

**INSTALLATION AND OPERATION
DENVER BOARD MODEL DB-1**

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i.**, inc.

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DENVER BOARD MODEL DB-1
TERMINAL EXPANSION BOARD
INSTALLATION AND OPERATION

11 November, 1982

D.B.I., Inc.

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WARRANTY AND ASSISTANCE

This DBI product is warranted unconditionally against defects in material and workmanship for a period of ninety (90) days from date of shipment. DBI will, at its option, repair or replace the defective product during the warranty period provided it is returned to DBI.

Repair of the DB-1 by the user is not recommended. DBI has an exchange program set-up for fast and reasonable service. Inoperative boards that are not physically altered or damaged will be exchanged for \$125.00. All other boards will be exchanged for \$300.00.

This manual provides detailed instructions for installing and operating a model DB-1 Terminal Expansion Board. The information in this manual is divided into four sections as follows:

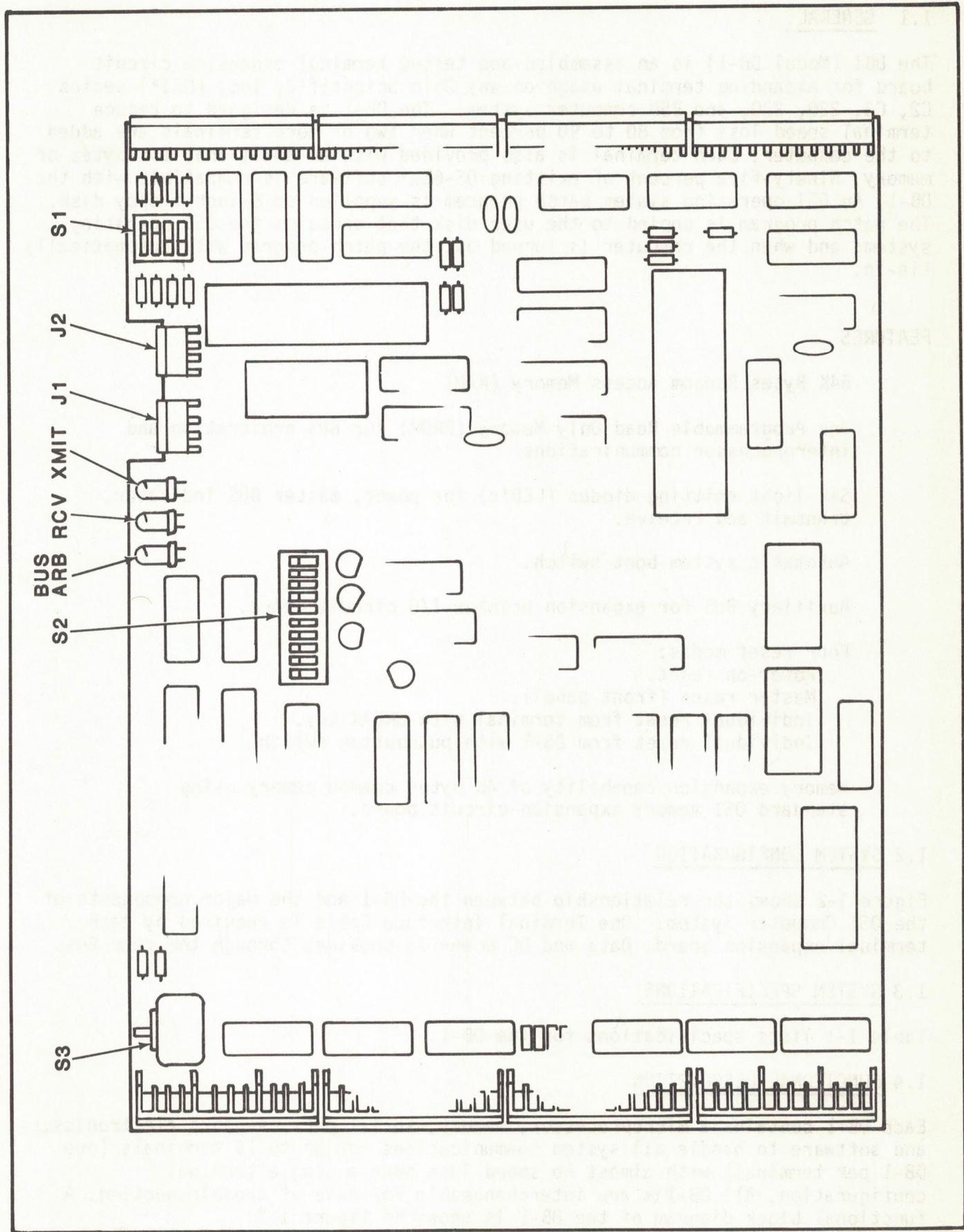
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Figure 1-1 Denver Board Model DB-1



GENERAL INFORMATION

1.1 GENERAL.

The DBI (Model DB-1) is an assembled and tested terminal expansion circuit board for expanding terminal usage on any Ohio Scientific, Inc. (OSI*) series C2, C3, 220, 230, and 250 computer system. The DB-1 is designed to reduce terminal speed loss from 80 to 90 percent when two or more terminals are added to the computer. Each terminal is also provided with an additional 16K bytes of memory. Ninety-five percent of existing OS-65u* software is compatible with the DB-1. An OSI operating system patch program is supplied on 8-inch floppy disk. The patch program is copied to the user disk that contains the OSI operating system; and when the computer is turned on, the patch program will automatically tie-in.

