74701010

CONTROL DATA
CORPORATION

CDC® HOST COMMUNICATIONS PROCESSOR

2550-2

2552-1

2550-100

GENERAL DESCRIPTION
OPERATION
INSTALLATION
THEORY OF OPERATION
DIAGRAMS
DDLTS AND PROCEDURES
MAINTENANCE
PARTS DATA

Volume 2 of 2

Preliminary Edition

HARDWARE MAINTENANCE MANUAL

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MANUAL TO EQUIPMENT LEVEL CORRELATION SHEET

This manual reflects the equipment configurations listed below.

EXPLANATION: Locate the equipment type and series number, as shown on the equipment **FCO** log, in the list below. Immediately to the right of the series number is an **ECO** or **FCO** number. If that number and all of the numbers underneath it match all of the numbers on the equipment **FCO** log, then this manual accurately reflects the equipment.

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
DW108-A	01		
DW108-B	01		
AA109-A	01		
DU106-A	01		
GD122-B	01		
GD122-E	01		
XA148-A	01		
AT241-B	01		
FA104-A	01 & 02		
BE602-A	01		

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PREFACE

This manual comprises volume 2 of the hardware maintenance manual for the CONTROL DATA® 2550-2, 2552-1 and 2550-100 Host Communications Processors (HCPs).

This manual contains extensive installation and checkout procedures for the HCP. A complete set of diagnostic decision logic tables (DDLTs) and test procedures are provided for troubleshooting. Additional information is provided on the repair of all equipments, backpanels and cable assemblies contained in the HCP. This manual is of primary interest to the first contact CDC Customer Engineer (CE).

Volume 1 is the 2550-2 (MOS) Host Communications Processor Hardware Maintenance Manual, Publication No. 74701000. The manual contains an expanded system description and theory of operation with associated logic drawings. Also, the manual contains programming information useful to the diagnostic and hardware support engineers.

The related publications listed below are available through the literature distribution services, Minneapolis, Minnesota.

Publication	Publication Number
2550-2 (MOS) Host Communications Processor - Hardware Reference Manual	74375500
2550 Series Host Communications Processor - Site Preparation Manual	74641200
2560-1/-2/-3 Synchronous Communications Line Adapters - Hardware Reference and Maintenance Manual	74700700
1714 Computer System - Reference Manual	60364900
Basic Microprogrammable Processor - Hardware Maintenance Manual	39451400

Publication	Publication Number
CW212-A I/O TTY Controller - Hardware Maintenance Manual	96728900
DE402-A/1700 Transform with Micromemory - Hardware Maintenance Manual	96728700
AA109-A/B 1700 Enhanced Processor with MOS Memory and Interface - Hardware Maintenance Manual	96768600
FA104-A Tape Cassette Controller - Hardware Maintenance Manual	96711900
6671/6676 Emulation Coupler - Hardware Reference/Maintenance Manual (DY159-A)	60470400

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SECTION 1

GENERAL DESCRIPTION

SECTION 1

GENERAL DESCRIPTION

This section contains a brief description of the HCP equipments. The contents of this section are arranged as follows:

1A - Microprogrammable Processor, Cabinet and Maintenance Panel
1B - Maintenance Panel and Controller
1C - Cassette Tape and Controller

SECTION 1A

MICROPROGRAMMABLE PROCESSOR, CABINET, AND MAINTENANCE PANEL

MICROPROGRAMMABLE PROCESSOR

The AA109 microprogrammable base processor is a multilevel processing unit that utilizes 16-bit macroinstruction words. It emulates the basic 1700 instruction repertoire plus an enhanced instruction set with an instruction execution time relative to a main memory cycle time of 600 nanoseconds. When used in a single or dual processor configuration, it is the processor in bay 1. See figure 1A-1.

The processor has the following features:

- I/O-TTY interface for teletypewriter (current mode operation) or conversational display terminal, (RS232C operation)
- Internal TTL level bus system that is functionally compatible with CDC 1700 A/Q or A/Q DMA and NCR MOS I/O peripheral requirements.
- Auto data transfer (ADT) operation mode
- Real-time clock interrupt facility
- Sixteen levels of micro/macro interrupt facilities to accommodate most system configurations
- Priority-oriented direct memory access (DMA) bus system.

Additional expansion capabilities provide for:

- Interface to 131K words of MOS memory or 98K words of MOS memory and 98K word ECC MOS array modules
- Accommodates either the 16K word MOS memory module or the 32K MOS memory module, which is expandable up to 131K words of internal MOS memory per processor or 96K words.

- Accommodates the breakpoint panel
- Accommodates RAM/ROM micromemory up to 4K
- The back panel of each input/output board position in the processor accepts a push-on cable connector for attaching the controller within the logic chassis to an associated peripheral device.

Input/Output facilities provided by the prewired back panel are as follows:

- 1700 A/Q or MOS TTL-level peripheral devices (five slots).
- 1700 A/Q-DMA TTL level peripheral devices (four slots).
- Unassigned input/output board positions that provide standard input power only (two slots).

MICROPROGRAMMABLE PROCESSOR (2552-1)

The AA109 microprogrammable multiplexer processor has the same features and options as the AA109 base processor, except that it is the bay 0 processor in a dual-processor (2552) configuration. The AA109 multiplexer processor shares the power distribution system and operators TTY with the AA109 basic processor. See figure 1A-1.

The dual-processor configuration provides the following additional capability:

- The external ports of two MOS memory systems directly interconnected provide up to 262K words of common storage accessible by both processor ports and both DMA ports
- The second processor AA109 is installed in the cabinet adjacent to the first processor with interconnecting cables being no longer than four feet.

EQUIPMENT CABINET CONFIGURATION

2550-2, 2550-100 CONFIGURATIONS

The AA109 processor normally is mounted in a standard 2 bay equipment cabinet. The cabinet is a vertical rack type. Included as part of the equipment cabinet are power supplies of +5VDC, ±12VDC and -9VDC, and a power distribution box. See figure 1A-1.

The power supplies are installed as illustrated in figure 1A-2. The +5VDC power supply supplies power to the logic boards located in the processor. The +12VDC, -5VDC and -9VDC provides power to the memory modules and the ±12VDC supplies power to the I/O-TTY circuits.

The power distribution box in installed in the equipment cabinet as shown in figure 1A-2. It provides AC power ON/OFF control and primary line filtering for the processor and installed peripherals.

2552-1 CONFIGURATION

Consists of one Bay which is the same as the 2550-2 above but the second Bay is similar to the first, housing an AA109 processor. The second Bay shares the AC power distribution box located in the first Bay. The equipment is mounted as illustrated in figure 1A-1.

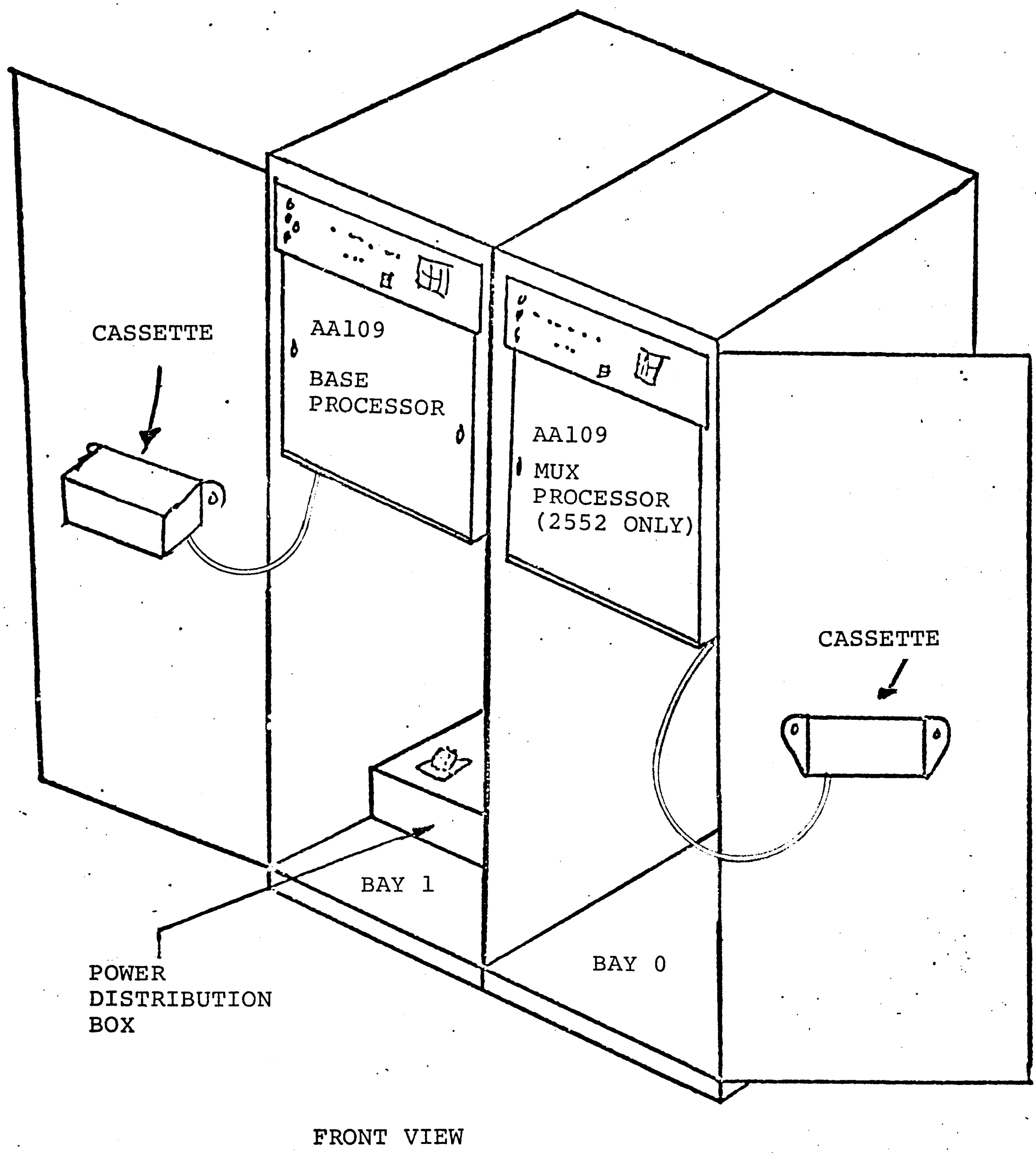


Figure 1A-1. 2550/2552 HCP Cabinet

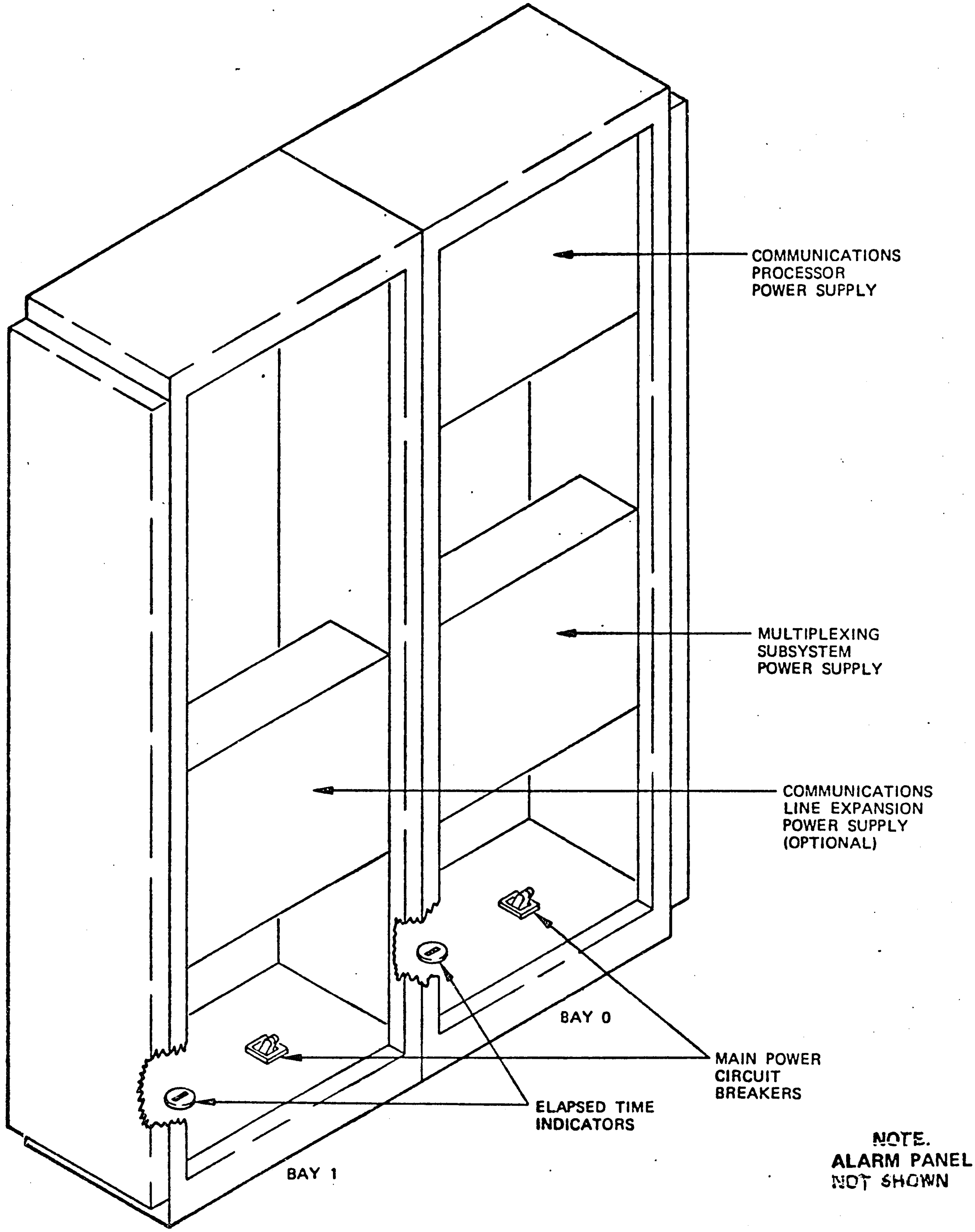


Figure 1A-2. 2550 HCP Rear View

SECTION 1B

MAINTENANCE PANEL AND CONTROLLER

The maintenance panel provides interface to the micro/macro processor. It allows the operator to load and display all registers and memory within the processor via the maintenance panel controller. It provides a operator interface to the function control register and permits setting and clearing all microprocessor control bits of the function control register. It also includes a 16-bit light-emitting diode display and limited keyboard interface. The maintenance panel communicates with the processor via the maintenance panel controller, which is a printed-circuit board located within the logic chassis of the processor. This controller provides a programmable micro/macro breakpoint capability that is useful in debugging software and trouble-shooting hardware.

Figure 1B-1 illustrates the physical characteristics of the maintenance panel, which is located behind the left front door of the HCP.

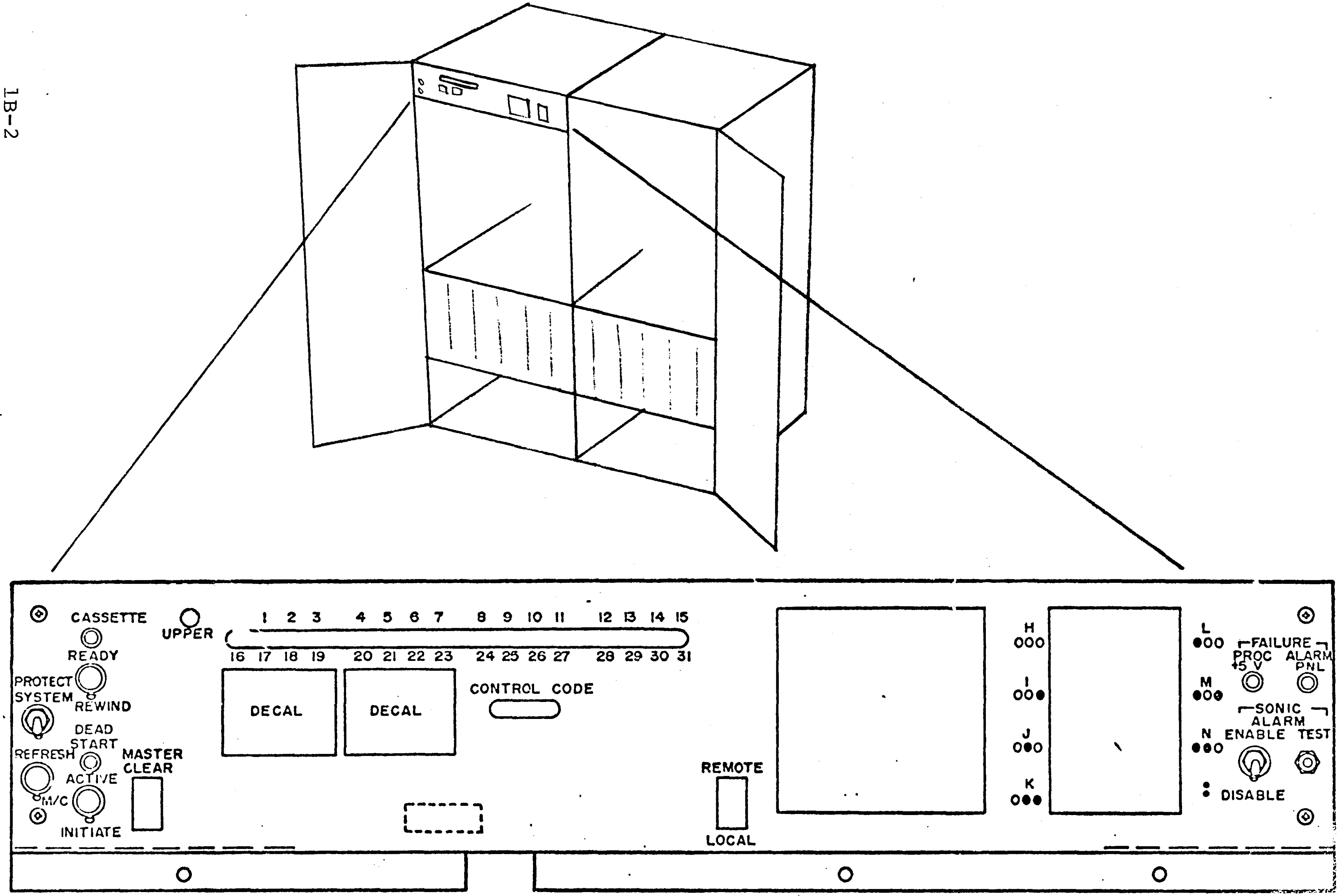


Figure 1B-1. Maintenance Panel Physical Characteristics

SECTION 1C

CASSETTE TAPE TRANSPORT AND CONTROLLER

The cassette tape transport and the cassette tape controller are used as a program load device or a data recording device. The cassette transport (figure 1C-1) is a small, compact read/write device using a cassette tape cartridge for data storage. The controller for the cassette tape transport is located in its predetermined slot in the logic chassis of the processor and provides an interface between the processor and cassette for access and control of either one or two transports. The transport is equipped with an interlock switch on the lid that disables all functions when the lid is open. The cassette tape can be inserted with either side up. The cartridge has a keyway that is sensed by the transport to determine which side is up. The transport is capable of five modes of operation: forward read, forward write, reverse, rewind, and idle. The only actions required of the operator are to load and unload tape and to provide scheduled maintenance.

The transport operates using +5VDC, +12VDC and -12VDC supplied from the processor power supplies via MP17 Backplane. The controller gets its operating power from the processor. (See figure 1C-2).

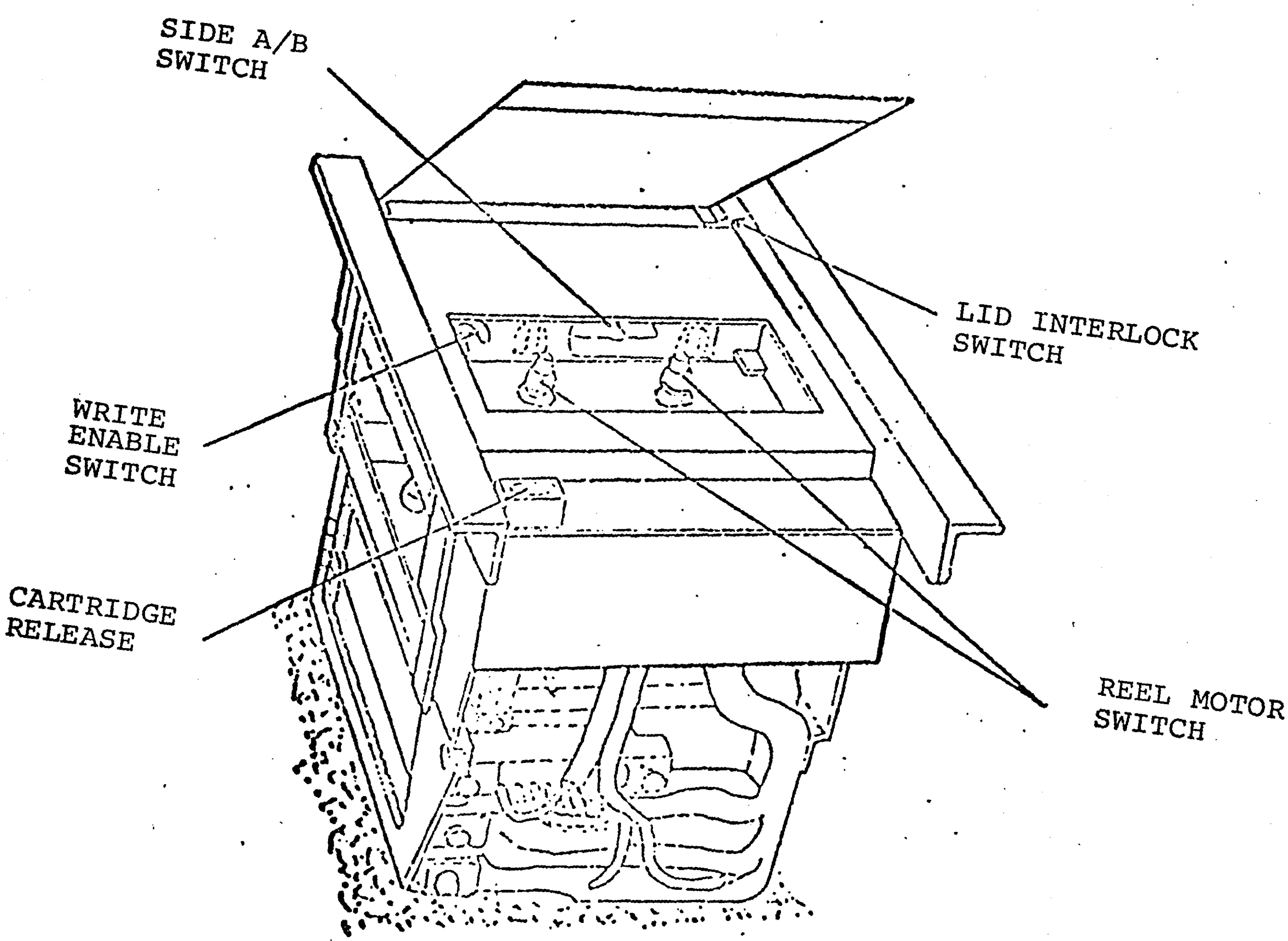


Figure 1C-1. Cassette Tape Transport Physical Characteristics

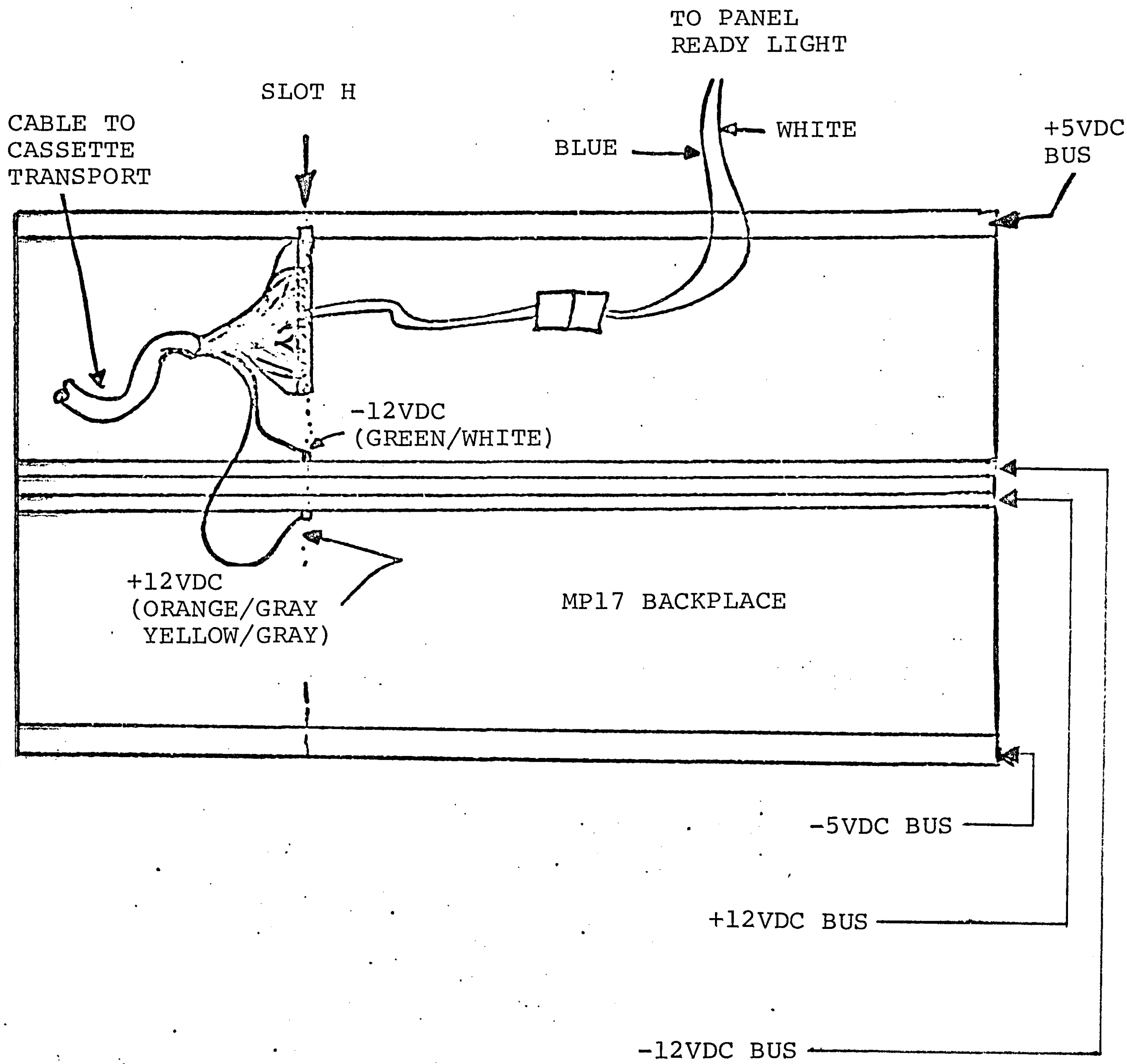


Figure 1C-2. Cassette Transport Power Connections

SECTION 2

OPERATION

SECTION 2

OPERATION

This section contains information on the HCP controls and indicators and operating instructions which include start-up and shut-down procedures. The contents of this section are arranged as follows:

SECTION 2A

PROCESSOR, CABINET, AND MAINTENANCE PANEL

Operators controls are limited to those associated with the maintenance panel and power distribution system. These switches and indicators are illustrated in Figure 2A-1.

Operator control of the processor within a system configuration is via the teletypewriter (TTY) and maintenance panel. These operator control units provide basic control functions including deadstart, master clear, stop, manual interrupt, and run. Figure 2A-2 shows the location and identity of the controls and indicators normally used.

Some maintenance actions described in the diagnostic decision logic tables (DDLTs) in section 6 must be performed in panel mode. This mode enables the display of various computer registers on the TTY and the performance of necessary maintenance operations. Panel mode is entered by pressing the ESC key on the conversational display terminal. Once in panel mode, entries, are made on the conversational display terminal as described in the DDLTs in section 6. Each entry is terminated by pressing the colon (:) or G key on the keyboard.

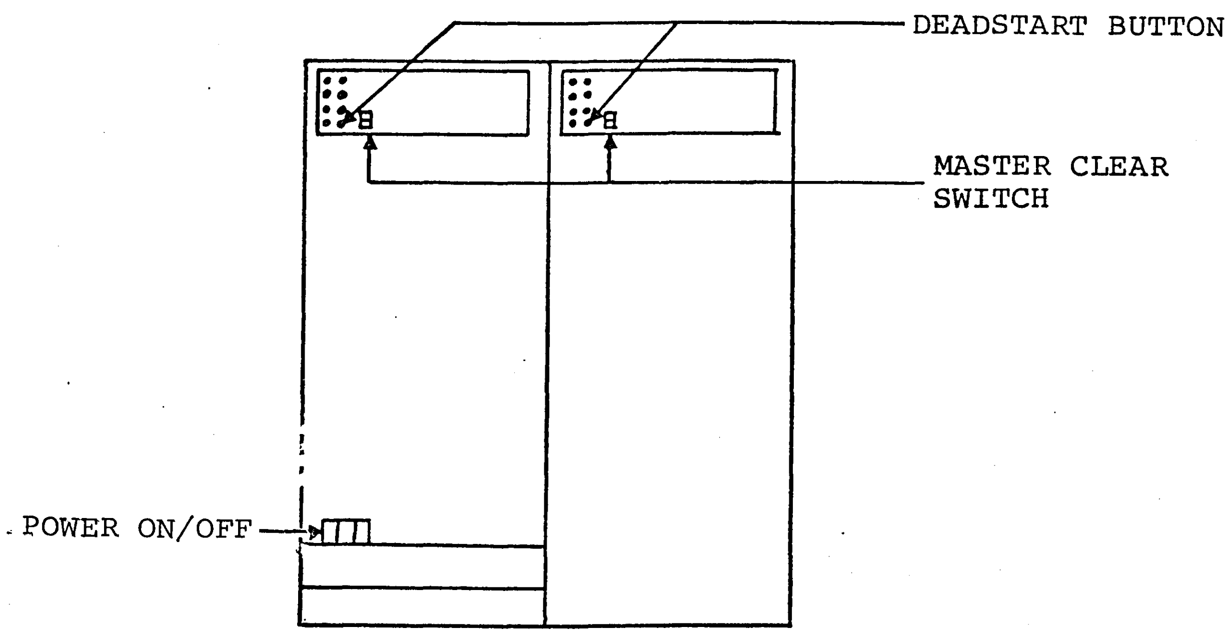


Figure 2A-1. Cabinet and Processor Switches and Indicators

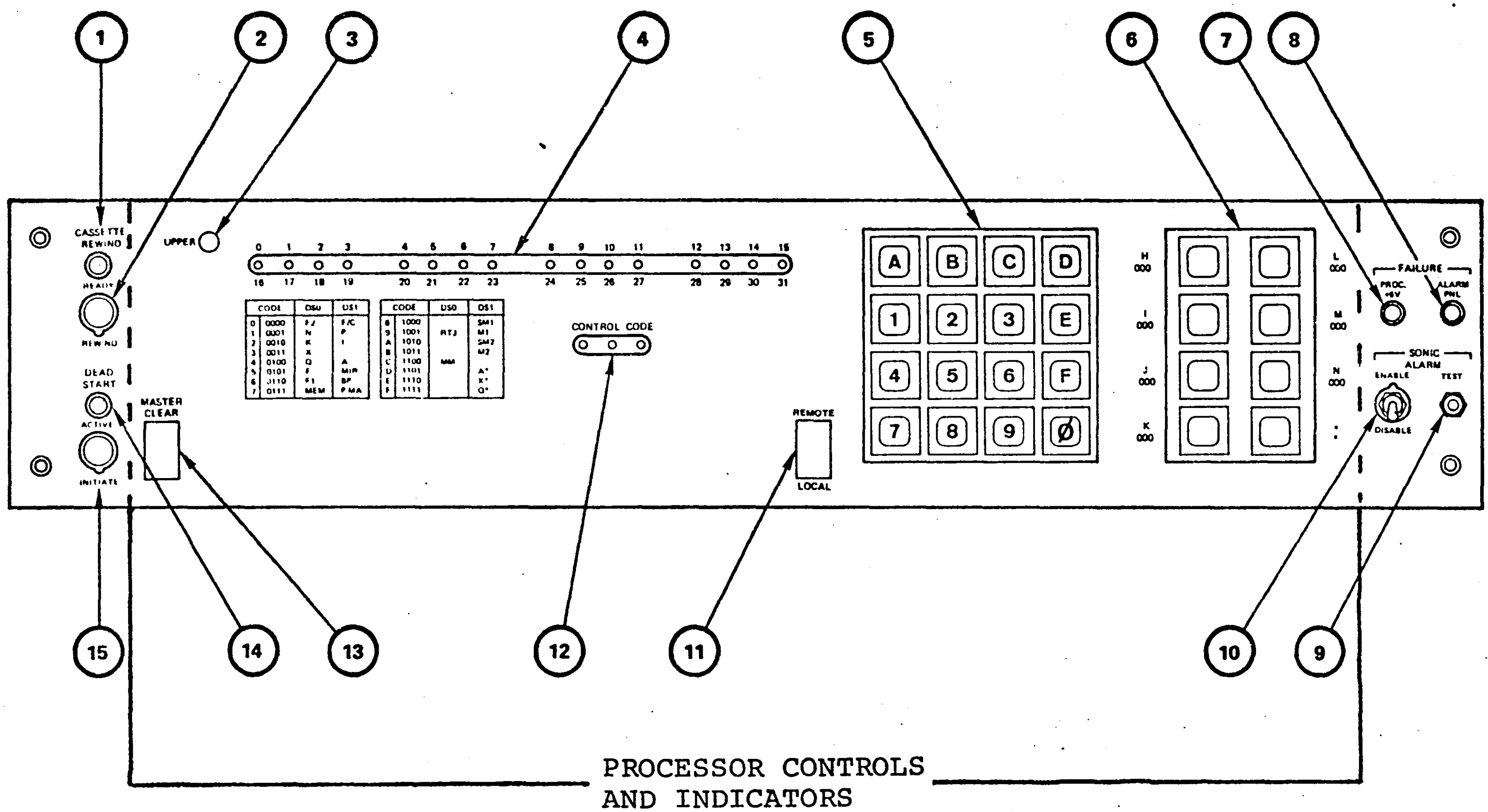


Figure 2A-2. Maintenance Panel - Controls and Indicators

MAINTENANCE PANEL

In the following descriptions, the individual item numbers correspond to the callouts in figure 1B-1. The following controls and indicators are located on the maintenance panel:

1. CASSETTE READY Indicator. This light-emitting diode (LED) indicator illuminates to indicate that the tape cassette transport is ready. This condition exists with a cassette installed, door closed, transport not rewinding, and no CRC error. A cassette must be READY to initiate dead-start.

2. CASSETTE REWIND Switch. This momentary-contact pushbutton switch is used to actuate the rewind mode of operation in the tape cassette transport.

3. UPPER Indicator. This LED indicator operates in conjunction with the data display indicators as described in Item 4 below. Primary use is the display of the FCR.

4. Data Display Indicators. These 16 LED indicators are used to display the contents of a selected register in the MP. Since some of these registers contain 32 bits, the UPPER indicator is used to determine whether the display is presenting the upper or lower 16 bits in a register. When the UPPER indicator is lit, bits 0 through 15 are being displayed; when UPPER is not lit, bits 16 through 31 are displayed.

5. Data Entry Switches. These 16 momentary-contact pushbutton switches are used to enter data in hexadecimal (16-bit) form. These are labeled "0" through "9", "A" through "F".

6. <u>Control Character Switches</u>. These eight momentary-contact pushbutton switches are used to enter control characters: H, I, J, K, L, M, N, and the colon (:). Function of these control characters is as follows:

- H When used alone (followed by a colon terminator), causes program execution to halt. The halt affects macro program execution or micro program execution, depending on the setting of bit 12 of the FCR.

  When used preceding a two-digit number (followed by a colon terminator), causes the corresponding bit of the FCR to be reset.

- I When used alone (followed by a colon terminator), causes program execution to be initiated. Affects micro or macro execution, depending upon setting of FCR bit 12.

  When used preceding a two-digit number (followed by a colon terminator), causes the corresponding bit of the FCR to be set.

- J When used alone (followed by a colon terminator), causes the UPPER indicator to change state, permitting upper and lower portions of the FCR, for example, to be displayed.

  When used preceding a two-digit number (followed by a colon terminator), causes four bits of the FCR referenced by the first digit (0 through 5) to be replaced by the value of the second digit.

- K When used alone (followed by a colon terminator), causes the contents of the register specified by the "Display 1" portion of the FCR to be displayed.

  When used preceding a 4- or 8-hex digit number (followed by a colon terminator), causes the contents of the register by the FCR "Display 1" character to be replaced by the specified digits.

NOTE

When main memory is displayed or entered, the register selected is Display 1 is the main memory address. The Display 1 selection must be the P register. This register is incremented by 1 after the display.

When micromemory is displayed or entered, the K register is the least significant 8 bits of the address, and the N register provides for the remaining bits. The K register is incremented by 1 after the display.

- L The L function is operationally the same as the K function except that it is associated with Display 0.
- M Not presently used.
- N Not presently used.
- : Used to terminate all entries. (Note that when using the console in lieu of the maintenance panel, three terminating characters can be used - colon, G, or @. The @ character also causes control to switch from panel mode to I/O mode.

7. FAILURE PROC. +5 Indicator. This LED indicator is used to indicate logic power is not available for the processor and alarm panel system. This indicator must be OFF for the alarm panel failure indicator to provide valid results.

8. FAILURE ALARM PNL Indicator. This LED indicator is used to indicate that one (or more) of the power supplies has failed, and/or an over-temperature condition exists. The specific failure(s) can be determined by looking at the individual indicators on the alarm panel mounted in the rear of the HCP cabinet.

9. <u>SONIC ALARM TEST Switch</u>. This momentary-contact pushbutton switch is used to provide a standard "Press to Test" function for the sonic alarm.

10. <u>SONIC ALARM ENABLE/DISABLE Switch</u>. This two-position toggle switch is used to enable and disable the sonic alarm circuit. Visual alarms, however, will be presented regardless of the setting of this switch.

11. <u>REMOTE/LOCAL Switch</u>. This two-position rocker switch is used to select either the maintenance panel or the communications console as the point of control for the HCP. When the switch is set to the LOCAL position, the maintenance panel is enabled; when the switch is set to the REMOTE position, the communications console is enabled.

12. <u>CONTROL CODE Indicator</u>. These three LED indicators present the last character entered via the control character switches. The display may be interpreted by using table 2A-1. In this table a one denotes a lighted LED. Once entered, a control code remains set until replaced by another control code, or master-cleared.

TABLE 2A-1. CONTROL CODES

Display	Character
000	H (master-cleared state)
001	I
010	J
011	K
100	L
101	M (not used)
110	N (not used)
111	Error

NOTE

The error code can be used as one indicator that a program failed to load correctly.

13. MASTER CLEAR Switch. This momentary-contact rocker switch is used to clear memory in the CP and the peripheral controller.

14. DEAD START ACTIVE Indicator. This LED indicator is used to indicate that the HCP is ready to receive data from a card reader or the tape cassette transport, and that the deadstart sequence is in process.

15. DEAD START INITIATE Switch. This momentary-contact pushbutton switch is used to actuate the reading of a data by a card reader or the tape cassette transport. Selection of the device to be used is determined by the READY state of the peripherals; only one dead-start peripheral can be READY when using this switch.

SECTION 2B

MAINTENANCE PANEL AND CONTROLLER

The maintenance panel and controller allows the operator to display all registers, interface to the function control register (FCR) (which allows the setting and clearing of control bits), and permits setting of breakpoint for software and hardware analysis. The maintenance panel is enabled by placing the LOCAL/REMOTE switch on the panel to the LOCAL position. Table 2B-1 briefly describes the function of the switches and indicators identified in Figure 2B-1. In a dual processor system, each processor has a maintenance panel and controller.

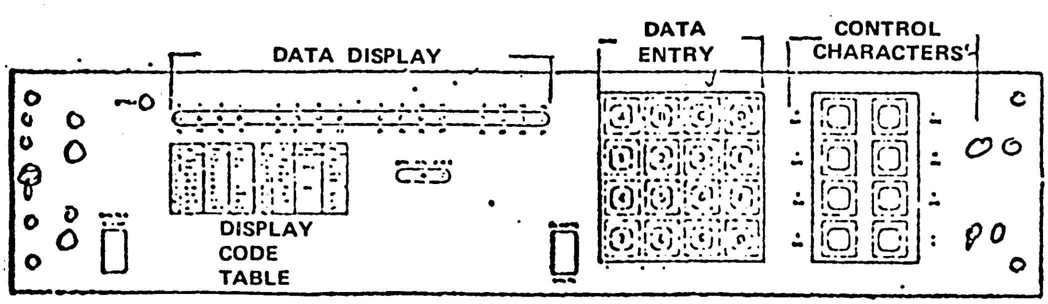


Figure 2B-1. Maintenance Panel Switches and Indicators

Table 2B-1. Switch and Indicator Functions

Switch and Indicator	Type	
MASTER CLEAR	Momentary contact switch	Pressing this switch provides a master clear to the processor, memory, and all peripheral controllers within the processor.
REMOTE/LOCAL	single-pole single-throw switch	In local mode, this switch enables use of the breakpoint panel. In remote, the normal conversational display terminal entry mode is used.
Data display	Indicator	This 16-bit panel provides a display of register data as functions are performed.
UPPER	Indicator	When lit, this light-emitting diode indicates the upper 16 bits of any 32-bit register selected are being displayed. If not lit, the lower 16 bits are displayed.
CONTROL CODE	Indicator	This 3-bit light-emitting diode display indicates the last control character entered.
Data entry	Pushbutton switches	These 16 momentary contact switches are used to enter hexadecimal data.
Control characters	Pushbutton switches	These momentary contact switches are used for entering control characters.

SECTION 2C

CASSETTE TAPE TRANSPORT AND CONTROLLER

The cassette tape transport, when included in the system, provides a convenient and efficient method of loading diagnostics or software. Internal switches on the controller are described in section 4C. Figure 2C-1 illustrates the location of the interlock and function switches associated with the transport and table 2C-1 describes the function of each.

External operator switches and indicators on the operators panel (Figure 2A-2) are described in Table 2C-2.

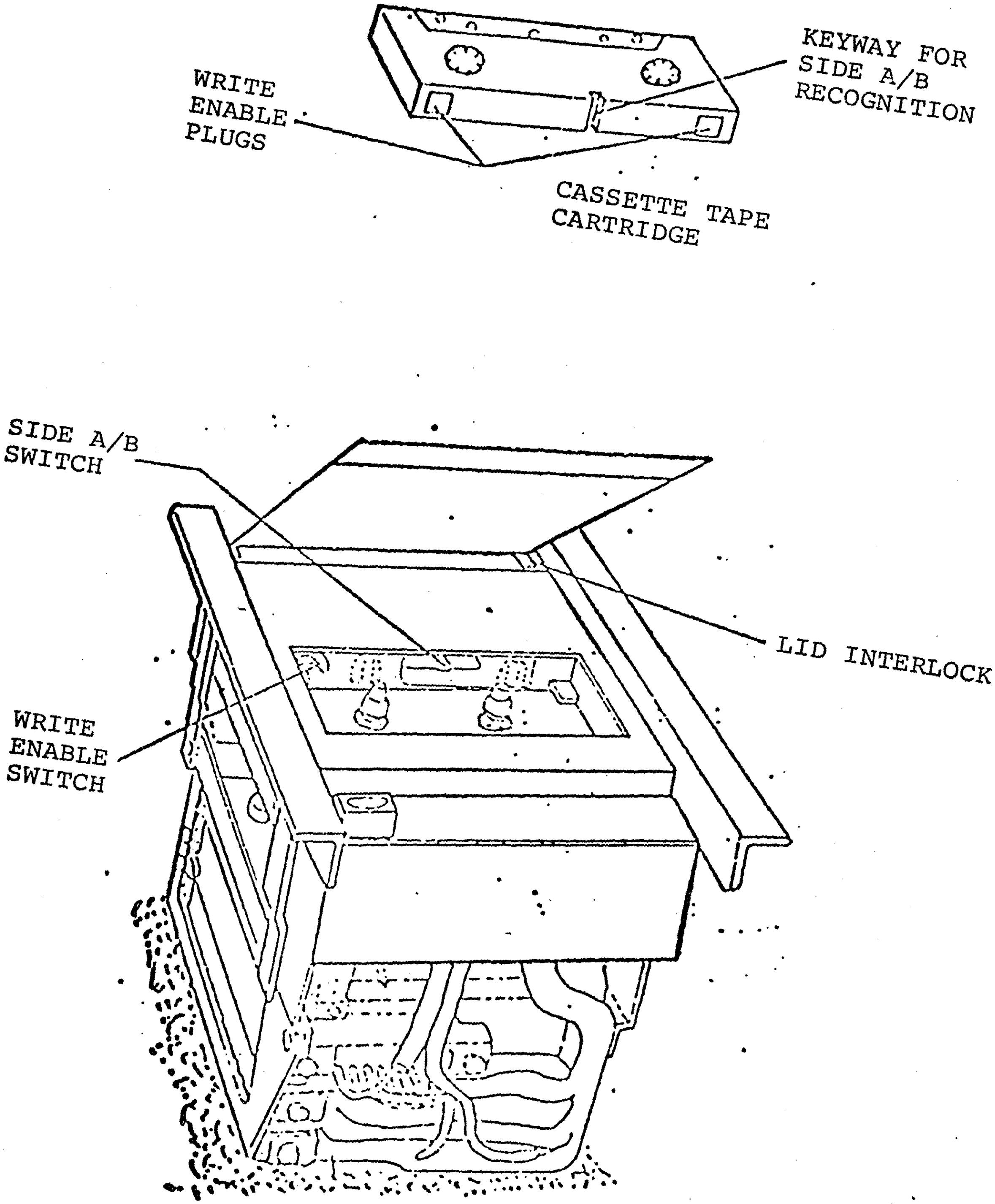


Figure 2C-1. Cassette Tape Transport Interlock and Function Switches

Table 2C-1. Cassette Tape Transport Control and Indicator Functions

Control or Indicator	Type	Function
Lid Interlock	Switch	Senses whether the lid on the transport is open or closed. When open, it provides an interlock causing the transport to go not ready.
Side A/B	Switch	Senses whether the cassette is loaded with side A or side B positioned under the read/write head.
Write Enable	Switch	Senses the presence or absence of the write enable plug {at the cassette} for whichever track is positioned under the read/write head.

Table 2C-2. Maintenance Panel Cassette Tape Transport Indicators

Indicator	Function
READY	When illuminated, indicates that the transport is ready to respond to controller-initiated operations.

SECTION 2D

OPERATING PROCEDURES

MASTER CLEAR

The HCP can be master-cleared by any of the following actions:

1. If a TTY is used as the input device, first depress the ESCAPE key. Then depress the question mark (?) key on the communications console. On TTY units not having an ESCAPE key, this function can be generated by depressing SHIFT, CONTROL, and K simultaneously.

2. Depress the MASTER CLEAR switch on the maintenance panel.

3. Receipt of an external master clear signal from the host computer.

4. A power-on master clear.

TAPE CASSETTE AUTOLOAD

1. Master clear the HCP using any of the methods described earlier in this section.

2. Insert tape cassette in transport. Ensure that the lid on the tape transport is closed securely; this enables transport operation by depressing the lid switch. Tape moves to Beginning of Tape (BOT).

3. Type ESCAPE on the communications console.

4. Press the DEADSTART switch on the maintenance panel. Tape will load and processor will start.

NOTE

When loading any sort of program, it is always good practive to observe the value displayed in the three Control Code LED indicators.

Any time all three indicators are lit simultaneously an error is indicated. Frequently the final value of the Control Code indicators will be the Error Condition (all on) if an error was sensed anywhere in the load operation. This applies regardless of the type of autoload device used.

CARD READER AUTOLOAD

If system is equipped with 2571-1 Peripheral Controller and a card reader, the following procedure may be used:

1. Master clear the HCP using any of the methods described earlier in this section.

2. Place the card deck in the card reader. Make card reader READY.

3. Type ESCAPE on the communications console.

4. Press the DEADSTART switch on the maintenance panel. Cards will feed in and processor will start.

HOST COMPUTER AUTOLOAD

The host computer autoload is a software function which provides a DOWN-LINE LOAD command to the HCP. In order for this command to be received the ON LINE/OFF LINE switch located on the communications coupler, host interface circuit card, must be set to the ON LINE position. Refer to 2550 Load Initialize information in this section.

START PROCESSOR

The HCP can be started from the console by entering the following command:

```
I:
||______ end of message symbol
|_______ control function
```

If bit $0C_{16}$ (12_{10}) of the FCR is "0", both micro and macroprograms will begin running. If bit $0C_{16}$ (12_{10}) of the FCR is "1", only microprograms begin running.

STOP PROCESSOR

The HCP can be stopped from the console by entering the following command:

```
H:
||______ end of message symbol
|_______ control function
```

If FCR bit $0C_{16}$ (12_{10}) is "0", then a macro stop will occur.

If FCR bit $0C_{16}$ (12_{10}) is "1", then a micro stop will occur.

It is often good practice to halt the processor when inserting patches to programs being executed. Failure to observe this caution frequently results in patches not entering as expected.

FCR OPERATING PROCEDURES

The following procedures are provided for monitoring the FCR contents by command and printout on the control console. Refer to FCR bit definitions and digit functions.

NOTE

> On the maintenance panel only 16 bits are displayed at a time. Use of control code J77: will cause the bits 0 through 15 to display (table 2-1) and the UPPER indicator will be lit. Use of control code J: will cause bits 16 through 31 to be displayed.

Bits 0 through 17 can be set under operator control. Bits 24 through 31 are status bits only and cannot be set under operator control. Display 1 and 0 are used to display and set various registers and memory by use of control codes K and L.

DISPLAY FCR CONTENTS

To display the contents of the FCR at any time, enter:

```
J77:
|||______ end of message symbol
||_______ dummy number (status
|         portion of FCR, which
|         cannot be affected)
|________ control function
```

NOTE

> Whenever a printout occurs, the initial symbol will be the last Control Function entered. When the same Control Function is required, it need not be reentered. The stored value is changed by Master Clear (to 000) or Error (to 111).

CLEAR BIT IN FCR

To clear a single bit position in the FCR, enter:

```
H14:
|||______ end of message symbol
||_______ bit number in hexadecimal
|         notation (hex) to be
|         cleared
|________ control function
```

The updated FCR will be displayed at the console.

SET BIT IN FCR

To set a single bit position in the FCR, enter:

```
I14:
   end of message symbol
   bit number in hex to be set
   control function
```

The updated FCR will be displayed at the console.

CHANGE FCR IN HEX DIGIT MODES

To change the contents of an FCR hex digit (0-5), enter:

```
J14:
   end of message symbol
   value (0-F) hex
   specifies hex digit number
   control function
```

The above entry specifies an FCR change is to be made in the digit mode, and updates FCR hex digit No. 1 to a value = 4 hex (0100). To determine the meaning of the value, the user must refer to table 3-2, where digit 1 = display 1, and a count code of 4 = "A" register. The response to the console will be the updated FCR value (which is always displayed in 8 hex digits).

CHANGE FCR IN BIT MODE

The operator cannot change the contents of FCR digits 6 and 7, as they are readouts of machine status. The remaining hex digits 0-5 can all be changed with the same command from the console, as follows:

a. ESCAPE key (or SHIFT/CTRL/K) (Panel Mode)

b. ? (Master Clear)

c. ESCAPE key (Panel Mode)

d. To change hex digits 0-5 together proceed entering digits per this example:

```
K710008xx:
   end of message symbol
   anything
   enable console echo
   default
   default
   default
   P register
   main memory
   control function
```

NOTE

Default is the prior value of the FCR that is not to be changed (in this case zeros).

e. The response to the console is the updated FCR.

TOGGLE UPPER INDICATOR

To toggle the UPPER indicator on the maintenance panel (alternately display the upper and lower 16 bits of the FCR), enter the following:

```
J:
   end of message symbol
   control function
```

DISPLAY REGISTER DEFINED IN DISPLAY 0

The operator can display the contents of any of the registers defined in Display 0 by using the following procedure.

Example: Assume the operator wants to display the contents of the K register at the console.

1. The element to be displayed must first be defined in the FCR. The console input is:

```
J02:
|||└── end of message symbol
||└─── specifies K register
|└──── specifies display 0
└───── control function
```

The above input specifies FCR change is in the hex digit mode and defines the K register in display 0. The response to the console will be the updated FCR.

2. The operator then types a command from the console to Display 0:

```
L:
|└── end of message symbol
└─── control function
```

The response to the console will be the present value of the K register.

DISPLAY REGISTER DEFINED IN DISPLAY 1

The operator can display the contents of any of the registers defined in Display 1 by using the following procedure.

Example: Assume the operator wants to display the contents of the P register at the console.

1. The element to be displayed must first be defined in the FCR. The console input is:

```
J11:
|||└── end of message symbol
||└─── specifies P register
|└──── specifies Display 1
└───── control function
```

The above input specifies FCR change is in the hex digit mode and defines the P register in Display 1. The response to the console will be the updated FCR.

2. The operator then types a command from the console to Display 1:

```
K:
|└── end of message symbol
└─── control function
```

The response to the console will be the present value of the P register.

LOAD REGISTER DEFINED IN DISPLAY 0

The operator can load a value into any register defined in Display 0 by using the following procedure.

Example: Assume the operator wants to load $14FE_{16}$ into the N register.

1. The element to be loaded must first be defined.

```
J01:
|||└── end of message symbol
||└─── N register
|└──── Display 0
└───── control function
```

2. The update value is then entered.

```
L14FE:
| |  └── end of message symbol
| └───── update value in hex
└─────── control function
```

3. Verify that the new value has been transferred into the desired register.

```
L:
|└── end of message symbol
└─── control function
```

LOAD REGISTER DEFINED IN DISPLAY 1

The operator can load a value into any register defined in Display 1 by using the following procedure.

Example: Assume the operator wants to load $14FE_{16}$ into the breakpoint (BP) register.

1. The element to be loaded must first be defined.

```
J16:
|||└── end of message symbol
||└─── specifies BP register
|└──── specifies Display 1
└───── control function
```

2. The update value is then entered.

```
K14FE:
| |  └── end of message symbol
| └───── update value in hex
└─────── control function
```

3. Verify that the new value has been transferred into the desired register.

```
K:
|└── end of message symbol
└─── control function
```

PROCEDURE EXAMPLES

The following subsections contain typical procedural sequences which are used in operating the HCP.

Display Main Memory Location

The contents of a specific location within main memory can be interrogated and displayed by entering the following:

1. ESCAPE (Panel Mode)
2. ? (Master Clear)
3. ESCAPE (Panel Mode)
4. Load FCR to define P register and main memory

   K71000800:

   Verify FCR update.
5. Load P with desired memory location

   Kxxxx: (xxxx → P)
6. Display memory location

   L:
7. Response to console is memory contents "pointed to" by the P register; the P register is incremented.
8. Consecutive memory locations can be displayed each time the following is entered at the console:

   :
   response
   :
   response, etc.

Write Into Main Memory

Specific locations within main memory can be loaded by entering the following:

1. ESCAPE
2. ?
3. ESCAPE
4. K71000800:, set up FCR
5. Kxxxx:, (xxxx → P)
6. Lyyyy:, (yyyy → loc xxxx)

   The P register has automatically been incremented following the : from the console.
7. The next memory location (xxxx +1) may now be loaded with a new value by Lyyyy:, etc., without having to update P.

Display P Register in Repeat Mode

The P register can be displayed in the repeat mode by entering the following:

1. ESCAPE (Panel Mode)
2. ? (Master Clear)
3. ESCAPE (Panel Mode)
4. K71000400: (Select P register, repeat mode)
5. K: (Display P contents)

Response is P register contents, repeatedly. This command is usually used with local (maintenance panel) operations rather than console mode when a TTY is used as the console device.

To display the P register locally (as to determine, for example, if the program is running), enter the following:

1. LOCAL/REMOTE switch to local
2. J11: (selects P register)
3. J54: (sets repeat mode, resets console echo)

Response is P register contents, repeatedly. To exit this mode, enter:

J58: (sets console echo, resets repeat mode)

Operation in Step Mode

The processor can be placed in the step mode, and programs can be executed in single steps (individual instructions) by entering the following:

1. ESCAPE (Panel Mode)
2. ? (Master Clear)
3. ESCAPE (Panel Mode)
4. K71100800: (load FCR)
5. K1000: (1000 → P register)
6. K: (display P contents)
7. Repeat step 6 to execute individual instructions sequentially through the program.

Load and Execute Macroprogram

A program can be loaded into main memory and executed by entering the following:

1. ESCAPE (Panel Mode)
2. ? (Master Clear)
3. ESCAPE (Panel Mode)
4. K71000800: (load FCR; select P register, memory; console echo)
5. K1000: (0B00 → Loc 1000)
6. L0B00: (0B00 → Loc 1000)
7. L0B00: (0B00 → Loc 1001)
8. L0B00: (0B00 → Loc 1002)
9. L0B00: (0B00 → Loc 1003)
10. L18FB: (18FB → Loc 1004)
11. K1000: (1000 → P)
12. I:, execute program starting at location 1000

LOAD INITIALIZE

The HCP is loaded and initialized by the host computer system. To prepare for a downline load, the operator must:

1. Verify that ports (CLA addresses) to the communications network connections are correct.
2. On the loop multiplexer circuit card, set the power (PWR) switch to ON.
3. On the CLA circuit card, set the CLA ON/OFF switch to ON.

Only those cards that are configured are affected.

4. Verify the local console is in the normal ON condition.

5. Verify the ON LINE/OFF LINE switch on the communications coupler host interface circuit card is set to the ON LINE position.

Upon successful completion of the downline load operation by the host, a message containing the CCP version, host identification number, and HCP identification number is output at the local console. The following is an example of that message format:

```
CCP         1.0
HOST ID:     00
NPU ID:      01
```

The host then configures the 2550 terminals and normal system operation begins.

If the downline load is unsuccessful, the host initiates and receives a dump of the HCP memory, micromemory, and file registers. The initiation of another downline load attempt is under control of the host.

HOST FAILURE

If the HCP should lose communication with the host because of host failure, the console and interactive terminals are sent a host down message and input from the terminals is stopped. When communication with the host is restored, if the loss was of short duration caused by a temporary inability of the host to obtain control of the HCP channel, a host up message signals restoration of communication and system operation resumes unaffected by the temporary loss. Following longer or more serious losses of communication, however, the host may reload the HCP processor and cause the system to operate as after the initial load operation.

SUSPENSION OF OPERATION

If it becomes necessary to stop operations of the HCP for any reason, momentarily press the MASTER CLEAR switch on the maintenance panel.

CONTROL STATEMENTS ENTRY

Operator control statements (commands) are entered through the local console keyboard. These statements specify either supervisory or diagnostic functions that can be selectively activated or deactivated.

The NPU console can be in either the read or write mode, selected by the G (control G) character key on the console keyboard. Pressing the G key causes a manual interrupt that, in turn, causes the console to alternate between the read and write modes with the mode changing each time the key is pressed. To input operator control statements, the console must be in the read mode, and to output responses, the console must be in the write mode. All operator control statements begin with a slash (/) character and terminate with an EOT (control D) character. Each parameter within the control statement is separated by either a comma or a blank character. Any number of control statements can be entered before the write mode is activated to receive responses. When the write mode is activated, the following response is output at the console:

*WM

If an input error is made during entry of control statements, the console response is an echo of the input message followed by:

*ERR

CONSOLE COMMANDS

Supervisory Function /SUP

This console command causes the console to engage the supervisory function. While the supervisory function is active, the following supervisory inputs are accepted:

XY Ⓓ

where X is message type interpreted as follows:

0 = Upline error and statistics messages

1 = Other upline service messages

2 = Downline service messages

3 = Diagnostic response CE messages

Y specifies routing for messages indicated by X, as follows:

NOTE

**Indicates service messages to the console may cause system overload due to excessive print time.

0 = Discard all mesages

**1 = Print all messages on NPU console

2 = Send all messages to host or service module

**3 = Send all messages to host or service module and also print on local console.

Ⓓ indicates the control Ⓓ key on the console keyboard.

Each message type can be individually designated by X and independently routed by Y, without regard to routing of other message types. The system default is the supervisory mode with all upline service messages sent to the host and all downline service messages sent to the service module.

Diagnostic Function /DIA

This console command causes the console to engage the diagnostic function. While the diagnostic function is active, the group of commands described in the following paragraphs are available. In those command formats, the terms used are interpreted as follows:

DN = Destination node address. Two hexadecimal characters specifying the ID for the NPU

SN = Source node address. Two hexadecimal characters specifying the ID for the host

PORT = Port number. Two hexadecimal characters specifying the port associated with the line to be affected by the command

SUBPORT = Subport number. Two hexadecimal characters specifying the subport associated with the line to be affected by the command

CLA TYPE = 00 if 2560-1 CLA
01 if 2561-1 CLA
02 if 2560-2 or 2560-3 CLA

NOTE

Although all input parameters for each command are shown as two hexadecimal characters, it can be omitted if the leftmost character is zero.

Place Line Out of Service

This command causes all activity on a specified line to terminate and must be entered prior to initiating any diagnostic test command. Servicing of other lines is not affected. The format of this command is as follows:

DN SN 00 40 03 00 00 PORT SUBPORT

A line taken out of service can be reactivated by the "place line in service" command.

Place Line in Service

This command allows a line to be returned to operational service by an "enable line" service message currently outstanding or subsequently issued by the host. System servicing of other lines is not affected by this command. The "place line in service" command has the following format:

DN	SN	00	40	03	01	00	PORT	SUBPORT

Start CLA Internal Loopback Test

This command initiates the CLA internal loopback test which consists of a CLA command test and a data verification test. The CLA command test verifies operation of the CLA as it relates to command functions. System servicing of other lines is not affected by this command. The command format is shown in figure 2D-1(A).

Any errors detected during the CLA test result in printout of a response service message with an appropriate error code at the local NPU console and termination of the test. To restart the test, re-enter the "start CLA internal loopback test" command at the local console.

Start Modem Loopback Test

If modem loopback is available, this command isolates problems occurring further out in the communications system. The test consists of a data verification test with limited analysis of modem control signals. System servicing of other lines is not affected by this command. The command format is shown in figure 2D-1(B).

Start External Loopback Test

This command provides for loopback of data external to the CLA. The test consists of a command and data verification test with the primary purpose of verifying operation of the line drivers and receivers. The loopback jumper plug (2560-1 External Test Connector for synchronous CLA or 2561-1 External Test Connector for asynchronous CLA) must be connected to the CLA to be tested before this command is entered at the console. System servicing of other lines is not affected by this command. The command format is shown in figure 2D-1(C).

Terminate Test

This command, entered while a test is in progress, causes the test to terminate at the end of the normal test cycle currently being executed. System servicing of other lines is not affected by this command. The command format is shown in figure 2D-1(D).

Diagnostic Test

The diagnostic test responses are output to the local console in the standard format as shown in figure 2D-1(E).

where: RCEC = Response code or error code

Response codes and error codes are interpreted in tables 2D-1 and 2D-2, respectively.

Question If Supervisory /QIS

This command causes the current console function (supervisory or diagnostic) to be printed at the console in the following format:

Q = XXX

where:

XXX is SUP or DIA

The purpose of /QIS is to allow the operator to determine if the console is in the supervisory or the diagnostic mode.

TABLE 2D-1. RESPONSE CODES

Response Code (hex)	Meaning	Remarks
A0	Line is out of service	Normal response to place line out of service command
A1	Command rejected	System temporarily low on buffers
A2	Line in service	Normal response to place line in service command
A3	Diagnostics in process	Response to place line in service command if diagnostics still in process
A4	Diagnostics started	Normal response to diagnostic function command
A5	Invalid line number or bad command	Invalid line number issued in command or command code (byte 5) is not valid
A6	Invalid CLA type	Invalid CLA type issued in command
A7	Invalid test mode	Invalid diagnostic test mode (byte 6) issued with command
A8	Line not out of service	Response to place line in service command if line specified was not out of service when command issued
A9	Test already in process	Response to a diagnostic loopback test command if the test specified is already in process
~~AA~~ DD	Test completed, no errors	Normal response to a terminate test command
~~CE~~ DE	Diagnostic not in progress	Response to terminate test command if not preceded by diagnostic command

TABLE 2D-2. ERROR CODES

Error Code (hex)	Meaning
AB	Unsolicited input detected
AC	Unsolicited output data demand detected
AD	Input loop error
AE	Output loop error
AF	Parity error
B0	Framing error
B1	Data transfer overrun
B2	Next character not available
B3	No CLA status after CLA status was requested
B4	Unsolicited CLA status
B5	CLA status not cleared after input supervision on (ISON) was sent
B6	No status after request to send (RTS) or input status request (ISR) was sent
B7	No clear to send (CTS) after RTS
B8	No status after data terminal ready (DTR)
B9	No data set ready (DSR) after DTR
BA	No signal quality detect (SQD) after DTR
BB	No ring (RI) after DTR
BC	No status after secondary request to send (SRTS)
BD	No secondary received line signal detector (SRLSD) after SRTS
BE	No CLA status after local mode (LM)
BF	No data carrier detect (DCD) after LM
C0	Unsolicited status after originate mode (OM)
C1	No status or improper operation of ring indicator (RI) after terminal busy (TB)
C2	No status after new sync (NSYN)
C3	Improper operation of DCD, RI, quality monitor (QM) after NSYN
C4	No RI after RTS
C5	Input data timeout during data verification test
C6-CD	Data compare errors
CF	Unsolicited status after LM

(A)	DN	SN	00	40	03	02	00	PORT	SUBPORT	CLA TYPE
(B)	DN	SN	00	40	03	02	01	PORT	SUBPORT	CLA TYPE
(C)	DN	SN	00	40	03	02	02	PORT	SUBPORT	CLA TYPE
(D)	DN	SN	00	40	03	03	00	PORT	SUBPORT	
(E)	DN	SN	00	40	00	04	00	RCEC	PORT	SUBPORT

Figure 2D-1. Test Command Formats

Activate Function /ACT XXX

This command activates either the supervisory or diagnostic function, as specified by XXX. XXX can equal either SUP or DIA. To activate the function does not select it as the current console function, but only prepares the function so that it may be selected, if desired.

Deactivate Function /DEA XXX

This command deactivates either the supervisory or diagnostic function, as specified by XXX. XXX can equal either SUP or DIA. To deactivate a function means that it cannot be selected as a console function.

Requeue /REQ

This command causes requeuing of a console output message that has been interrupted by a manual interrupt. The message will be output the next time the console enters the write mode.

Cancel /CAN

This command cancels a console output message that has been interrupted by a manual interrupt.

USE OF MANUAL INTERRUPT

The manual interrupt is caused by pressing the G (control G) key on the console keyboard. This act causes the console to alternate between the read and write mode, with the mode changing each time the key is pressed.

If a manual interrupt occurs while output is in progress, the following applies:

1. A manual interrupt followed by /REQ causes the current output to be requeued.

2. A manual interrupt followed by /CAN causes the current output message to be canceled and discarded.

3. A manual interrupt followed by any input other than the foregoing causes the interrupted output message to continue printing after return to the write mode (from the point at which it was interrupted).

EDITING CONSOLE INPUT

The following console editing standards apply to all console input:

1. Carriage returns (CR) and line feeds (LF) are ignored in that they are used as local characters only.

2. Control shift N is replaced by CR.

3. Control shift M is replaced by LF.

4. Control C discards input. The response to a discarded input is the input message discarded followed by *ERR.

5. Data can be overwritten by using the backspace (←), with n backspaces causing n characters to be removed. Corrections can then be entered in place of the removed characters.

SYSTEM HALTS

When the HCP software detects an inconsistency for which no recovery is planned, the system immediately halts execution and prints a system halt message at the console. The format for such messages is as follows:

```
*HALT XXXX XXXX
        |    |
        |    └──Halt Code (4 hexa-
        |       decimal characters)
        |
        └──Location that initiated
           halt (4 hexadecimal
           characters)
```

Each unrecoverable error has an associated halt code. These are described in table 2D-3. When a system halt occurs, the host normally dumps the HCP memory, micromemory, and file registers for use in analyzing the reason for the halt. For a discussion of operator actions in the event of a system halt, refer to the Software Diagnostic Handbook. See preface.

EMERGENCY OFF PROCEDURE

1. Set the main AC power circuit breakers at the rear of Bay 0 and Bay 1 to the OFF position.

2. Turn off all peripherals.

CHECK AND ADJUSTMENTS

Operational checks are limited to observing the LED indicators on the circuit cards and the maintenance panel to ensure the presence of all required signals as described in Controls and Indicators.

SHUTDOWN PROCEDURE

NOTE

The HCP is normally powered-up, except for motor-driven peripherals which are turned on only as needed. However, the following procedure is to be used should the operator desire to completely shut down the HCP).

1. Turn off all peripherals and auxiliary power units.

2. Set the PWR switches on all LM circuit cards to the OFF position.

3. Set the circuit breakers on the power supplies for the LM and the optional CLE unit to the OFF position.

4. Set the main AC power circuit breakers at the rear of Bay 0 and Bay 1 to the OFF position.

TABLE 2D-3. HALT CODES

Halt Code	Description	Remarks
0000	Not a valid halt code	
0001	Power Failure	Location 100 (hexadecimal) indicates location of instruction that would normally be executed after the power failiure.
0002	Memory parity error detected	Location 100 (hexadecimal) indicates location of instruction that would normally be executed after the instruction in which the memory parity error was detected.
0003	Program protect bit error detected by 2550	Location 100 (hexadecimal) indicates location of instruction that would normally be executed after the program protect fault.
0004	Interrupt count less than zero	
0005	Timal (base system timing services) worklist error	
0006	Active line control block (LCB) list error	
0007	No buffers left	
0008	Size error in stamp	
0009	Duplicate GET buffer	
000A	Duplicate RELEASE buffer	
000B	Buffer chain error	
000C	Buffer out of range	
000D	Bad command, not type 1 or type 2	
000E	Bad coupler initialization status	Problem in downline load. Repeat load and, if failure occurs again, contact CE.
000F	Attempted to clear an enabled line	
0010	Not used	
0011	Bad multiplex loop interface adapter (MLIA) initialization status	Problem in downline load. Repeat load and, if failure occurs again, contact CE.

TABLE 2D-3. HALT CODES (Contd)

Halt Code	Description	Remarks
0012	Duplicated CLA address detected	Check CLA addresses for duplicates. If correct, contact CE.
0013	Attempt to redefine an existing destination node (DN) directory entry	
0014	Attempt to redefine an existing connection number (CN) directory entry	
0015	Attempt to remove a non-existent DN directory entry	
0016	Attempt to remove a non-existent source node (SN) directory entry	
0017	Attempt to remove a non-existent CN directory entry	
0018	Real time clock lost count	
0019	Illegal point of interface (POI) key	
001A	Attempted to add zero connection number (CN) to directories	
001C	Monitor did not run for specified (B2TIME/2) seconds.	
001D	Service module called with worklist empty	
001E	Service module work code out of range	
001F	Multiplex loop interface adapter (MLIA) failure	
0020	Pointer to read next loop cell from circular input buffer (CIB) exceeded present line frame pointer	
0021 0022 0023 0024 0025 0026 0027	Reserved for firmware use	

TABLE 2D-3. HALT CODES (Contd)

Halt Code	Description	Remarks
0028	Coupler alarm condition	Coupler detected memory parity error or program protect bit error during data transfer.
0029	No queue control block	
002A	Bad line number from TIP	
002B	Unknown TASKNR selected	Detected by Mode 4 TIP
002C	Unknown block/CMD received	Detected by Mode 4 TIP
002D	Improper multiplex subsystem operation	Detected by Mode 4 TIP
002E	Improper Mode 4 TIP operation	Non-acceptable tasks
002F	Control for disabled Mode 4 line	TIP attempting to run on disabled line
0030	Reserved for Mode 4 TIP	Not a valid halt
0031	Error in upline block handler (PNHDRBLD)	
0032	Not used	
0033	Illegal line status detected by CLA status handler (PTCLAS)	
0034	Illegal call to put n segments in queue (PBTNSEG) or get n segments from queue (PTGTNSEG) where queue pointer type from TCB indicates data list queue	
0035	Attempt to queue output to NPU console in system without console	
0036	Directory change attempted with DN too large	

SECTION 3

INSTALLATION AND CHECKOUT

SECTION 3

INSTALLATION AND CHECKOUT

This section contains procedures on installation and checkout as follows:

3A - 2550-100 Controlware Installation

3B - HCP Installation and System Test

2550-100 CONTROLWARE INSTALLATION

INTRODUCTION

The 2550-100 Emulator 6671/6676, also referred to as the 2550-100 controlware, is a controlware program for the HCP that emulates multiple 6671 and/or 6676 Data Set Controllers (DSCs) for CYBER 6000, CYBER 7X, or CYBER 17X host computers. As many as four DSCS can be emulated. In this document, these DSCs are referred to as equipment numbers 1 through 4.

The 2550-100 controlware is supplied by Control Data as a binary load file on a tape cassette cartridge. The initial tape cassette delivered will contain the master controlware program at the most current field change order (FCO) revision level. The tables within the controlware defining equipment and line configurations will be empty (nonconfigured). This document provides the procedures for loading the initial tape cassette cartridge, configuring the equipment and lines, and writing a new tape cassette cartridge containing the customer's desired equipment and line complement.

