DEC 3000 Models 400S/600S/ 900S AXP Front-to-Rear Cooled Systems

Service Information

Order Number: EK–TACSF–SV. A01

Digital Equipment Corporation, Maynard, MA

January 1995

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FCC NOTICE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

S2680

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About This Document

Purpose

This document provides information for servicing the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems. A variety of diagnostic and troubleshooting aids is provided, along with procedures to remove and replace failed or damaged field replaceable units (FRUs).

Audience

This manual is a support and reference document for Digital Services personnel who perform maintenance work on the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems. It is also intended for Digital customers who have a self-maintenance agreement with Digital.

Structure

This guide consists of 15 chapters, 3 appendixes, a glossary, and an index. It is organized into four parts as Table 1 describes.

Table 1 Parts Description

Part	Title	Description
I	Installation Information	Chapters 1–2 provide information for preparing to install and installing the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems.
II	DEC 3000 Model 400S/600S AXP Specific Information	Chapters 3–7 provide information specific to the DEC 3000 Models 400S/600S AXP systems. The chapters include system configuration, FRU removal and replacement, diagnostics, troubleshooting, and a spare parts list.

(continued on next page)

Table 1 (Cont.) Parts Description

Part	Title	Description
III	DEC 3000 Model 900S AXP Specific Information	Chapters 8–12 provide information specific to the DEC 3000 Model 900S AXP system. The chapters include system configuration, FRU removal and replacement, diagnostics, troubleshooting, and a spare parts list.
IV	Common System Information	Chapters 13–15 provide information common to the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems. The chapters describe console and utility commands, LED codes and status/error messages, and SCSI ID option devices information.

Conventions Used in this Document

This document uses the following conventions:

Convention	Meaning
Note	A note provides general information.
Caution	A caution provides information that prevents damage to equipment and software.
Warning	A warning provides information to prevent personal injury.
$\boxed{\text{Key}}$	A key name in a box used in text and examples means that you press that key on your keyboard.
[ ]	Information contained within brackets is optional.
{ }	Information contained within braces is required.
TEST ASIG	Boldface text indicates new terms or information that the user must supply.
SET PASSWORD	In text, commands are shown in uppercase to differentiate them from text.
❶	A circled number in text or examples corresponds to that number in an illustration.

The following symbols appear on the chassis. Please review their definitions below:

This Dangerous Voltage warning symbol indicates risk of electric shock and hazards from dangerous voltage.

This Attention symbol is used to alert the reader to specific safety conditions and to instruct the reader to read separate instructional material.

Related Documentation

The documents listed in Table 2 provide additional information about the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems.

Table 2 Systems Reference Documentation

Document	Order Number
DEC 3000 Model 400/400S Server Documentation Kit	EK–SNPSV–DK
DEC 3000 Model 600/600S AXP Owner's Guide	EK–SNDPL–OG
DEC 3000 Model 800/800S/900/900S AXP Owner's Guide	EK–FLMUL–OG
OSF Factory Installed Software User's Guide	EK–SFFIS–UG

Digital Support Centers

Availability

Digital Services representatives are available at Digital Support Centers for on-site warranty and service contract customers. If you do not currently receive this support but would like to, please contact either a Digital Support Center listed in Table 3 or your local Digital office.

Contact Numbers

Table 3 lists telephone numbers for Digital Support Centers.

If your country's Digital Services number is not listed, please contact your local Digital office for assistance.

Table 3 Telephone Numbers of Digital Support Centers

Country	Telephone Number
United States	1-800-354-9000
Canada	1-800-267-5251
Canada (Quebec only)	1-800-267-2603
United Kingdom	[44]256 59200
France	[33]92955111
Germany	[49]-(89)-95913218

Part I

Installation Information

Part I provides information for installing the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems. This part includes the following chapters:

1

Preparing for Installation

1.1 Overview

1.1.1 Chapter Overview

This chapter contains the following topics:

- Verifying the Installation Site
- Tools Required
- Unpacking the System

1.1.2 Introduction

The DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems provide easy access for servicing. Once installed, the system can be pulled out of the cabinet for servicing without disconnecting the system. The top cover can be removed to gain access to the modules and other components in the top of the system box. The system box can also be pivoted upward and the bottom cover removed to gain access to the components in the bottom of the system box.

Before installing the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems, you must:

- Verify that the installation site meets the required environmental conditions.
- Unpack the system.

1.2 Verifying the Installation Site

1.2.1 System Warranty Caution

Caution

Review your system warranty. It may require that a Digital Services representative install your system to prevent damage to equipment or software.

1.2.2 Preinstallation Considerations

Before installing the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems, make sure:

- All cables that you plan to connect to the system are in place and clearly labeled:

  Terminal data cables
  Telephone cables
  Network cables

- The specifications and environmental conditions listed in Appendix A are met. For additional information about planning and preparing the installation site for a computer network or freestanding system, refer to the *Site Environmental Preparation Guide* (EK-CSEPG-MA), which is not shipped with the system.
- The system is located in an area that provides 61 cm (24 in) clearance from the rear of the cabinet and 91 cm (36 in) from the front of the cabinet for ventilation and servicing.

1.2.3 Airflow Caution

Caution

Do not impede airflow by obstructing the front and/or rear of the unit. Exceeding internal thermal limits can affect system reliability and availability.

1.2.4 Cabinet Stabilization Warning

Warning

The system weighs approximately 54.5 kg (120 lb). To prevent personal injury and equipment damage, ensure that the system is contained in an enclosure that can be stabilized when the system is pulled out on its slides.

It is the customer's responsibility to ensure that the enclosure can be stabilized.

1.3 Tools Required

The following tools are required to install the rackmount kit:

- Pencil
- Flat-blade screwdriver
- Phillips screwdrivers (long #2 and short #2)
- 5/16-inch hex socket head driver
- 1/2-inch open-end wrench or adjustable wrench

1.4 Unpacking the System

1.4.1 Checking the Shipment

Note

Save all packing materials in case you need to return the system.

Before installing the system, check that the shipment contains the parts listed on the packing slip shipped with your system.

1.4.2 If Parts Are Missing

If any parts are missing or damaged, contact your delivery agent immediately and contact your Digital sales representative.

1.4.3 2T-PE413-T4 Shipping Contents

The DEC 3000 Model 400S (2T-PE413-T4) AXP system shipment contains the items listed in Table 1–1.

Table 1–1 2T-PE413-T4 Parts List

Description	Part Number	Qty
DEC 3000 Model 400S (2T-PE413-T4) AXP unit assembly	70–31793-01	1
Short right slide mounting bracket	74–48447–01	1
Short left slide mounting bracket	74–48447–02	1
Long right slide mounting bracket	74–48466–01	1
Long left slide mounting bracket	74–48466–02	1
8-32 pan head screws	90–00062–23	8
Flat washers	90–06661–00	8
Split lockwashers	90–06690–00	8
Nuts	90–06561–00	8
10-32 bar nuts	74–48448–01	4
10-32 clip nuts	90–07786–00	6
10-32 truss head screws	90–00063–39	14
Power cord	17–00083–58	1
Antistatic wriststrap	12–36175–01	1
DEC 3000 Models 400S/600S/900S AXP Front-to-Rear Cooled Systems Service Information	EK–TACSF–SV	1
DEC 3000 Model 400/400S Server Document Kit	EK–SNDSV–DK	1
OSF Factory Installed Software User's Guide	EK–SFFIS–UG	1

1.4.4 2T-PE423-T4 Shipping Contents

The DEC 3000 Model 600S (2T-PE423-T4) AXP system shipment contains the items listed in Table 1–2.

Table 1–2 2T-PE423-T4 Parts List

Description	Part Number	Qty
DEC 3000 Model 600S (2T-PE423-T4) AXP unit assembly	70–31793-02	1
Short right slide mounting bracket	74–48447–01	1
Short left slide mounting bracket	74–48447–02	1
Long right slide mounting bracket	74–48466–01	1
Long left slide mounting bracket	74–48466–02	1
8-32 pan head screws	90–00062–23	8
Flat washers	90–06661–00	8
Split lockwashers	90–06690–00	8
Nuts	90–06561–00	8
10-32 bar nuts	74–48448–01	4
10-32 clip nuts	90–07786–00	6
10-32 truss head screws	90–00063–39	14
Power cord	17–00083–58	1
Antistatic wriststrap	12–36175–01	1
DEC 3000 Models 400S/600S/900S AXP Front-to-Rear Cooled Systems Service Information	EK–TACSF–SV	1
DEC 3000 Model 600/600S AXP System Owner's Guide	EK–SNDPL–OG	1
OSF Factory Installed Software User's Guide	EK–SFFIS–UG	1

1.4.5 2T-PE54B-T4 Shipping Contents

The DEC 3000 Model 900S (2T-PE54B-T4) AXP system shipment contains the items listed in Table 1–3.

Table 1–3 2T-PE54B-T4 Parts List

Description	Part Number	Qty
DEC 3000 Model 900S (2T-PE54B-T4) AXP unit assembly	70–31587-02	1
Short right slide mounting bracket	74–48447–01	1
Short left slide mounting bracket	74–48447–02	1
Long right slide mounting bracket	74–48466–01	1
Long left slide mounting bracket	74–48466–02	1
8-32 pan head screws	90–00062–23	8
Flat washers	90–06661–00	8
Split lockwashers	90–06690–00	8
Nuts	90–06561–00	8
10-32 bar nuts	74–48448–01	4
10-32 clip nuts	90–07786–00	6
10-32 truss head screws	90–00063–39	14
Power cord	17–00083–58	1
Antistatic wriststrap	12–36175–01	1
DEC 3000 Models 400S/600S/900S AXP Front-to-Rear Cooled Systems Service Information	EK–TACSF–SV	1
DEC 3000 Model 800/800S/900/900S AXP Owner's Guide	EK–FLMUL–OG	1
OSF Factory Installed Software User's Guide	EK–SFFIS–UG	1

2

Installing the System

2.1 Overview

2.1.1 Chapter Overview

This chapter explains how to install the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems in a cabinet and contains the following topics:

- Preparing the Cabinet for Installation
- Preparing and Installing the Chassis Slides
- Installing the Chassis in the Cabinet
- Connecting the Power Cord and Cables
- Verifying the System

2.1.2 Introduction

This chapter describes how to install the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems in a standard 19-inch RETMA cabinet.

2.2 Preparing the Cabinet for Installation

2.2.1 Establishing Cabinet Location

When the customer has identified the location for the cabinet installation, perform the following steps:

Step	Action
1	Move the cabinet to the selected location.
2	Use an open-end (spanner) wrench to screw down the cabinet leveler feet.
3	Place a spirit level on the cabinet base to ensure that the cabinet is level.
4	Readjust the leveler feet (if necessary) until the cabinet is level.
5	Slide out the stabilizer bar (or other cabinet stabilizing device) to support the weight of the system being installed.

2.2.2 Cabinet Stability Warning

Warning

To ensure cabinet stability, Digital does not recommend installing the system in the top area of the cabinet.

2.2.3 Cabinet Rail Hole Pattern

The space between mounting holes in the cabinet rails follows a pattern of 1.27 cm (0.50 in), 1.59 cm (0.625 in), and 1.59 cm (0.625 in). This pattern is repeated for the length of the rails.

2.2.4 Determining the Installation Area

To determine the installation area for the system in a standard 19-inch RETMA cabinet, perform the following steps at the front and rear cabinet rails. See Figure 2–1.

Step	Action
1	Select a section of the cabinet rail where there is a 1.27 cm (0.50 in) space between two holes.
2	Make a mark between the holes. This is your starting point.
3	Count up or down three holes. This is one **set** and equals 4.45 cm (1.75 in).
4	Count up or down eight sets and make a mark. The area between the marks is the **installation area**.

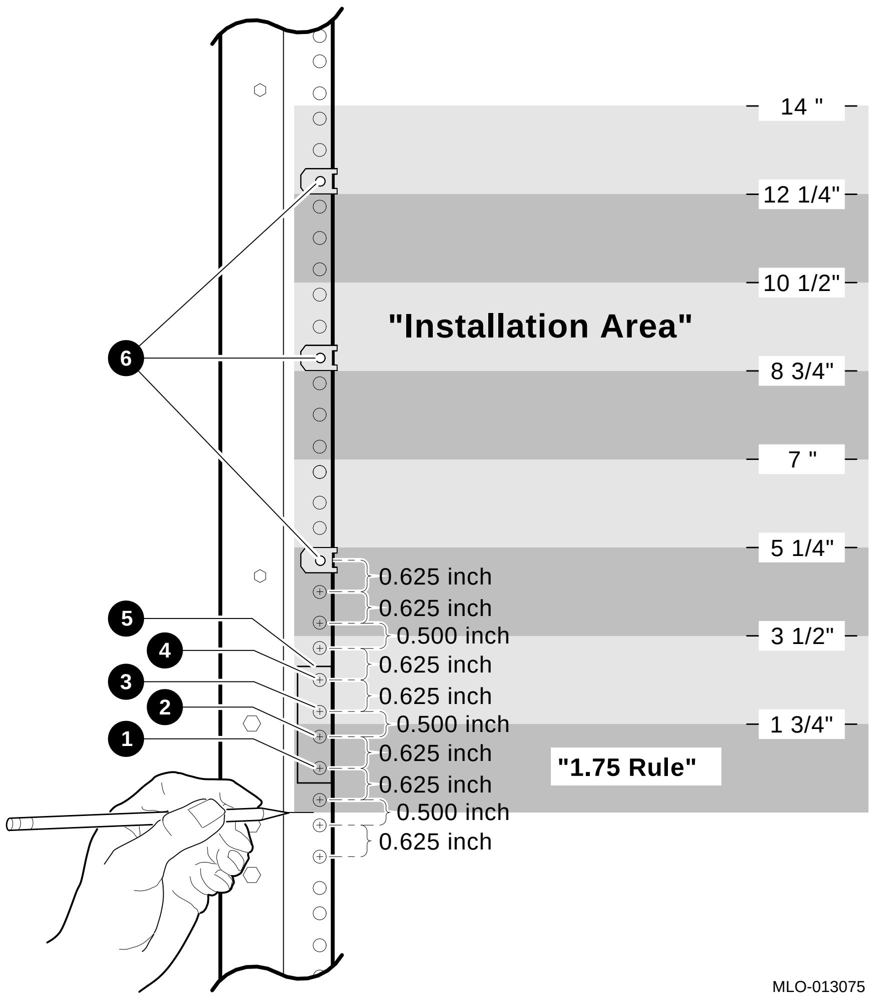
The total installation area is 35.56 cm (14 in). The equation for calculating the total area is

$$4.45 \text{ cm } (1.75 \text{ in}) \times 8 \text{ sets} = 35.56 \text{ cm } (14 \text{ in})$$

Note

The hole count described in this section determines the system installation location in any 35.56-cm (14-in) area of the cabinet.

Figure 2–1 Determining the Installation Area



❶ Hole 2, for attaching slide
❷ Hole 3, for front bezel captive screw
❸ Hole 4, for attaching slide
❹ Hole 5, for attaching slide
❺ Bar nut (placed behind the rail)
❻ Holes 9, 16, and 22, for attaching clip nuts

2.3 Preparing and Installing Chassis Slides

2.3.1 Required Materials for Assembling Chassis Slides

The following items are needed to assemble chassis slides:

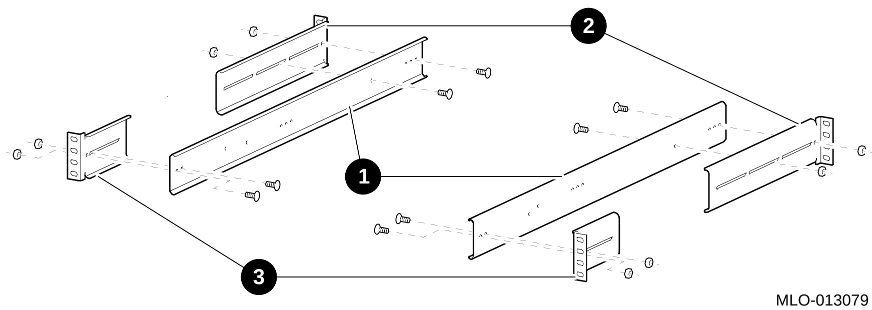
- Sixteen 8-32 pan head screws (PN 90-00062-23)
- Eight flat washers (PN 90-06661-00)
- Eight split lockwashers (PN 90-06690-00)
- Eight nuts (PN 90-06561-00)
- Two short slide mounting brackets (PN 74-48447-01/02)
- Two long slide mounting brackets (PN 74-48466-01/02)

2.3.2 Attaching Slide Mounting Brackets to Outer Slides

To attach the slide mounting brackets to the outer slides, refer to Figure 2–2 and perform the following procedure:

Step	Action
1	Remove the outer slide from the left side of the chassis by sliding it toward the rear of the chassis. Extend the outer slide to the rear as far as it will go, then push in the slide lock and continue extending the outer slide to the rear until it is completely free from the inner slide race.
2	Attach a short slide mounting bracket ❸ to the left outer slide ❶ using two 8-32 pan head screws, two split lockwashers, two flat washers, and two nuts.
3	Attach a long slide mounting bracket ❷ to the rear of the left outer slide ❶ using two 8-32 pan head screws, two split lockwashers, two flat washers, and two nuts, but do not tighten.
4	Adjust the long slide mounting bracket ❷ so the outer slide fits between the front and rear rails. Then tighten the hardware installed in step 3.
5	Repeat steps 1 through 4 to remove the right outer slide and attach the slide mounting brackets to the right outer slide.

Figure 2–2 Attaching the Slide Mounting Brackets



2.3.3 Required Materials for Installing Outer Slides

The following items are needed to install outer slides:

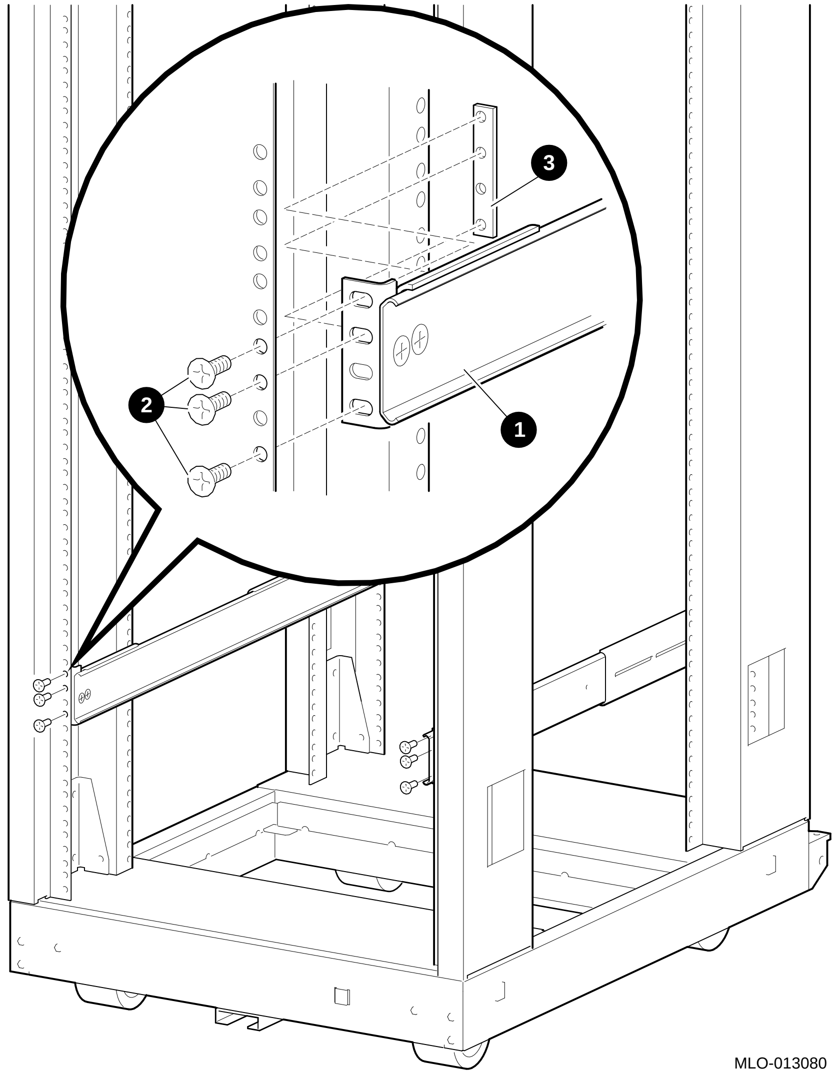
- Right and left outer slide assemblies (assembled in the previous section)
- Fourteen 10-32 truss head screws (PN 90-00063-39)
- Four 10-32 bar nuts (PN 74-48448-01)
- Six 10-32 clip nuts (PN 90-07786-00)

2.3.4 Installing the Right/Left Outer Slide Assemblies

To install the left outer slide assembly, refer to Figure 2–3 and perform the following procedure:

Step	Action
1	Count up five holes from the bottom of the installation area on the left front and rear cabinet rails and make a mark.
2	Align the left outer slide assembly ❶ to the second, third, fourth, and fifth holes, then secure the assembly to the cabinet rails using seven 10-32 truss head screws ❷ (three in front, four in rear) and two bar nuts ❸ (one in front, one in rear).
3	Install a 10-32 clip nut over holes 9, 16, and 22 of the front left rail by sliding them over the edge of the rail and aligning them with the holes.
4	Repeat steps 1 through 3 to install the right outer slide assembly to the right rails.

Figure 2–3 Installing the Left/Right Outer Slide Assembly



2.4 Installing the Chassis in the Cabinet

2.4.1 Chassis Installation Warning

Warning

The chassis can weigh approximately 54.5 kg (120 lb). Use sufficient personnel or proper lifting equipment to install the system. Failure to do so could cause personal injury.

To ensure cabinet stability, Digital does not recommend installing the system in the top area of the cabinet.

2.4.2 Securing the Unit to the Outer Slide Assemblies

To secure the system to the outer slide assemblies, refer to Figure 2–4 and proceed as follows:

Step	Action
1	Slide out the cabinet stabilizer bar or other cabinet stabilizing device (if not already out) to support the weight of the system ❸ being installed. Figure 2–4 shows an example of a cabinet with the stabilizer bar ❶ extended.
2	Slide both the left and right inner slide races that are attached to the chassis ❷ toward the rear until they are fully extended and locked in place.

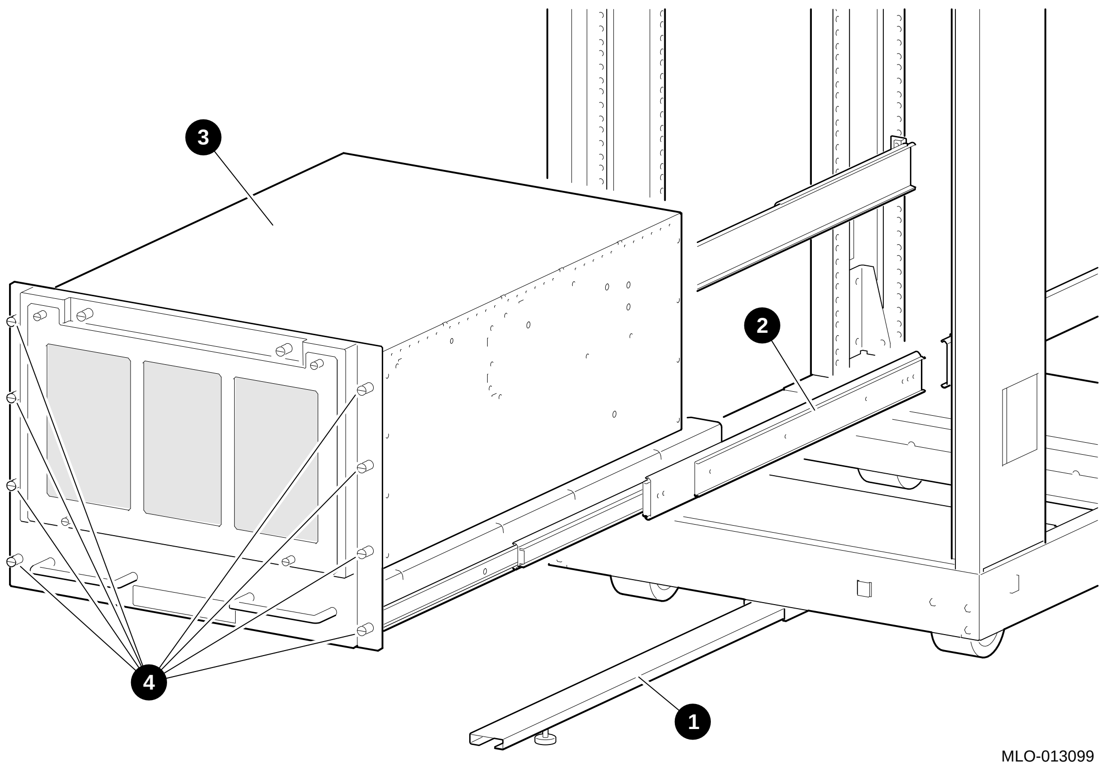
Warning

The chassis can weigh approximately 54.5 kg (120 lb). Use sufficient personnel or proper lifting equipment to install the system. Failure to do so could cause personal injury.

Step	Action
3	Use sufficient personnel or proper lifting equipment to lift the system ❸ and position it so that the extended left and right inner slide races align with the outer slide assemblies that are attached to the cabinet rails.
4	Move the system into the cabinet while ensuring that the inner slide races slide into the outer slide assemblies.
5	Loosen (do not remove) all of the screws on the front bezel that secure the front bezel to the chassis.

Step	Action
6	Tighten the eight captive screws ❹ (four on each side) that secure the chassis front bezel to the cabinet rails.
7	Tighten all of the screws on the front bezel that were loosened in step 5.

Figure 2–4 Installing the Chassis in the Cabinet



2.5 Connecting Power Cord and Cables

2.5.1 Connecting System Cables

To connect the system cables, refer to Figure 3–4 for DEC 3000 Models 400S/600S AXP systems or Figure 8–3 for DEC 3000 Model 900S AXP systems for the location of the power connector and the option cable connectors.

2.6 System Verification

2.6.1 Initial Powerup

After installing the chassis in the cabinet, connecting the power cord, and connecting the cables, perform the following initial power-up sequence:

1. Loosen the eight captive screws (four on each side) on the front bezel and extend the chassis on the slides.
2. Remove the top cover. See Section 4.4.2.
3. Check the internal fan failure circuit breaker inside the chassis and ensure that it is in the ON position.
4. Reinstall the top cover and resecure the chassis into the cabinet with the eight captive screws on the front bezel.
5. Loosen the two captive screws on the front of the chassis and open the front door.
6. Turn the dc power on by pressing the dc on/off switch.

   The dc power ON indicator on the front panel will light, the diagnostic display LEDs (on the rear panel of the Models 400S/600S AXP and on the front panel of the Model 900S AXP) will light, and the main fan will start spinning.
7. Close the front door and secure it with the two captive screws.

At this time, the initial power-up sequence is complete.

2.6.2 Verifying the System

For system verification for the DEC 3000 Model 400S AXP systems, refer to the *DEC 3000 Model 400/400S Server Document Kit* (EK–SNPSV–DK).

For system verification for the DEC 3000 Model 600S AXP systems, refer to the *DEC 3000 Model 600/600S AXP Owner's Guide* (EK–SNDPL–OG).

For system verification for the DEC 3000 Model 900S AXP systems, refer to the *DEC 3000 Model 800/800S/900/900S AXP Owner's Guide* (EK–FLMUL–OG).

Part II

DEC 3000 Models 400S/600S AXP Specific Information

Part II provides information specific to the DEC 3000 Models 400S/600S AXP systems. This part includes the following chapters:

3 System Configuration

3.1 Overview

3.1.1 Chapter Overview

This chapter contains the following topics:

- Components and Features of the DEC 3000 Models 400S/600S AXP Systems
- System Block Diagram
- I/O Block Diagram
- Front View of the System
- Rear View of the System
- Serial ROM Jumpers
- Console Security
- ROM Update
- Storage Devices
- Memory Configuration

3.1.2 Introduction

The DEC 3000 Models 400S/600S AXP systems use the DECchip 21064 implementation of the Alpha AXP architecture.

The DEC 3000 Models 400S/600S AXP are high-performance rackmount servers that may also be mounted in a standard EIA 19-inch rack.

The DEC 3000 Models 400S/600S AXP are based on Digital's Alpha AXP architecture, providing all the advantages of a 64-bit computing environment, and the choice of several different operating systems.

3.1.3 General Rules

When removing, upgrading, or replacing either storage devices or memory, record the present switch and jumper settings before making any changes. Record the settings again after the removal, replacement, or upgrade is complete to ensure the change has been done correctly.

3.1.4 Console Commands

Use the following console commands to show the configuration of the system devices and options:

- SHOW CONFIGURATION
- SHOW MEMORY
- SHOW DEVICE

3.2 Components and Features

3.2.1 System Components

The DEC 3000 Models 400S/600S AXP systems include a system unit, which consists of:

- System (CPU) board
- I/O board
- Memory motherboard (MMB)
- Memory SIMMs
- Mass storage shelf
- Power supply
- A terminal (or monitor and TURBOchannel graphics option) and keyboard (must be provided by the user)

3.2.2 System Board

The system board (Syscard shown in Figure 3–1) consists of:

- DECchip 21064 processor chip
- DECchip 21064 Icache and Dcache
- Bcache and main memory control
- TURBOchannel interface

Interconnection: The system board (Syscard) provides connectors to interface to the DEC 3000 Models 400S/600S AXP I/O boards (SPIOMOD) and to the SIMM MMB modules.

SLICE Chips: The primary data paths on the Syscard are contained within the SLICE chips. The SLICE chips interface the 128-bit DECchip 21064 bus to a main memory bus that is 256 bits wide and to the I/O bus that is 32 bits wide.

ELVIS Chip: The addresses for main memory, I/O, and the Bcache are controlled by the ELVIS chip.

3.2.3 I/O Board

The DEC 3000 Models 400S/600S AXP I/O boards (SPIOMOD, Figure 3–2) contain all of the internal and external I/O connectors along with three TURBOchannel options connectors.

The I/O board has the following features:

- Two SCSI-2 interface chips
- Interface to the TURBOchannel
- Ethernet, ISDN, printer, and audio communication ports that have DMA
- 32K-entry scatter/gather map for virtual DMA

The I/O board contains the following hardware jumpers:

- ROM Update jumper–Enables/disables the writable feature of the FEPROMs.
- Secure System jumper–When placed in the enabled position, this jumper enables the operator to lock out certain console commands from unauthorized users. It can also be used to clear a forgotten password.
- External SCSI terminator–Enables/disables the use of an external SCSI terminator.

3.2.4 Memory Motherboard

The DEC 3000 Models 400S/600S AXP consist of four memory motherboards (MMBs). To improve memory latency and bandwidth, the memory system is sliced among four memory motherboards. To have an operational system, all four MMBs must be present.

3.2.5 System Features

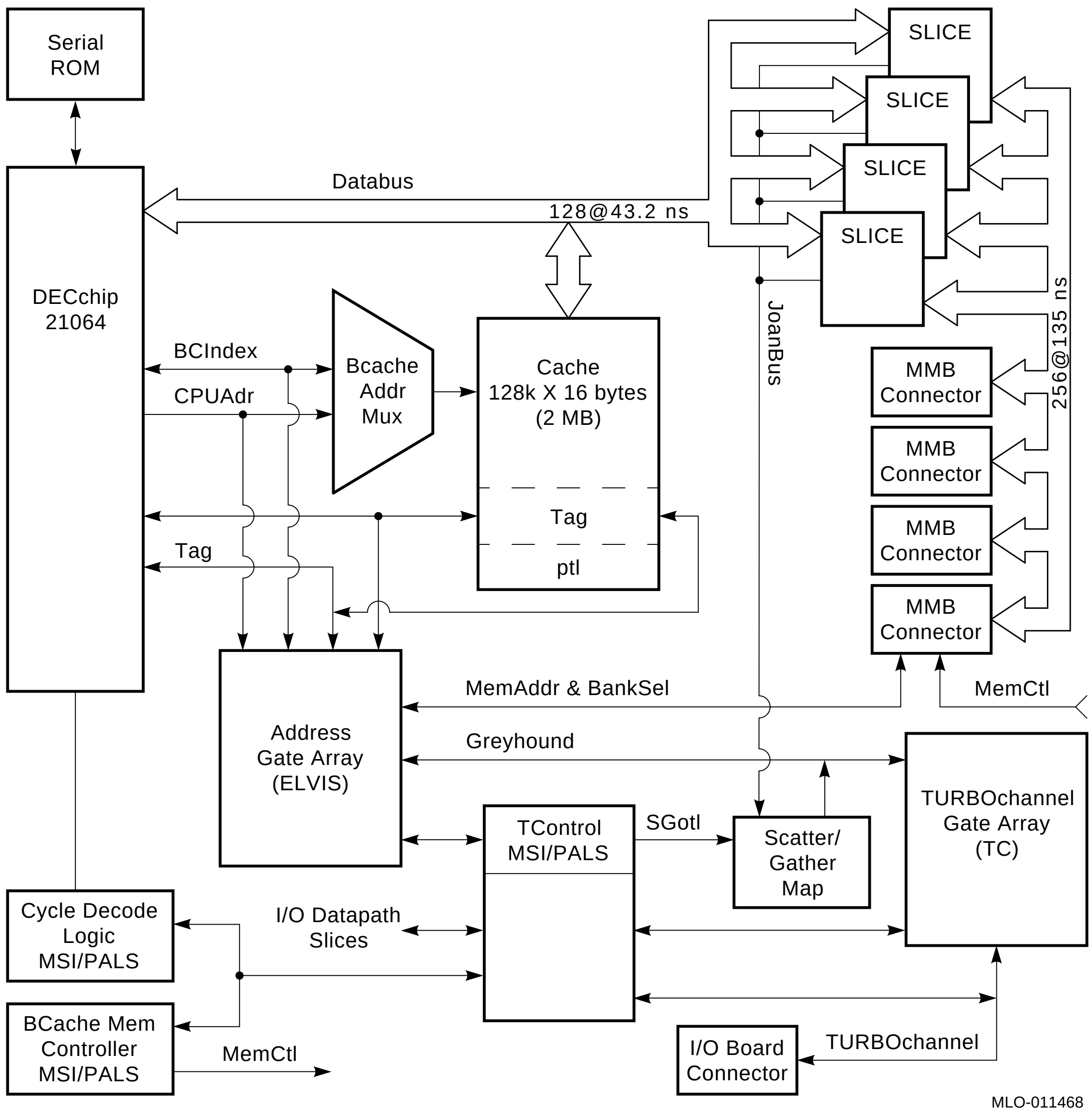
The DEC 3000 Models 400S/600S AXP provide the following features:

Feature	Benefit
Alpha AXP 64-bit computing using the DECchip 21064 microprocessor chip, which contains 8 KB of instruction cache and 8 KB of data cache	Double the industry-standard 32-bit data path. Internal instruction and data caches improve performance.
Expandable from 16 MB to 512 MB of memory	Memory expands using either 2, 4, 8, 16, or 32 MB DRAM SIMMs.
A 2 MB secondary cache	Improves speed and performance.
Internal and external SCSI options	Increases storage, graphics, communications, and other capabilities to the workstation. Local I/O with two SCSI ports. External storage supports up to seven SCSI devices.
AUI Thickwire Ethernet port	Connects directly to an AUI Ethernet DECnet network.
A 10BASE-T network port	Connects directly to a twisted pair network.
ISDN Network capabilities (not supported initially)	Connects directly to an ISDN network (not presently accessible for use).
Three TURBOchannel I/O adapter slots	Allow for high-performance module interconnection that makes available a variety of options.
Password security	Additional security for privileged commands in console mode.
Audio technology	Built-in audio for voice grade output capabilities.
Choice of operating systems	Currently, choice of OpenVMS Alpha AXP, and DEC OSF/1 Alpha AXP.
Access to an integrated computing environment	The best features of both timesharing and local or distributed applications.
DECwindows Motif software	Industry-standard windows-style user interface to allow concurrent applications.

3.3 System Block Diagram

3.3.1 Block Diagram

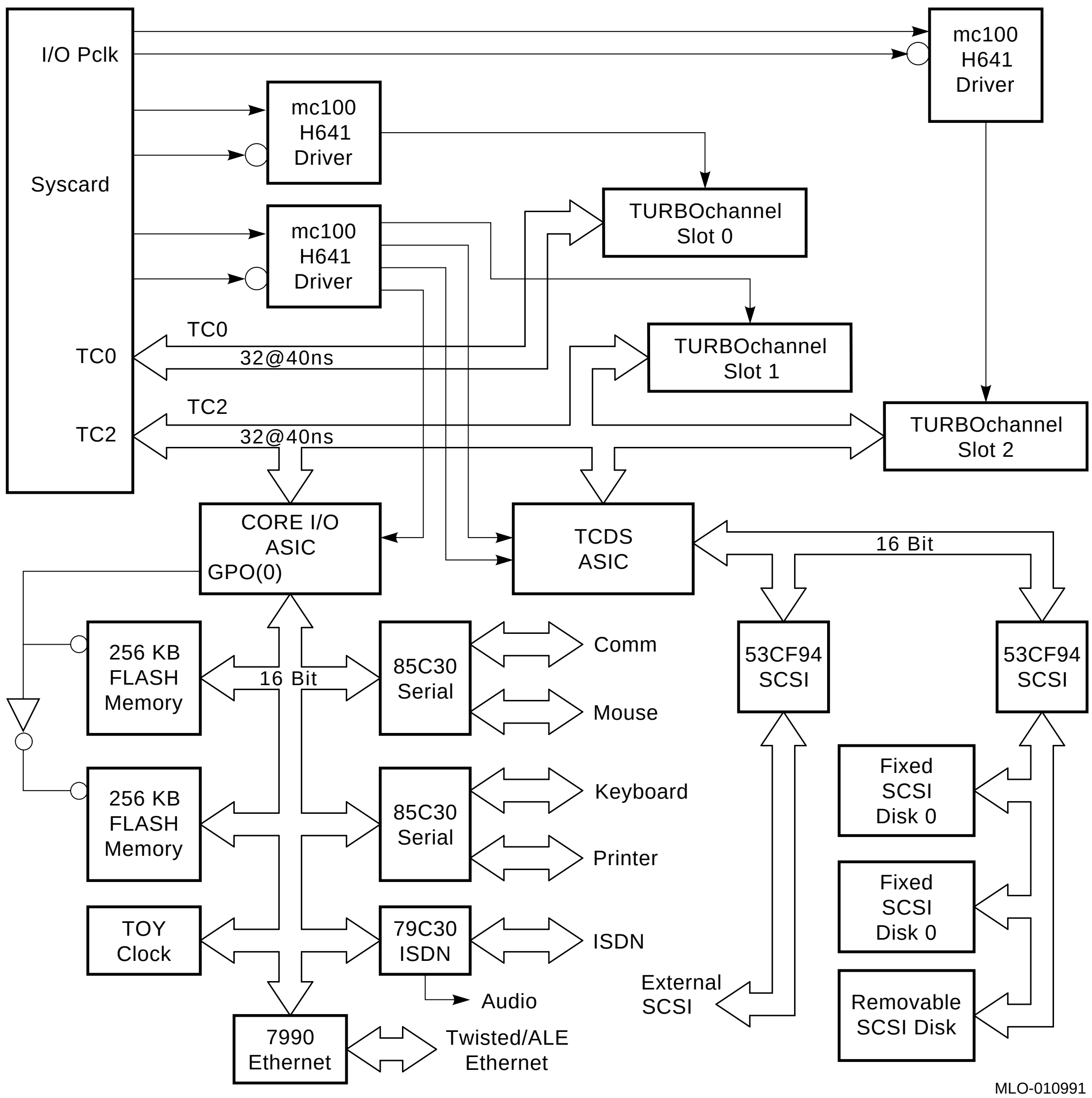
Figure 3–1 DEC 3000 Models 400S/600S AXP System Board Block Diagram



3.4 I/O Block Diagram

3.4.1 Block Diagram

Figure 3–2 DEC 3000 Models 400S/600S AXP I/O Subsystem Block Diagram



3.5 Front View

3.5.1 Front View

See Figure 3–3 and Table 3–1 for information pertaining to the front of the DEC 3000 Models 400S/600S AXP systems.

Figure 3–3 Front View

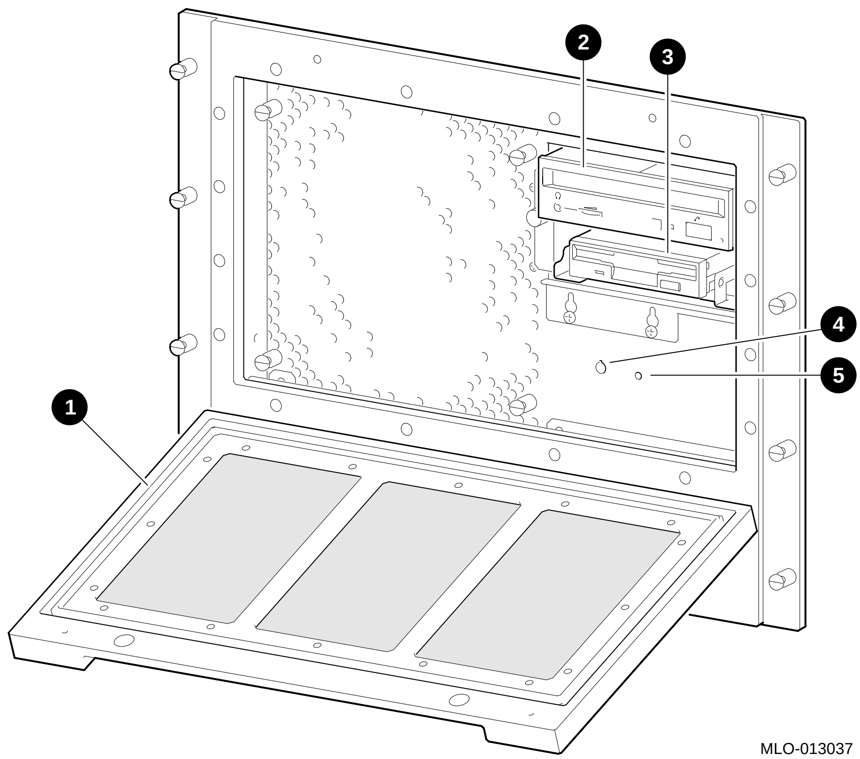


Table 3–1 DEC 3000 Models 400S/600S AXP Systems (Front)

Feature	Function
❶ Front door	Opens to allow access to the front panel indicators, controls, and the removable storage media.
❷ Compact disc or floppy disk (optional)	Removable storage media.
❸ Compact disc or floppy disk (optional)	Removable storage media.
❹ DC On/Off switch	Turns the dc power on and off.
❺ DC power ON indicator	When lit, indicates that the dc power is on.

3.6 Rear View

3.6.1 Rear View

See Figure 3–4 and Table 3–2 for information pertaining to the rear of the DEC 3000 Models 400S/600S AXP.

Figure 3–4 Rear View

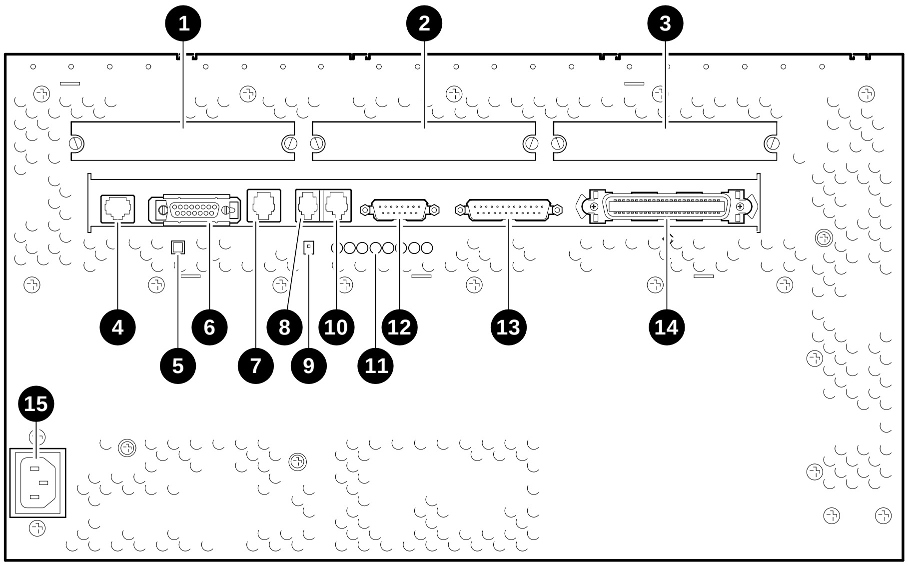


Table 3–2 DEC 3000 Models 400S/600S AXP Systems (Rear)

Feature		Function
❶	TURBOchannel slot 0[1]	Connect a TURBOchannel option.
❷	TURBOchannel slot 1[2]	Connect a TURBOchannel option.
❸	TURBOchannel slot 2	Connect a TURBOchannel option.
❹	10BASE-T port	Connect a 10BASE-T twisted pair Ethernet network cable.
❺	Halt button	Place the system in console mode.
❻	AUI Ethernet network port	Connect an AUI Thickwire Ethernet network cable.

[1]Dual-width TURBOchannel options must be installed in slots 0 and 1

[2]Dual-width TURBOchannel options *cannot* be installed in slots 1 and 2.

(continued on next page)

Table 3–2 (Cont.) DEC 3000 Models 400S/600S AXP Systems (Rear)

Feature		Function
❼	ISDN port (not presently accessible for use)	Connect an ISDN network cable.
❽	Audio port	Connect a voice grade audio output cable.
❾	Alternate console switch	A toggle switch used to switch to either a graphic or an alternate console connected to the MMJ port ❿. With the switch in the up position, the system is in graphic mode, with the switch in the down position, the system is in alternate console mode.
❿	Printer/alternate console port	Connect either a printer or an alternate console using an MMJ connector.
⓫	Eight amber diagnostic display LEDs	Decode diagnostic error codes.
⓬	Keyboard/mouse port	Connect the keyboard/mouse cable.
⓭	Synch/asynch full-modem communications port	Connect to a communications device such as a printer, plotter, modem, or console terminal.
⓮	External SCSI port	Connect Small Computer Systems Interface (SCSI) peripheral devices.
⓯	System power socket	Connect the system ac power cord.

3.7 Serial ROM Jumpers

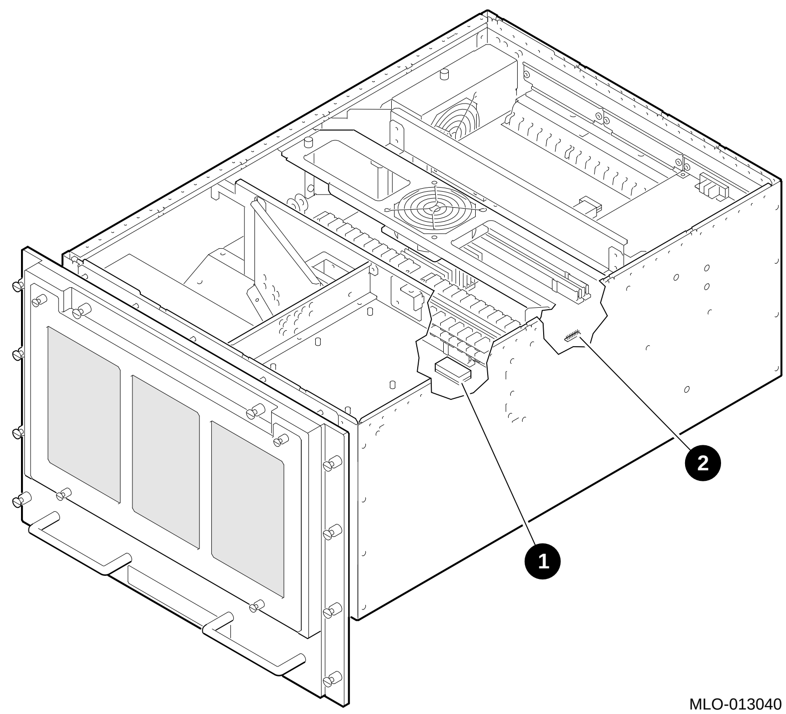
3.7.1 Serial ROM Jumpers

Figure 3–5 shows the serial ROM ❶ and the serial ROM jumpers ❷. The jumper must be installed in location 0 and all other serial ROM jumpers must be removed.

Caution

Installing multiple jumpers can cause permanent damage to the system board. Moving the jumper from position 0 keeps the system from entering console mode or boot.

Figure 3–5 Serial ROM Jumpers



3.8 Console Security

3.8.1 Password Protection

The DEC 3000 Models 400S/600S AXP systems have a password-protected console security feature that prevents unauthorized users from accessing all the console commands. Authorized users can access the console commands by using the following privileged commands:

- BOOT (with parameters)
- DEPOSIT
- EXAMINE
- FIND
- HALT
- INITIALIZE
- REPEAT
- SET
- SHOW
- START
- TEST

The unprivileged commands are:

- BOOT (no parameters)
- LOGIN
- CONTINUE
- HELP

3.8.2 Setting the Password

To restrict users from entering the secure console mode, do the following:

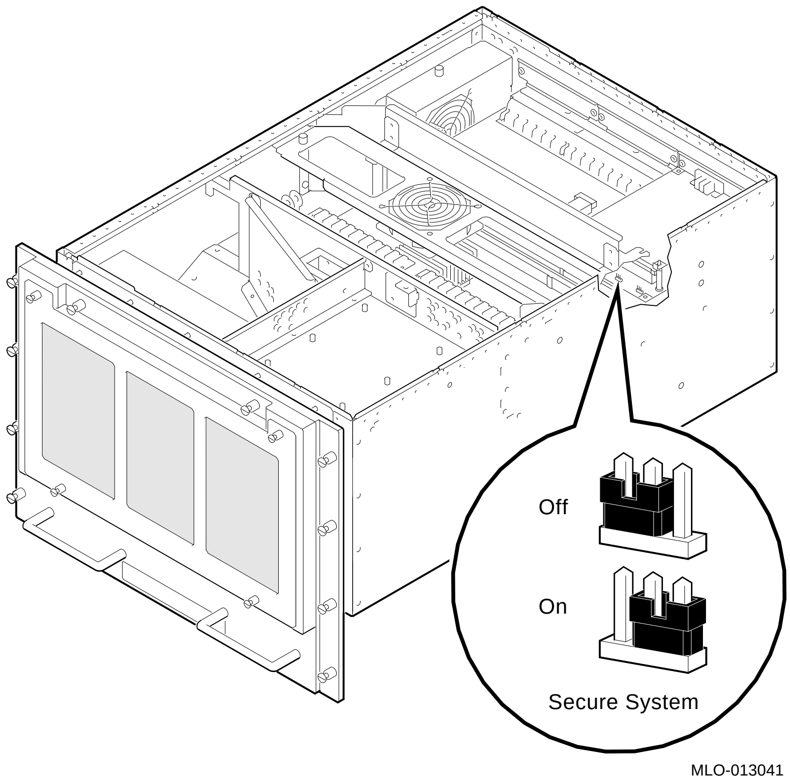
1. Set the jumper to the enabled position. See Figure 3–6.
2. Set the password (if not already set).

```
>>> SET PASSWORD [Return]
PSWD1 >>> ENTER_NEW_PASSWORD
PSWD2 >>> ENTER_NEW_PASSWORD
```

3.8.3 Secure Jumper

Figure 3–6 shows the secure jumper in the off position (disabled) and on position (enabled).

Figure 3–6 Secure Jumper



3.8.4 Enabling the Password

Once you enter and confirm your password, then enable the password.

Enter SHOW SECURE at the console prompt:

```
>>> SHOW SECURE Return
```

If the screen displays `SECURE=OFF`, then the password feature is not enabled.

If the screen displays `SECURE=ON`, then the password feature is enabled.

To enable the password feature, enter SET SECURE ON at the console prompt.

```
>>> SET SECURE ON Return
```

3.8.5 Setting a New Password

Use this procedure to set a new password.

1. Log in to access the privileged functions.
2. Enter console mode. The console prompt (>>>) appears.
3. Enter SET PASSWORD at the console prompt:

   ```
   >>> SET PASSWORD Return
   ```

   The prompt PSWD0 >>> appears.
4. Enter your old password. The password must be exactly 16 hexadecimal characters (0 through F):

   ```
   PSWD0 >>> ENTER_OLD_PASSWORD Return
   ```

   The prompt PSWD1 >>> appears.
5. Enter your new password.

   ```
   PSWD1 >>> ENTER_NEW_PASSWORD Return
   ```

6. Enter your new password again. The prompt PSWD2 >>> appears to verify that you entered the password correctly.

   ```
   PSWD2 >>> ENTER_NEW_PASSWORD Return
   ```

7. If the two entries match, then the new password is in nonvolatile memory.

3.8.6 Entering the Privileged State

To enter the privileged state on a secured console, enter LOGIN at the console prompt.

```
>>> LOGIN Return
PSWD0 >>> ENTER_PASSWORD
```

3.8.7 Exiting the Privileged State

The following commands allow you to exit the privileged state:

- BOOT
- CONTINUE
- HALT

3.8.8 Disabling Console Security

Use the next procedure to disable console security.

1. In console mode, set SECURE to zero (SET SECURE 0 or SET SECURE OFF).
2. Move the secure jumper from the I/O board to the off position.

3.8.9 Restoring the Console Password

If you forget the console password and you need a new password to gain access to the privileged state, then perform the following:

1. Set the secure jumper to the disabled position.
2. While in console mode, enter the following DEPOSIT command:

   ```
   >>> DEP -U -Q -N:1 1E0200088 0 Return
   ```

3. Move the jumper to the enabled (on) position.
4. Enter your new password.

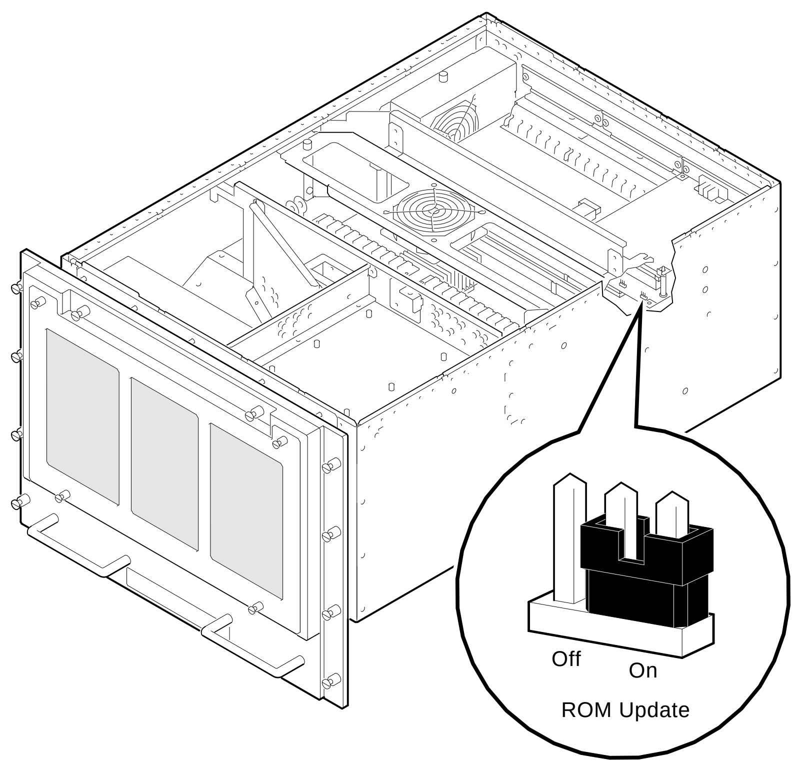
   ```
   >>> ENTER_NEW_PASSWORD Return
   ```

3.9 ROM Update

3.9.1 ROM Update Jumper

Figure 3–7 shows the ROM update jumper in the enabled position. The factory default setting is in the enabled position.

Figure 3–7 ROM Update Jumper



In the enabled position, the ROM can be rewritten when new versions of the firmware are distributed.

3.10 Storage Devices

3.10.1 Configuring SCSI Drives

When you replace a SCSI device, you must configure the new device to match the old device.

3.10.2 Replacing SCSI Drives

Configure a new device as follows:

1. At the console prompt, enter SHOW DEVICE for device information:

   ```
   >>> SHOW DEVICE Return
   ```

2. Go to Chapter 4 for procedures to remove the device.
3. Set all jumpers/switches on the replacement drives same as the removed device.
4. Replace the device.
5. At the console prompt, enter SHOW DEVICE to verify that the replacement device is correct.

   ```
   >>> SHOW DEVICE Return
   ```

6. Go to Chapter 13 and run the disk verifier diagnostic.

3.10.3 Adding SCSI Drives

When you add a SCSI drive, you must configure the device.

Configure the new drive as follows:

1. At the console prompt, enter SHOW DEVICE for existing device information:

   ```
   >>> SHOW DEVICE Return
   ```

2. Set the SCSI address. See Table 3–3 and Table 3–4 for the recommended SCSI jumper/switch settings.
3. Mount the device. Refer to:
   - Figure 4–2 for the system power cable routing.
   - Figure 4–3 for the SCSI disk cable routing and placement of drives within the DEC 3000 Model 400S/600S AXP.
   - Figure 4–4 for the disk drive power cable routing.
4. Install the device.
5. At the console prompt, enter SHOW DEVICE to verify that the device installation is correct.

   ```
   >>> SHOW DEVICE Return
   ```

6. Go to Chapter 13 and run the disk verifier diagnostic.

Table 3–3 lists the recommended SCSI jumper settings.

Note

For each SCSI bus in your system, you can only have one device for each address.

Table 3–3 Recommended SCSI Jumper Settings

Drive	SCSI Address	2	1	0
RZ2x	0	Out	Out	Out
RZ2x	1	Out	Out	In
RZ2x	2	Out	In	Out
Factory-installed RZ2x	3	Out	In	In
RRD42	4	In	Out	Out
(Open ID)	6	In	In	In
SCSI Controller	7	In	In	Out

In = Attached
Out= Removed

Table 3–4 lists the recommended SCSI switch settings.

Table 3–4 Recommended SCSI Switch Settings

Drive	SCSI Address	1	2	3	4
RX26/TLZ06	5	Down	Up	Down	—
TZK10		In	Out	In	—
TZK11		Left	Left	Right	Left
TZ30					

Note

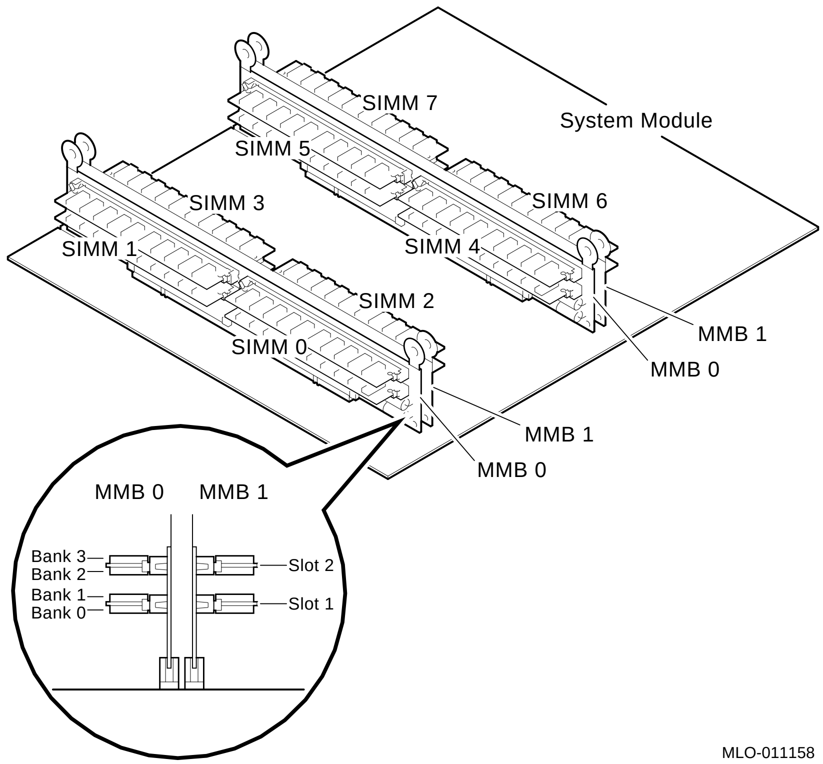
SCSI ID 7 is reserved for the SCSI controller.

3.11 Memory Configuration

3.11.1 Banks and Slots

A bank represents the eight memory arrays (SIMMs 0 through 7) as shown in Figure 3–8. A slot consists of two banks because every memory array can be populated on both sides as shown.

Figure 3–8 Example of a Memory Bank



3.11.2 Example

The following example shows a sample memory motherboard configuration and the relationship between banks, SIMM memory size, and slots. For the DEC 3000 Models 400S/600S AXP systems, the banks are numbered 0 through 3.

```
DEC 3000 - M600 Memory: 96 Mbytes
------------------------------------------
BANK #      MEMORY_SIZE         START_ADDRESS
------      -----------         -------------
0            032 Mbytes         0x00000000
1            032 Mbytes         0x02000000
2            032 Mbytes         0x04000000
3            000 Mbytes         0x00000000

 >>>
```

Banks	Meaning
0 and 1	Occupy slot 1. Banks 0 and 1 are two-sided SIMMs that consist of 64 MB.
2 and 3	Occupy slot 2. Banks 2 and 3 are single-sided SIMMs that consist of 32 MB.

Two banks occupy one memory slot. Each memory card (SIMM) can be populated on both sides, which total 64 MB per SIMM card maximum (32 MB on each side). This is not the case with the 16 MB and 32 MB SIMMs.

3.11.3 Memory Configuration Rules

When installing memory, you must follow these configuration rules:

- Each memory slot with the same number must be filled with sets of eight SIMMs.
- The eight memory SIMMs in a slot with the same number must be of equal size and of the same type (single- or double-sided).

Note

If you violate these memory rules, then the memory size displayed will be that of the smallest size SIMM installed.

3.11.4 Identifying the SIMMs

The following table lists the part numbers for 2, 4, 8, 16, and 32 MB memory SIMMs.

Part Number	Description
54-21139-BA	2 MB Memory SIMM
54-21139-CA	4 MB Memory SIMM
54-21139-DA	8 MB Memory SIMM
54-22389-AA	16 MB Memory SIMM
54-22389-BA	32 MB Memory SIMM

4

Removal and Replacement Procedures

4.1 Overview

4.1.1 Chapter Overview

This chapter contains the following topics:

- Locating Field Replaceable Units (FRUs)
- Cable Routing
- Top and Bottom Covers
- Fans
- Fixed Media Devices
- Removable Media Devices
- TURBOchannel Option
- Memory Motherboard
- SIMMs
- I/O Board
- System (CPU) Board
- Power Supply
- Airflow Sensor
- -12 Vdc Converter
- Fan Tachometer Alarm Board
- DC On/Off Switch
- DC Power LED
- AC Input Filter

4.1.2 Static Caution

Caution

Always follow antistatic procedures when handling drives and other static-sensitive items.

4.1.3 Before You Start

Before removing or replacing defective parts, the customer must prepare the system by doing the following:

1. If the system is in working condition, back up all data files.
2. Shut down the software.
3. Record the present system configuration. Refer to the SHOW CONFIG command for the procedure.
4. Record environment values.
5. Loosen the two captive screws on the front of the chassis and open the front door.
6. Turn the dc power off with the dc on/off switch.
7. Loosen the eight captive screws (four on each side) on the front bezel and extend the chassis on the slides.
8. Disconnect the ac power cord from the ac power connector on the rear of the chassis.

