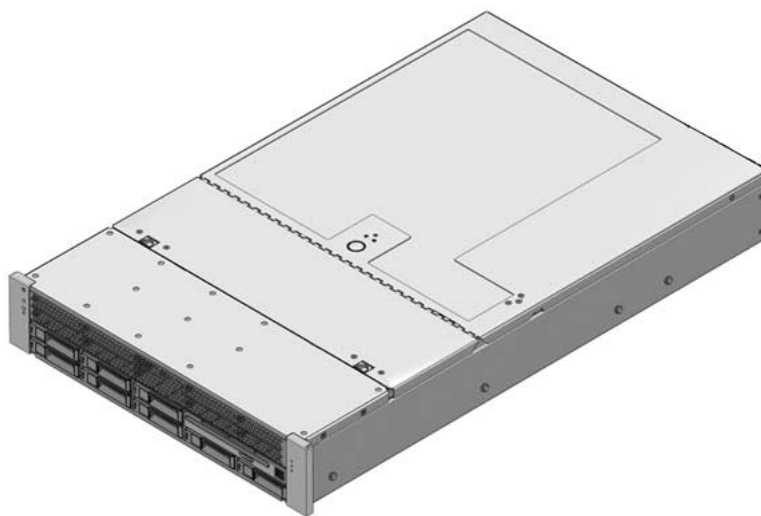


Sun Fire™ X4440 Server Service Manual



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Preface

The *Sun Fire X4440 Server Service Manual* provides detailed procedures for removing and replacing replaceable parts in the Sun Fire™ X4440 Server. This manual also includes information about the use and maintenance of the server.

This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

How This Document Is Organized

This manual contains the following chapters.

TABLE P-1 Sun Fire X4440 Service Manual Chapters

Chapter	Describes:
Chapter 1	Sun Fire X4440 Server Overview provides an overview of the system, including front and rear panel features. Contains illustrations showing system components.
Chapter 2	Preparing to Service the System describes the steps necessary to prepare the system for service.
Chapter 3	Servicing Customer-Replaceable Devices describes the service procedures that can be done while the system is running (hot-serviceable procedures).
Chapter 4	Servicing Motherboard Components describes the service procedures for the motherboard and its associated components, including installing and upgrading memory modules (DDR2 DIMMs).
Chapter 5	Servicing Infrastructure Boards and Components describes the service procedures for all other components.

TABLE P-1 Sun Fire X4440 Service Manual Chapters *(Continued)*

Chapter	Describes:
Chapter 6	Returning the Server to Operation describes how to bring the server back to operation after performing service procedures.
Appendix A	Connector Pinouts contains pinout tables for all external connectors.
Appendix B	BIOS Power-On Self-Test (POST) Codes contains information on how the BIOS POST works, how to redirect output, and how to change options.
Appendix C	BIOS Screens contains examples of typical BIOS screens.

Related Documentation

To view the latest Sun Fire X4440 Server documentation online, go to <http://docs.sun.com>, and then navigate to Sun Fire X4440 Server documentation.

The following table lists the available documents related to service.

TABLE P-2 Sun Fire X4440 Related Documentation

Title	Description	Part Number
<i>Where to Find Sun Fire X4140, X4240, and X4440 Servers Documentation</i>	Where to find the documentation for the Sun Fire X4140, X4240, and X4440 servers.	820-2395
<i>Sun Fire X4140, X4240, and X4440 Server Installation Guide</i>	How to install the Sun Fire X4140, X4240, and X4440 server in an equipment rack, how to configure the service processor, and how to configure the preinstalled Solaris™ Operating System.	820-2394
<i>Sun Fire X4140, X4240, and X4440 Servers Operating System Installation Guide</i>	How to install and configure operating systems on the Sun Fire X4140, X4240, and X4440 servers. Excludes the preinstalled Solaris Operating System and the Windows operating system.	820-2397
<i>Sun Fire X4140, X4240, and X4440 Server Windows Operating System Installation Guide</i>	How to install the Windows operating system on the Sun Fire X4140, X4240, and X4440 servers.	820-2399
<i>Sun Fire X4140, X4240, and X4440 Server Diagnostics Guide</i>	How to troubleshoot the Sun Fire X4140, X4240, and X4440 server. Includes information on system event logs.	820-3067
<i>Sun Integrated Lights Out Manager 2.0 User's Guide</i>	Describes the Integrated Lights Out Manager, which is system management software that runs on the Sun Fire X4140, X4240, and X4440 server service processor.	820-1188
<i>Sun Fire X4140, X4240, and X4440 Servers Product Notes</i>	Information about late-breaking changes and problems in the Sun Fire X4140, X4240, and X4440 servers.	820-2396
<i>x64 Servers Utilities Reference Manual</i>	Contains instructions for using applications and utilities common to many X64 servers.	820-1120

Before You Read This Document

To fully use the information in this document, you must have thorough knowledge of the topics discussed in the *Sun Fire X4450 Server Product Notes*.

Sun Online

The following table shows where to find Sun documents online.

TABLE P-3 Sun Fire X4440 Online Documents

Sun Function	URL	Description
Sun Documentation	http://docs.sun.com	You can navigate to the Sun Fire X4440 server document page and then download PDF and view HTML documents. Includes the LSI card <i>MegaRAID Storage Manager x64 Server Utilities Reference Manual</i> for MSM.
Support	http://www.sun.com/support/	Obtain technical support and download patches.
Training	http://www.sun.com/training/	Learn about Sun courses.
Warranty	http://www.sun.com/service/support/warranty/index.html	Obtain specific details regarding your warranty.
Feedback	http://www.sun.com/hwdocs/feedback/	Submit your comments.

Safety Symbols

Note the meanings of the following symbols that might appear in this document.



Caution – There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.



Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.



Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

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Please include the title and part number of your document with your feedback:

Example: *Sun Fire X4440 Server Service Manual*, part number 820-3836-14.

Sun Fire X4440 Server Overview

This chapter provides an overview of the features of the Sun Fire X4440.

The following information is included:

- [Section 1.1, “Product Description” on page 1-1](#)
- [Section 1.2, “Sun Fire X4440 Server Chassis Overview” on page 1-3](#)
- [Section 1.3, “Sun Fire X4440 Front Panel Features” on page 1-9](#)
- [Section 1.4, “Sun Fire X4440 Rear Panel Features” on page 1-10](#)
- [Section 1.5, “Illustrated Parts Breakdown” on page 1-11](#)

1.1 Product Description

The Sun Fire X4440 Server is an enterprise-class four-socket rackmount x64 system powered by the AMD Opteron processor, packing high performance and room for growth with six PCIe slots and 32 DIMM slots into a compact 2-RU footprint.

The product features are listed in [TABLE 1-1](#).

TABLE 1-1 Sun Fire X4440 Server System Features

Feature	Description (Sun Fire X4440)
Processor	AMD64 Opteron Socket F [1207] (1 MByte L2 cache per CPU chip) – dual core capable. Supports dual, and quad core.
Memory	8 DDR-2 DIMM slots per socket. Up to 800 MHz memory speeds depending upon processor type and memory configuration. PC2-4200R 533 MHz Registered DIMMs with ECC PC2-5300R 667 MHz Registered DIMMs with ECC PC2-6400R 800 MHz Registered DIMMs with ECC 1GB, 2GB, 4GB, or 8GB per DIMM See Section 4.1.2, “DDR2 DIMM Guidelines” on page 4-5.
Ethernet ports	4 ports, 10/100/1000 Mbps, auto-negotiating through two separate controllers
Internal drives	SAS (up to 8) or SATA (up to 8) disk drives, and SSDs (up to 4). Up to 8 SFF SAS 73-GB or 146-GB 2.5-inch form factor drives. Support for hardware-embedded RAID 0 (striping) and RAID 1 (mirroring) Optional RAID Levels 0, 1, IE, 5, 5EE, 6, 10, 50, 60 with SAS drives
Removable media	1 slimline DVD drive, supporting CD-R/W, CD+R/W, DVD-R/W, DVD+R/W
USB ports	5 USB 2.0 ports: 2 in front, 2 in rear, plus 1 internal USB port
Service ports	1 RJ-45 serial management port (SER MGT) (default connection to access service processor) 1 10-MB network management port (NET MGT) (to access service processor) HD15 VGA video port to view redirected service processor video.
Cooling	6 hot-service system fan modules (2 fans per module) An air duct facilitates processor/memory airflow
PCI interfaces	6 standard low-profile PCIe slots on three riser boards (2 - x8 and 4 - x4 electrical / 3 - x16 and 3 - x8 mechanical) See Section 4.5.1, “Sun Fire X4440 PCIe Card Guidelines” on page 4-25.
Power	AC power: 100-240VAC, 12-5A, 50-60Hz 1 or 2 hot-service 1050W power supply units (PSUs) to provide N+N redundancy, with energy efficient design

