DEC 3000 Model 500/500S AXP Service Information

EK–FLAMI–SV. C01

March 1993

This guide is a support and reference document for Digital service personnel who perform maintenance work on the DEC 3000 Model 500/500S AXP workstation.

The guide is also intended for customers who have a self-maintenance agreement with Digital.

This is a revised document.

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Preface

About This Guide

Purpose and Audience

This guide is a support and reference document for Digital service personnel who perform maintenance work on the DEC 3000 Model 500/500S AXP workstation. The guide is also intended for customers who have a self-maintenance agreement with Digital.

Organization

This guide includes seven chapters and six appendices:

- Chapter 1 provides an overview of the DEC 3000 Model 500/500S AXP system CPU, memory subsystem, and network interface.
- Chapter 2 provides configuration information and console security information.
- Chapter 3 describes system console commands and the use of alternate consoles.
- Chapter 4 provides information on diagnostic testing.
- Chapter 5 provides information on diagnostic utilities.
- Chapter 6 contains troubleshooting information.
- Chapter 7 describes how to remove and replace field replaceable units (FRUs).
- Appendix A describes how to upgrade firmware and create a bootable disk. The appendix also provides monitor alignment patterns.
- Appendix B describes monitor alignment diagnostics.
- Appendix C lists error codes and describes error and status information.
- Appendix D lists FRU part numbers.

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- Appendix E describes how to install the DEC 3000 Model 500/500S AXP system in the IEC RS–310 (RETMA) cabinet.
- Appendix F describes how to install the DEC 3000 Model 500/500S AXP system in the H9A00–AJ cabinet.

Conventions Used in this Guide

This guide uses the following conventions:

Convention	Meaning
Note	Provides general information on the current topic.
Caution	Provides information to prevent damage to equipment and software.
Warning	Provides information to prevent personal injury.
Key	Keys and switches that are labeled appear in a box. For example, Return indicates that you press the Return key on your terminal.
{ }	In command formats, braces contain required information. The brackets {} are not part of the syntax and should not be typed.
[ ]	In command formats, brackets contain optional information. The brackets [ ] are not part of the syntax and should not be typed.
BOLD	Bold type in examples indicates user input.
❶	Circled numbers provide a link between figures and and text.

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Related Documentation

The following documents provide additional information about the DEC 3000 Model 500/500S AXP workstation.

Document	Order Number
DEC 3000 Model 500/500S AXP Owner's Guide	EK–FLAMI–OM
DEC 3000 Model 500/500S AXP Options Installation Guide	EK–FLAMI–IG
DEC 3000 Model 500/500S AXP Quick Installation Card	EK–FLAMI–IC
DEC 3000 Model 500/500S AXP Technical Summary	EK–FLASA–TM

Chapter 1
System Overview

System Overview

System Components

The DEC 3000 Model 500/500S AXP system is a high-performance deskside workstation. The system can also be rack mounted in a standard 19-inch cabinet.

The DEC 3000 Model 500/500S AXP system includes the following components:

- System module
- I/O module
- Memory subsystem
- Power supply

The DEC 3000 Model 500/500S AXP system provides support for

- Up to four internal SCSI disk drives
- Two 5.25-inch, half-height, removable SCSI devices
- Up to seven external SCSI devices

System Module

The system module includes the following components:

- 150 MHz DECchip (CPU)
- 8K byte serial ROM
- 512K byte backup cache
- Main memory controller

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System Module (continued)

- Controller for the TURBOchannel I/O bus
- 8-plane CXT buffer logic for base graphics
- 256 Kbyte Flash ROM (system ROM)
- Three TURBOchannel option slots

I/O Module

The I/O module includes the following components:

- TOY/NVR controller chip
- Two serial line controllers
- ISDN interface with audio I/O
- Two SCSI controllers
- Ethernet controller
- 256K byte of flash ROM
- Three TURBOchannel option slots
- High-performance two-dimensional graphics subsystem

The DEC 3000 Model 500/500S AXP system provides interfaces to

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

Continued on next page

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 Kbyte pages. This translation is an option, enabled on a device-by-device basis.

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

Equipment	Function
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 10BaseT 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 controller chips. 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 powered off.

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Memory Subsystem

The memory subsystem includes the following:

- Four memory motherboards (MMB) that mount on the system module. 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 modules, two on each MMB.

  The memory subsystem can support up to 256M bytes, with a future expansion of up to 1 gigabyte of memory.

The DEC 3000 Model 500/500S AXP system contains a high-performance memory subsystem that uses ECC logic. Memory can be configured with up to 256M byte (using 1M×4 DRAMs) or up to 1 gigabyte (using 4M×4 DRAMs).

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CPU/Cache

The DEC 3000 Model 500/500S AXP system contains a single chip processor and floating point running at 6.6ns. The processor is a superscalar, superimplementation of the Alpha AXP architecture.

The DEC 3000 Model 500/500S AXP system contains the following direct-mapped caches:

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

The system uses 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 512K byte, direct-mapped, write-back cache with a block size of 32 bytes.

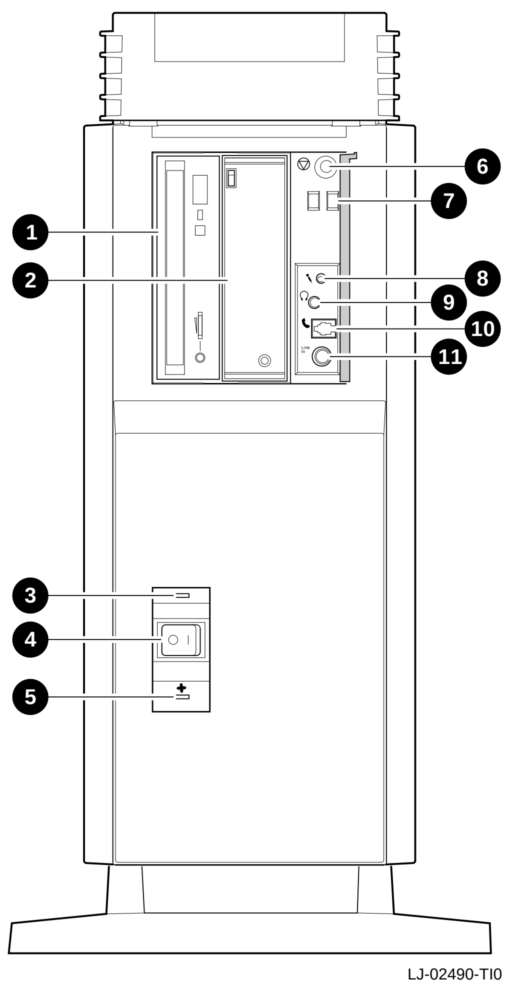
The cache is implemented on the system module using 32K byte $\times$ 8 static RAMs. Theread bandwidth between the processor and the second level cache is approximately 640 MB/s, and the write bandwidth is 420 MB/s.

Front View

Front View

Figure 1–1 shows the controls, lights, and devices on the front of the DEC 3000 Model 500/500S AXP system. Table 1–1 describes their function.

Figure 1–1 Front View



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Front View, Continued

Table 1–1 DEC 3000 Model 500/500S AXP System (Front)

This Feature...	Lets You...
❶ and ❷ Removable media device slots	Access devices that use removable storage media, such as diskettes, compact disks, cassette tapes, or cartridge tapes.
❸ DC OK light	Check that all dc voltages are present on the power supply.
❹ On/Off switch	Turn the system unit on (|) and off (0).
❺ Fan failure indicator light	Check whether a fan has failed.
❻ Halt button	Put the system in console mode.
❼ Diagnostic display	View error codes that indicate potential system problems.
❽ Microphone input jack	Connect for a microphone.
❾ Speaker output jack	Connect a speaker or headphone for audio output.
❿ Telephone jack	Connect a telephone handset.
⓫ Audio input jack	Connect an audio input line.

Rear View

Figure 1–2 shows the switches, connectors, and modules on the rear of the DEC 3000 Model 500/500S AXP system. Table 1–2 describes for their function.

Figure 1–2 Rear View

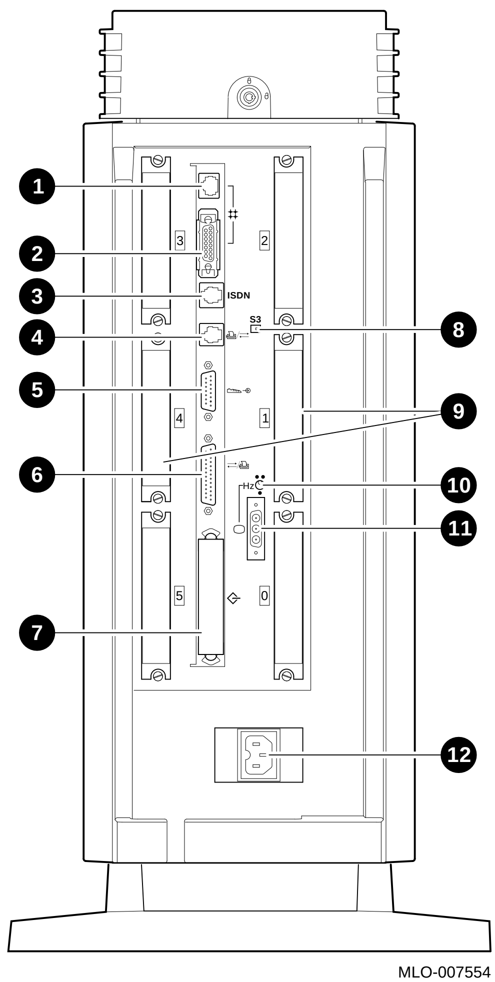

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Table 1–2 DEC 3000 Model 500/500S AXP System (Rear)

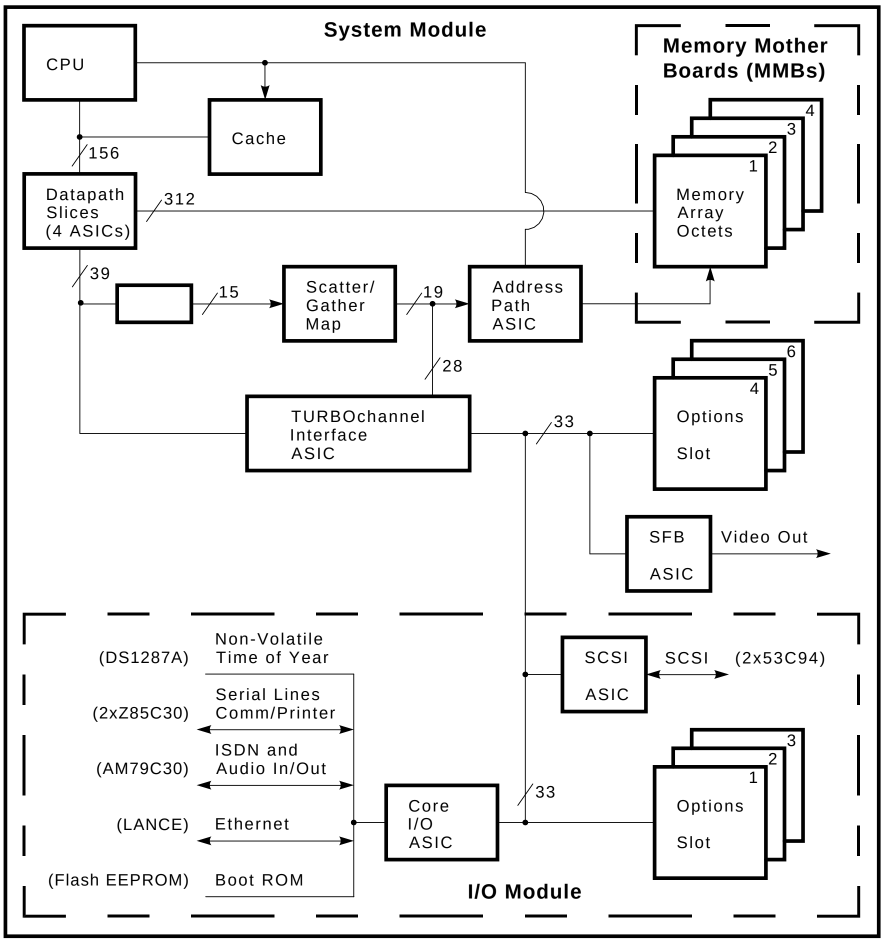
This Feature...	Lets You...
❶ 10baseT port	Connect a 10baseT (twisted-pair) Ethernet network cable.
❷ AUI Ethernet port	Connect an AUI (Thickwire) Ethernet network cable.
❸ ISDN port	Connect an ISDN network cable.
❹ Printer/alternate console port	Connect a printer or an alternate console.
❺ Keyboard/mouse port	Connect a keyboard or mouse.
❻ Synchronous/asynchronous communications port	Connect a communications device, such as a modem.
❼ External SCSI port	Connect small computer system interface (SCSI) peripheral devices.
❽ Printer/alternate console switch	Select the function of the printer/alternate console port.
❾ Six TURBOchannel slots	Install TURBOchannel option modules. There are three designated slots for the I/O module and three designated slots for the system module.
❿ Video refresh switch	Select the correct video refresh rate (66Hz or 72Hz) for the monitor.
⓫ Monitor port	Connect the monitor video cable.
⓬ System power port	Connect the system power cord. The port is keyed.

System Block Diagram

System Diagram

Figure 1–3 shows the interaction of all system components.

Figure 1–3 System Block Diagram



Chapter 2
Configuration

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- System Module Jumper Locations
- I/O Module Jumper Locations
- Console Security
- Storage Devices
  - Configuring Storage Devices
- Memory Configuration
  - Memory Configuration Rules
  - Identifying Memory Modules

General Rules

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

1. If replacing storage devices, then set storage devices to the same setting as the previously removed drive.
2. If upgrading storage devices, then enter the console command SHOW CONFIG to see all current SCSI address settings.
3. If upgrading or replacing memory, make sure all memory modules are of same value for memory bank.

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Commands

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

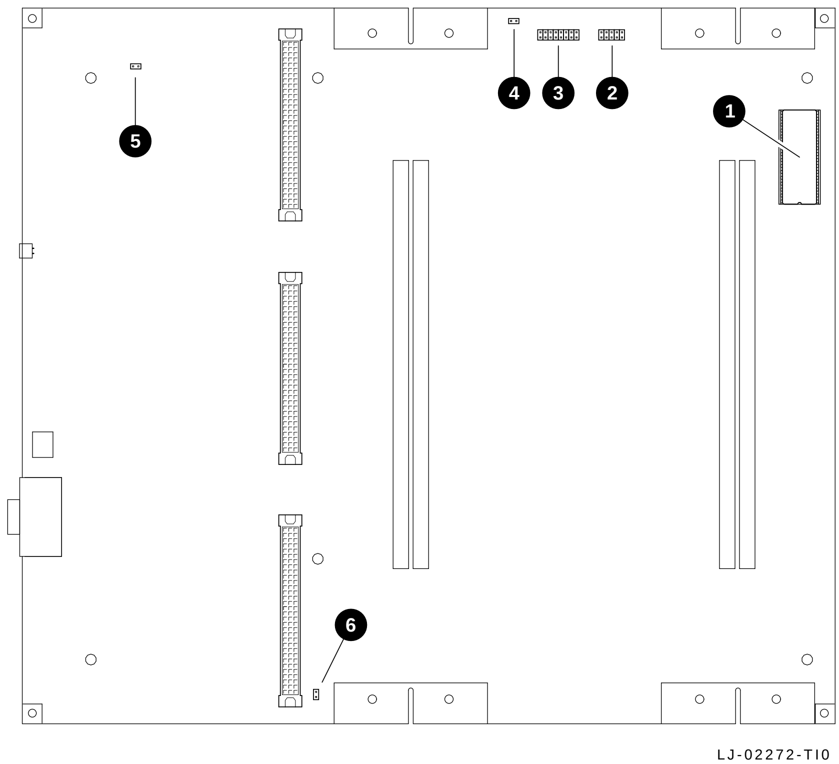
- SHOW CONFIGURATION
- SHOW MEMORY
- SHOW DEVICE

System Module Jumper Locations

System Module Jumper Locations

Figure 2–1 shows the location of jumpers and the serial ROM on the system module. Table 2–1 describes eac location.

Figure 2–1 System Module Jumper Locations



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System Module Jumper Locations, Continued

Table 2–1 System Module Jumpers

Feature	Description	Comments	Default Setting
❶	Serial ROM	–	–
❷	Not used	Reference only.	All jumpers must be removed.
❸	Serial ROM jumpers	–	Jumper location 0 only.
❹	Not used	Reference only.	All jumpers must be removed.
❺	Test pins	Used by Engineering.	–
❻	Flash enable jumper	In = enabled. Out = disabled.	Disabled.

I/O Module Jumper Locations

I/O Module Jumper Locations

Figure 2–2 shows the location of the jumpers, Enet chip, TOY /NVR chip, and flash ROM on the I/O module. Table 2–2 describes each location.

Figure 2–2 I/O Module Jumper Locations

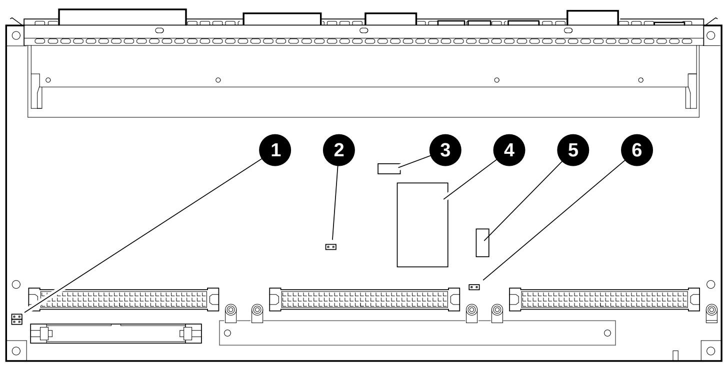

Table 2–2 I/O Module Jumpers

Feature	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.

Console Security

Securing the Console

To secure the console, perform the following steps. Use Figure 2–2 and Table 2–2 for reference.

1. Power down the system.
2. Remove the I/O module and install the secure jumper.
3. Reinstall the I/O module.
4. Power up the system and enter console mode (>>>).
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.

Example

This example shows when the password is set.

```
>>>SET PASSWORD  Return

PSWD0> enter_old_password
PSWD1> enter_new_password
PSWD2> enter_new_password

>>>SET SECURE ON  Return
```

This example shows when the password is not set.

```
>>>SET PASSWORD  Return
PSWD1> enter_new_password
PSWD2> enter_new_password
>>>
```

Continued on next page

Entering the Privileged State

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

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

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

Exiting the Privileged State

The following commands allow you to exit the privileged state:

- BOOT
- CONTINUE
- HALT

Disabling Console Security

To disable console security:

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

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Restoring the Console Password

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

1. Perform a system shutdown.
2. Power down the unit.
3. Remove the I/O module.
4. Remove the secure jumper from the I/O module.
5. Reinstall the I/O module 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 module and install the secure jumper.
10. Reinstall the I/O module.
11. Power up the unit.
12. Enter the new password.

Storage Devices

Configuring Storage Devices

When replacing failed storage devices:

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 7.
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 5.

When configuring additional storage devices:

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

   ```
   >>>SHOW DEVICE [Return]
   ```

2. Set the SCSI address. Refer to the following sections for the SCSI jumper settings for particular devices.
3. Mount the device (Chapter 7). See Figure 2–10 for internal cable routing, Figure 2–11 for the factory-default SCSI ID settings, and Figure 2–12 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 5.

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Table 2–3 lists the recommended SCSI jumper settings. See Chapter 5 for SCSI utilities.

Table 2–3 Recommended SCSI Jumper Settings

Drive	Recommended SCSI Address	0	1	2
RZ24L, RZ25, RZ26	0	Out	Out	Out
RZ24L, RZ25, RZ26	1	In	Out	Out
RZ24L, RZ25, RZ26	2	Out	In	Out
Factory-installed RZ24L, RZ25, RZ26	3	In	In	Out
RRD42	4	Out	Out	In
RX26, TZK10, TLZ06	5	In	Out	In
SCSI controller	6	Out	In	In
(High-priority drive)	7	In	In	In

Out = Removed.
In = Attached.

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RZ24L Disk Drive Jumper Settings

Table 2–4 lists the RZ24L jumper settings.

Table 2–4 RZ24L Disk Drive Jumper Settings

SCSI Address*	A0	A1	A2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6	Out	In	In
7	In	In	In

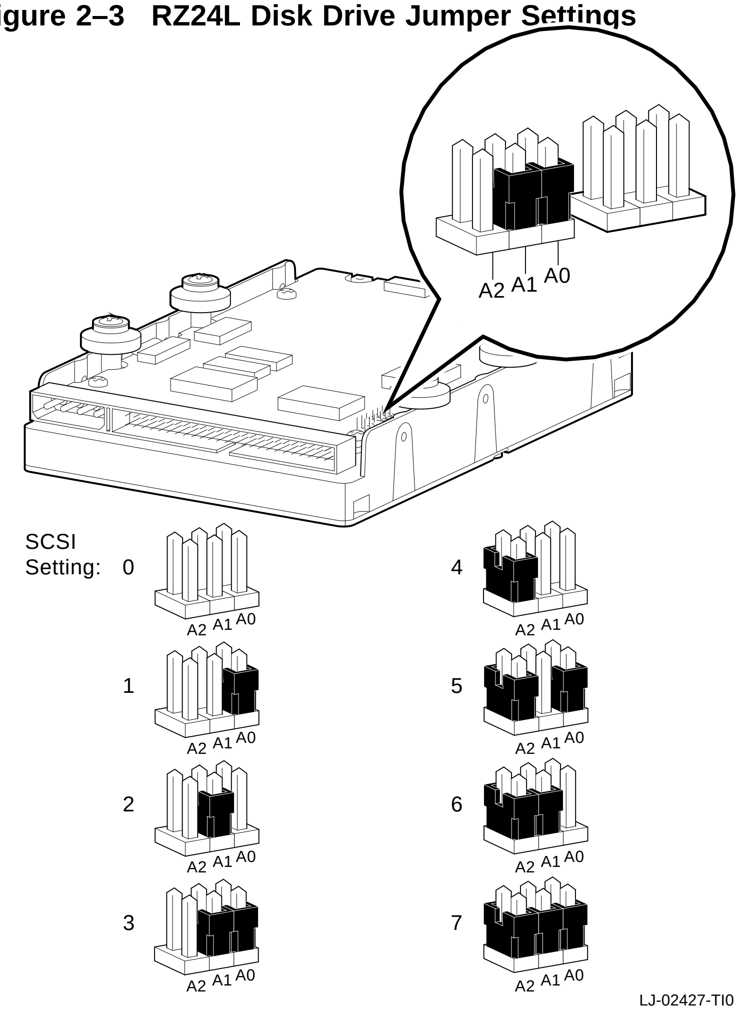
*Check for conflicts with RZ25 or RZ26 SCSI address settings.

In = Attached.
Out = Removed.

Continued on next page

Figure 2–3 shows the RZ24L disk drive jumper settings.

Figure 2–3 RZ24L Disk Drive Jumper Settings



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RZ25 Disk Drive Jumper Settings

When setting SCSI ID addresses for the RZ25 drive:

- Use location J5 only
- Remove all jumpers from location J7 *except jumper 4*

Failure to do so could cause dual SCSI address problems. See Table 2–5 for RZ25 SCSI ID settings. See Table 2–6 and Table 2–7 for pin descriptions of J6 and J7.

Table 2–5 RZ25 Disk Drive Jumper Settings (J5)

SCSI Address*	0	1	2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6	Out	In	In
7	In	In	In

*Check for conflicts with RZ24L and RZ26 SCSI address settings.

Out = Removed.
In = attached.

Continued on next page

Table 2–6 describes the J6 jumper positions.

Table 2–6 RZ25 J6 Jumper Description

Jumper Position	Description
J6–1	Factory use only.
J6–2	In = Enables motor start option. Out = Drive operation depends if jumper is installed in J6–3.
J6–3	In = Enables motor start option (if J6–2 is out). Motor start delay is 16 times the drive ID number in seconds.
J6–4	In = Entire drive is write protected.
J6–5	In = Parity checking by drive is enabled.
J6–6	Reserved for later use.
J6–7	In = Supplies drive power to SCSI bus, pin 26.
J6–8	In = Supplies power only to drive terminators.

NOTE

If J6 pins 7 are 8 are positioned horizontally (lower part), the drive takes power from the SCSI bus, pin 26. Jumpers on both pins 7 and 8 can be in at the same time.

Continued on next page

Table 2–7 describes the RZ25 J7 jumper positions.

Table 2–7 RZ25 J7 Jumper Description

Jumper Position	Description
J7–1	SCSI ID (Use J5 ID setting.)
J7–2	SCSI ID (Use J5 ID setting.)
J7–3	SCSI ID (Use J5 ID setting.)
J7–4	Jumper must be installed if no cable is connected.
J7–5	Used for a connection to a remotely located LED indicator.

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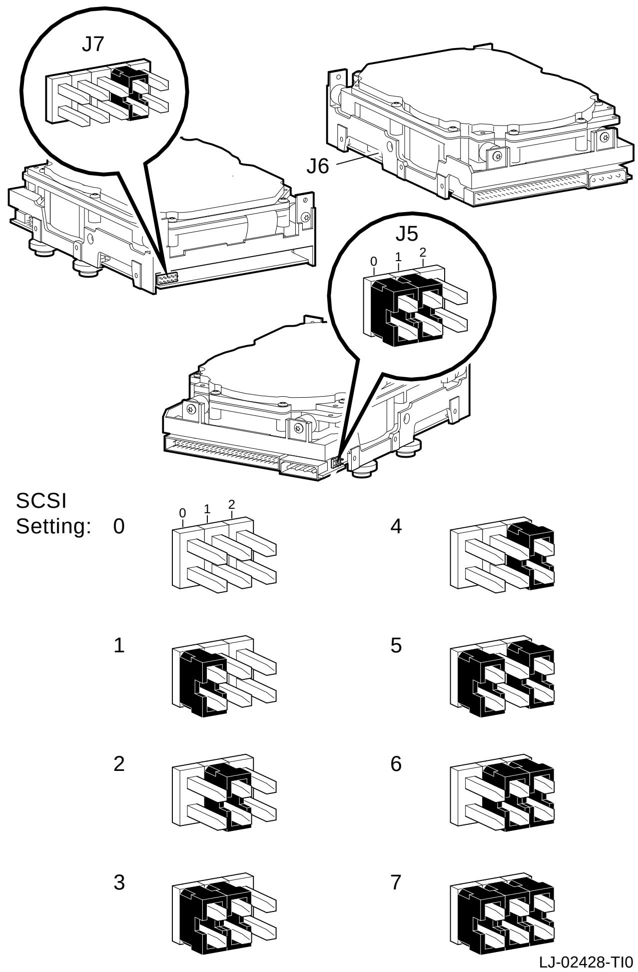
Figure 2–4 shows the RZ25 disk drive jumper settings.

Figure 2–4 RZ25 Disk Drive Jumper Settings



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RZ26 Disk Drive Jumper Settings

Table 2–8 shows the RZ26 jumper settings.

Table 2–8 RZ26 Disk Drive Jumper Settings

SCSI Address*	0	1	2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6	Out	In	In
7	In	In	In

*Check for conflicts with RZ24L and RZ25 SCSI address setting.

Out = Removed.
In = Attached.

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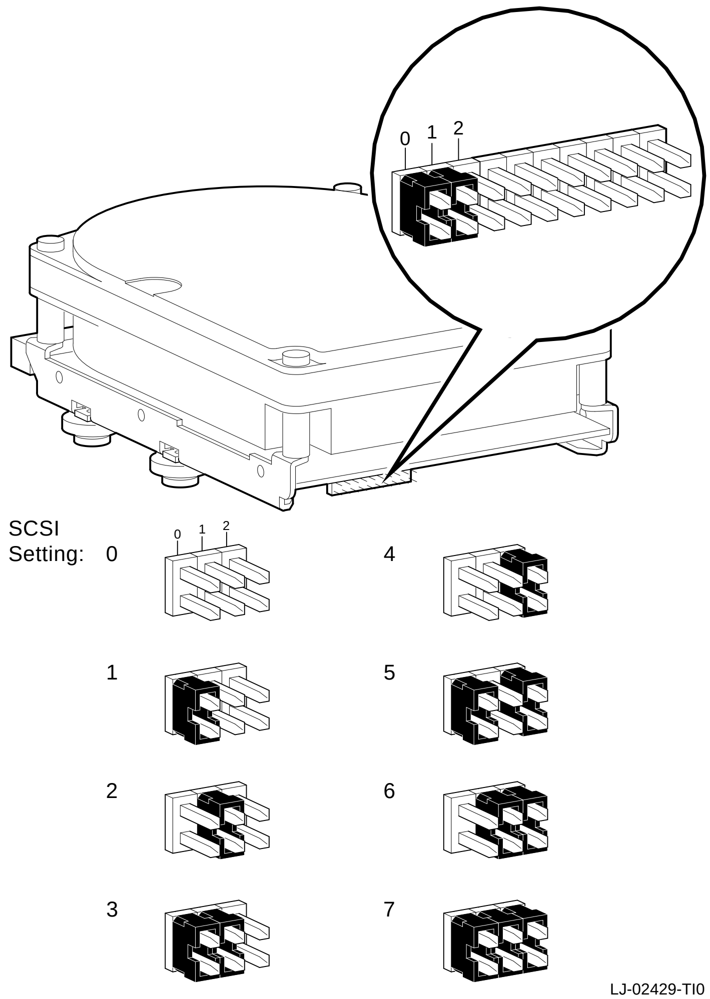
Figure 2–5 shows the RZ26 disk drive jumper settings.

Figure 2–5 RZ26 Disk Drive Jumper Settings



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RRD42 Disc Drive Jumper Settings

Table 2–9 shows the RRD42 disc drive jumper settings.

Mode Select Jumper

The mode select jumper (Figure 2–6) is a user-selectable feature. If you do not select the correct mode, the drive does not operate properly.

The mode select jumper has two modes:

- Mode 0—default mode

When the drive is shipped from the factory, the jumper is **not** installed. The drive operates in the default mode with a block size of 2Kbytes. Use mode 0 with the MS–DOS and SCO UNIX operating systems.

- Mode 1—standard mode

When the jumper is installed, the drive operates in standard mode with a block size of 512 bytes. Use mode 1 with the OpenVMS and ULTRIX operating systems.

The mode select jumper does not affect other operations.

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Table 2–9 RRD42 Disc Drive Jumper Settings

SCSI Address	0	1	2
0	Out	Out	Out
1	In	Out	Out
2	Out	In	Out
3	In	In	Out
4	Out	Out	In
5	In	Out	In
6	Out	In	In
7	In	In	In

Out = Removed.
In = Attached.

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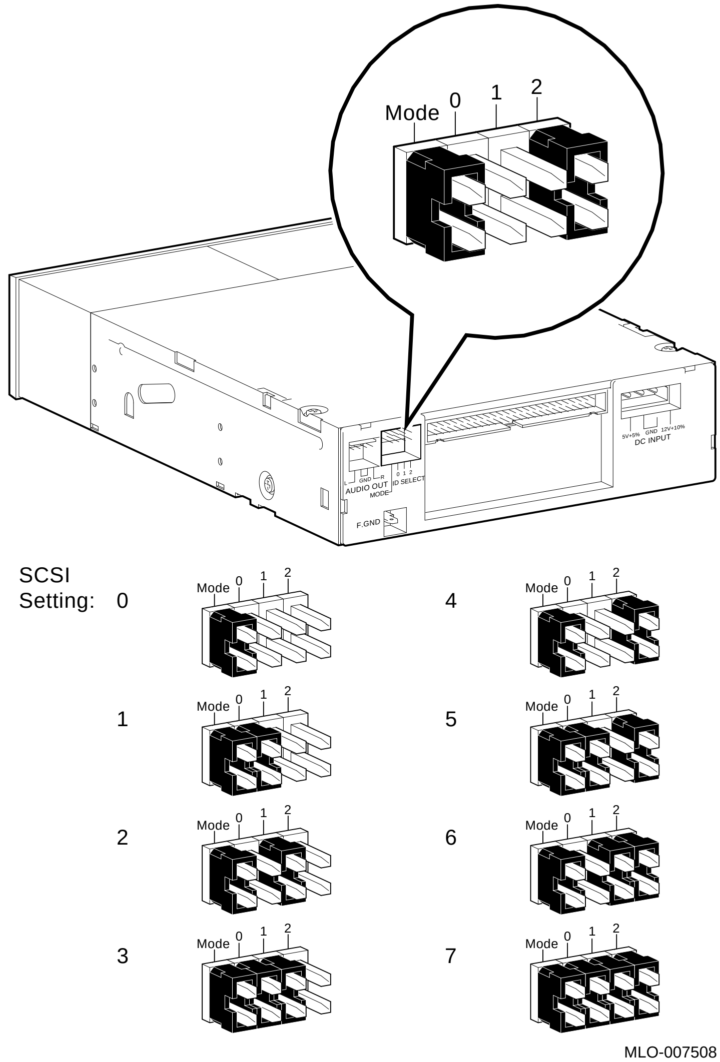
Figure 2–6 shows the RRD42 SCSI ID jumper settings.

Figure 2–6 RRD42 SCSI ID Jumper Settings



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RX26 Diskette Drive Jumper Settings

Table 2–10 shows the RX26 switch settings.

Table 2–10 RX26 Switch Settings

SCSI Address*	1	2	3
0	Up	Up	Up
1	Down	Up	Up
2	Up	Down	Up
3	Down	Down	Up
4	Up	Up	Down
5	Down	Up	Down
6	Up	Down	Down
7	Down	Down	Down

*Check for conflicts with TZK10 and TLZ06 for SCSI address setting.

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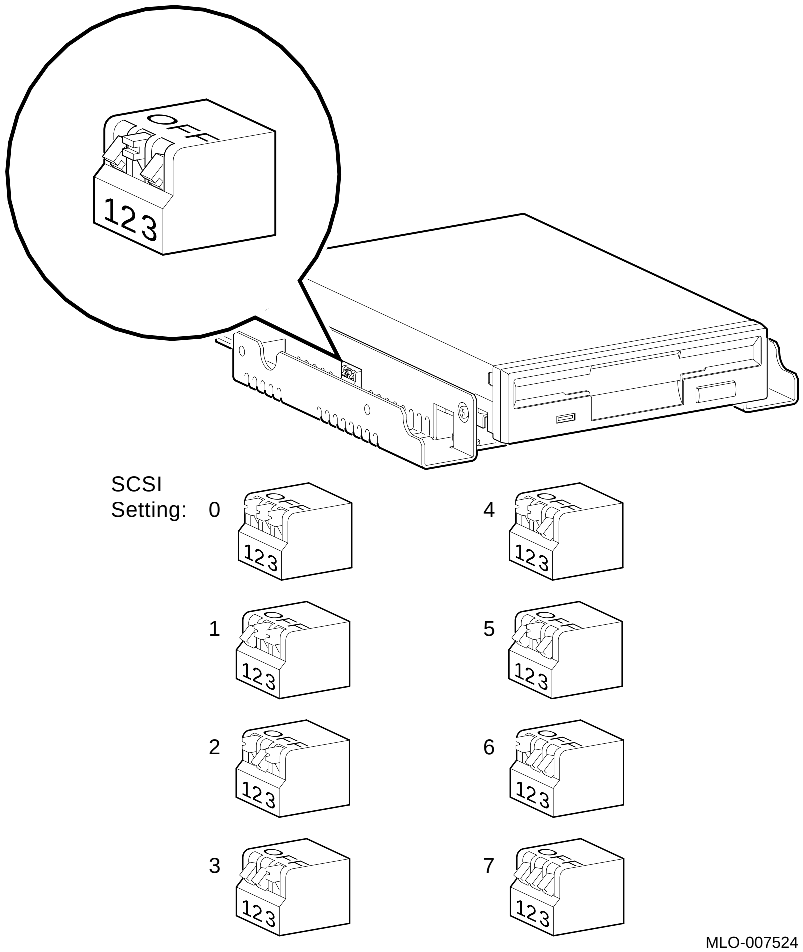
Figure 2–7 shows the RX26 SCSI ID switch settings.

Figure 2–7 RX26 SCSI ID Switch Settings



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TZK10 Tape Drive Jumper Settings

Table 2–11 shows TZK10 SCSI ID jumper settings. Table 2–12 describes pin locations.

Table 2–11 TZK10 SCSI ID Settings

SCSI Address	2	1	0
0	Out	Out	Out
1	Out	Out	In
2	Out	In	Out
3	Out	In	In
4	In	Out	Out
5[1]	In	Out	In
6[2]	In	In	Out
7	In	In	In

[1]Default ID address.

[2]Reserved address—do not use.

Out = Removed.
In = Attached.

Continued on next page

Table 2–12 TZK10 Pin Description

Pin Location	Description
0	Terminator power, when the jumper is installed, power for the terminator is provided by the drive
1	SCSI ID setting
2	SCSI ID setting
3	SCSI ID setting
4	Disable Auto Density (DADs), when the jumper is installed, automatic density selection is disabled.
5	Manufacturing use only
6	Manufacturing use only
7	Manufacturing use only
8	Manufacturing use only
9	Manufacturing use only

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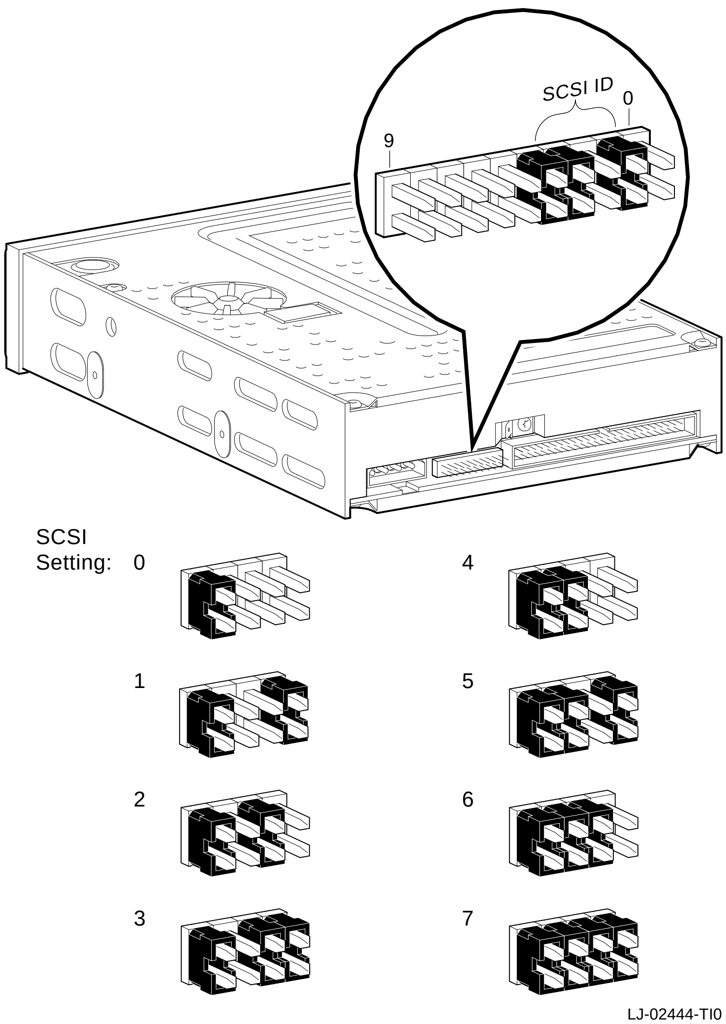
Figure 2–8 shows TZK10 SCSI ID jumper settings.

Figure 2–8 TZK10 SCSI ID Jumper Settings



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TLZ06 Tape Drive Switch Settings

Table 2–13 shows TLZ06 SCSI ID switch settings.

Table 2–13 TLZ06 SCSI ID Switch Settings

SCSI Address*	1	2	3
0	Off	Off	Off
1	On	Off	Off
2	Off	On	Off
3	On	On	Off
4	Off	Off	On
5	On	Off	On
6	Off	On	On
7	On	On	On

*Check for conflicts with RX26 and TLZ06.

Table 2–14 describes TLZ06 switch locations.

Table 2–14 TLZ06 Switch Locations

Switch Location	Description
1	SCSI ID setting
2	SCSI ID setting
3	SCSI ID setting
4	SCSI 1 or SCSI 2
5	Parity
6	Compression
7	Reserved
8	Self-test

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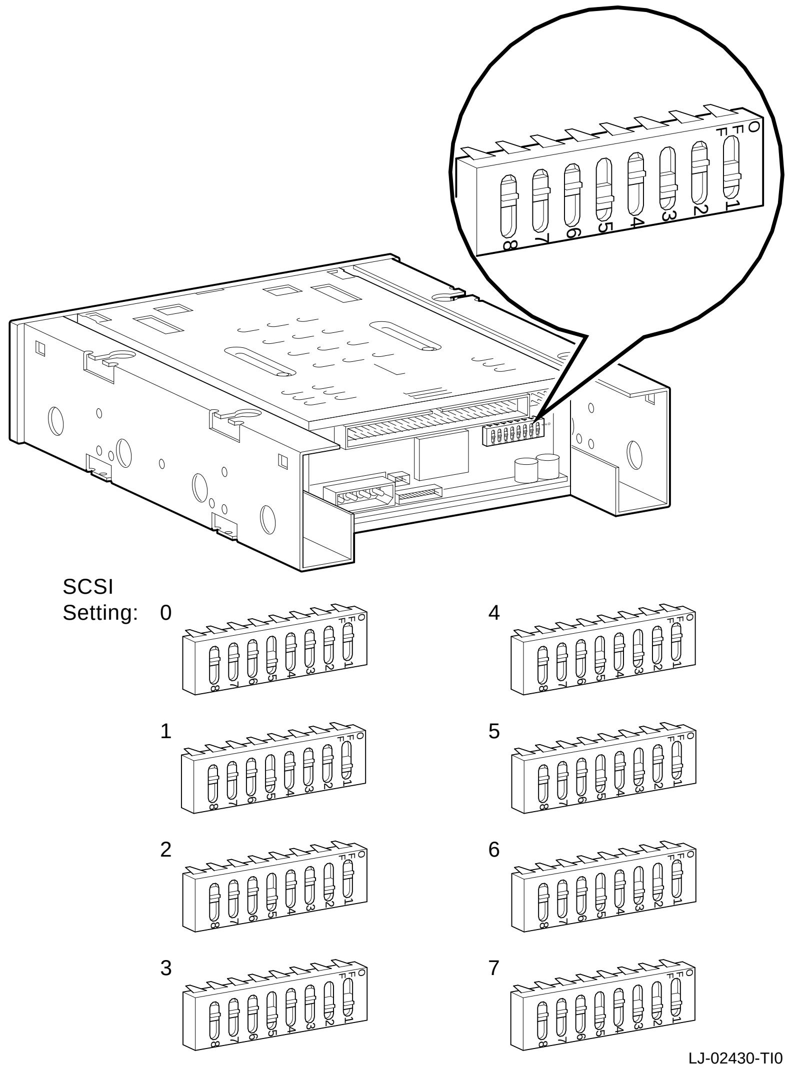
Figure 2–9 shows the TLZ06 SCSI ID switch settings.

