



# Netra™ 440 Server Service Manual

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# Preface

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The *Netra 440 Server Service Manual* includes detailed service procedures for the Netra™ 440 server. This book is intended for technicians, system administrators, qualified Sun service providers, and advanced computer system end users who have experience removing and installing server hardware.

For information about the Netra 440 server, and detailed instructions for configuring and administering the server, see the *Netra 440 Server System Administration Guide* (817-3884-xx).

For information about diagnosing problems with the server, see the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx).

This book does not cover the initial installation of the server. For those instructions, see the *Netra 440 Server Installation Guide* (817-3882-xx).

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## Before You Read This Book

Follow the instructions for mounting the server in a cabinet before continuing with the removal and installation instructions in this book.

You can find rackmounting instructions in the *Netra 440 Server Installation Guide* (817-3882-xx).

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# How This Book Is Organized

This book contains the following chapters:

- [Chapter 1](#) illustrates the front panel and back panel features, and the LED indicators.
- [Chapter 2](#) offers procedures for powering on and powering off the system. In addition, it describes how to prepare the system for service, including the tools required, and how to avoid electrostatic discharge.
- [Chapter 3](#) provides procedures for servicing hot-swappable components.
- [Chapter 4](#) provides procedures for servicing cold-swappable components.

This book also includes the following reference appendices:

- [Appendix A](#) contains an illustrated parts breakdown, as well as a reference for field-replaceable unit (FRU) numbers.
- [Appendix B](#) is a reference for connector pinouts.
- [Appendix C](#) lists physical and environmental specifications.
- [Appendix D](#) is a reference for board connectors.

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# Using UNIX Commands

This document might not contain information on basic UNIX<sup>®</sup> commands and procedures such as shutting down the system, booting the system, and configuring devices. See the following for this information:

- Software documentation that you received with your system
- Solaris<sup>™</sup> operating environment documentation, which is at <http://docs.sun.com>

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# Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

---

# Typographic Conventions

Typeface <sup>1</sup>	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>% You have mail.</code>
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	<code>% su</code> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

<sup>1</sup> The settings on your browser might differ from these settings.

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## Related Documentation

<b>Application</b>	<b>Title</b>	<b>Part Number</b>
Late-breaking product information	<i>Netra 440 Server Product Note</i>	817-3885-xx
Product description	<i>Netra 440 Server Product Overview</i>	817-3881-xx
Installation instructions	<i>Netra 440 Server Installation Guide</i>	817-3882-xx
Administration	<i>Netra 440 Server System Administration Guide</i>	817-3884-xx
Diagnostics and troubleshooting	<i>Netra 440 Server Diagnostics and Troubleshooting Guide</i>	817-3886-xx
Advanced Lights Out Manager (ALOM) system controller	<i>Sun Advanced Lights Out Manager User's Guide for the Netra 440 Server</i>	817-5481-xx

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*Netra 440 Server Service Manual*, part number 817-3883-11



# Identifying the Netra 440 Server FRUs and LEDs

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This chapter contains the following sections:

- [“Locating Front Panel Components and LEDs” on page 2](#)
- [“Locating Back Panel Components and LEDs” on page 12](#)
- [“Locating Internal Components” on page 19](#)

For background information about the Netra 440 server and detailed instructions for installing, configuring, and administering the server, see:

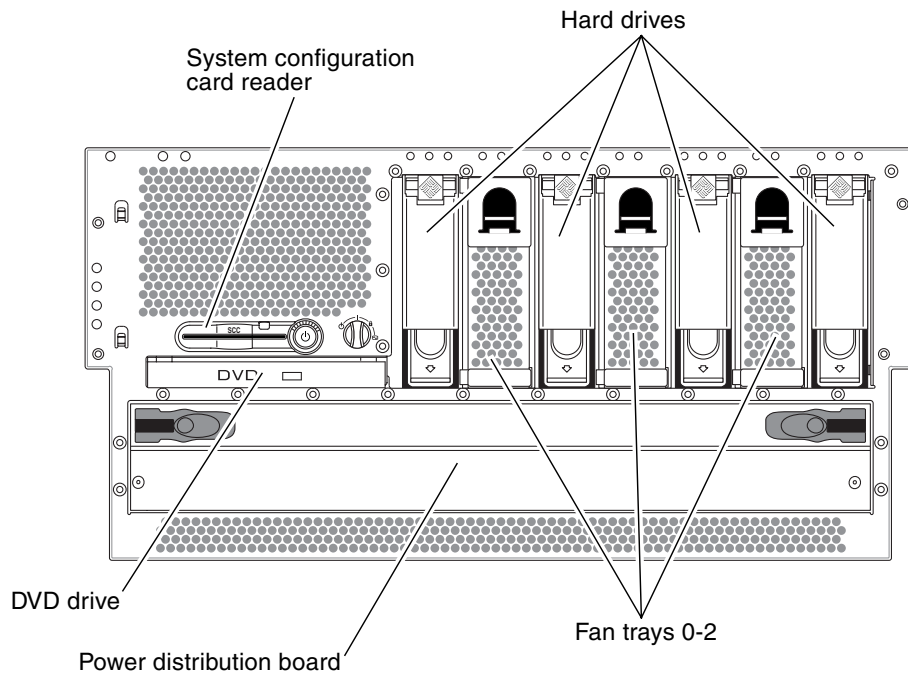
- *Netra 440 Server Installation Guide*
- *Netra 440 Server System Administration Guide*

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# Locating Front Panel Components and LEDs

## Front Panel Components

**FIGURE 1-1** shows the system components that you can access from the front panel. In the figure, the system door is opened.



**FIGURE 1-1** Front Panel Components

For more detailed information about each of the front panel components, refer to the *Netra 440 Server Product Overview*.

TABLE 1-1 lists the front panel components. The table indicates whether the components are hot-swappable or cold-swappable, and whether they can be removed from the front of the system or through the top of the system.

**TABLE 1-1** Front Panel Components

Component	Hot- or Cold-Swappable		Removal point	
	Hot	Cold	Front	Top
System configuration card reader		•		•
Hard drives	•		•	
DVD drive		•	•	
Power distribution board		•	•	
Fan trays 0-2	•		•	

## Front Panel LEDs

Several front panel LEDs provide general enclosure status, alert you to system problems, and help you to determine the location of system faults.

During system startup, the LEDs are toggled on and off to verify that each one is working correctly. LEDs located on the front panel work in conjunction with specific fault LEDs. For example, a fault in the power supply subsystem illuminates the power supply Service Required LED on the affected power supply, as well as the system Service Required LED. Since all front panel status LEDs are powered by the system's standby power source, fault LEDs remain lit for any fault condition that results in a system shutdown.

FIGURE 1-2 shows the LEDs that are accessible from the front. In the figure, the system door is opened.

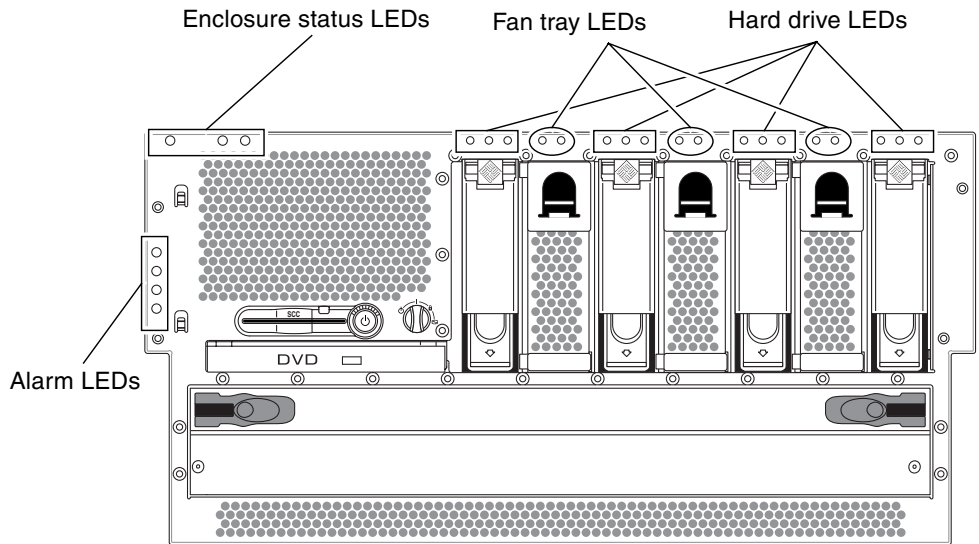
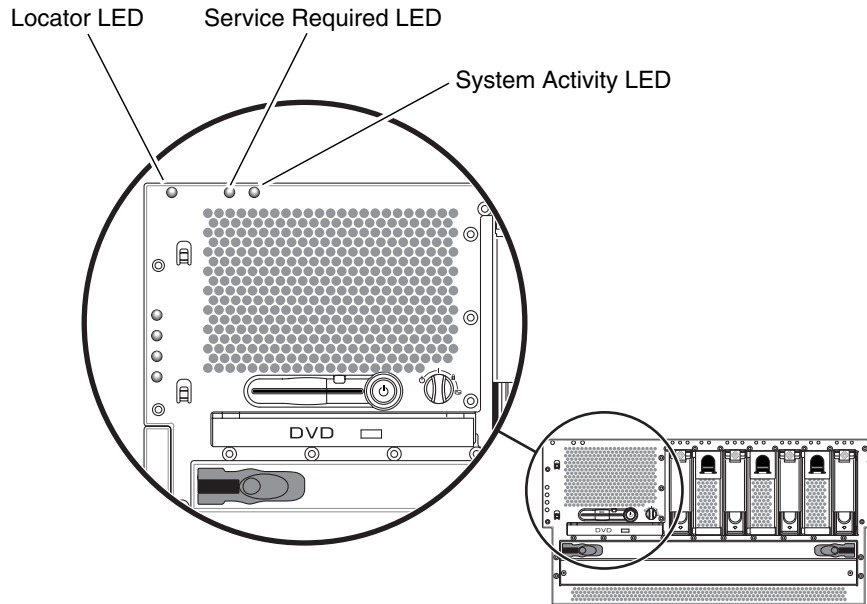


FIGURE 1-2 Front Panel LEDs

## Enclosure Status LEDs

At the top left of the system as you look at its front are three enclosure status LEDs. The System Activity LED and the system Service Required LED provide a snapshot of the overall enclosure status. The Locator LED helps you to quickly locate a specific system even though it may be one of numerous systems in a room. The Locator LED is at the far left in the cluster, and is lit by command from the administrator.






**FIGURE 1-3** Enclosure Status LEDs

Each enclosure status LED has a corresponding LED on the back panel.

The enclosure status LEDs operate as described in the following table.

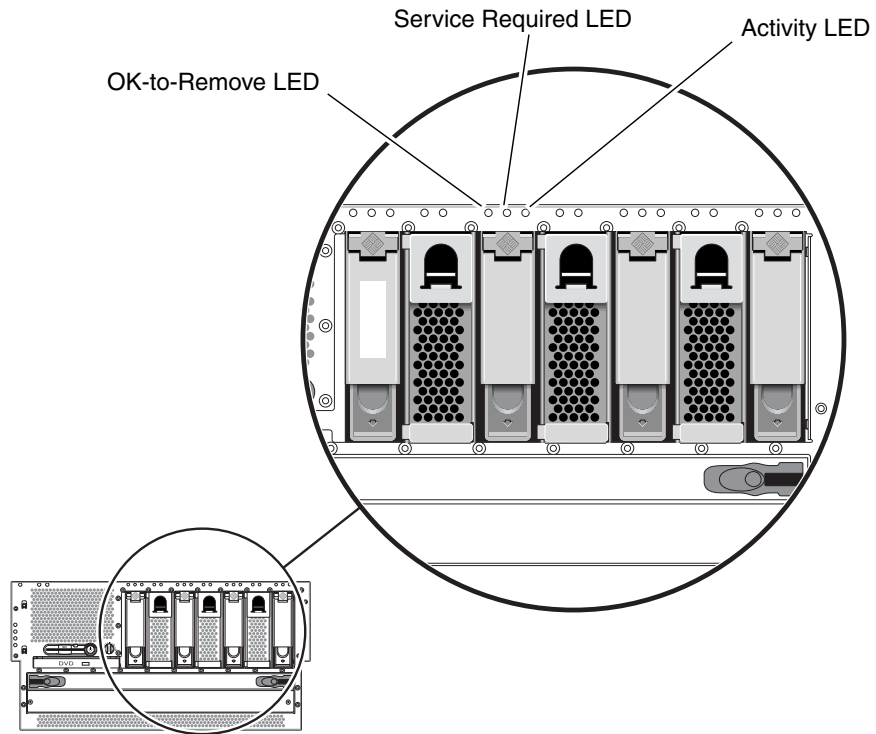
**TABLE 1-2** Enclosure Status LEDs

Name	Icon	Description
Locator		This white LED is lit by a Solaris OS command or by ALOM software to locate a system. See the <i>Netra 440 Server System Administration Guide</i> for more information.
Service Required		This amber LED lights when system hardware or software has detected a system fault. This LED lights for any faults or failures detected in the following areas: <ul data-bbox="458 527 715 718" style="list-style-type: none"><li>• Motherboard</li><li>• CPU/memory module</li><li>• DIMM</li><li>• Hard drive</li><li>• Fan trays</li><li>• Power supply</li></ul> In addition to the system Service Required LED, other fault LEDs might also be lit, depending on the nature of the fault. If the system Service Required LED is lit, check the status of other fault LEDs on the front panel to determine the nature of the fault. See the <i>Netra 440 Server Diagnostics and Troubleshooting Guide</i> for more information.
System Activity		This green LED lights when the ALOM detects that the Solaris OS is running.



## Hard Drive Status LEDs

Each hard drive has its own status LEDs directly above the drive.



**FIGURE 1-4** Hard Drive Status LEDs

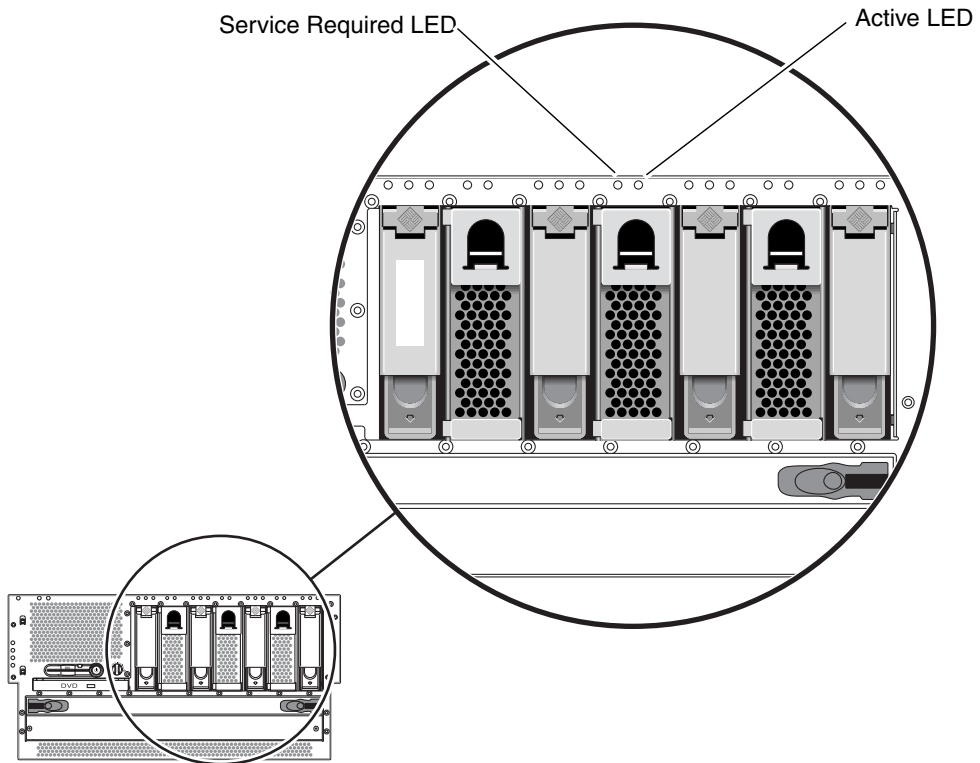
The following table describes the hard drive LEDs.

**TABLE 1-3** Hard Drive LEDs

Name	Icon	Description
OK-to-Remove		This blue LED lights when the hard drive has been taken offline and is safe to remove from the system.
Service Required		Reserved for future use.
Activity		This green LED lights when the system is powered on and a hard drive is present in the monitored drive slot. This LED flashes slowly during the hard drive hot-swap procedure. It flashes rapidly when the hard drive is spinning up or down, or during read/write activity.

## Fan Tray Status LEDs (0-2)



The fan tray LEDs are located behind the front cover, directly above each fan tray. Note that these LEDs give information only for fan trays 0-2; they do not give information on fan tray 3, located inside the system.



**FIGURE 1-5** Fan Tray Status LEDs

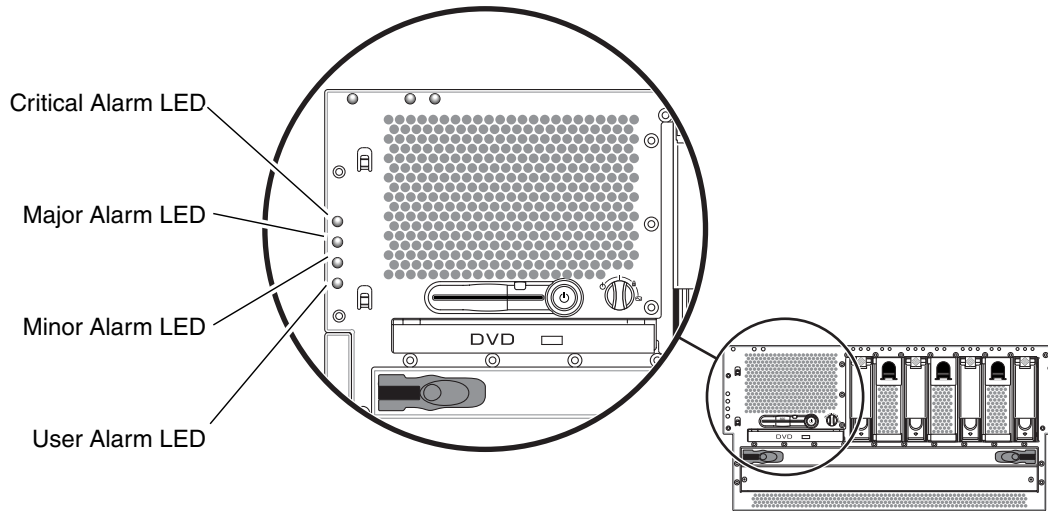
The following table describes the fan tray LEDs.

**TABLE 1-4** Fan Tray LEDs

Name		Description
Service Required		This amber LED lights when there is a fault detected with the fan tray. Note that the Service Required LEDs on the front and back panels also light when this occurs.
Activity		This green LED lights when the fan tray is on and operating normally.

## Alarm LEDs

The alarm LEDs are located at the front of the system, along the left side of the front cover.



**FIGURE 1-6** Alarm LEDs

The dry contact alarm card has four LED status indicators that are supported by ALOM. Information about the alarm indicators and dry contact alarm states is provided in [TABLE 1-5](#). For more information about alarm indicators, refer to the *Sun Advanced Lights Out Manager Software User's Guide for the Netra 440 Server* (817-5481-xx). For more information about an API to control the alarm indicators, refer to the *Netra 440 Server System Administration Guide* (817-3884-xx).

**TABLE 1-5** Alarm Indicators and Dry Contact Alarm States

Indicator and Relay Labels	Indicator Color	Application or Server State	Condition or Action	System Indicator State	Alarm Indicator State	Relay NC <sup>‡</sup> State	Relay NO <sup>§</sup> State	Comments
Critical (Alarm0)	Red	Server state (Power on/off and Solaris OS functional/not functional)	No power input.	Off	Off	Closed	Open	Default state
			System power off.	Off	On	Closed	Open	Input power connected
			System power turns on; Solaris OS not fully loaded.	Off	On	Closed	Open	Transient state
			Solaris OS successfully loaded.	On	Off	Open	Closed	Normal operating state
			Watchdog timeout.	Off	On	Closed	Open	Transient state; reboot Solaris OS
			Solaris OS shutdown initiated by user.*	Off	On	Closed	Open	Transient state
			Lost input power.	Off	Off	Closed	Open	Default state
			System power shutdown initiated by user.	Off	On	Closed	Open	Transient state
		Application state	User sets Critical alarm on. <sup>†</sup>	—	On	Closed	Open	Critical fault detected
			User sets Critical alarm off. <sup>†</sup>	—	Off	Open	Closed	Critical fault cleared
Major (Alarm1)	Red	Application state	User sets Major alarm on. <sup>†</sup>	—	On	Open	Closed	Major fault detected
			User sets Major alarm off. <sup>†</sup>	—	Off	Closed	Open	Major fault cleared

**TABLE 1-5** Alarm Indicators and Dry Contact Alarm States (*Continued*)

Indicator and Relay Labels	Indicator Color	Application or Server State	Condition or Action	System Indicator State	Alarm Indicator State	Relay NC <sup>‡</sup> State	Relay NO <sup>§</sup> State	Comments
Minor (Alarm2)	Amber	Application state	User sets Minor alarm on. <sup>†</sup>	—	On	Open	Closed	Minor fault detected
			User sets Minor alarm off. <sup>†</sup>	—	Off	Closed	Open	Minor fault cleared
User (Alarm3)	Amber	Application state	User sets User alarm on. <sup>†</sup>	—	On	Open	Closed	User fault detected
			User sets User alarm off. <sup>†</sup>	—	Off	Closed	Open	User fault cleared

\* The user can shut down the system using commands such as `init0` and `init6`. This does not include the system power shutdown.

† Based on a determination of the fault conditions, the user can turn the alarm on using the Solaris platform alarm API or ALOM CLI. For more information about the alarm API, see the *Netra 440 Server System Administration Guide* and for more information about ALOM CLI, see the *Sun Advanced Lights Out Manager Software User's Guide for the Netra 440 Server*.

‡ NC state is the normally closed state. This state represents the default mode of the relay contacts in the normally closed state.

§ NO state is the normally open state. This state represents the default mode of the relay contacts in the normally open state.

In all cases when the user sets an alarm, a message is displayed on the console. For example, when the Critical alarm is set, the following message is displayed on the console:

```
SC Alert: CRITICAL ALARM is set
```

Note that in some instances when the Critical alarm is set, the associated alarm indicator is not lit.

---

# Locating Back Panel Components and LEDs

## Back Panel Components

FIGURE 1-7 shows the system components that you can access from the back panel. Note that the power supplies shown in FIGURE 1-7 are for the DC-powered servers; the power supplies for the AC-powered servers would be in the same location as those shown in FIGURE 1-7, but would have different input connectors.

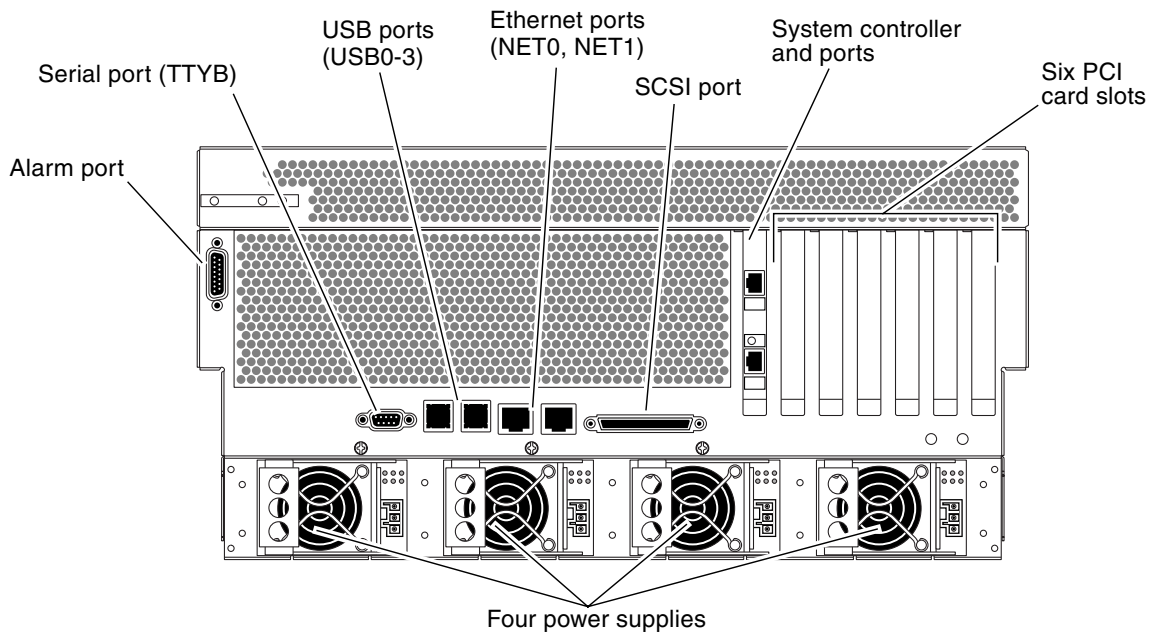


FIGURE 1-7 Back Panel Features

TABLE 1-6 lists the rear panel components, and shows whether they are hot-swappable or cold-swappable, and whether they can be removed from the rear of the system or through the top of the system.

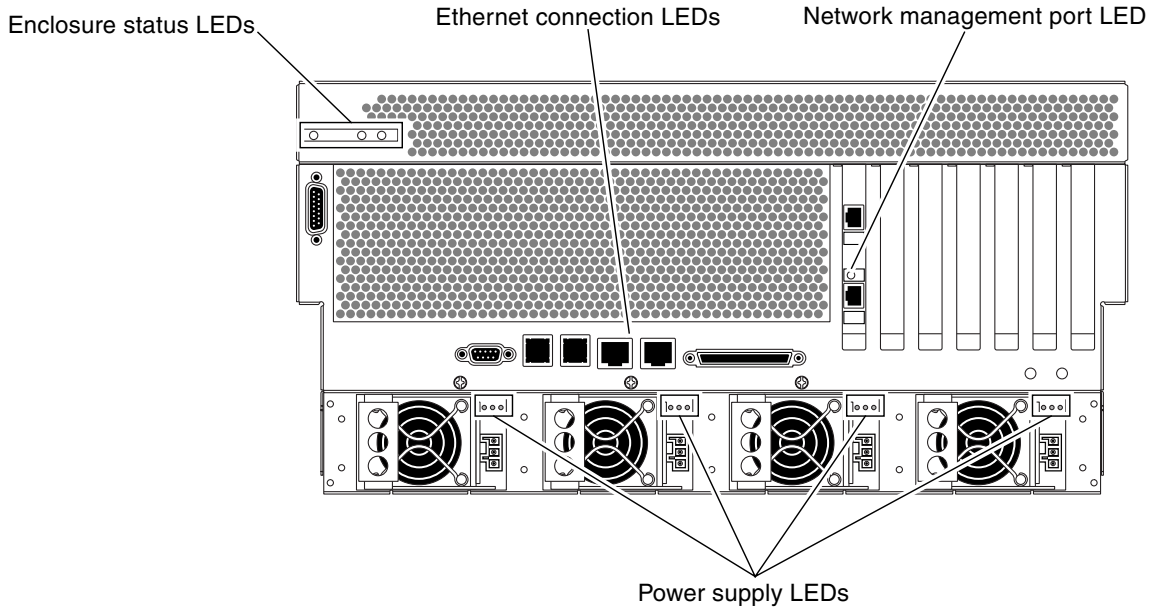
For more detailed information about each of the rear panel components, refer to the *Netra 440 Server Product Overview* (817-3881-xx).

**TABLE 1-6** Back Panel Components

Component	Hot- or Cold-Swappable		Removal Point	
	Hot	Cold	Rear	Top
Alarm card and port		•		•
Motherboard with data ports		•		•
ALOM system controller and ports		•		•
PCI cards		•		•
Power supplies	•		•	

# Back Panel LEDs

The back panel LEDs include the enclosure status LEDs, the Ethernet port LEDs, the power supply LEDs, and the SYSTEM controller card LED. The enclosure status LEDs are replicated from the front panel.



**FIGURE 1-8** Back Panel LEDs

## Ethernet Connection LEDs

A set of Ethernet LEDs is located on each Ethernet port. The Ethernet LEDs operate as described in the following table.

**TABLE 1-7** Ethernet LEDs

Name	Description
Link/Activity	This green LED lights when a link is established at the particular port with its link partner, and blinks to indicate activity.
Speed	This amber LED lights when a Gigabit Ethernet connection is established, and is off when a 10/100-Mbps Ethernet connection is established.



## Enclosure Status LEDs

The back panel enclosure status LEDs consist of the System Activity LED, the system Service Required LED, and the Locator LED. These LEDs are located in the top-left corner of the back panel, and operate as described in [TABLE 1-2](#).

## Network Management Port LED

The network management port has a Link LED that operates as described in [TABLE 1-8](#).




**TABLE 1-8** Network Management Port LED

Name	Description
Link	This green LED lights when an Ethernet connection is present.

## Power Supply LEDs

There are three LEDs on each power supply. These LEDs operate as described in [TABLE 1-9](#).

**TABLE 1-9** Power Supply LEDs

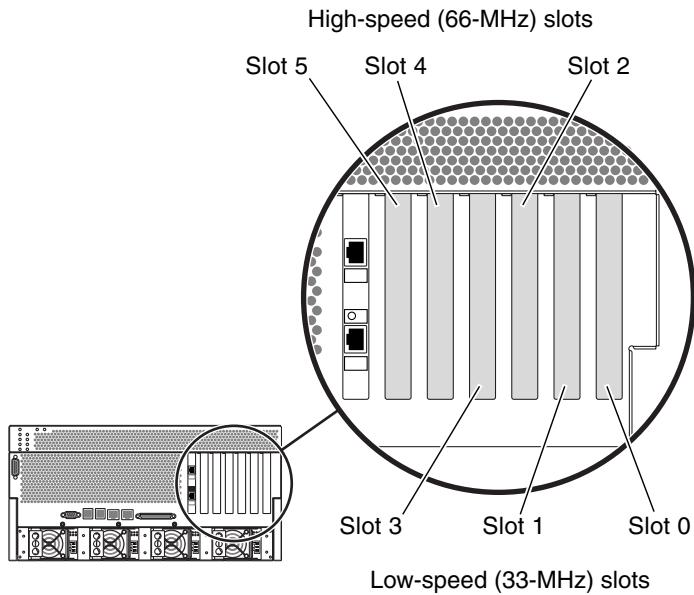
Name	Icon	Description
OK-to-Remove		This blue LED lights when it is safe to remove the power supply from the system. This LED is controlled by the software only.
Service Required		This amber LED lights when the power supply's internal circuitry detects a fault. Note that the Service Required LEDs on the front and back panels also light when this occurs.
Power OK		This green LED lights when the power supply is in standby mode or when it is on and outputting regulated power within specified limits.

# Back Panel Slots and Ports

The back panel provides access to the PCI slots, external ports, and Advanced Lights Out Manager (ALOM) card ports.

