

DEC 3000 Model 300 Series AXP

Hardware Reference Guide

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Preface

About This Guide

This guide describes how to:

- Remove and replace internal options
- Connect external options
- Use console commands to run tests and utilities, and to set and show the value of parameters
- Set the password security feature
- Connect and use an alternate console
- Identify and solve problems

This guide also provides system and option specifications, port pinouts, a list of associated documents, help in debugging programs, and information for PTT network users.

Two Methods of Adding Options

You can add internal options by:

- Adding the options yourself.
- Having a Digital service representative add them.

You can add external options to your system, by connecting them to the SCSI port, the ISDN port, the Audio port, and the RS232 asynchronous/synchronous communications port.

If you choose to add internal options yourself, note that additions typically take about 15 minutes for each option. If you choose to add external options, note that additions typically take about 5 minutes for each option, although some procedures may take more or less time.

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.
UPPERCASE lowercase	The console program does not distinguish between uppercase and lowercase characters in typed user input. All examples in this guide show user input in lowercase. All system output is in uppercase.
show	A word in this typeface indicates a command that you must enter from the keyboard at the console prompt (<code>>>></code>). For example, <code>boot</code> .
<i>variable</i>	Lowercase italicized letters in commands indicate a variable value that you must provide. The value must be an actual option like a number or logical such as on/off. For example, <code>>>> set language 3</code> . A variable may be indicated by angle brackets <code>< ></code> as in the following <code>help</code> command example: <pre>>>> he[lp] <code>Return</code> Result: BOOT HELP ADVANCED INITIALIZE SET[ENV] <envar> <value> SHOW PRINTENV [<envar>] TEST</pre>
[]	The information contained within these brackets is optional. The brackets are not part of the command syntax and should not be typed.

Convention	Description
{ }	The information contained within these braces is required. The braces are not part of the command syntax and should not be typed.
" "	Quotation marks indicate a literal string. A command in lowercase surrounded by quotes will not convert to uppercase and will be put on the network as lowercase. For example, >>> B esa0 -fi "test.sys" will remain in lowercase letters.
-	Options/qualifiers are identified by a dash and indicate that additional information can be, or in some cases must be, supplied on the command line. The dash must be supplied.
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.
❶	A number in a circle corresponds to a number in an illustration.

Digital Support

Digital Services representatives are available for on-site support for warranty and service contract customers. If you are not currently eligible to receive this support but would like to be eligible, please contact either a Digital Support Center listed in Table 1, or your local Digital office.

Support Center Contact Numbers

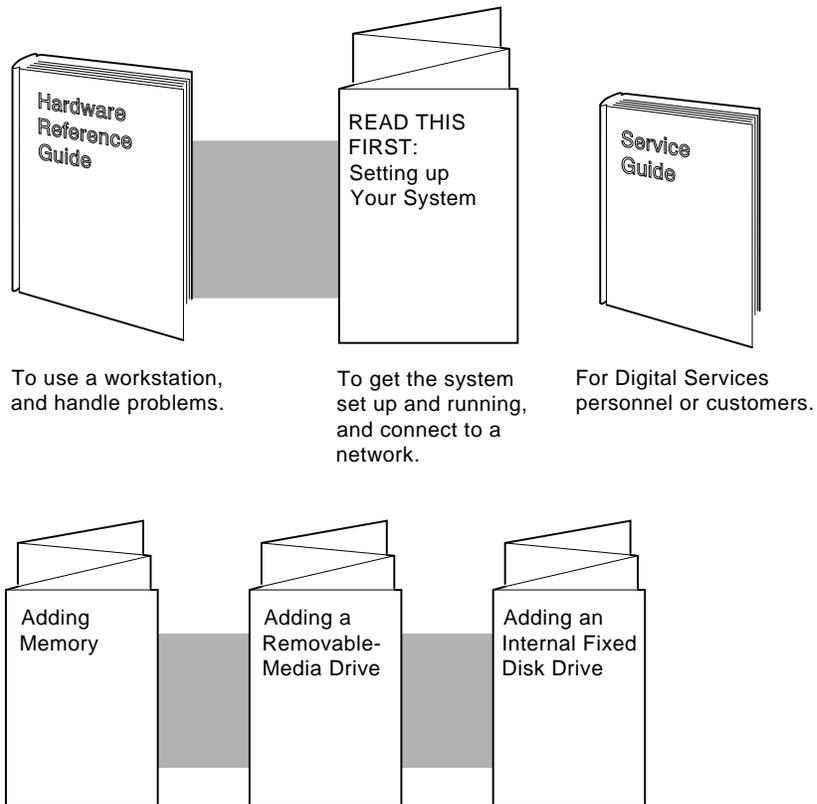
Table 1 lists the Digital Support Center contact numbers. If a number for your area is not listed below, please contact your local Digital office for assistance.

Table 1 Telephone Numbers of Digital Support Centers

Country	Telephone Number
United States	1-800-354-9000
Canada	1-800-267-5251
Canada (Quebec)	1-800-267-2603
United Kingdom	[44]25659200
France	[33]92955111
Germany	[49]-(89)-95913218
Australia	009 252-277

Figure 1 is a guide to the DEC 3000 Model 300 Series AXP documentation.

Figure 1 Guide to DEC 3000 Model 300 Series AXP Documentation



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1

Introduction to Your System

Chapter Overview

Introduction The DEC 3000 Model 300 Series AXP system is a high-performance, desktop system that uses Digital's DECchip 21064 RISC-style microprocessor. Your new DEC 3000 Model 300 Series AXP system is a member of a family of powerful desktop systems based on the Digital Alpha AXP architecture. It provides all the advantages of a 64-bit computing environment and the choice of multiple operating systems.

In This Chapter This chapter covers the following topics:

- Product Description
- Operating Systems
- Graphics Capabilities
- Integrated Services Digital Network (ISDN)
- Audio Capabilities
- System Personalization Capabilities
- Firmware Update Utility

Product Description

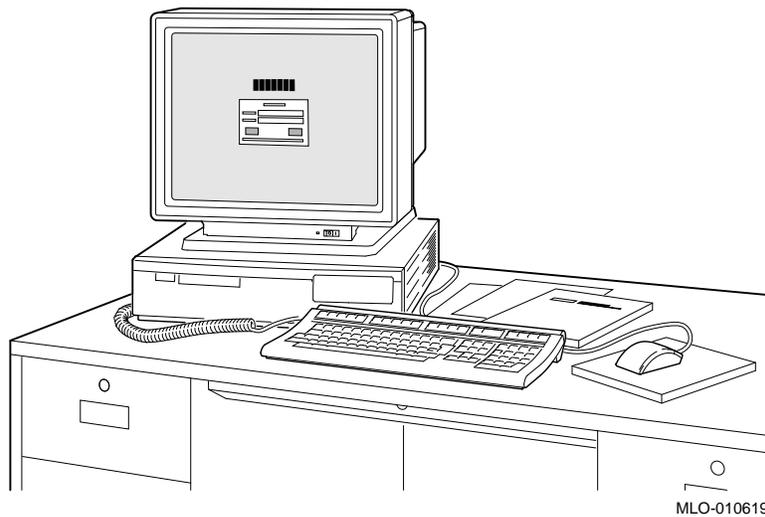
System Components

The DEC 3000 Model 300 Series AXP system consists of four basic components:

- System unit
- Monitor
- Keyboard
- Mouse

Figure 1-1 shows the system and its components.

Figure 1-1 System Components



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Model 300 Series Features

There are four variants of the DEC 3000 Model 300 series of systems: the Models 300, 300X and 300LX with TURBOchannel option support, and the Model 300L. Table 1-1 lists the features of each system.

Table 1-1 System Features

Feature	Models 300/300X/300LX	Model 300L	Order Number
Operating systems:	DEC OSF/1 AXP; OpenVMS AXP	Same	–
CPU speed:	150 Mhz - model 300	100 Mhz - model 300L	–
	125 Mhz - model 300LX	–	–
	175 Mhz - model 300X	–	–
TURBOchannel options:	Two slots	None	Refer to Chapter 2
Monitor support:	Monochrome 19"	–	VR319-DA/D4
	Monochrome 17"	Monochrome 17"	VRM17-HA/H4
	Color 16"	Color 16"	VRC16-HA/H4
	Color 19"	–	VRT19-HA/H4
	One or two additional monitors (requires up to two TURBOchannel HX options)	Not available	
Monitor resolution:	1280 x 1024	1024 x 768	–
Memory:	8-megabyte standard inline memory modules (SIMMs), expandable to 64 megabytes in 16-megabyte increments.	Same	MS16-BA
	32-megabyte SIMMs expandable to 256 megabytes in 64-megabyte increments.		MS16-DA

(continued on next page)

Product Description

Table 1–1 (Cont.) System Features

Feature	Models 300/300X/300LX	Model 300L	Order Number
Graphics:	Integral 8-plane 2D graphics, 1280 x 1024 HX TURBOchannel option	Integral 8-plane 2D graphics, 1024 x 768	PMAGB–BE/BF
	2D TX TURBOchannel option (DEC OSF/1 AXP only)	Not available	PMAGB–JA/JB
	PXG+ 8-plane 3D Z-buffer (DEC OSF/1 AXP only)	Not available	PMAGB–DA/DB
	PXG+ 24-plane 3D (DEC OSF/1 AXP only)	Not available	PMAGB–EA/EB
	8- to 24-plane upgrade for PXG+ (DEC OSF/1 AXP only)	Not available	PMAG–GB
	24-bit Z-buffer upgrade for 8-plane PXG+ (DEC OSF/1 AXP only)	Not available	PMAG–HA
	ZLX-M1 24-plane 3D Z-buffer (DEC OSF/1 AXP only)	Not available	PMAGC–AA
	3D Denali graphics (DEC OSF/1 AXP only)	Not available	PEXGA–AA/BA /CA

(continued on next page)

Table 1–1 (Cont.) System Features

Feature	Models 300/300X/300LX	Model 300L	Order Number
Network connections:	10BASE-T (twisted-pair) 10 Mb/s Ethernet port AUI or ThinWire (10base2) connection using a Digital-recommended adapter Industry-standard ISDN port for voice and data	Same	–
Secure system feature:	Additional system security for limited access to console functions	Same	–
Audio technology:	Telephone quality audio input/ output, including a built-in speaker. Headset available with some models.	Same	–

(continued on next page)

Product Description

Table 1–1 (Cont.) System Features

Feature	Models 300/300X/300LX	Model 300L	Order Number
External SCSI-II port:	One on-board 5 MB/s SCSI channel for both internal and external devices (up to two internal and five external devices)	Same	–
	Optional dual SCSI TURBOchannel module	Not available	PMAZC-AA
Communications port:	25-pin synchronous/asynchronous connection to a printer, plotter, modem, or console terminal.	Same	–
Battery backup clock:	Battery-run backup internal clocking system for synchronous operations.	Same	–
Internal devices:	Two 3½-inch RZxx fixed disk drives: RZ25, RZ25L, RZ26, RZ26L or optional RZ28	Same	RZ25-EP RZ25L-EP RZ26-EP RZ26L-EP RZ28-EP
	<i>or</i> One 3½-inch RZxx fixed disk drive and one 3½-inch RX26 removable-media drive		RX26-FB

Future Options Additional options for your system may be available at a later time.

Operating Systems

A Choice of Operating Systems

Digital's Alpha AXP architecture supports multiple operating systems for your DEC 3000 Model 300 Series AXP system.

This section gives a brief description of the operating systems currently available for this product:

- OpenVMS AXP
- DEC OSF/1 AXP

Information about installation and operation of each operating system is provided in system-specific software documentation.

OpenVMS AXP

The OpenVMS AXP operating system:

- Is a general-purpose, multiuser operating system that can be used in many different environments for a wide variety of applications.
- Promotes ease-of-use and improved programming productivity, and facilitates system management.
- Offers a combination of commercial strength and open system benefits, including the following:
 - integrated networking
 - system security
 - distributed computing
 - windowing capabilities
- Supports a large number of industry standards that facilitate application portability and interoperability.

DEC OSF/1 AXP

The DEC OSF/1 AXP operating system complies with the OSF Application Environment Specification (AES), which specifies the interface to support applications that run on a variety of hardware platforms.

Operating Systems

The DEC OSF/1 AXP operating system:

- Is Digital Equipment Corporation's implementation of the Open Software Foundation (OSF) operating system components and Motif graphical user interface and programming environment.
- Complies with standards and industry specifications, including FIPS 151-1, POSIX (IEEE Std. 1003.1-1988), XPG3 BASE branding, XTI, and AT&T System V Interface Definition (SVID) Issue 2 (Base System and Kernel Extensions).
- Is an advanced kernel architecture based on Carnegie Mellon University's Mach V2.5 kernel design with components from Berkeley Software Distribution 4.3 (BSD) and other sources.
DEC OSF/1 AXP provides numerous features to assist application programmers in developing applications that use shared libraries, multithread support, and memory mapped files.

Factory Installed Software

If there is a yellow sticker over the power connector on the back of your system unit, your operating system is already installed on an internal fixed disk. Depending on which operating system you ordered, your workstation will start with the OpenVMS AXP Factory Installed Software (FIS) procedure, or the DEC OSF/1 AXP Initialization Transition (IT) program. Refer to your factory-installed software instructions for:

- Startup procedures
- Examples of startup screens
- System prompts
- Password information
- Login information

Graphics Capabilities

The Model 300L System

All DEC 3000 Model 300 Series AXP systems are shipped with an integral, high-performance, accelerated 2-D, 8-plane, color graphics frame buffer on the system module. However, the Model 300L does not support additional graphics heads; that is, you cannot connect more than one monitor to the system.

The Model 300/300X/300LX Systems

Additional graphics capabilities are supported on the DEC 3000 Model 300 Series AXP systems; support is operating-system specific.

- **OpenVMS Operating System**

If your DEC 3000 Model 300 Series AXP system is running the OpenVMS AXP operating system, you can add one or two two-dimensional (2D) HX graphics options in TURBOchannel slots 0 and/or 1. This HX option provides additional 8-plane, accelerated 2D graphics and windowing operations. You can add two HX options and two additional monitors to expand the display area. Information about setting up your system to use more than one monitor is provided in the *OpenVMS Alpha Version 1.5 Upgrade and Installation Manual*.)

Graphics Capabilities

- **DEC OSF/1 Operating System**

If your DEC 3000 Model 300 Series AXP system is running the DEC OSF/1 AXP operating system, version 1.3B or later, — the two-dimensional (2D) HX graphics option, the two-dimensional (2D) TX graphics option, the 2D/3D ZLX graphics options, or the 3D HX+ graphics option can be installed in a TURBOchannel slot.

Adding either the HX option (for DEC OSF/1 AXP and OpenVMS AXP), or adding either the HX+ or the TX option (for DEC OSF/1 AXP only), allows you to expand the display area. The TX option provides 8-bit and 24-bit accelerated 2D graphics, windowing operations, and a hardware cursor. The HX+ option provides 8-bit and 24-bit accelerated 3D graphics, windowing operations, and a hardware cursor.

Information about setting up your system to use more than one monitor is provided in the *DEC OSF/1 Guide to System Administration*.

Installation Information

For information about installing graphics options in the Model 300/300X/300LX systems, see Chapter 2.

Integrated Services Digital Network (ISDN)

ISDN Not Yet Available

Though your DEC 3000 Model 300 Series AXP system can provide ISDN capabilities, it is not as yet agency approved and available for your DEC 3000 Model 300 Series AXP system. When your system is shipped, a foam block covers the ISDN port on the back of the system unit.

Once agency approval of ISDN for the DEC 3000 Model 300 Series AXP systems is granted, you will be contacted by your Digital sales representative to inform you of ISDN certification. When you are ready to install ISDN hardware, you must request your Digital service representative install the required hardware.

The following information explains the ISDN capabilities for your DEC 3000 Model 300 Series AXP system pending license approval.

Australian ISDN Connections

The ISDN interface in this equipment has not completed Australian ISDN network connection certification testing and as such does not have an AUSTEL permit for connection. In Australia, it is an offense to connect nonpermitted devices to a public telecommunications network and may attract a fine of up to \$12,000.

ISDN Capabilities

ISDN is a digital telecommunications network, providing connectivity for voice and data applications.

Your DEC 3000 Model 300 Series AXP system includes an ISDN Basic Rate S/T interface, which includes:

- Two 64 kilobits per second B channels for voice and data transmission
- One 16 kilobits per second D channel for signaling and control

Use of ISDN B Channels

The B channels can be used for digitized voice, circuit-switched data at up to 64 kilobits per second, or packet-switched data transmission.

Integrated Services Digital Network (ISDN)

Use of ISDN D Channels

The D channel uses a protocol standardized by the International Telegraph and Telephone Consultative Committee (CCITT) for setting up these D-Channel connections. The D channel can also be used for low-speed packet transmission.

Audio Capabilities

Audio Feature

The DEC 3000 Model 300 Series AXP system features telephone-quality audio input and output capabilities, including a built-in speaker.

You can attach a microphone, headphone, handset, headset, or externally-powered speakers to the audio port. Normally, the RS232 audio port is used in asynchronous mode. However, support for X.25 synchronous communications is available, but is operating-system-dependent.

The port pinouts for the audio jack on the back of the system unit are provided in Appendix C. Chapter 4 describes ISDN tests that you can issue from console mode: for example, to repeat, record and playback audio messages.

DECsound Application

The DECsound application, shipped with your system as part of the DECwindows Motif for OpenVMS AXP software, is an easy-to-use software application that lets you play back recorded messages, record audio messages, mail recorded messages, and include recorded messages in compound documents.

Audio Conferencing Software

Multimedia Services software and the DECspin audio conferencing software are also shipped with your system as part of the DEC OSF/1 software. These free applications let you take advantage of the voice-quality base audio on your system. The audio headset (provided in the parts kit with some models) is for you to use in the quiet of your office with these new applications. See the information sheet provided with the headset for instructions on how to start the applications.

System Personalization Capabilities

Firmware Parameters

Your system firmware includes commands and parameters that you can change to suit your specific needs. You may change the default settings for these parameters from console mode (>>>) by entering the `set` command followed by the parameter you want to change, as described in the next table.

To change this...	Use this command...
The action the console takes after a halt	<code>set <i>auto_action</i></code>
The default boot device	<code>set <i>bootdef_dev</i></code>
The default diagnostic startup mode	<code>set <i>diag_quick</i></code>

Refer to Chapter 4 for the format and available settings for these parameters.

Before You Change Parameters

Do not change any parameters without fully understanding the effect that the change may have on your workstation. If you are not sure about changing parameters, ask your system manager for assistance, or your Digital service representative.

Firmware Update Utility

Purpose

Digital Equipment Corporation distributes new Firmware Update utility software whenever there are any changes to the console firmware. The utility provides new firmware for the flash ROM (read-only memory) in your system, including the console program and diagnostic testing capabilities.

Note

Refer to the release notes you receive with the software update for an explanation of how to use the Firmware Update Utility software.

Write-Protecting the Flash ROM

For your convenience, your system is shipped from the factory with the flash ROM write jumper, labeled W1 on the system module, in the write-enabled position. Thus, there is no need to remove the system unit cover and get inside the system unit. You can update your console firmware with the latest version using the release notes.

To write-protect the flash ROM so that it cannot be overwritten:

1. Open the system unit cover.

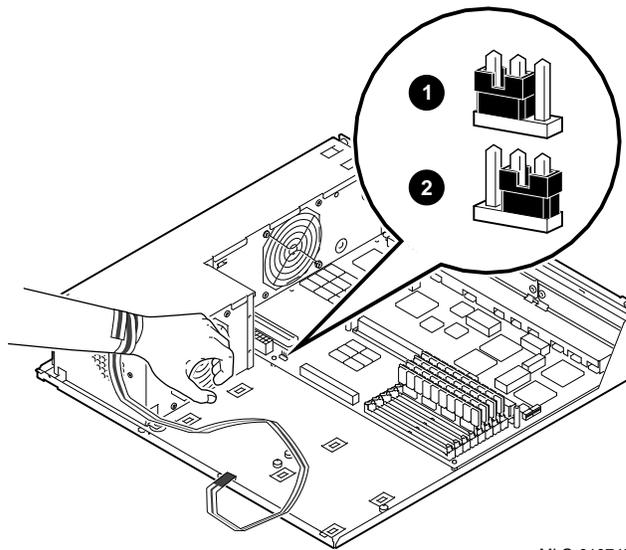
Caution

To avoid possible product damage, refer to Chapter 2 for instructions on how to power off the system, open, and work inside your system unit.

2. Locate the W1 jumper shown in Figure 1-2.

The default write-enabled position of the jumper is on pins 2 and 3.

Figure 1–2 Firmware Update Jumper



MLO-010745

- ❶ Enabled
- ❷ Disabled

3. Write-protect the flash ROM by moving the jumper to pins 1 and 2 (the disabled position), using tweezers or another small tool.
4. Replace the system unit cover.

Once this is done, future firmware updates will require repositioning the jumper.

2

Adding, Removing, and Replacing Internal Options

Chapter Overview

In This Chapter

When you receive your system from Digital, it may be configured with the internal devices specified in your order. At a later time, however, you may wish to add another internal option, or remove and replace one option with a different option.

This chapter provides the following information:

- Recording Information Before Making Changes
- Understanding SCSI IDs
- Preparing Your System
- Identifying and Locating Options
- Removing and Installing a Removable-Media Drive
- Removing and Installing a Fixed Disk Drive
- Removing and Installing a Memory Module
- Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)
- Removing and Installing the CPU Module
- Removing and Installing the Power Supply
- Removing and Installing the System Module
- Restoring the System

Chapter Overview

Required Tools

Be sure you have a Phillips screwdriver before you attempt to remove the system unit cover or install options. You may also need a flat-head screwdriver to remove some of the cables from the back of the system unit.

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 options yourself, note that additions typically take about 15 minutes for each option, although some procedures may take more or less time.

CAUTION: Possible Module Damage

Improper installation of an optional drive or module could lead to damage and failure of both the new drive or module and other system components. Your DEC 3000 Model 300 Series AXP warranty may not cover such a failure.

Device Verification

Be sure to refer to the operating system software product description (SPD) to verify that all installed devices are compatible with the operating system you are using.

Recording Information Before Making Changes

Diagnostic Displays

Before you install any options, you should be familiar with your DEC 3000 Model 300 Series AXP system and the following diagnostic displays:

- System startup messages
- The displays resulting from the following console mode (>>>) commands:
 - `show device` to display the names and status of devices in your system. Device is a general name for any hardware unit capable of receiving, storing, or transmitting data.
 - `show config` to display the status of the devices in your system
 - `show mem` to display the amount of memory installed

These `show` commands are described in the next few sections.

The show device Command

Enter the `show device` command as follows:

```
>>> show device Return
```

The `show device` command displays the status of each SCSI device and network interconnect that is recognized by the system. Record the displayed information for later reference (of particular importance is the information in the `BOOTDEV`, `ADDR` and `DEVNAM` columns). After adding or replacing a drive, you can then 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 either is not installed correctly or may be damaged.

The following occurs when the `show device` command is issued:

- The system issues the inquiry command to obtain device types and device names
- The system spins up the disks
- The device information is displayed

Recording Information Before Making Changes

- The following information is displayed:
 - ID, controller, Logical Unit Number (LUN)
 - Device name
 - Device type
 - Device capacity
 - Removable or fixed media
 - Write protection information for each disk
 - Firmware revision

The show device Display

Figure 2–1 shows an example of a show device display (the numbers are for reference only).

Figure 2–1 The show device Display

1	2	3	4	5	6	7	8
BOOTDEV	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM	REV
-----	-----	-----	-----	-----	---	-----	---
ESA0	08-00-2B-2F-F8-E6	TENBT					
DKA300	A/3/0	DISK	535MB	FX		RZ25L	0900
DKA500	A/5/0	DISK	RM		RX26	0068
..HOSTID..	A/7	INITR					

>>>

Recording Information Before Making Changes

Table 2-1 defines the columns of the `show device display`.

Table 2-1 Elements of the show device Display

Element	Description
❶ BOOTDEV	Console boot name for a device.
❷ ADDR	The Ethernet hardware address of each device. <code>08-00-2B-2F-F8-E6</code> is an example of the system hardware Ethernet address. The SCSI ID address setting of each device, <code>A/3/0</code> is an example: where <code>A</code> identifies the controller unit, <code>3</code> identifies the address setting, and <code>0</code> identifies the logical unit number (LUN).
❸ DEVTYPE	The type of device in the system.
❹ NUMBYTES	The capacity of this device.
❺ RM/FX	Specific device in this system: a removable-media (RM) or a fixed-disk (FX) device.
❻ WP	Status of the drive: write-protected or not write-protected.
❼ DEVNAM	The device name of the installed device.
❽ REV	The microcode revision number of the installed device.

Recording Information Before Making Changes

The show config Command

Enter the show config command as follows:

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

The show config command displays the following information:

- The system model number
- Revision number of the PAL (privileged architecture library) chip
- Name or mnemonic and status of the device

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

Figure 2-2 shows an example of a show config display. Table 2-2 defines the elements of the display.

Figure 2-2 The show config Display

```
❶ DEC 3000 M300
  Digital Equipment Corporation
❷ VPP PAL X5.25-80800101/OSF PAL X1.14-80800201 - Built on 2-OCT-1993 12:47:55.09
❸
❹
❺
TCINFO  DEVNAM  DEVSTAT
-----  -----  -----
        CPU    OK KN16-AA - Vx.x-Syyy-Izzz- sx.x - DECchip 21064 P3.0
        ASIC   OK
        MEM    OK
        FEROM  OK
6
        CXT    OK
5
        NVR    OK
        SCC    OK
        NI     OK
        ISDN   OK
4
        SCSI   OK
>>>
```

Recording Information Before Making Changes

Table 2-2 explains the elements in Figure 2-2.

Table 2-2 Elements of the show config Display

Element	Description
❶	The system model number.
❷	The revision number of the VPP PAL (privileged architecture library) code: where Xn.nn is for OpenVMS AXP or for the DEC OSF/1 AXP PAL code, and the date on which it was released.
❸	The physical addresses for baseboard devices, as follows: Slots 0 and 1 are for TURBOchannel devices (Models 300/300X/300LX only). If a TURBOchannel module requires both slots 0 and 1, only slot 0 is listed in the display. Slots 2 and 3 are reserved. Slot 4 is for a SCSI device. Slot 5 is for I/O control. Slot 6 is for the CXT (integral 2D accelerated graphics module). Slot 7 is for the system CSRs.
❹	Device name or mnemonic.
❺	The status of the device: KN16-AA identifies the CPU type. Vx.x identifies the system revision. Syyy identifies the system ROM edit revision. Izzz identifies the I/O ROM edit revision. sx.x identifies the serial ROM edit revision. DECchip 21064 P3.0 identifies the AXP chip revision. OK means that the device is installed correctly and diagnosed to be OK. A blank means there is no test for this device.

Recording Information Before Making Changes

System Configuration Errors

Two question marks (??) next to a component name in the DEVSTAT column indicate a problem with that component. If you normally use the `set diag_quick on` command to define your diagnostic startup mode, the error message consists of the question marks alone. Refer to Chapter 8 for an explanation of the error line.

To display the error message, you must enter the following command:

```
>>>show error
```

Example:

```
>>> show error   
?? 004 SCC 0x0060  
?T-ERR-SCC-MOUSE - 0 char rcvd
```

Refer to Chapter 4 for an explanation of the `show error` command.

If you use the `set diag_quick off` command to define your diagnostic startup mode (a full startup sequence occurs), then you will see two question marks in the display; see Figure 2-3. Note any field replaceable unit (FRU) number and error number. An FRU is a replaceable drive or module. See Chapter 8 for additional information about error messages and FRU codes.

Recording Information Before Making Changes

Figure 2-3 Configuration Display with Error at Startup

```
DEC 3000 Model 300
Digital Equipment Corporation
  VPP PAL X5.25-80800101/OSF PAL X0.14-80800201 - Built on 2-OCT-1993 12:47:55.09

TCINFO  DEVNAM  DEVSTAT
-----  -
150      CPU    OK KN16-AA - Vx.x-Syyy-Izzz - sx.x - DECchip 21064 3.0
        ASIC   OK
        MEM    OK 32MB
6        CXT    OK
5        NVR    OK
        SCC    ?? 003 0050 ptr(0) = Not Present keybd(2) = Not Present
        NI     OK Ethernet Address: 08-00-2B-2F-F8-E6, TENBT
        ISDN   OK
4        SCSI   OK
>>>
-----
System power up tests detected error(s).
See your system documentation for more information.
*** NO KBD - Switching to Alternate Console ***
```

To interpret this error message, refer to Chapter 8 of this guide for a list of FRU codes and the *DEC 3000 Model 300 Series AXP Service Guide* for a detailed explanation of error codes.

Recording Information Before Making Changes

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 Chapter 4 for a description of console commands, Chapter 8 for FRU codes, and the <i>DEC 3000 Model 300 Series AXP Service Guide</i> for more information.

The show mem Command

The `show mem` 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.

Enter the `show mem` command as follows:

```
>>> show mem 
```

The show mem Display

Figure 2–4 shows an example of a `show mem` display. (The numbers are for reference only.)

Figure 2–4 The show mem Display

```

  ❶  ❷  ❸
BANK #  MEMORY_SIZE  START_ADDRESS
-----
  0      008 Mbytes  0x00000000
  1      008 Mbytes  0x00800000
  2      008 Mbytes  0x01000000
  3      008 Mbytes  0x01800000
  4      000 Mbytes  0x00000000
  5      000 Mbytes  0x00000000
  6      000 Mbytes  0x00000000
  7      000 Mbytes  0x00000000

>>>

```

Table 2–3 defines each element of the `show mem` display.

Table 2–3 Elements of the show mem Display

Element	Description
❶ BANK #	The bank numbers indicate the position of each memory board.
❷ MEMORY_SIZE	The memory size is the total amount of memory installed in each bank. In this example, there are eight megabytes of memory in banks 0, 1, 2, and 3; none in the remaining banks.
❸ START_ADDRESS	The starting address is the location number of each memory bank.

Understanding SCSI IDs

Overview

Before you remove an internal device and install another device, you should note the following information about devices and understand SCSI IDs.

Digital RX26 Drive

Your system may arrive configured with an RX26 removable media drive. The hardware specifications and device-specific SCSI ID information for this drive are included in Appendix B of this document.

If you plan to add an RX26 removable media drive, refer to *DEC 3000 Model 300 Series AXP Adding a Removable-Media Drive* (part number EK-PELAF-IC), shipped with the drive.

RZ25, RZ25L, RZ26 or RZ26L Drives

Your system may arrive configured with an RZ25, RZ25L, RZ26 or RZ26L fixed disk drive. The hardware specifications and device-specific SCSI ID information for these drives are included in Appendix B of this document.

If you plan to add an RZ25, RZ25L, RZ26, RZ26L or the optional RZ28 fixed disk drive, refer to *DEC 3000 Model 300 Series AXP Adding an Internal Fixed Disk Drive* (part number EK-PELAD-IC), shipped with each additional drive ordered.

Adding an External Option

If you plan to add a Digital manufactured compact disc drive, tape drive, or expansion box, refer to the documentation that accompanies that option for the proper setting of SCSI addresses for the device. See Appendix D for a listing of external option documentation.

If you plan to add a device that is not manufactured by Digital, refer to the documentation accompanying the device for SCSI ID address information.

Brief Introduction to SCSI IDs

For proper communication between your system and all the devices installed in the system unit, each device must have a unique SCSI address setting (ID). SCSI settings are determined by the position of the electrical switches or jumpers located on the back or side of the device. Switches can be either up or down; jumpers can be either attached or removed.

If you are replacing a device, be sure the SCSI ID setting on the new device is unique. Only one SCSI ID (0—6) is allowed per device. The SCSI ID 7 is reserved for the SCSI controller.

If you order a new drive separately from the system, you will receive an installation card. Refer to this card for the exact location of the switches or jumpers on the drive you order.

A replacement drive is often set to the same address as the drive it replaces. Use the `show device` command on the replacement drive to confirm it's address.

Preparing Your System

Overview

Before you install or remove any internal option, you must take the following steps to prevent loss of data or damage due to static discharge. Refer to the appropriate section of this chapter for details of each action.

Step	Action
1	Back up your files.
2	Shut down all software following the instructions in your software documentation.
3	At the console prompt (>>>), enter the <code>show mem</code> , <code>show device</code> , and <code>show config</code> commands. Record the displayed information.
4	At the console prompt (>>>), enter the <code>set auto_action halt</code> command.

