #24 stranded wire; 49/64 in. lg by 0.062 contact diameter; NSA drawing 0N1504452-1; Winchester type 100-1024P	Used with connector body, plug, electrical for signal wiring									144
	CONTACT, electrical: Crimp removable contact for connector body, plug, electrical; accepts AWG #16 stranded wire; 49/64 in. lg by 0.062 contact diameter; NSA drawing 0N1504452-2; Winchester type 100-1016P	Used with connector body, plug, electrical for power wiring									16
	CONTACT, electrical: Crimp removable contact for J1-J4; accepts #24 AWG stranded wire; 49/64 in. lg by 0.062 socket diameter; NSA drawing 0N1504453-1; Winchester type 100-1024S	Used with J1-J4 for signal wiring									140
	CONTACT, electrical: Crimp removable contact for J1-J4; accepts #16 AWG stranded wire; 49/64 in. lg by 0.062 socket diameter; NSA drawing 0N1504453-2; Winchester type 100-1016S	Used with J1-J4 for power wiring									56
	KEY, polarizing: Nylon insert for connector 0N1504454; 0.286 in. lg by 0.122 in. wd by 0.263 in. high; NSA drawing 0N1504456; Winchester type 109-8957	Keying for XA1-XA19 to allow insertion of proper Circuit Card Assembly only									19
	NUT, sheet spring: Formed sheet metal nut; 0.31 in. wd by 0.38 in. lg; fits 1/16 in. panels; accepts #4A sheet metal screw; olive drab finish; NSA drawing 0N1504431; Tinnerman type C15263-4Z-1.	Retaining device for bottom cover									5

FORM J4736 REV MAR 69 *(Supersedes J4736 FEB 63 which is obsolete)*

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CHAPTER 7

ILLUSTRATED PARTS BREAKDOWN

LIST OF ILLUSTRATIONS

CHAPTER 7

ILLUSTRATED PARTS BREAKDOWN

I - INTRODUCTION

7-1. GENERAL. - This Illustrated Parts Breakdown lists and describes all replaceable parts of the Decoder, Command Signals KY-68l/GGC.

7-2. GROUP ASSEMBLY PARTS LIST. - The Group Assembly Parts Lists (Section II) consists of all parts in the complete equipment.

a. Figure and Index Number Column. - The first item in the figure and index number column is the figure number of the illustration of the assembly listed. The figure number is not repeated thereafter except with the first item of listings continued on succeeding pages. The second number is the index number to key the part to the illustration callout. Identical parts occurring in the same general location on the equipment are illustrated and indexed but once.

b. Reference Designation Column. - This column contains all reference designations used in this Illustrated Parts Breakdown and assigned in the equipment.

c. Description Column. The names used are the same assigned to the manufacturing drawings. Abbreviations used are in accordance with MIL-STD-12. Attaching parts are listed immediately below the items they attach.

d. Part Number Column. - Part numbers used in this column are selected according to the following order of preference: Military standards, design activity numbers and vendor numbers. When a vendors part number is used, the design activities spec control number is listed in the Description column.

e. Code Ident (FSCM) Column. - Manufacturers' codes are in accordance with cataloging handbook H4-1. Following is a list of manufacturers used in this Illustrated Parts Breakdown.

Code Ident (FSCM)	Name and Address
03877	Transitron Electronic Corp. 168 Albion St. Wakefield, Mass. 01880
04713	Motorola Semiconductor Products Inc. P. 0. Box 955 Phoenix, Ariz. 85001

Code Ident (Continued) (FSCM)	Name and Address
05397	Union Carbide Elec. Div. 270 Park Ave. New York, N. Y. 10017
06751	Components, Inc. Arizona Div. 3540 W. Osborn Rd. Phoenix, Ariz.
07263	Fairchild Semiconductor 313 Fairchild Drive Mountain View, Calif.
11162	Cipco Corp. 2206-08 Colen St. St. Louis, MO. 63106
18324	Signetics Corp. 811 East Arques Ave. Sunnyvale, Calif. 94086
27014	National Semiconductor Corp. 2975 San Ysidro Way Santa Clara, Calif. 95051
71590	Globe-Union Inc., Centralab Div. P. 0. Box 591 Milwaukee, Wisc. 53201
78553	Tinnerman Products Inc. 8700 Brookpart Rd. Cleveland, Ohio 44129
80183	Sprague Products Co. 99 Marshall St. North Adams, Mass. 01247
81312	Winchester Electronics Main St. and Hillside Ave. Oakville, Conn. 06779
82567	Reeves Hoffman 400 West North St. Carlisle, Pa. 17013

Code Ident (Continued) (FSCM)	Name and Address
83508	Grant Pully and Hardware co. High St West Nyack, N. Y. 10994
88245	Litton Industries USECO Div. 13536 Saticoy St. Van Nuys, Calif. 91409

f. Units Per Assembly Column. - This number is the quantity required for the particular application being listed. "Ref" is used to indicate the number of units required has been given in a previous listing. The previous listing is indicated in parenthesis following the description of the item in the Description Column.

g. Usable On Code Column. - The absence of a code in this column indicates that the parts shown are usable on all models or assemblies covered by these figures.

7-3. NUMERICAL INDEX. - The Part Number column of the Numerical Index on III) contains all of the part numbers that appear in the Group Assembly Parts List.

a. Part Number Column. - The order of precedence in beginning the part number arrangement on the first (left hand) position of the part number is as follows:

Letters A through Z
Numerals 0 through 9
(Alphabetic O's shall be considered numeric zeros (0)).

The second and succeeding positions of the part number from left to right is as follows:

(1) Space (blank column)
(2) Diagonal (slant)
(3) Point (period)
(4) Dash (-)
(5) Letters A through Z
(6) Numerals Ø through 9

b. Figure And Index Number Column. - This column lists the figure and in&x number of each appearance of the part in the Group Assembly Parts List (Section II). For Military Standard part numbers, only the first appearance in the Group Assembly Parts List is shown.

c. Quantity Per Article Column. - This column lists the total quantity of each part required for the complete equipment listed.

7-4. REFERENCE DESIGNATION INDEX.- The Reference Designation column of the Reference Designation Index (Section IV) includes all reference symbols used in the Group Assembly Parts List, arranged first in alphabetical and secondly in numerical order. Opposite each symbol number is listed the figure and index number of the part in the Group Assembly Parts List, and the part number.

7-5. HOW TO USE THIS ILLUSTRATED PARTS BREAKDOWN.

a. If Location Of Parts Is Known. - Refer to Table of Contents to find the page number for the assembly in which the part is used. Turn to the page number of the illustration. Locate the part and its index number on the illustration. Find the index number in the Group Assembly Parts List. The associated listing contains all necessary information.

b. If Part Number Is Known. - Refer to Section III, the Numerical Index, and find the part number. Note the figure and index number. Turn to Section II and find the illustration of the assembly in which the part is used. Locate the part and its index number on the illustration. Find the index number in the Group Assembly Parts List. The associated listing gives all necessary information.

c. If the reference Designation Is Known.- Refer to Section IV, Reference Designation Index and find the reference designation. The part number is given in this table. If description or location is desired, note the figure and index number. Turn to Section II and find the illustration of the assembly in which the part is used. This is the location of the part. Find the index number in the Group Assembly Parts List. Description is given in this listing.

II - GROUP ASSEMBLY PARTS LIST

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-1 -		DECODER, COMMAND SIGNALS KY-681/GGC	0N150423		Ref	
- 1		. DECODER SUBASSEMBLY	0N150424		1	
- 2		. . BRACKET, MOUNTING.....	0N150425		2	
		(ATTACHING PARTS)				
- 3		. . SCREW, MACHINE.....	MS51959-43		6	
- 4		. . WASHER, LOCK	MS35338-137		6	
- 5		. . NUT, HEX.....	MS20341-8C		6	
		---*---				
- 6		. . CHASSIS, ELEC EQPT.....	0N150426		1	
- 7		. . PANEL, FRONT.....	0N150427		1	
- 8		. . COVER, BOTTOM.....	0N150428		1	
		(ATTACHING PARTS)				
- 9		. . NUT, SHEET SPRING - NSA PART NO. ØN15Ø431.....	C15263-4Z-1	78553	5	
- 1Ø		. . SCREW, TAPPING	MS24616-3		5	
		---*---				
- 11		. . HANDLE, BOW - NSA PART NO. ØN15Ø429..... ..	1012-12	88245	2	
		(ATTACHING PARTS)				
- 12		. . FERRULE, HANDLE - NSA PART NO. ØN15Ø43Ø.....	900-12	88245	4	
- 13		. . SCREW, MACHINE	MS51958-63		4	
- 14		. . WASHER, LOCK	MS35338-138		4	
		---*---				
- 15		. . HOLDER, CARD LABEL - NSA PART NO. ØN15Ø432.....	1527US28	11162	1	
		(ATTACHING PARTS)				
- 16		. . SCREW, MACHINE	MS51959-17		4	
- 17		. . WASHER, FLAT.....	MS15759-803		4	
- 18		. . WASHER, LOCK	MS35338-135		4	
- 19		. . NUT, HEX	MS20341-4C		4	
		---*---				
- 2Ø		. . GUIDE, CIRCUIT CARD	0N150435		1	

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
		(ATTACHING PARTS)				
7-1 - 21		. . SCREW, MACHINE	MS51957-43		4	
- 22		. . WASHER, LOCK	MS35338-137		4	
- 23		. . NUT, HEX	MS20341-8C		4	
		---*---				
- 24		. . MOTHERBOARD	0N150436		1	
- 25		. . PRINTED WIRING BOARD	0N150437		1	
- 26	XA1 thru XA19	. . CONN, RCPT, ELEC - NSA PART NO. ØN15Ø454	8BD28DO	81312	2Ø	
- 27		. . POLARIZING KEY - NSA PART NO. ØN15Ø456	109-8597	81312	19	
		(ATTACHING PARTS)				
- 28		. . SCREW, MACHINE	MS51957-14		14	
- 29		. . WASHER, LOCK	MS35338-135		14	
- 3Ø		. . NUT, HEX	MS20341-4C		14	
		---*---				
- 31	J1 thru J4	. . CONN BODY, RCPT ELEC - NSA PART NO. ØN15Ø451	XAC75SF2A016	81312	4	
		(ATTACHING PARTS)				
- 32		. . SCREW, MACHINE	MS51957-14		16	
- 33		. . WASHER, LOCK	MS35338-135		16	
- 34		. . NUT, HEX	MS20341-4C		16	
		---*---				
- 35		. . CONTACT, ELECTRICAL - NSA PART NO. ØN15Ø453-1	100-1024S	81312	14Ø	
- 36		. . CONTACT, ELECTRICAL - NSA PART NO. ØN15Ø453-2	100-1016S	81312	56	
- 37		. . GUIDE, CIRCUIT CARD	0N150448		1	
		(ATTACHING PARTS)				
- 38		. . SCREW, MACHINE	MS51957-43		4	
- 39		. . WASHER, LOCK	MS35338-137		4	
- 4Ø		. . NUT, HEX	MS20341-8C		4	
		---*---				
- 41		. . PLATE, IDENTIFICATION	0N150433		1	

II - GROUP ASSEMBLY PARTS LIST

Figure & Index No.	Ref. Des.	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
		(ATTACHING PARTS)				
7-1-42		. . SCREW, MACHINE	MS51957-4		2	
-43		. . WASHER, LOCK	MS35338-134		2	
-44		. . NUT, HEX	MS20341-2C		2	
		---*---				
-45	J5	. . CONN, RCPT, ELEC	MS3102R14S5S		1	
		(ATTACHING PARTS)				
-46		. . SCREW, MACHINE	MS51957-16		4	
-47		. . WASHER, LOCK	MS35338-135		4	
-48		. . NUT, HEX	MS20341-4C		4	
		---*---				
-49	A1 thru A4	. CIRCUIT CARD ASSEMBLY	0N150438		4	
		(SEE FIG. 2 FOR BREAKDOWN)				
-50	A5 thru A9	. CIRCUIT CARD ASSEMBLY	0N150440		4	
		(SEE FIG. 3 FOR BREAKDOWN)				
-51	A5	. CIRCUIT CARD ASSEMBLY	0N150442		1	
		(SEE FIG. 4 FOR BREAKDOWN)				
-52	A10 thru A19	. CIRCUIT CARD ASSEMBLY	0N150444		10	
		(SEE FIG. 5 FOR BREAKDOWN)				
-53		. EXTENDER CARD	0N150446		1	
-54		. SLIDE, DRAWER EXTENSION - NSA PART NO. 0N150449 . . .	329-18	83500	1	
		(ATTACHING PARTS)				
-55		. SCREW, MACHINE	MS51959-43		4	
-56		. WASHER, LOCK	MS35338-137		4	
-57		. NUT, HEX	MS20341-8C		4	
		---*---				
-58		. CONN BODY, PLUG ELEC - NSA PART NO. 0N150450	XAC75PD3A300	81312	4	
-59		. CONTACT, ELECTRICAL - NSA PART NO. 0N150452-1.	100-1024P	81312	144	
-60		. CONTACT, ELECTRICAL - NSA PART NO. 0N150452-2	100-1016P	81312	16	
-61		. SEMICONDUCTOR DEVICE, DIODE	JAN1N914		960	
-62		. CONN, PLUG, ELEC	MS3106A14S5P		1	
-63		. CLAMP, CABLE	MS3057-6A		1	
-64		. BUSHING, CABLE	MS3420-6		1	

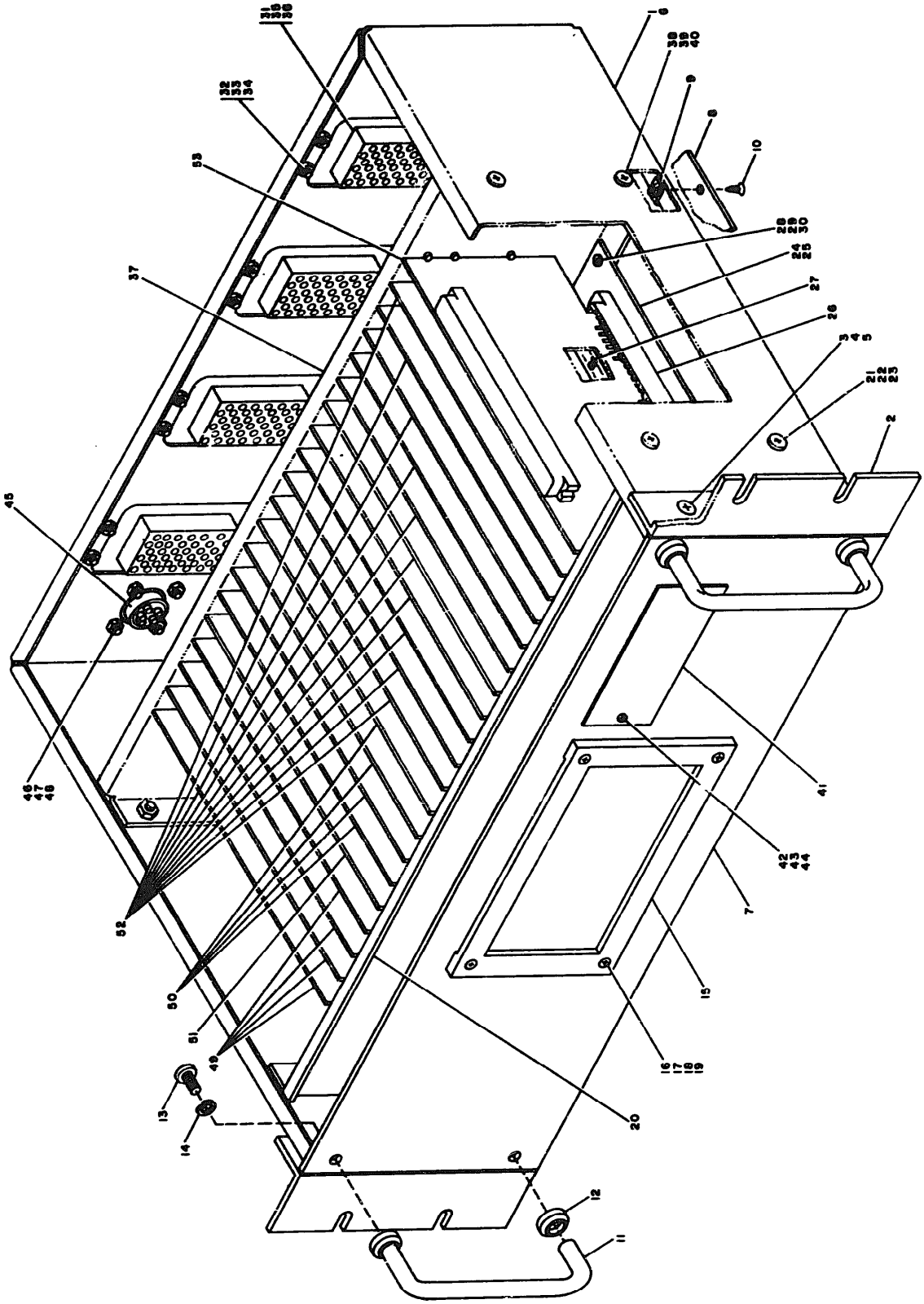


Figure 7-1. - Decoder, Command Signals KY-681/GGC

II - GROUP ASSEMBLY PARTS LIST

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-2 -	Prefix with A1, A2, A3 or A4	CIRCUIT CARD ASSY (SEE FIG. 1-49 FOR NHA).....	0N150438		Ref	
- 1		. PRINTED WIRING BOARD.....	0N150486-1		1	
- 2	Q1	. TRANSISTOR - NSA PART NO. ØN15Ø457	2N4126	Ø4713	1	
- 3	MD1	. INTEGRATED CIRCUIT, SHIFT REGISTER - NSA PART NO. ØN15Ø458	MM505	27Ø14	1	
- 4	MD5, MD6, MD7, MD8, MD11, MD12, MD13, MD14, MD15	. INTEGRATED CIRCUIT, FLIP-FLOP - NSA PART NO. ØN15Ø459	SP321A	18324	9	
- 5	MD1Ø	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø462	SP377A	18324	1	
- 6	MD2, MD4	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø464	SP387A	18324	2	
- 7	MD16	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø465	N8480A	18324	1	
- 8	MD3	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø466	N8481A	18324	1	
- 9	MD9	. INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER - NSA PART NO. ØN15Ø469..... (ALTERNATE SOURCE).....	MC1437L TOA2809E	Ø4713 Ø3877	1	
- 1Ø	VR1	. SEMICONDUCTOR DEVICE, DIODE NSA PART NO. ØN15Ø47Ø ..... (ALTERNATE SOURCE).....	1N4733 1N4733	Ø4713 Ø6751	1	
- 11	C2, C4, C7	. CAPACITOR, FIXED, CERAMIC DISC, .Ø1 MFD - [illegible]WVDC - NSA PART NO. ØN15Ø471.....	HK-103	7159Ø	3	
- 12	C3, C6, C8	. CAPACITOR, FIXED, TANTALUM, 1.Ø MFD 35WVDC - NSA PART NO. ØN15Ø475 ..... (ALTERNATE SOURCE)..... (ALTERNATE SOURCE).....	CS13BF105M 150X0035A2 K1J35S	8Ø183 Ø5397	3	
- 13	C5	. CAPACITOR, FIXED.....	CK05BX221K		1	
- 14	C1	. CAPACITOR, FIXED.....	CK05BX681K		1	

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-2 - 15	R3	. RESISTOR, FIXED	RC07GF470J		1	
- 16	R8	. RESISTOR, FIXED	RC07GF821J		1	
- 17	R2	. RESISTOR, FIXED	RC07GF102J		1	
- 18	R1	. RESISTOR, FIXED	RC07GF302J		1	
- 19	R5	. RESISTOR, FIXED	RC07GF752J		1	
- 2Ø	R6	. RESISTOR, FIXED	RC07GF822J		1	
- 21	R4	. RESISTOR, FIXED	RC07GF183J		1	
- 22	R11, R12	. RESISTOR, FIXED	RC07GF683J		2	
- 23	R9, R1Ø	. RESISTOR, FIXED	RC07GF754J		2	
- 24	R7	. RESISTOR, FIXED	RC20GF2R2J		1	
- 25	R13	. RESISTOR, FIXED	RC07GF682J		1	