FEATURES

64K Bytes Random Access Memory (RAM)

One Programmable Read Only Memory (PROM) for BUS arbitration and interprocessor communications.

Six light emitting diodes (LED's) for power, master BUS indicator, transmit and receive.

Automatic system boot switch.

Auxiliary BUS for expansion printer I/O circuit board.

Four reset modes:

Power-on reset.

Master reset (front panel).

Individual reset from terminal with BREAK key.

Individual reset from DB-1 with pushbutton switch.

Memory expansion capability of 4K bytes common memory using standard OSI memory expansion circuit board.

1.2 SYSTEM CONFIGURATION

Figure 1-2 shows the relationship between the DB-1 and the major components of the OSI Computer System. One Terminal Interface Cable is required by each terminal expansion board. Data and DC power is provided through the rear Bus.

1.3 SYSTEM SPECIFICATIONS

Table 1-1 lists specifications for the DB-1.

1.4 FUNCTIONAL DESCRIPTION

Each DB-1 contains a microprocessor, memory, serial port, support electronics, and software to handle all system communications for up to 16 terminals (one DB-1 per terminal) with almost no speed loss over a single terminal configuration. All DB-1's are interchangeable for ease of troubleshooting. A functional block diagram of the DB-1 is shown in figure 1-3.

* OSI and OS-65u are trademarks of OHIO SCIENTIFIC, INC.

Table 1-1. Specifications

DESCRIPTION	CHARACTERISTICS
Serial I/O Port	75 to 19,200 baud, selectable on board by switch.
Microprocessor	6502A running at 2 MHz.
Memory	65,536 Bytes RAM.
Operating Temp Range	0 to 55 Deg C.
Power Requirements	+ 5 Volts @ 1.5 A +12 Volts @ 200 MA - 9 Volts @ 50 MA
Physical Characteristics	Width: 11 inches Height: 8 inches Weight: 16 oz

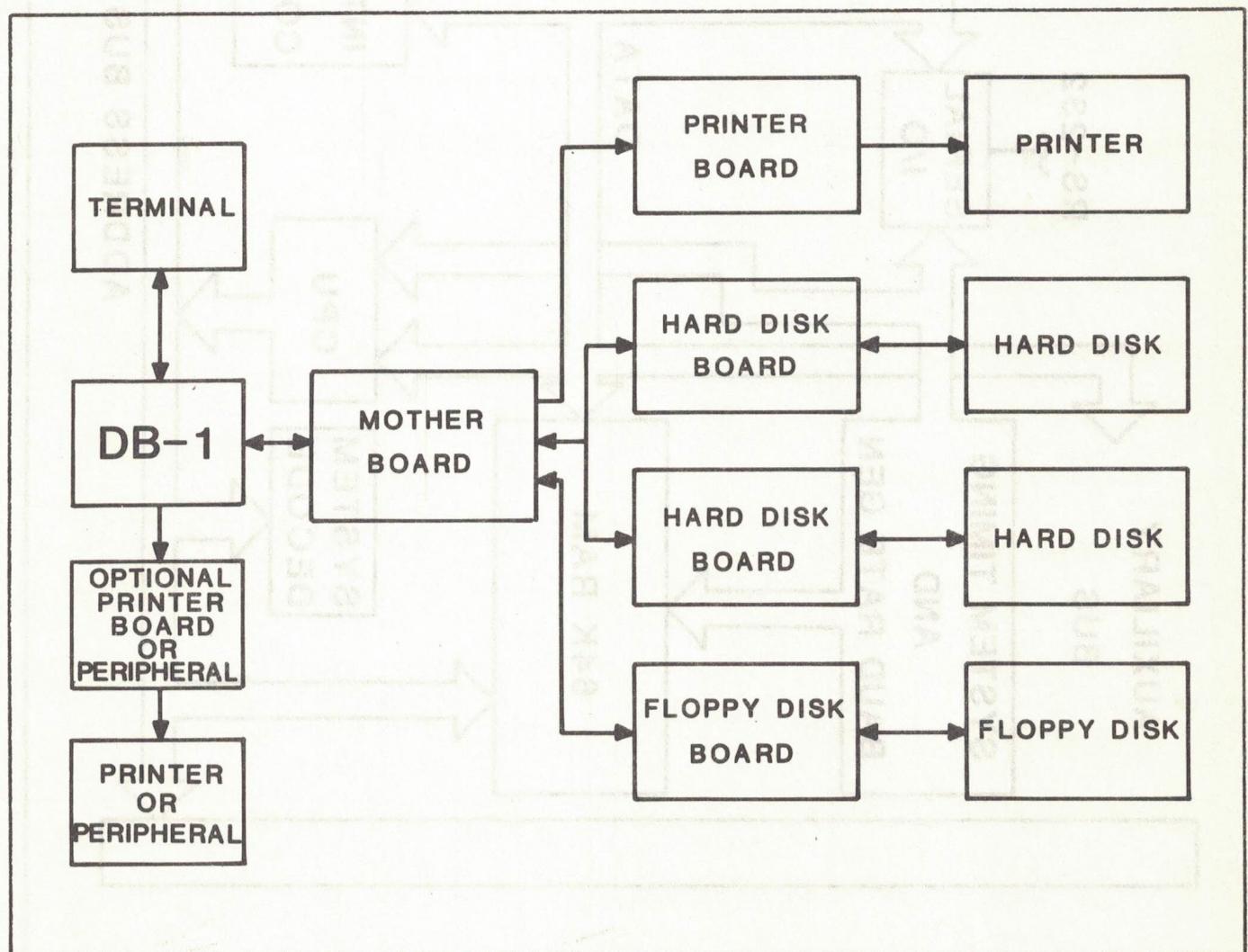


Figure 1-2. Simplified System Configuration Diagram.