TABLE 1-1 Sun Fire X4440 Server System Features *(Continued)*

Feature	Description (Sun Fire X4440)
Remote management	On-board Integrated LOM service processor providing: <ul style="list-style-type: none">• DMTF CLP-based command line interface (CLI) over SSH• Web-based browser interface GUI over HTTPS• IPMI 2.0• SNMP (v1, v2c, and v3)• Remote graphical access (remote KVM) over Ethernet• Remote storage over Ethernet
Operating system	Solaris™ 10, Update 4 Solaris 10 OS with specific Sun Fire X4440 Server software components Supports: <ul style="list-style-type: none">• Red Hat Enterprise Linux 4 U4 (AS) (32-bit/64-bit)• Red Hat Enterprise Linux 5 (32-bit/64-bit)• SUSE Linux Enterprise Server 10 SP1 (64-bit)• VMware ESX 3.0.2• Windows Server 2003 x32 SP2 or greater (Standard Edition/ Enterprise Edition)
Other software	Java™ Enterprise System with a 90-day trial license

1.2 Sun Fire X4440 Server Chassis Overview

The Sun Fire X4440 Server is based on an all-new chassis family.

- [Section 1.2.1, “Infrastructure Boards” on page 1-4](#)
- [Section 1.2.2, “System Cables” on page 1-5](#)
- [Section 1.2.3, “Dimensions” on page 1-8](#)

Note – Some of the procedures in this manual are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the list below. FRU components should be replaced only by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

1.2.1 Infrastructure Boards

The Sun Fire X4440 has the boards listed in [TABLE 1-2](#) installed in the chassis.

TABLE 1-2 Infrastructure Boards

Board	Description	Reference
Motherboard FRU	<p>The motherboard is on a removable tray. It has 16 DIMM slots and the service processor (iLOM) subsystem. Hyper-transport connector slots to a mezzanine tray support two additional processors and memory.</p> <p>The server motherboard provides an integrated lights out management (iLOM) service processor function, which includes remote boot and remote software upgrades. The service processor (iLOM) subsystem controls the host power and monitors host system events (power and environmental). The iLOM controller draws power from the host's 3.3V standby supply rail, which is available whenever the system is receiving AC input power, even when the system is turned off.</p>	<p>Section 4.7, "Servicing the Motherboard Assembly" on page 4-34</p> <p>Refer to the Sun Fire 4140, 4240, and 4440 Server Diagnostics Guide for iLOM sensor information.</p> <p>Refer to the <i>Sun Integrated Lights Out Manager 2.0 User's Guide</i></p>
Mezzanine tray FRU	<p>This removable mezzanine tray includes 2 additional CPU modules, slots for 16 DIMMs, and memory control subsystems.</p>	<p>Section 4.2, "Servicing the Mezzanine Tray" on page 4-12</p>
Power distribution board FRU	<p>This power distribution board distributes main 12V power from the power supplies to the rest of the system. It is directly connected to the Vertical PDB card, and to the motherboard through a bus bar and ribbon cable. It also supports a top cover interlock ("kill") switch.</p> <p>In the Sun Fire X4440, the power supplies connect to the power supply backplane which connects to the power distribution board.</p>	<p>Section 5.5, "Servicing the Power Distribution Board (PDB)" on page 5-14</p>
Vertical PDB card FRU	<p>This vertical power distribution board serves as the interconnect between the power distribution board and the fan power boards, drives backplane, and I/O board.</p>	<p>Section 5.7, "Servicing the Paddle Card" on page 5-19</p>
Power supply backplane card FRU	<p>This board connects the power distribution board to power supplies 0 and 1.</p>	<p>Section 5.6, "Servicing the Power Supply Backplane" on page 5-17</p>
Fan power boards (2) FRU	<p>These boards carry power to the system fan modules. In addition, they contain fan module status LEDs and transfer I²C data for the fan modules.</p>	<p>Section 5.1, "Servicing the Fan Power Boards" on page 5-2</p>

TABLE 1-2 Infrastructure Boards *(Continued)*

Board	Description	Reference
Drives backplane FRU	This board includes the connectors for the drives, as well as the interconnect for the I/O board, Power and Locator buttons, and system/component status LEDs. The Sun Fire X4440 has an eight-disk backplane. Each drive has an LED indicator for power/activity, fault, and ok-to-remove.	Section 5.3, “Servicing the Drives Backplane” on page 5-10
Front I/O board FRU	This board carries the front panel USB connections from the drives backplane. The board connects directly to the drives backplane. It is packaged with the DVD drive as a single unit.	Section 3.7, “Servicing the DVD/USB Module” on page 3-22
PCIe risers FRU	In the Sun Fire X4440, each riser supports two PCIe cards. There are three risers per system, each attached to the rear of the motherboard.	Section 4.4, “Servicing PCIe Risers” on page 4-21

1.2.2 System Cables

The Sun Fire X4440 internal cables are listed in [TABLE 1-3](#).

TABLE 1-3 Sun Fire X4440 Server Cables

	Cable	Connects...
1	Drives data cables (2)	Between the optional HBA PCI-Express Card and the drives backplane
2	Motherboard to PDB cable	Between the power distribution board and the motherboard
3	PSU backplane cable	To the power supply units
4	Top cover interlock cable	To the power distribution board

[FIGURE 1-1](#) shows the SAS cables on the Sun Fire X4440.

[FIGURE 1-2](#) shows the SATA cables on the Sun Fire X4440.

[FIGURE 1-3](#) shows the diskless configuration on the Sun Fire X4440.

FIGURE 1-1 Cables (SAS)