## PCI Slots

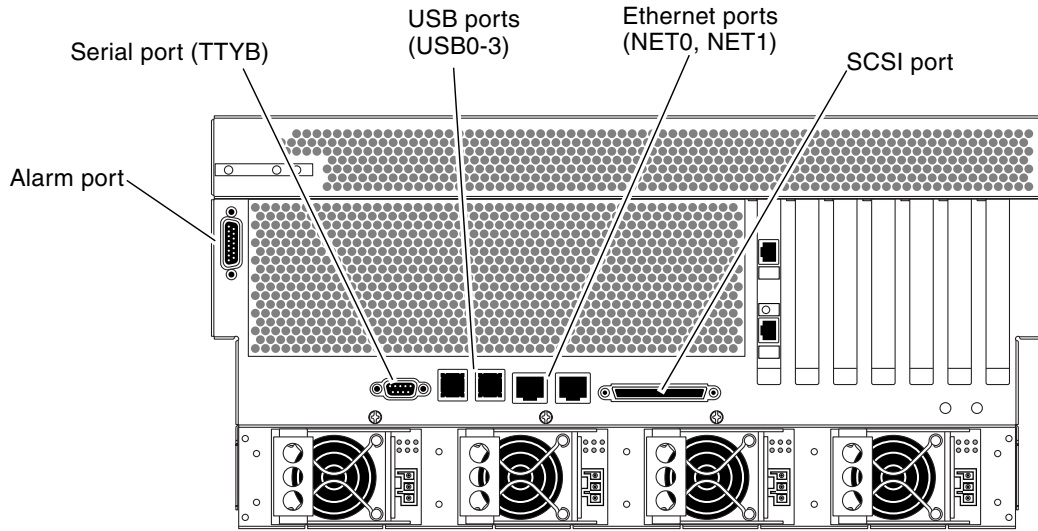
The Netra 440 server has three 33-MHz PCI slots and three 66-MHz PCI slots. These are labeled on the back panel. The Advanced Lights Out Manager (ALOM) card is located to the left of the PCI slots.



**FIGURE 1-9** PCI Slots





## External Ports

The Netra 440 server has eight external data ports on the back panel, which are described in [TABLE 1-10](#).



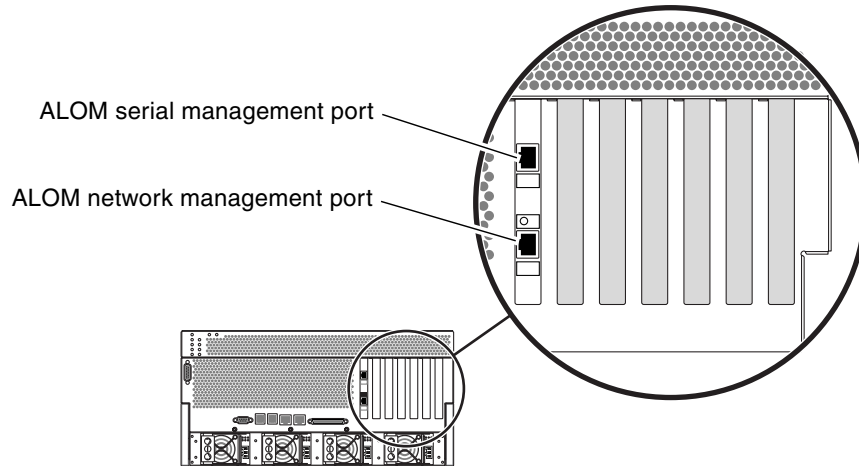
**FIGURE 1-10** Back Panel External Ports

**TABLE 1-10** Back Panel External Ports

Icon	Description
N/A	Alarm port. The system has one alarm port on the back panel, which uses a DB-15 connector.
	Serial port. The system has one serial port (TTYB) on the back panel, which uses a DB-9 connector.
	Universal Serial Bus (USB) ports. The system has four USB ports (USB0, USB1, USB2, USB3).
	Ethernet ports. The system has two 10/100/1000-Mbps Ethernet ports (NET0, NET1).
	SCSI connector. The system has one external SCSI 68-pin SCSI connector.



## ALOM System Controller Card External Ports

The Advanced Lights Out Manager (ALOM) system controller card has two connectors, which are described in [TABLE 1-11](#).



**FIGURE 1-11** ALOM System Controller Card Ports

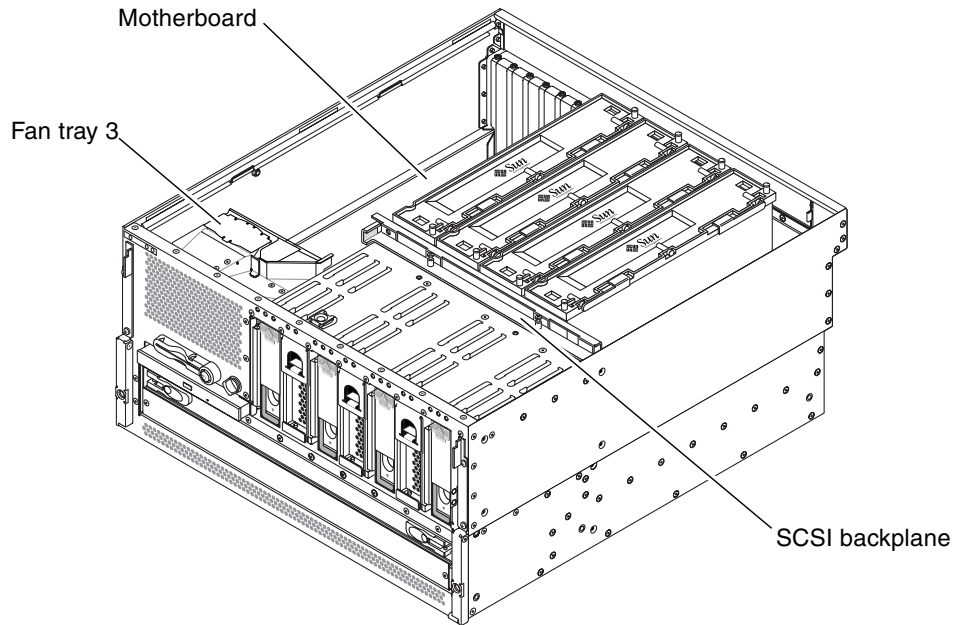
**TABLE 1-11** ALOM External Ports

Icon	Description
	Serial (RJ-45) port. This is the default serial management connection for the system.
	Ethernet port. This port provides direct network access to the ALOM system controller card, when configured, and can access the ALOM prompt and system console output.

---

# Locating Internal Components

The illustration below shows the system's internal components from the top view.



**FIGURE 1-12** Locating Internal Components

**TABLE 1-12** lists the internal components, and shows whether they are hot-swappable or cold-swappable, and whether they can be removed from the rear of the system or through the top of the system.

For more detailed information about each of the rear panel components, refer to the *Netra 440 Server Product Overview*.

**TABLE 1-12** Internal Components

Component	Hot- or Cold-Swappable		Removal Point	
	Hot	Cold	Rear	Top
Fan tray 3		•		•
Motherboard		•		•
SCSI backplane		•		•
CPU modules		•		•

## Preparing to Service the System

---

This chapter contains the following sections:

- [“Service Guidelines” on page 21](#)
- [“Tools Required for Installation and Service” on page 22](#)
- [“Controlling Server Power” on page 22](#)
- [“Initiating a Reconfiguration Boot” on page 28](#)
- [“Accessing Internal Components” on page 30](#)
- [“Avoiding Electrostatic Discharge” on page 32](#)

---

## Service Guidelines

Be sure to keep the following guidelines in mind when servicing the system:

- Except for removing and installing hard drives, the system must be serviced by qualified service providers.
- Only power supplies, fan trays 0, 1 and 2, the air filter, and hard drives are hot-swappable. You must power off the system to service any other component.
- You must disconnect the AC or DC power cables when servicing the following components:
  - Motherboard
  - SCSI backplane
  - Connector board
  - System configuration card (SCC) reader
  - Advanced Lights Out Manager (ALOM) system controller card
  - Power distribution module

---

# Tools Required for Installation and Service

The following tools are required to install and service the system:

- Screwdriver, Phillips No. 1
- Screwdriver, Phillips No. 2
- Screwdriver, long Phillips No. 2 (shaft at least 8 inches/120.32 cm long)
- Adjustable wrench
- Electrostatic discharge (ESD) mat, Sun part number 250-1088, or equivalent
- Grounding wrist or foot strap

The last two items help protect the system against damage due to electrostatic discharge. For more information, see [“Avoiding Electrostatic Discharge” on page 32](#).

---

# Controlling Server Power

Refer to the following sections to power the server on and off:

- [“Powering On the System” on page 22](#)
- [“Powering Off the System” on page 26](#)

## Powering On the System

Refer to the following sections to power on the system either locally or remotely:

- [“Powering On the System Locally” on page 22](#)
- [“Powering On the System Remotely” on page 25](#)

## Powering On the System Locally

Do not use this power-on procedure if you have just added any new internal option or external storage device, or if you have removed a storage device without replacing it. To power on the system under those circumstances, you must initiate a reconfiguration boot. For those instructions, see [“Initiating a Reconfiguration Boot” on page 28](#).





---

**Caution** – Never move the system when the system power is on. Movement can cause catastrophic hard drive failure. Always power off the system before moving it.

---



---

**Caution** – Before you power on the system, ensure that the system doors and all panels are properly installed.

---

**1. Turn on power to any external peripherals and storage devices.**

Read the documentation supplied with the device for specific instructions.

**2. Establish a connection to the system console.**

If you are powering on the system for the first time, connect a device to the serial management port using one of the methods described in the *Netra 440 Server Installation Guide*. Otherwise, use one of the methods for connecting to the system console, also described in the *Netra 440 Server Installation Guide*.

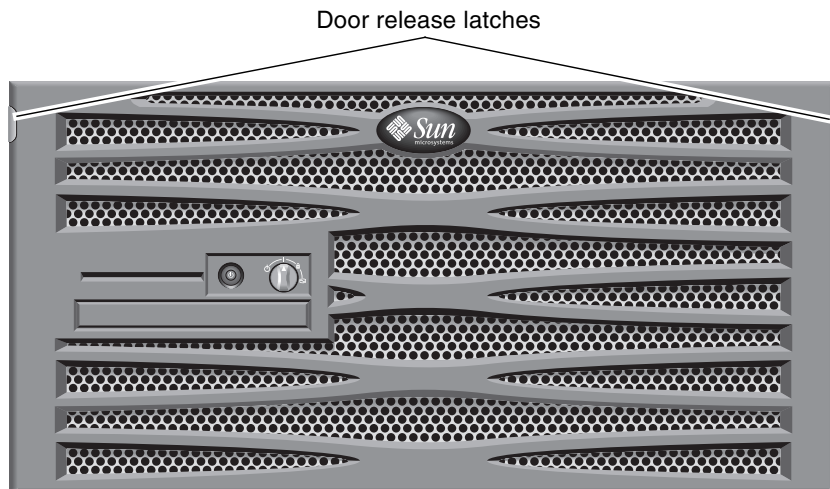
**3. Connect the AC or DC power cables.**

---

**Note** – As soon as the power cables are connected to the system, the ALOM boots and displays its power-on self-test (POST) messages. Though the system power is still off, the ALOM is up and running, and monitoring the system. Regardless of the system power state, as long as the power cords are connected and providing standby power, the ALOM is on and monitoring the system.

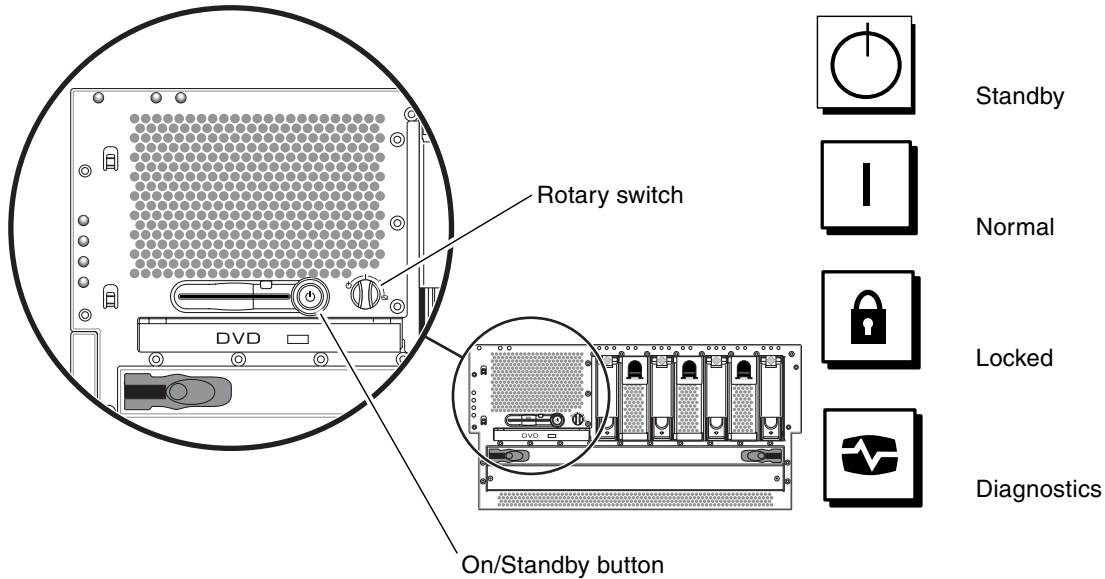
---

**4. Press the door release latches and lower the system door.**



**FIGURE 2-1** Opening the System Door

5. Turn the rotary switch to the Normal or Diagnostics position (FIGURE 2-2).



**FIGURE 2-2** Locating the Rotary Switch and On/Standby Button

6. Press and release the On/Standby button to power on the system (FIGURE 2-2).

The power supply Power OK LEDs light when power is applied to the system. Verbose (POST) output is immediately displayed to the system console if diagnostics are enabled at power-on, and the system console is directed to the serial and network management ports.

The system can take anywhere from 30 seconds to 20 minutes before text messages appear on the system monitor (if one is attached) or the system prompt appears on an attached terminal. This time depends on the system configuration (number of CPUs, memory modules, PCI cards, and console configuration) and the level of POST and OpenBoot Diagnostics tests being performed. The System Activity LED lights when the server is running under control of the Solaris OS.

7. Turn the rotary switch to the Locked position (FIGURE 2-2).

This prevents anyone from accidentally powering off the system.

8. Close the system door.

## Powering On the System Remotely

Do not use this power-on procedure if you have just added any new internal option or external storage device, or if you have removed a storage device without replacing it. To power on the system under those circumstances, you must initiate a reconfiguration boot. For those instructions, see [“Initiating a Reconfiguration Boot” on page 28](#).

To issue software commands, you need to set up an alphanumeric terminal connection, a local graphics monitor connection, ALOM connection, or a TIP connection to the Netra 440 server. See the *Netra 440 Server Installation Guide* for more information about connecting the Netra 440 server to a terminal or similar device.



---

**Caution** – Before you power on the system, ensure that the system doors and all panels are properly installed.

---



---

**Caution** – Never move the system when the system power is on. Movement can cause catastrophic hard drive failure. Always power off the system before moving it.

---

### 1. Log in to the ALOM.

Refer to the *Advanced Lights Out Manager Software User’s Guide for the Netra 440 Server* (817-5481-xx) for more information.

### 2. Type the following command:

```
sc> poweron
```

# Powering Off the System

Refer to the following sections to power off the system either locally or remotely:

- “Powering Off the Server Locally” on page 26
- “Powering Off the System Remotely” on page 27

## Powering Off the Server Locally



---

**Caution** – Applications running on the Solaris OS can be adversely affected by a poorly executed system shutdown. Ensure that you stop and exit applications, and shut down the operating environment before powering off the system.

---

1. **Notify users that the system will be powered down.**
2. **Back up the system files and data, if necessary.**
3. **Open the system door.**
4. **Ensure that the rotary switch is in the Normal or Diagnostics position (FIGURE 2-2).**
5. **Press and release the On/Standby button (FIGURE 2-2).**

The system begins a graceful software system shutdown.

---

**Note** – Pressing and releasing the On/Standby button initiates a graceful software system shutdown. Pressing and holding in the On/Standby button for four seconds or turning the rotary switch to the Standby position causes an immediate hardware shutdown. Whenever possible, you should use the graceful shutdown method. Forcing an immediate hardware shutdown can cause hard drive corruption and loss of data. Use that method only as a last resort.

---

6. **Wait for the system to power off.**  
The power supply Power OK LEDs go out when the system is powered off.
7. **Turn the rotary switch to the Standby position (FIGURE 2-2).**



---

**Caution** – Be sure to turn the rotary switch to the Standby position before handling any internal components. Otherwise, it is possible for a remote ALOM user to power on the system while you are working inside it. The Standby position is the only rotary switch position that prevents someone from using an ALOM session to restart the system remotely.

---

8. **Close the system door.**

## Powering Off the System Remotely

To issue software commands, you need to set up an alphanumeric terminal connection, a local graphics monitor connection, ALOM connection, or a TIP connection to the Netra 440 server. See the *Netra 440 Server Installation Guide* (817-3882-xx) for more information about connecting the Netra 440 server to a terminal or similar device.

You can power off the system remotely either from the `ok` prompt or from the ALOM `sc>` prompt.



---

**Caution** – Applications running on the Solaris OS can be adversely affected by a poorly executed system shutdown. Ensure that you stop and exit applications, and shut down the operating environment before powering off the system.

---

### *Powering Off the System From the `ok` Prompt*

1. **Notify users that the system will be powered off.**
2. **Back up the system files and data, if necessary.**
3. **Get to the `ok` prompt.**

Refer to the *Netra 440 Server System Administration Guide* (817-3884-xx) for more information, if necessary.

4. **Issue the following command:**

```
ok power-off
```

### *Powering Off the System From the ALOM System Controller Prompt*

1. **Notify users that the system will be powered off.**
2. **Back up the system files and data, if necessary.**
3. **Log in to the ALOM.**

Refer to the *Advanced Lights Out Manager Software User's Guide for the Netra 440 Server* (817-5481-xx) for more information.

4. **Issue the following command:**

```
sc> poweroff
```

---

# Initiating a Reconfiguration Boot

After installing any new internal option or external storage device, you must perform a reconfiguration boot so that the operating system is able to recognize the newly installed device(s). In addition, if you remove any device and do not install a replacement device prior to rebooting the system, you must perform a reconfiguration boot in order for the operating system to recognize the configuration change. This requirement also applies to any component that is connected to the system I<sup>2</sup>C bus to ensure proper environmental monitoring.

This requirement *does not* apply to any component that is:

- Installed or removed as part of a hot-swap operation
- Installed or removed before the operating system is installed
- Installed as an identical replacement for a component that is already recognized by the operating system

To issue software commands, you need to set up an alphanumeric terminal connection, a local graphics monitor connection, ALOM connection, or a TIP connection to the Netra 440 server. See the *Netra 440 Server Installation Guide* (817-3882-xx) for more information about connecting the Netra 440 server to a terminal or similar device.



---

**Caution** – Before you power on the system, ensure that the system doors and all panels are properly installed.

---

This procedure assumes that you are accessing the system console using the serial management or network management port.

For more information, refer to the *Netra 440 Server Administration Guide* (817-3884-xx).

**1. Turn on power to any external peripherals and storage devices.**

Read the documentation supplied with the device for specific instructions.

**2. Turn on power to the alphanumeric terminal or local graphics monitor, or log in to the ALOM.**

**3. Turn the rotary switch to the Diagnostics position (FIGURE 2-2).**

Use the Diagnostics position to run POST and OpenBoot Diagnostics tests to verify that the system functions correctly with the new part(s) you just installed.

**4. Press the On/Standby button to power on the system.**

5. If you are logged in to the `sc>` prompt, switch to the `ok` prompt and type:

```
sc> console
```

6. When the system banner is displayed on the system console, immediately abort the boot process to access the system `ok` prompt.

The system banner contains the Ethernet address and host ID. To abort the boot process, use one of the following methods:

- Hold down the Stop (or L1) key and press A on your keyboard.
- Press the Break key on the terminal keyboard.
- Type the `break` command from the `sc>` prompt.

7. At the `ok` prompt, type the following commands:

```
ok setenv auto-boot? false
ok reset-all
```

You must set the `auto-boot?` variable to `false` and issue the `reset-all` command to ensure that the system correctly initializes upon reboot. If you do not issue these commands, the system may fail to initialize.

8. At the `ok` prompt, type the following command:

```
ok setenv auto-boot? true
```

You must set the `auto-boot?` variable back to `true` so that the system boots automatically after a system reset.

9. At the `ok` prompt, type the following command:

```
ok boot -r
```

The `boot -r` command rebuilds the device tree for the system, incorporating any newly installed options so that the operating system recognizes them.

---

**Note** – The system can take anywhere from 30 seconds to 20 minutes before the system banner appears. This time depends on the system configuration (number of CPUs, memory modules, PCI cards) and the level of POST and OpenBoot Diagnostics tests being performed. For more information about OpenBoot configuration variables, see the *Netra 440 Server System Administration Guide* (817-3884-xx).

---

**10. Turn the rotary switch to the Locked position (FIGURE 2-2).**

This prevents anyone from accidentally powering off the system.

**11. Close the system door.**

The system front panel LED indicators provide power-on status information. For information about the system LEDs, see “[Front Panel LEDs](#)” on page 3.

If the system encounters a problem during startup, and the rotary switch is in the Normal position, try restarting the system in diagnostics mode to determine the source of the problem. Turn the rotary switch to the Diagnostics position and power cycle the system. See “[Powering Off the System](#)” on page 26.

For information about system diagnostics and troubleshooting, refer to the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx).

---

## Accessing Internal Components

### Removing the Top Cover

**1. Power off the system.**

See “[Powering Off the System](#)” on page 26.

**2. Remove the system from the rack.**

The procedures for removing the system from the rack will vary, depending on the type of rack mount kit that you are using. Refer to the *Netra 440 Server Installation Guide* (817-3882-xx) for more information.

**3. Open the system door.**



4. Loosen the Phillips No. 2 captive lockdown screw securing the top cover to the chassis.

The lockdown screw is located on the chassis face above the hard drives, between the two latches (FIGURE 2-3).

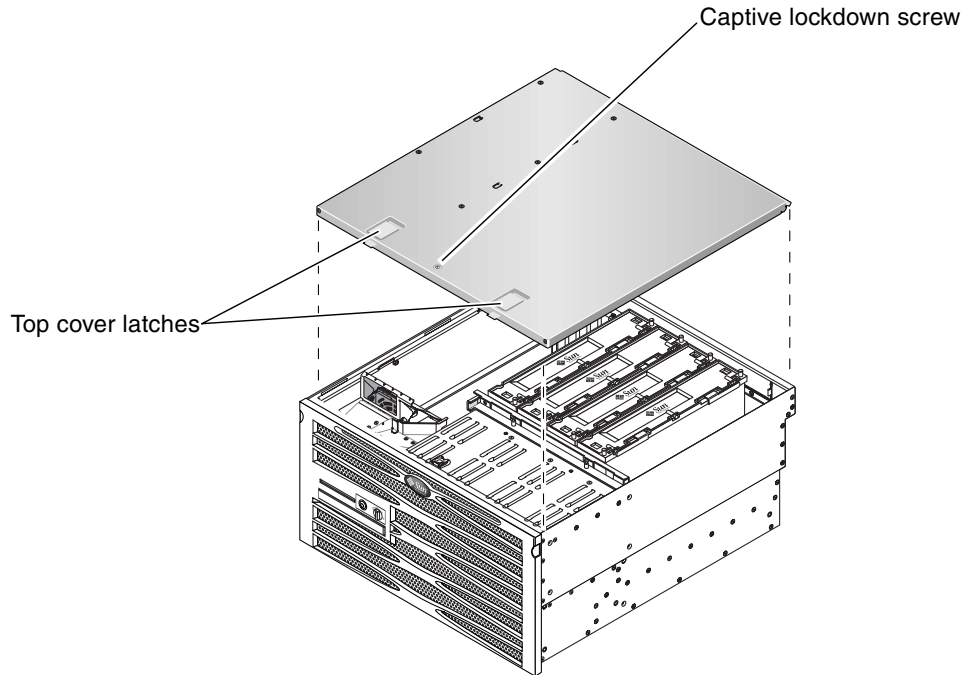


FIGURE 2-3 Locating the Latches on the Top Cover

5. Pull the latches up to release the top cover from the chassis, then lift the cover up and off the chassis (FIGURE 2-3).

## Installing the Top Cover

1. Insert the back edge of the top cover under the lip on the back panel.
2. Grasp the latches and lower the top cover onto the chassis (FIGURE 2-3).
3. Release the latches when the top cover is seated on the chassis.
4. Tighten the Phillips No. 2 captive lockdown screw that secures the top cover to the chassis.

The lockdown screw is located on the chassis face above the hard drives.

5. **Close the system door.**

6. **Install the system back into the rack.**

The procedures for installing the system back into the rack will vary, depending on the type of rack mount kit that you are using. Refer to the *Netra 440 Server Installation Guide* (817-3882-xx) for more information.

7. **Power on the system.**

See [“Powering On the System”](#) on page 22.

---

## Avoiding Electrostatic Discharge

Use the following procedure to prevent static damage whenever you are accessing any of the internal components of the system.

You must have the following items:

- Antistatic wrist or foot strap
- Antistatic mat (or the equivalent)



---

**Caution** – Printed circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or the work environment can destroy components. Do not touch the components or any metal parts without taking proper antistatic precautions.

---

1. **Power off the system.**

See [“Powering Off the System”](#) on page 26.

2. **Remove the system from the rack.**

The procedures for removing the system from the rack will vary, depending on the type of rack mount kit that you are using. Refer to the *Netra 440 Server Installation Guide* (817-3882-xx) for more information.

3. **If you are servicing any internal components, remove the top cover.**

See [“Accessing Internal Components”](#) on page 30.

4. **Disconnect the AC or DC power cables.**

**5. Use an antistatic mat or similar surface.**

When performing any installation or service procedure, place static-sensitive parts, such as boards, cards, and hard drives, on an antistatic surface. The following items can be used as an antistatic surface:

- The bag used to wrap a Sun replacement part
- The shipping container used to package a Sun replacement part
- Sun electrostatic discharge (ESD) mat, Sun part number 250-1088 (available through your Sun sales representatives)
- Disposable ESD mat, shipped with replacement parts or options

**6. Use an antistatic wrist strap.**

Attach the appropriate end of the strap to the system chassis sheet metal and attach the other end of the strap to your wrist. Refer to the instructions that come with the strap.

---

**Note** – Ensure that the wrist strap is in direct contact with the metal on the chassis.

---

**7. Detach both ends of the strap after you have completed the installation or service procedure.**



## Removing and Replacing Hot-Swappable Components

---

Hot-swappable components are those that you can install or remove while the system is running, without affecting the rest of the system's capabilities. However, you might have to prepare the operating system prior to the hot-swap operation by performing certain system administration tasks.

In a Netra 440 server, the following components are hot-swappable:

- ["Fan Trays \(0-2\)" on page 36](#)
- ["Power Supplies" on page 39](#)
- ["Hard Drives" on page 44](#)
- ["Air Filter" on page 50](#)

---

## Fan Trays (0-2)

---

**Note** – Only fan trays 0-2 are hot-swappable; fan tray 3 is a cold-swappable component. Refer to “[Fan Tray 3](#)” on [page 74](#) for information on removing and replacing fan tray 3.

---

If fan tray 0, 1 or 2 fails, the enclosure status Service Required LED lights and a console message indicates which fan tray failed.



---

**Caution** – Have a replacement fan tray available before removing a fan tray. A system can only run for approximately 15 minutes with only two fan trays operating before overheating occurs.

---



---

**Caution** – The power supplies contain fans that are integral to system cooling. Failure to install a replacement fan tray or power supply could lead to serious overheating and severe damage to the system. For more information, refer to the *Netra 440 Server Product Overview* (817-3881-xx).

---



---

**Caution** – The fan trays contain sharp moving parts. Use extreme caution when servicing the fan trays.

---

The part number for fan trays 0-2 is F540-5855.

## Removing a Fan Tray (0-2)

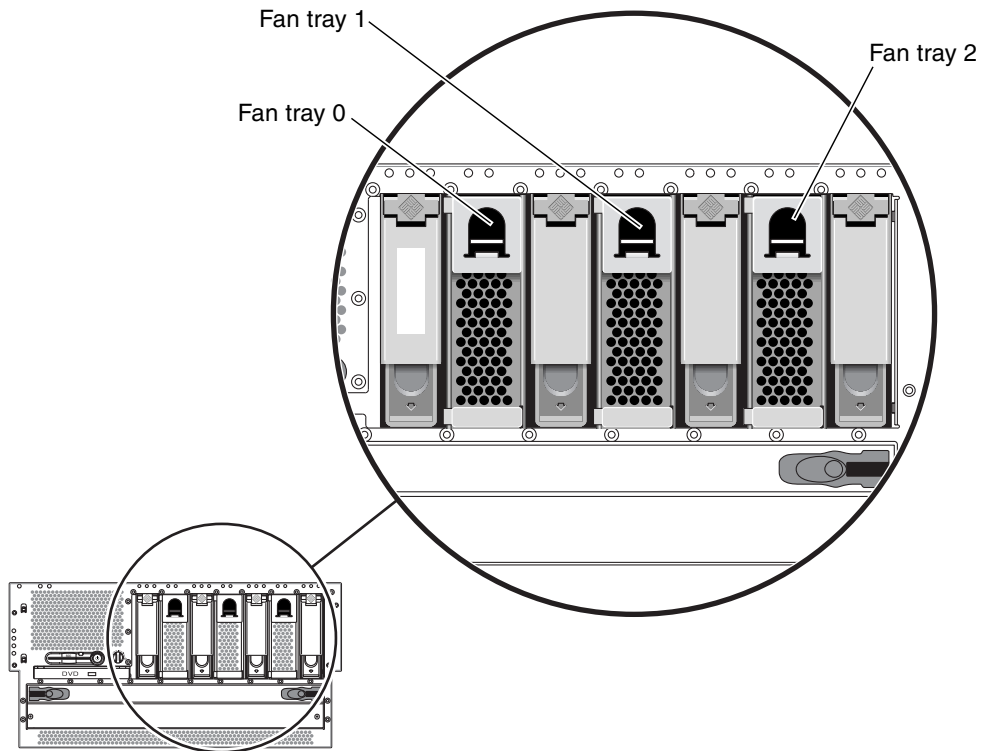
1. Attach the antistatic wrist strap.

See [“Avoiding Electrostatic Discharge”](#) on page 32.

2. Open the system door.

3. Identify the fan tray to be removed and note the bay in which it is installed.

**FIGURE 3-1** shows the location of the three fan trays. Refer to the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx) for more information about isolating failed parts.



