

DEC 3000 Model 400/400S AXP

Options Guide

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Preface

About This Guide

This guide describes how to open and close the DEC 3000 Model 400/400S AXP system unit, and how to install and remove the following options:

- RRD42 compact disc drive
- RX26 diskette drive
- TZK10 cartridge tape drive
- TLZ06 cassette tape drive
- TZ30 cartridge tape drive
- RZ24L fixed disk drive
- RZ25 fixed disk drive
- RZ26 fixed disk drive
- Memory modules
- TURBOchannel option modules
- External options: console terminal, dial box and button box, headset, modems, printers, tablet

Information for Each Option

This guide provides the following information for each internal option:

- How to install and remove options
- How to test for successful installation
- Option specifications

This guide also briefly describes the external options.

Two Methods of Adding Options

There are two methods of adding options inside your system:

- Add the options yourself.
- Have a Digital service representative add them.

If you choose to add the options, note that installations typically take about 15 minutes for each option, although some procedures may take more or less time.

What You Should Know Beforehand

The instructions in this guide assume that you are accustomed to opening the system unit, disconnecting and connecting internal cables, and using antistatic precautions. You should also understand the following diagnostic test displays and concepts:

- System test messages
- Displays resulting from the `show config`, `show dev`, and `show mem console` commands
- SCSI switch and jumper settings

(If you are not familiar with SCSI concepts, refer to *Small Computer System Interface: An Overview*, listed in Appendix A of this guide.)

CAUTION: Possible Module Damage

Improper installation of an optional drive or module could lead to damage and failure of that option. Your DEC 3000 Model 400/400S AXP system warranty may not cover such a failure.

**IMPORTANT:
Software
Product
Descriptions**

The Software Product Description (SPD) is the official defining document for software products licensed by Digital Equipment Corporation, including third-party products licensed by Digital. An SPD describes all important functional characteristics of the software. The terms and conditions under which the corporation sells and licenses its software products identify SPDs as the documents that specify Digital's obligation under software warranty.

SPDs also describe a software product's system environment, and identify required and optional hardware and software. All information contained in the SPD is valid in the international marketplace.

For more information on the SPD for your operating system, please contact your Digital sales representative.

Organization

This guide is organized into 14 chapters, one appendix, a glossary, and an index.

Chapter	Title	Brief Description
1	Internal Options for Your System	Identification and location of internal options.
2	Preparing Your System for Internal Options	Preparation of your system before adding internal options.
3	RRD42 Compact Disc Drive	Drive features, installation and removal procedures, care of discs and caddies, and hardware specifications.
4	RX26 Diskette Drive	Drive features, installation and removal procedures, care of diskettes, and hardware specifications.
5	TZK10 Tape Drive	Drive features, installation and removal procedures, care of cartridges, and hardware specifications.
6	TLZ06 Tape Drive	Drive features, installation and removal procedures, care of cassettes, and hardware specifications.
7	TZ30 Tape Drive	Drive features, installation and removal procedures, care of tapes, and hardware specifications.
8	RZ24L Fixed Disk Drive	Drive features, installation and removal procedures, and hardware specifications.
9	RZ25 Fixed Disk Drive	Drive features, installation and removal procedures, and hardware specifications.
10	RZ26 Fixed Disk Drive	Drive features, installation and removal procedures, and hardware specifications.

Chapter	Title	Brief Description
11	Memory Modules	Description of memory modules and installation and removal procedures.
12	TURBOchannel Options	Description of TURBOchannel modules and installation and removal procedures.
13	Restoring the System	Restoration and testing of your system after internal options are added.
14	External Options for Your System	Connection of console terminal, printers, modems, dial box, button box, headset, and tablet with puck and pen to the back of the system unit.
A	Associated Documents	List of documents associated with the DEC 3000 Model 400/400S AXP system.

Conventions in This Guide

The following conventions are used in this guide:

Convention	Description
<code>Return</code>	A key name is shown enclosed to indicate that you press the named key on the keyboard.
DEC OSF/1 operating system	This name refers to the DEC OSF/1 AXP operating system
OpenVMS operating system	This name refers to the OpenVMS AXP operating system
<code>show</code>	A word in this typeface indicates a command that you must enter from the keyboard at the console prompt (<code>>>></code>) exactly as shown, for example: <code>show config</code> .
WARNING:	Warnings contain information to prevent personal injury. Read these carefully.
CAUTION:	Cautions provide information to prevent damage to equipment or software. Read these carefully.

1

Internal Options for Your System

Chapter Overview

Introduction

Both internal and external options are available for your DEC 3000 Model 400/400S AXP system. Internal options, such as fixed disk and removable-media drives, memory modules, and TURBOchannel option modules, are added inside the system unit. External options, such as a console terminal, printers, modems, and pointing devices are connected externally to the system unit by cable. (External options are described in Chapter 14.)

In This Chapter

This chapter identifies the following internal options and shows where they are positioned in the DEC 3000 Model 400/400S AXP system unit:

- Removable-media drives:
 - RRD42 compact disc drive
 - RX26 diskette drive
 - TZK10 tape drive
 - TLZ06 tape drive
 - TZ30 tape drive
- Fixed-disk drives:
 - RZ24L fixed-disk drive
 - RZ25 fixed-disk drive
 - RZ26 fixed-disk drive
- Memory options
- TURBOchannel option modules

Chapter Overview

Future Options

The preceding list and contents of this chapter represent the options available with the first shipments of the DEC 3000 Model 400/400S AXP system. Other options may be available at a later time.

Supported Drives and Boards

Your DEC 3000 Model 400/400S AXP system supports the following options:

- One 3½-inch removable-media drive: RX26 diskette drive or TLZ06 tape drive, both with a mounting plate.
- One 5¼-inch removable-media drive: RRD42 compact disc drive, TZK10 tape drive, or TZ30 tape drive.
- Up to two half-height fixed-disk drives: RZ24L, RZ25, or RZ26.
- Memory modules.
- Up to three TURBOchannel option modules.

Required Tools

Phillips and flat-head screwdrivers are shipped with the system. Be sure you have these tools before you try to install or remove any options.

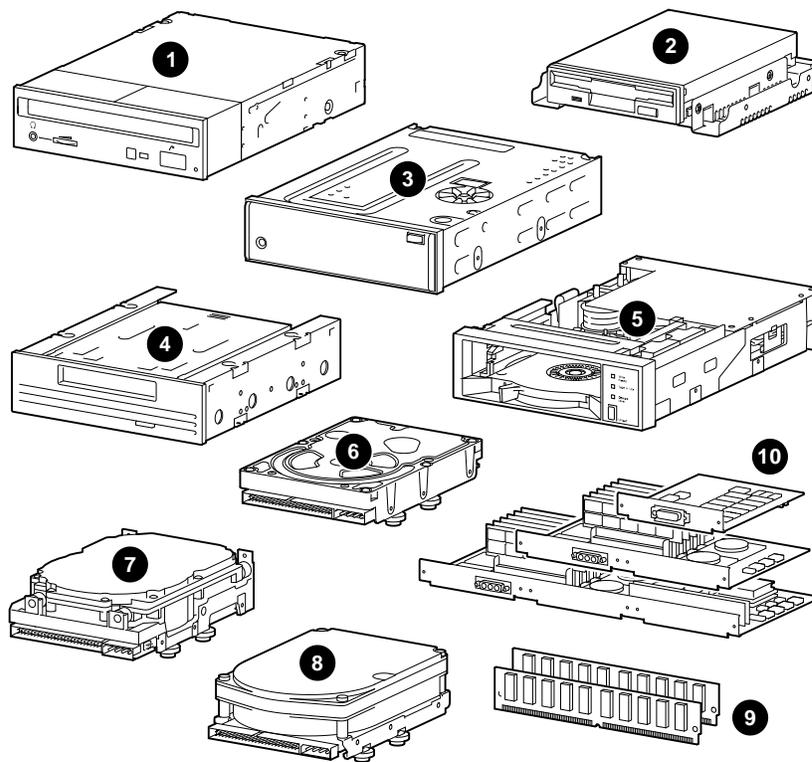
Internal Options and Their Positions in the System Unit

Identification of Options

Figure 1-1 shows optional drives, the memory modules, and the TURBOchannel modules. Figures 1-2 and 1-3 show where the drives, memory boards, and TURBOchannel modules are installed in the DEC 3000 Model 400/400S AXP system unit.

Internal Options and Their Positions in the System Unit

Figure 1-1 Internal Options You Can Add



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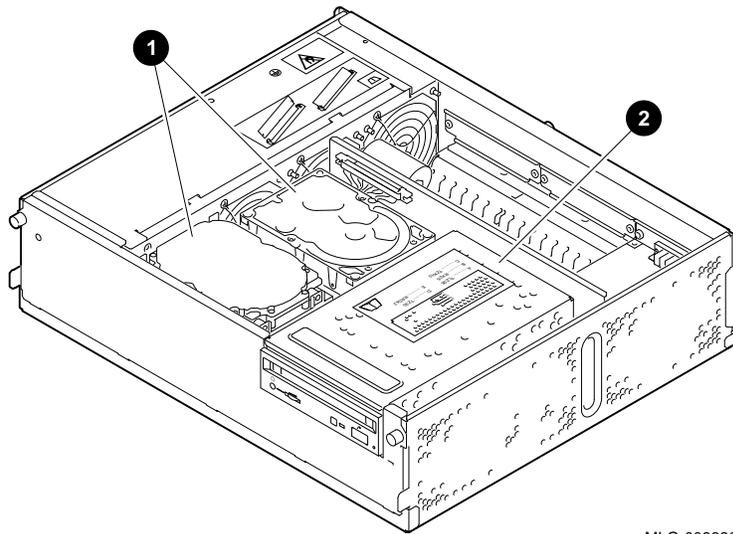
- | | | | | | | | | |
|----------------------------|------------------------------|-----------------------------|-----------------------------|--------------------------|-------------------------|-------------------------|------------------|-------------------------------|
| ❶ RRD42 compact disc drive | ❸ TZK10 cartridge tape drive | ❹ TLZ06 cassette tape drive | ❺ TZ30 cartridge tape drive | ❻ RZ24L fixed-disk drive | ❼ RZ25 fixed-disk drive | ❽ RZ26 fixed-disk drive | ❾ Memory modules | ❿ TURBOchannel option modules |
|----------------------------|------------------------------|-----------------------------|-----------------------------|--------------------------|-------------------------|-------------------------|------------------|-------------------------------|

Internal Options and Their Positions in the System Unit

Removable-Media and Fixed-Disk Drives

Figure 1-2 shows where to install the fixed-disk drives (RZ24L, RZ25, and RZ26) ❶ and the removable-media drive bracket ❷, which holds the RRD42, RX26, TZK10, TLZ06, or TZ30 drives.

Figure 1-2 Position of Fixed-Disk and Removable-Media Drives



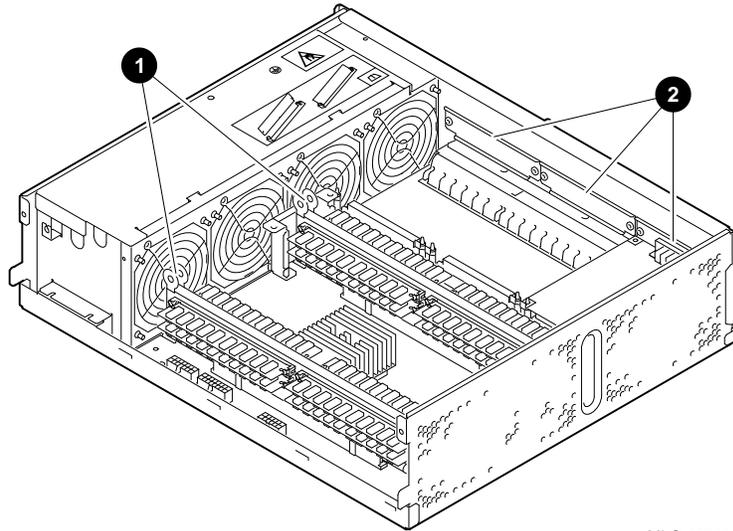
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Internal Options and Their Positions in the System Unit

Memory and TURBOchannel Modules

As shown in Figure 1-3, memory modules are installed under the drive plate ❶, and TURBOchannel modules are installed behind the drive plate ❷.

Figure 1-3 Position of Memory Modules and TURBOchannel Modules



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2

Preparing Your System for Internal Options

Chapter Overview

**IMPORTANT:
Read First** Refer to this chapter before you install any of the options described in this guide.

In This Chapter This chapter covers the following preparation tasks:

- Backing Up Files and Shutting Down Software
- Displaying the System Configuration
- Shutting Down the Hardware
- Removing the System Unit Cover
- Using the Antistatic Wrist Strap
- Preparing to Insert Removable-Media Drives

Reminder: Two Methods for Adding Options

There are two methods of adding internal options:

- Add the options yourself.
- Have a Digital service representative add them.

If you choose to add the options, note that installations typically take about 15 minutes for each option, although some procedures may take more or less time.

CAUTION: Damage

Improper installation of an option could lead to damage or failure of that module, and your warranty may not cover that damage.

Backing Up Files and Shutting Down Software

Back Up Your Files

Before you begin system preparation tasks, be sure to back up files stored on a fixed disk, removable-media device, or both by following the instructions in your software documentation.

Shut Down Networked Systems

Procedures for shutting down your software vary depending on whether and how your system is networked.

If you are	See your
Networked, or part of a cluster	System manager
Not networked, nor part of a cluster	Software documentation
Not sure if you are part of a network	System manager

Displaying the System Configuration

Diagnostic Test Displays

Before you install any options, you should be familiar with the DEC 3000 Model 400/400S AXP system and the following diagnostic displays:

- System startup messages
- The display resulting from the `show device`, `show config`, and `show memory console` commands

The `show` commands are described in the sections that follow:

Task Overview

These are the steps involved in displaying the system configuration:

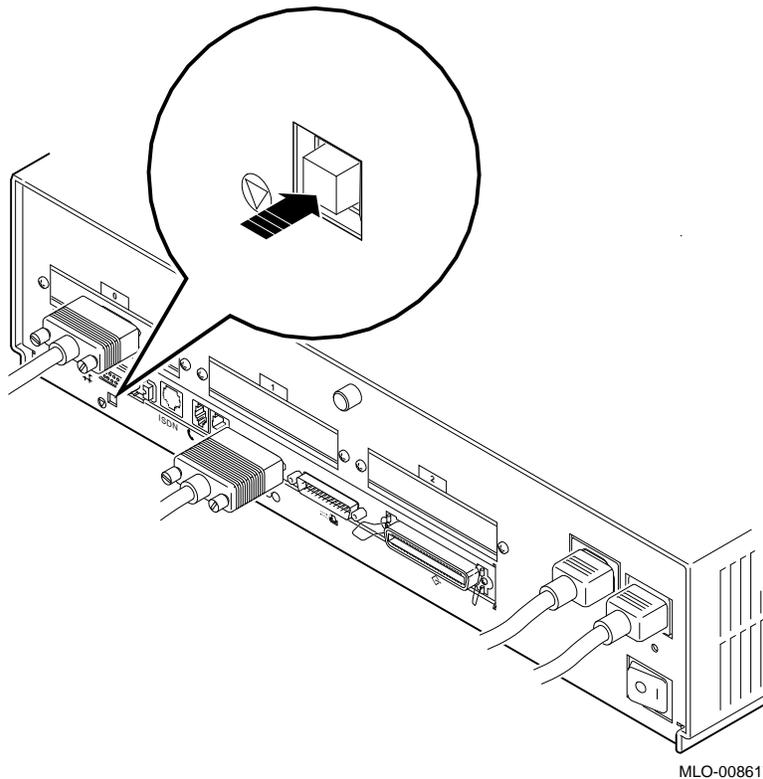
Step	Action
1	Press the halt button on the back of the system unit to get to console mode (>>>).
2	Type the <code>show device</code> command at the console prompt (>>>) to display the names and status of drives.
3	Type the <code>show config</code> command at the console prompt (>>>) to display the status of the TURBOchannel options.
4	Type the <code>show memory</code> command at the console prompt (>>>) to display the amount of memory installed in the system.

Displaying the System Configuration

Step 1: Press the Halt Button

Put your system into console mode to display the console prompt (>>>) by pressing the halt button on the back of your system unit, as shown in Figure 2-1.

Figure 2-1 Halt Button



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Displaying the System Configuration

Step 2: Enter the show dev Command

Enter the show device command as follows:

```
>>> show device 
```

The show device command displays the status of each drive that is recognized by the system. Record the displayed information for later reference. After adding or replacing a drive, you can compare the new system configuration with the previous one to verify that all drives were installed correctly. If an installed drive is not listed in the display, it is not installed correctly.

Example: show device Display

Figure 2-2 shows an example of a show device display (the black callout numbers are for reference only). Table 2-1 describes the columns of the show device display.

Figure 2-2 show device Display

1	2	3	4	5	6	7	8
BOOTDEV	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM	REV
-----	----	-----	-----	-----	--	-----	---
ESA0	08-00-2B-12-00-9C						
DKA0	A/0/0	DISK	426.25MB	FX		RZ25	0700
DKA100	A/1/0	DISK	426.25MB	FX		RZ25	0700
DKA400	A/4/0	RODISK	RM	WP	RRD42	4.3d
..HOSTID..	A/6	INITR					
..HOSTID..	B/6	INITR					

>>>

Displaying the System Configuration

Description: show device Display

The following table explains the elements in each column of the `show device display`.

Table 2–1 Elements of the show device Display

Column Head	Description
❶	A list of possible devices from which the system can be booted.
❷	The SCSI address setting of each device (middle number).
❸	The type of device in the drive.
❹	The capacity of this drive.
❺	Whether the device in this drive is a removable-media (RM) or a fixed-disk (FX) drive.
❻	Write-protected status of this drive.
❼	The name of the installed drive.
❽	The microcode revision number of the installed drive.

Displaying the System Configuration

Step 3: Enter the show config Command

Enter the show config command as follows:

```
>>> show config Return
```

The show config command displays the following information:

- Revision numbers of the system and I/O modules
- Revision number of the PALs (programmable array logic chips)
- Name and status of the tested device

Record this information for later reference. After adding or replacing TURBOchannel modules, you can compare the new system configuration with the previous one to verify that all options are present and functioning correctly.

Example: show config Display

Figure 2-3 shows an example of a show config display (the black callout numbers are for reference only). Table 2-2 defines the elements of the display.

Figure 2-3 show config Display

```
❶ DEC 3000 Model 400
   Digital Equipment Corporation
❷   Rev C System module/ Rev B IO module
❸   VPP PAL X4.33-82000101/OSF PAL X0.13- 2000001 -
     Built on 25-JUN-1993 12:30:55.09 by Jones

❹   TCINFO      ❺   DEVNAM      ❻   DEVSTAT
-----
      CPU        OK KN15-BA - BL X5.2-S07A-I052 - DECchip 21064
      ASIC       OK
      MEM        OK

8
7
      NVR        OK
      SCC        OK
      NI         OK

6
      SCSI       OK
3-PMAGB-BA TC3
```

Displaying the System Configuration

Description: show config Display

Table 2-2 explains the elements of each column of the show config display.

Table 2-2 Elements of the show config Display

Element	Description
①	The system model and base level number.
②	The etch revision number of the system and I/O modules.
③	The number of the programmable array logic (PAL) chip, the date on which it was built, and by whom.
④	The number of the TURBOchannel slot and the mnemonic of the module in a slot. TURBOchannel slots 0 through 2 are reserved for TURBOchannel options; slot 6 is for the SCSI controller; slots 7 and 8 contain built-in system devices. If a TURBOchannel module requires more than one slot, only the first slot is listed.
⑤	The mnemonic of the device.
⑥	The status of the tested device. OK = device installed correctly and diagnosed to be OK ?? = error blank = no test for this device

Displaying the System Configuration

System Configuration Error

Two question marks (??) next to a component name in the DEVSTAT column indicate an error. If you see an error indicator, as shown in Figure 2-4, note the field replaceable unit (FRU) number and error number. The FRU is a replaceable drive or module.

Figure 2-4 Configuration Display with Error

```

DEC 3000 Model 400
Digital Equipment Corporation
  Rev C System module/ Rev B IO module
  VPP PAL X4.33-82000101/OSF PAL X0.13- 2000001 -
  Built on 25-JUN-1993 12:30:55.09 by Jones

TCINFO    DEVNAM    DEVSTAT
-----    -
          CPU      OK KN15-BA - BL X5.2-S07A-I052 - DECchip 21064
          ASIC     OK
          MEM      OK
8
7
          NVR      OK
          SCC      OK
          NI       ?? 001 0172
6
          SCSI     OK
3-PMAGB-BA TC3      |_____ Error Number
                    |_____ FRU Number
  
```

What to Do About a Configuration Error

Refer to the following table to resolve a configuration error:

If you	Then
Are not comfortable diagnosing technical errors	Contact your Digital service representative.
Are comfortable diagnosing technical errors	Refer to the <i>DEC 3000 Model 400/400S AXP Owner's Guide</i> to determine the exact problem.

Displaying the System Configuration

Step 4: Enter the show memory Command

Enter the show memory command as follows:

```
>>> show memory 
```

The show memory command displays the following information:

- Bank number
- Memory size for each bank
- Start address for each bank

Record this information for later reference. After adding or replacing memory, you can compare the new system configuration with the previous one to verify that all options are present and functioning correctly.

Example: show memory Display

Figure 2–5 shows an example of a show memory display (the black callout numbers are for reference only). Table 2–3 defines the elements of the display.

Figure 2–5 show memory Display

1 BANK #	2 MEMORY_SIZE	3 START_ADDRESS
0	032 Mbytes	0x00000000
1	032 Mbytes	0x02000000
2	032 Mbytes	0x04000000
3	032 Mbytes	0x06000000

**Description:
show memory
Display**

Table 2-3 defines each element of the `show memory` display.

Table 2-3 Elements of the show memory Display

Element	Description
❶	The bank numbers correspond to the four mother memory boards (MMBs). (See Chapter 11.)
❷	The memory size is the total amount of memory installed in each bank.
❸	The start address is the number of each memory storage location.

Shutting Down the Hardware

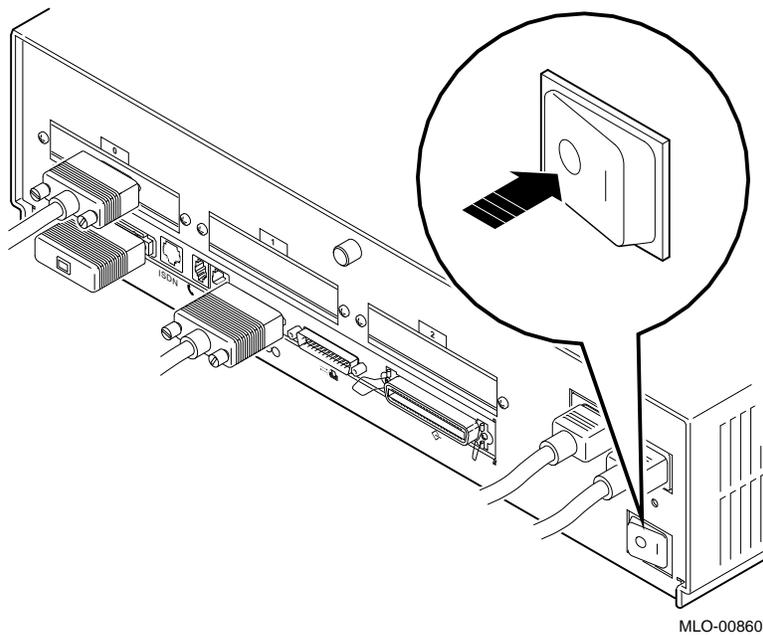
**Turn Off
Equipment**

Shut down the hardware by following these steps:

1. Turn off (O) the system by pressing the On/Off switch on the back of the system unit to the off (O) position, as shown in Figure 2-6.

Shutting Down the Hardware

Figure 2-6 Turning Off the System Unit



2. Turn off (O) all expansion boxes.
3. Turn off (O) all peripheral devices (such as printers and modems).
4. Turn off (O) the monitor. (Turning off the system does not automatically turn off the monitor).

**CAUTION:
Component
Damage**

Do not unplug the power cord. This power connection helps protect internal components from damage caused by static discharge.

Removing the System Unit Cover

**CAUTION:
Capacitor
Discharge**

After you turn off the system and *before* you open the system unit, wait about five minutes for the power supply capacitors to safely discharge.

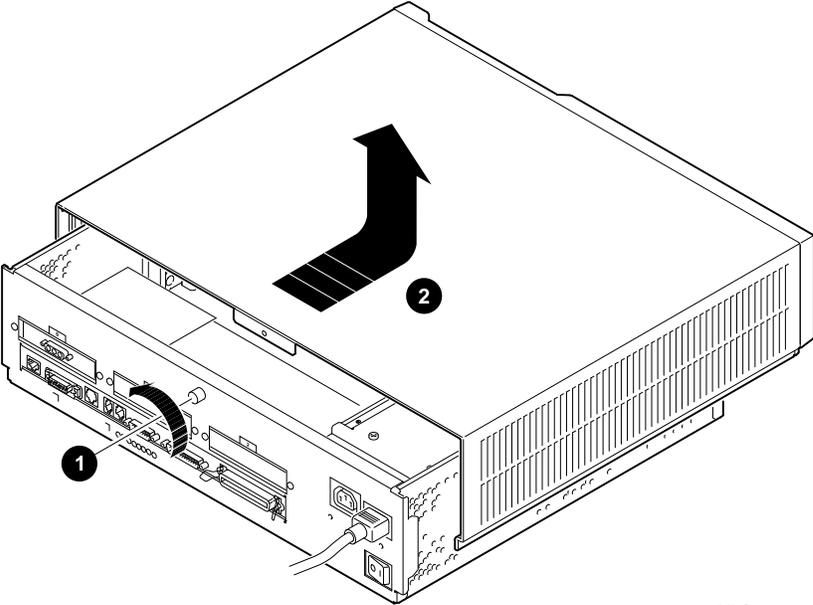
Remove Cover

To remove the system unit cover, refer to Figure 2-7 and follow these steps:

1. Disconnect all external cables from the system unit except the power cord.
2. Loosen the captive screw ❶ on the back of the system unit.
3. With one hand on each side, tug firmly on the cover to pull it towards the front of the system unit and lift it off ❷.

Removing the System Unit Cover

Figure 2-7 Removing the System Cover



MLO-008608

Using the Antistatic Wrist Strap

CAUTION:
Static
Discharge

Before you begin adding options, attach the antistatic wrist strap that came with your system or option, if you ordered an option separately. Always use this strap when you work inside the system unit to avoid damage to internal devices from static discharge.

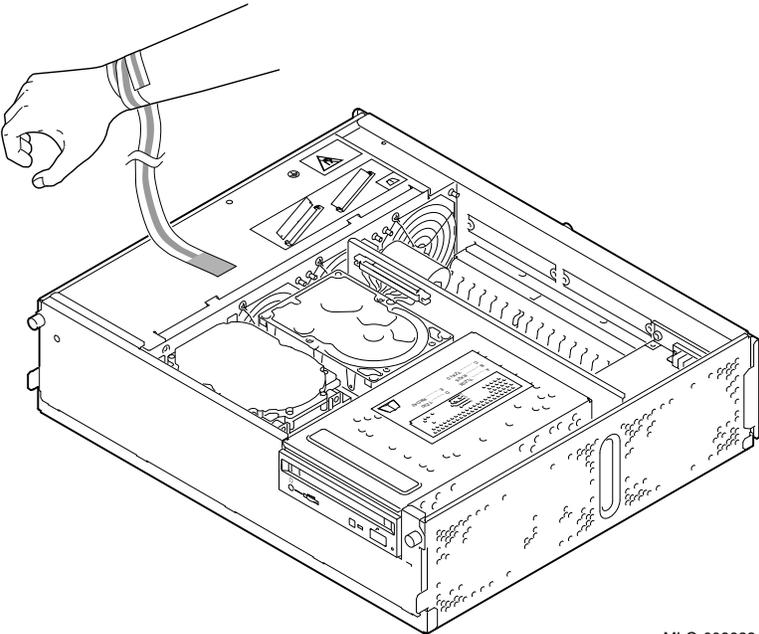
Attach the
Wrist Strap

To attach the antistatic wrist strap, follow these steps and refer to Figure 2-8:

1. Locate the strap in an envelope labeled “Disposable Grounding Wrist Strap.” Save this envelope for storing the strap later. You can use the strap several times before discarding it.
2. Remove the protective paper from the end of the strap with the metal strip; save this paper for later use.
3. Press the metal strip onto the metal surface of the system unit.
4. Place the other end of the strap, sticky side down, on your wrist and wrap it around twice.

Using the Antistatic Wrist Strap

Figure 2-8 Using the Antistatic Wrist Strap



MLO-008622

Preparing to Insert Removable-Media Drives

Task Overview

These are the steps involved in preparing to install or replace a removable-media drive (RRD42, RX26, TZK10, TLZ06, or TZ30 drive):

Step	Action
1	Remove the drive bracket.
2	Identify the internal power cable connections to the drive.
3	Identify the internal SCSI cable connections to the drive.
4	Insert the new drive inside the system unit.
5	Remove the blank bezel from the system cover.

The following sections describe these steps.

Step 1: Remove the Drive Bracket

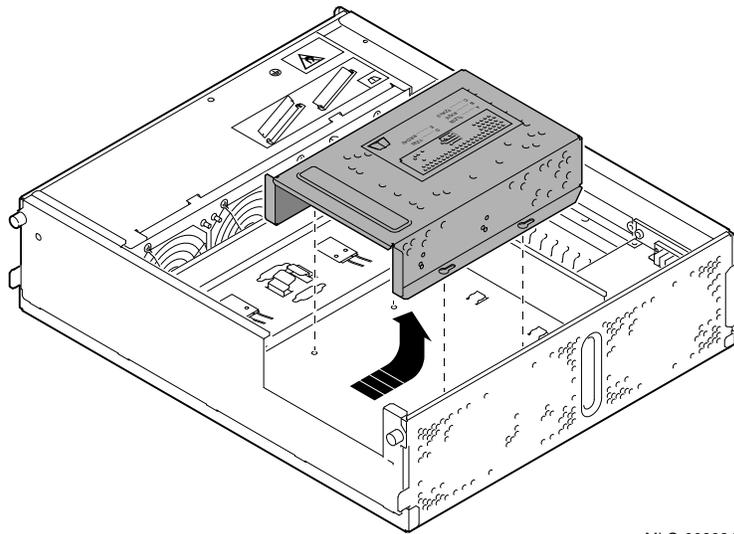
To remove the drive bracket:

1. Loosen but do not remove the four screws, two on each side of the bracket, as shown in Figure 2-9, that secure the bracket to the drive plate.

(If there is one or more fixed disk drive already in place, push those cables aside to reach the two screws on the left side of the drive bracket.)

Preparing to Insert Removable-Media Drives

Figure 2-9 Removing the Drive Bracket



MLO-008624

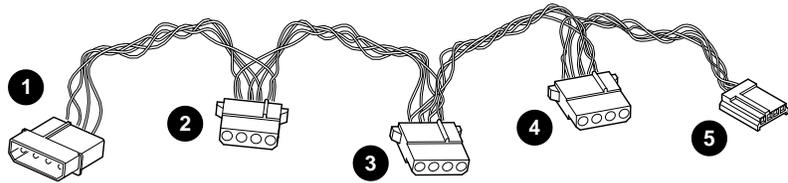
2. Slide the bracket towards the back of the system unit and lift up.

Preparing to Insert Removable-Media Drives

Step 2: Identify the Internal Power Cable

The connectors on the internal power cable must be connected to the corresponding power ports on the back of each drive. The internal power cable and connectors are shown in Figure 2–10.

Figure 2–10 Power Cable and Connectors



MLO-008625

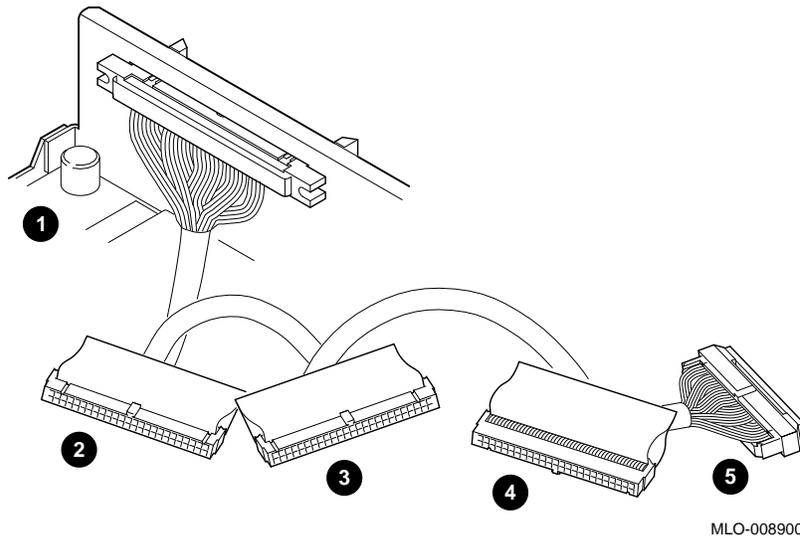
- ❶ Connects to the main power supply.
- ❷ Connects to a fixed disk drive, if any.
- ❸ Connects to a second fixed disk drive, if any.
- ❹ Connects to a removable-media drive, if any.
- ❺ Connects to the RX26 drive only.

Preparing to Insert Removable-Media Drives

Step 3: Identify the Internal SCSI Cable

The connectors on the internal SCSI cable must be connected to the SCSI port on each drive. The internal SCSI cable and connectors are shown in Figure 2–11.

Figure 2–11 SCSI Cable and Connectors



MLO-008900

- ❶ Connects to the system SCSI bus.
- ❷ Connects to a rear disk drive, if any.
- ❸ Connects to a front fixed disk drive, if any.
- ❹ Connects to a removable-media drive, if any
- ❺ This is a terminator.

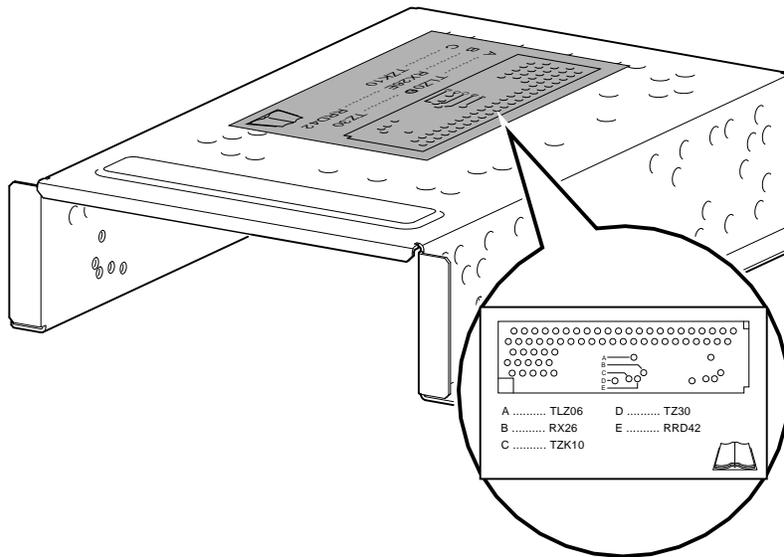
Hold each SCSI connector with the key facing up for the fixed disk drives, the RX26, TZK10, TLZ06, and TZ30; and with the key facing down for the RRD42 drive.

Preparing to Insert Removable-Media Drives

Step 4: Insert the Drive into the Bracket

Align the mounting holes on the sides of the drive with those on the sides of the drive bracket. The label, shown in Figure 2–12, illustrates which holes to use for securing each drive in the bracket.

Figure 2–12 Drive Bracket Label



MLO-009201

Refer to the appropriate chapter in this book for details on the drive you want to install.

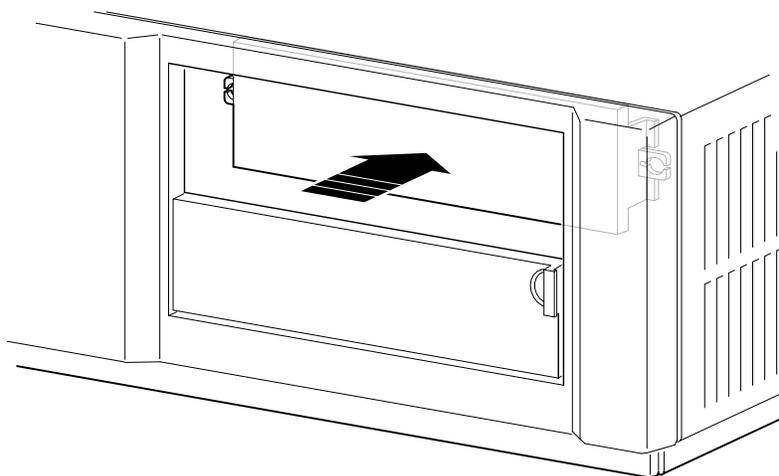
Preparing to Insert Removable-Media Drives

Step 5: Remove the Blank Bezel

To remove the blank bezel from the front panel of the system cover:

1. Remove the system cover.
2. Push inward on the bezel to remove it.

Figure 2–13 Removing the Blank Bezel from the System Cover



MLO-008904

Preparing to Insert Removable-Media Drives

What Comes Next

This completes your preparation of the system for an option installation. To add a particular option, refer to the chapter indicated in the following table:

To install or replace	Refer to
An RRD42 compact disc drive	Chapter 3
An RX26 diskette drive	Chapter 4
A TZK10 tape drive	Chapter 5
A TLZ06 tape drive	Chapter 6
A TZ30 tape drive	Chapter 7
An RZ24L fixed disk drive	Chapter 8
An RZ25 fixed disk drive	Chapter 9
An RZ26 fixed disk drive	Chapter 10
Memory modules	Chapter 11
TURBOchannel modules	Chapter 12
External options	Chapter 14

To Restart Your System

For information on restarting the system and testing internal modules, see Chapter 13.

3

RRD42 Compact Disc Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap
6. Remove the drive bracket

In This Chapter

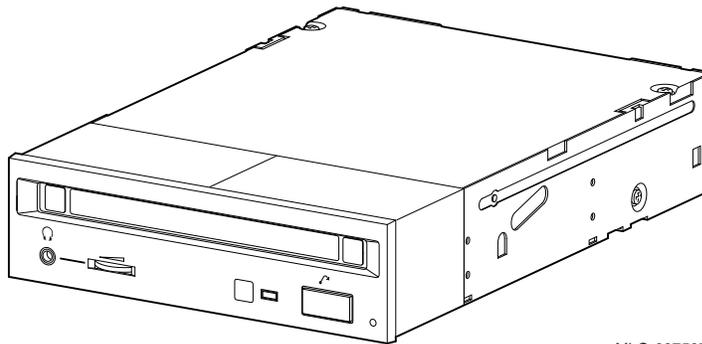
This chapter covers the following topics:

- RRD42 Compact Disc Drive Description
- Setting the Jumpers
- Installing the RRD42 Drive
- Using Compact Discs and Caddies
- Using the Headset
- Removing the RRD42 Drive
- RRD42 Drive Specifications

RRD42 Compact Disc Drive Description

- Purpose** The RRD42 compact disc drive can be used for:
- Installation of the operating system and other software
 - Access to read-only databases, such as online documentation
- Storage Capacity** The RRD42 compact disc drive has a maximum capacity of 600 megabytes of information.
- Illustration** Figure 3–1 shows the RRD42 compact disc drive.