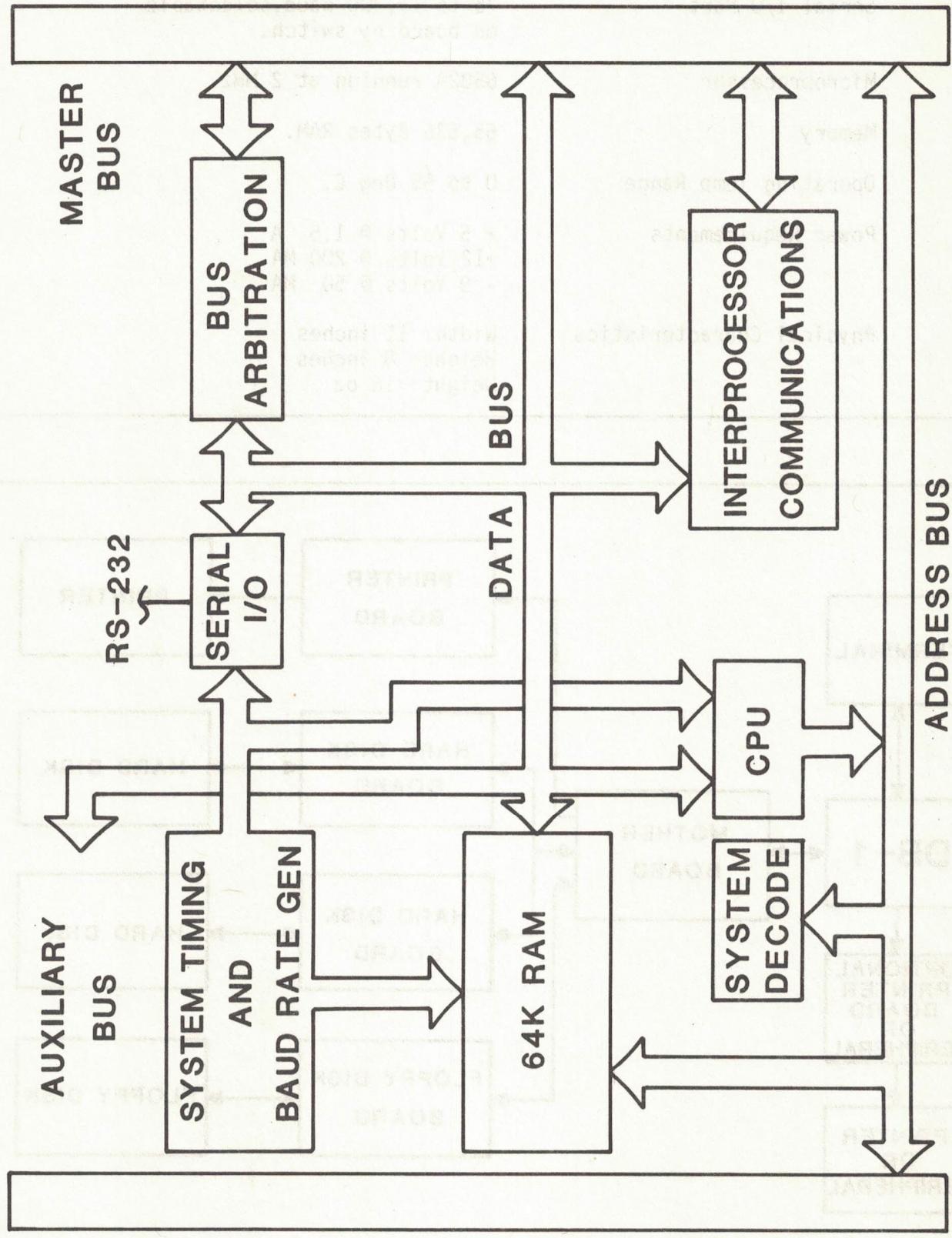


Figure 1-3. Functional Block Diagram.

SOFTWARE MODIFICATION

2.1 GENERAL

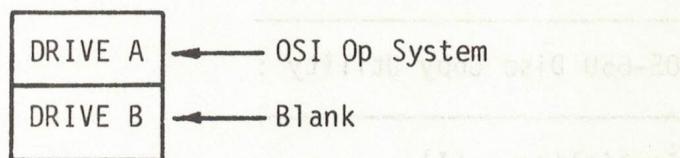
This section provides information on upgrading the existing OSI Operating System to accommodate the addition of the terminal expansion board DB-1. Carefully read all the instructions in this section before proceeding with the actual modification.

2.2 SOFTWARE PATCH INSTRUCTIONS

Included in the shipment of the DB-1 package is one eight inch floppy disk marked DB-1 Software Modification Programs. You will need this disk and one blank/scratch disk to perform the modification.