Preparing Your System

Step	Action
5	Turn off the monitor and all peripheral devices such as printers, modems and expansion boxes.
6	Turn off the system unit.
Warning	
Before you unplug the power cord and open the system unit, wait about one minute. This allows time for the power supply capacitors to safely discharge.	
7	Remove all cables, loopbacks, terminators and power cords from the back of the system unit and monitor.
8	Wait a few minutes for the monitor to discharge.
9	Move the monitor away from the system unit (this requires two people).
10	Remove the system unit cover.
11	Attach the antistatic wrist strap.

Shut Down Networked Systems

Procedures for shutting down your software vary depending on 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

Shut Down Operating Systems

For information on how to shut down your operating system, refer to your operating system documentation. These manuals and their order numbers are listed in Appendix D.

Shutting down your system may require knowledge of file back up and operating system shutdown procedures. The following privileges may be required:

- For the OpenVMS AXP operating system, the shutdown procedure usually requires certain software privileges.
- For the DEC OSF/1 AXP operating system, you may require superuser privileges to shutdown the system.

If you do not have the required system privileges, ask your system manager for assistance.

Operating System	Shutdown Command	Documentation Titles
OpenVMS AXP	@sys\$system:shutdown	<i>System Management, Vol. 1A, Guide to Starting Up and Shutting Down the System</i>
DEC OSF/1 AXP	shutdown -h now	<i>Guide to System Administration</i>

Note

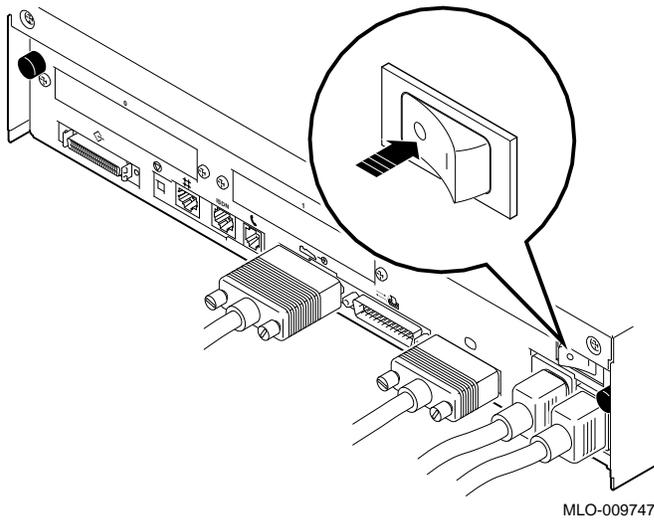
Typing `shutdown -r now` or `reboot` at the console prompt (`>>>`) reboots your system.

**Turning Off Equipment:
Task Overview**

Shutting down the hardware involves the following steps:

Step	Action
1	Turn off (O) all expansion boxes.
2	Turn off (O) all peripheral devices (such as printers).
3	Turn off (O) the monitor. (Turning off the system does not automatically turn off the monitor).
4	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 2-5.

Figure 2-5 Turning Off the System Unit



CAUTION:
Before
Disconnecting
a Monitor

After you turn off the system and *before* you disconnect the power cord from the monitor and system unit, wait about one minute to allow time for the power supply capacitors to safely discharge.

To disconnect the monitor:

Step	Action
1	Disconnect the power cords from the monitor and system unit.
2	Disconnect the monitor video cable from the rear of the monitor and system unit.
3	Move the monitor away from the top of the system unit.

Warning

The monitor can weigh up to 75 lbs. (34 kg). To avoid possible injury, two people are required to move the monitor.

Remove the System Unit Cover

To remove the system unit cover, refer to Figure 2–6 and follow these steps:

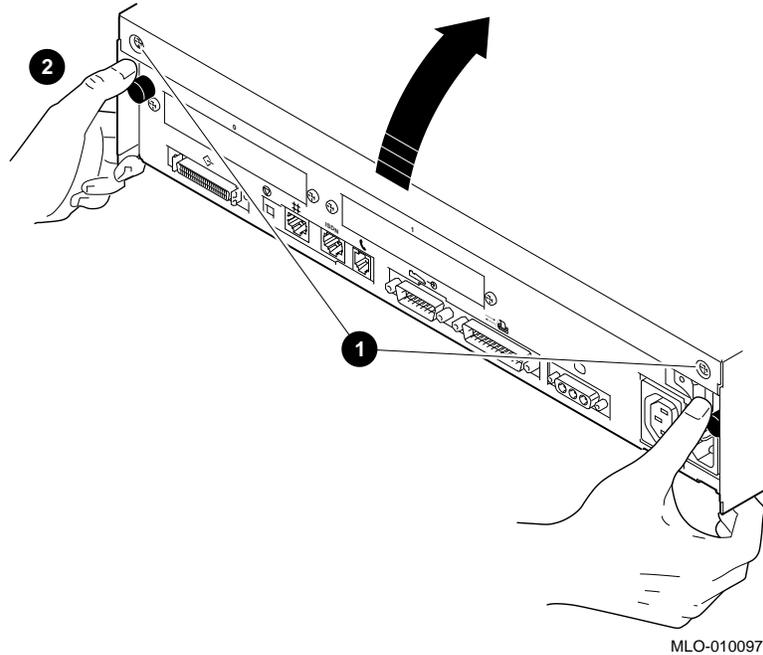
Step	Action
1	Remove the two Phillips screws on the right and left back corners of the system unit cover ❶.
2	Place the system unit so that the back edge extends over the edge of your table or desk.
3	Place your thumbs on the two black caps ❷ on the back of the system unit, and at the same time, place your fingers under the cover's bottom edge. Press down with your thumbs while you press up against the cover's edge with your fingers to lift the cover.

Note

A significant amount of pressure is required to lift the cover. You may want to cushion your fingers.

4	Pivot the cover on the tabs that run along the system unit's front edge.
5	Pull the system unit cover up and away until it releases from the tabs.
6	Place the cover safely aside.

Figure 2-6 Removing the System Cover



WARNING:
Thermal
Problems

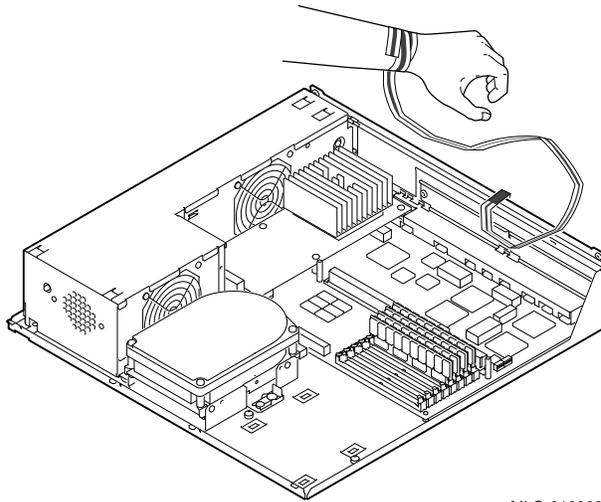
Do not run the system for an extended period of time (15 minutes) with the cover removed. Prolonged use of the system without the cover may cause thermal problems.

CAUTION:
Static
Discharge

Do not touch anything inside the system unit until you attach the antistatic wrist strap included with your system or option shipment. Always use this strap when you work inside the system unit to avoid damage to internal devices from static discharge. Digital also recommends that you use an antistatic mat.

To attach the antistatic wrist strap, shown in Figure 2-7, follow the steps printed on the envelope containing the strap. Save this envelope for storing the strap.

Figure 2-7 Attaching the Antistatic Wrist Strap



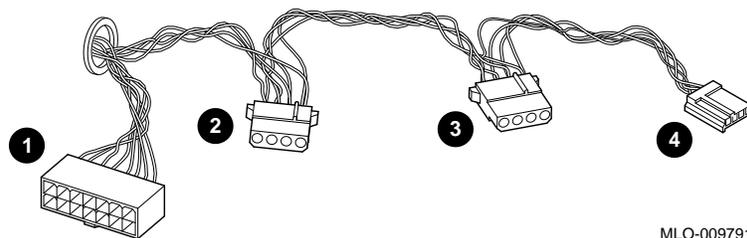
MLO-010098

Identify the Internal Power Cable

Each connector on the internal power cable must be connected to the corresponding power port on the back of each drive.

The internal power cable and connectors are shown in Figure 2-8.

Figure 2-8 Power Cable and Connectors



MLO-009791

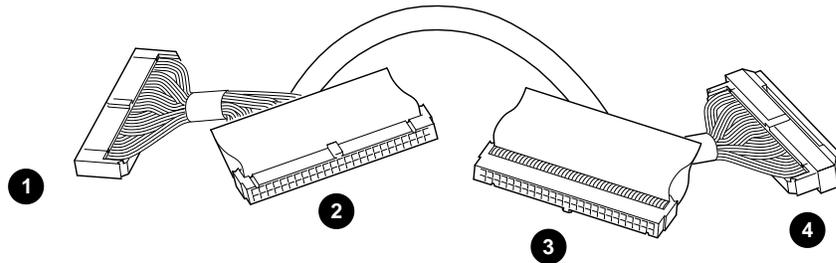
- ❶ Connects to the system module.
- ❷ Connects to a fixed disk drive, if any.
- ❸ Connects to a second fixed disk drive or removable-media drive, if any.
- ❹ Connects to the removable-media drive only.

Preparing Your System

Identify the Internal SCSI Cable

Each connector 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 2-9.

Figure 2-9 SCSI Cable and Connectors



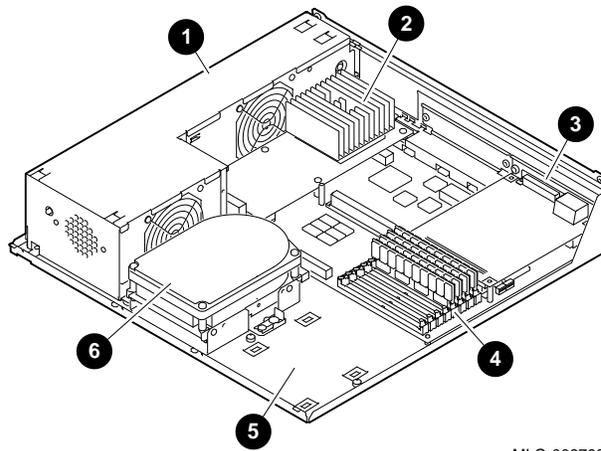
MLO-009792

- ❶ Connects to the system SCSI bus.
- ❷ Connects to a fixed disk drive in position 1, if any.
- ❸ Connects to a fixed disk drive or a removable-media drive in position 2, if any.
- ❹ Is a SCSI bus terminator.

Identifying and Locating Options

Figure 2-10 shows the location of memory modules, fixed disk and removable media devices, and TURBOchannel modules (if any) in the DEC 3000 Model 300 Series AXP systems.

Figure 2-10 Device Positions



MLO-009798

- ❶ Power supply
- ❷ CPU module with heat sink
- ❸ TURBOchannel option module installed in slot 0 (slot 1 is shown empty)
- ❹ Memory modules
- ❺ Device position 2
- ❻ Device position 1, with a fixed disk installed

Removing and Installing a Removable-Media Drive

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the caution statement associated with Figure 2-7.

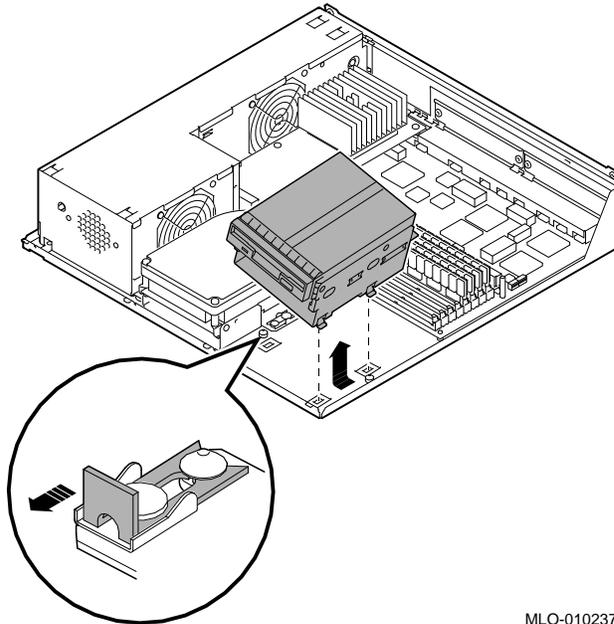
Remove a Removable-Media Drive

To remove a removable-media drive from position 2, perform the following steps:

Step	Action
1	Be sure all system preparation tasks are complete. Refer to <i>Preparing Your System</i> for additional information.
2	Record, for later use, the SCSI ID setting of the drive you remove. Use the <code>show device</code> command (Chapter 4) before you remove the device.
3	Unlock the drive from the base of the system unit by releasing the latch on the left side of the drive. (See Figure 2-11.)
4	Disconnect the internal power and SCSI cables.
5	Lift up and slide the drive to the left. (See Figure 2-11.)
6	Insert the filler panel and shield, as described in the section entitled <i>Install the Filler Panel and Metal Shield</i> later in this chapter.

Removing and Installing a Removable-Media Drive

Figure 2–11 Removing a Removable-Media Drive



MLO-010237

Removable-Media Drive SCSI Switch Settings

The setting of the SCSI switches on the removable-media drive enables the system to recognize the drive. Normally, the SCSI address for removable-media drives should be preset to a SCSI ID of 5.

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

If you do change the setting, use a small pointed instrument (such as the tip of a ballpoint pen) to move the switches. Do not use a pencil; graphite particles can damage the switches. Refer to Appendix B for an illustration of SCSI ID settings.

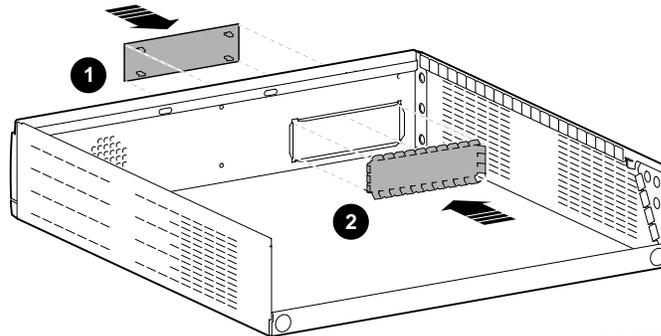
Removing and Installing a Removable-Media Drive

Install the Filler Panel and Metal Shield

After you remove a removable-media drive, look for a plastic filler panel and metal shield that came in your shipment (see Figure 2–12). To fill in the space that the front of the drive occupied:

Step	Action
1	Insert the filler panel ❶ from the outside into the open slot on the system unit cover bezel, as shown in Figure 2–12.
2	Insert the metal shield ❷ from the inside into the open slot on the system unit cover bezel, as shown in Figure 2–12.

Figure 2–12 Installing the Shield and Filler Panel



MLO-010570

Remove the Filler Panel and Metal Shield

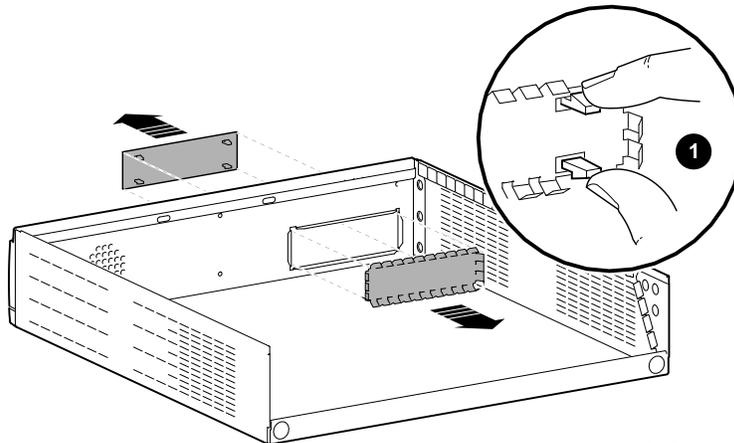
If you did not order a removable-media drive from the factory when you placed your order with Digital, and are installing one now, you must first remove the plastic filler panel and metal shield from the front bezel on the system unit cover.

Removing and Installing a Removable-Media Drive

To remove these items:

Step	Action
1	Release the filler panel from the metal shield by gently pressing on the filler panel tabs and pushing outward. See ❶ in Figure 2-13.
2	Store the shield and filler panel for future use.

Figure 2-13 Removing the Shield and Filler Panel



MLO-010273

Connect the Drive Cables

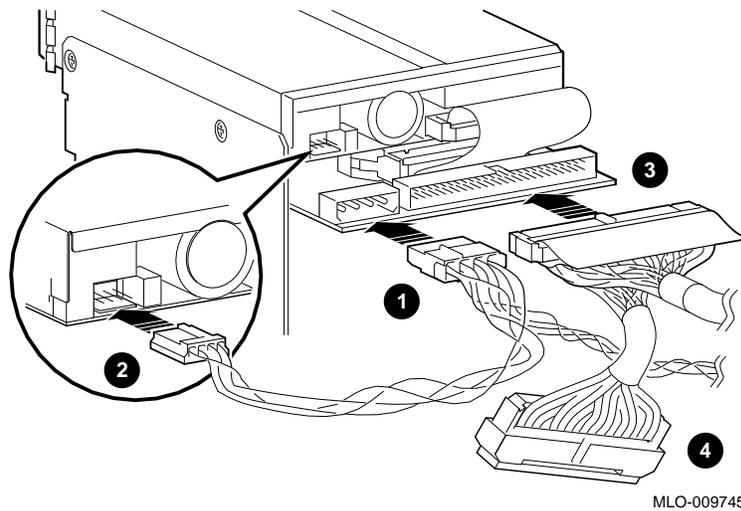
To cable the drive, hold it outside the system unit before you install it, follow these steps, and refer to Figure 2-14:

Step	Action
1	Connect the large connector ❶ on the power cable to the power port on the back of the RX26 drive.
2	Connect the small connector ❷ on the power cable to the smaller power port on the back of the drive.

Removing and Installing a Removable-Media Drive

Step	Action
3	Connect the internal SCSI cable with the key facing up ③ to the SCSI port on the back of the drive. The power cable must be under the SCSI cable.
4	Tuck the SCSI terminator ④, located at the end of the SCSI cable, in the mounting bracket under the RX26 drive.

Figure 2–14 Cabling the RX26 Drive



Install a Removable-Media Drive

To install a removable-media drive, reverse the steps in the removal procedure as follows:

Step	Action
1	Record the SCSI ID setting for future use. Refer to Chapter 4, the show device command.
2	Be sure all system preparation tasks are complete. See the section entitled Preparing Your System.
3	Be sure the cables are all connected.

Removing and Installing a Removable-Media Drive

Step	Action
4	Insert the mounting bracket tabs on the right side of the drive into the slots on the base of the system unit.
5	Press down on the drive.
6	Lock the drive in place, by sliding the latch back. (See Figure 2-11).

Format a Diskette

After you have installed a removable-media drive, you may wish to format a diskette before you use it. You do this with the Diskette Formatter Utility. Refer to Diskette Formatter Utility Example in Chapter 4 for a description and example of the `test scsi format` command that runs this utility.

Removing and Installing a Fixed Disk Drive

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge.

Device Configuration

Your system may arrive configured with either an RZ25, RZ25L, RZ26 or RZ26L fixed disk drive. The installation instructions in the following sections picture an RZ25 or RZ26 drive; the instructions also apply to the RZ25L, RZ26L and RZ28 fixed disk drives.

Remove a Fixed Disk

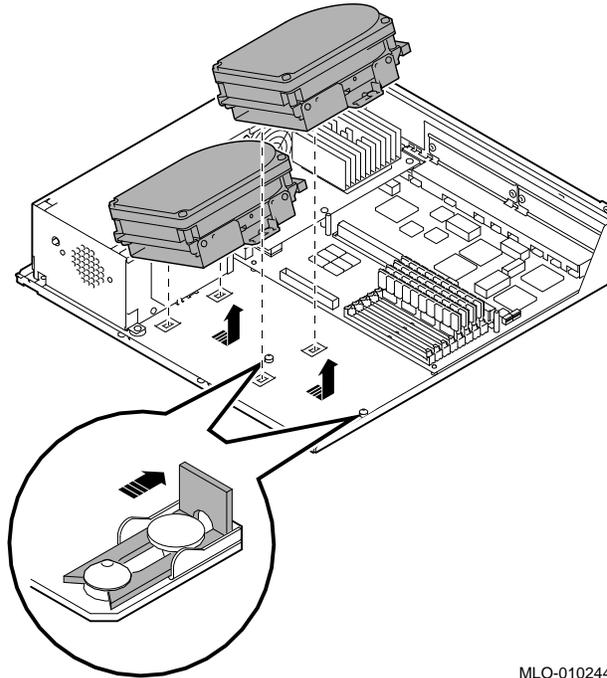
To remove a fixed disk drive, perform the following steps and refer to Figure 2-15:

Step	Action
1	Be sure all system preparation tasks are complete. Refer to the section entitled Preparing Your System for more information.

Removing and Installing a Fixed Disk Drive

Step	Action
2	Unlock the drive by pushing the lock tab back, as shown in Figure 2-15.
3	Disconnect the internal power and SCSI cables from the back of the drive.
4	Tilt the drive to the left and lift it out of the system.

Figure 2-15 Removing a Disk Drive



MLO-010244

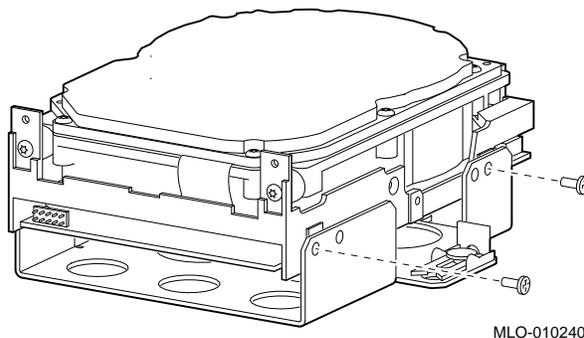
Removing and Installing a Fixed Disk Drive

Note

If you are replacing a drive with a third-party drive, remove the mounting bracket from the drive, as shown in Figure 2-16.

Figure 2-16 shows the removal of the mounting bracket from a fixed disk drive. Remember, this is necessary *only* if you are replacing the drive with a third-party drive, or if you need to gain access to the SCSI ID settings.

Figure 2-16 Removing the Mounting Bracket from a Disk Drive



MLO-010240

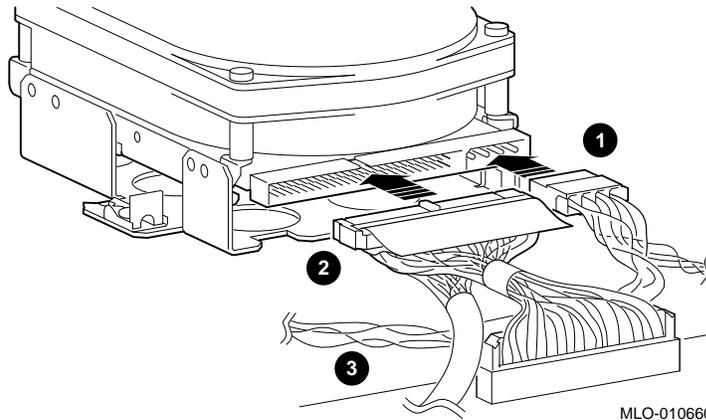
Removing and Installing a Fixed Disk Drive

Cabling for Drive in Position 1

To cable the drive that you are installing in position 1, follow these steps and refer to Figure 2–17:

Step	Action
1	Connect the large power connector ❶ on the power cable to the power port on the back of the RZxx drive.
2	Connect the internal SCSI cable ❷ to the back of the disk drive. Be sure the key (the notch in the center of the cable connector) is facing up. The power cable ❸ must be under the SCSI cable.
3	Lay the terminator, located at the end of the SCSI cable, and the remaining length of power cable in the empty position 2.

Figure 2–17 Cabling a Drive in Position 1



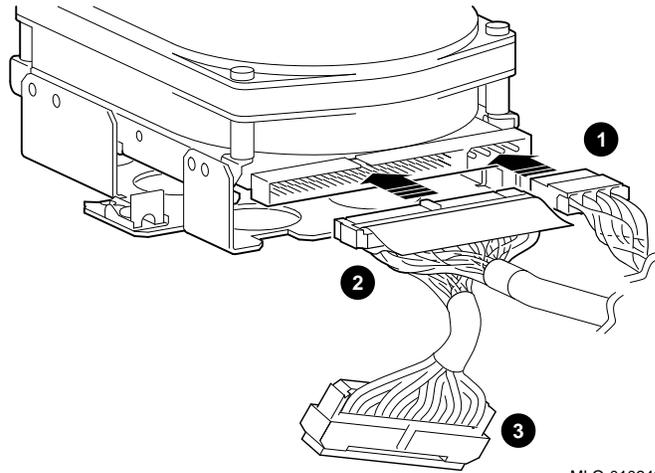
Removing and Installing a Fixed Disk Drive

Cabling for Drive in Position 2

To cable the drive that you are installing in position 2, follow these steps and refer to Figure 2–18:

Step	Action
1	Connect the large power connector ❶ on the power cable to the power port on the back of the RZxx drive.
2	Connect the internal SCSI cable ❷, with the key facing up, to the back of the disk drive.
3	Tuck the SCSI terminator ❸, located at the end of the SCSI cable, in the mounting bracket under the RZxx drive in device position 2.

Figure 2–18 Cabling a Drive in Position 2



MLO-010242

Removing and Installing a Fixed Disk Drive

Install a Disk Drive

To install a fixed disk drive, reverse the steps in the removal procedure, as follows:

Step	Action
1	Record the SCSI ID setting for future use. Refer to the next section and Chapter 4, the <code>show device</code> command.
2	Be sure all system preparation tasks are complete before opening the system. Refer to the section entitled <i>Preparing Your System</i> .
3	Be sure all cables are connected.
4	Insert the mounting bracket tabs on the left of the drive into the slots on the base of the system unit. (See Figure 2-15.)
5	Press down on the drive.
6	Lock the disk drive in place by pulling the lock tab forward.

Fixed Disk Drive SCSI Jumper Settings

When a fixed disk drive arrives from the factory, all SCSI jumpers may be attached to prevent loss during shipment. Digital's recommended setting for a fixed disk drive is 1, 2, or 3. However, if the drive is preset to a SCSI ID other than 1, 2, or 3, you need not change it unless that setting is already taken by another device installed in your system.

To change the setting, choose one that is not in use, and carefully move the jumpers using tweezers or another small tool. If you remove any jumpers, save them, you may need them later. Refer to Appendix B for the device you are installing.

Verify Disk Blocks

After you have installed a disk, you may wish to verify that all blocks on that disk can be read. You do this using the Disk Verify utility. Refer to Chapter 4 for a description and example of the `test scsi verify` command that runs this utility.

Erase a Fixed Disk

You may also need to erase a fixed disk if you are installing a previously-used one. Do this using the Erase Disk Utility. Refer to Chapter 4 for a description and example of the `test scsi erase` command that runs this utility.

Removing and Installing a Memory Module

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge.

Memory Module Introduction

A memory module is known as a Single Inline Memory Module (SIMM). Two types of memory modules are supported on the DEC 3000 Model 300 Series AXP system, each type has components on both sides of the module:

- An 8-megabyte memory module (part number MS16-BA) that allows from 16 to 64 megabytes of memory to be added in 16-megabyte increments
- A 32-megabyte memory module (part number MS16-DA) that allows from 64 to 256 megabytes of memory to be added in 64-megabyte increments
- The two memory module types may be mixed in your memory configuration, as long as the memory configuration guidelines are followed.

Your DEC 3000 Model 300 Series AXP system module includes eight memory module connectors.

Note

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

It may be necessary to remove a device before you add the last SIMM.

Removing and Installing a Memory Module

Memory Configuration Rules

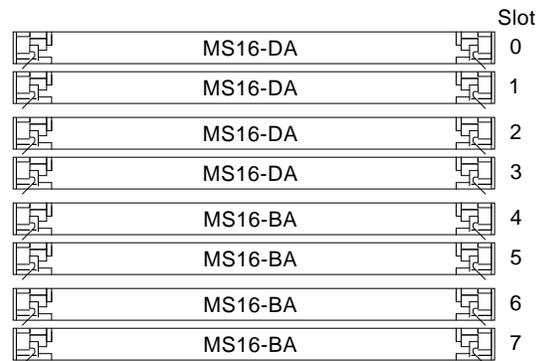
When mixing 8- and 32-megabyte SIMMs, follow these rules:

- Always add the 32-megabyte SIMMs first.
- Add 32-megabyte SIMMs in pairs, 64 to 256 megabytes in total.
- Add 8-megabyte SIMMs in pairs, 16 to 64 megabytes in total.
- Always add SIMMs in pairs, no individual modules, 2, 4, 6 or 8 SIMMs in the system.
- Add SIMMs starting at slot 0 (see Figure 2-19).
- No empty slots between pairs of SIMMs.

The following example is provided for information only. For a system that requires 160 megabytes of memory, follow these steps:

1. Add one 32-megabyte SIMM (MS16-DA) to slots 0, 1, 2, and 3, for a total of 128 megabytes of memory.
2. Add one 8-megabyte SIMM (MS16-BA) to slots 4, 5, 6, and 7, for a total of 32 megabytes of memory.

Figure 2-19 160 MB Memory Configuration

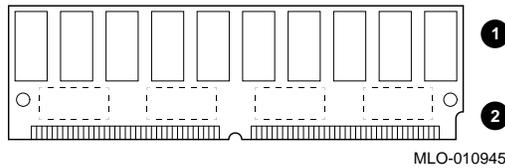


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Adding 8-MB SIMMs

To increase your system's memory capacity from a minimum of 32 megabytes to 48 or 64 megabytes, add two or four 8-megabyte SIMMs. The SIMMs are identified by counting ten chips on the top row ❶ and four chips on the bottom row ❷ in Figure 2-20. There are fourteen chips on one side of the module, but only 10 chips on the other side of the module. Note that the 8 megabyte chips on the top row are smaller than the 32-megabyte chips shown in Figure 2-21.

Figure 2-20 8-Megabyte SIMM



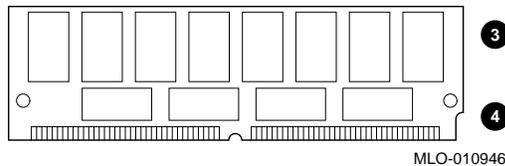
Adding 32-MB SIMMs

To increase your system's memory capacity from a minimum of 64 megabytes to 128 or 256 megabytes, add four or eight 32-megabyte SIMMs. The SIMMs are identified by counting eight chips on the top row ❶, and four chips on the bottom row ❷ in Figure 2-21. There are 12 chips on each side of the module.

Note

32-megabyte chips are larger than 8-megabyte chips.

Figure 2-21 32-Megabyte Simm



See the section entitled Identifying and Locating Options and Figure 2-10 for additional information.

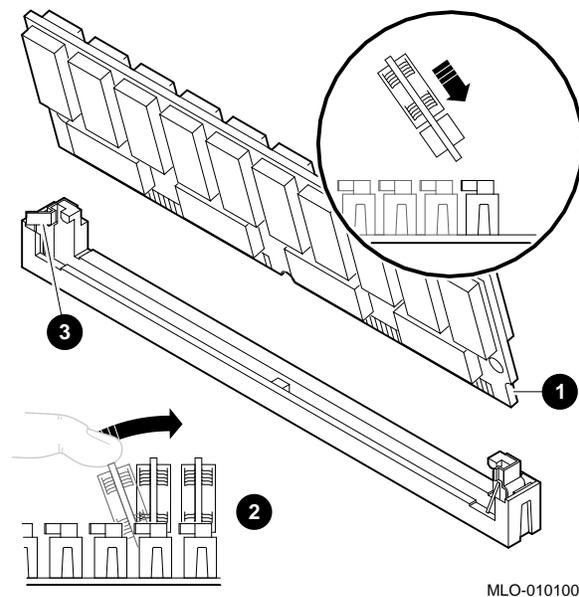
Removing and Installing a Memory Module

Remove Memory

To remove or replace a memory module, refer to Figure 2–22 and perform the following steps:

Step	Action
1	Be sure all system preparation tasks are complete. Refer to section entitled Preparing Your System for additional information.
2	Remove memory beginning with the module closest to device position 2. (See Identifying and Locating Options and Figure 2–10 for the location of device position 2.) Release the sprint clips ③ at both ends of the module. Hold the module by its edges, tilt the module forward, and pull up and out. ②.

