
USER
GUIDE

applicationDEC 400*x*P

User Guide

Order Number: EK-PS200-CG. A01

This document describes the configuration and installation information for the applicationDEC 400*x*P system and all option modules and media storage devices available with it.

Digital Equipment Corporation
Maynard, Massachusetts

First Printing, February 1992

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- Bildschirmgeräte nach — DIN IEC 380/VDE 0806 oder EN 60950
  — ZH1/618
- Datensichtgerät — System to be used with GS approved terminals
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Contents

3 System Configuration

4 Opening the System Cabinet

5 Installation and Upgrade of the CPU Module and CPU Cache

6 Memory Installation

7 Installing Optional Disk and Tape Drives

8 Installing Option Modules

9 Installing a Terminal Multiplexer and Terminal Concentrator

10 Installing a SCSI Adapter and a Storage Expander

11 Installing a Printer

12 Uninterruptible Power Supply

13 System Exerciser - Installation Verification Procedure

14 Problem Solving

A Configuration Rules

B Device Mapping

C ISA Option Configuration Files

D Error and Informational Messages

E Equipment Log

F Caring for Your System

G Technical Specifications

Index

Figures

Tables

Preface

Intended Audience

This manual is intended for the users responsible for installation and upgrade of the applicationDEC 400*x*P system. Configuration and installation of all supported applicationDEC 400*x*P option modules and media devices are described in this book.

Purpose

This manual, the *applicationDEC 400xP User Guide*, is designed as a reference manual for all hardware configurable features of the system. It is not intended to be read sequentially. Instead, the manual is organized for easy reference when, at some later date, you need to install an option module or device.

Each piece of the system is described in a single chapter. Both the installation and configurable features of each item are identified and the selection options shown.

applicationDEC 400*x*P system Documentation Set

This manual is part of a documentation set shipped with each applicationDEC 400*x*P system. The manuals in this set are listed in Table 1.

Table 1 applicationDEC 400*x*P Documentation Set

Manual	Part Number
System Installation Guide[1]	EK-PS200-IG
Minimum Requirements for Operating Systems[1]	EK-PS200-AD
Electrostatic Discharge Notice[1]	EK-PS200-ED
Product Information Request[1]	EK-PS200-CC
Software Support Notice[1]	EK-PS100-SW
User Guide	EK-PS200-CG
SCO UNIX Boot Process Notice[1]	EK-PS200-SB

[1]Part of the *applicationDEC 400xP Installation Package* (EK-PS200-IP)

Conventions

The following conventions are used in this manual:

Enter	A key name, such as Enter, is shown enclosed to indicate that you press a key on the keyboard.
Ctrl/X	A two key sequence, such as Ctrl/X, is shown enclosed to indicate that you must hold down the key labeled Ctrl while you simultaneously press another key.
Ctrl/Alt/Delete	A multiple key sequence, such as Ctrl/Alt/Delete, is shown enclosed to indicate that you must hold down the keys labeled Ctrl and Alt while you simultaneously press another key.
boldface text	Boldface text is used to represent the name of a command.
italic text	Italic text is used to indicate SCO UNIX System V file names.

CHAP 1

1

System Overview

The applicationDEC 400xP system is a versatile, industry standard computer system suitable for use in any of the following configurations:

- Multiuser timesharing configurations running SCO UNIX System V
- Network file server for Digital PATHWORKS, Novell NetWare, or Banyan Vines network operating systems
- Single user workstation environments running MS–DOS or Open Desktop

1.1 Features

The applicationDEC 400xP system features include:

- Intel 80486 CPU speeds of 25, 33, or 50 MHz
- Cache memory up to 256 KB
- Up to 192 MB of memory
- Support for 2, 4, 8, and 16 MB single in-line memory modules (SIMMs)
- Support for IDE and SCSI hard disks
- Up to 4.8 GB of internal SCSI disk storage
- Up to 14 GB of additional external disk storage
- Universal 350 W power supply
- 1.44 MB 3.5-inch diskette drive standard
- Seven half-height storage bays, convertible to three full-height and one half-height bay

The applicationDEC 400xP system supports:

- SCO UNIX System V
- Open Desktop
- All industry standard SCO UNIX System V applications
- MS–DOS
- Banyan Vines
- Novell NetWare

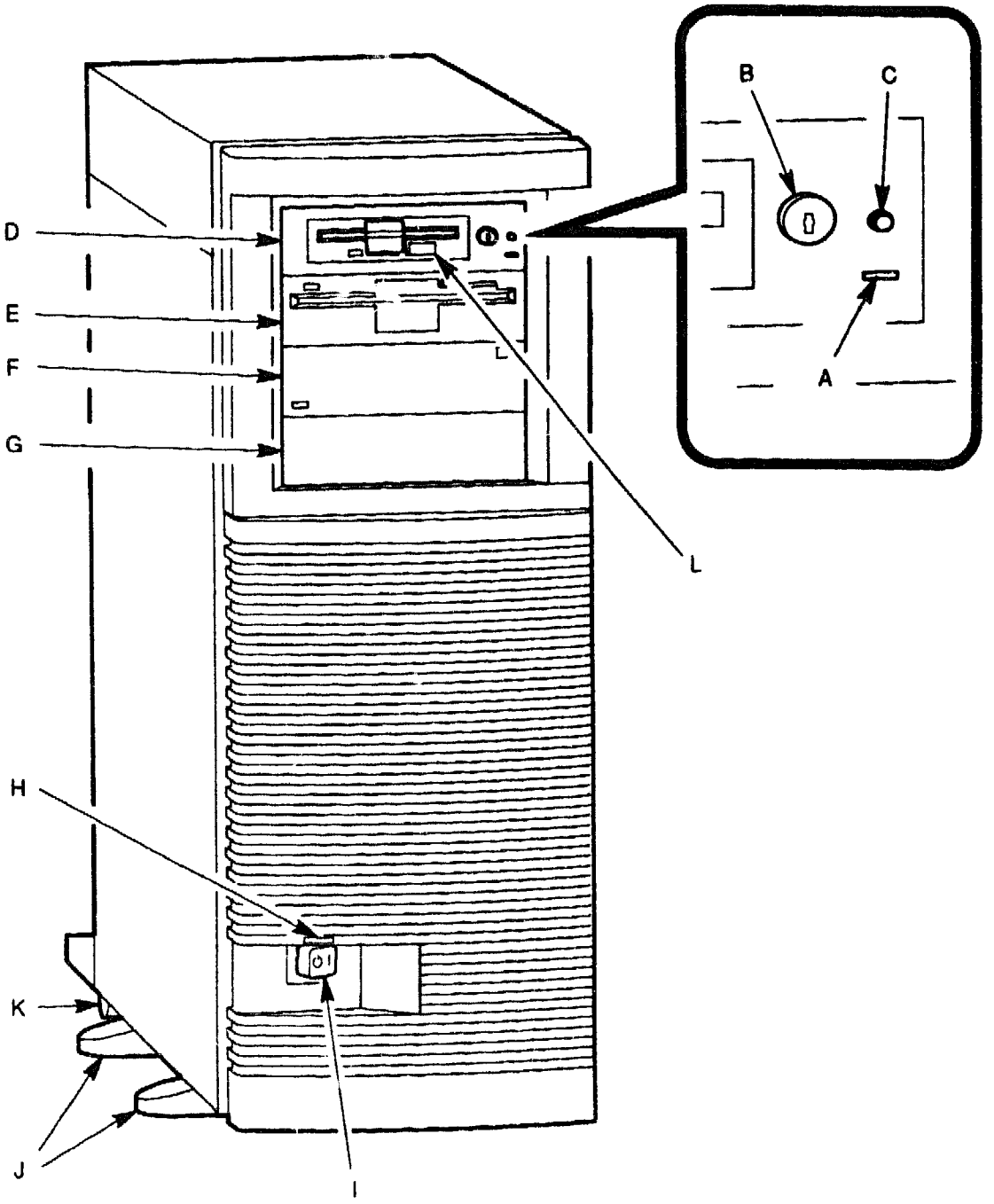
System Cabinet

The system cabinet front panel is shown in Figure 1–1. Refer to the figure key in Table 1–1.

Table 1–1 Key for Figure 1–1

Key	Description
A	Disk activity LED — indicates activity on the IDE and SCSI bus
B	Keyboard lock — disables system keyboard and mouse
C	Reset button — resets the system by emulating a power-off/power-on sequence and causes POST to run
D	1.44 MB, 3.5-inch diskette drive
E	1.2 MB, 5.25-inch diskette drive (optional)
F	525 MB QIC tape drive (optional)
G	Blank panel
H	Power indicator — indicates power is applied to the system
I	Power switch (Standby/On) — applies power to the system
J	Support feet
K	Cabinet rear wheels
L	Diskette eject button

Figure 1–1 System Cabinet, Front View



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1.2 Moving the System

To move the system, grasp the front bezel near the top of the system cabinet and lift the front of the cabinet slightly. The system can then be moved by wheeling it on the rear wheels.

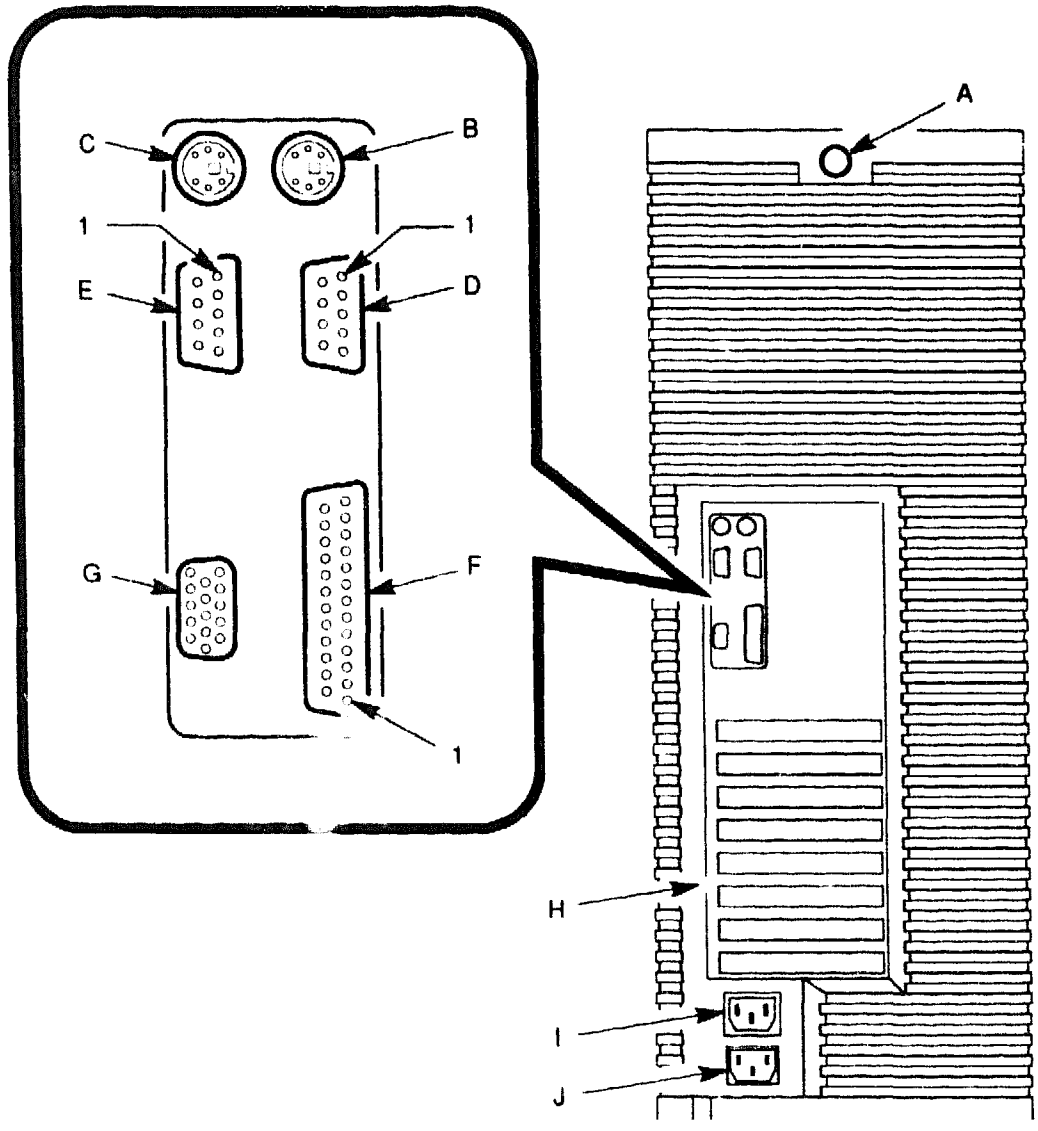
1.3 Rear Connectors

The system cabinet rear panel connectors are shown in Figure 1–2. Refer to the figure key in Table 1–2.

Table 1–2 Key for Figure 1–2

Key	Description
A	Cabinet keylock
B	Mouse connector — connects mouse used with VGA analog monitor
C	Keyboard connector — connects keyboard used with VGA analog monitor
D	Serial port 2 — RS-232 port for serial printers, UPS control, configured as COM2
E	Serial port 1 — RS-232 port for serial printers, UPS control, configured as COM1
F	Parallel port — parallel printer port, configured as LPT1
G	VGA monitor connector — connects VGA analog monitor
H	Option module external connector slots (8)
I	Auxiliary ac output — unswitched IEC-320 connector
J	AC input

Figure 1–2 System Cabinet, Rear View



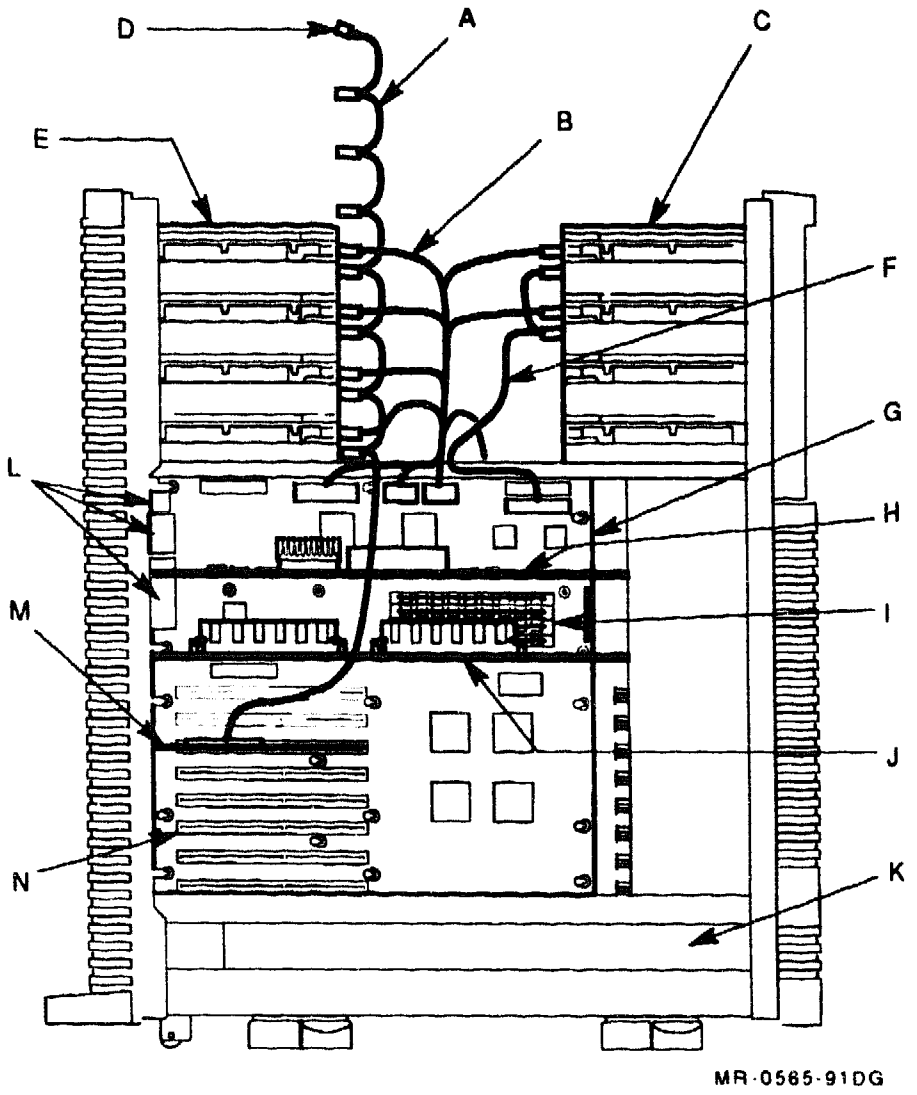
1.4 System Cabinet Internals

Figure 1–3 shows the major components of the system when the cabinet is opened. Refer to the figure key in Table 1–3.

Table 1–3 Key for Figure 1–3

Key	Description
A	SCSI bus cable
B	Power cables
C	Front drive bays
D	SCSI terminator
E	Rear drive bays
F	Diskette drive cable
G	System board
H	CPU module
I	On-board memory SIMMs
J	Memory expansion module
K	Power supply
L	I/O connectors
M	SCSI host adapter
N	EISA option module slots (8)

Figure 1–3 System Cabinet, Internal View



1.5 System Power

In the lower area of the cabinet is the system power supply. The supply provides 350 W to the system cabinet and autosenses input power. This means the cabinet can be connected to 110/120 V or 220/240 V, 50 or 60 Hz, without making any mechanical settings.

1.6 System Logic

The applicationDEC 400xP system consists of three logic modules (see Figure 1–3):

- System board
- CPU module with plug-in cache (25 MHz and 33 MHz CPU) or attached cache (50 MHz CPU)
- Optional memory expansion module

1.6.1 System Board

The system board, shown in Figure 1–4, contains the following features:

- Slot for CPU module
- Slot for memory expansion module
- 8 EISA slots (6 bus master slots, 2 slave slots)
- On-board VGA with 512K RAM (optional upgrade to 1 MB RAM) and 1024 x 768 resolution
- 4 SIMM sockets (accepts 2, 4, 8, and 16 MB SIMMs for maximum of 64 MB)
- Diskette drive control
- IDE disk control
- 2 serial 9-pin ports
- 1 parallel 25-pin port
- Keyboard and mouse connections
- VGA monitor connection

Refer to the figure key in Table 1–4.

1.6.2 CPU Module

The CPU and all associated speed-dependent components are isolated on a separate CPU module. Upgrading a system is as easy as removing the current CPU module and replacing it with a faster CPU module. The system can be configured for use with the following Intel 80486 CPUs.

- 25 MHz Intel 486SX
- 33 MHz Intel 486DX
- 50 MHz Intel 486DX

The 25 MHz and 33 MHz CPU modules contain a socket for installation of an optional 64 or 128 KB cache card. The 50 MHz CPU module comes standard with 256 KB cache installed.

1.6.3 Memory Expansion Module

The memory expansion module:

- Allows for increased memory beyond the 64 MB of memory that can be installed on the system board
- Is installed in a slot on the system board
- Contains 8 SIMM slots
- Accepts 2, 4, 8, and 16 MB SIMMs

If 16 MB SIMMs are installed on the memory expansion module, an additional 128 MB of memory is provided. Combined with the maximum possible 64 MB available on the system board, 192 MB of memory is available.

All of the memory logic is designed for future support of 32 MB SIMMs. When 32 MB SIMMs are available, the total possible memory will be 384 MB.

Figure 1–4 System Board

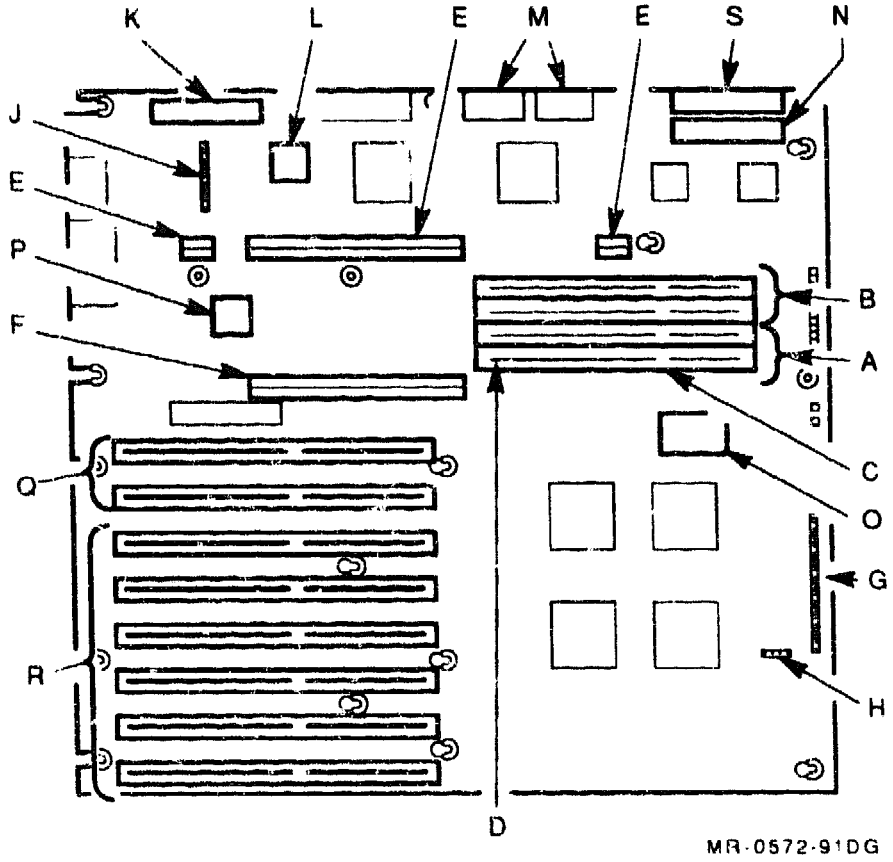


Table 1–4 Key for Figure 1–4

Key	Description
A	Memory bank 0
B	Memory bank 1
C	Install first SIMM here
D	Pin 1 of SIMM socket
E	CPU module slot
F	Memory module slot
G	System setup jumpers[1]
H	LED SCSI activity cable connector (connect SCSI adapter activity output here)
J	VGA setup jumpers[1]
K	IDE cable connector
L	VGA 512K memory upgrade socket
M	Power connector (cable from power supply is factory installed)
N	Diskette cable connector (cable is factory installed)
O	Real-time clock
P	Western Digital WD90C30 VGA chip
Q	EISA slave slots
R	EISA master slots
S	Front panel connector (cable is factory installed)

[1]Table G–14 lists all the system board jumpers and factory default settings.

1.7 On-Board Video Graphics Adapter

The on-board video graphics adapter (VGA) is a Western Digital WD90C30 chip. This VGA provides the resolutions listed in Table 1–5.

Table 1–5 VGA Resolutions

Video Memory	Resolution	Colors
512K	640 x 400	256
512K	640 x 480	256
512K	800 x 600	256
512K	1024 x 768	16
1 MB	1024 x 768	256

The VGA comes standard with 512K of video memory. An optional 512K RAM upgrade is available. When the 512K RAM upgrade is installed, jumper E0720 must be moved from the 1–2 position to the 2–3 position.

In 800 x 600 mode, refresh rates of 56, 60, or 72 Hz are supported. In 1024 x 768 mode, refresh rates of interlaced 44/88 Hz and noninterlaced 60 and 70 Hz are supported. The refresh rate selection is made in the system configuration utility (SCU).

For SCO UNIX System V and Open Desktop, use the **mkdev graphics** command to specify the resolution. The WD controller is supported by SCO UNIX System V and Open Desktop.

For DOS, three utilities and driver diskettes are provided for configuring the video. Use the VGAMODE.EXE utility to select the resolution. Read the README file on the DOS formatted diskette for full instructions on VGAMODE.EXE.

Table 1–6 lists the utilities on the diskettes.

The software drivers on the video disks allow some applications to execute in high resolutions. The refresh frequency you use depends on the type of monitor. Refer to the monitor documentation for more information.

Refer to the Video Drivers Disk README file for information on:

- DOS driver installation procedure
- OS/2 driver installation procedure
- Installing software application drivers under DOS
- Software installation tips

Table 1–6 VGA Utility Software

Utility	Description
Disk 1	
FRAMEWORK II drivers	Used for various resolutions
GEM 3.0 and 3.1 driver	Used for various resolutions
Lotus 1-2-3 driver	Used for various resolutions
Lotus Symphony driver	Used for various resolutions
Ventura Publisher driver	Used for various resolutions
Windows 3.0 driver	Used for various resolutions
WordPerfect drivers	Used for various resolutions
VGAMODE.EXE	Mode switching utility. This program controls the standard that the video emulates.
RAMBIOS.EXE	TSR program to copy BIOS to RAM
RAMBIOS.SYS	Device driver to copy BIOS to RAM
RWS.EXE	WordStar page preview mode
SS.EXE	Screen saver program
Disk 2	
AutoShade v1.x driver	Used for various resolutions
AutoCAD Release 9/Release 10 non-display list dual screen driver	Used for various resolutions
SETC.EXE	AutoCAD R9/R10 utility for setting color
AutoCAD R10 display list driver	Used for various resolutions
AutoCAD R9/R10 386 non-display list driver	Used for various resolutions
AutoCAD Release 11 display list driver	Used for various resolutions
CONF.EXE	Configuration program for R11 display list drivers
Cadvance drivers	Used for various resolutions
Generic CADD level 3 driver	Used for various resolutions
P-Cad level 2 driver	Used for various resolutions

(continued on next page)

Table 1–6 (Cont.) VGA Utility Software

Utility	Description
Versacad v5.3 and v5.4 drivers	Used for various resolutions
Versacad v5.4/386 driver	Used for various resolutions
Disk 3	
MicroSoft OS/2 1.21 PM driver	Used for various resolutions

1.8 Disk Storage and Media Options

The system board supports IDE drives directly. An IDE drive connector on the board allows connection of up to two 105 MB half-height IDE drives.

By installing a SCSI adapter in an EISA expansion slot, greater expansion is possible. A SCSI bus can have up to seven SCSI devices. The system enclosure has seven half-height expansion bays. These are convertible to full-height bays. Any combination of full- and half-height bays is possible. For maximum storage, three 1.3 GB full-height SCSI drives and one 825 MB half-height drive can be installed for a total of 4.8 GB inside the enclosure.

Three of the seven half-height storage bays are accessible. These bays are directly below the standard 3.5-inch 1.44 MB diskette drive in the front of the enclosure. These bays can be used for the installation of SCSI half-height or full-height tape drives, if desired.

1.9 External SCSI Storage Devices in the PS2XR-*xx* Storage Expander

The Storage Expander allows for a variety of configuration options in a tower cabinet that matches the applicationDEC 400*x*P cabinet. The Storage Expander can contain up to fourteen half-height disk drives, for a total capacity of 11.5 GB, or up to seven full-height disk drives for a total capacity of 9.1 GB. The Storage Expander has the following features:

- A total of 14 half-height (7 full-height) storage bays
- Four half-height (2 full-height) externally accessible bays, for tape drives or SCSI diskette drives available from third parties

- Connections for one or two SCSI buses
- A 350 W international power supply, which automatically senses 110/120 V or 220/240 V

For maximum storage, two Storage Expanders each with seven 1.3 GB disks can be attached to SCSI adapters in the EISA bus. This provides 18.2 GB of external storage.

1.9.1 Use of Vendor Hard Disk Drives

The storage limitations described above are based on Digital Equipment Corporation hard disk drives. Higher storage capabilities might be acheived by using another vendor's SCSI hard disk drives.

1.10 Option Module Slots

Eight extended industry standard architecture (EISA) option slots are available on the system board. The slots are industry standard architecture (ISA) compatible, so both EISA and ISA option modules can be installed.

Six of the EISA slots are EISA master slots. EISA master modules must be installed in EISA master slots. EISA master modules are devices which assume control of the bus for activities such as direct memory access (DMA). ISA modules and EISA slave modules may be installed in any slot.

Some of the option modules supported by the applicationDEC 400*x*P system are listed below. More information is provided in the chapters on the specific options.

- Terminal multiplexer
- SCSI (small computer system interface) bus adapter supporting up to seven devices per bus
- VGA (video graphics array) adapter used in place of the on-board VGA

1.11 Standard and Optional Components

Table 1–7 lists the applicationDEC 400xP system standard and optional components that are supported. Table 1–8 identifies the option modules as master or slave.

Table 1–7 Standard and Optional Components

Area	Standard	Optional
Memory	4 MB	Upgrade to 192 MB
CPU	Specified when ordered	Upgrade 25 MHz to 33 MHz or 50 MHz Upgrade 33 MHz to 50 MHz
Cache	None with 25 MHz and 33 MHz CPUs	Upgrade to 64 KB or 128 KB
	256 KB with 50 MHz CPU	
Diskette drive	1.44 MB, 3.5-inch (RX23)	1.2 MB, 5.25-inch (RX33)
QIC tape cassette (SCSI) drive		525 MB (TZK10)
Disk drive (SCSI)		209 MB (RZ24), 426 MB (RZ25), 665 MB (RZ56), 825 MB (RZ35), 1.0 GB (RZ57), 1.3 GB (RZ58)
Disk drive (IDE)		105 MB
Terminal multiplexer kit		PC4XD-DA
SCSI adapter		Adaptec 1540B, 1520, or 1740A
Ethernet adapter		3Com 3C503, WD 8003, WD 8013-EBT
Printer		LA70, LA75, LA324, DEClaser
Uninterruptible power supply		4N-AEAAE-AF

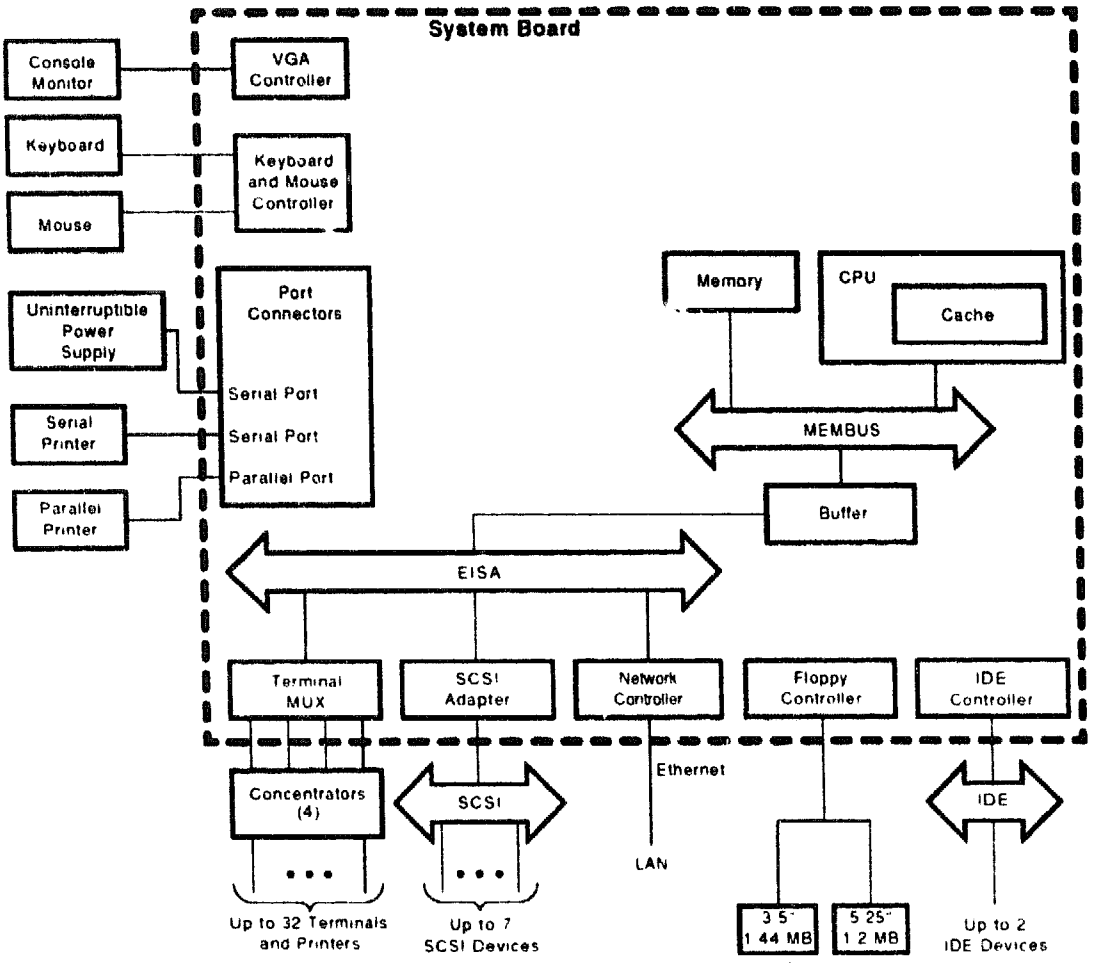
Table 1–8 Master/Slave Option Modules

Module	Slave	Master	Slot restrictions
Terminal multiplexer	X		None
Adaptec 1520 SCSI adapter	X		None
Adaptec 1540B SCSI adapter	X		None
Adaptec 1740A SCSI adapter		X	3 to 8
3Com 3C503 Ethernet adapter	X		None
Western Digital WD8003 Ethernet adapter	X		None
Western Digital WD8013-EBT Ethernet adapter	X		None

1.12 Typical Multiuser Timesharing Configuration

Figure 1–5 shows a typical multiuser timesharing configuration. Three option modules are installed: a terminal multiplexer, a SCSI host adapter, and an Ethernet adapter. The user terminals connect to concentrators, which are connected to a terminal multiplexer installed in the EISA bus. Disk and tape storage is provided by the SCSI bus and, possibly, the IDE bus (from the on-board IDE controller). The SCSI bus can have up to seven devices (tapes and hard disk drives). The IDE bus can have up to two hard disk drives.

Figure 1–5 Multiuser Timesharing Configuration



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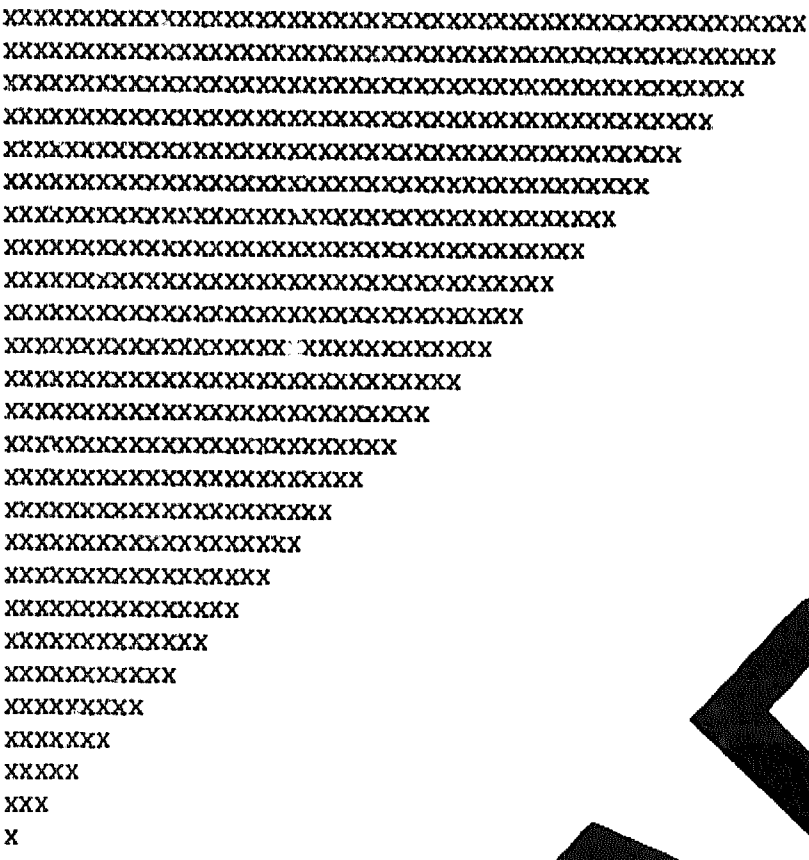
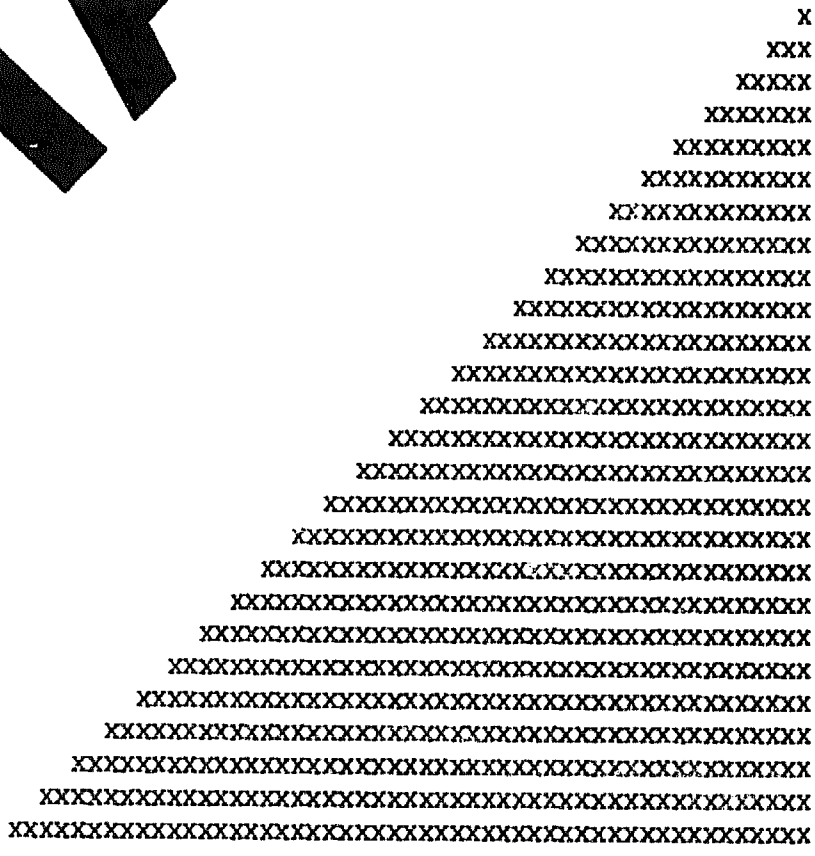


CHAP 2



2

System Startup

2.1 Introduction

This chapter describes how to start up the system. It also describes the following system components:

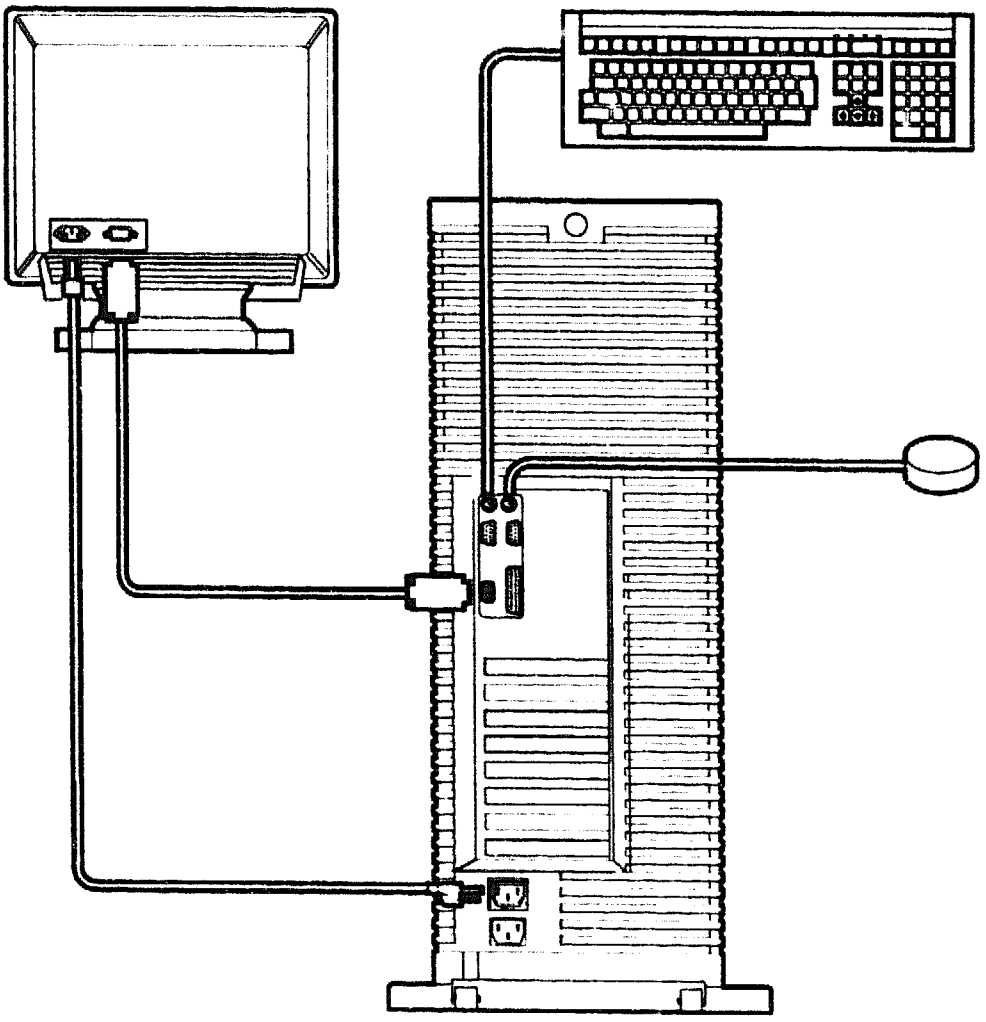
- System security
- Hot key sequences
- Power-on self-test (POST)
- BIOS setup utility
- Disk and tape drives
- Diskette drives

If the system does not operate as described in this chapter, follow the instructions in Chapter 14, Problem Solving. If error messages appear on the screen, refer to Appendix D, Error and Informational Messages, for possible causes and suggested solutions.

2.2 Installing the Monitor, Keyboard, and Mouse

The VGA monitor, keyboard, and mouse connectors are located on the rear of the system. Refer to Figure 2–1. Monitors with an IEC-320 connector (no prongs) can be plugged directly into the auxiliary ac output on the back of the system.

Figure 2–1 Monitor, Keyboard, and Mouse Installation



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2.3 System Security

The system cabinet comes with an electrical keylock that locks the keyboard and mouse to prevent unauthorized access. A set of matching keys is provided to operate the keylock, which is located at the front of the system cabinet (Figure 1–1).

In addition, there is a mechanical keylock in the back of the system to lock the system chassis (Figure 1–2). This keylock mechanically locks the cabinet top cover, thereby preventing any of the cabinet covers from being removed. The keys for the mechanical and electrical keylocks are not the same.

Note

Do not lose the system keys. Without them, you cannot lock or unlock the keyboard, mouse, and cabinet covers. Contact your Digital service representative for information on replacing lost keys.

An access password utility is also available. The password can be set using the system configuration utility (SCU). The password can be changed whenever it is entered. It must be entered every time the system is booted.

Keyboard and network passwords are also available. These passwords default to the same password as the power-on password. If separate keyboard and network passwords are desired, they are set using the SCU. See Chapter 3.