The configurator initializes or modifies four tables within the 2550-100 controlware. Two of the tables, EQUIP and LINE, are reference tables containing equipment and line specifications relating to the system being emulated. The other two tables, XREF and EQT, are pointer tables facilitating a fast, cross-reference system between the equipment and the lines.

The EQUIP table provides the following information:

1. Type of equipment emulated
2. Number of lines assigned to the equipment
3. Coupler assigned to the equipment
4. Coupler address definitions

The LINE table provides the following information:

1. Line characteristics (sync/async, switched/dedicated, parity)
2. Equipment cross-reference addresses

The XREF table is a pointer table ordered by the CLA address and contains pointers to the EQT table which identifies the equipment/line using a particular CLA.

The EQT table is ordered by equipment/line number and contains the address of the CLA used for the particular equipment/line.

To configure these tables, the configuration accepts a set of parameters entered by the operator through the communications console. In interpreting the parameters supplied by the operator, the configurator functions basically as a character scanner (accepting only the first alphanumeric character, or the first few numeric characters, of each parameter). The accepted parameter is validated for format and consistency, and entered into the appropriate tables. Parameters, other than those appropriate for each step in the configuration process, generate error messages to the operator via the communications console.

Once the configuration parameters have been loaded into main memory via the communications console, the configuration may be captured by writing the tables from memory to tape cassettes; further, once the configuration is written onto cassettes, it may be loaded from the cassettes into main memory.

LOAD, CONFIGURE, WRITE AND INITIALIZE PROCEDURES

This section describes procedures to load the 2550-100 controlware, configure the system, write the configuration onto cassette tape, and to initialize the system. These procedures are used to initially configure the tables or to change the table parameters.

Once the configuration tables are written to the cassette tape, an abbreviated load procedure is used (see load, initialize procedures in this section).

LOADING

Load the 2550-100 controlware as follows:

1. Insert the 2550-100 system cassette into the tape transport and close the transport lid. The transport should immediately rewind the cassette if the tape is not fully rewound.

   NOTE

   If a system cassette is already in the transport, it may be necessary to open and close the transport lid (cycling the transport lid switch) to initiate rewind.

2. Observe that the CASSETTE READY indicator illuminates.
3. Set the REMOTE/LOCAL switch on the maintenance panel to the REMOTE position.
4. Press the MASTER CLEAR switch on the maintenance panel.
5. Press the ESCAPE key on the communications console.
6. Press the DEADSTART switch on the maintenance panel.
7. Observe that the system has been successfully loaded (the message: "2550-100 SYSTEM 01 COPYRIGHT CONTROL DATA CORPORATION 1975" will be displayed on the communications console).

   NOTE

   If the system does not load successfully, display the contents of the A Register at the communications console. If this register contains a "D", then an error has occurred in loading which causes the bootstrap loader to halt the load by executing a closed loop. In this case, repeat the above sequence of steps, or load another copy of the controlware using the above sequence. If the system still does not load properly, initiate diagnostic procedures in accordance with the Hardware Maintenance Manual (see preface) or notify responsible maintenance personnel.

CONFIGURING

Configuring the 2550-100 controlware is as follows:

1. Only the underlined characters in an operator input to the console are interpreted by the configurator. For example, if the operator response is: <u>P</u>artial, only the letter P is interpreted as a response. The remaining

letters are ignored and the configurator scans for a terminating character. Upper or lower case characters may be used when configuring.

2. The symbol: < is used to denote the carriage return key on the communications console.

3. The operator may abort his response to any query by pressing Rubout, Line Feed, and <. After this, the operator may re-enter the complete response to the last query.

To activate the configurator, the operator first examines the last communications console display. If the last communications console display consists of a "J" typed at the beginning of a new line, then

Operator Types: *F<

This activates the configurator, and interactive communications via the communications console with the operator is initiated starting with Step 1 as described below.

If "J" does not appear in the last communications console display, the operator initiates the system's manual interrupt processor by:

Operator Types:

CTRL BELL (two communications console keys)

System Writes: MI

Operator Types: *F<

The last operator input activates the configurator, and interactive communications via the communications console with the operator is initiated starting with Step 1 as described below.

STEP 1: ACTIVATION OF CONFIGURATOR

System Writes:

CONFIGURE, RECONFIGURE, OR GO (C,R,G)

Operator Types: Configure<

If the system has never been configured, and the operator responded with Reconfigure or Go, then:

System Writes:

MUST CONFIGURE (CONFIGURE OPTION TAKEN)

and the system proceeds to Step 2, as if the operator has responded with Configure.

STEP 2: SPECIFYING EQUIPMENT TYPE

System Writes:

EQUIPMENT X TYPE (N,1,A)

where X is the logical equipment number. The allowed operator responses are:

Operator Types: None or
1 or
A

where:

1 = 6671 is to be emulated by equipment X

A = 6676 is to be emulated by equipment X

None = logical equipment X will not emulate

If None is the response chosen, the configurator will repeat Step 2 for the next logical equipment. If all equipment has been processed, the configurator will proceed to Step 5.

After the operator has chosen the equipment option to be emulated:

System Writes: COUPLER NUMBER (1,2)

where the operator is expected to assign logical equipment X to one of the two couplers by:

Operator Types: 1 or
2

STEP 3: LINE ASSIGNMENT (QUANTITY)

System Writes: NUMBER OF LINES=

Operator Types: dd

where dd are the two digits supplied by the operator which represent (in base-10 notation) the number of lines to be assigned to the equipment chosen in Step 2.

NOTE

In choosing the number of lines assigned to the equipment chosen, the operator should be aware that:

a. If the equipment emulated is a 6671, the number of lines assigned may not exceed 16.

b. If the equipment emulated is a 6676, the number of lines assigned may not exceed 64.

c. Regardless of the configuration options chosen in Step 2, the maximum number of lines assigned for all four logical equipment units may not exceed 128.

To avoid re-entering the configuration process unnecessarily, the operator should configure the system to the maximum number of lines he expected to handle, even though all lines will not be active initially.

STEP 4: LINE SPECIFICATION (TYPE)

System Writes: LINE xx

where xx is the line number (starting at 01 and going up to the maximum number of lines specified by the operator in Step 3). The operator may respond with:

Operator Types:

```
hh,Switch,Sync,C,I<                     or
   Ded

hh,Switch,Async,C,I,s,bbbb,FDX<         or
   Ded                     HDX

99<
```

where:

hh	=	communications line adapter (CLA) address (in hexadecimal notation) assigned to this line. (Maximum of two alphanumeric characters used.)
Switch	=	a switched line type
Ded	=	a dedicated line type
Async	=	an asynchronous line type
Sync	=	a synchronous line type
C	=	character length transmitted on this line; C may equal 6, 7 or 8 bits. When operating with ASCII or EBCDIC terminals, C will always equal 8.
I	=	ignore vertical parity (e.g., no vertical parity is generated or checked). Vertical parity, where required, is normally appended by the host processor. The operator may type Odd (odd parity) or Even (even parity) if it is desired to have the emulator generate or check parity.
s	=	number of stop bits used on an asynchronous line; s may equal 1 or 2.
bbbb	=	baud rate at which line will transmit; available baud rates are: 110 baud 134.5 baud (non-CDC standard) 150 baud 300 baud 600 baud 1200 baud
FDX	=	full-duplex line (asynchronous only)
HDX	=	half-duplex line (asynchronous only)
99	=	indicates that the line is reserved (Line parameters may be defined at a later time using the MODIFY feature.)

NOTE

In choosing the options for each line, the operator should be aware that:

a. Synchronous lines are available only to logical equipment units emulating a 6671.

b. If emulating a 6676 (as chosen in Step 2), only asynchronous lines are available.

c. If parity is observed, then the actual character length that is transmitted is C + 1, where the parity bit is supplied by the CLA.

d. The stop-bit specification, duplexity specification and baud rate assignment are relevant only on asynchronous line assignments.

e. The number of stop bits is contingent upon the baud rate. The configurator does not check for consistency.

f. Current SCOPE and NOS operating system restrictions limit the number of line assignments per equipment depending on line speeds. Do not exceed the line and line-speed capabilities of the operating system that the emulator is interfacing.

g. For each equipment the lines have to be assigned in a decreasing baud rate order; fastest lines are assigned first, and slowest lines last.

Step 4 is repeated for every line specified in Step 3. After all lines have been assigned for a given equipment, the configurator will proceed to the assignment of the next logical equipment by repeating Step 2.

After all four logical equipment units have been configured, the configurator proceeds to Step 5.

STEP 5: PRINTOUT OF CONFIGURATION

System Writes: PRINTOUT (N,P,F)

The allowed operator responses are:

Operator Types: None<

which indicates that no printout is desired, and the configurator proceeds to Step 6.

or,

Operator Types: Full<

which indicates that a full printout of the system configuration is required, and the configurator responds with a header:

System Writes:

EQ TYPE CP LINE CLA TYPE USE LEN PAR STOP BAUD DUPLEX

and information regarding all equipment and lines in the system is listed under the header. After the printout, the configurator proceeds to Step 6.

or,

Operator Types: Partial<

which indicates that the operator only desires a printout for specific equipment/line combinations.

System Writes: EQUIPMENT=, LINE=

Operator Types: d,xx<

where:

d = equipment number ($1 \le d \le 4$)

xx = line number ($1 \le xx \le$ maximum specified in Step 3 for equipment d)

The configurator first prints a header as for the full printout response, and then lists the information for the equipment/line combination specified. This sequence is repeated until the operator responds to the equipment/line query by:

which indicates that the operator has obtained information for all equipment/line combinations desired and the configurator then proceeds to Step 6.

STEP 6: MODIFICATION OF INDIVIDUAL LINE

System Writes: MODIFY (N,Y)

The allowed operator responses are:

Operator Types: No<

which indicates that no individual line is to be modified and the configurator proceeds to Step 7.

Or,

Operator Types: Yes<

which indicates that the operator desires to change the configuration for one or more lines and the configurator responds with:

System Writes: EQUIPMENT=, LINE=

Operator Types: d,xx<

where:

d = equipment number ($1 \le d \le 4$)

xx = line number ($1 \le xx \le$ maximum specified in Step 3 for equipment d)

The configurator responds with a carriage return which indicates that input from the operator is required (formatted as in Step 4). This sequence is repeated for various equipment/line combinations until the operator responds to the equipment/line query with:

Operator Types: 0 (zero)<

which indicates that all equipment/line combinations desired have been modified and the configurator reverts to Step 5.

STEP 7: TERMINATION

System Writes: GO (N,Y)

If the operator elects to write the configured tables onto cassette tape:

Operator Types: No<

The configurator exits to the operating system dispatcher after displaying:

System Writes:

END OF CONFIGURATION - EXIT TO DISPATCHER

If the operator elects to start running the configured system:

Operator Types: Yes<

System Writes:

END OF SYSTEM CONFIGURATION - INITIALIZE AND GO

END 2550-100 SYSTEM INITIALIZATION

At this point, the system is up and ready.

WRITING

1. Remove the system cassette from the transport.
2. Insert the 2550-100 UTILITY cassette in the transport and close the transport lid. The transport should immediately rewind the cassette if the tape is not fully rewound.

   NOTE

   If necessary, cycle the transport lid switch (open and close the lid) to initiate rewind.

3. Observe that the CASSETTE READY indicator illuminates.
4. Press the MASTER CLEAR switch on the maintenance panel.

5. Press the ESCAPE key on the communications cosole.

6. Press the DEADSTART switch on the maintenance panel.

7. UTILITY will then "come up". Note: A bell will ring to indicate "ready". When operating with UTILITY, all characters input from the console must be in upper case.

8. Remove the UTILITY cassette from the transport.

9. Insert a blank cassette in the transport, and close the lid. The transport should immediately rewind the cassette, if the tape is not fully rewound.

NOTE

If necessary, cycle the transport lid switch to initiate rewind.

10. Observe that the CASSETTE READY indicator illuminates.

11. Operator Types:

    GSB,0,0,7000,7120,2800/

12. System Writes:

    (three 4-digit numbers in hexadecimal notation)

    Example: xxxx yyyy zzzz

13. Ignore the xxxx number.

14. Operator Types:

    WTC,0,yyyy,zzzz/

15. System Responds:

    (BELL)

16. Operator Types:

    WTC,0,0,6000/

    where:

    6000 is the length of the system minus 1.

17. System Responds:

    (BELL)

18. Operator Types:

    EFC,0,1/

19. System Responds:

    (BELL)

The cassette will now contain the configured system parameters.

To write system parameters onto additional cassettes, repeat steps 2 through 19 of this procedure.

INITIALIZING

1. Operator Types:

    CTRL BELL (two communications console keys)

    System Writes: MI

2. Operator Types:

    *F<

    System Writes:

    CONFIGURE, RECONFIGURE, OR GO (C,R,G)

3. Operator Types: GO<

    System Writes:

    END OF SYSTEM CONFIGURATION - INITIALIZE AND GO
    END 2550-100 SYSTEM INITIALIZATION

At this point, the system is up and ready for emulating the data set controllers.

CONFIGURATION EXAMPLE

The example system to be configured consists of:

Equipment 1 - a 6671 with eight lines connected to the host on Coupler 1.

Equipment 2 - a 6676 with eight lines connected to the host on Coupler 1

Equipment 3 - a 6676 with three lines connected to the host on Coupler 2.

Equipment 4 - Not used.

The configuration-operator communications are listed in tables 3A-1 and 3A-2. Each operator response appears on the teletype line subsequent to the system query, with the carriage return and line feed supplied by the system. (Notation used: SW = System Writes, OT = Operator Types, < = Carriage Return Key.)

TABLE 3A-1. CONFIGURATION EXAMPLE

Origin	Communications	Comments
OT:	CTRL/BELL (two keys)	If the last communications console display is not "J", then the manual interrupt will have to be activated.
SW:	MI	Manual interrupt activated.
OT:	*F<	Activates the configurator.
SW:	CONFIGURE, RECONFIGURE OR GO (C,R,G)	
OT:	C<	Configure option chosen.
SW:	EQUIPMENT 1 TYPE (N,1,A)	
OT:	1<	Equipment 1 selected for the 6671.
SW:	COUPLER NUMBER (1,2)	
OT:	1<	Equipment 1 assigned to Coupler 1.
SW:	NUMBER OF LINES=	
OT:	8<	Eight lines assigned to Equipment 1.
SW:	LINE 01	
OT:	0,DED,SYNC,8,I<	Line 01 is assigned a synchronous CLA with address 0 on a dedicated line, using 8-bit data; ignore parity.
SW:	LINE 02	
OT:	1,SWITCH,S,8,I<	Line 02 is assigned a synchronous CLA with address 1 on a switched line, using 8-bit data; ignore parity.
SW:	LINE 03	
OT:	99<	Line 03 is skipped and will be unassigned.
SW:	LINE 04	
OT:	6,S,A,8,I,2,12,H<	Line 04 is like 05 except that the line is 1200 baud, half-duplex.
SW:	LINE 05	
OT:	5,S,A,8,I,2,15,F<	Line 05 is assigned an asynchronous CLA with address 5 on a switched, full-duplex line, using 8-bit data and two stop bits at 150 baud.
SW:	LINE 06	

TABLE 3A-1. CONFIGURATION EXAMPLE (CONTD)

Origin	Communications	Comments
OT:	4,S,A,7,I,1,134,F<	Line 06 is assigned an asynchronous CLA with address 4, on a switched, full-duplex line, using 7-bit data, and one stop bit at 134.5 baud. Parity is ignored.
SW:	LINE 07	
OT:	2,D,ASYNC,8,I,2,110,F<	Line 07 is assigned an asynchronous CLA with address 2, on a dedicated, full-duplex line, using 8-bit data and two stop bits at 110 baud.
SW:	LINE 08	
OT:	3,D,ASYNC,8,I,2,110,F<	Line 08 is like 07.
SW:	EQUIPMENT 2 TYPE (N,1,A)	
OT:	A<	Equipment 2 is selected for the 6676.
SW:	COUPLER NUMBER (1,2)	
OT:	1<	Equipment 2 is assigned to Coupler 1.
SW:	NUMBER OF LINES=	
OT:	8<	Eight lines are assigned to Equipment 2.
SW:	LINE 01	
OT:	1F,S,A,8,I,2,300,F<	Line 01 is assigned an asynchronous CLA with address 1F, on a switched, full-duplex line, with 8-bit data and two stop bits at 300 baud.
SW:	LINE 02	
OT:	99<	Leaves line 02 unassigned.
SW:	LINE 03	
OT:	4,D,A,7,I,1,134,F<	Line 03 is assigned CLA address 4 which has already been assigned.
SW:	CLA IN USE EQUIPMENT 1 LINE 06 REASSIGN (N,Y)	The configurator asks whether the CLA should be reassigned to the new line.
OT:	N<	The operator acknowledges the error and does not wish to reassign, so he types the assignment over which assigns to line 03 an asynchronous CLA with address 1E, on a dedicated line, with 7-bit data and one stop bit at 134.5 baud.
OT:	1E,D,A,7,I,1,134,F<	

TABLE 3A-1. CONFIGURATION EXAMPLE (CONTD)

Origin	Communications	Comments
SW:	LINE 04	
OT:	1C,SW,ASY,8,I,2,110,F<	Line 04 is assigned an asynchronous CLA with address 1C, on a switched, full-duplex line, with 8-bit data and two stop bits at 110 baud.
SW:	LINE 05	
OT:	1D,S,A,8,I,2,110,F<	Line 05 is like 04.
SW:	LINE 06	
OT:	99<	Leaves line 06 unassigned.
SW:	LINE 07	
OT:	20,S,A,8,I,2,110,F<	Line 07 is assigned an asynchronous CLA with address 20, on a switched, full-duplex line, using 8-bit data and two stop bits at 110 baud.
SW:	LINE 08	
OT:	21,S,A,8,I,2,110,F<	Line 08 is assigned an asynchronous CLA with address 21, on a switched, full-duplex line, using 8-bit data and two stop bits at 110 baud.
SW:	EQUIPMENT 3 TYPE (N,1,A)	
OT:	A<	Equipment 3 is selected for the 6676.
SW:	COUPLER NUMBER (1,2)	
OT:	2<	Equipment 3 is assigned to Coupler 2.
SW:	NUMBER OF LINES=	
OT:	3<	Three lines are assigned to Equipment 3.
SW:	LINE 01	
OT:	2F,S,A,8,I,2,300,F<	Line 01 is assigned an asynchronous CLA with address 2F, on a switched, full-duplex line with 8-bit data and two stop bits at 300 baud.
SW:	LINE 02	
OT:	2E,S,A,7,I,1,134,F<	Line 02 is assigned an asynchronous CLA with address 2E, on a switched, full-duplex line with 7-bit data and one stop bit at 134.5 baud.

TABLE 3A-1. CONFIGURATION EXAMPLE (CONTD)

Origin	Communications	Comments
SW:	LINE 03	
OT:	2D,D,A,8,I,2,110,F<	Line 03 is assigned an asynchronous CLA with address 2D, on a dedicated, full-duplex line with 8-bit data and two stop bits at 110 baud.
SW:	EQUIPMENT 4 TYPE (N,1,A)	
OT:	N<	Equipment 4 is designated to remain unassigned.
SW:	PRINTOUT (N,P,F)	
OT:	F<	Full printout is desired.
SW:		Tabulated data shown in table 3-2.
SW:	MODIFY (N,Y)	
OT:	Y<	Operator chooses to modify.
SW:	EQUIPMENT=, LINE=	
OT:	1,3<	Equipment 1, line 3 is to be modified to become a synchronous, dedicated line with CLA address 7, with 8-bit data and no parity.
OT:	07,DED,SYN,8,IGN<	
SW:	EQUIPMENT=, LINE=	
OT:	0<	Termination of the modification process.
SW:	PRINTOUT (N,P,F)	
OT:	PARTIAL<	Partial printout chosen.
SW:	EQ TYPE CP LINE CLA TYPE USE LEN PAR STOP BAUD DUPLEX	
SW:	EQUIPMENT=, LINE=	
OT:	1,3<	Operator wants to see Equipment 1 Line 3 printout only.
SW:	1 1 1 03 07 DED SYNC 8 IGN	
SW:	EQUIPMENT=, LINE=	
OT:	0<	Termination of partial printout.
SW:	MODIFY (N,Y)	

TABLE 3A-1. CONFIGURATION EXAMPLE (CONTD)

Origin	Communications	Comments
OT:	N<	No further modification.
SW:	GO (N,Y)	
OT:	N<	The 2550-100 controlware is not to be started immediately.
SW:	End of Configuration - Exit to Dispatcher	Exit to dispatcher.

TABLE 3-2. FULL PRINTOUT FOR CONFIGURATION EXAMPLE

EQ	TYPE	CP	LINE	CLA	TYPE	USE	LEN	PAR	STOP	BAUD	DUPLEX
1	1	1	01	00	DED	SYNC	8	IGN			
1	1	1	02	01	SWICH	SYNC	8	IGN			
1	1	1	03	UND							
1	1	1	04	06	SWICH	ASYN	8	IGN	2	1200	HALF
1	1	1	05	05	SWICH	ASYN	8	IGN	2	150	FULL
1	1	1	06	04	SWICH	ASYN	7	IGN	1	134.5	FULL
1	1	1	07	02	DED	ASYN	8	IGN	2	110	FULL
1	1	1	08	03	DED	ASYN	8	IGN	2	110	FULL
2	A	1	01	1F	SWICH	ASYN	8	IGN	2	300	FULL
2	A	1	02	UND							
2	A	1	03	1E	DED	ASYN	7	IGN	1	134.5	FULL
2	A	1	04	1C	SWICH	ASYN	8	IGN	2	110	FULL
2	A	1	05	1D	SWICH	ASYN	8	IGN	2	110	FULL
2	A	1	06	UND							
2	A	1	07	20	SWICH	ASYN	8	IGN	2	110	FULL
2	A	1	08	21	SWICH	ASYN	8	IGN	2	110	FULL
3	A	2	01	2F	SWICH	ASYN	8	IGN	2	300	FULL
3	A	2	02	2E	SWICH	ASYN	7	IGN	1	134.5	FULL
3	A	2	03	2D	DED	ASYN	8	IGN	2	110	FULL

RECONFIGURATION

Reconfiguration allows for changing line parameters. In choosing whether to configure or reconfigure the system, the operator should be aware that the equipment types emulated in the system and the number of lines assigned to an equipment can only be changed by choosing the configure option. If the configure option is chosen, then the entire system has to be configured.

RECONFIGURATION EXAMPLE

The following procedure illustrates reconfiguration entry via the communications console. The configured system of the Configuration Example is used as a baseline for this example. The following reconfiguration data will be added:

1. Equipment 1, line 3, will be undefined.

2. Equipment 3, line 3, will be changed to a switched line.

The Configurator-Operator communications are listed in table 3A-3. Each operator response appears on the same communications console line as the system query with no carriage return or line feed in between. (Notation used: SW = System Writes, OT = Operator Types, < = Carriage Return Key.)

ERROR MESSAGES

A. ERROR IN FIELD X

Cause:

1. a missing field

2. an incorrect alphabetic option character used

3. in a decimal option field, a decimal value out-of-range or a nondecimal character used

4. in a hexadecimal option field, a hexadecimal value out-of-range or a nonhexadecimal character used

5. a required option is missing when the field never appeared

6. the input line may be over 40 characters in length preventing some fields from being seen

Corrective Action:

After the error message is printed, the entire input line is retyped with the erroneous field corrected.

Typical Errors:

1. a CLA address not in the range of 0 to 7F

2. an equipment number not in the range of 1 to 4

3. a line number not in the range of 1 to 16 (or maximum specified) for a 6671, or 1 to 64 (or maximum specified) for 6676

4. the number of lines specified is greater than the number that the particular equipment can accommodate

5. the total number of parameters for a CLA is insufficient (the synchronous CLA has five options, and the asynchronous CLA has eight options)

B. CLA IN USE EQUIPMENT X LINE YY

Cause:

Specified CLA has already been assigned previously to the noted equipment and line combination.

Corrective Action:

The configurator prints REASSIGN (N,Y). If the operator responds with NO< then he may retype the input line correcting the CLA address. If the operator responds with YES< then the latest CLA assignment will be implemented and the previous assignment nulled.

TABLE 3A-3. RECONFIGURATION EXAMPLE

Origin	Communications	Comments
OT:	CTRL/BELL (two keys)	If the last communications console display is not "J" then the manual interrupt will have to be activated.
SW:	MI	Manual interrupt activated.
OT:	*F<	Configurator activated.
SW:	CONFIGURE, RECONFIGURE OR GO (C,R,G)	
OT:	R<	Reconfiguration is chosen.
SW:	PRINTOUT (N,Y)	
OT:	N<	No printout is desired.
SW:	MODIFY (N,Y)	
OT:	Y<	Modification is desired.
SW:	EQUIPMENT=, LINE=	
OT:	1,3<	Equipment 1, line 3 to be modified.
OT:	99<	This line is to be cancelled.
SW:	EQUIPMENT=, LINE=	
OT:	3,3<	Equipment 3, line 3 to be modified.
OT:	2D,S,A,8,I,2,110,F<	This line is changed from a dedicated to a switched line.
SW:	PRINTOUT (N,Y)	
OT:	N<	No printout is desired, yet.
SW:	MODIFY (N,Y)	
OT:	N<	No further modification.

C. MUST CONFIGURE (CONFIGURE OPTION TAKEN)

Cause:

The RECONFIGURE or GO response was given to the CONFIGURE, RECONFIGURE, OR GO (C,R,G) message when the system was not configured.

Corrective Action:

By default, the configurator proceeds as if the operator responded with CONFIGURE. No further action other than going through the configuration procedure is required of the operator.

D. ERROR IN READ – RETYPE

Cause:

The operator response or parameter was not successfully transmitted by the communications console.

Corrective Action:

Retype the entire input line.

E. CLA IN USE EQUIPMENT X LINE YY REASSIGN (Y,N)

Cause:

The CLA referenced has already been assigned.

Corrective Action:

If the operator intended that the current assignment be accepted, he will respond with Y<; the old assignment is to be nulled (disregarded). A N< response indicates that the operator acknowledges an error in the CLA address assignment and the old assignment is not changed.

F. CLA XX_{16} – DATA SET NOT READY .

Cause:

The data set ready signal was OFF on a dedicated line for the specified CLA during initialization.

Corrective Action:

The operator should check hardware connections and try again by initiating the *F manual interrupt. At this point the configurator is activated and the operator responds to to the Step 1 query with GO.

G. COUPLER Y CANNOT BE INITIALIZED – ABORT, RETRY, OR CONTINUE (A,R,C)

Cause:

(Y equals 1 or 2 as specified in the configuration procedure). This message indicates that the specified coupler could not be accessed successfully by the initializer.

Corrective Action:

The operator should check the hardware prior to responding. A response of A< indicates that the initialization process is to be aborted. A response of R< indicates that the initialization process is to be retried for the indicated coupler. A response of C< (to be used only on systems configured for two couplers) directs the controlware to service the equipment defined for the operational coupler, and to ignore the equipment defined for coupler Y.

NOTE

> If a C response is used, the controlware must be reloaded to re-activate the servicing of the associated coupler Y.

H. DUPLICATE CLA XX DETECTED

Cause:

This message (XX is the CLA address in hexadecimal notation) indicates that, in the process of initialization, two or more CLAs were found to have the same address assigned.

Corrective Action:

The operator must correct the duplication and initialize the CLA.

I. PE

Cause:

A memory parity error was detected.

Corrective Action:

Call the local customer engineer.

J. IP

Cause:

An invalid parameter was detected by the manual interrupt processor.

Corrective Action:

Select only the allowable manual interrupt function (*C, *D, *F, *G, *I).

K. MUX ERROR

Cause:

The controlware has detected a multiplex loop interface adapter malfunction. (This error causes the system to hang).

Corrective Action:

The operator should report the error to the site CE. Then the controlware should be reloaded and initialized.

LOAD, INITIALIZE PROCEDURES

This section describes procedures to load and initialize the controlware with a cassette tape which contains the desired configuration tables. To initially configure the tables or to change table parameters, refer to Section 3A.

LOADING

1. Insert the configured system cassette into the transport and close the transport lid. The transport should immediately rewind the cassette if the tape is not fully rewound.

   NOTE

   If a configured system cassette is already in the transport, it may be necessary to open and close the transport lid (cycling the transport lid switch) to initiate rewind.

2. Observe that the CASSETTE READY indicator illuminates.
3. Set the REMOTE/LOCAL switch on the maintenance panel to the REMOTE position.
4. Press the MASTER CLEAR switch on the maintenance panel.
5. Press the ESCAPE key on the communications console.
6. Press the DEADSTART switch on the maintenance panel.
7. Observe that the system has been successfully loaded (the message: "2550-100 SYSTEM 01 COPYRIGHT CONTROL DATA CORPORATION 1975" will be displayed on the communications console).

   NOTE

   If system does not load successfully, display contents of A Register at communications console. If A contains a "D" then an error occurred in loading which caused bootstrap loader to halt the load by executing a closed log. In this case, repeat above sequence of steps or load another copy of controlware using above sequence. If system still does not come up, initiate diagnostic procedures in accordance with Hardware Maintenance Manual (see Preface) or notify responsible maintenance personnel.

INITIALIZING

1. Operator Types:

   CTRL BELL (two communications console keys)

   System Writes: MI

2. Operator Types: *F<

   System Writes:

   CONFIGURE, RECONFIGURE, OR GO (C,R,G)

3. Operator Types: GO<

   System Writes:

   END OF SYSTEM CONFIGURATION - INITIALIZE AND GO

   END 2550-100 SYSTEM INITIALIZATION

At this point the system is up and ready for emulating the data-set controllers.

ERROR MESSAGES

Refer to error messages earlier in this section.

INSTALLATION OF FCOs

The purpose of this section is to describe the procedure for temporary application of controlware changes by installing field change orders (FCOs). Application of FCOs provides a method to patch the controlware until a corrected version can be shipped to the customer site on cassette tape.

FCOs must be installed immediately after the "2550-100 SYSTEM 01 COPYRIGHT CONTROL DATA CORPORATION 1975" message is displayed on the communications console after loading. Upper or lower case characters may be used. < denotes the Carriage Return key.

CAUTION

> The *I and *D manual interrupts described below must not be activated after the controlware is initialized.

PROCEDURE

1. Load system or configured cassette

2. System Writes:

   2550-100 SYSTEM 01

   COPYRIGHT CONTROL DATA CORPORATION 1975

3. Operator Types: Control "G"

   System Writes: MI

4. Operator Types:

   *I,start,hhhh$_1$,hhhh$_2$,hhhh$_3$,
   hhhh$_4$,hhhh$_5$<

   where: start is the hexadecimal core address

   hhhh$_i$ is the hexadecimal value to be entered (hhhh$_1$ through hhh$_5$ are contiguous memory addresses)

   System Writes: J

   The above action changes the contents of the specified address to the new value (hhhh$_i$).

5. Operator Types:

   *D, start,end<

   where: start is the starting hexadecimal core address

   end is the ending hexadecimal core address

   This action displays the new contents of the specified address.

6. Proceed to configure the system. (See Section 2, Configuring.)

NOTE

> To correct a partially entered entry, Operator Types: RUBOUT, LINE FEED,<, and repeats the entire entry.

SECTION 3B

HCP INSTALLATION AND TEST

SCOPE AND OBJECTIVE

This document is designed to provide the installing Customer Engineer with a plan which delineates the procedural steps for pre-delivery, installation and system test of the HCP.

The objective of this plan is to assure a well-planned, orderly and methodical installation and system test leading to a timely NEI (Notice of Equipment Installation).

REFERENCE DOCUMENTS

Should the requirements of this installation plan and the Contract conflict, the Contract shall govern. Where the requirements of this installation plan and the latest issue of reference documents other than the Contract conflict, the installation plan shall govern.

SUPPORT MATERIALS AND TOOLS

The following materials and tools are required to be available on site before starting installation:

a. ODS Diagnostic Program Cassette(s) (P/N 12323181, 82)
b. UTOPIA/MSMP (P/N 12323182)
c. Digital Voltmeter (P/N 18697566 or equivalent)
d. Tektronix 453 Oscilloscope (or equivalent) (P/N 18697506)
e. CCP1.0 Operating Program Cassette (or equivalent) (P/N 12323183, 84)

GENERAL INSTALLATION

The installation will be divided into five operational parts which are listed as follows:

a. Pre-Installation Site Check
b. Delivery, Unpacking, and Placement
c. System Assembly and Physical Verification
d. Power Up and Verification
e. System Hardware Test and Verification

PRE-INSTALLATION SITE CHECK

Prior to arrival of system at the computer site, visit the facility and verify the completion of the site preparation by performing the following checks:

SITE INSPECTION CHECKLIST

	Completed
a. Retrace equipment moving path from offloading point to room location, to assure a clear path without obstructions.	☐
b. Check power distribution and outlets for proper location, type, and quantity. [Use Site Planning (A&ES) MUS and Site Layout]	☐
c. Measure each power outlet for proper voltage and pin phasing.	☐
d. Check grounding system. [See Site Preparation Manual (CDC 74641200)]	☐
e. Arrange for temporary space for unpacking and disposal of crates and boxes.	☐

DELIVERY, UNPACKING AND PLACEMENT

Upon scheduled delivery of the system, CDC Customer Engineering should be present to monitor the unpacking and placement of the hardware (reference C.E.D Field Procedures Guide, Section 8:020:04). As a minimum, the following steps are a guide to achieving a smooth delivery:

DELIVERY CHECKLIST

		Completed
a.	Meet the carrier (van) at the unloading point (entrance to building).	☐
b.	Check for external damage to packing material as the equipment is unloaded.	☐
c.	Monitor removal of outer packing material and check for visible damage to equipment. (NOTE: This step may follow Step d).	☐
d.	Monitor movement of equipment to site position and verify placement is correct and over the floor opening. (Reference Site Layout Drawing*).	☐
e.	Check equipment against Bill of Lading/ Inventory.	☐
f.	Verify carrier removes all used packing material.	☐
g.	Complete all CDC/Carrier paperwork and retain as required. (Reference CED Field Procedures, Section 8:20:04, Page 2).	☐
h.	Release carrier personnel.	☐
i.	Unpack all small parts boxes/cartons and place contents in a safe location for later installation. NOTE: Small boxes or cartons may be shipped inside the R/H cabinet of the 2550 Mainframe (see Step j).	☐
j.	If the system includes 2556-3, -4 Loop Multiplexer Expansion, skip this step (go to Step k). Otherwise, open the front and rear doors of the R/H bay (from the front) and remove all loose cartons/boxes that are stored within. (Follow any instructions that are visible). Unpack and place contents with those of Step i.	☐

* Available from District Site Planning (AE&S).

Completed

k. Open the doors on the 2550 and remove the shipping blocks and packing material, as follows: (see Figure 3B-1 for location). ☐

From Rear (R.H. Bay)

1. Remove the vertical wood block from the L.H. side.

2. Remove the 2 supporting brackets on the R.H. side under the power supplies (each has 2 screws).

3. Remove the protective tape on the power supply retaining locks (see Figure 3B-2 for location) and release the locks.

4. Swing open both power supplies.

5. Remove the wood block located across the top of the upper power supply.

6. Cut the tie-wraps on the coiled cables at the bottom of the cabinet and remove the bag covers from the connectors.

From Front (L.H. Bay)

1. Remove nylon tape from communications processor cover, air filters and loop multiplexer (2).

2. Cut tie-wrap on M.T. Cable located on the lower L.H. unistrut brace, and remove bag over connector.

General

1. Remove packing material from the inside of all doors.

l. Level the 2550 Mainframe by adjusting the corner leveling pads. (Access is from under cabinet). ☐

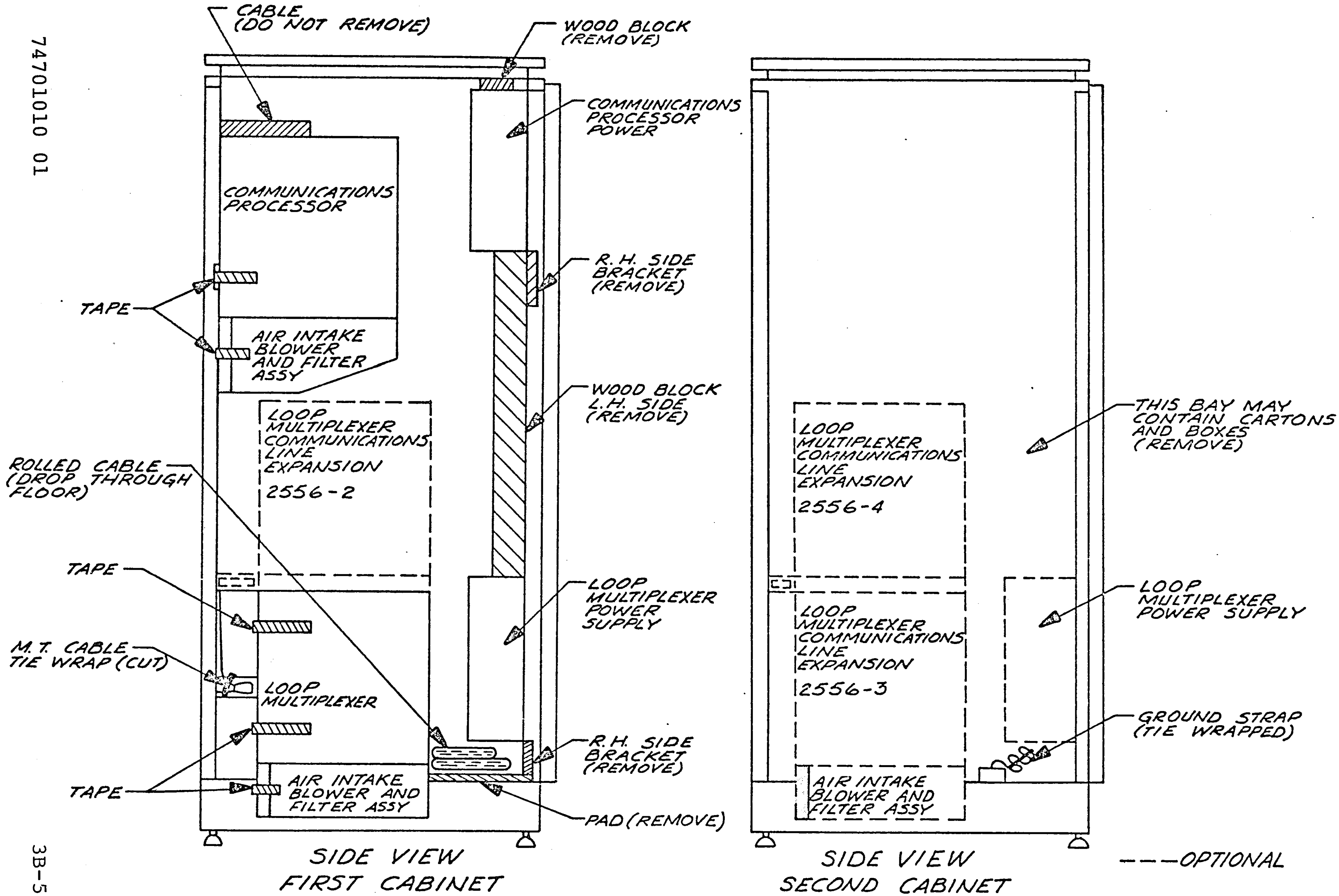


FIGURE 3-B1. HCP SHIPPING BLOCKS AND PACKING DIAGRAM

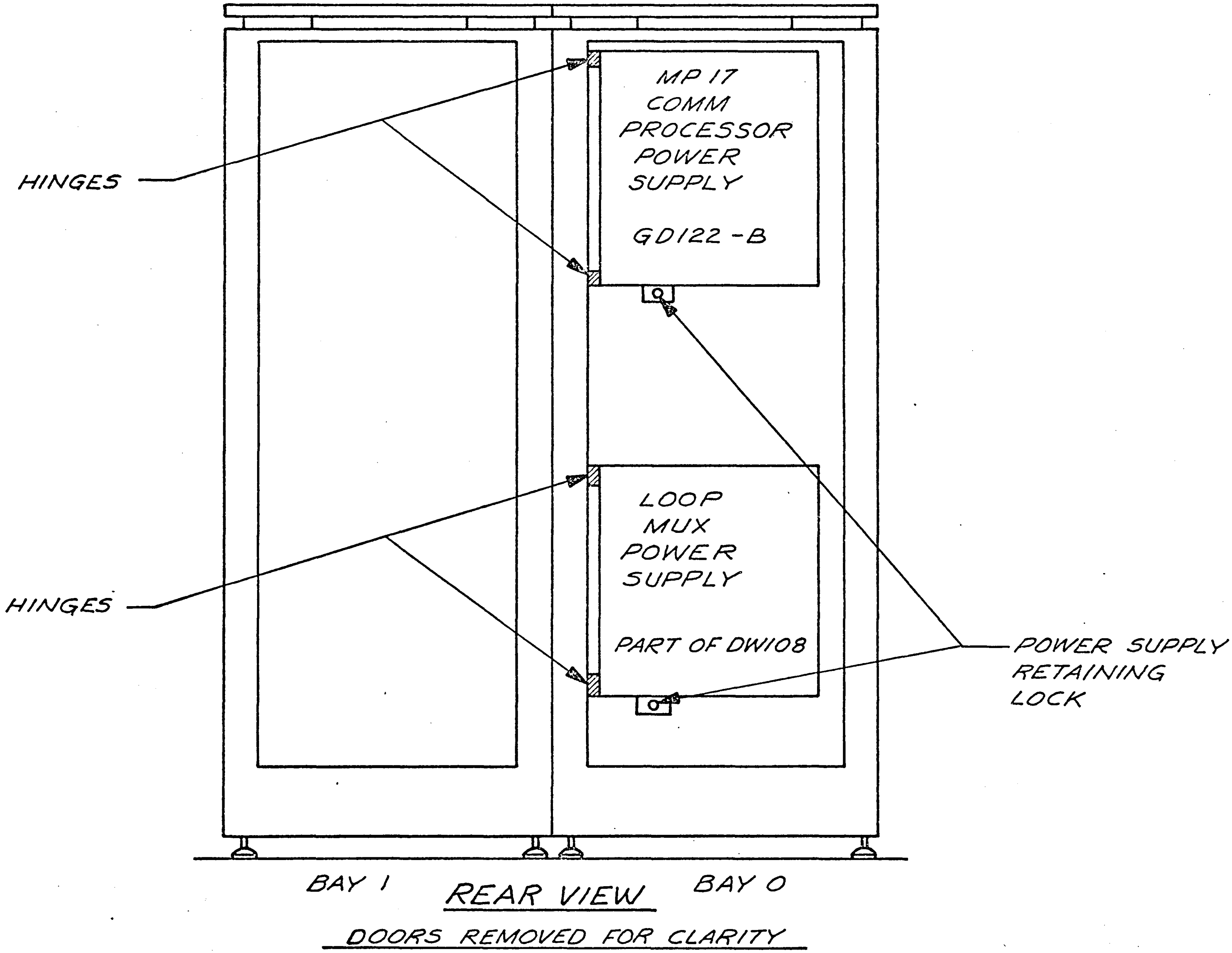


Figure 3B-2. Power Supply Locations

SYSTEM ASSEMBLY AND PHYSICAL VERIFICATION

This section deals with the physical assembly set-up and cable verification of the HCP. At this time, cable connections both internal and external to peripheral equipments will be either connected or verified. Also, all switch settings will be verified. (See Figures 3B-3 and 3B-4 for cabinet hardware location).

Internal Cable Verification

Install and/or verify internal cabling as follows:

	Completed
a. Locate the ground strap (rear of cabinet, L.H. Bay), release, drop through floor opening, and attach to system ground plane.	☐
b. Verify all main facility power circuit breakers are OFF.	☐
c. Locate the 2550 power cable (rear of cabinet, R.H. Bay), release, drop through floor opening, and plug into power connector. [Do not turn on power at this time.] Drop all other cables through floor opening.	☐
d. Release the power supply retaining locks and swing out the processor, and loop mux power supplies located in the rear of Bay 0. (See Figure 3B-2). (This may have been accomplished earlier).	☐
e. Insure and/or verify that all the power wiring connections on the two power supplies are tight. (Connections located on L/H side of P/S).	☐
f. Insure and/or verify that all the power wiring connections on the processor backpanel (located behind the processor P/S) are tight. See Figure 3B-5 for connection locations.	☐
g. Insure and/or verify that all the power wiring connections on the loop multiplexer backpanel (located behind the loop mux P/S) are tight. See Figure 3B-6 for connection locations.	☐

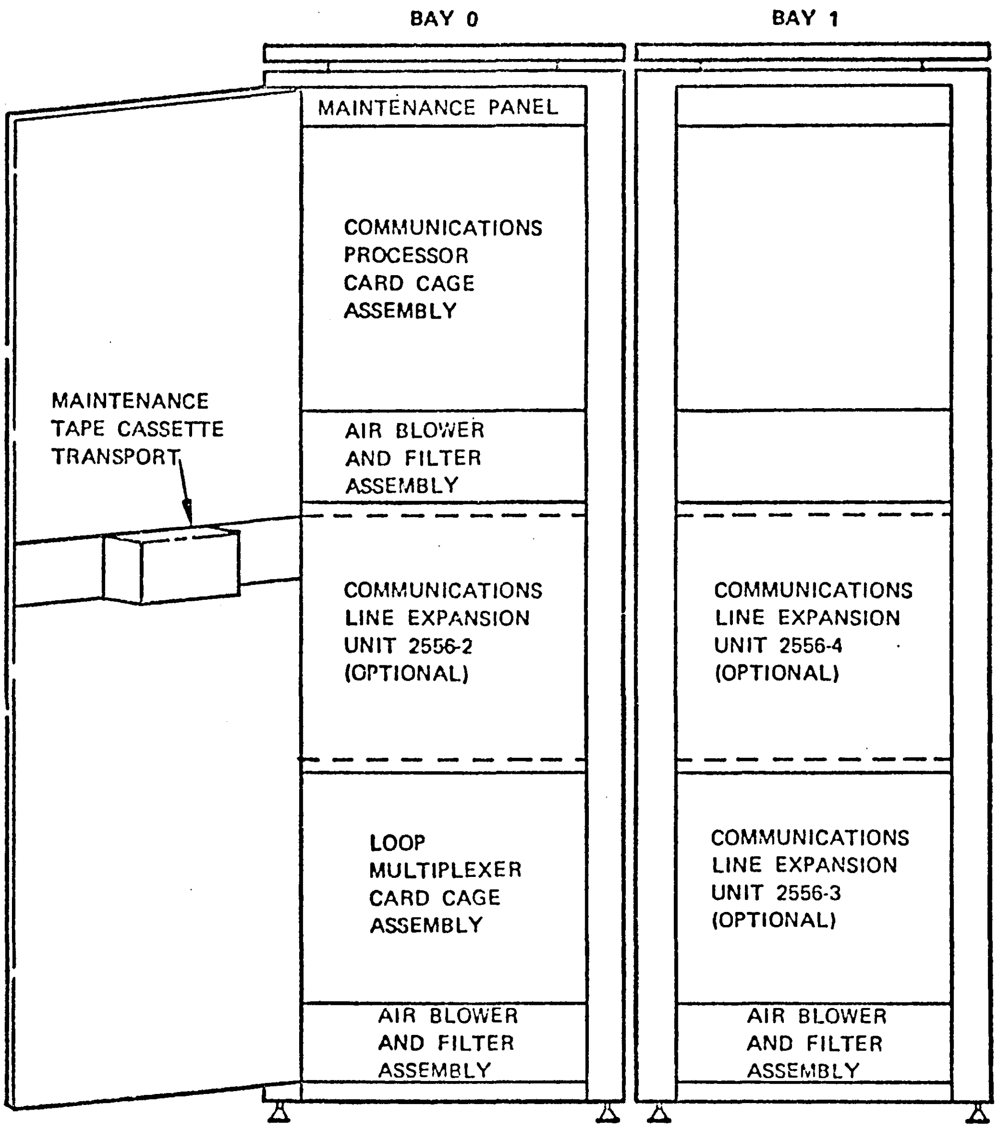


FIGURE 3B-3. HCP CABINET ASSEMBLY
FRONT VIEW

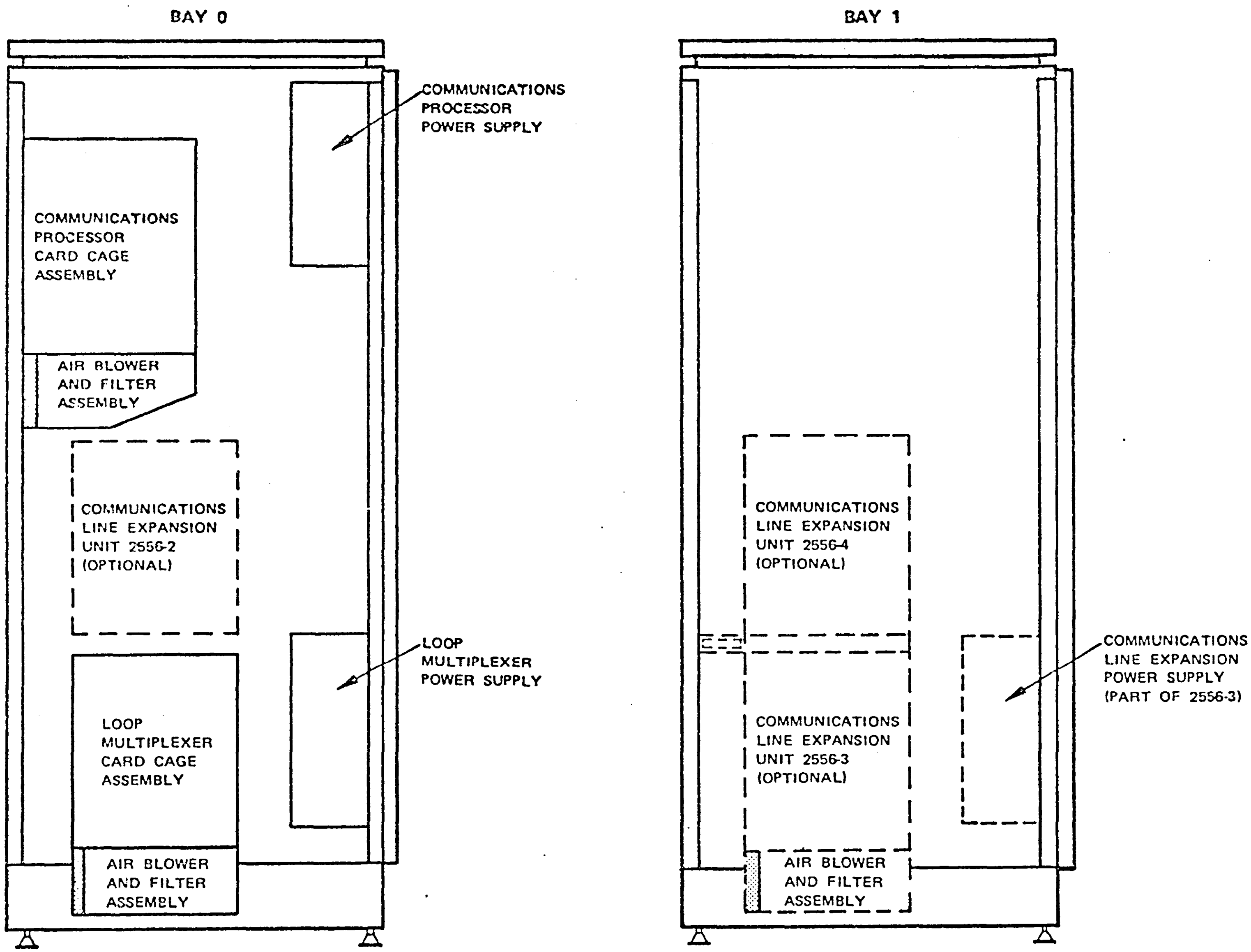
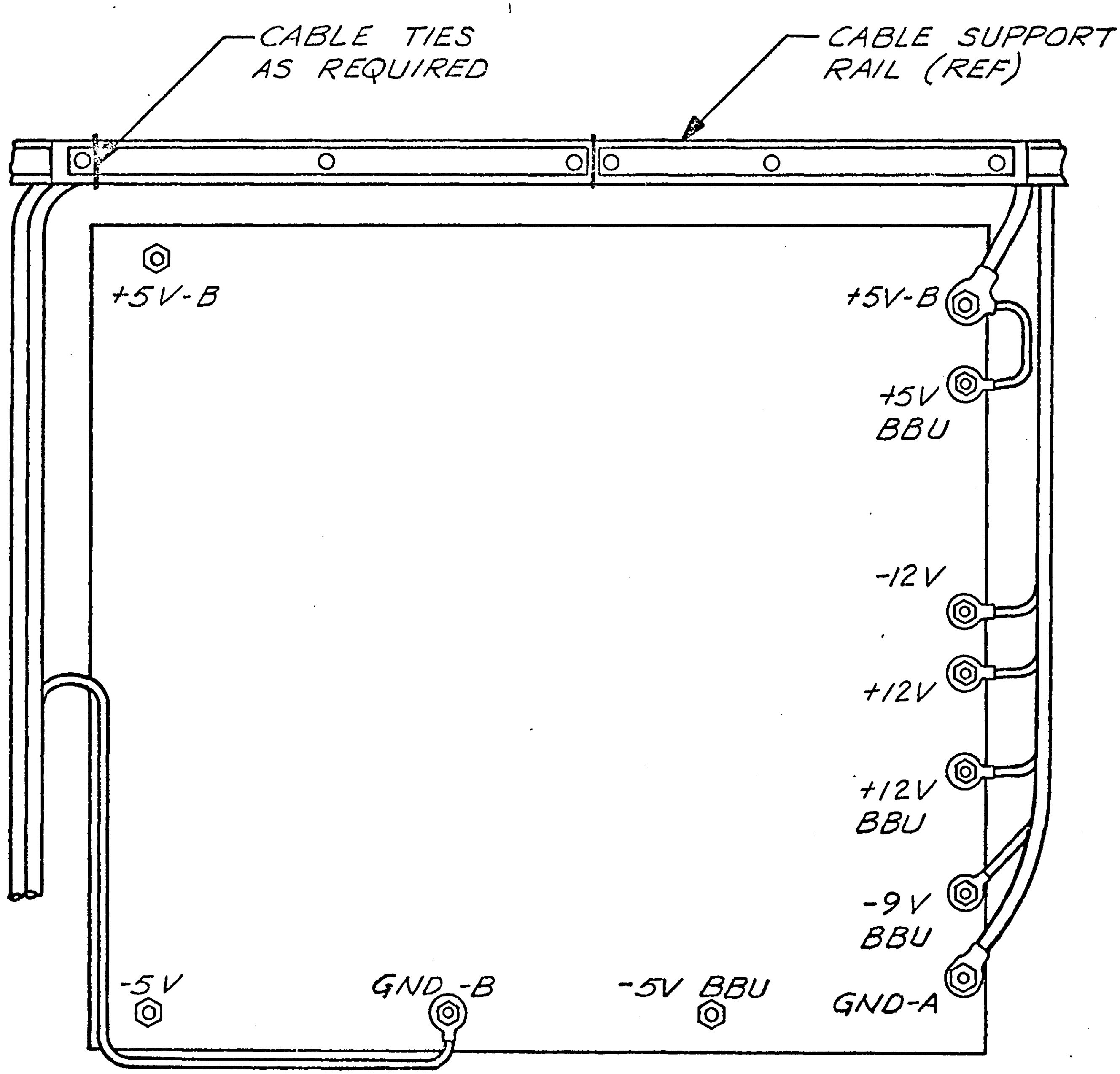
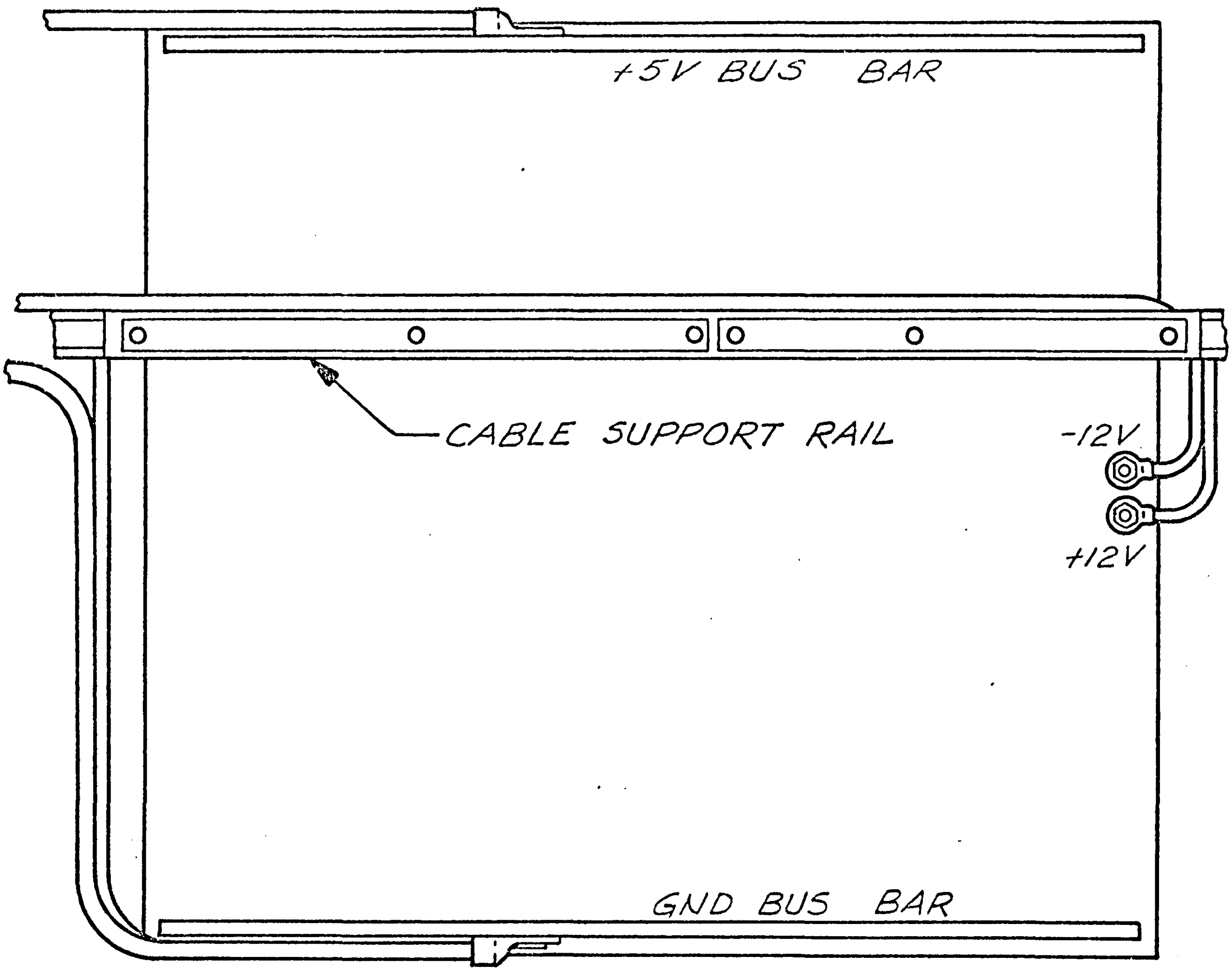


FIGURE 3B-4. HCP CABINET ASSEMBLY, SIDE VIEW



PROCESSOR BACK PANEL
VIEWED FROM REAR OF CABINET

FIGURE 3B-5. PROCESSOR BACK PANEL POWER CONNECTIONS



LOOP MULTIPLEXER BACK PANEL
VIEWED FROM REAR OF CABINET

FIGURE 3B-6. LOOP MULTIPLEXER BACK PANEL
POWER CONNECTIONS

Completed

h. Verify the proper installation (check for loose connections) and placement of processor backplane cables as follows: (see Figure 3B-7 for location). ☐

1. Row B, Power Jumper

2. Row B, Host Input and Output

3. Row B, Down Line (Pass-On) Input and Output (CYBER 170 Coupler only)

4. Row E and F, Loop Mux Connections

5. Row H, Tape Cassette and Maintenance Panel Connections

6. Row J, Maintenance Panel Connections

7. Row K, Console I/O Connections (TTY Cable in place)

8. Row W, Maintenance Panel Connections

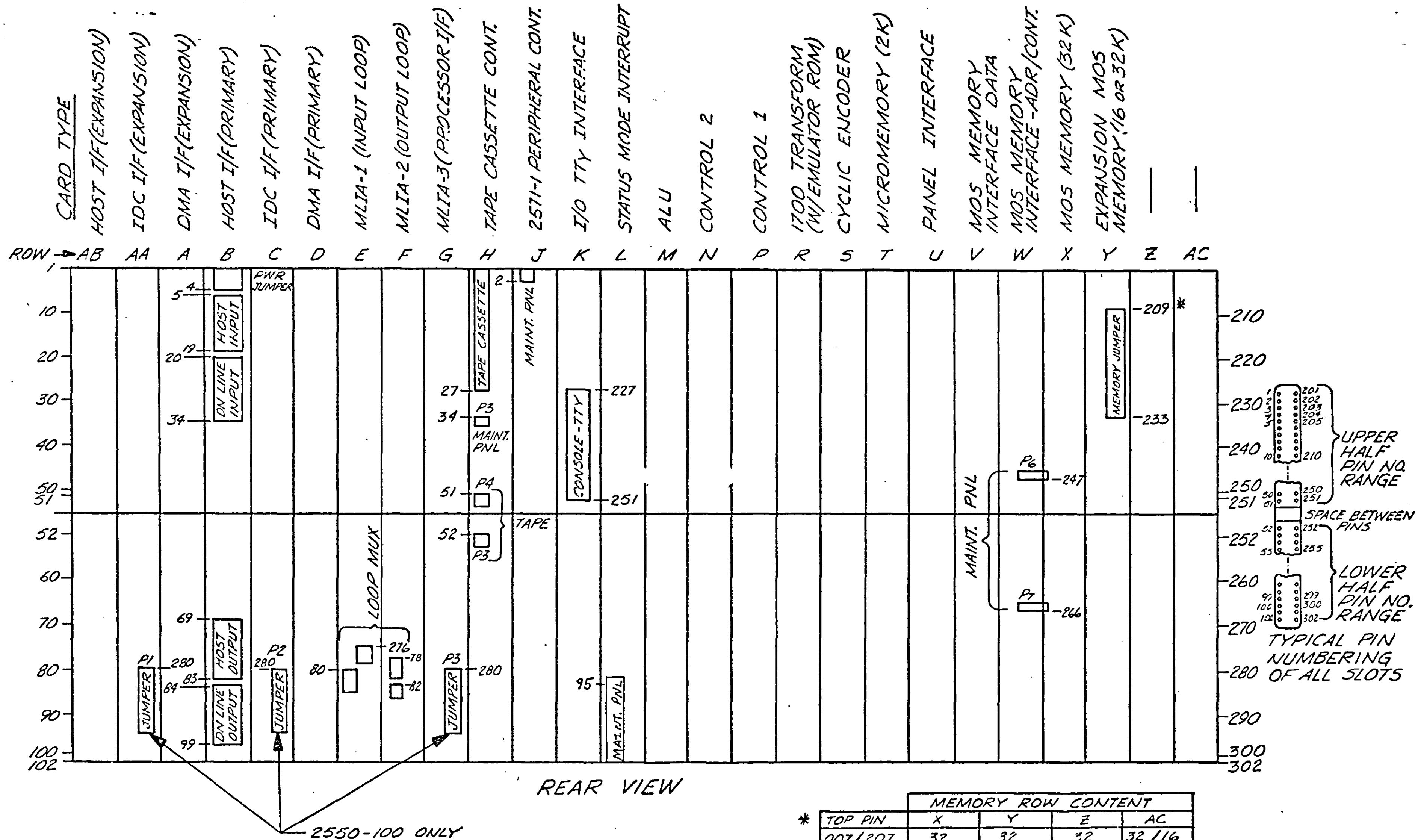
9. Row Y, Memory Jumper

10. Row L, Maintenance. Panel Connections

If the system includes the 2550-100 emulator package verify the following:

1. Jumpers P_1, P_2 and P_3 installed in Rows AA, C and G. If not installed, install at this time.

NOTE: A JUMPER PLUG SHOULD BE INSTALLED IN ROWS Y, Z, AC ONLY IF A MEMORY CARD IS INSTALLED IN THAT ROW. THE TOP OF THE JUMPER SHOULD BE ALIGNED ACCORDING TO THE CHART ON FIGURE 3B-7.



	MEMORY ROW CONTENT			
* TOP PIN	X	Y	Z	AC
007/207	32	32	32	32/16
008/208	32	32	16	16
009/209	32	16	16	16
010/210	16	16	16	16

FIGURE 3B-7. PROCESSOR BACKPANEL

Internal Circuit Card Verification

Install and/or verify the internal circuit cards as follows:

Completed

a. Locate the Loop Multiplexer Card Cage and verify the following. (See Figure 3B-3, Lower Front L.H. Cabinet). ☐

1. Verify the loop multiplexer card is installed in the far right slot and seated properly. (See Figure 3B-8).

2. Verify that cable P/N 74659500 is installed in J-1 of the Loop Mux Card and cable P/N 74659300 is installed in J-2 and that their respective retaining screws are tight.

3. Verify the proper number of CLA cards are installed in the Loop Mux Cage. (See Figure 3B-8.) (Check customer order).

4. Verify that the synchronous CLA cards are installed in the left-most slots with the asynchronous CLA's to their, right. Verify/Set that the left-most CLA card address' are dialed to 01 & 02 and those to its right are dialed in increasing numbers contiguously (addresses are in Hex.) ☐

b. Pull the following circuit cards located in the communications processor card cage, verify part numbers and re-install (re-seat) the cards: (see Figure 3B-9 for card location.)

*1.	Slot C - Coupler - IDC	P/N 74873590
2.	Slot D - Coupler - DMA	P/N 74656801
3.	Slot E - MLIA-1	
4.	Slot F - MLIA-2	
5.	Slot G - MLIA-3	
6.	Slot L - Status Mode Int.	
7.	Slot M - ALU Unit	
8.	Slot N - Controller 2	
9.	Slot P - Controller 1	
10.	Slot R - 1700 Transform	
11.	Slot S - Cyclic Encoder	

NOTE: * If a 2550-100 Emulator is included in the system order, the Slot C card should be replaced with P/N 74850001, and Slot D card should be removed.

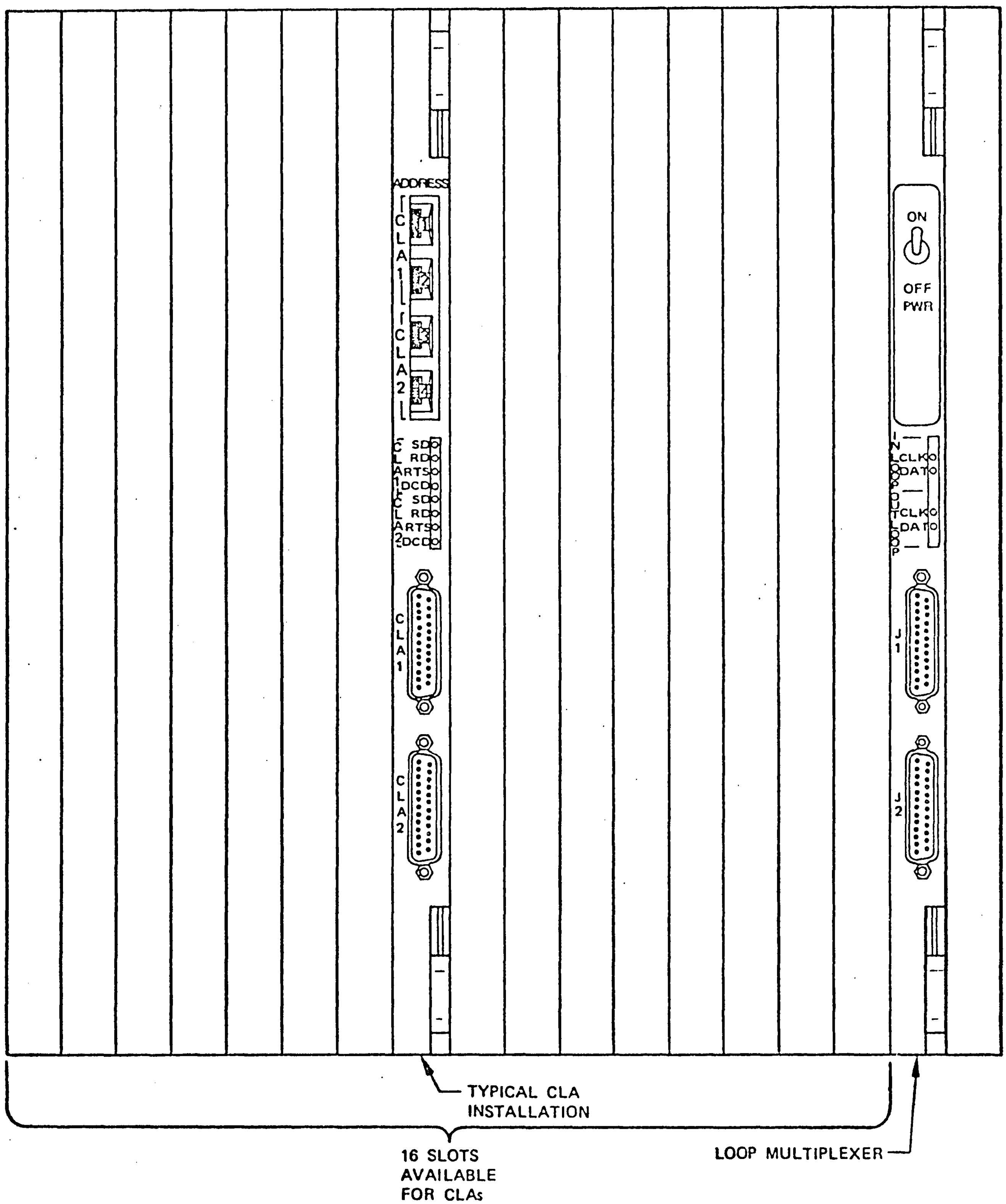


FIGURE 3B-8. LOCATION OF LOOP MULTIPLEXER AND TYPICAL COMMUNICATIONS LINE ADAPTER (CLA)

EXPANSION COMM. COUPLER (HOST I/F) *	AB
EXPANSION COMM. COUPLER (IDC I/F) *	AA
EXPANSION COMM. COUPLER (DMA I/F) *	A
PRIMARY COMM. COUPLER (HOST I/F)	B
PRIMARY COMM. COUPLER (IDC I/F)	C
PRIMARY COMM. COUPLER (DMA I/F)	D
MLIA-1 (INPUT LOOP I/F)	E
MLIA-2 (OUTPUT LOOP I/F)	F
MLIA-3 (PROCESSOR I/F)	G
TAPE CASSETTE CONTROLLER	H
2571-1 PERIPHERAL CONTROLLER *	J
I/O TTY INTERFACE	K
STATUS MODE INTERRUPT	L
ARITHMETIC AND LOGIC UNIT	M
CONTROL 2	N
CONTROL 1	P
1700 TRANSFORM (W/EMULATOR ROM)	R
CYCLIC ENCODER	S
MICROMEMORY (2K)	T
PANEL INTERFACE	U
MOS MEMORY INTERFACE — DATA	V
MOS MEMORY INTERFACE-ADDRESS/CONTROL	W
MOS MEMORY	X
MOS MEMORY MODULE *	Y
MOS MEMORY (OPTIONAL) *	Z
MOS MEMORY (OPTIONAL) *	AC

* OPTIONAL (MAY NOT BE PRESENT) CHECK CUSTOMER ORDER

FIGURE 3B-9. COMM. PROCESSOR CARD LOCATION

Completed

12. Slot U - Panel Int.

13. Slot V - Memory-Data

14. Slot Y - MOS Memory

c. Pull the coupler host I/F circuit card (processor slot B) (see note below*) verify the P/N is 74655300*, set rocker switches as applicable (see table 4A-4) for host interface. Set the ON/OFF line switch to the OFF position (see figure 3B-10). Reinstall card in slot B. ☐

d. Pull the tape cassette controller circuit card (processor slot H), set the SW01 rocker switches 2 and 4 to OFF and 1 to ON (see figure 3B-11). Set the SW02 rocker switches 1 and 2 to ON and 3 and 4 to OFF (see figure 3B-11). Reinstall card in slot H (see figure 4C-3). ☐

e. Pull the I/O TTY interface circuit card (processor slot K), set the rocker switches, figure 3B-12, in accordance with baud rate table shown on figure 4A-8. Reinstall card in slot T. ☐

f. Pull the micromemory circuit card (processor slot T), set the rocker switches, figure 3B-13, in accordance with table shown in figure 4A-11. Reinstall card in slot T. ☐

The following steps to be accomplished only if the system includes a 2550-100:

g. Set PPU rocker switches for appropriate equipment numbers. See example table 3B-1. ☐

NOTE: a. Do not adjust any other components on this board, except upon failure to run.

b. Check with PSD analyst for actual equipment assignments, which should be used when mated to the CYBER 70/170.

NOTE: *If a 2550-100 Emulator is included in the system order, the slot B card should be replaced with P/N 74872873 or 74845001 set-up per Steps g, h and i.