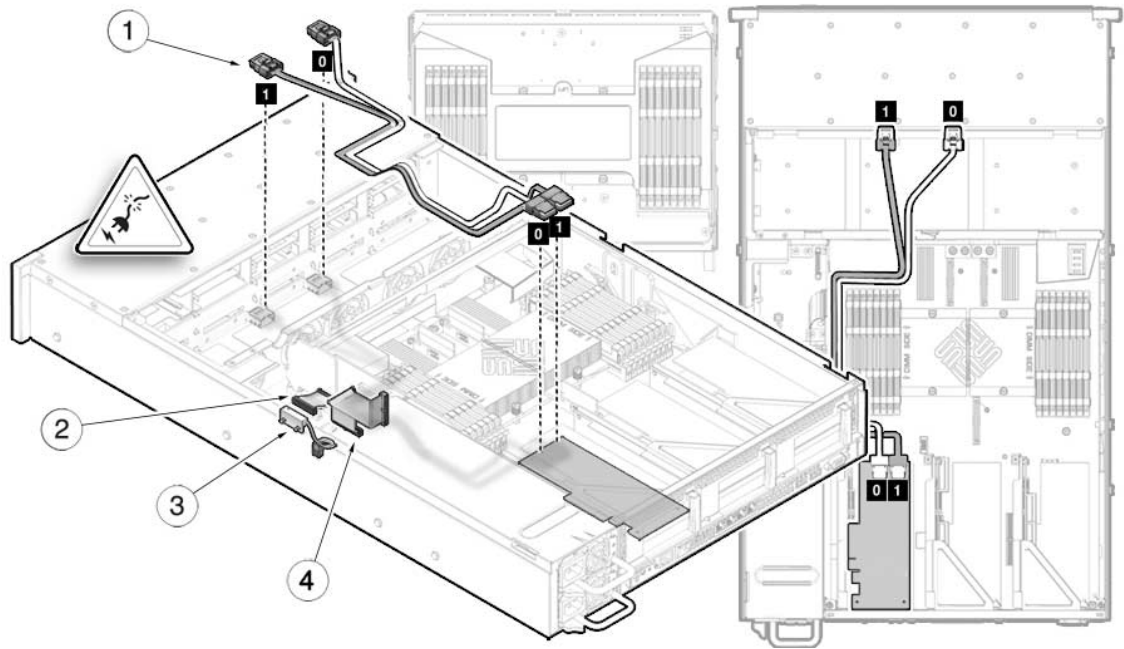
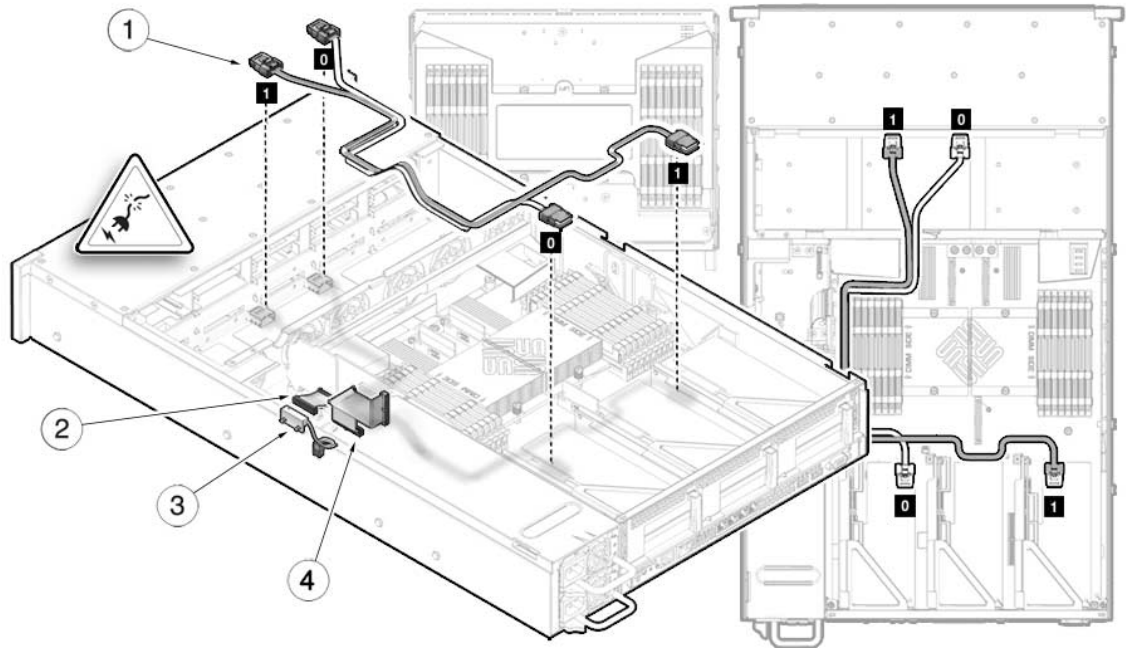
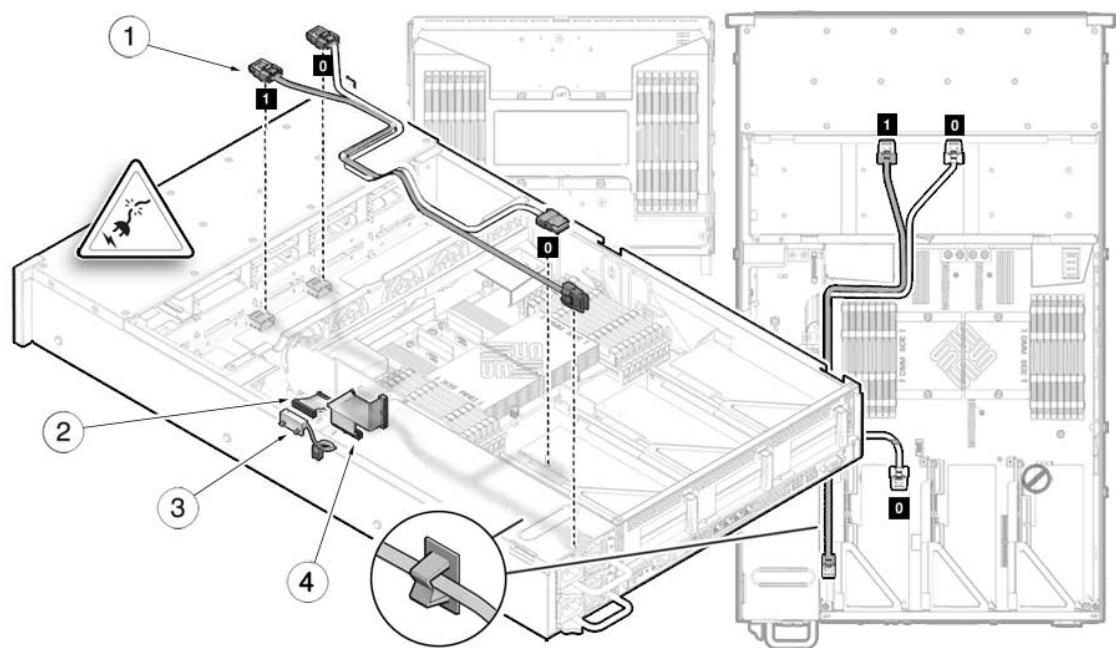


FIGURE 1-2 Cables (SATA)



Caution – The Drives Data Cable (1) and (0) connectors must be placed in the order shown.

FIGURE 1-3 Cables (Diskless Configuration)



1.2.3 Dimensions

The 2U chassis form factor dimensions are listed in [TABLE 1-4](#).

TABLE 1-4 Sun Fire X4440 Server Dimensions

Dimension	Sun Fire X4440
Height	87.85 mm/3.46 inches
Width	445.71 mm/17.55 inches (includes ears - chassis is 425.46 mm/16.75 inches)
Depth	733.65 mm/28.88 inches (includes PSU handle - chassis is 711.25/28.00)
Weight	Maximum: 28.6 kg/62.9 lbs

1.3 Sun Fire X4440 Front Panel Features

FIGURE 1-4 shows front panel features on the Sun Fire X4440.

FIGURE 1-4 Front Panel Features

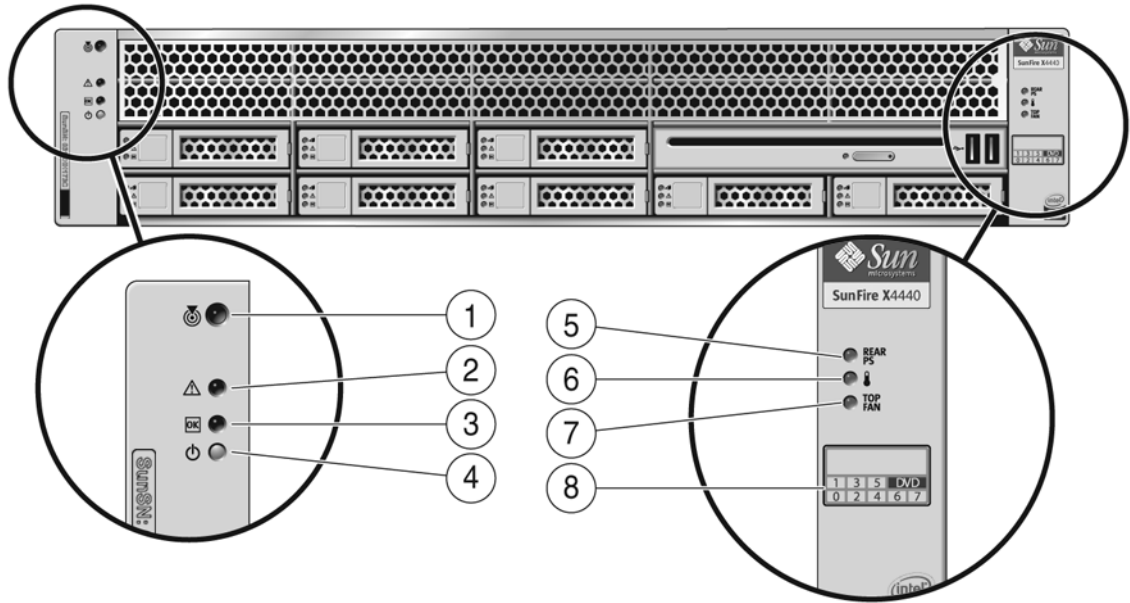


Figure Legend

1	Locator LED/Locator button (white)	5	Power Supply Service Required LED (amber)
2	Service Action Required LED (amber)	6	System Overtemperature LED (amber)
3	Power/OK LED (green)	7	Fan Module Service Required LED (amber)
4	Power button	8	Drives map