Figure 2–9 TLZ06 SCSI ID Switch Settings



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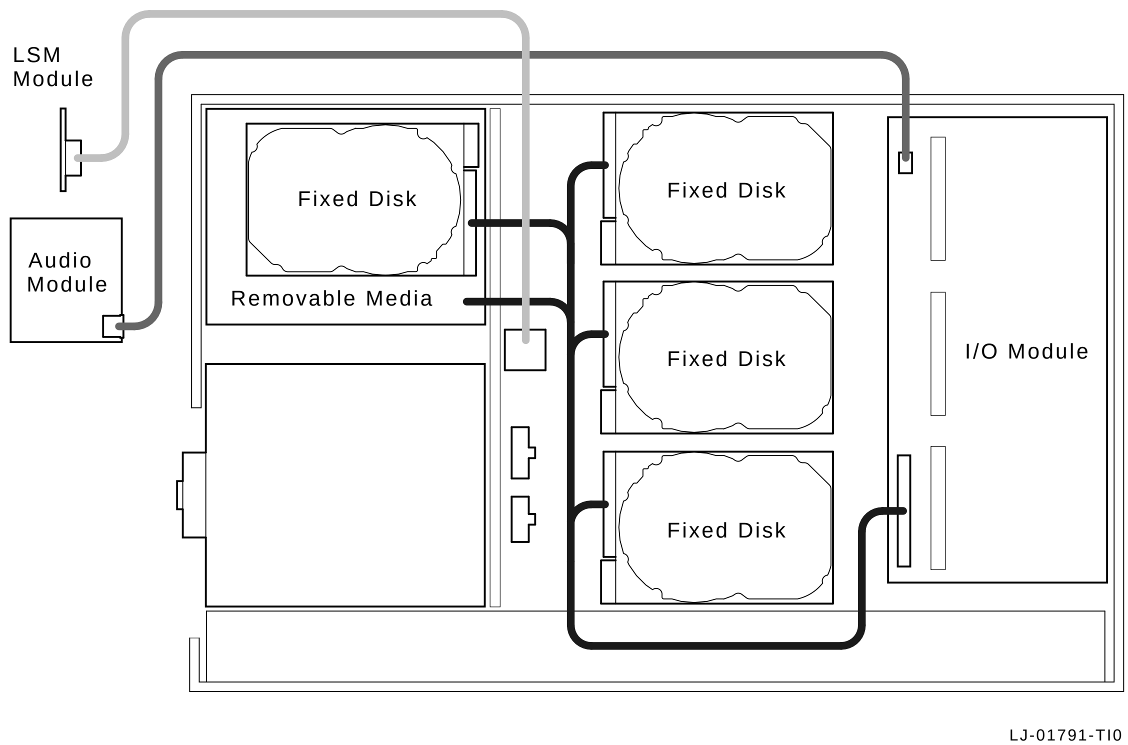
Internal Cable Routing

Figure 2–10 shows cable connections between modules and disks in the DEC 3000 Model 500/500S AXP system.

Figure 2–10 Internal Cable Routing



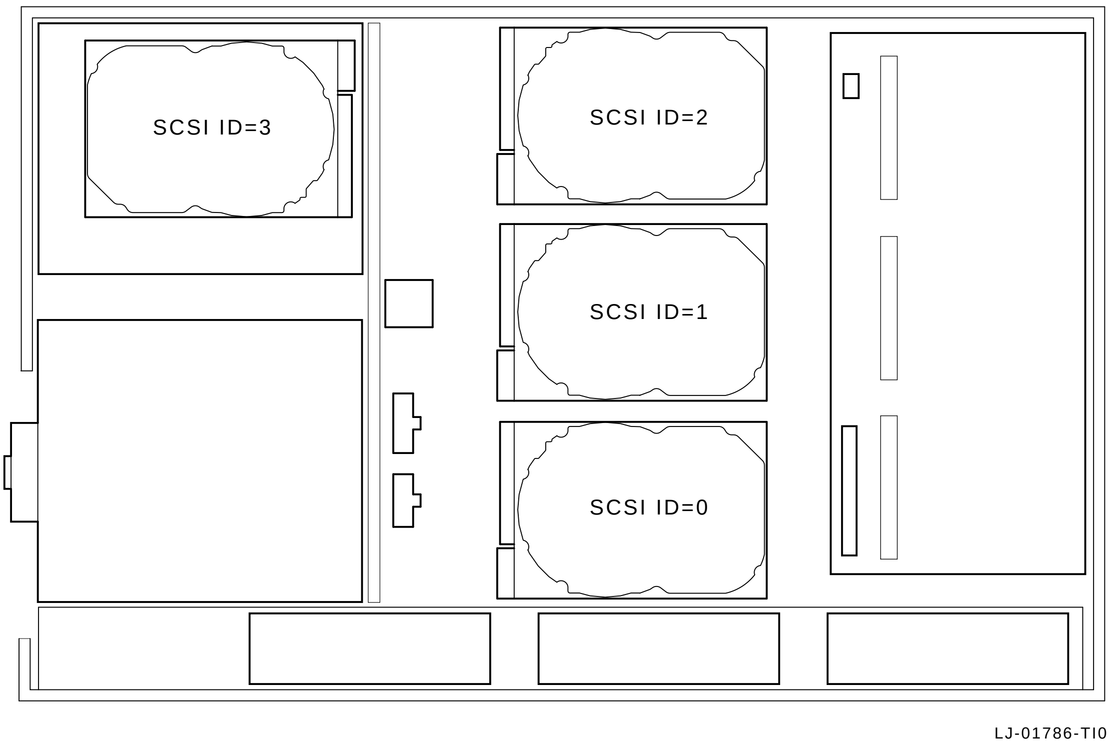
LSM is the lights and switch module.

Continued on next page

Disk Configuration

Figure 2–11 shows the default SCSI ID setting assigned to each drive location in the DEC 3000 AXP Model 500/500S system.

Figure 2–11 Factory-Default SCSI ID Settings for Drives

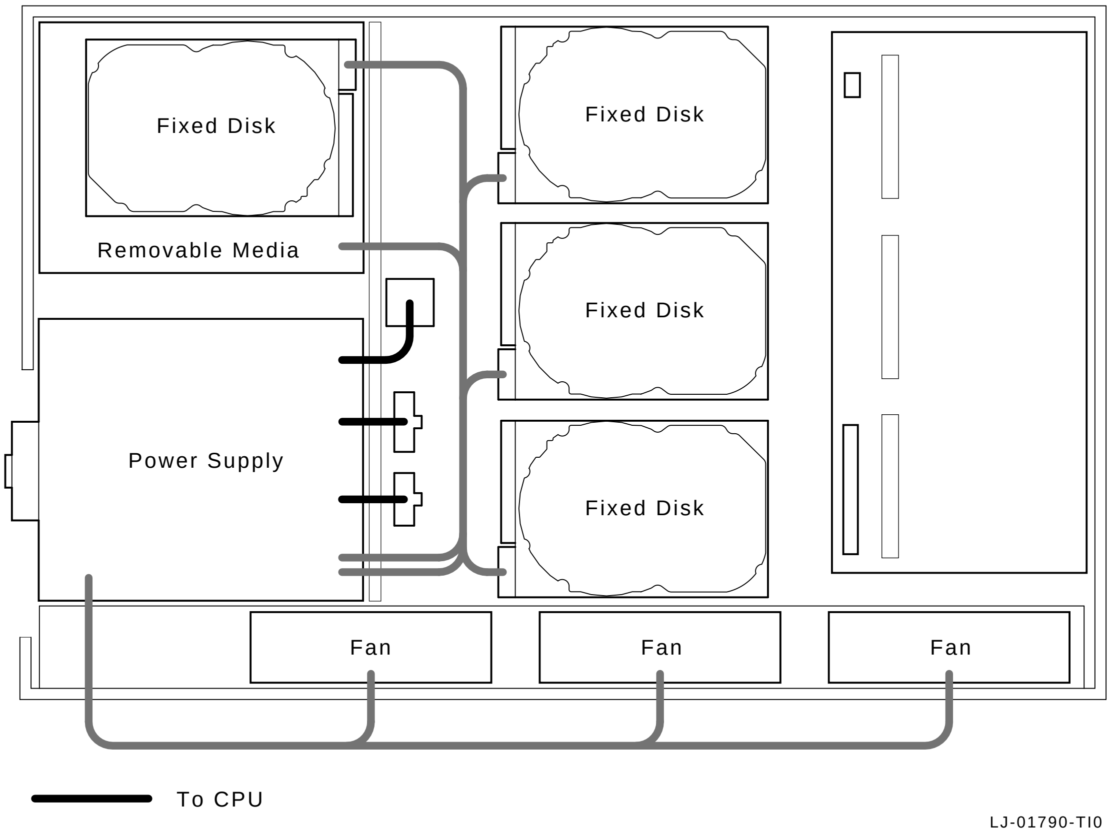


Continued on next page

Power Cable Routing

Figure 2–12 shows the internal power cable connections and routing.

Figure 2–12 Power Cabling



Memory Configuration

Banks and Slots

A bank represents the eight memory arrays (memory modules 0 to 7) as shown in Figure 2–13. A slot consists of two banks because every memory array can be populated on both sides as shown in Figure 2–13.

Example

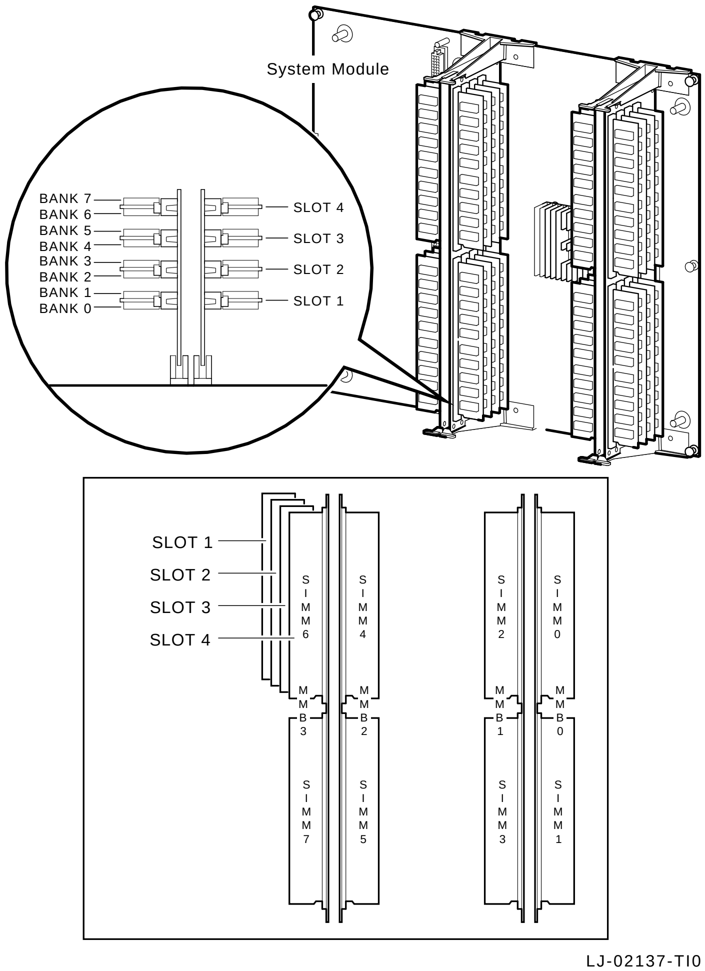
The following example shows a memory configuration and the relationship between banks and memory module size. For the DEC 3000 AXP Model 500/500S system, the banks are numbered 0 to 7.

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

DEC 3000 AXP - M500 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

 >>>
```

Continued on next page

Figure 2–13 shows a layout of memory banks.

Figure 2–13 Memory Bank Layout



Continued on next page

Memory Configuration Rules

When installing memory, follow these configuration rules:

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

If the rules are violated, the memory size displayed by a SHOW MEMORY command will be that of lowest value memory module.

Identifying Memory Modules

The following table lists the part numbers for 4 MB and 8 MB memory modules.

Description	Part Number
4 MB memory module	54–21139–CA
8 MB memory module	54–21139–DA

Chapter 3
Using the Console

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- Console command list
- Commands:
  - BOOT
  - CONTINUE
  - DEPOSIT
  - EXAMINE
  - HELP
  - INITIALIZE
  - LOGIN
  - REPEAT
  - SET
  - SHOW
  - START
  - TEST
- Alternate Consoles

Continued on next page

Console Command List

This chapter describes the system console commands and alternate console commands. Each section provides a brief description of the command, along with its associated parameters and qualifiers.

The following table lists the console commands and their function.

Console Commands	Function
BOOT	Initiates the bootstrap process
CONTINUE	Returns 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
HELP	Displays basic help file
INITIALIZE	Resets console, devices, and CPU
LOGIN	Secures system entry
REPEAT	Repeats commands
SET	Sets an environment variable
SHOW	Shows an environment variable
START	Starts CPU at a given address
TEST	Runs diagnostics

BOOT

Description

The BOOT command bootstraps the operating system.

If you use the boot_device parameter or -fl and -fi qualifiers, you override the current default value for the current boot request but do not change the stored default value.

Format

`>>> B[OOT] [qualifier] [boot_device]` Return

Parameters and Qualifiers

The following section describes the *boot_device* parameter and its qualifiers.

BOOT Command Parameter and Qualifiers

boot_device

Specifies a device the firmware should use to boot the system. This setting only applies for the current BOOT command.

NOTE

To change the default boot device, use the SET BOOTDEF_DEVICE command.

Device Name Conventions: Use the following conventions to specify a boot device name:

OpenVMS System	**OSF System**
ddiunn	*ddiu*

Table 3–1 describes these conventions.

Table 3–1 OpenVMS and OSF Device Naming Conventions

OpenVMS System	OSF System	Description
dd	*dd*	Device name identifier.
i	*i*	Designates SCSI controller A or B.
u	*u*	Designates a SCSI ID number.
nn	–	Logical unit number, default = 00.

Continued on next page

Device Name Identifiers: The following names are supported device identifiers:

OpenVMS Device Identifiers	OSF Device Identifiers	Device Type
DK	RZ	Fixed or removable disk
MK	TZ	Tape
ES	–	Ethernet, MOP protocol
–	EZ	Ethernet, BOOTP protocol

Sample Names

A disk device on SCSI controller A with a SCSI ID of 4 and a logical unit number (LUN) of 0 would have the following name:

OpenVMS system:	DKA400
OSF system:	RZ4A

Continued on next page

Qualifiers

-fl <value>

Specifies flags in an ASCII string of up to 23 characters. The string must be enclosed in quotation marks to be passed to the operating system unmodified.

-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.

Qualifier	Description
-fl <value>	Specifies flags in an 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.

Examples

This example uses the default boot specification:

```
>>> BOOT [Return]
```

This example for an OpenVMS system boots from a disk device on SCSI controller A with a SCSI ID of 4 and an LUN of 0, using the default flag values:

```
>>>  BOOT DKA400 [Return]
```

This example for an OpenVMS system performs a MOP boot to device ESA0 with the flags equal to 0,0:

```
>>> BOOT -FL 0,0 ESA0 [Return]
```

Continued on next page

MOP Boot Examples

To perform a MOP boot to another node over the network:

- Find the Enet address of node to which you want to boot.
- Set the Trigger variable to ON.
- Set the MOP variable to ON.

```
$ MC NCP [Return]   ! From any nonprivileged account

NCP>>> TRIGGER VIA SVA-0 PHY ADD 08-00-2B-2A-1F-82 SER PASS
 1234567890ABCDEF
```

To perform a MOP boot to a remote node or to access the console:

- Find the Enet address of node to which you want to boot.
- Set the Trigger variable to ON.
- Set the MOP variable to ON.

```
$ MC NCP [Return]   ! From any nonprivileged account

NCP>>> CONN VIA SVA-0 PHY ADD 08-00-2B-2A-1F-82 SER PASS
 1234567890ABCDEF

>>> LOGIN [Return]
PSDWO>>>                 !Enter password

>>>                       !Console mode
```

CONTINUE

Description

Returns the operating system from the console mode to program mode.

The processor begins instruction execution at the address contained in the program counter.

The CONTINUE command does not initialize processor initialization.

Format

>>> **C[ONTINUE]** Return

Example

This example returns the operating system from the console mode to program mode:

```
>>> C Return
```

DEPOSIT

Description

Writes data to memory locations from the console.

Format

>>> **DEPOSIT [qualifiers] {address} {data} [{data}]** Return

The address specifies the address (or first address) to be written. You must use hexadecimal data values.

Qualifiers

The following qualifiers specify data size:

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:

Address Option	Description
-VM	Virtual address
-PM	Physical address (default)
PS*	Processor status register (PS). The data size is always quadword.
-R	General-purpose register, R0 to R31. The data size is always quadword.
-FR	Floating point register, FR0 to FR31. The data size is always quadword.
PC*	Program counter. The data size is always quadword.
SP*	Stack pointer. The data size is always quadword.

*Do not being these options with a hyphen (-).

Continued on next page

The following qualifiers specify miscellaneous information:

Miscellaneous Option	Description
-N{value}	Specifies the number of locations to be written with the value specified by data.
-S{value}	Specifes the address increment size.
-U	Allows access to console private memory.

Address

A longword address that specifies the first location to deposit data.

Data

The data to be deposited. If the specified data is larger than the deposit data size, the console ignores the command and issues an error response. If the specified data is smaller than the deposit data size, the date is extended on the left with 0s.

Examples

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

```
>>> D[EPOSIT]-U-PM-N:5 00100000 01234567 Return
```

This example deposits FFFF in general-purpose registers R0 to R2:

```
>>> D -R -N 2 0 FFFF Return
```

This example deposits F in the stack pointer:

```
>>> D SP F Return
```

EXAMINE

Description

Displays the contents of the specific memory locations.

Format

>>> **E[XAMINE] [qualifiers] [{address}]** Return

The *address* specifies the address (or first address) to be read.

Qualifiers

The following qualifiers specify data size:

Data 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:

Address Option	Description
-VM	Virtual address.
-PM	Physical address (default).
PS*	Processor status register (PS). The data size is always quadword.
-R	General-purpose register, R0 to R31. The data size is always quadword.
-FR	Floating-point register, FR0 to FR31. The data size is always quadword.
PC*	Program counter. The data size is always quadword.
SP*	Stack pointer. The data size is always quadword.

*Do not begin these options with a hyphen (-).

Continued on next page

The following qualifiers specify miscellaneous information:

Miscellaneous Option	Description
-N{value}	Specifies the number of locations to be read.
-S{value}	Specifes the address increment size. The default is the data size.
-U	Allows access to console private memory.

The following qualifier specifies the display type:

Display Option	Description
-A	Interpret and display data as ASCII.

Address

A longword address that specifies the first location to examine.

Examples

This example reads the value that was written into locations starting at address 00100000:

>>> **EXAMINE-PM-N:5 00100000** Return

Result:

```
P 00100000 01234567
P 00100004 01234567
P 00100008 01234567
P 0010000C 01234567
P 00100010 01234567
P 00100014 01234567
```

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

>>> **E-U-Q-A-N: 10 0** Return

Continued on next page

Result:

```
00000000.00000000 ........
00000000.00000008 HWRPB
00000000.00000010 ........
00000000.00000018 .@......
00000000.00000020 ........
00000000.00000028 ........
00000000.00000030 ........
00000000.00000038 ........
00000000.00000040 ........
00000000.00000048 ........
```

This example examines general-purpose registers R0 to R2:

```
>>> E -R -N 2 0  Return

GPR: 00 00000000 0000FFFF
GPR: 01 00000000 0000FFFF
GPR: 02 00000000 0000FFFF
```

This example examines the stack pointer:

```
>>> E SP  Return
GPR: 1E 00000000 0000000F
```

HELP

Description

Displays a brief list of commands, parameters, and qualifiers.

If you specify a topic, the HELP command displays information for that topic only.

Format

`>>> HE[LP]` Return

Examples

This example displays a list of commands:

```
>>> HELP Return

BOOT
HELP ADVANCED
INITIALIZE
SET[ENV] <ENVAR> <VALUE>
SHOW | PRINTENV [<ENVAR>]
TEST
```

This example shows an expanded listing of available HELP features:

```
>>> HE[LP] ADVANCED Return

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>]
```

INITIALIZE

Description

Initializes the processor, console, and any devices connected to the system by default values.

Format

```
>>> I[NITIALIZE]  [Return]
```

Example

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

```
>>> I  [Return]
```

Result:

```
INIT-S-CPU...
INIT-S-RESET_TC...
INIT-S-ASIC...
INIT-S-NVR...
INIT-S-CXT...
INIT-S-SCC...
INIT-S-NI...
INIT-S-SCSI...
INIT-S-ISDN...
INIT-S-TC4...
```

LOGIN

Description

The LOGIN command enables restricted console commands when the SECURE jumper is installed on the I/O module and the SECURE bit is set to ON. Enter the console password on the line following the LOGIN command.

NOTE

After you set SECURE to ON, enter LOGIN at the >>> prompt. Then enter the password at the PSWD0>>> prompt.

Format

```
>>> LO[GIN] Return
PSWD0>>> console_password
```

Example

This example enables access to restricted console commands when the SECURE bit is set:

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

REPEAT

Description

Causes the console program to repeatedly execute any specified tests.

To stop the REPEAT command, press Control C or the Halt button.

Format

```
>>> R[EPEAT] T[EST] {device_name},[{device_name}],... Return
```

Examples

This example repeats the ASIC test:

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

This example repeates the ASIC and MEMORY tests:

```
>>> R T ASIC,MEM Return
```

SET

Description

The SET command

- Sets an environmental variable to a value or setting
- Defines a command qualifier
- Defines the console password

Format

>>> **SET {parameter} [{qualifier}]** Return

Parameters and Qualifiers

The following section describes the SET command parameters and their qualifiers.

SET Command Parameters and Qualifiers

AUTO_ACTION

Specifies the default action after a halt or power-up.

Format

```
>>> SET AUTO[_ACTION] {qualifier} Return
```

Qualifier

Select one of the following qualifiers when setting AUTO_ACTION:

Qualifier	Description
RESTART	Perform a restart.
BOOT	Perform a reboot.
HALT	Perform a halt.

Example

This example sets the default action to HALT:

```
>>> SET AUTO HALT Return
```

Result:

```
AUTO_ACTION = HALT
```

Continued on next page

BOOTDEF_DEV

Defines the default device that the operating system will bootstrap. The device names must be valid boot devices supported by the BOOT command.

Use the SHOW DEVICE command to display the available boot devices.

Format

```
>>> SET BOOTDEF_DEV {qualifier} [Return]
```

Qualifier

See the BOOT command.

Example

This example sets the boot default to DKA200:

```
>>> SET BOOTDEF_DEV DKA200 [Return]
```

Result:

```
BOOT = DKA200
```

Continued on next page

BOOT_OSFLAGS

Defines additional default parameters to pass to the system software during booting.

Format

```
>>> SET BOOT_OSFLAGS {value} [Return]
```

Value

You can use the following values with the OSFLAGS command:

Root	R5 Contents	Description
0	0	Default boot of operating system
E[1]	0	Standalone backup boot
0	1	Conversional boot

[1] If installed on disk

Example

This example specifies a default boot of the operating system:

```
>>> SET BOOT_OSFLAGS 0,0 [Return]
```

Continued on next page

BOOT_RESET

Specifies whether or not the console should initialize the system before booting.

Format

`>>> **SET BOOT_RESET {qualifier}** Return`

Qualifier

Use one of the following qualifiers:

Qualifier	Description
ON	Enable system initialization before booting.
OFF	Disable system initialization before booting.

Example

This example enables system initialization before booting:

```
>>> SET BOOT_RESET ON Return
```

Result:

```
BOOT_RESET = ON
```

Continued on next page

DIAG_LOE

Allows a diagnostic to loop on an error, with all output suppressed.

To exit the diagnostic error loop, press the Halt button to return to the diagnostic environment (console mode or service mode).

This feature is available on loadable diagnostics only.

Format

`>>> **SET DIAG_LOE {qualifier}**` Return

Qualifier

Use one of the following qualifiers when setting the DIAG_LOE parameter:

Qualifier	Description
ON	Enables the loop-on-error feature.
OFF	Disables the loop-on-error feature.

Example

This example sets the loop-on-error feature:

>>>SET DIAG_LOE ON Return

Result:

```
DIAG_LOE = ON
```

Continued on next page

DIAG_QUICK

Sets the diagnostic startup mode to normal testing or fast startup testing. If you select fast mode, not all diagnostic tests are performed.

Format

```
>>> SET DIAG_QUICK {qualifier} Return
```

Qualifier

Select one of the following qualifiers to set the diagnostic startup mode:

Qualifier	Description
ON	Quick verification testing
OFF	Normal testing

Example

This example sets the diagnostic startup mode to quick verify testing:

```
>>> SET DIAG_QUICK ON Return
```

Result:

```
DIAG_QUICK = ON
```

Continued on next page

DIAG_SECTION

Specifies the diagnostic environment in which diagnostics can be run.

Format

```
>>> SET DIAG_SECTION {qualifier} [Return]
```

Qualifier

Select one of the following qualifiers to set the diagnostic environment:

Qualifier	Mode	Description
1	Console	Default mode after power-up.
2	Service	Provides a more thorough test than in console mode. Loopback connectors may be required to run certain tests.

Example

This example sets the diagnostic environment to the console mode:

```
>>> SET DIAG_SECTION 1 [Return]
```

Result:

```
DIAG_SECTION = 1
```

Continued on next page

ENABLE_AUDIT

Enables or disables the boot audit trail message.

Format

>>> **SET ENABLE_AUDIT {qualifier}** Return

Qualifier

Select one of the following qualifiers to set the boot audit trail:

Qualifier	Description
ON	Enables the boot audit trail.
OFF	Disables the boot audit trail.

Example

This example enables the boot audit trail:

>>> **SET ENABLE_AUDIT ON** Return

Result:

```
ENABLE_AUDIT = ON
```

Continued on next page

ETHERNET

Sets the Ethernet port to thickwire or twisted-pair use.

Format

```
>>> SET ETHERNET {qualifier} Return
```

Qualifier

Select one of the following qualifiers to set the Ethernet port:

Qualifier	Description
THICK	AUI Ethernet port (thickwire)
TENBT	10baseT port (twisted pair)

Example

This example sets the Ethernet port to thickwire:

```
>>> SET ETHERNET THICK Return
```

Result:

```
ETHERNET = THICK
>>>
```

Continued on next page

LANGUAGE

Sets the keyboard language.

The default setting is English (3).

Format

`>>> SET LANGUAGE {qualifier} Return`

Qualifier

Select one of the following language qualifiers:

Qualifier	Description
0) Dansk	Danish
1) Deutsch	German/Swiss
2) Deutsch	Schweiz
3) English	North American (default)
4) English	British/Irish
5) Espanol	Spanish
6) Francais	French
7) Francais	Canadian
8) Francais	Suisse Romande
9) Italiano	Italian
10) Nederlands	Netherlands
11) Norsk	—
12) Portugues	Portuguese
13) Suomi	—
14) Svenska	Swedish
15) Vlaams	—

Continued on next page

Example

This example sets the language to English:

```
>>> SET LANGUAGE 4 [Return]
```

Result:

```
LANGUAGE = 4
>>>
```

Continued on next page

MOP

Enables or disables the NI Ethernet listener in console mode. When enabled, the listener can send and receive messages on the network.

Format

```
>>> SET MOP {qualifier} [Return]
```

Qualifier

Select one of the following qualifiers to enable or disable the MOP bit:

Qualifier	Description
ON	Network listener enabled. Able to send and receive messages on the network. (default)
OFF	Network listener disabled.

Example

This example enables the network listener in console mode:

```
>>> SET MOP ON [Return]
```

Result:

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

Continued on next page

PASSWORD

Lets you sets a new console password.

The following are key points to remember about passwords:

- The console secure jumper must be installed on the I/O module.
- The password must be exactly 16 hexadecimal characters. You can use 0 to 9 and A to F.
- The password feature is enabled when SECURE = ON. The password feature is disabled when SECURE = OFF.

Format

```
>>> SET PASSWORD [Return]
```

Example

This example sets the password:

```
>>> SET PASSWORD [Return]
```

Result:

```
PSWD0> old_password    !Enter the old password (if any).)
PSWD1> new_password    !Enter the new password.
PSWD3> new_password    !Reenter the new password for verification.
>>>
```

Continued on next page

RADIX

Specifies the default radix (base number). The default setting is hexadecimal.

Format

```
>>> SET RADIX {qualifier} [Return]
```

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

Example

This example sets the address to a decimal base address:

```
>>> SET RADIX 10 [Return]
```

Result:

```
RADIX = 10
```

Continued on next page

SCSI_A

Sets the SCSI host ID value. The default value is 6.

Format

>>> **SET SCSI_A {qualifier}** Return

Qualifier

Select a host ID value from 0 to 7.

Example

This example sets the SCSI_A host ID to 6.

>>> **SET SCSI_A 6** Return

Result:

```
SCSI_A = 00000006
```

Continued on next page

SCSI_B

Sets the host ID value. The default value is 6.

Format

>>> **SET SCSI_B {qualifier}** Return

Qualifier

Select a host ID value from 0 to 7.

Example

This example sets the SCSI B host ID to 6:

>>> **SET SCSI_B 6** Return

Result:

```
SCSI_B = 00000006
```

Continued on next page

SCSI_RESET

Causes a time delay after a SCSI reset before booting.

The default value is 4.

Format

```
>>> SET SCSI_RESET {qualifier} [Return]
```

Qualifier

Select a value from 0 to 7.

Boot Device	Recommended Value
Floppy drive	3
Tape drive	4
CD–ROM	6

Example

This example sets a time delay of 4:

```
>>> SET SCSI_RESET 4 [Return]
```

Result:

```
SCSI_RESET = 4
```

Continued on next page

SECURE

Enables the console password bit to restrict access to the console. This command works in conjunction with the console secure jumper on the I/O module.

Format

```
>>> SET SECURE {qualifier} [Return]
```

Qualifier

Select one of the following qualifiers to set the SECURE bit:

Qualifier	Description
ON	Security features enabled.
OFF	Security features disabled.

Example

This example enables the security features:

```
>>> SET SECURE ON [Return]
```

Result:

```
SECURE = ON
```

Continued on next page

SERVER

Modifies SCC power-up diagnostics to match the DEC 3000 Model 500/500S AXP system configuration. You can specify a server (Model 500S) or workstation (Model 500) configuration.

If you select the server setting, you do not have to connect the keyboard and mouse to complete power-up diagnostics successfully.

If you select the workstation setting, you must connect the keyboard and mouse to complete power-up diagnostics successfully.

Format

```
>>> SET SERVER {qualifier} [Return]
```

Qualifier

Select one of the following qualifiers:

Qualifier	Description
ON	Specifies a server (Model 550S).
OFF	Specifies a workstation (Model 500). (default)

Example

This example sets the configuration to a server:

```
>>> SET SERVER ON [Return]
```

Result:

```
SERVER = ON
```

Continued on next page

TRIGGER

Enables the entity-based module (EMB).

With EMB and the NI listener enabled (TRIGGER = ON), you can boot the system from a remote system.

Format

>>> **SET TRIGGER {qualifier}** [Return]

Qualifier

Select one of the following qualifiers to set the remote trigger:

Qualifier	Description
ON	Enables the remote trigger.
OFF	Disables the remote trigger.

Example

This example enables the remote trigger:

>>> **SET TRIGGER ON** [Return]

Result:

```
TRIGGER = ON
```

SHOW

Description

Displays information on a requested topic:

- Environmental variable
- Console options
- Hardware configuration

Format

>>> **SHOW {parameter}** Return

Parameters

The following sections describe the SHOW command parameters.

Example

This example displays the current values for environmental variables.

```
>>> SHOW Return
AUTO_ACTION = RESTART
BOOTDEF_DEV = DKA100
BOOT_OSFLAGS = 0,0
ENABLE_AUDIT = ON
BOOT_RESET = ON
SCSI_RESET = 3
DIAG_LOE = OFF
DIAG_QUICK = OFF
DIAG_SECTION = 1
ETHERNET = 08-00-2B-2A-21-80 , THICK
MOP = OFF
SECURE = ON
RADIX = 0
SCSI_A = 6
SCSI_B = 6
SERVER = ON
TRIGGER = ON
```

SHOW Command Parameters

AUTO_ACTION

Displays the action the console will take following an error halt or power-up halt.

Format

```
>>> SHOW AUTO_ACTION [Return]
```

Results

The SHOW AUTO_ACTION command displays one of the following values:

Value	Description
RESTART	Perform a restart.
BOOT	Perform a reboot.
HALT	Perform a halt.

Example

This example shows the auto action is HALT:

```
>>> SHOW AUTO_ACTION [Return]
```

Result:

```
AUTO_ACTION = HALT
```

Continued on next page

BOOTDEF_DEV

Displays the default device or device list used for booting.

Format

```
>>> SHOW BOOTDEF_DEV Return
```

Example

This example shows the default boot device is the DKA400 device:

```
>>> SHOW BOOTDEF_DEV Return
```

Result:

```
BOOT = DKA400
```

Continued on next page

BOOT_OSFLAGS Displays additional default parameters that were passed to system software during the last boot operation.

Format

```
>>> SHOW BOOT_OSFLAGS [Return]
```

Values

The SHOW BOOT_OSFLAGS command displays one of the following pairs of values:

Root	R5 Contents	Description
0	0	Default boot of operating system
E[1]	0	Standalone backup boot
0	1	Conversional boot

[1]If installed on disk

Example

This example shows that the OSFLAGS specify a default boot of the operating system:

```
>>> SHOW BOOT_OSFLAGS [Return]
```

Result:

```
BOOT_OSFLAGS = 0,0
>>>
```

Continued on next page

BOOT_RESET

Displays the value of the *BOOT_RESET* variable, which enables or disables system initialization before booting.

Format

`>>> SHOW BOOT_RESET` Return

Values

The SHOW BOOT_RESET command displays one of the following values:

Value	Description
ON	System initialization before booting is enabled.
OFF	System initialization before booting is disabled.

Continued on next page

CONFIG

Displays system configuration and device status information.

Format

>>> **SHOW CONFIG** [Return]

Example

This example shows the current system configuration.

>>> **SHOW CONFIG** [Return]

Result:

```
DEC 3000 AXP - M500
Digital Equipment Corporation
     VPP PAL X5.12-82000101/OSF PAL X1.09-82000201

TCINFO      DEVNAM       DEVSTAT
------      --------     --------
             CPU          OK KN15-AA - BL7.0-S0F0-I080 - sBLx.x -
                                                   DECchip 21064
             ASIC         OK
             MEM          OK
8
             CXT          OK
7
             NVR          OK
             SCC          OK
             NI           OK
             ISDN         OK
6
             SCSI         OK
4-PMAGB-BA  TC4
```

Column	Meaning	
TCINFO	System slots:	
	0 to 5	TURBOchannel slots
	6	SCSI controller
	7 and 8	Built-in system devices
DEVNAM	Device name	
DEVSTAT	Device status	

Continued on next page

DEVICE

Displays SCSI and Ethernet device information.

Format

```
>>> SHOW DEVICE [Return]
```

Example

This example shows the current SCSI and Ethernet devices located.

```
>>> SHOW DEVICE
```

Result:

```
BOOTDEV    ADDR     DEVTYPE   NUMBYTES   RM/FX  WP   DEVNAM    REV
-------    ----     -------   --------   -----  --   ------    ---
ESA0        08-00-2B-2A-21-80 , THICK
DKA100     A/1/0    DISK      426.25MB   FX            RZ25     0700
DKA200     A/2/0    DISK      209.81MB   FX            RZ24     211B
DKA400     A/4/0    RODISK    599.35MB   RM     WP    RRD42    4.3d
DKA500     A/5/0    DISK        ......    RM     WP    RX23     0068
..HostID.. A/6      INITR
..HostID.. B/6      INITR
DKB700     B/7/0    DISK      295.42MB   RM            RWZ01    2.16
```

Column	Meaning
BOOTDEV	Console boot name for the device
ADDR	Ethernet hardware address or SCSI ID
DEVTYPE	Device type (RODISK is a read-only disk.)
NUMBYTES	Drive capacity
RM/FX	Removable or fixed media drive
WP	Write-protected drive
DEVNAM	Device name for the drive
REV	Firmware revision level for the drive

Continued on next page

DIAG_LOE

Displays the setting of the loop-on-error diagnostic feature.

Format

```
>>> SHOW DIAG_LOE  Return
```

Values

The SHOW DIAG_LOE command displays one of the following values:

Setting	Description
ON	Loop-on-error feature enabled.
OFF	Loop-on-error feature disabled.

Example

This example shows that the current setting of DIAG_LOE is OFF.

```
>>> SHOW DIAG_LOE Return
```

Result:

```
DIAG_LOE = OFF
```

Continued on next page

DIAG_QUICK

Displays the diagnostic mode.

Format

>>> **SHOW DIAG_QUICK** [Return]

Values

The SHOW DIAG_QUICK command displays on the following values:

Diagnostic Setting	Description
ON	Quick verify testing
OFF	Normal testing

Continued on next page

DIAG_SECTION

Displays the diagnostic environment in which diagnostics can be run.

Format

`>>> SHOW DIAG_SECTION [Return]`

Values

The SHOW DIAG_SECTION command displays on the following values:

Setting	Mode	Description
1	Console	Default mode at power-up.
2	Service	Provides a more thorough test than in console mode. Loopback connectors may be required to run certain tests.

Continued on next page

ENABLE_AUDIT

Indicates whether or not the boot audit trail message is enabled.

Format

`>>> SHOW ENABLE_AUDIT` [Return]

Values

The SHOW ENABLE_AUDIT command displays one of the following values:

Audit Setting	Description
ON	Boot audit trail enabled.
OFF	boot audit trail disabled.

Continued on next page

SHOW Command Parameters, Continued

ERROR

The ERROR parameter displays error information.

Format

```
>>> SHOW ERROR [Return]
```

Example

This example displays the current error information:

```
>>> SHOW ERROR [Return]
```

Result:

```
??002 SCC 0x0020
?T-ERR-SCC-MODEM - CTS bit Exp = 1 Rec = 0
```

Continued on next page

ETHERNET

Displays the hardware Ethernet address and Ethernet port.

Format

>>> **SHOW ETHERNET** [Return]

Result:

```
ENET port = THICK
ETHERNET = 08-00-2b-07-04-17
```

Continued on next page

LANGUAGE

Identifies the language currently used to display console messages.

Format

```
>>> SHOW LANGUAGE [Return]
```

Values

See the SET LANGUAGE command for possible settings.

Example

This example shows that the current language is English (North American):

```
>>> SHOW LANGUAGE [Return]
```

Result:

```
Language = 3
```

Continued on next page

MEMORY

Displays status information for the following:

- Bank number
- Memory size/bank
- Starting address of each bank

Format

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

Example

This example shows the memory status information:

```
>>> SHOW MEMORY
```

Result:

```
SHOW MEMORY

DEC 3000 AXP - M500 Memory: 160 Mbytes
------------------------------------------
BANK #      MEMORY_SIZE        START_ADDRESS
------      -----------        -------------
0            032 Mbytes        0x00000000
1            032 Mbytes        0x02000000
2            032 Mbytes        0x04000000
3            000 Mbytes        0x00000000
4            032 Mbytes        0x06000000
5            032 Mbytes        0x08000000
6            000 Mbytes        0x00000000
7            000 Mbytes        0x00000000

 >>>
```

In the example, the banks are populated as follows:

- 0,1—dual-sided memory module
- 2,3—single-sided memory module
- 4,5—dual-sided memory module
- 6,7—No memory

Continued on next page

MOP

Indicates whether or not the MOP network listener is enabled.

Format

`>>> SHOW MOP` Return

Values

The SHOW MOP command displays one of the following settings:

Setting	Description
ON	Network listener enabled. Can send and receive messages on the network.
OFF	Network listener disabled.

Continued on next page

RADIX

Displays the default radix (base number). The default is hexadecimal.

Format

`>>> SHOW RADIX` Return

Values

The SHOW RADIX command displays one of the following values:

Base Address Setting	Description
0	Default base address (hexadecimal)
10	Decimal base address
16	Hexadecimal base address

Continued on next page

SCSI_A

The SCSI_A parameter displays the SCSI ID for the system (A bus).

Format

```
>>> SHOW SCSI_A [Return]
```

Values

The SHOW SCSI_A displays a host ID number from 0 to 7.

Example

This example shows the SCSI ID for the system is 6.