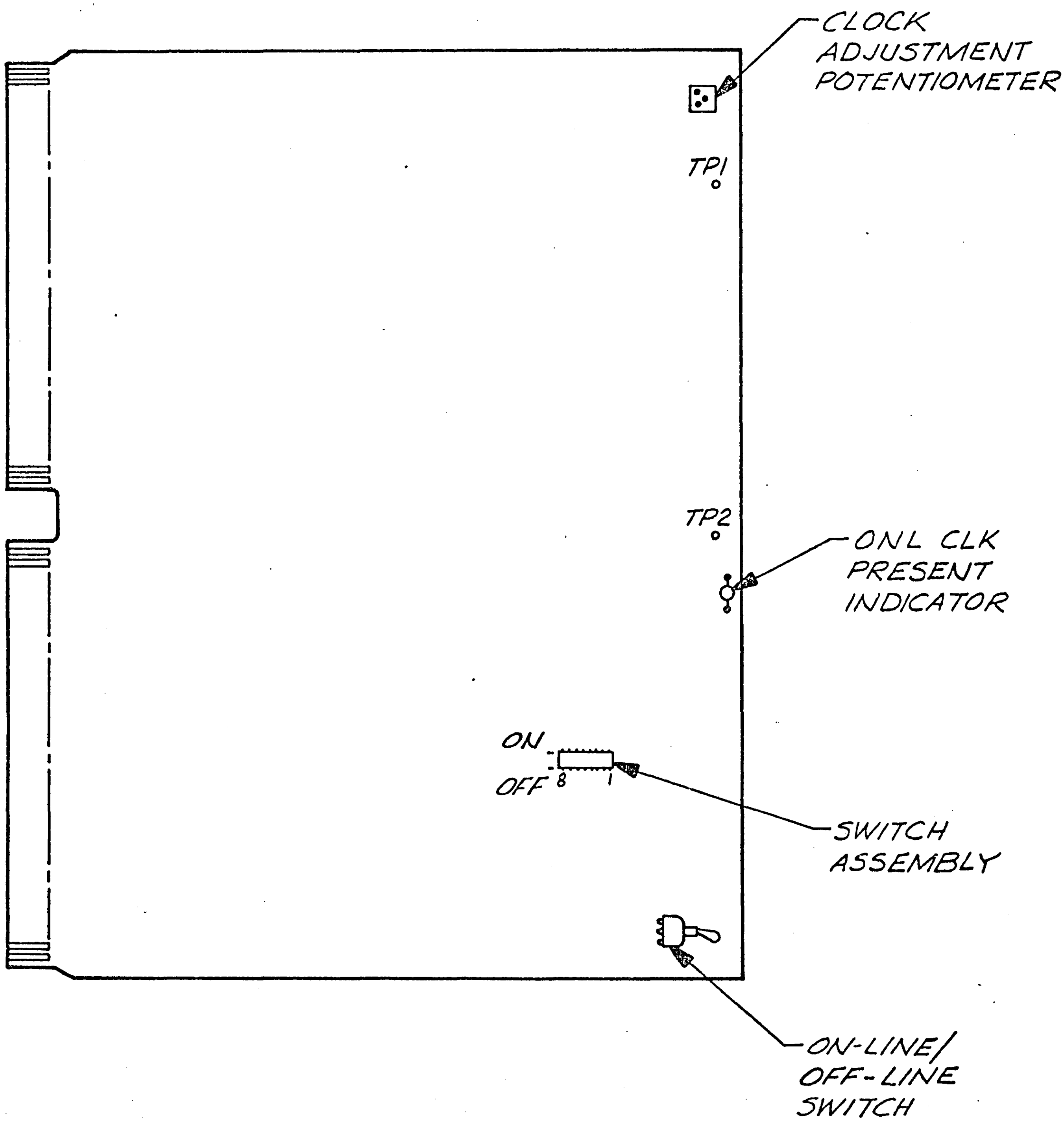


FIGURE 3B-10. COMMUNICATIONS COUPLER, HOST INTERFACE CIRCUIT CARD CONTROLS AND INDICATORS

TABLE 3B-1. EXAMPLE OF PPU EQUIPMENT SWITCH TO INTERNAL ASSIGNED EQUIPMENTS TABLE

PPU Equipment Address Switch Number	Internal Equipment Address Assigned to the Switch
S1	Internal Equipment 0
S2	Internal Equipment 1
S3	Internal Equipment 2
S4	Internal Equipment 3

NOTE

Four PPU equipment switches determine which PPU equipment numbers are assigned to the coupler. The switches are positioned on coupler assigned equipment numbers. The maximum equipment numbers that can be assigned to one coupler is four (ranging from 0-7). Once the assigned equipments are known, only one equipment switch may be positioned on any one equipment number at a time. This restriction allows the hardware to properly generate the required internal equipment number. Precautions related to the equipment switches are described in the installtion portion of this document.

The equipment switches are shown in figure 3B-12. If only two equipment numbers are assigned to the coupler and S1, S2 are to be used to detect them, then S3 and S4 must be placed into a OFF (floating) position. Which decoder output S1, and S2 are to be positioned on is determined as the system is being configured. Each of the switches may be positioned on any of the eight decoder outputs (except for the restrictions described above).

Table 3B-1 is an example of PPU equipment switch settings: Assume PPU equipment numbers assigned the coupler are 5 and 7. Where 7 must become internal equipment 0, and 5 internal equipment 2. The following table is used to determine which switch is used to select the assigned equipment. Table 3B-1 indicates that S1 must be positioned to 7, S3 to position 5, and S2/S4 in their OFF (floating) position.

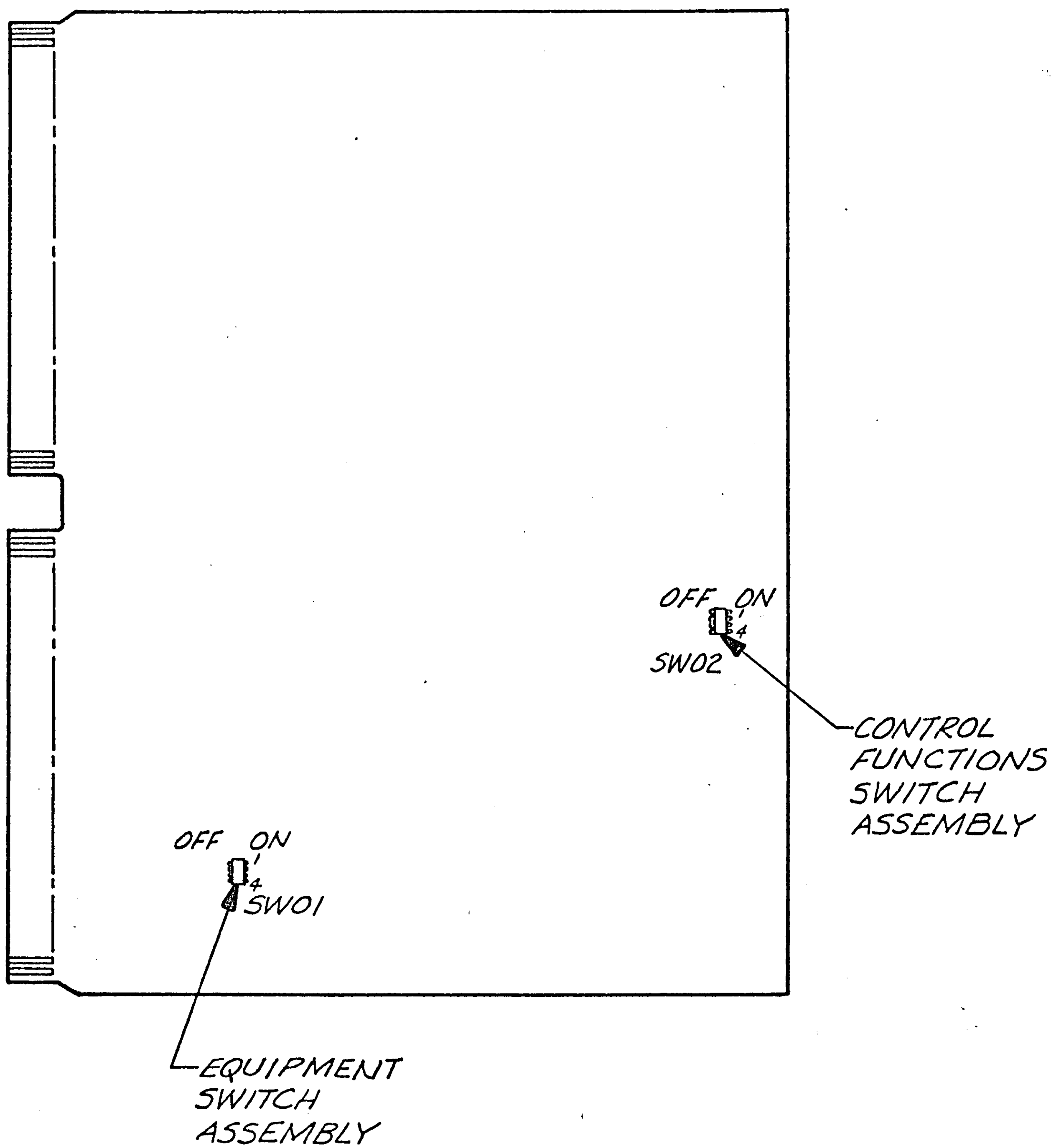
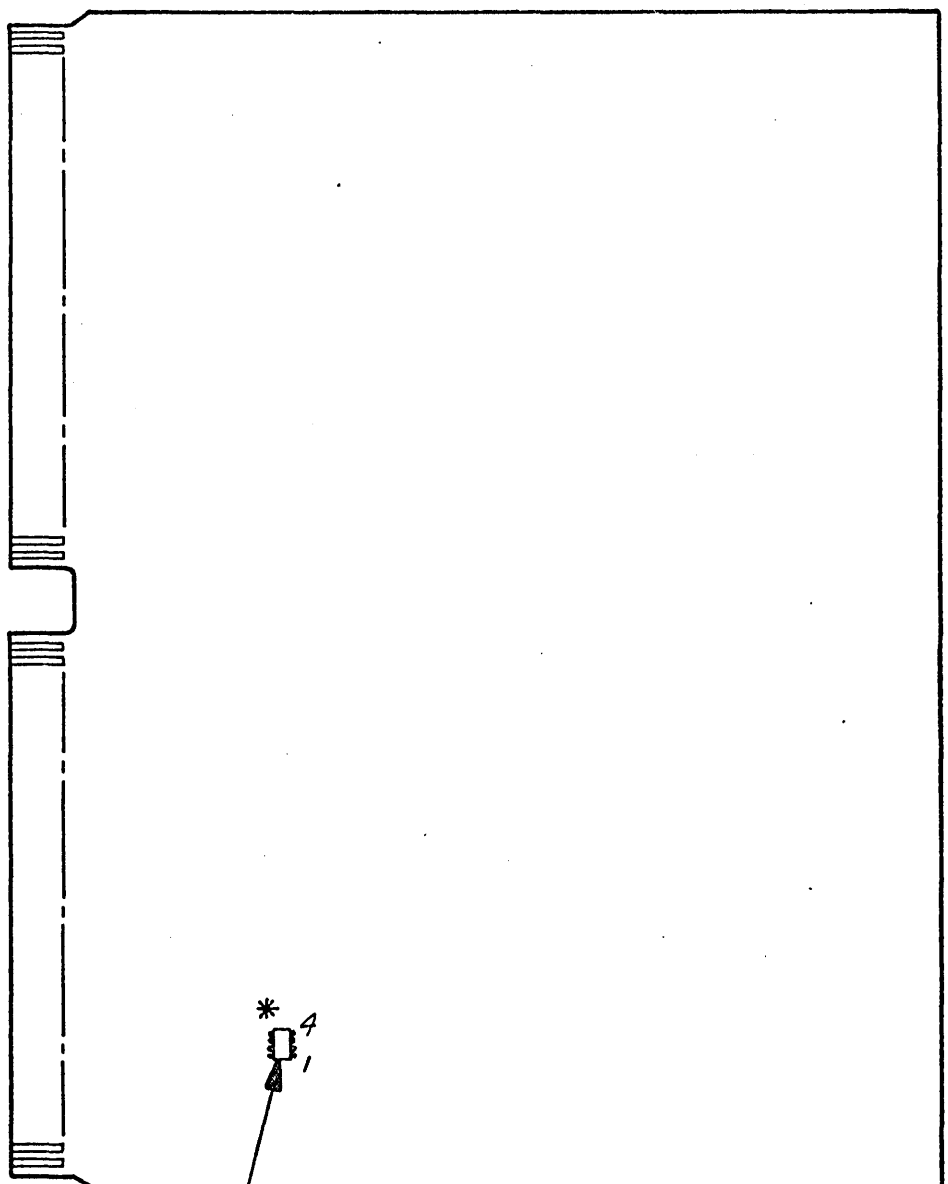


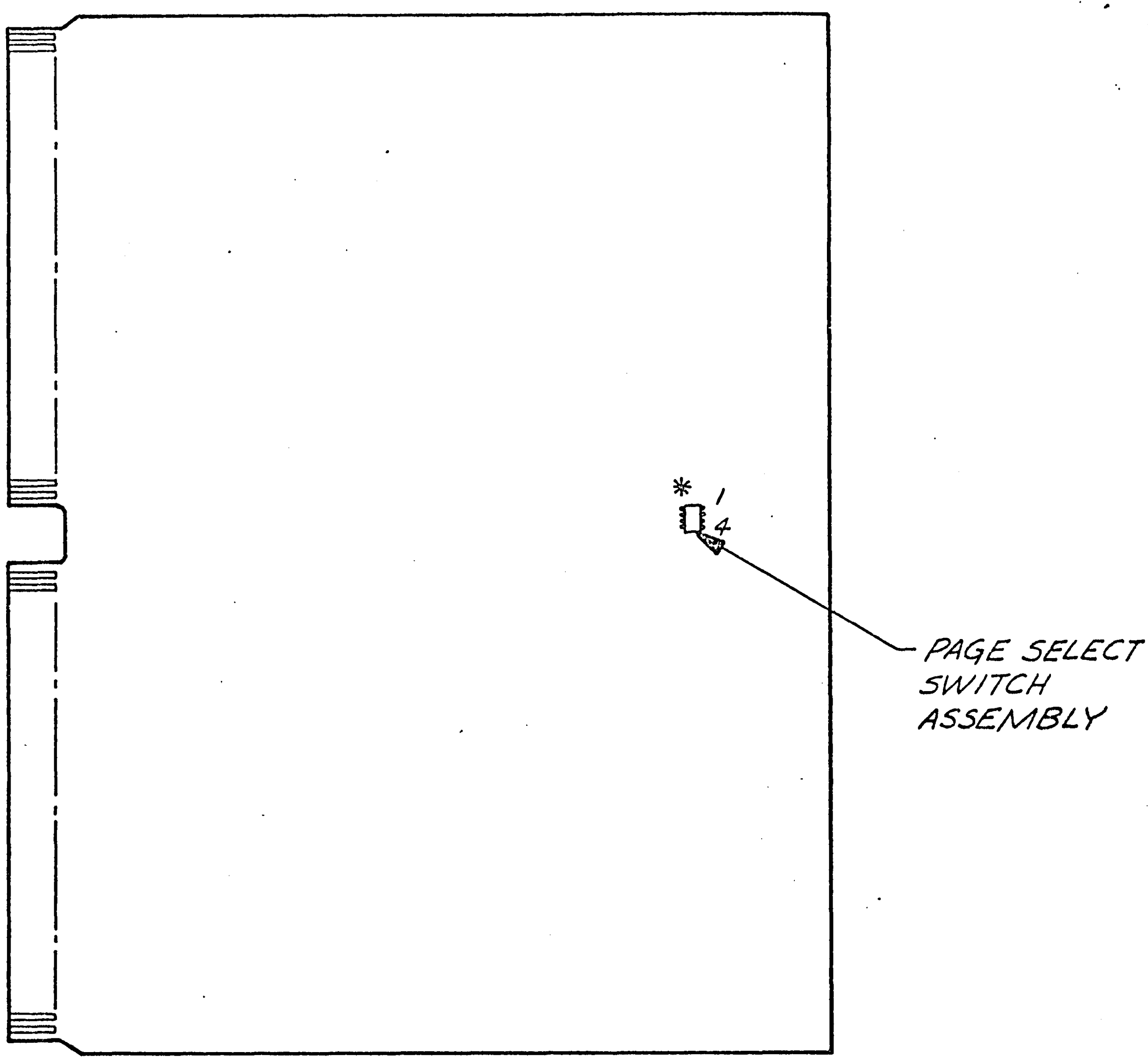
FIGURE 3B-11. TAPE CASSETTE CONTROLLER SWITCHES



SWITCH ASSEMBLY

* FOLLOW ON/OFF AS MARKED ON SWITCH, ALL ELSE ON CARD ETCH

FIGURE 3B-12. I/O TTY INTERFACE CIRCUIT CARD SWITCH



*FOLLOW ON/OFF AS MARKED ON SWITCH, ALL ELSE ON CARD ETCH

FIGURE 3B-13. MICROMEMORY CIRCUIT CARD SWITCH

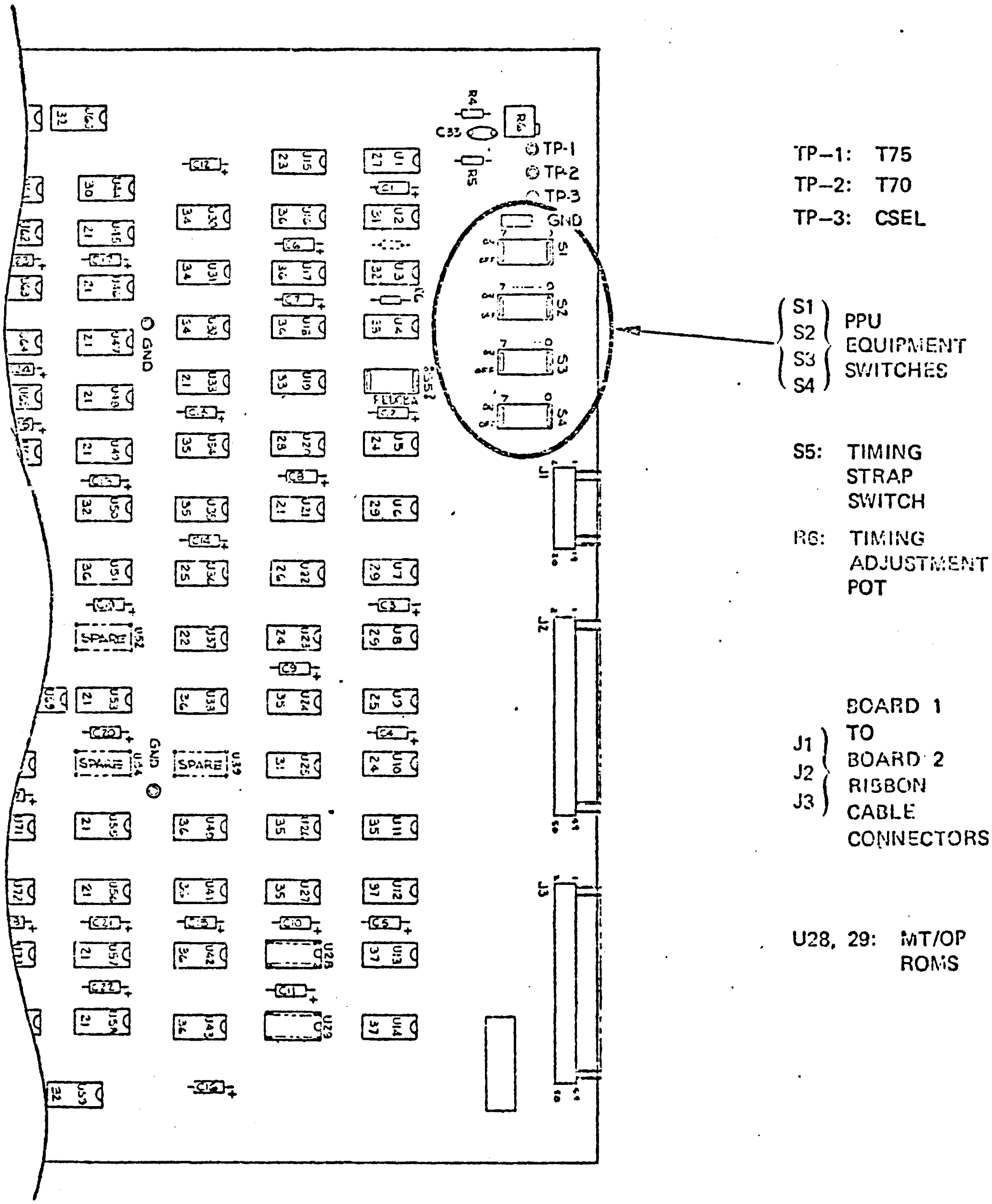


Figure 3B-12. Synchronizer Card Assembly Drawing — DY159-A (Board 1)

Completed

h. Install ribbon cables between board 1 (Slot B) and Board 2 (Slot C). (See Figure 3B-15). ☐

i. Return to Step d. ☐

Console Installation

There are at present, two types of consoles that may be used with the 2550 system; one is a CRT and the other a Teletype. The following are procedures for both types:

a. Check the customer order for I/O console device. If it is a 7XX CRT proceed to the next step. If a 1711-4, 1712 or 1713 is specified proceed to step g. ☐

b. Remove the console TTY connector from Row K of the communications processor backpanel (see Figure 3B-7). ☐

c. Cut the tie-wraps holding a similar plug tied and bagged to the horizontal cable support and install in the same location as the connector removed in Step b (I/O CRT). ☐

d. Pull the other end of the I/O CRT cable (RS232 25 Pin connector) under the floor to the CRT location and connect it to the back of the CRT (receptacle marked "Data Set"). ☐

e. Set the switches on the rear connector panel as follows: ☐

   1. Half/Full Duplex - Full

   2. Parity - Even

   3. Speed - 110 Baud

f. Tie down the un-used TTY connector plug to the horizontal cable support. Proceed to step i. ☐

g. Pull the lugged end of the I/O TTY cable under the floor to the Teletype console unit and thread it up the R/H side to the terminal strip at the R.H. rear, under the top cover. ☐

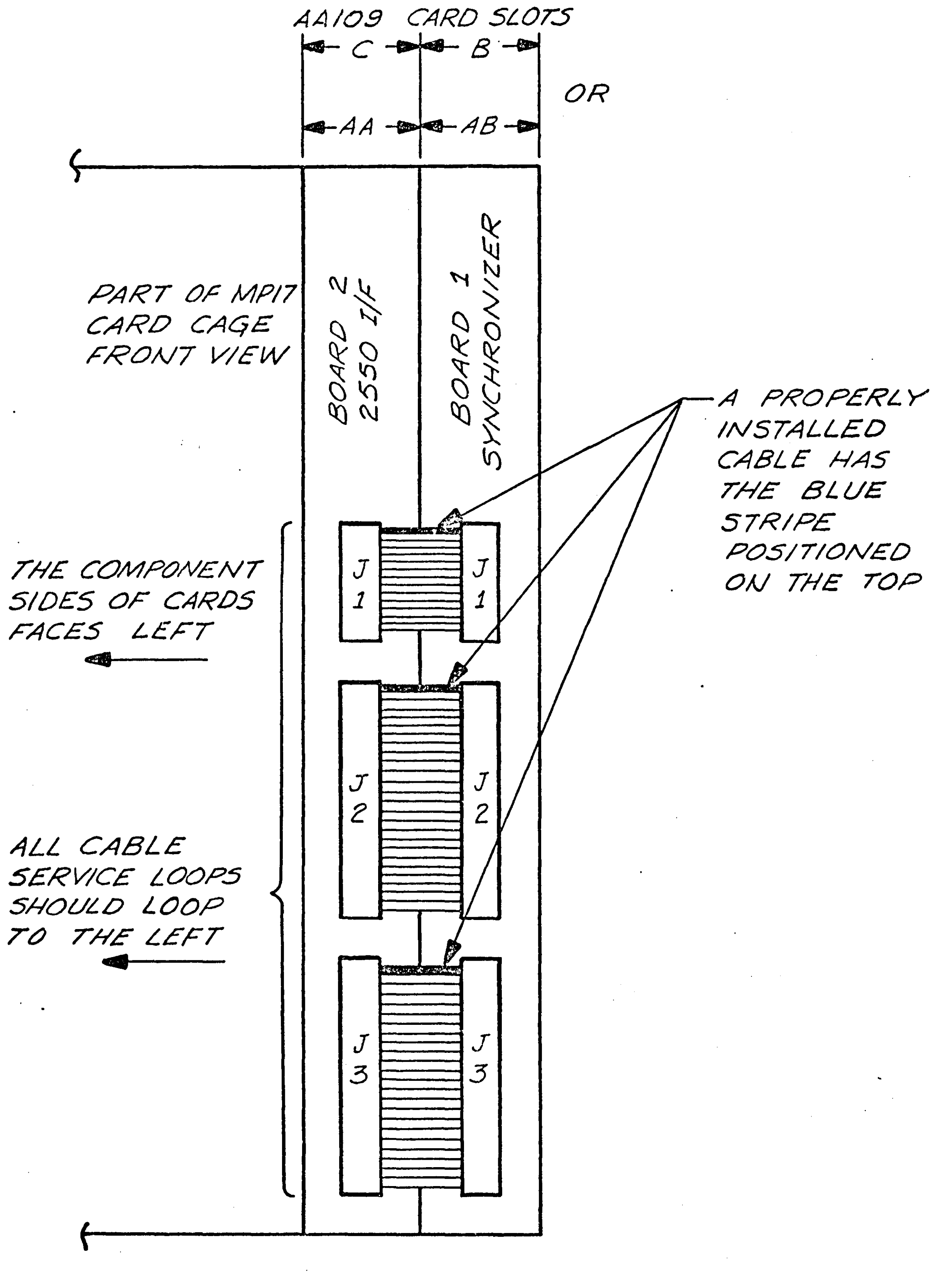


FIGURE 3B-15. CARDS AND RIBBON CABLES INSTALLED IN MOS MACHINE

Completed

h. Connect the cable to the TTY terminal strip as shown below for the particular unit provided. ☐

M33 (1711)

- Yellow wire - 3
- Brown wire - 4
- Single white wire - 7
- Jumper wire between - 3-6
- Triple white wire - Ground
- Small black wire - Ground
- Red wire - Not Used
- Orange wire - Not Used
- Large black wire - Not Used

M35 (1712 or 1713)

- Yellow wire - 8
- Brown wire - 5
- Single white wire - 7
- Jumper wire between - 6-8
- Triple white wire - Ground
- Small black wire - Ground
- Red wire - Not Used
- Orange wire - Not Used
- Large black wire - Not Used

i. Connect the console power cord to the outlet under the floor. Do not turn on the power. ☐

Cassette Mag Tape Installation

a. Mount the cassette MT Transport to the L.H. front door of the HCP using the 4 quick release screws retained in the bracket (see Figure 3B-3). ☐

b. Locate the M.T. cable hanging loose near the L.H. front side lower bracket and connect to the mating connector on the cassette transport. ☐

Peripheral Equipment Installation

This section to be used only if a card reader (2572-1, -2) or a line printer (2570-1, -2) are part of the order. The following are instructions for connecting to the 2550-X:

> NOTE: Follow unpacking and set-up instructions furnished with the card reader and/or printer.

a. Unpack and Set-Up peripherals in their proper locations. (Use manual supplied with peripheral). ☐

b. Install/Verify the peripheral controller circuit card P/N 88909503 (K26) in the HCP communications processor Slot J. ☐

Completed

c. Verify that the feed switch (lower front of peripheral card) is OFF (toward front of card). ☐

d. Install/Verify the signal cables to the peripherals (as required) on the communications processor backpanel as follows and tie-wrap to the horizontal cable support rails: (see Figure 3B-16). ☐

   1. Connect the card reader cable P/N 88894500 to Row J Pins 78-102.

   2. Connect the printer cable P/N 88894601 to Row J Pins 52-76.

NOTE: The above cables come with and are part of the FH301A peripheral controller.

e. Install the printer cable under the floor to the printer location and connect to receptacle AJ109 located under the top rear cover, RH rear area. ☐

f. Drop the printer power cable through the floor and plug into the outlet under the floor. Do not turn on the power. ☐

g. Install the card reader cable under the floor to the card reader location and connect to the mating receptacle at the rear of the card reader. ☐

h. Repeat Step f for the card reader power cable. ☐

i. Open the card reader back (2 quick release screws). Loosen the 2 screws on the R.H. side of the small board and swing open. Set the rocker switches on the small board as follows: ☐

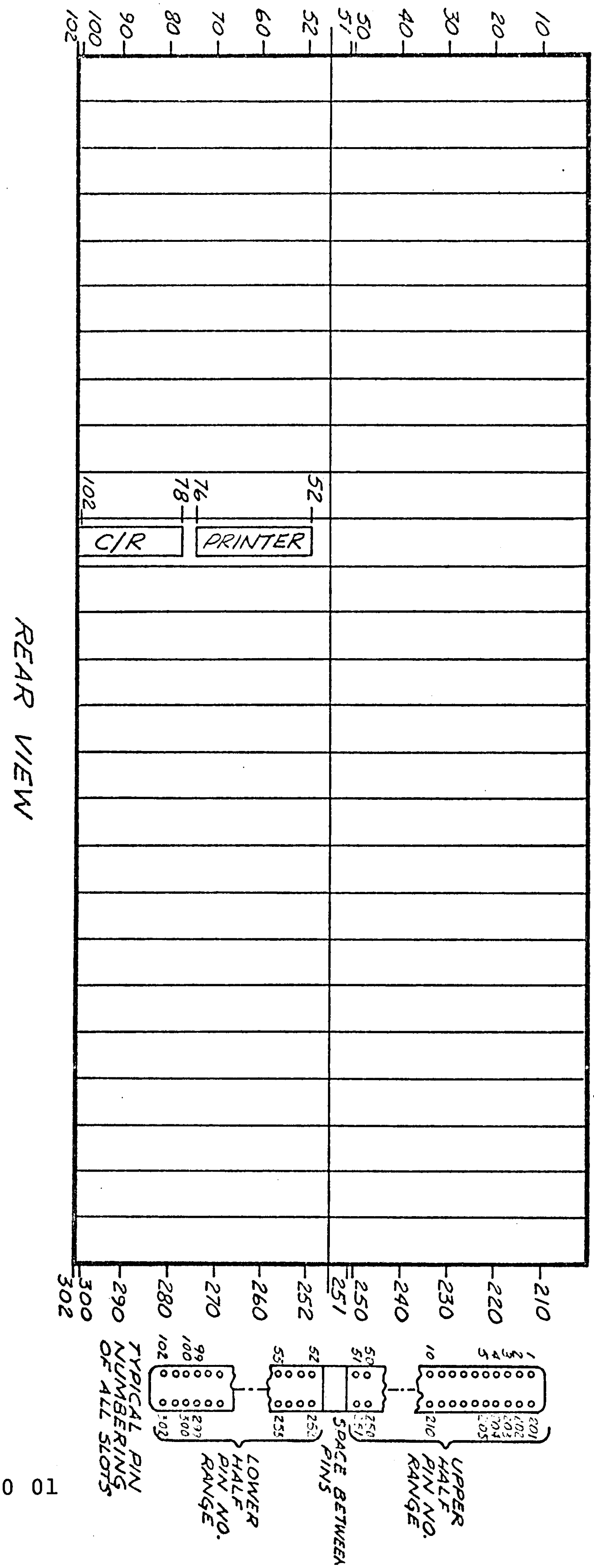
   1. BP OFF

   2. RP OFF

   3. All others ON

   Set the rocker switches on the large board, all OFF.

j. Secure the small board and close and secure the back cover. ☐



ROW	CARD TYPE
AB	HOST I/F (EXPANSION)
AA	IDC I/F (EXPANSION)
A	DMA I/F (EXPANSION)
B	HOST I/F (PRIMARY)
C	IDC I/F (PRIMARY)
D	DMA I/F (PRIMARY)
E	MLIA-1 (INPUT LOOP)
F	MLIA-2 (OUTPUT LOOP)
G	MLIA-3 (PROCESSOR I/F)
H	TAPE CASSETTE CONT.
J	2571-PERIPHERAL CONT.
K	I/O TTY INTERFACE
L	STATUS MODE INTERRUPT
M	ALU
N	CONTROL 2
P	CONTROL 1
R	1700 TRANSFORM (W/EMULATOR ROM)
S	CYCLIC ENCODER
T	MICROMEMORY (2K)
U	PANEL INTERFACE
V	MOS MEMORY INTERFACE DATA
W	MOS MEMORY INTERFACE-ADR/CONT.
X	MOS MEMORY (32K)
Y	EXPANSION MOS MEMORY (16 OR 32K)
Z	—
AC	—

FIGURE 3B-16. PERIPHERAL CABLE LOCATION

CYBER 70/170 Cable Installation

In order to connect the HCP to the CYBER 70/6000 or CYBER 170 the following cabling must be accomplished.

Completed

a. Trace the 5 ft. cable connected from the upper half of the processor backpanel, Row B pins 5-19 (see Figure 3B-7) to its connector and tag the connector end "Host Input". ☐

b. Trace the 5 ft. cable connected from the lower half of the processor backpanel, Row B pins 69-83 (see Figure 3B-7) to its connector and tag the connector end "Host Output". ☐

c. Install, under the floor, the two CYBER interconnect cables from the CYBER 70/6000/170 to the HCP. ☐

> NOTE: For CYBER 70/6000 installations, the cables are 70 ft. P/N 52675001 and for CYBER 170 they are 65 ft. P/N 19191600.

d. Connect the CYBER 70/6000/170 end of the cable to the channel input and the HCP end to the connector marked "Host Input". (Reference Step a). ☐

e. Connect the CYBER 70/6000/170 end of the other cable to the channel output and the HCP end to the connector marked "Host Output". (Reference Step b). ☐

f. For CYBER 170 installations, there will be two 5 ft. cables remaining. The cables are for downline pass-on (connected to upper half of backpanel) and downline pass-back (connected to lower half of backpanel). ☐

HCP Terminal/Modem Cabling

In order to connect the HCP to the communications network terminals the following must be accomplished:

a. Unpack the CLA/Modem cables if not already done previously. ☐

b. Install the CLA/Modem cables under the floor between the HCP and the modem area with the female plug on the HCP end. Leave the HCP end of the cable loose but at the front L.H. Bay, near the CLA cards. ☐

c. Match the cables with their respective modems and CLA's per Figure 3B-17. ☐

CLA	MODEM (DATA SETS)	CABLE	
		PRODUCT ID	EQUIP ID
2560-1 RS232 (Sync)	AT&T 201	10401-1	XA130A
2560-1 RS232 (Sync)	AT&T 203A	10401-3	XA131A
2560-1 RS232 (Sync)	AT&T 208A	10401-2	XA129A
2560-1 RS232 (Sync)	AT&T 208B	10401-1	XA130A
2560-2 Coaxial (Sync)	AT&T 301	10402-1	XA136A
2560-2 Coaxial (Sync)	AT&T 303	10402-1	XA136A
2560-3 Diff. (Sync)	——	10403-1	XA137A
2561-1 RS232 Async.	AT&T 103A	10400-1	XA133A
2561-1 RS232 Async.	AT&T 113	10400-1	XA133A
2561-1 RS232 Async.	AT&T 202	10400-1	XA133A
2561-1 RS232 Async.	Direct to Terminal	10400-2	XA135A
2561-1 RS232 Async.	AT&T 103F	10400-3	XA134A
2561-1 RS232 Async.	AT&T 202R	10400-3	XA134A
2561-1 RS232 Async.	CDC 362	10400-3	XA134A
2560-1 RS232 (Sync)	Direct to Terminal	10401-4	XA132A

NOTE: IF OTHER THAN THE LISTED DATA SETS ARE USED, VERIFY THAT THE INTERFACE IS THE EXACT EQUIVALENT. COMPATIBLE, IN SOME CASES, DOES NOT ALWAYS MEAN DIRECTLY INTERCHANGEABLE.

Figure 3B-17. CLA/Cable Matrix

Completed

d. Label each end of the cable with CLA number and modem type and number. ☐

e. Connect the CLA cables to their respective modem's and tighten down the retaining screws. (Note: the higher speed modems are to be connected to the left-most CLA's decreasing speeds to the right.) ☐

f. Turn OFF (Disable) all CLA's (2 switches on each CLA card, front). ☐

g. Connect the CLA cables to their respective CLA's and tighten down the retaining screws. ☐

h. Dress and tie the CLA cables in a neat manner to the cabinet support framing. Use the cable ducts if line expansion 2556-2, -3, -4 is included (see Figure 3B-3). ☐

POWER UP

This section deals with the actual powering up of the HCP. This is probably the only time the total system will be completely powered off. This section does not include power up procedures for the CYBER Host Computer.

General

Insure and verify that the following equipment power switches/breakers are OFF:

a. The HCP main cabinet power breaker (located at the rear base of both Bays). ☐

b. Both 5 volt output breakers on the two rear HCP power supplies (located on the L.H. side terminal board at the top). ☐

c. The HCP loop mux switch located on the loop mux card installed at the front lower card cage (see Figure 3B-8). ☐

d. Repeat Step c for all loop mux expansion (if present). ☐

e. The card reader (if present) power breaker (S-1) located on the rear connector panel. ☐

f. The line printer (if present) power breaker, located on the L.H. Side near the rear behind the small door. ☐

g. The console unit TTY/CRT power switch. ☐

Power On Sequence

The following steps will insure that the equipment is turned on in an orderly manner with the least chance of damage:

		Completed
a.	Turn ON the main facility power breakers serving the HCP equipments.	☐
b.	Check the equipment area for smoke or burning.	☐
c.	Turn ON the console and each peripheral equipment one at a time.	☐
d.	Check each equipment for burning or smoke.	☐
e.	Turn ON the HCP main breaker located at the rear base of the R.H. Bay. (from rear) Note: Verify visually that each/every blower starts up and runs, cycle breaker if necessary.	☐
f.	Swing out both upper and lower power supplies and turn ON the 5 volt output breaker on each.	☐
g.	Turn ON the loop mux power switch located on the front of the card.	☐
h.	If the other Bay has no equipments mounted, do not turn ON the Bay power breaker (bottom rear of cabinet). If there is hardware mounted turn ON the breaker and repeat Step g for each of the loop mux extensions.	☐

THIS NOW COMPLETES THE POWER ON SEQUENCE. PROCEED TO POWER CHECK.

Power/Voltage Check

All voltages have been preset to their nominal value during factory QAI checkout. The following steps allow verification of these nominal voltages. If the given voltage differs more than ± 0.1%, adjust that particular power supply to allow the voltage to fall within the ± 0.1% limit. (Use a digital voltmeter 0.1% accuracy or better).

NOTE: Refer to the power supply hardware maintenance manual (GD122B) for power supply adjusting points.

a.	Measure and verify the +5V at the processor backpanel upper R.H. terminal marked +5V -B (see Figure 3B-5). Adjust, if required, at upper power supply module adjustment screw.	☐
b.	Measure and verify the -12V at the processor backpanel R.H. center terminal marked -12V (see Figure 3B-5). Adjust, if required, at center power supply module adjustment screw R73.	☐

Completed

c. Measure and verify the +12V at the processor backpanel R.H. center terminal marked +12V (see Figure 3B-5). Adjust, if required, at center power supply module adjustment screw R66. ☐

d. Measure and verify the +12V at the processor backpanel R.H. lower terminal marked +12V BBU (see Figure 3B-5). Adjust, if required, at lower power supply module adjustment screw "+12V". ☐

e. Measure and verify the -9V at the processor backpanel R.H. lower terminal marked -9V BBU (see Figure 3B-5). Adjust, if required, at lower power supply module adjustment screw "-9V". ☐

f. Measure and verify the -5V at the processor backpanel bottom terminal marked -5V BBU (see Figure 3B-5). Adjust, if required, at lower power supply module adjustment screw "-5V". ☐

g. Measure and verify the +5V at the loop mux backpanel top +5V buss bar (see Figure 3B-6). Adjust, if required, at upper power supply module adjustment screw. ☐

h. Measure and verify the -12V at the loop mux backpanel R.H. terminal marked -12V (see Figure 3B-6). Adjust, if required, at lower power supply module adjustment screw "volt". ☐

i. Measure and verify the +12V at the loop mux backpanel R.H. terminal marked +12V (see Figure 3B-6). Adjust, if required, at center power supply module adjustment screw "volt". ☐

THE HCP IS NOW CONSIDERED OPERATIONAL FOR TEST AND VERIFICATION. PROCEED TO NEXT SECTION.

SYSTEM HARDWARE TEST AND VERIFICATION

Now that the HCP is physically installed, this section, when completed, verifies the proper operation. It is not required that the host computer be either operational or connected to the NPU for this verification, as these tests verify the HCP and cannot be dependent on the proper operation of the host. Proper operation of the complete system (i.e., HCP, Host, Network) is the task of the PSD (software/hardware) system test leading to the system acceptance (NEA). The limits of this procedure bring the HCP up to hardware installation complete (NEI) only.

The following cassette tapes must be on hand to support this section.

a.	ODS 2.0	PN 12323181
b.	UTOPIA/MSMP	PN 12323182
c.	CCP 1.0 48K	PN 12323183
d.	CCP 1.0 32K	PN 12323184

Proceed to section 6 of this manual and perform DDLTs.

If any of the tests in this section do not pass, the C.E. is directed to go to the specific hardware reference manual and specific additional diagnostic tests as called out in the diagnostic reference manuals provided. The specific equipment should be repaired or replaced and the test and verification restarted and run to its completion.

SECTION 4

THEORY OF OPERATION

SECTION 4

THEORY OF OPERATION

This section describes the functions of the replaceable assemblies for each equipment of the 2550/2552 system. Where applicable switch and jumper settings are described with figure notations as to system normal operating settings.

This section is divided into subsections that deal with each equipment in the 2550/2552 system. The contents are arranged as follows:

SECTION 4A

PROCESSOR AND CABINET

REPLACEABLE ASSEMBLIES

The processor is housed in a cabinet that includes power supplies and power distribution circuits. The replaceable assemblies that make up a 2550-2 system are listed in Table 4A-1, and the replaceable assemblies that make up a 2552 System are listed in Table 4A-2. The assembly part numbers are listed in Section 8A.

Table 4A-1. 2550-2 System Replaceable Assemblies

Equipment	Replaceable Assemblies
Processor	Arithmetic/logic unit (ALU) (printed circuit board)
	Status mode interrupt (SMI) (printed circuit board)
	Control 1, (printed-circuit board)
	Control 2 (printed-circuit board)
	Transform (printed-circuit board)
	I/O-TTY controller (printed circuit board)
	Memory interface address (printed circuit board)
	Memory interface data (printed circuit board)
	Cooling fans
	Coupler, MLIA, Loop Mux and CLA's
Processor Options	512-instruction micro memory (printed circuit board)
	2048-instruction micro memory (printed circuit board)
	ECC MOS array (printed circuit board)
	16K MOS memory (printed circuit board)
	32K MOS memory (printed-circuit board)
Cabinet	Power distribution system:
	Elapsed time indicator
	Line filters
	Circuit breakers
	Power supply
	+5VDC module
	±12VDC module
	∓12VDC, -9VDC, and -5VDC regulator

Table 4A-2. 2552 System Replaceable Assemblies

Equipment	Replaceable Assemblies
Processor No. 1 (AA109) Base Processor	Arithmetic/logic unit (ALU) (printed-circuit board) Status mode interrupt (SMI) (printed-circuit board) Control 1 (printed-circuit board Control 2 (printed-circuit board) Transform (printed-circuit board) I/O-TTY controller (printed-circuit board) Memory interface address (printed-circuit board) Memory interface data (printed-circuit board) Cassette tape controller (printed-circuit board) Cooling fans Coupler Boards
Processor No. 2 (AA109) Mux Processor	Arithmetic/logic unit (ALU) (printed-circuit board) Status mode interrupt (SMI) (printed-circuit board) Control 1 (printed-circuit board) Control 2 (printed-circuit board) Transform (printed-circuit board) I/O-TTY controller (printed-circuit board) Memory interface address (printed-circuit board) Memory interface data (printed-circuit board) Cassette tape controller (printed-circuit board) Cooling fans MLIA (Loop Multiplexer Interface Adapter) Loop Mux CLAs

Table 4A-2. 2552 System Replaceable Assemblies (Continued)

Equipment	Replaceable Assemblies
Processor Options (both processors)	512-instruction micro memory (printed-circuit board)
	2048-instruction micro memory (printed-circuit board)
	ECC MOS array (printed-circuit board)
	16K MOS memory (printed-circuit board)
	32K MOS memory (printed-circuit board)
Cabinet	Power distribution system Elapsed time indicator Line filters Circuit breakers
	Power supply +5VDC module ±12VDC module ±12VDC, -9VDC, -5VDC regulator

PRINTED CIRCUIT BOARD LOCATIONS

Printed-circuit board locations within the processor chassis are illustrated in figure 4A-1. All printed circuit boards are 11 x 14 inches in size and each board occupies one printed-circuit board position (slot) within the processor chassis. The functional interrelationship of these basic assemblies is outlined in the block diagram in figure 4A-2.

FUNCTIONAL DESCRIPTIONS

Table 4A-3 gives a brief functional description of these replaceable assemblies.

MEMORY INTERFACE BOARD

The memory interface address board contains printed-circuit-type switches for selection of direct memory access (DMS) priority. Figure 4A-3 shows the location and normal settings of these switches for an HCP.

PPU EQUIPMENT SWITCH PREPARATION

SYNCHRONIZER CARD

The synchronizer card (figure 4A-4) must have the PPU equipment switches set prior to circuit card installation. PPU equipment switches S1 thru S4 are dual-inline-package (DIP) switches. Each switch housing contains eight individual SPST switches. For Sychronizer Card 74850000, refer to figure 4A-5. For Synchronizer Card 74850001, refer to figure 4A-6. Switch labels (0-7) on the board clad adjacent to the switch correspond to the PPU Equipment Addresses (0-7). Table 3B-1 is an example of how equipment switches should be positioned for a particular PPU equipment number, once the PPU equipment addresses are assigned to the coupler.

Table 4A-3. Replaceable Assembly Functional Description

Replaceable Assembly	Description
Processor:	
Arithmetic/logic unit	Provides arithmetic and logical capabilities, and data transfer organization of the processor
Status mode interrupt	Provides interrupt control for the processor
Control 1	Provides main timing and register control functions of the processor
Control 2	Provides all basic microprocessing control within the processor
Transform (with read-only memory)	Selects bits from various sources in the organization of the processor and transfers them to the micro-memory address register to start sequence of micro instructions that emulate (using read-only memory) a 1700 macro instruction
I/O-TTY controller	Provides data and address signal drive circuits to peripheral controllers within the processor chassis.
Memory interface address; memory interface data	Two boards (address and data) that determine the main memory bank selected, insert and monitor parity and protect bits, and perform DMA data transfers.
Cooling fans	Six muffin-type fans mounted on the bottom of the processor logic board chassis to provide cooling for the logic boards within the processor

Table 4A-3. Replaceable Assembly Functional Description (Continued)

Replaceable Assembly	Description
Processor options:	
512 instruction micro memory; finalization kit	Functions as micro-instruction storage unit for the processor. Provides read/write storage for 512 32-bit micro-control instructions. Developed for systems that require the processor to be reprogrammed or reorganized for a variety of applications
2048 instruction micro memory; finalization kit	Similar to the 512 instruction micro memory except that it provides a 2048 32-bit micro-control instruction storage capability for the processor
ECC MOS array; finalization kit	Provides error correction for 384K words of read/write MOS memory. Corrects single-bit errors and detects multiple-bit errors.
16K MOS memory; finalization kit	Consists of 16K 18-bit words of MOS memory and serves as the macro memory in the processor
32K MOS memory; finalization kit	Same as 16K MOS memory except that it provides 32K 18-bit words of macro memory
Power supply: +5VDC power supply +12VDC power supply Voltage regulator	These three power supplies provide DC voltages of +5V, +12V, and -9V to the various circuits in the processor logic and memory. A power fail signal is sent to the control 1 board from the 5V supply if its voltage drops below +4.75V.
Power distribution system Line filters Circuit breakers Elapsed Time Indicator	Provides distribution of AC power to the processor power supplies. Includes RFI line filters to limit line transients and emissions, circuit breakers and elapsed time indicator

Place all individual switches of S1 thru S4 in the OFF position. If S1 is used to select PPU equipment zero, then the switch opposite S1 clad label 0 should be placed in the ON position. All other switches of S1 (clad labels 1-7) must remain in the OFF position (open). Follow the same procedure for equipment switches S2-S4.

The four PPU Equipment Address Switches have three types of restrictive settings (refer to figures 4A-5, 4A-6 for switch terminology):

1. No more than one equipment switch housing (S1 thru S4) may select a given PPU Equipment Address at any one time (a coupler logic encode problem will result if this is incorrectly set).

2. No one equipment switch housing may have more than one switch in the ON position.

3. In an application that requires the coupler to be fewer than four equipment, the unused equipment switch housings must have all switches placed in the OFF position. An error here could affect the channel and/or coupler operations.

4. Switch S5 must not be altered during installation procedures. S5 is set during initial manufacturing tests, and must not be altered here. Description of S5 is in the timing adjustments procedure in the Maintenance section of this manual. The switches of S5 normally set to the ON position are:

   - For the 74850000 card, switches A and E
   - For the 74850001 card, switches B and F

HOST INTERFACE CIRCUIT CARD

MP Equipment Select Switch Preparation

The 2550 interface card must have the MP select switch set to the proper 2550 equipment address assigned to the coupler. Figure 4A-7 is a simplified drawing of the 2550 Interface Card. Switch S1 is a SPDT toggle switch. When the switch is UP the address selected is three, when it is DOWN the address selected is two (refer to table 4A-4).

This circuit card contains the following controls and indicators:

1. CLOCK ADJUSTMENT POTENTIOMETER. This potentiometer can be used to adjust the phase of the clock signal provided by the host computer. This is adjusted during HCP installation and normally needs no readjustment. It should be adjusted only by qualified maintenance personnel.

2. ONL CLK PRESENT Indicator. When lit, this LED indicates that the on-line clock signal from the host computer is available. The LED continues to indicate the availability of the on-line clock, even if the ON LINE/OFF LINE switch is set to the OFF LINE position. When lit, this LED also indicates the presence of +5V electrical power. The indicator will not be lighted if either the on-line clock is not available, or if electrical power is not present. It is a valuable indication of cable integrity back to the host.

3. ON LINE/OFF LINE Switch. This two-position toggle switch is used to connect the 2550-2 to the enabled host data channel. When the switch is set to the ON LINE(up) position, the 2550-2 is connected to the host channel. When the switch is set to the OFF LINE (down) position, the communications links with the host data channel are disabled. Normally the switch is in the ON LINE position except when off-line diagnostics are being run.

4. SWITCH Assembly. This is an eight-element switch assembly; each element is a two-position rocker switch. Elements 1, 2 3 are used to select an equipment code (address) for the

communications coupler; elements 4, 5, 6 and 7 are not used; and element 8 is used for parity. Table 3-5 presents the functions for these switches. This switch assembly is set at the time the HCP is installed, and is not reset under normal conditions.

I/O-TTY CONTROLLER

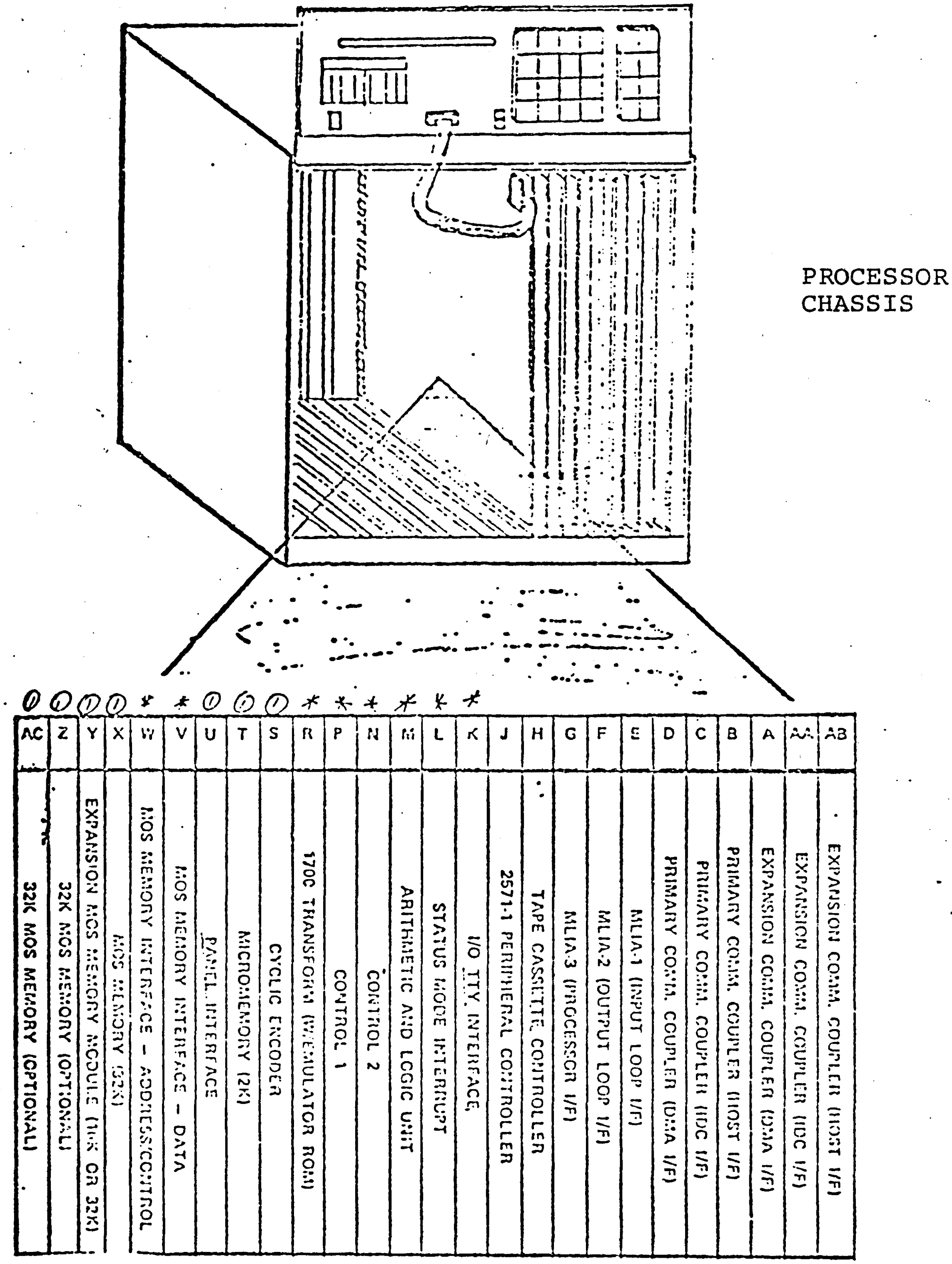
This board provides an interface between the processor and a comment device (teletypewriter or conversational display terminal). Communications rates (speeds) vary with the type of device used and the application. Therefore, whe rate select (baud rate) on the I/O-TTY controller must be set to a rate compatible with the comment device. The normally selected rate is 9600 baud. Figure 4A-8 shows the location and normal operating position of these switches.

Cassette controller board provides equipment selection and function switches, see figures 4C-2 and 4C-3.

TABLE 4A-4. SWITCH SETTINGS - COMMUNICATIONS COUPLER HOST INTERFACE CIRCUIT CARD

1	2	3	EQUP. CODE	4	5	6	7	8	Parity
On	On	On	0	Not Used	Not Used	Not Used	Not Used	On	Channel Parity Disabled (6000, CYBER 70)
Off	On	On	1						
On	Off	On	2						
Off	Off	On	3						
On	On	Off	4						
Off	On	Off	5					Off	Channel Parity Enabled (CYBER 170)
On	Off	Off	6						
Off	Off	Off	7						

The standard equipment code assignment is seven (111).



* - Basic processor boards

1 - Optional boards for expansion to basic processor.

CAUTION: All logic boards must be inserted with the component side facing left, otherwise the board will be damaged.

Figure 4A-1. P.C. Board Placement Diagram for AA109

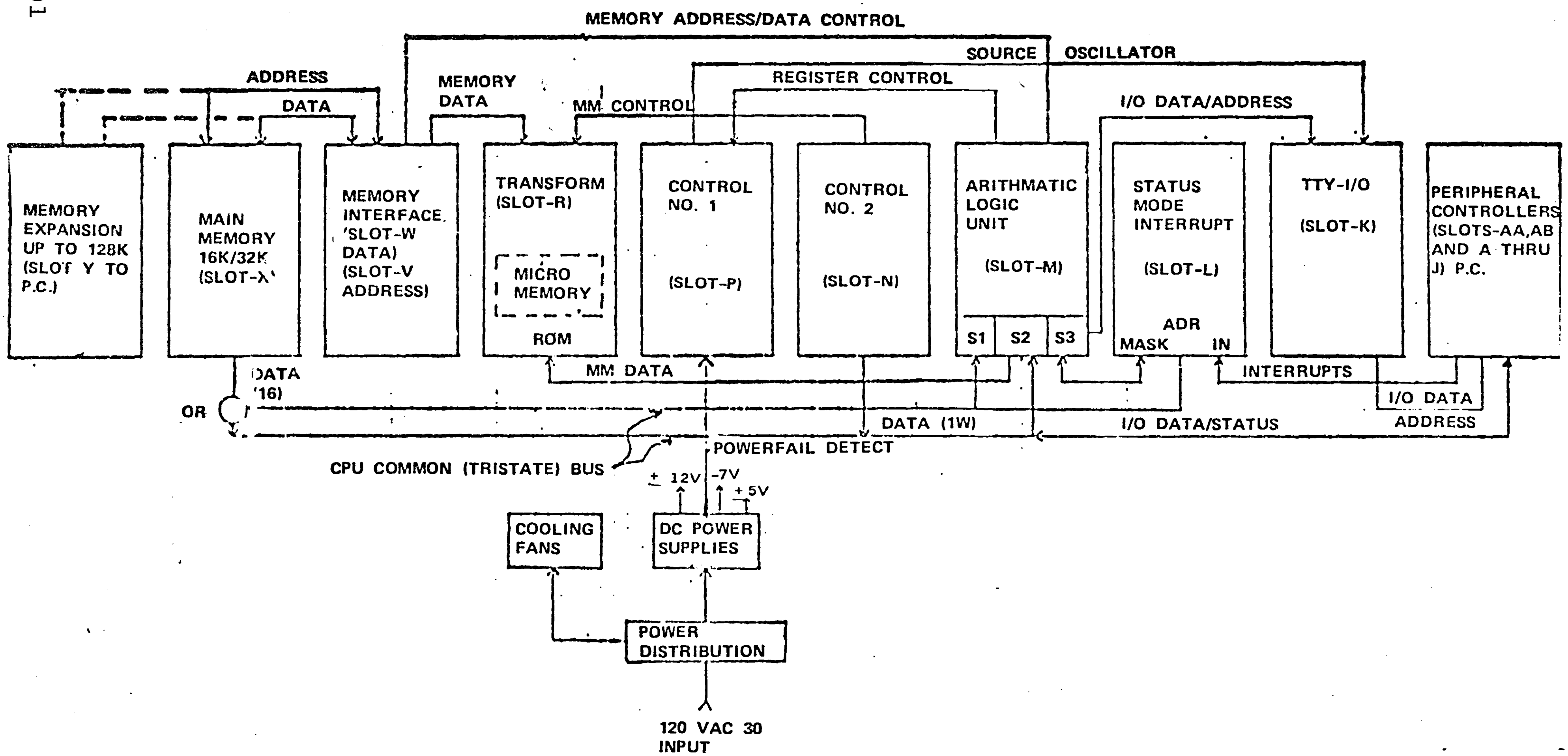
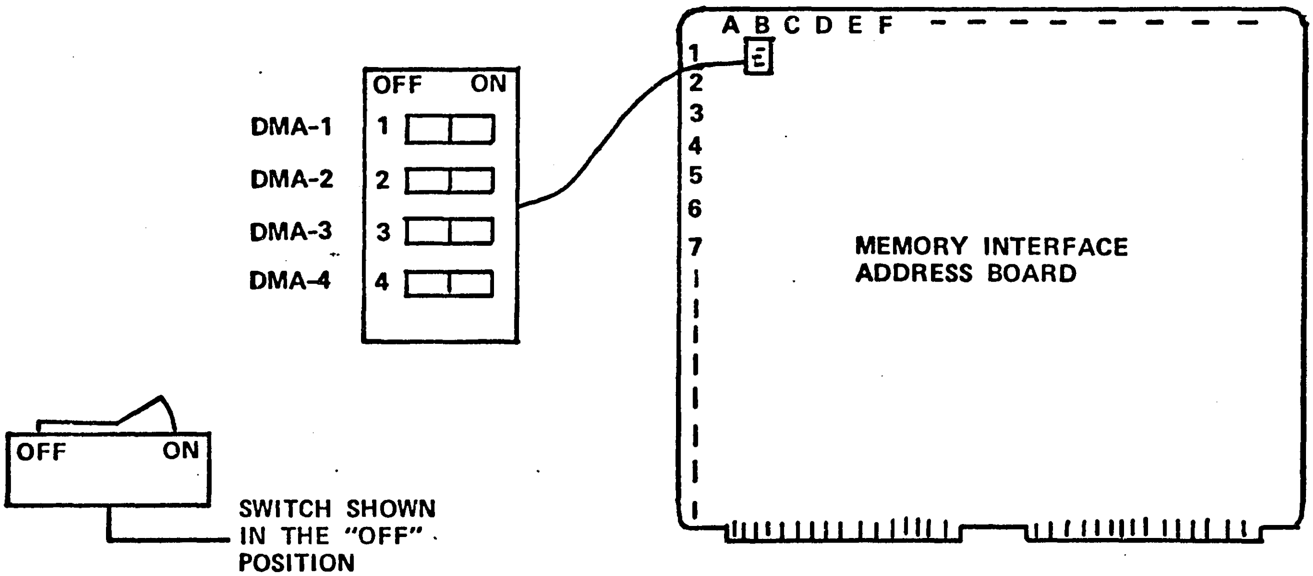


Figure 4A-2. Processor Functional Block Diagram



PRIORITY CHANNEL ENABLE		
FUNCTION	**LOCATION**	**NORMAL POSITION**
DMA-1	S1	OFF*
DMA-2	S2	OFF*
DMA-3	S3	OFF*
DMA-4	S4	OFF*

*NORMAL OPERATING POSITION (NO PRIORITY SELECTED)

Figure 4A-3. Memory Interface Priority Switches

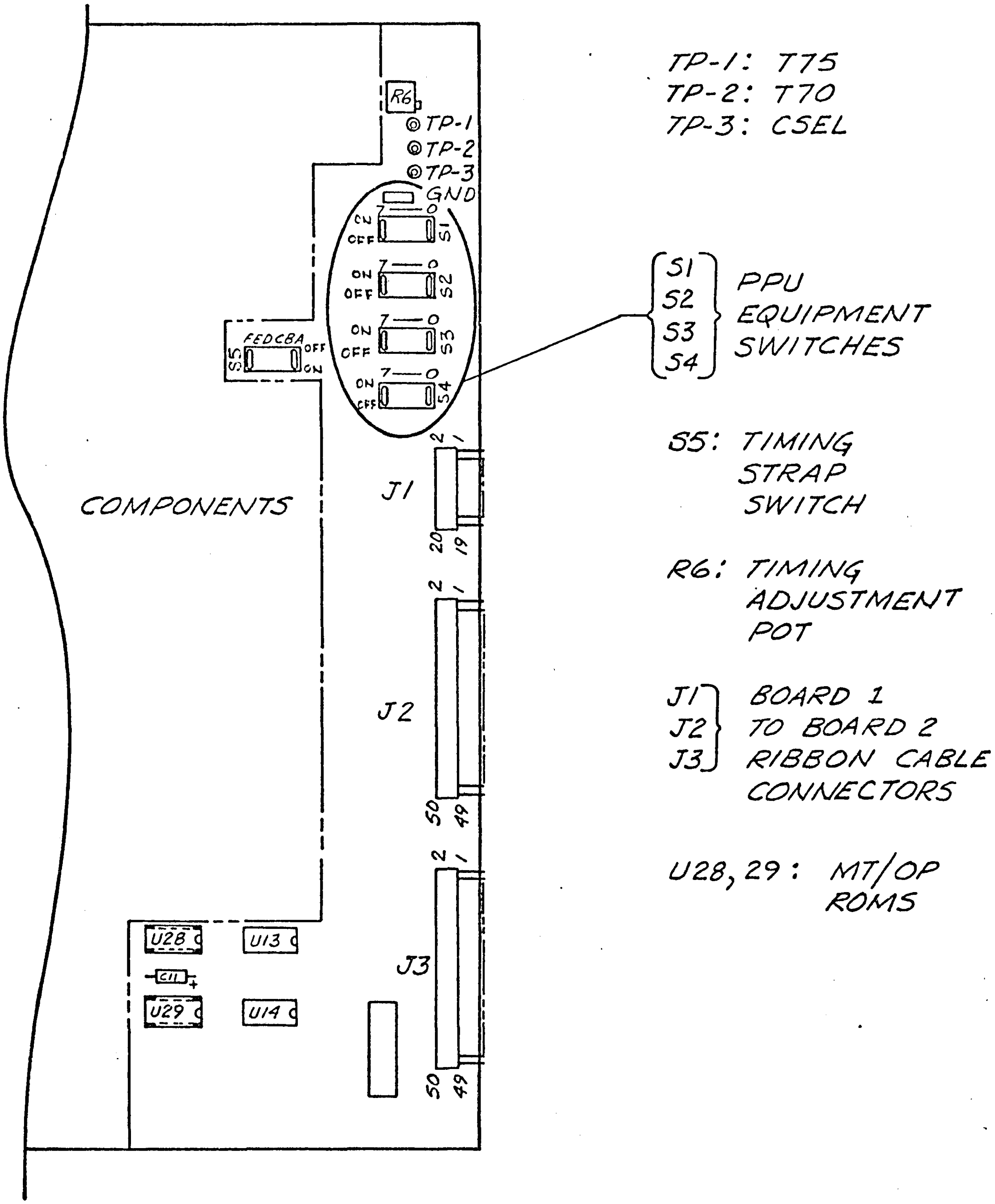


Figure 4A-4. Synchronizer Card Assembly Drawing DY159-A (Board 1)

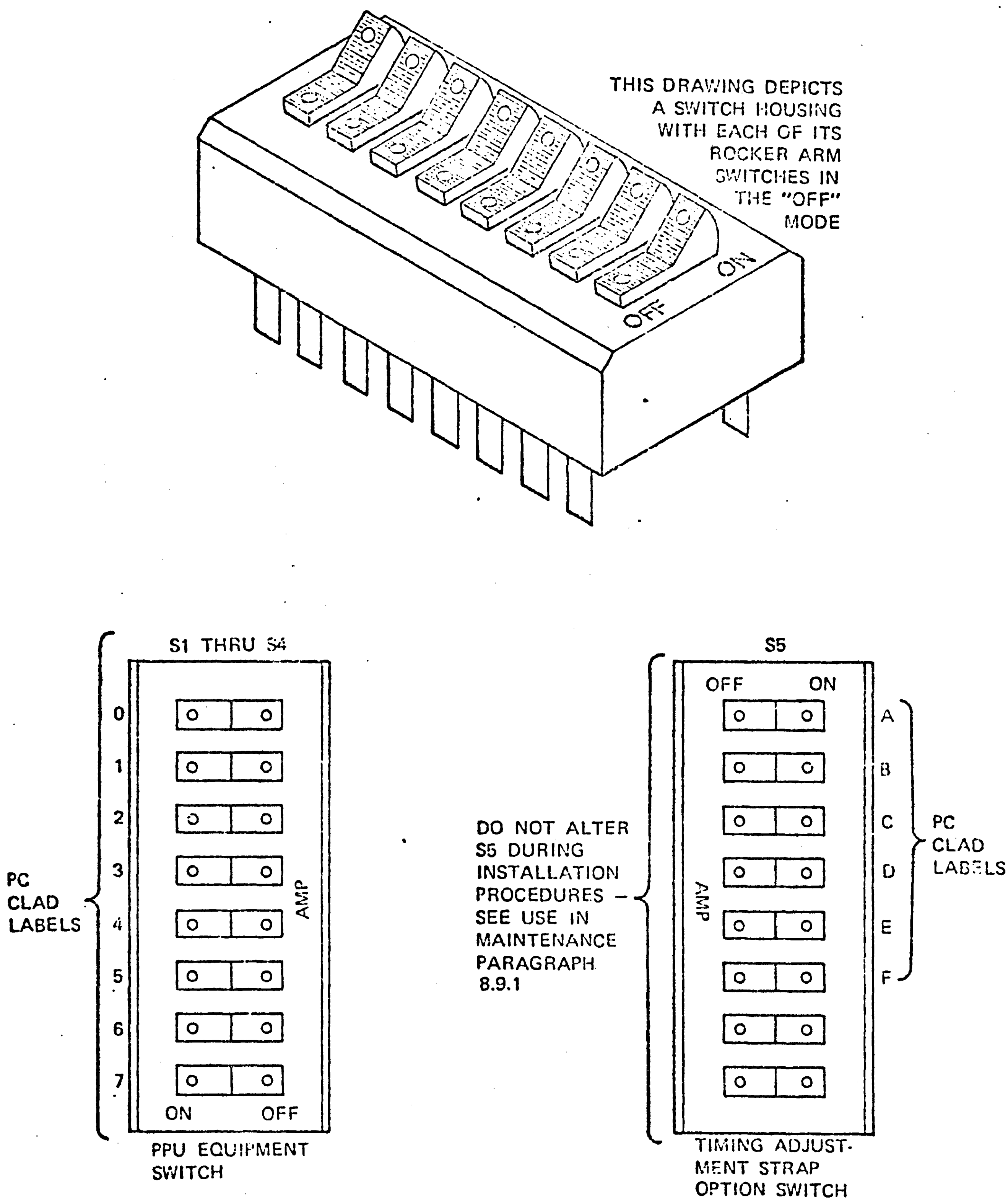


Figure 4A-5. Dual-in-Line Package (DIP) Switches – SPST Rocker Arm Type

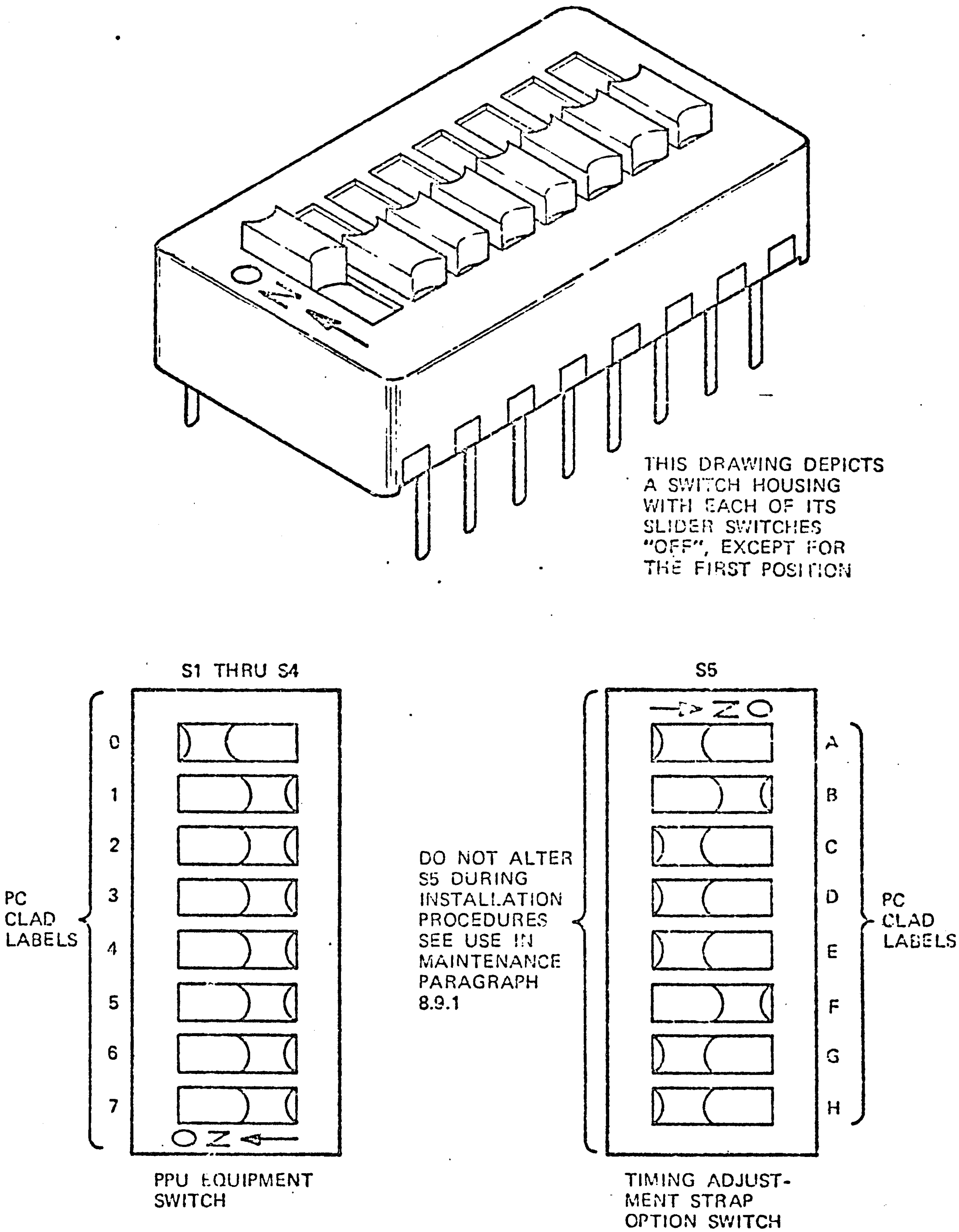


Figure 4A-6. Dual-in-Line Package (DIP) Switches — SPST Slider Switch Type

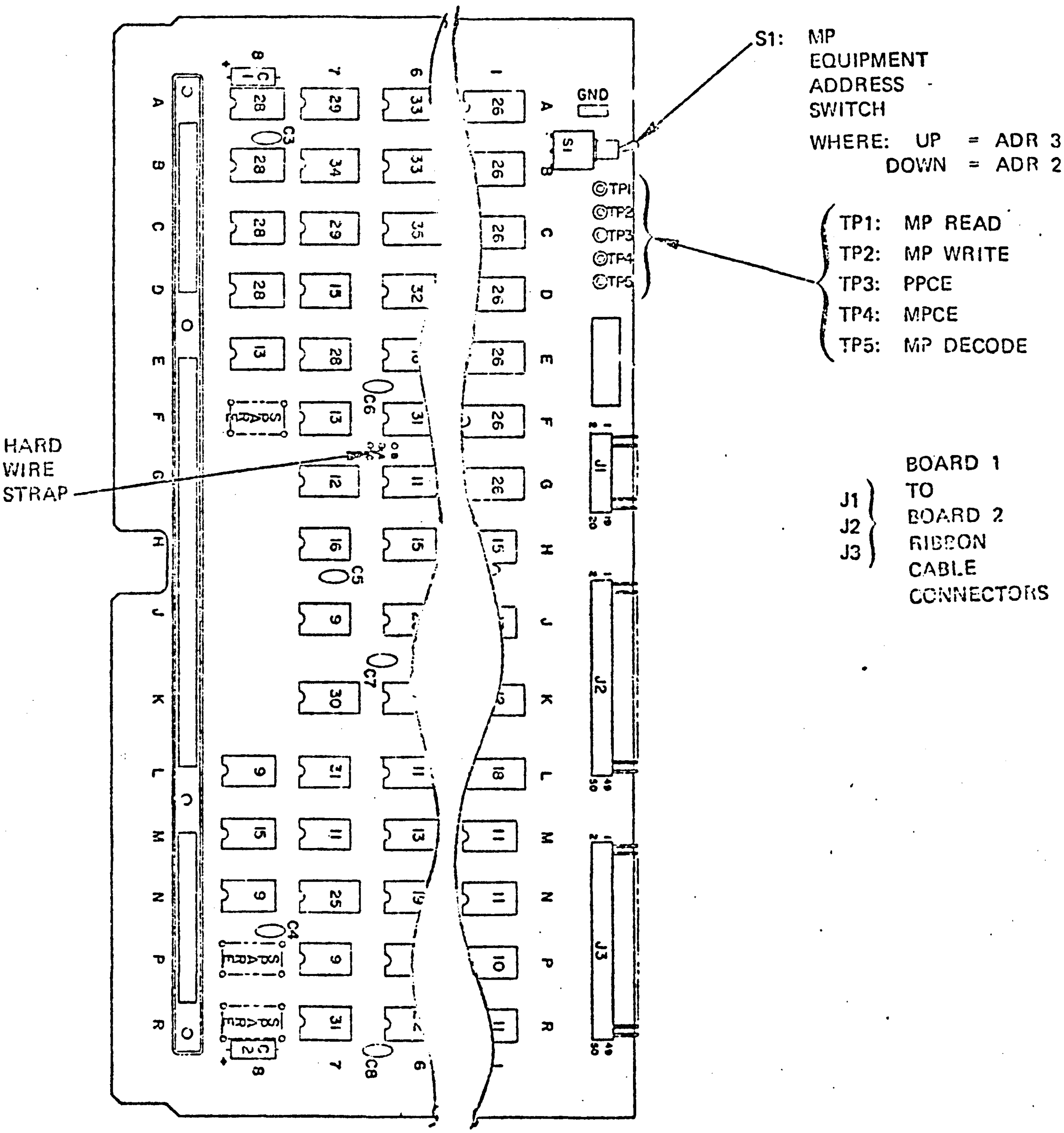
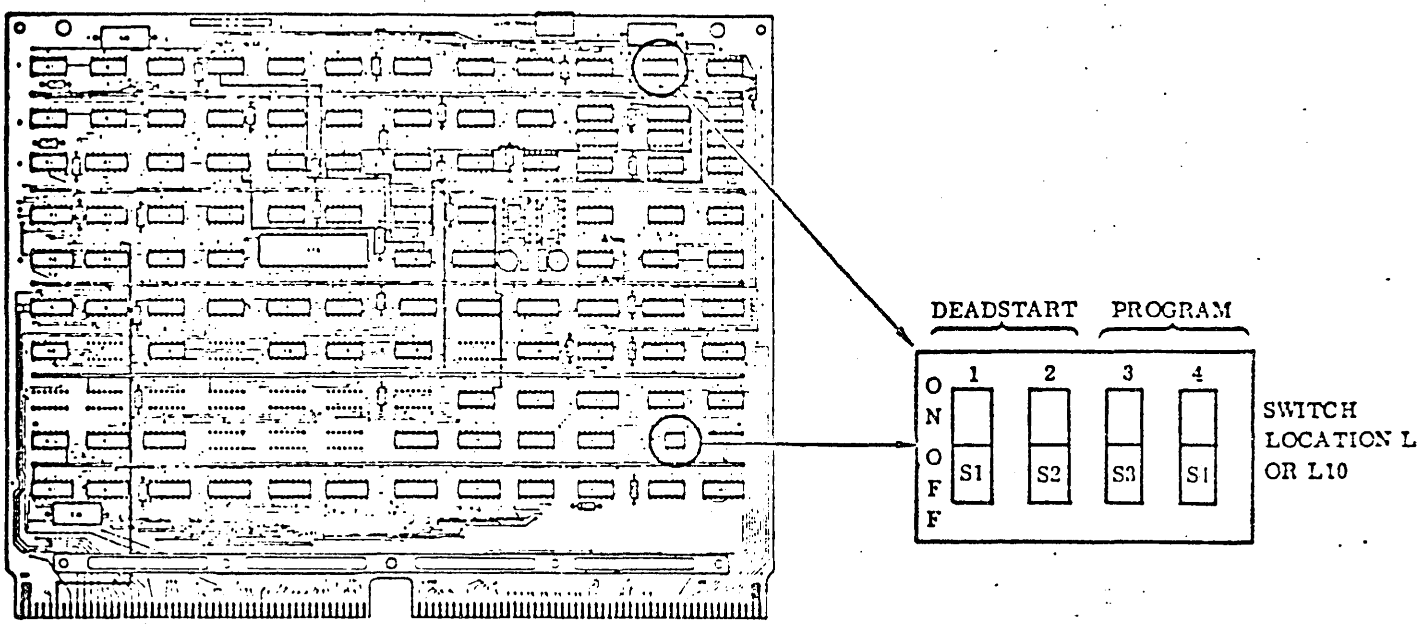


Figure 4A-7. 2550 Interface Card Assembly Drawing — DY159-A (Board 2)

I/O-TTY CONTROLLER BOARD (COMPONENT SIDE)



BAUD RATE SELECT (LOCATION L1 OR L10)

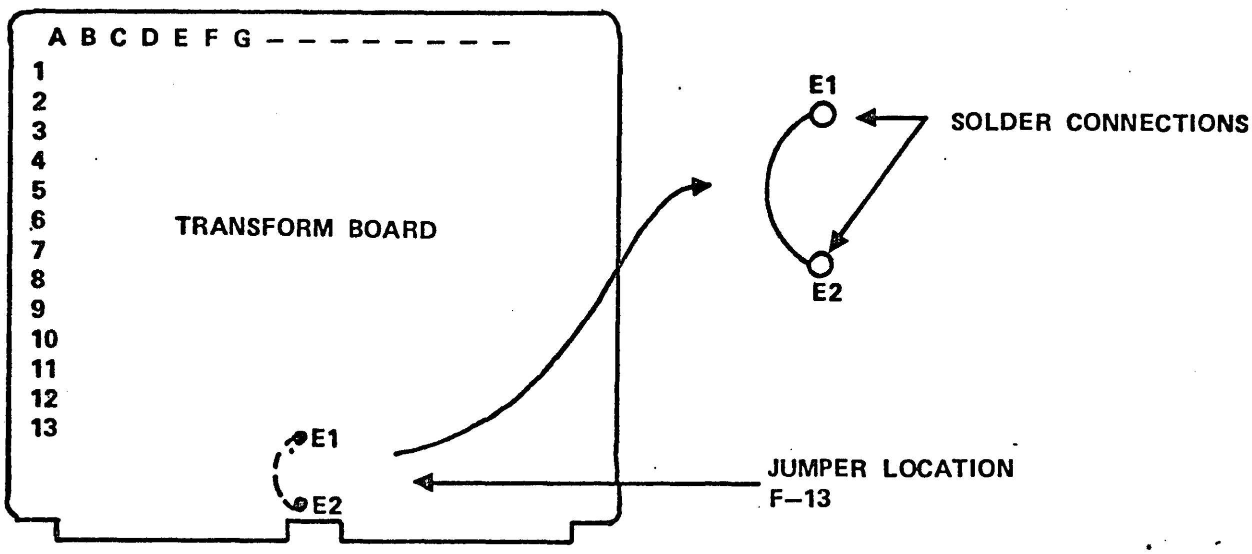
Rate	Deadstart		Program	
	Switch Position 1	Switch Position 2	Switch Position 3	Switch Position 4
110	ON	ON	ON †	ON †
300	ON	OFF	ON	OFF
1200	OFF	ON	OFF	ON
9600†	OFF †	OFF †	OFF	OFF
†Normal Operating Position				

017

Figure 4A-8. I/O-TTY Controller Board Switches

TRANSFORM BOARD

The transform board provides for enable/disable of programmed read-only memory via a jumper located at board position F-13. When this jumper is installed, read-only micro memory on the board is enabled for pages 0 and 1. When the jumper is absent, read/write micro memory on a board located in another position of the processor may be enabled for pages 0 and 1. Figure 4A-9 illustrates the location and function of the micro-memory select jumper for the 255x processor configuration.