Figure 3–1 RRD42 Compact Disc Drive



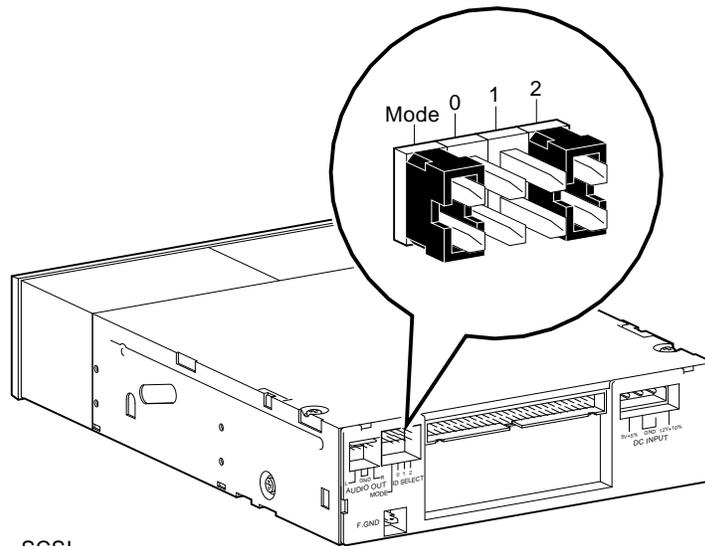
MLO-007507

Setting the Jumpers

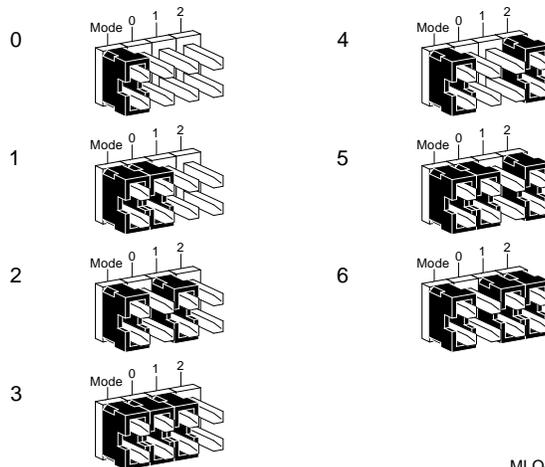
SCSI Address Settings	For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. These settings are determined by the position of three removable electrical connectors, called jumpers, located on the back of the drive. On the RRD42 drive, these jumpers are labeled 0, 1, and 2 and can be either attached or removed.
Operating System Setting	The RRD42 drive also includes a mode jumper. Be sure this jumper is attached to ensure that the drive works with the operating system.
SCSI Factory Setting	<p>When your RRD42 drive arrives from the factory, all SCSI jumpers may be attached to prevent their loss during shipment. If this is the case, you should reset the jumpers to the recommended SCSI address setting of 4, as shown in Figure 3-2, where:</p> <ul style="list-style-type: none">• Jumper 0 is removed• Jumper 1 is removed• Jumper 2 is attached

Setting the Jumpers

Figure 3-2 RRD42 SCSI Jumper Settings



SCSI
Address
Settings: 0



MLO-010275

To Change SCSI Settings

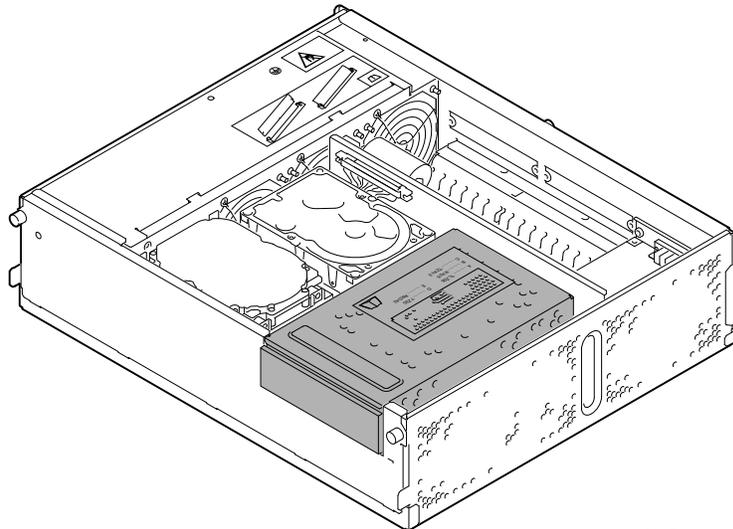
If the recommended setting is already in use by another device installed in your system, you must reset it. To change the setting, choose one from Figure 3-2 that is not in use by another device, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them in case you need them later.

Installing the RRD42 Drive

Where to Install

You can install one RRD42 compact disc drive in the removable-media drive bracket, shown in the shaded area of Figure 3-3.

Figure 3-3 Position of the RRD42 Compact Disc Drive



MLO-008623

Installing the RRD42 Drive

Task Overview

These are the tasks involved in installing the RRD42 compact disc drive:

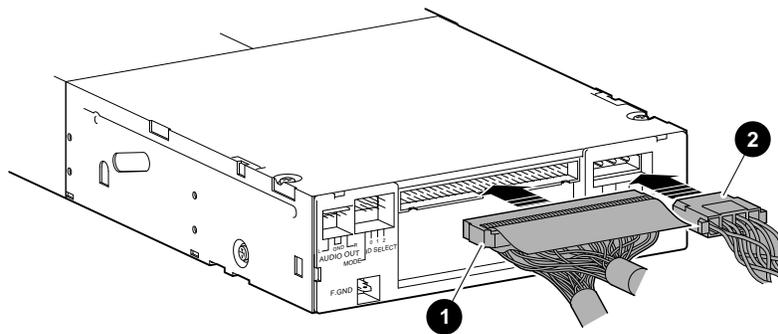
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert and secure the drive into the drive bracket.
3	Replace the drive bracket with the drive inside.

Task 1: Connect the Cables

To connect the SCSI and power cables to the RRD42:

1. Hold the SCSI cable connector with the key facing down so that the key fits into the RRD42 notch on the bottom edge of the drive connector.
2. As shown in Figure 3-4, connect the SCSI cable connector ❶ and the power cable connector ❷ to the ports on the back of the drive.

Figure 3-4 Connecting Cables to the RRD42 Drive



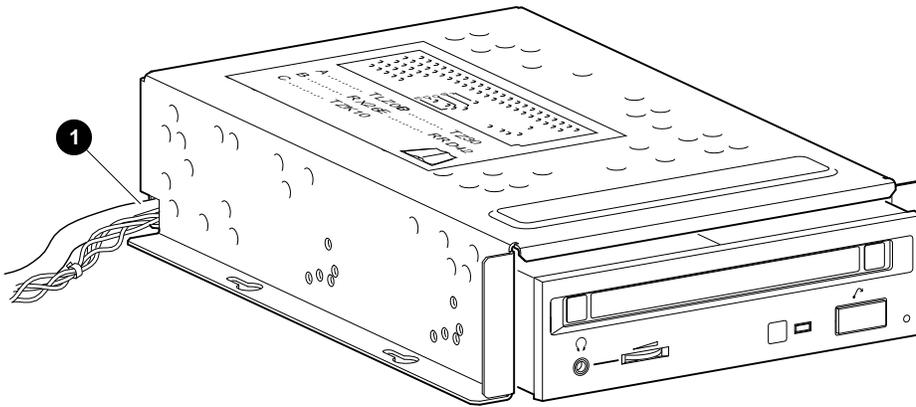
MLO-007515

Task 2: Insert the Drive into the Bracket

You should have already removed the drive bracket from inside the system unit (see Chapter 2). To insert the drive into the drive bracket:

1. Hold the bracket over the drive with the drive cables at the back.
2. Lower the bracket onto the drive.
3. Tuck the cables securely into the bracket and through the opening at the back left corner ❶, as shown in Figure 3–5.

Figure 3–5 Securing RRD42 Cables in the Bracket



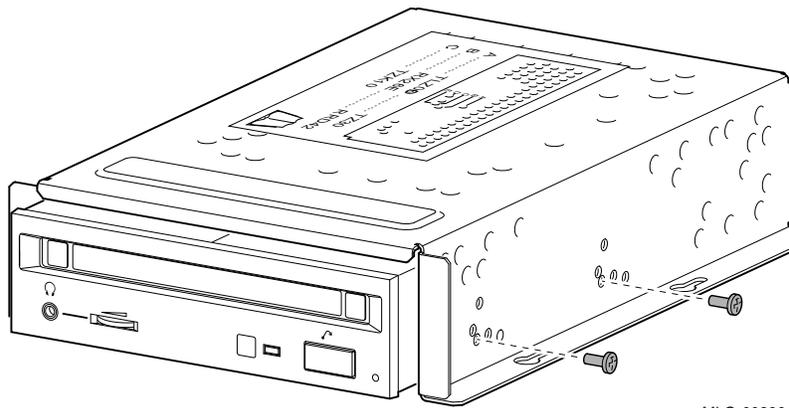
MLO-009202

4. Adjust the drive slightly so that the four mounting holes, two on each side of the drive, align with the corresponding four holes in the drive bracket.

Installing the RRD42 Drive

5. Secure the drive in the bracket with the four screws that were shipped in a plastic bag with the drive. See Figure 3-6.

Figure 3-6 Securing the RRD42 Drive in the Bracket



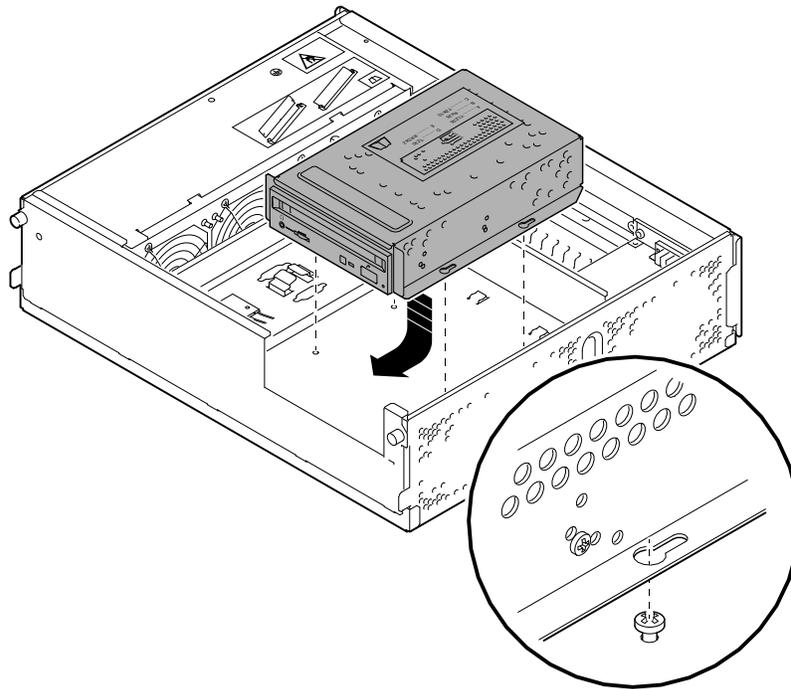
Task 3: Replace the Drive Bracket

To replace the drive bracket and drive inside the system unit, follow these steps and refer to Figure 3-7:

1. Place the two keyhole slots on each side of the bracket over the corresponding four screws on the drive plate.
2. Pull the bracket forward until it feels tight.
3. Tighten the four screws on the drive plate.

If there is one or more fixed disk drives in place, push those cables aside to reach the two drive plate screws on the left of the drive bracket.

Figure 3-7 Replacing the Drive Bracket with the Drive Inside



MLO-008902

What Comes Next

This completes the installation of the RRD42 compact disc drive.

If you need to	Then
Use compact discs and caddies, remove the RRD42 drive, or understand the drive specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

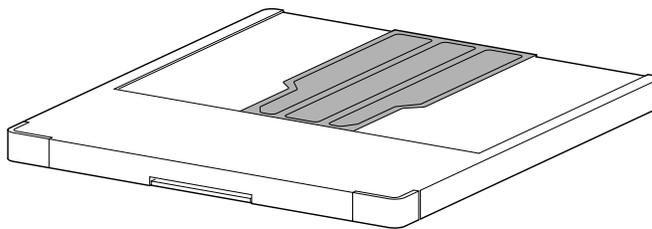
Using Compact Discs and Caddies

Guidelines for Handling and Storing

Compact discs are housed in disc caddies, which are inserted into the RRD42 compact disc drive. When handling and storing RRD42 discs and caddies observe the following guidelines:

- Do not drop or strike the disc or the caddy.
- Do not disassemble the caddy.
- Store discs and caddies away from dust.
- Keep discs and caddies out of direct sunlight and away from heaters and other heat sources. Store discs and caddies at a constant temperature between 10°C and 40°C (50°F and 104°F), and where the relative humidity is between 10% and 90%.
- Do not touch the surface of a disc; handle the disc by its edges.
- Wipe a disc with a compact disc cleaner when dust or fingerprints contaminate its surface.
- Never manually open the caddy shutter, shown in Figure 3–8, or touch the disc. The caddy shutter opens automatically when you insert the caddy into the drive.

Figure 3–8 Caddy Shutter



MLO-007517

**Task Overview:
Loading and
Removing
Discs**

These are the tasks involved in loading and removing compact discs into and out of the drive:

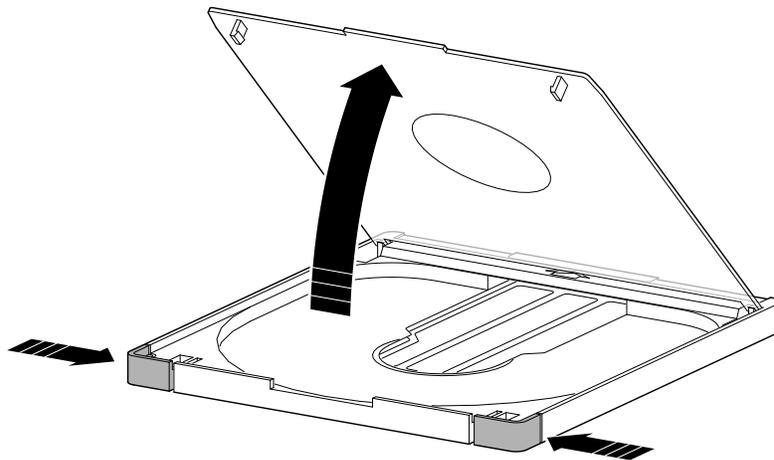
Task	Action
1	Load the disc into a caddy.
2	Insert the caddy into the drive.
3	Remove the caddy from the drive.

**Task 1: Load
the Compact
Disc into a
Caddy**

Follow these steps to load a compact disc into the RRD42 compact disc caddy:

1. Open the caddy by pressing the tabs on both sides of the caddy at the end opposite the shutter, as shown in Figure 3-9.

Figure 3-9 Opening the Compact Disc Caddy

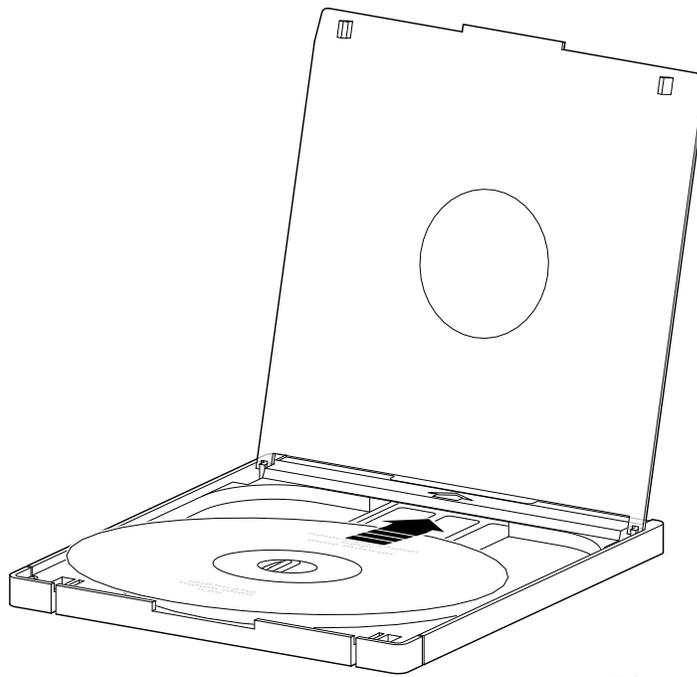


MLO-007519

Using Compact Discs and Caddies

2. Set a disc, printed side up, into the caddy as shown in Figure 3–10.

Figure 3–10 Loading a Compact Disc into a Caddy



MLO-007520

3. Close the caddy lid by pressing firmly on both corners.

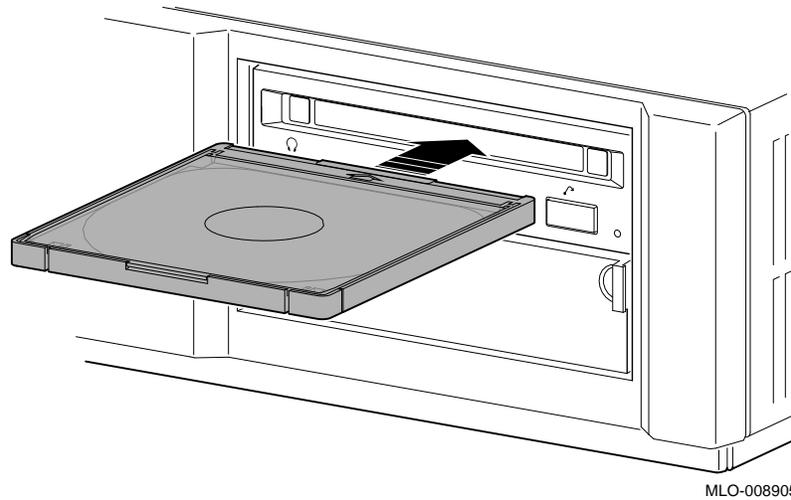
Using Compact Discs and Caddies

Task 2: Insert the Caddy into the Drive

To insert the disc caddy into the drive, follow these steps:

1. Be sure the system is on (|).
2. Be sure the indicator light is off.
3. Insert the disc caddy into the drive, with the arrow on the caddy facing in the direction shown in Figure 3–11.

Figure 3–11 Inserting a Disc Caddy into the Drive



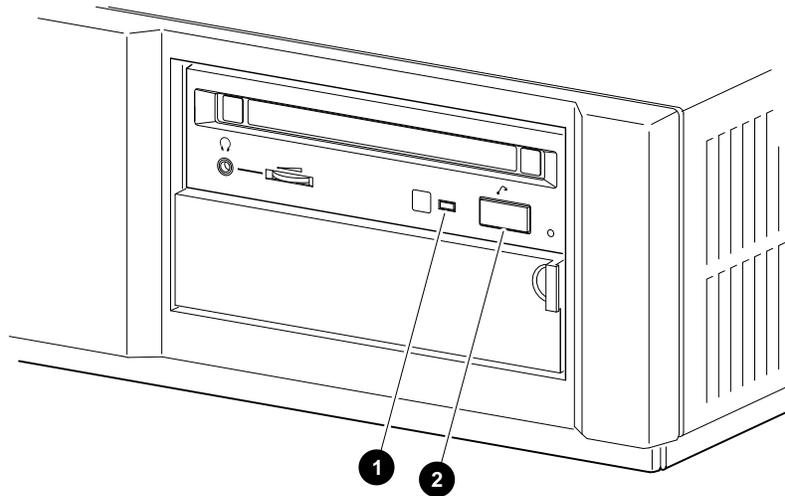
MLO-008905

4. Push the caddy into the drive as far as it will go. The caddy should be completely inside the drive when properly inserted.

Using Compact Discs and Caddies

5. Check the busy indicator light ❶, shown in Figure 3–12, which comes on when the caddy is inserted correctly.

Figure 3–12 RRD42 Controls and Indicator Light



MLO-008903

The drive ejects the caddy if:

- The enclosed disc is upside down.
- The disc is improperly positioned in the caddy.
- Any other conditions prevent the drive from reading the disc.

When the busy indicator light goes off, the compact disc drive is ready to use. To operate the compact disc drive, follow the instructions provided with your system software.

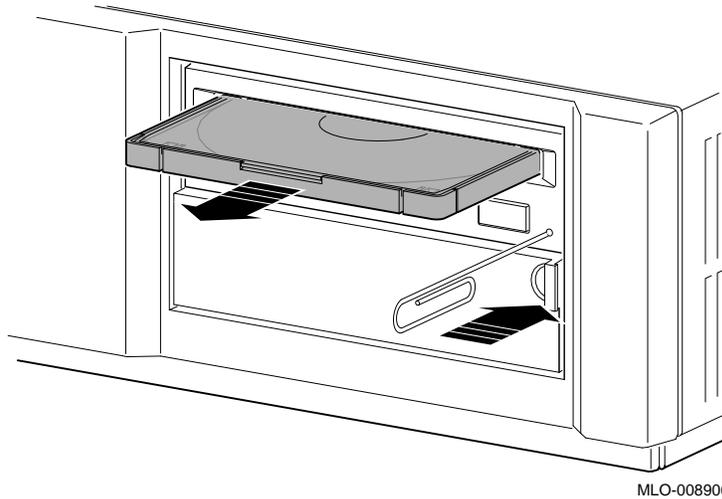
**Task 3:
Remove the
Caddy from the
Drive**

Remove a disc caddy automatically by pressing the eject button , shown in Figure 3-12.

If the eject button is disabled by the software, you can remove the caddy manually as follows:

1. Refer to Chapter 2 to shut down the system and hardware.
2. Insert the end of a large paper clip into the manual eject hole until the disc emerges from the drive, as shown in Figure 3-13.

Figure 3-13 Manually Removing a Caddy



MLO-008906

**CAUTION:
Possible Disc
Damage**

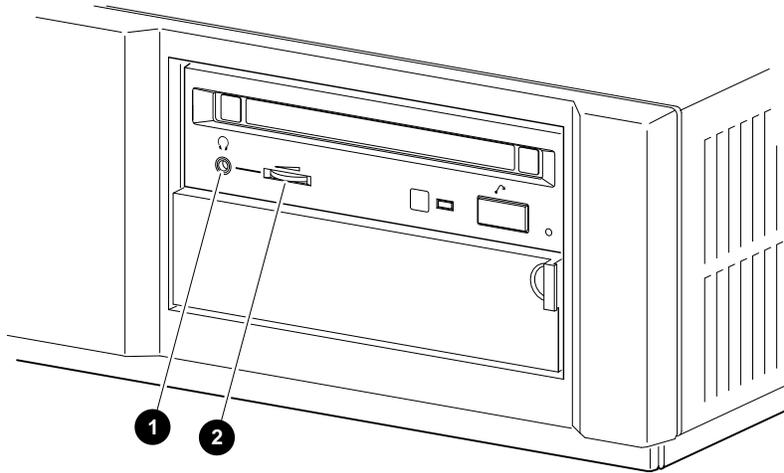
Never insert or remove a disc caddy when the drive is in use (the indicator light on the front of the drive is on) or the system power is on; doing so can damage the disc.

Using the Headset

Connect the Headset

If you ordered an audio headset, connect them to the headset jack ❶, shown in Figure 3–14.

Figure 3–14 Headset Jack and Volume Control



MLO-009655

Raise or Lower Volume

If the volume is not right when you listen through the headset, increase or decrease the volume using the headset volume control ❷.

Removing the RRD42 Drive

Remove the Drive from the Bracket

To remove the RRD42 drive from the drive bracket:

1. Remove the four small screws, two on each side of the drive bracket, that secure the drive inside the bracket, and put them aside in a safe place.
2. Turn the bracket upside down.
3. Pull the drive part way out of the bracket.
4. Disconnect the SCSI cable by pulling on the white tab.
5. Disconnect the power cable.
6. Remove the drive by firmly pushing the back of the drive toward the front of the drive bracket.

RRD42 Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight	Height	Width	Depth
1.3 kg (2.87 lb)	4.17 cm (1.63 in)	14.6 cm (5.75 in)	20.51 cm (8.0 in)

RRD42 Drive Specifications

Performance

The following table lists the performance of the drive:

Data Access Time	Data Transfer Rate	Initial Start Time
Full stroke: 650 msec (typical)	Sustained rate: 150 KB/s	2.0 s (maximum)
Average: 380 msec (typical) (1/4 stroke)	Burst rate: 1.5 MB/s	

Operating Conditions

The following table lists the operating conditions of the drive:

Variable	Operating Level
Maximum rate of temperature change	10°C to 50°C (50°F to 122°F)
Temperature range	5°C to 50°C (41°F to 122°F) ¹
Relative humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)

¹Reduce maximum temperature by 1.8°C (5.24°F) for each 1000-meter (3300-foot) increase in altitude.

RRD42 Drive Specifications

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Variable	Operating Level
Temperature range	-30°C to 55°C (-22°F to 131°F)
Relative humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	46°C (115°F), packaged, noncondensing
Minimum dew point temperature	2°C (36°F)
Altitude	13,600 m (44,600 ft) at 36°C (96°F)

4

RX26 Diskette Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap
6. Remove the drive bracket

In This Chapter

This chapter covers the following topics:

- RX26 Diskette Drive Description
- Setting the SCSI Switches
- Installing the RX26 Drive
- Using RX26 Diskettes
- Removing the RX26 Drive
- RX26 Drive Specifications
- RX26 Diskette Specifications

RX26 Diskette Drive Description

Physical Description The RX26, shown in Figure 4-1, is a 3½-inch diskette drive. It is packaged in its own mounting bracket that allows it to fit into the 5¼-inch drive bracket and allows you to easily transfer it from one system to another.

Purpose The RX26 drive allows you to store data on removable diskettes with various capacities. The drive can be used to:

- Back up system files
- Load applications
- Transport files between standalone systems

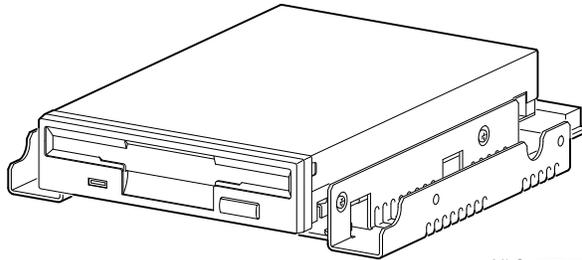
Storage Capacity The following table lists the storage capacity of an RX26 unformatted diskette, depending on the density of the diskette:

Diskette	Capacity	Read/Write Capability
Double density (DD) 8.89 cm (3½ inches)	737,280 bytes per drive 4608 bytes per track	Read
High density (HD) 8.89 cm (3½ inches)	1,474,560 bytes per drive 9216 bytes per track	Read/write
Extra density (ED) 8.89 cm (3½ inches)	2,949,120 bytes per track	Read/write

Illustration

Figure 4–1 shows the RX26 diskette drive.

Figure 4–1 RX26 Diskette Drive



MLO-007523

Setting the SCSI Switches

Types of Switches

There are two types of SCSI switches you must set for the RX26 diskette drive:

- The SCSI-FDI (floppy disk interface) switch that interfaces with the SCSI-FDI controller.
- The SCSI address switch.

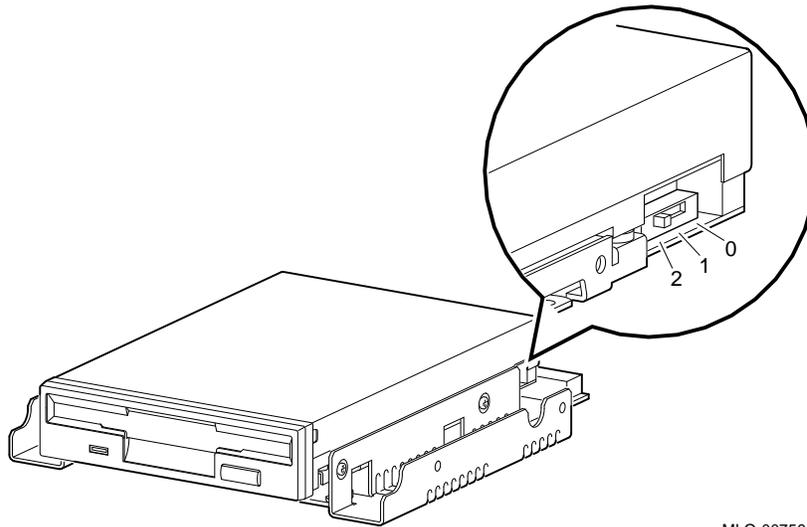
The SCSI-FDI Switch

The RX26 drive is one of three types of diskette drives. Each diskette drive is connected to a SCSI-FDI controller through a SCSI bus.

For the SCSI-FDI controller to recognize the different drives, there is a different select number (0, 1, and 2) for each drive. For the RX26 drive, be sure the select number is in position 2 by moving the slide switch, shown in Figure 4–2, to the forward position.

Setting the SCSI Switches

Figure 4-2 RX26 SCSI-FDI Switch



MLO-007561

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. SCSI settings are determined by the position of the electrical switches located on the side of the drive. These switches can be either up or down.

SCSI Factory Setting

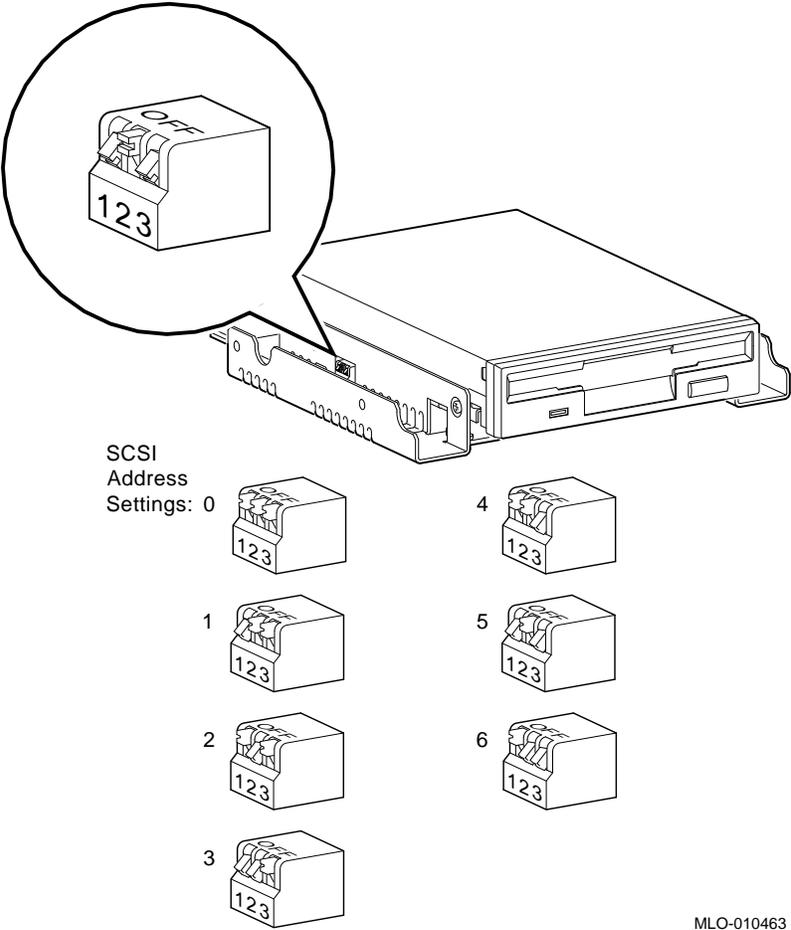
When your RX26 drive arrives from the factory, it should be preset to the recommended SCSI setting 5, as shown in Figure 4-3, where:

- Switch 1 is down
- Switch 2 is up
- Switch 3 is down

However, if the drive is not preset to setting 5, you need to change it *only* if that drive's preset setting is already taken by another device installed in your system.

Setting the SCSI Switches

Figure 4-3 RX26 SCSI ID Switch Settings



MLO-010463

Setting the SCSI Switches

To Change SCSI Settings

To change the default SCSI setting, choose one from Figure 4–3 that is not in use.

CAUTION: Possible Switch Damage

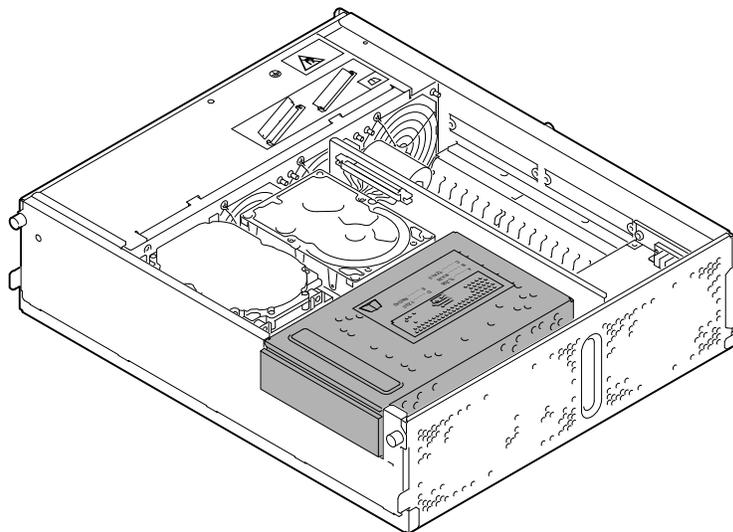
If you do change the setting, use a small pointed instrument (such as the tip of a ball-point pen). **Do not use a pencil;** graphite particles can damage the switches.

Installing the RX26 Drive

Where to Install

You can install one RX26 diskette drive in the removable-media drive bracket, shown in the shaded area of Figure 4–4.

Figure 4–4 Position of the RX26 Diskette Drive



MLO-008623

Task Overview

These are the tasks involved in installing the RX26 diskette drive:

Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert and secure the drive into the drive bracket.
3	Replace the drive bracket with the drive inside.
4	Insert the RX26 filler panel in the panel on the front of the system cover.

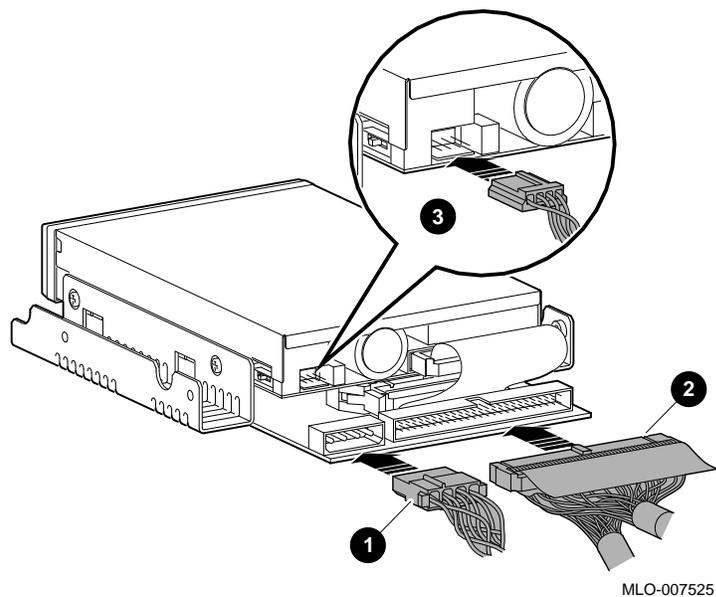
**Task 1:
Connect the
Cables**

To connect the internal SCSI and power cables to the RX26:

1. Hold the SCSI cable connector with the key facing up.
2. Connect the large power cable ❶, the SCSI cable ❷, and the small power cable ❸ to the ports on the back of the drive. See Figure 4-5.

Installing the RX26 Drive

Figure 4-5 Connecting Cables to the RX26

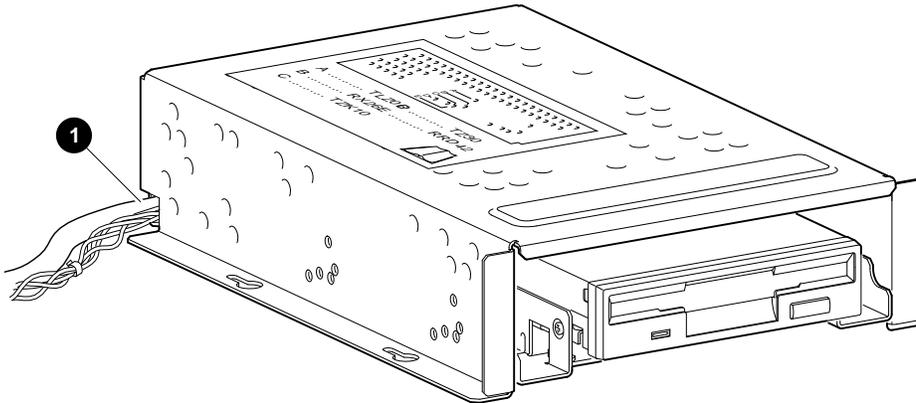


Task 2: Insert the Drive into the Bracket

You should have already removed the drive bracket from inside the system unit (see Chapter 2). To insert the drive into the drive bracket:

1. Hold the bracket over the drive with the drive cables at the back.
2. Lower the bracket onto the drive.
3. Tuck the cables securely into the bracket and through the opening at the back left corner ❶, as shown in Figure 4–6.

Figure 4–6 Securing RX26 Cables in the Bracket

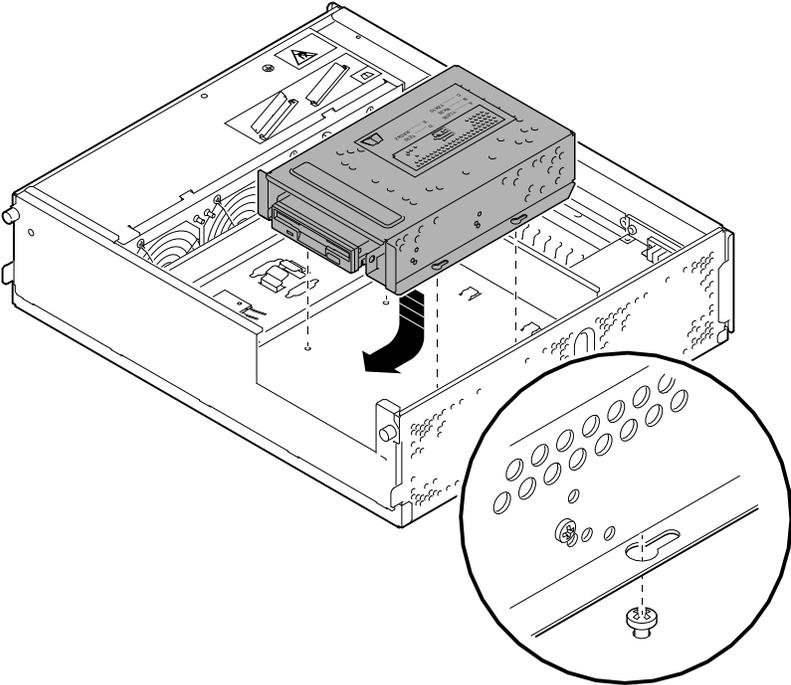


MLO-009203

4. Adjust the drive slightly so that the four mounting holes, two on each side of the drive, align with the corresponding four holes in the drive bracket.