**FIGURE 3-1** Fan Tray 0-2 Locations

4. Pull down on the handle at the top of the fan tray to lower the fan tray catches (FIGURE 3-2).

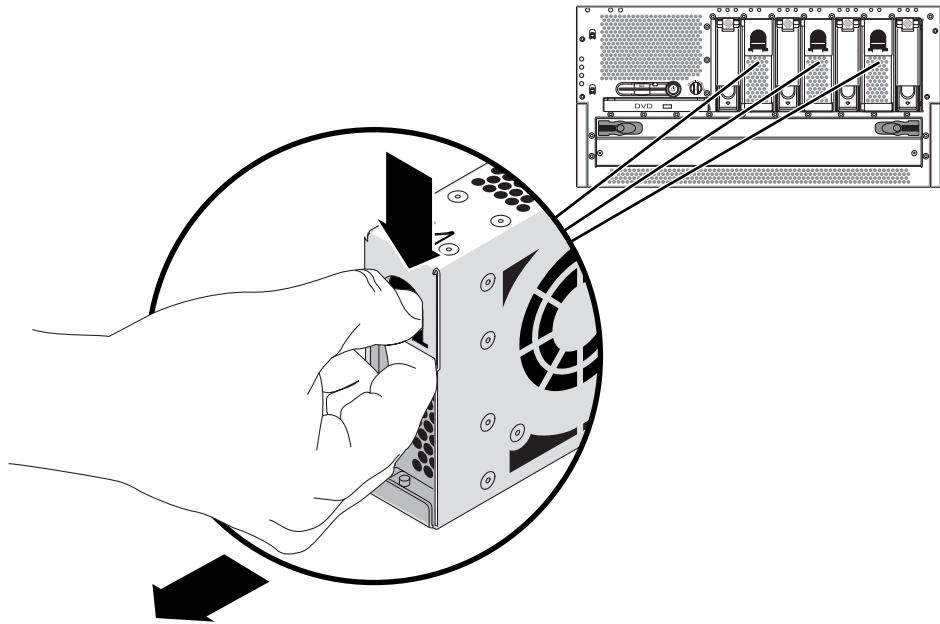


FIGURE 3-2 Removing a Fan Tray

5. Holding the fan tray by the handle, slide the fan tray out of the bay.

---

**Note** – When you reinstall the fan tray (or a replacement fan tray), ensure that you install the fan tray into the same bay as the one from which it was just removed.

---

6. If you are not replacing the fan tray right away, close the system door.



---

**Caution** – Do not operate the system for longer than 15 minutes without the fan tray in place or the system may overheat.

---



## Installing a Fan Tray (0-2)

1. **Open the system door.**

2. **Align the fan tray to its bay.**

Orient the fan tray so that the latch is on the bottom.

---

**Note** – If you are replacing a fan tray that you removed previously, be sure to install the fan tray into the same bay from which it was removed.

---

3. **Insert the fan tray into the bay guide rails and slide the fan tray into the bay until it makes firm contact with the backplane.**

4. **Close the system door.**

---

## Power Supplies

The system's power supply hot-swap feature enables you to remove a power supply without shutting down the operating system or turning off the system power, provided that at least two other power supplies are online, working, and properly secured.

When removing a power supply using the hot-swap operation, you need to issue a software command to prepare the system for the hot-swap operation. This command also lights up the power supply OK-to-Remove LED. You will use the Advanced Lights Out Manager (ALOM) software tool to initiate a hot-swap operation of the Netra 440 server's power supply. Refer to the *Sun Advanced Lights Out Manager User's Guide* (817-5481-xx) for additional information, if necessary.

Note that the power supply removal and replacement instructions are identical for both DC- and AC-powered systems.



---

**Caution** – If a power supply fails, leave the supply in its bay until you are ready to install a replacement. Two power supplies must be present at all times to ensure proper system cooling.

---

---

**Note** – All internal devices, except hard drives, must be installed only by qualified service personnel.

---

The following procedure assumes that you are accessing the system console by the default method of connecting to the serial management port (SERIAL MGT) of the Netra 440 server.

The part number for a DC power supply is F300-1567, and the part number for an AC power supply is F300-1674.

## Removing a Power Supply

If a power supply fails, the enclosure status Service Required LED and that power supply Service Required LED will light.



---

**Caution** – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper system cooling.

---



---

**Caution** – Power supply hot-swap operations should only be conducted by qualified service personnel.

---



---

**Caution** – Attempting to remove a power supply without issuing a software command to isolate it could damage the power supply.

---



---

**Caution** – You have limited time to perform the power supply hot-swap operation. You have 10 minutes at sea level and a maximum of 7 minutes at 10,000 feet (3048 meters) to ensure proper system cooling. Ensure that you have a replacement power supply ready before beginning this procedure.

---

### 1. Attach the antistatic wrist strap.

See [“Avoiding Electrostatic Discharge”](#) on page 32.

2. At the rear of the system, locate the power supply that you want to remove.

Check the power supply LEDs to determine which power supply is faulty. For more information, see “Power Supply LEDs” on page 15 and the *Netra 440 Server System Administration Guide* (817-3884-xx).

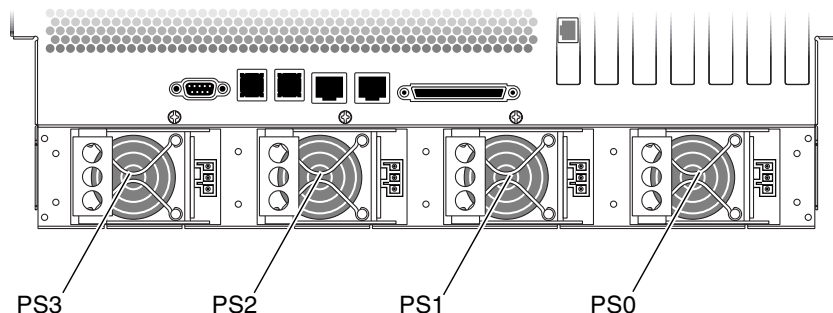


FIGURE 3-3 Locating the Power Supplies

3. To access the ALOM system controller prompt, type the ALOM system controller escape sequence (#.).

4. Type the following ALOM command:

```
sc> removefru power-supply
```

Where *power-supply* is the name of the power supply to be removed. For example, to remove power supply 1, type the following command:

```
sc> removefru PS1
```

The OK-to-Remove LED lights on the power supply.



---

**Caution** – Do not remove a power supply from a running system until the power supply OK-to-Remove LED is lit.

---

5. Disconnect the DC or AC power cable from the power supply being removed.



---

**Caution** – There are several pinch points on the power supply, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supply for more information.

---

6. Pull the lever on the back of the power supply to the right (FIGURE 3-4).  
This disconnects the power supply from the power distribution board inside the server.

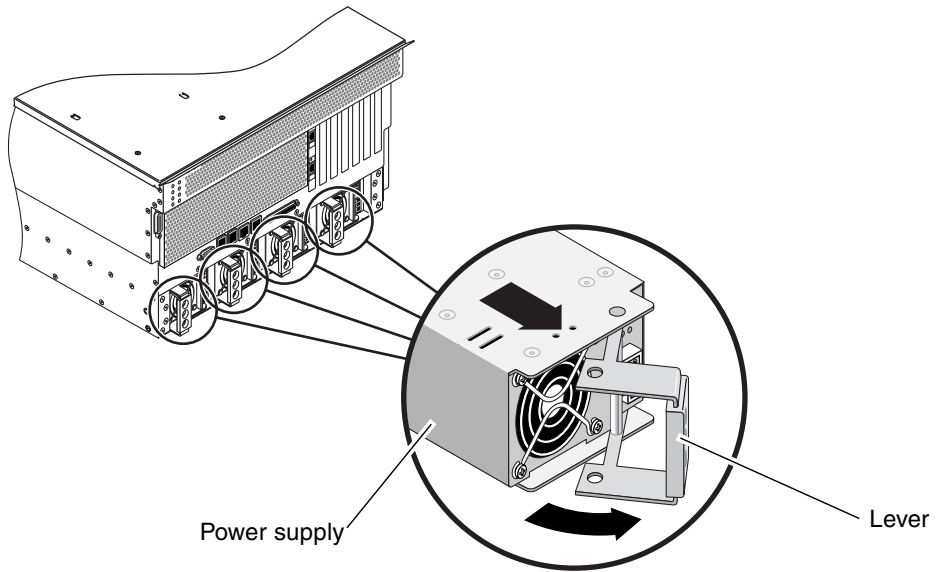


FIGURE 3-4 Removing a Power Supply

7. Slide the power supply out of the server chassis by pulling on the lever (FIGURE 3-4).



---

**Caution** – Never insert your hand into the power supply bay while the system is running or while the system is connected to power. Doing so could result in serious personal injury.

---

The system console displays a message confirming the removal of the power supply.

# Installing a Power Supply

The system's power supply hot-swap feature enables you to insert a power supply without shutting down the operating system or turning off the system power.

When installing a power supply, you must insert the power supply and wait for the two green power supply LEDs to light.

The following procedure assumes that you are accessing the system console by the default method of connecting to the serial management port (SERIAL MGT) of the Netra 440 server.



---

**Caution** – You have limited time to perform a power supply hot-swap operation. You have 10 minutes at sea level and a maximum of 7 minutes at 10,000 feet (3048 meters) to ensure proper system cooling.

---

1. **Align the new power supply with its bay.**
2. **Slide the PSU into the server until you feel it engage with the power distribution board inside.**

Ensure that the lever does not return to a rightmost position until the power supply engages with the power distribution board. If the lever does return early, the power supply will not engage correctly.



---

**Caution** – There are several pinch points on the power supply, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supply for more information.

---

3. **Press the lever to the left until it clicks.**

Returning the lever to a leftmost position engages the power supply with the power distribution board inside the server.

4. **Connect the DC or AC power cable to the power supply.**
5. **Verify that the power supply is operating correctly.**

Check the Service Required, OK-to-Remove, and Power OK LEDs on the power supply. You should hear the power supply fan start spinning and the two green LEDs should light within three seconds after completing a hot-swap installation.

For more information on the power supply LEDs, refer to [“Power Supply LEDs” on page 15](#).

6. Enter the following command to reset the OK-to-Remove LED:

```
sc> poweron PSN
```

Where *N* is the power supply number. For example, to turn power on to power supply 0, type:

```
sc> poweron PS0
```

---

## Hard Drives

For information about performing a hot-swap operation on a mirrored hard drive, refer to the *Netra 440 Server System Administration Guide* (817-3884-xx).

The system's hard drive hot-swap feature enables you to remove a hard drive without shutting down the operating system or turning off the system power. The way in which you remove a hard drive depends on the application you are using and whether you are replacing a drive, adding a new one, or removing a drive permanently.

When you remove a drive using the hot-swap operation, you need to stop the hard drive and take it offline to remove the logical software links to the hard drive, and to reconfigure the file systems so that they now ignore the removed drive. You might also have to reconfigure your application software to operate without the removed drive.

Use the `cfgadm` command to remove a Netra 440 server's internal hard drive using the hot-swap operation. The following procedure describes the general steps involved, but your specific device names might be different.

The following procedure assumes that you are accessing the system console by the default method of connecting to the serial management port (SERIAL MGT) of the Netra 440 server.



---

**Caution** – Do not hot-swap drives without the correct preparations. The system supports hot-swapping hard drives, but you must issue a software command before you remove or install a hard drive.

---

If a hard drive fails, the enclosure status Service Required LED lights up and a console message indicates which hard drive failed.

If you have not configured the system with two boot drives, you cannot hot-swap a single boot drive. You can only hot-swap the boot drive when you have configured a two-drive mirror of the boot drive for hot-swapping. If the system is configured with a boot drive and data drives, you can hot-swap the data drives, but not the boot drive. For more information on drive mirroring, refer to the *Netra 440 Server System Administration Guide* (817-3884-xx).

When removing and replacing a hard drive, keep the following points in mind:

- You must use Sun standard 3.5-inch wide and 1-inch high (8.89-cm x 2.54-cm) hard drives that are SCSI-compatible and run at 15,000 revolutions per minute (rpm). Drives must be either the single-ended or low-voltage differential (LVD) type.
- The SCSI target address (SCSI ID) of each hard drive is determined by the slot location where the drive is connected to the Ultra-4 SCSI backplane. There is no need to set any SCSI ID jumpers on the hard drives themselves.

The part number for a hard drive is F540-5924, XRA-SC1N2-73G15K.

## Removing a Hard Drive

1. **Obtain the logical device name(s) for the device(s) you plan to remove.**

Refer to the *Netra 440 Server System Administration Guide* (817-3884-xx) for more information.

2. **Select the drive and stop any activity or applications accessing the hard drive.**
3. **Unmount any file systems mounted on the hard drive.**
4. **Attach the antistatic wrist strap.**  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
5. **Log in as superuser:**

```
% su
Password:
#
```

6. Remove the hard drive from the device tree using the following command:

```
# cfgadm -x unconfigure /dev/rdisk/device-name
```

Where *device-name* is the name of the hard drive to be removed. For example:

```
# cfgadm -x unconfigure /dev/rdisk/c0t0d0
```

The blue OK-to-Remove hard drive LED lights.

7. Allow the drive to spin down completely.



---

**Caution** – When hot-swapping a hard drive, first ensure that the drive's blue OK-to-Remove LED is lit. Then, after disconnecting the drive from the SCSI backplane, allow 30 seconds or so for the drive to spin down completely before removing it. Failing to let the drive spin down before removing it could damage the drive.

---

8. Open the system door.



9. Identify the hard drive (HDD) to be removed and note the bay in which it is installed.

FIGURE 3-5 shows the location of the four hard drives. Refer to the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx) for more information about isolating failed parts.

---

**Note** – HDD0 is the default system drive.

---

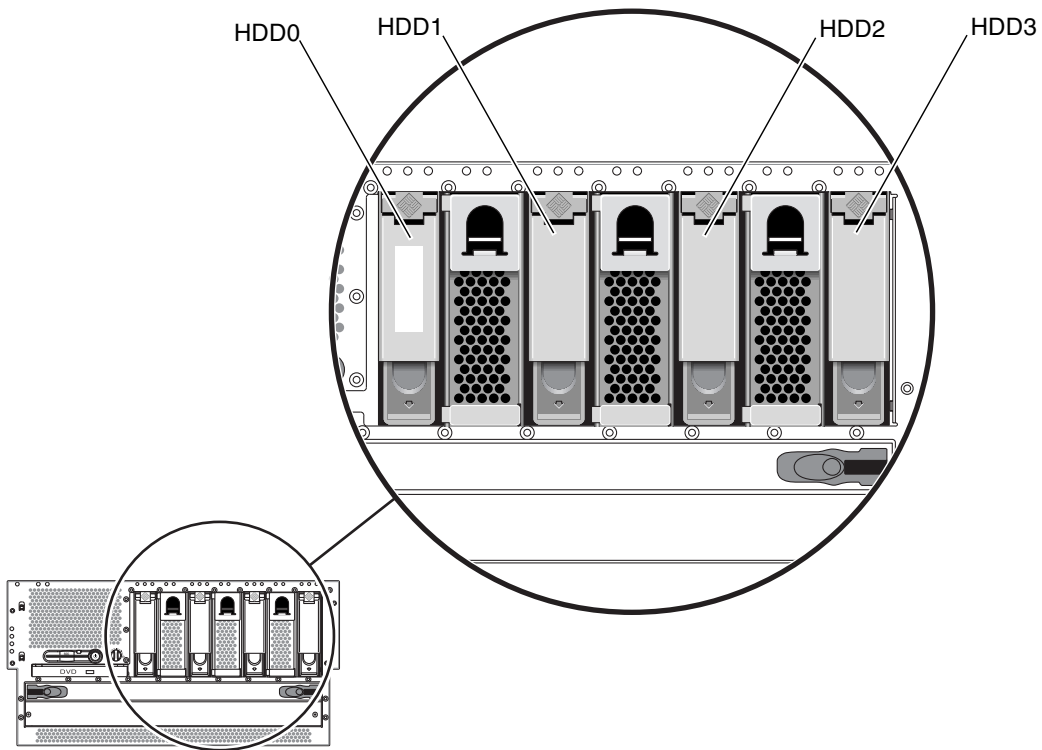
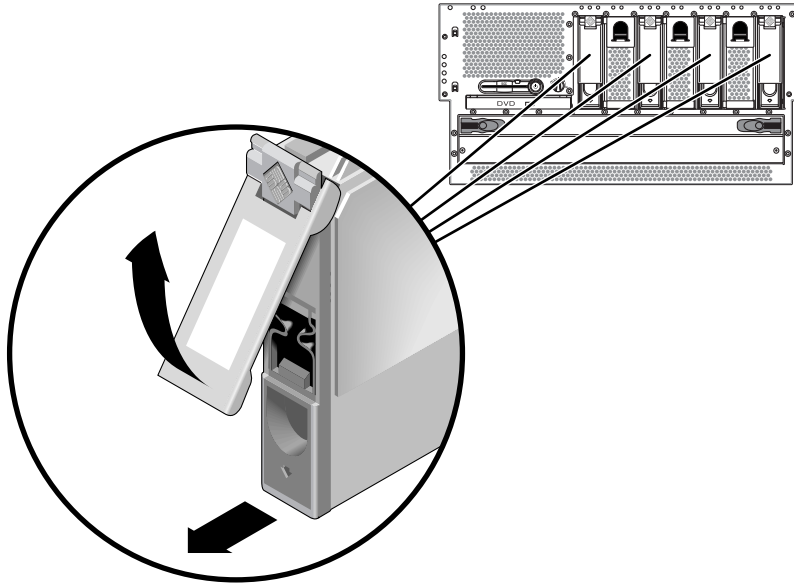


FIGURE 3-5 Hard Drive Locations

10. Pinch the hard drive latch up to release the hard drive handle (FIGURE 3-6).



**FIGURE 3-6** Removing a Hard Drive

11. Pull the handle away from the hard drive until you feel the hard drive connector disengage from the SCSI backplane connector (FIGURE 3-6).
12. Holding the hard drive by the handle, slide the hard drive out of the hard drive bay.

---

**Note** – When you reinstall the hard drive (or a replacement drive), be sure to install the hard drive into the same drive bay as the one from which it was just removed.

---

13. If you are not replacing the hard drive right away, close the system door.

# Installing a Hard Drive

The system's drive hot-swap feature enables you to insert a hard drive without shutting down the operating system or turning off the system power. When installing a drive, you must insert the hard drive and wait for it to spin up to operating speed. Then you re-create or reconfigure the file systems so that the Solaris OS recognizes the hard drive. Finally, you configure your application (if necessary) to operate with this new drive.

Use the `cfgadm` command to install a Netra 440 server's internal hard drives using the hot-swap operation. The following procedure describes the general steps involved, but your specific device names might be different.

The following procedure assumes that you are accessing the system console by the default method of connecting to the serial management port (SERIAL MGT) of the Netra 440 server.



---

**Caution** – Do not hot-swap drives without the correct preparations. The system supports hot-swapping hard drives, but you must issue a software command before you remove or install a hard drive.

---

1. **Open the system door.**
2. **Release the hard drive handle on the hard drive.**

Pinch the hard drive latch to open the handle.

3. **Align the hard drive to its drive bay.**

Orient the hard drive so that the hard drive latch is on the bottom.

---

**Note** – If you are replacing a drive that you removed previously, be sure to install the hard drive into the same drive bay from which it was removed.

---

4. **Insert the hard drive into the hard drive bay guide rails.**

Slide the hard drive into the bay until it barely contacts the backplane.

5. **Firmly press the center of the hard drive handle toward the hard drive until the latch closes, securing the hard drive in place.**

6. **Log in as superuser:**

```
% su
Password:
#
```

**7. Configure the new hard drive using this command:**

```
# cfgadm -x configure /dev/rdisk/device-name
```

where *device-name* is the name of the hard drive to be configured. For example:

```
# cfgadm -x configure /dev/rdisk/c0t0d0
```

The blue OK-to-Remove LED goes out, and the green Activity LED flashes as the hard drive is added to the device tree.

**8. Close the system door.**

**9. Mount any file systems associated with the hard drive and restart any applications accessing the hard drive.**

---

## Air Filter

The air filter is located behind the system door at the front of the system. You should have a replacement air filter available before going through with these procedures. The system may become damaged if you run it without an air filter for an extended period of time. The filters are not designed to be cleaned, so you must completely discard dirty filters and replace them with new clean filters.

The time frame in which the air filter should be replaced varies depending on the environment where the Netra 440 is installed; if the air in the operating environment is especially dirty, you may have to replace the filter more frequently. Reliability may be reduced noticeably when 120 grams of dust has accumulated on the filter, so you should change the filter at that point. In typical locations with high levels of dust and dirt in the air, the recommended service time could be as low as two months. In clean-air environments, the filter may only need to be changed every 18 months or longer.

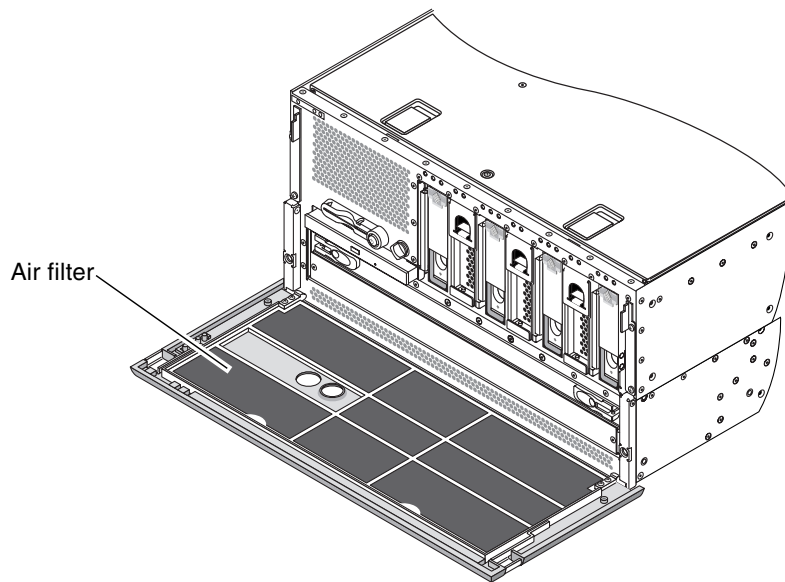
The following is an example that demonstrates how to calculate service times for the Netra 440 server, assuming that the Netra 440 server has an airflow of approximately 96 cubic feet per minute:

**TABLE 3-1** Calculating Air Filter Replacement Schedules for the Netra 440 Server

	Room Cleanliness	Replacement Schedule, in Days
<b>Case A</b>	0.0000016 grams/ft <sup>3</sup>	539.16
<b>Case B</b>	0.0000161 grams/ft <sup>3</sup>	53.92
<b>Your environment</b>		

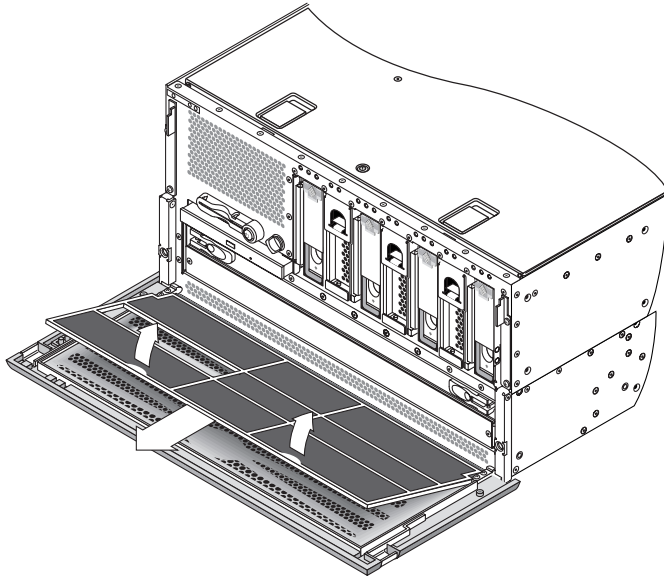
The part number for the air filter pack is X8217A.

1. Open the system door.
2. Locate the air filter behind the front door panel ([FIGURE 3-7](#)).



**FIGURE 3-7** Locating the Air Filter

3. Remove the air filter assembly from the front door panel ([FIGURE 3-8](#)).



**FIGURE 3-8** Removing the Air Filter

## Installing the Air Filter

1. Install the air filter assembly into the front door panel ([FIGURE 3-8](#)).
2. Close the system door.

## Removing and Replacing Cold-Swappable Components

---

Cold-swappable components require the system to be powered down before you can remove them.

In a Netra 440 server, the following components are cold-swappable:

- [“DVD Drive” on page 54](#)
- [“System Configuration Card \(SCC\)” on page 57](#)
- [“System Configuration Card Reader” on page 60](#)
- [“SCSI Backplane” on page 68](#)
- [“Fan Tray 3” on page 74](#)
- [“CPU/Memory Module” on page 77](#)
- [“Memory Modules” on page 81](#)
- [“PCI Cards” on page 86](#)
- [“ALOM System Controller Card” on page 94](#)
- [“Alarm Card” on page 100](#)
- [“Power Distribution Board” on page 104](#)
- [“Motherboard” on page 108](#)

---

# DVD Drive

The following section describes how to remove and install both the DVD-ROM drive and the DVD-RW drive (both referred to as the DVD drive in this section).

The part numbers for the DVD drives are:

- DVD-RW drive—F540-6068, X7424A
- DVD-ROM drive—F540-6067, X7423A

## Removing the DVD Drive

**1. Power off the system.**

See [“Powering Off the System”](#) on page 26.

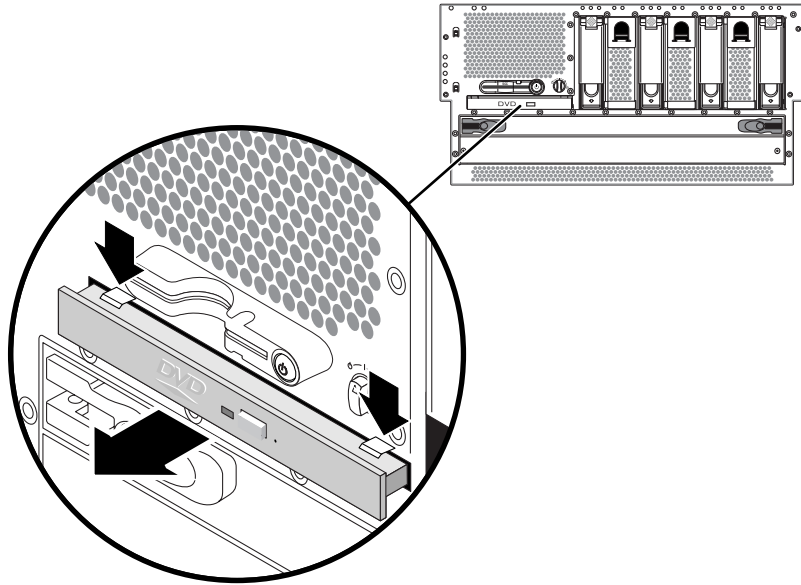
**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

**3. Open the system door.**

**4. Press down on the two DVD drive locking tabs, releasing the DVD drive from its cage ([FIGURE 4-1](#)).**

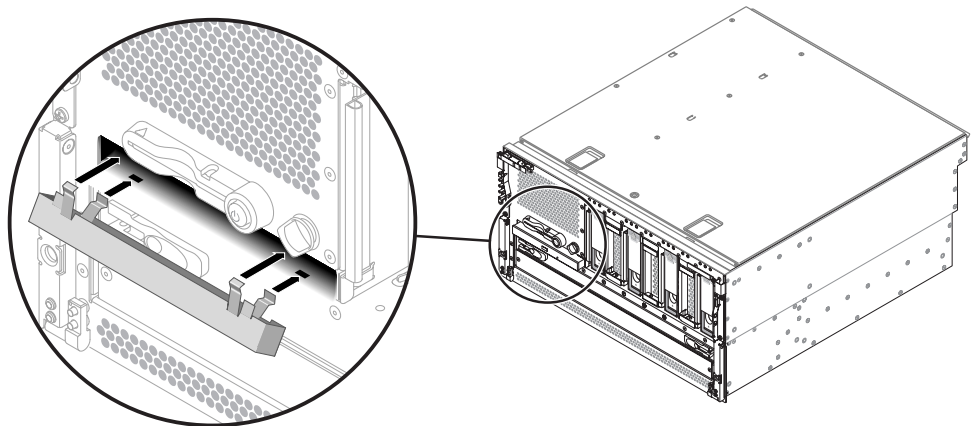




**FIGURE 4-1** Removing a DVD Drive

- 5. Pull out the DVD drive from the front of the system.**
- 6. If you are not replacing the DVD drive immediately, install the DVD slot cover over the empty DVD space.**

Insert the lower two tabs of the DVD cover into the two slots in the empty DVD space, then push the top of the DVD slot cover up until it clicks into place ([FIGURE 4-2](#)).

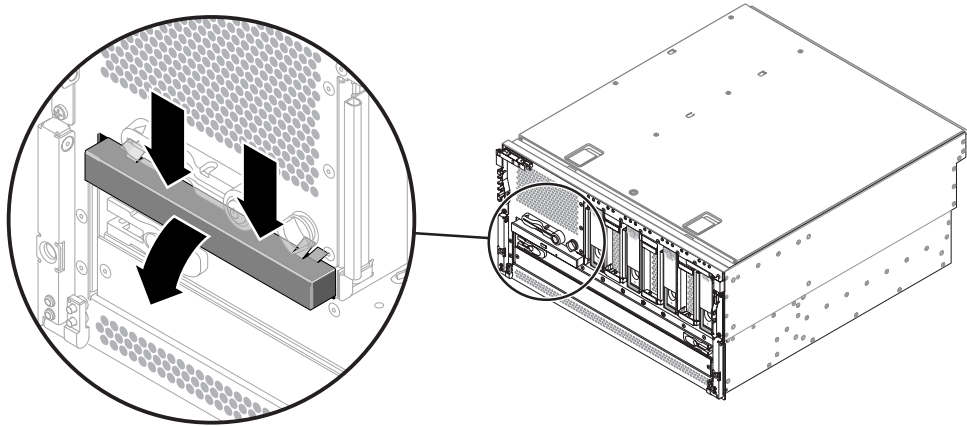


**FIGURE 4-2** Installing the DVD Slot Cover

# Installing the DVD Drive

**1. Remove the DVD slot cover, if one is installed.**

Pull down on the top of the DVD slot cover, then lift it up and away from the empty DVD slot ([FIGURE 4-3](#)). Store the DVD slot cover in a safe place.



**FIGURE 4-3** Removing the DVD Slot Cover

**2. Slide the DVD drive into the system until the two DVD drive locking tabs click into place.**

**3. Close the system door.**

**4. Power on the system and perform a configuration reboot.**

See [“Powering On the System”](#) on page 22.

---

## System Configuration Card (SCC)

The system configuration card stores system configuration variables and MAC addresses. For more information on the system configuration card, refer to the *Netra 440 Server Product Overview* (817-3881-xx).

You can replace a functioning system configuration card and install it into another system, thereby preserving the system's host ID information. Thus, migrating a system configuration card from one system to another can smooth transitions to new or upgraded systems, or quickly bring up a backup system if a primary system becomes unavailable, without disrupting the system's identity on the network. Note that you can only migrate a system configuration card from one Netra 440 server to another Netra 440 server.

If you are replacing a defective system configuration card, you must contact a Sun service representative to obtain a new card with the existing server's host ID and MAC address. Do not reuse an old system configuration card if you have replaced it with a new one with the same host ID and MAC address.