```
>>> SHOW SCSI_A [Return]
```

Result:

```
SCSI_A = 6
```

Continued on next page

SCSI_B

Displays the SCSI ID for the system (B bus).

Format

>>> **SHOW SCSI_B** Return

Values

The SHOW SCSI_B command displays a host ID number from 0 to 7.

Continued on next page

SCSI_RESET

Displays the current time-delay setting.

Format

>>> **SHOW SCSI_RESET** [Return]

Values

The SHOW SCSI_RESET command displays a value from 0 to 7.

Value	Device Booted
3	Floppy drive
4	Tape drive
6	CD–ROM

Example

This example shows the current value of the SCSI reset is set to 4, for booting from a tape drive:

>>> **SHOW SCSI_RESET** [Return]

Result:

```
SCSI_RESET = 4
```

Continued on next page

SECURE

Indicates whether or not console security is enabled. See the SET SECURE command for details on console security.

Format

>>> **SHOW SECURE** [Return]

Values

The SHOW SECURE command displays one of the following values:

SECURE Setting	Description
ON	Security features enabled.
OFF	Security features disabled.

Continued on next page

SERVER

Indicates whether a server or workstation configuration is in use.

Format

`>>>` **`SHOW SERVER`** `Return`

Values

The SHOW SERVER command displays one of the following settings:

Setting	Description
ON	Server (Model 550S) configuration
OFF	Workstation (Model 500) configuration (default)

Example

This example shows the current SERVER configuration is for a workstation:

`>>>` **`SHOW SERVER`** `Return`

Result:

```
SERVER = OFF
```

Continued on next page

TRIGGER

Displays the current trigger setting.

Format

`>>>` **`SHOW TRIGGER`** `Return`

Values

The SHOW TRIGGER command displays one of the following settings:

Trigger Setting	Description
ON	Trigger enabled. Lets you access the console or boot the system from a remote system.
OFF	Trigger disabled.

START

Description

Sets the program counter (PC) and starts the CPU. The START command causes the system to exit console mode and enter program mode.

Format

`>>>` **`START {address}`** `Return`

TEST

Description

Performs all available diagnostics (except TURBOchannel) or selected diagnostics.

Format

```
>>> TEST {qualifier} [Return]
```

Qualifier

See Chapter 4 for a diagnostic listing.

Examples

This example runs the ASIC diagnostic:

```
>>> TEST ASIC [Return]
```

This example runs all available diagnostics, except TURBOchannel diagnostics:

```
>>> T[EST]  [Return]
```

Alternate Consoles

Overview

The DEC 3000 Model 500/500S system provides two ways to use alternate consoles if the graphics subsystem fails. You can enter console commands locally on a terminal connected to the alternate console port (printer port) or remotely from a network connection.

Alternate Console Port

To access the alternate console port from a terminal, verify the following settings:

- The baud rate of the terminal is 9600 baud.
- The alternate console switch on the rear of the unit is set to the left.

NOTE

The state of the alternate console switch is only read at power-up. Changing the switch setting while the system is powered up has no effect until the unit is powered down and up again.

Network Console

You can access the system console from the network. The network console lets you remotely troubleshoot the system or provide a console when no other consoles are available.

Some console tests and commands will terminate the network connection, either because the commands use the network device or they cause a connection timeout at the remote node.

Continued on next page

Network Console (continued)

To access the console:

- Obtain the hardware Ethernet address of the workstation.
- Obtain access to an operating system on the same Ethernet segment as the DEC 3000 Model 500/500S AXP system. The systems cannot be separated by a bridge or router.
- Set the following DEC 3000 500/500S AXP workstation parameters:
  - A console password
  - MOP, TRIGGER

After the DEC 3000 Model 500/500S AXP system is set up, perform the following steps from the other operating system to connect to the console:

1. Log in to the user account (no special privileges are required).
2. Enter the following commands:

```
$ MC NCP          Enters the Network Control Program (NCP).
NCP> SHOW KNOWN CIRCUITS Shows available circuits you can connect through.
NCP> CONNECT VIA  circuit SERVICE PASSWORD xxxx
       PHYSICAL ADDRESS 08-00-2B-XX-XX-XX
>>>[Ctrl] [D]        Disconnects the console.
NCP>  EXIT         Exits NCP.
$ LO                Logs off the system.
```

NOTE

Do not run the memory diagnostic. The memory diagnostic will cause the console to hang, and you will have to turn off the system.

Chapter 4
Diagnostic Testing

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- FRU Code Table
- Diagnostic Listing
- Running Diagnostic Tests
- Entering and Exiting Console and Service Mode
- Diagnostics:
  - ASIC Diagnostic
  - NVR Diagnostic
  - Memory Diagnostic
  - CXT Diagnostic
  - SCSI Diagnostic
  - NI Diagnostic
  - SCC Diagnostic
  - ISDN Diagnostic
- Testing TURBOchannel Options

FRU Code Table

System Device FRU Codes

Table 4–1 lists the system device FRU codes.

Table 4–1 System Device FRU Codes

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

Continued on next page

TURBOchannel Option FRU Codes

Table 4–2 lists the TURBOchannel FRU codes.

Table 4–2 TURBOchannel FRU Codes

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

SCSI Device FRU Codes

Table 4–3 lists the SCSI device FRU codes.

Table 4–3 SCSI FRU Codes

FRU Code	Description
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*.

Diagnostic Listing

Diagnostic Listing

The following diagnostics are available:

ASIC
NVR
MEM
CXT
SCSI
NI
SCC
ISDN
TURBOchannel (See the “Testing TURBOchannel Options ” section in this chapter.)

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

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

Example

The following 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 ?
```

Running Diagnostic Tests

Before You Begin

You must take the following actions before running diagnostics:

Step	Action	Refer to...
1	Put the system in console mode.	Entering Console Mode (this chapter)
2	Attach loopbacks if required.	Table 4–4
3	Select the diagnostic environment.	Table 4–4

Diagnostic Environment

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

Table 4–4 Diagnostics Environments

Environment	To Access	Requirements
Console	Enter the following command: `>>> SET DIAG_SECTION 1` Return	Requires no setup beyond 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.

Continued on next page

Running a Single Diagnostic Test

To run a single test, enter the following command:

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

Example

This example executes the NVR diagnostic:

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

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

Running Diagnostic Subtests

To run a diagnostic subtest, enter the following command:

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

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
```

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 specified on the command line. Some diagnostics require

- Service mode
- Loopback connectors

You can specify individual tests or ranges of tests:

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

Continued on next page

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 will occur.

Diagnostics that run in console mode will 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
```

The following example runs the SCC diagnostic, then runs the range of diagnostics from the ASIC diagnostic to the CXT diagnostic:

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

Continued on next page

Continuous Run

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.

NOTE

If you repeat the CXT diagnostics alone, you may need to push the Halt button to stop the tests.

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
```

Entering and Exiting Console and Service Mode

Entering Console Mode

To enter console mode, perform one of the following actions:

NOTE

Perform a system shutdown before pressing the Halt button.

- Press the Halt button.
- Enter SET DIAG_SECTION 1 command while in service mode.
- Enter the SET AUTO_ACTION HALT command. See the command description in Chapter 3.

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 3.

- CONTINUE

  The CONTINUE command clears the RC State Flag bit and resumes processor execution. See Chapter 3.

To exit console mode and enter service mode, enter the following command:

- SET DIAG_SECTION 2

  See Chapter 3.

Continued on next page

Entering and Exiting Console and Service Mode, Continued

Entering Service Mode

Some diagnostics require that 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]
```

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 3.

- CONTINUE

  The CONTINUE command clears the RC State Flag bit and resumes processor execution. See Chapter 3.

To exit service mode and enter console mode, enter the following command:

- SET DIAG_SECTION 1

  See Chapter 3.

ASIC Diagnostic

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 field replaceable unit (FRU).

Running ASIC Diagnostics

To run the ASIC diagnostic and subtests, use the TEST command:

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

Subtests

Table 4–5 lists ASIC diagnostic subtests.

Table 4–5 ASIC Diagnostic SubTests

SubTests	Description
INIT	Runs the INIT test.
SGMAP	Tests the scatter/gather map register.
?	Lists available subtests

Continued on next page

Examples

This example runs the ASIC diagnostic:

```
>>> T ASIC [Return]
```

This example runs the ASIC diagnostic and SGMAP subtest.

```
>>> T ASIC SGMAP [Return]
```

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T ASIC
?? 001 ASIC xxxxxxxx
```

Table 4–6 lists ASIC diagnostic error messages and identifies the FRU to replace.

Table 4–6 ASIC Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	ASIC	Appendix C	System module
??	002	ASIC	Appendix C	I/O module

NVR Diagnostic

Overview

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

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 field replaceable unit (FRU).

Running NVR Diagnostics

To run the NVR diagnostic and subtests, use the TEST command:

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

Subtests

Table 4–7 lists NVR subtests.

Continued on next page

Table 4–7 NVR Diagnostic Subtests

Subtests	Description
TOY	Runs the following tests: • Clock test • Test to ensure that the clock is ticking • Clock reentry test
NVR	Runs the following tests: • Check battery test • NVR register test
INTERRUPT	Runs the Interrupt test.
INIT	Runs the Initialization test.
?	Lists available diagnostics.

Example

This example runs the NVR diagnostic:

```
>>> T NVR [Return]
```

This example runs the NVR diagnostic and TOY subtest:

```
>>> T NVR TOY [Return]
```

Continued on next page

NVR Diagnostic, Continued

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T NVR
?? 002 NVR xxxxxxxx
```

Table 4–8 lists NVR diagnostic error messages and identifies the FRU to replace.

Table 4–8 NVR Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	NVR	Appendix C	I/O module

Memory Diagnostic

Overview

The memory diagnostic detects address and data-stuck-at faults. The diagnostic also performs ECC testing of memory.

The system performs the NVR 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 is reserved and is tested by the serial ROM (SROM) code before the console is loaded.

The diagnostic isolates faults to the field replaceable unit (FRU).

Running Memory Diagnostics

To run the memory diagnostic and subtests, use the TEST command:

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

Continued on next page

Subtests

Table 4–9 lists memory diagnostic subtests.

Table 4–9 Memory Diagnostic Subtests

Subtests	Description
ALL	Performs all tests.
CELL	Memory cell test.
ADDR	Address lines and refresh test.
LLSC	ldl_l/stl_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 4–10 lists the memory options.

Table 4–10 Memory Test Options

Option	Default	Description
-l:*xxxxxxxx*	002000000 (2Mb)	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.

Continued on next page

Examples

This example runs the memory diagnostic:

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

This example runs the memory diagnostic and the CELL subtest:

```
>>> T MEM CELL Return
```

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T MEM
?? 8xy MEM xxxxxxxx
```

Table 4–11 explains the 8*xy* memory error code.

Continued on next page

Error Reporting (continued)

Table 4–11 Memory Error Identification

Code	Description
8	Extended error code prefix.
x	Bank number (0 to 7).
y	Memory module number (0 to 7), if there are data errors in one module. 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

Continued on next page

Example

This example shows a sample memory error message:

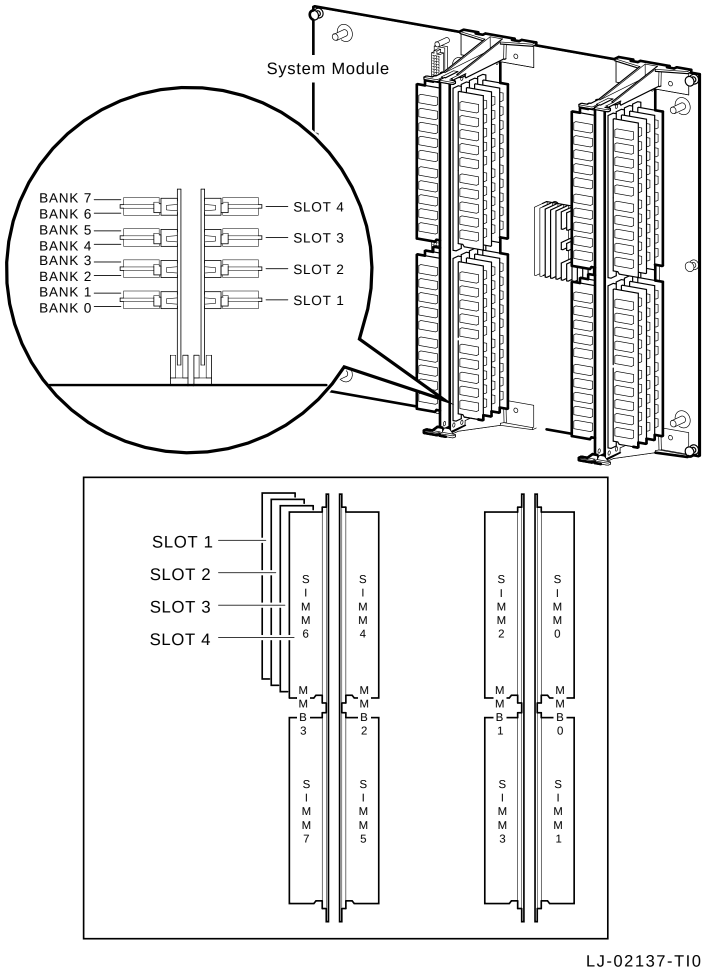
```
>>> T MEM [Return]
T-STS-MEM - LLSC Test Addr 00200000
T-STS-MEM - Cell Test 00200000 <-> 10000000
T-STS-MEM -       Wr AAAAAAAA Addr 0FFFFFFC
T-STS-MEM -       FWD - Rd AAAAAAAA Wr 55555555 Addr 0D000000
MCHK: logout frame address = 00088000
1st quadw: 00000000 000001D8 exc_addr: 00000000 0006D59E  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
 0006F0
   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 4–1 for the location of the failed SIMM.

Continued on next page

Figure 4–1 Memory Bank Layout



CXT Diagnostic

Overview

The CXT diagnostic ensures the integrity of the graphics subsystem and monitor.

Running CXT Diagnostics

To run the CXT diagnostics, use the TEST command:

```
>>> T CXT [subtest][?][-v][-d][-cn][-b][-m][-wr][-nc]
```

Qualifiers

You can specify the following qualifiers with the CXT diagnostic:

Qualifier	Meaning
?	Lists available subtests.
-v	Verbose qualifier, for stepping through a test.
-d	Keeps the display active.
-c*n*	Font qualifier, where *n* is the font character.
-b	Scrolls black characters on a white background.
-m	Specifies the multinational font set (8-bit).
-w*r*	Specifies the number of rows (*r*) to stipple.
-n*l*	Specifies the number of lines (*l*) in a quadrant.
-w*r*	Specifies the number of rows (*r*) to copy (copy test).

Examples

This example runs all CXT diagnostic subtests:

```
>>> T CXT Return
```

This example lets you step through the BOX test, using the Return key to go to the next step:

```
>>> T CXT BOX -v Return
```

Continued on next page

Examples (continued)

This example lists all available CXT subtests:

```
>>> TEST CXT ? Return

T CXT INIT
T CXT CONF   [?]  [-V] [-D]
T CXT INT    [?]  [-V] [-D]
T CXT REG    [?]  [-V] [-D]
T CXT VRAM   [?]  [-V] [-D]
T CXT BOX    [?]  [-V] [-D]
T CXT PATT   [?]  [-V] [-D]
T CXT VDAC   [?]  [-V] [-D]
T CXT STIP   [?]  [-WROWS]  [-V] [-D] [-Z]
T CXT COPY   [?]  [-WROWS]  [-V] [-D]
T CXT BOOL   [?]  [-V] [-D]
T CXT PLANE  [?]  [-V] [-D]
T CXT PSHIFT [?]  [-V] [-D]
T CXT LINE   [?]  [-NLINES] [-V] [-D]
T CXT FONT   [?]  [-CCHAR]  [-B] [-M] [-V] [-D]
```

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> TEST CXT
?? 001 CXT XXXXXXXX
```

Table 4–12 lists CXT diagnostic error messages and identifies the FRU to replace.

Table 4–12 CXT Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	CXT	Appendix C	System module

SCSI Diagnostic

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.

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 5.

Continued on next page

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 1–2, feature ❼.

```
>>> T[EST] SCSI [subtest] Return
```

Subtests

Table 4–13 lists SCSI diagnostic subtests.

Table 4–13 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.

Continued on next page

SCSI Diagnostic, Continued

Examples

This runs the SCSI diagnostic:

```
>>> T SCSI Return
```

This example runs the SCSI diagnostic and the REGISTER subtest:

```
>>> T SCSI REGISTER Return
```

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

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

Table 4–14 lists SCSI diagnostic error messages and identifies the FRU to replace.

Table 4–14 SCSI Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	SCSI	Appendix C	System module
??	002	SCSI	Appendix C	I/O module
??	1xy[1]	SCSI	Appendix C	SCSI controller A
??	2xy[1]	SCSI	Appendix C	SCSI controller B

[1]x = SCSI ID.
y = logical unit number.

NI Diagnostic

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.

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. Failure to do so will result in an external loopback failure. See Figure 1–2, feature ❷ for the port's location and Table 1–2 for a description.

To run the NI diagnostic and subtests, use the TEST command:

```
>>> T[EST] NI [subtest] [Return]
```

Subtests

Table 4–15 lists the NI diagnostic subtests.

Continued on next page

Table 4–15 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]	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

Examples

This example runs the NI diagnostic:

```
>>> T NI [Return]
```

This example runs the NI diagnostic and the NAR subtest:

```
>>> T NI NAR [Return]
```

Continued on next page

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T NI
?? 001 NI xxxxxxxx
```

Table 4–16 describes the NI diagnostic error messages and identifes the FRU to replace.

Table 4–16 NI Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	001	NI	Appendix C	System module
??	002	NI	Appendix C	I/O module

SCC Diagnostic

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

Running SCC Diagnostics

To run the SCC diagnostic and subtests, use the TEST command:

```
>>> T[EST] SCC [subtest] Return
```

Subtests

NOTE

You must connect the modem loopback to run the MODEM subtest, or a failure will occur. See Figure 1–2, feature ❻ for the location of the modem port.

Table 4–17 lists the SCC diagnostic subtests.

Continued on next page

Subtests (continued)

Table 4–17 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.

Examples

This example runs the SCC diagnostic:

```
>>> T SCC Return
```

This example runs the SCC diagnostic and the LK401 subtest:

```
>>> T SCC LK401 Return
```

Continued on next page

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T SCC
?? 003 SCC xxxxxxxx
```

Table 4–18 lists the SCC diagnostic error messages and the FRU to replace.

Table 4–18 SCC Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	SCC	See Appendix C	I/O module
??	003	SCC	See Appendix C	Keyboard
??	004	SCC	See Appendix C	Mouse

ISDN Diagnostic

Overview

The ISDN diagnostic ensures that the 79C30A chip is fully functional by testing the following:

- 79C30A internal registers
- Generate, verify, and disable interrupts
- 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

Running ISDN Diagnostics

To run the ISDN diagnostic and subtests, use the TEST command:

```
>>> T[EST] ISDN [subtest] Return
```

Subtests

Table 4–19 lists the ISDN diagnostic subtests.

Continued on next page

Table 4–19 ISDN Diagnostic Subtests

Subtest	Description	Mode
INIT	Initialize test	Console
REG	Internal registers test	Console
TONE	Audio output	Service
D_LOOP	Internal digital audio loopback test	Service
A_LOOP	Analog loopback	Console
INT	Interrupt test	Console
DMA	DMA	Console
LOGO	Audio logo	Power up
RECORD[1]	Record test	Service
PLAYBACK	Playback	Service test
REPEAT[1]	Repeat test	Service

[1]Requires a headset to perform the test correctly.

Examples

This example runs the ISDN diagnostic:

```
>>> T ISDN [Return]
```

This example runs the ISDN diagnostic and the REGISTER subtest:

```
>>> T ISDN REGISTER [Return]
```

Continued on next page

ISDN Diagnostic, Continued

Error Reporting

The diagnostic reports any error that it finds. Error messages include a hexadecimal longword of data and an FRU code to identify the failing FRU:

```
>>> T ISDN
?? 002 ISDN xxxxxxxx
```

Table 4–20 describes the ISDN diagnostic error messages and identifies the FRU to replace.

Table 4–20 ISDN Error Identification

Test Failure Code	FRU Code	Failing Test	Error Code	Replace...
??	002	ISDN	Appendix C	I/O module

Testing TURBOchannel Options

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

Before You Begin

Before testing, enter console mode and use the SHOW CONFIG command to display the installed TURBOchannel device names. Identify and record TURBOchannel device name 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.

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 scrips and run single test scripts.

Example

This example runs the default test script on the TURBOchannel option in slot 2.

```
>>> T TC2  Return
```

Continued on next page

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 execuatable; they will fail if selected.

```
>>> T [device_name] ls
```

Example

This example display a list of scripts for the TURBOchannel option in slot 2:

```
>>> T TC2 ls Return
```

Running Single Test Scripts

To run diagnostic test scripts, enter the following:

```
>>> T {device_name script} {script_name}
```

Example

This example runs script pst-m on the TURBOchannel option in slot 2:

```
>>> T TC2 script pst-m Return
```

Initializing a TURBOchannel Option

To initialize a selected TURBOchannel option, enter the following command:

```
>>> T [dev_name] INIT Return
```

Example

This example initializes the TURBOchannel option in slot 3:

```
>>> T TC3 INIT Return
```

Continued on next page

Testing TURBOchannel Options, Continued

Additional Commands

Here are some other TEST commands used with TURBOchannel options:

Command	Description
>>> T [dev_name] [cnfg]	Display configuration on TC option slot.
>>> T [dev_name] [cat scriptname]	List contents of a script.

Chapter 5
SCSI Utilities

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- SCSI Utility List
- Show Device Utility
- Hard Disk Eraser Utility
- Diskette Formatter Utility
- Disk Verifier Utility

SCSI Utility List

Description

Table 5–1 describes the SCSI utilities.

Table 5–1 SCSI Utility Options

Utility Name	Description
SHOW DEV	Displays SCSI device information.
ERASE	Hard disk eraser.
FORMAT	Diskette formatter.
VERIFY	Disk verifier.

Show Device Utility

Overview

The show device utility displays information about all SCSI devices attached to the SCSI bus.

The show device utility provides the following information:

- 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

Format

To obtain information about devices attached to the SCSI bus, enter the following command:

```
>>> SHOW DEV [Return]
```

Hard Disk Eraser Utility

Overview

The hard disk eraser utility spins up a disk and erases it.

Format

To erase a hard disk, enter the following command and answer the prompts (Table 5–2):

```
>>> T[EST] SCSI ERASE [Return]
```

Table 5–2 Erase Utility Prompts

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

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
  >>>
```

Error Reporting

See Appendix C.

Diskette Formatter Utility

Overview

The diskette formatter utility formats a diskette. After the utility starts, *do not terminate the utility or halt the machine*; this will corrupt the device being tested, and you will have to run the utility again.

Format

To format a diskette, enter the following command and answer the prompts (Table 5–3):

```
>>> T[EST] SCSI FORMAT [Return]
```

Table 5–3 Diskette Utility Prompts

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

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
```

Error Reporting

See Appendix C.

Disk Verifier Utility

Overview

The disk verifier utility verifies that all blocks on a disk can be read.

Format

To verify a disk, enter the following command and answer the prompts (Table 5–4):

```
>>> T[EST] SCSI VERIFY [Return]
```

Table 5–4 Verify Utility Prompts

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

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
 >>>
```

Error Reporting

See Appendix C.

Chapter 6
Troubleshooting

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- System Device FRU Codes
- Power-Up LED Error Codes
- 84 Fail Message
- Troubleshooting Tables

  System Problems
  Monitor Problems
  Mouse Problems
  Keyboard Problems
  Drive Problems
  Network Problems
  Audio Problems
  Console Security Problems
  Firmware Upgrade Problems

NOTE
The troubleshooting techniques described do not identify all possible problems, nor do the suggested actions correct all problems.

Replacing Modules

Before you replace modules, check for proper cable connections, installed loopbacks, and proper termination.

System Device FRU Codes

System Device FRU Codes

Table 6–1 lists the system device FRU codes. This table serves as a reference for the Power-Up LED Error Codes section in this chapter.

Table 6–1 System Device FRU Codes

Code	FRU
000	Unknown, or diagnostic does not support FRU reporting
001	System module
002	I/O module
003	LK keyboard
004	Mouse/pointing device
005	Audio module
006	Reserved

Power-Up LED Error Codes

Successful Power-Up Display

The following example shows the display for a successful power-up sequence:

```
DEC 3000 AXP M500
Digital Equipment Corporation
System conducting power up tests

Devnam         Devstat
CPU            OK KN15-AA - BL7.0-S0F0-I080 - sBLx.x - DECchipOK
   144MB
NVR            OK
CXT            OK
SCC            OK PTR(0)= Present Keybd(2)= Present
NI             OK Ethernet Address: 08-00-2B-2A-1F-82, THICK
SCSI           OK
ISDN           OK
TC4            OK - PMAGB-BA

System power up OK
Enter B to boot software from DKB0
>>>
```

If You See An Error

The LED codes described in this section provide instructions for a power-up sequence failure. Check the LED code displayed and go to the appropriate section.

Serial ROM LED Codes

This section lists LED codes for the first diagnostics in the power-up sequence. If an error occurs before the system enters the console program, the diagnostic LEDS display a hexadecimal error code that identifies the failed test.

Use the diagnostic LEDs to help diagnose problems when the system is unable to set up the console.

Continued on next page

Table 6–2 lists the serial ROM LED error codes. If the diagnostic LEDs display one of these codes, use Tables 6–2 and 6–3 to isolate the failed FRU.

This portion of the testing is not displayed on the monitor.

Table 6–2 Serial ROM LED Error Codes

LED Code	First Try Table 6–3 Actions (in Order)	Then Replace FRU (in Order)	FRU Description
00	1, 2	001	System module
		002	I/O module
ff	1, 2	001	System module
		002	I/O module
fe	1, 2	001	System module
		002	I/O module
fd	1, 2	001	System module
		002	I/O module
fc	1, 2	001	System module
		002	I/O module
fb	1, 2	001	System module
		002	I/O module
fa	1, 2	001	System module
		002	I/O module
f9	1, 2	001	System module
		002	I/O module
f8	1, 2	001	System module
		002	I/O module
f7	1, 2	001	System module
		002	I/O module

Continued on next page

Table 6–2 (Continued) Serial ROM LED Error Codes

LED Code	First Try Table 6–3 Actions (in Order)	Then Replace FRU (in Order)	FRU Description
f6	1, 2	001 002	System module I/O module
f5	1, 2	001 002	System module I/O module
f4	1, 2	001 002	System module I/O module
f3	1, 2	001 002	System module I/O module
f2	1, 2	001 002	System module I/O module
f1	1, 2	001 002	System module I/O module
f0	1	002	I/O module
20	1, 2	001 002	System module I/O module

Table 6–3 Serial ROM Code Action Table

Step	Action
1	Make sure there is a a good connection between the system module and I/O module.
2	Make sure that all memory modules are properly installed. You may need to reseat the memory motherboards or modules.

Continued on next page

ASIC LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the ASIC diagnostics and interpret the error information using

- The SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–4 and 6–5 to isolate the failed FRU.

Table 6–4 ASIC LED Codes

LED Code	First Try Table 6–5 Action	Then Replace FRU (in Order)	FRU Name
35	1	001 002	System module I/O module

Table 6–5 ASIC Action Table

Step	Action
1	Reseat the system module and I/O module.

Memory LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

Continued on next page

If the system enters the console program, then run the MEMORY diagnostics and interpret the error information using

- The SHOW ERROR command
- Diagnostic information (Chapter 4)

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

CXT LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the CXT diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–6 and 6–7 to isolate the failed FRU.

Continued on next page

NOTE

Before you replace the system module, first replace the monitor cable and the monitor.

Table 6–6 CXT LED Codes

LED Code	First Try Table 6–7 Actions (in Order)	Then Replace FRU (in Order)	FRU Name
81	1, 2	001	System module
82	1, 2	001	System module
83	1, 2	001	System module
84	1, 2	001	System module
85	1, 2	001	System module
86	1, 2	001	System module
87	1, 2	001	System module
88	1, 2	001	System module
89	1, 2	001	System module
8A	1, 2	001	System module
8B	1, 2	001	System module
8C	1, 2	001	System module

Table 6–7 CXT LED Action Table

Step	Action
1	Make sure the monitor cable is properly connected.
2	Reseat the system module.

Continued on next page

NVR LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the NVR diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–8 and 6–9 to isolate the failed FRU.

Table 6–8 NVR LED Codes

LED Code	First Try Table 6–9 Action	Then Replace FRU (in Order)	FRU Name
3A	1	002 001	I/O module System module
3B	1	002 001	I/O module System module
3C	1	002 001	I/O module System module
3D	1	002 001	I/O module System module
3E	1	002 001	I/O module System module

Continued on next page

Table 6–9 NVR LED Action Table

Step	Action
1	Reseat the system module and I/O module.

SCC LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the NVR diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–10 and 6–11 to isolate the failed FRU.

NOTE

When testing a DEC 3000 Model 500/500S AXP system, the console command SERVER must be set to 1 (SET SERVER 1) for this diagnostic.

Table 6–10 SCC LED Codes

LED Code	First Try Table 6–11 Action	Then Replace FRU (in Order)	FRU Name
40	1	002	I/O module

Continued on next page

Table 6–10 (Continued) SCC LED Codes

LED Code	First Try Table 6–11 Action	Then Replace FRU (in Order)	FRU Name
41	1	002	I/O module
42	1	002	I/O module
43	2	002	I/O module
44	1	002	I/O module
45	1	002	I/O module
46	1	002	I/O module
47	4	003 002	Keyboard I/O module
48	3	004	Mouse
49–4E	Reserved	–	–
4f	1	002	I/O module

Table 6–11 SCC LED Action Table

Step	Action
1	Reseat the I/O module.
2	Reseat the modem loopback.
3	Reseat the mouse connection.
4	Reseat the keyboard connection.

NI LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

Continued on next page

If the system enters the console program, then run the NVR diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–12 and 6–13 to isolate the failed FRU.

Table 6–12 NI LED Codes

LED Code	First Try Table 6–13 Actions (in Order)	Then Replace FRU	FRU Name
50	1	002	I/O module
51	1	002	I/O module
52	1	002	I/O module
53	2	002	I/O module
54	1	002	I/O module
55	1	002	I/O module
56	1	002	I/O module
57	1	002	I/O module
58	1	002	I/O module
59	1, 2	002	I/O module
5A	1	002	I/O module

Continued on next page

Table 6–13 NI LED Action Table

Step	Action
1	Reseat the I/O module and system module.
2	If thickwire is selected, you must use a 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.

ISDN LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the NVR diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)
- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–14 and 6–15 to isolate the failed FRU.

Continued on next page

Power-Up LED Error Codes, Continued

Table 6–14 ISDN LED Codes

LED Code	First Try Table 6–15 Actions (in Order)	Then Replace FRU (in Order)	FRU Name
70	1	002	I/O module
71	1	002	I/O module
72	1	002	I/O module
73	1	002	I/O module
74	1	001	System module
75	1	002	I/O module
76	1, 2, 3	002 001	I/O module System module

Table 6–15 ISDN Action Table

Step	Action
1	Reseat the I/O module and system module.
2	Make sure a handset (microphone/speaker) is connected.
3	Make sure the audio module cable is connected to the I/O module.

SCSI LED Codes

The following LED codes represent continued power-up testing. If an error occurs during this testing sequence, the system displays a hexadecimal code plus FRU and error code information on the screen.

If the system enters the console program, then run the NVR diagnostics and interpret the error information using

- SHOW ERROR command
- Diagnostic information (Chapter 4)

Continued on next page

Power-Up LED Error Codes, Continued

- Diagnostic error messages (Appendix C)

If the unit does not enter the console program (>>> prompt displayed on monitor or DD code displayed on the LEDs), then use Tables 6–16 and6–17 to isolate the failed FRU.

Table 6–16 SCSI LED Codes

LED Code	First Try Table 6–17 Actions (in Order)	Then Replace FRU	FRU Name
60	1	002	I/O module
61	1	002	I/O module
62	1	002	I/O module
63	1, 2	002	I/O module, then drive
64	1, 2	002	I/O module, then drive
65	1, 2, 3	002	I/O module, then drive

Table 6–17 SCSI Action Table

Step	Action
1	Reseat the I/O module and system module.
2	Check SCSI cables and SCSI ID setting.
3	All disk devices with removable media **must** have media installed.

Continued on next page

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 display the DD code and the screen displays the >>> console prompt. These are the only indications that the system has entered the console program.

If the system does not enter the console program, use Tables 6–18 and 6–19 to isolate the failed FRU.

Table 6–18 Console LED Codes

LED Code	First Try Table 6–19 Action	Then Replace FRU	FRU Name
EF	1	001	System module
EE	1	001	System module
ED	1	001	System module
EC	1	001	System module
EB	1	001	System module
EA	1	001	System module
E9	1	001	System module
E8	1	001	System module
E7	1	001	System module
E6	1	001	System module
E5	1	001	System module
E4	1	001	System module
E3	1	001	System module
E2	1	001	System module
E1	1	001	System module

Continued on next page

Power-Up LED Error Codes, Continued

Table 6–18 (Continued) Console LED Codes

LED Code	First Try Table 6–19 Action	Then Replace FRU	FRU Name
E0	1	001	System module
DF	1	001	System module
DE	1	001	System module
DD	–	–	Console program entered. The screen should display the >>> console prompt.

Table 6–19 Console Action Table

Step	Action
1	Reseat the system module.

84 Fail Message

Overview

`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, the system also displays a diagnostic error code. 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.

Troubleshooting Tables

Overview

The following tables list symptoms, possible causes, and corrections for problems you may find when troubleshooting. Each table covers a different category of problem.

System Problems

Table 6–20 covers general system power-up problems.

Table 6–20 System Problems

Symptom	Possible Cause	Corrective Action
Fan failure	A fan failed.	Check the red fan failure LED. • If the LED is on, a fan has failed; replace the fan. • If the LED is off, the fans are OK.
	The three fan connections are not connected.	Reseat the connectors. If needed, replace the harness.
	The power supply failed.	Replace the power supply.
The DC OK LED is off.	The power supply failed.	Replace the power supply.
All LEDs do not work.	The LSM module /cable or system module failed.	See Chapter 7 for module locations.
The monitor display is blank, and the diagnostic LEDs display 00.	The SROM jumper setting is incorrect.	See Chapter 2 for the jumper location and correct setting.

Continued on next page

Table 6–20 (Continued) System Problems

Symptom	Possible Cause	Corrective Action
		Reseat the I/O module system module.
		Reseat memory motherboards.
The power-up display is not displayed, and the diagnostic LEDs display the DD code.	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.	Install the system software. See the software documentation for installation instructions.

Continued on next page

Table 6–20 (Continued) System Problems

Symptom	Possible Cause	Corrective Action
	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 3 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 3 for command descriptions.
	Boot device is not configured properly.	Use the **SHOW DEVICE** command to check that all devices are configured properly. If not, check SCSI ID settings and SCSI cables.
	Faulty boot device	Run SCSI diagnostic utilities (Chapter 4).

Continued on next page

Monitor Problems

Table 6–21 covers monitor problems. If the corrective actions do not correct a problem:

1. Check all cable connections.
2. If the connections are okay, run the CXT diagnostics (Chapter 4).

Table 6–21 Monitor Problems

Symptom	Possible Cause	Corrective Action
No monitor display.	The alternate console is enabled.	Check the alternate console switch setting.
The monitor display is unstable.	The video refresh switch setting is incorrect.	Check the video refresh setting. The correct setting depends on the monitor.
	Monitor needs alignment.	Refer to the monitor's documentation for adjustment procedures and Appendix C for alignment pattern diagnostics.

Continued on next page

Mouse or Tablet Problems

Table 6–22 covers mouse and tablet problems. If the corrective actions do not correct a problem:

1. Check all cable connections.
2. If the connections are okay, run the SCC diagnostics (Chapter 4).

Table 6–22 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.

Continued on next page

Keyboard Problems

Table 6–23 covers keyboard problems. If the corrective actions do not correct a problem:

1. Check all cable connections.
2. If the connections are okay, run the SCC diagnostics (Chapter 4).

Table 6–23 Keyboard Problems

Symptom	Possible Cause	Corrective Action
Keys do not work.	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.

Drive Problems

Table 6–24 covers drive problems. If the corrective actions do not correct a problem:

1. Check all cable connections.
2. If connections are okay, you must run the SCSI diagnostic (Chapter 4) or utilities (Chapter 5) to isolate a media or controller problem.

   See Chapter 2 for information on specfic storage devices. Figure 2–10 shows internal cable routing, and Figure 2–12 shows power cable routing. Figure 2–11 shows recommended SCSI ID settings and drive placement.

Continued on next page

Table 6–24 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 the SCSI IDs to a unique number.
	A cable is loose.	Make sure all cables connections are okay.
	A drive is defective.	Run diagnostics to isolate the fault to an FRU. Replace the FRU.

Continued on next page

Network Problems

Table 6–25 covers network problems.

If the corrective actions do not correct a problem, run NI diagnostics in service mode (for extended testing capabilities). See Chapter 4.

Table 6–25 Network Problems

Symptom	Possible Cause	Corrective Action
An NI error message is displayed when verifying the Ethernet.	A thickwire /10baseT terminator or cable was not installed.	Attach an appropriate Ethernet terminator.
	A cable is loose.	Check all cable connections on the Ethernet segment.
The system cannot boot from the network.	Local network problem.	The problem is most likely caused by the server system or the network.
	Defective NI interface.	Run the NI diagnostics (TEST NI command) with terminators attached. If a test fails, replace the faulty FRU.

Continued on next page

Audio Problems

To isolate audio problems, run the ISDN diagnostics service mode (for extended testing capabilities). See Chapter 4.

Console Security Problems

To isolate console security problems, see Chapter 2 for procedures on

- Enabling console security
- Resetting the console password
- Entering the privileged state

Firmware Upgrade Problems

Table 6–26 covers problems when trying to upgrade the flash EEPROMs.

Table 6–26 Firmware Upgrade Problems

Symptom	Possible Cause	Corrective Action
Unable to complete firmware upgrade.	Jumpers on the system module and I/O module are not set correctly.	See Appendix C.

Chapter 7
Removing and Replacing FRUs

Chapter Overview

Chapter Topics

This chapter covers the following topics:

- FRU Locations
- Top Cover
- Front Bezel
- Side Panels
- Rear Bezel
- Audio Module Assembly
- Lights and Switch Module
- Power Supply
- RZxx Disk Drives
- I/O Module
- Fans
- Memory Motherboard
- Memory Module
- System Module
- System Cable and Power Routing

Continued on next page

Part Numbers

For convenience, each removal procedure lists the part numbers of the FRUs removed in that procedure.

Prevent ESD

When removing an FRU, use a properly grounded wriststrap to prevent electrostatic discharge (ESD).

FRU Locations

Locating an FRU

To locate an FRU:

1. Find the FRU in Table 7–1.
2. Locate the FRU in Figure 7–1 or 7–2 by locating its reference number.
3. To remove the FRU, refer to the FRU's removal procedure in this chapter.

Table 7–1 FRU Table

FRU	Figure Reference
Front bezel	❶ Figure 7–1
Audio assembly	❷
Lights and switch module (LSM)	❸
Disks	❹
I/O module	❺
Rear bezel	❻
Fan assembly	❼
Left side panel	❽ Figure 7–2
Memory modules	❾
Memory motherboard (MMB)	❿
System module	⓫
Top cover	⓬
Right side panel	⓭
Power supply	⓮

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Figure 7–1 shows the right side view of the DEC 3000 Model 500/500S AXP system.