Installing the RX26 Drive

Figure 4-8 Replacing the Drive Bracket with the Drive Inside



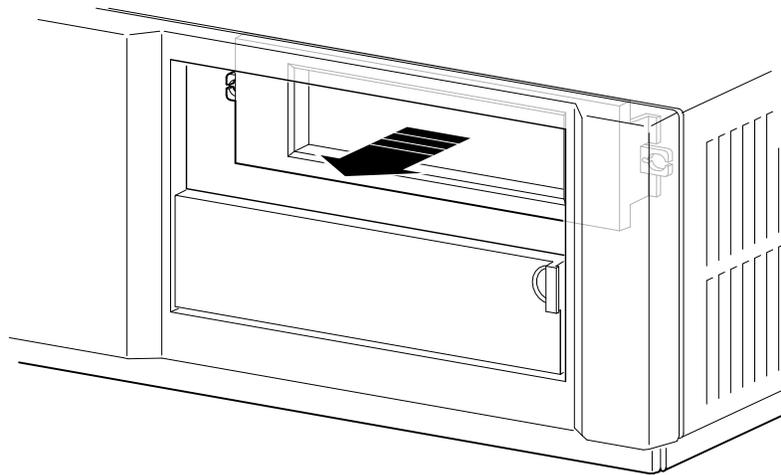
MLO-008908

Installing the RX26 Drive

Task 4: Insert the RX26 Filler Panel

You should have already removed the blank filler panel from the panel on the front of the system unit (see Chapter 2). Now insert the RX26 filler panel in that slot from the inside of the cover, as shown in Figure 4–9, so that the RX26 drive controls project through the opening in the filler panel.

Figure 4–9 Inserting the RX26 Filler Panel



MLO-008909

What Comes Next

This completes installation of the RX26 diskette drive.

If you need to	Then
Use RX26 diskettes, remove the RX26 drive, or understand the drive and diskette specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Using RX26 Diskettes

Guidelines for Handling and Storing

When handling and storing RX26 diskettes:

- Keep the diskettes dry, out of extreme temperatures and direct sunlight.
- Keep the diskettes away from any equipment that contains a magnet, such as the monitor or a telephone.

The heat and electromagnetic field of your monitor can damage diskettes by distorting or erasing the magnetic data.

For further information, refer to the *RX26 Owner's Reference Card*, listed in Appendix A.

Why Write-Protect a Diskette

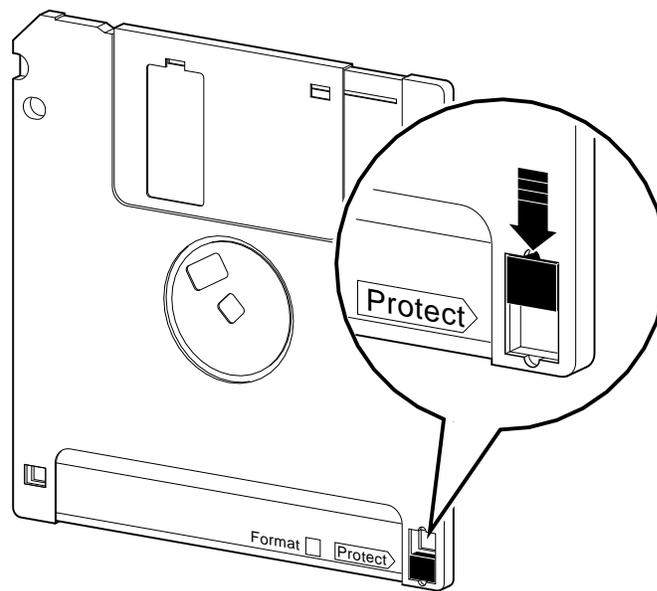
Write-protecting a diskette prevents accidental overwriting or erasure of data on the diskette. For example, if you are using a diskette to install software applications on your system, you may want to protect the information on the diskette.

Using RX26 Diskettes

Before Using a Diskette

Check the write-protect switch on the back of the diskette, shown in Figure 4-10.

Figure 4-10 Write-Protecting a Diskette



MLO-007529

How to Use the Write-Protect Switch

Use the write-protect switch as follows:

To do this	Slide the switch
Read information from the diskette, with write-enable off	Down and locked into the Protect position.
Write to a diskette	Up until it locks into place away from the Protect position.

**Before You
Insert the
Diskette**

Before you insert a diskette:

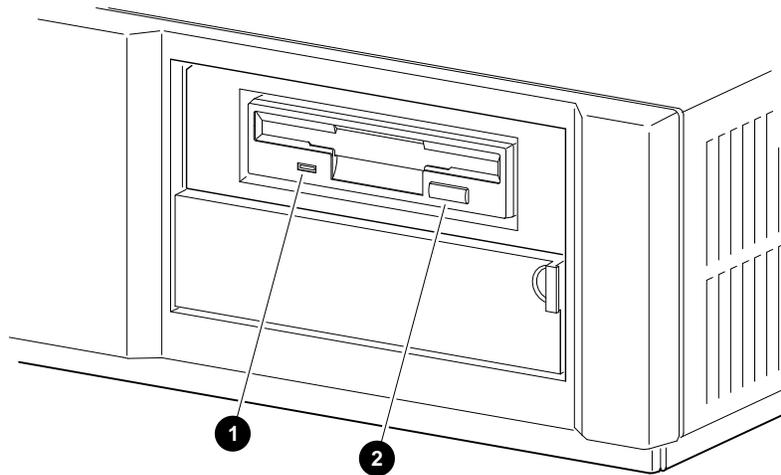
1. Be sure the system is on (|).
2. Be sure the busy indicator light, ❶ in Figure 4–11, is off.

**Insert a
Diskette into
the Drive**

To insert a diskette into the drive:

1. Press the eject button, ❷ in Figure 4–11, on the front of the drive to open the drive door.

Figure 4–11 RX26 Indicator Light and Eject Button

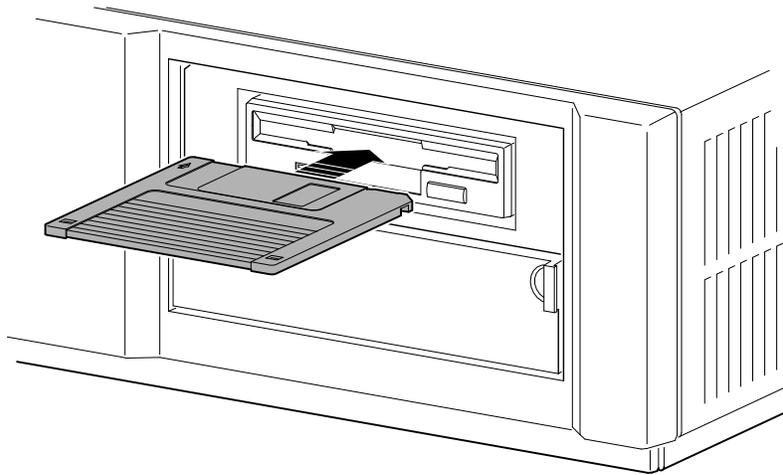


MLO-008910

Using RX26 Diskettes

2. Slide the diskette, arrow side up, straight into the drive, as shown in Figure 4-12.

Figure 4-12 Inserting a Diskette into the Drive



MLO-008911

3. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for mounting instructions.
4. Check the busy indicator light, which comes on when the diskette is first inserted into the drive.

The drive ejects the diskette if:

- The diskette is improperly inserted in the drive.
- Any other conditions prevent the drive from reading the diskette.

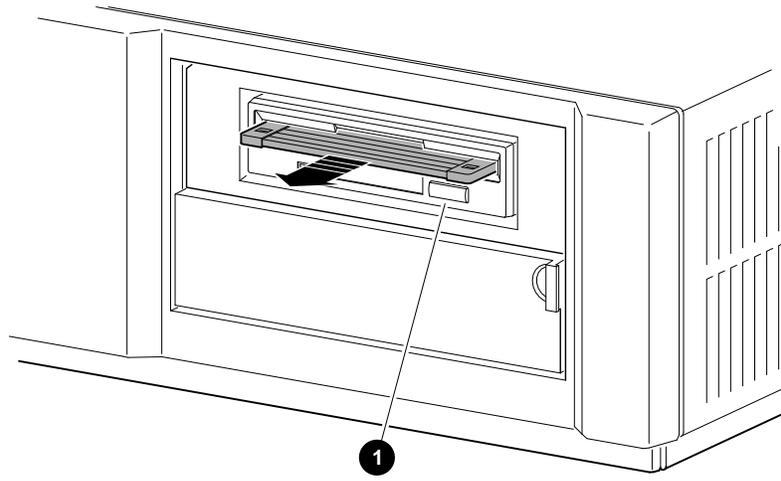
When the busy indicator light goes off, the diskette drive is ready to use. To operate the diskette drive, follow the instructions provided with your system software.

Remove a Diskette from the Drive

To remove a diskette from the RX26 drive:

1. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for dismounting instructions.
2. Press the eject button, ❶ in Figure 4-13.
3. When the diskette ejects part way, grasp the diskette and slide it out of the drive, as shown in Figure 4-13.

Figure 4-13 Removing a Diskette from the Drive



MLO-009656

CAUTION: Possible Diskette Damage

Never insert or remove a diskette when the diskette drive is in use (the busy indicator light on the front of the drive is on); doing so can damage the diskette.

Removing the RX26 Drive

Remove the Drive from the Bracket

To remove the RX26 drive from the drive bracket:

1. Remove the four small screws, two on each side of the drive bracket, that secure the drive inside the bracket. Put these screws aside in a safe place.
2. Turn the bracket upside down.
3. Pull the drive part way out.
4. Disconnect the SCSI cable by pulling on the white tab.
5. Disconnect the two power cables.
6. Remove the drive by firmly pushing the back of the drive toward the front of the drive bracket.

RX26 Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight	Height	Width	Depth
425 g (0.94 lb)	25.4 mm (1.00 in)	101.6 mm (4.00 in)	150.0 mm (5.91 in)

RX26 Drive Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Variable	Operating Level
Temperature change rate	11°C (20°F) per hour, maximum
Temperature range	5°C to 50°C (40°F to 122°F) ¹
Relative humidity	8% to 80%, noncondensing
Maximum wet bulb temperature	25.6°C (78°F)
Altitude	-300 m to 3050 m (-1000 to 10,000 ft) maximum
Power	1.25 watts (read/write) 4.60 watts (seek)
Standby power	0.30 watts

¹Reduce maximum temperature by 1.8°C (5.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Variable	Level
Temperature range	-40°C to 66°C (-40°F to 151°F)
Relative humidity	5% to 95%, noncondensing
Maximum wet bulb temperature	46°C (115°F), packaged, noncondensing
Altitude	-300 m to 12,200 m (-1000 to 40,000 ft) max.

RX26 Diskette Specifications

Diskette Performance

The following table lists the performance of a diskette:

Variable	Description
Data access time	Minimum time: 3 ms Average time: 15 ms
Data transfer rate	Double density: 250 Kbits per second High density: 500 Kb/s Extra density: 1000 Kb/s
Seek time	3 ms minimum; 15 ms average
Average latency	100 ms
Number of cylinders	80
Number of heads	2
Track density	135 tracks/in
Recording surfaces per diskette	2
Sectors per track	9 DD; 18 HD; 36 ED

5

TZK10 Tape Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap
6. Remove the drive bracket

In This Chapter

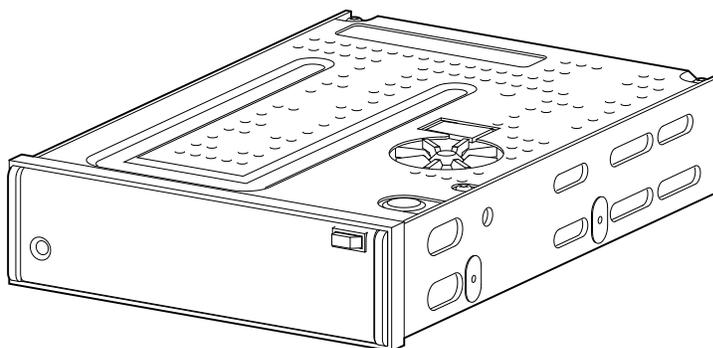
This chapter covers the following topics:

- TZK10 Tape Drive Description
- Setting the Jumpers
- Installing the TZK10 Drive
- Using Cartridge Tapes
- Removing the TZK10 Tape Drive
- TZK10 Drive Specifications
- TZK10 Tape Specifications

TZK10 Tape Drive Description

- Purpose** The TZK10 tape drive allows you to store data on removable cartridge tapes with various capacities. The drive can be used for backing up files and loading applications.
- Storage Capacity** The storage capacity of the TZK10 drive is 320 megabytes or 525 megabytes, depending on the tape used.
- Illustration** Figure 5-1 shows the TZK10 tape drive.

Figure 5-1 TZK10 Tape Drive



MLO-007532

TZK10 Tape Drive Description

**Compatible
Cartridge Tapes**

The TZK10 tape drive uses any of Digital's standard quarter-inch cartridges (QIC) listed in Table 5-1.

Table 5-1 TZK10 Cartridge Tapes

Cartridge	Maximum Capacity	Format	R/W¹	Length
DC6525	525 MB	QIC-320	R/W	300 m (1000 ft)
DC6320	320 MB	QIC-320	R/W	186 m (620 ft)
DC6150 DC600XTD	150 MB	QIC-150	R/W	189 m (620 ft)
DC6150 DC600XTD	120 MB	QIC-120	R/W	189 m (620 ft)
DC600A	60 MB	QIC-24	R	183 m (600 ft)

¹R/W = read/write capabilities

Setting the Jumpers

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. These settings are determined by the position of three removable electrical connectors, called DADS and DRIVE SELECT jumpers, located on the back of the drive. These jumpers can be either attached or removed.

Operating System Setting

The TZK10 drive also includes a DADS (parity) jumper, shown in Figure 5-2 as the sixth jumper from the left. Be sure this jumper is attached to ensure that the drive works with the operating system.

The DRIVE SELECT jumpers allow selection of a unique address for each drive. These jumpers are the second, third, and fourth jumpers from the right side.

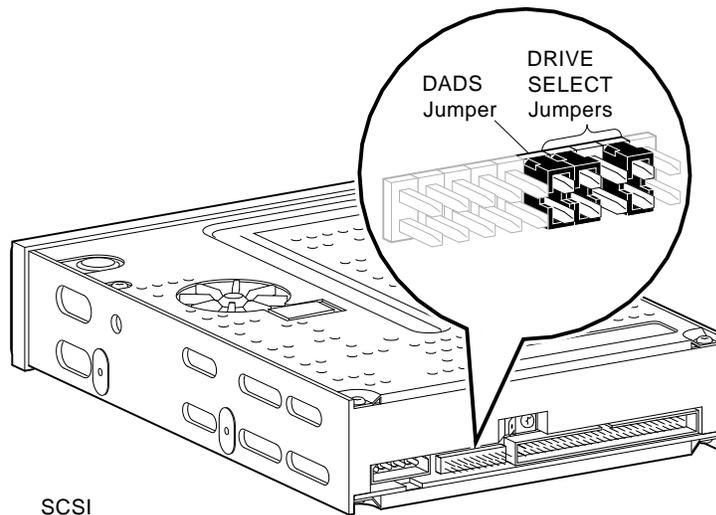
SCSI Factory Setting

When your TZK10 drive arrives from the factory, all SCSI jumpers may be attached to prevent their loss during shipment. If this is the case, you should reset the jumpers to the recommended SCSI address setting of 5, as shown in Figure 5-2, where, counting from the left:

- The seventh jumper is attached
- The eight jumper is removed
- The ninth jumper is attached

Setting the Jumpers

Figure 5-2 TZK10 SCSI Jumper Settings



SCSI
Address
Settings: 0



1



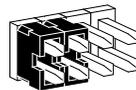
2



3



4



5



6



MLO-010276

Setting the Jumpers

To Change SCSI Settings

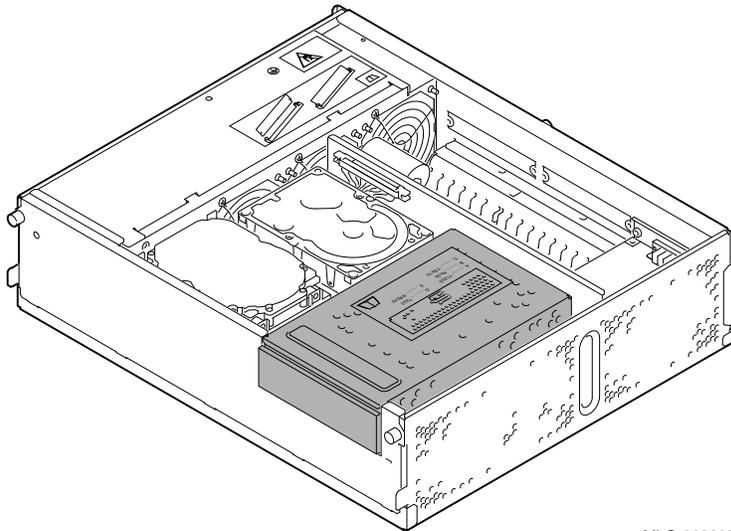
If the recommended setting is already in use by another device installed in your system, you must reset it. To change the SCSI setting, choose one from Figure 5-2 that is not in use, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them in case you need them later.

Installing the TZK10 Drive

Where to Install

You can install one TZK10 cartridge tape drive in the removable-media drive bracket, shown in the shaded area of Figure 5-3.

Figure 5-3 Position of the TZK10 Tape Drive



MLO-008623

Task Overview

These are the tasks involved in installing the TZK10 cartridge tape drive:

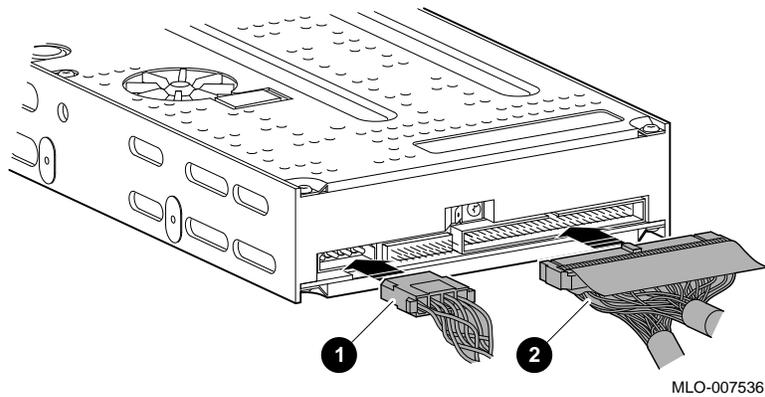
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert and secure the drive into the drive bracket.
3	Replace the drive bracket with the drive inside.

**Task 1:
Connect the
Cables**

To connect the SCSI and power cables to the TZK10:

1. Hold the SCSI connector with the key facing up.
2. As shown in Figure 5-4, connect the power cable connector ❶ and the SCSI cable connector ❷ to the ports on the back of the drive.

Figure 5-4 Connecting Cables to the TZK10 Drive



Installing the TZK10 Drive

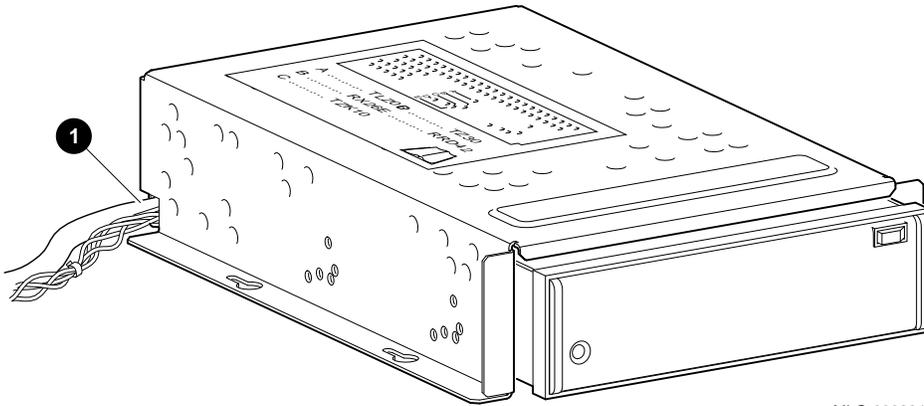
Task 2: Insert the Drive into the Bracket

You should have already removed the drive bracket from inside the system unit (see Chapter 2).

To insert the drive into the drive bracket:

1. Hold the bracket over the drive with the drive cables at the back.
2. Lower the bracket onto the drive.
3. Tuck the cables securely into the bracket and through the opening at the back left corner ❶, as shown in Figure 5–5.

Figure 5–5 Securing TZK10 Cables in the Bracket



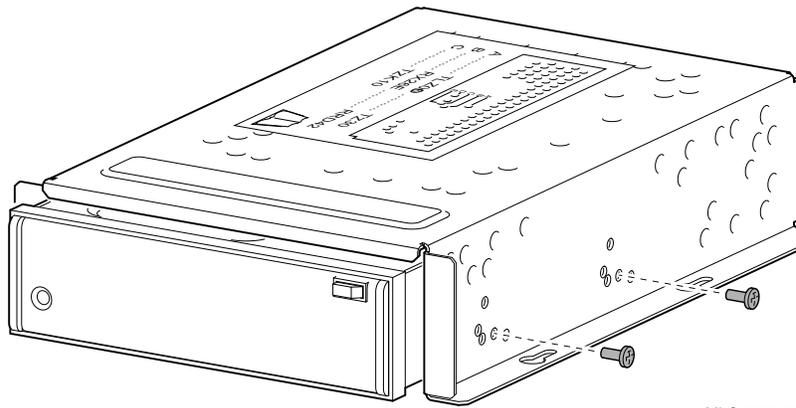
MLO-009204

4. Adjust the drive slightly so that the four mounting holes, two on each side of the drive, align with the corresponding four holes in the drive bracket.

Installing the TZK10 Drive

5. Secure the drive in the bracket with the four screws that were shipped in a plastic bag with the drive. See Figure 5-6.

Figure 5-6 Securing the TZK10 Drive in the Bracket



MLO-008913

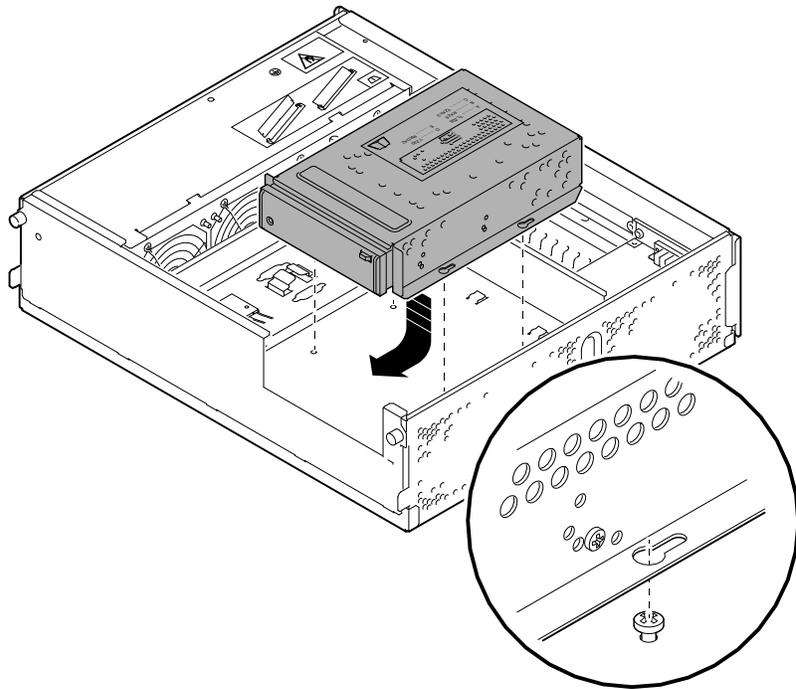
Installing the TZK10 Drive

Task 3: Replace the Drive Bracket

To replace the drive bracket and drive inside the system unit, follow these steps and refer to Figure 5-7:

1. Place the two keyhole slots on each side of the bracket over the corresponding four screws on the drive plate, two on each side of the bracket.
2. Pull the bracket forward until it feels tight.
3. Tighten the four screws on the drive plate, two on each side.
If there is one or more fixed disk drive already in place, push those cables aside to reach the two drive plate screws on the left side of the drive bracket.

Figure 5-7 Replacing the Drive Bracket with the Drive Inside



MLO-008914

What Comes Next

This completes installation of the TZK10 tape drive.

If you need to	Then
Use TZK10 cartridge tapes, remove the TZK10 drive, or understand the drive and tape specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Using Cartridge Tapes

Guidelines for Handling and Storing

When handling and storing TZK10 cartridge tapes:

- Do not drop or strike tapes.
- Keep tapes out of direct sunlight, away from heaters and other sources of heat.
- Store tapes where the temperature is between 10°C and 40°C (50°F and 104°F).
- If a tape has been exposed to extreme heat or cold, allow it to stabilize at room temperature for the same amount of time as it was exposed, up to 24 hours.
- Avoid placing tapes near sources of electromagnetic interference, such as terminals, motors, and video or X-ray equipment. Any tape exposed to a magnetic field can lose information.
- Store a tape in a dust-free environment where the relative humidity is between 20% and 80%.
- Store a tape in its protective container, on edge or stacked. However, when stacking tapes, do not stack more than five high.

Using Cartridge Tapes

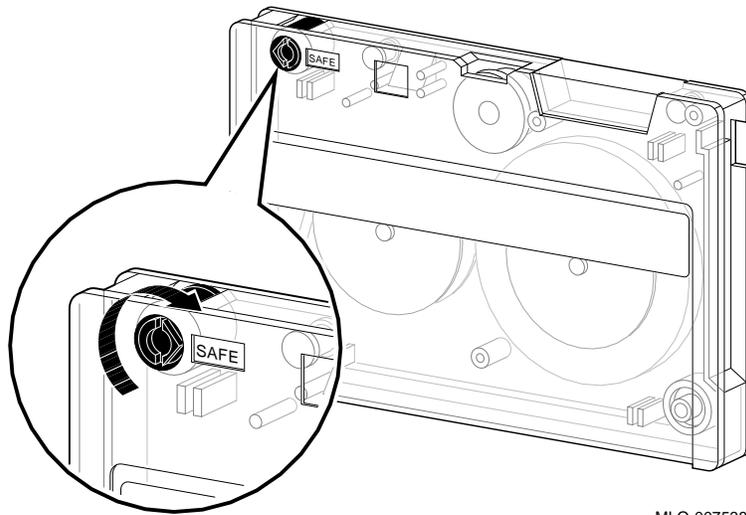
Why Write-Protect

Write-protecting a tape prevents accidental overwriting or erasure of data on the tape.

Before Using

Check the write-protect switch in the top left-hand corner of the tape, shown in Figure 5–8.

Figure 5–8 Write-Protecting TZK10 Cartridge Tapes



MLO-007538

Set the Write-Protect Switch

Set the write-protect switch as follows:

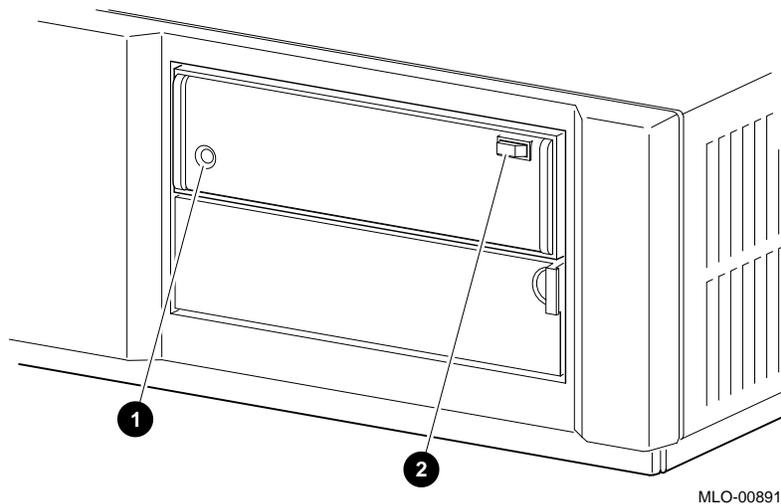
To do this	Turn the switch
Read information from the tape, with write-enable off	To the right towards the SAFE position
Write to the tape	To the left away from the SAFE position

Before You Insert the Tape

Check the following:

- The system is on (|).
- The dual color (amber or green) indicator light, ❶ in Figure 5-9, is off.

Figure 5-9 TZK10 Indicator Light and Eject Button



MLO-008915

Insert the Tape into the Drive

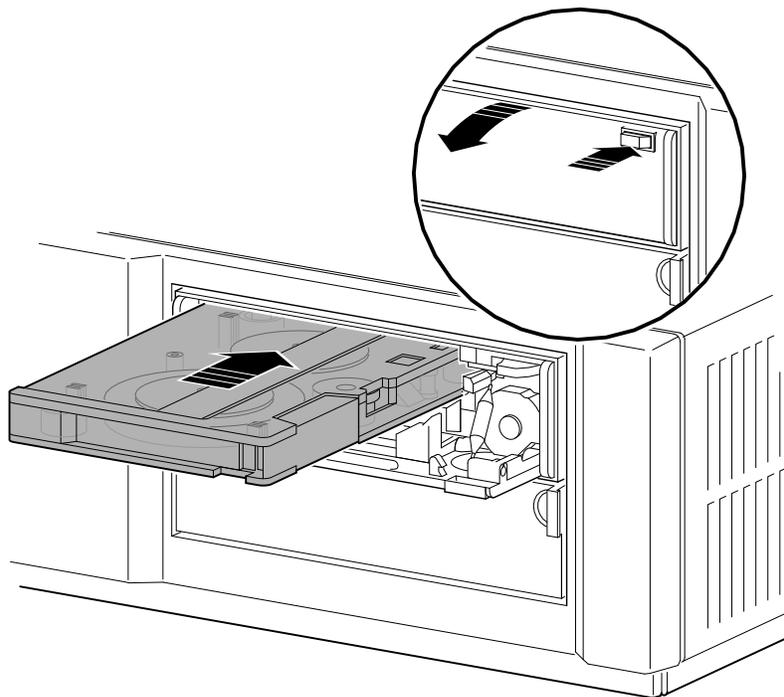
To insert the tape into the drive, follow these steps:

1. Press the eject button, ❷ in Figure 5-9, to open the drive door on the front of the system unit.
2. Insert the TZK10 tape into the drive with the cartridge's write-protect switch in the SAFE position.

Using Cartridge Tapes

3. Slide the tape straight into the drive until you feel resistance, as shown in Figure 5–10.

Figure 5–10 Inserting a TZK10 Cartridge Tape



MLO-008916

4. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for mounting instructions.
5. Check the indicator light, which comes on when the tape is inserted correctly.

The drive ejects the tape if:

- The tape is improperly inserted in the drive.
- Any other conditions prevent the drive from reading the tape.

Indicator Light States

Table 5–2 summarizes the meaning of each state of the TZK10 green and amber indicator light.

Table 5–2 TZK10 Indicator Light States

State	Meaning
Off	Tape is not present or tape is present but is not loaded (is dismounted.)
Solid green	Tape is loaded (mounted). ¹
Blinking green	Tape is in motion.
Solid amber	Drive is faulty.

¹Cartridge tape is loaded automatically when inserted.

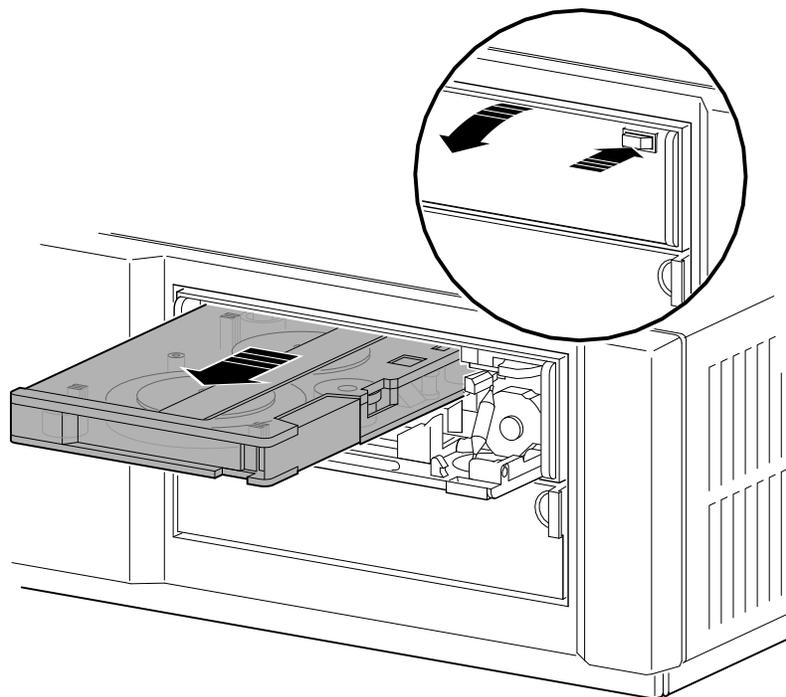
Remove the Tape from the Drive

To remove the tape from the drive, follow these steps:

1. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for dismounting instructions.
2. Press the eject button after data transfer is complete (the tape has stopped and the indicator light is solid green).
3. When the tape ejects part way, grasp it and slide it out of the drive, as shown in Figure 5–11.

Using Cartridge Tapes

Figure 5–11 Removing a TZK10 Cartridge Tape from the Drive



MLO-009799

CAUTION:
Possible Tape
Damage

Never insert or remove a tape when the drive is in use (the indicator light on the front of the drive is blinking green); doing so can damage the tape.

Removing the TZK10 Tape Drive

Remove the Drive from the Bracket

To remove the TZK10 tape drive from the drive bracket, follow these steps:

1. Remove the four small screws, two on each side of the drive bracket, that secure the drive inside the bracket.
2. Turn the bracket upside down.
3. Pull the drive part way out of the bracket.
4. Disconnect the SCSI cable by pulling on the white tab.
5. Disconnect the power cable.
6. Remove the drive by firmly pushing the back of the drive toward the front of the drive bracket.

TZK10 Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight ¹	Height	Width	Depth
1.1 kg (2.4 lb)	44 mm (1.732 in)	146.05 mm (5.75 in)	208.28 mm (8.20 in)

¹Without cartridge

TZK10 Drive Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Variable	Operating Level
Mode of operation	Streaming
Drive interface	SCSI-2
Media	DC6320/DC6525 cartridge tape or Digital-approved equivalent (see Table 5-1)
Temperature ¹	5°C to 40°C (41°F to 122°F)
Humidity	20% to 80%, noncondensing
Maximum wet bulb temperature	26°C (79°F)
Minimum dew point temperature	2°C (36°F)
Altitude	0 m to 2400 m (0 ft to 13,000 ft) at 36°C (96°F)

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Variable	Nonoperating Level
Temperature	-30°C to 60°C (-22°F to 140°F)
Humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Altitude	-304 m to 12,300 m (-1000 ft to 40,000 ft) at 36°C (96°F)

TZK10 Tape Specifications

Tape Dimensions

The following table lists the dimensions of a TZK10 tape:

Variable	Dimensions
Track width, write	0.1778 mm +0.0000/-0.0127 mm (0.0070 in +.0000 in/-0.0005 in)
Track width, read	0.1270 mm +0.0127/-0.0000 mm (0.0050 in +.0005 in/-0.0000 in)
Data density	16,000 bpi
Number of tracks	26
Track format	Multiple track serpentine recording

Storage Capacity

The following table lists the storage capacity of a TZK10 tape:

For Formatted Tape	Capacity
Per DC6320 cartridge	320 MB (approximate)
Per DC6525 cartridge	525 MB (approximate)
Per surface	2.48 MB
Per track	1.8 MB
Per block	512 bytes
Blocks per track	36
Blocks per drive	649,040
Spare blocks per cylinder	8
Spare blocks per drive	10,300 MB

TZK10 Tape Specifications

Tape Performance

The following table lists the performance of a TZK10 tape:

Variable	Operating Level
Data transfer rate	200 KB at average streaming mode 1½ MB at SCSI maximum
Bus asynchronous mode	1.50 MB/s
Bus synchronous mode	4 MB/s
Seek time track to track	≤4 ms
Seek time average	≤16 ms
Seek time maximum	≤35 ms
Average rotational latency	8.3 ms
Rotational speed	3600 rpm
Tape speed	3.05 cm/s (120 ips)
Start time	20 s maximum
Stop time	20 s maximum
Interleave	1:1
Bus latency	600 μs
Input current	2.4 A @ 100–120 Vac
Frequency	50–60 Hz
Power requirements	+12 V ± 5% @ 1.0 A (2.0 A surge), 150 mV ripple peak-to-peak +5 V ± 5% @ 1.2 A (1.8 A surge), 150 mV ripple peak-to-peak
Nominal power consumption	20 watts
Peak power consumption	33 watts

6

TLZ06 Tape Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap
6. Remove the drive bracket

In This Chapter

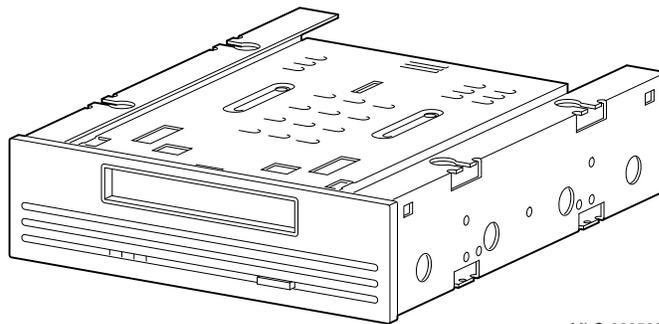
This chapter covers the following topics:

- TLZ06 Tape Drive Description
- Setting the SCSI Switches
- Installing the TLZ06 Drive
- Using Cassette Tapes
- Removing the TLZ06 Tape Drive
- TLZ06 Drive Specifications
- TLZ06 Tape Specifications

TLZ06 Tape Drive Description

Physical Description	The TLZ06 drive is a 3½-inch cassette tape drive. It is packaged in its own bracket fits into the 5¼-inch drive bracket in the system unit and allows you to easily transfer it from one system to another.
Purpose	The TLZ06 tape drive allows you to store large amounts of data on two types of removable cassette tapes. The drive can be used for backing up files and loading applications.
Storage Capacity	With a 90-meter tape, the TLZ06 drive typically has a capacity of 4.0 gigabytes of compressed data or 2.0 gigabytes of noncompressed data.
Illustration	Figure 6–1 shows the TLZ06 tape drive.

Figure 6–1 TLZ06 Tape Drive



MLO-008526

**Compatible
Cassette Tapes**

The TLZ06 tape drive accommodates both of the tapes described in the following table:

Type of Tape	Function
Digital data storage (DDS)	Supports the use of digital audio tape for applications.
Digital audio tape (RDAT)	Allows data to be stored diagonally on the tape.

Both recording technologies ensure a high level of data integrity. The TLZ06 drive can use either of the Digital cassette tapes listed in Table 6–1.