1.4 Sun Fire X4440 Rear Panel Features

FIGURE 1-5 shows rear panel features on the Sun Fire X4440. For more detailed information about ports and their uses, see the *Sun Fire X4450 Server Installation Guide*. For a detailed description of PCIe slots, see [Section 4.4, “Servicing PCIe Risers”](#) on page 4-21.

FIGURE 1-5 Rear Panel Features

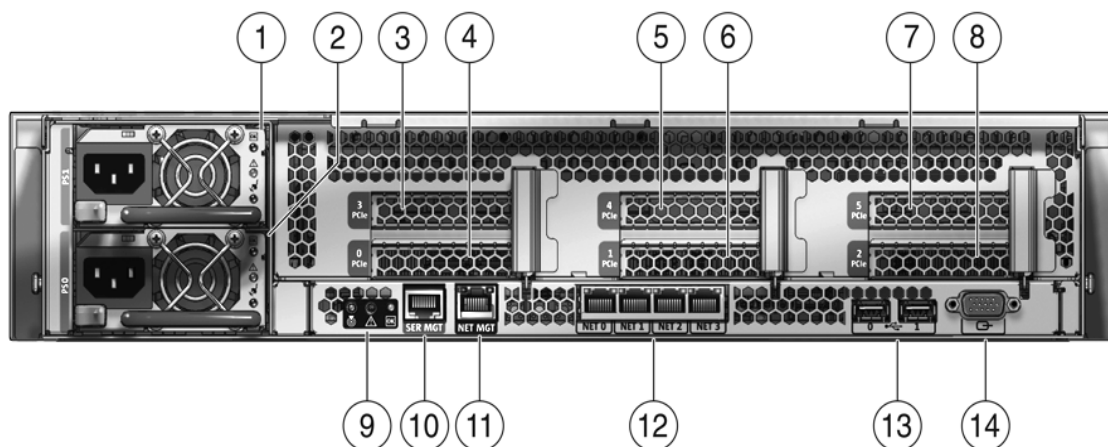


Figure Legend

1	PSU 1	9	Rear Panel System Status LEDs <i>Locator LED/Locator button (white)</i> <i>Service Action Required LED (amber)</i> <i>Power/OK LED (green)</i>
2	PSU 0	10	Serial Management Port (SER MGT)
3	PCIe 3	11	Network Management Port (NET MGT)
4	PCIe 0		NMI button (Behind panel, not shown)
5	PCIe 4		Reset Button (Behind panel, not shown)
5	PCIe 1	12	Gbit Ethernet Ports (0, 1, 2, 3)
7	PCIe 5	13	USB Ports (0, 1)
8	PCIe 2	14	HD15 Video Port

1.5 Illustrated Parts Breakdown

The following illustrations provide exploded views of system components. Use these illustrations, and the accompanying tables, to identify parts in your system.

FIGURE 1-6 I/O Components (Sun Fire X4440)

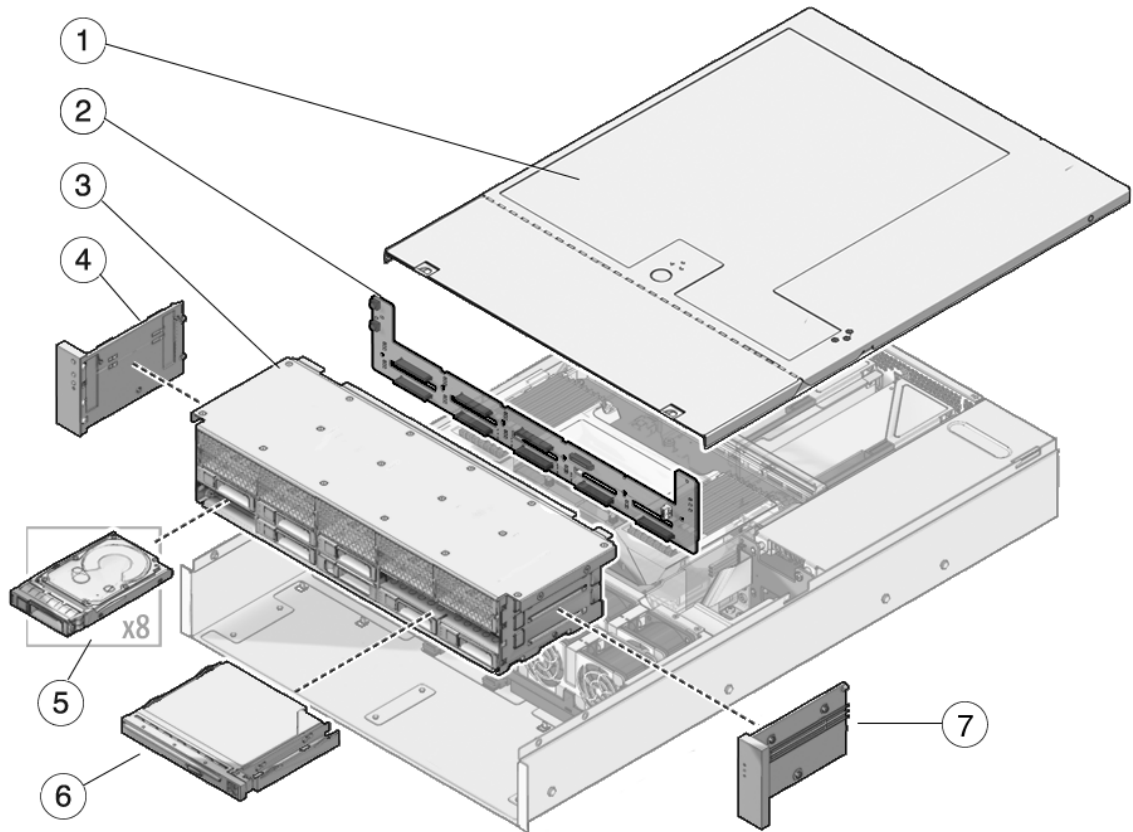


Figure Legend

1	Top Cover	5	Drives (16)
2	Hard Disk Backplane	6	DVD/USB Module
3	Hard Disk Cage	7	Right Control Panel Light Pipe Assembly
4	Left Control Panel Light Pipe Assembly		

FIGURE 1-7 Power Distribution/Fan Module Components (Sun Fire X4440)