Figure 2–22 Removing and Installing a Memory Module



Removing and Installing a Memory Module

Install Memory

To install memory, reverse the steps in the removal procedure, as follows, and refer to Figure 2-22:

Step	Action
1	Be sure all system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Hold the module at an angle with the notch ❶ away from the power supply and the module pins facing the system module.
3	Firmly push the module into the connector and stand the module upright ❷.
4	Make sure that the memory module snaps into the spring clips at each end of the connector ❸.
5	Continue adding modules, filling available connectors in succession.

Note

To remove a memory module other than the last one, release the spring clips of all memory modules starting with the last one and progressing to the memory module to be removed. The released memory modules may be tilted out of the way, but not completely removed. After removing the memory module in question and replacing it with a new one, stand the remaining module(s) upright, and snap the module into the metal retainers at each end of the connector.

Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

Definition of TURBOchannel

A TURBOchannel bus is a high-performance interconnection that allows you to support up to two monitors and use a variety of Digital options, third-party graphics, multimedia, and communications options. The TURBOchannel bus is a synchronous asymmetrical I/O channel that connects option modules to the system module.

Multiscreen Capability

Using a TURBOchannel module you can connect two (or more) monitors: one to the built-in HX graphics module, and an additional one (or two) to the HX or TX TURBOchannel modules that you install. When you connect an additional monitor to the TURBOchannel module in slot 0 or slot 1, it is the first console device detected on the TURBOchannel, and therefore becomes the console device.

Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

**Supported
TURBOchannel
Options**

Table 2-4 lists the TURBOchannel options you can add to your DEC 3000 Model 300/300X/300LX system:

Table 2-4 TURBOchannel Options

TURBOchannel Option	Customer Order Number	Field Service Part Number
HX 2D graphics accelerator, 1280 x 1024, 72 Hz	PMAGB-BE/BF	54-21143-03
TX 2D 24-plane color frame buffer (nonaccelerated), 1280 x 1024, 72 HZ (DEC OSF/1 AXP systems only)	PMAGB-JA/JB	30-35790-02
PXG+ ¹ 3D 8-plane Z-buffer, low-to mid-range, 1280 x 1024, 72 HZ	PMAGB-DA/DB	54-20116-AA
PXG+ ¹ 3D 24-plane Z-buffer, ² low-to mid-range, 1280 x 1024, 72 HZ	PMAGB-EA/EB	54-20185-05
ZLX-M1, 24-plane, 3D, Z-buffer (DEC OSF/1 AXP systems only)	PMAGC-AA	
8-to-24-plane upgrade for PXG+ (requires Digital Services installation)	PMAG-GB	37-01250-03
24-bit Z-buffer ² option for 8-plane PXG+ systems	PMAG-HA	8-bit: 54-20410-AA 16-bit: 54-20352-AA
Denali P310 3D graphics, P510 3D graphics, and V620 3D graphics, (DEC OSF/1 AXP systems only)	PEXGA-AA/BA/CA	
Dual SCSI adapter	PMAZB-CA	54-21833-01
Dual SCSI adapter with fast SCSI support (8-bit, 5-MB/sec or 10-MB/sec ports)	PMAZC-AA	54-21833-03
AUI (Thickwire) Ethernet module	PMAD-AA	54-19874-01
FDDIcontroller 700 (fiber optic) interface	DEFTA-FA	
Sound and Motion J300 multimedia option	AV300-AA	70-30284-01
Prestoserve option	DJ-30APS-AA	
Sync com option	DSYT-1	
UTP (Twisted Pair) to 10BASE-2 (ThinWire) adapter	DETTR-AA/AB	
UTP (Twisted Pair) to AUI (ThickWire) adapter	DETTR-BA/BB	

¹3D PXG+ options do not include DEC PHIGS Runtime license or DEC Open3D license (required for 3D graphics); it must be ordered separately. One 3D option is supported per system; two TURBOchannel slots required.

²A Z-Buffer improves 3D graphics performance.

Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge earlier in this chapter for additional information.

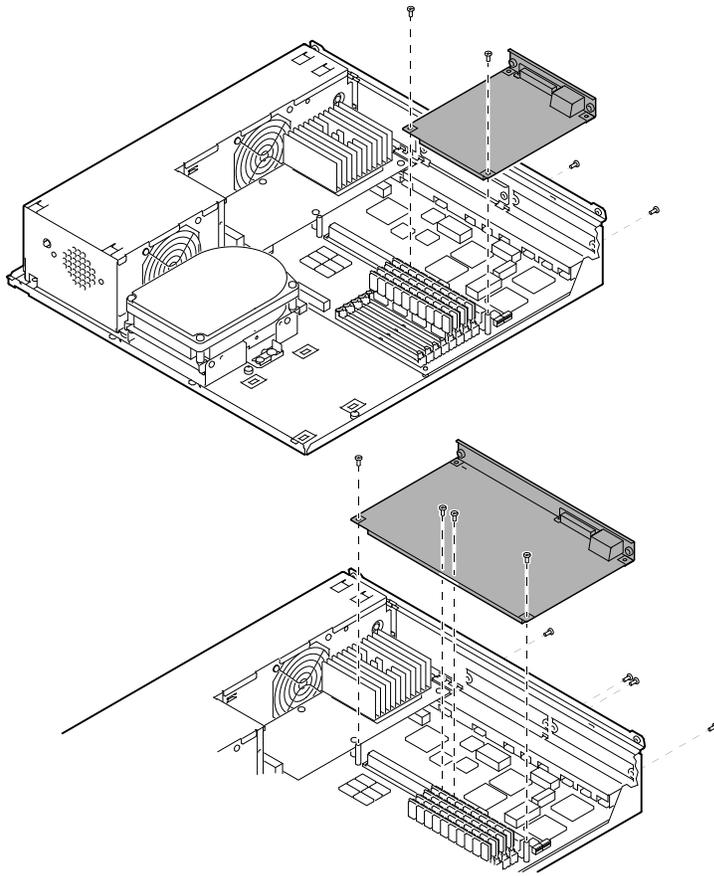
Remove a TURBOchannel Option

To remove a TURBOchannel option, refer to Figure 2-23 and follow these steps:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Disconnect external cables to the TURBOchannel slots at the back of the system unit.
3	Remove the two screws from the two posts at the back of a single-width TURBOchannel module and four screws from four posts at the back of a double-width module. These screws secure the TURBOchannel module to the system module.
4	Remove the two screws from a single-width module and four screws from a double-width module on the back of the system unit that hold the TURBOchannel module in the connector slot. Save the screws for step 6.
5	Lift the single-width or double-width TURBOchannel option up off the system connector and out toward the front of the system unit. This may require extra effort, as the TURBOchannel options are installed tightly.
6	Insert one or two filler plates, depending on the width of the module, into the TURBOchannel slot openings, and attach with the two or four screws from step 4. See Figure 2-24.

Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

Figure 2-23 Removing and Installing a TURBOchannel Option



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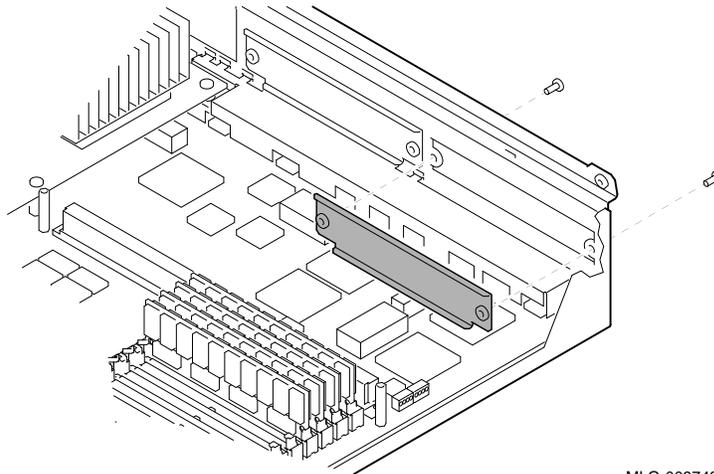
Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

Install a TURBOchannel Option

To install a TURBOchannel option, reverse the removal procedure, and refer to Figure 2–23 as follows:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Remove the screws from the back of the system unit that hold the filler plate or plates (depending on the width of the module) in the TURBOchannel slot, as shown in Figure 2–24. Save the screws to use in step 6. Save the filler plate or plates in case you remove the option. Reinsert the filler plate or plates when the option is removed in order to maintain the EMI and thermal integrity of the system.

Figure 2–24 Removing the TURBOchannel Filler Plate



MLO-009749

Removing and Installing a TURBOchannel Option (For Models 300/300X/300LX Systems)

- 3 Insert the TURBOchannel option connector into the open slot at the back of the system unit.
 - 4 Firmly press the module onto the TURBOchannel connector. This may require some extra effort, as TURBOchannel options fit tightly.
 - 5 Insert the two or four screws (that come with the option) through the holes on the TURBOchannel module and into the posts on the system module. Screw the module down to secure the option to the system module.
 - 6 Reinsert the screws (from step 2) to the back of the system unit to hold the TURBOchannel option in place.
 - 7 Connect external cables to the TURBOchannel option at the back of the system unit. Refer to the option documentation for proper cabling procedures.
-

Removing and Installing the CPU Module

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge earlier in this chapter. Handle the CPU module by its edges only.

Remove the CPU Module

To remove the CPU module, refer to Figure 2–25 and perform the following steps:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Loosen the four captive (nonremovable) screws that hold the module in place: two at the back corner edges of the module and two at the center edges. The four support posts ❷ may remain attached to the system module during CPU removal. However, they must be removed before you remove the system module.

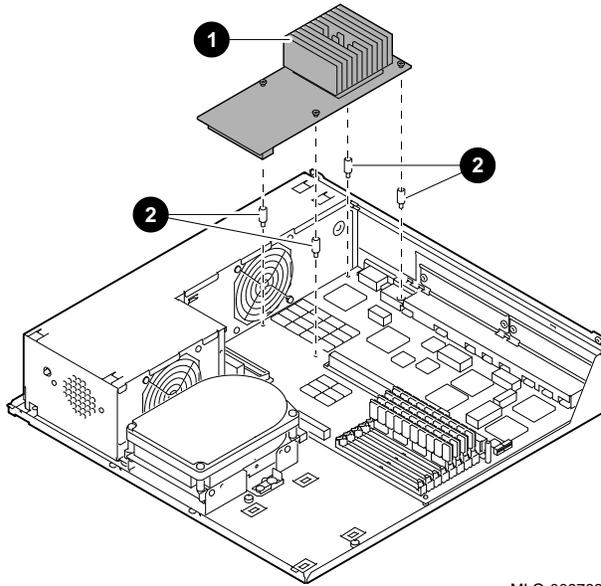
Warning

Do not use the aluminum heat sink (❶ in Figure 2–25) as a handle. This part of the CPU module is very hot if the system has recently been running.

3	Lift the module up off the system module connector and out.
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Removing and Installing the CPU Module

Figure 2–25 Removing the CPU Module



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Install the CPU Module

To install the CPU module, reverse all steps in the removal procedure and refer to Figure 2–25, as follows:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Holding the module by its edges, set it onto the four posts to which it attaches ②. (Do not handle the module by the aluminum heat sink ①.) Push down on the connector end of the module to ensure a good connection.
3	Tighten the four captive screws to the posts: two at the back corner edges of the module, and two at the center edges.

Removing and Installing the Power Supply

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge earlier in this chapter.

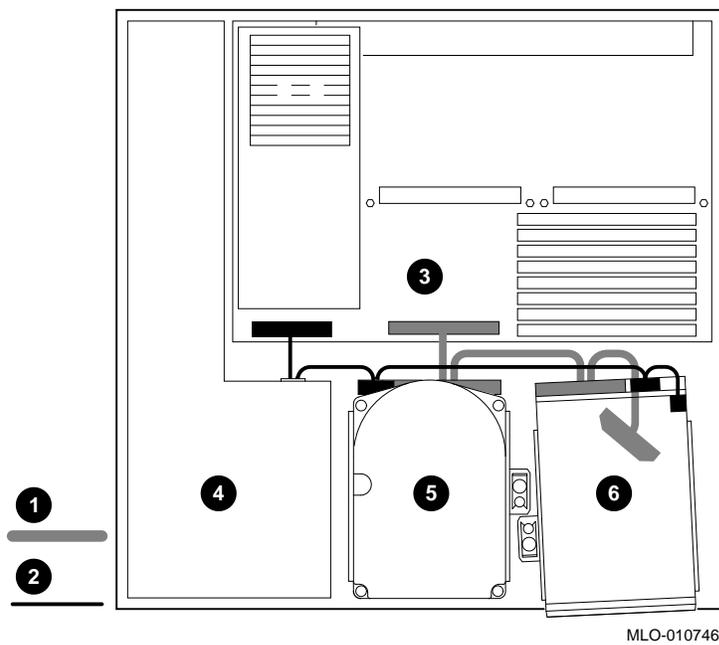
Remove the Power supply

To remove the power supply, refer to figures 2-26 and 2-27, and perform the following steps:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Squeeze the plastic tab on the front of the power supply cable connector and pull up to disconnect the cable from the system module. See Figure 2-26. If any drives are installed, disconnect the cable from these drives as well.

Removing and Installing the Power Supply

Figure 2–26 The Power Supply Cable



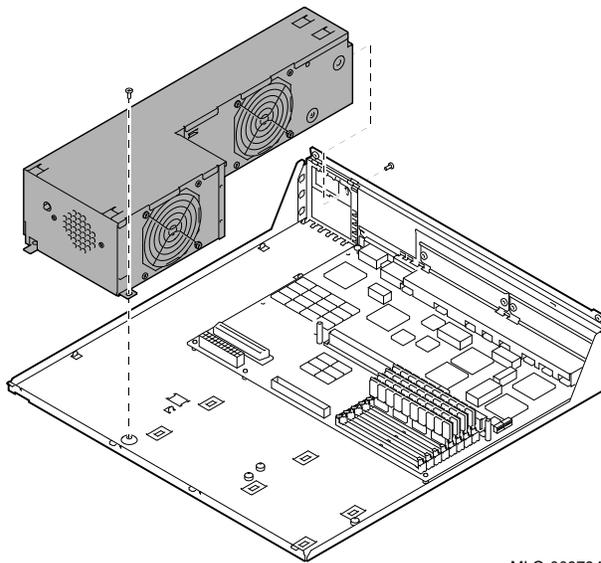
Each numbered component is identified as follows:

- ❶ SCSI cable
- ❷ Power cable
- ❸ System module
- ❹ Power supply
- ❺ Device in position 1
- ❻ Device in position 2

Removing and Installing the Power Supply

Step	Action
3	Remove the two mounting screws: one located at the bottom front of the power supply on a metal tab facing the inside of the system unit; the other located at the back of the system unit next to the on/off switch. See Figure 2-27.
Note	
Do not confuse the back mounting screw with the back screw of the power supply cover.	
4	Slide the power supply toward the front of the system unit, raise the back of the power supply above the back of the system unit, and slide the power supply out.

Figure 2-27 Removing the Power Supply



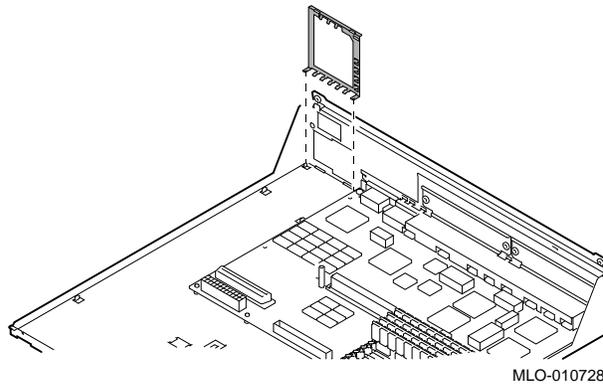
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Removing and Installing the Power Supply

Caution: Shield

It is possible for the metal shield that is attached to the inside of the system unit to come loose when you remove the power supply. This shield is located at the back of the system unit and encircles the opening through which the power supply sockets extend (see Figure 2–28). If the shield comes loose, be sure to reinstall it.

Figure 2–28 Reinstalling the Metal Shield



Install the Power Supply

To install the power supply, reverse all steps in the removal procedure and refer to Figure 2–27, as follows:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled <i>Preparing Your System</i> for more information.
2	Insert the tab on the bottom front of the power supply into the slot on the base plate of the system unit.
3	Push the power supply toward the back of the system unit.
4	Insert and tighten the two mounting screws.
5	Connect the power supply cable connector to the system module, and then a connector to each drive, if any are installed.

Removing and Installing the System Module

Antistatic Precautions

Do not remove or install any internal option without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge.

Remove the Ethernet ROM

In the event that you must replace the system module, be aware that you can retain your system's original Ethernet address, by transferring the Ethernet ROM from the failing system module to the new system module.

To remove the Ethernet ROM from the failing system module, refer to Figure 2-29 and perform the following steps:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Locate the Ethernet ROM on both the new and failing system modules. The ROM is a 16-pin socketed chip; it is labeled ❶ in Figure 2-29. Note the orientation of the ROM; there is a ROM key (a small notch) at the end of the chip close to the memory modules.
3	Remove the Ethernet ROM from the replacement (new) system module using a chip puller or a small flat-head screwdriver. Put this ROM aside. Lift the chip gradually, loosening first one end of the chip and then the other.

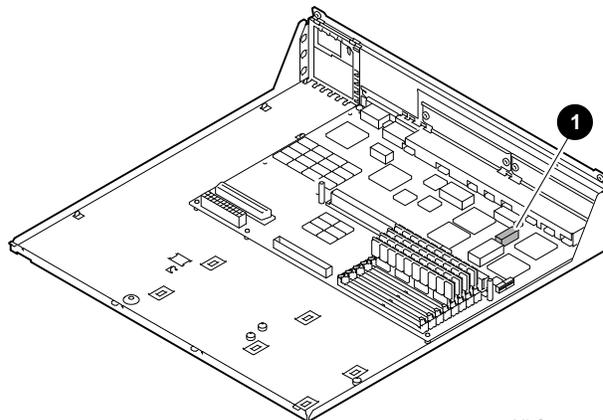
CAUTION

When you remove an Ethernet ROM, be very careful not to bend the pins on the chip. The pins are fragile and must be intact for you to add the Ethernet ROM to the replacement system module.

Removing and Installing the System Module

Step	Action
4	Remove the Ethernet ROM from the failing system module using a chip puller or a small flat-head screwdriver. Lift the chip gradually, loosening first one end of the chip and then the other.
5	Make sure the pins on the Ethernet ROM are straight after you remove the ROM from the failing system module. If the pins are bent, carefully straighten them.
6	Transfer and add the chip (that you just removed from the failing system module) to the replacement system module, installing it in the vacant Ethernet ROM socket. Make sure you place the chip in the vacant socket in the same orientation as it was in when you removed it from the failing module. Make sure the pins on the Ethernet ROM are properly aligned in the socket before pushing the ROM into place.
7	Take the Ethernet ROM you removed from the new system module and insert it in the vacant socket on the failing system module.

Figure 2–29 Removing the Ethernet ROM



MLO-012103

Removing and Installing the System Module

Remove the System Module

To remove the system module, refer to Figure 2–30 and perform the following steps:

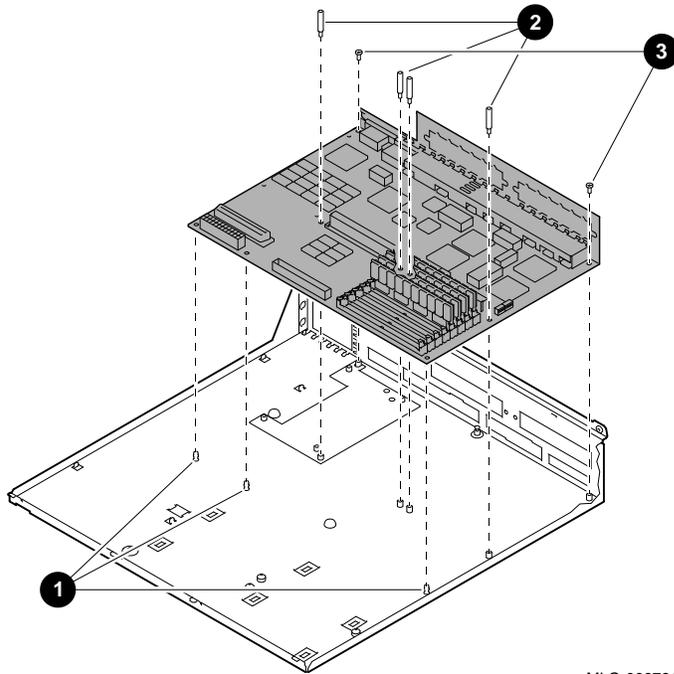
Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Remove the TURBOchannel modules (Models 300/300X/300LX only), see Figure 2–23.
3	Remove the TURBOchannel filler plates, see Figure 2–24.
4	Remove the power supply. See Figure 2–27.
5	Remove the CPU module. See Figure 2–25. The four support posts may remain attached to the system module during CPU removal. However, they must be removed before you remove the system module.
6	Remove the drives, if any. Disconnect the SCSI cable from the system module.
7	Remove the memory modules (SIMMs), see Figure 2–22.
8	Unscrew the four TURBOchannel posts labeled ❷ in Figure 2–30. (Models 300/300X/300LX only)
9	Unscrew the four CPU module support posts labeled ❷ in Figure 2–25.
10	Remove the two screws labeled ❸ in Figure 2–30.
11	Before you remove the system module, remember to swap the Ethernet chip, that is, move the chip from the old module to the new module.
12	Gently pry the system module off the three standoffs, labeled ❶ in Figure 2–30, and pull the module toward the front of the system unit (away from the connector/slot openings on the bottom enclosure).

Removing and Installing the System Module

Note

After you remove the system module, you will see a loose metal plate. Be sure this plate is in place when you reinstall the system module. (See Figure 2–30.)

Figure 2–30 Removing the System Module



MLO-009781

Removing and Installing the System Module

Install the System Module

To install the system module, reverse all steps in the removal procedure and refer to Figure 2-30, as follows:

Step	Action
1	Be sure the system preparation tasks are complete. See the section entitled Preparing Your System for more information.
2	Insert the connectors on the system module through the openings on the bottom enclosure. Seat the system module over the standoffs ❶ and push down gently.
3	Add the two screws labeled ❸ in Figure 2-30.
4	Screw the four TURBOchannel posts in place, see ❷ in Figure 2-30.
5	Add the four CPU module support posts, see ❷ in Figure 2-25.
6	Install the memory modules (SIMMs), see Figure 2-22.
7	Install the drive(s). Refer to the sections entitled Removing and Installing a Removable-Media Drive and Removing and Installing a Fixed Disk Drive.
8	Install the CPU module. Refer to the section entitled Install the CPU Module.
9	Install the power supply. Refer to the previous section entitled Install the Power Supply.
10	Connect the power cable and the internal SCSI cable to the system module and the drives. See Figure 2-26.
11	Install the TURBOchannel modules and/or the option slot filler plates. See figures 2-23 and 2-24.
12	Connect all cables to the back of the system unit.

Restoring the System

Save the Wrist Strap

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

Step	Action
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.

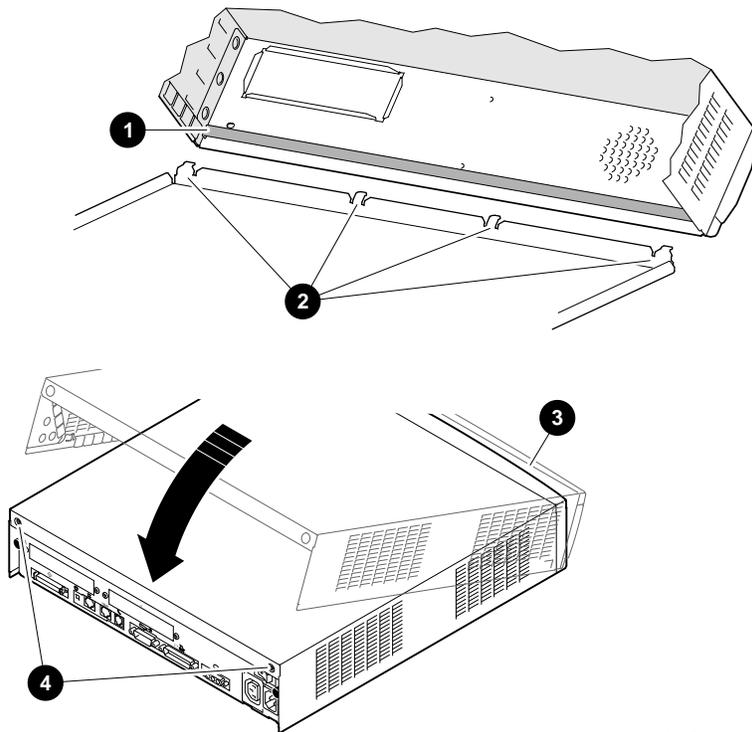
Replace the System Unit Cover

To replace the system cover, see Figure 2-31 and follow these steps:

Step	Action
1	Align the lip on the front inside edge of the cover ❶ with the four tabs along the front edge of the system unit ❷. Position the cover so that the lip fits over the tabs.
2	Maintain a slight pressure on the front of the cover ❸ as you lower it. Be sure the sides of the cover fit over the outside of the bottom enclosure.
3	Press down firmly on the edges of the cover.
4	Replace the two screws on the back of the system unit that hold the cover in place ❹.

Restoring the System

Figure 2-31 Replacing the System Cover



MLO-010101

Reconnect and Restart the System

To reconnect your system, follow these steps:

Warning

The monitor can weigh up to 75 lbs. (34 kg). To avoid possible injury, two people are required to move the monitor.

Step	Action
1	Return your monitor to its former position.
2	Connect the following components: <ul style="list-style-type: none">a. Monitor and system power cords.b. Monitor video and mouse/keyboard cables.c. Network cable and optional adapter.d. System power cord to a grounded outlet.
3	Turn on the following components: <ul style="list-style-type: none">a. Peripheral devices, such as a printer, modem, or expansion box.b. Monitor and system unit.

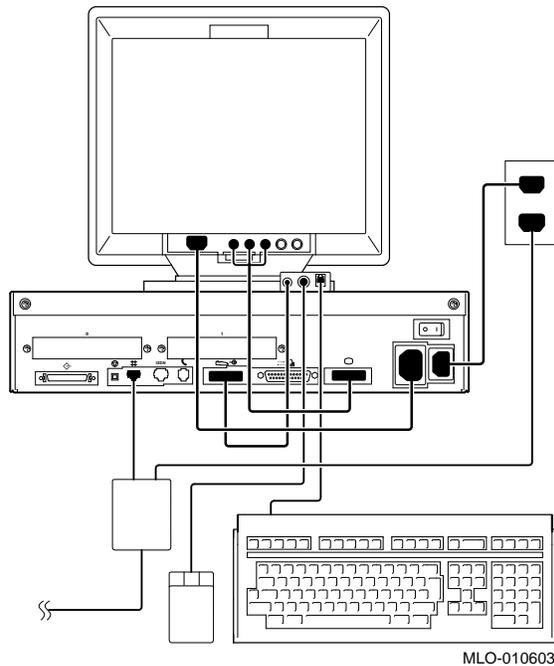
Note

If you do not turn on SCSI expansion boxes before you turn on the system unit, the system will not recognize the devices mounted in the SCSI expansion boxes.

Figure 2-32 shows the connections between the system unit, monitor, mouse and keyboard, network, and grounded outlet.

Restoring the System

Figure 2-32 Reconnecting the System



When you turn on the system successfully, you should see a display similar to that shown in Figure 2-33. This display is similar to the screen displayed when you enter the `show config` console command.

Figure 2-33 System Display After Restoring Your System

```

DEC 3000 - M300
Digital Equipment Corporation
System conducting power up tests
-----
DEVNAM          DEVSTAT
-----
      CPU      OK KN16-AA - Vx.x-Syyy-Izzz - sx.x - DECchip 21064 P3.0
      ASIC      OK
      MEM      OK 32MB
      NVR      OK
      CXT      OK
      SCC      OK ptr(0) = Present keybd(2) = Present
      NI       OK Ethernet Address: 08-00-2B-2F-F8-E6 , TENBT
      SCSI     OK
      ISDN     OK
-----
System power up OK.
>>>

```

Test the System

To confirm that the options are connected correctly:

Step	Action
1	<p>Enter the <code>show device</code> command at the console prompt to display the status of the drives, as explained in the section entitled <i>Recording Information Before Making Changes</i> at the beginning of this chapter.</p> <p>From this display, you can:</p> <ul style="list-style-type: none"> • Compare the new display with the display you viewed when you prepared the system. You should see the new drive, and the drive that was in the system before you made the addition. If the 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. See Chapter 8.

Restoring the System

Step	Action
2	Enter the <code>show device</code> command at the console prompt to display a list of the devices in your system. If you have a DEC 3000 Model 300/300X/300LX system, this command will also display a list of your TURBOchannel modules.
3	Enter the <code>show mem</code> command at the console prompt to verify that installation of additional memory was successful.
4	At the console prompt (<code>>>></code>), enter the <code>set auto_action boot</code> command. If your system has the OpenVMS AXP or the DEC OSF/1 AXP operating system software already installed, enter <code>B</code> at the console prompt, and press the Return key to automatically start your system. If you do not already have operating system software, refer to your software documentation.

Record Messages

If any messages are displayed, write them down in case you need to contact your Digital service representative.

If you see error messages during the startup or `show config` procedure, 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 ID setting.)
- Are any SCSI ID addresses set to ID 7? The system SCSI controller uses SCSI ID address number 7.

If gaining entry to the system unit is required for checking cables and modules, refer back to the section entitled *Preparing Your System*.

If you continue to see error messages, refer to Chapter 7 or Chapter 8, or contact your Digital service representative.

3

Connecting External Options

Chapter Overview

In This Chapter This chapter covers the following topics:

- Headset
- Tablet
- Printers
- Modems
- Expansion Boxes
- Compact Disc Drive
- External Device Connections

Future Options The previous list represents the external options that are available when the DEC 3000 Model 300 Series AXP System first ships. Other options may be available later.

For More Information For information on the installation and use of these options, consult the documentation accompanying the option. To purchase an option, contact your Digital sales representative.

Headset

Headset

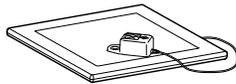
Purpose



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

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.

Printers

Recommended Printers

Many printers, including third-party plotters, can be used with your DEC 3000 Model 300 Series 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.

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).

A variety of modems can be used with your DEC 3000 Model 300 Series AXP system, the baud rate and model is specified in the operating system documentation. See your Digital sales representative for a list of the recommended modems.

Consult the documentation that came with the modem to unpack the modem.

Expansion Boxes

Available Expansion Devices

Expansion boxes allow you to add up to five additional industry-standard SCSI devices external to your system. A few of the devices you can add are the RRD42, RZ25, RZ25L, RZ26, RZ26L, TZ30, and the TLZ06 drives. The DEC 3000 Model 300 Series AXP systems support the BA353 expansion box. An optional dual-SCSI TURBOchannel option card supports a maximum of 14 additional SCSI devices.

An optional pedestal mounting kit (BA350X-FA) is available for the BA353 expansion box. See your Digital sales representative for more information about this box and its options. Refer to your expansion box documentation for mounting instructions.

Device Verification

Be sure to refer to the operating system software product description (SPD) to verify that all devices in a particular expansion box are supported.

SCSI Terminator

If no external devices are added, you must connect the SCSI terminator to the SCSI port on the back panel of the system unit to maintain signal integrity.

If external device(s) are added, you must connect a SCSI terminator to the SCSI port on the last external device.

Compact Disc Drive

Introduction

The RRD42 compact disc drive is a half-height, 5¼-inch, 600-megabyte storage device. You can connect the external model of this drive to the SCSI port on the back panel of your DEC 3000 Model 300 Series AXP system (see External Device Connections) and plug it in to an available outlet.

Refer to the *600 MB SCSI CD-ROM Installation Guide*, listed in Appendix D, for information on connecting cables to the RRD42 compact disc drive and on drive specifications.

Operating System Installation

If your system does not have factory-installed software, you can load the operating system from an external compact disc.

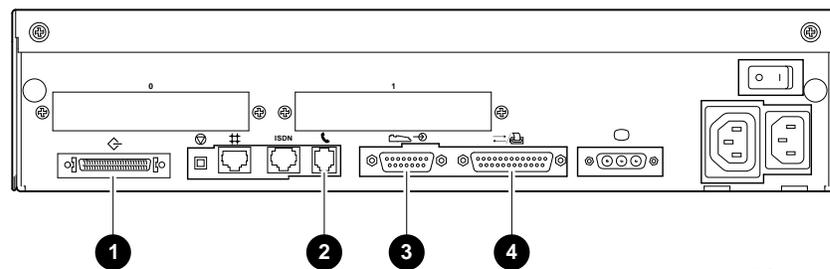
For information on loading a disc into a caddy, and loading the caddy into a compact disc drive, refer to either your operating system installation documentation, or the instruction booklet packed in the CD case.