2.2.1 PATCH PROCEDURE

It is necessary to have your present OSI Operating System on an eight inch floppy disk. If it is located on the hard disk, make a copy and label it OSI Operating System Master (Single User). This disk will be used as your file copy and in case you encounter any equipment problems while making the modification. Power up your OSI Computer System and boot up as normal. After the Computer is up and running insert the OSI Operating System Master (Single User) disk into Drive A and a blank disk into drive B. Example below is for hard disk modification



Call up: MENU

SCREEN WILL DISPLAY:

```
: OS-65U V1.42 3/82 - CD-36 - 2 Mhz - Dev A ! Single User :  
: M/A-COM Office Systems Inc. Business BASIC ! :  
: Copyright 1981, 1982 - All Rights Reserved ! :
```

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) System Utilities
- 4) Transient Utilities
- 5) Unlock System
- 6) Select File System
- 7) Select Multi - User Menu

Enter your selection ? ENTER 3

SCREEN WILL DISPLAY:

INITIALIZATION STATUS

READY FOR

: System Utilities :

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) Create file
- 4) Delete file
- 5) Rename file
- 6) Dump file contents
- 7) Copy from file to file
- 8) Disc Copier
- 9) General purpose DMS+ compatiable file editor

Enter your selection, <return> to exit ? ENTER 8

SCREEN WILL DISPLAY:

OS-65U Disc Copy Utility :

- | |
|---------|
| A DRIVE |
| B DRIVE |
- Initialize (I)
 - Copy System (S)
 - Copy Files (F)
 - Copy Both (B)
 - Exit (cr) ? ENTER I

SCREEN WILL DISPLAY:

DEvice ? ENTER B

SCREEN WILL DISPLAY:

From address ? ENTER 0

SCREEN WILL DISPLAY:

To address ? ENTER 25087

SCREEN WILL DISPLAY:

Will Initialize 0 through 25087
Alright ? ENTER Y

SCREEN WILL DISPLAY:

Initialize (I)
Copy System (S)
Copy Files (F)
Copy Both (B)
Exit (cr) ? ENTER S

SCREEN WILL DISPLAY:

From DEvice (<cr>=A) ? ENTER <cr>

SCREEN WILL DISPLAY:

To DEvice (<cr>=B) ? ENTER <cr>

SCREEN WILL DISPLAY:

Are you sure ? ENTER Y

SCREEN WILL DISPLAY:

From DEvice: A Address: 00000
Initialize (I)
Copy System (S)
Copy Files (F)
Copy Both (B)
Exit (cr) ? ENTER <cr>

To DEvice: B Address: 00000

SCREEN WILL DISPLAY:

Enter a <Return> to continue ? ENTER <Return>

SCREEN WILL DISPLAY:

: System Utilities :

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) Create file
- 4) Delete file
- 5) Rename file
- 6) Dump file contents
- 7) Copy from file to file
- 8) Disc Copier
- 9) General purpose DMS+ compatiable file editor

Enter your selection, <return> to exit ? ENTER <cr>

SCREEN WILL DISPLAY:

Enter a <Return> to continue ? ENTER <Return>

SCREEN WILL DISPLAY:

: OS-65U V1.42 3/82 - CD-36 - 2 Mhz - Dev A ! Single User :
: M/A-COM Office Systems Inc. Business BASIC ! :
: Copyright 1981, 1982 - All Rights Reserved ! :

: Functions :

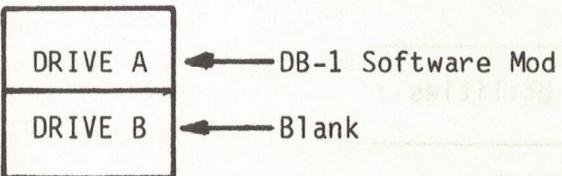
- 1) DIRECtory
 - 2) Print DIRECtory
 - 3) System Utilities
 - 4) Transient Utilities
 - 5) Unlock System
 - 6) Select File System
 - 7) Select Multi - User Menu

Enter your selection ? ENTER 5

SCREEN WILL DISPLAY:

OK
ENTER NEW

Take the OSI Operating System Master Disk out of Drive A and insert the DB-1 Software Modification Disk.



SCREEN WILL DISPLAY:

OK
ENTER RUN"莫斯模

SCREEN WILL DISPLAY:

65U Multi-Processing Setup Utility

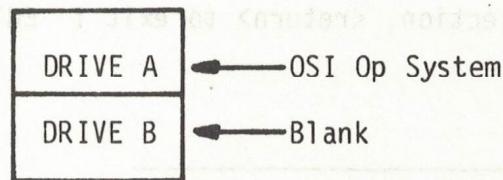
SCREEN WILL DISPLAY:

What type of drive:
1) Floppy
2) Hard
? ENTER 2

SCREEN WILL DISPLAY:

OK
ENTER NEW

Take the DB-1 Software Modification Disk out of Drive A and insert the OSI Operating System Master Disk.