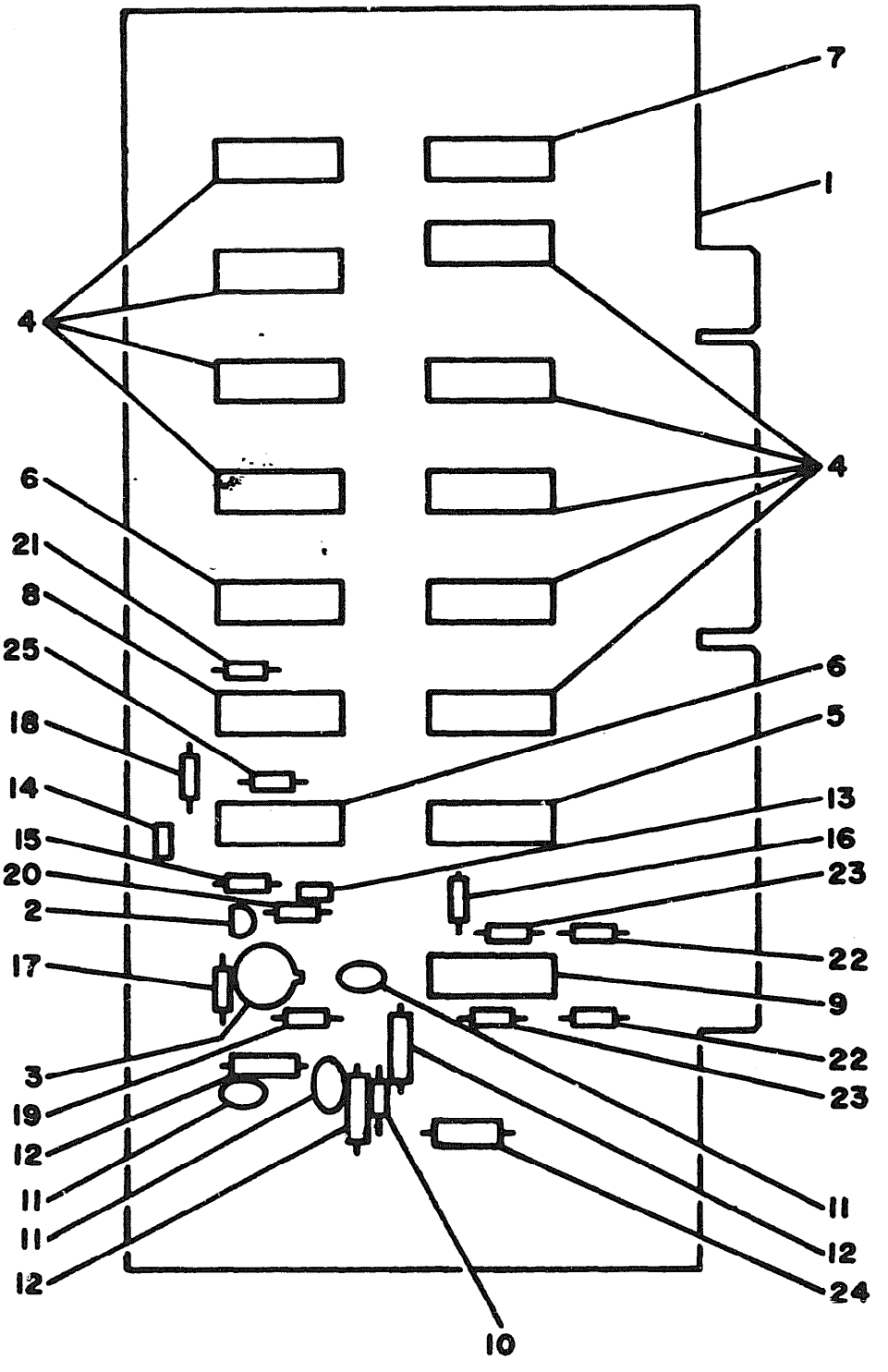


Figure 7-2. - Circuit Card Assembly, Input

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-3 -	Prefix with A6, A7, A8 or A9	CIRCUIT CARD ASSEMBLY (SEE FIG. 1-50 FOR NHA).....	0N150440		Ref	
- 1		. PRINTED WIRING BOARD.....	0N150486-2		1	
- 2	MD1, MD2, MD3, MD4, MD5, MD6, MD7, MD8, MD9	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø463	SP380A	18324	9	
- 3	MD14	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø464	SP387A	18324	1	
- 4	MD13, MD15	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø468	U6A993S59X	Ø7263	2	
- 5	MD1Ø, MD11, MD12, MD16, MD17, MD18	. INTEGRATED CIRCUIT, OPERATIONAL AMPLIFIER, NSA PART NO. ØN15Ø469	MD1437L	Ø4713	6	
		(ALTERNATE SOURCE).....	TOA2809E	Ø3877		
- 6	VR1	. SEMICONDUCTOR DEVICE, DIODE NSA PART NO. ØN15Ø47Ø.....	1N4733	Ø4713	1	
		(ALTERNATE SOURCE).....	1N4733	Ø6751		
- 7	C2	. CAPACITOR, FIXED, CERAMIC DISC, .Ø1 MFD 5ØWVDC - NSA PART NO. ØN15Ø471.....	HK-103	7159Ø	1	
- 8	C3 thru C14	. CAPACITOR, FIXED, CERAMIC DISC, .Ø2 MFD 5ØWVDC - NSA PART NO. ØN15Ø472.....	HK-203	7159Ø	12	
- 9	C1	. CAPACITOR, FIXED, TANTALUM, 1.Ø MFD 35 WVDC - NSA PART NO. ØN15Ø475	CS13BF105M		1	
		(ALTERNATE SOURCE).....	150X003SA2	8Ø183		
		(ALTERNATE SOURCE).....	K1J35S	Ø5397		
- 1Ø	CR1 thru CR12	. SEMICONDUCTOR DEVICE, DIODE	JAN1N914		12	
- 11	R15, R16, R19, R2Ø, R23, R24, R27, R28, R31, R32, R35, R36	. RESISTOR, FIXED.....	RC07GF750J		12	
- 12	R1 thru R12	. RESISTOR, FIXED	RC07GF751J		12	
- 13	R14, R17, R18, R21, R22, R25, R26, R29, R30, R33, R34, R37	. RESISTOR, FIXED	RC07GF152J		12	
- 14	R13	. RESISTOR, FIXED	RC20GF3R3J		1	

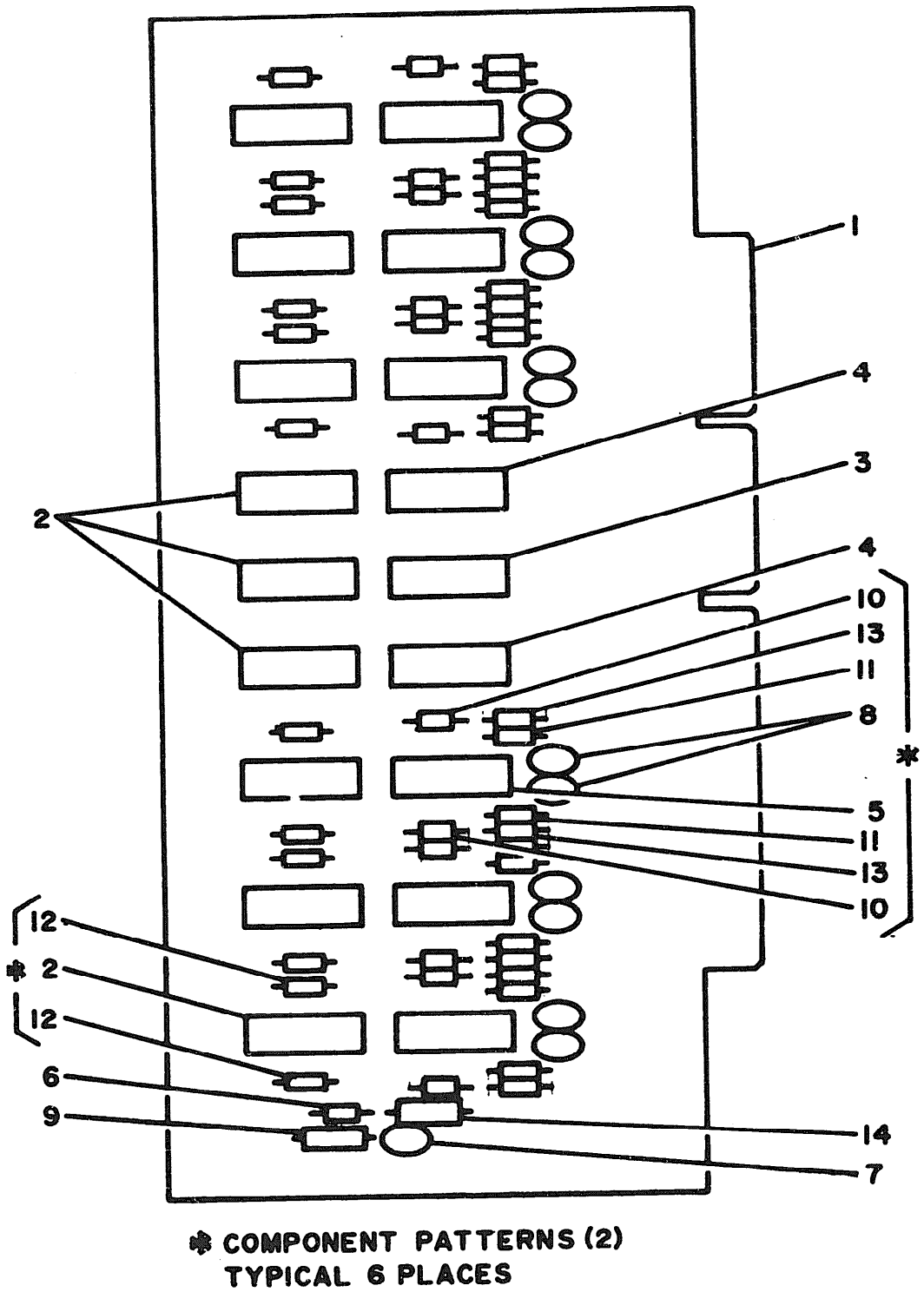


Figure 7-3. - Circuit Card Assembly, Output

II - GROUP ASSEMBLY PARTS LIST

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-4 -	Prefix with A5	CIRCUIT CARD ASSEMBLY (SEE FIG. 1-51 FOR NHA).....	0N150442		Ref	
- 1		. PRINTED WIRING BOARD.....	0N150486-3		1	
- 2	MD2, MD3, MD4, MD5, MD7, MD8, MD9, MD10	. INTEGRATED CIRCUIT, FLIP-FLOP - NSA PART NO. ØN15Ø459	SP321A	18324	8	
- 3	MD6	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø464	SP387A	18324	1	
- 4	MD1	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø467	N8880A	18324	1	
- 5	VR1	. SEMICONDUCTOR DEVICE, DIODE NSA PART NO. ØN15Ø47Ø.....	1N4733	Ø4713	1	
		(ALTERNATE SOURCE).....	1N4733	Ø6751		
- 6	C2, C4	. CAPACITOR, FIXED, CERAMIC DISC, .Ø1 MFD 5ØWVDC - NSA PART NO. ØN15Ø471.....	HK-103	7159Ø	2	
- 7	Y1	. CRYSTAL UNIT, QUARTZ, 8.ØØØ MHZ - NSA PART NO. ØN15Ø473	RHA5A30-8.000MHZ	82567	1	
- 8	C1, C3	. CAPACITOR, FIXED, TANTALUM, 1.ØMFD 35 % VDC - NSA PART NO. ØN15Ø475.....	CS13BF105M		2	
		(ALTERNATE SOURCE).....	150X0035A2	8Ø183		
		(ALTERNATE SOURCE).....	K1J35S	Ø5397		
- 9	R1	. RESISTOR, FIXED.....	RC07GF111J		1	
- 1Ø	R4, R5	. RESISTOR, FIXED.....	RC07GF102J		2	
- 11	R2	. RESISTOR, FIXED.....	RC07GF202J		1	
- 12	R3	. RESISTOR, FIXED.....	RC20GF2R7J		1	
- 13	R6	. RESISTOR, FIXED.....	RC20GF200J		1	
- 14	R7	. RESISTOR, FIXED.....	RC20GF680J		1	

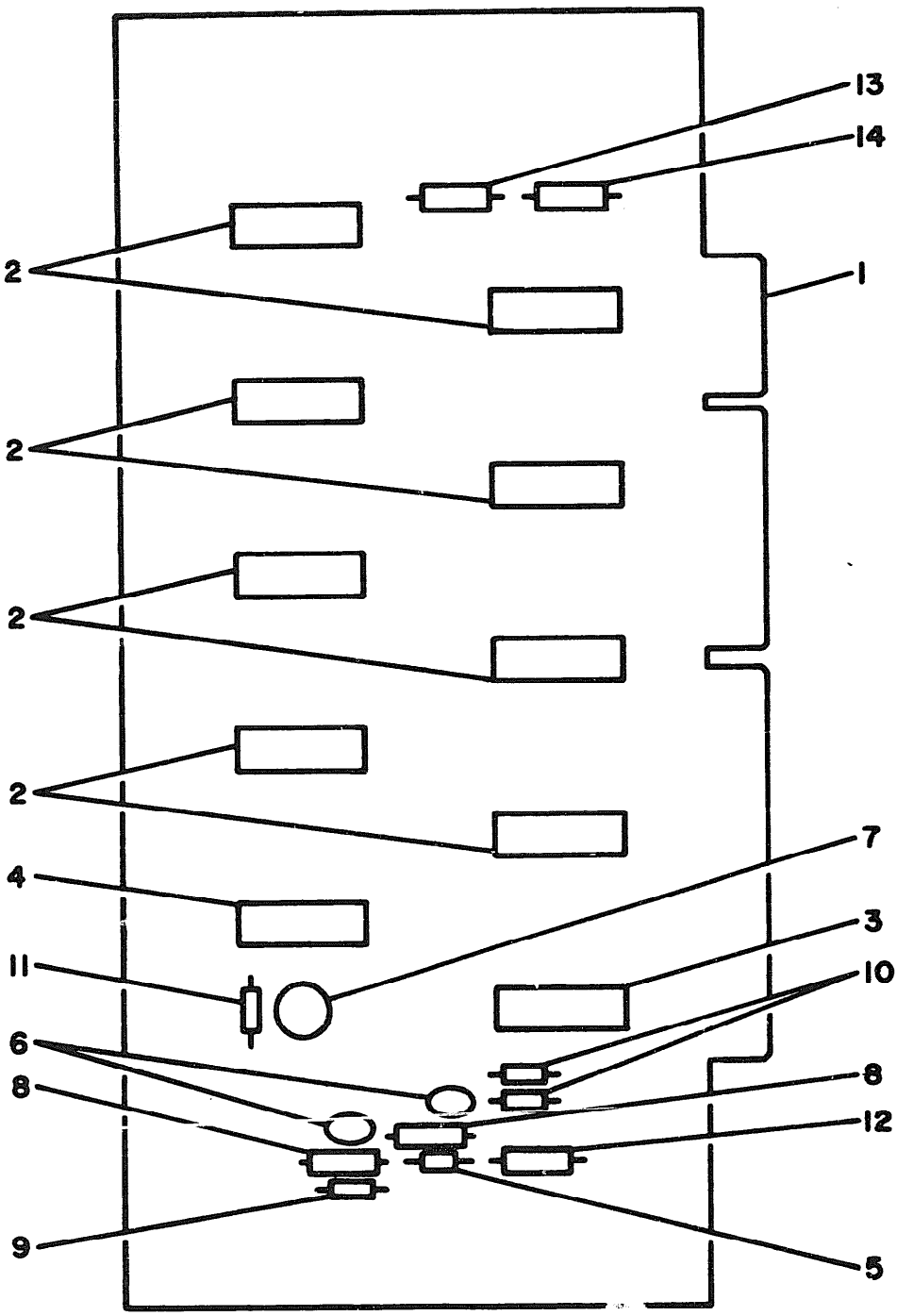


Figure 7-4. - Circuit Card Assembly, Timing

II - GROUP ASSEMBLY PARTS LIST

Figure & Index No.	Ref Des	Description	Part No.	Code Ident (FSCM)	Units Per Assy	Usable On Code
7-5 -	Prefix with A10, A11, A12, A13, A14, A15, A16, A17, A18, or A19	CIRCUIT CARD ASSEMBLY ..... (SEE FIG. 1-52 FOR NHA)	0N150444		Ref	
- 1		. PRINTED WIRING BOARD	0N150486-4		1	
- 2	MD1, MD3	. INTEGRATED CIRCUIT, FLIP-FLOP - NSA PART NO. ØN15Ø459	SP321A	18324	2	
- 3	MD5	. INTEGRATED CIRCUIT, FLIP-FLOP - NSA PART NO. ØN15Ø46Ø	SP322A	18324	1	
- 4	MD2, MD4, MD6, MD8	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø461	SP370A	18324	4	
- 5	MD7	. INTEGRATED CIRCUIT, LOGIC GATE - NSA PART NO. ØN15Ø464	SP387A	18324	1	
- 6	VR1	. SEMICONDUCTOR DEVICE, DIODE NSA PART NO. ØN15Ø47Ø..... (ALTERNATE SOURCE)	1N4733 1N4733	Ø4713 Ø6751	1	
- 7	C2	. CAPACITOR, FIXED, CERAMIC DISC, .Ø1 MFD 50WVDC - NSA PART NO. ØN15Ø471	HK-103	7159Ø	1	
- 8	C1	. CAPACITOR, FIXED, TANTALUM, 1.Ø MFD 35WVDC - NSA PART NO. ØN15Ø475 ..... (ALTERNATE SOURCE) ..... (ALTERNATE SOURCE)	CS13BF105M 150D105X0035A2 K1J35S	8Ø183 Ø5397	1	
- 9	R1	RESISTOR, FIXED	RC20GF3R9J			

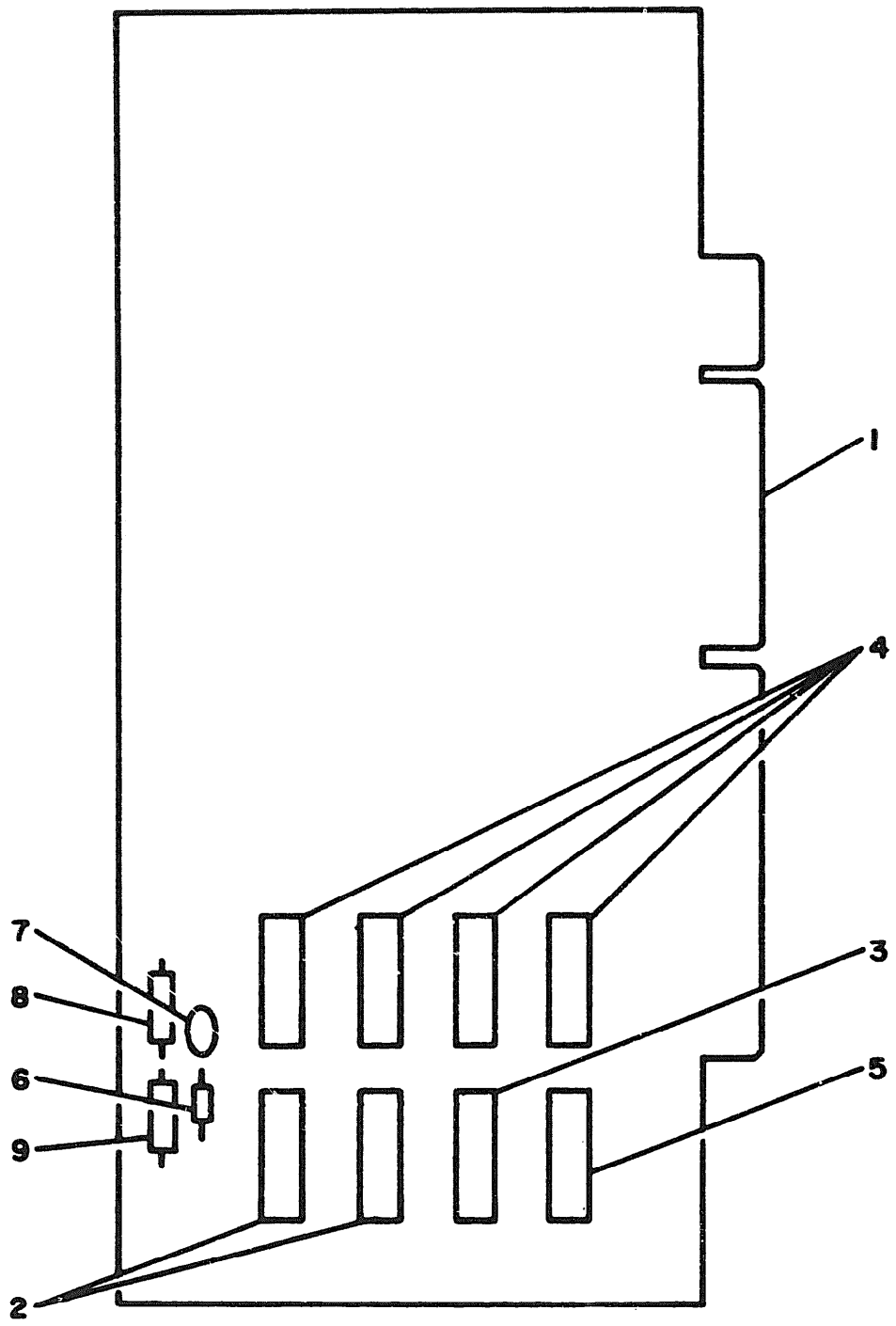


Figure 7-5. Circuit Card Assembly, Register/Program

III - NUMERICAL INDEX

PART NO.	FIG. & INDEX NO.	QTY PER ART	SOURCE CODE	REPAIR CODE
CK05BX221K	7-2-13	4		
CK05BX681K	7-2-14	4		
CS13BF105M	7-2-12,7-3-9,7-4-8,7-5-8	28		
C15263-4Z-1	7-1-9	5		
HK-103	7-2-11,7-3-7,7-4-6,7-5-7	28		
HK-203	7-3-8	48		
JAN1N914	7-1-61	1ØØ8		
K1J35S	7-2-12,7-3-9,7-4-8,7-5-8	28		
MC1437L	7-2-9,7-3-5	28		
MM505	7-2-3	4		
MS3057-6A	7-1-63	1		
MS3102R14S5S	7-1-45	1		
MS3106A14S5P	7-1-62	-		
MS3420-6	7-1-64	1		
MS15795-803	7-1-17	4		
MS203741-2C	7-1-44	2		
MS20341-4C	7-1-19	38		
MS20341-8C	7-1-5	2Ø		
MS24616-3	7-1-1Ø	5		
MS35338-134	7-1-43	2		
MS35338-135	7-1-18	38		
MS35338-137	7-1-4	2Ø		
MS35338-138	7-1-14	4		
MS51957-4	7-1-42	2		
MS51957-14	7-1-28	3Ø		
MS51957-16	7-1-46	4		
MS51957-43	7-1-21	8		
MS51958-63	7-1-13	4		
MS51959-17	7-1-16	4		
MS51959-43	7-1-3	1Ø		
N8480A	7-2-7	4		
N8481A	7-2-8	4		
N8880A	7-4-4	1		
RC07GF470J	7-2-15	4		
RC07GF750J	7-3-11	48		