NOTE: Jumper is normally installed for the 2551 and 2552 systems.

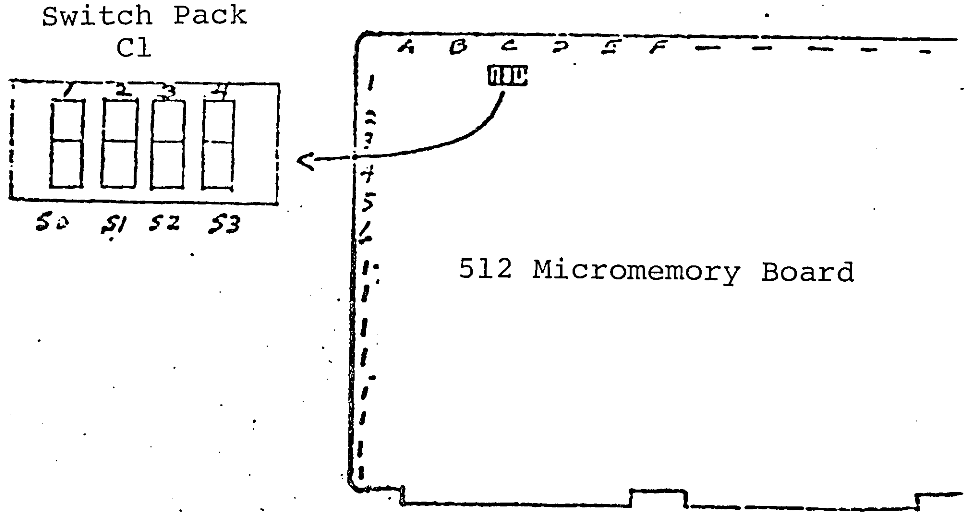
Figure 4A-9. Transform Board Jumper

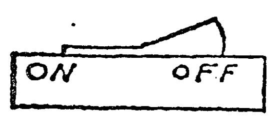
The switches shown in figure 4A-10 provide for micromemory page selection. When the 512 micro-memory board and a transform board with read-only memory or programmed read-only memory are included together in a system, page 0 is normally reserved for the transform read-only memory. The micro-memory page select switches must therefore be set above page 0. If a transform without ROM is used, the page select switches on the micro-memory board may be set to utilize page 0.

Truth Table

Select Page	SW 3 (C1)			
	S0	S1	S2	S3
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

Switch Pack
C1

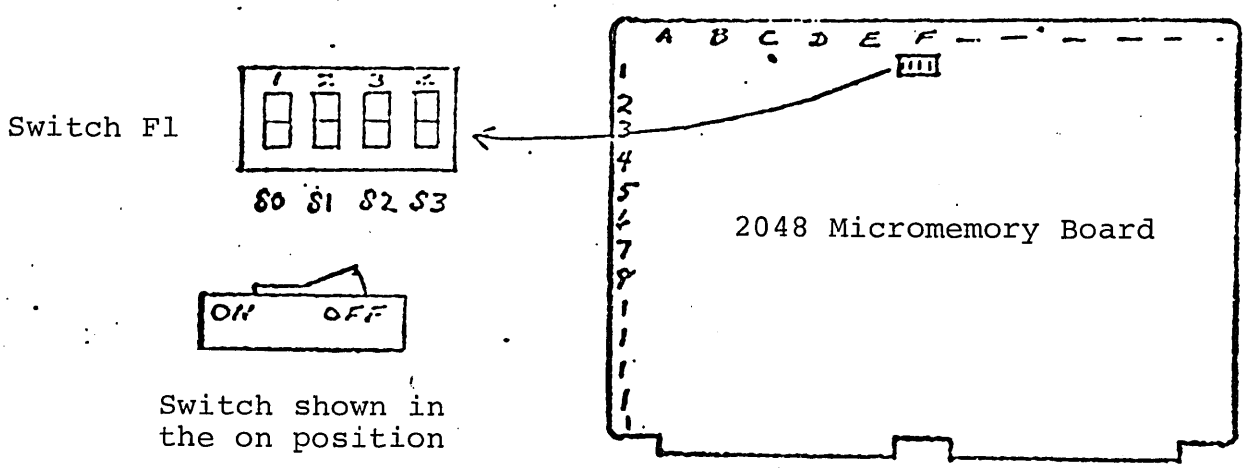




Switch shown in
the on position

Figure 4A-10. 512 Instruction Micro Memory Page Select Switches

The switches shown in figure 4A-11 provide for micromemory page selection. When 2048 micro-memory board and a transform board with read-only memory or programmed read-only memory are included in the system, pages 0 and 1 are normally reserved for the transform read-only memory. The micro-memory page select switches must therefore be set to pages 4, 8, or 12. If a transform without ROM is used, the page select switches on the micro-memory board may be set to pages 0 and 1.



SWITCH F1 Truth Table

S0	S1	S2	S3	RAM Pages Selected
OFF	OFF	OFF	N.U.	0 --- 3
OFF	ON	OFF	N.U.	4 --- 7
ON	OFF	OFF	N.U.	8 --- 11
ON	ON	OFF	N.U.	12 --- 15

Figure 4A-11. 2048 Instruction Micro Memory Page Select Switches

SECTION 4B

MAINTENANCE PANEL AND CONTROLLER

The maintenance panel system consists of a maintenance panel, a ribbon cable, and a controller, which are the only replaceable assemblies. They are illustrated in Figure 4B-1, and their functions are described in Table 4B-1. In dual-CPU systems, each CPU will have a maintenance panel and controller, see Section 8B for subassembly part numbers.

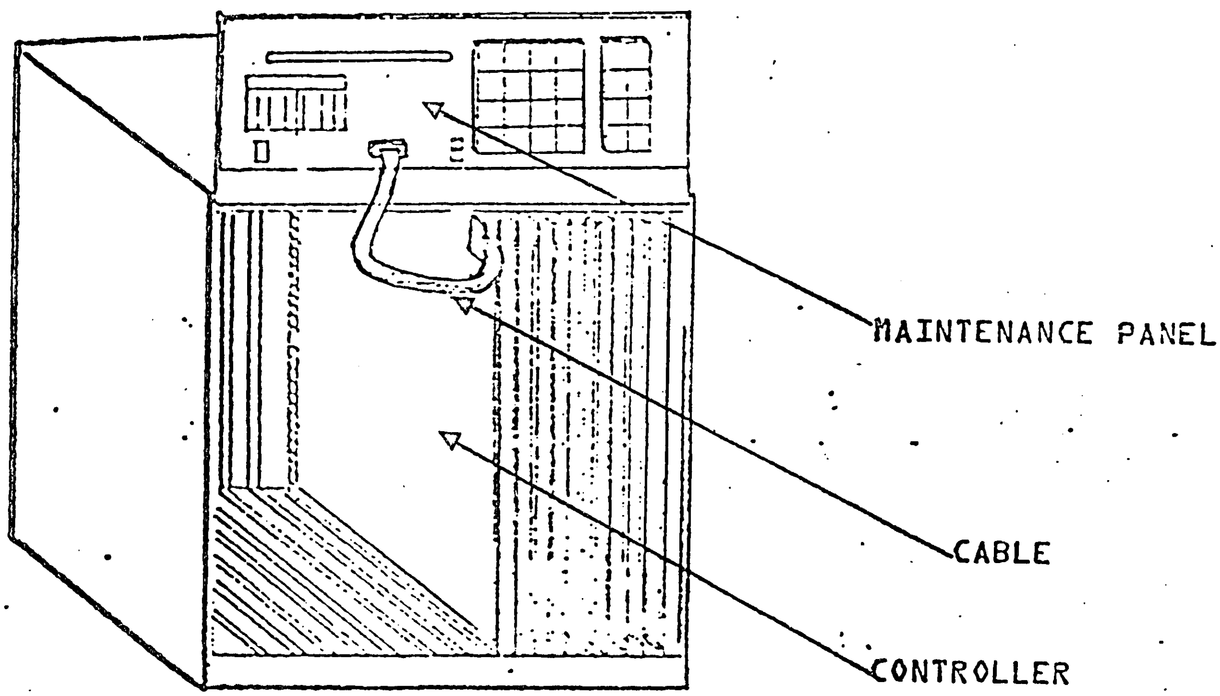


Figure 4B-1. Maintenance Panel Replaceable Assemblies

Table 4B-1. Maintenance Panel Replaceable Subassemblies Functional Description

Replaceable Subassembly	Function
Maintenance Panel	Provides operator interface to the micro/macro processor (via the controller) and display of all registers and both micro and macro memory. Permits setting and clearing of processor function control bits.
Maintenance Panel Controller	This printed-circuit board occupies one slot in the processor chassis, provides a breakpoint capability, is compatible with either RS232 input/output or parallel inputs, and accommodates baud rates of 110, 300, 1200, and 9600.
Interface cable	This 1.5-foot ribbon cable connects the panel and controller and provides a path for data and control signal interchange.

SECTION 4C

CASSETTE TAPE TRANSPORT AND CONTROLLER

Table 4C-1 lists the replaceable assemblies of the cassette tape transport subsystem. Subassembly part numbers are listed in Section 8-A.

TABLE 4C-1. CASSETTE TAPE TRANSPORT SUBSYSTEM REPLACEABLE ASSEMBLIES

Replaceable Assembly	Assembly Type
Cassette Tape Controller	Printed circuit-board
Cassette Tape Transport	Unit
Interface Cable	Unit

Figure 4C-1 is a functional block diagram of the cassette tape transport system.

The following describes briefly the function of the replaceable assemblies.

1. Cassette tape controller - This board housed in a predetermined slot of the computer chassis serves as an interface between the processor and the cassette tape transport. All function and status requests are initiated by the computer. The controller interfaces with either one or two cassette tape transports.

2. Cassette tape transport - Used as an input device for loading diagnostics or software. It contains no operator-controlled switches. An auto-rewind feature may be used when desired by selecting switches on the controller board (see Switch Settings).

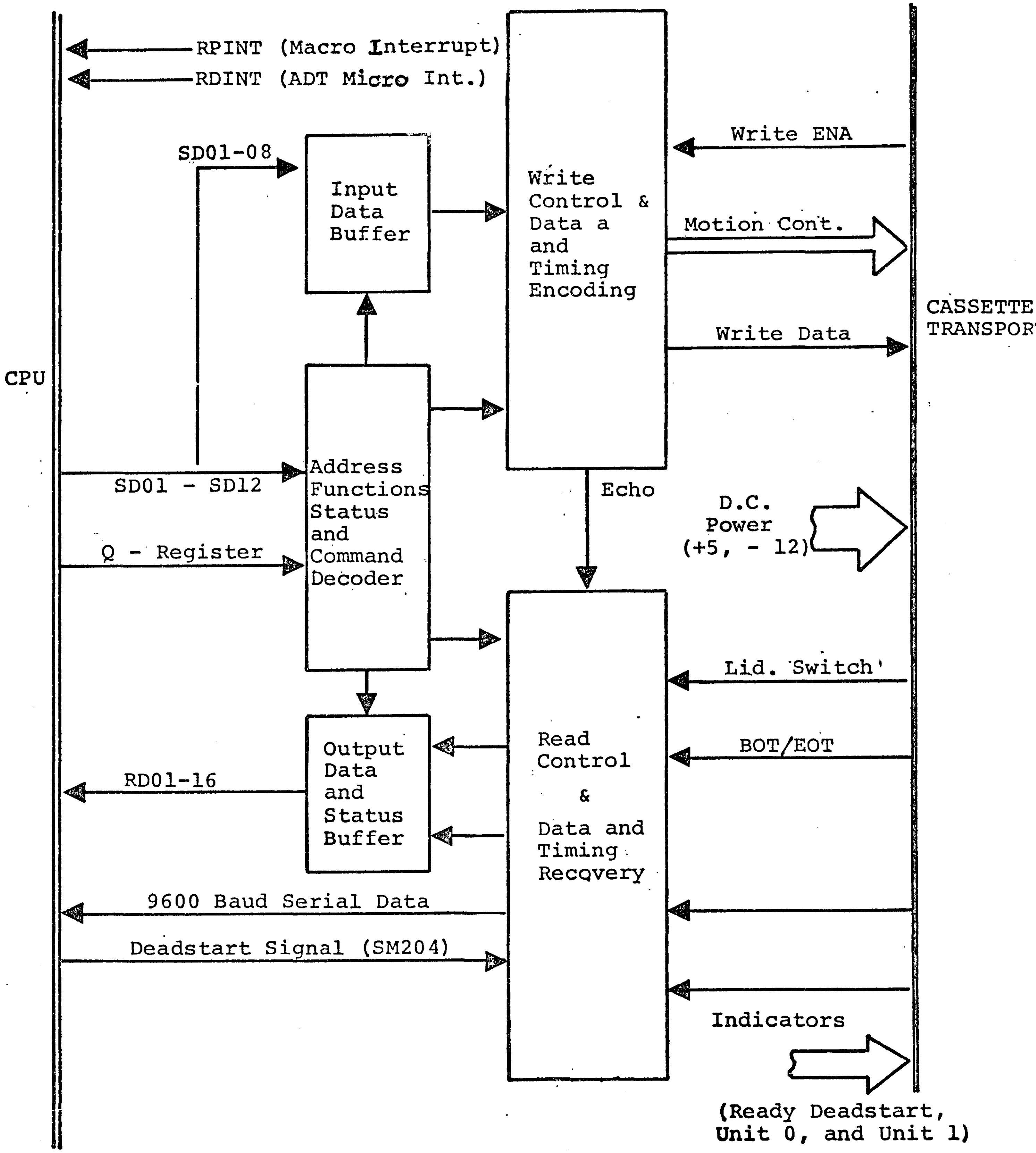


Figure 4C-1. Logic Block Diagram

SWITCH SETTINGS, NORMAL OPERATION

Table 4A-1 illustrates the location of the controller in the processor chassis.

Figure 4C-2 and 4C-3 illustrates the location and normal operating positions of the equipment and function code switches on the controller.

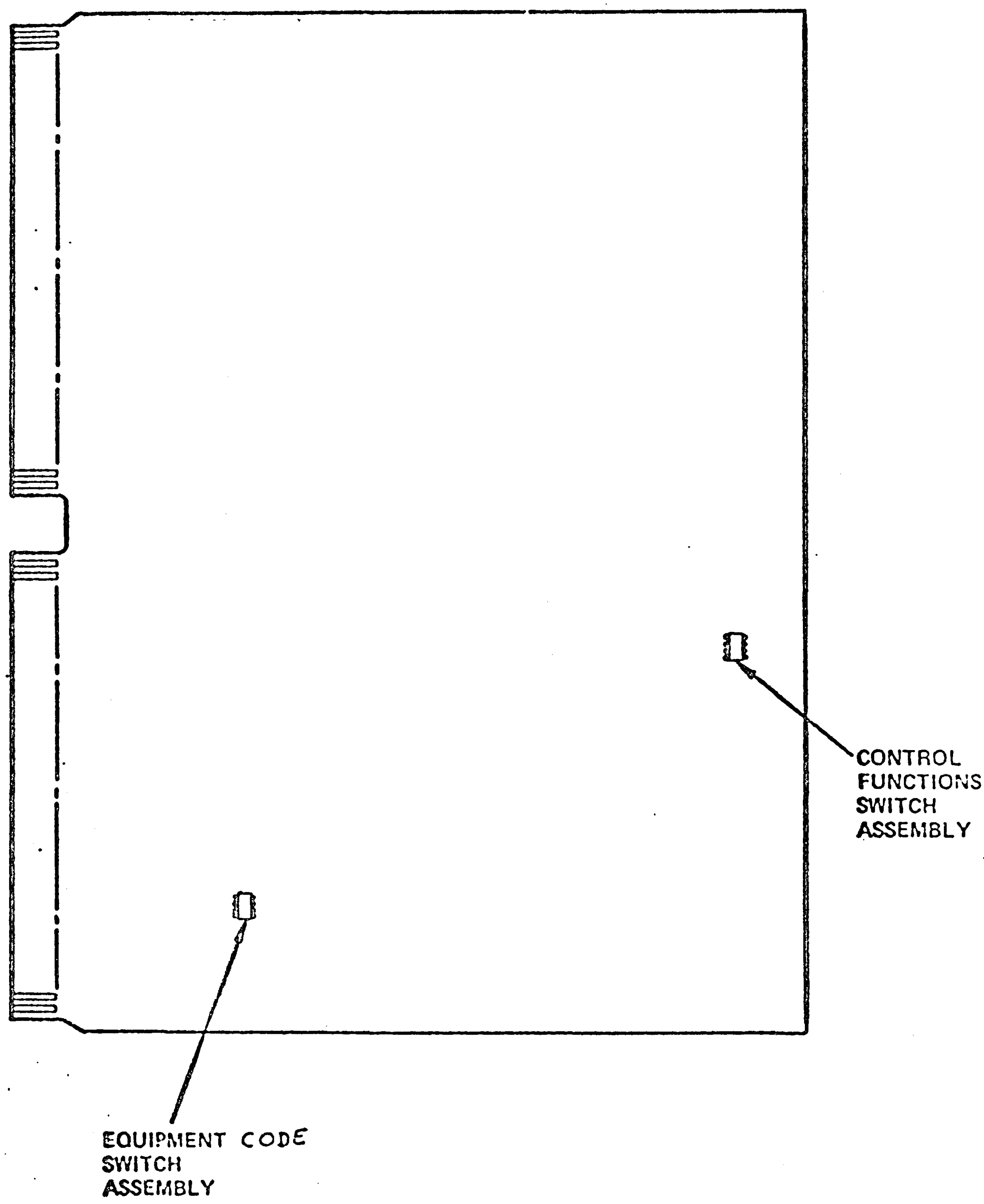
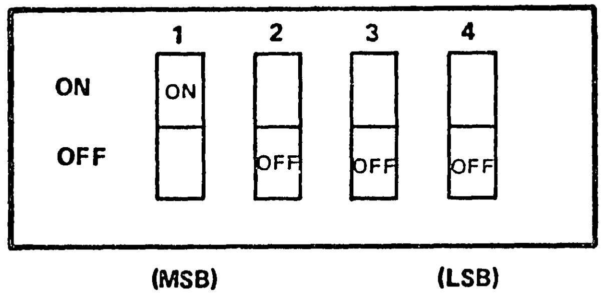


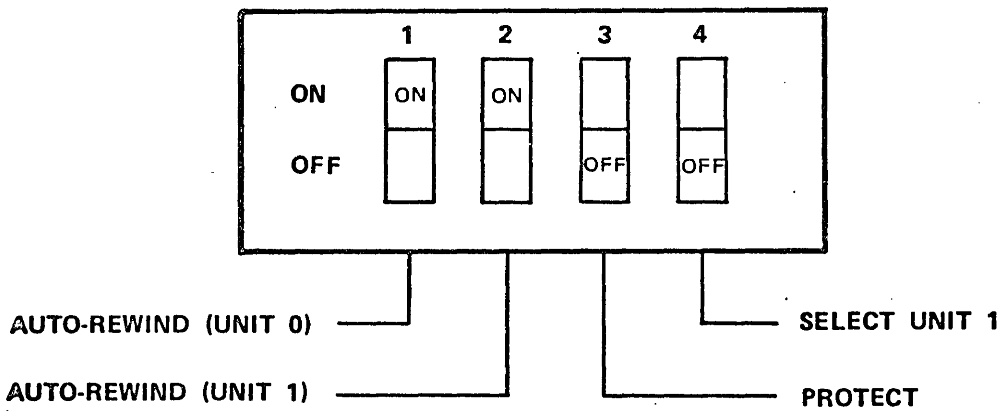
Figure 4C-2. Tape Cassette Controller Switches

SWITCH 1 — EQUIPMENT CODE



ON = LOGIC 0
OFF = LOGIC 1

SWITCH 2 — CONTROL FUNCTIONS



	1	2	3	4
ON	AUTO-REWIND ENABLED (UNIT 0)	AUTO-REWIND ENABLED (UNIT 1)	PROTECTED MODE	UNIT 1 FOR DEADSTART
OFF	AUTO-REWIND INHIBITED (UNIT 0)	AUTO-REWIND INHIBITED (UNIT 1)	UNPROTECTED MODE	NORMAL UNIT 0

Figure 4C-3. Cassette Control Switches

SECTION 5

DIAGRAMS

SECTION 5

DIAGRAMS

This section contains cabling diagrams, power distribution schematics and assembly drawings for the HCP. The drawings are arranged as follows:

5A-1 thru 5A-10	2552 Cabinet Drawings
5B-1	Maintenance Panel Interface Cable
5C-1	Cassette Tape Interface Cable
5D-1 thru 5D-6	Multiplex Loop Subsystem Circuit Card Drawings

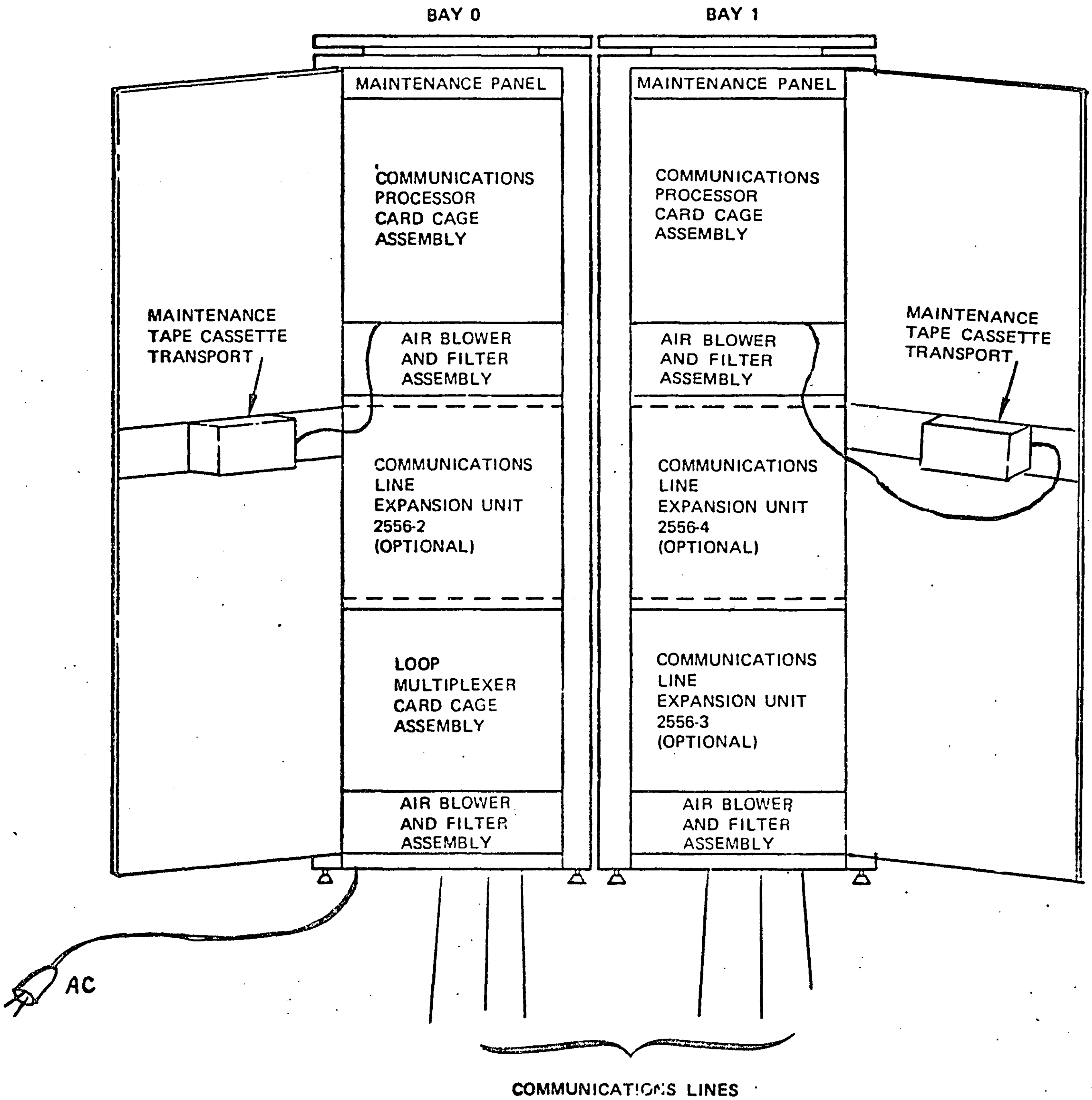


Figure 5A-1. 2552 HCP, Front View, Site Cabling Diagram

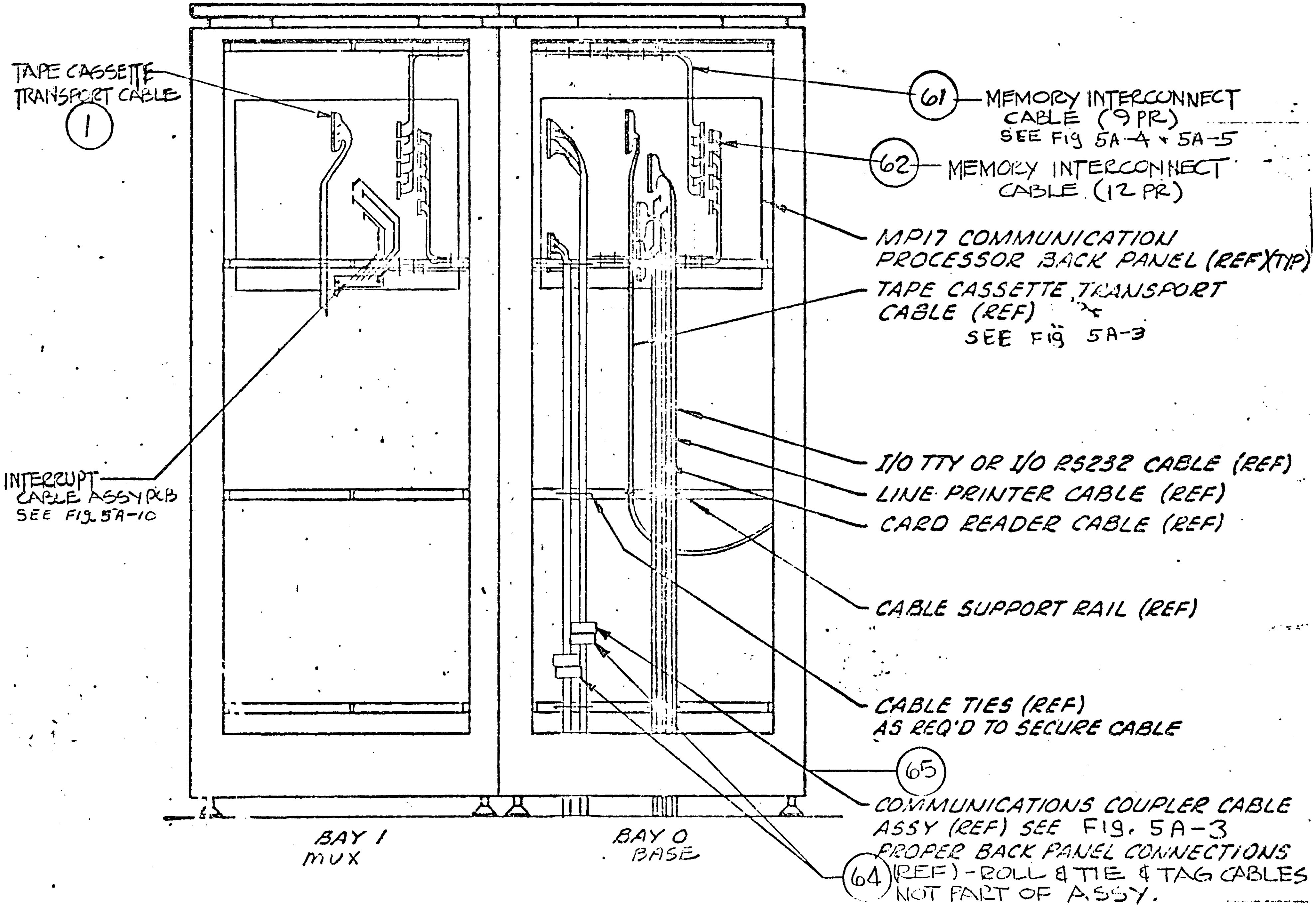
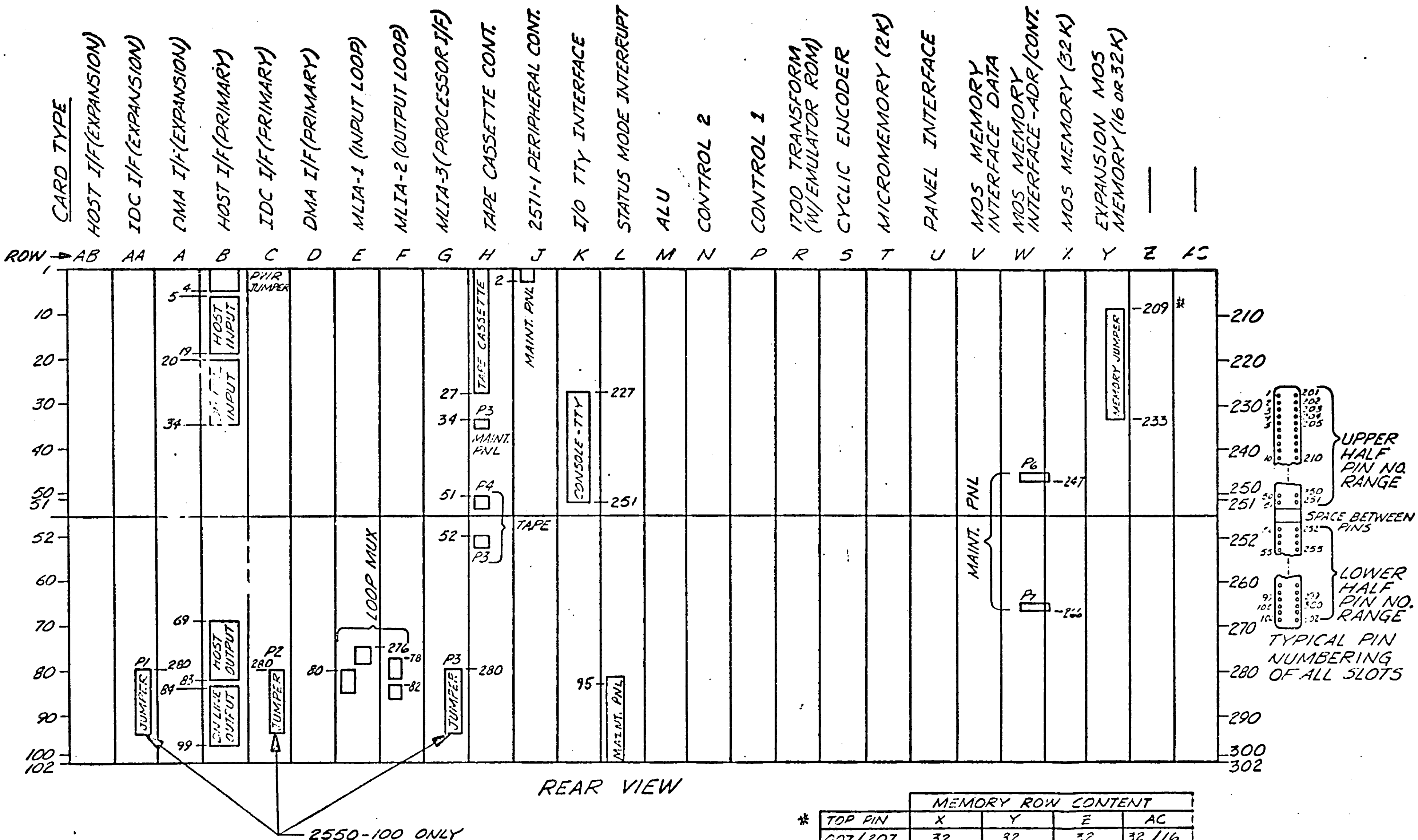


Figure 5A-2. 2552 Backplane Cables



*	MEMORY ROW CONTENT			
TOP PIN	X	Y	E	AC
007/207	32	32	32	32/16
008/208	32	32	16	16
009/209	32	16	16	16
010/210	16	16	16	16

Figure 5A-3. 2550-2 Processor Backpanel

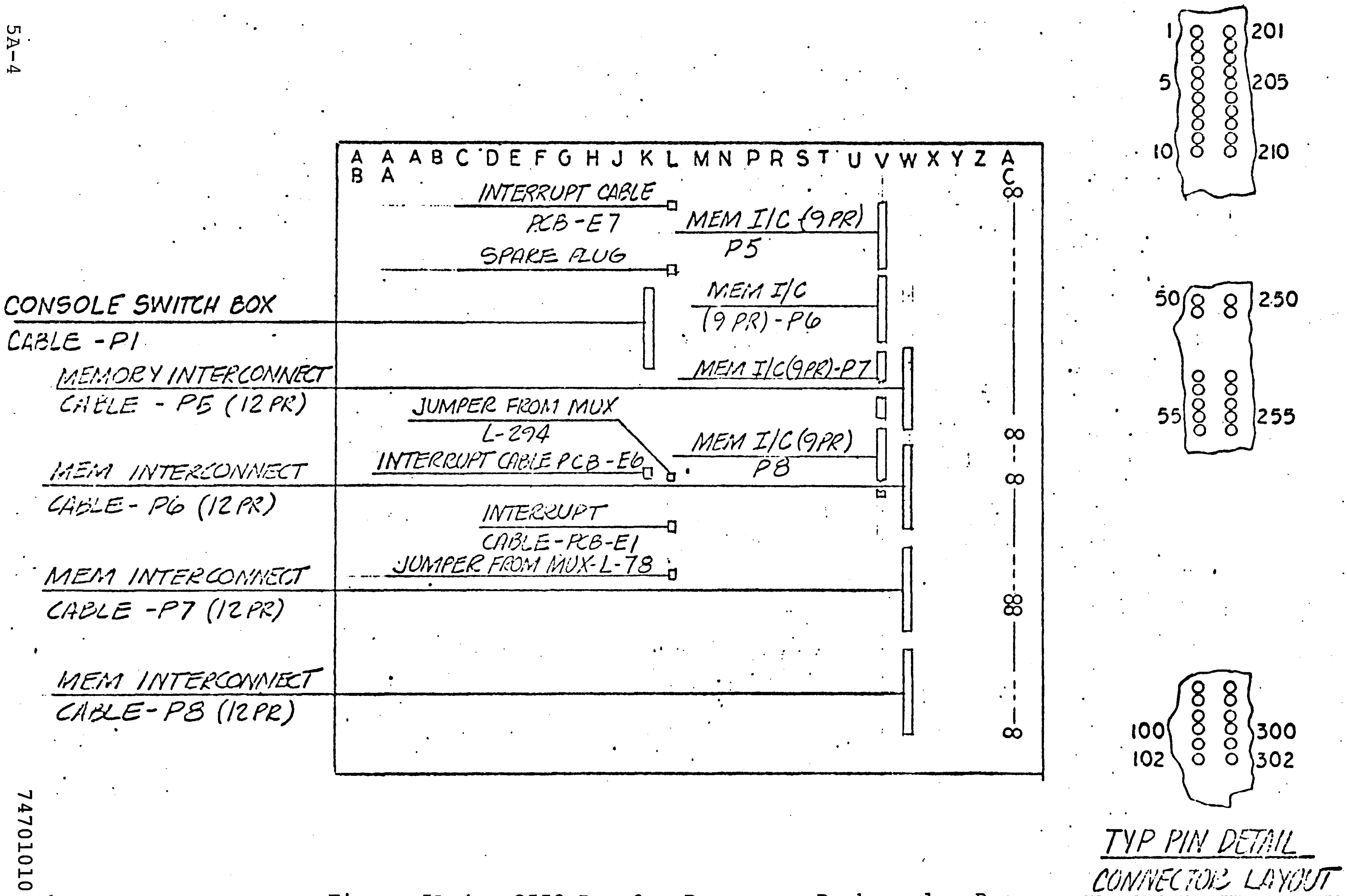


Figure 5A-4. 2552 Bay 0 - Processor Backpanel - Base

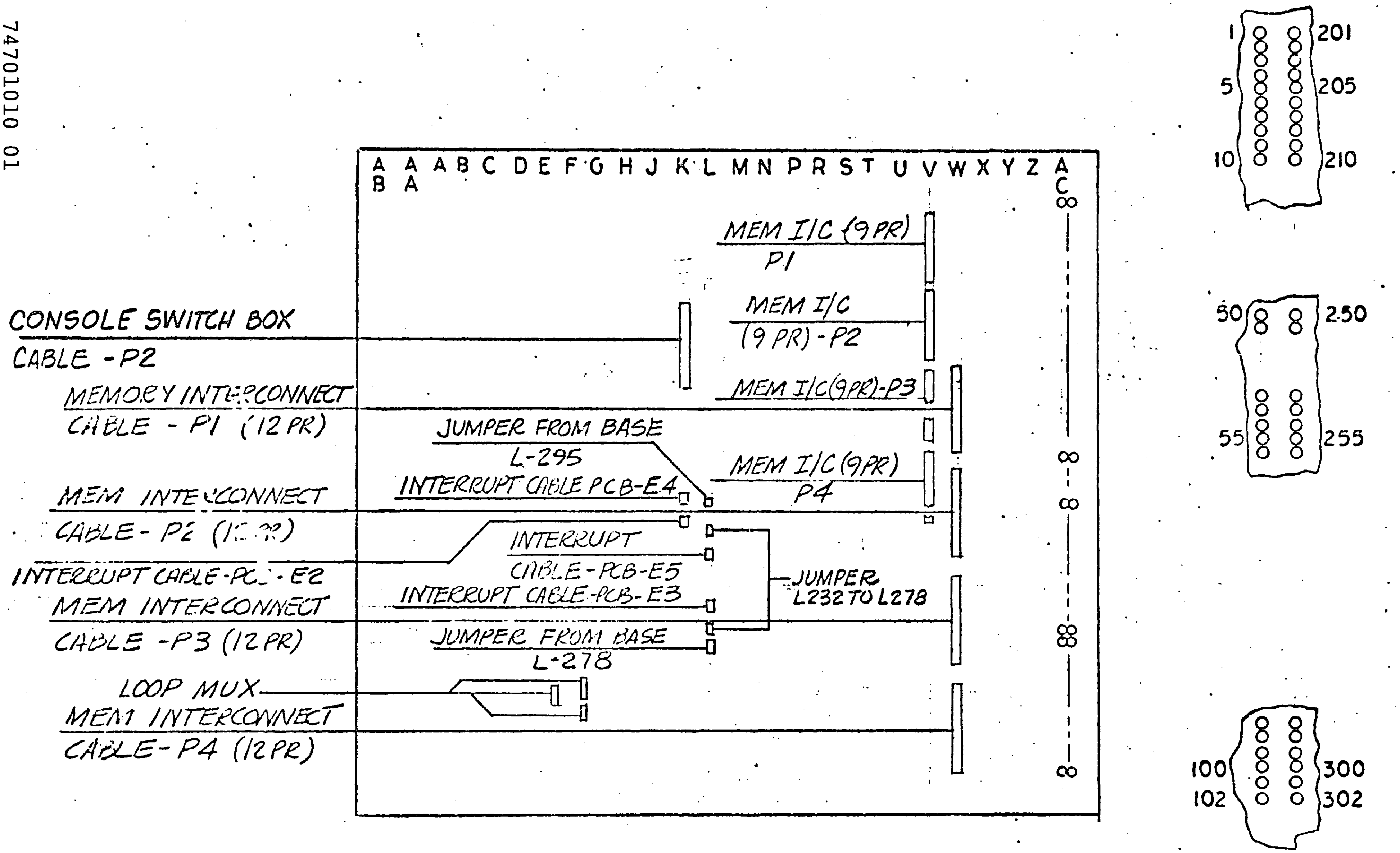
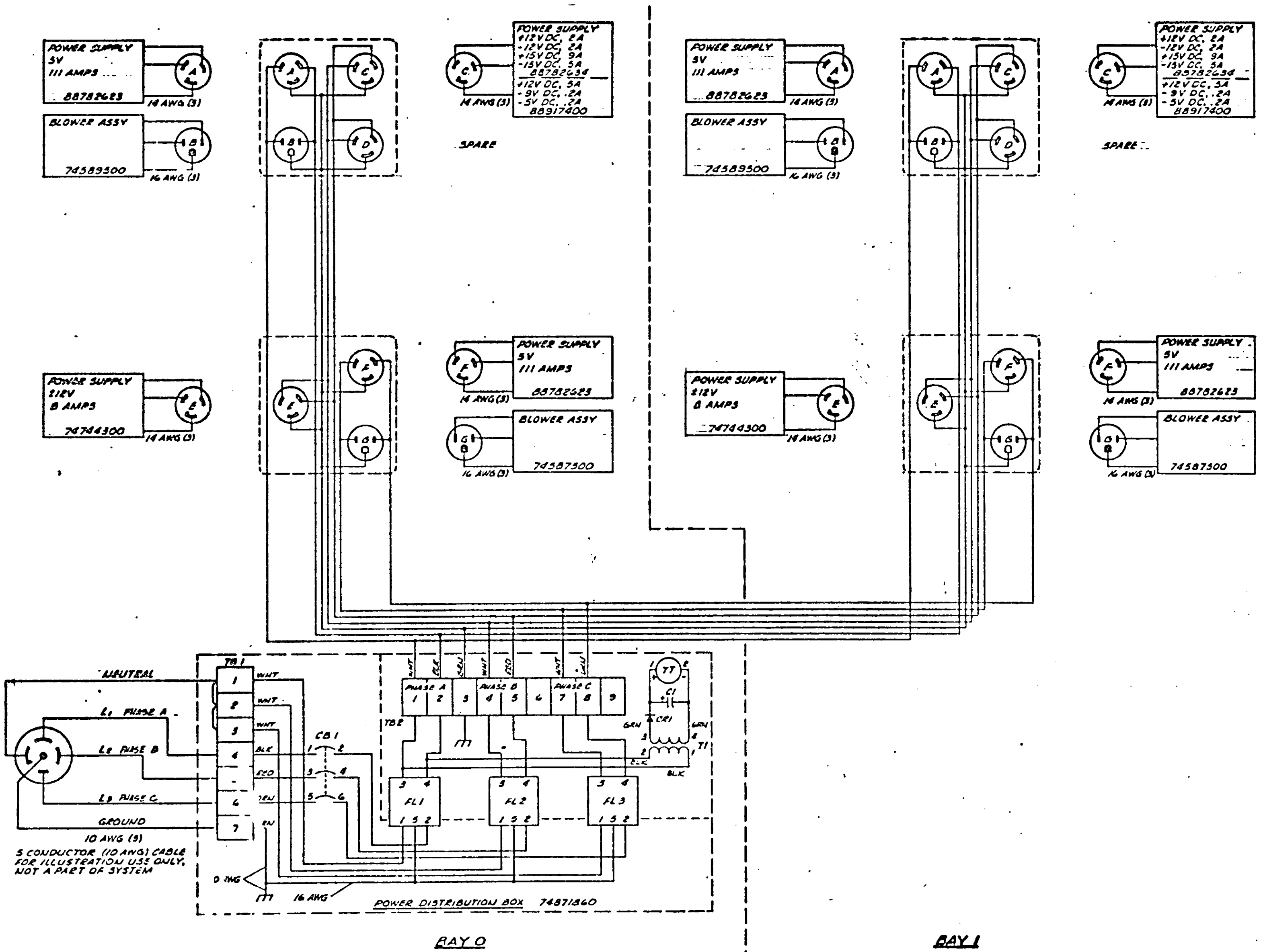


Figure 5A-5. 2552 Bay 1 - Processor Backpanel - Mux



NOTES:
1. ALL POWER SUPPLIES
   A. INPUT VOLTAGES: 120V, 1Φ, 50/60 HZ
2. HOOK-UP WIRE
   A. 12 AWG CONDUCTOR (UL 1015)
   B. 16 AWG CONDUCTOR (UL 1061)
3. CONDUCTORS FROM POWER DISTRIBUTION BOX TO OUTLET BOXES, BOTH BAYS, HOUSED IN 3/4" E.M.T. CONDUIT.
4. COMPONENTS
   A. TERMINAL BOARDS
      1. (TB1) CURTIS (P/N [illegible]) [illegible] PRESSURE SOLDERLESS CONNECTORS
      2. (TB2) KULKA (P/N 603-9)
   B. CIRCUIT BREAKER:
      1. (CB1) AIRPAX (P/N UPL-211-4288-1)
   C. LINE FILTERS:
      1. (FL1, FL2, FL3) CORCOM (P/N 20W1)
   D. ELAPSED TIME METER:
      1. (TT) PRECISION TIMER INC. (P/N DC-260-7)
   E. TRANSFORMER:
      1. (T1) STANCOR, 24V, 1A (P/N P6469)
   F. DIODE:
      1. (CR1) TEXAS INST. (P/N 1N914)
   G. CAPACITOR:
      1. (C1) SPRAGUE, 15MF, 35VDC (P/N 43E2555)
5. POWER CORDS
   A. 5 CONDUCTOR (14 AWG) TELEDYNE WESTERN WIRE & CABLE (TYPE SO-600-14-3)

Figure 5A-6. HCP AC Power Distribution

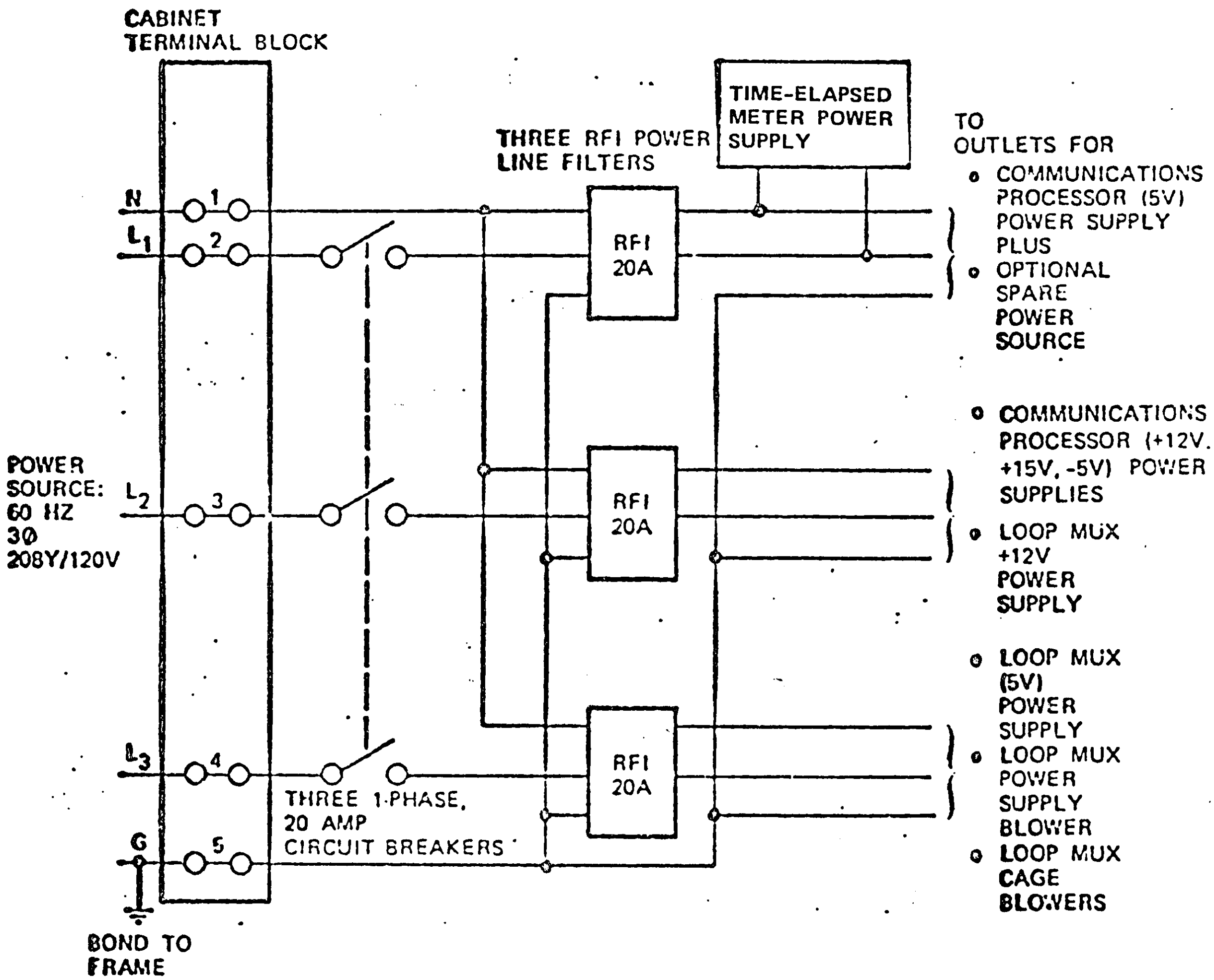


Figure 5A-7. Typical Electrical Distribution Box Schematic

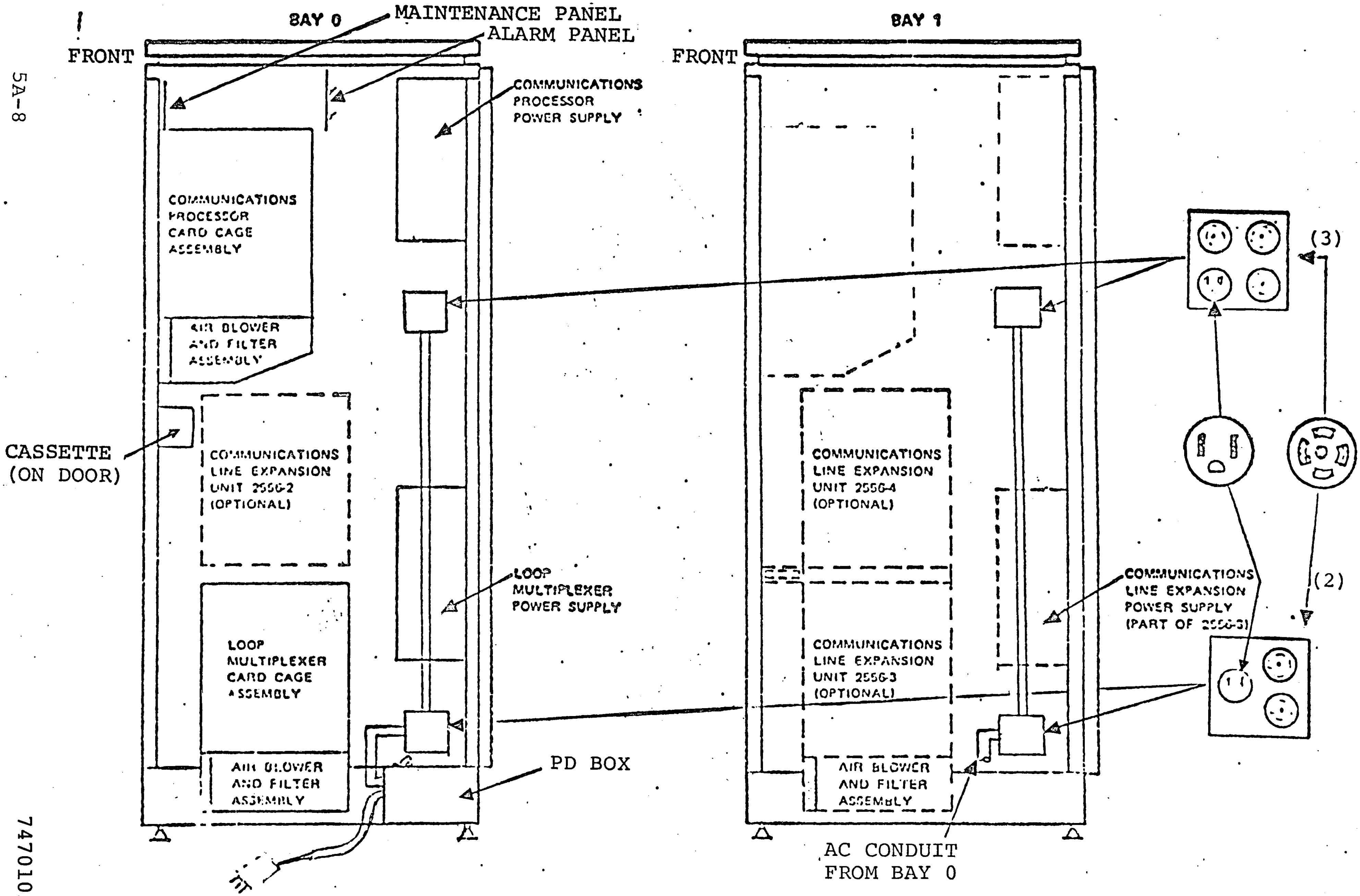


Figure 5A-8. HCP, Side View

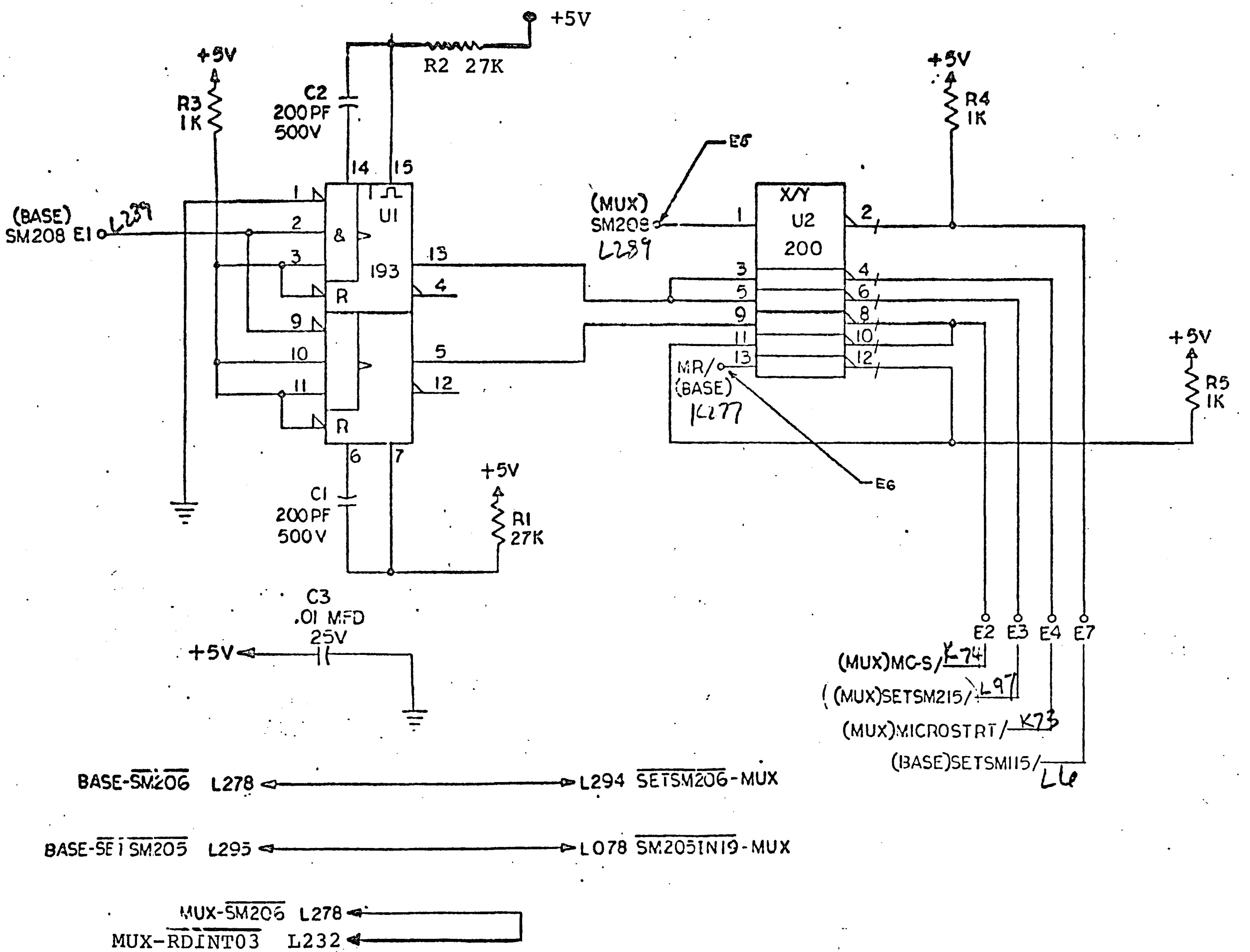


Figure 5A-9. 2552 Interrupt Cable Schematic

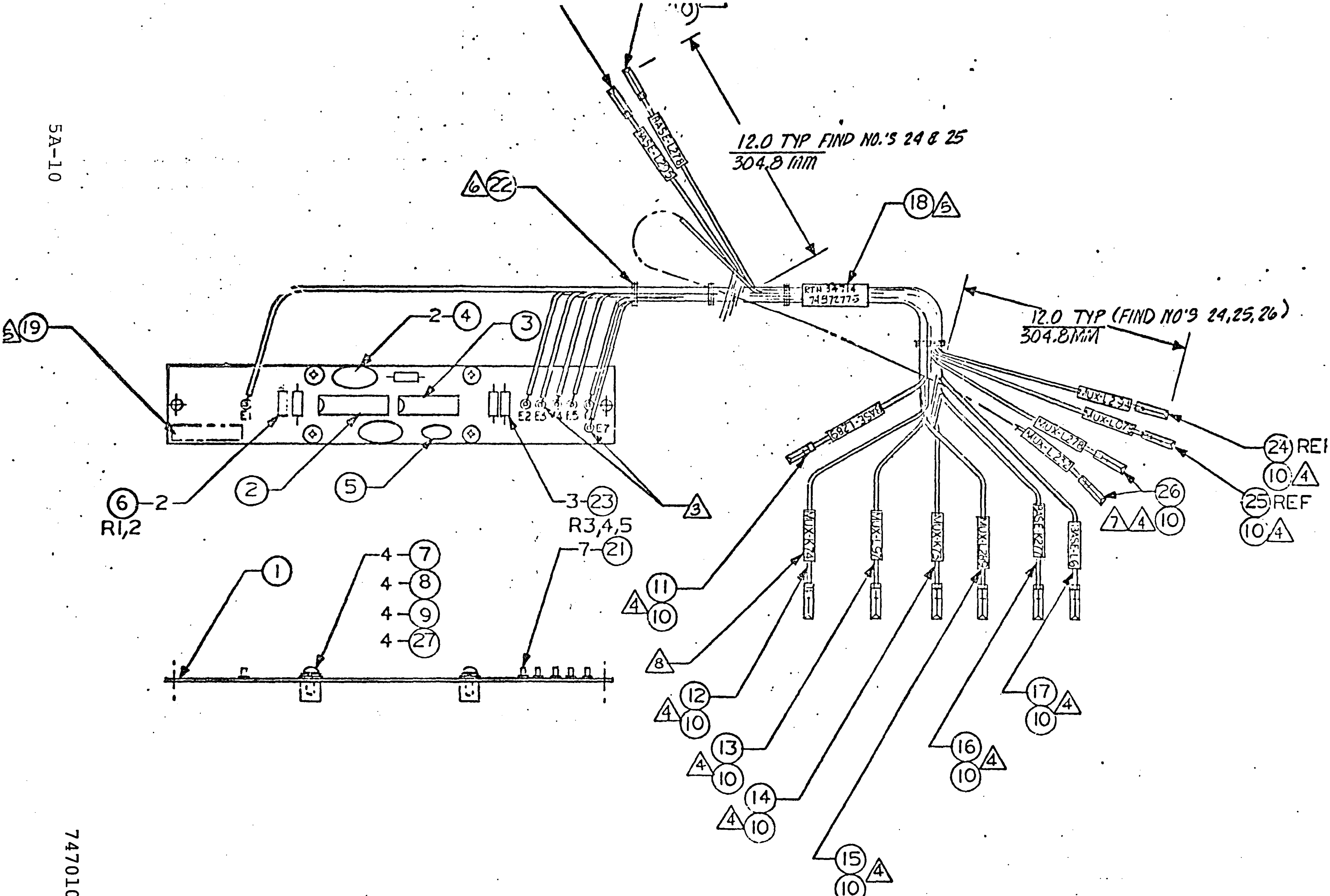


Figure 5A-10. Interrupt Cable Connections

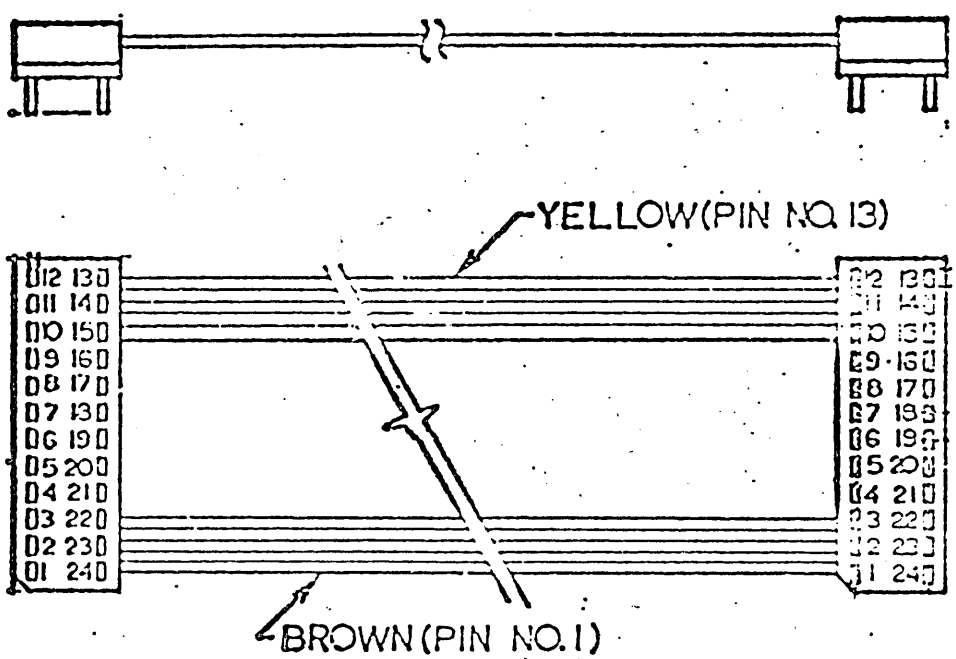


Figure 5B-1. Maintenance Panel Interface Cable

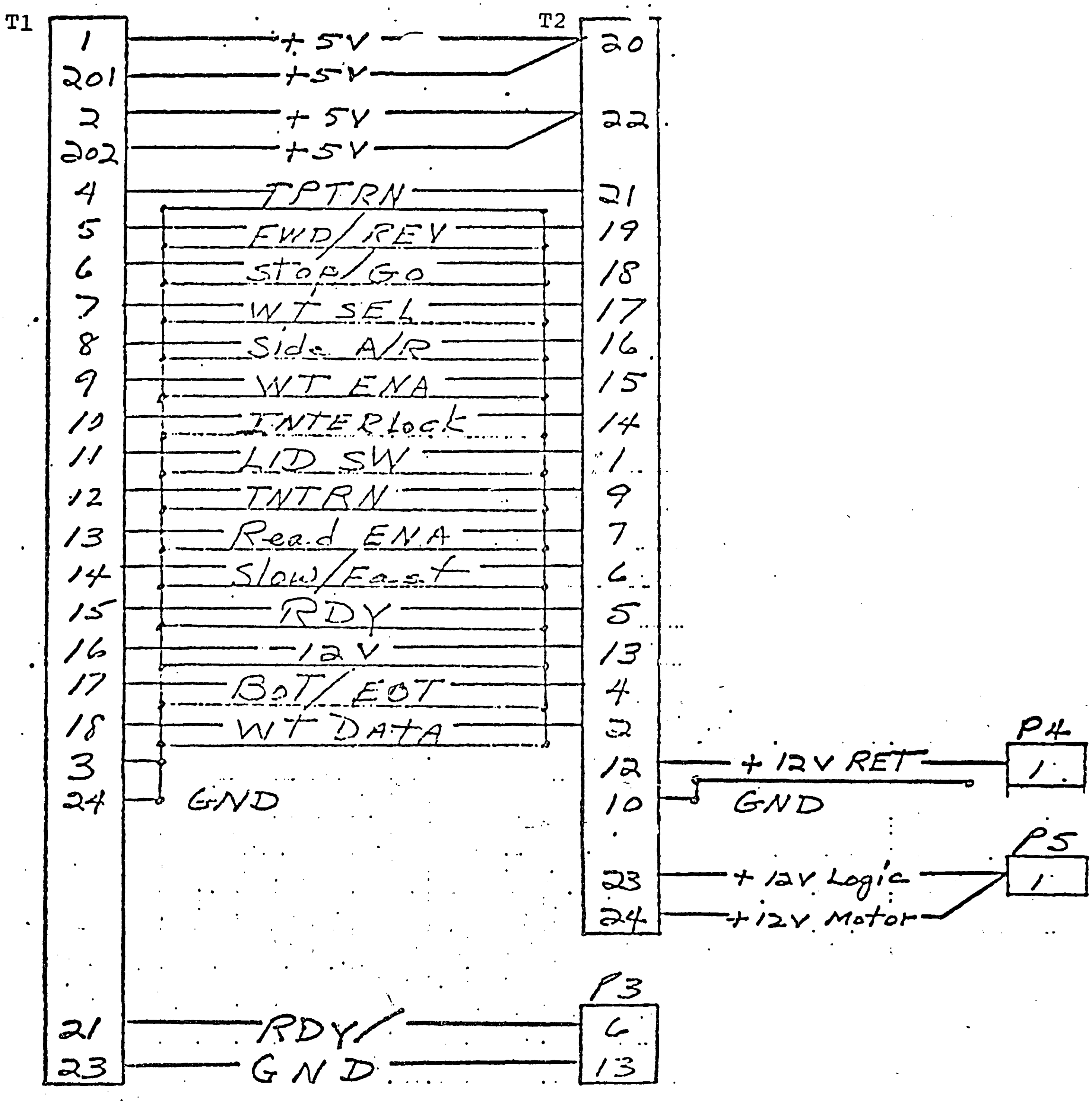


Figure 5C-1. Cassette Tape Transport Interface Cable

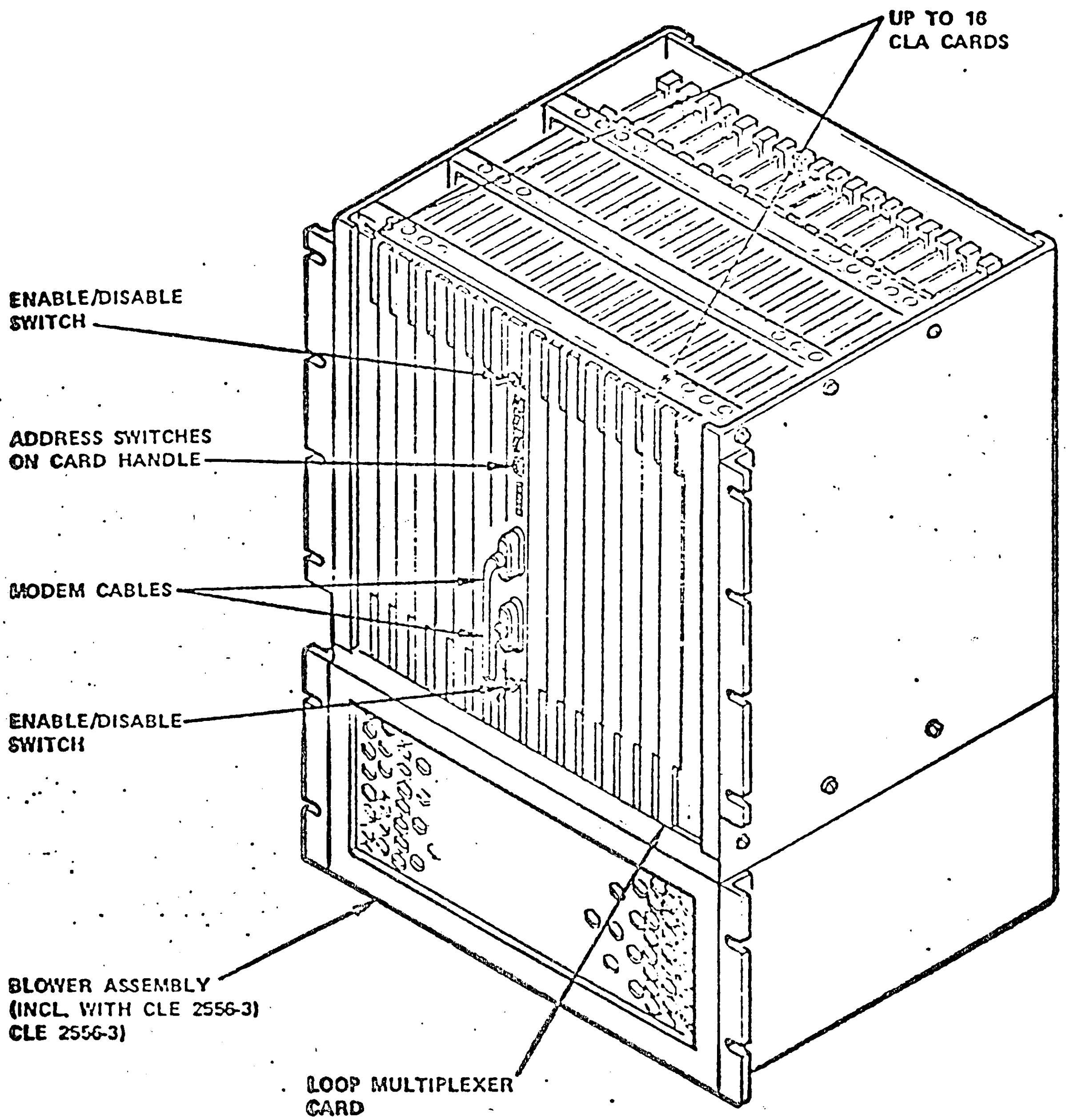


Figure 5D-1. Typical LM CArd Cage Assembly

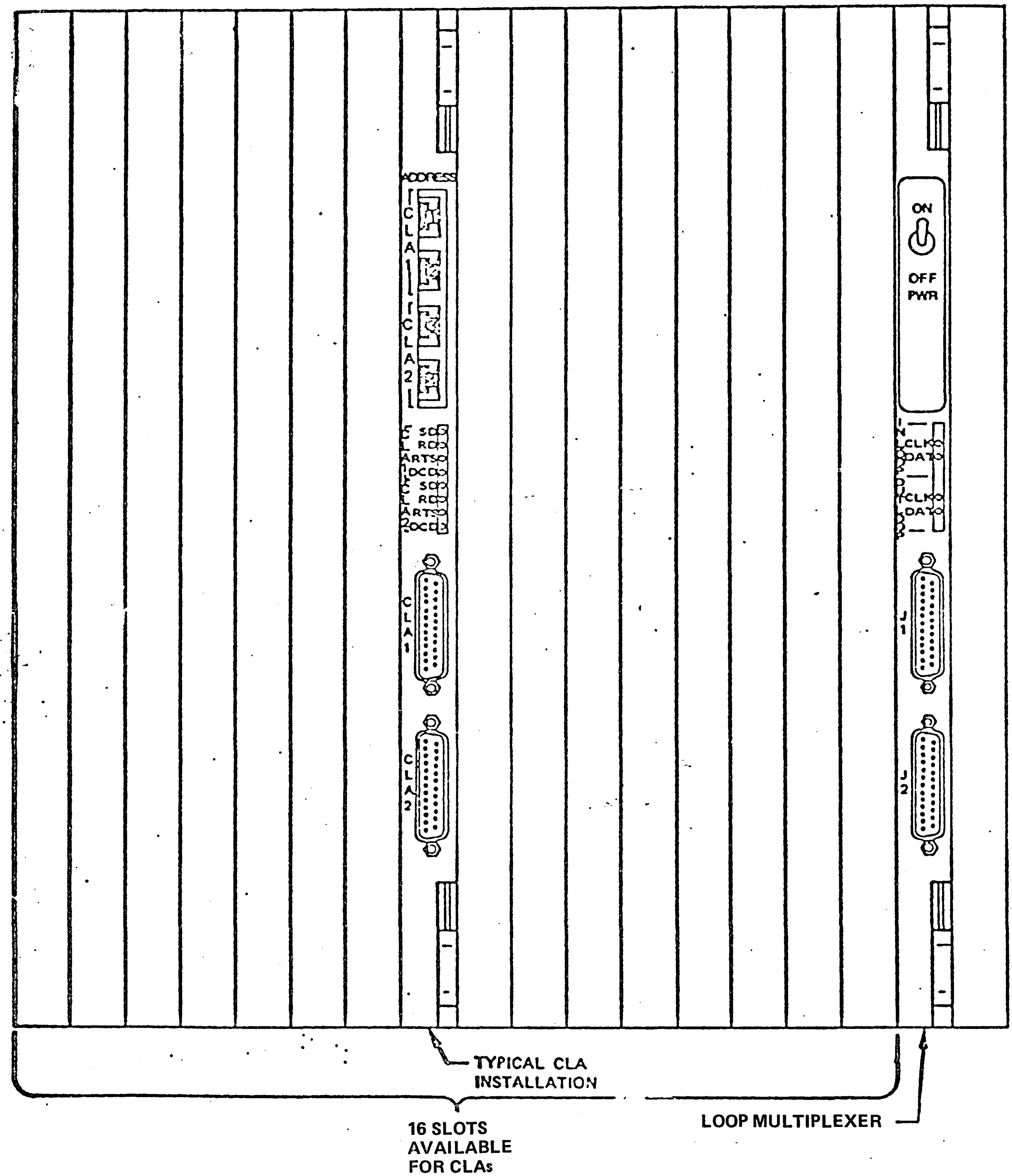


Figure 5D-2. Location of Loop Multiplexer and Typical Communications Line Adapter