SCREEN WILL DISPLAY:

OK
ENTER RUN"BEXEC*

SCREEN WILL DISPLAY:

: OS-65U V1.42 3/82 - CD-36 - 2 Mhz - Dev A ! Single User :
: M/A-COM Office Systems Inc. Business BASIC ! :
: Copyright 1981, 1982 - All Rights Reserved ! :

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) System Utilities
- 4) Transient Utilities
- 5) Unlock System
- 6) Select File System
- 7) Select Multi - User Menu

Enter your selection ? ENTER 3

SCREEN WILL DISPLAY:

: System Utilities :

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) Create file
- 4) Delete file
- 5) Rename file
- 6) Dump file contents
- 7) Copy from file to file
- 8) Disc Copier
- 9) General purpose DMS+ compatiable file editor

Enter your selection, <return> to exit ? ENTER 3

SCREEN WILL DISPLAY:

: OS-65U Create File Utility V1.66 :

DEVice ? ENTER E

SCREEN WILL DISPLAY:

File Name (six characters maximum) ? ENTER MPEXC*

SCREEN WILL DISPLAY:

Maximum length in bytes (decimal) ? ENTER 10752

SCREEN WILL DISPLAY:

File Type
Data (D)
Basic (B)
Other (O) ? ENTER B

SCREEN WILL DISPLAY:

Access Rights
None (N)
Read (R)
Write (W)
Read/Write (RW) ? ENTER R

SCREEN WILL DISPLAY:

Four Letter Pass Word ? ENTER PASS

SCREEN WILL DISPLAY:

MPEXC* BASIC Read 10752 PASS
Are you sure ? ENTER Y

SCREEN WILL DISPLAY:

Please Wait...
Another (A)
DIRECtory (D)
Exit (cr) ? ENTER <cr>

SCREEN WILL DISPLAY:

Enter a <Return> to continue ? ENTER <Return>

SCREEN WILL DISPLAY:

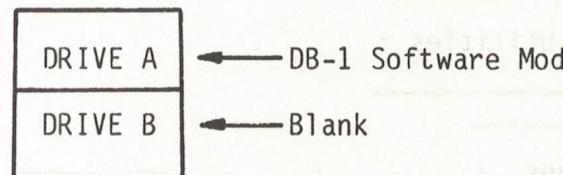
: System Utilities :

: Functions :

- 1) DIRECtory
- 2) Print DIRECtory
- 3) Create file
- 4) Delete file
- 5) Rename file
- 6) Dump file contents
- 7) Copy from file to file
- 8) Disc Copier
- 9) General purpose DMS+ compatiable file editor

Enter your selection, <return> to exit ? ENTER 7

Take the OSI Operating System Master Disk out of Drive A
and insert the DB-1 Software Modification Disk.



SCREEN WILL DISPLAY:

: OS-65U Copy File Utility :

From
DEvice ? ENTER A

SCREEN WILL DISPLAY:

File Name ? ENTER MP74-for 74/36 meg Hard Disk
or
MP23-for 23/7 meg Hard Disk

SCREEN WILL DISPLAY:

Password ? ENTER PASS

SCREEN WILL DISPLAY:

To
DEvice ? ENTER E

SCREEN WILL DISPLAY:

Filename ? ENTER MPEXC*

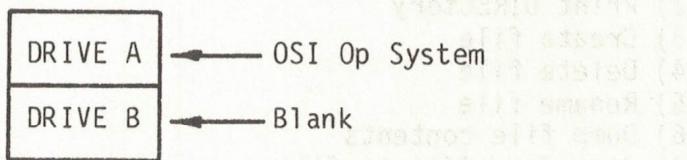
SCREEN WILL DISPLAY:

Password ? ENTER PASS

SCREEN WILL DISPLAY:

Are you sure ? ENTER Y

After program transfer take the DB-1 Software Modification Disk out of Drive A and insert the OSI Operating System Master Disk.



SCREEN WILL DISPLAY:

Enter a <Return> to continue ? ENTER <cr>

SCREEN WILL DISPLAY:

: System Utilities :

: Functions :

- 1) DIRECtory
- 2) Print DIRECTORY
- 3) Create file
- 4) Delete file
- 5) Rename file
- 6) Dump file contents
- 7) Copy from file to file
- 8) Disc Copier
- 9) General purpose DMS+ compatible file editor

Enter your selection, <return> to exit ? ENTER 8

SCREEN WILL DISPLAY:

: OS-65U Disc Copy Utility :

Initialize (I)
Copy System (S)
Copy Files (F)
Copy Both (B)
Exit (cr) ? ENTER S

SCREEN WILL DISPLAY:

From DEvice (<cr>=A) ? ENTER B

SCREEN WILL DISPLAY:

To DEvice (<cr>=B) ? ENTER E

SCREEN WILL DISPLAY:

From system based at address ? ENTER 0

SCREEN WILL DISPLAY:

Are you sure ? ENTER Y

SCREEN WILL DISPLAY:

From DEvice: B Address: 00000
Initialize (I)
Copy System (S)
Copy Files (F)
Copy Both (B)
Exit (cr) ? ENTER <cr>

To DEvice: E Address: 00000

You have made a DB-1 - OSI Operating System Master and copied it down to the Hard Disk for permanent use. Take the floppy disk out of Drive B and label it DB-1 - OSI Operating System Master (Multi User). This is the same Operating System that is now on your Hard Disk. In a safe place File the OSI Operating System Master (Single User), DB-1 Software Modification Master, DB-1-OSI Operating System Master (Multi User), and the floppy disk for future use. Power down the OSI Computer System. You are now ready to proceed with the Installation Section.

INSTALLATION

3.1 GENERAL

The DB-1 has a 48-pin master BUS that is plug compatible with the OSI C2, C3, 220, 230, and 240 BUS. The DB-1 replaces the OSI CA-10X terminal, CPU, and memory circuit boards. If a printer is to be assigned to an individual terminal, the printer I/O circuit board may be plugged into the DB-1 through an optional adapter available at additional cost.