If additional system security is required, follow the procedures in Appendix G for disabling the FLASH memory jumper. Disabling the FLASH memory jumper permanently stores system configuration information in FLASH (nonvolatile) memory.

2.4 Hot Key Sequences

The following hot key sequences are used to invoke special system functions (see Table 2–1). Please note that all numbers and symbols refer to numeric pad keys.

Note

These BIOS based key sequences are disabled if SCO UNIX is running.

Table 2–1 Hot Key Sequences

Keystroke Sequence	Function
Ctrl/Alt/Delete	Soft boots the system.
Ctrl/Alt/1	Sets slow mode for the current session. CPU module simulates 8 MHz Intel 286 microprocessor operation. All caching logic is disabled.
Ctrl/Alt/2	Sets fast mode for the current session. CPU module operates at full rated speed.
Ctrl/Alt/+	Controls the keyboard-click sound. The keyboard-click sound increases to a maximum level, after which it returns to a minimum level and then repeats the sequence.

2.5 POST

Each time you turn on the applicationDEC 400αP system, the power-on self-test (POST) displays a numeric countdown (880 to 000) sequence as it checks the system board, Intel 486, system board timers and logic devices, keyboard, memory, and so on. POST countdown numbers 800 through 520 are displayed on the monitor.

Note

During the POST memory test, the amount of memory being tested is displayed on the screen. Depending on the amount of extended memory installed, the POST memory test can take several minutes to complete. POST does not check memory after a soft boot.

If POST does not detect any configuration errors, the system beeps once and displays a message similar to the following:

```
PhoenixBIOS (TM) E486 Version x.xx.xx.xxx
Copyright (c) 1985-1991 Phoenix Technologies Ltd.
All Rights Reserved
. . .

  640K Base Memory
03072K Extended
000

To continue press:.....................................SPACEBAR
To configure system press:.............................F1
```

Note

After the above message appears, you have approximately 10 seconds to press the appropriate function key to display the initial Setup screen. If you do not press the appropriate function key within the specified time, and if POST failed to detect any configuration errors, the system will continue with the boot sequence.

If configuration errors are found, the system beeps more than once and displays a message similar to the following:

```
PhoenixBIOS (TM) E486 Version x.xx.xx.xxx
Copyright (c) 1985-1991 Phoenix Technologies Ltd.
All Rights Reserved
. . .

  640K Base Memory
03072K Extended
150: Invalid configuration information

To continue press:.....................................Esc
To configure system press:.............................F1
```

It is normal for the above message to appear the first time you start the system. Run the system configuration utility (SCU) to create a valid system configuration. If any other error messages appear on the screen, refer to Appendix D, Error and Informational Messages, for possible causes and suggested solutions.

2.6 BIOS Setup Utility

The system board BIOS contains a Setup program that enables you to change certain configuration settings that are stored in CMOS. These settings take effect each time you boot the system. Refer to Table 3–2, System Board Setup Options, for a list of the configuration settings.

2.6.1 Running Setup

Note

Always use the SCU to configure your system. Do not use Setup to configure your system. Setup is used primarily to enable your diskette drive.

To run Setup, wait for POST to complete. Then, press the appropriate function key to display the following initial Setup screen in the chosen language:

```
                    **** NOTE ****

Since values specified using the BIOS Setup Utility will be overwritten when
the System Configuration Utility (SCU) is run, it is recommended that the BIOS
Setup Utility be used only if you:

o   Need to enable your diskette drive
o   Do not have access to a diskette drive
o   Have only ISA expansion boards and will not be using the SCU

To exit Setup press ESC. To continue Setup press F1.
```

2.6.2 Setup Options

The BIOS Setup Utility displays three pages of configuration options. These options are the same as those provided in the Configuration Computer option of the SCU with the exception of the password. For an explanation of these options, refer to Table 3–2 in Chapter 3, System Configuration. For an explanation of passwords, refer to Section 3.3.1, Access Password Utility.

2.6.3 Exiting Setup

To exit Setup after changing all desired options, press Esc to display the following menu:

```
Esc     Continue with SETUP.
F4      Save values, exit SETUP, and reboot.
F5      Load default values for all pages.
F6      Abort SETUP without saving values.
```

Note

After the system boots, make sure POST completed with no errors (000 will be displayed on the screen). If POST failed to complete, take the appropriate action to correct any errors.

You can also press F5 to load factory default values. Loading these values allows the system to operate with a minimum of options.

2.7 Disk and Tape Drives

The system uses hard disk drives, diskette drives, and tape drives to store information. Diskette drives and hard disk drives (IDE or SCSI interface compatible) are available in two sizes: 3.5-inch and 5.25-inch. Tape drives are available only in the 5.25-inch size.

Diskette drives and tape drives are mounted at the front of the system for easy access. Hard disk drives can also be mounted in the front drive bay (behind the front bezel) and in the rear drive bay. Note that the system board's diskette and IDE controller support two diskette drives and two IDE hard disk drives.

2.7.1 Drive Identifiers and System Prompts

Many software commands use a drive identifier to tell the system which disk drive to access. DOS uses a single letter followed by a colon (:). For example:

A: identifies the first diskette drive
B: identifies the second diskette drive (if installed)
C: identifies the first hard disk drive or partition
D: identifies the second hard disk drive or partition (if installed)

The DOS system prompt can be configured to let you know which drive is selected. The prompt usually includes one of the drive identifiers listed above.

Note

A streaming tape device is not recognized with the same type of identifier as a hard disk drive. A streaming tape device uses special software that distinguishes it from a diskette drive or hard disk drive.

2.8 Diskette Drives

The following paragraphs describe how to:

- Handle diskettes
- Write-protect 3.5-inch diskettes
- Write-protect 5.25-inch diskettes

2.8.1 Handling Diskettes

The applicationDEC 400xP system uses 3.5-inch and 5.25-inch diskettes. To preserve them, observe the following:

- Do not put heavy objects on a diskette.
- Store diskettes in a temperature range between 10°C and 51°C (50°F and 125°F).
- Keep diskettes away from magnetic fields.

In addition, observe the following when handling a 5.25-inch diskette:

- Do not touch or scratch any exposed portion of the magnetic surface or allow dust or moisture to collect on the diskette.
- Do not bend the diskette.

- When the diskette is removed from the diskette drive, place it in a diskette envelope.
- Use only felt-tipped pens to write on the diskette labels and press very lightly. Ball point pens or pencils can damage the diskette.

2.8.2 Write Protection

Write protection prevents inadvertent writing or deleting of data on diskettes. If a diskette is write-protected, the diskette drive cannot write to it.

2.8.2.1 Write-Protecting 3.5-Inch Diskettes

To write-protect a 3.5-inch diskette, turn the diskette over and slide the write-protect switch so the hole is visible. To write data on the diskette, slide the write-protect switch to cover the hole.

2.8.2.2 Write-Protecting 5.25-Inch Diskettes

Most 5.25-inch diskettes have a write-protect notch on the right side. If the notch is uncovered, you can write data on the diskette. If the notch is covered with a write-protect tab, the diskette is write-protected and data cannot be written to it. Diskettes without a notch are permanently write-protected.

2.9 Equipment Log

Use the equipment log in Appendix E to record the model and serial number of your system, all options you install, and any other pertinent information. You will need this information when configuring your system and if you need technical assistance or service.

A label on the card cage cover provides a place for you to record the modules and options currently installed. Use a pencil to update the label whenever you make changes to your configuration.


CHAP 3

3

System Configuration

This chapter provides detailed information on how to use the EISA system configuration utility (SCU).

3.1 EISA Architecture

The EISA bus provides an open architecture for installation of any EISA or ISA compliant option module. Specific parameters must be configured according to the option modules installed and how the system is configured. Parameters that can be assigned include:

- Interrupt request (IRQ) lines
- Memory address
- Port address
- DMA channel

The EISA architecture includes a means of configuring these parameters by the SCU. ISA modules are generally configured with jumpers and switches. EISA option modules have no jumpers or switches, and their addresses and interrupt selections are all made with the SCU.

The EISA architecture is an industry standard architecture shared by many manufacturers. The EISA system configuration utility (revision 2.0) is an industry standard utility which is customized for each manufacturer's system.

3.2 System Configuration Utility

The system configuration utility (SCU) is used to configure the system. The SCU performs many of the same functions that a firmware-based setup utility performs in other ISA systems. However, the SCU provides additional functionality beyond traditional setup utilities.

When the SCU executes, it is able to detect automatically your system board configuration (CPUs and memory) and any EISA modules that are installed. EISA modules are detected by polling modules on the EISA bus. ISA modules are detected by your use of ISA CFG files; you define the ISA modules installed in your system.

The SCU then creates a system configuration file which represents the configuration of your system. The SCU saves system configuration files in two ways:

- By writing system configuration data to nonvolatile memory on your system board
- By writing a system configuration file to your system configuration diskette

The stored data is accessed by the system firmware and must be accurate. Therefore the SCU must be run whenever your system configuration changes.

The system configuration file is also written to your SCU diskette as a backup. The file is included on your system as an SCI file.

Note

The SCU diskette must be write-enabled to write a system configuration file to your diskette. No error message is produced if the SCU is able to write to memory but not to your diskette. You must ensure that the SCU diskette is write-enabled.

3.2.1 Diskettes Provided

Two configuration diskettes are provided for use with the applicationDEC 400xP system, the SCU diskette and the library diskette. The SCU diskette contains both the SCU program and the system configuration files. When the SCU prompts you for the "System Configuration Diskette," this is the diskette that is needed. Also provided is a library diskette, labeled "Library Diskette," which contains ISA CFG files for many ISA modules.

3.2.2 When to Use the SCU

Features controlled by the SCU include the following:

- Select a specific keyboard type
- Copy the System Configuration Diskette
- Learn about configuring your computer
- Set the computer date and time
- Configure your computer
- Maintain the System Configuration Diskette
- Access the password utility

Each item is available through the main menu of the SCU (see Figures 3–1 and 3–2). You must run the SCU:

- When the system is first installed
- When you add or remove an ISA or EISA option module
- When you change a jumper or switch setting on an ISA option module
- When you need to set the date or time

Note

Refer to Appendix D for error messages that may be received during power-on, system boot, and SCU execution. Appendix D also lists recommended solutions.

3.2.3 Booting the SCU

Boot the SCU from the 3.5-inch diskette drive. Insert the sytem configuration diskette into the drive and press the reset switch on the front panel.

Note

Make a copy of the SCU using the SCU copy diskette function before proceeding with any system configuration tasks.

Figure 3–1 SCU Main Menu Options (Part 1 of 2)

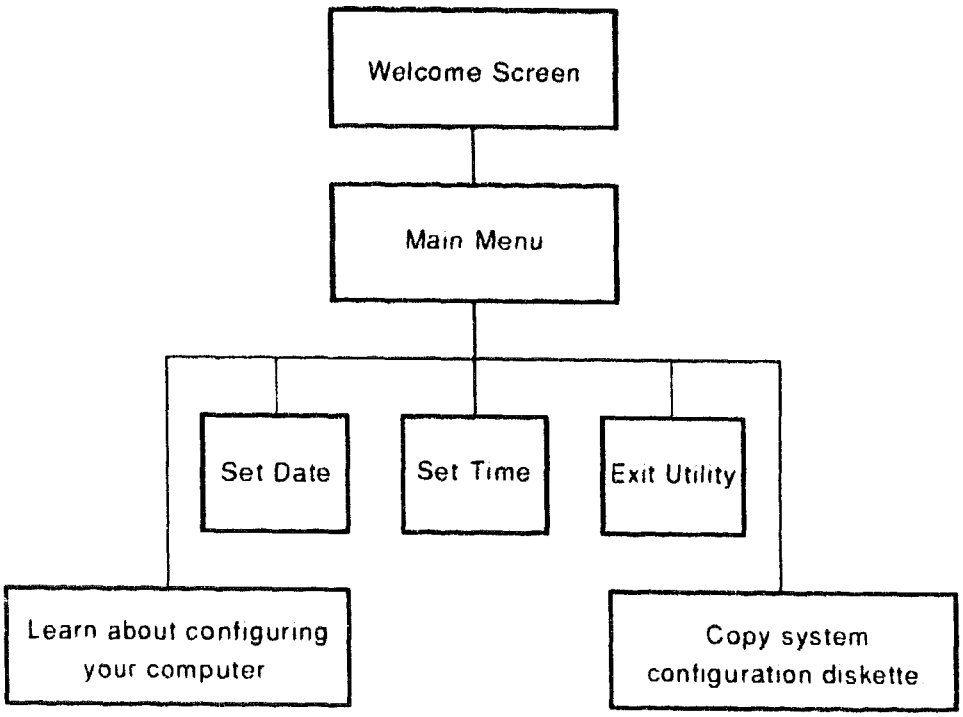
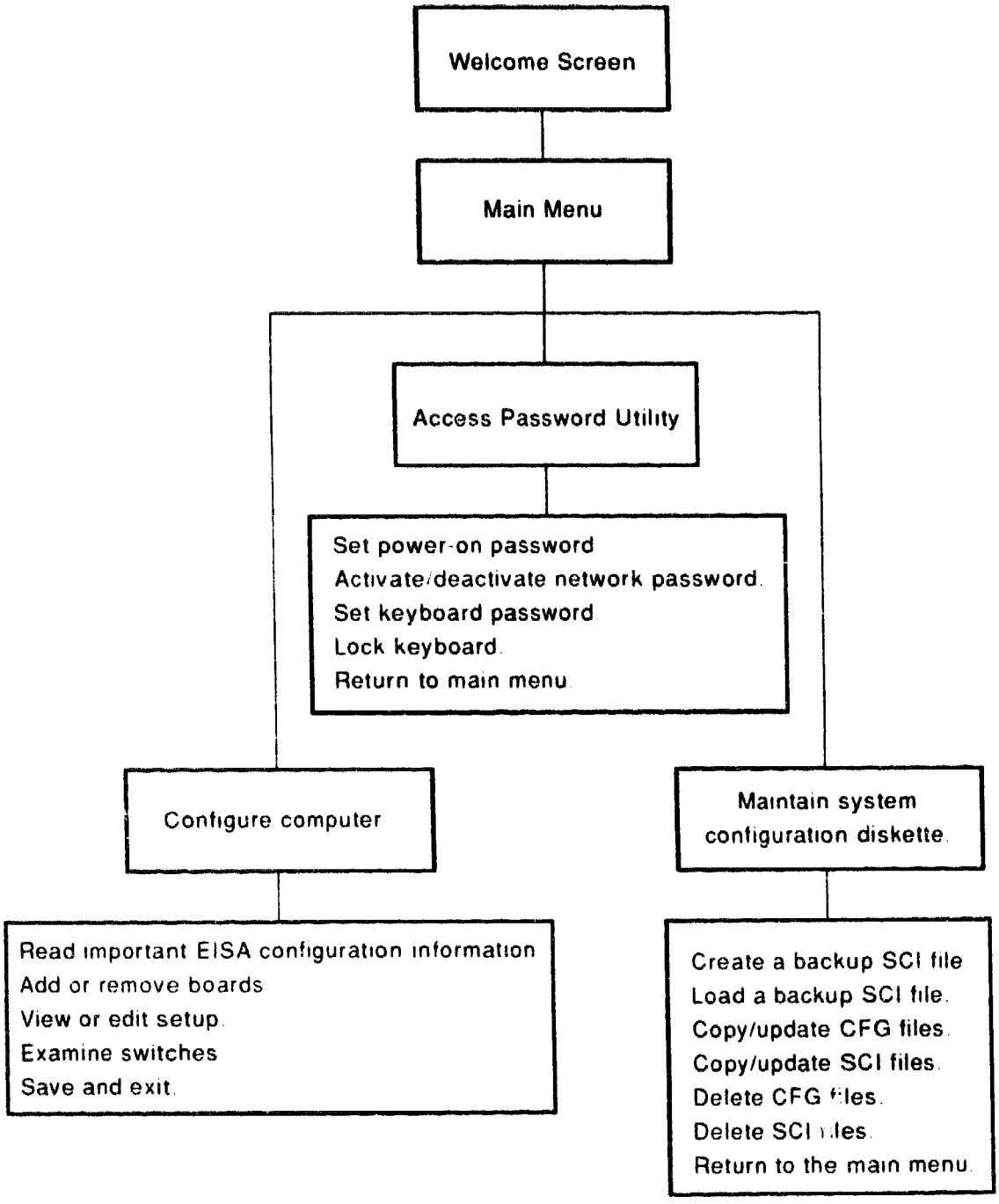


Figure 3–2 SCU Main Menu Options (Part 2 of 2)



3.2.4 How to Use the SCU

Table 3–1 lists the keyboard function keys used to access the SCU, scroll through the menu screens, and select specific menu items.

Table 3–1 SCU Keyboard Function Keys

Keyboard Key	Function
↓	Moves the cursor down one menu item.
↑	Moves the cursor up one menu item.
→	Moves the cursor one character to the right.
←	Moves the cursor one character to the left.
Enter	Selects the highlighted item.
F1	Displays the selected menu item's help screen.
Esc	Returns the monitor screen to the previously selected menu item.

You can also use a mouse. To use the mouse:

1. Highlight menu items by placing the mouse pointer on your choice and clicking the left mouse button once.
2. Select menu items by placing the mouse pointer on your choice and clicking the left mouse button twice.
3. Highlight pull-down menus by placing the mouse pointer on your choice, holding the left mouse button down while sliding the mouse to the bottom of the menu, and then releasing the left mouse button.

3.2.5 SCI Files and CFG Files

The SCU creates a system configuration information (SCI) file each time you configure your computer system. This file is stored in nonvolatile memory on the system board and is used during operation. The SCI file is also copied to the SCU diskette and can serve as a backup to the EISA configuration stored in nonvolatile memory. The SCI file is maintained on the System Configuration Diskette and has the default name *SYSTEM.SCI*.

Configuration (CFG) files contain system board, EISA, and ISA expansion board vital characteristics and the system resources they require for proper operation. The System Configuration Diskette contains a CFG file for the system board. If you install additional EISA or ISA expansion boards, make sure you have the appropriate CFG files for those modules. If a CFG file was not shipped with your ISA option module, look for the ISA CFG file on the library diskette.

3.3 Configuring Your Computer System

This section describes how to configure your system using the SCU. If this is the first time using the SCU, it is recommended that you follow the procedures in the order given. If this is a subsequent session, refer to the appropriate sections to update your system configuration.

1. Install any optional hardware (disk drives, EISA expansion boards, and so on) following the instructions in the specific chapter for the board.
2. Insert the System Configuration Diskette into drive A (the 1.44 MB 3.5-inch diskette drive).
3. Press the reset button on the front panel. After a short wait, the SCU introductory screen will be displayed on your monitor screen.

Note

The SCU contains pop-up help screens for selected menu items. Press F1 at any time to display them and Esc to remove them.

4. Press Enter to display the SCU Welcome screen.

   If no configuration errors appear, the Welcome screen will display information about the SCU. Press Enter to display the Main menu, run the "Configure computer" option to create the computer SCI file, and then exit to boot the system so the changes can take effect.

   If a configuration error appears, the Welcome screen will display information about the error and tell you to reconfigure your system. Press Enter to display the Main menu, select the "View or edit details" menu item from the "Configure computer" option, make any changes as indicated by POST error messages, and then exit to boot the system so the changes can take effect.

Note

Make a backup copy of the original System Configuration Diskette. Store the original in a secure place and use the backup copy when running the SCU.

5. Using the "Select keyboard type" option, select your keyboard type.

6. Using the "Copy System Configuration Diskette" option, make a backup copy of the original System Configuration Diskette. Two copy options are available:

   a. Copy diskette from diskette drive A to diskette drive A

   b. Copy diskette from drive A to diskette drive B

Note

Always copy from diskette drive A to diskette drive A. Drive B is a 1.2 MB 5.25-inch diskette drive.

Follow the prompts on your monitor screen to back up the System Configuration Diskette. You will have to swap diskettes several times to copy the entire diskette.

7. Using the "Maintain System Configuration Diskette" option, copy the CFG files supplied with any EISA or ISA expansion board.

8. Select "Learn about configuring your computer" to familiarize yourself with the SCU.

9. Set the current computer time and date using the "Set time" and "Set date" menu items.

10. Select the "Configure computer" option to configure your system. Refer to Section 3.3.2 for further information.

Note

If the message "Unable to update configuration information in FLASH memory" appears on the monitor screen while you are accessing the "Configure computer" option, make sure the FLASH memory jumper is set correctly before you continue. The FLASH memory jumper is jumper E0721 and should be in the 1–2 position.

11. Select the "Maintain System Configuration Diskette" option to create, change, or update SCI or CFG files.

12. Select the "Access password utility" option to set system and network passwords and lock the keyboard.

13. To write the configuration data shown in the SCU to the system's memory, select the "Exit from this utility" option.

Note

Do not install the SCU or any of its utilities on a hard disk drive. Running the SCU or any of its utilities from a hard disk drive might cause memory conflicts between the SCU and application software. This specifically applies to memory managers and Windows applications.

3.3.1 Access Password Utility

The password utility allows you to:

- Set or change the power-on password.
- Activate or deactivate a network password.
- Set a different keyboard password.
- Lock the keyboard (locks the keyboard until the password is reentered).

Use the SCU to set the power-on password. Passwords may be from one to seven characters. The power-on password is the default for the keyboard and network passwords; you can select different passwords for all three.

The password utility must be enabled with the password jumper, E0390. To enable passwords, move the jumper to the 2–3 position. If the jumper is in the disable position (1–2), the password defined in the SCU will not be written to memory. When the password jumper is enabled and a password is defined, the boot sequence pauses with a password prompt. The correct password must be entered for the system to continue booting.

If you are locked out of the system because you forgot the password, open the system and set the password jumper to the disable position. The system can then be booted successfully. The system cabinet key prevents unauthorized access to the password jumper.

To change the password, run the SCU and select the "Access password utility" option.

The password can also be changed at the password prompt. To change the power-on password, type the following string at the password prompt:

```
Current password/new password/new password
```

To delete the power-on password, type the following string at the password prompt:

```
Current password/
```

3.3.2 Configure Computer

If you are accessing this menu item for the first time, it is recommended that you follow the menu items listed below in order. If this is a subsequent session, refer to the appropriate menu item to update your system configuration.

1. Important EISA configuration information
2. Add or remove boards
3. View or edit details (Setup)
4. Examine required switches
5. Save and exit

3.3.3 Important EISA Configuration Information

This menu item provides basic EISA configuration information on seven screens. These screens are available at any time during the configuration process by pressing F1 and selecting "EISA configuration" from the help menu.

3.3.4 Adding or Removing Boards

This menu item allows you to add or delete ISA expansion boards. This menu item also allows you to display the location of the system board and all expansion boards installed in your system.

Note

The SCU automatically detects any EISA expansion board installed in your system. The SCU does not automatically detect ISA expansion boards.

The SCU automatically detects EISA modules, but you must load an EISA CFG file to configure an EISA module. If the EISA CFG file is already on the System Configuration Diskette, the SCU loads it automatically.

3.3.5 View or Edit Details

This menu item allows you to view or edit the configuration of your system board, all EISA expansion modules, and certain ISA expansion modules. Note that the number of options depends on your configuration.

Table 3–2 lists the configuration (setup) options for the system board. The options are listed in the order in which they appear in the SCU. The order might not be the same for the BIOS Setup Utility, which is based on your installed options. Following Table 3–2 are detailed descriptions of the setup options that need further explanation.

For more information on a specific option, move the cursor to that option and press F1 to display the corresponding help screen.

Table 3–2 System Board Setup Options

SCU Setup Field	Settings	Comments
CPU module	Not user selectable	Displays the currently installed CPU module.
System board extended memory	Not user selectable	Displays the current amount of extended memory.
System base memory option	512 KB 640 KB[1]	Sets size of base memory; should be changed to 512 KB only when software explictly requires 512 KB base memory.
User definable hard drives	Types 2 and 3[1] Types 48 and 49	The SCU allows types 2 and 3 or types 48 and 49 to be user definable.[2]
Cache control	Enabled[1]	Enables the internal Intel 486 and external cache memory (if installed).
	Disabled	Disables all cache memory resources.
On-board floppy controller	Enabled[1]	Enables the on-board diskette controller interface.
	Disabled	Disables the on-board diskette controller interface.

[1]Default.

[2]Some operating systems do not recognize hard disk drive types above 29.

(continued on next page)

Table 3–2 (Cont.) System Board Setup Options

SCU Setup Field	Settings	Comments
Diskette A Diskette B	Disabled	Disables the selected diskette drive.
	3.5-inch 720 KB, 1.44 MB, or 2.88 MB densities	Selects size and density of 3.5-inch diskette drives; standard 3.5-inch RX23 diskette drive set to 1.44 MB.
	5.25-inch 720 KB or 1.2 MB densities	Selects size and density of 5.25-inch diskette drives; optional 5.25-inch RX33 diskette drive set to 1.2 MB.
On-board IDE hard disk controller	Enabled	Enables the on-board IDE controller interface; the controller can be used as the primary interface to the bootable hard disk drive.
	Disabled[1]	Disables the on-board IDE controller interface.
Hard drive 1 Hard drive 2	Drive types 1–49	Enables hard drive size and specific parameters from a predetermined list of drive types. Drive types 2 and 3 or 48 and 49 are user definable for hard drives not listed in the BIOS drive table.[3] Obtain number of cylinder heads, number of sections, and so on, from drive documentation or label on the drive.
	Not installed	Disables the selected hard disk drive.

[1]Default

[3]Drive type 48 or 49 information is aliased to drive type 2 or 3 when application software does not recognize drive types above 47.

(continued on next page)

Table 3–2 (Cont.) System Board Setup Options

SCU Setup Field	Settings	Comments
Parallel port	Disabled	Disables any desired on-board printer port.[4]
	Enabled Base address 378h compatible[1] Base address 378h bi-directional Base address 278h compatible Base address 278h bi-directional	Enables bi-directional mode (PS/2 compatible) or compatible mode (PC AT Centronics compatible).[4] 378h is LPT1.
Serial port 1	Disabled	Disables any desired on-board serial port at the specified base address.[4]
	Enabled Base address 03F8h[1] Base address 02F8h Base address 03E8h	Enables any desired on-board serial port.[4] 3F8 is COM1.
Serial port 2	Disabled	Disables any desired on-board serial port at the specified base address.[4]
	Enabled Base address 02F8h[1] Base address 03E8h Base address 02E8h	Enables any desired on-board serial port.[4] 2F8 is COM2.
COM1 redirection, COM2 redirection	Disabled[1]	Disables redirection of video signals to the COM1 or COM2 serial ports.
	Enabled 1200 baud 2400 baud 9600 baud	Allows the use of "scan-code" terminals to act as the system console through the COM1 and COM2 serial ports. [5,6]

[1]Default.

[4]Refer to the appropriate section after this table for further explanation.

[5]Overall system performance will be degraded if this option is enabled but not used.

[6]Redirection is not available for the COM3 and COM4 serial ports.

(continued on next page)

Table 3–2 (Cont.) System Board Setup Options

SCU Setup Field	Settings	Comments
Video type	Not installed EGA/VGA[1] CGA 40 columns CGA 80 columns MDA	Allows you to specify the type and mode of the video adapter that has been installed.
Shadow off-board video BIOS	Enabled	Enables shadowing of off-board video BIOS.
	Disabled[1]	Disables shadowing of off-board video BIOS.
On-board video	Enabled[1]	Enables on-board video.
	Disabled	Disables on-board video.
800 x 600 mode refresh rate	56 Hz 60 Hz 72 Hz[1]	Selects refresh rate.
1024 x 768 mode refresh rate	Interlaced at 44/88 Hz Non-interlaced at 60 Hz Non-interlaced at 70 Hz[1]	Selects refresh rate.
Video font	9 x 16[1] 8 x 16	9 x 16 is standard VGA font. 8 x 16 provides TUV-compliant font character spacing.
On-board video controller	Primary[1] Secondary	Selects on-board video controller.
On-board video BIOS mapping	To E0000h[1]	Selects video BIOS mapping.
	To E0000h and C0000h	Maps video BIOS into the C0000h to C7FFFh space. Required by some graphics software. Does not free up the E0000h space.
Keyboard control	Enabled[1]	Requires you to enter a keystroke during the boot process.
	Disabled	Allows the system to boot without a keyboard.

[1]Default.

(continued on next page)

Table 3–2 (Cont.) System Board Setup Options

SCU Setup Field	Settings	Comments
On-board mouse control	Enabled[1]	Enables the on-board PS/2 mouse port. IRQ = 12.
	Disabled	Disables the on-board PS/2 mouse port.
Speaker control	Enabled[1]	Turns the speaker on.
	Disabled	Turns the speaker off.
CPU speed	Fast[1]	CPU module operates at its full rated speed.
	Slow	CPU module simulates 8 MHz Intel 286 microprocessor operation.
NumLock	No	Off when system boots.
	Yes	On when system boots.
I/O bus performance	Standard[1]	Some ISA and EISA modules can be run in standard or enhanced mode. Set this feature to match the mode of the module. Adaptec 1520, 1540B, and 1740A are default in standard mode.
	Enhanced	Set when the 1740A is set for enhanced mode.
LCD operation	Enabled	For future use. Do not enable LCD operation.
	Disabled[1]	Disables the LCD option.
	Enabled - suppress POST messages	Enables the LCD option, but suppresses any POST messages.
Reserved system resources	Configuration file and overlay	For future use.

[1]Default.

3.3.5.1 System Board Extended Memory

This function indicates the amount of extended memory (memory addressable beyond 1 MB) resident on the system board and on an optional memory expansion module (if installed). The amount of extended memory is automatically detected and cannot be modified using the SCU.

Note

Extended memory installed on EISA or ISA boards is not included in the quantity of extended memory indicated.

3.3.5.2 System Base Memory

System base memory is automatically detected by the POST. It selects 640 KB unless you have an expansion board that uses the address space between 512 KB and 640 KB.

3.3.5.3 Shadow Off-Board Video BIOS

The system board reserves an area of fast 32-bit DRAM for a copy of off-board video BIOS. If you choose to shadow off-board video BIOS, the computer copies the video BIOS to the appropriate area in DRAM and disables the slower ROM. Faster graphics performance may be obtained if you choose to shadow off-board video BIOS.

Note

Only EGA and VGA video controllers have a video BIOS that can be shadowed. Some high-resolution monitor controllers do not work properly when video BIOS is shadowed. If you have a high-resolution monitor controller installed and you experience monitor problems, select "Disable off-board video BIOS."

3.3.5.4 User Definable Hard Disk Drive

System BIOS contains a table of drive types for IDE hard disk drives. Of these, you can define the number of sectors, cylinders, heads, and so on, for types 2 and 3 or types 48 and 49. Choose types 48 and 49, unless your local area network (LAN) software does not recognize them.

3.3.5.5 Hard Drive 1

This option must be configured to determine drive-specific parameters. Choose from types 1 through 47. If hard drive 1 is not installed, then select "Disabled."

User-definable types 2, 3, 48, and 49 require you to enter specific parameters (cylinders, heads, precompensation, landing zone, and sectors). You can select either types 2 and 3 or types 48 and 49 as user definable. IDE hard drives are usually selected as "Drive Type 1." Because certain operating systems do not recognize BIOS drive type parameters above type 47, the parameters for drive types 48 and 49 should be aliased to types 2 and 3 using this option.

3.3.5.6 Hard Drive 2

This option is the same as the hard drive 1 option.

3.3.5.7 Parallel Port and Serial Ports

The system logically assigns LPT*x* and COM*x* names to:

- Parallel ports in the address order 378h and 278h
- Serial ports in the address order 3F8h, 2F8h, 3E8h, and 2E8h

This occurs during each boot process. For example, if you are using the DOS operating system and you disable the serial port that is assigned to 3F8h as COM1, during the next boot cycle the system will reassign the name COM1 to the next enabled serial port in the sequence.

3.3.5.8 CPU Speed

This option determines the speed used by the system each time you turn it on or reboot it. Fast is the normal setting for CPU speed. The fast setting enables operation at the rated speed. Slow (equivalent to 8 MHz) is used to reduce the effective CPU speed to be compatible with some speed-dependent application programs (mostly games). If an application program does not run correctly at full speed, try changing the CPU speed to slow.

3.3.6 Examine Required Switches

This menu item allows you to display the switches and jumpers that must be set manually on the system board and on any expansion board. This menu item also lists applicable software drivers that need to be installed.

If you need to set switches or jumpers, make sure you write them down before you exit the SCU and power down your system.

3.3.7 Save and Exit

This menu item allows you to save all changes and exit from the "Configure computer" menu. Note that when you exit, your system boots and all changes take effect immediately.

3.4 Configuring Your System with the SCU for ISA Modules

You must install an ISA CFG file for every ISA module in your system. The ISA CFG file is used to record the settings of the ISA module. The settings must be accurate because the SCU uses the settings to determine available resources for auotconfiguration of EISA modules.

3.4.1 Adding an ISA CFG File

1. Boot the SCU.
2. Select "Configure computer."
3. Select "Add or remove boards."
4. With the arrow keys, highlight the backplane slot in which the module is (will be) installed and press Enter.
5. A menu choice is shown. Press Enter to see a list of available ISA CFG files on the system configuration diskette. The ISA CFG files for use with the three supplied ISA modules are shown in Table 3–3. To view ISA CFG files on the library diskette, replace the system configuration diskette with the library diskette and press Enter. See Appendix C for a list of the ISA CFG files on the library diskette.
6. Use the arrow keys to select the desired ISA CFG file and press Enter.
7. Use the arrow keys to select the slot in which the ISA module is installed.
8. Press Enter. The ISA CFG file is now installed in the slot you selected.

Table 3–3 ISA CFG Files for applicationDEC 400*x*P ISA Modules

ISA Module	ISA CFG File on System Configuration Diskette
Adaptec 1540B	ADP0100.CFG Adaptec AHA-1540/1542 ISA SCSI Host Adapter
Terminal multiplexer host adapter (option module, any slot)	ISAC001.CFG Corollary 8x4 MUX (Rotary Switches)

If the ISA module you are installing does not have an ISA CFG file shipped with it, and there is not one listed on the library diskette, you can use the

generic ISA configuration file, "ISA0000.CFG." This file can be used to specify the I/O address, IRQ setting, DMA channel, and memory resources used by your ISA module.

You must configure the ISA CFG file to accurately represent the configuration of your ISA module. Use the "View or edit details" step to do this.

1. Select "View or edit details" from the "Configure computer" menu.
2. Use the arrow keys to highlight the module feature you need to set. Items such as addresses are shown.
3. Press F6 to see a list of resources used by the option. These resources include items such as IRQ settings. Many resources displayed by the F6 key are informational only and cannot be changed. If a resource can be changed, it is displayed with a plus (+) or minus (–) symbol. Press the plus or minus symbol at the top of the keyboard to select the resource used by your module.

Note

Setting an ISA module feature in the SCU does not set the feature on the module. You must ensure that the ISA feature in the SCU matches the physical configuration of the module.

3.5 Configuring Your System with EISA Option Modules

EISA options are shipped with an EISA CFG file. This EISA CFG file must be installed on your system configuration diskette enable the SCU to recognize all of the features selectable on your EISA module. The SCU can automatically configure your module using the available resources.

Although your system will detect the EISA option automatically, you must install the EISA CFG file to set all the configurable options on the module. The EISA CFG file is installed using the "Add or remove boards" step of the "Configure computer" menu.

When EISA modules are removed from a system, you must use "Add or remove boards" to tell the SCU that the option has been removed. Highlight the removed EISA module and press delete to remove it from the configuration.

When you make a selection for an EISA module in the "View or edit details" step, the selections are made on the module when you exit. No physical configuration of the EISA module is necessary.

3.6 Automatic Configuration

The SCU will configure your system automatically. If you have only EISA modules installed, the configuration is completely automatic. The SCU scans the EISA modules you have installed, and selects available IRQs, I/O addresses, and memory options for each module. When you exit from the SCU, the selected settings will be configured for each EISA module.

When ISA modules are installed, and you select an I/O address or IRQ for the module, the SCU automatically checks to see if that resource is available. If it is not available, the SCU identifies the conflicting resource and suggests a change.

Automatic configuration can be disabled for the entire system:

1. Select the advanced configuration screen from the "View or edit details" menu by pressing F7. A submenu is displayed.
2. Highlight the "Set verification mode" item and press Enter.
3. Use the arrow keys to highlight the "Manual" item and press Enter.

In manual verification mode, the SCU will not identify resource conflicts until you select the "Verify" option during the "View or edit details" menu. The "Verify" option does not appear unless you are in manual verification mode.

Automatic configuration can be disabled for individual modules. By "locking" a board, you prevent the SCU from automatically changing the module's resources, or suggesting a change. To lock a module:

1. Select the advanced configuration screen from the "View or edit details" menu by pressing F7. A submenu is displayed.
2. Highlight the "Lock/unlock boards" item.
3. The list of slots with the modules installed is displayed. Use the arrow keys to select the module whose resources you do not want to change.
4. Press Enter to lock the board.

In all displays of the system, locked boards are designated with an exclamation mark (!).

3.7 Viewing Total System Configuration

To view a list of all used and available system resources, select the "View or edit details" screen. Press F7 during this display. A secondary menu appears with "View additional system information" as an option. Select this choice by highlighting it and pressing Enter. You then have a choice of viewing all used system resources, or all available resources. This is a very useful feature.

Note

The available system amperage resource is for future use. Any number displayed in this resource should not be relied upon since not all ISA CFG files contain information about the amperage used by the board.

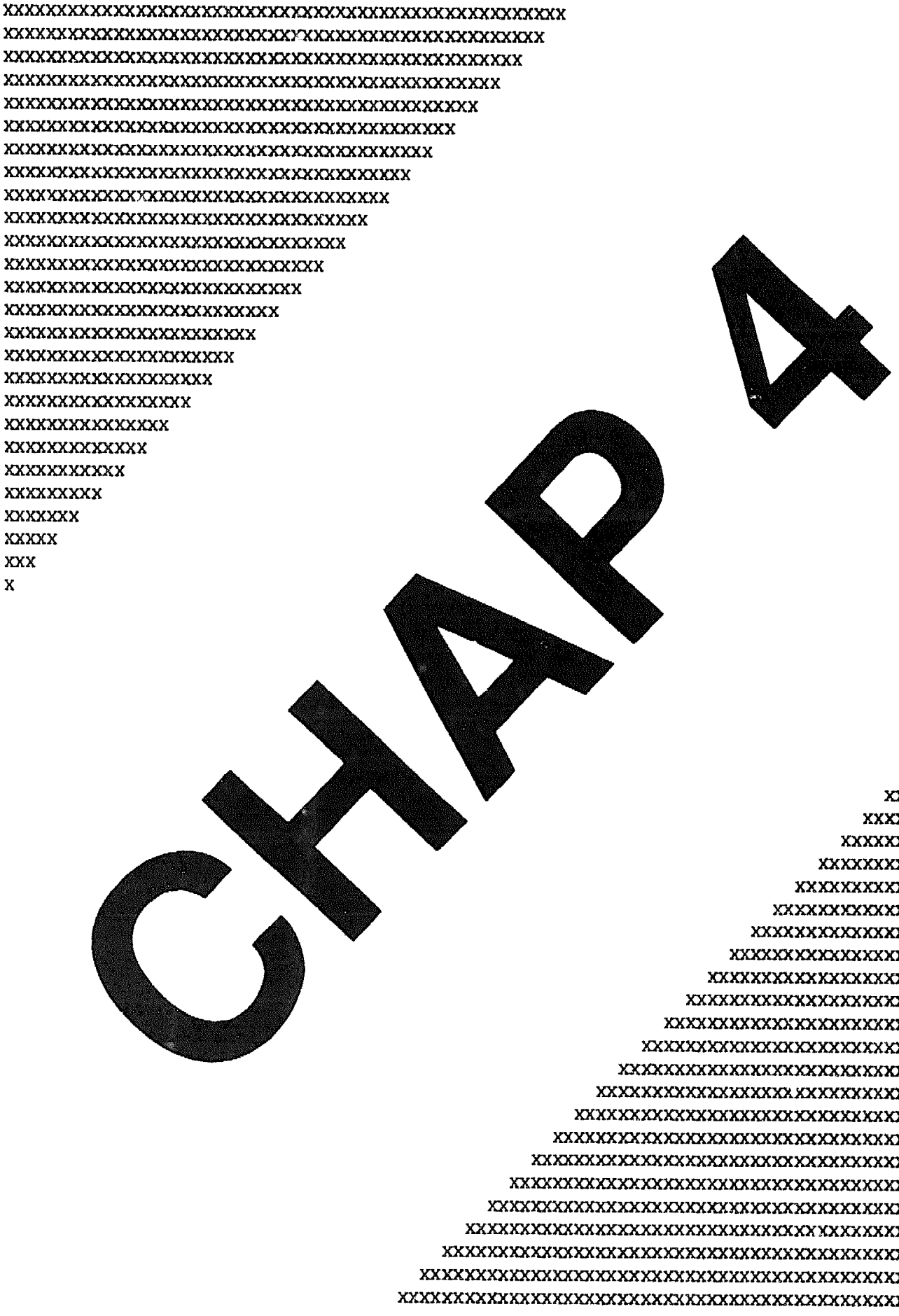
3.8 Library Diskette

The EISA architecture is backwards compatible with the ISA architecture. However, since ISA modules were created and used before ISA CFG files were created, many ISA modules are in use which were shipped without ISA CFG files. In order to use these modules in EISA systems, ISA CFG files are required. To assist users of older ISA modules, many vendors have submitted ISA CFG files to the EISA consortium. These ISA CFG files are contained on the library diskette shipped with the SCU. See Appendix C for a list of the ISA CFG files on the library diskette.

When you install an ISA module for which you have no ISA CFG file, look on the library diskette. The files are listed by their EISA standard file name, as well as by the vendor product name. The ISA CFG file for your ISA module can be installed in your system configuration file. Under the "Add or remove boards" section of the "Configure computer" main menu selection, you have the option of inserting the library diskette to search for an ISA CFG file. Files for many popular ISA CFG files are contained on this diskette.

Note

ISA CFG files contained on the Library Diskette are submitted to the EISA consortium by individual vendors. Digital Equipment Corporation has not qualified or tested any of the files on the library diskette and these files are provided as is.


CHAP 4

4

Opening the System Cabinet

This chapter describes how to open the applicationDEC 400xP system cabinet to gain access to the internal components. Refer to Figure 4–1 and Table 4–1.

4.1 Required Tools

The following tools are required for option installations:

- Phillips screwdriver
- Antistatic wrist strap

4.2 Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can damage integrated circuits and circuit modules. To prevent costly ESD damage, when you handle modules:

- Wear an antistatic wrist strap attached to chassis ground.
- Handle the module by the edges.
- Do not touch the surface of the module or any circuit components on the module.