Figure 7–1 FRU Locations (Right Side)

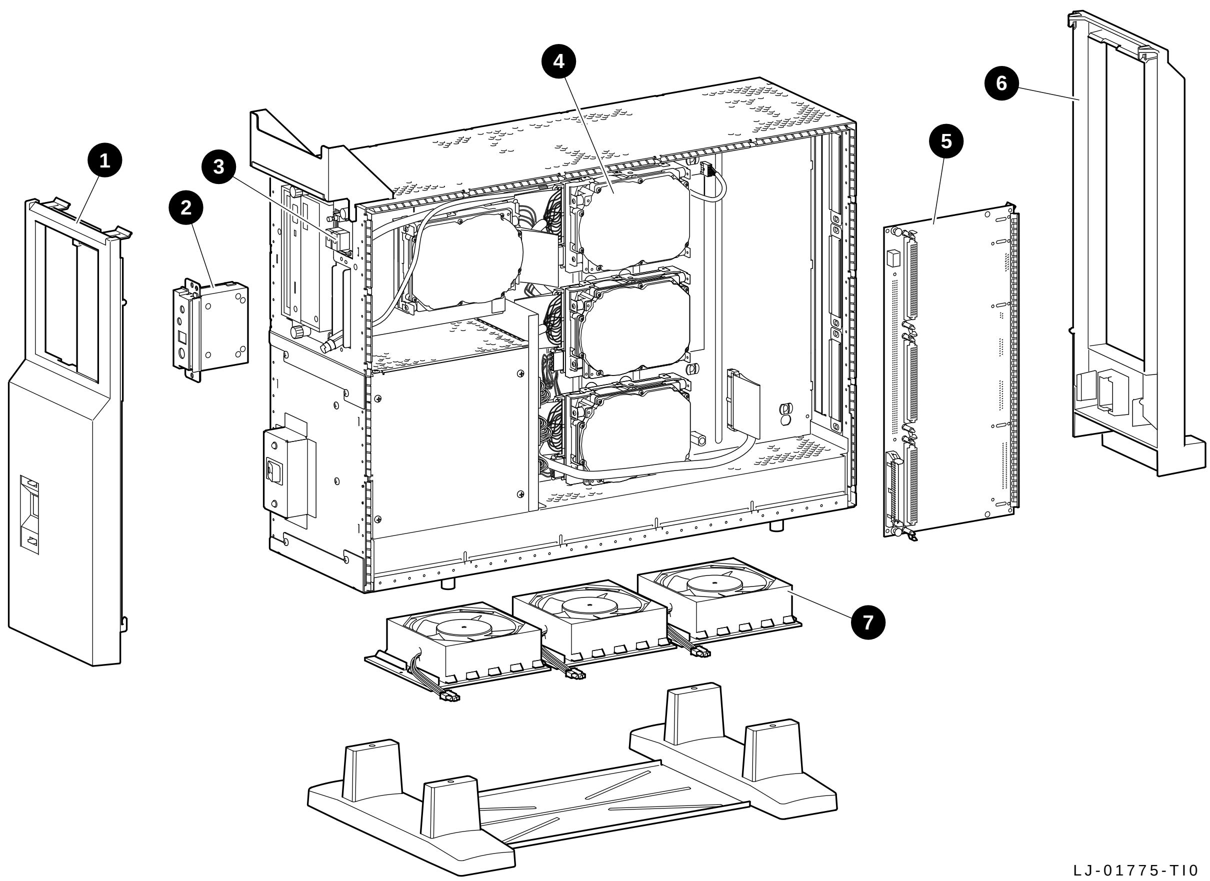

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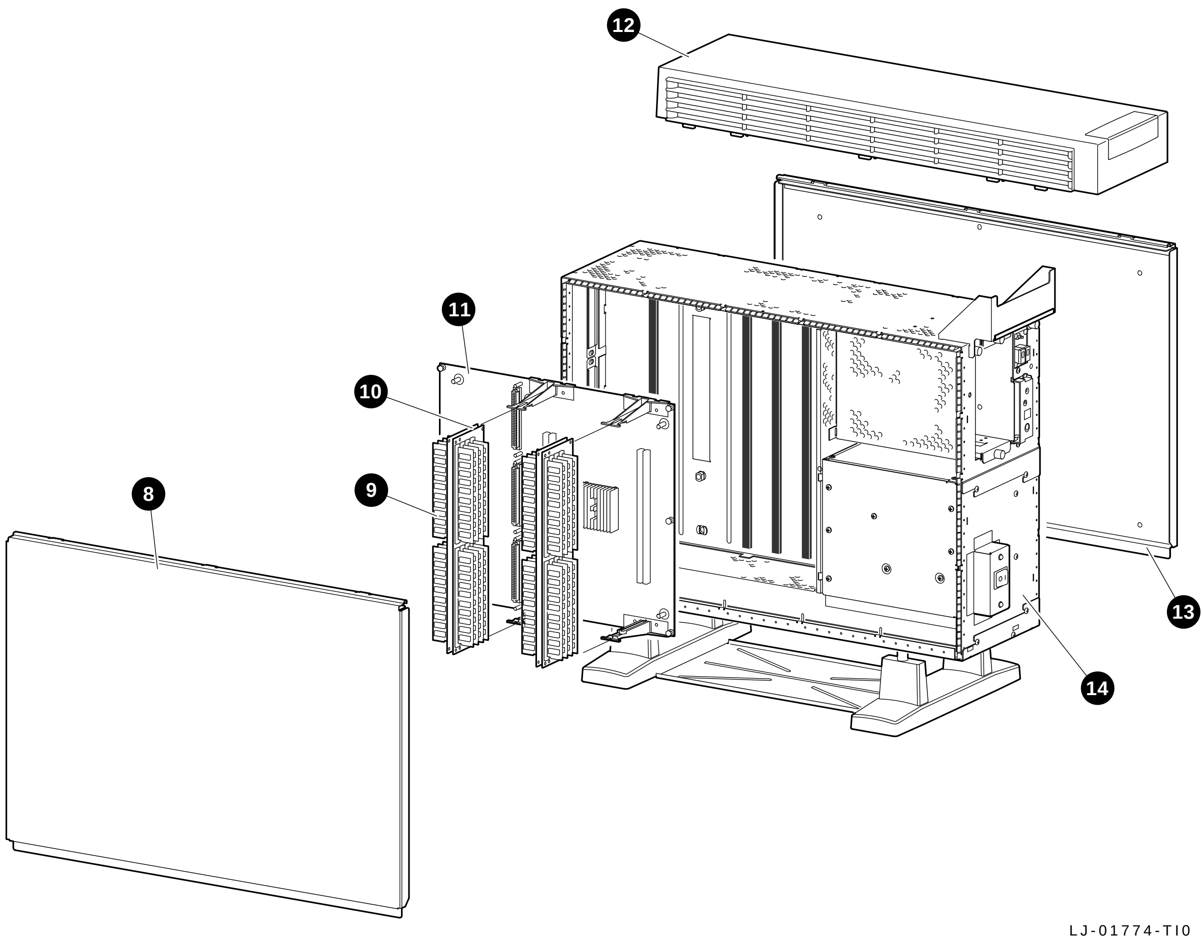
Figure 7–2 shows the left side view of the DEC 3000 Model 500/500S system.

Figure 7–2 FRU Locations (Left Side)



Top Cover

Keylock Security

If the unit is locked, the customer is required to supply keys to the Digital service representative to open the top cover.

Before leaving the site, the Digital service representative should return all keys to the customer or inform the customer that the unit is locked.

Digital service personnel are not responsible for lost keys and will not provide keys. It is the responsibility of customers to ensure that the unit is secured; they should record key numbers stamped on keys.

If the unit is locked and keys are lost, then the customer will need to call a locksmith to open the unit.

Top Cover Removal

NOTE

Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove the top cover:

Step	Action	Refer to Figure 7–3
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Unlock the top cover.	❶
4	Slide the cover forward and up off the system.	❷

Part Number

Description	Part Number	Quantity
Top cover	70–30266–01	1

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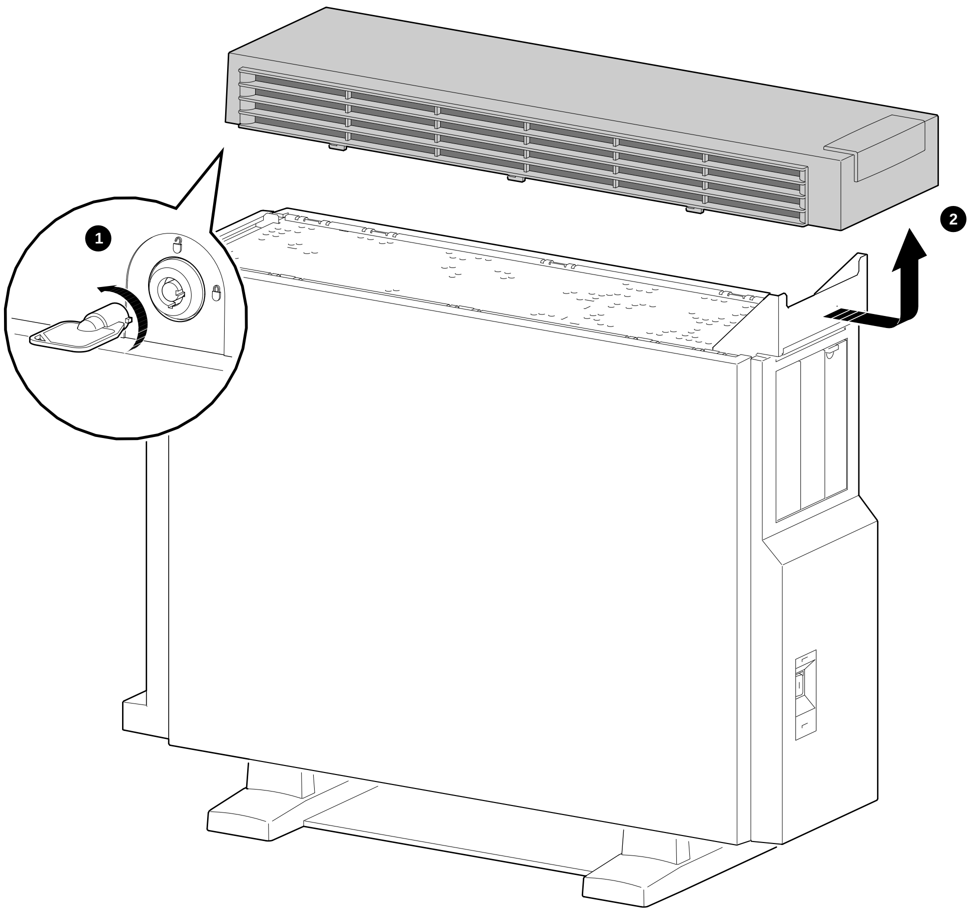
Figure 7–3 Removing the Top Cover



Top Cover Replacement

To install the top cover, reverse the removal steps.

Front Bezel

Front Bezel Removal

NOTE

Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove the front bezel:

Step	Action	Refer to Figure 7–4
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Release the two tabs.	❶
5	Tilt the front bezel forward and down off the system.	–

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Front bezel	74–43830–01	1

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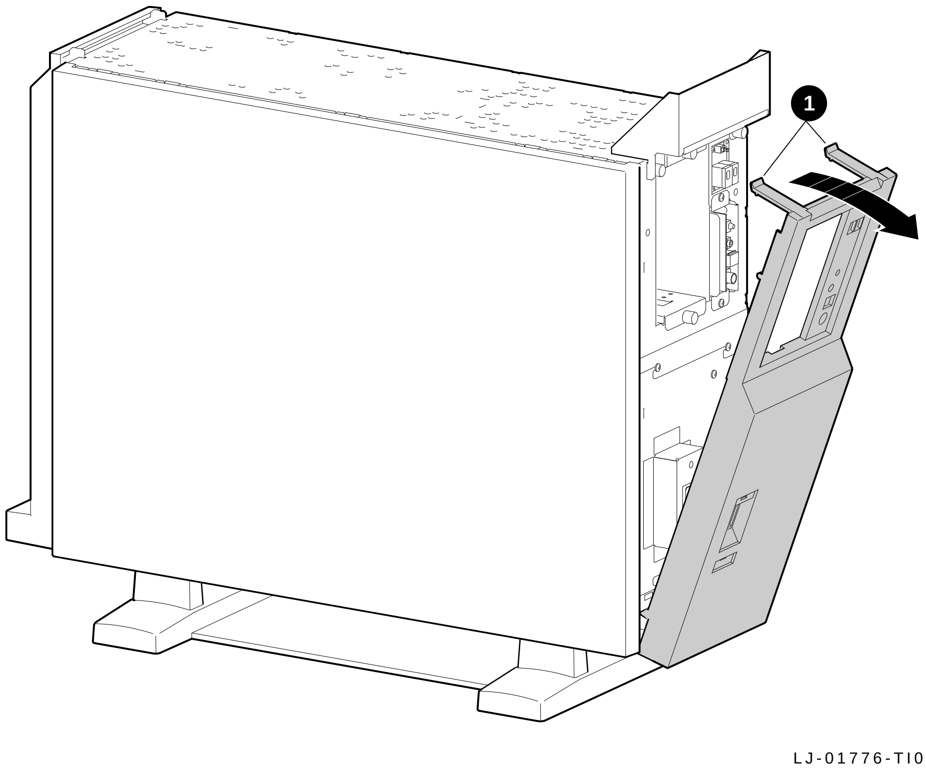
Figure 7–4 Removing the Front Bezel



Front Bezel Replacement

To install the front bezel, reverse the removal steps.

Side Panels

Side Panel Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove either side panel:

Step	Action	Refer to Figure 7–5
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Pull the panel towards you by grabbing the metal tabs.	❶
5	Lift up and remove the panel.	❷

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Side panel (pedestal)	70–29563–01	1
Side panel (rackmount)	70–29564–01	1

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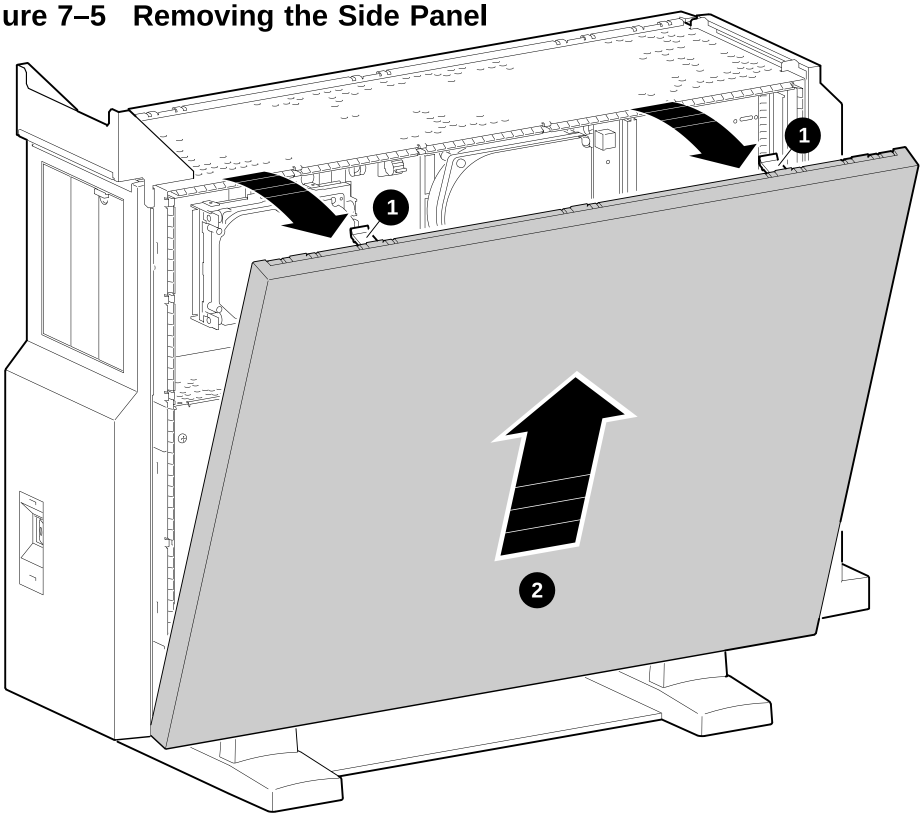
Figure 7–5 Removing the Side Panel



Side Panel Replacement

To install the side panel, reverse the removal steps.

Rear Bezel

Rear Bezel Removal

NOTE

Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove the rear bezel:

Step	Action	Refer to Figure 7–6
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Disconnect the cables from rear.	–
4	Remove the top cover.	–
5	Lift the bezel up and out of the system.	❶

Part Numbers

Description	Part Number	Quantity
Top cover	70-30266-01	1
Rear bezel	74-44072-01	1

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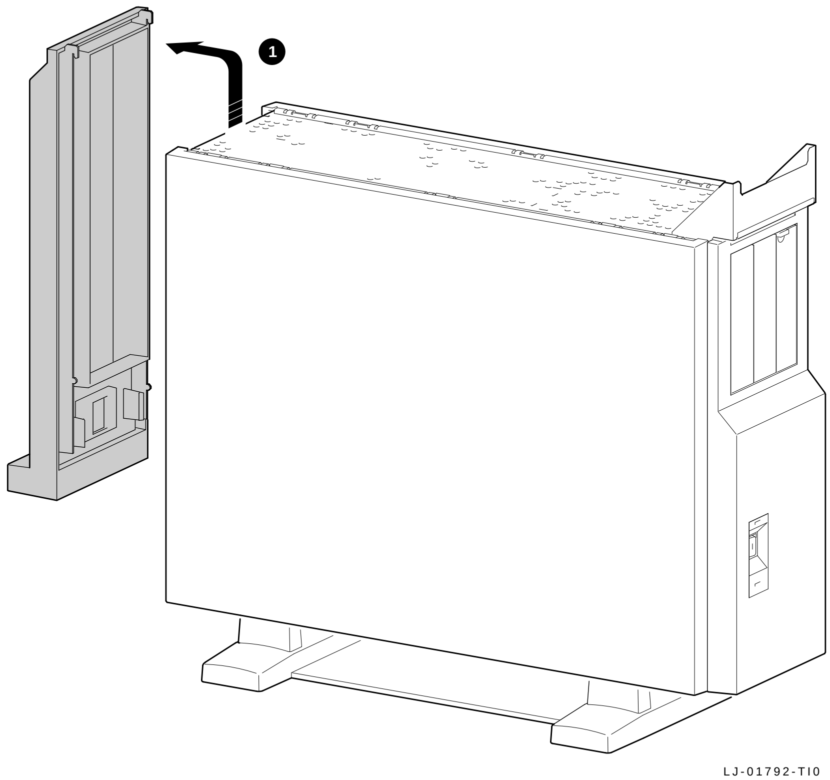
Rear Bezel, Continued

Figure 7–6 Removing the Rear Bezel



Rear Bezel Replacement

To install the rear bezel, reverse the removal steps.

Audio Module Assembly

Audio Module Removal

NOTE

Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged audio module assembly:

Step	Action	Refer to Figure 7–7
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the front bezel.	–
5	Remove the two removable rivets.	❶
6	Slide the audio module assembly out slightly.	❷
7	Disconnect the audio cable from the rear of audio module assembly and remove audio module assembly.	❸

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Front bezel	74–43830–01	1
Removable rivets	12–36064–01	2
Audio assembly	70–29562–01	1
Audio cable	17–03502–01	1

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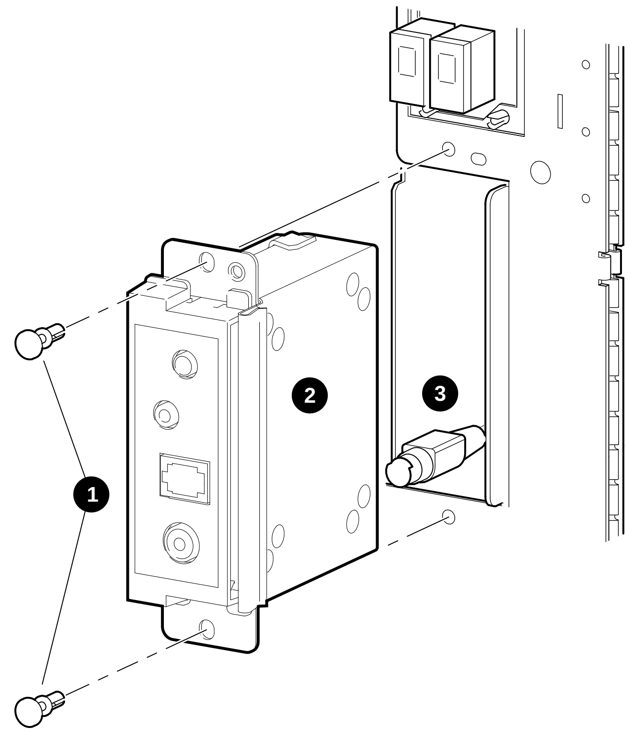
Figure 7–7 Removing the Audio Module Assembly



Audio Module Replacement

To install the audio module assembly, reverse the removal steps.

Lights and Switch Module

LSM Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged lights and switch module (LSM):

Step	Action	Refer to Figure 7–8
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the right side panel.	–
5	Disconnect the LSM cable.	❶
6	Remove the four removable rivets.	❷
7	Remove the LSM module.	❸

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Front bezel	74–43830–01	1
LSM cable	17–03501–01	1
Removable rivets	12–36064–01	4
LSM module	54–21145–02	1

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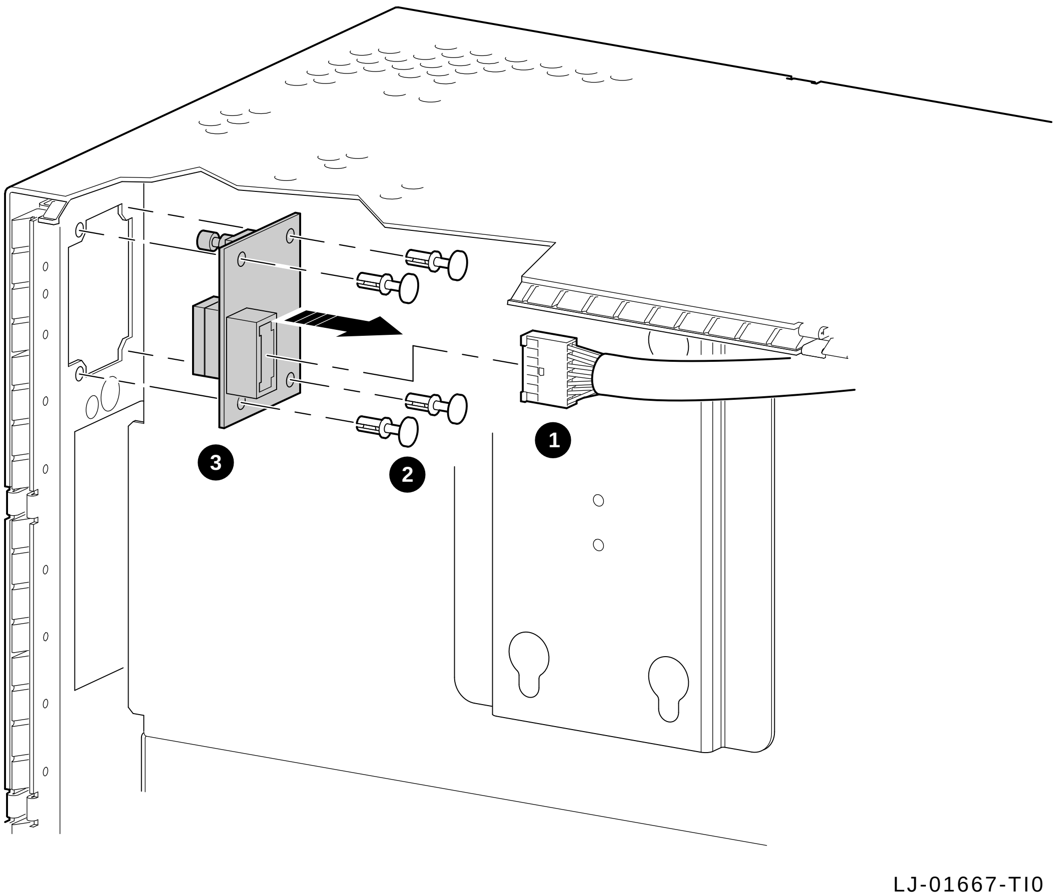
Figure 7–8 Removing the LSM Module



Lights and Switch Module Replacement

To install the LSM module, reverse the removal steps.

Power Supply

Power Supply Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged power supply:

Step	Action	Refer to Figure
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the front bezel.	–
5	Remove both side panels.	–
6	Disconnect the five power cables at the rear of power supply.	❶ Figure 7–9
7	Lower the access panel and disconnect the ac power cord and fan connector.	❷ Figure 7–10
8	Loosen the four mounting screws.	❸
9	Remove the power supply.	❹

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Figure 7–9 shows the power supply cabling for the DEC 3000 Model 500/500S AXP system.

Figure 7–9 Power Supply Cabling

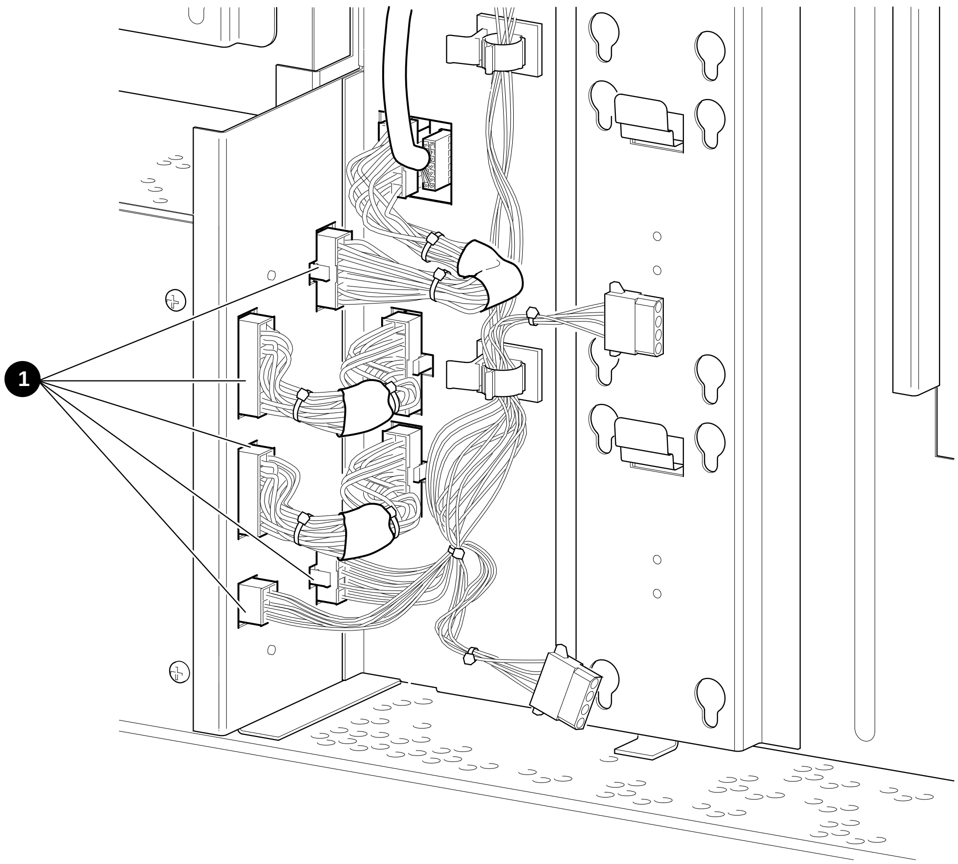

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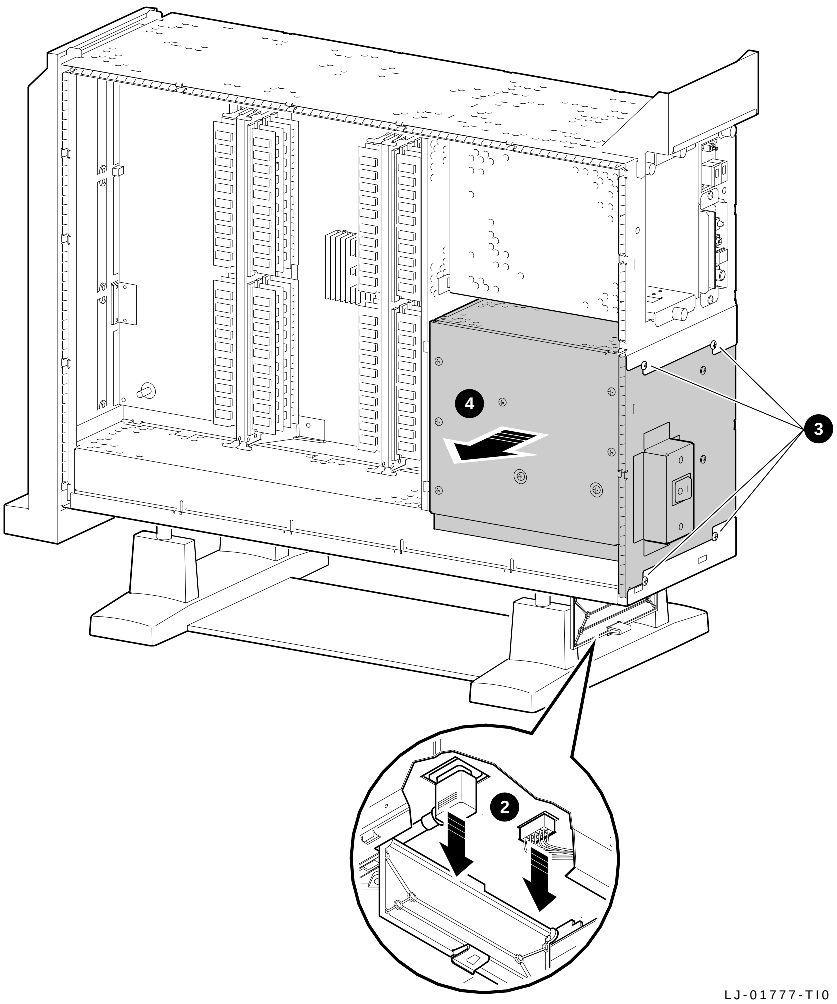
Figure 7–10 Removing the Power Supply



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Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Side panels	70–29563–01	2
Power cable	17–03395–01	1
Mounting screws	–	4
Power supply	H7883–YA	1

Power Supply Replacement

To install the power supply, reverse the removal steps.

RZ*xx* Disk Drives

Overview

This section describes how to remove the following RZ disk drives:

RZ24L-E
RZ25-E
RZ26-E

RZ*xx* Drive Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged RZxx disk:

Step	Action	Refer to Figure
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the right side panel.	–
5	Disconnect the power/SCSI interface cables.	➊ + ➋ Figure 7–11
6	Press the release tab.	➌
7	Slide the RZxx drive up and lift out of system.	➍
8	Record the SCSI ID setting, for use on the replacement drive.	Figure 7–12

NOTE
If you are adding disk drives, refer to the configuration chapter in *DEC 3000 Model 500/500S AXP Service Information*.

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Figure 7–11 shows the removal of an RZ*xx* disk drive from the DEC 3000 Model 500/500S AXP system.

Figure 7–11 Removing an RZ*xx* Drive

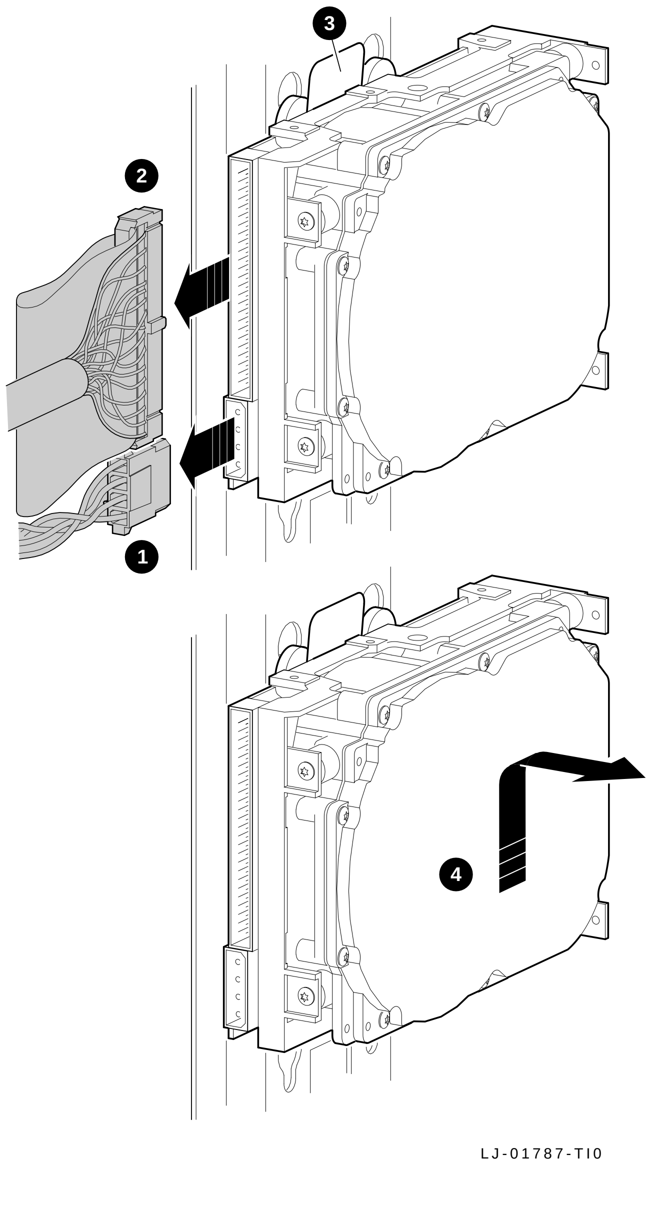

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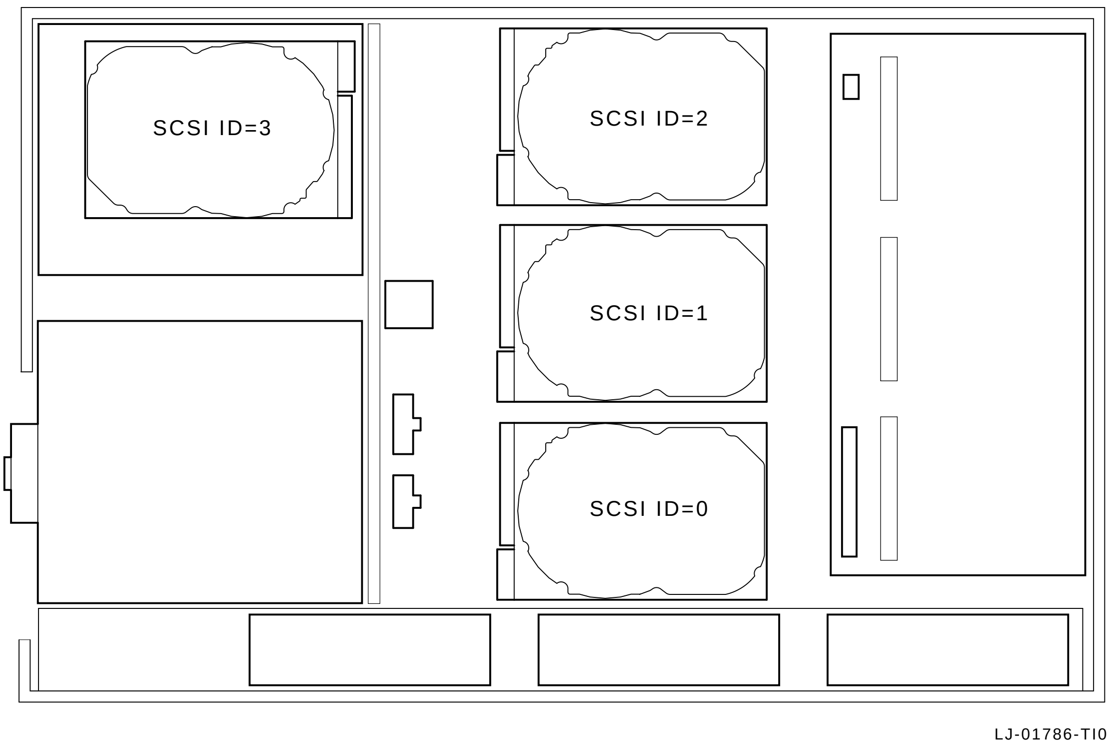
Figure 7–12 shows the default SCSI ID settings for disk drives in the DEC 3000 Model 500/500S AXP system.

Figure 7–12 Default SCSI ID Settings



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Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Right side panel	70–29563–01	1
Disk drive	RZ24L–E	Up to 4 drives
Disk drive	RZ25–E	Up to 4 drives
Disk drive	RZ26–E	Up to 4 drives

RZ*xx* Disk Replacement

To install an RZ*xx* disk drive, reverse the removal steps.

I/O Module

I/O Module Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged I/O module:

Step	Action	Refer to Figure 7–13 and Figure 7–14
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the right panel.	–
5	Disconnect all I/O bulkhead connections.	❶
6	Remove any TURBOchannel modules.	❷
7	Disconnect the audio cable from the I/O module.	❸
8	Remove the SCSI I/O module cables.	❹
9	Release the two removable rivets (top and bottom).	❺
10	Release the tabs.	❻
11	Remove the I/O module.	❼

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Figure 7–13 I/O Module Cable Connections

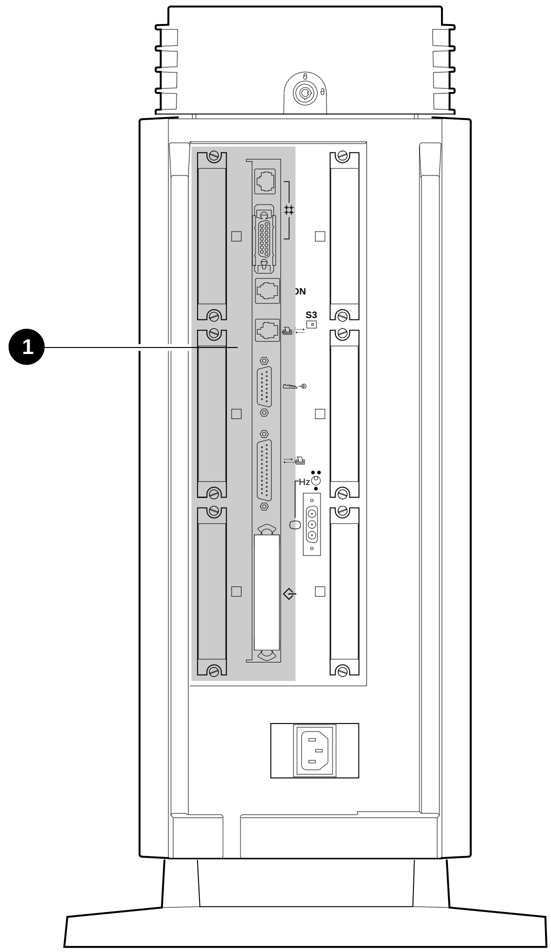

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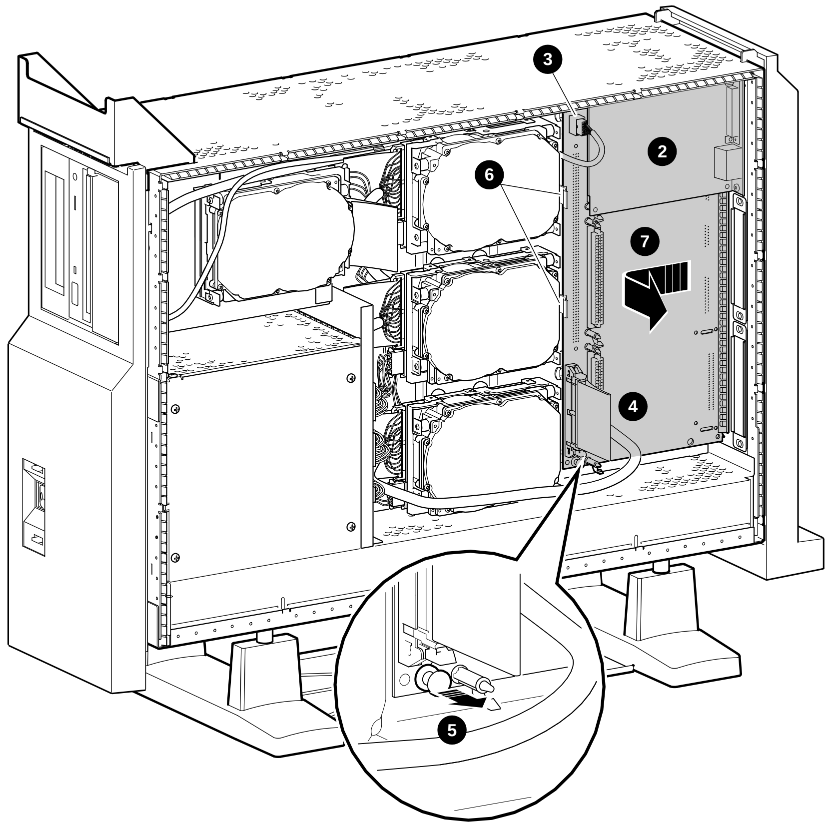
Figure 7–14 Removing the I/O Module (Side View)



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I/O Module, Continued

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Right side panel	70–29563–01	1
TURBOchannel modules	xx–xxxxx–xx*	Up to 6
Removable rivets	12–36064–01	4
I/O module	54–21147–01	1

*See the *DEC 3000 Model 500/500S AXP Options Installation Guide.*

I/O Module Replacement

Before installing the new I/O module, ensure that

- The console secure jumper is set to the same setting as the failed module
- The flash ROM jumper is set to the same setting as the failed module

To install the I/O module, reverse the installation steps.

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Figure 7–15 shows the I/O module jumper locations. Table 7–2 briefly describes each jumper.

Figure 7–15 I/O Module Jumper Locations

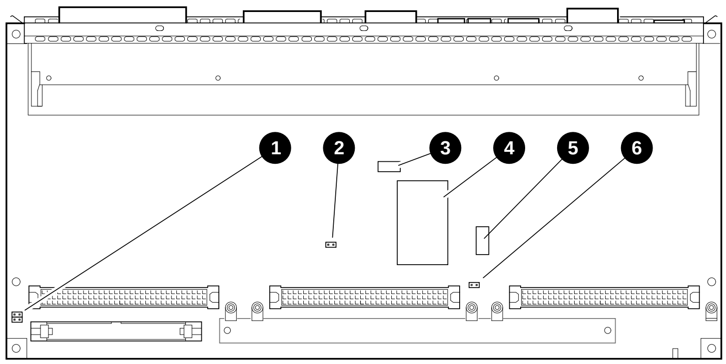


Table 7–2 describes each of the I/O module jumpers.