External Device Connections

Figure 3–1 shows where each of the external options connects to the back panel of the system unit.

- ❶ Connect an external compact disc drive or storage expansion box to the SCSI port.
- ❷ Connect a headset or handset to the audio input/output port. Audio amplification is not provided by the system. To use external speakers, you must provide amplification.
- ❸ Connect a tablet to the connector block where the mouse cable would otherwise be connected.
- ❹ Connect a printer, plotter, modem or console terminal to the RS232 synchronous/asynchronous communications port. The RS232 port is normally used in asynchronous mode. The communications port supports X.25 synchronous communication, but the support is operating-system-specific.

Figure 3–1 External Connections to the System Unit



MLO-009748

4

Using Console Commands

Chapter Overview

In This Chapter

This chapter lists and then explains the use of the DEC 3000 Model 300 Series AXP console commands and their parameters and qualifiers. Each console command description includes a summary of its purpose, a list of associated parameters and qualifiers, and usage examples.

The following console commands are covered in this chapter:

boot	login
continue	repeat
deposit	set
examine	show
halt	start
help	test
initialize	

Additionally, this chapter covers these topics:

- Skill level required
- Definitions of console and program mode
- Three diagnostic environments
- Diagnostic examples associated with the test command

Chapter Overview

Skill Level Recommended

Using console commands requires basic, intermediate, and sometimes advanced knowledge of your system and its components, as well as the effect that console commands can have on your system.

Command	How Used	Skill Level Recommended
boot	Starts the operating system	Intermediate/ Advanced
continue	Returns from console mode to operating system level (program mode)	Advanced
deposit	Writes to specific memory, I/O, and register locations from the console	Advanced
examine	Displays contents of specific memory, I/O, and register locations	Advanced
halt	Halts the system	Basic
help	Displays the main help screen, which is a list of six console commands: boot, help advanced, set, show, test	Basic
help advanced	Displays advanced help	Intermediate
initialize	Resets console, devices, and CPU	Intermediate
login	Gives you access to the system and restricted console commands if set <i>password</i> command has been enabled	Intermediate
repeat	Executes commands repeatedly	Advanced
set	Sets an environment variable	Advanced ¹
show	Shows an environment variable	Basic
start	Starts CPU at a given address	Advanced
test	Runs diagnostic tests	Intermediate

¹Exception: set *language* is a basic command that sets the keyboard language.

Before You Begin

Console Mode Definition

In console mode, the system operates under the control of the console subsystem, rather than the operating system. All user input is passed to and interpreted by the console subsystem.

Console mode is in effect when the system is turned on and the operating system software has not been started, or when the operating system has been shut down.

When Console Mode Is Used

You interact directly with the console subsystem under the following circumstances:

- Before booting the operating system software
- While setting environment variables
- When using the Firmware Update Utility
- When trying to identify and resolve system problems or errors (see Chapter 7)

Console Prompt

The console mode prompt looks like this:

```
>>>
```

You can enter control characters and console commands at the console prompt.

Program Mode Definition

In program mode, the system and console are under control of the operating system. All user input is passed to the operating system. You cannot issue console commands without returning to console mode.

Program mode is in effect when the system is turned on and the operating system software has started. In program mode, the user can manage the system, run software applications, and perform network tasks.

Program Prompt

The program mode default prompt usually looks like this:

```
$
```

Before You Begin

Console Mode Keys and Control Characters

Control characters are entered by holding down the key labeled Ctrl while pressing another key, for example, `Ctrl/C`.

Table 4-1 lists the keys and control characters that you can use while operating in console mode.

Table 4-1 Supported Keys and Control Characters

Key or Control Character	Function
<code>Return</code>	The Return key executes the command that you enter at the console prompt.
<code><x</code>	The delete key deletes one character to the left of the current command line position. On video terminals, deleted characters will be erased from the screen. On hardcopy terminals, deleted characters display within a pair of backslash delimiters (<code>\ \</code>) as they are deleted.
<code>Ctrl/C</code>	This character aborts the current command. This command has no effect once control has been passed from console mode to another program, such as the operating system or a loadable diagnostic application. This command appears as <code>^C</code> on the screen.
<code>Ctrl/O</code>	This character suppresses output to the console terminal until the <code>Ctrl/O</code> control character is pressed again. This command appears as <code>^O</code> on the screen.
<code>Ctrl/S</code>	This character suspends output to the console terminal until you press <code>Ctrl/Q</code> .
<code>Ctrl/Q</code>	This character resumes the display that was previously suspended by pressing <code>Ctrl/S</code> .

What To Do First

Before using any console commands, you should complete these tasks:

- If your operating system is running, use the shutdown procedures specific to your operating system:

Operating System	Shutdown Command	For Additional Information
OpenVMS AXP	@sys\$system:shutdown	<i>System Management, Vol. 1A, Guide to Starting Up and Shutting Down the System</i>
DEC OSF/1 AXP	shutdown -h now	<i>Guide to System Administration</i>

- If your system is not displaying the >>> prompt, then place your system in console mode by pressing the halt button after the operating system is shut down.

Before You Change Parameters

Do not change any parameters without fully understanding the effect the change may have on your system. If you are unsure of what the change will be when you specify a command, then read carefully the information in this chapter before you make the change.

Before You Begin

CAUTION: Control of System Devices

Some console commands control system devices and memory. Do not use console commands without fully understanding the effect they can have on your DEC 3000 Model 300 Series AXP system.

For instance, some advanced-level commands, such as `deposit` and `set` let you manipulate nonvolatile and system memory. Using the `deposit` command to place a value in a location of memory containing the actual console firmware could either hang the system or prevent it from restarting after it is turned off.

If you are not sure about using console commands, ask your system manager for help.

Diagnostics

Three Diagnostic Environments

You can access three different diagnostic environments:

1. Power-up diagnostic environment

This mode applies only when power is first applied to the system, and before the system reaches console level.

Note

The term *startup*, as used in text, describes the starting up of your system from console mode.

2. Customer (console) diagnostic environment

For customer-run (console) diagnostics, first shut down the operating system. If the console is not displaying the `>>>`, then press the halt button on the back of the system unit. Type the following command:

```
>>> set diag_s[ection] 1 
```

From the customer (console) environment you can run a single diagnostic test using, for example, the `test` command and then specifying a device name. The following example tests the NVR:

```
>>> t[est] nvr 
```

3. Service diagnostic environment

To run multiple tests with one command, and for a thorough testing of your system, first shut down the operating system, then press the halt button on the back of the system unit, and type:

```
>>> set diag_s[ection] 2 
```

Note that there may be special requirements in order to execute a certain test; for example, loopback connectors, a handset, or a specific device may be required. See the description of the `test` command.

You can run multiple diagnostic tests using, for example, the `test device_name,device_name` or `test device_name:device_name` commands. The `test` command is described at the end of this chapter.

The following command tests the network interconnect (NI) and nonvolatile random-access memory (NVR):

```
>>> t[est] ni,nvr 
```

BOOT

BOOT

Loads and Starts Operating System

The `boot` command initializes the system and starts the boot program, which loads and starts the operating system. There is an 80-character limit on the input line, and there is no command line wrap feature.

Format

Issue the `boot` command with the following syntax:

```
>>> b[oot] [-fl value][-fi filename]["slot_number/device_name"][-ns] Return
```

Parameters and Qualifiers

The `boot` command, and its parameters and qualifiers, are described in Table 4-2.

Table 4-2 Parameters/Qualifiers for the `boot` Command

Parameter/Qualifier	Description
<code>-fl <i>value</i></code>	The <code>-fl</code> boot flag is an ASCII string of up to 23 characters. The string <i>value</i> must be enclosed in quotation marks if it is to be passed to the operating system unmodified.
<code>-fi <i>filename</i></code>	A filename of up to 23 characters, used to specify the name of a file to load into the system when booting across a network device.
<code>boot_device_name</code>	A device name (such as <code>dka300</code> , <code>rz3a</code> or a list of devices), from which the system attempts to boot, or a saved boot specification in the form of an environment variable. One or more default boot devices may be specified with the <code>set boot</code> command.

(continued on next page)

Table 4–2 (Cont.) Parameters/Qualifiers for the boot Command

Parameter/Qualifier	Description
<code>-tc slot_number</code> <code>[,net]</code>	<p>The TURBOchannel (<code>-tc</code>) slot number you wish to boot through. This parameter tells the boot class driver that it needs to call the MIPS emulator to execute the device's boot object. Quotation marks " " are required when booting from a TURBOchannel device. For example, to set the default boot device and then issue the boot command, enter these commands:</p> <pre>>>> set bootdef_dev "1/DKA0" Return >>> b "1/DK0" Return</pre> <p>To boot from device DKA400 connected to TURBOchannel slot 2, enter this command:</p> <pre>>>> boot "2/dka400" Return</pre> <p>To perform a MOP boot from a device connected to TURBOchannel slot 3, enter this command:</p> <pre>>>>boot "3/esa0" -fi "filename.sys" Return</pre> <p>To perform a BOOTP boot (tftp) from a device connected to TURBOchannel slot 4, enter this command:</p> <pre>>>>boot "4/ez0" -fi "/tmp/vmunix" Return</pre> <p>The user must specify a value for <code>.net</code> if the device is a network device. For example, the following command lines boot a system from the network device in TURBOchannel slot 1:</p> <pre>>>> b "1/ES" Return</pre>

(continued on next page)

BOOT

Table 4–2 (Cont.) Parameters/Qualifiers for the `boot` Command

Parameter/Qualifier	Description
<code>-ns</code>	Tells the console to not start the code after it has been loaded. This parameter can be used as a debug tool.

Using the `boot` Command

- Issuing the `boot` command with the `-fl`, `-fi` qualifiers and `boot_device_name` parameter overrides the current default value for the current boot request, but it does not change the stored default value.
- If no device name is specified with the `boot` command, the default boot device, stored using the `set bootdef_dev` command, is assumed.
- If no flag is given, then the default value is read from the environment variable stored by the `set boot_osflags` command. If no value is specified for the flags, the value (0, 0) is assumed.

Additional information about boot flags is provided in your operating system documentation.

For this operating system...	Refer to the...
OpenVMS AXP	<i>OpenVMS AXP Installation and Upgrade Manual</i>
DEC OSF/1 AXP	<i>Guide to Installing DEC OSF/1 AXP</i>

Boot Device Names and Naming Conventions

A device is a hardware unit connected to your DEC 3000 Model 300 Series AXP system that is capable of receiving, storing, or transmitting data. The device name is a special identifier that is recognized by the system.

The device names used in booting a DEC OSF/1 system are identical to those used in booting an OpenVMS AXP system: the DK/MK/ES device names shown in Table 4-3 apply to both operating systems. In addition, a DEC OSF/1 system can be booted using the alternate device names (RZ/TZ/ES/EZ) also shown in Table 4-3.

Table 4-3 Device Names

OpenVMS AXP Device Name	DEC OSF/1 AXP Device Name	Device Type
DK	RZ	Fixed or removable disk
MK	TZ	Tape
ES	ES	Ethernet boot using MOP protocol
-	EZ	Ethernet boot using bootp protocol. Refer to your DEC/OSF1 operating system documentation for information on the bootp protocol.

BOOT

**Conventions
for Both
Operating
Systems**

The device naming convention common to both the OpenVMS AXP and DEC OSF/1 operating system is *ddiunn*. The alternate device naming convention for the DEC OSF/1 operating system is *ddui*. See Table 4-4 and Table 4-5 for descriptions of these conventions.

Table 4-4 Naming Convention Common to Both Operating Systems

Convention	Description
<i>dd</i>	Device name identifier from Table 4-3
<i>i</i>	Designates SCSI controller (A)
<i>u</i>	Designates the SCSI ID number, also known as a logical unit number (LUN).
<i>nn</i>	Designates SCSI sub-logical unit number (sub-LUN), with the default of 00

Table 4-5 Alternate Naming Convention for DEC OSF/1 System

Convention	Description
<i>dd</i>	Device name identifier from Table 4-3
<i>u</i>	Designates the SCSI ID number, also known as a logical unit number (LUN).
<i>i</i>	Designates SCSI controller (A)

BOOT

A disk device with a SCSI ID of 3 and a sub-LUN of 00 could have the following device name:

```
dka300
```

A disk device with a SCSI ID of 3 could have an alternate OSF/1 device name:

```
rz3a
```

Example: Default Boot

The following example specifies the default boot command:

```
>>> boot 
```

Example: Overriding the Default Boot

The following example overrides the current default boot environment settings. It does not change the default values stored as environment variables.

```
>>> boot -fi "myboot.com"
```

Example: Device Boot

The following example boots from:

- DK — the disk device
- A — SCSI controller A
- 3 — SCSI ID 3
- 00 — LUN 00

```
>>> boot dka300 
```

Example: DEC/OSF1 Network Boot

The following example performs a network boot:

```
>>> boot -fi "mop/tmp/vmunix" "1/esa0" 
```

BOOT

Example: OpenVMS Network Boot

The following example performs a Maintenance Operations Protocol (MOP) boot to device ESA0 with the flags equal to 0,0.

```
>>> b -f1 0,0 esa0 
```

To perform a MOP boot from another node over the network on OpenVMS systems, follow these steps and refer to the example that follows:

1. Identify the Ethernet address of the node you want to boot
2. Set trigger on
3. Set mop on

```
$ mc ncp  ! From any non-privileged account  
NCP>>> trigger via sva-0 phy add 08-00-2b-2a-1f-82 ser pass  
1234567890abcdef 
```

Follow these steps to access the console on a remote system:

1. Identify the Ethernet address of the node you want to boot
2. Set trigger on
3. Set mop on

```
$ mc ncp  ! From any non-privileged account  
NCP>>> conn via sva-0 phy add 08-00-2b-2a-1f-82 ser pass  
1234567890abcdef   
>>> login   
PSDWO>>>  ! Enter password  
>>> exit  ! Console mode
```

CONTINUE

Returns System to Program Mode

The `continue` command returns the system to program mode (operating system level), after console mode has been invoked.

Note

The `continue` command is supported only on the OpenVMS operating system.

Your operating system should resume execution after you enter this command, providing that the contents of memory used by the operating system have not been altered or corrupted. The processor begins instruction execution at the address contained in the program counter. Commands that can corrupt or alter system memory include the `test` and `deposit` commands. This command does not initialize the processor.

The following function is *not* supported on a graphics console:

```
[Ctrl/P]/continue
```

This function works only on the alternate console.

Format

To execute the `continue` command, use the following syntax:

```
>>> c[continue] [Return]
```

Example

The following example returns the system from console mode to program mode.

```
>>> c [Return]
```

DEPOSIT

DEPOSIT

Writes to Memory

The `deposit` command is used to write to memory locations from the console. If no address space or data size options are specified, the defaults are the last address space and the data size used in a `deposit` or `examine` command.

Format

To execute the `deposit` command, use the following syntax:

```
>>> d[deposit] [-{size_option}] [-{address_option}] [-{misc_opts}] {address} {data} Return
```

The `{address}` qualifier specifies the address (or first address) to be written. Data values must be in hexadecimal form.

Parameters and Qualifiers

The `[-{size_option}]` qualifiers specify data size:

Size Option	Description
-b	byte (8 bits) ¹
-w	word (16 bits) ¹
-l	longword (32 bits) (default) ¹
-q	quadword (64 bits) ¹

¹The size option qualifiers conflict with all of the `examine` register commands, as all processor registers are quadwords.

The [-{address_option}] qualifiers specify address type:

Address Option	Description
-vm[em]	The address space is virtual memory.
-pm[em]	The address space is physical memory (default)
ps	Processor status register (PS). The data size is always a quadword. ¹
-u	Unprotects a protected memory location. Use caution when depositing information in memory locations 0 - 200000, as they contain the console code, hardware restart parameter block, console routine block, console terminal block, memory descriptors, page tables, etc. Be aware that the -u qualifier gives you unprotected access to these registers.
-r	General purpose register, R0 through R31. The data size is always quadword.
-fr	Floating point register, FR0 through FR31. The data size is always quadword.
-i	Internal processor registers (IPRs). The data size is always quadword.
pc	Program counter. The data size is always quadword. ¹
sp	Stack pointer. The data size is always quadword. ¹

¹This option should not be typed with the hyphen (-).

DEPOSIT

The [-{miscellaneous_options}] qualifiers specify miscellaneous information.

Miscellaneous Option	Description
-n{value}	Specifies the number of consecutive locations to modify. The information specified in {value} is deposited to the first address, and then to the specified number of succeeding addresses.
-s{value}	Address increment size.
-u{value}	Access to console private memory is allowed. This option disables virtual address protection checks.

The {address} qualifier is a longword that specifies (in hexadecimal form) the first location into which data is deposited.

Supported Symbolic Addresses	Description
'*'	The location last referenced in an examine or deposit command.
'+'	The location immediately following the last location referenced in an examine or deposit command.
'-'	The location immediately preceding the last location referenced in an examine or deposit command.
'@'	An indirect operation. Take the address specifier and use it as the pointer to the data.

DEPOSIT

The {data} qualifier specifies the data to be deposited. If the specified data is larger than the deposit data size, the console ignores the command and issues an error response. If the specified data is smaller than the deposit data size, it is extended on the left with zeros.

Examples

The following example writes a value of 01234567 into six longword locations starting at address 00100000:

```
>>> d -u -pm -n:5 00100000 01234567 
```

The following example deposits FFFF to general purpose registers R0 through R2:

```
>>> d -r -n 2 0 ffff 
```

The following example deposits F to stack pointer:

```
>>> d sp f 
```

EXAMINE

EXAMINE

Displays Memory Locations

The `examine` command examines and displays the contents of the specified memory location. The displayed line consists of a single character address specifier, the hexadecimal physical address to be examined.

After initialization, the default address space is physical memory, the default data size is a longword and the default address is zero. If conflicting address space or data sizes are specified, the console ignores the command and issues an error response.

Format

To execute the `examine` command, use the following syntax:

```
>>> e[examine] [-{size_option}][-{address_option}] [-{miscellaneous_options}] [{address}] Return
```

The `{address}` qualifier specifies the address (or first address) to be read.

Parameters and Qualifiers

Except for the `-u` miscellaneous option, the console code remembers the qualifiers specified in the last command and continues in that mode until you provide a new qualifier. For example:

```
>>> e r0
    GPR: 00 00000000 00000000

>>> e 100000
?22 ILL REF
```

The above sequence produces an illegal address error, as there is no address `r100000`. The following sequence is required:

```
>>> e r0
    GPR: 00 00000000 00000000

>>> e -pm -u 100000
    PMEM: 00000000.00100000 4C202343 54205420
```

In the above sequence, the `-u` (unprotected) qualifier was added to the command line.

CAUTION

Use caution when examining registers 0 - 200000, as they contain the console code, hardware restart parameter block, console routine block, console terminal block, memory descriptors and page tables. Be aware that the `-u` qualifier gives you unprotected access to these registers.

The `[-{size_option}]` qualifiers specify data size:

Data Option	Description
<code>-b</code>	byte (8 bits) ¹
<code>-w</code>	word (16 bits) ¹
<code>-l</code>	longword (32 bits) (default) ¹
<code>-q</code>	quadword (64 bits) ¹

¹The data option qualifiers conflict with all of the `examine` register commands, as all processor registers are quadwords.

The `[-{address_option}]` qualifiers specify address type:

Address Option	Description
<code>-vm[em]</code>	The address space is virtual memory.
<code>-pm[em]</code>	The address space is physical memory (default).
<code>ps</code>	Processor status register (PS). The data size is always a quadword. ¹
<code>-u</code>	Unprotects a protected memory location.
<code>-r</code>	General-purpose register, R0 through R31. The data size is always quadword.
<code>-fr</code>	Floating-point register, FR0 through FR31. The data size is always quadword.
<code>-i</code>	Internal processor registers (IPRs). The data size is always quadword.
<code>pc</code>	Program counter. The data size is always quadword. ¹
<code>sp</code>	Stack pointer. The data size is always quadword. ¹

¹This option should not be typed with the hyphen (-).

EXAMINE

The `miscellaneous_options` qualifiers specify miscellaneous information.

Misc Option	Description
-n <i>{value}</i>	Specifies the number of locations to be read.
-s <i>{value}</i>	Specifies address increment size. Default is data size.
-u	Access to console private memory is allowed.

The following qualifier specifies type of display.

Display Option	Description
-a	Interpret and display data as ASCII data. Non-printing characters are displayed as a period (.).

The `{address}` qualifier is a longword that specifies (in hexadecimal form) the first location into which data is deposited.

Supported Symbolic Addresses	Description
'*'	The location last referenced in an <code>examine</code> or <code>deposit</code> command.
'+'	The location immediately following the last location referenced in an <code>examine</code> or <code>deposit</code> command.
'-'	The location immediately preceding the last location referenced in an <code>examine</code> or <code>deposit</code> command.
'@'	An indirect operation. Take the address specifier and use it as the pointer to the data.

Examples

This example reads the Hardware Restart Parameter Block register (HRPB) with ASCII for 10 locations starting at location 0.

```
>>> e-u-q-a-n: 10 0 
```

Result:

```
00000000.00000000 .....
00000000.00000008 .....
00000000.00000010 .....
00000000.00000018 .....
00000000.00000020 .....
00000000.00000028 .....
00000000.00000030 .....
00000000.00000038 .....
00000000.00000040 .....
00000000.00000048 .....
00000000.00000050 .....
00000000.00000058 .....
00000000.00000060 .....
00000000.00000068 .....
00000000.00000070 .....
00000000.00000078 .....
00000000.00000080 .....
```

This example will examine general-purpose registers R0 through R2.

```
>>> e-r-n 2 0 
```

```
GPR: 00 00000000 00000000
GPR: 01 00000000 00000000
GPR: 02 00000000 00000000
```

The following example examines the stack pointer.

```
>>> e sp 
GPR: 1E 00000000 00000000
```

The following example examines general-purpose register 5.

```
>>> e r5
GPR: 05 00000000 00000000
```

The following example examines floating-point register 4.

```
>>> e fr4
```

HALT

HALT

Halts the System

The `halt` command halts the system. There are no parameters associated with this command.

Format

Issue the `halt` command as follows:

```
>>> h[alt] 
```

The system halts and the following message displays:

```
?2E HLTED  
>>>
```

HELP

Displays List of Commands

The help command displays a brief list of commands, parameters, and qualifiers. If you specify set, show, or mips_[emulator], you will receive further information for that topic only. The help command is not intended to provide a complete description of each command. For a more complete list of commands, use the help advanced command.

Format

To execute the help command, use the following syntax:

```
>>> he[lp] [advanced][set][show][mips_emulator] RETURN
```

Example: help Command

The help command used alone displays the main help screen.

```
>>> help Return
```

Result:

```
BOOT
HELP ADVANCED
INITIALIZE
SET[ENV] <envar> <value>
SHOW | PRINTENV [<envar>]
TEST
```

HELP

Example: help advanced Command

The help advanced command displays a list of the advanced commands.

```
>>> help advanced 
```

Result:

```
BOOT [-FL <bflg> ] [-FI <filnam>] <devlist>
CONTINUE
DEPOSIT [ { -B | -W | -L | -Q | -A } ] [ { -PM | -VM } ] [-U] [-N:<n>]
      [ { <addr> | <sym> | + | - | * | @ } ] [ <datum> ] ]
EXAMINE [ { -B | -W | -L | -Q | -A } ] [ { -PM | -VM } ] [-U] [-N:<n>]
      [ { <addr> | <sym> | + | - | * | @ } ] ]
HALT
HELP [MIPS_EMULATOR | SET | SHOW]
INITIALIZE
LOGIN
REPEAT <cmd>
SET[ENV] <envar> <value>
SHOW | PRINTENV [<envar>]
START <addr>
TEST <devnam> [<tstnam>]
```

HELP

**Example: help
set Command**

The help set command displays a list of set command parameters and qualifiers.

```
>>> help set 
```

Result:

```
SET[ENV] AUTO_ACTION <{RESTART | 1} | {BOOT | 2} | {HALT | 3}>  
SET[ENV] BOOTDEF_DEV <ddau>  
SET[ENV] BOOT_OSFLAGS <bflg>  
SET[ENV] BOOT_RESET <{OFF | 0} | {ON | 1}>  
SET[ENV] DIAG_LOE <{OFF | 0} | {ON | 1}>  
SET[ENV] DIAG_QUICK <{OFF | 0} | {ON | 1}>  
SET[ENV] DIAG_SECTION <1-3>  
SET[ENV] ENABLE_AUDIT <{OFF | 0} | {ON | 1}>  
SET[ENV] LANGUAGE <0-15>  
SET[ENV] MOP <{OFF | 0} | {ON | 1}>  
SET[ENV] PASSWORD  
SET[ENV] RADIX < 0 | 10 | 16 >  
SET[ENV] {SCSI_A} <0-7>  
SET[ENV] SCSI_RESET <0-7>  
SET[ENV] SECURE <{OFF | 0} | {ON | 1}>  
SET[ENV] TRIGGER <{OFF | 0} | {ON | 1}>
```

HELP

Example: help show Command

Entering the help show command displays a list of show command parameters.

```
>>> help show 
```

Result:

```
PRINTENV |
SHOW { AUTO_ACTION | BOOTDEF_DEV | BOOT_OSFLAGS |
      BOOT_RESET | CONFIG | DEVICE |
      DIAG_LOE | DIAG_QUICK | DIAG_SECTION |
      ENABLE_AUDIT | ETHERNET | ERROR |
      LANGUAGE | MEMORY | MOP |
      RADIX | SCSI_A | SCSI_RESET |
      SECURE | TRIGGER |
    }
```

Example: help mips_emulator Command

The help mips_emulator command displays a list of TURBOchannel tests.

```
>>> help mips_emulator 
```

Result:

```
T TC# <tstnam>
T TC# ?
T TC# SCRIPT <scriptnam>
T TC# INIT
T TC# CNFG
T TC# LS
T TC# CAT <scriptnam>
```

INITIALIZE

Initializes Processor, Console, and Devices

The `initialize` command initializes the processor, console, and any devices connected to the system by default values. In order to guarantee the state of the system, the console program will also initialize `r0` through `r30` to 0 and the ISO and OC to 20000000.

Format

To execute the `initialize` command, use the following syntax:

```
>>> i[nitalize] Return
```

Example: initialize Command

This example initializes the processor, console, and any devices connected to the system.

```
>>> i Return
```

Result:

```
INIT-S-CPU...
INIT-S-RESET_TC...
INIT-S-NVR...
INIT-S-CXT...
INIT-S-ASIC...
INIT-S-MEM...
INIT-S-SCC...
INIT-S-NI...
INIT-S-SCSI...
INIT-S-ISDN...
```

LOGIN

LOGIN

Use with Set Password Command

The `login` command enables restricted console commands, such as those used in the Set Password Utility, when:

- the secure jumper is installed on the system module
- the password has been set and *secure* is set to *on*

Note

After set *secure* is set to *on*, type `login` at the `>>>` prompt. Type your password at the `PSWD0>>>` prompt.

Format

To execute the `login` command, use the following syntax:

```
>>> lo[gin]   
PSWD0>>> console_password 
```

Example: login Command

This example enables access to restricted console commands when the *secure* bit is set.

```
>>> login   
PSWD0>>>
```

REPEAT

Repeats Specified Tests

The `repeat` command causes the console program to repeatedly execute any specified tests. It is terminated by pressing `Ctrl/C` or by pressing the Halt button. There are no defaults for this command.

Format

To execute the `repeat` command, use the following syntax:

```
>>> r[repeat] command {qualifier_list},... Return
```

Parameters and Qualifiers

The `command` variable specifies the command to be executed. This can be any valid console command listed in this chapter. The `qualifier_list` variable specifies the tests to be repeated, but is not required, for example:

```
ASIC  
MEM  
NVR  
SCC  
NI  
ISDN
```

Examples: repeat Command

The following examples show acceptable command format:

```
>>> r test  
>>> test scc mouse  
>>> r test scc:ni
```

The next example permits the ASIC (application-specific integrated circuit) test to be repeated.

```
>>> r[repeat] t[est] asic Return
```

The following example permits the ASIC, memory and SCSI tests to be repeated.

```
>>> r[repeat] t[est] asic,mem,scsi Return
```

SET

SET

Sets an Environment Variable

The `set[env]` command:

- Sets an environment variable to a value or setting
- Displays the value specified
- Defines a command qualifier
- Defines the console password

Format

To execute the `set` command, use the following syntax:

```
>>> set[env] environment [value] Return
```

Environment Variables and Values

Table 4–6 provides a list of the environment variables that can be specified when the `set` command is used.

Table 4–6 set[env] Command Environment Variables and Values

Environment Variable	Variable Description	Value	Value Description
<i>auto_action</i>	Specifies the action the console should take after a halt.	Restart (or use 1) Boot (or use 2) Halt (or use 3)	A restart is executed. A reboot is executed. A halt is executed
<i>bootdef_dev</i>	Sets the default boot device. The device names must be valid boot devices supported by the <code>boot</code> command. Entering "." resets the boot device to the default value.		
<i>boot_osflags</i>	Defines additional default values that will be passed to system software during booting. The value must be an ASCII string, eight characters in length, and set in quotations ("). A comma (,) is not one of the special characters.	See Table 4–7.	

(continued on next page)

SET

Table 4–6 (Cont.) set[env] Command Environment Variables and Values

Environment Variable	Variable Description	Value	Value Description
<i>boot_reset</i>	Determines if the console will initialize the system prior to booting. Digital recommends that <i>boot_reset</i> be set to On.	On (or use 1) Off (or use 2)	Enables system initialization before booting. Disables system initialization before booting.
<i>diag_loe</i>	Allows a diagnostic to loop on error. All output is suppressed. To exit the loop, press the Halt button to return to the diagnostic environment (either console or service mode). This feature is available on loadable diagnostics only. It will not work on TURBOchannel devices.	On (or use 1) Off (or use 2)	Enables loop on error feature. Disables loop on error feature.
<i>diag_quick</i>	Sets the diagnostic startup mode to either normal or fast startup testing. When fast mode is selected, not all diagnostic tests are executed.	On (or use 1) Off (or use 2)	Quick verify testing only. Normal (full) testing occurs.
<i>diag_section</i>	Sets the diagnostic environment in which diagnostics can be run, either console or service mode.	See Table 4–8	

(continued on next page)

Table 4–6 (Cont.) set[env] Command Environment Variables and Values

Environment Variable	Variable Description	Value	Value Description
<i>enable_audit</i>	Determines whether or not the boot audit trail message generation is enabled.	On (or use 1) Off (or use 2)	Enables boot audit trail. Disables boot audit trail.
<i>language</i>	Sets the keyboard language. Entering <code>set language</code> without a qualifier displays a list of keyboard languages from which you make a selection. English (3) is the default value setting.	See Table 4–9	
<i>mop</i>	Enables the NI (Ethernet) listener while the system is in console mode. The listener can send and receive messages on the network. Determines whether or not the boot audit trail message generation is enabled. Digital recommends that you keep the <code>mop</code> environment set to <code>off</code> (except when you plan to use it, after which you should return the status to <code>OFF</code>).	On (or use 1) Off (or use 0)	Network listener enabled. Able to receive and transmit messages on the network. (Default) Network listener disabled.

(continued on next page)

Table 4–6 (Cont.) set[env] Command Environment Variables and Values

Environment Variable	Variable Description	Value	Value Description
<i>password</i>	Sets the console password. The console secure jumper must be installed on the system module. See Chapter 5. The password must be exactly 16 characters (hexadecimal) 0 through 9, and A through F.	On (or use 1)	Password is enabled when <i>secure</i> = on.
		Off (or use 0)	Password disabled when <i>secure</i> = off.
<i>radix</i>	Defines the default Radix to a specified value. The default is hexadecimal.	0	Default base address (hexadecimal).
		10	Decimal base address.
		16	Hexadecimal base address.
<i>scsi_reset</i>	Causes a time delay (in milliseconds) after a SCSI reset and before booting the system.	0 through 7 Use 3 for a removable-media drive. Use 4 (default) for tape drives. Use 6 for CDs.	The value is <i>n</i> in the expression 2^n . For example, a value of 3 is 2^3 and means 8 seconds. The default is 2^4 .