Table 6–1 TLZ06 Cassette Tapes

Cassette	Size	Capacity With Compression	Capacity Without Compression
TLZ04-CA ¹	4mm x 60m	2.6 GB	1.3 GB
TLZ06-CA	4mm x 90m	4.0 GB	2.0 GB

¹The TLZ06 drive can read the TLZ04 tape only when compression is disabled.

Setting the SCSI Switches

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. These settings are determined by the position of the electrical switches located on the back of the drive. On the TLZ06 drive, the relevant switches are labeled 1, 2, and 3 and can be either up or down.

Operating System Setting

The TLZ06 drive also includes a mode switch. Be sure this switch is in the down position to ensure that the drive works with the operating system.

SCSI Factory Setting

When your TLZ06 drive arrives from the factory, it should be preset to the recommended SCSI setting of 5, where:

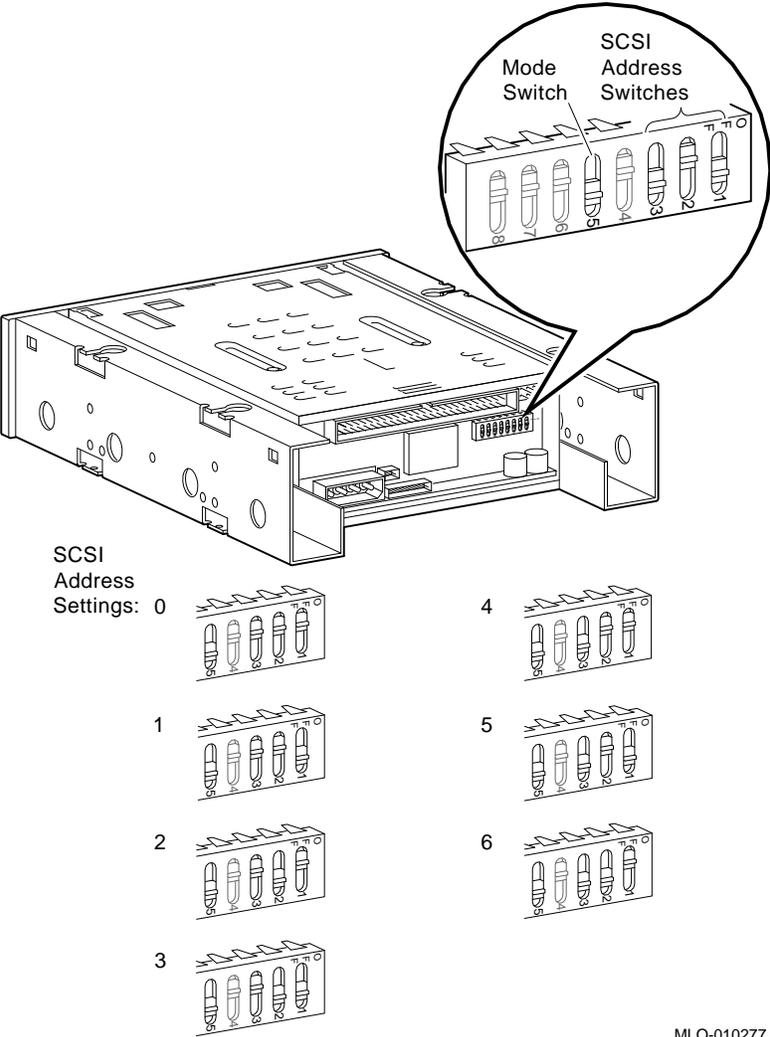
- Switch 1 is down
- Switch 2 is up
- Switch 3 is down
- Switch 4 is up
- Switch 5 (mode) is down

However, if the drive is not preset to setting 5, you need to change it *only* if that drive's preset setting is already taken by another device installed in your system.

Figure 6-2 shows the possible settings of the TLZ06 drive.

Setting the SCSI Switches

Figure 6-2 TLZ06 SCSI Switches



MLO-010277

To Change SCSI Settings

To change the setting, choose one from Figure 6-2 that is not in use.

Setting the SCSI Switches

CAUTION:
**Possible Switch
Damage**

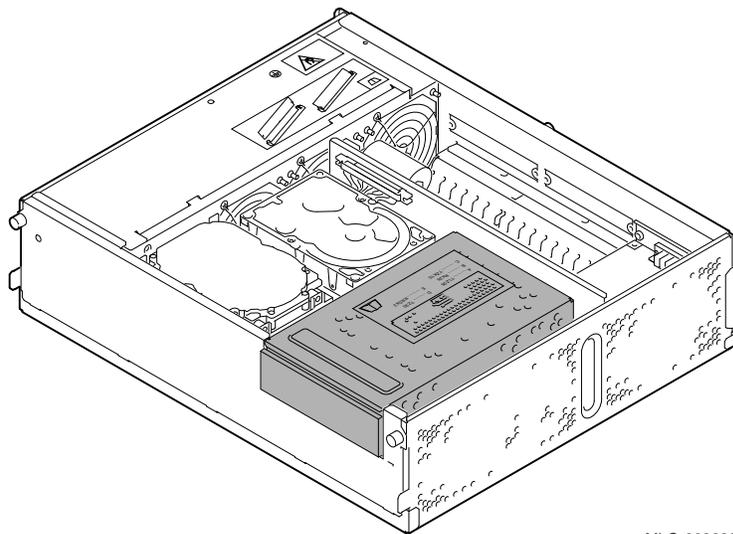
If you need to change the default address, use a small pointed instrument (such as the tip of a ball-point pen). **Do not use a pencil**; graphite particles can damage the switches.

Installing the TLZ06 Drive

Where to Install

You can install one TLZ06 cassette tape drive in the removable-media drive bracket, shown in the shaded area of Figure 6-3.

Figure 6-3 Position of the TLZ06 Tape Drive



MLO-008623

Task Overview

These are the tasks involved in installing the TLZ06 cassette tape drive:

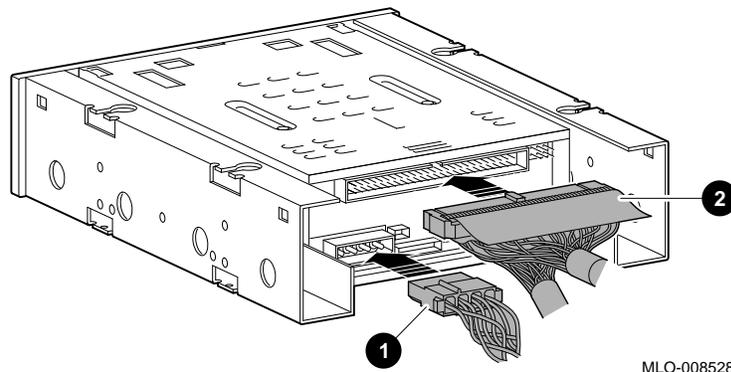
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert and secure the drive into the drive bracket.
3	Replace the drive bracket with the drive inside.

**Task 1:
Connect the
Cables**

To connect the SCSI and power cables to the TLZ06:

1. Hold the SCSI connector with the key facing up.
2. Connect the power supply cable ❶ and the SCSI cable ❷ to the ports on the back of the drive. See Figure 6-4.

Figure 6-4 Connecting Cables to the TLZ06



MLO-008528

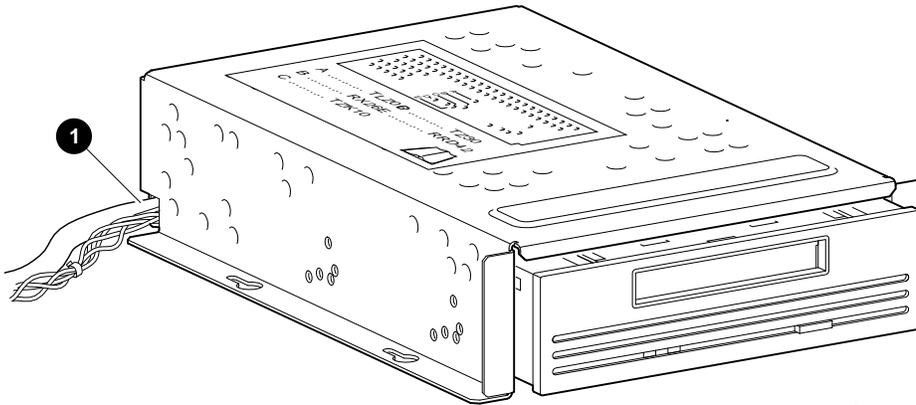
Installing the TLZ06 Drive

Task 2: Insert the Drive into the Bracket

You should have already removed the drive bracket from inside the system unit (see Chapter 2). To insert the drive into the drive bracket:

1. Hold the bracket over the drive with the drive cables at the back.
2. Lower the bracket onto the drive.
3. Tuck the cables securely into the bracket and through the opening at the back left corner ❶, as shown in Figure 6–5.

Figure 6–5 Securing TLZ06 Cables in the Bracket



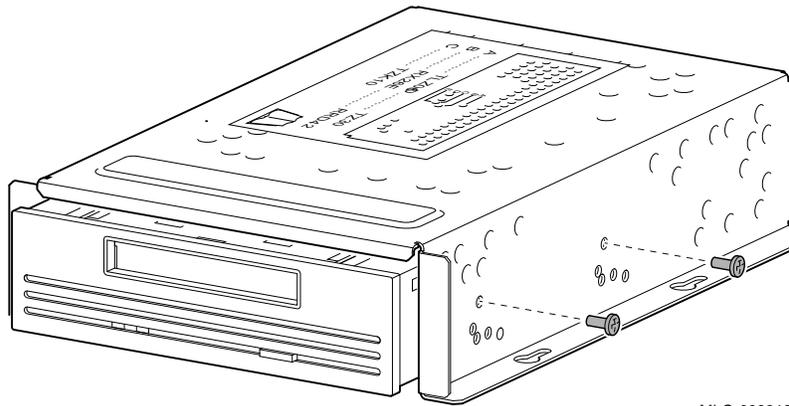
MLO-009205

4. Adjust the drive slightly so that the four mounting holes, two on each side of the drive, align with the corresponding four holes on the drive bracket.

Installing the TLZ06 Drive

5. Secure the drive in the bracket with the four screws that were shipped in a plastic bag with the drive. See Figure 6-6.

Figure 6-6 Securing the TLZ06 Drive in the Bracket



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Installing the TLZ06 Drive

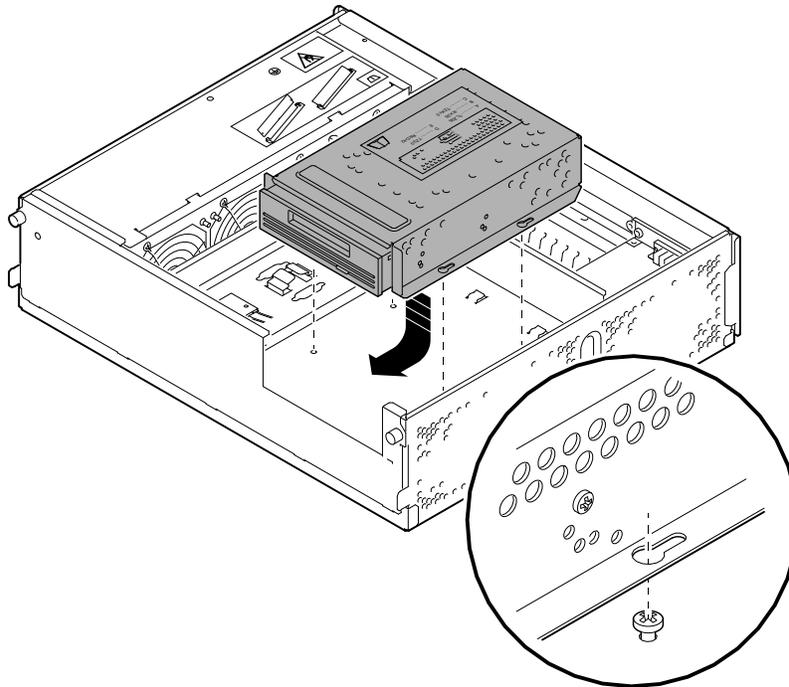
Task 3: Replace the Drive Bracket

To replace the drive bracket and drive inside the system unit, follow these steps and refer to Figure 6-7:

1. Place the two keyhole slots on each side of the bracket over the corresponding four screws on the drive plate.
2. Pull the bracket forward until it feels tight.
3. Tighten the four screws on the drive plate.

If there is one or more fixed disk drive already in place, push those cables aside to reach the two drive plate screws on the left of the drive bracket.

Figure 6-7 Replacing the Drive Bracket with the Drive Inside



MLO-008919

What Comes Next

This completes installation of the TLZ06 tape drive.

If you need to	Then
Use TLZ06 cassette tapes, remove the TLZ06 drive, or understand the drive and tape specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Using Cassette Tapes

Guidelines for Handling and Storing

When handling and storing TLZ06 cassette tapes:

- Do not drop or strike cassettes.
- Keep cassettes out of direct sunlight, away from heaters and other sources of heat.
- Store cassettes where the temperature is between 5°C and 32°C (40°F and 90°F). If a cassette has been exposed to extreme heat or cold, allow it to stabilize at room temperature for the same amount of time as it was exposed, up to 24 hours.
- Avoid placing cassettes near sources of electromagnetic interference, such as terminals, motors, and video or X-ray equipment. Any tape exposed to a magnetic field can lose information.
- Store a cassette in a dust-free environment where the relative humidity is between 20% and 60%.

Using Cassette Tapes

- Store a cassette in its protective container, on edge or stacked. However, when stacking cassettes, do not stack more than five high.
- Periodically clean the drive heads. (See the next section.)

Task Overview: Using TLZ06 Tapes

These are the tasks you may want to perform with a TLZ06 cassette tape:

Task	Action
1	Clean the drive heads
2	Label the tape
3	Write-protect the tape
4	Insert the tape into the drive
5	Remove the tape from the drive

The following sections describe these steps.

Task 1: Clean the Tape Drive Heads

Statistics show that over 90 percent of tape drive-related problems are associated with the tapes. Therefore, Digital recommends that you clean the drive heads about every two weeks or after every 25 hours of use.

To clean the heads, follow these steps:

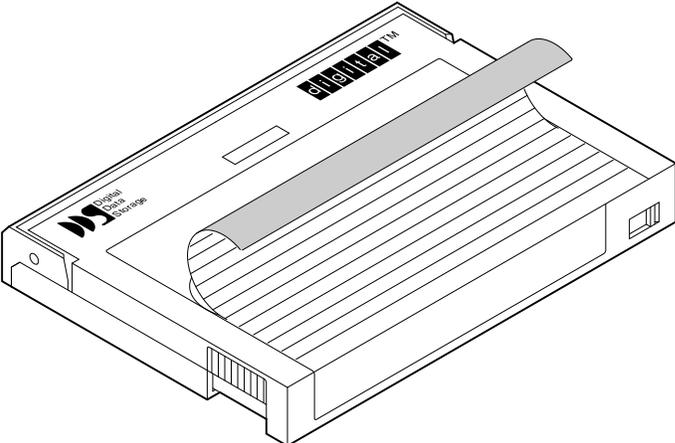
1. Turn the system On/Off switch to the on (|) position.
2. Make sure the busy indicator light is on.
3. Insert the head-cleaning cassette that came with your tape drive into the drive.
4. The drive automatically begins cleaning the heads, and ejects the cassette after about 30 seconds.
5. In the space provided on the head-cleaning cassette, place a check mark every time you use the tape.

Under normal conditions, each head-cleaning cassette is good for approximately 25 cleanings. See your Digital service representative to order additional cassettes.

Task 2: Label a TLZ06 Cassette Tape

Figure 6–8 shows the proper placement of a TLZ06 cassette label on the top of the tape.

Figure 6–8 Labeling TLZ06 Cassette Tapes



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Using Cassette Tapes

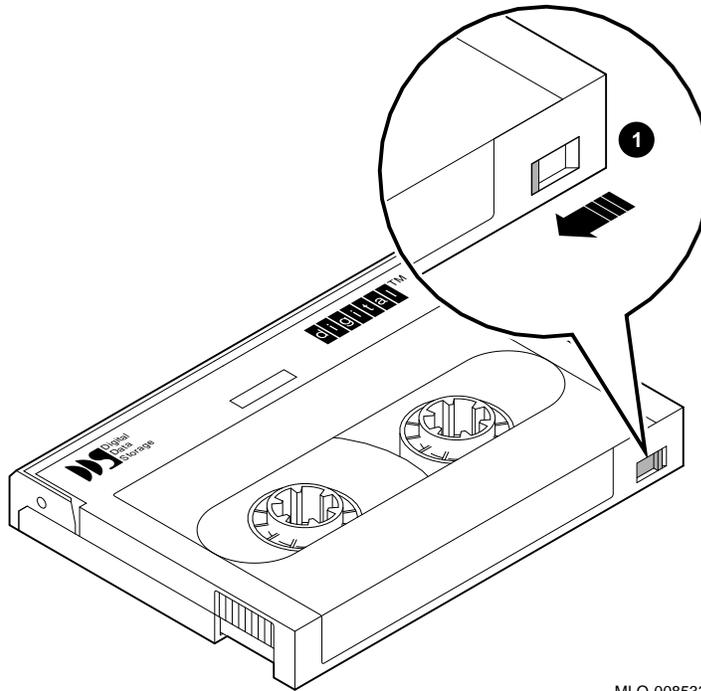
Why Write-Protect Tape

Write-protecting a cassette prevents accidental overwriting or erasure of data on the cassette.

Before Using

Check the write-protect switch ❶, shown in Figure 6-9.

Figure 6-9 Write-Protecting TLZ06 Cassette Tapes



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Task 3: Set the Write-Protect Switch

Set the write-protect switch as follows:

To do this	Turn the switch
Read information from the cassette, with write-protect off	To the far left
Write to the cassette	To the far right

CAUTION: Tape Damage

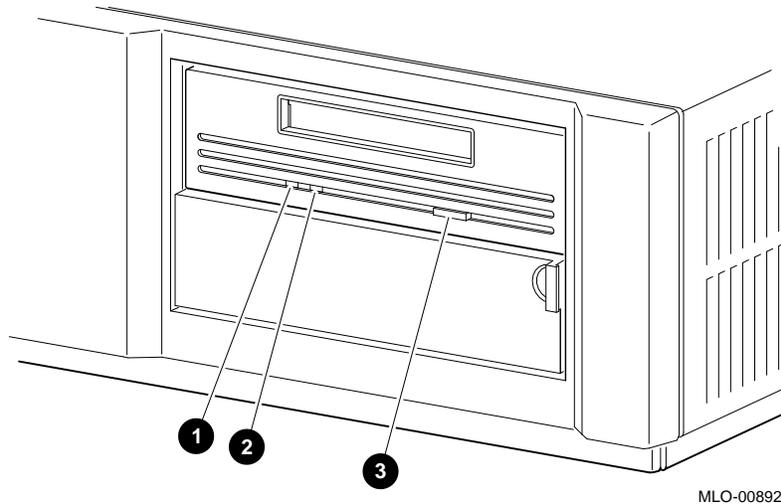
Use a pen to slide the write-protect switch. **Do not use a pencil**; the graphite can damage the tape.

Before You Insert the Tape

Check the following:

- The system is on (|).
- The busy indicator light, ❶ in Figure 6–10, is off.

Figure 6–10 TLZ06 Controls and Indicator Light



MLO-008920

Task 4: Insert the Cassette into the Drive

To insert a tape into the drive:

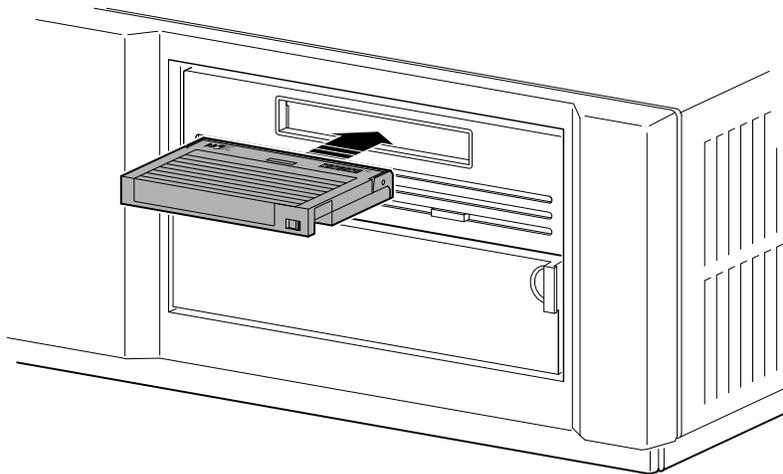
1. Press the tape eject button, ❸ in Figure 6–10 on the front of the drive to open the drive door.

Using Cassette Tapes

2. Insert the TLZ06 cassette tape into the drive with the cassette's write-protect switch to the far left.

The write-protect indicator, ② in Figure 6–10 lights up when the tape is write-protected.

Figure 6–11 Inserting the TLZ06 Cassette



MLO-008921

3. Slide the cassette straight into the drive until you feel resistance, then close the door, as shown in Figure 6–11.
4. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for mounting instructions.
5. Check the busy indicator light which comes on when the tape is inserted correctly.

The drive ejects the tape if:

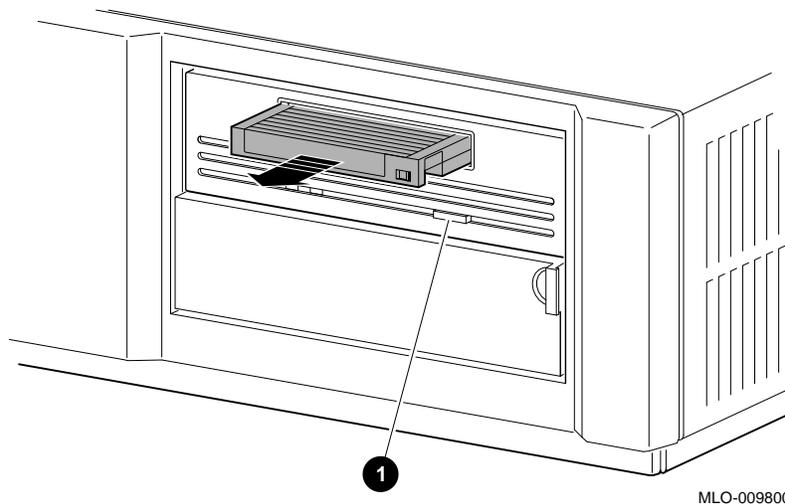
- The tape is improperly inserted in the drive.
- Any other conditions prevent the drive from reading the tape.

**Task 5:
Remove the
Cassette from
the Drive**

To remove the cassette from the drive:

1. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for dismounting instructions.
2. Press the eject button, ❶ in Figure 6–12, after data transfer is complete (the tape has stopped and the busy indicator light is on).
3. When the cassette ejects part way, grasp it and slide it out of the drive, as shown in Figure 6–12.

Figure 6–12 Removing the TLZ06 Cassette Tape from the Drive



**CAUTION:
Possible Tape
Damage**

Never insert or remove a tape when the drive is in use (the busy indicator light on the front of the drive is on); doing so can damage the tape.

Removing the TLZ06 Tape Drive

Remove the Drive from the Bracket

To remove the TLZ06 tape drive from the drive bracket:

1. Remove the four small screws, two on each side of the drive bracket, that secure the drive inside the bracket.
2. Turn the bracket upside down.
3. Pull the drive part way out of the bracket.
4. Disconnect the SCSI cable by pulling on the white tab.
5. Disconnect the power cable.
6. Remove the drive by firmly pushing on the back of the drive toward the front of the drive bracket.

TLZ06 Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight ¹	Height	Width	Depth
2.2 kg (4.7 lb)	4.1 cm (1.6 in)	14.6 cm (5.75 in)	17.8 cm (7.0 in)

¹Without cassette

TLZ06 Drive Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Variable	Operating Level
Mode of operation	Streaming
Drive interface	SCSI-2
Media	TLZ04-CA or TLZ06-CA
Operating temperature ¹	10°C to 40°C (50°F to 104°F)
Operating humidity	20% to 80%, noncondensing
Altitude	0 km to 4.6 km (0 ft to 15,000 ft)

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Variable	Nonoperating Level
Temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	5% to 95%, noncondensing
Altitude	0 km to 15.2 km (0 ft to 50,000 ft) at 36°C (96°F)
Power consumption	9 W
Power requirements	100 to 240 V ac, 0.3 A

TLZ06 Tape Specifications

Tape Performance

The following table lists the performance of the tape:

Variable	Operating Level
Transfer rate to/from tape	183 KB/s
Bit density	114 Mb/in ²
Passes per cassette	300

7

TZ30 Tape Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap
6. Remove the drive bracket

In This Chapter

This chapter covers the following topics:

- TZ30 Tape Drive Description
- Setting the SCSI Switches
- Installing the TZ30 Tape Drive
- Using TZ30 Tapes
- Removing the TZ30 Tape Drive
- TZ30 Drive Specifications
- TZ30 Tape Specifications

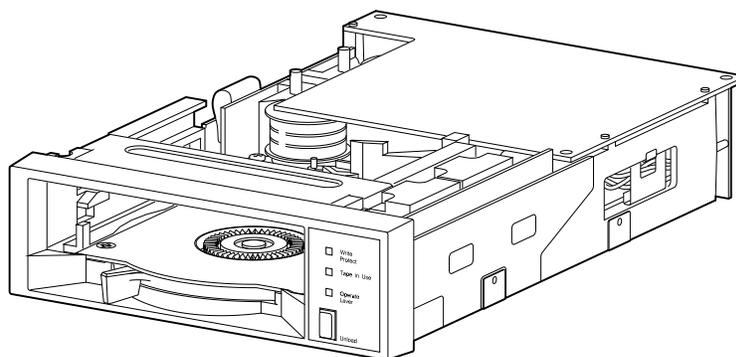
TZ30 Tape Drive Description

Purpose The TZ30 tape drive, shown in Figure 7-1, allows you to back up files on storage devices and load applications onto your system.

Storage Capacity The TZ30 tape stores up to 95 megabytes of data.

Illustration Figure 7-1 shows the TZ30 tape drive.

Figure 7-1 TZ30 Tape Drive



MLO-009657

Setting the SCSI Switches

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. These settings are determined by the position of the four electrical switches on the side of the drive. These switches are labeled 1, 2, 3, and 4, and can be either set left (on) or right (off).

SCSI Factory Setting

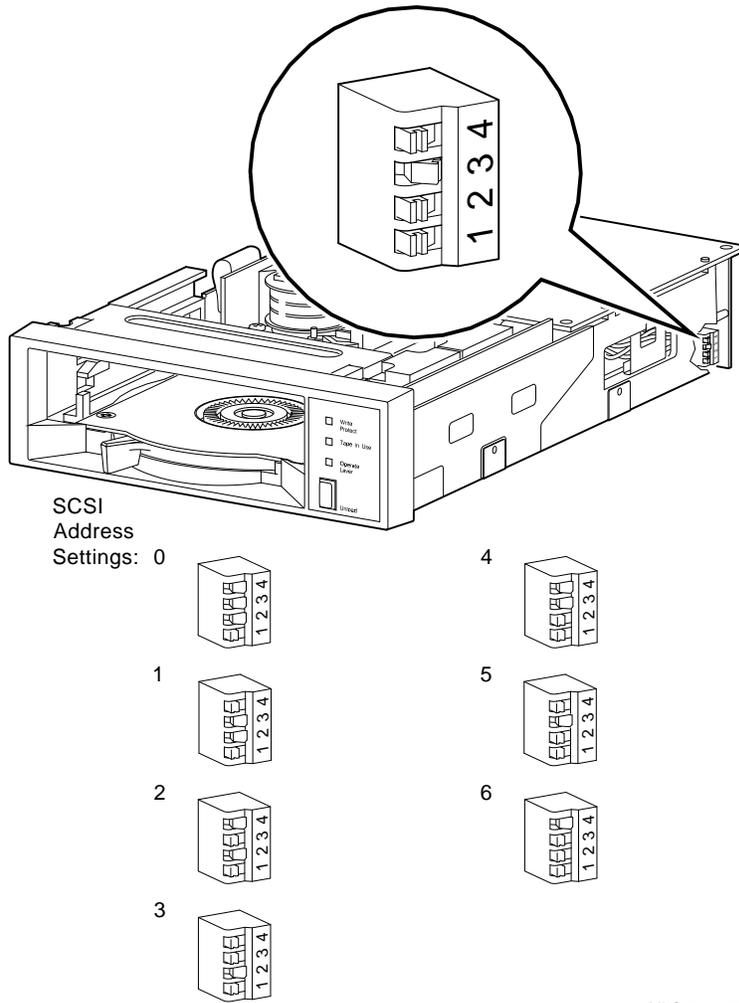
When your TZ30 drive arrives from the factory, it should be preset to the recommended SCSI address setting of 5, as shown in Figure 7-2, where:

- Switch 1 is left (on)
- Switch 2 is left (on)
- Switch 3 is right (off)
- Switch 4 is left (on)

If the drive is not preset to that setting, however, you need to change it *only* if that drive's preset setting is already in use by another device installed in your system.

Setting the SCSI Switches

Figure 7-2 TZ30 SCSI Switches



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Setting the SCSI Switches

To Change SCSI Settings

To change the default SCSI setting, choose one from Figure 7-2 that is not in use.

CAUTION: Possible Switch Damage

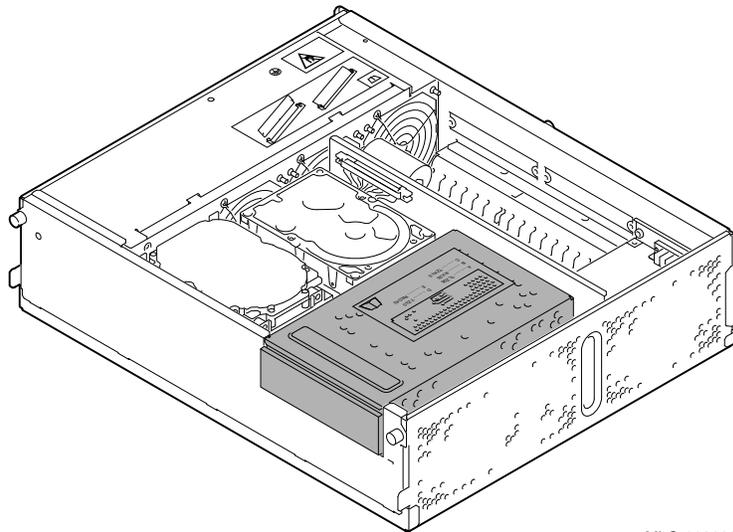
If you do change the switch setting, use a small pointed instrument (such as the tip of a ballpoint pen). **Do not use a pencil**; graphite particles can damage the switches.

Installing the TZ30 Tape Drive

Where to Install

You can install one TZ30 tape drive in the removable-media drive bracket, shown in the shaded area of Figure 7-3.

Figure 7-3 Position of the TZ30 Tape Drive



MLO-008623

Installing the TZ30 Tape Drive

Task Overview

These are the tasks involved in installing a TZ30 tape drive:

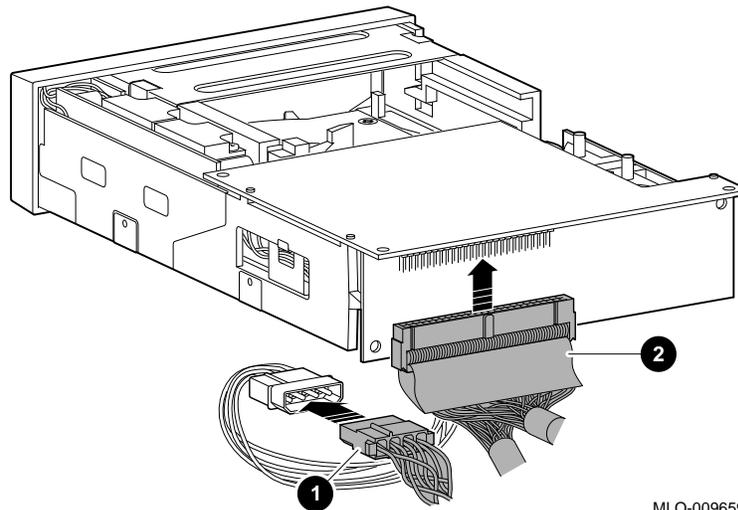
Task	Action
1	Connect the SCSI and power cables to drive.
2	Insert and secure the drive into the drive bracket.
3	Replace the drive bracket with the drive inside.

Task 1: Connect the Cables

To connect the SCSI and power cables to the TZ30 drive:

1. Hold the SCSI connector with the key facing up.
2. Connect the power cable **1** and the SCSI cable **2** to the connectors on the back of the drive, as shown in Figure 7-4).

Figure 7-4 Connecting Cables to the TZ30 Drive



MLO-009659

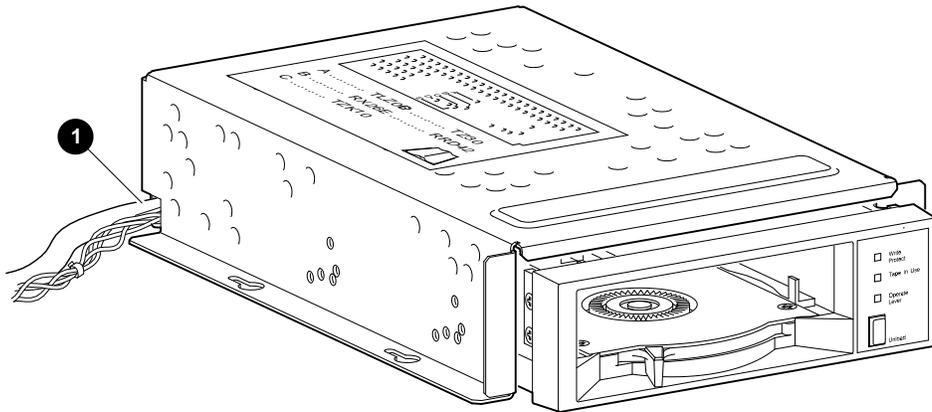
Installing the TZ30 Tape Drive

Task 2: Insert the Drive into the Bracket

You should have already removed the drive bracket from inside the system unit (see Chapter 2). To insert the drive into the drive bracket:

1. Hold the bracket over the drive with the drive cables at the back.
2. Lower the bracket onto the drive.
3. Tuck the cables securely into the bracket and through the opening at the back left corner ❶, as shown in Figure 7-5.

Figure 7-5 Securing TZ30 Cables in the Bracket

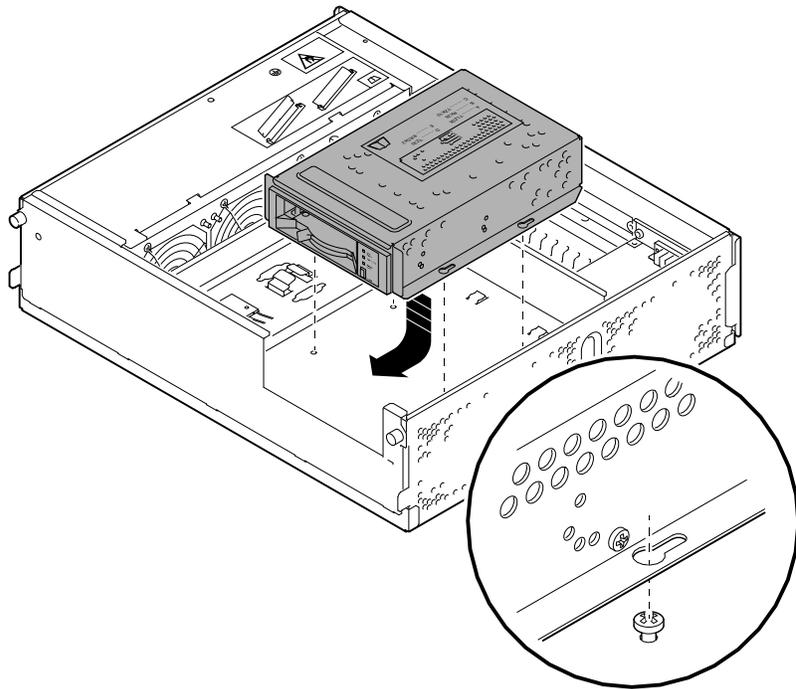


MLO-009690

4. Adjust the drive slightly so that the four mounting holes, two on each side of the drive, align with the corresponding four holes in the drive bracket.

Installing the TZ30 Tape Drive

Figure 7-7 Replacing the Drive Bracket with the Drive Inside



MLO-009692

Installing the TZ30 Tape Drive

What Comes Next

This completes installation of the TZ30 tape drive.

If you need to	Then
Use TZ30 tapes, remove the TZ30 drive, or understand the drive and tape specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Using TZ30 Tapes

Guidelines for Handling and Storing

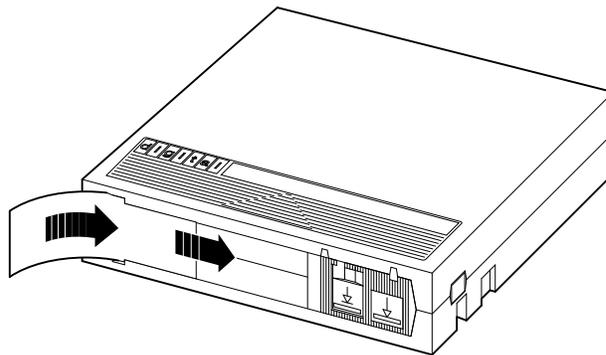
When handling and storing TZ30 tapes:

- Do not drop or strike tapes.
- Keep tapes out of direct sunlight, away from heaters and other sources of heat.
- Store tapes where the temperature is between 10°C and 40°C (50°F and 104°F).
- If a tape has been exposed to extreme heat or cold, allow it to stabilize at room temperature for the same amount of time as it was exposed, up to 24 hours.
- Avoid placing tapes near sources of electromagnetic interference, such as terminals, motors, and video or X-ray equipment. Any tape exposed to a magnetic field can lose information.
- Store a tape in a dust-free environment where the relative humidity is between 20% and 80%.
- Store a tape in its protective container, on edge or stacked. However, when stacking tapes, do not stack more than five high.

Label a TZ30 Tape

Figure 7-8 shows the proper placement of a TZ30 label on the front of the cartridge. Do not place a label in any other location on the tape cartridge.

Figure 7-8 Labeling a TZ30 Tape



MLO-009698

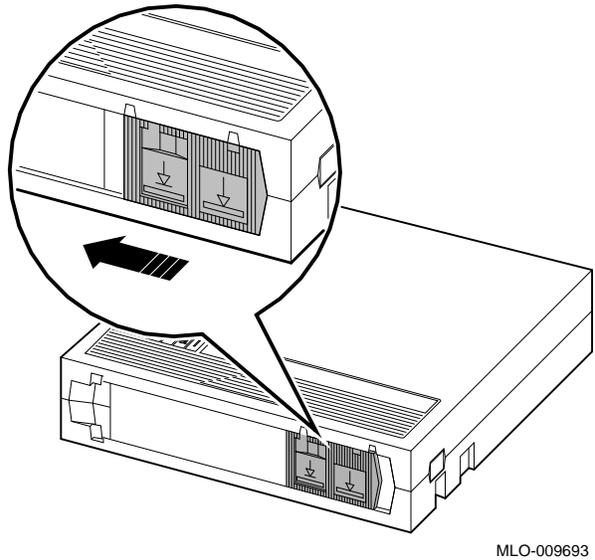
Why Write-Protect

Write-protecting a tape prevents accidental overwriting or erasure of data on the tape.