III - NUMERICAL INDEX

PART NO.	FIG. & INDEX NO.	QTY PER ART	SOURCE CODE	REPAIR CODE
RC07GF111J	7-4-9	1		
RC07GF751J	7-3-12	48		
RC07GF821J	7-2-16	4		
RC07GF102J	7-2-17	6		
RC07GF152J	7-3-13	48		
RC07GF202J	7-4-11	1		
RC07GF302J	7-2-18	4		
RC07GF682J	7-2-25	4		
RC07GF752J	7-2-19	4		
RC07GF822J	7-2-20	4		
RC07GF183J	7-2-21	4		
RC07GF683J	7-2-22	8		
RC07GF754J	7-2-23	8		
RC20GF2R2J	7-2-24	4		
RC20GF2R7J	7-4-12	1		
RC20GF3R3J	7-3-14	4		
RC202GF3R9J	7-5-9	10		
RC20GF200J	7-4-13	1		
RC20GF680J	7-4-14	1		
RHA5A30-8.000MHZ	7-4-7	1		
SP321A	7-2-4, 7-4-2, 7-5-2	64		
SP322B	7-5-3	10		
SP370A	7-5-4	40		
SP377A	7-2-5	4		
SP380A	7-3-2	36		
SP387A	7-2-6, 7-3-3, 7-4-3, 7-5-5	23		
TOA-2809E	7-2-9, 7-3-5	28		
U6A993559X	7-3-4	8		
XAC75PD3A300	7-1-58	4		
XAC75SF2A016	7-1-31	4		
0N150423	7-1	REF		
0N150424	7-1-1	1		
0N150425	7-1-2	2		
0N150426	7-1-6	1		

III - NUMERICAL INDEX

PART NO.	FIG. & INDEX NO.	QTY PER ART	SOURCE CODE	REPAIR CODE
0N150427	7-1-7	1		
0N150428	7-1-8	1		
0N150433	7-1-41	1		
0N150435	7-1-2Ø	1		
0N150436	7-1-24	1		
0N150437	7-1-25	1		
0N150438	7-1-49,7-2	4		
0N150440	7-1-5Ø,7-3	4		
0N150442	7-1-51,7-4	1		
0N150444	7-1-52,7-5	1Ø		
0N150446	7-1-53	1		
0N150448	7-1-37	1		
0N150486-1	7-2-1	4		
0N150486-2	7-3-1	4		
0N150486-3	7-4-1	1		
0N150486-4	7-5-1	1Ø		
1N4733	7-2-1Ø,7-3-6,7-4-5,7-5-6	19		
100-1016P	7-1-60	16		
100-1024P	7-1-59	144		
100-1016S	7-1-36	56		
100-1024S	7-1-35	14Ø		
109-8597	7-1-27	19		
150D105X0035A2	7-2-12,7-3-9,7-4-8,7-5-8	28		
2N4126	7-2-2	4		
329-18	7-1-54	1		
8BD28D0	7-1-26	2Ø		
900-12	7-1-12	4		
1012-12	7-1-11	2		
1527US28	7-1-15	1		

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A1	7-1-49	0N150438
A1C1	7-2-14	CK05BX681K
A1C2	7-2-11	HK-103
A1C3	7-2-12	CS13BF105M
A1C4	7-2-11	HK-103
A1C5	7-2-13	CK05BX221K
A1C6	7-2-12	CS13BF105M
A1C7	7-2-11	HK-103
A1C8	7-2-12	CS13BF105M
A1MD1	7-2-3	MM505
A1MD2	7-2-6	SP387A
A1MD3	7-2-8	N8481A
A1MD4	7-2-6	SP387A
A1MD5	7-2-4	SP321A
A1MD6	7-2-4	SP321A
A1MD7	7-2-4	SP321A
A1MD8	7-2-4	SP321A
A1MD9	7-2-9	MC1437L
A1MD10	7-2-5	SP377A
A1MD11	7-2-4	SP321A
A1MD12	7-2-4	SP321A
A1MD13	7-2-4	SP321A
A1MD14	7-2-4	SP321A
A1MD15	7-2-4	SP321A
A1MD16	7-2-7	N8480A
A1Q1	7-2-2	2N4126
A1R1	7-2-18	RC07GF302J
A1R2	7-2-17	RC07GF102J
A1R3	7-2-15	RC07GF470J
A1R4	7-2-21	RC07GF183J
A1R5	7-2-19	RC07GF752J
A1R6	7-2-20	RC07GF822J
A1R7	7-2-24	RC20GF2R2J
A1R8	7-2-16	RC07GF821J
A1R9	7-2-23	RC07GF754J
A1R10	7-2-23	RC07GF754J
A1R11	7-2-22	RC07GF683J
A1R12	7-2-22	RC07GF683J
A1R13	7-2-25	RC07GF682J
A1VR1	7-2-10	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A2	7-1-49	0N150438
A2C1	7-2-14	CK05BX681K
A2C2	7-2-11	HK-103
A2C3	7-2-12	CS13BF105M
A2C4	7-2-11	HK-103
A2C5	7-2-13	CK05BX221K
A2C6	7-2-12	CS13BF105M
A2C7	7-2-11	HK-103
A2C8	7-2-12	CS13BF105M
A2MD1	7-2-3	MM505
A2MD2	7-2-6	SP387A
A2MD3	7-2-8	N8481A
A2MD4	7-2-6	SP387A
A2MD5	7-2-4	SP321A
A2MD6	7-2-4	SP321A
A2MD7	7-2-4	SP321A
A2MD8	7-2-4	SP321A
A2MD9	7-2-9	MC1437L
A2MD10	7-2-5	SP377A
A2MD11	7-2-4	SP321A
A2MD12	7-2-4	SP321A
A2MD13	7-2-4	SP321A
A2MD14	7-2-4	SP321A
A2MD15	7-2-4	SP321A
A2MD16	7-2-7	N8480A
A2Q1	7-2-2	2N4126
A2R1	7-2-18	RC07GF302J
A2R2	7-2-17	RC07GF102J
A2R3	7-2-15	RC07GF470J
A2R4	7-2-21	RC07GF183J
A2R5	7-2-19	RC07GF752J
A2R6	7-2-20	RC07GF822J
A2R7	7-2-24	RC20GF2R2J
A2R8	7-2-16	RC07GF821J
A2R9	7-2-23	RC07GF754J
A2R10	7-2-23	RC07GF754J
A2R11	7-2-22	RC07GF683J
A2R12	7-2-22	RC07GF683J
A2R13	7-2-25	RC07GF682J
A2VR1	7-2-10	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A3	7-1-49	0N150438
A3C1	7-2-14	CK05BX681K
A3C2	7-2-11	HK-103
A3C3	7-2-12	CS13BF105M
A3C4	7-2-11	HK-103
A3C5	7-2-13	CK05BX221K
A3C6	7-2-12	CS13BF105M
A3C7	7-2-11	HK-103
A3C8	7-2-12	CS13BF105M
A3MD1	7-2-3	MM505
A3MD2	7-2-6	SP387A
A3MD3	7-2-8	N8481A
A3MD4	7-2-6	SP387A
A3MD5	7-2-4	SP321A
A3MD6	7-2-4	SP321A
A3MD7	7-2-4	SP321A
A3MD8	7-2-4	SP321A
A3MD9	7-2-9	MC1437L
A3MD10	7-2-5	SP377A
A3MD11	7-2-4	SP321A
A3MD12	7-2-4	SP321A
A3MD13	7-2-4	SP321A
A3MD14	7-2-4	SP321A
A3MD15	7-2-4	SP321A
A3MD16	7-2-7	N8480A
A3Q1	7-2-2	2N4126
A3R1	7-2-18	RC07GF302J
A3R2	7-2-17	RC07GF102J
A3R3	7-2-15	RC07GF470J
A3R4	7-2-21	RC07GF183J
A3R5	7-2-19	RC07GF752J
A3R6	7-2-20	RC07GF822J
A3R7	7-2-24	RC20GF2R2J
A3R8	7-2-16	RC07GF821J
A3R9	7-2-23	RC07GF754J
A3R10	7-2-23	RC07GF754J
A3R11	7-2-22	RC07GF683J
A3R12	7-2-22	RC07GF683J
A3R13	7-2-25	RC07GF682J
A3VR1	7-2-10	1N4733

IV- REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A4	7-1-49	0N150438
A4C1	7-2-14	CK05BX681K
A4C2	7-2-11	HK-103
A4C3	7-2-12	CS3BF105M
A4C4	7-2-11	HK-103
A4C5	7-2-13	CK05BX221K
A4C6	7-2-12	CS3BF105M
A4C7	7-2-11	HK-103
A4C8	7-2-12	CS3BF105M
A4MD1	7-2-3	MM505
A4MD2	7-2-6	SP387A
A4MD3	7-2-5	N8481A
A4MD4	7-2-6	SP387A
A4MD5	7-2-4	SP321A
A4MD6	7-2-4	SP321A
A4MD7	7-2-4	SP321A
A4MD8	7-2-4	SP321A
A4MD9	7-2-9	MC1437L
A4MD10	7-2-5	SP377A
A4MD11	7-2-4	SP321A
A4MD12	7-2-4	SP321A
A4MD13	7-2-4	SP321A
A4MD14	7-2-4	SP321A
A4MD15	7-2-4	SP321A
A4MD16	7-2-7	N8480A
A4Q1	7-2-2	2N4126
A4R1	7-2-18	RC07GF302J
A4R2	7-2-17	RC07GF102J
A4R3	7-2-15	RC07GF470J
A4R4	7-2-21	RC07GF183J
A4R5	7-2-19	RC07GF752J
A4R6	7-2-20	RC07GF822J
A4R7	7-2-24	RC20GF2R2J
A4R8	7-2-16	RC07GF821J
A4R9	7-2-23	RC07GF754J
A4R10	7-2-23	RC07GF754J
A4R11	7-2-22	RC07GF683J
A4R12	7-2-22	RC07GF683J
A4R13	7-2-25	RC07GF682J
A4VR1	7-2-10	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A5	7-1-51	0N150442
A5C1	7-4-8	CS13BF105M
A5C2	7-4-6	HK-103
A5C3	7-4-8	CS13BF105M
A5C4	7-4-6	HK-103
A5MD1	7-4-4	N8880A
A5MD2	7-4-2	SP321A
A5MD3	7-4-2	SP321A
A5MD4	7-4-2	SP321A
A5MD5	7-4-2	SP321A
A5MD6	7-4-3	SP387A
A5MD7	7-4-2	SP321A
A5MD8	7-4-2	SP321A
A5MD9	7-4-2	SP321A
A5MD10	7-4-2	SP321A
A5R1	7-4-9	RC07GF111J
A5R2	7-4-11	RC07GF202J
A5R3	7-4-12	RC20GF2R7J
A5R4	7-4-10	RC07GF102J
A5R5	7-4-10	RC07GF102J
A5R6	7-4-13	RC20GF200J
A5R7	7-4-14	RC20GF680J
A5VR1	7-4-5	IN4733
A5Y1	7-4-7	RHA5A30-8.000MHZ

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A6	7-1-50	0N150440
A6C1	7-3-9	CS13BF105M
A6C2	7-3-7	HK-103
A6C3	7-3-8	HK-203
A6C4	7-3-8	HK-203
A6C5	7-3-8	HK-203
A6C6	7-3-8	HK-203
A6C7	7-3-8	HK-203
AGC8	7-3-8	HK-203
A6C9	7-3-8	HK-203
A6C10	7-3-8	HK-203
A6C11	7-3-8	HK-203
A6C12	7-3-8	HK-203
A6C13	7-3-8	HK-203
A6C14	7-3-8	HK-203
A6CR1	7-3-1Ø	JAN1N914
A6CR2	7-3-1Ø	JAN1N914
A6CR3	7-3-1Ø	JAN1N914
A6CR4	7-3-1Ø	JAN1N914
A6CR5	7-3-1Ø	JAN1N914
A6CR6	7-3-1Ø	JAN1N914
A6CR7	7-3-1Ø	JAN1N914
A6CR8	7-3-1Ø	JAN1N914
A6CR9	7-3-1Ø	JAN1N914
A6CR10	7-3-1Ø	JAN1N914
A6CR11	7-3-1Ø	JAN1N914
A6CR12	7-3-1Ø	JAN1N914
A6MD1	7-3-2	SP380A
A6MD2	7-3-2	SP380A
A6MD3	7-3-2	SP380A
A6MD4	7-3-2	SP380A
A6MD5	7-3-2	SP380A
A6MD6	7-3-2	SP380A
A6MD7	7-3-2	SP380A
A6MD8	7-3-2	SP380A
A6MD9	7-3-2	SP380A
A6MD10	7-3-5	MC1437L
A6MD11	7-3-5	MC1437L
A6MD12	7-3-5	MC1437L
A6MD13	7-3-4	U6A993559X
A6MD14	7-3-3	SP387A

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A6MDl5	7-3-4	U6A993559X
A6MD16	7-3-5	MC1437L
A6MD17	7-3-5	MC1437L
A6MD18	7-3-5	MC1437L
A6R1	7-3-12	RC07GF751J
A6R2	7-3-12	RC07GF751J
A6R3	7-3-12	RC07GF751J
A6R4	7-3-12	RC07GF751J
A6R5	7-3-12	RC07GF751J
A6R6	7-3-12	RC07GF751J
A6R7	7-3-12	RC07GF751J
A6R8	7-3-12	RC07GF751J
A6R9	7-3-12	RC07GF751J
A6R10	7-3-12	RC07GF751J
A6R11	7-3-12	RC07GF751J
A6R12	7-3-12	RC07GF751J
A6R13	7-3-14	RC20GF3R3J
A6R14	7-3-13	RC07GF751J
A6R15	7-3-11	RC07GF750J
A6R16	7-3-11	RC07GF750J
A6R17	7-3-13	RC07GF152J
A6R18	7-3-13	RC07GF152J
A6R19	7-3-11	RC07GF750J
A6R20	7-3-11	RC07GF750J
A6R21	7-3-13	RC07GF152J
A6R22	7-3-13	RC07GF152J
A6R23	7-3-11	RC07GF750J
A6R24	7-3-11	RC07GF750J
A6R25	7-3-13	RC07GF152J
A6R26	7-3-13	RC07GF152J
A6R27	7-3-11	RC07GF750J
A6R28	7-3-11	RC07GF750J
A6R29	7-3-13	RC07GF152J
A6R30	7-3-13	RC07GF152J
A6R31	7-3-11	RC07GF750J
A6R32	7-3-11	RC07GF750J
A6R33	7-3-13	RC07GF152J
A6R34	7-3-13	RC07GF152J
A6R35	7-3-11	RC07GF750J
A6R36	7-3-11	RC07GF750J
A6R37	7-3-13	RC07GF152J
A6VR1	7-3-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A7	7-1-50	0N150440
A7C1	7-3-9	CS13BF105M
A7C2	7-3-7	HK-103
A7C3	7-3-8	HK-203
A7C4	7-3-8	HK-203
A7C5	7-3-8	HK-203
A7C6	7-3-8	HK-203
A7C7	7-3-8	HK-203
A7C8	7-3-8	HK-203
A7C9	7-3-8	HK-203
A7C1Ø	7-3-8	HK-203
A7C11	7-3-8	HK-203
A7C12	7-3-8	HK-203
A7C13	7-3-8	HK-203
A7C14	7-3-8	HK-203
A7CR1	7-3-1Ø	JAN1N914
A7CR2	7-3-1Ø	JAN1N914
A7CR3	7-3-1Ø	JAN1N914
A7CR4	7-3-1Ø	JAN1N914
A7CR5	7-3-1Ø	JAN1N914
A7CR6	7-3-1Ø	JAN1N914
A7CR7	7-3-1Ø	JAN1N914
A7CR8	7-3-1Ø	JAN1N914
A7CR9	7-3-1Ø	JAN1N914
A7CR1Ø	7-3-1Ø	JAN1N914
A7CR11	7-3-1Ø	JAN1N914
A7CR12	7-3-1Ø	JAN1N914
A7MD1	7-3-2	SP380A
A7MD2	7-3-2	SP380A
A7MD3	7-3-2	SP380A
A7MD4	7-3-2	SP380A
A7MD5	7-3-2	SP380A
A7MD6	7-3-2	SP380A
A7MD7	7-3-2	SP380A
A7MD8	7-3-2	SP380A
A7MD9	7-3-2	SP380A
A7MD1Ø	7-3-5	MC1437L
A7MD11	7-3-5	MC1437L
A7MD12	7-3-5	MC1437L
A7MD13	7-3-4	U6A993559X
A7MD14	7-3-3	SP387A

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A7MD15	7-3-4	U6A993559X
A7MD16	7-3-5	MC1437L
A7MD17	7-3-5	MC1437L
A7MD18	7-3-5	MC1437L
A7R1	7-3-12	RC07GF751J
A7R2	7-3-12	RC07GF751J
A7R3	7-3-12	RC07GF751J
A7R4	7-3-12	RC07GF751J
A7R5	7-3-12	RC07GF751J
A7R6	7-3-12	RC07GF751J
A7R7	7-3-12	RC07GF751J
A7R8	7-3-12	RC07GF751J
A7R9	7-3-12	RC07GF751J
A7R1Ø	7-3-12	RC07GF751J
A7R11	7-3-12	RC07GF751J
A7R12	7-3-12	RC07GF751J
A7R13	7-3-14	RC20GF3R3J
A7R14	7-3-13	RC07GF752J
A7R15	7-3-11	RC07GF750J
A7R16	7-3-11	RC07GF750J
A7R17	7-3-13	RC07GF752J
A7R18	7-3-13	RC07GF752J
A7R19	7-3-11	RC07GF750J
A7R2Ø	7-3-11	RC07GF750J
A7R21	7-3-13	RC07GF752J
A7R22	7-3-13	RC07GF752J
A7R23	7-3-11	RC07GF750J
A7R24	7-3-11	RC07GF750J
A7R25	7-3-13	RC07GF752J
A7R26	7-3-13	RC07GF752J
A7R27	7-3-11	RC07GF750J
A7R28	7-3-11	RC07GF750J
A7R29	7-3-13	RC07GF752J
A7R3Ø	7-3-13	RC07GF752J
A7R31	7-3-11	RC07GF750J
A7R32	7-3-11	RC07GF750J
A7R33	7-3-13	RC07GF752J
A7R34	7-3-13	RC07GF752J
A7R35	7-3-11	RC07GF750J
A7R36	7-3-11	RC07GF750J
A7R37	7-3-13	RC07GF752J
A7VR1	7-3-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A8	7-1-50	0N150440
A8C1	7-3-9	CS13BF105M
A8C2	7-3-7	HK-103
A8C3	7-3-8	HK-203
A8C4	7-3-8	HK-203
A8C5	7-3-8	HK-203
A8C6	7-3-8	HK-203
A8C7	7-3-8	HK-203
A8C8	7-3-8	HK-203
A8C9	7-3-8	HK-203
A8C1Ø	7-3-8	HK-203
A8C11	7-3-8	HK-203
A8C12	7-3-8	HK-203
A8C13	7-3-8	HK-203
A8C14	7-3-8	HK-203
A8CR1	7-3-1Ø	JAN1N914
A8CR2	7-3-1Ø	JAN1N914
A8CR3	7-3-1Ø	JAN1N914
A8CR4	7-3-1Ø	JAN1N914
A8CR5	7-3-1Ø	JAN1N914
A8CR6	7-3-1Ø	JAN1N914
A8CR7	7-3-1Ø	JAN1N914
A8CR8	7-3-1Ø	JAN1N914
A8CR9	7-3-1Ø	JAN1N914
A8CR1Ø	7-3-1Ø	JAN1N914
A8CR11	7-3-1Ø	JAN1N914
A8CR12	7-3-1Ø	JAN1N914
A8MD1	7-3-2	SP380A
A8MD2	7-3-2	SP380A
A8MD3	7-3-2	SP380A
A8MD4	7-3-2	SP380A
A8MD5	7-3-2	SP380A
A8MD6	7-3-2	SP380A
A8MD7	7-3-2	SP380A
A8MD8	7-3-2	SP380A
A8MD9	7-3-2	SP380A
A8MD1Ø	7-3-5	MC1437L
A8MD11	7-3-5	MC1437L
A8MD12	7-3-5	MC1437L
A8MD13	7-3-4	U6A993559X
A8MD14	7-3-3	SP387A

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A8MD15	7-3-4	U6A993559X
A8MD16	7-3-5	MC1437L
A8MD17	7-3-5	MC1437L
A8MD18	7-3-5	MC1437L
A8R1	7-3-12	RC07GF751J
A8R2	7-3-12	RC07GF751J
A8R3	7-3-12	RC07GF751J
A8R4	7-3-12	RC07GF751J
A8R5	7-3-12	RC07GF751J
A8R6	7-3-12	RC07GF751J
A8R7	7-3-12	RC07GF751J
A8R8	7-3-12	RC07GF751J
A8R9	7-3-12	RC07GF751J
A8R10	7-3-12	RC07GF751J
A8R11	7-3-12	RC07GF751J
A8R12	7-3-12	RC07GF751J
A8R13	7-3-14	RC20GF3R3J
A8R14	7-3-13	RC07GF152J
A8R15	7-3-11	RC07GF750J
A8R16	7-3-11	RC07GF750J
A8R17	7-3-13	RC07GF152J
A8R18	7-3-13	RC07GF152J
A8R19	7-3-11	RC07GF750J
A8R20	7-3-11	RC07GF750J
A8R21	7-3-13	RC07GF152J
A8R22	7-3-13	RC07GF152J
A8R23	7-3-11	RC07GF750J
A8R24	7-3-11	RC07GF750J
A8R25	7-3-13	RC07GF152J
A8R26	7-3-13	RC07GF152J
A8R27	7-3-11	RC07GF750J
A8R28	7-3-11	RC07GF750J
A8R29	7-3-13	RC07GF152J
A8R30	7-3-13	RC07GF152J
A8R31	7-3-11	RC07GF750J
A8R32	7-3-11	RC07GF750J
A8R33	7-3-13	RC07GF152J
A8R34	7-3-13	RC07GF152J
A8R35	7-3-11	RC07GF750J
A8R36	7-3-11	RC07GF750J
A8R37	7-3-13	RC07GF152J
A8VR1	7-3-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A9	7-1-50	0N150440
A9C1	7-3-9	CS13BF105M
A9C2	7-3-7	HK-103
A9C3	7-3-8	HK-203
A9C4	7-3-8	HK-203
A9C5	7-3-8	HK-203
A9C6	7-3-8	HK-203
A9C7	7-3-8	HK-203
A9C8	7-3-8	HK-203
A9C9	7-3-8	HK-203
A9C10	7-3-8	HK-203
A9C11	7-3-8	HK-203
A9C12	7-3-8	HK-203
A9C13	7-3-8	HK-203
A9C14	7-3-8	HK-203
A9CR1	7-3-10	JAN1N914
A9CR2	7-3-10	JAN1N914
A9CR3	7-3-10	JAN1N914
A9CR4	7-3-10	JAN1N914
A9CR5	7-3-10	JAN1N914
A9CR6	7-3-10	JAN1N914
A9CR7	7-3-10	JAN1N914
A9CR8	7-3-10	JAN1N914
A9CR9	7-3-10	JAN1N914
A9CR10	7-3-10	JAN1N914
A9CR11	7-3-10	JAN1N914
A9CR12	7-3-10	JAN1N914
A9MD1	7-3-2	SP380A
A9MD2	7-3-2	SP380A
A9MD3	7-3-2	SP380A
A9MD4	7-3-2	SP380A
A9MD5	7-3-2	SP380A
A9MD6	7-3-2	SP380A
A9MD7	7-3-2	SP380A
A9MD8	7-3-2	SP380A
A9MD9	7-3-2	SP380A
A9MD10	7-3-5	MC1437L
A9MD11	7-3-5	MC1437L
A9MD12	7-3-5	MC1437L
A9MD13	7-3-4	U6A993559X
A9MD14	7-3-3	SP387A