(continued on next page)

Table 4–6 (Cont.) set[env] Command Environment Variables and Values

Environment Variable	Variable Description	Value	Value Description
<i>secure</i>	Enables the console password bit to restrict access to the console. This command works in conjunction with the console secure jumper located on the system module. See Chapter 5.	On (or use 1) Off (or use 0)	Secure feature is enabled. Secure feature disabled.
<i>trigger</i>	Enables the Entity-Based Module (EMB). With EMB and the NI listener enabled (trigger = on), you can boot the system from a remote system.	On (or use 1) Off (or use 0)	Enables trigger. Disable trigger.

SET

Example: set auto_action Command

To execute the set *auto_action* command, use the following syntax:

```
>>> se[t] auto[_action] {value} Return
```

The following example sets the auto action default to halt.

```
>>> set auto 3 Return
```

Result:

```
AUTO_ACTION = HALT
```

Example: set bootdef_dev Command

To execute the set *bootdef_dev* command, use the following syntax:

```
>>> set bootdef_dev {value} Return
```

Issuing the show *device* command displays the available boot devices.

The following example shows the boot default device being set to dka200.

```
>>> set bootdef_dev dka200 Return
```

Result:

```
boot = dka200
```

Example: set boot_osflags Command

To execute the set *boot_osflags* command, use the following syntax:

```
>>> set boot_osf[lags] {value} Return
```

Table 4–7 describes the values to be used with the *boot_osflags* environment and the OpenVMS operating system.

Table 4–7 boot_osflags Command Values

Root	Contents of R5	Description
0	0	Default boot of operating system
E	0	Boot standalone backup ¹
0	1	Conversational boot

¹If installed on disk

The following example initiates a default boot of the operating system.

```
>>> set boot_osf 0,0 Return
```

**Example: set
boot_reset
Command**

To execute the `set boot_reset` command, use the following syntax:

```
>>> set boot_r[eset] {value} Return
```

The following example enables the system initialization before booting.

```
>>> set boot_r on Return
```

Result:

```
BOOT_RESET = ON
```

**Example:
set diag_loe
Command**

To execute the `set diag_loe` command, use the following syntax:

```
>>> set diag_loe [value] Return
```

The following example sets up a loop on error.

```
>>> set diag_loe on Return
```

Result:

```
DIAG_LOE = ON
```

SET

Example: set diag_quick Command

To execute the set *diag_quick* command, use the following syntax:

```
>>> set diag_q[quick] [value] Return
```

The following example sets the diagnostic startup mode to quick verify testing.

```
>>> set diag_q on Return
```

Result:

```
DIAG_QUICK = ON
```

Example: set diag_section Command

To execute the set *diag_section* command, use the following syntax:

```
>>> set diag_s[ection] {value} Return
```

Select one of the following values to set the diagnostic environment.

Table 4–8 set diag_section Command Values

Value	Mode	Description
0	Power-up	Power-up operation.
1	Customer (Console)	Default mode after power is applied to system
2	Service	Sets up diagnostic environment. Provides for more thorough testing. Loopback connectors may be required to execute certain tests.

SET

In the following example, the diagnostic environment is set to console mode.

```
>>> set diag_s 1 
```

Result:

```
DIAG_SECTION = 1
```

Example: set enable_audit Command

To execute the set *enable_audit* command, use the following syntax:

```
>>> set enable_a[udit] {value} 
```

The following example enables the boot audit trail.

```
>>> set enable_a on 
```

Result:

```
ENABLE_AUDIT = ON
```

Example: set language Command

To execute the set *language* command, use the following syntax:

```
>>> set l[anguage] {value} 
```

SET

Select one of the following values to set the appropriate language:

Table 4–9 Selecting a Keyboard Language

Value	Language Selected
0) Dansk	Danish
1) Deutsch	German
2) Deutsch (Schweiz)	German/Swiss
3) English	North American English (default setting)
4) English	British/Irish
5) Español	Spanish
6) Français	French
7) Français	Canadian French
8) Français	Swiss French
9) Italiano	Italian
10) Nederlands	Dutch
11) Norsk	Norwegian
12) Português	Portuguese
13) Suomi	Finnish
14) Svenska	Swedish
15) Vlaams	Flemish

The following example sets the language to Spanish.

```
>>> set language 5 
```

Result:

```
LANGUAGE = 5  
>>>
```

SET

Example: set mop Command

To execute the `set mop` command, use the following syntax:

```
>>> set mop {value} 
```

The following example enables the network listener while the system is in console mode.

```
>>> set mop on 
```

Result:

```
MOP = ON  
>>>
```

Example: set password Command

To execute the `set password` command, use the following syntax:

```
>>> set pass[word] 
```

The following example sets the password.

```
>>> set password 
```

Result:

```
PSWD0> old_password      !Type old password (if one has been set)  
PSWD1> new_password     !Type new password  
PSWD2> new_password     !Verify new password  
>>>
```

Example: set secure Command

To execute the `set secure` command, use the following syntax:

```
>>> set sec[ure] {value} 
```

The following example enables the security features.

```
>>> set secure on 
```

Result:

```
SECURE = ON
```

SET

Example: set radix Command

To execute the set *radix* command, use the following syntax:

```
>>> set ra[dix] {value} Return
```

The following example sets the address to a decimal base address.

```
>>> set radix 10 Return
```

Result:

```
RADIX = 10
```

Example: set scsi_reset Command

To execute the set *scsi_reset* command, use the following syntax:

```
>>> set scsi_r[eset] {value} Return
```

The following example sets a time delay of 4 milliseconds (default).

```
>>> set scsi_r 4 Return
```

Result:

```
SCSI_RESET = 4
```

Example: set trigger Command

To execute the set *trigger* command, use the following syntax:

```
>>> set tri[gger] {value} Return
```

The following example enables trigger.

```
>>> set trigger on Return
```

Result:

```
TRIGGER = ON
```

SHOW

Shows Environment Variables

Your system is shipped with default values set for all available parameters. The `show` console command displays the following information:

- Environment variables
- Console options
- Hardware configuration

Format

To display the current values for a specified environment variable, type:

```
>>> show {variable} 
```

To display the current value for all variables, type:

```
>>> show 
```

SHOW

Environment Variables and Values

Table 4–10 provides a list of the environment variables that can be specified when the `show` command is used.

Table 4–10 Environment Variables and Values for the `show` Command

Environment Variable	Variable Description	Value	Value Description
<i>auto_action</i>	Displays the action the console takes following an error halt or a halt during startup.	Restart	A restart was executed.
		Boot	A reboot was executed.
		Halt	A halt was executed.
<i>bootdef_dev</i>	Displays the default boot device or device list from which booting will next be attempted.		
<i>boot_osflags</i>	Displays default parameters passed to system software during booting.	On	System initialization enabled.
		Off	System initialization disabled.
<i>boot_reset</i>	Displays the value of the <code>boot_reset</code> variable.	On	System initialization enabled.
		Off	System initialization disabled.
<i>config</i>	Displays the system configuration and device status.		
<i>device</i>	Displays SCSI and Ethernet device information.	See Chapter 2.	
<i>diag_loe</i>	Displays the diagnostic loop on error feature.	On	Loop on error enabled.
		Off	Loop on error disabled.

(continued on next page)

SHOW

**Table 4–10 (Cont.) Environment Variables and Values for the
show Command**

Environment Variable	Variable Description	Value	Value Description
<i>diag_quick</i>	Displays the diagnostic startup mode, either normal or fast.	On Off	Fast testing. Normal testing.
<i>diag_section</i>	Displays the diagnostic environment	0 1 2	Startup. Customer. Service.
<i>enable_audit</i>	Displays the boot audit trail message generation.	On Off	Enabled. Disabled.
<i>error</i>	Displays error information for ASIC, MEM, NVR, SCC, NI, ISDN, SCSI. See example in value column.	? 004 SCC 0x0060	Error message indicator. FRU number. Name of the diagnostic test that detected an error. Error number in hexadecimal form.
<i>ethernet</i>	Displays the hardware Ethernet address and Ethernet port.		
<i>language</i>	Displays the keyboard language (only if your system has a graphics head). Identifies the language in which console messages are displayed.	3	English
<i>mem</i>	Displays memory status information	0 - 7 008 Mbytes 0x00000000	Bank number. Memory size per bank. Starting address of each bank.

(continued on next page)

SHOW

Table 4–10 (Cont.) Environment Variables and Values for the `show` Command

Environment Variable	Variable Description	Value	Value Description
<i>mop</i>	Displays the NI (Ethernet) listener.	On	Network listener enabled. Receive and transmit network messages.
		Off	Network listener disabled.
<i>secure</i>	Displays system security status. This command works in conjunction with the console secure jumper located on the system module.	On	Secure feature enabled.
		Off	Secure feature disabled.
<i>radix</i>	Displays the default Radix (base number).	0	Default base address (hexadecimal form.)
		10	Decimal base address.
		16	Hexadecimal base address.
<i>scsi_a</i>	Displays the SCSI ID for the system bus	Value = 0 through 7.	Number of the host ID.
<i>scsi_reset</i>	Displays the time delay (in milliseconds) after a SCSI reset and before booting.	Value = 0 through 7.	
<i>trigger</i>	Displays the current trigger setting.	On	Trigger enabled.
		Off	Trigger disabled.

Example: show Command

The following example displays the current values for all environment variables.

```
>>> sh[ow] Return
```

SHOW

Result:

```
AUTO_ACTION = RESTART
BOOTDEF_DEV = DKA100
BOOT_OSFLAGS = 0,0
ENABLE_AUDIT = ON
BOOT_RESET = ON
SCSI_RESET = 4
DIAG_LOE = OFF
DIAG_QUICK = ON
DIAG_SECTION = 1
ETHERNET = 08-00-2B-2F-F8-E6 , TENBT
LANGUAGE = 3
MOP = OFF
SECURE = ON
RADIX = 0
SCSI_A = 7
TRIGGER = ON
```

**Example: show
auto_action
Command**

To execute the `show auto_action` command, use the following syntax:

```
>>> sh[ow] auto_a[ction] 
```

The following example shows the action the console takes after a halt.

```
>>> sh auto_a 
```

Result:

```
AUTO_ACTION = RESTART
```

**Example: show
bootdef_dev
Command**

To execute the `show bootdef_dev` command, use the following syntax:

```
>>> sh[ow] bootdef_d[ev] 
```

The following example shows that the default boot device is `dka400`.

```
>>> sh bootdef_d 
```

Result:

```
boot = dka400
```

SHOW

Example: show boot_osflags Command

To execute the `show boot_osflags` command, use the following syntax:

```
>>> sh[ow] boot_o[sflags] Return
```

The following example displays the current osflags stored in the system.

```
>>> show boot_o Return
```

Result:

```
BOOT_OSFLAGS = 0,0
```

```
>>>
```

Where 0,0 refers to the contents of the root and of register 5, as follows:

Root	Contents of R5	Description (OpenVMS system)
0	0	Default boot of operating system
E ¹	0	Boot standalone backup
0	1	Conversational boot

¹If installed on disk

Example: show boot_reset Command

To execute the `show boot_reset` command, use the following syntax:

```
>>> sh[ow] boot_r[eset] Return
```

The following example shows the value of the boot reset variable.

```
>>> sh boot_r Return
```

Result:

```
BOOT_RESET = ON
```

SHOW

Example: show config Command

To execute the show *config* command, use the following syntax:

```
>>> sh[ow] conf[ig] Return
```

The following is an example of a system configuration.

```
>>> show config
```

Result:

```
DEC 3000 - M300
Digital Equipment Corporation
VPP PAL X5.39-80800101/OSF PAL X1.28-80800201 -
Built on 30-MAR-1993 09:55:18.29

TCINFO  DEVNAM  DEVSTAT
-----  -
        CPU  OK KN16-AA - Vx.x-Syyy-Izzz - sx.x - DECchip 21064 P3.0-150
        ASIC OK
        MEM  OK
        FEROM
6
        CXT  OK
5
        NVR  OK
        SCC  OK
        NI   OK
        ISDN OK
4
        SCSI OK
```

Example: show device Command

To execute the show *device* command, use the following syntax:

```
>>> sh[ow] dev[ice] Return
```

The following example shows the current devices.

```
>>> show device Return
```

Result:

BOOTDEV	ADDR	DEVTYPE	NUMBYTES	RM/FX	WP	DEVNAM	REV
-----	----	-----	-----	-----	--	-----	---
ESA0	08-00-2B-2F-F8-E6	TENBT					
DKA300	A/3/0	DISK	426.25MB	FX		RZ25	0900
DKA500	A/5/0	DISK	RM		RX26	0068
..HOSTID..	A/7	INITR					

SHOW

Example: show diag_loe Command

To display the current *diag_loe* variable setting, use the following syntax:

```
>>> sh[ow] diag_l[oe] Return
```

The following example shows that the current setting of *diag_loe* is OFF.

```
>>> sh diag_l Return
```

Result:

```
DIAG_LOE = OFF
```

Example: show diag_quick Command

To execute the show *diag_quick* command, use the following syntax:

```
>>> sh[ow] diag_q[uick] Return
```

One of the diagnostic settings in the following table is displayed on the screen.

Diagnostic Setting	Description
On	Fast testing
Off	Normal testing

The following example shows the selected diagnostic mode.

```
>>> show diag_quick Return
```

Result:

```
DIAG_QUICK = ON
```

Example: show diag_section Command

To execute the show *diag_section* command, use the following syntax:

```
>>> sh[ow] diag_s[ection] Return
```

SHOW

The following example shows the mode selected.

```
>>> sh diag_s 
```

Result:

```
DIAG_SECTION = 2
```

**Example: show
enable_audit
Command**

To execute the `show enable_audit` command, use the following syntax:

```
>>> sh[ow] enable_a[udit] 
```

The following example shows the boot audit trail enabled.

```
>>> sh enable_a 
```

Result:

```
ENABLE_AUDIT = ON
```

**Example: show
error Command**

To execute the `show error` command, use the following syntax:

```
>>> sh[ow] e[rror] 
```

The following example displays the error information.

```
>>> show error 
```

Result:

```
??002 SCC 0x0040  
?T-ERR-SCC-MODEM - CTS bit Exp = 1 Rec = 0
```

The status message in this example means that the modem test expected the CTS bit to be set, but it was clear.

```
??001 SCC 0x0060  
?T-ERR-SCC-Mouse - %x char recvd
```

The status message in this example means that the response received from the mouse was less than the number of characters expected.

SHOW

Example: show ethernet Command

To execute the `show ethernet` command, use the following syntax:

```
>>> sh[ow] et[hernet] 
```

The following example shows the Ethernet address and Ethernet port.

```
>>> show ethernet 
```

Result:

```
ETHERNET = 08-00-2B-2F-F8-E6 , TENBT
```

Example: show language Command

To execute the `show` command with *language* variable, use the following syntax:

```
>>> sh[ow] l[anguage] 
```

The following example identifies the language as Spanish.

```
>>> show language 
```

Result:

```
LANGUAGE = 5
```

SHOW

Example: show mem Command

To execute the `show mem` command, use the following syntax:

```
>>> sh[ow] mem 
```

The following example shows the memory status information.

```
>>> show mem
```

Result:

```
DEC 3000 - M300 Memory: 32 Mbytes
```

```
-----  
BANK #      MEMORY_SIZE      START_ADDRESS  
-----  
0           008 Mbytes      0x00000000  
1           008 Mbytes      0x00800000  
2           008 Mbytes      0x01000000  
3           008 Mbytes      0x01800000  
4           000 Mbytes      0x00000000  
5           000 Mbytes      0x00000000  
6           000 Mbytes      0x00000000  
7           000 Mbytes      0x00000000
```

```
>>>
```

In the above example:

- Banks 0,1,2,3 each contain one 8-megabyte SIMM
- Banks 4,5,6,7 contain no memory

Example: show mop Command

To execute the `show mop` command, use the following syntax:

```
>>> sh[ow] mo[p] 
```

The following example shows that the mop environment has been selected.

```
>>> sh mo 
```

SHOW

```
UTC          = 0000000D.5F384CA0
AccurTDF     = 10000000.000186A0
BytesRx      = 00000000.00000000
BytesTx      = 00000000.00000000
FramesRx     = 00000000.00000000
FramesTx     = 00000000.00000000
McBytsRx     = 00000000.00000000
McFrmsRx     = 00000000.00000000
FrmDefer     = 00000000.00000000
FrmlColl     = 00000000.00000000
FrmMColl     = 00000000.00000000
TerXsCol     = 00000000.00000014
TerCarCk     = 00000000.00000000
TerShCkt     = 00000000.00000000
TerOpCkt     = 00000000.00000000
TerFRLng     = 00000000.00000000
TerNoDef     = 00000000.00000000
RerFCSEr     = 00000000.00000000
RerFrmEr     = 00000000.00000000
RerFrLng     = 00000000.00000000
UnknDest     = 00000000.00000000
DataOvrn     = 00000000.00000000
SyBuffUn     = 00000000.00000000
UsBuffUn     = 00000000.00000000
HrtBtErr     = 00000000.00000000

MOP = ON
```

Example: show radix Command

To execute the `show radix` command, use the following syntax:

```
>>> sh[ow] ra[dix] 
```

The following example displays the radix.

```
>>> show radix 
```

Result:

```
RADIX = 10
```

Example: show secure Command

To execute the `show secure` command, use the following syntax:

```
>>> show secure 
```

The following example displays the console security status.

```
>>> show secure 
```

SHOW

Result:

```
SECURE = OFF
```

Example: show scsi_a Command

To execute the `show scsi_a` command, use the following syntax:

```
>>> sh[ow] scsi_a 
```

The following example shows the SCSI ID for the system is 7.

```
>>> show scsi_a 
```

Result:

```
SCSI_A = 7
```

Example: show scsi_reset Command

To execute the `show scsi_reset` command, use the following syntax:

```
>>> sh[ow] scsi_r[eset] 
```

The following example shows that the current value of the SCSI reset is 4.

```
>>> show scsi_reset 
```

Result:

```
SCSI_RESET = 4
```

Example: show trigger Command

To execute the `show trigger` command, use the following syntax:

```
>>> sh[ow] t[rigger] 
```

The following example shows the current trigger setting.

```
>>> show trigger 
```

Result:

```
TRIGGER = OFF
```

START

START

Starts CPU

The `start` command is used to set the program counter (PC) and start the CPU. The command causes the system to exit console mode and enter program mode.

Format

To execute the `start` command, use the following syntax:

```
>>> start {address} 
```

TEST

Diagnostic Testing

The `test` command lets you test the entire system, a portion of the system (or subsystem), or a specific device. If you do not specify a parameter, the system will test all components.

Format

To execute the `test` command, use the following syntax:

```
>>> t[est] [test_device] [optional_parameters] 
```

Parameters

The following table describes the `test` command parameters:

Parameter	Function
<i>test_device</i>	The name of the device or subsystem to be tested.
<i>optional_parameters</i>	Optional parameters accepted by a subsystem test. Refer to Table 4-15 through Table 4-20, and Table 4-22.

CAUTION

If the action performed by a parameter has the potential of destroying data written on media, you are first prompted to make sure that you really want to perform the action. The following prompt is displayed: `OK?`

TEST

The `test` command, when used with the `test_device` parameter and an optional parameter, executes selected diagnostics. The following parameters specify a device or subsystem to be tested. A list of available devices in the system can be obtained by issuing a `show config` command. Table 4–11 lists the names of the devices and subsystems you substitute for *[test_device]* in the command line.

Table 4–11 Test Devices

Parameter	Function
<code>asic</code>	Tests the ASIC (application-specific integrated circuit) subsystem.
<code>cxt</code>	Runs the CXT (graphics) pattern test with the user verification parameter set.
<code>ferom</code>	Tests to see if the Flash ROM image is correct for the CPU, and that the expected checksums are correct.
<code>isdn</code>	Tests the ISDN and audio subsystem.
<code>mem</code>	Performs ECC testing of memory, as well as detects address and data with faults.
<code>ni</code>	Verifies that the LANCE chip is operational. The diagnostic also induces "forced errors" to ensure functionality.
<code>nvr</code>	Tests NVR (nonvolatile random-access memory), and specifically ensures the integrity of the TOY/NVR controller located on the system module.
<code>scc</code>	Tests the SCC (serial communication controller chip: keyboard, mouse) subsystem, and specifically the data path to the SCC, and the ability to operate in asynchronous mode.
<code>scsi</code>	Tests the SCSI subsystem, specifically the controller chips, SCSI ASIC, SCSI bus, and DMA path.
<code>tcn</code>	Tests the TURBOchannel option in slot <i>n</i> , that is, the option installed in either slot 0 or 1. For use on Model 300/300X/300LX systems.

TEST

The following `test scsi` command parameters specify the frequently-used SCSI test utilities:

Parameter	Function	Test Requirements
<code>erase</code>	Spins up and erases a fixed disk.	RZnn disk drive
<code>format</code>	Formats and erases a diskette.	RX26 removable-media drive
<code>verify</code>	Verifies that all blocks on a fixed disk can be read.	RZnn disk drive

TEST

Erase Disk Utility Example

The following example erases a fixed disk. Enter the following command and answer the question.

```
>>> t[est] scsi erase 
```

The following example displays the questions to which you must respond:

```
>>> t scsi erase 
SCSI_id(0-7)>>> 3 
SCSI_lun(0-7)>>> 0 
      SCSI HD_DSK_ERAS_UTIL
DKA300 OK?  OK 
.....
SCSI-bb-repl 0
SCSI-util_succ
OK
>>>
```

Table 4-12 explains the action required by each prompt.

Table 4-12 Erase Disk Utility Prompts

Utility Prompts With...	Action
SCSI_id(0-7)>>>	Select SCSI ID number <07:00>
SCSI_lun(0-7)>>>	Select logical unit number <07:00>
DKA100 OK?	Answer OK if device is correct

TEST

Diskette Formatter Utility Example

The Diskette Formatter Utility formats and erases a diskette.

To format a diskette in a device specified, for example, as dka500:

1. Place the diskette in the drive.
2. Enter the following command, answering the questions that are displayed:

```
>>> t[est] scsi format   
SCSI_id(0-7)>>> 5   
SCSI_lun(0-7)>>> 0   
SCSI FLP_FMT_UTIL  
DKA500 OK? OK   
SCSI-util_succ  
OK
```

Table 4-13 explains the action required by each prompt.

Table 4-13 Diskette Formatter Utility Prompts

Utility Prompts With...	Action
SCSI_id(0-7)>>>	Select SCSI ID number <07:00>
SCSI_lun(0-7)>>>	Select logical unit number <07:00>

CAUTION

Once the Diskette Formatter Utility is started, do not terminate the action or halt the machine. This will corrupt the device being tested, and formatting will have to be performed again.

TEST

Verify Disk Utility Example

The Disk Verify Utility verifies that all blocks on a disk can be read. To verify a disk, enter the following command and answer the questions that are displayed:

```
>>> test scsi verify 
```

The following example verifies device dka500.

```
>>> t scsi verify   
SCSI_id(0-7)>>> 1   
SCSI_lun(0-7)>>> 0   
DKA500 OK ? OK   
SCSI_DSK_VER_UTIL  
SCSI-util_succ  
OK  
>>>
```

Table 4–14 explains the action required by each prompt.

Table 4–14 Verify Utility Prompts

Utility Prompts With...	Action
SCSI_id(0-7)>>>	Select SCSI ID number <07:00>
SCSI_lun(0-7)>>>	Select logical unit number <07:00>

TEST

**Example: test
Command**

The following example runs all available diagnostics, except TURBOchannel diagnostics on the Model 300L system.

```
>>> test 
```

The display on your screen may show some of the following tests:

```
T-STC-ASIC - OK
T-STC-MEM - Current Test Parameters
T-STC-MEM - lo_addr = 00200000 init_mem = ON test_bad_pages = OFF
T-STC-MEM - hi_addr = 02000000 stop_on_err = ON max_retries = 0
T-STC-MEM - Fill mem Wr AAAAAAAAA 01800000
T-STC-MEM - Cell Test: FWD RD WR 55555555
T-STC-MEM - Addr Test: Waiting 10 seconds to test refresh
T-STC-MEM - OK
T-STC-NVR - ASSURE_CLOCK_IS_TICKING test
T-STC-SCC - DMA test
T-STC-SCC - LK401 test
T-STC-SCC - OK
T-STC-NI - Ext Lpbk test -
```

TEST

Example: test asic Command

Diagnostic testing of the application-specific integrated circuit (ASIC) is performed when the system is in console mode. All reported errors contain a hexadecimal longword of data, and the FRU code 001 to identify the failing component. Table 4–15 describes each ASIC test and the mode in which it is run.

Table 4–15 ASIC Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
coreio	Tests the CORE I/O ASIC registers	Console	None
fp	Tests the floating point registers	Console	None
init	Initializes the TURBOchannel interface registers and core ASIC registers	Console	None
tci	Tests the TURBOchannel interface registers	Console	None
?	Lists subtests	Console Service	None

The following is the command format for the ASIC test:

```
>>> t[est] asic test_name Return
```

Result (on error):

```
?? 001 ASIC xxxxxxxx
```

**Example:
test ferom
Command**

Diagnostic testing of the flash ROM (FEROM) is performed when the system is in console mode. All reported errors contain a hexadecimal longword of data, and the FRU code 001 to identify the failing component. Table 4–16 describes each FEROM test and the mode in which it is run.

Table 4–16 FEROM Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
chksum	Verifies that the calculated checksums equals the checksum in the ROM.	Console	None
cpu	Flash ROM image must correspond to CPU.	Console	None

**Example: test
mem Command**

Diagnostic testing of system memory detects address and data that is stuck at faults, as well as performing ECC testing of memory. Table 4–17 lists and describes the parameters. All reported errors contain a hexadecimal longword of data, and the FRU code 8yz to help locate the failing memory module.

Table 4–17 describes each memory test and the mode in which it is run. Chapter 8 contains additional information about testing memory.

TEST

Table 4–17 Memory Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
addr	Detects addresses stuck at faults	Console	None
all	Performs all tests	Console	None
bits	Detects marching ones in a field of zeros; single-bit parity testing, every bit in each longword	Console	None
cell	Detects data stuck at faults	Console	None
init	Initializes all memory to zeros	Console	None
llsc	Tests the load-locked/store conditional	Console	MOP must be set OFF
?	Lists subtests and options	Console Service	None

The following is the command format for the memory test:

```
>>> t[est] mem test_name Return
```

Result (on error):

```
?? 8yz MEM xxxxxxxx
```

Example: test nvr Command

Diagnostic testing of the nonvolatile RAM (NVR) tests the TOY/NVR controller that is located on the system module. Table 4–18 lists and describes the parameters. All reported errors contain a hexadecimal longword of data, and the FRU code 001 to help locate the failing component. Table 4–18 describes each NVR test and the mode in which it is run.

TEST

Table 4–18 NVR Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
cpu	Tests the CPU	Console	None
init	Initializes the interval timer registers	Console	None
interrupt	Tests the interval timer	Console	None
nvr	Tests nonvolatile RAM	Console	None
toy	Tests the TOY (time of year) clock	Console	None
?	Lists subtests and options	Console Service	None

The following is the command format for the NVR test:

```
>>> t[est] nvr test_name Return
```

Result (on error):

```
?? 001 NVR xxxxxxxx
```

Example: test scc Command

Diagnostic testing of the serial communications controller (SCC) tests the functionality of the following:

- Data path to the SCC
- Ability to operate in asynchronous mode
- Data path from SCC to connectors on the back panel of the system unit
- DMA using the RS232 port
- Keyboard/mouse port

All reported errors contain a hexadecimal longword of data, and the FRU code 001 to help locate the failing component. Table 4–19 describes each SCC test and the mode in which it is run.

TEST

Table 4–19 SCC Diagnostic Subtests

init	Performs a reset test on SCC controller	Console Service	None
polled	Tests polled I/O	Console Service	None
interrupt	Tests interrupt driven I/O	Console Service	None
dma	Tests DMA transfers	Console Service	None
LK401	Tests for presence of keyboard	Power-up Console	Keyboard
mouse	Tests for presence of mouse	Power-up Console	Mouse
modem	Tests modem control signals	Power-up Console	Loopback
?	Lists subtests	Console Service	None

The following is the command format for the SCC test:

```
>>> t[est] scc test_name 
```

Possible results (on error):

```
?? 001 SCC xxxxxxxx  
?? 003 SCC xxxxxxxx  
?? 004 SCC xxxxxxxx
```

Example: test ni Command

The Network Interconnect (NI) diagnostic test verifies that the LANCE chip is operational. The NI listener is enabled at startup; that is, it executes automatically with no intervention. It may be disabled by typing `set mop 0`. All reported errors contain a hexadecimal longword of data, and the FRU code 001 to help locate the failing component. Table 4–20 describes each NI test and the mode in which it is run.

TEST

Table 4–20 NI Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
collision	Tests internal loopback with collision	Service	Loopback
crc	Tests internal loopback with CRC check	Service	Loopback
dma_init	Tests LANCE initialization and DMA	Console Service	Loopback
ext_lpbk	Tests the external loopback	Console Service	Loopback
filter	Tests internal loopback with address filter checking	Service	Loopback
ilpbk	Tests internal loopback and initialization	Console Service	Loopback
init	Initializes the LANCE chip and NI port	Console Service	Loopback
interrupt	Tests internal loopback with interrupts	Console Service	Loopback
nar	Tests network address ROM	Console Service	Loopback
register	Tests LANCE registers	Console Service	Loopback
rx_miss_buff	Tests internal loopback with MISS error	Service	Loopback
tx_buff	Tests internal loopback with transmit buffer error	Service	Loopback
?	Lists subtests	Console Service	None

The following is the command format for the NI test:

```
>>> t[est] ni test_name Return
```

TEST

If an external loopback is not present, the following message is displayed:

```
T-STN-NI - Ext lpbk test
? T-ERR-NI - Exte Lpbk test
T-ERR-NI - Err = ac
?? 000 NI0x00f2
```

Example: test tc Command

The TURBOchannel (TC) diagnostic test tests TURBOchannel options in slots 0 and 1 using MIPS emulator scripts.

In addition to diagnostic testing, the MIPS emulator performs these additional tasks on a TURBOchannel option:

- Initializes the option
- Displays option configuration
- Runs the console on a TURBOchannel option
- Boots the operating system using a TURBOchannel option

Note

Not all TURBOchannel options can be successfully tested with this command. Refer to your option installation manual for additional information.

The following is the command format for the TURBOchannel self-test:

```
>>> t[est] device_name 
```

where:

- `device_name` is the TURBOchannel device name in the form of `TCn`, where `n` is the slot number of the TURBOchannel device you wish to test.

To test a device connected to slot 2, enter the following command:

```
>>> test tc2
```

TEST

On power-up, the script `pst-q` is run unless the environment variable `diag_quick` is set to on. With `diag_quick` set to ON, no TURBOchannel testing is done. When the environment variable `diag_section` is equal to 1 or 2, the `pst-m` script is run. Graphics options are an exception to this rule, since the `cnsltest` script is run as part of console determination.

The following command format should be used to execute a selected test on a TURBOchannel option.

```
>>> test device_name test_name
```

where `device_name` is the TURBOchannel device name and `test_name` is the name of the test you want to run.

The following example lists the contents of the option ROM and the available scripts for the option in TURBOchannel slot 1. Object scripts are not executable. All items listed are not to be used as a `script_name`.

```
>>> t[est] tcl ls 
```

If an asterisk (*) is at the end of a script, then the object script will fail if selected. If `test_name` contains a slash or hyphen, then `test_name` should be enclosed in double quotes so that the command line parser treats it as a single argument.

The following example runs a diagnostic script on the option installed in TURBOchannel slot 1.

```
>>> t[est] tcl script_name 
```

The following example executes default test scripts on the option installed in TURBOchannel slot 1.

```
>>> t[est] tcl 
```

The following example executes a single test script.

```
>>> t[est] tcl pst-m 
```

TEST

Table 4–21 TC Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
cnfg	Displays configuration on TC option slot	Console Service	TC option
init	Initializes option in TURBOchannel slot	Console Service	TC option
initc	Initializes console device	Console Service	TC option
putc	Outputs a character	Console Service	TC option
cat script_name	Lists content of a script	Power-up Console	TC option
script script_name	Runs the script script_name on the option in the TURBOchannel slot	Power-up Console	TC option
?	Lists subtests	Console Service	None

The following example initializes TURBOchannel option 1.

```
>>> t[est] tcl init 
```

**Example: test
scsi Command**

SCSI diagnostic testing verifies the following:

- SCSI controller chip
- SCSI ASIC
- SCSI bus
- DMA path in physical and virtual modes

Testing in console mode exercises the data paths between the:

- CPU and the TURBOchannel interface
- TURBOchannel interface and the SCSI ASIC
- SCSI ASIC and SCSI controllers
- SCSI controllers and the SCSI bus

All reported errors contain a hexadecimal longword of data, and the FRU code 001 or 1TL to help locate the failing component. Chapter 8 contains additional FRU code information. Table 4–22 describes each SCSI test and the mode in which it is run.