3.2 BOARD SET UP PROCEDURES

The DB-1 has two Dip Switches S1 and S2, and one Pushbutton Switch S3 (Reset). S1 is the Board Address Switch. Position S1 (Refer to Figure 1-1 for component location) as shown in Table 3-1

TABLE 3-1. BOARD ADDRESS SWITCH SETTINGS

User Number	S1 Pin Setting	User Number	S1 Pin Setting
	4 3 2 1		4 3 2 1
Zero	1 1 1 1	Eight	1 1 1 0
One	0 1 1 1	Nine	0 1 1 0
Two	1 0 1 1	Ten	1 0 1 0
Three	0 0 1 1	Eleven	0 0 1 0
Four	1 1 0 1	Twelve	1 1 0 0
Five	0 1 0 1	Thirteen	0 1 0 0
Six	1 0 0 1	Fourteen	1 0 0 0
Seven	0 0 0 1	Fifteen	0 0 0 0

1 = On, 0 = Off

S2 is the Baud Rate and auto Boot Switch. Determine the Baud Rate for your Terminal (from terminal operators manual) and if Auto Boot (Automatically Boots up when system is turned on) is wanted and position S2 (Refer to Figure 1-1 for component location) as shown in Table 3-2.

TABLE 3-2. BAUD RATE SWITCH SETTINGS

Baud Rate	S2 Pin Setting
	1 2 3 4 5 6 7 8 9 10
75	On Off Off Off Off Off Off Off Off
150	Off On Off Off Off Off Off Off Off
300	Off Off On Off Off Off Off Off Off
600	Off Off Off On Off Off Off Off Off
1200	Off Off Off Off On Off Off Off Off
2400	Off Off Off Off Off On Off Off Off
4800	Off Off Off Off Off Off On Off Off
9600	Off Off Off Off Off Off Off On Off
19200	Off Off Off Off Off Off Off Off On
Auto Boot On	On
Auto Boot Off	Off

3.3 TERMINAL INTERFACE CABLE

One Terminal Interface Cable is required for each DB-1 Board Installed. If you are setup for multiuser, the cable going from the back of the OSI System to the CA10X Terminal Board can be made into Four seperate cables. Disconnect the cable and cut off the twelve pin MOLEX plug. With the three pin MOLEX plug provided with each DB-1, construct four seperate cables (figure 3-1). If you are setup for single user construct a cable for each DB-1 installed as shown in figure 3-1. If you are not able to construct a cable, contact your nearest cable manufacturing company and have them fabricate a cable using figure 3-1 as a guide.

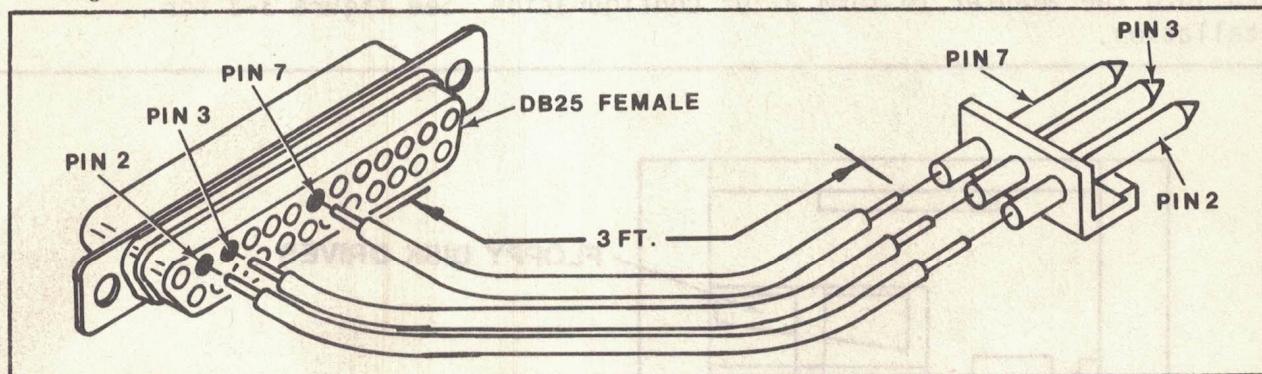


Figure 3-1. Terminal Interface Cable.

3.4 RESISTOR INSTALLATION

In the DB-1 package there are five metal film resistors. Pull out the CPU cabinet so all of the Circuit Cards are exposed. The five resistors are installed on the existing OSI Mother Board (Back Plain) in pins 17, and 19 thru 22. See Figure 3-2 for location.

NOTE: On most OSI Computer Systems four of these resistors are already installed on pins 19 thru 22. In this case just install the resistor on pin 17.

