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CONTROL DATA CORPORATION

NTA MAS

CDC®
RS 232 BUFFERED AND UNBUFFERED INTERFACE

for Matrix Printer

INTRODUCTION
INSTALLATION AND CHECKOUT
PRINCIPLES OF OPERATION
DIAGRAMS

FIELD SERVICE, REFERENCE AND PARTS MANUAL

REVISION RECORD

REVISION	DESCRIPTION
A 7-77	Initial release of the RS-232 Buffered and Unbuffered Interface
B 1-78	Update to incorporate ECO PH14895- Update parts list.
C 4-78	Incorporate Comment
D 7-78	Incorporate corrections 1J01 Terminal identification
E 10-78	Incorporate ECO PH15610- Reverse channel jumper.
F 4-80	Incorporate ECO PH16236 - KMOD Connector Spacers.
G 7-80	Incorporate C.E. correction.
H 7-81	Incorporate Engineering Change Order PH17484-Add MOS Label, PH17671-Chg. I.C. 1024-1 from Inactive P/N.

PUBLICATION NO.
95445069

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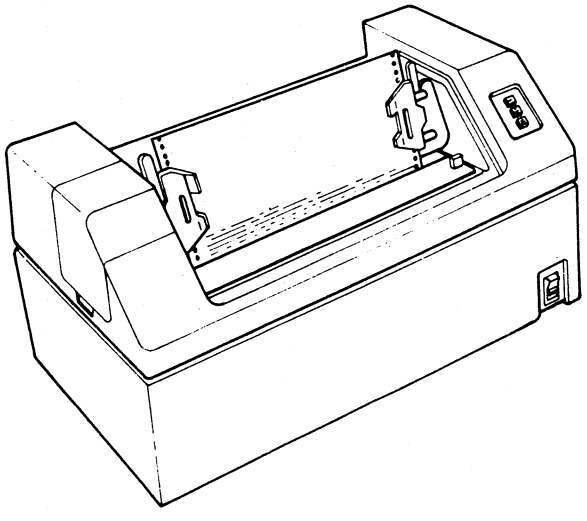


MATRIX PRINTER

THE RS-232 BUFFERED AND UNBUFFERED INTERFACE ADAPTER KIT
IS FOR USE WITH THE ABOVE 70/125 MATRIX PRINTER

INTRODUCTION

GENERAL

This manual provides service and reference information for the RS-232 Buffered and Unbuffered Interface Kits designed for installation on the 70/125 Matrix Printer.

The interface may be used with a modem connected through telephone lines to a remote data source or can also be connected to a data source with an RS-232 I/O port without the use of a modem.

The interface accepts synchronous serial data from the data source and assembles this data into five to eight bit characters. The number of bits per character is switch selectable at the printer. The rate of bit transfer is also switch selectable at the printer. The printer can accept data at a rate of 150,300,600,1200,1800,2400,4800, or 9600 baud.

For connector pin assignments see Table 1-1.

TABLE 1-1. CONNECTOR PIN ASSIGNMENTS

DATA SET CONNECTOR PIN NO.	MNEMONIC	FUNCTION
1	AA	PROTECTIVE GROUND
3	BB	RECEIVED DATA
7	AB	RETURN
4	CA	REQUEST TO SEND
6	CC	DATA SET READY
8	CF	REC. LINE SIG. DETECTOR
11	SA	SECONDARY REQUEST TO SEND
20	CD	DATA TERMINAL READY
22	CE	RING INDICATOR

INSTALLATION

The necessary installation information for the RS-232 (Buffered and Unbuffered) Interface Kits is contained in this section.
The section is divided into two parts: Installation (70/125 Matrix Printer) and RS-232 Logic Programming And Jumper Selection. Only trained field personnel should attempt the installation of this kit.

INSTALLATION (70/125) MATRIX PRINTER

1. Unpackage the kit parts and check them against the parts section of this manual.

2. Disconnect the printer line cord from its power source.

3. Remove the two knobs located on the right side of the cabinet cover by pulling them off their shafts (Figure 2-1).

4. Remove the upper cabinet cover from the lower cabinet skirt (Figure 2-1).

5. Remove the four screws that mount the lower cabinet skirt to the base plate and remove the lower cabinet skirt (Figure 2-1).

6. At the rear of the printer remove the two pivot pin mounting screws and their associated nuts and washers (Figure 2-2).

7. Install the Interface Adapter Frame and its support bracket onto the two pivot pins and remount the pivot pins with existing hardware (Figure 2-2).

8. At the rear of the printer unlatch the Controller And Head Logic Board in card location 1PC2 and swing it down so that the component side is accessable.

9. Remove the two screws and related hardware that mount the board latches to the board (Figure 2-3). Remove the two latches.

10. Loosen the four screws that mount the board to the board support bracket, but do not remove them (Figure 2-3).

11. Mount the mylar shield to the foil side of the board as shown in Figure 2-3. This is accomplished by sliding the cutouts in the bottom of the shield between the board and support brackets and over the screws. Remount the board latches and tighten the four support bracket mounting screws.

12. Swing the board up and adjust the latches so that the board latches properly.

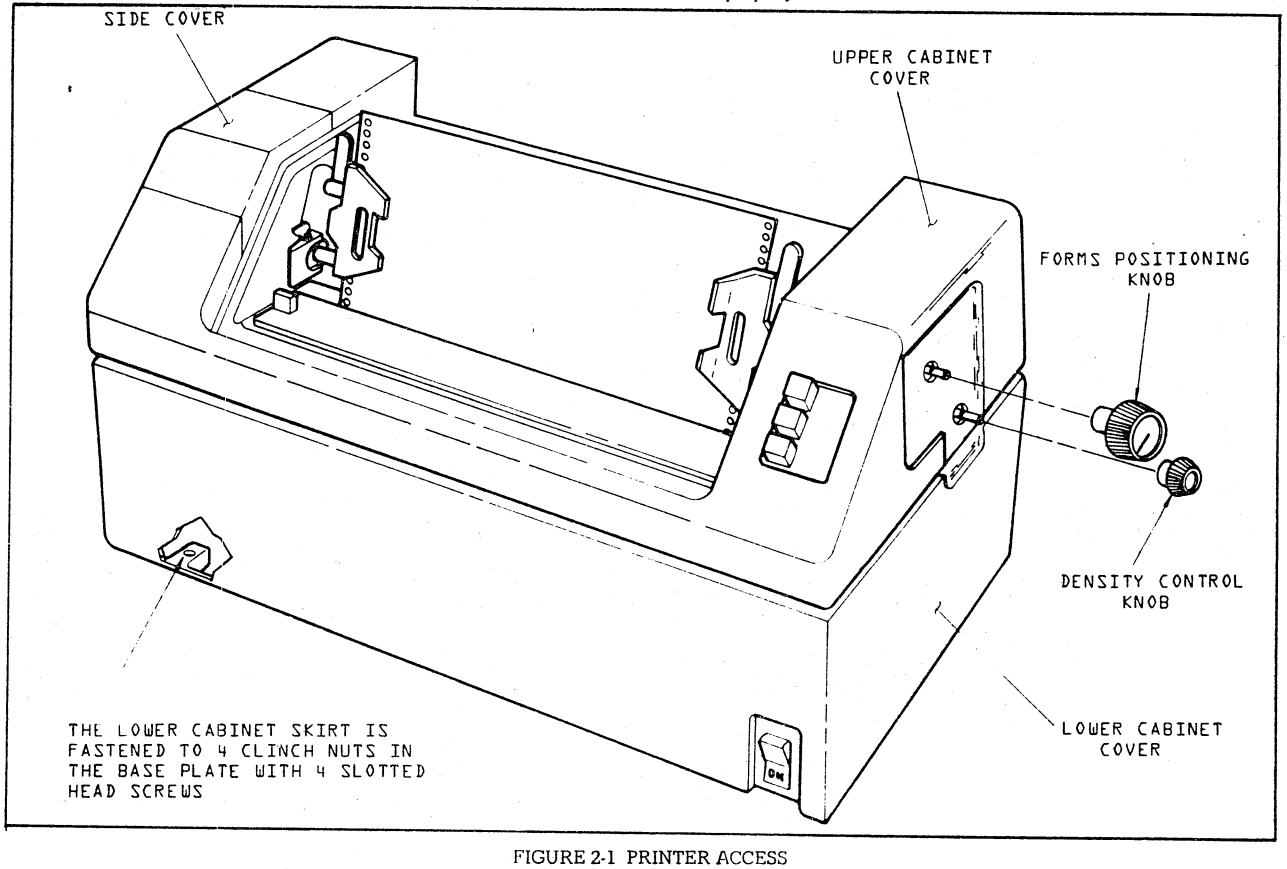


FIGURE 2-1 PRINTER ACCESS

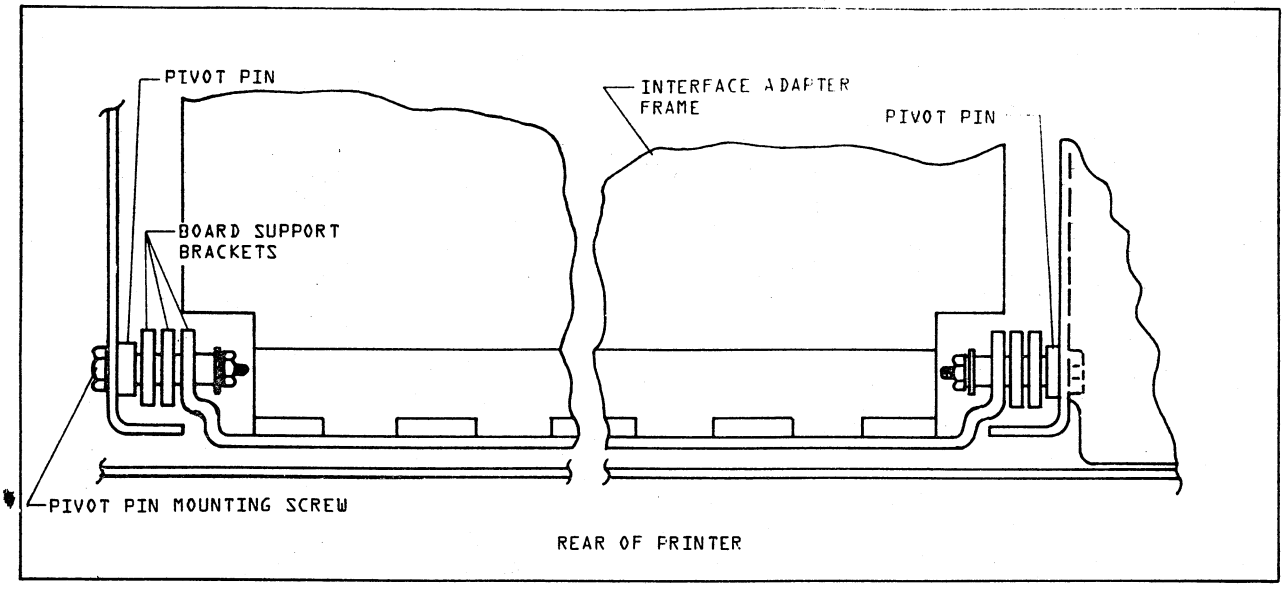


FIGURE 2-2 INTERFACE ADAPTER FRAME INSTALLATION

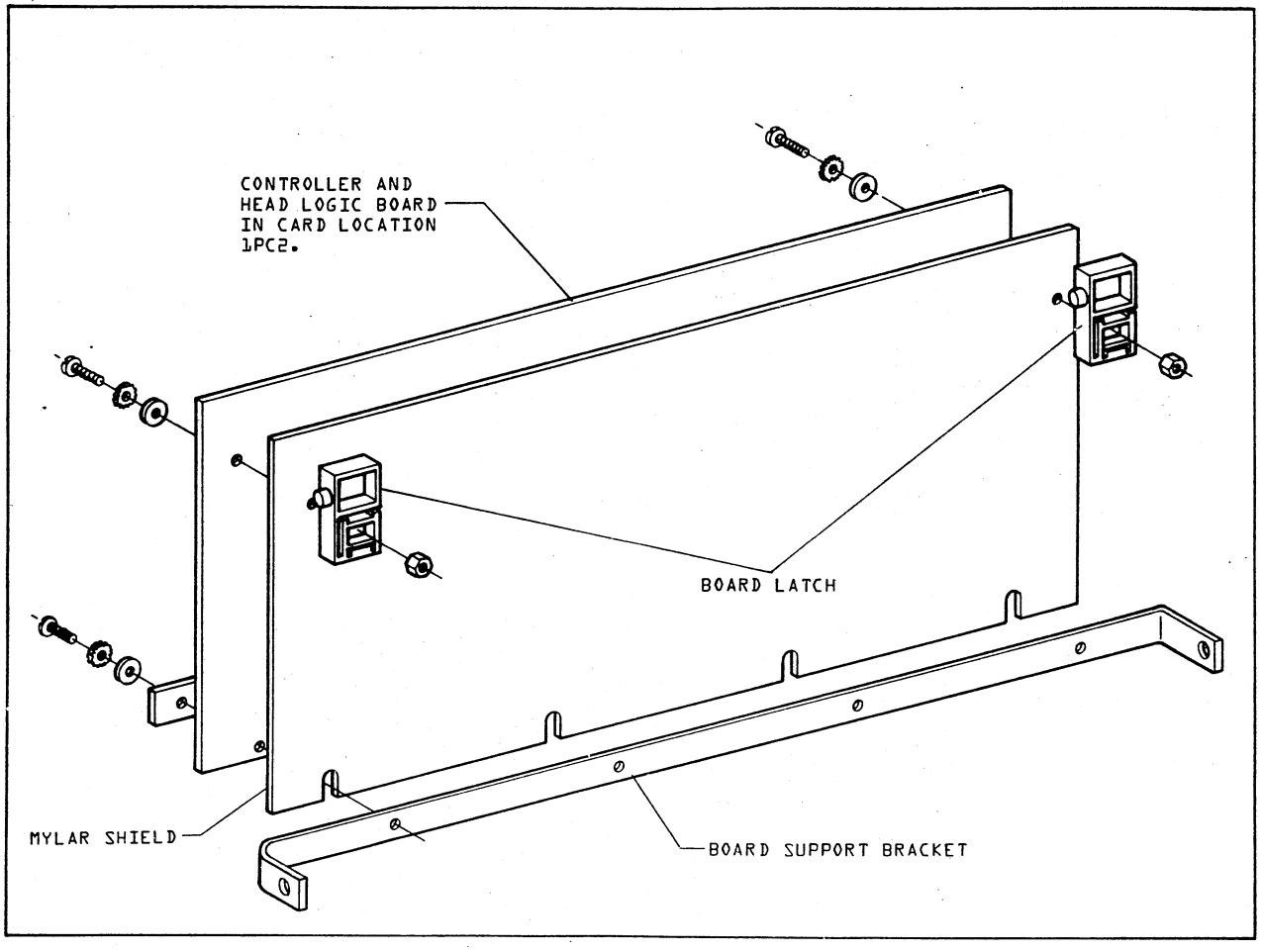


FIGURE 2-3 MYLAR SHIELD INSTALLATION

13. Fasten the 9 wire interface connector mounting plate to the outside of the interface mounting plate bracket at the left rear corner of the printer (Figure 2-4). Use the existing interface plate mounting hardware.
    Mount the connector plate so that connector pins 13 and 25 are towards the bottom of the printer.

14. Interface connections:

    A. Make the following connections from interface connector 1J01 to the interface Adapter Rack Card in card location 1A03 (Figure. 2-4):

FROM	TO
1J01-3	1A03-J3-9
1J01-4	1A03-J3-11
1J01-6	1A03-J3-8
1J01-7	1A03-J3-1
1J01-8	1A03-J3-4
1J01-11	1A03-J3-7
1J01-20	1A03-J3-10
1J01-22	1A03-J3-12

    B. Connect the protective ground wire from 1J01-1 to the grounding screw in the printer base plate (Figure 2-4).

    C. A Reverse Channel Jumper Wire Assembly is provided in this kit. The field engineer must check the modem or data source to see what I/O pin Reverse Channel is on. If Reverse Channel from the data source is other than 1J01-11, attach this jumper from 1J01-11 to the 1J01 pin required (Figure 2-4).

15. Connect the DC power to interface harness assembly to the interface adapter card 1A03-J4. This harness is not part of this kit, but comes as standard equipment on the Power Supply Card. Route the harness as shown in Figure 2-4 and plug its connector into 1A03-J4 This plug is polarized and will only go on in one direction.

16. A Ground Wire Assembly is provided in this kit. Connect the ring terminal end of the ground wire to the ground screw in the right rear corner of the print head structure (Figure 2-4). This is the same screw that is used to ground the green wire from the transformer. Connect the other end of the ground wire assembly by inserting the terminal into the mating connector of J8 on the power supply board in card location 1PC1 (Figure 2-4).

17. Their are two ribbon cables supplied with this kit. One has a 26 pin connector on either end and the other has a 34 pin connector on either end.
    Connect the 34 pin ribbon cable from 1PC2-J8 to 1A03-J2 (Figure 2-4). Connect the 26 pin ribbon cable from 1PC2-J12 to 1A03-J1 (Figure 2-4). Pin 1 on all connectors is identified by an arrow.

18. The RS-232 Interface Card should be installed in the Interface Adapter Card Rack at this time.
    Check that the switches and jumpers on the RS-232 card conform to your interface configuration (see the RS-232 Logic Programming And Jumper Selection area in this section of the manual).
    Install the RS-232 Interface Board in the Interface Adapter Card Rack card location 1A04 and insure that the board is properly seated (Figure 2-4).

19. Swing the Power Supply Board and the Controller And Head Logic Board up and into their latched positions.
    Adjust the ribbon cables between the Controller And Head Logic Card and the Interface Adapter Card Frame so that they will not become pinched or restrict the latching of the Interface Adapter Card Frame.

20. Replace the cabinet skirt and mount it to the base with its four mounting screws (Figure 2-1).

21. Replace the upper cabinet cover on the lower cabinet skirt (Figure 2-1).

22. Replace the two knobs located on the right side of the cabinet cover by pushing them on to their shafts (Figure 2-1).

23. Connect the printer line cord to its power source.

24. Install paper in the printer.

RS-232 LOGIC PROGRAMMING JUMPER SELECTION (FIGURE 2-5 AND TABLE 2-1)

When programming and determining jumper selections on the RS-232 card, the following decisions must be made: Baud rate, parity, number of data bits, buffer overflow, auto answering, reverse channel mark and space, and audible alarm. Also refer to the Logic Programming page in the Logic Diagram section of this manual.

1. Baud Rate. To determine baud rate (the rate at which the printer will accept data from the terminal) ask the customer what baud of communications is being used. Once the baud rate is known the switch selection can be determined per the baud rate portion of Table 2-1.

2. Parity. Select parity (no parity - SW 2-1 off, even-SW 2-1 on and SW 2-2 off, odd - SW 2-1 on and SW 2-2 on).

3. Number of Data Bits. The number of serial data bits in a print character code which is sent from the parent must be determined (not counting parity). Switch 2 position 3 and 4 and jumper J07 are used to select the data bits as follows:

If		SW 2-3	SW 2-4
5 data bits	J07	on	on
6 data bits	J07	on	off
7 data bits	J07	off	on
8 data bits		off	off

NOTE:
ON= CLOSED
OFF= OPEN

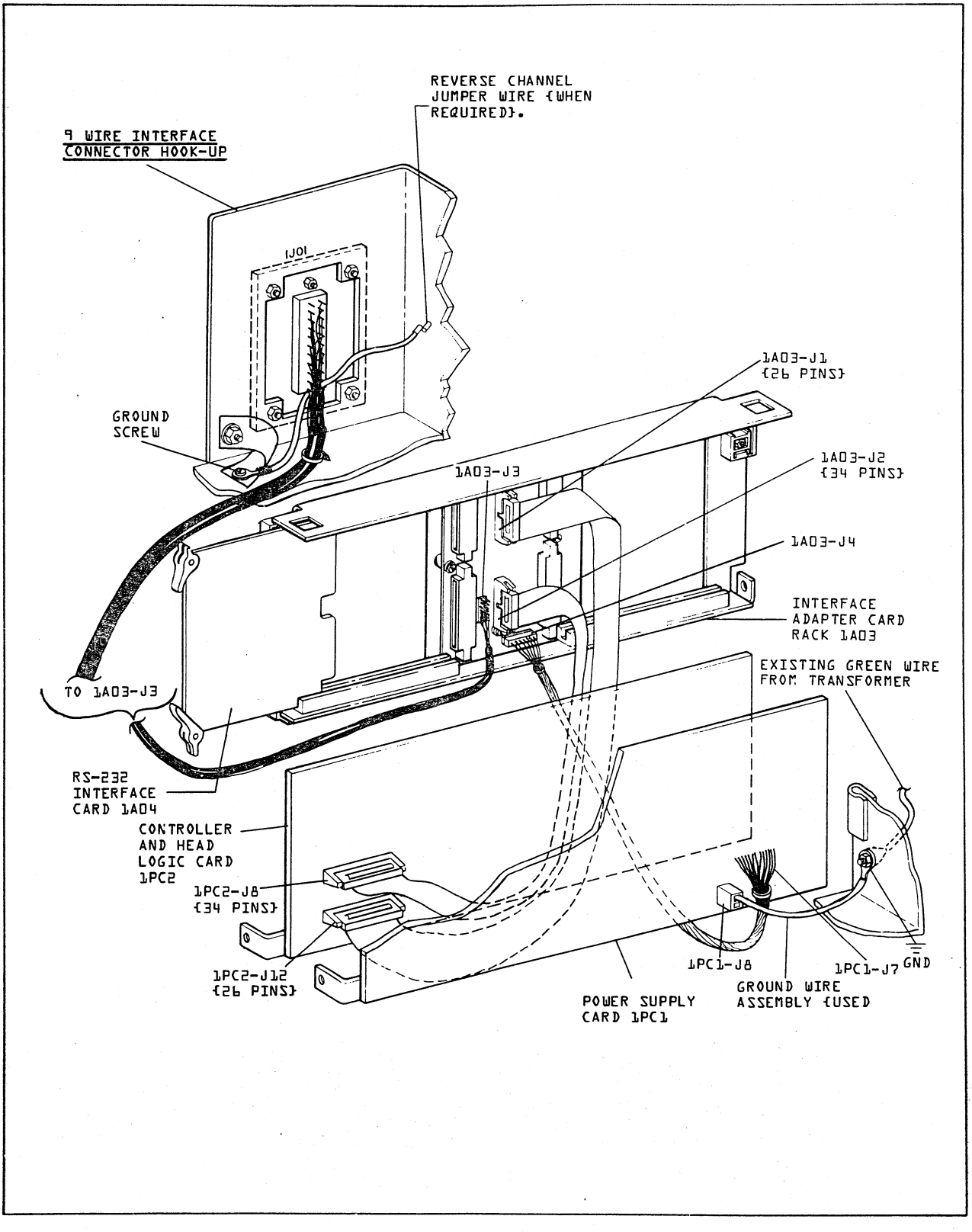


FIGURE 2-4 INTERFACE INSTALLATION

4. Buffer Overflow. If a jumper is installed in J04, the printer will disconnect should the buffer become full and no data will be lost. If J04 is not installed, disconnect will not occur if the buffer becomes full, but data will be lost.

5. Auto Answering. Installing a jumper in J05 will allow reception of data by the printer when the Ring Indicator signal is received.

6. Reverse Channel Mark and Reverse Channel Space. Placing a jumper in J03 (Reverse Channel Mark) will allow Reverse Channel to go high, if an error occurs. If a space condition is required to keep Reverse Channel low, move the jumper in J02 (Reverse Channel Space).

7. Audible Alarm. If an audible alarm signal is desired when an "out of paper" condition exists, place a jumper in J01. If a signal is desired when a Bel code is received, place a jumper at J06.

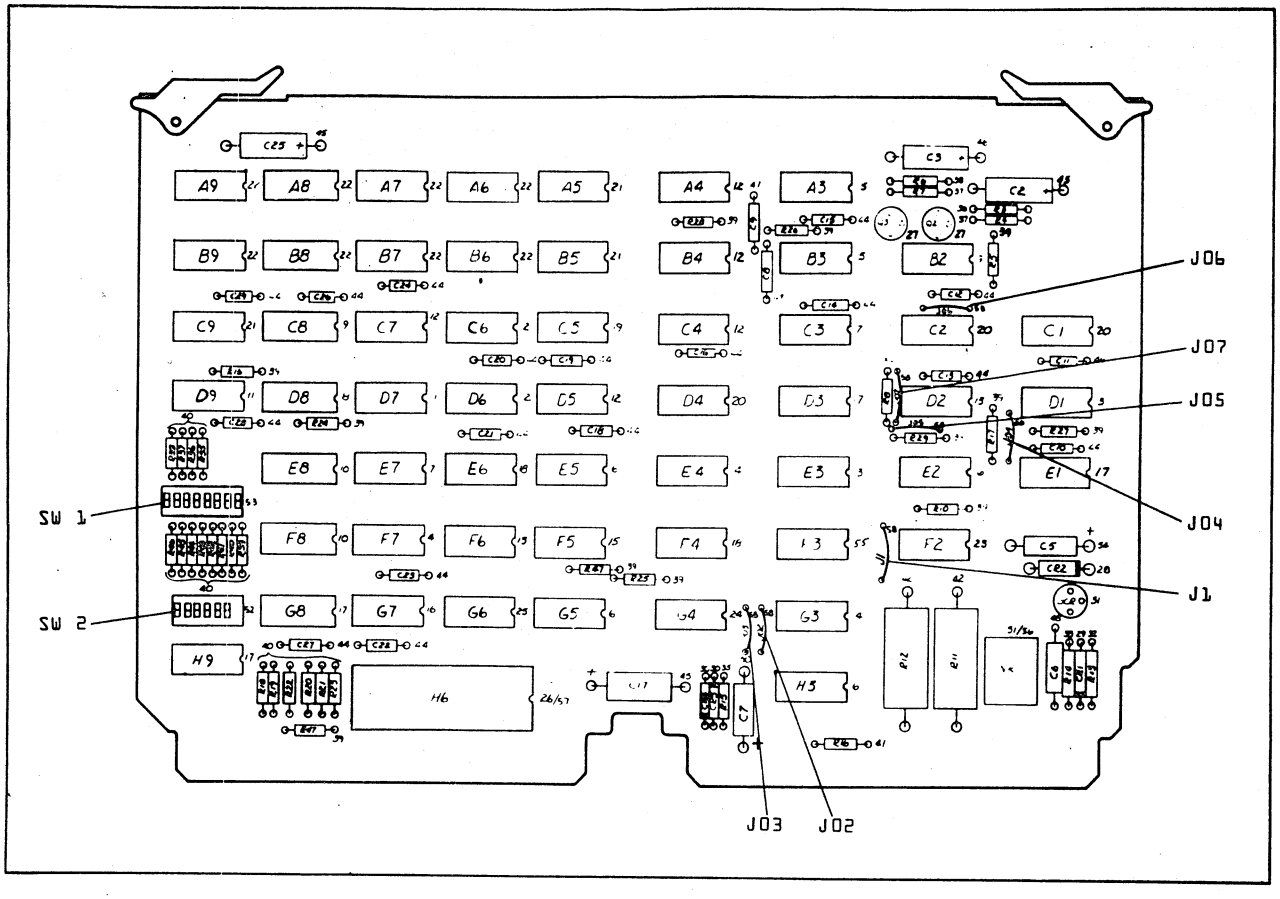


FIGURE 2-5 JUMPER AND SWITCH LOCATOR

(BUFFERED BOARD DISPLAYED-JUMPERS AND SWITCH ARE THE SAME ON UNBUFFERED BOARD).