Table 4–22 SCSI Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
asic	Tests the SCSI ASIC registers	Console Service	SCSI terminator or device
device ²	Tests SCSI devices	Service	SCSI terminator, media in device
erase	Specifies the Hard Disk Eraser Utility	Console Service	RZ <i>nn</i> hard disk
format	Specifies the Floppy Formatter Utility	Console Service	RX26 removable-media drive

²Removable-media drive must have media installed before testing.

(continued on next page)

TEST

Table 4–22 (Cont.) SCSI Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
init	Initializes the drive	Console Service	SCSI device
interrupt ¹	Tests the interrupt logic	Console Service	SCSI terminator, device
register ¹	Tests SCSI controller registers	Console Service	SCSI terminator, device
transfer	Tests data transfers across the SCSI bus	Console Service	SCSI device
verify	Specifies the Disk Verifier Utility	Console Service	RZnn hard disk
?	Lists subtests and options	Console Service	None

¹Does not require the presence of a device on the SCSI bus.

The following is the format of the `test scsi` command:

```
>>> t[est] scsi test_name Return
```

Result (on error):

```
?? 001 SCSI xxxxxxxx
```

TEST

Example: test isdn Command

The ISDN diagnostic tests test both ISDN and audio functionality. Table 4–23 describes each ISDN test and the mode in which it is run.

Table 4–23 ISDN Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
a_loop	Tests analog loopback.	Console Service	None
d_loop	Tests internal digital audio loopback.	Service	None
DMA	Tests DMA.	Console Service	None
init	Initialize ISDN chip.	Console Service	None
int	Interrupt test.	Console Service	None
playback	Plays back the recorded message.	Service	Handset
record	Prompts you to speak into handset. A short message is saved in memory and then played back through the speaker.	Service	Handset
reg	Tests internal registers.	Console Service	None
repeat	Allows you to speak into the handset and hear your speech repeated.	Service	Handset
tone	Tests audio output.	Service	Handset
?	Lists subtests.	Console Service	None

The following is the command format for the ISDN test:

```
>>> t[est] isdn test_name 
```

TEST

Result (on error):

```
?? 001 ISDN xxxxxxxx
```

The following example tests the audio record feature:

```
>>> test isdn record 
```

Example: test cxt Command

Graphics (CXT) diagnostic testing is performed when the system is in power-up mode, e.g., when power is first applied to the system. A graphics pattern test is displayed. All reported errors contain a hexadecimal longword of data, and the FRU code 001 to identify the failing component.

Table 4–24 CXT Diagnostic Subtests

Test Name	Description	Mode	Test Requirements
patt-v	Runs the CXT (graphics) pattern test	Power-up	None

The following is the command format for the CXT test:

```
>>> t[est] cxt test_name 
```

Result (on error):

```
?? 001 CXT xxxxxxxx
```

5

Using the Password Security Feature

Chapter Overview

In This Chapter

This chapter presents information on the following topics:

- Secure Console Commands
- Invoking the Password Security Feature
- Changing, Erasing, and Disabling the Password

Purpose of the Security Feature

If the password security feature is not used, whenever a user enters console mode, he or she can use all of the privileged console commands, such as `halt`, `set`, `deposit`, and `boot`. The password security feature allows you to restrict access to these key console mode functions.

Before You Use the Security Feature

Before making your system secure, determine who will have access to privileged commands once you enable the security feature. Whoever requires privileged access to the system will need to know the password that you enter.

If your operating system is running, use the shutdown procedures in your operating system documentation to shut it down.

Secure Console Commands

Privileged Commands

Once you invoke the password security feature and change the secure system jumper, privileged console commands become protected. That is, you can access these commands only if you log in to the system with the `login` command at the console prompt (`>>>`).

In general, any commands that modify memory and registers, or that transfer CPU control from the console monitor to another program, such as `boot` (with parameters) or `start`, are considered privileged commands. Once you have access to privileged commands, access continues until you disable the password. (See the section entitled `Disable the Password` in this chapter.)

List of Commands

Table 5-1 lists both privileged and non-privileged console commands.

Table 5-1 Console Command Access

Privileged Commands	Non-privileged Commands
<code>boot</code> (with parameters)	<code>boot</code> (without parameters)
<code>deposit</code>	<code>login</code> (to allow password entry to the privileged state)
<code>examine</code>	<code>continue</code> (if you inadvertently push the halt button, this command lets you continue operations in a non-privileged mode)
<code>halt</code>	<code>help</code>
<code>initialize</code>	–
<code>repeat</code>	–
<code>set</code>	–
<code>show</code>	–
<code>start</code>	–
<code>test</code>	–

Invoking the Password Security Feature

Steps to Making the System Secure

Making your DEC 3000 Model 300 Series AXP system secure requires software and hardware tasks. Table 5-2 describes the steps required to secure your system.

Table 5-2 Steps to Making the System Secure

Step	Description
1	Enter a password
2	Enable security
3	Move the secure system jumper

Antistatic Precautions

Do not perform any tasks inside the system unit without attaching the antistatic wrist strap to your wrist and the system. Refer to the section entitled CAUTION: Static Discharge in Chapter 2.

Enter a New Password

Your system arrives from the factory without a password. The password you enter must be a character string of *exactly* 16 hexadecimal characters (0 through 9 and A through F). To enter a password on your system, enter the commands shown in Table 5-3 starting at the console prompt (>>>).

Table 5-3 Entering a Password

Enter this command:	System responds...
>>> set password	PSWD1>
PSWD1> <i>new_password</i> <input type="text"/>	PSWD2>
PSWD2> <i>new_password</i> <input type="text"/>	>>>

As you enter the password, what you type does not display, or echo, on the screen. If the two passwords you entered match, your password is preserved in nonvolatile memory, which means that the system saves your password value even when the system unit is turned off.

Invoking the Password Security Feature

If the two passwords you enter do not match, the console displays the following error message:

```
? 30 ILL PSWD
```

In this case, enter the `set password` command again as described above.

Note Your Password

Be sure to make a note of your password and store it in a secure place. If you forget your console mode password, refer to *Erase The Password*, later in this chapter, or call your Digital service representative.

Enable the Password Security Feature

Once you have entered and confirmed your password, check to be sure the secure parameter is set to *on*, as follows:

```
>>> show secure   
SECURE = OFF
```

If, as in the example above, the password security feature is **not** enabled, set it to *on*, as follows:

```
>>> set secure on   
SECURE = ON
```

Before You Move the Secure System Jumper

After entering a password and enabling the secure parameter, you must move the secure system jumper, on the system module, to the enable position to complete the security feature.

Before you move the secure system jumper, be sure you complete the following steps:

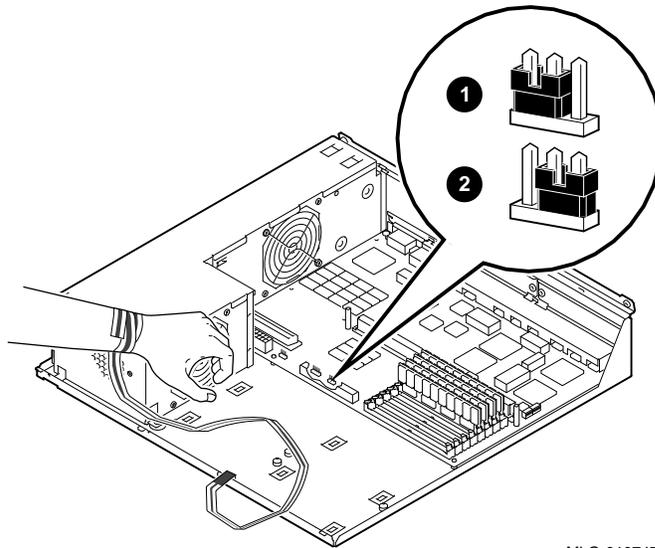
Step	Action
1	Halt the system, if necessary, to display the console prompt (>>>). (See Chapter 2.)
2	Turn off your equipment. (See Chapter 2.)
3	Remove the system unit cover. (See Figure 2-6).
4	Attach the antistatic wrist strap.

Invoking the Password Security Feature

Locate the Secure System Jumper

Figure 5–1 shows the secure system jumper, labeled W3 on the system module. In the enabled position, the jumper is attached to pins 1 and 2, counting from left to right. In the default disabled position, the jumper is attached to pins 2 and 3, counting from left to right.

Figure 5–1 The Secure System Jumper



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- ❶ Enabled
- ❷ Disabled

Move the Jumper

To use the password security feature, move the jumper to the enabled position, pins 1 and 2, using tweezers or another small tool.

Invoking the Password Security Feature

Restore the System

After you move the jumper, complete the following steps to restore the system:

Step	Action
1	Replace the system unit cover. (See Figure 2–31.)
2	Turn on the system. (See Chapter 2.)
3	If your system does not halt automatically, press the halt button to display the console prompt (>>>). (See Chapter 2.) From this point on, you will need to use the login command, described in the next section, to access privileged console commands.

Log In to the System

After entering the password, enabling it, and then changing the secure system jumper on the system module, you must use the login command to access privileged console commands, as Table 5–4 describes.

Table 5–4 Entering a Login Command

Enter this command:	System responds...
>>> login <input type="text" value="Return"/>	PSWD0>
PSWD0> <i>password</i> <input type="text" value="Return"/>	>>>

The variable *password* is the password you issued with the set password command. If you enter the password incorrectly, the system responds with this message:

```
? 30 ILL PSWD
```

In this case, enter the login command again as described in Table 5–4.

Changing, Erasing, and Disabling the Password

Change the Password

To change the password, enter the `set password` command, your old password, and your new password as shown in Table 5–5. The password must be exactly 16 hexadecimal characters, 0 through 9 and A through F.

Table 5–5 Changing a Password

Enter the following:	The system responds...
>>> <code>set password</code>	PSWD0>
PSWD0> <code>old_password</code> <input type="text"/>	PSWD1>
PSWD1> <code>new_password</code> <input type="text"/>	PSWD2>
PSWD2> <code>new_password</code> <input type="text"/>	>>>

If the two new passwords you enter are the same, your password is changed.

If the two passwords do not match, the system displays:

```
? 30 ILL PSWD
```

Try the procedure again.

Erase The Password

You can erase the current password without knowing what it is. Therefore, if you forget your password, you may want to erase it and enter a new one. To erase the current password, enter the `deposit` command with the *exact* parameters shown in the following example. There is no system response to this `deposit` command.

```
>>> deposit /u/q-n:1 1A0200088 0 
```

Changing, Erasing, and Disabling the Password

Caution

When you turn on the system, the firmware is loaded into and executed from memory. If you did not disable the flash ROM update jumper, be aware that using the `deposit` command to place a value in a location of memory containing the actual console firmware could hang the system. To restart the system, turn the power off and then back on.

Once your password is erased, you can enter a new password as explained in the section `Enter a New Password` earlier in this chapter.

Disable the Password

To disable the password security feature, you must enter the `login` command and your password. Then enter the following command at the console prompt:

```
>>> set secure 0   
SECURE = OFF
```

If you then try to log in, the following message is displayed:

```
?31 PASWD NOTEN
```

6

Using an Alternate Console Device

Chapter Overview

Introduction The alternate console feature of your system lets you direct console input and output from a graphics monitor to another device, such as a terminal or printer.

In This Chapter This chapter covers the following topic:

- Setting the Alternate Console Feature

Setting the Alternate Console Feature

When to Use the Alternate Console Feature

The following are possible reasons for using an alternate console:

- You cannot display output on your graphics monitor because it is not working properly.
- You want to save a hard copy of the console screen display on a printer.

Task Overview

Table 6–1 describes the steps for using the alternate console feature.

Table 6–1 Using the Alternate Console

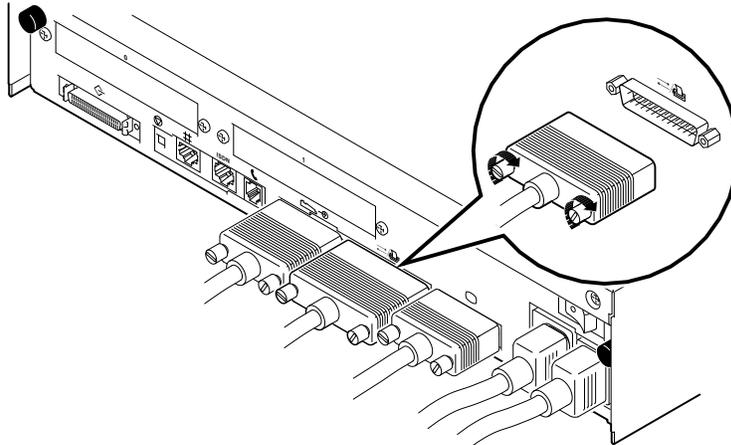
Step	Action
1	Connect a terminal or printer to the synchronous/asynchronous communications RS-232 port on the back of the system unit.
2	Detach your keyboard <i>or</i> change the alternate console jumper.
3	Redirect output to the alternate console.

Setting the Alternate Console Feature

Connect a Terminal or Printer

To connect a terminal or printer as an alternate console device, connect the terminal or printer cable to the synchronous/asynchronous communications port on the system unit, shown in Figure 6-1.

Figure 6-1 Connecting the Alternate Console to the System



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Setting the Alternate Console Feature

Alternate Console/Printer Port Settings

The alternate console/printer port on the back of the system unit is set at the factory to the parameter settings listed in Table 6–2. These settings cannot be changed.

Table 6–2 Alternate Console/Printer Port Parameters

Parameter	Setting
Baud rate	9600
Parity	None
Stop bit	1
Bits per character	8

Disconnect the Keyboard

To switch to the alternate console by removing the keyboard, follow these steps:

Step	Action
1	Turn off the system unit. ¹
2	Wait 10 to 15 seconds.
3	Disconnect the keyboard/mouse extension cable from the back of the system unit.
4	Turn on the system. Output is automatically transferred to the alternate console device. In most cases, this is a terminal, which has its own keyboard.
5	If you want to use the graphics terminal as well as the alternate console device, reconnect the keyboard/mouse extension cable. If you are running the operating system, however, you cannot change from one console to the other. You can do this only from console mode (>>>).

¹If you were using a graphics monitor to display console output before you connected an alternate console device, you must restart your system to redirect console output. If you do not restart your system, the console output will not display on the terminal or printer you connected.

Note that the system automatically displays its configuration every time it is turned on.

Setting the Alternate Console Feature

Or, Change the Alternate Console Jumper

To switch to the alternate console by changing the alternate console jumper, remove the system unit cover (see Chapter 2), and reset the jumper, shown in Figure 6–2 and labeled W2.

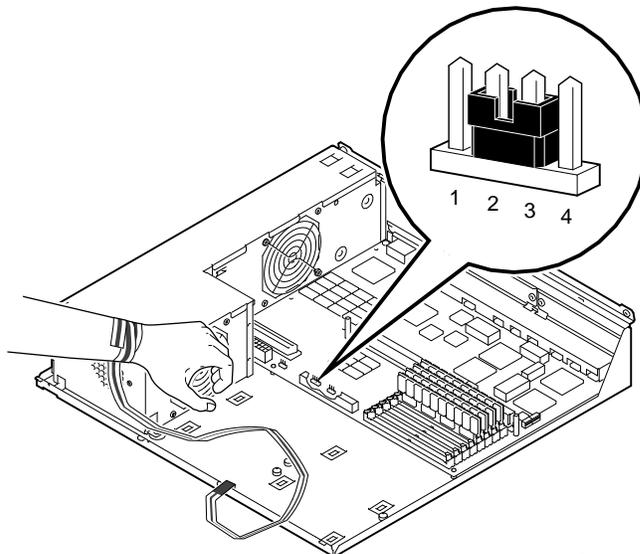
Note

Do not perform any tasks inside the system unit without attaching the antistatic wrist strap to your wrist and to the system, as shown in Figure 6–2.

By setting the jumper, you can select either of the following ports for console output:

- The graphics port: pins 1 and 2 (default)
 - The serial port for an alternate console device: pins 2 and 3
- (Pins 3 and 4 are reserved.)

Figure 6–2 Alternate Console Jumper



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Setting the Alternate Console Feature

Restart the System

After you reset the jumper, you must restart the system to redirect the console output. The system automatically displays the `show config` display. From here on, the system will always come up on the alternate console when you start it.

To Access Console Output via the Network

Console output can also be accessed via the network. Thus, you can remotely troubleshoot the system or use a remote console when no local console is available.

Note that some console tests and commands, such as the memory diagnostic, cause the network connection to be terminated because the commands use the network device, or they cause a connection timeout at the remote node. If this occurs, you will have to turn the system off and then back on.

To access console output via the network:

Step	Action
1	Obtain the hardware Ethernet address of the system.
2	Obtain access to an operating system on the same Ethernet segment as the DEC 3000 Model 300 Series AXP System (the systems cannot be separated by a bridge or router).
3	Set the following system parameters: <ul style="list-style-type: none">• A console password• <code>set mop</code>, <code>set trigger</code>

Setting the Alternate Console Feature

To connect to the console:

Step	Action
1	Log into the user account (no special privileges are required).
2	Type the following commands for OpenVMS AXP only: \$ mcr ncp <input type="text"/> ;Enters the Network Control Program (NCP) NCP> show known circuits <input type="text"/> ;Shows available circuits ;you can connect through NCP> connect via circuit_name service password xxxx physical address 08-00-2B-XX-XX-XX <input type="text"/> >>> Ctrl/D <input type="text"/> ;Disconnects console NCP> exit <input type="text"/> ;Exits NCP \$ lo <input type="text"/> ;Logs off the system

7

Troubleshooting by Visual Inspection

Chapter Overview

Introduction

Though your DEC 3000 Model 300 series system is a high-quality, thoroughly tested product, it is also an electrical device that may on occasion exhibit a problem. The tables in this chapter can help you quickly identify the problem with a visual check, and possibly fix the problem. If you cannot identify the problem using these tables, try the more advanced procedures described in Chapter 8.

This chapter also describes how to clean the system.

Before You Begin

Before you proceed with this chapter:

1. Verify the problem as follows:
 - a. Turn off all expansion boxes.
 - b. Turn off the monitor and all peripheral devices, such as printers and modems.
 - c. Turn off the system unit.
 - d. Check that all cables and cords are correctly connected at both ends.
 - e. Turn the equipment back on in the following order:
 1. Any storage expansion box
 2. Printer
 3. Monitor
 4. System unit

2. Adjust the brightness and contrast of your monitor.

If your system is still not working correctly after completing the previous steps to verify the problem, use the troubleshooting tables to identify the problem.

If the power-up graphics display appears, followed by the console prompt (>>>), try starting your operating system.

Using the Troubleshooting Tables

Introduction

Use the information in this section to help locate system problems. The following tables do not identify all possible problems with the system, nor do the actions suggested remedy all problems, but they are useful for many common problems.

To use the troubleshooting tables, follow these steps:

1. Find the problem your system is having in the Symptom column in the following tables.
2. Check the conditions for that symptom in the Possible Cause column.
3. Follow the advice in the Corrective Action column.

System Problems

If you are having trouble with your entire system, locate the problem in Table 7-1.

Table 7-1 Preliminary Troubleshooting of System Problems

Symptom	Possible Cause	Corrective Action
Window display does not appear on the screen. (System does not boot.)	Your software is not installed.	See your software documentation for installation instructions.
		System startup has failed. Check the status of the diagnostic display lights, described in Chapter 8, or refer to the <i>Service Guide</i> or your Digital service representative.
Power indicator light is off and fans are not running.	Power cord is not connected.	Check the power cord connections at both ends.
	Defective power supply.	Contact your Digital service representative.
Power indicator light is off, but fans are running.	—	Contact your Digital service representative.
Power-up graphics display does not appear after 1 minute and the diagnostic display lights display ●●●●●●●● .	Monitor is not turned on.	Turn on the monitor. See Chapter 8 for additional corrective actions.
Power-up graphics display does not appear and the diagnostic display lights display ○○○○○○○○ .	SROM jumper setting is incorrect.	Contact your Digital service representative.
No diagnostic display lights after startup.	Possible defective system module, or defective cable.	See Chapter 2 for information on the location of the system module and cables. Reseat the system module, ensure that all cables have a tight fit in their connectors, and restart the system.
Startup display contains question marks or an error message.	Possible system error. Loose cable connections.	Refer to Chapter 4 for information on running diagnostic tests.

(continued on next page)

Using the Troubleshooting Tables

Table 7-1 (Cont.) Preliminary Troubleshooting of System Problems

Symptom	Possible Cause	Corrective Action
System does not boot at startup.	Software is not installed.	<p>If a ?? appears next to NI, the Ethernet cable may be loose.</p> <p>If a ?? appears next to SCC, then the keyboard and mouse cables may be loose in the keyboard/mouse connector block, or the keyboard/mouse connector block cable connector may not be firmly attached to the system unit.</p>
	Default recovery action is set to halt.	Install the system software. Refer to the software documentation for installation instructions.
	Incorrect boot device was specified.	Refer to Chapter 4 to change the default recovery action to boot the system from the system disk.
	Boot device is not properly configured.	Change the default boot device (bootdef_dev) parameter, explained in Chapter 4.
	Software problem.	Enter a show device command as Chapter 4 describes and check to see that all devices are configured properly. If not, check the SCSI IDs and the SCSI cables. Refer to Chapter 2.
	Software problem.	Refer to your operating system documentation. Call your Digital service representative.

Monitor Problems

If you are having trouble with your monitor, locate the problem in Table 7-2.

Table 7-2 Troubleshooting Monitor Problems

Symptom	Possible Cause	Corrective Action
No display appears on the monitor screen.	Monitor is not turned on.	Check that the monitor on/off switch is on. Check that the monitor power cord is connected at both ends.
	Wall socket may not be operative.	Try a different wall socket, or try an electrical device that you know works in the wall socket.
	Contrast and brightness controls are set too low to see the screen display.	Adjust the contrast and brightness controls. Refer to the monitor guide for more information.
	System module or graphics board failure.	Refer to Chapter 4 for information on running diagnostic tests.
	Monitor video cable is not connected.	Check that the monitor cable is connected at both ends. If the problem persists, contact your Digital service representative.
	System did not pass startup test.	Refer to Chapter 4 and Chapter 8 for information on running diagnostic tests or contact your Digital service representative.
	Monitor is defective.	Contact your Digital service representative.
Display is distorted.	Your color monitor has six connectors, three marked Video In, and three marked Video Out. Ensure that the monitor video cable is connected to the three Video In connectors.	

Using the Troubleshooting Tables

Mouse/Tablet Problems

If you are having trouble with your mouse or other pointing device, locate the problem in Table 7-3.

Table 7-3 Troubleshooting Mouse/Tablet Problems

Symptom	Possible Cause	Corrective Action
Mouse or optional tablet pointer does not appear on screen, or monitor does not respond to pointing device commands.	[Ctrl/F3] was pressed by mistake, and system pointer mode is off.	Press [Ctrl/F3] again to restart the pointer mode.
System boots operating system, but mouse or optional tablet pointer does not appear on the screen. Or, monitor does not respond to pointing device commands.	Pointing device cable is installed incorrectly or is loose.	Turn off the system. Unplug and then install the cable. Turn on the system.
	Pointing device is faulty.	Replace the pointing device.
	The system is in console mode (>>>); no pointer appears on the screen.	Correct condition. No action necessary. Change the system to program mode by entering boot at the console prompt (>>>).

Keyboard Problems

If you are having trouble with your keyboard, locate the problem in Table 7-4.

Table 7-4 Troubleshooting Keyboard Problems

Symptom	Possible Cause	Corrective Action
Keys do not work.	Hold Screen key is active. Hold Screen light is on.	Press the Hold Screen key to release hold on screen.
	Keyboard cable is loose or not connected.	Check the keyboard cable at both ends.
	Keyboard has failed.	Replace the keyboard. If the problem persists, contact your Digital service representative.

SCSI Device Problems

If you are having trouble with a SCSI device, such as an internal drive, or an expansion box, locate the problem in Table 7-5.

Table 7-5 Troubleshooting SCSI Device Problems

Symptom	Possible Cause	Corrective Action
An installed drive does not work or is not recognized by the system.	Two SCSI identifiers are set to the same number.	Enter the show device command as Chapter 4 describes. If a drive is not recognized, reset each SCSI ID to a unique number.
	You turned on the system unit before you turned on your expansion box.	Turn off the entire system; turn equipment back on beginning with the expansion box.
	Loose cables.	Check to make sure all cables are connected.
	Defective drive.	Refer to Chapter 4 for information on running diagnostic tests.
Software does not boot from the fixed disk drive.	A problem exists with the fixed disk.	Refer to Chapter 4 for information on running diagnostic tests.

(continued on next page)

Using the Troubleshooting Tables

Table 7–5 (Cont.) Troubleshooting SCSI Device Problems

Symptom	Possible Cause	Corrective Action
Software installed in the diskette drive does not work, or a diskette read or write error message is displayed.	Default boot device is set incorrectly.	See Chapter 4 to set or change the default boot device.
	Recovery action may be set to halt.	See Chapter 4 to change the default recovery action.
	A problem exists with the software (if installed) on the fixed disk.	Refer to your software documentation for help.
	No diskette is in the diskette drive.	Insert a software diskette. See your software documentation.
	Diskette was inserted incorrectly.	Check that the write-protect notch on the diskette is to your left when you insert the diskette and that the label is up.
	Diskette is damaged or does not contain software.	Try another diskette that contains software.
	Two SCSI identifiers are set to the same number.	Reset each SCSI ID to a unique number.

Network Problems

If you are having trouble with your network, locate the problem in Table 7–6.

Table 7–6 Troubleshooting Network Problems

Symptom	Possible Cause	Corrective Action
NI error message is displayed when verifying Ethernet. ¹	No Twisted-pair cable was installed.	Attach a Twisted-pair cable.
	Ethernet cable connection is loose.	Check that all connections on the Ethernet segment are secure.

¹After you solve an NI problem, type `test ni` and press the Return key. This either clears the error or displays a message to let you know the problem still exists.

(continued on next page)

Table 7–6 (Cont.) Troubleshooting Network Problems

Symptom	Possible Cause	Corrective Action
Cannot boot from the network.	Local network problem.	Problem is most likely caused by the customer's server system or the network.
	Defective NI interface.	Refer to Chapter 4 for information on running diagnostic tests.
Data transfer problems.	Network connection	If you are using an AUI or ThinWire adapter to convert your network connection from 10BASE-T to another network protocol, turn off the heartbeat in the network transceiver (DELNI) to eliminate the problem, or contact your Digital service representative.

Table 7–7 Troubleshooting Audio Problems

Symptom	Possible Cause	Corrective Action
No audio tones from the system when it is turned on.	Defective sound chip.	Refer to Chapter 4 for information on running diagnostic tests.

Cleaning Your System

How to Clean the System Unit

In some cases a problem with your system may be as simple as dust or spilled liquid.

To clean the system unit:

1. Clean your system unit regularly by wiping dust and particles from it with a soft cloth.
2. If you inadvertently spill liquid inside the unit, turn off the system and contact your Digital Service representative.

How to Clean the Keyboard

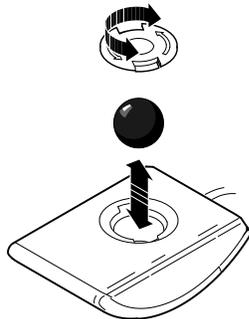
To clean the keyboard:

1. Disconnect the keyboard from the system unit and clean with a soft cloth.
2. If you spill water on it, wipe the excess off immediately, turn the keyboard over to drain, and let it dry for several hours before you reconnect it.

How to Clean the Mouse

To clean the mouse:

1. Remove the cover plate.
2. Remove the rubber ball from the mouse unit, clean with lukewarm water, and dry off.
3. Return the rubber ball to the mouse unit.



Advanced Diagnostics

Chapter Overview

Introduction

This chapter describes more detailed troubleshooting procedures. During power-up, diagnostic error reporting is done in three stages:

1. Preliminary initialization, and a test that executes the serial ROM (SROM) code.
2. Main console power-up and self-tests.
3. More extensive tests the user can run from the main console, using the `test` command. (See Chapter 4).

Before You Begin

Before you proceed with this chapter:

1. Be sure you have gone through the visual inspection procedures described in Chapter 7.
2. Record the following information on the Handling Problems Worksheet at the end of this chapter:
 - The serial number and model number of your system. The numbers are printed on a label located on the back of the system above the monitor connector.
 - The status of your system, using the checklist on the Handling Problems Worksheet.
 - The status of the internal diagnostic light display pattern.

Preliminary Power-up Test Displays

Power-up Problems

When you turn on the system, the SROM (serial ROM) code performs the following preliminary diagnostic tests:

- Memory sizing
- I/O
- Cache

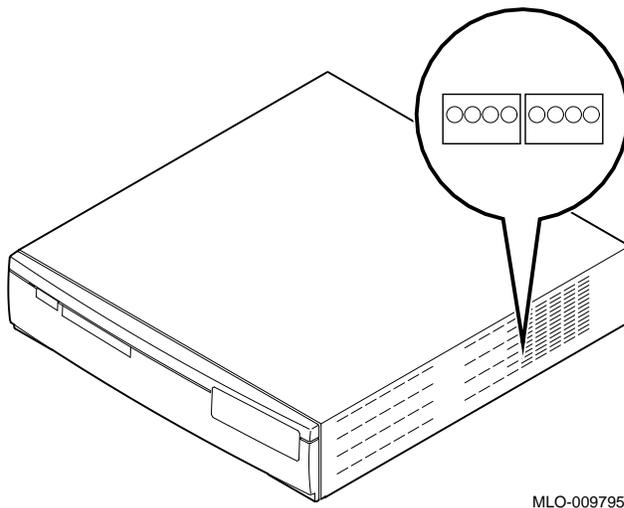
If no fatal errors are encountered, the SROM code loads the main console firmware from the flash ROM into main memory. If the system stops executing because of a fatal error before it reaches main console mode, messages will not be displayed on your screen. However, you may be able to determine the problem by examining the diagnostic display lights (light-emitting diodes, referred to as LEDs, and described in the next section).

Location of Diagnostic Display Lights

Diagnostic display lights are the eight red lights located inside the system unit.

Figure 8–1 shows the location of these LEDs in the system. You should be able to read them through the air vents on the side of the system unit cover without removing the cover. If you have trouble seeing the lights, however, remove the system unit cover, as described in Chapter 2.

Figure 8-1 Position of Diagnostic Display Lights



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Display Light Patterns

- When you power up the system, all lights come on and flash through a sequence of patterns, which are binary representations of the hexadecimal codes. If a problem is detected during system power-up, the lights are lit in a pattern that indicates either the current system status or a problem.
- When power-up tests have completed successfully and the system is at console mode (>>>), the lights are lit in the following binary pattern:

on on off on on on off on [OR] ● ● ○ ● ● ○ ● ●
 7 6 5 4 3 2 1 0

In hexadecimal code, this pattern is DD, where the first D refers to the left set of four lights; the second D refers to the right set of four lights.

- When the operating system is running, all diagnostic lights should be off.
- Refer to *DEC 3000 Model 300 Series AXP Service Guide* for a complete listing of hexadecimal codes, their binary (LED) equivalent, and their meaning.

Preliminary Power-up Test Displays

Correcting the Problem

If the system stops before successful completion of the preliminary tests, the lights display other patterns. To correct the problem, check to see that all:

- Modules inside the system unit are seated firmly
- Cables are securely connected to the correct ports
- Power cables are plugged into the appropriate outlet
- Power switches are on

If these actions do not correct the problem, record the LED patterns on the appropriate section of the Handling Problems Worksheet at the end of this chapter and call your Digital service representative.

Post-Powerup LEDs

Even after the console firmware is loaded, the system may stop executing before it is able to display messages on your screen. This may happen because not all SROM tests pass (this displays LED codes ff through f0, and 20).

Table 8–1 lists the hexadecimal values of the LED codes and lists the category of the code.

Table 8–1 Console LED Codes

Code	Category of Code
f0 through ff, and 20	SROM Power-up sequence
30 through 3F	ASIC
20 through 2f	Memory
3A through 3E	TOY clock or NVR
40 through 4f	SCC
50 through 5F	NI
60 through 6F	SCSI
70 through 7F	ISDN
81 through 8C	CXT (graphics)
90 through 9A	MIPS Emulator

If no fatal errors occur, the console firmware is loaded and any further problems display a message on the screen.