Before Using

Check the write-protect switch, shown in Figure 7-9.

Figure 7-9 Write-Protecting TZ30 Tapes



Set the Write-Protect Switch

Set the write-protect switch as follows:

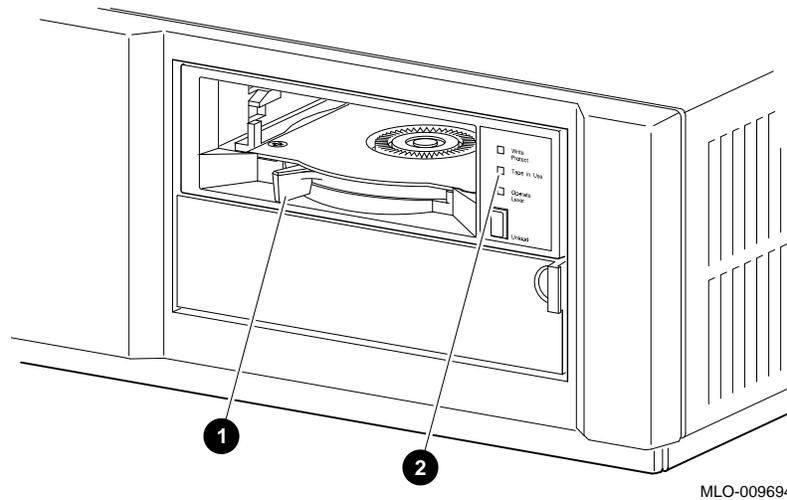
To do this	Push the switch
Read information from the tape, with write-enable off	To the far left with the orange rectangle visible
Write to the tape	To the far right

Before You Insert the Tape

Check the following:

1. Be sure the system is on (|).
2. Be sure the operation lever, ❶ in Figure 7–10, is at the far left (unlock) position.
3. Be sure the yellow tape-in-use light, ❷ in Figure 7–10, is off.

Figure 7–10 TZ30 Controls

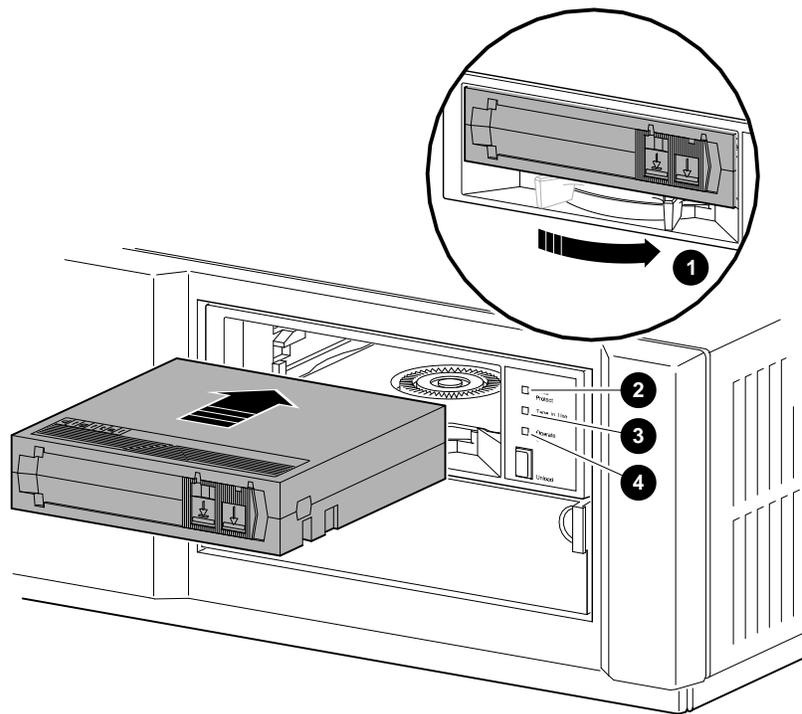


Insert the Tape into the Drive

To insert the tape into the drive, refer to Figure 7–11 and follow these steps:

1. Insert the TZ30 tape into the drive with the write-protect switch in the far left position.
2. Slide the tape straight into the drive until you feel resistance.

Figure 7-11 Inserting a TZ30 Tape



MLO-009695

3. Push the operate lever ❶ to the far right to lock the tape in place.
The following lights come on when the tape is write-protected and ready to use:
 - The orange write-protect light ❷
 - The yellow tape-in-use light ❸
 - The green lever light ❹
4. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for mounting instructions.

TZ30 Light States

Table 7–1 summarizes the meaning of each state of the TZ30 drive lights.

Table 7–1 TZ30 Light States

State of Light	Meaning
Orange write-protect light:	
on	Tape is write-protected.
off	Tape is write-enabled.
Yellow tape-in-use light:	
blinking	Tape is in use.
on	Tape is loaded and ready for use.
Green lever light:	
on	You can operate the lever.
off	Do not operate the lever.
blinking	There is a faulty cartridge or a calibration error.
All 3 lights:	
on	The startup diagnostic is in progress.
blinking	An error occurred during operation.

TZ30 Beeper

Table 7–2 summarizes the meaning of each beep of the TZ30 drive.

Table 7–2 TZ30 Beeper

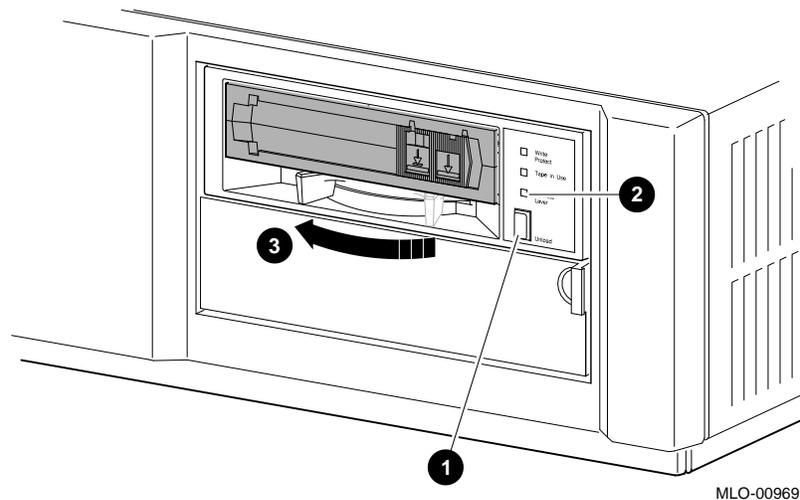
Number of Beeps	Meaning
One beep	The tape is starting.
Two beeps	One of the following: <ul style="list-style-type: none"> • The tape is unloaded and can be removed from the drive. • The tape is not locked in the drive.

Remove the Tape from the Drive

To remove the tape from the drive, refer to Figure 7–12 and follow these steps:

1. If you are using the OpenVMS AXP operating system, refer to your operating system documentation for dismounting instructions.
2. Press the unload button ❶ to rewind the tape.
When this operation is complete, the beeper sounds twice and the green lever light ❷ comes on.
3. Push the operate lever ❸ to the left to unlock the drive.
4. When the tape ejects part way, grasp the tape, and slide it out of the drive.

Figure 7–12 Removing a TZ30 Tape from the Drive



MLO-009699

CAUTION: Possible Tape Damage

Never insert or remove a tape when the drive is in use (the yellow tape-in-use light on the front of the drive is blinking); doing so can damage the tape.

Removing the TZ30 Tape Drive

Remove the Drive from the Bracket

To remove the TZ30 tape drive from the drive bracket, follow these steps:

1. Remove the four small screws, two on each side of the drive bracket, that secure the drive inside the bracket.
2. Turn the bracket upside down.
3. Pull the drive part way out of the bracket.
4. Disconnect the SCSI cable by pulling on the white tab.
5. Disconnect the power cable.
6. Remove the drive.

TZ30 Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight ¹	Height	Width	Depth
1.5 kg (3.13 lb)	86 mm (.3.38 in)	150 mm (5.88 in)	223 mm (8.79 in)

¹Without tape

TZ30 Drive Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Variable	Operating Level
Mode of operation	Streaming
Drive interface	SCSI
Media	12.77 mm (½ in.) magnetic tape
Temperature ¹	10°C to 40°C (50°F to 104°F)
Humidity	20% to 80%, noncondensing
Altitude	0 m to 3658 m (0 ft to 12,180 ft)

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Variable	Nonoperating Level
Temperature	-30°C to 66°C (-22°F to 151°F)
Humidity	10% to 90%, noncondensing
Altitude	-304 m to 9,144 m (-1000 ft to 30,000 ft)

TZ30 Tape Specifications

Tape Dimensions

The following table lists the dimensions of the tape:

Variable	Dimensions
Track pitch, unformatted	0.483 mm (0.019 in)
Data density	6667 bpi
Number of tracks	22
Track format	Multiple track serpentine recording

Tape Performance

The following table lists the performance of the tape:

Variable	Operating Level
Data transfer rate	62.5 KB at average streaming mode 1½ MB at SCSI maximum
Tape speed	190 cm/s (75 ips)
Power requirements	+12 V ± 5% @ 1.0 A (2.0 A surge), 100 mV ripple peak-to-peak +5 V ± 5% @ 1.2 A (1.8 A surge), 100 mV ripple peak-to-peak
Nominal power consumption	20 watts
Peak power consumption	33 watts

RZ24L Fixed Disk Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap

In This Chapter

This chapter covers the following topics:

- RZ24L Fixed Disk Drive Description
- Setting the SCSI Jumpers
- Installing the RZ24L Fixed Disk Drive
- RZ24L Fixed Disk Drive Specifications

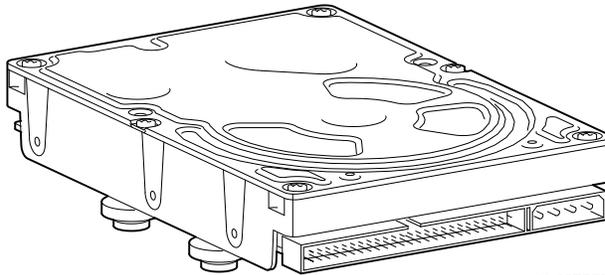
RZ24L Fixed Disk Drive Description

Purpose The RZ24L disk drive allows you to store large amounts of data on a fixed disk. The drive can be used for storage of software applications and user files.

Storage Capacity The storage capacity of the RZ24L is 209 megabytes.

Illustration Figure 8-1 shows the RZ24L disk drive.

Figure 8-1 RZ24L Fixed Disk Drive



MLO-007559

Setting the SCSI Jumpers

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI setting. SCSI settings are determined by the position of three removable electrical connectors, called jumpers, located on the back of the drive. On the RZ24L drive, these jumpers are labeled A0, A1, and A2 and can be either attached or removed.

SCSI Factory Setting

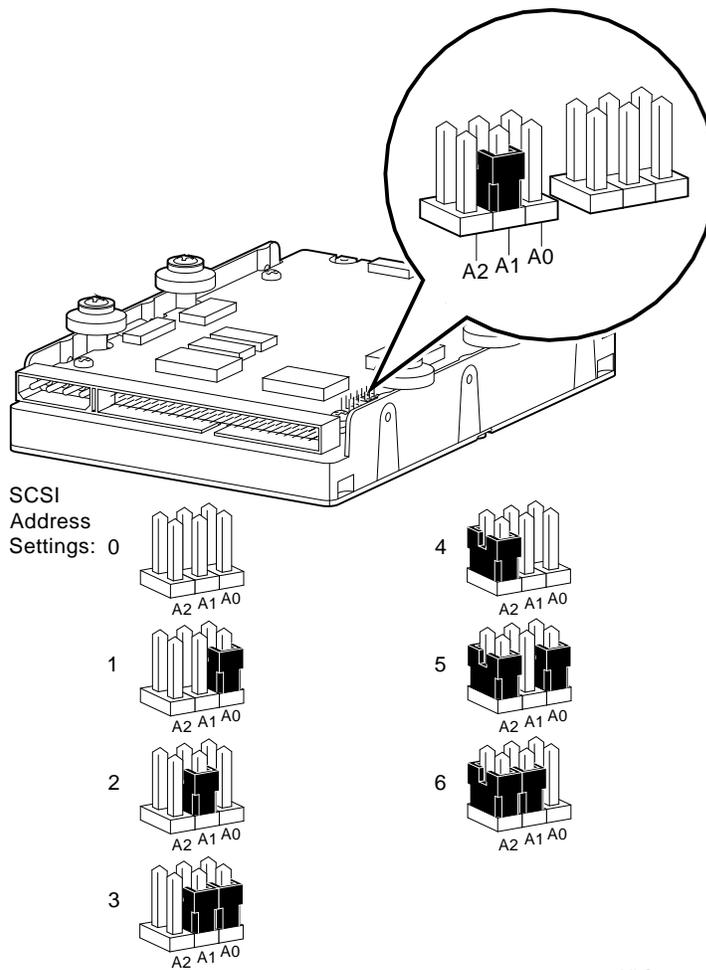
When your RZ24L drive arrives from the factory, all SCSI jumpers may be attached to prevent their loss during shipment. If this is the case, you should reset the jumpers to an address setting of 1, 2, or 3, the recommended settings for a fixed disk drive. Figure 8-2 shows the disk set at SCSI setting 2, where:

- Jumper A0 is removed
- Jumper A1 is attached
- Jumper A2 is removed

However, if the drive is not preset to one of those settings, you need to change it *only* if that drive's preset setting is already taken by another device installed in your system.

Setting the SCSI Jumpers

Figure 8-2 RZ24L SCSI Jumpers



MLO-010659

To Change SCSI Settings

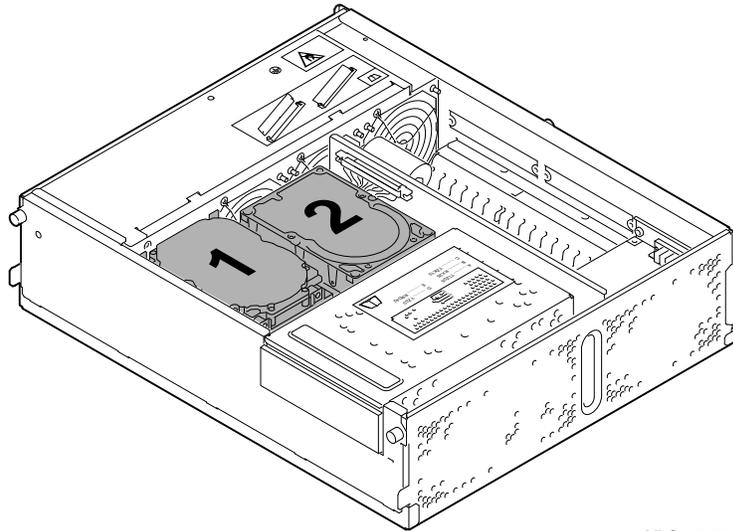
To change the setting, choose one from Figure 8-2 that is not in use, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them in case you need them later.

Installing the RZ24L Fixed Disk Drive

Where to Install

If you have only one fixed disk drive, install it in the position closer to the front of the system unit, shown as position 1 in Figure 8-3. Install a second drive in position 2. Up to two of the following drives can be installed in any combination in the two positions: RZ24L, RZ25, or RZ26.

Figure 8-3 Position of the RZ24L Fixed Disk Drive



MLO-008923

Installing the RZ24L Fixed Disk Drive

Task Overview

These are the tasks involved in installing the RZ24L fixed disk drive:

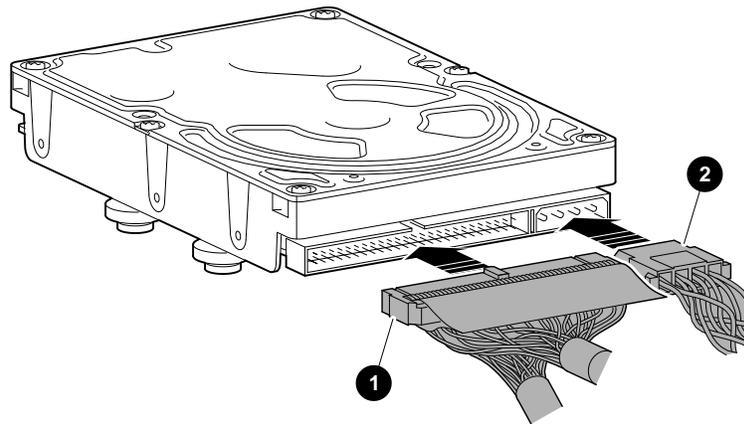
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert the drive into the system unit.

Task 1: Connect the Cables

To connect the SCSI and power cables to the RZ24L:

1. Hold the SCSI connector with the key facing up.
2. Connect the power cable **2** and the SCSI cable **1** into the back of the drive. See Figure 8-4.

Figure 8-4 Connecting Cables to the RZ24L Drive



MLO-008925

Installing the RZ24L Fixed Disk Drive

Task 2: Insert the RZ24L Drive

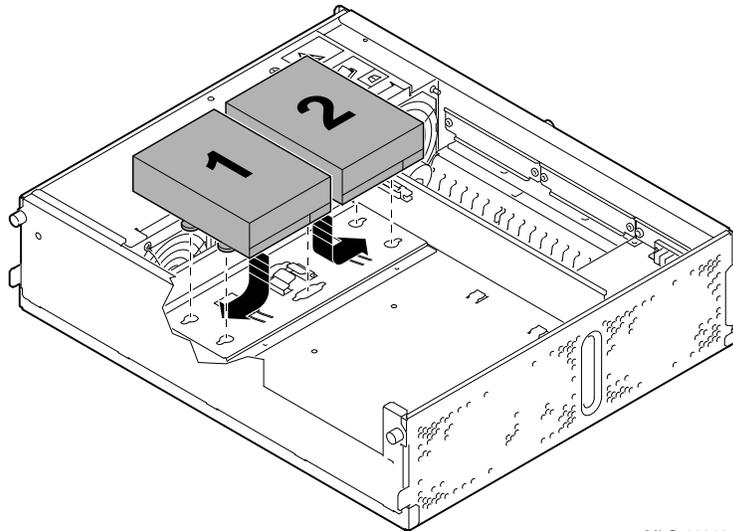
To insert the drive into the system unit:

1. Hold the drive so that the attached cables are facing to your right.

There is a small diagram stamped into the drive plate, (under the arrows in Figure 8-5) that shows this orientation.

2. Place the knobs at the base of the drive into the keyhole slots at the base of the drive plate.
3. Slide the drive away from the tab until it clicks into place, as shown in Figure 8-5.

Figure 8-5 Installing the RZ24L Fixed Disk Drive



MLO-008924

Installing the RZ24L Fixed Disk Drive

What Comes Next

This completes installation of the RZ24L fixed disk drive.

If you need to	Then
Remove the RZ24L drive or understand the drive specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Removing the RZ24L Fixed Disk Drive

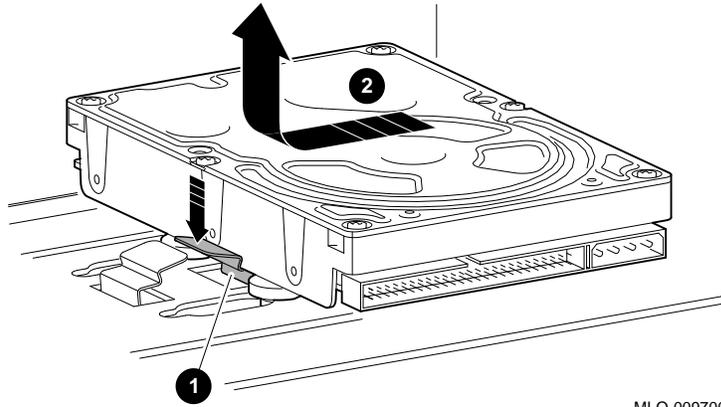
Remove the Drive

To remove the RZ24L drive:

1. While pushing down on the tab ❶ with the eraser end of a pencil, push the disk in the direction of the tab and lift out ❷, as shown in Figure 8-6.

Removing the RZ24L Fixed Disk Drive

Figure 8–6 Removing the RZ24L Fixed Disk Drive



MLO-009700

2. Disconnect the internal SCSI cable by pulling on the white tab and disconnect the power cable.
3. Carefully press all cables back into the system unit.

RZ24L Fixed Disk Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight	Height	Width	Depth
.47 kg (1.05 lb)	2.54 cm (1.0 in)	10.2 cm (4.0 in)	14.6 c m (5.75 in)

Formatted Storage Capacity

The following table lists the formatted storage capacity of the drive:

Variable	Description
Capacity per drive	245.4 MB
Capacity per block	512 bytes
Blocks per drive	479,350
Spare blocks per drive	1818

Performance

The following table lists the performance of the drive:

Variable	Description
Transfer rate to/from media	1.87 MB/s to 3.75 MB/s
Bus asynchronous mode	4.0 Mb/s
Bus synchronous mode	5.0 Mb/s
Seek time track to track	2½ msec
Seek time average	16 msec
Seek time maximum (full stroke)	≤ 30 msec
Average rotational latency	6.97 msec
Rotational speed	4306 rpm
Start time	16 sec nominal, 20 sec max.

RZ24L Fixed Disk Drive Specifications

Variable	Description
Stop time	16 sec nominal, 20 sec max.
Interleave	1:1

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Variable	Operating Level
Ambient temperature ¹	10°C to 55°C (50°F to 132°F)
Relative humidity	8% to 80%
Maximum wet bulb temperature	25.6°C (78°F)
Altitude	-305 m to 3050 m (-1000 ft to 10,000 ft)

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Nonoperating Variable	Level
Ambient temperature	-40°C to 66°C (-40°F to 150°F)
Relative humidity	8% to 95%, packaged, noncondensing
Maximum wet bulb temperature	46°C (115°F), packaged, noncondensing
Altitude	-305 m to 12,200 m (-1000 ft to 40,000 ft)

9

RZ25 Fixed Disk Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap

In This Chapter

This chapter covers the following topics:

- RZ25 Fixed Disk Drive Description
- Setting the SCSI Jumpers
- Installing the RZ25 Fixed Disk Drive
- Removing the RZ25 Fixed Disk Drive
- RZ25 Fixed Disk Drive Specifications

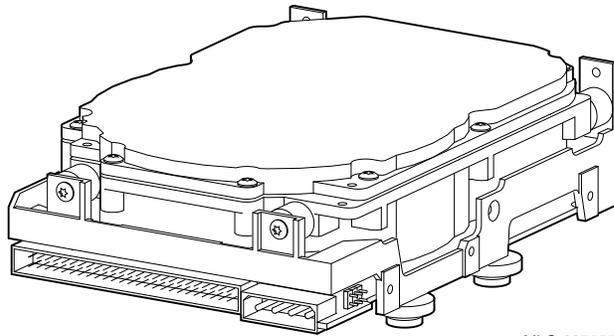
RZ25 Fixed Disk Drive Description

Purpose The RZ25 disk drive allows you to store large amounts of data on a fixed disk. The drive can be used for storage of applications and user files.

Storage Capacity The RZ25 fixed disk has a storage capacity of 426 megabytes.

Illustration Figure 9-1 shows the RZ25 disk drive.

Figure 9-1 RZ25 Fixed Disk Drive



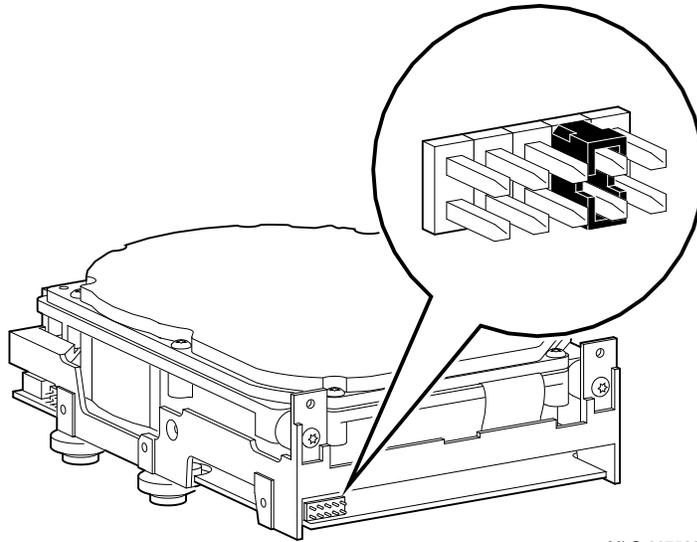
MLO-007555

Setting the SCSI Jumpers

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI setting. SCSI settings are determined by the position of three removable electrical connectors, called jumpers. There are two sets of RZ25 jumpers: one set located on the back of the drive, as shown in Figure 9-2, and one set located on the front, as shown in Figure 9-3.

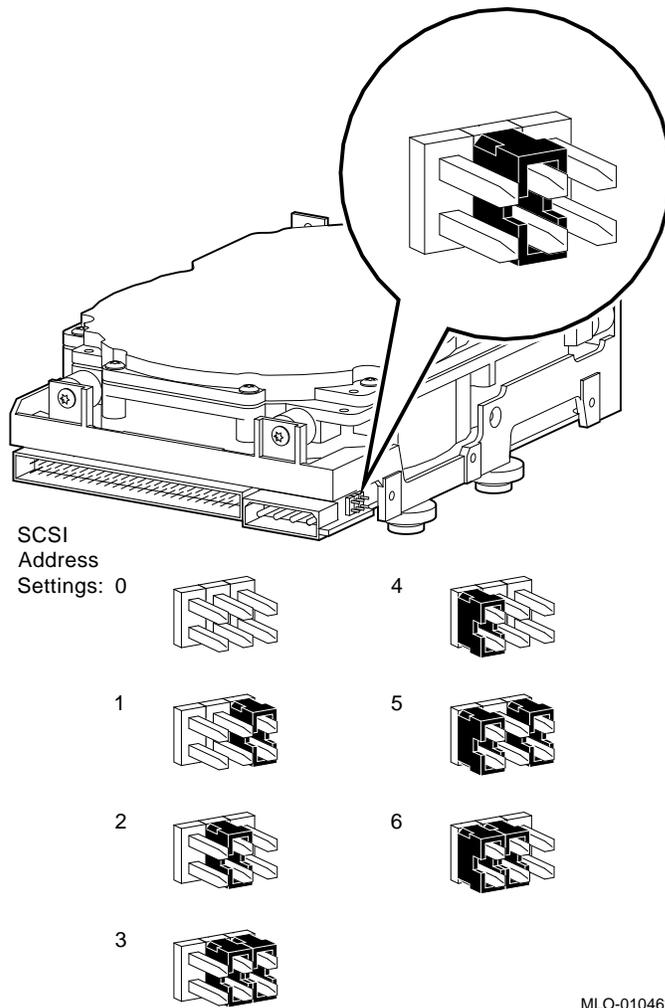
Figure 9-2 RZ25 SCSI Jumpers (Back)



MLO-007562

Setting the SCSI Jumpers

Figure 9-3 RZ25 SCSI Jumpers (Front)



SCSI Factory Setting

When your RZ25 drive arrives from the factory, all SCSI jumpers may be attached so that they are not lost during shipment. If this is the case, set the first three jumpers of one set to setting 1, 2, or 3, the recommended settings for a fixed disk drive. Remove the first three jumpers from the other set. Figure 9-3 shows the jumpers on the back of the disk at SCSI setting 2, where:

- The first jumper is removed
- The second jumper is attached
- The third jumper is removed

However, if the drive is not preset to setting 1, 2, or 3, you need to change it *only* if that drive's preset setting is already taken by another device installed in your system.

To Change SCSI Settings

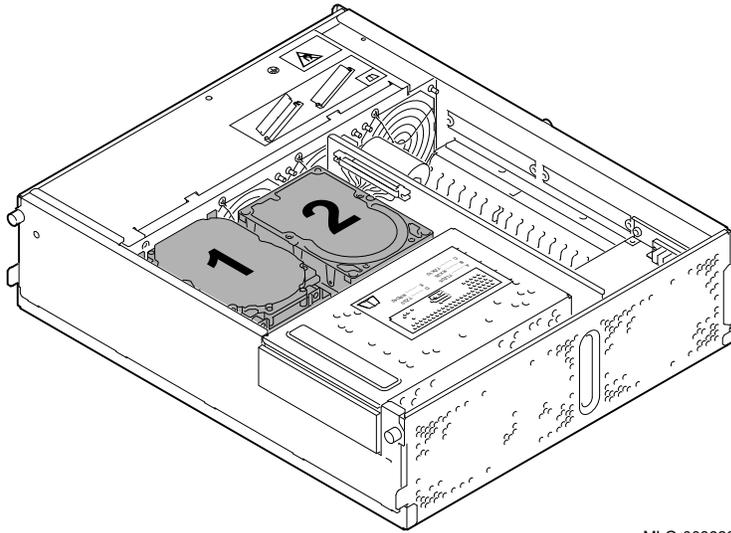
To change the setting, choose one from Figure 9-3 that is not in use, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them in case you need them later.

Installing the RZ25 Fixed Disk Drive

Where to Install

If you have only one fixed disk drive, install it in the position closer to the front of the system unit, shown as position 1 in Figure 9-4. Install a second drive in position 2. Up to two of the following drives can be installed in any combination in the two positions: RZ24L, RZ25, or RZ26.

Figure 9-4 Position of the RZ25 Fixed Disk Drive



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Installing the RZ25 Fixed Disk Drive

Task Overview

These are the tasks involved in installing the RZ25 fixed disk drive:

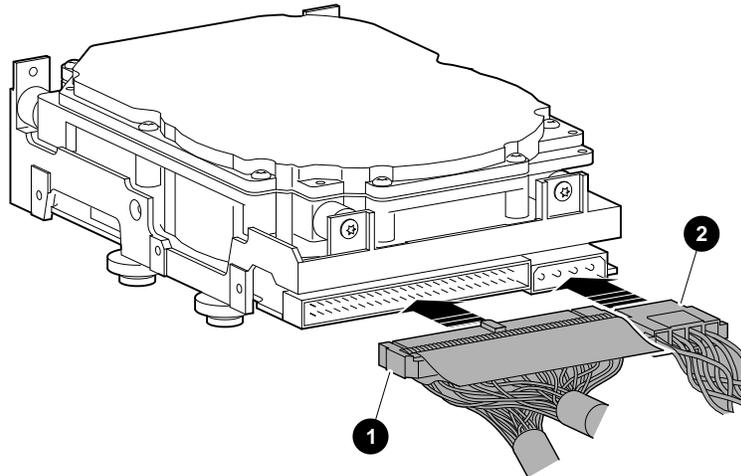
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert the drive into the system unit.

Task 1: Connect the Cables

To connect the SCSI and power cables to the RZ25:

1. Hold the SCSI cable with the key facing up.
2. Connect the power cable **2** and the SCSI cable **1** into the back of the drive. See Figure 9-5.

Figure 9-5 Connecting Cables to the RZ25 Drive



MLO-009383

Installing the RZ25 Fixed Disk Drive

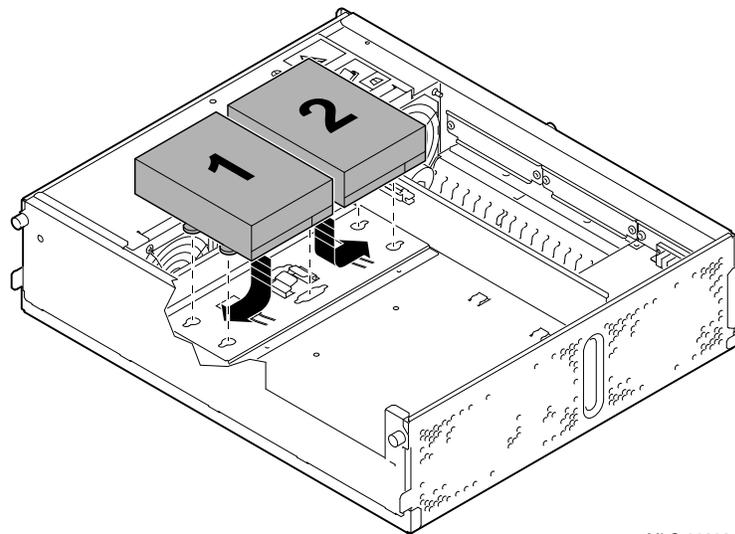
Task 2: Insert the RZ25 Drive

To insert the drive into the system unit:

1. Hold the drive so that the attached cables are facing to your right.

There is a small diagram stamped into the drive plate (under the arrows in Figure 9-6) that shows this orientation.

Figure 9-6 Installing the RZ25 Fixed Disk Drive



MLO-008924

Installing the RZ25 Fixed Disk Drive

2. Place the knobs on the base of the drive into the keyhole slots on the bottom of the drive plate
3. Slide the drive away from the tab until it clicks into place.

What Comes Next

This completes installation of the RZ25 fixed disk drive.

If you need to	Then
Remove the RZ25 drive or understand the drive specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

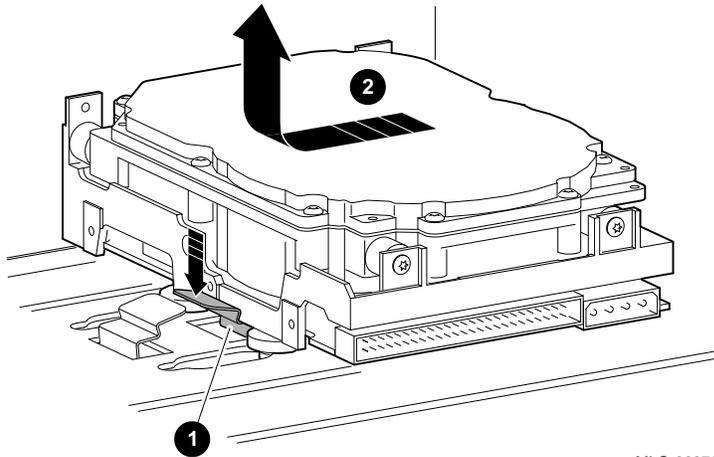
Removing the RZ25 Fixed Disk Drive

Remove the Drive

To remove the RZ25 drive:

1. While pushing down on the tab **1** with the eraser end of a pencil, push the disk in the direction of the tab and lift out **2**, as shown in Figure 9-7.

Figure 9-7 Removing the RZ25 Fixed Disk Drive



MLO-009701

2. Disconnect the internal SCSI cable by pulling on the white tab and disconnect the power cable.
3. Carefully press all cables back into the system unit.

RZ25 Fixed Disk Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight	Height	Width	Depth
0.8 kg (1.8 lb)	4.1 cm (1.63 in)	10.2 cm (4.0 in)	14.6 cm (5.75 in)

Formatted Storage Capacity

The following table lists the formatted storage capacity of the drive:

Variable	Description
Megabytes per drive	426
Megabytes per surface	47.3
Bytes per track	24,576–37,376 (variable)
Bytes per block	512 bytes
Blocks per drive	832,031
Blocks per track	48
Spare blocks per track	1
Spare blocks per drive	14,148
Spare cylinders	2
Buffer size	60 KB

RZ25 Fixed Disk Drive Specifications

Performance

The following table lists the performance of the drive:

Variable	Description
Transfer rate to/from media	2.1–3.2 MB/sec (variable)
Transfer rate to/from buffer	2.33 MB/sec
Bus asynchronous mode	3.0 MB/sec
Bus synchronous	4.0 MB/sec
Seek time track to track	2½ msec
Seek time average	14 msec
Seek time maximum (full stroke)	28 msec
Average rotational latency	6.8 msec
Rotational speed	4412 ± 0.5%
Start time	20 sec maximum
Stop time	30 sec maximum
Interleave	1:1

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Variable	Operating Level
Ambient Temperature ¹	10°C to 55°C (50°F to 122°F)
Relative Humidity	8% to 80%, noncondensing
Maximum wet bulb temperature	25.6°C (78°F)
Minimum dew point temperature	2°C (36°F)
Altitude	30.48 m to 304.78 m (100.58 ft to 1005.77 ft) at 36°C (96°F)

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

RZ25 Fixed Disk Drive Specifications

**Nonoperating
Conditions**

The following table lists the nonoperating conditions of the drive:

Nonoperating Variable	Level
Ambient Temperature	-40°C to 66°C (-40°F to 151°F)
Relative Humidity	8% to 95%, noncondensing
Maximum wet bulb temperature	46°C (115°F)
Minimum dew point temperature	2°C (36°F)
Altitude	-300 m to 3,000 m (-984.3 ft to 9843 ft) at 36°C (96°F)

10

RZ26 Fixed Disk Drive

Chapter Overview

IMPORTANT:
Before You
Install or
Remove a Drive

You must prepare your system before you can install or remove this drive. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap

In This Chapter

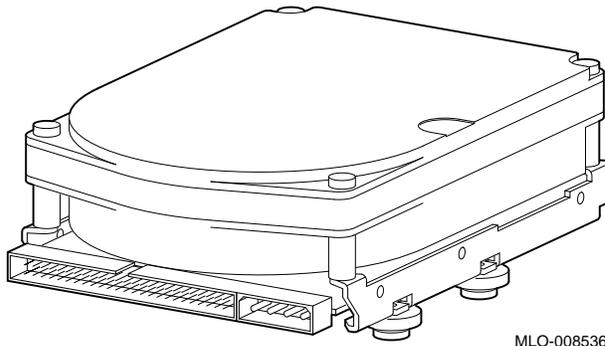
This chapter covers the following topics:

- RZ26 Fixed Disk Drive Description
- Setting the SCSI Jumpers
- Installing the RZ26 Fixed Disk Drive
- Removing the RZ26 Fixed Disk Drive
- RZ26 Fixed Disk Drive Specifications

RZ26 Fixed Disk Drive Description

- Purpose** The RZ26 disk drive allows you to store large amounts of data on a fixed disk. The disk can be used for storage of software applications and user files.
- Storage Capacity** The storage capacity of the RZ26 fixed disk drive is 1.05 gigabytes.
- Illustration** Figure 10–1 shows the RZ26 disk drive.

Figure 10–1 RZ26 Fixed Disk Drive



MLO-008536

Setting the SCSI Jumpers

SCSI Address Settings

For proper communication between your system and all the drives installed in the system unit, each drive must have a unique SCSI address setting. These settings are determined by the position of three removable electrical connectors, called jumpers, located on the back of the drive. On the RZ26 drive, these jumpers are labeled 0, 1, and 2 and can be either attached or removed.