4.1.4 Antistatic Precautions

Anytime you remove or replace a board in the DEC 3000 Models 400S/600S AXP systems, you must take antistatic precautions. To use the antistatic mat, perform the following:

Step	Action
1	Place the elastic end of the antistatic wriststrap on your wrist.
2	Attach the alligator clip to the system power supply.
3	Remove the part or board that you want to remove or replace.

4.1.5 Power Source Warning

Warning

Before removing the top or bottom cover to access the system, you must power down the system and disconnect the power cable from the power source and from the ac power connector on the rear of the chassis.

4.2 Locating Field Replaceable Units

4.2.1 FRU Table and Exploded View

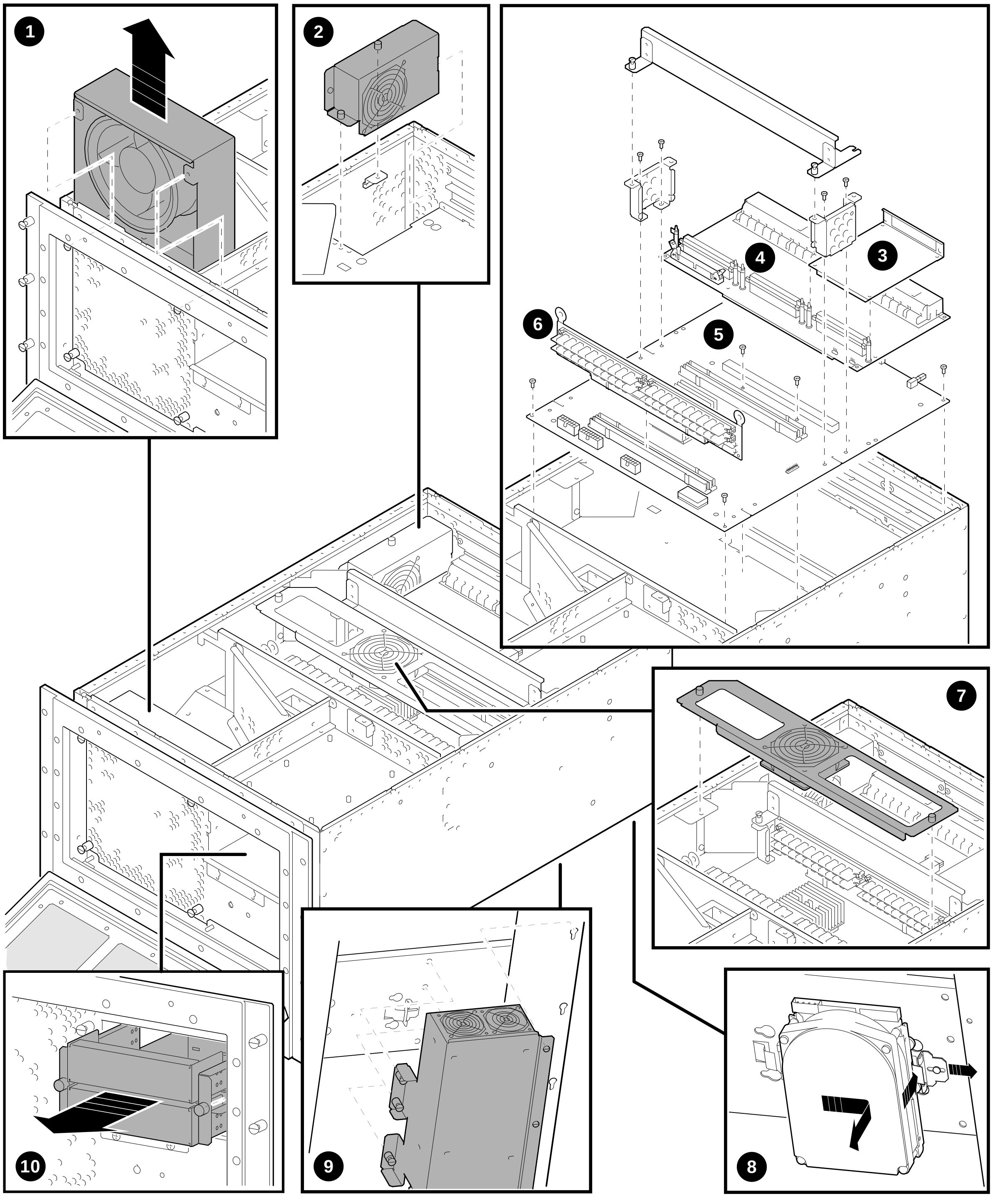
To locate a particular FRU, refer to Table 4–1 and Figure 4–1. Table 4–1 lists each FRU and an associated number showing its location in Figure 4–1.

Table 4–1 FRU Locations

FRU	Refer to Figure 4–1
Main fan	❶
Rear fan	❷
TURBOchannel option (slot 0 shown)	❸
I/O board	❹
System board	❺
MMBs with SIMMs installed	❻
Impingement fan	❼
Fixed disk drives	❽
Power supply	❾
Compact disc or removable media (optional)	❿
Airflow sensor	–
-12 Vdc converter	–
Fan tachometer alarm board	–
DC on/off switch	–
DC power LED	–
AC input filter	–

Figure 4–1 shows the assembly front view of the DEC 3000 Models 400S/600S AXP systems.

Figure 4–1 System Major Assembly View (Front)

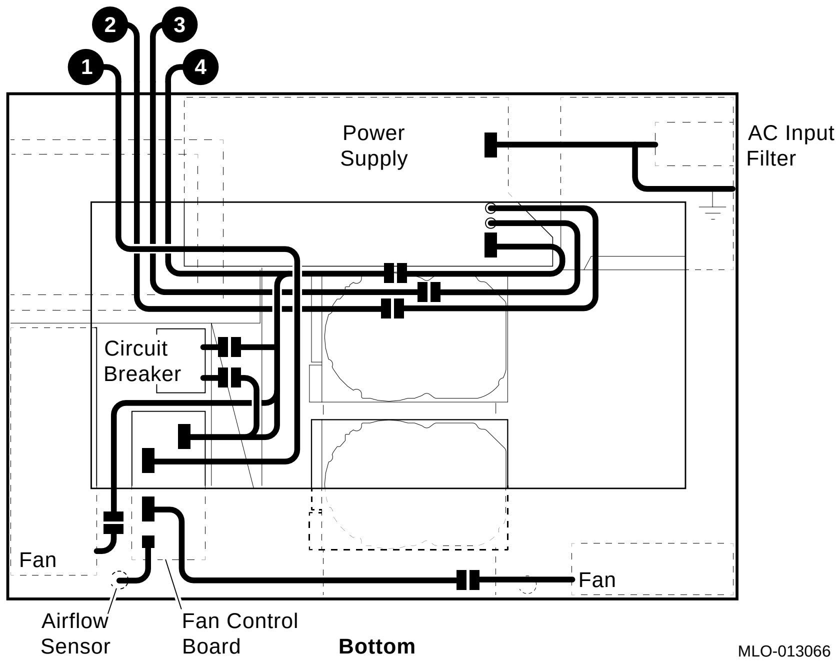


4.3 Cable Routing

4.3.1 System Power Cable Routing

Figure 4–2 illustrates the system power cable connections and routing.

Figure 4–2 System Power Cable Routing

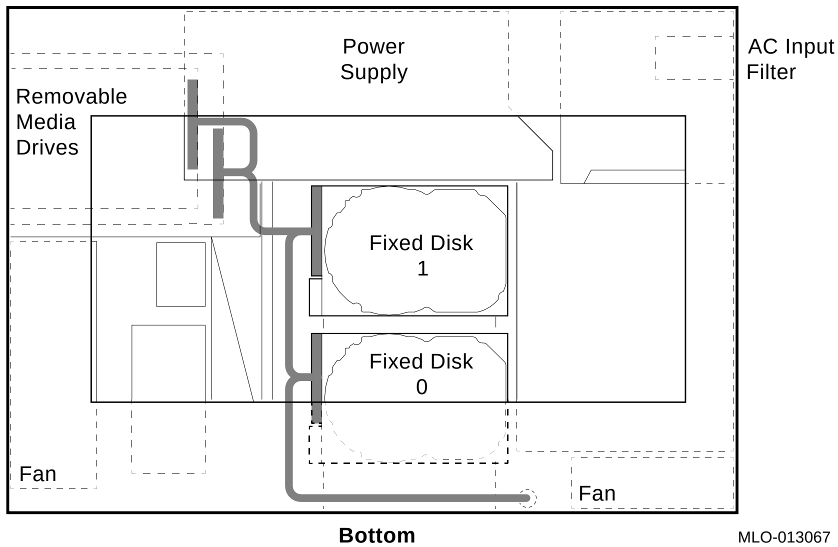


❶ To impingement fan
❷ +5 V
❸ +5 V
❹ +3.3 V/+12 V/-12 V

4.3.2 SCSI Disk Cable Routing

Figure 4–3 shows the SCSI disk drive cable (PN 17-03801-01) routing and placement of drives within the DEC 3000 Models 400S/600S AXP.

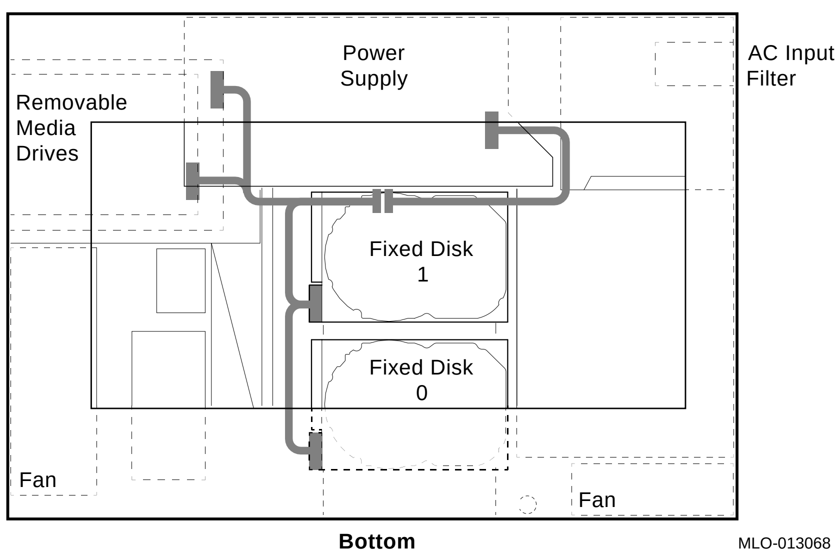
Figure 4–3 SCSI Disk Cable Routing



4.3.3 Disk Drive Power Cable Routing

Figure 4–4 shows the disk drive power cable (PN 17-03489-01) connections and routing.

Figure 4–4 Disk Power Cabling



4.4 Top and Bottom Covers

4.4.1 Power Supply Warning

Warning

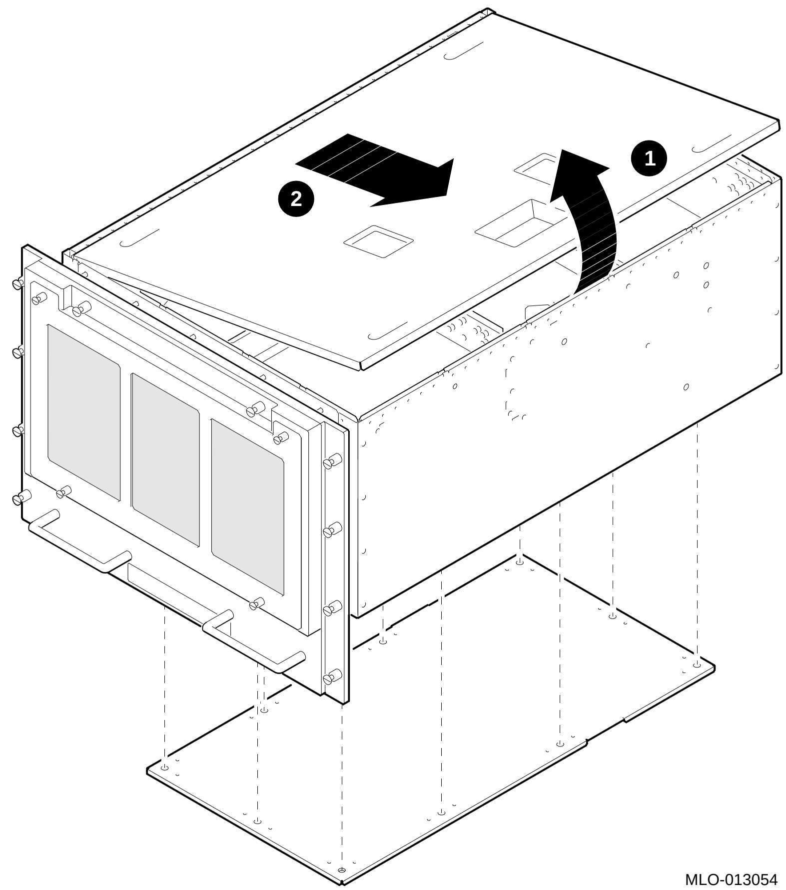
Wait at least five minutes after turning off the system unit power before you open the system unit. This gives the power supply capacitors time to discharge safely.

4.4.2 Top Cover Removal

To remove the top cover, use the following procedure:

Step	Action	Refer to Figure 4–5
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Loosen the three captive fasteners that secure the top cover by turning them counterclockwise.	–
3	Lift the right side of the top cover.	❶
4	Pull the top cover to the right to slide out the top cover flange from under the lip on the left side of the chassis.	❷

Figure 4–5 Removing the Top and Bottom Covers



4.4.3 Replacement

Reverse all of the steps in the removal procedure to install the top cover.

4.4.4 Bottom Cover Removal

To remove the bottom cover, use the following procedure:

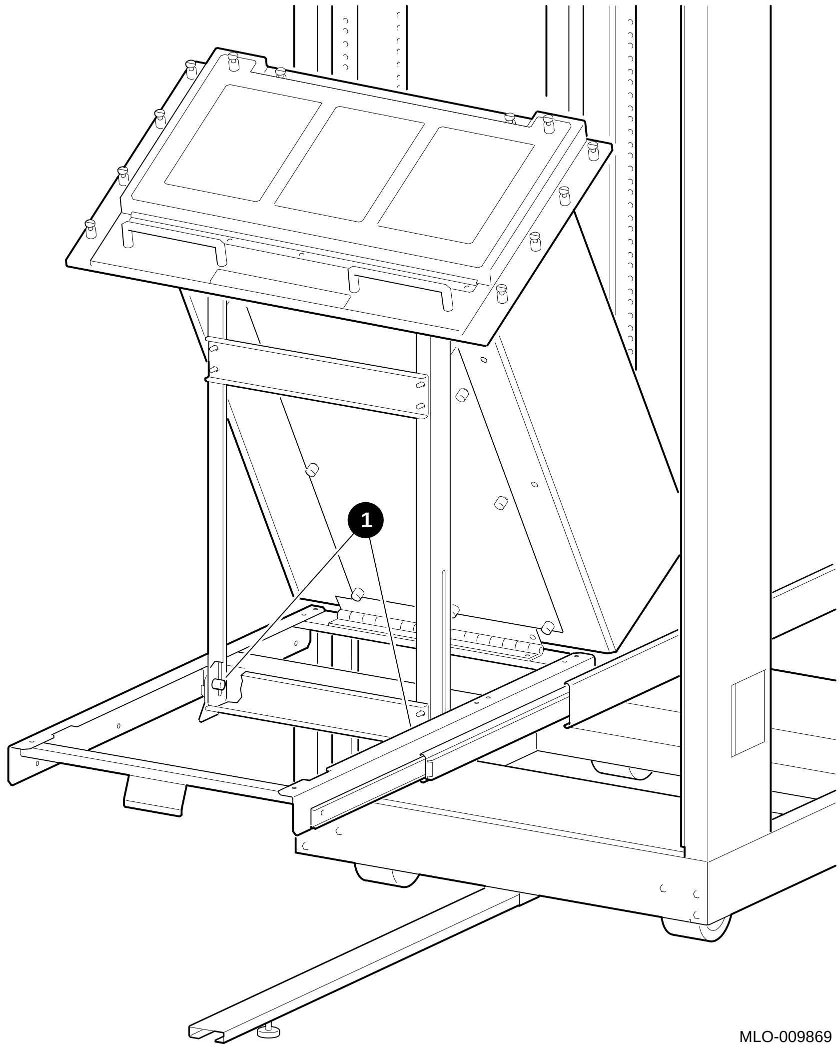
Step	Action	Refer to Figure 4–5 and Figure 4–6
1	Perform the preservice procedure. See Section 4.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised. See ❶ Figure 4–6.

Step	Action	Refer to Figure 4–5 and Figure 4–6
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	❶ Figure 4–6
3	Loosen the 10 captive screws that secure the bottom cover by turning them counterclockwise.	Figure 4–5
4	Remove the bottom cover from the chassis.	Figure 4–5

Figure 4–6 Raising the Chassis



4.4.5 Replacement

Reverse all of the steps in the removal procedure to install the bottom cover.

4.5 Fan Assemblies

4.5.1 Main Fan Removal

To remove the main fan assembly, use the following procedure:

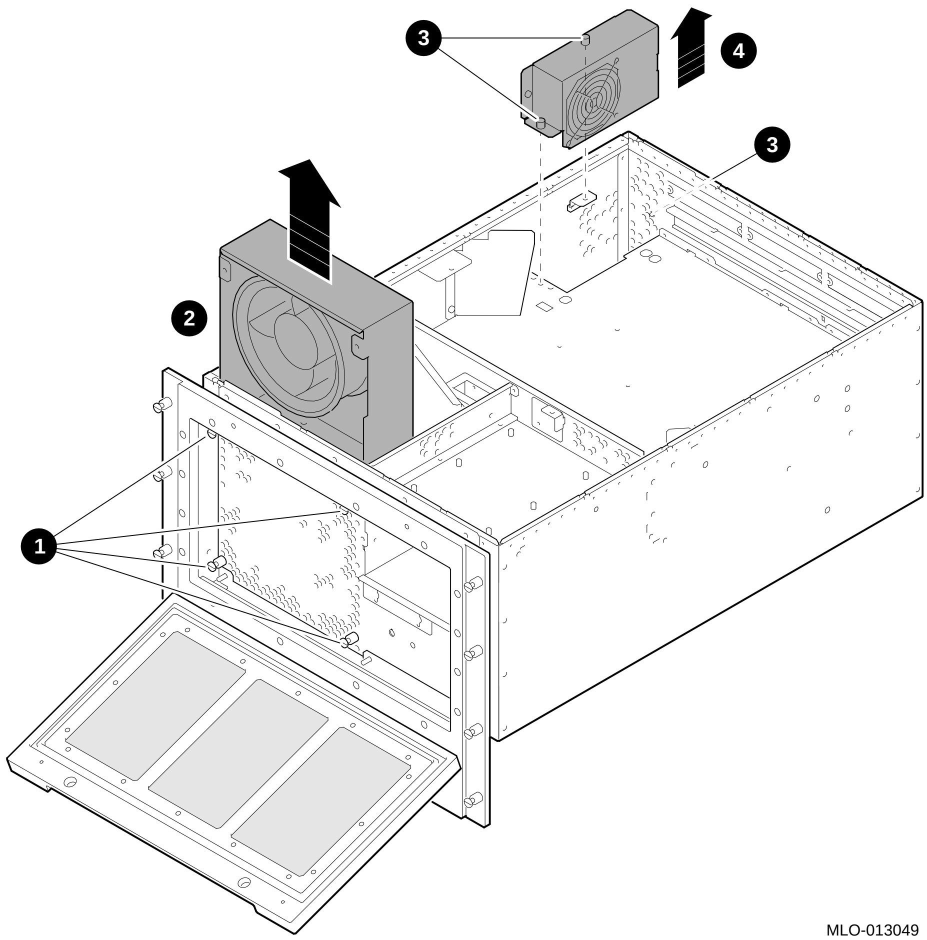
Step	Action	Refer to Figure 4–7
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 4–7
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 4.4.4.	–
5	From the bottom, disconnect the dc power cable to the main fan.	–
6	Loosen the four captive fasteners on the front of the chassis.	❶
7	Lift out the main fan assembly from the top of the chassis.	❷

Figure 4–7 Removing the Main Fan and Rear Fan Assemblies



4.5.2 Replacement

Reverse all of the steps in the removal procedure to install the main fan assembly.

4.5.3 Rear Fan Removal

To remove the rear fan assembly, use the following procedure:

Step	Action	Refer to Figure 4–7
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 4–7
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 4.4.4.	–
5	From the bottom, disconnect the dc power cable to the rear fan.	–
6	From the top and rear, loosen the three captive fasteners that secure the rear fan to the chassis.	❸
7	Lift out the rear fan assembly from the top of the chassis.	❹

4.5.4 Replacement

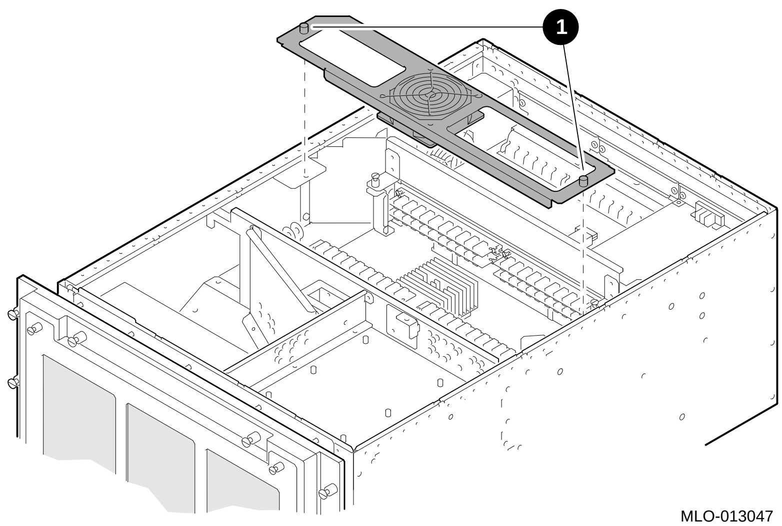
Reverse all of the steps in the removal procedure to install the rear fan assembly.

4.5.5 Impingement Fan Removal

To remove the impingement fan assembly, use the following procedure:

Step	Action	Refer to Figure 4–8
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–
3	Disconnect the dc power cable to the impingement fan.	–
4	Loosen the two captive fasteners and lift the impingement fan assembly out of the chassis.	❶

Figure 4–8 Removing the Impingement Fan Assembly



4.5.6 Replacement

Reverse all of the steps in the removal procedure to install the impingement fan assembly.

4.6 Fixed Media Devices

4.6.1 Switch Settings Note

Note

If you are replacing a drive, record the switch settings on the old drive and set the switches on the new drive to the same settings. In many cases, the whole drive is not an FRU. Follow the replacement procedure for the specific option.

4.6.2 Removal

To remove fixed media devices from the system, use the following procedure:

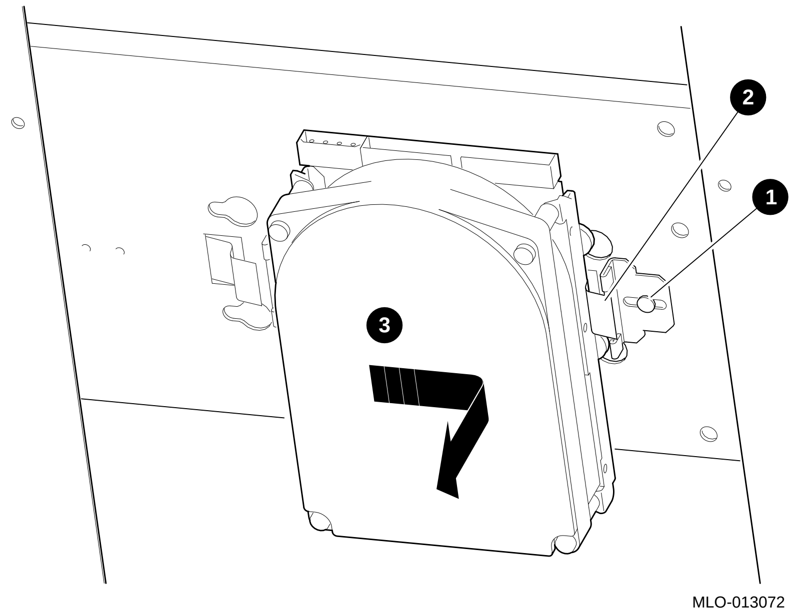
Step	Action	Refer to Figure 4–9
1	Perform the preservice procedure. See Section 4.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 4–9
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 4.4.4.	–
4	Disconnect the power cable connector from the drive.	–
5	Remove the SCSI signal cable from the drive.	–
6	Loosen the locking tab screw and slide the locking tab until it clears the retaining spring.	❶
7	Depress the retaining spring.	❷
8	Slide the drive toward the retaining spring and lift the drive out.	❸

Figure 4–9 Removing a Fixed Media Device



4.6.3 Replacement

Reverse all the steps in the removal procedure to install the fixed media devices.

4.7 Removable Media Devices

4.7.1 Switch Settings Note

Note

If you are replacing a drive, record the switch settings on the old drive and set the switches on the new drive with the same settings. In many cases, the whole drive is not an FRU. Follow the replacement procedure for the specific option.

4.7.2 Removal

Use the following procedure to remove either a CD-ROM (PN RRD42–AA), tape drive (PN TZK10-FM or TZ30), or the fixed, half-height, 3.5-inch disk drive (PN RX26):

Step	Action	Refer to Figure 4–10
1	Perform the preservice procedure. See Section 4.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

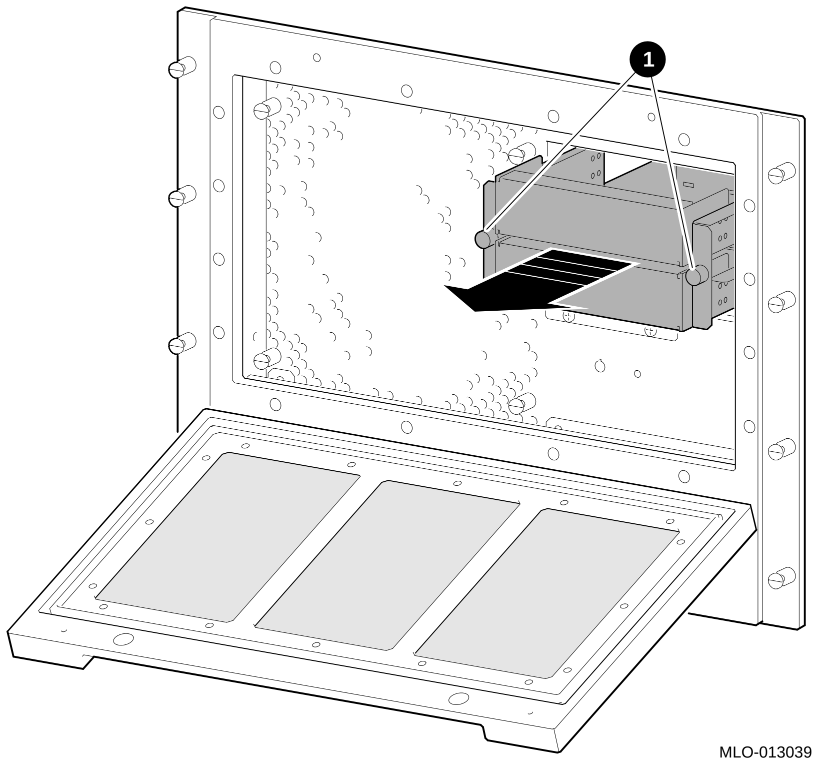
Step	Action	Refer to Figure 4–10
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 4.4.4.	–
4	Remove the power supply. See Section 4.13.1.	–
5	Disconnect the dc power connector from the drive tray.	–
6	Disconnect the SCSI connector from the drive tray.	–

Caution

Ensure that the dc power connector and the SCSI connector are disconnected before removing the drive tray.

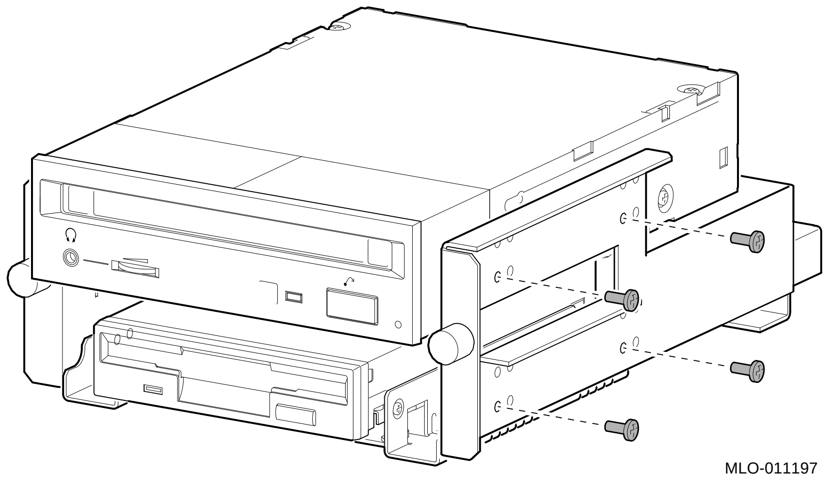
Step	Action	Refer to Figure 4–10
7	Loosen the two captive screws holding the drive tray in place and slide the drive tray out of the enclosure.	➊

Figure 4–10 Loosening the Drive Tray Screws



Step	Action	Refer to Figure 4–11
8	Position the drive tray so that the four screws that mount the drive to the tray (two on each side) can be removed. Remove the drive from the tray.	–
9	Remove the power cable connector attached to the drive.	–
10	Remove the SCSI signal cable connector from the drive.	–

Figure 4–11 Removing a Removable Media Device



4.7.3 Replacement

Reverse all of the steps in the removal procedure to install removable media devices.

4.8 TURBOchannel Option

4.8.1 Installation Note

Note

If a dual-width TURBOchannel option is installed, then it must be placed in slots 0 and 1. If necessary, move the single-width TURBOchannel option to slot 2.

4.8.2 Precautions

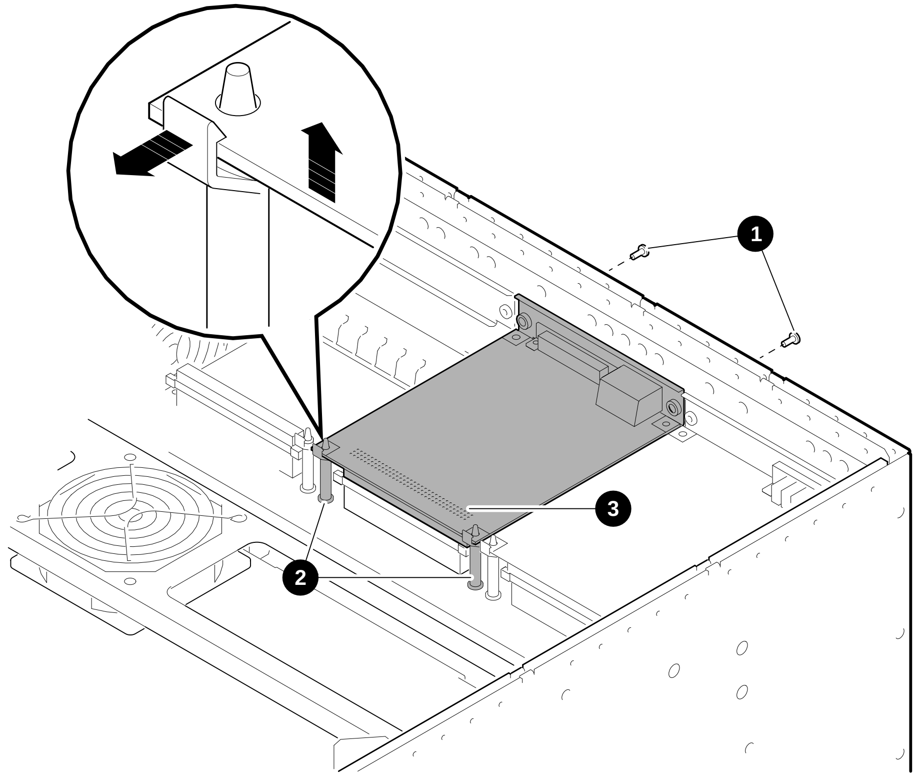
Anytime you replace a board in a system, you must follow antistatic precautions. Refer to Section 4.1.4.

4.8.3 TURBOchannel Option Removal

To remove the TURBOchannel option, use the following procedure:

Step	Action	Refer to Figure 4–12
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Disconnect any external connections to the TURBOchannel in the rear of the system.	–
3	Remove the top cover. See Section 4.4.2.	–
4	If you are replacing the option board, record any jumpers or switch settings on the old board and set the same value on the new board.	–
5	Remove the screws located on the rear of the chassis that secure the TURBOchannel option.	❶
6	Release the standoffs.	❷
7	Lift the TURBOchannel option board from the connector located on the I/O board.	❸

Figure 4–12 Removing the Screws and Standoffs from a TURBOchannel Option



4.8.4 Replacement

Reverse all of the steps in the removal procedure to install a TURBOchannel option.

4.9 Memory Motherboard

4.9.1 Precautions

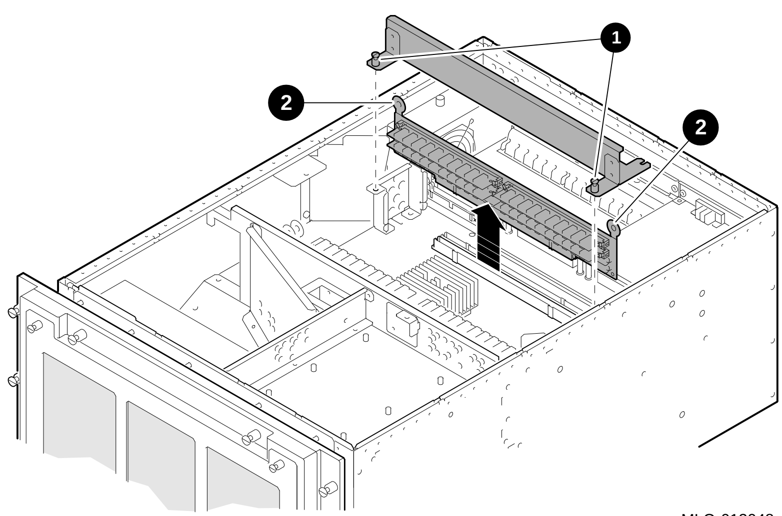
Anytime you replace a board in the DEC 3000 Models 400S/600S AXP systems, antistatic precautions must be taken. Refer to Section 4.1.4.

4.9.2 Memory Motherboard (MMB) Removal

Use the following procedure to remove the memory motherboard:

Step	Action	Refer to Figure 4–13
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–
3	Remove the memory plenum tower from the MMB that is being replaced by loosening the four screws that secure it to the transport tray support brackets. Slide the memory plenum tower toward the rear of the chassis and lift out.	❶
4	Remove the memory motherboard (MMB) by pulling straight up on the tabs at the end of the MMB.	❷

Figure 4–13 Removing the Memory Motherboard



4.9.3 Replacement

Reverse all of the steps in the removal procedure to install a memory motherboard.

4.10 SIMMs

4.10.1 Replacement Note

Note

If you are replacing one SIMM, the new SIMM must be the same memory size and speed as the remaining seven SIMMs located on the same plane.

4.10.2 Precautions

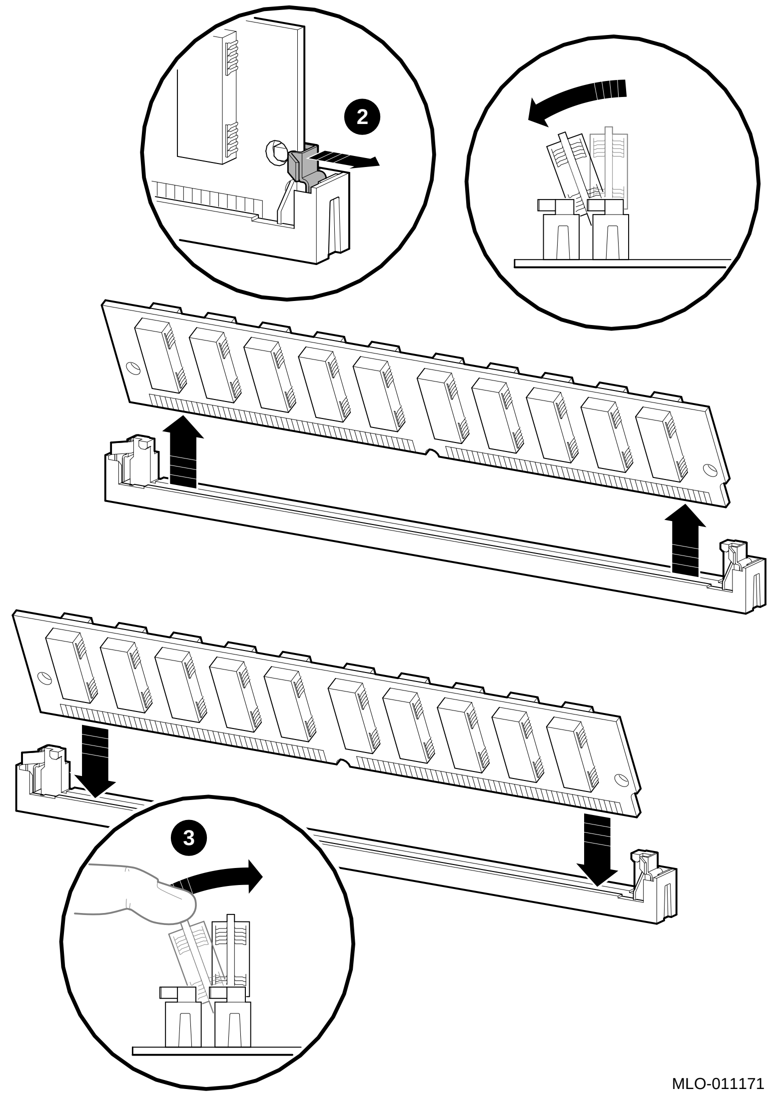
Anytime you replace a board in the DEC 3000 Models 400S/600S AXP systems, antistatic precautions must be taken. Refer to Section 4.1.4.

4.10.3 SIMMs Removal

To remove the SIMMs, use the following procedure:

Step	Action	Refer to Figure 4–14
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–
3	Remove the memory motherboard. See Section 4.9.2.	–
4	Release the clip located at both ends of the SIMM.	❷
5	Tilt the board forward at a 30-degree angle.	–
6	Pull the SIMM out.	–

Figure 4–14 Removing and Replacing the SIMMs



4.10.4 Replacement

Reverse all of the steps in the removal procedure to install the SIMMs, making sure you push firmly on the SIMM to lock it in place ❸.

4.11 I/O Board

4.11.1 Replacement Note

Note

When replacing the I/O board, you must install the I/O shield on the replacement board.

4.11.2 Precautions

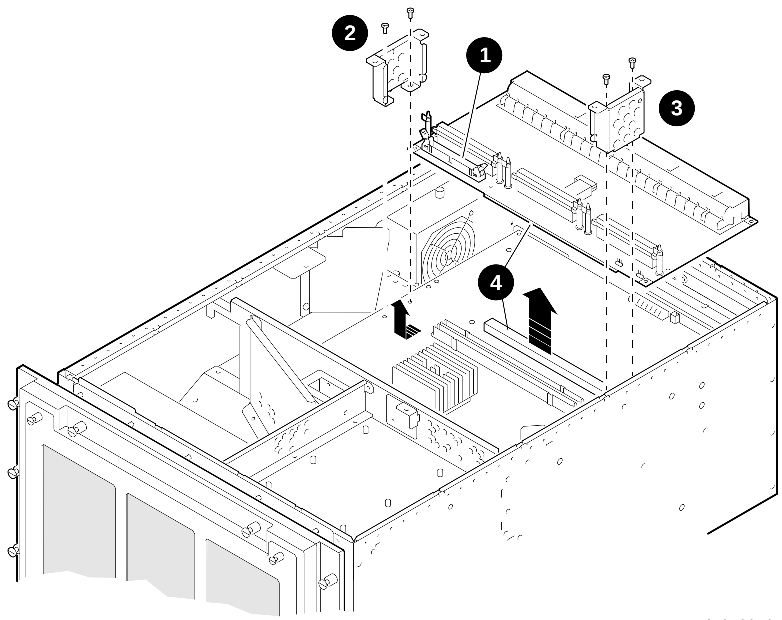
Anytime you replace a board in the DEC 3000 Models 400S/600S AXP systems, antistatic precautions must be taken. Refer to Section 4.1.4.

4.11.3 I/O Board Removal

To remove the I/O board, use the following procedure:

Step	Action	Refer to Figure 4–15
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–
3	Remove the impingement fan assembly. See Section 4.5.5.	–
4	Remove the TURBOchannel options. See Section 4.8.3.	–
5	Remove the two MMBs located closest to the I/O board. See Section 4.9.2.	–
6	Remove the short SCSI cable from the I/O board connector.	❶
7	Remove all the screws on the two transport tray support brackets that secure the I/O board. Slide the brackets toward the front of the unit. Remove the transport brackets to avoid damaging any components on the system card.	❷ and ❸
8	Lift the I/O board straight up by applying pressure evenly throughout the length of the connector that attaches the I/O board to the system board.	❹

Figure 4–15 Removing the I/O Board

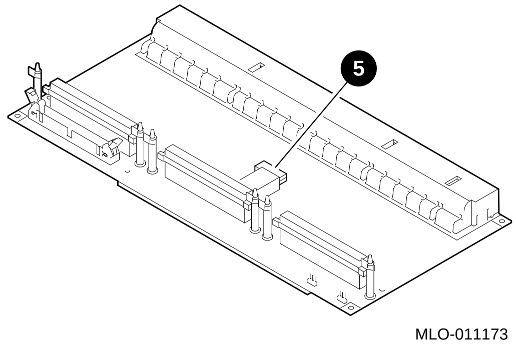


4.11.4 I/O Board Replacement

Use the following procedure to replace the I/O board:

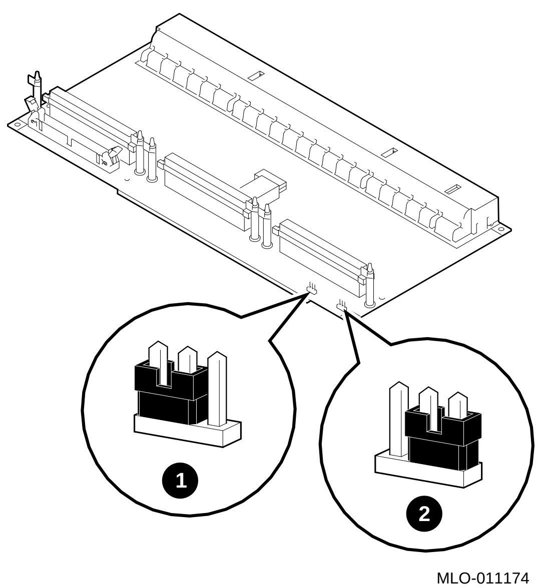
Step	Action	Refer to Figure 4–16
1	Remove the Ethernet ROM chip and install it on the replacement I/O board.	❺
2	Install the new I/O board by reversing the steps in the removal procedure.	–
3	Set the environment variables just as they were set on the board you are replacing. Refer to Section 13.14.	–

Figure 4–16 Replacing the I/O Board



Step	Action	Refer to Figure 4–17
4	Verify that the secure system jumper is installed on the board in the same position as the one you removed.	❶
5	Verify that the ROM upgrade jumper on the replacement board is installed in the same position as the one you removed.	❷

Figure 4–17 Verifying Jumper Settings



4.12 System (CPU) Board

4.12.1 Switch Settings Note

Note

Record the position of the switches. When replacing the board, set the switches in the same position on the new board.

Make sure that the new board has the shield installed toward the rear of the system.

4.12.2 Precautions

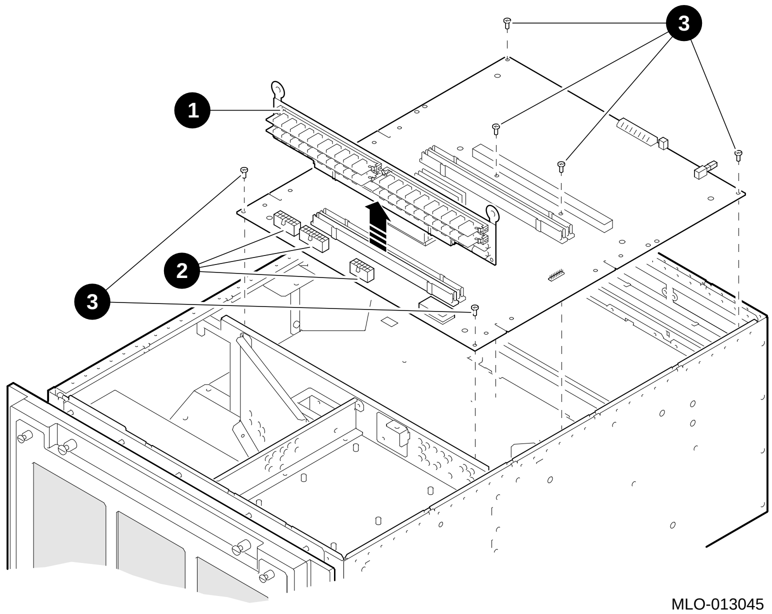
Anytime you replace a board in the DEC 3000 Models 400S/600S AXP systems, antistatic precautions must be taken. Refer to Section 4.1.4.

4.12.3 System Board Removal

To remove a system board, use the following procedure:

Step	Action	Refer to Figure 4–18
1	Perform the preservice procedure. See Section 4.1.3.	–
2	Remove the top cover. See Section 4.4.2.	–
3	Remove the impingement fan assembly. See Section 4.5.5.	–
4	Remove the TURBOchannel options. See Section 4.8.3.	–
5	Remove the I/O board. See Section 4.11.3.	–
6	Remove all MMBs with the SIMMs installed. See Section 4.9.2.	❶
7	Unplug the three power cable connectors.	❷
8	Remove the six screws attaching the board to the base of the system chassis. Lift the system board from the front and slide it forward.	❸

Figure 4–18 Removing the System Board



4.12.4 Replacement

Reverse all of the steps in the removal procedure to install the system (CPU) board.

4.13 Power Supply

4.13.1 Power Supply Removal

To remove the power supply, use the following procedure:

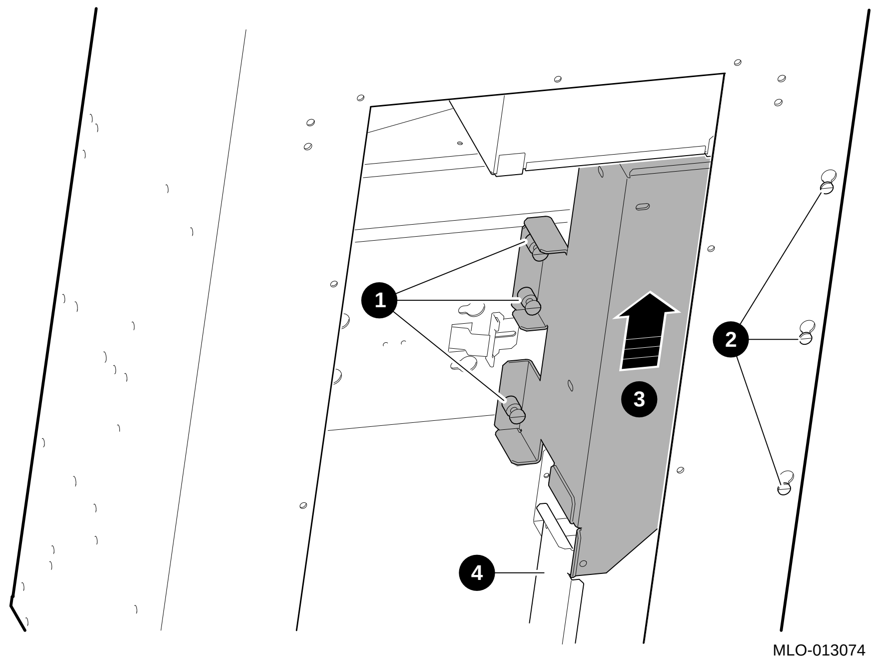
Step	Action	Refer to Figure 4–19
1	Perform the preservice procedure. See Section 4.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 4–19
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 4.4.4.	–
4	Remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.	❹
5	Disconnect the ac connector from the rear of the power supply.	–
6	Disconnect the dc connectors on the left side of the power supply.	–
7	Loosen the three captive screws on the left side of the power supply.	❶
8	Loosen the three screws that secure the power supply to the bottom of the chassis.	❷
9	Slide the power supply forward until the three screws that secure the power supply to the bottom of the chassis are centered in the large part of the keyhole slots and then screw them in.	❸
10	Push the power supply up until the screw heads clear the keyhole slots, then carefully slide the power supply to the left and remove the power supply.	–

Figure 4–19 Removing the Power Supply



4.13.2 Replacement

Reverse all of the steps in the removal procedure to install the power supply.

4.14 Airflow Sensor

4.14.1 Airflow Sensor Removal

To remove the airflow sensor, use the following procedure. Refer to Figure 4–20 for the airflow sensor location.

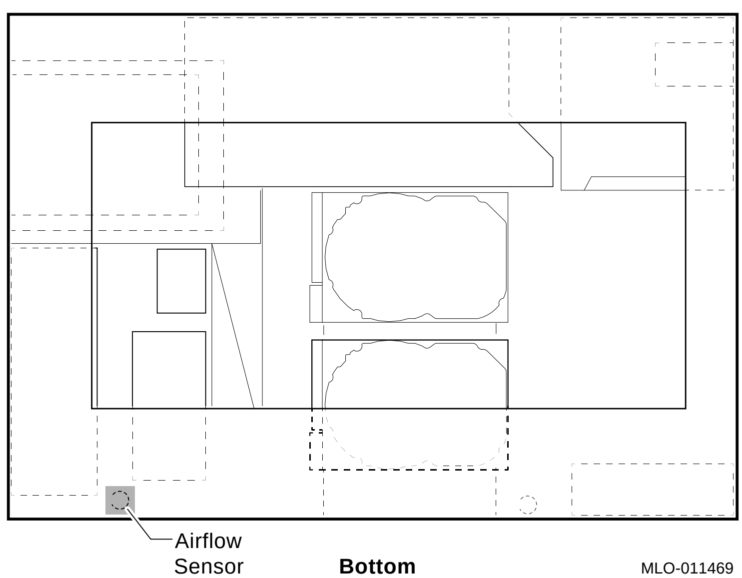
Step	Action
1	Perform the preservice procedure. See Section 4.1.3.
2	Remove the top cover. See Section 4.4.2.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
4	Remove the bottom cover. See Section 4.4.4.
5	From the bottom, disconnect the airflow sensor connector.
6	From the top, remove the screw that secures the airflow sensor clamp to the chassis and lift out the airflow sensor and clamp from the top.

Figure 4–20 Airflow Sensor Location



4.14.2 Replacement

Reverse all of the steps in the removal procedure to install the airflow sensor.

4.15 -12 Vdc Converter

4.15.1 -12 Vdc Converter Removal

To remove the -12 Vdc converter board, use the following procedure. Refer to Figure 4–21 for the -12 Vdc converter board location.

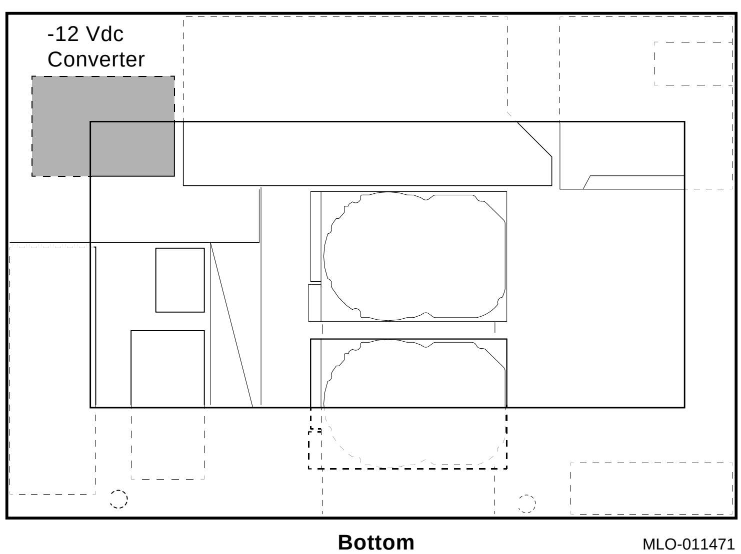
Step	Action
1	Perform the preservice procedure. See Section 4.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 4.4.4.
4	Disconnect the connector from the -12 Vdc converter board.
5	Remove the four screws that secure the -12 Vdc converter board to the chassis and save them for use in the replacement procedure.
6	Remove the -12 Vdc converter board from the chassis.

Figure 4–21 -12 Vdc Converter Board Location



4.15.2 Replacement

Reverse all of the steps in the removal procedure to install the -12 Vdc converter board.

4.16 Fan Tachometer Alarm Board

4.16.1 Fan Tachometer Alarm Board Removal

To remove the fan tachometer alarm board, use the following procedure. Refer to Figure 4–22 for the fan tachometer alarm board location.

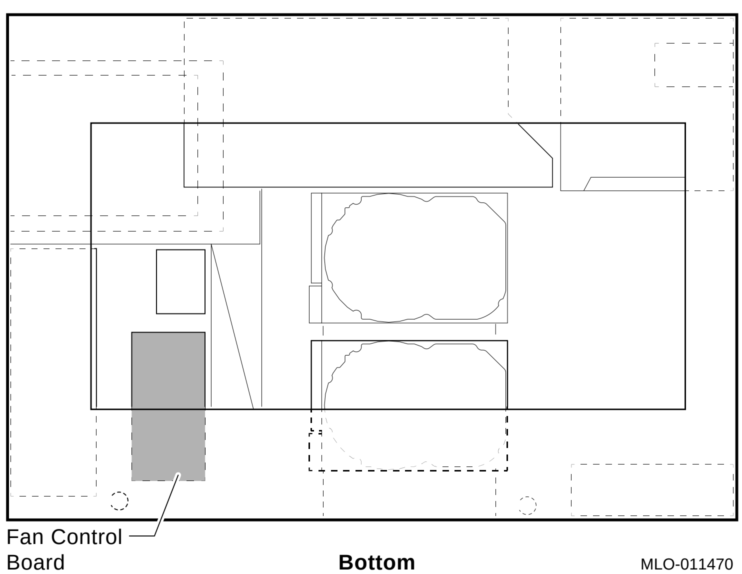
Step	Action
1	Perform the preservice procedure. See Section 4.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 4.4.4.
4	Disconnect the four connectors from the fan tachometer alarm board.
5	Remove the four screws that secure the fan tachometer alarm board to the chassis and save them for use in the replacement procedure.
6	Remove the fan tachometer alarm board.

Figure 4–22 Fan Tachometer Alarm Board Location



4.16.2 Replacement

Reverse all of the steps in the removal procedure to install the fan tachometer alarm board.

4.17 DC On/Off Switch

4.17.1 DC On/Off Switch Removal

To remove the dc on/off switch, use the following procedure:

Step	Action
1	Perform the preservice procedure. See Section 4.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 4.4.4.
4	Disconnect the dc connector from the dc on/off switch.
5	Slide the retaining ring off the rear of the dc on/off switch.
6	Pull the dc on/off switch and the attached cable through the mounting hole on the front of the chassis.

4.17.2 Replacement

Reverse all of the steps in the removal procedure to install the dc on/off switch.

4.18 DC Power LED

4.18.1 DC Power LED Removal

To remove the dc power LED, use the following procedure:

Step	Action
1	Perform the preservice procedure. See Section 4.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 4.4.4.
4	Disconnect the dc connector from the dc power LED.
5	Remove the retaining ring from the rear of the LED socket.
6	From the rear, pull the dc power LED out of the LED socket.
7	Remove the LED socket from the front of the chassis.

4.18.2 Replacement

Reverse all of the steps in the removal procedure to install the dc power LED.

4.19 AC Input Filter

4.19.1 AC Input Filter Removal

To remove the ac input filter, use the following procedure. Refer to Figure 4–23 for the ac input filter location.

Warning

Ensure that the ac power cord is disconnected before starting this procedure.

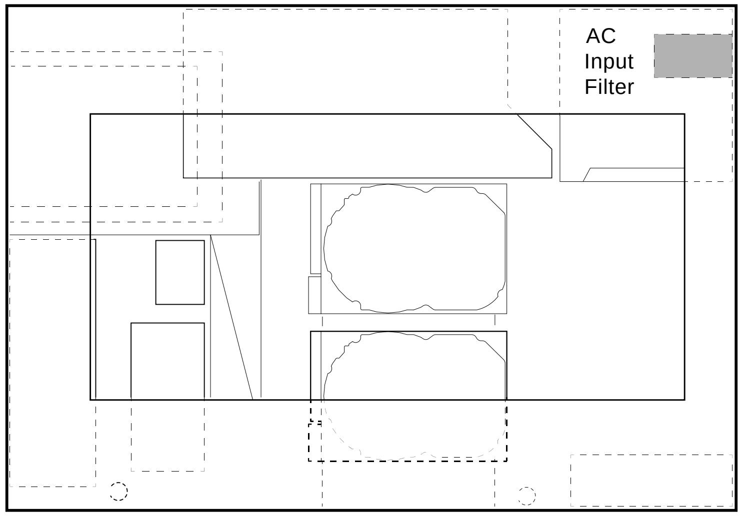
Step	Action
1	Perform the preservice procedure. See Section 4.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 4.4.4.
4	Remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.
5	Remove the brown and blue wires from the two fastons on the rear of the ac input filter (note the wire colors and label them for replacement purposes).
6	Remove the outer nut from the internal ground stud and remove the outer ground wire (from the power supply).
7	Remove the inner nut from the internal ground stud and remove the inner ground wire (from the ac input filter).
8	From the rear of the chassis, remove the two screws that secure the ac input filter to the chassis.
9	Remove the ac input filter by pulling it out through the opening in the rear of the chassis.

Figure 4–23 AC Input Filter Location



4.19.2 Replacement

Reverse all of the steps in the removal procedure to install the ac input filter.

Warning

When reconnecting the ground wires to the internal ground stud, ensure that the ground wire from the ac input filter is secured against the chassis wall with a separate nut before reconnecting the ground wire from the power supply.

5 Diagnostic Testing

5.1 Overview

5.1.1 Chapter Overview

The following topics are contained in this chapter:

- Power-On Diagnostics
- FRU Code Tables
- List of Diagnostics
- Running Single/Multiple Tests
- Running a Test Continuously
- Entering/Exiting Console and Service Modes
- Diagnostics:
  - ASIC
  - NVR
  - MEMORY
  - SCSI
  - NI
  - SCC
  - ISDN
- TURBOchannel Testing

5.2 Power-On Diagnostics

5.2.1 Power-On Diagnostics

The power-on diagnostics executes automatically whenever you turn on the DEC 3000 Model 400S/600S systems. The power-up self-test runs limited memory testing; it tests the first eight megabytes of memory, which is where the operating system is loaded. To test the rest of the memory, you must execute the memory diagnostics.

5.2.2 Examples

The next example shows a typical power up diagnostics message. See the following table for further explanation of this example.

```
DEC 3000 - M600
Digital Equipment Corporation
System conducting power up tests
------------------------------------------------------------

Devnam      Devstat
--------    -------
     CPU      OK KN17-BA -V3.0-S4A3-I077 - sV2.0 - DECchip 21064 P3.0
    ASIC      OK
     MEM      OK 80MB
     NVR      OK
     SCC      OK ptr(0) = Present  keybd(2) = Present
     NI       OK Ethernet Address: 08-00-2B-1A-38-31 , THICK
    SCSI      OK
    ISDN      OK
     TC0      OK - PMAGB-BA
------------------------------------------------------------
System power up OK.
Enter B to boot software from DKA200
```

Code	Meaning
KN17–BA	System type
V3.0	System revision
S4A3	System ROM edit revision
I077	I/O ROM edit firmware revision
sV2.0	SROM Version
DECchip 21064 P3.0	Chip revision
MEM	Total configured memory
SCC	Displays options connected to the I/O ports Mouse/tablet is connected to port 0 Keyboard is connected to port 2
NI	Displays the Ethernet Address and the type (thickwire or ThinWire connection)

Code	Meaning
TC0	Displays the option in the TURBOchannel slot. In this example, a graphics option PMAGB–BA is located in slot 0.

The next example shows an unsuccessful power up of the DEC 3000 Model 400S/600S AXP system due to the network being connected improperly, a thickwire loopback connector is missing, or an NI logic problem in the system.

```
DEC 3000 - M600
Digital Equipment Corporation
System conducting power up tests
------------------------------------------------------------

Devnam     Devstat
--------   -------
     CPU      OK KN17-BA - V3.0-S4A3-I077 - sV2.0 - DECchip 21064 P3.0
    ASIC      OK
     MEM      OK 80MB
     NVR      OK
     SCC      OK ptr(0) = Present  keybd(2) = Present
     NI       ?? 000 00f2 Ethernet Address: 08-00-2B-1A-38-31 , THICK
    SCSI      OK
    ISDN      OK
     TC0      OK - PMAGB-BA
------------------------------------------------------------
System power up tests detected errors.
See your system documentation for more information.

>>>
```

The next example shows an unsuccessful power up of a DEC 3000 Model 400S/600S AXP system. Due to a problem in the PMAGB graphics option, the red and blue lines were not properly connected or terminated.

```
DEC 3000 - M600
Digital Equipment Corporation
System conducting power up tests
------------------------------------------------------------

Devnam     Devstat
--------   -------
     CPU      OK KN17-BA - V3.0-S4A3-I077 - sV2.0 - DECchip 21064 P3.0
    ASIC      OK
     MEM      OK 80MB
     NVR      OK
     SCC      OK ptr(0) = Present  keybd(2) = Present
     NI       OK Ethernet Address: 08-00-2B-1A-38-31 , THICK
    SCSI      OK
    ISDN      OK
     TC0      ?? 300 TC0    0 - PMAGB-BA
------------------------------------------------------------
System power up tests detected errors.
See your system documentation for more information.

>>>
```

5.3 FRU Code Tables

5.3.1 System Device FRU Codes

Table 5–1 shows the system device FRU codes that appear in error messages and their meanings.

Table 5–1 System Device FRU Codes

FRU Code	Meaning
000	Unknown or diagnostic does not support FRU reporting.
001	Failed FRU is most likely the system board.
002	Failed FRU is most likely the I/O board.
003	Failed FRU is most likely the keyboard.
004	Failed FRU is most likely the mouse or pointing device.

5.3.2 TURBOchannel Options FRU Codes

Table 5–2 shows the TURBOchannel options FRU codes and their meanings.

Table 5–2 TURBOchannel Options FRU Codes

FRU Code	Meaning
010	Failed FRU is most likely TURBOchannel option 0.
011	Failed FRU is most likely TURBOchannel option 1.
012	Failed FRU is most likely TURBOchannel option 2.
013-FF	Reserved

5.3.3 SCSI Device FRU Codes

Table 5–3 shows the SCSI device FRU codes and their meanings.

Table 5–3 TURBOchannel Options FRU Codes

FRU Code	Meaning
1TL	SCSI device on bus A (internal), Target T, Logical unit L (for example, FRU code for DKA0 is 100)
2TL	SCSI device on bus B (external), Target T, Logical unit L

5.4 Diagnostic Listing

5.4.1 Diagnostic Listing

A diagnostic test is a composite of a string of subtests. You can select a subtest to be executed rather than executing the full device test.