Figure 4–1 Opening the System Cabinet

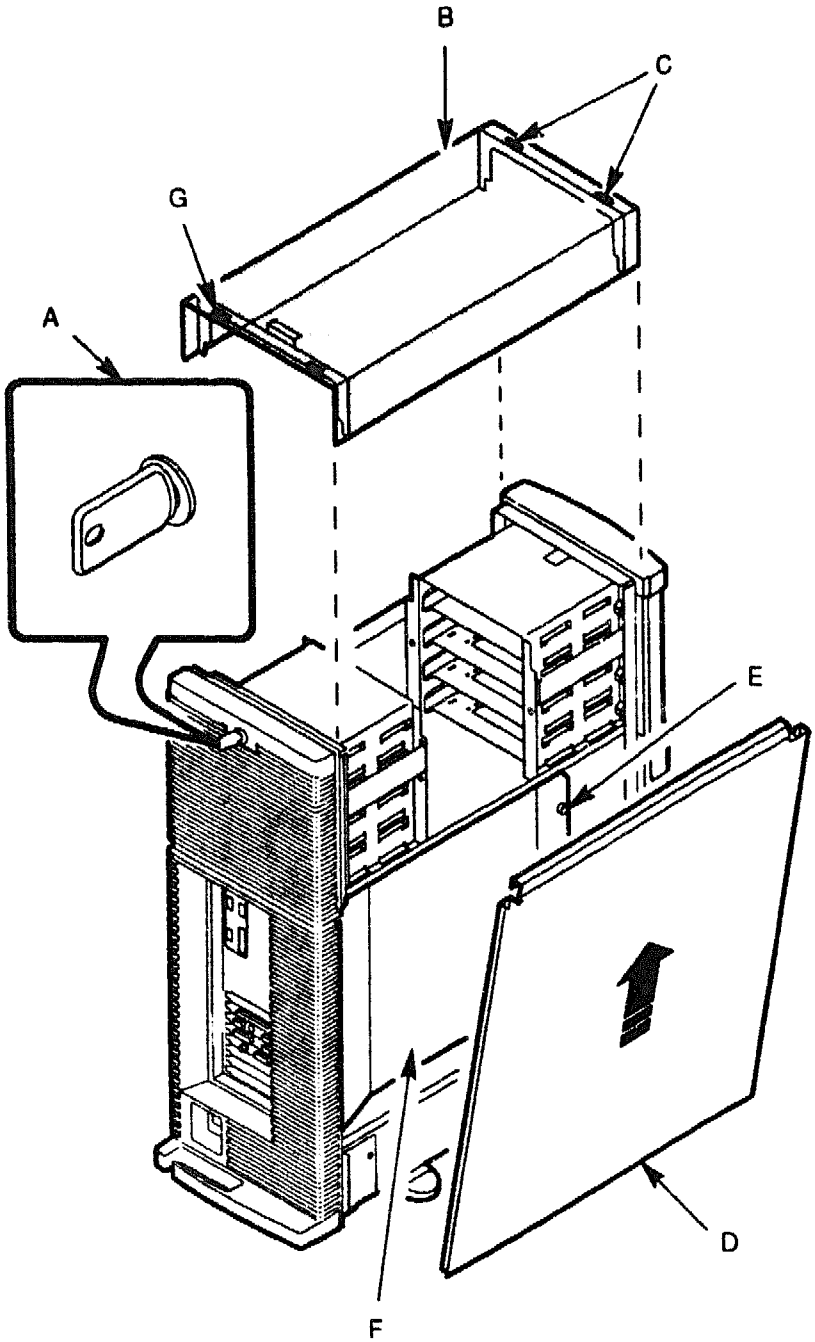


Table 4–1 Key for Figure 4–1

Key	Description
A	Cabinet key
B	Top cover
C	Front locking tabs
D	Left side panel
E	Cover retaining screw
F	Card cage cover
G	Rear locking tabs

4.3 System Shutdown

Prior to opening the system cabinet, shut the system down as follows:

1. If the SCO UNIX System V operating system is being used, type **shutdown** on the system console. This provides for an orderly shutdown of the entire system. It closes all open files and prepares hard disk drives and other hardware for loss of power.
2. Remove any diskettes from the diskette drives. (If a diskette is left in the diskette drive, the system will attempt to boot from the diskette drive when power is re-applied to the system.)
3. Place the power switch to the Standby position.
4. Unplug the power cord from the wall socket.

Warning

You must unplug the power cord from the wall socket to ensure there is no electricity in the system.

4.4 Removing the Top Cover and Side Panels

1. Unlock the top cover by inserting the cabinet key and turning it fully to the left. This will pull the top cover toward the rear of the cabinet. Remove the cabinet key.
2. Push the cover toward the rear to free the front locking tabs. Remove the top cover by lifting it straight up.
3. Remove a side panel by lifting it up and away from the cabinet. The two side panels are identical.

4.5 Removing the Card Cage Cover

1. Loosen the two screws on the right side of the card cage cover. Do not remove the screws.
2. Slide the cover to the right to clear the keyhole and remove the cover.

4.6 Replacing the Card Cage Cover

1. Insert the left edge of the card cage cover into the retaining slot.
2. Push the cover in place against the chassis.
3. Tighten the two screws on the right side of the cover to secure the cover to the chassis.

4.7 Replacing the Top Cover and Side Panels

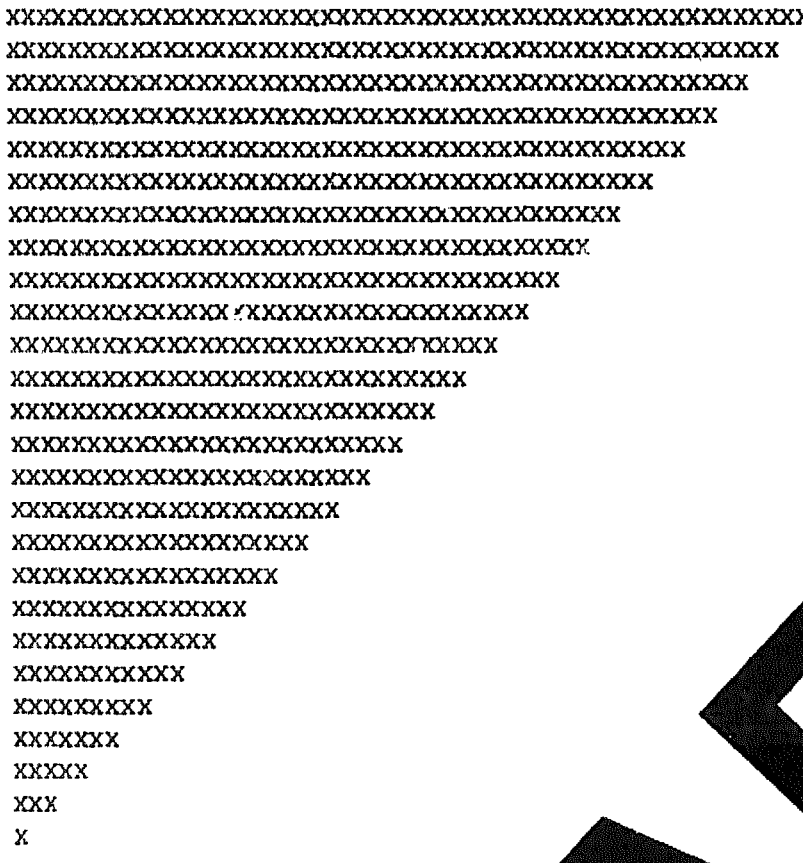
1. Place a side panel into position with the panel tipped out slightly and with the lip on the bottom edge of the panel under the edge of the cabinet chassis. The two side panels are identical.
2. Move the side panel to the vertical position. The panel will not fit flush against the side of the cabinet because the lip on the top edge of the panel is not engaged with the cabinet chassis.
3. Raise the panel slowly until the lip on the top edge of the panel slips over cabinet chassis. The lip on the bottom edge of the panel will still be engaged.
4. Push the panel down into position. If the top and bottom lips are engaged, the top and bottom of the panel will be held securely in place.
5. Insert the cabinet key and turn it fully to the left.

6. Place the top cover into position so that the cover is fully seated and flush with the top of the front and rear bezels.

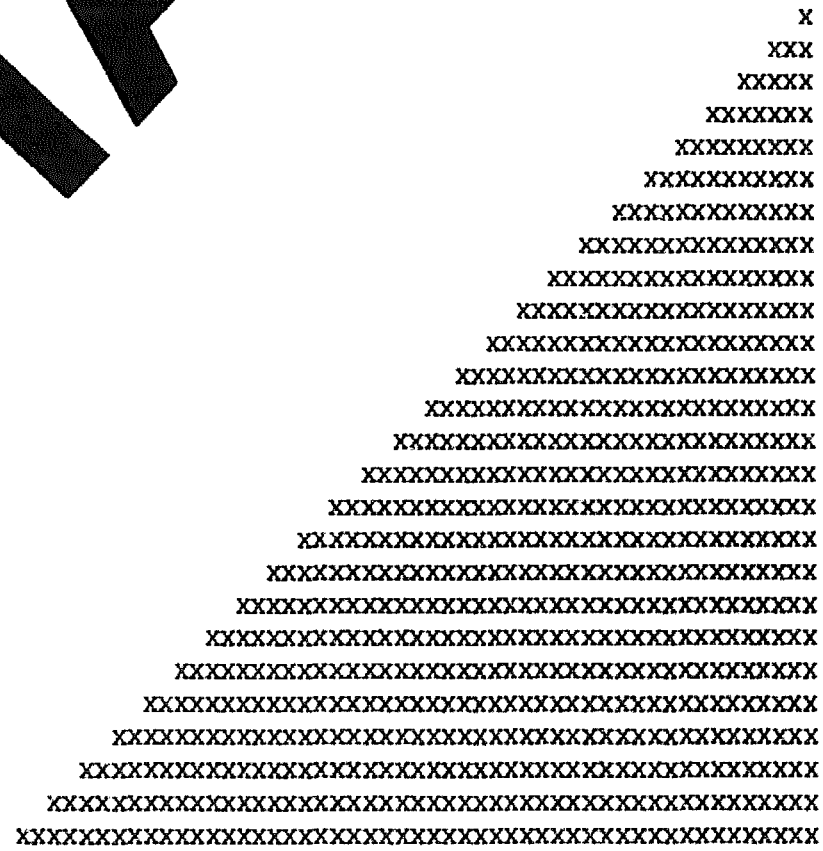
Note

An arrow on the underside of the cover points to the front.

7. Lock the top cover by turning the cabinet key to the right. This will push the cover toward the front ofthe cabinet and into the locked position.



CHAP 5



5

Installation and Upgrade of the CPU Module and CPU Cache

This chapter describes how to install a CPU module and upgrade an existing CPU module. The installation and upgrade of the CPU cache is also described.

5.1 Description

The applicationDEC 400xP system CPU is available in three speeds with optional cache, as shown in Table 5–1.

Table 5–1 CPU and Cache Options

CPU (MHz)	Cache (KB)
25	0, 64, or 128
33	0, 64, or 128
50	256

The 25 MHz or 33 MHz CPU module is shown in Figure 5–1. The 64 KB and 128 KB cache options associated with these modules are on an integrated circuit chip that plugs into a socket on the CPU module.

The 50 MHz CPU module is also shown in Figure 5–1. The cache associated with the 50 MHz CPU is fixed at 256 KB. Refer to the figure key in Table 5–2.

Figure 5–1 CPU Modules

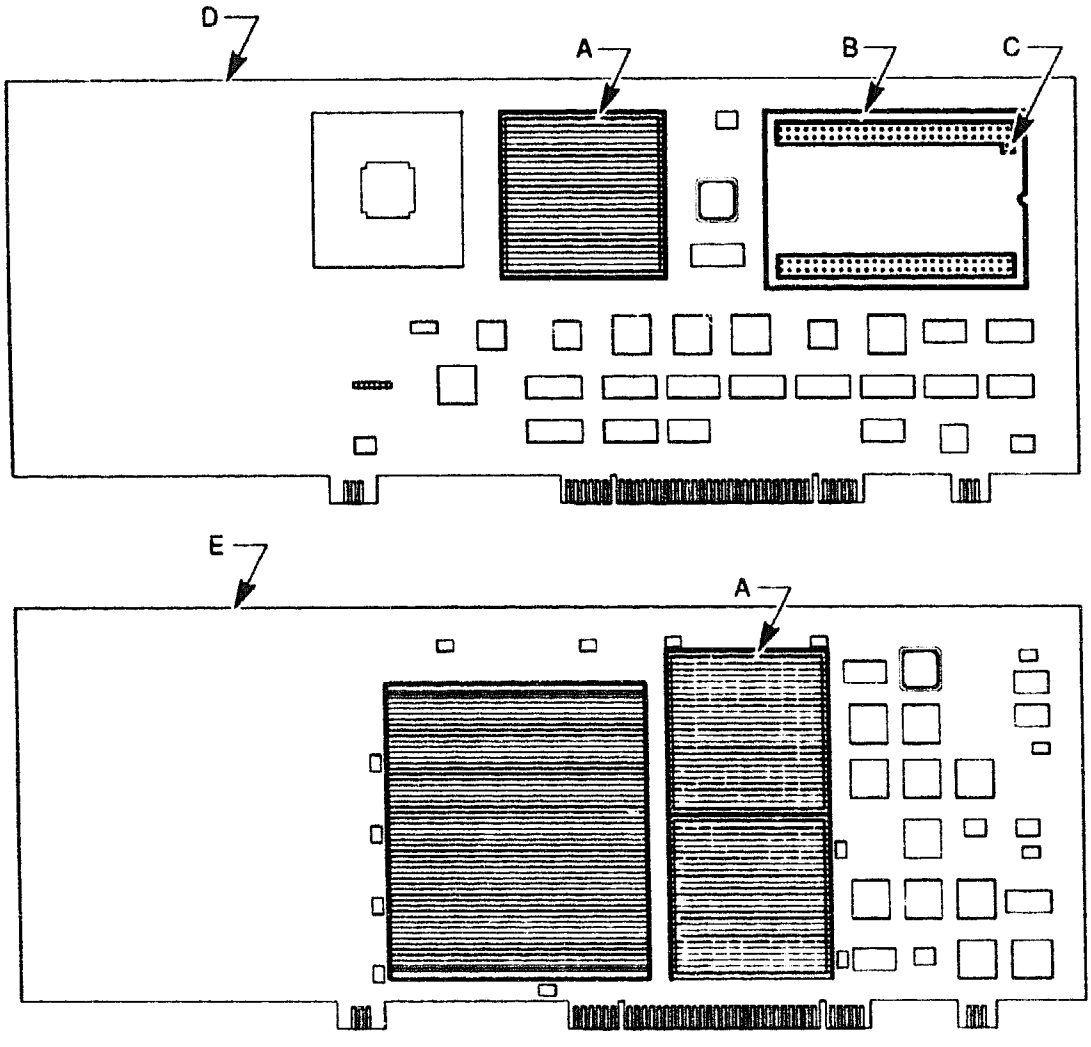


Table 5–2 Key for Figure 5–1

Key	Description
A	CPU
B	Cache socket
C	Guide pin
D	25 MHz or 33 MHz CPU module
E	50 MHz CPU module

5.2 Installation

Follow the procedures in Chapter 4 to:

- Shut down the system.
- Disconnect the power cord.
- Remove the cabinet top cover, left side panel, and the card cage cover.
- Take proper precautions against electrostatic discharge damage. Wear an antistatic wrist strap connected to chassis ground. Handle the modules only by the edges and do not touch the surface of any chip or component.

5.2.1 Removing the CPU Module

Remove the CPU if you are:

- Upgrading to a faster CPU module
- Installing CPU cache
- Installing SIMM memory modules on the system board.

To remove a CPU:

1. Remove the CPU module retaining bar (see Figure 5–2 and Table 5–3) by removing the screw on the left end of the bar and sliding the bar out of the slot on the right side.
2. Carefully remove the CPU module from the system board.
3. If upgrading both the CPU and cache, place the module in an antistatic package. Otherwise, place the module on an antistatic foam pad or a grounded workstation surface.

Figure 5–2 Installing a CPU Module

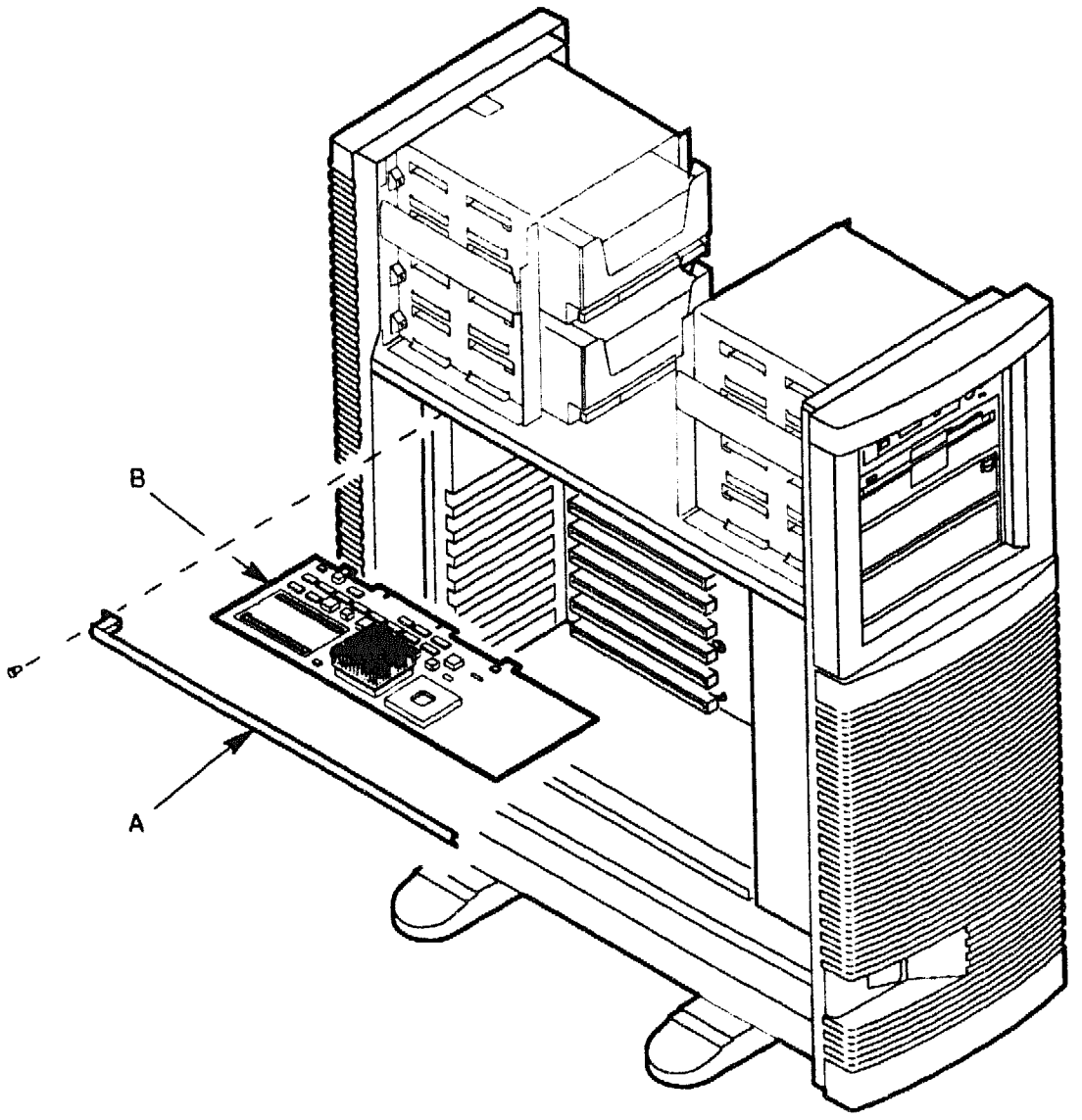


Table 5–3 Key for Figure 5–2

Key	Description
A	Retaining bar
B	CPU module

5.2.2 Installing Cache

Caution

Always remove the CPU module before removing or installing a cache chip. Do not remove or install a cache chip while the CPU module is installed on the system board.

1. If the existing cache is to be removed, use a chip puller to carefully pry up the cache chip and remove it from from the CPU module. Place the cache chip in an antistatic package.
2. Remove the new cache chip from its antistatic package, being careful not to touch any pins or components, and place it on an antistatic foam pad or a grounded workstation surface.
3. Position the cache chip over the CPU module with the guide pin over the corresponding pin socket as shown in Figures 5–1 and 5–3. See also Table 5–4.
4. Gently mate the pins on the cache chip to the socket on the CPU module.
5. Push the cache chip down evenly onto the CPU module. Be careful not to bend the pins.

Figure 5–3 Installing Cache

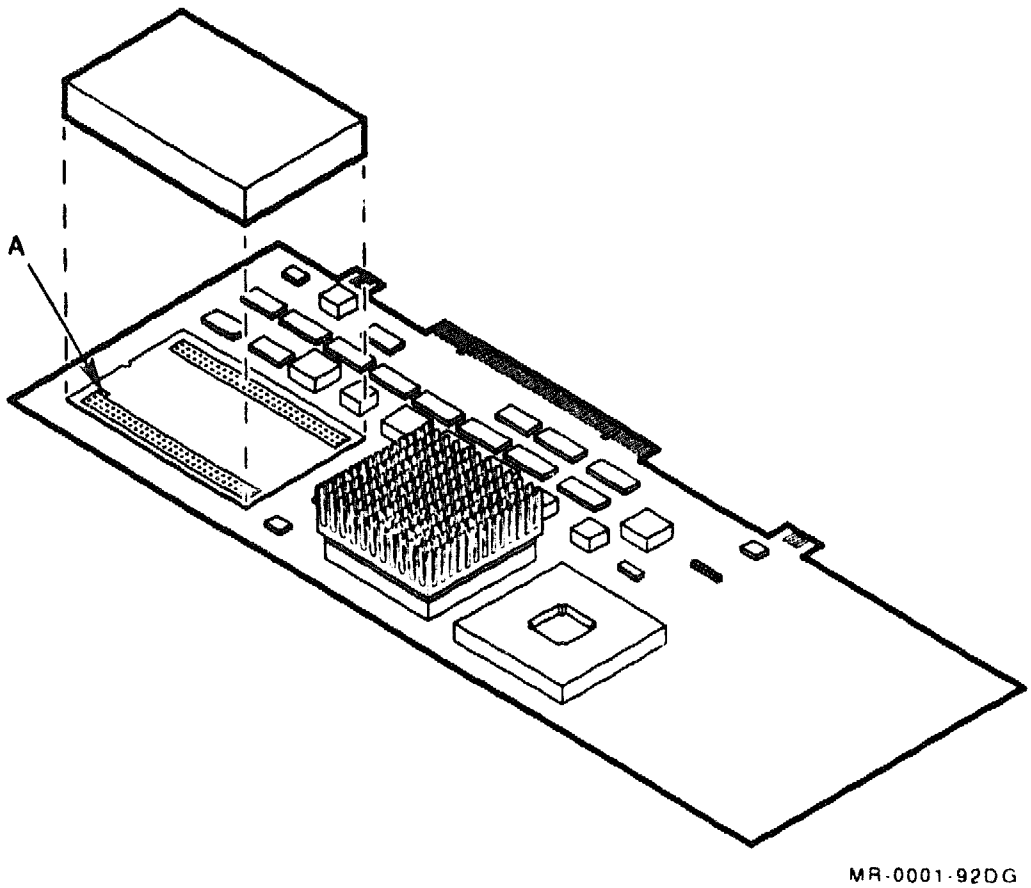


Table 5–4 Key for Figure 5–3

Key	Description
A	Guide pin

5.2.3 Installing the CPU Module

1. If a new CPU module is being installed, record the serial number of the CPU module in the equipment log. Remove the CPU module retaining bar (see Figure 5–2 and Table 5–3) by removing the screw on the left end of the bar and sliding the bar out of the slot on the right side.
2. Install the CPU module (Figure 5–2) into the system board, making sure that the three module connectors are engaging the three connector sockets on the board.
3. Replace the CPU module retaining bar (Figure 5–2) over the outer edge of the CPU module. Slide the tabs on the right end of the bar into the slots in the chassis. Install the screw on the left end of the bar.

5.3 Closing the System Cabinet

1. Replace the card cage cover, cabinet side panel, and top cover, following the procedures in Chapter 4.
2. Plug in the system power cord.
3. Turn the power switch to the On (|) position.

5.4 Run the SCU

Remember to boot the system and run the SCU (see Chapter 3) to configure the system for the new option.

Note

The system will not operate properly after a CPU or cache upgrade until you run the SCU and create a new system configuration file with the "Save and exit" selection.


CHAP 6

6

Memory Installation

This chapter describes how to install and upgrade system memory.

6.1 Supported SIMMs and Configuration Rules

Table 6–1 shows the single in-line memory modules (SIMMs) that are supported by the applicationDEC 400*x*P system. The 32 MB SIMMs are supported in the design. However, at the time of this writing, 32 MB SIMMs were not available.

Table 6–1 Supported SIMMs

Size (MB)	Supported Speed
2	70 ns and 80 ns
4	70 ns and 80 ns
8	70 ns and 80 ns
16	70 ns only
32 (when available)	70 ns only

SIMMs must always be installed in pairs of matching size and speed, because data is interleaved between SIMMs. SIMMs can be installed in memory banks on the system board or, for further expansion, on the memory expansion module. Figure 6–1 illustrates a typical SIMM. Refer to the figure key in Table 6–2.

Figure 6–1 Typical SIMM

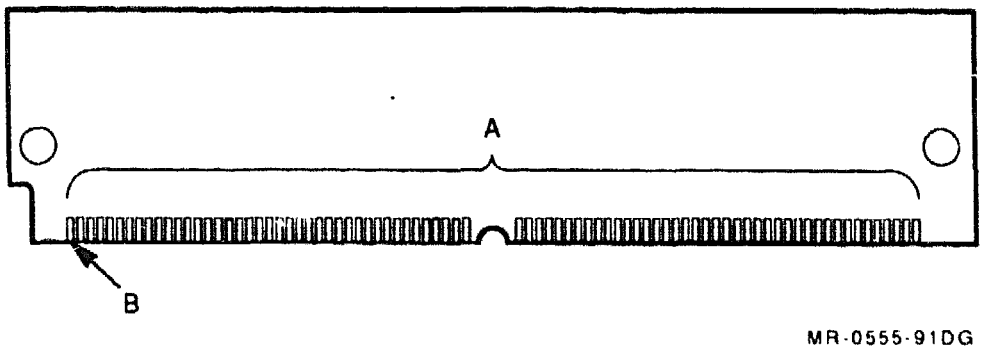


Table 6–2 Key for Figure 6–1

Key	Description
A	72 pin connector
B	Pin 1

When 16 MB and 32 MB SIMMs are installed on the system board or memory expansion module, you must change a jumper on the board or module. The jumpers are listed in the instructions for SIMM installation on the system board or memory expansion module.

Figure 6–2 shows the system board. Refer to the figure key in Table 6–3. The upper two slots and lower two slots are the memory banks. The memory expansion module has four memory banks with two SIMMs per row (see Figure 6–6). Each memory bank on the system board and on the memory module has a jumper which is set to position 1–2 for 2, 4, and 8 MB SIMMs and to position 2–3 for 16 MB and 32 MB SIMMs.

Figure 6–2 System Board Memory Banks

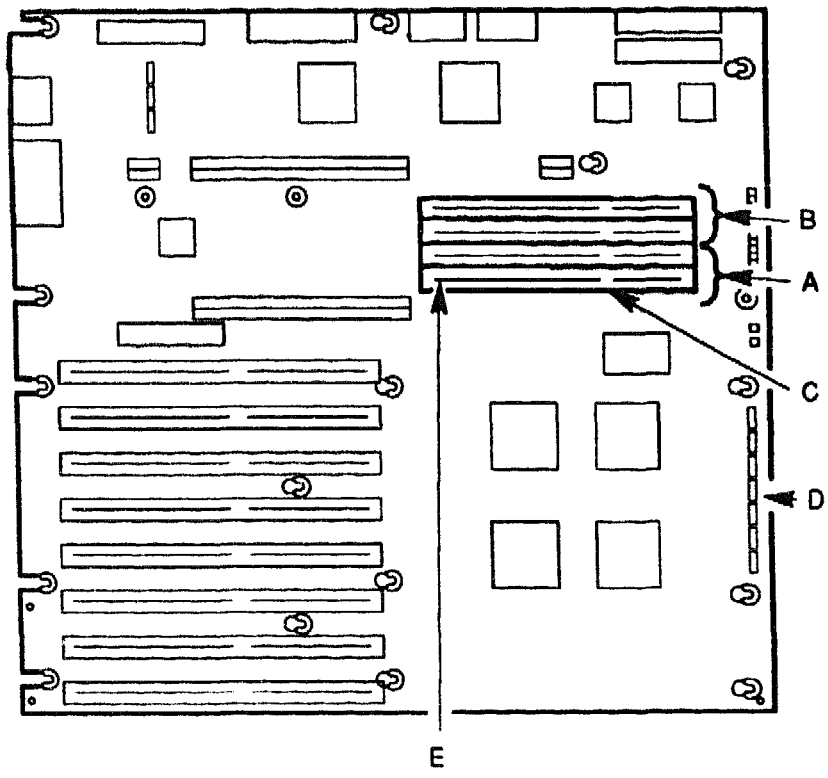
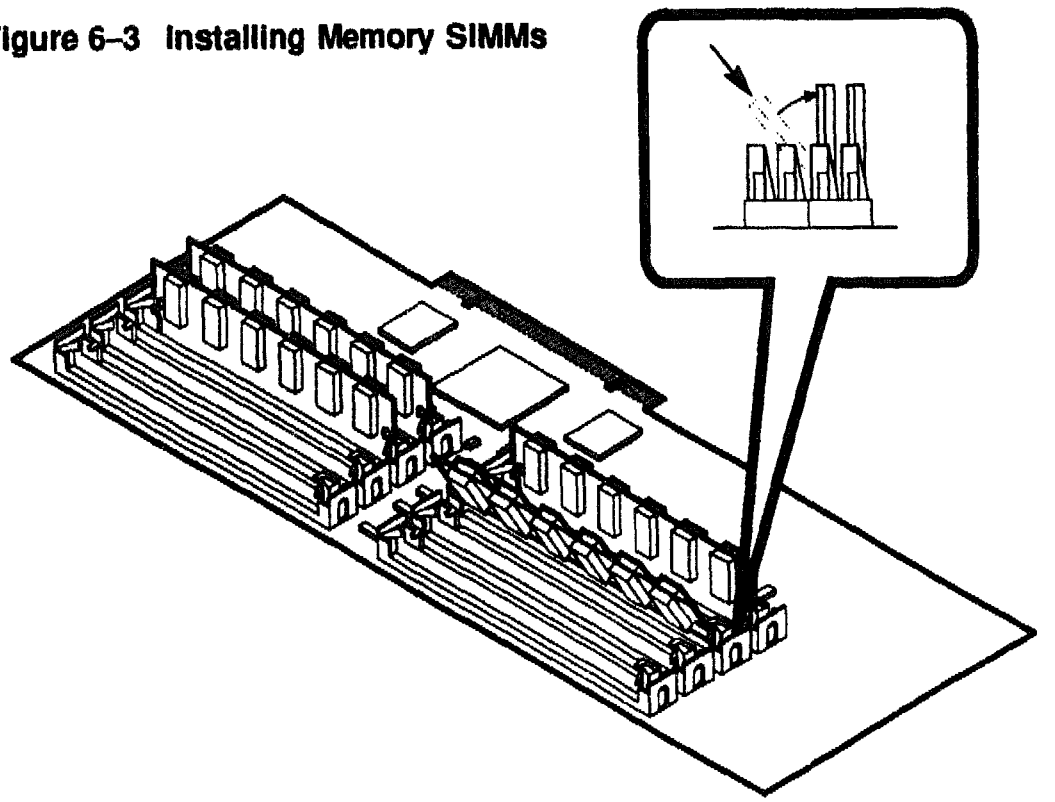


Table 6–3 Key for Figure 6–2

Key	Description
B	Memory bank 1
A	Memory bank 0
C	Install first SIMM here
D	System setup jumpers. Jumpers for 16 MB SIMMs are located here. See also Figure 6–4.[1]
E	Pin 1 of SIMM socket

[1]Table G–14 lists all the system board jumpers and factory default settings.

Figure 6–3 Installing Memory SIMMs



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SIMMs are inserted into their slots at oblique angles and then moved to the vertical position (Figure 6–3). When installing SIMMs on the system board, start with the lowest slot and work up as shown in Figure 6–3. When installing SIMMs on the memory expansion module, start with the two slots closest to the module connector (row 4 in Figure 6–6). The other slots on the memory expansion module are filled in descending order (slots 3, 2, and then 1).

At least two SIMMs[1] must be installed on the system board before you can install a memory expansion module. The system will not operate with all the memory on the expansion module.

[1] A basic system has two 2 MB SIMMs.

6.2 Opening the System Cabinet

Follow the procedures in Chapter 4 to:

- Shut down the system.
- Disconnect the power cord.
- Remove the cabinet top cover, left side panel, and the card cage cover.
- Take proper precautions against electrostatic discharge damage. Wear an antistatic wrist strap connected to chassis ground. Handle the modules only by the edges and do not touch the surface of any chip or component.

6.3 Installing or Upgrading SIMMs on the System Board

1. If a memory expansion module is installed, remove it using the procedures in Section 6.4.1.
2. Remove the CPU module following the procedures in Section 5.2.1.
3. If you need to remove any SIMMs, perform the following steps:
   a. Clips on each end of the memory slot hold each SIMM in the vertical position. Use your finger or a small flat-blade screwdriver to bend these clips outward.
   b. Tip the SIMM toward the top edge of the system board.
   c. Handling the module only by its edges, remove it.
4. Install SIMMs in memory bank 0 first.
5. Install the SIMM obliquely into the memory slot with the pin 1 end (Figure 6–1) toward the center of the system board (Figure 6–2).
6. Move the SIMM to the vertical position (see Figure 6–3).
7. Make sure that the clips on the ends of the memory slot are closed, securing the SIMM in the vertical position.

8. Repeat the preceding three steps for each SIMM you install.
9. If you installed a 16 MB or 32 MB SIMM, you must change the SIMM jumper for the corresponding memory bank to the 2–3 position. Bank 0 is controlled by jumper E0391. Bank 1 is controlled by jumper E0392.

   Table 6–4 shows the jumper positions. Figure 6–4 shows the memory jumper locations on the system board. Refer to the figure key in Table 6–5.
10. Replace the CPU module following the procedures in Section 5.2.3.
11. If you removed a memory expansion module, replace it using the procedures in Section 6.4.3.
12. Remember to boot the system and run the SCU (Chapter 3). The new value of system memory will be incorporated into the setup parameters as the SCU executes.

Table 6–4 System Board Memory Jumpers

SIMM Size (MB)	E0392/E0391 Jumper Position
2, 4, 8	1-2
16, 32	2-3

Figure 6–4 System Board Memory Jumpers

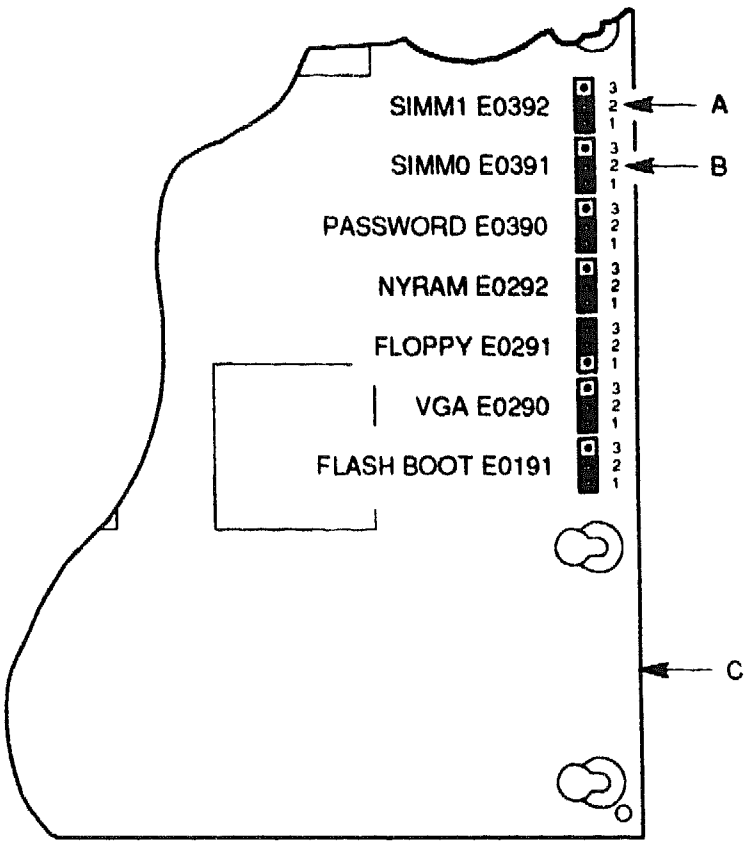

Table 6–5 Key for Figure 6–4

Key	Description
A	Memory bank 1 jumper
B	Memory bank 0 jumper
C	System board

6.4 Installing or Upgrading SIMMs on a Memory Expansion Module

Always remove the memory expansion module before installing SIMMs on it. Do not install or remove SIMMs from the memory expansion module while it is installed on the system board.

Note

Make sure that at least one memory bank (two SIMMs) is installed on the system board. The system will not operate with all the memory on the expansion module.

6.4.1 Removing the Memory Expansion Module

1. Remove the memory expansion module retaining bar (Figure 6–5 and Table 6–6) by removing the screw on the left end of the bar and sliding the bar to the left. Save this screw.
2. Carefully remove the memory expansion module from the system board.
3. Place the module on an antistatic foam pad or a grounded workstation surface.

6.4.2 Installing the SIMMs

1. If you need to remove any SIMMs, perform the following steps:
   a. Clips on each end of the memory slot hold each SIMM in the vertical position. Use your finger or a small flat-blade screwdriver to bend these clips outward.
   b. Tip the SIMM toward the edge opposite the module connector.
   c. Handling the module only by its edges, remove it.
2. Select the slots to be used on the memory expansion module, beginning with row 4 and in descending order.

Figure 6–5 Installing a Memory Expansion Module

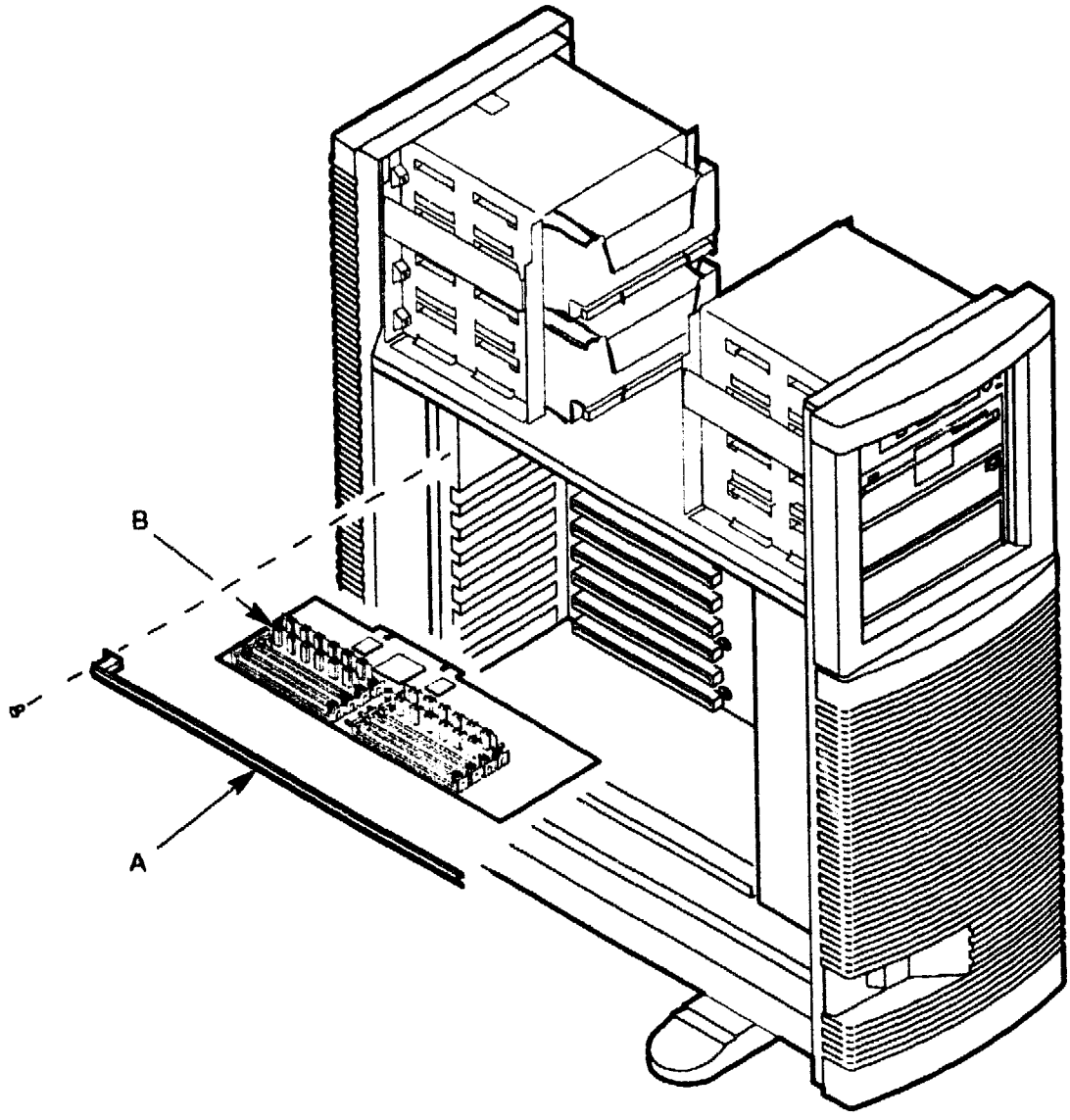

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Table 6–6 Key for Figure 6–5

Key	Description
A	Retaining bar
B	Memory expansion module

3. Install the SIMM obliquely into the memory slot with the pin 1 end positioned as shown in Figure 6–6. Refer to the figure key in Table 6–7.
4. Move the SIMM to the vertical position (see Figure 6–3).
5. Make sure that the clips on the ends of the memory slot are closed, securing the SIMM in the vertical position.
6. Repeat the preceding three steps for each SIMM installed.
7. Check the jumper(s) associated with the memory bank(s). Figure 6–6 shows the jumper locations on the memory expansion module. Table 6–8 shows the correct jumper positions.