Table 7–2 I/O Module 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

Fans

NOTE

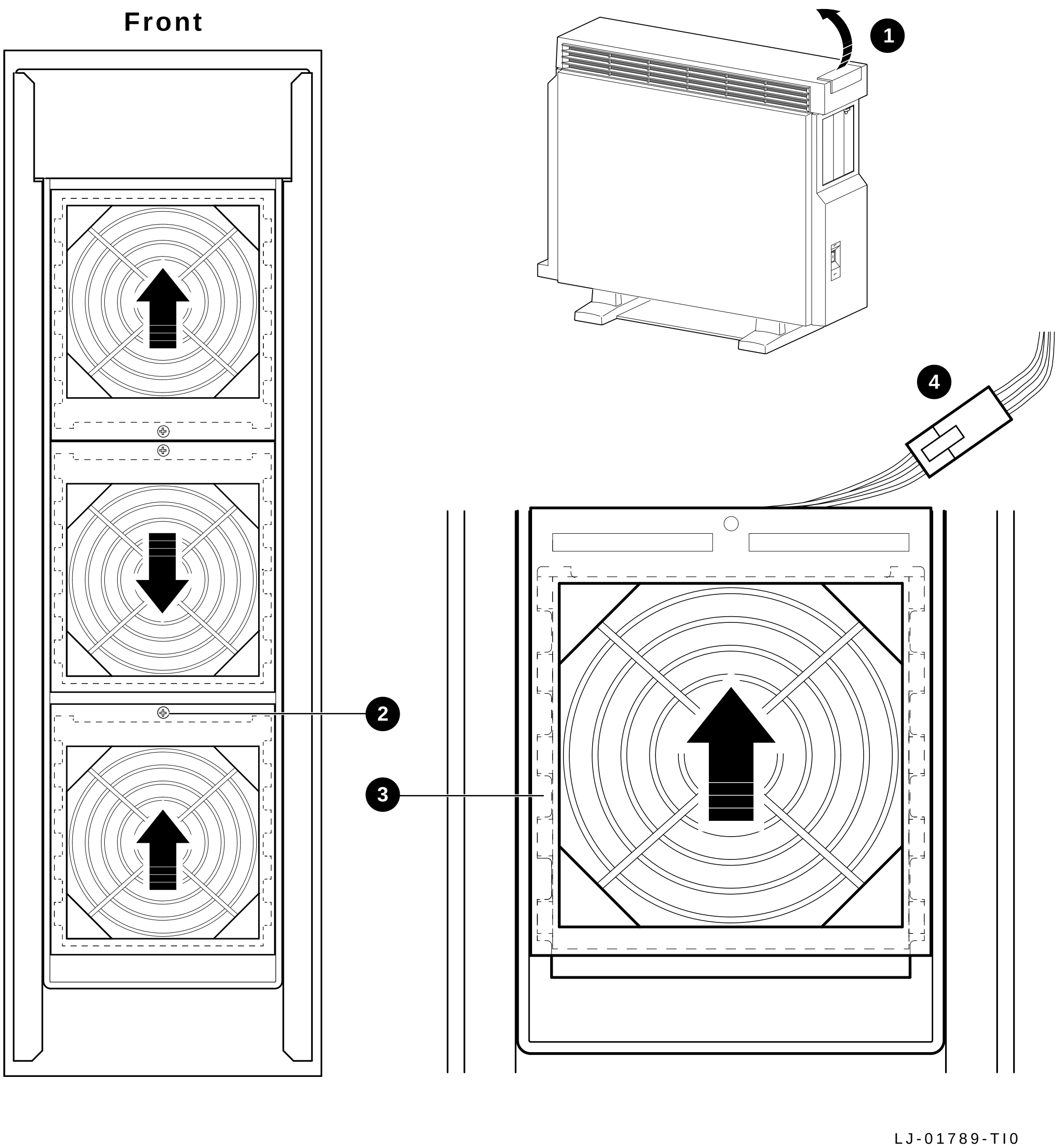
Before the system is powered down, have the system manager perform a system shutdown if needed.

There are three system fans on the bottom of the unit. To remove a failed or damaged system fan:

Step	Action	Refer to Figure 7–16
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove all bulkhead cables from rear.	–
4	Face the front of the unit. Carefully tilt the unit back, so it is resting on its rear panel.	❶
5	Remove the fan screw.	❷
6	Slide the fan boot as shown.	❸
7	Disconnect the fan cable.	❹
8	Remove the fan.	

Continued on next page

Figure 7–16 Removing a Fan



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Part Number

Description	Part Number	Quantity
Fan assembly	12–23609–12	3

Fan Replacement

To install the system fan, reverse the removal steps.

Memory Motherboard

Memory Motherboard Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged memory motherboard (MMB):

Step	Action	Refer to Figure 7–17
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove the left side panel.	–
5	Release the module guide catch releases at the top and bottom of the module.	❶
6	Remove the MMB.	❷
7	Remove all memory modules on a failed MMB.	–

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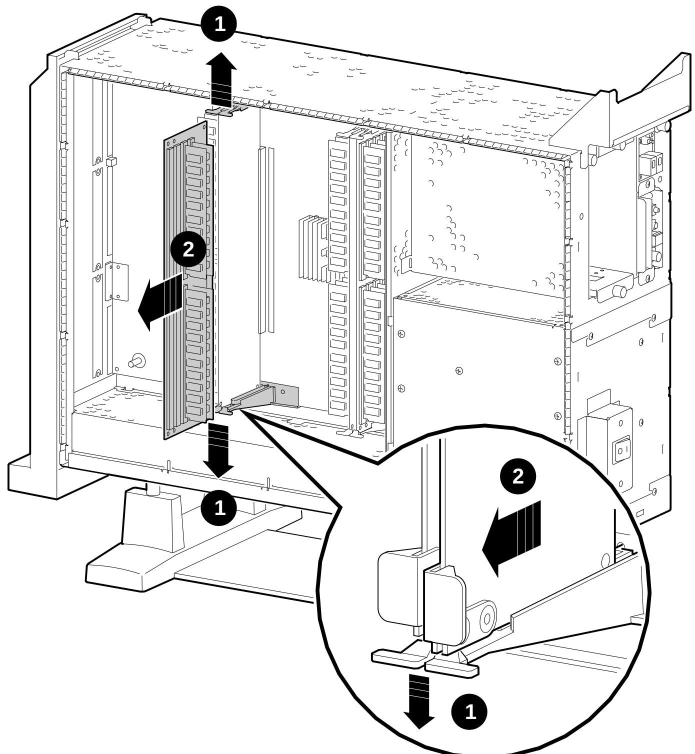
Figure 7–17 Removing a Memory Motherboard



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Memory Motherboard, Continued

Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Left side panel	70–29563–01	1
Memory motherboard	54–21141–01	2

Memory Motherboard Replacement

To install the memory motherboard, reverse the removal steps.

Memory Module

Memory Module Removal

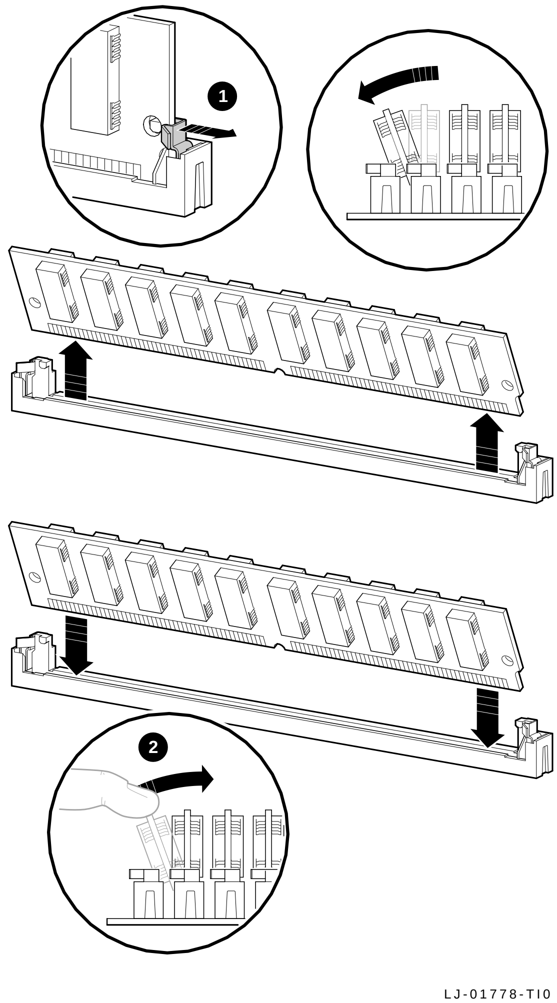
NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged memory module:

Step	Action	Refer to Figure 7–18
1	Perform the system shutdown.	–
2	Power down the unit.	–
4	Remove the left side panel.	–
5	Remove the memory motherboard and place on an antistatic mat.	–
6	Release the connector latches and remove the memory module.	❶

Continued on next page

Figure 7–18 Memory Module Removal and Replacement



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Part Numbers

Description	Part Number	Quantity
Left side panel	70–29563–01	1
Memory motherboard	54–21141–01	1
4 MB memory module	54–21139–CA	–
8 MB memory module	54–21139–DA	–

Memory Module Replacement

To replace a memory module, perform the following steps:

Step	Action	Refer to Figure 7–18
1	Insert the module and carefully push forward until the it locks in place.	❷
2	Reverse the removal steps.	–

System Module

System Module Removal

NOTE
Before the system is powered down, have the system manager perform a system shutdown if needed.

To remove a failed or damaged system module:

Step	Action	Refer to Figure
1	Perform the system shutdown.	–
2	Power down the unit.	–
3	Remove the top cover.	–
4	Remove both side panels.	–
5	Disconnect the power and LSM cables from rear of the power supply.	❶
6	Disconnect TURBOchannel cables (three) from rear of unit.	❷
7	Remove TURBOchannel modules	❸
8	Remove memory motherboards (MMB). Do not remove memory modules from memory motherboards.	–
9	Release the seven captive rivets.	❹
10	Remove the system module.	❺

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Figure 7–19 shows the system module power connections for the DEC 3000 Model 500/500S system.

Figure 7–19 System Module Power Connections

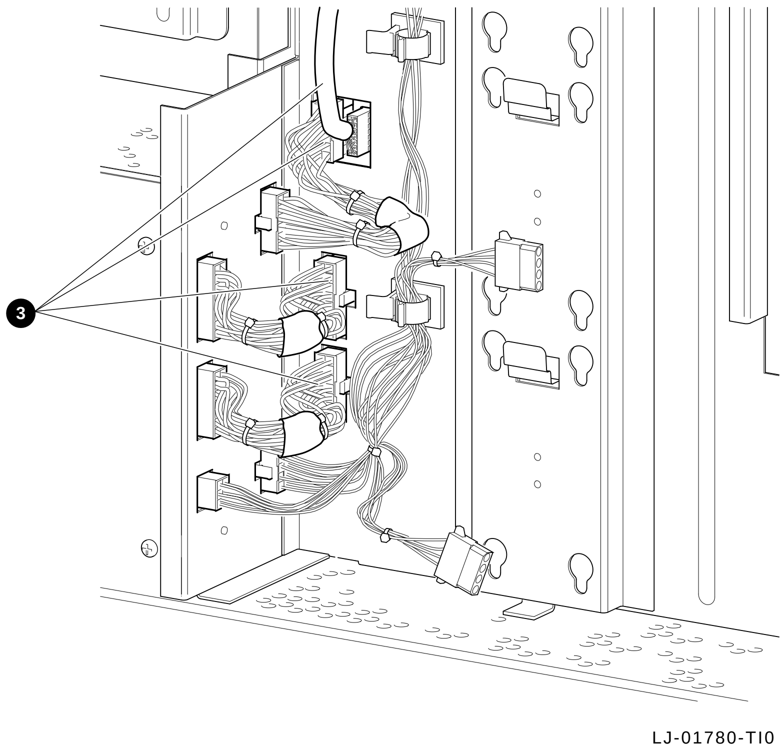

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Figure 7–20 shows the TURBOchannel connections for the DEC 3000 Model 500/500S system.

Figure 7–20 TURBOchannel Connections

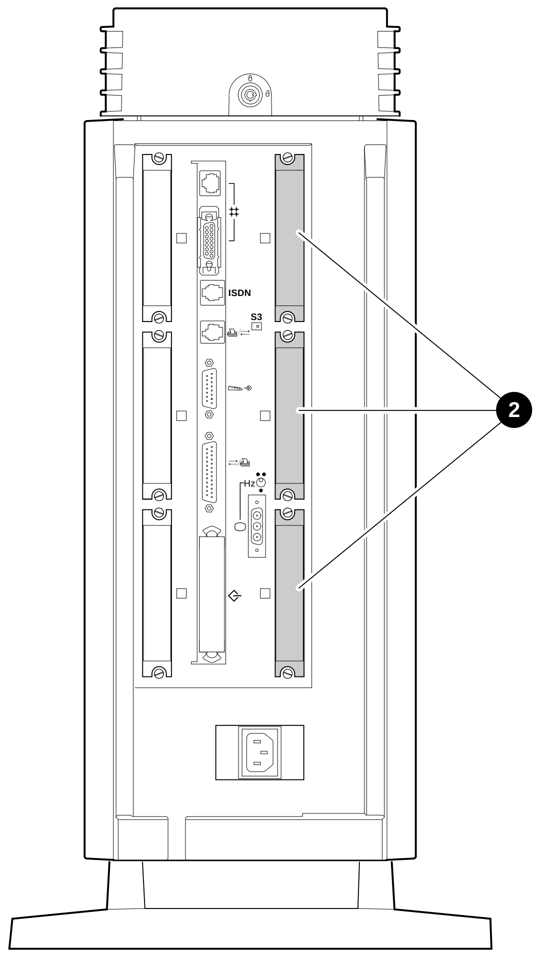

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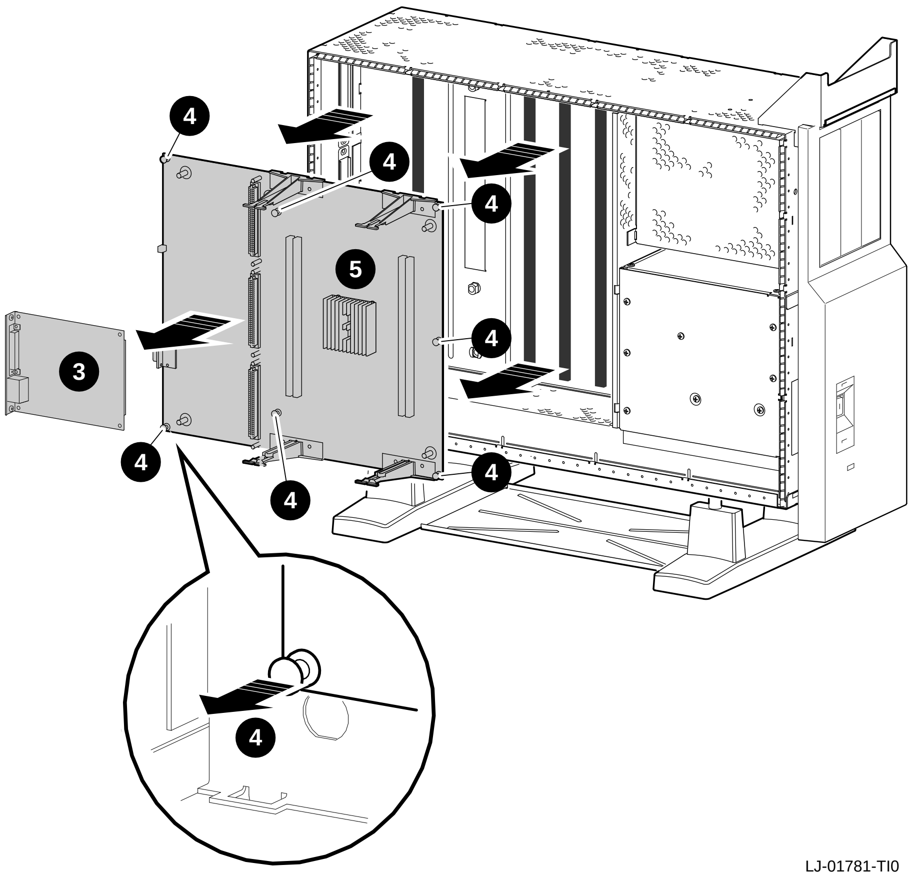
Figure 7–21 shows the removal of the system module from the DEC 3000 AXP Model 500/500S.

Figure 7–21 Removing the System Module



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Part Numbers

Description	Part Number	Quantity
Top cover	70–30266–01	1
Right side panel	70–29563–01	1
Left side panel	70–29563–01	1
TURBOchannel	xx–xxxxx–xx*	Up to 3
Memory motherboard (MMB)	54–21141–01	2
Captive rivets	12–36064–01	7
System module	54–21149–03	1

*See the *DEC 3000 Model 500/500S AXP Options Installation Guide*

System Module Replacement

To install the system module, reverse the removal steps.

See Figure 7–22 for system module jumper locations and Table 7–3 for a description of the jumpers.

NOTE

Make sure that all captive rivets are in the out position before replacing the module.

Make sure that the setting for the flash ROM jumper is the same as on the failed FRU.

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Figure 7–22 shows the locations of the jumpers on the system module.

Figure 7–22 System Module Jumpers Locations

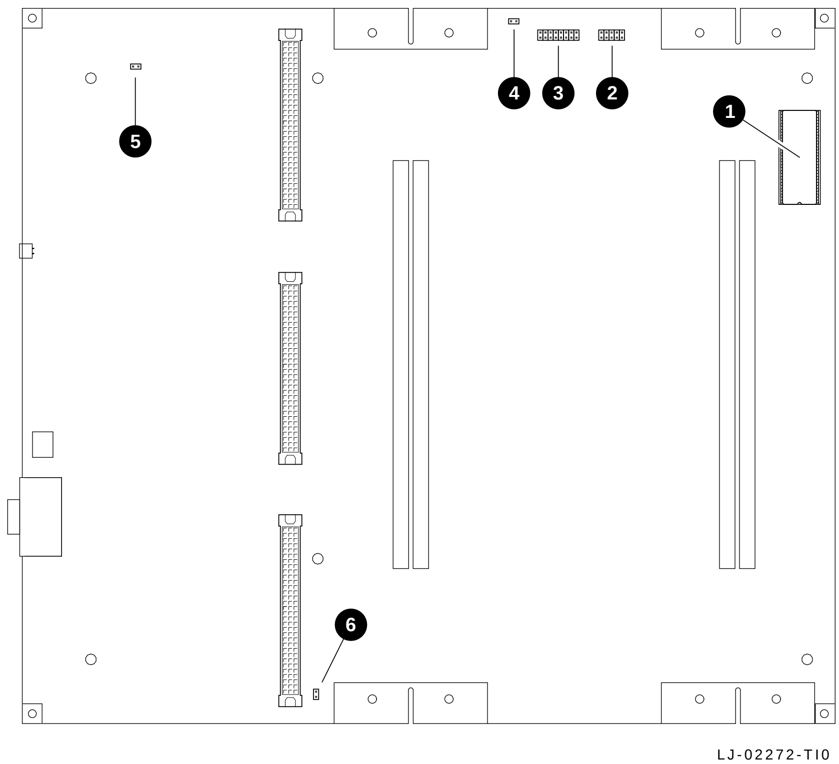

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Table 7–3 describes the system module jumpers.

Table 7–3 System Module Jumper Locations

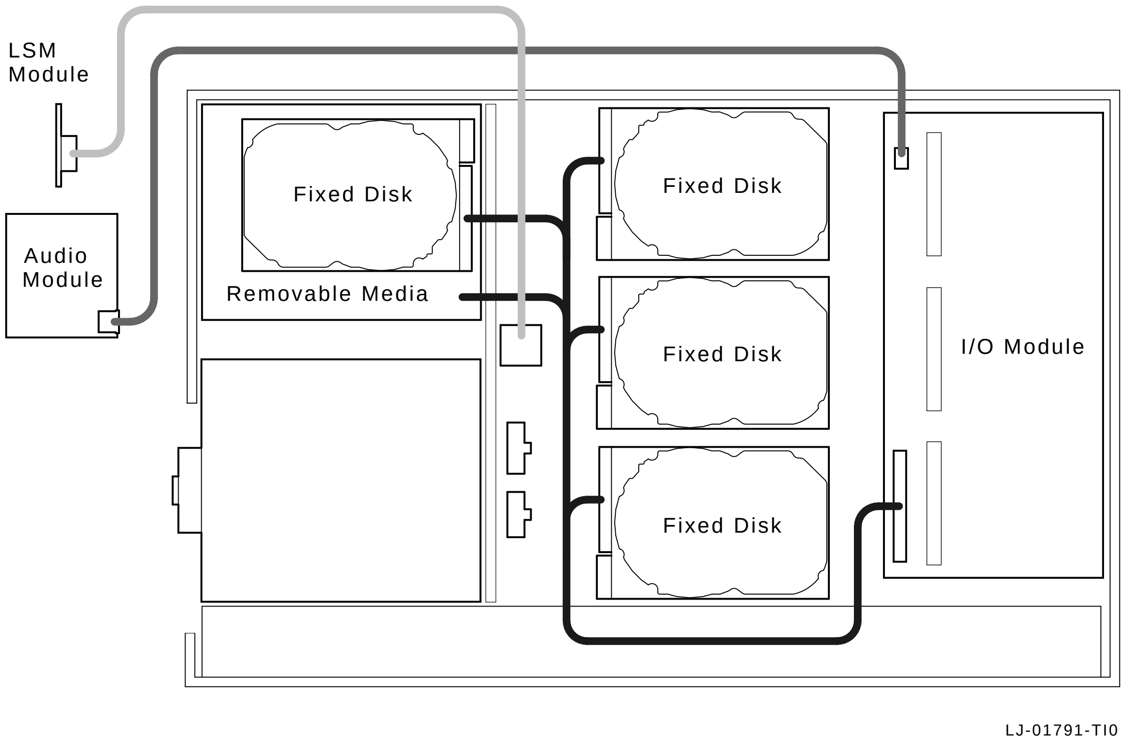
Location	Description	Comments	Default Setting
❶	Serial ROM	–	–
❷	Not used	Reference only.	All out.
❸	Serial ROM jumpers	Jumper location 0 only.	Installed.
❹	Not used	Reference only.	Out.
❺	Test pins	Used by Digital Engineering.	–
❻	Flash enable jumper	In = enabled. Out = disabled.	Disabled.

System Cable and Power Routing

Internal Cable Routing

Figure 7–23 shows cable connections between modules and disk drives in the DEC 3000 Model 500/500S AXP system.

Figure 7–23 Internal Cabling



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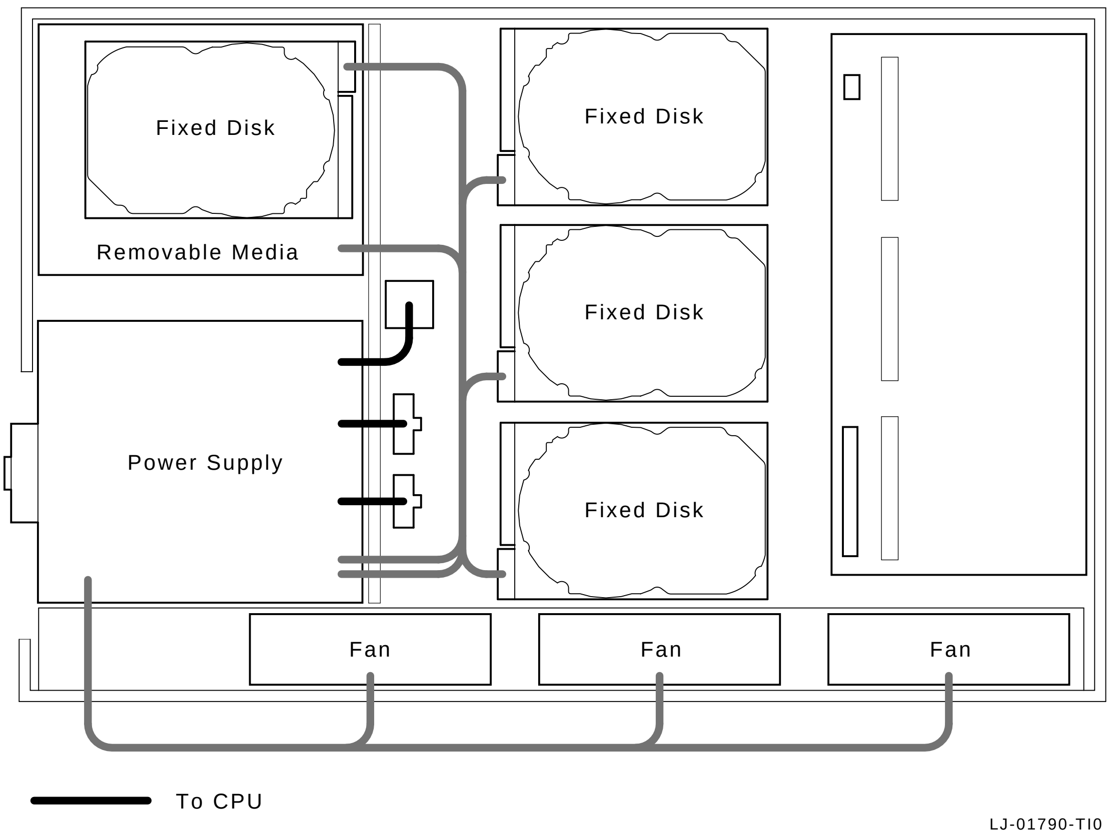
Power Cable Routing

Figure 7–24 shows power connections between the power supply, disk drives, and the system module.

Figure 7–24 Power Cabling



Appendix A
Upgrading Firmware

Overview

Overview

This appendix covers the following topics:

- Upgrading Firmware, Using a CD–ROM
- Creating a Bootable Disk Over the Network

Upgrading Firmware, Using a CD–ROM

Description

The Flash ROM Update Utility is used to upgrade the system ROM and I/O ROM with the latest firmware revision.

NOTE

Both the I/O and system ROM must be updated; otherwise, the console program will not run.

Before You Begin

Before you proceed with the firmware upgrade using a CD–ROM:

- Make sure that the flash ROM jumpers on the system module and I/O module are enabled. See Chapter 2 for jumper locations.
- Log in to a privileged account.
- Perform a system shutdown and enter console mode by pressing the Halt button.
- Obtain an RRD42 boot device name by using the SHOW DEVICE command.
- Insert the CD–ROM into the RRD42 drive.

Continued on next page

Sample Upgrade Session, Using a CD–ROM

In the following sample session, all user input is in bold typee. Comments begin with an exclamation point (!).

```
>>> BOOT DKA400 [Return]  !Boot RRD42 load update program
INIT-S-CPU...
AUDIT_CHECKSUM_GOOD
AUDIT_LOAD_DONE
*** FIRMWARE UPDATE UTILITY V7.3 ***
*** SYSTEM TYPE: MODEL 500 ***
UPDATE                  ! See Table A-1
VERIFY                  ! See Table A-1
LIST                    ! See Table A-1
SHOW                    ! See Table A-1
SET                     ! See Table A-1
?                       ! See Table A-1

UPD->UPDATE [Return]  ! Update Utility prompt,user input required

READ IO ROM DEVICE ID
UPD-I VERIFY LOADED ROM IMAGE
..............................
UPD-I VERIFY LOADED ROM IMAGE DONE
MANUFACTURER INTEL (0x89)
DEVICE CODE = 28F020 (0xBD) 256K x 8
UPDATE SYSTEM ROM DEVICE
UPD-I VERIFY LOADED ROM IMAGE
...............................
UPD-I VERIFY LOADED ROM IMAGE DONE
FIRMWARE REVISION: BLx.x LENGTH: 0xfirm_upgrade3FF28 -> 261928
 BYTES
    CHECKSUM: 0xdf
MANUFACTURER = INTEL (0x89)
DEVICE CODE =28F020 (0xbd) 256k x 8
UPD-I *** ROM CONTENTS WILL BE DESTROYED ***
UPD I ARE YOU READY TO PROGRAM DEVICE ? (Y/N) Y !Program
      prompts for decision
UPD-I PRECHARGING DEVICE
.........................................................
```

Continued on next page

Sample Upgrade Session, Using a CD–ROM (continued)

```
UPD-I ERASING ROM DEVICE
 .......................................................
 UPD-I PROGRAMMING DEVICE
 .......................................................
 UPD-I PROGRAMMING COMPLETED
 .......................................................
 SYSTEM ROM UPDATE SUCCESSFUL
 UPDATE IO ROM DEVICE
 UPD-I VERIFY LOADED ROM IMAGE
 ..............................................
 UPD-I VERIFY LOADED ROM IMAGE DONE
 FIRMWARE REVISION: BLx.x LENGTH: 0x3da08 -> 252424 BYTES CHECKSUM:
 0xb8
 MANUFACTURER = INTEL (0x89)
 DEVICE CODE = 28F020 (0xbd) 256k x 8
 UPD-I PRECHARGING DEVICE
 ..............................................
 UPD-I ERASING ROM DEVICE
 ..............................................
 UPD-I PROGRAMMING DEVICE
 ..............................................
 UPD-I PROGRAMMING COMPLETED
 ..............................................
 IO ROM UPDATE SUCCESSFUL
 UPD-> QUIT Return              !Exits update program
```

Update Utility Menu Commands

Table A–1 lists the Update Utility Menu commands.

Table A–1 Update Utility Menu

Command	Description
UPDATE	Upgrades system and I/O ROMs to the latest firmware revision.
VERIFY	Verifies the ROM checksums.
SHOW	Shows the current ROM revision and revision for loaded image.
SET	Sets the platform type (model) when the platform cannot be determined or is incorrect.
LIST	Lists current supported devices that can be updated.
?	Displays help on specified commands (? SHOW).

Continued on next page

Storing Updated Firmware Build

After the I/O and system ROMs are updated, load the new version of the ROM code into the memory. To load the current version:

1. Power down the system.
2. Power up the system.

Creating a Bootable Disk Over the Network

Before You Begin

Before you begin creating a bootable image:

1. Log in to a privileged account.
2. Copy the system I/O .EXE code to your system disk.

Sample Session

Following is a sample session of creating a bootable disk over the network. All user input is bolded.

```
$ WRITEBOOT:==$[SYSEXE]WRITEBOOT.EXE Return
$ INIT DKA100: TEST Return
$ MOUNT DKA100:TEST Return
$ CREATE/DIR DKA100:[TEST] Return
$ COPY BL4_1_P2.EXE DKA100:[TEST]*/CONT/LOG Return
$ WRITEBOOT Return
$ Update VAX portion of boot block (default is Y)N Return
$ Update ALPHA AXP portion of boot block (default is Y)Y Return
DKA100:[TEST]BL4_1_P2.EXE Return  ! Enter Alpha boot file
$ DISMOUNT DKA100 Return
$ @SYS$SYSTEM:SHUTDOWN Return
```

Follow the procedures in the section "Upgrading Firmware, Using a CD–ROM " to upgrade the system and I/O ROMs.

Storing Updated Firmware Build

After the I/O and system ROMs are updated, load the new version of the ROM code into the memory. To load the current version:

1. Power down the system.
2. Power up the system.

Appendix B
Monitor Alignment Diagnostics

Monitor Alignment Diagnostics

Overview

This appendix lists diagnostic commands to display monitor alignment patterns. You can use these patterns when performing alignment procedures in the monitor's service documentation.

Alignment Patterns

You can use the TEST CXT diagnostic commands in Table B–1 to display alignment patterns. For alignment procedures, refer to the monitor's service documentation.

Table B–1 CXT Alignment Diagnostics

Alignment Pattern	Command Format
Red	T CXT PATT -V
Blue	T CXT PATT -V
Green	T CXT PATT -V
All white	T CXT PATT -V
Circle	T CXT BOX -V
Cross hatch	T CXT BOX -V
All E's	T CXT FONT -CE

Running CXT Diagnostics

You enter TEST CXT diagnostics at the console prompt. Use the following format;

```
>>> T CXT [subtest][?][-v][-d][-cn][-b][-m][-wr][-nc]
```

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You can specify the following qualifiers:

Qualifier	Meaning
?	Lists available subtests.
-v	Verbose qualifier, for stepping through a test.
-d	Keeps the display active.
-c*n*	Font qualifier, where *n* is the font character.
-b	Scrolls black characters on a white background.
-m	Specifies the multinational font set (8-bit).
-w*r*	Specifies the number of rows (*r*) to stipple.
-n*l*	Specifies the number of lines (*l*) in a quadrant.
-w*r*	Specifies the number of rows (*r*) to copy (copy test).

Example

This example runs all CXT subtests:

```
>>> T CXT Return
```

This example lets you step through the BOX test, using the Return key to go to the next step:

```
>>> T CXT BOX -v Return
```

This example scrolls a screen of E's:

```
>>> T CXT FONT -CE Return
```

Appendix C
LED Codes and Status/Error Messages

Overview

Overview

This Appendix contains the following topics:

- LED Codes
- Console Error Messages
- Console Halt Messages
- CXT Diagnostic Error Codes
- 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

LED Codes

Serial ROM LED Codes

The system displays the following LED codes at the beginning of the power-up test. If a failure occurs during this portion of the power-up procedure, perform the following steps:

1. Make sure there is a good connection between the system module and I/O module.
2. Make sure that all memory modules are properly installed. You may need to reseat memory modules.
3. Initiate the power-up sequence. If a failure occurs, replace the following FRUs and verify the system is operating correctly:
   - System module
   - I/O module

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 displayed on error).	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).

Continued on next page

LED Codes, Continued

LED Code	Test Description	Reason for Failure
fb	Memory configuration completed.	Should never stop here.
fa	Memory test with non-bcache bit SET, dcache OFF, and mchk enabled	If read .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 .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 .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 .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 .NE. write, send error dump to SROM port.
f5	Coreio register test and initialization	Should never stop here. If read .NE. write, send error dump to SROM port.
f4	Look for CXT ROM manufacturing data	Read of CXT ROM manufacturing data did not return data expected. Send error dump to SROM port and branch to SROM miniconsole.
f3	Completed load of CXT ROM into memory.	Should never stop here.

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LED Code	Test Description	Reason for Failure
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.

ASIC LED Codes

The following LED codes represent ASIC power-up tests. If an error occurs during one of these tests, the screen displays an FRU code and error code.

All values are in hexadecimal.

LED Code	Description
35	Scatter/gather map test
3F	All tests passed

Continued on next page

Memory LED Codes

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

All values are in hexadecimal.

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 to 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

Continued on next page

CXT LED Codes

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

All values are in hexadecimal.

LED Code	Description
81	CXT Interrupt test
82	CXT Register test
83	CXT Video RAM test
84	CXT Patterns test
85	CXT RAMDAC test
86	CXT Stipple Mode test
87	CXT Copy Mode test
88	CXT Boolean Mode test
89	CXT Plane Mask test
8A	CXT Pixel Shift test
8B	CXT Line test
8C	CXT Box test

Continued on next page

NVR LED Codes

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

All values are in hexadecimal.

LED Code	Description
3A	Check Battery test
3B	Test NVR registers
3C	Assure Clock is Ticking test
3D	Test TOY registers
3E	Interrupt test
3F	All tests passed

SCC LED Codes

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

All values are in hexadecimal.

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.

Continued on next page

NI LED Codes

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

All values are in hexadecimal.

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

ISDN LED Codes

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

All values are in hexadecimal.

LED Code	Description
70	Register test
71	Tone test
72	Digital loop test
73	Analog loop test
74	Interrupt test
75	DMA test
76	Logo test
77	Record utility test
78	Repeat test
79	Playback test

Continued on next page

LED Code	Description
7F	All tests passed

SCSI LED Codes

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

All values are in hexadecimal.

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

Console LED Codes

At the end of the power-up sequence, the diagnostic LEDs should display the DD code for console entry.

If the sequence halts at any code from EF to DE, then reseat the system module and run the power-up sequence again.

All values are in hexadecimal.

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.

Continued on next page

LED Codes, Continued

LED Code	Description
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.

MIPS Emulator LEDs

The follow LED codes represent MIPS emulator diagnostic tests. If an error occurs during one of these tests, the screen displays an 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	Can not load ROM object.
97	Invalid MIPS-I instruction detected.
98	ROM object called halt.
99	Invalid callback called.
9A	Unsupported callback called; callback will be included in next release.

Console Error Messages

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 was found by parser.
? 25 LTL	Too many characters entered on command line.
? 26 ILL ADDR	Invalid address was 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.

Continued on next page

Console Error Messages, Continued

Message	Description
? 3A INV ACCS	Internal processor register can not be accessed as specified.
? 3B NVR RDERR	Problem reading NVR.
? 3C NVR WRTERR	Problem writing NVR.

Console Halt Messages

Console Halt Messages

The following table listd console halt messages displayed when a halt sequence is entered:

```
?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.

CXT Diagnostic Error Codes

CXT Diagnostic Error Codes

The following table contains the error codes produced by the CXT diagnostic:

All status codes are displayed in hexadecimal.

If the diagnostic fails, then perform the following:

1. Make sure the monitor cable is connected.
2. Reseat the system module and I/O module connection.
3. Run the CXT diagnostic to verify system operation. If a failure reoccurs, replace FRUs in the following order. Replace one FRU at a time and run the CXT diagnostic to ensure the failure has been corrected.
   a. Monitor cable
   b. Monitor
   c. System module

Error Code	Description
00	VDAC 1: FILL VIDEO RAM
02	VDAC 2: ID REGISTER TEST
04	VDAC 3: REVISION REGISTER TEST
06	VDAC 4: MONITOR CONNECTED TEST
08	VDAC 5: COMMAND REGISTER TEST
0A	VDAC 6: OVERLAY RAM TEST
0C	VDAC 7: LOAD COLOR MAP
0E	VDAC 8: COLOR RAM TEST
10	VDAC 9: CURSOR COMMAND REGISTER TEST
12	VDAC 10: CURSOR RAM TEST
14	VDAC 11: CURSOR COLOR TEST
16	VDAC 12: CURSOR CROSSHAIR TEST
18	VDAC 13: CURSOR SIGNATURE TEST
20	VRAM 1: LOAD COLOR MAP
22	VRAM 2: WRITE 55 TEST

Continued on next page

CXT Diagnostic Error Codes, Continued

Error Code	Description
24	VRAM 3: READ 55/WRITE AA
26	VRAM 4: READ AA/WRITE EE
40	BOX 1: LOAD THE GRIP MAP
42	BOX 2: LOAD THE CIRCLE ON THE GRID
50	PATT 1: FILL VIDEO RAM
52	PATT 2: COLOR BAR TEST
54	PATT 3: COLOR BAR REFERENCE VOLTAGE TEST
56	PATT 4: GRAY SCALE TEST
58	PATT 5: RED SCREEN TEST
5A	PATT 6: GREEN SCREEN TEST
5C	PATT 7: BLUE SCREEN TEST
5E	PATT 8: BLUE - RED SCREEN TEST
60	PATT 9: BLUE - RED BLUE - GREEN TEST
62	PATT 10: RED - BLUE TO RED - GREEN TEST
64	PATT 11: COLOR SIGNATURE ANALYSIS TEST
66	PATT 12: WHITE SCREEN TEST
70	INT 1: INTERRUPT ASSERTION TEST
72	INT 2: NO ASSERTION TEST
80	REG 1: REGISTER WRITE/READ AND ACCESS TEST
90	STIP 1: STIPPLE FOREGROUND TEST
92	STIP 2: STIPPLE BACKGROUND TEST
94	STIP 3: STIPPLE INCREMENTAL TEST
96	STIP 4: STIPPLE VRAM XOR TEST
A0	LINE 1: TRANSPARENT SHORT LINE (TRIANGLE) TEST
A2	LINE 2: TRANSPARENT CENTERED HORIZONTAL LINE TEST
A4	LINE 3: TRANSPARENT ALTERNATE HORIZONTAL LINE TEST
A6	LINE 4: TRANSPARENT CENTERED VERTICAL LINE TEST

Continued on next page

CXT Diagnostic Error Codes, Continued

Error Code	Description
A8	LINE 5: TRANSPARENT DIAGONAL LINE DECREMENT ADDRESS TEST
AA	LINE 6: TRANSPARENT DIAGONAL LINE INCREMENT ADDRESS TEST
AC	LINE 7: TRANSPARENT M < 1 XA < XB QUADRANT 1 TEST
AE	LINE 8: TRANSPARENT M < 1 XA > XB QUADRANT 2 TEST
B0	LINE 9: TRANSPARENT M > 1 XA < XB QUADRANT 1 TEST
B2	LINE 10: TRANSPARENT M > 1 XA > XB QUADRANT 2 TEST
B4	LINE 11: OPAQUE M < -1 XA < XB QUADRANT 3 TEST
B6	LINE 12: OPAQUE M < -1 XA > XB QUADRANT 4 TEST
B8	LINE 13: OPAQUE M > -1 XA < XB QUADRANT 3 TEST
BA	LINE 14: OPAQUE M > -1 XA > XB QUADRANT 4 TEST
BC	LINE 15: LINE SIGNATURE MODE TEST
C0	COPY 1: COPY ALIGNED DATA TEST
C2	COPY 2: COPY ALIGNED 1 TO 32 BYTES TEST
D0	BOOL 1: BOOLEAN SIMPLE FRAME BUFFER MODE TEST
D2	BOOL 2: BOOLEAN STIPPLE MODE TEST
D4	BOOL 3: BOOLEAN COPY MODE TEST
E0	PLANE 1: PLANE WRITE TEST
F0	PSHIFT 1: 32 BYTE POSITIVE SHIFT TEST
F2	PSHIFT 1: 32 BYTE NEGATIVE SHIFT TEST
110	FONT 1: SHUT OFF THE CURSOR
112	FONT 2: FILL SCREEN

ASIC Diagnostic Error Codes

ASIC Diagnostic Error Codes

The following table contains the error codes produced by the ASIC diagnostic.

All status codes are displayed in hexadecimal.

If the diagnostic fails, reseat the system and I/O module connection.

Run the ASIC diagnostic to verify system operation. If a failure reoccurs, replace the system module and run the ASIC diagnostic to ensure that the failure has been corrected.

Error Code	Description	Replace
18	ASIC$K_SG_PASS1_FAILED	System module
1A	ASIC$K_SG_PASS2_FAILED	System module
1C	ASIC$K_SG_PARITY_FAILED	System module

NVR Diagnostic Error Codes

NVR Diagnostic Error Codes

The following table contains the error codes produced by the NVR diagnostic.

All status codes are displayed in hexadecimal.

If the diagnostic fails, reseat the system and I/O module connection.

Run the NVR diagnostic to verify system operation. If a failure reoccurs, then replace the FRU listed for that error. Replace FRUs one at a time and run the NVR diagnostic to ensure that the failure has been corrected.

Error Code	Description	Replace
03	Soft-error on power-on, check time	I/O module
04	Battery failure	I/O module
08	Data miscompare testing NVR registers	I/O module
10	Data miscompare testing TOY registers	I/O module
20	Valid RAM and time bit clear. Possible RAM corruption due to power loss.	I/O module
40	Battery codes do not match.	I/O module
80	Update in progress, bit will not clear.	I/O module
100	CSR_A data miscompare.	I/O module
200	CSR_B data miscompare.	I/O module
400	Interrupt test failed—no interrupt generated.	I/O module, system module

ISDN Diagnostic Error Codes

ISDN Error Codes

The following table lists the error codes produced by the ISDN diagnostic.

All status codes are displayed in hexadecimal.

If the diagnostic fails, then perform the following steps:

1. Reseat the audio cable between the audio module and the I/O module.
2. Reseat the system module and I/O module connection.
3. Run the ISDN diagnostic to verify system operation. If a failure reoccurs, replace the following FRUs in order. Replace FRUs one at a time and run the ISDN diagnostic to ensure that the failure has been corrected.
   a. Audio cable
   b. Audio module
   c. I/O module

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

Continued on next page

ISDN Diagnostic Error Codes, Continued

Error Code	Description
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

SCC Diagnostic Error Codes

SCC Error Codes

The following table contains the error codes produced by the SCC diagnostic.

All status codes are displayed 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 module and I/O module connection.
5. Run the SCC diagnostic to verify system operation. If a failure reoccurs, repleace the FRU listed for the error. Replace FRUs one at a time and run the SCC diagnostic to ensure that the failure has been corrected.

Error Code	Description	Replace
10	SCC reset test failed.	I/O module
20	SCC modem test failed when testing CTS<->RTS.	I/O module
22	SCC modem test failed when testing DSR<->SS.	I/O module
24	SCC modem test failed when testing CD<->SS.	I/O module
26	SCC modem test failed when testing RI<->DTR.	I/O module
30	SCC polled test failed due to transfer timeout.	I/O module
32	SCC polled test failed due to parity error on receive.	I/O module
34	SCC polled test failed due to framing error on receive.	I/O module

Continued on next page

SCC Diagnostic Error Codes, Continued

Error Code	Description	Replace
36	SCC polled test failed due to overrun error in receive.	I/O module
38	SCC polled test failed due to data comparison error.	I/O module
40	SCC Interrupt not seen at the COREIO	I/O module
42	SCC interrupt not seen at TURBOchannel ASIC	I/O module
44	SCC interrupt not seen at DECchip 21064 CPU	I/O module
50	SCC LK401 test failed due to transfer timeout.	Keyboard, I/O module
52	SCC LK401 test failed due to Illegal response received.	Keyboard, I/O module
60	SCC Mouse Test failed due to transfer timeout.	Mouse, I/O module
62	SCC Mouse Test failed due to illegal response received.	Mouse, I/O module
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 module
92	SCC had unexpected interrupts during DMA test.	I/O module
94	SCC had incorrect buffer pointers during the DMA test.	I/O module
96	SCC had a data buffer miscompare during the DMA test.	I/O module

SCSI Diagnostic Error Codes

SCSI Error Codes

The following table lists error codes produced by the SCSI diagnostic.

All status codes are displayed 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 module and I/O module connection.
3. Run the SCSI diagnostic to verify system operation. If a failure reoccurs, replace the FRU listed for that error. Replace FRUs one at a time and run the SCSI diagnostic to ensure that the failure has been corrected.

Error Code	Description	Replace
02	SCSI ASIC register test failed testing bus A.	System module, I/O module
04	SCSI controller register test failed testing bus A.	System module, I/O module
06	SCSI interrupt test failed testing bus A.	System module, I/O module
08	SCSI data transfer test failed testing bus A.	SCSI A device, I/O module, system module
0A	SCSI map error test failed testing bus A.	SCSI A device, I/O module, system module
0C	SCSI minimal device test failed testing bus A.	SCSI A device, I/O module, system module
52	SCSI ASIC register test failed testing bus B.	SCSI B device, I/O module, system module

Continued on next page

SCSI Diagnostic Error Codes, Continued

Error Code	Description	Replace
54	SCSI controller register test failed testing bus B.	SCSI B device, I/O module, system module
56	SCSI interrupt test failed testing bus B.	SCSI B device, I/O module, system module
58	SCSI data transfer test failed testing bus B.	SCSI B device, I/O module, system module
5A	SCSI map error test failed testing bus B.	SCSI B device, I/O module, system module
5C	SCSI minimal device test failed testing bus B.	SCSI B device, I/O module, system module

NI Diagnostic Error Codes

NI Error Codes

The following table lists error codes produced by the NI diagnostic.

All status codes are displayed 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 module and I/O module connection.
3. Run the NI diagnostic to verify system operation. If a failure reoccurs, then replace the following FRUs. Replace FRUs one at a time and run the NI diagnostic to ensure that the failure has been corrected.
    - Loopback connector (for error codes A0 to AC)
    - System module
    - I/O module

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.
32	LANCE initialization: receiver disabled.

Continued on next page

NI Diagnostic Error Codes, Continued

Error Code	Description
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.

Continued on next page

Error Code	Description
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.
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.

Continued on next page

NI Diagnostic Error Codes, Continued

Error Code	Description
F0	LANCE initialization failed.
F2	LANCE transmit failed.
F4	LANCE unknown transmit error.
F6	LANCE receive failure.
F8	LANCE unknown receive error.

MEMORY Diagnostic Error Codes

Memory Error Codes

The following table lists error codes produced by the memory diagnostic.

All status codes are displayed in hexadecimal.

If the diagnostic fails, reseat memory modules.

Error Code	Description	Replace
02	CELL data did not equal pattern expected on forward pass.	Memory module
04	CELL data did not equal pattern expected on reverse pass.	Memory module
10	ADDR data does not equal address as expected.	Memory module
20	LLSC load-locked/store-conditional failure.	Memory module

ASIC Diagnostic Status/Error Messages

ASIC Status/Error Messages

The ASCI 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
```

NVR Diagnostic Status/Error Messages

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
```

ISDN Diagnostic Status/Error Messages

ISDN Status/Error Messages

The ISDN diagnostic displays the following status/error information when an error occurs.

The failing FRU for all error messages is the I/O module.

Before replacing the I/O module, *first* reseat the module and run the ISDN diagnostic to see if the failure is cleared.