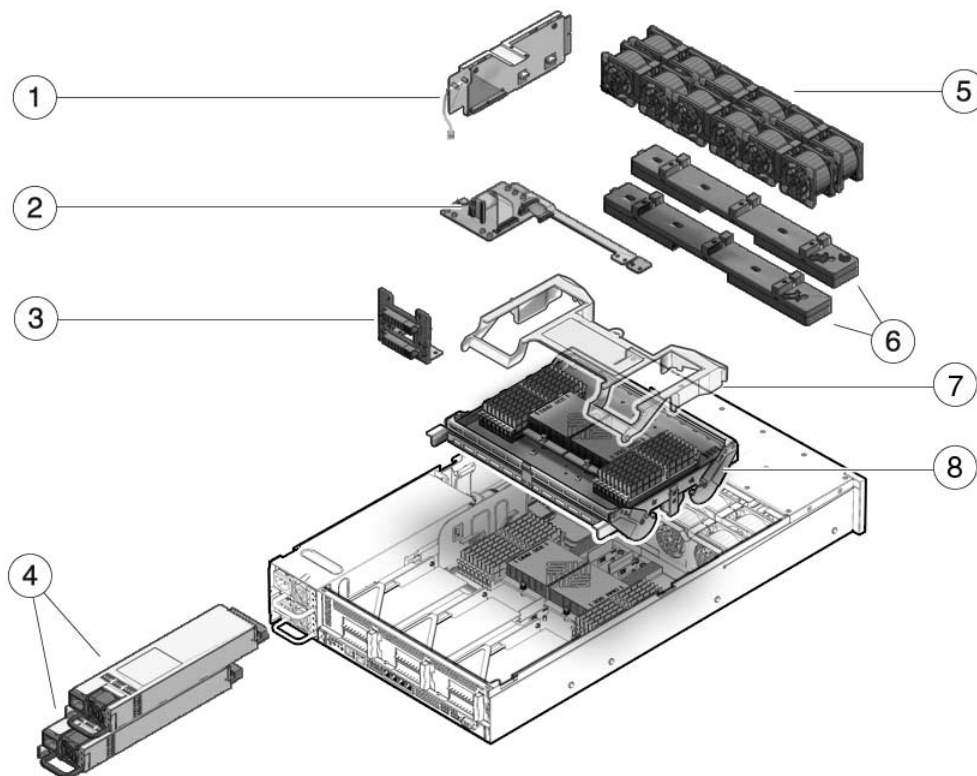


Figure Legend

1	Paddle Card	5	Fan Modules
2	Power Distribution Board/Bus Bar Assembly	6	Fan Boards
3	PSU Backplane	7	Air Baffle
4	Power Supplies	8	Mezzanine Tray

Preparing to Service the System

This chapter describes how to prepare the Sun Fire X4440 for servicing.

The following topics are covered:

- [Section 2.1, “Safety Information” on page 2-1](#)
- [Section 2.2, “SSD Minimum Required Firmware” on page 2-2](#)
- [Section 2.3, “Required Tools” on page 2-2](#)
- [Section 2.4, “Obtaining the Chassis Serial Number” on page 2-3](#)
- [Section 2.5, “Powering Off the Server” on page 2-4](#)
- [Section 2.6, “Extending the Server to the Maintenance Position” on page 2-5](#)
- [Section 2.7, “Removing a Server From the Rack” on page 2-8](#)
- [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures” on page 2-10](#)
- [Section 2.9, “Removing the Top Cover” on page 2-12](#)

2.1 Safety Information

This section describes important safety information that you need to know prior to removing or installing parts in the Sun Fire X4440 server.



Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.



Caution – Equipment damage possible. The covers must be in place for proper air flow.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all Sun cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Sun Hardware Systems* (816-7190).
- Follow all cautions, warnings, and instructions marked on the equipment and described in the *Sun Fire X4450 Server Compliance and Safety Manual*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Follow the electrostatic discharge safety practices as described in this chapter.

2.2 SSD Minimum Required Firmware

BIOS/ILOM Firmware

- BIOS: 0ABMN064
- ILOM: 3.0.3.37

Adaptec/LSI Firmware

- Adaptec FW: 15872
- LSI FW: 1.27.02, MPTBIOS: 6.26.00

Backplane Firmware

- Backplane FW: 5.02.04 (LSI SAS expander)

SSD firmware

- Intel SSD FW: 845C8626

2.3 Required Tools

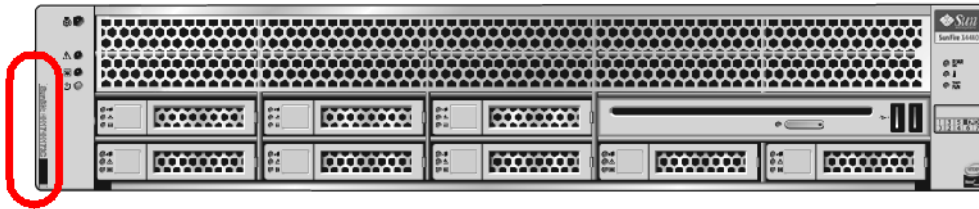
The Sun Fire X4440 server can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver
- Non-conducting No. 1 flat-blade screwdriver (for battery removal), or equivalent
- Non-conducting stylus or pencil (to power on server)

2.4 Obtaining the Chassis Serial Number

To obtain support for your server, you need your chassis serial number. You can find a chassis serial number label on the server front panel on the left side. See [FIGURE 2-1](#). Another chassis serial number label is on the top of the server.

FIGURE 2-1 Chassis Serial Number Label



▼ To View Chassis Serial Number

To view information about a system component, you need the Read Only (o) role enabled.

1. Log in to the ILOM CLI.

2. At the prompt, type:

```
-> cd /SYS
/SYS
-> cd MB
/SYS/MB
-> show chassis_serial_number type
/SYS/MB
Properties:
  chassis_serial_number = 0811QAD01C
  type = Motherboard
```

For more information, see *Sun Integrated Lights Out Manager (ILOM) 3.0 CLI Procedures Guide* (820-6412).

2.5 Powering Off the Server

To remove main power from the server, use one of the methods shown in the following table.

TABLE 2-1 Shutdown Procedures


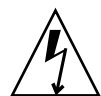
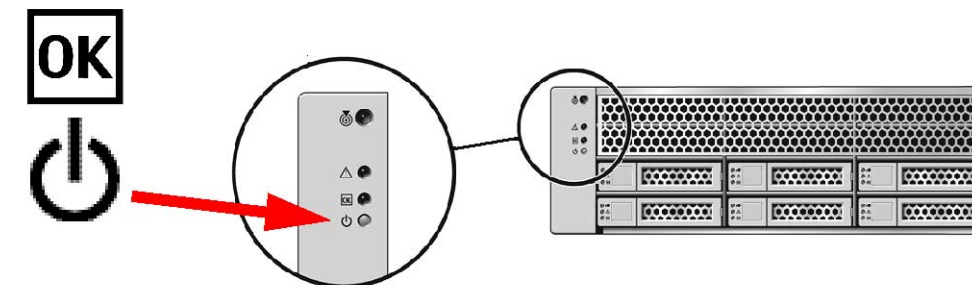
Shutdown	Method
Graceful shutdown	Use a pen, or other non-conducting pointed object, to press and release the Power button on the front panel. Pressing the power button causes Advanced Configuration and Power Interface (ACPI)-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
Emergency shutdown	<p>Press and hold the Power button for at least four seconds until the main power is off and the server enters standby power mode. See FIGURE 2-2.</p> <p>When the main power is off, the Power/OK LED on the front panel flashes, indicating that the server is in standby power mode.</p>
	<div>Caution - All applications and files will be closed abruptly without saving changes. File system corruption might occur.</div>
ILOM SP CLI shutdown	See Section 2.5.1, "Powering Off the Server Using the Service Processor Command Line" on page 2-5.

FIGURE 2-2 Front Panel Power/OK LED



Caution – To completely power off the server, you must disconnect the AC power cords from the rear panel of the server.

2.5.1 Powering Off the Server Using the Service Processor Command Line

You can use the service processor to perform a graceful shutdown of the server and ensure that all of your data is saved and the server is ready for restart.

Refer to the Solaris™ operating system documentation for additional information.

1. **Log in as a superuser or equivalent.**

Depending on the type of problem, you might want to view server status or log files, or run diagnostics before you shut down the server.

2. **Notify affected users.**

3. **Save any open files and quit all running programs.**

Refer to your application documentation for specific information.

4. **Shut down all logical domains.**

5. **Shut down the Solaris OS.**

6. **Open an SSH session.**

7. **Log in to the Service Processor.**

8. **Type:**

```
stop /SYS  
or  
cd /SP/CtrlInfo  
set powerctrl=off
```

2.6 Extending the Server to the Maintenance Position

The following components can be serviced with the server in the maintenance position:

- Hard drives
- SSDs
- Fan modules
- Power supplies

- DVD/USB module
- Fan power boards
- DDR2 DIMMs
- PCIe cards
- Motherboard battery

If the server is installed in a rack with extendable slide rails, use this procedure to extend the server to the maintenance position.