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A9MD15	7-3-4	U6A993559X
A9MD16	7-3-5	MC1437L
A9MD17	7-3-5	MC1437L
A9MD18	7-3-5	MC1437L
A9R1	7-3-12	RC07GF751J
A9R2	7-3-12	RC07GF751J
A9R3	7-3-12	RC07GF751J
A9R4	7-3-12	RC07GF751J
A9R5	7-3-12	RC07GF751J
A9R6	7-3-12	RC07GF751J
A9R7	7-3-12	RC07GF751J
A9R8	7-3-12	RC07GF751J
A9R9	7-3-12	RC07GF751J
A9R10	7-3-12	RC07GF751J
A9R11	7-3-12	RC07GF751J
A9R12	7-3-12	RC07GF751J
A9R13	7-3-14	RC20GF3R3J
A9R14	7-3-13	RC07GF152J
A9R15	7-3-11	RC07GF750J
A9R16	7-3-11	RC07GF750J
A9R17	7-3-13	RC07GF152J
A9R18	7-3-13	RC07GF152J
A9R19	7-3-11	RC07GF750J
A9R20	7-3-11	RC07GF750J
A9R21	7-3-13	RC07GF152J
A9R22	7-3-13	RC07GF152J
A9R23	7-3-11	RC07GF750J
A9R24	7-3-11	RC07GF750J
A9R25	7-3-13	RC07GF152J
A9R26	7-3-13	RC07GF152J
A9R27	7-3-11	RC07GF750J
A9R28	7-3-11	RC07GF750J
A9R29	7-3-13	RC07GF152J
A9R30	7-3-13	RC07GF152J
A9R31	7-3-11	RC07GF750J
A9R32	7-3-11	RC07GF750J
A9R33	7-3-13	RC07GF152J
A9R34	7-3-13	RC07GF152J
A9R35	7-3-11	RC07GF750J
A9R36	7-3-11	RC07GF750J
A9R37	7-3-13	RC07GF152J
A9VR1	7-3-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A1Ø	7-1-52	0N150444
A1ØC1	7-5-8	CS13BF105M
A1ØC2	7-5-7	HK-103
A1ØMD1	7-5-2	SP321A
A1ØMD2	7-5-4	SP370A
A1ØMD3	7-5-2	SP321A
A1ØMD4	7-5-4	SP370A
A1ØMD5	7-5-3	SP322A
A1ØMD6	7-5-4	SP370A
A1ØMD7	7-5-5	SP387A
A1ØMD8	7-5-4	SP370A
A1ØR1	7-5-9	RC20GF3R9J
A1ØVR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A11	7-1-52	0N150444
A11C1	7-5-8	CS13BF105M
A11C2	7-5-7	HK-103
A11MD1	7-5-2	SP321A
A11MD2	7-5-4	SP370A
A11MD3	7-5-2	SP321A
A11MD4	7-5-4	SP370A
A11MD5	7-5-3	SP322A
A11MD6	7-5-4	SP370A
A11MD7	7-5-5	SP387A
A11MD8	7-5-4	SP370A
A11R1	7-5-9	RC20GF3R9J
A11VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A12	7-1-52	0N150444
A12C1	7-5-8	CS13BF105M
A12C2	7-5-7	HK-103
A12MD1	7-5-2	SP321A
A12MD2	7-5-4	SP370A
A12MD3	7-5-2	SP321A
A12MD4	7-5-4	SP370A
A12MD5	7-5-3	SP322A
A12MD6	7-5-4	SP370A
A12MD7	7-5-5	SP387A
A12MD8	7-5-4	SP370A
A12R1	7-5-9	RC20GF3R9J
A12VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A13	7-1-52	0N150444
A13C1	7-5-8	CS13BF105M
A13C2	7-5-7	HK-103
A13MD1	7-5-2	SP321A
A13MD2	7-5-4	SP370A
A13MD3	7-5-2	SP321A
A13MD4	7-5-4	SP370A
A13MD5	7-5-3	SP322A
A13MD6	7-5-4	SP370A
A13MD7	7-5-5	SP387A
A13MD8	7-5-4	SP370A
A13R1	7-5-9	RC20GF3R9J
A13VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A14	7-1-52	0N150444
A14C1	7-5-8	CS13BF105M
A14C2	7-5-7	HK-103
A14MD1	7-5-2	SP321A
A14MD2	7-5-4	SP370A
A14MD3	7-5-2	SP321A
A14MD4	7-5-4	SP370A
A14MD5	7-5-3	SP322A
A14MD6	7-5-4	SP370A
A14MD7	7-5-5	SP387A
A14MD8	7-5-4	SP370A
A14R1	7-5-9	RC20GF3R9J
A14VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A15	7-1-52	0N150444
A15C1	7-5-8	CS13BF105M
A15C2	7-5-7	HK-103
A15MD1	7-5-2	SP321A
A15MD2	7-5-4	SP370A
A15MD3	7-5-2	SP321A
A15MD4	7-5-4	SP370A
A15MD5	7-5-3	SP322A
A15MD6	7-5-4	SP370A
A15MD7	7-5-5	SP387A
A15MD8	7-5-4	SP370A
A15R1	7-5-9	RC20GF3R9J
A15VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A16	7-1-52	0N150444
A16C1	7-5-8	CS13BF105M
A16C2	7-5-7	HK-103
A16MD1	7-5-2	SP321A
A16MD2	7-5-4	SP370A
A16MD3	7-5-2	SP321A
A16MD4	7-5-4	SP370A
A16MD5	7-5-3	SP322A
A16MD6	7-5-4	SP370A
A16MD7	7-5-5	SP387A
A16MD8	7-5-4	SP370A
A16R1	7-5-9	RC20GF3R9J
A16VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A17	7-1-52	0N150444
A17C1	7-5-8	CS13BF105M
A17C2	7-5-7	HK-103
A17MD1	7-5-2	SP321A
A17MD2	7-5-4	SP370A
A17MD3	7-5-2	SP321A
A17MD4	7-5-4	SP370A
A17MD5	7-5-3	SP322A
A17MD6	7-5-4	SP370A
A17MD7	7-5-5	SP387A
A17MD8	7-5-4	SP370A
A17R1	7-5-9	RC20GF3R9J
A17VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A18	7-1-52	0N150444
A18C1	7-5-8	CS13BF105M
A18C2	7-5-7	HK-103
A18MD1	7-5-2	SP321A
A18MD2	7-5-4	SP370A
A18MD3	7-5-2	SP321A
A18MD4	7-5-4	SP370A
A18MD5	7-5-3	SP322A
A18MD6	7-5-4	SP370A
A18MD7	7-5-5	SP387A
A18MD8	7-5-4	SP370A
A18R1	7-5-9	RC20GF3R9J
A18VR1	7-5-6	1N4733

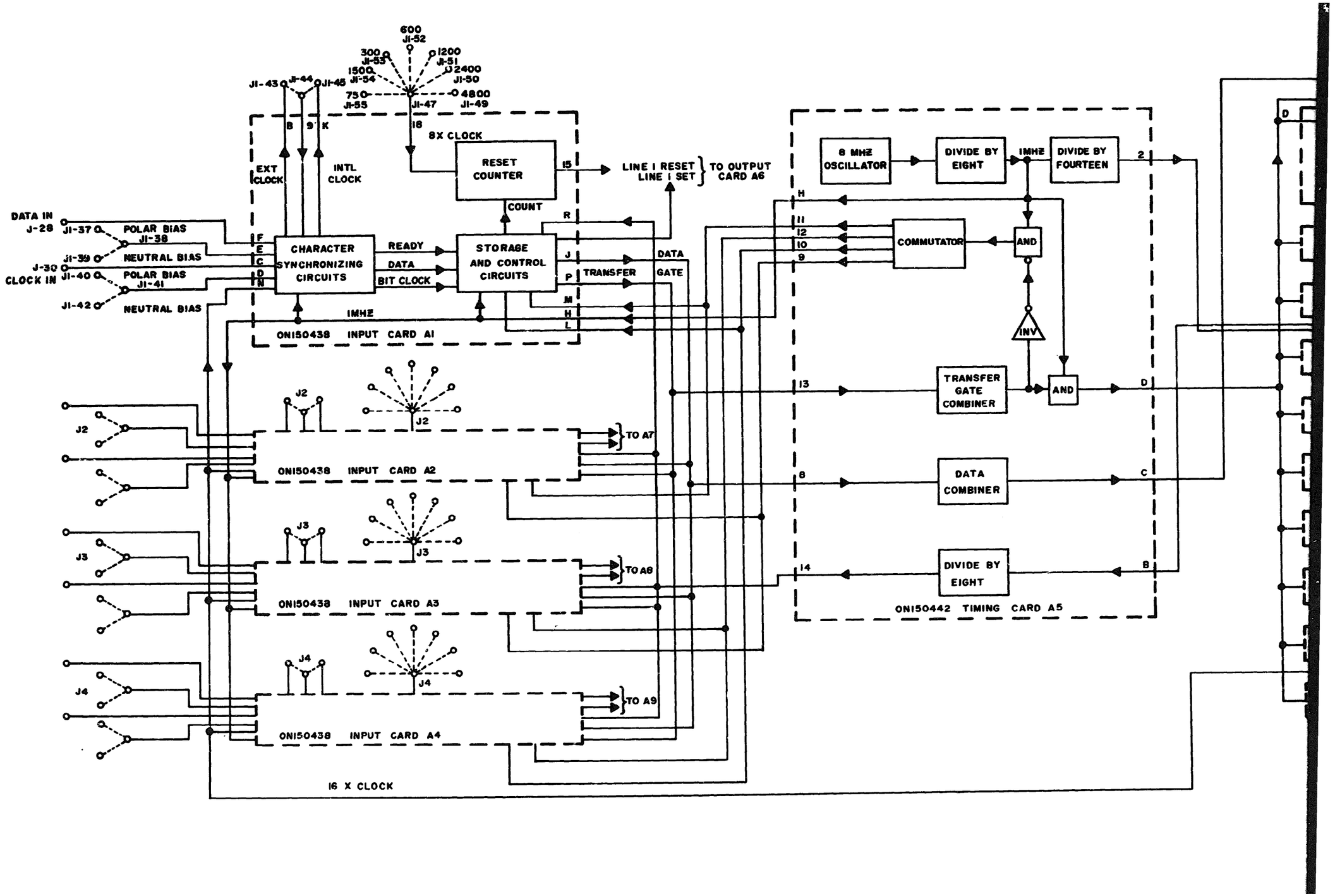
IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
A19	7-1-52	0N150444
A19C1	7-5-8	CS13BF105M
A19C2	7-5-7	HK-103
A19MD1	7-5-2	SP321A
A19MD2	7-5-4	SP370A
A19MD3	7-5-2	SP321A
A19MD4	7-5-4	SP370A
A19MD5	7-5-3	SP322A
A19MD6	7-5-4	SP370A
A19MD7	7-5-5	SP387A
A19MD8	7-5-4	SP370A
A19R1	7-5-9	RC20GF3R9J
A19VR1	7-5-6	1N4733

IV - REFERENCE DESIGNATION INDEX

REFERENCE DESIGNATION	FIGURE & INDEX NO.	PART NUMBER
J1	7-1-31	XAC75SF2A016
J2	7-1-31	XAC75SF2A016
J3	7-1-31	XAC75SF2A016
J4	7-1-31	XAC75SF2A016
J5	7-1-45	MS3102R14S5S
XA1 THRU XA19	7-1-26	8BD28DO

APPENDIX


600
JI-52
300
JI-53
1200
JI-51
1500
JI-54
2400
JI-50
750
JI-55
4800
JI-49
JI-43
JI-44
JI-45
JI-47
B
9
K
18
8X CLOCK
EXT CLOCK
INTL CLOCK
RESET COUNTER
15
LINE 1 RESET
LINE 1 SET
TO OUTPUT CARD A6
COUNT
R
DATA IN
J-28
JI-37
POLAR BIAS
JI-38
NEUTRAL BIAS
JI-39
J-30
CLOCK IN
JI-40
POLAR BIAS
JI-41
JI-42
NEUTRAL BIAS
F
E
C
D
N
CHARACTER SYNCHRONIZING CIRCUITS
READY
DATA
BIT CLOCK
STORAGE AND CONTROL CIRCUITS
J
P
TRANSFER
DATA GATE
M
H
L
IMHZ
ONI50438 INPUT CARD A1
8 MHZ OSCILLATOR
DIVIDE BY EIGHT
IMHZ
DIVIDE BY FOURTEEN
2
H
11
12
10
9
COMMUTATOR
AND
INV
13
TRANSFER GATE COMBINER
AND
D
J2
TO A7
ONI50438 INPUT CARD A2
8
DATA COMBINER
C
J3
TO A8
ONI50438 INPUT CARD A3
14
DIVIDE BY EIGHT
B
ONI50442 TIMING CARD A5
J4
TO A9
ONI50438 INPUT CARD A4
16 X CLOCK

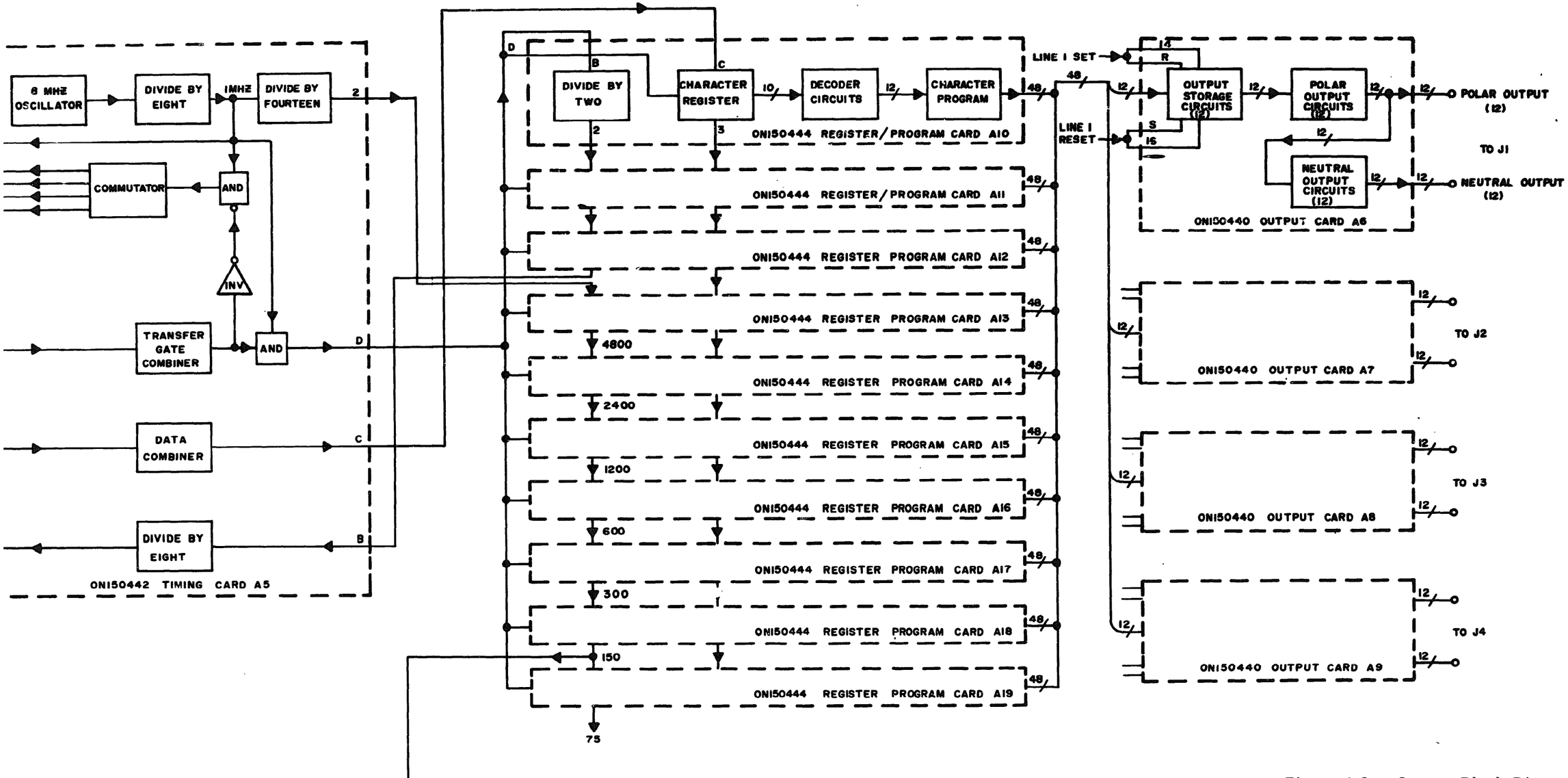
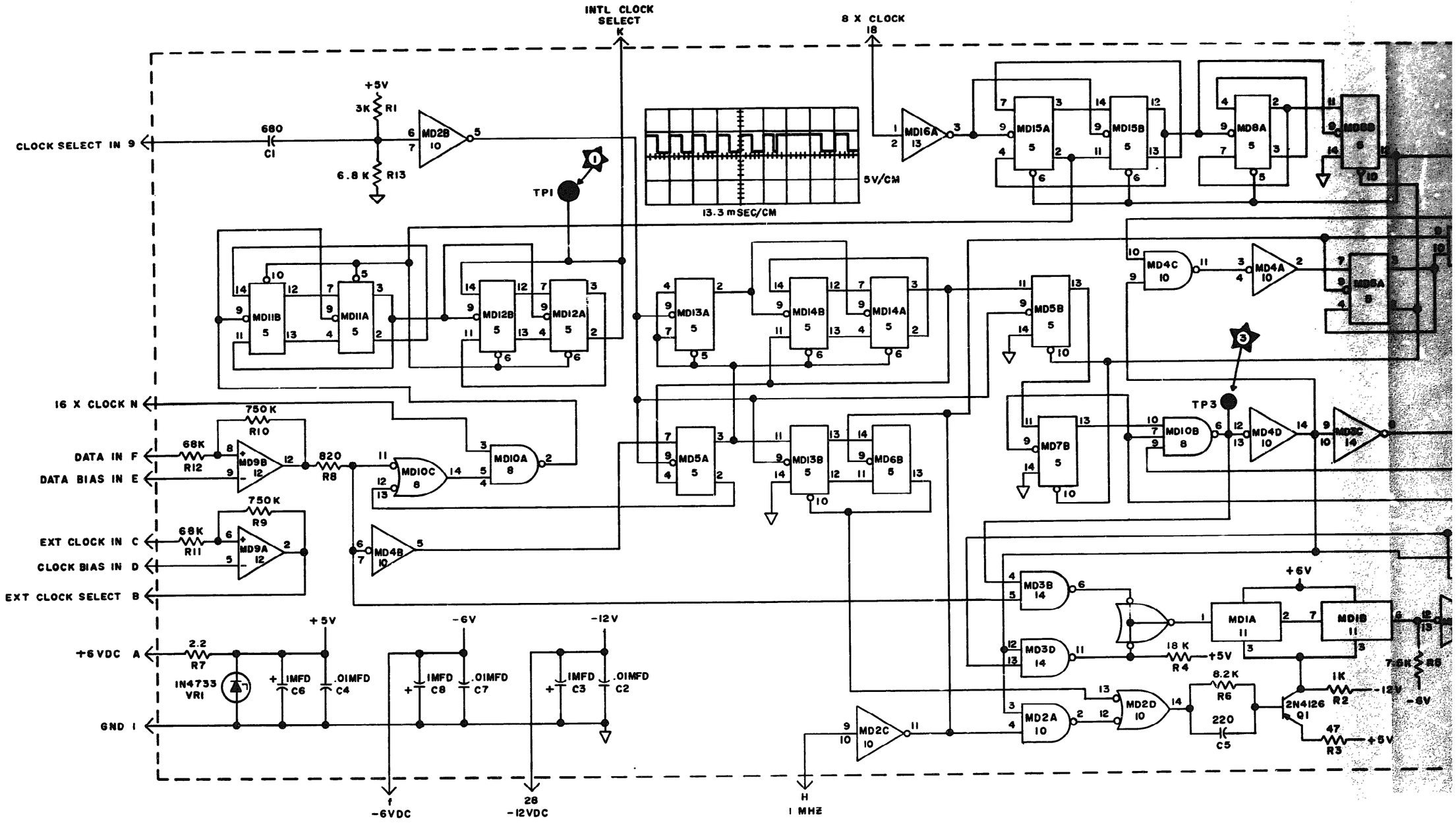