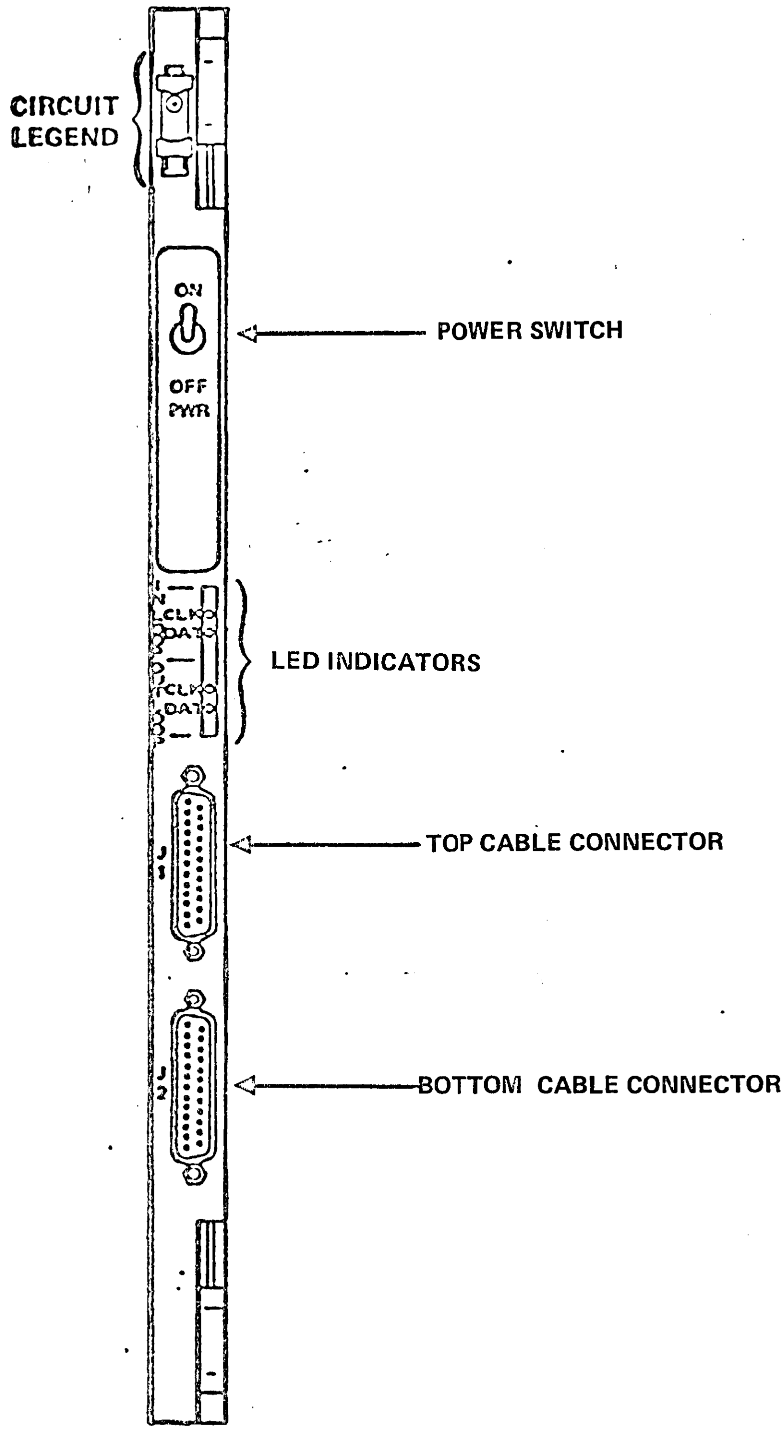


Figure 5D-3. Loop Multiplexer Circuit Card - Controls and Indicators

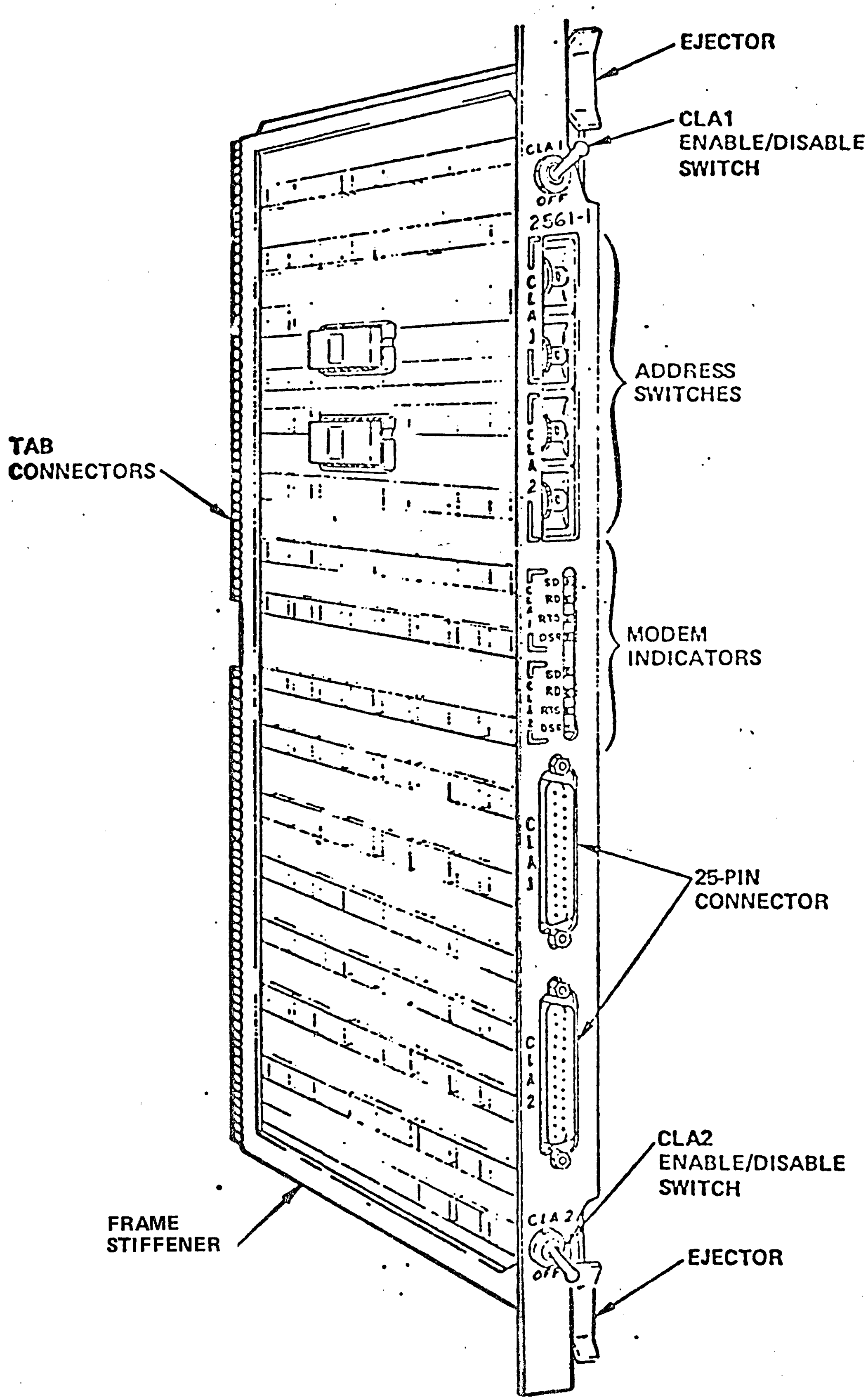


Figure 5D-4. ACLA Circuit Card

ACLA CABLES

Product No.	Assy No.	Application	Connector to Modem	Connector to ACLA
10400-1	746577xx	Compatible with AT&T 103/113 data sets	25-contact plug (male)	25-contact socket (female)
10400-2	746579xx	Can connect to terminal directly	25-contact socket (female) with threaded retaining spacers	25-contact socket (female)
10400-3	746583xx	Compatible with AT&T 103F, 202R data sets or CDC telegraphic level converter, or equivalent modem	25-contact plug (male)	25-contact socket (female)

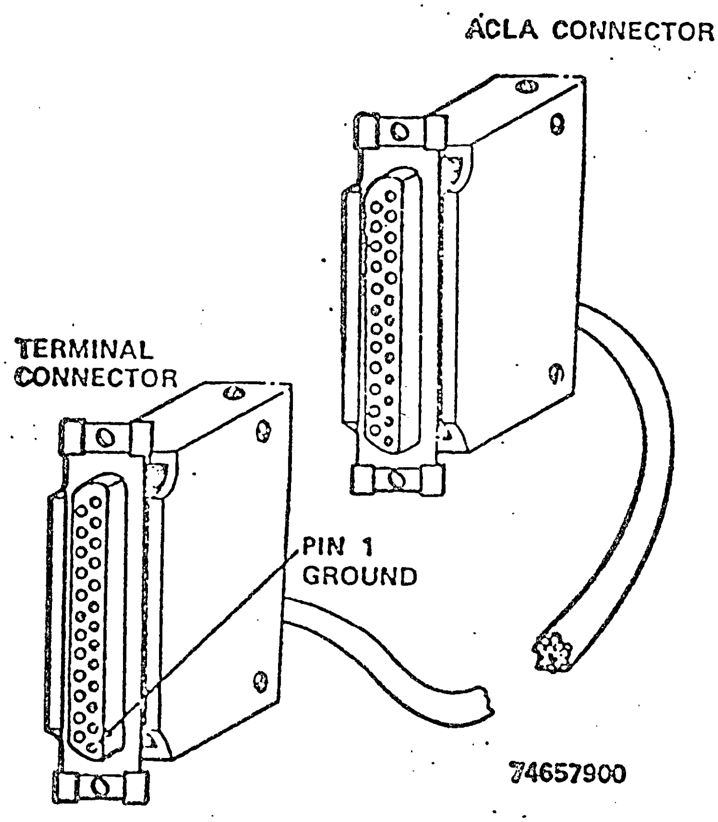


Figure 5D-5. Typical ACLA Cables

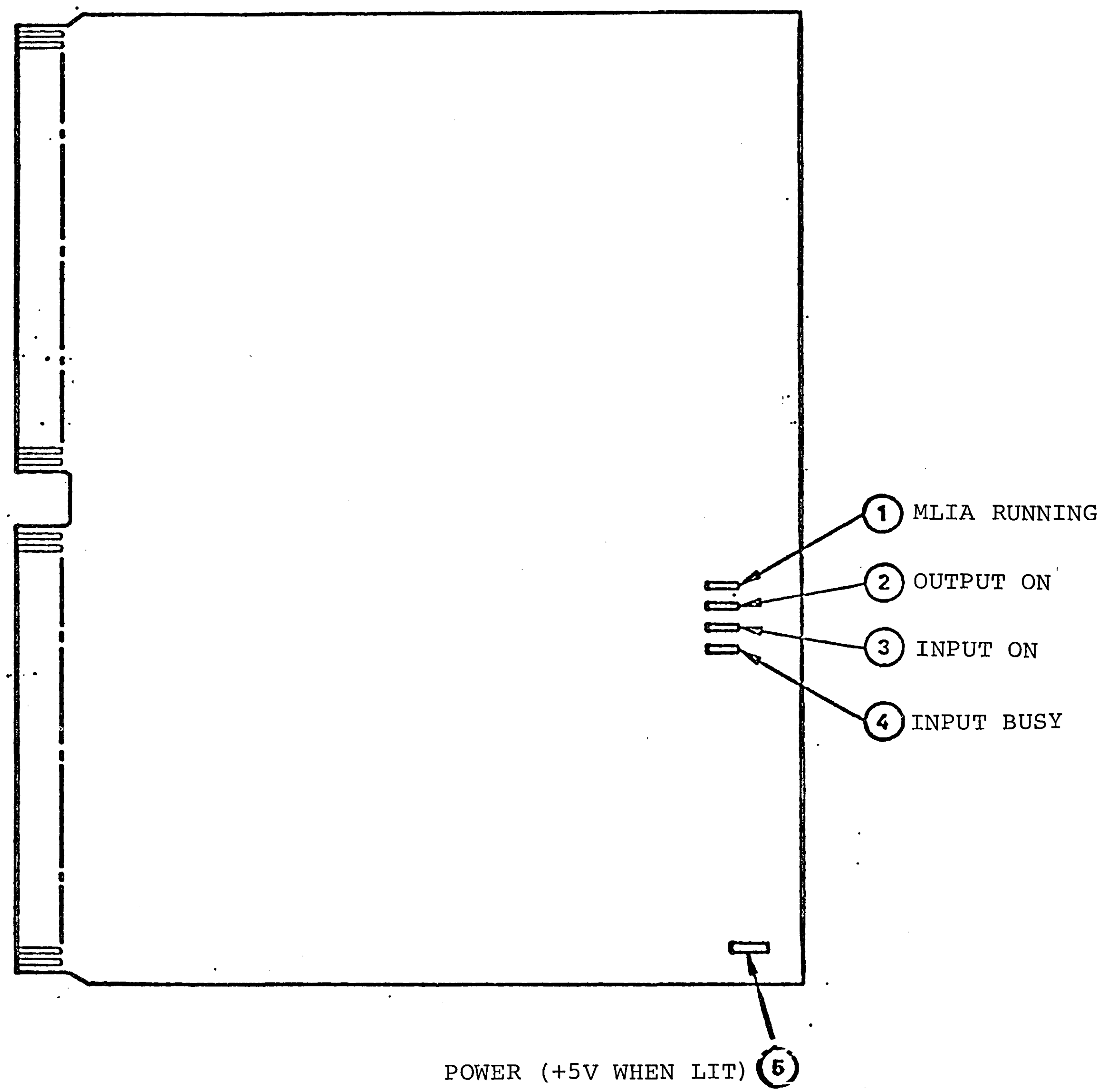


Figure 5D-6. MLIA, Output Loop Interface Circuit Card - Indicators

SECTION 6

DDLTS AND PROCEDURES

SECTION 6

DDLTS AND PROCEDURES

INTRODUCTION

This section contains the ODS 2.0 DDLTs and procedures. Figure 6-1 is a graphic representation of the organizational structure of this section. The DDLT program list is provided in Table 6-1. In addition to the DDLTs and appendixes are the following:

6A - Processor, Cabinet and Operator's Panel Procedure

6B - Maintenance Panel Replacement Procedure

6C - Cassette Transport Test Procedure.

Table 6-2 provides the preventive maintenance plan for the NPU equipment.

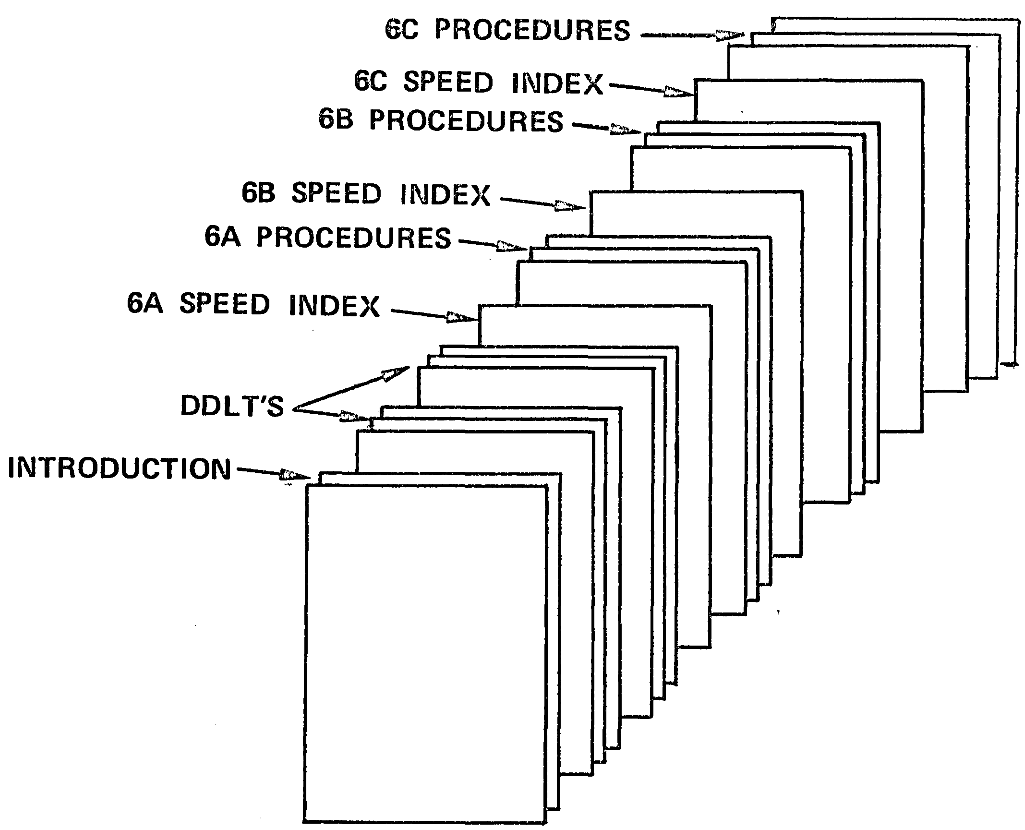


Figure 6-1. Organizational Structure of Section 6.

ON-SITE SERVICE APPROACH

1. Before going to the customer's site, the customer should be sure he has the necessary documentation and should be aware of what spare parts may be required at the site.

2. Upon arriving at the customer's site, the customer engineer should talk to the customer contact in an attempt to obtain as much information as possible about the nature of the system failure. The customer engineer should find out if the customer can identify specifically what is wrong with the system.

3. Regardless of what the malfunction is described to be, the customer engineer should always check that all cables are securely connected and check that all printed circuit boards are properly seated in the microprocessors.

4. If the malfunction is in a peripheral unit, the customer engineer should first run the DDLT tests in Tables 6-3 and 6-4 and then proceed to test the known bad device (see Table 6-5). This is illustrated by Figure 6-2. If a fault exists, but the customer cannot identify what is wrong, then a complete system verification test should be run. This is accomplished by running all DDLTs in sequence as illustrated in Figure 6-3.

5. If a device does not exist on a system, ignore that DDLT table and go to the next table.

6. After taking corrective action, the customer engineer should rerun the DDLT starting at Sheet 1 of that table to ensure that the fault has been corrected.

7. After testing is complete, the customer engineer should perform any required preventive maintenance as described in Table 6-2. Be sure to leave all switches used during testing set to the proper position for customer use of the system.

8. Finally, before leaving the customer site the customer engineer should talk to the customer contact and, more importantly, never leave the site without first receiving assurance that he as satisfied the customer.

TABLE 6-1. 2550 ODS 2.0 DIAGNOSTIC PROGRAM LIST

Mnemonic	Title	DDLT TABLE
LDCHK	Load Check	6-3
MPINS	Command Test	6-5
MPMOS	MOS Memory Test	6-6
MOSMA	MOS Memory Test	6-6
MPRTC	Protect Test	6-7
MIMEM	Micromemory Test	6-8
MIINS	Microinstruction Test	6-9
Page 1	MOS Memory Paging Test	6-10
DUCPU	Dual CPU Test	6-11
MPMEM	Core Memory Test	6-12
CASEC	Cassette Echo Test	6-13
	UTOPIA/MSMP	
CEL042	Cyclic Encoder	6-14
MST041	Multiplex Subsystem Diagnostic	6-15
CPL040	6000 Coupler Diagnostic	6-16
CPL040	Expanded Coupler Diagnostic	6-17
CUP043	3000L Coupler Diagnostic	6-18
TTY08	CRT/TTY Console Diagnostic	6-19
UTOPIA	Utility Routines	Appendixes

Appendix	
A	Tape Cassette Format
B	Tape Cassette Copy Routine
C	Parameter Changes and Patches to MSMP17 Diagnostics
D	Debug Aids - Trace Interpretation
E	System Initialization

PREVENTIVE MAINTENANCE

Preventive maintenance is a scheduled maintenance routine performed to keep the equipment operating at its optimal level. The maintenance index (Table 6-2) describes the time interval of preventive maintenance activity for specific equipments.

DIAGNOSTIC DECISION LOGIC TABLES (DDLT's)

The DDLTs identify and isolate equipment malfunctions in the replaceable subassemblies.

The DDLT analyzes a situation down to specific conditions and then directs the customer engineer to those actions that will correct the situation, with the most likely action listed first. Basically, the table is arranged in five sections: assumptions, conditions, conditions, responses, actions and sequence of actions (see DDLT example Figure 6-4).

ASSUMPTIONS

The upper section of the DDLT contains the prerequisites pertaining to the specific tests to be performed. The DDLT is valid only if all assumptions are true.

CONDITIONS

The center-left section of DDLT contains the conditions or tests to be made which are in the form of questions that can be answered yes or no.

RESPONSES

The center-right section of the DDLT contains the response to the question asked in the conditions section. Note that each condition, or question, can be answered with a yes (Y) or a no (N). The example chosen for Figure 6-4 has 10 unique situations, numbered from 1 to 10, left to right. The shaded area in the example shows the conditions that define situation 9. That is, the POWER ON indicator does not illuminate; all other indicators do not illuminate when READ CHECK indicator/switch is pressed; no single indicator illuminates; and no motors start.

TABLE 6-2. PREVENTIVE MAINTENANCE PLAN

The "Level" columns are designated, for scheduling purposes as:

- Level 1 - Before power-up after sustained shutdown
- Level 2 - 150 Hours or weekly
- Level 3 - 700 hours or monthly
- Level 4 - 2100 hours or quarterly
- Level 5 - 6000 hours or annually

Equipment I.D.	Level 1	Level 2	Level 3	Level 4	Level 5	Action	Reference Procedure	Time Required
1700 Enhanced Processor	X					Visual Inspection	6A-3	15 Min.
		X				Clean fan filter	6A-14	10 Min.
		X				Check fans	6A-10	15 Min.
Panel		X				Visual inspection and removal of accumulated dust from panel surfaces	None	2 Min.
Tape Cassette Transport		X				Clean Transport	6C-4	10 Min.
					X	Lubricate Transport	6C-3	15 Min.

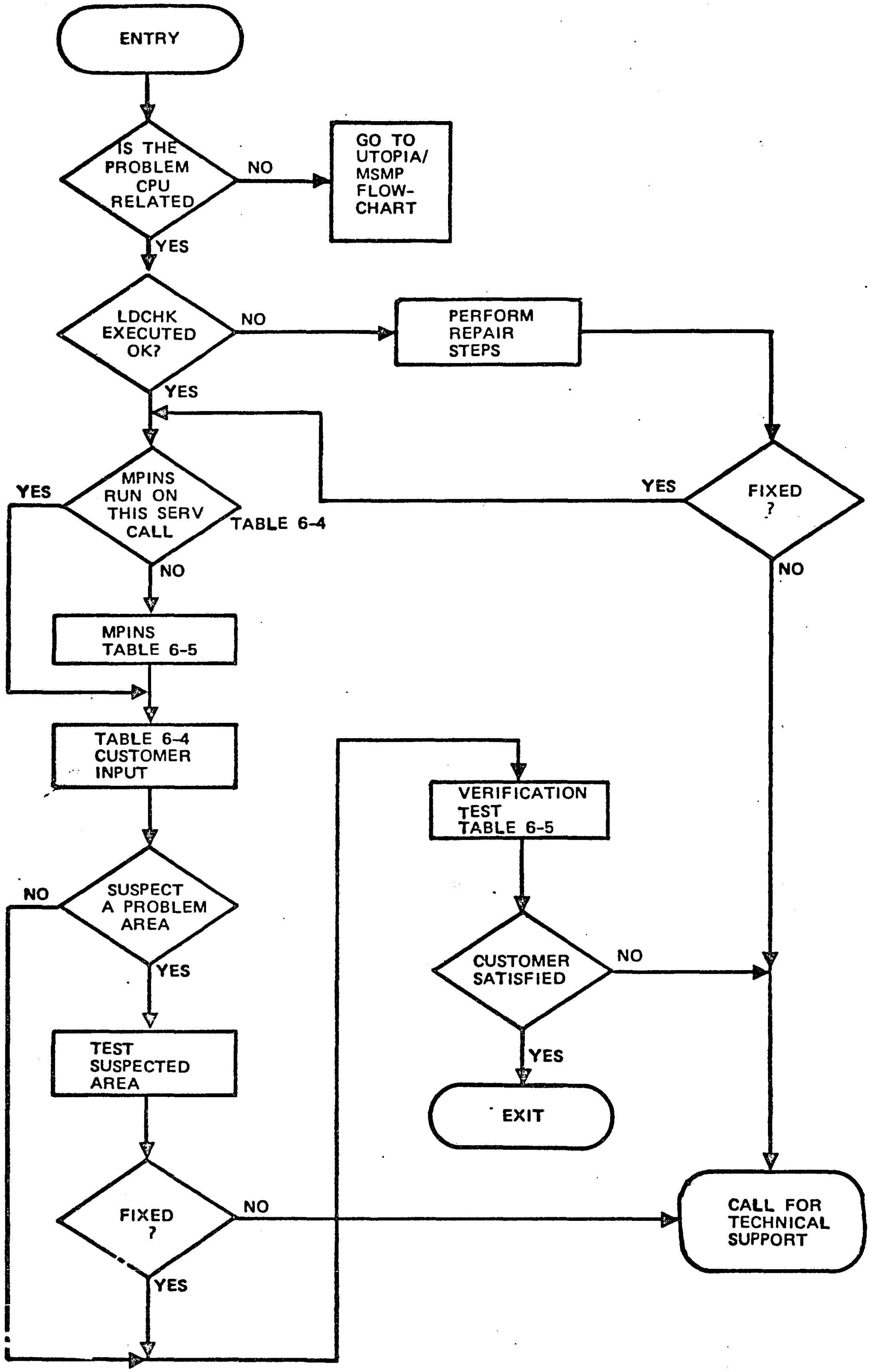


Figure 6-2. System Troubleshooting Flow Chart

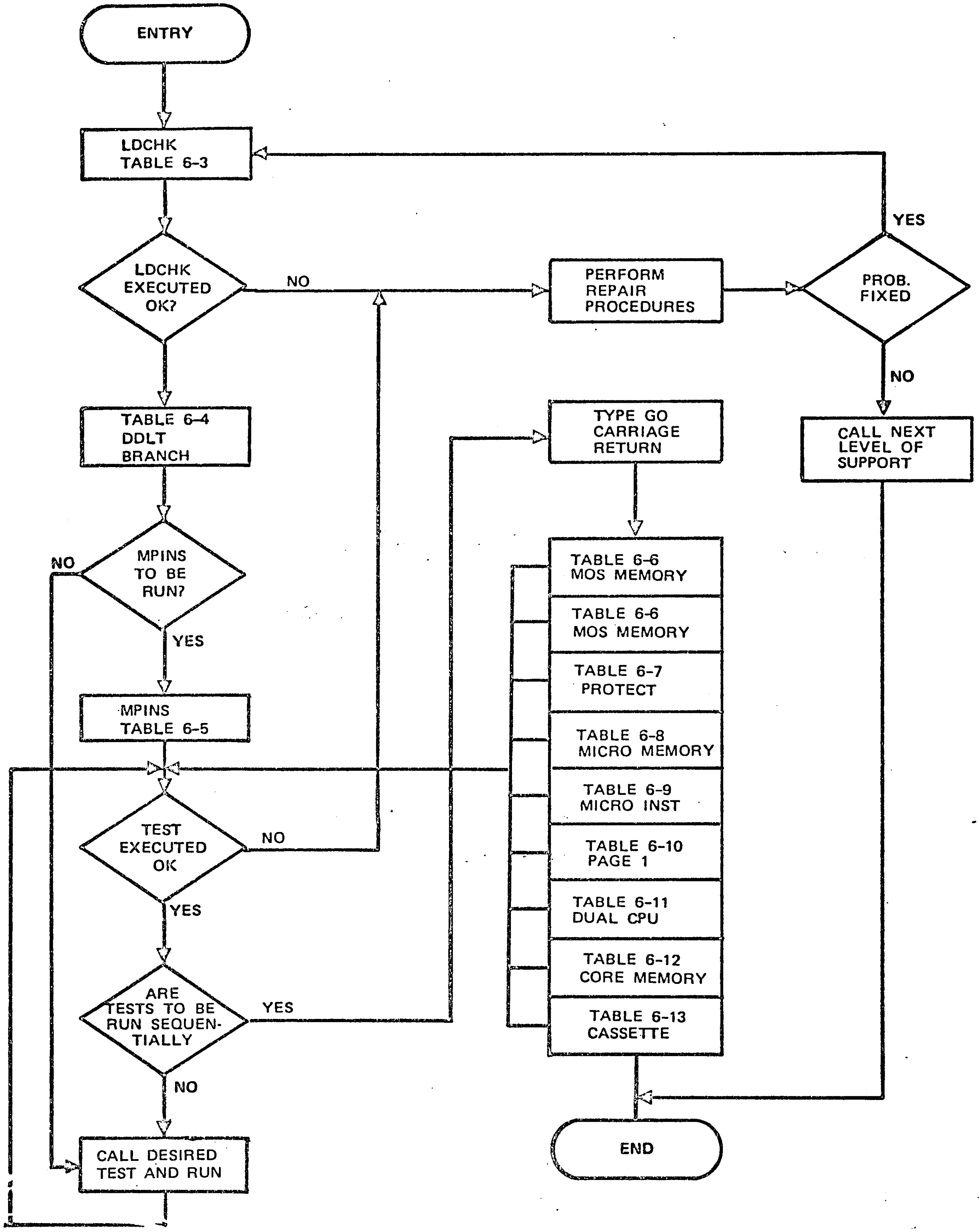


Figure 6-3. Flow Chart for System Verification Test Sequence

The first condition should be examined for a yes or no response. The applicable response directs the operator to the next condition in the column, etc., until all conditions in the column have been analyzed. In Figure 6-4, column 1 identifies an everything-is-normal situation for the tests made. Therefore, the Actions section in the lower left of the table directs the customer engineer: "Go to Sheet 2 of this table." The customer engineer then goes to Sheet 2 of the table and does not waste time with further examination of Sheet 1.

ACTIONS

The lower left quadrant lists actions to correct a situation.

SEQUENCE OF ACTIONS

The lower right section lists the sequence of the actions required to correct a situation, with each succeeding action being performed only if a previous action failed to correct the condition under test. The sequential numbering of actions reflects the probability of the corresponding action correcting the problem, with the most likely listed first. A "1" indicates that no sequence of actions is necessary but the action listed must be performed. Both actions and conditions may refer to specific procedures to follow (for example, when checking and adjusting power-supply voltages). The customer engineer must exit the table to perform the procedure and then return to the same point in the table to answer any questions that are related to the procedure. He also continues from this point in the table if the fault still persists. The same is true if an exit to another table or sheet of the same table does not find the fault and the action that called for the exit is not the last action in the sequence. The customer engineer must return to his original DDLT exit point and continue testing from there.

The DDLT's presume all operator inputs are entered correctly. Any incorrect entry may result in the DDLT directing incorrect action. Hence, if any doubt exists about the accuracy of the operator entry, always repeat the sequence of DDLT steps that led up to an action before taking further actions.

(EXAMPLE)

TABLE 6-X. CARD READER DDLT

Power On — Sheet 1 of 6

ASSUMPTIONS:

1. If card reader is load device, go to sheet 2 of this table.
2. Card reader power cord is connected to ac outlet.
3. Power is on (procedure D1).
4. Ensure card reader is not ready by pressing RESET.

		1	2	3	4	5	6	7	8	9	10
CONDITIONS:											
1.	Is POWER ON indicator on card reader illuminated?	Y						N			
2.	Press READ CHECK switch/indicator. Do all other indicators illuminate?	Y				N		Y	N		
3.	Do any indicators illuminate?					Y	N		Y	N	
4.	Press and release RESET switch/indicator. Does RESET indicator illuminate?	Y			N						
5.	When RESET switch/indicator is pressed, do stacker springs and/or card drum turn?	Y		N							
6.	Did motor power come up and then drop within 10 to 30 seconds after releasing RESET switch/indicator?	Y	N								
ACTIONS:											
1.	Go to sheet 2 of this table.	X									
2.	Check that toggle switch S1 (rear panel) is up.									1	
3.	Check that removable power cord is connected securely to card reader.									2	
4.	Check fuses (rear panel) and ac power.									3	
5.	Check switch board and associated cabling (procedure D9). Replace if required (procedure D10).				3	2	2	2		4	
6.	Check +17-volt power supply (procedure D6).								1		
7.	Check for +17 vdc between ground and control board connector P2, pins 2 and 3, and between ground and switch board connector, pins 2 and 3 (two pins joined by foil).								2		
8.	Check cable between control board and switch board.								3		
9.	Replace lamp in failing indicator (procedure D9).							1			

RESPONSES

SEQUENCE OF ACTIONS

NOTE: ARROWS AND CIRCLED NUMBERS INDICATE SEQUENTIAL FLOW OF ANALYSIS PROCEDURE.

Figure 6-4. Example of a Diagnostic Decision Logic Table (DDLT)

TYPEOUT	DESCRIPTION
GHOST IN INTERRUPT LINES	Unexpected interrupt was received.
xxxx (level 1 test)	xxxx = a bit mask indicating what line was interrupted.

PRECAUTIONS

The following are precautions the customer engineer should keep in mind while performing diagnostic testing:

- After any power to the computer is turned on or off, the computer should be master cleared.
- Power to the peripherals should be turned off before the power to the computer is turned off.
- Printed circuit boards may be removed from or installed in the processor with the power on.
- Do not press any key on the conversational display terminal while diagnostic card decks are being loaded.

Whenever the ESC key on the conversational display terminal is pressed, the computer is placed into panel mode. This prevents further messages from being displayed on the conversational display terminal. To a user it appears that the system is hung up. If the ESC key is accidently pressed, the condition can be rectified by pressing the @ character on the keybaord.

The DDLT's presume all operator inputs are entered correctly. Any incorrect entry may result in the DDLT directing incorrect action. Hence, if any doubt exists about the accuracy of the operator entry, always repeat the sequence of DDLT steps that led up to an action before taking further actions.

TABLE 6-3. LOADCHECK DDLT

ASSUMPTIONS:

System power is turned on at each device.

Set TTY select switch to CPU being tested.

If this is a dual-CPU system, tests on second processor must be performed after completing tests on first processor.

Press MASTER CLEAR on maintenance panel of CPU being tested.

The following is entered at the keyboard:

ESC key is pressed.

J58G is typed in. (Does not print)

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display:												
J000008x0 or J000008x8	Y	N										
Jxxxxxxx1		Y	N									
Jxxxxxxx2			Y	N								
Jxxxxxxx4				Y	N							
Jxxxxxx8x					Y	N						
*Jxxxxxxxx or Jxxxxxxxx						Y	N					
where any of the above x's may equal any number.												
ACTIONS												
Go to sheet 2 of this table.	x											
Replace control 1 (slot P).		7	9	9	1	4	3					
Replace control 2 (slot N).		8	10	10	7	3	4					
Replace ALU (slot M).		1	7	7	5	6	2					
Replace transform (slot R)		4	1	1	6	5	5					
Replace memory interface (slot V)		5	2	2	9	10	9					
Replace memory interface (slot W)		6	3	3	10	11	10					
Replace I/O (slot K).		10	4	4	2	8	6					
Replace memory (slot X)		9	5	6	8	9	11					
Replace SMI (slot L)		3	8	8	4	7	7					
Call next level of support		11	11	11	11	12	12					
Verify the power supplies (Proc. A7, A9, A11)							1					
Ensure shift lock on keyboard is released. Restart this page.						1						
Replace panel interface (slot U).		2	6	5	3	2	8					

Assumptions:

The conditions below are read before going to the next assumption.

MASTER CLEAR on maintenance panel of CPU being tested is pressed.

Level I cassette tape is inserted into the respective unit if this is a dual-CPU system.

Tape is observed for rewind and forward-to-load-point motion when lid of drive is closed.

All system switch settings are correct . Section 4A.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Did the tape move in both directions?	Y		N									
Did the tape move in only one direction?			Y	N								
After approximately five seconds, did the cassette READY indicator on the CPU maintenance panel illuminate?	Y	N										
Actions:												
Go to sheet 3 of this table.	X											
Use another tape if available and/or restart this page.		2	1	1								
Check cassette power supply voltages. (Procedure 6C-8)			2	2								
Replace the cassette drive (Procedure 6C-7)		5	3	6								
Replace the cassette controller (slot H)		4	4	5								
Check power distribution box (Procedure A-13).				3								
Verify processor power supplies (Procedures A7, A9, A11)				4								
Ensure that the cassette tape is in the correct drive.		1										
Check cables to READY light on CPU maintenance panel).		3										
Call next level of support.		6	5	7								

TABLE 6-3. LOADCHECK DDLT (CONTINUED)

Assumptions:

DEADSTART INITIATE button on CPU maintenance panel is pressed.

CPU maintenance panel indicator lights are observed.

MEMORY PROTECT switch enabled (up).

Conditions:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display: (After approximately 2 minutes?)												
123456	Y		N									
12345			Y	N								
1234				Y	N							
123					Y	N						
12						Y	N					
1							Y	N				
Are you retesting a peripheral following a DDLT action?	N	Y										
Did the tape move?								Y	N			
Is the tape stopped with READY off?								N		Y		
Did the DEADSTART light illuminate?									Y		N	
Actions:												
Go to sheet 4 of this table.								5				
Go to table 6-4.		X										
Go to table 6-4.	X											
Replace memory (slot X).			2	6	2		2					
Replace memory interface (slot V).			3	7	3		3	4				
Replace memory interface (slot W).			4	8	4		4	3				
Replace ALU (slot M).			5	5	5		6			5		
Replace transform (slot R).			6	4	8		7					
Replace SMI (slot L).			7	9	6		5		3		2	
Replace I/O-TTY (slotK).			8	2	7		8					

TABLE 6-3. LOADCHECK DDLT (CONTINUED)

Continued from Sheet 3 of 6

ACTIONS (Continued):	1	2	3	4	5	6	7	8	9	10	11	12
Replace panel interface (slot U).								2		4		
Replace the cassette controller (slot H).				3					1	2		
Use another cassette tape and/or restart sheet 2.			1	1	1		1	1		1	1	
Replace the cassette drive (Procedure 6C-7).									2	3		
Check the DEADSTART switch and wiring.											3	
Call next level of support.			9	10	9		9		4	6	4	
Go to Sheet 4 of this table.						X						

TABLE 6-3. LOADCHECK DDLT (continued)

ASSUMPTIONS:

1. The following is entered on the keyboard:

   ESC Key is pressed.
   J11G is typed in.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10
1. Is RUN indicator illuminated? Bit 24 of the FCR	Y	N								
2. Does the CDT display:										
Jxxxxxxx0 or Jxxxxxxl		Y	N							
Jxxxxxxx2 or Jxxxxxx4			Y	N						
Jxxxxxxx6				Y	N					
Jxxxxxxx8 or JxxxxxxxC or Jxxxxxxx9					Y	N				
JxxxxxxxE						Y	N			
where x may equal any number.										

ACTIONS:	1	2	3	4	5	6	7	8	9	10
1. Go to sheet 5 of this table.		X								
2. Replace transform, slot R.	1		3	1	8	3	1			
3. Replace memory interface, slot V.	5		4	2	3	1	4			
4. Replace memory interface, slot W.	6		5	3	4	2	5			
5. Replace memory, slot X.	4		8	5	2	4	3			
6. Replace ALU, slot M.	3		1	6	7	7	6			
7. Replace SMI, slot L.	2		2	7	5	6	2			
8. Replace control 1, slot P.	8		6	8	9	8	7			
9. Replace control 2, slot N.	9		7	9	10	9	8			
10. Replace I/O-TTY, slot K.	7		9	4	6	5	9			
11. Go to procedure 21.					1					
12. Replace micro-memory, slot T.	10		10	10	11	10	10			
13. Go to table 6-101.	11		11		12	11	11			

ASSUMPTIONS:

Entry is made from Sheet 4 of this table.

KG is typed in at the keyboard.

Observe the CDT display for one of the following conditions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the CDT display:												
K0056 or K0059 or K005C	Y	N										
K1003 or K1006 or K1009		Y	N									
K100C			Y	N								
K100F or K1011 or K1013 or K1015				Y	N							
K101A					Y	N						
K101C or K101E or K1020 or K1022 or K1024 or K1026						Y	N					
K1029							Y	N				
K102C								Y	N			
K102F									Y	N		
K1032										Y	N	
K1035											Y	N
ACTIONS:												
Replace memory, slot X (power down micro processor)	1	6	6	4	5	7	6	6	6	6	6	
Replace memory interface, slot V	2	7	7	8	8	4	8	7	8	7	7	
Replace memory interface, slot W	3	8	8	9	9	5	9	8	9	8	8	
Replace SMI slot L	4	5	5	2	2	2	4	4	4	5	4	
Replace ALU, slot M.	5	2	3	3	3	3	3	3	3	3	3	
Replace transform, slot R.	6	1	4	5	4	6	1	5	1	4	5	
Replace control 2, slot N.	7	3	2	7	7	9	7	2	7	1	2	
Replace control 1, slot P.	8	4	1	6	6	8	2	1	2	2	1	
Replace I/O-TTY, slot K.	9	9	9	1	1	1	5	9	5	9	9	
Replace micro - memory slot T.	10	10	10	10	10	10	10	10	10	10	10	
Go to table 6-101	11	11	11	11	11	11	11	11	11	11	11	
Go to sheet 6 of this table												X

ASSUMPTIONS:

Entry is made from Sheet 5 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
K1038 or K103B or K103E or K1041	Y	N										
K1044		Y	N									
K1047 or K104A or K104D or K1050 or K1053			Y	N								
K1056 or K1059 or K105C				Y	N							
K1073 or K1076 or K1079 or K107B or K107C or K107E or K107F					Y	N						
K1081 or K1082 or K1084 or K1085 or K1087 or K1088 or K108A						Y	N					
K108C							Y	N				
K108D or K1090								Y	N			
K1094 or K10DA									Y	N		
K10D5										Y	N	
K10D7 or K10E0 or K10E2											Y	N
ACTIONS:												
Replace transform, slot R.	1	5	1	6	1	1	4	1	4	3	4	1
Replace control 1, slot P.	2	1	2	8	4	4	3	4	1	2	1	3
Replace ALU, slot M.	3	3	3	5	2	2	2	2	2	1	2	4
Replace SMI, slot L.	4	4	4	4	5	5	5	5	5	5	5	5
Replace I/O-TTY, slot K.	5	9	5	9	9	9	9	9	9	9	9	9
Replace memory, slot X.	6	6	6	1	6	6	6	6	6	6	6	6
Replace control 2, slot N	7	2	7	7	3	3	1	3	3	4	3	2
Replace memory interface, slot V.	8	7	8	2	7	7	7	7	7	7	7	7
Replace memory interface, slot W.	9	8	9	3	8	8	8	8	8	8	8	8
Replace micro memory, slot T	10	10	10	10	10	10	10	10	10	10	10	10
Go to table 6-101.	11	11	11	11	11	11	11	11	11	11	11	11

TABLE 6-4. TAPE RELOAD AND CUSTOMER INPUT

ASSUMPTIONS:

Loadcheck {LDCHK} has completed successfully.

Last TTY output message was:

123456

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Has MPINS been run on this service call?	N	Y										
Is this a reload following a maintenance action?		Y	N									
Is this a reload for final verification?			Y	N								
Can the customer identify a problem area?				Y	N							
ACTIONS:												
Go to next table {Command Test}. Execute MPINS.	X		1									
Go to DDLT that specified last maintenance action.		X										
Go to DDLT of suspected problem area.				X								
Go to Table 6-6 and continue through DDLT's per Figure 6-3.			2		X							

TABLE 6-5. COMMAND DDLT

ASSUMPTIONS:

If this test is not to be run, go to next table.

The test name for this DDLT is MPINS.

MPINS may be started executing by

(a) typing MPINS carriage return if the TTY has just typed out a test name (xxxxx?) listed above MPINS in Table 6-1, or

(b) by typing GO carriage returns if MPINS? has just been typed out.

Messages output on the TTY must be followed to complete this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Is MPINS EXECUTING displayed?	Y									N		
Is MPINS TERMINATED displayed after approximately 10 seconds?	Y	N										
Are any of the following action codes displayed?												
xx11 or xx12 or xx13 or xx14		Y				N						
xx11 or xx21		Y	N			Y	N					
xx12 or xx22			Y	N			Y	N				
xx13 or xx23				Y	N			Y	N			
ACTIONS:												
Go to table 6-6.	X											
Replace transform (slot R).		1	1	1	1	2	2	2	2			
Replace ALU (slot M).		2	2	2	2	1	1	1	1			
Replace control 1 (slot P).		5	5	3	3	5	5	3	3			
Replace control 2 (slot N)		4	4	5	4	4	4	5	4			
Replace SMI (slot L)		3	6	4	5	3	6	4	5			
Replace memory (slot X)		6	7	6	6	6	7	6	6			
Replace I/O-TTY (slot K).		9	3	9	9	9	3	9	9			
Replace memory interface (slot V).		7	8	7	7	7	8	7	7			
Replace memory interface (slot U).		8	9	8	8	8	9	8	8			
Go to Table 6-100.		10	10	10	10	10	10	10	10	X		

TABLE 6-6. MOS MAIN MEMORY DDLT

ASSUMPTIONS:

If this test is not to be run, go to next table.

The test name for this DDLT is MPMOS.

MPMOS may be started executing by

(a) typing MPMOS Carriage Return if the TTY has just typed out a test name (xxxxx?) listed above MPMOS in Table 6-1, or

(b) by typing GO Carriage Return if MPMOS? has just been typed out.

Messages output on the TTY must be followed to complete this table.

Loadcheck and the Command test ran successfully.

Memory protect switches are in the ENABLED (up) position.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display: MPMOS EXECUTING. MPMOS SUSPENDED BOT	Y		N									
Is this CPU 2 of a dual-CPU system?	Y	N										
ACTIONS:												
Go to Table 6-100.			X									
At the TTY keyboard: Type in A, 0 0 4 65K 2550-2 4 0 4 2552 Dual CPU 65K ea. Press CARRIAGE RETURN Type in D, 0, F F F F 2, F F F F Press CARRIAGE RETURN Fill in the above spaces with run parameters as directed in Procedure A-20.		1										
At the TTY keyboard: Type in A, _ _ _ Press CARRIAGE RETURN Type in D, _, _ _ _ _ Press CARRIAGE RETURN Fill in the above spaces with run parameters as directed in Procedure A-20.	1											
At the TTY keyboard: Type in GO Press CARRIAGE RETURN	2	2										
5. Go to sheet 2 of this table.	3	3										

TABLE 6-6. MOS MAIN MEMORY DDLT {CONTINUED}

ASSUMPTIONS:

Observe TTY display for the following conditions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display: Set Multi-Level Indirect Switch OFF {ESC J40 @ GO CR} · MPMOS SUSPENDED SELF	Y	N										
ACTIONS:												
At the TTY keyboard: Press ESC key; Type in J40 @ GO; Press CARRIAGE RETURN	1											
Go to sheet 3 of this table.	2											
Repeat the Loadcheck test {Table 6-3} and repeat this test. Operator error suspected.		1										
Call next level of support.		2										

ASSUMPTIONS:

Entry is made from sheet 2 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
After several minutes delay does the TTY display: MPMOS SECTION 0001 MPMOS SECTION 0003 MPMOS SECTION 0004 MPMOS SECTION 0005 MPMOS SECTION 0006 MPMOS COMPLETED 0001 PASSES SET MULTI-LEVEL INDIRECT SWITCH ON ESC J42 @ GO CR) MPMOS SUSPENDED SELF	Y	N										
ACTIONS:												
1. At the TTY keyboard: Press ESC key Type in J42 @ GO Press CARRIAGE RETURN	1											
2. Go to sheet 4 of this table.	2											
3. Go to sheet 5 of this table.		X										

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 4 of 14

ASSUMPTIONS:

Entry is made from sheet 3 of this table.

CONDITIONS:	1	2	3
1. Does the CDT display: MPMOS TERMINATED 0000 ERRORS	Y	N	
2. Is an error code displayed?		Y	N
ACTIONS:			
1. Go to sheet 8 of this table.	X		
2. Repeat the loadcheck test (table 6-3) and repeat this test. Operator error is suspected.			1
3. Call next level of support.			2
4. Go to sheet 5 of this table		X	

TABLE 6-6. MOS MAIN MEMORY DDLT {CONTINUED}

ASSUMPTIONS:

Entry is made from Sheet 4 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display:												
04E7	Y	N										
04E8		Y	N									
04E9			Y	N								
04D0				Y	N							
xxx0 through xxx7					Y	N						
xxx8 through xxxF						Y	N					
ACTIONS:												
Repeat the Loadcheck test (Table 6-3) and repeat this test. Run parameters are incorrect. Memory protect switch disabled.	1	1	1	1								
Replace memory interface {local slot V}	2	3					3					
Replace memory interface {local slot W}	3	4		2			2					
Replace MOS array {local slot X}.	4											
Replace MOS array {local slot Y}.	5											
Replace MOS array {local slot Z}.	6											
Replace MOS array {local slot AC}.	7											
Replace ECC array {local slot AC}.	8											
Replace 1700 transform {local slot R}.	9			3			8					
Replace control 2 {local slot N}.	10			4			9					
Replace control 1 {local slot P}.	11			5			10					
Replace I/O-TTY {local slot K}.	12			6			11					
Replace panel interface {local slot U}	13			7			12					

CONTINUED FROM Sheet 5 of 14

ACTIONS {CONTINUED}:	1	2	3	4	5	6	7	8	9	10	11	12
Replace SMI {local slot L}.	14			8			13					
Replace ALU {local slot M}.	15			9			14					
Run the Loadcheck test {Table 6-3} and run this test in alternate CPU.		2					1					
Replace memory interface {remote slot {remote slot V}.		5					5					
Replace memory interface {remote slot W}.		6					4					
Replace cable at local slot V, pin 228		7										
Replace cable at local slot V, pin 240		8										
Replace cable at local slot W, pin 53.		9					6					
Replace cable at local slot W, pin 77.		10					7					
Verify proper placement of MOS address connectors at local slots Y through AC and repeat each one.. See Procedure A-17.	16											
Verify proper placement of array boards in local slots X through AC. See procedure A-17.	17											
Call next level of support.	19	12	3	11			16					
Go to sheet 6 of this table.					X							
Go to sheet 7 of this table.						X						
Verify address and data cables that connect CPU 1 and CPU 2 if a dual CPU System.	18	11	2	10			15					

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 6 of 14

ASSUMPTIONS:

Entry is made from sheet 5 of this table.

	1	2	3	4	5	6	7	8	9	10	11	12	13
CONDITIONS:													
Does the CDT display:													
1. xxx0	Y	N											
2. xxx6 or xxx7		Y	N										
3. xxx1			Y		N								
4. xxx2					Y		N						
5. xxx3							Y			N			
6. xxx4										Y		N	
7. Are there any 32K boards in the local CPU?			Y	N	Y	N	Y		N				
8. Is there only one 32K board in the local CPU?							Y	N		Y	N		
9. Are there only two 32K boards in the local CPU?												Y	N
ACTIONS:													
1. Replace MOS array board in one of the following local slots:													
X	1	4	1	5	5	5	5	5	5	5	5	5	5
Y	5	5	5	1	1	6	6	1	6	6	6	6	6
Z	6	6	6	6	6	1	1	6	7	7	1	7	1
AC	7	1	7	7	7	7	7	7	1	1	7	1	7
2. Replace ECC array board (if present), local slot AC.	2		2	2	2	2	2	2	2	2	2	2	2
3. Replace memory interface board, local slot V.	3	2	3	3	3	3	3	3	3	3	3	3	3
4. Replace memory interface board, local slot W.	4	3	4	4	4	4	4	4	4	4	4	4	4
5. Call next level of support.	8	7	8	8	8	8	8	8	8	8	8	8	8

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 7 of 14

ASSUMPTIONS:

Entry is made from sheet 5 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12	13
Does the CDT display:													
1. xxx8	Y	N											
2. xxxE or xxxF		Y	N										
3. xxx9			Y		N								
4. xxxA					Y		N						
5. xxxB							Y			N			
6. xxxC										Y		N	
7. Are there any 32K boards in the remote CPU?			Y	N	Y	N	Y		N				
8. Is there only one 32K board in the remote CPU?							Y	N		Y	N		
9. Are there only two 32K boards in the remote CPU?												Y	N
ACTIONS:													
1. Replace MOS array board in one of the following remote slots:													
X	1	10	1	11	11	11	11	11	11	11	11	11	11
Y	11	11	11	1	1	12	12	1	12	12	12	12	12
Z	12	12	12	12	12	1	1	12	13	13	1	13	1
AC	13	1	13	13	13	13	13	13	1	1	13	1	13
2. Replace ECC array board, remote slot AC.	2		2	2	2	2	2	2	2	2	2	2	2
3. Replace memory interface board, remote slot V.	3	2	3	3	3	3	3	3	3	3	3	3	3
4. Replace memory interface board, remote slot W.	4	3	4	4	4	4	4	4	4	4	4	4	4
5. Replace memory interface board, local slot V.	5	4	5	5	5	5	5	5	5	5	5	5	5
6. Replace memory interface board, local slot W.	6	5	6	6	6	6	6	6	6	6	6	6	6

Continued on next page

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 7 of 14 (Contd)

ACTIONS (Continued):	1	2	3	4	5	6	7	8	9	10	11	12	13
7. Replace cable at local slot V, pin 228.	7	6	7	7	7	7	7	7	7	7	7	7	7
8. Replace cable at local slot V, pin 240.	8	7	8	8	8	8	8	8	8	8	8	8	8
9. Replace cable at local slot W, pin 53.	9	8	9	9	9	9	9	9	9	9	9	9	9
10. Replace cable at local slot W, pin 77.	10	9	10	10	10	10	10	10	10	10	10	10	10
11. Call next level of support.	14	13	14	14	14	14	14	14	14	14	14	14	14

ASSUMPTIONS:

If this test is not to be run, go to next table.

The test name for this DDLT is MOSMA.

MOSMA may be started executing by

(a) typing MOSMA carriage return if the TTY has just typed out a test name (xxxxx?) listed above MOSMA in Table 6-1, or

(b) by typing GO Carriage Return if MOSMA? has just been typed out.

Messages output on the TTY must be followed to complete this table.

Entry to this sheet is from sheet 4 of this table.

Memory protect switches are in the ENABLED (up) position.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display: MOSMA EXECUTING. MOS SUSPENDED.BOT	Y		N									
Is this CPU 2 of a dual-CPU system?	Y	N										
ACTIONS:												
Go to Table 6-100.			X									
At the TTY keyboard: ,0, 0 4, 2550-2 65K Type A, 4 0 4 Dual CPU 65K each Press CARRIAGE RETURN Type D, 0 F F F F , 2 Press CARRIAGE RETURN Type 3, 7 8 A 0 Press CARRIAGE RETURN Fill in the above spaces with run parameters as directed in Procedure A-20.		1										
At the TTY keyboard: Type A, _ _ _ Press CARRIAGE RETURN Type D, _, _ _ _ _, _ Press CARRIAGE RETURN Type 3, _ _ _ _ Press CARRIAGE RETURN Fill in the above spaces with run parameters as directed in procedure. A-20.	1											
At the TTY keyboard: Type GO Press CARRIAGE RETURN	2	2										
Go to sheet 9 of this table.	3	3										

TABLE 6-6. MOS MAIN MEMORY DDLT (CONTINUED)

ASSUMPTIONS:

Observe TTY display for the following questions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Does the TTY display: Set MULTI-LEVEL INDIRECT SWITCH OFF (ESC J40 @ GO CR) MOSMA SUSPENDED SELF	Y	N										
ACTIONS:												
1. At the TTY keyboard: Press ESC key Type J40 @ GO Press CARRIAGE RETURN	1											
2. Go to sheet 10 of this table	2											
3. Repeat the Loadcheck test (Table 6-3) and repeat this test (from sheet 8). Operator error is suspected.		1										
4. Call next level of support.		2										

ASSUMPTIONS:

Entry is made from sheet 9 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
After several minutes delay does the TTY display: MOSMA SECTION 0007 MOSMA SECTION 0008 MOSMA SECTION 0009 (optional) MOSMA SECTION 000A MOSMA COMPLETED 0001 PASSES SET MULTI-LEVEL INDIRECT SWITCH ON (ESC J42 @ GO CR) MOSMA SUSPENDED SELF	Y	N										
ACTIONS:												
1. At the TTY keyboard: Press ESC key Type J42 @ GO Press CARRIAGE RETURN	1											
2. Go to sheet 11 of this table.	2											
3. Go to sheet 12 of this table.		X										

ASSUMPTIONS:

Entry is made from Sheet 10 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display: MOSMA TERMINATED 0000 ERRORS	Y	N										
ACTIONS:												
Go to next table	X											
Repeat the Loadcheck test {Table 6-3} and repeat this test {from sheet 8}. Operator error is suspected.		1										
Call next level of support.		2										

ASSUMPTIONS:

Entry is made from Sheet 10 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the TTY display:												
24C0 or 24CE	Y	N										
24D0		Y	N									
24E4, 24E5, 24E6, or 24E9			Y	N								
24E7, 24EA, or 24EC				Y	N							
24E8					Y	N						
xxx0 through xxx7						Y	N					
xxx8 through xxxF							Y	N				
ACTIONS:												
Repeat the Loadcheck test (Table 6-3) and repeat this test (from sheet 8) Run parameters are incorrect. Memory protect switch disable.			1	1	1							
Replace memory interface {local slot V}.	5	1		2	3			3				
Replace memory interface {local slot W}.	6	2		3	4			2				
Replace MOS array {local slot X}.				4								
Replace MOS array {local slot Y}.	2			5								
Replace MOS array {local slot Z}.	3			6								
Replace MOS array {local slot AC}.				7								
Replace ECC array {local slot AC}.	4			8								
Replace 1700 transform {local slot R}.		3		9				8				
Replace control 2 {local slot N}.		4		10				9				
Replace control 1 {local slot P}.		5		11				10				

TABLE 6-6. MOS MAIN MEMORY DDLT (CONTINUED)

Continued from Sheet 12 of 14

ACTIONS (Continued):	1	2	3	4	5	6	7	8	9	10	11	12
Replace I/O-TTY (local slot K).		6		12				11				
Replace panel interface (local slot U)		7		13				12				
Replace SMI (local slot L).		8		14				13				
Replace ALU (local slot M).		9		15				14				
Run the Loadcheck test (Table 6-3) and run this test in the alternate CPU					2			1				
Replace memory interface (remote slot V).					5			5				
Replace memory interface (remote slot W).					6			4				
Replace cable at local slot V, pin 228					7							
Replace cable at local slot V, pin 240.					8							
Replace cable at local slot W, pin 53.					9			6				
Replace cable at local slot W, pin 77.					10			7				
Call next level of support.	8	11	3	17	12			16				
Go to sheet 13 of this table.						X						
Go to sheet 14 of this table.							X					
Verify address and data cables that connect CPU 1 and CPU 2 are correct if a dual CPU System.	7	10	2	16	11			15				

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 13 of 14

ASSUMPTIONS:

Entry is made from sheet 12 of this table.

CONDITIONS: Does the CDT display:	1	2	3	4	5	6	7	8	9	10	11	12	13
1. xxx0	Y	N											
2. xxx6 or xxx7		Y	N										
3. xxx1			Y		N								
4. xxx2					Y		N						
5. xxx3							Y			N			
6. xxx4										Y		N	
7. Are there any 32K boards in the local CPU?			Y	N	Y	N	Y		N				
8. Is there only one 32K board in the local CPU?							Y	N		Y	N		
9. Are there only two 32K boards in the local CPU?												Y	N
ACTIONS:													
1. Replace MOS array board in local slot: X	1	4	1	5	5	5	5	5	5	5	5	5	5
Y	5	5	5	1	1	6	6	1	6	6	6	6	6
Z	6	6	6	6	6	1	1	6	7	7	1	7	1
AC	7	1	7	7	7	7	7	7	1	1	7	1	7
2. Replace ECC array board if present, local slot AC.	2		2	2	2	2	2	2	2	2	2	2	2
3. Replace memory interface board, local slot V.	3	2	3	3	3	3	3	3	3	3	3	3	3
4. Replace memory interface board, local slot W.	4	3	4	4	4	4	4	4	4	4	4	4	4
5. Call next level of support.	8	7	8	8	8	8	8	8	8	8	8	8	8.

ASSUMPTIONS:

Entry is made from sheet 12 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12	13
Does the CDT display:													
1. xxx8	Y	N											
2. xxxE or xxxF		Y	N										
3. xxx9			Y		N								
4. xxxA					Y		N						
5. xxxB							Y			N			
6. xxxC										Y		N	
7. Are there any 32K boards in the remote CPU?			Y	N	Y	N	Y		N				
8. Is there only one 32K board in the remote CPU?							Y	N		Y	N		
9. Are there only two 32K boards in the remote CPU?												Y	N
ACTIONS:													
1. Replace MOS array board in remote slot:													
X	1	10	1	11	11	11	11	11	11	11	11	11	11
Y	11	11	11	1	1	12	12	1	12	12	12	12	12
Z	12	12	12	12	12	1	1	12	13	13	1	13	1
AC	13	1	13	13	13	13	13	13	1	1	13	1	13
2. Replace ECC array board, remote slot AC.	2		2	2	2	2	2	2	2	2	2	2	2
3. Replace memory interface board, remote slot V.	3	2	3	3	3	3	3	3	3	3	3	3	3
4. Replace memory interface board, remote slot W.	4	3	4	4	4	4	4	4	4	4	4	4	4
5. Replace memory interface board, local slot V.	5	4	5	5	5	5	5	5	5	5	5	5	5

Continued on next page

TABLE 6-6. MOS MAIN MEMORY DDLT (Contd)

Sheet 14 of 14 (Contd)

ACTIONS (Continued):	1	2	3	4	5	6	7	8	9	10	11	12	13
6. Replace memory interface board, local slot W.	6	5	6	6	6	6	6	6	6	6	6	6	6
7. Replace cable at local slot V, pin 228.	7	6	7	7	7	7	7	7	7	7	7	7	7
8. Replace cable at local slot V, pin 240.	8	7	8	8	8	8	8	8	8	8	8	8	8
9. Replace cable at local slot W, pin 53.	9	8	9	9	9	9	9	9	9	9	9	9	9
10. Replace cable at local slot W, pin 77.	10	9	10	10	10	10	10	10	10	10	10	10	10
11. Call next level of support.	14	13	14	14	14	14	14	14	14	14	14	14	14

TABLE 6-7. MEMORY PROTECT AND INTERRUPT SYSTEM TEST

ASSUMPTIONS:

1. If this test is not to be run, go to next table.

2. After xxxxx? is displayed, the following is entered at the keyboard (if xxxxx is not displayed, go to table 6-100):

   MPRTC is typed in.
   CARRIAGE RETURN is pressed.

   NOTE: xxxxx = test name

3. See the table below for operator actions as directed by diagnostic. Then observe the CDT display for the following conditions after approximately two minutes. Following program input requests, observe conditions.