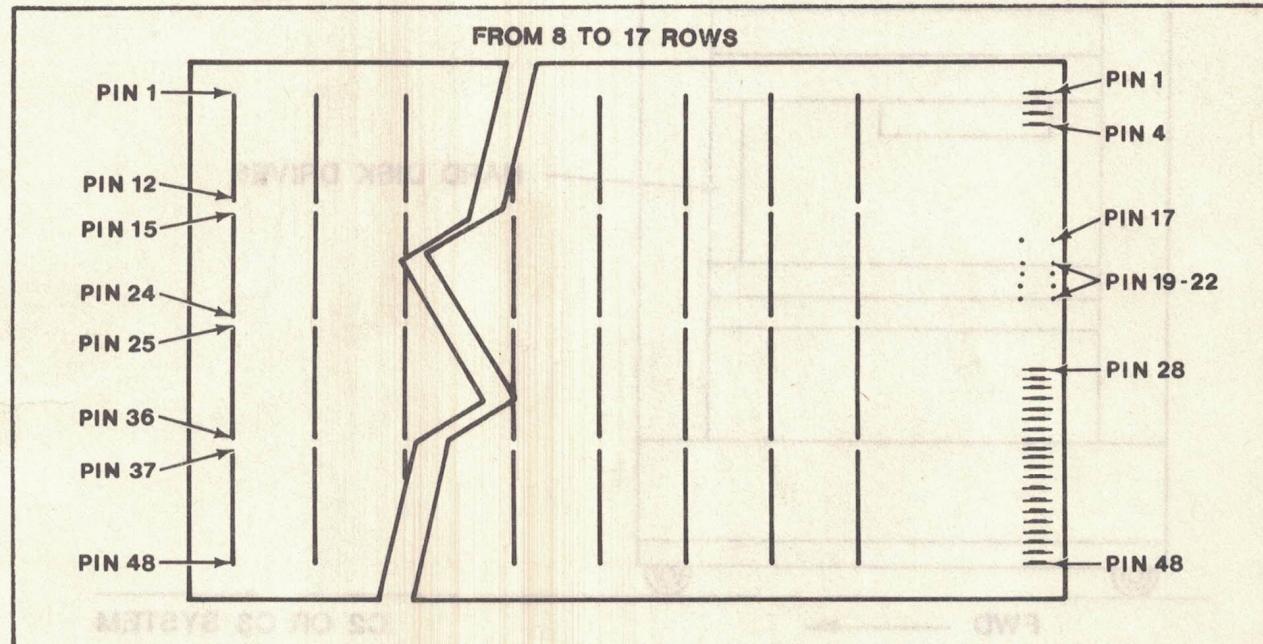


Figure 3-2. Resistor Installation Diagram.

Remove the CA10X Terminal Board (if used), the CPU board, and all of the Memory Boards. Insert the DB-1 Board(s) into any available slots on the Mother Board (Back Plain). Connect the Terminal Interface Cable to J2 (see figure 1-1 for component location) on the DB-1 Board(s). If more than four DB-1's are added an OSI rear panel is needed for the cabinet. If a printer or peripheral is being used by only one terminal it can be connected to the DB-1 by use of an adapter connector available from D.B.I., Inc at additional cost. Plug the adapter into the auxillary bus (front of the DB-1) and the printer board into the adapter to form a "U" configuration. See figure 3-3 for installation.