Figure 1-3. - System Block Diagram


INTL CLOCK SELECT K
8 X CLOCK 18
CLOCK SELECT IN 9
680 C1
+5V
3K R1
6.8 K R13
MD2B 10
TP1
13.3 mSEC/CM
5V/CM
MD16A 13
MD15A 5
MD15B 5
MD8A 5
MD8B 8
MD11B 5
MD11A 5
MD12B 5
MD12A 5
MD13A 5
MD14B 5
MD14A 5
MD5B 5
MD4C 10
MD4A 10
MD8A 8
16 X CLOCK N
750K R10
DATA IN F
DATA BIAS IN E
68K R12
MD9B 12
820 R8
MD10C 8
MD10A 8
MD5A 5
MD13B 5
MD6B 5
MD7B 5
TP3
MD10B 8
MD4D 10
MD8C 14
750K R9
EXT CLOCK IN C
CLOCK BIAS IN D
EXT CLOCK SELECT B
68K R11
MD9A 12
MD4B 10
MD3B 14
MD3D 14
MD1A 11
MD1B 11
+6V
18 K R4
+5V
8.2K R6
220 C5
MD2D 10
MD2A 10
MD2C 10
1K R2
-12V
2N4126 Q1
47 R3
+6VDC A
GND I
2.2 R7
IN4733 VR1
+5V
-6V
-12V
.1MFD C6
.01MFD C4
.1MFD C8
.01MFD C7
.1MFD C3
.01MFD C2
f -6VDC
28 -12VDC
H 1 MHZ

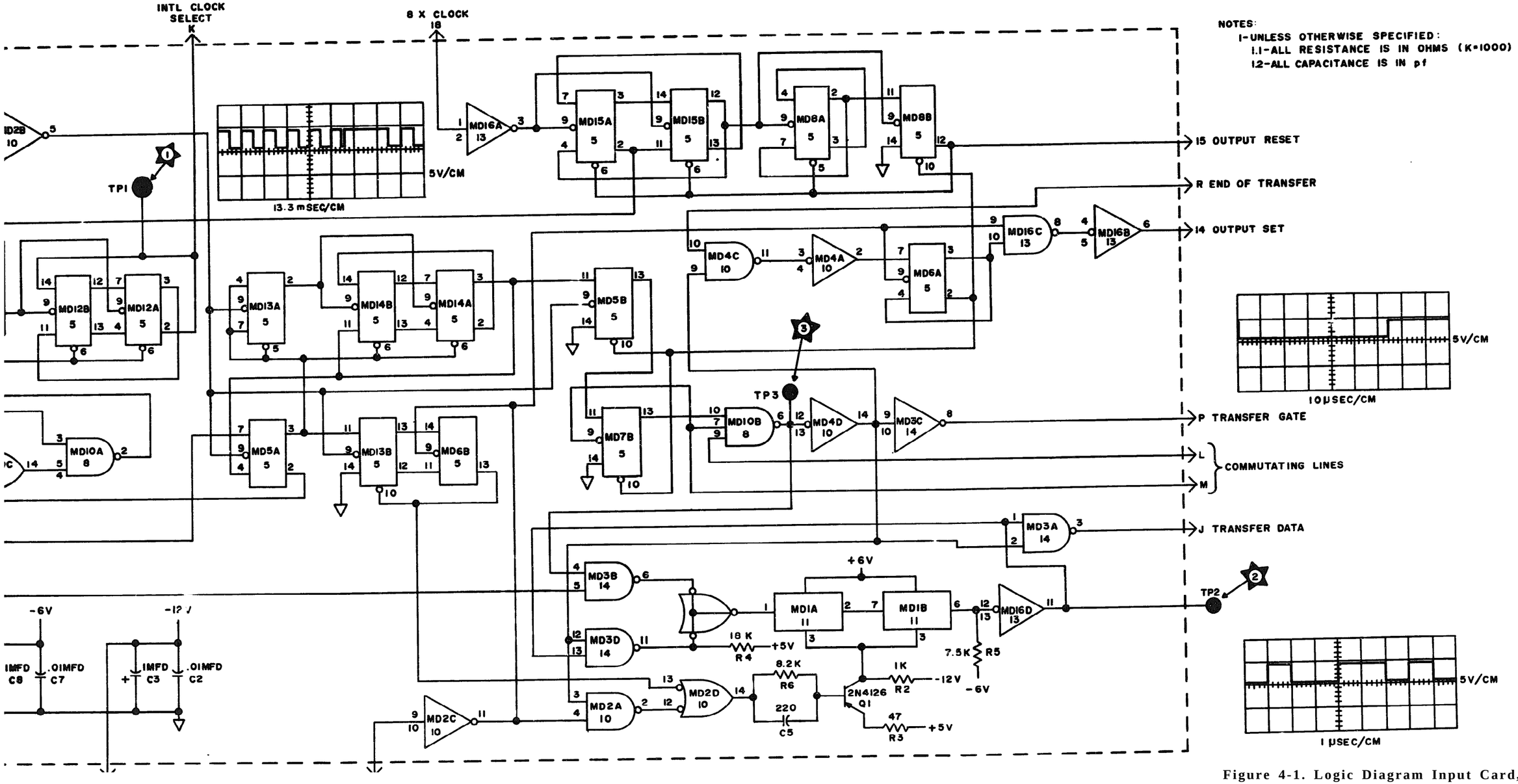
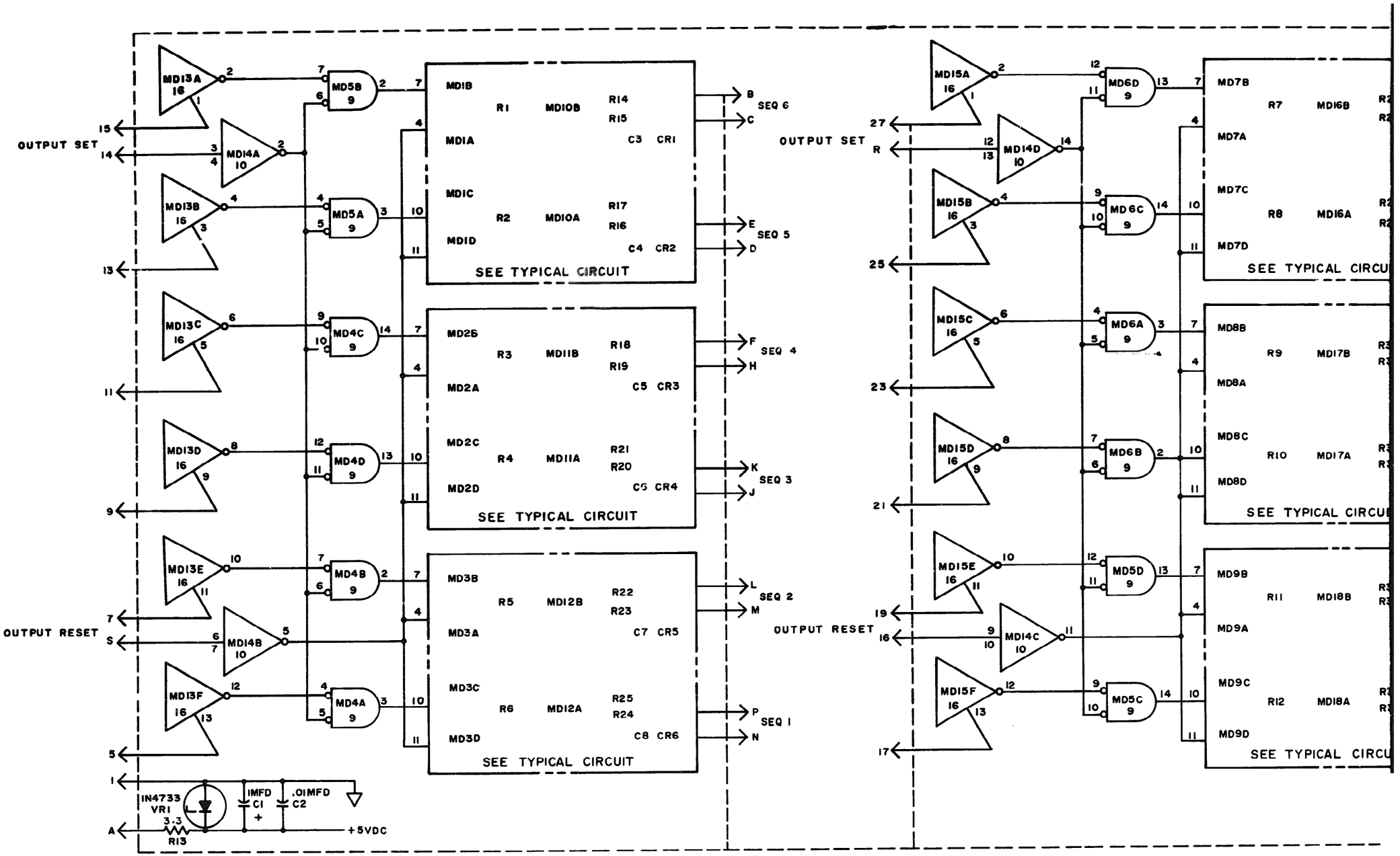


Figure 4-1. Logic Diagram Input Card, A1 thru A4.


OUTPUT SET
MD13A 16
MD14A 10
MD13B 16
MD13C 16
MD13D 16
MD5B 9
MD5A 9
MD4C 9
MD4D 9
MD1B
R1
MD10B
R14
R15
MD1A
C3 CR1
MD1C
R2
MD10A
R17
R16
MD1D
C4 CR2
SEE TYPICAL CIRCUIT
MD2B
R3
MD11B
R18
R19
MD2A
C5 CR3
MD2C
R4
MD11A
R21
R20
MD2D
C6 CR4
SEE TYPICAL CIRCUIT
B
C
SEQ 6
E
D
SEQ 5
F
H
SEQ 4
K
J
SEQ 3
MD13E 16
MD14B 10
MD13F 16
MD4B 9
MD4A 9
MD3B
R5
MD12B
R22
R23
MD3A
C7 CR5
MD3C
R6
MD12A
R25
R24
MD3D
C8 CR6
SEE TYPICAL CIRCUIT
L
M
SEQ 2
P
N
SEQ 1
OUTPUT RESET
IN4733 VR1
3.3 RI3
.1MFD C1
.01MFD C2
+5VDC
MD15A 16
MD14D 10
MD15B 16
MD15C 16
MD15D 16
MD6D 9
MD6C 9
MD6A 9
MD6B 9
MD7B
R7
MD16B
MD7A
MD7C
R8
MD16A
MD7D
SEE TYPICAL CIRCU
MD8B
R9
MD17B
MD8A
MD8C
R10
MD17A
MD8D
SEE TYPICAL CIRCU
MD15E 16
MD14C 10
MD15F 16
MD5D 9
MD5C 9
MD9B
R11
MD18B
MD9A
MD9C
R12
MD18A
MD9D
SEE TYPICAL CIRCU

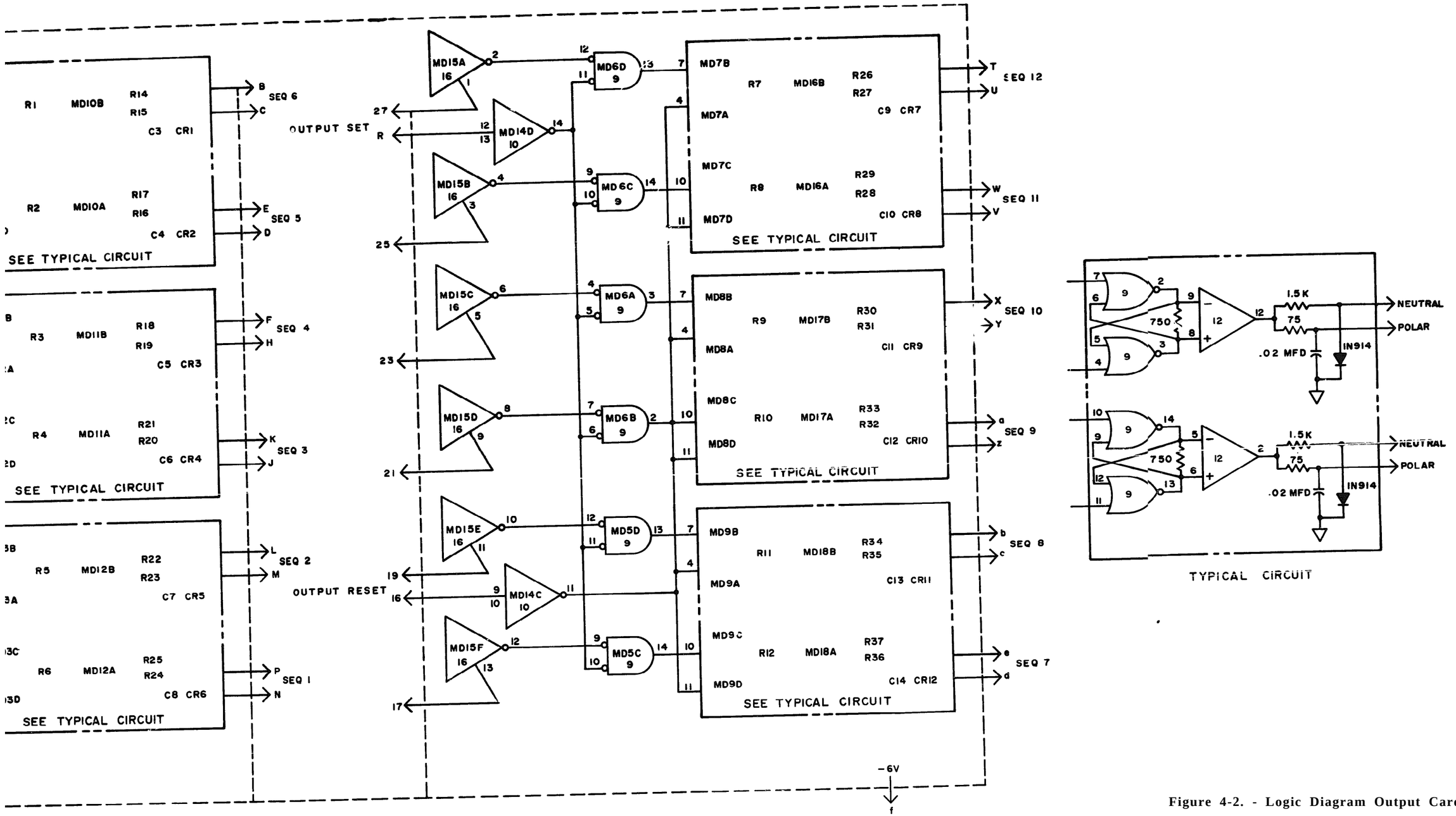
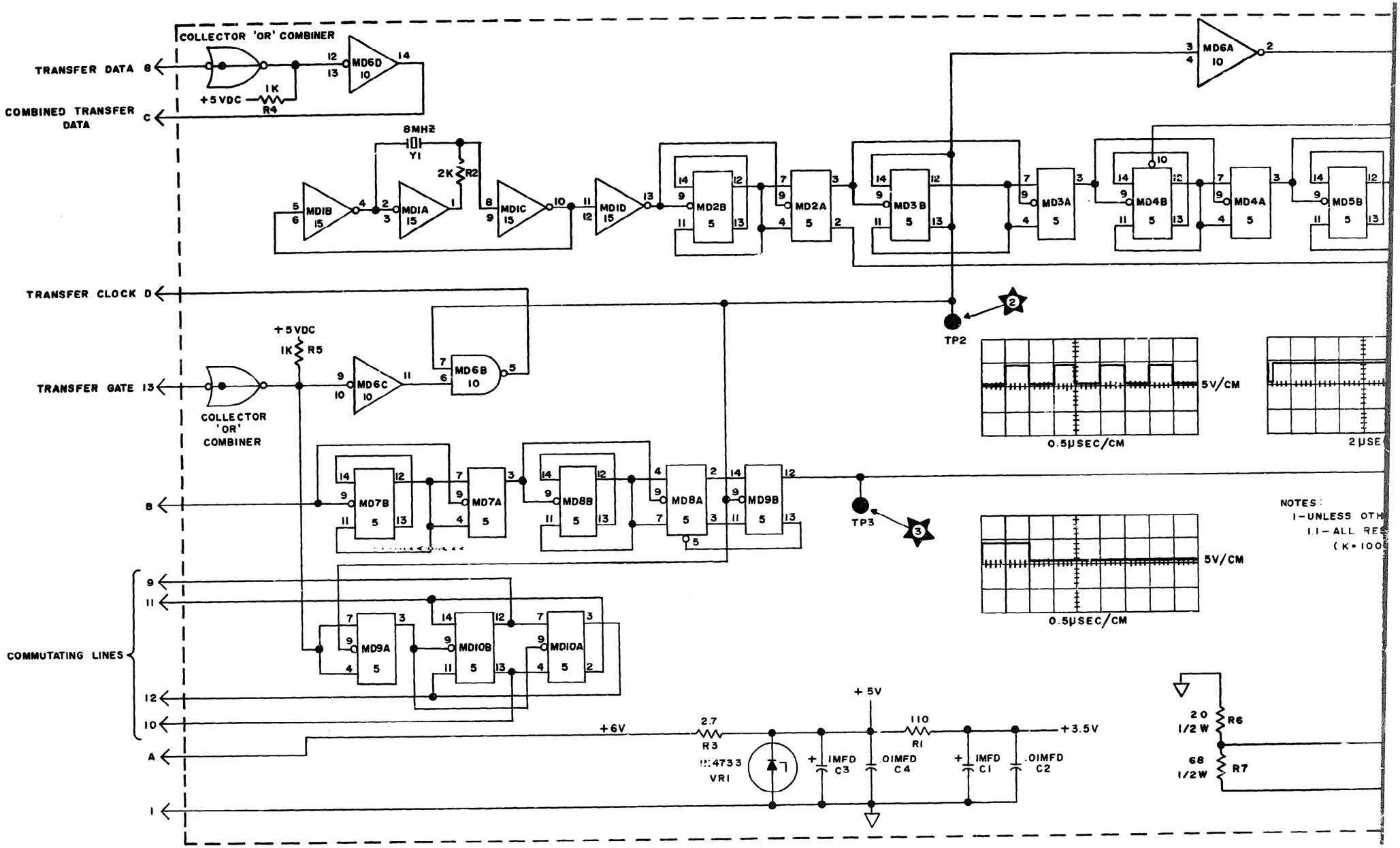


Figure 4-2. - Logic Diagram Output Card, A6 thru A9.


COLLECTOR 'OR' COMBINER
TRANSFER DATA 8
COMBINED TRANSFER DATA C
+5VDC
1K R4
MD6D 10
8MHz Y1
2K R2
MD1B 15
MD1A 15
MD1C 15
MD1D 15
MD2B 5
MD2A 5
MD3B 5
MD3A 5
MD4B 5
MD4A 5
MD5B 5
MD6A 10
TRANSFER CLOCK D
TP2
+5VDC
1K R5
TRANSFER GATE 13
COLLECTOR 'OR' COMBINER
MD6C 10
MD6B 10
5V/CM
0.5μSEC/CM
2μSE
B
MD7B 5
MD7A 5
MD8B 5
MD8A 5
MD9B 5
TP3
5V/CM
0.5μSEC/CM
NOTES:
1-UNLESS OTH
11-ALL RE
(K=100
COMMUTATING LINES
9
11
12
10
A
1
MD9A 5
MD10B 5
MD10A 5
+6V
2.7 R3
1N4733 VR1
+5V
110 R1
+3.5V
1MFD C3
.01MFD C4
1MFD C1
.01MFD C2
20 1/2W R6
68 1/2W R7