---

**Caution** – Do not handle the system configuration card unless you need to transfer it to another system. If you need to handle the card for this reason, avoid contact with the gold terminals on the underside of the card.

---



---

**Caution** – Never remove the system configuration card while the server is booting or running the Solaris OS. Either disconnect power from the server, or put the server into standby mode, before removing or inserting the SCC. If the SCC is removed while the system is running, the system will shut down if the SCC is not replaced within 60 seconds.

---

Keep the following points in mind when removing or installing the system configuration card:

- The system attempts to access the system configuration card while booting.
- The system will not power on without a properly formatted system configuration card present in the reader.
- If the content of the `nvr`ram section is invalid, the system is initialized with its default `nvr`ram configuration.
- If the content of the `idprom` section is invalid, OpenBoot firmware displays a warning message and the system does not auto-boot the Solaris OS. However, you can boot the system from the `ok` prompt using the `boot` command.



---

**Caution** – Because the system configuration card is crucial for system operation, you must store the SCC safely if you have to remove it from the server, and replace it before restarting the server.

---

For a list of OpenBoot configuration variables stored on the system configuration card, refer to the *Netra 440 Server System Administration Guide* (817-3884-xx).

The part number for the system configuration card is F370-5155.

## Removing the System Configuration Card

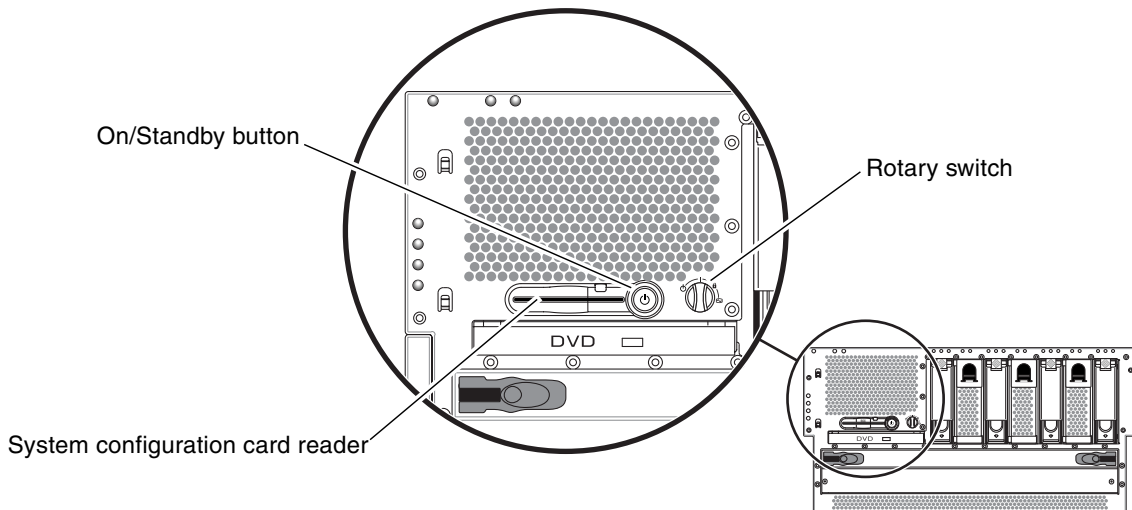


---

**Caution** – Attempting to remove the system configuration card while the system is running causes an immediate system shutdown in 60 seconds.

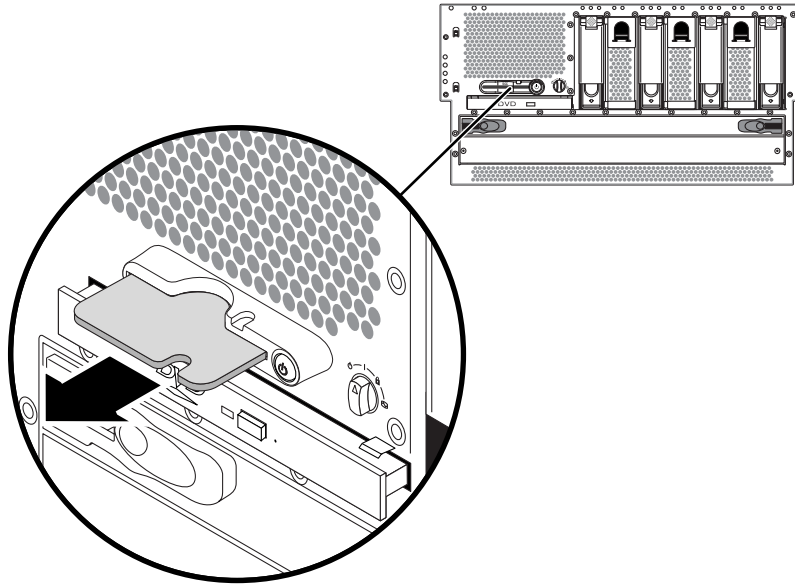
---

1. **Power off the system.**  
See [“Powering Off the System”](#) on page 26.
2. **Attach the antistatic wrist strap.**  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
3. **Open the system door.**
4. **Locate the system configuration card reader** ([FIGURE 4-4](#)).



**FIGURE 4-4** Locating the System Configuration Card Reader

5. Pull the security post out of its position from in front of the system configuration card (FIGURE 4-5).



**FIGURE 4-5** Removing a System Configuration Card

6. Grasp the system configuration card with your fingers and pull it out of the system.

## Installing the System Configuration Card

1. Insert the system configuration card into the system configuration card reader, which is at the left of the On/Standby button (FIGURE 4-4).  
Orient the system configuration card so that the Sun logo is on the top of the card.
2. Insert the security post into its position in front of the system configuration card.
3. Close the system door.
4. Power on the system.  
See [“Powering On the System”](#) on page 22.

---

# System Configuration Card Reader

The system configuration card reader is mounted to the lower piece of the fan tray 3 assembly.

The part number for the system configuration card reader is F540-5856.

## Removing the System Configuration Card Reader



---

**Caution** – The system supplies power to the system configuration card reader even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the system configuration card reader.

---

- 1. Power off the system.**  
See [“Powering Off the System”](#) on page 26.
- 2. Attach the antistatic wrist strap.**  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
- 3. Disconnect the AC or DC power cables from the back of the system.**
- 4. Remove the top cover.**  
See [“Removing the Top Cover”](#) on page 30.
- 5. Completely remove the system configuration card from the system configuration card reader.**
- 6. Remove the DVD drive from the front of the system.**  
See [“Removing the DVD Drive”](#) on page 54.

7. Disconnect the fan cable from the SCSI backplane (FIGURE 4-6).

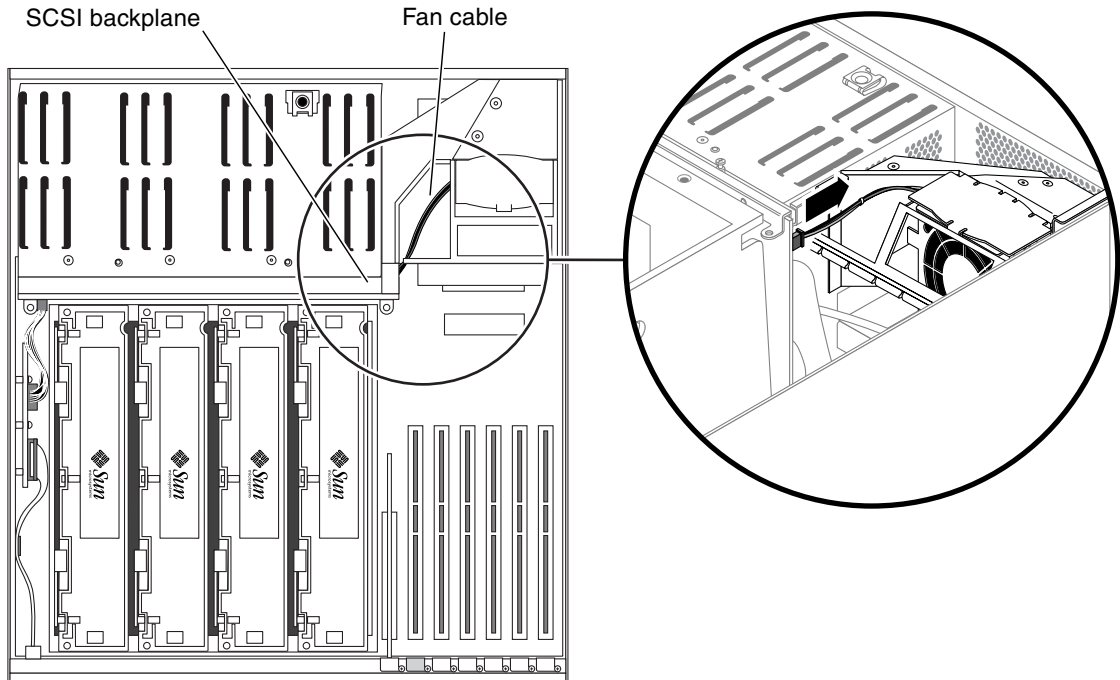


FIGURE 4-6 Disconnecting the Fan Cable from the SCSI Backplane

8. Pull the rotary switch away from the system to remove it from the server (FIGURE 4-7).

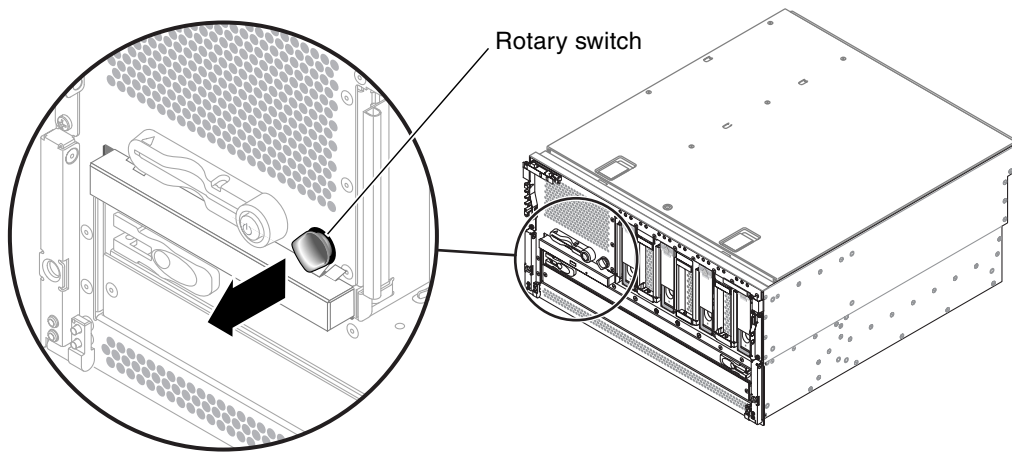


FIGURE 4-7 Removing the Rotary Switch

9. Disconnect the connector board power cable from the J18 connector on fan tray 3 (FIGURE 4-8).

Pull the cable out of the connector.

10. Disconnect the P1 DVD cable from the P1 connector on the motherboard (FIGURE 4-8).

Lift up the connector ejector levers as far as they go to release the DVD cable end from the connector, then pull the DVD cable out of the connector.

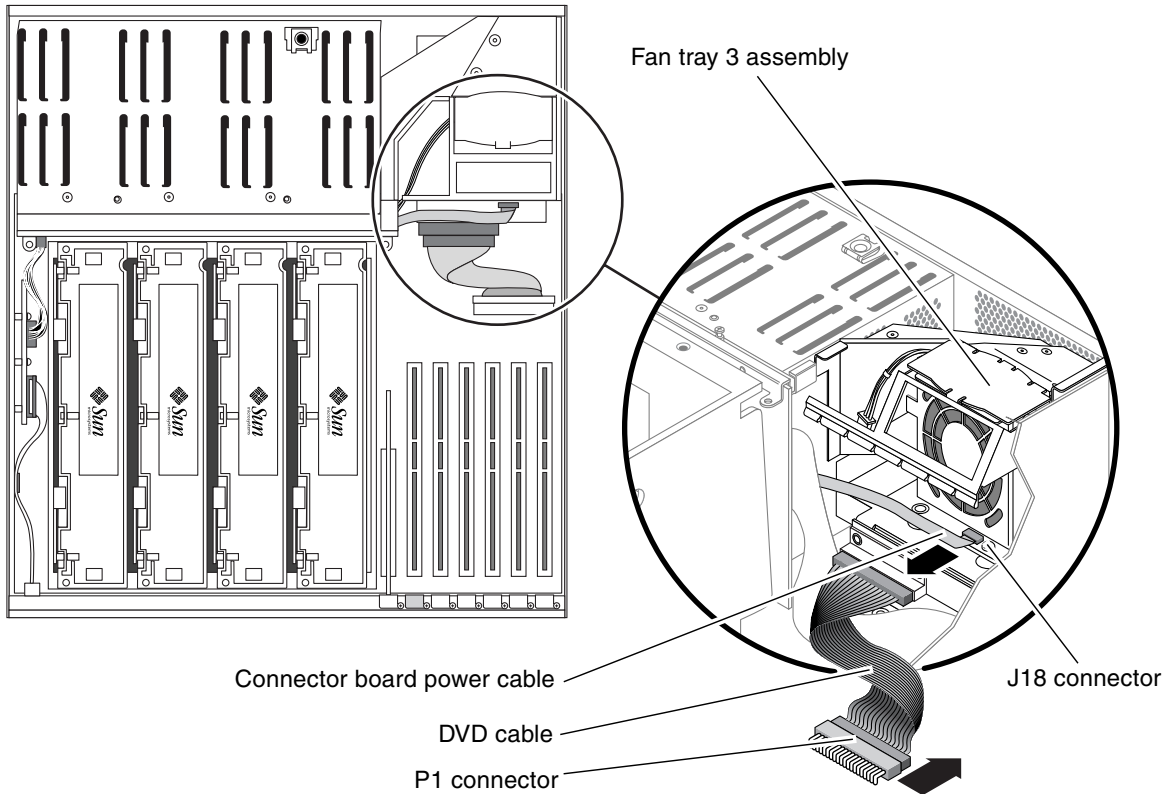


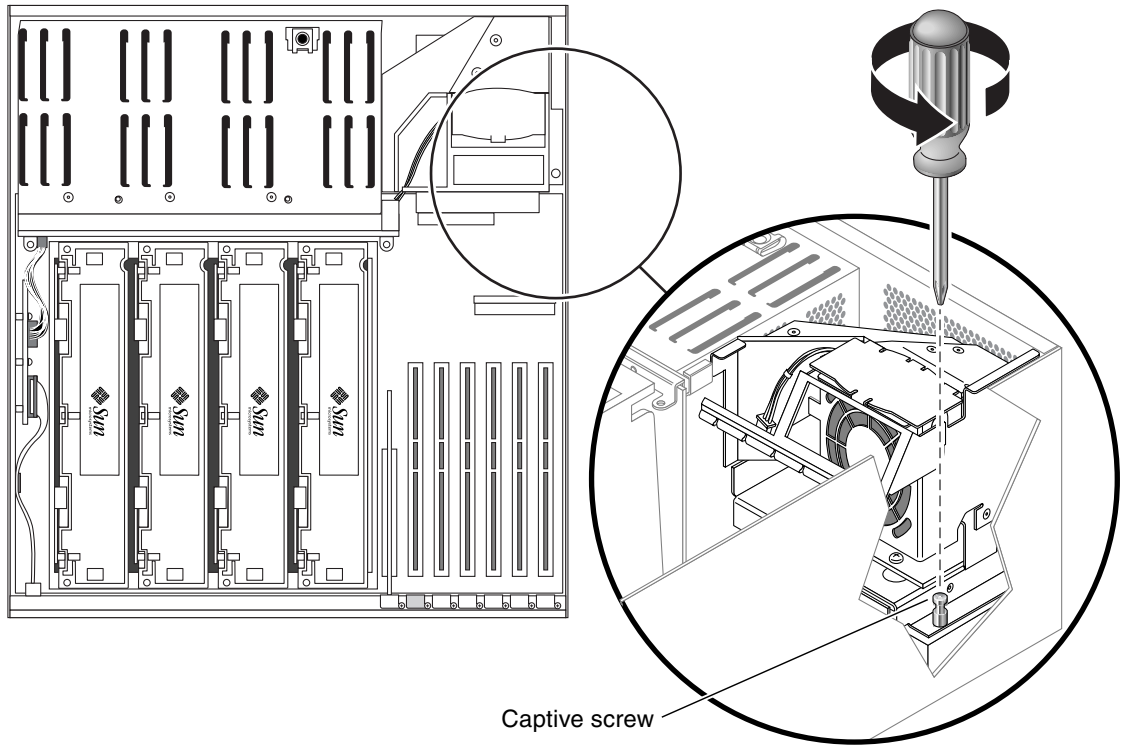
FIGURE 4-8 Locating J18 and P1 Connectors

11. Remove the PCI cards from the system, if necessary.

- If *short* PCI cards are installed in the PCI slots at the rear of the system, you do not have to remove them from the system. Go to [Step 12](#).
- If *long* PCI cards are installed in the PCI slots at the rear of the system, you must remove them from the system before you can remove the system configuration card reader. See [“Removing a PCI Card” on page 86](#) for those instructions, then return here.

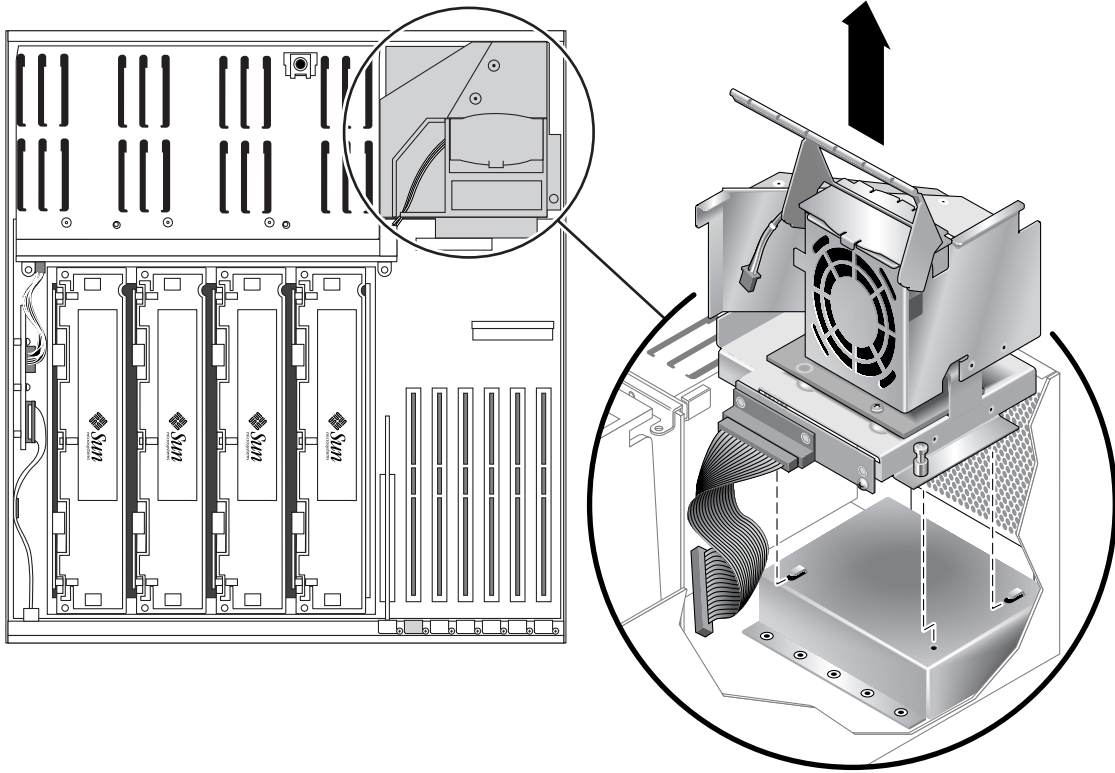


12. Unscrew the one screw that secures the fan tray 3 assembly to the system (FIGURE 4-9).



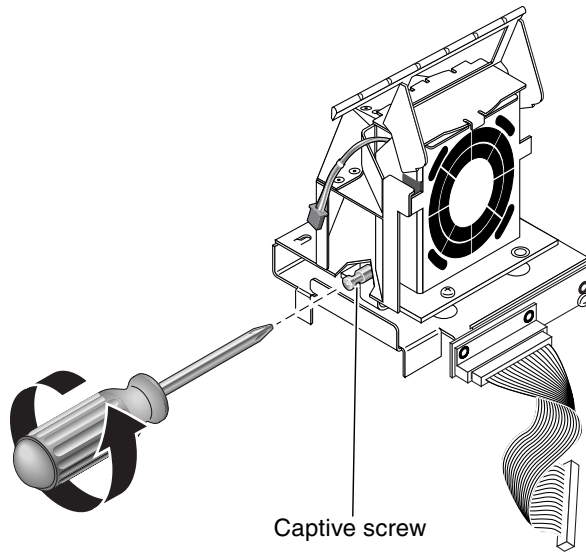
**FIGURE 4-9** Unscrewing the Captive Screw for the Fan Tray 3 Assembly

13. Slide the fan tray 3 assembly to the rear of the system to disengage it and lift it up to remove it from the system (FIGURE 4-10).



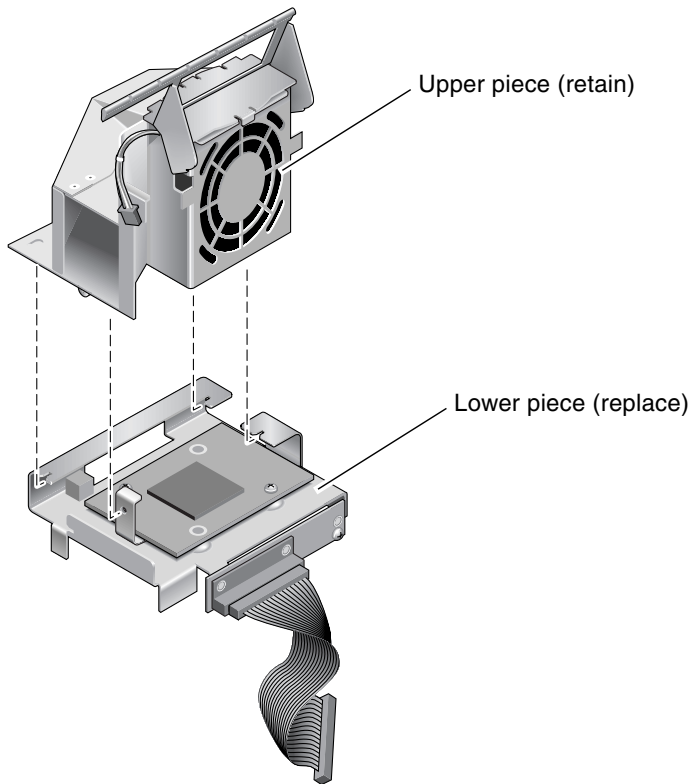
**FIGURE 4-10** Removing the Fan Tray 3 Assembly

14. Unscrew the one screw to split the fan tray 3 assembly into two pieces (FIGURE 4-11).



**FIGURE 4-11** Loosening the Fan Tray 3 Assembly Captive Screw

The system configuration card reader is mounted to the lower piece of the fan tray 3 assembly, so the entire lower piece of the fan tray 3 assembly will be replaced (FIGURE 4-12). Do not discard the upper piece of the fan tray 3 assembly; you will attach that to the replacement lower piece.



**FIGURE 4-12** Splitting the Fan Tray 3 Assembly Into Two Pieces

# Installing the System Configuration Card Reader



---

**Caution** – The system supplies power to the system configuration card reader even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the system configuration card reader.

---

1. Get the replacement lower piece of the fan tray 3 assembly, which contains the system configuration card reader.
2. Assemble the new lower piece of the fan tray 3 assembly with the existing upper piece.  
Align the three tabs on the existing upper piece of the fan tray 3 assembly with the three slots in the new lower piece and slide the two pieces completely together.
3. Secure them together using the single captive screw (FIGURE 4-11).
4. Insert the fan tray 3 assembly into the system (FIGURE 4-10).
5. Secure the fan tray 3 assembly to the system using the single captive screw (FIGURE 4-9).
6. Reinstall any long PCI cards, if necessary.  
See “Installing a PCI Card” on page 92 for those instructions.
7. Connect the connector board power cable at J18 on fan tray 3 (FIGURE 4-8).
8. Connect the DVD cable at P1 on the motherboard (FIGURE 4-8).
9. Install the DVD drive back into the system.  
See “Installing the DVD Drive” on page 56.
10. Push the rotary switch back into place at the front of the server (FIGURE 4-7).
11. Connect the fan cable to the SCSI backplane (FIGURE 4-6).
12. Replace the top cover.  
See “Installing the Top Cover” on page 31.
13. Connect the AC or DC power cables to the back of the system.
14. Power on the system.  
See “Powering On the System” on page 22.

---

# SCSI Backplane

The part number for the SCSI backplane is F540-5853.

## Removing the SCSI Backplane



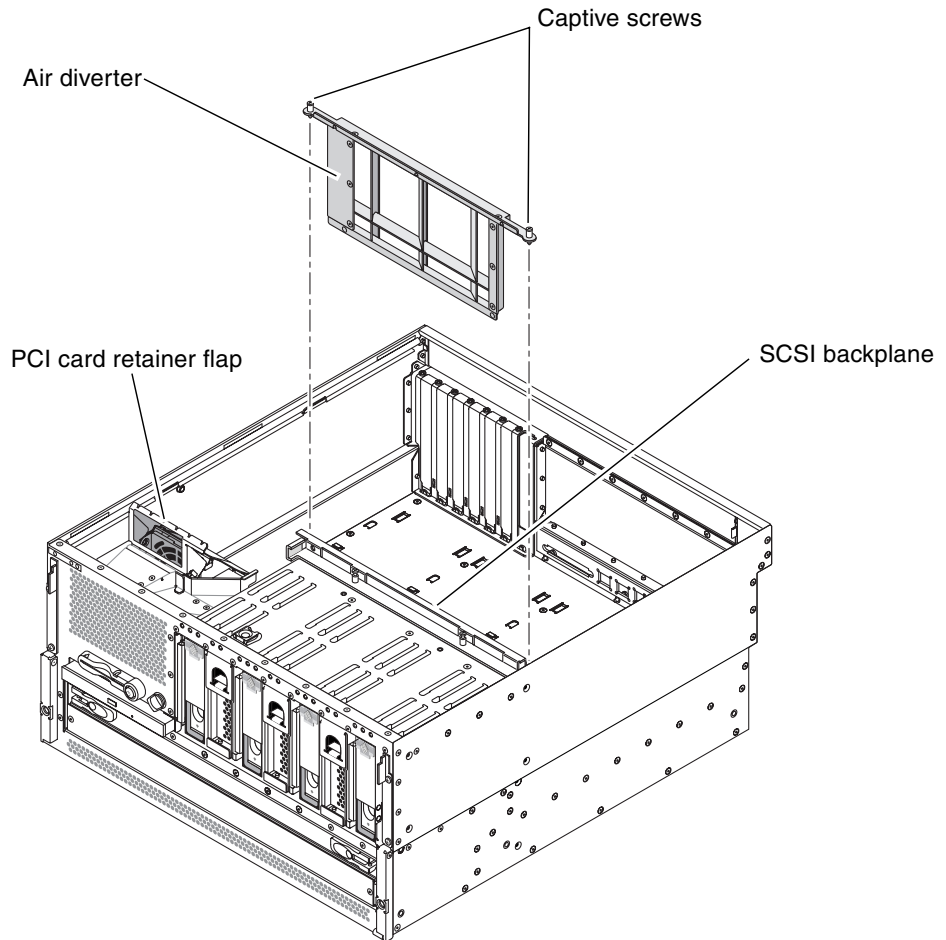
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**Caution** – The system supplies power to the SCSI backplane even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the SCSI backplane.

---

1. **Power off the system.**  
See [“Powering Off the System”](#) on page 26.
2. **Attach the antistatic wrist strap.**  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
3. **Disconnect the AC or DC power cables from the back of the system.**
4. **Disengage the hard drives and fan trays 0, 1 and 2 from the SCSI backplane.**
  - a. **Pinch the latch up to release the handle.**
  - b. **Pull the handle away from the hard drive or fan tray until you feel the connector disengage from the SCSI backplane connector.**  
You do not have to completely remove the hard drive and fan trays from the bay.
  - c. **Repeat [Step a](#) and [Step b](#) for each hard drive and fan tray until all the hard drives and fan trays are fully disengaged from the SCSI backplane.**
5. **Remove the top cover.**  
See [“Removing the Top Cover”](#) on page 30.

6. Raise the slotted PCI card retainer flap on the fan tray 3 assembly (FIGURE 4-13).
7. Locate the air diverter and SCSI backplane (FIGURE 4-13).



**FIGURE 4-13** Removing the Air Diverter

8. Unscrew the two screws from the top of the air diverter and remove the air diverter from the system (FIGURE 4-13).

9. Disconnect the cables from the following connectors on the *front* of the SCSI backplane (the side facing the front of the system):

- SCSI/system LED connector
- Fan tray 3 connector
- SCSI data to motherboard connector
- System configuration card reader to smart card connector

FIGURE 4-14 shows the locations of these connectors.

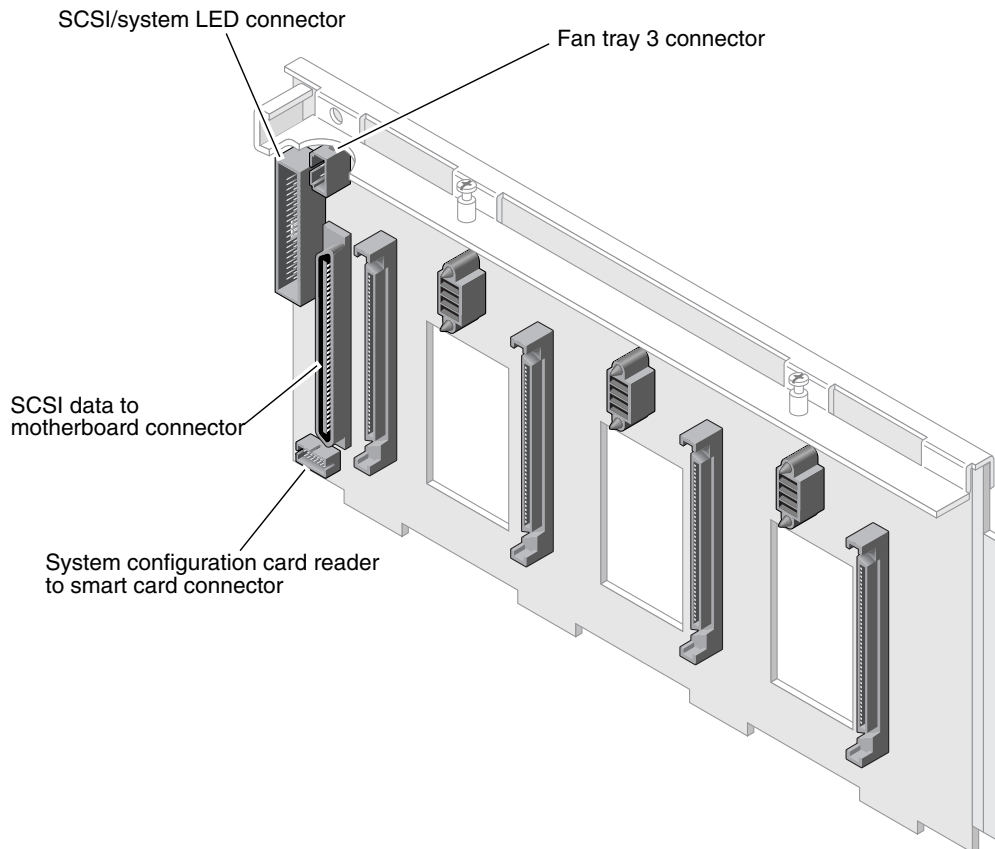


FIGURE 4-14 SCSI Backplane Connectors, Front



10. Disconnect the cables from the following connectors on the *rear* of the SCSI backplane (the side facing the rear of the system):

- Alarm input connector
- SCSI power to motherboard connector

FIGURE 4-15 shows the locations of these connectors.