When a device is selected without specifying a subtest, all subtests are executed.

The following are the available diagnostics:

ASIC
NVR
MEM
SCSI
NI
SCC
ISDN

5.4.2 Format

To obtain a diagnostic subtest listing, enter the following:

>>> **T[EST] {device name} ?** Return

Note

You must be in either console or service mode to obtain a listing.

5.4.3 Example

This example shows the subtests associated with the diagnostic ASIC.

>>> **T ASIC ?** Return

Results:

```
T ASIC INIT
T ASIC SGMAP
T ASIC ?
>>>
```

5.5 Running Single/Multiple Tests

5.5.1 Before You Begin

You must take the following actions before running diagnostics:

Step	Action	Refer to...
1	Put the system in console mode.	Section 5.6.1
2	Attach loopbacks if required.	Chapter 5
3	Select the diagnostic environment.	Table 5–4

5.5.2 Diagnostic Environment

Table 5–4 describes the diagnostic environments and how to access them.

Table 5–4 Diagnostics Environments

Environment	To Access	Requirements
Console	Enter the following at the >>> prompt: >>>**SET DIAG_SECTION 1**	None except installation of the system.
Service	Enter the following at the >>> prompt: >>>**SET DIAG_SECTION 2**	Loopbacks, but provides a more comprehensive test. The key utilities must be run in this environment.

5.5.3 Running a Single Diagnostic Test

To execute a single diagnostic test, enter the following:

```
>>> T[EST] {device_name} Return
```

5.5.4 Example

This example executes all ASIC subtests.

When you select a diagnostic test, that test executes its complete set of subtests.

```
>>> T ASIC Return
```

5.5.5 Running Diagnostic Subtests

To execute a diagnostic subtest, enter the following:

```
>>> T[EST] {device name} {sub-test} Return
```

5.5.6 Example

This example indicates that testing of the subtest SGMAP has been selected. ASIC testing is performed *only* on those areas defined by the SGMAP subtests.

```
>>> T ASIC SGMAP  Return
```

5.5.7 Running Multiple Diagnostic Tests

Diagnostics may be linked together in different combinations depending on your needs. Diagnostic tests are executed one at a time in the order you specify on the command line. The diagnostic selection chosen may require that:

- Service mode be selected
- Loopback connector be connected

The following are sample diagnostic combinations:

```
>>> T[EST] {device name}, {device name}...  Return
```

```
>>> T[EST {device name}:{device name}  Return
```

```
>>> T[EST] {device name}:{device name},{device name}...  Return
```

5.5.8 Examples

This example executes testing on MEM and NVR diagnostics. You may add any combination of diagnostics, but separate the device names with a comma.

```
>>> T MEM,NVR  Return
```

The next example executes testing on a range of diagnostics starting with the ASIC diagnostic and ending with the ISDN diagnostic. When specifying a range, separate the device names with a colon.

```
>>> T ASIC:ISDN  Return
```

The starting and ending diagnostic range is:

ASIC
MEM
NVR
SCC
NI
SCSI
ISDN

Note

When running diagnostics in the previous configuration, those run in service mode require loopback connectors. Otherwise, all of these tests can be run in console mode.

Diagnostics that run in console mode also run in service mode.

The next example starts testing the SCC diagnostic, then the ASIC diagnostic, and ending with the MEMORY diagnostic.

```
>>> T SCC,ASIC:MEM  Return
```

5.5.9 Running Tests Continuously

The console REPEAT command runs a diagnostic or a sequence of diagnostics continuously. The REPEAT command executes testing continuously until you enter Ctrl C at the console or depress the Halt button, or until an error occurs.

Note

If you press the Halt button, this interrupts the running test and returns to the console prompt.

5.5.10 Format

To execute the REPEAT command, enter the following:

```
>>> R[EPEAT] T[EST] {device name}, {device name} Return
```

5.5.11 Example

The next example shows that the memory diagnostic runs continuously until you enter Ctrl C at the console.

```
>>> R T MEM  Return
```

The next example shows that the memory diagnostic and the NVR diagnostic runs continuously until you enter Ctrl C at the console.

```
>>> R T MEM,NVR  Return
```

5.6 Entering/Exiting Console and Service Modes

5.6.1 Entering Console Mode

You may enter console mode by performing one of the following.

Note

Perform a system shutdown before pushing the Halt button.

- Depress the Halt button (this places you in console mode).
- Enter SET DIAG_SECTION 1 from service mode (this places you in console mode).
- Enter console mode by default after power on is executed by issuing one of the following SET commands while in console mode:
  - SET AUTO_ACTION HALT
  - SET AUTO_ACTION 3

For more information, see Chapter 13.

5.6.2 Exiting Console Mode

Issue one of the following console commands at the console prompt to exit console mode and enter program mode.

Note

If memory tests are run and the contents of memory are changed, then the CONTINUE command causes a system failure. This is normal operation since you have overwritten the program information.

- BOOT

  Issuing the BOOT command initiates a system bootstrap operation. See Chapter 13.
- CONTINUE

  Issuing the CONTINUE command clears the RC State Flag bit and resumes processor execution. See Chapter 13.

Note

If memory tests are run and the contents of memory is changed, then the CONTINUE command causes a system failure. This is a normal operation since you have overwritten the program information.

- SET DIAG_SECTION 2

  Console mode can be exited and service mode entered by using the SET DIAG_SECTION 2 command. Setting the diagnostic environment to service mode allows for extended testing of certain diagnostics. To enter service mode, enter:

  >>> **SET DIAG_SECTION 2** Return

5.6.3 Entering Service Mode

Some diagnostics require that service mode be used when testing. To enter service mode, you must first enter console mode. At the console prompt, enter:

>>> **SET DIAG_SECTION 2** Return

5.6.4 Exiting Service Mode

Service mode can be exited by issuing one of the following console commands at the console prompt.

Note

BOOT and CONTINUE cause you to exit the diagnostic environment and enter program mode.

SET DIAG_SECTION 1 keeps you in the diagnostic environment.

- BOOT

  Issuing the BOOT command initiates a system bootstrap operation. See Chapter 13.

- CONTINUE

  Issuing the CONTINUE command clears the RC State Flag bit and resumes processor execution. See Chapter 13.

Note

If the memory contents changed while you were in service mode, this command causes a failure and should not be used.

- SET DIAG_SECTION 1

  Issuing the SET DIAG_SECTION 1 command selects console mode.

5.7 ASIC Diagnostic

5.7.1 Overview

The ASIC diagnostic tests the Scatter/Gather Map registers.

TURBOchannel and CORE I/O ASIC registers are initialized by placing all registers in a *known state*.

Diagnostic testing is performed when:

- Unit is powered on.
- Console mode is entered and ASIC diagnostic selected.

Fault isolation is to the field replaceable unit (FRU).

5.7.2 Running ASIC Diagnostics

To select and execute the ASIC diagnostic and/or subtests, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.7.3 Example

This example executes the ASIC diagnostic SGMAP sub-test.

>>> **T ASIC** Return

The next example executes the ASIC diagnostic and SGMAP sub-test.

>>> **T ASIC SGMAP** Return

5.7.4 Subtests

Table 5–5 lists the ASIC diagnostic subtests.

Table 5–5 ASIC Diagnostic Subtests

Subtests	Description
INIT	Executes the INIT test
SGMAP	Executes the Scatter/Gather Map register
?	Lists available subtests

5.7.5 Error Reporting Format

All reported errors contain a hexadecimal longword of data and FRU code to identify the failing FRU. The error reporting format is as follows:

```
>>> T ASIC
?? 001 ASIC XXXXXXXX
```

Table 5–6 describes the diagnostic error message and the FRU that needs to be replaced.

Table 5–6 ASIC Error Identification

FRU Code	Failing Test	Error Code	Replace
001	ASIC	Refer to Chapter 14.	System board
002	ASIC	Refer to Chapter 14.	I/O board

5.8 NVR Diagnostic

5.8.1 Overview

The NVR diagnostic ensures the integrity of the TOY/NVR controller located on the I/O board.

The NVR diagnostic tests 50 bytes of nonvolatile RAM (NVR) along with an NVR register test/initiation sequence.

The TOY test verifies if the time-of-year clock has been set. If it has been set, then the diagnostic verifies the operation of the clock. If no time has been set, then testing of all registers used by the time-of-year clock are executed.

The register test verifies that each TOY register is capable of holding all possible values.

Diagnostic testing is performed when:

- Unit is powered-on.
- Console mode is entered and NVR diagnostics selected.

Fault isolation is to the field replaceable unit (FRU).

5.8.2 Running NVR Diagnostics

To select and execute the NVR diagnostic and/or subtests, enter the following:

```
>>> T[EST] {device name} [sub-test] Return
```

5.8.3 Example

This example selects and executes the NVR diagnostic.

```
>>> T NVR Return
```

The next example selects and executes the NVR diagnostic TOY subtest.

```
>>> T NVR TOY Return
```

5.8.4 Subtests

Refer to Table 5–7 for a list of NVR diagnostic subtests and their description.

Table 5–7 NVR Diagnostic Subtests

Subtests	Description
TOY	Executes the following diagnostic tests: • Clock test • Assure clock is ticking test • Clock reentry test
NVR	Executes the following diagnostic tests: • Check battery test • NVR register test
INTERRUPT	Executes the Interrupt diagnostic test
INIT	Executes the Init diagnostic test
?	Provides a list of available diagnostics

5.8.5 Error Reporting

All reported errors contain a hexadecimal longword of data and FRU code to identify the failing FRU.

When the diagnostic encounters an error, the error reporting procedure format is as follows:

```
>>> T NVR
?? 002 NVR XXXXXXXX
```

Table 5–8 describes the diagnostic error message and the FRU that needs to be replaced.

Table 5–8 NVR Error Identification

FRU Code	Failing Test	Error Code	Replace
002	NVR	See Chapter 14	I/O board

5.9 MEMORY Diagnostic

5.9.1 Overview

The MEMORY diagnostic detects address and data that is stuck at faults as well as performs ECC testing of memory.

The memory diagnostic is executed when:

- Power-on occurs.
- Console mode is entered and the MEMORY diagnostic selected.

During power-on, the MEMORY diagnostic:

- Checks the previous memory configuration
- Tests enough memory to load the secondary boot (APB.EXE for VMS)

All but the lowest 2 MB of memory will be exercised when run from console mode. Two MB of memory is reserved and is tested by the SROM code before the console is loaded.

Fault isolation is to the field replaceable unit (FRU).

5.9.2 Running Memory Diagnostics

To select and execute the MEMORY diagnostic and/or subtests, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.9.3 Examples

This example selects and executes the MEMORY diagnostic.

>>> **T MEM** Return

Results:

```
T-STS-MEM - Cell Test    00200000   <->  08000000
T-STS-MEM -      WR      AAAAAAAA   ADDR 07FFFFFC
T-STS-MEM -      FWD-RD  AAAAAAAA   WR   55555555  ADDR 07FFFFFC
T-STS-MEM -      REV-RD  55555555   WR   AAAAAAAA  ADDR 00200000
T-STS-MEM - ADDR Test    00200000   -->  08000000
T-STS-MEM -      WR DATA =  ADDR 07FFFFFC
T-STS-MEM -      RD DATA =  ADDR 07FFFFFC
T-STS-MEM - LLSC Test ADDR 00200000
T-STS-MEM - CLR  MEM  ADDR 00200000  -->  08000000
T-STS-MEM -      WR   00200000   ADDR  07FFFFFC
OK
>>>
```

The next example selects and executes the MEMORY diagnostic subtest CELL.

>>> **T MEM CELL** Return

The next example shows the HELP command being executed.

```
>>> T MEM ? Return

Mem Self Test Routines:
 ?      - this help screen
 ALL    - perform all tests
 LLSC   - ldl_l/stl_c
 CELL   - memory cells
 ADDR   - address lines & refresh
 INIT   - zero all mem
Options:
 -l:xxxxxxxx, starting address
 -h:xxxxxxxx, ending address
 -n:xxx, number of retries (hex)
 -x[-] stop on err ON [OFF]
 -i[-] init mem after test ON [OFF]
```

5.9.4 Subtests

Table 5–9 lists the MEMORY diagnostic subtests and their description.

Table 5–9 Memory Diagnostic Subtests

Subtests	Test description
ALL	Performs all tests
CELL	Memory cell test
ADDR	Address lines test
LLSC	Load-locked/Store-conditional
INIT	Zero all memory
?	Provides a list of available diagnostics

Memory options are provided to modify any memory subtest. Default values are used when option inputs are invalid or exceed their ranges. Table 5–10 lists the options and descriptions.

Table 5–10 Memory Test Options

Option	Default	Description
-l:xxxxxxxx	002000000 (2 MB)	Lower address boundary
-h:xxxxxxxx	Top of memory	Upper address boundary
-n:xx	0	Number of retries[1]
-x[-]	On	Stops on an error condition when set to ON [OFF]
-i[-]	On	Initializes memory after tests ON [OFF]

[1] Must be a hexadecimal value

5.9.5 Error Reporting

All reported errors contain a hexadecimal longword of data and FRU code to identify the failing memory SIMM.

When the diagnostic encounters an error, the error reporting procedure format is as follows:

```
>>> T MEM
  ?? 8XY MEM XXXXXXXX
```

Table 5–11 describes the memory error code.

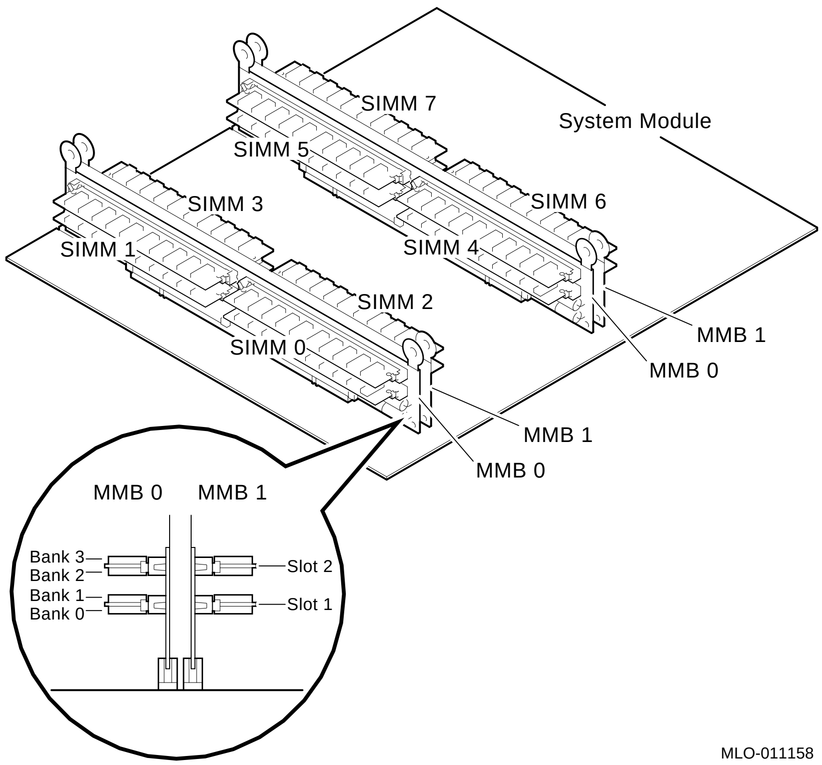
Table 5–11 Memory Error Code Description

Error Reporting Value	Description
8	Extended error code prefix
x	Bank 0 to 3
y	SIMM 0 to 7 for data errors in only one SIMM SIMM 8 to B for data errors in both SIMMs.

Where	Description
8	SIMMs 0,1
9	SIMMs 2,3
A	SIMMs 4,5
B	SIMMs 6,7

Figure 5–1 shows the location of the SIMMs.

Figure 5–1 MMBs



5.10 SCSI Diagnostic

5.10.1 Overview

SCSI diagnostic testing verifies several areas of the SCSI subsystem including:

- SCSI controller chips
- Dual SCSI ASIC
- SCSI bus problems
- DMA path in physical and virtual modes

Testing can be performed:

- Upon power on
- In console mode

  Testing in console mode exercises the data paths between:

  – CPU and TURBOchannel interface
  – TURBOchannel interface and dual SCSI ASIC
  – Dual SCSI ASIC and SCSI controllers
  – SCSI controllers and SCSI bus
- In service mode

  Testing performed in service mode includes all testing performed in console mode plus a map error test and minimal device test.

Available SCSI utilities:

- Provide status information on SCSI devices
- Spin up and erase/format hard disks
- Erase/format floppy diskettes
- Execute disk verifier testing

All utilities require user interaction and are to be executed at power-on. See Chapter 13.

5.10.2 Running SCSI Diagnostics

To select and execute the SCSI diagnostic and/or subtests, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.10.3 Example

This example selects and executes the SCSI diagnostics.

>>> **T SCSI** Return

The next example selects and executes the SCSI diagnostic REGISTER sub-test.

>>> **T SCSI REGISTER** Return

5.10.4 Subtests

Table 5–12 lists diagnostic subtests.

Table 5–12 SCSI Diagnostic Subtests

Subtests	Description	Mode
ASIC[1]	Tests dual SCSI ASIC registers and two SCSI DMA buffers	Console
REGISTER[1]	Tests both sets of SCSI controller registers (on SCSI A and B)	Console
INTERRUPT[1]	Test interrupt logic (SCSI A and B)	Console
TRANSFER	Test SCSI A and B bus data transfers	Console
MAP[2]	Test for map and parity errors	Service
DEVICE[3]	Test SCSI devices	Service
ERASE	Refer to Section 13.20.3	Any mode
FORMAT	Refer to Section 13.20.7	Any mode
VERIFY	Refer to Section 13.20.11	Any mode
INIT	Initializes the drive	Any mode
?	Lists all subtests	Any mode

[1]Does not require any devices to be present on either SCSI bus.

[2]Test executes only on the first device that responds to the TRANSFER test.

[3]Removable media drives *must* have media installed before testing. Tapes are rewound and started from BOT.

Console mode is DIAG_SECTION 1
Service mode is DIAG_SECTION 2

5.10.5 Error Reporting Format

All reported errors contain a hexadecimal longword of data and a FRU code to identify the failing FRU. The error reporting format is as follows:

```
>>> T SCSI
?? 001 SCSI XXXXXXXX
```

Table 5–13 describes the diagnostic error message and the FRU that needs to be replaced.

Table 5–13 SCSI Error Identification

Identifies Test Failed	FRU Code	Failing Test	Error Code	Replace
??	001	SCSI	See Chapter 14	System board
??	002	SCSI	See Chapter 14	I/O board
??	1xy	SCSI	See Chapter 14	SCSI controller A
??	2xy	SCSI	See Chapter 14	SCSI Controller B

x = SCSI ID
y = Logical unit number

5.11 NI Diagnostic

5.11.1 Overview

The NI diagnostic verifies that the LANCE chip is operational. The diagnostics also induce "forced errors" to ensure functionality.

When the unit is powered on, limited testing is performed. Complete testing of the NI diagnostics must be performed under service mode.

Testing can be performed:

- Upon powerup
- In console mode
- In service mode

Testing under service mode provides a full complement of patterns rather than a single pattern. Additionally, the full addressing range is tested for DMA read/write access.

5.11.2 Running NI Diagnostics

Before testing, a loopback connector (PN 12-22196-01) *must* be connected to the NI port or the port must be directly connected to the network. Failure to do so results in an external loopback failure. You must also verify that Thickwire has been selected.

To select and execute the NI diagnostic or subtests, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.11.3 Example

This example selects and executes the NI diagnostic.

>>> **T NI** Return

This example selects and executes the NI diagnostic NAR subtest.

>>> **T NI NAR** Return

5.11.4 Subtests

Refer to Table 5–14 for a list of diagnostic subtests.

Table 5–14 NI Diagnostic Subtests

Subtest	Description
NAR	Network address ROM test
REGISTER	LANCE register test
DMA_INIT	Initialize LANCE and test DMA logic test
ILPBK	Internal loopback and DMA test
INTERRUPT	Interrupt test
EXT_LPBK	External loopback test
CRC[1]	Test internal loopback with CRC check
RX_MISS_BUFF[1]	Test internal loopback with MISS error
COLLISION[1]	Test internal loopback with collision
FILTER[1]	Test internal loopback with address filter checking
TX_BUFF[1]	Test internal loopback with transmit buffer error
Init	Initializes the NI port
?	Lists all the subtests

[1]Diagnostic can only be executed in service mode, DIAG_SECTION 2.

5.11.5 Error Reporting

All reported errors contain a hexadecimal longword of data and FRU code to identify the failing FRU.

When the diagnostic encounters an error, the error reporting procedure format is as follows:

```
>>> T NI
?? 001 NI XXXXXXXX
```

Table 5–15 NI Error Identification

Identifies Test Failed	FRU Code	Failing Test	Error Code	Replace
??	002	NI	See Chapter 6 and Chapter 14 for more information.	Enet ROM

5.11.6 Examples

This example shows the results of running the NI diagnostics without the Ethernet loopback connector installed.

>>> **T NI** [Return]

Results:

```
T-STS-NI - Net ADDR ROM Test
T-STS-NI - Lance Reg Test
T-STS-NI - Init Test
T-STS-NI - Int Lpbk and DMA Test
T-STS-NI - Int Test
T-STS-NI - Ext Lpbk Test
?  T -ERR-NI   - Ext Lpbk Test
?  T -ERR-NI   - ERR = ac
??000          NI  0x00f2
84 Fail
>>>
```

The next example shows the results of when the loopback connector is reinstalled and the unit is powered up.

>>> **T NI** [Return]

Results:

```
T-STS-NI - Net ADDR ROM Test
T-STS-NI - Lance Reg Test
T-STS-NI - Init Test
T-STS-NI - Int Lpbk and DMA Test
T-STS-NI - Int Test
T-STS-NI - Ext Lpbk Test
OK
>>>
```

5.12 SCC Diagnostic

5.12.1 Overview

The Serial Communication Controller (SCC) diagnostic tests the functionality of:

- Data path to the SCC
- Ability to operate in asynchronous mode
- Data path from the SCC to the connectors

  You need a serial line loopback connector (PN 12-25083-01) for the printer, and a modem port loopback (PN 29-24795-01) for the modem port.
- Printer and communication ports using DMA transfers

The diagnostic tests only the SCC chips in asynchronous mode.

The diagnostic may be executed:

- Upon power up (If server, set console command SET SERVER)
- In console mode
- In service mode

5.12.2 Running SCC Diagnostics

To select and execute the SCC diagnostic or subtests, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.12.3 Examples

This example selects and executes the SCC diagnostic.

>>> **T SCC** Return

The next example selects and executes the SCC diagnostic subtest LK401.

>>> **T SCC LK401** Return

5.12.4 Subtests

Table 5–16 lists the diagnostic subtests.

Table 5–16 SCC Diagnostic Subtests

Subtests	Description
INIT	Performs a reset on both SCC controllers
POLLED	Tests SCC controllers using polled I/O
INTERRUPT	Tests SCC controllers using interrupt driven I/O
DMA	Tests SCC controllers using DMA transfers
LK401	Tests for presence of a keyboard
MOUSE	Tests for presence of a mouse
MODEM[1]	Tests modem control signals
?	Lists the subtests.

[1]Requires modem loopback (PN 29-24795). Testing in service mode, DIAG_SECTION 2.

5.12.5 Error Reporting

All reported errors contain a hexadecimal longword of data and a FRU code to identify the failing FRU.

When the diagnostic encounters an error, the error reporting procedure format is as follows:

```
>>> T SCC
?? 003 SCC  XXXXXXXX
```

Table 5–17 describes the diagnostic error message and the FRU that needs to be replaced.

Table 5–17 SCC Error Identification

Identifies Test Failed	FRU Code	Failing Test	Error Code	Replace
??	002	SCC	See Chapter 14	I/O board
??	003	SCC	See Chapter 14	Keyboard
??	004	SCC	See Chapter 14	Mouse

5.13 ISDN Diagnostic

5.13.1 Overview

Note

The ISDN port is not presently accessible.

The ISDN diagnostic will ensure that the 79C30A chip is fully functional by testing, generating, verifying, and disable interrupting the following:

- 79C30A Internal registers
- Internal digital and analog loopback
- Tone output
- DMA

The self test may be executed:

- Upon power up
- In console mode
- In service mode

5.13.2 Running ISDN Diagnostics

To select and execute the ISDN diagnostic or subtests or both, enter the following:

>>> **T[EST] {device name} [sub-test]** Return

5.13.3 Examples

This example selects and executes the ISDN diagnostic.

>>> **T ISDN** Return

The next example selects and executes the ISDN diagnostic REGISTER subtest.

>>> **T ISDN REGISTER** Return

5.13.4 Subtests

Table 5–18 lists the diagnostic subtests.

Table 5–18 ISDN Diagnostic Subtests

Subtests	Description	Mode
INIT	Initialize	Console
REG	Internal registers test	Console
TONE[1]	Audio output	Service
D_LOOP	Internal digital loopback	Service
A_LOOP	Internal analog loopback	Console
INT	Interrupt test	Console
DMA	DMA	Console
RECORD[1]	Record	Service
PLAYBACK[1]	Playback of recorded message	Service
REPEAT[1]	Immediate playback of message	Service
?	List subtests	

[1]Requires headset to perform diagnostics.

5.13.5 Error Reporting

All reported errors contain a hexadecimal longword of data and a FRU code to identify the failing FRU.

When the diagnostic encounters an error, the error reporting procedure format is as follows:

```
>>> T ISDN
  ?? 002 ISDN XXXXXXXX
```

Table 5–19 ISDN Error Identification

Identifies Test Failed	FRU Code	Failing Test	Error Code	Replace
??	002	ISDN	See Chapter 14.	I/O board

5.14 TURBOchannel Testing

5.14.1 Caution

Double-width TURBOchannel options should always be installed in slots 0 and 1. Attempting to install a double-width option into slot 2 could cause both permanent damage to the option and intermittent operation. See Chapter 3 for further details.

5.14.2 MIPS Emulator Overview

The MIPS emulator performs the following tasks on a TURBOchannel option:

- Performs diagnostic testing on a TURBOchannel option
- Initializes a TURBOchannel option
- Displays configuration on a TURBOchannel option
- Runs the console on a TURBOchannel graphics option
- Boots the operating system using a TURBOchannel option

The device name for a TURBOchannel option is TC#.

```
TC   =  TURBOchannel option
#    =  TURBOchannel slot number
```

A TURBOchannel option located in slot 2 has a device name of TC2.

5.14.3 Before You Begin

Before testing, perform the following:

Step	Action	Description
1	Enter console command	See Entering Console Mode.
2	Enter the following at the console prompt: >>> **SHOW CONFIG**	Displays TURBOchannel device names. Identifies and records TURBOchannel device names that you want to test (for example, TC2).
3	Enter the following at the console prompt: >>>**T[EST] {device_name} ls**	Lists available TC scripts. If an asterisk (*****) is at the end of a script, then it is an object script and will fail if selected.

5.14.4 Obtaining Script Listing

If an asterisk (*****) is at the end of a script, then it is an object script and will fail if selected. Object scripts are not executable. To obtain a listing of diagnostic test scripts, enter the following:

>>> **T [device_name] [ls]** Return

5.14.5 Example

This example obtains a script listing.

>>> **T TC1 ls** Return

5.14.6 Running Default Test Scripts

The following command (>>>T TC# pst-t) executes the pst-t test script, which executes a string of diagnostic test scripts. If the pst-t script is not available, then the test command fails. If failure occurs, then enter the following:

>>> **T [dev_name] ls** Return

This lists available scripts. If an asterisk (*) is at the end of a script, it is an object script. Object scripts are not executable. See Section 5.14.8 to execute test scripts.

>>> **T[EST] [device_name]** Return

5.14.7 Example

This example executes the default test scripts.

>>> **T TC1** Return

5.14.8 Running Single Test Scripts

To execute single diagnostic test scripts, enter the following:

>>> **T [dev_name] {test_name}** Return

5.14.9 Example

This example executes a single test script.

>>> **T TC1 pst-m** Return

5.14.10 Initializing a TURBOchannel Option

To initialize a selected TURBOchannel option, enter the following:

>>> **T [device_name] INIT** Return

5.14.11 Example

This example initializes TURBOchannel option 1.

>>> **T TC1 INIT** Return

5.14.12 Additional Commands

The following are additional commands that support the TEST command:

Command	Description
T [dev_name] [cnfg]	Displays configuration on TC option
T [dev_name] [init]	Initializes option in TC slot
T [dev_name] [cat scriptname]	Lists contents of a script

6
Troubleshooting

6.1 Overview

6.1.1 Chapter Overview

This chapter contains the following topics:

- LED Codes
- Troubleshooting tables for:
  - System
  - Monitor
  - Mouse/Tablet
  - Keyboard
  - Drives
  - Network
  - Audio
  - Console
  - Firmware

6.1.2 Introduction

The troubleshooting techniques described in this section neither identify all possible problems, nor do the suggested corrective actions remedy all problems. Call the Digital Support Center or your service representative if you encounter other problems.

The loopbacks you need to execute diagnostics are supplied with the DEC 3000 Models 400S/600S AXP systems.

6.1.3 Before You Start

Before performing any procedures, verify cable, terminators, cable connections, loopbacks, and proper termination. Replace the most probable FRU as reported by diagnostics. Refer to Chapter 5.

6.2 LED Codes

6.2.1 Serial ROM LED Codes

The LED display corresponds to a hexadecimal code and indicates what diagnostic is currently being executed when the unit is first powered on. If an error occurs before the system enters the console mode, then the failed test is identified by a binary display of two 4-bit hexadecimal numbers at the rear of the system.

Use the diagnostic LEDs to help diagnose problems when the system is unable to set up the console. This portion of the testing does not appear on the monitor.

Use Table 6–1 and Table 6–2 together to diagnose and correct problems. Table 6–1 identifies the LED display and hex code and the order in which to perform the actions. Table 6–2 describes the actions to take.

Note

In the tables containing LED codes, • indicates that an LED is on and o indicates that an LED is off.

Table 6–1 Serial ROM LED Codes

LED Display	HEX Code	Solution	Then Replace...	Finally Replace...
••••••••	FF	2	3	—
•••••••o	FE	2	3	—
••••••o•	FD	2	3	—
••••••oo	FC	2	3	—
•••••o••	FB	Informational only, never fails here.		
•••••o•o	FA	2	5	3
•••••oo•	F9	2	5	3
•••••ooo	F8	2	5	3
••••o•••	F7	2	5	3
••••o••o	F6	Informational only, never fails here.		
••••o•o•	F5	Informational only, never fails here.		
••••o•oo	F4	1	4	—
••••oo••	F3	Informational only, never fails here.		
••••oo•o	F2	1	4	—
••••ooo•	F1	Informational only, never fails here.		
••••oooo	F0	1	4	—
oo•ooooo	20	2	5	—

Table 6–2 Serial ROM LED Codes Action Table

Solution	Action
1	Ensure that a good connection is made between the system board and I/O board.
2	Ensure that all memory SIMMs are properly installed. It may be necessary to reseat memory SIMMs.
3	Replace system board.
4	Replace I/O board.
5	Replace MMB/SIMMs.

Chapter 14 describes each code, the corresponding test, and possible reasons for test failure.

6.2.2 ASIC LED Codes

The ASIC LED codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute ASIC diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–3 and then perform the specified steps in Table 6–4 to isolate the failed FRU.

Table 6–3 ASIC LED Codes

LED Display	HEX Code	Solution	Then Replace...	Finally Replace...
oo●●oooo	30	1	2	3[1]
oo●●ooo●	31	1	2	3
oo●●oo●o	32	1	2	3
oo●●oo●●	33	1	2	3
oo●●o●oo	34	1	2	3
oo●●o●o●	35	1	2	3
oo●●o●●o	36	1	2	3

[1] If replacing the system board fixes the system, then try reinstalling the original I/O board.

(continued on next page)

Table 6–3 (Cont.) ASIC LED Codes

LED Display	HEX Code	Solution	Then Replace...	Finally Replace...
oo••o•••	37	1	2	3
oo•••ooo	38	1	2	3
oo•••oo•	39	1	2	3
oo•••o•o	3A	1	2	3
oo••••••	3F	None: All tests Passed		

Table 6–4 ASIC LED Codes Action Table

Step	Action
1	Reseat I/O board.
2	Replace I/O board.
3	Replace system board.

6.2.3 Memory LED Codes

The Memory LED codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute the MEMORY diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5

If the system does not enter console mode (>>>) or hex code DD is not displayed on the LEDs, then replace the failing SIMM.

LED Display	HEX Code	Description
oo•ooooo	20	Machine Check
oo•oooo•	21	CELL Fill mem with test pattern data
oo•ooo•o	22	CELL Forward Rd/Compare /Complement/Wr
oo•ooo••	23	CELL Reverse Rd/Compare /Complement/Wr
oo•oo•oo	24	ADDR Fill mem with addresses as data
oo•oo•o•	25	Refresh test in progress
oo•oo••o	26	ADDR Read/Compare data = address

LED Display	HEX Code	Description
oo•oo•••	27	BITS Fill mem with a pattern of 1s in a field of 0s
oo•o•ooo	28	BITS Read/Compare data = pattern
oo•o•oo•	29	Reserved
oo•o•o•o	2A	Reserved
oo•o•o••	2B	LLSC load-locked/store-conditional tests
oo•o••oo	2C	B-cache tag parity detection
oo•o••o•	2D	ECC detection
oo•o•••o	2E	Reserved
oo•o••••	2F	Clear memory to zeroes

6.2.4 NVR LED Codes

The NVR LED codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode (>>>), then execute NVR diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–5 and then perform the specified steps in Table 6–6 to isolate the failed FRU.

Table 6–5 NVR LED Codes

LED Display	HEX Code	Solution	Then Replace...
oo•••o•o	3A	1	2
oo•••o••	3B	1	2
oo••••oo	3C	1	2
oo••••o•	3D	1	2
oo•••••o	3E	1	2
oo••••••	3F	All tests passed	

Table 6–6 NVR LED Codes Action Table

Step	Action
1	Reseat I/O board.
2	Replace I/O board.

6.2.5 SCC LED Codes

The SCC LED codes represent continued power on and extended self-test testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute SCC diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–7 and then perform the specified steps in Table 6–8 to isolate the failed FRU.

Note

If a DEC 3000 Model 400S or 600S AXP system is the one being tested, then the console command SERVER is required to be set to ON (SET SERVER ON).

Table 6–7 SCC LED Codes

LED Display	Hex Code	Solution	Then Replace...	Finally Replace...
o●oooooo	40	Informational only, never fails here.		
o●ooooo●	41	Informational only, never fails here.		
o●oooo●o	42	1	5	—
o●oooo●●	43	2	5	—
o●ooo●oo	44	1	5	—
o●ooo●o●	45	1	5	—
o●ooo●●o	46	1	5	—
o●ooo●●●	47	4	7	5[1]
o●oo●ooo	48	3	6	5

[1] If replacing the I/O board fixes the system, then try reinstalling the original keyboard.

(continued on next page)

Table 6–7 (Cont.) SCC LED Codes

LED Display	Hex Code	Solution	Then Replace...	Finally Replace...
o•oo•oo•	49	Reserved	—	—
o•oo•o•o	4A	Reserved	—	—
o•oo•o••	4B	Reserved	—	—
o•oo••oo	4C	Reserved	—	—
o•oo••o•	4D	Reserved	—	—
o•oo•••o	4E	Reserved	—	—
o•oo••••	4F	Informational only, never fails here.		

Table 6–8 SCC LED Codes Action Table

Step	Action
1	Reseat I/O board.
2	Reseat modem loopback (only in service mode).
3	Reseat mouse connection.
4	Reseat keyboard connection.
5	Replace I/O board.
6	Replace mouse.
7	Replace keyboard.

6.2.6 NI LED Codes

The NI LED codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute NI diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–9 and then perform the specified steps in Table 6–10 to isolate the failed FRU.

Table 6–9 NI LED Codes

LED Code	HEX Code	Solution	Then Replace...
o•o•oooo	50	1	2
o•o•ooo•	51	1	2
o•o•oo•o	52	1	2
o•o•oo••	53	1	2
o•o•o•oo	54	1	2
o•o•o•o•	55	1	2
o•o•o••o	56	1	2
o•o•o•••	57	1	2
o•o••ooo	58	1	2
o•o••oo•	59	1	2
o•o••o•o	5A	1	2
o•o••o••	5B	1	2
o•o•••oo	5C	1	2
o•o•••o•	5D	1	2
o•o••••o	5E	1	2
o•o•••••	5F	None: All Tests Passed	

Table 6–10 NI LED Codes Action Table

Step	Action
1	Reseat I/O board and system board.
2	Replace I/O board.

6.2.7 ISDN LED Codes

The ISDN LED codes represent continued power-on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute ISDN diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–11 and then perform the specified steps in Table 6–12 to isolate the failed FRU.

Table 6–11 ISDN LED Codes

LED Display	HEX Code	Solution	Then Replace...
o•••oooo	70	1	2
o•••ooo•	71	1, 3, 4	2, 5 (M900S)
o•••oo•o	72	1	2
o•••oo••	73	1	2
o•••o•oo	74	1	2
o•••o•o•	75	1	2
o•••o•••	77	3, 4, 1	2
o••••ooo	78	3, 4, 1	2
o••••oo•	79	3, 4, 1	2
o•••••••	7F	None: All Tests Passed	

Table 6–12 ISDN LED Codes Action Table

Step	Action
1	Reseat I/O board and system board.
2	Replace I/O board.
3	Make sure a handset is connected.
4	Make sure that the audio module cable is connected to the I/O board.
5	Replace audio module (M900S).

6.2.8 SCSI LED Codes

The SCSI LED codes represent continued power on testing. If an error occurs during this testing sequence, then a hexadecimal code appears with FRU and error code information on the monitor screen.

If the system enters console mode, then execute SCSI diagnostics and interpret the error information using the:

- SHOW ERROR command
- Diagnostic information in Chapter 5
- Diagnostic error messages in Chapter 14

If the system does not enter console mode (>>>) or if hex code DD is not displayed on the LEDs, then use Table 6–13 and then perform the specified steps in Table 6–14 to isolate the failed FRU.

Table 6–13 SCSI LED Codes

LED Display	HEX Code	Solution	Then Replace...
o●●ooooo	60	1	2
o●●oooo●	61	1	2
o●●ooo●o	62	1	2
o●●ooo●●	63	1, then 3	2, then 4
o●●oo●oo	64	1, then 3	2, then 4
o●●oo●o●	65	1, then 3	2, 4, then 5
o●●oo●●o	66	Reserved for future use	–
o●●oo●●●	67	Reserved for future use	–
o●●o●ooo	68	Reserved for future use	–
o●●o●oo●	69	Reserved for future use	–
o●●o●o●o	6A	Reserved for future use	–
o●●o●o●●	6B	Reserved for future use	–
o●●o●●oo	6C	Reserved for future use	–
o●●o●●o●	6D	Reserved for future use	–
o●●o●●●o	6E	Reserved for future use	–
o●●o●●●●	6F	None: All Tests Passed	–

Table 6–14 SCSI LED Codes Action Table

Step	Action
1	Reseat I/O board and system board.
2	Replace I/O board.
3	Check SCSI cables and SCSI ID.
4	Replace the drive.
5	All removable disk devices must have media installed.

6.2.9 Console LED Codes

The last testing sequence before entering the console program now begins. If this is successful, then the LEDs should display hex code DD for console entry.

If the system does not enter console mode, then use Table 6–15 and perform the specified steps in Table 6–16 to isolate the failed FRU.

No information appears other than the console (>>>) prompt or the DD hex code to indicate that console mode has been entered.

Table 6–15 Console LED Codes

LED Display	HEX Code	First Replace...	Then Replace...
•••o••••	EF	Informational only, never fails here.	
•••o•••o	EE	Informational only, never fails here.	
•••o••o•	ED	Informational only, never fails here.	
•••o••oo	EC	1	2
•••o•o••	EB	1	2
•••o•o•o	EA	1	2
•••o•oo•	E9	1	2
•••o•ooo	E8	1	2
•••oo•••	E7	1	2
•••oo••o	E6	1	2
•••oo•o•	E5	1	2
•••oo•oo	E4	1	2
•••ooo••	E3	1	2
•••ooo•o	E2	1	2
•••oooo•	E1	1	2
•••ooooo	E0	Informational only, never fails here.	
••o•••••	DF	1	2
••o••••o	DE	1	2
••o•••o•	DD	Console entry >>>	–
oooooooo	00	Console is about to be exited.	–

Table 6–16 Console LED Codes Action Table

Step	Action
1	Replace I/O board.
2	Replace system board.

6.2.10 MIPS Emulator LEDs

The following LED codes represent MIPS emulator diagnostic tests. If an error occurs during one of the tests, the screen displays a FRU code and error code.

Table 6–17 MIPS Emulator Codes

LED Display	HEX Code	Description
●oo●oooo	90	MIPS emulator running with no errors.
●oo●ooo●	91	Invalid REX command entered.
●oo●oo●o	92	Unsupported REX command entered. Supported in REX but not supported by emulator.
●oo●oo●●	93	Bad address detected by the emulator.
●oo●o●oo	94	ROM not found in this slot.
●oo●o●o●	95	ROM object not found.
●oo●o●●o	96	Cannot load ROM object.
●oo●o●●●	97	Invalid MIPS-I instruction detected.
●oo●●ooo	98	ROM object called halt.
●oo●●oo●	99	Invalid callback called.
●oo●●o●o	9A	Unsupported callback called; callback currently not in this release.

6.3 84 Fail

6.3.1 Overview

The message 84 Fail on your monitor is a general purpose failure message that is generated under two conditions:

- Using the TEST command

  When an 84 code failure occurs, diagnostic error code information also appears. Disregard the 84 Fail message and rely on the error code information.

- Using the BOOT command

  When an 84 code failure occurs during a BOOT command, the probable cause for the failure is:

  - BOOT device is not present.
  - BOOT device is present but there is no media.
  - BOOT block is not found on the media.

6.4 Troubleshooting Tables

6.4.1 Overview

The following tables contain information to help you troubleshoot the DEC 3000 Models 400S/600S AXP systems. The tables are organized as follows:

- System Problems
- Monitor Problems
- Mouse Problems
- Keyboard Problems
- Drive Problems
- Network Problems
- Audio Problems
- Console Secure Problems
- Firmware Upgrade Problems

6.4.2 Using the Tables

Each troubleshooting table contains symptoms, possible causes, and suggested actions. If more than one action is suggested, perform them in the order listed.

6.4.3 System Problems

Table 6–18 lists the symptoms, possible causes, and suggested actions you can take to troubleshoot system problems.

Table 6–18 System Problems

Symptom	Possible Cause	Corrective Action
Fan not running.	A fan failed.	Check the internal fan failure circuit breaker. • If the circuit breaker is tripped, a fan has failed; replace the fan. • If the circuit breaker is on, the fans are OK.
	The power supply failed.	Replace the power supply.
All fans start then the internal fan failure circuit breaker trips.	Airflow sensor failed.	Replace the airflow sensor.
	Fan tachometer alarm board failed.	Replace the fan tachometer alarm board.

(continued on next page)

Table 6–18 (Cont.) System Problems

Symptom	Possible Cause	Corrective Action
The DC ON LED is off.	No system power.	Check the power outlet and cord.
	Incorrect power supply harness connection.	Check the harness connectors.
	System power supply failure.	Replace the power supply.
No LEDs are on.	Possible bad I/O board and cable or system board.	Reseat the I/O board. If the problem persists, then replace the I/O board and then the system board. See Chapter 4 for location and procedure.
Power-on display does not appear and the LEDs indicate F0.	SROM jumper setting incorrect.	See Chapter 3 for setting and location.
Power-on display does not display and the LEDs display DD.	Monitor is not turned on.	Turn on the monitor.
No screen display.	Brightness and contrast controls adjusted incorrectly.	Adjust the monitor brightness and contrast controls.
	Loose or broken cable.	Verify the monitor cable/video connections are secure.
	Monitor fuse is blown.	See the monitor guide for fuse replacement instructions.
	The alternate console switch is not in the correct position.	If the console is connected to an alternate console port, then make sure the alternate console switch is set for the alternate console position (down). If the console is connected through a graphics option, then make sure that the alternate console switch is set to the graphic position (up).
System does not boot after power-on.	Software is not installed.	Install the system software. Refer to the software documentation for installation instructions.
	Default recovery action is set to halt.	In console mode (>>>), enter the SHOW AUTO_ACTION command for proper setting. Modify using the SET AUTO_ACTION command. See Chapter 13 for further information.

(continued on next page)

Table 6–18 (Cont.) System Problems

Symptom	Possible Cause	Corrective Action
	Incorrect boot device was specified.	See Chapter 13 for further information.
	In console mode (>>>), enter the SHOW BOOTDEF_DEV command for proper setting. Modify using the SET BOOTDEF_ DEV command.	See Chapter 13 for further information.
	Boot device is not properly configured.	Enter the SHOW DEVICE command to verify that all devices are configured properly. If they are not, then verify IDs and cables.
	Faulty boot device.	Run diagnostic/utilities for faulty devices. See Chapter 5.

6.4.4 Monitor Problems

Table 6–19 lists the symptoms, causes, and suggested actions for monitor problems. If the suggested actions listed do not correct the problem, then verify that all cable connections are secure. If cable connections are correct, verify the graphics option by executing the T TCx command.

Table 6–19 Monitor Problems

Symptoms	Possible Cause	Corrective Action
There is no monitor display.	Alternate console is enabled.	Verify that the alternate console switch setting is in the up position. Verify that the monitor power LED and system are on.
The monitor screen is unstable.	Monitor needs alignment.	Refer to the monitor reference material for adjustment procedures.
No screen display.	Brightness and contrast controls adjusted incorrectly.	Adjust the monitor brightness and contrast controls.

6.4.5 Mouse Problems

Table 6–20 lists the symptoms, causes, and suggested actions for mouse problems. If the suggested actions listed do not correct the problem, then verify that all cable connections are secure. If cable connections are correct, then execute the SCC diagnostics. See Chapter 5 for further information.

Table 6–20 Mouse Problems

Symptom	Possible Cause	Corrective Action
System boots 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.	Shut down the system. Reseat the cable. Reboot the system. Connect the mouse cable to the mouse /keyboard cable and make sure that the cable is connected to the workstation.
	The system is halted; no pointer appears on the screen.	If in console mode (>>>), boot the system.
Pointer does not appear on screen or does not respond.	Pointer mode is disabled.	Press Ctrl F3 to enable pointer.

6.4.6 Keyboard Problems

Table 6–21 lists the symptoms, causes, and suggested actions for keyboard problems. If the suggested actions listed do not correct the problem, then verify that all cable connections are secure. If cable connections are correct, then execute the SCC diagnostics. See Chapter 5 for further information.

Table 6–21 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 the screen.
	The keyboard cable is loose or not connected.	Verify that the keyboard cable is securely connected.

6.4.7 Drive Problems

Table 6–22 lists the symptoms, causes, and suggested actions for drive problems. If the suggested actions listed do not correct the problem, then verify that all cable connections are secure. If cable connections are correct, then execute the SCSI diagnostics or utilities to isolate a media problem. See Chapter 5 for further information.

Note

Before running diagnostics, terminate the SCSI B. This eliminates any external problems.

Table 6–22 Drive Problems

Symptom	Possible Cause	Corrective Action
Drive does not work.	Two SCSI identifiers are set to the same ID number.	Issue the SHOW DEVICE command while in console mode. Reset the SCSI IDs to a unique number. Make sure that all installed devices are present.
	The cables are loose.	Verify that all cables are securely connected.
	The drive is defective.	Run diagnostics to isolate the fault. Replace the FRU.
	Cables are terminated incorrectly.	Verify that the last device is correctly terminated.

6.4.8 Network Problems

Table 6–23 lists the symptoms, causes, and suggested actions for network problems. If the suggested actions listed do not correct the problem, then verify that all cable connections are secure. If cable connections are correct, then execute the ASIC and NI diagnostics while in service mode (for extended testing capabilities). See Chapter 5.

Table 6–23 Network Problems

Symptom	Possible Cause	Corrective Action
NI error message appears when verifying Ethernet.	No thickwire/10BASE-T terminator or cable was installed.	Attach appropriate terminator.
	Cable connection is loose.	Verify that all connections on the Ethernet segment are secure.
Cannot boot from the network.	There is a local network problem. The problem is most likely caused by the customer server system or the network.	Contact system manager.
	NI interface is defective.	Run diagnostics (TEST NI command) with terminators attached. Replace faulty FRU if test fails.

6.4.9 Audio Problems

To isolate audio problems, you must execute the ISDN diagnostics while in service mode (for extended testing capabilities). See Chapter 5 for details.

6.4.10 Console Secure Problems

Refer to Chapter 3 for procedures to:

- Enable console security
- Reset console password
- Enter the privileged state

6.4.11 Firmware Upgrade Problems

If you have encountered problems trying to upgrade the flash EEPROMs, refer to Table 6–24 to isolate the problem.

Table 6–24 Firmware Upgrade Problems

Symptom	Possible Cause	Corrective Action
Unable to perform the upgrade.	ROM update jumpers on the I/O board are not set to the on position.	See Chapter 3.

7

Recommended Spare Parts List

7.1 Spare Parts List for the DEC 3000 Models 400S/600S AXP

7.1.1 Spare Parts List

Table 7–1 lists the recommended spare parts for the DEC 3000 Models 400S/600S AXP systems.

Table 7–1 DEC 3000 Models 400S/600S AXP Spare Parts List

Part	Part Number
I/O Board (400S)	54-21813-01
I/O Board (600S)	54-21813-02
System (CPU) board (400S)	54-21149-02
System (CPU) board (600S)	54-23153-03
Memory motherboard (MMB)	54-21815-01
Power supply	70-31597-01
SIMM, 2 MB	54-21139-BA
SIMM, 4 MB	54-21139-CA
SIMM, 8 MB	54-21139-DA
SIMM, 16 MB	54-21139-EA
SIMM, 32 MB	54-21139-FA
Top cover	70-31827-01
Bottom cover	74-48446-01
Main fan assembly	70-31589-01
Rear fan assembly	70-31591-01
Impingement fan assembly	70-31590-01
Airflow sensor	70-31813-01
-12 Vdc converter board	54-20074-02
Fan tachometer alarm board	70-44209-01
DC on/off switch	70-31810-01
DC power LED	70-31598-01

(continued on next page)

Table 7–1 (Cont.) DEC 3000 Models 400S/600S AXP Spare Parts List

Part	Part Number
AC input filter	12-39991-01
Drive power cable	17-03489-01
SCSI cable, long	17-03487-01
SCSI cable, short	17-03488-01
Removable media tray SCSI data cable	17-03314-01
Internal SCSI data cable	17-03801-01
Internal 20-conductor power cable	17-03316-01
Internal fan power cable	70-31786-01
Internal fan power cable	70-31786-02
Internal fan power cable	70-31602-01
Internal 16-conductor power cable	70-31803-01
Power supply 16-conductor power cable	70-31806-01
Internal 14-conductor power cable	70-31804-01
Power supply 14-conductor power cable	70-31804-01
Internal 12-conductor power cable	70-31805-01
Removable tray power cable	17-03344-01
Internal ac power cable	70-31601-01
Power cord	17-00083-58
Desktop mouse and keyboard cable	17-02640-02
Front panel assembly	70-31595-01
Removable media tray cover	74-49237-01
Honeycomb filter	12-44369-01
Air filter	12-44371-01
Loopbacks and Terminators	
Printer port loopback	12-25083-01
Thickwire Ethernet loopback	12-22196-01
SCSI terminators	12-30552-01
Fast SCSI terminators	12-41296-01
10BASE-T Ethernet loopback	H4082-AA
Modem port loopback	29-24795

7.2 DEC 3000 Models 400S/600S AXP TURBOchannel Options Parts List

7.2.1 Options Part Numbers

Table 7–2 lists the part numbers for the TURBOchannel options.

Table 7–2 DEC 3000 Models 400S/600S AXP TURBOchannel Options List

Option	Option Number	Part Number
SCSI controller	PMAZ-AB	54-19876-01
Thickwire Ethernet controller	PMAD-AA	54-19874-01
FDDI interface module	DEFZA-AA	DEFZA-AA
TCE option module	-	54-20623-01
Monochrome frame buffer (MX)	PMAG-AA	54-20609-01
Color frame buffer (CX)	PMAG-BA	54-19815-01
Smart frame buffer 1280 x 1024, 72 Hz 1280 x 1024, 66 Hz (HX)	PMAGB-BA	54-21143-01
Smart frame buffer 1280 x 1024, 72 Hz 1024 x 864, 60 Hz (HX)	PMAGB-BC	54-21143-02
Smart frame buffer 1280 x 1024, 72 Hz 1024 x 768, 72 Hz (HX)	PMAGB-BE	54-21143-03
2D graphics accelerator (PX)	PMAG-CA	54-20314-01
True color frame buffer 66 Hz (TX)	PMAG-JA	30-35790-01
True color frame buffer 72 Hz (TX)	PMAGB-JA	30-35790-02
True color frame buffer picture-in-picture board		30-35788-01
Lo 3D graphics accelerator 66 Hz (PXG)	PMAG-DA	54-20185-01
Lo 3D graphics accelerator 72 Hz (PXG+)	PMAGB-DA	54-20185-02

(continued on next page)

Table 7–2 (Cont.) DEC 3000 Models 400S/600S AXP TURBOchannel Options List

Option	Option Number	Part Number
Lo 3D graphics accelerator 66 Hz (PXG+)	PMAGB-DC	54-20185-04
Mid 3D graphics accelerator 66 Hz (PXG)	PMAG-EA	54-20185-02
Lo 3D graphics accelerator 72 Hz with Z-buffer (PXG+)	PMAGB-EA	54-20185-05
Lo 3D graphics accelerator 66 Hz with Z-buffer (PXG+)	PMAGB-EC	54-20185-06
Hi 3D graphics accelerator 66 Hz (PXG turbo)	PMAG-FA	54-20114-01
Hi 3D graphics accelerator 72 Hz (PXG turbo+)	PMAGB-FA	54-20114-02
Fast SCSI	PMAZC	
8-bit Z-buffer	–	54-20410-AA
16-bit Z-buffer	–	54-20352-AA
8-plane video SIMM	–	54-20116-AA

Part III

DEC 3000 Model 900S AXP Specific Information

Part III provides information specific to the DEC 3000 Model 900S AXP systems. This part includes the following chapters:

8

System Configuration

8.1 Overview

8.1.1 Chapter Overview

This chapter covers the following topics:

- System Components
- System Block Diagram
- Front View
- Rear View
- System Board Jumper Locations
- I/O Board Jumper Locations
- Console Security
- Storage Devices
- Memory Configuration

8.1.2 Introduction

The DEC 3000 Model 900S AXP is a high-performance rackmount server that may be mounted in a standard EIA 19-inch rack.

The DEC 3000 Model 900S AXP is based on Digital's Alpha AXP architecture, providing all the advantages of a 64-bit computing environment, and the choice of several different operating systems.

8.1.3 General Rules

Before upgrading or replacing storage devices or memory, follow these general rules:

- If replacing storage devices, then set storage devices to the same SCSI ID as the previously removed drive.
- If upgrading storage devices, then enter the console command SHOW CONFIG to see all current SCSI address settings.
- If upgrading or replacing memory, make sure all memory SIMMs are of the same type for each memory bank and that each bank is fully populated.

8.1.4 Console Commands

Use the following console commands to verify compliance with the general rules and the results of configuration procedures:

- SHOW CONFIGURATION
- SHOW MEMORY
- SHOW DEVICE

8.2 System Components

8.2.1 System Components

The DEC 3000 Model 900S AXP systems include the following components:

- System (CPU) board
- Audio module
- I/O board
- Memory subsystem
- Power supply

The DEC 3000 Model 900S AXP systems provide support for:

- Up to four internal SCSI disk drives
- Two 13-centimeter (5.25-inch), half-height, removable SCSI devices
- Up to seven external SCSI devices
- Up to six TURBOchannel options

8.2.2 System Board

The system board includes the following components:

- DECchip 21064 (CPU)
- 8 KB serial ROM
- 2 MB backup cache
- Main memory controller
- Controller for the TURBOchannel I/O bus
- 256 KB of flash ROM (system ROM)
- Three TURBOchannel option slots

8.2.3 I/O Board

The I/O board includes the following components:

- TOY/NVR controller chip
- Two serial line controllers
- ISDN interface with audio I/O
- Two SCSI controllers
- Ethernet controller
- 256 KB of flash ROM

- Three TURBOchannel option slots

The DEC 3000 Model 900S AXP systems provide interfaces to:

- Serial lines
- Ethernet
- Fast SCSI
- ISDN
- Audio in/out
- Battery backed-up TOY
- High-performance two- and three-dimensional graphics subsystem
- FDDI

Addresses generated by DMA devices in the I/O system may be translated by a scatter/gather map. The scatter/gather map can map 32 KB pages. This translation is optional, enabled on a device-by-device basis.

Serial Lines: The serial line interface supports the following equipment:

Equipment	Connections
Keyboard	Connects to a 15-pin D-sub connector
Mouse	Shares 15-pin D-sub connector with keyboard
Printer	Connects to a 6-pin MMJ and is DEC-423 compliant
Communication port	Connects to a 25-pin D-sub connector and supports full modem control

Ethernet Interface: The Ethernet interface can connect to the local area network (LAN) by using an attachment unit interface (AUI, or thickwire) or 10BASE-T twisted-pair cable. The selection (thickwire or twisted pair) is software controllable.

SCSI Interface: The SCSI interface consists of two separate channels using two SCSI-2 controller chips (53CF94). These controller chips connect to the TURBOchannel through an ASIC. The ASIC buffers data to and from the SCSI controllers, providing 16-longword DMA bursts across the TURBOchannel for increased bus efficiency.

ISDN and Audio In/Out: An AMD 79C30A controller chip provides an ISDN interface and telephone-quality audio input and output. Jacks and connectors in the front of the unit provide connections for a microphone and headphones.

Battery Backed-Up TOY: A battery backed-up time-of-year (TOY) chip provides a time reference when the unit is turned off. The TOY also provides 50 bytes of nonvolatile RAM (NVR) for system parameters.

8.2.4 Memory Subsystem

The memory subsystem includes the following:

- Four memory motherboards (MMBs) that mount on the system board. To have an operational memory subsystem, all four MMBs must be present.
- The memory arrays are spread among the four MMBs. Each bank of memory consists of eight memory SIMMs, two on each MMB.

  The memory subsystem supports up to 1 gigabyte (GB) of memory.

The DEC 3000 Model 900S AXP systems contain a high-performance memory subsystem that uses ECC logic. Memory can be configured with up to 256 MB using 1M×4 DRAMs or up to 1 GB using 4M×4 DRAMs.

8.2.5 CPU/ Cache

The DEC 3000 Model 900S AXP systems contain a single-chip processor and floating point running at 5.0 ns. The processor is a superscalar superimplementation of the Alpha AXP architecture.

The DEC 3000 Model 900S AXP systems contain the following direct-mapped caches:

- Icache (instruction cache)
- Dcache (data cache)

The systems use a second-level cache to help minimize the performance penalty of misses and write-throughs to the primary cache. This second-level cache is a 2 MB, direct-mapped, write-back cache with a block size of 32 bytes.

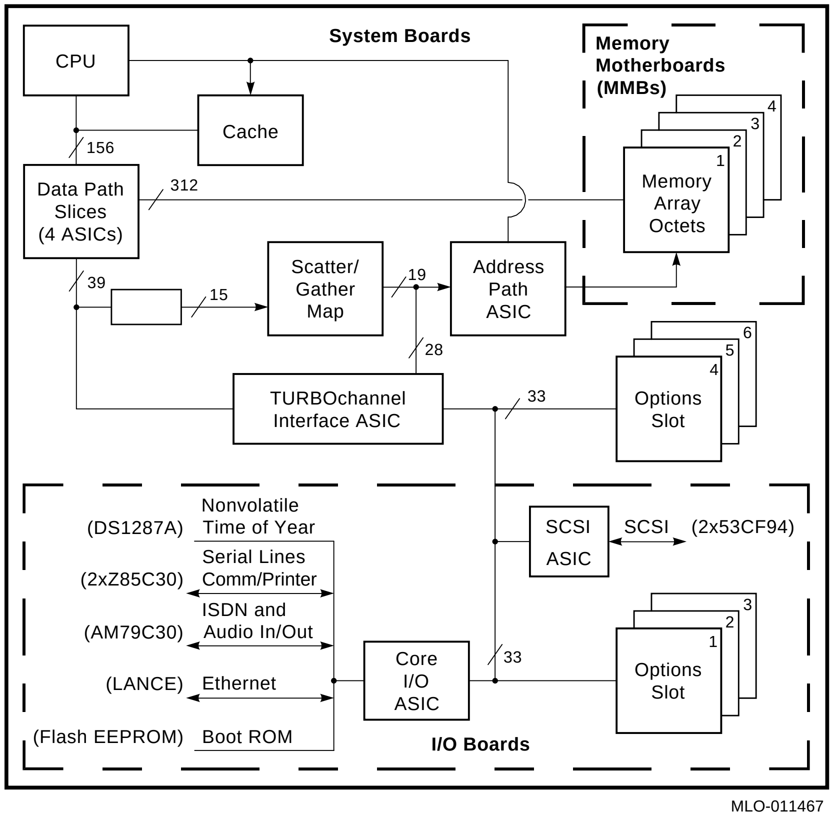
The cache is implemented on the system board using 128 KB × 8 static RAMs. The read bandwidth between the processor and the second-level cache is approximately 640 MB and the write bandwidth is 420 MB.

8.3 System Block Diagram

8.3.1 System Block Diagram

Figure 8–1 shows the interaction of all system components.

Figure 8–1 System Block Diagram



8.4 Front View

8.4.1 Front View

Figure 8–2 shows the controls, lights, and devices on the front of the DEC 3000 Model 900S AXP systems. Table 8–1 describes their functions.

Figure 8–2 Front View

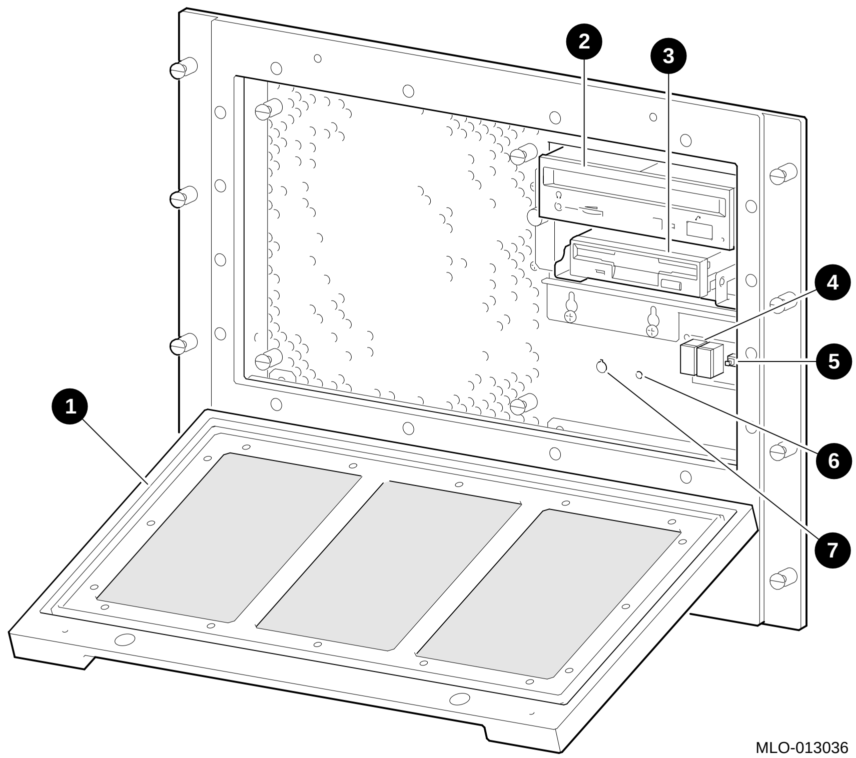


Table 8–1 DEC 3000 Model 900S AXP Systems (Front)

Feature	Function
❶ Front door	Opens to allow access to the front panel indicators, controls, and the removable storage media
❷ Compact disc or floppy disk (optional)	Removable storage media
❸ Compact disc or floppy disk (optional)	Removable storage media
❹ Diagnostic display	Displays error codes that indicate potential system problems
❺ Halt button	Puts the system in console mode
❻ DC power ON indicator	When lit, indicates that the dc power is on
❼ DC on/off switch	Turns the dc power on and off

8.5 Rear View

8.5.1 Rear View

Figure 8–3 shows the switches, connectors, and modules on the rear of the DEC 3000 Model 900S AXP systems. Table 8–2 describes their functions.