Figure 6–6 Memory Expansion Module

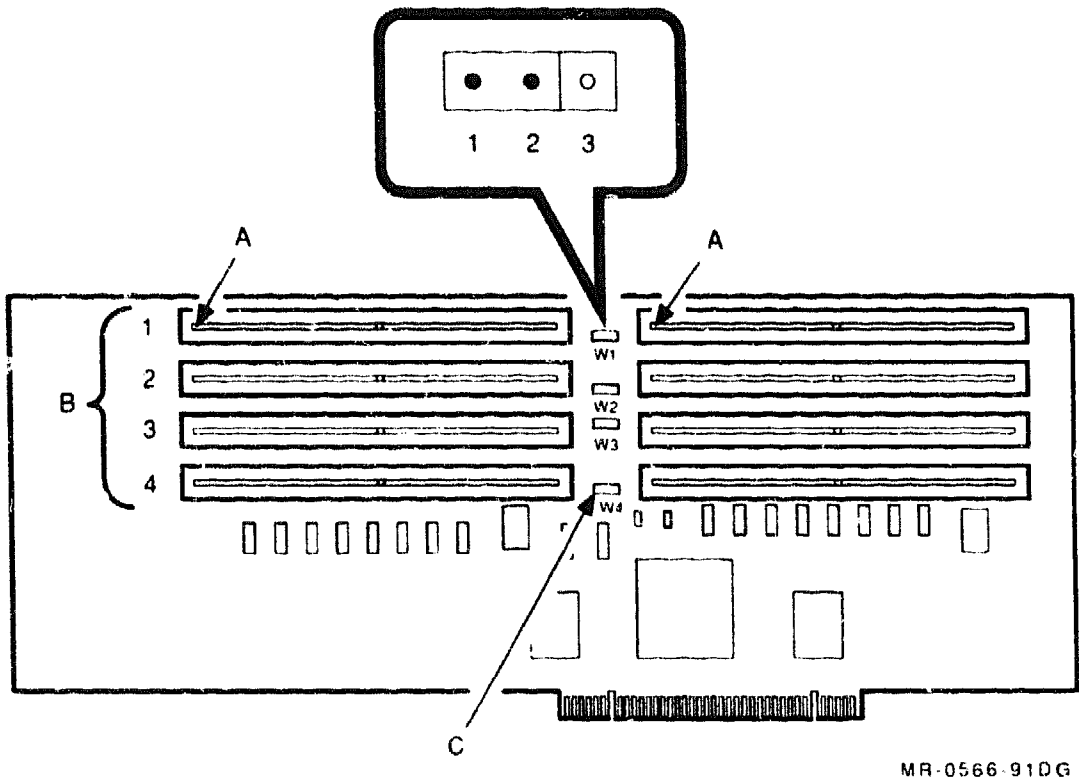


Table 6–7 Key for Figure 6–6

Key	Description
A	Pin 1
B	Memory banks. One bank comprises both slots in a row. Fill bank 4 first.
C	Memory bank jumpers (4), one for each memory bank.

Table 6–8 Memory Expansion Module Jumpers

SIMM Size (MB)	W1/W2/W3/W4 Jumper Position
2, 4, 8	1–2
16, 32	2–3

6.4.3 Installing the Memory Expansion Module

1. Carefully install the memory expansion module on the system board (Figure 6- 5).
2. Place the memory expansion module retaining bar (Figure 6–5 and Table 6–6) over the outer edge of the memory expansion module. Slide the tabs on the right end of the bar into the slots in the chassis. Install the screw on the left end of the retaining bar.
3. Remember to boot the system and run the SCU (Chapter 3). The new value of system memory will be incorporated into the setup parameters as the SCU executes.

6.5 Closing the System Cabinet

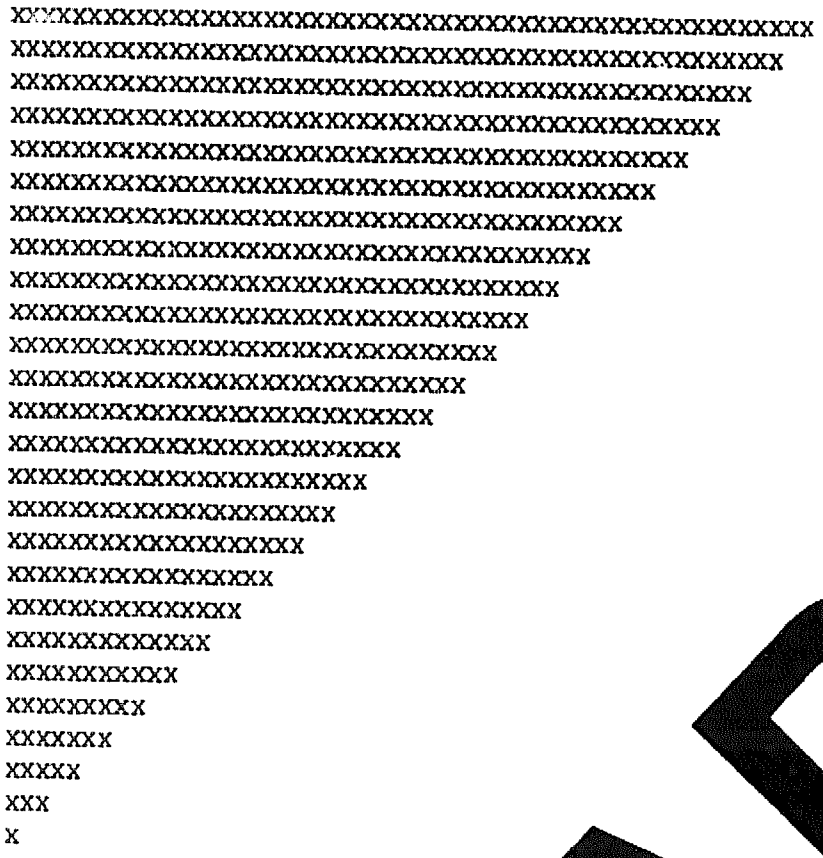
1. Replace the card cage cover, the cabinet left side panel, and top cover following the procedure in Chapter 4.
2. Plug in the system power cord.
3. Turn on the system power.

6.6 Run the SCU

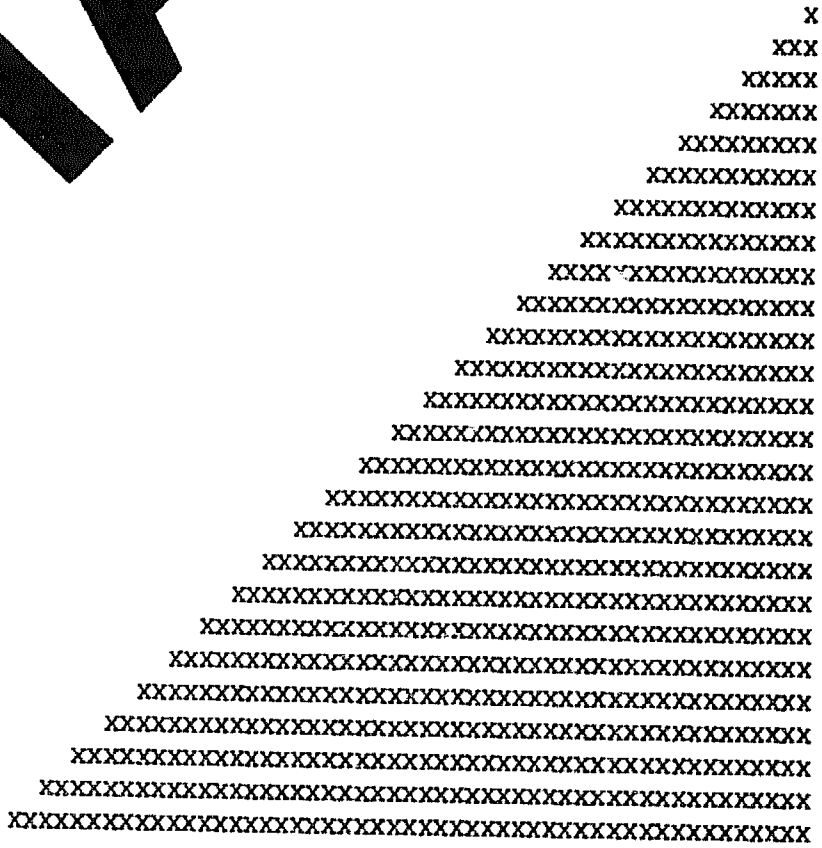
Remember to boot the system and run the SCU (Chapter 3) to configure the system for the new option.

Note

The system will not operate properly after a CPU or cache upgrade until you run the SCU and create a new system configuration file with the "Save and exit" selection.



CHAP 7



7

Installing Optional Disk and Tape Drives

7.1 Introduction

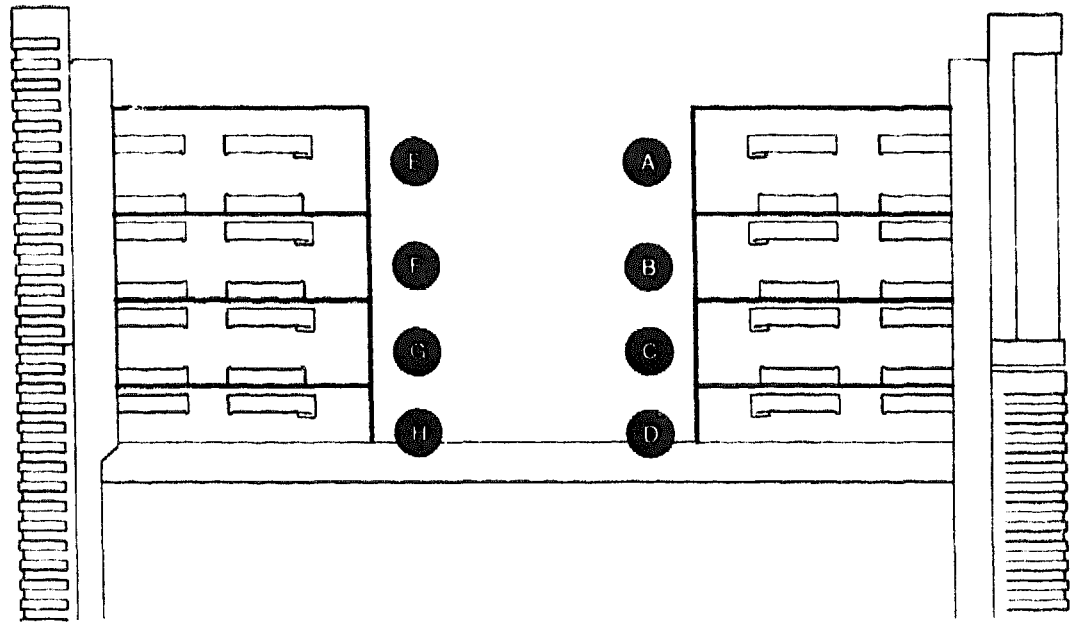
This chapter provides the installation instructions for the disk and tape drive options installed in the front and rear bays of the system cabinet. These options are:

- 1.2 MB 5.25-inch diskette drive (RX33)
- 525 MB QIC tape drive (TZK10-E)
- 209 MB half-height disk drive (RZ24-S)
- 426 MB half-height disk drive (RZ25-S)
- 852 MB half-height disk drive (RZ35)
- 665 MB full-height disk drive (RZ56)
- 1.0 GB full-height disk drive (RZ57)
- 1.3 GB full-height disk drive (RZ58)
- 105 MB IDE disk drive

When you install these options, observe the following guidelines:

- All tape and diskette devices must be placed in the front bays (Figure 7–1) for loading/unloading access.
- If the 1.2 MB diskette drive is used, it should be placed in the second bay (bay B), underneath the 1.44 MB, 3.5-inch diskette drive. Both drives connect to the same bus cable.
- QIC tape drives should be installed in bays C or D (lower front bays).

Figure 7–1 Storage Bays



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The rear bays are used for disk drives. The three lower front bays can also be used for disk drives if they are not occupied.

Half-height drives take up one bay compartment. The 665 MB, 1.0 GB, and 1.3 GB drives are full-height (FH) drives which require two bay compartments.

7.2 Cable Information

The following sections describe the cables for the diskette drives, SCSI devices, IDE devices, and power for the drives.

7.2.1 Diskette Drive Cable

The diskette drive cable connects to two diskette drives: the standard 1.44 MB drive (RX23) and the optional 1.2 MB drive (RX33). This flat ribbon cable is factory installed and is connected to the diskette drive connector on the system board.

7.2.2 SCSI Cable

The SCSI cable and terminator are supplied with the Adaptec SCSI adapter module options. The cable is also available separately.

The SCSI bus cable connects up to seven SCSI devices to a SCSI host adapter module. The cable is connected to the SCSI connector on the SCSI module. The cable is installed by putting the adapter end down through the hole in the top of the card cage. The cable routing is shown in Figure 7–2. Refer to the figure key in Table 7–1.

Figure 7–2 Routing of SCSI Cable

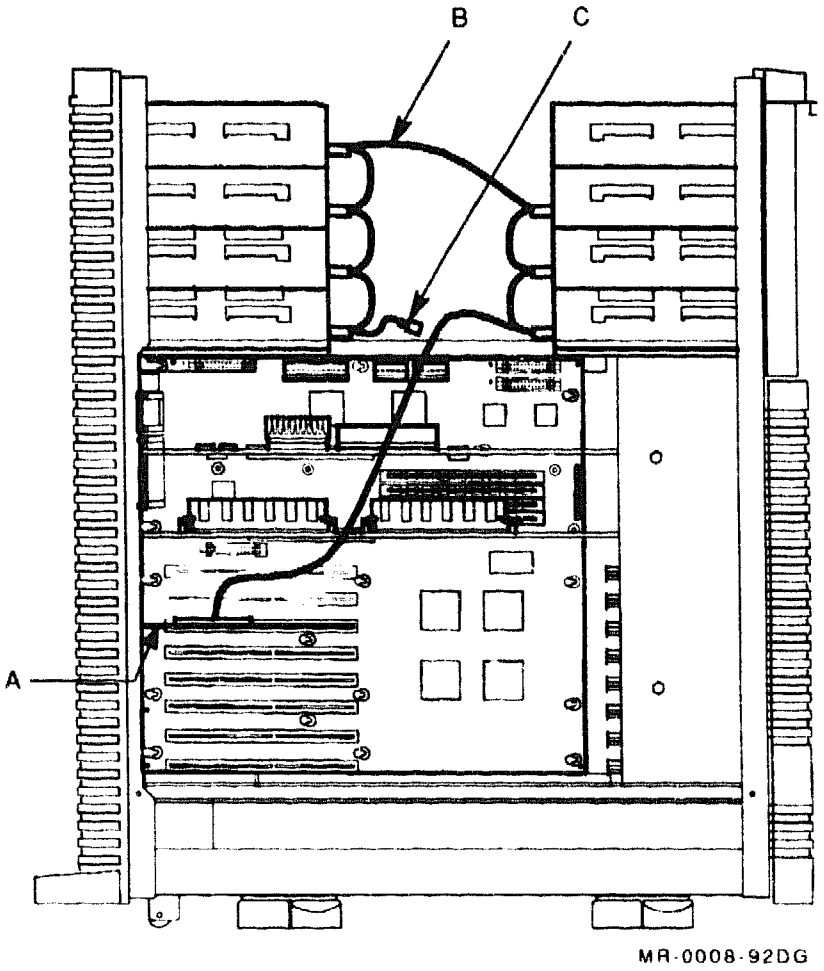


Table 7–1 Key for Figure 7–2

Key	Description
A	SCSI adapter
B	SCSI bus cable
C	Internal SCSI bus terminator

7.2.3 IDE Cable

An IDE cable can be installed to control IDE disk drives. The cable supports up to two IDE drives. The cable is installed by putting the adapter end down through a hole in the top of the card cage.

7.2.4 Power Cables

Power cables are factory installed. Any power connector can be used for an option device. Diskette drives use the two smaller power connectors.

7.3 Installing Drive Options

1. Shut down the system (Section 4.3).

Note

Before you install the device in the applicationDEC 400xP system, make sure that the operating system is halted and the ac power cord is disconnected.

2. Remove the top cover and two side panels from the system cabinet (Section 4.4).
3. Remove the top front (or rear) bezel (Figure 7–3 and Table 7–2) by pressing in on the four bezel locking tabs that extend through the cabinet chassis.
4. Loosen the two captive screws holding the EMI shield and mounting bracket to the bay compartment. Remove the shield and bracket. (If the option you are installing is a full-height drive, remove the shield and bracket from the compartment above also.) Store the bracket for future use. The shield will be reinstalled on rear bays.)

Figure 7–3 Accessing the Option Bays

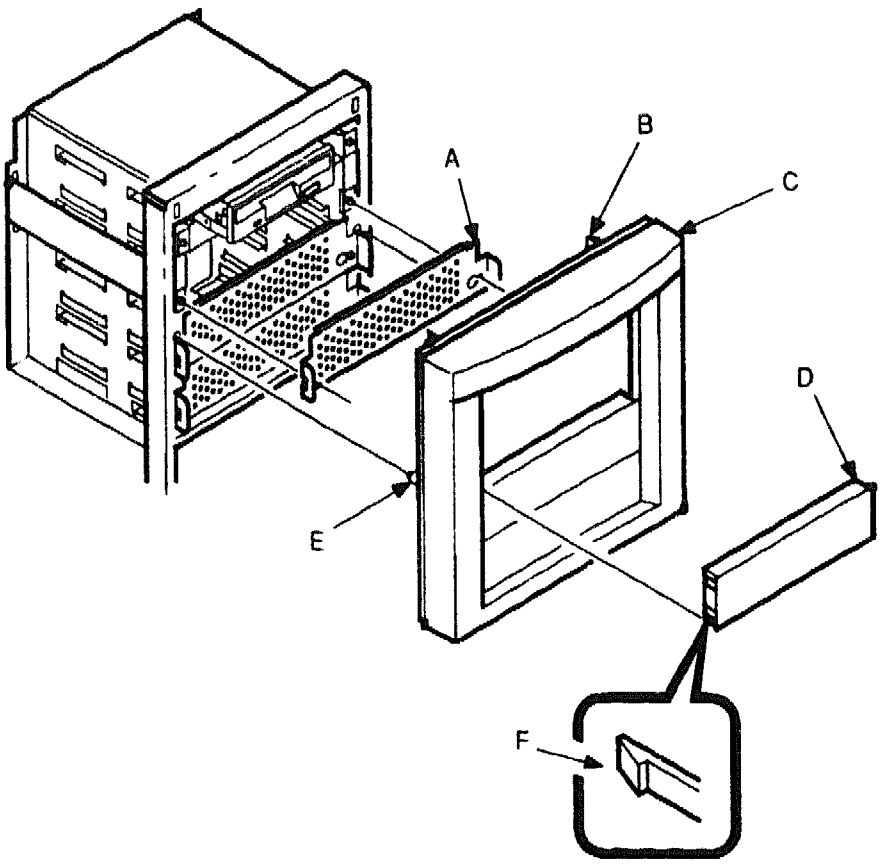


Table 7–2 Key for Figure 7–3

Key	Description
A	EMI shield
B	Front bezel locking tabs (4)
C	Front bezel
D	Blank panel
E	Guide pins (2)
F	Blank panel locking tabs

5. Verify that the device jumpers are installed or removed. See the figures listed in the Jumpers column of Table 7–4.
6. With the device upside down (see Figure 7–4 and Table 7–3), attach the mounting bracket to the bottom of the device with four screws from the hardware package that came with the system cabinet. Use SAE screws or the smaller metric screws as specified in Table 7–4. The four screw holes in the center of the bracket are used for a half-height device. The screw holes on the outer edge of the bracket are used for a full-height device.
7. Slide the device with the mounting bracket into the bay compartment.
8. Tighten the two mounting bracket screws that secure the mounting bracket to the cabinet chassis.
9. If the option is a hard disk drive, replace the EMI shield. If the option is a media device, save the shield for future use.
10. Attach the appropriate bus cable to the data connector on the back of the device. The connector is keyed and cannot be incorrectly installed.
11. Attach the power cable to the four-pin power connector on the rear of the device. The connector is keyed and cannot be incorrectly installed.
12. For media devices (diskette or tape drives), remove the blank panel (Figure 7–3). Press in on the four locking tabs and push the panel out.
13. Replace the top front (or rear) bezel by inserting the two guide pins (Figure 7–3) into the cabinet chassis and pushing the bezel into place. The four corner tabs snap in to hold the bezel securely onto the cabinet.
14. Replace the cabinet side panels and top cover (Section 4.7).
15. Plug in the system power cord.
16. Turn the power switch to the On (|) position.
17. Boot the system and run the SCU (Chapter 3).

Figure 7–4 Installation of Bay Options

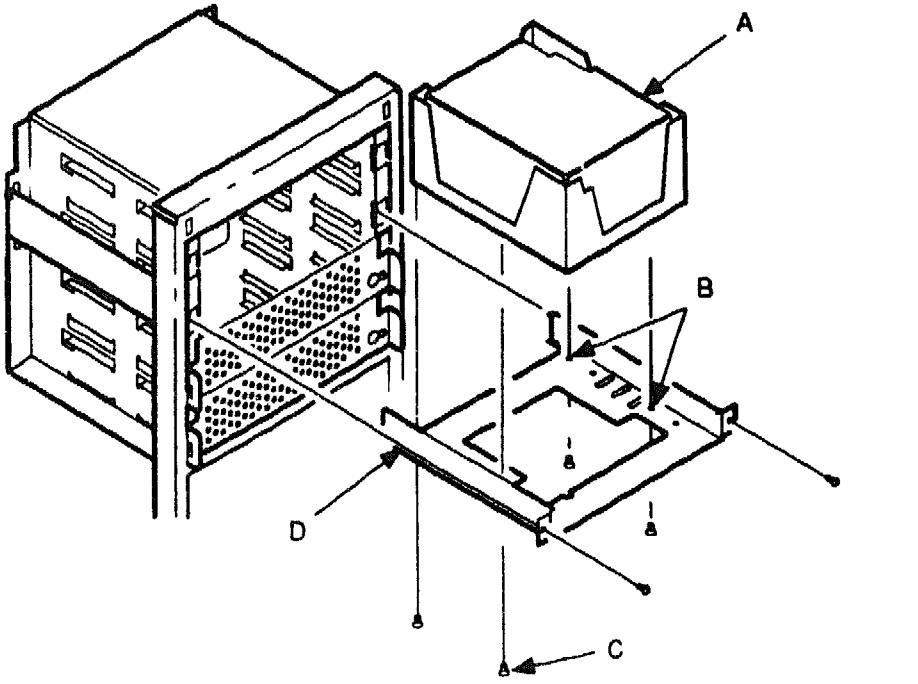


Table 7–3 Key for Figure 7–4

Key	Description
A	Option device (full-height shown)
B	Full-height device mounting holes
C	Mounting screws (4)
D	Mounting bracket

7.4 Installation Data

Table 7–4 contains installation data on the bay option devices. Refer to this table as you follow the procedures in Section 7.3.

Table 7–4 Bay Option Installation Data

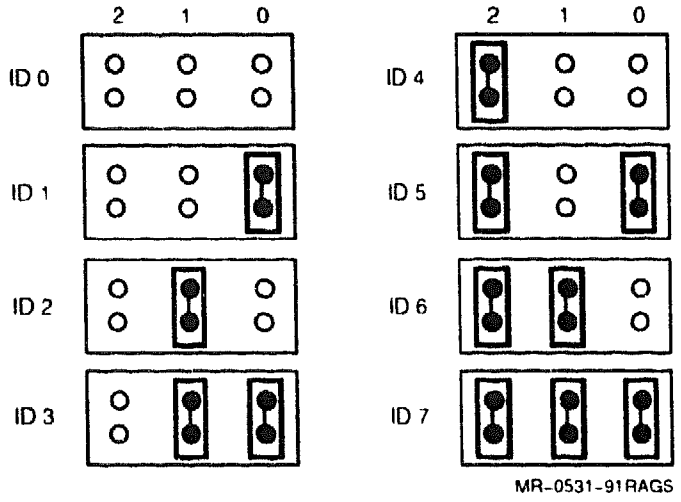
Description	Model No.	Jumpers	Screws	Connect to:
525 MB QIC tape drive	TZK10-E	Figure 7–6	Metric	SCSI bus cable
209 MB HH disk drive	RZ24-S	Figure 7–7	SAE	SCSI bus cable
426 MB HH disk drive	RZ25-S	Figure 7–8[1]	SAE	SCSI bus cable
665 MB FH disk drive	RZ56	Figure 7–9	SAE	SCSI bus cable
1.0 GB FH disk drive	RZ57	Figure 7–9 and Figure 7–10[1]	SAE	SCSI bus cable
105 MB HH IDE disk drive	PC4XR-EB	Figure 7–11	SAE	IDE bus cable
1.2 MB 5.25-inch HH diskette drive	RX33-AS	Figure 7–12[2]	Metric	Diskette drive cable

[1]Verify that the drive is jumper configured for spin-up on power.

[2]Verify that jumpers U1, D1, DC2, Density, and Grounding are installed.

Figures are listed in Table 7–4 to help you locate the device's ID jumpers (and other jumpers, if applicable). Each SCSI device has three ID jumpers which assign its unique ID on the bus. The jumpers specify the ID in binary format as shown in Figure 7–5. The device IDs on the SCSI bus are assigned according to the system configuration. Devices on the IDE bus are jumpered according to how many drives are on the bus and, if there are two, which is the primary and which is the secondary (Figure 7–11).

Figure 7–5 ID Jumper Code



Figures 7–6 through 7–12 show the jumper locations and configurations for the bay options. See also the corresponding figure keys in Tables 7–5 through 7–11.

Figure 7–6 TZK10-E ID Jumper Locations

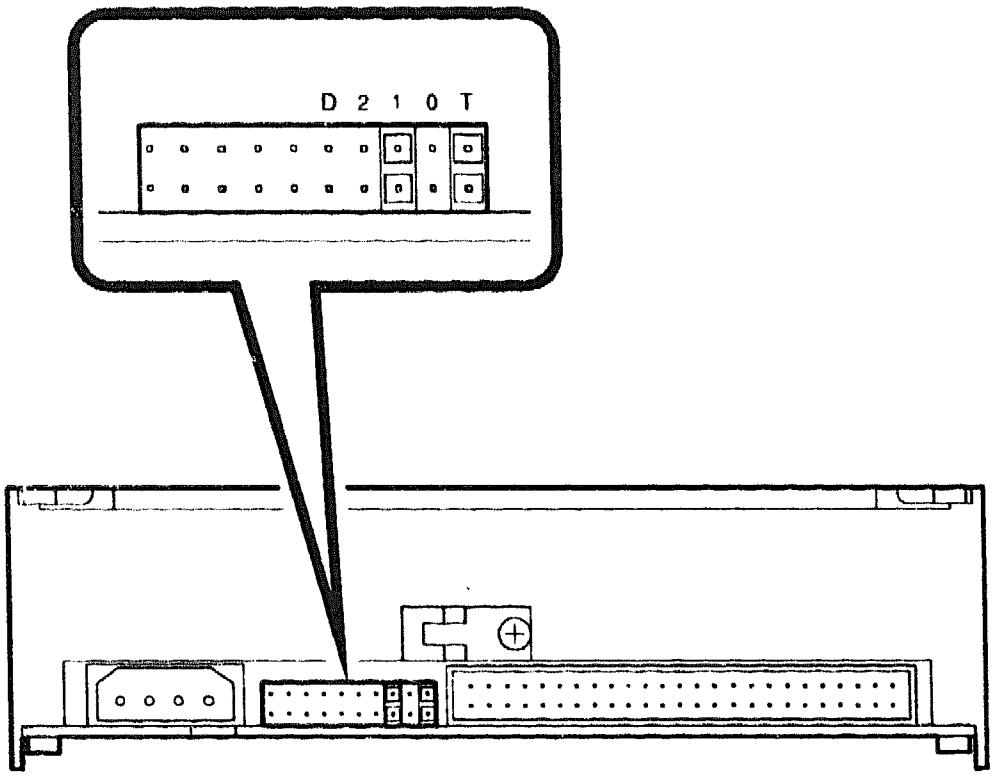


Table 7–5 QIC Tape SCSI ID and Configuration Jumpers

Jumper	Operating Position	Description
D	Out	Automatic density. Enables automatic density when removed.
2	Out	SCSI ID bit 2
1	In	SCSI ID bit 1
0	Out	SCSI ID bit 0
T	In	Terminator power source. When installed, power for the SCSI terminator is provided by the drive.

Figure 7–7 RZ24-S ID Jumper Locations

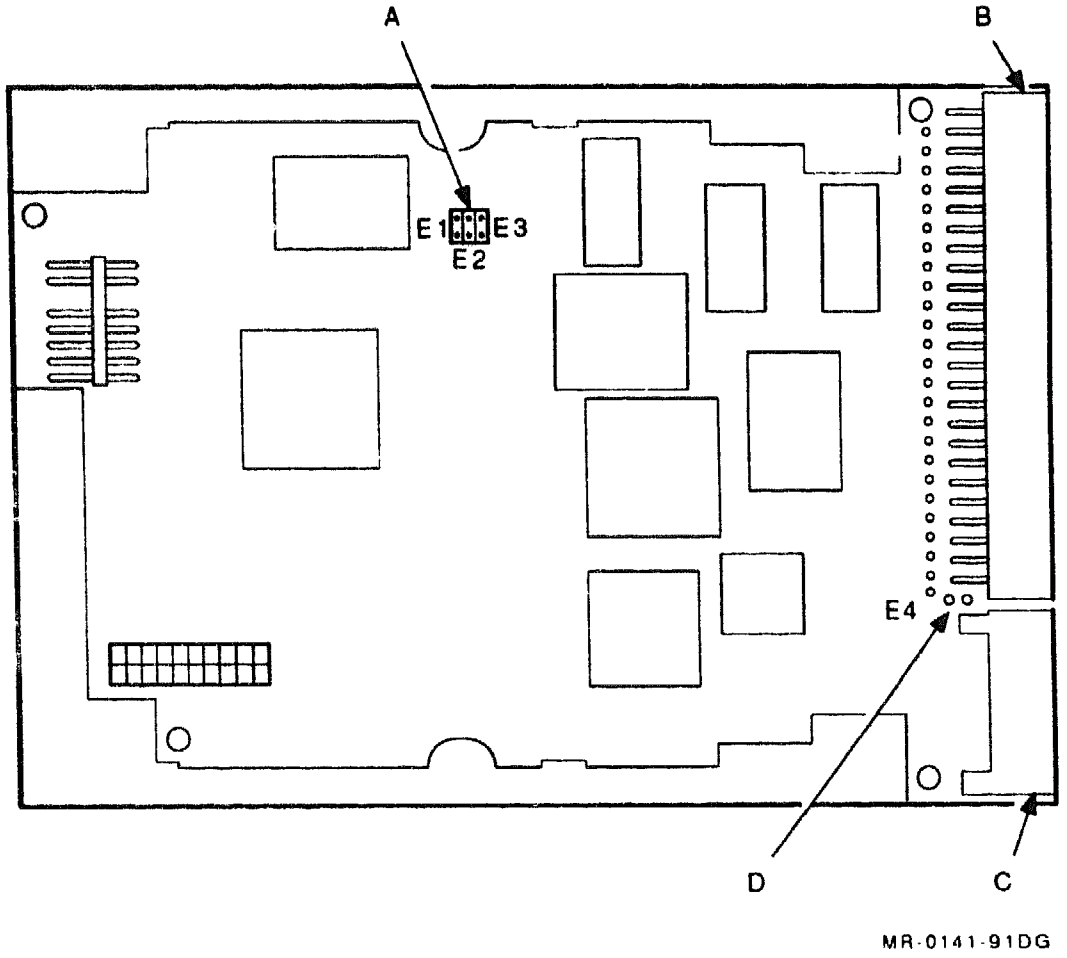


Table 7–6 Key for Figure 7–7

Key	Description
A	SCSI ID jumpers. E1, E2, and E3 = binary bits 0, 1, and 2, respectively. ID 0 shown.
B	SCSI data connector
C	Power connector
D	Parity jumper

Figure 7–8 RZ25-S Jumper Locations

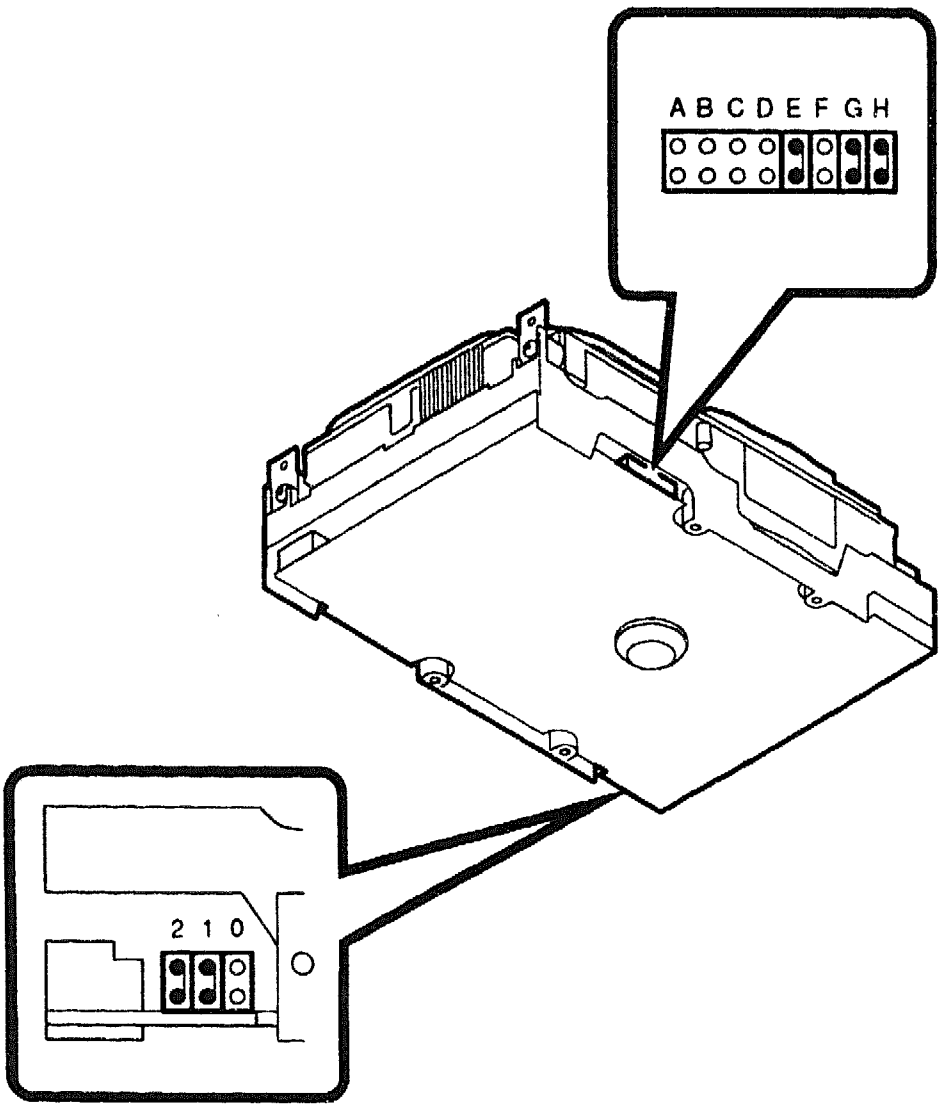


Table 7–7 RZ25-S Configuration

Jumper	Operating Position	Description
A	Out	Factory use only.
B	Out	Spin-up on power when removed. Spin-up on command when installed.
C	Out	Spin-up delay (valid only if jumper B is removed). Drive spins up after *n*-second delay when installed. (*n* = 16 x SCSI ID setting.) Drive spins up immediately when removed.
D	Out	Write-protect. Drive is write protected when installed.
E	In	Parity checking. Parity checking is enabled when installed.
F	Out	Reserved. Do not install jumper.
G	In	Terminator power source. The drive supplies power to SCSI bus, pin 26.
H	In	Terminator power source. The drive supplies power to its own terminators. Jumpers G and H should both be installed.
2, 1, 0	--	SCSI ID jumpers. ID 6 shown.

Figure 7–9 RZ56/RZ57 ID Jumper Locations

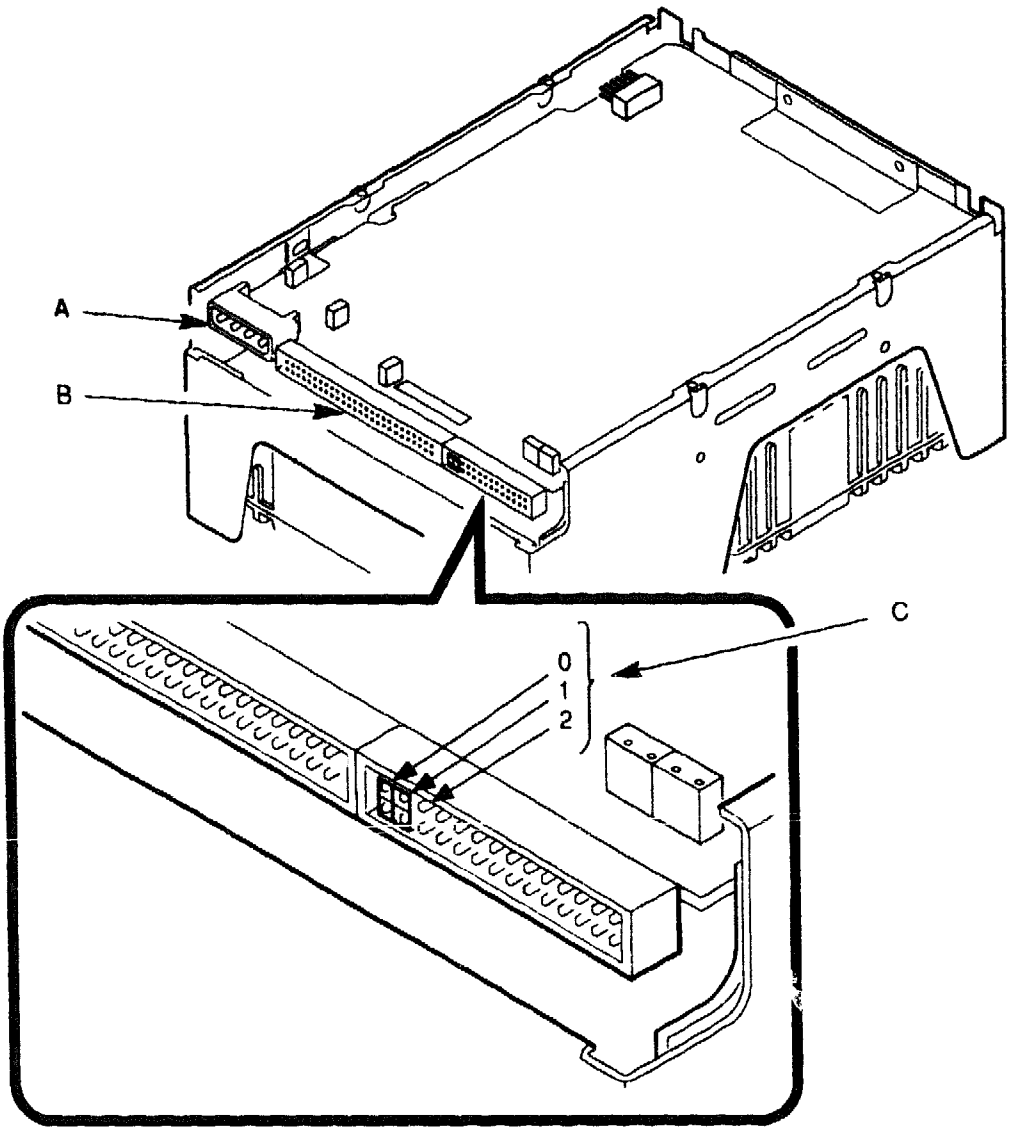


Table 7–8 Key for Figure 7–9

Key	Description
A	Power connector
B	Data connector
C	SCSI ID jumpers. ID 3 shown.