SCSI Factory Setting

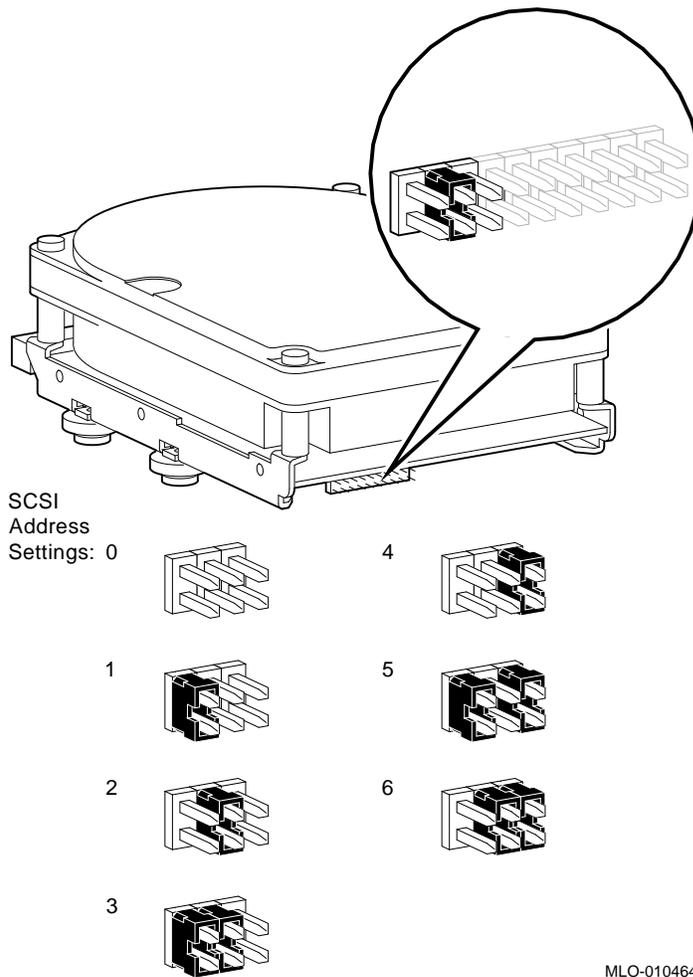
When your RZ26 drive arrives from the factory, all SCSI jumpers may be attached to prevent their loss during shipment. If this is the case, you should reset the jumpers to an address setting of 1, 2, or 3, the recommended settings for a fixed disk drive. Figure 10–2 shows the drive at setting 2, where the first three jumpers from left to right are set as follows:

- The first jumper is removed
- The second jumper is attached
- The third jumper is removed

However, if the drive is not preset to one of those settings, you need to change it *only* if that drive's preset setting is already taken by another device installed in your system.

Setting the SCSI Jumpers

Figure 10–2 RZ26 SCSI Jumpers



MLO-010464

To Change SCSI Settings

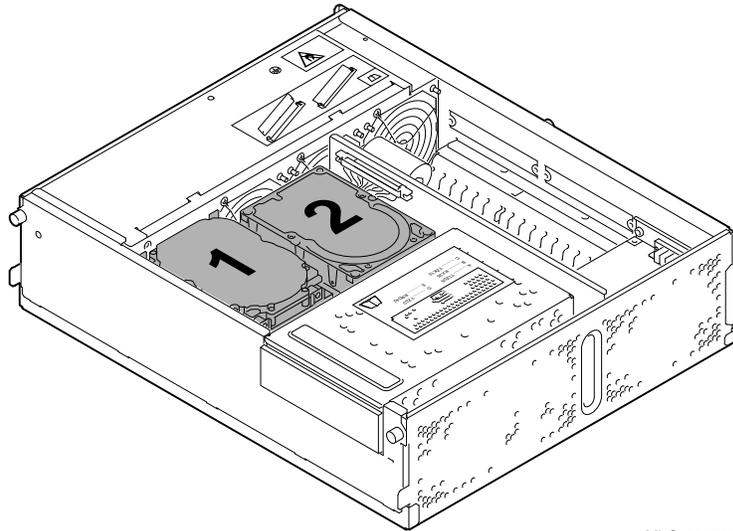
To change the setting, choose one from Figure 10–2 that is not in use, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them in case you need them later.

Installing the RZ26 Fixed Disk Drive

Where to Install

If you have only one fixed disk drive, install it in the position closer to the front of the system unit, shown as position 1 in Figure 10–3. Install a second drive in position 2. Up to two of the following drives can be installed in any combination in the two positions: RZ24L, RZ25, or RZ26.

Figure 10–3 Position of the RZ26 Fixed Disk Drive



MLO-008923

Installing the RZ26 Fixed Disk Drive

Task Overview

These are the tasks involved in installing the RZ26 fixed disk drive:

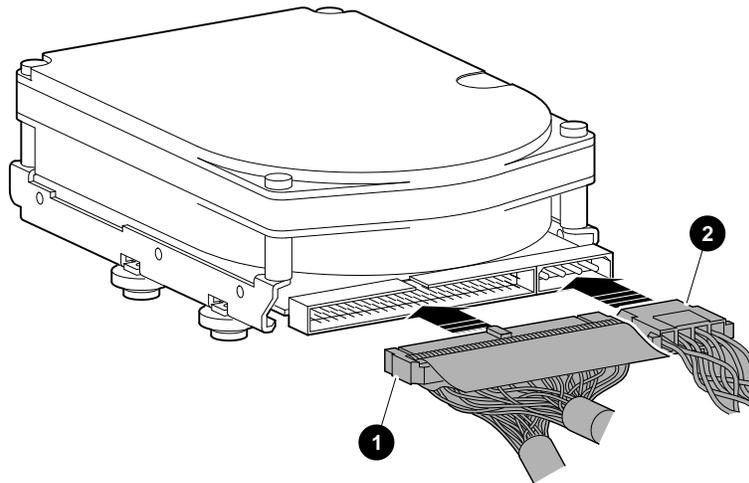
Task	Action
1	Connect the SCSI and power cables to the drive.
2	Insert the drive into the system unit.

Task 1: Connect the Cables

To connect the SCSI and power cables to the RZ26 drive:

1. Hold the SCSI cable with the key facing up.
2. Connect the power cable ❷ and the SCSI cable ❶ to the back of the drive. See Figure 10-4.

Figure 10-4 Connecting Cables to the RZ26 Drive



MLO-009384

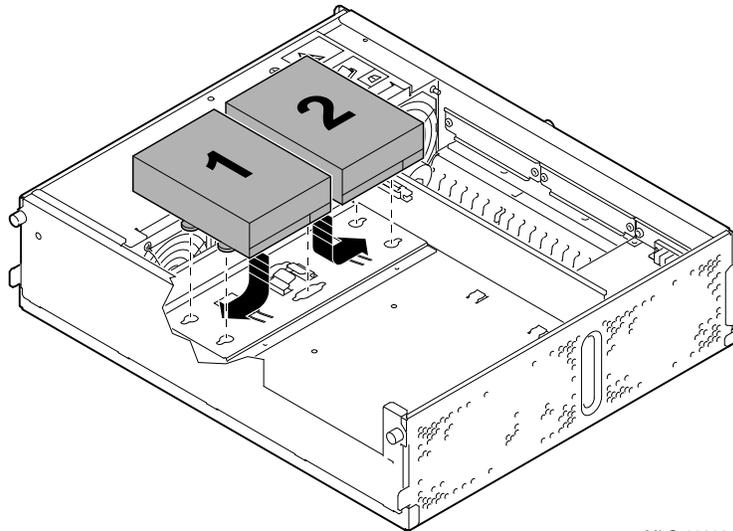
Installing the RZ26 Fixed Disk Drive

Task 2: Insert the RZ26 Drive

To insert the drive into the system unit:

1. Hold the drive so that the attached cables are facing to your right.
There is a small diagram stamped into the drive plate that shows this orientation.
2. Place the knobs at the base of the drive into the keyhole slots at the base of the drive plate.
3. Slide the drive away from the tab until it clicks into place, as shown in Figure 10-5.

Figure 10-5 Installing the RZ26 Fixed Disk Drive



MLO-008924

Installing the RZ26 Fixed Disk Drive

What Comes Next

This completes installation of the RZ26 fixed disk drive.

If you need to	Then
Remove the RZ26 drive or understand the drive specifications	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Removing the RZ26 Fixed Disk Drive

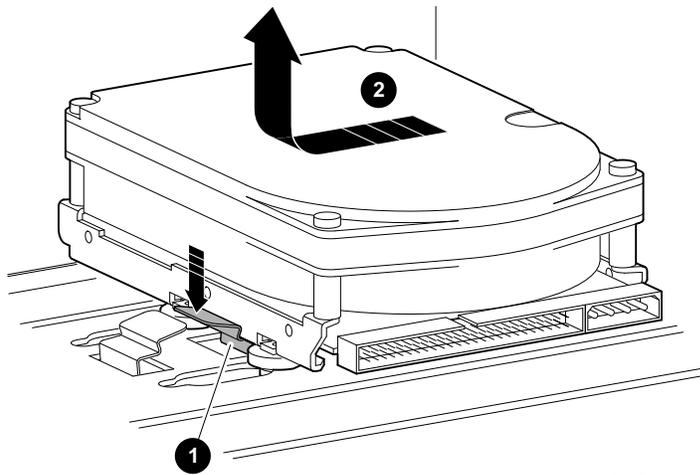
Remove the Drive

To remove the RZ26 drive:

1. While pushing down on the tab ❶ with the eraser end of a pencil, push the disk in the direction of the tab and lift out ❷, as shown in Figure 10-6.

Removing the RZ26 Fixed Disk Drive

Figure 10–6 Removing the RZ26 Fixed Disk Drive



MLO-009702

2. Disconnect the SCSI cable by pulling on the white tab and disconnect the power cable.
3. Carefully press all cables back into the system unit.

RZ26 Fixed Disk Drive Specifications

Weight and Dimensions

The following table lists the weight and dimensions of the drive:

Weight	Height	Width	Depth
0.9 kg (1.9 lb)	4.12 cm (1.625 in)	10.2 cm (4.00 in)	14.6 cm (5.75 in)

Formatted Storage Capacity

The following table lists the storage capacity of the drive:

Variable	Description
Bytes per track	29,640
Megabytes per drive	1050
Megabytes per surface	75
Buffer size	512 KB

Performance

The following table lists the performance of the drive:

Variable	Description
Transfer rate to/from media	2.6 MB/sec
Seek time track to track	1 msec
Seek time average	10 msec
Seek time maximum (full stroke)	≤ 20 msec
Average rotational latency	5.6 msec
Rotational speed	5363 rpm

RZ26 Fixed Disk Drive Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Variable	Operating Level
Ambient temperature ¹	10°C to 50°C (50°F to 122°F)
Relative humidity	10% to 90%

¹Reduce maximum temperature by 1.8°C (3.24°F) for each 1000-meter (3300-foot) increase in altitude.

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

Nonoperating Variable	Level
Ambient temperature	-40°C to 66°C (-40°F to 151°F)
Relative humidity	8% to 95%, noncondensing

11

Memory Modules

Chapter Overview

IMPORTANT:
**Before You
Install or
Remove
Memory**

You must prepare your system before you can install or remove any memory options. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap

In This Chapter

This chapter covers the following topics:

- Memory Mother Board and Module Description
- Installing Memory Modules
- Removing Memory Modules

Memory Mother Board and Module Description

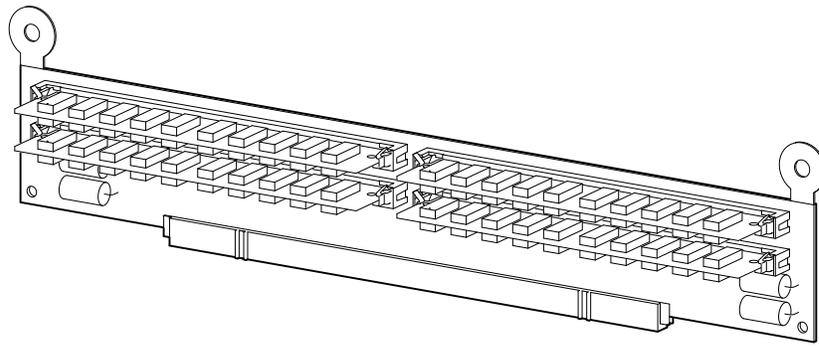
Memory Mother Board

The DEC 3000 Model 400/400S AXP system holds four memory mother boards (MMBs). Each MMB includes:

- Two plastic removal tags, one on each top corner
- Two double- or single-sided memory modules in an upper tier
- Two double- or single-sided memory modules in a lower tier

Figure 11–1 shows a deinstalled MMB with four double-sided connected memory modules.

Figure 11–1 Memory Mother Board



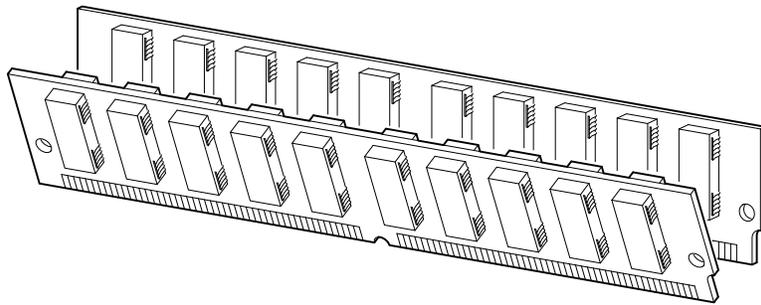
MLO-009703

Memory Mother Board and Module Description

Memory Module

Figure 11–2 shows two memory modules alone.

Figure 11–2 Two Memory Modules



MLO-007563

Memory Capacity

The DEC 3000 Model 400/400S AXP system has the capacity to hold, in the future, a maximum of 512 megabytes of memory: 16 memory modules. At the time the system is first shipped, it holds up to 128 megabytes of memory. The basic system has at least 16 megabytes of memory (eight 2-MB modules) installed. To see how much memory is installed, enter the `show config` command at the console prompt (`>>>`).

Memory Mother Board and Module Description

Table 11–1 lists which modules to install for a given amount of memory.

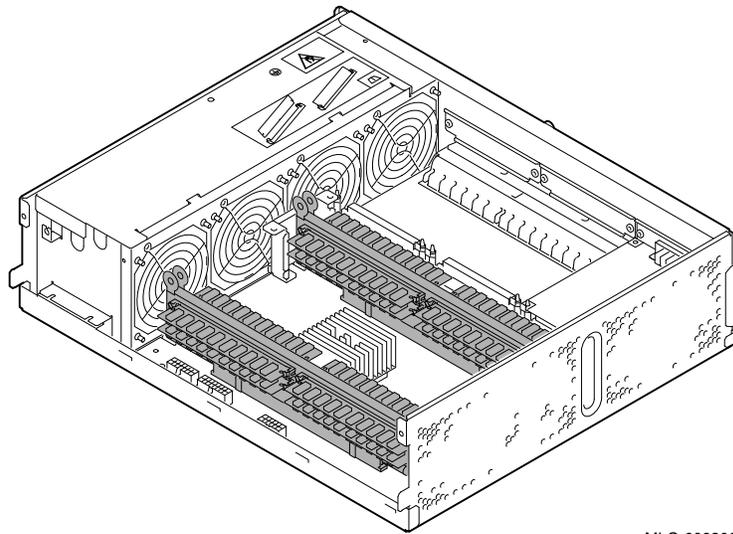
Table 11–1 Memory Capacity

For This Total Amount of Memory	Use Either This Configuration	Or This Configuration
16 MB	Upper tier: empty Lower tier: two 2-MB modules per MMB	
32 MB	Upper tier: two 2-MB modules per MMB Lower tier: two 2-MB modules per MMB	Upper tier: empty Lower tier: two 4-MB modules per MMB
48 MB	Upper tier: two 2-MB modules per MMB Lower tier: two 4-MB modules per MMB	
64 MB	Upper tier: two 4-MB modules per MMB Lower tier: two 4-MB modules per MMB	Upper tier: empty Lower tier: two 8-MB modules per MMB
80 MB	Upper tier: two 2-MB modules per MMB Lower tier: two 8-MB modules per MMB	
96 MB	Upper tier: Two 4-MB modules per MMB Lower tier: two 8-MB modules per MMB	
128 MB	Upper tier: Two 8-MB modules per MMB Lower tier: Two 8-MB modules per MMB	

Installing Memory Modules

Where to Install MMBs are located under the drive plate in the system unit, as shown in Figure 11-3.

Figure 11-3 Position of Memory Modules



MLO-009200

Installing Memory Modules

Task Overview

These are the tasks involved in installing additional memory modules:

Task	Action
1	Remove the drive plate.
2	Remove all four MMBs from the system unit.
3	Install the additional memory modules in sets of eight (two for each MMB).
4	Reinstall the MMBs.
5	Replace the drive plate.

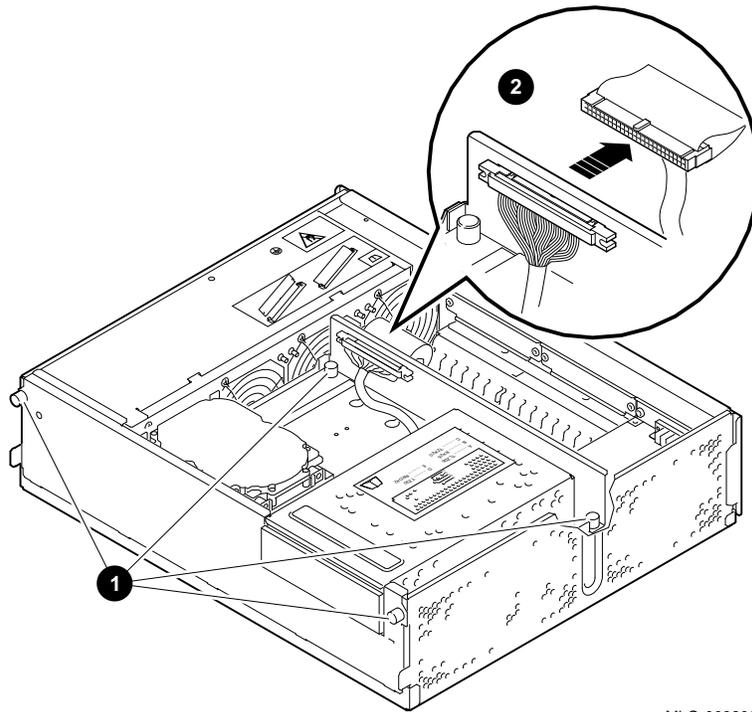
The following sections describe these steps.

Task 1: Remove the Drive Plate

The drive plate includes the front panel and the attached tray that holds the removable-media drive bracket and the two fixed disk drives (or the slots for these drives).

Refer to Figures 11–4 and 11–5 and follow Steps 1 through 5 to loosen and remove the drive plate:

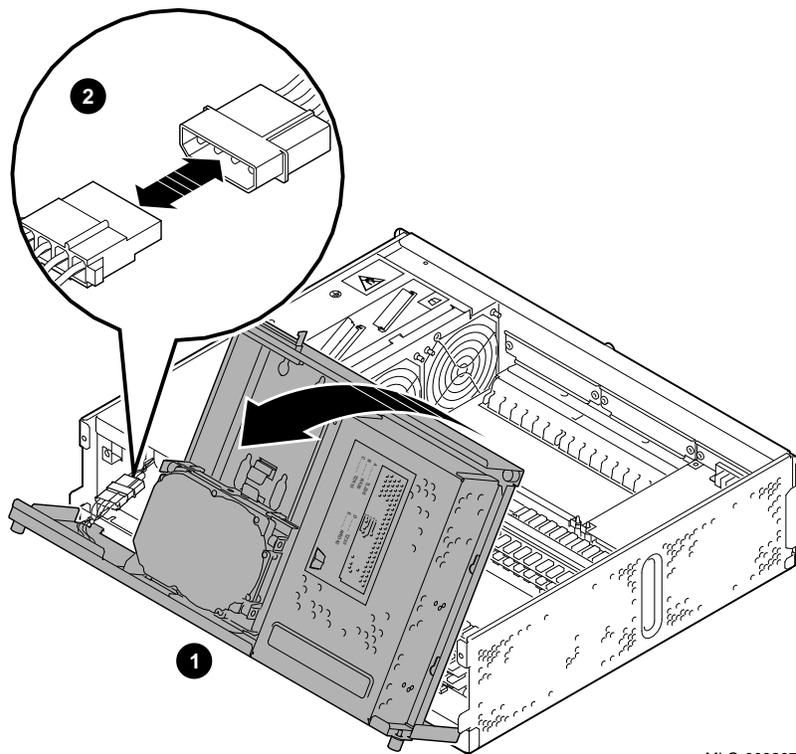
Figure 11-4 Loosening the Drive Plate



MLO-009206

1. Loosen the four captive screws, two at the back of the floor of the drive plate and two on the front panel ❶.
2. Disconnect the SCSI cable connected to the back of the drive plate by pushing out the spring clips on either side of the cable bracket and pulling on the white tab ❷.

Figure 11-5 Removing the Drive Plate



MLO-009207

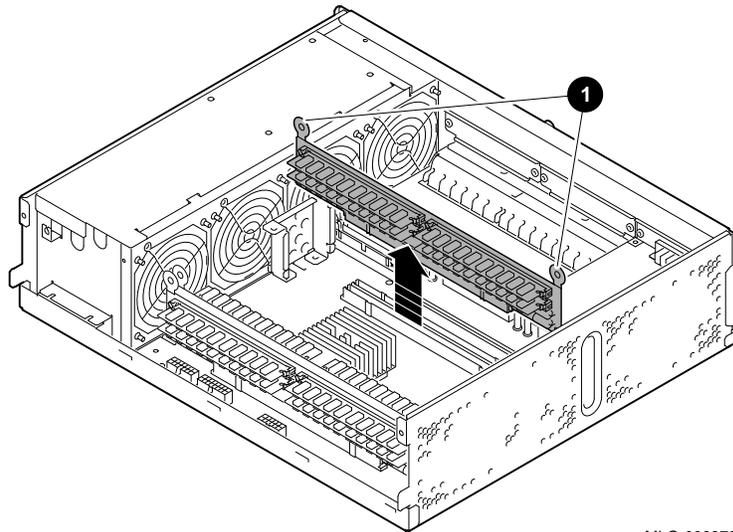
3. Pull up carefully on the back of the drive plate and tilt it forward ❶.
4. Disconnect the main internal power cable ❷.
5. Set the entire drive plate aside while you install or remove memory.

**Task 2:
Remove the
MMBs**

Remove all four MMBs from the system unit by following these steps:

1. Firmly pull straight up on the round plastic tabs **1** at the top corner of each MMB, as shown in Figure 11-6.

Figure 11-6 Removing a Memory Mother Board



MLO-009379

2. Place the MMB's flat surface down with any existing memory modules facing up.

**CAUTION:
System Module
Damage**

Do not install memory modules without removing the MMBs first. It is very likely you will damage the system module if modules are installed while the MMB is in place.

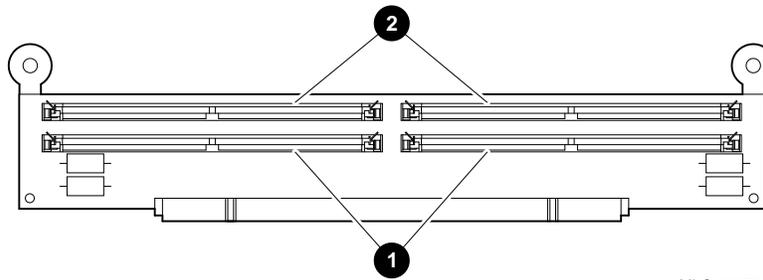
Installing Memory Modules

Installation Guidelines

Install memory modules using the following guidelines:

- Install modules in sets of eight, two modules in either the upper or the lower tier in each of the four MMBs.
- Install modules in the lower tiers **1** first; upper tiers **2** last, as shown in Figure 11-7.

Figure 11-7 Installing Memory Modules



- All upper tier modules must be of the same amount of memory and all lower tier modules must be of the same amount of memory. For example, the upper tier of MMB1 is 8 MB and the lower tier is 2 MB.

CAUTION: Use One Type of Module

Be sure to use only one size of memory module for each tier. If you mix sizes, the system may not recognize some of the memory. Also, do not attempt to use memory from any other system. Other modules are not necessarily compatible with this system.

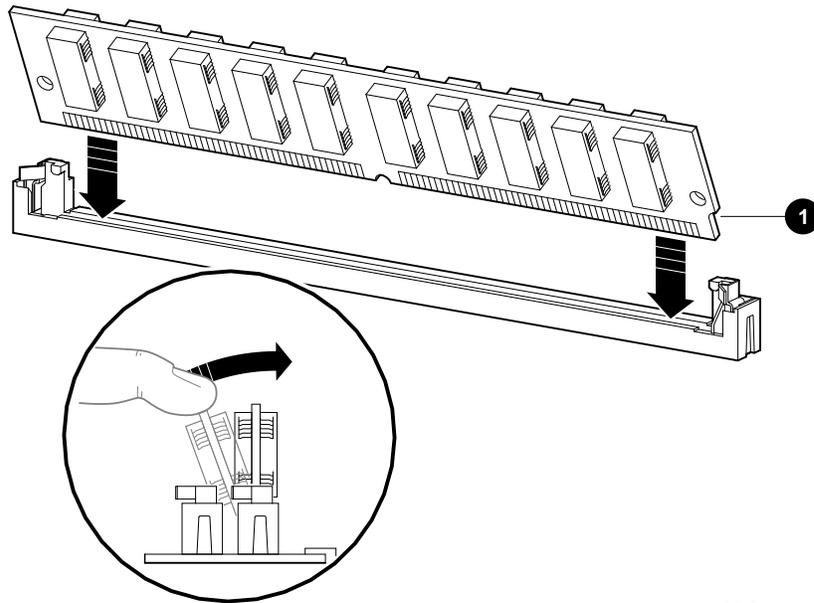
Task 3: Install Memory Modules

To install memory modules:

1. Hold the module with the notch **1** in the lower right corner, as shown in Figure 11-8.
2. Tilt the top of the module forward and lower the module over the connector in the MMB.
3. Firmly push down on the top end of the module until it clicks into place.

Installing Memory Modules

Figure 11–8 Installing a Memory Module



MLO-009380

CAUTION:
Damage

Always handle memory modules by their edges to avoid electrical damage and contamination of the module pins and connectors.

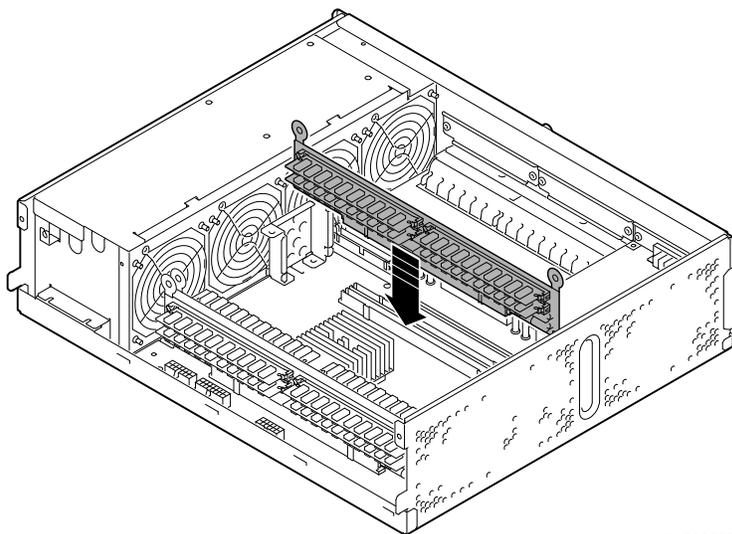
Task 4:
Reinstall the
MMBs

To reinstall each MMB:

1. Position the connector end of the module over the connector on the system unit.
2. Push firmly on the top ends and the top center to be sure the board is seated correctly, as shown in Figure 11–9

Installing Memory Modules

Figure 11–9 Reinstalling a Memory Board



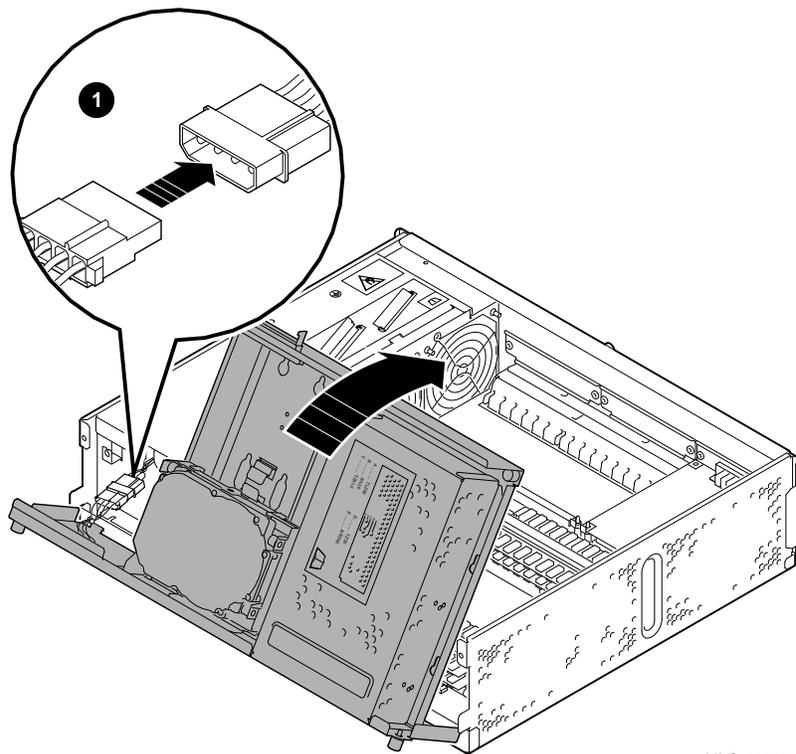
MLO-009382

**Task 5:
Replace the
Drive Plate**

To replace the drive plate:

1. Align the five tabs along the bottom front panel with the slots on the front of the system unit.
2. Tilt the drive plate towards the back of the system unit, as shown in Figure 11-10.
3. Reconnect the main internal power cable ❶.

Figure 11-10 Tilting the Drive Plate Back

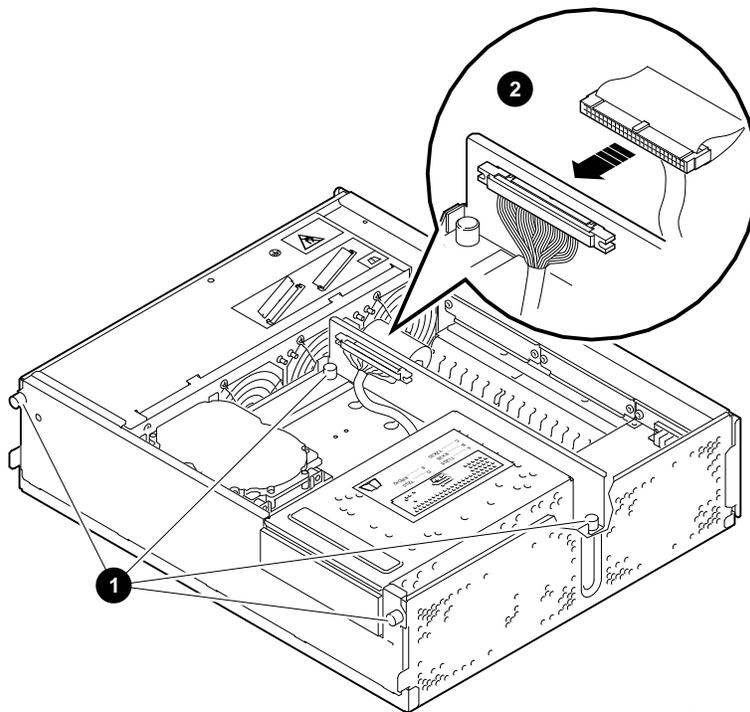


MLO-009208

Installing Memory Modules

4. Tighten the two front captive screws, one on each end of the front of the drive plate and the two back captive screws that hold the drive plate to the system unit, ❶ in Figure 11–11.
5. Reconnect the internal SCSI cable to the back of the drive plate ❷.

Figure 11–11 Replacing the Drive Plate



MLO-009209

What Comes Next

This completes installation of the memory modules.

If you need to	Then
Remove memory modules	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

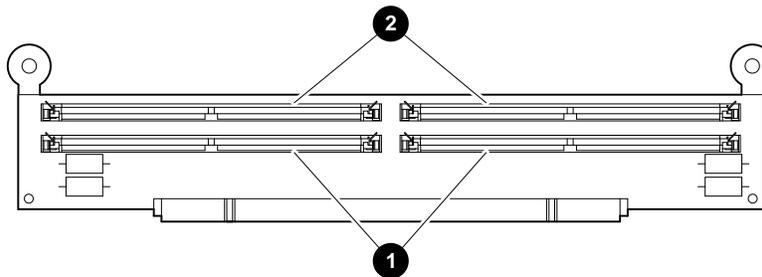
Removing Memory Modules

Removal Guidelines

Remove memory modules using the following guidelines:

- Remove modules in sets of eight, two modules from each of the four MMBs.
- Remove modules from the upper tiers ② first; lower tiers ① last, as shown in Figure 11–12.

Figure 11–12 Removing Memory Modules



MLO-009704

- The remaining modules in all upper tier modules must be of the same amount of memory and in all lower tier modules must be of the same amount of memory.

Removing Memory Modules

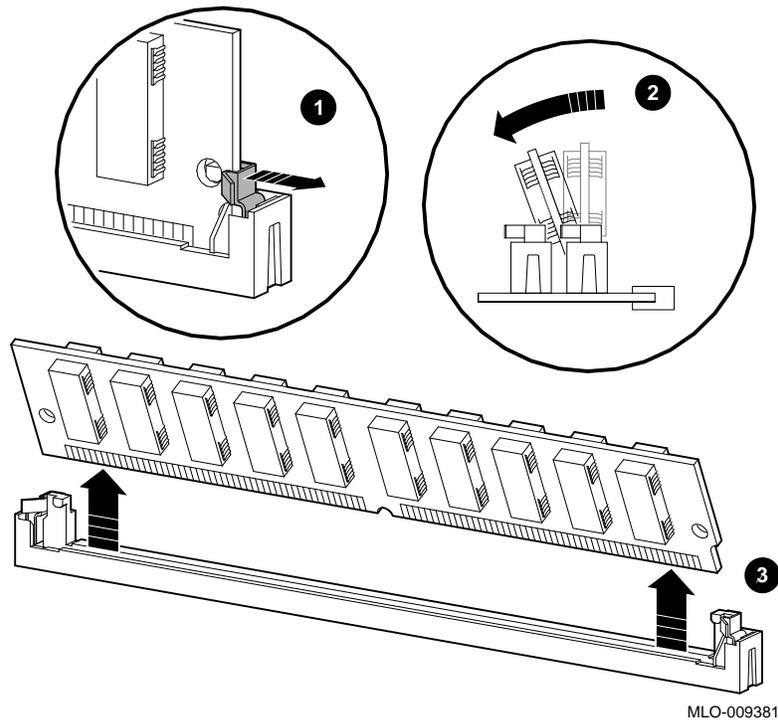
Remove a Module

Remove memory by removing the upper tier modules first in sets of eight: two from each MMB.

To remove a memory module, refer to Figure 11–13 and follow these steps:

1. Remove the drive plate as described earlier in this chapter.
2. Remove each MMB by pulling up firmly on the round plastic tabs, as shown in Figure 11–6, then lay the MMB flat.

Figure 11–13 Removing a Memory Module



Removing Memory Modules

3. Remove each memory module from the MMB by releasing the spring clips at each end of the module ❶, as shown in Figure 11–13.
4. Holding the module by its edges, tilt it towards you ❷ and pull up ❸.

After you remove as much memory as you want to, place each MMB back into its slot in the system unit.

12

TURBOchannel Options

Chapter Overview

IMPORTANT:
**Before You
Install or
Remove
TURBOchannel
Options**

You must prepare your system before you can install or remove any of the TURBOchannel options. See Chapter 2 to:

1. Back up files
2. Shut down the system software
3. Display the system configuration to determine the options already installed
4. Remove the cover from the system unit
5. Attach the antistatic wrist strap

In This Chapter

This chapter covers the following topics:

- TURBOchannel Description
- Graphics Support
- TURBOchannel Option Modules
 - HX 2D Frame Buffer
 - TX 2D Graphics Module
 - PXG+ 3D Graphics Module
 - PXG Turbo+ 3D Graphics Module
 - FDDI Module
 - AUI Ethernet Module

Chapter Overview

- Dual SCSI Adapter
- NVRAM Module
- Before Installing Modules
- Installing a TURBOchannel Option Module
- Removing a TURBOchannel Option Module

Third-Party Options

Although this chapter covers TURBOchannel option modules manufactured by Digital, other companies have developed modules that may be compatible with the DEC 3000 Model 400/400S AXP system. Digital's TRI/ADD program works with these third-party manufacturers to ensure compatibility with the TURBOchannel specification. Consult your Digital sales representative for more information.

TURBOchannel Description

Definition

A TURBOchannel is a high-performance interconnection that allows you to use a variety of Digital and third-party graphics, multimedia, and communications options. The TURBOchannel has a synchronous asymmetrical I/O channel that connects option modules to the system module. The system module and an option module have read or write access to each other, but option modules have no access to other option modules.

TURBOchannel Module Widths

TURBOchannel option modules come in three different widths: single-, double-, or triple-width. The modules connect to connectors on the system unit. There are also two upgrade kits that connect directly to the PXG module: the 8-to-24 plane upgrade and the 24-bit Z buffer upgrade.

Graphics Support

Graphics support is dependent on which operating system you are running, as shown in the next two sections.

OpenVMS Alpha Graphics

If your system is running the OpenVMS AXP operating system, the two-dimensional (2D) graphics option listed in Table 12–1 is available.

Table 12–1 Graphics Capabilities for OpenVMS AXP

Graphics Option	Description
HX	8-plane, accelerated 2D graphics and windowing operations

DEC OSF/1 Alpha Graphics

If your system is running the DEC OSF/1 AXP operating system, the graphics options listed in Table 12–2 are available.

Table 12–2 Graphics Capabilities for DEC OSF/1 AXP

Graphics Option	Description
HX	8-plane, accelerated 2D graphics and windowing operations
TX	24-plane true color 2D graphics; supports motion video
PXG+	Configurable 3D graphics: either 8-plane or 24-plane, double-buffered graphics, and optional 24-bit Z buffer graphics
PXG Turbo+	96-plane 3D graphics accelerator: 24-plane frame and double buffer graphics, 24-bit Z buffer graphics, and additional 24-bit configurable buffer graphics

OpenVMS AXP Support for 3D Applications

There is initially no support for three-dimensional (3D) hardware on the DEC 3000 Model 400/400S AXP system. However, 3D applications can be used by running a PHIGS (Programmer's Hierarchical Interactive Graphics System) or a GKS (Graphics Kernel System).

Graphics Support

Compatibility with Monitors

Not all graphics modules are compatible with all monitors. Before upgrading your graphics module, consider the monitor requirements. Consult your Digital service representative and your monitor documentation for more information.

The following monitors can display graphics generated by the DEC 3000 Model 400/400S AXP system graphics modules:

- VRT16-HA 16-inch color monitor
- VRT19-HA 19-inch color monitor
- VRM17-HA 17-inch monochrome monitor
- VR319-DA 19-inch monochrome monitor

IMPORTANT: Ordering Options Later

If you order any TURBOchannel options after you receive your system, you may receive documentation for a system other than the DEC 3000 Model 400/400S AXP system. Set that documentation aside and refer to this chapter.