Figure 8–3 Rear View

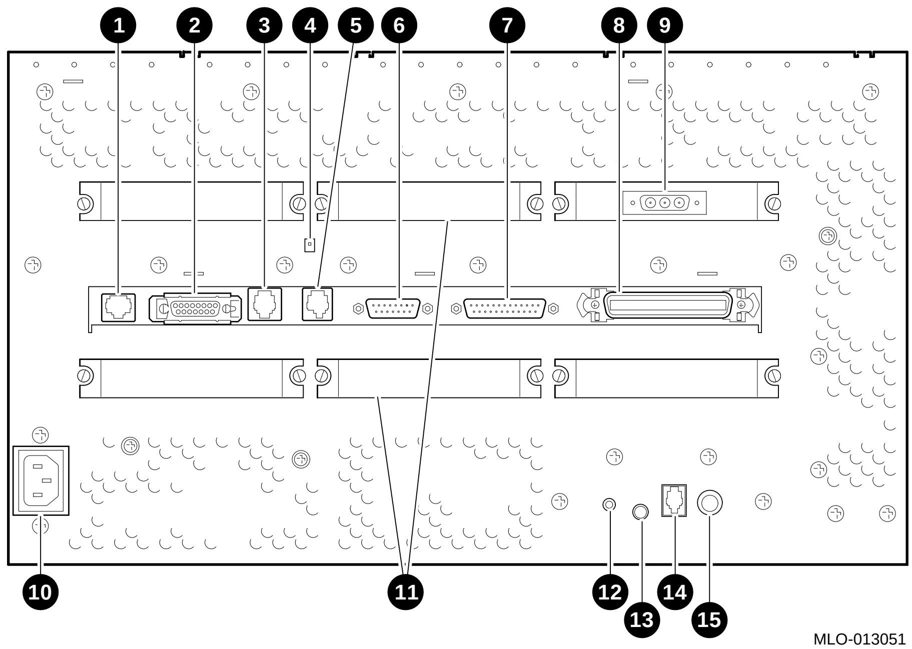


Table 8–2 DEC 3000 Model 900S AXP Systems (Rear)

Feature	Function
❶ 10BASE-T Port	Connects a 10BASE-T Ethernet network cable.
❷ AUI Port	Connects an Attachment Unit Interface (AUI) Ethernet network cable (sometimes referred to as standard or thickwire Ethernet).
❸ ISDN Port	Connects an Integrated Services Digital Network (ISDN) cable.
❹ Alternate console switch	Directs console output to a monitor (switch right) or to an alternate console such as a terminal (switch left).
❺ Alternate console/printer port	Connects a terminal as an alternate console, or a printer.
❻ Keyboard/mouse port	Connects the keyboard/mouse extension cable.
❼ Synchronous/ asynchronous communications port	Connects a communications device such as a printer, plotter, modem, or console terminal.
❽ External SCSI port	Connects Small Computer Systems Interface (SCSI) peripheral devices. The SCSI port has the SCSI terminator shipped in place.
❾ Monitor video port	Connects the monitor video cable (optional).
❿ System power socket	Connects the system ac power cord.
⓫ TURBOchannel slots	Connects TURBOchannel options, such as 2D or 3D graphics modules, SCSI adapters, and Ethernet adapters. There are six slots.
⓬ Microphone input jack	Connects a microphone.
⓭ Speaker output jack	Connects a speaker or headphone for audio output.
⓮ Telephone jack	Connects a telephone handset.
⓯ Audio input jack	Connects an audio input line.

8.6 System Board Jumper Locations

8.6.1 System Board Jumper Locations

Figure 8–4 shows the location of jumpers and the serial ROM on the system board. Table 8–3 describes each location.

Figure 8–4 System Board Jumper Locations

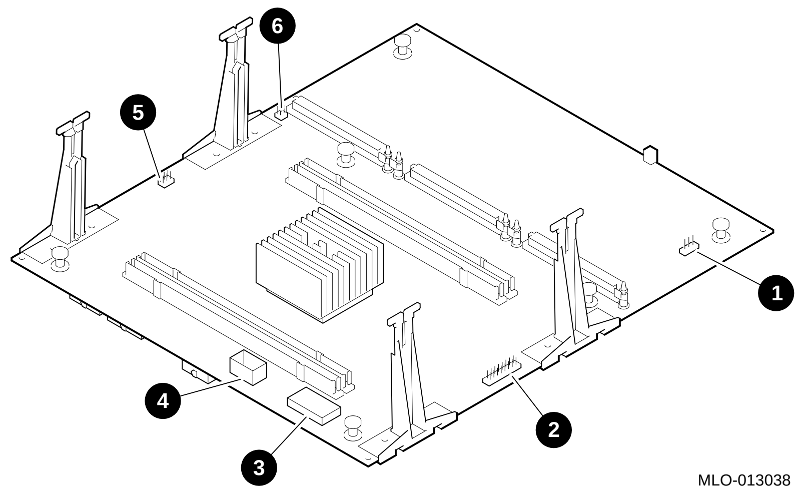


Table 8–3 System Board Jumpers

Feature	Description	Comments	Default Setting
❶	Test pins	Used by engineering	–
❷	Serial ROM jumpers	Jumper location 0 only	Installed
❸	Serial ROM	–	–
❹	Serial ROM test port	–	–
❺	Clock divider jumpers	–	Installed
❻	Flash ROM update jumper	Enable and park positions	Enabled

8.7 I/O Board Jumper Locations

8.7.1 I/O Board Jumpers

Figure 8–5 shows the location of the jumpers, Enet address ROM chip, TOY/NVR chip, and flash ROM on the I/O board. Table 8–4 describes each location.

Figure 8–5 I/O Board Jumper Locations

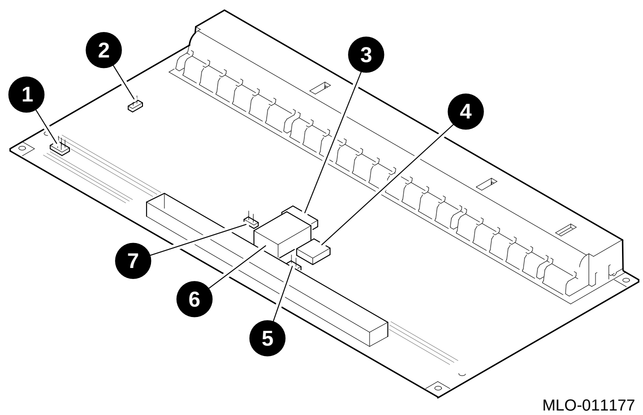


Table 8–4 I/O Board Jumpers

Feature	Description	Comments	Default Setting
❶	Park location	Used to store unused jumpers	–
❷	Active terminator enable	In = Enabled (terminator ON), Out = Disabled	Enabled
❸	Enet address ROM chip	Socketed	–
❹	Flash ROM	–	–
❺	Flash ROM jumper	In = Enabled, Out = Disabled	Enabled
❻	TOY/NVR chip	Socketed	–
❼	Console secure jumper	In = Enabled, Out = Disabled	Disabled

8.8 Console Security

8.8.1 Secure Jumper

To secure the console, perform the following steps. Use Figure 8–5 and Table 8–4 for reference.

1. Power down the system.
2. Remove the I/O board and install the secure jumper. See Chapter 9 for details.
3. Reinstall the I/O board.
4. Power up the system and enter console mode. The console prompt (>>>) appears.
5. Enter a 16-character hexadecimal password. You can use the characters 0 to 9 and A to F.
6. Set the environment variable SECURE to ON.

The system prompts you to enter the old password once and the new password twice. The passwords are not echoed or displayed.

The DEC 3000 Model 900S AXP systems have a password-protected console security feature that prevents unauthorized users from accessing all of the console commands. Authorized users can access the console commands by using the following privileged commands:

- BOOT (with parameters)
- DEPOSIT
- EXAMINE
- FIND
- HALT
- INITIALIZE
- REPEAT
- SET
- SHOW
- START
- TEST

The unprivileged commands are:

- BOOT (no parameters)
- LOGIN
- CONTINUE
- HELP

8.8.2 Example

This example shows when the password is set.

```
>>>SET PASSWORD Return
PSWD1> ENTER_NEW_PASSWORD
PSWD2> ENTER_NEW_PASSWORD
```

8.8.3 Entering the Privileged State

To enter the privileged state on a secured console, enter the LOGIN command as follows:

```
>>> LOGIN {password} RETURN
```

Use the password you set with the **SET PASSWORD** command. The password is not echoed or displayed.

8.8.4 Exiting the Privileged State

The following commands allow you to exit the privileged state:

- BOOT
- CONTINUE
- HALT

8.8.5 Disabling Console Security

To disable console security, do the following:

1. In console mode, set the SECURE variable to OFF.
2. Remove the secure jumper on the I/O board.

8.8.6 Restoring the Console Password

If you forget the console password, you can enter a new password as follows:

1. Shutdown the system.
2. Power down the unit.
3. Remove the I/O board.
4. Remove the secure jumper from the I/O board.
5. Reinstall the I/O board with the secure jumper disabled.
6. Power up the unit.
7. Enter the following DEPOSIT command:

   ```
   >>> DEP -U-Q-N:1 1E0200088 0 Return
   ```

8. Power down the unit.
9. Remove the I/O board and install the secure jumper.
10. Reinstall the I/O board.
11. Power up the unit.
12. Enter the new password.

8.9 Storage Devices

8.9.1 Configuring Storage Devices

Whne you replace a SCSI device, you must configure the new device to match the old device.

8.9.2 Replacing SCSI Drives

Configure a new device as follows:

1. At the console prompt, enter the SHOW DEVICE command for device information.

   >>> **SHOW DEVICE** Return

2. Remove the device, following the procedures in Chapter 9.
3. Set all jumpers and switches on the new device to match the removed device.
4. Install the new device.
5. At the console prompt, enter SHOW DEVICE to verify the replacement.

   >>> **SHOW DEVICE** Return

6. Run the disk verifier diagnostic (Chapter 14).

8.9.3 Adding SCSI Drives

When you add a SCSI drive, you must configure the device.

Configure the new drive as follows:

1. At the console prompt, enter SHOW DEVICE for existing device information.

   >>>**SHOW DEVICE** Return

2. Set the SCSI address. See Table 8–5 for the SCSI jumper settings for particular devices.
3. Mount the device (Chapter 9).
   - See Figure 9–4 for internal cable routing.
   - Figure 8–6 for the factory-default SCSI ID settings.
   - Figure 9–5 for power cable routing.
4. At the console prompt, enter SHOW DEVICE to verify that the replacement was correct.
5. Run the disk verifier diagnostic (Chapter 14).

Table 8–5 lists the recommended SCSI jumper settings. See Chapter 13 for information about SCSI utilities.

Table 8–5 Recommended SCSI Jumper Settings

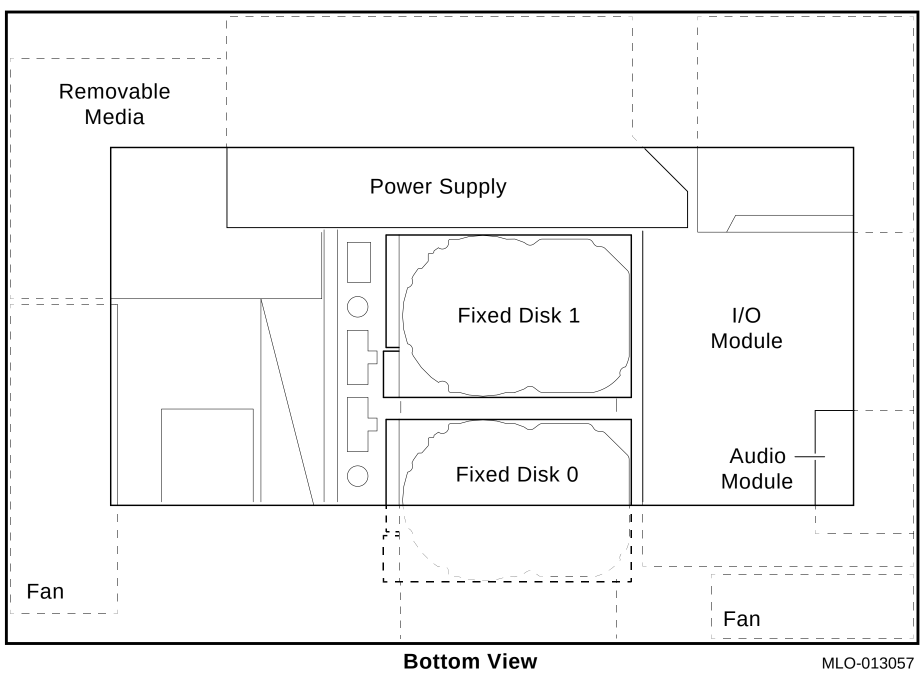
Drive	Recommended SCSI Address	2	1	0
RZ2x	0	Out	Out	Out
RZ2x	1	Out	Out	In
RZ2x	2	Out	In	Out
Factory-installed RZ2x	3	Out	In	In
RRD42	4	In	Out	Out
RX26, TZK1x, TLZ06, TZ30	5	In	Out	In
(Open ID)	6	In	In	In
SCSI controller	7	In	In	Out

Out = Removed.
In = Attached.

8.9.4 Disk Configuration

Figure 8–6 shows the default SCSI ID setting assigned to each drive location in the DEC 3000 Model 900S AXP systems.

Figure 8–6 Factory-Default SCSI ID Settings for Drives



8.10 Memory Configuration

8.10.1 Banks and Slots

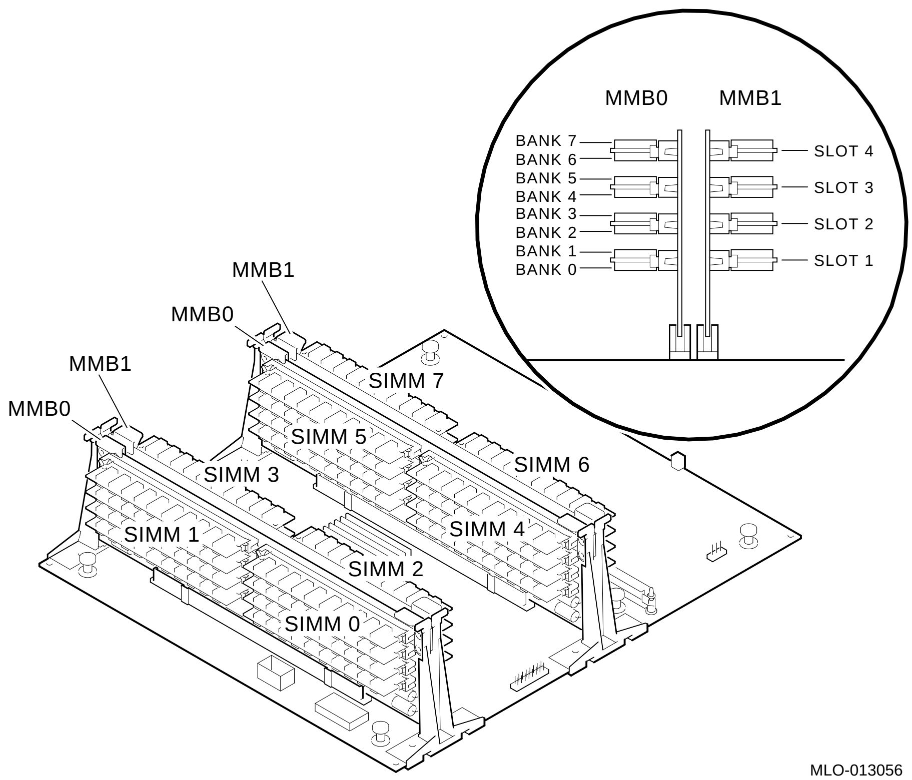
A bank represents the eight memory arrays (memory modules 0 through 7) as shown in Figure 8–7. A slot consists of two banks because every memory array can be populated on both sides as shown.

8.10.2 Example

The following example shows a memory configuration and the relationship between banks and memory module size. For the DEC 3000 Model 900S AXP systems, the banks are numbered 0 through 7, with 0 being closest to the system (CPU) board.

Figure 8–7 shows a layout of memory banks.

Figure 8–7 Memory Bank Layout




```
>>> SHOW MEMORY [Return]
SHOW MEMORY
```

```
DEC 3000 - M800 Memory: 144 Mbytes
------------------------------------------
BANK #      MEMORY_SIZE        START_ADDRESS
------      -----------        -------------
0            008 Mbytes        0x08000000
1            008 Mbytes        0x08800000
2            032 Mbytes        0x00000000
3            032 Mbytes        0x02000000
4            032 Mbytes        0x04000000
5            000 Mbytes        0x00000000
6            032 Mbytes        0x06000000
7            000 Mbytes        0x00000000
 >>>
```

8.10.3 Memory Configuration Rules

When installing memory, follow these configuration rules:

- Each memory bank must be filled in sets of eight memory SIMMs.
- The eight memory SIMMs in a bank must be of equal size.
- The eight memory SIMMs in a bank must be of the same type. They must all be single- or double-sided.

Note

If you violate the rules, the memory size displayed by a SHOW MEMORY command is of lowest value memory module.

8.10.4 Identifying the SIMMs

The following table lists the part numbers for 4, 8, 16, and 32 MB memory SIMMs.

Part Number	Description
54–21139–CA	4 MB Memory SIMM
54–21139–DA	8 MB Memory SIMM
54–22389–AA	16 MB Memory SIMM
54–22389–BA	32 MB Memory SIMM

9

Removal and Replacement Procedures

9.1 Overview

9.1.1 Chapter Overview

This chapter covers the following topics:

- Locating Field Replaceable Units (FRUs)
- Cable Routing
- Top and Bottom Covers
- Audio Module
- Lights and Switch Module
- Power Supply
- Fixed Media Devices
- Removable Media Devices
- TURBOchannel Option
- 3.45 V Regulator Board
- I/O Board
- Fans
- Memory Motherboard
- SIMMs
- System Board
- Airflow Sensor
- -12 Vdc Converter
- Fan Tachometer Alarm Board
- DC On/Off Switch
- DC Power LED
- AC Input Filter

9.1.2 Static Caution

Caution

Always follow antistatic procedures when handling drives and other static-sensitive items.

9.1.3 Before You Start

Before removing or replacing defective parts, the customer must prepare the system by doing the following:

1. If the system is in working condition, back up all data files.
2. Shut down the software.
3. Record the present system configuration. Refer to the SHOW CONFIG command for the procedure.
4. Record environment values.
5. Loosen the two captive screws on the front of the chassis and open the front door.
6. Turn the dc power off with the dc on/off switch.
7. Loosen the eight captive screws (four on each side) on the front bezel and extend the chassis on the slides.
8. Disconnect the ac power cord from the ac power connector on the rear of the chassis.

9.1.4 Antistatic Precautions

Anytime you remove or replace a board or module in the DEC 3000 Model 900S AXP systems, you must take antistatic precautions. To use the antistatic mat, perform the following:

Step	Action
1	Place the elastic end of the antistatic wriststrap on your wrist.
2	Attach the alligator clip to the system power supply.
3	Remove the part or module that you want to remove or replace.

9.1.5 Power Source Warning

Warning

Before removing the top or bottom cover to access the system, you must power down the system and disconnect the power cable from the power source and from the ac power connector on the rear of the chassis.

9.2 Locating Field Replaceable Units

9.2.1 Using the Exploded View

To locate a particular FRU, refer to Table 9–1, Figure 9–1, and Figure 9–2. Table 9–1 lists each FRU and the associated number showing its location in Figure 9–1 and Figure 9–2.

Table 9–1 FRU Locations

FRU	Figure Reference
Main fan	❶ Figure 9–1
Rear fan	❷
Memory motherboard (MMB) and SIMMs	❸
TURBOchannel option (slot 0 shown)	❹
System board	❺
Impingement fan	❻
Regulator board (3.45 V)	❼
Lights and switch module (LSM)	❽
Compact disc or removable media (optional)	❾
Fixed disk drives	❶ Figure 9–2
Power supply	❷
I/O board	❸
Audio module	❹
Airflow sensor	–
-12 Vdc converter	–
Fan tachometer alarm board	–
DC on/off switch	–
DC power LED	–
AC input filter	–

Figure 9–1 shows the FRUs located from the top of the DEC 3000 Model 900S AXP systems.

Figure 9–1 FRU Locations (Top)

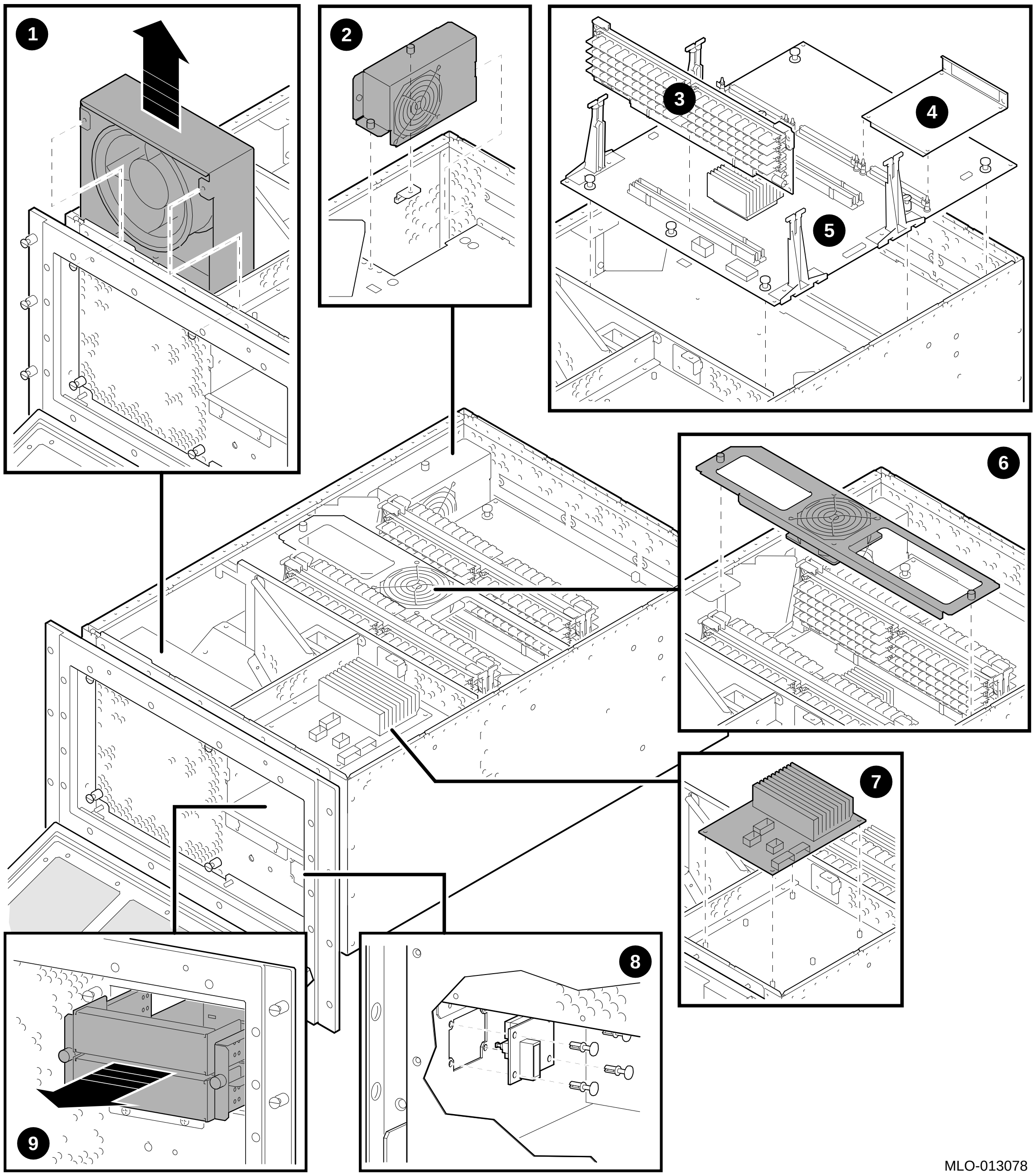
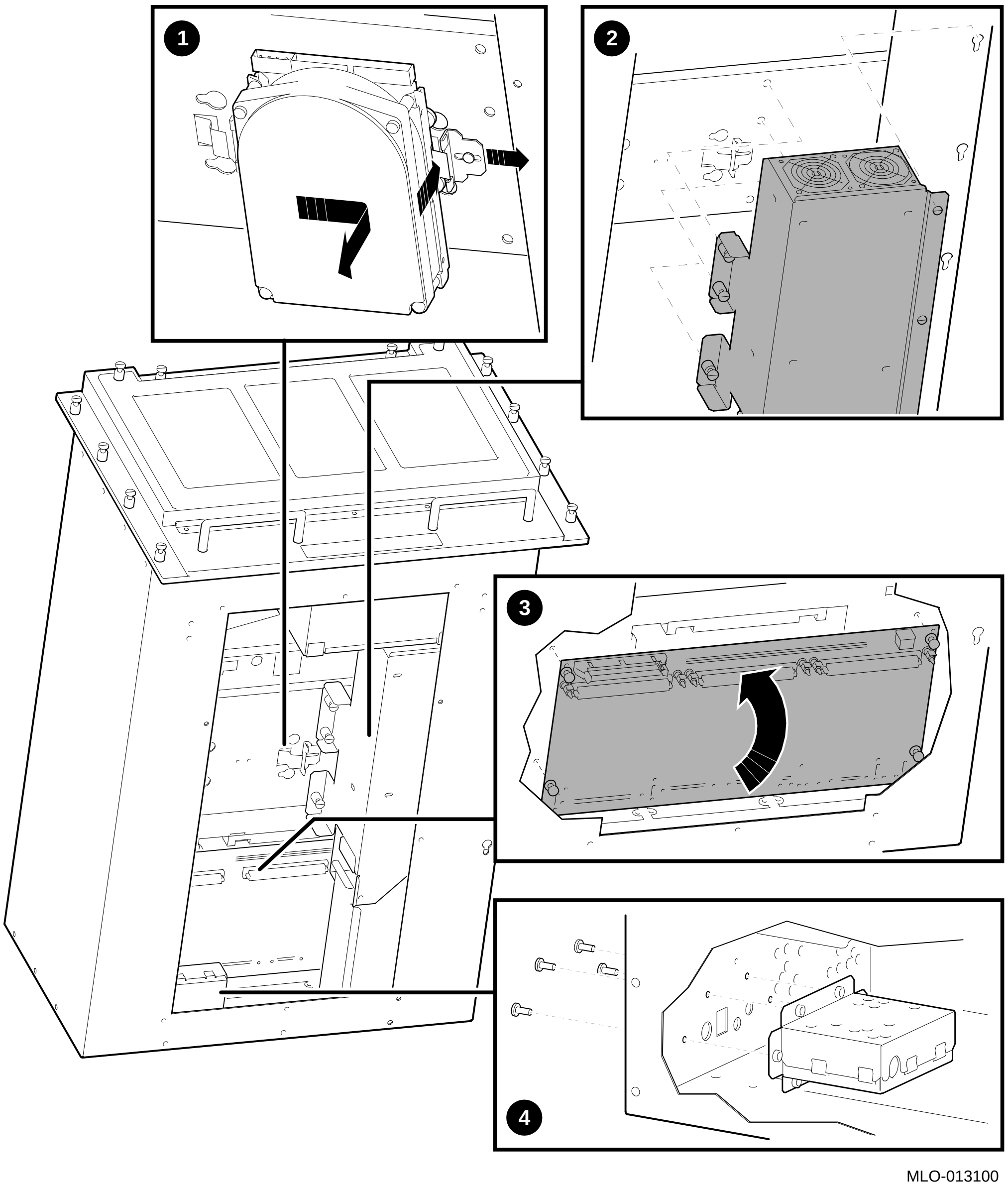


Figure 9–2 shows the FRUs located from the bottom of the DEC 3000 Model 900S AXP systems.

Figure 9–2 FRU Locations (Bottom)

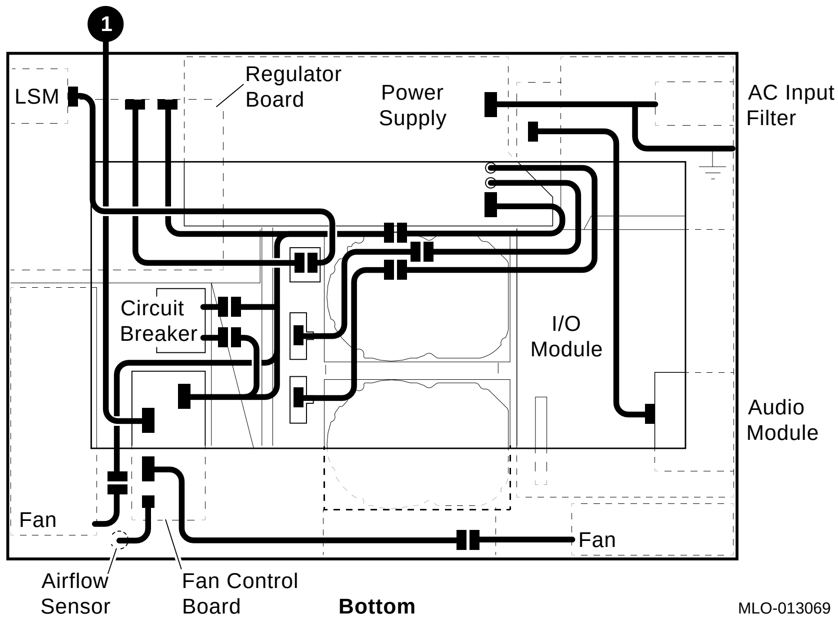


9.3 Cable Routing

9.3.1 System Power Cable Routing

Figure 9–3 illustrates the system power cable connections and routing.

Figure 9–3 System Power Cable Routing

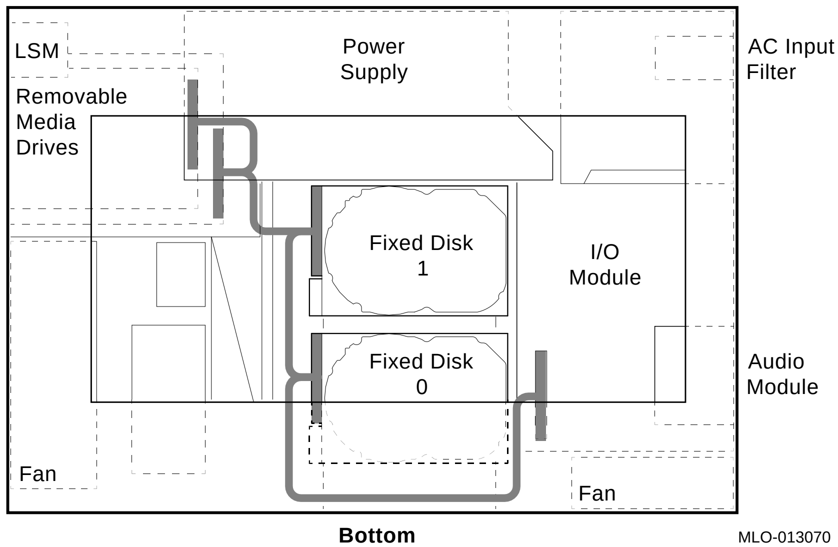


❶ To impingement fan

9.3.2 SCSI Disk Cable Routing

Figure 9–4 shows the SCSI disk drive cable (PN 17-03801-01) routing and placement of drives within the DEC 3000 Model 900S AXP.

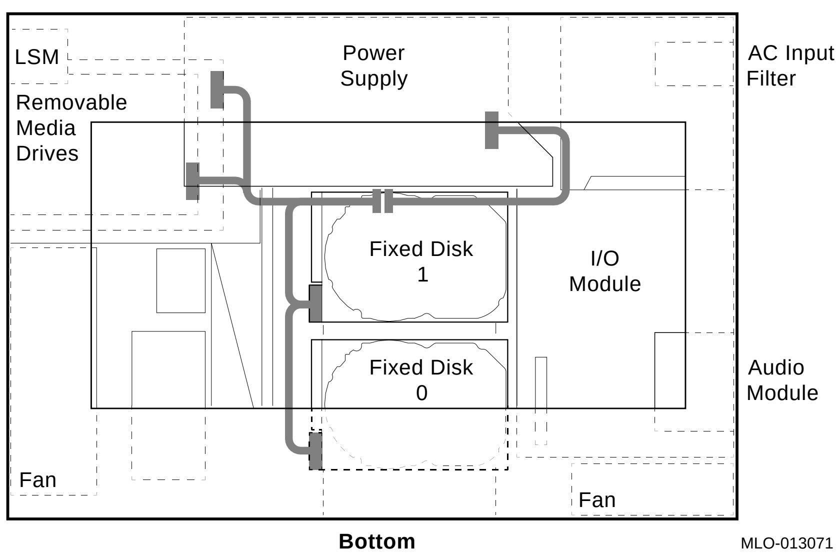
Figure 9–4 SCSI Disk Cable Routing



9.3.3 Disk Drive Power Cable Routing

Figure 9–5 shows the disk drive power cable (PN 17-03489-01) connections and routing.

Figure 9–5 Disk Power Cabling



9.4 Top and Bottom Covers

9.4.1 Power Supply Warning

Warning

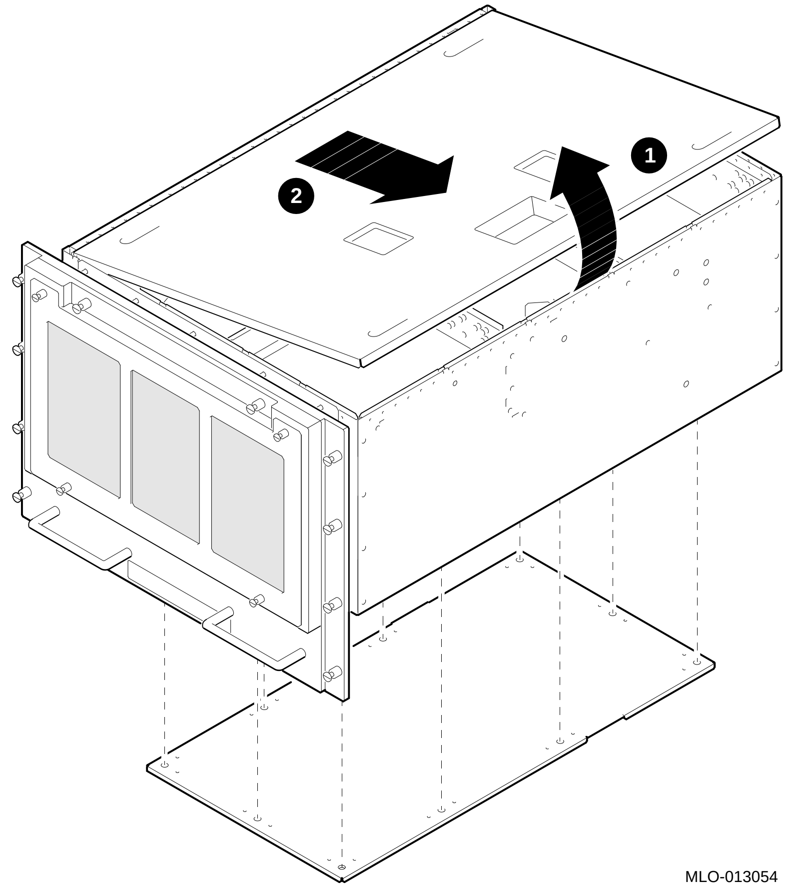
Wait at least five minutes after turning off the system unit power before you open the system unit. This gives the power supply capacitors time to discharge safely.

9.4.2 Top Cover Removal

To remove the top cover, use the following procedure:

Step	Action	Refer to Figure 9–6
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Loosen the three captive fasteners that secure the top cover by turning them counterclockwise.	–
3	Lift the right side of the top cover.	❶
4	Pull the top cover to the right to slide out the top cover flange from under the lip on the left side of the chassis.	❷

Figure 9–6 Removing the Top and Bottom Covers



9.4.3 Replacement

Reverse all of the steps in the removal procedure to install the top cover.

9.4.4 Bottom Cover Removal

To remove the bottom cover, use the following procedure:

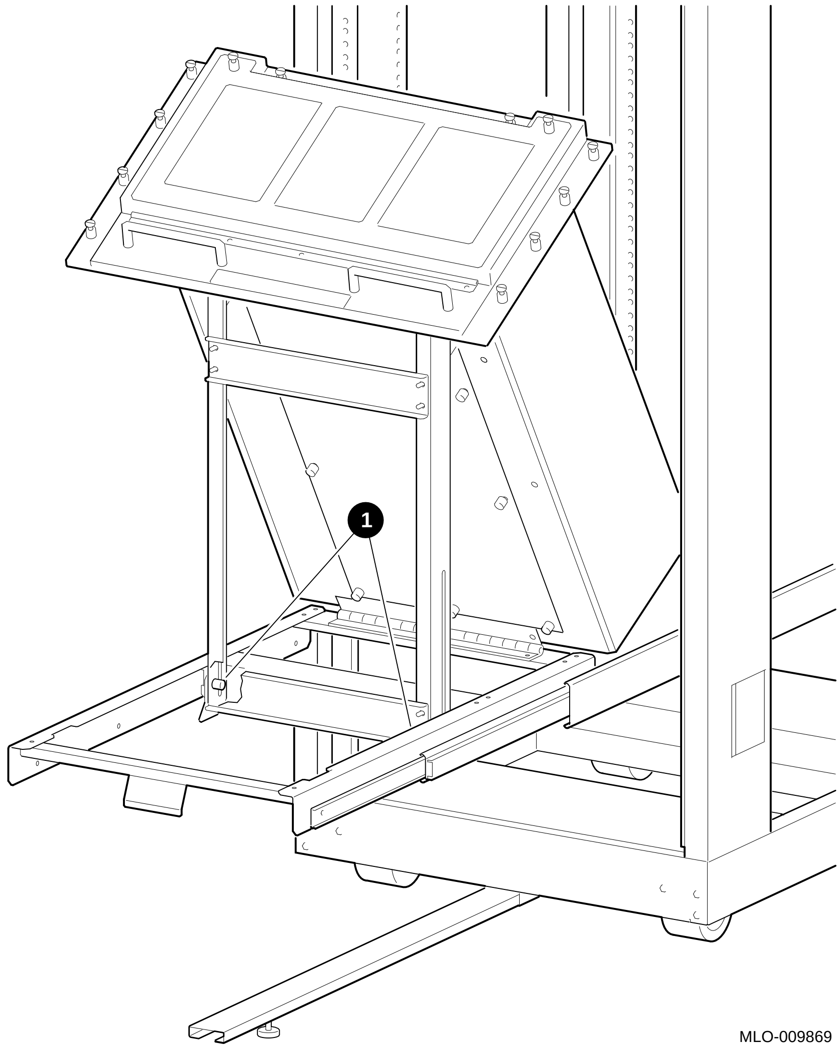
Step	Action	Refer to Figure 9–6 and Figure 9–7
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised. See ❶ Figure 9–7.

Step	Action	Refer to Figure 9–6 and Figure 9–7
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	❶ Figure 9–7
3	Loosen the 10 captive screws that secure the bottom cover by turning them counterclockwise.	Figure 9–6
4	Remove the bottom cover from the chassis.	Figure 9–6

Figure 9–7 Raising the Chassis



9.4.5 Replacement

Reverse all of the steps in the removal procedure to install the bottom cover.

9.5 Audio Module

9.5.1 Audio Module Removal

To remove a failed or damaged audio module, use the following procedure:

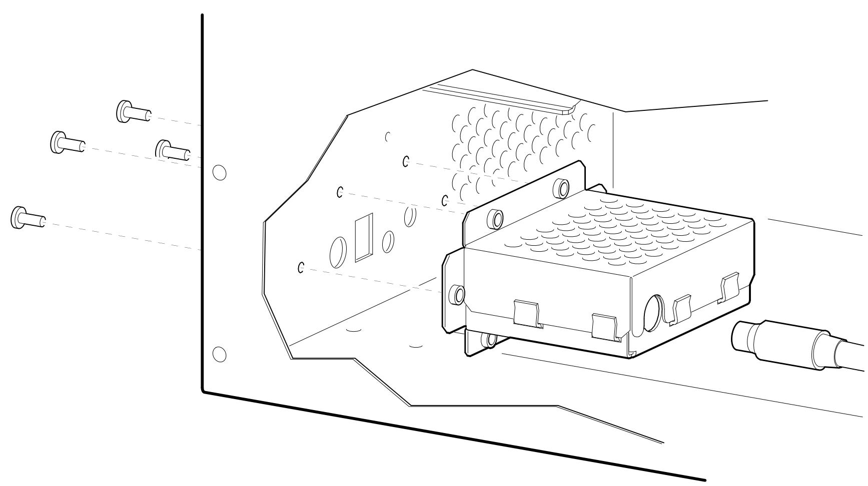
Step	Action	Refer to Figure 9–8
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–8
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 9.4.4.	–
4	From the rear of the chassis, remove the four screws securing the audio module.	–
5	Remove the audio module.	–
6	Disconnect the audio cable from the rear of the audio module.	–

Figure 9–8 Removing the Audio Module



9.5.2 Replacement

Reverse all of the steps in the removal procedure to install the audio module.

9.6 Lights and Switch Module

9.6.1 Lights and Switch Module Removal

To remove a failed or damaged lights and switch module (LSM), use the following procedure:

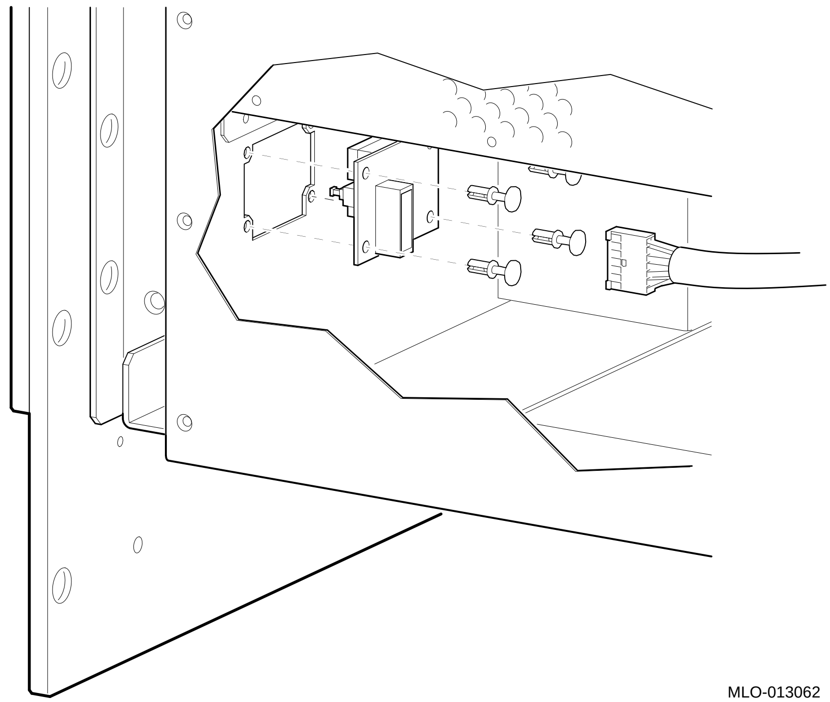
Step	Action	Refer to Figure 9–9
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–9
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 9.4.4.	–
4	Disconnect the LSM cable.	–
5	Remove the four removable rivets.	–
6	Remove the LSM module.	–

Figure 9–9 Removing the LSM Module



9.6.2 Replacement

Reverse all of the steps in the removal procedure to install the LSM module.

9.7 Power Supply

9.7.1 Power Supply Removal

To remove the power supply, use the following procedure:

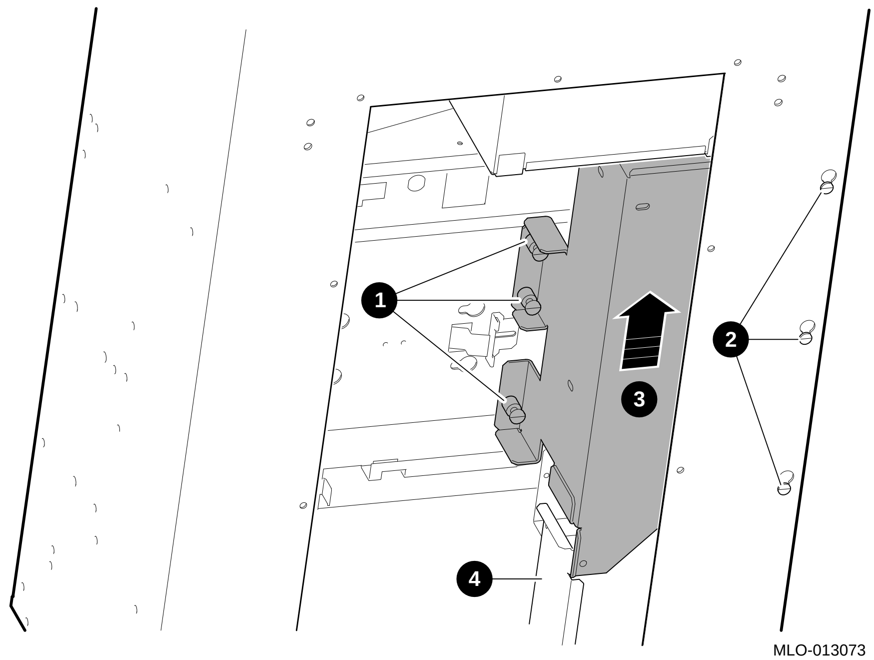
Step	Action	Refer to Figure 9–10
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–10
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 9.4.4.	–
4	Remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.	❹
5	Disconnect the ac connector from the rear of the power supply.	–
6	Disconnect the dc connectors on the left side of the power supply.	–
7	Loosen the three captive screws on the left side of the power supply.	❶
8	Loosen the three screws that secure the power supply to the bottom of the chassis.	❷
9	Slide the power supply forward until the three screws that secure the power supply to the bottom of the chassis are centered in the large part of the keyhole slots and then screw them in.	❸
10	Push the power supply up until the screw heads clear the keyhole slots, then carefully slide the power supply to the left and remove the power supply.	–

Figure 9–10 Removing the Power Supply



9.7.2 Replacement

Reverse all of the steps in the removal procedure to install the power supply.

9.8 Fixed Media Devices

9.8.1 Switch Settings Note

Note

If you are replacing a drive, record the switch settings on the old drive and set the switches on the new drive to the same settings. In many cases, the whole drive is not an FRU. Follow the replacement procedure for the specific option.

9.8.2 Fixed Media Devices Removal

To remove fixed media devices from the system, use the following procedure:

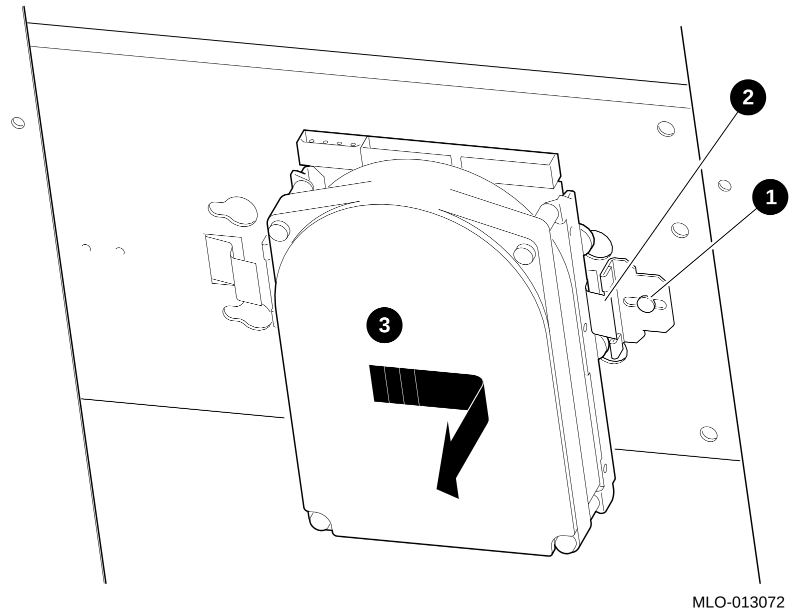
Step	Action	Refer to Figure 9–11
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–11
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 9.4.4.	–
4	Disconnect the power cable connector from the drive.	–
5	Remove the SCSI signal cable from the drive.	–
6	Loosen the locking tab screw and slide the locking tab until it clears the retaining spring.	➊
7	Depress the retaining spring.	➋
8	Slide the drive toward the retaining spring and lift the drive out.	➌

Figure 9–11 Removing a Fixed Media Device



9.8.3 Replacement

Reverse all of the steps in the removal procedure to install the fixed media devices.

9.9 Removable Media Devices

9.9.1 Switch Settings Note

Note

If you are replacing a drive, record the switch settings on the old drive and set the switches on the new drive with the same settings. In many cases, the whole drive is not an FRU. Follow the replacement procedure for the specific option.

9.9.2 Removable Media Devices Removal

Use the following procedure to remove either a CD-ROM (PN RRD42–AA), a tape drive (PN TZK10-FM or TZ30), or the fixed, half-height, 3.5-inch disk drive (PN RX26):

Step	Action	Refer to Figure 9–12
1	Perform the preservice procedure. See Section 9.1.3.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

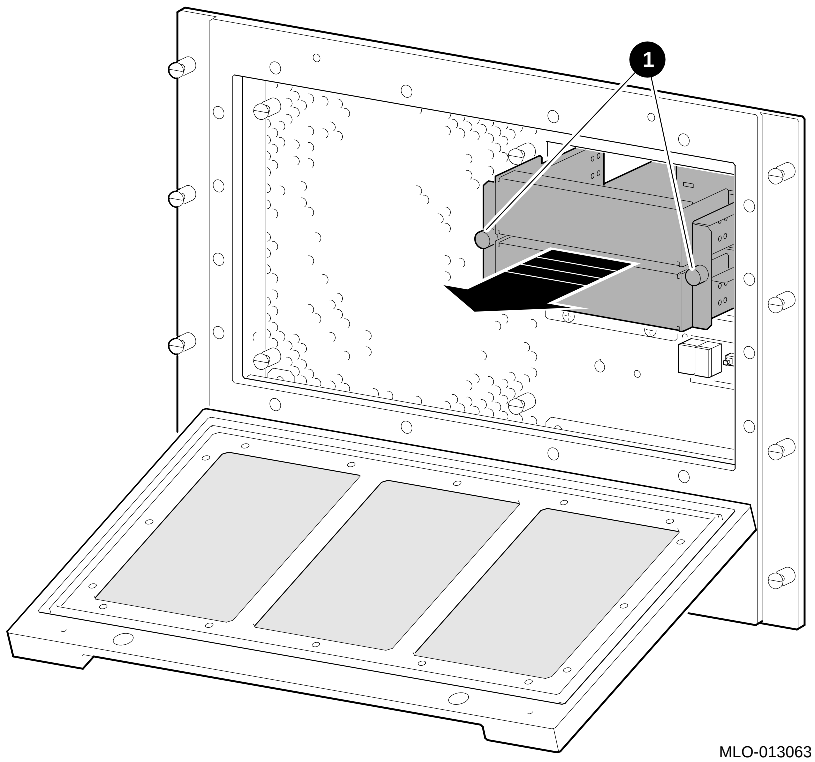
Step	Action	Refer to Figure 9–12
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
3	Remove the bottom cover. See Section 9.4.4.	–
4	Remove the power supply. See Section 9.7.1.	–
5	Disconnect the dc power connector from the drive tray.	–
6	Disconnect the SCSI connector from the drive tray.	–

Caution

Ensure that the dc power connector and the SCSI connector are disconnected before removing the drive tray.

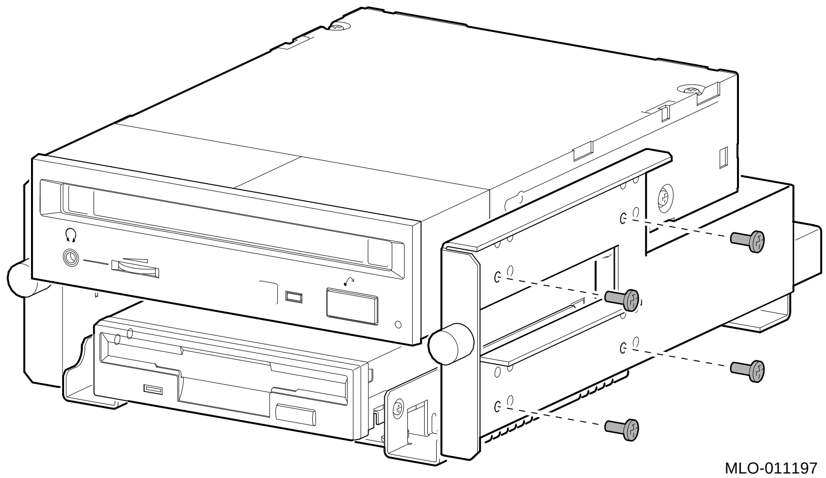
Step	Action	Refer to Figure 9–12
7	Loosen the two captive screws holding the drive tray in place and slide the drive tray out of the enclosure.	❶

Figure 9–12 Loosening the Drive Tray Screws



Step	Action	Refer to Figure 9–13
8	Position the drive tray so that the four screws that mount the drive to the tray (two on each side) can be removed. Remove the drive from the tray.	–
9	Remove the power cable connector attached to the drive.	–
10	Remove the SCSI signal cable connector from the drive.	–

Figure 9–13 Removing a Removable Media Device



9.9.3 Replacement

Reverse all of the steps in the removal procedure to install removable media devices.

9.10 TURBOchannel Option

9.10.1 Installation Note

Note

If a dual-width TURBOchannel option is installed, then it must be placed in slots 0 and 1. If necessary, move the single-width TURBOchannel option to slot 2.

9.10.2 Precautions

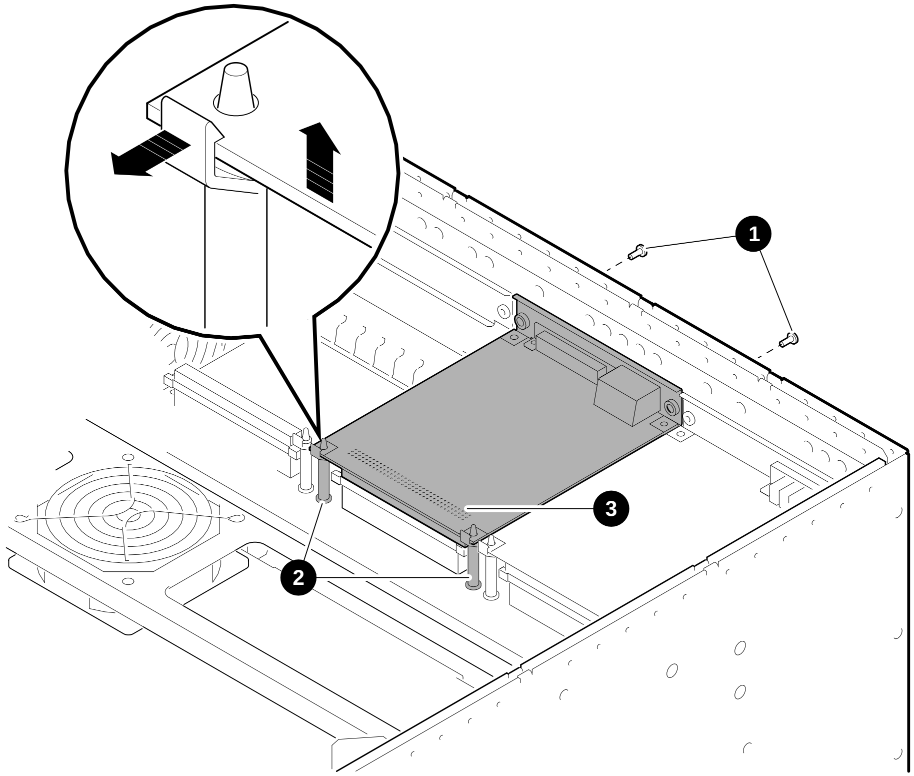
Anytime you replace a board or module in a system, you must follow antistatic precautions. Refer to Section 9.1.4.

9.10.3 Upper TURBOchannel Options Removal

To remove the upper TURBOchannel options from slot 0, slot 1, or slot 2, use the following procedure:

Step	Action	Refer to Figure 9–14
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Disconnect any external connections to the TURBOchannel option in the rear of the system.	–
3	Remove the top cover. See Section 9.4.2.	–
4	If you are replacing the option board, record any jumpers or switch settings on the old board and set the same value on the new board.	–
5	Remove the two screws located on the rear of the chassis that secure the TURBOchannel option.	❶
6	Release the standoffs.	❷
7	Lift the TURBOchannel option board from the connector located on the system (CPU) board.	❸

Figure 9–14 Removing the Screws and Standoffs from an Upper TURBOchannel Option



9.10.4 Replacement

Reverse all of the steps in the removal procedure to install an upper TURBOchannel option.

9.10.5 Lower TURBOchannel Options Removal

To remove the lower TURBOchannel options from slot 3, slot 4, or slot 5, use the following procedure:

Step	Action	Refer to Figure 9–14
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Disconnect any external connections to the TURBOchannel option in the rear of the system.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–14
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 9.4.4.	–
5	If you are replacing the option board, record any jumpers or switch settings on the old board and set the same value on the new board.	–
6	If the option being removed is installed in slot 3, remove the audio module (see Section 9.5.1) and remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.	–
7	Remove the screws located on the rear of the chassis that secure the TURBOchannel option.	–
8	Release the standoffs. Pull down and toward the front to disconnect the TURBOchannel option board from the connector located on the I/O board.	–

9.10.6 Replacement

Reverse all of the steps in the removal procedure to install a lower TURBOchannel option.

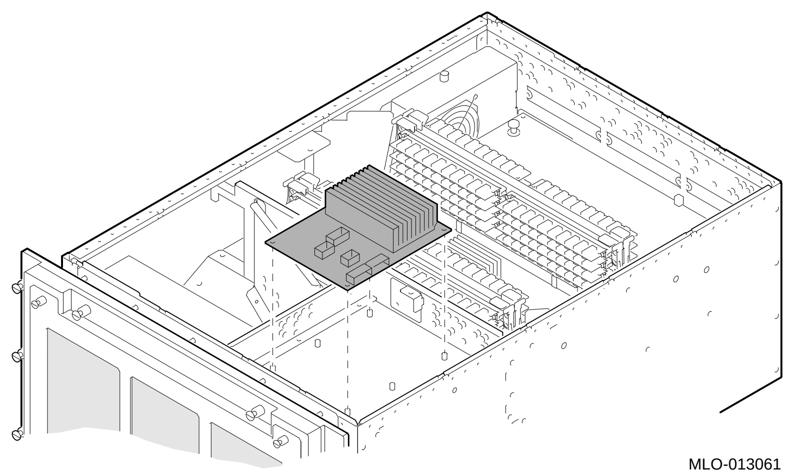
9.11 3.45 V Regulator Board

9.11.1 Regulator Board Removal

To remove a failed or damaged regulator board, use the following procedure:

Step	Action	Refer to Figure 9–15
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–
3	Disconnect all connections to the regulator board.	–
4	Remove the four screws that hold the board in place.	–
5	Remove the regulator board.	–

Figure 9–15 Removing the Regulator Board



9.11.2 Replacement

Reverse all of the steps in the removal procedure to install the regulator board.

9.12 I/O Board

9.12.1 I/O Board Removal

To remove a failed or damaged I/O board, use the following procedure:

Step	Action	Refer to Figure 9–16 and Figure 9–17
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Disconnect all I/O bulkhead connections.	❶ Figure 9–16

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–16 and Figure 9–17
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 9.4.4.	–
5	Remove the audio module. See Section 9.5.	–
6	Remove the power supply. See Section 9.7.1.	–
7	Remove any lower TURBOchannel modules. See Section 9.10.5.	–
8	Disconnect the audio cable from the I/O board.	❶ Figure 9–17
9	Disconnect the SCSI cable from the I/O board.	❷ Figure 9–17
10	Release the two removable rivets securing the I/O board.	❸ Figure 9–17
11	Release the two plastic tabs along the front edge of the I/O board.	❹ Figure 9–17
12	Remove the I/O board by pulling it down to disconnect the system board connection, then rotate the I/O board 90° to remove it through the bottom opening.	❺ Figure 9–17

Figure 9–16 I/O Board Cable Connections

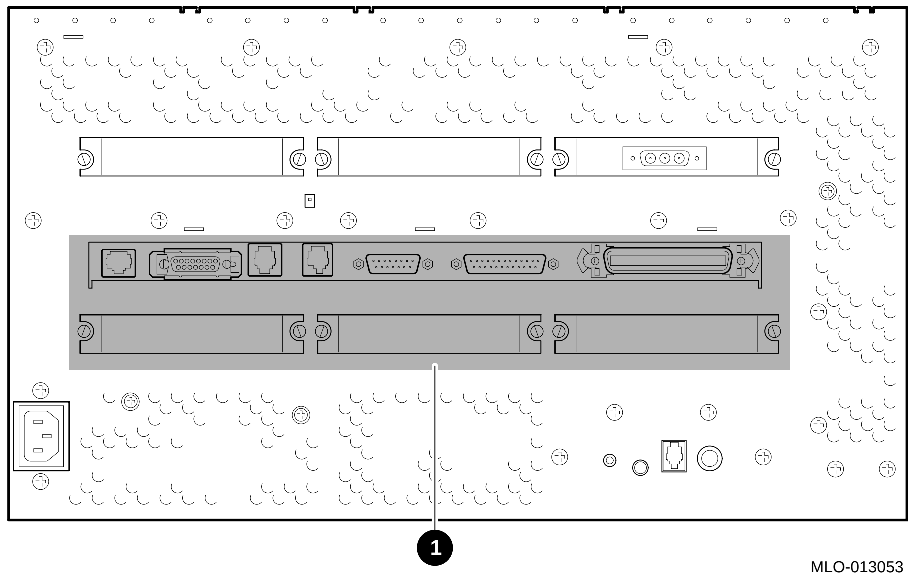
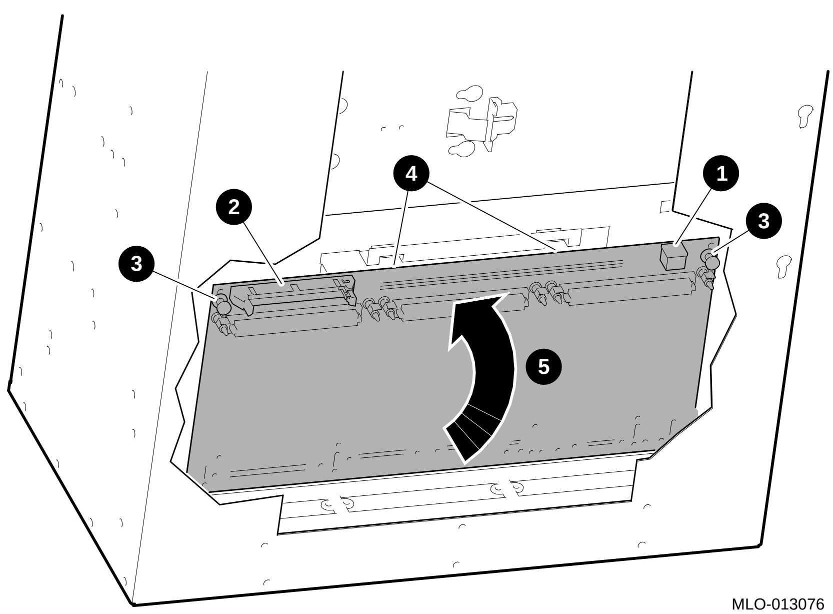


Figure 9–17 Removing the I/O Board (Bottom View)



9.12.2 Replacement

Before installing the new I/O board, ensure that:

- The console secure jumper is set to the same setting as the failed board.
- The flash ROM jumper is set to the same setting as the failed board.
- The ENET and TOY/NVR chips are swapped.