```
T-STS-ISDN - REGISTER TEST
    ? T-ERR-ISDN - REG FAILED - DATA MISMATCH
    failing address  =  (indirect address of failing register)
    data read         =  (data read)
    data expected    =  (data expected)

    ? T-ERR-ISDN - ISDN REGISTER ERROR - DATA MISMATCH)
    failing address = (indirect address of failing register)
    data read       = (data read)
    data expected   = (data expected)

T-STS-ISDN - TONE TEST
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 TEST
    ? T-ERR-ISDN - ISDN DIGITAL_LOOP ERROR - DATA MISCOMPARE

T-STS-ISDN - ANALOG_LOOP TEST
    ? T-ERR-ISDN - ISDN ANALOG_LOOP - DATA MISCOMPARE

T-STS-ISDN - INTERRUPT TEST
    ? 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
```

Continued on next page

```
T-STS-ISDN - DMA TEST
    ? T-ERR-ISDN - TIME OUT
    ? T-ERR-ISDN - INVALID INTERRUPT
      data read  = (current value of System Interrupt register)
      data exp   = (interrupt expected)
    ? T-ERR-ISDN - DATA MISMATCH
      fail addr     = (sparse address of mis-matched data)
      data read  = (data read)
      data exp   = (data expected)

T-STS-ISDN - LOGO:Send out DIGITAL's sound logo D-E-C

T-STS-ISDN - RECORD TEST: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 TEST:Allows user to speak and hear their message
              simultaneously

T-STS-ISDN - Will leave line open for about 10 seconds then turn off

T-STS-ISDN -PLAYBACK:Play back what was recorded using the RECORD utility
```

SCC Diagnostic Status/Error Messages

SCC Diagnostic Status Messages

This section lists the SCC diagnostic status messages.

`T-STS-SCC - Reset/Init Test`

This message indicates the SCC reset test is running.

`T-STS-SCC - Modem Test`

This message indicates the SCC modem test is running.

`T-STS-SCC - Poll test`

This message indicates the SCC POLLED mode test is running. The polled test currently runs only in internal loopback mode.

`T-STS-SCC - Intrpt Test`

This message indicates the SCC Interrupt test is running.

`T-STS-SCC - DMA test`

This message indicates the SCC DMA test is running. The printer port is tested only when the console is not attached to it.

`T-STS-SCC - LK401 test`

This message indicates the LK401 test is running.

`T-STS-SCC - Mouse test`

This message indicates the Mouse test is running.

SCC Diagnsotic Error Messages

The following is a list of the SCC diagnostic error messages:

NOTE

All MODEM error messages require a modem loopback and use of service mode (DIAG_SEC 2) or an error will occur.

Continued on next page

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

This message indicates the 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`

This message indicates the modem test expected the CTS bit to be set, but it is clear.

`? T-ERR-SCC-MODEM - DSR bit Exp = 0 Rec = 1`

This message indicates the 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`

This message indicates the modem test expected the DSR bit to be set, but it is clear.

`? T-ERR-SCC-MODEM - DCD bit Exp = 0 Rec = 1`

This message indicates the 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`

This message indicates the modem test expected the DCD bit to be set, but it is clear.

`? T-ERR-SCC-MODEM - RI bit Exp = 0 Rec = 1`

This message indicates the modem test expected the RI bit to be set to 0, but it was read as a 1.

Continued on next page

```
? T-ERR-SCC-MODEM - RI bit Exp = 1 Rec = 0
```

This message indicates the modem test expected the RI bit to be set, but it is clear.

```
? T-ERR-SCC - POLLED test - Transfer timed out
```

This message indicates the transfer has not completed. This usually indicates that transmitted characters were not received.

```
? T-ERR-SCC-DMA - Xfer tmout, Line x
```

This message indicates the DMA transmit has not completed on line x.

```
? T-ERR-SCC-DMA - Unexp ints,Line x
  T-STS-SCC - Exp = %x  Rec = %x
```

This message indicates the 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
```

This message indicates the data received by the DMA WRITE was not the same as the data transmitted on line x.

```
? T-ERR-SCC-LK401 - %x char rcvd
```

This message indicates the response received from the LK401 was less than the number of characters expected.

```
? T-ERR-SCC-LK401 - ill resp rcvd
```

This message indicates the response received from the LK401 was not the correct response.

```
? T-ERR-SCC-Mouse - %x char rcvd
```

This message indicates the response received from the Mouse was less than the number of characters expected.

Continued on next page

```
? T-ERR-SCC-Mouse - ill resp rcvd
```

This message indicates the mouse has failed its power-up self-test.

```
? T-ERR-SCC-CCR - Parity error
```

This message indicates a character received contains a parity error.

```
? T-ERR-SCC-CCR - Framing error
```

This message indicates a character received contains a framing error.

```
? T-ERR-SCC-CCR - Overrun error
```

This message indicates a character received contains an overrun error.

```
? T-ERR-SCC-CCR - rec (%x) != exp (%x)"
```

This message indicates the character received does not equal the character transmitted.

```
? T-ERR-SCC-INTR - SCC%x not set at COREIO
```

This message indicates SCC bit %x is not set at COREIO.

```
? T-ERR-SCC-INTR - Not set in TCASIC
```

This message indicates the COREIO interrupt is not set at the TURBOchannel ASIC.

```
? T-ERR-SCC-INTR - Not set at CPU
```

This message is not set at the DECchip 21064 CPU.

```
? T-ERR-SCC - TNF - %s
```

This message is printed out when the user requests a test that does not exist. The test name the user types in will be placed where the %s is placed.

SCSI Diagnostic Status/Error Messages

SCSI Status Messages

The following is a list of 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
```

SCSI Error Messages

The following is a list of the SCSI diagnostic error messages:

NOTE

The following error messages could indicate an I/O module failure. Before replacing the module, try reseating the module.

```
? 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) - 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 module failure. Before replacing the device or module, 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
```

Continued on next page

```
? 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)
```

NOTE

The following error messages could indicate a system module failure. Before replacing the module, try reseating the module.

```
? 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 module failure. Before replacing the device or module, try reseating them.

Continued on next page

```
? 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)
```

where:
`address` = Sparse address of failing location
`exp data` - Expected data
`actual data` - Actual data
`bus` = A or B
`device id` = SCSI id
`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

Continued on next page

NOTE

The next two values will only be printed out when a request sense command has been executed

`snskey` = sense key from request sense data packet

`extfru` = FRU value from request sense data packet

Informational Values

Information	Description
01	Terminal count bit clear in controller status register.
02	Gross error bit clear in controller status register.
03	Interrupt bit clear in controller status register.
04	Bus service bit clear in controller status register.
05	Disconnect bit clear in controller interrupt register.
06	Disconnect bit set in controller interrupt register.
07	Illegal command bit clear in controller interrupt register.
08	Illegal command bit set in controller 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.

Continued on next page

Information	Description
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 didn't drop off bus.
26	Illegal phase.
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 won't clear.
36	Controller interrupt register contents different from expected.
37	Controller 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.

Continued on next page

SCSI Diagnostic Status/Error Messages, Continued

Information	Description
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.
A2	Disk capacity is too small.
A3	Console function error.
A4	Illegal floppy drive.
A5	Illegal floppy media.

NI Diagnostic Status/Error Messages

Status Messages

The following is a list of 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
```

Error Messages

NOTE

The following messages may indicate a failing I/O module. Before replacing the module, first make sure the loopback connector is installed and try reseaing the module.

```
? 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 - Int 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)
```

Continued on next page

```
? 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)
```

where:

`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

Continued on next page

`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

MEMORY Diagnostic Status/Error Messages

Status Messages

The following is a list of 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)
```

Continued on next page

MEMORY Diagnostic Status/Error Messages, Continued

Error Messages

The following is a list of the memory diagnostic error messages:

NOTE

The following messages may indicate a failing memory motherboard or memory module. Before replacing, try reseating the board and modules.

```
? 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 failing system module. Before replacing, try reseating the module.