TABLE 2-1 LOGIC PROGRAMMING SELECTION

OPTIONS	JUMPERS							SWITCH 2			
	J01	J02	J03	J04	J05	J06	J07	1	2	3	4
EVEN PARITY								ON	OFF	-	-
ODD PARITY								ON	ON	-	-
NO PARITY								OFF	-	-	-
5 DATA BITS							X	-	-	ON	ON
6 DATA BITS							X	-	-	ON	OFF
7 DATA BITS							X	-	-	OFF	ON
8 DATA BITS								-	-	OFF	OFF
BUFFER OVERFLOW				X				-	-	-	-
AUTO ANSWERING					X			-	-	-	-
REVERSE CHANNEL MARK			X					-	-	-	-
REVERSE CHANNEL SPACE		X						-	-	-	-
AUDIBLE ALARM (OOP)	X							-	-	-	-
AUDIBLE ALARM (BEL CODE)						X		-	-	-	-

X=JUMPER INSTALLED

- = SWITCH POSITION DOES NOT MATTER FOR THIS OPTION

ON= CLOSED
OFF = OPEN

BAUD RATES	SWITCH 1								SWITCH 2	
	1	2	3	4	5	6	7	8	5	6
150 (416μsec PRT)	ON	ON	OFF	OFF	ON	ON	ON	ON	ON	OFF
300 (208μsec PRT)	OFF	ON	ON	OFF	ON	ON	ON	OFF	ON	OFF
600 (104μsec PRT)	OFF	OFF	ON	ON	ON	ON	OFF	OFF	ON	OFF
1200 (52μsec PRT)	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF
1800 (35μsec PRT)	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
2400 (26μsec PRT)	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
4800 (13μsec PRT)	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	ON
9600 (6.5μsec PRT)	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON

PRINCIPLES OF OPERATION

INTRODUCTION

The operation between the interface and the 70/125 Matrix Printer is described in this section. The cross reference numbers indicated in the flows can be located in this manual's Logic Diagram section and in the 70/125 basic manual Logic Diagram Section. The logic operations are explained through the use of Sequence of Events Charts and Flowcharts. It is recommended that the basic Matrix Printer manual be read before reading this section.

GENERAL

FLOWCHART SYMBOLS

Eight symbols are used in the flowcharts which appear in this manual. The symbols are illustrated in Figure 3-1 and are explained in the following text.

Normal Event Symbol. The normal event symbol is used to indicate an event which occurs at a definite time within the flow.

Special Event Symbol. This symbol is used to indicate that the event is of special significance to the user of the flowchart. It may indicate that the event occurs in a machine other than the one in which most of the events occur or as a result of a series of events which are charted or described elsewhere in the document. This symbol may also be used to designate an event which may happen at any time during a series of other events. Used in this manner the symbol usually indicates such unpredictable events as a parity error or an out of paper condition.

Check-For-Condition (Decision) Symbol. This symbol indicates a decision which occurs at a definite point in the flow and always determines the direction the flow takes subsequently.

Entry Symbol. The entry symbol is used at the beginning of a flowchart and at any point where information from another flowchart enters the subject flowchart.

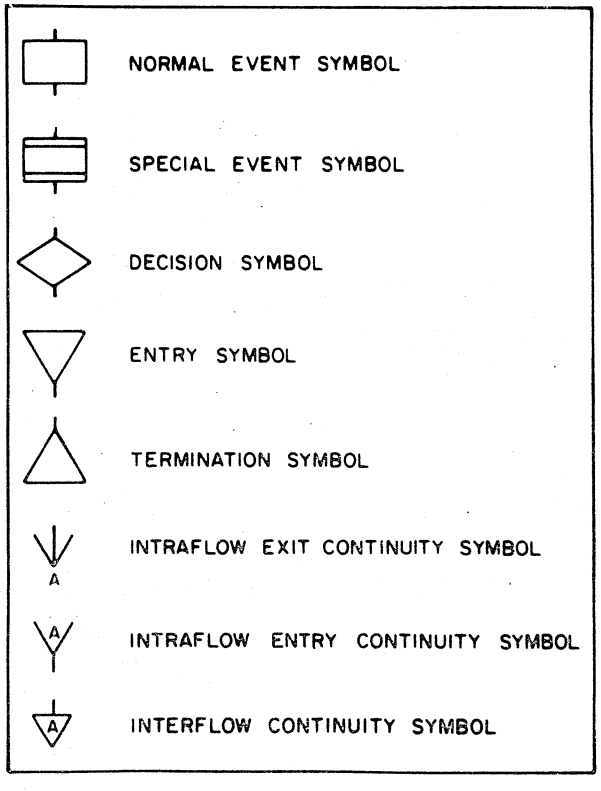


FIGURE 3-1. FLOWCHART SYMBOLS

Termination Symbol. The termination symbol is used at the end of a flowchart. Depending on how the sequence of operations being charted occur. a flowchart may have one or several termination symbols.

Intraflow Exit and Entry Continuity Symbols. These symbols are used to show flow continuity within a particular flowchart. They may be used to represent an exit from one point of the flow and an entry into another point of the same flow or to show continuity where the flow extends for more than one page.

Interflow Continuity Symbol. This symbol indicates that the sequence of operations described in one flowchart leads directly to a sequence described in another flowchart. When this symbol is used a letter will appear inside of the symbol and the same letter will appear inside the entry symbol on the subsequent flowchart.

Logic Sheet Reference Numbers. These numbers are provided on most flowcharts after the written statement of the event which has occured. The numbers are provided to aid the user of the flowchart to locate the point in the detailed logic (in the Field Service Manual) where the event occurs. These numbers will appear in parentheses and have two parts. The first part indicates the exact logic sheet number and the second part indicates the logic element and pin number. For example the reference number (00401/A1-5) indicates that the event occurs on sheet 00401 in the logic. It further indicates that the event occurs or can be checked at pin 5 of logic element A1 on that sheet.

GENERAL OPERATION

Unbuffered

A printer on line operation is initiated when the Data Set raises the Data Set Ready line and the Received Line Signal Detect line and starts transmitting bit serial data on the Received Data line. The printer uses a UART logic chip to assemble the bit serial data into a parallel word for storage in the printer memory. When the character has been assembled, it is strobed into the printer memory. The printer memory is capable of storing up to 132 characters plus 1 Control Code (CR- 000 1101, LF - 000 1010, VT - 000 1011, or FF - 000 1100). When a Control Code is received, the printer assumes the data line to be complete. It will then blank fill any remaining memory locations until the first character transferred is in the first output position. At this time a print operation is initiated. The memory contents are printed in the order in which they were loaded. Each character code selects a specific location in the Character ROM. As the print head moves across the print station, the outputs of the ROM fire the print wires creating the printed output. When the Control Code is detected at the memory output, the print operation is terminated and the forms advance operation is initiated.

The forms advance operation is determined by the Control Code. A CR code suppresses paper motion. An LF code performs a single line advance. The VT code selects a predetermined location on the form, and the FF code advances the forms to the top of the next page. Paper motion is monitored by a brush reader. The reader has three channels: Channel 1 is FF, Channel 2 is VT, Channel 3 is LF. When the selected channel is detected at the brush reader, the Paper Advance Motor is turned off and the Stop Pawl Solenoid is turned on. The pawl assembly acts as a mechanical brake to stop the forms motion.

NOTE

REFER TO THE BASIC PRINTER MANUAL PRINCIPLES OF OPERATION SECTION FOR THE OVERALL ON-LINE OPERATION.

PRINTER INTERFACE

The interface has single ended EIA RS-232 or CCITT-V.24 transmitters and receivers which are capable of communicating directly with a modem on an I/O cable up to 15.3 meters (50 feet) long. When connected to a modem, the voltage will be as follows: Mark = < -3 volts, Space= > +3volts. The mark (< -3 volts) input to the receiver chip is output as '1' level (+5 volts) in the printer. The space (> +3 volts) input is output as a '0' level (0 volt) in the printer. The transmitters need a '1' level (+5 volts) on both of their inputs to produce a mark (< -3 volts) output.

INTERFACE SIGNALS

There are eight interface lines plus a logic ground and a protective ground between the modem and the printer. The eight interface lines are Received Data, Request To Send, Data Set Ready, Data Terminal Ready, Received Line Signal Detector, Reverse Channel, Secondary Request to Send, and Ring Indicator.

Received Data

This line transmits the data and control codes from the Data Set to the printer. A -3 volt level (mark) on the line corresponds to a +5 volt level in printer. A +3 volt level space on the line corresponds to a zero volt level in the printer. This line should be held at a marking state at all times when the Received Line Signal Detector line is off (-3 volt level).

Request To Send

This line is not functional in the printer. The printer is a "receive only" device. At all times this line is held at a -3 volt level on the interface.

Data Set Ready

This signal gives the status of the Data Set to the printer when it is on (+3 volts level), the Data Set is in a ready condition. When it is off (-3 volt level), the printer ignores any other signals received with the exception of the Ring Indication line when Auto Answering is enabled.

Data Terminal Ready

This signal tells the Data Set when the printer is capable of receiving data. When this line is at +3 volt level the printer is in a ready condition. When the signal is at a -3 volt level it tells the Data Set that one of the following conditions exists:

1. Printer is not powered on.
2. Printer is not in a start condition.
3. A low paper condition exists.
4. The optional 1K buffer has overflowed.

Received Line Signal Detector

This line tells the printer when the Data Set is receiving information of an acceptable quality from the phone lines. When the line is on (+3 volt level), the signal received is good. When it is off (-3 volt level), the signal received is inferior. When the signal is off, Received Data line is held in a constant mark condition (-3 volt level).

Reverse Channel (Secondary Request To Send)

The interface function of both signals is identical. This signal is on (+3 volt level) whenever the printer is not busy, the optional 1K buffer is not over 3/4 full, and the Data Terminal Ready line is in the on condition. If any of the above signals change, the Reverse Channel signal is turned off for at least 200μsec or until the status reverts to the necessary condition.

Ring Indicator (Optional)

When this line is enabled at the printer, its on condition (+3 volt level) activates the Data Terminal Ready Signal on the first ring, if the printer is powered on and in a Start condition. The call is terminated when one of the following condition occurs:

1. An End Of Transmission control code is received
2. The Received Line Signal Detect is off (-3volt level) for more than 4 seconds.
3. The printer runs out of forms.
4. A not ready condition is detected in the printer.

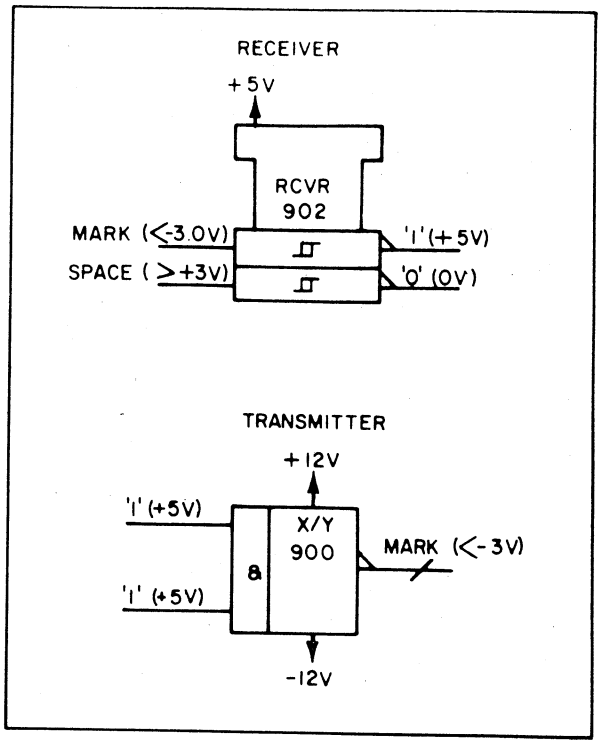
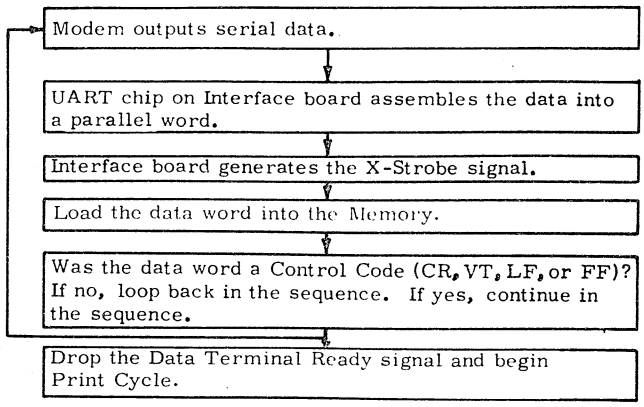


FIGURE 3-2. INTERFACE CIRCUITS

UNBUFFERED DATA LOAD

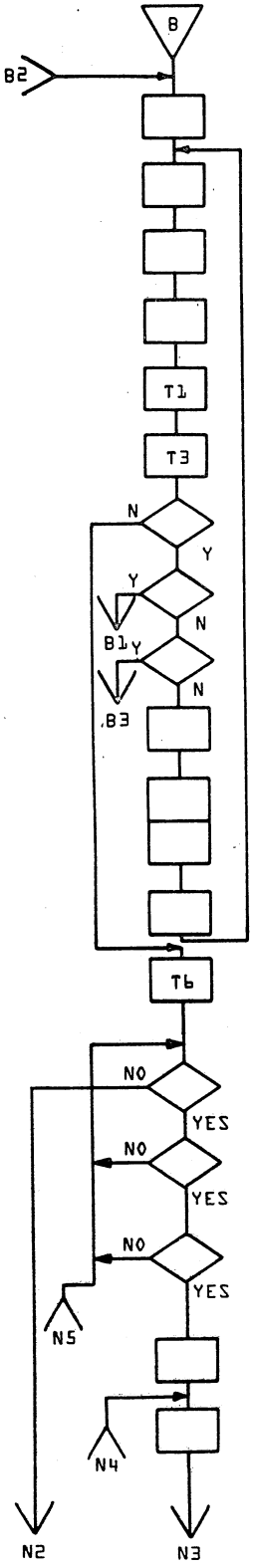
When the matrix printer uses the unbuffered interface board, the input data is transferred directly to the printer memory after assembly. The serial data from the modem is assembled into a parallel word by the UART chip. After assembling the word and checking for parity and insuring the code is legal, the interface board strobes the data word into the printer memory. Each succeeding data input is handled in this manner until a control code (ASCII codes CR, LF, VT, or FF) is detected by the printer. The control code is stored in the memory and the Data Terminal Ready signal is dropped. This signal will remain off until the printer can again accept data. Once the control code has been stored in memory, the printer initiates a Print Cycle and goes Print Busy. When the print operation is completed the Data Terminal Ready signal is again raised, and the next line of data can be loaded.



NOTE

THE BASIC MATRIX PRINTER LOAD CYCLE FLOWCHART IS DUPLICATED IN THIS FLOW FOR EASE OF UNDERSTANDING.

UNBUFFERED DATA LOAD



Data Set raises the Receive Line Signal Detect line. (00402/G6-6)

Data Set transmits the serial data word to the printer. (00402/G6-5)

The UART chip assembles the serial data word into a parallel output (00402/H6).

Generate the Data Delay Strobe signal (00402/G5-3)

Set the X-Strobe Enable Rgtr. (00403/C2-15)

Strobe the Special Format Control Decoders. (00403/H3-3)

Is this a Special Control Code? (00403/F6-6)

Is this a BEL code (07_{16})? (00403/E6-9)

Is this an EOT code (04_{16})?(00403/E6-5)

This is a Fill code (00_{16} or $3F_{16}$)?(00403/E6-1 or E7-12)

Clear the UART chip (00402/H6-18)

Drop the Data Delay Strobe signal. (00402/G5-3)

Reset the X-Strobe Enable Rgtr. (00403/C2-15)

Set the X-Strobe Rgtr. (00403/C2-13)

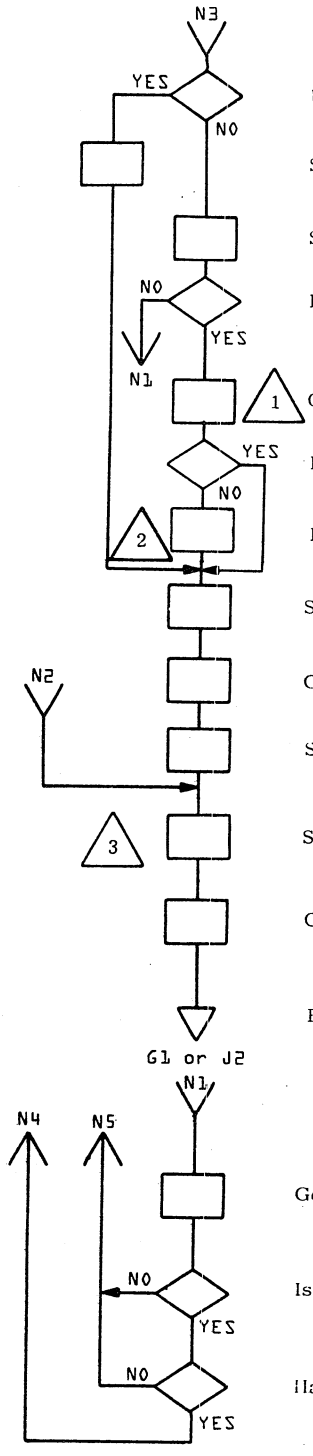
Is Ready Enable on?

Is the Acknowledge F/F reset?

Does Data Strobe = 1?

Microprocessor is at Step C (LED's are 00 1100)

Read Data Lines at port 3A



Is data a Control Code?

Store the Control Code for Paper Motion command.

Store the data

Is the buffer full?

Generate a carriage return for a control code.

Is AUTOTERM equal to 1?

Decrement columns by 1

Set Print Busy at port 2B

Generate ACK OUT pulse

Set Load Complete

Store columns in PTEND

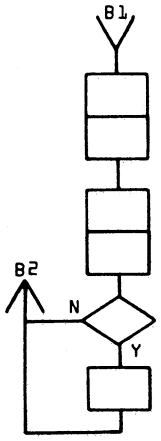
Clear Interrupt Enable flag

Return to: PRINT CYCLE, or PAPER MOTION subroutine

Generate ACK Output pulse (Port 2A)

Is the ACK Output pulse reset (Port 2 A)?

Has the next data strobe been received (Port 3C)?



Clear the UART chip. (00402/H6-18)

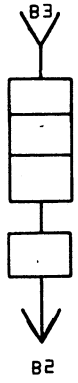
Drop the Data Delay Strobe signal. (00402/G5-3)

Reset the X-Strobe Enable Rgtr. (00403/C2-15)

Trigger the BEL o/s (00404/B1-5)

Is the Audible Alarm Option installed? (00404/J06)

Ring the Audible Alarm for 2 sec (00404/P1-62)



Clear the UART chip. (00402/H6-18)

Drop the Data Delay Strobe signal. (00402/G5-3)

Reset the Auto Answering Rgtr. (00403/D4-10)

Reset the X-Strobe Enable Rgtr. (00403/C2-15)

1. Generates a Carrage Return only (no Paper Motion) if maximum buffer length has been reached.

2. If this path was taken, it means the 81 print characters have been loaded, rather than 80 characters and a control code. Therefore, columns must be decremented by one, so 80 and not 81 columns will be printed, if the printer is in the 80 column mode. In all other cases (133/218 characters) the maximum printable line length (133/217) assures that no more characters can be printed.

3. PREND is used in the print cycle subroutine to determine if the print heads are beyond the last character to be printed in a line. If so, Head B or Head A and Head B printing is inhibited.

NOTE:

This subroutine may also be interrupted whenever a STP or MC is generated which CALLS the INTERRUPT SERVICE subroutine.

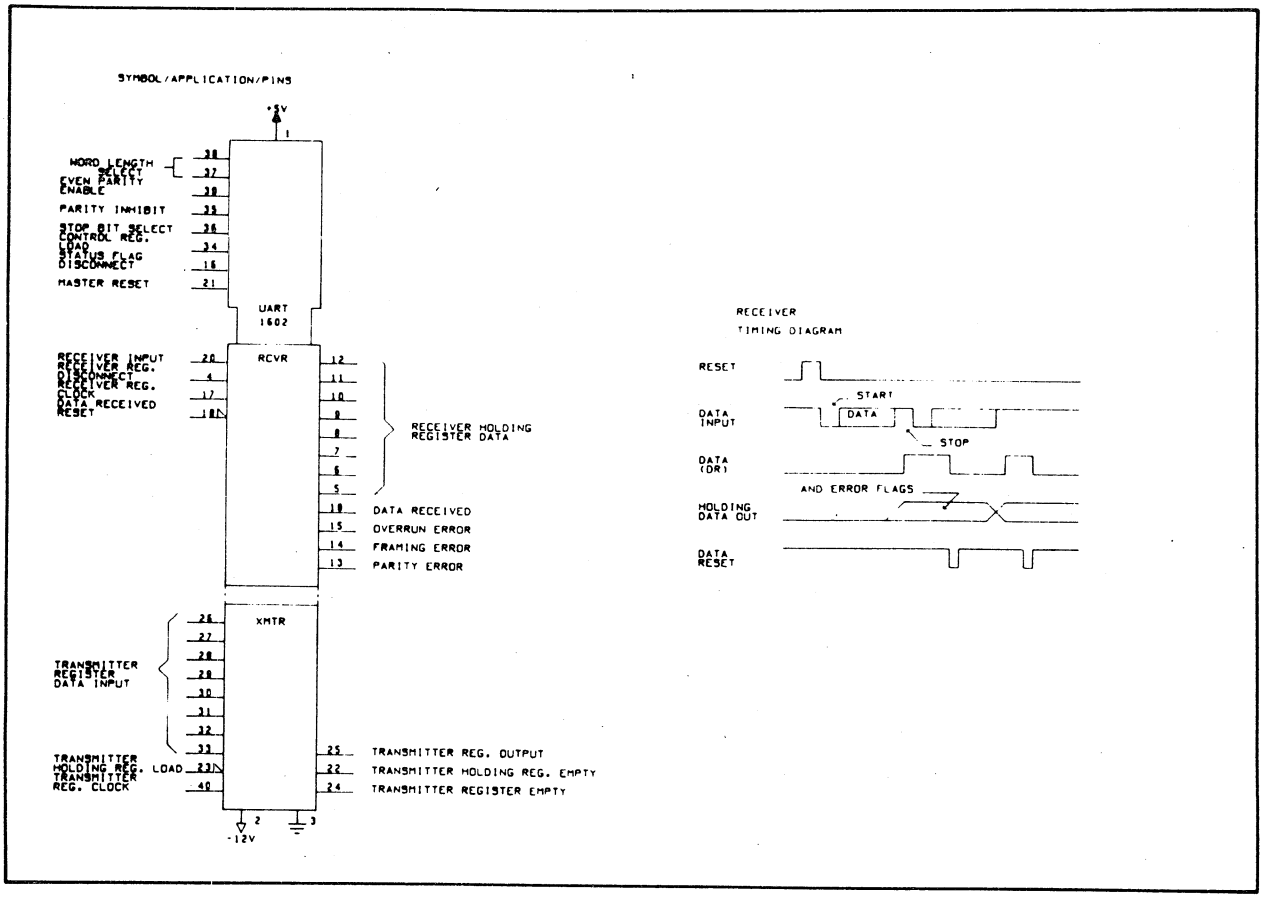


FIGURE 3-3. UART LOGIC CHIP FUNCTION

UART (Universal Asynchronous Receiver Transmitter)

The UART chip receives the serial data word with the start bit, parity bit and stop bits. It then assembles the serial bits into a parallel word, strips off the start and stop bits, and checks the word for proper parity. When the word has been assembled and stored in the chips output register, the Data Delay Strobe (pin 19) is generated and the Parity Error line (pin 13) is raised if a parity fault exists. This chip allows programming for the number of bits per data word (5-8) and the type of parity checking the interface uses (odd, even or none). For proper set-up of the input pins see Table 2-1.

GENERAL OPERATION

Buffered

A printer on line operation is initiated when the Data Set raises the Data Set Ready line and the Received Line Signal Detect line and starts transmitting bit serial data on the Received Data line. The printer uses a UART logic chip to assemble the bit serial data into parallel words. After assembly, the character is stored in the Adapter Memory located on the RS-232 Interface board. The Adapter Memory acts as a buffer between the interface and the printer. The interface writes into it, and the printer reads out of it. Read operations are performed between Write operations. During Read, the character stored in the Adapter Memory is transferred to the printer memory. After transfer to the printer memory operation of the buffered printer is identical to the unbuffered printer.

NOTE

REFER TO THE BASIC PRINTER MANUAL PRINCIPLES OF OPERATION SECTION FOR THE OVERALL ON-LINE OPERATION.

PRINTER INTERFACE

The interface has single ended EIA RS-232 or CCITT-V.24 transmitters and receivers which are capable of communicating directly with a modem on an I/O cable up to 15.3 meters (50 feet) long. When connected to a modem, the voltage will be as follows: Mark = < -3 volts, Space= > +3volts. The mark (< -3 volts) input to the receiver chip is output as '1' level (+5 volts) in the printer. The space (> +3 volts) input is output as a '0' level (0 volt) in the printer. The transmitters need a '1' level (+5 volts) on both of their inputs to produce a mark (< -3 volts) output.

INTERFACE SIGNALS

There are eight interface lines plus a logic ground and a protective ground between the modem and the printer. The eight interface lines are Received Data, Request To Send, Data Set Ready, Data Terminal Ready, Received Line Signal Detector, Reverse Channel, Secondary Request to Send, and Ring Indicator.

Received Data

This line transmits the data and control codes from the Data Set to the printer. A -3 volt level (mark) on the line corresponds to a +5 volt level in printer. A +3 volt level space on the line corresponds to a zero volt level in the printer. This line should be held at a marking state at all times when the Received Line Signal Detector line is off (-3 volt level).

Request To Send

This line is not functional in the printer. The printer is a "receive only" device. At all times this line is held at a -3 volt level on the interface.

Data Set Ready

This signal gives the status of the Data Set to the printer when it is on (+3 volts level), the Data Set is in a ready condition. When it is off (-3 volt level), the printer ignores any other signals received with the exception of the Ring Indication line when Auto Answering is enabled.

Data Terminal Ready

This signal tells the Data Set when the printer is capable of receiving data. When this line is at +3 volt level the printer is in a ready condition. When the signal is at a -3 volt level it tells the Data Set that one of the following conditions exists:

1. Printer is not powered on.
2. Printer is not in a start condition.
3. A low paper condition exists.
4. The optional 1K buffer has overflowed.

Received Line Signal Detector

This line tells the printer when the Data Set is receiving information of an acceptable quality from the phone lines. When the line is on (+3 volt level), the signal received is good. When it is off (-3 volt level), the signal received is inferior. When the signal is off, Received Data line is held in a constant mark condition (-3 volt level).

Reverse Channel (Secondary Request To Send)

The interface function of both signals is identical. This signal is on (+3 volt level) whenever the printer is not busy, the optional 1K buffer is not over 3/4 full, and the Data Terminal Ready line is in the on condition. If any of the above signals change, the Reverse Channel signal is turned off for at least 200μsec or until the status reverts to the necessary condition.

Ring Indicator (Optional)

When this line is enabled at the printer, its on condition (+3 volt level) activates the Data Terminal Ready Signal on the first ring, if the printer is powered on and in a Start condition. The call is terminated when one of the following condition occurs:

1. An End Of Transmission control code is received
2. The Received Line Signal Detect is off (-3volt level) for more than 4 seconds.
3. The printer runs out of forms.
4. A not ready condition is detected in the printer.