Error Messages

When the power-up tests are successful and the LEDs display the DD code, you are running at console mode (>>>). At this point, the system displays error messages on your screen if:

- It encounters problems
- You enter the `show config` command
- You enter the `show error` command

An error message is displayed on the screen in the following format:

```
?? fru_code error_code message
```

For example:

```
?? 003 0050 (ptr(0) = Not Present keybd(2) = Not Present
```

Where:

- ?? Indicates an error has occurred.
- 003 Is a FRU code indicating that the keyboard is the problem.
- 0050 Is an error code that is followed by a more detailed message.

FRU Codes

An FRU code is a message that indicates which field-replaceable unit (FRU) is causing the problem. Table 8-2 describes the most common FRU codes. If your system displays an error code that you do not understand, or that is not listed in Table 8-2, refer to your Service Guide, call the Digital hotline, or call your Digital service representative for help.

Preliminary Power-up Test Displays

Table 8–2 FRU Codes

FRU Code	Meaning	Action
000	Unknown, or diagnostic test does not support FRU reporting.	–
001	System and/or CPU modules are most probable FRUs. You could also be having audio or system option problems.	Visually inspect all components to make sure they are not defective and are securely connected. If necessary, replace the system module or CPU, or call your Digital Services representative. Check to see if the audio cable is installed correctly.
003	Keyboard is most probable FRU.	Be sure the cable is installed correctly in the connector block, and that none of the keys are stuck.
004	Mouse or pointing device is most probable FRU.	Be sure the cable is installed correctly in the connector block, and that none of the buttons are stuck.
010	TURBOchannel option in slot 0 is most probable FRU. (Models 300/300X/300LX only)	Be sure the TURBOchannel cable is secure and the module is seated correctly. Visually inspect the module to be sure it has no defective components. If necessary, replace the TURBOchannel module.
011	TURBOchannel option in slot 1 is most probable FRU. (Models 300/300X/300LX only)	Be sure the TURBOchannel cable is secure and the module is seated correctly. Visually inspect the module to be sure it has no defective components. If necessary, replace the TURBOchannel module.

(continued on next page)

Preliminary Power-up Test Displays

Table 8–2 (Cont.) FRU Codes

FRU Code	Meaning	Action
8xy	8xy is a three-digit hexadecimal number representing the bank number and SIMM with the failing data.	Be sure all SIMMs are installed in the correct positions and are secure. Rerun the test to verify.
	8 is the extended error code prefix	
	x = bank 0 to 7	
	y = SIMM 0 or 1 for data errors in one SIMM	
	8 is for data errors in both SIMMS of a SIMM pair	
	F if unable to isolate the error to the SIMM or SIMM pair.	

(continued on next page)

Preliminary Power-up Test Displays

Table 8–2 (Cont.) FRU Codes

FRU Code	Meaning	Action
	Value	SIMM
	8,0,0	0 ¹
	8,1,0	0
	8,0,1	1
	8,1,1	1
	8,2,0	2
	8,3,0	2
	8,2,1	3
	8,3,1	3
	8,4,0	4
	8,5,0	4
	8,4,1	5
	8,5,1	5
	8,6,0	6
	8,7,0	6
	8,6,1	7 ²
	8,7,1	7

¹SIMM 0 is the first SIMM next to to the TURBOchannel connector.

²SIMM 7 is the last SIMM at the edge of the module.

(continued on next page)

Table 8–2 (Cont.) FRU Codes

FRU Code	Meaning	Action
1TL	SCSI device on SCSI bus A, Target T, Logical unit L	<p>For the internal SCSI:</p> <ul style="list-style-type: none"> • Be sure the power cable and the internal SCSI cable are connected securely to the system module. • Inspect all cables for possible defects. • Check all jumpers. • If necessary, replace the disk at address DKA0, for example. <p>For the external SCSI, be sure there are no cable defects and the cables are connected securely.</p>

Error Code

The *DEC 3000 Model 300 Series AXP Service Guide* lists all the categories of error codes you may see while in console mode, according to the FRU that caused the problem. The FRU is identified by the FRU code in the error message. (See Table 8–2).

For example, in the following message, error code 003 (an SCC communications code) indicates that the problem FRU is the keyboard. See Table 8–2 and Table 8–3 for additional information.

```
?? 003 0050 ptr(0) = Not Present keybd(2) = Not Present
```

Also, look in the SCC LED Codes table in the *DEC 3000 Model 300 Series AXP Service Guide* to find the error code of 50. This code indicates that the specific problem is the LK401 keyboard.

Preliminary Power-up Test Displays

Table 8–3 shows the steps to take for a given console diagnostic test failure.

Table 8–3 Console-Level Problems

Diagnostic Test	Action
CXT	Ensure proper connection of monitor cable. Ensure proper seating of the CPU module. Reexecute CXT diagnostic to verify.
ASIC	Ensure proper seating of the CPU module and reexecute the ASIC diagnostic to verify.
TOY clock/ NVR	Ensure proper seating of the CPU module and reexecute the NVR diagnostic to verify.
ISDN	Ensure proper seating of the CPU module and reexecute the ISDN diagnostic to verify.
SCC	Add the modem loopback connector. Reseat keyboard/mouse extension cable. Reseat the CPU module connection. Reexecute SCC diagnostic to verify.
SCSI	Ensure proper device connection. Reseat the SCSI connector to the system module. Reexecute SCSI diagnostic to verify. Be sure all SCSI-2 IDs are unique.
NI	Ensure proper seating of the CPU module. Add the 10BASE-T loopback connector (if failure is between error codes A0 to AC). Reexecute NI diagnostic to verify.
Memory	Reseat memory SIMMs.
TCn	Reseat and/or replace the TURBOchannel option in the specified slot.

Messages from Other Tests

Refer to Chapter 4 for details of the `set` and `test` commands. Tests are run in one of three diagnostic modes, each of which is either set automatically or by using the console `set` command, as follows:

- The `set diag_section 0` command is applied automatically during power-up diagnostic testing.
After power-up is complete, you are automatically switched to `set diag_section 1`.
- The `set diag_section 1` command initiates the default customer diagnostic test, entered after power-up tests have completed and the system is running.
- The `set diag_section 2` command initiates a service diagnostic test, which provides more detailed testing. You may need to connect loopbacks to run some of these tests.

A

Hardware Specifications

Appendix Overview

In This Appendix

This appendix provides the following system specifications for the DEC 3000 Model 300 Series AXP system:

- Weight and Dimensions
- Power Specifications
- General Specifications
- Environmental Limitations
- Acoustical Specifications

System Specifications

Weight and Dimensions

Table A-1 provides the system unit dimensions.

Table A-1 System Unit Dimensions - Desktop

Weight	Height	Width	Depth
8.2 kg (diskless) (18 lb)	9.6 cm (3.8 in)	40.0 cm (16.0 in)	43.9 cm (17.3 in)

Power Specifications

Table A-2 provides the power specifications for the DEC 3000 Model 300 Series AXP System system.

Table A-2 System Power Specifications

Voltage requirements	120 V/240 V
Voltage tolerance	88 to 132 v/176 to 264 V
Frequency	Single phase: 50 Hz/60Hz
Frequency tolerance	47 to 63 Hz
Watts	260 AC
Maximum running current	4.0 A/2.0 A
Maximum power consumption	260 W

General Specifications

Table A-3 provides various information about the system and its components and options.

Table A-3 System Specifications

Processor	DECchip 21064 RISC-style microprocessor, with 256 KB secondary cache.
SIMM memory	64 MB to 256 MB
Optional fixed disk	Two 3½-inch fixed disks
Optional removable-media drive (RX26)	2.8 MB 3.5-inch, half-height drive
Optional RRD42 compact disc (CD) drive	External 600-MB 5¼-inch, half-height CD drive
Optional expansion boxes	BA353, SZ12, SZ16
Interfaces	One single-channel SCSI-2 compliant controller (SCSI channel A), that supports both synchronous and asynchronous devices, one 10BASE-T Ethernet port (10 Mbits/s), one ISDN port, one synchronous communications/printer/alternate console port, one audio port.
Dedicated power source with an isolated ground	Power source must be 110-120V AC or 220-240V AC.

System Specifications

Environmental Limitations

Table A-4 provides information about the environmental conditions in which the DEC 3000 Model 300 Series AXP System can operate. The term "operating conditions" refers to a system that is plugged in, turned on and running. The term "nonoperating conditions" refers to a system that is plugged in, not turned on, and not running.

Table A-4 System Environmental Specifications

Operating Conditions	
Temperature range	10°C to 40°C (50°F to 104°F)
Temperature change rate	11°C/hr (20°F/hr) maximum
Relative humidity	10% to 90% (noncondensing)
Altitude	0 to 2000 m (0 to 6562 ft) at 36°C (97°F)
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)
Nonoperating Conditions	
Temperature range	-40°C to 66°C (-40°F to 151°F)
Relative humidity	5% to 95%, (noncondensing)
Maximum altitude	3600 m (12,000 ft)
Maximum wet bulb temperature	46°C (115°F)

Acoustical Specifications

Table A-5 lists the English-language acoustical specifications.

Table A-5 Acoustics—Declared Values per ISO 9296 and ISO 7779

Product	Sound Power Level <i>L_{wAd}</i> , B ¹		Sound Pressure Level <i>L_{pAm}</i> , dBA (operator position)	
	Idle	Operate	Idle	Operate
PE30A	4.7	4.7	36	36
PE30A + 2xRZ25	4.8	4.8	37	37

¹1 B = 10 dBA

B

Internal Options: Specifications and SCSI ID Settings

Appendix Overview

**In this
Appendix**

This appendix provides the following option specifications:

- RX26 Drive Specifications
- RX26 Diskette Specifications
- RZ25 Fixed Disk Specifications
- RZ25L Fixed Disk Specifications
- RZ26 Fixed Disk Specifications
- RZ26L Fixed Disk Specifications
- RZ28 Fixed Disk Specifications

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)	2.54 cm (1.00 in)	10.16 cm (4.00 in)	15.00 cm (5.91 in)

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 Kb/s 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

RX26 Diskette Specifications

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 drive	Read/write

SCSI ID Switch Settings

For proper communication between your system and an RX26 drive, your RX26 must have a unique SCSI address setting. SCSI address settings are determined by the position of electrical switches located on the sides of the drive.

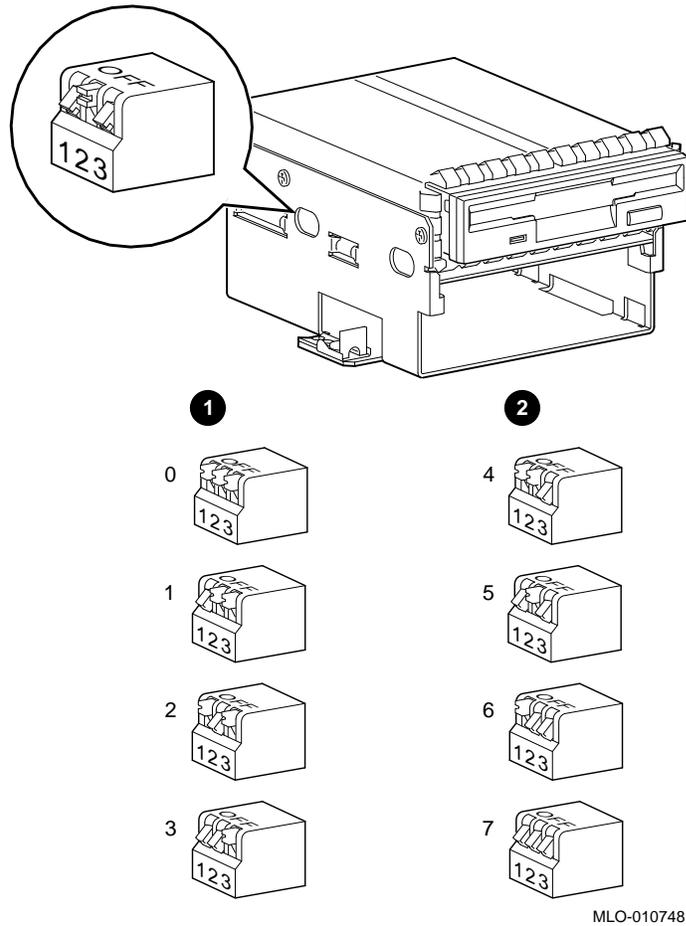
The SCSI-ID Address Setting

When your RX26 drive arrives from the factory, it should be preset to the recommended SCSI setting of 5, as shown in Figure B-1. Figure B-1 also shows all possible SCSI ID settings for the RX26 drive.

Note

SCSI ID 7 is **reserved** for the host SCSI controller.

Figure B-1 RX26 Switch Settings



- ① switch settings
- ② switch settings

When setting SCSI ID addresses for the RX26, remember that no two devices can be set to the same SCSI ID. Refer to the section entitled Understanding SCSI IDs in Chapter 2 for additional information.

RZ25 Fixed Disk 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

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

RZ25 Fixed Disk Specifications

Variable	Description
Seek time track to track	2½ ms
Seek time average	14 ms
Seek time maximum (full stroke)	28 ms
Average rotational latency	6.8 ms
Rotational speed	4412 ± 0.5%
Start time	20 s maximum
Stop time	30 s maximum
Interleave ratio	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 Specifications

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

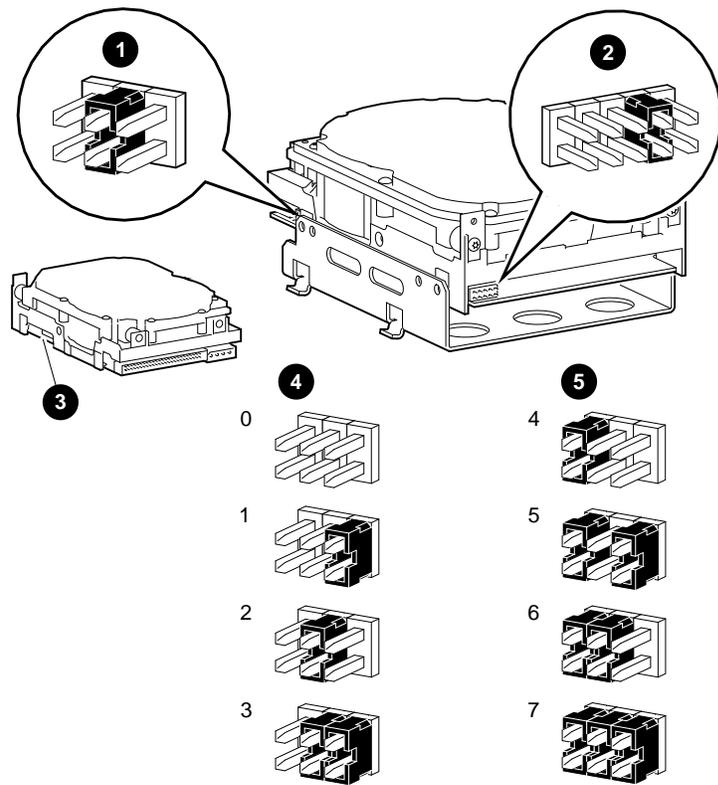
Nonoperating Variable	Level
Ambient Temperature	-40°C to 66°C (-40°F to 151°F)
Relative Humidity	8% to 95%, noncondensing
Maximum wet bulb temperature	46°C (115°F)
Minimum dew point temperature	2°C (36°F)
Altitude	-300 m to 3,000 m (-984.3 ft to 9843 ft) at 36°C (96°F)

SCSI ID Jumper Settings

Figure B-2 shows the SCSI ID settings for the RZ25 fixed disk drive. There are three jumper locations, J5, J6, and J7. Use J5 only. Remember, no two devices can be set to the same SCSI ID. Refer to Chapter 2 for additional information.

RZ25 Fixed Disk Specifications

Figure B-2 RZ25 Jumper Settings



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- ❶ J5 jumpers
- ❷ J7 jumpers
- ❸ J6 jumpers
- ❹ jumper settings, SCSI ID 0—3
- ❺ jumper settings, SCSI ID 4—7

RZ25 Fixed Disk Specifications

Table B-1 lists the RZ25 jumper settings for both customer and Digital Services use; Table B-2 and Table B-3 jumper settings are provided for Digital Services and self-maintenance customers. In Table B-1, Out = removed; In = attached.

Table B-1 J5 Jumper Settings

SCSI Address	0	1	2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6	Out	In	In
7 ¹	In	In	In

¹Reserved for host SCSI ID.

Table B-2 J6 Jumper Settings

Jumper Position	Description
J6-1	Factory use only
J6-2	In = Enables motor start option Out = Drive operation depends on whether a jumper is installed in J6-3
J6-3	In = Enables motor start option (if J6-2 is out). Motor start delay is 16 times the drive ID number in seconds.
J6-4	In = Entire drive is write-protected.
J6-5	In = Parity checking by drive is enabled.
J6-6	Reserved for later use.
J6-7	In = Supplies drive power to SCSI bus, pin 26.

(continued on next page)

Table B–2 (Cont.) J6 Jumper Settings

Jumper Position	Description
J6-8	In = Supplies power only to drive terminators.

Note

If J6 pins 7 and 8 are positioned horizontally (lower part), the drive takes power from the SCSI bus, pin 26. Jumpers on both pins 7 and 8 can be in at the same time.

Remove all jumpers from location *J7* *except jumper 4*. Failure to do so could cause dual SCSI address problems.

Table B–3 J7 Jumper Settings

Jumper Position	Description
J7-1	SCSI ID (use J5 ID setting)
J7-2	SCSI ID (use J5 ID setting)
J7-3	SCSI ID (use J5 ID setting)
J7-4	Jumper must be installed if no cable is connected.
J7-5	Used for a connection to a remotely located LED indicator.

RZ25L Fixed Disk Specifications

Weight and Dimensions

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

Weight	Height	Width	Depth
0.7 kg (1.5 lb)	2.5 cm (1.00 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:

Table B-4 RZ25L Hardware Specifications

Formatted Storage Capacity	
Per drive	535 MB
Per surface	90.7 MB
Bytes per track	48,460 (average)
Bytes per block	512
Spare blocks per track	1
Spare cylinders	2
Buffer size	240 KB

Performance

The following table lists the performance of the drive:

Performance	
Data transfer rate to/from media	5.25 MB/sec (maximum)
Seek time track to track	1.5 msec
Seek time average	10.5 msec

RZ25L Fixed Disk Specifications

Seek time maximum (full stroke)	23 msec
Average latency	5.4 msec
Rotational speed	5411 rpm \pm 0.5%
Interleave ratio	1:1

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Conditions	
Ambient temperature	5°C to 50°C (41°F to 122°F)
Relative humidity	8%–80%
Altitude	305 m to 3048 m (–1000 ft to 10,000 ft)
Maximum wet bulb temperature	28°C (82°F) (noncondensing)
Heat dissipation	8.4W (seeking) 7W (typical)
Temperature gradient	20°C/hr (36°F/hr)

Nonoperating Conditions

The following table lists the nonoperating conditions of the drive:

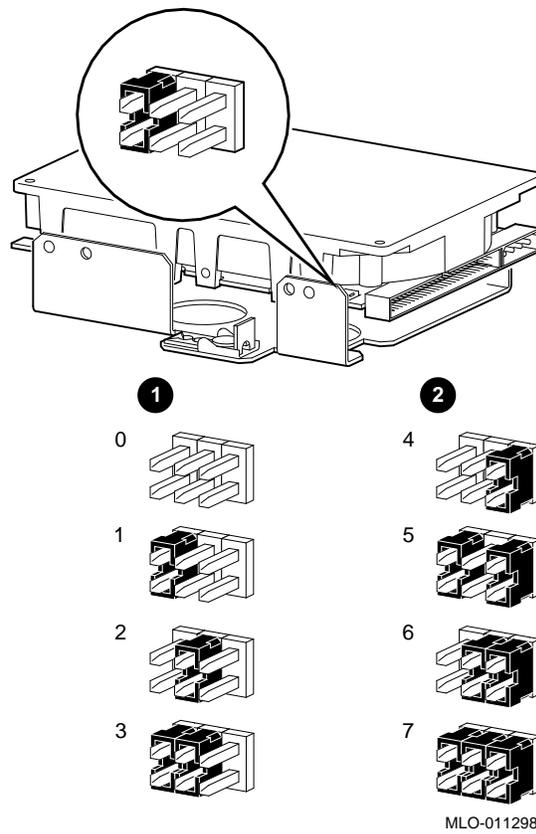
Nonoperating Conditions	
Ambient temperature	–40°C to 70°C (–40°F to 158°F)
Relative humidity	5%–95%
Altitude	–305 m to 12,210 m (1000 ft to 40,000 ft)
Maximum wet bulb temperature	46°C (115°F)
Temperature gradient	25°C (45°F/hr)

SCSI ID Jumper Settings

Figure B–3 shows the SCSI ID settings for the RZ25L fixed disk drive. You may need to remove the bracket attached to an RZ25L drive to access the jumper locations. Remember, no two devices can be set to the same SCSI ID. SCSI ID 7 is reserved for the host SCSI ID. Refer to Chapter 2 for additional information.

RZ25L Fixed Disk Specifications

Figure B-3 RZ25L Jumper Settings



- ❶ SCSI jumper settings 0—3
- ❷ SCSI jumper settings 4—7

RZ26 Fixed Disk 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/s
Seek time track to track	1 ms
Seek time average	10 ms
Seek time maximum (full stroke)	±20 ms
Average rotational latency	5.6 ms
Rotational speed	5363 rpm

RZ26 Fixed Disk 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

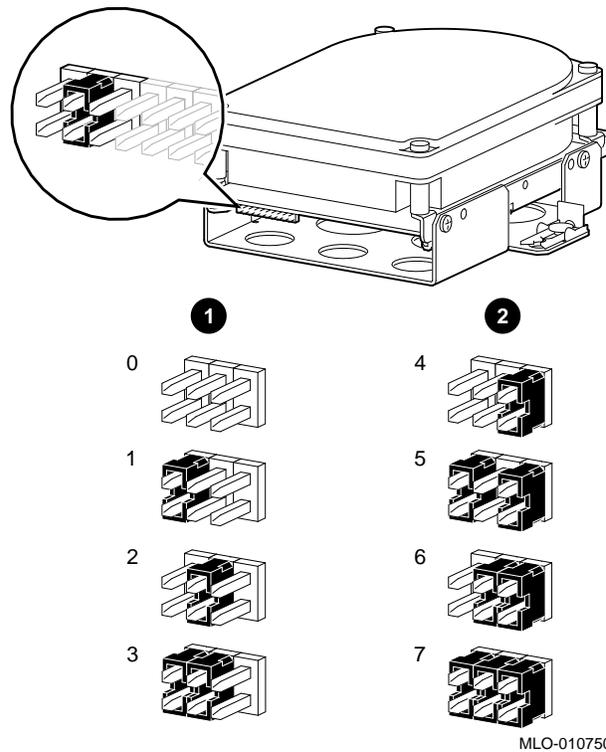
The following table lists the nonoperating conditions of the drive:

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

SCSI ID Jumper Settings

Figure B-4 shows the SCSI ID settings for the RZ26 fixed disk drive. SCSI ID 7 is reserved for the host SCSI ID.

Figure B-4 RZ26 Jumper Settings



- ❶ SCSI ID jumper settings 0—3
- ❷ SCSI ID jumper settings 4—7

When setting SCSI ID addresses for the RZ26, remember no two devices can be set to the same SCSI ID, see Chapter 2 for additional information.

RZ26L Fixed Disk Specifications

Weight and Dimensions

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

Weight	Height	Width	Depth
0.49 kg (1.08 lb)	2.54 cm (1.00 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 drive	1.05 GB (formatted)
Buffer size	512 KB

Performance

The following table lists the performance of the drive:

Variable	Description
Data transfer rate to/from media	2.7–5.5 MB/sec
Seek time track to track	1 msec
Seek time average	9.5 msec
Seek time maximum (full stroke)	≤ 20 msec
Average latency	5.6 msec
Rotational speed	5400 rpm
Interleave ratio	1:1

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Variable	Operating Level
Ambient temperature ¹	5°C to 55°C (41°F to 131°F)
Relative humidity	10%–90% non-condensing
Maximum wet bulb	32°C 90°F
Temperature gradient	20°C 36°F per hour

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%–95% (noncondensing)
Maximum wet bulb	46°C 115°F
Temperature gradient	30°C 55°F per hour

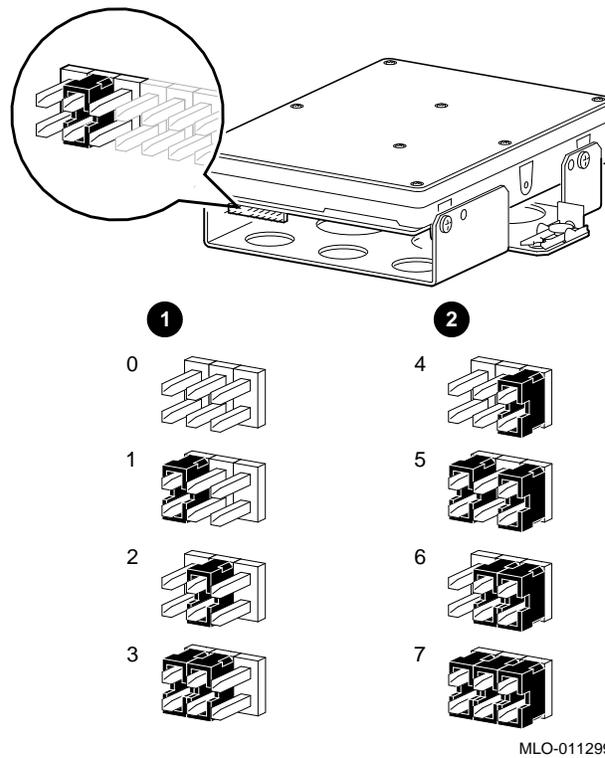
SCSI ID Jumper Settings

Figure B–5 shows the SCSI ID settings for the RZ26L fixed disk drive. SCSI ID 7 is reserved for the host SCSI ID.

Note

No special termination is required on workstations.

Figure B-5 RZ26L Jumper Settings



- ❶ SCSI jumper settings 0—3
- ❷ SCSI jumper settings 4—7

When setting SCSI ID addresses for the RZ26L, remember no two devices can be set to the same SCSI ID, see Chapter 2 for additional information.

RZ28 Fixed Disk 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)	4.13 cm (1.63 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
Megabytes per drive	2104
Gigabytes per drive	2.1
Bytes per track	30,208
Bytes per surface	144,683,520
Buffer size	1024 KB

Performance

The following table lists the performance of the drive:

Variable	Description
Data transfer rate to/from media	2.7MB/sec
Interface transfer rate, synchronous	10 MB/sec
Interface transfer rate, async	5 MB/sec
Seek time track to track	1 msec
Seek time average	10 msec
Seek time maximum (full stroke)	20 msec
Average latency	5.6 msec
Rotational speed	5400 rpm \pm 0.5%

RZ28 Fixed Disk Specifications

Operating Conditions

The following table lists the operating conditions of the drive:

Operating Variable	Operating Level
Ambient temperature	5°C to 55°C (41°F to 131°F)
Relative humidity	10%–90%

Nonoperating Conditions

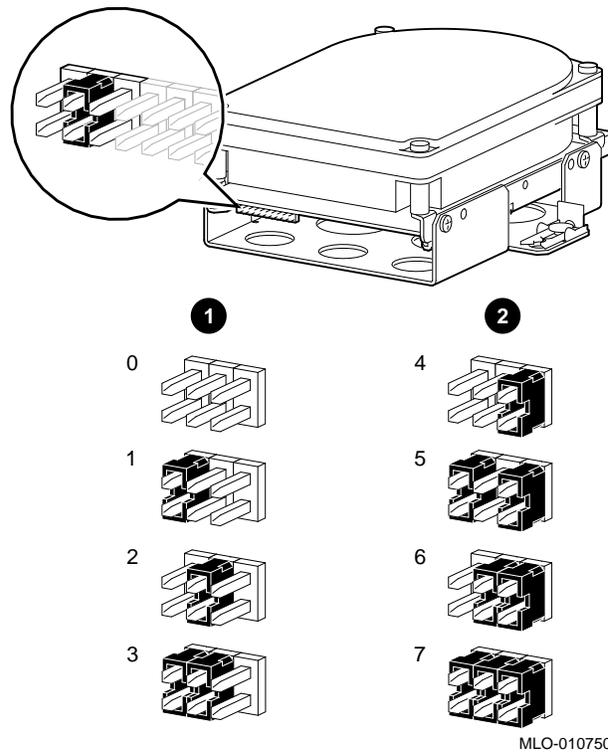
The following table lists the nonoperating conditions of the drive:

Nonoperating Variable	Level
Ambient temperature	–40°C to 66°C (–104°F to 151°F)
Relative humidity	8%–95% (packaged)

SCSI ID Jumper Settings

Figure B–6 shows the SCSI ID settings for the RZ28 fixed disk drive. SCSI ID 7 is reserved for the host SCSI ID.

Figure B-6 RZ28 Jumper Settings



- ❶ SCSI jumper settings 0—3
- ❷ SCSI jumper settings 4—7

When setting SCSI ID addresses for the RZ28, remember no two devices can be set to the same SCSI ID, see Chapter 2 for additional information.

C

Port Pinouts

Appendix Overview

Introduction

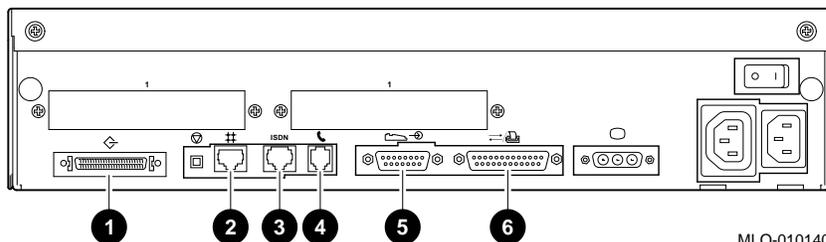
This appendix is for users who want to connect communications devices to their system. The tables in this appendix explain the functions of the pins on the communication ports.

In This Appendix

The following communications ports are listed in this appendix.

- External SCSI Port ❶
- 10BASE-T Port ❷
- ISDN Port ❸
- Audio Port ❹
- Keyboard/Mouse or Tablet Port ❺
- RS-232 Synchronous/Asynchronous Communications Port ❻

Figure C-1 Communications Ports

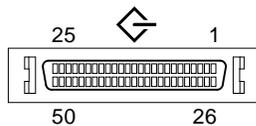


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External SCSI Port

Pin Layout

The following figure shows the pin layout for the external SCSI port.



Pin-Outs

Table C-1 describes pin usage for the external SCSI port.

Table C-1 External SCSI Port Pin-outs

Pin	Description	Pin	Description
1	Chassis ground	26	SCSI Bus Data [0]
2	Chassis ground	27	SCSI Bus Data [1]
3	Chassis ground	28	SCSI Bus Data [2]
4	Chassis ground	29	SCSI Bus Data [3]
5	Chassis ground	30	SCSI Bus Data [4]
6	Chassis ground	31	SCSI Bus Data [5]
7	Chassis ground	32	SCSI Bus Data [6]
8	Chassis ground	33	SCSI Bus Data [7]
9	Chassis ground	34	SCSI Bus Data Parity
10	Chassis ground	35	Chassis ground
11	Chassis ground	36	Chassis ground
12	Chassis ground	37	Chassis ground
13	Not used	38	Term power
14	Reserved	39	Reserved
15	Chassis ground	40	Chassis ground

(continued on next page)

External SCSI Port

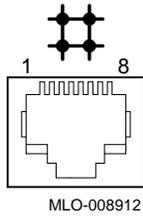
Table C-1 (Cont.) External SCSI Port Pin-outs

Pin	Description	Pin	Description
16	Chassis ground	41	SCSI Bus ATN
17	Chassis ground	42	Chassis ground
18	Chassis ground	43	SCSI Bus BSY
19	Chassis ground	44	SCSI Bus ACK
20	Chassis ground	45	SCSI Bus RST
21	Chassis ground	46	SCSI Bus MSG
22	Chassis ground	47	SCSI Bus SEL
23	Chassis ground	48	SCSI Bus CD
24	Chassis ground	49	SCSI Bus REQ
25	Chassis ground	50	SCSI Bus IO

10BASE-T Port

Pin Layout

The following figure shows the pin layout for the 10BASE-T port.



Pin-Outs

Table C-2 describes pin usage for the 10BASE-T port.