Figure 7–10 RZ57 Spin-Up Jumper Location

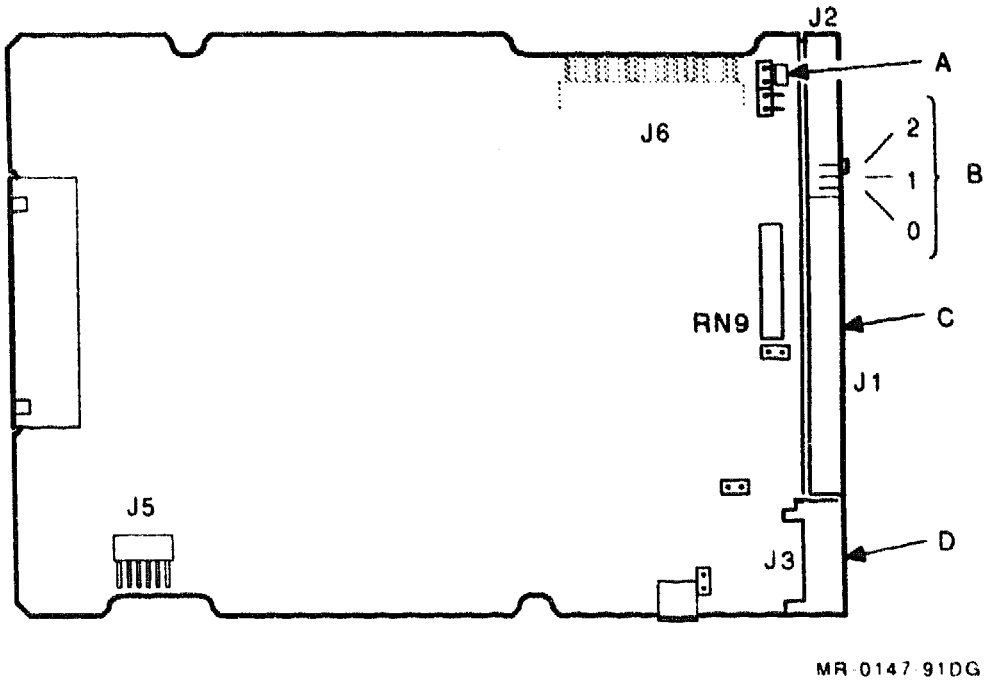


Table 7–9 Key for Figure 7–10

Key	Description
A	Spin-up jumper. Remove jumper for spin-up on power.
B	SCSI ID jumpers. ID 4 shown.
C	Data connector
D	Power connector

Figure 7–11 105 MB IDE Drive ID Jumper Locations

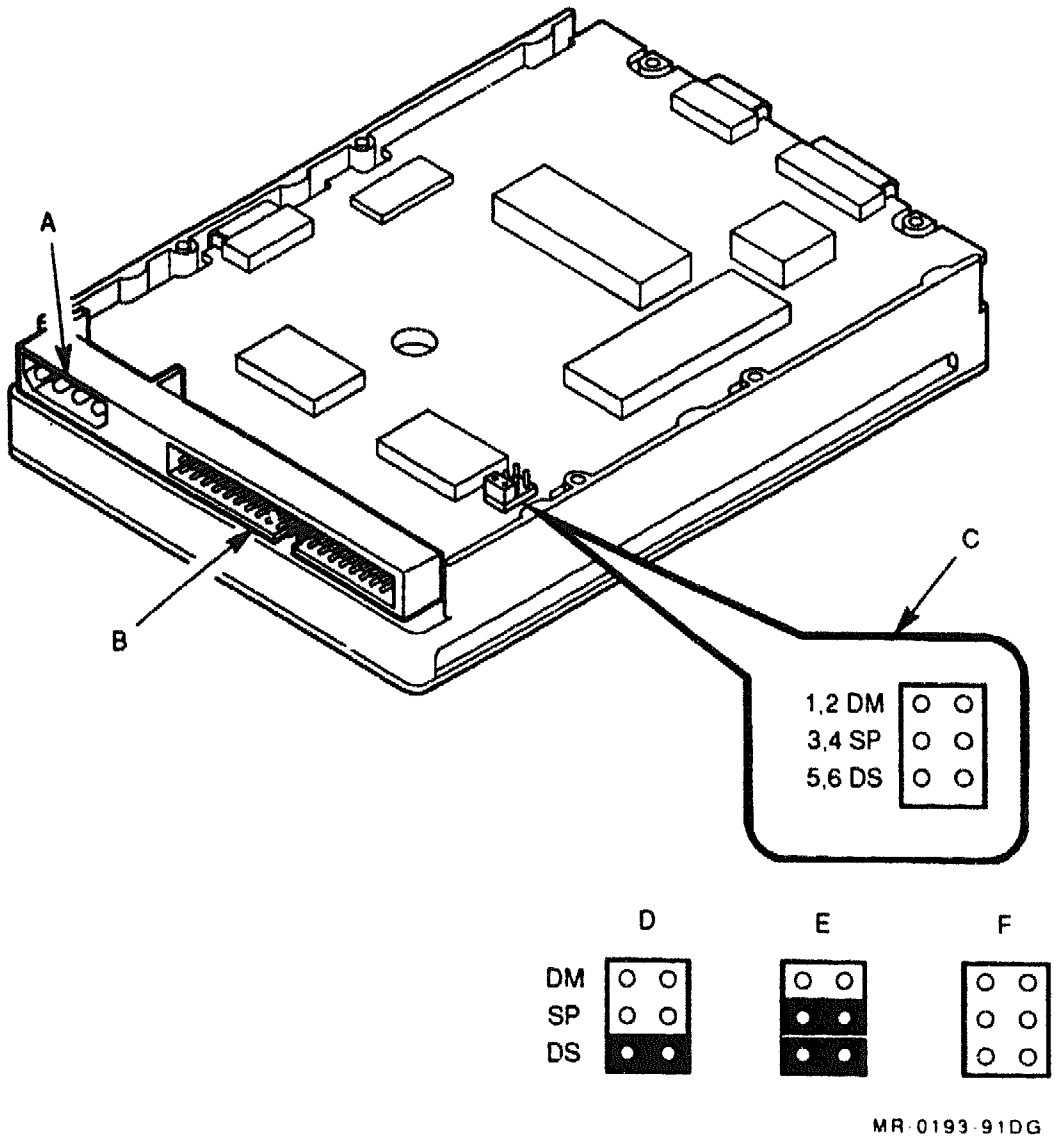


Table 7–10 Key for Figure 7–11

Key	Description
A	Power connector
B	Data connector
C	ID address jumpers
D	Setting for drive in single IDE drive system
E	Setting for primary drive in dual IDE drive system
F	Setting for secondary drive in dual IDE drive system

Figure 7–12 RX33 Jumper Locations

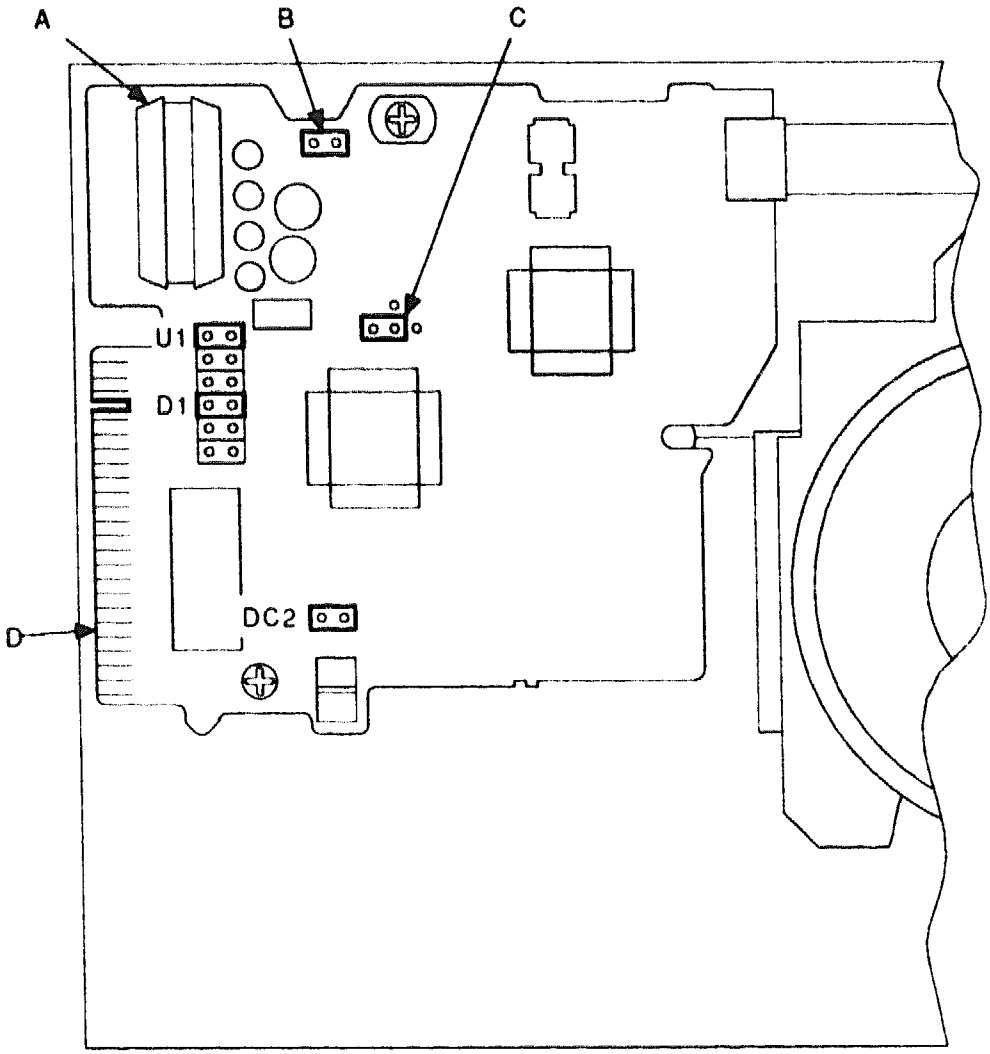


Table 7–11 Key for Figure 7–12

Key	Description
A	Power connector
B	Grounding jumper
C	Density jumper
D	Data connector


CHAP 8

8

Installing Option Modules

This chapter discusses the use of ISA/EISA and master/slave modules supported by the applicationDEC 400xP system, and provides the installation instructions common to all the modules.

8.1 ISA/EISA Modules

The applicationDEC 400xP system board has eight option slots into which option modules are installed. Each slot has two sets of contacts: an ISA set positioned about 1/4 inch into the slot, and an EISA set positioned about 1/2 inch into the slot and offset from the ISA contacts (Figure 8–1).

ISA modules have a shallow connector. When an ISA module is installed, its connector makes contact with only the ISA set of contacts. EISA modules have a deep connector with two rows of contacts. When an EISA module is installed, its connector makes contact with both rows of contacts. The EISA bus interface for the EISA module comprises both sets of contacts.

Figure 8–1 Option Module Slot Contacts

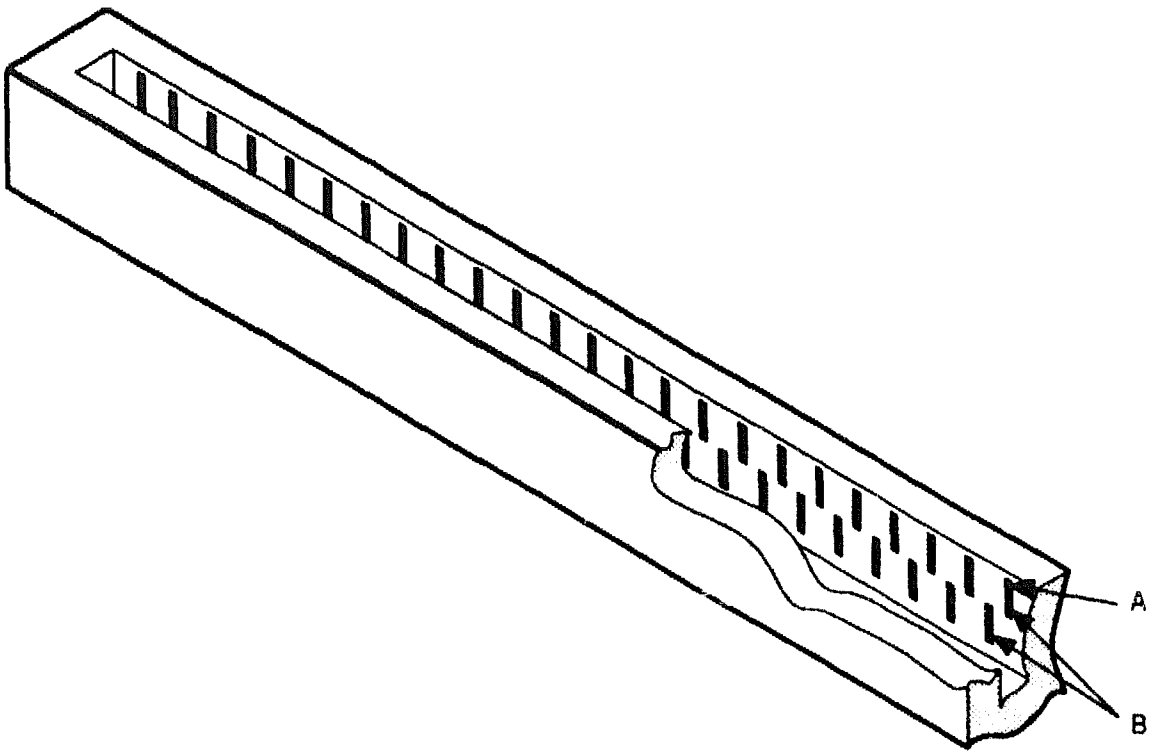


Table 8–1 Key for Figure 8–1

Key	Description
A	ISA contacts
B	EISA bus

8.2 Master/Slave Modules

Option modules are either master or slave. Master modules must go into master slots on the system board. Slave modules can go into any slot.

No option slot is reserved for a particular type of option module. Any option module can go into any option slot as long as the master-slave orientation described above is observed. Table 8–2 identifies the option modules as master or slave.

Table 8–2 Master/Slave Option Modules

Module	Slave	Master	Slot Restrictions
Terminal multiplexer	X	-	none
Adaptec 1520 SCSI adapter	X	-	none
Adaptec 1540B SCSI adapter	X	-	none
Adaptec 1740A SCSI adapter	-	X	3–8
3Com 3C503 Ethernet adapter	X	-	none
Western Digital WD8003 Ethernet adapter	X	-	none
Western Digital WD8013-EBT Ethernet adapter	X	-	none

8.3 Installation

All option modules are installed in a similar fashion. Refer to Figure 8–2 and Table 8–3. Install the modules as follows.

1. Remove the blank slot cover corresponding to the selected slot by removing the screw holding the panel to the chassis. Be careful not to drop the screw onto a module. Save the screw.
2. Store the blank panel for future use.
3. Slide the module into the slot with the component side facing up. For full-width modules, guide the right side of the module into the module guides on the cabinet chassis. Make sure that the fingers of the option module connector are fully inserted into the option module slot.
4. Align the module's I/O connector with the screw hole in the chassis and insert the screw saved from step 1.

Figure 8–2 Installation of Option Modules

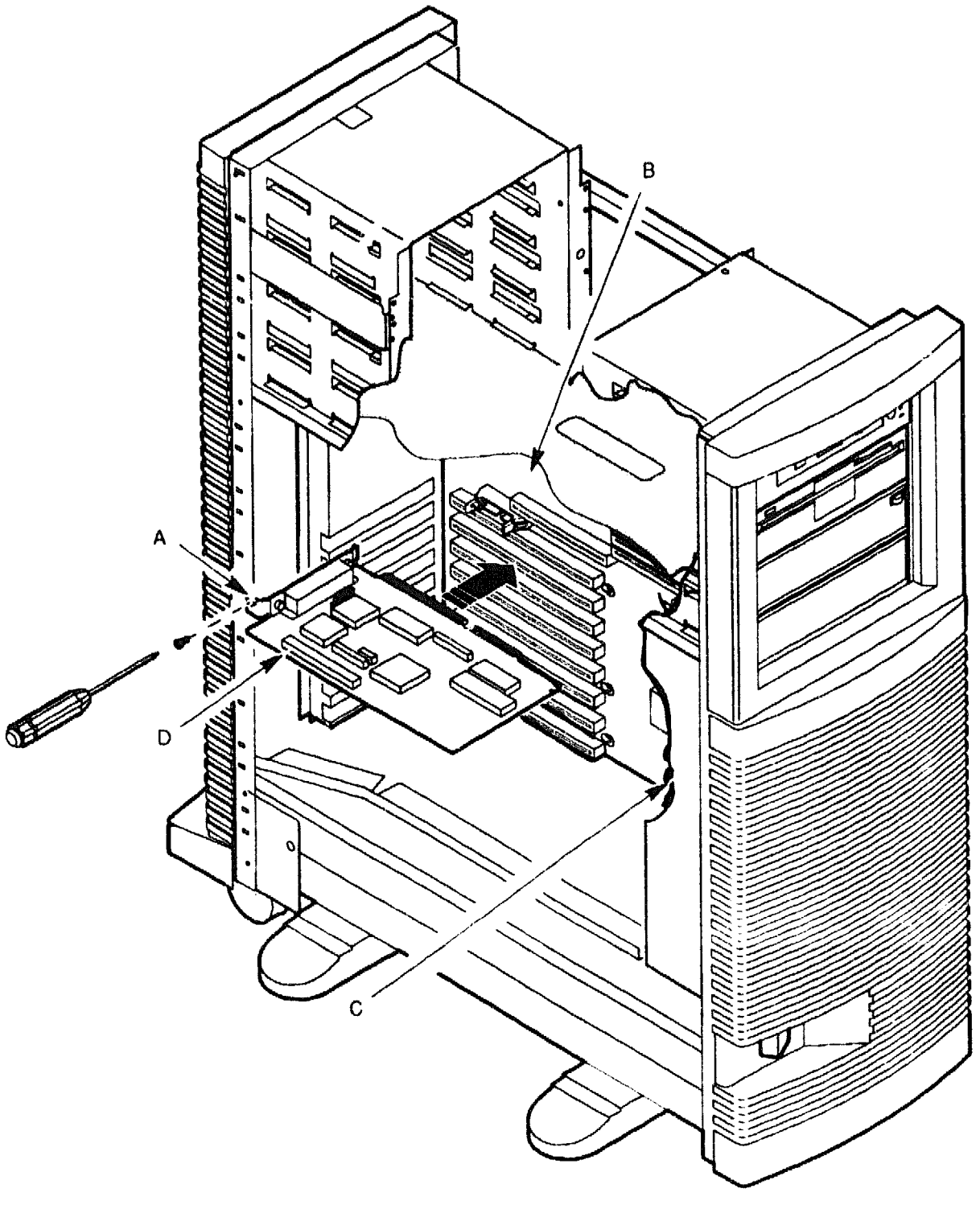
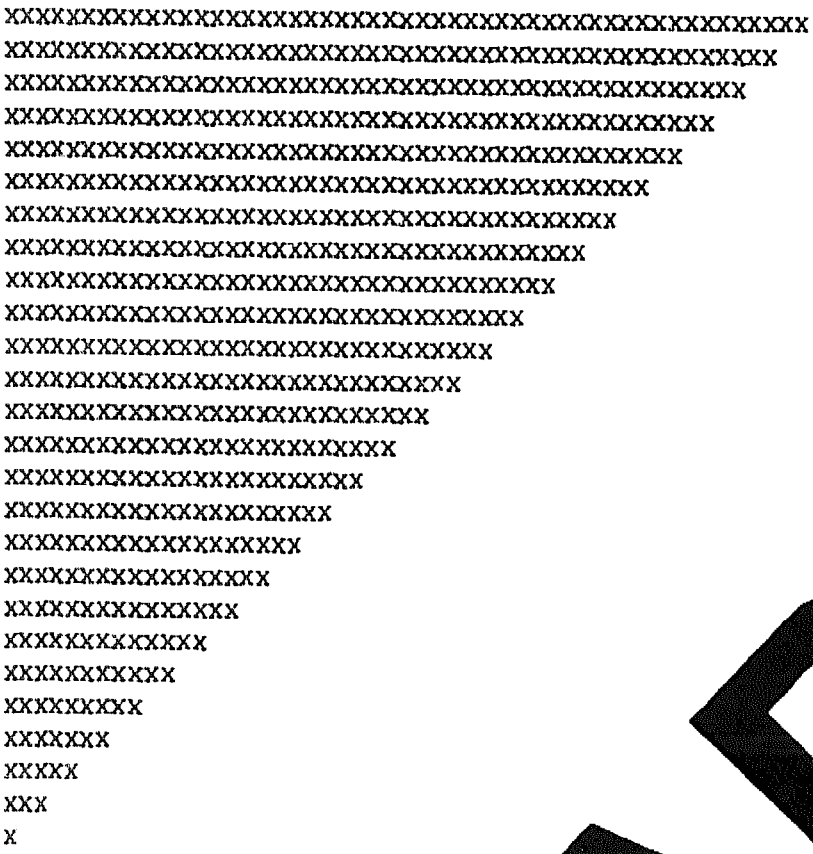


Table 8–3 Key for Figure 8–2

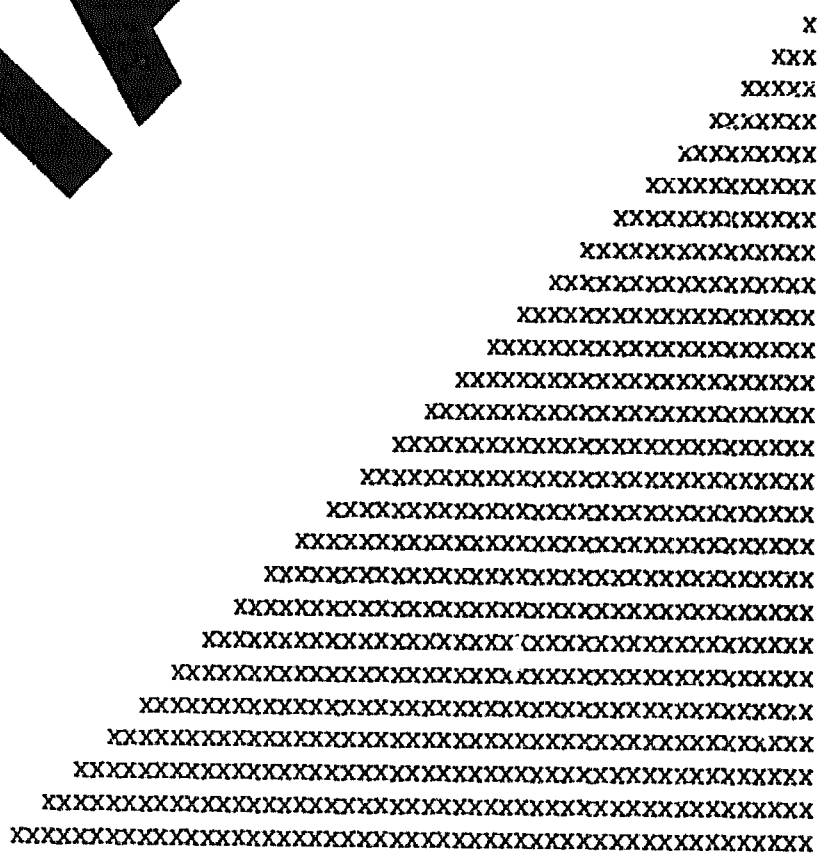
Key	Description
A	I/O connector
B	System board
C	Module guide
D	Option module

8.4 Update System Configuration File

After the option module is installed, you must boot the system and run the system configuration utility (SCU). For ISA modules, install the ISA CFG file for the module and make sure that the configuration shown in the SCU matches the settings of the module. For EISA modules, install the CFG file to configure the module. Refer to Chapter 3 for detailed information on running the SCU.



CHAP 9



9

Installing a Terminal Multiplexer and Terminal Concentrator

This chapter describes the installation of the terminal multiplexer host adapter and terminal concentrator option.

9.1 Description

The terminal multiplexer and terminal concentrator options used in the applicationDEC 400*x*P system are listed below.

- PC4XD-DA: terminal multiplexer kit consisting of the terminal multiplexer and the 8-port terminal concentrator
- PC4XD-DB: 8-port terminal concentrator
- PC4XD-DC: terminal concentrator extension kit

The terminal multiplexer is a 16-bit ISA module. It can be installed in either a master or a slave option module slot. One multiplexer can connect up to 32 users.

Each terminal multiplexer has four connectors on its distribution panel for installation of up to four terminal concentrators. Each terminal concentrator connects up to eight terminals and/or serial printers using RS-232 serial lines.

Figure 9–1 illustrates the installation of a terminal multiplexer and terminal concentrator.

Figure 9–1 Terminal Multiplexer and Terminal Concentrator Installation

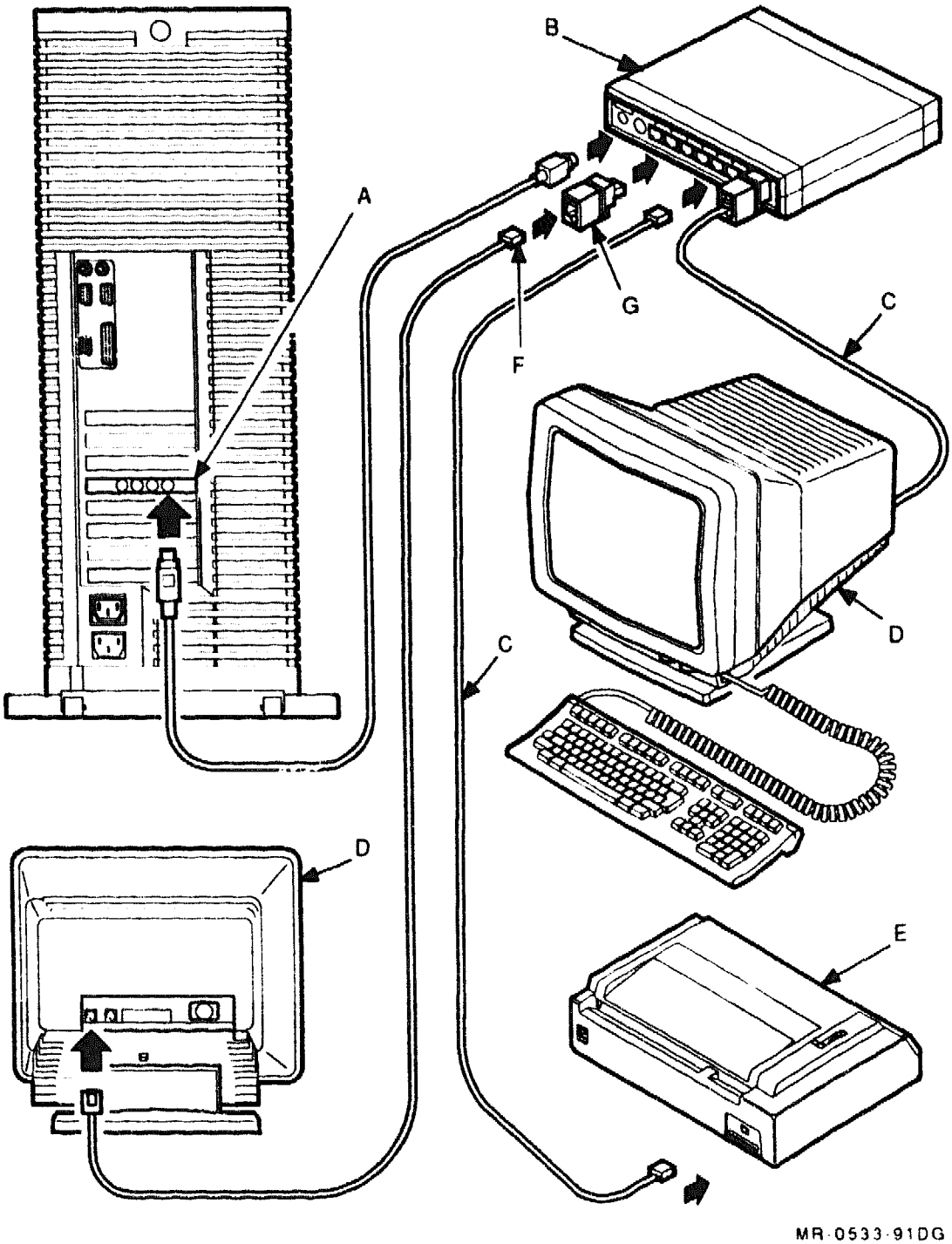


Table 9–1 Key for Figure 9–1

Key	Description
A	Terminal multiplexer
B	Terminal concentrator
C	RS-232 cable
D	Terminal
E	Printer
F	MMJ connector (found on Digital VT series terminals)
G	H8577-A adapter (converts MMJ input to RJ45 input)

The front and rear panels of the terminal concentrator are illustrated in Figure 9–2. The front panel has two status LEDs, one green and one yellow, for each of the eight terminal ports, and a green host LED.

The rear panel has eight terminal connection ports, a host jack, and an optional power jack. All cable connections to the concentrator are made to the rear panel.

The terminal ports are 8-pin RJ45 telephone plugs, for connection of serial lines from terminals or printers. The terminal concentrator ports carry signals that comply with RS-232 serial transmission standards.

The connector labeled HOST is for connection of the concentrator to the host adapter. The connecting cable carries data between the two units, and also supplies power to the concentrator. The cable is supplied with the concentrator and is 10 feet long.

The connector labeled OPTIONAL POWER is for use with the terminal concentrator extension kit. If you need to place the terminal concentrator further than 10 feet from the host adapter, you must use a terminal concentrator extension kit.

Note

Additional information can be found in the *Terminal Multiplexer Intelligent I/O Subsystem Installation Guide.*

Figure 9–2 Terminal Concentrator

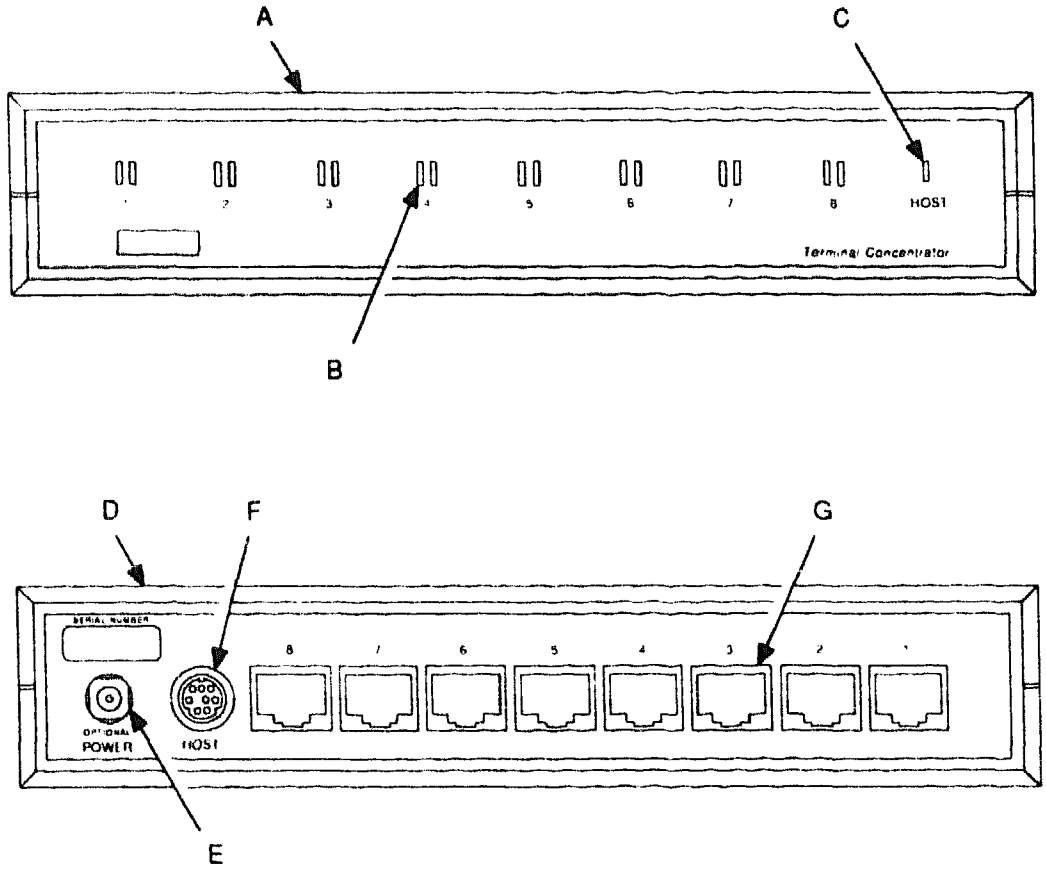


Table 9–2 Key for Figure 9–2

Key	Description
A	Concentrator front view
B	Port LEDs
C	Host LED
D	Concentrator rear view
E	Optional power connection
F	Host connection
G	Terminal connection ports (8)

9.2 Installation

Use the following instructions to install the terminal multiplexer and terminal concentrator.

1. Shut down the system (Section 4.3). Unplug the power cord from the wall socket.
2. Remove the top cover and left side panel from the system cabinet (Section 4.4).
3. Remove the card cage cover (Section 4.5).
4. The multiplexer memory address is set by rotary switches L and H shown in Figure 9–3. Refer to the figure key in Table 9–3. Make sure that switches H and L are set to 0 and D. This sets the multiplexer memory address to 0D0000–0DFFFF.
5. Install the terminal multiplexer into the system board following the instructions given in Section 8.3.
6. Connect the terminal concentrator(s) to the mini-DIN connector(s) on the multiplexer distribution panel using the cable provided with the concentrator.

Note

If a terminal concentrator will be further than 10 feet from the applicationDEC 400*x*P system, refer to Section 9.3.

7. Connect the printer(s) or terminal(s) to the rear connectors on the terminal concentrator(s). If the device you are connecting uses a modified modular jack (MMJ) cable (VT400 series terminals, for example), use an H8577-A adapter to convert the MMJ cable connection to an RJ45 connection for use with the terminal concentrator. H8577-A adapters are supplied with the terminal concentrator. See Figure 9–1.

Figure 9–3 Terminal Multiplexer

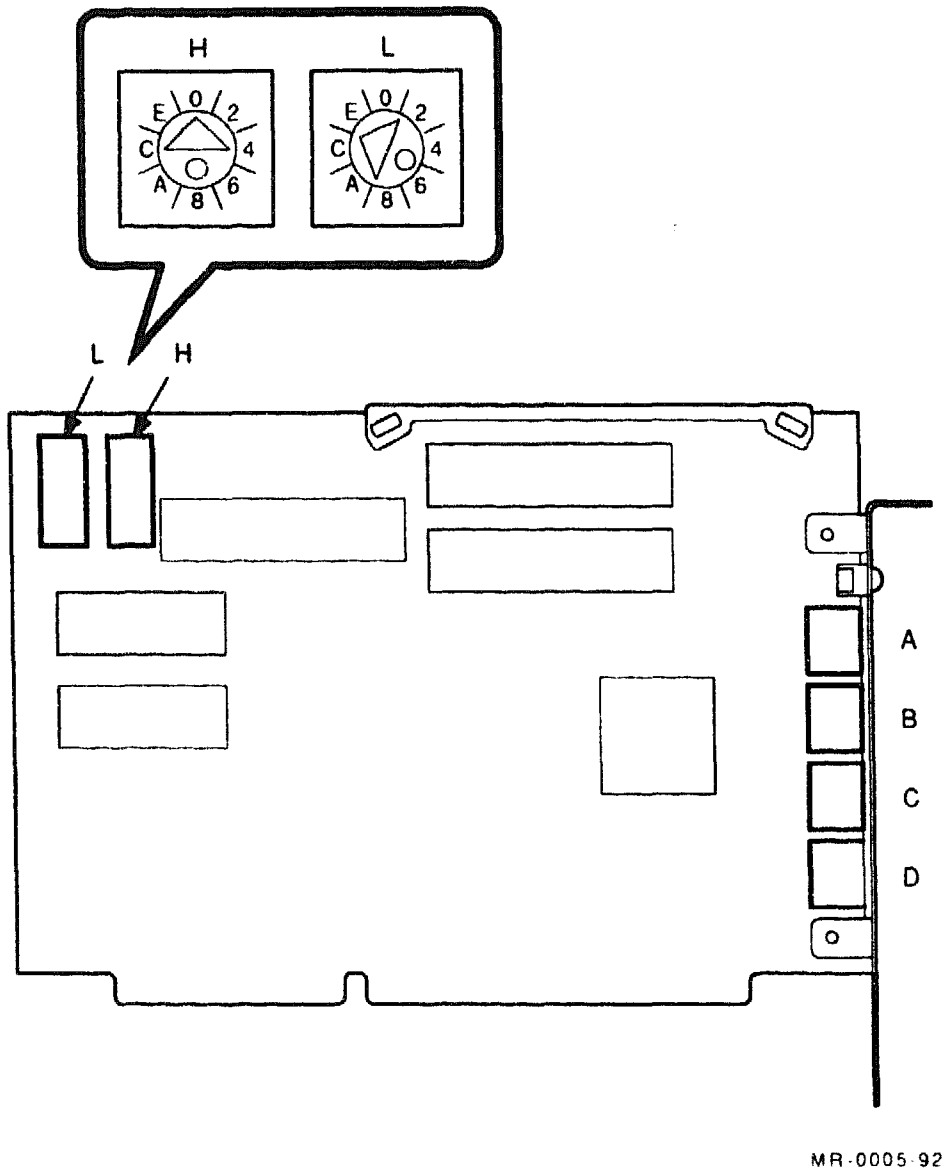


Table 9–3 Key for Figure 9–3

Key	Description
A	Multiplexer port A
B	Multiplexer port B
C	Multiplexer port C
D	Multiplexer port D

8. Replace the card cage cover (Section 4.6).
9. Replace the cabinet left side panel and top cover (Section 4.7).
10. Plug in the system power cord.
11. Turn the power switch to the On (|) position.
12. Boot the system and run the SCU (Chapter 3).

Note

The ISA CFG file for use with the terminal multiplexer option is called "ISAC001.CFG Corollary 8x4 MUX (Rotary Switches)" and is found on the Library diskette.

13. Install the terminal multiplexer software driver following the instructions given in the *Terminal Multiplexer Intelligent I/O Subsystem Installation Guide*. The IRQ specified during the driver installation should be 10, if 10 is not already assigned to another device. An IRQ level of 15 can also be used.

9.3 Installing Terminal Concentrators More Than 10 Feet from the System

If you need to place the terminal concentrator further than 10 feet from the host adapter, you must use the PC4XD-DC terminal concentrator extension kit. Concentrators can be placed up to 1000 feet from the terminal multiplexer using the extension kit.

The kit consists of:

- 8-pin mini DIN to DB25 male adapter cable
- 8-pin mini DIN to DB25 female adapter cable
- Wall-mounted power supply
- Power cable

Concentrator power is provided by the wall-mounted power supply through the concentrator's optional power connector. The 8-pin signal cable is extended by use of the male and female adapter cables and an extension cable that is supplied by the customer. The adapter cables do not carry power to the concentrator. Refer to Figure 9–4 and Table 9–4.

Figure 9–4 Terminal Concentrator Extension Kit Installation

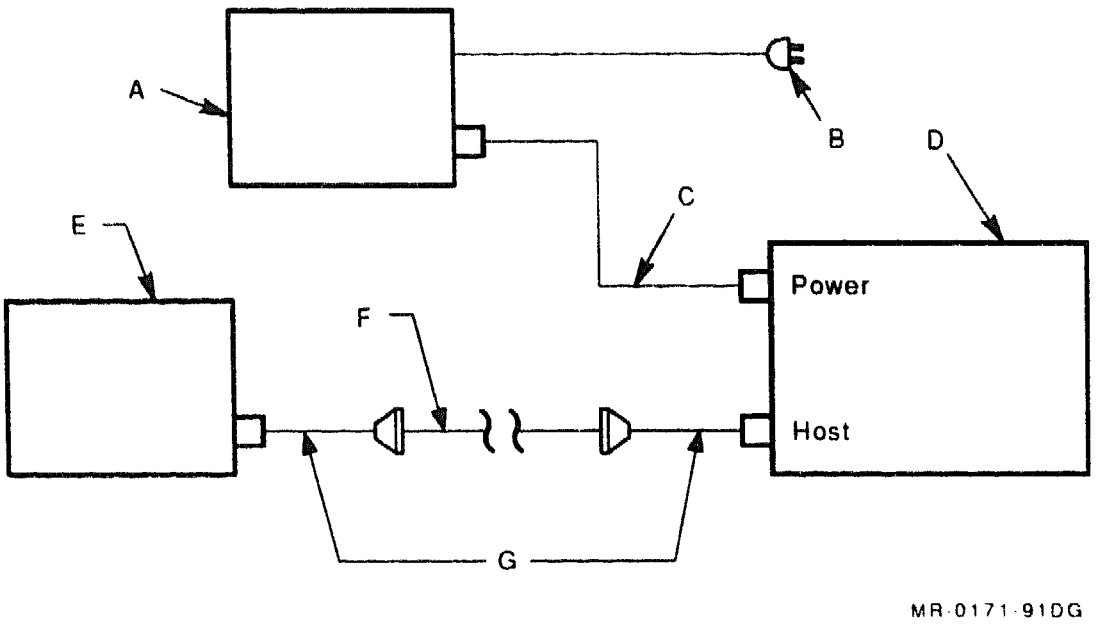


Table 9–4 Key for Figure 9–4

Key	Description
A	Power supply
B	Line power
C	Power cable
D	Concentrator
E	Terminal multiplexer
F	Customer supplied cable
G	8-pin mini DIN to DB25 adapter cable

The recommended specifications for the customer supplied extension cable are given in Table 9–5.

Table 9–5 Recommended Specifications for Customer Extension Cable

Item	Specification
Cable type	RS-422 shielded, twisted pair
Conductors	22 AWG stranded, 17 Ω/meter
Shield	85% coverage braid
Impedance	78 Ω
Capacitance	68 pF/meter

Refer to the *Terminal Multiplexer Intelligent I/O Subsystem User and Installation Guide* for more information on the terminal extension kit.

9.4 Using VT420 Terminals with SCO UNIX or Open Desktop

To use a VT420 with SCO UNIX or Open Desktop, you must change the VT420's default settings as described below.

9.4.1 Changing VT420 Setup Features

Follow these steps to change the default settings of the terminal:

1. Invoke the VT420 Setup menu by pressing F3 on the keyboard.

   In Setup, use the arrows keys to highlight your selection. Press Enter to invoke the next menu or to select a feature.

2. Select the Display menu.
3. Use the arrow keys to highlight the No Auto Wrap feature. Press Enter to change the selection to Auto Wrap.
4. Change the Smooth-2 Scroll selection to Jump Scroll.
5. Return to the Directory and select the Keyboard menu.
6. Change the <X| selection from Delete to Backspace.
7. Change the <> Key selection from its default setting to Sends '~.
8. Change the '~ Key selection from its default setting to Sends ESC.
9. Return to the main setup menu and select Save to save the terminal's settings. These setup features will now be in effect every time the terminal is powered up.

All other default terminal setup features can be used in their default settings.

9.4.2 Arrow Keys in the vi Editor

When you use the **vi** editor, enter command mode and issue the **set notimeout** command. This enables the VT420 arrow keys in the editor.

To make the **notimeout** setting permanent, edit the *.exrc* file in your user account and enter the **set notimeout** command. The *.exrc* file is an initialization file for the **vi** editor. If the *.exrc* file does not exist in your directory, create it and add the **set notimeout** command.

In Bourne shell environments, if you want to make the **notimeout** selection apply to all users on the system, edit the */etc/profile* file and add these commands:

```
EXINIT = "set notimeout"
export EXINIT
```

In C shell environments, the above commands are not valid. Instead, the following command should be added to the */etc/cshrc* file:

```
setenv EXINIT "set notimeout"
```

9.4.3 Setting the Interrupt Character

Because the delete key (<X|) was redefined to mean backspace, you should set the UNIX interrupt character to Ctrl/C. This is done with the command:

```
stty intr "^C"
```

To make this change permanent, edit the *.profile* file for your account and add the command to the file. The command is then executed whenever you log in.

9.4.4 Defining the VT420 Terminal Type

To ensure the correct display of graphics on the VT420 terminal, edit the */etc/ttytype* file, find the device line for your terminal, and set the terminal type to vt320.

9.4.5 VT420 Function Keys

On the VT420, the keys labeled F1, F2, F3, and F4 are dedicated to terminal control. Use the keys marked PF1, PF2, PF3, and PF4 when UNIX applications require the F1, F2, F3, or F4 keys.

See *Installing and Using the VT420 Video Terminal* for full information about key definitions.

9.4.6 Other Notes on VT420 Terminals

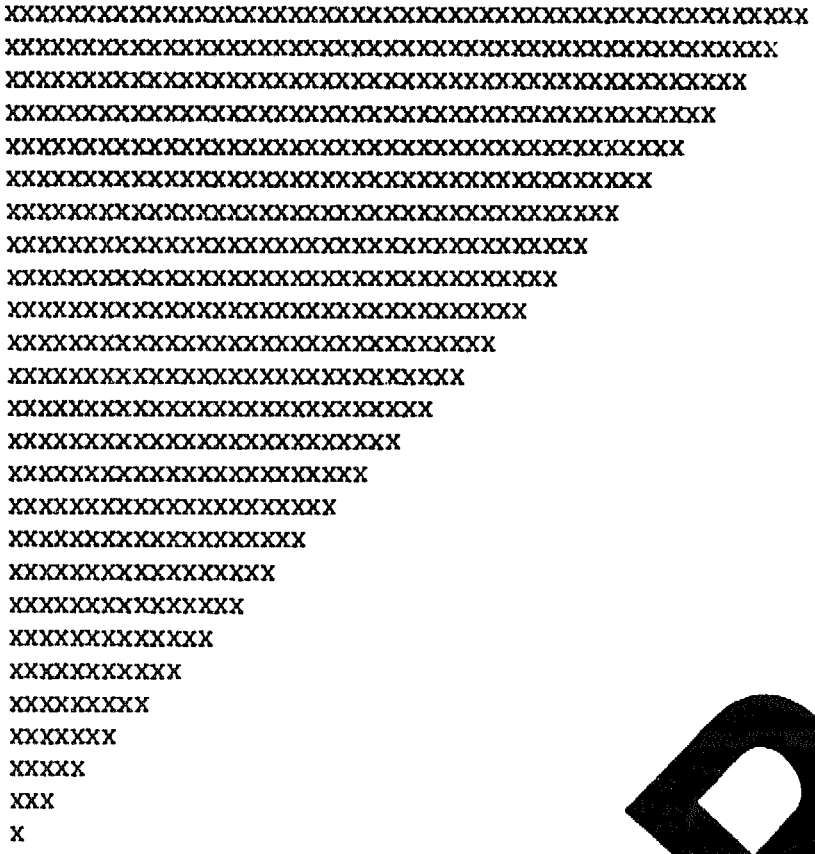
The following notes may be helpful when using the VT420 terminal.