Reverse all of the steps in the removal procedure to install the I/O board.

Figure 9–18 shows the I/O board chip and jumper locations. Table 9–2 briefly describes each jumper.

Figure 9–18 I/O Board Jumper Locations

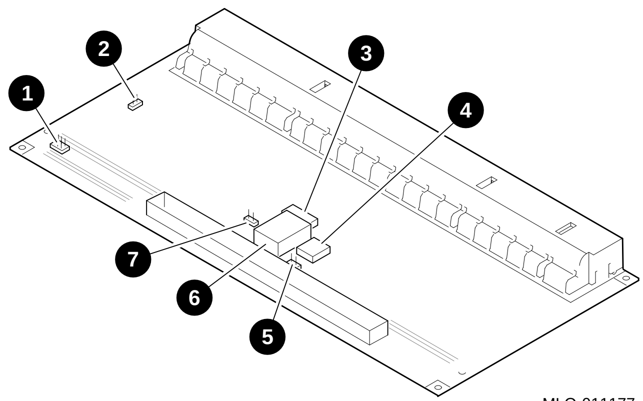


Table 9–2 I/O Board Jumper Locations

Location	Description	Comments	Default Setting
❶	Park location	Used to store unused jumper.	–
❷	Console secure jumper	In = enabled. Out = disabled.	Disabled
❸	Enet address chip	–	–
❹	TOY/NVR chip	–	–
❺	Flash ROM	–	–
❻	Flash ROM jumper	In = enabled. Out = disabled.	Enabled
❼	Active terminator enable	In = enabled (terminator ON). Out = disabled.	Enabled

9.13 Fan Assemblies

9.13.1 Main Fan Removal

To remove the main fan assembly, use the following procedure:

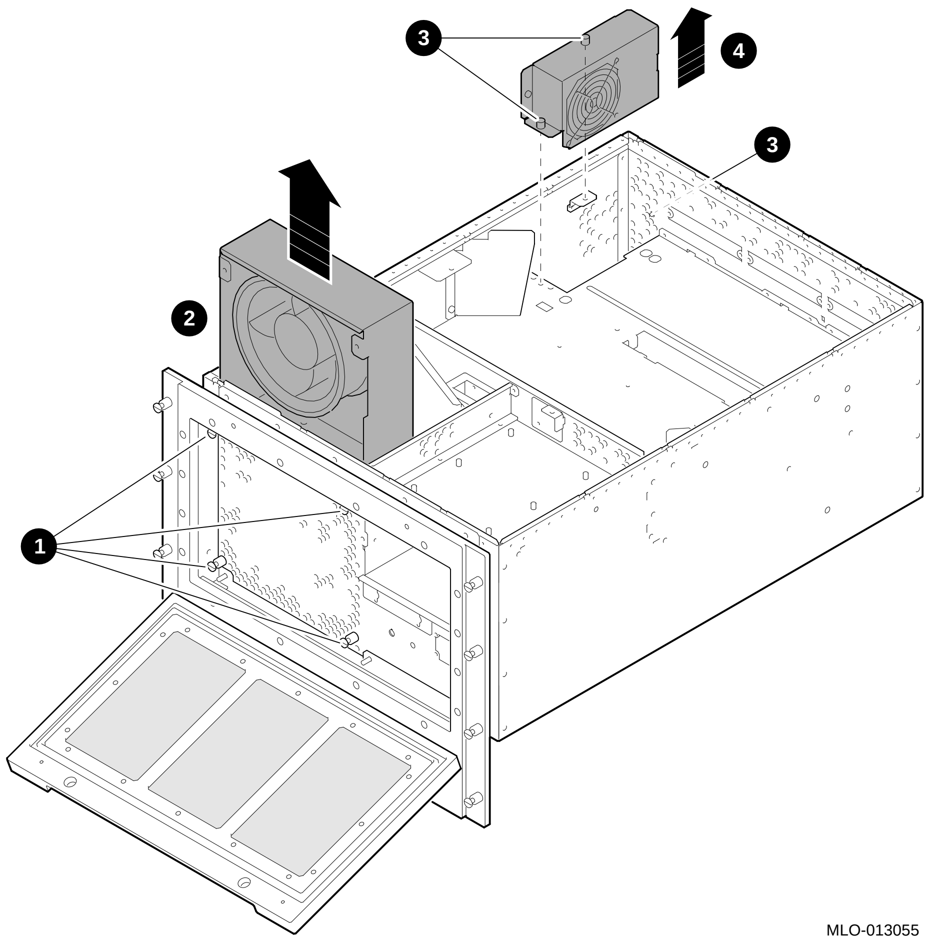
Step	Action	Refer to Figure 9–19
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–19
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 9.4.4.	–
5	From the bottom, disconnect the dc power cable to the main fan.	–
6	Loosen the four captive fasteners on the front of the chassis.	❶
7	Lift out the main fan assembly from the top of the chassis.	❷

Figure 9–19 Removing the Main Fan and Rear Fan Assemblies



9.13.2 Replacement

Reverse all of the steps in the removal procedure to install the main fan assembly.

9.13.3 Rear Fan Removal

To remove the rear fan assembly, use the following procedure:

Step	Action	Refer to Figure 9–19
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–19
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 9.4.4.	–
5	From the bottom, disconnect the dc power cable to the rear fan.	–
6	From the top and rear, loosen the three captive fasteners that secure the rear fan to the chassis.	❸
7	Lift out the rear fan assembly from the top of the chassis.	❹

9.13.4 Replacement

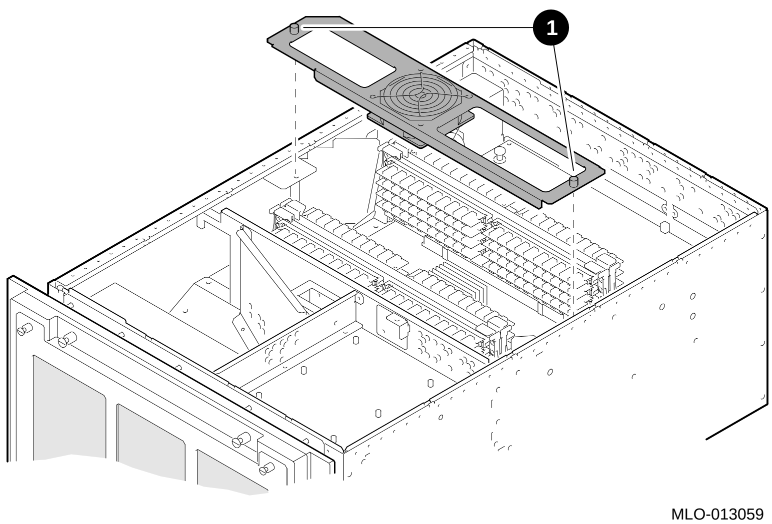
Reverse all of the steps in the removal procedure to install the rear fan assembly.

9.13.5 Impingement Fan Removal

To remove the impingement fan assembly, use the following procedure:

Step	Action	Refer to Figure 9–20
1	Perform the preservice procedure. See Section 9.1.3	–
2	Remove the top cover. See Section 9.4.2.	–
3	Disconnect the dc power cable to the impingement fan.	–
4	Loosen the two captive fasteners and lift the impingement fan assembly out of the chassis.	❶

Figure 9–20 Removing the Impingement Fan Assembly



9.13.6 Replacement

Reverse all of the steps in the removal procedure to install the impingement fan assembly.

9.14 Memory Motherboard

9.14.1 Precautions

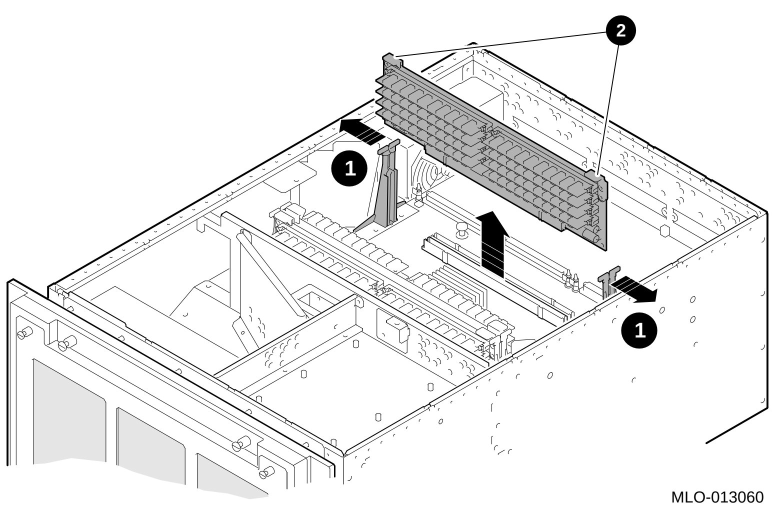
Anytime you replace a board in the DEC 3000 Model 900S AXP systems, antistatic precautions must be taken. Refer to Section 9.1.4.

9.14.2 Memory Motherboard (MMB) Removal

To remove a failed or damaged memory motherboard (MMB), use the following procedure:

Step	Action	Refer to Figure 9–21
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–
3	Remove the plastic board spacer that holds the two adjacent MMBs together.	–
4	Release the board guide catch releases at both sides of the board.	❶
5	Remove the MMB.	❷

Figure 9–21 Removing a Memory Motherboard



9.14.3 Replacement

Reverse all of the steps in the removal procedure to install a memory motherboard.

9.15 SIMMs

9.15.1 Memory Note

Note

If you are replacing one SIMM, the new SIMM must be the same memory size and speed as the remaining seven SIMMs located on the same plane.

9.15.2 Precautions

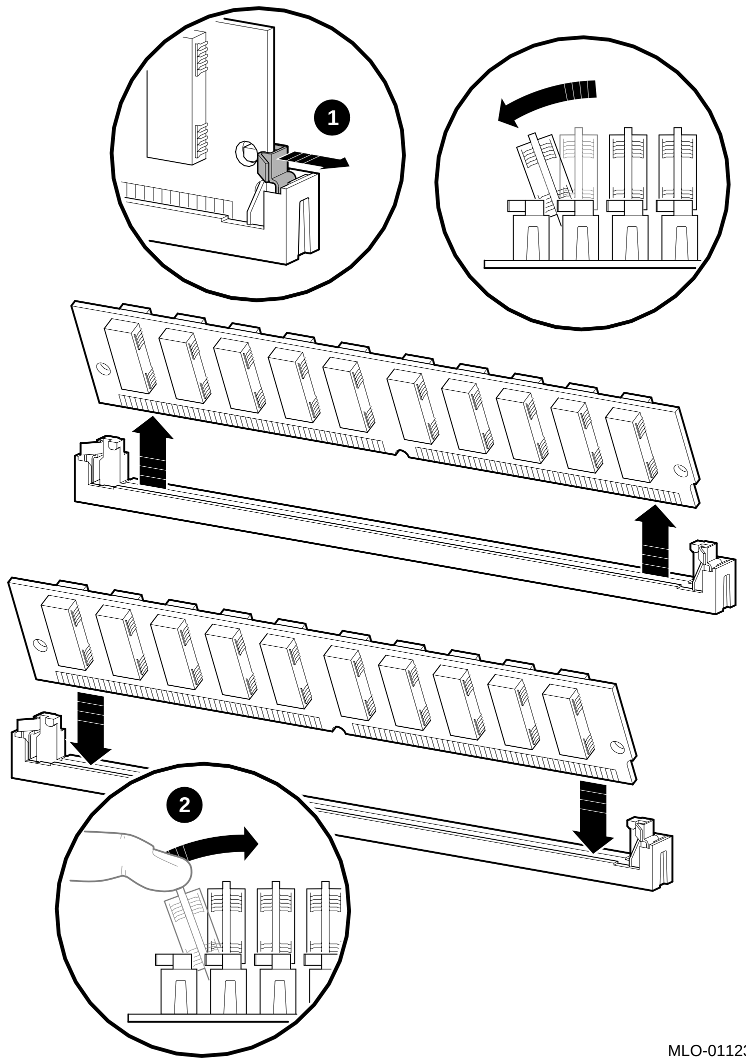
Anytime you replace a board or module in the DEC 3000 Model 900S AXP systems, antistatic precautions must be taken. Refer to Section 9.1.4.

9.15.3 SIMM Removal

Use the following procedure to remove a SIMM:

Step	Action	Refer to Figure 9–22
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–
3	Remove the memory motherboard and place it on an antistatic mat. See Section 9.14.2.	–
4	Release the clip located at each end of the SIMM.	❶
5	Tilt the board forward at a 30-degree angle.	–
6	Pull the SIMM out.	–

Figure 9–22 Removing and Replacing the SIMMs



9.15.4 Replacement

Reverse all of the steps in the removal procedure to install the SIMMs, making sure you push firmly on the SIMM to lock it in place ❷.

9.16 System (CPU) Board

9.16.1 Switch Settings Note

Note

Record the position of the switches on the system board. When replacing the system board, set the switches in the same position on the new system board.

9.16.2 Precautions

Anytime you replace a board or module in the DEC 3000 Model 900S AXP systems, antistatic precautions must be taken. Refer to Section 9.1.4.

9.16.3 System Board Removal

To remove a failed or damaged system board, use the following procedure:

Step	Action	Refer to Figure 9–23 through Figure 9–25
1	Perform the preservice procedure. See Section 9.1.3.	–
2	Remove the top cover. See Section 9.4.2.	–

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action	Refer to Figure 9–23 through Figure 9–25
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.	–
4	Remove the bottom cover. See Section 9.4.4.	–
5	Remove the audio module. See Section 9.5.1.	–
6	Remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.	–

Step	Action	Refer to Figure 9–23 through Figure 9–25
7	Disconnect the lower TURBOchannel cables and all I/O cables from the rear of the chassis.	❶ Figure 9–24
8	Remove the lower TURBOchannel options. See Section 9.10.5.	–
9	Perform as much of the I/O board removal procedure as necessary to disconnect the I/O board connector from the system board. See Section 9.12.1.	–
10	Disconnect the three power connectors ❶ and the LSM connector ❷ from the bottom front edge of the system board.	Figure 9–23
11	Release the locking mechanisms and lower the chassis to allow access to the top of the chassis.	–
12	Disconnect the upper TURBOchannel cables from the rear of the chassis.	❷ Figure 9–24
13	Remove the upper TURBOchannel options. See Section 9.10.3.	–
14	Remove the impingement fan assembly. See Section 9.13.5.	–
15	Remove the memory motherboards (MMBs). See Section 9.14.2.	–

Note

Do not remove the SIMMs from the memory motherboards.

Step	Action	Refer to Figure 9–23 through Figure 9–25
16	Disconnect the 3.45 volt sense line from the top front edge of the system board.	❸ Figure 9–23
17	Release the five captive rivets that secure the system board to the chassis.	❶ Figure 9–25

Step	Action	Refer to Figure 9–23 through Figure 9–25
18	Loosen the two captive screws that secure the system board to the chassis.	❷ Figure 9–25
19	Remove the system board by lifting the front edge and sliding it toward the front of the chassis.	❸ Figure 9–25

Figure 9–23 shows the system board power connections for the DEC 3000 Model 900S AXP systems.

Figure 9–23 System Board Power Connections

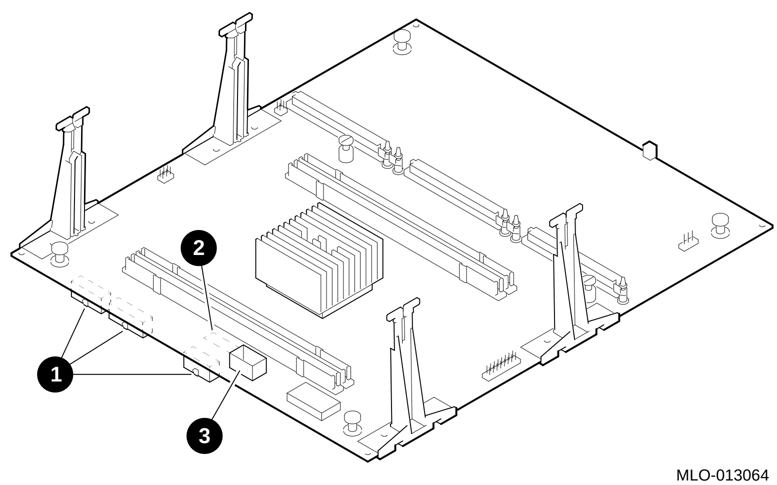


Figure 9–24 shows the TURBOchannel connections for the DEC 3000 Model 900S AXP systems.

Figure 9–24 TURBOchannel Connections

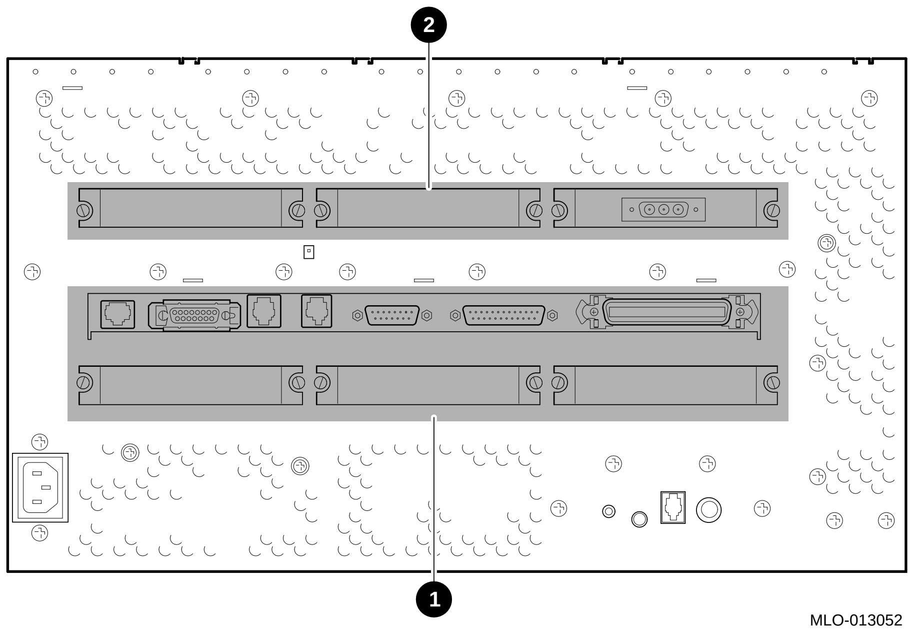
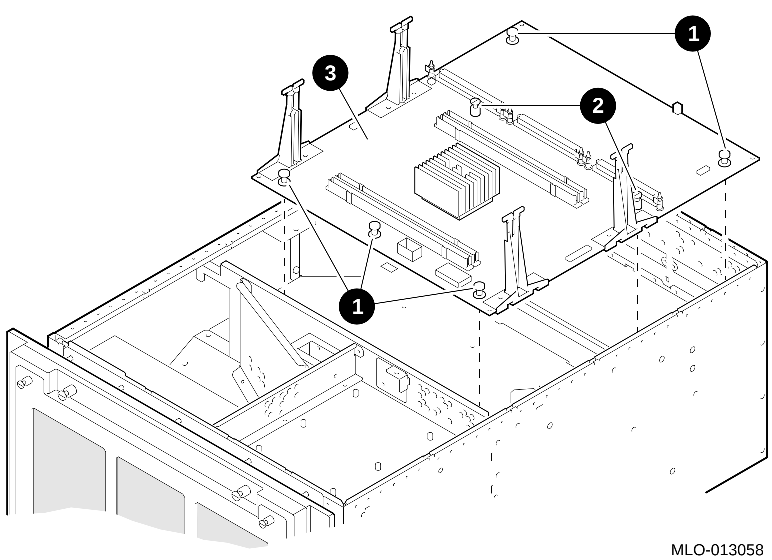


Figure 9–25 shows the removal of the system board from the DEC 3000 Model 900S AXP systems.

Figure 9–25 Removing the System Board



9.16.4 Replacement

To install the system board, reverse the removal steps.

See Figure 9–26 for system board jumper locations and Table 9–3 for a description of the jumpers.

Note

Ensure that all captive rivets are in the out position and that the setting for the flash ROM jumper is the same as on the failed FRU before replacing the board. Also ensure that the system board jumpers are located in the same positions on the replacement board.

Figure 9–26 shows the locations of the jumpers on the system board.

Figure 9–26 System Board Jumper Locations

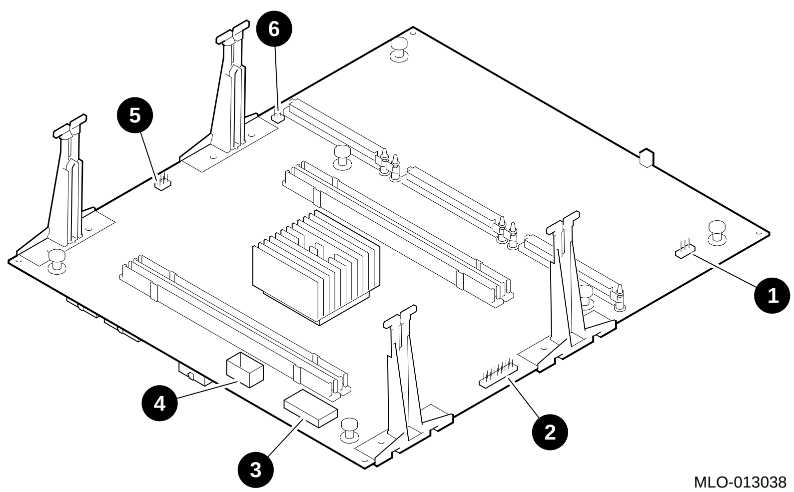


Table 9–3 describes the system board jumpers.

Table 9–3 System Board Jumper Locations

Location	Description	Comments	Default Setting
❶	Test pins	Used by engineering	–
❷	Serial ROM jumpers	Jumper location 0 only	Installed
❸	Serial ROM	–	–
❹	Serial ROM test port	–	–

(continued on next page)

Table 9–3 (Cont.) System Board Jumper Locations

Location	Description	Comments	Default Setting
❺	Clock divider jumpers	–	Installed
❻	Flash ROM update jumper	Enable and park positions	Enabled

9.17 Airflow Sensor

9.17.1 Airflow Sensor Removal

To remove the airflow sensor, use the following procedure. Refer to Figure 9–27 for the airflow sensor location.

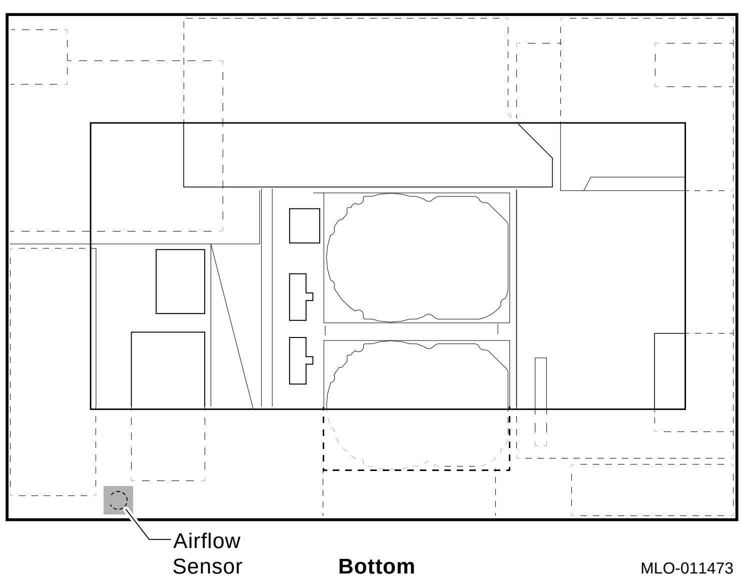
Step	Action
1	Perform the preservice procedure. See Section 9.1.3.
2	Remove the top cover. See Section 9.4.2.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
3	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
4	Remove the bottom cover. See Section 9.4.4.
5	From the bottom, disconnect the airflow sensor connector.
6	From the top, remove the screw that secures the airflow sensor clamp to the chassis and lift out the airflow sensor and clamp from the top.

Figure 9–27 Airflow Sensor Location



9.17.2 Replacement

Reverse all of the steps in the removal procedure to install the airflow sensor.

9.18 -12 Vdc Converter

9.18.1 -12 Vdc Converter Removal

To remove the -12 Vdc converter board, use the following procedure. Refer to Figure 9–28 for the -12 Vdc converter board location.

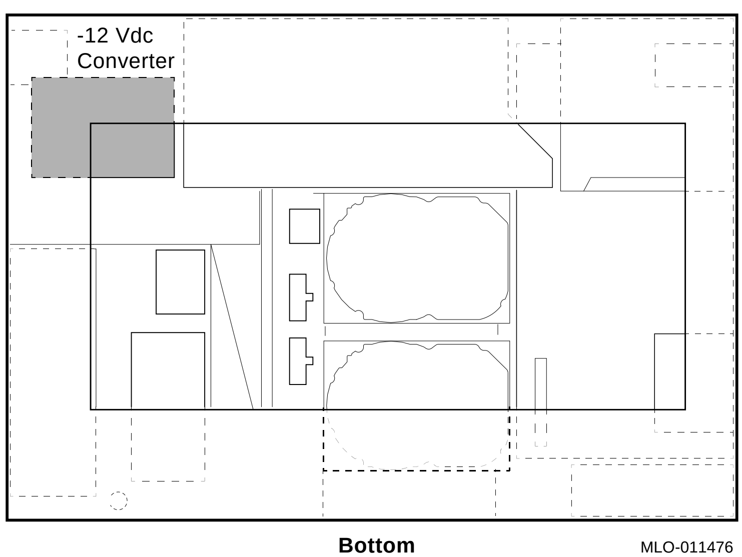
Step	Action
1	Perform the preservice procedure. See Section 9.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 9.4.4.
4	Disconnect the connector from the -12 Vdc converter board.
5	Remove the four screws that secure the -12 Vdc converter board to the chassis and save them for use in the replacement procedure.
6	Remove the -12 Vdc converter board from the chassis.

Figure 9–28 -12 Vdc Converter Board Location



9.18.2 Replacement

Reverse all of the steps in the removal procedure to install the -12 Vdc converter board.

9.19 Fan Tachometer Alarm Board

9.19.1 Fan Tachometer Alarm Board Removal

To remove the fan tachometer alarm board, use the following procedure. Refer to Figure 9–29 for the fan tachometer alarm board location.

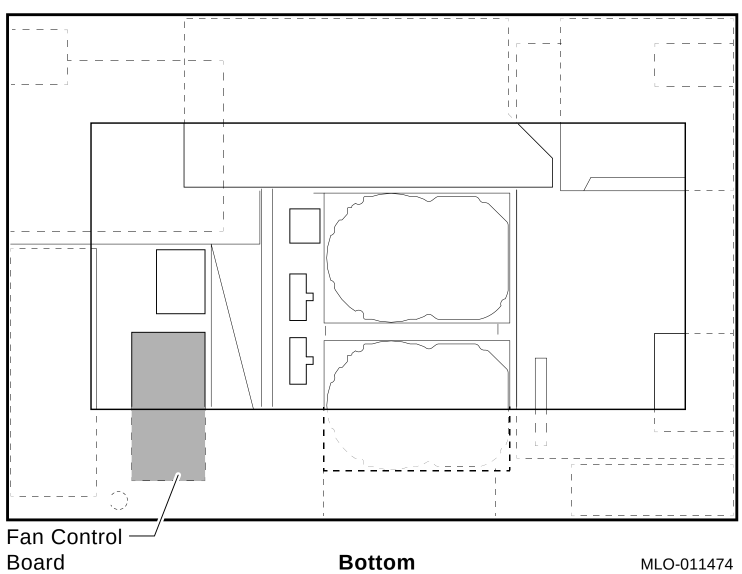
Step	Action
1	Perform the preservice procedure. See Section 9.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 9.4.4.
4	Disconnect the four connectors from the fan tachometer alarm board.
5	Remove the four screws that secure the fan tachometer alarm board to the chassis and save them for use in the replacement procedure.
6	Remove the fan tachometer alarm board.

Figure 9–29 Fan Tachometer Alarm Board Location



9.19.2 Replacement

Reverse all of the steps in the removal procedure to install the fan tachometer alarm board.

9.20 DC On/Off Switch

9.20.1 DC On/Off Switch Removal

To remove the dc on/off switch, use the following procedure:

Step	Action
1	Perform the preservice procedure. See Section 9.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 9.4.4.
4	Disconnect the dc connector from the dc on/off switch.
5	Slide the retaining ring off the rear of the dc on/off switch.
6	Pull the dc on/off switch and the attached cable through the mounting hole on the front of the chassis.

9.20.2 Replacement

Reverse all of the steps in the removal procedure to install the dc on/off switch.

9.21 DC Power LED

9.21.1 DC Power LED Removal

To remove the dc power LED, use the following procedure:

Step	Action
1	Perform the preservice procedure. See Section 9.1.3.

Warning

Ensure that the two locking spring devices are fully engaged when the chassis is raised.

Step	Action
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 9.4.4.
4	Disconnect the dc connector from the dc power LED.
5	Remove the retaining ring from the rear of the LED socket.
6	From the rear, pull the dc power LED out of the LED socket.
7	Remove the LED socket from the front of the chassis.

9.21.2 Replacement

Reverse all of the steps in the removal procedure to install the dc power LED.

9.22 AC Input Filter

9.22.1 AC Input Filter Removal

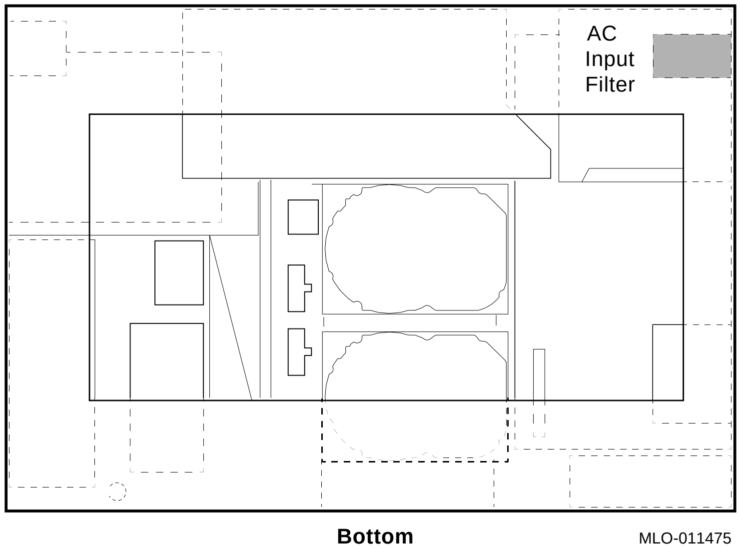
To remove the ac input filter, use the following procedure. Refer to Figure 9–30 for the ac input filter location.

Warning

Ensure that the ac power cord is disconnected before starting this procedure.

Step	Action
1	Perform the preservice procedure. See Section 9.1.3.
	Warning — **Ensure that the two locking spring devices are fully engaged when the chassis is raised.**
2	Release the locking mechanism on the front of the chassis and raise the chassis to access the bottom.
3	Remove the bottom cover. See Section 9.4.4.
4	Remove the power supply air plenum by loosening the two captive fasteners on the rear of the chassis and removing the screw that secures the plenum to the power supply bracket.
5	Remove the brown and blue wires from the two fastons on the rear of the ac input filter (note the wire colors and label them for replacement purposes).
6	Remove the outer nut from the internal ground stud and remove the outer ground wire (from the power supply).
7	Remove the inner nut from the internal ground stud and remove the inner ground wire (from the ac input filter).
8	From the rear of the chassis, remove the two screws that secure the ac input filter to the chassis.
9	Remove the ac input filter by pulling it out through the opening in the rear of the chassis.

Figure 9–30 AC Input Filter Location



9.22.2 Replacement

Reverse all of the steps in the removal procedure to install the ac input filter.

Warning

When reconnecting the ground wires to the internal ground stud, ensure that the ground wire from the ac input filter is secured against the chassis wall with a separate nut before reconnecting the ground wire from the power supply.

10
Diagnostic Testing

10.1 Overview

10.1.1 Chapter Overview

This chapter covers the following topics:

- FRU Code Tables
- Available Diagnostics
- Running Single/Multiple Tests
- Entering/Exiting Console and Service Mode
- Diagnostics:
  - ASIC Diagnostic
  - NVR Diagnostic
  - Memory Diagnostic
  - SCSI Diagnostic
  - NI Diagnostic
  - SCC Diagnostic
  - ISDN Diagnostic
- TURBOchannel Testing

10.2 FRU Code Tables

10.2.1 System Device FRU Codes

Table 10–1 lists the system device FRU codes.

Table 10–1 System Device FRU Codes

FRU Code	Device (Most Probable FRU)
000	Unknown or diagnostic does not support FRU reporting.
001	System board
002	I/O board
003	LK Keyboard
004	Mouse/pointing device
005	Audio module
006	Reserved

10.2.2 TURBOchannel Option FRU Codes

Table 10–2 lists the TURBOchannel FRU codes.

Table 10–2 TURBOchannel FRU Codes

FRU Code	TURBOchannel Option (Most Probable FRU)
010	0
011	1
012	2
013	3
014	4
015	5
016–FF	Reserved

10.2.3 SCSI Device FRU Codes

Table 10–3 lists the SCSI device FRU codes.

Table 10–3 SCSI FRU Codes

FRU Code	Device
1*TL*	SCSI device on bus A (internal), target *T*, logical unit number *L*. For example, the FRU code for device DKA0 is 100.
2*TL*	SCSI device on bus B (external), target *T*, logical unit number *L*.

10.3 Diagnostic Listing

10.3.1 Available Diagnostics

The following diagnostics are available:

ASIC
NVR
MEM
SCSI
NI
SCC
ISDN
TURBOchannel (See Section 10.13)

To obtain a list of subtests from any of the selected diagnostics, use the TEST command as follows:

```
>>> T[EST] {device name} ? Return
```

10.3.2 Example

This example shows the subtests for the diagnostic NVR:

```
>>> T NVR ? Return
T NVR INIT
T NVR NVR
T NVR TOY
T NVR INTERRUPT
T NVR ?
```

10.4 Running Single/Multiple Tests

10.4.1 Before You Begin

You must take the following actions before running diagnostics:

Step	Action	Refer to...
1	Enter console mode.	Section 10.5.1
2	Attach loopbacks if required.	Table 10–4
3	Select the diagnostic environment.	Table 10–4

10.4.2 Diagnostic Environment

Table 10–4 describes the diagnostic environments and how they can be accessed.

Table 10–4 Diagnostics Environments

Environment	To Access	Requirements
Console	Enter the following command: `>>> SET DIAG_SECTION 1` Return	Installation of the system.
Service	Enter the following command: `>>> SET DIAG_SECTION 2` Return	Requires loopbacks but provides a more comprehensive test. The key utilities must be run in this environment.

10.4.3 Running a Single Diagnostic Test

To run a single test, enter the following command:

>>> **T[EST] {device name}** Return

10.4.4 Example

This example executes the NVR diagnostic:

>>> **T NVR** Return

When you select a test without specifying subtests, the diagnostic runs all associated subtests.

10.4.5 Running Diagnostic Subtests

To run a diagnostic subtest, enter the following command:

>>> **T[EST]** Return

10.4.6 Example

This example selects the TOY subtest of the NVR diagnostic. NVR testing is performed *only* on those areas defined by the TOY subtest.

>>> **T NVR TOY** Return

10.4.7 Running Multiple Diagnostic Tests

You can specify different combinations of diagnostics, depending on your needs. The system performs tests one at a time, in the order you specify on the command line. Some diagnostics require

- Service mode
- Loopback connectors

You can specify individual tests or ranges of tests, as follows:

>>> **T[EST] {device name}, {device name}...** Return

>>> **T[EST {device name}:{device name}** Return

>>> **T[EST] {device name}:{device name},{device name}...** Return

10.4.8 Examples

The following example runs the MEM and NVR diagnostics. When specifying individual tests, separate the device names with a comma.

```
>>> T MEM,NVR [Return]
```

The following example runs a range of tests, starting with the ASIC diagnostic and ending with the ISDN diagnostic.

When specifying a range, separate the device names with a colon.

```
>>> T ASIC:ISDN [Return]
```

Note

If you select SCSI, NI, and SCC diagnostics in service mode, you need loopback connectors and the SCSI terminator mounted. Otherwise, an error occurs.

Diagnostics that run in console mode also run in service mode.

The following example runs the range of diagnostics from the ASIC diagnostic to the MEMORY diagnostic, then continues with the SCC diagnostic:

```
>>> T ASIC:MEM,SCC [Return]
```

10.4.9 Running Tests Continuously

You can use the console REPEAT command to run all or selected diagnostics continuously. The diagnostics run until you press [Ctrl] [C] at the console prompt or until an error occurs.

10.4.10 Examples

This example runs the MEMORY diagnostic continuously until you press [Ctrl] [C] at the console prompt:

```
>>> R T MEM [Return]
```

This example runs the memory diagnostic and the NVR diagnostic continuously until you press [Ctrl] [C] at the console prompt:

```
>>> R T MEM,NVR [Return]
```

10.5 Entering/Exiting Console and Service Mode

10.5.1 Entering Console Mode

To enter console mode, perform one of the following actions:

Note

Perform a system shutdown before pressing the Halt button.

1. Press the Halt button.
2. Enter SET DIAG_SECTION 1 command while in service mode.
3. Enter the SET AUTO_ACTION HALT command. See the command description in Chapter 13.

10.5.2 Exiting Console Mode

To exit console mode and enter program mode, enter one of the following commands at the console prompt:

- BOOT

  The BOOT command initiates a system bootstrap operation. See Chapter 13.

- CONTINUE

  The CONTINUE command clears the RC State Flag bit and resumes processor execution. This command does not restart the system if you have to shut it down. See Chapter 13.

To exit console mode and enter service mode, enter the following command:

- SET DIAG_SECTION 2

  See Chapter 13.

10.5.3 Entering Service Mode

Some diagnostics require that the system be in service mode. To enter service mode, you must first enter console mode. At the console prompt, enter the following command:

```
>>> SET DIAG_SECTION 2 Return
```

10.5.4 Exiting Service Mode

To exit service mode and enter program mode, enter one of the following console commands:

- BOOT

  The BOOT command initiates a system bootstrap operation. See Chapter 13.

- CONTINUE

  The CONTINUE command clears the RC State Flag bit and resumes processor execution. This command does not restart the system if you have to shut it down. See Chapter 13.

To exit service mode and enter console mode, enter the following command:

- SET DIAG_SECTION 1
  See Chapter 13.

10.6 ASIC Diagnostic

10.6.1 Overview

The ASIC diagnostics test the Scatter/Gather Map registers.

The diagnostics also initialize all TURBOchannel and Core I/O ASIC registers by placing all registers in a known state.

The system performs the ASIC diagnostic when you:

- Power up the unit.
- Enter console mode and select the ASIC diagnostic.

The diagnostic isolates faults to the FRU level.

10.6.2 Running ASIC Diagnostics

To run the ASIC diagnostic and subtests, use the TEST command.

>>> **T[EST] {device name} [sub-test]** Return

10.6.3 Subtests

Table 10–5 lists ASIC diagnostic subtests.

Table 10–5 ASIC Diagnostic Subtests

Subtests	Description
INIT	Runs the INIT test.
SGMAP	Tests the Scatter/Gather Map register.
?	Lists available subtests

10.6.4 Example

This example runs the ASIC diagnostic.

>>> **T ASIC** Return

This example runs the ASIC diagnostic and SGMAP subtest.

>>> **T ASIC SGMAP** Return

10.6.5 Error Reporting Format

The diagnostic reports any errors that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T ASIC
?? 001 ASIC xxxxxxxx
```

Table 10–6 lists ASIC diagnostic error messages and identifies which FRU to replace.

Table 10–6 ASIC Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	ASIC	See Chapter 14	System board
??	002	ASIC	See Chapter 14	I/O board

10.7 NVR Diagnostic

10.7.1 Overview

The NVR diagnostic ensures the integrity of the TOY/NVR controller on the I/O board.

The NVR diagnostic tests 50 bytes of nonvolatile RAM and performs an NVR register test/initiation sequence.

The TOY test verifies that the time-of-year clock has been set. If it has been set, then the test verifies the clock's operation. If the time is not set, then all registers used by the time-of-year clock are tested.

The register test verifies that each TOY register can hold all possible values.

The system performs the NVR diagnostic when you:

- Power up the unit.
- Enter console mode and select the NVR diagnostic.

The diagnostic isolates faults to the FRU level.

10.7.2 Running NVR Diagnostics

To run the NVR diagnostic and subtests, use the TEST command.

```
>>> T[EST] {device name} [subtest] Return
```

10.7.3 Subtests

Table 10–7 lists NVR subtests.

Table 10–7 NVR Diagnostic Subtests

Subtests	Description
TOY	Runs the following: • Clock test • Test to ensure that the clock is ticking • Clock reentry test
NVR	Runs the following: • Check battery test • NVR Register test
INTERRUPT	Runs the Interrupt test
INIT	Runs the Initialization test
?	Lists available diagnostics

10.7.4 Example

This example runs the NVR diagnostic.

```
>>> T NVR [Return]
```

The next example runs the TOY subtest of the NVR diagnostic.

```
>>> T NVR TOY [Return]
```

10.7.5 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T NVR
?? 002 NVR xxxxxxxx
```

Table 10–8 lists NVR diagnostic error messages and identifies which FRU to replace.

Table 10–8 NVR Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	NVR	See Chapter 14	NVR socketed

Note

If the NVR error persists, replace the I/O board.

10.8 Memory Diagnostic

10.8.1 Overview

The memory diagnostic detects address and data-stuck-at faults. The diagnostic also performs ECC testing of memory.

The system performs the memory diagnostic when you:

- Power up the unit.
- Enter console mode and select the memory diagnostic.

During power-up, the memory diagnostic

- Checks the previous memory configuration
- Tests enough memory to load the secondary boot (APB.EXE for OpenVMS)

The *only* time a complete memory test is performed during power-up is when the memory configuration has changed.

In console mode, the diagnostic exercises all memory except for the first 2 MB. The first 2 MB of memory are reserved and tested by the serial ROM (SROM) code before the console is loaded.

The diagnostic isolates faults to the FRU level.

10.8.2 Running Memory Diagnostics

To run the memory diagnostic and subtests, use the TEST command.

```
>>> T[EST] {device name} [subtest] Return
```

10.8.3 Subtests

Table 10–9 lists memory diagnostic subtests.

Table 10–9 Memory Diagnostic Subtests

Subtests	Description
ALL	Performs all tests
CELL	Memory cell test
ADDR	Address lines and refresh test
LLSC	ldx_l/stx_c
INIT	Sets all memory to zero
?	Provides a list of available diagnostics

The subtests have default values for the starting and ending address and other values. You can modify the values. The diagnostic uses the default values if the values you enter are invalid or exceed their ranges. Table 10–10 lists the memory options.

Table 10–10 Memory Test Options

Option	Default	Description
-l:*xxxxxxxx*	002000000 (2 MB)	Starting address
-h:*xxxxxxxx*	Top of memory	Ending address
-n:*xx*	0	Number of retries[1]
-x[-]	On	Stop on error ON [OFF]
-i[-]	On	Initialize memory after tests ON [OFF]

[1]Must be a hexadecimal value.

10.8.4 Examples

This example runs the memory diagnostic.

```
>>> T MEM Return
```

The next example runs the memory diagnostic and the CELL subtest.

```
>>> T MEM CELL Return
```

10.8.5 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T MEM
?? 8xy MEM xxxxxxxx
```

Table 10–11 explains the 8*xy* memory error code.

Table 10–11 Memory Error Identification

Code	Description
8	Extended error code prefix.
x	Bank number (0 through 7).
y	Memory module number (0 to 7), if there are data errors in one module.

(continued on next page)

Table 10–11 (Cont.) Memory Error Identification

Code	Description
	A value of 8 to B indicates data errors in both modules:

Code	Memory Modules
8	0,1
9	2,3
A	4,5
B	6,7

10.8.6 Example

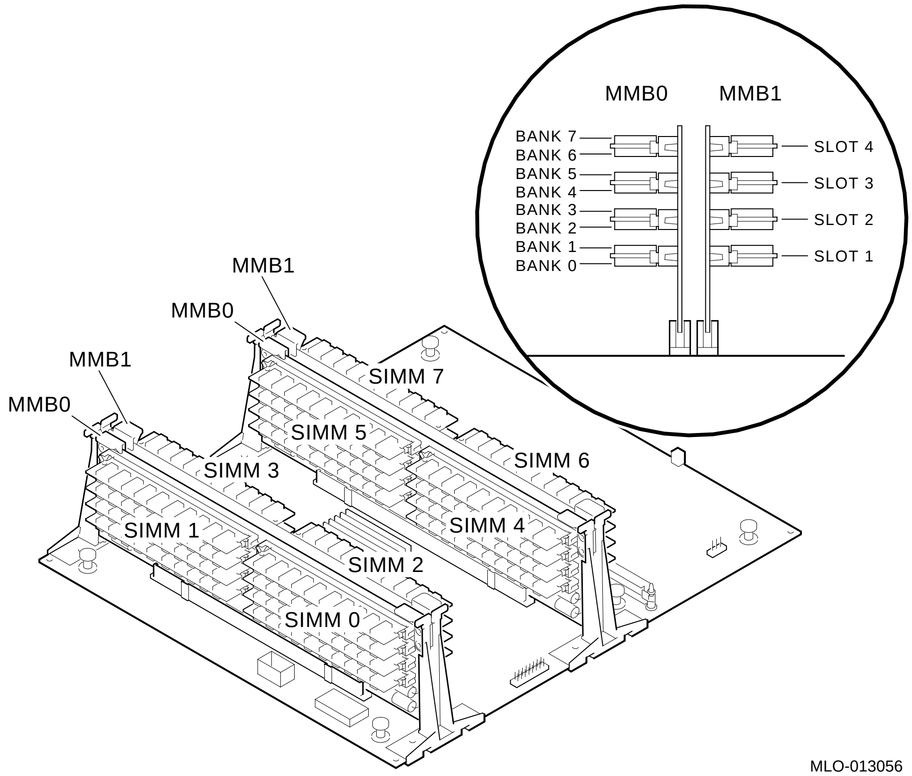
This example shows a sample memory error message.

```
>>> T MEM [Return]

T-STS-MEM - LLSC Test Addr 00200000
T-STS-MEM - Cell Test 00200000 <-> 10000000
T-STS-MEM -      Wr AAAAAAAA Addr 0FFFFFFC
T-STS-MEM -      FWD - Rd AAAAAAAA Wr 55555555 Addr 0D000000
MCHK: logout frame address = 00088000
1st quadw: 00000000 000001D8 exc_addr: 00000000 0006D59E  ID:00000000 00000019
fill_addr: 00000000 0D13C780 biu_addr: 00000000 0D13C780  va:00000000 0000038D
fill_synd: 00000000 00000075 biu_stat: 00000000 00000340 dc_stat:00000000 000006F0
   mm_csr: 00000000 000050f0   bc_tag: 00000000 00000000

? T-ERR-MEM - Addr = 0D13C780 Exp = AAAAAAAA Rec = 2AAAAAAA retries = 0
? T-ERR-MEM - Bad page = 689E  page count = 7F00  test count = 7EFF
T-ERR-MEM - 1 Errors
?? 860         MEM 0x0002

>>>
```

The error message `?? 860 MEM 0x0002` indicates that the error is in bank 6, memory module 0.

See Figure 10–1 for the location of the failed SIMM.

Figure 10–1 Memory Bank Layout



10.9 SCSI Diagnostic

10.9.1 Overview

The SCSI diagnostic verifies several areas of the SCSI subsystem, including:

- SCSI Controller chips
- Dual SCSI ASIC
- SCSI Bus problems
- Verification of the DMA path in physical and virtual modes

The system performs the SCSI diagnostic when you:

- Power up the unit.
- Enter console mode and select the SCSI diagnostic.

  In console mode, the diagnostic exercises the following data paths:

  – CPU — TURBOchannel interface
  – TURBOchannel interface — dual SCSI ASIC
  – Dual SCSI ASIC — SCSI controllers
  – SCSI controllers — SCSI bus

- Enter service mode and select the SCSI diagnostic.

  Service mode testing includes all tests performed in console mode, plus a map error test and minimal device test.

10.9.2 Utilities

Utilities perform the following tasks:

- Provide status information on SCSI devices.
- Spin up, erase, and format hard disks.
- Erase and format floppy diskettes.
- Perform disk verifier testing.

Utilities do not run at power-up. They require user interaction. See Chapter 13.

10.9.3 Running SCSI Diagnostics

To run the SCSI diagnostic and subtests, use the TEST command.

Note

You must use a terminator (H8574–A) if no external drives are connected. See Figure 8–3, feature ❽.

```
>>> T[EST] SCSI [subtest] Return
```

10.9.4 Subtests

Table 10–12 lists the SCSI diagnostic subtests.

Table 10–12 SCSI Diagnostic Subtests

Subtest	Description	Mode
ASIC[1]	Tests dual SCSI ASIC registers and two SCSI DMA buffers.	Console
REGISTER[1]	Tests both sets of SCSI controller registers (on SCSI A/B).	Console
INTERRUPT[1]	Tests the interrupt logic (SCSI A/B).	Console
TRANSFER	Tests SCSI A/B bus data transfers.	Console
MAP[2]	Tests for map and parity errors.	Service
DEVICE[3]	Tests SCSI devices.	Service

[1]Does not require any devices to be present on either SCSI bus.

[2]This test runs only on the first device that responds to the TRANSFER test.

[3]Removable media drives *must* have media installed before testing. Tapes are rewound and started from BOT.

10.9.5 Examples

This example runs the SCSI diagnostic.

```
>>> T SCSI Return
```

The next example runs the SCSI diagnostic and the REGISTER subtest.

```
>>> T SCSI REGISTER Return
```

10.9.6 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T SCSI
?? 001 SCSI XXXXXXXX
```

Table 10–13 lists the SCSI diagnostic error messages and identifies the FRU to replace.

Table 10–13 SCSI Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	SCSI	Chapter 14	System board
??	002	SCSI	Chapter 14	I/O board
??	1xy[1]	SCSI	Chapter 14	SCSI controller A
??	2xy[1]	SCSI	Chapter 14	SCSI controller B

[1]x = SCSI ID.
y = logical unit number.

10.10 NI Diagnostic

10.10.1 Overview

The NI diagnostic verifies that the LANCE chip is operational. The diagnostics also induce forced errors to ensure functionality.

The system performs the NI diagnostic when you:

- Power up the unit.

  When you power up the unit, the NI diagnostic performs limited testing. You should run the complete NI diagnostic in service mode.

- Enter console mode and select the NI diagnostic.
- Enter service mode and select the NI diagnostic.

  Testing in service mode provides a full complement of patterns, rather than a single pattern. Additionally, the full addressing range is tested for DMA read/write access.

10.10.2 Running NI Diagnostics

Before testing, you *must* either connect the thickwire loopback connector (12-22196-01) to the AUI Ethernet port or connect the port directly to the network. You must also verify that Thickwire has been selected. Failure to do so results in an external loopback failure. See Figure 8–3, feature ❷ for the port's location and Table 8–2 for a description.

To run the NI diagnostic and subtests, use the TEST command.

>>> **T[EST] NI [subtest]** Return

10.10.3 Subtests

Table 10–14 lists the NI diagnostic subtests.

Table 10–14 NI Diagnostic Subtests

Subtests	Description
NAR	Network address ROM test
REGISTER	LANCE Register test
DMA_INIT	Initialize LANCE and test DMA logic test
ILPBK	Internal loopback and DMA test
INTERRUPT	Interrupt test
EXT_LPBK	External loopback test
CRC[1]	Tests internal loopback with CRC check
RX_MISS_BUFF[1]	Tests internal loopback with MISS error
COLLISION[1]	Tests internal loopback with collision
FILTER[1]	Tests internal loopback with address filter checking
INIT	Initializes the NI chip
TX_BUFF[1]	Tests internal loopback with transmit buffer error

[1]Diagnostic can only be executed in service mode.

10.10.4 Examples

This example runs the NI diagnostic:

```
>>> T NI Return
```

The next example runs the NI diagnostic and the NAR subtest:

```
>>> T NI NAR Return
```

10.10.5 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T NI
?? 001 NI xxxxxxxx
```

Table 10–15 describes the NI diagnostic error messages and identifies which FRU to replace.

Table 10–15 NI Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	NI	See Chapter 14	System board
??	002	NI	See Chapter 14	I/O board

10.11 SCC Diagnostic

10.11.1 Overview

The serial communication controller (SCC) diagnostic performs a functional test of the following:

- Data path to the SCC
- Ability to operate in asynchronous mode
- Data path from the SCC to the connectors
- Printer and communication ports, using DMA transfers

The diagnostic tests the SCC chips only in asynchronous mode.

The system performs the diagnostic when you:

- Power up the unit in server mode (SET SERVER 1 console command).
- Enter console mode and select the SCC diagnostic.
- Enter service mode and select the SCC diagnostic.

10.11.2 Running SCC Diagnostics

To run the SCC diagnostic and subtests, use the TEST command.

>>> **T[EST] SCC [subtest]** Return

10.11.3 Subtests

Note

You must connect the modem loopback to run the MODEM subtest, or a failure occurs. See Figure 8–3, feature ❻ for the location of the modem port.

Table 10–16 lists the SCC diagnostic subtests.

Table 10–16 SCC Diagnostic Subtests

Subtests	Description
INIT	Performs a reset on both SCC controllers.
POLLED	Tests SCC controllers using polled I/O.
INTERRUPT	Tests SCC controllers, using interrupt-driven I/O.
DMA	Tests SCC controllers, using DMA transfers.
LK401	Tests for the presence of a keyboard.
MOUSE	Tests for the presence of a mouse.
MODEM[1]	Tests modem control signals.

[1]Requires a modem loopback. Run the test in service mode.

10.11.4 Examples

This example runs the SCC diagnostic.

```
>>> T SCC Return
```

The next example runs the SCC diagnostic and the LK401 subtest.

```
>>> T SCC LK401 Return
```

10.11.5 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T SCC
?? 003 SCC xxxxxxxx
```

Table 10–17 lists the SCC diagnostic error messages and which FRU to replace.

Table 10–17 SCC Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	SCC	See Chapter 14	I/O board
??	003	SCC	See Chapter 14	Keyboard
??	004	SCC	See Chapter 14	Mouse

10.12 ISDN Diagnostic

10.12.1 Overview

The ISDN diagnostic ensures that the 79C30A chip is fully functional by testing, generating, verifying, and disable interrupting the following:

- 79C30A Internal registers

- Internal digital loopback
- Internal analog loopback
- Tone output
- DMA

The system runs the diagnostic when you:

- Power up the unit.
- Enter console mode and select the ISDN diagnostic.
- Enter service mode and select the ISDN diagnostic.

10.12.2 Running ISDN Diagnostics

To run the ISDN diagnostic and subtests, use the TEST command.

```
>>> T[EST] ISDN [subtest] Return
```

10.12.3 Subtests

Table 10–18 lists the ISDN diagnostic subtests.

Table 10–18 ISDN Diagnostic Subtests

Subtest	Description	Mode
INIT	Initialize test	Console
REG	Internal registers test	Console
TONE	Audio output	Service
D_LOOP	Internal digital loopback test	Service
A_LOOP	Internal analog loopback test	Console
INT	Interrupt test	Console
DMA	DMA	Console
RECORD[1]	Record test	Service
PLAYBACK[1]	Playback	Service
REPEAT[1]	Repeat test	Service

[1]Requires a headset to perform the test correctly.

10.12.4 Examples

This example runs the ISDN diagnostic.

```
>>> T ISDN Return
```

The next example runs the ISDN diagnostic and the REGISTER subtest:

```
>>> T ISDN REGISTER Return
```

10.12.5 Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and a FRU code to identify the failing FRU.

```
>>> T ISDN
?? 002 ISDN xxxxxxxx
```

Table 10–19 describes the ISDN diagnostic error messages and identifies which FRU to replace.

Table 10–19 ISDN Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	ISDN	See Chapter 14	I/O board

10.13 TURBOchannel Testing

10.13.1 MIPS Emulator Overview

The MIPS emulator performs the following tests on a TURBOchannel option:

- Performs diagnostic testing on a TURBOchannel option
- Initializes a TURBOchannel option
- Displays configuration on a TURBOchannel option
- Runs the console on a TURBOchannel graphics option
- Boots the operating system using a TURBOchannel option

10.13.2 Before You Begin

Before testing, enter console mode and use the SHOW CONFIG command to display the name of the installed TURBOchannel device names. Identify and record the TURBOchannel device you want to test. The command lists TURBOchannel options by their slot number:

TC*n*

The *n* is the TURBOchannel option slot number. For example, a TURBOchannel option in slot 2 has a device name of TC2.

10.13.3 Running Default Test Scripts

The following command runs the pst-t test script, which performs a string of diagnostic test scripts for the selected device.

```
>>> T[EST] [device_name] Return
```

If no pst-t script is present, then the test fails. If there is a failure, you can display a list of scripts and run single test scripts.

10.13.4 Example

This example runs the default test script on the TURBOchannel option in slot 2.

>>> **T TC2** Return

10.13.5 Displaying a List of Scripts

The following command displays a list of available diagnostic test scripts.

An asterisk (*) indicates an object script. Object scripts are not executable; they fail if selected.

>>> **T {device_name} ls**

10.13.6 Example

This example displays a list of scripts for the TURBOchannel option in slot 2.

>>>**T TC2 ls** Return

10.13.7 Running Single Test Scripts

To run diagnostic test scripts, enter the following:

>>> **T {device_name} {script_name}**

10.13.8 Example

This example runs script pst-m on the TURBOchannel option in slot 2.

>>> **T TC2 pst-m** Return

10.13.9 Initializing a TURBOchannel Option

To initialize a selected TURBOchannel option, enter the following command:

>>> **T {dev_name} INIT** Return

10.13.10 Example

This example initializes the TURBOchannel option in slot 3.

>>> **T TC3 INIT** Return

10.13.11 Additional Commands

Other TEST commands used with TURBOchannel options are:

Command	Description
>>> T {dev_name} {cnfg}	Display configuration on TC option slot.
>>> T {dev_name} {cat scriptname}	List contents of a script.

11
Troubleshooting

11.1 Overview

11.1.1 Chapter Overview

This chapter covers the following topics:

- System Device FRU Codes
- LED Codes
- 84 Fail Message
- Troubleshooting tables for problems with:
  - System
  - Monitor
  - Mouse/tablet
  - Keyboard
  - Drives
  - Network
  - Audio
  - Console
  - Firmware

11.1.2 Introduction

The troubleshooting techniques described in this section neither identify all possible problems, nor do the suggested corrective actions remedy all problems. Call the Digital Service Center or your service representative if you encounter other problems.

The loopbacks you need to execute diagnostics are supplied with each DEC 3000 Model 900S AXP system.

11.1.3 Before You Start

Before performing any procedures, verify cable, terminators, cable connections, loopbacks, and proper termination. Replace the most probable FRU as reported by diagnostics. Refer to Chapter 10.

11.2 System Device FRU Codes

11.2.1 System Device FRU Codes

Table 11–1 lists the system device FRU codes. A code appears on your screen when a FRU fails.

Table 11–1 System Device FRU Codes

Code	FRU
000	Unknown, or diagnostic does not support FRU reporting
001	System board
002	I/O board
003	LK Keyboard
004	Mouse/pointing device
005	Audio module
006	Reserved

11.3 LED Codes

11.3.1 Successful Power-Up Display

The following example shows the display for a successful power-up sequence:

```
DEC 3000 - M800
Digital Equipment Corporation
System conducting power up tests

Devnam        Devstat
CPU           OK KN17-AA
MEM           OK 144MB
NVR           OK
SCC           OK PTR(0)= Present Keybd(2)= Present
NI            OK Ethernet Address: 08-00-2B-2A-1F-82, THICK
SCSI          OK
ISDN          OK
TC0           OK - PMAGB-BA

System power up OK
Enter B to boot software from DKB0
>>>
```

11.3.2 If You See An Error

The LED codes described in this section provide information on a power-up sequence failure. Note the LED code displayed and go to the appropriate section.

11.3.3 Serial ROM LED Codes

LED codes indicate what diagnostic is currently being executed when the unit is first powered on. If an error occurs before the system enters console mode, then the failed test is identified by a binary LED display of two 4-bit hexadecimal numbers. The LED display is located on the front panel.

Use these diagnostic LEDs to help diagnose problems when the system is unable to enter console mode. This portion of the testing does not appear on the monitor.

Table 11–2 lists the serial ROM LED error codes. For each LED code that appears, either the system board or the I/O board is the faulty FRU. Take the following action in the order listed.

1. Verify that there is a secure connection between the system board and the I/O board.
2. Verify that all memory modules are properly installed. Reseat the MMBs and SIMMs if necessary.
3. Verify that all power cables are connected correctly.

This portion of the testing is not displayed on the monitor.

Table 11–2 Serial ROM LED Error Codes

LED HEX Codes		
00	FF	FE
FD	FC	FB
FA	F9	F8
F7	F6	F5
F4	F3	F2
F1	F0	20

11.3.4 ASIC LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the ASIC diagnostics and interpret the error information using:

- The SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then the failed FRU is either the system board or the I/O board. Take the following action:

1. Reseat the board.
2. Replace the system board.

3. If the error persists, replace the I/O board.

The LED code is 35.

11.3.5 Memory LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the MEMORY diagnostics and interpret the error information using:

- The SHOW ERROR command.
- Diagnostic information (Chapter 10).

The next table lists the LED codes. For each LED code that appears, take the following action in the order listed.

1. Verify that all memory modules are properly installed. Reseat the MMBs and SIMMs if necessary.
2. Verify that all power cables are connected correctly.

LED Code	Description
20	Machine Check
21	CELL Fill mem with test pattern data
22	CELL Forward Rd/Compare/Complement/Wr
23	CELL Reverse Rd/Compare/Complement/Wr
24	ADDR Fill mem with addresses as data
25	ADDR Read/Compare data = address
26-2A	Reserved
2B	LLSC load-locked/store-conditional tests
2C	BCTP Bcache Tag Parity detection
2D	ECC Detection
2E	Reserved
2F	Clear memory to zeros

11.3.6 NVR LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, a hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the NVR diagnostics and interpret the error information using:

- SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then use Table 11–3 to isolate the failed FRU. Take the following action in the order listed:

1. Verify that there is a secure connection between the I/O board and the system board.

2. Replace the NVR.
3. Verify that all memory modules are properly installed. Reseat the MMBs and SIMMs if necessary.
4. Verify that all power cables are connected correctly.