Display message directive	Operator response
1. Clear protect and stop	1. Press ESC key 2. Type in J20@GO 3. Press CARRIAGE RETURN
2. Set protect and clear stop	1. Press ESC key 2. Type in J28@GO 3. Press CARRIAGE RETURN
3. Set protect and stop	1. Press ESC key 2. Type in J2A@GO 3. Press CARRIAGE RETURN
4. Verify CPU is halted at xxxx	1. Press ESC key 2. Type in J11GKG 3. Observe the value Knnnn, where nnnn portion equals the xxxx value in message. If not equal, go to next page and assume code 0651. If equal, type in I@ at the keyboard.
5. Set protect and clear stop	1. Press ESC key 2. Type in J28@GO 3. Press CARRIAGE RETURN
6. Clear protect and set stop	1. Press ESC key 2. Type in J22@GO 3. Press CARRIAGE RETURN

Continued on next page

TABLE 6-7. MEMORY PROTECT AND INTERRUPT SYSTEM TEST (Contd)

Sheet 1 of 2 (Contd)

CONDITIONS:	1	2	3	4	5	6	7	8
1. Is MPRTC EXECUTING displayed?	Y						N	
2. Is RUN indicator illuminated?							N	Y
3. Is micro processor halted at address displayed in display message directive 4 (see previous page)?	Y				N			
4. Is MPRTC TERMINATED displayed?	Y		N					
5. Are action codes displayed?			Y	N	Y	N		
6. Is there a ghost interrupt message?	N	Y						
ACTIONS:								
1. Go to next table.	X							
2. Go to table 6-100.							X	
3. Go to sheet 2 of this table.			X		X			
4. Go to sheet 2 of this table and assume action code 0651.						X		
5. Go to sheet 2 of this table and assume action code 0657.								X
6. Replace SMI board, slot L.		1						
7. Go to table 6-101.		2						
8. Go to sheet 2 of this table and assume action code 0652.				X				

TABLE 6-7. MEMORY PROTECT AND INTERRUPT SYSTEM TEST (Contd)

Sheet 2 of 2

ASSUMPTIONS:

1. A failure has been detected. The following analyzes and isolates the detected failure.

2. Observe CDT display for any of the following conditions.

CONDITIONS: Does the CDT display:	1	2	3	4	5	6	7	8	9
1. 0641 or 0642	Y	N							
2. 0651 or 0654 or 0656		Y	N						
3. 0652 or 0653			Y	N					
4. 0655				Y	N				
5. 0657 or 0621					Y	N			
6. 0661 or 06B2 or 06B3						Y	N		
7. 0671 or 0672							Y	N	
8. 06A1								Y	N
9. 06B1									Y
ACTIONS:									
1. Replace memory interface, slot V.	2	2	1		4		3	2	3
2. Replace memory interface, slot W.	3	3	2		5		4	3	4
3. Replace transform, slot R.	5	1	4	2	3	1	5	6	1
4. Replace SMI, slot L.	4	4	3	1	2	2	6	5	5
5. Replace memory, slot X.	1	5	5				2	4	2
6. Replace I/O-TTY, slot K.		6			1				
7. Go to procedures A7, A9, and A11.							1		
8. Restart this test (go back to sheet 1 of this table).								1	
9. Go to table 6-101.	6	7	6	3	6	3	7	7	6

TABLE 6-8. MIMEM MICROMEMORY TEST DDLT

MIMEM TEST	Sheet 1 of 3

ASSUMPTIONS:

There is a micromemory board in slot T.

If this test is not to be run, go to next table.

After XXXXX? is displayed, the following is entered at the keyboard:
MIMEM is typed in
CARRIAGE RETURN is pressed
NOTE: If XXXXX? is not displayed, go to Table 6-100.

Observe the CDT for the following conditions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Does the CDT display: MIMEM EXECUTING MIMEM SUSPENDED BOT?	Y	N										
2. Is RUN indicator illuminated? Bit 24 of the FCR		N	Y									
ACTIONS:												
1) Fill in the spaces below with the run paraméters as directed in procedure A22. At the CDT keyboard: Type D, 7 Press CARRIAGE RETURN Type 11, 7 Press CARRIAGE RETURN Type GO Press CARRIAGE RETURN	1											
2) Go to sheet 2 of this table	2											
3) Go to Table 6-101			X									
4) Go to Table 6-100.		X										

MIMEM TEST	Sheet 2 of 3

ASSUMPTIONS:

Entry is made from Sheet 1 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Within approximately 3 minutes does the CDT display: MIMEM Section 0001 MIMEM Section 0002 MIMEM Section 0003 MIMEM Section 0004 MIMEM Completed 0001 Passes MIMEM Terminated 0000 Errors	Y	N										
ACTIONS:												
1. Go to next table.	X											
2. Go to Sheet 3 of this table.		X										

TABLE 6-8. MIMEM MICRO MEMORY TEST DDLT (Cont)

MIMEM TEST

ASSUMPTIONS:

Entry is made from Sheet 2 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the CDT display:												
1. 02A4 or 0244	Y	N										
2. 02A5 or 0245		Y	N									
3. 02A6 or 0246			Y	N								
4. 02A7 or 0247				Y	N							
5. 02A8 or 0248					Y	N						
6. 02A9 or 0249						Y	N					
7. 02AA or 024A							Y	N				
8. 02AB or 024B								Y	N			
9. 02AC through 02AF or 024C through 024F									Y	N		
10. 0201 through 0204										Y	N	
ACTIONS:												
1. Replace micromemory (Slot T)	1	1	1	1							2	
2. Replace Control 2 (Slot N)	2	2	2	2				1			3	
3. Replace Control 1 (Slot P)	3	3	3	3	1	1	1	2				
4. Replace SMI (Slot L)	4	4	4	4	2	2	2	3				
5. Replace Transform (Slot R)	5	5	5	5	3	3	3	4				
6. Replace ALU (Slot M)	6	6	6	6	4	4	4	5				
7. Press MASTER CLEAR Press RUN Assure that run parameters are correct (Procedure A22) Restart test from page 1 of this table.					5	5	5	6	X	X	1	
8. Go to Table 6-100											4	
9. Call next level of support	7	8	8	8	7	7	7	7				

TABLE 6-9. MIINS MICROINSTRUCTION TEST DDLT

MIINS TEST — Sheet 1 of 3

ASSUMPTIONS:

1. If this test is not to be run, go to the next table.
2. At least one optional micromemory board is installed in the processor
3. After XXXX? is displayed, the following is entered at the keyboard:
   MIINS is typed in
   CARRIAGE RETURN is pressed
   NOTE: If XXXX? is not displayed, go to Table 6-100.
4. Observe the CDT for the following conditions

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Does the CDT DISPLAY: MIINS EXECUTING MIINS SUSPENDED BOT	Y	N										
2. Is RUN Indicator illuminated? Bit 24 of FCR		N	Y									
3. Is there 1 - Micromemory board in slot T.	N			Y								
ACTIONS:												
1. At the CDT Keyboard: Type B, 0 Press CARRIAGE RETURN				1								
2. At the CDT Keyboard: Type 60, Press CARRIAGE RETURN				2								
3. Go to Sheet 2 of this Table.				3								
4. Go To TABLE 6-100.		X										
5. Go to Table 6-101.			X									
6. At the CDT keyboard: Type NO, press CARRIAGE RETURN	X											

MIINS TEST	Sheet 2 of 3

ASSUMPTIONS:

Entry is made from Sheet 1 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Within approximately 30 seconds does the CDT display: MIINS Section 0001 MIINS Section 0002 MIINS Section 0003 MIINS Section 0004 MIINS Section 0005 MIINS Section 0006 MIINS Section 0007 MIINS Section 0008 MIINS Completed 0001 passes MIINS terminated 0000 errors	Y	N										
ACTIONS:												
1. Go to next Table	X											
2. Go to Sheet 3 of this Table		X										

MIINS TEST - Sheet 3 of 3

ASSUMPTIONS:

Entry is made from Sheet 5 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the CRT Display:												
1. 0E81 or 0E83	Y	N										
2. 0E82 or 0E84		Y	N									
3. 0E85			Y	N								
4. 0E86				Y	N							
5. 0E87					Y	N						
6. 0E88						Y	N					
7. 0E01							Y	N				
ACTIONS:												
1. Restart this test {From Page 1} Run Parameters incorrect							X					
2. Replace ALU {SLOT M}	1	2	4	1	3	3		1				
3. Replace Control 1 {Slot P}	2	3	2	3	2	4		2				
4. Replace Control 2 {Slot N}	3	1	3	2	4	5		3				
5. Replace Transform {Slot R}	4	7	1	4	5	6		4				
6. Replace SMI {Slot L}	5	4	7		1			5				
7. Replace Memory Interface {Slot W}	6	5	5			1		6				
8. Replace Memory Interface {Slot V}	7	6	6			2		7				
9. Replace Micro Memory {Slot T}	8	8	8	5	6	7		8				
10. Go to Table 6-100	9	9	9	6	7	8		9				
11. Call next level of support	10	10	10	7	8	9		10				

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT

Sheet 1 of 7

ASSUMPTIONS:

1. If this test is not to be run, go to table 6-11.
2. The MOS main memory test (table 6-6) runs successfully in both CPUs.
3. After xxxxx? is displayed, the following is entered at the keyboard (if xxxxx? is not displayed, go to table 6-100):
   PAGE1 is typed in.
   CARRIAGE RETURN is pressed.
   NOTE: xxxxx = test name
4. Observe the CDT display for the following conditions.

CONDITIONS:		1	2	3
1.	Does the CDT display: PAGE1 EXECUTING PAGE1 SUSPENDED BOT	Y		N
2.	Is this CPU 2 of a dual CPU system?	Y	N	
ACTIONS:				
1.	Go to table 6-100.			X
2.	At the CDT keyboard, enter parameters for executing out of CPU 1: Fill in the spaces below with run parameter A as directed in procedure A20. Type A, __ __ __ __ Press CARRIAGE RETURN Type GO Press CARRIAGE RETURN		1	
3.	At the CDT keyboard, enter parameters for executing out of CPU 2: Fill in the spaces below with run parameter A as directed in procedure A20. Type A, __ __ __ __ Press CARRIAGE RETURN Type GO Press CARRIAGE RETURN	1		
4.	Go to sheet 2 of this table.	2	2	

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT (Contd)

Sheet 2 of 7

ASSUMPTIONS:

Entry is made from sheet 1 of this table.

CONDITIONS:	1	2
1. Does the CDT display: SET MULTI-LEVEL INDIRECT SWITCH OFF (ESC J40 @ GO CR) PAGE 1 SUSPENDED SELF	Y	N
ACTIONS:		
1. At the CDT keyboard: Press ESC Type J40 @ GO Press CARRIAGE RETURN	1	
2. Go to sheet 3 of this table.	2	
3. Go to sheet 7 of this table.		X

		Sheet 3 of 7
ASSUMPTIONS: Entry is made from sheet 2 of this table.		
CONDITIONS:	1	2
1. After several seconds delay, does the CDT display: PAGE1 SECTION 0001 PAGE1 SECTION 0002 PAGE1 SECTION 0003 PAGE1 SECTION 0004 PAGE1 SECTION 0005 SET MULTI-LEVEL INDIRECT SWITCH ON (ESC J42 @ GO CR) PAGE1 SUSPENDED SELF	Y	N
ACTIONS:		
1. At the CDT keyboard: Press ESC Type J42 @ GO Press CARRIAGE RETURN	1	
2. Go to sheet 4 of this table.	2	
3. Go to sheet 7 of this table.		X

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT (Contd)

Sheet 4 of 7

ASSUMPTIONS:

Entry is made from sheet 3 of this table.

CONDITIONS:	1	2
Does the CDT display: SET MULTI-LEVEL INDIRECT SWITCH OFF (ESC J40 @ GO CR) PAGE1 SUSPENDED SELF	Y	N
ACTIONS:		
1. At the CDT keyboard: Press ESC Type J40 @ GO Press CARRIAGE RETURN	1	
2. Go to sheet 5 of this table.	2	
3. Go to sheet 7 of this table.		X

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT (Contd)

<table>
<tr><td colspan="3" align="right">Sheet 5 of 7</td></tr>
<tr><td colspan="3">ASSUMPTIONS:
Entry is made from sheet 4 of this table.</td></tr>
<tr><td>CONDITIONS:</td><td>1</td><td>2</td></tr>
<tr><td>Does the CDT display:
PAGE1 COMPLETED 0001 PASSES
SET MULTI-LEVEL INDIRECT SWITCH ON (ESC J42 @ GO CR)
PAGE1 SUSPENDED SELF</td><td>Y</td><td>N</td></tr>
<tr><td>ACTIONS:
1. At the CDT keyboard:
Press ESC
Type J42 @ GO
Press CARRIAGE RETURN</td><td>1</td><td></td></tr>
<tr><td>2. Go to sheet 6 of this table.</td><td>2</td><td></td></tr>
<tr><td>3. Go to sheet 7 of this table.</td><td></td><td>X</td></tr>
</table>

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT (Contd)

		Sheet 6 of 7
ASSUMPTIONS: Entry is made from sheet 5 of this table.		
CONDITIONS:	1	2
Does the CDT display: PAGE1 TERMINATED 0000 ERRORS	Y	N
ACTIONS:		
1. Go to table 6-11.	X	
2. Go to sheet 7 of this table.		X

TABLE 6-10. MOS MEMORY PAGING FILE TEST DDLT (Contd)

Sheet 7 of 7

ASSUMPTIONS:

Entry is made from sheet 2, 3, 4, 5, or 6 of this table. An error has occurred.

		1	2	3
CONDITIONS:				
Does the CDT display:				
1.	0301 or 0302	Y	N	
2.	0303, 0304, 0306, 0351, 0352, or 0353		Y	N
ACTIONS:				
1.	Return to sheet 1, action 2, of this table. Parameter A is incorrect.	1		
2.	Repeat the loadcheck test (table 6-3) and this test. Run parameters are incorrect.	2	1	1
3.	Replace memory interface, local slot V.			2
4.	Replace memory interface, local slot W.			3
5.	Replace transform, local slot R.			4
6.	Replace control 2, local slot N.			5
7.	Replace control 1, local slot P.			6
8.	Replace I/O-TTY, local slot K.			7
9.	Replace panel interface, local slot U.			8
10.	Replace SMI, local slot L.			9
11.	Replace ALU, local slot M.			10
12.	Call next level of support.	4	3	12
13.	Verify address and data cables that connect CPU 1 and CPU 2 are correct if a dual CPU System.	3	2	11

TABLE 6-11. DUAL CPU DDLT

Sheet 1 of 7

ASSUMPTIONS:

1. If this test is not to be run, go to next table.
2. MOS main memory test, memory protect test, and micro memory test run successfully in both CPUs.
3. Cassette drive for CPU 2 is empty.
4. CPU 1 is selected at the operators panel.

CONDITIONS:	1	2	3	4	5	6	7
1. Press MASTER CLEAR at operators panel. Press G at CDT. Does CDT display G?	Y	N					
2. Select CPU 2 at operators panel. Press G at CDT. Does CDT display G?	Y		N				
3. Select CPU 1 at operators panel. Press G at CDT. Does CDT display H000000X0?	Y			N			
4. Select CPU 2 at operators panel. Press G at CDT. Does CDT display H000000X0?	Y				N		
5. Press DEADSTART at operators panel. Does DEADSTART indicator remain on?	Y					N	
6. Select CPU 1 and press MASTER CLEAR at the operators panel. Select CPU 2 at the operators panel. Is the DEADSTART indicator off?	Y						N

ACTIONS:	1	2	3	4	5	6	7
1. Go to sheet 2 of this table.	X						
2. Replace I/O-TTY, slot K (CPU 1).		1		1			
3. Replace panel multiplexer board.				2	2		1
4. Replace I/O-TTY, slot K (CPU 1).			1		1		
5. Call next level of support.		2	2	3	3	X	2

ASSUMPTIONS:

1. CPU 1 is selected at operators panel and MASTER CLEAR button is pressed.

2. Level I tape is inserted into cassette drive for CPU 1.
   Cassette tape has rewound and READY indicator is on.

3. DEADSTART button is pressed.

4. After xxxxx? is displayed, the following is entered at the CDT keyboard (if xxxxx? is not displayed, go to table 6-100):

   DUCPU is typed in.
   CARRIAGE RETURN is pressed.

   NOTE: xxxxx = test name

5. Observe the CDT display for the following conditions.

CONDITIONS:	1	2
1. Does the CDT display: DUCPU EXECUTING DUCPU SUSPENDED BOT	Y	N
ACTIONS:		
1. Go to table 6-100.		X
2. At the CDT keyboard: Type A,30 carriage return C,1 carriage return 8,3 carriage return Type GO Press CARRIAGE RETURN	1	
3. Go to sheet 3 of this table.	2	

TABLE 6-11. DUAL CPU DDLT (Contd)

ASSUMPTIONS:

Entry is made from sheet 2 of this table.

CONDITIONS:	1	2
1. Does the CDT display: DUCPU SECTION 0001 DUCPU SECTION 0002 DUCPU SECTION 0003 DUCPU SECTION 0004 DUCPU SECTION 0005 DUCPU SECTION 0006 DUCPU SECTION 0007 DUCPU SECTION 0008 DUCPU SECTION 0009 SET PROTECT SWITCHES - PNL SEL - ESC - J28 @ - PNL SEL - J28 @ GO CR DUCPU SUSPENDED SELF	Y	N
ACTIONS:		
1. Select CPU 2.	1	
2. At the keyboard: Press ESC Type J28 @	2	
3. Select CPU 1.	3	
4. At the keyboard: Press ESC Type J28@GO Press RETURN	4	
5. Go to sheet 4 of this table.		5
6. Go to sheet 6 of this table.		X

TABLE 6-11. DUAL CPU DDLT (Contd)

		Sheet 4 of 7
ASSUMPTIONS: Entry is made from sheet 3 of this table.		
CONDITIONS:	1	2
Does the CDT display: RST PROTECT SWITCHES - PNL SEL - ESC - J20 @ - PNL SEL - J20 @ GO CR DUCPU SUSPENDED SELF	Y	N
ACTIONS:		
1. Select CPU 2.	1	
2. At the keyboard: Press ESC Type in J20 @	2	
3. Select CPU 1.	3	
4. At the keyboard: Press ESC Type J20@GO Press RETURN	4	
5. Go to sheet 5 of this table.	5	
6. Go to sheet 6 of this table.		X

TABLE 6-11. DUAL CPU DDLT (Contd)

Sheet 5 of 7

ASSUMPTIONS:

Entry is made from sheet 4 of this table.

CONDITIONS:	1	2
Does the CDT display: DUCPU COMPLETED 0001 PASSES DUCPU TERMINATED 0000 ERRORS	Y	N
ACTIONS:		
1. Go to next table.	X	
2. Repeat this test. Operator error is suspected.		1
3. Call next level of support.		2

TABLE 6-11. DUAL CPU DDLT (Contd)

Sheet 6 of 7

ASSUMPTIONS:

Entry is made from sheet 3 or 4 of this table. An error has occurred.

		1	2	3	4	5	6	7	8	9	10
CONDITIONS:											
Does the CDT display:											
1.	0D01	Y	N								
2.	0D02		Y	N							
3.	0D03			Y	N						
4.	0D04				Y	N					
5.	0D05					Y	N				
6.	0D06						Y	N			
7.	0D07							Y	N		
8.	0D08								Y	N	
9.	0D09									Y	N
ACTIONS:											
1.	Repeat this test from sheet 2. Wrong parameter.	1									
2.	Replace SMI, slot L, CPU 1.		1	1	1	2	2		2	1	
3.	Replace SMI, slot L, CPU 2.				2	1	1	1	1	2	
4.	Verify address and data cables that connect CPU 1 and CPU 2 are correct.	2	3	4	3	4	3	3	4	4	
5.	Verify CDT switch cables are correct.	3	2	3	4	5	4	4	3	3	
6.	Examine wire from L278 in CPU 1 to L294 in CPU 2 is correct. Verify that wire from L278 to L232 in CPU 2 is correct.	4	4	2	5	3	5	5	5	5	
7.	Examine interrupt cable from CPU 1 to CPU 2 for proper installation and operation.	5	5	5	6	6	6	2	6	6	
8.	Go to Sheet 7 of this table.										X
9.	Call next level of support.	6	6	6	7	7	7	6	7	7	

TABLE 6-11. DUAL CPU DDLT (Contd)

ASSUMPTIONS:

Entry is made from sheet 6 of this table. An error has occurred.

CONDITIONS: Does the CDT display:	1	2	3	4	5	6	7
1. 0D0A	Y	N					
2. 0D0B		Y	N				
3. 0D0C			Y	N			
4. 0D0D				Y	N		
5. 0D10, 0D11, 0D14, 0D15, or 0D16					Y	N	
6. 0D12, 0D13, 0D17, 0D18, or 0D19						Y	N
ACTIONS:							
1. Replace memory interface, CPU 1, slot V.	1	1	11	3	1	1	4
2. Replace memory interface, CPU 1, slot W.	2	2	12	4	2	2	5
3. Replace memory interface, CPU 2, slot V.	3	11	1	1	3	3	1
4. Replace memory interface, CPU 2, slot W.	4	12	2	2	4	4	2
5. Replace transform, CPU 1, slot R.	6	4					13
6. Replace control 1, CPU 1, slot P.	7	5					14
7. Replace control 2, CPU 1, slot N.	8	6					15
8. Replace ALU, CPU 1, slot M.	9	7					16
9. Replace SMI, CPU 1, slot L.	10	8					17
10. Replace I/O-TTY, CPU 1, slot K.	11	9					18
11. Replace 2K RAM, CPU 1, slot S.	12	10					19
12. Replace MOS array, CPU 1, slot X.	13	3	13	5			20
13. Replace MOS array, CPU 2, slot X.	5	13	3	13			3
14. Replace transform, CPU 2, slot R.			4	6			6
15. Replace control 1, CPU 2, slot P.			5	7			7

Continued on next page

TABLE 6-11. DUAL CPU DDLT (Contd)

Sheet 7 of 7 (Contd)							
ACTIONS (Continued):	1	2	3	4	5	6	7
16. Replace control 2, CPU 2, slot N.			6	8			8
17. Replace ALU, CPU 2, slot M.			7	9			9
18. Replace SMI, CPU 2, slot L.			8	10			10
19. Replace I/O-TTY CPU 2, slot K.			9	11			11
20. Replace 2K RAM CPU 2, slot S.			10	12			12
21. Replace cable at slot W, pin 77, CPU 2.					5		
22. Replace cable at slot W, pin 53, CPU 2.					6		
23. Replace cable at slot V, pin 240, CPU 2.					7		
24. Replace cable at slot W, pin 77, CPU 1.						5	
25. Replace cable at slot W, pin 53, CPU 1.						6	
26. Replace cable at slot V, pin 240, CPU 1.						7	
27. Call next level of support.	14	14	14	14	8	8	21

TABLE 6-12. MPMEM/CORE MEMORY DDLT

Sheet 1 of 5

ASSUMPTIONS:

1. If this test is not to be run, go to next table.
2. The name for this DDLT is MPMEM.
3. MPMEM may be started executing by:
   (a) Typing MPMEM carriage return is TTY has just typed out a test name (xxxxx) listed above MPMEM in table 6-1.
   (b) Type go carriage return is MPMEM has just been typed out.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Is MPMEM EXECUTING displayed?	Y	N	N									
2. Is RUN indicator illuminated? Is Bit 24 light FCR on Table 7A-2?		N	Y									
3. Is MPMEM SECTION 0002 displayed?	Y			N	N	N						
4. Are action codes displayed?				Y	N	N						
5. Is indicator illuminated? Is Bit 24 light FCR on Table 7A-2?					N	Y						
6. Is MPMEM SECTION 0003 displayed?	Y						N	N	N			
7. Are action codes displayed?							Y	N	N			
8. Is indicator illuminated? Is Bit 24 light FCR on Table 7A-2?								N	Y			
ACTIONS:												
1. Go to next page (sheet 2 of this table).	X											
2. Go to table 6-100.		X			X			X				
3. Go to sheet 3 of this table.				X			X					
4. Go to table 6-101.			X			X			X			

TABLE 6-12. MPMEM/CORE MEMORY DDLT (Contd)

ASSUMPTIONS:

Entry is made from sheet 1 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Is MPMEM SECTION 0004 displayed? (Run time is approximately one minute.)	Y	N	N	N								
2. Are action codes displayed?		Y	N	N								
3. Is indicator illuminated? Is Bit 24 light FCR on Table 7A-2?			N	Y								
4. Is MPMEM SECTION 0005 displayed?	Y				N	N	N					
5. Are action codes displayed?					Y	N	N					
6. Is indicator illuminated? Is Bit 24 light FCR on Table 7A-2?						N	Y					
7. Is MPMEM TERMINATED displayed?	Y							N	N	N		
8. Are action codes displayed?								Y	N	N		
9. Is indicator illuminated? Is Bit 24 light FCR on Table 7A-2?									N	Y		
10. Does machine have more than 32K?	Y										N	
ACTIONS:												
1. Go to table 6-13.											X	
2. Go to table 6-100.			X			X			X			
3. Go to sheet 3 of this table.		X			X			X				
4. Go to table 6-101.				X			X			X		
5. Swap untested memory boards into slots L, K, J, H, and repeat test sheet 1.	X											

TABLE 6-12. MPMEM/CORE MEMORY DDLT (Contd)

Sheet 3 of 5

ASSUMPTIONS:

1. A failure has been detected. The following analyzes and isolates the detected failure.
2. Observe CDT display for any of the following conditions:
3. A parameter entry is needed.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. 05E8 or 05E9	Y	Y	N	N	N	N	N	N				
2. Are there memory boards in micro processor slots X, Y, or Z?	N	Y										
3. 0540 or 05A0 or 0570			Y	N	N	N	N	N				
4. 0541 or 05A1 or 0571				Y	N	N	N	N				
5. 0542 or 05A2 or 0572					Y	N	N	N				
6. 0543 or 05A3 or 0573						Y	N	N				
7. 0578							Y	N				
8. Is this an expanded memory?	N		N	N	N	N	N	N	Y			
ACTIONS:												
1. Replace memory interface (slot V).	2		2	2	2	2	2					
2. Replace memory (slot W). (Power down micro processor.)	1		1									
3. Replace memory (slot X).				1								
4. Replace memory (slot Y).					1							
5. Replace memory (slot Z).						1						
6. Replace ALU (slot M).	3		3	3	3	3	3					
7. Go to table 6-101.	4		4	4	4	4	4	X				
8. Go to sheet 4 of this table.		X										
9. Enter at the keyboard: GO (cr).							1					
10. Go to sheet 5 of this table									1			

TABLE 6-12. MPMEM/CORE MEMORY DDLT (Contd)

Sheet 4 of 5

ASSUMPTIONS:

1. A parameter entry is required

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Is there a memory board in micro processor slot Y?	N	Y	Y									
2. Is there a memory board in micro processor slot Z?		N	Y									
ACTIONS:												
1. At the keyboard, enter the following: B, 3FFF (cr) E, 2 (cr) GO (cr) (16K)	1											
2. At the keyboard, enter the following: B, 5FFF (cr) E, 3 (cr) GO (cr) (24K)		1										
3. At the keyboard, enter the following: B, 7FFF (cr) E, 4 (cr) GO (cr) (32K)			1									
4. Return to sheet 1 of this table where the action code 05E8 or 05E9 first displayed.	2	2	2									

TABLE 6-12. MPMEM/CORE MEMORY DDLT (Contd)

Sheet 5 of 5

ASSUMPTION:

1. This is an expanded core memory
2. Entry made from sheet 3 of this table
3. Boards are located in the expanded memory side

CONDITION:	1	2	3	4	5	6	7	8
1. There are boards in slot R, P, N, M, L, K, J, H?	Y	N						
2. Do slots L, K, J, H, contain lower 32K core memory boards?	Y	N						
ACTIONS:								
1. Enter at keyboard B, 7FFF CR E, 4 CR GO CR	1							
2. Return to sheet 1 of this table where the action code or 05E8 or 05E9 was displayed.	2							
3. Check core configuration and restart table		X						
4. Replace board in slot H	3							
5. " " " " J	4							
6. " " " " K	5							
7. " " " " L	6							
8. " " " " M	7							
9. " " " " N	8							
10. " " " " P	9							
11. " " " " R	10							

TABLE 6-13. CASEC: CASSETTE ECHO TEST DDLT

ASSUMPTIONS:

1. If this test is not to be run, go to the next table.
2. If there are two cassette transports (Unit 0 and Unit 1) in the system, tests are performed first on Unit 0.
3. After XXXXX? is displayed, the following is entered at the keyboard (if XXXXX is not displayed, go to Table 6-100):
   CASEC is typed in
   CARRIAGE RETURN is pressed
   NOTE: XXXXX = test name
4. Observe the CDT display for one of the following conditions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11
1. Does the CDT display: CASEC EXECUTING READY SELECTED UNIT WITH WRITE ENABLED SCRATCH CASSETTE (UNLESS ONLY SECTION 2 CHOSEN) CASEC SUSPENDED SELF	Y	N									
2. Is the run inidictor illuminated Bit 24 of the FCR.		Y	N								
ACTIONS											
1. Install a write enabled scratch cassette in each unit per procedure C1. (If scratch cassette cannot be installed because takeup and supply reels keep turning with the lid on the transport lifted, replace the cassette transport, procedure C7. Permit tape to rewind until READY indicator on operator panel illuminates.	1										
2. Type GO Press CARRIAGE RETURN	2										
3. Go to sheet 2 of this table	3										
4. Repeat Loadcheck and restart test. Probably an operator error has occurred.		1									
5. Go to table 6-100.		2	X								

TABLE 6-13. CASEC: CASSETTE ECHO TEST (Contd)

Sheet 2 of 3

ASSUMPTIONS:

1. Entry is made from sheet 1 of this table

	1	2	3	4	5	6	7	8	9	10	11
CONDITIONS:											
1. Does the CDT Display:											
CASEC SECTION 1											
CASEC SECTION 2											
CASEC SECTION 3											
CASEC SECTION 4											
CASEC SECTION 5											
CASEC SECTION 6											
CASEC COMPLETED 0001 PASSES	Y			N							
CASEC SUSPENDED ENDP											
2. Is there another cassette transport in the system which has not yet been tested?	Y	N									
3. Does the customer suspect a cassette problem?		N			Y						
4. Is an action Code displayed?				Y	N						
ACTIONS:											
1. Press MASTER CLEAR Press RUN	1		2								
2. Type A,1 Press CARRIAGE RETURN	2										
3. Type GO Press CARRIAGE RETURN	3										
4. Unit 1 has now been selected, Restart this page.	4										
5. Remove scratch cassette(s)		1	1								
6. Repeat Loadcheck			3								
7. Go to next table			4								
8. Go to sheet 3 of this table				X							
9. Repeat Loadcheck and restart test. Probably an operator error has occurred.					1						
10. Call next level of support					2						
11. End level I test		2									

TABLE 6-13. CASEC: CASSETTE ECHO TEST DDLT (Cont)

Sheet 3 of 3

ASSUMPTIONS:

Entry is made from sheet 2 of this table.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11
Does the CDT display: 1. 0C10	Y	N									
2. 0C11		Y	N								
3. 0C20			Y	N							
4. 0C21				Y	N						
5. 0C30					Y	N					
6. 0C40						Y	N				
7. 0C41							Y	N			
8. 0C50								Y	N		
9. 0C80									Y	N	
10. 0C81										Y	N
ACTIONS:											
1. Replace cassette controller, Slot H	1	1	1	1	1	1	1	1	1	2	
2. Replace I/O TTY controller, Slot K	2	2	2	2	2	2	2	2	2	3	
3. Replace Control 1, Slot P	3	3	3	3	3	3	3	3	3	4	
4. Replace ALU, Slot M	4	4	4	4	4	4	4	4	4	5	
5. Replace SMI, Slot L	5	5	5	5	5	5	5	5	5	6	
6. Replace Control 2, Slot N	6	6	6	6	6	6	6	6	6	7	
7. Replace Transform, Slot R	7	7	7	7	7	7	7	7	7	8	
8. Replace cassette transport (Procedure C7)	8	8	8	8	8	8	8	8	8	9	
9. Repeat Loadcheck and restart test. Probably an operator error has occurred.										1	
10. Call next level of support	9	9	9	9	9	9	9	9	9	10	X

TABLE 6-100. LOADER FAULT DDLT

ASSUMPTIONS:

1. The following is typed in at the keyboard:

   ESC
   J116 KG

2. Observe TTY display for any of the following conditions. Where an x appears in the action code, the x may be 1, 3, 5 or 7.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the CDT display:												
1. KxEFE OR KxEFA or KxEFC	Y	N										
2. KxEF2 or KxEF4 or KxF0E or KxF0A		Y	N									
3. KxF0C or KxEF0 or KxF08 or KxF00 or KxF02 or KxF04 or KxF06			Y	N								
4. KxEF6				Y	N							
5. KxEF8					Y	N						
6. KxEFA						Y	N					
7. YEEE							Y	N				
8. YEEC								Y	N			
ACTIONS:												
1. Go to sheet 2 of this table.									X			
2. Use another cassette (same program), if available. Go to Table 6-3.	1											
3. Inspect cassette for obvious problems.	2											
4. Type in I @ TTY keyboard.	3											
5. Replace I/O-TTY (slot K).	4	1	1	2	1							
6. Replace cassette controller (slot H).	5	2	2	3	2							
7. Replace transform (slot R).		3	3									
8. Replace ALU (slot M).		4	4									
Replace memory (slot X).	6	5	5									
10. Replace memory (slot Y).	7	6	6									

TABLE 6-100. LOADER FAULT DDLT (CONTINUED)

Continued from sheet 1 of 2

ACTIONS (Continued):	1	2	3	4	5	6	7	8	9	10	11	12
Replace memory interface (slot V).	8	7	7									
Replace memory interface (slot W).	9	8	8									
Replace SMI (slot L).		9	9	4	3							
Go to Table 6-13	10			5	4							
Call the next level of support.	10	10	10									
Load cassette and make ready.				1								
This is a normal completion by the loader if the load device was not loaded and ready for input. If at this point it is desirable to level a diagnostic, load the load device, make ready, and press RUN.						X						
The end-of-library has been found and identified by two successive file marks found.							X					
There as not an end-of-file found at the end of program. Use another cassette.								X				

ASSUMPTIONS:

The following is typed in at the keyboard:

J146
KG

Observe CDT display for any of the following conditions.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
Does the CDT display:												
K0007	Y	N										
K0008		Y	N									
K0009			Y	N								
K000A or K000B				Y	N							
K000C					Y	N						
K000D						Y	N					
K000E or K000F							Y	N				
K0010								Y	N			
K0011									Y	N		
K0012 or K0013 or K0014										Y	N	
K0015 through K001C											Y	N
IONS:												
Call next level of support.												X
Use another deck or cassette {same program}, if available.				1	1					1		
Replace I/O-TTY {slot K}.	2					3	1	2	1	2	1	
Replace cassette controller {slot H}.						4	2	3	2	3	2	
Replace transform {slot R}.		3									3	
Replace ALU {slot M}.											4	
Replace memory {slot X}. {Power down micro processor.}		5	1								5	

TABLE 6-100. LOAD FAULT DDLT {CONTINUED}

Continued from sheet 2 of 2

ACTIONS {Continued}:	1	2	3	4	5	6	7	8	9	10	11	12
Replace memory {slot Y}. {Power down micro processor}.			2								6	
Replace memory interface {slot V}.		1	3								7	
Replace memory interface {slot W}.		2	4								8	
Replace SMI {slot L}.	1	4				5	3	4	3	4	9	
Make cassette ready.						1						
Check diagnostic cassette for obvious damage.						2						
Go to Table 6-13.						6	4	5	4	5		
Load cassette and make ready Type I a.								1				
Call next level of support.	3	6	5	2	2	8	5	6	5	6	10	

TABLE 6-101. VERIFICATION SEQUENCE DDLT

ASSUMPTIONS:

All system faults have been corrected.

CONDITIONS:	1	2	3	4	5	6	7	8	9	10	11	12
1. Is a verification to be run on the system?	Y	N										
ACTIONS:												
Go to Table 6-3 and begin verification run.	X											
2. Testing is complete. Call your boss.		X										

TAPE 12323182 (MST041)

DDLT's for CEL042, MST041, CPL040, CUP043, and TTYA08

Description:

The following DDLT's are to be used with the special CSD Utopia Formatted MSMP17 Diagnostics Tape Cassette. The DDLT's are intended for use by an operator or customer engineer who has little or no experience with MSMP17 diagnostics. Loading and operating instructions are included in the DDLT's, along with fault isolation.

The Utopia formatted MSMP17 Diagnostics Tape Cassette consists of seven bootstrap loading type files. The files are: 1) CEL042 Cyclic Encoder Diagnostic, 2) MST041 Multiplexer Subsystem Diagnostic, 3) CPL040 6000 Coupler Diagnostic, 4) CPL040 6000 Expansion Coupler Diagnostic, 5) CUP043 3000L Coupler Diagnostic, 6) TTYA08 CRT/TTY Console Diagnostic, and 7) Utopia.

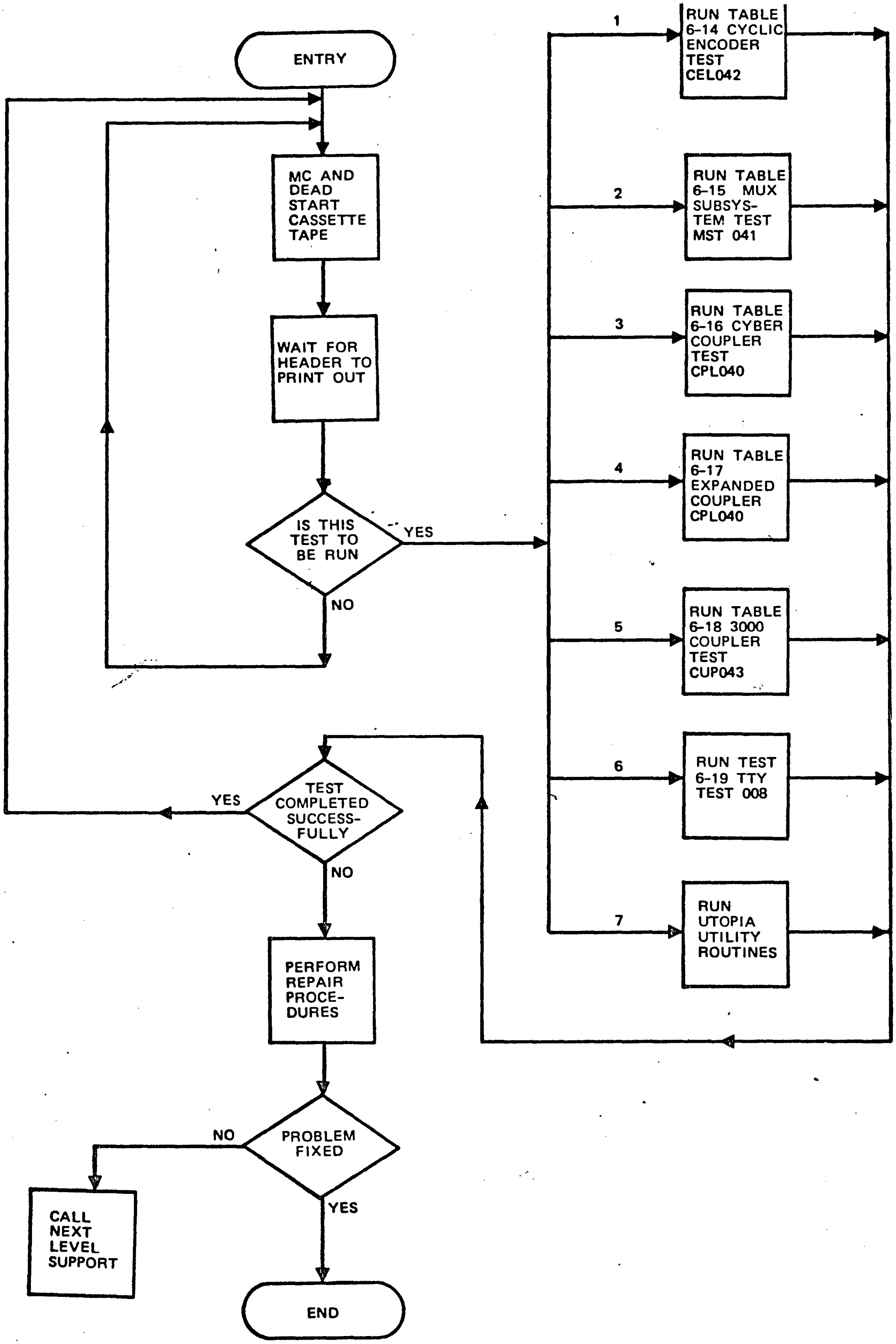


Figure 6-5. UTOPIA/MSMP Test Sequence

TABLE 6-14

DDLT FOR CEL042 CYCLIC ENCODER DIAGNOSTIC

Sheet 1 of 3

ASSUMPTIONS	1	2	3	4	5	6
1. The 255X System power is turned on.						
2. The Micro Memory page selection switches (located at position F-1 on the Micro Memory card in slot T) are set for pages 4-7 (switch #1 on; switches #0, #2, and #3 off). Fig. 4A-7						
3. The Maintenance Panel Local/Remote switch is set to remote.						
4. The Maintenance Panel Protect System switch is off (down).						
5. The operator is familiar with ODS DDLT format.						
6. The tape cassette transport must be connected.						
7. The tape cassette being used is the special UTOPIA formatted MEMP17 cassette.						
8. Switches on Cassette Controller Board are correct (Slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off). Section 4C						

TABLE 6-14 (Contd)

Sheet 2 of 3

CONDITIONS	1	2	3	4	5	6
1. Place cassette in Cassette Drive and wait for cassette to finish rewinding. Did cassette rewind and the Cassette Ready indicator turn on?	Y	N	-	-	-	-
2. Press Master Clear, then press Initiate. Did the "Dead Start Active" indicator turn on and then off?	Y	-	N	-	-	-
3. Wait approximately 25 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console test display the following two lines; "CYCLIC ENCODER TEST 42 IA = 0A00"?	Y	-	-	-	N	-
5. The CEL042 diagnostic is now running. The test will take approximately 30 seconds to complete. Wait 30 seconds. Did a printout occur?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 3 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	-	1	1	1	1
3. Check power supply voltages procedure A7, A9, A11	-	2	2	2	2	2
4. Replace cassette controller card (Slot H)	-	1	-	-	-	-
5. Call next level of support	-	3	3	3	3	3

TABLE 6-14 (Contd)

Sheet 3 of 3

CONDITIONS	1	2	3	4	5	6
1. Did the typeout start with "4234"?	Y	N	N	N		
2. Did the typeout start with "4258"?	-	Y	N	N		
3. Did the typeout start with "0028" or "0038"?	-	-	Y	N		
ACTIONS						
1. The CEL042 Diagnostic has finished successfully.	X	-	-	-		
2. An error has occurred, replace the Cyclic Encoder card (slot S).	-	1	-	-		
3. A monitor error has occurred, see the MSMP Diagnostic Reference Manual (96700000) for the significance of the entire message. Run the ODS Load Check and Mainframe diagnostics.	-	-	1	-		
4. Run the ODS Load Check and Mainframe diagnostics.	-	2	-	1		
5. Check power supply voltages procedures A7, A9, A11	-	3	2	2		
6. Call next level of support	-	4	3	3		

MSTON!

DDLT For Multiplex Subsystem (Off-Line Test)

ASSUMPTIONS	1	2	3	4	5	6

1. Mainframe power turned on. See Section 5D for Multiplex Subsystem Cards
2. Loop Mux assembly's power supply turned on.
3. All CLA's being tested have their enable switches turned on.
4. All CLA's not being tested have their enable switches turned off.
5. All Loop Multiplexers have their power switches turned on. #
6. All Loop Multiplexer cables to the Loop Mux Assemblies being tested are connected.
7. Any CLA.s that are to have their RS-232 Modem Drivers tested have their proper external test connector installed.

   2560-1 use 74715000 connector
   2561-1 use 74715600 connector
   2563-1 use 74870830 connector
8. All couplers ON/OFF Line switches are set to off-line. (The switch is located on the Cyber-Interface card; located at slot A on core memory machines, and slot B on MOS memory machines) On MOS machines with an expansion coupler, also look at slot AB.
9. The Maintenance Panel Local/Remote switch is set to remote.
10. The tape cassette transport is connected.
11. MLIA cards are plugged in (slots D, E, and F in core memory machines; slots E, F, and G in MOS memory machines).
12. The Maintenance Panel Protect System switch is off (down).
13. There must not be any duplicated CLA address numbers.
14. After each corrective action, the program must be reloaded before retesting.
15. Only try to correct the first error condition encountered, other errors may be caused as a result of the first error.
16. The tape cassette being used is the special UTOPIA formatted MSMP17 cassette.
17. Switches on Cassette Controller card are correct (Slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off). Section 4C

\# All Secondary Loop Multiplexer cards must be unplugged from the card cage.

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Place cassette in Cassette Drive, close cover and wait for cassette to finish rewinding. Did Cassette Rewind and the Cassette Ready light turn on?	Y	-	-	-	-	N
2. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off, and did the cassette start moving?	Y	-	-	-	N	-
3. Wait 25 seconds for cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console start to display the following: "CYCLIC ENCODER TEST 42"	Y	N	-	-	-	-
5. Press Master Clear, then Press Initiate. Did the Dead Start Active light turn on and off, and did the cassette start moving?	Y	N	-	-	-	-
ACTIONS						
1. Go to sheet 3 of this table.	X	-	-	-	-	-
2. Go run ODS Load Check and Cassette Tests.	-	1	1	1	1	-
3. Call next level of Support.	-	2	2	2	2	2
4. Replace Cassette Controller card (Slot H)	-	-	-	-	-	1
5. Check power supply voltages procedure A7, A9, A11	-	2	2	2	2	3

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6	7
1. Wait 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	Y	Y	Y	Y	Y	N
2. Did the console display the following lines: "MSTO41 MULTIPLEXER SUBSYSTEM TEST 41 031776 IA = 0A00, FC = 01"?	Y	Y	Y	Y	Y	N	-
3. Did the console display an additional message within five seconds?	Y	Y	Y	Y	N	-	-
4. Were the next two lines displayed on the console the following: "CLA PRODUCT ADDRESS NO." ?	Y	Y	Y	N	-	-	-
5. Were the next group of lines displayed on the console a list of the enabled CLA's addresses and Product Numbers?	Y	Y	N	-	-	-	-
6. Were the CLA's addresses and Product Numbers all as shown on the individual CLA handles with all CLA's with external test connectors printing "External Connector"; and were there no other information listed, no disabled CLA's listed, and no enabled CLA's missing from the list?	Y	N	-	-	-	-	-
ACTIONS							
1. Go to sheet 4 of this table	X	-	-	-	-	-	-
2. Go run ODS Load Check, Memory, and Cassette Tests.	-	-	-	-	-	1	1
3. Call next level support.	-	-	-	-	-	3	3
4. Go to sheet 22 of this table	-	-	-	-	X	-	-
5. Go to sheet 5 of this table	-	-	X	X	-	-	-
6. Go to sheet 12 of this table.	-	X	-	-	-	-	-
7. Check power supply voltages procedures A7, A9, All.	-	-	-	-	-	2	2

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Wait approximately 10 seconds for each Sync CLA and approximately 30 seconds for each Async CLA under test, or until another printout occurs (while testing is going on, the CLA under test will be flashing it's send and receive data indicators). Did another printout occur?	Y	Y	N			
2. Did the next console printout after the list of CLA addresses and Product Numbers start with "4134"?	Y	N	-			
ACTIONS						
1. This shows a successful completion of the MST041 test. The test can be run again by entering carriage return on the console, or the test parameters may be changed and the test run again (see the MSMP Diagnostic Reference Manual 96700000 for directions).	X	-	-			
2. Go to sheet 5 of this table.	-	X	-			
3. Replace MLIA card #1 (slot D in core memory machines, slot E in MOS machines).	-	-	1			
4. Replace MLIA card #2 (slot E in core memory machines, slot F in MOS machines).	-	-	2			
5. Replace MLIA card #3 (slot F in core memory machines, slot G in MOS machines).	-	-	3			
6. Run ODS Load Check and Mainframe diagnostics.	-	-	4			
7. Call next level of support.	-	-	6			
8. Check power supply voltages procedure A7, A9, A11	-	-	5			

TABLE 2

DDLT FOR MULTIPLEX SUBSYSTEM (OFF-LINE TEST)

CONDITION	1	2	3	4	5	6
Were the first four characters of the console printout 0028 or 0038?	Y	N	N	N	N	N
Were the first four characters of the console printout 4168?	-	Y	N	N	N	N
Was the first part of the console printout "EXCESSIVE ODD INTERRUPTS"?	-	-	Y	N	N	N
Was the first part of the console printout "EXCESSIVE L F INTERRUPTS"?	-	-	-	Y	N	N
Was the first part of the console printout "UNEXPECTED INTERRUPT"?	-	-	-	-	Y	N
ACTIONS						
1. This shows a monitor error, see the MSMP Diagnostic Reference Manual (96700000) for the significance of the entire message. Run the ODS Load Check test and any other appropriate test.	1	-	-	-	-	-
2. This shows the Multiplexer Subsystem Test has detected a hardware error. <u>Go to sheet 18</u> for more details on the error.	-	X	-	-	-	-
3. <u>Go to sheet 15</u> of this table	-	-	X	-	-	-
4. <u>Go to sheet 16</u> of this table	-	-	-	X	-	-
5. <u>Go to sheet 17</u> of this table	-	-	-	-	X	-
6. <u>Go to sheet 6</u> of this table	-	-	-	-	-	X
7. Call next level of Support	3	-	-	-	-	-
8. Check power supplies voltages procedures A1, A9, A11	2	-	-	-	-	-

DDLT For Multiplex Subsystem (Off-Line Test)

Excessive MLIA Error Interrupts

CONDITIONS	1	2	3	4	5	6
1. Was the first part of the console printout "EXCESSIVE MLIA ERROR INTERRUPTS DETECTED - -"?	Y	Y	N			
2. Was the next two numbers of the console printout "00", or "01", or "02"?	Y	N	-			
ACTIONS						
1. Check the power indicator on the MLIA cards (slots D, E, and F in core memory machines, and slots E, F, and G in MOS memory machines) lower edges.	1	-	-			
2. Replace MLIA card #1 (slot D in core memory machines, slot E in MOS machines).	2	-				
3. Replace MLIA card #2 (slot E in core memory machines, slot F in MOS machines).	3	-				
4. Replace MLIA card #3 (slot F in core memory machines, slot G in MOS machines).	4	-				
5. Run ODS Load Check and Mainframe diagnostics.	5	-				
6. Call next level of Support.	7	-				
7. Go to sheet 7 of this table.	-	X	-			
8. Check power supply voltages procedures A7, A9, A11	6	-	-			
9. Go to sheet 23 of this table.	-	-	X			

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Are all the Primary Loop Multiplexer Clock and Data indicators lit (input and output loops)?	Y	N	N			
2. Does one of the Primary Loop Multiplexers have all it's indicators off?	-	Y	N			
ACTIONS						
1. The last two characters of the first line of the Excessive MLIA Error message are the address of the CLA being tested. Replace that CLA.	1	-	-			
2. Replace the Loop Multiplexer of the Loop Mux Cage that the CLA resides in. (If the CLA Address = 00, replace each of the Loop multiplexers one at a time).	2	-	-			
3. Replace MLIA card #1 (slot D in core memory machines, slot E in MOS machines).	3	-	-			
4. Replace MLIA card #2 (slot E in core machines, slot F in MOS machines).	4	-	-			
5. Replace MLIA card #3 (slot F in core machines, slot G in MOS machines).	5	-	-			
6. Check +5, +12, and -12 voltages at Loop Multiplexer Cage procedures A7, A9, A11	6	3	-			
7. Run ODS Load Check and Mainframe diagnostics.	7	-	-			
8. Call next level of Support	8	4	-			
9. Check that the Loop Mux power switch is on for the Primary Loop Multiplexer that has no indicators lit.	-	1	-			
10. Replace the Loop Multiplexer card.	-	2	-			
11. Go to sheet 8 of this table	-	-	X			

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Find the Loop Multiplexer whose bottom cable goes directly to the MLIA. Are only the two Output Loop indicators lit?	Y	N	N	N		
2. Follow the top cable on the Loop Multiplexer to the next Loop Multiplexer. Are only the two Output Loop indicators lit?	-	Y	N	N		
3. Repeat the above step until you find a Loop Multiplexer with only the two Cutput Loop indicators lit or you get back to the MLIA. Did you find a Loop Multiplexer with only the two Output Loop indicators lit?	-	-	Y	N		
ACTIONS						
1. Replace the top cable or the Loop Multiplexer	1	1	1	-		
2. Replace the Loop Multiplexer	2	2	2	-		
3. Follow the top cable on the Loop Multiplexer to the next Loop Multiplexer and replace it, if the cable goes to the MLIA, replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	3	3	3	-		
4. Go to sheet 9 of this table	-	-	-	X		
5. Call next level of Support	5	5	5	-		
6. Check power supply voltages procedures A7, A9, A11	4	4	4	-		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Find the Loop Multiplexer whose top cable goes directly to the MLIA. Are only the two Input Loop indicators lit?	Y	N	N	N		
2. Follow the bottom cable on the Loop Multiplexer to the next Loop Multiplexer. Are only the two Input Loop indicators lit?	-	Y	N	N		
3. Repeat the above step until you find a Loop Multiplexer with only the two Input Loop indicators lite or you get back to the MLIA. Did you find a Loop Multiplexer with only the two Input Loop indicators lit?	-	-	Y	N		
ACTIONS						
1. Replace the bottom cable on the Loop Multiplexer.	1	1	1	-		
2. Replace the Loop Multiplexer.	2	2	2	-		
3. Follow the bottom cable on the Loop Multiplexer to the next Loop Multiplexer and replace it, or if the cable goes to the MLIA, replace MLIA card #2 (slot E in core memory machines and slot F in MOS memory machines).	3	3	3	-		
4. Go to sheet 10 of this table	-	-	-	X		
5. Call next level of Support.	5	5	5	-		
6. Check power supply voltages procedures A7, A9, A11	4	4	4	-		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Find the Loop Multiplexer whose bottom cable goes directly to the MLIA. Is only one of the Input Loop indicators off?	Y	N	N	N		
2. Follow the top cable on the Loop Multiplexer to the next Loop Multiplexer. Is only one of the Input Loop indicators off?	-	Y	N	N		
3. Repeat the above step until you find a Loop Multiplexer with only one of the Input Loop indicators off or you get back to the MLIA. Did you find a Loop Multiplexer with only one of the Input Loop indicators off?	-	-	Y	N		
ACTIONS						
1. Replace the top cable on the Loop Multiplexer	1	1	1	-		
2. Replace the Loop Multiplexer.	2	2	2	-		
3. Follow the top cable on the Loop Multiplexer to the next Loop Multiplexer and replace it, or if the cable goes to the MLIA, replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	3	3	3	-		
4. Go to sheet 11 of this table	-	-	-	X		
5. Call next level of Support.	5	5	5	-		
6. Check power supply voltages procedures A7, A9, A11	4	4	4	-		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Find the Loop Multiplexer whose top cable goes directly to the MLIA. Is only one of the Output Loop indicators lit?	Y	N	N	N		
2. Follow the bottom cable on the Loop Multiplexer to the next Loop Multiplexer. Is only one of the Output Loop indicators lit?	-	Y	N	N		
3. Repeat the above step until you find a Loop Multiplexer with only one of the Input Loop indicators lit or you get back to the MLIA. Did you find a Loop Multiplexer.	-	-	Y	N		

ACTIONS	1	2	3	4	5	6
1. Replace the bottom cable on the Loop Multiplexer.	1	1	1	-		
2. Replace the Loop Multiplexer.	2	2	2	-		
3. Follow the bottom cable on the Loop Multiplexer to the next Loop Multiplexer and replace it, or if the cable goes to the MLIA, replace MLIA card #2 (slot E in core memory machines and slot F in MOS memory machines).	3	3	3	-		
4. You have misinterpreted one of the directions, go back to sheet 7 and try again.	-	-	-	1		
5. Call next level of Support.	5	5	5	3		
6. Check power supply voltages procedures A7, A9, A11	4	4	4	2		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

Sheet 12 of 23

CONDITIONS	1	2	3	4	5	6
1. Was there an "UNEXPECTED INTERRUPT" message(s) among the CLA Addresses and Product Numbers printed out?	Y	Y	Y	N		
2. Look at the fifth group of numbers in the "UNEXPECTED INTERRUPT" message. The group of numbers is the CLA address. Is this CLA listed among the CLA address and Product Numbers printed out?	Y	Y	N	-		
3. Are there two CLA's set to this address?	Y	N	-	-		
ACTIONS						
1. Change one of the duplicated CLA Addresses to an unused address.	X	-	-	-		
2. Replace the CLA whose address was in the "UNEXPECTED INTERRUPT" message.	-	X	-	-		
3. If there is an enabled CLA whose address was not among the CLA Addresses and Product Numbers printed out, replace that CLA.	-	-	1	-		
4. If there is a disabled CLA whose address was in the "UNEXPECTED INTERRUPT" message, replace that CLA.	-	-	2	-		
5. Replace the Primary Loop Multiplexer card of the Loop Mux Cage containing the CLA of the address in question.	-	-	3	-		
6. Go to sheet 13 of this table	-	-	-	X		
7. Call next level of Support.	-	-	5	-		
8. Check power supply voltage procedures A7, A9, A11.	-	-	4	-		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

Sheet 13 of 23

CONDITIONS	1	2	3	4	5	6
1. Were there any CLAs with external test connectors that did not print out "EXTERNAL CONNECTOR" following the product number print out?	Y	N				
ACTIONS						
1. Check to see that the proper external test connector was used on the CLA as follows: Product No. — Connector Part Number 2560-1 — 74715000 2561-1 — 74715600 2563-1 — 74870830	1	-				
2. Check the + and -12 volt supply voltages on the Loop Multiplexer card cage. Procedure A9	2	-				
3. Replace the CLA that had the right external test connector but did not print it out.	3	-				
4. Go to sheet 14 of this table	-	X				
5. Call next level of Support.	5	-				
6. Check power supply voltage procedures A7, A8, A11	4	-				

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Were there any enabled CLA's missing from the print out of CLA Addresses and Product Numbers?	Y	N	N	N	N	
2. Were there any disabled CLA's that showed up in the printout of CLA Addresses and Product Numbers?	-	Y	N	N	N	
3. Were there any of the following error messages after one or more of the CLA Addresses: NO ODD RECEIVED, WRONG ODD ADDRESS RECEIVED, MORE THAN ONE ODD RECEIVED, BAD STATUS RECEIVED, WRONG STATUS ADDRESS RECEIVED, NO STATUS RECEIVED, BAD LINE FRAME RECEIVED, ERROR IN SECOND COMMAND SET RESPONSES, or NO SQD STATUS RECEIVED?	-	-	Y	N	N	
4. Were there any CLA listed under the wrong Product Number or under UNKNOWN?	-	-	-	Y	N	
ACTIONS						
1. Replace the enabled CLA whose address was missing from the printout.	1	-	-	-	-	
2. Replace the Loop Multiplexer which resides in the Loop Mux cage containing the missing CLA Address.	2	-	-	-	-	
3. Replace the disabled CLA whose address showed up in the CLA Addresses and Product Numbers.	-	X	-	-	-	
4. Replace the CLA whose addresses appears just before the error printout.	-	-	X	-	-	
5. Replace the CLA whose addresses appears just before the bad Product Number printout.	-	-	-	X	-	
6. Call next level of Support	4	-	-	-	-	
7. Check power supply voltages procedures A7, A9, A11	3	-	-	-	-	
8. Go to sheet 5 of this table	-	-	-	-	X	

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

(Excessive Odd Interrupts)

CONDITIONS	1	2	3	4	5	6
1. Has the following message printed out before the excessive ODD interrupts message: "CLA PRODUCT ADDRESS NO" ?	Y	Y	N			
2. Look at the group of four numbers following the "EXCESSIVE ODD INTERRUPTS" printout. This is a CLA Address. Is there a CLA plugged into the system with this address?	Y	N	-			
ACTIONS						
1. Replace the CLA	1	-	-			
2. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in.	2	-	-			
3. Bypass Loop Multiplexer card cages one at a time by disconnecting the Loop Multiplexer cables and connecting the two cables together (or by disabling at the CLA's in the card cage), and retry the test until the "EXCESSIVE ODD INTERRUPTS" printout disappears. The last Loop Multiplexer bypassed has the bad CLA in it. Reconnect the Loop Multiplexer.	-	1	-			
4. Disable CLA's one by one in the bad Loop Multiplexer card cage and retry the test until the "EXCESSIVE ODD INTERRUPTS" printout disappears. Replace the last CLA you disabled.	-	2	-			
5. Unplug CLA's from the backplane one by one in the bad Loop Multiplexer card cage and retry the test until the "EXCESSIVE ODD INTERRUPTS" printout disappears. Replace the last CLA you unplugged.	-	3	-			
6. Replace MLIA card #1 (slot D in core memory machines, and slot E in MOS memory machines).	3	4	1			
7. Replace MLIA card #2 (slot E in core memory machines, and slot F in MOS memory machines).	4	5	2			
8. Replace MLIA card #3 (slot F in core memory machines, and slot G in MOS memory machines).	5	6	3			
9. Call next level of Support.	7	7	4			
10. Check power supply voltages procedures A7, A9, A11	6					

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

(Excessive L F Interrupts)

CONDITIONS	1	2	3	4	5	6
1. Look at the group of four numbers following the "EXCESSIVE L F INTERRUPTS" printout. If the numbers are 0EXX or 0FXX, the XX is a CLA Address. If the numbers are not 0EXX or 0FXX, look at the numbers in the next "EXCESSIVE L F INTERRUPTS" message. Is there a CLA plugged into the system with this address?	Y	N				
ACTIONS						
1. Replace the CLA.	1	-				
2. Replace the Loop Multiplexer of the Loop Multiplexer card cage that CLA resides in.	2	-				
3. Bypass the Loop Multiplexer card cages one at a time by disconnecting the Loop Multiplexer cables and connecting the two cables together (or by disabling all the CLA's in the card cage), and retry the test until the "EXCESSIVE L F INTERRUPTS" printout disappears. The last Loop Multiplexer bypassed has the bad CLA in it. Reconnect the Loop Multiplexer.	-	1				
4. Disable CLA's one by one in the bad Loop Multiplexer card cage and retry the test until the "EXCESSIVE L F INTERRUPTS" printout disappears. Replace the last CLA you disabled.	-	2				
5. Check the +5 and +12 volt supplies voltages at the card cage. Procedures A7, A9.	-	3				
6. Unplug CLA's from the backplane one by one in the bad Loop Multiplexer cage and retry the test until the "EXCESSIVE L F INTERRUPTS" printout disappears. Replace the last CLA you unplugged.	-	4				
7. Replace MLIA card #1 (slot D in core memory machines, and slot E in MOS memory machines).	3	5				
8. Replace MLIA card #2 (slot E in core memory machines, and slot F in MOS memory machines).	4	6				
9. Replace MLIA card #3 (slot F in core memory machines, and slot G in MOS memory machines).	5	7				
10. Call next level Support.	6	8				

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

(Unexpected Interrupts)

CONDITIONS	1	2	3	4	5	6
1. Has the following message printed out before the unexpected interrupts message: "CLA PRODUCT ADDRESS NO" ?	Y	Y	N			
2. Look at the group of fourth group of numbers following the "UNEXPECTED INTERRUPTS" printout. This is a CLA Address. Is there a CLA plugged into the system with this address?	Y	N	-			
ACTIONS						
1. Replace the CLA.	1	-	-			
2. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in.	2	-	-			
3. Bypass Loop Multiplexer card cages one at a time by disconnecting the Loop Multiplexer cables and connecting the two cables together (or by disabling at the CLA's in the card cage), and retry the test until the "UNEXPECTED INTERRUPTS" printout disappears. The last Loop Multiplexer bypassed has the bad CLA in it. Reconnect the Loop Multiplexer.	-	1	-			
4. Disable CLA's one by one in the bad Loop Multiplexer card cage and retry the test until the "UNEXPECTED INTERRUPTS" printout disappears. Replace the last CLA you disabled.	-	2	-			
5. Unplug CLA's from the backplane one by one in the bad Loop Multiplexer card cage and retry the test until the "UNEXPECTED INTERRUPTS" printout disappears. Replace the last CLA you unplugged.	-	3	-			
6. Replace MLIA card #1 (slot D in core memory machines, and slot E in MOS memory machines).	3	4	1			
7. Replace MLIA card #2 (slot E in core memory machines, and slot F in MOS memory machines).	4	5	2			
8. Replace MLIA card #3 (slot F in core memory machines, and slot G in MOS memory machines).	5	6	3			
9. Run ODS Load Check and Mainframe diagnostics.	6	7	4			
10. Call next level of Support-	8	9	6			
11. Check power supply voltages procedures A7, A9, A11	7	8	5			

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

Sheet 18 of 23

CONDITIONS	1	2	3	4	5	6
Is the first part of the message -- 4168 xxxx xzzz where zzz = 001?	Y	N	N	N	N	
Is the first part of the message -- 4168 xxxx xzzz where zzz = 002?	-	Y	N	N	N	
Is the first part of the message -- 4168 xxxx xzzz where zzz = 003?	-	-	Y	N	N	
Is the first half of the message -- 4168xxxx xzzz xxxx xxxx yyyy where zzz = 403 or 703 or 803?	-	-	-	Y	N	
ACTIONS						
1. Replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	3	3	2	-	-	
2. Replace MLIA card #2 (slot E in core memory machines and slot F in MOS memory machines).	2	2	1	-	-	
3. Replace MLIA card #3 (slot F in core memory machines and slot G in MOS memory machines).	1	1	3	-	-	
4. yyyy is equal to the address of the CLA being tested. Replace this CLA.	-	-	-	1	-	
5. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in.	-	-	-	2	-	
6. Go to sheet 19 of this table	-	-	-	-	X	
7. Call next level of Support	5	5	5	4	-	
8. Check power supply voltages procedures A7, A9, A11	4	4	4	3	-	

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
Is the first part of the message -- 4168 xxxx xzzz where zzz = 104?	Y	N	N	N	N	
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 404, or 704, or 804?	-	Y	N	N	N	
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 305, or 505, or 605, or 905, or B05?	-	-	Y	N	N	
Is the first half of the message -- 4168 xxxx xzzz xxxx yyyy where zzz = 306, or 606, or B06?	-	-	-	Y	N	

ACTIONS	1	2	3	4	5	6
1. Replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	1	-	-	-	-	
2. Replace MLIA card #2 (slot E in core memory machines and slot F in MOS memory machines).	2	-	-	-	-	
3. Replace MLIA card #3 (slot F in core memory machines and slot G in MOS memory machines).	3	-	-	-	-	
4. yyyy is equal to the address of the CLA under test. Replace this CLA.	-	1	1	1	-	
5. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in.	-	2	2	2	-	
6. Go to sheet 20 of this table	-	-	-	-	X	
7. Call next level of Support	5	4	4	4	-	
8. Check power supply voltages procedures A7, A9, A11.	4	3	3	3	-	

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
Is the first part of the message -- 4168 xxxx xzzz where zzz = 107 or 207?	Y	N	N	N	N	N
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 407, or 507, or 707, or 807, or 907?	-	Y	N	N	N	N
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 508, or 908?	-	-	Y	N	N	N
Is the first part of the message -- 4168 xxxx xzzz where zzz = 109?	-	-	-	Y	N	N
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 309, or 409, or 509, or 609, or 709, or 809, or 909?	-	-	-	-	Y	N
ACTIONS						
1. Replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	1	-	-	1	-	-
2. Replace MLIA card #2 (slot E in core memory machines and slot F in MOS memory machines).	2	-	-	2	-	-
3. Replace MLIA card #3 (slot F in core memory machines and slot G in MOS memory machines).	3	-	-	3	-	-
4. yyyy is equal to the address of the CLA under test. Replace this CLA.	-	1	1	-	1	-
5. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in	-	2	2	-	2	-
6. Go to sheet 21 of this table	-	-	-	-	-	X
7. Call next level of Support.	5	4	4	5	4	-
8. Check power supply voltages procedures A7, A9, A11	4	3	3	4	3	-

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
Is the first part of the message -- 4168 xxxx xzzz where zzz - 20B? 20B?	Y	N	N	N		
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 40B, or 70B?	-	Y	N	N		
Is the first half of the message -- 4168 xxxx xzzz xxxx xxxx yyyy where zzz = 90C?	-	-	Y	N		
ACTIONS						
1. Replace MLIA card #1 (slot D in core memory machines and slot E in MOS memory machines).	3	3	-	-		
2. Replace MLIA card #2 (slot E in core memory machines and slot G in MOS memory machines).	1	1	-	-		
3. Replace MLIA card #3 (slot F in core memory machines and slot G in MOS memory machines).	2	2	-	-		
4. yyyy is equal to the address of the CLA under test. Replace the CLA.	-	4	1	-		
5. Replace the Loop Multiplexer of the Loop Multiplexer card cage that the CLA resides in.	-	5	2	-		
6. This is an illegal error message. Run the ODS Quick Look, Memory and Instruction Test.	-	-	-	1		
7. Call next level of Support	5	7	4	3		
8. Check power supply voltages procedures A7, A9, A11	4	6	3	2		

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test)

CONDITIONS	1	2	3	4	5	6
1. Does the 2550 have core memory?	Y	N				
ACTIONS						
1. Replace MLIA card #1 (slot D).	1	-				
2. Replace MLIA card #2 (slot E).	2	-				
3. Replace MLIA card #3 (slot F).	3	-				
4. Call for next level of Support	5	3				
5. Run ODS off-line mainframe diagnostics.	-	1				
6. Check power supply voltages procedures A7, A9, All	4	2				

Table 6-15

DDLT For Multiplex Subsystem (Off-Line Test) Sheet 23 of 23

CONDITIONS	1	2	3	4	5	6
1. Was the first part of the console printout "4134"?	Y	Y	N			
2. Was there a Loop Multiplexer card cage connected with one or more CLA's plugged into the cage and enabled?	Y	N	-			
ACTIONS						
1. Replace the primary loop multiplexer card	1	-	-			
2. Replace MLIA card #1 (slot D in core memory machines, slot E in MOS machines).	2	-	1			
3. Replace MLIA card #2 (slot E in core memory machines, slot F in MOS machines).	3	-	2			
4. Replace MLIA card #3 (slot F in core memory machines. slot G in MOS machines).	4	-	3			
5. Run ODS Load check and Mainframe diagnostics.	5	-	4			
6. Call next level of Suppport.	7	-	5			
7. Connect a Loop Multiplexer card cage with one or more CLA's plugged into the cage and enabled.	-	X	-			
8. Check power supply voltages procedures A7, A9, A11	6	-	-			

Table 6-16

DDLT For CPL040 6000 Coupler Diagnostic

Sheet 1 of 6

ASSUMPTIONS	1	2	3	4	5	6
1. All the 255X power supplies are turned on. 2. All three of the 6000 Coupler cards are plugged in (in MOS memory machines, slots B, C, and D; and in core memory machines, slots A, B, and C). 3. The Maintenance Panel Local/Remote switch is set to Remote. 4. The Maintenance Panel Protect System switch is off (down). 5. The tape cassette transport is connected. 6. The operator is familiar with ODS DDLT format. 7. The Coupler Cyber card On-Line/Off-Line switch is off (down). The card is located at slot B in MOS memory machines, and slot A in core memory machines. 8. Only try to correct the first error condition encountered, other errors may be caused as a result of the first error. 9. The tape cassette being used is the special UTOPIA formatted MSMP17 cassette. 10. Switches on Cassette Controller card are correct (slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off).						