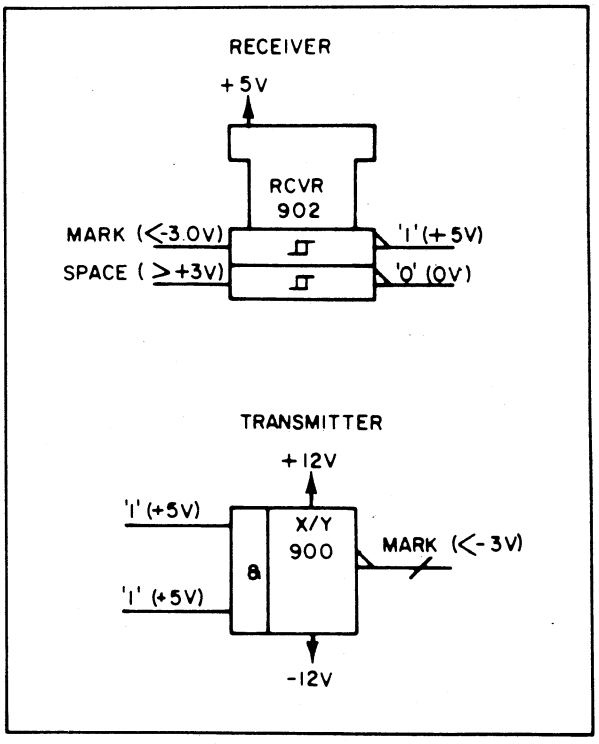


FIGURE 3-4. INTERFACE CIRCUITS

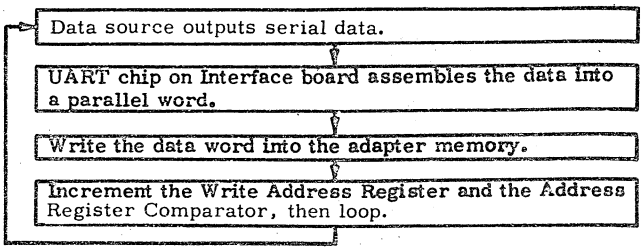
BUFFERED DATA LOAD

When the buffered interface board is installed in the printer the input data is stored in an adapter memory until the printer can transfer it to the Shift Register Memory. The serial data from the data source is assembled into a parallel word by the UART chip on the Interface board. The parallel word is then loaded into the adapter memory after it has been checked for parity and determined it is a legal code.

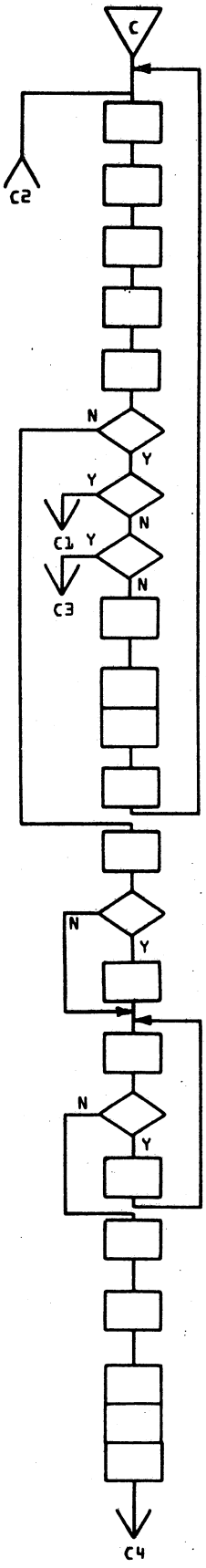
The adapter memory is a random access memory controlled by two Address Registers: Read and Write. The Write Address Register selects the location of memory the input data is written into. After each character has been loaded, the Write Address Register is incremented by one count in preparation for the next input word. The Address Registers maximum count is equal to the capacity of the adapter memory. When the counter reaches its maximum count, the next increment sets it back to zero, and it addresses the first memory location. At the same time the Write Address Register is incremented, the Address Register Comparator is incremented. It is decremented each time a character is read out of memory.

NOTE

THE BASIC MATRIX PRINTER LOAD CYCLE FLOWCHART IS DUPLICATED IN THIS FLOW FOR EASE OF UNDERSTANDING.



BUFFERED DATA LOAD



Data source transmits the serial word to the printer (00402/G6-5)

The UART chip assembles the serial data input into a parallel output (00402/H6)

Generate the Data Delay Strobe signal (00402/G5-3)

Set the Data Ready Delay Enable Rgtr. (00403/C2-15)

Strobe the Special Format Control Decoder. (00403/H3-3)

Is this a Special Control Code? (00403/F6-6)

Is this a BEL code(07_{16}) ? (00403/ E6-9)

Is this an EOT code(04_{16}) ? (00403/E6-5)

This is a Fill code (00_{16} or $3F_{16}$). (00403/E6-1 or E7-12)

Clear the UART chip, (00402/H6-18)

Drop the Data Delay Strobe signal. (00402/G5-3)

Reset the Data Ready Delay Enable Rgtr. (00403/C2-15)

Set the Data Ready Delay Rgtr. (00403/C2-13)

Is the Adapter Memory over 3/4 full (Buffer Overflow)? (00409/H3-8)

Drop the Reverse Channel (Secondary Request To Send) signal (00403/G4-8).

Set the Writing Rgtr. (00404/D4-12)

Is a Read operation being performed? (00401/C2-12)

Reset the Writing Rgtr. (00404/D4-12)

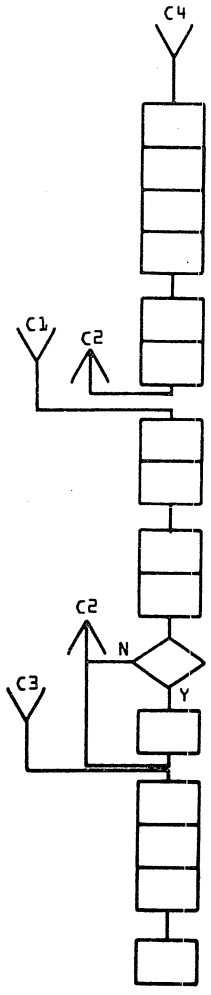
Set the Memory Write Rgtr. (00404/D4-13)

Strobe the data character into the Adapter Memory. (00406, 07, 08/A6, A7, A8, A9, B6, B7, B8, & B9)

Reset the Writing Rgtr. (00404/D4-12)

Reset the Memory Write Rgtr. (00404/D4-13)

Generate the +1 pulse. (00404/C3-12)



Clear the UART chip, (00402/H6-18)

Drop the Data Delay Strobe signal. (00402/G5-3)

Increment the Write Address Register (00405/D6-5)

Increment the Memory Address Register Comparator (00409/C4-5)

Reset the Data Ready Delay Enable Rgtr. (00403/C2-15)

Reset the Data Ready Delay Rgtr. (00403/C2-13)

Clear the UART chip, (00402/H6-18)

Drop the Data Delay Strobe signal (00402/G5-3)

Reset the Data Ready Delay Enable Rgtr. (00403/C2-15)

Trigger the BEL o/s. (00404/B1-5)

Is the Audible Alarm Option installed? (00404/J06)

Ring the Audible Alarm for 2 sec. (00404/P1-62)

Clear the UART chip, (00402/H6-18)

Drop the Data Delay Strobe signal. (00402/G5-3)

Reset the Auto Answering Rgtr. (00403/D4-10)

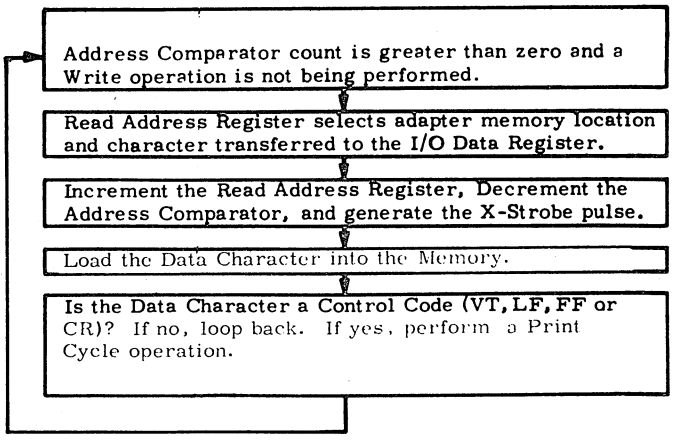
Reset the Data Ready Delay Enable Rgtr (00403/C2-15)

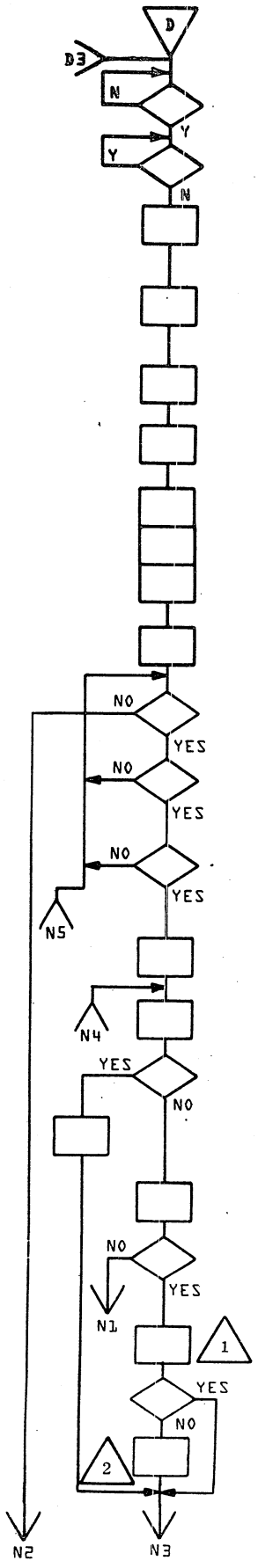
BUFFERED TRANSFER TO PRINTER MEMORY

This operation is only performed when the buffered interface board is installed. During this operation data words are transferred from the adapter memory to the printer memory. This operation is initiated anytime the Address Comparator count is greater than zero and a Write operation is not being performed. The adapter memory location to be transferred is selected by the Read Address Register. The output character of the adapter memory is stored in the I/O data Register. After the character is stored the Read Address Register is incremented by one count in preparation for the next Read operation and the Address Comparator is decremented by one count. At the same time the X-Strobe signal is generated by the Interface board. The printer then stores the data character in the Memory. If the data character is a control Code (CR, LF, VT, or FF), the printer then performs a print operation. When the print operation is complete or if the data character was not a Control Code, the next Read operation is initiated, and the next data character in the adapter memory is transferred to the printer memory.

NOTE

THE BASIC PRINTER LOAD CYCLE FLOWCHART IS DUPLICATED IN THIS FLOW FOR EASE OF UNDERSTANDING.





Is the Address Comparator count > 0? (00409/D1-11)

Is a Write operation being performed? (00404/D4-12)

Set the Reading Rgtr. (00401/C2-12)

The Adapter Memory outputs the data character stored in the address location selected by the Read Address Counter (00406, 07, 08/A6, A7, A8, A9, B6, B7, B8 &, B9)

Load the Adapter Memory output into the I/O Data Registers (00408/D7&D9)

Generate the -1 pulse (00401/D1-8)

Set the X-Strobe Rgtr. (00401/C2-10)

Increment the Read Address Register. (00405/C6-5)

Decrement the Memory Address Comparator (00409/C4-4)

Reset the Reading Rgtr. (00401/C2-12)

Is Ready Enable on?

Is the Ackowledge F/F reset?

Does Data Strobe = 1?

Microprocessor is at Step C (LED's are 00 1100)

Read Data Lines at port 3A

Is data a Control Code?

Store the Control Code for Paper Motion command.

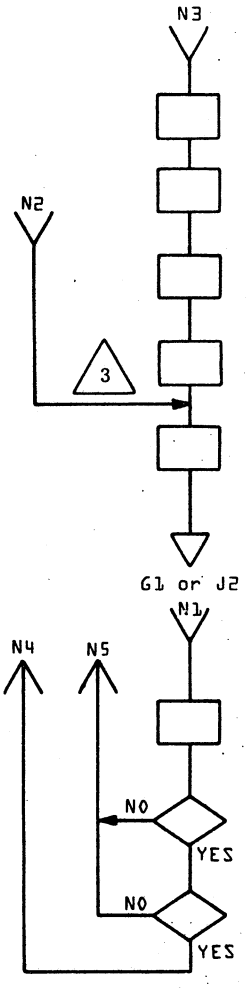
Store the data

Is the buffer full?

Generate a carriage return for a control code.

Is AUTOTERM equa to 1?

Decrement columns by 1



Set Print Busy at port 2B

Generate ACK OUT pulse

Set Load Complete

Store columns in PTEND

Clear Interrupt Enable flag

Return to: PRINT CYCLE, or PAPER MOTION subroutine

Generate ACK Output pulse (Port 2A)

Is the ACK Output pulse reset (Port 2 A)?

Has the next data strobe been received (Port 3C)?

1. Generates a Carrage Return only (no Paper Motion) if maximum buffer length has been reached.

2. If this path was taken, it means the 81 print characters have been loaded, rather than 80 characters and a control code. Therefore, columns must be decremented by one, so 80 and not 81 columns will be printed, if the printer is in the 80 column mode. In all other cases (133/218 characters) the maximum printable line length (133/217) assures that no more characters can be printed.

3. PREND is used in the print cycle subroutine to determine if the print heads are beyond the last character to be printed in a line. If so, Head B or Head A and Head B printing is inhibited.

NOTE:

This subroutine may also be interrupted whenever a STP or MC is generated which CALLS the INTERRUPT SERVICE subroutine.

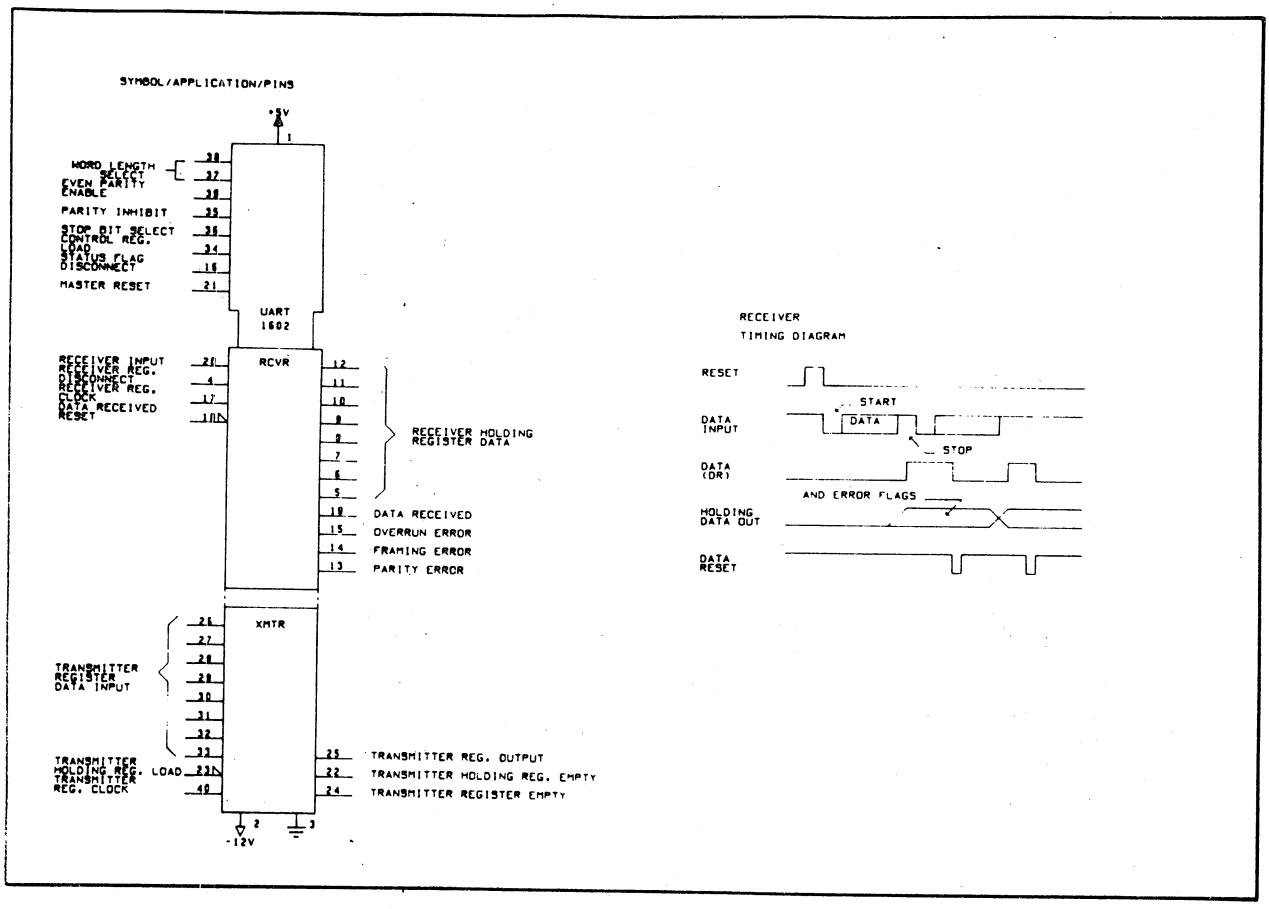
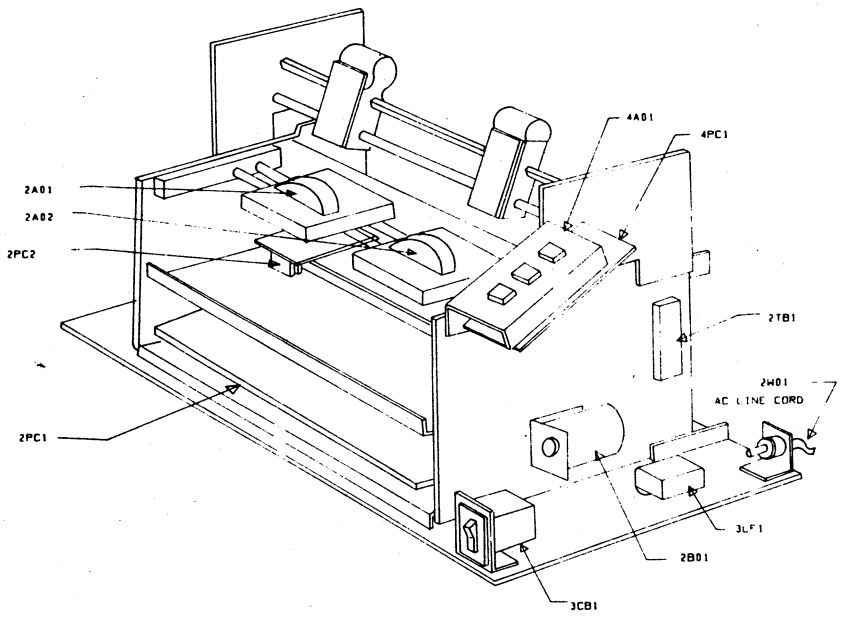


FIGURE 3-5. UART LOGIC CHIP FUNCTION

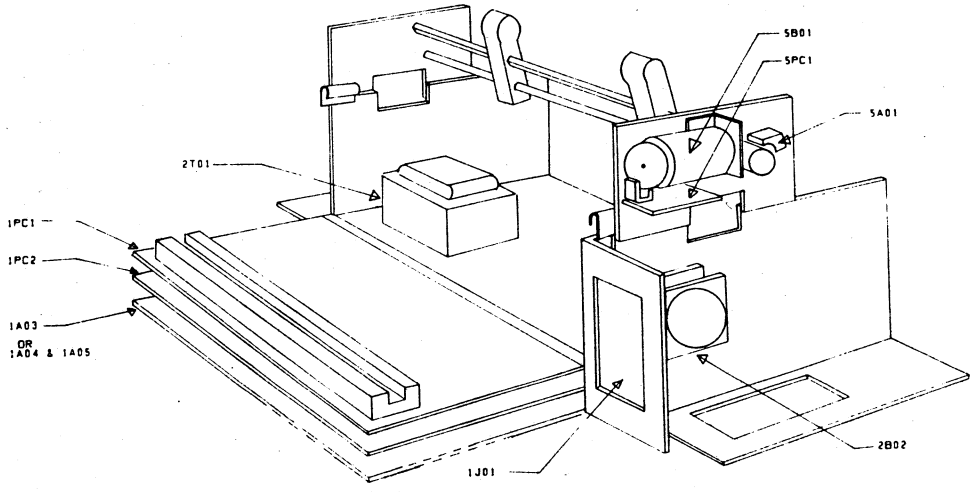
LOGIC DIAGRAMS

CONTENTS

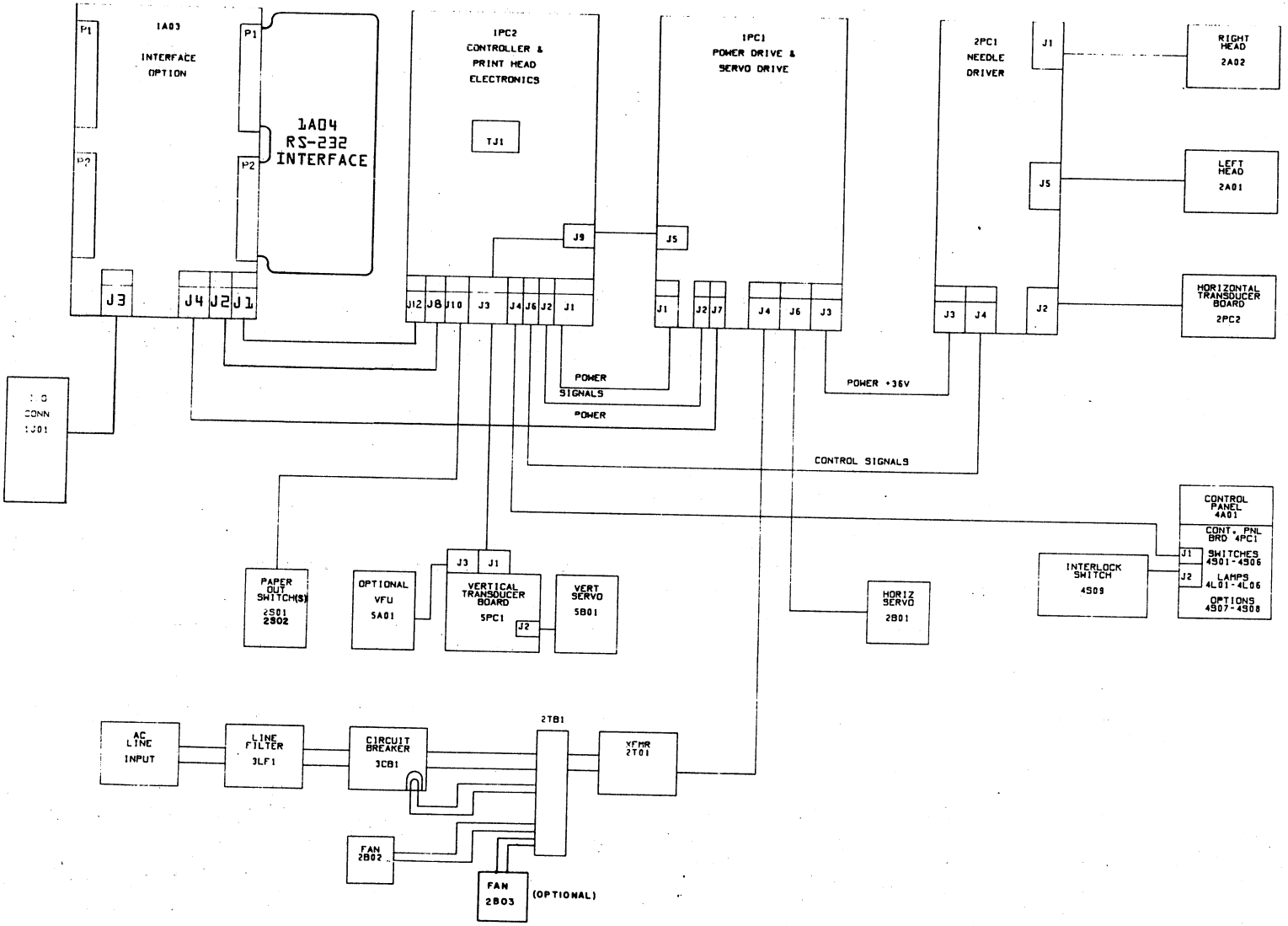
COMPONENT LOCATION DRAWING FOR 70/125 MATRIX PRINTER