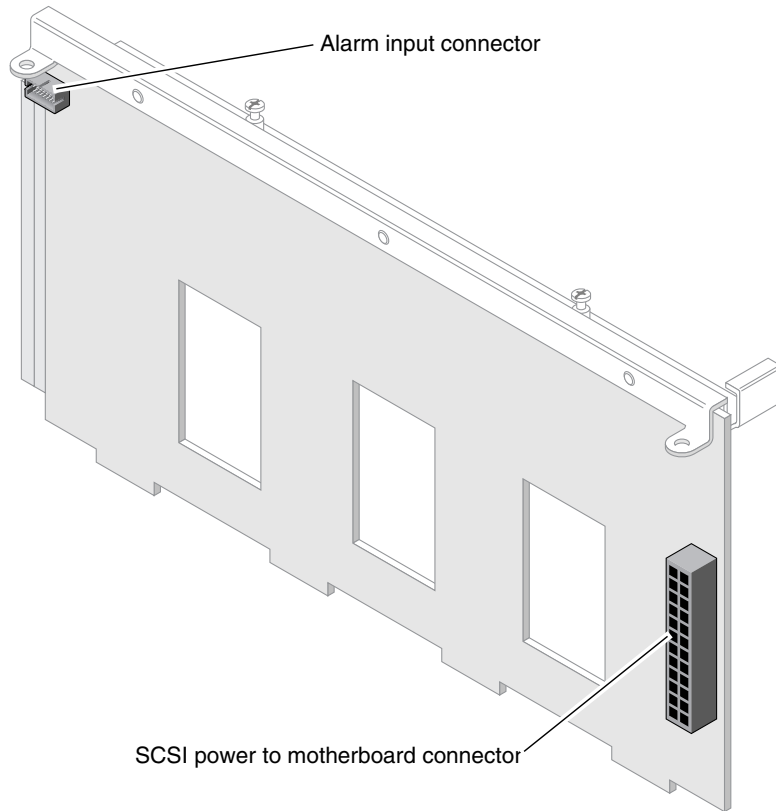
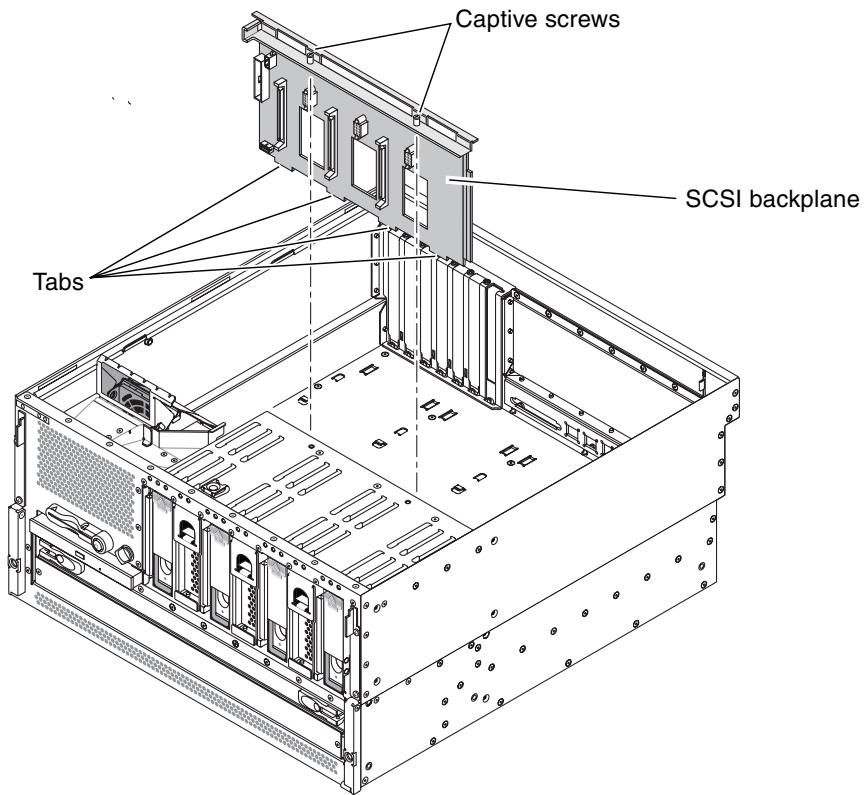


FIGURE 4-15 SCSI Backplane Connectors, Rear

11. Unscrew the two captive screws that secure the SCSI backplane to the system (FIGURE 4-16).



**FIGURE 4-16** Removing the SCSI Backplane

12. Pull the SCSI backplane up and out of the system.

# Installing the SCSI Backplane



---

**Caution** – The system supplies power to the SCSI backplane even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the SCSI backplane.

---

1. **Place the SCSI backplane into the system so the four tabs on the bottom of the SCSI backplane align with the slots in the system (FIGURE 4-16).**  
Ensure that the two captive screws align with their screw holes.
2. **Tighten the two captive screws that secure the SCSI backplane to the chassis.**
3. **Connect the cables to the following connectors on the *front* of the SCSI backplane (the side facing the front of the system):**
  - SCSI/system LED connector
  - Fan tray 3 connector
  - SCSI data to motherboard connector
  - System configuration card reader to smart card connector

FIGURE 4-14 shows the locations of these connectors.
4. **Connect the cables to the following connectors on the *rear* of the SCSI backplane (the side facing the rear of the system):**
  - Alarm input connector
  - SCSI power to motherboard connector

FIGURE 4-15 shows the locations of these connectors.
5. **Insert the air diverter back into the system and tighten the two captive screws to secure it to the top of the SCSI backplane (FIGURE 4-13).**
6. **Reseat the hard drives and fan trays 0, 1 and 2.**
  - a. **Firmly press the center of the handle toward the hard drive or fan tray until the latch closes, securing the hard drive or fan tray in place.**
  - b. **Repeat Step a for each hard drive and fan tray until they are all reseated.**
7. **Replace the top cover.**  
See “Installing the Top Cover” on page 31.
8. **Connect the AC or DC power cables to the back of the system.**
9. **Power on the system.**  
See “Powering On the System” on page 22.

---

## Fan Tray 3



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**Caution** – Fan tray 3 on a Netra 440 server is *not* hot-swappable. Attempting to replace fan tray 3 while the server is running poses an extreme risk of bodily injury, and could damage the system hardware and environmental monitoring components.

---



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**Caution** – The power supplies contain fans that are integral to system cooling. Failure to install a replacement system fan or power supply could lead to serious overheating and severe damage to the system. For more information, refer to the *Netra 440 Server Product Overview* (817-3881-xx).

---



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**Caution** – Fan tray 3 contains sharp moving parts. Use extreme caution when servicing this fan tray.

---

The part number for fan tray 3 is F540-6069.

## Removing Fan Tray 3



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**Caution** – Do not attempt to operate the system without fan tray 3 installed. Doing so could overheat and seriously damage the system.

---



---

**Caution** – The system supplies power to fan tray 3 even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the fan tray 3.

---

If fan tray 3 fails, the Service Required LED from the enclosure status indicators lights.

**1. Power off the system.**

See [“Powering Off the System”](#) on page 26.

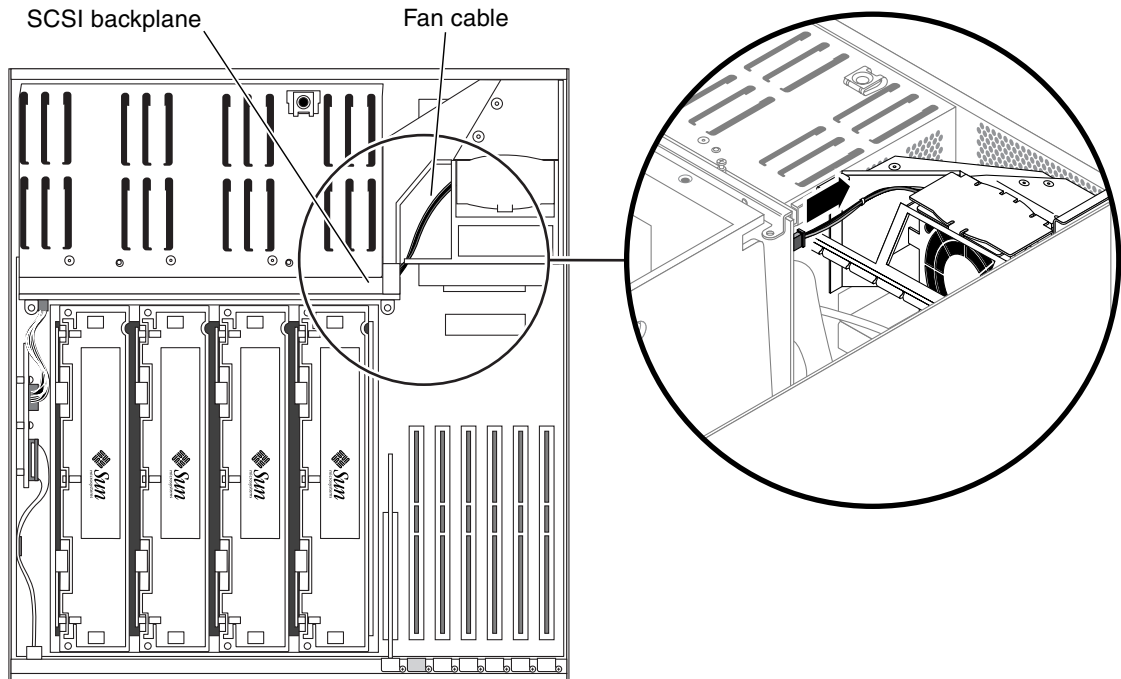
**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

3. Remove the top cover.

See [“Removing the Top Cover”](#) on page 30.

4. Disconnect the fan cable from the SCSI backplane ([FIGURE 4-17](#)).



**FIGURE 4-17** Disconnecting the Fan Cable from the SCSI Backplane

5. Grab the metal plate at the top of fan tray 3 and pull fan tray 3 up and out of the system (FIGURE 4-18).

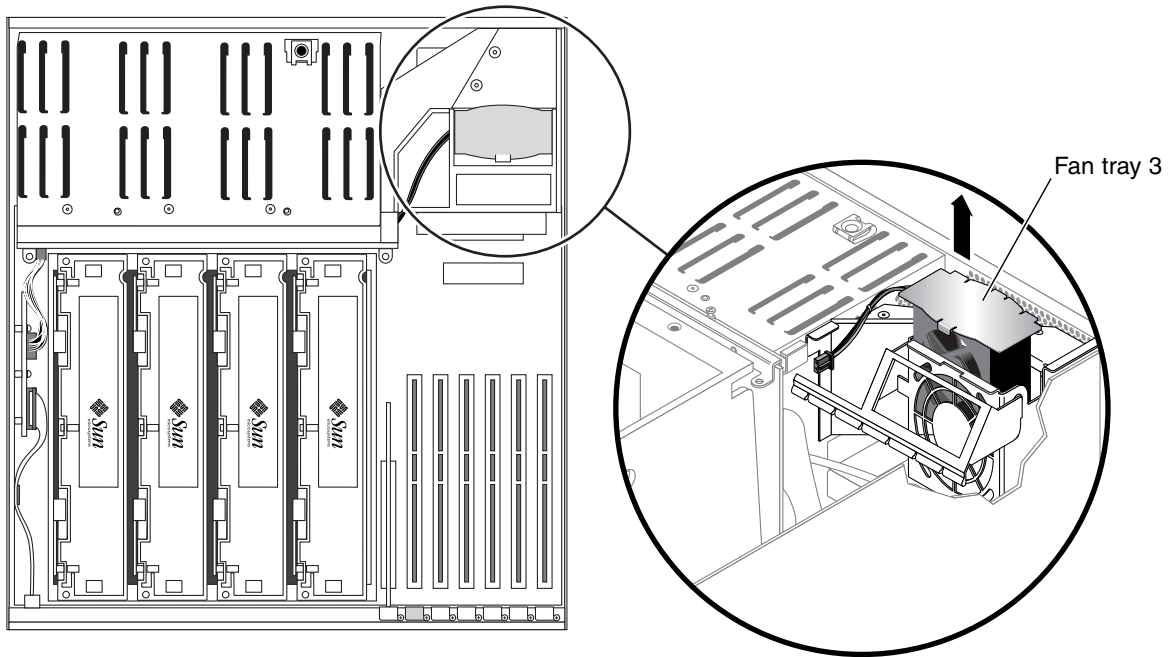


FIGURE 4-18 Removing Fan Tray 3

## Installing Fan Tray 3



---

**Caution** – Do not power on the system without a functioning fan tray 3 installed. Doing so could overheat and seriously damage the system.

---



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**Caution** – The system supplies power to fan tray 3 even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the fan tray 3.

---

1. Align the tabs on fan tray 3 with their corresponding slots in the chassis (FIGURE 4-18).

The side tab fits into a slot in the chassis side. The two bottom tabs correspond to two slots in the bottom of the chassis.

2. Insert fan tray 3 into the system until it is firmly seated.
3. Connect the fan cable to the SCSI backplane.
4. Replace the top cover.  
See [“Installing the Top Cover”](#) on page 31.
5. Power on the system.  
See [“Powering On the System”](#) on page 22.

---

## CPU/Memory Module

The part numbers for the CPU/memory module are:

- 1.28 GHz CPU/memory module with no memory—F501-6370
- 1.28 GHz CPU/memory module with 2 GB memory (4 x 512 MB DIMMs)—X7426A
- 1.28 GHz CPU/memory module with 4 GB memory (4 x 1 GB DIMMs)—X7416A

## Removing a CPU/Memory Module

If a CPU/memory module fails, POST diagnostics alerts ALOM to light the enclosure status Service Required LED.



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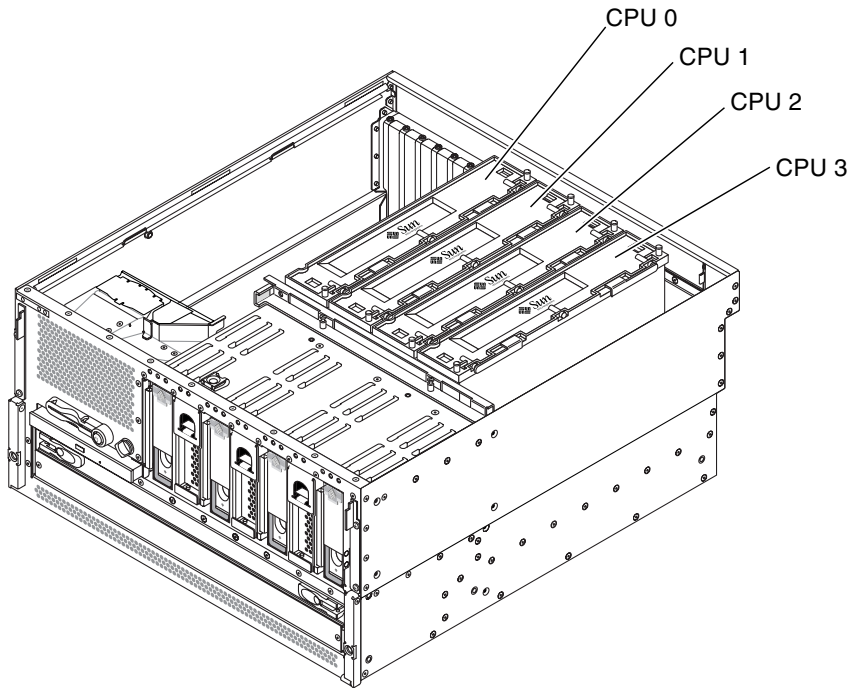
**Caution** – The system supplies power to the CPU/memory module even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the CPU/memory module.

---

1. Power off the system.  
See [“Powering Off the System”](#) on page 26.
2. Attach the antistatic wrist strap.  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
3. Remove the top cover.  
See [“Removing the Top Cover”](#) on page 30.

4. Identify the CPU/memory module to be removed (FIGURE 4-19).

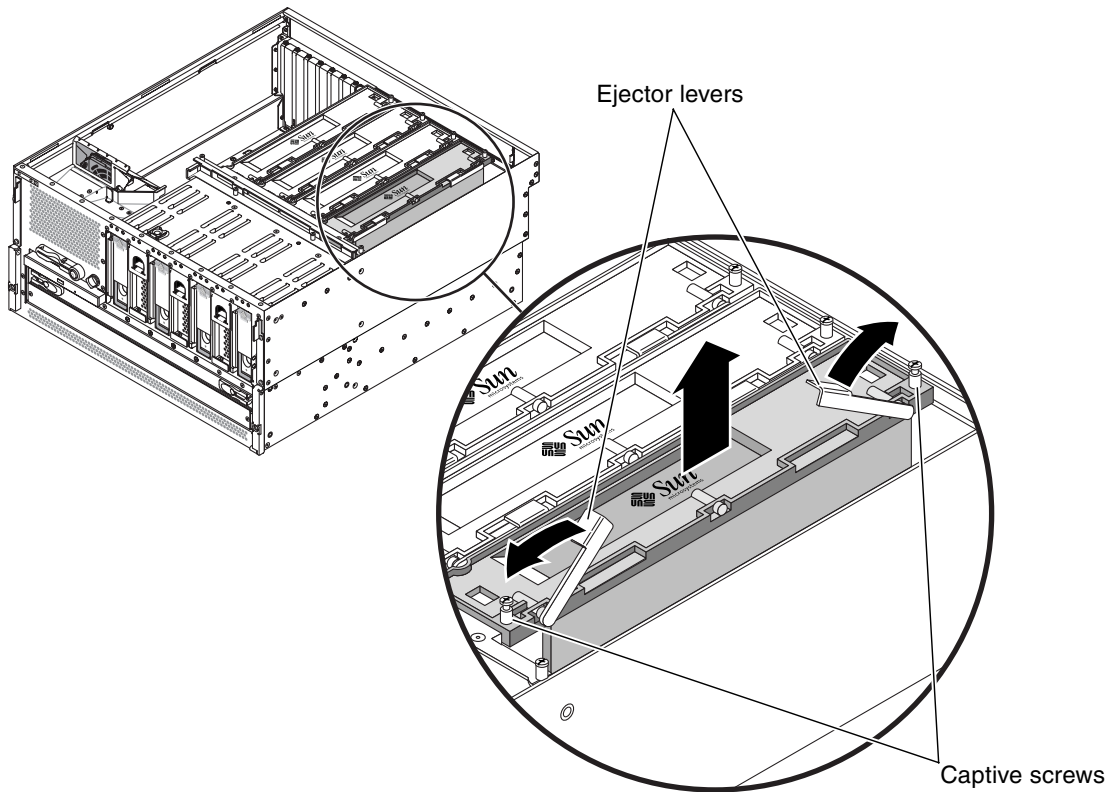
Refer to the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx) for information about isolating failed parts.



**FIGURE 4-19** CPU Locations



5. Loosen the two Phillips No. 2 captive screws securing the CPU/memory module to the CPU cage (FIGURE 4-20).



**FIGURE 4-20** Removing a CPU/Memory Module

6. Rotate the CPU/memory module ejector levers upward so that the CPU/memory module connectors disengage from the CPU cage (FIGURE 4-20).
7. Pull the CPU/memory module from the chassis by the levers and place it on an antistatic mat.

Support the CPU/memory module from underneath as you transfer it to the antistatic mat.



---

**Caution** – The CPU/memory module can be hot. Handle the CPU/memory module carefully to avoid injury.

---

# Installing a CPU/Memory Module



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**Caution** – The system supplies power to the CPU/memory module even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the CPU/memory module.

---

1. **Identify the CPU/memory module slot into which you want to install the CPU/memory module.**

The CPU/memory module slots are marked on the bottom of the CPU cage.

2. **Inspect the CPU/memory module connector and the motherboard connector for foreign objects.**
3. **Ensure that the ejector levers on the CPU/memory module are rotated up to a 90-degree angle.**
4. **Slide the CPU/memory module into the guides in the CPU cage.**  
Slide the CPU/memory module into the chassis until the connectors on the module begin to engage the socket on the motherboard.
5. **Push down on both ejector levers, simultaneously, until the levers are completely pressed into their slots.**

---

**Note** – Do not press down directly on the CPU/memory module. Let the levers press the CPU/memory module into its socket.

---

6. **Tighten the two Phillips No. 2 captive screws that secure the CPU/memory module to the CPU cage.**
7. **Repeat [Step 1](#) through [Step 6](#) for every CPU/memory module that you want to install.**

If you are installing several CPU/memory modules at one time, once you have installed the final CPU/memory module, you should press down on each of the CPU/memory modules one last time to verify that they are all fully seated.

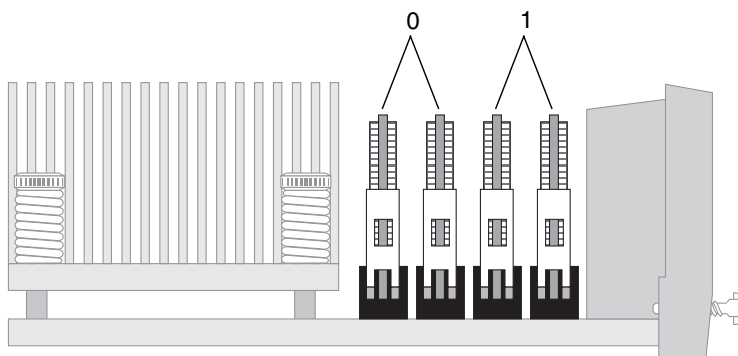
8. **Replace the top cover.**  
See [“Installing the Top Cover”](#) on page 31.
9. **Power on the system.**  
See [“Powering On the System”](#) on page 22.

---

# Memory Modules

The Netra 440 server uses 2.5-volt, high-capacity double data-rate dual inline memory modules (DDR DIMMs) with error-correcting code (ECC). The system supports DIMMs with 512-Mbyte and 1-Gbyte capacities.

Within each CPU/memory module, the four DIMM slots are organized into groups of two. The system reads from, or writes to, both DIMMs in a group simultaneously. DIMMs, therefore, must be added in pairs. The figure below shows the DIMM slots and DIMM groups on a Netra 440 server CPU/memory module. Adjacent slots belong to the same DIMM group. The two groups are designated 0 and 1.



**FIGURE 4-21** Memory Module Groups 0 and 1

You must physically remove a CPU/memory module from the system before you can install or remove DIMMs. The DIMMs must be added in pairs within the same DIMM group, and each pair used must have two identical DIMMs installed—that is, both DIMMs in each group must be from the same manufacturing vendor and must have the same capacity (for example, two 512-Mbyte DIMMs or two 1-Gbyte DIMMs).

---

**Note** – Each CPU/memory module must be populated with a minimum of two DIMMs, installed in either group 0 or group 1.

---



---

**Caution** – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static electricity from your clothes or work environment can destroy the DIMM. Do not remove a DIMM from its antistatic packaging until you are ready to install it on the CPU/memory module. Handle the DIMM only by its edges. Do not touch the components or any metal part. Always wear an antistatic grounding strap when you handle the DIMM. For more information, see [“Avoiding Electrostatic Discharge” on page 32.](#)

---

## Memory Interleaving

You can maximize the system’s memory bandwidth by taking advantage of its memory interleaving capabilities. The Netra 440 server supports two-way interleaving. In most cases, higher interleaving results in improved system performance. However, actual performance results can vary depending on the system application. Two-way interleaving occurs automatically in any DIMM bank where the DIMM capacities in DIMM group 1 do not match the capacities used in a DIMM group 2. For optimum performance, install identical DIMMs in all four slots in a CPU/memory module.

Keep the following points in mind when removing or installing a memory module:

- DIMMs must be added in pairs within the same group of DIMM slots; adjacent slots belong to the same DIMM group.
- Each group used must have two identical DIMMs installed—that is, both DIMMs must be from the same manufacturing vendor and must have the same capacity (for example, two 512-Mbyte DIMMs or two 1-Gbyte DIMMs).

---

**Note** – If DIMMs of different densities and speeds are installed as a pair, both DIMMs will operate at the lower density and slower speed.

---

The part numbers for the memory modules are:

- 1 GB memory (2 x 512 MB DIMMs)—F370-4939, X7403A
- 2 GB memory (2 x 1 GB DIMMs)—F370-4940, X7404A

# Removing a Memory Module

If a memory module (DIMM) fails, POST diagnostics alerts ALOM to light the enclosure status Service Required LED.



---

**Caution** – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static electricity from your clothes or work environment can destroy the DIMM. Do not remove a DIMM from its antistatic packaging until you are ready to install it on the CPU/memory module. Handle the DIMM only by its edges. Do not touch the components or any metal part. Always wear an antistatic grounding strap when you handle the DIMM. For more information, see [“Avoiding Electrostatic Discharge”](#) on page 32.

---



---

**Caution** – The CPU/memory module and the DIMMs can be hot. Handle the CPU/memory module and the DIMMs carefully to avoid injury.

---

**1. Power off the system.**

See [“Powering Off the System”](#) on page 26.

**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

**3. Remove the top cover.**

See [“Removing the Top Cover”](#) on page 30.

**4. Remove the appropriate CPU/memory module from the system.**

See [“Removing a CPU/Memory Module”](#) on page 77.

**5. Identify the memory module to be removed.**

Refer to the *Netra 440 Server Diagnostics and Troubleshooting Guide* (817-3886-xx) for information about isolating failed parts.

6. Push down on the ejector levers on each side of the memory module, simultaneously, until the memory module ejects from its socket (FIGURE 4-22). Apply even pressure on both levers.

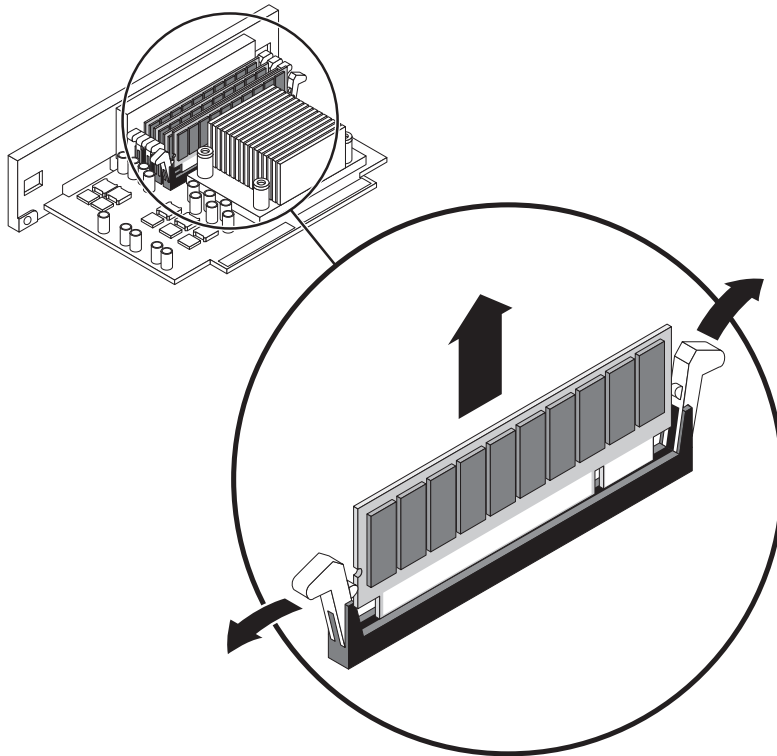


FIGURE 4-22 Removing a Memory Module

7. Grasp the top corners of the memory module and pull it up and out of its socket.
8. Place the memory module on an antistatic mat.
9. Repeat Step 5 through Step 8 for all the memory modules to be removed.

# Installing a Memory Module



---

**Caution** – DIMMs are made of electronic components that are extremely sensitive to static electricity. Static electricity from your clothes or work environment can destroy the DIMM. Do not remove a DIMM from its antistatic packaging until you are ready to install it on the CPU/memory module. Handle the DIMM only by its edges. Do not touch the components or any metal part. Always wear an antistatic grounding strap when you handle the DIMM. For more information, see [“Avoiding Electrostatic Discharge”](#) on page 32.

---



---

**Caution** – The CPU/memory module and the DIMMs can be hot. Handle the CPU/memory module and the DIMMs carefully to avoid injury.

---

1. **Locate the slot into which you are installing the memory module.**
2. **Rotate out the memory module ejector levers for that slot.**
3. **Holding the bottom edge of the module parallel to its socket, carefully align the module so that each of its contacts is centered on a socket pin.**

Ensure that the memory module is correctly oriented. A notch along the bottom of the memory module corresponds to a tab on the socket.
4. **Push firmly and evenly on both ends of the memory module until its bottom edge is firmly seated in the socket.**

You hear a click when the ejector levers lock into place.
5. **Repeat [Step 1](#) through [Step 4](#) for all memory modules to be installed.**
6. **Install the CPU/memory module back into the system.**

See [“Installing a CPU/Memory Module”](#) on page 80.
7. **Replace the top cover.**

See [“Installing the Top Cover”](#) on page 31.
8. **Power on the system.**

See [“Powering On the System”](#) on page 22.

---

## PCI Cards

Keep the following points in mind when removing or installing a PCI card:

- All slots accept short or long PCI cards.
- 33-MHz slots accept 5V PCI cards; 66-MHz slots accept only 3.3V cards.
- All slots accept either 32-bit or 64-bit PCI cards.
- All slots comply with PCI Local Bus Specification Revision 2.2.
- All slots accept universal PCI cards.
- Each slot can supply up to 15 watts of power. The total power used for all six slots must not exceed 90 watts, in any combination of 5-volt and/or 3.3-volt cards.
- Compact PCI (cPCI) cards and SBus cards are not supported.
- You can improve overall system availability by installing redundant network or storage interfaces on separate PCI buses. For additional information, refer to the *Netra 440 Server System Administration Guide* (817-3884-xx).

---

**Note** – A 33-MHz PCI card installed in to any of the 66-MHz slots causes that bus to operate at 33 MHz.

---

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**Note** – All internal devices, except hard drives, must be installed only by qualified service personnel.

---

The part number for the PCI card will vary, depending on the card. Contact your local Sun service representative for more information.

## Removing a PCI Card



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**Caution** – The system supplies power to the PCI card even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the PCI card.