Table 6-16

DDLT For CPL040 6000 Coupler Diagnostics

Sheet 2 of 6

CONDITIONS	1	2	3	4	5	6
1. Place cassette in Cassette Drive and wait for cassette to finish rewinding. Did the Cassette Rewind and the Cassette Ready light turn on?	Y	N	-	-	-	-
2. Press Master Clear, then Press Initiate. Did the Dead Start Active light turn on and off?	Y	-	N	-	-	-
3. Wait approximately 25 seconds for the Cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console start to display the following: "CYCLIC ENCODER TEST 42 IA = 0A00"?	Y	-	-	-	N	-
5. Press Master Clear, then press Initiate. Did the dead start active light turn on and off and did the cassette start moving?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 3 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	-	1	1	1	1
3. Call next level of Support.	-	3	3	3	3	3
4. Replace Cassette Controller card (slot H)	-	1	-	-	-	-
5. Check power supply voltages procedures A7, A9, A11	-	2	2	2	2	2

Table 6-16

DDLT For CPL040 6000 Coupler Diagnostic

Sheet 3 of 6

CONDITIONS	1	2	3	4	5	6
1. Wait approximately 45 seconds for cassette to stop moving. Did the cassette stop?	Y	N	-	-	-	-
2. Did the console start to display the following: "MST041 MULTIPLEXER SUBSYSTEM TEST 41 031776 IA = 0A00, FC = 0?	Y	-	N	-	-	-
3. Press Master Clear, then press Initiate. Did the Deat Start Active indicator turn on and off and did the cassette start moving?	Y	-	-	N	-	-
4. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	-	N	-
5. Did the console display the following: "DK106A COUPLER TEST 40 052675 IA = 0A00, FC = 01 "?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 4 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	1	1	1	1	1
3. Call next level of Support	-	3	3	3	3	3
4. Check power supply voltages procedures A7, A9, All	-	2	2	2	2	2

Table 6-16

DDLT for CPL040 6000 Coupler Diagnostics

CONDITIONS	1	2	3	4	5	6
1. The Coupler test is now running. The diagnostic takes approximately 15 minutes to complete running. Wait 15 minutes or until a printout occurs. Did a printout occur?	Y	N	-			
2. Did the above console display begin with "4034"?	Y	-	N			

ACTIONS	1	2	3	4	5	6
1. This indicates a successful end of test.	X	-	-			
2. Go to sheet 5 of this table	-	-	X			
3. Replace the Coupler DMA card (slot D on MOS memory machines, and slot C on core memory machines).	-	1	-			
4. Replace the Coupler IO card (slot C for MOS and slot C for MOS and slot B for core).	-	2	-			
5. Run ODS Load Check and Mainframe diagnostics.	-	3	-			
6. Call next level of Support.	-	5	-			
7. Check power supply voltages procedures A7, A9, A11	-	4	-			

Table 6-16

DDLT for CPL040 6000 Coupler Diagnostics

CONDITIONS	1	2	3	4	5	6
1. Did the console display start with "0028 or 0038"?	Y	N	N			
2. Did the console display start with "40x8"? (where x = 5, 6, or 7)	-	Y	N			
ACTIONS						
1. A monitor error has occurred, see the MSMP Diagnostic Reference Manual (96700000) for the significance of the entire message. Run the ODS Load Check and Mainframe diagnostics.	1	-	-			
2. Call next level of Support.	3	-	5			
3. Go to sheet 6 of this table. (A coupler error has been detected)	-	X	-			
4. Replace the coupler DMA card (slot D on MOS memory machines and slot C on core memory machines).	-	-	1			
5. Replace the Coupler IO card (slot C for MOS and slot B for core).	-	-	2			
6. Run ODS Load Check and Mainframe Diagnostics.	-	-	3			
7. Check power supply voltages procedures A7, A9, A11	2	-	4			

Table 6-16

DDLT For CPL040 6000 Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Look at the first three words of the print out ("40x8 xxxx xxyy", where the x's are to be ignored). The last two digits of the third word (yy) are the error code. Is the error code equal to "01" or "02" or "04" or "09" or "10" or "12" thru "15" or "23" or "24" or "30" thru "33" or "35" thru "40" or "42" thru "44" or "57" or "60" thru "63"?	Y	N	N			
2. Is the error code equal to "03" or "16" or "18" thru "22" ?	-	Y	N			
ACTIONS						
1. Replace the coupler DMA card (slot D on MOS memory machines and slot C on core memory machines).	1	2	1			
2. Replace the coupler IO card (slot C on MOS memory machines and slot B on core memory machines).	2	1	2			
3. Run ODS Load Check and Mainframe Diagnostics.	3	3	3			
4. Check power supply voltages procedures A7, A9, All	4	4	4			
5. Call next level of Support.	5	5	5			

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

ASSUMPTIONS	1	2	3	4	5	6
1. All the 255X power supplies are turned on. 2. The Coupler DMA card is plugged into slot A and the coupler IO card is plugged into slot AA. 3. The Maintenance Panel Local/Remote Switch is set to Remote. 4. The Maintenance Panel Protect System switch is off (down). 5. The tape cassette transport is connected. 6. The operator is familiar with ODS DDLT format. 7. The Coupler Cyber card is unplugged (slot AB). 8. Only try to correct the first error condition encountered, other errors may be caused as a result of the first error. 9. The tape cassette being used is the special UTOPIA formatted MSMP17 cassette. 10. Switches on Cassette Controller card are correct (slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off).						

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Place cassette in cassette drive and wait for cassette to finish rewinding. Did the cassette rewind and the Cassette Ready light turn on?	Y	N	-	-	-	-
2. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off?	Y	-	N	-	-	-
3. Wait approximately 25 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console start to display the following: "CYCLIC ENCODER TEST 42 IA = 0A00"?	Y	-	-	-	N	-
5. Press Master Clear, then press Initiate. Did the dead start active light turn on and off and did the cassette start moving?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 3 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	-	1	1	1	1
3. Call next level of Support.	-	3	3	3	3	3
4. Replace Cassette Controller card (slot H)	-	1	-	-	-	-
5. Check power supply voltages procedures A7, A9, All	-	2	2	2	2	2

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Wait approximately 45 seconds for Cassette to stop moving. Did the cassette stop?	Y	N	-	-	-	-
2. Did the console start to display the following: "MST041 MULTIPLEXER SUBSYSTEM TEST 41 031776 IA = 0A00, FC = 01?	Y	-	N	-	-	-
3. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	-	-	N	-	-
4. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	-	N	-
5. Did the console start to display the following: "DK106A COUPLER TEST 40 052675 IA = 0A00, FC = 01" ?	Y	-	-	-	-	N
ACTIONS						
1. Go to 4 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	1	1	1	1	1
3. Call next level of Support.	-	3	3	3	3	3
4. Check power supply voltages procedures A7, A9, All A7, A9, All	-	2	2	2	2	2

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console display the following: "DK106A EXPANED TEST 40 052675 IA = 0A00, FC = 01"?	Y	-	-	N	-	-
ACTIONS						
1. Go to sheet 5 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	1	1	1	-	-
3. Call next level of Support.	-	3	3	3	-	-
4. Check power supply voltages procedures A7, A9, A11	-	2	2	2	-	-

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. The Coupler test is now running. The diagnostic takes approximately 15 minutes to complete running. Wait 15 minutes or until a printout occurs. Did a printout occur?	Y	N	-	-	-	-
2. Did the above console display begin with "4034"?	Y	-	N	-	-	-
ACTIONS						
1. This indicates a successful end of test.	X	-	-	-	-	-
2. Go to sheet 6 of this table	-	-	X	-	-	-
3. Replace the Coupler DMA card (slot A on MOS memory machines).	-	1	-	-	-	-
4. Replace the Coupler IO card (slot AA for MOS).	-	2	-	-	-	-
5. Run ODS Load Check and Mainframe diagnostics	-	3	-	-	-	-
6. Call next level of Support	-	5	-	-	-	-
7. Check power supply voltages procedures A7, A9, A11	-	4	-	-	-	-

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

Sheet 6 of 7

CONDITIONS	1	2	3	4	5	6
1. Did the console display start with "0028 or 0038"?	Y	N	N	-	-	-
2. Did the console display start with "40x8"? (where x = 5, 6, or 7)	-	Y	N	-	-	-
ACTIONS						
1. A monitor error has occurred, see the MSMP Diagnostic Reference Manual (96700000) for the significance of the entire message. Run the ODS Load Check and Mainframe diagnostics.	1	-	-	-	-	-
2. Call next level of Support	3	-	5	-	-	-
3. Go to sheet 7. (a coupler error has been detected.)	-	X	-	-	-	-
4. Replace the coupler DMA card (slot A on MOS memory machines).	-	-	1	-	-	-
5. Replace the Coupler IO card (slot AA for MOS machines).	-	-	2	-	-	-
6. Run ODS Load Check and Mainframe Diagnostics.	-	-	3	-	-	-
7. Check power supply voltages procedures A7, A9, A11	2	-	4	-	-	-

Table 6-17

DDLT for CPL040 6000 Expansion (secondary) Coupler Diagnostic

Sheet 7 of 7

CONDITIONS	1	2	3	4	5	6
1. Look at the first three words of the print out ("40x8 xxxx xxyy" where the x's are to be ignored). The last two digits of the third word (yy) are the error code. Is the error code equal to "01" or "02" or "04" or "09" or "10" or "12" thru "15" or "23" or "24" or "30" thru "33" or "35" thru "40" or "42" thru "44" or "57" or "60" thru "63"?	Y	N	N	-	-	-
Is the error code equal to "03" or "16" or "18" thru "22"?	-	Y	N	-	-	-
ACTIONS						
1. Replace the Coupler DMA card (slot A on MOS memory machines).	1	2	1	-	-	-
2. Replace the Coupler IO card (slot AA on MOS memory machines).	2	1	2	-	-	-
3. Run ODS Load Check and Mainframe Diagnostics.	3	3	3	-	-	-
4. Call next level of Support	5	5	5	-	-	-
5. Check power supply voltages procedures A7, A9, All	4	4	4	-	-	-

Table 6-18

DDLT for CUP043 3000L Coupler Diagnostic

ASSUMPTIONS	1	2	3	4	5	6
1. All the 255x power supplies are turned on. 2. The Coupler DMA card is plugged into slot D, and the Coupler IO card is plugged into slot C, and the Coupler 3000L Channel Interface card is plugged into slot E. 3. The Maintenance Panel Local/Remote Switch is set to Remote. 4. The Maintenance Panel Protect System switch is off (down). 5. The tape cassette transport is connected. 6. The operator is familiar with ODS DDLT format. 7. The Coupler Cyber card On-Line/Off-Line switch is off (down). The card is located at slot B. 8. Only try to correct the first error condition encountered, other errors may be caused as a result of the first error. 9. The tape cassette being used is the special UTOPIA formatted MSMP17 cassette. 10. Switches on Cassette Controller card are correct (slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off).						

Table 6-18

DDLT for CUP043 3000LCoupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Place cassette in cassette drive and wait for cassette to finish rewinding. Did the cassette rewind and the Cassette Ready light turn on?	Y	N	-	-	-	-
2. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off?	Y	-	N	-	-	-
3. Wait approximately 25 seconds for the Cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console start to display the following: "CYCLIC ENCODER TEST 42 IA = 0A00" ?	Y	-	-	-	N	-
5. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off and did the cassette start moving?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 3 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	-	1	1	1	1
3. Call next level of Support.	-	3	3	3	3	3
4. Replace Cassette Controller card (slot H)	-	1	-	-	-	-
5. Check power supply voltages procedure A7, A9, A11	-	2	2	2	2	2

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Wait approximately 45 seconds for cassette to stop moving. Did the cassette stop?	Y	N	-	-	-	-
2. Did the console start to display the following: "MST041 MULTIPLEXER SUBSYSTEM TEST 41 031776 IA = 0A00, FC = 01?	Y	-	N	-	-	-
3. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	-	-	N	-	-
4. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	-	N	-
5. Did the console start to display the following: "DK106A COUPLER TEST 40 052675 IA = 0A00, FC = 01"?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 4 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	1	1	1	1	1
3. Call next level of Support	-	3	3	3	3	3
4. Check power supply voltages procedures A7, A9, A11	-	2	2	2	2	2

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console start to display the following: "DK106A EXPANED TEST 40 052675 IA = 0A00, FC = 01"?	Y	-	-	N	-	-
ACTIONS						
1. Go to sheet 5 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	1	1	1	-	-
3. Call next level of Support.	-	3	3	3	-	-
4. Check power supply voltages procedures A7, A9, A11	-	2	2	2	-	-

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console display the following: "3000L COUPLER TEST 43 IA = 0A00, FC = 01"?	Y	-	-	N	-	-

ACTIONS	1	2	3	4	5	6
1. Go to sheet 6 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	1	1	1	-	-
3. Call next level of Support.	-	3	3	3	-	-
4. Check power supply voltages procedures A7, A9, A11	-	2	2	2	-	-

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

CONDITIONS	1	2	3	4	5	6
1. The Coupler test is now running. The diagnostic takes approximately 15 minutes to complete running. Wait 15 minutes or until a printout occurs. Did a printout occur?	Y	N	-	-	-	-
2. Did the above console display begin with "4034"?	Y	-	N	-	-	-
ACTIONS						
1. This indicates a successful end of test.	X	-	-	-	-	-
2. Go to sheet 7 of this table	-	-	X	-	-	-
3. Replace the Coupler DMA card (slot D on MOS memory machines).	-	1	-	-	-	-
4. Replace the Coupler IO card (slot C for MOS).	-	2	-	-	-	-
5. Replace the 3000L Channel Interface card (slot B)	-	3	-	-	-	-
6. Run ODS Load Check and Mainframe diagnostics.	-	4	-	-	-	-
7. Call next level of Support	-	6	-	-	-	-
8. Check power supply voltages procedure A7, A9, A11	-	5	-	-	-	-

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

Sheet 7 of 8

CONDITIONS	1	2	3	4	5	6
1. Did the console display start with "0028 or 0038"?	Y	N	N	-	-	-
2. Did the console display start with "40x8"? (where x = 5, 6, or 7)	-	Y	N	-	-	-
ACTIONS						
1. A monitor error has occurred, see the MSMP Diagnostic Reference Manual (96700000) for the significance of the entire message. Run the ODS Load Check and Mainframe diagnostics.	1	-	-	-	-	-
2. Call next level of Support	3	-	4	-	-	-
3. Go to sheet 8 of this table (A coupler error has been detected).	-	X	-	-	-	-
4. Replace the Coupler DMA card (slot D on MOS memory machines).	-	-	1	-	-	-
5. Replace the Coupler IO card (slot C for MOS machines).	-	-	2	-	-	-
6. Replace the 3000L Channel Interface card (slot B)	-	-	3	-	-	-
7. Run ODS Load Check and Mainframe diagnostics.	-	-	4	-	-	-
8. Check power supply voltages procedure A7, A9, A11	2	-	5	-	-	-

Table 6-18

DDLT for CUP043 3000 Coupler Diagnostic

Sheet 8 of 8

CONDITIONS	1	2	3	4	5	6
1. Look at the first three words of the print out ("40x8 xxxx xxyy", where the x's are to be ignored). The last two digits of the third word (yy) are the error code. Is the error code equal to "01" or "02" or "04" or "09" or "10" or "12" thru "15" or "23" or "24" or "30" thru "33" or "35" thru "40" or "42" thru "44" or "57" or "60" thru "63"?	Y	N	N	-	-	-
Is the error code equal to "03" or "16" or "18" thru "22"?	-	Y	N	-	-	-
ACTIONS						
1. Replace the Coupler DMA card (slot D on MOS memory machines).	1	2	1	-	-	-
2. Replace the Coupler IO card (slot C on MOS memory machines).	2	1	2	-	-	-
3. Run ODS Load Check and Mainframe diagnostics	3	3	3	-	-	-
4. Replace the 3000L Channel Interface card (slot B)	4	4	4	-	-	-
5. Call next level of Support.	6	6	6	-	-	-
6. Check power supply voltages procedure A7, A9, A11	5	5	5	-	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

ASSUMPTIONS	1	2	3	4	5	6
1. All the 255X power supplies are turned on.						
2. All Coupler(s) ON/OFF Line Switches are set to Off-Line. (The switch is located on the Cyber Interface card; located in slot A on core memory machines, and slot B on MOS memory machines. On MOS machines with an expansion coupler, also look at slot AB)						
3. The Maintenance Panel Local/Remote switch is set to Remote.						
4. The tape cassette transport is connected.						
5. The Maintenance Panel Protect System is off (down).						
6. The CRT/TTY Console's power cord is plugged in.						
7. The CRT/TTY Console's power is turned on and is switched to the On-Line position.						
8. The I/O TTY card (slot K) is plugged in and the baud rate is set to the same baud rate as the console. The baud rate switches are located at L-10 position of the I/O TTY card. The 300 baud position is with switch #3 on and switches #1, #2 and #4 off. The 110 baud position is with switches #3 and #4 on and switches #1 and #2 off. The 1200 baud position is with switch #4 on and switches #1, #2 and #3 off. The 9600 baud position is with switches #1, #2, #3 and #4 off.						
9. The Console cable is connected to the bottom half of the top backplane connector on slot K.						
10. The operator is familiar with ODS DDLT format.						
11. The tape cassette being used is the special UTOPIA formatted MSMP17 cassette.						
12. Switches on Cassette Controller card are correct (slot H). (Switches at SW1 have switch #1 on and switches #2, #3, and #4 off; while switches at SW2 have switches #1 and #2 on, and switches #3 and #4 off).						

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Place Cassette in Cassette drive and wait for cassette to finish rewinding. Did the Cassette rewind and the Cassette Ready light turn on?	Y	N	-	-	-	-
2. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off?	Y	-	N	-	-	-
3. Wait approximately 25 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	N	-	-
4. Did the console start to display the following: "CYCLIC ENCODER TEST 42 IA = 0A00"?	Y	-	-	-	N	-
5. Press Master Clear, then press Initiate. Did the Dead Start Active light turn on and off and did the cassette start moving?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 3 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	-	1	1	1	1
3. Call next level of Support	-	3	3	3	3	3
4. Replace Cassette Controller Card (slot H).	-	-	-	-	-	-
5. Check power supply voltages procedure A7, A9, A11	-	2	2	2	2	2

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Wait approximately 45 seconds for Cassette to stop moving. Did the cassette stop?	Y	N	-	-	-	-
2. Did the console start to display the following: "MST041 MULTIPLEXER SUBSYSTEM TEST 41 031776 IA - 0A00, FC - 01?	Y	-	N	-	-	-
3. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	-	-	N	-	-
4. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	-	-	N	-
5. Did the console start to display the following: "DK106A COUPLER TEST 40 052675 IA = 0A00, FC = 01"?	Y	-	-	-	-	N
ACTIONS						
1. Go to sheet 4 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	1	1	1	1	1
3. Call next level of Support	-	3	3	3	3	3
4. Check power supply voltages procedures	-	2	2	2	2	2

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console start to display the following: "DK106A COUPLER TEST 40 052675 IA = 0A00, FC = 01"?	Y	-	-	N	-	-
ACTIONS						
1. Go to sheet 5 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics.	-	1	1	1	-	-
3. Call next level of Support	-	3	3	3	-	-
4. Check power supply voltages procedures . . A7, A9, A11	-	2	2	2	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

Sheet 5 of 11

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 45 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console start to display the following: "3000L COUPLER TEST 43 IA = 0A00, FC = 01"?	Y	-	-	N	-	-
ACTIONS						
1. Go to sheet 6 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	1	1	1	-	-
3. Call next level of Support	-	3	3	3	-	-
4. Check power supply voltages procedures. A7, A9, All	-	2	2	2	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Press Master Clear, then press Initiate. Did the Dead Start Active indicator turn on and off and did the cassette start moving?	Y	N	-	-	-	-
2. Wait approximately 15 seconds for the cassette to stop moving. Did the cassette stop?	Y	-	N	-	-	-
3. Did the console display the following: "TTYA08 CRT/TTY INTERFACE TEST 103174 IA = 0A00, FC = 01"?	Y	-	-	N	-	-
4. Was the message displayed correctly?	Y	-	-	-	N	-
ACTIONS						
1. Go to sheet 7 of this table	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostics	-	1	1	1	-	-
3. Call next level of Tech Support	-	2	2	2	-	-
4. Go to sheet 11 of this table	-	-	-	-	X	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Was there another printout within 5 seconds?	Y	N	-	-	-	-
2. Was the printout the following: "STATUS CHECK"?	Y	-	N	-	-	-
3. Was there another printout?	Y	-	-	N	-	-
4. Did the printout start with the following: "AQ TYPE IN RANDOM DATA"?	Y	-	-	-	N	-
ACTIONS						
1. Go to sheet 8 of this table	X	-	-	-	-	-
2. Go to sheet 10 of this table	-	-	X	-	X	-
3. Run ODS Load Check and Mainframe diagnostics.	-	1	-	1	-	-
4. Call next level of Support.	-	3	-	3	-	-
5. Check power supply voltages procedures A7, A9, All	-	2	-	2	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Type in up to 200 random characters on the console (if less than 200 characters, terminate with a Control-Bell). Did the characters display on the console as you entered them?	Y	N	-	-	-	-
2. Where the characters displayed the same as the characters you entered at the console?	Y	-	N	-	-	-
3. After terminating the input, did the characters you entered display again?	Y	-	-	N	-	-
4. Where the characters displayed the same as the characters you entered at the console?	Y	-	-	-	N	-

ACTIONS	1	2	3	4	5	6
1. Go to sheet 9 of this table	X	-	-	-	-	-
2. Go to sheet 11 of this table	-	-	X	-	X	-
3. Run ODS Load Check and Mainframe diagnostics.	-	1	-	1	-	-
4. Call next level of Support	-	3	-	3	-	-
5. Check power supply voltages procedures A7, A9, A11	-	2	-	2	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Did another message display?	Y	N	-	-	-	-
2. Did the message start with "0824"?	Y	-	N	-	-	-
ACTIONS						
1. This shows a successful completion of the TTYA08 test. The test can be run again by entering carriage return on the console, or the test parameters may be changed and the test run again (see the MSMP Diagnostic Reference Manual (96700000) for directions).	X	-	-	-	-	-
2. Run ODS Load Check and Mainframe diagnostic.	-	1	-	-	-	-
3. Call next level of Support	-	3	-	-	-	-
4. Go to sheet 10 of this table	-	-	X	-	-	-
5. Check power supply voltages procedure A7, A9, All	-	2	-	-	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Did the message start with "0838"?	Y	N	-	-	-	-
2. Was the next word of the message "00yy" or "06yy" where yy = "01" thru "03" or "07" thru "13" or "15" thru "18" or "20" or "21" or "26" thru "28"?	Y	-	N	-	-	-
ACTIONS						
1. Replace the I/O TTY card in slot K.	1	2	2	-	-	-
2. Replace the console cable (going to slot K).	3	3	3	-	-	-
3. Replace the console terminal.	4	4	4	-	-	-
4. Run ODS Load Check and Mainframe diagnostics.	2	1	1	-	-	-
5. Call next level of Support	6	6	6	-	-	-
6. Check power supply voltages procedure A7, A9, A11	5	5	5	-	-	-

Table 6-19

DDLT For CRT/TTY Console (Off-Line Diagnostic)

CONDITIONS	1	2	3	4	5	6
1. Place Console Terminal in the local mode (off-line). Enter random characters on the console. Did the characters display on the console at the time they were entered?	Y	N	-	-	-	-
2. Were the characters the same as the characters entered at the console?	Y	-	N	-	-	-
ACTIONS						
1. Place the console terminal back to the on-line mode and replace the IO/TTY card in slot K.	1	-	-	-	-	-
2. Replace the console cable (going to slot K)	2	-	-	-	-	-
3. Run ODS Load Check and Mainframe diagnostics	3	-	-	-	-	-
4. Replace the console terminal	4	1	1	-	-	-
5. Call next level of Support	6	-	-	-	-	-
6. Check power supply voltages procedure A7, A9, A11	5	-	-	-	-	-

APPENDIX A

TAPE CASSETTE FORMAT

The UTOPIA formatted MSMP17 Diagnostics Tape Cassette consists of seven bootstrap loading type files. The files are: (1) CEL042 Cyclic Encoder Diagnostic; (2) MST041 Multiplexer Subsystem Diagnostic; (3) CPL040 6000 Coupler Diagnostic; (4) CPL040 6000 Expansion Coupler Diagnostic; (5) CPU043 3000L Coupler Diagnostic; (6) TTYA08 CRT/TTY Console Diagnostic; and (7) UTOPIA.

Each of the first six files contain three records. The first record is a dead start bootstrap record which is made using the UTOPIA Cassette Bootstrap Generator. The Bootstrap record loads into memory starting at location $7000, loads the next record into memory starting at location $0000, and starts execution of the program at location $0A00. The second record contains the desired diagnostic program with the MPMP17 monitor built into it. The third record contains an end of file mark.

The seventh file contains a bootstrap record that loads into memory starting at location $6F00, a record containing UTOPIA that starts loading and execution into at location $7000, and a record with an end of file mark.

APPENDIX B

TAPE CASSETTE COPY ROUTINE

NOTE: This copy tape cassette requires 65K of memory

1. Load in the UTOPIA on the seventh file of the UTOPIA formatted MSMP17 tape cassette.

2. Execute the following UTOPIA command:

   MBC,7000,7150,D000/ (Move UTOPIA to high core D000)

   The console will output carriage return, line feed, bell when the UTOPIA command is completed.

3. Enter the following at the console:

   ESP H: (Halt the 2550)

   The console should respond with the following:

   H71200841

4. Enter the following at the console:

   KD000: (Set P-Register to D000)

   The console should respond with the following:

   KD000

5. Enter the following at the console:

   I@ (Set console to I/O Mode and start the 2550)

   The console should respond with carriage return, line feed, bell. You are now in UTOPIA which is executing at $D000 in memory.

6. Place the Master Tape Cassette (the one being copied) into the tape cassette drive, close the lid and wait for the cassette to finish rewinding. Be sure the write enable tabs have been removed.

7. Enter the following UTOPIA command:

ARC,0,1/	(Advance cassette 1 record)

NOTE: The console will respond with carriage return, line feed, bell at the completion of each UTOPIA command. Wait for completion before entering the next command. Some commands may take one or two minutes to complete.

8. Enter the following commands:

RTC,0,0,1FB0/	(read in CEL042 Test)
ARC,0,2/	(Advance 2 records)
RTC,0,2000,5D08?	(Read in MST041 Test)
ARC,0,2/	(Advance 2 records)
RTC,0,6000,9716/	(Read in 6000 Coupler test)
GSB,0,0A00,7000,7120,0800/	(Generate a Bootstrap Load location)

NOTE: The GSB command will respond with the following before the completion of the command:

D933 D9B2 DAA2

9. Remove the master tape cassette and place the new tape cassette (the cassette you wish to write the information on) in the cassette drive, close the lid, and wait for the cassette to finish rewinding. Be sure the cassette has the write enable tabs set.

10. Enter the following UTOPIA commands:

WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,0,1FB0/	(Write CEL042 Test)
EFC,0,1/	(Write File Mark)
WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,2000,5D08/	(Write MST041 Test)
EFC,0,1/	(Write File Mark)
WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,6000,9716/	(Write 6000 Coupler Test)
EFC,0,1/	(Write File Mark)

11. Remove the new tape cassette and place the Master Tape Cassette in the cassette drive, close the lid and wait for the cassette to finish rewinding.

12. Enter the following UTOPIA commands:

AFC,0,3/	(Advance 3 files)
ARC,0,1/	(Advance 1 record)
RTC,0,0,3716/	(read in 6000 Expansion Coupler Test)
ARC,0,2/	(Advance 2 records)
RTC,0,4000,73C9/	(Read in 3000L Coupler Test)
ARC,0,2/	(Advance 2 records)
RTC,0,8000,90BF/	(Read in CRT/TTY Test)

13. Remove the Master Tape Cassette and place the new tape cassette in the cassette drive, close the lid and wait for the cassette to finish rewinding.

14. Enter the following UTOPIA commands:

AFC,0,3/	(Advance 3 Files)
WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,0,3716/	(Write 6000 Expansion Coupler Test)
EFC,0,1/	(Write File Mark)
WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,4000,73C9/	(Write 3000L Coupler Test)
EFC,0,1/	(Write File Mark)
WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,8000,90BF/	(Write CRT/TTY Test)
EFC,0,1/	(Write File Mark)

GSB,7000,7000,6F00,7120,0800/

NOTE: The GSB command will respond with the following before the completion of the command:

D933 D9B2 DAA2

15. Enter the following commands:

WTC,0,D9B2,DAA2/	(Write Bootstrap)
WTC,0,D00,DF50/	(Write UTOPIA)
EFC,0,1/	(Write File Mark)

16. Remove the new cassette from the cassette drive and remove the write tabs.

APPENDIX C

PARAMETER CHANGES AND PATCHES TO MSMP17 DIAGNOSTICS

1. After each diagnostic was built in memory with the MSMP17 monitor, the Master Stop/Jump word (location B2) was changed to 0240 and the Local Stop/Jump word (location AA) was changed to 024C.

2. The Cyclic Encoder diagnostic (CEL042) had no further changes.

3. The Multiplexer Subsystem diagnostic (MST041) had no further changes.

4. The 6000 Coupler Diagnostic (CPL040) has the following patch for clearing the program protect bits:

Memory Address	Contents
0A00	1808
0A08	1400
	3707
3707	0C00
	0700
	0814
	9000
	3706
	0103
	0D01
	1400
	3708
	1400
	0A11

5. The 6000 Expansion Coupler Diagnostic (CPL040) has the Equipment Address of the Coupler parameter (stop 3A) changed to address C_{16}. The following patches for clearing the program protect bits and for changing the header print out have also been made:

Memory Location	Contents	Memory Location	Contents
0A00	1808		0103
0A08	1400		0D01
	3707		1400
3707	0C00		3708
	0700		1400
	0814		0A11
	9000	1EF7	2045
	3706		5850
			414E
			4544

6. The 3000L Coupler Diagnostic (CUP043) has the following patch for clearing the program protect bits:

Memory Location	Contents
0A00	1808
0A08	1400
	33B9
33B9	0C00
	0700
	0814
	9000
	33B8
	0103
	0D01
	1400
	33BA
	1400
	0A11

7. The CRT/TTY Console Diagnostic (TTYA08) has had its section parameter changed to a 0041 (select sections 0 and 6). The following patches were made so the test header will be displayed without needing a stop to enter parameters and so a TTY would have time to do a carriage return before printing the next character.

Memory Location	Contents
0A00	1808
0A08	1400
	1088
0EEB	0D0A

8. The UTOPIA program was copied from the DEBUG section of the MST041 diagnostic.

PROCEDURES

Perform the following procedures 6A, 6B and 6C.

SECTION 6A

PROCESSOR, CABINET AND OPERATORS PANEL

INDEX

PROCEDURE

PROCEDURE A-1

VISUAL INSPECTION

Step

1. Open the cabinet front doors.
   Remove the processor plenum cover {front panel} by releasing the two captive fasteners.

2. Check that the logic board identifications {labeled at front of PC Board edge} agree with the PC Board placement, Figure 4A-1.

3. Check that all logic boards in the processor chassis are properly seated in their connectors by applying a firm thumb pressure at the upper and lower corners of each logic board.

4. Check that all peripheral interconnect cables are correctly and fully connected to the processor backplane pins at their respective controller locations.

5. Check that power supply fuses and circuit breakers are ON and not blown.

6. Check power supply fans by momentarily turning on power {Reference Procedures A-3 and A-4}.

7. Check that the processor cooling fans are operational per Procedure A-5.

PROCEDURE A-2

CLEANING FAN FILTER

Step

1. Open the front door.

2. Refer to Figure 6A-2 for location and remove filter from the chassis. Use a vacuum cleaner to clean front and back surfaces of the filter.

3. Check that filter has been properly cleaned by holding filter up to a light. No obvious dark areas should be seen. If it cannot be adequately cleaned - replace filter.

4. Restore filter in its housing.

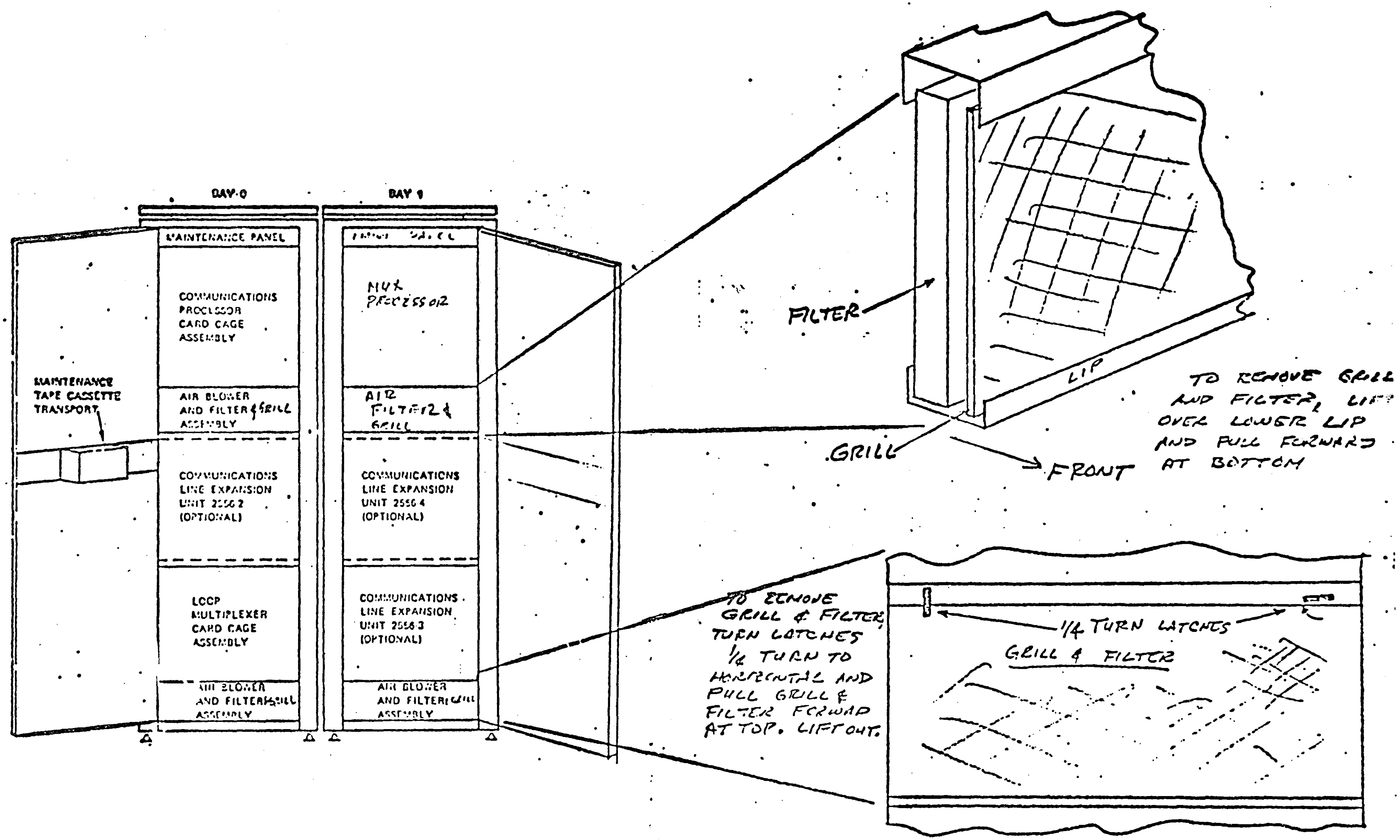


Figure 6A-2. Filter Assemblies

PROCEDURE A-3

POWER TURN-ON

Step

To turn the power ON (Figure 6A-3) perform the following:

1. Check that the AC power cord from the processor cabinet power distribution box is connected to the site power outlet.

2. Open the rear door of Bay 0.

3. If the micro processor is being turned on for the first time, refer to procedures A-7, A-9 and A-11 to verify that the voltages are within tolerance.

4. Set the main power circuit breakers to the ON position. All cooling fans will begin to operate if power is present. If there is no indication of power to the fans, refer to Procedures A-7, A-9, and A-11 to check the power supplies.

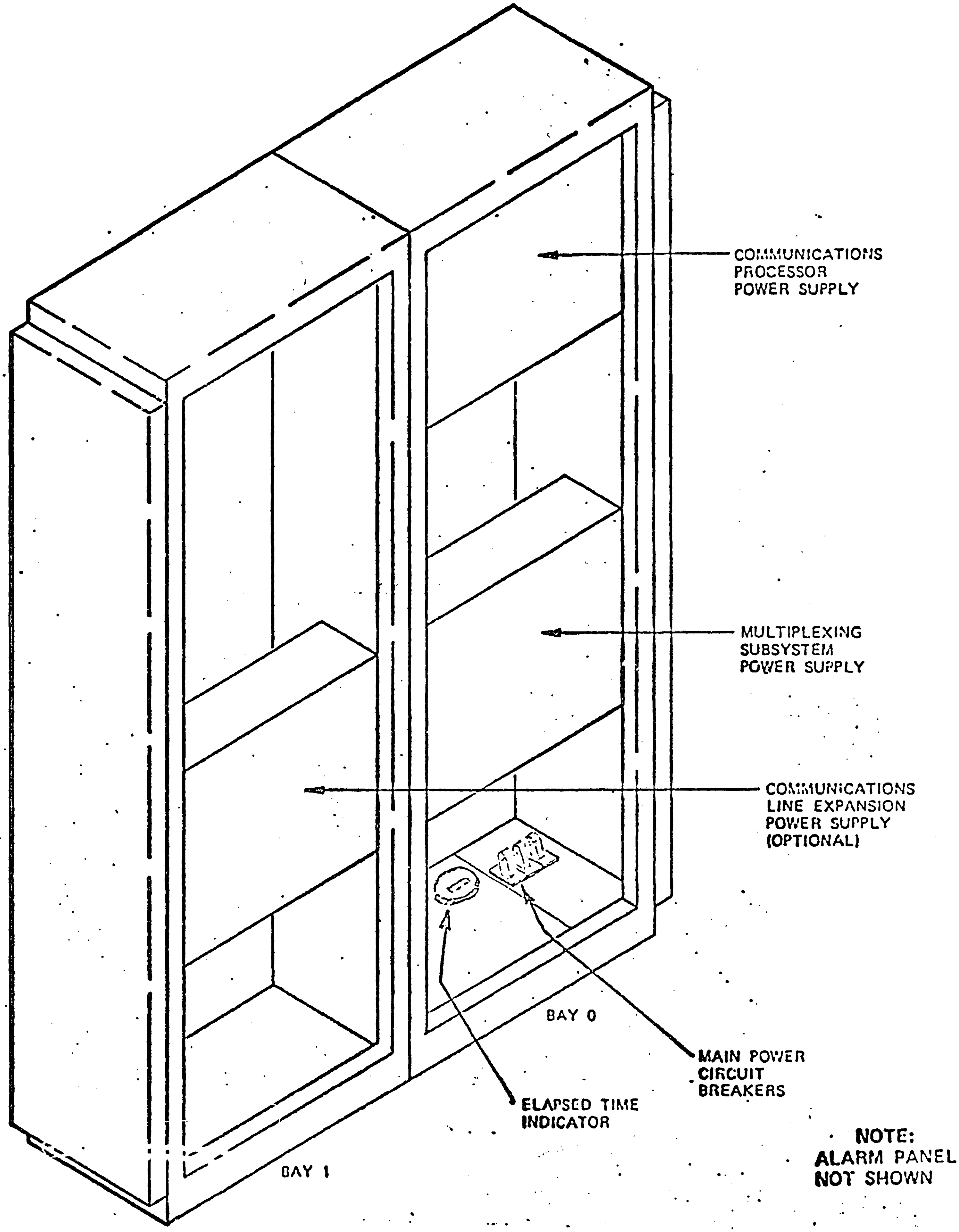


Figure 6A-3. NPU Rear View

PROCEDURE A-4

POWER TURN-OFF

Step

To turn the power OFF, perform the following:

1. Press MASTER CLEAR on the processor(s) maintenance panel(s).

2. Open the rear door(s).

3. Set the main power circuit breakers to the OFF position.

Procedure A-5

COOLING FANS CHECK

Step

To check the cooling fans (Figure 6A-4) perform the following:

1. Open rear doors.

2. Remove the air filter, (see Figure 6A-2).

3. Insert an inspection mirror into the air intake opening. Do not touch the running fan blades.

4. Direct the light from a flashlight into the mirror while angularly directing the mirror toward one of the six cooling fans.

5. Verify that the fan blades are in motion.

6. Repeat steps 4 and 5 for all six cooling fans.

7. Replace the air filter.

8. Check that air is being exhausted from both the power supplies. If it is not, replace the power supplies (Procedures A-8 and A-10).

9. Restore right side panel to its original position.

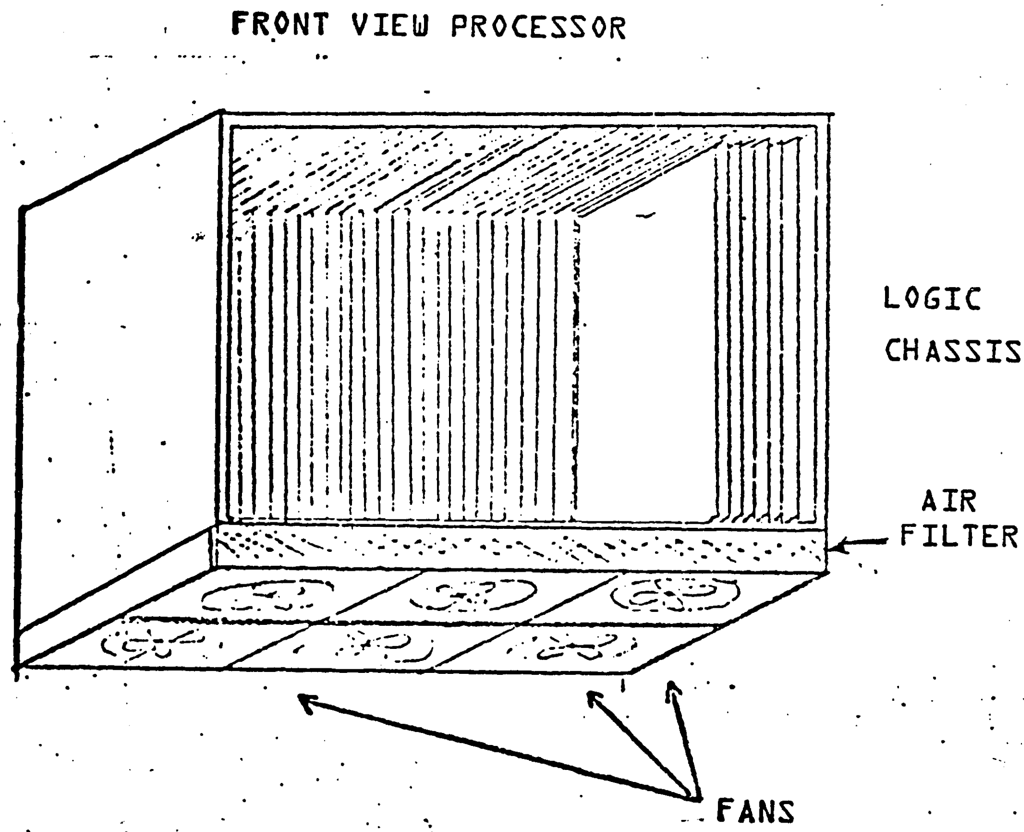


Figure 6A-4. Processor Cooling Fans

PROCEDURE A-6

COOLING FAN REPLACEMENT

Step

To replace the cooling fan (Figure 6A-5), perform the following:

1. Turn the power OFF (Procedure A-4).

2. Open front door(s).

3. Remove the filters.

4. Using either a 1/4-inch open-end wrench, a 1/4-inch spin-tight wrench, or a Phillips head screwdriver, remove the two screws holding the cooling fan to be replaced.

5. Remove the power connect plug to the cooling fan.

6. Remove the screws and the fan grill from the old fan.

7. Before inserting the new fan into the chassis, orient the new fan so that the air flow notation arrows on the fan are pointing upward.

8. Insert the new fan and connect to it the power plug.

9. Install the fan grill and the screws on the fan and fasten the assembly to the chassis.

10. Turn the power ON (Procedure A-3), and verify proper operation (Procedure A-5).

11. Re-install filter and grill.

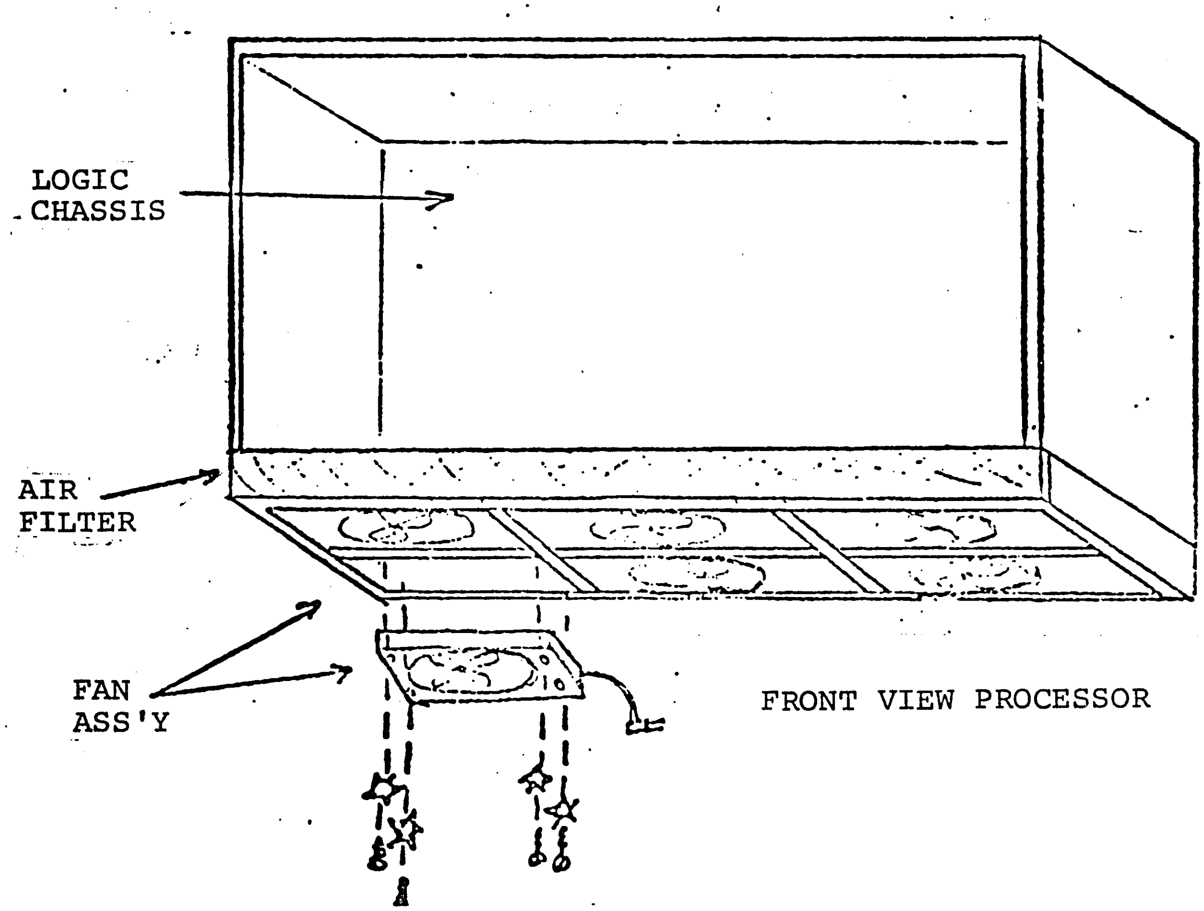


Figure 6A-5. Cooling Fan Ass'y

PROCEDURE A-7

+5 VDC POWER SUPPLY CHECK

Step

To check the +5 VDC Power Supply (see Figure 6A-6 and 6A-15) perform the following:

1. Open the rear door(s).

2. Swing out the power supply from the cabinet (see Figure 6A-6).

3. Visually verify that the +5 VDC Power Supply circuit breaker is ON, (CB1).

4. Set a multimeter to a dc voltage range capable of clearly displaying 5 VDC.

5. Check that the cabinet blowers are running by detecting air flow through the Processor Logic Chassis. If they are not running, check the power connection to the site outlet.

6. Connect the negative lead of the multimeter to the 5V RTN terminal and the positive lead to the 5V out terminal. The meter should read 5V $\pm$0.25 VDC.

   If the voltage is not correct (low), adjust the VOLT ADJ potentiometer (a clockwise turn increases the voltage) until the correct level is attained. If the power supply cannot be adjusted, replace the +5V power supply (Procedure A-8).

7. If system has a Dual CPU, repeat test on second Power Supply.

8. Secure power supplies and close door(s).

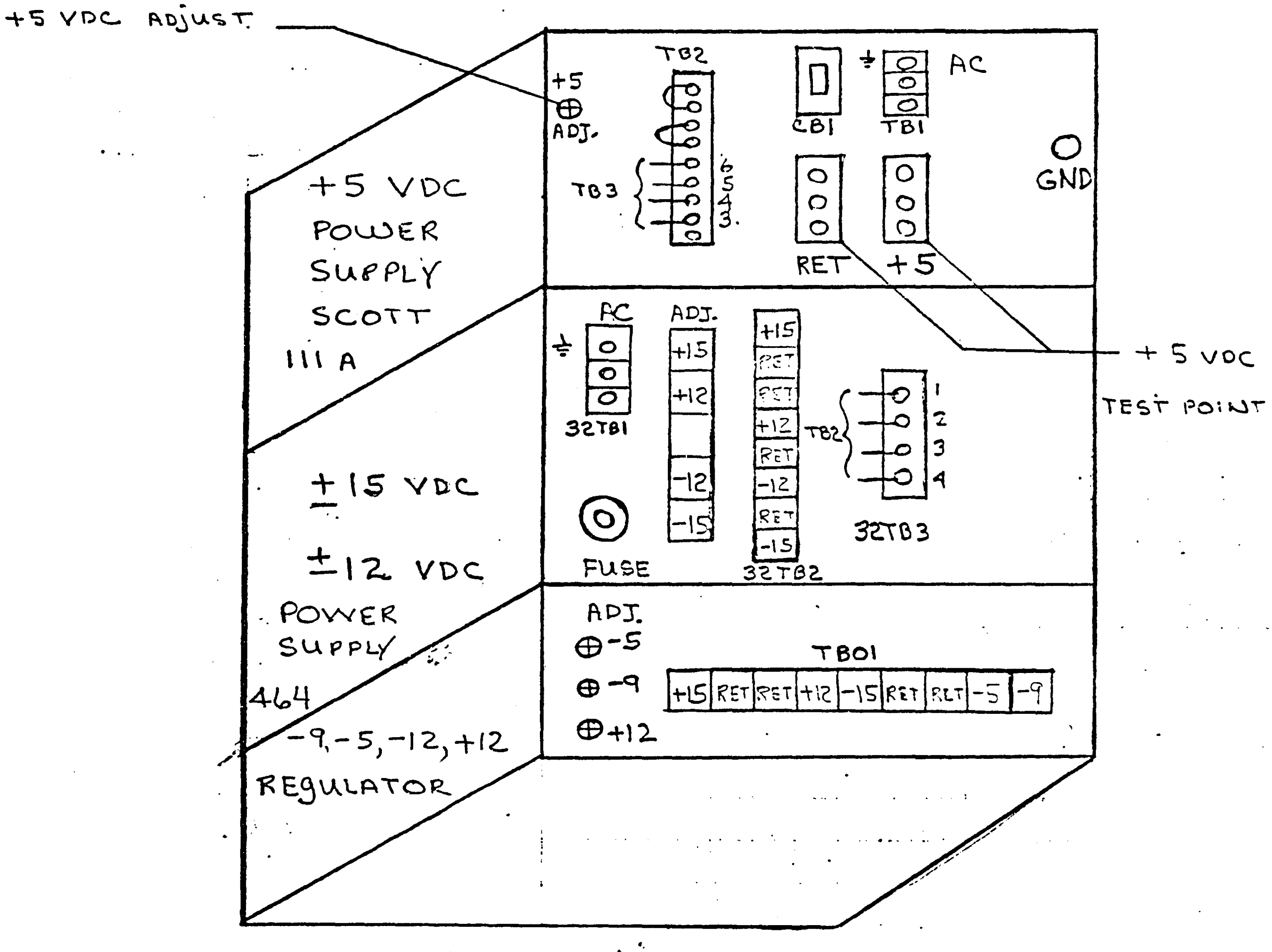


Figure 6A-6. Scott Power Supply for MP +5vdc
Test Points and Adjustments

Table 6A-1. PS1 and PS2 Interconnecting Wires

FROM	TO
PS1 (5V. Power Supply)	PS2 (15V Power Supply)
TB1 - 1	TB1 - 1
TB1 - 2	TB1 - 2
TB1 - 3	TB1 - 3
TB2 - 3	TB3 - 1
TB2 - 4	TB3 - 2
TB2 - 5	TB3 - 3
TB2 - 6	TB3 - 4
PS1 (5V Power Supply)	PS1 (5V Power Supply)
TB2 - 11	TB2 - 12
TB2 - 13	TB2 - 14

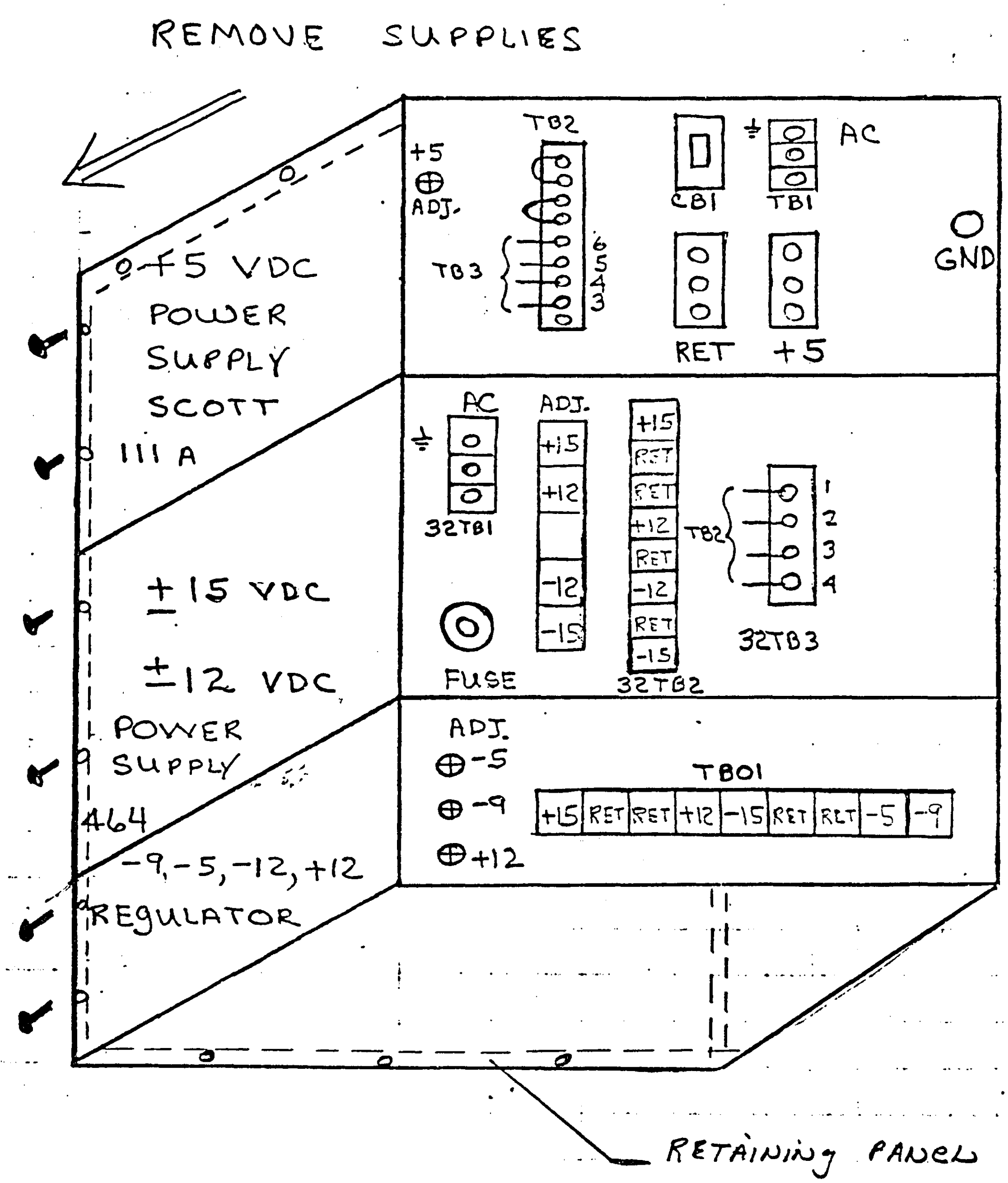


Figure 6A-7. Scott Power Supply for MP +5vdc Housing

PROCEDURE A-8

+5VDC POWER SUPPLY REPLACEMENT

Step

To replace the +5V Power Supply, perform the following:

1. Turn the Power OFF (Procedure A-4) and disconnect Power Cord from Primary Source.

2. Swing out the Supply.

3. Perform the following: (Figure 6A-7). Set a multimeter to a range capable of displaying 120VAC. Connect the negative lead of the multimeter through the cover plate of TB1 on the +5V Power Supply to Terminal 3. Connect the positive lead of the multimeter through the cover plate of TB1 to Terminal 1.

   NOTE: The multimeter should read zero voltage. If the multimeter does not read Zero Voltage, recheck the input AC Power Cord and disconnect from the site Power Source.

4. Attach stick-on labels to the lugged wires connected to the 5V OUT and 5V RTN terminals. Identify (on the labels) the terminating location of each wire.

5. Remove the lugged wires from the 5V OUT and 5V RTN terminals using either a 7/16-inch open-end or spin-tight wrench.

6. Remove each wire of TB1, labeling it with its previous terminal location as it is removed.

7. Remove each wire of TB2, labeling it with its previous location as it is removed.

Step

8. Remove the ten backplate mounting screws at the rear of the Power Supply Housing. Remove the plate.

9. Remove the two screws in front of the Power Supply Housing (power terminating end). Note ground braid connection.

10. Remove the Power Supply from its housing by pulling the Power Supply out from the rear of the housing.

11. Install the new Power Supply into the housing in the same orientation as the one that was removed.

12. Reconnect the new Power Supply in reverse order, starting with Step 8 and ending with Step 5 above. Do not perform Step 4.

13. Turn the Power ON (Procedure A-3) and connect the negative lead of the multimeter, set to a range of displaying 10VDC, to the 5V RTN terminal. Connect the positive lead to the multimeter to the 5V OUT terminal. Check that the circuit breaker switch (CB1) on the Power Supply is in the ON position. The meter should read no greater than 5.5VDC. If the meter reads greater than 5.5VDC, adjust the VOLT ADJ potentiometer on the Power Supply counterclockwise until a level of 5.5VDC or less is attained.

14. Turn the Power OFF and connect the lugged wires (step 4) to the 5V OUT and 5V RTN terminals of the Power Supply. Ensure that the screws are tightened on the terminal.

PROCEDURE A-8

Step

15. Turn the Power ON and again measure the voltage between the 5VDC and 5V RET terminals. Adjust the VOLT ADJ potentiometer on the Power Supply until a level of 5, ±0.25VDC is attained. If the power supply cannot be adjusted, it may be necessary to get technical assistance.

16. Check the Power Fail Signal level. To do this, connect the negative probe of the multimeter to terminal TB2-4 and the positive probe to TB2-3. The meter should read a voltage greater than +2.5VDC but less than +5.5VDC. If the voltage is not correct, check that the interconnection of the wires between this power supply and the ±15V/±12V power supply agree with Table 6A-1. If correct then turn the Power OFF and remove the wires terminating at TB2-4 and TB2-3 of the +5V power supply. Turn the Power ON and again measure the voltage at these terminals as described agove. If the voltage is correct, replace the +5V/+15V power supply. If the voltage is not correct, replace the +5V power supply.

17. Disconnect the multimeter leads, replace cover, secure supply lock screw.

18. Continue DDLT testing sequence.

PROCEDURE A-9

±15V/±12V POWER SUPPLY CHECK

Step

To check the ±15V/±12V Power Supply (see Figure 6A-8 and 6A-15). Perform the following:

1. Open rear doors. Unlatch and swing out the Power Supply.

2. Check that the cabinet blowers are running by detecting air flow through the Logic Chassis. If they are not running, check the power connection to the site outlet.

3. Set a multimeter to a DC voltage range capable of clearly displaying 15VDC.

4. Connect the multimeter leads to the TB2 terminals as described in Table 6A-2. Adjust the potentiometer as indicated for Scott power supplies.

   If the voltage cannot be adjusted, power down the system, as described in Procedure A-2, and check the fuse (Figure 6A-8).

   If the power supply cannot be adjusted, replace the ±15V/±12V power supply (Procedure A-10).

5. If the ±12 volt problem is in the Mux cage, check the sorrensen power supply voltages at the Mux backpanel. ±12 volts is carried on the blue, red and black wires.

6. If system has a Dual-CPU, repeat tests on the second Power Supply.

7. Close doors.

8. Resume DDLT Test Sequence.

TABLE 6A-2. TEST VOLTAGE READINGS

NEGATIVE LEAD	POSITIVE LEAD	READING SHOULD BE NO GREATER THAN	IF READING IS GREATER, ADJUST POTENTIOMETER COUNTERCLOCKWISE TO
TB2-N	TB2-7	15V ±0.7V	+15V
TB2-6	TB2-5	12V ±0.6V	+12V
TB2-3	TB2-4	12V ±0.6V	-12V
TB2-1	TB2-2	15V ±0.7V	-15V

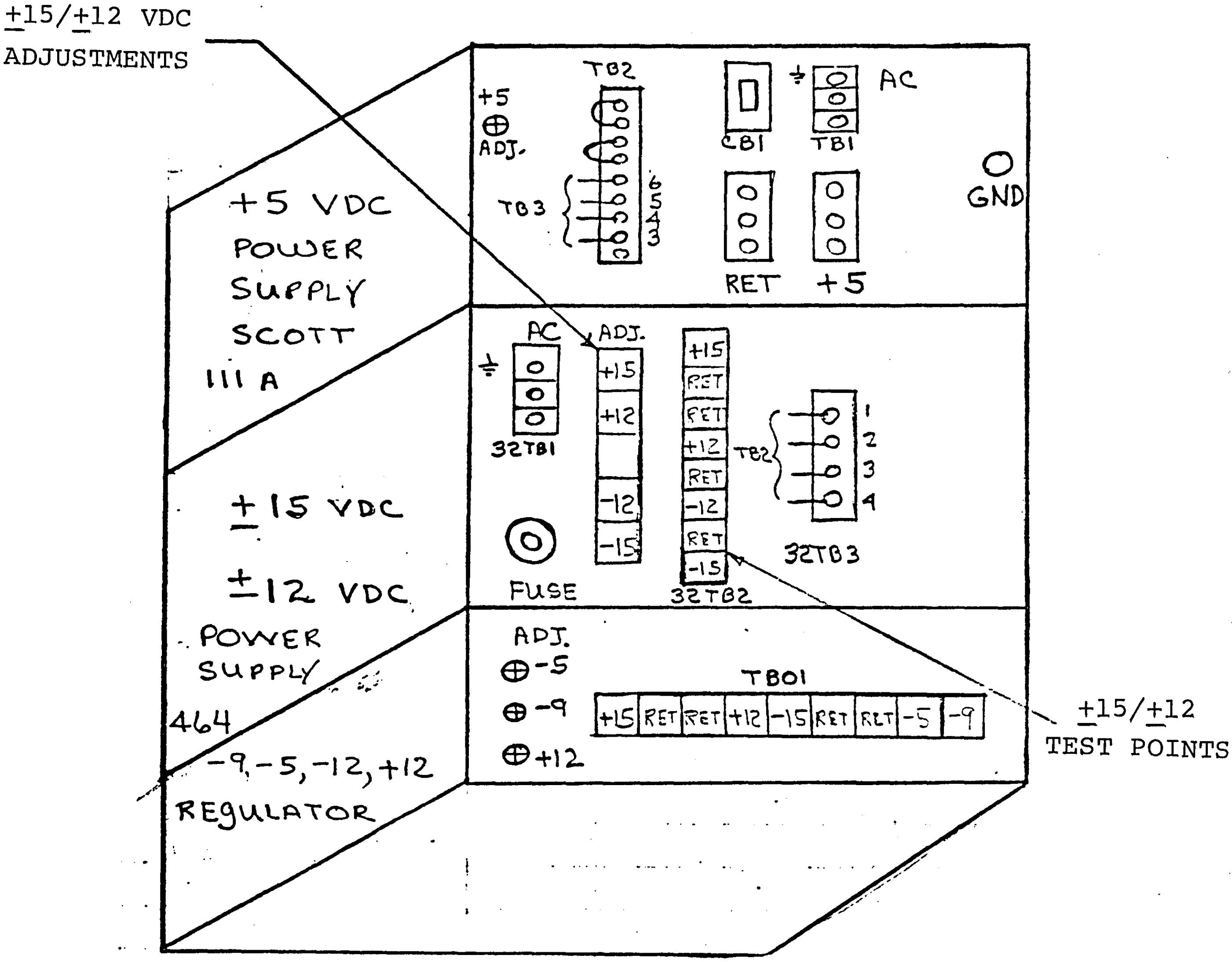


Figure 6A-8. Scott Power Supply for MP ±/±12 vdc Test Points and Adjustments

PROCEDURE A-10

±15V/±12V POWER SUPPLY REPLACEMENT

Step

To replace the ±15V/±12V Power Supply perform the following:

1. Turn Power OFF (Procedure A-4) and disconnect power cord from primary source.

2. Swing out supply.

3. Perform the following (Figure 6A-9): Set a multimeter to a range capable of displaying 120VAC. Connect the negative lead of the multimeter through the cover plate of TB1 on the ±15V/±12V power supply terminal 3.

   Connect the positive lead of the multimeter through the cover plate of TB1 to terminal 1.

   NOTE: The multimeter should read zero voltage. If the multimeter does not read zero voltage, recheck the input AC power cord and disconnect from the site power outlet and repeat step 4. Replace the ON/OFF switch if necessary.

4. Attach the stick-on labels to the lugged wires connecting to the terminals of TB2 and TB3.

5. Remove each wire from TB2 and identify on its label its previous terminal location on TB2. Remove each wire of TB3 and identify on its label its previous terminal location.

6. Remove the nine backplate mounting screws at the rear of the power supply housing and remove the plate.

PROCEDURE A-10

Step

7. Remove the three screws in front of the power supply housing.

8. Remove the Power Supply from its housing by pulling it out from the rear of the housing.

9. Install the new power supply into the housing in the same orientation as the one that was removed.

10. Connect the new Power Supply in reverse order starting with Step 9 and ending with Step 6 above. Do not reconnect the TB2 wires (Step 4).

11. Turn the Power ON (Procedure A-3). Connect the negative and positive leads of a multimeter; set it to a range capable of displaying 15VDC to the terminal locations described in Table 6A-3.

12. Turn OFF the power and connect the lugged wires (Step 6) to terminal block TB2.

13. Turn the power on and again measure the voltage at terminal block TB2 (Table 6A-4).

14. Check the power fail signal level. To do this, set the multimeter to a range capable of displaying 5VDC. Connect the negative probe of the meter to TB3-2 and the positive probe to TB3-1. The meter should read a voltage greater than +2.5VDC but less than +5.5VDC. If the voltage is not correct, perform Step 17 of Procedure A-8.

15. Disconnect the multimeter leads, secure Power Supply lock screw.

16. Continue DDLT test sequence.

TABLE 6A-3. TEST VOLTAGE READINGS

(NOT LOADED)

NEGATIVE LEAD	POSITIVE LEAD	READING SHOULD BE NO GREATER THAN	IF READING IS GREATER, ADJUST POTENTIOMETER COUNTERCLOCKWISE TO
TB2-8	TB2-7	16.5V	+15V
TB2-6	TB2-5	13.2V	+12V
TB2-3	TB2-4	13.2V	-12V
TB2-1	TB2-2	16.5V	-15V

TABLE 6A-4. TEST VOLTAGE READINGS

(LOADED)

NEGATIVE LEAD	POSITIVE LEAD	READING SHOULD BE NO GREATER THAN	IF READING IS NOT CORRECT, ADJUST POTENTIOMETER COUNTERCLOCKWISE TO
TB2-8	TB2-7	15V ±0.7V	+15V
TB2-6	TB2-5	12V ±0.6V	+12V
TB2-3	TB2-4	12V ±0.6V	-12V
TB2-1	TB2-2	15V ±0.7V	-15V

If the voltage cannot be adjusted, it may be necessary to get technical assistance.

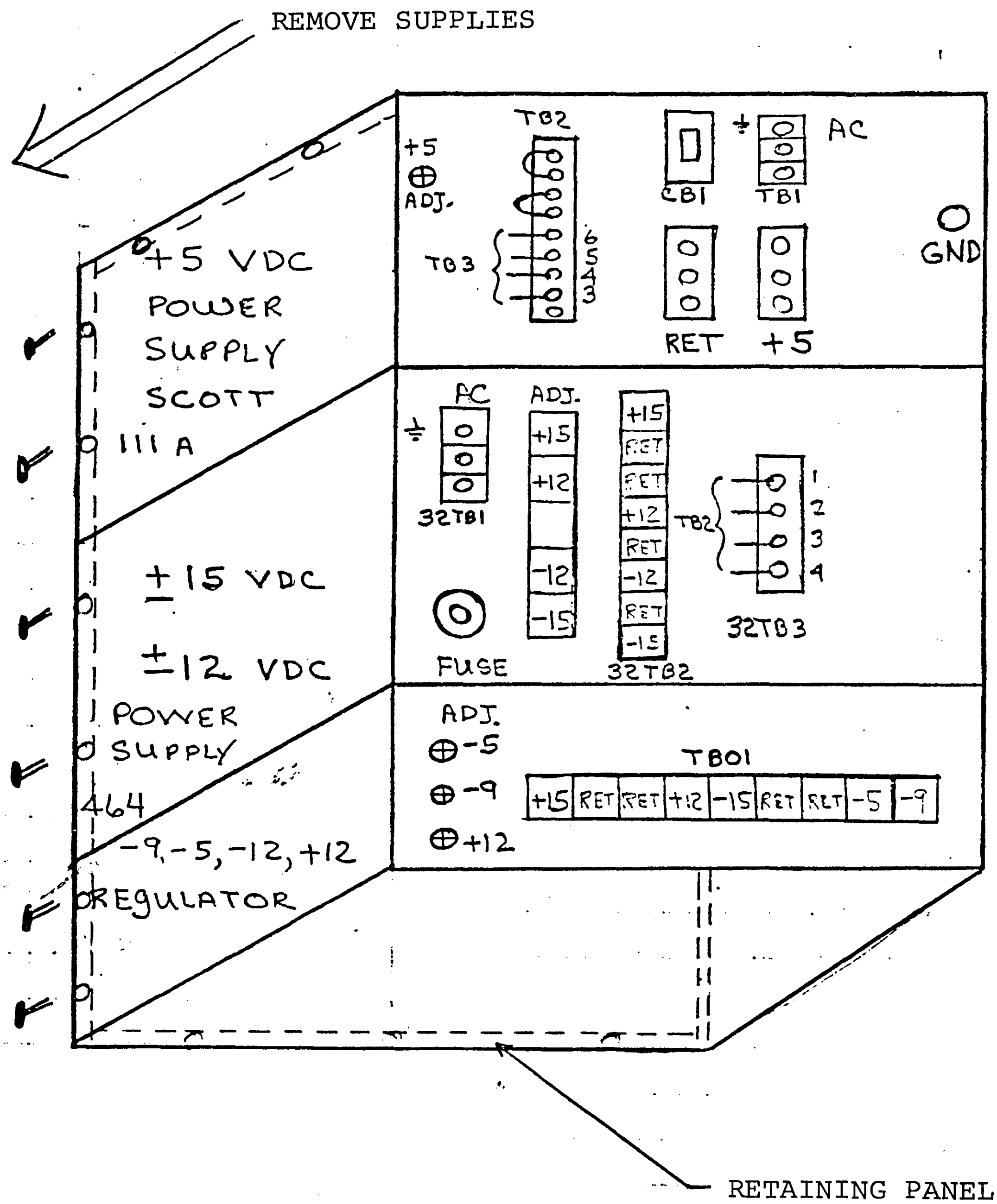


Figure 6A-9. Scott Power Supply for MP ±15/±12 Housing

PROCEDURE A-11

-9VDC POWER SUPPLY CHECK

Step

To check the 9VDC Power Supply, Figure 6A-10) perform the following:

1. Open rear door(s). Swing out the supply.

2. Check that the Power Supply blowers are running. If they are not running, check the power connection to the site outlet.

3. Set a multimeter to a DC voltage range capable of displaying 9 VDC.

4. Connect the meter leads to -9VDC test points TB1-7(+) and 8(-). Adjust potentiometer for -9VDC +0.5V.

5. If the Power Supply cannot be adjusted, power OFF the system and replace the Power Supply per Procedure A-12.

6. If the system has a dual-CPU, repeat tests on the second Power Supply.

7. Secure Power Supply lock screws.

8. Resume DDLT Test Sequence.

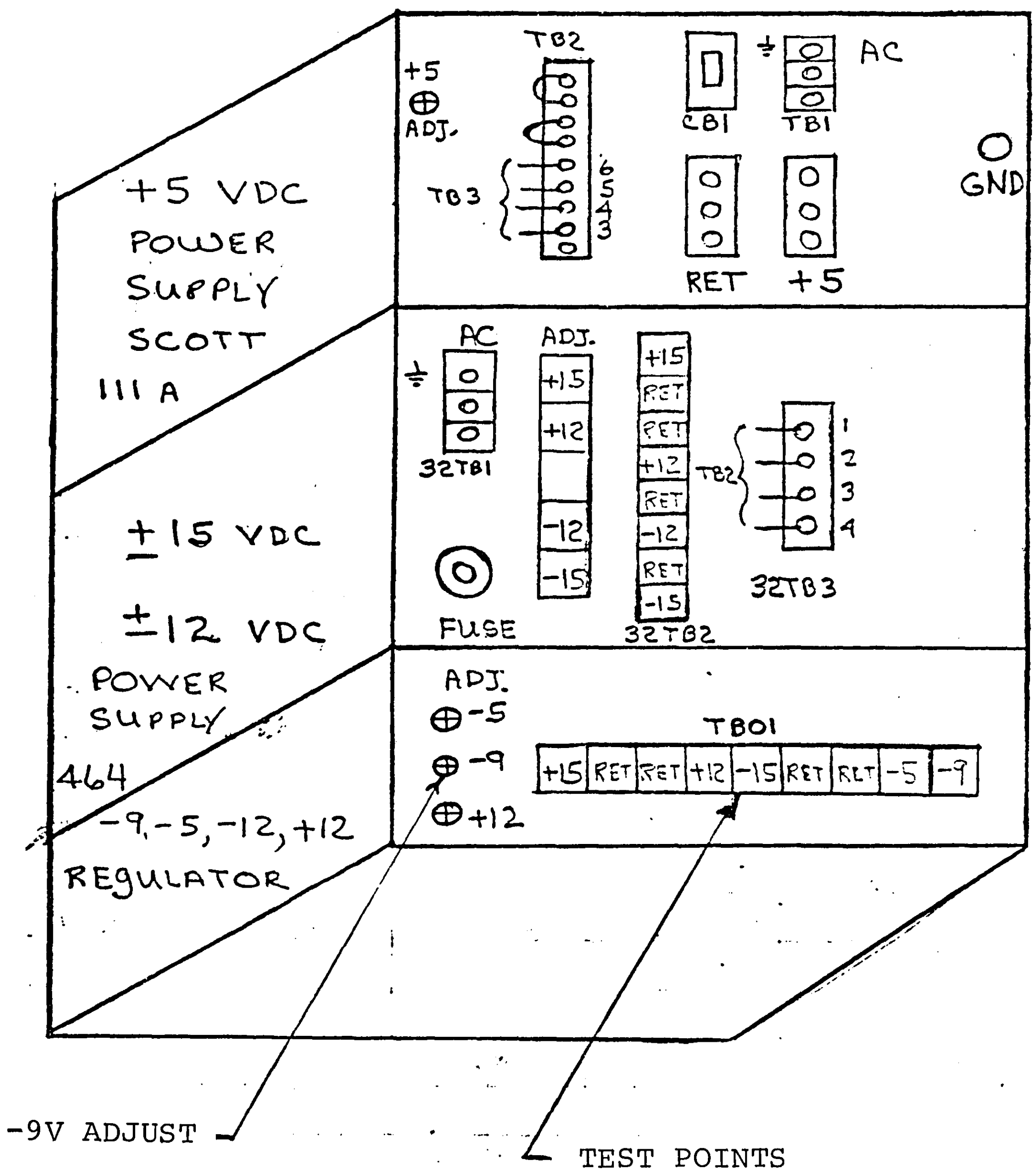


Figure 6A-10. Scott Power Supply for MP -9, -5, -12, +12 Regulator Test Points and Adjustments

PROCEDURE A-12

REPLACING 9VDC POWER SUPPLY

Step

1. Turn power OFF and disconnect power cord from primary source.

2. Swing out Supply.

3. Refer to Figure 6A-11 and perform the following:

   Set a multimeter to a range capable of displaying 120VAC. Connect the negative lead of the meter to TB1-3 and the positive Lead to TB1-1 on the 5V Power Supply.