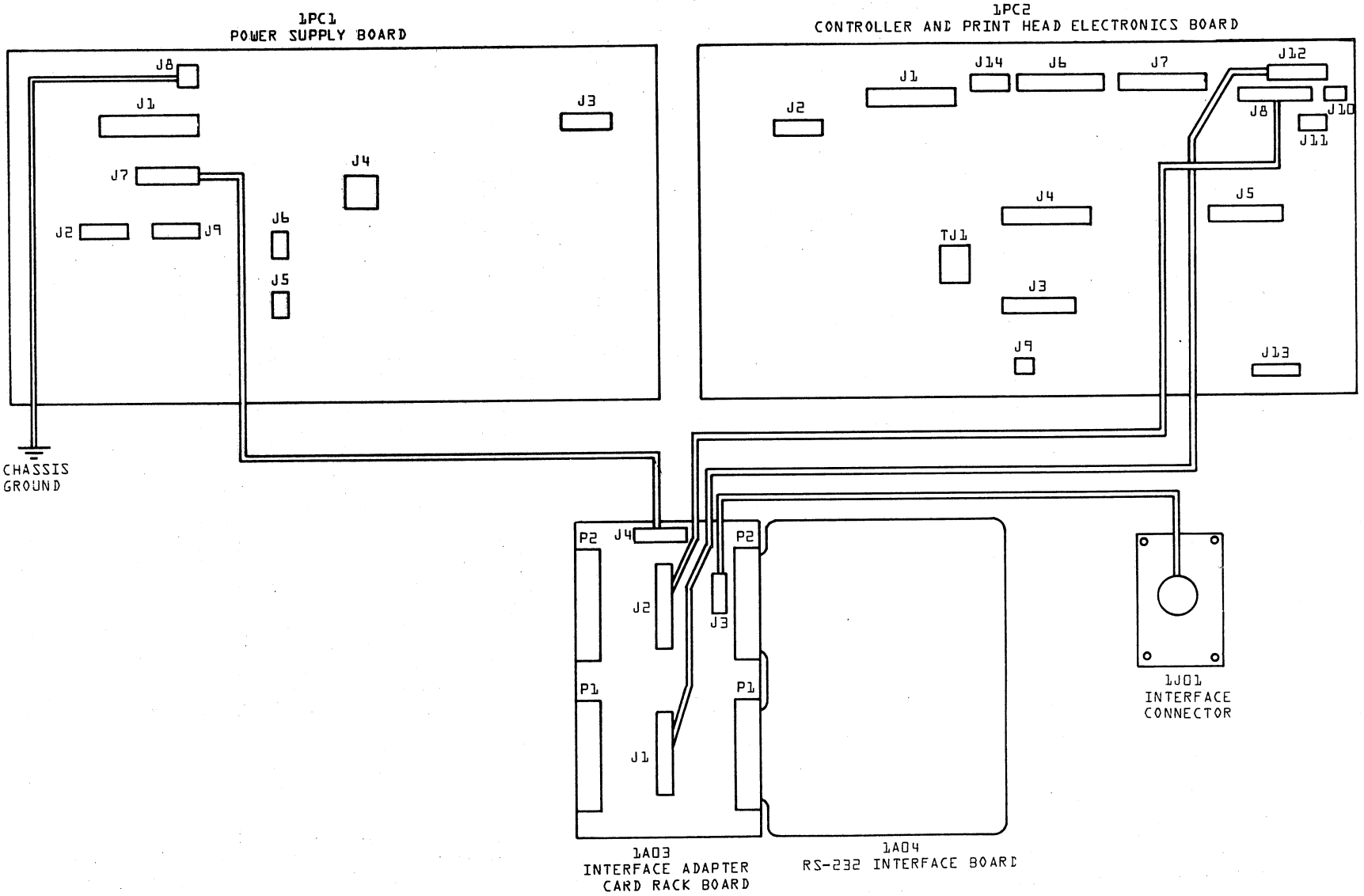
FRONT VIEW



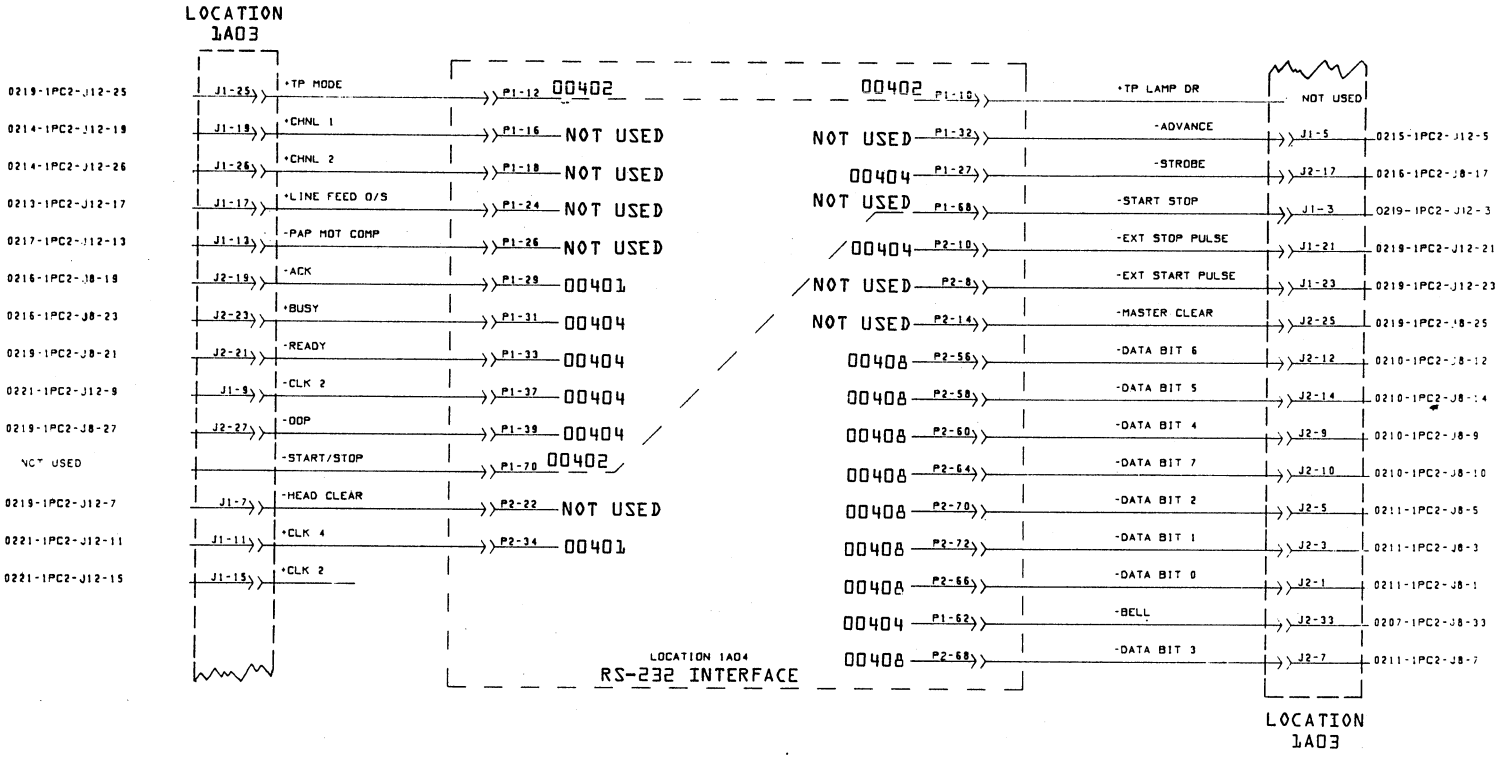
REAR VIEW



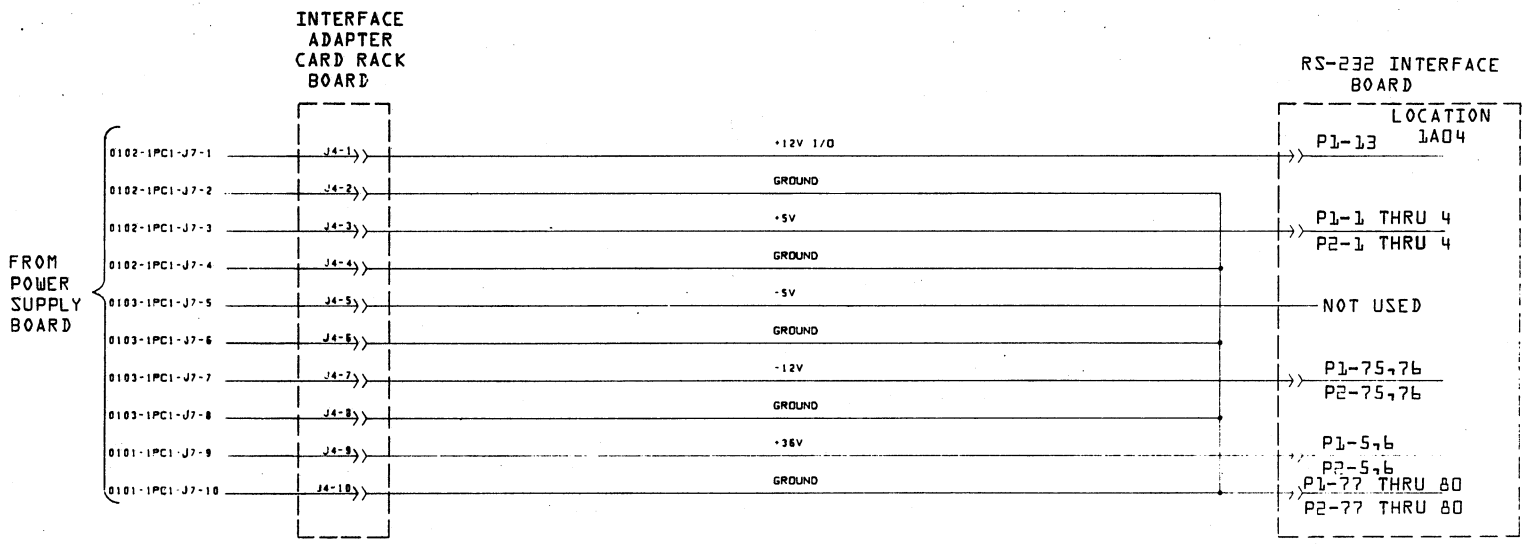
CONNECTOR LOCATIONS FOR 70/125 MATRIX PRINTER



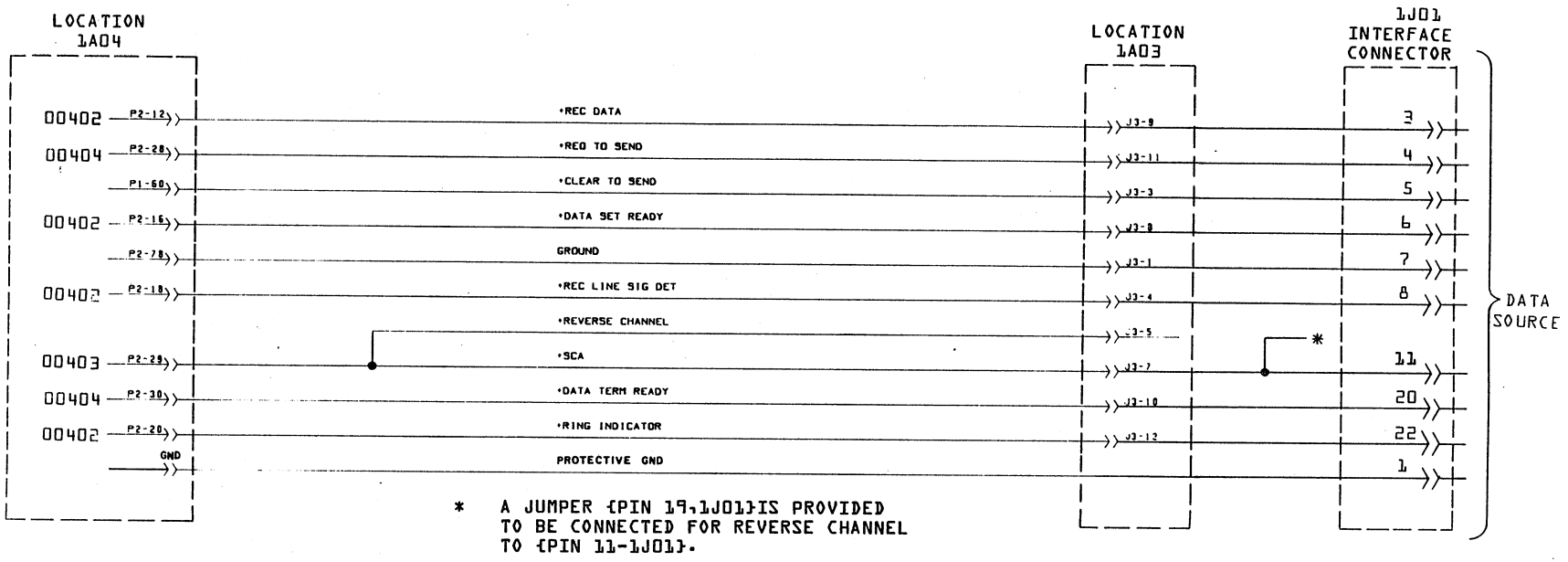
INSTALLATION DIAGRAM OF RS-232 INTERFACE IN 70/125 MATRIX PRINTER



RS-232 INTERFACE BOARD TO ADAPTER RACK DIAGRAM 70/125 MATRIX PRINTER

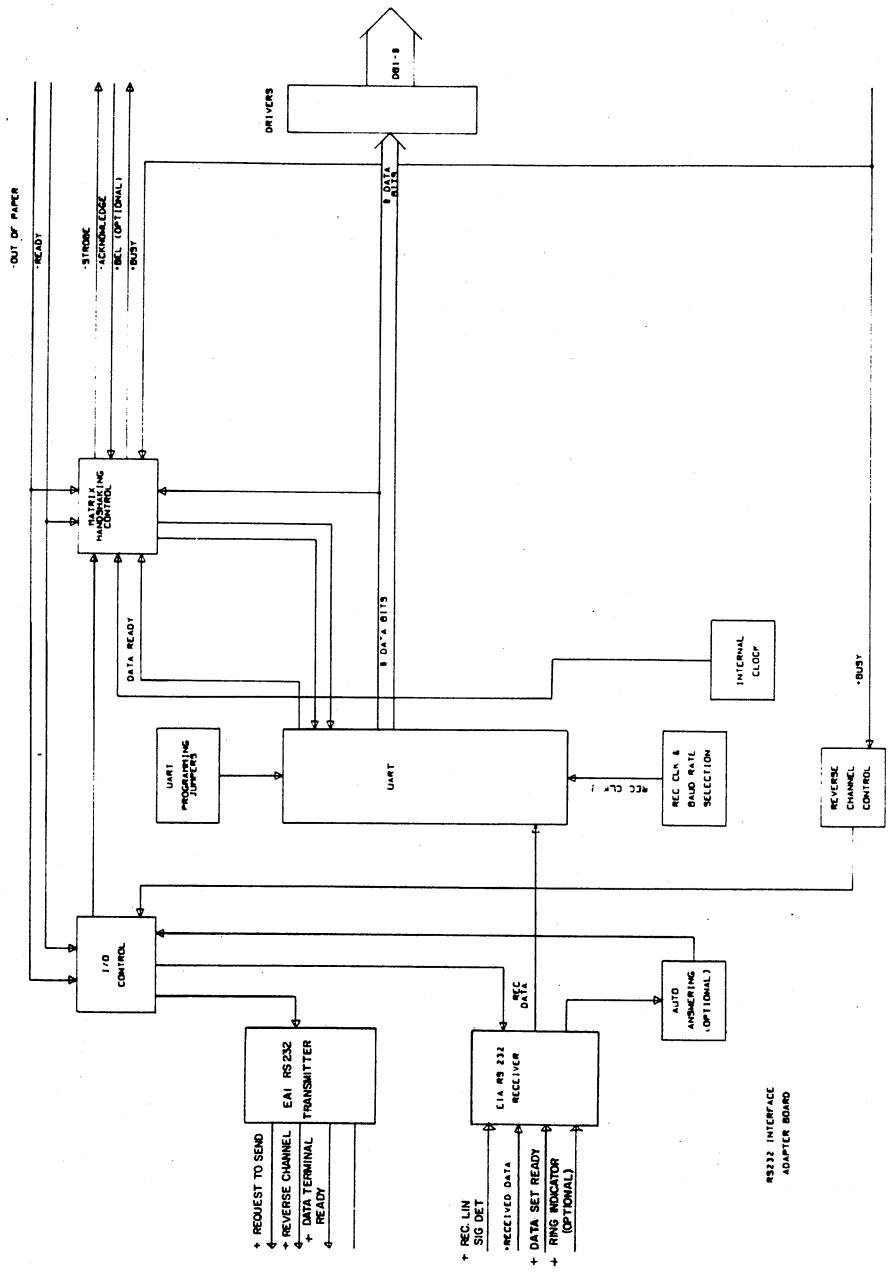


POWER SUPPLY TO INTERFACE DIAGRAM(70/125 MATRIX PRINTER)



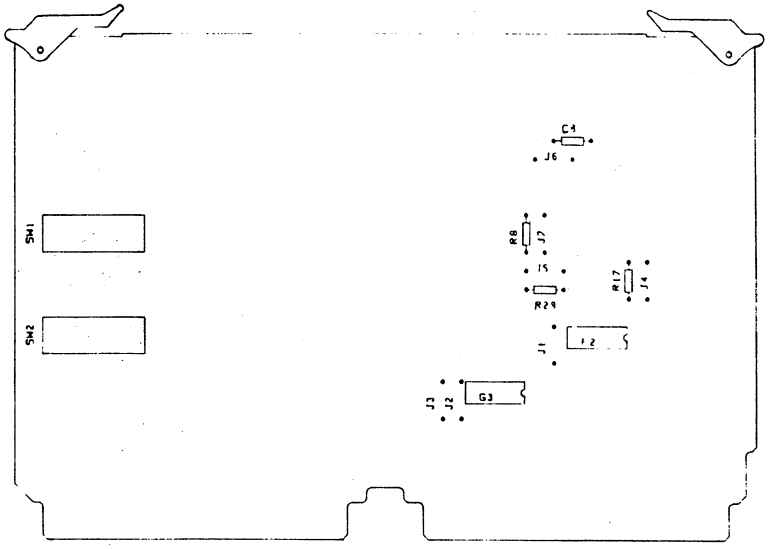
* A JUMPER (PIN 19-1J01) IS PROVIDED TO BE CONNECTED FOR REVERSE CHANNEL TO (PIN 11-1J01).

RS-232 INTERFACE CONNECTOR DIAGRAM (70/125 MATRIX PRINTER)



RS-232 UNBUFFERED BLOCK DIAGRAM

	REC CLOCK TIME 416 USEC	REC CLOCK TIME 208 USEC	REC CLOCK TIME 104 USEC	REC CLOCK TIME 52 USEC	REC CLOCK TIME 35 USEC	REC CLOCK TIME 26 USEC	REC CLOCK TIME 13 USEC	REC CLOCK TIME 6.5 USEC												
	BAUD RATE SELECTION 150	BAUD RATE SELECTION 300	BAUD RATE SELECTION 600	BAUD RATE SELECTION 1200	BAUD RATE SELECTION 1800	BAUD RATE SELECTION 2400	BAUD RATE SELECTION 4800	BAUD RATE SELECTION 9600	EVEN PARITY	ODD PARITY	NO PARITY	5 DATA BITS	6 DATA BITS	7 DATA BITS	8 DATA BITS	BUFFER OVERFLOW	AUTO ANSWERING	REVERSE CHANNEL MARK	REVERSE CHANNEL SPACE	AUDIBLE ALARM OUT OF PAPER	AUDIBLE ALARM BEL CODE
J01																				
J02																				
J03																				
J04																				
J05																				
J06																				
SW1-1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF												
SW1-2	ON	ON	OFF	OFF	ON	OFF	OFF	OFF												
SW1-3	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF												
SW1-4	OFF	OFF	ON	ON	OFF	OFF	ON	OFF												
SW1-5	ON	ON	ON	ON	ON	OFF	ON	OFF												
SW1-6	ON	ON	ON	OFF	OFF	OFF	OFF	OFF												
SW1-7	ON	ON	OFF	OFF	ON	ON	OFF	ON												
SW1-8	ON	OFF	OFF	ON	OFF	ON	ON	ON												
SW2-1									ON	ON	OFF									
SW2-2									OFF	ON										
SW2-3												ON	ON	OFF	OFF					
SW2-4												ON	OFF	ON	OFF					
SW2-5	ON	ON	ON	ON	OFF	ON	OFF	OFF												
SW2-6	OFF	OFF	OFF	OFF	ON	OFF	ON	ON												
J07												X	X	X						



NOTES:-

1. TO USE THE PRINTER ON OTHER BAUD RATES THAN SHOWN ABOVE, THE FOLLOWING FORMULA CAN BE USED: LOAD VALUE = 256 − $\frac{1}{32 \text{ (BAUD RATE) } A}$ IN DECIMAL. THE LOAD VALUE IN DECIMAL MUST BE CONVERTED INTO BINARY. THEN THAT VALUE IS LOADED INTO THE SWITCHES

   A= FOR SWITCH 2-5 CLOSED AND 2-6 OPEN 1×10^{-6} (>2400 BAUD AND 1800 BAUD)

   A= FOR SWITCH 2-6 CLOSED AND 2-5 OPEN $.25 \times 10^{-6}$ (≤ 2400 BAUD EXCEPT 1800 BAUD)

2. SWITCHES 2-5 AND 2-6 CAN NEVER BE CLOSED OR OPEN AT THE SAME TIME. IF EITHER OF THESE OCCURS EITHER A WRONG FREQUENCY OR NO FREQUENCY IS SUPPLIED TO THE BAUD RATE SELECTOR.

LOGIC PROGRAMMING & JUMPER SELECTION

LOCATION

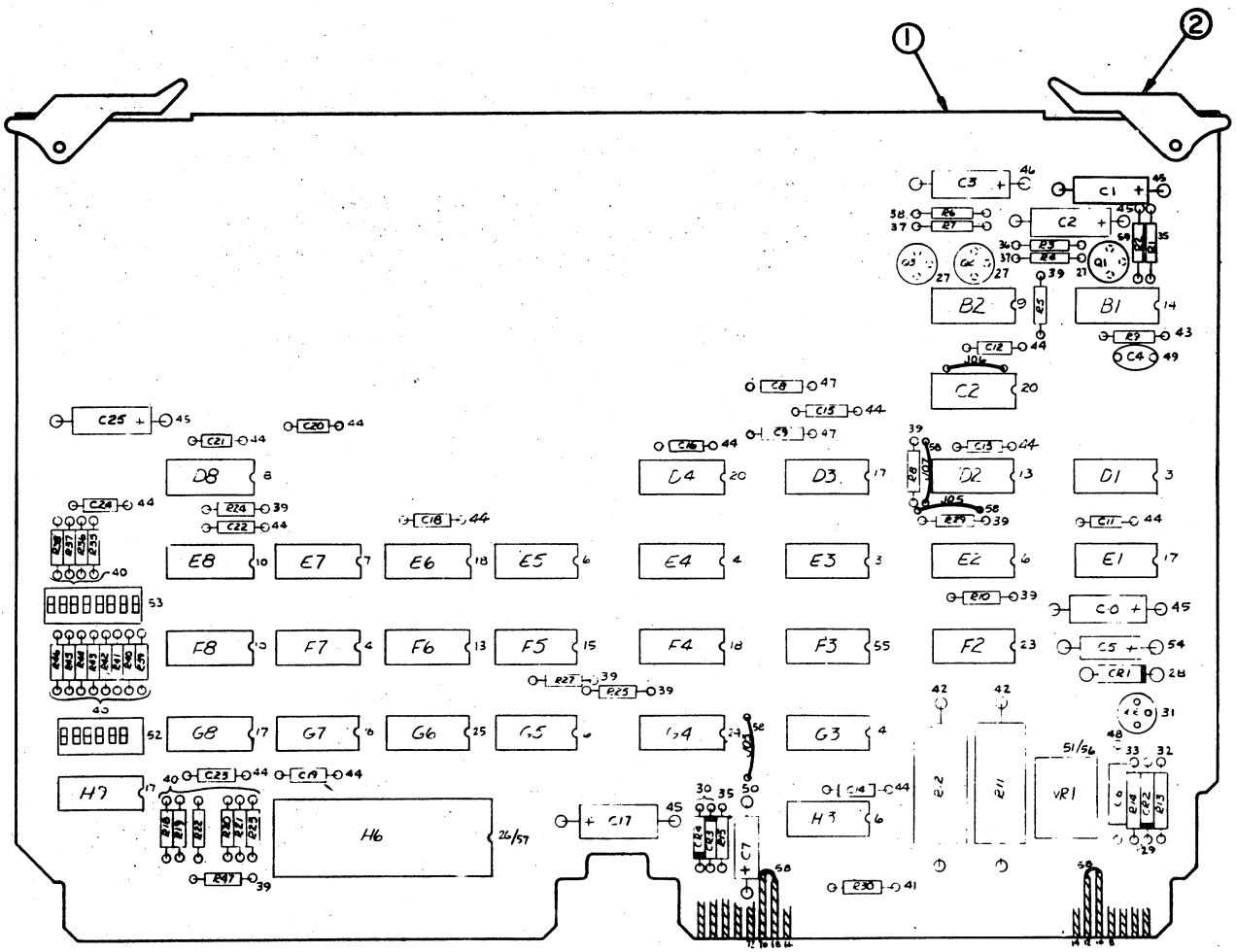
1A04

RS-232 UNBUFFERED INTERFACE BOARD

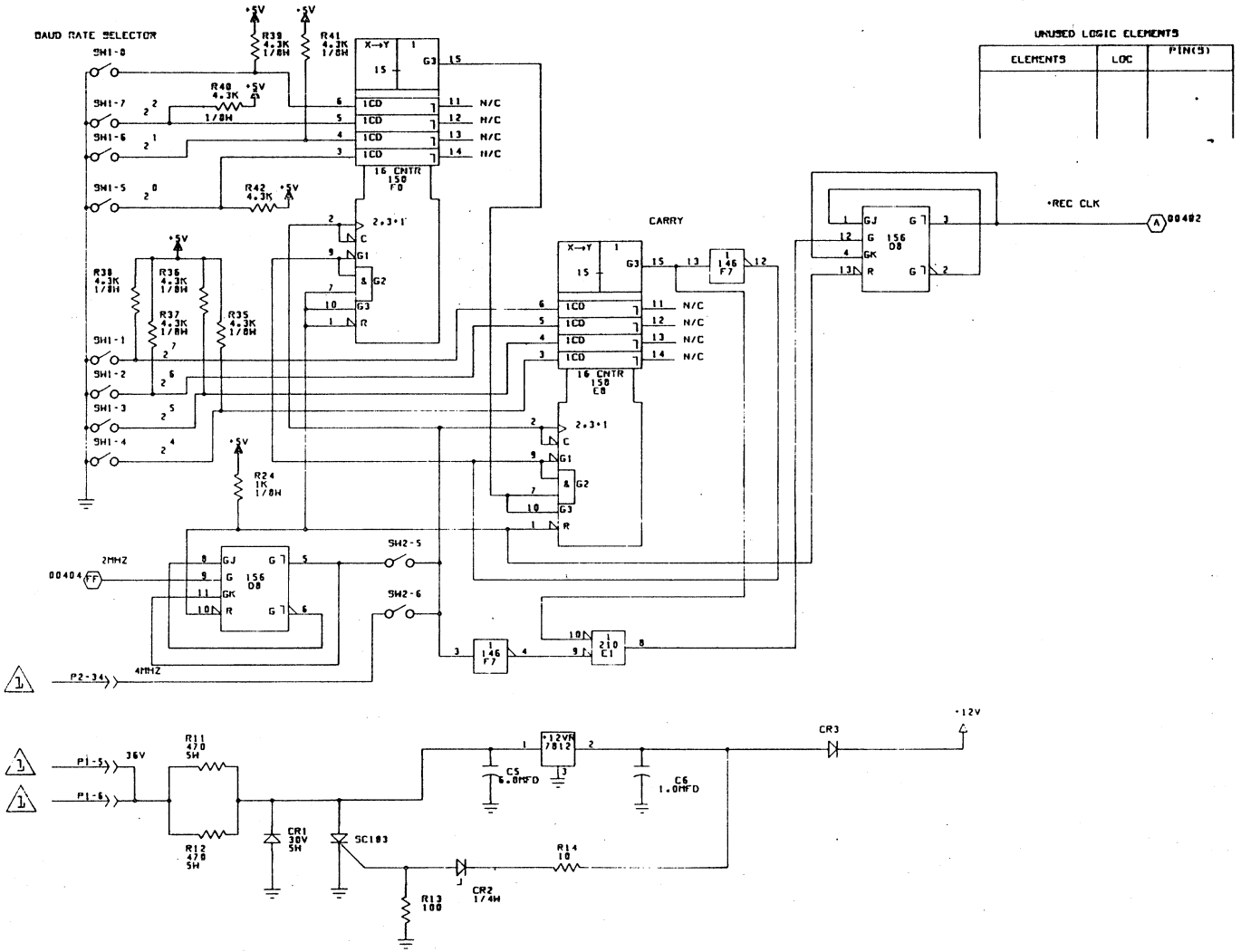
BOARD NUMBER	PAGE NO.
44670104	4-11 A-E

NOTE

J3 IS NOT USED. DISREGARD ALL J3 REFERENCES. HOWEVER, J3 REFERENCES CAN BE USED AS TEST POINTS.