This portion of the testing is not displayed on the monitor.

Table 11–3 NVR LED Error Codes

LED Codes		
3A	3B	3C
3D	3E	

11.3.7 SCC LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, a hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the SCC diagnostics and interpret the error information using:

- SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then use Table 11–4 to isolate the failed FRU. Take the following action in the order listed.

1. Reseat the I/O board.
2. Reseat the modem loopback.
3. Reseat the mouse connection.
4. Reseat the keyboard connection.

Note

When testing DEC 3000 Model 900S AXP systems, the console command SERVER must be set to ON (SET SERVER ON) for this diagnostic.

This portion of the testing is not displayed on the monitor.

Table 11–4 SCC LED Error Codes

LED Codes		
40	41	42
43	44	45
46		

LED code 47 is for the keyboard and I/O board. LED code 48 is for the mouse. LED codes 49 through 4E are reserved.

11.3.8 NI LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the NI diagnostics and interpret the error information using:

- SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then use Table 11–5 to isolate the failed FRU. Take the following action in the order listed.

1. Reseat the I/O board and system board.
2. If thickwire is selected, you must use a thickwire loopback connector, or the system must be connected to the network through the Thickwire port. If 10BASET is selected and the diagnostic environment is service mode, you must connect a 10BASET loopback connector, or the system must be connected to the network through the 10BASET port.

Table 11–5 NI LED Error Codes

LED Codes		
50	51	52
53	54	55
56	57	58
59	5A	

11.3.9 ISDN LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the ISDN diagnostics and interpret the error information using:

- SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then use Table 11–6 to isolate the failed FRU. Take the following action in the order listed.

1. Reseat the I/O board and system board.
2. Make sure a handset (microphone/speaker) is connected.
3. Make sure the audio module cable is connected to the I/O board.

Table 11–6 ISDN LED Error Codes

LED Codes		
70	71	72
73	74	75

11.3.10 SCSI LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system hexadecimal code plus FRU and error code information appear on the screen.

If the system enters console mode, then run the SCSI diagnostics and interpret the error information using:

- SHOW ERROR command
- Diagnostic information (Chapter 10)
- Diagnostic error messages (Chapter 14)

If the system does not enter console mode (>>>), or if the hex code DD is not displayed on the LEDs, then use Table 11–7 to isolate the failed FRU. Take the following action in the order listed.

1. Reseat the I/O board and system board.
2. Check SCSI cables and SCSI ID setting.
3. All disk devices with removable media must have the media installed.

Table 11–7 SCSI LED Error Codes

LED Codes		
60	61	62
63	64	65

11.3.11 Console LED Codes

This section lists error codes that may appear in the last test sequence before entering the console program.

If the power-up sequence is successful, the diagnostic LEDs DD hex code and the console (>>>) prompt appear. These are the only indications that the system has entered console mode.

If the system does not enter the console program, use Table 11–8 to isolate the failed FRU and reseat the system board.

Table 11–8 Console LED Error Codes

LED Codes		
EF	EE	ED
EC	EB	EA
E9	E8	E7
E6	E5	E4
E3	E2	E1
E0	DF	DE

11.4 84 Fail Message

11.4.1 Overview

The message `84 Fail` is a general-purpose failure message that can appear under two conditions:

- Using the TEST command

  If an `84 Fail` message occurs during a TEST command, a diagnostic error code appears on the screen also. Disregard the `84 Fail` message and rely on the error code information.

- Using the BOOT command

  If an `84 Fail` message occurs during a BOOT command, the probable cause for the failure is one of the following:

  – Boot device is not present.

  – Boot device is present, but there is no media installed.

  – Boot block is not found on the media.

11.5 Troubleshooting Tables

11.5.1 Overview

The following tables contain information to help you troubleshoot DEC 3000 Model 900S AXP systems. The tables are organized as follows:

- System Problems
- Monitor Problems
- Mouse Problems
- Keyboard Problems
- Drive Problems
- Network Problems
- Firmware Upgrade Problems

11.5.2 Using the Tables

Each troubleshooting table contains symptoms, possible causes, and suggested actions. If more than one action is suggested, perform them in the order listed.

11.5.3 System Problems

Table 11–9 covers general system power-up problems.

Table 11–9 System Problems

Symptom	Possible Cause	Corrective Action
Fan not running.	A fan failed.	Check the internal fan failure circuit breaker. • If the circuit breaker is tripped, a fan has failed; replace the fan. • If the circuit breaker is on, the fans are OK.
	The power supply failed.	Replace the power supply.
All fans start then the internal fan failure circuit breaker trips.	Airflow sensor failed.	Replace the airflow sensor.
	Fan tachometer alarm board failed.	Replace the fan tachometer alarm board.
The DC ON LED is off.	No system power.	Check the power outlet and cord.
	Incorrect power supply harness connection.	Check the harness connectors.

(continued on next page)

Table 11–9 (Cont.) System Problems

Symptom	Possible Cause	Corrective Action
	System power supply failure.	Replace the power supply.
All LEDs do not work.	The LSM module/cable or system board failed.	See Chapter 9 for module locations.
The monitor is blank, and the diagnostic LEDs display 00.	The SROM jumper setting is incorrect.	See Chapter 8. Reset the jumper.
		Reseat the I/O board.
		Reseat memory motherboards.
The power-up display does not appear and the diagnostic LEDs DD code is on.	The monitor is turned off.	Turn on the monitor.
	The monitor brightness and contrast controls are too dark to see the screen display.	Adjust the monitor brightness and contrast controls.
		Check the monitor cable and video connections.
	The monitor fuse is blown.	See the monitor's documentation for fuse replacement instructions.
The system does not boot at power-up.	Software is not installed. The alternate console switch is in the wrong position.	Install the system software. See the software documentation for installation instructions. Set the console switch in the correct position.
	Default recovery action is set to halt.	In console mode, enter the SHOW AUTO_ACTION command to find the proper setting. Use the SET AUTO_ACTION command to change the setting. See Chapter 13 for command descriptions.
	Incorrect boot device was specified.	In console mode, enter the SHOW BOOTCMD_DEV command to find the proper setting. Use the SET BOOTCMD_DEV command to change the setting. See Chapter 13 for command descriptions.

(continued on next page)

Table 11–9 (Cont.) System Problems

Symptom	Possible Cause	Corrective Action
	Boot device is not configured properly.	Use the SHOW DEVICE command to verify that all devices are configured properly. If not, verify that all SCSI ID settings and SCSI cables are correct.
	Faulty boot device	Run SCSI diagnostic utilities (Chapter 10).

11.5.4 Monitor Problems

Table 11–10 describes monitor problems. If the corrective actions do not correct a problem, verify that all cable connections are correct and secure. If they are, and the TURBOchannel grapahics option is installed, run the diagnostics in (Chapter 10).

Table 11–10 Monitor Problems

Symptom	Possible Cause	Corrective Action
The screen is blank.	The alternate console is enabled.	Disable the alternate console.
	Brightness and contrast controls adjusted incorrectly.	Adjust the monitor brightness and contrast controls.
The screen display is unstable.	The display needs alignment.	Refer to the monitor's documentation for adjustment procedures and Chapter 14 for alignment pattern diagnostics.

11.5.5 Mouse or Tablet Problems

Table 11–11 describes mouse and tablet problems. If the corrective actions do not correct a problem:

1. Verify that all cable connections are correct and secure.
2. If the connections are okay, run the SCC diagnostics (Chapter 10).

Table 11–11 Mouse Problems

Symptom	Possible Cause	Corrective Action
The system boots, but the mouse or optional tablet pointer does not appear on the screen, or the monitor does not respond to pointing device commands.	The pointing device cable is installed incorrectly or is loose.	Turn off the system. Reseat the cable. Turn on the system.
	The system is halted. The pointer does not appear on the screen.	If in console mode (>>>), boot the system.
The pointer does not appear on screen or does not respond.	Pointer mode is disabled.	Press Ctrl F3 to enable the pointer.

11.5.6 Keyboard Problems

Table 11–12 describes keyboard problems. If the corrective actions do not correct a problem:

1. Verify that all cable connections are correct and secure.
2. If the connections are okay, run the SCC diagnostics (Chapter 10).

Table 11–12 Keyboard Problems

Symptom	Possible Cause	Corrective Action
System does not respond when keys are pressed.	The Hold Screen key is active. The hold screen light on the keyboard is on.	Press the Hold Screen key to release the screen display.
	The keyboard cable is loose or disconnected.	Check the keyboard cable connection at both ends.

11.5.7 Drive Problems

Table 11–13 describes drive problems. If the corrective actions do not correct a problem:

1. Verify that all cable connections are correct and secure.
2. If connections are okay, you must run the SCSI diagnostic (Chapter 10) or utilities (Chapter 13) to isolate a media or controller problem.

   See Chapter 8 for information on specific storage devices. Figure 9–4 shows internal cable routing, and Figure 9–5 shows power cable routing. Figure 8–6 shows recommended SCSI ID settings and drive placement.

Table 11–13 Drive Problems

Symptom	Possible Cause	Corrective Action
Drive does not work.	Two SCSI identifiers are set to the same ID number.	In console mode, enter the SHOW DEVICE command to check current settings. Reset each SCSI ID to a unique number.
	A cable is loose.	Verify that all cables connections are correct and secure.
	A drive is defective.	Run diagnostics to isolate the fault to a FRU. Replace the FRU.

11.5.8 Network Problems

Table 11–14 describes network problems. If the corrective actions do not correct a problem:

1. Verify that all cable connections are correct and secure.
2. Run NI diagnostics in service mode (for extended testing capabilities). See Chapter 10.

Table 11–14 Network Problems

Symptom	Possible Cause	Corrective Action
An NI error message appears when verifying the Ethernet.	A thickwire/10BASET terminator or cable was not installed.	Attach an appropriate Ethernet terminator.
	Ethernet setting in console is wrong.	You may have a 10BASET cable plugged in, but the Ethernet is set to THICK.
	A cable is loose.	Secure all cable connections on the Ethernet segment.
The system cannot boot from the network.	Local network is faulty. The problem is most likely caused by the server system or the network.	Contact your system manager.
	Defective NI interface.	Run the NI diagnostics (TEST NI command) with terminators attached. If a test fails, replace the faulty FRU.

11.5.9 Audio Problems

To isolate audio problems, run the ISDN diagnostics service mode (for extended testing capabilities). See Chapter 10.

11.5.10 Console Security Problems

To isolate console security problems, see Chapter 8 for procedures to:

- Enable console security.
- Reset the console password.
- Enter the privileged state.

11.5.11 Firmware Upgrade Problems

Table 11–15 describes problems when trying to upgrade the flash EEPROMs.

Table 11–15 Firmware Upgrade Problems

Symptom	Possible Cause	Corrective Action
Unable to complete firmware upgrade.	Jumpers on the system board and I/O board are not set correctly.	See Chapter 14.

12

Recommended Spare Parts List

12.1 Spare Parts List for the DEC 3000 Model 900S AXP

12.1.1 Spare Parts List

Table 12–1 lists the recommended spare parts and part numbers for the DEC 3000 Model 900S AXP systems.

Table 12–1 DEC 3000 Model 900S AXP Spare Parts List

Part	Part Number
I/O Board	54-21147-02
System (CPU) board	54-23153-04
Memory motherboard (MMB)	54-21141-01
Power supply	70-31597-01
SIMM, 4 MB	54-21139-CA
SIMM, 8 MB	54-21139-DA
SIMM, 16 MB	54-21139-EA
SIMM, 32 MB	54-21139-FA
Top cover	70-31827-01
Bottom cover	74-48446-01
Main fan assembly	70-31589-01
Rear fan assembly	70-31591-01
Impingement fan assembly	70-31590-01
Lights and switch module	54-21145-01
Regulator board (3.45 V)	70-32475-01
Audio module	70-31594-01
Airflow sensor	70-31813-01
-12 Vdc converter board	54-20074-02
Fan tachometer alarm board	70-44209-01
DC on/off switch	70-31810-01

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Table 12–1 (Cont.) DEC 3000 Model 900S AXP Spare Parts List

Part	Part Number
DC power LED	70-31598-01
AC input filter	12-39991-01
Drive power cable	17-03489-01
SCSI cable, long	17-03487-01
SCSI cable, short	17-03488-01
Removable media tray SCSI data cable	17-03314-01
Internal SCSI data cable	17-03801-01
Internal 20-conductor power cable	17-03316-01
Internal fan power cable	70-31786-01
Internal fan power cable	70-31786-02
Internal fan power cable	70-31602-01
Internal 16-conductor power cable	70-31806-01
Internal 14-conductor power cable	70-31807-01
Internal 12-conductor power cable	70-31808-01
Removable tray power cable	17-03344-01
Internal ac power cable	70-31601-01
LSM data cable	17-03501-01
Audio module cable	17-03502-01
Power cord	17-00083-58
Desktop mouse and keyboard cable	17-02640-02
Front panel assembly	70-31595-01
Removable media tray cover	74-49237-01
Honeycomb filter	12-44369-01
Air filter	12-44371-01

(continued on next page)

Table 12–1 (Cont.) DEC 3000 Model 900S AXP Spare Parts List

Part	Part Number
Loopbacks and Terminators	
Printer port loopback	12-25083-01
Thickwire Ethernet loopback	12-22196-01
SCSI terminators	12-30552-01
Fast SCSI terminators	12-41296-01
10BASE-T Ethernet loopback	H4082-AA
Modem port loopback	29-24795

12.2 DEC 3000 Model 900S AXP TURBOchannel Options Parts List

12.2.1 Options Part Numbers

Table 12–2 lists the part numbers for the TURBOchannel options.

Table 12–2 DEC 3000 Model 900S AXP TURBOchannel Options List

Option	Option Number	Part Number
SCSI controller	PMAZ-AB	54-19876-01
Thickwire Ethernet controller	PMAD-AA	54-19874-01
FDDI interface module	DEFZA-AA	DEFZA-AA
TCE option module	-	54-20623-01
Monochrome frame buffer (MX)	PMAG-AA	54-20609-01
Color frame buffer (CX)	PMAG-BA	54-19815-01
Smart frame buffer 1280 x 1024, 72 Hz 1280 x 1024, 66 Hz (HX)	PMAGB-BA	54-21143-01
Smart frame buffer 1280 x 1024, 72 Hz 1024 x 864, 60 Hz (HX)	PMAGB-BC	54-21143-02
Smart frame buffer 1280 x 1024, 72 Hz 1024 x 768, 72 Hz (HX)	PMAGB-BE	54-21143-03
2D graphics accelerator (PX)	PMAG-CA	54-20314-01
True color frame buffer 66 Hz (TX)	PMAG-JA	30-35790-01
True color frame buffer 72 Hz (TX)	PMAGB-JA	30-35790-02
True color frame buffer picture-in-picture board		30-35788-01
Lo 3D graphics accelerator 66 Hz (PXG)	PMAG-DA	54-20185-01
Lo 3D graphics accelerator 72 Hz (PXG+)	PMAGB-DA	54-20185-02
Lo 3D graphics accelerator 66 Hz (PXG+)	PMAGB-DC	54-20185-04

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Table 12–2 (Cont.) DEC 3000 Model 900S AXP TURBOchannel Options List

Option	Option Number	Part Number
Mid 3D graphics accelerator 66 Hz (PXG)	PMAG-EA	54-20185-02
Lo 3D graphics accelerator 72 Hz with Z-buffer (PXG+)	PMAGB-EA	54-20185-05
Lo 3D graphics accelerator 66 Hz with Z-buffer (PXG+)	PMAGB-EC	54-20185-06
Hi 3D graphics accelerator 66 Hz (PXG turbo)	PMAG-FA	54-20114-01
Hi 3D graphics accelerator 72 Hz (PXG turbo+)	PMAGB-FA	54-20114-02
Fast SCSI	PMAZC	
8-bit Z-buffer		54-20410-AA
16-bit Z-buffer		54-20352-AA
8-plane video SIMM		54-20116-AA

Part IV

Common System Information

Part IV provides information common to both the DEC 3000 Models 400S/600S AXP and the DEC 3000 Model 900S AXP systems. This part includes the following chapters:

13

Using the Console and Utilities Commands

13.1 Overview

13.1.1 Chapter Overview

This chapter contains the following topics:

- Console Commands List
- Alternate Consoles
- SCSI Utilities

13.2 Console Commands List

Each console command description contains a brief description of the command, its format, at least one example, and associated parameters and qualifiers.

The following table lists the console commands and their function.

Console Commands	Function
BOOT	Initiates the bootstrap process
CONTINUE	Changes operating system from console to program mode
DEPOSIT	Writes to memory, I/O, and register locations
EXAMINE	Displays specific memory, I/O, and register locations
HALT	Halts the current program and changes the system from program mode to console mode
HELP	Displays basic help file
INITIALIZE	Resets console, devices, and CPU
LOGIN	Secures the system
REPEAT	Repeats commands
SET	Sets an environment variable
SHOW	Shows an environment variable
START	Starts CPU at a given address
TEST	Runs diagnostics

13.3 BOOT

13.3.1 Description

The BOOT command bootstraps the operating system.

Issuing the boot command with the -fl, -fi flag or boot device option overrides the current default value for the current boot request, but does not change the stored default value.

13.3.2 Format

To execute the BOOT command, enter the following:

```
>>> B[OOT] [device_name] [qualifier] Return
```

13.3.3 Environment Variables

The environment variables required when you use the BOOT command are described in the next section. All parameter names are listed in alphabetical order and qualifiers are listed within that particular parameter.

13.4 BOOT Command Parameters

13.4.1 device_name

A device from which the firmware attempts to boot.

Note

A default boot device may be specified by using the SET BOOTDEF_DEV command.

Device Name Identifiers: The following names are supported device identifiers:

OpenVMS AXP Device Identifiers	DEC OSF/1 AXP Device Identifiers	Device Type
DK	RZ	Fixed or removable disk
MK	TZ	Tape
ES	–	Ethernet, MOP protocol
–	EZ	Ethernet, BOOTP protocol

OpenVMS AXP Device Naming Convention: The device naming convention for the OpenVMS AXP operating system is `ddiunn`. The device naming convention for the DEC OSF/1 AXP operating system is `ddiu`. See Table 13–1 for a description of the OpenVMS AXP and DEC OSF/1 AXP device naming conventions.

Table 13–1 OpenVMS AXP and DEC OSF/1 AXP Device Naming Conventions

OpenVMS AXP Convention	DEC OSF/1 AXP Convention	Description
dd	dd	Device name identifier
i	i	Designates SCSI controller (A/B)
u	u	Designates SCSI ID number
nn		Logical unit number is always 00; LUN must be two digits

For example, a disk device on SCSI controller A with a SCSI ID of 4 and an LUN of 0 would have the following OpenVMS AXP device naming convention:

```
DKA600
```

Note

BOOT commands can either be in OpenVMS AXP or DEC OSF/1 AXP format when the system is operating under either OpenVMS AXP or DEC OSF/1 AXP. Two command syntaxes are available so as to match the current OpenVMS AXP and DEC OSF/1 AXP syntaxes.

13.4.2 Qualifiers

-fl <value>

ASCII string up to 23 characters.

-fi <filename>

Used when booting across a network device to specify the name of a file to load into the operating system. The filename is limited to 23 characters. Note that the filename must be in quotes.

Qualifier	Description
-fl <value>	FLAGS, ASCII string of up to 23 characters
-fi <filename>	Used when booting across a network device to specify the name of a file to load into the system

13.4.3 Examples

This example uses the default boot specification.

```
>>> BOOT Return
```

The next example boots from a disk device on SCSI controller A with a SCSI ID of 6 and an LUN of 0 and using the default flag values stored in the environment variable BOOTDEF_DEV.

```
>>> BOOT DKA600 Return
```

The next example performs a MOP boot to device ESA0 with the flags equal to 0,0.

```
>>> BOOT -FL 0,0 ESA0 Return
```

The next example performs a MOP boot to device ESA0 from filename E_BOOT.CMD.

```
>>> BOOT -FI "E_BOOT.CMD" ESA0 Return
```

The next example performs an OSF boot command from filename SENVMUNIX.

```
>>> BOOT -FI "SENVMUNIX" RZ3A Return
```

13.5 CONTINUE

13.5.1 Description

The CONTINUE command changes the operating system from console mode to program mode.

The processor begins instruction execution at the address contained in the program counter.

Processor initialization is not performed.

The Ctrl P/CONTINUE function is *not* supported on graphics consoles; this function only works on an alternate console.

13.5.2 Format

To execute the CONTINUE command, enter the following:

```
>>> C[ONTINUE] Return
```

13.5.3 Example

This example changes the operating system from console mode to the program mode.

```
>>> CONTINUE Return
```

13.6 DEPOSIT

13.6.1 Description

The DEPOSIT command is used to write to memory, I/O, and register locations from the console.

13.6.2 Format

To execute the DEPOSIT command, enter the following:

>>> **DEPOSIT [qualifier_list]{address}{data}[{data}]** Return

The address specifies the address (or first address) to be written. Data values must be in hexadecimal.

13.6.3 Qualifier_list

The following qualifiers specify data size:

Data Size (option)	Description
-B	Byte (8 bits)
-W	Word (16 bits)
-L	Longword (32 bits) (default)
-Q	Quadword (64 bits)

The following qualifiers specify address type options:

Address Type (option)	Description
-VM	Virtual memory address
-PM	Physical memory address
PS[1]	Processor Status register (PS). The data size is always quadword.
-R	General Purpose register set, R0 through R31. The data size is always quadword.
-FR	Floating Point register set, F0 through F31. The data size is always quadword.
-U	Access to console private memory is allowed.
PC[1]	Program counter. The data size is always quadword.
SP[1]	Stack pointer. The data size is always quadword.

[1]These options should *not* be typed with (-), otherwise the command will not work.

The following qualifiers specify the miscellaneous options:

Miscellaneous Options	Description
-N:{count}	Specifies the number of locations to be written with the value specified by data.
-S	Address increment size. Default is data size.

13.6.4 Address

Address is a longword address that specifies the first location into which data is deposited.

13.6.5 Data

Data is the data to be deposited. If the specified data is larger than the deposit data size, then the console ignores the command and issues an error response. If the specified data is smaller than the deposit data size, then it is extended on the left with 0s.

13.6.6 Examples

This example deposits 01234567 into location 00400000 and five subsequent locations:

```
>>> D -PM -N:5 400000 01234567 Return
```

To verify that the deposit worked properly, enter the following:

```
>>> E -PM -N:5 400000 Return
```

Result:

```
  PMEM: 00000000.00400000 01234567
  PMEM: 00000000.00400004 01234567
  PMEM: 00000000.00400008 01234567
  PMEM: 00000000.0040000C 01234567
  PMEM: 00000000.00400010 01234567
  PMEM: 00000000.00400014 01234567
>>>
```

The next example deposits 0123456789ABCDEF into general purpose registers 00 through 31 inclusive:

```
>>> D -R -N:1F 0 0123456789ABCDEF Return
```

To verify that the deposit was successful, enter the following:

>>> **E -R -N:1F 0** Return

Result:

```
GPR: 00 01234567 89ABCDEF
GPR: 01 01234567 89ABCDEF
GPR: 02 01234567 89ABCDEF
GPR: 03 01234567 89ABCDEF
GPR: 04 01234567 89ABCDEF
GPR: 05 01234567 89ABCDEF
GPR: 06 01234567 89ABCDEF
GPR: 07 01234567 89ABCDEF
GPR: 08 01234567 89ABCDEF
GPR: 09 01234567 89ABCDEF
GPR: 0A 01234567 89ABCDEF
GPR: 0B 01234567 89ABCDEF
GPR: 0C 01234567 89ABCDEF
GPR: 0D 01234567 89ABCDEF
GPR: 0E 01234567 89ABCDEF
GPR: 0F 01234567 89ABCDEF
GPR: 10 01234567 89ABCDEF
GPR: 11 01234567 89ABCDEF
GPR: 12 01234567 89ABCDEF
GPR: 13 01234567 89ABCDEF
GPR: 14 01234567 89ABCDEF
GPR: 15 01234567 89ABCDEF
GPR: 16 01234567 89ABCDEF
GPR: 17 01234567 89ABCDEF
GPR: 18 01234567 89ABCDEF
GPR: 19 01234567 89ABCDEF
GPR: 1A 01234567 89ABCDEF
GPR: 1B 01234567 89ABCDEF
GPR: 1C 01234567 89ABCDEF
GPR: 1D 01234567 89ABCDEF
GPR: 1E 01234567 89ABCDEF
GPR: 1F 01234567 89ABCDEF
```

The next example deposits 0123456789ABCDEF into floating point registers 0-8 inclusive:

>>> **D -FR -N:8 0 0123456789ABCDEF** Return

To verify that the deposit was successful, enter the following:

>>> **E -N:1F -FR 0** Return

Result:

```
FPR: 00 01234567 89ABCDEF
FPR: 01 01234567 89ABCDEF
FPR: 02 01234567 89ABCDEF
FPR: 03 01234567 89ABCDEF
FPR: 04 01234567 89ABCDEF
FPR: 05 01234567 89ABCDEF
FPR: 06 01234567 89ABCDEF
FPR: 07 01234567 89ABCDEF
FPR: 08 01234567 89ABCDEF
FPR: 09 00000000 00000000
FPR: 0A 00000000 00000000
FPR: 0B 00000000 00000000
FPR: 0C 00000000 00000000
FPR: 0D 00000000 00000000
FPR: 0E 00000000 00000000
FPR: 0F 00000000 00000000
FPR: 10 00000000 00000000
FPR: 11 00000000 00000000
FPR: 12 00000000 00000000
FPR: 13 00000000 00000000
FPR: 14 00000000 00000000
FPR: 15 00000000 00000000
FPR: 16 00000000 00000000
FPR: 17 00000000 00000000
FPR: 18 00000000 00000000
FPR: 19 00000000 00000000
FPR: 1A 00000000 00000000
FPR: 1B 00000000 00000000
FPR: 1C 00000000 00000000
FPR: 1D 00000000 00000000
FPR: 1E 00000000 00000000
FPR: 1F 00000000 00000000
```

13.7 EXAMINE

13.7.1 Description

The EXAMINE command displays the contents of the specific memory locations.

13.7.2 Format

To execute the EXAMINE command, enter the following:

>>> **E[XAMINE] [qualifier_list] [{address}]** Return

The address specifies the address (or first address) to be read.

13.7.3 Qualifiers_list

The following qualifiers specify data size options:

Data Size (option)	Description
-B	Byte (8 bits)
-W	Word (16 bits)
-L	Longword (32 bits)
-Q	Quadword (64 bits)

The following qualifiers specify address type options:

Address Type (option)	Description
-VM	Virtual memory address
-PM	Physical memory address
-I	Internal Processor register
-U	Unprotects a protected memory location.
PS[1]	Processor Status register (PS). The data size is always quadword.
-R	General Purpose register set, R0 through R31. The data size is always quadword.
-FR	Floating Point register, F0 through F31. The data size is always quadword.
PC[1]	Program counter. The data size is always quadword.
SP	Stack pointer. The data size is always quadword.

[1]These options should *not* be typed with (-), otherwise the command will not work.

The following qualifiers specify the miscellaneous options:

Miscellaneous Options	Description
-N:{count}	Specifies the number of locations to be written with the value specified by data.
-S	Address increment size. Default is data size.

The following qualifier specifies the display option:

Display Option	Description
-A	ASCII data representation.

13.7.4 Address

Address is a longword address that specifies the first location to be examined.

13.7.5 Examples

This example reads the value which was written into locations starting at physical memory address 00100000. For this example, the DEPOSIT command is used to put a known value.

>>> **DEPOSIT -PM -N:5 00100000 01234567** Return

>>> **EXAMINE -PM -N:5 001000000** Return

Result:

```
PMEM: 00000000.00100000 01234567
PMEM: 00000000.00100004 01234567
PMEM: 00000000.00100008 01234567
PMEM: 00000000.0010000C 01234567
PMEM: 00000000.00100010 01234567
PMEM: 00000000.00100014 01234567
```

The next example examines and displays byte data.

>>> **E -B 1000000** Return

Result:

```
PMEM:  00000000.01000000 00
>>>
```

The next example examines the word data size option.

>>> **E -W 1000000** Return

Result:

```
PMEM:  00000000.01000000 0000
>>>
```

The next example examines the longword.

>>> **E -L 1000000** Return

Result:

```
PMEM:  00000000.01000000 00000000
>>>
```

The next example examines the quadword.

>>> **E -Q 1000000** Return

Result:

```
PMEM: 00000000.01000000 00000000 00000000
>>>
```

The next example examines the location of the next three memory address locations.

>>> **E -N:2 1000000** Return

Result:

```
PMEM:   000000.01000000 00000000 00000000
PMEM:   000000.01000008 00000000 00000000
PMEM:   000000.01000010 00000000 00000000
>>>
```

The next example examines physical memory.

>>> **E -PM 1000000** Return

Result:

```
PMEM:   000000.01000000 00000000 00000000
>>>
```

The next example examines the physical memory longword.

>>> **E -L -PM 1000000** Return

Result:

```
PMEM:   000000.01000000 00000000
>>>
```

The next example examines the contents of the General Purpose register 0.

>>> **E -R 0** Return

Result:

```
GPR:00   00000000 00000000
>>>
```

The next example examines the contents of the Processor Status register.

>>> **E PS** Return

Result:

```
PS:  00000000 00001F00
>>>
```

The next example examines the contents of the stack pointer.

>>> **E SP** Return

Result:

```
GPR: 1E 01234567 89ABCDEF
>>>
```

The next example examines the contents of the program counter.

```
>>> E PC Return
```

Result:

```
PC: 00000000 20000000
>>>
```

13.8 HALT

13.8.1 Description

The HALT command stops the execution of instructions and initiates console I/O mode. A message appears, indicating the processor has halted along with the contents of the program counter.

If the processor halts before the receipt of a HALT command, then the HALT command has no effect.

Note

Pressing the Halt button on the back panel performs the same function as the HALT command.

13.8.2 Format

To execute the HALT command, enter the following:

```
>>> HA[LT] Return
```

Sample result:

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

13.9 HELP

13.9.1 Description

The HELP command displays a brief list of commands, parameters, and qualifiers. If you specify a topic, then information for only that topic appears.

13.9.2 Format

To execute the HELP command, enter the following:

```
>>> HE[LP] Return
         or
>>> ? Return
```

13.9.3 Examples

This example displays a list of HELP topics.

```
>>> HELP [Return]
```

Result:

```
    BOOT
    HELP ADVANCED
    SET [ENV] <ENVAR> <VALUE>
    SHOW | PRINTENV [<ENVAR>]
    TEST
>>>
```

To obtain an expanded listing of available HELP features, enter the following:

```
>>> HE[LP] ADVANCED [Return]
```

Result:

```
BOOT [-FL <bflg> ] [-FI <filnam>] <devlist>
CONTINUE
DEPOSIT [{ -B | -W | -L | -Q | -A }] [{ -PM | -VM }] [-G] [-U] [-N:
        <n>] [{ <addr> | <sym> | + | - | * | @ }
        [<datum>]]
EXAMINE [{ -B | -W | -L | -Q | -A }] [{ -PM | -VM }] [-G] [-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>]
>>>
```

To see what SET commands are available, enter the following:

```
>>> HELP SET [Return]
```

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] ETHERNET <{THICK | 0} | {TENBT | 1}>
SET[ENV] {FAST_SCSI_A | FAST_SCSI_B} <{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 | SCSI_B} <0-7>
SET[ENV] SCSI_RESET <0-7>
SET[ENV] SECURE <{OFF | 0} | {ON | 1}>
SET[ENV] SERVER <{OFF | 0} | {ON | 1}>
SET[ENV] TRIGGER <{OFF | 0} | {ON |1}>
```

The next example displays the commands available for the SHOW command.

```
>>> HELP SHOW Return
```

Result:

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

13.10 INITIALIZE

13.10.1 Description

The INITIALIZE command initializes the processor, console, and any devices connected to the system by default values.

13.10.2 Format

To execute the INITIALIZE command, enter the following:

```
>>> I[NITIALIZE] Return
```

13.10.3 Example

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

```
>>> I[NITIALIZE] Return
```

Result:

```
INIT-S-CPU...
INIT-S-RESET_TC...
INIT-S-ASIC...
INIT-S-NVR...
INIT-S-SCC...
INIT-S-NI...
INIT-S-SCSI...
INIT-S-ISDN...
INIT-S-TC1...
INIT-S-TC0...

>>>
```

13.11 LOGIN

13.11.1 Description

The LOGIN command enables restricted console commands when the Secure bit is set.

13.11.2 Format

To execute the LOGIN command, enter the following:

>>> **LO[GIN]** Return

13.11.3 Example

This example shows a successful LOGIN command with the password feature enabled.

>>> **LOGIN** Return

```
PSWD0>>>
```

The next example shows an unsuccessful LOGIN command when the password feature is disabled.

>>> **LOGIN** Return

Result:

```
?35 PSWD NOTEN
>>>
```

13.12 REPEAT

13.12.1 Description

The REPEAT command causes the console program to execute any specified tests until you terminate them.

To terminate the REPEAT command, press Ctrl C.

13.12.2 Format

To execute the REPEAT command, enter the following:

>>> **R[EPEAT]T[EST]{qualifier_list},[{qualifier_list}],** Return

13.12.3 Examples

This example shows the test ASIC being repeated.

>>> **R T ASIC** Return

The next example shows specific tests being repeated.

>>> **R T ASIC,MEM,SCSI** Return

The next example shows a range of tests being repeated.

>>> **R T ASIC:ISDN** Return

Result:

```
T-STS-ASIC - OK
T-STS-MEM - OK
T-STS-NVR - OK
T-STS-SCC - OK
T-STS-NI - OK
T-STS-SCSI A - OK
T-STS-SCSI B - OK
T-STS-ISDN - OK

T-STS-ASIC - OK
T-STS-MEM - OK
T-STS-NVR - OK
T-STS-SCC - OK
T-STS-NI - OK
T-STS-SCSI A - OK
T-STS-SCSI B - OK
T-STS-ISDN - OK
```

13.13 SET

13.13.1 Description

The SET command has three functions.

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

13.13.2 Format

To execute the SET command, enter the following:

>>> **SET {parameter} [{qualifier}]** Return

13.13.3 Example

This example displays the commands available with the SET command.

>>> **HELP SET** Return

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] ETHERNET <{THICK | 0} | {TENBT | 1}>
SET[ENV] {FAST_SCSI_A | FAST_SCSI_B} <{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 | SCSI_B} <0-7>
SET[ENV] SCSI_RESET <0-7>
SET[ENV] SECURE <{OFF | 0} | {ON | 1}>
SET[ENV] SERVER <{OFF | 0} | {ON | 1}>
SET[ENV] TRIGGER <{OFF | 0} | {ON | 1}>
```

13.14 SET Command Parameters

13.14.1 Overview

The information in this section provides the environment variables required when the SET command is used. All parameter names are listed in the far left margin in alphabetic order and qualifiers are listed within that particular parameter.

13.14.2 AUTO_ACTION

The AUTO_ACTION parameter specifies the default halt action for all halts or power-on halts.

13.14.3 Format

To execute the SET AUTO_ACTION command, enter the following:

>>> **SET AUTO[_ACTION] {qualifier}** Return

13.14.4 Qualifier

Select one of the following qualifiers when setting AUTO_ACTION:

Qualifier[1]		Description
1	Restart	A restart is executed.
2	Boot	A boot is executed.
3	Halt	A halt is executed.

[1]The qualifier can take the form of either a number or the actual qualifier name. For example, 1 indicates restart, 2 boot, and 3 halt.

13.14.5 Example

This example sets the auto action to restart.

>>> **SET AUTO_ACTION RESTART** Return

Result:

```
AUTO_ACTION = RESTART
>>>
```

The next example sets the auto action to reboot.

```
>>> SET AUTO_ACTION BOOT Return
```

Result:

```
AUTO_ACTION = BOOT
>>>
```

The next example sets the auto action to halt.

```
>>> SET AUTO_ACTION 3 Return
```

Result:

```
AUTO_ACTION = HALT
>>>
```

13.14.6 BOOTDEF_DEV

The BOOTDEF_DEV parameter defines the default device that the operating system bootstraps. The device names must be valid boot devices supported by the BOOT command.

Issuing the SHOW DEVICE command displays the available boot devices.

13.14.7 Format

To execute the SET BOOTDEF_DEV command, enter the following:

```
>>> SET BOOTDEF_DEV {qualifier} Return
```

13.14.8 Qualifier

The following names are supported device name identifiers:

OpenVMS AXP Device Identifiers	DEC OSF/1 AXP Device Identifiers	Device Type
DK	RZ	Fixed or removable disk
MK	TZ	Tape
ES	–	Ethernet, MOP Protocol
–	EZ	Ethernet, BOOTP Protocol

Refer to the SHOW BOOT command for a complete list and sample of the syntax to use with the BOOT commands.

13.14.9 Example

This example sets the BOOT default device to DKA100.

```
>>> SET BOOTDEF_DEV DKA100 Return
```

Result:

```
BOOTDEF_DEV = DKA100
>>>
```

In the next example, the system tries booting from ESA0 first and then booting from DKA600 if ESA0 fails.

```
>>> SET BOOTDEF_DEV ESA0, DKA600 Return
```

Result:

```
BOOTDEF_DEV = ESA0,DKA600
>>>
```

13.14.10 BOOT_OSFLAGS

The BOOT_OSFLAGS parameter defines additional default boot flags, which may be overridden by the -fl switch at boot time.

13.14.11 Format

To execute the BOOT_OSFLAGS command, enter the following:

```
>>> SET BOOT_OSFLAGS {value} Return
```

13.14.12 Qualifiers

The function of the {value} field is to define the type of boot.

Value	Significance
0,0	Default boot of operating system
E,0	Perform boot standalone backup
0,1	Enter SYSBOOT (conversational boot)
0,80	CD-ROM update conversational boot

13.14.13 Example

This example sets the default BOOT_OSFLAGS value.

```
>>> SET BOOT_OSFLAGS 0,0 Return
```

Result:

```
BOOT_OSFLAGS = 0,0
>>>
```

The next example sets up the CD-ROM update conversational boot.

```
>>> SET BOOT_OSFLAGS 0,80 Return
```

Result:

```
BOOT_OSFLAGS = 0,80
>>>
```

13.14.14 BOOT_RESET

The BOOT_RESET parameter determines whether the console initializes the system prior to booting.

13.14.15 Format

To execute the BOOT_RESET command, enter the following:

```
>>> SET BOOT_RESET {qualifier} Return
```

13.14.16 Qualifier

Select one of the following qualifiers when resetting the BOOT.

Qualifier[1]		Description
1	ON	Enables the system to be initialized before booting
0	OFF	Disables the system initialization before booting

[1]The qualifier can take the form of either a number or the actual qualifier name.

13.14.17 Example

This example enables the system to be initialized before booting.

```
>>> SET BOOT_RESET ON Return
```

Result:

```
BOOT_RESET = ON
>>>
```

The next example disables system initialization before booting.

```
>>> SET BOOT_RESET 0 Return
```

Result:

```
BOOT_RESET = OFF
>>>
```

13.14.18 DIAG_LOE

The DIAG_LOE parameter allows a diagnostic to loop on an error (non-TURBOchannel devices only). All output is suppressed. To exit the diagnostic error loop, press the Halt button to return to the diagnostic environment (either console or service mode).

This feature is available on loadable diagnostics only.

13.14.19 Format

To execute the DIAG_LOE parameter, enter the following:

```
>>> SET DIAG_LOE {qualifier} Return
```

13.14.20 Qualifier

Select one of the following qualifiers when setting the DIAG_LOE parameter:

Qualifier[1]		Description
1	ON	Enables loop on error feature
0	OFF	Disables loop on error feature

[1]The qualifier can take the form of either a number or the actual qualifier name.

13.14.21 Example

This example sets the loop on error feature.

```
>>>SET DIAG_LOE ON Return
```

Result:

```
DIAG_LOE = ON
>>>
```

The next example also sets the loop on error feature.

```
>>>SET DIAG_LOE 0 Return
```

Result:

```
DIAG_LOE = OFF
>>>
```

13.14.22 DIAG_QUICK

The DIAG_QUICK parameter sets the diagnostic startup mode to either normal or fast startup testing. When fast mode is selected, all diagnostic tests on the base system are run. No TURBOchannel options are tested *unless* they are graphics options.

13.14.23 Format

To execute the DIAG_QUICK command, enter the following:

```
>>> SET DIAG_QUICK {qualifier} Return
```

13.14.24 Qualifier

Select one of the following qualifiers to set the diagnostic startup mode:

Qualifier[1]		Description
1	ON	Quick verify testing
0	OFF	Normal testing

[1]The qualifier can take the form of either a number or the actual qualifier name.

13.14.25 Example

This example sets the quick verify testing.

```
>>> SET DIAG_QUICK ON Return
```

Result:

```
DIAG_QUICK = ON
>>>
```

The next example sets the normal testing.

```
>>> SET DIAG_QUICK 0 Return
```

Result:

```
DIAG_QUICK = OFF
>>>
```

13.14.26 DIAG_SECTION

The DIAG_SECTION parameter sets the diagnostic environment in which the diagnostics can be run.

13.14.27 Format

To set the diagnostic operating environment, enter the following:

```
>>> SET DIAG_SECTION {qualifier} Return
```

13.14.28 Qualifier

Select one of the following qualifiers to set the diagnostic environment:

Qualifier	Mode	Description
1	Console	Default mode after power-on. Loopbacks are not required.
2	Service	Provides a more thorough test than in console mode. Special loopback connectors may be required to execute certain tests.

13.14.29 Example

This example sets the diagnostic environment to the console mode.

```
>>> SET DIAG_SECTION 1 Return
```

Result:

```
DIAG_SECTION = 1
>>>
```

13.14.30 ENABLE_AUDIT

The ENABLE_AUDIT parameter defines whether the boot audit trail message generation is enabled.

13.14.31 Format

To execute the ENABLE_AUDIT command, enter the following:

```
>>> SET ENABLE_AUDIT {qualifier} Return
```

13.14.32 Qualifier

Select one of the following qualifiers to set the boot audit trail:

Qualifier[1]		Description
1	ON	Enables boot audit trail
0	OFF	Disables boot audit trail

[1]The qualifier can take on the form of either a number or the actual qualifier name.

13.14.33 Example

This example enables the boot audit trail.

```
>>> SET ENABLE_AUDIT 1 Return
```

Result:

```
ENABLE_AUDIT = ON
>>>
```

13.14.34 ETHERNET

The ETHERNET parameter sets the Ethernet port to either thickwire or twisted pair.

13.14.35 Format

To execute the SET ETHERNET command, enter the following:

```
>>> SET ETHERNET {qualifier} Return
```

13.14.36 Qualifier

Select one of the following qualifiers to set the Ethernet port:

Qualifier	Description
THICK	AUI Ethernet port (thickwire)
TENBT	10BASE-T port (twisted pair)

13.14.37 Example

This example selects a thickwire network.

```
>>> SET ETHERNET THICK Return
```

Result:

```
ETHERNET = THICK
 >>>
```

The next example selects a 10BASE-T network.

```
>>> SET ETHERNET TENBT Return
```

Result:

```
ETHERNET = TENBT
 >>>
```

13.14.38 FAST_SCSI_A and FAST_SCSI_B

The FAST_SCSI_A and FAST_SCSI_B console commands initialize the SCSI controllers. The variable FAST_SCSI_A is for bus A devices and FAST_SCSI_B is for bus B devices. When fast SCSI devices are connected and FAST_SCSI_A/B is set to ON, the SCSI firmware operates in fast SCSI mode. If both slow and fast SCSI devices are connected to the same bus and the FAST_SCSI_A/B command is ON, the firmware differentiates between devices.

Note that the recommended maximum bus length is 4 meters for slow SCSI devices and 3 meters for fast SCSI devices. When these limits are exceeded, the SCSI bus is likely to have errors. If your total bus length, including internal and external cables, is greater than 3 meters, you must set the FAST_SCSI_A/B command for that bus OFF.

13.14.39 Available Settings

You can set FAST_SCSI_A and FAST_SCSI_B to ON or OFF.

- ON to operate in slow and fast SCSI mode, device dependent
- OFF to operate in slow SCSI mode

13.14.40 Default Settings

The default settings for the FAST_SCSI_A and FAST_SCSI_B commands are OFF. Therefore, the SCSI controllers are initialized to operate in slow SCSI mode.

13.14.41 Command Example

To set the FAST_SCSI_A and FAST_SCSI_B commands, enter the appropriate command. The system responds as shown.

```
>>> SET FAST_SCSI_A ON  Return
FAST_SCSI_A = ON
>>>
```

Using the ON parameter changes the default setting.

13.14.42 LANGUAGE

The LANGUAGE parameter defines the keyboard language when executed from a graphics console.

Note

English (3) is the default value setting. The keyboard must be of the correct language type to match the language command; otherwise, the language command will not execute.

13.14.43 Format

To execute the LANGUAGE command, enter the following:

```
>>> SET LANGUAGE {qualifier}  Return
```

13.14.44 Qualifier

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

Qualifier	Description
0) Dansk	Danish
1) Deutsch	German
2) Deutsch (Schweiz)	German/Swiss
3) North American English	Default setting
4) English (British/Irish)	British/Irish
5) Español	Spanish
6) Français	French
7) Français (Canadian)	Canadian
8) Français (Suisse Romande)	Swiss French
9) Italiano	Italian
10) Nederlands	Netherlands
11) Norsk	Norwegian
12) Portugues	Portuguese
13) Suomi	Finnish
14) Svenska	Swedish
15) Vlaams	Flemish

13.14.45 Example

This example is executed from a graphic display. This command shows the default language, which is English. If you press Return, you get the default setting. If you want to change the language, enter the number then press Return.

```
>>> SET LANGUAGE   Return
```

Result:

```
0) Dansk                        8) Francais  (Suisse Romande)
1) Deutsch                      9) Italiano
2) Deutsch (Schweiz)            10) Nederlands
3) English                      11) Norsk
4) English (British/Irish)      12) Portugues
5) Espanol                      13) Suomi
6) Francais                     14) Svenska
7) Francais (Canadian)          15) Vlaams

3 >>>

LANGUAGE = 3
>>>
```

The next example is executed from the alternate console. Set language commands should only be executed from a graphics option.

```
>>> SET LANGUAGE [Return]
```

Result:

```
?23  ILL CMD
>>>
```

13.14.46 MOP

The Maintenance Operations Protocol (MOP) parameter enables the NI (Ethernet) listener while the system is in console mode. The listener sends and receives messages on the network.

13.14.47 Format

To set the MOP bit, enter the following:

```
>>> SET MOP {qualifier} [Return]
```

13.14.48 Qualifier

Select one of the following qualifiers to enable or disable the MOP bit:

Qualifier	Description
ON[1]	Network listener enabled. Able to receive and transmit messages on the network. Allows access to the console through the network and boot network firmware update procedure.
OFF	Network listener disabled. Cannot access the console through the network or boot network firmware update procedure.

[1]Default setting

13.14.49 Examples

This example enables the network listener.

```
>>>  SET MOP ON [Return]
```

Result:

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

The next example disables the network listener.

```
>>>  SET MOP OFF [Return]
```

Result:

```
MOP = OFF
>>>
```

13.14.50 PASSWORD

The PASSWORD parameter sets the console password.

The following are key points to remember about passwords:

- The password must be exactly 16 characters (hexadecimal, 0 to F).
- The password feature is enabled when SECURE = ON.
- The password feature is disabled when SECURE = OFF.

Note

The secure jumper must be in the correct configuration for the password feature to operate correctly. Refer to *Section 3.8.3* in Chapter 3 (Model 400S/600S AXP) or Chapter 8 (Model 900S AXP) for more information.

13.14.51 Format

To set the console password, enter the following:

```
>>> SET PASSWORD Return
```

13.14.52 Example

This example sets the console password.

```
>>> SET PASSWORD Return
```

Result:

```
PSWD0>ENTER_OLD_PASSWORD Return
          (if one has been set)
PSWD1>ENTER_NEW_PASSOWRD Return
PSWD2>ENTER_NEW_PASSWORD Return
>>>
```

13.14.53 SECURE

The SECURE parameter enables the console password bit to restrict access to the console.

13.14.54 Format

To enable or disable the SECURE bit, enter the following:

```
>>> SET SECURE {qualifier} Return
```

13.14.55 Qualifier

Select one of the following qualifiers to set the SECURE bit.

Note

If SECURE is set to ON, then enter LOGIN at the console prompt (>>>), and the password at the (PSWD0 >>>) prompt.

Qualifier[1]		Description
1	ON	Security feature enabled
0	OFF	Security feature disabled

[1]The qualifier can take the form of either a number or the actual qualifier name.

13.14.56 Example

This example enables the security features.

```
>>> SET SECURE ON Return
```

Result:

```
SECURE=ON
>>>
```

The next example disables the security features.

```
>>> SET SECURE OFF Return
```

Result:

```
SECURE=OFF
>>>
```

13.14.57 RADIX

The RADIX parameter defines the default Radix to a specified value. The default is hexadecimal.

13.14.58 Format

To execute the RADIX command, enter the following:

```
>>> SET RADIX {qualifier} Return
```

13.14.59 Qualifier

Select one of the following qualifiers to set the base address:

Qualifier	Description
0	Default base address (hexadecimal)
10	Decimal base address
16	Hexadecimal base address

13.14.60 Example

This example sets the base address to a decimal base address.

```
>>> SET RADIX 10 Return
```

Result:

```
RADIX = 10
>>>
```

13.14.61 SCSI_A

The SCSI_A parameter sets the SCSI host ID. The default value is 7.

13.14.62 Format

To set the SCSI host ID, enter the following:

```
>>> SET SCSI_A {qualifier} Return
```

13.14.63 Qualifier

Select a qualifier of 0 through 7 to set the host ID.

13.14.64 Example

This example sets the SCSI_A host ID to 6.

```
>>> SET SCSI_A 6 Return
```

Result:

```
SCSI_A = 00000006
>>>
```

13.14.65 SCSI_B

The SCSI_B parameter sets the host ID. The default value is 7.

13.14.66 Format

To execute the SET SCSI_B command, enter the following:

```
>>> SET SCSI_B {qualifier} Return
```

13.14.67 Qualifier

Select a qualifier of 0 through 7 to set the host ID.

13.14.68 Example

This example sets the SCSI B host ID to 6.

```
>>> SET SCSI_B 6 Return
```

Result:

```
SCSI_B = 00000006
>>>
```

13.14.69 SCSI_RESET

The SCSI_RESET parameter causes a time delay after a SCSI reset before booting.

- A value of 3 is recommended if a floppy or a hard disk is being booted.
- A value of 4 is recommended for tape drives.
- A value of 6 is recommended for CD-ROMs.

  The time delay is in seconds. The qualifier value is actually the n in the 2^n; therefore, the 3 for a floppy means 8 seconds or 2^3.

13.14.70 Format

To execute the SET SCSI_RESET command, enter the following:

```
>>> SET SCSI_RESET {value} Return
```

13.14.71 Value

Select a value of 0 to 7 to set the SCSI_RESET parameter. The qualifier value is actually the n in the 2^n; therefore, the 3 for a floppy means 8 seconds or 2^3.

13.14.72 Example

This example sets a time delay of 4.

```
>>> SET SCSI_RESET 4 Return
```

Result:

```
SCSI_RESET = 4
>>>
```

13.14.73 SERVER

The SERVER parameter modifies the SCC power-up diagnostics when the configuration is a server.

When selected as a server, the keyboard and mouse need not be connected to successfully complete power-up diagnostics.

When selected as a workstation, the keyboard and mouse must be connected to successfully complete power-up diagnostics.

13.14.74 Format

To select either a DEC 3000 Model 400S/600S or 900S AXP configuration, enter the following:

```
>>> SET SERVER {qualifier} Return
```

13.14.75 Qualifier

Select one of the following qualifiers when setting the SERVER parameter:

Qualifier[1]		Description
1	ON	When configuration is a server (Model 400S /600S or 900S AXP)
0	OFF	When configuration is a workstation (Model 400/600 or 900 AXP) (default setting)

[1]The qualifier can take on the form of either a number or the actual qualifer name.

13.14.76 Examples

This example sets the configuration to a server.

```
>>> SET SERVER ON Return
```

Result:

```
SERVER = ON
```

The next example sets the configuration to a non-server.

```
>>> SET SERVER OFF Return
```

Result:

```
SERVER = OFF
>>>
```

13.14.77 TRIGGER

The TRIGGER parameter enables the Entity-Based Module (EMB).

With EMB and the NI listener enabled (TRIGGER = ON), you can access the console or boot the system from a remote system.

13.14.78 Format

To enable or disable the TRIGGER bit, enter the following:

```
>>> SET TRIGGER {qualifier} Return
```

13.14.79 Qualifier

Select one of the following qualifiers to set the remote trigger:

Qualifier[1]		Description
1	ON	Enables trigger
0	OFF	Disables trigger

[1]The qualifier can take on the form of either a number or the qualifier name.

13.14.80 Examples

This example enables the trigger.

```
>>> SET TRIGGER ON Return
```

Result:

```
TRIGGER = ON
>>>
```

The next example disables the trigger.

```
>>> SET TRIGGER 0 Return
```

Result:

```
TRIGGER = OFF
>>>
```

13.15 SHOW

13.15.1 Description

The SHOW command displays information about:

- Environment variable
- Console options

- Hardware configuration

13.15.2 Format

To execute the SHOW command, enter the following:

```
>>> SHOW [parameter] Return
```

13.15.3 Example

This example displays the current values for environment variables.

```
>>> SHOW Return
```

Result:

```
AUTO_ACTION = HALT
BOOTDEF_DEV = ESA0,DKA600
BOOT_OSFLAGS = 0,0
ENABLE_AUDIT = ON
BOOT_RESET = OFF
SCSI_RESET = 4
DIAG_LOE = OFF
DIAG_QUICK = OFF
DIAG_SECTION = 1
ETHERNET = 08-00-2B-1A-38-31 , THICK
FAST_SCSI_A = OFF
FAST_SCSI_B = OFF
LANGUAGE = 3
MOP = ON
SECURE = OFF
RADIX = 0
SCSI_A = 7
SCSI_B = 7
SERVER = OFF
TRIGGER = ON
>>>
```

Note

DIAG_LOE is available for loadable diagnostics only.

13.16 SHOW Command Parameters

13.16.1 Overview

The information in this section provides the environment variables required when you use the SHOW command. All parameter names are listed in the far left margin in alphabetical order and qualifiers are listed within that particular parameter.

13.16.2 AUTO_ACTION

The AUTO_ACTION parameter displays the action the console will take following an error halt or power-up halt.

13.16.3 Format

To execute the SHOW AUTO_ACTION command, enter the following:

```
>>> SHOW AUTO_ACTION Return
```

One of the following functions appears on the screen:

Function	Description
Restart	A restart is executed
Boot	A boot is executed
Halt	A halt is executed

13.16.4 Example

This example shows the current setting of AUTO ACTION.

```
>>> SHOW AUTO_ACTION Return
```

Result:

```
AUTO_ACTION = HALT
>>>
```

13.16.5 BOOTDEF_DEV

The BOOTDEF_DEV parameter displays the default device or device list from which booting is next attempted.

13.16.6 Format

To execute the SHOW BOOTDEF_DEV command, enter the following:

```
>>> SHOW BOOTDEF_DEV Return
```

13.16.7 Example

This example shows booting from the ESAO, DKA600 device.

```
>>> SHOW BOOTDEF_DEV Return
```

Result:

```
BOOTDEF_DEV = ESA0,DKA600
>>>
```

13.16.8 BOOT_OSFLAGS

The BOOT_OSFLAGS parameter displays additional default parameters that were passed to system software during the last boot operation.

13.16.9 Format

To execute the SHOW BOOT_OSFLAGS command, enter the following:

```
>>> SHOW BOOT_OSFLAGS Return
```

13.16.10 Qualifiers

See the list of qualifiers for the SET BOOT_OSFLAGS command.

13.16.11 Example

This example displays the current OSFLAGS.

```
>>> SHOW BOOT_OSFLAGS [Return]
```

Result:

```
 BOOT_OSFLAGS = 0,0
>>>
```

13.16.12 BOOT_RESET

The BOOT_RESET parameter displays the value of the BOOT_RESET variable.

13.16.13 Format

To execute the SHOW BOOT_RESET command, enter the following:

```
>>> SHOW BOOT_RESET [Return]
```

One of the following reset settings appears on the screen:

Resets	Description
ON	Enables system initialized before booting
OFF	Disables system initialized before booting

13.16.14 Example

This example shows the BOOT RESET set to ON.

```
>>> SHOW BOOT_RESET [Return]
```

Result:

```
BOOT_RESET=ON
>>>
```

13.16.15 CONFIG

The CONFIG parameter displays the system configuration and device status.

13.16.16 Format

To execute the SHOW CONFIG command, enter the following:

```
>>> SHOW CONFIG [Return]
```

13.16.17 Example

This example shows the system configuration and device status.

```
>>> SHOW CONFIG [Return]
DEC 3000 - M600
Digital Equipment Corporation
VPP PAL X5.41-82000101/OSF PAL X1.28-82000201-Built on25-JUN-1993 09:54
```

```
TCINFO   DEVNAM    DEVSTAT
------   --------  --------
           CPU      OK KN17-xA -V3.0-S4A3-I077-sV2.0-DECchip 21064 P3.0
          ASIC      OK
           MEM      OK
8
7
           NVR      OK
           SCC      OK
            NI      OK
          ISDN      OK
6
          SCSI      OK
1-PMAGB-B  TC1
>>>
```

Response	Meaning
VPP PAL X5.41-82000101	VAX PALcode revision
OSF PAL X1.28-82000102	OSF PALcode revision
KN17-xA	Identifies the system type
V3.0	Identifies the system firmware revision
S4A3	Identifies the system ROM edit revision
I077	Identifies the I/O ROM EDIT firmware revision
sV2.0	Identifies the serial ROM firmware revision
TCINFO	Lists system slots • Slots 0 to 2 = TURBO slots • Slot 6 = SCSI controller • Slot 7 and 8 = built-in system devices
DEVNAM	Device name
DEVSTAT	Device status

13.16.18 DEVICE

The DEVICE parameter displays SCSI and Ethernet device information.

13.16.19 Format

To execute the SHOW DEVICE command, enter the following:

>>> **SHOW DEVICE** Return

13.16.20 Example

This example shows the current devices. See the following table for further explanation of each column in this example.

```
>>> SHOW DEVICE
  BOOTDEV    ADDR     DEVTYPE   NUMBYTES  RM/FX   WP   DEVNAM   REV
  -------    ----     -------   --------  -----   --   ------   ---
  ESA0       08-00-2B-1A-38-31 , THICK
 ..HostID..  A/7      INITR
 ..HostID..  B/7      INITR
>>>
```

Column	Meaning
BOOTDEV	Console boot name for the device
ADDR	Either hardware address or SCSI ID
DEVTYPE	Device type (RODISK is a read only disk)
NUMBYTES	Drive capacity
RM/FX	Indicates whether the drive has removable or fixed media
WP	Indicates whether the drive is write protected
DEVNAM	Device name for the drive
REV	Firmware revision level for the drive

13.16.21 DIAG_LOE

The DIAG_LOE parameter displays whether the diagnostic loop on error feature is selected.

13.16.22 Format

To display the current DIAG_LOE parameter setting, enter the following:

>>> **SHOW DIAG_LOE** Return

13.16.23 Example

This example shows that the current setting of DIAG_LOE is OFF.

>>> **SHOW DIAG_LOE** Return

Result:

```
DIAG_LOE = OFF
```

One of the following settings appears on the screen.

Setting	Description
ON	Enables loop on error feature
OFF	Disables loop on error feature

13.16.24 DIAG_QUICK

The DIAG_QUICK parameter displays the diagnostic mode.

13.16.25 Format

To execute the SHOW DIAG_QUICK command, enter the following:

>>> **SHOW DIAG_QUICK** Return

One of the following diagnostic settings appears on the screen:

Diagnostic Setting	Description
ON	Quick verify testing
OFF	Normal testing

13.16.26 Example

This example shows that the diagnostic mode is set to quick verify testing.

>>> **SHOW DIAG_QUICK** Return

Result:

```
DIAG_QUICK = ON
```

13.16.27 DIAG_SECTION

The DIAG_SECTION parameter determines the diagnostic environment in which the diagnostics can be run.

13.16.28 Format

To execute the SHOW DIAG_SECTION command, enter the following:

>>> **SHOW DIAG_SECTION** Return

One of the following diagnostic modes appears on the screen:

Setting	Mode	Description
1	Console	Default mode upon power-on
2	Service	Provides a more thorough test than in console mode. Special loopback connectors may be required to execute certain tests.

13.16.29 Example

This example shows that the current diagnostic mode is in console mode.

>>> **SHOW DIAG_SECTION** Return

Result:

```
DIAG_SECTION = 1
>>>
```

13.16.30 ENABLE_AUDIT

The ENABLE_AUDIT parameter indicates if the boot audit trail message generation has been enabled.

13.16.31 Format

To execute the SHOW ENABLE_AUDIT command, enter the following:

>>> **SHOW ENABLE_AUDIT** [Return]

One of the following audit settings appears on the screen:

Audit Setting	Description
ON	Enables boot audit trail
OFF	Disables boot audit trail

13.16.32 Example

This example displays that the boot audit trail has been enabled.

>>> **SHOW ENABLE_AUDIT** [Return]

Result:

```
ENABLE_AUDIT = ON
>>>
```

13.16.33 ERROR

The ERROR parameter displays error information for all devices listed by the SHOW CONFIG with the exception of errors occurring on TURBOchannel options. The TURBOchannel option error information is not saved by the MIPS Emulator and must be obtained from the console display.

13.16.34 Format

To execute the SHOW ERROR command, enter the following:

>>> **SHOW ERROR** [Return]

13.16.35 Example

This example shows an error caused by a missing loopback connector.

>>> **SHOW ERROR** [Return]

Result:

```
    ??000   NI 0x00f2
>>>
```

13.16.36 ETHERNET

The ETHERNET parameter displays the hardware Ethernet address and Ethernet port.

13.16.37 Format

To execute the SHOW ETHERNET command, enter the following:

```
>>> SHOW ETHERNET Return
```

Result:

```
ETHERNET = 08-00-2B-1A-38-31 , THICK
>>>
```

13.16.38 LANGUAGE

The LANGUAGE parameter identifies the language in which console messages appear when using a graphics console.

13.16.39 Format

To execute the SHOW LANGUAGE command, enter the following:

```
>>> SHOW LANGUAGE Return
```

13.16.40 Examples

This example shows language from a graphics option.

```
>>> SHOW LANGUAGE Return
```

Result:

```
LANGUAGE = 3
>>>
```

The next example shows language from an alternate console.

```
>>> SHOW LANGUAGE Return
```

Result:

```
?23 ILL CMD
>>>
```

13.16.41 MEMORY

The MEMORY parameter displays memory status information on:

- Bank number
- Memory size per bank
- Starting address of each bank

13.16.42 Format

To execute the SHOW MEMORY command, enter the following:

```
>>> SHOW MEMORY Return
```

13.16.43 Example

This example shows the memory status information for a DEC 3000 Model 600/600S system.

```
SHOW MEMORY

DEC 3000 - M600  Memory: 80 Mbytes
------------------------------------------
BANK #      MEMORY_SIZE        START_ADDRESS
------      -----------        -------------
0            032 Mbytes        0x00000000
1            032 Mbytes        0x02000000
2            016 Mbytes        0x04000000
3            000 Mbytes        0x00000000
 >>>
```

Response	Meaning
Bank #	Two memory slots. Each memory card can be populated on both sides, totalling 64 MB per SIMM card maximum (32 MB on each side).
Banks 0 and 1	Occupy slot 1. Two-sided SIMMs consisting of 64 MB.
Banks 2 and 3	Occupy slot 2. Single-sided SIMMs consisting of 16 MB.