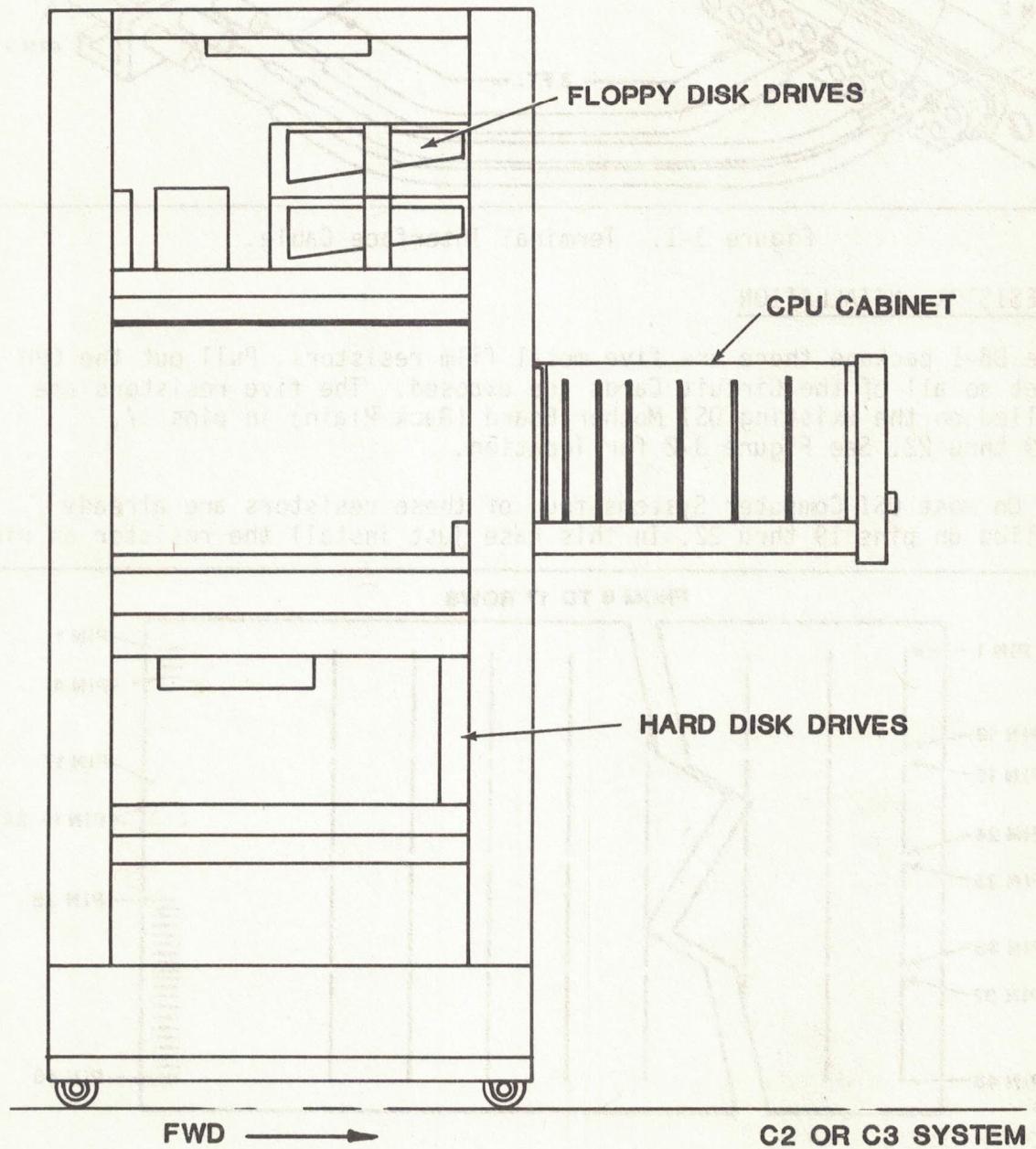


Figure 3-3. Installation Diagram (sheet 1 of 1).

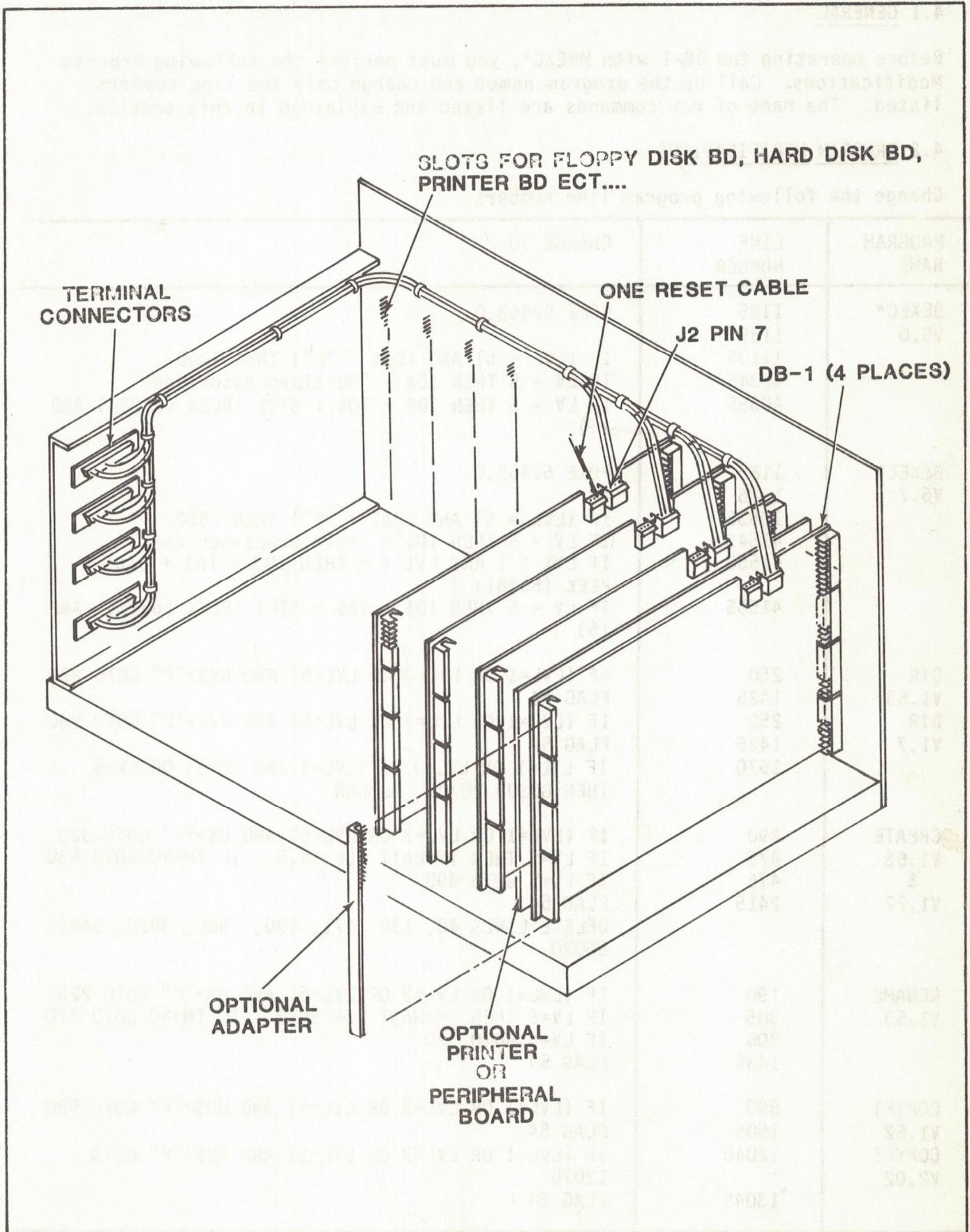


Figure 3-3. Installation Diagram (sheet 2 of 2).