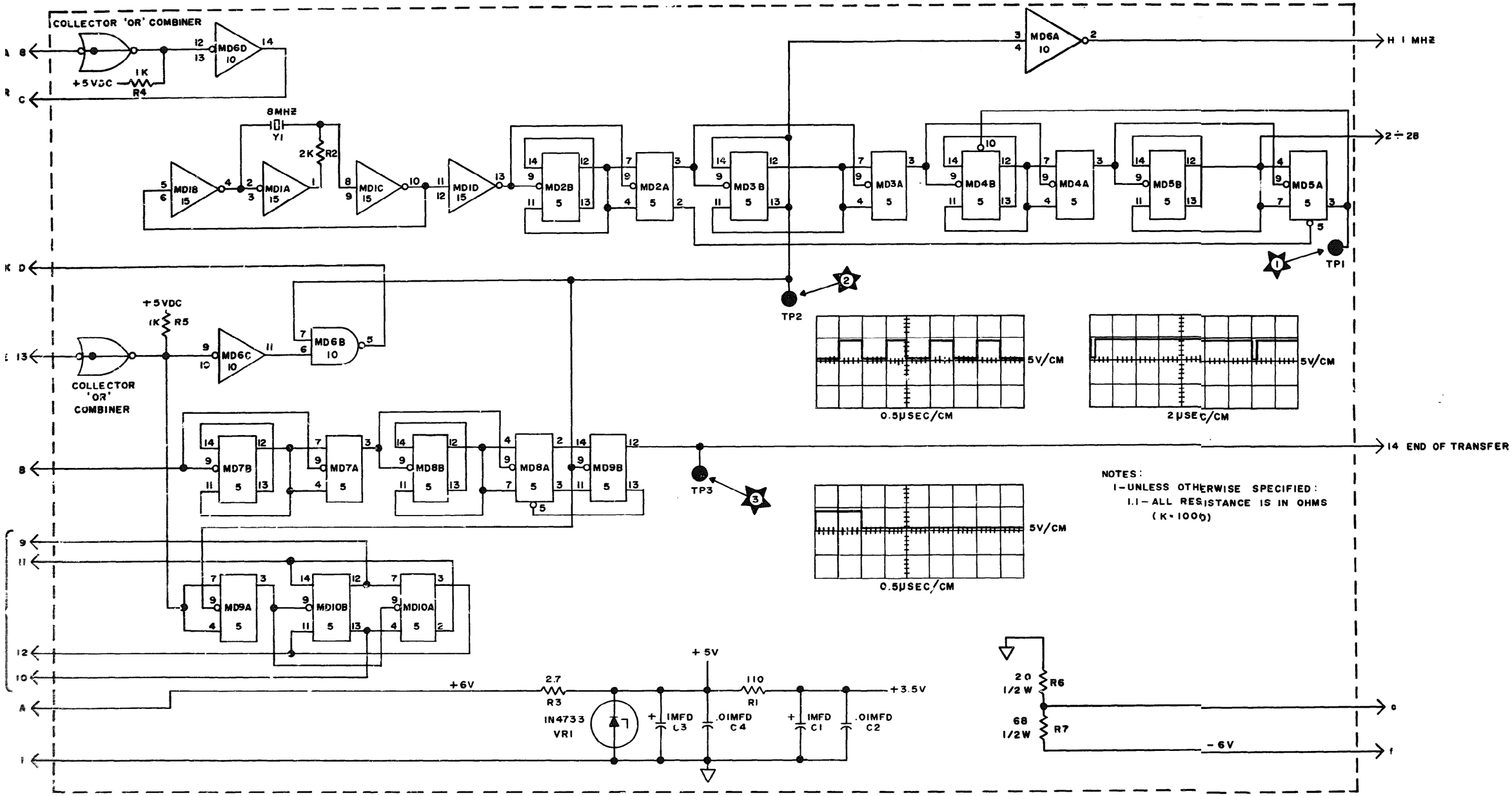
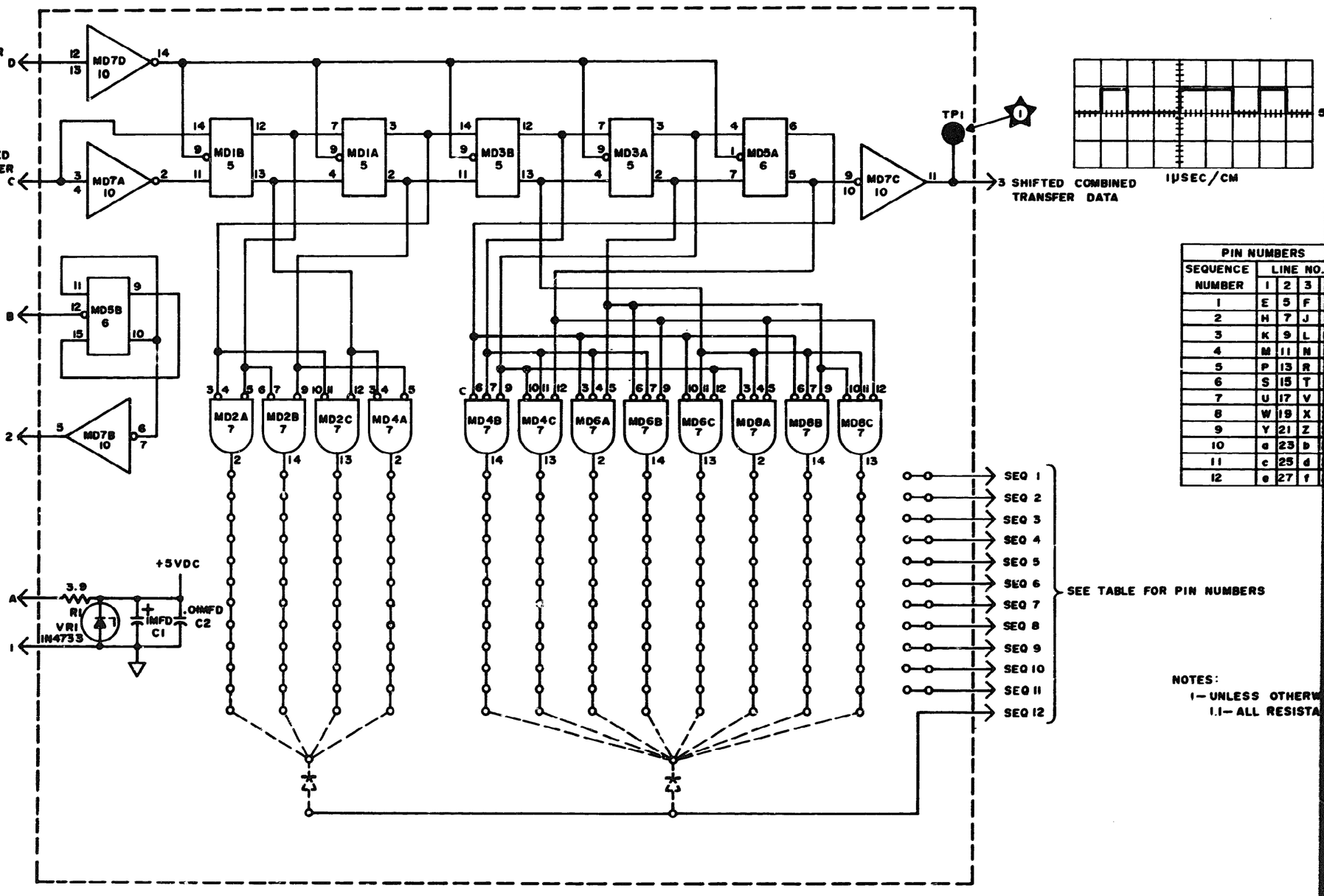


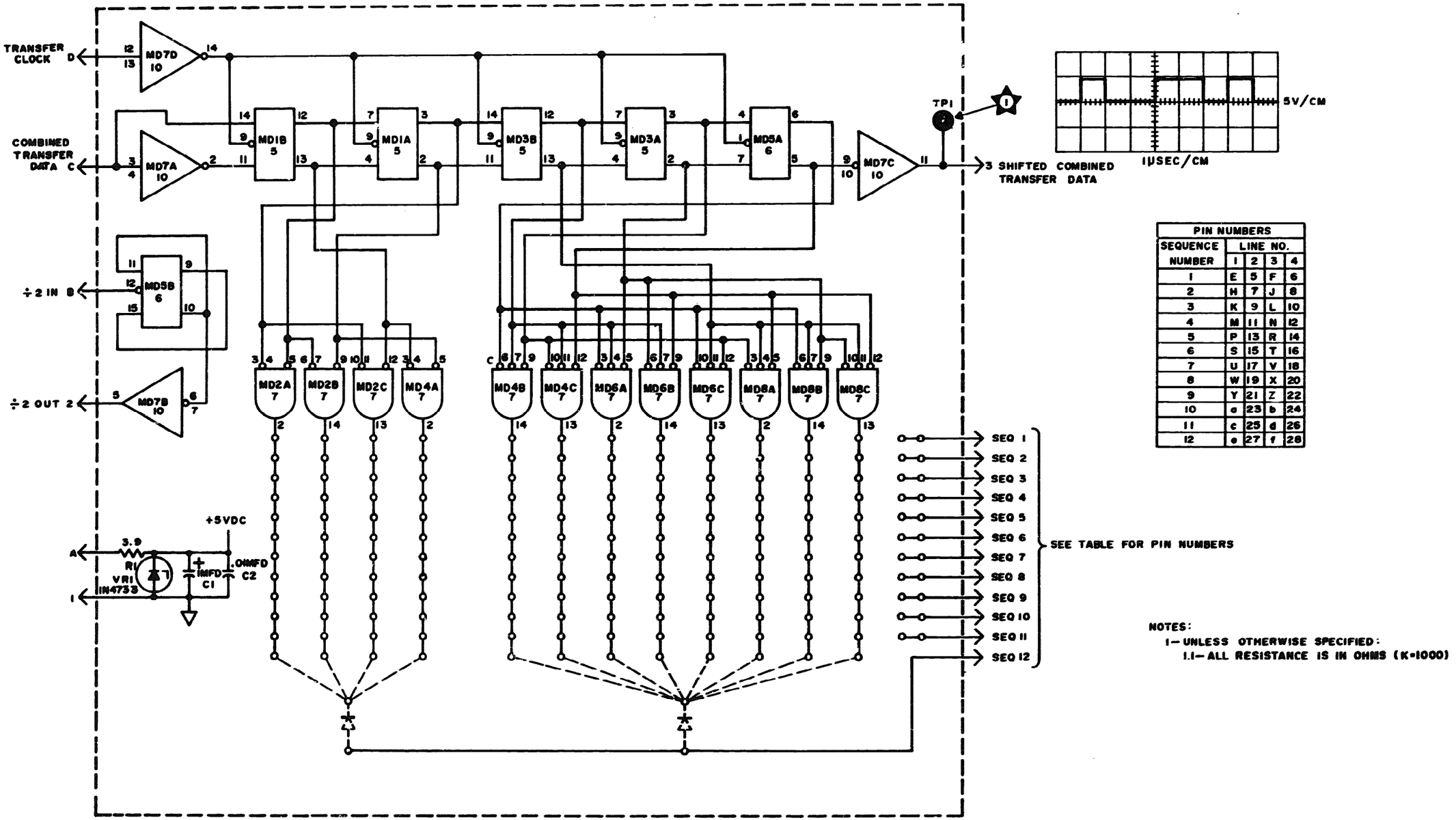
Figure 4-3. - Logic Diagram Timing Card, A5



PIN NUMBERS			
SEQUENCE NUMBER	LINE NO. 1	2	3
1	E	5	F
2	H	7	J
3	K	9	L
4	M	11	N
5	P	13	R
6	S	15	T
7	U	17	V
8	W	19	X
9	Y	21	Z
10	a	23	b
11	c	25	d
12	e	27	f

NOTES:
1— UNLESS OTHERW
1.1— ALL RESISTA

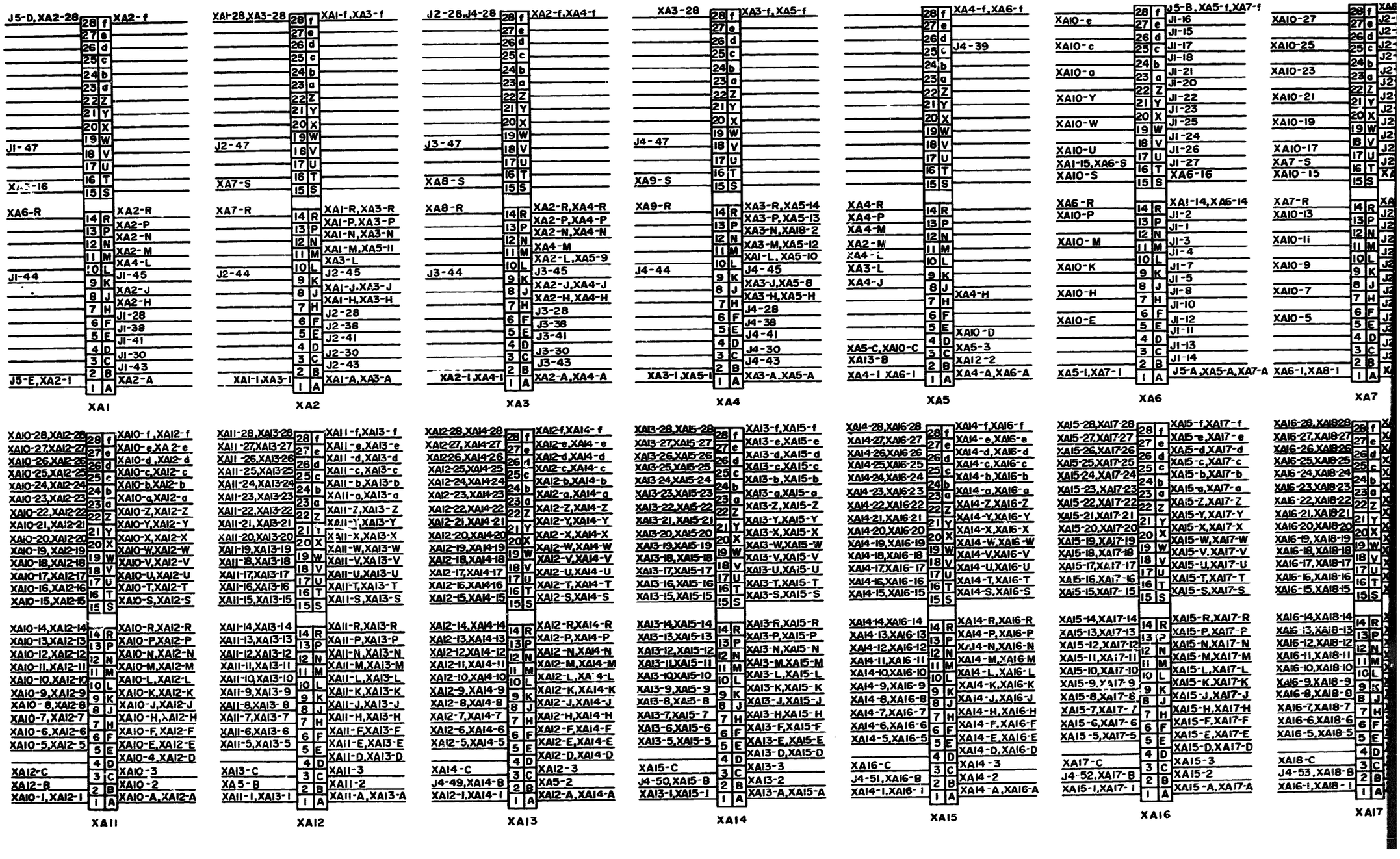
Figure 4-4.- Logic Diagram Re
A10 thru A19.



PIN NUMBERS				
SEQUENCE NUMBER	LINE NO. 1	2	3	4
1	E	5	F	6
2	H	7	J	8
3	K	9	L	10
4	M	11	N	12
5	P	13	R	14
6	S	15	T	16
7	U	17	V	18
8	W	19	X	20
9	Y	21	Z	22
10	a	23	b	24
11	c	25	d	26
12	e	27	f	28

NOTES:
1- UNLESS OTHERWISE SPECIFIED:
1.1- ALL RESISTANCE IS IN OHMS (K=1000)

Figure 4-4.- Logic Diagram Register/Program Card, A10 thru A19.


J5-D, XA2-28
XA2-f
J1-47
XA6-R
J1-44
J5-E, XA2-1
XA2-R
XA2-P
XA2-N
XA2-M
XA4-L
J1-45
XA2-J
XA2-H
J1-28
J1-38
J1-41
J1-30
J1-43
XA2-A
XA1
XA1-28, XA3-28
XA1-f, XA3-f
J2-47
XA7-S
XA7-R
J2-44
XA1-1, XA3-1
XA1-R, XA3-R
XA1-P, XA3-P
XA1-N, XA3-N
XA1-M, XA5-11
XA3-L
J2-45
XA1-J, XA3-J
XA1-H, XA3-H
J2-28
J2-38
J2-41
J2-30
J2-43
XA1-A, XA3-A
XA2
J2-28, J4-28
XA2-f, XA4-f
J3-47
XA8-S
XA8-R
J3-44
XA2-1, XA4-1
XA2-R, XA4-R
XA2-P, XA4-P
XA2-N, XA4-N
XA4-M
XA2-L, XA5-9
J3-45
XA2-J, XA4-J
XA2-H, XA4-H
J3-28
J3-38
J3-41
J3-30
J3-43
XA2-A, XA4-A
XA3
XA3-28
XA3-f, XA5-f
J4-47
XA9-S
XA9-R
J4-44
XA3-1, XA5-1
XA3-R, XA5-14
XA3-P, XA5-13
XA3-N, XA18-2
XA3-M, XA5-12
XA1-L, XA5-10
J4-45
XA3-J, XA5-8
XA3-H, XA5-H
J4-28
J4-38
J4-41
J4-30
J4-43
XA3-A, XA5-A
XA4
XA4-f, XA6-f
J4-39
XA4-R
XA4-P
XA4-M
XA2-M
XA4-L
XA3-L
XA4-J
XA5-C, XA10-C
XA13-B
XA4-1 XA6-1
XA4-H
XA10-D
XA5-3
XA12-2
XA4-A, XA6-A
XA5
J5-B, XA5-f, XA7-f
XA10-e
XA10-c
XA10-a
XA10-Y
XA10-W
XA10-U
XA1-15, XA6-S
XA10-S
XA6-R
XA10-P
XA10-M
XA10-K
XA10-H
XA10-E
XA5-1, XA7-1
J1-16
J1-15
J1-17
J1-18
J1-21
J1-20
J1-22
J1-23
J1-25
J1-24
J1-26
J1-27
XA6-16
XA1-14, XA6-14
J1-2
J1-1
J1-3
J1-4
J1-7
J1-5
J1-8
J1-10
J1-12
J1-11
J1-13
J1-14
J5-A, XA5-A, XA7-A
XA6
XA10-27
XA10-25
XA10-23
XA10-21
XA10-19
XA10-17
XA7-S
XA10-15
XA7-R
XA10-13
XA10-11
XA10-9
XA10-7
XA10-5
XA6-1, XA8-1
XA7
XA10-28, XA12-28
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XA10-9, XA12-9
XA10-8, XA12-8
XA10-7, XA12-7
XA10-6, XA12-6
XA10-5, XA12-5
XA12-C
XA12-B
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XA11-d, XA13-d
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XA14-C
J4-49, XA14-B
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XA14-W, XA16-W
XA14-V, XA16-V
XA14-U, XA16-U
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XA14-F, XA16-F
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XA15-R, XA17-R
XA15-P, XA17-P
XA15-N, XA17-N
XA15-M, XA17-M
XA15-L, XA17-L
XA15-K, XA17-K
XA15-J, XA17-J
XA15-H, XA17-H
XA15-F, XA17-F
XA15-E, XA17-E
XA15-D, XA17-D
XA15-3
XA15-2
XA15-A, XA17-A
XA16
XA16-28, XA18-28
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J4-53, XA18-B
XA16-1, XA18-1
XA17

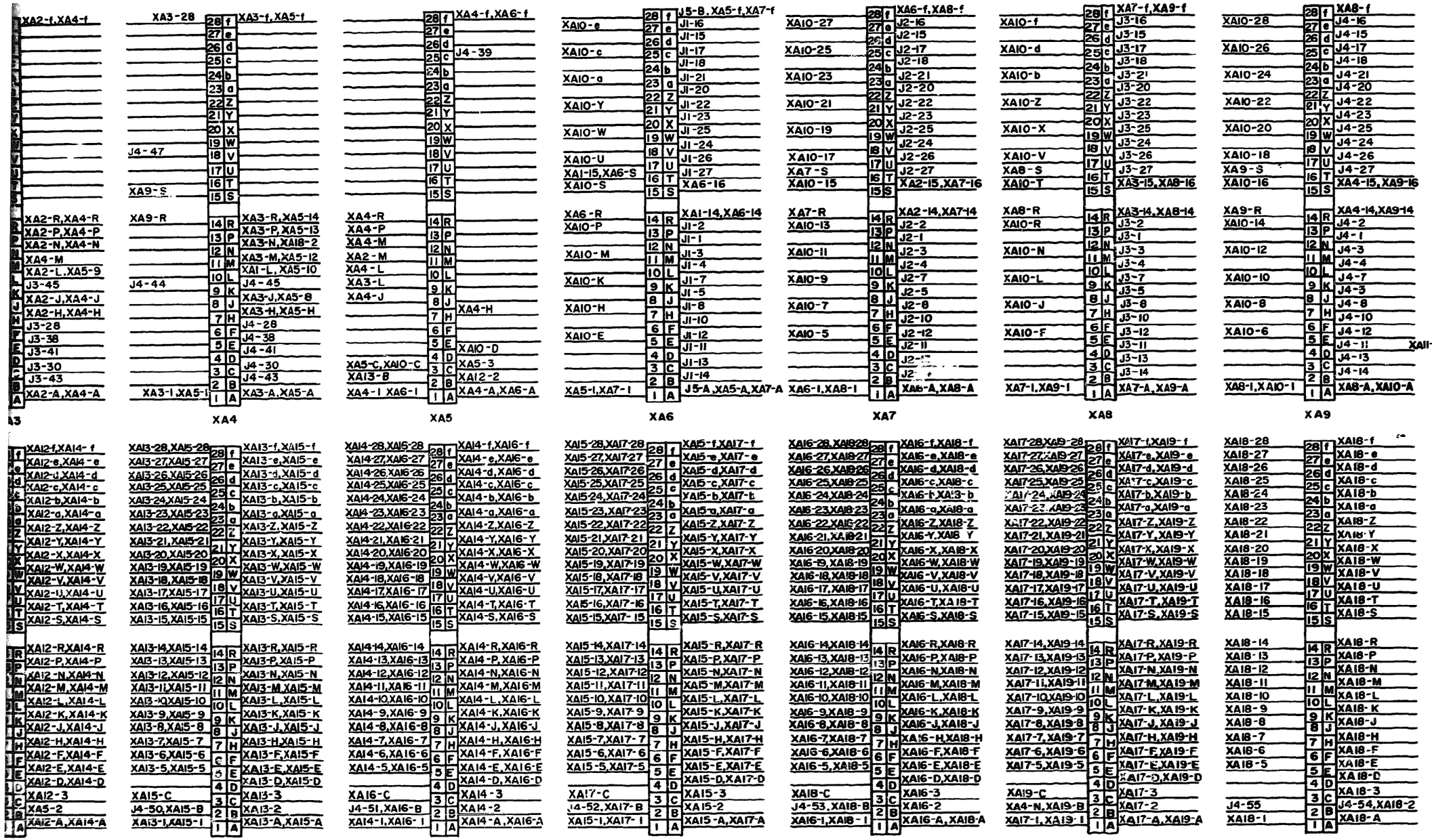
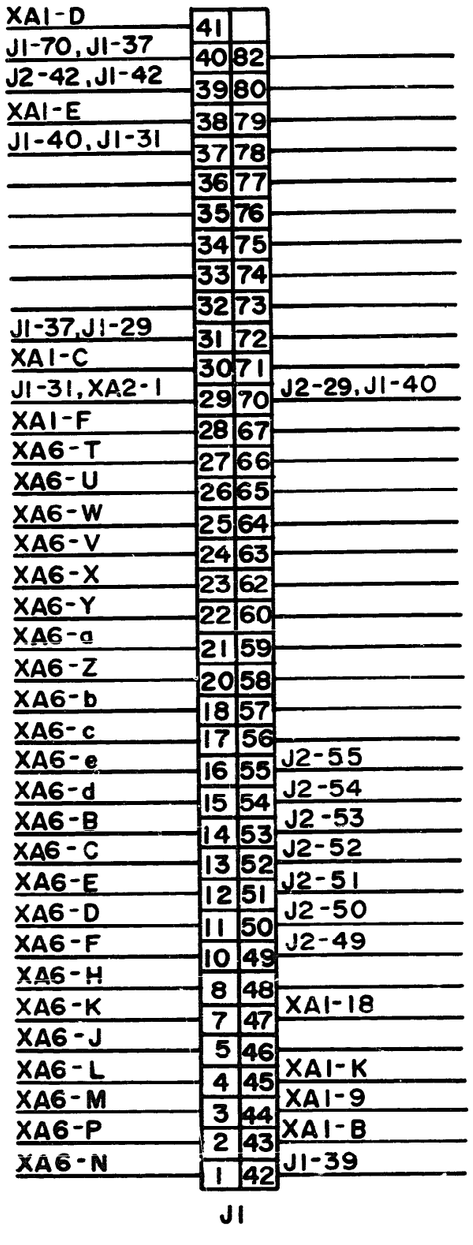