- When running sysadmsh, you may need to enter the escape character twice for the screen to react.
- Your terminal display may become garbled when you display a binary file, such as when you issue the **cat /bin/ls** command. If this happens, use the following commands to clear the terminal:

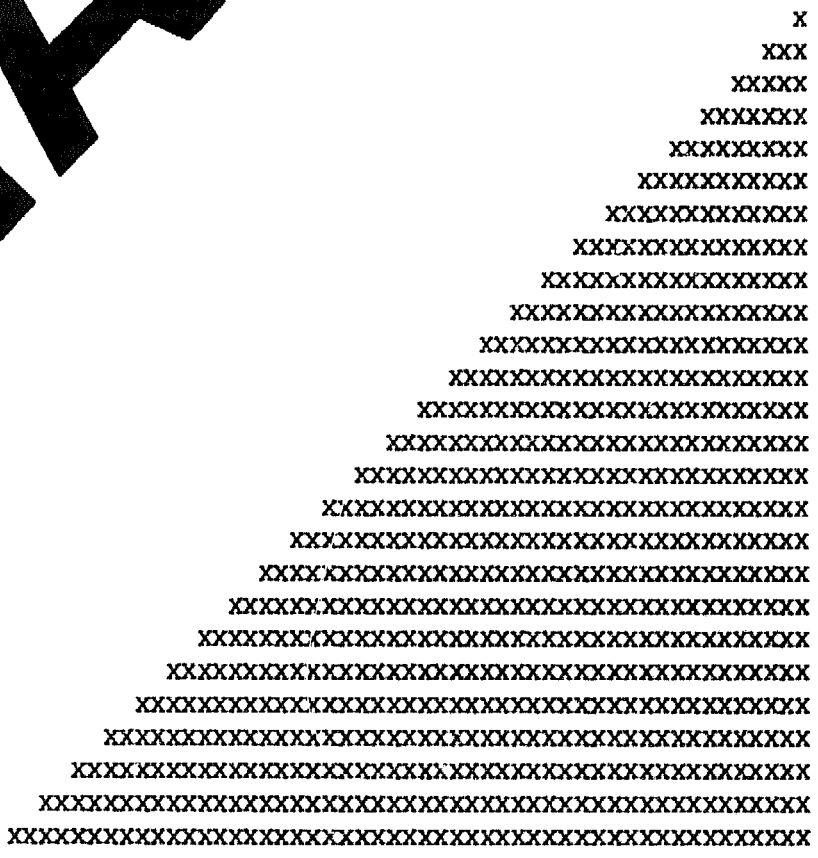
  ```
  stty sane ^j
  tput reset
  ```

  If these commands have no effect, use the Clear Comm selection on the terminal setup menu, or reset the terminal by powering the VT420 off and on.
- If you wish to examine control characters sent by the host, you can change the Interpret Controls feature to Display Controls. This selection is made in the SETUP screen of the VT420. Each control character is displayed instead of interpreted using the feature.
- To examine a terminal's current line settings, use the following command:

  ```
  stty -a
  ```



CHAP 10



10

Installing a SCSI Adapter and a Storage Expander

This chapter describes the installation of the:

- Adaptec AHA-1540B 16-bit ISA SCSI adapter
- Adaptec AHA-1520 8-bit ISA SCSI adapter
- Adaptec AHA-1740A 32-bit EISA SCSI adapter
- Digital PS2XR Storage Expander Cabinet

10.1 Description

The Adaptec AHA-1540B and AHA-1520 adapters are ISA modules that connect the SCSI bus to the ISA bus on the system board. They can be installed in any slot on the board.

The Adaptec AHA-1740A is a 32-bit EISA master module that connects the SCSI bus to the EISA bus on the system board. The AHA-1740A adapter is plugged into a master slot on the system board.

The adapters can be used to control drives inside the system cabinet, outside the system cabinet, or a combination of internal and external drives. In all cases, no more than seven drives can be connected to the bus (regardless of the number of connectors on the cable) and each connected drive must have a unique SCSI ID. See Section 10.13.

10.2 Cabling for Internal SCSI Bus

Figure 10–1 shows how the SCSI bus cable should be routed in the system cabinet. See also Table 10–1.

Figure 10–1 SCSI Adapter: Cabling for Internal Drives

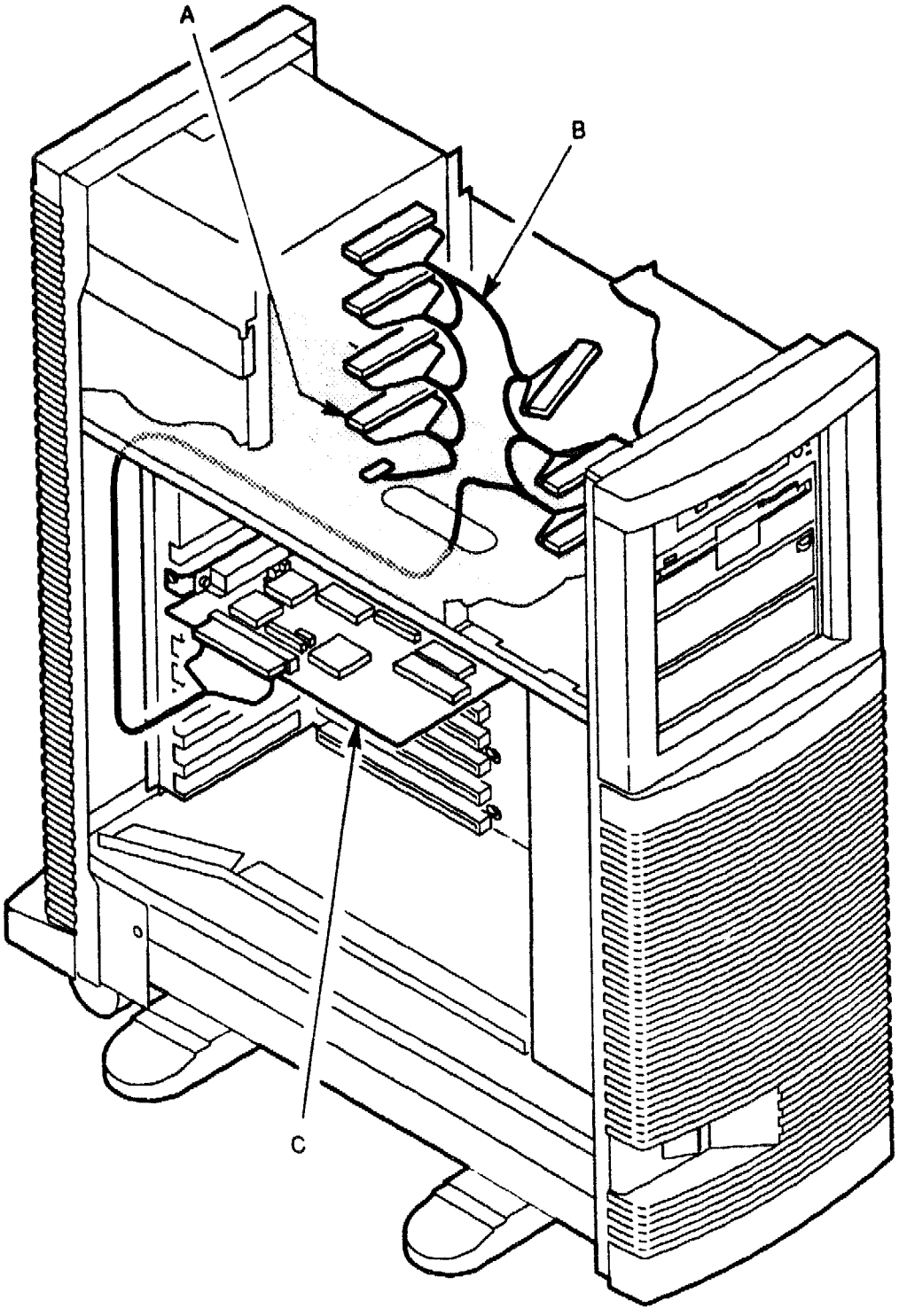


Table 10–1 Key for Figure 10–1

Key	Description
A	SCSI data connector
B	SCSI bus cable
C	SCSI host adapter module

10.3 Using an Adapter to Control Internal Drives

If the adapter is to control internal drives only, observe the following restrictions:

- Install the module in an EISA slot. The AHA-1740A module must be installed in slot 3.
- Use the SCSI cable shipped with the adapter to connect the drives. The cable is also available separately (order number PSXAZ-DA).
- Make sure that a terminator is installed on the end of the cable.
- Leave the terminator resistor packs installed on the adapter module.

10.4 Using an Adapter to Control External Drives

If the adapter is to control external drives only, observe the following restrictions:

- Install the module in any master slot.
- If you are not using the Storage Expander, make sure that the end of the SCSI bus is terminated.
- Leave the terminator resistor packs installed on the adapter module.
- If an ISA adapter (AHA-1540B or AHA-1520) for external drives is installed in addition to an adapter for internal drives, you may need to change some default jumper settings on the module to avoid addressing conflicts. Use the SCU to identify the available system resources that can be used by the module. If necessary, you can disable the adapter BIOS memory.

10.5 Using an Adapter to Control Internal and External Drives

A single SCSI adapter can be used to control drives internal and external to the system, under the following restrictions:

- The total number of drives must not exceed seven.
- The terminator resistor packs on the module must be removed.
- The ends of each cable connected to the adapter must be terminated.

10.6 SCSI Bus Termination

The SCSI bus must be terminated correctly. Generally, both ends of the SCSI bus must be terminated. When only one cable is connected to the adapter, the terminator resistor packs on the adapter serve to terminate one end of the bus. These packs must be removed if cables are attached to both connectors.

Table 10–2 summarizes the SCSI bus termination requirements. Table 10–3 lists the terminator resistors on the modules.

Table 10–2 SCSI Bus Termination

If adapter controls:	Terminator resistor packs must be:	Cable termination
Internal drives only	Installed on module (the default)	Cable must have a terminator installed on the end. (Terminator comes with adapter and cable.)
External drives only	Installed on module (the default)	Cable must have a terminator installed on the end. (The cable supplied inside the Storage Expander comes with a terminator installed. If connecting any other expansion box, make sure the end of the cable is terminated.)
Internal and external drives	Removed from the module	Terminator must be on the end of the cable inside the box and at the end of the cable inside the Storage Expander. If connecting any other expansion box, make sure the end of the cable is terminated.

Table 10–3 Terminator Resistors for SCSI Adapter Modules

Adapter Module	Designations
AHA-1520	RN2, RN3, RN4
AHA-1540B	RN2, RN3, RN5
AHA-1740A	RN5, RN6, RN7

10.7 Important Installation Considerations

The Adaptec SCSI adapters are installed in the EISA option module slots. Refer to Chapter 4 for information on opening the system to install a module. The following points should be considered when installing the SCSI adapters.

- Install the cable from the top of the box down through the slot in the card cage. It is easier to do this before you install the adapter module.
- The AHA-1740A must be installed in slot 3 through slot 8. If the adapter will control internal disk drives, install the adapter in slot 3.
- The AHA-1520 and AHA-1540B adapters can be installed in any slot.
- Remove the terminator resistors from the adapter if the adapter will control both external and internal drives.
- Note that an Adaptec AHA-1540B sold by Digital comes configured differently than an AHA-1540B sold by Adaptec. The AHA-1540B sold by Digital is configured for a BIOS address of C8000 and a DMA transfer rate of 5.7 MB/second. The 5.7 MB/second rate provides slightly faster performance. The BIOS address of C8000 provides a conflict-free setting in an applicationDEC 400*x*P system. (The Adaptec default of DC000 conflicts with the memory used by the terminal multiplexer.)
- After you install the adapter module, you must install the appropriate CFG file for the adapter using the SCU. See Table 10–4.

Note

The ISA CFG File for the Adaptec AHA-1540B has default settings for a DMA transfer rate of 5.0 MB/second and a BIOS address of DC000. You must change the DMA transfer rate to 5.7 MB/second and the BIOS address to C8000. These changes are made with the SCU. Select the "Configure computer" option from the main menu, and then select "View or edit details."

- If you install the AHA-1740A adapter, install the EISA CFG file shipped with the module. Use the SCU to configure the adapter to use available system resources.

Table 10–4 lists the CFG files used by the Adaptec modules.

Table 10–4 Adaptec SCSI Adapters CFG Files

Adapter	CFG File	Name
AHA-1740A	ADP0001.CFG	Adaptec 32-bit SCSI Host Adapter (without floppy)
AHA-1540B	ADP0100.CFG	Adaptec 1540/1542 ISA SCSI Host Adapter
AHA-1520	ADP0200.CFG	Adaptec 1520 ISA SCSI Host Adapter

10.8 Adaptec AHA-1540B Configuration Parameters

The factory configuration of the Adaptec AHA-1540B sold by Digital provides a conflict-free installation of the module. Four jumper blocks are used to configure the AHA-1540B adapter into the system. These are J5, J6, J7, and J9 (Figure 10–2 and Table 10–5). All the jumpers have been factory set to their default settings (Figure 10–3). Table 10–6 describes the default settings.

Note

Refer to the *ISA 16-Bit SCSI Host Adapter Installation and User's Manual* for more information on the configuration parameters.

Figure 10–2 AHA-1540B Adapter

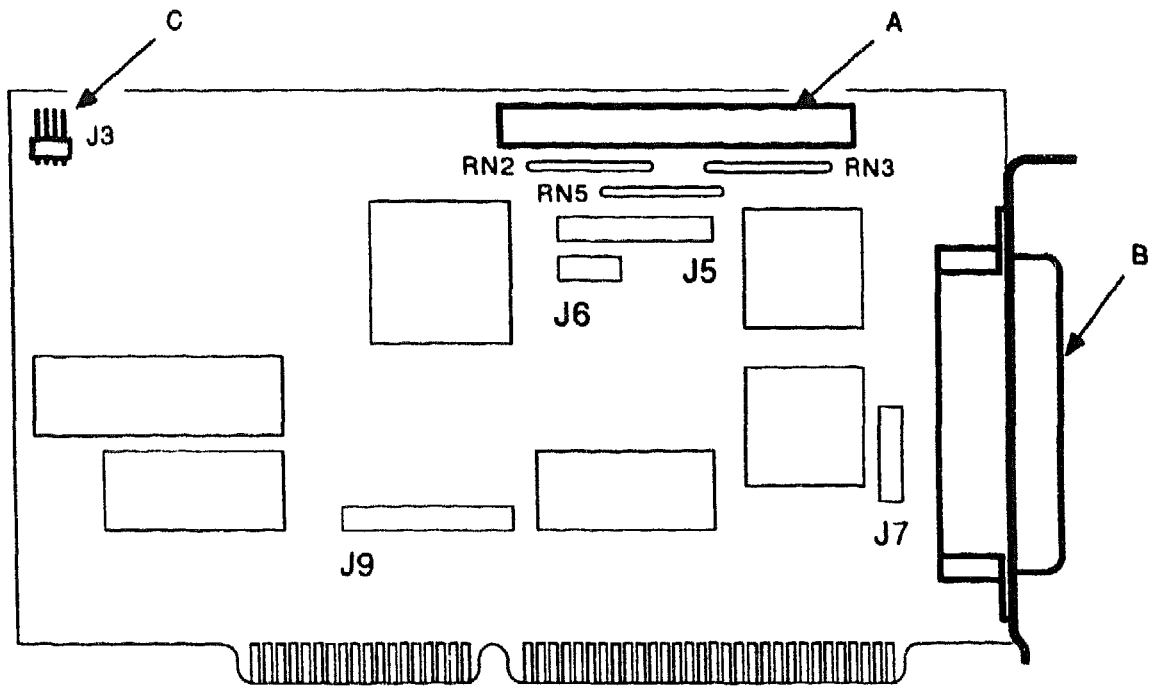


Table 10–5 Key for Figure 10–2

Key	Description
A	Internal SCSI bus connector
B	External SCSI bus connector
C	Disk activity LED connector

Figure 10–3 AHA-1540B Configuration Jumpers

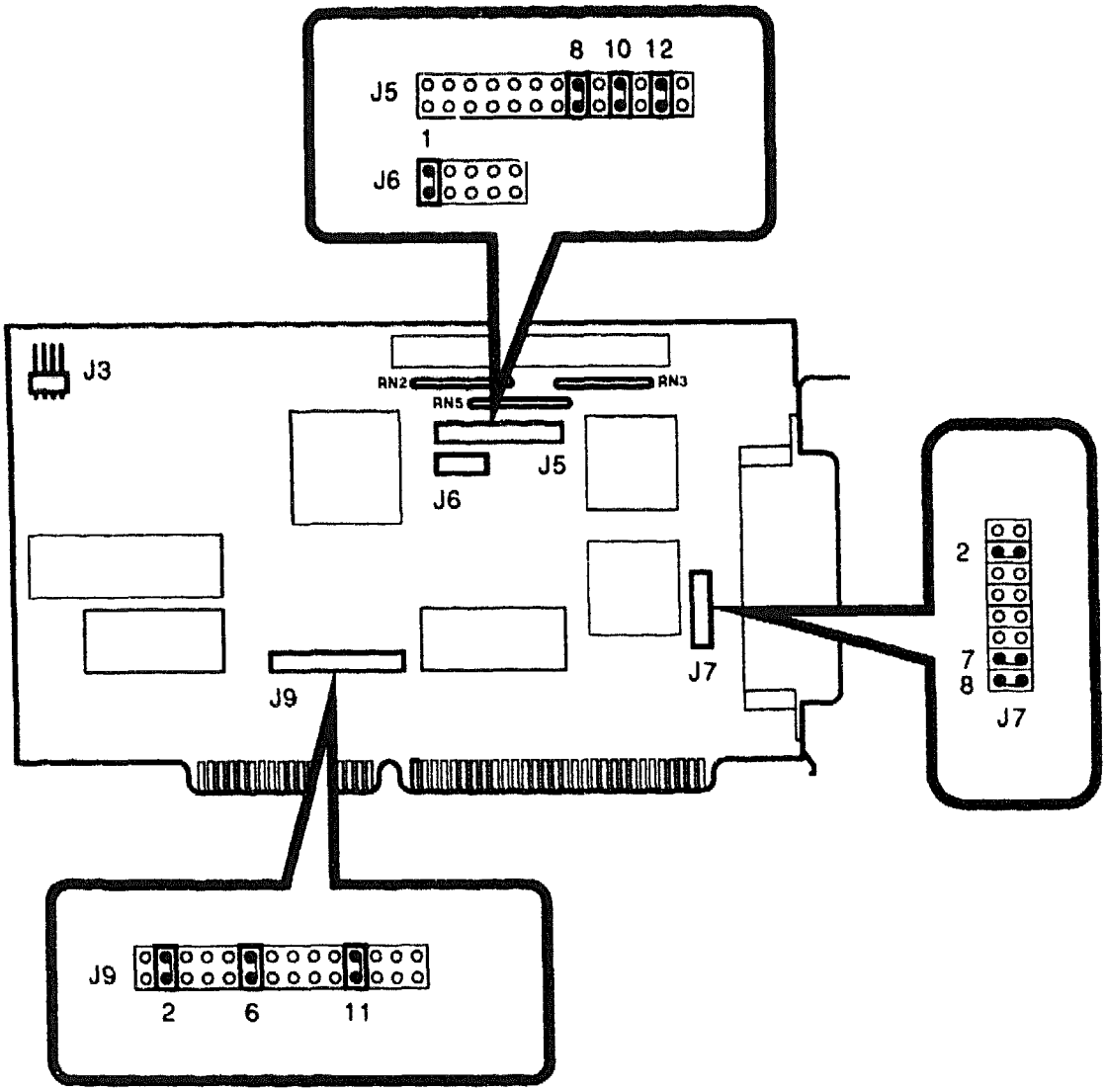


Table 10–6 Default Parameters

Parameter	State
SCSI Synchronous Negotiation Initiation	Disabled
Diagnostics	Disabled
SCSI Parity	Enabled
SCSI ID	7
DMA Channel	5
DREQ	5
DACK	5
IRQ	11
DMA Transfer Speed	5.7
BIOS	Enabled
Auto Sense	Enabled
Floppy Secondary Address	Disabled
Adapter ISA Port Address	330 (Hex)
BIOS Wait State Delay	0
BIOS Memory Starting Address	C8000

10.9 Adaptec AHA-1520 Configuration Parameters

Refer to the documentation supplied with the AHA-1520 adapter for information on the AHA-1520 configuration parameters.

10.10 Adaptec AHA-1740A Configuration Parameters

The AHA-1740A adapter is configured using the SCU. Refer to Chapter 3 and the documentation supplied with the AHA-1740A adapter for information on setting the AHA-1740A configuration parameters.

Note

If the Adaptec AHA-1740A SCSI host adapter is configured for enhanced mode, you must also change the "I/O Bus Performance" setting in the SCU to "Enhanced." See Chapter 3 for further information.

10.11 Connecting the Disk Drive Activity LED Cable

The SCSI adapters are shipped with a short cable to enable the Disk Drive Activity LED on the front panel. When this cable is installed, the LED will light when SCSI bus activity occurs.

Connect the cable to the four-pin connector on the adapter. Connect the other end of the cable to the HD-LED connector (J0190) on the system board.

10.12 Connecting a Storage Expander

To connect a Storage Expander to the SCSI adapter installed in the applicationDEC 400*x*P system, connect the SCSI bus ports on the Storage Expander to the connectors on the SCSI adapter. Refer to Figure 10–4 and Table 10–7. The Storage Expander is shipped with two low-density-to-low-density cables. These cables can be connected directly to an AHA-1540B or an AHA-1520 adapter.

To connect an AHA-1740A adapter, use a BC09D-03 cable that has a low-density-to-high-density connector. The high-density connector (smaller connector) connects to the AHA-1740A external adapter.

Figure 10–4 Connecting a Storage Expander

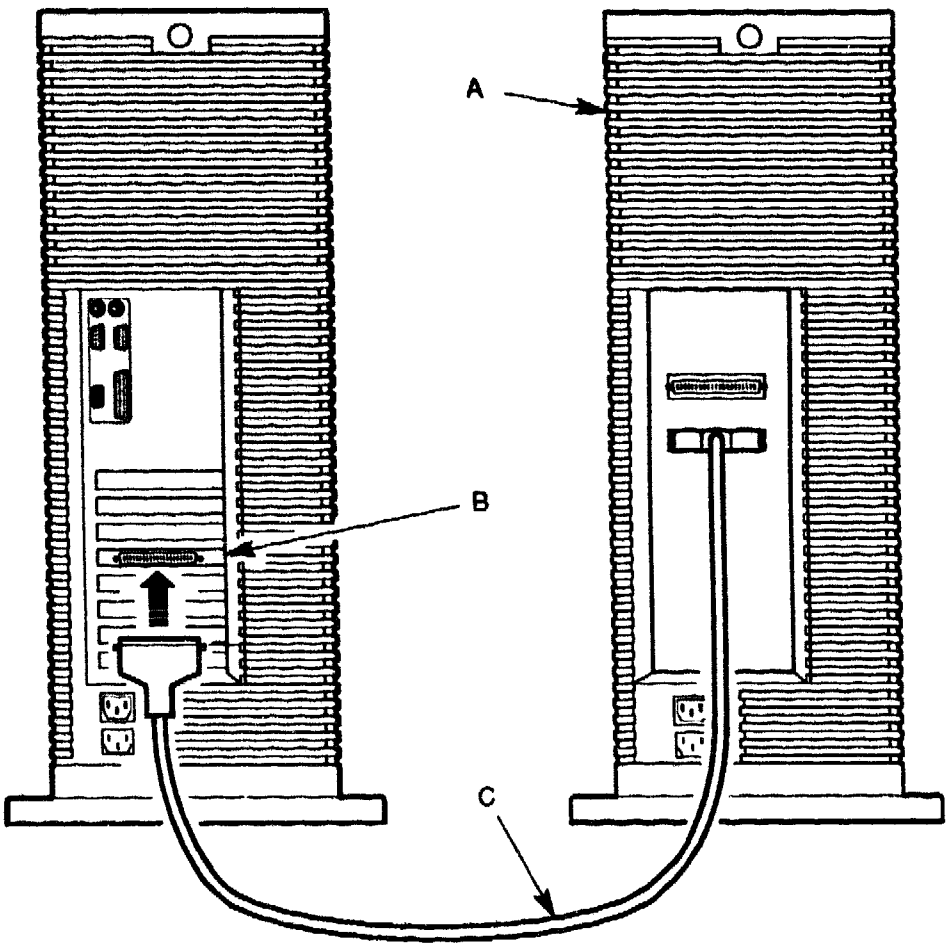


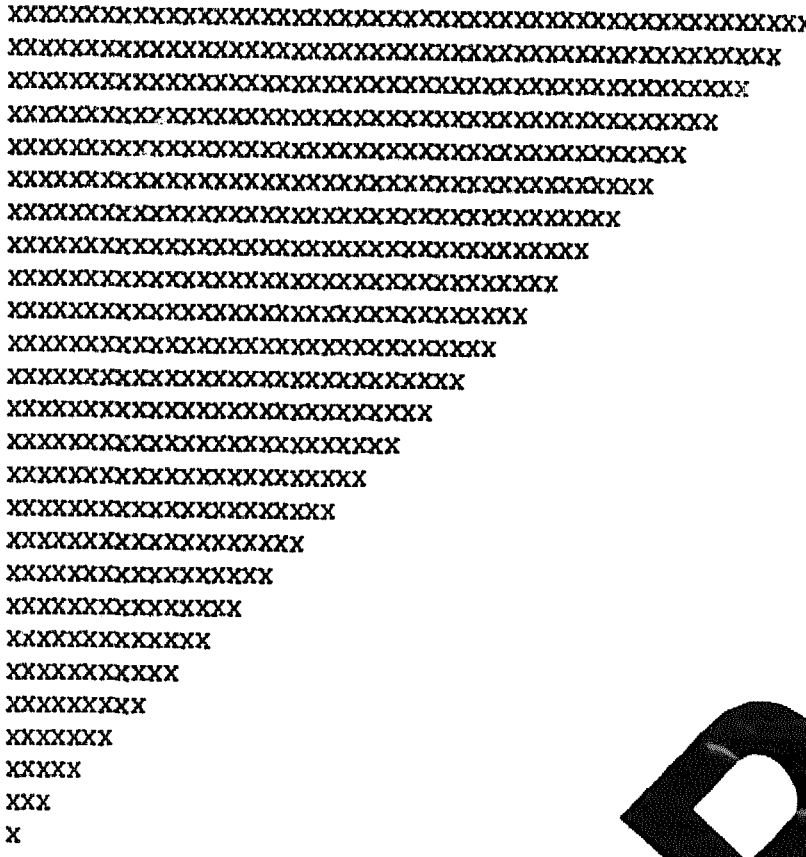
Table 10–7 Key for Figure 10–4

Key	Description
A	Storage Expander cabinet
B	External SCSI connector
C	SCSI connector cable

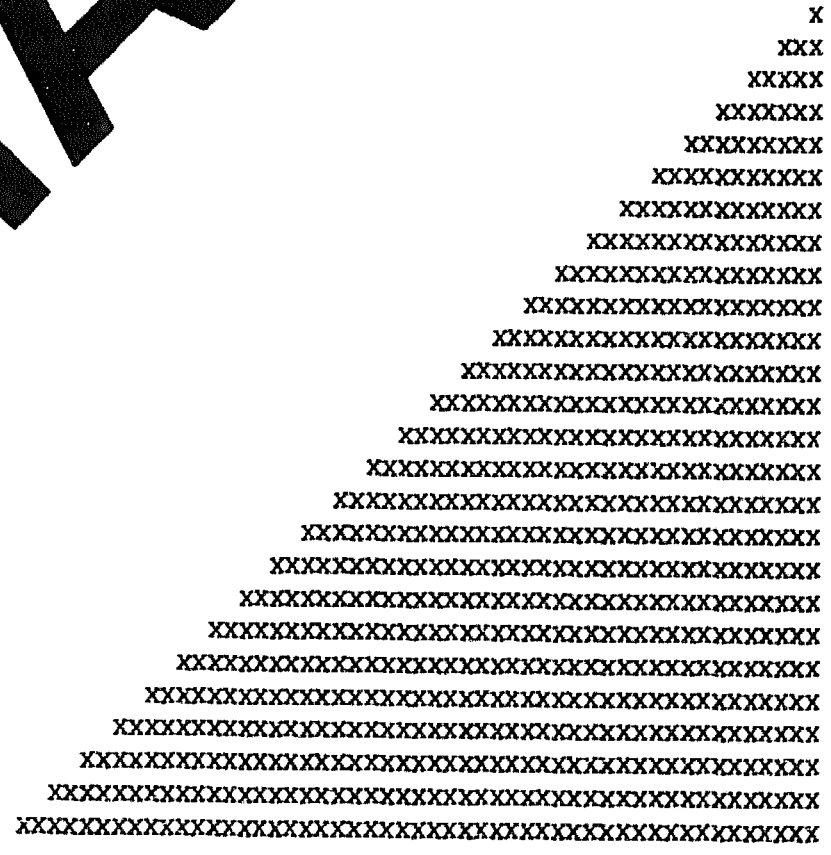
10.13 SCSI Bus Configuration Guidelines

Each SCSI bus in the system should be configured following these guidelines:

- All SCSI buses must be terminated at each end. The terminator resistor packs on the module, if installed, terminate one end of the bus. A cable terminator must be at the end of the SCSI bus cable. If cables are connected to both connectors on the module, the terminator resistor packs must be removed, and the ends of both cables must have terminators installed.
- Each SCSI bus can have up to seven SCSI devices.
- Each device on the SCSI bus must have a unique SCSI ID between 0 and 6. (SCSI IDs are set with jumpers on the device. See the chapter on each device for the location of the jumpers, or refer to your vendor's documentation for non-Digital SCSI devices.)
- The adapter's SCSI ID is always 7.
- The total length of all SCSI cables on each SCSI bus must be less than 6 meters (19.7 feet).



CHAPTER 11



11

Installing a Printer

This chapter describes the installation of a serial or parallel printer into the applicationDEC 400xP system.

11.1 Description

Printers supported by the applicationDEC 400xP system include:

- LA70
- LA75 Companion
- LA324
- DEClaser 2000 series

These printers are supported in the "Other" protocol. For example, the LA75 Companion printer has a Protocol button on the front panel. Press this button to place the printer in the "Other" protocol. DEClaser series printers are supported in PostScript mode.

Printers can be installed in three different ways on an applicationDEC 400xP system:

- As a device on a terminal concentrator (serial printers)
- As a device on a serial port or parallel port of the system board
- As a transparent device on the auxiliary port of a terminal

The following sections describe each of these ways to connect a printer.

11.2 Serial Printers on Terminal Concentrators

A serial printer can be installed as a device on a terminal concentrator (see Figure 9–1). When connected to a terminal concentrator, the device name used should be a lower case device name, and not a modem control device name. The device naming convention is established by the software.

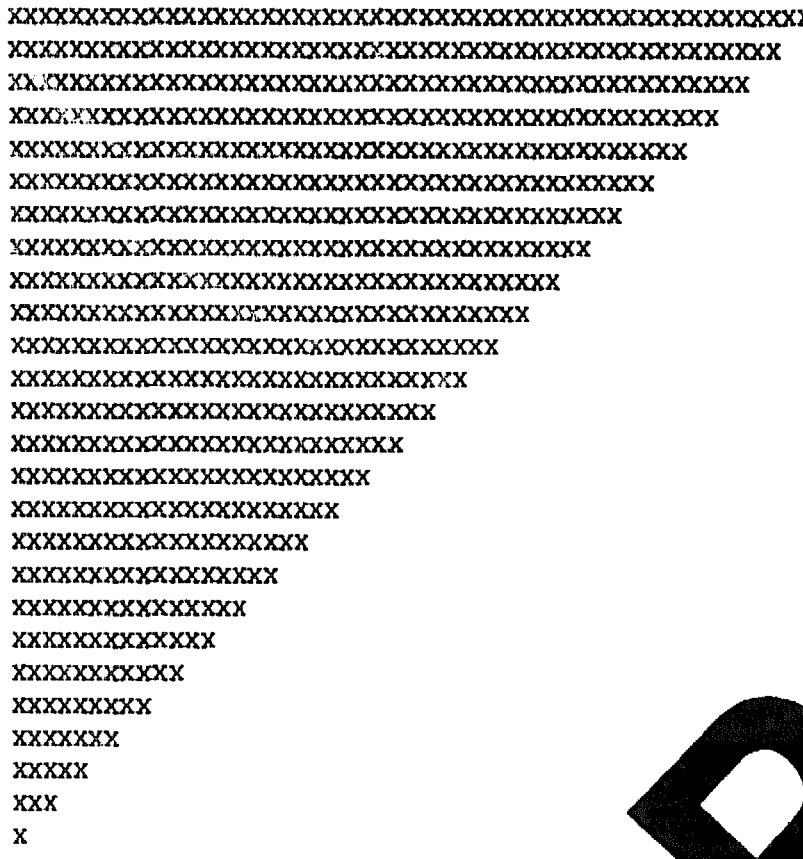
11.3 Serial and Parallel Printers on the System Board

There are two serial ports and one parallel port on the system board that can be used to attach printers. The serial ports are normally configured as COM1: and COM2:. The default address of the parallel port is LPT1:. Figure 1–2 shows the serial and parallel ports on the system board.

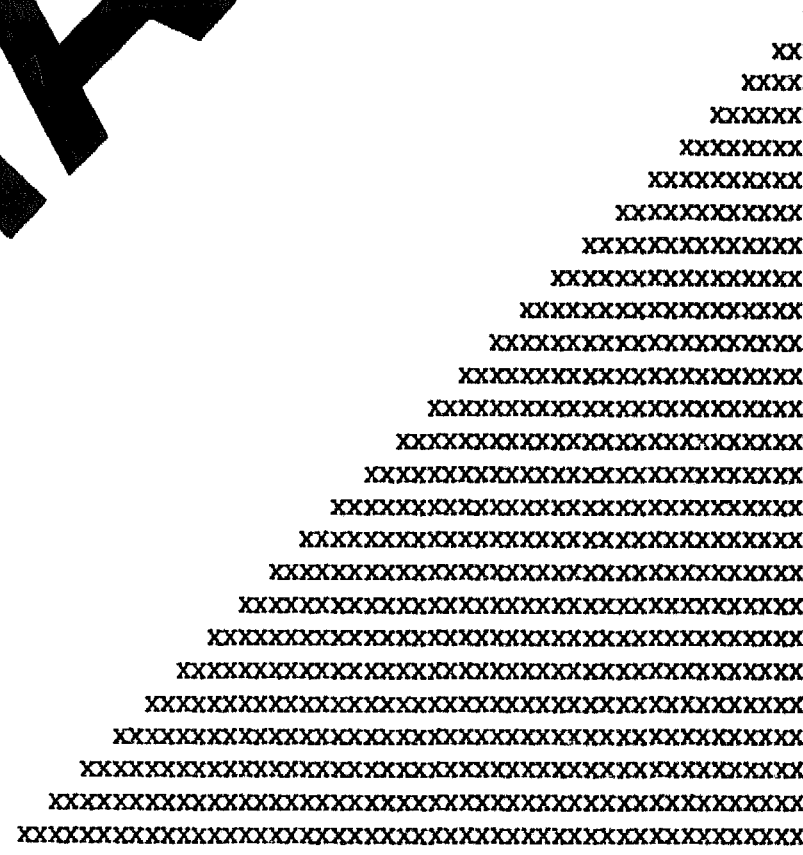
11.4 Intelligent Transparent Printing

Intelligent transparent printing is a means of using the printer port present on many terminals. When connected to a port on a terminal concentrator, the device name **ttya1p** should be used to designate the printer device. Do not use the modem device name.

Refer to the *Terminal Multiplexer Intelligent I/O Subsystem Installation Guide* for more information on intelligent transparent printing.



CHAP 12



12

Uninterruptible Power Supply

12.1 Description

An uninterruptible power supply (UPS) helps ensure that sudden loss of power to your system does not cause loss of data. To guarantee filesystem integrity, SCO UNIX System V must experience an orderly shutdown of the system. The UPS with intelligent shutdown software ensures an orderly shutdown, even in unattended situations.

12.2 Recommended UPS

The recommended UPS for use with an applicationDEC 400xP system is the Exide Powerware Personal 1000. The UPS and the shutdown software are available from Digital Equipment Corporation. Order numbers are shown in Table 12–1.

Table 12–1 Recommended UPS Order Numbers

Item	Digital Order Number
Exide Powerware Personal 1000 with RS-232 port	4N-AEAAE-AF
SCO UNIX System V Shutdown Software	4N-AEAEO-AB

In the event of a power failure, this UPS provides up to 8 A of battery backup power for up to 15 minutes. The power supplied to the host system is uninterrupted. The UPS sends a signal across the RS-232 communications line indicating that power has been lost. The shutdown software detects this signal and begins an orderly shutdown of the system. Generally a complete shutdown of a SCO UNIX System V system takes less than 5 minutes.

12.3 Installation

Detailed installation information is included with the UPS. The following is a summary of the instructions:

1. Plug the UPS into a grounded 3-prong receptacle.
2. Verify that the output switch is off (not illuminated). The output switch is located on the front of the UPS.
3. Connect the applicationDEC 400*x*P system power cord into the UPS rear panel output receptacles.
4. Connect one end of an RS-232 cable to the connector on rear of the UPS. Connect the other end of the RS-232 cable to the serial port defined COM2: on your system. Serial port address COM2: is factory configured as the serial port on the serial/parallel module.
5. Turn the computer equipment on.
6. Turn the output switch on.
7. Install the shutdown software on the applicationDEC 400*x*P system.


CHAP 13

13

System Exerciser - Installation Verification Procedure

This chapter describes how to run the installation verification procedure (IVP) on the system exerciser diskette.

13.1 Description

The system exerciser diskette is a self-contained bootable diskette used to diagnose the complete system. It contains tests for additional sections of the system beyond the tests done by the ROM resident diagnostics. The system exerciser is bootable; you do not need an operating system installed to run the system exerciser.

The system exerciser device tests can be run in destructive (write/read) or nondestructive (read only) mode. Destructive mode erases and destroys any data currently present on a device. Destructive mode provides a more thorough testing of a device, but should be used only when you are certain that you do not need any data present on the device. It is primarily designed for devices on which you have not yet loaded any information.

In general, nondestructive (read only) testing identifies most device failures, and should be used for systems that are in current use.

Note

Before you run the system exerciser, run the system configuration utility (SCU) to verify proper system configuration.

13.2 Running the Installation Verification Procedure

The following steps explain how to load the system exerciser and run the installation verification procedure (IVP):

1. Insert the system exerciser diskette into the 3.5-inch diskette drive.
2. Boot the system from the diskette in either of the following ways:
   - Press the reset switch on the front panel.
   - Turn the power switch to the Standby position and then to the On position.

   When the system exerciser has been booted:

   a. System configuration information is displayed on the screen.

   b. You are prompted to load scratch media into all drives to be tested in write/read mode, and then to press any key when ready.

   c. You are prompted for printer connection information.

   d. The system exerciser displays a message that it is sizing the SCSI and EISA. (Please wait about 5 minutes.)

   e. You are prompted to choose destructive or nondestructive device testing.

      Press [Enter] to select nondestructive testing for each device.

   f. A list of system exerciser tests is displayed on the screen
3. At the HLT> prompt, type the **ivp** command and press [Enter]:

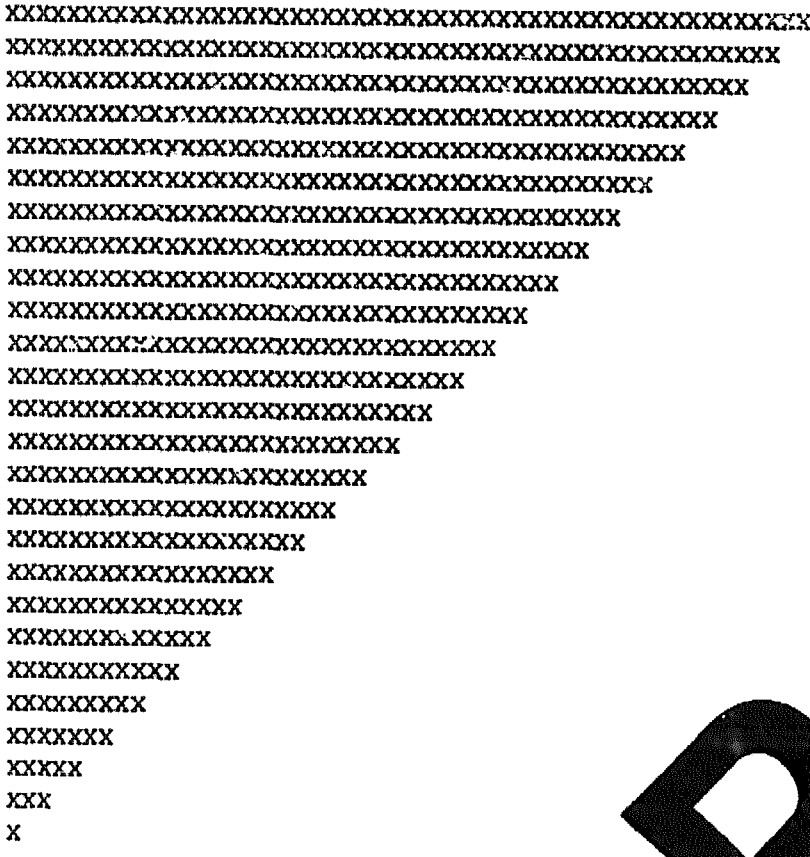
   ```
   HLT> ivp [Enter]
   ```

   The system exerciser performs the 15-minute system installation verification procedure. ([Ctrl/C] halts the system exerciser, if necessary.)