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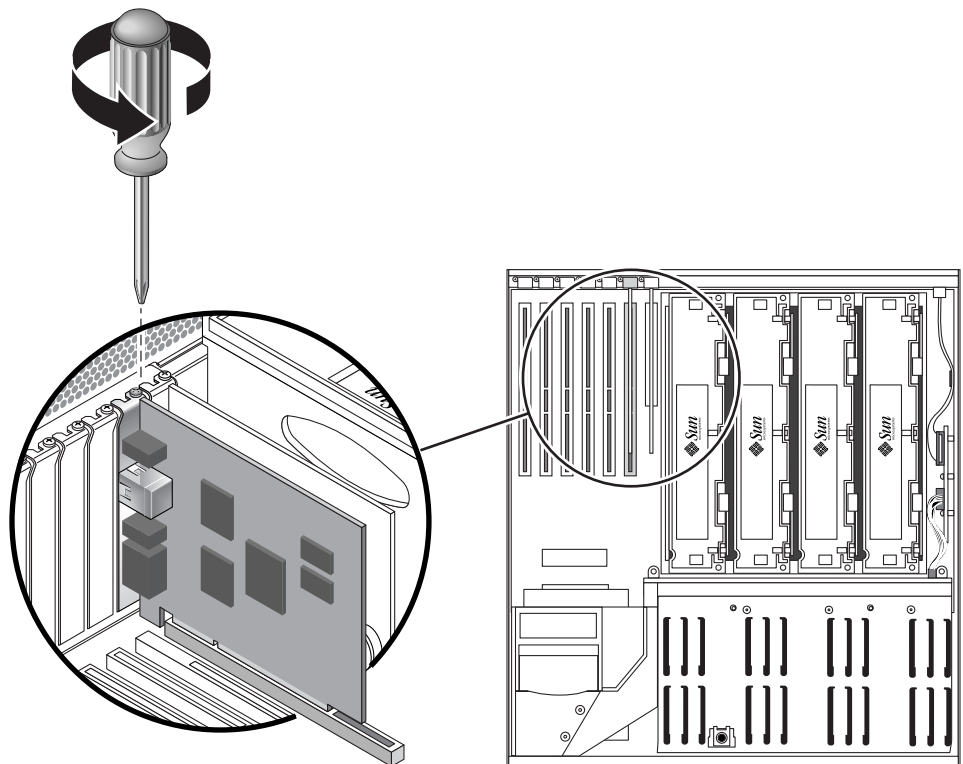
### 1. Power off the system.

See [“Powering Off the System”](#) on page 26.

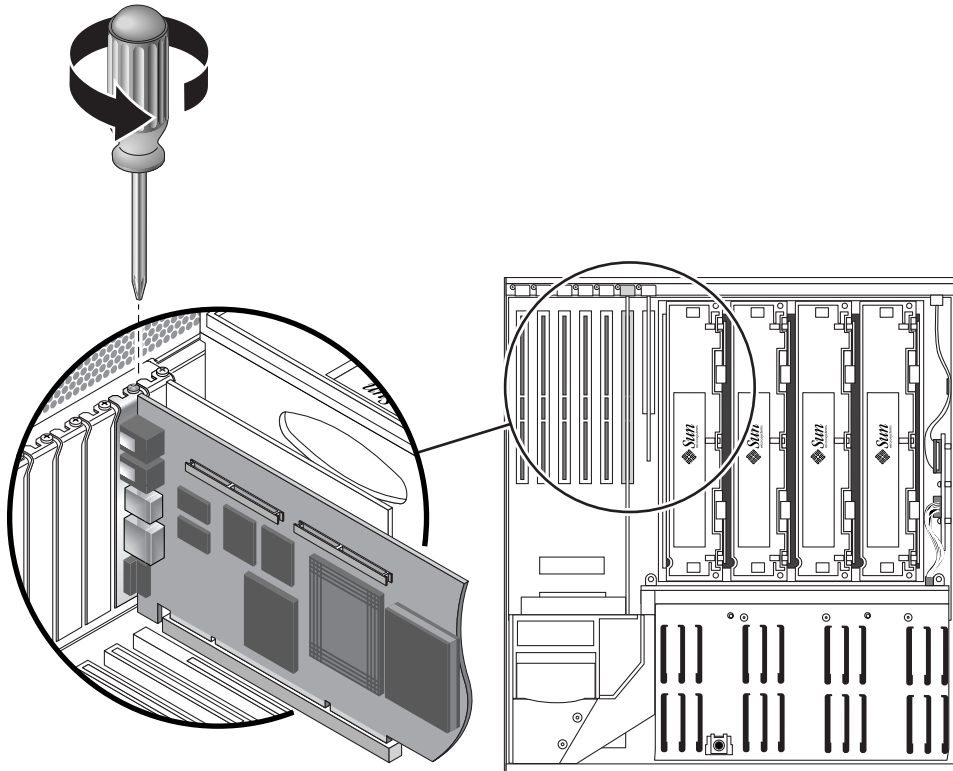


2. **Attach the antistatic wrist strap.**  
See “[Avoiding Electrostatic Discharge](#)” on page 32.
3. **Remove the top cover.**  
See “[Installing the Top Cover](#)” on page 31.
4. **Disconnect any external cables attached to the faceplate of the PCI card.**
5. **Disconnect any internal cables connected to the PCI card internal connectors.**
6. **Remove the Phillips No. 1 screw securing the card to the system back panel.**

[FIGURE 4-23](#) shows the screw being removed for a regular PCI card, and [FIGURE 4-24](#) shows the screw being removed from a long PCI card.

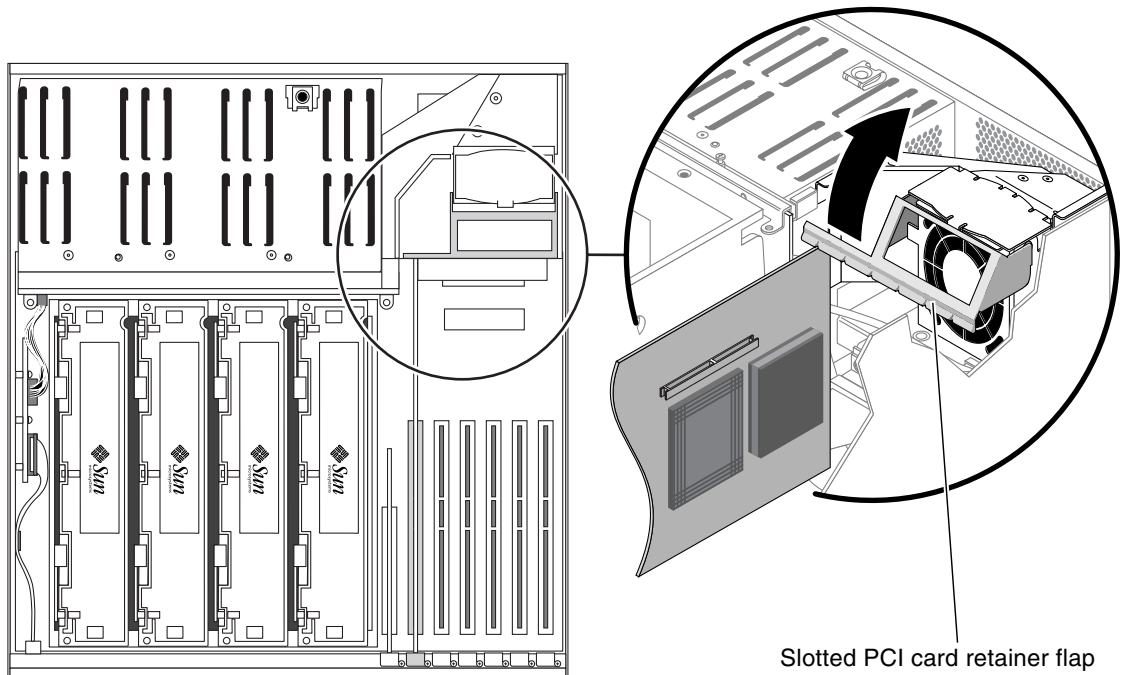


**FIGURE 4-23** Removing the Screw for a Regular PCI Card



**FIGURE 4-24** Removing the Screw for a Long PCI Card

7. If you are removing a *long* PCI card, raise the slotted PCI card retainer flap on the fan tray 3 assembly (FIGURE 4-25).



**FIGURE 4-25** Lifting the Slotted PCI Card Retainer Flap

8. Pull the PCI card from its slot.

FIGURE 4-26 shows a regular PCI card being removed from the system, and FIGURE 4-27 shows a long PCI card being removed from the system.

Hold the card by the faceplate and its opposite edge. Pull up while rocking the card from end to end until it is freed from its slot.



---

**Caution** – Do not apply excessive force to one end or one side of the card. Doing so could damage the card.

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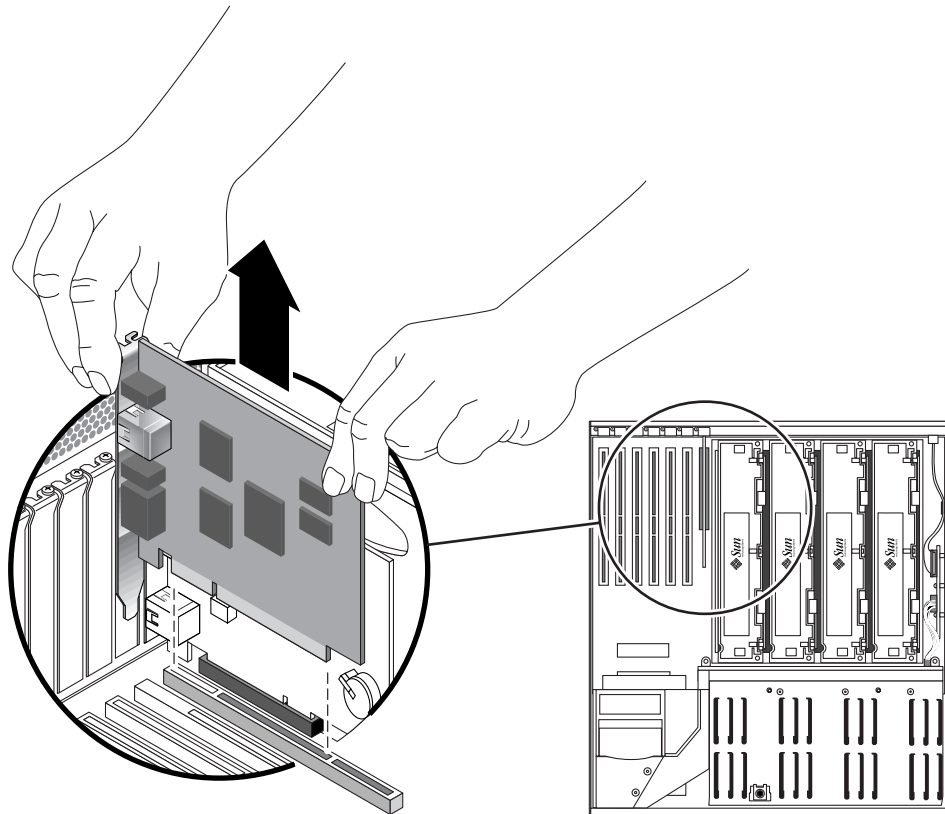
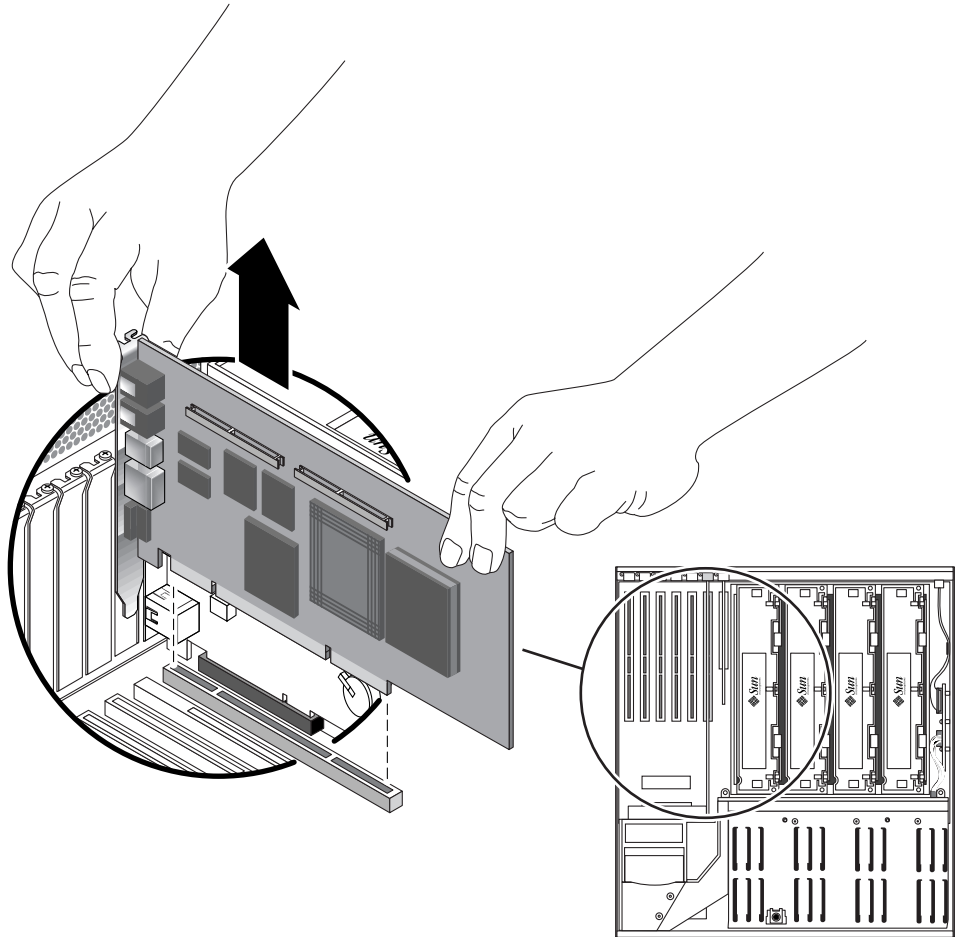


FIGURE 4-26 Removing a Regular PCI Card



**FIGURE 4-27** Removing a Long PCI Card

9. Place the PCI card on an antistatic mat.
10. If you are not replacing the PCI card, install a PCI filler panel and reassemble the system.

The PCI filler panel prevents debris from entering the system and ensures proper cooling.

  - a. Slide the filler panel into the appropriate slot.
  - b. Replace the Phillips No. 1 screw that secures the filler panel to the system back panel.
  - c. If you removed a *long* PCI card, lower the slotted PCI card retainer flap on the fan tray 3 assembly (FIGURE 4-25).

d. **Replace the top cover.**

See “Installing the Top Cover” on page 31.

e. **Power on the system.**

See “Powering On the System” on page 22.

## Installing a PCI Card



---

**Caution** – The system supplies power to the PCI card even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the PCI card.

---

1. **Power off the system, if you have not done so already.**

See “Powering Off the System” on page 26.

2. **Remove the top cover, if you have not done so already.**

See “Removing the Top Cover” on page 30.

3. **Locate an unused PCI slot.**

---

**Note** – PCI slots 2, 4, and 5 can handle 33-MHz or 66-MHz cards. PCI slots 0, 1, and 3 are reserved for 33-MHz cards.

---

---

**Note** – Installing a 33-MHz PCI card into a 66-MHz slot (slots 2, 4, or 5) causes each card or device on that bus to operate at 33-MHz. For more information about PCI cards and buses, refer to the *Netra 440 Server Product Overview* (817-3881-xx).

---

4. **If you are installing a PCI card into an unused slot, remove the corresponding filler panel from the system back panel. Otherwise, go to Step 3.**

a. **Remove the Phillips No. 1 screw securing the PCI filler panel to the system back panel.**

b. **Lift out the filler panel and save it for future use.**

c. **If you are installing a *long* PCI card, raise the slotted PCI card retainer flap on the fan tray 3 assembly (FIGURE 4-25).**

**5. Insert the PCI card into the appropriate slot on the motherboard.**

Ensure that the faceplate of the PCI card is not bent. A bent faceplate could affect the installation of the card.

**a. Insert the faceplate end of the card into the appropriate opening in the back panel.**

**b. Push the card into the corresponding connector on the motherboard.**

Apply even pressure along each edge of the card.



---

**Caution** – Do not apply excessive force to one end or one side of the card. Doing so could damage the card or the motherboard connector.

---

**6. Secure the PCI card faceplate to the system back panel with the Phillips No. 1 screw.**

**7. If you are installing a *long* PCI card, lower the slotted PCI card retainer flap on the fan tray 3 assembly onto the long PCI card.**

**8. If necessary, connect any internal cables to the PCI card internal connectors.**

**9. If necessary, connect any external cables to the PCI card.**

**10. Replace the top cover.**

See [“Installing the Top Cover”](#) on page 31.

**11. Perform a reconfiguration boot on the system so that the system is able to recognize the new PCI card.**

See [“Initiating a Reconfiguration Boot”](#) on page 28.

**12. Run the OpenBoot diagnostics tests to verify that the system functions correctly with the new PCI card you have just installed.**

For additional information, see the *Netra 440 Server System Administration Guide* (817-3884-xx).

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# ALOM System Controller Card



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**Caution** – Although access to the Advanced Lights Out Manager (ALOM) system controller through the network management port is secure, access through the serial management port is not secure. Therefore, avoid connecting a serial modem to the serial management port.

---

The ALOM serial management port (labeled SERIAL MGT) and network management port (labeled NET MGT) are present in the Solaris OS device tree as `/dev/ttya`, and in the OpenBoot configuration variables as `ttya`. However, the serial management port does not function as a standard serial connection. If you want to attach a standard serial device to the system (such as a printer), you need to use the DB-9 connector on the system back panel, which corresponds to `/dev/ttyb` in the Solaris OS device tree, and as `ttyb` in the OpenBoot configuration variables. See the *Netra 440 Server Product Overview* (817-3881-xx) for more information.

- The ALOM system controller card is installed in a dedicated slot on the system motherboard. Never move the ALOM system controller card to another system slot, as it is *not* a PCI-compatible card.
- The ALOM system controller card is *not* a hot-swappable component. Before installing or removing the ALOM system controller card, you must power off the system and disconnect all system power cords.
- The serial management port on the ALOM system controller card cannot be used as a conventional serial port. If your configuration requires a standard serial connection, use the DB-9 port labeled “TTYB” instead.
- The 10BASE-T network management port on the ALOM system controller card is reserved for use with the ALOM software and the system console. The network management port does not support connections to 100 Mbps or Gigabit networks. If your configuration requires a high-speed Ethernet port, use one of the Gigabit Ethernet ports instead. For information on configuring the Gigabit Ethernet ports, refer to the *Netra 440 Server Installation Guide* (817-3882-xx).
- The ALOM system controller card must be installed in the system for the system to function properly.
- The ALOM system controller card is not a conventional PCI card. Do not attempt to install the ALOM system controller card into a PCI slot. In addition, do not attempt to install a PCI card into the ALOM system controller slot.

---

**Note** – All internal devices, except hard drives, must be installed only by qualified service personnel.

---



The part number for the ALOM system controller card is F501-6346.

## Removing the ALOM System Controller Card

---



**Caution** – The system supplies power to the ALOM system controller card even when the system is powered off. To avoid personal injury or damage to the ALOM system controller card, you must disconnect the AC or DC power cables before servicing the ALOM system controller card.

---

**1. Power off the system.**

See [“Powering Off the System”](#) on page 26.

**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

**3. Disconnect the AC or DC power cables from the back of the system.**

**4. Remove the top cover.**

See [“Removing the Top Cover”](#) on page 30.

**5. Locate the ALOM system controller card.**

**6. Disconnect any external cables attached to the faceplate of the ALOM system controller card.**

Note and label cable connector locations.

7. Remove the Phillips No. 1 screw securing the card to the system back panel (FIGURE 4-28).



**Caution** – Ensure that the power cords are disconnected from the system before removing the ALOM system controller card.

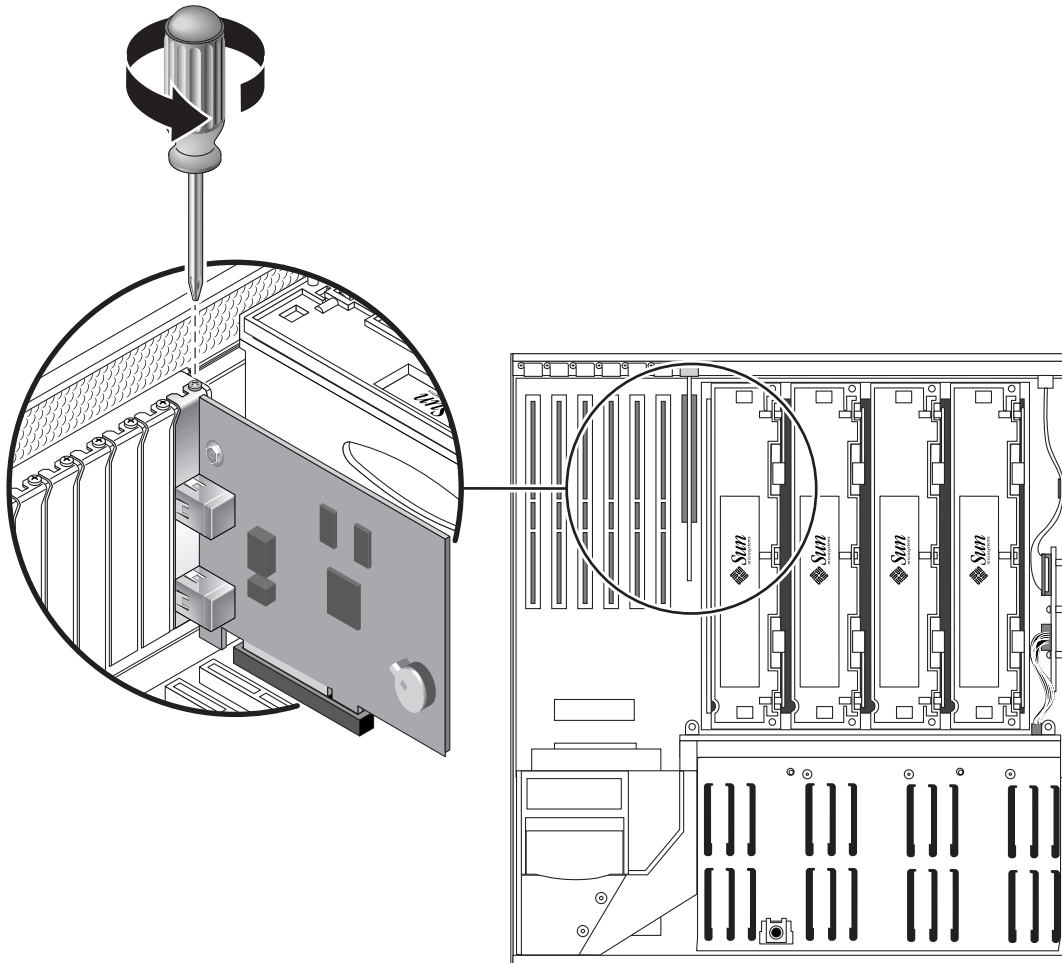


FIGURE 4-28 Removing the ALOM System Controller Card



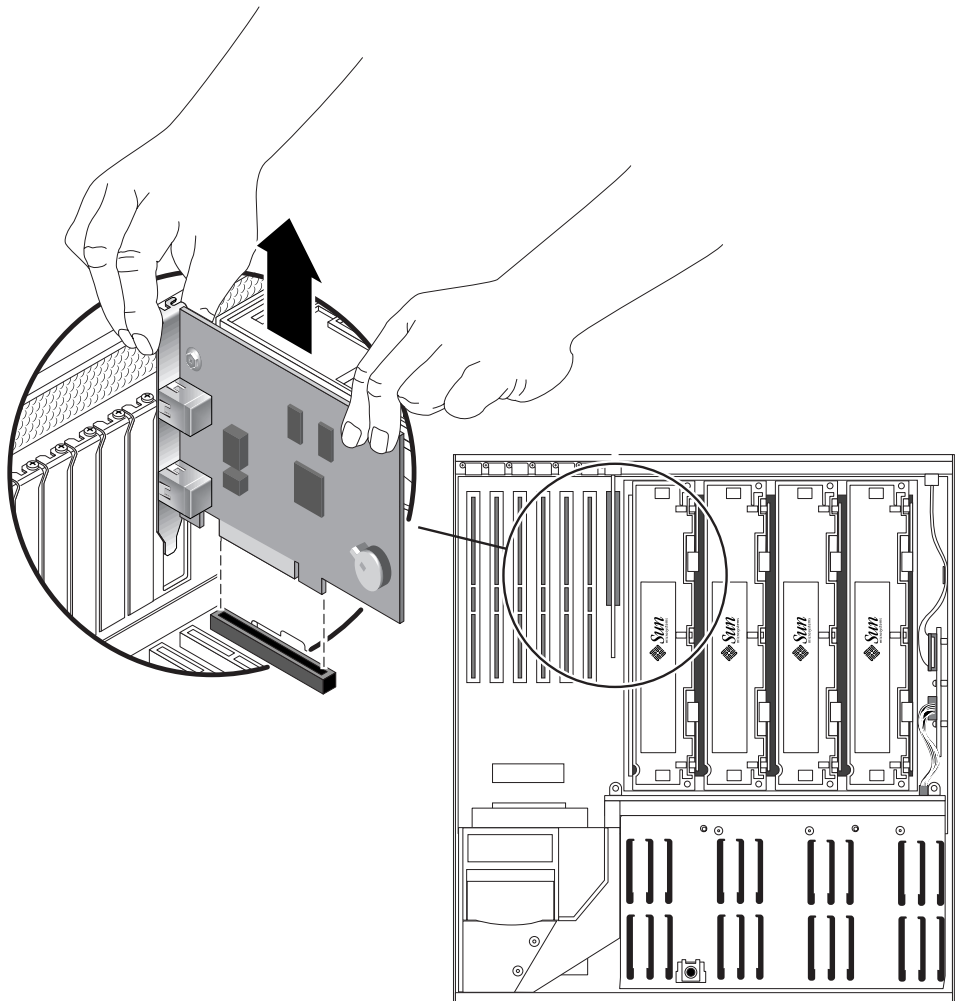
---

**Caution** – Follow the instructions in the next step carefully or you may damage the ALOM system controller card or the motherboard.

---

8. Using equal force on both ends of the ALOM system controller card, pull the card straight up from its slot (FIGURE 4-29).

Hold the card by the faceplate and its opposite edge. Pull up while rocking the card from end to end until it is freed from its slot.



**FIGURE 4-29** Removing the ALOM System Controller Card

9. Place the ALOM system controller card on an antistatic mat.

# Installing the ALOM System Controller Card



---

**Caution** – The system supplies power to the ALOM system controller card slot even when the system is powered off. To avoid personal injury or damage to the ALOM system controller card, you must disconnect the AC or DC power cables before servicing the ALOM system controller card.

---

## 1. Locate the slot for the ALOM system controller card.

---

**Note** – Ensure that you install the ALOM system controller card into the ALOM slot. Though the ALOM system controller card might physically fit into a PCI slot, it does not function if installed there.

---



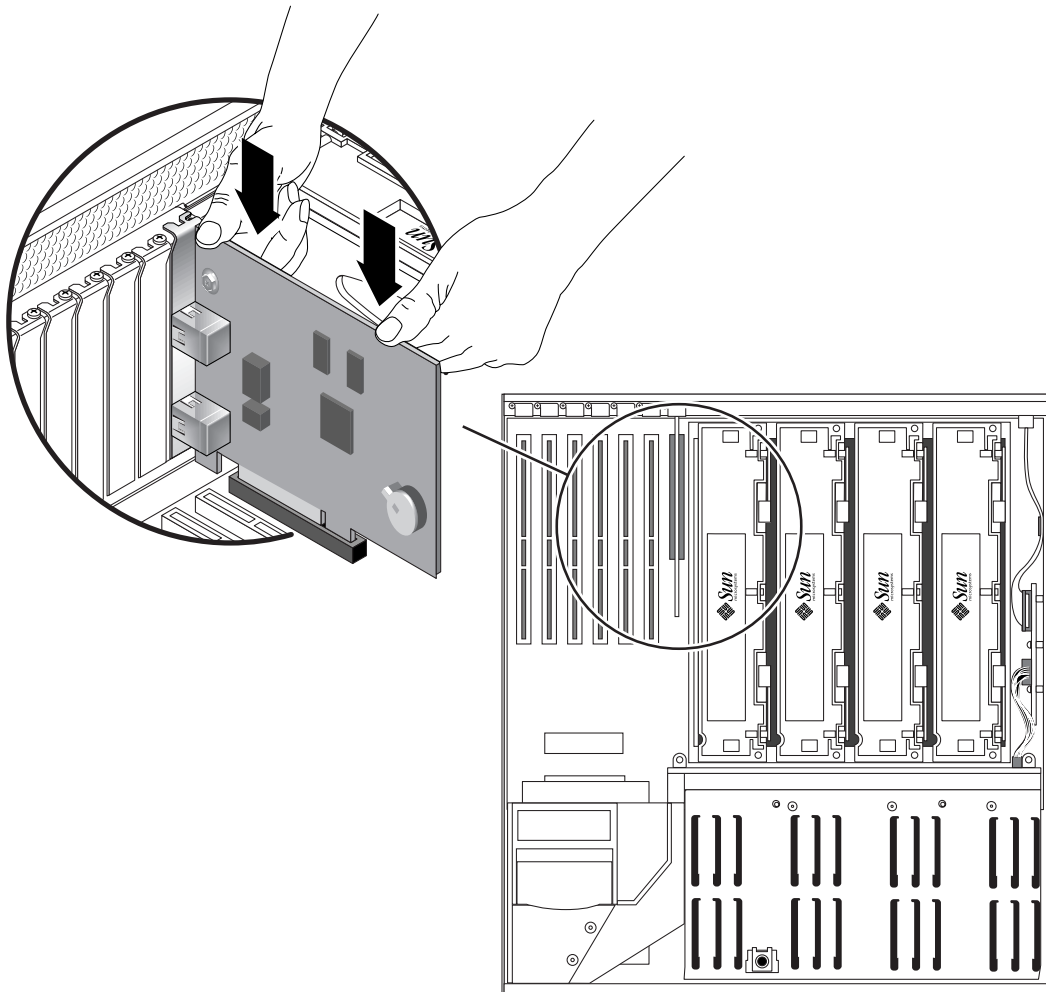
---

**Caution** – Follow the instructions in the next step carefully or you may damage the ALOM system controller card or the motherboard.

---

## 2. Insert the ALOM system controller card into its slot on the motherboard ([FIGURE 4-30](#)).

- a. Insert the faceplate end of the card into the appropriate opening in the system back panel.
- b. Using both hands to apply even pressure along the edge of the card, push the card into the connectors on the motherboard.



**FIGURE 4-30** Inserting the ALOM System Controller Card

- 3. Secure the ALOM system controller card faceplate to the back panel with the Phillips No. 1 screw.**
- 4. Connect the cables to the faceplate of the ALOM system controller card.**
- 5. Replace the top cover.**  
See [“Installing the Top Cover”](#) on page 31.
- 6. Connect the AC or DC power cables to the back of the system.**
- 7. Power on the system.**  
See [“Powering On the System”](#) on page 22.