Figure 6-1. **,- Wiring Diagram Motherboard**


XA1-D
J1-70,J1-37
J2-42,J1-42
XA1-E
J1-40,J1-31
J1-37,J1-29
XA1-C
J1-31,XA2-1
XA1-F
XA6-T
XA6-U
XA6-W
XA6-V
XA6-X
XA6-Y
XA6-a
XA6-Z
XA6-b
XA6-c
XA6-e
XA6-d
XA6-B
XA6-C
XA6-E
XA6-D
XA6-F
XA6-H
XA6-K
XA6-J
XA6-L
XA6-M
XA6-P
XA6-N
41
40 82
39 80
38 79
37 78
36 77
35 76
34 75
33 74
32 73
31 72
30 71
29 70
28 67
27 66
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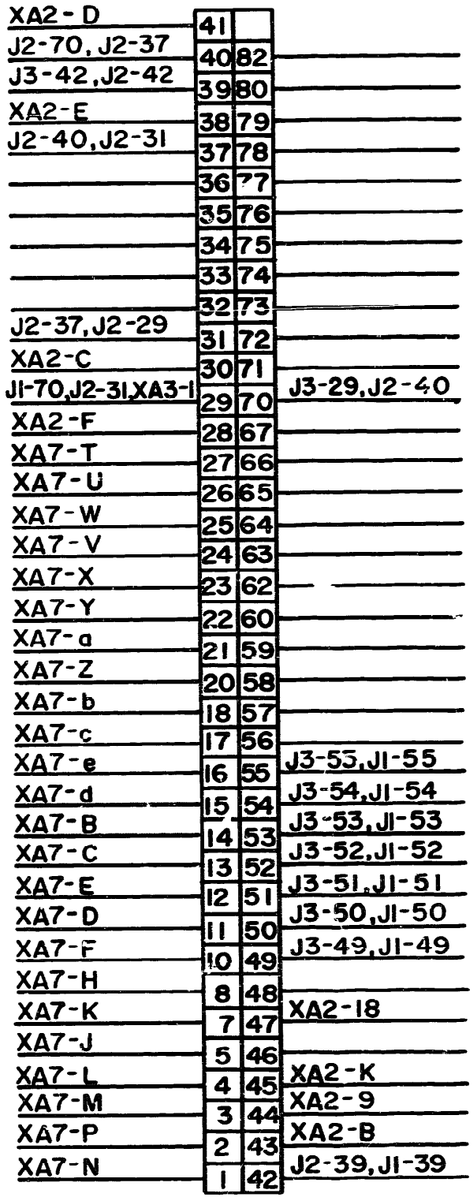
XA1-B
J1-39
J1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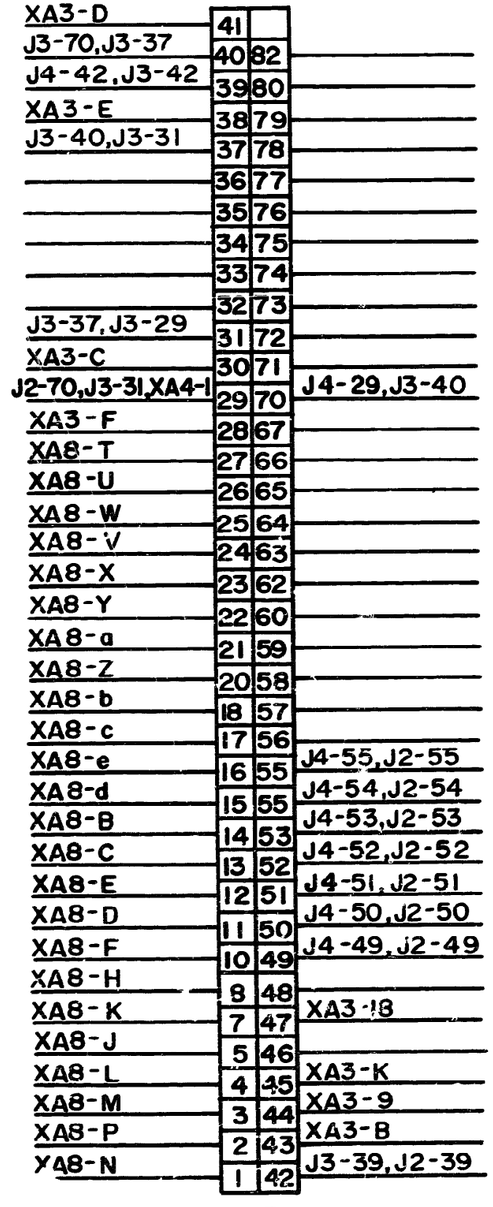
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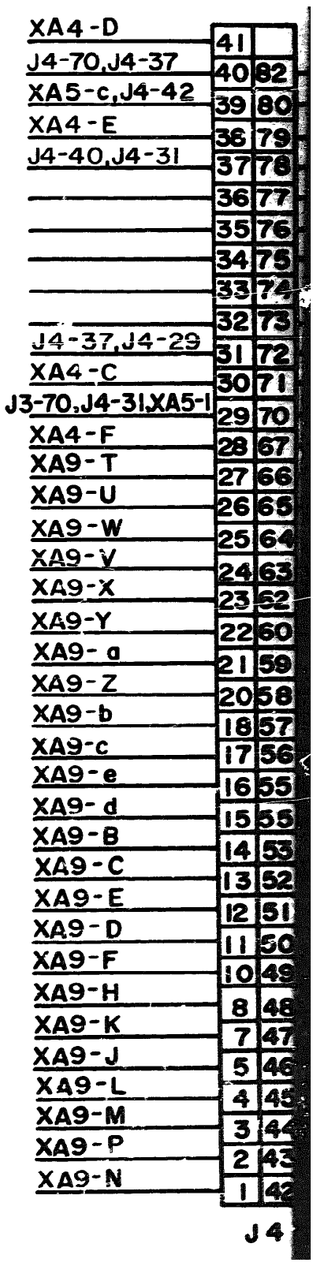
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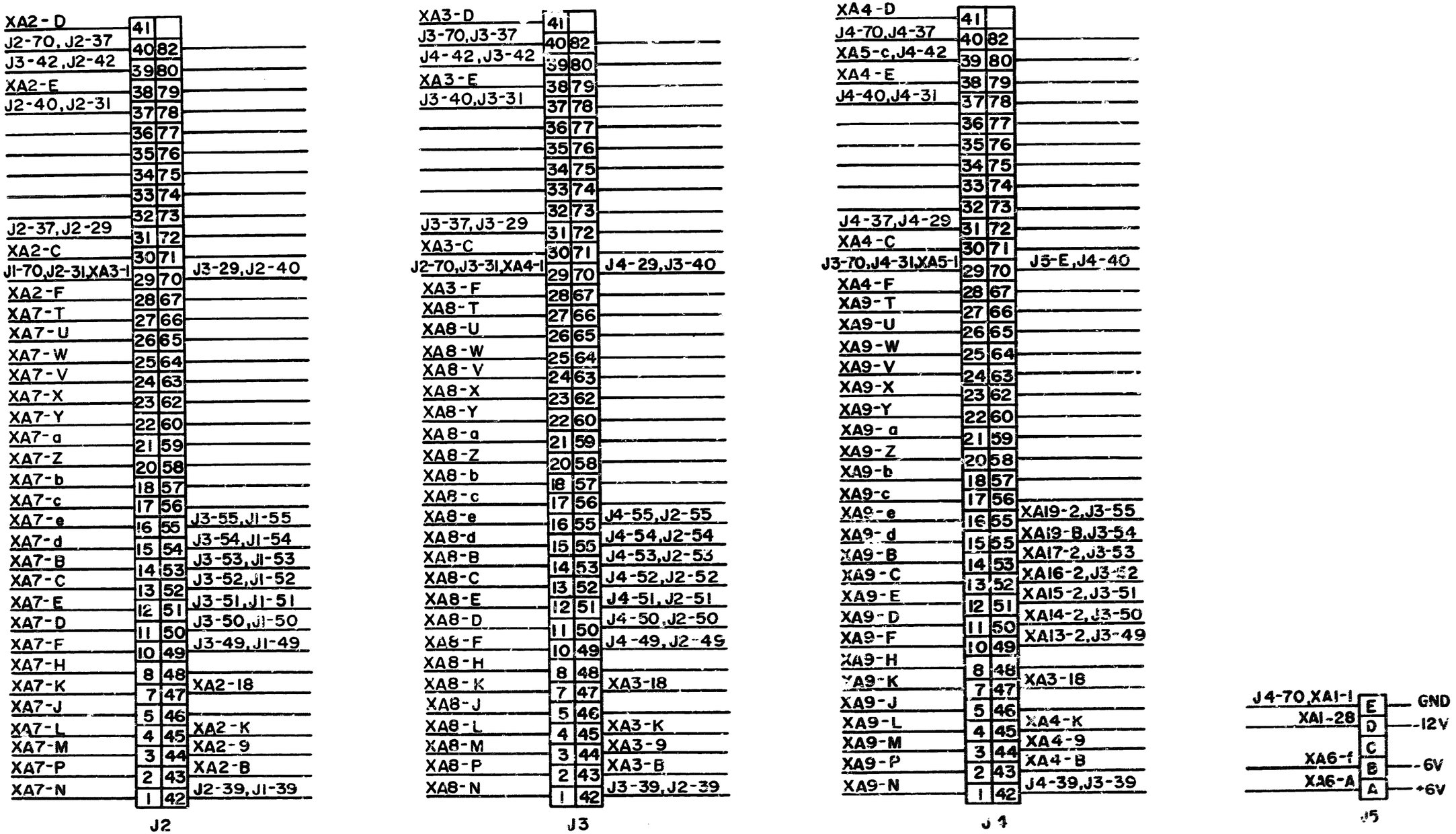

Figure 6-2. **Wiring Diagram Input/Output Connectors**

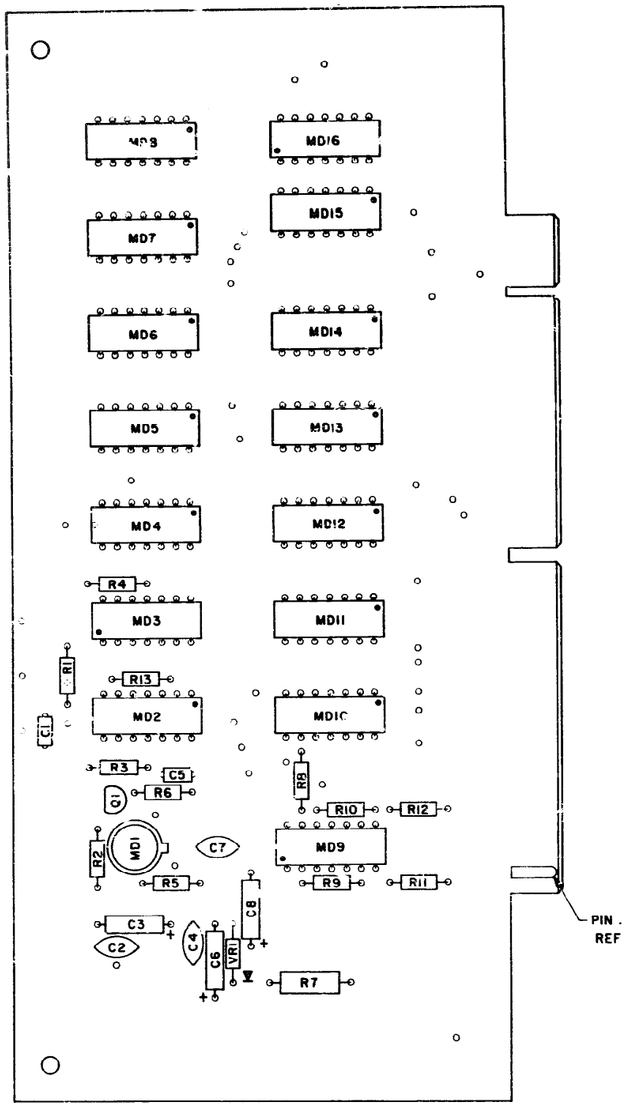

Figure 6-3A

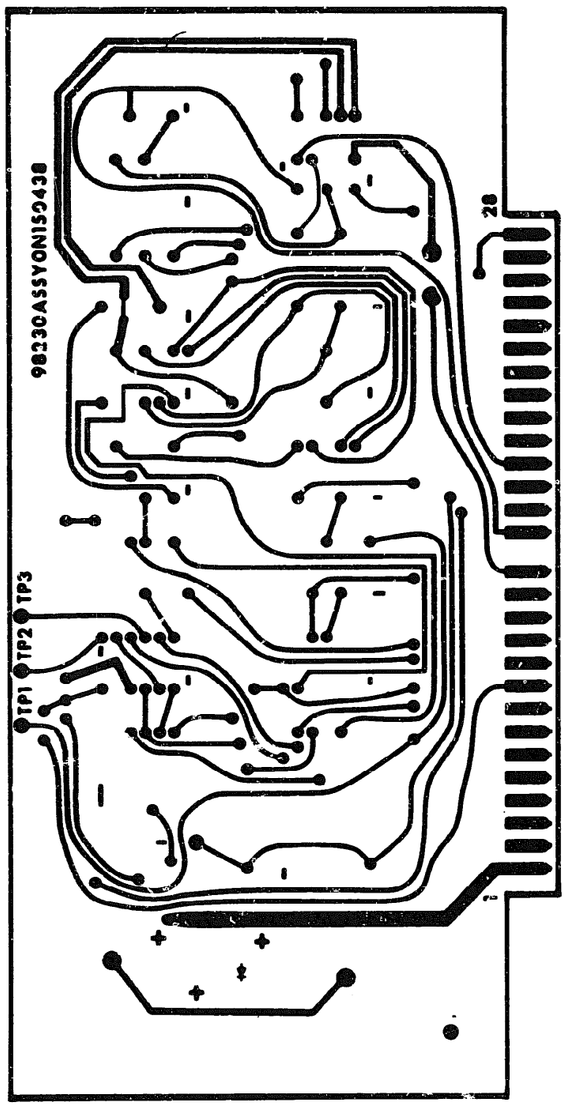

Figure 6-3B

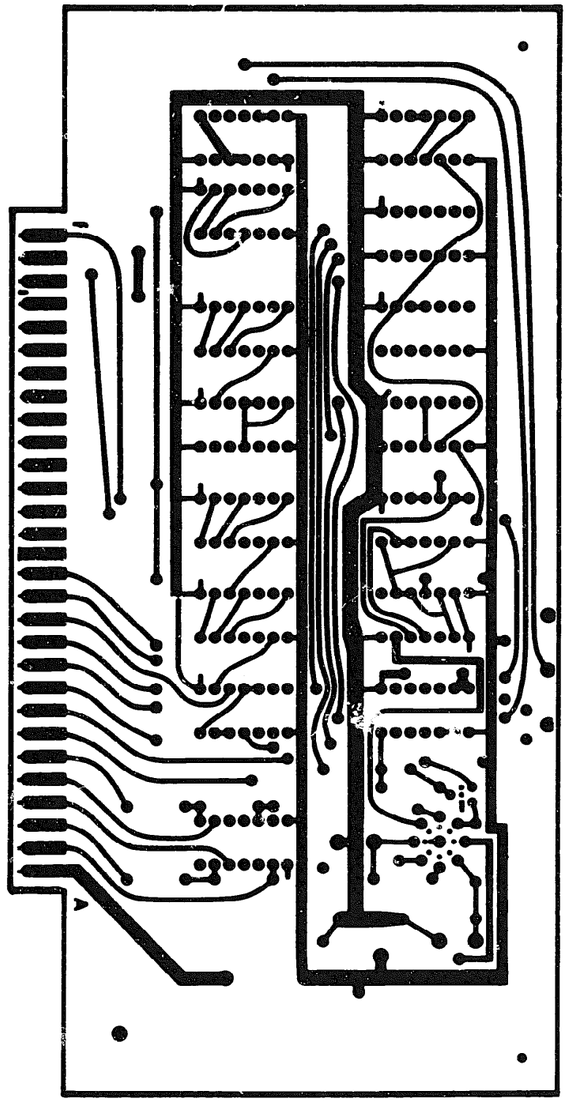

Figure 6-3C

Figure 6-3. - **Wiring Diagram P.W. Board, Input Card, A1 thru A4, P/N ON15Ø438**

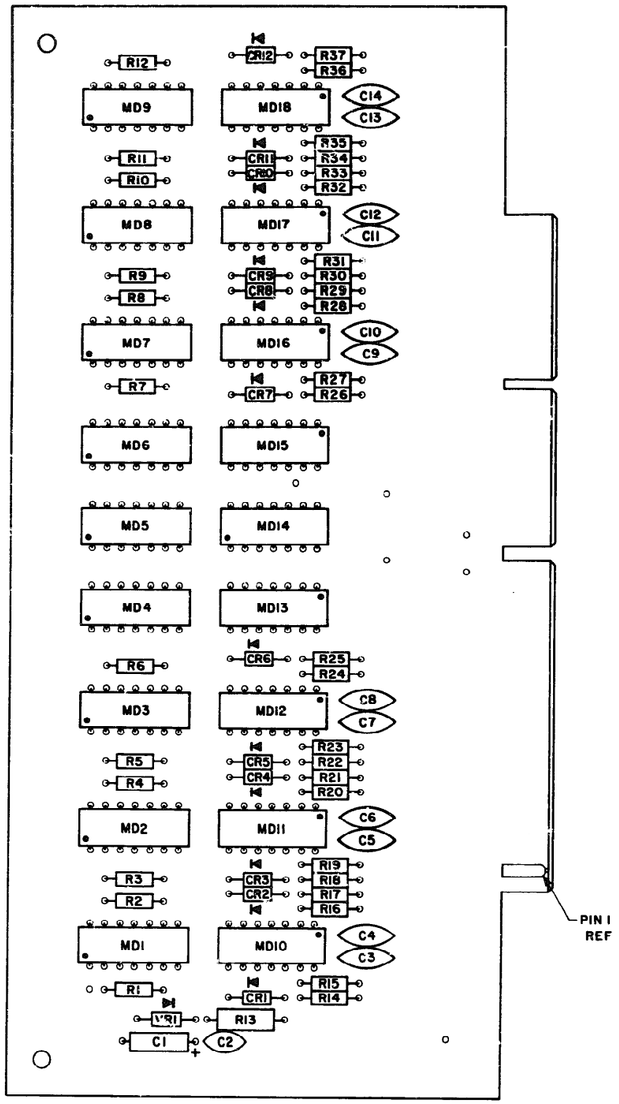

Figure 6-4A

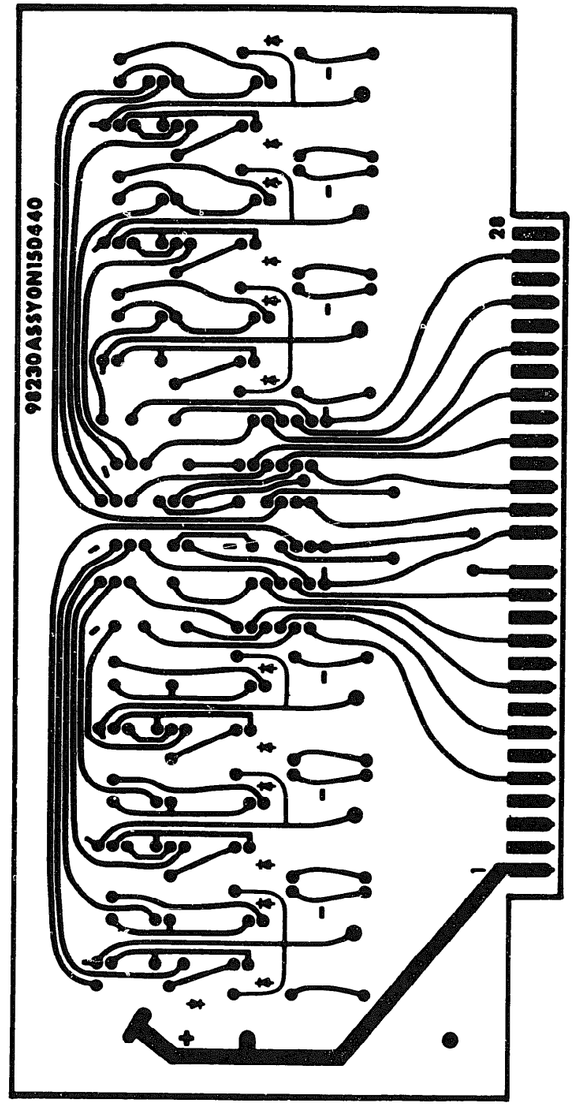

Figure 6-4B

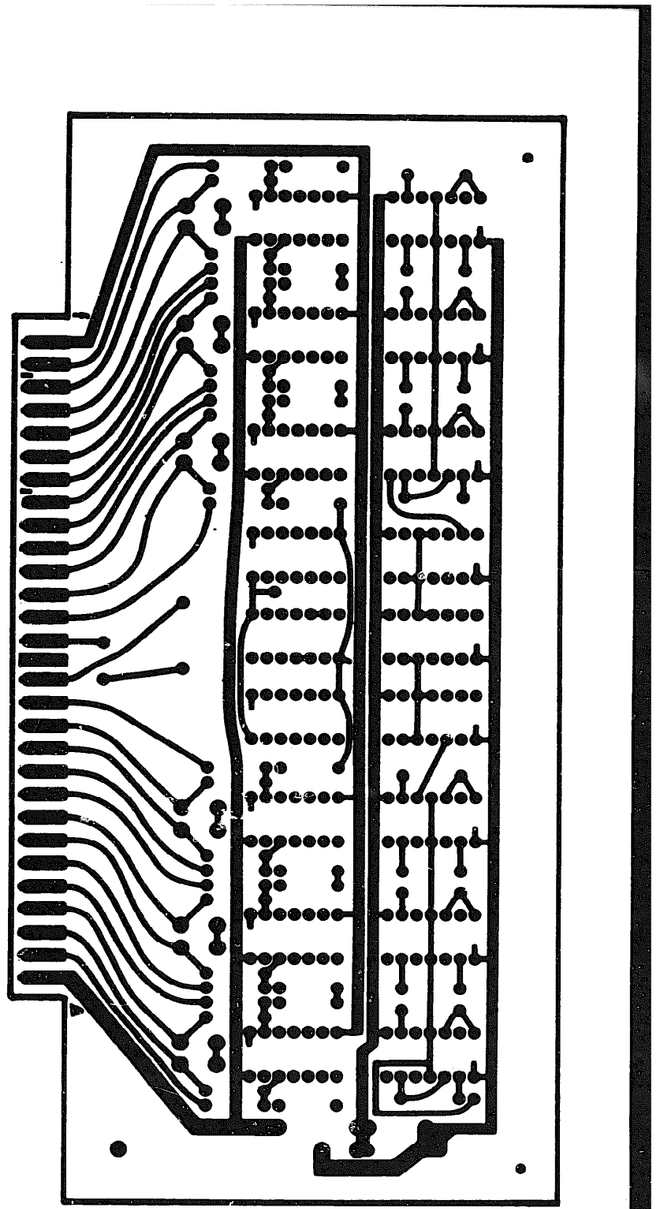

Figure 6-4C

Figure 6-4. – **Wiring Diagram P.W. Board, Output Card, A6 thru A9, P/N ON15Ø44Ø**