   NOTE: Multimeter should read zero.
   If meter reading is not zero volts recheck and disconnect the input AC Power from the site source. Check and replace power ON/OFF switch if necessary are repeat Step 4.

4. Attach stick-on labels to the lugged wires connected to the terminals of TB-1 of the -9V Power Supply.

5. Identify each wire (with the labels) as to it's location on the terminal block. (Figure 6A-11).

6. Remove identified wires from TB-1.

7. Remove the nine mounting screws holding the retaining plate at the rear of the power supply housing. (Figure 6A-11).

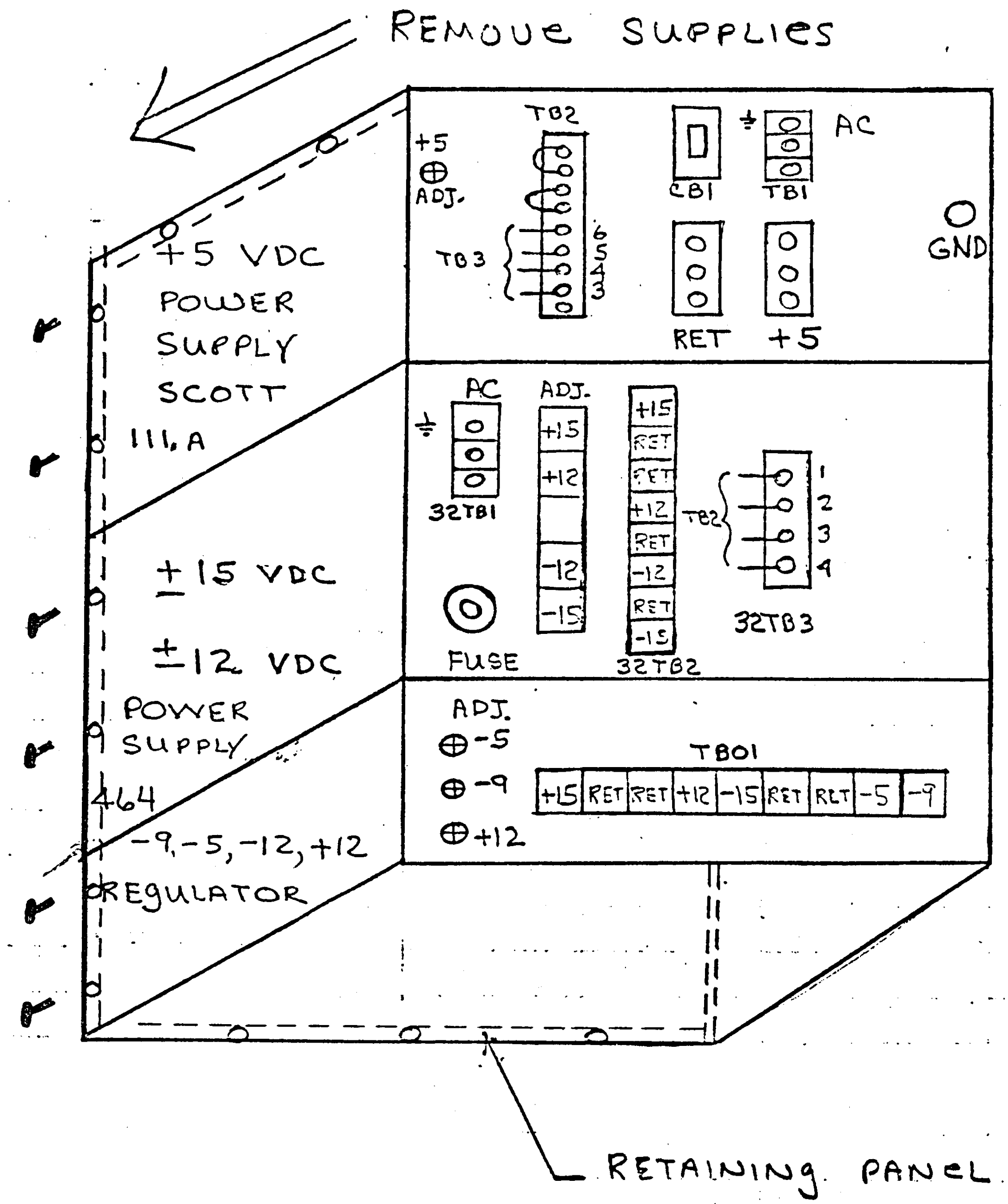


Figure 6A-11. Scott Power Supply for MP -9 V Housing

Step

8. Remove the two screws at the left front of the Power Supply Housing.

9.9 Remove the Power Supply from the housing by pulling out from the rear of the housing.

10. Install the new power supply into the housing in the same orientation as the one that was removed.

11. Reconnect the wires identified in Step 6 as input wires, TB1-1, TB1-2, TB1-5 and TB1-6 to the new power supply.

12. With the multimeter set to read 15VDC, turn processor power ON and make the following voltage tests: (See Table 6A-5).

13. Reconnect remaining output wires to TB1-3, TB1-4, TB1-7, TB1-8 and TB1-9.

14. Make voltage tests and re-adjustments as in Step 13.

15. Disconnect meter leads and secure equipment. Secure supply lock screw.

16. Continue DDLT Test Sequence.

TABLE 6A-5. VOLTAGE ADJUSTMENT TABLE

NEGATIVE LEAD	POSITIVE LEAD	READING SHOULD BE	ADJUST POTENTIOMETER
TB1-2	TB1-1	±15VDC*	+15V Adjust on ±15/±12V Power Supply
TB1-6	TB1-5	-15VDC	-15V Adjust on ±15/+12V Power Supply
TB1-3	TB1-4	+12VDC	+12V Adjust on 9V Power Supply
TB1-7	TB1-8	-9VDC	-9V Adjust on 9V Power Supply
TB1-7	TB1-9	-5VDC	-5V Adjust on 9V Power Supply

(If +15 or -15VDC cannot be adjusted, Perform Procedures A-7 and A-9).

PROCEDURE A-13

CHECKING P.D. BOX COMPONENTS

Step

Checking components of the P.D. Box requires the use of a VOM and the following procedure: (Ref. Figure 6A-12).

1. Open rear door of Bay 0.

2. Turn OFF the main breakers.

3. Remove the left side cover (Hour meter side) from the P.D. Box. Extend the wires to the transformer and meter and prop up the cover.

4. Turn ON the main breakers.

5. With the VOM set to read 300VAC, check the voltage on the output terminals of the line filters. Voltage will indicate approximately 110VAC ±10% when fully loaded.

6. With the VOM set to read 300VAC, check the input voltage on terminals 1 and 2 of any filter that has the incorrect output. Voltage should be 120VAC ±10%.

7. If the filter output is incorrect but the input voltage is O.K., replace the filter. (Procedure A-14).

8. If the input voltage to a filter is incorrect, turn OFF the main breakers and remove the right side (circuit breaker side) P.D. Box cover.

PROCEDURE A-13

Step

9. Carefully prop up the cover so that the circuit breaker terminals are accessible.

10. Verify connections and voltages on TB1 (See Figure 6A-12).

11. Turn ON the main breakers and with the VOM set to 300VAC verify that the voltage across each breaker is 0 (zero).

12. If the voltage across a breaker is 120VAC ±10%, the breaker is faulty. Replace the breaker. (Procedure A-15).

13. Verify that the transformer output (green wires) is approximately 24VAC.

14. With the VOM set to 60VDC, verify that a DC voltage greater than 5 volts is present at the Hour Meter. (Terminal 1 (+) positive.)

15. If the voltage is incorrect, turn OFF the main breakers. Slip the wires off the Hour Meter and check the diode and capacitor with an Ohmmeter.

16. If the voltage at the meter is O.K., but the meter does not advance, replace the meter (Procedure A- 16).

17. Re-install the P.D. Box cover(s).

18. Continue with Testing Sequence.

PROCEDURE A-14

REPLACING AC LINE FILTER

Step

1. Turn OFF the main breakers and disconnect the power cord from the primary source.

2. Remove the left side (Hour Meter side) cover from the P.D. Box.

3. Refer to Figure 6A-12 and locate the line filter.

4. Identify and remove wires from the line filter.

5. Take out four mounting screws and remove the line filter from the P.D. Box.

6. Install new line filter with the same orientation as before, replace mounting screws and wires.

7. Re-install P.D. Box Cover.

8. Reconnect power cord to primary power source and continue Testing Sequence.

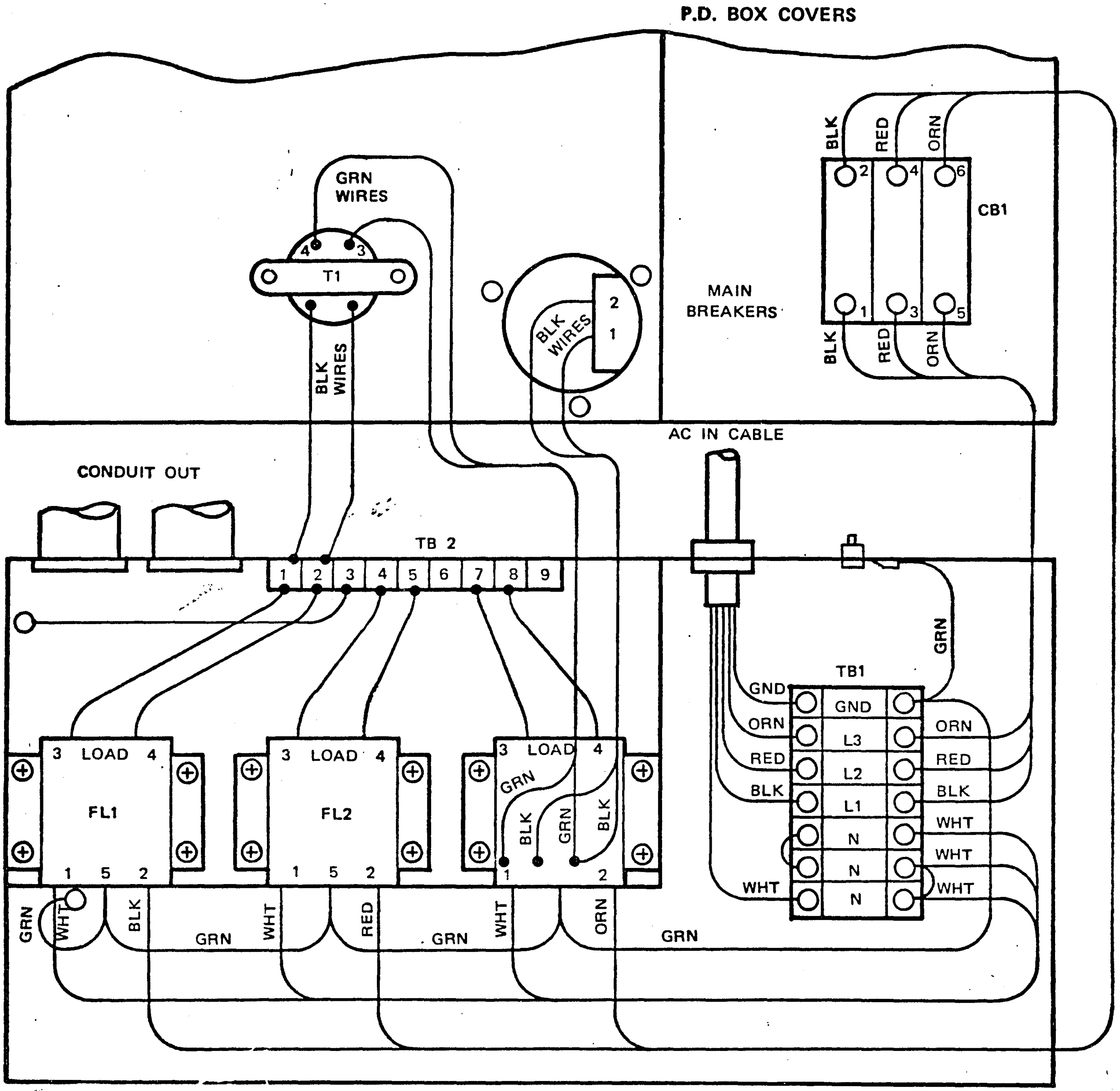


Figure 6A-12. P.D. Box Assembly

PROCEDURE A-15

CHECKING/REPLACING P.D. BOX CIRCUIT BREAKER

Step

To check and/or replace the circuit breaker in the P P.B. Box, proceed as follows:

1. Turn off all power to the processor and disconnect the power coard from the primary source.

2. Refer to Figure 6A-12 and locate the circuit breaker.

3. Identify and remove the wires from the circuit breaker.

4. With an Ohmmeter check for continuity across the circuit breaker terminals. If no continuity is present, operate the breaker lever, if there is no continuity when closed (ON), replace the breaker.

5. Remove the circuit breaker by removing the six mounting screws on the outside of the P.D. Box cover and pulling it out.

6. Install the new circuit breaker with the same orientation as before, replace mounting screws.

7. Re-install P.D. Box Cover.

8. Re-connect power cord to primary source and continue Testing Sequence.

PROCEDURE A-16

REPLACING ELAPSED TIME METER

Step

1. Turn OFF the main breakers and disconnect the power cord. from the primary source.

2 - Remove the left side (Hour Meter side) cover from the P.D. Box.

3 - Refer to Figure 6A-12 and locate the elapsed time meter.

4 - Identify and remove wires from the meter.

5 - Take out three mounting screws and remove the meter from the P.D. Box cover.

6 - Install new time meter with the same orientation as before, replace mounting screws and wires.

7 - Re-install P.D. Box Cover.

8 - Reconnect power cord to primary power source and continue Testing Sequence.

PROCEDURE A-17

LOGIC BOARD REPLACEMENT

Step

To replace the logic boards, perform the following:

1. Turn the power OFF (Procedure A-4).

2. Open front door of 255x cabinet.

3. Remove the plenum cover (front Panel) by rotating the two captive fasteners one quarter turn counter-clockwise.

4. Locate the logic board for removal (Figure 6A-13).

5. Using the card extractor tool (CDC part number 88911900) attached to the plenum cover, slide the logic board out of the chassis and place it on a flat surface.

6. Before installing the new logic board, verify that all jumpers and switches correspond to the normal operating positions as defined in section 4 and Figure 6A-14.

7. Position the board in the front of the logic chassis with the component side facing left.

8. Slide the board carefully into the cassis. Seat the board into the connector by applying firm thumb pressure at the upper and lower corners of the board.

9. Turn the power ON (Procedure A-3), and execute the DDLTs starting with Table 6-3 to verify proper operation.

10. Replace the plenum cover and close door.

EXPANSION COMM. COUPLER (HOST I/F)	AB
EXPANSION COMM. COUPLER (IDC I/F)	AA
EXPANSION COMM. COUPLER (DMA I/F)	A
PRIMARY COMM. COUPLER (HOST I/F)	B
PRIMARY COMM. COUPLER (IDC I/F)	C
PRIMARY COMM. COUPLER (DMA I/F)	D
MLIA–1 (INPUT LOOP I/F)	E
MLIA–2 (OUTPUT LOOP I/F)	F
MLIA–3 (PROCESSOR I/F)	G
TAPE CASSETTE CONTROLLER	H
2571–1 PERIPHERAL CONTROLLER	J
I/O TTY INTERFACE	K
STATUS MODE INTERRUPT	L
ARITHMETIC AND LOGIC UNIT	M
CONTROL 2	N
CONTROL 1	P
1700 TRANSFORM (W/EMULATOR ROM)	R
CYCLIC ENCODER	S
MICROMEMORY (2K)	T
PANEL INTERFACE	U
MOS MEMORY INTERFACE – DATA	V
MOS MEMORY INTERFACE – ADDRESS/CONTROL	W
MOS MEMORY (32K)	X
EXPANSION MOS MEMORY MODULE (16K OR 32K)	Y
	Z
	AC

Figure 6A-13. Communications Processor Card Cage Assembly

PROCEDURE A-18

MOS ARRAY BOARD REPLACEMENT

Step

1. Turn OFF Processor power.

2. Open front door of 255x cabinet.

3. Remove the front panel to the processor by rotating two captive fasteners counterclockwise.

4. Refer to Figure 6A-13 and locate memory board to be removed.

5. Using the extractor tool attached to the inside of the processor front panel, slide the memory board out.

6. Position the new board in the vacated position with the component side of board facing left.

7. Apply firm pressure at the upper and lower corners of the board and seat it into the backplane connector.

8. Refer to Procedure A-19 item 5 through 7, and verify DMA priority switches on Memory Interface Board.

9. Replace cover and turn on power.

PROCEDURE A-19

MEMORY INTERFACE BOARD REPLACEMENT

Step

1. With power OFF open front door of 255x cabinet.
2. Remove the front panel to the processor by rotating two captive fasteners counterclockwise.
3. Refer to Figure 6A-13 and locate memory interface boards (data and address).
4. Using the extractor tool attached to the front panel slide the desired board or/boards out.
5. Before installing new boards DMA priority switches must be set. (Refer to Figure 4A-3 for normal settings).
6. Position new board, or boards with new switch settings in their designated positions with the component side facing left.
7. Apply firm pressure at the upper and lower corners of the boards and set them into their respective backplane connectors.
8. Replace front panel. Restore power to processor.

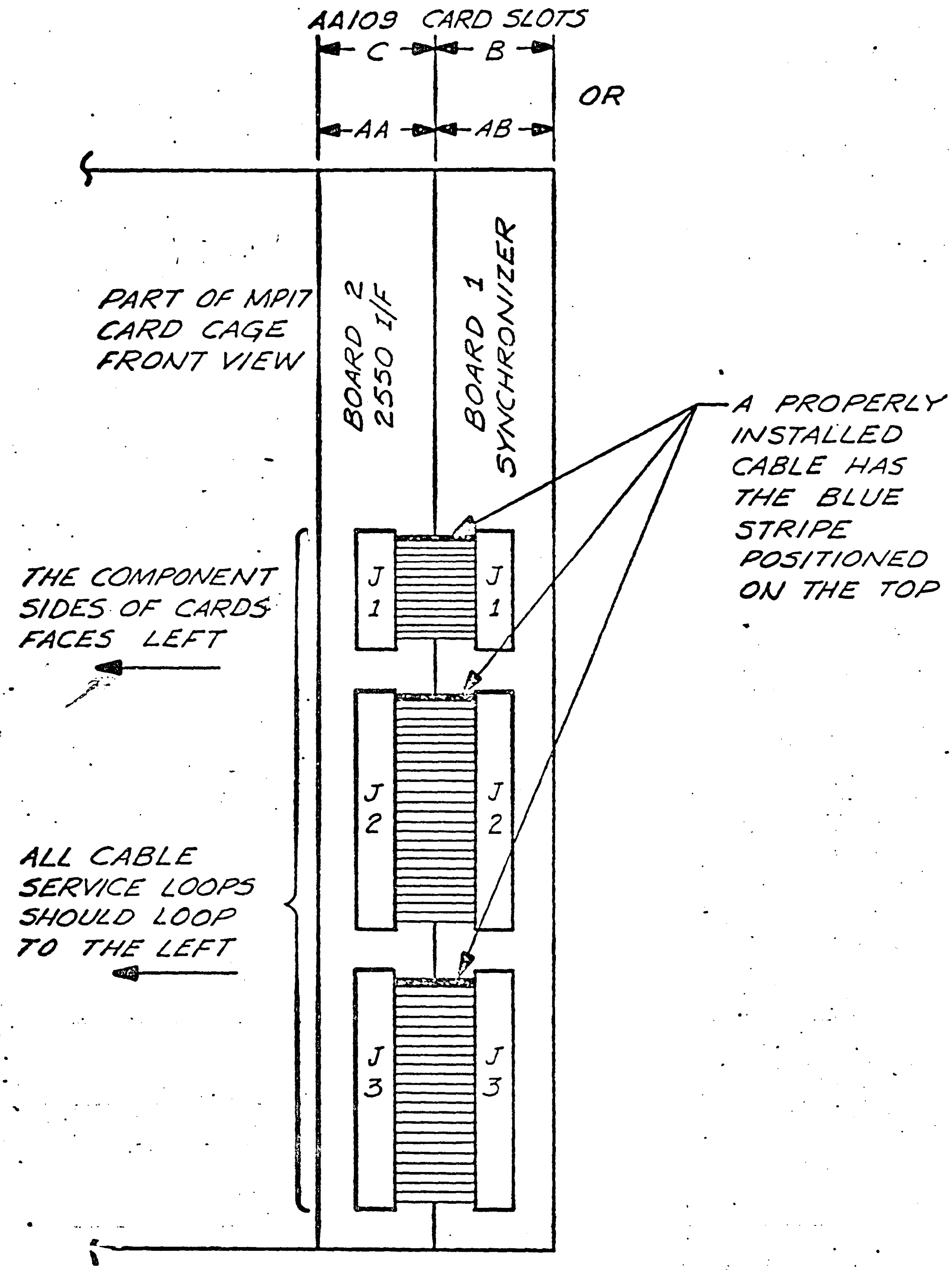


Figure 6A-14. Cards and Ribbon Cables Installed in MOS Machine

PROCEDURE A20

MOS MAIN MEMORY RUN PARAMETERS

NOTES

1. Read the entire procedure before entering parameters in tables 6-8 and 6-10.
2. In a dual processor system, CPU 1 is the base processor and CPU 2 is the Mux processor. The local processor is the one in which the diagnostic resides and can be either CPU 1 or CPU 2.

1. Examine the FCO tags on both sides of the front covers of processor 1 and processor 2 to determine the MOS memory configuration (slots X-AC). Fill in the Equip Number columns of the table below:

TABLE 6A-6. SYSTEM MOS MEMORY CONFIGURATION

Slot	Processor 1		Processor 2	
	Equip Number	16 K Blocks per Board	Equip Number	16 K Blocks per Board
X				
Y				
Z				
AC				
Total Number of 16 K Blocks per Processor				

2. Fill in the 16 K Blocks per Board column of the above table using the following information:

Equip Number	Board Type	16 K Blocks per Board
AT241	32 K Array	2
AT275	16 K Array	1
DT223	ECC Array	0

Calculate the 16 K Blocks per Processor for each processor by adding up the 16 K Blocks per Board in each processor.

3. Use the total number of 16 K blocks for each CPU (derived from system MOS Memory Configuration Table) and select the correct V, W, X, Y, Z parameters from the MOS Memory Run Parameter Table.

TABLE 6A-7. MOS MEMORY RUN PARAMETER TABLE

16K BLOCKS/REMOTE CPU \ 16K BLOCKS/LOCAL CPU	1	2	3	4	5	6	7	8	Parameters
0	001 0 0 3FFF 3FFF	002 0 0 7FFF 7FFF	003 0 0 BFFF BFFF	004 0 0 FFFF FFFF	005 1 1 3FFF 3FFF	006 1 1 7FFF 7FFF	007 1 1 BFFF BFFF	008 1 1 FFFF FFFF	V W X Y Z
1	101 2 0 3FFF 3FFF	102 2 0 7FFF 3FFF	103 2 0 BFFF 3FFF	104 2 0 FFFF 3FFF	105 2 0 3FFF 3FFF	106 2 0 7FFF 3FFF	107 2 0 BFFF 3FFF	108 2 0 FFFF 3FFF	V W X Y Z
2	201 2 0 3FFF 7FFF	202 2 0 7FFF 7FFF	203 2 0 BFFF 7FFF	204 2 0 FFFF 7FFF	205 2 0 3FFF 7FFF	206 2 0 7FFF 7FFF	207 2 0 BFFF 7FFF	208 2 0 FFFF 7FFF	V W X Y Z
3	301 2 0 3FFF BFFF	302 2 0 7FFF BFFF	303 2 0 BFFF BFFF	304 2 0 FFFF BFFF	305 2 1 3FFF BFFF	306 2 1 7FFF BFFF	307 2 1 BFFF BFFF	308 2 1 FFFF BFFF	V W X Y Z
4	401 2 0 3FFF FFFF	402 2 0 7FFF FFFF	403 2 0 BFFF FFFF	404 2 0 FFFF FFFF	405 2 1 3FFF FFFF	406 2 1 7FFF FFFF	407 2 1 BFFF FFFF	408 2 1 FFFF FFFF	V W X Y Z
5	501 3 0 3FFF 3FFF	502 3 0 7FFF 3FFF	503 3 0 BFFF 3FFF	504 3 0 FFFF 3FFF	505 3 1 3FFF 3FFF	506 3 1 7FFF 3FFF	507 3 1 BFFF 3FFF	508 3 1 FFFF 3FFF	V W X Y Z
6	601 3 0 3FFF 7FFF	602 3 0 7FFF 7FFF	603 3 0 BFFF 7FFF	604 3 0 FFFF 7FFF	605 3 1 3FFF 7FFF	606 3 1 7FFF 7FFF	607 3 1 BFFF 7FFF	608 3 1 FFFF 7FFF	V W X Y Z
7	701 3 0 3FFF BFFF	702 3 0 7FFF BFFF	703 3 0 BFFF BFFF	704 3 0 FFFF BFFF	705 3 1 3FFF BFFF	706 3 1 7FFF BFFF	707 3 1 BFFF BFFF	708 3 1 FFFF BFFF	V W X Y Z
8	801 3 0 3FFF FFFF	802 3 0 7FFF FFFF	803 3 0 BFFF FFFF	804 3 0 FFFF FFFF	805 3 1 3FFF FFFF	806 3 1 7FFF FFFF	807 3 1 BFFF FFFF	808 3 1 FFFF FFFF	V W X Y Z

TABLE 6A-8. SYSTEM MEMORY CONFIGURATION TABLE

Pin 1 of Address Connector Mates with Bookplane Pin No.	MOS Array Board Size			
	Slot X	Slot Y	Slot Z	Slot AC
7	32K	32K	32K	32/16K
8	32K	32K	16K	16K
9	32K	16K	16K	16K
10	16K	16K	16K	16K

Example:

If CPU 1 is the local processor and has 16 K blocks totaling 6, follow the horizontal numbers at the top of the table to 6 and if CPU 2 has 16 K blocks totaling 2, follow the vertical numbers at the left of the table to 2. At the point where they intersect on the table read the parameters:

V = 206

W = 2

X = 0

Y = 7FFF

Z = 7FFF

From the ECC Run Parameter Table, determine values for parameters T and U.

TABLE 6A-9. ECC RUN PARAMETER TABLE

Local CPU Slot AC	Parameter T	Parameter U
With ECC Array	3	789A
Without ECC Array	2	78A0

4. Utilizing the parameters derived from the MOS Memory and ECC Run Parameter Tables, enter required test parameters as called for in the DDLTs:

DDLT	Test	Parameter Word and Input Values
Table 6-8, Sheet 1	MPMOS	A, ___ (Parameter V) D, _ (Parameter W), ____ (Parameter Z)
Table 6-8, Sheet 8	MOSMA	A, ___ (Parameter V) D, _ (Parameter X), ____ (Parameter Y), ____ (Parameter T) 3, ____ (Parameter U)
Table 6-10, Sheet 1	Page 1	A, ___ (Parameter V)

PROCEDURE A-21

CLEARING MEMORY PARITY ERROR

Step

To clear a memory parity error, perform the following:

1. Master clear the system by pressing the MASTER CLEAR switch on the maintenance panel.
2. Press the ESCAPE key on the teletypewriter (TTY).
3. Enter K71602800: on the TTY.
4. Enter K0000: on the TTY.
5. Enter L6A03: 0D01: 18FD: on the TTY.
6. Master clear (step 1).
7. Escape (step 2).
8. Enter K71602800 on the TTY.
9. Enter K0000: on the TTY.
10. Enter I: on the TTY. (This starts the program.)
11. After approximately 3 seconds, master clear (step 1).
12. Restart with Table 6-3.

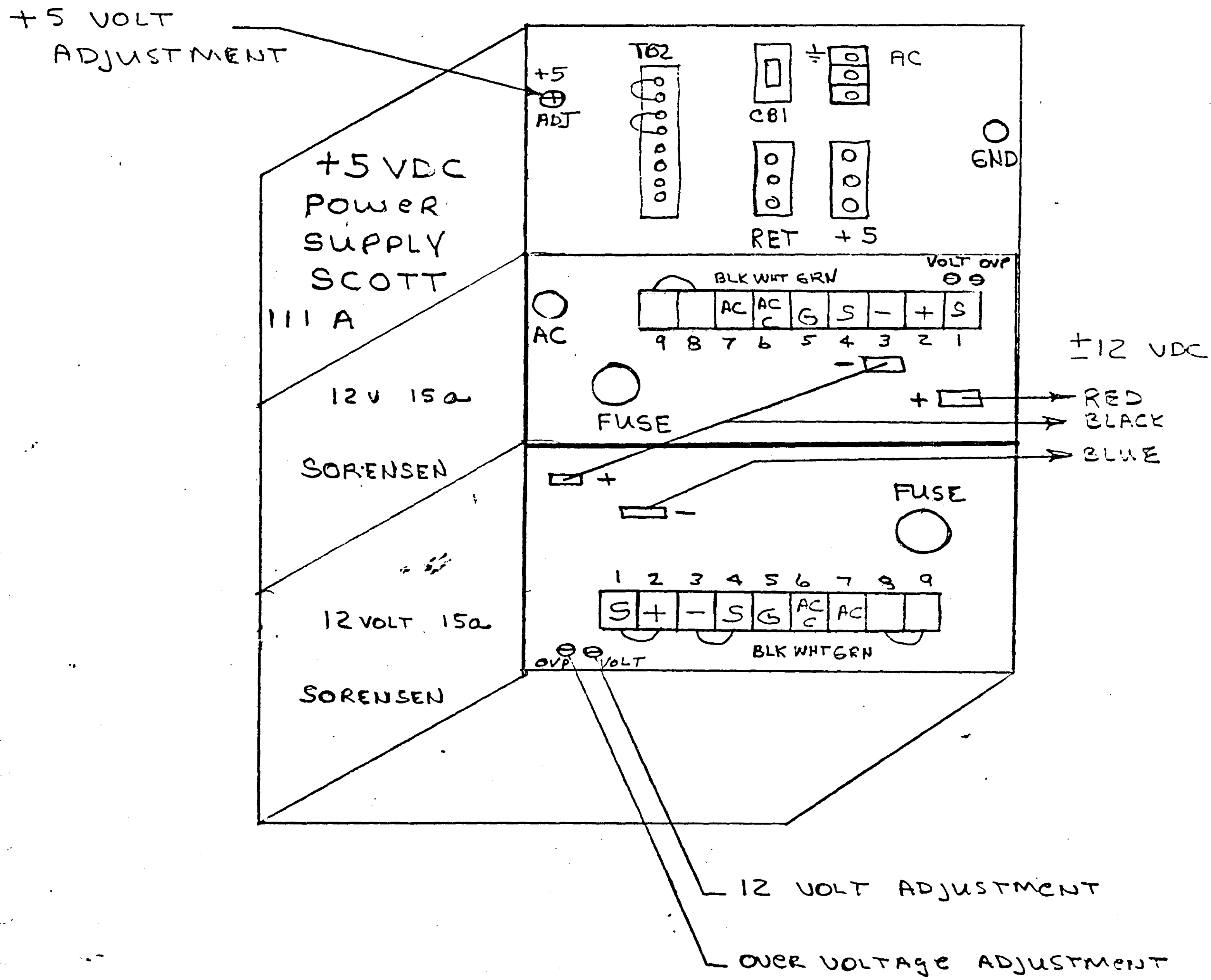


Figure 6A-15. Scott/Sorensen Power Supplies for MUX
+5 volt DC, ±12 volt DC

A22 RUN PARAMETERS FOR MICRO MEMORY TEST

NOTES:

1. Read the entire procedure before entering parameters into the computer as required by the DDLT's.

2. Some systems have only a single processor (CPU 1) and some have dual processors (CPU 1 and CPU 2). In a dual processor system micro memory tests will be performed on both CPU 1 and CPU 2. The local processor is the one in which the diagnostic resides and can be either CPU 1 or CPU 2. When entering the test parameters into the computer as required by the DDLT's, be sure that the parameter is from the table for the CPU being tested.

1) Remove the front panel from the cabinet of the CPU being tested.

2) Examine the FCO tags for slot T on the front cover of the processor to determine what micro memory features are installed. The following conditions may be observed:

A. Slots T and S may both be empty. If Slots T and S are empty, this CPU does not contain micromemory, and the MIMEN and MIINS tests cannot be run. Proceed to the next table.

CPU 1 TEST PARAMETERS TABLE

Slot T Equipment No.	Description	Parameter D	Parameter 11	Check
BA209	512 Instr. Micro-Memory	4	4	
BA210	2048 Instr. Micro-Memory	7	7	

CPU 2 TEST PARAMETERS TABLE

Slot T Equipment No.	Description	Parameter D	Parameter 11	Check
BA209	512 Instr. Micro-Memory	4	4	
BA210	2048 Instr. Micro-Memory	7	7	

3) Using the parameters D and 11 derived in the appropriate section above, enter these test parameters as called for in the DDLT's:

D, ____ (Parameter D from appropriate table above)

11, ____ (Parameter 11 from appropriate table above)

SECTION 6B

MAINTENANCE PANEL, CONTROLLER, INTERFACE CABLE

INDEX

Procedure

PROCEDURE B-1

MAINTENANCE PANEL REPLACEMENT

Step

1. Turn OFF power to the processor and open the front door.

2. Remove the interface cable from the maintenance panel at connect J1.

3. Remove the mounting screws at the bottom of the panel. Figure 6B-1.

4. Replace the maintenance panel with the new one by reversing the above steps.

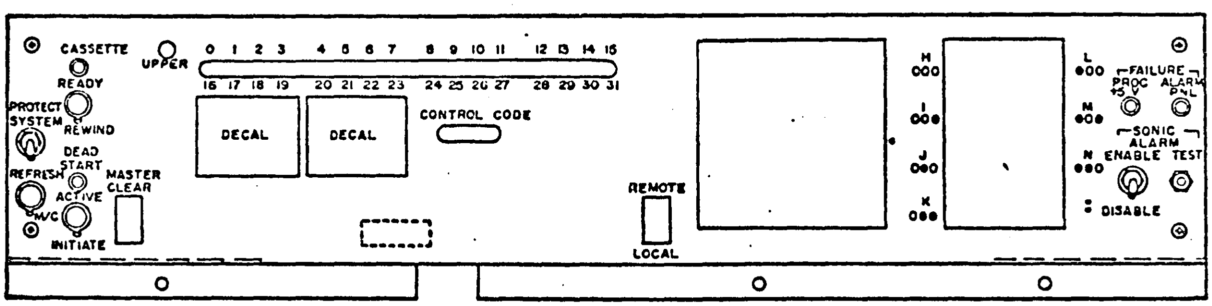


Figure 6B-1. Maintenance Panel Mounting

PROCEDURE B-2

MAINTENANCE PANEL CONTROLLER REPLACEMENT

Step	
1.	Open the front door of the cabinet.
2.	Remove the coverplate at the front of the processor chassis by releasing the two captive retaining latches.
3.	Use the extracter tool attached to the cover plate and remove the controller. (Refer to Figure 4A-1 for location of controller).
4.	Verify that the equipment code, and function code switches are set to their normal operating positions on the new controller. (Refer to Figure 6B-2 and Section 4C for location and setting).
5.	Position the new controller in front of the processor chassis such that the components are facing left.
6.	Insert the controller in its assigned position in the card cage and seat by applying firm pressure at the top and bottom of the controller. The controller is properly installed only when fully seated.
7.	Replace the extractor tool, coverplate and close the access panel.

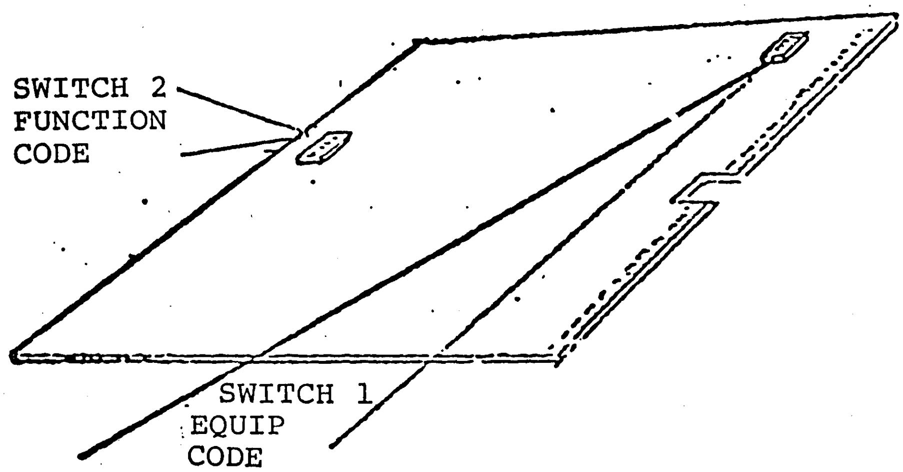


Figure 6B-2. Panel Interface Controller

PROCEDURE B-3

INTERFACE CABLE INSTALLATION

Step

1. Open the front door of the cabinet.

2. Remove the cover plate at the front of the processor chassis by releasing the two captive retaining latches.

3. Use the extractor tool attached to the cover plate and pull the controller out far enough to gain access to the interface cable connector. (Refer to Figure 4A-1 for location of Controller).

4. Remove the interface cable from the controller

5. Remove the interface cable from the maintenance panel at connector J1. (Figure 6B-3)

6. Replace the interface cable by reversing the above procedure.

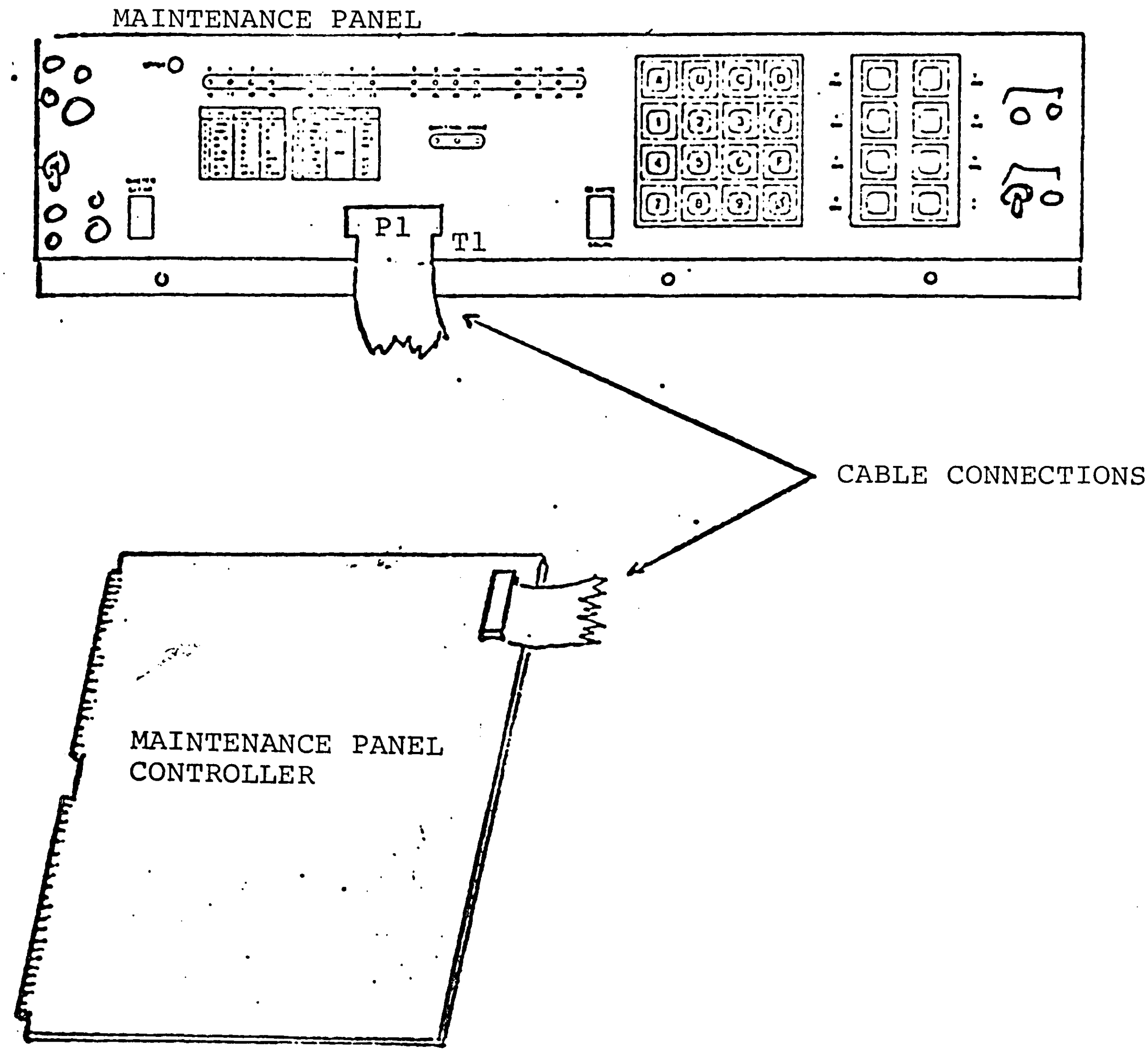


Figure 6B-3. Interface Cable Connections

SECTION 6C

CASSETTE TRANSPORT

INDEX

PROCEDURES C-1

LOADING CASSETTE CARTRIDGE

Step

1. Raise the lid of the tape transport.

2. If a cartridge is already loaded in the transport, remove it using instructions in Procedure C-2.

3. Observe the cartridge to be loaded. For recording the write enable tabs (Figure C-1) must be installed. For reading tape only, these tabs should be removed.

4. Refer to Figure C-1 and insert the back edge of the cassette cartridge into the transport and press the front edge down until it snaps in place (the exposed side of the cartridge (A or B) will be active side of the tape therefore the cartridge must be installed with the desired side up).

5. Close the lid to engage the interlock which enables operation of the transport.

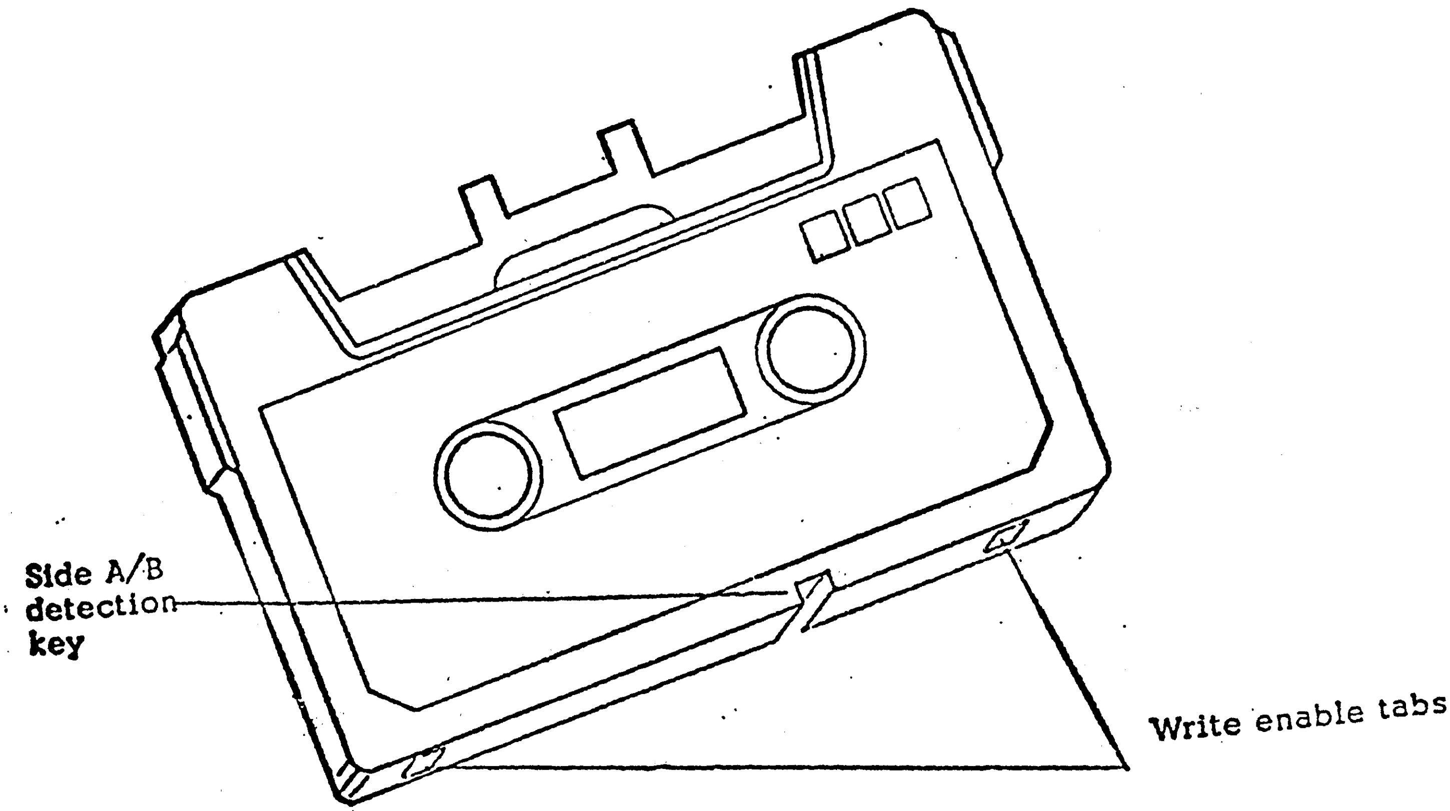


Figure C-1. Cassette Tape Cartridge

PROCEDURE C-2

UNLOADING CASSETTE CARTRIDGE

Step

1. Raise the lid of the tape transport.

2. Press the eject button to release the cassette cartridge. {Figure 6C-2}.

3. Remove cassette cartridge from the transport and place in it's designated storage area using care not to drop, contaminate the tape or expose it to a magnetic field. {It is usually a good practice to rewind the tape before it is removed from the transport}.

4. Close lid on tape transport.

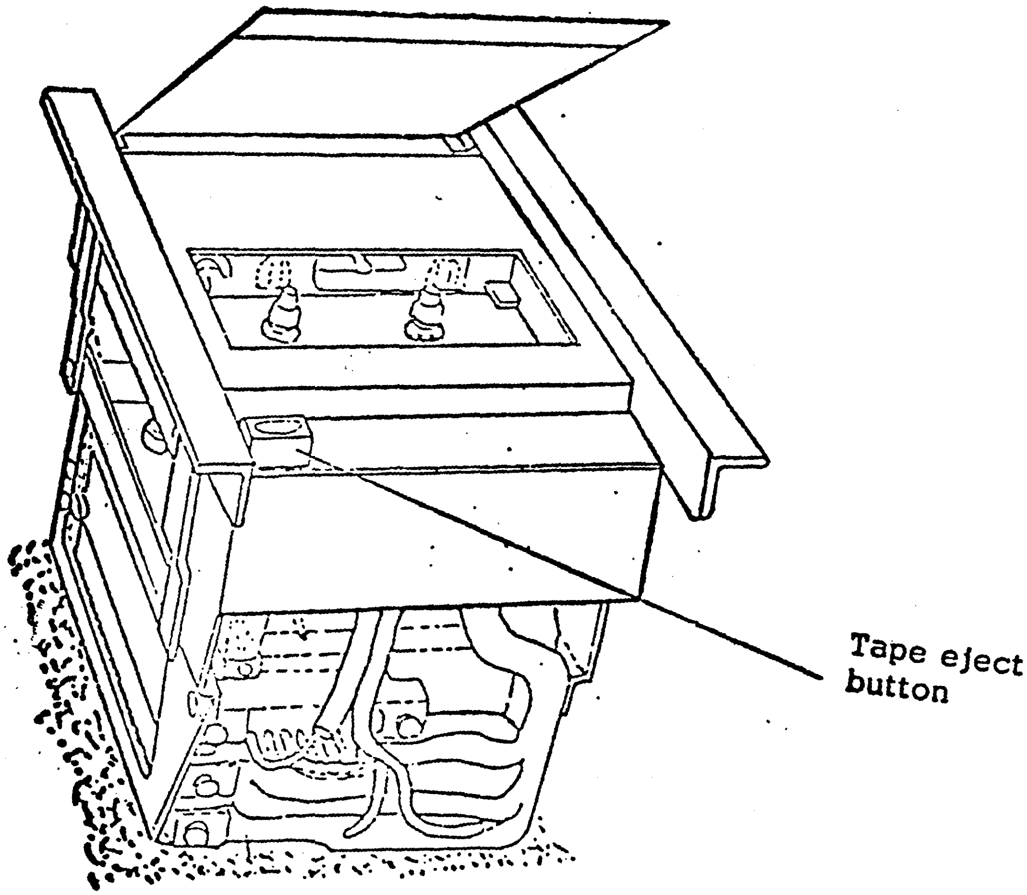


Figure 6C-2. Cassette Tape Transport

PROCEDURE C-3

TAPE TRANSPORT LUBRICATION
(Ref. Figure 6C-3)

Step

1. Apply one drop of NCR 803M or an equivalent type lubricant to each of the points listed below. (A syringe or a lubristyle pen oiler should be used for this purpose).

   a. Capstan thrust bearings under each flywheel.

   b. Each end of each head guide shaft. After applying lubricant move slide base assembly back and forth several times.

   c. Each joint of the two pinch roller solenoid connecting rods.

   d. Each bushing near the pinch roller on the connecting rod. Actuate the pinch roller solenoid several times after applying lubricant.

   e. Brake arm pivot points. Actuate brakes several times after applying lubricant.

   f. On the end of the eject button post at the point of contact between the end of the post and the eject arm assembly.

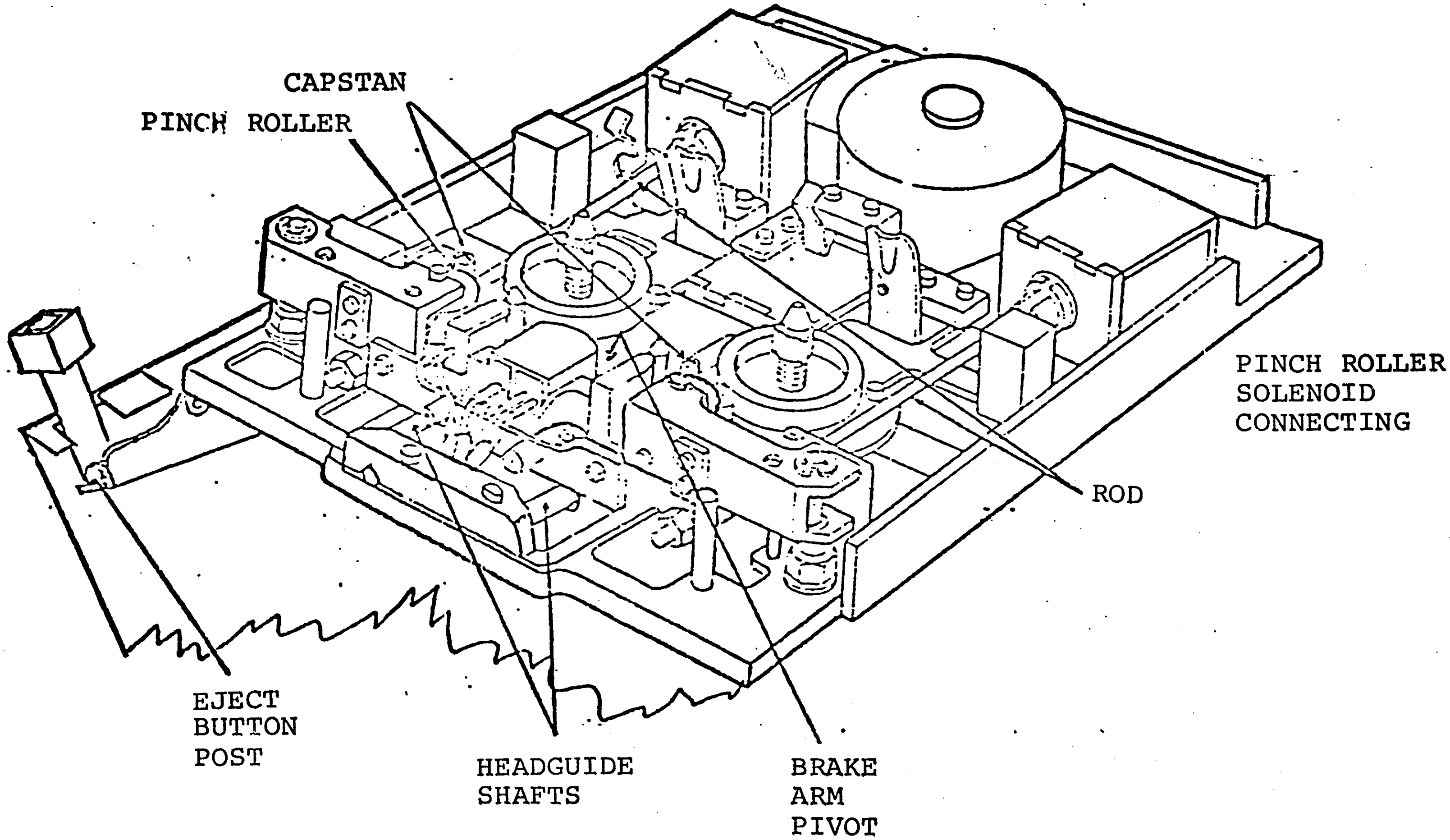


Figure 6C-3. CTT Lubrication Points

PROCEDURE C-4

TAPE TRANSPORT CLEANING
(Figure 6C-4)

Step

1. The following steps should be followed when cleaning the transport.

   a. Apply isopropyl alcohol to a cotton swab.

   b. While rotating the pinch roller rub the cotton swab up and down on the pinch roller. As the swabs become dirty with oxides discard them and use a fresh one until the swabs remain clean after rubbing the pinch roller.

   c. Clean the two capstans using the same procedure described for the pinch rollers.

   d. Clean the head, tape guides and guide pins using the same procedure as before.

   e. With a dry swab wipe the head, tape guides and all areas cleaned to remove any remaining alcohol.

NOTE: Remove any lint that might have remained in the transport from a cotton swab.

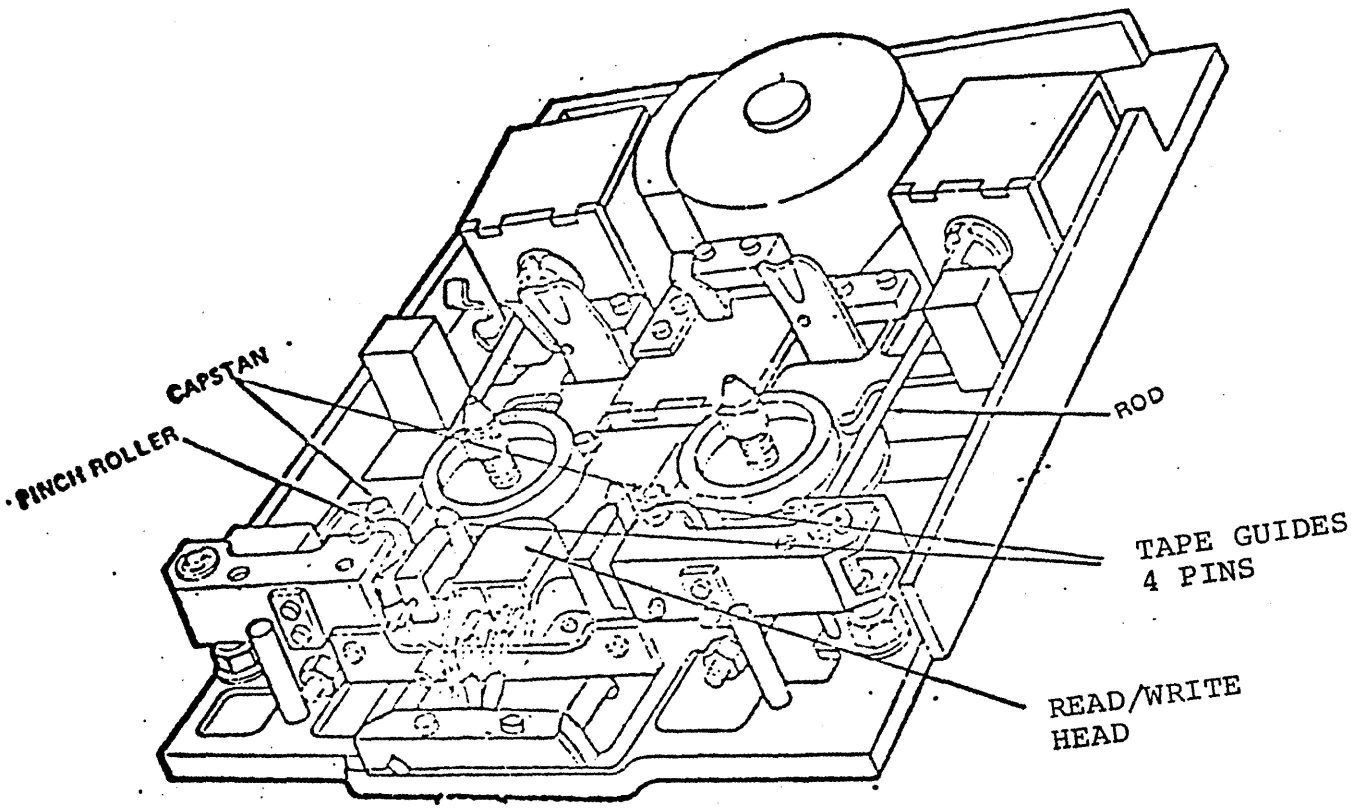


Figure 6C-4. CTT Cleaning Points

PROCEDURE C-5

REMOVING A TAPE WRAP

Step

1. If the tape becomes wrapped around the pinch roller, the following procedure is recommended to free it.

   a. Turn off power.

   b. Press eject button

   c. Carefully remove cassette

   d. Using fingers, pull the tape from the pinch roller, taking care not to damage the transport mechanism.

   e. If tape has not been broken, it can be rewound by using a pen or other non-magnetic instrument. In most cases the data is salvageable up to the point where the damage occurred. Discard tape after reading data from the salvageable area.

   f. Install a known good (blank if possible) cassette.

   g. If the second cassette tape also wraps, replace tape transport and return for repair.

PROCEDURE C-6

CASSETTE TAPE CONTROLLER REPLACEMENT

Step

1. Open front door of cabinet.
2. Remove cassette tape from transport if present.
3. Remove the cover panel from the processor chassis, by releasing the two captive fasteners at the botton of the panel.
4. Use the extractor tool attached to the inside of the panel and remove the controller from the processor chassis. Refer to Figure 4A-1 for location.
5. Verify that the equipment code and function code switches are set to their normal operating positions on the new controller. Refer to Figure 4C-2 and 4C-3 for switch locations.
6. Position the new controller in its assigned position within the processor chassis with the component side facing left.
7. Seat the controller into its backplane connector by applying firm pressure at the top and bottom of the controller.
8. Replace the extractor, cover panel, and close door.

PROCEDURE C-7

REPLACING CASSETTE TAPE TRANSPORT

(Figure 6C-6)

Step

To replace the cassette tape transport proceed as follows:

1. Open front door of cabinet

2. Remove cassette tape from transport

3. Turn off power

4. Disconnect cable from transport.

5. Remove transport carrier from door by turning the four 1/4 turn fasteners counter-clockwise.

6. Place carrier on a work surface.

7. Remove the two screws from the front and two screws from the rear of carrier.

8. Lift out tape transport.

9. Install new transport in the carrier.

10. Replace carrier on the cabinet door.

11. Re-connect cable to transport.

12. Continue Test Sequence.

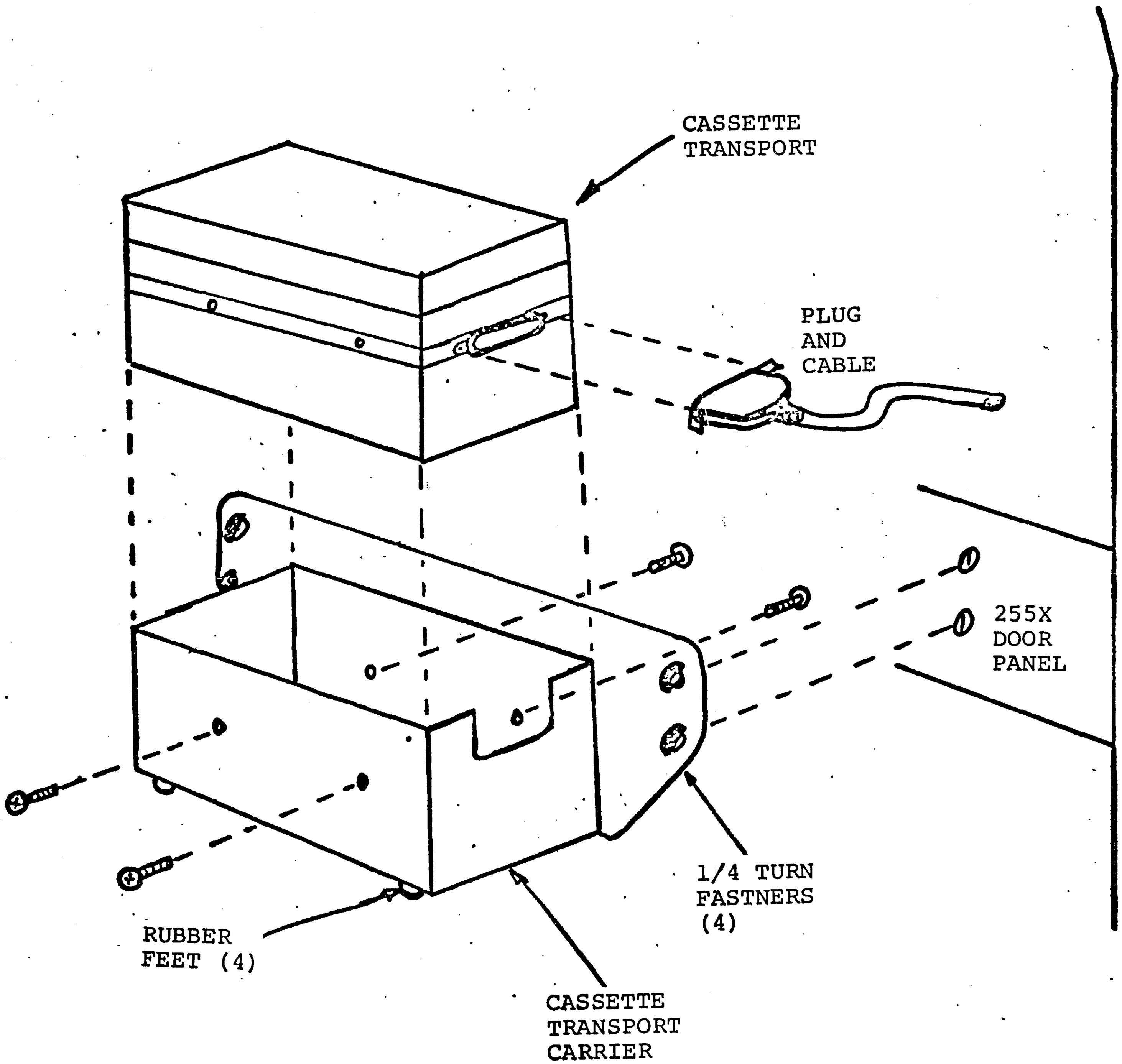


Figure 6C-6. Cassette Transport Mounting Configuration

PROCEDURE C-8

CASSETTE POWER SUPPLY VOLTAGES

1. Cassette power is obtained from the microprocessor backplane. Figure 1C-2.

2. The voltages to be checked are +5 volts and ±12 volts. These voltages can be checked by procedure 6A7 and 6A9.

SECTION 7

MAINTENANCE

SECTION 7

MAINTENANCE

The maintenance information in this section describes the tools (diagnostics) required by the CE to perform normal maintenance. The contents are as follows:

SECTION 7A

PROCESSOR AND CABINET

MAINTENANCE TOOLS

DIAGNOSTICS

On site maintenance personnel require the following diagnostic programs on cassette tape: Refer to Table 7A-1.

TABLE 7A-1

2550 ODS 2.0 Cassette P/N 12323181A

ODCHK3	Transfer paths check
MPINS	Macroinstruction test
MPMOS	Macromemory test (MOS)
MOSMA	Macromemory test (MOS)
MPRTC	Protect test
MIMEM	Micromemory
MINNS	Microinstruction
PAGE 1	Paging test
DUCPU	Dual CPU test
MPMEM	Core Memory test
CASEC	Cassette Echo test

UTOPIA/MSMP Cassette P/N 12323182

Bootstrap	(deadstart)
CEL042	Cyclic Encoder test
EOF	
Bootstrap	(deadstart)
MST041	MUX subsystem test
EOF	
Bootstrap	(deadstart)
CPL040	CYBER coupler test
EOF	
Bootstrap	(deadstart)
CPL040	Expanded Coupler Test
EOF	
Bootstrap	(deadstart)
CPU043	3000L Coupler test
EOF	
Bootstrap	(deadstart)
TTY008	Teletype test
EOF	
Bootstrap	(deadstart)
UTOPIA	Utility Routines
EOF	

TEST EQUIPMENT

If maintenance support is required, the following additional test equipment is required for testing:

Oscilloscope -- Dual trace, DC to 10 MHz minimum, calibrated trigger sweep (Tektronic Model 546).

The following test equipment is required in addition to a normal complement of hand tools.

Multimeter -- DC, 0-50V, accuracy 3 percent minimum, 20K ohm/V; AC, 0-250V, accuracy 3 percent minimum.

Card Extender -- CDC part number 96742400.

Tables 7A-2 and 7A-3 provide function control register and display codes as reference for support level maintenance. For additional information, see the 1709 Enhanced Processor with Core Memory-Hardware Reference Manual. Refer to the ODS Reference Manual for further information.

FUNCTION CONTROL REGISTER

See Table 7A-3.

TABLE 7A-2. FUNCTION CONTROL REGISTER {FCR}

Bit		Digit	Bit Definition
{LSB} 31	1F	7	Overflow
30	1E		Not Protected Instruction
29	1D		Protect Fault
28	1C		Parity Error
			Status Only
27	1B	6	Interrupt System Active
26	1A		Auto-Restart Enabled
25	19		Micro Running
24	18		Macro Running
23	17	5	Not used
22	16		Not used
21	15		Enable Auto Display
20	14		Enable Console Echo
19	13	4	Enable Micro Memory Write
18	12		Multilevel Indirect Addressing Mode
17	11		Not used
16	10		Suppress Console Transmit
			0 0 Breakpoint Off
15	0F		0 1 Instruction Reference BP
14	0E	3	1 0 Storage Operand BP
			1 1 All References BP
13	0D		BP Interrupt {BP Stop if Clear}
12	0C		Micro BP, Step, Go, Stop {Macro if Clear}
11	0B	2	Step
10	0A		Selective Stop
09	09		Selective Skip
08	08		Protect Switch
07	07		
06	06		
05	05	1	DISPLAY 1
04	04		
03	03		
02	02	0	DISPLAY 0
01	01		
{MSB} 00	00		

TABLE 7A-3. DISPLAY CODE DEFINITIONS

Code		Display 1	Display 0
0	0 0 0 0	FCR	D2 {Addressed by N}
1	0 0 0 1	P*	N {MSBs}**
2	0 0 1 0	I	K {LSBs}**
3	0 0 1 1		X
4	0 1 0 0		Q
5	0 1 0 1	MIR	F
6	0 1 1 0	BP/P-MA {Display Only}	F1 {Addressed by K Enabled by SM111}
7	0 1 1 1	P-MA {Display Only}	MEM
8	1 0 0 0	SM1	
9	1 0 0 1	MI	$\overline{\text{RTJ}}$
A	1 0 1 0	SM2	
B	1 0 1 1	M2	
C	1 1 0 0		MM
D	1 1 0 1	A*	
E	1 1 1 0	X*	
F	1 1 1 1	Q*	

* Used to address macromemory.
Automatically incremented after each memory reference.

** The combined contents of these two registers are used to address micromemory. The K register is automatically incremented after each memory reference. The N register does not automatically increment.

SECTION 7B

MAINTENANCE PANEL

Maintenance of the maintenance panel does not require any special tools or diagnostics.

Tools and aids necessary to execute the DDLT's are identified in the procedures and tables associated with the maintnenance panel.

SECTION 7C

CASSETTE TAPE TRANSPORT

MAINTENANCE TOOLS

DIAGNOSTICS

Maintenance requires the use of the following ODS diagnostics:

1. LODCHK
2. Echo (cassette controller)
3. ODS Monitor
4. Cassette

Part numbers for the above diagnostics are found in Table 7A-1.

TEST EQUIPMENT

No test equipment other than the normal complement of tools will be required by site maintenance personnel.

SECTION 8

PARTS DATA

SECTION 8

PARTS DATA

SECTION 8

PARTS DATA

This section contains Spare Parts Lists, equipment numbers and part numbers for replaceable subassemblies and components of the 2550/2552 systems.

This section is divided into subsections that deal with each equipment in the 2550/2552 systems. The codes used to identify each subsection are as follows:

- 8A - Cabinet, processors, power distribution
- 8B - Maintenance Panel and Controller
- 8C - Cassette transport and controller

SECTION 8A

CABINET, PROCESSORS, POWER DISTRIBUTION

Sub-Assembly	Equipment Number	Spare Part	Part Number
2550 Processor	AA109	--	96751900
		PWA, I/O-TTY	88919700
		PWA, SMI	88909100
		PWA, ALU	88909200
		PWA, Control 2	88909300
		PWA, Control 1	88919600
		PWA, Transform	88910100
		PWA, Memory Interface Data	96740800
		PWA, Memory Interface Address	96740500
		Cooling Fans	88912000
2550 Cabinet			
		Filter, AC Line	97644778
		Circuit Breaker	74459200
		Power Supply, +5VDC	88782623
		Power Supply, ±12VDC	88780604
		Regulator, ±12, -9, -5VDC	88917300
		Filter, Fan	
		Fuse, Slo Blo, 6.25 amps	
		Elapsed Time Meter	
2552 Communications Processor	AA109	Same as for 2550 Processor	
2552 Mux Processor	AA109		88916400
		PWA, I/O-TTY	88919700
		PWA, SMI	88909100
		PWA, ALU	88909200
		PWA, Control 2	88909400
		PWA, Control 1	88919600
		PWA, Transform	88910100
		PWA, Memory Interface Data	96740800
		PWA, Memory Interface Address	96740500
		Cooling Fans	88912000
2552 Cabinet		--	--
		Uses same spare parts as 2550 Cabinet plus	

SECTION 8A (continued)

Sub-Assembly	Equipment Number	Spare Part	Part Number
2550/2552 Power Supplies	GD1225	--	88906900
		Power Supply, +5VDC	88782623
		Power Supply, ±15VDC	88782624
		Power Supply, MOS Regulator	88917300

OPTIONS:

16K MOS Memory	AT275B	PWA	96745800
32K MOS Memory	AT241B	PWA	96745700
512 Instruction Micromemory	BA209A	PWA	88925100
2048 Instruction Micromemory	BA210B	PWA	96755900
ECC MOS Array, 192K Bytes	DT2232	PWA	96787400

SECTION 8B

MAINTENANCE PANEL AND CONTROLLER

Sub-Assembly	Equipment Number	Spare Part	Part Number
Panel	DT 120	--	96744572
		Cable, Interface	88879721
		Switch	88889100/01
		Indicator	88887100
Controller	FC 402	PWA	96744570

SECTION 8C

CASSETTE TAPE TRANSPORT AND CONTROLLER

Subassembly	Equipment Number	Spare Part	Part Number
Tape Transport	BE602	- -	88889800
		Cassette Tape	12262298
Controller	FA104A	PWA - -	88908100
		Cable Interface	

COMMENT SHEET

MANUAL TITLE 2550-2, 2552-1, 2550-100 Host Communications Processor

Preliminary Hardware Maintenance Manual

PUBLICATION NO. 74701010 REVISION 01

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