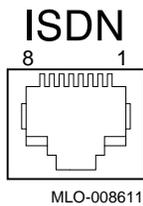
Table C-2 10BASE-T Port Pin-outs

Pin Number	Description
1	Transmit
2	Transmit, active low
3	Receive
4	Not used
5	Not used
6	Receive, active low
7	Not used
8	Not used

ISDN Port

Pin Layout

The following figure shows the pin layout for the ISDN port.



Pin-Outs

Table C-3 describes pin usage for the ISDN port.

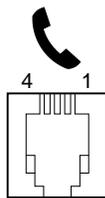
Table C-3 ISDN Port Pin-outs

Pin Number	Description
1	Not used
2	Not used
3	Line out, active low
4	Line in
5	Line in, active low
6	Line out
7	Not used
8	Not used

Audio Port

Pin Layout

The following figure shows the pin layout for the audio port.



Pin-Outs

Table C-4 describes pin usage for the audio port.

Table C-4 Audio Port Pin-outs

Pin Number	Description
1	Audio in A
2	Earphone interface 1 (audio out)
3	Earphone interface 2 (audio out return)
4	Audio input B (ground)

This port is pin-compatible with a telephone handset.

Keyboard/Mouse or Tablet Port

Pin Layout

The following figure shows the pin layout for the keyboard/mouse or tablet port.

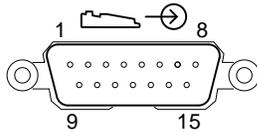
**Pin-Outs**

Table C-5 describes pin usage for the keyboard/mouse or tablet port. The tablet, keyboard, and mouse interface use the same physical port.

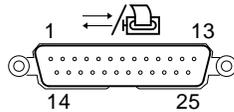
Table C-5 Keyboard/Mouse or Tablet Port Pin-outs

Pin	Source	Signal	Description
1		GND	Chassis ground
2		KEY.TX	Keyboard transmitted data
3	Keyboard	KEY.RX	Keyboard received data
4		+12V	Keyboard/tablet power
5		GND	Chassis ground
6	Mouse/tablet	MSE.RX	Mouse received data
7		MSE.TX	Mouse transmitted data
8		GND	Chassis ground
9		GND	Chassis ground
10		NC	Not used
11		NC	Not used
12		NC	Not used
13		+5V	Mouse power
14		-12V	Mouse power
15		GND	Chassis ground

RS-232 Synchronous/Asynchronous Communications Port

Pin Layout

The following figure shows the pin layout for the RS-232 synchronous/asynchronous communications port.



Port Pin-Outs

Table C-6 describes pin usage for the synchronous/asynchronous communications port.

Table C-6 Synch/Asynch Communications Port Pin-outs

Pin	Description	Pin	Description
1	Protective ground	14	Not used
2	Transmit data	15	Transmitter signal element timing
3	Receive data	16	Not used
4	Request to send	17	Receiver signal element timing
5	Clear to send	18	Not used
6	Data set ready	19	Not used
7	Signal ground	20	Data terminal ready
8	Data channel received	21	Not used
9	Not used	22	Ring indicator
10	Not used	23	Data signal rate selector
11	Not used	24	Not used
12	Speed mode indicator	25	Not used
13	Not used		

D

Associated Documents

Introduction

For option and system hardware part numbers, consult your Digital sales representative.

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

Associated Printed Documents

Table D-1 lists the associated documents and material available in printed form.

Table D-1 DEC 3000 Model 300 Series AXP System Printed Documents

Titles	Order Numbers
DEC 3000 Model 300 Series AXP Systems	
<i>DEC 3000 Model 300 Series AXP Hardware Reference Guide</i>	EK-PELCN-OG
<i>DEC 3000 Model 300 Series AXP Service Guide</i>	EK-PELCN-SV
<i>DEC 3000 Model 300 Series AXP Setting Up Your System</i>	EK-PELHW-IC
<i>DEC 3000 Model 300 Series AXP Adding Memory</i>	EK-PELAM-IC
<i>DEC 3000 Model 300 Series AXP Adding an Internal Fixed Disk Drive</i>	EK-PELAD-IC

(continued on next page)

Associated Documents

**Table D-1 (Cont.) DEC 3000 Model 300 Series AXP System
Printed Documents**

Titles	Order Numbers
DEC 3000 Model 300 Series AXP Systems	
<i>DEC 3000 Model 300 Series AXP Adding a Removable-Media Drive</i>	EK-PELAF-IC
<i>OpenVMS AXP Factory Installed Software (FIS) User Information</i>	EK-A0377-UG
<i>DEC OSF/1 AXP Factory-Installed Software User Information</i>	EK-SFFIS-UG
TURBOchannel-related Documentation	
<i>Smart Frame Buffer TURBOchannel Module</i>	EK-SFBOM-TC
<i>Smart Frame Buffer Plus Module Owner's Guide</i>	EK-SMFBP-SG
<i>ZLX Graphics Accelerator Modules Owner's Guide</i>	EK-PIXEL-OG
<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 Option Installation Kit</i>	EK-PMAZA-UG
<i>DEC FDDIcontroller 700 Installation</i>	EK-DEFZA-IN
<i>FDDIcontroller 700 Release Notes</i>	AA-PJKWA-TE
<i>Dual SCSI Module Owner's Guide</i>	EK-DSCSE-OG
<i>Dual SCSI Module (PMAZC-AA) Owner's Guide</i>	EK-SCSIB-OG

(continued on next page)

Table D-1 (Cont.) DEC 3000 Model 300 Series AXP System Printed Documents

Titles	Order Numbers
Multimedia Documentation	
<i>Sound and Motion J300 Owner's Guide</i>	EK-JXPVS-UG
<i>Multimedia Services for DEC OSF/1 AXP Installation Guide</i>	AA-Q0ANA-TE
<i>Multimedia Services for DEC OSF/1 AXP Programmer's Guide</i>	AA-Q0APA-TE
DEC 3000 Firmware Documentation	
<i>Alpha AXP Systems Firmware Release Notes</i>	AA-PW8YE-TE
Drives	
<i>600 MB SCSI CD-ROM Installation Guide</i>	EK-XCRAA-IG
<i>OpenVMS AXP Version 1.5 Compact Disc User's Guide</i>	AV-PQYVA-RE
<i>RX26 Owner's Reference Card</i>	EK-RX26D-RC
<i>RZ Series Disk Drive Reference Manual</i>	EK-RZXXD-RM
<i>RZ Series Disk Drive Installation Guide</i>	EK-DRZ01-IG
<i>RRD42 Compact Disc Drive Owner's Manual</i>	EK-RRD42-OM
<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-TZ30C-OG

(continued on next page)

Associated Documents

Table D-1 (Cont.) DEC 3000 Model 300 Series AXP System Printed Documents

Titles	Order Numbers
SCSI Documents	
<i>Small Computer System Interface: An Overview</i>	EK-SCSIS-OV
<i>Small Computer System Interface: A Developer's Guide</i>	EK-SCSIS-SP
OPEN DECconnect Documentation	
<i>OPEN DECconnect Building Wiring Components and Applications Catalog</i>	EC-I1834-29

DEC OSF/1 AXP Documentation

Table D-2 lists the user DEC OSF/1 AXP documentation kit and its contents:

Table D-2 End User Documentation, QA-MT4AB-GZ

Titles	Order Numbers
<i>Startup Documentation Subkit</i>	QA-MT4AC-GZ
<i>Release Notes</i>	AA-PS2BA-TE
<i>Guide to Installing DEC OSF/1</i>	AA-PS2DA-TE
<i>Guide to Software License Management</i>	AA-PS2EA-TE
<i>Read This First Letter</i>	AV-PS3JA-TE
<i>Quick Reference (card)</i>	AV-PS3KA-TE

OpenVMS AXP Documents

Table D-3 lists some of the OpenVMS AXP documentation:

Table D-3 General OpenVMS AXP Operating System Documents

Titles	Order Numbers
<i>OpenVMS Alpha Version 1.5 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 Compact Disc User's Guide</i>	AA-PSQVC-RE
<i>OpenVMS AXP Version 1.5 Release Notes</i>	AA-PV72A-TE
<i>Overview of OpenVMS Documentation</i>	AA-PV6YA-TK

Miscellaneous Documents

Table D-4 lists other documentation that may be useful to you:

Table D-4 Miscellaneous Documents

Titles
<i>Linkworks User's Guide</i>
<i>GNU Emacs Manual</i>
<i>GNU Emacs Lisp Reference Manual</i>
<i>Guide to Prestoserve</i>

Help in Debugging Programs

Appendix Overview

Memory-Based Data Structures

The DEC 3000 AXP console stores away memory-based data structures that may help in debugging certain crashes. These structures are:

- Impure area—This area contains the saved machine state on an entry into console.
- Machine check logout—This area contains the last machine check log caused by:
 - A system/processor correctable error (small frame)
 - A system/processor uncorrectable error (large frame)

For example:

A MCHECK FR PAL (Machine CHECK FRom PAL) implies that the system encountered a machine check condition while executing PALcode and not while executing operating system code. Because of this, an operating system level crash dump does not take place. Instead, a machine check logout frame is created by the PALcode before entering console mode. This logout frame may be examined while in console mode, using the examine commands.

In This Appendix

This appendix describes each data structure.

Examining the Impure Area

Commands and Display Elements

Enter the following command to examine the impure area:

```
>>> E -PM -Q -U -N 94 F4000
```

You must use the ctrl-s (XOFF) and ctrl-q (XON) commands to stop and start the display. The following are the address and description of each element in the impure area.

- Console Flags - Address: F4000h
- Console Halt Reason - Address: F4008h
- Saved General-Purpose Registers - Address: F4010h - F4108h
 - Description: Contents of the general-purpose register R0 -R31 at time of console entry.
- Saved Floating-Point Registers - Address: F4110h - F4208h
 - Description: Contents of the floating-point register FR0 -FR31 at time of console entry
- Machine Check Flag - Address: F4210h
- Saved PAL Temp Registers - Address: F4218h - F4310h
 - Description: Contents of PT0 - PT31 on console entry. Operating system use.
- Exception Address - Address: F4318h
- PAL Base - Address: F4320h
- Saved HIRR - Address: F4328h
- Saved HIER - Address: F4330h
- Saved MMCSR - Address: F4338h
- Saved VA - Address: F4340h
- Saved BIU_ADDR - Address: F4348h
- Saved BIU_STAT - Address: F4350h
- Saved DC_ADDR - Address: F4358h
- Saved FILL_ADDR - Address: F4360h

Examining the Impure Area

- Saved DC_STAT - Address: F4368h
- Saved FILL_SYNDROME - Address: F4370h
- Saved BC_TAG - Address: F4378h
- Saved ABOX_CTL - Address: F4380h
- Saved BIU_CTL - Address: F4388h
- Saved FP_CSR - Address: F4390h
- Console Entered State Variable - Address: F4398h
- Saved Values of the PAL Temp Registers - Address: F43A0h - F4498h
 - Description: Contents of PAL temps when in console mode.
- Saved PAL Base Register - Address: F44A0h

Examining the Machine Check Logout Area

To Examine the Small Frame

Enter the following command to examine the machine check logout area: To look at the small frame:

```
>>> E -PM -Q -U -N A F8000
```

You must use the ctrl-s (XOFF) and ctrl-q (XON) commands to stop and start the display.

The following are the address and description of each element in the small frame in the logout area:

- Flag Field - Address: F8000h
 - Description: Contains the size of the frame in the low longword and the retry bit is represented by bit 63
- Offset Field - Address: F8008h
 - Description: Byte offset to the CPU specific part of the logout frame in low longword, offset to the system error code is in the high longword.

Examining the Machine Check Logout Area

- Machine Check Error Code - Address: F8010h
- BIU_STAT Contents- Address: F8018h
- BIU_ADDR Contents - Address: F8020h
- DC_STAT Contents - Address: F8028h
- FILL_SYNDROME Contents - Address: F8030h
- FILL_ADDR Contents - Address: F8038h
- BC_TAG Contents - Address: F8040h
- Machine Check Error CODE - Address: F8048h

To Examine the Large Frame

Enter the following to look at the large frame:

```
>>> E -PM -Q -U -N 3B F8050
```

You must use the ctrl-s (XOFF) and ctrl-q (XON) commands to stop and start the display.

The following are the address and description of each element in the large frame in the logout area:

- Flag Data - Address: F8050h
 - Description: Low longword contains the size of the log in the low longword, bit 63 is used as a retry bit
- Offset Data - Address: F8058h
 - Description: Low longword is offset to CPU specific data, high longword is offset to system specific data.
- Machine Check Code - Address: F8060h
- Saved PAL Temp Registers - Address: F8068h - F8158h
 - Description: Contents of PT0 - PT31 at the time of the error
- Saved Exception Address- Address: F8160h
 - Description: Address that was executing at the time of the machine check
- Saved Exception Summary Register - Address: F8168h
- Saved Exception Mask Register - Address: F8170h
- Saved ICSSR - Address: F8178h

Examining the Machine Check Logout Area

- Saved PALbase - Address: F8180h
- Saved HIER - Address: F8188h
- Saved HIRR - Address: F8190h
- Saved MMCSR - Address: F8198h
- Saved DC_STAT - Address: F81A0h
- Saved DC_ADDR - Address: F81A8h
- Saved ABOX_CTL - Address: F81B0h
- Saved BIU_STAT - Address: F81B8h
- Saved BIU_ADDR - Address: F81C0h
- Saved BIU_CTL - Address: F81C8h
- Saved FILL_SYNDROME - Address: F81D0h
- Saved FILL_ADDR - Address: F81D8h
- Saved VA - Address: F81E0h
- Saved BC_TAG - Address: F81E8h
- Machine Check Code - Address: F81F0h
- Memory Configuration Status - Address: F81F8h
- Saved TCASIC SLOT MODE Register - Address: F8200h
- Saved TCASIC CONFIG Register - Address: F8208h
- Saved TCASIC Failing Address Register - Address: F8210h
- Saved TCASIC Error Register - Address: F8218h
- Saved TCASIC Interrupt Register - Address: F8220h
- Saved Interrupt Mask Register - Address: F8228h

F

Supplementary Information for PTT Network Users

Appendix Overview

Introduction Certain European countries and the United Kingdom require that installation information be provided on the system module (54-22249), which is hosted within the DEC 3000 Model 300 Series AXP systems.

In This Appendix This appendix includes the following information:

- Service Specifications
- Host Power Rating
- Module Isolation
- Safety Warnings for UK Installations Only
- Cable Approval for the UK Only
- Supported Cables
- Equipment Between the Approved Module and a Digital Circuit (PTT)

Appendix Overview

Service Specifications

Table F-1 lists the service specifications for the system module.

Table F-1 Service Specifications for the System Module

Service Category	Interface Type (CCITT recommendation)	Service Requirements		Data Rate	Public Telecommunications Operators ¹		
		Electrical	Physical		BT	Hull	MCL
1	X.21bis	V.24	ISO 2110,	2400 bps	Yes	Yes	Yes
		/V.28	BS.6623:	4800 bps	Yes	Yes	Yes
			part1, 1985.	9600 bps	Yes	Yes	Yes
				19200 bps	No	No	Yes
		Approved extension cables: ²					
		BC22F-25 (25 feet) and					
		BC22F-10 (10 feet)					

¹BT — British Telecommunications plc.
Hull — Kingston Communications (Hull) plc.
MCL — Mercury Communications Limited.

²The total length of cable used must not exceed 27 feet.

Host Power Rating

You must ensure that the total power drawn by the approved module, the host, and other auxiliary equipment drawing power from the host, is within the rating of the host power supply.

Digital has designed all permutations of the host configuration (including the DEC 3000 Model 300 Series AXP Systems) to operate within the limits of the host power rating, as shown in Table F-2.

Table F-2 Module Power

Nominal Voltage	Maximum Voltage (Volts)	Maximum Voltage (Volts)	Maximum Input Current (Amperage) ¹	Maximum Input Current (Amperage) ²
+5.1V	+4.896	+5.304	16.0	24.0
+12.1V	+11.616	+12.584	0.8	1.8
-12.0V	-11.4	-12.6	0.1	0.1

¹Without TURBOchannel options slots populated.

²With two TURBOchannel options slots populated. This is a worst-case situation as specified in the TURBOchannel hardware specification.

Module Isolation

Digital has ensured that when the system module is installed within the DEC 3000 Model 300 Series AXP Systems, the clearance and creepage distances to the host are met. Clearance is the shortest distance in air between two points. Creepage is the shortest distance along a continuous surface between those same two points.

Creepage distances apply when the system module is installed in a controlled environment. You can check creepage distances by measuring the distance between adjacent parts.

If in doubt, you should seek the advice of a telecoms safety engineer. Failure to install the system module in accordance with these instructions will invalidate the approval.

Except at the connector that plugs into the host, clearance and creepage distances of Xmm and Ymm, as listed in Table F-3, must be maintained between the approved module and other parts of the host, including expansion cards.

Table F-3 Clearance and Creepage Distances

Clearance Xmm	Creepage Ymm	Voltage Used or Generated by Other Parts of the Host or Expansion Card Vrms or Vdc
2.0	2.4 (3.8) ¹	Up to 50
2.6	3.0 (4.8)	Up to 125
4.0	5.0 (8.0)	Up to 250
4.0	6.4 (10.0)	Up to 300

¹The distances shown in parentheses apply in an uncontrolled environment where heat, humidity, and temperature may fluctuate.

Safety Warnings for UK Installations Only

Ports indicated by the safety warning label do not provide sufficient isolation to satisfy the requirements of the relevant parts of standard BS6301. Therefore, any product connected to this port must meet one of the following conditions:

- Be covered by the Office of Telecommunications (OFTEL)'s General Approval NS/G/1234/J/100003
(All products supplied by Digital comply with this General Approval.)
- Have been approved to the relevant parts of standard BS6301
- Have previously been evaluated against British Telecom (Post Office) Technical Guide 2 or 26 and given permission to attach

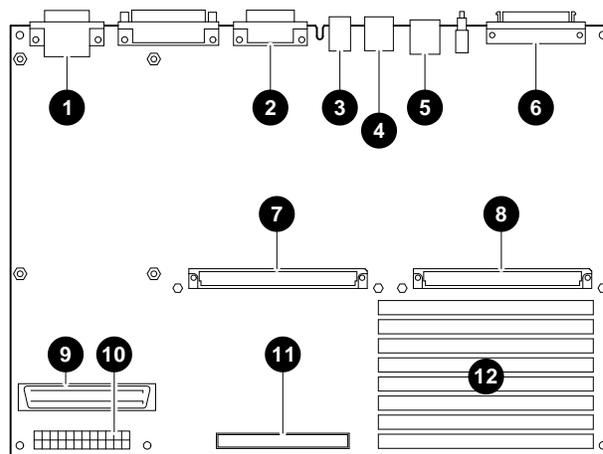
Any other use of this product invalidates approval.

If a port has the following label, direct or indirect interconnection of that port, whether the port is marked or not, may produce hazardous conditions on the network:

SAFETY WARNING --- See Instructions for Use Before Making Any Connection to This Module

The warning label applies to all ports labeled ❶ through ❾ in Figure F-1.

Figure F-1 Ports to Which Warning Label Applies



MLO-009782

The numbers correspond to the following ports:

- ❶ Monitor port
- ❷ Keyboard/mouse port
- ❸ Audio input/output port
- ❹ ISDN port
- ❺ 10BASE-T port
- ❻ External SCSI port
- ❼ TURBOchannel 1
- ❽ TURBOchannel 0
- ❾ CPU module
- ❿ Power supply connector

Appendix Overview

- ① Fixed disk/removable disk/SCSI interface
- ⑫ Memory

Note

ISDN communications are not yet available for your workstation. ISDN ports for connection to PTT public service networks will be provided by a product update to be released in the near future.

Cable Approval for the UK Only

The system module is approved for direct connection to a particular digital circuit. This approval includes an interconnecting cable with mating connectors that conform to the British standard BS6623, parts 1 and 4. If the module is connected to the service with anything other than its own approved cables, those cables must benefit from relevant general approval NS/G/1235/100009 and/or conform to any other applicable requirements.

The following table describes pin usage for the system module connector.

Pin	Description	Pin	Description
1	Ground	14	Not used
2	Transmit data	15	Transmit data
3	Receive data	16	Not used
4	Request to send	17	Receive clock
5	Clear to send	18	Not used
6	Data set ready	19	Not used
7	Ground	20	DTR
8	Carrier detect	21	Not used
9	Not used	22	Ring indicator
10	Not used	23	Data signal rate selector
11	Not used	24	Not used
12	Speed indicator	25	Not used

Supported Cables

Table F-4 describes the cables for the system module.

Table F-4 Cables Supported by the Approved Module

Interface	Cable Type	Order Number	Molding	Pins
V.24	Extension	BC22F-10 (10 feet)	straight	25-25
V.24	Extension	BC22F-25 (25 feet)	straight	25-25

**Equipment
Between the
Approved
Module and a
Digital Circuit
(PTT)**

If any other equipment, including cables or wiring, is to be connected between the approved module and the point of connection to any particular digital circuit, that equipment must conform as follows:

- The overall transmission characteristics of all other equipment must not have any material effect on the electrical conditions between the equipment and the digital circuit.
- All other equipment must comprise only the following:
 - Approved equipment, which may be subject to limitations on its use, for the purpose of connection between it and a particular digital circuit.
 - Cable or wiring that complies with a code of practice for the installation of equipment covered by this standard or other requirements that may be applicable.

Glossary

10BASE2 Ethernet network

See ThinWire Ethernet network.

10BASE-T Ethernet network

The IEEE standard 802.3-compliant Ethernet products used for local distribution of data. These networking products characteristically use a cable made by twisting together two insulated conductors with no common covering. (Commonly known as twisted-pair cable.) *Compare with* thickwire Ethernet network.

accelerator

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

alternate console feature

A feature that allows you to receive system messages on an alternate console terminal and direct system activities from this terminal, if necessary, to diagnose problems with the monitor.

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, or damage to your equipment.

applications

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

architecture

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

ASIC (Application-Specific Integrated Circuit)

Customized chips chosen from a library of circuits. The test asic command tests the ASIC subsystem.

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 also* standard Ethernet network.

autoboot

The process by which the system boots automatically.

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.

bezel

The removable molded panel on the front of the system unit.

bit

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

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.

boot console device

The device name from which the console boots the operating system. This name is listed in a `show device display` under the `BOOTDEV` column. Example: `ESA0` indicates the network.

boot flag

An indicator bit, set by the system manager, that contains information that is read and used by the bootstrap software during a system bootstrap procedure. Default boot flags should already be set when you receive your system.

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.

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.

cable junction block

A small block attached to the monitor cable from which the BNC connectors emerge.

cache

See cache memory.

cache memory

A small, high-speed area of memory placed between slower main memory and the processor. Cache memory increases memory transfer rates and processor speed. It contains copies of data recently used by the processor and fetches several bytes of data from memory in anticipation that the processor will access the next sequential series of bytes.

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.

CISC

Complex instruction set computer. A computer that uses an instruction set consisting of a large number of complex instructions that are managed by microcode. *Contrast with* RISC.

client

A piece of hardware or software that obtains a specific set of services from a server.

client-server computing

An approach to computing that enables personal computer and workstation users—the “clients”—to work cooperatively with software programs stored on a mainframe or minicomputer—the “server.”

clock

A signal used to synchronize the circuits in a computer system.

cluster

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

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.

compact disc read-only memory

An area of memory that can be read, but not written to.

component

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

configuration

See system configuration.

connector

Hardware that connects directly to a port on the system.

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 subsystem

The subsystem that provides the user interface to the system when operating system software is not running. The console subsystem consists of the following components:

- console program
- console terminal
- console terminal port
- remote access device
- remote access port
- Ethernet ports

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.

CXT

Integral 2D accelerated graphics.

cycle

One clock interval.

data

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

data bus

A pathway used to carry data signals between two or more components of the system.

data transmission

The movement of data in the form of electrical signals along a communications line.

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.

D-cache

Data cache. A high-speed memory reserved for the storage of data. *Contrast with I-cache.*

DEChip 21064

The system's main processor running various cycle times.

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. DEC OSF/1 AXP runs on the range of AXP systems, from workstations to servers.

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.

depth of image

The number of bits per pixel in a frame buffer.

device

The general name for a hardware unit connected to the system that is capable of receiving, storing, or transmitting data. An example of a device is a fixed disk drive; you can install a fixed disk drive into the system unit or into an expansion box that you then connect to the system unit.

device name

The name by which a device or controller is identified in the system. The name that a particular operating system uses for a storage device to access that particular 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.

direct memory access

A processor that transfers data directly from one memory to another without going through the main processor.

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 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.

diskless system

A system that has no storage capacity of its own.

DMA

See direct memory access.

DRAM

See dynamic random-access memory.

drive bracket

A bracket that holds a removable-media drive, such as the RX26, or a fixed disk drive, such as the RZ25 or RZ26 drives.

dynamic random-access memory

Read/write memory that must be refreshed (read from or written to) periodically to maintain the storage of information.

environment variable

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

error line

A line of information that appears if a self-test or a power-up test fails. The following information appears on the error line: Field replaceable unit (FRU) number; component number; component mnemonic; error message number.

Example: 001 9 NI 172

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 option that can be attached to your system that holds one or more TURBOchannel option modules, hard disk drives, and 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.

fatal error

An error from which a process cannot recover. Fatal errors are either those that cause the CPU to stop, or disk-write errors that occur at any time except when the disk drive is being powered down or write-locked.

FDDI

See Fiber Distributed Data Interface

FEPROM (flash-erasable programmable read-only memory)

A memory device from which data can be erased in large amounts at a time. If the FEPROM code does not correspond to the CPU code, you receive an error message and you must update the flash ROM.

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 (FRU) number

A Digital number allocated to any component or module that can be replaced by you or your Digital service representative.

file

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

filler panel

A blank panel that covers the slot for the removable-media drive when the removable-media drive is not installed in the system. The RX26 removable-media drive has its own front panel, which permits the user to access the front of the drive.

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.

Firmware Update Utility

The firmware code provides a number of basic functions on your system, including the console program and diagnostic testing. The Firmware Update Utility lets you update your system with new software code whenever it is available from Digital.

FIS

See Factory Installed Software.

fixed disk

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

fixed disk drive

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

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.

gigabyte (GB)

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

graphics

The use of lines, figures, shapes, and shaded areas to display information.

graphics heads

Multiple monitors connected to one system unit through the use of a second and third graphics module.

ground

A conducting connection to an electrical circuit that is at zero potential relative to the earth; a voltage reference point that has a zero voltage potential. Ground should be at the same potential as neutral. Each dedicated circuit should contain a neutral and green ground wire.

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. This action 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.

hard error

A nonrecoverable error.

hardware

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

hexadecimal

A numbering system using the base 16 that is a shorthand method for representing binary numbers. Using this method, each four bits is converted into a single hexadecimal digit. For example, 1001 in binary form is equal to 9 in hexadecimal form.

hexword

A length of 256 bits, 16 words, 8 longwords, or 32 bytes.

icon

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

initialization

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

I-cache

Instruction cache. A high-speed memory reserved for the storage of instructions. *Contrast with* D-cache.

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.

interactive communication

A method of communicating with the computer. In an interactive session, you enter a command at the keyboard and the system executes the command and then prompts you for another command.

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, such as an audio jack. (*Compare with* port.)

kilobyte (KB)

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

LAN

See local area network.

LANCE

Local-area network controller for Ethernet.

latency

The amount of time it takes the system to respond to an event.

light-emitting diode (LED)

A semiconductor device that glows when supplied with a specific voltage. The DEC 3000 Model 300 Series AXP system module contains eight LEDs that indicate the status of the modules in the system.

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 area system

A type of configuration in which cluster information is carried out over the Ethernet by software that emulates certain computer interconnect (CI) port functions.

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.

longword

Four contiguous bytes (32 bits) starting on any addressable byte boundary. Bits are numbered from right to left, 0 through 31. The address of the longword is the address of the byte containing 0. A naturally aligned longword has an address evenly divisible by 4.

loopback connector

An Ethernet or communications connector used on the back of the system unit when testing the Ethernet subsystem or the synchronous/asynchronous communications adapter.

loopback tests

Diagnostic tests used to isolate a failure by testing segments of a particular control or data path.

machine check

An operating system action triggered by certain system hardware-detected errors that can be fatal to system operation. Once triggered, machine-check handler software analyzes the error.

Maintenance Operations Protocol

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 .5 MIPS is equal to 500,000 instructions per second.

mnemonic

The abbreviation used by the system to identify a device or controller in the system. Also referred to as the device name.

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).

multiprocessing system

A system that executes multiple tasks simultaneously.

network

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

Network Interconnect (NI)

A high-speed bus that interconnects systems and serves as the primary means of communication between them; for example, Ethernet.

network manager

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 (NVR)

Memory, such as magnetic tape or core memory, in which values are stored even when the system is turned off. NVR codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code is displayed along with FRU and error code information

ns

See nanoseconds.

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 a new operating system based on the UNIX standard. Part of the Open Software Foundation's charter is to provide an interface for developing portable applications that run on a variety of hardware platforms.

open system

A system that implements open specifications for interfaces, services, and supporting formats so that applications software can:

- Be ported across a wide range of systems with minimal changes
- Interoperate with other applications on local and remote systems
- Interact with users in a style that facilitates user portability

OpenVMS AXP operating system

Digital's open version of the VMS operating system, which runs on DEC 3000 machines. *See also* open system.

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. The DEC 3000 Model 300 Series AXP system runs the OpenVMS and DEC OSF/1 operating systems.

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).

PALcode

Privileged Architecture Library code, written to support DEC 3000 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.

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.

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. (*Compare with* jack.)

port pin-outs

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

power-up

The sequence of events that occur when you supply power to the system for the first time.

Privileged Architecture Library (PAL)

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

privileged console commands

The commands allowed by the password security feature. *See also* password security feature.

privileged console mode

The state the system is in when the password security feature is enabled. When the system is in this mode, certain console commands can be issued only after a password is provided. *See also* password security feature.

program

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

program mode

The state in which the computer is controlled by the operating system. After the operating system is invoked, the system always operates in program mode, unless you put it into console mode. In program mode, the user can manage the system, run software applications, and perform network tasks. *Compare with console mode.*

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.*

quadword

Eight contiguous bytes starting on an arbitrary byte boundary. The bits are numbered from right to left, 0 through 63.

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.

Reduced Instruction Set Computer

A computer with an instruction set that is reduced in complexity, but not necessarily in the number of instructions. RISC architectures typically require more instructions than Complex Instruction Set Computer (CISC) architectures to perform given operations, because an individual RISC instruction performs less work than a CISC instruction.

register

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

reliability

The probability that a device or system will not fail to perform its intended functions during a specified time when operated under stated conditions.

remote

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

removable-media drive

An external or internal 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.

RISC

See Reduced Instruction Set Computer.

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 ID

The switch or jumper setting that identifies the address of each device installed on the system. Each device must have a unique SCSI ID for proper communication between the system and the device.

SCSI jumpers

Removable electrical connectors on some of the drives, such as the RRD42, that are set to determine the SCSI ID 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.

secure system jumper

An electrical jumper in the system unit that you can move so that the system is accessible to only those with the correct password.

self-test

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

Serial Communication Controller (SCC)

The DEC 3000 Model 300 Series AXP I/O subsystem includes two SCC chips that control the mouse, keyboard, and serial communications.

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. *See also* client-server computing.

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.

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.

storage array

A group of mass storage devices, frequently configured as one logical disk.

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 module

A circuit board that provides interface connectors to the memory modules.

system configuration

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

system disk

The device on which operating system software resides.

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 containing mechanical components that holds, turns, reads, and writes on magnetic tape.

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 device is 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.

ThinWire Ethernet network

A Digital trademark used to describe its 10BASE2 Ethernet products. *See also* 10BASE2.

time-of-year clock (TOY)

The `t[est] toy` command verifies that the Time-Of-Year clock has been set, and that it is ticking.

turn off

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

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 or the TX 24-plane color 2D option, which supports motion video.

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 block 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.

volatile memory

Memory from which values are lost when the system is turned off.

WAN

See wide-area network.

wide-area network

A high-speed public or private data communications system that connects multiple users in different geographical areas, such as different cities or states. In a WAN, transmissions are carried primarily over telephone lines.

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 and DEC OSF/1 workstation software.

word

Two contiguous bytes (16 bits) starting on an addressable byte boundary. Bits are numbered from right to left, 0 through 15. A word is identified by the address of the byte containing bit 0.

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.

write-enabled

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

wrist strap

See antistatic wrist strap.

write-protected

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

Z buffer

A buffer that attaches a depth value to every pixel to determine which parts of an image must be discarded from processing or be hidden from view.

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