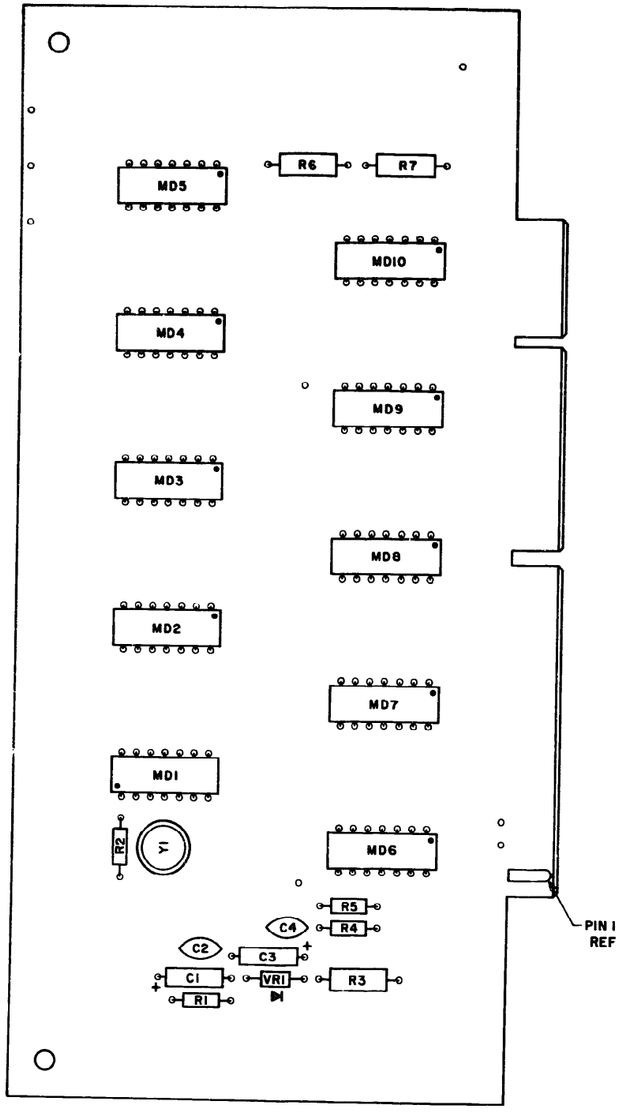

Figure 6-5A

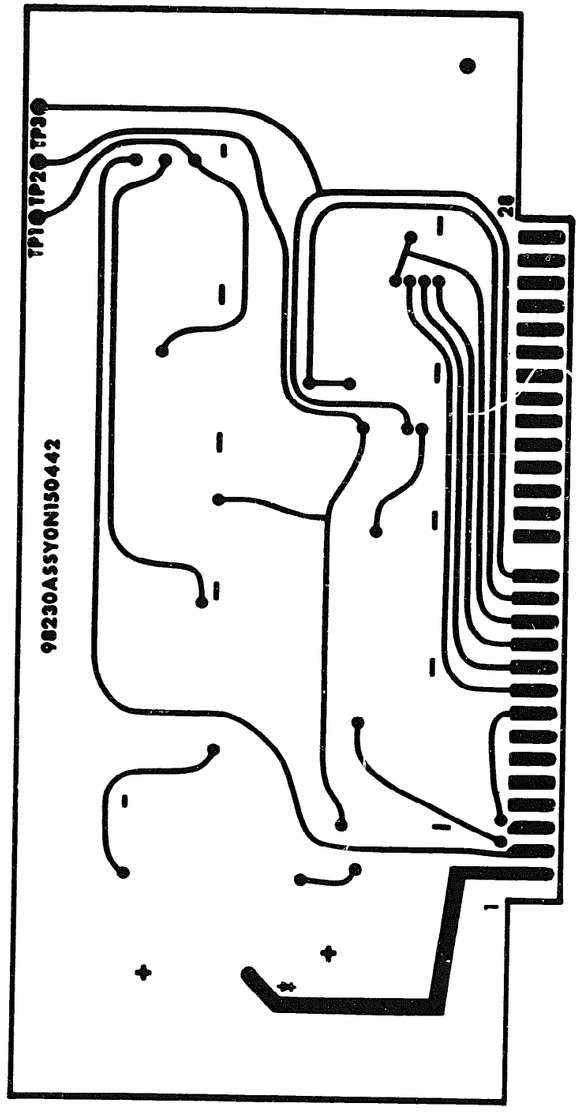

Figure 6-5B

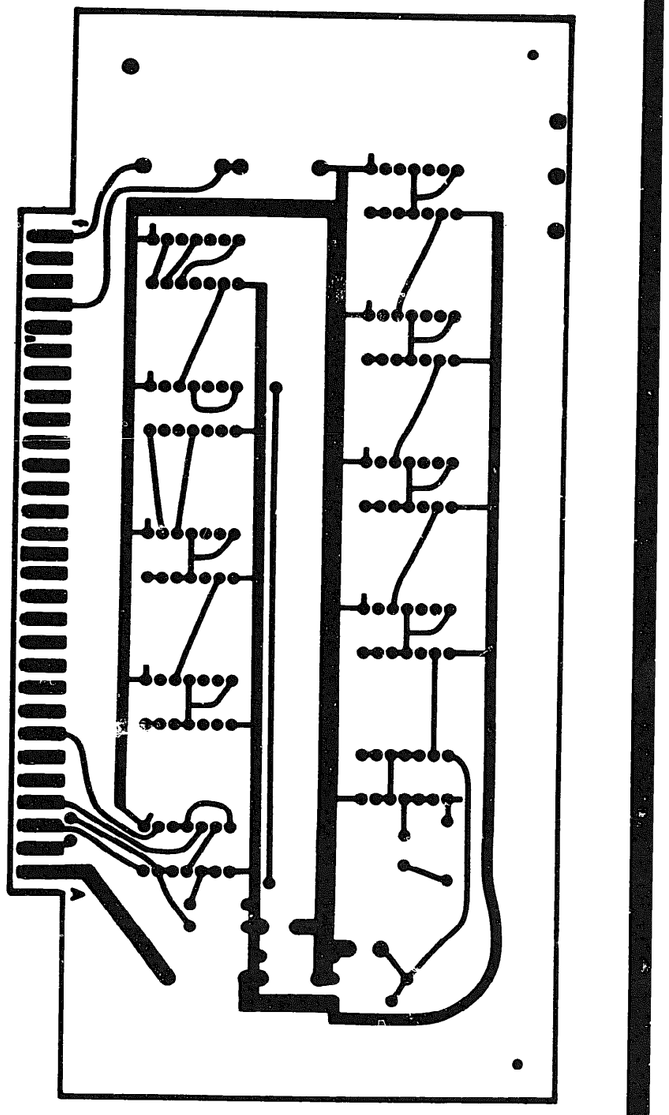

Figure 6-5C

Figure 6-5. - Wiring Diagram P.W. Board, Timing Card, A5, P/N ON15Ø443

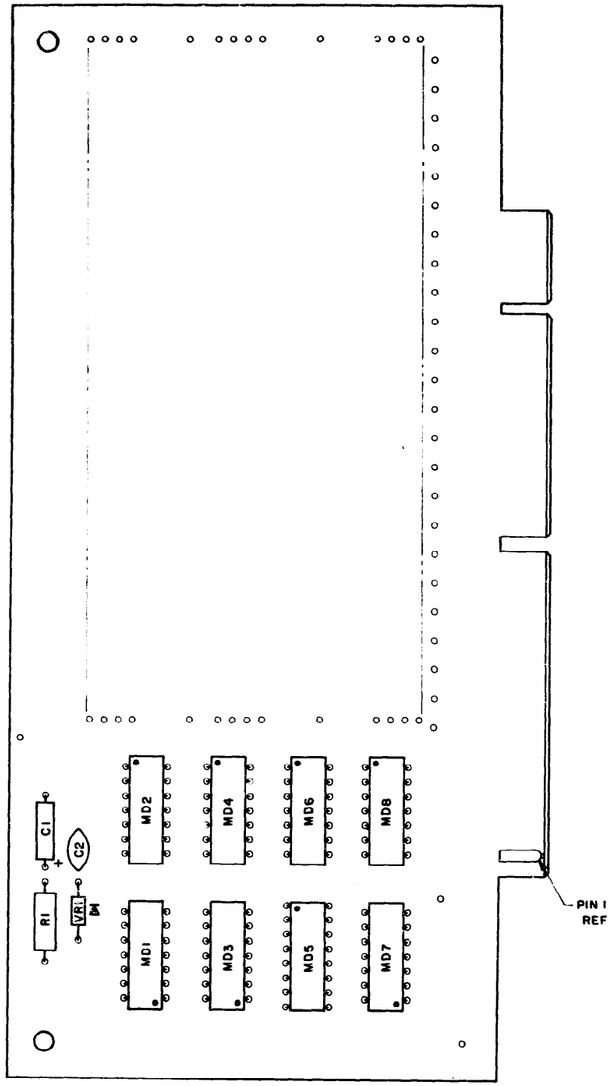

Figure 6-6A

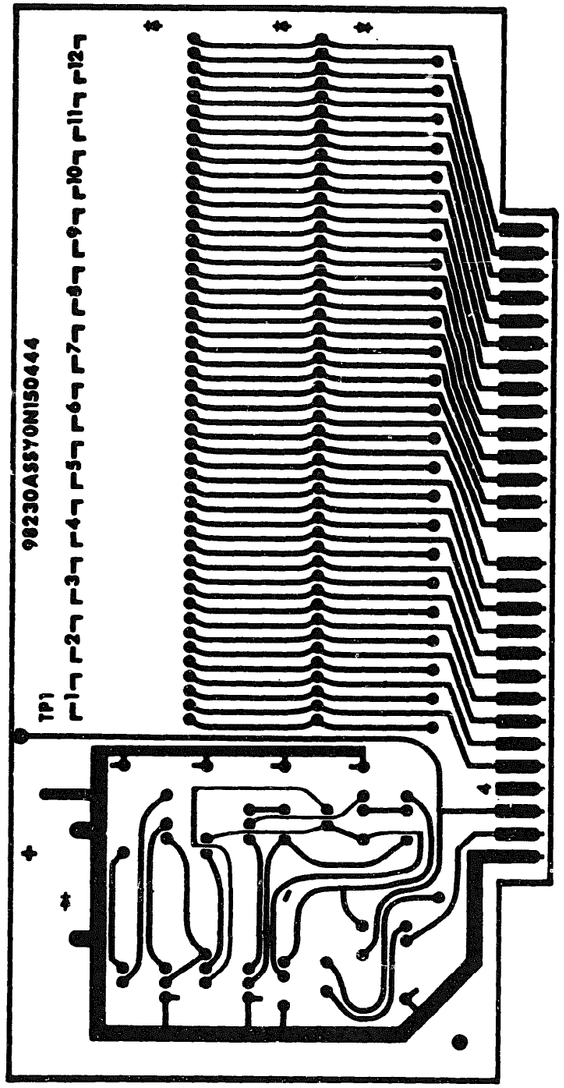

Figure 6-6B

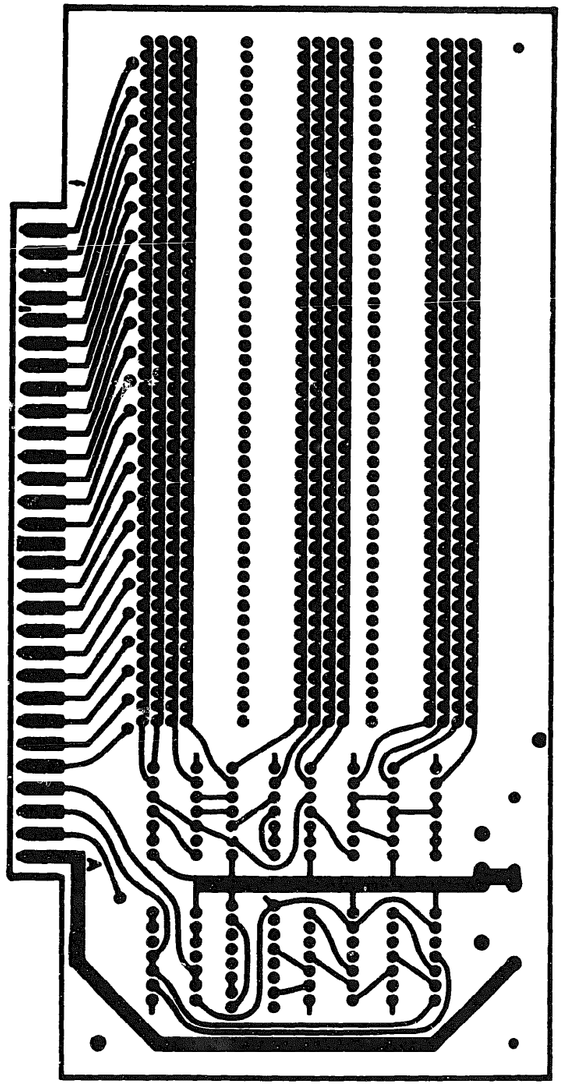

Figure 6-6C

Figure 6-6. - **Wiring Diagram P.W. Board, Register/Program Card, A1Ø thru A19, P/N ON15Ø444**

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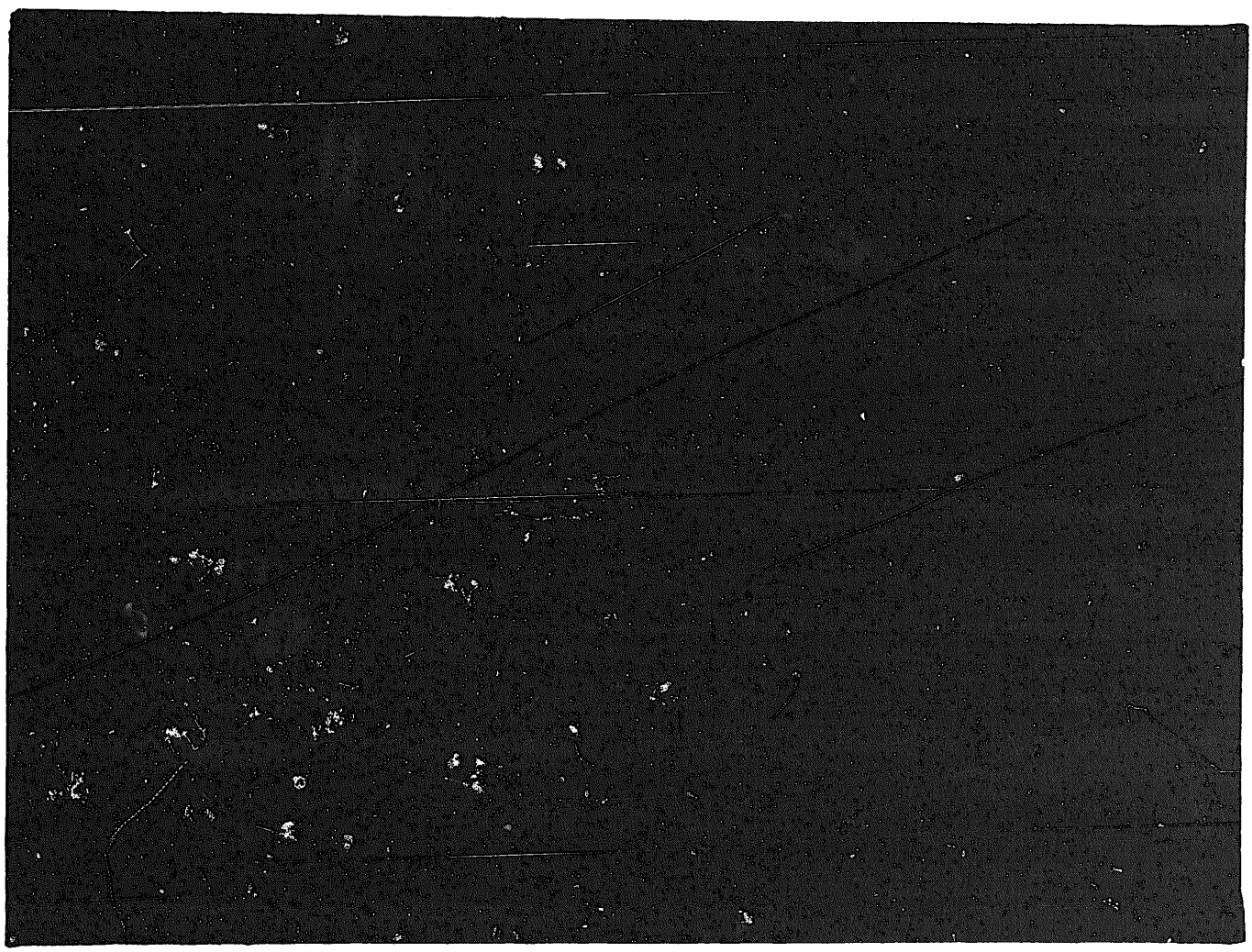

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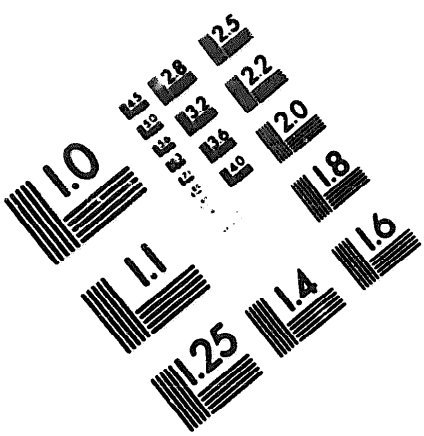
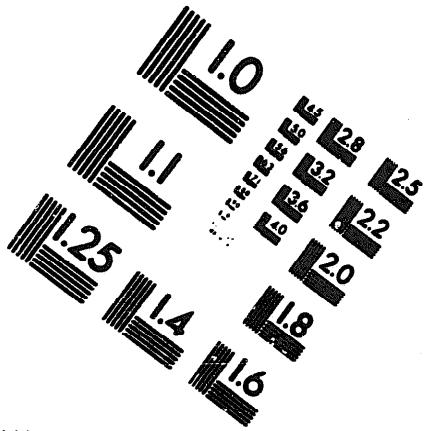
MICROFORM
TEST TARGET





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1.5 mm (e= 1.09 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMNOPQRSTUVWXYZ
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1234567890$¢£/%#½¼¾—=+×&@*

2.5 mm (e= 1.77 mm)

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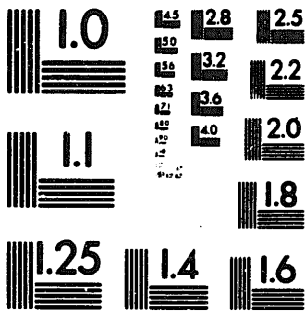

1.0 mm (e= .81 mm)

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1.5 mm (e= 1.09 mm)

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2.0 mm (e= 1.37 mm)

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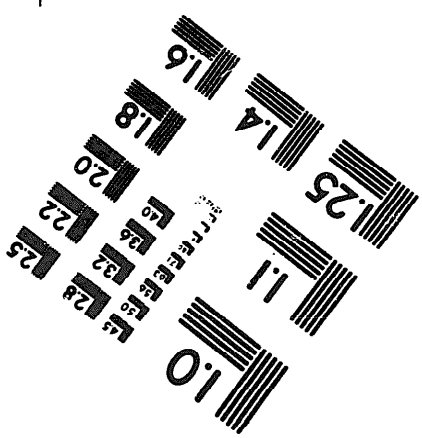
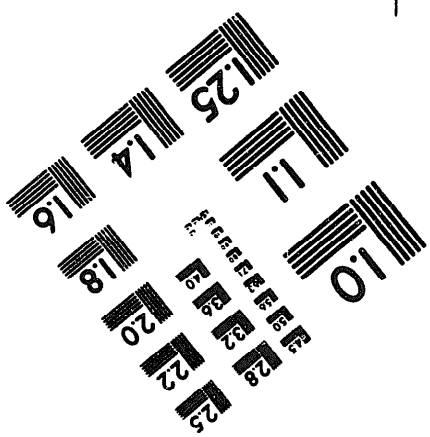
200 MM





250 MM