TURBOchannel Option Modules
Option Part Numbers and Slot Widths

The following table lists the part number for each TURBOchannel option as well as how many TURBOchannel slots the module requires:

Name	Model Number	Slot Width
HX	PMAGB-BE/BF	1
TX	PMAGB-JA	1
PXG+ 8-plane	PMAGB-DA	2 (slots 0 and 2)
PXG+ 24-plane	PMAGB-EA	2 (slots 0 and 2)
PXG+ 8-24 plane upgrade	PMAG-GB	–
PXG+ Z buffer upgrade	PMAG-HA	–
PXG Turbo+	PMAGB-FA/FB	3
FDDI	DEFTA-AA/AB	1
AUI	PMAD-AA/AB	1
Dual SCSI adapter	PMAZB-A/AA/AB	2
NVRAM	DJ-30APS-AA/AB	1

TURBOchannel Option Modules

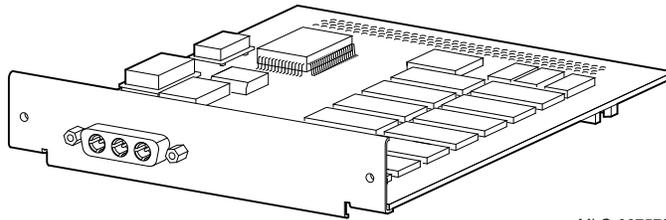
HX 2D Frame Buffer

Your DEC 3000 Model 400/400S AXP system is standardly shipped with the HX 2D single-width smart frame buffer TURBOchannel graphics option installed. A frame buffer is an area of memory that contains a pixel-level description of an image. The HX 2D module allows you a basic two-dimensional interface to the monitor providing acceleration for 2D line drawings, stippled polygon filling, pixel copy operations, and boolean operations (raster operations).

The HX 2D module is compatible with both the OpenVMS AXP and DEC OSF/1 AXP operating systems and supports a wide range of monitors.

Figure 12–1 shows the HX 2D frame buffer.

Figure 12–1 HX 2D Frame Buffer Module



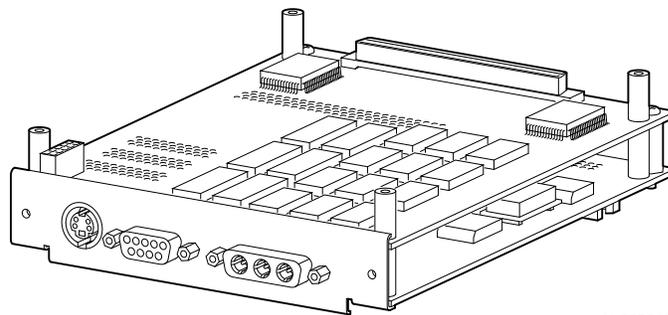
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TX 2D Graphics Module

The TX 2D graphics module is a single-width, 24-plane color frame buffer. This module is compatible only with the DEC OSF/1 AXP operating system, and supports a 1280-x-1024, 72-Hz monitor, such as a VRT16 or a VRT19.

Figure 12-2 shows the TX 2D graphics color frame buffer.

Figure 12-2 TX 2D Graphics Module



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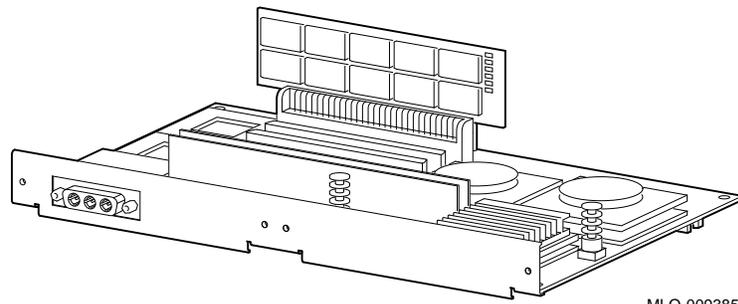
TURBOchannel Option Modules

PXG+ 3D Graphics Module

The PXG+ 3D graphics module is a color, double-width, 8-plane or 24-plane Z buffer. This module operates at 72 Hz and is compatible with the DEC OSF/1 AXP operating system only.

Figure 12-3 shows the 8-plane PXG+ module.

Figure 12-3 PXG+ 3D 8-plane Graphics Module



**CAUTION:
Possible PXG+
Damage**

To avoid physical damage to the PXG+ module during replacement and removal of the system unit cover, you must install this option in connectors 0 and 1.

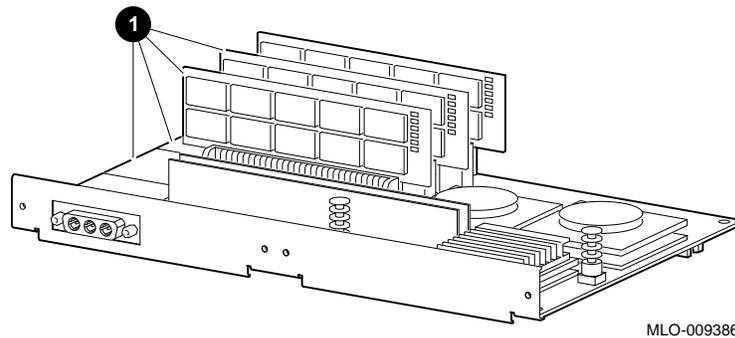
Upgrade Kits

You can also order the following two PXG+ upgrade kits that connect directly into the PXG+ module:

- The 8-to-24 plane upgrade
- The 24-bit Z buffer upgrade (the recommended base model)

Figure 12-4 shows the 24-plane PXG+ module with the 8-to-24 plane upgrade modules and chips **1**. (The chips are installed on the bottom of the PXG+ module).

Figure 12-4 PXG+ 3D 24-plane Graphics Module with 8-to-24 Plane Upgrade

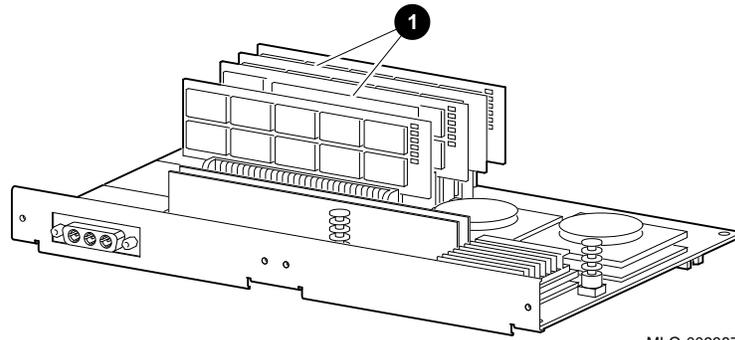


MLO-009386

TURBOchannel Option Modules

Figure 12-5 shows the 24-plane PXG+ module with the Z buffer upgrade modules ❶ that fit in between the 8-to-24 plane modules.

Figure 12-5 PXG+ 3D 24-plane Graphics Module with Z Buffer Upgrade



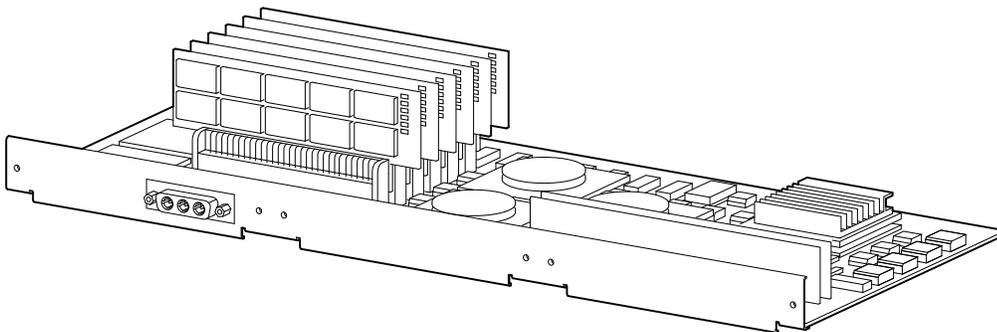
MLO-009387

**PXG Turbo+
3D Graphics
Module**

The PXG Turbo+ graphics module is a triple-width, high-performance, 24-plane 3D accelerator. This module is compatible with the DEC OSF/1 AXP operating system only and supports one or two 1280-x-1024, 66-Hz monitors, such as the VRT16 or the VRT19.

Figure 12-6 shows the PXG Turbo+ 3D 24-plane graphics module.

Figure 12-6 PXG Turbo+ 3D 24-plane Graphics Module



MLO-008587

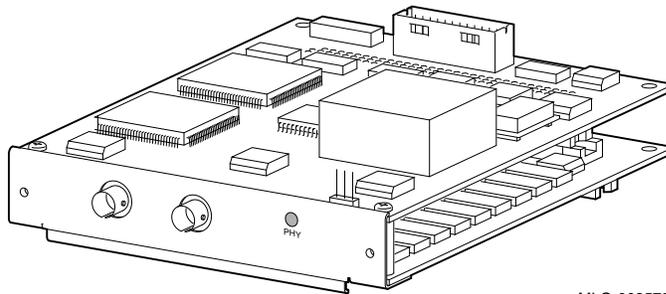
TURBOchannel Option Modules

FDDI Module

The FDDI module (DEFTA-AA) is a single-width FDDI Controller 700 communications adapter that allows you to connect the DEC 3000 Model 400/400S AXP system unit to the FDDI Ethernet network. This module is compatible with both the OpenVMS AXP and DEC OSF/1 AXP operating systems.

Figure 12-7 shows the FDDI module.

Figure 12-7 FDDI Module



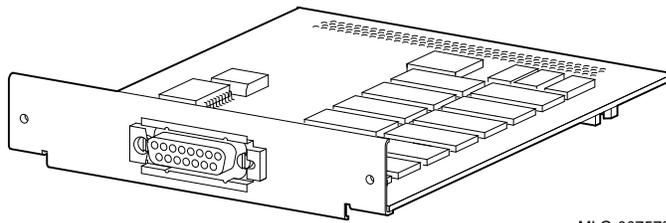
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AUI Ethernet Module

The AUI (Attachment Unit Interface) Ethernet module is a single-width, Ethernet communications controller that allows you to connect an additional AUI (thickwire) Ethernet network cable to the DEC 3000 Model 400/400S AXP system unit. This module is compatible with the OpenVMS AXP operating system only.

Figure 12-8 shows the AUI Ethernet module.

Figure 12-8 AUI Ethernet Module



MLO-007573

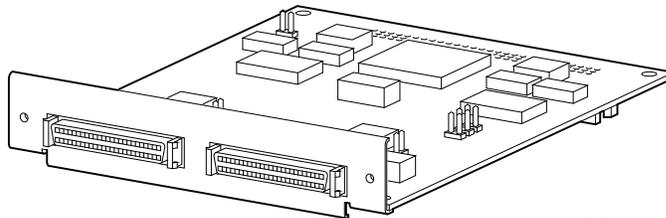
TURBOchannel Option Modules

Dual SCSI Adapter

The dual SCSI adapter (PMAZB-A) is a single-width TURBOchannel-to-SCSI interface. It provides two additional 8-bit SCSI ports that transfer up to 5 megabytes per second, and is compatible with the DEC OSF/1 AXP operating system only.

Figure 12-9 shows the dual SCSI adapter.

Figure 12-9 Dual SCSI Adapter



MLO-009706

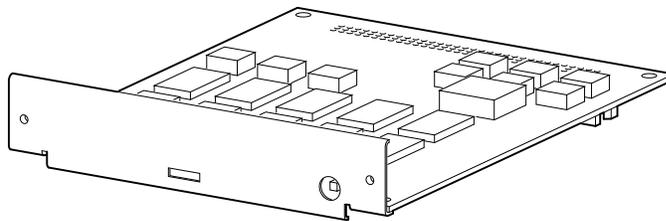
TURBOchannel Option Modules

NVRAM Module

The NVRAM module (DJ-30APS-AA) provides nonvolatile RAM storage for applications that require it. The module accommodates 1 megabyte of SRAM and has lithium battery backup. It occupies 1 slot.

Figure 12–10 shows the NVRAM module.

Figure 12–10 NVRAM Module



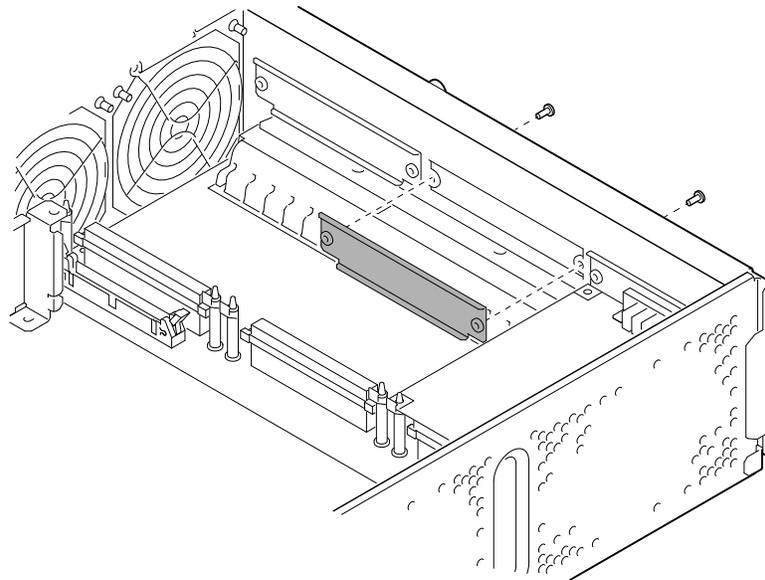
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Before Installing Modules

Remove the Metal Filler Plate

Until you add a TURBOchannel option, there is a metal filler plate over each slot opening at the back of the system unit. Each module port requires one open slot. Remove the two screws that hold the metal filler plate in place over the appropriate slot and remove the plate, as shown in Figure 12–11. You will need to check which plate to remove for each module first.

Figure 12–11 Removing a Metal Filler Plate



MLO-009710

Keep the Metal Plate

Set aside the two screws for attaching the new module, and save the metal filler plate in case you ever remove the option and need to replace the plate.

Preparing Modules

Before installing certain modules, you may need to make sure that jumpers are set correctly or remove mechanical spacers. These procedures are explained in the following sections.

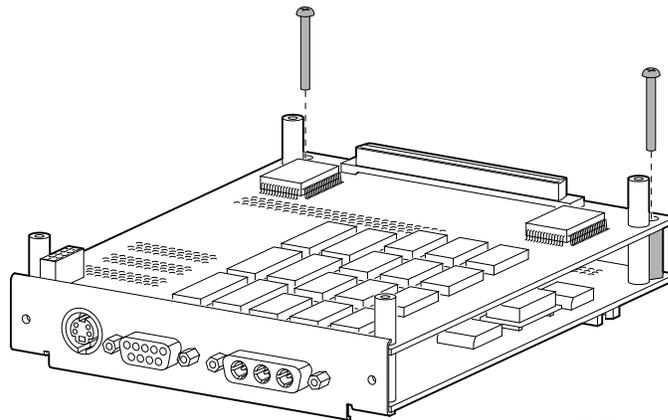
Before Installing Modules

HX Module Jumper Setting

Before installing an HX module, refer to the documentation that came with your HX module to set the module jumper for your monitor.

TX Module Modification

Before installing a TX module, remove the screws and spacers on the rear corners of the module, the shaded items shown in Figure 12–12. Be careful to remove only the corner screws and spacers, not the ones adjacent to the corner spacers.



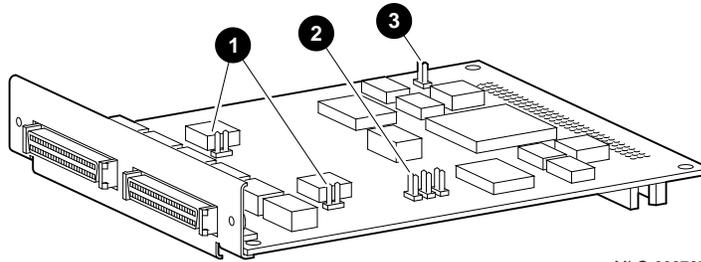
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Before Installing Modules

Dual SCSI Module Jumpers

Before installing a Dual SCSI module, make sure that the jumpers are set correctly. Referring to Figure 12–13, make sure that the terminator jumpers **1** are in place. Make sure that the flash memory write jumper **3** is removed. The jumper rest **2** is for storing up to three unused jumpers.

Figure 12–13 Dual SCSI Module Jumpers

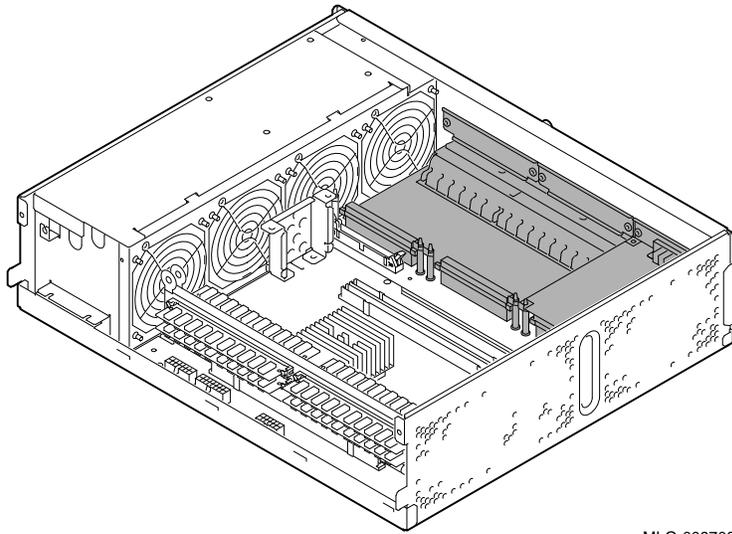


MLO-009707

Installing a TURBOchannel Option Module

Where to Install The shaded area in Figure 12–14 shows where to install the TURBOchannel option in the system unit.

Figure 12–14 Location of TURBOchannel Options

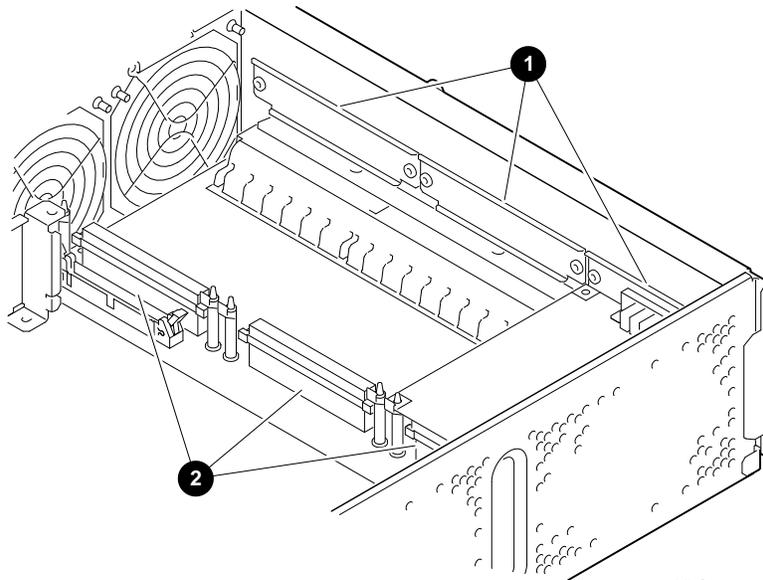


MLO-009708

Installing a TURBOchannel Option Module

As shown in Figure 12-15, there are three TURBOchannel connectors **2** on the inside of the system unit, behind the drive plate. There are also three corresponding slots **1**, labeled 0, 1, and 2, on the back of the system unit through which the TURBOchannel option ports extend.

Figure 12-15 TURBOchannel Slots and Connectors



MLO-009709

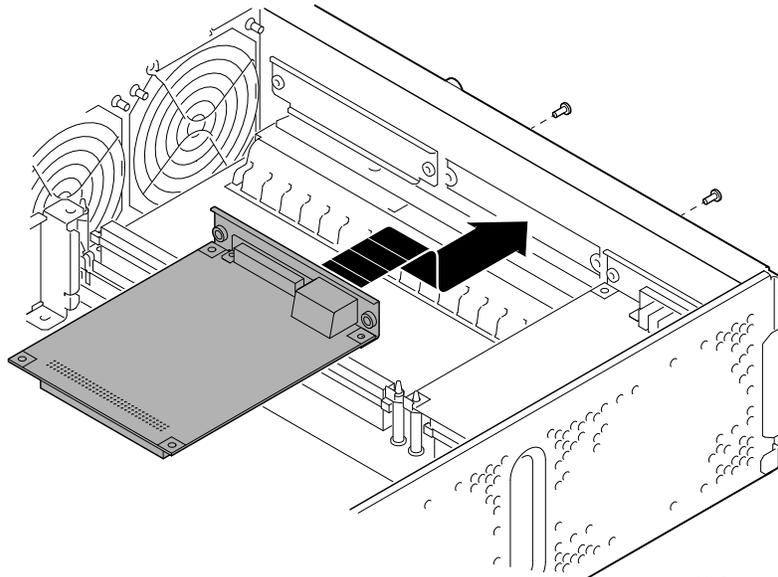
Installing a TURBOchannel Option Module

Insert the TURBOchannel Module

To insert a TURBOchannel option module, follow these steps:

1. Select one to three slots, depending on the width of the module. You may need to move an existing module to allow installation of a double- or triple-width module.
2. Orient the TURBOchannel module inside the system unit so that the module port faces the slot opening at the back of the system unit, as shown in Figure 12–16.

Figure 12–16 Installing a TURBOchannel Module



MLO-009711

Installing a TURBOchannel Option Module

3. Insert the module port into the open slot at the back of the system.
4. Firmly press on the back corners of the module so that the module's connector fits tightly into the connector on the system board.
5. Secure the TURBOchannel module to the back of the system unit using the two Phillips screws that held the metal filler plate.

What Comes Next

This completes the installation of TURBOchannel options.

If you need to	Then
Remove a TURBOchannel option	Continue with this chapter.
Add other options inside the system unit	Turn to the appropriate chapter for each option.
Add no other options inside the system unit	Refer to Chapter 13 to restore and check the system.

Removing a TURBOchannel Option Module

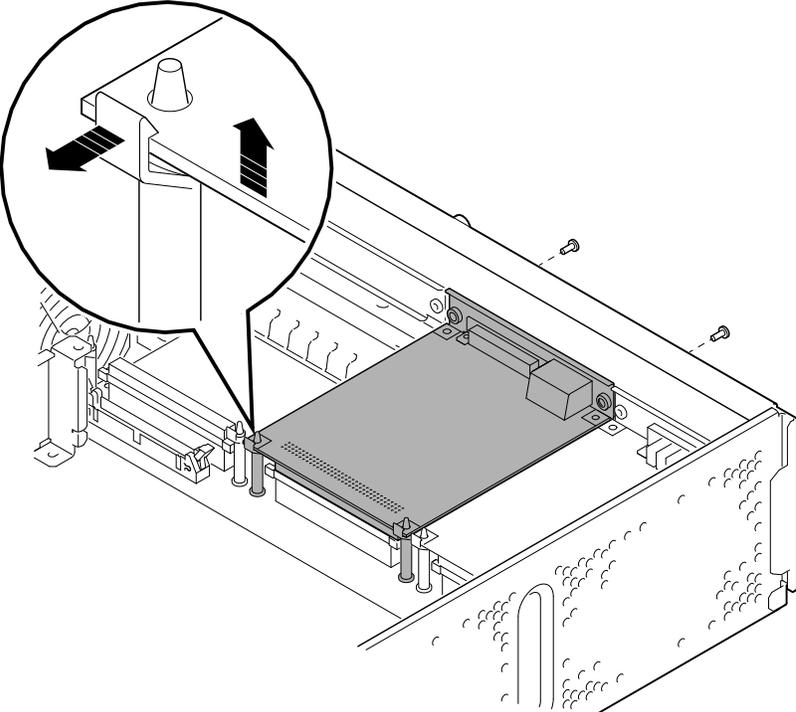
General Removal Procedure

To remove all TURBOchannel options except the PXG Turbo+, refer to Figure 12-17 and follow these steps:

1. Remove the two screws that secure the module to the back of the system unit.
2. Pull back on the mounting posts, pull up on the back of the TURBOchannel option, and slide the module out of the TURBOchannel slot.
3. Using the two screws you removed, replace the metal filler plate over any open slots.

Removing a TURBOchannel Option Module

Figure 12-17 Removing a TURBOchannel Module



MLO-009712

Removing a TURBOchannel Option Module

To Remove the PXG Turbo+ Option

Because the PXG Turbo+ option module requires three TURBOchannel slots, there are six mounting posts that must be released simultaneously to remove the module. If you remove this module, you may need assistance in releasing the mounting posts and pulling the module away from the system module connector.

13

Restoring the System

Chapter Overview

- In This Chapter** This chapter covers the following topics:
- Saving the Wrist Strap
 - Replacing the System Unit Cover
 - Restarting and Testing the System

Saving the Wrist Strap

Remove the Antistatic Wrist Strap

After you have installed all the internal options you want at this time, remove and save the antistatic wrist strap as follows:

1. Remove the copper end of the strap from the system unit.
2. Cover the sticky surface with the protective paper you removed earlier.
3. Unwrap the strap from your wrist.
4. Refold the strap and save it in the envelope it came in for future use.

Replacing the System Unit Cover

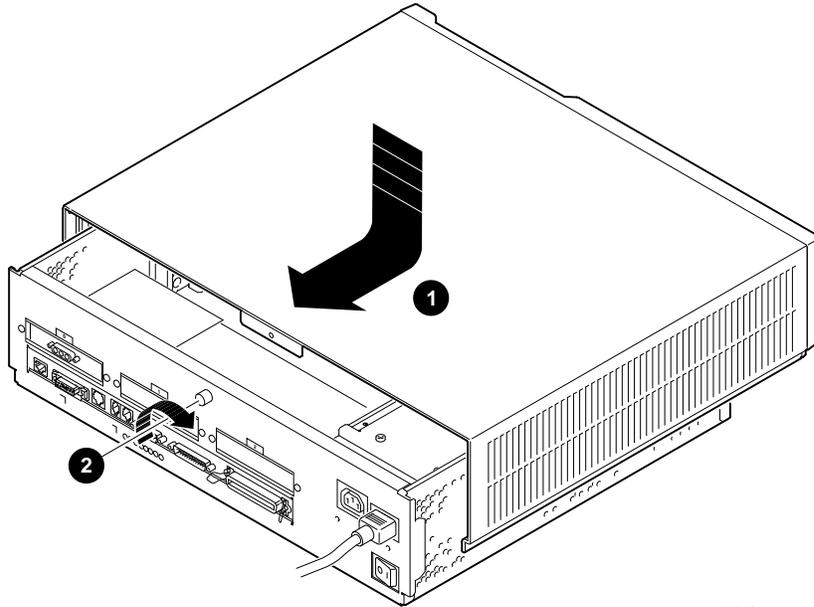
Slide the Cover onto the System Unit

To replace the system cover:

1. Place the cover over the top of the system unit with the fastening screw at the back.
2. Firmly slide the cover toward the back **1**, as shown in Figure 13-1.

Replacing the System Unit Cover

Figure 13–1 Replacing the System Cover



MLO-008609

3. When the cover is firmly in place, tighten the captive screw **2** on the back of the system unit.

Restarting and Testing the System

Task Overview These are the tasks involved in restarting the system and testing internal options:

Task	Action
1	Turn on your equipment.
2	Record messages.
3	Enter the device and configuration commands.

The following sections describe these steps.

Task 1: Turn On Equipment To restart your system, turn on (|) the equipment in the following order:

1. Monitor
2. System unit

You can turn on expansion boxes, printers and modems at any time.

When you turn on the system successfully, you should see a similar display to the one that is shown when you enter the `show config` console command, followed by either the console prompt (`>>>`) or your operating system prompt.

Task 2: Record Messages If any messages are displayed, write them down in case you need to contact your Digital services representative.

Refer to the *DEC 3000 Model 400/400S AXP Owner's Guide* for an explanation of common messages and for more information about testing the system.

Task 3: Enter the Device and Configuration Commands

To confirm that the options are connected correctly:

1. Enter the `show device` command at the console prompt to display the status of the drives, as explained in Chapter 2.

From this display, you can:

- Compare the latest display with the display you viewed when you prepared the system before adding a device. You should see new drives and all the drives that were in the system before you made additions. If a new drive is not in the list, it has not been installed properly.
 - Verify that devices are set to the correct SCSI settings (ADDR) so that all devices can be accessed.
 - Verify that there are no error messages. If there are error messages, write them down.
2. Enter the `show config` command at the console prompt to display the TURBOchannel configuration, as explained in Chapter 2.
 3. Enter the `show mem` command at the console prompt to display the memory configuration, as explained in Chapter 2.

If You See Error Messages

If you see error messages during the startup or `show config test` procedures, check the following:

- Are all cables inside and outside the system properly connected?
- Are all modules fully seated in their connectors?
- Are SCSI switches and jumpers set correctly? (No two devices should have the same SCSI setting.)

If you continue to see error messages, refer to your *DEC 3000 Model 400/400S AXP Owner's Guide*, or contact your Digital services representative.

14

External Options for Your System

Chapter Overview

In This Chapter This chapter covers the following topics:

- Console Terminal
- Dial Box and Button Box
- Headset
- Modems
- Printers
- Tablet

Future Options The previous list represents the external options that are available when the DEC 3000 Model 400/400S AXP system first ships. Other options may be available at a later time.

For More Information

For more information on the installation and use of these options, contact your Digital services representative.

Console Terminal

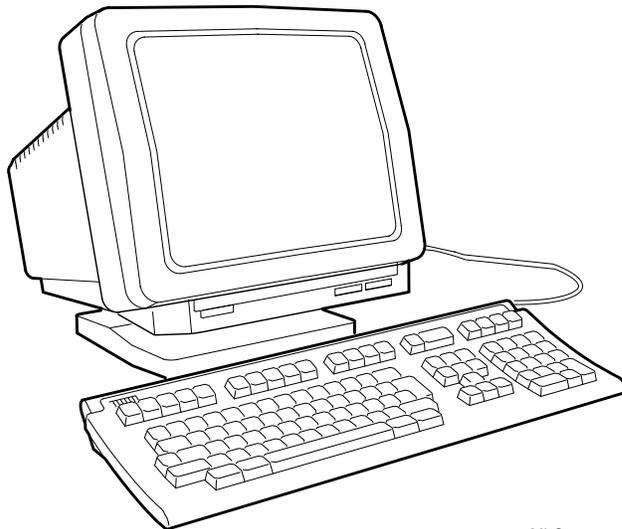
Purpose

You may need an alternate console terminal connected to your system to issue console commands.

Illustration

Console terminal VT420-XX, shown in Figure 14-1, is available for use with your DEC 3000 Model 400/400S AXP system.

Figure 14-1 Console Terminal

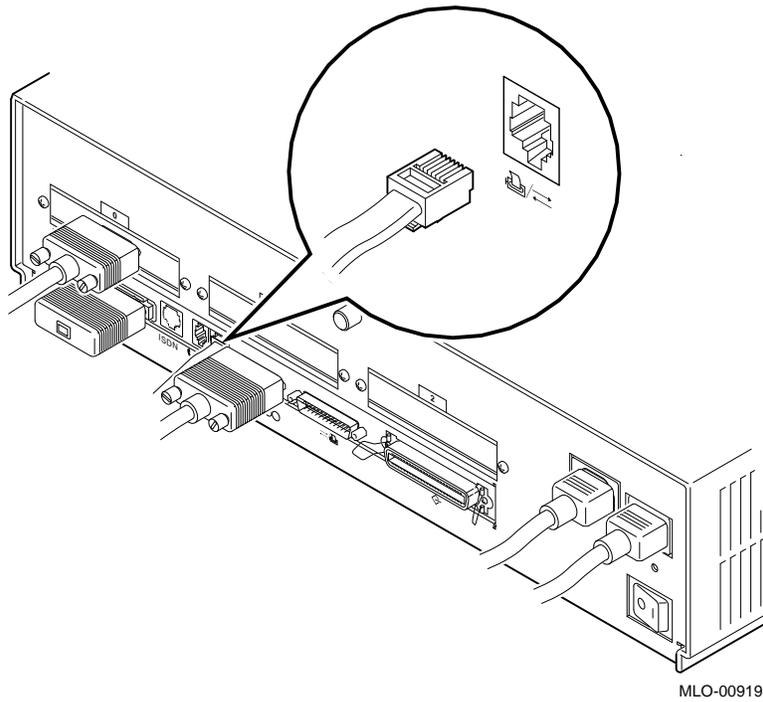


MLO-009398

Connection to the System

Figure 14–2 shows that you connect the console terminal to the synchronous communications port on the back of the system unit.

Figure 14–2 Connecting a Console Terminal to the System



Dial Box and Button Box

Purpose

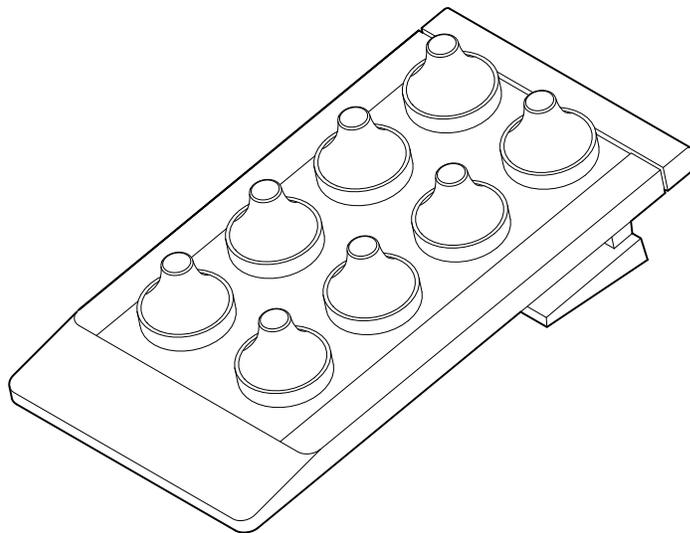
You can use the optional dial box (VSX30-AA) and programmable function keyboard (button box: VSX20-AA) for special graphics applications on the DEC 3000 Model 400/400S AXP system. These options allow you to move data on your monitor screen and are compatible with the DEC OSF/1 AXP operating system only.

The two boxes are also available as a combined package (VSX10-AA).

Illustrations

Figure 14-3 shows a dial box, and Figure 14-4 shows a button box.

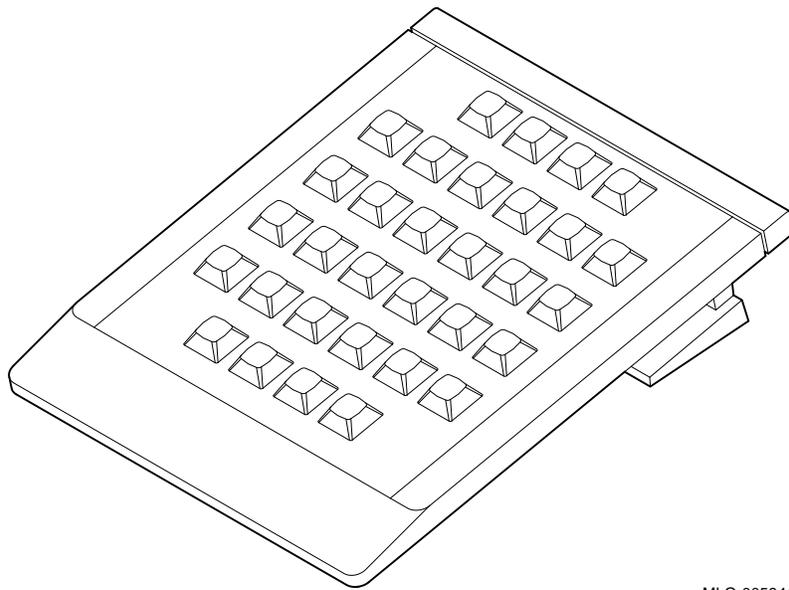
Figure 14-3 Dial Box



MLO-005936

Dial Box and Button Box

Figure 14-4 Button Box



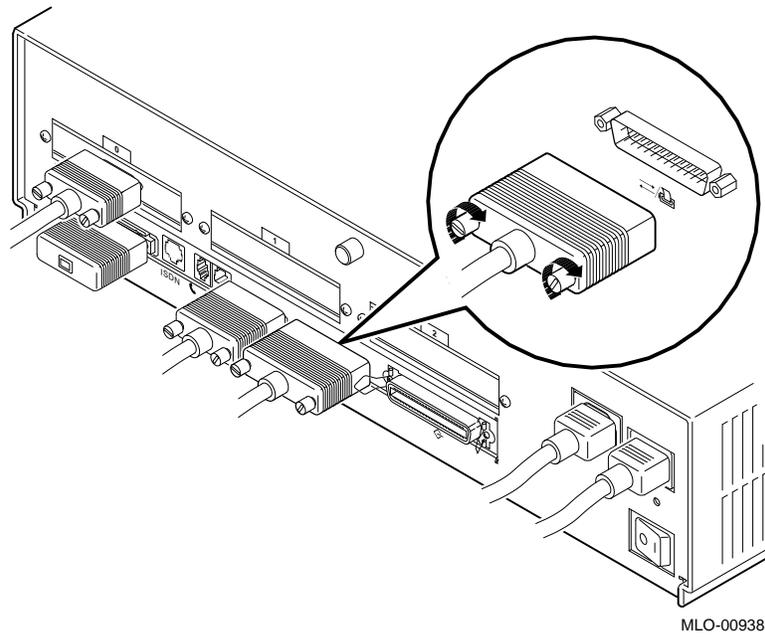
MLO-005941

Connection to the System

The dial box and button box each connect to a peripheral control module (PCM) that is connected to the system unit, as shown in Figure 14-5.

Dial Box and Button Box

Figure 14-5 Connecting the Dial Box and Button Box to the System



Headset

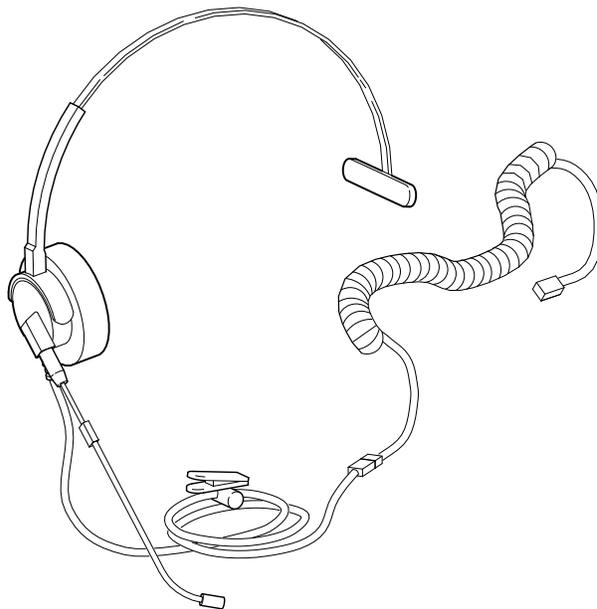
Purpose

You can use the optional headset (VSXXX-JA), as an alternative to a telephone handset, to input and output audio data. The headset includes an adjustable microphone for voice input, a two-foot cord with a clothing clip, and a quick-disconnect connector that allows you to move away from your system without removing your headset. The headset is compatible with both OpenVMS AXP and DEC OSF/1 AXP operating systems.

Illustration

Figure 14-6 shows the optional headset.