13.16.44 MOP

The MOP parameter indicates if the MOP network listener has been enabled.

13.16.45 Format

To execute the SHOW MOP command, enter the following:

>>> **SHOW MOP** Return

One of the following network listener settings appears on the screen:

Setting	Description
ON	Network listener enabled. Able to receive and transmit messages on the network.
OFF	Network listener disabled.

13.16.46 Example

This command enables examining the current MOP status, whether MOP is enabled or disabled.

>>> **SHOW MOP** Return

Result:

```
UTC      = 00000000.D27234E0
AccurTDF = 10000000.000186A0
BytesRx  = 00000000.00000000
BytesTx  = 00000000.00000078
FramesRx = 00000000.00000000
FramesTx = 00000000.00000002
McBytsRx = 00000000.00000000
McFrmsRx = 00000000.00000000
FrmDefer = 00000000.00000000
Frm1Coll = 00000000.00000000
FrmMColl = 00000000.00000000
TerXsCol = 00000000.00000000
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 = 00000000.00000002

MOP = ON
>>>
```

13.16.47 SECURE

The SECURE parameter displays the console security.

13.16.48 Format

To execute the SHOW SECURE command, enter the following:

>>> **SHOW SECURE** Return

One of the following SECURE mode settings appears on the screen:

SECURE Setting	Description
ON	Security features enabled
OFF	Security features disabled

13.16.49 Example

This example shows the current SECURE value.

>>> **SHOW SECURE** Return

Result:

```
SECURE = OFF
>>>
```

13.16.50 RADIX

The RADIX parameter displays the default radix (base number). The default is hexadecimal.

13.16.51 Format

To execute the SHOW RADIX command, enter the following:

```
>>> SHOW RADIX Return
```

One of the following base address settings appears on the screen:

Base Address Setting	Description
0	Default base address (hexadecimal)
10	Decimal base address
16	Hexadecimal base address

13.16.52 Example

This example shows that the current radix is set at the default base address.

```
>>> SHOW RADIX Return
```

Result:

```
RADIX = 0
>>>
```

13.16.53 SCSI_A

The SCSI_A parameter displays the SCSI ID for the system (A bus).

13.16.54 Format

To execute the SHOW SCSI_A command, enter the following:

```
>>> SHOW SCSI_A Return
```

A host ID number between 0 and 7 appears on the screen.

13.16.55 Example

This example shows the SCSI A for the system is 6.

```
>>> SHOW SCSI_A Return
```

Result:

```
SCSI_A = 6
```

13.16.56 SCSI_B

The SCSI_B parameter displays the SCSI ID for the system (B bus).

13.16.57 Format

To execute the SHOW SCSI_B command, enter the following:

```
>>> SHOW SCSI_B Return
```

A host ID number between 0 and 7 appears on the screen.

13.16.58 Example

This example shows the SCSI B for the system is 6.

```
>>> SHOW SCSI_B [Return]
```

Result:

```
SCSI_B = 6
>>>
```

13.16.59 SCSI_RESET

The SCSI_RESET command displays the current time delay setting.

- A value of 3 is recommended if a floppy and hard disk are being booted.
- A value of 4 is recommended for tape drives.
- A value of 6 is recommended for CDROM.

13.16.60 Format

To execute the SHOW SCSI_RESET command, enter the following:

```
>>> SHOW SCSI_RESET {qualifier} [Return]
```

A number between 0 and 7 appears on the screen.

13.16.61 Example

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

```
>>> SHOW SCSI_RESET [Return]
```

Result:

```
SCSI_RESET = 4
```

13.16.62 SERVER

The SERVER parameter shows which server configuration has been selected.

13.16.63 Format

To display the current configuration, enter the following:

```
>>> SHOW SERVER [Return]
```

One of the following settings appears on the screen:

Setting	Description
ON	When configuration is a server (Model 400S/600S or 900S AXP)
OFF	When configuration is a workstation (Model 400 /600 or 900 AXP) (default setting)

13.16.64 Example

This example shows the current SERVER configuration set to OFF.

```
>>> SHOW SERVER [Return]
```

Result:

```
SERVER = OFF
>>>
```

13.16.65 TRIGGER

The TRIGGER parameter displays the current trigger setting.

13.16.66 Format

To execute the SHOW TRIGGER command, enter the following:

>>> **SHOW TRIGGER** Return

One of the following trigger settings appears on the screen:

Trigger Setting	Description
ON	Enables trigger. Allows you to access the console or boot the system from a remote system.
OFF	Disables trigger.

13.16.67 Example

This example shows the trigger enabled.

>>> **SHOW TRIGGER** Return

Result:

```
TRIGGER = ON
>>>
```

13.17 START

13.17.1 Description

The START command sets the program counter (PC) and starts the CPU. The command causes the system to exit console mode and enter program mode.

13.17.2 Format

To execute the START command, enter the following:

>>> **START {address}** Return

13.18 TEST

13.18.1 Description

The TEST command executes selected diagnostic tests.

13.18.2 Format

To execute the TEST command, enter the following:

>>> **T[EST] {qualifier}** Return

13.18.3 Qualifier

For a list of diagnostic tools see Chapter 5 (for Model 400S/600S AXP) or Chapter 10 (for Model 900S AXP).

13.18.4 Example

This example runs the ASIC diagnostic.

```
>>> T ASIC Return
```

13.19 Alternate Consoles

13.19.1 Overview

The system provides an alternate console for server configurations and in the event of a graphics subsystem failure. Console commands may be entered on a terminal connected to the printer port or from a network connection.

13.19.2 Printer Port Console

To access the printer port console, verify that the:

- Baud rate of the terminal connected to the alternate console port is set at 9600 baud.
- The alternate console switch located on the rear of the unit is in the up position when the system is using a graphics console. When the switch is in the down position, the alternate console port can be connected to the alternate console.

Note

The state of the alternate console switch is only read at power up. Changing the switch setting when the system is powering up has no effect until the system is powered down and then powered up again. You may also change from the alternate graphics console using the SET CONSOLE command.

13.19.3 Network Console

The system console can also be accessed from the network. The network console allows you to remotely troubleshoot the system or provide a console when no other consoles are available.

Some console tests and commands cause the network connection to terminate because the commands use the network device, or they cause a connection timeout at the remote node.

To access the network console:

- Obtain the hardware Ethernet address of the workstation.
- Obtain access to an operating system on the same Ethernet segment as the DEC 3000 AXP (the systems cannot be separated by a bridge or a router).
- Set the following DEC 3000 AXP workstation parameters:
  - A console password

- MOP, TRIGGER

Once the system is set up, perform the following steps from the other operating system to connect to the console:

1. Log into the user account (no special privileges are required)
2. Enter the following commands:

```
$ MC NCP
NCP> SHOW KNOWN CIRCUITS
NCP> CONNECT VIA  circuit SERVICE PASSWORD xxxx
     PHYSICAL ADDRESS 08-00-2B-XX-XX-XX
>>>
>>> CTRL/D

NCP> EXIT

$ LO
```

Command	Meaning
$MC NCP	Enters the Network Control Program (NCP).
NCP> SHOW KNOWN CIRCUITS	Shows available circuits to which you can connect.
NCP> CONNECT VIA circuit SERVICE PASSWORD xxxx PHYSICAL ADDRESS 08-00-2B-XX-XX-XX	Connects to the console.
>>>Login	Performs console functions.
Password	System response to LOGIN command. You must enter the correct password to gain access to the system.
>>> CTRL/D	Disconnects console.
NCP> EXIT	Exits NCP.
$LO	Logs off the system.

Note

Do not run the memory diagnostic. It causes the console to hang and you will have to power off the system.

13.20 SCSI Utilities

Table 13–2 lists each SCSI utility and a description of each one.

Table 13–2 SCSI Utility Options

Utility Name	Description
SHOW DEV	Displays SCSI device information.
ERASE	Hard disk eraser.
FORMAT	Diskette formatter.
VERIFY	Disk verifier.

13.20.1 Show Device Utility

The show device utility displays information about all SCSI devices attached to the SCSI bus.

The show device utility provides the following:

- Issues an inquiry command to obtain device types and device names
- Spins up disks
- Device capacity of disks
- Write-protection information
- Print information:

  ID, controller, logical unit number (LUN)
  OpenVMS or OSF device name
  Device type
  Device capacity
  Removable or fixed media
  Write-protection information
  Device name
  Firmware revision

13.20.2 Format

To obtain information about devices attached to the SCSI bus, enter the following command:

```
>>> SHOW DEV Return
```

13.20.3 Hard Disk Eraser Utility

The hard disk eraser utility spins up a disk and erases it.

13.20.4 Format

To erase a hard disk, enter the following command and respond to the prompts as described in Table 13–3.

```
>>> T[EST] SCSI ERASE Return
```

Table 13–3 Erasing a Hard Disk

At this Prompt...	Enter...
SCSI_bus(A,B)>>>	A (internal bus) or B (external bus)
SCSI_id(0-7)>>>	SCSI ID Number
SCSI_lun(0-7)>>>	Logical unit number
DKA100 OK?	OK, if device listed is correct

13.20.5 Example

This example erases device DKA100.

```
>>> T SCSI ERASE Return
 SCSI_bus(A,B)>>>A
 SCSI_id(0-7)>>>1
 SCSI_lun(0-7)>>>0
     SCSI HD_DSK_ERAS_UTIL
  DKA100 OK?  OK
  SCSI-bb-repl 0
  SCSI-util_succ
  OK
  >>>
```

13.20.6 Error Reporting

See Chapter 14.

13.20.7 Diskette Formatter Utility

The diskette formatter utility formats a diskette. After the utility starts, *do not terminate the utility or halt the machine*; this corrupts the device being tested, and you will have to run the utility again.

13.20.8 Format

To format a diskette, enter the following command and respond to the prompts as described in Table 13–4:

```
>>> T[EST] SCSI FORMAT Return
```

Table 13–4 Formatting a Diskette

At the Prompt...	Enter...
SCSI_bus(A,B)>>>	A (internal bus) or B (external bus)

(continued on next page)

Table 13–4 (Cont.) Formatting a Diskette

At the Prompt...	Enter...
SCSI_id(0-7)>>>	SCSI ID Number
SCSI_lun(0-7)>>>	Logical unit number

13.20.9 Example

This example formats the device DKA500.

```
>>> T SCSI FORMAT Return
SCSI_bus(A,B)>>>A
SCSI_id(0-7)>>>5
SCSI_lun(0-7)>>>0
```

13.20.10 Error Reporting

See Chapter 14.

13.20.11 Disk Verifier Utility

The disk verifier utility verifies that all blocks on a disk can be read.

13.20.12 Format

To verify a disk, enter the following command and respond to the prompts as described in Table 13–5:

```
>>> T[EST] SCSI VERIFY Return
```

Table 13–5 Verifying a Disk

At the Prompts...	Enter...
SCSI_bus(A,B)>>>	A (internal bus) or B (external bus)
SCSI_id(0-7)>>>	SCSI ID Number
SCSI_lun(0-7)>>>	Logical unit number

13.20.13 Example

This example verifies device DKA100.

```
>>> T SCSI VERIFY Return
SCSI_bus(A,B)>>>A
SCSI_id(0-7)>>>1
SCSI_lun(0-7)>>>0

    SCSI_DSK_VER_UTIL

  SCSI-util_succ

 OK
 >>>
```

13.20.14 Error Reporting

See Chapter 14.

14

LED Codes and Status/Error Messages

14.1 Overview

This chapter contains the following topics:

- LED Codes
- Console Error Messages
- Console Halt Messages
- ASIC Diagnostic Error Codes
- NVR Diagnostic Error Codes
- ISDN Diagnostic Error Codes
- SCC Diagnostic Error Codes
- SCSI Diagnostic Error Codes
- NI Diagnostic Error Codes
- MEMORY Diagnostic Error Codes
- ASIC Diagnostic Status/Error Messages
- ISDN Diagnostic Status/Error Messages
- SCC Diagnostic Status/Error Messages
- SCSI Diagnostic Status/Error Messages
- NI Diagnostic Status/Error Messages
- MEMORY Diagnostic Status/Error Messages
- MIPS Emulator Status Messages

14.2 LED Codes

14.2.1 Serial ROM LED Codes

The system displays a series of hexadecimal codes at the beginning of the power-up test. The codes, the corresponding test description, and possible reasons for a test failure are described in Table 14–1.

Note

See Table 6–1 for a list of the LED displays and corresponding hex codes for the DEC 3000 Models 400S/ 600S AXP systems.

Table 14–1 Power-Up Test Serial ROM Codes

LED Code	Test Description	Reason for Failure
FF	Set all 8 Multiplexer Control Registers (MCRs) to 128M.	MCR did not read back as expected (fatal error, branches to SROM miniconsole).
FE	Mapping out an MCR per macrocoders manual (only appears if an error occurs).	MCR did not read back as expected (fatal error, branches to SROM miniconsole).
FD	Memory sizing completed.	All MCRs mapped out (no memory detected - fatal error, branches to SROM miniconsole).
FC	Mapping an MCR.	Only MCR did not read back as expected (fatal error, branches to SROM miniconsole).
FB	Memory configuration completed.	Should never stop here.
FA	Memory test with non-BCACHE bit SET, Dcache OFF, and mchk enabled	If read as .NE. write, send error dump to SROM port and branch to SROM miniconsole.
F9	Memory test with non-BCACHE bit CLEAR, Dcache OFF, and mchk enabled.	If read as .NE. write, send error dump to SROM port and branch to SROM miniconsole.
F8	Memory test with non-BCACHE bit SET, Dcache ON, and mchk enabled.	If read as .NE. write, send error dump to SROM port and branch to SROM miniconsole.
F7	Memory test with non-BCACHE bit CLEAR, Dcache ON, and mchk enabled.	If read as .NE. write, send error dump to SROM port and branch to SROM miniconsole.
F6	tc register test and initialization	Should never stop here. If read as .NE. write, send error dump to SROM port.
F5	Coreio register test and initialization	Should never stop here. If read as .NE. write, send error dump to SROM port.
F2	Look for I/O ROM manfacturing data.	Read of I/O ROM manfacturing data did not return data expected. Send error dump to SROM port and branch to SROM miniconsole.
F1	Completed load of I/O ROM into memory.	Should never stop here.
30	SROM code execution completed normally.	Should never stop here.
20	Machine check.	Send mchk dump to SROM port and to SROM miniconsole.

If a failure occurs during this portion of the power-up procedure, perform the following steps:

1. Verify that there is a good connection between the system board and I/O board.
2. Verify that all memory SIMMs are properly installed. You may need to reseat memory SIMMs.
3. Initiate the power-up sequence. If a failure occurs, replace the following FRUs and verify that the system is operating correctly:
   - System board
   - I/O board

14.2.2 ASIC LED Codes

The following LED codes represent ASIC power-up tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
35	Scatter/Gather Map (SGMAP) test
3F	All tests passed

14.2.3 Memory LED Codes

The following LED codes represent memory diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
20	Machine check
21	CELL Fill mem with test pattern data
22	CELL Forward Rd/Compare/Complement/Wr
23	CELL Reverse Rd/Compare/Complement/Wr
24	ADDR Fill mem with addresses as data
25	Refresh test in progress
26	ADDR Read/Compare data = address
27	BITS Fill mem with a pattern of 1’s in a field of 0’s
28	BITS Read/Compare data = pattern
29	Reserved
2A	Reserved
2B	LLSC load-locked/store-conditional tests
2C	B-cache tag parity detection
2D	ECC detection
2E	Reserved
2F	Clear memory to zeros

14.2.4 NVR LED Codes

The following LED codes represent NVR diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
3A	Check Battery test
3B	Tests NVR registers
3C	Assure Clock is Ticking test
3D	Test TOY registers
3E	Interrupt test
3F	All tests passed

14.2.5 SCC LED Codes

The following LED codes represent SCC diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
40	SCC Self-test starting
41	SCC Self-test is connecting to driver
42	SCC Reset/Init test
43	SCC Modem test
44	SCC Polled test
45	SCC Interrupt test
46	SCC DMA test
47	SCC LK401 test
48	SCC Mouse test
49-4E	Reserved
4F	SCC Test complete

14.2.6 NI LED Codes

The following LED codes represent NI diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
50	Network address ROM test
51	Test LANCE Registers
52	LANCE initialization test
53	LANCE internal loopback and DMA test
54	Interrupt test
55	LANCE CRC Generation and detection test
56	Test LANCE MISS and BUFF Errors test
57	Test LANCE Collision detection test
58	LANCE Address filtering test
59	LANCE External loopback test
5A	LANCE Transmit BUFF error test
5F	All tests passed

14.2.7 ISDN LED Codes

The following LED codes represent ISDN diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
70	Register test
71	Tone test
72	Digital loop test
73	Analog loop test
74	Interrupt test
75	DMA Test
77	Record utility test
78	Repeat test
79	Playback test
7A	ISDN Init
7F	All tests passed

14.2.8 SCSI LED Codes

The following LED codes represent SCSI diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
60	Dual SCSI ASIC register test
61	SCSI Controller Chip register test
62	Interrupt test
63	Data Transfer test
64	Map Error test
65	Minimal Device test
6F	All tests passed

14.2.9 Console LED Codes

At the end of the power-up sequence, the diagnostic LEDs should display the DD hex code for console entry.

If the sequence halts at any code from EF to DE, then reseat the system board and run the power-up sequence again.

LED Code	Description
EF	Entry
EE	Powerup
ED	Powerup and saved state is 2 (put a hex number here)
EC	Init$build_config completed
EB	Init$crb completed
EA	Init$mem_clear completed
E9	Call class init_driver
E8	Console init driver done
E7	Call driver reset_input
E6	Call NVR Self-test
E5	NVR Self-test done
E4	Init$console_device done
E3	Page tables initialized
E2	HWRPB Initialized
E1	TURBOchannel sizing completed
E0	Powerup banner printout
DF	Class driver reset_input
DE	Driver reset output (SCC only)
DD	Console entry >>>
00	Console is about to be exited

14.2.10 MIPS Emulator LEDs

The following LED codes represent MIPS emulator diagnostic tests. If an error occurs during one of these tests, the screen displays a FRU code and error code.

LED Code	Description
90	MIPS Emulator running with no errors.
91	Invalid REX command entered.
92	Unsupported REX command entered supported in REX but not yet supported by emulator.
93	Bad address detected by the emulator.
94	ROM not found in this slot.
95	ROM object not found.
96	Cannot load ROM object.
97	Invalid MIPS-I instruction detected.
98	ROM object called halt.
99	Invalid callback called.
9A	Unsupported callback called; callback currently not in this release.

14.3 Console Error Messages

14.3.1 Console Error Messages

The following table lists console error messages for improperly entered commands:

Message	Description
? 21 CORRPTN	Console data structures have been corrupted.
? 22 ILL REF	Illegal reference attempted.
? 23 ILL CMD	Illegal command entered.
? 24 INV DGT	Invalid digit found by parser.
? 25 LTL	Too many characters entered on command line.
? 26 ILL ADDR	Invalid address entered.
? 27 LEN VIO	Length violation (currently unused).
? 28 VAL TOO LRG	The value entered was too large.
? 29 ILL SW	Illegal switch was entered.
? 2A SW CONF	Conflicting switches entered on the command line.
? 2B UNK SW	Unknown switch entered on the command line.
? 2C UNK SYM	Unknown symbol entered on the command line.
? 2D AMB SYM	Ambiguous symbol entered on the command line.
? 2E CHKSM	Incorrect checksum passed by the X command.
? 31 TMOUT	Timeout while waiting for input during the X command.
? 32 MEM ERR	Invalid virtual address translation or memory error.
? 34 ILL PSWD	Illegal password was entered.
? 35 PSWD NOTEN	Password system is not enabled.
? 36 NO PSWD DEF	No password defined.
? 37 NOT IMPL	Function not implemented by the console.
? 38 IPR NOT IMPL	Internal Processor register not implemented on this system.
? 39 IPR NOACCS	Internal Processor register can not be accessed.
? 3A INV ACCS	Internal Processor register can not be accessed as specified.
? 3B NVR RDERR	Problem reading NVR.
? 3C NVR WRTERR	Problem writing NVR.

14.4 Console Halt Messages

14.4.1 Console Halt Messages

The following example shows the results when you enter a halt sequence. The next table lists the console halt messages that result from the sequence.

```
?02 EXT HLT
PC=xxxxxxxx.xxxxxxxx PSL=xxxxxxxx.xxxxxxxx
>>>
```

The PC and PSL of the halt are also printed out.

nn	Message	Meaning
02	EXT HLT	Console mode entered because the external halt button was pressed.
06	HLT INST	Console mode entered because a HALT instruction was executed.
08	KSP INVAL	Console mode entered because PALcode detected an invalid kernel stack pointer while building a stack frame.
18	HW MCHK	Console mode entered because PALcode detected a nonrecoverable machine check.
20	SCBB BAD	Console mode entered because PALcode detected an invalid SCB base while trying to dispatch to a user's handler.

14.5 ASIC Diagnostic Error Codes

14.5.1 ASIC Diagnostic Error Codes

The following table contains the error codes produced by the ASIC diagnostic.

All values are in hexadecimal.

If the diagnostic fails, reseat the system and I/O boards.

Run the ASIC diagnostic to verify system operation. If a failure reoccurs, replace the system board and run the ASIC diagnostic to ensure that the failure has been corrected.

Error Code	Description	Replace
18	ASIC$K_SG_PASS1_FAILED	System board
1A	ASIC$K_SG_PASS2_FAILED	System board
1C	ASIC$K_SG_PARITY_FAILED	System board

14.6 NVR Diagnostic Error Codes

14.6.1 NVR Diagnostic Error Codes

The following table contains the error codes produced by the NVR diagnostic.

All values are in hexadecimal.

If the diagnostic fails, reseat the system and I/O board.

Run the NVR diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Except for the last one, only one FRU should be replaced. Run the NVR diagnostic after replacing the FRU to determine if the failure has been corrected.

Error Code	Description	Replace
03	Soft-error on power-on, check time	I/O board
04	Battery failure	I/O board
08	Data miscompare testing NVR registers	I/O board
10	Data miscompare testing TOY registers	I/O board
20	Valid RAM and time bit clear. Possible RAM corruption due to power loss.	I/O board
40	Battery codes do not match.	I/O board
80	Update in progress, bit will not clear.	I/O board
100	CSR_A data miscompare.	I/O board
200	CSR_B data miscompare.	I/O board
400	Interrupt test failed—no interrupt generated.	I/O board system board[1]

[1]Replace the I/O board, then run the NVR diagnostic. If the diagnostic fails, then replace the system board.

14.7 ISDN Diagnostic Error Codes

14.7.1 ISDN Error Codes

The following table lists the error codes produced by the ISDN diagnostic.

All values are in hexadecimal.

If the diagnostic fails, then perform the following steps:

1. Reseat the audio cable between the audio module and the I/O board.
2. Reseat the system board and I/O board connection.

3. Run the ISDN diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Replace FRUs one at a time, running the ISDN diagnostic after replacing each one to determine if the failure has been corrected.
   a. Audio cable
   b. Audio module
   c. I/O boaed

Error Code	Description
02	Data miscompare testing Line Interface Unit Status register
04	Data miscompare testing Line Interface Unit Priority register
06	Data miscompare testing Line Interface Unit Mode register 1
08	Data miscompare testing Line Interface Unit Mode register 2
A	Data miscompare testing Multiplexer Control register 1
C	Data miscompare testing Multiplexer Control register 2
E	Data miscompare testing Multiplexer Control register 3
10	Data miscompare testing Main Audio Processor Mode register 1
12	Data miscompare testing Main Audio Processor Mode register 2
14	Data miscompare testing Data Link Controller Mode register 1
16	Data miscompare testing Data Link Controller Mode register 4
20	Data miscompare testing internal digital loopback using MCR1
24	Data miscompare testing internal digital loopback using MCR2
26	Data miscompare testing internal digital loopback using MCR3
28	Data miscompare testing internal analog loopback
30	Interrupt test data miscompare
32	Interrupt test time out
34	Invalid 79C30A interrupt
36	Interrupt not generated
38	All interrupts not received
40	DMA Test time out
42	DMA Test unexpected interrupts
44	DMA Test data miscompare

14.8 SCC Diagnostic Error Codes

14.8.1 SCC Error Codes

The following table contains the error codes produced by the SCC diagnostic.

All values are in hexadecimal.

If the diagnostic fails, then perform the following steps:

1. Check all loopback connectors.
2. Reseat the keyboard connection.
3. Reseat the mouse connection.
4. Reseat the system board and I/O board connection.
5. Run the SCC diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Replace FRUs one at a time, running the ISDN diagnostic after replacing each one to determine if the failure has been corrected.

Error Code	Description	Replace
10	SCC reset test failed.	I/O board
20	SCC modem test failed when testing CTS<->RTS.	I/O board
22	SCC modem test failed when testing DSR<->SS.	I/O board
24	SCC modem test failed when testing CD<->SS.	I/O board
26	SCC modem test failed when testing RI<->DTR.	I/O board
30	SCC polled test failed due to transfer timeout.	I/O board
32	SCC polled test failed due to parity error on receive.	I/O board
34	SCC polled test failed due to framing error on receive.	I/O board
36	SCC polled test failed due to overrun error in receive.	I/O board
38	SCC polled test failed due to data comparison error.	I/O board
40	SCC Interrupt not seen at the COREIO	I/O board
42	SCC Interrupt not seen at TURBOchannel ASIC	I/O board
44	SCC Interrupt not seen at DECchip 21064 CPU	I/O board
50	SCC LK401 Test failed due to transfer timeout.	Keyboard, I/O board
52	SCC LK401 Test failed due to Illegal response received.	Keyboard, I/O board

Error Code	Description	Replace
60	SCC Mouse Test failed due to transfer timeout.	Mouse, I/O board
62	SCC Mouse Test failed due to illegal response received.	Mouse, I/O board
70	SCC Self-test was unable to connect to the driver.	
80	SCC was unable to find free memory with which to test.	
90	SCC had a transmit timeout during the DMA test.	I/O board
92	SCC had unexpected interrupts during DMA test.	I/O board
94	SCC had incorrect buffer pointers during the DMA test.	I/O board
96	SCC had a data buffer miscompare during the DMA test.	I/O board

14.9 SCSI Diagnostic Error Codes

14.9.1 SCSI Error Codes

The following table lists error codes produced by the SCSI diagnostic.

All values are in hexadecimal.

If the diagnostic fails, then perform the following steps:

1. Make sure the SCSI device is properly connected to the system.
2. Reseat the system board and I/O board connection.
3. Run the SCSI diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Replace FRUs one at a time, running the SCSI diagnostic after replacing each one to determine if the failure has been corrected.

Error Code	Description	Replace
02	SCSI ASIC Register test failed testing bus A.	System board, I/O board
04	SCSI Controller register test failed testing bus A.	System board, I/O board
06	SCSI Interrupt test failed testing bus A.	System board, I/O board
08	SCSI Data transfer test failed testing bus A.	SCSI A Device, I/O board, system board
0A	SCSI Map error test failed testing bus A.	SCSI A Device, I/O board, system board
0C	SCSI Minimal device test failed testing bus A.	SCSI A Device, I/O board, system board

Error Code	Description	Replace
52	SCSI ASIC Register test failed testing bus B.	SCSI B Device, I/O board, system board
54	SCSI Controller register test failed testing bus B.	SCSI B Device, I/O board, system board
56	SCSI Interrupt test failed testing bus B.	SCSI B Device, I/O board, system board
58	SCSI Data transfer test failed testing bus B.	SCSI B Device, I/O board, system board
5A	SCSI Map error test failed testing bus B.	SCSI B Device, I/O board, system board
5C	SCSI Minimal device test failed testing bus B.	SCSI B Device, I/O board, system board

14.10 NI Diagnostic Error Codes

14.10.1 NI Error Codes

The following table lists error codes produced by the NI diagnostic.

All values are in hexadecimal.

If the diagnostic fails, then perform the following steps:

1. Reseat the loopback connector (for error codes A0 to AC).
2. Reseat the system board and I/O board connection.
3. Run the NI diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Replace FRUs one at a time, running the NI diagnostic after replacing each one to determine if the failure has been corrected.
   - Loopback connector (for error codes A0 to AC)
   - System board
   - I/O board

Error Code	Description
10	Network Address ROM: read access failed.
12	Network Address ROM: null address.
14	Network Address ROM: bad group address.
16	Network Address ROM: bad checksum.
18	Network Address ROM: bad group 2.
1A	Network Address ROM: bad group 3.
1C	Network Address ROM: bad test patterns.
20	LANCE Register Address Port R/W error.
22	LANCE CSR0 R/W error.
24	LANCE CSR1 R/W error.
26	LANCE CSR2 R/W error.
28	LANCE CSR3 R/W error.
30	LANCE initialization failed.

Error Code	Description
32	LANCE initialization: receiver disabled.
34	LANCE initialization: transmitter disabled.
36	LANCE initialization: receiver enabled.
38	LANCE initialization: transmitter enabled.
40	LANCE internal loopback/DMA: initialization failed.
42	LANCE internal loopback/DMA: transmit failed.
44	LANCE internal loopback/DMA: receive failed.
46	LANCE internal loopback/DMA: packet comparison failed.
48	LANCE internal loopback/DMA: init DMA error.
4A	LANCE internal loopback/DMA: transmit DMA error.
4C	LANCE internal loopback/DMA: receive DMA error.
4E	LANCE internal loopback/DMA: unknown tx or rx error.
50	LANCE interrupts: initialization failed.
52	LANCE interrupts: TC Interrupt register bit not set.
54	LANCE interrupts: SIR NI Interrupt register bit not set.
56	LANCE interrupts: NI ISR not entered.
60	LANCE CRC: initialization failed.
62	LANCE CRC: transmit failed.
64	LANCE CRC: receive failed.
66	LANCE CRC: packet comparison failed.
68	LANCE CRC: LANCE generated bad CRC.
6A	LANCE CRC: LANCE rejected good CRC.
6C	LANCE CRC: LANCE accepted bad CRC.
6E	LANCE CRC: Other error.
70	LANCE rx MISS/BUFF: initialization failed.
72	LANCE rx MISS/BUFF: transmit failed.
74	LANCE rx MISS/BUFF: unknown receive error.
76	LANCE rx MISS/BUFF: MISS error not flagged.
78	LANCE rx MISS/BUFF: BUFF error not flagged.
80	LANCE collision: initialization failed.
82	LANCE collision: unknown transmit error.
84	LANCE collision: RETRY not flagged.
86	LANCE collision: transmitter disabled.
90	LANCE address filtering: initialization failed.
92	LANCE address filtering: transmit failed.
94	LANCE address filtering: receive failed.
96	LANCE address filtering: packet comparison failed.
98	LANCE address filtering: broadcast filtering failed.
9A	LANCE address filtering: promiscuous mode failed.
9C	LANCE address filtering: null destination accepted.
9E	LANCE address filtering: good logical address rejected.
A0	LANCE external loopback: initialization failed.
A2	LANCE external loopback: transmit failed.
A4	LANCE external loopback: receive failed.
A6	LANCE external loopback: packet comparison failed.
A8	LANCE external loopback: unknown transmit error.

Error Code	Description
AA	LANCE external loopback: unknown receive error.
AC	LANCE external loopback: check NI port lpbk connector.
B0	LANCE tx BUFF: initialization failed.
B2	LANCE tx BUFF: BUFF error not flagged.
B4	LANCE tx BUFF: transmitter enabled.
B6	LANCE tx BUFF: unknown transmit error.
D0	DMA registers: MAP_BASE register error.
D2	DMA registers: I/O write access to map registers failed.
D4	DMA registers: I/O read access to map registers failed.
D6	DMA registers: parity error not flagged.
E4	LANCE DMA: valid DMA failed.
E6	LANCE DMA: DMA failed during initialization.
E8	LANCE DMA: DMA failed during transmit.
EA	LANCE DMA: DMA failed during receive.
F0	LANCE initialization failed.
F2	LANCE transmit failed.
F4	LANCE unknown transmit error.
F6	LANCE receive failure.
F8	LANCE unknown receive error.

14.11 MEMORY Diagnostic Error Codes

14.11.1 Memory Error Codes

The following table lists error codes produced by the memory diagnostic.

All values are in hexadecimal.

If the diagnostic fails, reseat the memory SIMMs.

Error Code	Description	Replace
02	CELL data did not equal pattern expected on forward pass.	Memory SIMMs
04	CELL data did not equal pattern expected on reverse pass.	Memory SIMMs
10	ADDR data does not equal address as expected.	Memory SIMMs
20	LLSC load-locked/store-conditional failure.	Memory SIMMs

14.12 ASIC Diagnostic Status/Error Messages

14.12.1 ASIC Status/Error Messages

The ASIC disagnostic displays the following status/error information when an error occurs:

```
T-STS-ASIC - ASIC$SG_MAP TEST
             ? T-ERR-ASIC - SCATTER/GATHER MAP REGISTER  DATA MISMATCH

             ? T-ERR-ASIC - TNF - %s
```

14.13 NVR Diagnostic Status/Error Messages

14.13.1 NVR Status/Error Messages

The NVR diagnostic displays the following status/error information when an error occurs:

```
T-STS-NVR - NVR_REG TEST
            ? T-ERR-NVR - BATTERY FAILURE WHILE POWER WAS OFF
            ? T-ERR-NVR - VRT BIT FAILURE, FINAL CHECK

T-STS-NVR - NVR CHECK BATTERY TEST
            ? T-ERR-NVR - BATTERY CODES DON'T MATCH

T-STS-NVR - NVR INIT TEST
            ? T-ERR-NVR - NVR REGISTER ERROR  - DATA MISMATCH

T-STS-NVR - NVR CLOCK TEST
        ? T-ERR-NVR - UIP FAILED TO CLEAR ERROR

T-STS-NVR - NVR ASSURE_CLOCK_IS_TICKING TEST
        ? T-ERR-NVR - ON POWERUP ALWAYS SET TIME -  ERROR (3)

T-STS-NVR - NVR TOY REGISTERS TEST
            ? T-ERR-NVR - TOY REGISTER ERROR - DATA MISMATCH

T-STS-NVR - NVR CLOCK_REENTRY TEST
            ? T-ERR-NVR - UIP FAILED TO CLEAR ERROR
            ? T-ERR_NVR - CLOCK HASN'T TICKED
            ? T-ERR_NVR - CSR_A ERROR - DATA MISMATCH
            ? T-ERR_NVR - CSR_B ERROR - DATA MISMATCH

T-STS-NVR - NVR INTERRUPT TEST
            ? T-ERR-NVR - WRONG NUMBER OF INTERRUPTS

            ? T-ERR-NVR - TNF - %s
```

14.14 ISDN Diagnostic Status/Error Messages

14.14.1 ISDN Status/Error Messages

The ISDN diagnostic displays the following status/error information when an error occurs.

The failed FRU for all error messages is the I/O board.

Before replacing the I/O board, *first* reseat the board and run the ISDN diagnostic to see if the failure is cleared.

```
T-STS-ISDN - REGISTER
    ? T-ERR-ISDN - LIU_REG DATA MISCOMPARE
    failing address  =  (indirect address of LIU register)
    data read        =  (data read)
    data expected    =  (data expected)

    ? T-ERR-ISDN - REGISTER - DATA MISCOMPARE
    failing address = (indirect address of failing register)
    data read       = (data read)
    data expected   = (data expected)

T-STS-ISDN - TONE
T-STS-ISDN - TONE RINGER: Use tone ringer to generate sound
T-STS-ISDN - TONE GENERATOR: Use tone generator to generate sound
T-STS-ISDN - DTMF: Use DTMF to generate sound

T-STS-ISDN - DIGITAL_LOOP
    ? T-ERR-ISDN - DIGITAL_LOOP - DATA MISCOMPARE

T-STS-ISDN - ANALOG_LOOP
    ? T-ERR-ISDN - ANALOG_LOOP - DATA MISCOMPARE

T-STS-ISDN - INTERRUPT
    ? T-ERR-ISDN - NO INTERRUPT GENERATED
      data read  = (current value of DSR2 register in 79C30A)
      data exp   = (data expected)
    ? T-ERR-ISDN - INVALID INTERRUPT
      data read  = (current value of IR register in 79C30A)
      data exp   = (data expected)
    ? T-ERR-ISDN - DATA MISMATCH
      data read  = (data read)
      data exp   = (data expected)

     ? T-ERR-ISDN - INVALID DSR2 INT
      data read  = (data read)
      data exp   = (data expected)

     ? T-ERR-ISDN - TIME OUT

     ? T-ERR-ISDN - HAVEN'T RECEIVED ALL INTERRUPTS

     ? T-ERR-ISDN - TNF - %s

T-STS-ISDN - DMA
    ? T-ERR-ISDN - TIME OUT
    ? T-ERR-ISDN - INVALID INTERRUPT RECEIVED
      data read  = (current value of System Interrupt register)
      data exp   = (interrupt expected)
    ? T-ERR-ISDN - DMA NEVER OCCURRED

    ? T-ERR-ISDN - DATA MISMATCH
      fail addr  = (sparse address of mis-matched data)
      data read  = (data read)
      data exp   = (data expected)
```

```
T-STS-ISDN - RECORD: Records and plays back a user’s message
 T-STS-ISDN-Recording begins: Queues user to start talking
 T-STS-ISDN-Recording ends: Queues user that recording has ended
 T-SYS-ISDN-Playback recording: Queues user that message is being played
 back

T-STS-ISDN - REPEAT: Allows user to speak and hear their message
             simultaneously

T-STS-ISDN - PLAYBACK: Play back what was recorded using the RECORD
             utility
```

14.15 SCC Diagnostic Status/Error Messages

14.15.1 SCC Diagnostic Status Messages

The following table lists the SCC diagnostic status messages and their meanings.

Message	Meaning
T-STS-SCC - Reset/Init Test	SCC Reset test is running.
T-STS-SCC - Modem Test	SCC Modem test is running.
T-STS-SCC - Poll test	SCC POLLED Mode test is running. The polled test currently runs only in internal loopback mode.
T-STS-SCC - Intrpt Test	SCC Interrupt test is running.
T-STS-SCC - DMA test	SCC DMA Test is running. The printer port is tested only when the console is not attached to it.
T-STS-SCC - LK401 test	LK401 Test is running.
T-STS-SCC - Mouse test	Mouse test is running.

14.15.2 SCC Diagnsotic Error Messages

The following table lists the SCC diagnostic error messages and their meanings.

Note

All MODEM error messages require a modem loopback and use of service mode (DIAG_SEC 2) or an error will occur.

Message	Meaning
`? T-ERR-SCC-MODEM - CTS bit Exp = 0 Rec = 1`	Modem test expected the CTS bit to be set to 0 but it was read as a 1.
`? T-ERR-SCC-MODEM - CTS bit Exp = 1 Rec = 0`	Modem test expected the CTS bit to be set, but it is clear.
`? T-ERR-SCC-MODEM - DSR bit Exp = 0 Rec = 1`	Modem test expected the DSR bit to be set to 0, but it was read as a 1.
`? T-ERR-SCC-MODEM - DSR bit Exp = 1 Rec = 0`	Modem test expected the DSR bit to be set, but it is clear.
`? T-ERR-SCC-MODEM - DCD bit Exp = 0 Rec = 1`	Modem test expected the DCD bit to be set to 0, but it was read as a 1.
`? T-ERR-SCC-MODEM - DCD bit Exp = 1 Rec = 0`	Modem test expected the DCD bit to be set, but it is clear.
`? T-ERR-SCC-MODEM - RI bit Exp = 0 Rec = 1`	Modem test expected the RI bit to be set to 0, but it was read as a 1.
`? T-ERR-SCC-MODEM - RI bit Exp = 1 Rec = 0`	Modem test expected the RI bit to be set, but it is clear.
`? T-ERR-SCC - POLLED test - Transfer timed out`	Transfer has not completed. This usually indicates that transmitted characters were not received.
`? T-ERR-SCC-DMA - Xfer tmout, Line x`	DMA Transmit has not completed on line x.
`? T-ERR-SCC-DMA - Unexp ints, Line x; T-STS-SCC - Exp = %x Rec = %x`	System did not receive the expected interrupts.
`? T-ERR-SCC-DMA - Data buf miscomp, Line x; T-STS-SCC - Addr = %x Exp = %x Rec = %x`	Data received by the DMA WRITE was not the same as the data transmitted on line x.
`? T-ERR-SCC-LK401 - %x char rcvd`	Response received from the LK401 was less than the number of characters expected.
`? T-ERR-SCC-LK401 - ill resp rcvd`	Response received from the LK401 was not the correct response.
`? T-ERR-SCC-Mouse - %x char rcvd`	Response received from the mouse was less than the number of characters expected.
`? T-ERR-SCC-Mouse - ill resp rcvd`	Mouse has failed its power-up self-test.
`? T-ERR-SCC-CCR - Parity error`	Character received contains a parity error.
`? T-ERR-SCC-CCR - Framing error`	Character received contains a framing error.
`? T-ERR-SCC-CCR - Overrun error`	Character received contains an overrun error.
`? T-ERR-SCC-CCR - rec (%x) != exp (%x)"`	Character received does not equal the character transmitted.
`? T-ERR-SCC-INTR - SCC%x not set at COREIO`	SCC bit %x is not set at COREIO.

Message	Meaning
? T-ERR-SCC-INTR - Not set in TCASIC	COREIO interrupt is not set at the TURBOchannel ASIC.
? T-ERR-SCC-INTR - Not set at CPU	Message is not set at the DECchip 21064 CPU.
? T-ERR-SCC - TNF - %s	Message is printed out when the user requests a test that does not exist. The test name the user enters is placed where the %s is placed.

14.16 SCSI Diagnostic Status/Error Messages

14.16.1 SCSI Status Messages

The following are the SCSI diagnostic status messages:

```
T-STS-SCSI (bus) - SCSI ASIC Register test
T-STS-SCSI (bus) - SCSI Ctrl Register test
T-STS-SCSI (bus) - Interrupt test
T-STS-SCSI (bus) - Data Transfer test
T-STS-SCSI (bus) - Map Error test
T-STS-SCSI (bus) - Minimal Device test
```

14.16.2 SCSI Error Messages

The following is a list of the SCSI diagnostic error messages.

Note

The following error messages could indicate an I/O board failure. Before replacing the board, try reseating the board.

```
? T-ERR-SCSI -  NVR err

? T-ERR-SCSI (bus) - DMA map err

? T-ERR-SCSI (bus) - SCSI ASIC Reg test - Data miscompare
  T-ERR-SCSI (bus) - Addr = (address) Exp = (exp data)
                     Act = (actual data)

? T-ERR-SCSI (bus) - SCSI Ctrl Reg test - Data miscompare
  T-ERR-SCSI (bus) - Addr = (address) Exp = (exp data)
              Act = (actual data)

? T-ERR-SCSI (bus) - SCSI Ctrl Register test - Reg bit wrong
  T-ERR-SCSI (bus) - Addr = (address) Info = (informational value)

? T-ERR-SCSI (bus) - SCSI Ctrl Register test - Parity Error

? T-ERR-SCSI (bus) - Int test - cause no int

? T-ERR-SCSI (bus) - Int test - int disab high ipl

? T-ERR-SCSI (bus) - Int test - int enab high ipl

? T-ERR-SCSI (bus) - Int test - int enab low ipl
```

Note

The following error messages could indicate a SCSI device or I/O board failure. Before replacing the device or board, try reseating them.

```
   T-ERR-SCSI (bus) - info = (informational value) Status = (status)
   T-ERR-SCSI (bus) - IR = (ir) CIR = (cir) IME = (ime)

? T-ERR-SCSI (bus) - Data Trans test - inondma inq

? T-ERR-SCSI (bus) - Data Trans test - dma inq

? T-ERR-SCSI (bus) - Data Trans test - dma nonaligned inq

? T-ERR-SCSI (bus) - Data Trans test - sync dma inq
```

```
? T-ERR-SCSI (bus) - Data Trans test - virt dma inq
  T-ERR-SCSI (bus)  - id = (device id) lun = (logical unit number)
                      info = (informational value)
  T-ERR-SCSI (bus) - actcmd = (actual command)
                     curcmd = (current command)
              status = (status) int = (interrupt)
  T-ERR-SCSI (bus) - IR = (ir) CIR = (cir) IME = (ime)
  T-ERR-SCSI (bus) - snskey = (sense key) extfru = (extended fru info)

? T-ERR-SCSI (bus) - Data  Trans test - nondma inq not enough data

? T-ERR-SCSI (bus) - Data Trans test - nondma/dma inq size miscompare

? T-ERR-SCSI (bus) - Data Trans test - nondma/dma_nonal inq size
 miscompare

? T-ERR-SCSI (bus)  - Data Trans test - nondma/dma_nonal inq data
 miscompare

? T-ERR-SCSI (bus) - Data Trans test - nondma/sync inq size miscompare

? T-ERR-SCSI (bus) - Data Trans test - nondma/sync inq data miscompare

? T-ERR-SCSI (bus) - Data Trans test - nondma/virt inq size miscompare

? T-ERR-SCSI (bus) - Data Trans test - nondma/virt inq data miscompare
  T-ERR-SCSI (bus) - id = (device id) lun = (logical unit number)
  T-ERR-SCSI TNF   - %s
```

Note

The following error messages could indicate a system board failure. Before replacing the board, try reseating the board.

```
? T-ERR-SCSI (bus) - Map Err test - ir notval  not set

? T-ERR-SCSI (bus) - Map Err test - ir parerr  not set
  T-ERR-SCSI (bus) - id = (device id) lun = (logical unit number)
  T-ERR-SCSI (bus) - virt data addr = (data addr)
                     map reg addr   = (map reg adr)
  T-ERR-SCSI (bus) - map reg data = (map data) IR = (ir) CIR = (cir)

? T-ERR-SCSI (bus) - Map Err test - DMA inq err
  T-ERR-SCSI (bus) - id = (device id) lun = (logical unit number)
                     info = (informational value)
  T-ERR-SCSI (bus) - actcmd = (actual command)
                     curcmd = (current command)
              status = (status) int = (interrupt)
  T-ERR-SCSI (bus) - IR = (ir) CIR = (cir) IME = (ime)
  T-ERR-SCSI (bus) - snskey = (sense key) extfru = (extended fru info)
```

Note

The following error messages could indicate a SCSI device or I/O board failure. Before replacing the device or board, try reseating them.

```
? T-ERR-SCSI (bus) - Min Dev test - start unit

? T-ERR-SCSI (bus) - Min Dev test - test unit ready

? T-ERR-SCSI (bus) - Min Dev test - rewind

? T-ERR-SCSI (bus) - Min Dev test - mode select

? T-ERR-SCSI (bus) - Min Dev test - read

? T-ERR-SCSI (bus) - Min Dev test - send diagnostic
  T-ERR-SCSI (bus) - id = (device id) lun = (logical unit number)
            info = (informational value)
  T-ERR-SCSI (bus) - actcmd = (actual command)
       curcmd = (current command)
              status = (status) int = (interrupt)
  T-ERR-SCSI (bus) - IR = (ir) CIR = (cir) IME = (ime)
  T-ERR-SCSI (bus) - snskey = (sense key) extfru = (extended fru info)

? T-ERR-SCSI (bus) - Min Dev test - wrong num bytes

? T-ERR-SCSI (bus) - Min Dev test - data miscompare
  T-ERR-SCSI (bus) - id = (device id) lun (logical unit number)
```

Message	Meaning
address	Sparse address of failing location.
exp data	Expected data.
actual data	Actual data.
bus	A or B.
device id	SCSI ID number.
logical unit number	Logical unit number of device.
info	Informational value from following table.
actcmd	Original command that was sent to SCSI bus.
curcmd	Actual command that failed.
status	SCSI controller Status register contents at time of error.
interrupt	SCSI controller Interrupt register contents at time of error.
ir	TURBOchannel Interrupt register contents at time of error.
cir	DUAL SCSI ASIC Control Interrupt Register contents at time of error.
ime	DUAL SCSI ASIC Interrupt Mask Enable register contents at error.
data addr	Virtual address of data.
map reg adr	Map register address.

Note

The next two values are printed out when a request sense command is executed.

Message	Meaning
snskey	Sense key from request sense data packet.
extfru	FRU value from request sense data packet.

14.16.3 Informational Values

Information	Description
01	Terminal count bit clear in Control Status register.
02	Gross error bit clear in Control Status register.
03	Interrupt bit clear in Control Status register.
04	Bus service bit clear in Control Status register.
05	Disconnect bit clear in Control Interrupt register.
06	Disconnect bit set in Control Interrupt register.
07	Illegal command bit clear in Control Interrupt register.
08	Illegal command bit set in Control Interrupt register.
09	Arbitration not won.
0A	Selection timeout.
0B	Invalid sequence in Sequence Step register.
0C	Unexpected ISR hit.
0D	Interrupt service routine was not entered.
0E	Interrupt bit in controller status register will not clear.
0F	Bad request sense key.
10	Bad status returned from status phase.
11	Not enough sense data returned from a request sense command.
12	Phase did not go to command phase.
13	Phase did not go to message out phase.
14	Phase did not go to message in phase.
15	Command phase changed too soon.
16	Message in phase changed too soon.
17	Stuck in command phase.
18	Stuck in message in phase.
19	Stuck in message out phase.
1A	Stuck in data out phase.
1B	Stuck in data in phase.
1C	Should not be in message out phase.
1D	No interrupt after sending SCSI command.
1E	No interrupt after sending command complete.
1F	No interrupt after sending message accepted.
20	No interrupt after sending transfer information.
21	All data out bytes were not sent.
22	Unexpected message reject from device.
23	FIFO Flag count is wrong.
24	Message is unsupported.
25	Bus device reset was sent, but device did not drop off bus.
26	Illegal phase.

Information	Description
27	Should not be in data in phase.
28	Problem with a device trying to reconnect.
29	Unexpected disconnect message received.
2A	Device not seen before trying to reconnect.
2B	Bad identify message received on reconnection.
2C	Out of retries for this command.
2D	Too many bytes sent in data out phase.
2E	Too many bytes received in data in phase.
2F	SCSI Parity error.
30	SCSI Map error.
31	SCSI Bit in TURBOchannel interrupt register is not set.
32	SCSI Bit in TURBOchannel interrupt register is set.
33	SCSI Bit in control interrupt register is not set.
34	SCSI Bit in control interrupt register is set.
35	SCSI Bit in control interrupt register will not clear.
36	Control Interrupt register contents different from expected.
37	Control Status register contents different from expected.
50	Wrong device type. Device is not of type specified.
51	Not enough data returned in mode sense command.
52	Byte count specified for read or write is too small.
53	Boot block checksum error.
54	Boot block flags is not zero.
55	Boot block count is zero.
56	Device is too small for specified read or write.
57	Device block size is not valid.
58	Prom$ routine error.
59	Error parsing boot string.
90	SCSI Bus specified is not valid.
91	Utility specified is not valid.
92	Device number specified is not valid.
93	LUN specified is not valid.
94	Wrong number of parameters for utility .
95	Device number specified is the same as the host.
96	Wrong mode of operation.
97	Not enough data returned from device.
98	Device is not a disk.
99	Device is not a tape.
9A	Device is not removable.
9B	Device is removable.
9C	Media is write protected.
9D	Device is not ready.
9E	Data read is incorrect.
9F	LUN is illegal.
A0	Problem building format page.
A1	Problem building flexible page.

Information	Description
A2	Disk capacity is too small.
A3	Console function error.
A4	Illegal floppy drive.
A5	Illegal floppy media.

14.17 NI Diagnostic Status/Error Messages

14.17.1 Status Messages

The following are the NI diagnostic status messages:

```
T-STS-NI - Net Addr ROM test
T-STS-NI - LANCE Reg test
T-STS-NI - Init test
T-STS-NI - Int Lpbk and DMA test
T-STS-NI - Int test
T-STS-NI - CRC test
T-STS-NI - Rx Miss and Buff Err test
T-STS-NI - Collision test
T-STS-NI - Addr Filter test
T-STS-NI - Ext Lpbk test
T-STS-NI - Tx Buff Err test
```

14.17.2 Error Messages

Note

The following messages may indicate a failing I/O board. Before replacing the board, first verify that the loopback connector is installed and try reseating the board.

```
? T-ERR-NI - NVR err

? T-ERR-NI - DMA Init err

? T-ERR-NI - DMA Rx err

? T-ERR-NI - DMA Tx err

? T-ERR-NI - Init test - DMA err

  T-ERR-NI - Err = (error code) CSR0 = (csr0)

  T-ERR-NI - IR = (ir) dma_addr = (dma address)

? T-ERR-NI - Init err

? T-ERR-NI - Init test - Init err

? T-ERR-NI- Int test - Init err
  T-ERR-NI - Err = (error code) CSR0 = (csr0)
             iblk_addr = (init address)
  T-ERR-NI - iblk_mode = (mode) ladrf0 = (filter0) ladrf1 = (filter1)

? T-ERR-NI - Tx err

? T-ERR-NI - Collision test - tx error

? T-ERR-NI - Tx Buff Err test - tx err
  T-ERR-NI - Err = (error code) CSR0 = (csr0) tx_addr = (tx address)
  T-ERR-NI - tx_desc1 = (tx data1) tx_desc2 = (tx data2)
```

```
? T-ERR-NI - Rx err
  T-ERR-NI - Err = (error code) CSR0 = (csr0) rx_addr = (rx address)
  T-ERR-NI - rx_desc1 = (rx data1) rx_desc2 = (rx data2)

? T-ERR-NI - Net Addr ROM test - group err
  T-ERR-NI - Err = (error code) na_base = (base addr) na_data1 = (data1)
  T-ERR-NI - na_data2 = (data2) cksum = (checksum)

? T-ERR-NI - Net Addr ROM test - test patt err
  T-ERR-NI - Err = (error code) patt1 = (pattern1) patt2 = (pattern2)

? T-ERR-NI - LANCE Reg test - data miscompare
  T-ERR-NI - Err = (error code) Addr = (address)
             Exp = (exp data)   Act = (actual  data)

? T-ERR-NI - Int Lpbk and DMA test - Pkt err

? T-ERR-NI - Int test - Pkt err

? T-ERR-NI - CRC test - Pkt err

? T-ERR-NI - Addr Filter test - Pkt err

? T-ERR-NI - Ext Lpbk test - Pkt err
  T-ERR-NI - Err = (error code) CSR0 = (csr0)
  T-ERR-NI - pkt_len = (packet length) pkt_pattern = (packet pattern)
  pkt_crc = (packet crc)

? T-ERR-NI - Int test - int err
  T-ERR-NI - Err = (error code) IR = (ir)
  T-ERR-NI - SIR = (sir) SIM = (sim)

? T-ERR-NI - Ext Lpbk test - Pkt err
  T-ERR-NI - Err = (error code)
```

Message	Meaning
error code	Error code from NI error codes section.
csr0	Contents of LANCE CSR0.
ir	TURBOchannel interrupt register contents at error.
dma address	Physical DMA address.
tx address	Physical DMA address of the current transmit descriptor.
tx data1	First four bytes of the transmit descriptor.
tx data2	Second four bytes of the transmit descriptor.
rx address	Physical DMA address of the current receive descriptor.
rx data1	First four bytes of the receive descriptor.
rx data2	Second four bytes of the receive descriptor.
mode	Initialization block mode.
ladrf0	Upper longword of the logical address filter.
ladrf1	Lower longword of the logical address filter.
ir	TURBOchannel interrupt register contents at time of error.
init address	Physical DMA address of the initialization block.
base addr	Base address of the network address ROM.
data1	First four bytes of the network address ROM.
data2	Next two bytes or network address and two byte check.

Message	Meaning
checksum	Calculated checksum.
pattern1	First four bytes of test patterns.
pattern2	Last four bytes of test patterns.
address	Sparse address of failing location.
exp data	Expected data.
actual data	Actual data.
packet length	Packet length in bytes.
packet pattern	Packet pattern or packet index.
packet crc	Packet CRC.
ir	TURBOchannel interrupt register contents at error.
sir	COREIO ASIC system interrupt register at error.
sim	COREIO ASIC system interrupt mask register at error.

14.18 MEMORY Diagnostic Status/Error Messages

14.18.1 Status Messages

The following are the memory diagnostic status messages.

```
T-STS-MEM -  Cell Test (address) <-> (address)
T-STS-MEM -  Wr (pattern) Addr (address)
T-STS-MEM -  FWD Rd (pattern) Wr (pattern) Addr (address)
T-STS-MEM -  REV  Rd (pattern) Wr (pattern) Addr (address)
T-STS-MEM -  Addr Test (address) -> (address)
T-STS-MEM -  Wr Data = Addr (address)
T-STS-MEM -  Rd Data = Addr (address)
T-STS-MEM -  LLSC Test Addr (address)
T-STS-MEM -  Clr Mem (address) -> (address)
T-STS-MEM -  Wr 00000000 Addr (address)
T-STS-MEM -  Errors (nmbr)
```

14.18.2 Error Messages

The following are the memory diagnostic error messages.

Note

The following messages may indicate a failed memory motherboard or memory SIMMs. Before replacing, try reseating the board and SIMMs.

```
? T-ERR-MEM - Addr = (address) Exp = (data exp)
               Rec = (data rec) retries = (dec)
```

```
? T-ERR-MEM - Bad page = (hex)  page count = (hex)  test count = (hex)
```

Note

The following messages may indicate a failed system board. Before replacing, try reseating the board.

```
? T-ERR-MEM - ldl_l/stl_c atomic sequence
```

```
? T-ERR-MEM - ldl_l/stl_c intervening IO transaction
```

```
? T-ERR-MEM - ldl_l bcache hit
```

```
? T-ERR-MEM - stl_c bcache hit
```

```
? T-ERR-MEM - ldl_l bcache miss no victim
```

```
? T-ERR-MEM - ldl_l bcache miss with victim
```

```
? T-ERR-MEM - stl_c bcache miss with victim
```

```
? T-ERR-MEM - stl_c bcache miss no victim
```

Message	Meaning
address	8-Character hex representation of the address.
data exp	8-Character hex representation of the data expected.
data rec	8-Character hex representation of the data received.
pattern	8-Character hex representation of the test pattern data.
dec	Decimal number.
hex	Hexadecimal number.

14.19 MIPS Emulator Status Messages

14.19.1 MIPS Status Messages

The following are MIPS emulator status messages.

Message	Meaning
ERR-MIPS - DID NOT FIND ROM IN SLOT <N>	No ROM was found at TURBOchannel slot N.
ERR-MIPS - UNRECOGNIZED COMMAND	An unrecognized command was passed to the MIPS emulator.
ERR-MIPS - REX COMMAND NOT SUPPORTED	The REX command passed to the emulator is not supported at this time.
ERR-MIPS - COULD NOT LOAD ROM OBJECT <object_name>	The object called <object_name> was not found in the option ROM.
ERR-MIPS - ROM OBJECT REPORTED A SEVERE ERROR	A TURBOchannel ROM has returned a severe error code to the emulator.

15

SCSI ID Settings for Optional Drives

15.1 Setting a Unique SCSI Address

15.1.1 Overview

Each internal drive has a SCSI address that must be unique. If more than one drive is set to the same SCSI address, the system cannot communicate with the drives.

When your drive arrives from the factory, all SCSI jumpers may be attached so that they are not lost during shipment. If this is the case, the address is set to 7 and must be changed.

TURBOchannel modules and memory modules do not have SCSI addresses.

This chapter contains an illustration for each of the drives supported on the DEC 3000 Models 400S/600S AXP and the DEC 3000 Model 900S AXP systems.

15.1.2 Selecting SCSI Address

There are six possible SCSI ID settings (SCSI ID setting 7 is reserved for the controller). Table 15–1 contains the settings that Digital recommends.

Table 15–1 SCSI ID Settings

Drive Type	SCSI ID Setting
Fixed disk drive	0, 1, 2, 3
Compact disc drive	4
Tape or diskette drive	5
Tape or diskette drive	6

15.1.3 Changing the Setting

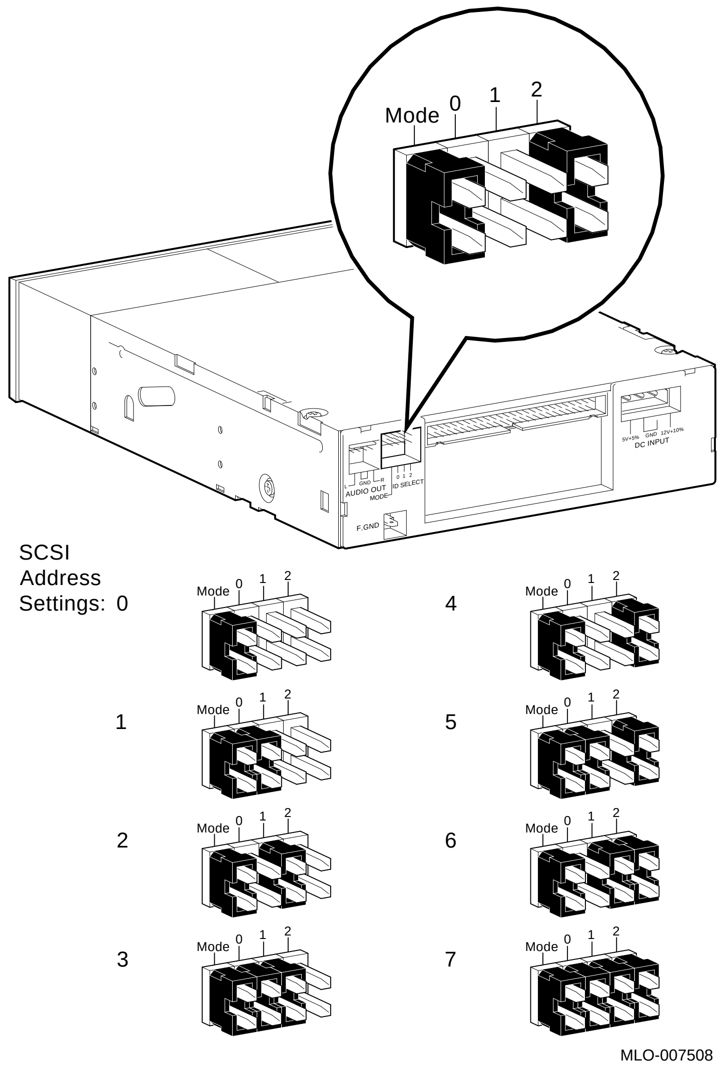
Follow these steps to change a SCSI ID setting:

Jumpers: Jumpers are removable electrical connectors. Carefully remove or replace jumpers using tweezers or another small tool. Save any SCSI jumpers you remove; you may need them later.

Switches: Carefully set the switches using a small pointed instrument, such as the tip of a ball-point pen. Do not use a pencil to set the SCSI switches; graphite particles can damage switches.

Figure 15–1 shows the RRD42 SCSI ID settings.