1. **(Optional) Type the following command from the service processor (SP) prompt**
-> **to locate the system that requires maintenance.**

```
-> set /SYS/LOCATE status=on  
Locator indicator is on.
```

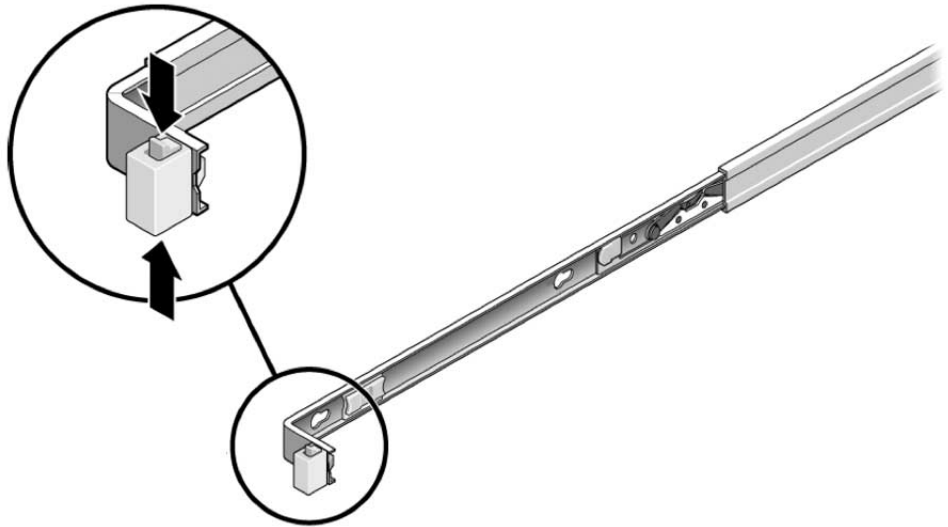
After you have located the server, press the Locator LED/Locator button to turn it off.

2. **Verify that no cables will be damaged or will interfere when the server is extended.**

Although the cable management arm (CMA) that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

3. **Extend the lower floor arm on the cabinet for safety, if present.**
4. **From the front of the server, release the two slide release latches ([FIGURE 2-3](#)).**
Squeeze the green slide release latches to release the slide rails.

FIGURE 2-3 Slide Release Latches



5. While squeezing the slide release latches, slowly pull the server forward until the slide rails latch.

2.7 Removing a Server From the Rack

The server must be removed from the rack to service the following components:

- Motherboard
- Power distribution board
- Power supply backplane
- Vertical PDB card
- Disk cage
- Drives backplane
- Front panel light-pipe assemblies



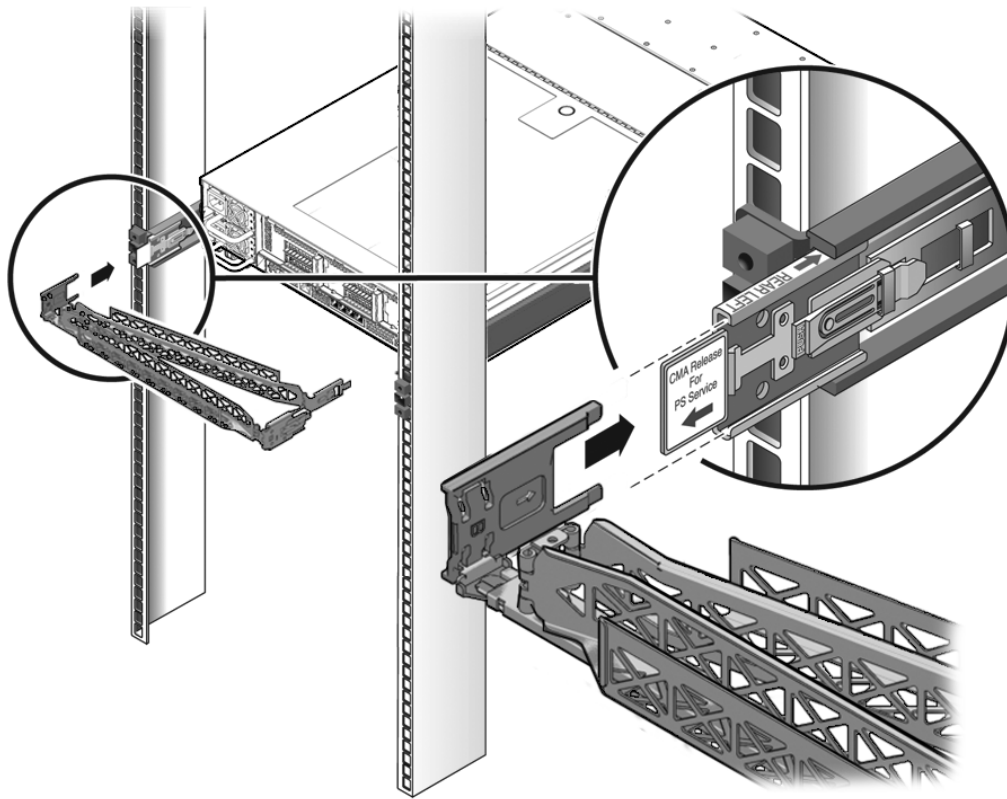
Caution – If necessary, use two people to dismount and carry the chassis.



To remove a server from the rack:

1. **Disconnect all cables and power cords from the server.**
Label the cables (optional).
2. **Extend the lower floor arm on the cabinet for safety, if present**
3. **Extend the server to the maintenance position.**
See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.
4. **Press the metal lever that is located on the inner side of the rail to disconnect the cable management arm (CMA) from the rail assembly (FIGURE 2-4).**
The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA.

FIGURE 2-4 Metal Lever and Cable Management Arm



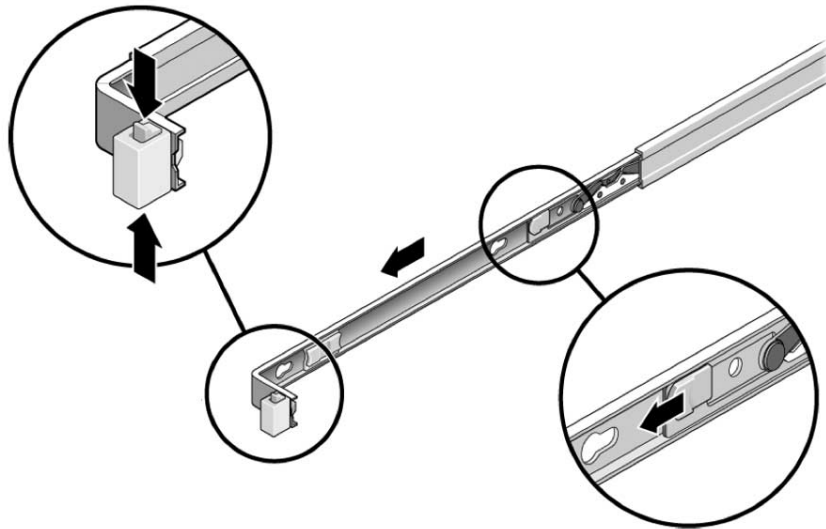
Caution – If necessary, use two people to dismount and carry the chassis.



5. From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails (FIGURE 2-5).

A release tab is located on each rail.

FIGURE 2-5 Release Tabs and Slide Assembly



6. Set the server on a sturdy work surface.

2.8 Performing Electrostatic Discharge and Antistatic Prevention Measures

2.8.1 Electrostatic Discharge Safety Measures

Electrostatic discharge (ESD) sensitive devices, such as the motherboards, PCI cards, drives, SSDs, and memory cards, require special handling.



Caution – Circuit boards, drives, and SSDs contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components without antistatic precautions, especially along the connector edges.



Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

2.8.1.1 Using an Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as drive assemblies, circuit boards, or PCI cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note – An antistatic wrist strap is not included in the accessory kit for the Sun Fire X4440 Server. However, antistatic wrist straps are still included with options.