---

# Alarm Card

The part number for the alarm card is F595-7287.

## Removing the Alarm Card



---

**Caution** – The system supplies power to the alarm card even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the alarm card.

---

**1. Power off the system.**

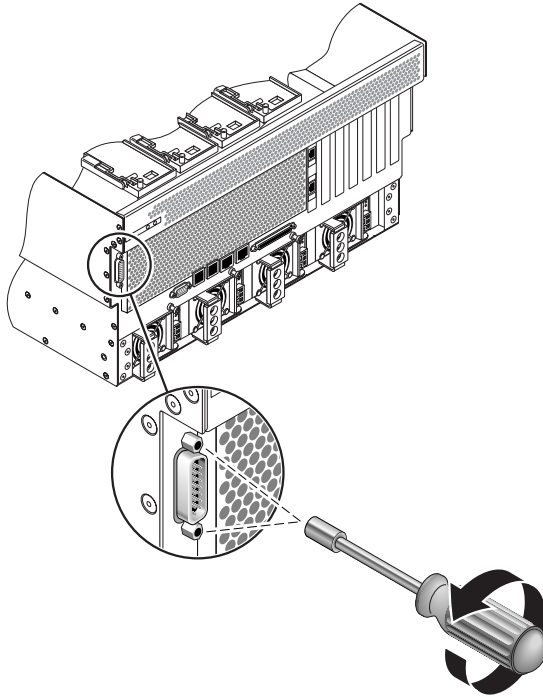
See [“Powering Off the System”](#) on page 26.

**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

**3. Disconnect the AC or DC power cables from the back of the system.**

4. Remove the two screws that secure the alarm port connector to the rear of the system (FIGURE 4-31).



**FIGURE 4-31** Removing the Alarm Port Connector from the Rear of the System

5. Remove the top cover.  
See “Removing the Top Cover” on page 30.

6. Locate the alarm card mounted on the inside of the server (FIGURE 4-32).

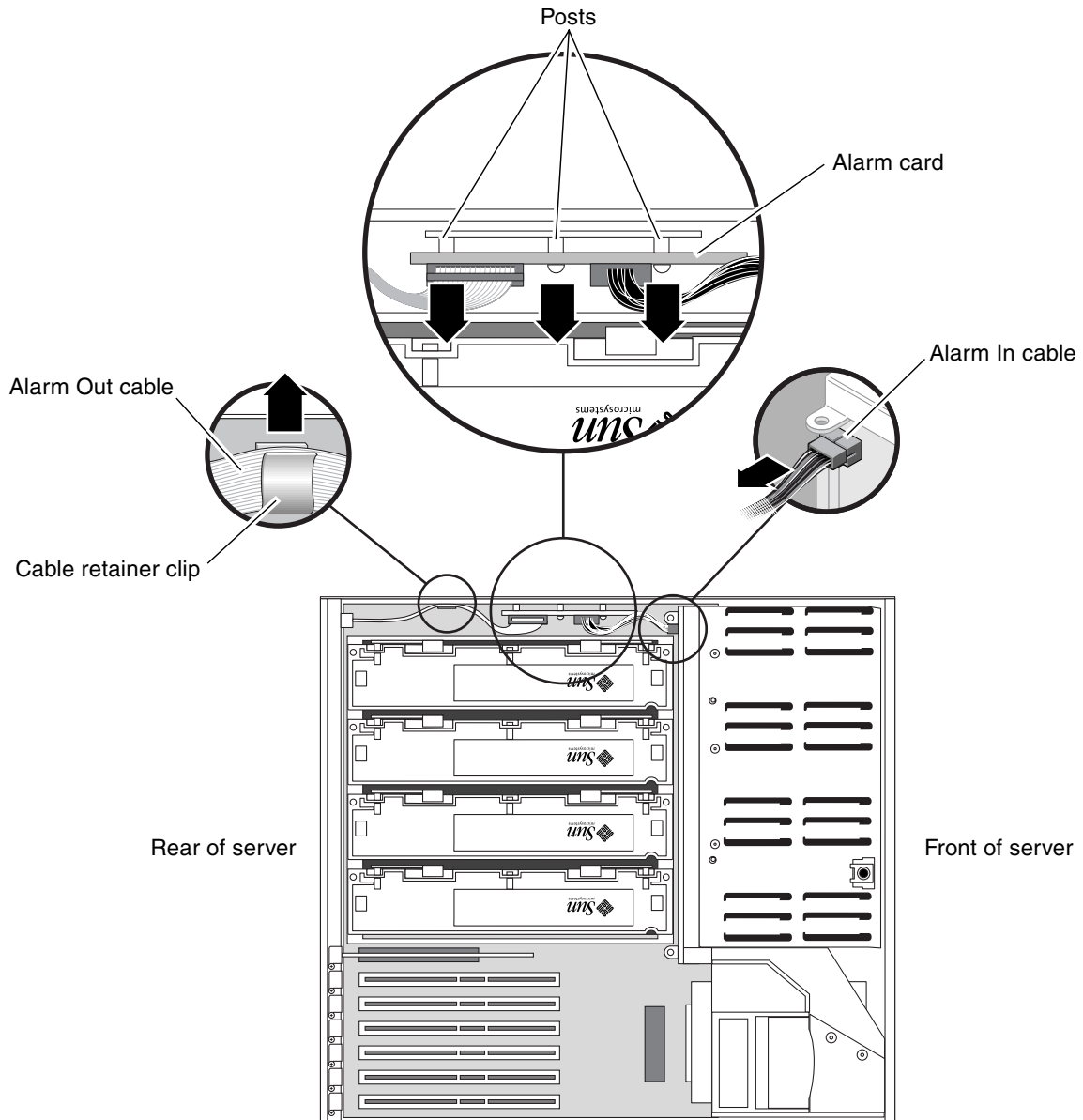


FIGURE 4-32 Locating the Alarm Card

7. Disconnect the Alarm In cable from the SCSI backplane (FIGURE 4-32).



8. Remove the Alarm Out cable from the cable retainer clip on the side of the server (FIGURE 4-32).
9. Press against the sides of the alarm card to first disengage the bottom of the alarm card from the two posts on the side of the server, then the top of the alarm card from the one post on the side of the server (FIGURE 4-32).
10. Remove the alarm card and cables from the system.

## Installing the Alarm Card



---

**Caution** – The system supplies power to the alarm card even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the alarm card.

---

1. Insert the alarm card and cables into the system (FIGURE 4-32).
2. Align the three holes in the alarm card with the three posts on the inside of the server and press firmly to secure the alarm card to the system (FIGURE 4-32).
3. Connect the Alarm In cable to the SCSI backplane (FIGURE 4-32).
4. Route the Alarm Out cable through the clip on the inside of the server (FIGURE 4-32).
5. Insert the alarm port connector through the alarm port hole at the rear of the server and secure it using the two screw (FIGURE 4-31)s.
6. Replace the top cover.  
See “Installing the Top Cover” on page 31.
7. Connect the AC or DC power cables to the back of the system.
8. Power on the system.  
See “Powering On the System” on page 22.

---

# Power Distribution Board

The part number for the power distribution board is F540-5854.

## Removing the Power Distribution Board



---

**Caution** – The system supplies power to the power distribution board even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the power distribution board.

---

**1. Power off the system.**

See [“Powering Off the System”](#) on page 26.

**2. Attach the antistatic wrist strap.**

See [“Avoiding Electrostatic Discharge”](#) on page 32.

**3. Disconnect the AC or DC power cables from all of the power supplies at the back of the system.**



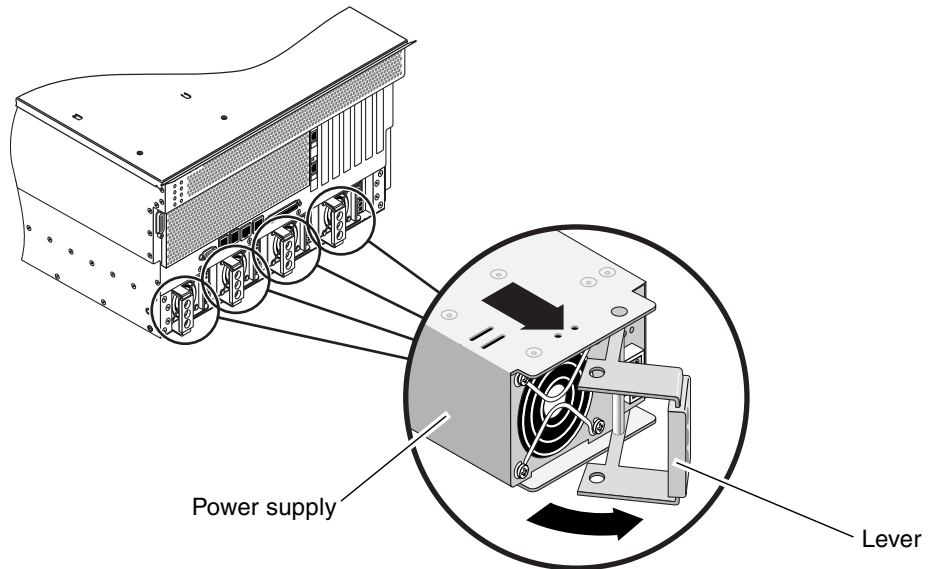
---

**Caution** – There are several pinch points on the power supplies, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supplies for more information.

---

4. Disengage all of the power supplies from the power distribution board.
  - a. Go to the back of the system and pull the lever on the power supply to the right (FIGURE 4-33).

This disconnects the power supply from the power distribution board.



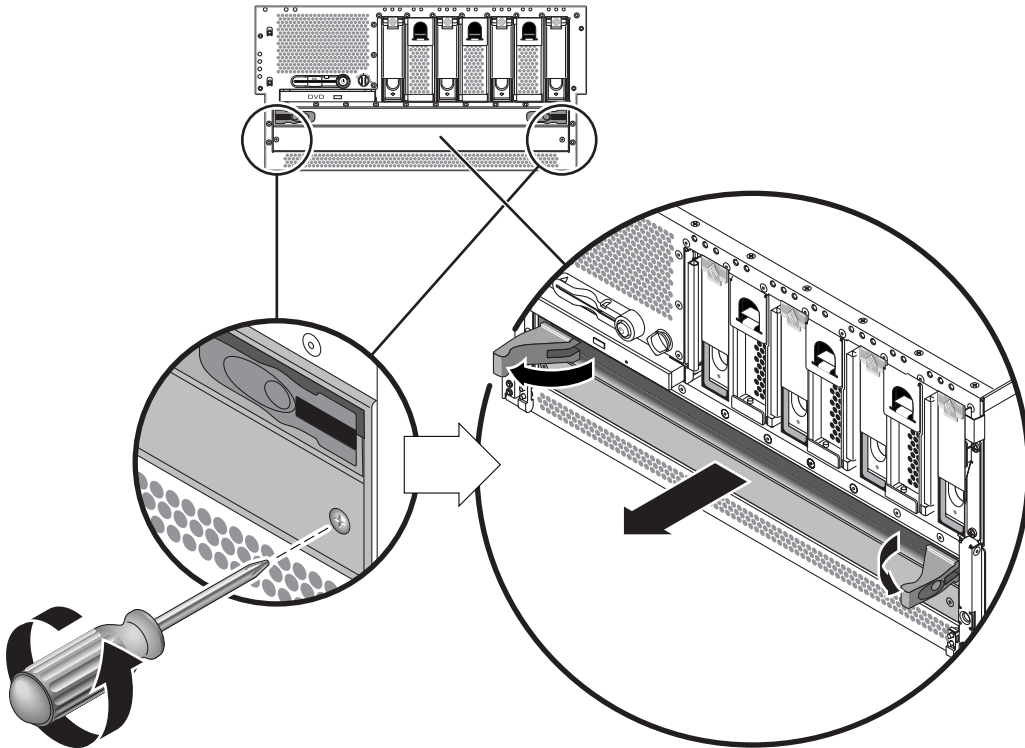
**FIGURE 4-33** Removing a Power Supply Unit

- b. Pull the power supply out of its bay just enough to disengage the power supply connectors from the power distribution board connectors.

Leave the power supply in its bay, but disconnected from the power distribution board.

- c. Repeat [Step a](#) and [Step b](#) for the remaining three power supplies.

5. At the front of the system, open the system door.
6. Using a Phillips screwdriver, loosen the two captive screws that secure the base of the power distribution board to the server (FIGURE 4-34).
7. Pull on the ejector latches and pull the power distribution board out of its bay (FIGURE 4-34).



**FIGURE 4-34** Removing the Power Distribution Board

# Installing the Power Distribution Board



---

**Caution** – The system supplies power to the power distribution board even when the system is powered off. To avoid personal injury or damage to the system, you must disconnect all AC or DC power cables before servicing the power distribution board.

---

1. **At the front of the system, slide the power distribution board partly back into the system until you first feel resistance.**  
Do not push the power distribution board all the way in.
2. **Use the ejector levers at the front of the power distribution board to fully seat the module all the way into the system.**
3. **Using a Phillips screwdriver, tighten the two captive screws to secure the base of the power distribution board to the server.**
4. **Close the system door.**



---

**Caution** – There are several pinch points on the power supplies, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supplies for more information.

---

5. **At the rear of the system, fully push all four of the power supplies back into the system.**
6. **Push the lever on each power supply to the left to fully seat it in the system.**
7. **Connect the AC or DC power cables to all of the power supplies at the back of the system.**
8. **Power on the system.**  
See [“Powering On the System”](#) on page 22.

---

# Motherboard

The part number for the motherboard is F540-5919.

## Removing the Motherboard



---

**Caution** – The system supplies power to the motherboard even when the system is powered off. To avoid personal injury or damage to the motherboard, you must disconnect all AC or DC power cables before servicing the motherboard.

---

- 1. Power off the system.**  
See [“Powering Off the System”](#) on page 26.
- 2. Attach the antistatic wrist strap.**  
See [“Avoiding Electrostatic Discharge”](#) on page 32.
- 3. Disconnect the AC or DC power cables from the back of the system.**
- 4. Remove the top cover.**  
See [“Removing the Top Cover”](#) on page 30.
- 5. Remove all CPU/memory modules.**  
See [“Removing a CPU/Memory Module”](#) on page 77.
- 6. Remove all PCI cards.**  
See [“Removing a PCI Card”](#) on page 86.
- 7. Remove the ALOM system controller card.**  
See [“Removing the ALOM System Controller Card”](#) on page 95.
- 8. Remove the alarm card.**  
See [“Removing the Alarm Card”](#) on page 100.

9. Locate the air diverter (FIGURE 4-35).

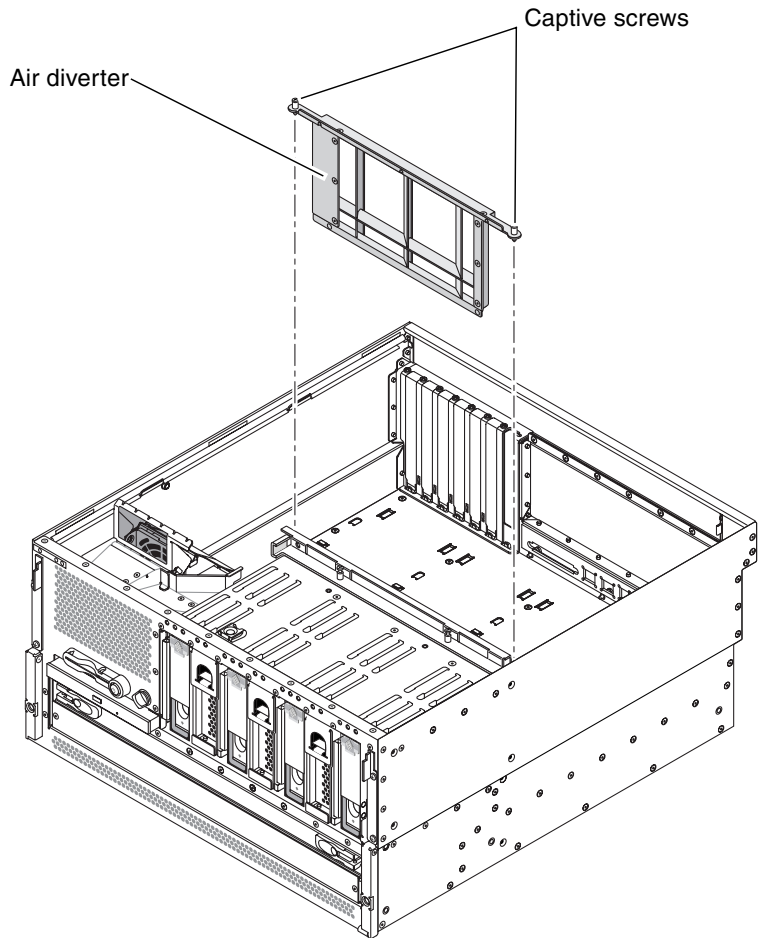


FIGURE 4-35 Removing the Air Diverter

10. Unscrew the two screws from the top of the air diverter and remove the air diverter from the system (FIGURE 4-35).

11. Disconnect the P5 SCSI backplane power cable from *both* ends (the end at P5 on the motherboard and the end on the SCSI backplane). See [FIGURE 4-36](#).

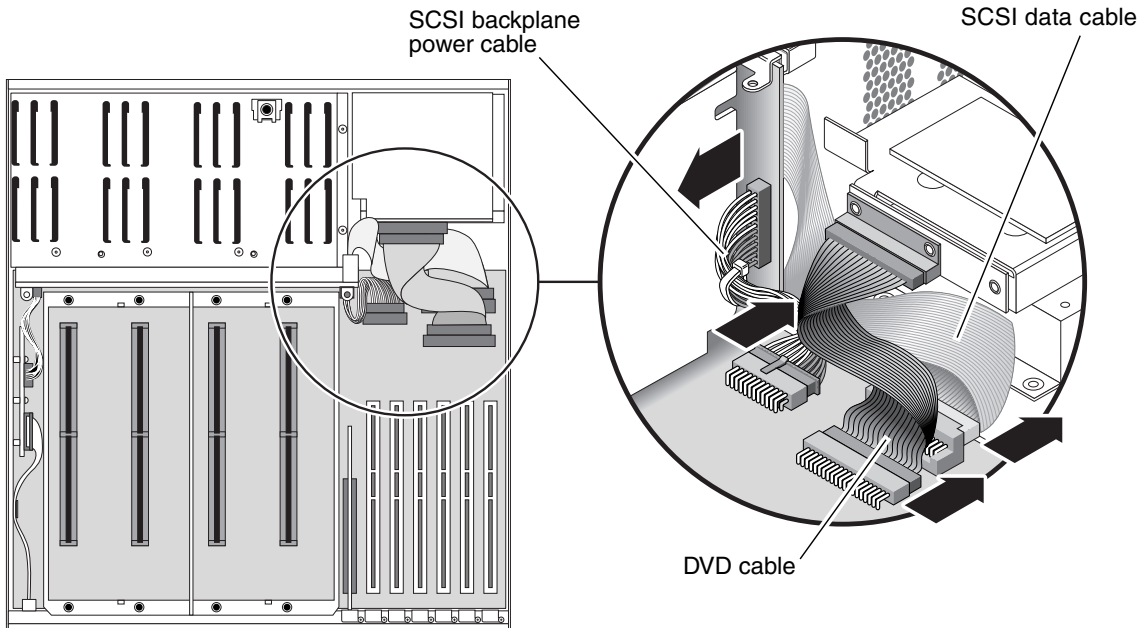
Press the locking tab on the P5 motherboard end and pull it out of the connector. Hold the SCSI backplane end by the edges and gently rock the cable from side to side as you pull it out of the connector.

12. Disconnect the P1 DVD cable end at P1 on the motherboard ([FIGURE 4-36](#)).

Lift up the connector ejector levers as far as they go to release the DVD cable end from the connector, then pull the DVD cable out of the connector.

13. Disconnect the P3 SCSI data cable end at P3 on the motherboard ([FIGURE 4-36](#)).

Hold the cable end by the edges and gently rock the cable from side to side as you pull it out of the connector.



**FIGURE 4-36** Disconnecting the Cables From the Motherboard



---

**Caution** – There are several pinch points on the power supplies, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supplies for more information.

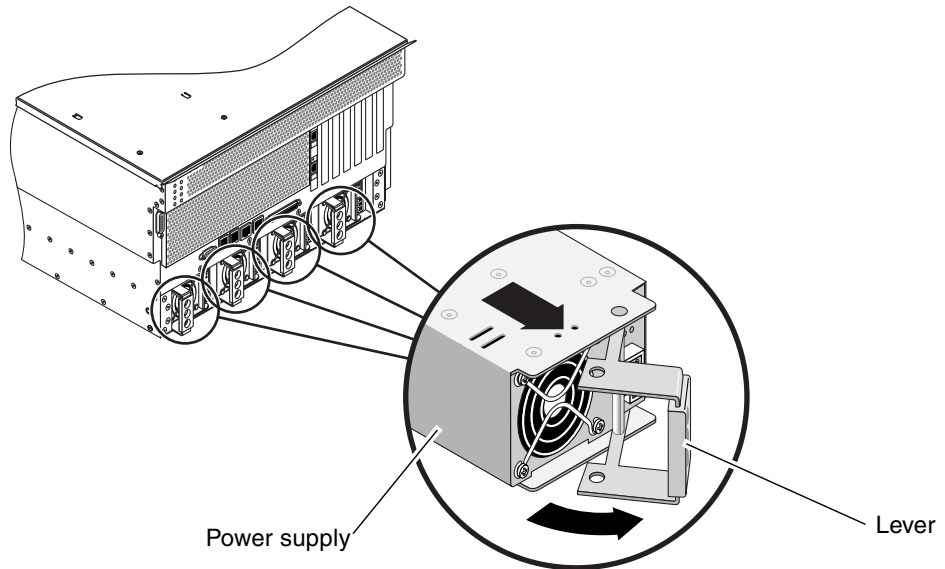
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**14. Disengage the power supplies from the power distribution board.**

- a. Go to the back of the system and pull the lever on the back of a power supply to the right (FIGURE 4-37).**

This disconnects the power supply from the power distribution board inside the server.



**FIGURE 4-37** Removing a Power Supply

- b. Pull the power supply out of its bay just enough to disengage the power supply connectors from the power distribution board connectors.**

Leave the power supply in its bay, but disconnected from the power distribution board.

- c. Repeat [Step a](#) and [Step b](#) for the remaining three power supplies.**

15. Disengage the power distribution board from the motherboard.

- a. Using a Phillips screwdriver, loosen the two captive screws that secure the base of the power distribution board to the server (FIGURE 4-38).
- b. Pull on the ejector latches to unseat the power distribution board from the motherboard (FIGURE 4-38).

Leave the power distribution board in its bay, but disconnected from the motherboard.

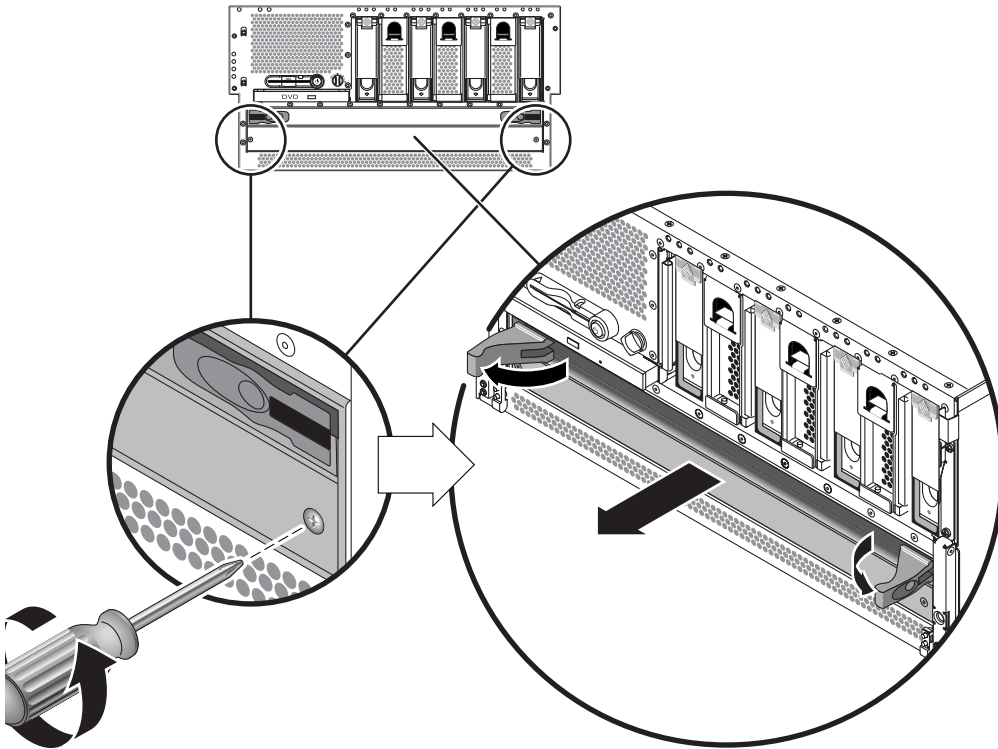
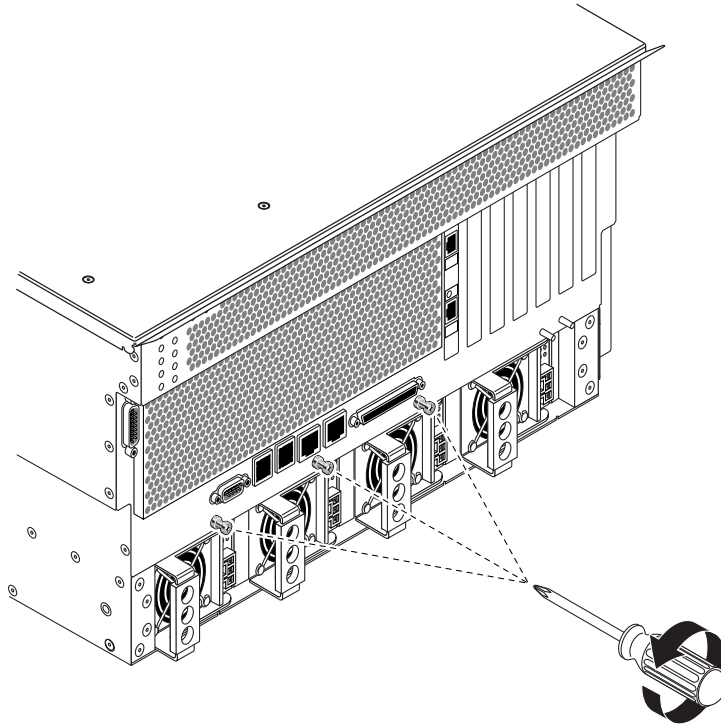


FIGURE 4-38 Disengaging the Power Distribution Board

16. At the back of the system, disconnect any external cables attached to the motherboard.

Note and label connector locations.

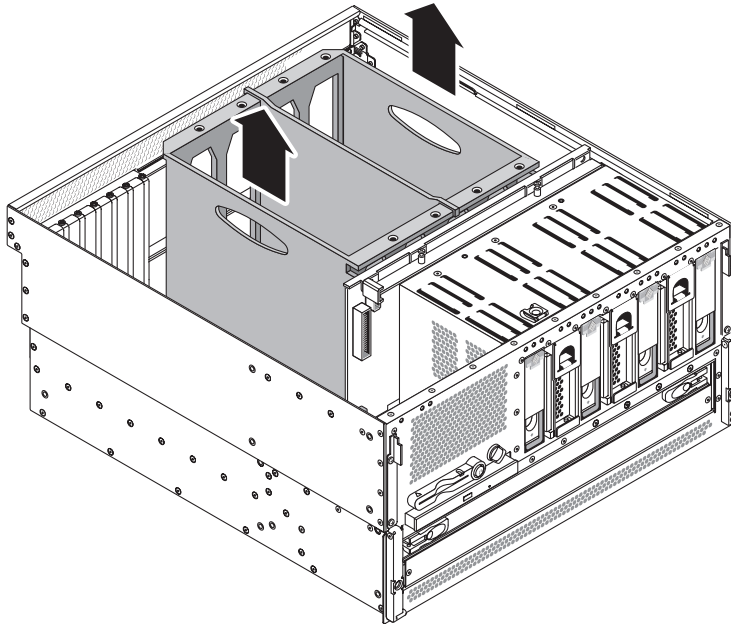
17. Unscrew the three Phillips No. 2 screws that secure the motherboard to back of the system (FIGURE 4-39).



**FIGURE 4-39** Unscrewing the Motherboard Screws

18. Slide the motherboard slightly toward the front of the system to disengage the tabs at the bottom of the motherboard from the slots in the system.
19. Pull the motherboard up and out to remove it from the system (FIGURE 4-40).

Remove the motherboard at an angle to clear the sides of the system. You may have to rock the motherboard from side-to-side to remove it cleanly.



**FIGURE 4-40** Removing the Motherboard From the System

## Installing the Motherboard



---

**Caution** – The system supplies power to the motherboard even when the system is powered off. To avoid personal injury or damage to the motherboard, you must disconnect all AC or DC power cables before servicing the motherboard.

---

1. Align the motherboard with the chassis so the CPU cage sits directly behind the hard drives and fan trays (FIGURE 4-40).
2. Lower the motherboard into the chassis at an angle, inserting the CPU side of the board first.

Ensure that the DVD cable and the SCSI cable are folded back out of the way. You might have to rock the motherboard from side-to-side to install it cleanly.

3. With the motherboard sitting flat on the base of the system, slide the motherboard toward the back of the system to engage the tabs at the bottom of the motherboard with the slots at the base of the system.
4. Tighten the three Phillips No. 2 screws to secure the motherboard to the system (FIGURE 4-39).
5. Connect the P3 SCSI data cable end at P3 on the motherboard.
6. Connect the P1 DVD-ROM cable end at P1 on the motherboard.
  - a. Ensure that the ejector levers are rotated up before inserting the cable.
  - b. Push the cable end into its connector until the ejector levers lie flat.
7. Connect the P5 SCSI backplane power cable end at P5 on the motherboard.
8. At the front of the system, slide the power distribution board back into the system until it is engaged with the motherboard.

Use the ejector levers at the front of the power distribution board to fully secure it against the motherboard.



---

**Caution** – There are several pinch points on the power supplies, so use caution when removing or installing a power supply in the system. Refer to the caution label on the power supplies for more information.

---

9. Tighten the two captive screws to completely secure the power distribution board to the motherboard.
10. At the rear of the system, fully push all four of the power supplies back into the system.
11. Push the lever on each power supply to the right to fully seat it in the system.
12. Reinsert the air diverter into the system and tighten the two screws at the top of the air diverter to secure it to the system.
13. Install the alarm card.

See “Installing the Alarm Card” on page 103.
14. Install the ALOM system controller card.

See “Installing the ALOM System Controller Card” on page 98.
15. Install all PCI cards.

See “Installing a PCI Card” on page 92.
16. Install all CPU/memory modules.

See “Installing a CPU/Memory Module” on page 80.

**17. Replace the top cover.**

See [“Installing the Top Cover”](#) on page 31.