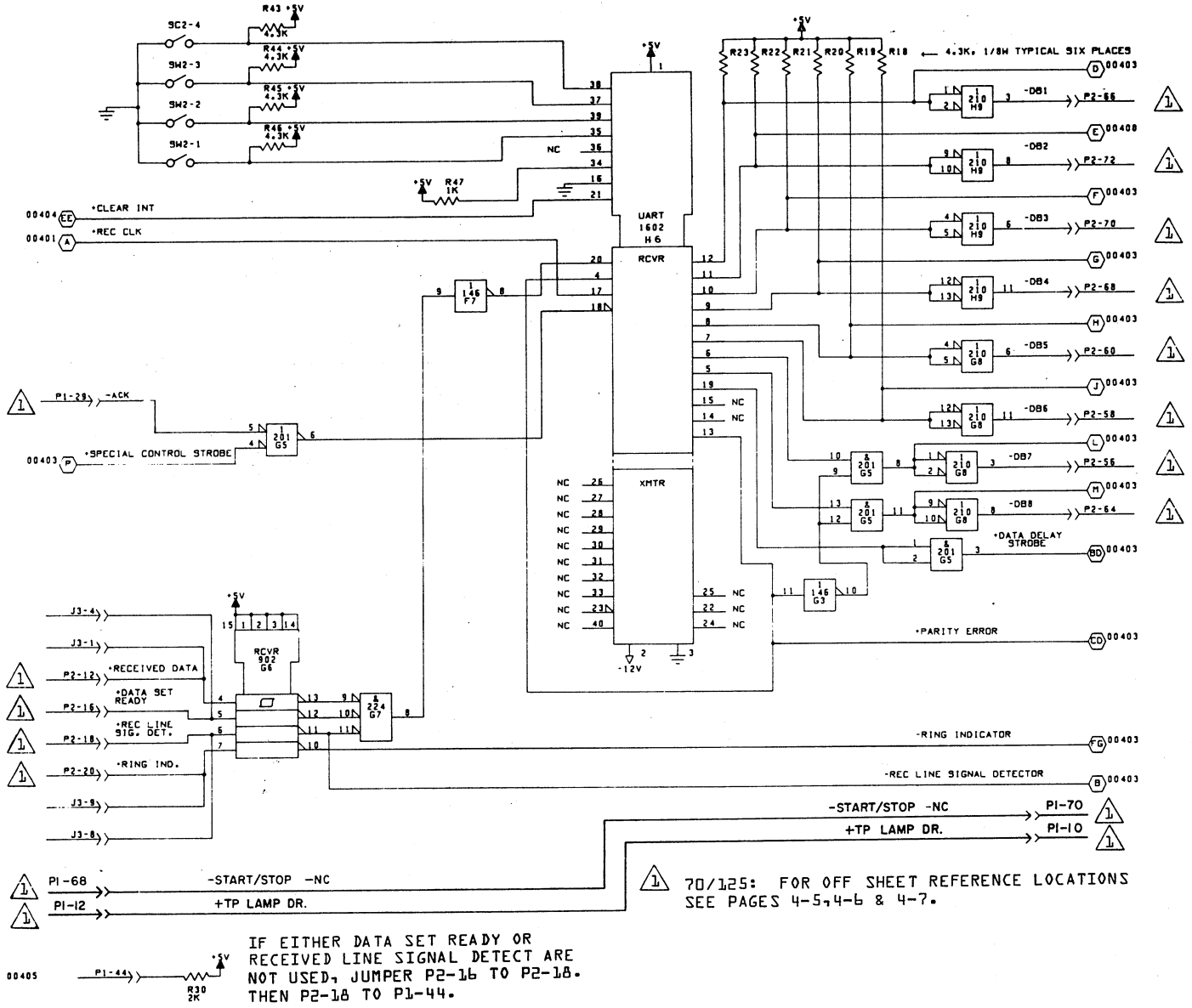


RS-232 UNBUFFERED INTERFACE BOARD 44670104

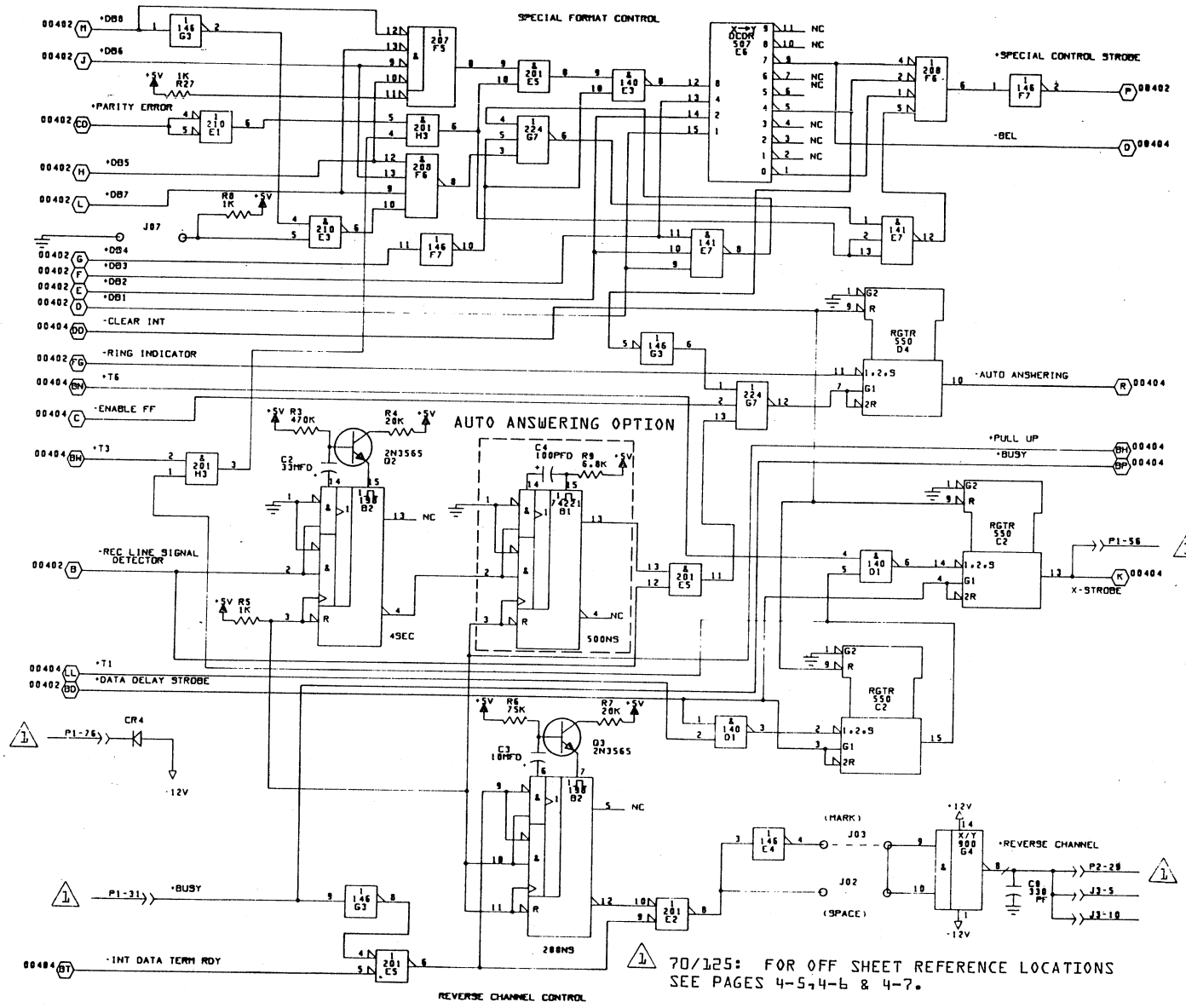


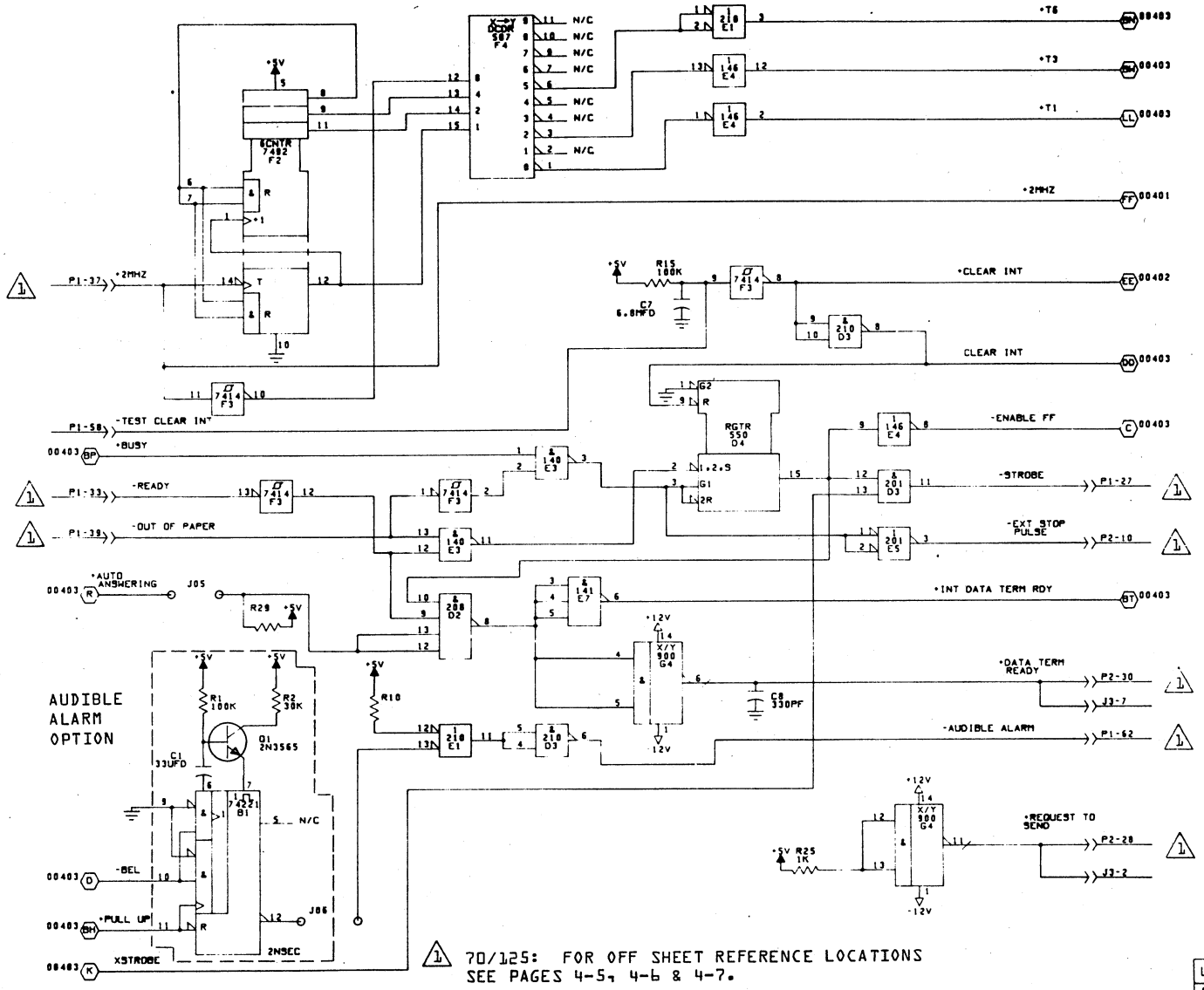
1 70/125: FOR OFF SHEET REFERENCE LOCATIONS
SEE PAGES 4-5, 4-6 & 4-7.

LOC. 1A04
CROSS REF NO. 00401



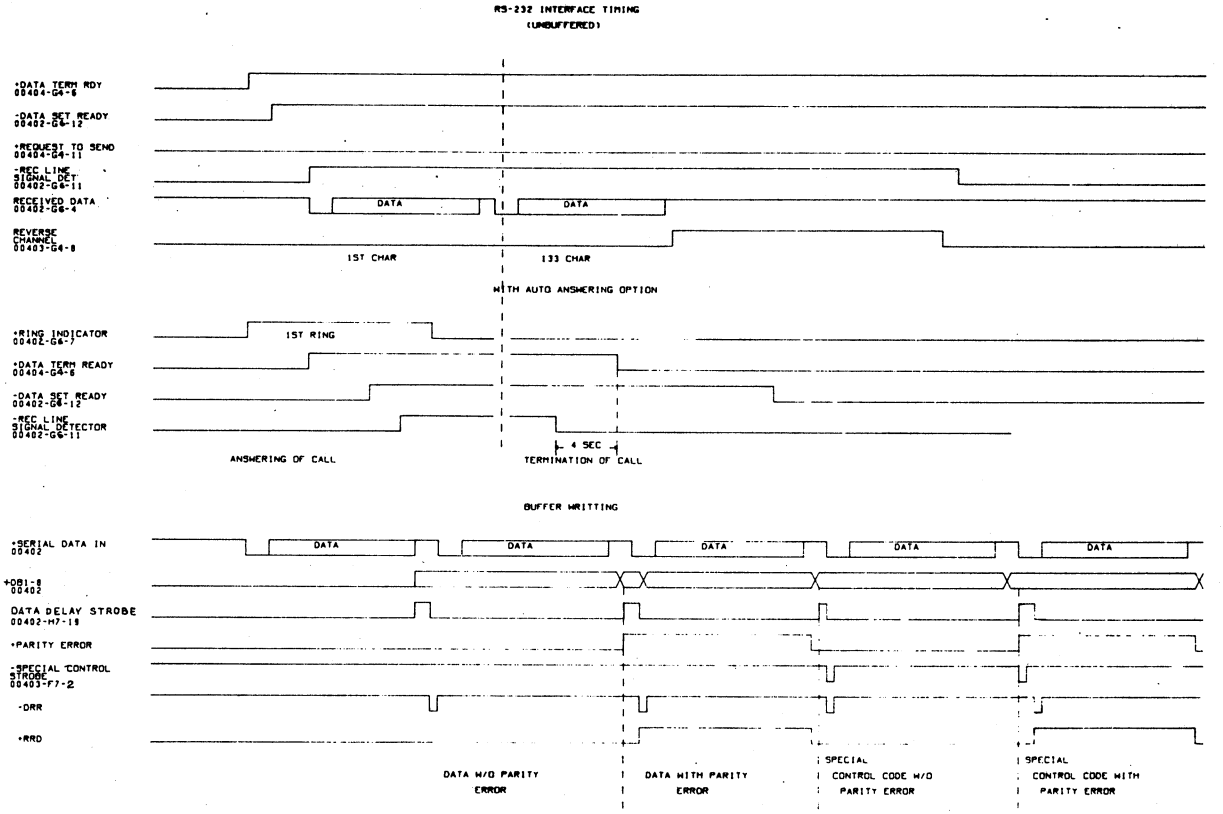
RS-232 UNBUFFERED INTERFACE BOARD 44670104


SPECIAL FORMAT CONTROL
AUTO ANSWERING OPTION
REVERSE CHANNEL CONTROL
*DB8
*DB6
*PARITY ERROR
*DB5
*DB7
*DB4
*DB3
*DB2
*DB1
-CLEAR INT
-RING INDICATOR
*T6
-ENABLE FF
*T3
-REC LINE SIGNAL DETECTOR
*T1
*DATA DELAY STROBE
-INT DATA TERM RDY
*BUSY
P1-31
P1-26
CR4
-12V
*SPECIAL CONTROL STROBE
-BEL
-AUTO ANSWERING
*PULL UP
*BUSY
P1-56
X-STROBE
*REVERSE CHANNEL
P2-20
J3-5
J3-10
(MARK)
(SPACE)
J03
J02
J07
4SEC
500NS
200NS
RGTR 550 D4
RGTR 550 C2
RGTR 550 C2
2N3565 Q2
2N3565 Q3
NC
70/125: FOR OFF SHEET REFERENCE LOCATIONS SEE PAGES 4-5,4-6 & 4-7.
LOC. 1A04
CROSS REF NO. 00403

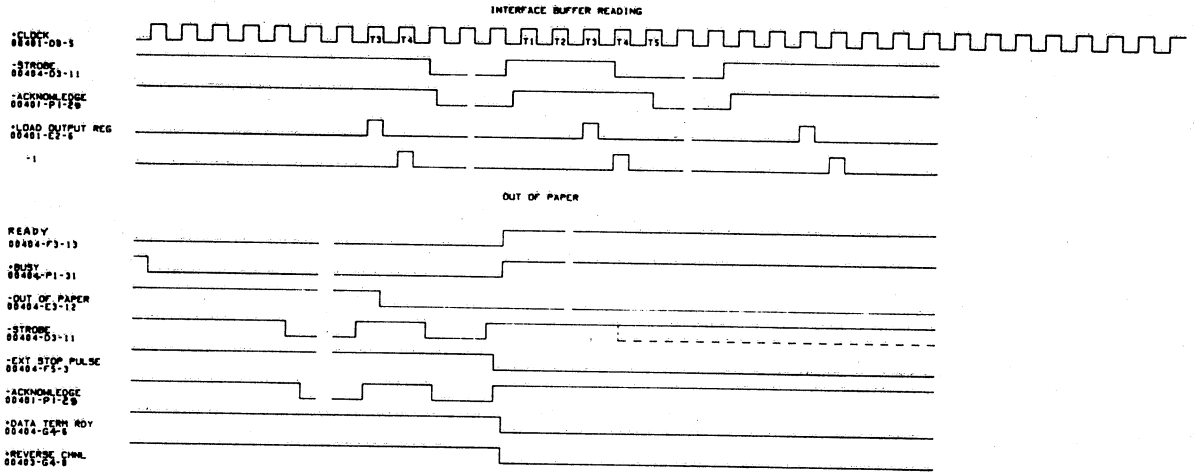


70/125: FOR OFF SHEET REFERENCE LOCATIONS SEE PAGES 4-5, 4-6 & 4-7.

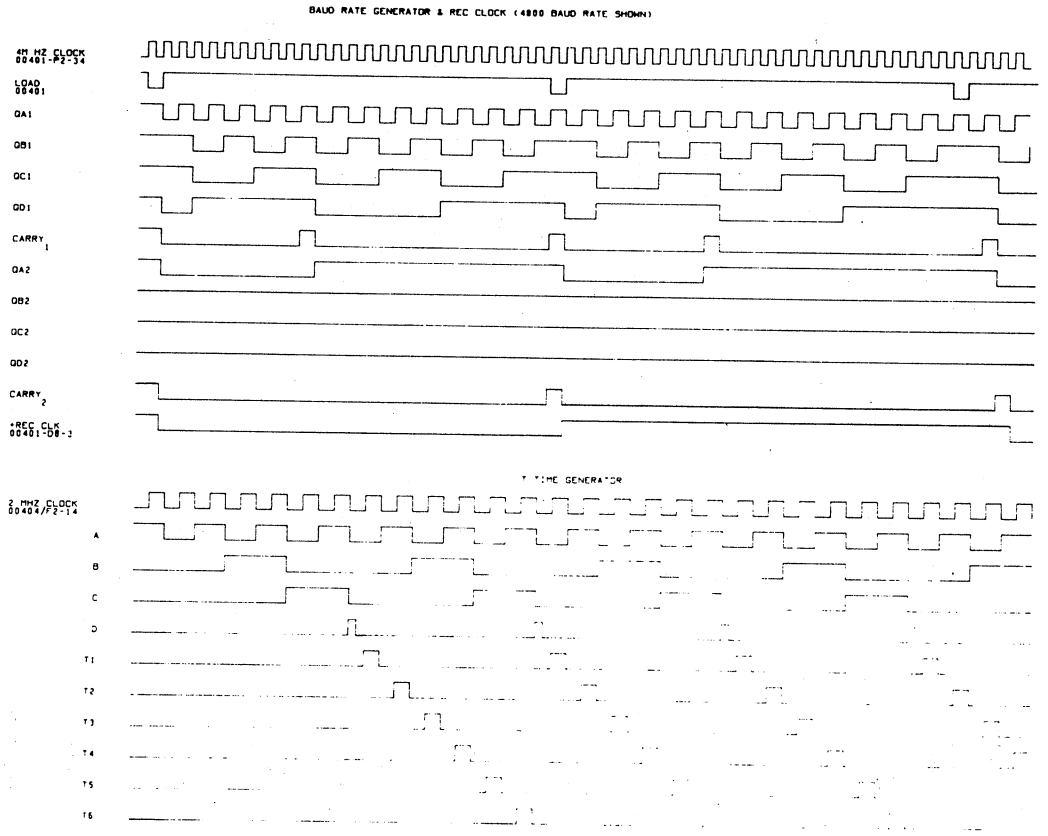
RS 232 UNBUFFERED INTERFACE BOARD 44670104



UNBUFFERED INTERFACE TIMING DIAGRAM

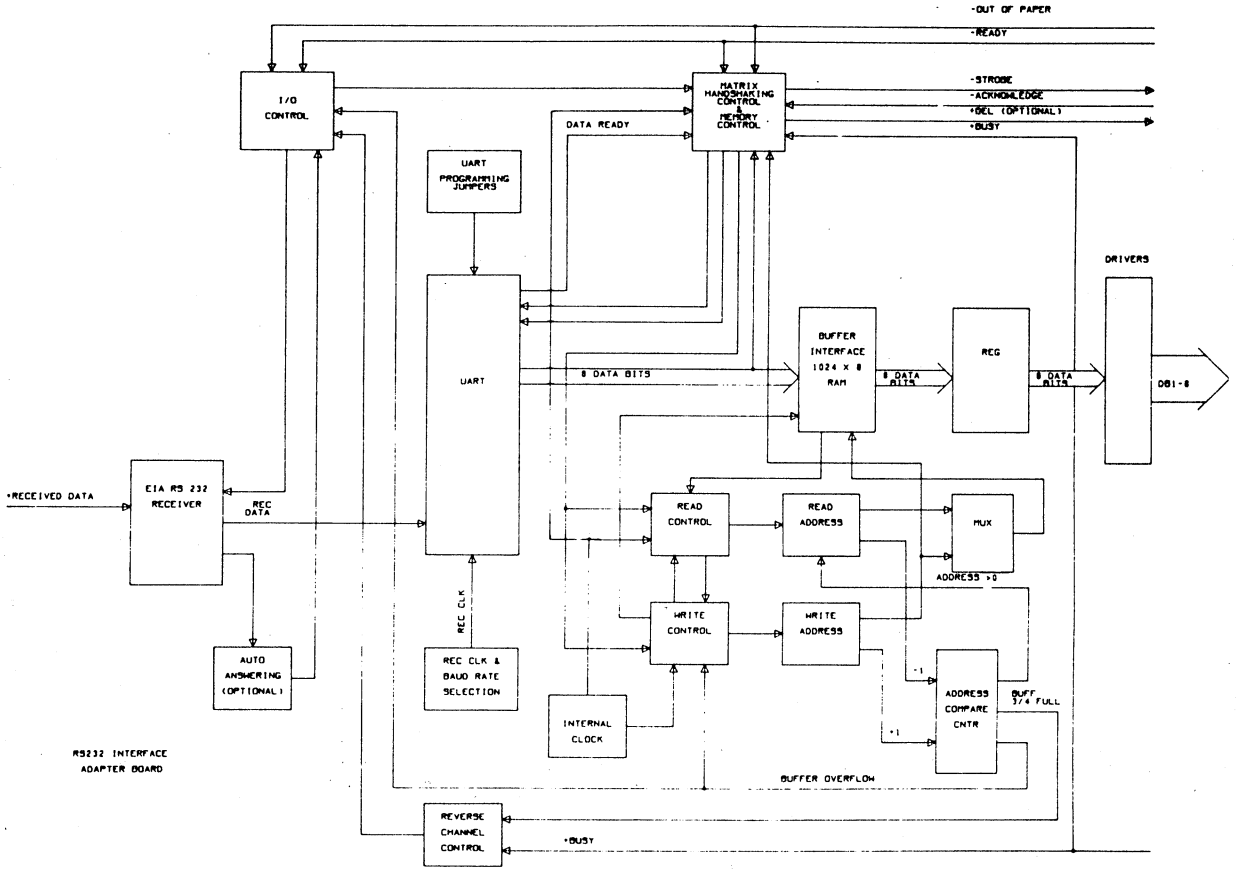


BUFFER READING TIMING DIAGRAM



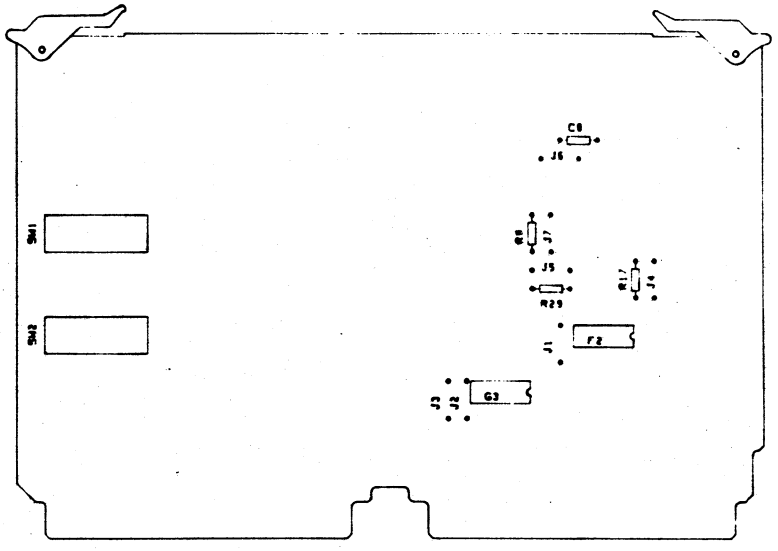
BAUD RATE GENERATOR TIMING DIAGRAM

LOCATION	REF NO.	TERM
A		
1A04	00404	-AUDIBLE ALARM
1A04	00403	-AUTO ANSWERING
B		
1A04	00403	-BEL
----	00405	BUSY
C		
1A04	00404	CLEAR INT
1A04	00404	-CLEAR INT
D		
1A04	00402	DATA DELAY STROBE
----	00405	DATA SET READY
1A04	00404	DATA TERM READY
1A04	00402	-DB 1 - DB 8
E		
1A04	00404	-ENABLE FF
1A04	00404	-EXT STOP PULSE
I		
1A04	00404	INT DATA TERM RDY
O		
	00405	-OUT OF PAPER
P		
1A04	00402	PARITY ERROR
1A04	00403	PULL UP
R		
	00405	R30 - 2K PULLUP
	00405	-READY
1A04	00401	REC CLK
----	00405	RECEIVED DATA
----	00405	REC LINE SIG DET
1A04	00402	-REC LINE SIGNAL DETECTOR
1A04	00404	REQUEST TO SEND
1A04	00403	REVERSE CHANNEL
----	00405	RING IND
1A04	00402	-RING INDICATOR
S		
1A04	00403	SPECIAL CONTROL STROBE
1A04	00404	-STROBE
T		
1A04	00404	T1
1A04	00404	T3
1A04	00404	T6
X		
1A04	00403	X-STROBE
NUMERIC		
----	00405	2MHZ
----	00405	4MHZ
----	00405	-12V
----	00405	36V



RS-232 BUFFERED BLOCK DIAGRAM

	REC CLOCK TIME 416 USEC	REC CLOCK TIME 208 USEC	REC CLOCK TIME 104 USEC	REC CLOCK TIME 52 USEC	REC CLOCK TIME 35 USEC	REC CLOCK TIME 26 USEC	REC CLOCK TIME 13 USEC	REC CLOCK TIME 6.5 USEC													
	BAUD RATE SELECTION 150	BAUD RATE SELECTION 300	BAUD RATE SELECTION 600	BAUD RATE SELECTION 1200	BAUD RATE SELECTION 1800	BAUD RATE SELECTION 2400	BAUD RATE SELECTION 4800	BAUD RATE SELECTION 9600	EVEN PARITY	ODD PARITY	NO PARITY	5 DATA BITS	6 DATA BITS	7 DATA BITS	8 DATA BITS	BUFFER OVERFLOW	AUTO ANSWERING	REVERSE CHANNEL MARK	REVERSE CHANNEL SPACE	AUDIBLE ALARM OUT OF PAPER	AUDIBLE ALARM BELL CODE
J01																				x	
J02																			x		
J03																		x			
J04																x					
J05																	x				
J06																					x
SW1-1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF													
SW1-2	ON	ON	OFF	OFF	ON	OFF	OFF	OFF													
SW1-3	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF													
SW1-4	OFF	OFF	ON	ON	OFF	OFF	ON	OFF													
SW1-5	ON	ON	ON	ON	ON	OFF	ON	OFF													
SW1-6	ON	ON	ON	OFF	OFF	OFF	OFF	OFF													
SW1-7	ON	ON	OFF	OFF	ON	ON	OFF	ON													
SW1-8	ON	OFF	OFF	ON	OFF	ON	ON	ON													
SW2-1									ON	ON	OFF										
SW2-2									OFF	ON											
SW2-3												ON	ON	OFF	OFF						
SW2-4												ON	OFF	ON	OFF						
SW2-5	ON	ON	ON	ON	OFF	ON	OFF	OFF													
SW2-6	OFF	OFF	OFF	OFF	ON	OFF	ON	ON													
J07												x	x	x							



NOTES--

1. TO USE THE PRINTER ON OTHER BAUD RATES THAN SHOWN ABOVE, THE FOLLOWING FORMULA CAN BE USED-- LOAD VALUE = 256 − $\left(\frac{1}{32 \text{ (BAUD RATE)} A}\right)$ IN DECIMAL

   THE LOAD VALUE IN DECIMAL MUST BE CONVERTED INTO BINARY. THEN THAT VALUE IS LOADED INTO THE SWITCHES

   A= FOR SWITCH 2-5 CLOSED AND 2-6 OPEN 1×10^{-6} (>2400 BAUD AND 1800 BAUD)

   A= FOR SWITCH 2-6 CLOSED AND 2-5 OPEN $.25 \times 10^{-6}$ (≤ 2400 BAUD EXCEPT 1800 BAUD)

2. SWITCHES 2-5 AND 2-6 CAN NEVER BE CLOSED OR OPEN AT THE SAME TIME. IF EITHER OF THESE OCCURS EITHER A WRONG FREQUENCY OR NO FREQUENCY IS SUPPLIED TO THE BAUD RATE SELECTOR.