2.8.1.2 Using an Antistatic Mat

Place static-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

2.8.2 Antistatic Handling Procedure

1. Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.

Place static-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

- Antistatic bag used to wrap a Sun replacement part
- Sun ESD mat, part number 250-1088
- A disposable antistatic mat (shipped with some replacement parts or optional system components)

2. Attach an antistatic wrist strap.

When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

2.9 Removing the Top Cover

The top cover and fan door are integrated.

Note – Some field-replaceable units (FRUs) require removal of the rear cover.

1. Unlatch the fan module door. (FIGURE 2-6 [1])

Pull the two release tabs back to release the door. Rotate the fan door to the open position and hold it there.

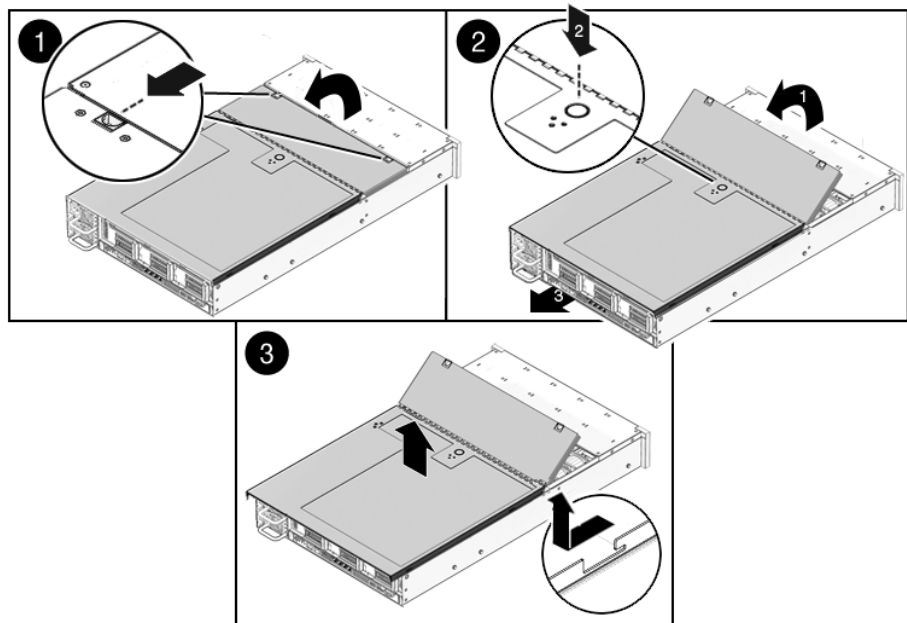
2. Press the top cover release button and slide the top cover to the rear about a half-inch (12.7 mm). [2]

3. Lift up and remove the top cover. [3]



Caution – If the top cover is removed before the server is powered off, the server will immediately go into Standby mode.

FIGURE 2-6 Removing the Top Cover



Servicing Customer-Replaceable Devices

This chapter describes how to replace the hot-swappable and hot-pluggable customer-replaceable units (CRUs) in the Sun Fire X4440 Server. A customer-replaceable unit can be replaced by anyone.

The following topics are covered:

- [Section 3.1, “Devices That Are Hot-Serviceable” on page 3-1](#)
- [Section 3.2, “Servicing Drives” on page 3-2 \(CRU\)](#)
- [Section 3.3, “Servicing Solid-State Drives \(SSDs\)” on page 3-8 \(CRU\)](#)
- [Section 3.4, “Using Drive Fillers” on page 3-10 \(CRU\)](#)
- [Section 3.5, “Servicing Fan Modules” on page 3-10 \(CRU\)](#)
- [Section 3.6, “Servicing Power Supplies” on page 3-16 \(CRU\)](#)
- [Section 3.7, “Servicing the DVD/USB Module” on page 3-22 \(CRU\)](#)

3.1 Devices That Are Hot-Serviceable

3.1.1 Hot-Pluggable Devices

Hot-pluggable devices can be removed and installed while the server is running, but you must perform administrative tasks before or after installing the hardware (for example, mounting a drive).

In the Sun Fire X4440, only drives are hot-pluggable. To hot-plug a drive you must take the drive offline (to prevent any applications from accessing it, and to remove the logical software links to it) before you can safely remove it. See [Section 3.2, “Servicing Drives”](#) on page 3-2.

3.1.2 Hot-Swappable Devices

Hot-swappable devices can be removed and installed while the server is running without affecting the rest of the server’s capabilities.

In the Sun Fire X4440, the following devices are hot-swappable:

- Fan modules. See [Section 3.5, “Servicing Fan Modules”](#) on page 3-10.
- Power supplies. See [Section 3.6, “Servicing Power Supplies”](#) on page 3-16.

Note – The chassis-mounted drives can be hot-swappable, depending on how they are configured. See [Section 3.2, “Servicing Drives”](#) on page 3-2.

3.2 Servicing Drives

The following topics are covered:

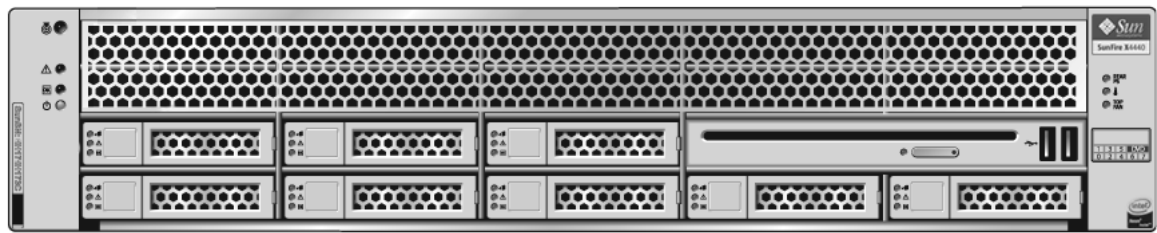
- [Section 3.2.1, “Sun Fire X4440 Server Drive Guidelines”](#) on page 3-2
- [Section 3.2.2, “Drive Status LED Reference”](#) on page 3-3
- [Section 3.2.3, “Removing a Drive”](#) on page 3-4
- [Section 3.2.4, “Installing a Drive”](#) on page 3-6

Note – CRU: This customer-replaceable unit can be replaced by anyone.

3.2.1 Sun Fire X4440 Server Drive Guidelines

[TABLE 3-1](#) shows physical drive locations for a Sun Fire X4440 server with 8 drives.

FIGURE 3-1 Server Front



3.2.2 Drive Status LED Reference

FIGURE 3-2 Drive Status LEDs

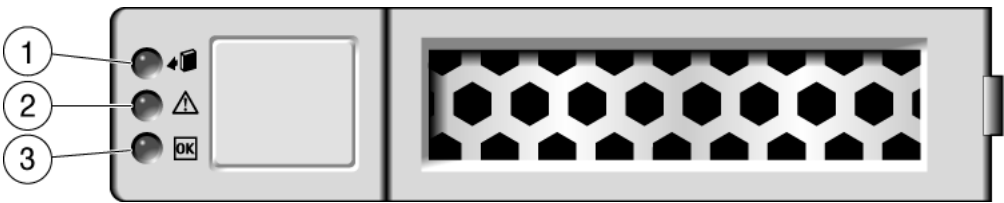





Figure Legend

Legend	LED	Symbol	Color	Lights when
1	OK to Remove		Blue	A drive can be removed safely during a hot-plug operation. Note - The blue "OK to Remove" LED requires OS support and is not functional with all operating systems.
2	Service Required		Amber	The system is running and the drive is faulty. The front and rear panel Service Required LEDs are also lit if the system detects a drive fault.
3	OK/Activity		Green	Data is being read from or written to the drive.

3.2.3 Removing a Drive

Drives can be hot-plugged or cold-plugged. Drives in the Sun Fire X4440 might be hot-pluggable, depending on the drive configuration.

To hot-plug a drive you must take the drive offline (to prevent applications from accessing it, and to remove the logical software links to it) before you can safely remove it.