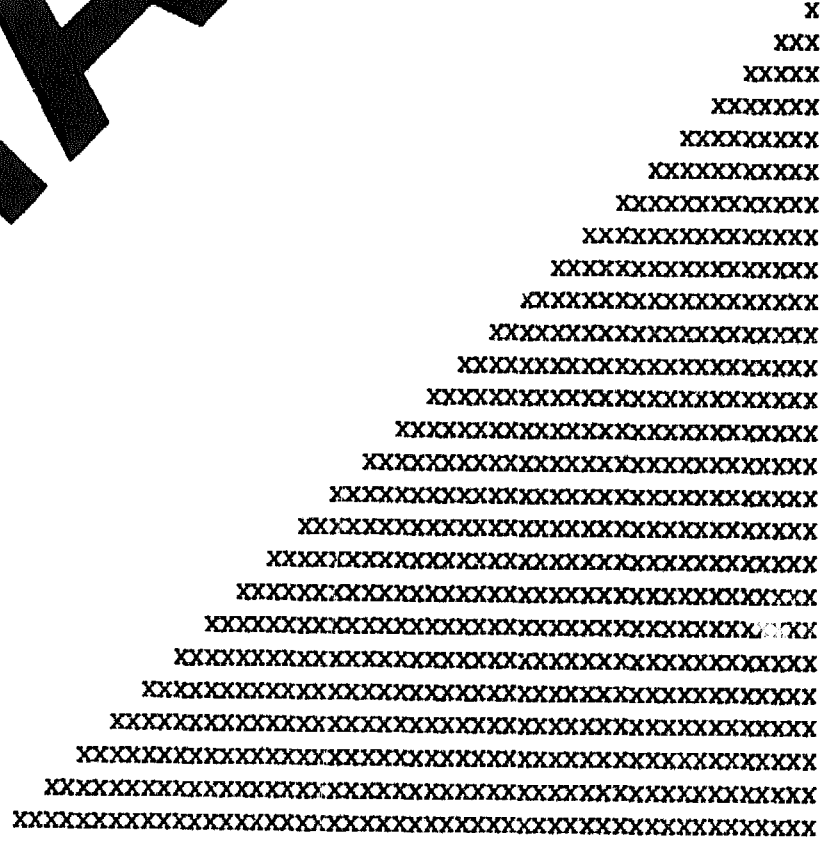
   After 15 minutes, a success message is displayed, indicating that the system is functional.

   If an error is detected, the error message identifies the failing unit by naming the slot number, SCSI ID number, or device that failed a test.

4. If the system exerciser identifies a module or device as failed, further investigation is usually required before replacing the module or device. For example, check all connections to modules or devices. Reseat all removable modules in the system. Check cable connections to a device to make sure the connection is complete.
5. If you do not find any other reason for receiving an error message, contact your service provider.



CHAP 14



14

Problem Solving

14.1 Introduction

This chapter suggests corrective actions that can be taken before you return system components to Digital for service. If you have installed options, refer to the documentation supplied with the options for troubleshooting information.

14.2 Troubleshooting Procedure

Follow this general procedure to troubleshoot your applicationDEC 400xP system.

1. Press the reset button on the front panel. If your system fails to boot, turn it off, wait 20 seconds, and then turn it back on.
2. Check for non-bootable diskette in A: (drive A).
3. Check for loose cables and connections.
4. Check the computer and monitor indicator lights.
5. Observe any POST messages. Refer to Appendix D, Error and Informational Messages, take the appropriate steps to correct the problem, and then reset the computer.
6. Run the SCU and make sure the system is configured correctly for the installed hardware and software.
7. Contact Digital Customer Services for software or hardware problems.
8. Package the failed component in the original container and return it to Digital for service.

14.3 System, Disk Drive, and Monitor Problems

Tables 14–1 through 14–3 help you to identify and solve system, disk drive, and monitor problems.

Table 14–1 System Troubleshooting

Problem	Possible Cause	Action
No response when the system is turned on	System is not plugged in	Turn off the system, plug it in, and turn it on again.
	No power at the wall outlet	Use another wall outlet.
Power is on, but there is no monitor display	Monitor brightness and contrast controls are not properly set	Adjust the monitor brightness and contrast controls.
	Monitor is off	Turn on the monitor.
	Monitor cable is incorrectly installed	Check all monitor connections.
	Video expansion board failure	Make sure the video expansion board is properly installed and firmly seated.
System does not boot from an IDE hard disk drive	Operating system software is not installed on the IDE hard disk drive	Install the operating system on the hard disk.
	IDE hard disk drive is not properly formatted or the requested partition does not exist	Format the IDE hard disk drive or correctly partition the IDE hard disk drive using the supplied operating system software.
	There is no software on the requested partition	Install software on the requested partition.
	IDE hard disk drive jumpers incorrectly set	Refer to the supplied IDE hard disk drive kit installation instructions.
	IDE drive type incorrect	Run the SCU to identify the correct drive type.
	Loose cables	Check all cable connections.

(continued on next page)

Table 14–1 (Cont.) System Troubleshooting

Problem	Possible Cause	Action
System does not boot from a SCSI hard disk drive	Operating system software is not installed on the SCSI hard disk drive	Install the operating system.
	Requested partition does not exist	Partition the SCSI hard disk drive and then reload the operating system.
	SCSI hard disk drive jumpers incorrect	Refer to the supplied SCSI hard disk drive kit installation instructions.
	SCSI ID conflicts	Refer to the supplied SCSI hard disk drive kit installation instructions on setting SCSI IDs.
	Terminating resistors not removed from the SCSI hard disk drive	Remove terminating resistors. Refer to the supplied kit installation instructions.
	System not configured for SCSI hard disk operation	Run the SCU to configure the system for SCSI operation.
	IDE drive is configured in the system	Remove the IDE drive or install the boot software on the IDE drive.
System does not boot from a target diskette drive	Drive ID incorrectly set	Make sure the drive ID is correctly set (see Chapter 7).
	Diskette drive not enabled	Run BIOS Setup Utility to enable diskette drive.
	Diskette does not contain start-up files	Insert diskette with correct start-up files.
	Diskette drive is empty	Insert the diskette that contains an operating system.
	Diskette is worn or damaged	Try another diskette.
	Loose cables	Check all cable connections.
System will not boot from System Configuration Diskette	System Configuration Diskette faulty	Contact Digital or an authorized dealer.

(continued on next page)

Table 14–1 (Cont.) System Troubleshooting

Problem	Possible Cause	Action
No response to keyboard commands	Keyboard is password protected	Run the SCU to enter the keyboard password.
	Keyboard is not connected	Connect the keyboard.
	Keyboard is connected to the mouse port	Connect the keyboard to keyboard port.
	Keyboard is locked	Unlock the keyboard.

Table 14–2 Disk Drive Troubleshooting

Problem	Possible Cause	Action
IDE/SCSI hard disk drive cannot read or write information	Incorrect jumper settings	Refer to the supplied kit installation instructions.
	Loose or incorrectly installed cables	Make sure all cables are correctly installed.
	IDE/SCSI hard disk drive is not properly formatted or partitioned	Format and partition as required using the supplied operating system.
	IDE drive type incorrect	Run the SCU to identify the correct drive type.
	System not configured for SCSI hard disk operation	Run the SCU to configure the system for SCSI operation.
Target diskette drive cannot read or write information	Diskette is not formatted	Format the diskette.
	Diskette is worn or damaged	Try another diskette.

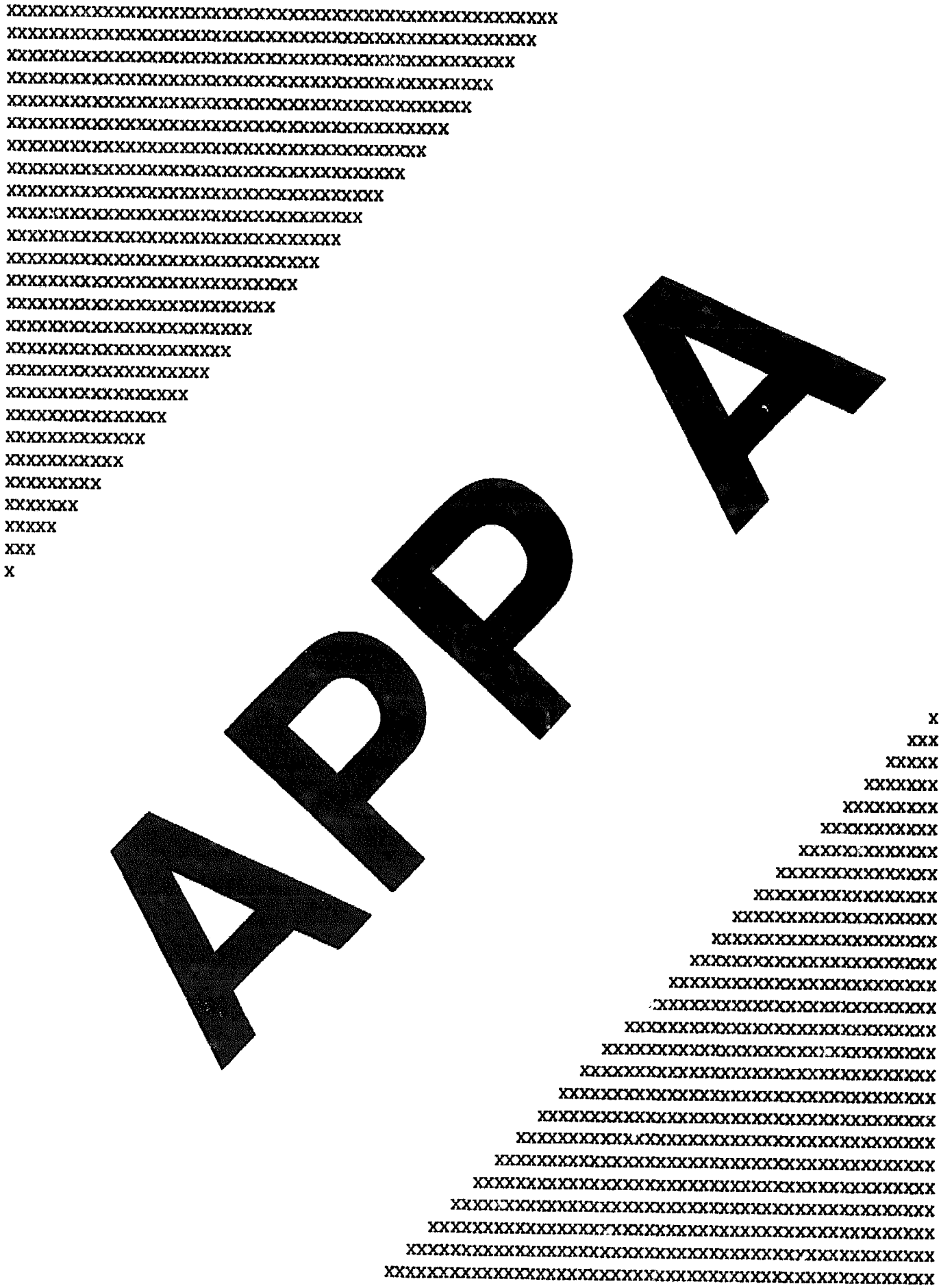
(continued on next page)

Table 14–2 (Cont.) Disk Drive Troubleshooting

Problem	Possible Cause	Action
	Diskette is write-protected	Slide the write-protect switch so the hole is not visible (3.5-inch diskette) or uncover the write-protect notch (5.25-inch diskette).
	Diskette drive is empty	Insert a diskette.

Table 14–3 Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on	Monitor is turned off	Turn on the monitor.
	Power cord is not connected	Connect the power cord to the system.
	No power at wall outlet	Use another outlet.
	Power indicator is defective	Contact your local Digital service representative.
No monitor display	Configuration error	Check video board cabling and jumper settings.
	Monitor brightness and contrast controls are not properly set	Adjust the monitor brightness and contrast controls.
Distorted, rolling, or flickering screen display, or wrong/uneven color	Monitor incorrectly adjusted	Adjust accordingly.
	Monitor signal cable incorrectly installed	Straighten any bent connector pins and then reseat.
Color monitor displaying monochrome	System was turned on before the monitor was turned on	Turn off the system, turn on the monitor, and then turn the system on.


APP A

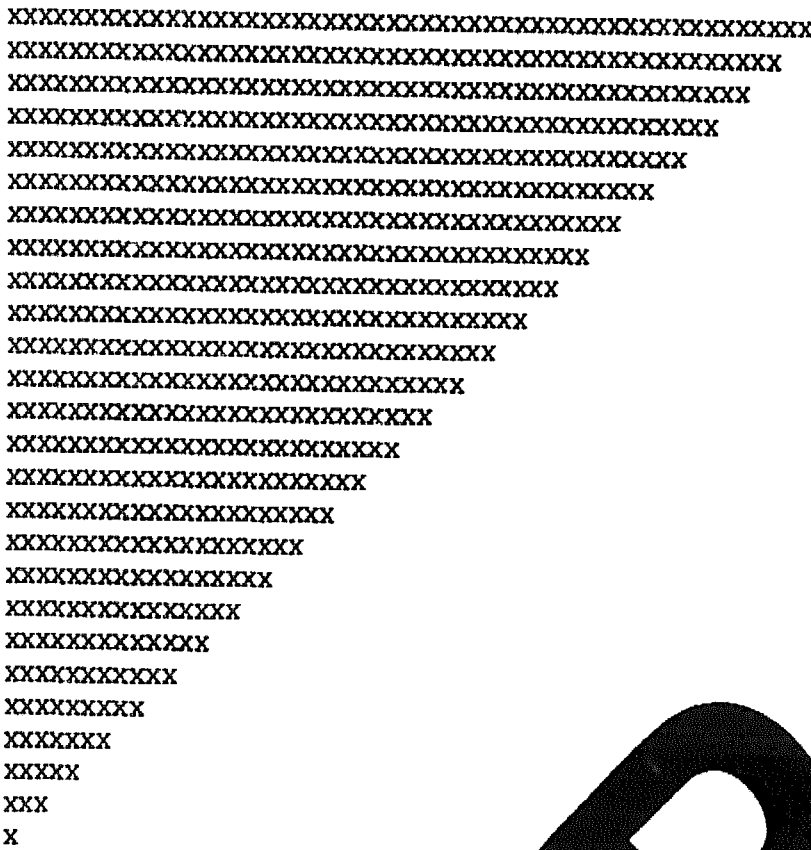
A

Configuration Rules

The following list summarizes the configuration rules that must be observed:

- Slots 1 through 2 (at the top) are EISA slave slots. Slots 3 through 8 are EISA master slots. EISA master modules must go in master slots.
- The Adaptec 1740A is an EISA master module and must be installed in slots 3 through 8.
- The Adaptec 1540B and 1520 may be installed in any slot.
- SCSI adapters used to control internal drives must be installed in the highest slot possible (slot 3 for master adapters).
- SCSI adapters that control both internal and external drives must have their terminator resistor packs removed.
- SIMMs may be 2, 4, 8, 16, or 32 MB SIMMs.
- SIMMs must be installed in matching pairs. Both size and speed must match for each pair.
- 2, 4, and 8 MB SIMMs can be either 70 ns or 80 ns speed.
- 16 MB SIMMs must be 70 ns.
- If 16 MB or 32 MB SIMMs are installed in system board memory bank 0, jumper E0391 must be changed to the 2–3 position (nonstandard).
- If 16 MB or 32 MB SIMMs are installed in system board memory bank 1, jumper E0392 must be changed to the 2–3 position (nonstandard).
- If a VGA or SVGA module is installed in an option slot, the on-board VGA should be be disabled using the SCU. (The on-board VGA can be permanently disabled by setting jumper E0290 to the 2–3 position.)
- If IDE and SCSI drives are installed, the operating system must boot from the IDE drives.
- QIC tape drives should be installed in bays C or D (lower front bays).

- A 5.25-inch diskette drive or CDROM drive must be installed in bay B (second from top front bay).
- Full-height disk drives must be installed in bays E/F or G/H first (rear bays).
- The applicationDEC 400αP system supports one terminal multiplexer only.
- The Digital terminal multiplexer module and the Digital EtherWORKS Turbo module cannot both be installed in the system simultaneously.



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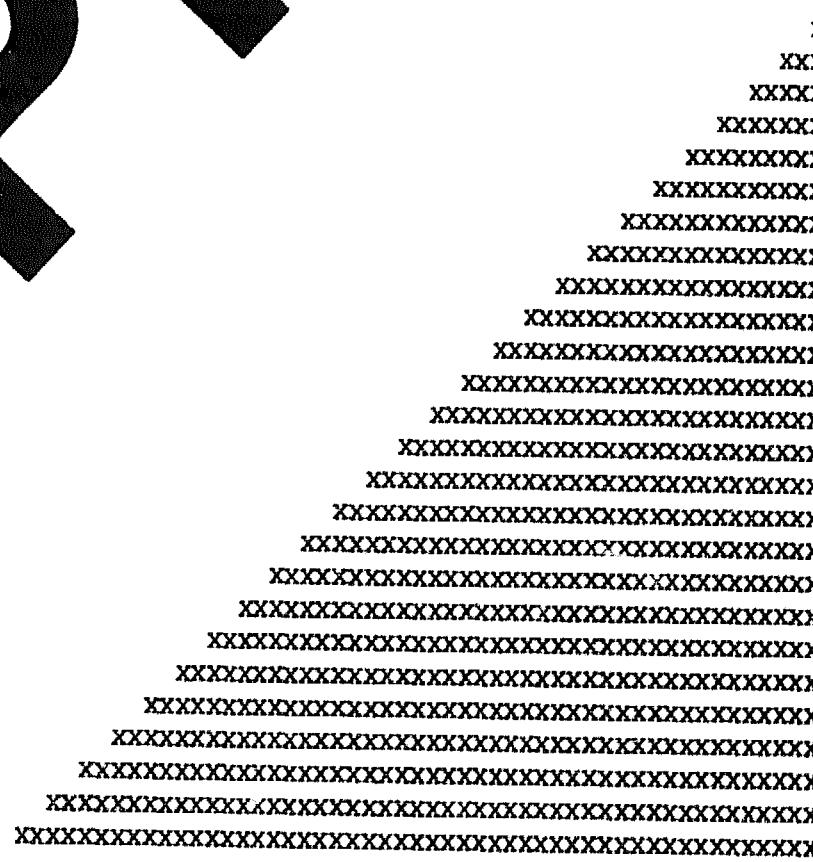


B

Device Mapping

Tables B–1 through B–5 list the computer system's memory, I/O address, interrupt, and DMA maps.

Resources used by the system board are shown in Table B–1. Resources used by option modules are not shown. Use the SCU to view total system resources (see Section 3.7, Viewing Total System Configuration).

Table B–1 Memory Map, Without Options

Address Range (Hex)	Function	Size	Shadow	Cache	WP[1]
0010 0000–01FF FFFF	Extended memory	63 MB	No	Yes	No
000F 0000–000F FFFF	System BIOS	64 KB	Yes	Yes	Yes
000E 8000–000E FFFF	Reserved system resources[2]	32 KB	No	Yes	Yes
000E 0000–000E 7FFF	On-board video BIOS extension	32 KB	No	Yes	Yes
000D 0000–000D FFFF	Available for options	64 KB	No	Yes	Yes
000C 8000–000C FFFF	Available for options	32 KB	No	Yes	Yes
000C 0000–000C 7FFF	Video BIOS (when mapped)	32 KB	Yes	Yes	Yes
000A 0000–000B FFFF	Video RAM	128 KB	No	Yes	Yes
0000 0000–0009 FFFF	Base memory	640 KB	No	Yes	Yes

[1]Write protected (not cached in the Intel 486).

[2]Used only before operating system boot.

Table B–2 Memory Map, Typical Configuration

Address Range (Hex)	Function	Size	Shadow	Cache	WP[1]
0010 0000–01FF FFFF	Extended memory	63 MB	No	Yes	No
000F 0000–000F FFFF	System BIOS	64 KB	Yes	Yes	Yes
000E 8000–000E FFFF	Reserved system resources[2]	32 KB	No	Yes	Yes
000E 0000–000E 7FFF	On-board video BIOS extension	32 KB	No	Yes	Yes
000D 0000–000D FFFF	Terminal multiplexer	64 KB	No	Yes	Yes
000C 8000–000C FFFF	Adaptec SCSI host adapter	32 KB	No	Yes	Yes
000C 2000–000C 7FFF	Available for options	24 KB	No	Yes	Yes
000C 0000–000C 1FFF	3Com 3C503 Ethernet	8 KB	No	Yes	Yes
000A 0000–000B FFFF	Video RAM	128 KB	No	Yes	Yes
0000 0000–0009 FFFF	Base memory	640 KB	No	Yes	Yes

[1]Write protected (not cached in the Intel 486).

[2]Used only before operating system boot.

Table B–3 I/O Address Map

Range (Hex)	Function
0000–000F	ISP DMA controller one
0020–0021	ISP interrupt controller one
0026	MECA and CLASIC configuration index
0027	MECA and CLASIC configuration data
0040–0043	IPS timer one
0048–004B	ISP timer two
0060	Keyboard data
0061	ISP NMI
0064	Keyboard command/status
0070 (bit 7)	ISP enable NMI
0070 (bits 6–0)	Real-time clock address
0071	Real-time clock data

(continued on next page)

Table B–3 (Cont.) I/O Address Map

Range (Hex)	Function
0078	BIOS timer
0080–008F	ISP DMA
0092	System control port
00A0–00A1	ISP interrupt
00C0–00DE	ISP DMA
00F0	Reset numeric error
01F0–01F7	IDE controller
0278–027B	Parallel 2
02E8–02EF	Serial 4
02F8–02FF	Serial 2
0378–037F	Parallel 2
03B0–03BB	Video registers
03C0–03BF	Parallel 1
03E8–03EF	Serial 3
03F0–03F5	Diskette controller
03F6	IDE
03F7 (bits 6–0)	IDE read
03F8–03FF	Serial 1
0400–040B	ISP high DMA
040C–040F	ISP control and test
0461–0464	ISP extended NMI
0464–0465	ISP bus master
0480–048F	ISP high DMA
04C2–04CE	ISP extended DMA
04D0–04D1	ISP interrupt edge/level
04D2–04FF	ISP extended DMA
0C01–0C07	Baseboard configuration
0C09–0C79	Baseboard configuration
0C80–0C83	Baseboard EISA identification

(continued on next page)

Table B–3 (Cont.) I/O Address Map

Range (Hex)	Function
0C84	Baseboard enable
0C85–0CFF	Baseboard configuration

Table B–4 Interrupt Map

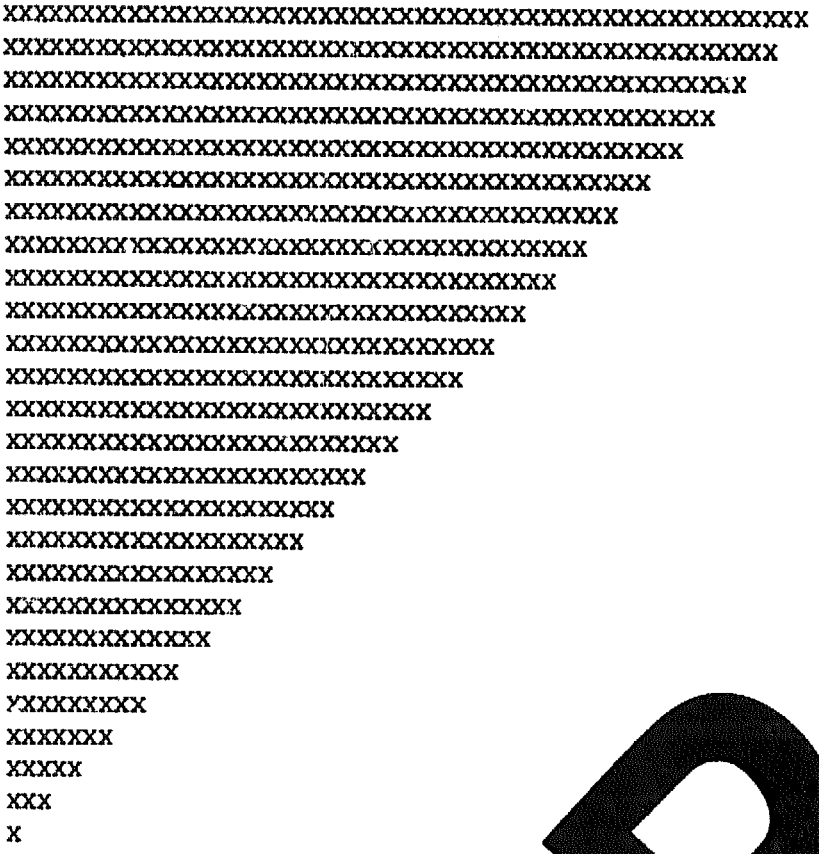
Priority	Interrupt Controller	Interrupt Number	Interrupt Source
1	1	IRQ0	System timer
2	1	IRQ1	Keyboard controller
3–10	1	IRQ2	Interrupt controller 2
3	2	IRQ8	Real-time clock (RTC)
4	2	IRQ9	Available for EISA options
5	2	IRQ10	Available for EISA/ISA options
6	2	IRQ11	Available for EISA/ISA options
7	2	IRQ12	Mouse
8	2	IRQ13	Numeric coprocessor
9	2	IRQ14	IDE hard disk drive (available for EISA/ISA options if no IDE)
10	2	IRQ15	Available for EISA/ISA options
11	1	IRQ3	COMx[1]
12	1	IRQ4	COMx[1]
13	1	IRQ5	LPTy[2]
14	1	IRQ6	Diskette drive
15	1	IRQ7	LPTy[2]

[1]Can be COM1 through COM4.

[2]Can be either LPT1 or LPT2.

Table B–5 DMA Map

Channel	Controller	Function
0	1	Refresh
1	1	Not used
2	1	Diskette controller
3	1	Not used
5	2	Not used
6	2	Not used
7	2	Not used



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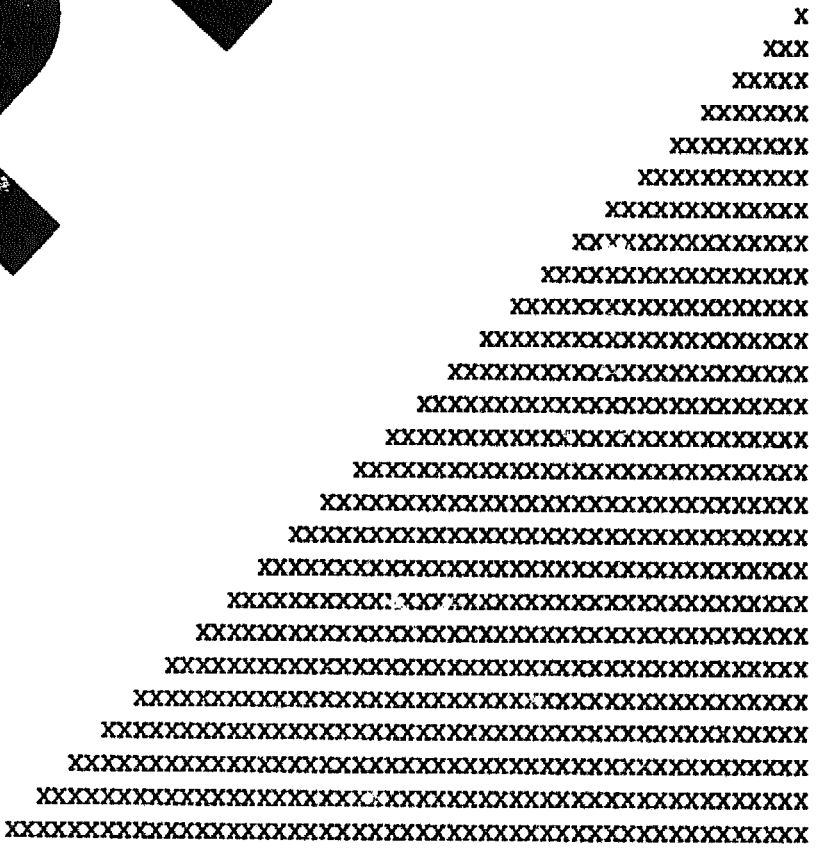

C

ISA Option Configuration Files

Table C–1 is a list of the ISA CFG files on the SCU library diskette supplied with your applicationDEC 400xP system.

Table C–1 ISA Option Configuration Files

Company	Description	CFG File	Category
3Com Corporation	Etherlink 3C500B, ASM 34-0780	ISA8C02	NET
	Etherlink 3C501, ASM 1221	ISA8C01	NET
	Etherlink II 3C503	ISA8C03	NET
	Etherlink Plus 3C505-2012, 16 bit	ISA8C00	NET
	Etherlink Plus 3C505-2012, 8 bit	ISA8C06	NET
	Tokenlink 3C603, 16 bit	ISA8C04	NET
	Tokenlink 3C603, 8 bit	ISA8C08	NET
	Tokenlink Plus 3C605-2065, 16 bit	ISA8C07	NET
	Tokenlink Plus 3C605-2065, 8 bit	ISA8C05	NET
Alloy	FTFA Tape and Floppy Controller	ISABA03	MSD
	IMP2 Multiuser Port Controller	ISABA00	COM
	IMP8 Multiuser Port Controller	ISABA01	COM
	PC-HIA XBUS Controller	ISABA02	OTH
American Megatrends, Inc. (AMI)	SMART PACK 2 W/ PAL 5.1	ISAD800	MEM
	SMART PACK 2 W/ PAL 6.1	ISAD801	MEM
	SMART PACK 2 W/ PAL 6.2	ISAD802	MEM
Anvil	Stallion Intelligent I/O Controller	ISAB000	COM
Archive	SC499R Tape Controller	ISAB800	MSD
	VP402 Tape Adapter	ISAB801	MSD

(continued on next page)

Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
Arnet	Modular SMARTPORT Card	ISAAE02	COM
	SMARTPORT 16 Card	ISAAE03	COM
	SMARTPORT Card	ISAAE01	COM
AST Research	3270/COAX II Rev. X4	ISA8200	COM
	5251/11 Enhanced Plus	ISA8201	COM
	Rampage 286	ISA8203	MEM
	RAMvantage	ISA8204	MEM
	SixPackPlus, Version A	ISA8202	MEM
AT&T	Starlan Network adapter	ISA8F00	NET
	Truevision Image Capture	ISA8F01	VID
ATI Technologies	EGA Wonder	ISAAC00	VID
	VGA Wonder	ISAAC01	VID
Atronics	Professional Image Board Plus	ISACF00	VID
Attachmate	3270 COAX adapter (long board)	ISA8100	COM
	Advanced 3270 COAX adapter (Short board)	ISA8101	COM
	SDLC Adapter	ISA8103	COM
	SDLC/Autolink adapter	ISA8102	COM
Banyan	Intelligent Communications Adapter	ISAB500	COM
Bell Technologies	ACE Multiport Serial Card	ISAC100	COM
Bi-Tech Enterprises, Inc.	SCSI 2110 HD/Tape Controller	ISAD000	MSD
	SCSI 2200 Controller	ISAD001	MSD
BICC	ISOLAN Ethernet adapter	ISAA600	NET
BIT3	403/404/405 Bus Communication Adaptors	ISABB00	OTH
BlueLynx	BlueLynx 3270 Enhanced Coax	ISAC304	COM

(continued on next page)

Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
	BlueLynx 3270 Remote	ISAC302	COM
	BlueLynx 5250	ISAC301	COM
	BlueLynx 5251-12	ISAC300	COM
	BlueLynx Enhanced 5251-11	ISAC303	COM
Boca Research, Inc.	Bocaram/AT Plus	ISABC00	MEM
	I/O Master AT	ISABC01	OTH
Capital Equipment Corporation	PC 488 IEEE Printer Controller	ISAC500	OTH
Chase Research	AT4/AT8/AT16	ISADD00	COM
Codonol	Codenet 3051	ISAA800	NET
Computer Peripherals	Graphmaster Plus EGA	ISAB602	VID
	Monographic Video	ISAB600	VID
	Vision Master VGA	ISAB601	VID
Computone	IntelliPort ATCC Cluster Controller	ISAAF01	COM
	IntelliPort Multiport Serial Card	ISAAF00	COM
Comtrol Corporation	SMART HOSTESS Multiport Serial Card	ISAD200	COM
Control Systems	Artist 10	ISAA700	VID
	Artist XJ10	ISAA701	VID
Core International, Inc.	CNT-ATP ESDI Internal FD Controller	ISAC400	MSD
Corollary	8x4 Mux (Jumpers)	ISAC000	COM
	8x4 Mux (Rotary Switches)	ISAC001	COM
DCA (Digital Comm. Associates)	10 Net adapter	ISA8507	NET
	IRMA 3278 Emulation adapter	ISA8501	COM
	IRMA 3279 Graphics adapter	ISA8502	COM
	IRMA Remote SDLC Adapter	ISA8506	COM

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
	IRMA2 3279 Graphics adapter	ISA8508	COM
	IRMA2 adapter	ISA8500	COM
	IRMA3 Convertible adapter	ISA8503	COM
	Smart Alec 5250	ISA8505	COM
DEC (Digital Equipment Corp.)	DEPCA EtherLink adapter, Rev D1	ISA8B00	NET
	DEPCA EtherLink adapter, Rev E, F	ISA8B01	NET
DigiBoard	DigiBoard Com/8s	ISAB904	COM
	DigiChannel PC/8	ISAB905	COM
	DigiChannel PC/8e	ISAB903	COM
	DigiChannel PC/8i	ISAB901	COM
	DigiChannel PC/Xe	ISAB900	COM
Digital Storage Systems	ARC6000	ISACD00	MSD
Emerald	3XPlus 5250 Remote	ISAB101	COM
	3XTwin 5250 Twinax	ISAB100	COM
Emulex	MPC-II Comm Controller	ISAD300	COM
Eotron	EOgraph Plus	ISABF00	OTH
Equinox Systems	Megaport Board	ISAD100	COM
Everex	Evercom 24 2400 Baud modem	ISAB200	COM
Excelan	EXOS 205E	ISAA400	NET
	EXOS 205T 16-bit	ISAA401	NET
GammaLink	GammaFax CP	ISAD501	COM
	GammaFax NA	ISAD500	COM
Gateway	G/Ethernet 8-bit PC	ISA9401	NET
	G/Ethernet AT	ISA9400	NET
	G/Net LNIM	ISA9405	NET
	G/Net VS	ISA9404	NET

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
	G/Token Ring 8-bit	ISA9402	NET
	G/Token Ring AT	ISA9403	NET
Genoa Systems Corp.	QIC-02 Tape Controller	ISA9F07	MSD
	Super VGA, 16 bit	ISA9F00	VID
	SuperEGA HiRes+	ISA9F03	VID
	SuperSpectrum Model 4640	ISA9F05	VID
	SuperSpectrum Model 4650	ISA9F04	VID
	SuperVGA	ISA9F02	VID
Hayes Microcomputer Products,Inc	Smartmodem 1200B	ISAAB00	COM
	Smartmodem 2400B	ISAAB01	COM
Hercules Computer Technology	GB222 InColor Card	ISA9000	VID
	Graphics Card Plus	ISA9001	VID
	VGA Card	ISA9002	VID
Hewlett Packard Company	Dual Serial Interface Board (24541B)	HWP1400	COM
	Enhanced Graphics Adapter Board (45983A)	HWP0030	VID
	HP 82328A Intelligent Graphics Controller	ISA9B00	VID
	HP Serial/Parallel Interface Board (24540B)	HWP1C00	COM
	HP-IB Interface board (82335A)	HWP1450	OTH
	Internal 1200 Baud Modem (24550A)	HWP1420	COM
	Internal 2400 Baud Modem (24551A)	HWP1410	COM
	Monochrome Plus Video Board (35732A)	HWP0000	VID
	Multimode Color Adapter Board (45984A)	HWP0020	VID
	Multimode Video Adapter (45981A)	HWP0010	VID
	Scanjet Plus Interface (88290A)	HWP1460	COM
	ThinLAN Interface Card (27210B)	HWP1810	NET

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
Hughes Lan Systems	4140 Ethernet Board	ISAD700	NET
	6130 Broadband Network Card	ISAD701	NET
	6140 Token Ring Network Board	ISAD702	NET
IBM	Advanced 3278/79 adapter	ISA8303	COM
	Enhanced 5250 Emulator	ISA8300	COM
	Enhanced 5250 Emulator, Rev B	ISA8301	COM
	Enhanced Graphic adapter	ISA830C	VID
	Monochrome adapter	ISA8308	VID
	PC Network	ISA8305	NET
	PGA	ISA830D	VID
	SDLC (3270 or 5250 Remote)	ISA8302	COM
	Serial/Parallel Adapter	ISA8304	OTH
	Token Ring Adapter I	ISA8306	NET
	Token Ring adapter II	ISA8307	NET
	Token Ring adapter, 16/4	ISA830B	NET
	Token Ring II adapter, Short card	ISA830A	NET
	VGA display adapter	ISA8309	VID
Idea	5250/Remote	ISA8400	COM
	5251 Twinax Plus, Rev D	ISA8401	COM
	IDEAcomm 5251 Twinax Plus, Rev C	ISA8402	COM
	IDEAcomm 5251 Twinax, Rev A, B, C	ISA8403	COM
Ideatech, Inc.	Ideaphone Input Device	ISACE00	OTH
IMC Networks Corporation	PCnic, 16 bit NIC	ISA9700	NET
Intel Corporation	Above Board 286 (no Piggyback)	ISA9202	MEM
	Above Board 286 with 2MB Piggyback	ISA9203	MEM
	Above Board Plus 8 (including 6 MB Piggyback)	ISA9206	MEM
	Above Board PS/286 (no Piggyback)	ISA9204	MEM
	Above Board PS/286 with 2MB Piggyback	ISA9205	MEM
	Above Board/AT (no Piggyback)	ISA9200	MEM
	Above Board/AT with 2MB Piggyback	ISA9201	MEM

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
	Visual Edge printing enhancement system	ISA9207	OTH
Iomega Corporation	Bernoulli II Combo Adapter Board	ISAB702	OTH
	Bernoulli PC2/50, PC2B/50 Boards	ISAB701	OTH
	Bernoulli PC3B/50 Board	ISAB700	OTH
Konan	TNT-1050 Caching Disk Controller	ISACB00	MSD
LSE Electronics	Platinum VGA 16 card	ISAC701	VID
	YC808 Color Graphics Printer adapter	ISAC700	OTH
Madge	AT Ring Node	ISA9600	NET
Matrox	PG-1024	ISA9C02	VID
	PG-1281	ISA9C01	VID
	PG-641	ISA9C03	VID
Metheus	UGA 1104 Graphics Controller	MET1104	VID
	UGA 1124/1128 Graphics Controller	MET1128	VID
Micom-Interlan	NI5210/16 Ethernet	ISA9303	NET
	NI5210/8 Ethernet adapter	ISA9302	NET
	NP600A Ethernet adapter, 16 bit	ISA9300	NET
Micro Integration	PC-MICOAX	ISAC201	COM
	PC-STWINAX	ISAC200	COM
Microsoft Corporation	Mouse Controller	ISA8E00	OTH
National Instruments	AT-GPIB	ISACA01	OTH
	GPIB-PC	ISACA02	OTH
	GPIB-PCIIA	ISACA00	OTH
NEC	Multisync Graphics Board GB-1	ISAD900	VID
Nestar	ARCNET Plan 2000	ISA8A00	NET

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
Novell	Coax adapter 3270 connection	ISA8700	COM
	COAX Graphics, Rev. A	ISA8701	COM
	NE1000 Ethernet adapter	ISA8711	NET
	NE2000 Ethernet adapter	ISA8712	NET
	RX-Net, Rev B,C,D network interface	ISA8713	NET
	RX-Net, Rev E,F,G network interface	ISA8714	NET
	Twinax 5250	ISA8702	COM
Nth Graphics	Nth Engine	ISADC00	VID
Orchid	Enhanced Board OM	ISAA102	MEM
	Enhanced Board w/IO	ISAA103	MEM
	ProDesigner VGA/VGA+	ISAA101	VID
	Turbo PGA	ISAA100	VID
Packard Bell	PB 3270 Coax	ISACC00	COM
Paradise Systems	Autoswitch EGA	ISAA202	VID
	VGA Plus, 8 bit	ISAA201	VID
	VGA Professional, 16 bit	ISAA200	VID
Pixel Works	Micro Clipper Graphics	ISA9E00	VID
	Ultra Clipper Graphics	ISA9E01	VID
Practical Peripherals	Practical Modem 2400	ISAB300	COM
Proteon Corporation	ProNET-4/AT P1344	ISA9500	NET
Pure Data	PDI508 ArcNet	ISAA501	NET
	PDI8025 Token Ring	ISAA500	NET
QMS	Jet Script	ISADE00	OTH
Qua Tech	DS-201 Dual Channel RS-422	ISABE04	OTH
	DSDP-402 Dual Serial/Dual Parallel	ISABE06	OTH
	ES-100 8 Channel Asynchronous	ISABE01	COM
	MXI-100 IEEE 488 GPIB	ISABE03	OTH
	PXB-1608 Parallel Expansion Board	ISABE00	OTH

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
	PXB-721 Parallel Expansion	ISABE05	OTH
	QS-100M 4 Channel Asynchronous	ISABE02	COM
	SmartLynx Multiport Adapter	ISABE08	COM
	WSB-10 Waveform Synthesizer	ISABE07	OTH
Quadram	QuadEGA+	ISA9100	VID
	QUADMEG-AT	ISA9102	MEM
	Quadram+ w/IO	ISA9103	MEM
	QuadVGA Video adapter	ISA9101	VID
Rabbit Software	RB14 X.25 Adapter	ISADB00	COM
	RB24 Multi-Protocol Comm	ISADB01	COM
Racal-Interlan	NI5210/16 Ethernet	ISABD03	NET
	NI5210/8 Ethernet	ISABD02	NET
	NP600A Ethernet 16-bit	ISABD00	NET
Renaissance	Rendition I	ISA9D00	VID
	Rendition II Intelligent Graphics Controller	ISA9D01	VID
Sigma Designs	SigmaVGA or VGA/HP8	ISA9901	VID
	VGA-PC-HP160/162	ISA9900	VID
SIIG Inc.	ARCLAN-100 Arcnet network board	ISAC900	NET
SMC	ARCNET PC	ISA8900	NET
	ARCNET PC100	ISA8901	NET
	ARCNET PC110	ISA8902	NET
	ARCNET PC130/E	ISA8903	NET
	ARCNET PC220/120	ISA8904	NET
	ARCNET PC270/E	ISA8905	NET
	ARCNET PC500	ISA8906	NET
	Ethernet PC510	ISA8907	NET
STB Systems	Chauffer HT	ISAB402	VID
	EGA MultiRes	ISAB404	VID
	EGA Plus	ISAB401	VID
	VGA Extra	ISAB403	VID

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Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
Street Electronics Corporation	ECHO PC+ Speech Synthesizer	ISAC800	OTH
Sun Micro Systems	TOPS Flashcard	ISAAD00	COM
Tecmar	EGA Master 480/800	ISA8804	VID
	Maestro AT	ISA8805	MEM
	QIC PC36 Tape Controller	TEC8001	MSD
	QIC60 Host adapter	TEC8000	MSD
	QT Host Adapter	TEC8002	MSD
	QT PC36 Tape Controller	TEC8003	MSD
The Complete PC, Inc.	FAX/9600	ISAD600	COM
Thomas-Conrad Corporation	TC6042 ARC-Card/CE	TCO030D	NET
	TC6045 ARC-Card/AT	TCO010C	NET
	TC6142 ARC-Card/CE	TCO040B	NET
Tiara	LANCARD/A, Rev B	ISA8D00	NET
	LANCARD/E PC 16	ISA8D01	NET
Torus	Ethernet adapter	ISADA00	NET
	Ethernet adapter /SB	ISADA01	NET
Truevision	ATVista ICB	ISAA300	VID
Ungerman-Bass Inc.	3270 NIUpc	UBIB200	NET
	NIC	UBIC100	NET
	NIUpc	UBIB100	NET
	NIUpc / Token Ring	UBID100	NET
	Personal NIU	UBIA100	NET
	Personal NIU/ex	UBIA200	NET
Vector International	SCC Async/BSC/SDLC	ISAC600	COM

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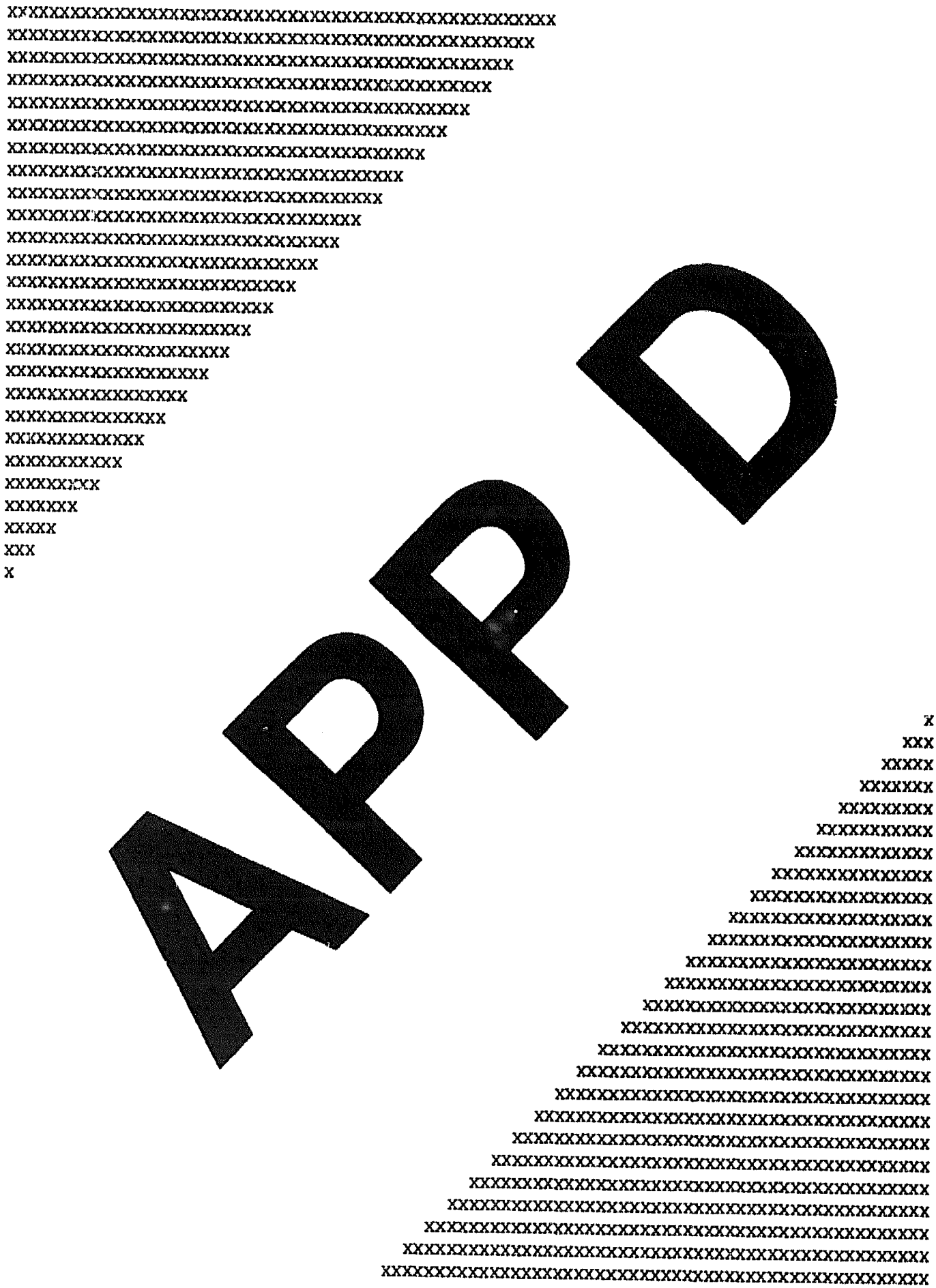
Table C–1 (Cont.) ISA Option Configuration Files

Company	Description	CFG File	Category
Vermont Micro Systems	Cobra	VMI0211	VID
	Cobra Plus	VMI0E01	VID
	Image Manager 1024	VMI0201	VID
	Image Manager 640	VMI0601	VID
	Page Manager 100	ISAA000	VID
Verticom, Inc.	M16/M256E	ISA9A00	VID
	MX16/AT & MX256/AT	ISA9A01	VID
Video Seven	FastWrite VGA Video adapter	ISA9802	VID
	V-RAM VGA	ISA9800	VID
	Vega Deluxe EGA adapter	ISA9801	VID
Western Digital Corporation	EtherCard + 8003EB 61-600090-00	WDC03E4	NET
	EtherCard + 8003EB 61-600245-02	WDC03E2	NET
Western Digital Corporation	EtherCard PLUS 16 8013EBT	WDC13E0	NET
	EtherCard PLUS 8003E	WDC03E0	NET
	EtherCard PLUS TP 8003WT	WDC03E3	NET
	EtherCard PLUS w/Boot 8003EBT	WDC03E1	NET
	StarCard PLUS 8003S	WDC0300	NET
	StarLink PLUS 8003SH	WDC0301	NET
	TokenCard 8005TR/8005TRWS	WDC0510	NET
	WD1004A-WX1 Controller	ISAD400	MSD
	WD1006V-MM2 Winchester/Floppy Controller	ISAD401	MSD
	WD1006V-SR2 Winchester/Floppy Controller	ISAD402	MSD
	WD1007A-WAH Winchester Controller	ISAD403	MSD
	WD1007V-SE1 Winchester Controller	ISAD40	MSD


APP D

D

Error and Informational Messages

D.1 Introduction

This appendix describes the applicationDEC 400xP system errors that might occur during power-on. The error messages are grouped as follows:

- POST and boot error messages
- Run-time error messages
- Beep codes for fatal errors
- Beep codes for non-fatal errors

D.2 POST and Boot Messages

POST displays messages to alert you to errors in hardware, software, and firmware. It also displays information about your system.