LOGIC PROGRAMMING & JUMPER SELECTION

LOCATION

1A04

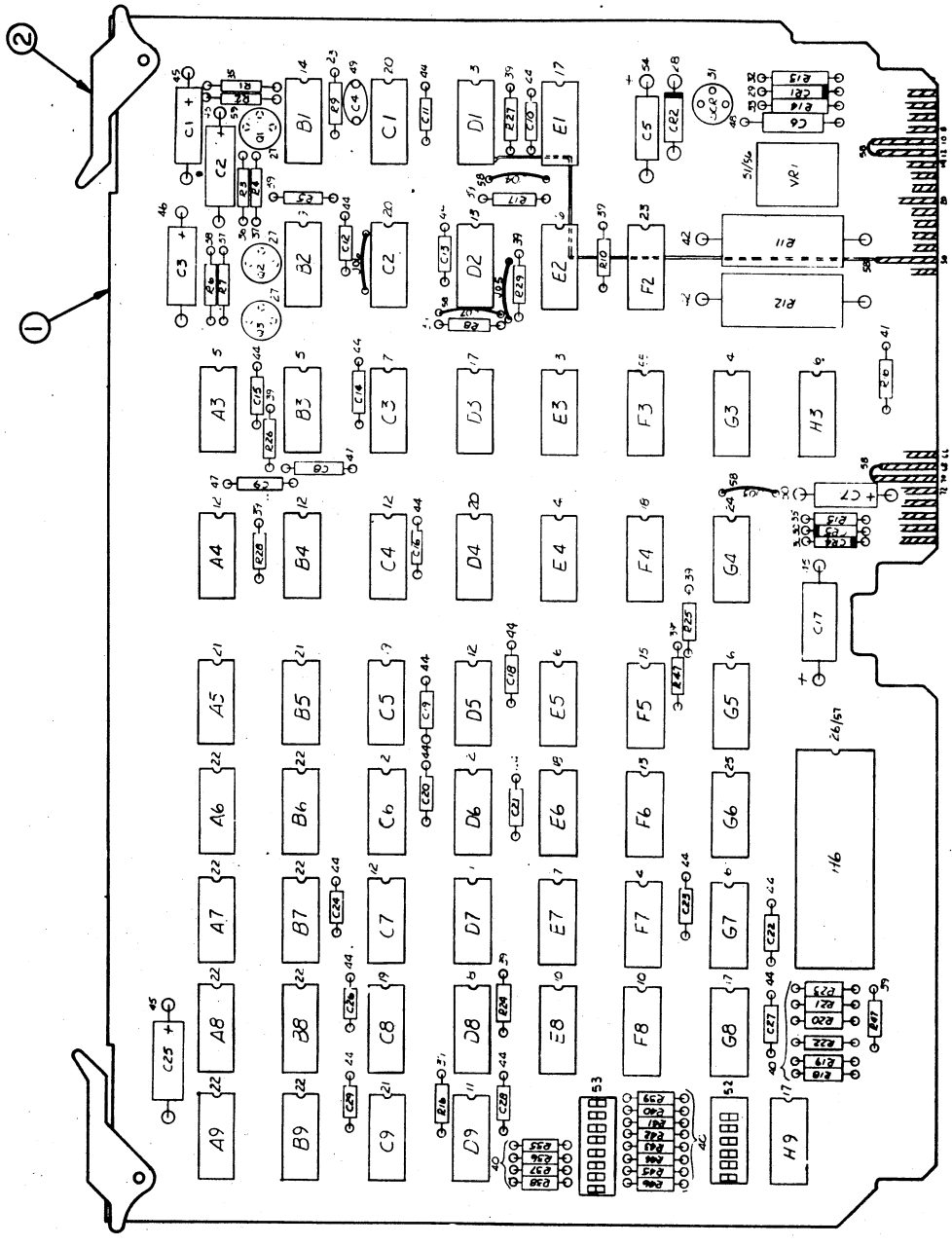
RS-232 BUFFERED INTERFACE BOARD

BOARD NUMBER
44670096

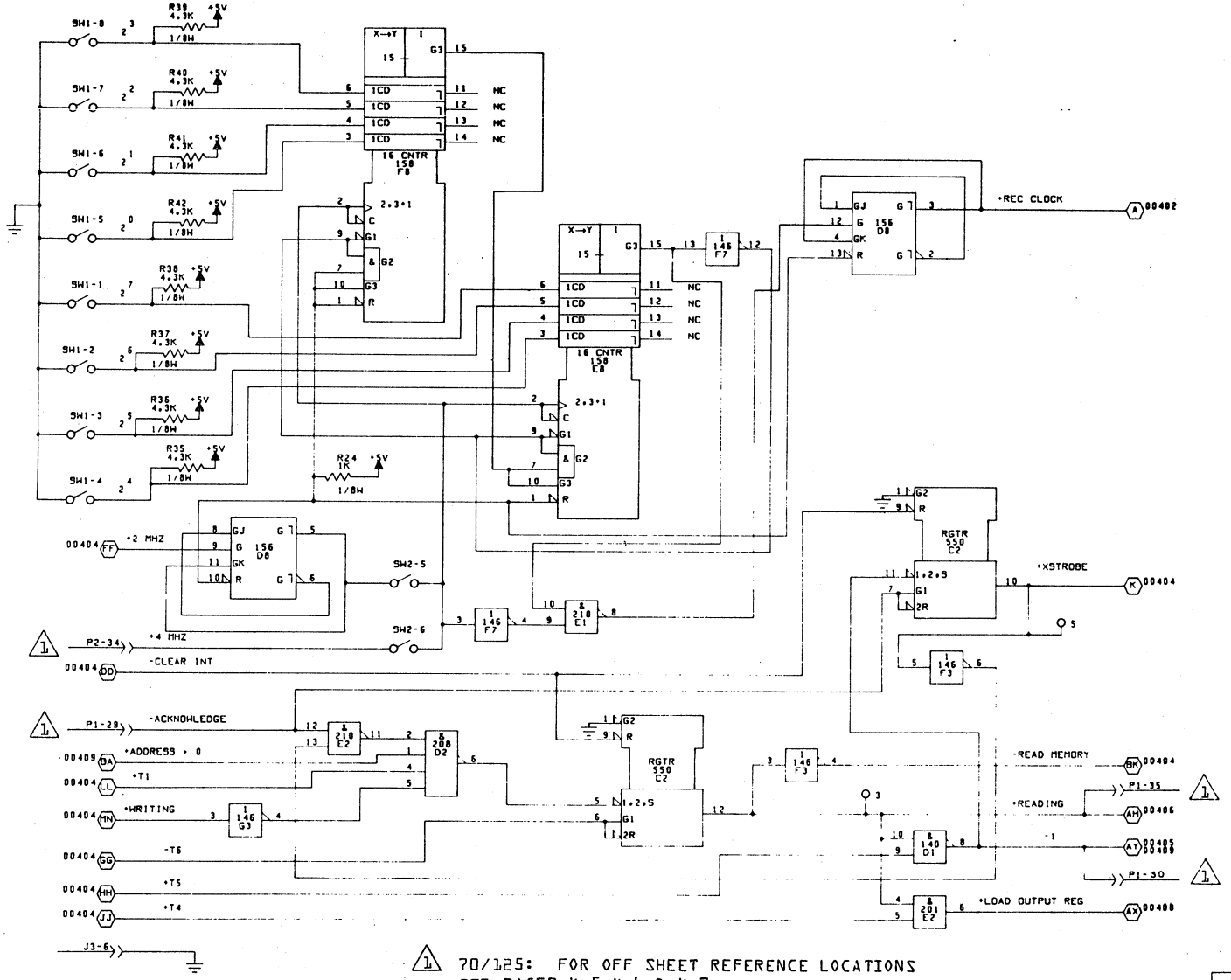
PAGE NO.
4-19 A-J

NOTE

J3 IS NOT USED. DISREGARD ALL J3 REFERENCES. HOWEVER, J3 REFERENCES CAN BE USED AS TEST POINTS.

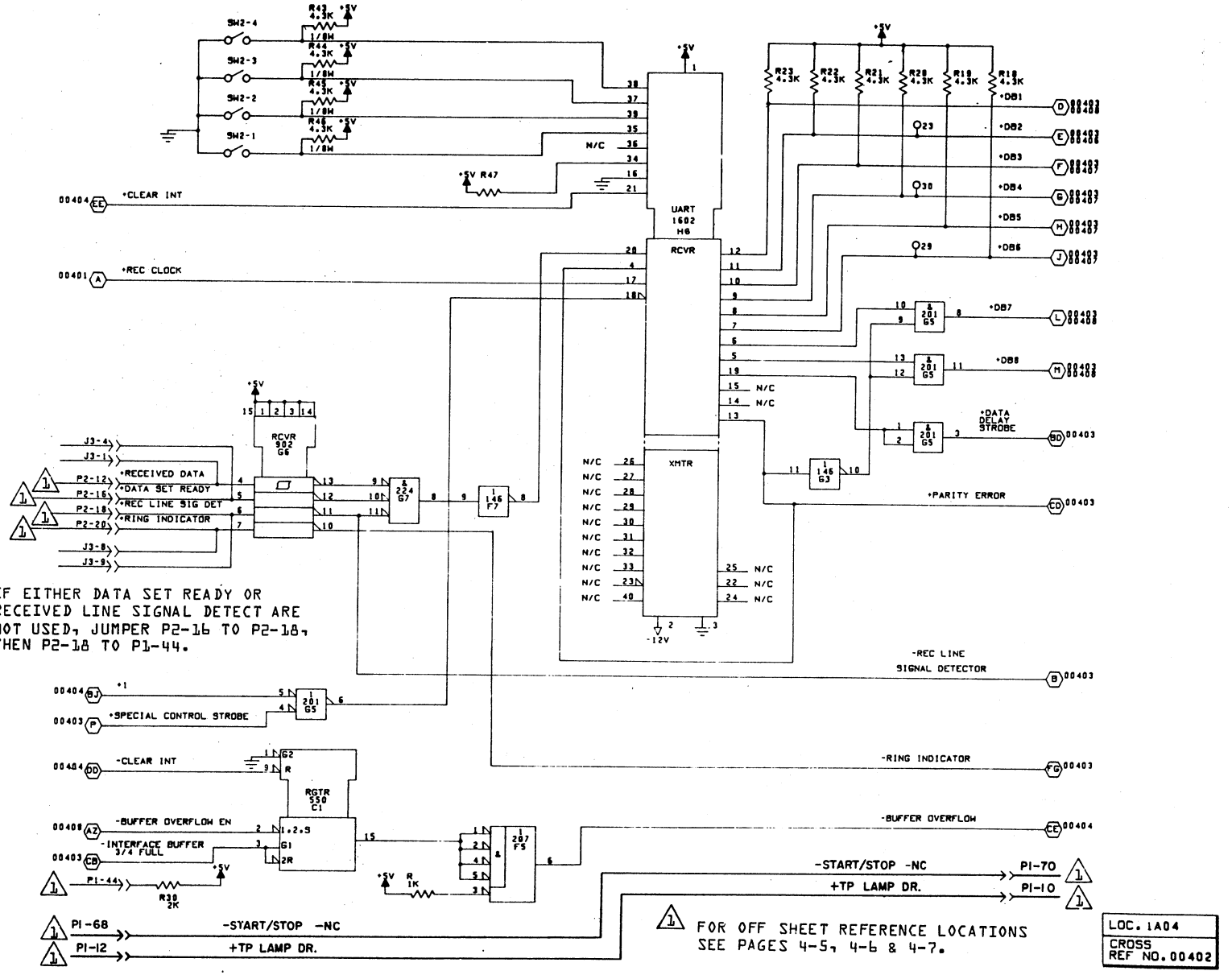


RS-232 BUFFERED INTERFACE BOARD 44670096

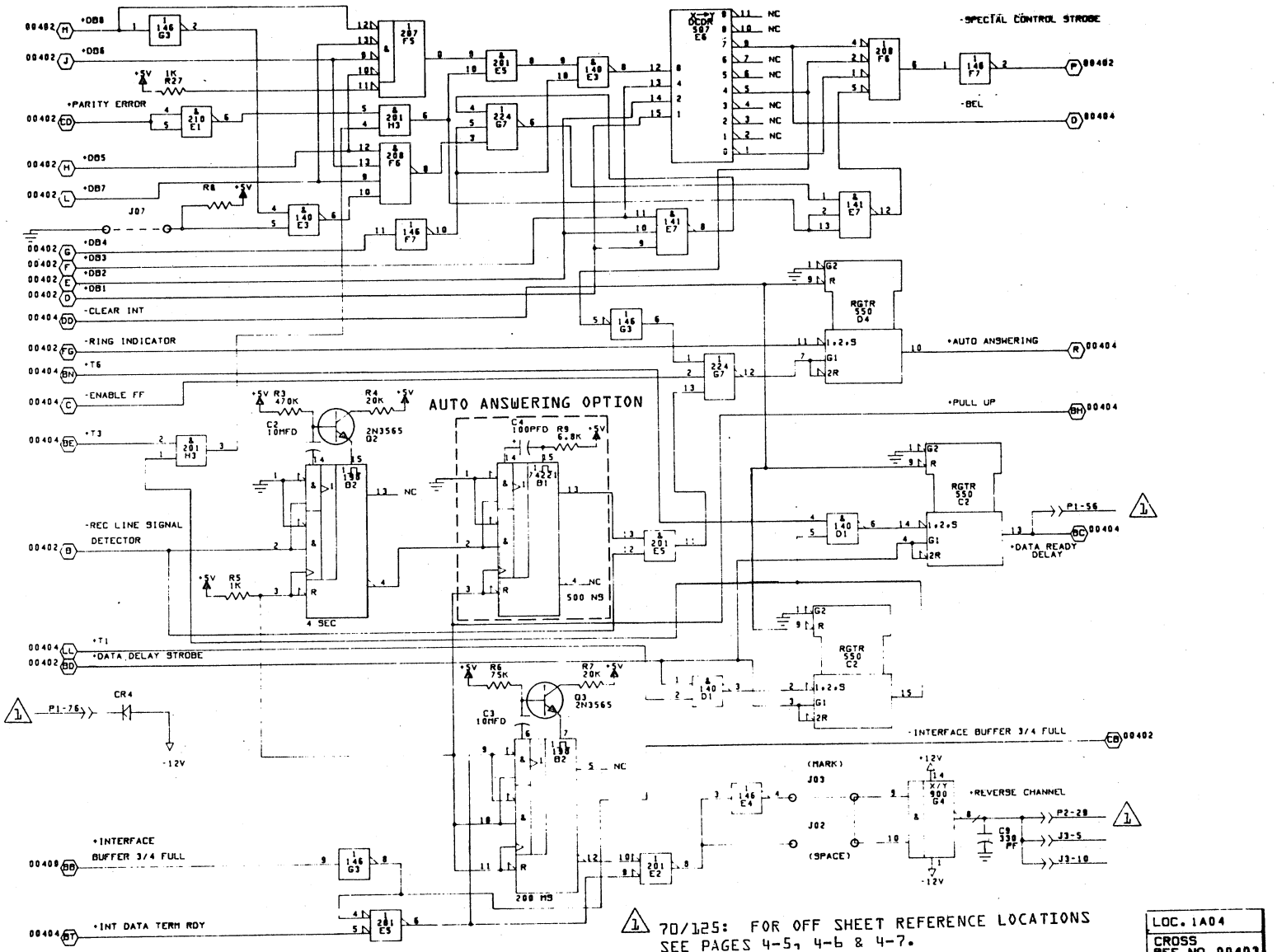


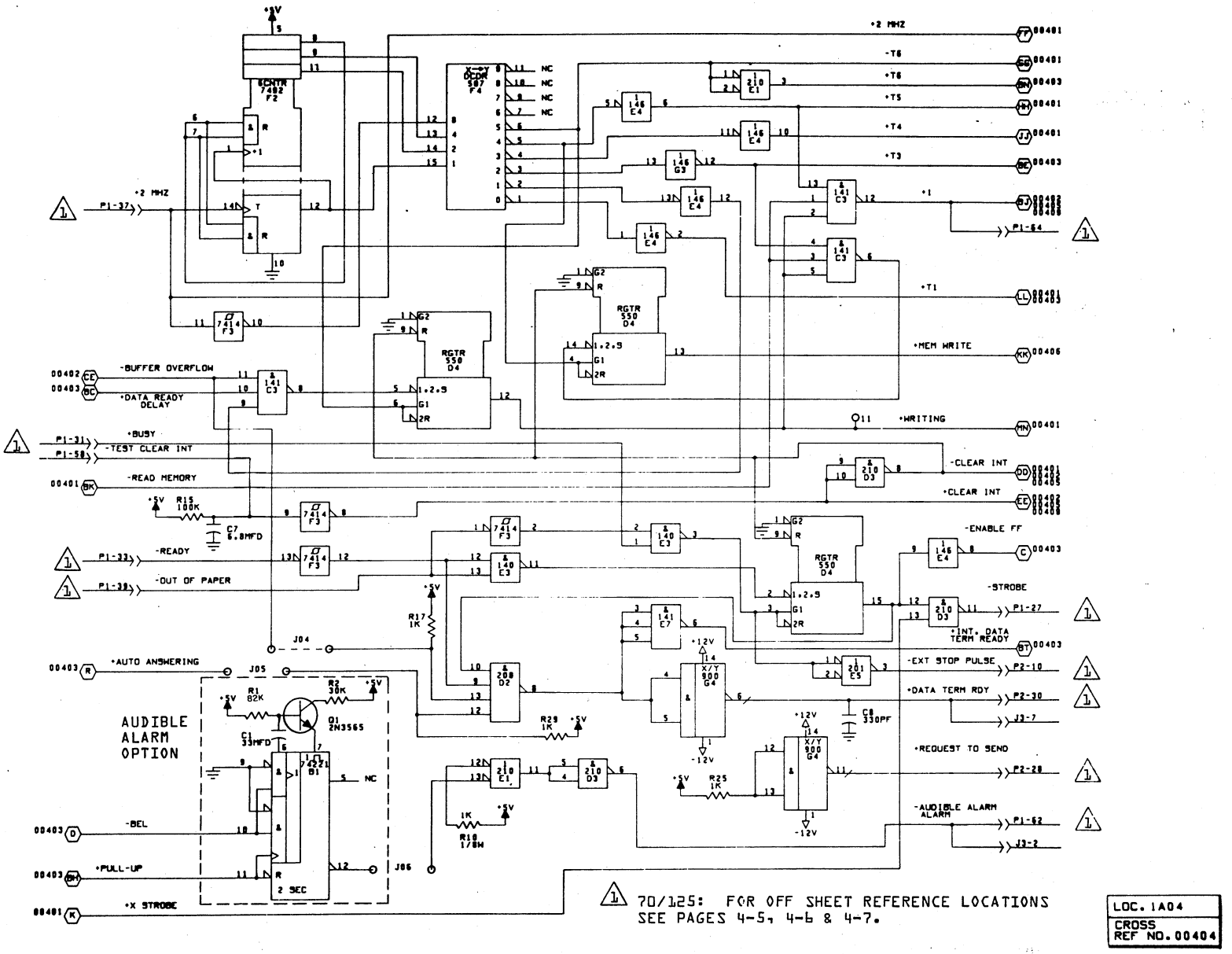
70/125: FOR OFF SHEET REFERENCE LOCATIONS SEE PAGES 4-5,4-6 & 4-7.

LOC. 1A04
CROSS REF NO. 00401

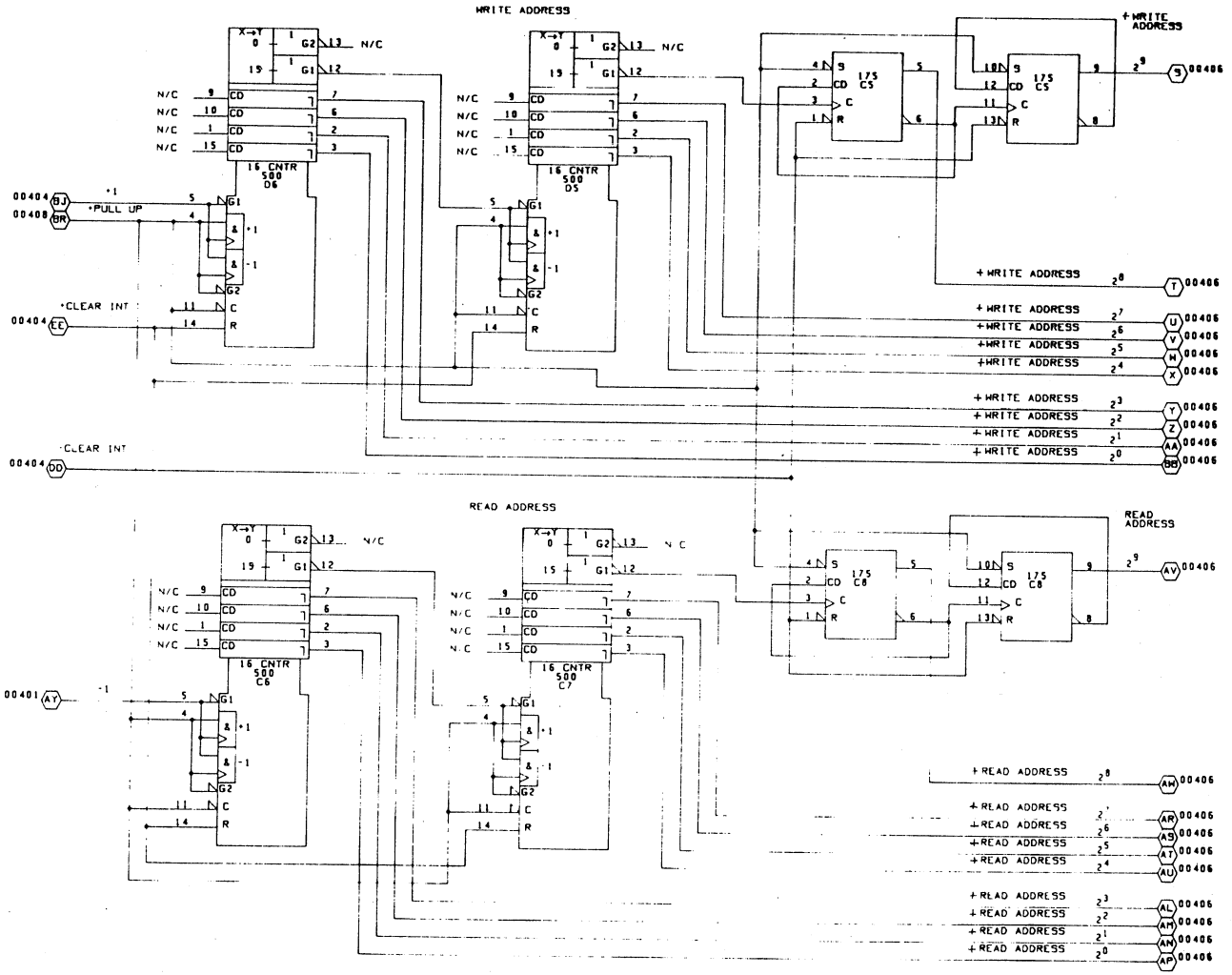


RS-232 BUFFERED INTERFACE BOARD 44670096

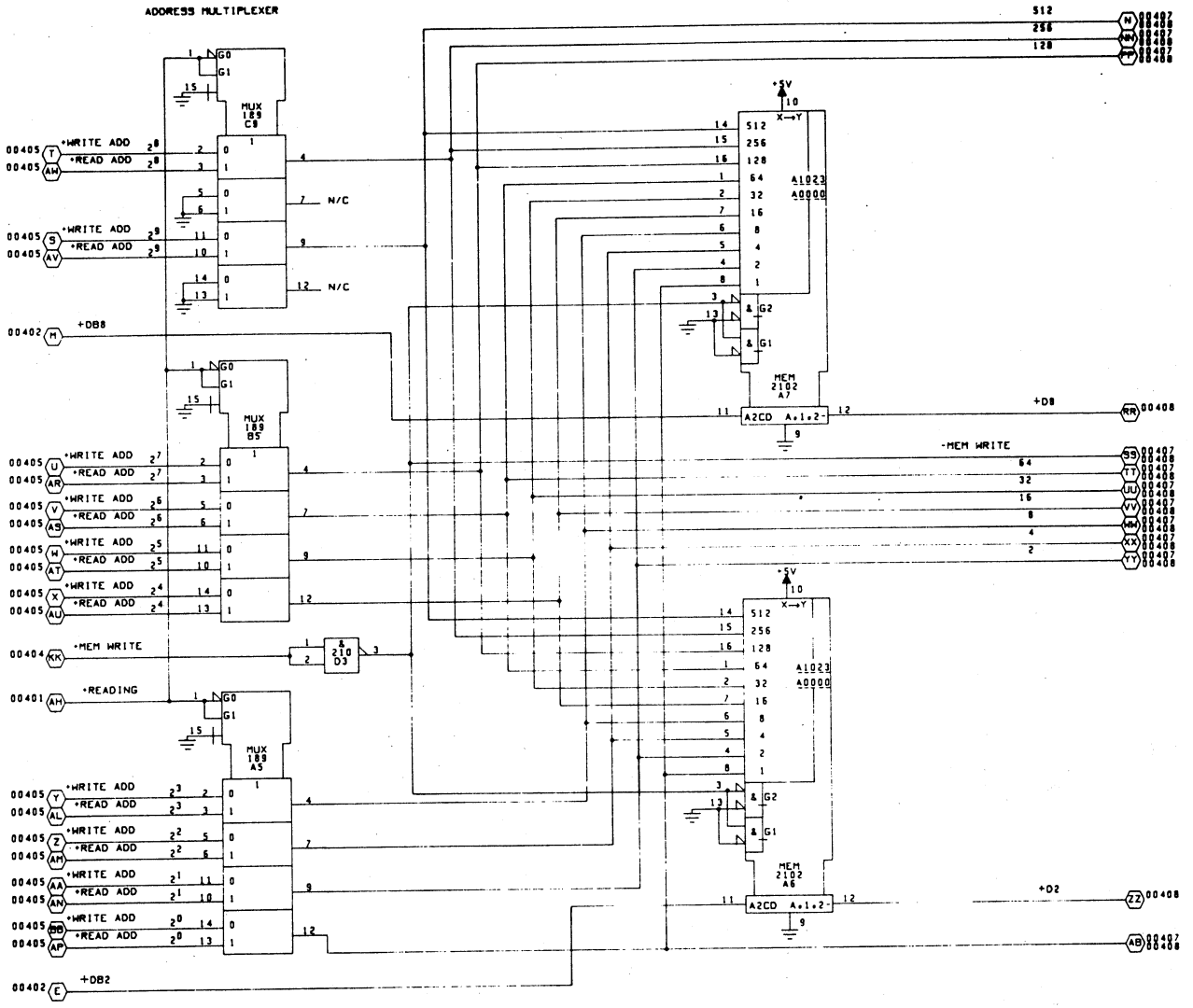

AUTO ANSWERING OPTION
-SPECIAL CONTROL STROBE
-BEL
*PARITY ERROR
*DB8
*DB6
*DB5
*DB7
*DB4
*DB3
*DB2
*DB1
-CLEAR INT
-RING INDICATOR
*T6
-ENABLE FF
*T3
-REC LINE SIGNAL DETECTOR
*T1
*DATA DELAY STROBE
*AUTO ANSWERING
*PULL UP
*DATA READY DELAY
-INTERFACE BUFFER 3/4 FULL
*REVERSE CHANNEL
*INTERFACE BUFFER 3/4 FULL
*INT DATA TERM RDY
(MARK)
(SPACE)
4 SEC
500 MS
70/125: FOR OFF SHEET REFERENCE LOCATIONS
SEE PAGES 4-5, 4-6 & 4-7.
LOC. 1A04
CROSS REF NO. 00403