```
? 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
```

`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

MIPS Emulator Status Messages

MIPS Status Messages

The following are MIPS emulator status messages:

`ERR-MIPS - DID NOT FIND ROM IN SLOT <N>`

This message indicates that no ROM was found at TURBOchannel slot N.

`ERR-MIPS - UNRECOGNIZED COMMAND`

This message indicates an unrecognized command was passed to the MIPS emulator.

`ERR-MIPS - REX COMMAND NOT SUPPORTED`

This message indicates the REX command passed to the emulator is not supported at this time.

`ERR-MIPS - COULD NOT LOAD ROM OBJECT <object_name>`

This message indicates the object called <object_name> was not found in the option ROM.

`ERR-MIPS - ROM OBJECT REPORTED A SEVERE ERROR`

This message indicates a TURBOchannel ROM has returned a severe error code to the emulator.

Appendix D
Recommended Spares List

Recommend Spares List

Spares List

Table D–1 lists the recommended spare parts for the DEC 3000 Model 500/500S system.

Table D–1 Spares List

Part Number	Description	Comment
54–21139–C	4 MB memory module	Half-populated module
54–21139–D	8 MB memory module	Full populated module
54–21141–01	Memory motherboard	
54–21145–01	Lights and switch module	Rackmount unit only
54–21145–02	Lights and switch module	Pedestal mount only
54–21147–01	I/O module	
54–21149–01	System module	
H3103	Printer port loopback	
H4082–AA	Twisted pair loopback	10BaseT
H7883–AA	Power supply	
12–23609–12	Fan	
12–25083–01	Serial line loopback	

Continued on next page

Table D–1 (Continued) Spares List

Part Number	Description	Comment
12–22196–01	Ethernet Thickwire loopback	
12–30552–01	SCSI terminator	
12–36064–01	Removable rivets	Used on modules
17–03314–01	Removable media tray SCSI data cable	
17–03315–01	Internal SCSI data cable	
17–03316–01	Internal 20-conductor power cable	
17–03317–01	Internal fan power cable	
17–03318–01	Internal 16-conductor power cable	
17–03319–01	Internal 14-conductor power cable	
17–03320–01	Internal 12-conductor power cable	
17–03344–01	Removable tray power cable	
17–03395–01	Internal AC power cable	
17–03501–01	LSM data cable	
17–03502–01	Audio cable	
17–00083–43	Power cord	
17–02640–02	Desktop mouse & keyboard cable	
17–02906–03	Video cable	
70–29562–01	Audio assembly	
70–29563–01	Side panel	Pedestal mount

Continued on next page

Table D–1 (Continued) Spares List

Part Number	Description	Comment
70–29564–01	Side panel	Rackmount
70–30266–01	Top cover assembly	
74–43810–01	Fan boot	Same for all three fans
74–43811–01	Access door	
74–43830–01	Front bezel	
74–44072–01	Rear bezel	
74–44073–01	Top cover	
74–44141–01	Audio module cover	
74–44142–01	Audio box	
74–44487–02	Removable media bezel	
74–44620–01	LSM door	
74–44649–01	Audio bezel cover	

Appendix E
Rackmount Installation for the IEC RS–310 Cabinet

Installation Procedure (IEC RS–310 Cabinet)

Overview

This appendix describes how to install a DEC 3000 Model 500 (PE50A–B9) or Model 500S (PE50A–D9) AXP rackmount system in an IEC RS–310 (RETMA) cabinet.

NOTE

The configurations that this procedure supports do not require a power controller.

Cabinet Location

The customer chooses the location to install the cabinet. When the location is identified, perform the following steps:

Steps	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 to support the weight of the system being installed.

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Determine the Installation Area in the Cabinet

To determine the installation area for the PE50A–B9/D9 unit in an IEC RS-310 cabinet, perform the following steps at the front and rear cabinet rails. See Figure E–1.

WARNING

Digital does not recommend installing the system in the top area of the cabinet, for stability reasons.

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

Steps	Action
1	Select a section of the cabinet rail where there is a 0.50 inch (1.27 cm) 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 1.75 inches (4.45 cm).
4	Count up or down nine sets and make a mark. The area between the marks is the **installation area**.

The total installation area is 15.75 inches (40.01 cm). The equation for calculating the total area is

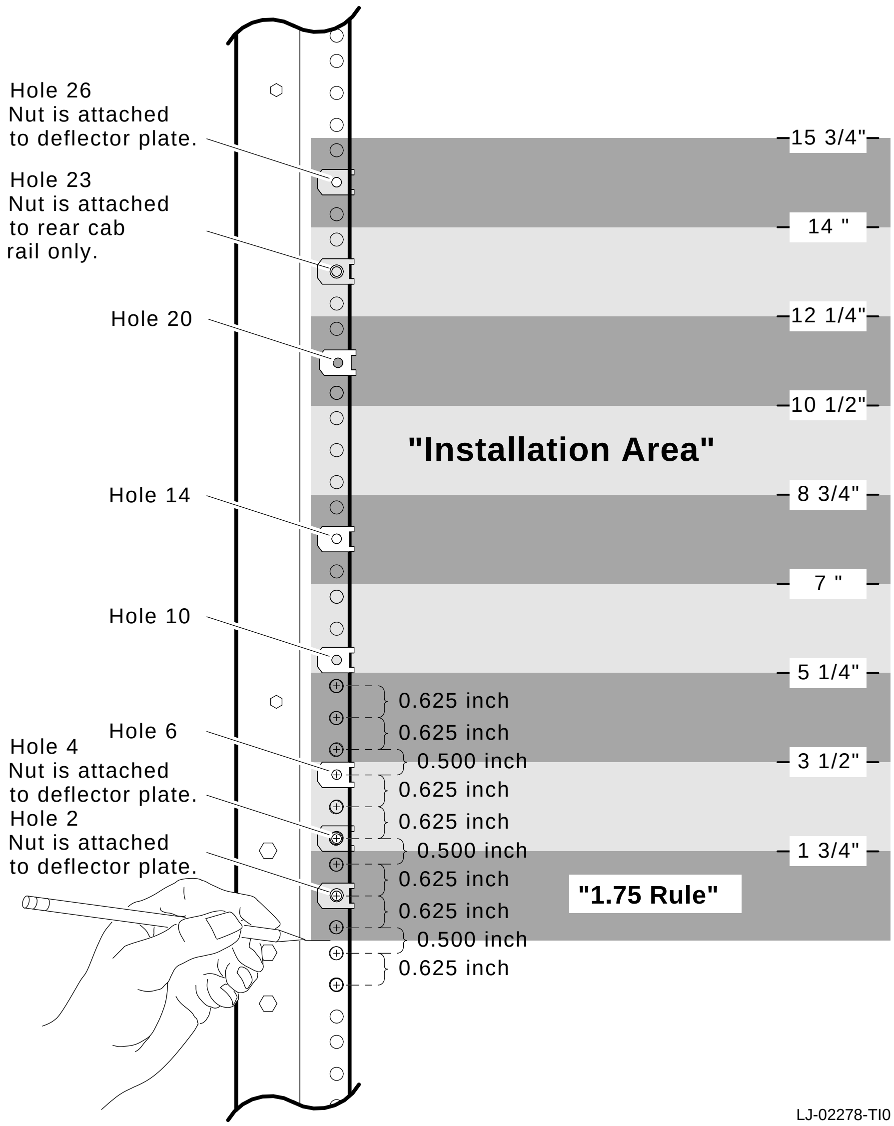
1.75 inches (4.45 cm) $\times$ 9 sets = 15.75 inches (40.01 cm)

NOTE

The hole count described in this section will install the system in any predetermined 15.75-inch (40.01 cm) area.

Continued on next page

Figure E–1 Determining the Installation Area



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Assemble the Top Air Deflector and Baffle Subassembly

Required materials:

- Six 6/32 screws
- Top air baffle (PN 74–46195–01)
- Top air deflector (PN 74–46196–01)

To assemble the top air deflector and baffle subassembly (Figure E–2):

Steps	Action
1	Align the holes in the deflector ❶ to the holes in the baffle ❷.
2	Insert and tighten the six screws to secure the baffle to the deflector.

Install the Top Air Deflector Assembly

Required materials:

- Four 10/32 screws with integral washers
- Six clip nuts (PN 90-07786-00)
- Top air deflector assembly (assembled in previous section)

To install the top air deflector assembly (Figure E–2):

Steps	Action
1	Attach clip nuts to each tab ❸ on the deflector as shown.
2	Count up 26 holes from the bottom of the installation area on the front and rear cabinet rails, as shown in Figure E–1.
3	Use the four 10/32 screws to secure the top air deflector assembly to the cabinet rails.

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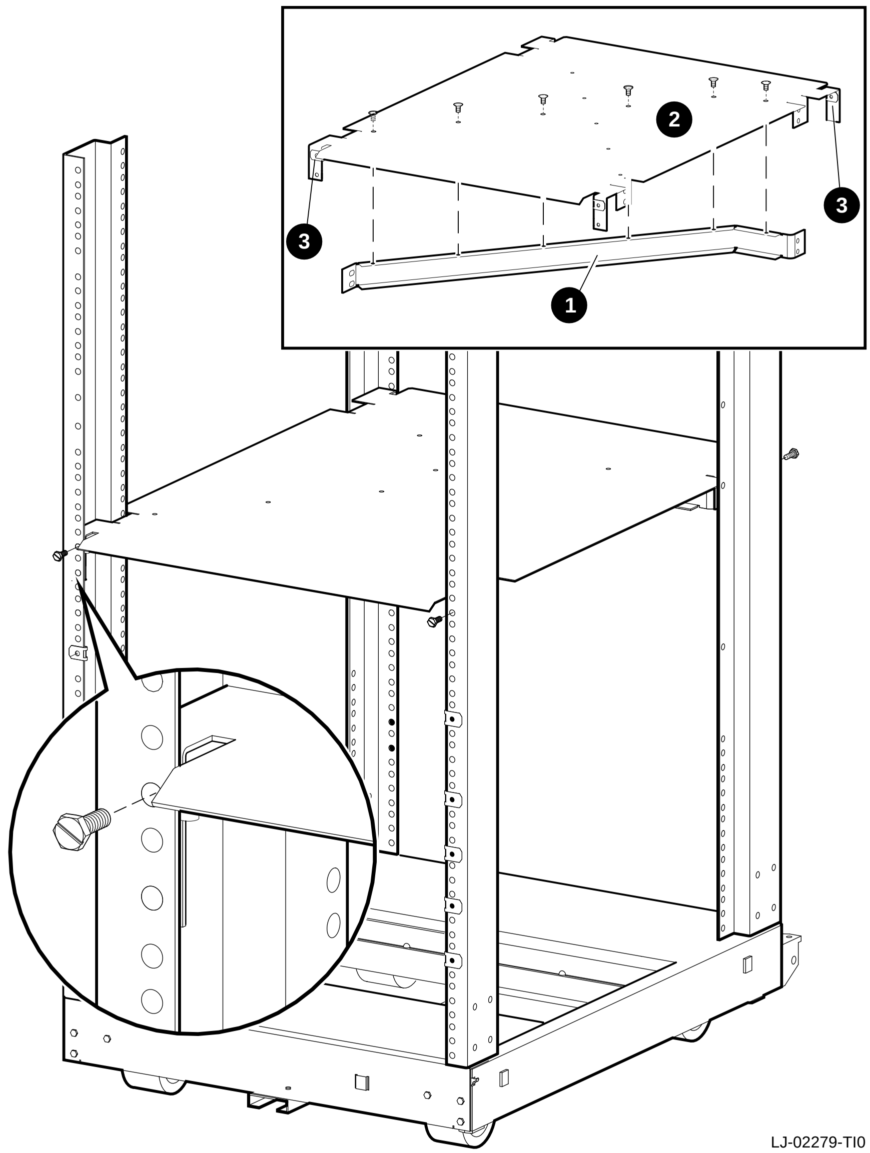
Figure E–2 Installing the Top Air Deflector



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Installation Procedure (IEC RS–310 Cabinet), Continued

Assemble the Bottom Air Deflector and Baffle Subassembly

Required materials:

- Six 6/32 screws
- Bottom air baffle (PN 74–46195–01)
- Bottom air deflector (PN 74–46208–01)

To assemble the bottom air deflector and baffle subassembly (Figure E–3):

Steps	Action
1	Align the holes in the deflector ❶ to the holes in the baffle ❷.
2	Insert and tighten the six screws to secure the baffle to the deflector.

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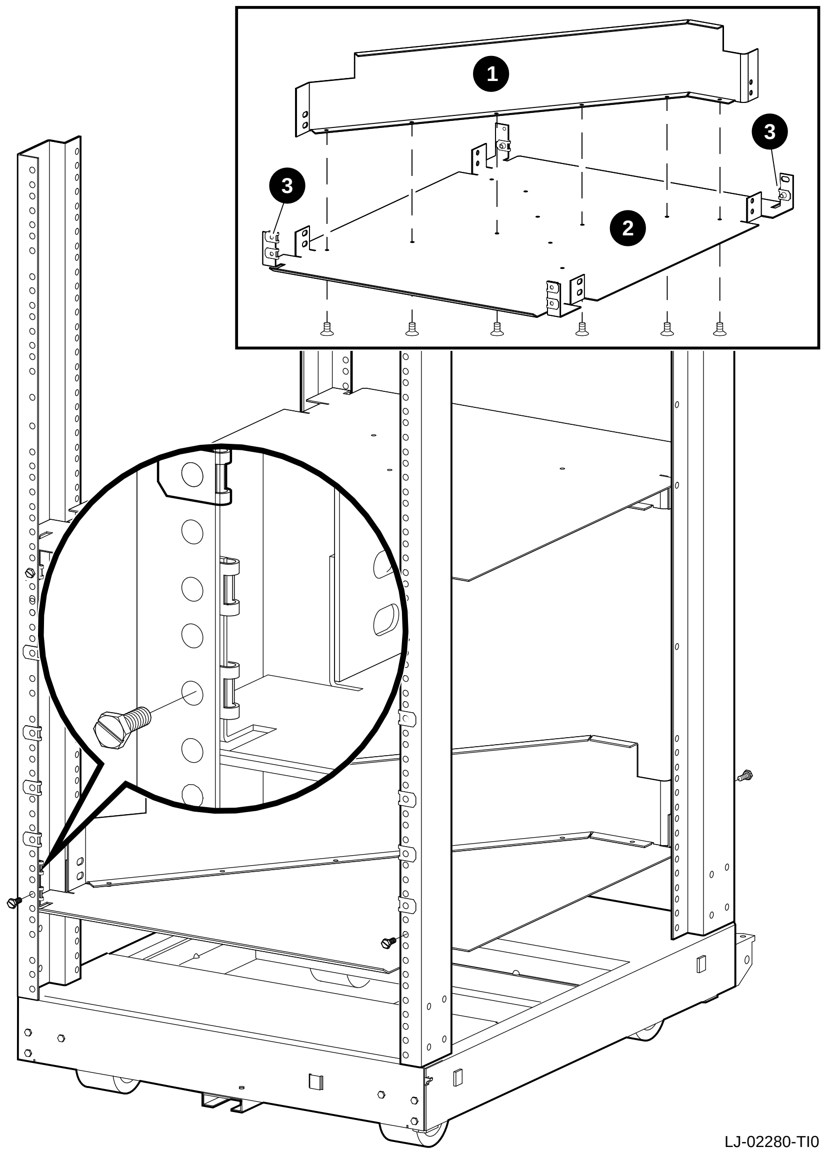
Figure E–3 Installing the Bottom Air Deflector Assembly



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Install the Bottom Air Deflector Assembly

Required materials:

- Four 10/32 screws with integral washers
- 14 clip nuts (PN 90-07786-00)
- Bottom air deflector assembly (assembled in the previous section)

To install the bottom air deflector assembly (Figure E–3):

Steps	Action
1	Attach clip nuts to each tab ❸ on the deflector as shown.
2	Count up four holes from the bottom of the installation area at the front of the cabinet and two holes at the rear of the cabinet.
3	Use the four 10/32 screws to secure the bottom air deflector assembly to the cabinet rails.
4	Install clip nuts in holes 6, 10, 14, and 20 on the front cabinet rails. Install clip nuts in holes 6, 10, 20, and 23 on the rear cabinet rails. See Figure E–1.

Continued on next page

Assemble the Right Side Chassis Slide Subassembly

Required materials:

- Eight 8/32 screws
- Eight nuts
- Two slide mounting brackets (PN 74–46197–01)
- Chassis slide (PN 12–18166–02)
- Slide mounting angle brace (PN 74–45548–02)

NOTE

The slide mounting brackets have two mounting ends. One end is for IEC mounting, and the other is for metric mounting. See Figure E–4.

Continued on next page

Installation Procedure (IEC RS–310 Cabinet), Continued

Assemble the Right Side Chassis Slide Subassembly (continued)

To assemble the right side chassis slide subassembly (Figure E–4):

Steps	Action
1	Orient the slide mounting bracket ❶ so the IEC end is facing out.
2	Use four 8/32 screws to secure the slide mounting brackets to the chassis slide ❷. Do not tighten the two screws at the rear slide mounting bracket.
3	Use four 8/32 screws to secure the slide mounting angle brace ❸ to the chassis slide.

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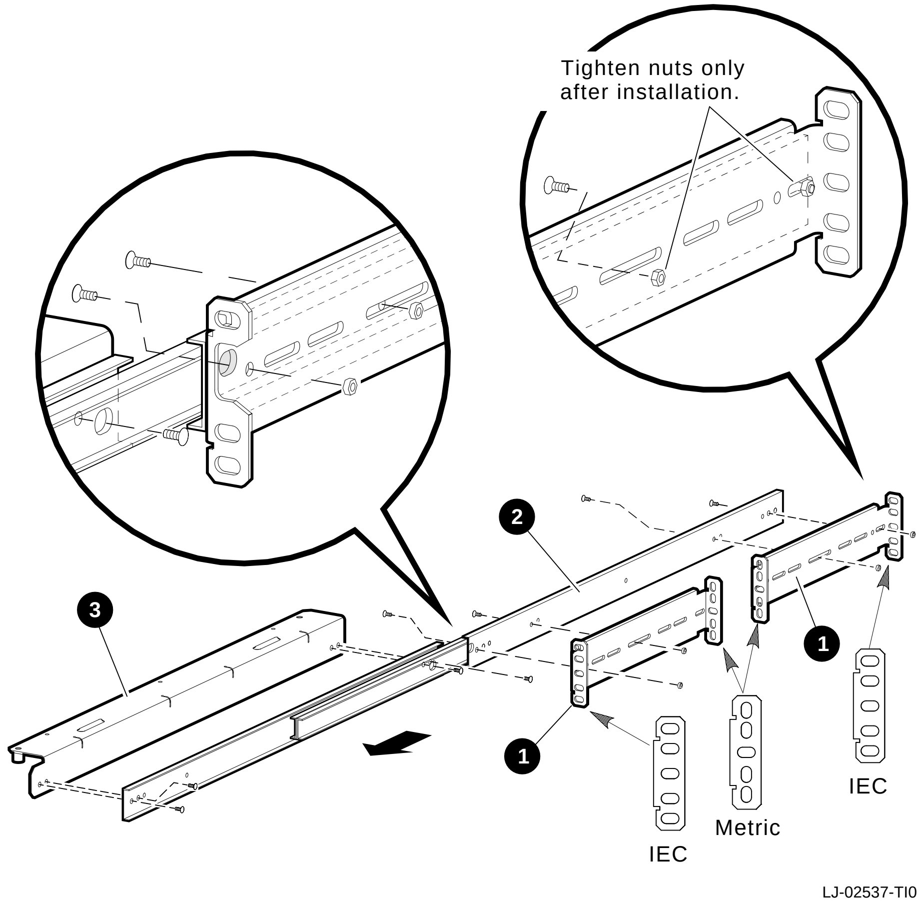
Figure E–4 Assembling the Right Side Chassis Slide Subassembly



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Install the Right Side Chassis Slide Assembly

Required materials:

- Right side chassis slide assembly (assembled in the previous section)
- Two 10/32 screws

To install the right side chassis slide assembly (Figure E–5):

Steps	Action
1	Count up 6 holes from the bottom of the installation area on the front and rear cabinet rails.
2	Count up 10 holes from the bottom of the installation area on the front and rear cabinet rails.
3	Align the chassis slide assembly ❶ to the sixth and tenth hole, then secure the assembly to the cabinet rails ❷.
4	Tighten the two screws on the rear slide mounting bracket.

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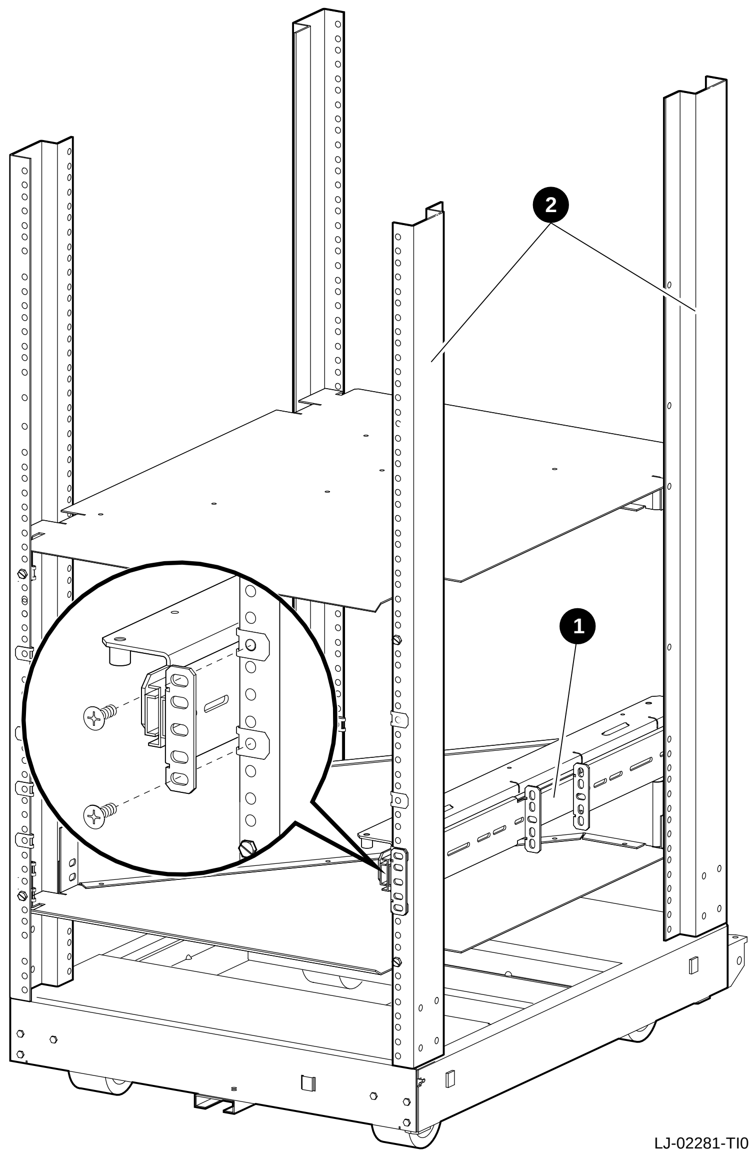
Figure E–5 Installing the Right Side Chassis Slide Assembly



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Assemble the Left Side Chassis Slide Subassembly

Required materials:

- Eight 8/32 screws
- Eight nuts
- Two slide mounting brackets (PN 74–46197–01)
- Chassis slide (PN 12–18166–02)
- Slide mounting angle brace (PN 74–45548–01)

NOTE

The slide mounting brackets have two mounting ends. One end is for IEC mounting, and the other is for metric mounting. See Figure E–6.

To assemble the left side chassis slide subassembly (Figure E–6):

Steps	Action
1	Orient the slide mounting bracket ❶ so the IEC end is facing out.
2	Use four 8/32 screws to secure the slide mounting brackets to the chassis slide ❷. Do not tighten the two screws at the rear slide mounting bracket.
3	Use four 8/32 screws to secure the slide mounting angle brace ❸ to the chassis slide.

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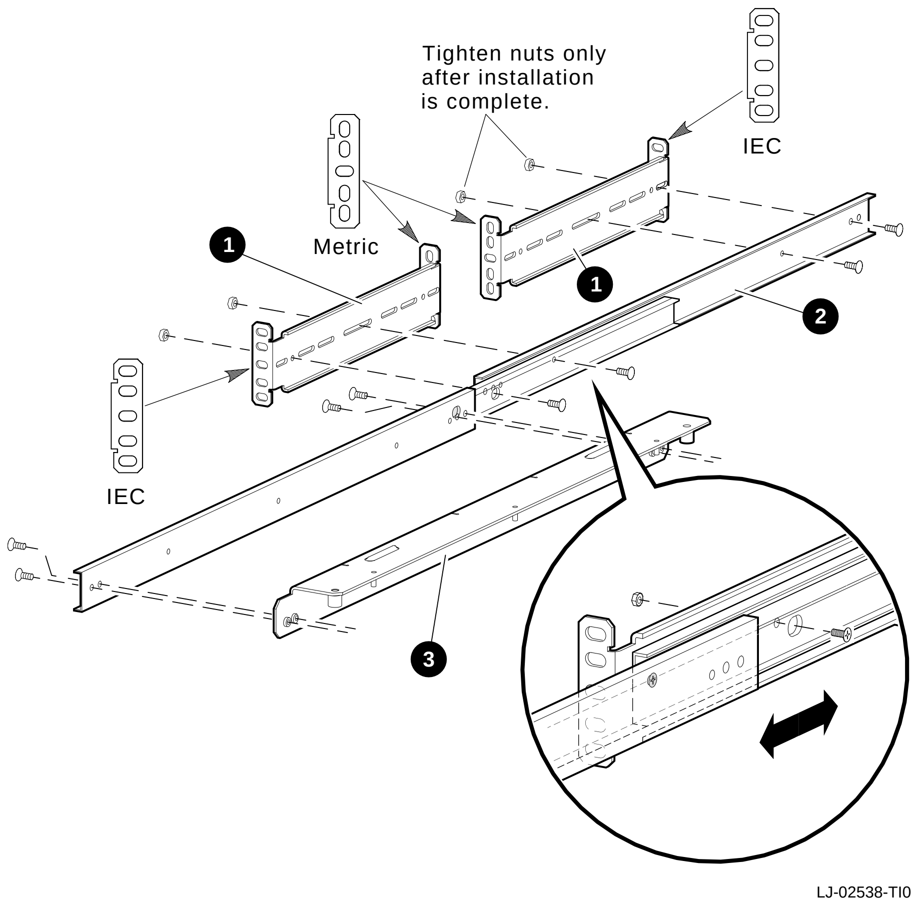
Figure E–6 Assembling the Left Side Chassis Slide Subassembly



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Install the Left Side Chassis Slide Assembly

Required materials:

- Left side chassis slide assembly (assembled in the previous section)
- Two 10/32 screws

To install the left side chassis slide assembly (Figure E–7):

Steps	Action
1	Count up 6 holes from the bottom of the installation area on the front and rear cabinet rails.
2	Count up 10 holes from the bottom of the installation area on the front and rear cabinet rails.
3	Align the chassis slide assembly ❶ to the sixth and tenth hole, then secure the assembly to the cabinet rails ❷.
4	Tighten the two screws at the rear slide mounting bracket.

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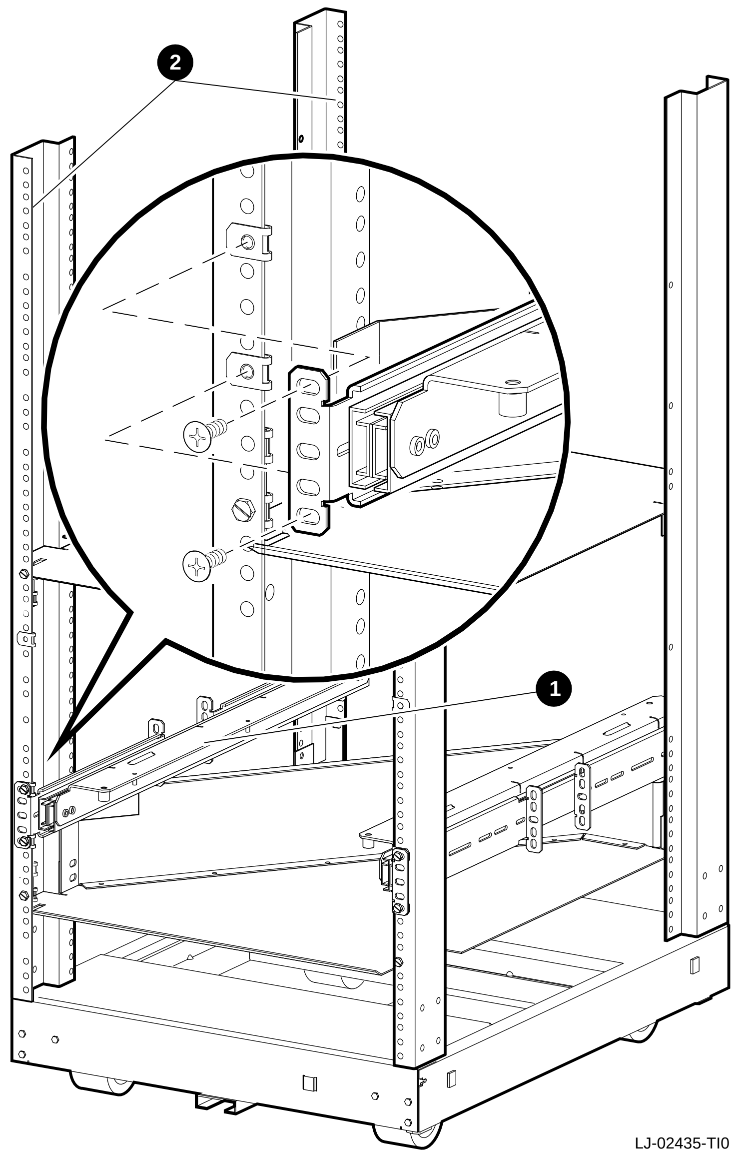
Figure E–7 Installing the Left Side Chassis Slide Assembly



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Install the Chassis Slide Support Brackets

Required materials:

- Three support brackets (PN 74–45547–01)
- Six nuts

To install the chassis slide support brackets (Figure E–8):

Steps	Action
1	Slide out the stabilizer bar❸ to support the weight of the system being installed.
2	Fully extend both chassis slide assemblies ❶.
3	Use the six nuts to secure the three support brackets ❷ to the chassis slide assemblies. Do not tighten the nuts.

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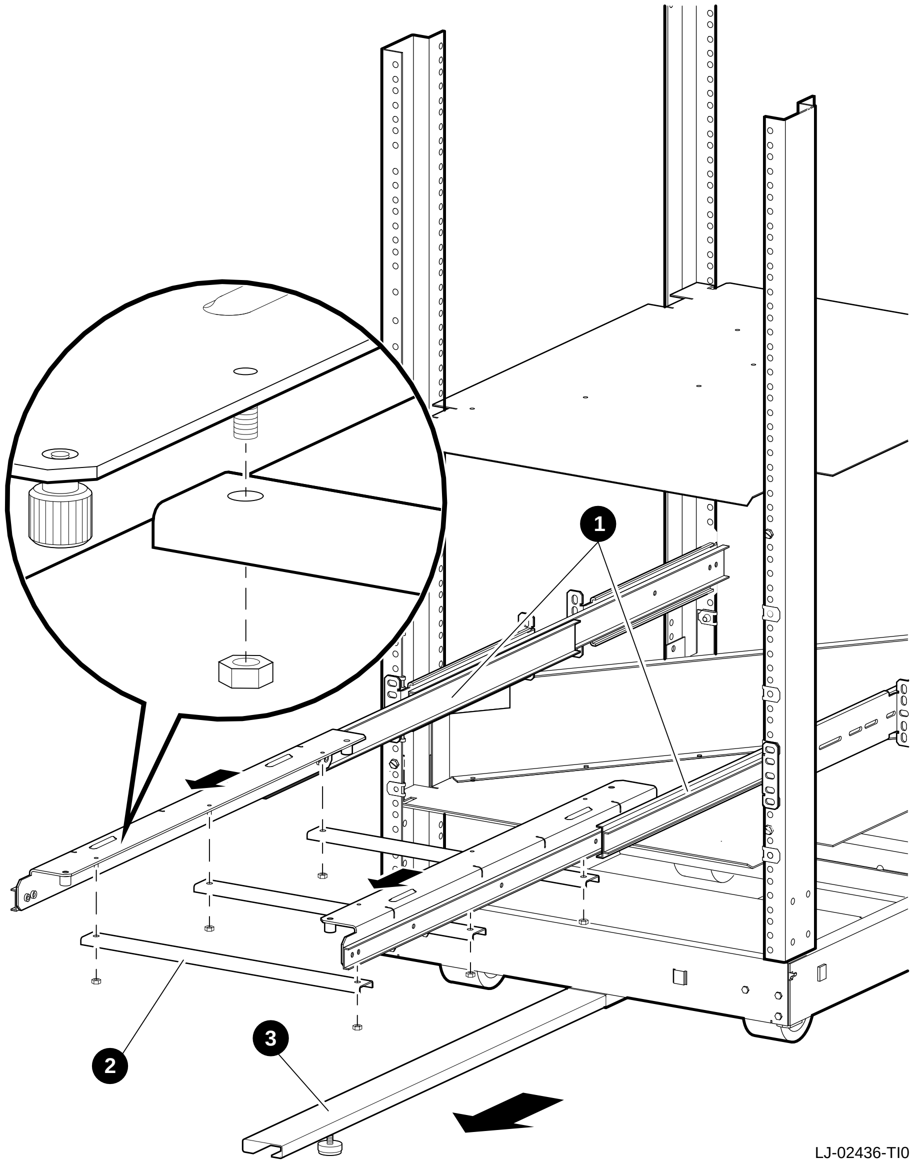
Figure E–8 Installing the Chassis Slide Support Brackets



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Secure the PE50A–B9/D9 Unit to the Chassis Slide Assembly

WARNING

Two people are required to install the system. Failure to do so could cause personal injury.

Digital does not recommend installing the PE50A–B9/D9 unit in the top area of the IEC RS–310 (RETMA) cabinet, for stability reasons.

To secure the PE50A–B9/D9 unit to the chassis slide assembly (Figure E–9):

Steps	Action
1	Slide out the stabilizer bar (if not already out) to support the weight of the system being installed.
2	Slide out both chassis slide assemblies ❷ (if not already out) until they are fully extended.
3	Use two people to carefully lift the PE50A–B9/D9 unit ❶ and place it on the extended chassis slide assemblies ❷.
4	Secure the PE50A–B9/D9 unit to the assemblies, using the four thumb screws at the bottom of the assemblies.
5	Tighten the six nuts securing the chassis slide support brackets to the assemblies.
6	Do not push the PE50A–B9/D9 unit into the cabinet.

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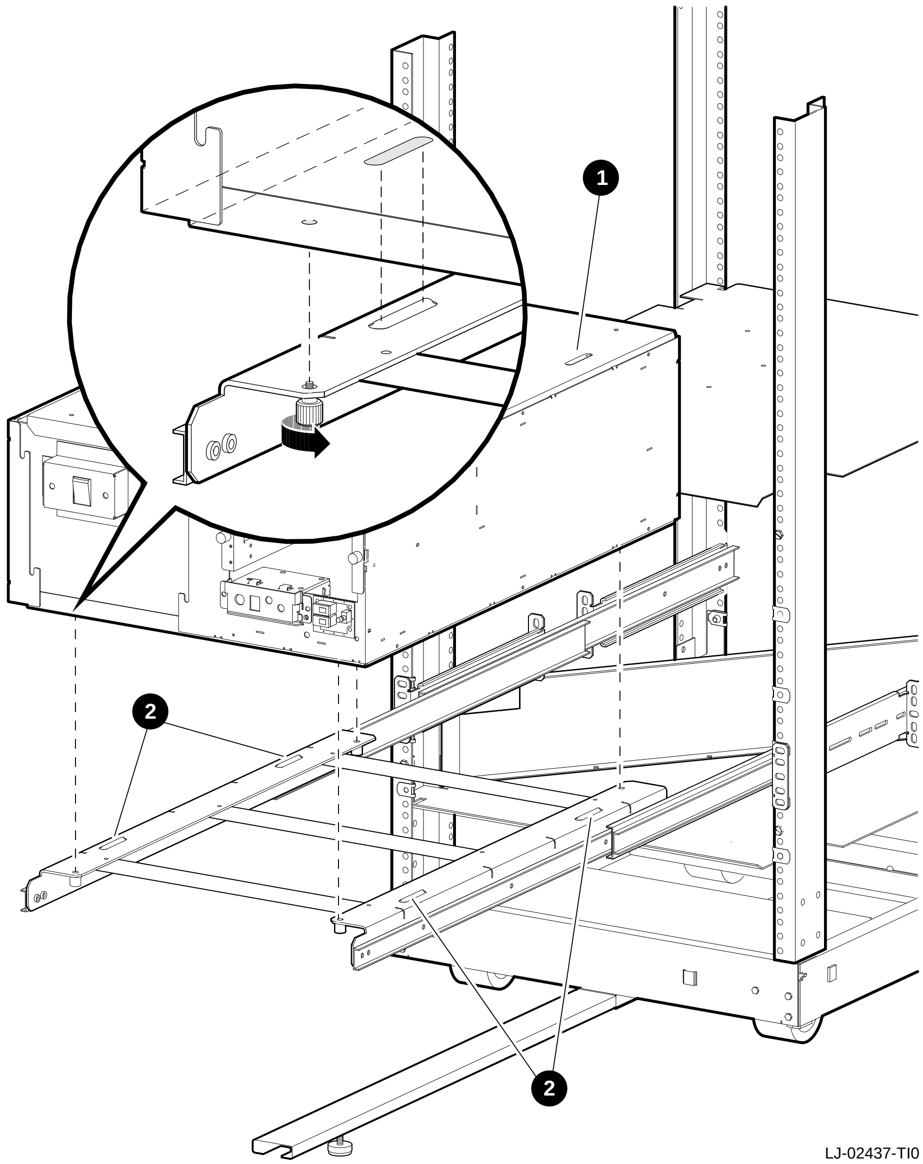
Figure E–9 Securing the PE50A–B9/D9 Unit to the Chassis Slide Assembly



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Installation Procedure (IEC RS–310 Cabinet), Continued

Install the Faceplate Mounting Brackets

Required materials:

- Two 6/32 screws
- Six 10/32 screws
- Right mounting bracket (PN 74–45544–01)
- Left mounting bracket (PN 74–45543–01)

To install the faceplate mounting brackets Figure E–10):

Steps	Action
1	Use the two 6/32 screws to secure the right faceplate mounting brackets ❶ to the system ❷. The left faceplate bracket is secured using screws that are already in place on the power supply.
2	Count up 2 holes, 14 holes, and 20 holes from the bottom of the installation area on the front cabinet rails.
3	Install clip nuts at the locations determined in step 2 (if not already installed).
4	Push the PE50A-B9/D9 unit into the cabinet.
5	Use the six 10/32 screws to secure the faceplate mounting brackets❶ to the cabinet.

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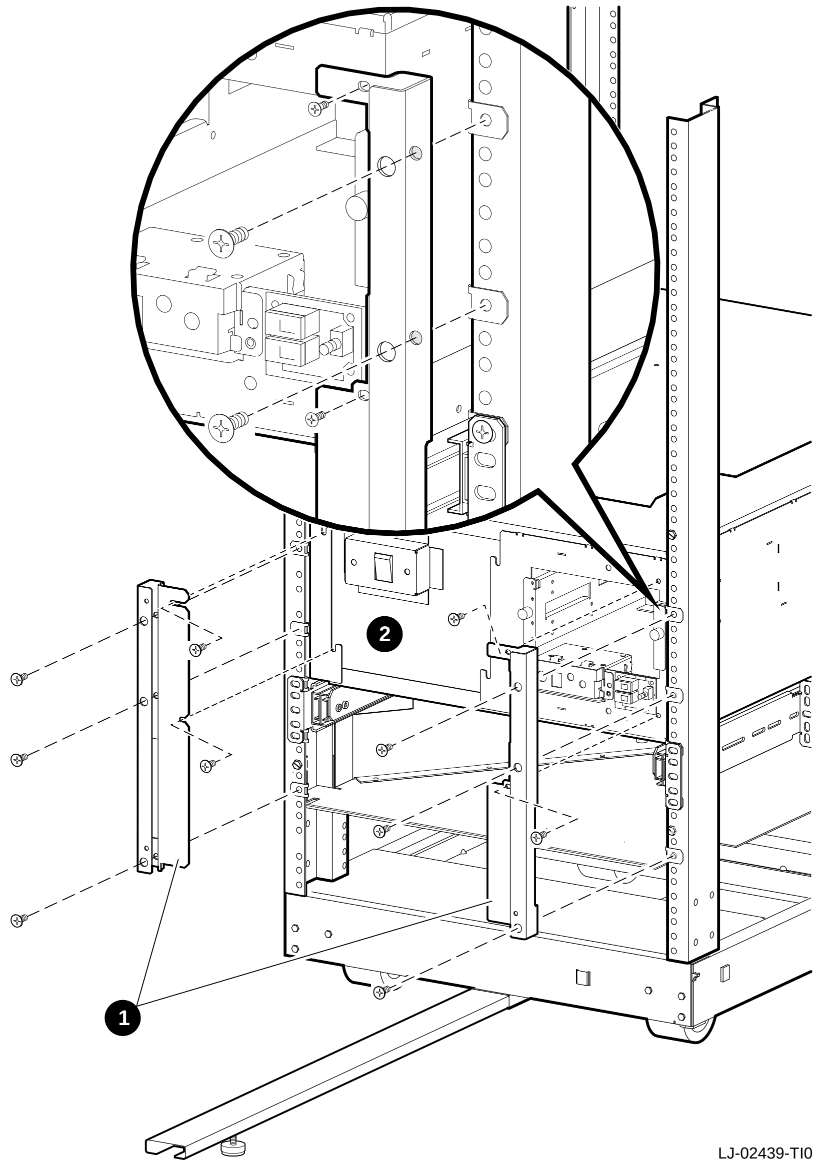
Installation Procedure (IEC RS–310 Cabinet), Continued

Figure E–10 Installing the Faceplate Mounting Brackets



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Install the System Faceplate

To install the faceplate (PN 70–30322–01), snap the faceplate onto the taps at the front of the system (Figure E–11).

NOTE

In Figure E–11, the faceplate has two option inserts. The bottom insert is for an RZ26 drive. The top insert is a blank, used when no other drive is installed with the RZ26.

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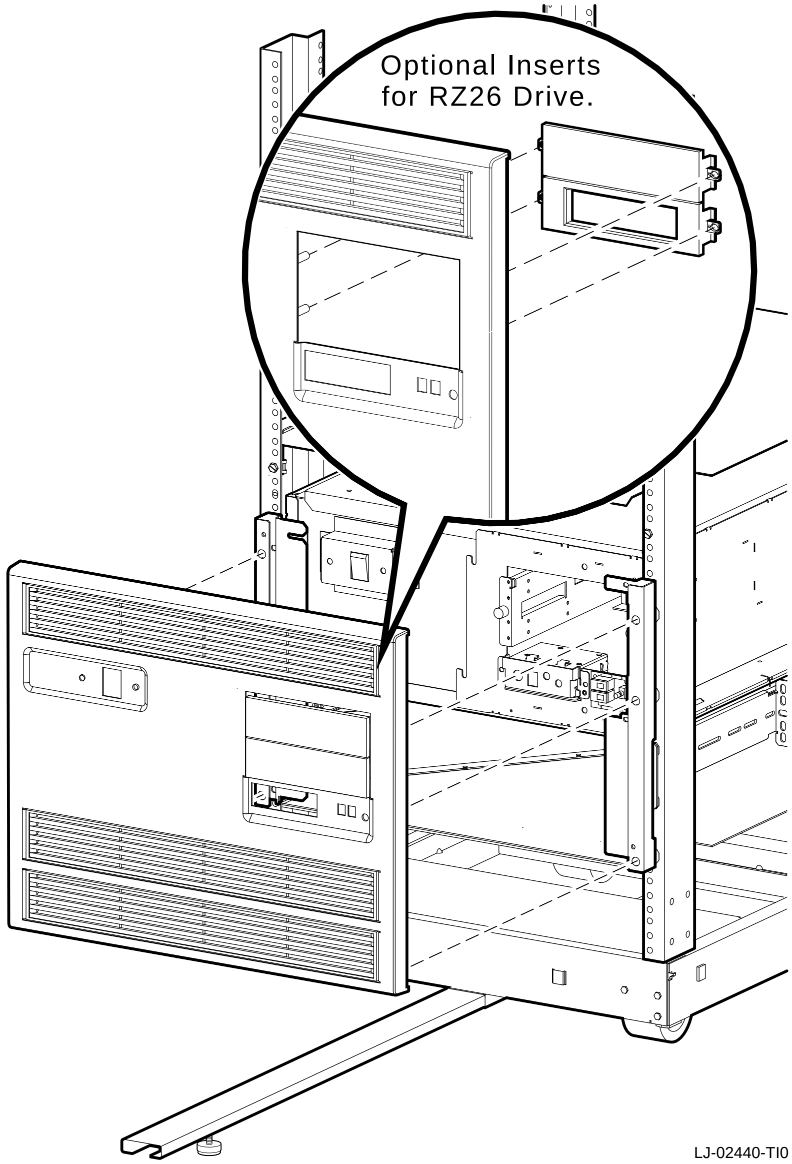
Figure E–11 Installing the Faceplate



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Install the Rear Support Bracket

Required materials:

- Two 6/32 screws
- Rear support bracket (PN 74–45545–02)
- Four 10/32 screws

To install the rear support bracket (Figure E–12):

Steps	Action
1	On the rear cabinet rails, count up 20 holes and 26 holes from the bottom of the installation area. Install clip nuts on these holes, if not already installed.
2	Use the two 6/32 screws to secure the rear support bracket ❶ to the rear of the PE50A–B9/D9 unit ❷.
3	Use the four 10/32 screws to secure the rear support bracket to the rear of the cabinet.

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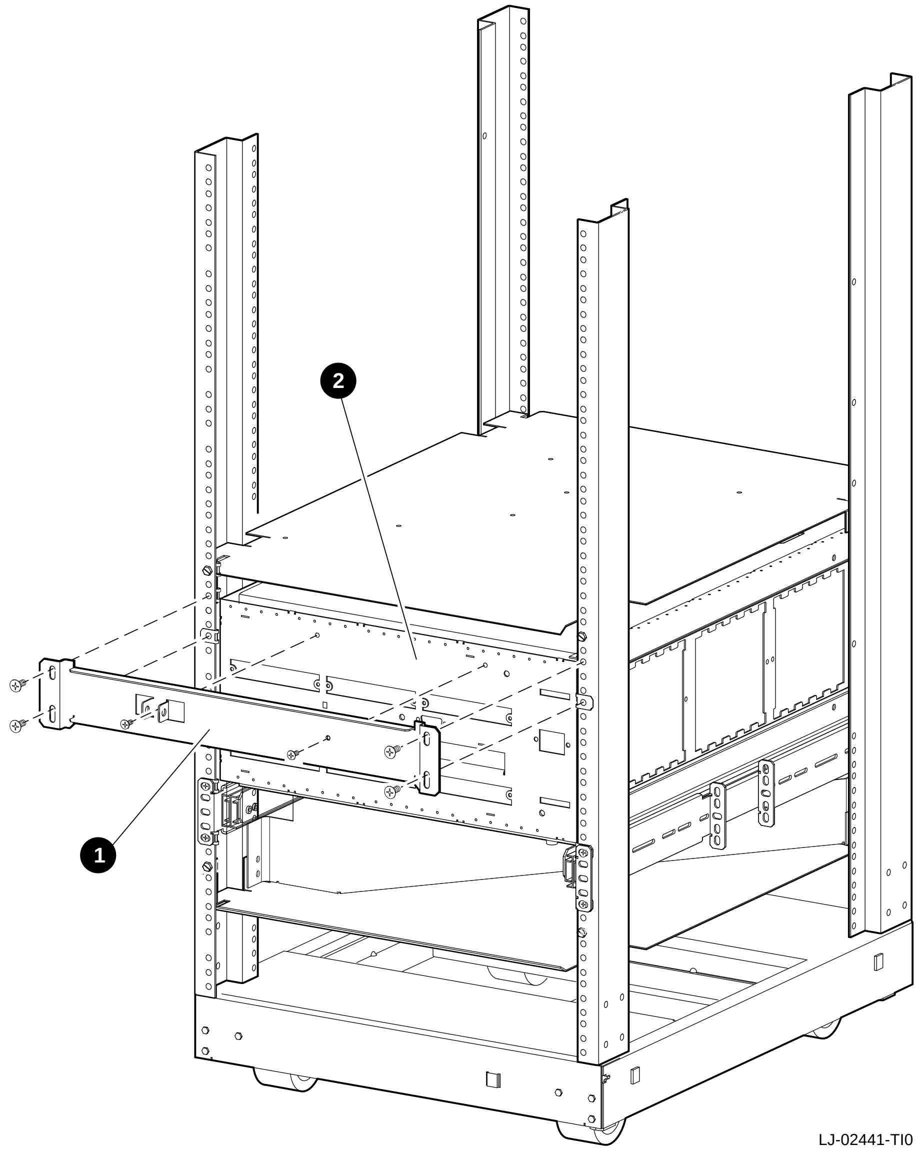
Figure E–12 Installing the Rear Support Bracket



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Power and Cabling

Figure E–13 shows the rear connectors, switches, and option slots on the DEC 3000 Model 500/500S AXP system. Table E–1 describes these items.

Figure E–14 shows the front switches, lights, jacks, and removable media slots. Table E–2 describes these items.

To connect the system cables (Figure E–13):

Steps	Action
1	Connect the keyboard/mouse cable ❺.
2	Connect the monitor cable ⓫.
3	Connect power cord ⓬. There is no power controller.
4	Connect any other necessary cables.

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Figure E–13 Rear View of the System

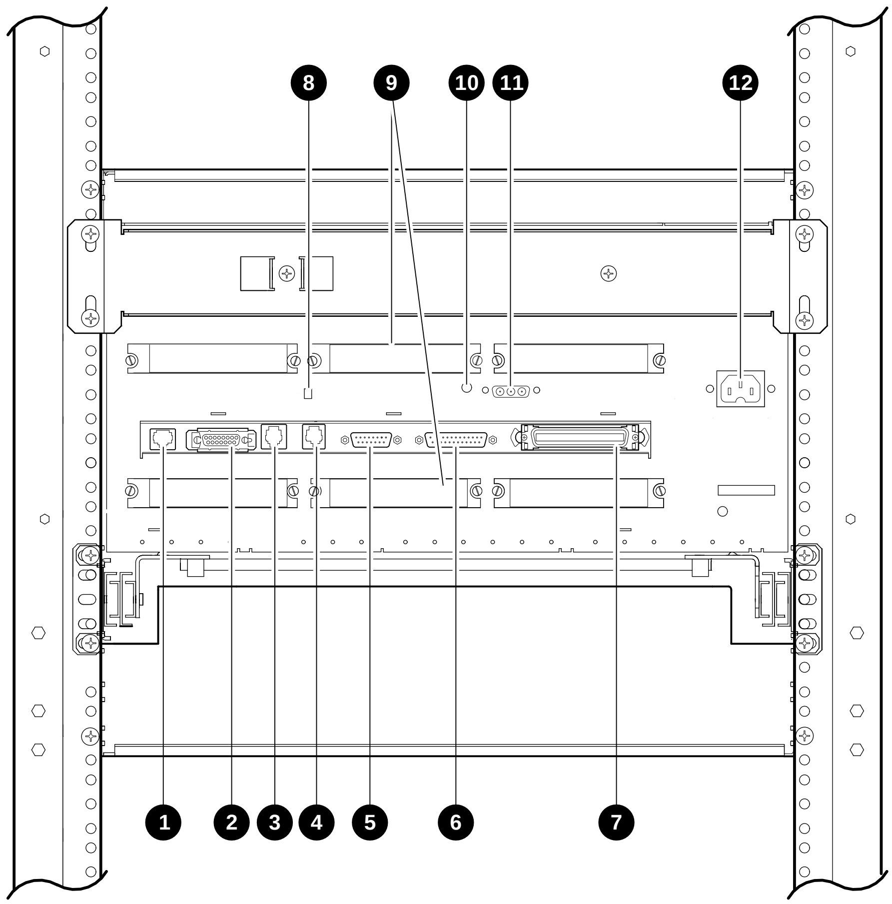

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Table E–1 DEC 3000 Model 500/500S AXP System (Rear)

This Feature...	Lets You...
❶ 10baseT port	Connect a 10baseT (twisted-pair) Ethernet network cable.
❷ AUI Ethernet port	Connect an AUI (thickwire) Ethernet network cable.
❸ ISDN port	Connect an ISDN network cable.
❹ Printer/alternate console port	Connect a printer or an alternate console.
❺ Keyboard/mouse port	Connect the keyboard/mouse cable.
❻ Synch/asynch communications	Connect to a communication device, such as a modem.
❼ External SCSI port	Connect Small Computer System Interface (SCSI) peripheral devices.
❽ Printer/alternate console switch	Select the function of the printer/alternate console port.
❾ Six TURBOchannel slots	Install TURBOchannel option modules. (There are three designated slots for the I/O module and three slots for the system module.)