Figure 14-6 Headset



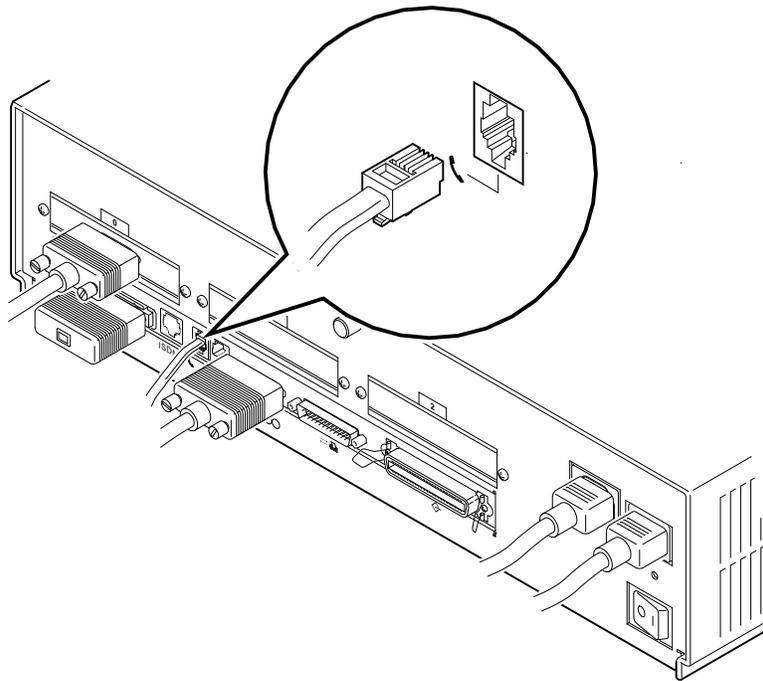
MLO-009714

Headset

Connection to the System

Figure 14–7 shows the headset connected to the audio I/O port on the back of the system unit.

Figure 14–7 Connecting a Headset to the System Unit



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Modems

Purpose

A modem is a device that converts computer signals to signals that can be sent over a telephone line. Modems are typically used for communications in large networks, such as wide area networks (WANs). See your Digital sales representative for a list of the recommended modems for your system.

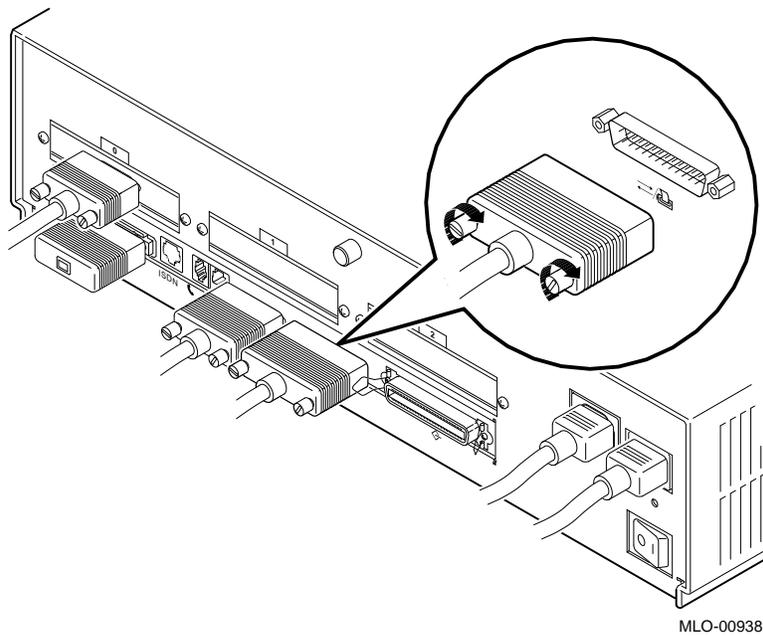
Consult the documentation that came with the modem to unpack the modem and clear the Force DSR attribute. (With this attribute cleared, your system will recognize the loss of the modem connection, should it occur.)

Connection to the System

Connect the modem cable to the synchronous communications port shown in Figure 14-8.

Modems

Figure 14–8 Connecting a Modem to the System



Printers

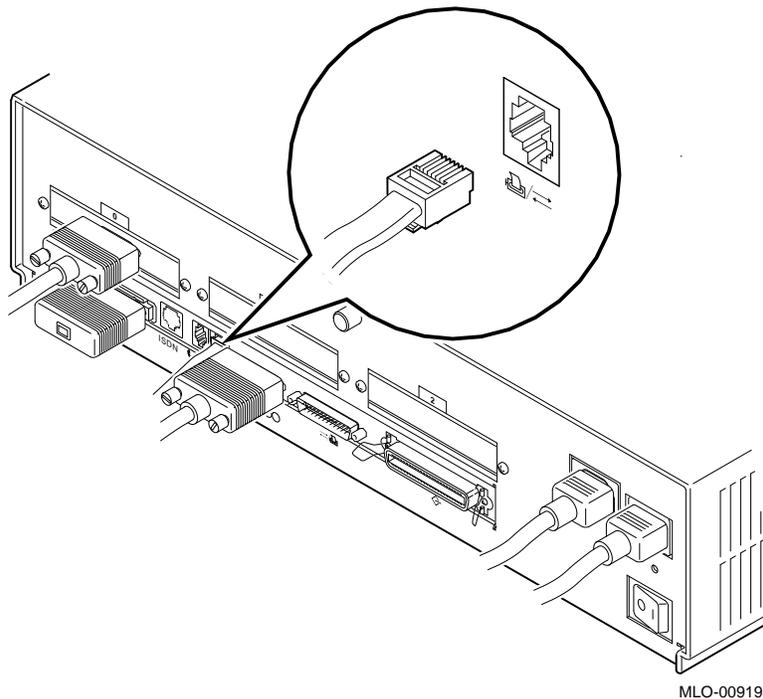
Recommended Printers

Many printers, including third-party plotters, can be used with your DEC 3000 Model 400/400S AXP system. See your Digital sales representative for a list of the recommended printers. Consult the documentation that came with the printer to unpack the printer and set the baud rate.

Connection to the System

Depending on the type of printer you have, you can connect the printer cable to the the back of the system in either the alternate/console/printer port, shown in Figure 14-9, or the synchronous communications port.

Figure 14-9 Connecting a Printer to the System



Tablet

Tablet

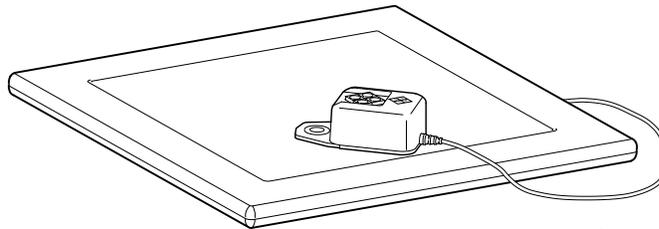
Purpose

You can use either an 11-by-11-inch tablet with a puck and pen pointer (VSXXX-AB) or the standard mouse to position the cursor on your monitor screen.

Illustration

Figure 14–10 shows the 11-by-11-inch tablet.

Figure 14–10 Tablet



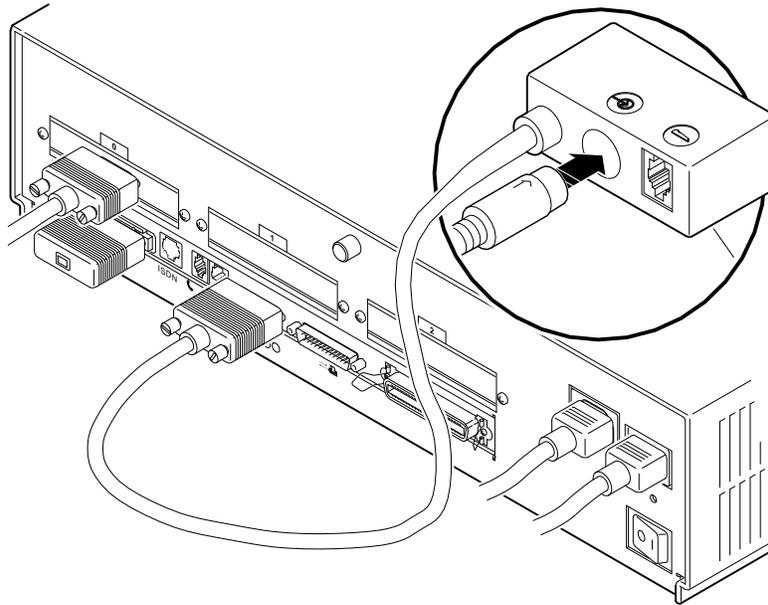
MLO-008589

Tablet

Connection to the System

The tablet is connected to the mouse port on keyboard/mouse extension cable block. The cable block, in turn, connects to the keyboard/mouse port on the back of the system unit, as shown in Figure 14–11.

Figure 14–11 Connecting the Tablet to the System



MLO-009715

A

Associated Documents

Appendix Overview

Introduction

This appendix provides information about available documentation. For option and system hardware part numbers, consult your Digital sales representative.

Not all of the following documents are available in every country. Check with your Digital sales representative for availability.

In This Appendix

This appendix covers the following topics:

- Associated Printed Documents
- OpenVMS AXP Documentation
- DEC OSF/1 AXP Documentation

Associated Printed Documents

Related Printed Books

Table A-1 lists the associated DEC 3000 Model 400/400S AXP system documents available in printed form.

Table A-1 Associated Printed Documents

TITLE	ORDER NUMBER
DEC 3000 Model 400/400S Server Kit	EK-SNPSV-DK
DEC 3000 Model 400/400S Workstation Kit	EK-SNDPR-DK
<i>DEC 3000 Model 400/400S Service Guide</i>	EK-SNDPR-SV
<i>DEC 3000 Model 400/400S Technical Summary</i>	EK-SNDPR-TM
<i>OpenVMS AXP Factory-Installed Software (FIS) User Information</i>	EK-A0377-UG
<i>DEC OSF/1 AXP Factory-Installed Software (FIS) User Information</i>	EK-SFFIS-UG
<i>BA47X-AA Vertical Floor Stand: Installing Your System</i>	EK-SNDPR-IC

Associated Printed Documents

Drive Documents

Table A-2 lists the documentation for drives available with the DEC 3000 Model 400/400S AXP system system.

Table A-2 Drives

TITLE	ORDER NUMBER
<i>RRD42 Compact Disc Drive Owner's Manual</i>	EK-RRD42-OM
<i>RX26 Owner's Reference Card</i>	EK-RX26D-RC
<i>TZK10 Cartridge Tape Drive Owner's Guide</i>	EK-TZK10-OG
<i>TLZ06 Cassette Tape Drive Owner's Guide</i>	EK-TLZ06-OM
<i>TZ30 Cartridge Tape Drive Owner's Guide</i>	EK-OTZ30-OM
<i>TZ30 Cartridge Tape Drive Subsystem Service Manual</i>	EK-OTZ30-SV
<i>RZ Series Disk Drive Subsystem Pocket Service Guide</i>	EK-RZXXD-PS
<i>RZ Series Reference Manual</i>	EK-RZXXD-RM

Workstation Handbook

Table A-3 lists the associated workstation handbook documentation.

Table A-3 Handbook Series

TITLE	ORDER NUMBER
<i>Workstation Family Technical Summary</i>	EC-H0742-51

Associated Printed Documents

TURBOchannel Documents

Table A-4 lists the TURBOchannel documentation.

Table A-4 TURBOchannel-Related Documents

TITLE	ORDER NUMBER
<i>Smart Frame Buffer TURBOchannel Module</i>	EK-SFBOM-TC
<i>The High Three-Dimensional (3D) Graphics TURBOchannel Module</i>	EK-H3DOM-TC
<i>The Low Three-Dimensional (3D) Graphics TURBOchannel Module</i>	EK-L3DOM-TC
<i>The ThickWire Ethernet TURBOchannel Module</i>	EK-TWETH-TC
<i>TURBOchannel Extender Operator's Guide</i>	EK-PM32X-EX
<i>TURBOchannel Extender (TCE) Option Module</i>	EK-TCEIM-TC
<i>SCSI TURBOchannel Options Installation Kit</i>	EK-PMAZA-UG
<i>FDDIcontroller 700-C Installation</i>	EK-DEFTA-CI
<i>FDDIcontroller 700 Software Product Description</i>	AE-PE9MD-TE
<i>FDDIcontroller 700 Release Notes</i>	AA-PJKWA-TE

SCSI Documents

Table A-5 lists the available SCSI documentation.

Table A-5 SCSI Documents

TITLE	ORDER NUMBER
<i>Small Computer System Interface: An Overview</i>	EK-SCSIS-OV
<i>Small Computer System Interface: A Developer's Guide</i>	EK-SCSIS-SP

OpenVMS AXP Documentation

Available Documentation

The following sections list some of the OpenVMS AXP operating system documentation.

- General Documentation
- DECconnect Documents

General Documentation

Table A-6 lists general OpenVMS AXP operating system associated documents.

Table A-6 General OpenVMS AXP Operating System Documents

TITLE	ORDER NUMBER
<i>OpenVMS Alpha Version 1.0 Upgrade and Installation Manual</i>	AA-PV6XA-TE
<i>OpenVMS System Manager's Manual: Essentials</i>	AA-PV5MA-TK
<i>OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems</i>	AA-PV5NA-TK
<i>OpenVMS Alpha Layered Products Disc User's Guide</i>	AA-PSQVC-RE
<i>OpenVMS AXP Release Notes</i>	AA-PV72A-TE
<i>Overview of OpenVMS Documentation</i>	AA-PV6YA-TK

DECconnect Documents

Table A-7 lists available DECconnect documentation.

Table A-7 DECconnect System

TITLE	ORDER NUMBER
<i>OPEN DECconnect Building Wiring Components and Applications Catalog</i>	EC-I1834-29
<i>DECconnect System General Description</i>	EK-DECSY-GD
<i>DECconnect System Requirements Evaluation Workbook</i>	EK-DECSY-EG
<i>DECconnect System Installation and Verification Guide</i>	EK-DECSY-SR
<i>DECconnect System Stand-alone ThinWire Networks: Planning and Installation Guide</i>	EK-DECSY-TG
<i>DECconnect System Planning and Configuration Guide</i>	EK-DECSY-CG

DEC OSF/1 AXP Documentation

Available Documentation

The following sections list the DEC OSF/1 AXP operating system documentation kits and their contents:

- User Documentation
- Server Documentation

User Documentation

Table A-8 lists available subkits of the DEC OSF/1 AXP operating system documentation.

Table A-8 User Documentation, QA-MT4AB-GZ

TITLE	ORDER NUMBER
<i>Startup Documentation Subkit</i>	QA-MT4AC-GZ
<i>Guide to Installing DEC OSF/1</i>	AA-PS2DA-TE
<i>Quick Reference (card)</i>	AV-PS3KA-TE
<i>Read This First Letter</i>	AV-PS3JA-TE
<i>Release Notes</i>	AA-PS2BA-TE
<i>General User Documentation Subkit</i>	QA-MT4AD-GZ
<i>DEC OSF/1 User's Guide</i>	AA-PS2HA-TE
<i>Network and Communications Overview</i>	AA-PS2MA-TE
<i>Reader's Guide</i>	AA-PS2JA-TE

(continued on next page)

Table A-8 (Cont.) User Documentation, QA-MT4AB-GZ

TITLE	ORDER NUMBER
<i>System and Network Management Documentation Subkit</i>	QA-MT4AE-GZ
<i>DEC Verifier and Exerciser Tool User's Guide</i>	AA-PTTMA-TE
<i>Guide to Kernel Debugging</i>	AA-PS2TA-TE
<i>Network Administration and Problem Solving</i>	AA-PS2SA-TE
<i>Configuring Your Network Software</i>	AA-PS2GA-TE
<i>Guide to Prestoserve</i>	AA-PQT0A-TE
<i>Guide to Software License Management</i>	AA-PS2EA-TE
<i>Guide to System Administration</i>	AA-PS2RA-TE
<i>Migration Documentation Subkit</i>	QA-MT4AF-GZ
<i>System V to DEC OSF/1 Migration Guide</i>	AA-PS3DA-TE
<i>ULTRIX to DEC OSF/1 Migration Guide</i>	AA-PS3EA-TE

Server Documentation

Table A-9 lists the available documentation about servers.

Table A-9 Server Documentation Kit, QA-MT4AL-GZ

TITLE	ORDER NUMBER
<i>Guide to Sharing Software on a Local Area Network</i>	AA-PS3LA-TE

Glossary

accelerator

A hardware graphics processor that produces faster images than a CPU and frees the CPU to do other work.

ANSI

Abbreviation for American National Standards Institute, an organization that develops and publishes standards for the computer industry.

antistatic wrist strap

A grounded strap you connect to your wrist and the system unit while handling internal devices that are sensitive to static. This strap prevents electrostatic discharge that could result in loss of data.

applications

Programs, such as a financial spreadsheet program, that perform end-user tasks.

Application-specific Integrated Circuit

An integrated circuit programmed to perform one specific task.

architecture

The internal configuration of a computer including its registers, instruction set, and input/output structure.

ASIC

See Application-specific Integrated Circuit.

asynchronous transmission

A type of communications in which data is transmitted at different time intervals. *Compare with* synchronous.

AUI (Attachment Unit Interface)

An IEEE standard 802.3-compliant Ethernet network made of standard Ethernet cable, as opposed to ThinWire Ethernet cable. Also called standard Ethernet. *Compare with* ThinWire Ethernet network. *See* standard Ethernet network or thickwire Ethernet network.)

backup copy

A copy of files or software made for safekeeping. Making a backup copy of the data stored on your disk allows you to recover that data after an accidental loss. You can make backup copies on tape cartridges, or over a network using the Remote System Manager.

baud rate

The speed at which signals are serially transmitted over a communications line. Baud rates can be measured in bits per second or characters per second. One baud equals one bit per second; eight bauds equals one character per second.

bit

A binary digit; the smallest unit of information in a binary system of notation, designated as a 0 or a 1.

BIU

See bus interface unit.

boot

Short for bootstrap, meaning to bring a device or system to a defined state where it can operate on its own.

boot (or bootstrap) device

The memory storage device that holds the software that carries out a system bootstrap procedure.

buffer

An internal memory area used for temporary storage of data records during input or output operations.

bus

A group of signals consisting of transmission lines or wires to create a common channel or pathway. The bus interconnects either internal computer system components to provide communications paths for addresses, data, and control information or external terminals and systems in a communications network.

bus interface unit

Hardware designed to interface internal logic, a module, or a chip, to a bus.

byte

A group of eight contiguous binary digits (bits). Bits are numbered from right to left, 0 through 7, with bit 0 being the low-order bit. *See also* kilobyte and megabyte.

cable

A sheathed group of electrical conductors.

caddy

The holder for an RRD42 compact disc.

CD

See compact disc.

CD-ROM

See compact disc read-only memory.

central processing unit (CPU)

The unit of the computer that is responsible for interpreting and executing instructions.

cluster

A group of networked computers that communicate over a common interface to share disk storage, application programs, and other computer resources. *See also* VMScluster system.

command

A request made to the operating system to perform a specific function, for example, a request to run a program or show the configuration of a system.

communications

The transmission of digital data from one point (the source) to another (the receiver).

compact disc

A removable flat circular plate, used in the compact disc drive on which read-only optical data is stored. A laser optical reader retrieves this information.

component

A basic part, or element, of your system that can be either internal or external. *Compare with* device.

configuration

See system configuration.

console

A device through which an operator communicates with the computer.

console commands

Commands input when the system is in console mode.

console mode

The state in which the computer is controlled directly by user commands from the console terminal rather than indirectly through the operating system. Console mode is in effect when the system is turned on and the operating system software has not been started, or the operating system software has been interrupted by pressing the halt button on the system unit. Console mode is indicated by the console prompt (>>>) on the monitor screen. *Compare with* program mode.

console password

The password used to access privileged console commands.

console program

The code that the CPU executes during console mode.

console prompt

The prompt (>>>) that appears on the screen when the system is in console mode.

console terminal

The video or hardcopy terminal used to start the system and direct activities between the computer operator and the console subsystem.

console terminal port

The connector to which the console terminal cable is attached.

controller

A system component, usually a printed circuit board, that regulates the operation of one or more devices.

CPU

See central processing unit.

cursor

A blinking symbol on the screen that indicates where the next character you type will appear.

data

A formal representation of information suitable for communication, interpretation, and processing by humans or computers.

database

A collection of interrelated data on one or more mass storage devices. The collection is organized to facilitate efficient and accurate inquiry and update.

DECconnect

Digital's cabling system for extending Ethernet and terminal interconnections into offices and work areas.

DECchip 21064

This CPU microprocessor chip is a CMOS-4 superscalar (dual instruction issue), super-pipelined implementation of the Alpha AXP architecture.

DECnet network

Digital networking software that runs on nodes in both local and wide area networks.

DEC OSF/1 AXP operating system

A general-purpose operating system based on the Open Software Foundation OSF/1 1.0 technology.

DECwindows Motif

An interface to the operating system that allows a workstation screen to be divided into windows where several application programs can appear simultaneously, and commands can be executed using menus and a mouse. This interface is fully compliant with the OSF/Motif Graphical User Interface standard from the Open Software Foundation. *See also* window.

default

A computer value or setting that is automatically in effect unless or until another value is specified. There are some default values that you cannot override.

default recovery action

The action that the system takes after a power or system failure.

desktop enclosure

A type of system cabinet that is small enough to sit on top of a desk. *Compare with* floorstand *and* rackmount enclosure.

device

The general name for any hardware unit connected to the system and capable of receiving, storing, or transmitting data. Examples of devices are drives and units that you can install into or externally connect to the system unit or an expansion box.

device name

The name by which a device or controller is identified in the system. The name that a particular operating system uses to access a particular store device. Also called the device mnemonic.

diagnostics

Programs, located in read-only memory, that detect and identify abnormal system hardware operation.

digital data

Information recorded and transmitted in binary coded form.

disc

See compact disc.

disk

A flat circular plate with a magnetic coating on which data is magnetically stored in concentric circles (tracks). A fixed disk resides permanently inside a disk drive, whereas a diskette is removable.

disk drive

A device that holds a disk. The drive contains mechanical components that spin the disk and move the read and write heads that store and read the information on the surface of the disks.

diskette

A flexible disk contained in a square jacket. Diskettes can be inserted and removed from diskette drives.

diskette drive

A disk drive that reads from or writes to a removable diskette, such as an RX26 diskette.

disk fragmentation

The writing of files in noncontiguous areas on a disk. Fragmentation can cause slower system performance because of repeated read or write operations on fragmented data.

diskless system

A system that has no storage capacity of its own.

DRAM

See dynamic random-access memory.

drive plate

A removable section of the system unit on which you can mount one removable-media drive, such as a compact disc, and two 3½-inch fixed drives, such as the RZ family of drives.

environment variable

A global data structure that can be accessed only from console mode. The setting of these data structures determines how a system starts up, boots operating system software, and operates.

error message number

A number that appears on the error line representing a particular system or component problem.

Ethernet

A local area network (LAN) or wide area network (WAN) that connects (by coaxial cable) multiple computers that are running a variety of network operating systems. Ethernet transmits 10 megabits per second and does not require switching logic or control by a central computer.

Ethernet controller

An interface unit that connects a system to the Ethernet.

Ethernet hardware address

The unique Ethernet physical address associated with a particular Ethernet communications controller.

Ethernet ports

The connectors on the system unit through which the Ethernet is connected to the system.

Ethernet subsystem

The Ethernet controller chip built into the system module.

expansion box

An attachable system option that holds one TURBOchannel option module, two hard disk drives, and one removable media drive.

Factory-Installed Software (FIS)

Operating system software that is loaded into an internal fixed disk and installed in the system unit during manufacture. On site, the FIS is bootstrapped through the system disk, prompting a predefined menu of questions on the final configuration.

FDDI

See Fiber Distributed Data Interface

Fiber Distributed Data Interface

An ANSI-standard high-speed network technology that uses fiber optics as the transmission medium. FDDI employs a ring topology and operates up to 100 km in total network length. It uses 1300 nm wavelengths, which optimize fiber bandwidth.

field replaceable unit

Any system component that can be replaced by your Digital service representative.

file

A collection of related information treated by the system as a unit.

firmware

Software code that is stored in a fixed way (wired in), usually in read-only memory. The firmware executes when the system is turned on, during operating system boot and restarts, and as a result of operator intervention or a fatal system error.

FIS

See Factory-Installed Software.

fixed disk

A disk that resides permanently inside a disk drive. *Compare with* diskette.

fixed disk drive

The disk drive that holds and reads from or writes to a fixed disk.

floating point

A number that may be positive or negative but that has a whole (integer) portion and a fractional (decimal) portion; an arithmetic operation in which the decimal point is not fixed, but placed automatically in a correct position in a computer word.

floor stand

A type of system cabinet that sits on the floor. *Compare with* desktop enclosure.

frame buffer

An area of memory that contains a pixel-level description of a displayed image. The frame buffer is also used to refresh the raster display.

FRU

See Field Replaceable Unit.

gigabyte (GB)

The measure used to refer to memory or secondary storage capacity, equal to 1,024 megabytes or 1,073,741,824 bytes.

GKS (Graphical Kernel System) application

An application that uses the GKS graphics system and language to create two-dimensional (2D), three-dimensional (3D), and raster images on the screen. A GKS application can be developed on one system and easily move to another system.

graphics

A computer output of drawings, charts, and graphs.

half-height disk

Any 1 5/8-inch fixed drive that is 3½ inches (9-centimeters) wide, such as those in the RZ family; or a 1 5/8-inch removable drive that is 5-inches (12.7-centimeters) wide, such as a compact disc.

halt

The action of stopping the CPU from processing, which involves console mode and brings the system under the control of the console program. A halt can occur when an internal system error is detected, when you enter the HALT command at the console terminal, or when you press the Halt button on the back of the system unit.

hardware

The physical equipment—mechanical and electrical—that makes up a system. *Compare with* software.

icon

A graphical symbol on the system unit that identifies drives, ports, switches, and indicators.

IEEE

Abbreviation for Institute of Electrical and Electronics Engineers.

initialization

The sequence of steps that prepare the system to start. Initialization occurs automatically after a system has been turned on.

input/output (I/O) device

A piece of equipment that transmits data to (input) and from (output) the system. For example, a terminal or a mouse. *See* mouse.

Integrated Services Digital Network (ISDN)

An international telecommunications standard that allows a communications channel to simultaneously carry voice, video, and data.

interface

An electronic circuit board that links an external device to a computer. Also, a device or piece of software that allows a user to communicate with the system or allows the components of the system to communicate with each other.

ISDN

See Integrated Services Digital Network.

jack

A receptacle into which you insert a plug.

kilobyte (KB)

The measure used to refer to memory or secondary storage capacity, equal to 1,024 bytes.

LAN

See local area network.

light-emitting diode (LED)

A semiconductor device that glows when supplied with a specific voltage. The operator control panel contains LEDs that indicate the status of the modules in the computer.

local

In close proximity to the computer. *Compare with* remote.

local area network

A high-speed network communications system that connects a variety of multiple computers within a limited geographical area, such as one building or a group of buildings. It is a privately owned communication network whose speed is upward of one megabit per second. Using a LAN, multiple users can share devices and files at higher speeds, faster response times, and lower costs than with telephone lines.

local console mode

A mode in which you interact directly with the console subsystem without requiring the password security feature. *Compare with* privileged console mode.

local device

A disk drive, tape drive, or other device that is only available to the computer to which it is connected.

log in

To identify yourself to the operating system. When you log in, you type an account name and password. If the name and password match an account on the system, you are allowed access to that account.

logic

A sequence of hardware or software operations. Hardware logic consists of chips and circuits that compute and control computer operations. Software logic (also called program logic) is the sequence of program instructions.

login command

The command issued at the operating system prompt that allows access to and communication with the system.

magnetic tape

A tape, made of plastic and coated with magnetic oxide, that is used to store data. Also called magtape.

Maintenance Operations Protocol (MOP)

The transport protocol for network bootstraps and other network operations.

mass storage device

An input/output device on which data is stored. Typical mass storage devices include fixed disks, compact discs, magnetic tapes, and diskettes.

Mb

See megabit.

MB

See megabyte.

media

The physical material on which data is recorded, for example, magnetic disks, diskettes, and compact discs.

megabit

A unit of measure equal to a million bits.

megabyte

A unit of measure equal to 1,024 kilobytes or 1,048,576 bytes.

memory

The area of the system that electrically stores instructions and data, often temporarily.

memory module

A single in-line memory module (SIMM) that contains memory for your system. Memory modules come in different sizes, each with a different amount of memory.

millions of instructions per second (MIPS)

A unit of measure for recording the execution rate of a computer, for example 0.5 MIPS is equal to 500,000 instructions per second.

MMB

See memory mother board.

modem

A device that converts computer signals to signals that can be sent over a telephone line.

module

An etched circuit board that contains electrical components and electrically conductive pathways between components on which logic devices (such as transistors, resistors, and memory chips) are mounted. A module stores data or memory or controls the functions of a device.

monitor

A video device that displays data.

monochrome frame buffer

A separate memory component for black and white graphics.

MOP

See Maintenance Operations Protocol.

mouse

A hand-held input device that is moved across the desktop to move the pointer or cursor on the monitor screen and to select menu options and draw graphics. The mouse is palm-sized and contains up to three buttons (function keys).

network

Two or more computers linked by communication lines to share information and resources.

network coordinator

The person who manages the network, assigns unique node names and addresses for each system on the network, and provides administrative assistance to network users.

node

A device that has an address on, is connected to, and is able to communicate with other devices on the bus. In a computer network, an individual computer system connected to the network that can communicate with other systems on the network.

node name

A name that identifies a unique node.

nonvolatile random-access memory

Memory, such as magnetic tape or core memory, in which values are stored even when the system is turned off.

online documentation

Documents that can be read directly on your monitor screen. Online documentation is stored on a compact disc and includes all text and illustrations found in the printed manuals. Fast access time and cross-referencing are two advantages of online documentation.

Open Software Foundation (OSF)

A foundation formed to develop open design software based on the UNIX standard. Development to date includes the OSF/1 operating system, the Distributed Computing Environment (DCE), and the Distributed Management Environment (DME).

OpenVMS AXP operating system

Digital's open version of the OpenVMS AXP operating system, which runs on Alpha AXP machines.

operating system

An integrated collection of programs that controls the operation of the system and allows users access to data files, input/output devices, and application programs.

operating system mode

The state in which the system console terminal is under the control of the operating system software. Also called program mode.

PAL

See Privileged Architecture Library (software) and Programmable Array Logic (hardware).

PALcode

Privileged Architecture Library code, written to support Alpha AXP processors. PALcode implements architecturally defined behavior.

parameter

A variable given a specific value that is passed to a program before execution. The system console code uses many such parameters.

parity

A method for checking the accuracy of data by calculating the sum of the number of ones in a piece of binary data. Even parity requires the correct sum to be an even number, odd parity requires the correct sum to be an odd number.

password

A unique string of characters or numbers, or both that identifies you to the computer.

password security feature

The feature that restricts access to certain console commands. To use all console commands, users must enter a password.

pedestal

A system enclosure suitable in size and operating characteristics for an office environment. *See* floorstand.

peripheral device

An internal or external device that provides the central processing unit (CPU) with additional memory storage or communication capability. Examples are disk and diskette drives, video terminals, printers, and expansion boxes.

PHIGS (Programmer's Hierarchical Interactive Graphics System) application

An application that uses the PHIGS graphics system and language to create two-dimensional (2D) and three-dimensional (3D) images on the screen.

pointing device

A terminal input device that allows you to make a selection from a menu or to draw graphics. *See* mouse and tablet.

port

A socket on the front or back of the system unit to which a terminal, printer, modem or other device is connected.

port pin-outs

The description of the function of electronic signals transmitted through each pin in a port connector.

power up

To initiate the sequence of events that starts the flow of electrical current to a system or its components.

Privileged Architecture Library (PAL)

A software chip that has a series of logic gates (AND, OR, and NOT) that are not tied together.

process

A program currently using memory and running on the system.

program

The sequence of instructions the system uses to perform a task. *See also* software.

prompt

A symbol or message displayed by a program or an operating system, asking you to provide input.

puck

A palm-sized device that slides on a tablet's surface. The puck and tablet together function as a pointing device. *See also* pointing device and tablet.

rackmount enclosure

A type of system cabinet for which components are built to fit into a metal frame.

random access memory (RAM)

Memory that can be both read from and written to and that can randomly access any one location during normal operations. The type of memory the system uses to store the instructions of programs currently being run.

read-only memory (ROM)

Memory that cannot be modified. The system can use (read) the data contained in ROM but cannot change it.

register

A temporary storage location in hardware logic other than main memory.

remote

Physically distant from a computer, but linked to a computer by communication lines. *Compare with* local.

remote console port

The port that connects a remote access device to a system.

removable-media drive

A drive such as the RRD42, TZK10, TZ30, TLZ06, or RX26 from which the storage medium is removable.

restore

In software, to recover files or software that were backed up, copying the material from the backup medium (such as a tape or diskette) to the medium you normally use.

In hardware, to return the system to an operating condition.

ROM

See read-only memory.

satellite

A node that is booted remotely from the system disk on the boot node. Also, a computer system that obtains a specific set of services from a server system.

SCSI

See Small Computer System Interface.

SCSI bus

A communications pathway between the Small Computer System Interface (SCSI) and other internal devices. The SCSI bus consists of an address bus, which selects the location of the data, and a data bus, which transfers the data.

SCSI controller

The device that directs the operations of the Small Computer System Interface (SCSI) with synchronous and asynchronous capabilities.

SCSI jumpers

Removable electrical connectors on some of the drives, such as the RRD42, that determine the SCSI setting on a drive. Each installed drive must have a unique setting for proper communication between the system and all drives.

SCSI switches

Electrical switches on the side or back of some drives, such as the RX26, that determine the SCSI setting of the drive. Each installed drive must have a unique setting for proper communication between the system and all drives.

segment

A length of ThinWire Ethernet cable made up of one or more cable sections connected with barrel connectors or T-connectors.

self-test

A test that is invoked automatically when the system starts up.

serial port

A port dedicated to hookups with serial line devices such as terminals or printers. Serial devices transmit data one word after another (serially) along a single pair of lines from a sending device to a receiving device.

server

Hardware or software that provides a specific set of services to a satellite or client.

Small Computer System Interface (SCSI)

An ANSI-standard interface designed for connecting disks and other peripheral devices to computer systems. SCSI is used by many computer and peripheral vendors throughout the industry.

smart frame buffer

A separate memory component for graphics images.

software

Instructions executed by the system to perform a chosen or required function. *Compare with* hardware.

SPEC

See System Performance Evaluation Cooperative.

SPECmark

The geometric mean of the normalized results from the benchmarks defined by SPEC. *See also* System Performance Evaluation Cooperative (SPEC).

SRAM

Static random access memory.

SROM

Serial read-only memory.

standalone network

A network that starts and operates alone, without being connected to another network.

standalone workstation

A workstation that starts and operates alone, without being connected to another computer.

standard Ethernet network

An Ethernet network connected with standard Ethernet cable. (Also known as thickwire Ethernet). *Compare with ThinWire Ethernet network.*

startup procedure

The sequence events that occur when you supply power by turning on the system or its components.

storage device

A device, such as a diskette or tape, capable of recording information.

storage expansion box

See expansion box.

strain relief strap

See universal strain relief strap.

stylus

A penlike device that draws on the surface of a tablet and functions as a pointing device.

synchronous communication

A type of communication in which data is transmitted at equal time intervals. This type of communication allows you to connect your system to others in one of two ways:

- Through a modem to a Wide Area Network (WAN)
- Directly to another system through a null modem

system

A combination of hardware, software, and peripheral devices that together perform specific processing operations.

system configuration

The combined layout of hardware and software that makes up a usable computer system.

system disk

The disk that stores the operating system and that starts the system and allows it to run properly.

system unit

The part of the system that contains the drives, memory, power supply, and the computer itself.

tablet

An absolute-positioning input device composed of a flat-surfaced digitizing tablet that functions as a drawing surface. Two pointing devices, a puck and a stylus, are used with the tablet to move the cursor on the monitor screen, draw graphics, and make selections from the menu.

tape cartridge

Housing for magnetic tape. The cartridge contains a reel of tape and a take-up reel. A cartridge is similar to a cassette, but of slightly different design.

tape drive

A device that contains mechanical components and holds, turns, reads, and writes on magnetic tape.

T-connector

A connector used to join ThinWire Ethernet cable sections.

terminal

A device for entering information into a computer system and displaying it on a screen. A typewriter-like keyboard, mouse, tablet or other pointing devices are used to enter information.

terminator

A connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable. A terminator is also required on unused ports and on the end of a SCSI bus to complete the bus.

thickwire Ethernet network

An IEEE Standard 802.3-compliant Ethernet network made of standard Ethernet cable. Also called standard Ethernet. *Contrast with ThinWire.*

ThinWire Ethernet network

A Digital trademark used to describe its 10BASE2 Ethernet products. *See also 10BASE2. Compare with thickwire Ethernet network.*

three-dimensional graphics

Images that are displayed on the screen in 3D. These graphics require the use of the PXG+ or the PXG Turbo+ option and Software PEX (software PEX server). Software PEX allows a 3D application to run without specialized 3D hardware.

timesharing

A system in which two or more programs are allotted, in turn, equal time or use of a computer or computer device.

turn off

The sequence of steps that stops the flow of electricity to a system or its components.

twisted-pair cable

A cable made by twisting together two insulated conductors.

twisted-pair Ethernet network

See 10BASE-T Ethernet network.

TURBOchannel module

High-performance interconnection hardware that allows you to use a variety of Digital and third-party graphics, multimedia, and communications options. The TURBOchannel module is a synchronous asymmetrical I/O channel that connects option modules to the system module. With this connection, the system module and an option module have read or write access to each other, but option modules have no access to other option modules.

TURBOchannel extender

See expansion box.

two-dimensional graphics

Images that are displayed on the screen in 2D. These graphics require the use of the HX 8-plane smart frame buffer TURBOchannel graphics option.

universal strain relief strap

A plastic strap used when connecting the monitor video cable to the back of the monitor. The strap prevents the weight of the cable junction box from pulling the cables out of the BNC connectors.

user interface

The style of interaction between the computer and the user of that computer.

video refresh rate

The speed at which the image on the screen is restored.

VMScluster system

A highly integrated organization of Digital's OpenVMS AXP systems that communicate over a high-speed communications path. VMScluster configurations have all the functions of single-node systems, plus the ability to share CPU resources, queues, and disk storage.

window

An area on your monitor screen in which you can start, run, and view a separate process. Windowing capability is supported by both OpenVMS AXP and DEC OSF/1 AXP workstation software.

work group

Several workstations, connected together on a network, that perform similar tasks and share information or databases.

workstation

A single-user system that offers high-performance, high-resolution graphics, and can function in a network environment.

wrist strap

See antistatic wrist strap.

write-enabled

The condition that enables a tape or diskette to be written to. *Compare with* write-protected.

write-protected

The condition that prevents a tape or diskette from being accidentally overwritten.

Z-buffering

An advanced graphics term for attaching a depth value to every pixel as a means of determining which parts of the objects in a scene must be discarded from the processing because they would be hidden from view by other opaque objects (hidden surface removal).

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