RS-232 BUFFERED INTERFACE BOARD 44670096

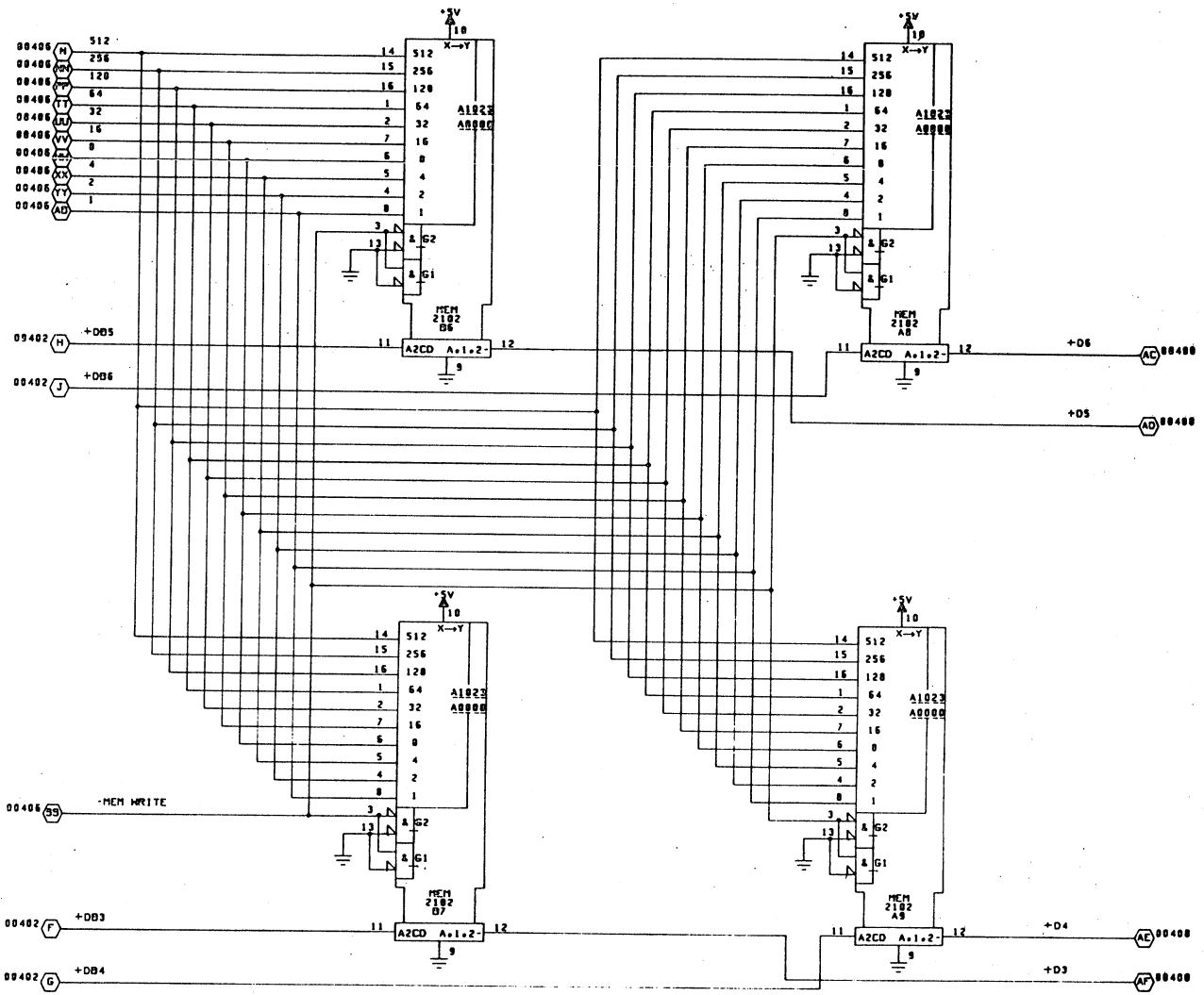


LOC. 1A04
CROSS REF NO. 00405



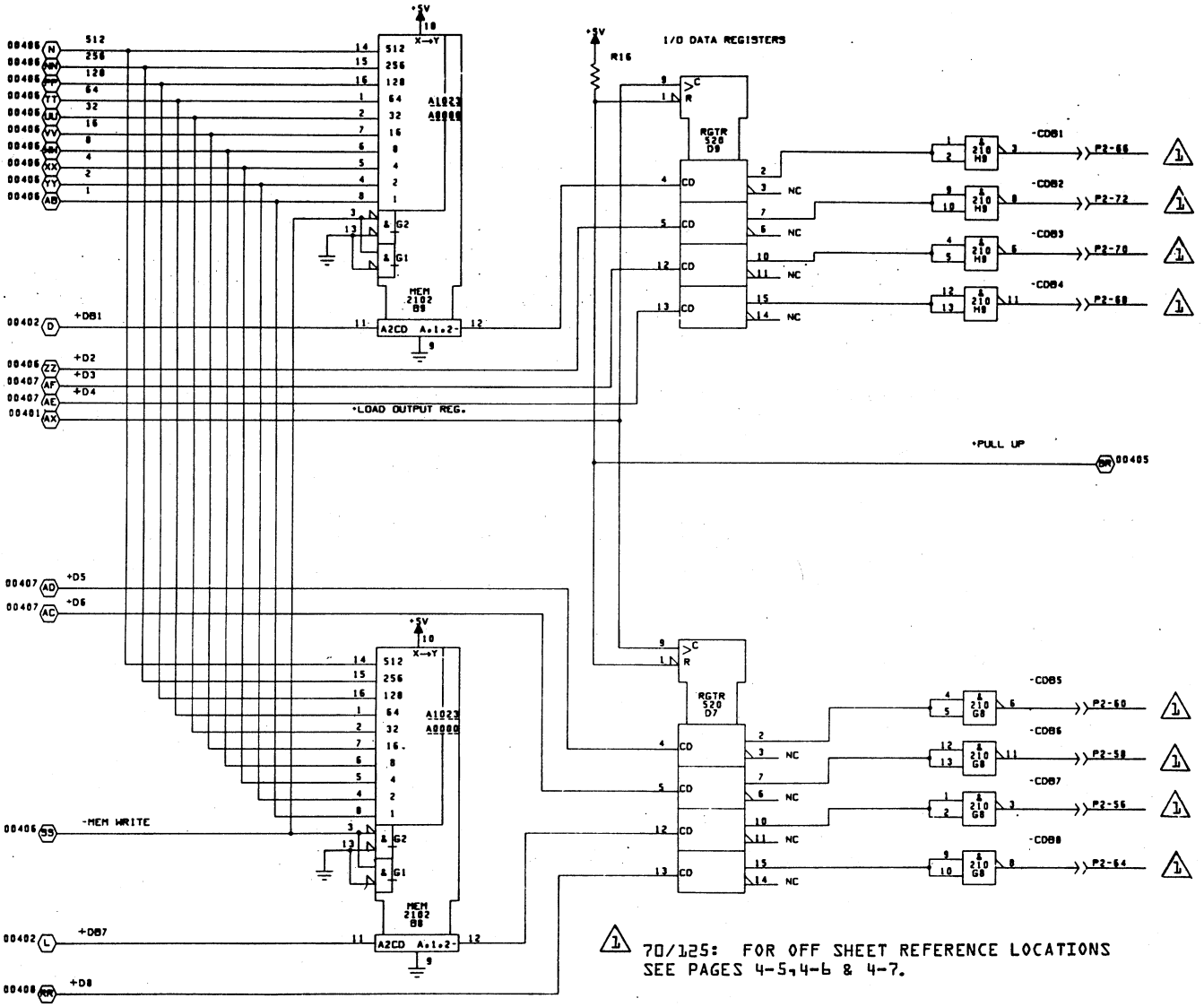
LOC. 1A04
CROSS REF NO. 00406

RS-232 BUFFERED INTERFACE BOARD 44670096

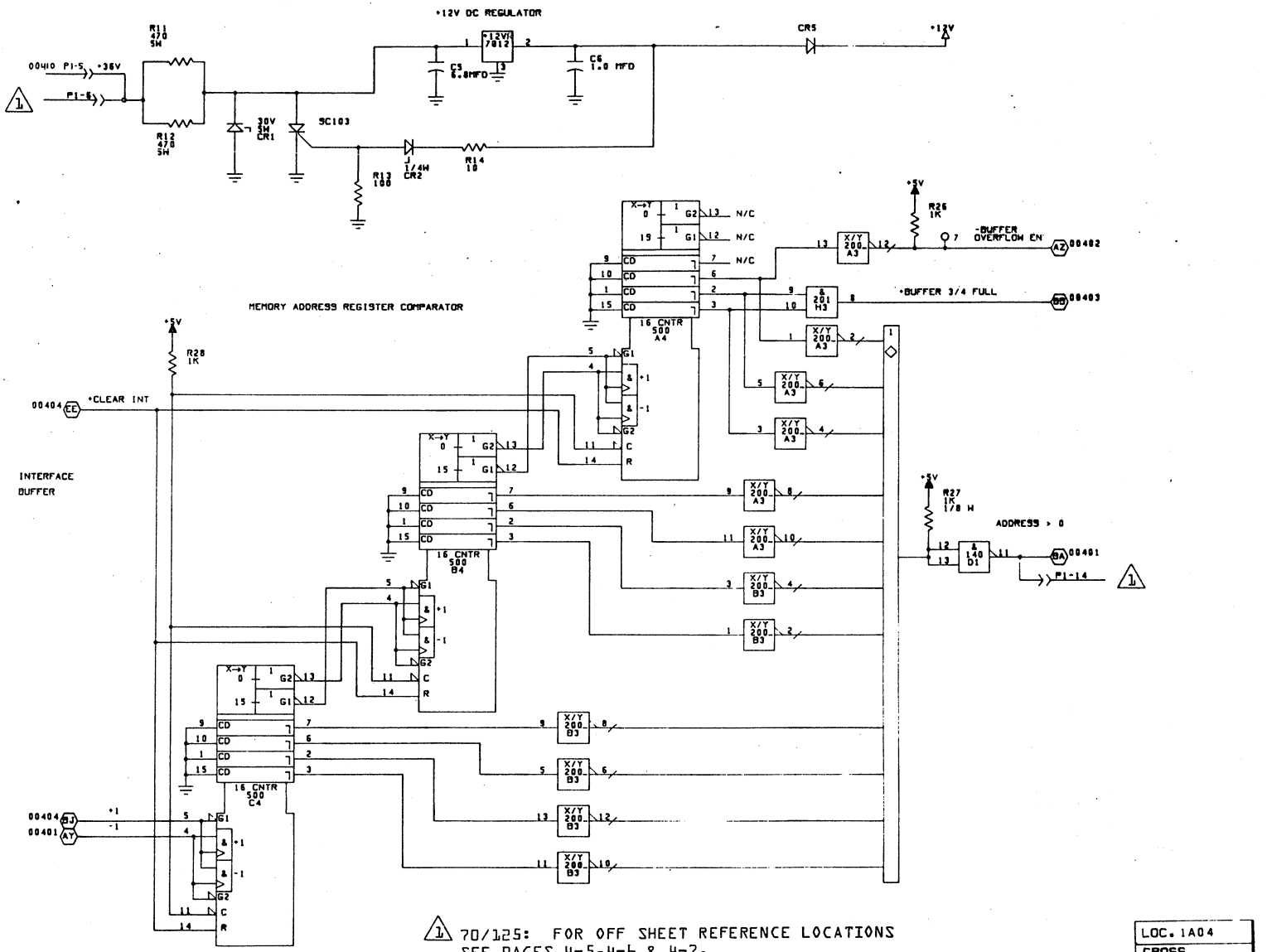


LOC. 1A04
CROSS REF NO. 00407

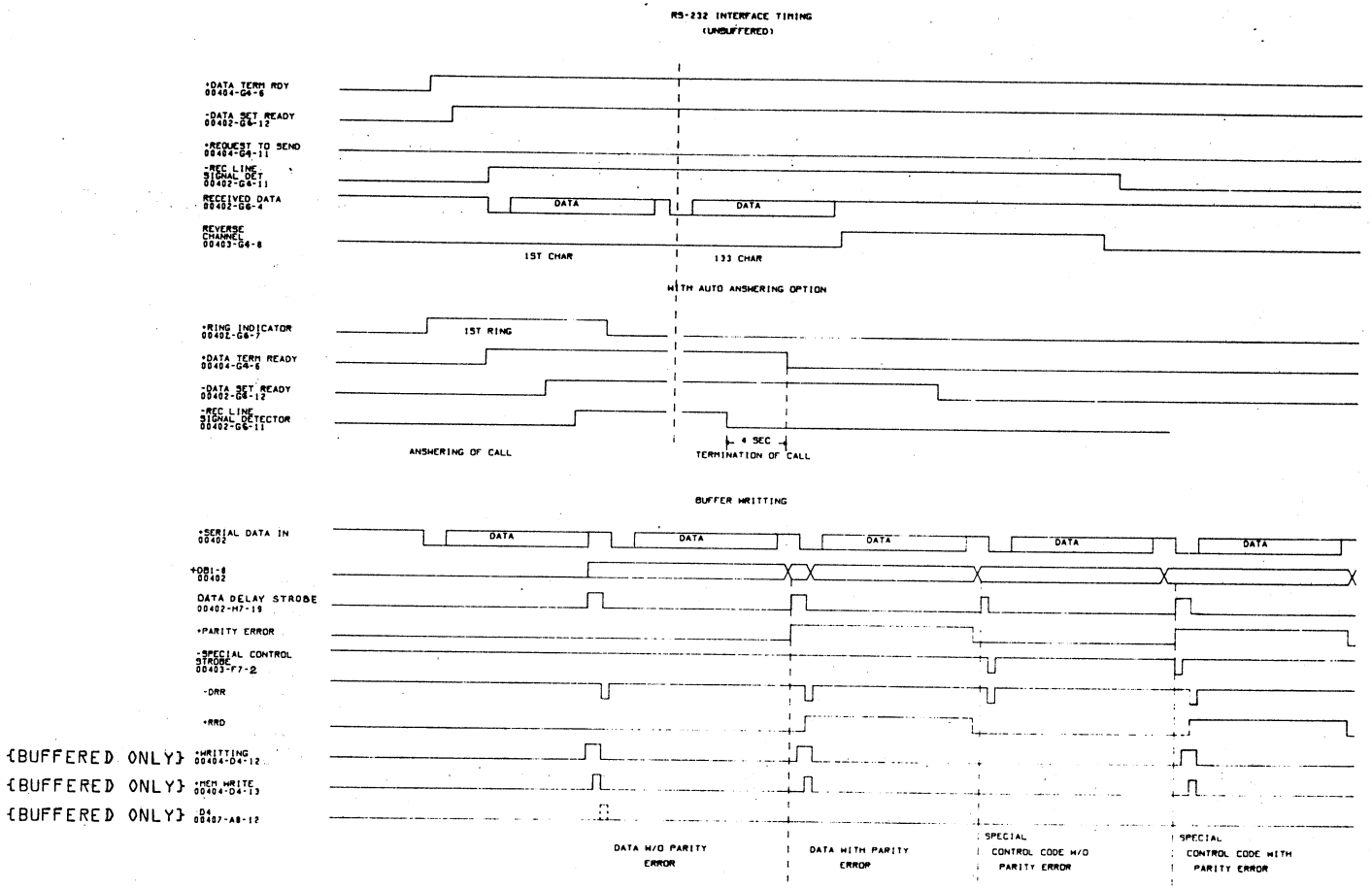
RS-232 BUFFERED INTERFACE BOARD 44670096



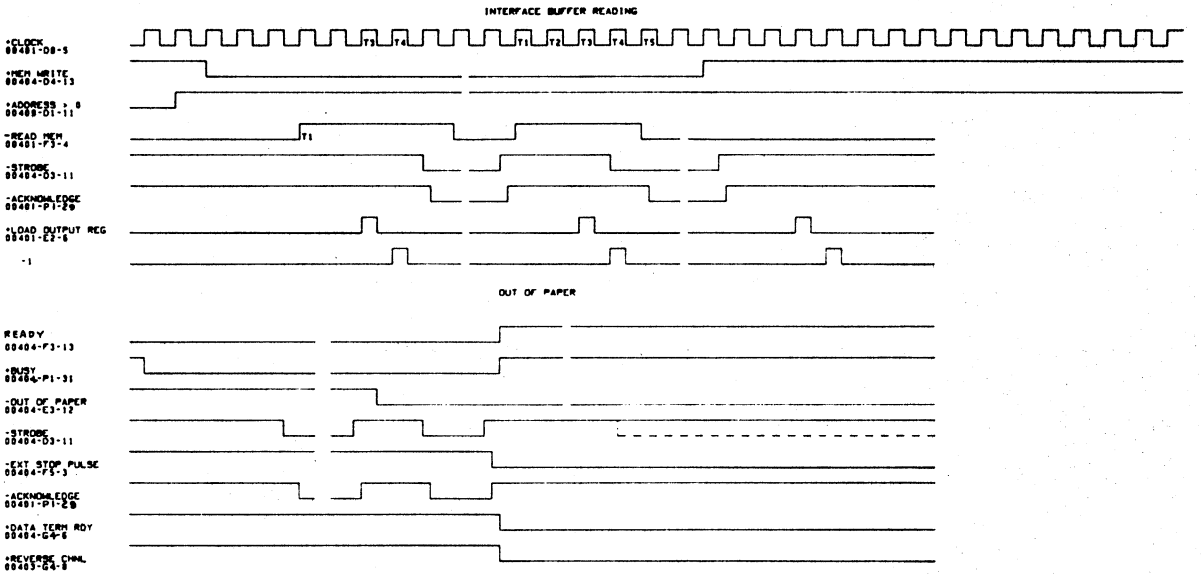
RS-232 BUFFERED INTERFACE BOARD 44670096



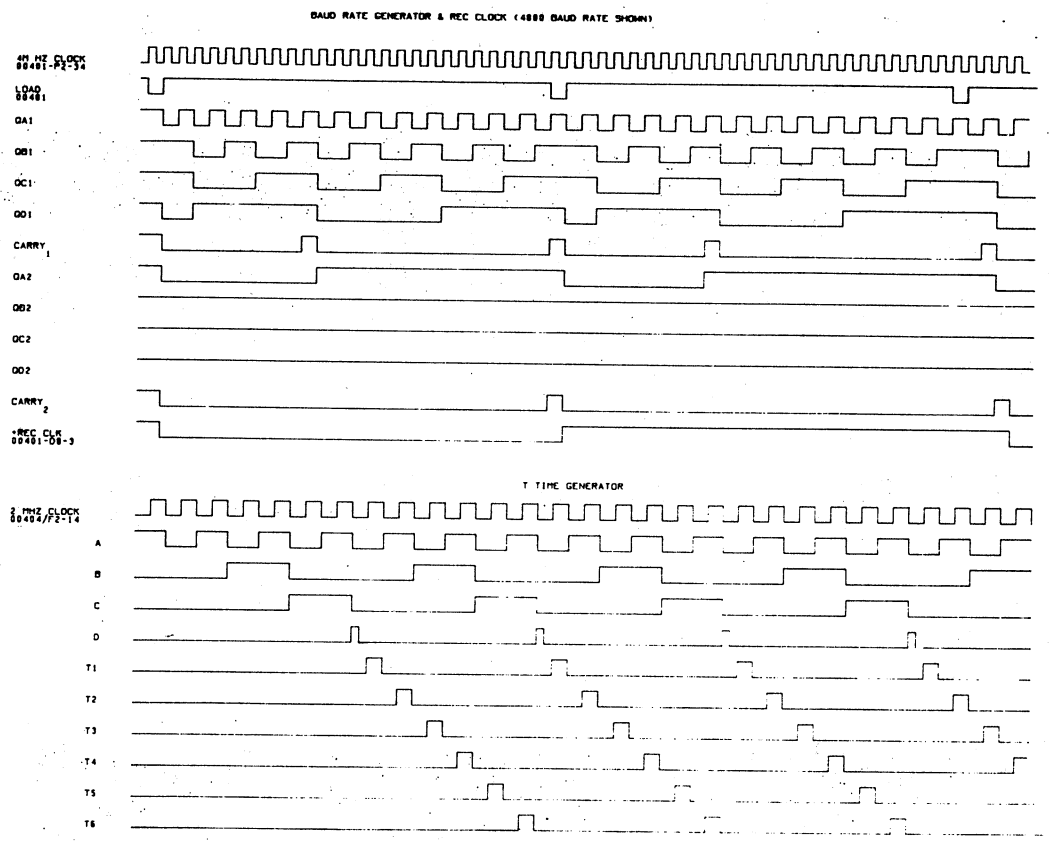
LOC. 1A04
CROSS REF NO. 00409



BUFFERED + UNBUFFERED INTERFACE TIMING DIAGRAM



BUFFER READING TIMING DIAGRAM



BAUD RATE GENERATOR TIMING DIAGRAM

LOCATION	REF. NO.	TERM
A		
----	00410	-ACKNOWLEDGE
1A04	00409	ADDRESS 0
1A04	00404	-AUDIBLE ALARM ALARM
1A04	00403	AUTO ANSWERING
B		
1A04	00403	-BEL
1A04	00409	BUFFER 3/4 FULL
1A04	00402	-BUFFER OVERFLOW
1A04	00409	-BUFFER OVERFLOW EN
----	00410	BUSY
C		
1A04	00408	-CDB1 - -CDB8
1A04	00404	CLEAR INT
1A04	00404	-CLEAR INT
D		
1A04	00406	D2
1A04	00407	D3 - D6
1A04	00406	D8
1A04	00402	DATA DELAY STROBE
1A04	00403	DATA READY DELAY
----	00410	DATA SET READY
1A04	00404	DATA TERM RDY
1A04	00402	DB 1 - DB 8
E		
1A04	00404	-ENABLE FF
1A04	00404	-EXT STOP PULSE
I		
1A04	00404	INT DATA TERM READY
1A04	00403	-INTERFACE BUFFER 3/4 FULL
L		
1A04	00401	LOAD OUTPUT REG
M		
1A04	00404	MEM WRITE
1A04	00406	-MEM WRITE
O		
----	00410	-OUT OF PAPER
P		
1A04	00402	PARITY ERROR
1A04	00403	PULL UP
R		
----	00410	R30 - 2K PULLUP
1A04	00405	READ ADDRESS 2^0 - READ ADDRESS 2^9
1A04	00401	READING
1A04	00401	-READ MEMORY
----	00410	-READY
1A04	00401	REC CLOCK
----	00410	RECEIVE DATA
----	00410	REC LINE SIG DET
1A04	00402	-REC LINE SIGNAL DETECTOR
1A04	00404	REQUEST TO SEND
1A04	00403	REVERSE CHANNEL
----	00410	RING INDICATOR
1A04	00402	-RING INDICATOR
S		
1A04	00403	-SPECIAL CONTROL STROBE
1A04	00404	-STROBE
T		
1A04	00404	T1, T3 - T6
1A04	00404	-T6

LOCATION	REF. NO.	TERM
W		
1A04	00405	WRITE ADDRESS 2^0 - WRITE ADDRESS 2^9
1A04	00404	WRITING
X		
1A04	00401	XSTROBE
NUMERIC		
1A04	00406	1
1A04	00404	+1
1A04	00401	-1
1A04	00406	2
----	00410	2 MHZ
1A04	00406	4
----	00410	4 MHZ
1A04	00406	8
----	00410	-12V
1A04	00406	16
1A04	00406	32
----	00410	36V
1A04	00406	64
1A04	00406	128
1A04	00406	256
1A04	00406	512

PARTS

GENERAL

This parts identification section provides parts data for the RS232 (Buffered and Unbuffered) interfaces.

Assembly parts data are arranged in numerical sequence.

DEFINITION OF TERMS

REF NUM (A) The reference number is the assembly part number. This number is shown at the top of each page to establish the numerical arrangement of assembly parts lists within the section.

REVISION (B) The revision letter is an indication of the revision status of the source data of the assembly parts list.

TITLE (C) The title description is the assembly nomenclature.

FIND NUM (D) The find number column identifies the parts that make up the REF NUM assembly. These same numbers are used on the accompanying illustrations to help the reader determine where the part is used on the assembly.

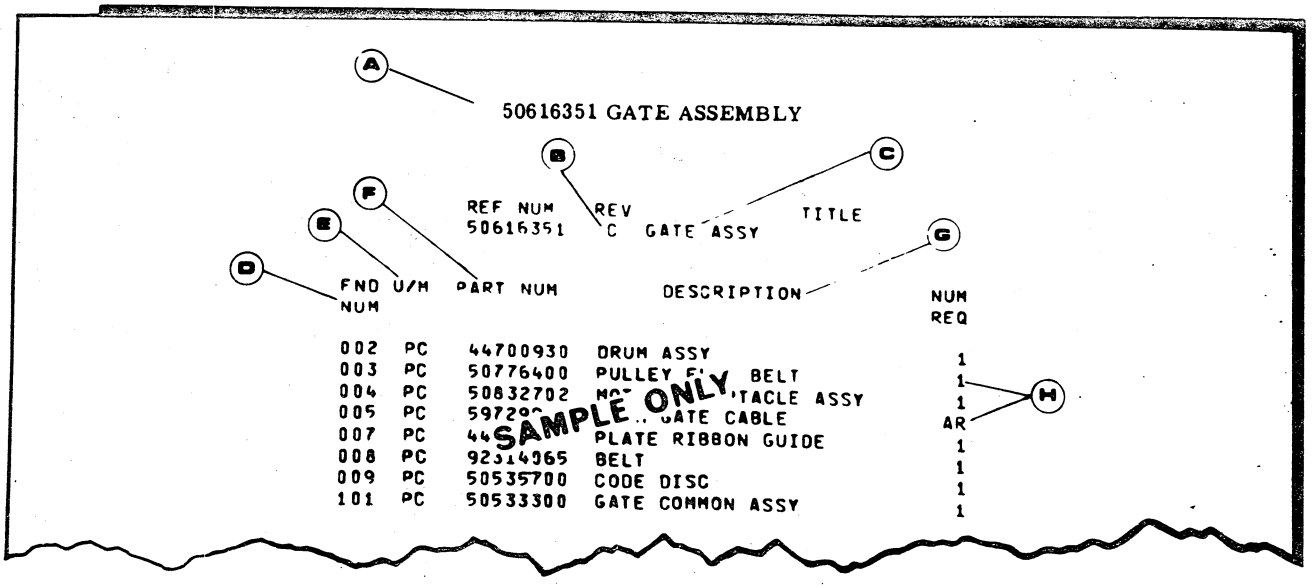
U/M (E) The unit measure describes the form that the part can be ordered in, i.e., PC, OZ, LBS, IN, FT, etc.