**18. Connect the AC or DC power cables to the back of the system.**

**19. Power on the system.**

See [“Powering On the System”](#) on page 22.

## Illustrated Parts Breakdown

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This appendix contains a sequence of illustrations that show how the various pieces of the system fit together. Use the accompanying tables as a reference for ordering field-replaceable units (FRUs).

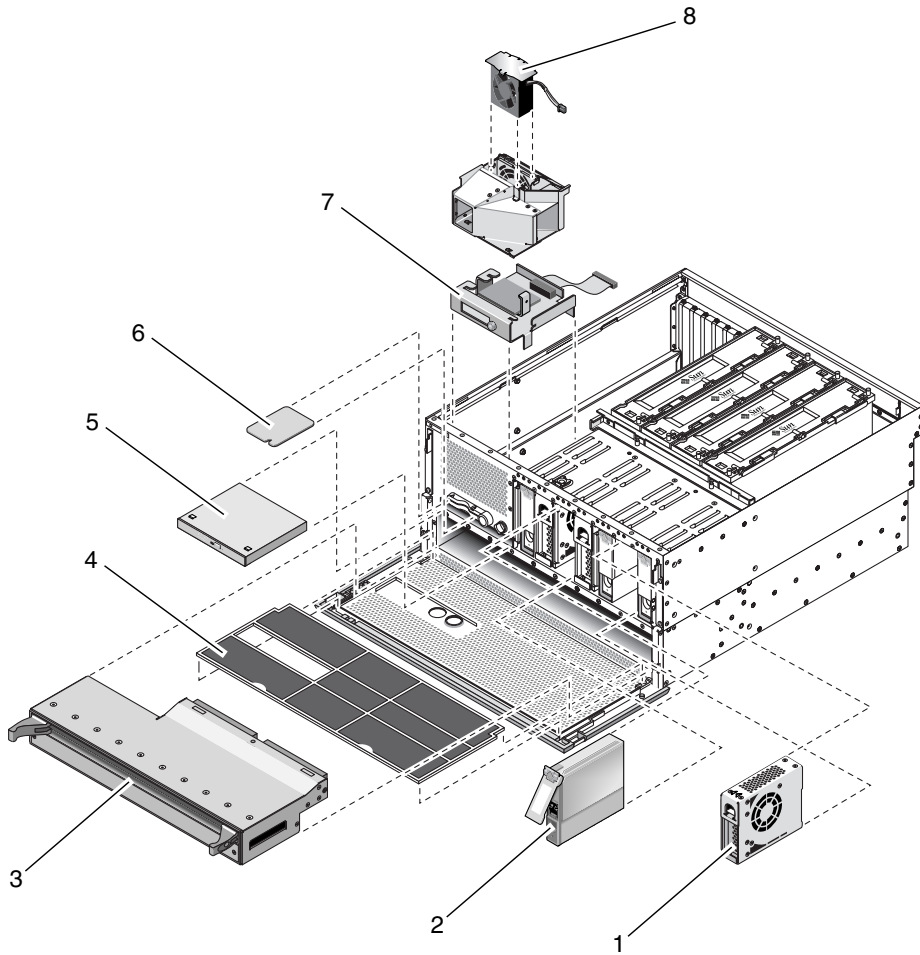
The part numbers listed in the following tables are correct as of the manual publication date but are subject to change without notice. Consult your authorized Sun sales representative or service provider to confirm a part number prior to ordering a replacement part.

This illustrated parts breakdown is divided into the following sections:

- [“Front Panel Components and Fan Tray 3 Assembly” on page 118](#)
- [“Motherboard and Other Miscellaneous Components” on page 120](#)
- [“Rackmount Kits” on page 122](#)

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# Front Panel Components and Fan Tray 3 Assembly



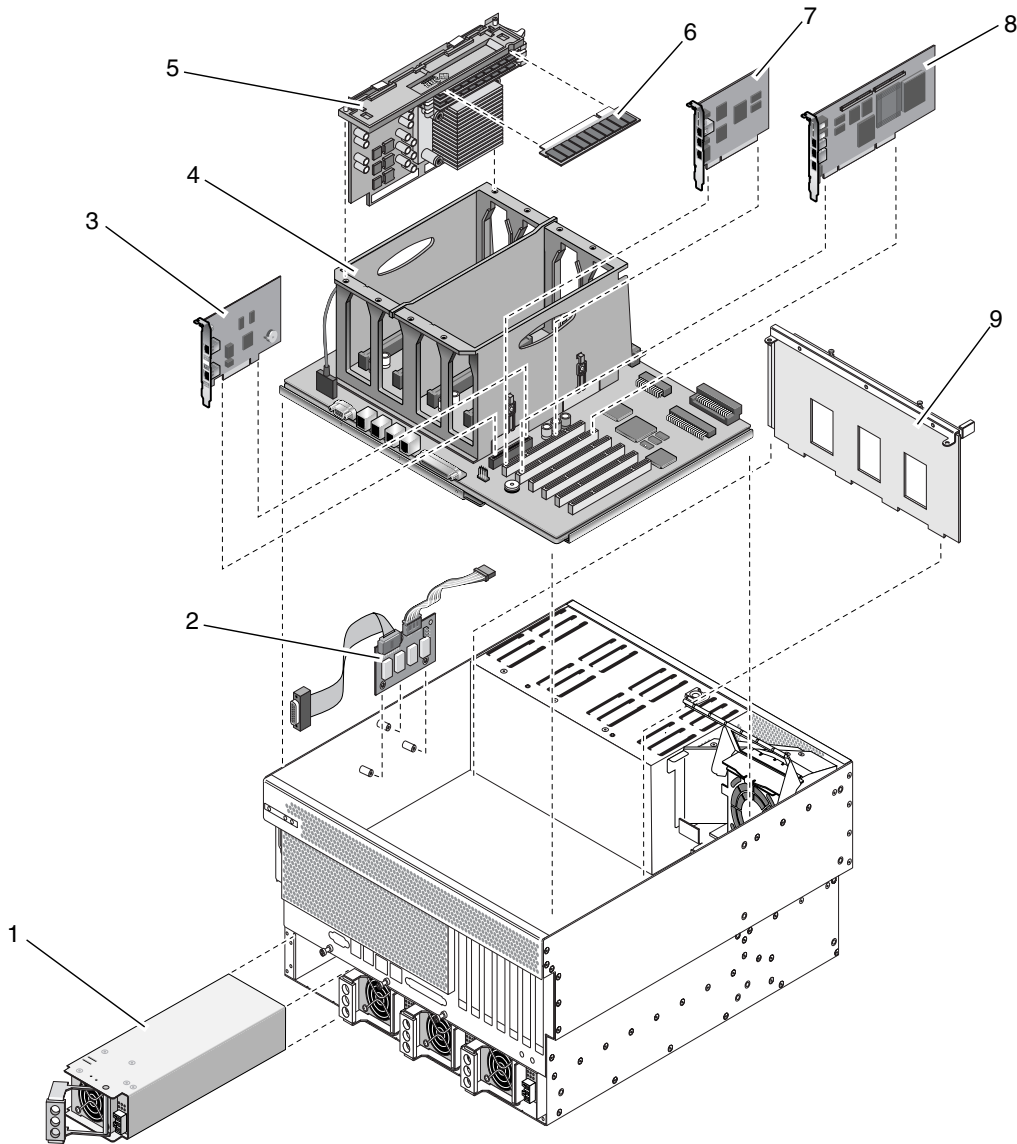
**FIGURE A-1** Front Panel Components and Fan Tray 3 Assembly



**TABLE A-1** Front Panel Components and Fan Tray 3 Assembly

<b>Reference Number</b>	<b>Part</b>	<b>Part Number</b>
1	Fan trays 0, 1 or 2	F540-5855
2	73 GB SCSI hard drive	F540-5924, XRA-SC1N2-73G15K
3	Power distribution board	F540-5854
4	Air filter	X8217A
5	DVD-RW drive	F540-6068, X7424A
5	DVD-ROM drive	F540-6067, X7423A
6	System configuration card	F370-5155
7	System configuration card reader/rotary switch	F540-5856
8	Fan tray 3	F540-6069

# Motherboard and Other Miscellaneous Components



**FIGURE A-2** Motherboard and Other Miscellaneous Components

**TABLE A-2** Miscellaneous Components

<b>Reference Number</b>	<b>Part</b>	<b>Part Number</b>
1	Power supply, DC	F300-1567
1	Power supply, AC	F300-1674
2	Alarm card, with Alarm In and Alarm Out cables	F595-7287
3	ALOM system controller card	F501-6346
4	Motherboard	F540-5919
5	1.28 GHz CPU/memory module with no memory	F501-6370
5	1.28 GHz CPU/memory module with 2 GB memory (4 x 512 MB DIMMs)	X7426A
5	1.28 GHz CPU/memory module with 4 GB memory (4 x 1 GB DIMMs)	X7416A
6	1 GB memory (2 x 512 MB DIMMs)	F370-4939, X7403A
6	2 GB memory (2 x 1 GB DIMMs)	F370-4940, X7404A
7	Short PCI card	Varies depending on the short PCI card. Contact your local Sun service representative for more information.
8	Long PCI card	Varies depending on the long PCI card. Contact your local Sun service representative for more information.
9	SCSI backplane	F540-5853
	Miscellaneous cables	F595-7286

---

# Rackmount Kits

**TABLE A-3** System Cables

<b>Part</b>	<b>Part Number</b>
23-inch 2-post Hard Mount Kit	X7903A
600mm x 600mm 2-post Hard Mount Kit	X7905A
19-inch 4-post Slide Mount Kit	X8100A

## Connector Pinouts

---

This appendix provides reference information about the system back panel ports and pin assignments.

Topics covered in this appendix include:

- [“Serial Port \(TTYB\)” on page 124](#)
- [“USB Ports” on page 125](#)
- [“Ethernet Ports” on page 126](#)
- [“Network Management Port” on page 127](#)
- [“Serial Management Port \(SERIAL MGT\)” on page 128](#)
- [“SCSI Port” on page 129](#)
- [“Alarm Port” on page 131](#)

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# Serial Port (TTYB)

The serial port connector (TTYB) is a DB-9 connector that can be accessed from the back panel.



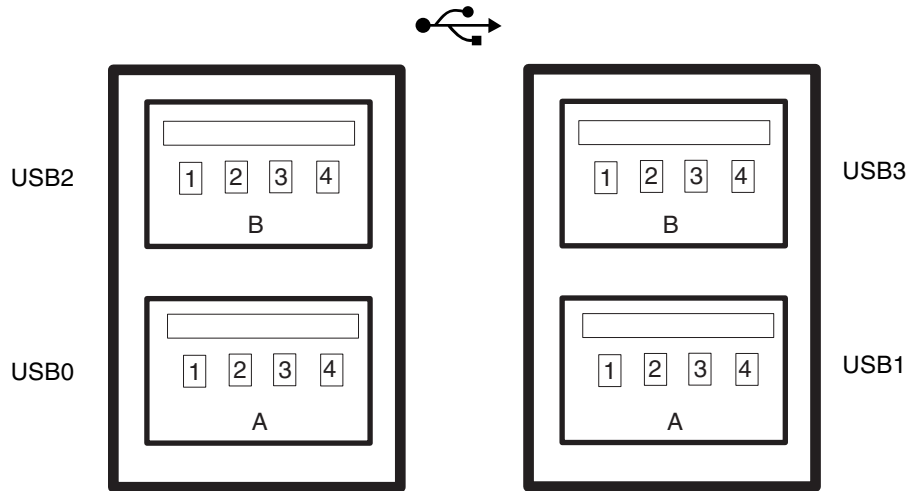
**FIGURE B-1** Serial Port Pin Numbering

**TABLE B-1** Serial Port Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Data Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicate
5	Ground		

# USB Ports

Four Universal Serial Bus (USB) ports are located on the motherboard in a double-stacked layout. The ports can be accessed from the back panel.



**FIGURE B-2** USB Connector Pin Numbering

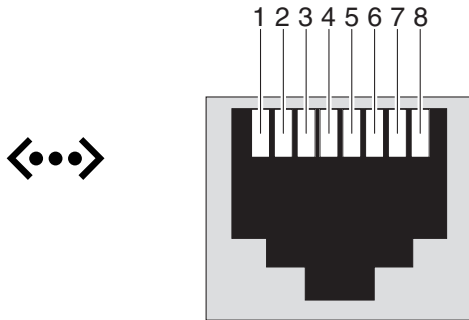
**TABLE B-2** USB Ports Pin Numbering

Pin	Signal Description	Pin	Signal Description
A1	+5 V (fused)	B1	+5 V (fused)
A2	USB0/1-	B2	USB2/3-
A3	USB0/1+	B3	USB2/3+
A4	Ground	B4	Ground

---

# Ethernet Ports

Two RJ-45 Gigabit Ethernet ports (NET0, NET1) are located on the system motherboard and can be accessed from the back panel. The Ethernet interfaces operate at 10 Mbps, 100 Mbps, and 1000 Mbps.



**FIGURE B-3** Ethernet Connector Pin Numbering

**TABLE B-3** Ethernet Connector Pin Signals

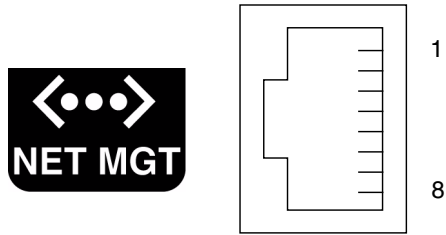
Pin	Signal Description	Pin	Signal Description
1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 -
2	Transmit/Receive Data 0 -	6	Transmit/Receive Data 1 -
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 -



---

# Network Management Port

The network management port (labeled NET MGT) is an RJ-45 connector located on the ALOM system controller card and can be accessed from the back panel. This port needs to be configured prior to use.



**FIGURE B-4** Network Management Port Pin Numbering

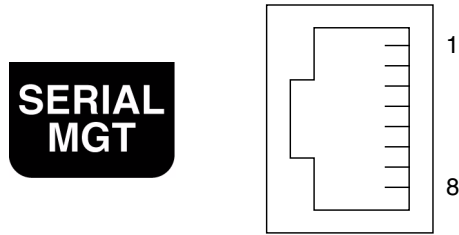
**TABLE B-4** Network Management Port Pin Signals

Pin	Signal Description	Pin	Signal Description
1	Transmit Data +	5	Common Mode Termination
2	Transmit Data -	6	Receive Data -
3	Receive Data +	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

---

# Serial Management Port (SERIAL MGT)

The serial management port (labeled SERIAL MGT) is an RJ-45 connector located on the ALOM system controller card and can be accessed from the back panel. This port is the default connection to the system. This is also the TTYA port for the system.



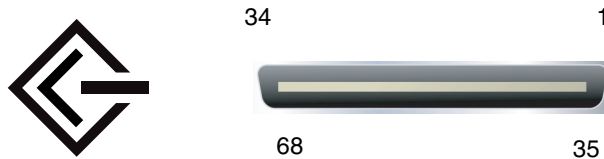
**FIGURE B-5** Serial Management Port Pin Numbering

**TABLE B-5** Serial Management Port Pin Signals

Pin	Signal Description	Pin	Signal Description
1	Request to Send	5	Ground
2	Data Terminal Ready	6	Receive Data
3	Transmit Data	7	Data Set Ready
4	Ground	8	Clear to Send

# SCSI Port

The SCSI serial data connector is located on the motherboard and can be accessed from the back panel.



**FIGURE B-6** SCSI Port Pin Numbering

**TABLE B-6** SCSI Port Pin Signals

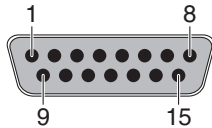
Pin	Signal Description	Pin	Signal Description
1	Data12 +	35	Data12 -
2	Data13 +	36	Data13 -
3	Data14 +	37	Data14 -
4	Data15 +	38	Data15 -
5	Parity1 +	39	Parity1 -
6	Data0 +	40	Data0 -
7	Data1 +	41	Data1 -
8	Data2 +	42	Data2 -
9	Data3 +	43	Data3 -
10	Data4 +	44	Data4 -
11	Data5 +	45	Data5 -
12	Data6 +	46	Data6 -
13	Data7 +	47	Data7 -
14	Parity0 +	48	Parity0 -
15	Ground	49	Ground
16	DIFF_SENSE	50	Ground
17	TERM_PWR	51	TERM_PWR

**TABLE B-6** SCSI Port Pin Signals (*Continued*)

<b>Pin</b>	<b>Signal Description</b>	<b>Pin</b>	<b>Signal Description</b>
18	TERM_PWR	52	TERM_PWR
19	(N/C)	53	(N/C)
20	Ground	54	Ground
21	ATN +	55	ATN -
22	Ground	56	Ground
23	BSY +	57	BSY -
24	ACK +	58	ACK -
25	RST +	59	RST -
26	MSG +	60	MSG -
27	SEL +	61	SEL -
28	CD +	62	CD -
29	REQ +	63	REQ -
30	I/O +	64	I/O -
31	Data8 +	65	Data8 -
32	Data9 +	66	Data9 -
33	Data10 +	67	Data10 -
34	Data11 +	68	Data11 -

# Alarm Port

The alarm port uses a standard DB-15 connector. In a telecommunications environment, use this port to connect to the central office alarming system. [FIGURE B-7](#) shows the pin numbering of the alarm port, [TABLE B-7](#) and describes the pin signals.



**FIGURE B-7** Alarm Port

**TABLE B-7** Alarm Port Signals

Pin	Signal Description	Pin	Signal Description
1	RESERVED	9	ALARM1_NC
2	RESERVED	10	ALARM1_COM
3	NC	11	ALARM2_NO
4	NC	12	ALARM2_NC
5	ALARM0_NC <sup>1</sup>	13	ALARM2_COM
6	ALARM0_NO <sup>1</sup>	14	ALARM3_NO
7	ALARM0_COM <sup>1</sup>	15	ALARM3_COM
8	ALARM1_NO	CHASSIS	FRAME GND

<sup>1</sup> The ALOM software sets the ALARM0 (critical) relay and the associated (critical) LED for the following conditions:

- When the system is in Standby mode.
- When the server is powered on and the operating system has not booted or has failed.



# System Specifications

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This appendix provides the following specifications for the Netra 440 server:

- [“Physical Specifications” on page 133](#)
- [“Electrical Specifications” on page 134](#)
- [“Environmental Specifications” on page 136](#)
- [“Clearance and Service Access Specifications” on page 136](#)

---

## Physical Specifications

**TABLE C-1** Physical Specifications, Netra 440 Server

<b>Measure</b>	<b>U.S.</b>	<b>Metric</b>
Width	17.32 inches	440.0 mm
Depth	19.5 inches	495 mm
Height	8.75 inches (5 rack units)	222 mm
Weight (without PCI cards or rack mounts)	79.4 lbs	36 kg
Weight (fully configured with 19-inch 4-post hardmount rack option)	81.6 lbs	37 kg

---

# Electrical Specifications

## AC Operating Power Limits and Ranges

The information in this section applies to the AC version of the Netra 440 server. [TABLE C-2](#) gives AC power source requirements for each power supply in the Netra 440 server, and [TABLE C-3](#) gives AC power source requirements for the Netra 440 server as a whole.

**TABLE C-2** AC Operating Power Limits and Ranges for Each Power Supply in the Netra 440 Server

Description	Limit or Range
Operating input voltage range	90 - 264 VAC
Operating frequency range	47 - 63 Hz
Maximum operating input current	5.5 A @ 90 VAC
Maximum operating input power	500 W

**TABLE C-3** AC Operating Power Limits and Ranges for the Netra 440 Server

Description	Limit or Range
Operating input voltage range	90 - 264 VAC
Operating frequency range	47 - 63 Hz
Maximum operating input current	11 A @ 90 VAC
Maximum operating input power	1000 W

---

**Note** – The figures for the maximum operating current are provided to help you specify the fusing and cabling you need to deliver power to your equipment. However, these figures represent worst-case scenarios.

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# DC Power Source Requirements

The information in this section applies to the DC version of the Netra 440 server. [TABLE C-4](#) gives DC power source requirements for each power supply in the Netra 440 server, and [TABLE C-5](#) gives DC power source requirements for the Netra 440 server as a whole.

**TABLE C-4** DC Operating Power Limits and Ranges for Each Power Supply in the Netra 440 Server

Description	Limit or Range
Operating input voltage range	-40 VDC to -75 VDC
Maximum operating input current	11.5 A
Maximum operating input power	450 W

**TABLE C-5** DC Operating Power Limits and Ranges for the Netra 440 Server

Description	Limit or Range
Operating input voltage range	-40 VDC to -75 VDC
Maximum operating input current	23 A
Maximum operating input power	900 W

---

# Environmental Specifications

You can operate and store the Netra 440 server safely in the conditions detailed in [TABLE C-6](#).

**TABLE C-6** Netra 440 Server Operating and Storage Specifications

Specification	Operating	Storage
Ambient temperature	5°C (41°F) to 40°C (104°F) Short term <sup>1</sup> : -5°C (23°F) to 55°C (131°F)	-40°C (-40°F) to 70°C (158°F)
Relative humidity	5% to 85% relative humidity, noncondensing Short term*: 5% to 90% relative humidity, noncondensing, but not to exceed 0.024 kg water/kg dry air (0.053 lbs. water/2.205 lb. dry air)	Up to 93% relative humidity noncondensing, 38°C (100.4°F) max wet bulb
Altitude	Up to 3000 m (9842.4 ft.)	Up to 12000 m (39369.6 ft.)

1 Short term (no more than 96 hours) temperature and humidity limits apply to servers with altitudes up to 1800 m (5905.44 ft.).

---

# Clearance and Service Access Specifications

Minimum clearances needed for servicing the system are as follows.

Blockage	Required Clearance
Front of system	36 in (91.4 cm)
Back of system	36 in (91.4 cm)

## Board Connector Locations

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This appendix illustrates the connector locations on the system boards. It contains the following sections:

- [“Motherboard Connectors” on page 138](#)
- [“SCSI Backplane Connectors” on page 139](#)
- [“ALOM System Controller Card Connectors” on page 141](#)

# Motherboard Connectors

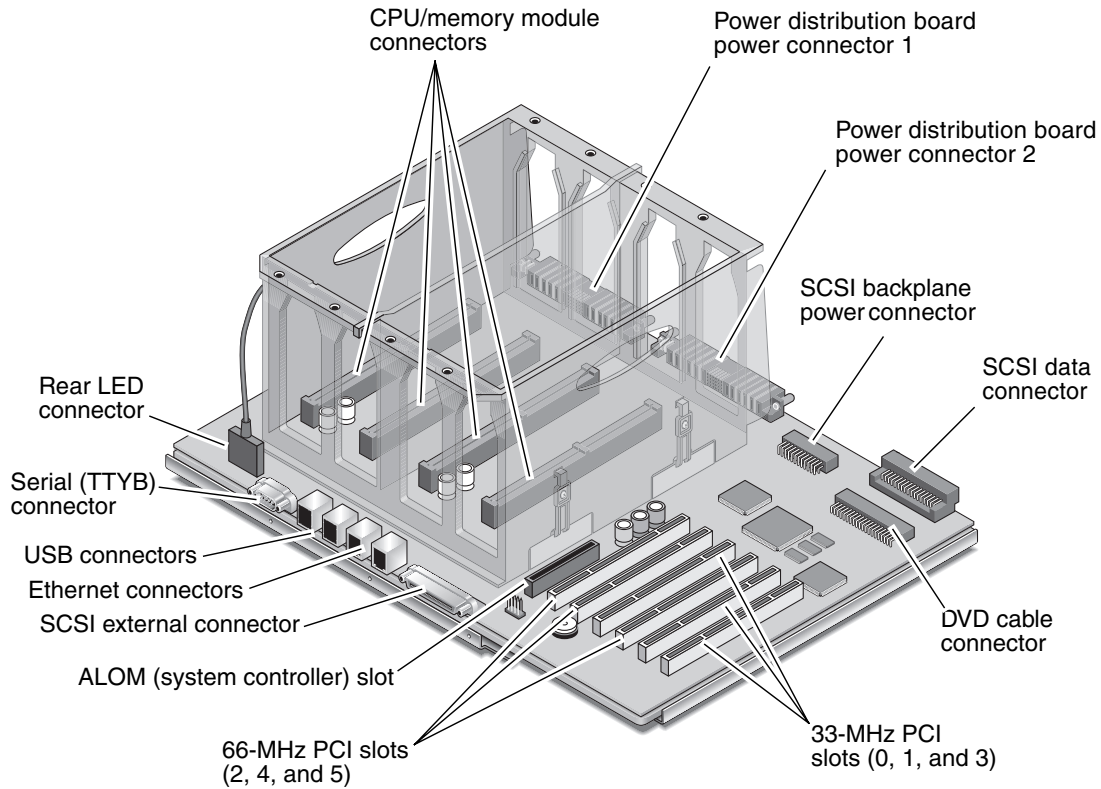


FIGURE D-1 Motherboard Connectors

# SCSI Backplane Connectors

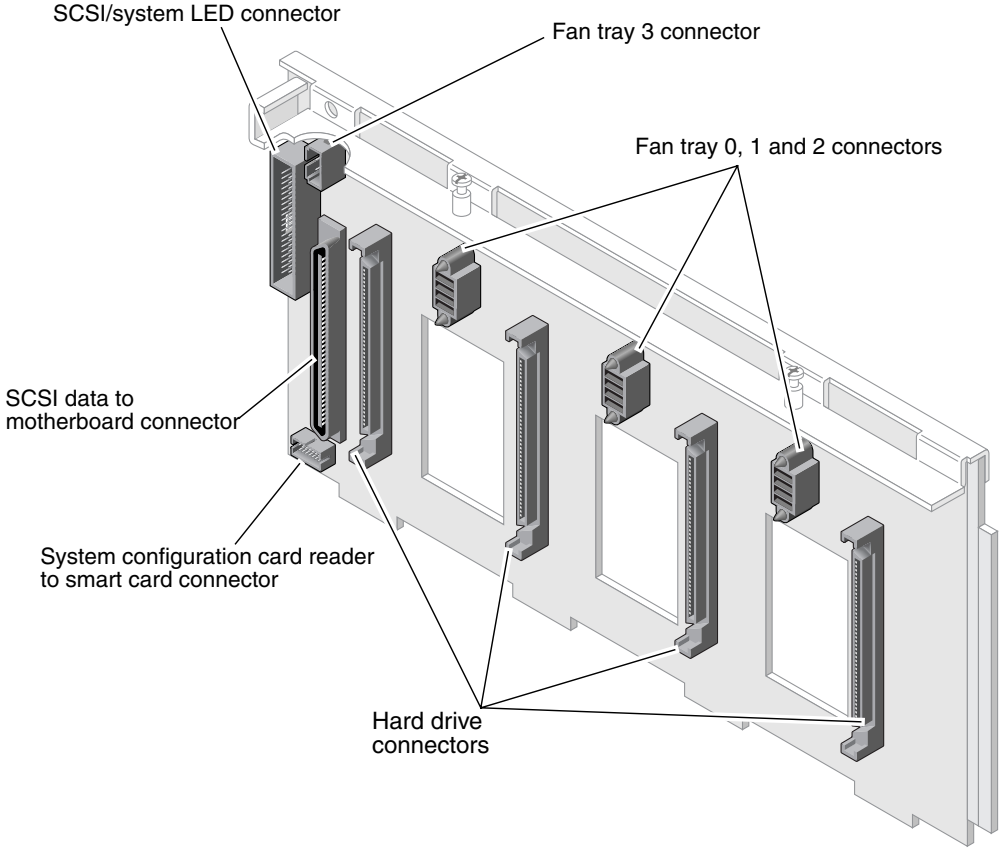
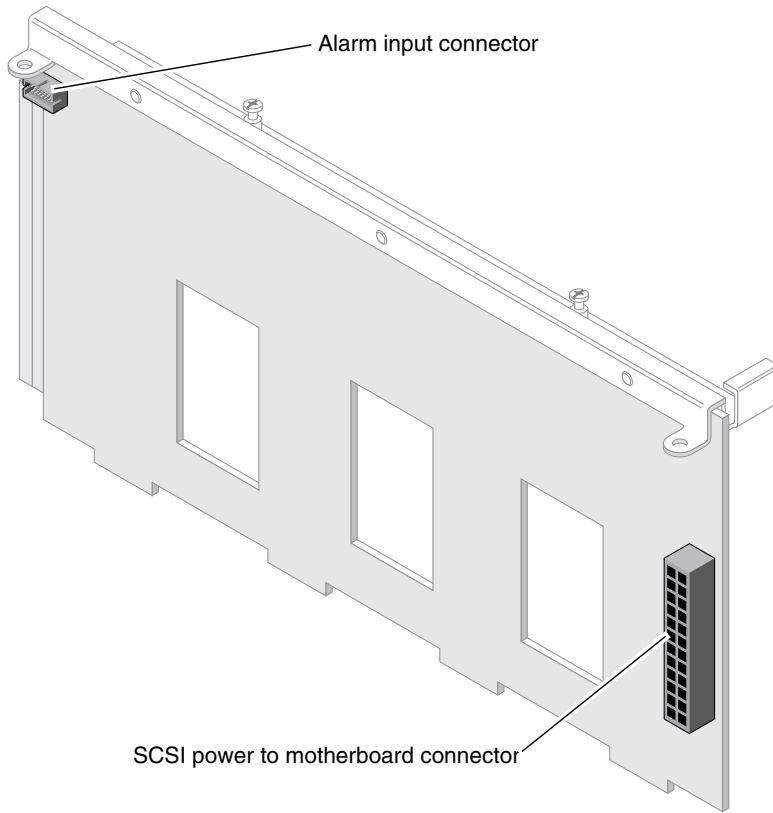


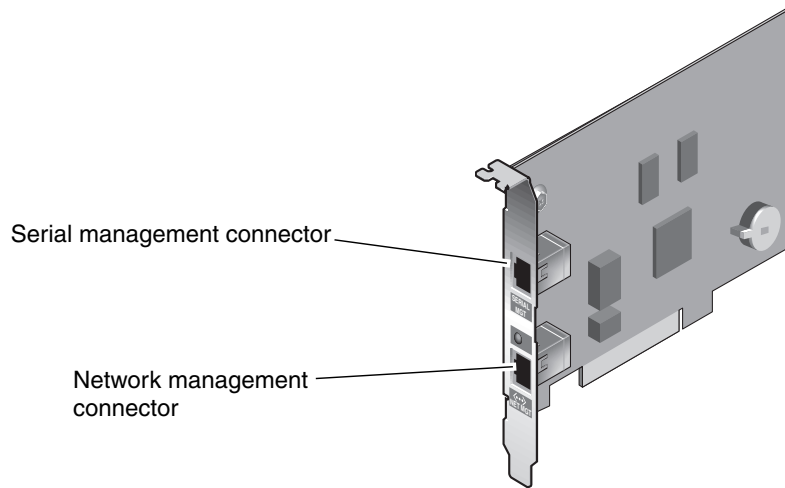
FIGURE D-2 SCSI Backplane Connectors, Front



**FIGURE D-3** SCSI Backplane Connectors, Rear

---

# ALOM System Controller Card Connectors



**FIGURE D-4** ALOM System Controller Card Connectors





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