Figure 15–1 RRD42 Compact Disc Drive SCSI ID Settings

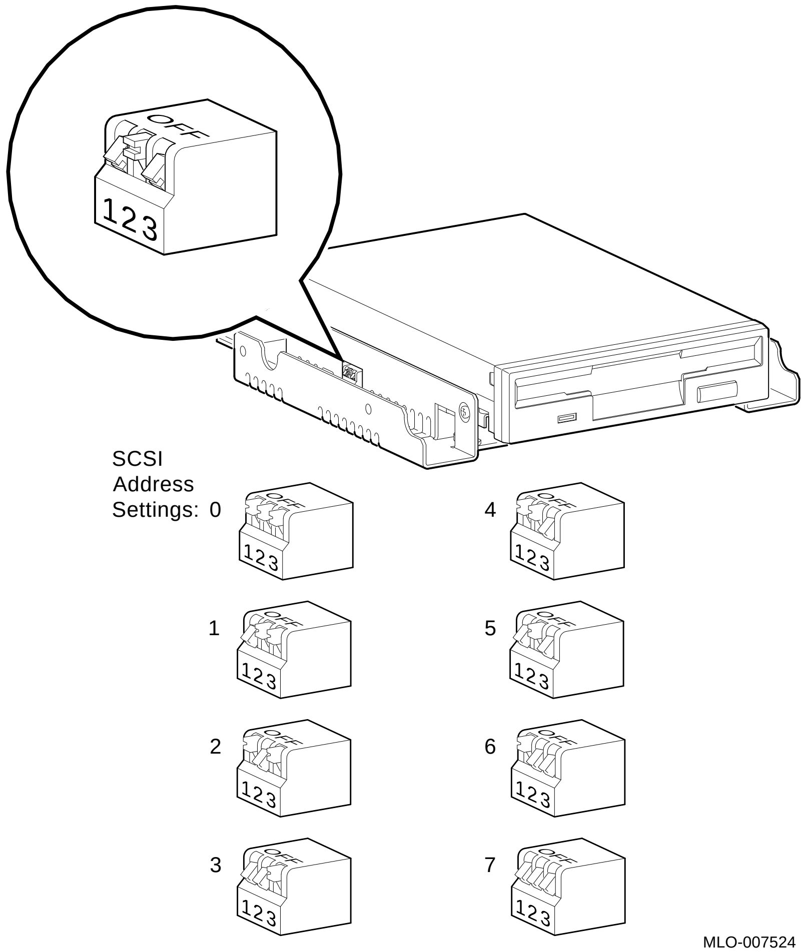


Mode Jumper

The mode jumper allows the drive to work with your operating system. The jumper must be in place for both the OpenVMS AXP and DEC OSF/1 AXP operating systems.

Figure 15–2 shows the RX26 SCSI ID settings.

Figure 15–2 RX26 Diskette Drive SCSI ID Settings



15.1.4 Setting the Unit Select Switch

Verify that the unit select switch is set to 2, as shown in Figure 15–3.

Figure 15–3 RX26 Unit Select Switch

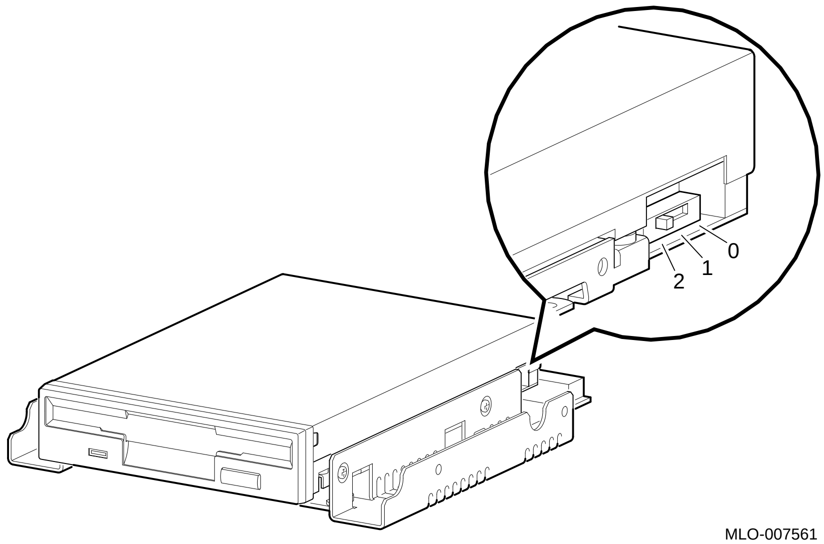
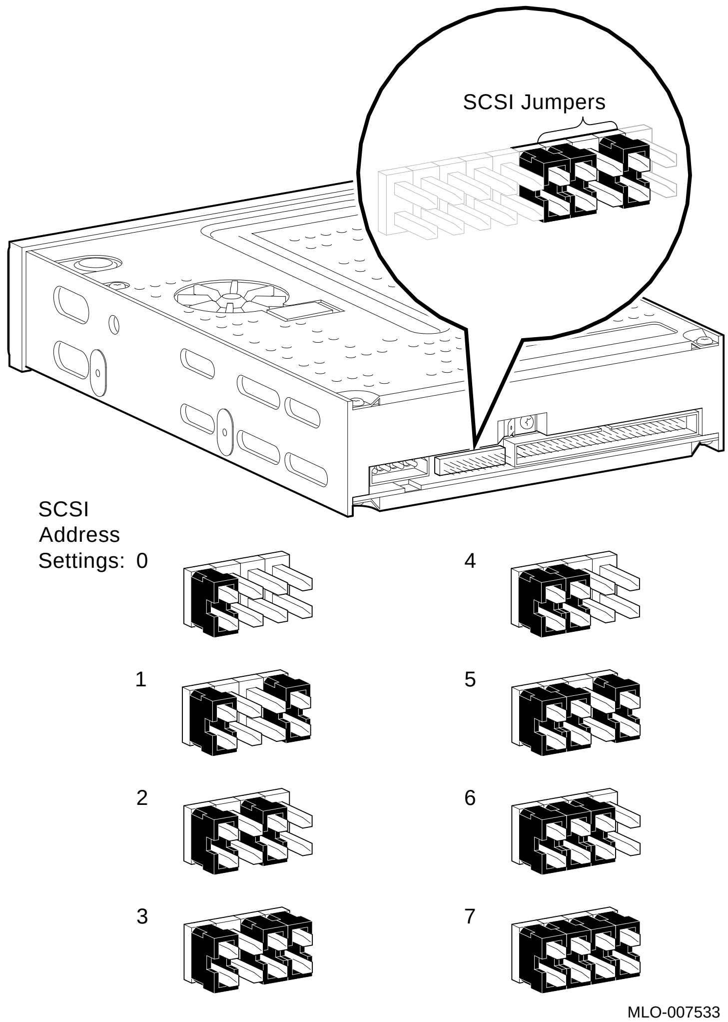


Figure 15–4 shows the TZK10/TZK11 SCSI ID settings.

Figure 15–4 TZK10/TZK11 Tape Drive SCSI ID Settings



The DADS Jumper

Before using the TZK10/11 drive, the DADS jumper is set for the desired operating system. The DADS jumper is the fifth jumper from the right side, and must be in place for both the OpenVMS AXP and DEC OSF/1 AXP operating systems.

Figure 15–5 shows the TZ30 SCSI ID settings.

Figure 15–5 TZ30 SCSI Switches

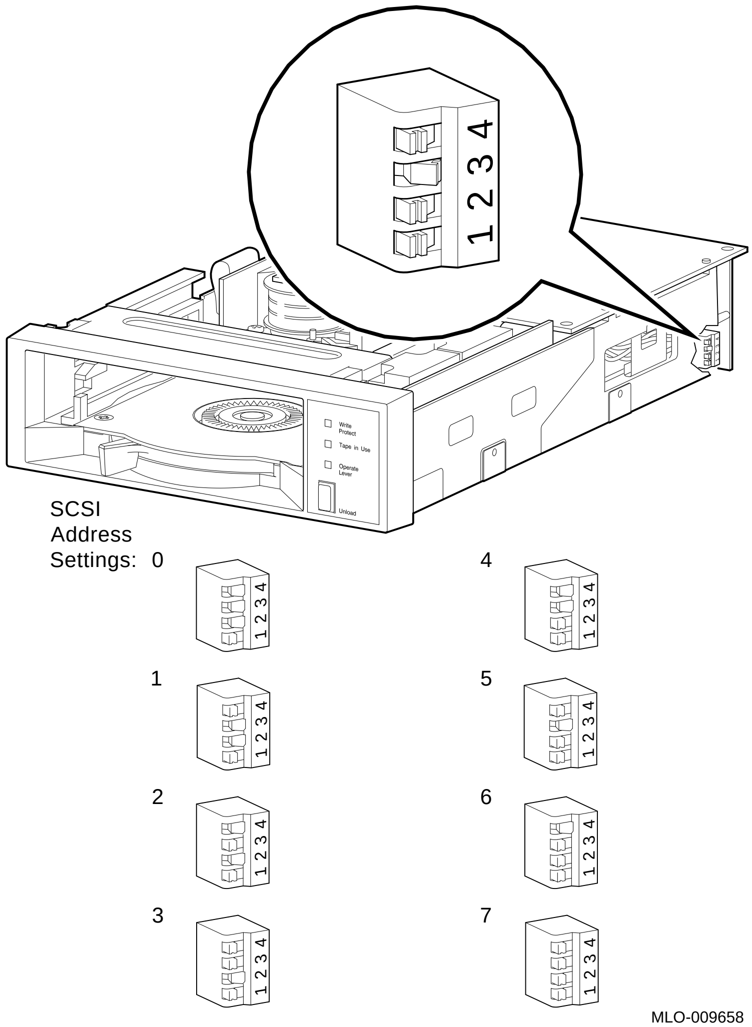
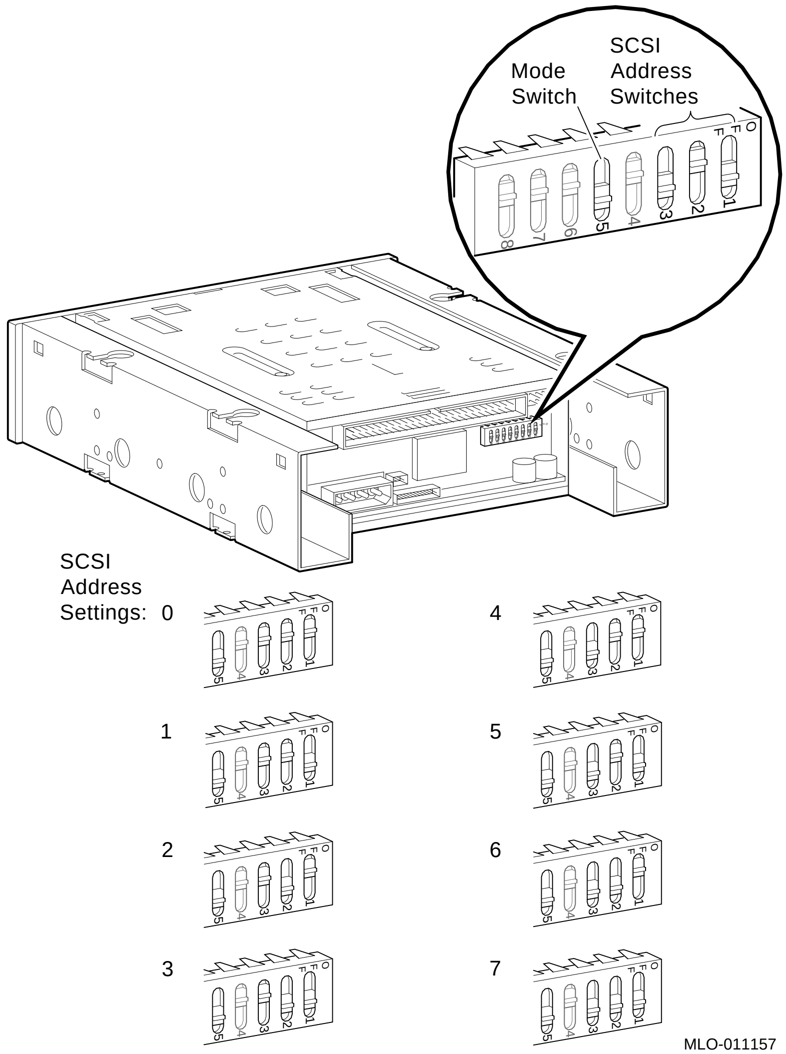


Figure 15–6 shows the TLZ06 SCSI ID settings.

Figure 15–6 TLZ06 Tape Drive SCSI ID Settings



Mode Switch

Switch 5 (Mode) allows the drive to work with your operating system, and must be set in the down position for both the OpenVMS AXP and DEC OSF/1 AXP operating systems.

Figure 15–7 shows the RZ24L SCSI ID settings.

Figure 15–7 RZ24L Fixed Disk Drive SCSI ID Settings

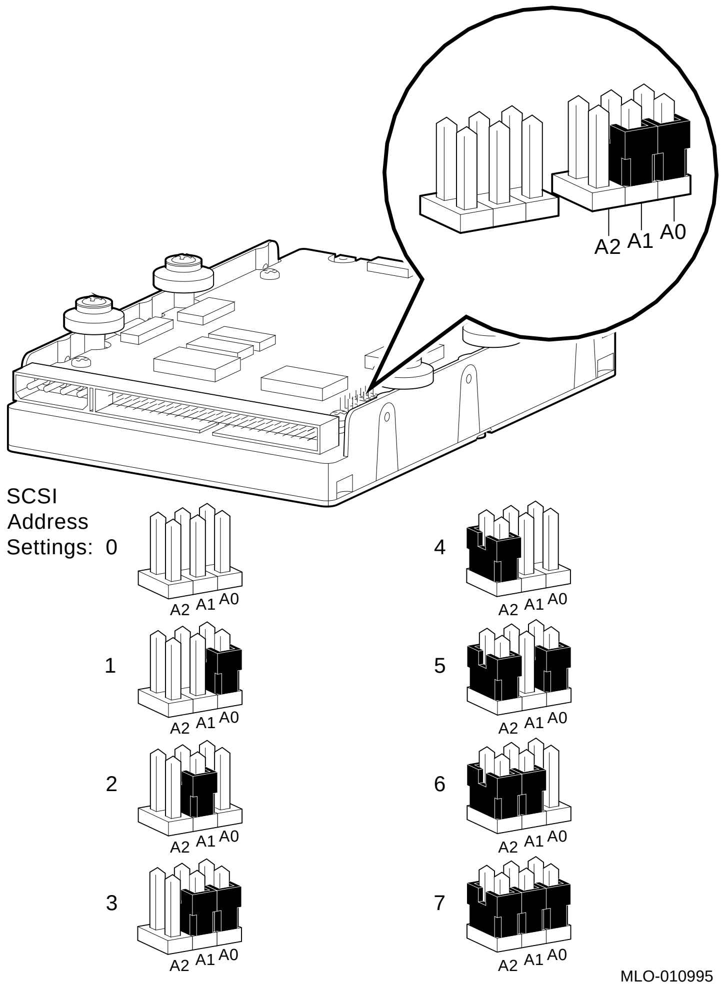
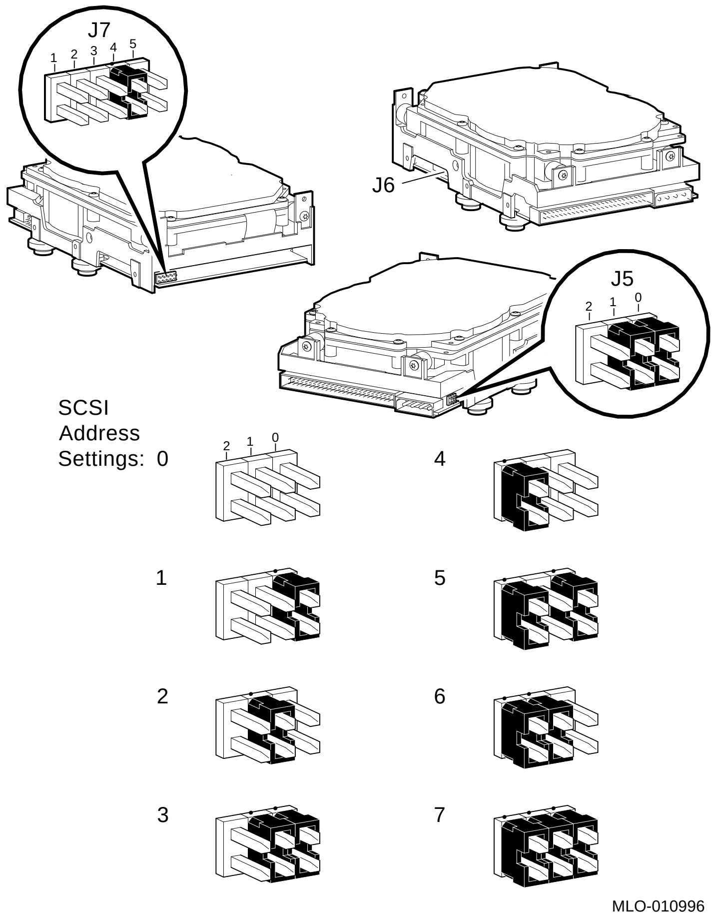


Figure 15–8 shows the RZ25 SCSI ID settings.

Figure 15–8 RZ25 Fixed Disk Drive SCSI ID Settings



15.1.5 Remote SCSI Address Jumpers

The SCSI address for the RZ25 drive is designed to be set either manually or automatically. The automatic setting is not applicable to the systems, therefore, you need to make sure that the first three jumpers on the left of this secondary port are removed, as shown in Figure 15–9. Be careful to remove *only* the SCSI address jumpers; do not remove any others.

Figure 15–9 RZ25 Secondary SCSI Address Port

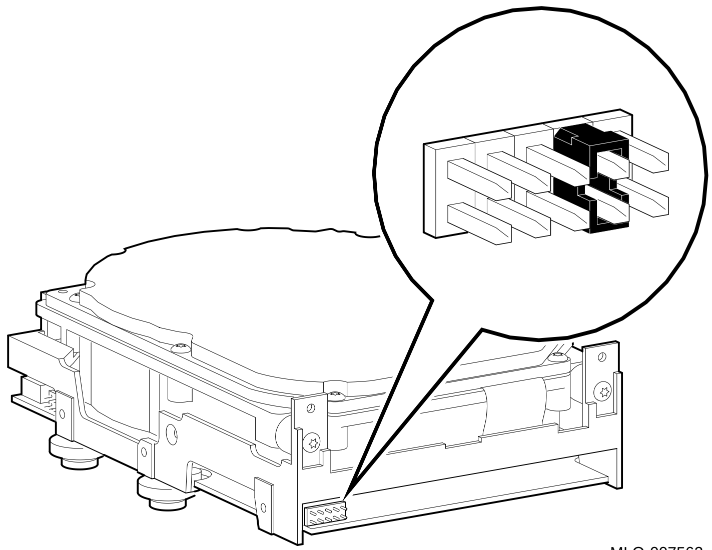


Figure 15–10 shows the RZ25L SCSI ID settings.

Figure 15–10 RZ25L Fixed Disk Drive SCSI ID Settings

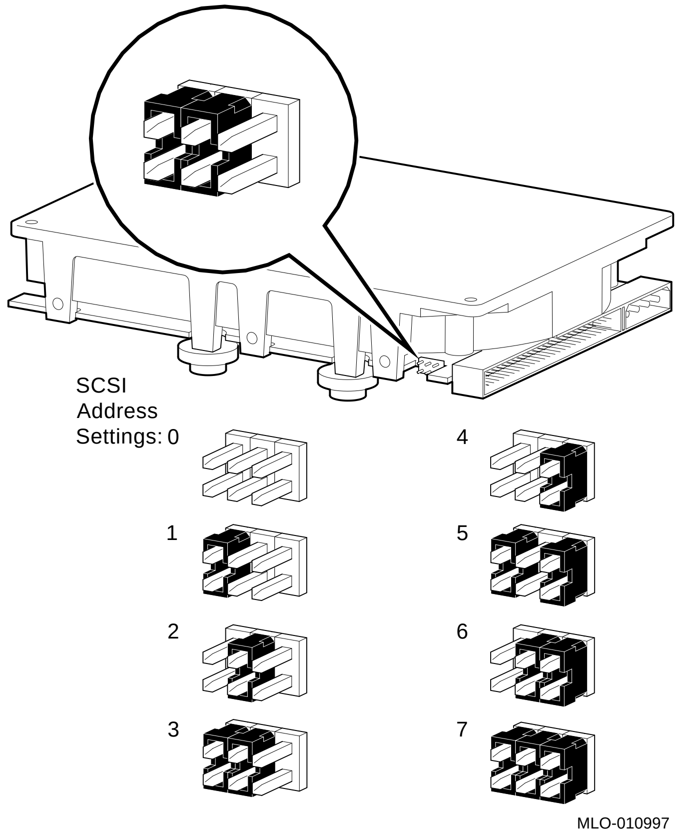


Figure 15–11 shows the RZ26 SCSI ID settings.

Figure 15–11 RZ26 Fixed Disk Drive SCSI ID Settings

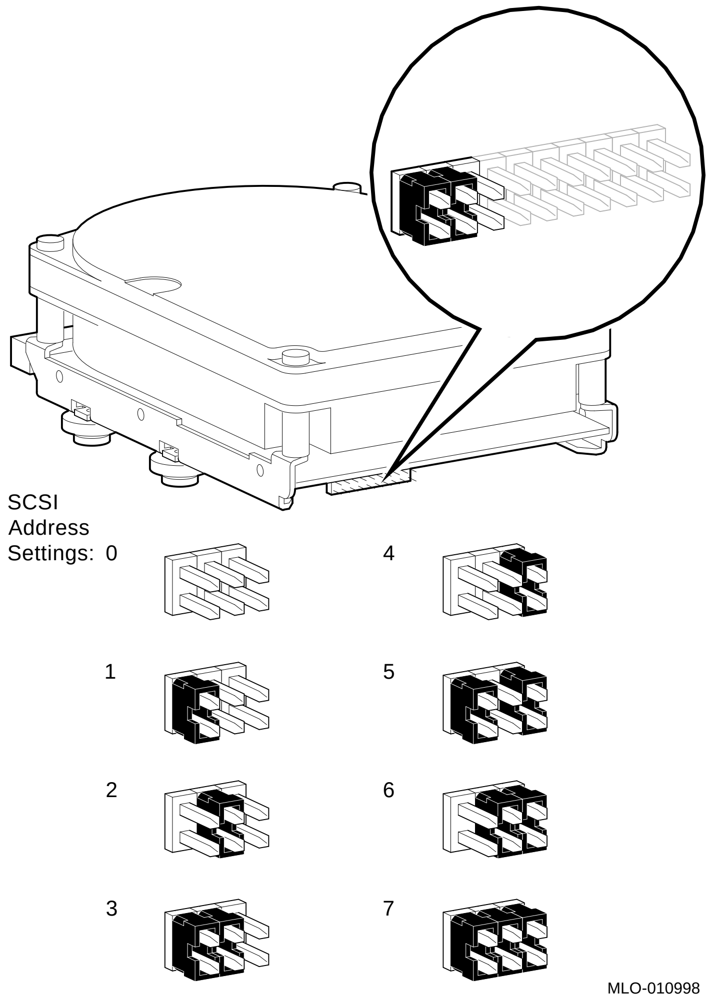


Figure 15–12 shows the RZ26L SCSI ID settings.

Figure 15–12 RZ26L Fixed Disk Drive SCSI ID Settings

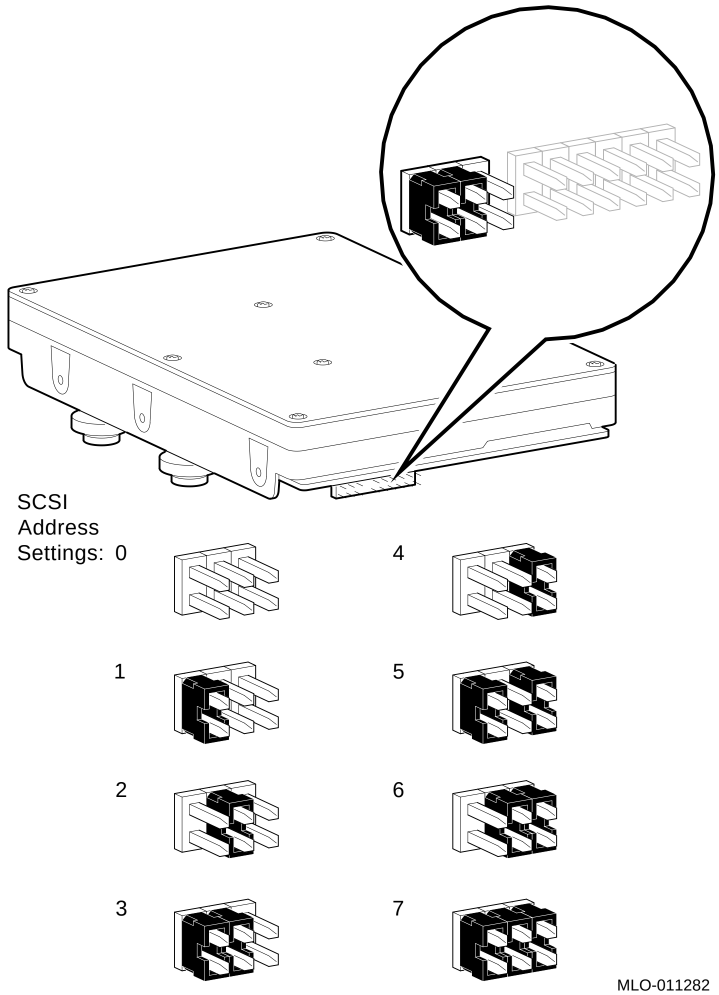
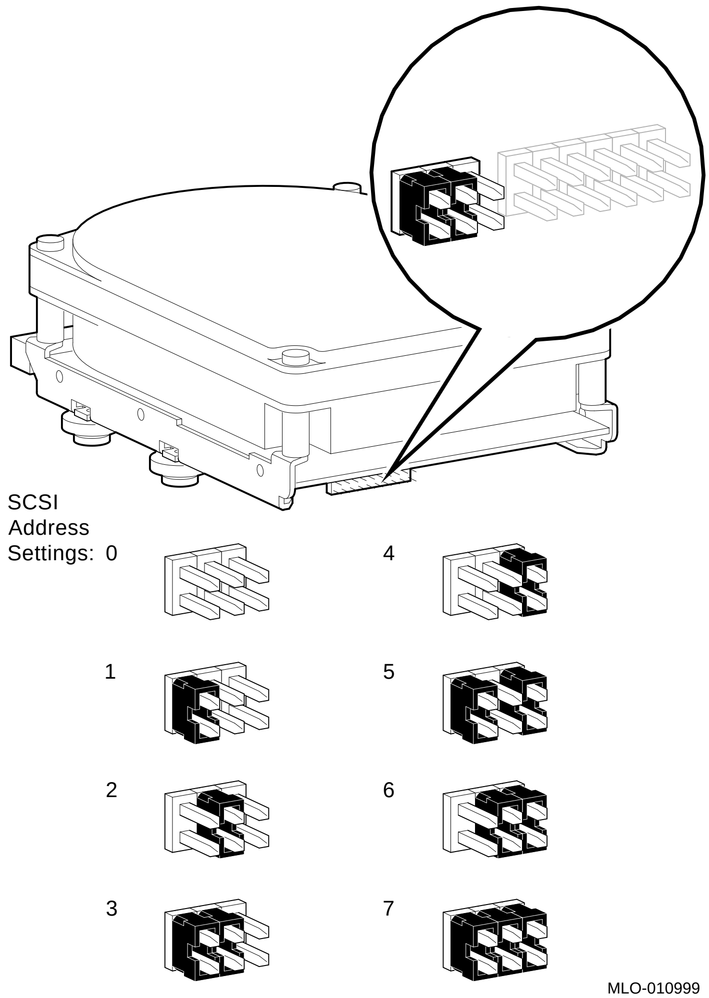


Figure 15–13 shows the RZ28 SCSI ID settings.

Figure 15–13 RZ28 Fixed Disk Drive SCSI ID Settings



A

System Hardware Specifications

A.1 Appendix Overview

A.1.1 Introduction

This appendix lists the hardware specifications for the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems.

A.1.2 In This Appendix

This appendix covers the following topics:

- System Unit Dimensions, Table A–1
- System Electrical Specifications, Table A–2
- General System Specifications, Table A–3
- Environmental Limitations, Table A–4

A.2 System Specifications

A.2.1 System Unit Dimensions

Table A–1 lists the dimensions of the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems.

Table A–1 System Unit Dimensions

Weight	Height	Width	Depth
54.5 kg	35.6 cm	48.3 cm	76.2 cm
(120 lb)	(14.0 in)	(19.0 in)	(30.0 in)

A.2.2 System Electrical Specifications

Table A–2 lists the electrical specifications for the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems.

Table A–2 System Electrical Specifications

Feature	Description
Input voltage	Automatically adjusting ac input from 100–120 Vac to 220–240 Vac
Amperage	5/2.5 A
Frequency range	50 to 60 Hz
Power	400 ≈ 600 watts input maximum, system only, power factor 0.99 maximum

A.2.3 General System Specifications

Table A–3 lists specifications of the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems components.

Table A–3 General System Specifications

Feature	Description
Processor	DECchip 21064 CMOS-4 KN17 Alpha microprocessor, with 8 KB data cache, 8 KB instruction cache and floating-point unit, running at 133 MHz (400S), 160 MHz (600S), or 275 MHz (900S)
Secondary cache	2 MB
SIMM memory	32 MB minimum, 512 MB maximum (400S/600S), 1 GB maximum (900S)
ROM memory	512 KB
Optional fixed disk	Two 3½-inch fixed disks
Optional RX26 diskette drive	2.88-MB, 3½-inch, half-height diskette drive
Optional RRD42 compact disc	600-MB, 5¼-inch, half-height compact disc drive
Optional TLZ06 tape	2-to-4 GB, 5¼-inch, half-height tape drive
Optional TZK10	525-MB, 5¼-inch, half-height, quarter-inch cartridge (QIC) tape drive
Optional expansion box	BA350 expansion box
Interfaces	Two single-channel SCSI-2 compliant controllers (one internal and one external) that support both synchronous and asynchronous devices, one 10BASE-T Ethernet port, one AUI Ethernet port, one ISDN port, one synchronous/asynchronous communications port, one printer port, one MMJ alternate console port, four audio ports

A.2.4 Environmental Limitations

Table A–4 provides information about the environmental conditions in which the DEC 3000 Models 400S/600S/900S AXP front-to-rear cooled systems can operate.

Table A–4 System Environmental Specifications

Condition	Description
Nonoperating Conditions, Packaged	
Temperature range	–40°C to 66°C (–40°F to 151°F)
Relative humidity	10% to 95% (noncondensing)
Altitude	0 to 12,192 m (0 to 40,000 ft)
Maximum wet bulb temperature	46°C (115°F)
Minimum dew point	N/A
Temperature rate of change	20°C per hour (36°F per hour)
Storage Conditions, Unpackaged	
Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 95% (noncondensing)
Altitude	0 to 3600 m (0 to 12,000 ft)
Maximum wet bulb temperature	32°C (90°F)
Minimum dew point	2°C (36° F)
Temperature rate of change	20°C per hour (36°F per hour)
Operating Conditions	
Temperature range	10°C to 50°C (50°F to 122°F)
Temperature change rate	11°C per hour (20°F per hour) maximum
Relative humidity	10% to 90% (noncondensing, no diskette)
Maximum altitude	3048 m (10,000 ft)
Maximum wet bulb temperature	28°C (82°F)
Minimum dew point	2°C (36°F)

B

Option Hardware Specifications

This appendix provides the option hardware specifications for:

- RRD42 Compact Disc Drive
- RX26 Diskette Drive
- TZK10 Tape Drive
- TZK11 Tape Drive
- TLZ06 Tape Drive
- TZ30 Drive
- RZ24L Fixed Disk Drive
- RZ25 Fixed Disk Drive
- RZ25L Fixed Disk Drive
- RZ26 Fixed Disk Drive
- RZ26L Fixed Disk Drive
- RZ28 Fixed Disk Drive

B.1 RRD42 Compact Disc Drive

Table B–1 contains the RRD42 specifications.

Table B–1 RRD42 Drive Specifications

Specification	Description
Weight	1.3 kg (2.87 lb)
Height	4.17 cm (1.63 in)
Width	14.6 cm (5.75 in)
Depth	20.51 cm (8.0)
Disc capacity	600 MB (maximum)
Access time	Full stroke 650 ms (typical)
	Average (1/4 stroke) 380 ms (typical)
Data transfer rate	Sustained rate 150 KB/s
	Burst rate 1.5 MB/s
RRD42 Drive Operating Conditions	
Maximum rate of temperature change	10°C to 50°C (50°F to 122°F)
Temperature range	5°C to 50°C (41°F to 122°F)
Relative humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Altitude	2400 m (8000 ft) at 36°C (96°F)
RRD42 Drive Nonoperating Conditions	
Temperature range	–30°C to 55°C (–22°F to 131°F)
Relative humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	46°C (115°F), packaged
Minimum dew point temperature	2°C (36°F)
Altitude	13,600 m (44,600 ft) at 36°C (96°F)

B.2 RX26 Diskette Drive

Table B–2 contains the RX26 specifications.

Table B–2 RX26 Drive Specifications (Formatted)

Specification	Description
Weight	425 g (0.94 lb)
Height	25.4 mm (1.00 in)
Width	101.6 mm (4.00 in)
Depth	150.0 mm (5.91 in)
Number of cylinders	80
Number of heads	2
Number of tracks	160
Capacity	2.88 KB
Operating power	1.25 watts (read/write)
	4.60 watts (seeking)
Standby power	0.30 watts
RX26 Drive Operating Conditions	
Temperature range	5°C to 50°C (40°F to 122°F)
Temperature change rate	11°C (20°F) per hour, maximum
Relative humidity	8% to 80%, noncondensing
Maximum wet bulb temperature	25.6°C (78°F)
Altitude	–300 to 3050 m (–1000 to 10,000 ft)
RX26 Drive Nonoperating Conditions	
Temperature range	–20°C to 66°C (–4°F to 151°F)
Relative humidity	5% to 95%, noncondensing
Maximum wet bulb temperature	46°C (115°F), packaged
Altitude	–300 to 12,200 m (–1000 to 40,000 ft)

B.3 TZK10 Tape Drive

Table B–3 contains the TZK10 specifications.

Table B–3 TZK10 Drive Specifications

Specification	Description
Weight	1.1 kg (2.4 lb)
Height	4.4 cm (1.73 in)
Width	14.6 cm (5.75 in)
Depth	20.8 cm (8.2 in)
Mode of operation	Streaming
Drive interface	SCSI-2
Media	DC6320/DC6525 tape cartridge or Digital approved equivalent
Track width, write	0.1778 mm +0.0000/–0.0127 mm (0.0070 inches +0.0000 inches/–0.0005 inches)
Track width, read	0.1270 mm +0.0127/–0.0000 mm (0.0050 inches +0.0005 inches/–0.0000 inches)
Data density	16,000 bits/in
Number of tracks	26
Data transfer rate	200 KB at average streaming mode 1.5 MB at SCSI maximum
Tape speed	3.05 cm/s (120 in/s)
Track format	Multiple track serpentine recording
Power requirements	+12 V ± 5% @ 1.0 A (2.0 A surge), 150 mV ripple peak-to-peak
	+5 V ± 5% @ 1.2 A (1.8 A surge), 150 mV ripple peak-to-peak
Nominal power consumption	20 watts
Peak power consumption	33 watts

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Table B–3 (Cont.) TZK10 Drive Specifications

Specification	Description
TZK10 Drive Operating Conditions	
Operating temperature	5°C to 40°C (41°F to 104°F)
Operating humidity	20% to 80%, noncondensing
Maximum wet bulb temperature	26°C (79°F)
Minimum dew point temperature	2°C (36°F)
Altitude	0 m to 2400 m (0 ft to 13,000 ft) at 36°C (96°F)
TZK10 Drive Nonoperating Conditions	
Nonoperating temperature	–30°C to 60°C (–22°F to 140°F)
Nonoperating humidity	10% to 90%, noncondensing
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Altitude	–304 m to 12,300 m (–1000 ft to 40,000 ft) at 36°C (96°F)

B.4 TZK11 Tape Drive

Table B–4 contains the TZK11 specifications.

Table B–4 TZK11 Drive Specifications

Specification	Description
Weight	1.1 kg (2.4 lb)
Height	4.4 cm (1.73 in)
Width	14.6 cm (5.75 in)
Depth	20.8 cm (8.2 in)
Per DC9200 cartridge (950’)	2.0 GB (approximate)
Per DC9200XL cartridge (1200’)	2.5 GB (approximate)
Buffer size	256 KB with parity
Data density	40,640 bpi
Data transfer rate	300 KB/s at average streaming mode 3 MB/s Burst, Sync., and Async.
Drive interface	SCSI and SCSI-2
Media	DC9200/DC9200XL cartridge tape or Digital-approved equivalent
Mode of operation	Streaming
Nominal power consumption	20 watts
Number of tracks	42
Peak power consumption	33 watts
Power requirements	+12 V ± 5% @ 1.0 A (2.0 A surge), 150 mV ripple peak-to-peak +5 V ± 5% @ 1.2 A (1.8 A surge), 150 mV ripple peak-to-peak
Track format	Multiple track serpentine recording

(continued on next page)

Table B–4 (Cont.) TZK11 Drive Specifications

Specification	Description
Operating Conditions	
Altitude	0 m to 2400 m (0 ft to 13,000 ft) at 36°C (96°F)
Humidity	20% to 80%, maximum
Maximum wet bulb temperature	26°C (79°F)
Minimum dew point temperature	2°C (36°F)
Temperature	5°C to 40°C (41°F to 122°F)
Nonoperating Conditions	
Altitude	–304 m to 12,300 m (–1000 ft to 40,000 ft) at 36°C (96°F)
Humidity	10% to 90%, maximum
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Temperature	–30°C to 60°C (–22°F to 140°F)

B.5 TLZ06 Tape Drive

Table B–5 contains the TLZ06 specifications.

Table B–5 TLZ06 Drive Specifications

Specification	Description
Weight	2.2 kg (4.7 lb)
Height	4.1 cm (1.6 in)
Width	14.6 cm (5.75 in)
Depth	17.9 cm (7.0 in)
Frequency	50–60 Hz
Power	9 watts
Operating Conditions	
Operating temperature	10°C to 40°C (50°F to 104°F)
Operating humidity	20% to 80%, noncondensing
Maximum wet bulb temperature	26°C (79°F)
Minimum dew point temperature	2°C (36°F)
Altitude	0 m to 4.6 km (0 ft to 15,000 ft)
Nonoperating Conditions	
Nonoperating temperature	–40°C to 70°C (–40°F to 158°F)
Nonoperating humidity	5% to 95%, noncondensing
Maximum wet bulb temperature	29°C (84°F)
Minimum dew point temperature	2°C (36°F)
Altitude	0 km to 15.2 km (0 ft to 50,000 ft)

B.6 TZ30 Drive

Table B–6 contains the TZ30 specifications.

Table B–6 TZ30 Drive Specifications

Specification	Description
Weight	1.5 kg (3.13 lb)
Height	86 mm (3.38 in)
Width	150 mm (5.88 in)
Depth	223 mm (8.79 in)
Operating Conditions	
Mode of operation	Streaming
Drive interface	SCSI
Media	12.77 mm (½ in) magnetic tape
Temperature	10°C to 40°C (50°F to 104°F)
Humidity	20% to 80%, noncondensing
Altitude	0 m to 3658 m (0 ft to 12,180 ft)
Nonoperating Conditions	
Temperature	–30°C to 66°C (–22°F to 151°F)
Humidity	10% to 90%, noncondensing
Altitude	–304 m to 9,144 m (–1000 ft to 30,000 ft)

B.7 RZ24L Fixed Disk Drive

Table B–7 contains the RZ24L specifications.

Table B–7 RZ24L Drive Specifications

Specification	Description
Weight	.47 kg (1.05 lb)
Height	2.54 cm (1.00 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
Per drive	245.4 MB
Blocks per drive	479,350
Spare blocks per drive	1818
Data transfer rate to/from media	1.87–3.75 MB/s (variable)
Bus asynchronous	4.0 MB
Bus synchronous	5.0 MB
Seek time track to track	2.5 ms
Seek time average	16 ms
Seek time maximum (full stroke)	30 ms
Average latency	6.97 ms
Rotational speed	4306 rpm ± 0.5%
Start time	20 s maximum
Stop time	20 s maximum
Interleave ratio	1:1

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Table B–7 (Cont.) RZ24L Drive Specifications

Specification	Description
Operating Conditions	
Ambient temperature	10°C to 50°C (50°F to 122°F)
Relative humidity	8%–80%
Altitude	–305 m to 3050 m (–1000 ft to 10,000 ft)
Maximum wet bulb temperature	25.6°C (78°F), noncondensing
Temperature gradient	11°C/hr (20°F/hr)
Nonoperating Conditions	
Ambient temperature	–40°C to 66°C (–40°F to 151°F)
Relative humidity	8%–95% (packaged)
Altitude	–1000 ft to 10,000 ft
Maximum wet bulb temperature	46°C (115°F)
Temperature gradient	20°C (68°F/hr)

B.8 RZ25 Fixed Disk Drive

Table B–8 contains the RZ25 specifications.

Table B–8 RZ25 Drive Specifications

Specification	Description
Weight	0.8 kg (1.8 lb)
Height	4.1 cm (1.63 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
Per drive	426 MB
Per surface	47.3 MB
Bytes per track	24,576 to 37,376 (variable)
Bytes per block	512
Blocks per track	48–74

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Table B–8 (Cont.) RZ25 Drive Specifications

Specification	Description
Blocks per drive	832,527
Spare blocks per track	1
Spare blocks per drive	14,148
Spare cylinders	2
Buffer size	60 KB
Data transfer rate to/from media	2.1–3.2 MB/s (variable)
Data transfer rate to/from buffer	2.33 MB/s
Bus asynchronous	3.0 MB
Bus synchronous	4.0 MB
Seek time track to track	2.5 ms
Seek time average	14 ms
Seek time maximum (full stroke)	28 ms
Average latency	6.8 ms
Rotational speed	4412 rpm ± 0.5%
Start time	20 s maximum
Stop time	30 s maximum
Interleave ratio	1:1
Operating Conditions	
Ambient temperature	10°C to 50°C (50°F to 122°F)
Relative humidity	8%–80%
Altitude	–304.8 m to 3048 m (–1000 ft to 10,000 ft)
Maximum wet bulb temperature	25.6°C (78°F), noncondensing
Heat dissipation	12 W (seeking), 10 W (typical)
Temperature gradient	11°C/hr (20°F/hr)

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Table B–8 (Cont.) RZ25 Drive Specifications

Specification	Description
Nonoperating Conditions	
Ambient temperature	–40°C to 66°C (–40°F to 151°F)
Relative humidity	8%–95% (packaged)
Altitude	–304.8 m to 3048 m (–1000 ft to 10,000 ft)
Maximum wet bulb temperature	46°C (115°F)
Temperature gradient	20°C/hr (68°F/hr)

B.9 RZ25L Fixed Disk Drive

Table B–9 contains the RZ25L specifications.

Table B–9 RZ25L Drive Specifications

Specification	Description
Weight	0.7 kg (1.5 lb)
Height	2.5 cm (1.00 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
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
Data transfer rate to/from media	5.25 MB/s
Seek time track to track	1.5 ms
Seek time average	10.5 ms
Seek time maximum (full stroke)	23 ms
Average latency	5.4 ms
Rotational speed	5411 rpm ± 0.5%
Interleave ratio	1:1

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Table B–9 (Cont.) RZ25L Drive Specifications

Specification	Description
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
Temperature gradient	20°C/hr (36°F/hr)
Nonoperating Conditions	
Ambient temperature	–40°C to 70°C (–40°F to 158°F)
Relative humidity	5%–95% (packaged)
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/hr (45°F/hr)

B.10 RZ26 Fixed Disk Drive

Table B–10 contains the RZ26 specifications.

Table B–10 RZ26 Drive Specifications

Specification	Description
Weight	0.9 kg (1.9 lb)
Height	4.13 cm (1.63 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
Per drive	1050 MB
Per surface	75 MB
Bytes per track	29,640
Buffer size	512 KB
Data 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 latency	5.6 ms
Rotational speed	5363 rpm
Operating Conditions	
Ambient temperature	10°C to 50°C (50°F to 122°F)
Relative humidity	10%–90%
Nonoperating Conditions	
Ambient temperature	–40°C to 66°C (–40°F to 151°F)
Relative humidity	8%–95%, noncondensing

B.11 RZ26L Fixed Disk Drive

Table B–11 contains the RZ26L specifications.

Table B–11 RZ26L Drive Specifications

Specification	Description
Weight	0.49 kg (1.08 lb)
Height	2.54 cm (1.00 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
Per drive	1.05 GB (formatted)
Buffer size	512 KB
Data transfer rate to/from media	2.7–5.5 MB/s
Seek time track to track	1 ms
Seek time average	9.5 ms
Seek time maximum (full stroke)	$\leq$ 20 ms
Average latency	5.6 ms
Rotational speed	5400 rpm
Interleave ratio	1:1
Operating Conditions	
Ambient temperature	5°C to 55°C (41°F to 131°F)
Relative humidity	10%–90%, noncondensing
Maximum wet bulb	32°C (90°F)
Temperature gradient	20°C (36°F) per hour
Nonoperating Conditions	
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

B.12 RZ28 Fixed Disk Drive

Table B–12 contains the RZ28 specifications.

Table B–12 RZ28 Drive Specifications

Specification	Description
Weight	0.9 kg (1.9 lb)
Height	4.13 cm (1.63 in)
Width	10.2 cm (4.00 in)
Depth	14.6 cm (5.75 in)
Per drive	2.1 GB
Bytes per track	30,208
Bytes per surface	144,683,520
Gigabytes per drive	2104
Buffer size	1024 KB
Data transfer rate to/from media	2.7 MB/s
Interface transfer rate, synchronous	10 MB/s
Interface transfer rate, asynchronous	5 MB/s
Seek time track to track	1 ms
Seek time average	10 ms
Seek time maximum (full stroke)	20 ms
Average latency	5.6 ms
Rotational speed	5400 rpm ± 0.5%
Operating Conditions	
Ambient temperature	5°C to 55°C (41°F to 131°F)
Relative humidity	10%–90%
Nonoperating Conditions	
Ambient temperature	–40°C to 66°C (–104°F to 151°F)
Relative humidity	8%–95% (packaged)

C

System Port Pinouts

C.1 Appendix Overview

C.1.1 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 system unit ports.

C.1.2 In This Appendix

This appendix covers the following topics:

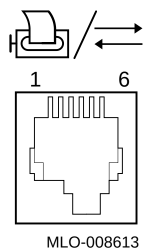
- Alternate Console/Printer Port
- Synchronous/Asynchronous Communications Port
- External SCSI Port
- Keyboard/Mouse or Tablet Port
- AUI Ethernet Port
- ISDN Port
- 10BASE-T Port
- Audio Port

C.2 Alternate Console/Printer Port

C.2.1 Alternate Console/Printer Port Diagram

Figure C–1 shows the pin layout for the alternate console/printer port.

Figure C–1 Alternate Console/Printer Port



C.2.2 Alternate Console/Printer Port Pinouts

Table C–1 describes pin usage for the alternate console/printer port.

Table C–1 Alternate Console/Printer Port Pinouts

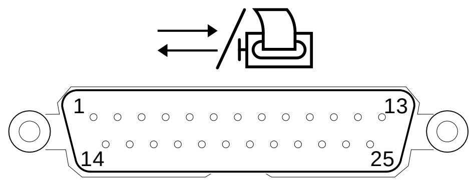
Pin	Description
1	Data terminal ready
2	Transmit data
3	Chassis ground
4	Receive return
5	Receive data
6	Data set ready

C.3 Synchronous/Asynchronous Communications Port

C.3.1 Synchronous/ Asynchronous Communication Port Diagram

Figure C–2 shows the pin layout for the synchronous /asynchronous communications port.

Figure C–2 Synchronous/Asynchronous Communications Port



C.3.2 Synchronous/ Asynchronous Communications Port Pinouts

Table C–2 describes pin usage for the synchronous/asynchronous communications port.

Table C–2 Synchronous/Asynchronous Communications Port Pinouts

Pin	Source	Signal	CCITT[1]	EIA[2]	Description
1		GND	102	AB	Signal ground
2	KN15	TX	103	BA	Modem transmitted data
3	Modem/printer	RX	104	BB	Modem received data
4	KN15	RTS	105	CA	Request to send
5	Modem/printer	CTS	106	CB	Clear to send
6	Modem/printer	DSR	107	CC	Data set ready
7		GND	102	AB	Signal ground
8	Modem/printer	CD	109	CF	Carrier detector
9					Not used
10					Not used
11					Not used
12					Not used
13					Not used
14					Not used
15					Not used
16					Not used

[1]International Telegraph and Telephone Consultative Commiittee (CCITT), an international consultative committee that sets international communications standards.

[2]Electronic Industries Association.

(continued on next page)

Table C–2 (Cont.) Synchronous/Asynchronous Communications Port Pinouts

Pin	Source	Signal	CCITT[1]	EIA[2]	Description
17					Not used
18					Not used
19					Not used
20	KN15	DTR	108.2	CD	Data terminal ready
21					Not used
22	Modem/printer	RI	125	CE	Ring indicator
23					Not used
24					Not used
25					Not used

[1]International Telegraph and Telephone Consultative Commiittee (CCITT), an international consultative committee that sets international communications standards.

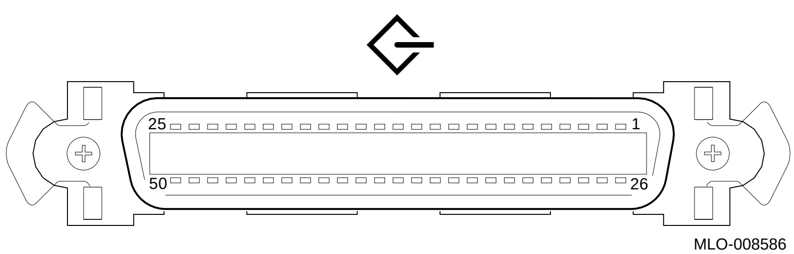
[2]Electronic Industries Association.

C.4 External SCSI Port

C.4.1 External SCSI Port Diagram

Figure C–3 shows the pin layout for the external SCSI port.

Figure C–3 External SCSI Port



C.4.2 External SCSI Port Pinouts

Table C–3 describes pin usage for the external SCSI port.

Table C–3 External SCSI Port Pinouts

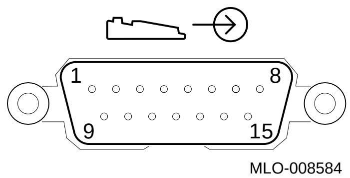
Pin	Description	Pin	Description
1	Chassis ground	26	SCSI bus data [0]
2	Chassis ground	27	SCSI bus data [1]
3	Chassis ground	28	SCSI bus data [2]
4	Chassis ground	29	SCSI bus data [3]
5	Chassis ground	30	SCSI bus data [4]
6	Chassis ground	31	SCSI bus data [5]
7	Chassis ground	32	SCSI bus data [6]
8	Chassis 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	Not used	37	Not used
13	Not used	38	Terminal power
14	Not used	39	Not used
15	Chassis ground	40	Chassis ground
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 I/O

C.5 Keyboard/Mouse or Tablet Port

C.5.1 Keyboard/Mouse or Tablet Port Diagram

Figure C–4 shows the pin layout for the keyboard/mouse port.

Figure C–4 Keyboard/Mouse or Tablet Port



C.5.2 Keyboard/Mouse or Tablet Port Pinouts

Table C–4 describes pin usage for the keyboard/mouse port.

Table C–4 Keyboard/Mouse or Tablet Port Pinouts

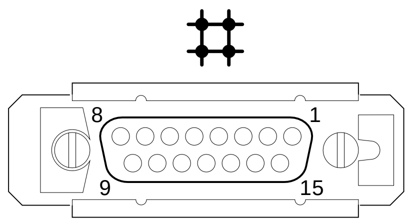
Pin	Source	Signal	Description
1		GND	Chassis ground
2		KEY.TX	Keyboard transmitted data
3	Keyboard	KEY.RX	Keyboard received data
4		+12V	Keyboard/tablet power
5		GND	Chassis ground
6	Mouse/tablet	MSE.RX	Mouse received data
7		MSE.TX	Mouse transmitted data
8		GND	Chassis ground
9		GND	Chassis ground
10		NC	Not used
11		NC	Not used
12		NC	Not used
13		+5V	Mouse power
14		-12V	Mouse power
15		GND	Chassis ground

C.6 AUI Ethernet Port

C.6.1 AUI Ethernet Port Diagram

Figure C–5 shows the pin layout for the AUI Ethernet port.

Figure C–5 AUI Ethernet Port



C.6.2 AUI Ethernet Port Pinouts

Table C–5 describes pin usage for the AUI Ethernet port.

Table C–5 AUI Ethernet Port Pinouts

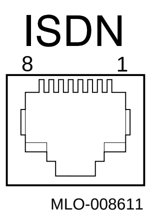
Pin	Source	Signal	Description
1			Chassis ground
2	XCVR	ACOL+	Collision presence
3	KN15	ATX+	Transmit
4		GND	Chassis ground
5	XCVR	ARX+	Receive
6	XCVR	GND	Power return
7		CTL+	Not used
8		GND	Chassis ground
9	XCVR	ACOL-	Collsion, active low
10	KN15	ATX-	Transmit, active low
11		GND	Chassis ground
12	XCVR	ARX-	Receive, active low
13	KN15	+12V	Power
14		GND	Chassis ground
15		CTL-	Control output

C.7 ISDN Port

C.7.1 ISDN Port Diagram

Figure C–6 shows the pin layout for the ISDN port.

Figure C–6 ISDN Port



C.7.2 ISDN Port Pinouts

Table C–6 describes pin usage for the ISDN port.

Table C–6 ISDN Port Pinouts

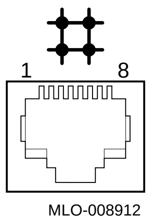
Pin	Description
1	Not used
2	Not used
3	Transmit-
4	Receive+
5	Receive-
6	Transmit+
7	Not used
8	Not used

C.8 10BASE-T Port

C.8.1 10BASE-T Port Diagram

Figure C–7 shows the pin layout for the 10BASE-T port.

Figure C–7 10BASE-T Port



C.8.2 10BASE-T Port Pinouts

Table C–7 describes pin usage for the 10BASE-T port.

Table C–7 10BASE-T Port Pinouts

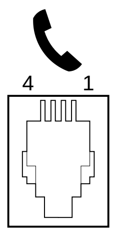
Pin	Description
1	Transmit
2	Transmit, active low
3	Receive
4	Not used
5	Not used
6	Receive, active low
7	Not used
8	Not used

C.9 Audio Port

C.9.1 Audio Port Diagram

Figure C–8 shows the pin layout for the audio port.

Figure C–8 Audio Port



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C.9.2 Audio Port Pinouts

Table C–8 describes pin usage for the audio port.

Table C–8 Audio Port Pinouts

Pin	Description
1	Audio in
2	Audio out
3	Audio out return
4	Audio in return (ground)

This adapter is pin compatible with a telephone handset.

Glossary

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.

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 wriststrap

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

applications

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

architecture

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

asynchronous communication

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

AUI (Attachment Unit Interface) Ethernet network

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

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.

baud rate

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

bit

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

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 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.

bootp

An Internet protocol used for network booting. It is based on UDP (the Internet User Datagram Protocol) which is a simple, reliable datagram protocol. The bootp protocol allows a diskless machine to find its Internet address, the address of a bootserver, and the name of a file to boot.

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 box 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.

caddy

The holder for an RRD42 compact disc.

CD

See compact disc.

CD-ROM

See compact disc read-only memory.

central processing unit (CPU)

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

channel

A path along which digital information can flow in a computer. Also, the main current path between the source and drain electrodes in a semiconductor device. *See also* bus.

checksum

A sum of digits or bits that is used to verify the integrity of a piece of data.

CI

See computer interconnect.

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. *See also* VMScluster system.

CMOS

See Complementary metal-oxide semiconductor.

coaxial cable

A passive communications media.

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 (CD-ROM)

The removable disc used in the compact disc drive. Data can be stored on this disc and retrieved from it.

complementary metal-oxide semiconductor (CMOS)

A silicon device that requires very little power and can operate at very high speeds.

component

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

computer interconnect (CI)

A high-speed, fault-tolerant, dual-path bus, which has a bandwidth of 70 megabits per second. With the CI, any combination of processor nodes and intelligent I/O subsystem nodes, up to 16 in number, can be coupled loosely in a computer-room environment.

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 that you input when the system is in console mode.

console mode

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

console password

The password used to access privileged console commands.

console program

The code that the CPU executes during console mode.

console prompt

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

console terminal

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

console terminal port

The connector to which the console terminal cable is attached.

controller

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

CPU

See central processing unit.

cursor

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

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.

DECconnect

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

DECchip 21064

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

DECnet network

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

DEC OSF/1 AXP operating system

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

DECwindows Motif

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

default

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

default recovery action

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

desktop enclosure

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

device

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

device name

The name by which a device or controller is identified in the system. The name that a particular operating system uses 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.

distributed processing

A processing configuration in which each processor has its own autonomous operating environment. In a distributed processing environment, the processors are not tightly coupled and globally controlled as they are with multiprocessing. Instead, an application is distributed over more than one system. The application must have the ability to coordinate its activity over a dispersed operating environment.

DMA

See direct memory access.

DRAM

See dynamic random-access memory.

dynamic random-access memory (DRAM)

Read/write memory that must be refreshed (read from or written to) periodically to maintain the storage of information.

ECC error

Describes a memory error. There are two kinds of ECC errors. ECC correctable errors are errors that are successfully corrected by the error detection and correction process. ECC uncorrectable errors are not successfully corrected by this process.

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 correction code (ECC)

Code that carries out automatic error correction by performing an exclusive OR operation on the transferred data and applying a correction mask.

error message number

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

Ethernet

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

Ethernet controller

An interface unit that connects a system to the Ethernet.

Ethernet hardware address

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

Ethernet ports

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

Ethernet subsystem

The Ethernet controller chip built into the system module.

expansion box

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

Factory-Installed Software (FIS)

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

fast SCSI

An optional mode of SCSI-2 that allows transmission rates of up to 10 megabytes a second.

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.

Fiber Distributed Data Interface (FDDI)

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)

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

file

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

firmware

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

FIS

See Factory Installed Software.

fixed disk

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

fixed disk drive

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

floating point

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

frame buffer

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

FRU

See Field Replaceable Unit.

gigabyte (GB)

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

GKS (Graphical Kernel System) application

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

graphics

A computer output of drawings, charts, and graphs.

half-height disk

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

halt

The action of stopping the CPU from processing. 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.

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 is equal to 9 in hexadecimal.

hit

Indicates that a valid copy of a desired memory location is currently in cache.

icon

A graphical symbol on the system unit or window that identifies drives, ports, switches, indicators, and programs running in the background. Symbols displayed on a window represent an action the computer can take. The symbol replaces a command you would otherwise type.

IEEE

Abbreviation for Institute of Electrical and Electronics Engineers.

initialization

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

input/output (I/O) device

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

Integrated Services Digital Network (ISDN)

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

interface

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

internal cache

See memory.

internal processor register (IPR)

A register internal to the CPU chip.

ISDN

See Integrated Services Digital Network.

jack

A receptacle into which you insert a plug, such as an audio jack.

kilobyte (KB)

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

LAN

See local area network.

light-emitting diode (LED)

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

local

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

local area network

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

local area VMScluster system

A type of configuration in which cluster communication is carried out over the Ethernet by software that emulates certain computer interconnect (CI) port functions.

local console mode

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

local device

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

log in

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

logic

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

logical

The design of a system rather than its implementation.

login command

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

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, or when the Ethernet and communications ports are not in use.

loopback tests

Diagnostic tests used to isolate a failure by testing segments of a particular control or data path.

magnetic tape

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

Maintenance Operations Protocol (MOP)

The transport protocol for network bootstraps and other network operations.

mass storage device

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

Mb

See megabit.

MB

See megabyte.

media

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

megabit

A unit of measure equal to one 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.

miss

Indicates that a copy of a desired memory location is not in a cache.

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.

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

A processing method that replicates the sequential computer and interconnects the collection so that each processor can execute the same or a different program at the same time.

multiprocessing system

A system that executes multiple tasks simultaneously.

multiplex

To transmit several messages or signals simultaneously on the same circuit or channel.

nanosecond

A unit of measure equal to one billionth of one second used to measure the speed of memory and logic chips.

network

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

network coordinator

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

node

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

node name

A name that identifies a unique node.

nonvolatile random-access memory

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

ns

See nanosecond.

null modem

A connection box that replaces two modems and their connecting wires. This box allows two devices that are designed to interact through modems to be locally connected.

NVRAM

See nonvolatile random-access memory.

online documentation

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

Open Software Foundation (OSF)

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

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 operating system

Digital Equipment Corporation's proprietary operating 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.

operating system mode

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

PAL

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

PALcode

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

parameter

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

parity

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

password

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

password security feature

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

pedestal

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

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.

PEX-based application

An application that runs on Software PEX (software PEX server). Software PEX allows a three-dimensional (3D) application to run without specialized 3D hardware.

PHIGS (Programmer's Hierarchical Interactive Graphics System) application

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

pipeline

a CPU design technique whereby multiple instructions are simultaneously overlapped in execution.

pointing device

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

port

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

port pinouts

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

primary cache

The cache that is the fastest and closest to the processor. The DECchip 21064 CPU contains an instruction cache and a data cache.

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.

process

A program currently using memory and running on the system.

processor module

A module that contains the CPU chip.

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.

Programmable Array Logic (PAL)

A hardware device that can be programmed by a process that blows individual fuses to create a circuit.

prompt

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

puck

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

rackmount enclosure

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

random access memory (RAM)

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

read-only memory (ROM)

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

Reduced Instruction Set Computer (RISC)

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.

remote

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

remote console port

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

removable-media drive

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

restore

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

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

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 Systems Interface.

SCSI bus

A communications pathway between the Small Computer Systems 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 Systems Interface (SCSI) with synchronous and asynchronous capabilities.

SCSI jumpers

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

SCSI switches

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

secondary cache

A random access mass storage area implemented on devices such as disks. *Compare with* main memory.

segment

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

self-test

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

serial port

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

server

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

Small Computer Systems 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.

soft error

A recoverable error.

software

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

SROM

Serial read-only memory.

standalone network

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

standalone workstation

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

standard Ethernet network

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

startup procedure

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

storage device

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

storage expansion box

See expansion box.

strain relief strap

See universal strain relief strap.

stylus

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

superpipelined

Describes a pipelined machine that has a larger number of pipe stages and more complex scheduling and control. *See also* pipeline.

superscalar

Describes a machine that issues multiple independent instructions per clock cycle.

synchronous communication

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

- Through a modem to a wide area network (WAN)
- Directly to another system through a null modem

system

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

system configuration

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

system disk

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

system unit

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

tablet

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

tape cartridge

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

tape drive

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

T-connector

A connector used to join ThinWire Ethernet cable sections.

terminal

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

thickwire Ethernet network

See AUI.

thickwire

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

ThinWire Ethernet network

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

three-dimensional graphics

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

turn off

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

twisted-pair cable

A cable made by twisting together two insulated conductors.

twisted-pair Ethernet network

See 10BASE-T Ethernet network.

TURBOchannel module

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

two-dimensional graphics

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

universal strain relief strap

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

user interface

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

video refresh rate

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

VMScluster system

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

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 AXP and DEC OSF/1 AXP workstation software.

work group

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

workstation

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

wriststrap

See antistatic wriststrap.

write-enabled

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

write-protected

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

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