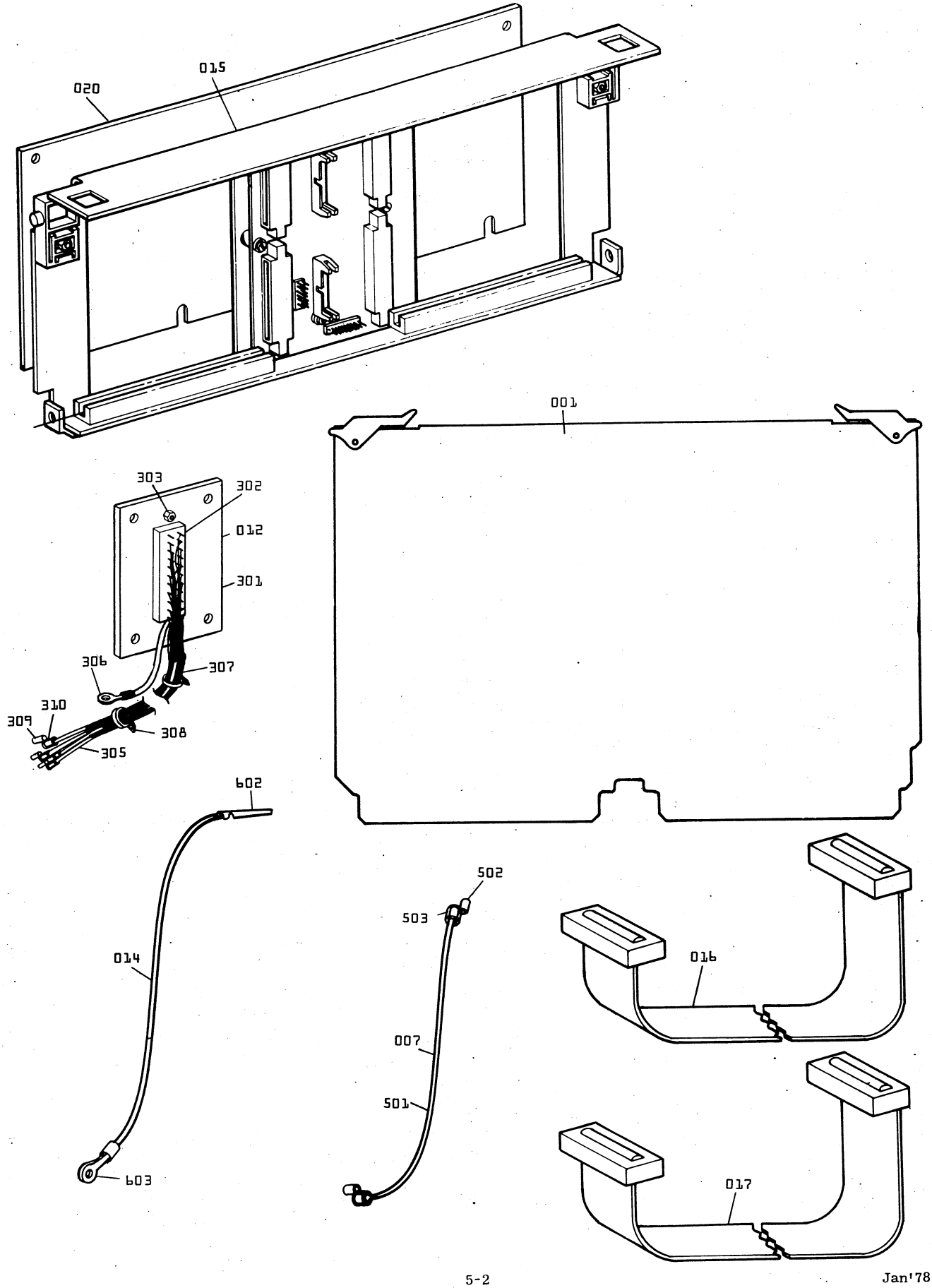
PART NUM (F) These 8-digit part numbers are used in reordering parts and are arranged in find number sequence to identify the parts that make up the REF NUM assembly.

DESCRIPTION (G) The part description is the part nomenclature.

AR (H) This abbreviation is used to indicate an as-required quantity.

NR (H) This abbreviation is used to indicate none required for quantity.

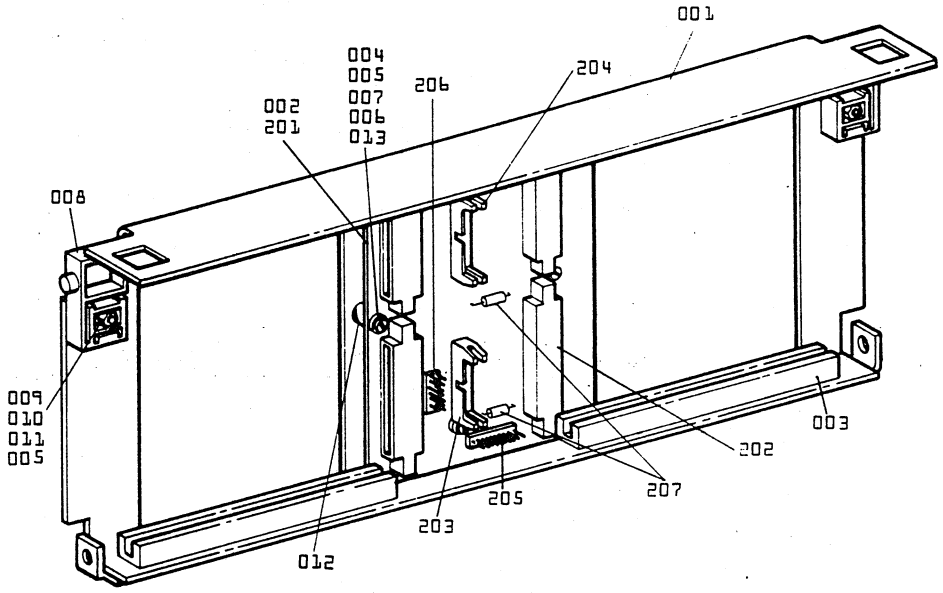



020
015
001
303
302
012
301
306
307
310
309
308
305
602
014
603
502
503
007
501
016
017

44674180 RS-232 BUFFERED INTERFACE
44674179 RS-232 UNBUFFERED INTERFACE

REF NUM	REV	TITLE
44674180	C	RS-232 BUFFERED INTERFACE
44674179	C	RS-232 UNBUFFERED INTERFACE

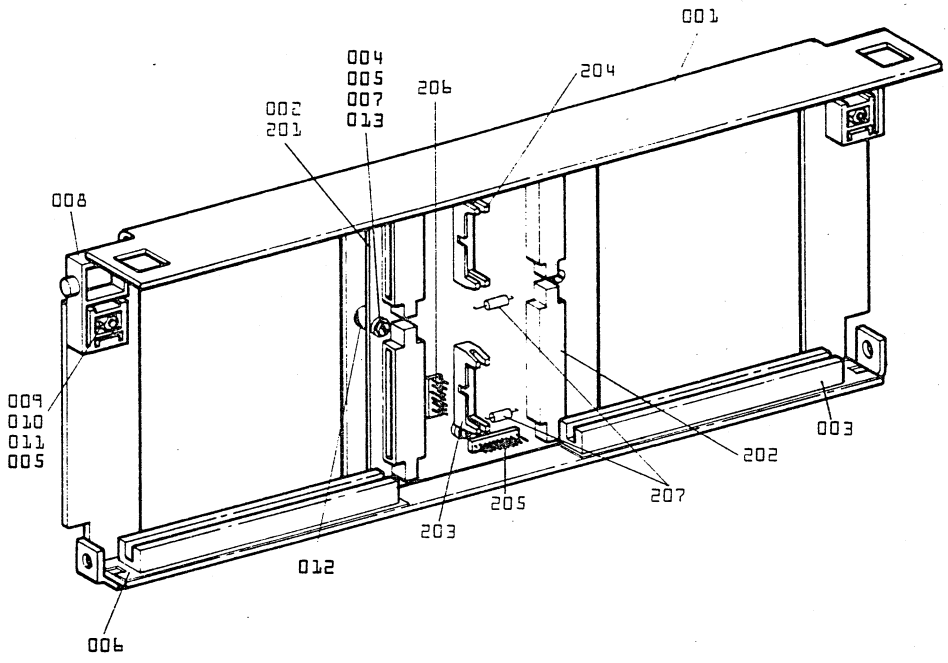
FND NUM	U/M	PART NUM	DESCRIPTION	NUM REQ
001	PC	44670096	RS-232 INTER BUFF ASSY	1
001	PC	44670104	RS-232 INTER UNBUFF ASSY	1
007	PC	44671138	CZ ASSY-REVER CHAN JUMP WIRE	1
501	FT	24546310	WIRE 24 GA WHT	0.5
502	PC	44670240	CONTACT SOCKETS	2
503	FT	24534704	SLEEVING	0.5
012	PC	44673329	CZ-ASSY I/O CONN I MTG PLATE	1
301	PC	95393600	PLATE CONN MTG	1
302	PC	76673901	CONNECTOR-25 PIN WIRE WRAP	1
303	PC	94288024	CONNECTOR HARDWARE	2
304	FT	15003709	WIRE STRAND 26 AWG WHT	18
305	FT	52629920	WIRE SOLID 26 AWG BLK	0.5
306	PC	95318401	RING TERMINAL	1
307	FT	24528636	SLEEVING	2
308	PC	94277400	TY-RAP	2
309	PC	44670239	CONTACT SOCKET REVERSE CRIMP	8
310	FT	24534704	SLEEVING	0.5
014	PC	44674230	GROUND WIRE ASSY	1
601	IN	93463000	WIRE STRAND 18 AWG BLK	12
602	PC	44670938	CONTACT-RECEPTACLE	1
603	PC	93541011	RING TERMINAL	1
015	PC	44681239	ASSY-INTERFACE FRAME	1
016	PC	95448008	CZ-ASSY-FLAT CABLE	1
017	PC	95448009	CZ RIBBON CABLE ASSY	1
018	PC	44672273	FORM FIELD CHANGE ORDER	1
019	PC	47868600	PLATE EQUIP. IDENT. MED	1
020	PC	44673911	MYLAR SHIELD	1



REF NUM	REV	TITLE
44673506	A	ASSY-INTERFACE FRAME

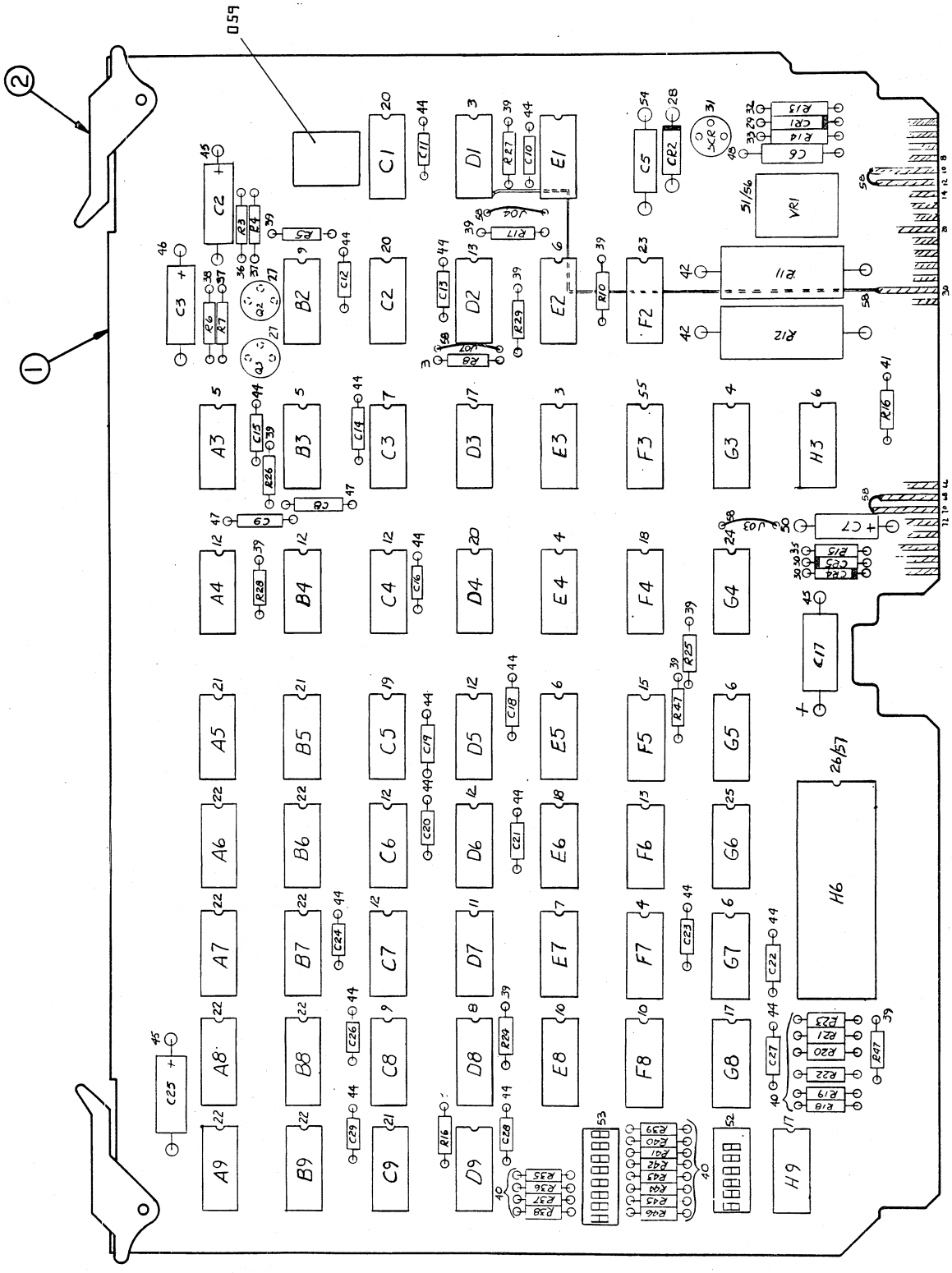
FND NUM	U/M	PART NUM	DESCRIPTION	NUM REQ
001	PC	44673493	BRACKET-CARD RACK	1
002	PC	44673234	ASSY-I FACE ADAPT BACKPLANE	1
201	PC	44673233	BD INTERFACE BACKPLANE	1
202	PC	76640400	PC CONNECTOR (RT ANGLE EDGE)	4
203	PC	95433302	HEADER SOLDER TAIL 34 PINS	1
204	PC	95433301	HEADER 26 PINS	1
205	PC	95443408	CONNECTOR 10 PIN	1
206	PC	95353505	HEADER-WW PC MOUNT	1
207	PC	68582310	CAP FIXED 10000	3
208	PC	95302715	SCR SELF TAP 4-40 X 1/4	4
209	FT	52629909	WIRE SOLID 30 AWG WHT	.3
003	PC	94362000	CARD GUIDE SNAP-IN	4
004	PC	76590037	SCR MCH CHS SLT M3X0.5X18	4
005	PC	76590201	NUT HEX M3X0.5	6
006	PC	93564039	WASHER NYLON	4
007	PC	76590524	WSHR INTL LK METRIC M3-3.2 ID	4
008	PC	44671517	BOARD LATCH	2
009	PC	76590033	SCR MCH CHS SLT M3X0.5X10	2
010	PC	76590404	WSHR FLT METRIC M3-3.2 ID	2
011	PC	76590504	WSHR EXT LK METRIC M3-3.2 ID	2
012	PC	94834904	SPACER	4
013	PC	93564013	WASHER NYLON	4

44671239 ASSY-INTERFACE FRAME



REF NUM	REV	TITLE
44681239	A	ASSY-INTERFACE FRAME

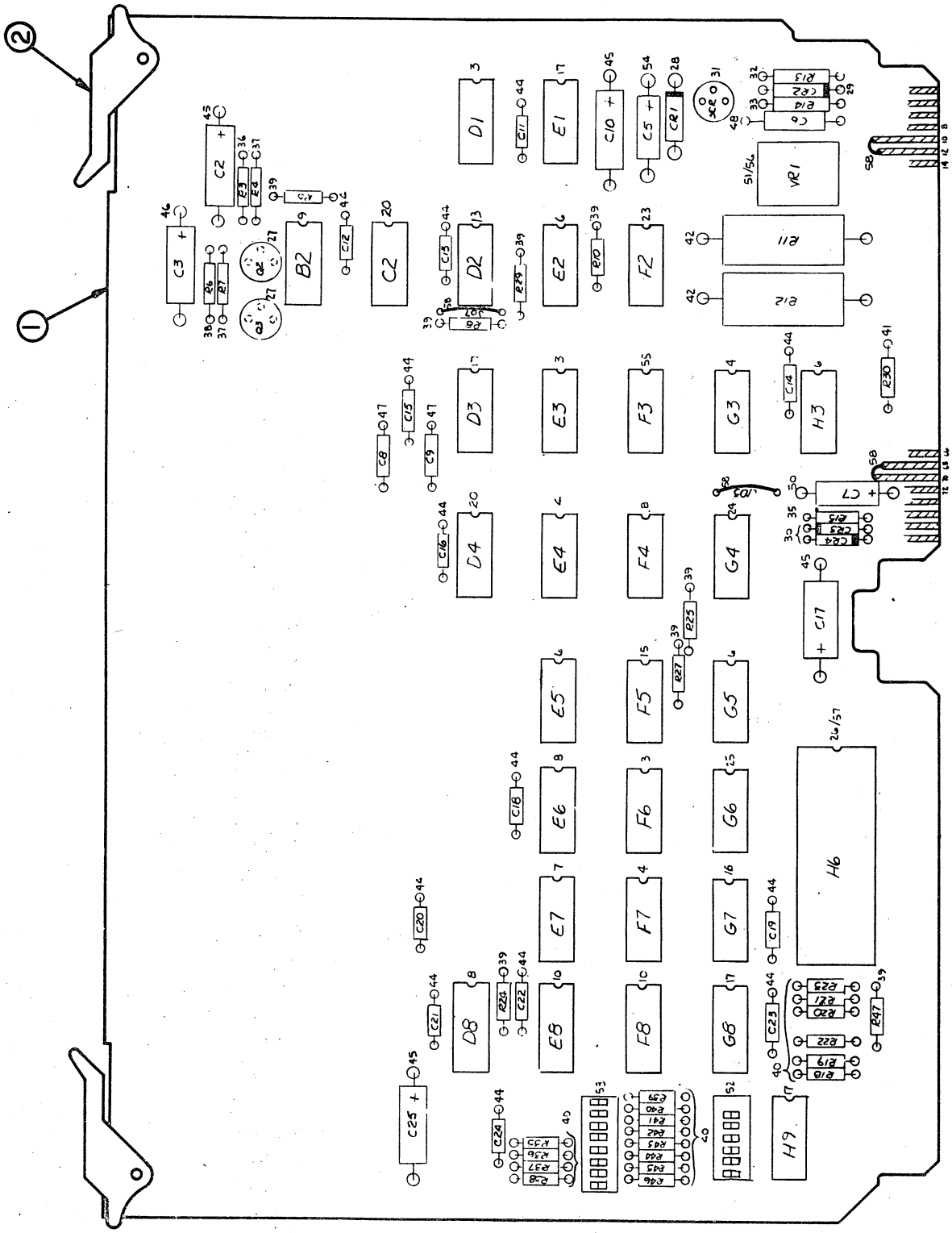
FND NUM	U/M	PART NUM	DESCRIPTION	NUM REQ
001	PC	44677353	BRACKET-CARD RACK	1
002	PC	44673234	ASSY-I FACE ADAPT BACKPLANE	1
201	PC	44673233	BD INTERFACE BACKPLANE	1
202	PC	76640400	PC CONNECTOR (RT ANGLE EDGE)	4
203	PC	95433302	HEADER SOLDER TAIL 34 PINS	1
204	PC	95433301	HEADER 26 PINS	1
205	PC	95443408	CONNECTOR 10 PIN	1
206	PC	95353505	HEADER-WW PC MOUNT	1
207	PC	68582310	CAP FIXED 10000	3
208	PC	95302715	SCR SELF TAP 4-40 X 1/4	4
209	FT	52629909	WIRE SOLID 30 AWG WHT	.3
003	PC	94362000	CARD GUIDE SNAP-IN	4
004	PC	76590037	SCR MCH CHS SLT M3X0.5X18	4
005	PC	76590201	NUT HEX M3X0.5	6
006	PC	44680968	CARD GUIDE SPACER	4
007	PC	76590524	WSHR INTL LK METRIC M3-3.2 ID	4
008	PC	44671517	BOARD LATCH	2
009	PC	76590033	SCR MCH CHS SLT M3X0.5X10	2
010	PC	76590404	WSHR FLT METRIC M3-3.2 ID	2
011	PC	76590504	WSHR EXT LK METRIC M3-3.2 ID	2
012	PC	44680969	SPACER BK PLN PCB	4
013	PC	93564039	WASHER NYLON	4



44670096 RS-232 BUFFERED INTERFACE BOARD

REF. NUM	REV	TITLE
44670096	E	RS-232 BUFFERED INTERFACE BD.

FND NUM	U/M	PART NUMBER	DESCRIPTION	QTY
001	PC	44670093	BD RS232 BUFFER INTERFACE	1
002	PC	51894400	INJECTOR-EJECTOR	2
003	PC	36186800	IC 7400	2
004	PC	95350102	IC 7404	3
005	PC	50254200	IC 7406	2
006	PC	95338002	IC 7408	4
007	PC	36187200	IC 7410	2
008	PC	15105000	IC 74107	1
009	PC	50254300	IC 74123	1
010	PC	51761500	IC 74161	2
011	PC	15104500	IC 74175	2
012	PC	17184200	FREQ DIV 74193	7
013	PC	36187300	IC 7420	2
015	PC	15109500	IC 7425	1
016	PC	15106800	IC 7427	1
017	PC	15107000	IC 7437	4
018	PC	95347802	IC 7442	2
019	PC	15104800	IC 7474	2
020	PC	15107300	IC 9314	3
021	PC	51784000	IC 9322	3
022	PC	15140300	MEMORY 8102	8
023	PC	17186000	IC 7492	1
024	PC	36186400	IC 75188	1
025	PC	50254500	IC 75154	1
026	PC	15125700	1602A UART	1
027	PC	94825000	TRANSISTOR 2N3565	2
028	PC	95321630	ZENER DIODE 5W	1
029	PC	94823810	ZENER DIODE	1
030	PC	11803000	DIODE SILICON	2
031	PC	76604300	SILICON CONT RECTIFIER	1
032	PC	24500015	RESISTOR 10 OHMS 1/4W 5	1
033	PC	24500039	RESISTOR 100 OHMS 1/4W 5	1
035	PC	17705912	RES 100K OHMS 1/4W 5	1
036	PC	17705928	RES 470K OHMS 1/4W 5	1
037	PC	24500094	RESISTOR 20K 1/4W 5	2
038	PC	17705909	RES 75K OHMS 1/4W 5%	1
039	PC	24500063	RESISTOR 1K 1/4W 5	13
040	PC	24563086	RESISTOR 4.3K	18
041	PC	94402163	RESISTOR 2K 1/4W 5	1
042	PC	95596551	RES 470, 5W	2
044	PC	92496227	CAP .01MFD 20% 100V	18
045	PC	24504353	33 MF, 20 15V	3
046	PC	24505261	CAP 10.0UFD 10% 6V	1
047	PC	24501725	CAP 330PF 20% 50V	2
048	PC	24505229	CAP 1.0UFD 10% 6V	1
050	PC	24504312	CAP 6.8 MFD 20% 6V	1
051	PC	95385700	POS. VOLT. REGULATOR (+12 V)	1
052	PC	83452203	SWITCH NET 6POS	1
053	PC	83452205	SIWTCH NET 8POS	1
054	PC	24504339	CAP 6.8 MFD 35V	1
055	PC	15124800	IC-7414	1
056	PC	94765400	XSTR INSULATOR	1
057	PC	51858103	40 PIN SOCKET	1
058	FT	52629909	WIRE SOLID 30 AWG WHT	.50
059	PC	44677512	LABEL-MOS	1



44670104 RS-232 UNBUFFERED INTERFACE BOARD

REF. NUM	REV.	TITLE
44670104	A	RS-232 UNBUFFERED INTERFACE BD.

FND NO.	U/M	PART NUMBER	DESCRIPTION	QTY
001	PC	44670101	BD RS232 UNBUFF INTERFACE	1
002	PC	51894400	INJECTOR-EJECTOR	2
003	PC	36186800	IC 7400	2
004	PC	95350102	IC 7404	3
006	PC	95338002	IC 7408	4
007	PC	36187200	IC 7410	1
008	PC	15105000	IC 74107	1
009	PC	50254300	IC 74123	1
010	PC	51761500	IC 74161	2
013	PC	36187300	IC 7420	2
015	PC	15109500	IC 7425	1
016	PC	15106800	IC 7427	1
017	PC	15107000	IC 7437	4
018	PC	95347802	IC 7442	2
020	PC	15107300	IC 9314	2
023	PC	17186000	IC 7492	1
024	PC	36186400	IC 75188	1
025	PC	50254500	IC 75154	1
026	PC	15125700	1602A UART	1
027	PC	94824000	TRANSISTOR 2N3565	2
028	PC	95321630	ZENER DIODE 5W	1
029	PC	94823810	ZENER DIODE	1
030	PC	11803000	DIODE SILICON	2
031	PC	76604300	SILICON CONT RECTITIER	1
032	PC	24500015	REISSTOR 10 OHMS 1/4W 5	1
033	PC	24500039	RESISTOR 100 OHMS 1/4W 5	1
035	PC	17705912	RES 100K OHMS 1/4W 5	1
036	PC	17705928	RES 470K 1/4W 5	1
037	PC	24500094	RESISTOR 20K 1/4W 5	2
038	PC	17705909	RES 75K OHMS 1/4W 5	1
039	PC	24500063	RESISTOR 1K 1/4W 5	8
040	PC	24563086	RESISTOR 4.3K	18
041	PC	24500070	RESISTOR 2K1/4W 5	1
042	PC	95595551	RESISTOR 470, 5W	2
044	PC	92496227	CAP .01MFD 20% 100V	13
045	PC	24504353	33 MF, 20 15V	4
046	PC	24505261	CAP 10.0UFD 10% 6V	1
047	PC	24501725	CAP 330 PF 20% 50V	2
048	PC	24505229	CAP 1.0UFD 10% 35V	1
050	PC	24504312	CAP 6.8MFD 20% 6V	1
051	PC	95385700	POS. VOLT. REGULATOR (+12V)	1
052	PC	95398502	SWITCH NET 6POS	1
053	PC	95398504	SWITCH NET 8POS	1
054	PC	24504339	CAP 6.8 MFD 35V	1
055	PC	15124800	IC-7414	1
056	PC	94765400	XSTR INSULATOR	1
057	PC	51858103	40 PIN SOCKET	1
058	FT	52629909	WIRE SOLID 30 AWG WHT	

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