During POST, the system board speaker beeps to alert you to specific POST steps. Two beeps signal the start of the time during which you can enter Setup. Another beep signals the end of that time, and then a subsequent beep signals that a system boot has begun.

If an error occurs during POST, the countdown is stopped. If an error occurs before the monitor is initialized, specific beep codes sound to alert you to a problem. If an error occurs after the monitor is initialized, both the POST number and the error message are displayed on the monitor.

Table D–1 lists POST and boot messages by number.

Note

Italics indicate the variable parts of a message, such as memory addresses, hex values, and so on. These parts of the message can differ at each occurrence.

Table D–1 POST and Boot Messages

POST No.	Error Name	Description	Solution
880	POST starts		
860	Set processor speed for POST		
850	Chipset initialization 2		
840	Chipset initialization 3		
830	CPU register test		
820	8742 initialization		
810	RTC RAM and register test	RTC RAM and register test failure	Contact your Digital service representative.
800	System BIOS checksum test	System BIOS checksum failure	Contact your Digital service representative.
790	Initialize programmable interval timer	Programmable interval timer failure	Contact your Digital service representative.
780	DMA channel test	DMA channel failure	Contact your Digital service representative.
770	DMA page register test	DMA page register failure	Contact your Digital service representative.
760	Verify RAM refresh test	RAM refresh failure	Contact your Digital service representative.

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Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
759		First 64 KB RAM parity test failure	Contact your Digital service representative.
758		First 64 KB RAM address line failure	Contact your Digital service representative.
757		First 64 KB RAM odd/even logic failure	Contact your Digital service representative.
756		First 64 KB RAM chip or data line failure, multibit	Contact your Digital service representative.
755–740		First 64 KB RAM chip or data line failure, bit 0–15	Contact your Digital service representative.
730	Initialize stack		
710	Initialize keyboard buffer		
700	Chipset initialization 4	Shadow of on-board BIOS failed	Computer DRAM has failed. Replace any failed SIMM.
692		Extended CMOS checksum failure	See 690.
691		CMOS checksum failure	See 690.
690	CMOS checksum test	CMOS power failure	The configuration information stored in CMOS does not agree with your hardware configuration. Run the SCU to verify configuration. Reboot system.

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Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
680	Initialize EISA slots		
670	Initialize serial ports		
660	Initialize parallel ports		
655	DMA register test (slave)	DMA register failure (slave)	Contact your Digital service representative.
650	DMA register test (master)	DMA register failure (master)	Contact your Digital service representative.
645	Programmable interrupt controller register test (master)	Programmable interrupt controller register failure (master)	Contact your Digital service representative.
640	Programmable interrupt controller register test (slave)	Programmable interrupt controller register failure (slave)	Contact your Digital service representative.
620	Initialize interrupt vector table		
610	Enable timer tick interrupt		
600	Initialize keyboard controller	Keyboard controller failure	Contact your Digital service representative.
590	Check video configuration		
580	Search for video ROM		
570	Initialize video controller		
560	Using alternate video controller	Primary display adapter failed, using alternate	Contact your Digital service representative.
540	Scan and initialize video ROM		
530	Verify video configuration		

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
520	Initialize console redirection		
500	Display sign on message		
490	Timer tick interrupt test	No timer tick interrupt	Contact your Digital service representative.
480	Shutdown test	Shutdown failure	Contact your Digital service representative.
461		Software port NMI failure	Contact your Digital service representative.
460	EISA extended devices test	Fail safe timer NMI failure	Contact your Digital service representative.
450	Chipset initialization 6		
441		Unexpected interrupt in protected mode	The computer received an interrupt while in protected mode (probably while testing memory). If the problem persists, contact your Digital service representative.
440	Size memory above 64 KB	Gate A20 failure	The computer cannot switch into protected mode. Contact your Digital service representative.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
430	Interval timer 2 test	Timer 2 failure	The integrated system peripheral (ISP) chip on the system board might have failed. If the problem persists, contact your Digital service representative.
390	Initialize keyboard flags		
374		Keyboard failure	Replace keyboard.
373		Keyboard stuck key failure	One or more of the keys was pressed. Release the key or keys and try again.
372		Keyboard data line failure	See 371.
371		Keyboard clock line failure	The keyboard or the keyboard cable connection has failed. Check the keyboard connection. If the connection is good, the keyboard might have failed. Try another keyboard. If the problem persists, Contact your Digital service representative.
370	Test keyboard	Keyboard controller failure	Contact your Digital service representative.
350	Reinitialize keyboard controller		
330	Initialize auxiliary device		

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
310	Initialize keyboard controller output port		
300	Initialize gate A20		
297		Decreasing available memory	This message immediately follows any memory error message informing you that memory modules are failing. Check that all SIMMs are installed correctly.
296		Memory write/read failure at XXXX–YYYY, read QQQQ expecting ZZZZ	See 292.
295		Memory address line failure at XXXX–YYYY, read QQQQ expecting ZZZZ	See 292.
294		Memory high address failure at XXXX–0000 to XXXX–FFFF	See 292.
293		Memory double word logic failure at XXXX–0000 to XXXX–FFFF	See 292.
292		Memory odd/even logic failure at XXXX–0000 to XXXX–FFFF	One of the SIMMs or associated circuitry has failed. Check for failed SIMM and replace if necessary. If the message repeats, contact your Digital service representative.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
291		Memory data line failure at XXXX–0000 to XXXX–FFFF	See 290.
290	Test memory above 64 KB	Memory parity failure at XXXX–0000 to XXXX–FFFF	One of the SIMMs or associated circuitry has failed. Check for failed SIMM and replace if necessary. If the message repeats, contact your Digital service representative.
270	Initialize extended BIOS data area		
250	Chipset initialization 7		
230	Enable hardware interrupts		
210	Read keyboard ID		
190	Real-time clock test	Real-time clock failure	The internal battery for the clock is probably dead. Replace the real-time clock device.
160	Coprocessor test	Coprocessor failed	The coprocessor failed or is missing.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
150	Check for invalid configuration		Run the SCU.
140	Chipset initialization 8		
132		Diskette drive 1 failure	See 131.
131		Diskette drive 0 failure	Drive 0 has either failed or is missing. Verify the settings for drive 0 using the BIOS Setup Utility. Make sure drive 0 is present and the diskette is inserted properly. If it is, drive 0 might have failed.
130	Initialize diskette subsystem	Diskette drive failure	Drive has either failed or is missing. Verify the drive settings using the BIOS Setup Utility. Make sure drive is present and the diskette is inserted properly. If they are, drive might have failed.
122		Hard drive 0 failure	See 120 and 121.
121		Hard drive controller failure	See 120. Check both ends of the controller's cables.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
120	Initialize hard drive subsystem	Hard drive configuration error	Check the system configuration and drive type by running the SCU.
110	Chipset initialization 9		
101		Shadow of off-board video BIOS aborted, no video ROM found	Run the SCU and turn off video BIOS shadow.
100	Shadow ROMs	Shadow of off-board video BIOS failed	The video controller board might have failed. Check that it is installed correctly. Run the SCU. Also, see 700.
090	Enable cache	Internal cache test failed, cache disabled	Cache failed. Replace CPU module.
080	Initialize option ROMs	XXXX0h optional ROM bad checksum=YYh	Expansion board configuration error. Run the SCU.
070	Set system clock	Time of day clock not set	Run the SCU.
060	Check for electrical keylock	Keyboard is locked, please unlock	Unlock the keyboard.
043		Invalid EISA configuration information	An EISA board has not been properly configured. Run the SCU and verify all settings. Make sure that an EISA CFG file has been installed for the module.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
042		Invalid ISA configuration information	An ISA board has not been properly configured. Run the SCU and check switch and jumper settings. Make sure that an ISA CFG file has been installed for the module.
041		ID mismatch error, slot X	(A) The board in slot X is bad and returns a bad ID. (B) The board ID does not match the ID that the SCU expects for slot X. The mismatch is due to either the wrong board in the slot or the wrong configuration file for the board. Run the SCU to configure slot X, or replace the bad board. If the problem persists, contact your Digital service representative.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
040	Report configuration errors and prompt for configuration utility	Configuration error, slot X	Run the SCU for the board in slot X.
020	Enable parity checking and NMI		
004		No boot sector on hard drive	The hard disk drive is not formatted as a bootable disk.
003		Hard drive read failure	The hard disk drive has failed. Check the system configuration and drive type by running the SCU. Check both ends of the controller's cables, and reseat the hard disk controller board. If the problem persists, contact your Digital service representative.

(continued on next page)

Table D–1 (Cont.) POST and Boot Messages

POST No.	Error Name	Description	Solution
002		No boot device available	If booting from a diskette, it is a nonbootable type or the diskette drive has failed. If booting from a hard disk drive, it might not be formatted or the drive might have failed. The problem might also be the SCSI controller board. Make sure the diskette in drive A contains an operating system. If applicable, make sure the hard disk drive contains an operating system.
001		Not a bootable diskette	The diskette in drive A is not formatted as a bootable diskette. Replace the diskette with a bootable diskette and try again.
000	Boot	Diskette read failure	No diskette in drive A. Insert a diskette and try again.

D.3 Run-Time Error Messages

Run-time error messages are displayed on the monitor screen if an error occurs after the system boots. Table D–2 lists the run-time error messages by number.

Table D–2 Run-Time Error Messages

POST No.	Message	Solution
980	Unresolved memory parity error	Computer DRAM has failed. Replace any failed SIMM.
981	Memory parity error at XXXX–YYYY	See 980.
982	I/O expansion board NMI, slot X	Malfunction or configuration error for expansion board in slot X. Run the SCU and verify settings.
983	Unresolved I/O expansion board NMI	See 982. Slot is unknown.
984	Expansion board disabled	Configuration error or malfunctioning expansion board. Run the SCU and verify settings.
985	Fail safe timeout NMI	Expansion board malfunction. Replace defective board.
986	Unresolved bus timeout NMI	See 985.
987	Bus timeout NMI, slot X	
988	Software NMI	
970	Unexpected software interrupt	There is an error in a software utility. Try turning the system off and then on again. If the problem persists, contact your software manufacturer's representative.
971	Unexpected hardware interrupt	This could be any hardware-related problem. Check all cables, connections, jumpers, and boards. If the problem persists, contact your Digital service representative.

D.4 Beep Codes

If POST finds an error and cannot display a message, the system board speaker beeps to indicate the error and places a value in I/O port 80h. For example, a failure of bit 3 in the first 64 KB of DRAM is indicated by a 2-1-4 beep code (a burst of two beeps, a single beep, and a burst of four beeps).

Tables D–3 and D–4 list the beep codes and the values POST writes to I/O port 80h when it encounters an error. Table D–3 lists fatal errors (errors that lock the computer), and Table D–4 lists nonfatal errors (errors that do not lock the computer).

One beep code is not listed in either table: a long beep followed by one or more short beeps. This beep code indicates a video controller failure.

Table D–3 Beep Codes for Fatal Errors

Beep Code	Error Message	Port 80h
1-1-3	RTC write/read failure	02h
1-1-4	ROM BIOS checksum failure	03h
1-2-1	Programmable interval timer failure	04h
1-2-2	DMA initialization failure	05h
1-2-3	DMA page register write/read failure	06h
1-3-1	DRAM refresh verification failure	08h
1-3-3	1st 64 KB DRAM chip or data line failure	0Ah
1-3-4	1st 64 KB DRAM odd/even logic failure	0Bh
1-4-1	1st 64 KB DRAM address line failure	0Ch
1-4-2	1st 64 KB DRAM parity test in-progress failure	0Dh
2-1-1	Bit 0 1st 64 KB DRAM failure	10h
2-1-2	Bit 1 1st 64 KB DRAM failure	11h
2-1-3	Bit 2 1st 64 KB DRAM failure	12h
2-1-4	Bit 3 1st 64 KB DRAM failure	13h
2-2-1	Bit 4 1st 64 KB DRAM failure	14h
2-2-2	Bit 5 1st 64 KB DRAM failure	15h

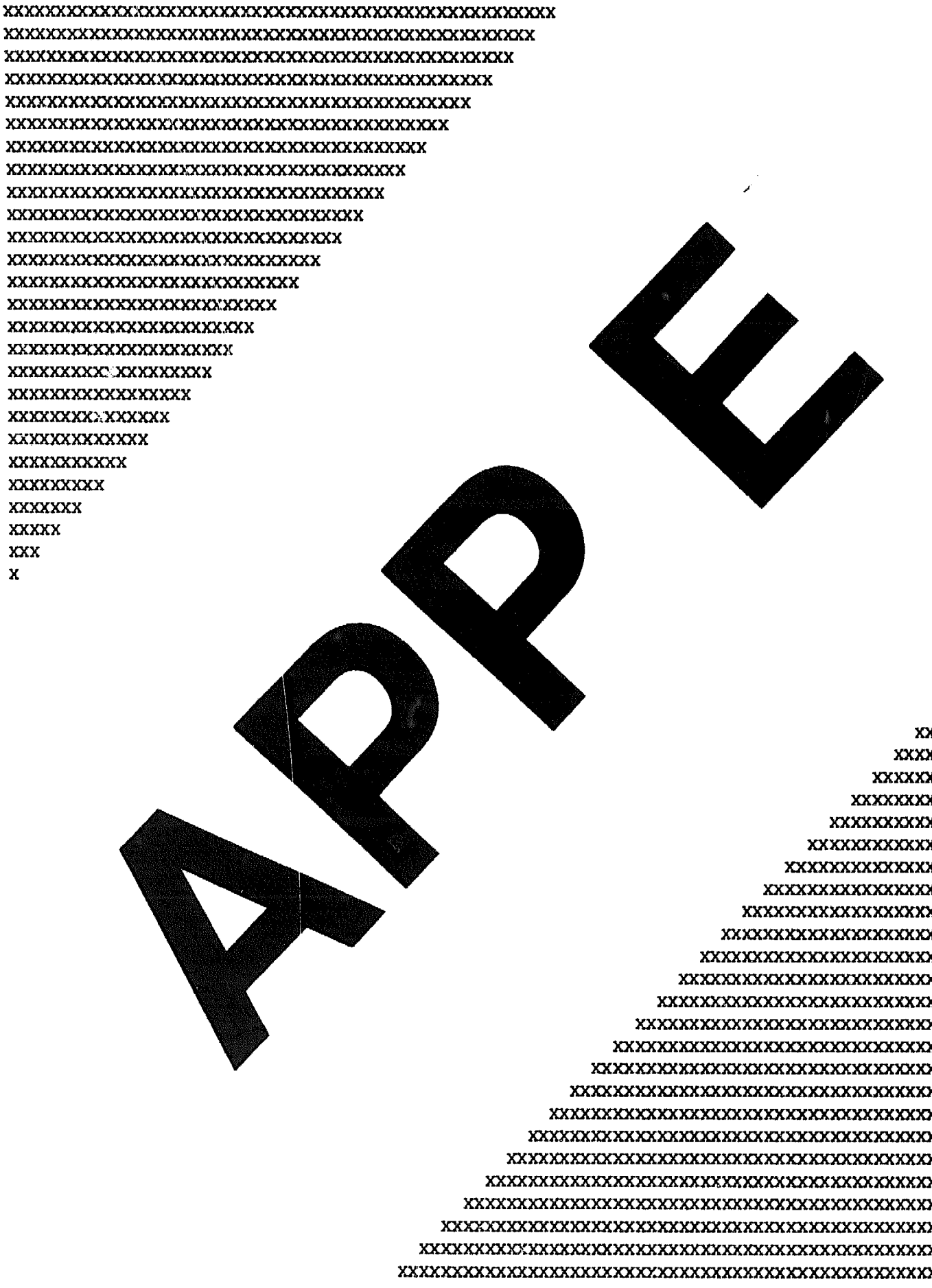
(continued on next page)

Table D–3 (Cont.) Beep Codes for Fatal Errors

Beep Code	Error Message	Port 80h
2-2-3	Bit 6 1st 64 KB DRAM failure	16h
2-2-4	Bit 7 1st 64 KB DRAM failure	17h
2-3-1	Bit 8 1st 64 KB DRAM failure	18h
2-3-2	Bit 9 1st 64 KB DRAM failure	19h
2-3-3	Bit A 1st 64 KB DRAM failure	1Ah
2-3-4	Bit B 1st 64 KB DRAM failure	1Bh
2-4-1	Bit C 1st 64 KB DRAM failure	1Ch
2-4-2	Bit D 1st 64 KB DRAM failure	1Dh
2-4-3	Bit E 1st 64 KB DRAM failure	1Eh
2-4-4	Bit F 1st 64 KB DRAM failure	1Fh
3-1-1	Slave DMA register failure	20h
3-1-2	Master DMA register failure	21h
3-1-3	Master interrupt mask register failure	22h
3-1-4	Slave interrupt mask register failure	23h
3-2-4	Keyboard/mouse controller test failure	27h

Table D–4 Beep Codes for Nonfatal Errors

Beep Code	Error Message	Port 80h
3-3-4	Screen memory test failure	2Bh
3-4-1	Screen initialization failure	2Ch
3-4-2	Screen retrace test failure	2Dh


APPE

E

Equipment Log

E.1 Introduction

Use the equipment log form in this appendix to record information about the system. You will need this information during system configuration and if the system needs service. You should also update the equipment log when you add options.

The equipment log provides a warranty record that should include the dates of all system upgrades and configuration changes.

E.2 Serial Numbers

Record the model and serial numbers of computer components in the equipment log. Also record the model and serial numbers of any components added to the system, such as hard disk drives, expansion boards, diskette drives, and so on.

Record the model and serial number of the chassis key, system board, and CPU module. The model and serial number of the system is recorded on a label attached to the rear cover. The key for the chassis lock has a serial number engraved on it. The serial number of the system board is located on the edge of the board next to the computer jumpers. The serial number for the CPU module is located on the component side of the module at the right end.

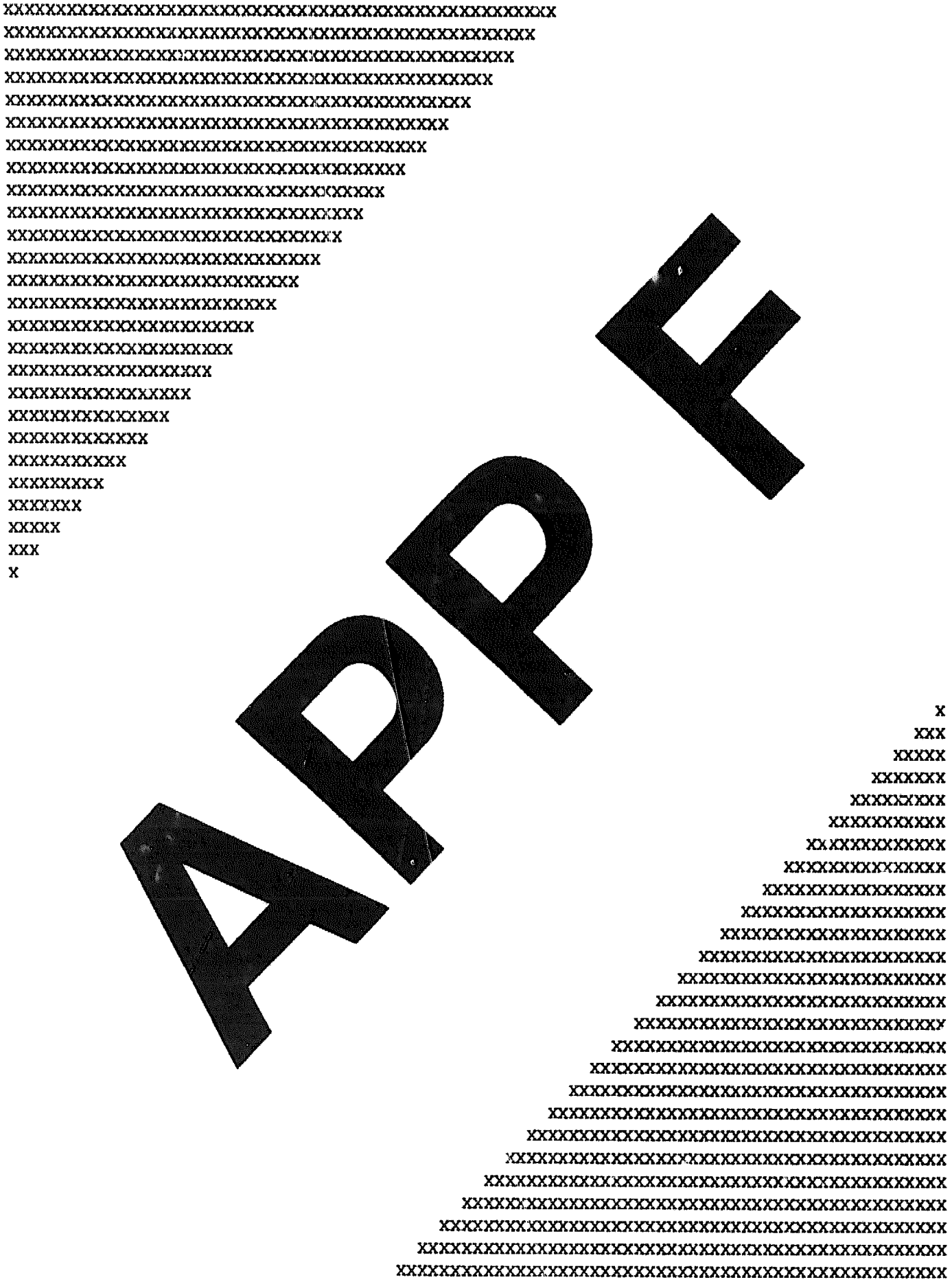
The location of the serial numbers on hard disk drives, expansion boards, diskette drives, and external equipment (monitors, printers, and so on) varies. Refer to the documents supplied with these products for the location of model and serial numbers.

E.3 Equipment Log

Table E–1 contains a sample equipment log.

Table E–1 Equipment Log Sample

Component	Vendor/Type/Size	Model No.	Serial No.	Date Installed
applicationDEC 400*x*P system				
applicationDEC 400*x*P system board				
CPU module				
applicationDEC 400*x*P key number				
Monitor				
Keyboard				
Installed diskette drive				
Device 2				
Device 3				
Device 4				
Device 5				
Device 6				
Device 7				


APPF

F

Caring for Your System

F.1 Introduction

This chapter describes how to:

- Clean the outside of the system cabinet
- Clean the monitor screen
- Clean the mouse
- Prepare to move the system

Caution

Make sure you turn off the system and disconnect any external devices before you clean the system. When you use a moistened cloth for cleaning, do not allow any excess moisture to leak into the system, keyboard, or monitor. Always wait until the system is completely dry before you apply power.

F.2 Cleaning the System Cabinet

Clean the outside of the system cabinet periodically with a soft cloth. Use a cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleansers.

F.3 Cleaning the Screen

If the monitor screen gets dirty, clean it with a sponge or chamois cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleansers.

F.4 Cleaning the Mouse

If your mouse cursor moves erratically across the screen, check for an accumulation of dirt on a ball located inside the mouse. Turn the mouse over, release the cover, and place the cover and ball on a clean surface. Use a cotton swab lightly moistened with a mild detergent solution to clean the ball and the inside of the cover. Replace the ball and cover.

F.5 Moving the System

To prepare to ship or move the system:

1. Back up all files stored on hard disk drives.
2. Turn off the monitor, and disconnect the monitor power cord.
3. Turn off the system, and disconnect the system power cord.
4. Disconnect the monitor signal cable.
5. Disconnect the keyboard and mouse from the computer.
6. Disconnect any other external peripheral devices, such as printers and modems.
7. Insert a drive protection card in all 5.25-inch and 3.5-inch diskette drives (if applicable). If you do not have drive protection cards, use blank diskettes.
8. Read and follow the instructions in Section F.5.1.

F.5.1 Packing the System

If you are moving the system a short distance (from one room to another in the same building), you do not need to pack the system. If you are shipping the system, pack it in the original packing material and boxes.

Warning

Use care when moving the system cabinet. Due to its weight, two people are required to lift it. Failure to use two people violates certain safety regulations and can result in personal injury or equipment damage.


APP G

G

Technical Specifications

G.1 Introduction

This appendix provides information about the technical characteristics of the applicationDEC 400xP system. It includes specifications and information on:

- External computer connectors
- Expansion slot current limitations
- System current requirements
- System board jumpers

G.2 System Specifications

Tables G–1 through G–5 list the applicationDEC 400xP system dimensions, and the performance, environmental, and acoustic specifications.

Table G–1 Performance Specifications

Attributes	Specification
Microprocessor	Intel 486
EISA bus speed	8.33 MHz
Data I/O	8 and 16 bits
Interrupts	15
Physical addressing	4 GB
Virtual addressing	64 terabytes
ROM BIOS Size	128 KB
System board memory	4 MB to 64 MB (using 16 MB SIMMs)

Table G–2 System Dimensions

Dimension	Specification
Width, top	23.0 cm (9 in)
Width, bottom	30.5 cm (12 in)
Length, top	56 cm (22 in)
Length, bottom	61 cm (24 in)
Height	63.5 cm (25 in)
Weight[1]	26.6 kgm (59 lb)

[1]With standard 1.44 MB diskette drive, but without CPU module or other options.

Table G–3 Environmental Specifications

Attributes	Specification
Operating temperature	10°C to 40°C (50°F to 104°F)
Storage temperature	–20°C to 60°C (–4°F to 140°F)
Operating humidity (noncondensing)	20% to 80% relative humidity, max wet bulb 33°C
Storage humidity (noncondensing)	95% relative humidity, max wet bulb 35°C
Operating altitude	3,048 m (10,000 ft) maximum
Operating shock	2.0 G
Nonoperating shock	30 G, trapezoidal wave, 170 ips D velocity

Table G–4 Acoustics — Declared Values per ISO 9296 and ISO 7779

	Sound Power Level L_{WAd}, B(A)	Sound Pressure Level, L_{pAm}, dB(A)	
		Operator Position	Bystander Position
Idle (2RZ25)[1]	5.5	40	39
Operating (2RZ25)[1]	5.5	40	39

[1]Current values for specific configurations are available from Digital representatives.

Table G–5 Schallemissionswerte — Vorläufige Werteangaben nach ISO 9296 und ISO 7779/DIN45635-19

	Schalleistungspegal L_{WAd}, B(A)	Schalldruckpegel, L_{pAm}, dB(A)	
		Bediener Position	Zuschauerpositionen
Leerlauf (2RZ25)[1]	5,5	40	39
Betrieb (2RZ25)[1]	5,5	40	39

[1]Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich.

G.3 CPU Module Specifications

Your applicationDEC 400xP system will have one the following CPU modules installed:

- 25 MHz
- 33 MHz
- 50 MHz

If you do not know which CPU module is installed in your system, run the System Configuration Utility (SCU). Specific CPU module speeds are detected by the SCU and displayed in one of the "View or edit details" screens under the "Configure computer" option (see Section 3.3.2).

G.3.1 25 MHz Module

Table G–6 lists the performance specifications for the 25 MHz CPU module.

Table G–6 25 MHz Processor Module Performance Specifications

Attributes	Specification
Microprocessor	25 MHz Intel 486SX
Cache	Optional Intel 486 turbo cache
	64 KB or 128 KB
	Zero wait state cache hit
	Write-through mode
Memory interface	486 burst-mode support using fast-page mode
	64-bit dual-bank memory
	Zero wait state one-deep posted memory write
	6,1,1,1 burst reads

G.3.2 33 MHz Module

Table G–7 lists the performance specifications for the 33 MHz CPU module.

Table G–7 33 MHz Processor Module Performance Specifications

Attributes	Specification
Microprocessor	33 MHz Intel 486DX
Cache	Optional Intel 486 turbo cache
	64 KB or 128 KB
	Zero wait state cache hit
	Write-through mode
Memory interface	486 burst-mode support using fast-page mode
	64-bit dual-bank memory
	Zero wait state one-deep posted memory write
	7,1,2,1 burst reads

G.3.3 50 MHz Module

Table G–8 lists the performance specifications for the 50 MHz CPU module.

Table G–8 50 MHz Processor Module Performance Specifications

Attributes	Specification
Microprocessor	50 MHz Intel 486DX
Cache	82490/82495 based
	256 KB
	Zero wait state cache hit
	Write-back operation
Memory interface	486 burst-mode support using fast-page mode
	64-bit dual-bank memory
	Zero wait state one-deep posted memory write
	10,2,2,2 burst reads

G.4 External Computer Connectors

This section lists all external computer connectors located at the rear of the system cabinet. Each of the following connectors is described.

- Parallel printer connector, 25-pin D-subminiature female
- Serial port connectors, 9-pin D-subminiature male
- Keyboard and mouse connectors, 6-pin mini-DIN

G.4.1 Parallel Printer Connector

The parallel printer connector provides an interface to a printer or other parallel devices. Table G–9 lists its pin assignments.

Note

The system logically assigns LPTx names to parallel ports in the address order 378h and 278h. This occurs during each boot process.

Table G–9 Parallel Printer Connector Pinout

DB25 Pin	Signal	Function
1	STB-R[1]	Strobe
2	PRTD0	Printer data bit 0
3	PRTD1	Printer data bit 1
4	PRTD2	Printer data bit 2
5	PRTD3	Printer data bit 3
6	PRTD4	Printer data bit 4
7	PRTD5	Printer data bit 5
8	PRTD6	Printer data bit 6
9	PRTD7	Printer data bit 7
10	ACK[1]	Acknowledge
11	BUSY	Busy
12	PE	Paper end
13	SLCT	Select
14	AUTOFDXT[1]	Auto feed
15	ERR[1]	Error
16	INIT[1]	Initialize printer
17	SLCTIN[1]	Select input
18–25	GND	Ground

[1]Asserted low.

G.4.2 Serial Port Connectors

The serial port connectors consist of two 9-pin D-subminiature connectors. Table G–10 lists the pin assignments. The baud rates supported by the system for the serial ports are 300, 1200, 2400, 4800, 9600, 19200, and 38400.

Note

The system logically assigns COMx names to serial ports in the address order 3F8h, 2F8h, 3E8h, and 2E8h. This occurs during each boot process.

Table G–10 Serial Port Connector Pinout

DB9 Pin	Signal	Function
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

G.4.3 Keyboard and Mouse Connectors

The keyboard and mouse connectors consist of two 6-pin mini-DIN connectors. The connector closest to the system board is the keyboard connector; the other is the mouse connector. Table G–11 lists the pin assignments.

Table G–11 Keyboard and Mouse Connector Pinouts

Pin	Signal
1	Data
2	No connection
3	Ground
4	+5 Vdc (fused)
5	Clock
6	No connection

G.5 Expansion Slots

The system board contains eight EISA bus master expansion slots, which are also ISA compatible. The maximum +5 Vdc current for any expansion slot depends upon the following four parameters:

- Power supply capacity of 35 A at +5 Vdc
- The +5 Vdc requirements of the board set, including CPU and memory modules

- The +5 Vdc requirements of the peripherals
- The power demands of all other slots in use

Caution

Each EISA bus expansion board is limited to 4.5 A at +5 Vdc maximum. The power supply connectors are limited to 5 A per pin, maximum, with a total of 35 A maximum for 7 pins. These limitations plus the maximum capacity of the power supply itself may be more restrictive than the current limitations of the pin/connectors and expansion slots. Do not exceed 35 A when computing the total +5 Vdc current drain for the system board. This avoids damage to the power supply and system board.

G.6 Power Supply and Input Power Requirements

The power supply provides four dc voltages: +12 Vdc, –12 Vdc, +5 Vdc, and –5 Vdc. These voltages are used by the various components within the system. Table G–12 lists the power requirements.

Table G–12 System Power Requirements

Parameter	Specification
AC voltage (nominal)	110/120 V or 220/240 V (autosensing)
Frequency (nominal)	60 Hz or 50 Hz
AC phases	1
AC power input (maximum, including auxiliary ac outlet)	830 W
AC power output	350 W
Inrush current (maximum)	50 A
Auxiliary ac output current (maximum)	
110/120 V	3.0 A
220/240 V	1.5 A

G.7 System Component Current Requirements

The system has a 350 W power supply. Table G–13 specifies the nominal current requirements for typical computer components.

Table G–13 Computer Component Current and Power Requirements

Assembly	+5 Vdc	+12 Vdc	-12 Vdc	Total Power (without surge)
System board (32 MB memory)	6.0 A	0.06 A	0.06 A	31.4 W
486/50, 256 KB cache	4.7 A			23.5 W
486/33, 128 KB cache	4.2 A			21.0 W
486/25, 128 KB cache	4.0 A			20.0 W
64 MB memory	3.0 A			15 W
3.5-inch diskette drive	0.8 A	1.00 A		16 W
5.25-inch diskette drive	0.2 A	0.20 A		3.4 W
Keyboard and mouse	0.5 A			2.5 W
1 EISA slot[1]	2.0 A	0.06 A	0.06 A	11.4 W
8 EISA slots[1]	16 A	0.48 A	0.48 A	91 W
3.5-inch hard drive[1]	1.1 A	0.80 A (2 A surge)		15.1 W
5.25-inch hard drive (half-height)[1]	1.0 A	1.50 A (4.5 A surge)		23 W
5.25-inch hard drive (full-height)[1]	1.5 A	2.00 A (4.5 A surge)		31.5 W

[1]Options vary. Typical values are shown.

G.8 System Board Jumpers

Jumper pins allow you to set specific system parameters. They are set by changing the pin location of jumper blocks. A jumper block is a small plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting, remove the jumper from its current location with your fingers. Position the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins. Be careful not to bend the pins.

G.8.1 Jumper Settings

Table G–14 lists the system board jumpers and factory default settings. Figure G–1 shows the location of these system jumpers.

Caution

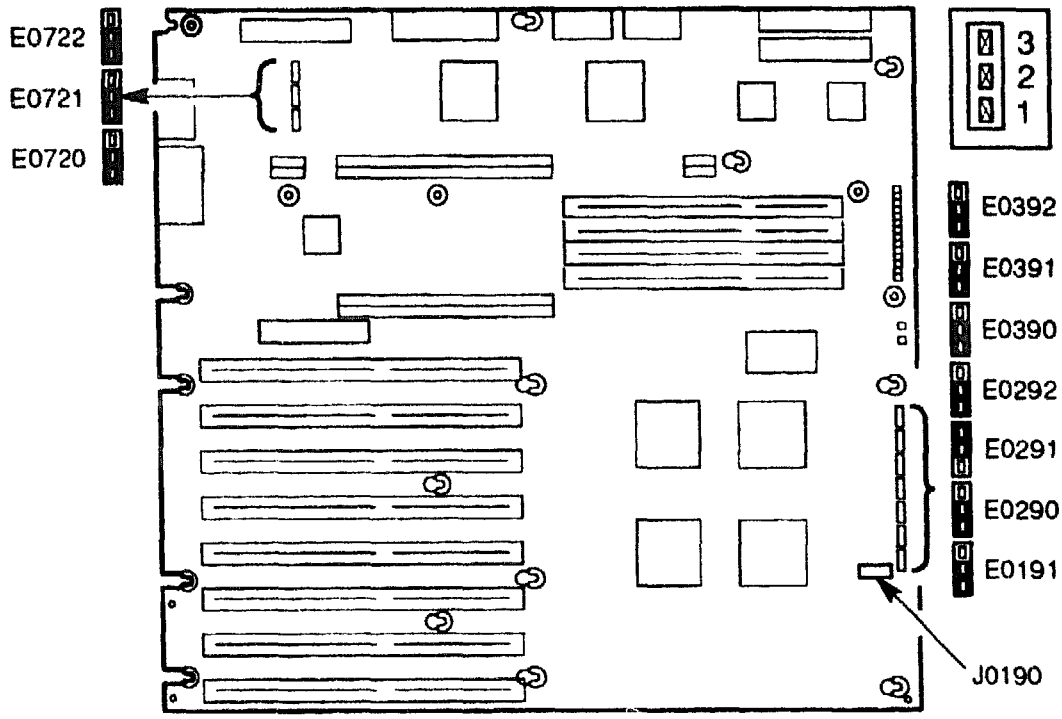
Do not touch any electronic component unless you are wearing a grounded wrist strap or touching an exposed metal part of the system chassis. A static discharge from your fingers can result in permanent damage to electronic components.

Table G–14 System Board Jumper Settings

Board Designation	1–2 jumper	2–3 jumper
FLASH		
E0191 FLASH	Normal BIOS boot block[1]	Update BIOS boot block
E0721 F-P	Flash write enable[1]	Flash read only
FLOPPY		
E0291 FLOPPY	Diskette write-protected	Diskette read/write enabled[1]
KEYBOARD		
E0292 NVRAM	Retain configuration memory[1]	Clear configuration memory
E0390 PASSWORD	Password disable/clear	Password enable[1]
MEMORY		
E0391 SIMM0	2, 4, 8 MB SIMMs in bank 0[1]	16, 32 MB SIMMs in bank 0
E0392 SIMM1	2, 4, 8 MB SIMMs in bank 1[1]	16, 32 MB SIMMs in bank 1
VGA		
E0290 VGA	On-board VGA enabled[1]	On-board VGA disabled
E0720 VID1M	512 KB video memory[1]	1 MB video memory
E0722 VID	Video base address = 03C3h[1]	Video base address = 46E8h

[1] Default.

Figure G–1 Location of System Board Jumpers




INDEX

Index

S

T

V