❿ Video refresh switch	Choose the correct video refresh rate (66Hz or 72Hz) for the monitor.
⓫ Monitor port	Connect the monitor video cable.
⓬ System power port	Connect the system power cord. (The port is keyed.)

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Figure E–14 Front View of the System

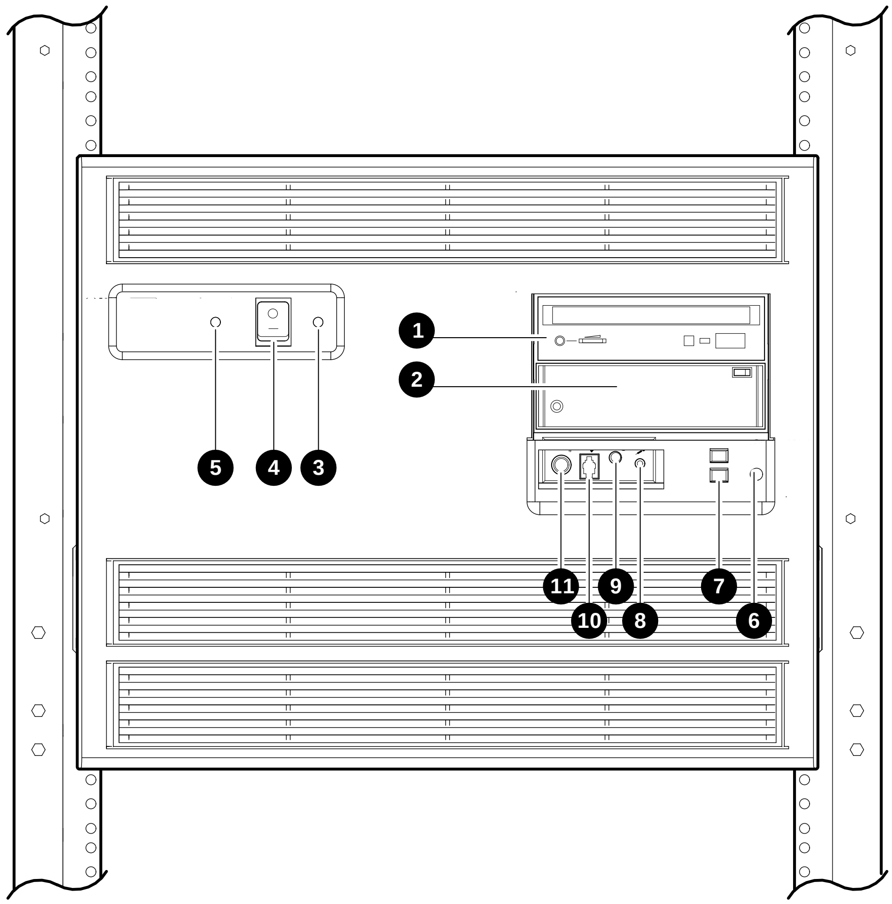

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Table E–2 DEC 3000 Model 500/500S AXP System (Front)

This Feature...	Lets You...
❶ and ❷ Removable-media area	Access devices that use removable storage media such as diskettes, compact discs, cassette tapes, or cartridge tapes.
❸ DC OK light	Check that all dc voltages are present on the power supply.
❹ On/Off switch	Turn the system on | and off (0).
❺ Fan indicator light	Check whether a fan has failed.
❻ Halt button	Put the system in console mode.
❼ Diagnostic display	View error codes that may indicate potential problems with the system.
❽ Microphone input jack	Connect a microphone to the system.
❾ Speaker output jack	Connect a speaker or headphone for audio output.
❿ Telephone jack	Connect a telephone handset.
⓫ Audio input jack	Connect an audio input line.

Verify the System

For system verification, refer to *DEC 3000 Model 500/500S AXP Service Information*.

Appendix F
Rackmount Installation for the H9A00–AJ Cabinet

Installation Procedure (H9A00-AJ Cabinet)

Overview

This chapter describes how to install the DEC 3000 Model 500 (PE50A–B9) or Model 500S (PE50A–D9) AXP rackmount system in an H9A00-AJ cabinet.

NOTE

The configurations that this procedure supports do not require a power controller.

Cabinet Location

The customer chooses the location to install the cabinet. When the location is identified, perform the following steps:

Steps	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 to support the weight of the system being installed.

Continued on next page

Determine the Installation Area in the Cabinet

To determine the installation area for the PE50A–B9/D9 unit in an H9A00–AJ cabinet, perform the following steps at the front and rear cabinet rails. See Figure F–1.

WARNING

Digital does not recommend installing the system in the top area of the cabinet, for stability reasons.

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

Steps	Action
1	Select a section of the cabinet rail where there is a 0.50 inch (1.27 cm) 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 1.75 inches (4.45 cm).
4	Count up or down 10 sets and make a mark. The area between the marks is the **installation area**.

The total installation area is 17.50 inches (44.45 cm). The equation for calculating the total area is

1.75 inches (4.45 cm) $\times$ 10 sets = 17.50 inches (44.45 cm)

NOTE

The hole count described in this section will install the system in any predetermined 17.50-inch (44.45 cm) area.

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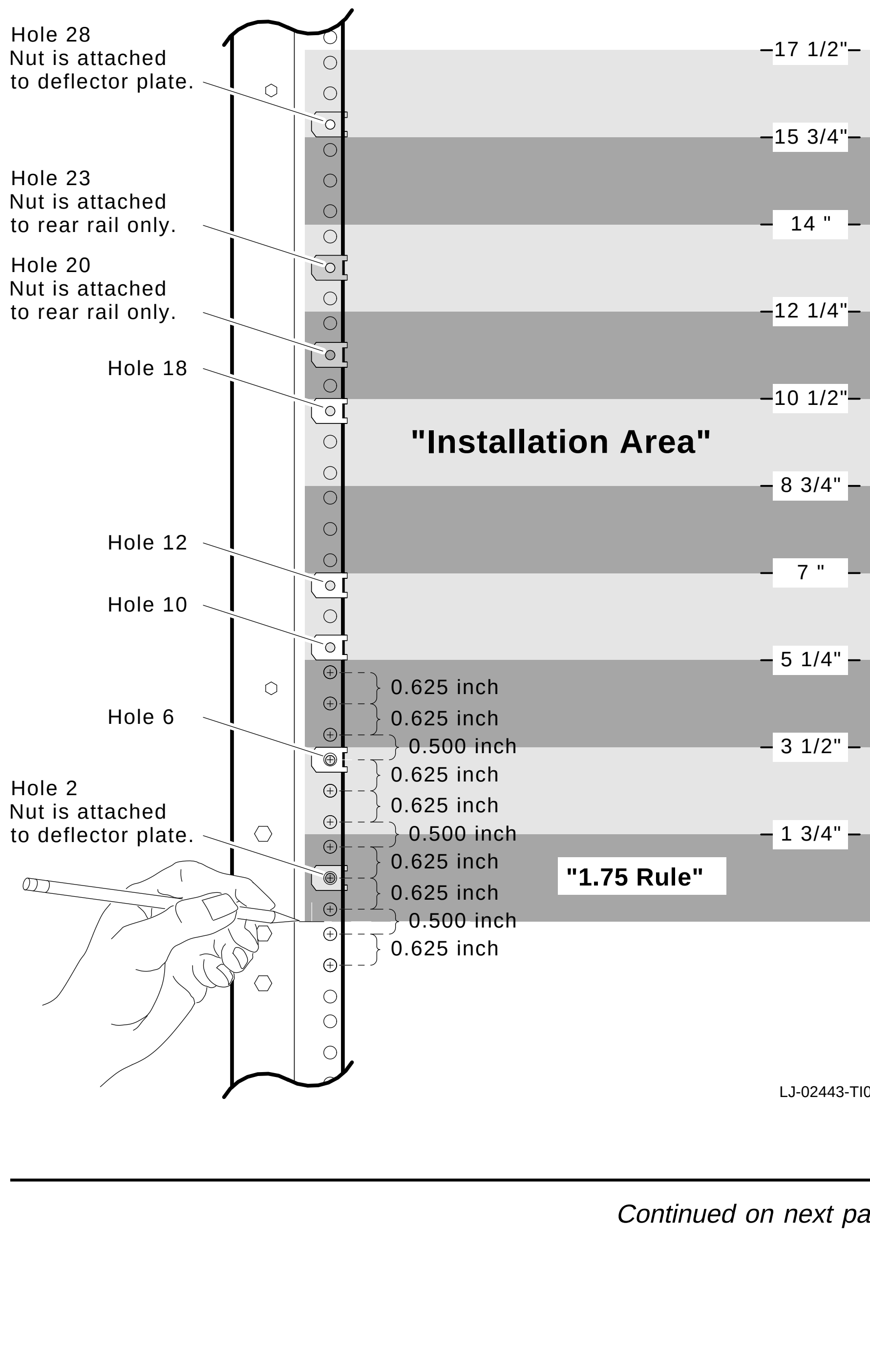
Figure F–1 Determining the Installation Area



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Assemble the Top Air Deflector and Baffle Subassembly

Required materials:

- Six 6/32 screws
- Top air baffle (PN 74–46159–01)
- Top air deflector (PN 74–46157–01)

To assemble the top air deflector and baffle subassembly (Figure F–2):

Steps	Action
1	Align the holes in the deflector ❶ to the holes in the baffle ❷.
2	Insert and tighten the six screws to secure the baffle to the deflector.

Install the Top Air Deflector Assembly

Required materials:

- Four 10/32 screws with integral washers
- Four clip nuts (PN 90–07786–00)
- Top air deflector assembly (assembled in the previous section)

To install the top air deflector assembly (Figure F–2):

Steps	Action
1	Attach one clip nut to each tab ❸ on the deflector.
2	Count up 28 holes from the bottom of the installation area on the front and rear cjabinet rails, as shown in Figure F–1.
3	Use the four 10/32 screws to secure the top air deflector assembly to the cabinet rails.

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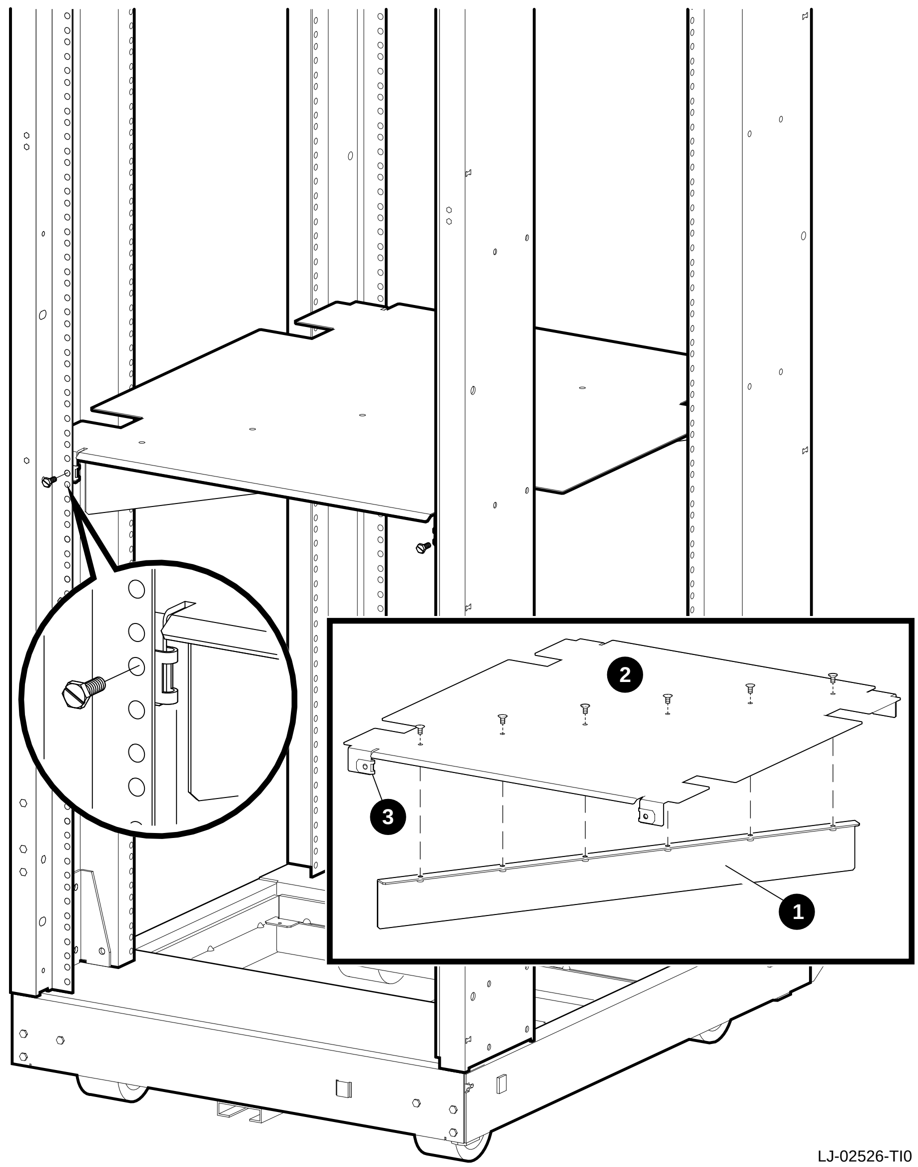
Figure F–2 Installing the Top Air Deflector



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Installation Procedure (H9A00-AJ Cabinet), Continued

Assemble the Bottom Air Deflector and Baffle Subassembly

Required materials:

- Six 6/32 screws
- Bottom air baffle (PN 74–46159–01)
- Bottom air deflector (PN 74–46158–01)

To assemble the bottom air deflector and baffle subassembly (Figure F–3):

Steps	Action
1	Align the holes in the deflector ❶ to the holes in the baffle ❷.
2	Insert and tighten the six screws to secure the baffle to the deflector.

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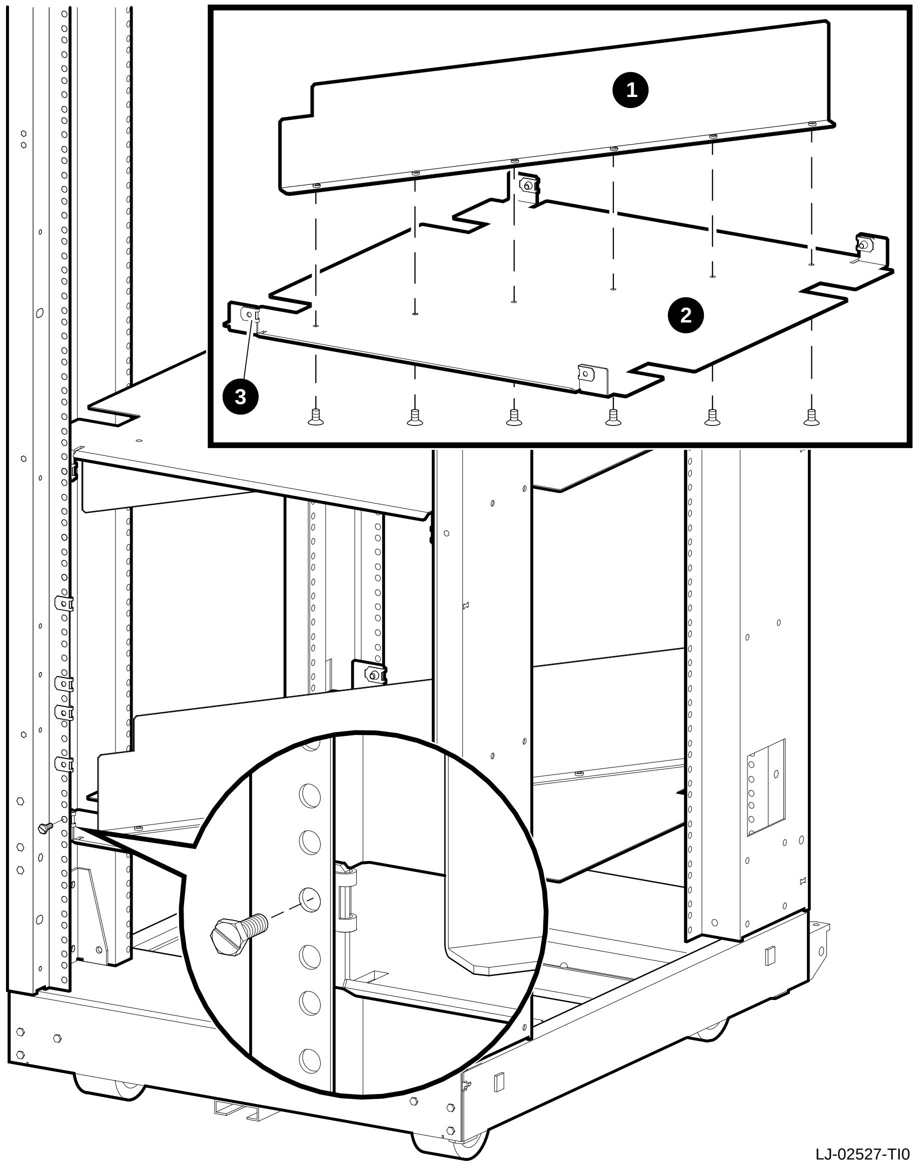
Figure F–3 Installing the Bottom Air Deflector Assembly



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Install the Bottom Air Deflector Assembly

Required materials:

- Four 10/32 screws with integral washers
- 12 clip nuts (PN 90–07786–00)
- Bottom air deflector assembly (assembled in the previous section)

To install the bottom air deflector assembly (Figure F–3):

Steps	Action
1	Attach one clip nut to each tab ❸ on the deflector, as shown in Figure F–3.
2	Count up two holes from the bottom of the installation area on the front and rear cabinet rails.
3	Use the four 10/32 screws to secure the bottom air deflector assembly to the cabinet rails.
4	Install clip nuts in holes 6, 10, 12, and 18 on the front cabinet rails. Install clip nuts in holes 6, 10, 20, and 23 on the rear cabinet rails. See Figure F–1.

Continued on next page

Assemble the Right Side Chassis Slide Subassembly

Required materials:

- Eight 8/32 screws
- Eight nuts
- Two slide mounting brackets (PN 74–46197–01)
- Chassis slide (PN 12–18166–02)
- Slide mounting angle brace (PN 74–45548–02)

NOTE

The slide mounting brackets have two mounting ends. One end is for IEC mounting, and the other is for metric mounting. See Figure F–4.

Continued on next page

Installation Procedure (H9A00-AJ Cabinet), Continued

Assemble the Right Side Chassis Slide Subassembly (continued)

To assemble the right side chassis slide subassembly (Figure F–4):

Steps	Action
1	Orient the slide mounting bracket ❶ so the IEC end is facing out.
2	Use four 8/32 screws to secure the slide mounting brackets to the chassis slide ❷. Do not tighten the two screws at the rear slide mounting bracket.
3	Use four 8/32 screws to secure the slide mounting angle brace ❸ to the chassis slide.

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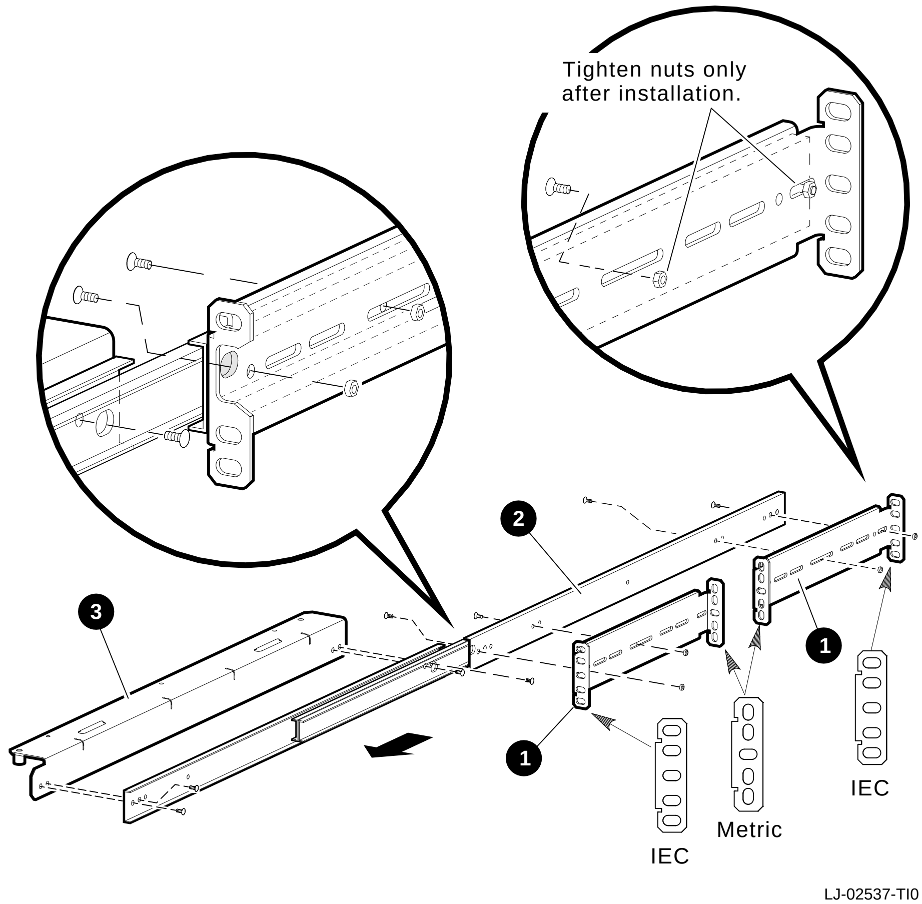
Figure F–4 Assembling the Right Side Chassis Subassembly



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Install the Right Side Chassis Slide Assembly

Required materials:

- Right side chassis slide assembly (assembled in the previous section)
- Two 10/32 screws

To install the right side chassis slide assembly, perform the following (Figure F–5):

Step	Action
1	Count up 6 holes from the bottom of the installation area on the front and rear cabinet rails.
2	Count up 10 holes from the bottom of the installation area on the front and rear cabinet rails.
3	Align the chassis slide assembly ❶ to the sixth and tenth hole, then secure the assembly to the cabinet rails ❷.
4	Tighten the two screws at the rear slide mounting bracket.

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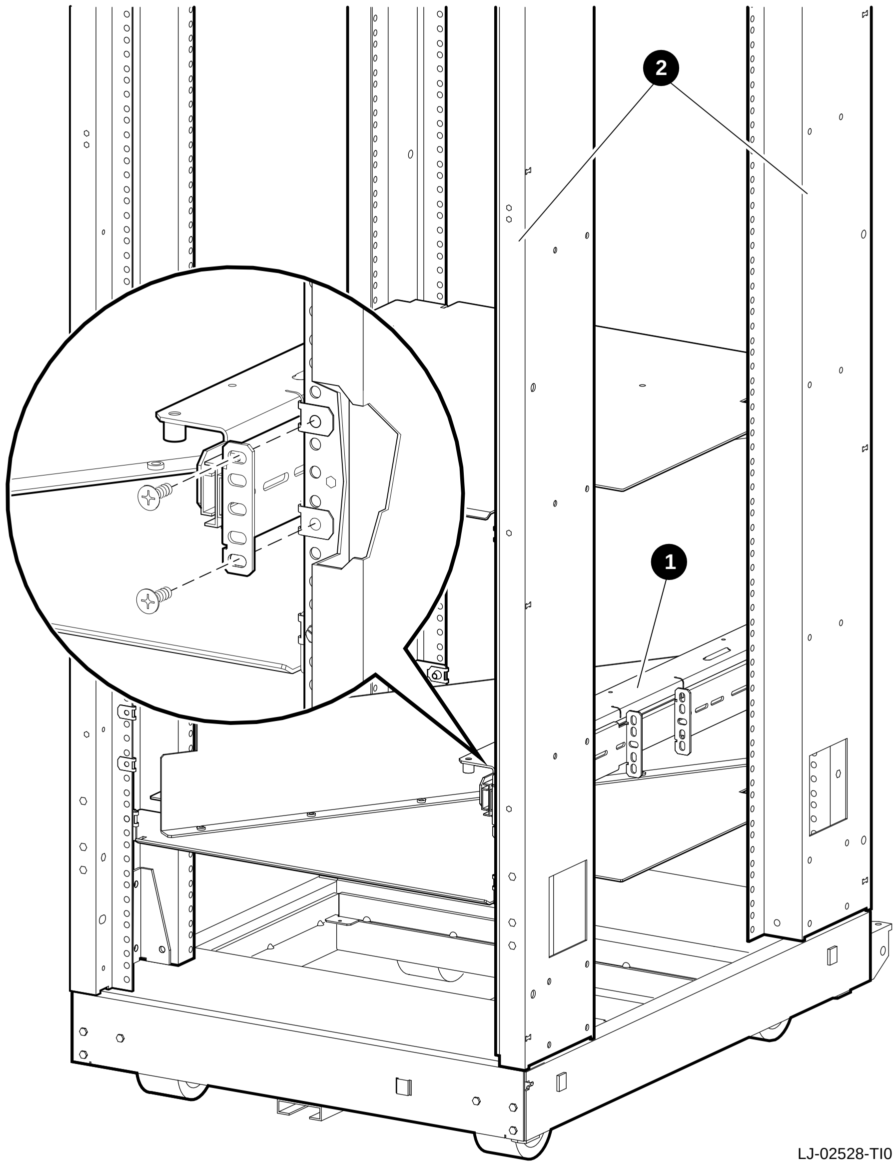
Figure F–5 Installing the Right Side Chassis Slide Assembly



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Installation Procedure (H9A00-AJ Cabinet), Continued

Assemble the Left Side Chassis Slide Subassembly

Required materials:

- Eight 8/32 screws
- Eight nuts
- Two slide mounting brackets (PN 74–46197–01)
- Chassis slide (PN 12–18166–02)
- Slide mounting angle brace (PN 74–45548–01)

NOTE

The slide mounting brackets have two mounting ends. One end is for IEC mounting, and the other is for metric mounting. See Figure F–6.

To assemble the left side chassis slide subassembly (Figure F–6):

Steps	Action
1	Orient the slide mounting bracket❶ so the IEC end is facing out.
2	Use four 8/32 screws to secure the slide mounting brackets to the chassis slide ❷. Do not tighten the two screws at the rear slide mounting bracket.
3	Use four 8/32 screws to secure the slide mounting angle brace ❸ to the chassis slide.

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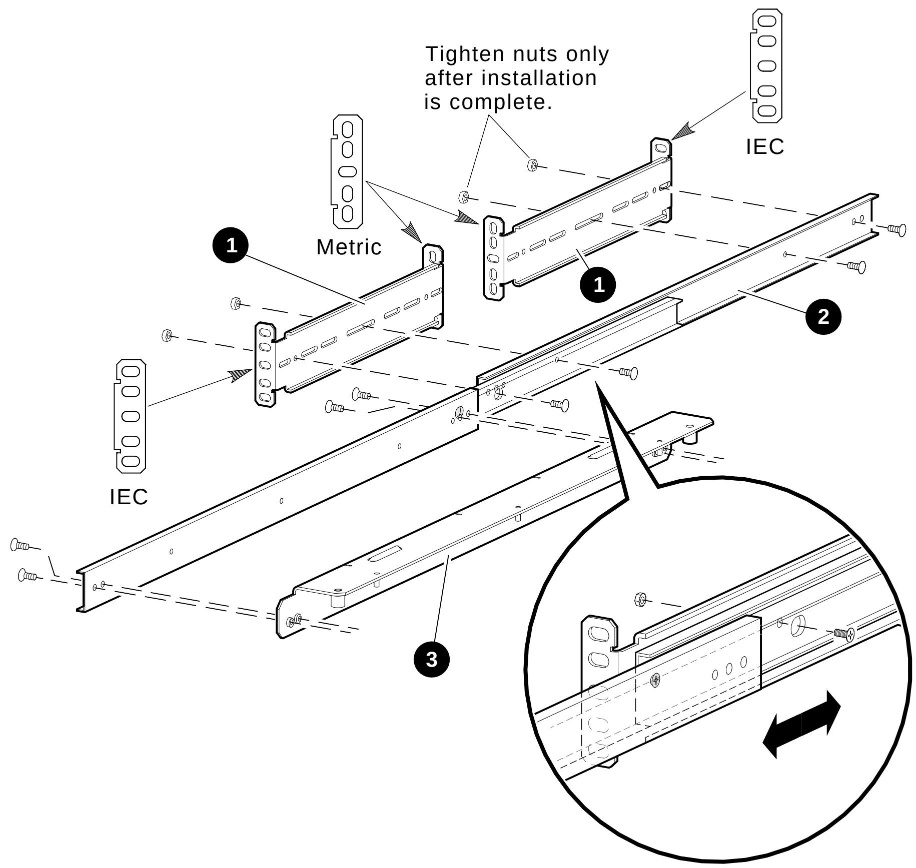
Figure F–6 Assembling of the Left Side Slide Subassembly



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Install the Left Side Chassis Slide Assembly

Required materials:

- Left side chassis slide assembly (assembled in the previous section)
- Two 10/32 screws

To install the left side chassis slide assembly (Figure F–7):

Steps	Action
1	Count up 6 holes from the bottom of the installation area on the front and rear cabinet rails.
2	Count up 10 holes from the bottom of the installation area on the front and rear cabinet rails.
3	Align the chassis slide assembly ❶ to the sixth and tenth hole, then secure the assembly to the cabinet rails ❷.
4	Tighten the two screws at the rear slide mounting bracket.

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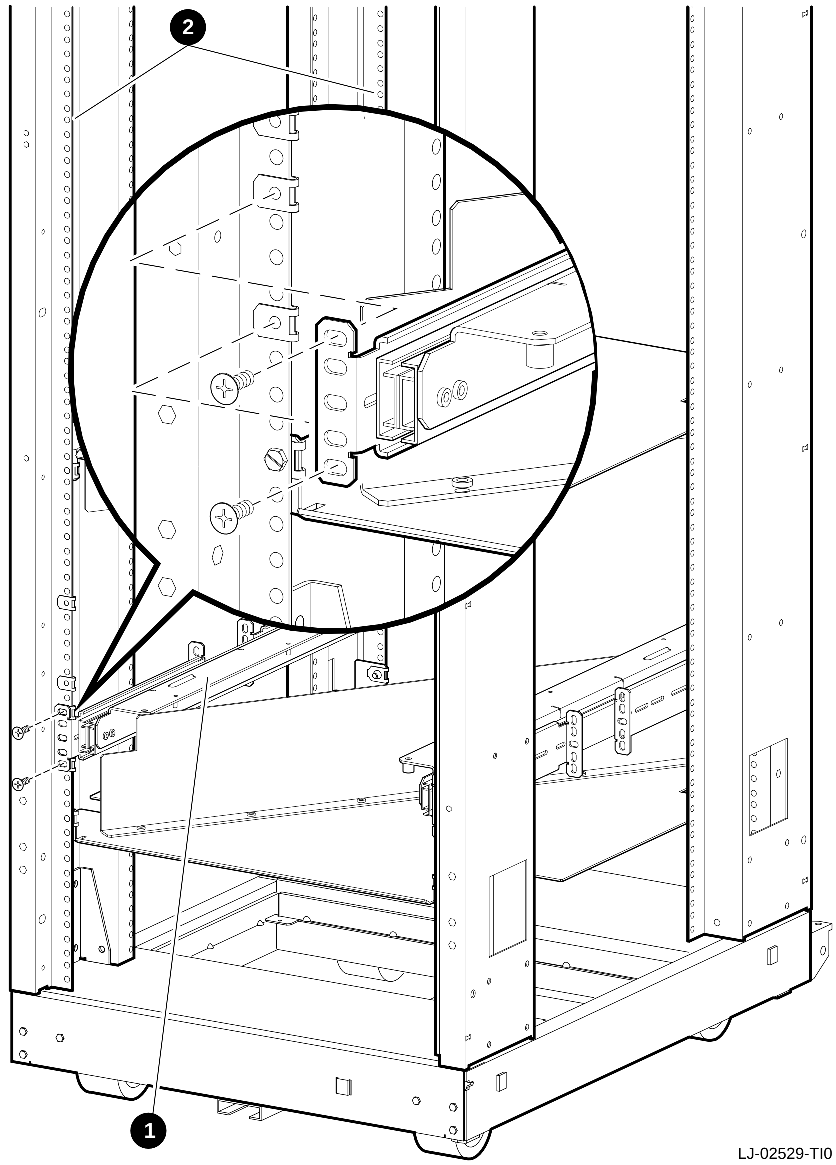
Figure F–7 Installing the Left Side Chassis Slide Assembly



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Install Chassis Slide Support Brackets

Required materials:

- Three support brackets (PN 74–45547–01)
- Six nuts

To install the chassis slide support brackets (Figure F–8):

Steps	Action
1	Slide out the stabilizer bar ❸ to support the weight of the system being installed (if not already out).
2	Fully extend both chassis slide assemblies ❶.
3	Use the six nuts to secure the three support brackets ❷ to the chassis slide assembly. Do not tighten the nuts.

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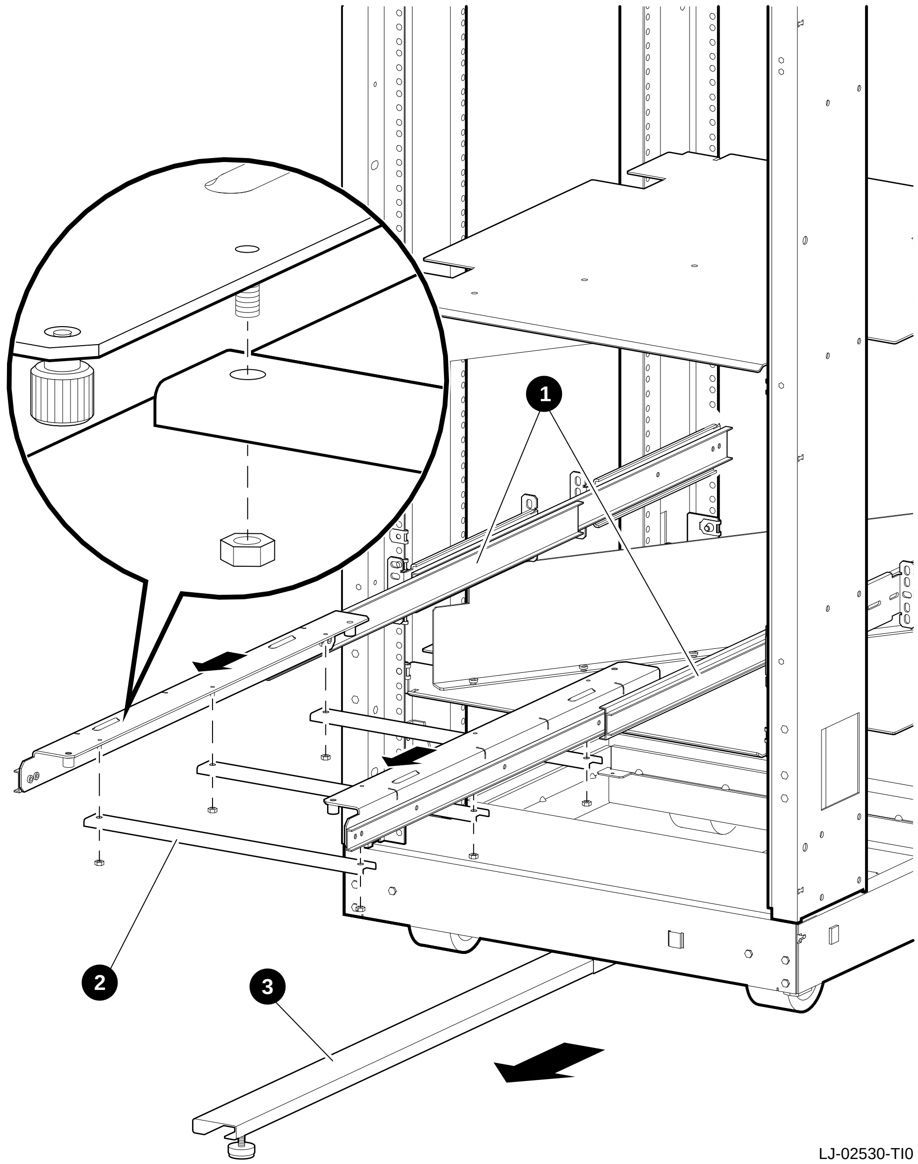
Figure F–8 Installing the Chassis Slide Support Brackets



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Secure the PE50A–B9/D9 Unit to the Chassis Slide Assembly

WARNING
Two people are required to install the system. Failure to do so could cause personal injury.

Digital does not recommend installing the PE50A–B9/D9 unit in the top area of the H9A00–AJ cabinet, for stability reasons.

To secure the PE50A-B9/D9 to the chassis slide assembly (Figure F–9):

Steps	Action
1	Slide out the stabilizer bar (if not already out) to support the weight of the system being installed.
2	Slide out both chassis slide assemblies ❷ until they are fully extended.
3	Use two people to carefully lift the PE50A–B9/D9 unit ❶ and place it on the extended chassis slide assemblies ❷.
4	Secure the PE50A–B9/D9 unit to the assemblies, using the four thumb screws at the bottom of the assemblies.
5	Tighten the six nuts securing the chassis slide support brackets to the assemblies.
6	Do not push the PE50A–B9/D9 unit into the cabinet.

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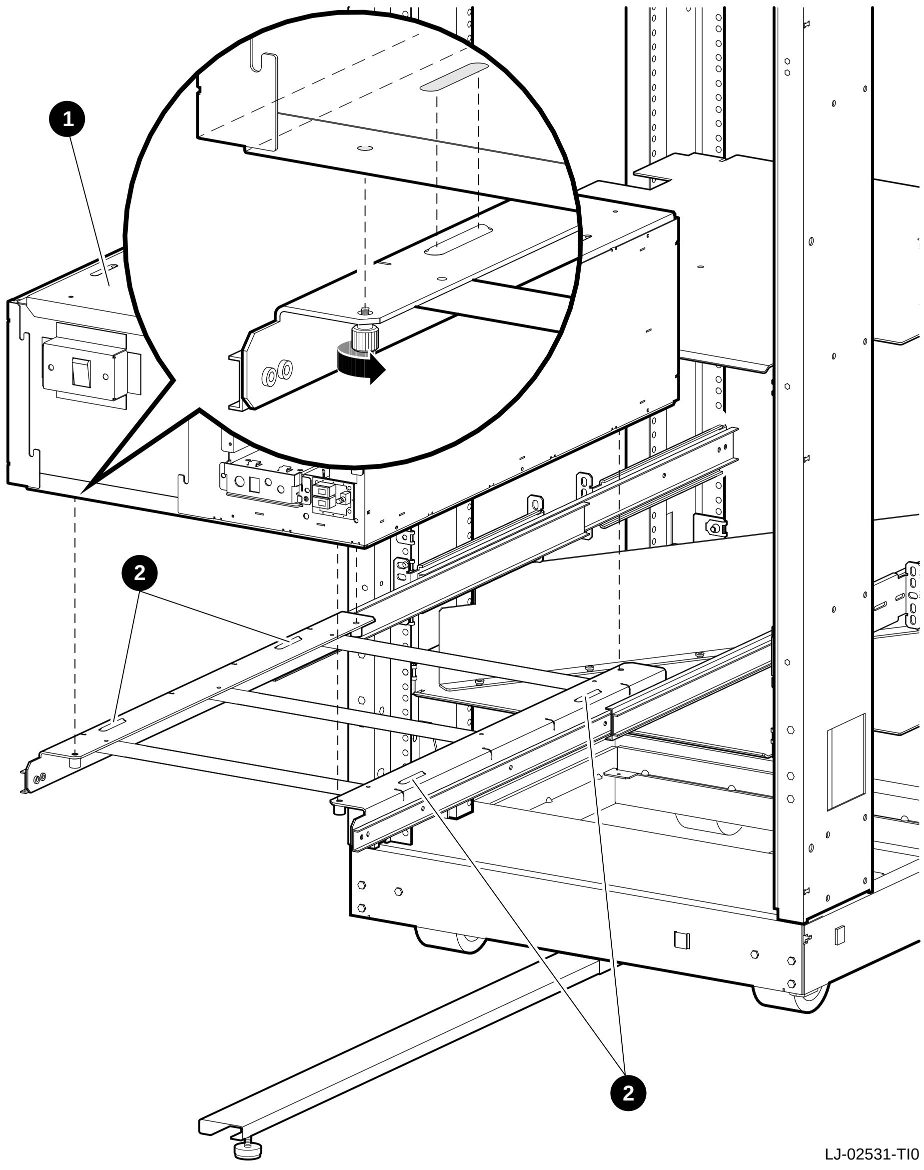
Figure F–9 Securing the PE50A–B9/D9 Unit to the Chassis Slide Assembly



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Install the Faceplate Mounting Brackets

Required materials:

- Two 6/32 screws
- Four 10/32 screws
- Right mounting bracket (PN 74–45544–01)
- Left mounting bracket (PN 74–45543–01)

To install the faceplate mounting brackets (Figure F–10):

Steps	Action
1	Use the two 6/32 screws to secure the right faceplate mounting brackets ❶ to the system❷. The left faceplate bracket is secured using the screws that are already in place on the power supply.
2	Count up 12 holes and 18 holes from the bottom of the installation area on the front cabinet rails.
3	Insert clip nuts at the locations determined in step 2 (if not already installed).
4	Push the PE50A–B9/D9 unit into the cabinet.
5	Use the four 10/32 screws to secure the faceplate mounting brackets ❶ to the cabinet.

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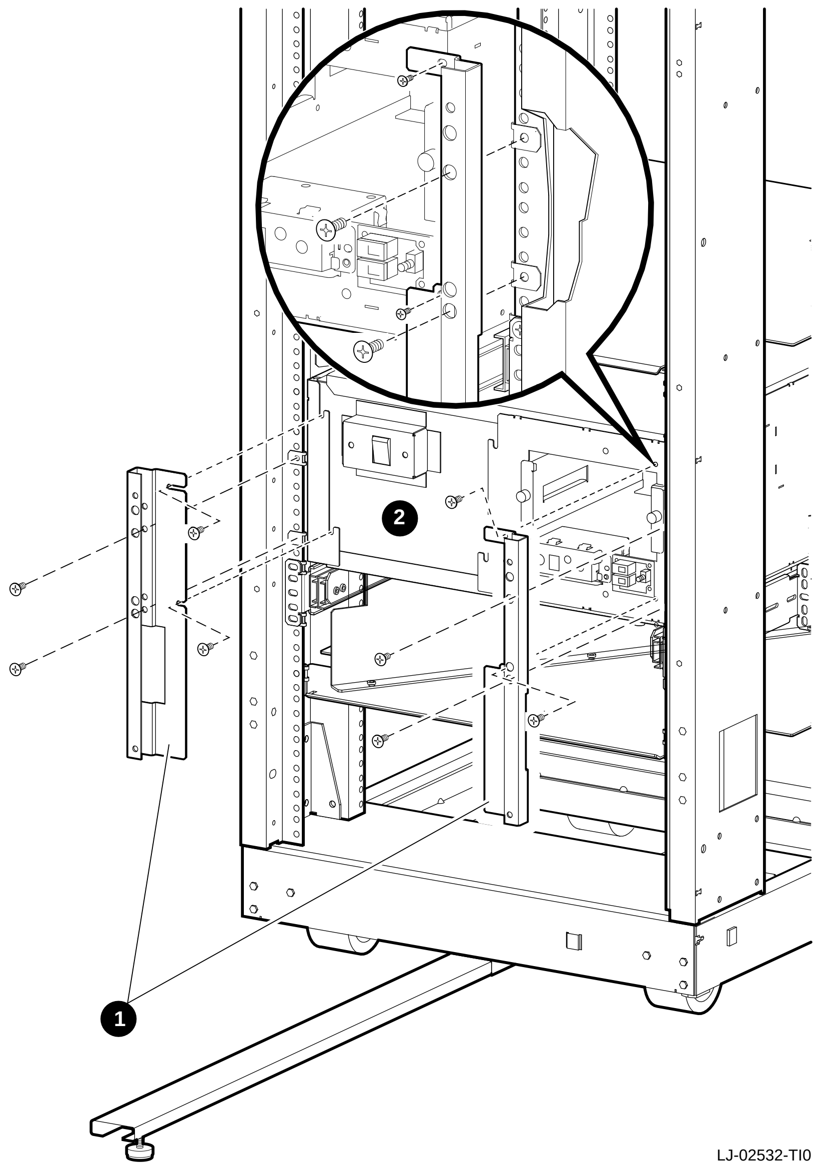
Figure F–10 Installing the Faceplate Mounting Brackets



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Installation Procedure (H9A00-AJ Cabinet), Continued

Install the Faceplate

Required materials:

- Faceplate (PN 70–30304–01)
- Four 10/32 screws

To install the faceplate (Figure F–11):

Step	Action
1	Align the face with the holes at the front of the cabinet.
2	Secure the faceplate to the front of the cabinet with the four 10/32 screws.

NOTE

In Figure F–11, the faceplate has two option inserts. The bottom insert is for an RZ26 drive. The top insert is a blank, used when no other drive is installed with the RZ26.

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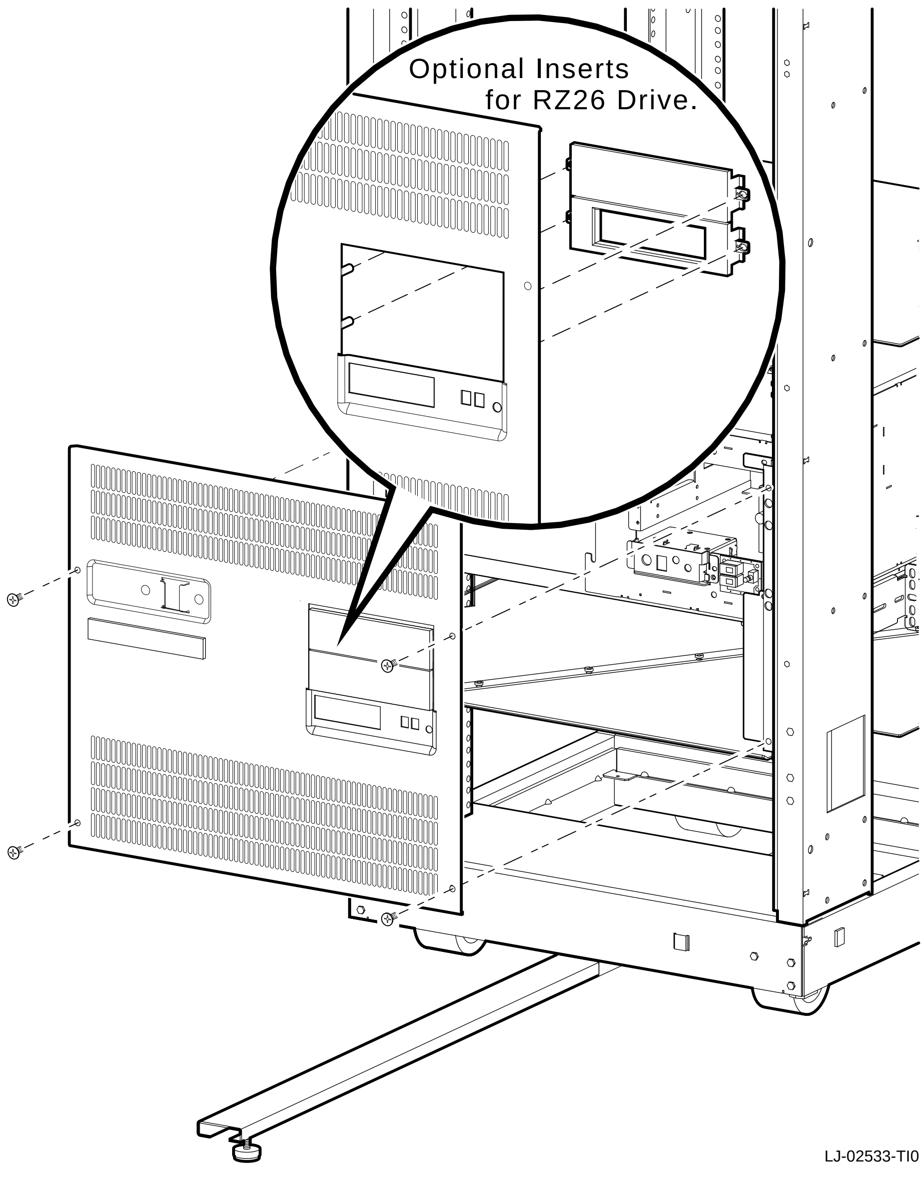
Figure F–11 Installing the Faceplate



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Install the Rear Support Bracket

Required materials:

- Two 6/32 screws
- Rear support bracket (PN 74–45545–01)
- Four 10/32 screws

To install the rear support bracket (Figure F–12):

Steps	Action
1	At the rear cabinet rails, count up 20 holes and 23 holes from the bottom of the installation area. Install clip nuts on these holes, if not already installed.
2	Use the two 6/32 screws to secure the rear support bracket ❶ to the rear of the PE50A–B9/D9 unit ❷.
3	Use the four 10/32 screws to secure the rear support bracket to the rear of the cabinet.

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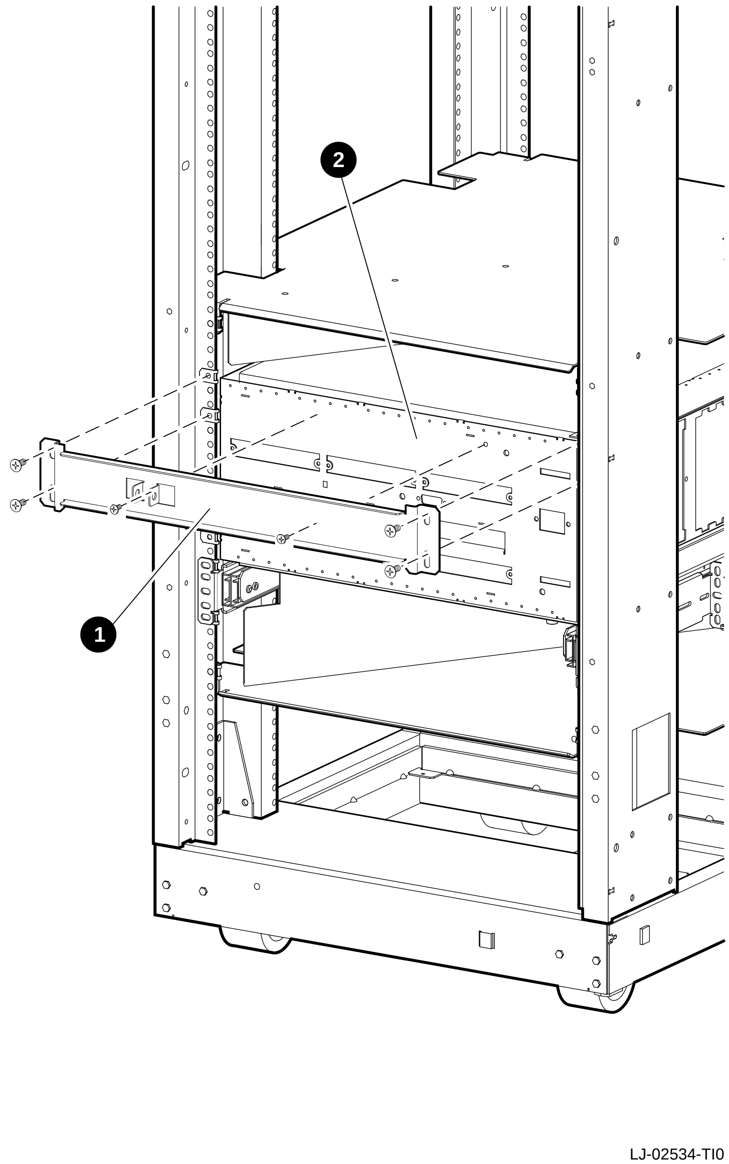
Figure F–12 Installing the Rear Support Bracket



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Power and Cabling

Figure F–13 shows the rear connectors, switches, and option slots on the DEC 3000 Model 500/500S AXP system. Table F–1 describes these items.

Figure F–14 shows the front switches, lights, jacks, and removable media slots. Table F–2 describes these items.

To connect the system cables (Figure F–13):

Steps	Action
1	Connect the keyboard/mouse cable ❺.
2	Connect the monitor cable ⓫.
3	Connect power cord ⓬. There is no power controller
4	Connect any other necessary cables.

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Figure F–13 Rear View of the System

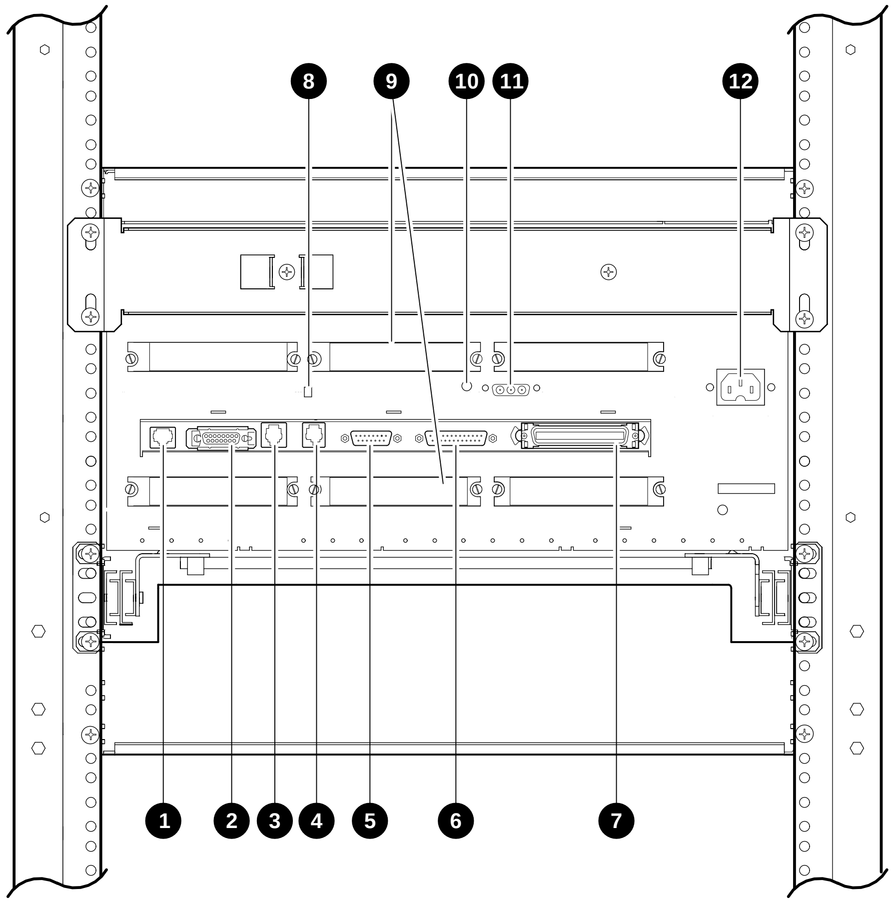

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Table F–1 DEC 3000 Model 500/500S AXP System (Rear)

This Feature...	Lets You...
❶ 10baseT port	Connect a 10baseT (twisted-pair) Ethernet network cable.
❷ AUI Ethernet port	Connect an AUI (thickwire) Ethernet network cable.
❸ ISDN port	Connect an ISDN network cable.
❹ Printer/alternate console port	Connect a printer or an alternate console.
❺ Keyboard/mouse port	Connect the keyboard/mouse cable.
❻ Synch/asynch communications	Connect to a communication device, such as a modem.
❼ External SCSI port	Connect Small Computer System Interface (SCSI) peripheral devices.
❽ Printer/alternate console switch	Select the function of the printer/alternate console port.
❾ Six TURBOchannel slots	Install TURBOchannel option modules. (There are three designated slots for the I/O module and three slots for the system module.)
❿ Video refresh switch	Choose the correct video refresh rate (66Hz or 72Hz) for the monitor.
⓫ Monitor port	Connect the monitor video cable.
⓬ System power port	Connect the system power cord. (The port is keyed.)

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Figure F–14 Front View of the System

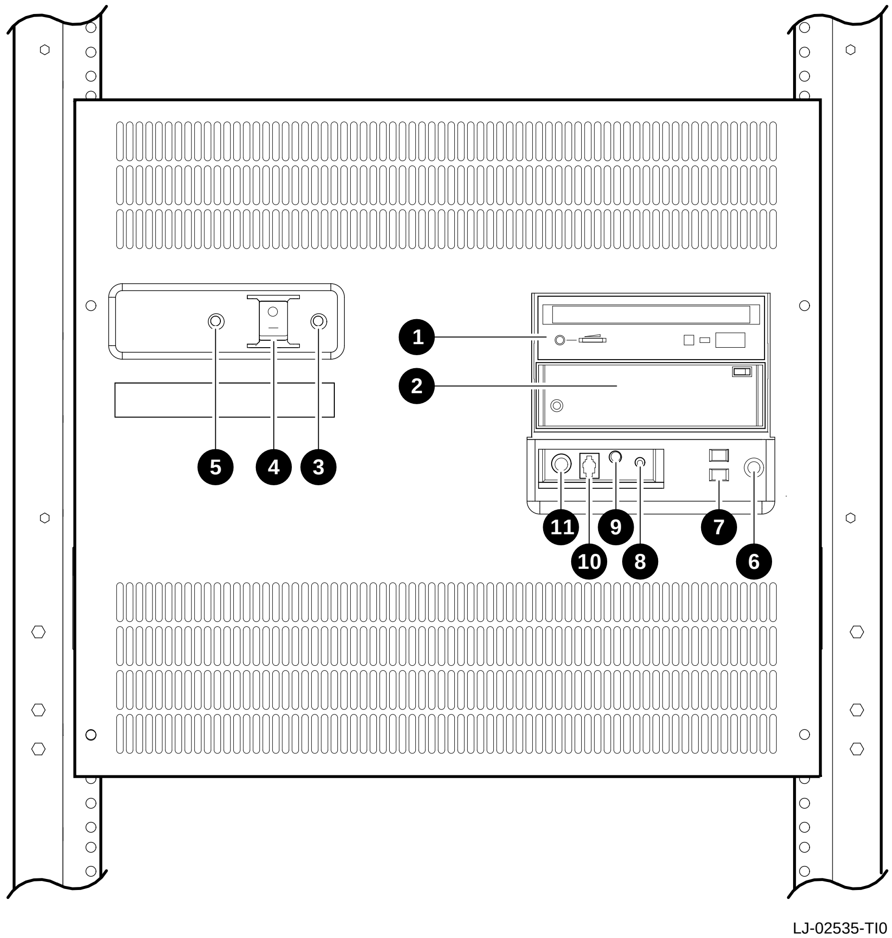

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Table F–2 DEC 3000 Model 500/500S AXP System (Front)

This Feature...	Lets You...
❶ and ❷ Removable-media area	Access devices that use removable storage media such as diskettes, compact discs, cassette tapes, or cartridge tapes.
❸ DC OK light	Check that all dc voltages are present on the power supply.
❹ On/Off switch	Turn the system on | and off (0).
❺ Fan indicator light	Check whether a fan has failed.
❻ Halt button	Put the system in console mode.
❼ Diagnostic display	View error codes that may indicate potential problems with the system.
❽ Microphone input jack	Connect a microphone to the system.
❾ Speaker output jack	Connect a speaker or headphone for audio output.
❿ Telephone jack	Connect a telephone handset.
⓫ Audio input jack	Connect an audio input line.

Verify the System

For system verification, refer to *DEC 3000 Model 500/500S AXP Service Information*.

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