To remove a drive from a Sun Fire X4440:

1. Identify the drive you want to remove.

The amber Service Required LED might be lit. For specific drive locations, see [Section 3.2.1, “Sun Fire X4440 Server Drive Guidelines” on page 3-2](#).

2. Determine if the drive can be hot-plugged, or cold-plugged.

The following conditions might prevent you from hot-plugging a drive. You must power off the server, if the drive:

- Contains the operating system, and the operating system is not mirrored on another drive.
- Cannot be logically isolated from the online operations of the server.

3. Do one of the following:

■ **To hot-plug a drive:**

Unconfigure the drive, as required. You must take the drive offline before you can safely remove it. Placing the drive offline prevents applications from accessing the drive, and removes logical software links to the drive.

See one of the following HBA documents, if your system uses RAID:

For Sun StorageTek: *Sun StorageTek RAID Manager Software User's Guide*

For LSI MegaRAID Storage Manager (MSM): *x64 Server Utilities Reference Manual*

■ **To cold-plug a drive:**

You must power off the server before you can safely remove the drive. Do one of the procedures described in [Section 2.5, “Powering Off the Server” on page 2-4](#).

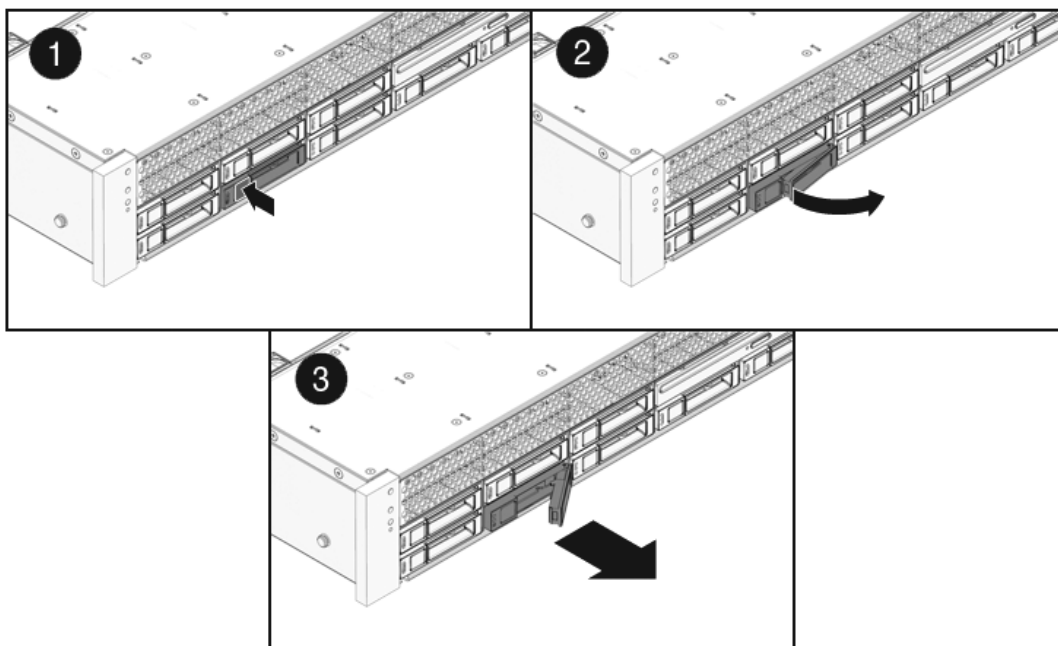
4. On the drive you plan to remove, push the drive release button to open the latch (FIGURE 3-3 [1]).

5. Grasp the latch [2] and pull the drive out of the drive slot [3].



Caution – The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.

FIGURE 3-3 Locating the Drive Release Button and Latch



3.2.4 Installing a Drive

Installing a drive into the Sun Fire X4440 Server is a two-step process. You must first install a drive into the drive slot, and then configure that drive to the server.



Caution – Before inserting a replacement drive, wait 15 seconds, and verify that your monitoring or administration application has detected the missing or failed drive.

To install a drive into a Sun Fire X4440 server:

1. If necessary, remove the drive fillers from the chassis.

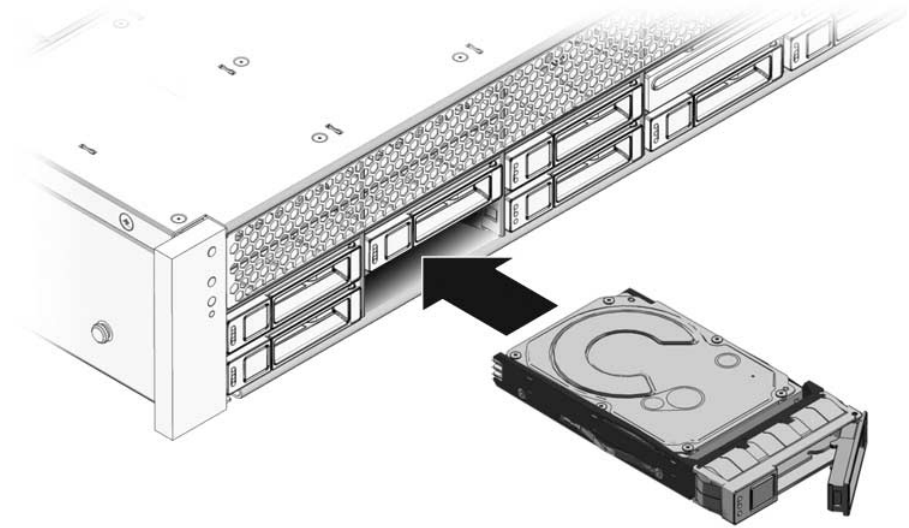
The Sun Fire X4440 might have as many as eight drive fillers covering unoccupied drive slots.

2. Determine the drive slot location for the replacement drive.

If you removed an existing drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed. Drives are physically addressed according to the slot in which they are installed. See [TABLE 3-1](#) for drive locations.

3. Slide the drive into the drive slot until it is fully seated. (FIGURE 3-4)

FIGURE 3-4 Installing a Drive



4. Close the latch to lock the drive in place.

5. Do one of the following:

- **If you have hot-plugged the drive:**

Configure the drive. See one of the following HBA documents:

For Sun StorageTek: *Sun StorageTek RAID Manager Software User's Guide*

For LSI MegaRAID Storage Manager (MSM): *x64 Server Utilities Reference Manual*

- **If you have cold-plugged the drive:**

Restore power to the server. Do the procedure described in [Section 6.4, "Powering On the Server"](#) on page 6-6.

3.3 Servicing Solid-State Drives (SSDs)

The following topics are covered:

- [Section 3.3.1, “Solid-State Drive Guidelines” on page 3-8](#)
- [Section 3.3.2, “Removing a Solid-State Drive” on page 3-9](#)
- [Section 3.3.3, “Installing a Solid-State Drive” on page 3-9](#)

See also [Section 3.4, “Using Drive Fillers” on page 3-10](#)

For latest software versions that support SSDs, see [Section 2.2, “SSD Minimum Required Firmware” on page 2-2](#).

Note – CRU: This customer-replaceable unit can be replaced by anyone.

3.3.1 Solid-State Drive Guidelines

The Sun Fire X4440 servers support solid-state drives (SSDs) under the following conditions:

Sun Fire X4440 with on-board controller:

- One to 4 SSDs can be installed.
- Hard drives are not supported.
- SSDs can be installed in any drive slot.

Sun Fire X4440 with HBA:

- One to 4 SSDs can be installed. The remaining slots can be filled with hard drives that can equal up to 8 drives total. Example: 2 SSD and 6 hard drives.
- SSDs can be installed in any drive slot.
- When replacing or installing a SSD to be included in a RAID configuration, in the Sun Fire X4440 system, make sure that the firmware on the newly installed SSD is the same as the firmware that is installed on the other SSDs in the RAID volume

Note – You can create RAID volumes with SAS hard drives and SATA SSDs, as long as you do not mix them in a same volume.

The following cable kits are used for the HBA controller when using hard drives and SSDs:

TABLE 3-1 Cable Kits for HBA Controller

System	Cable Kit	Order Number
Sun Fire X4240 and X4440	SAS/SATA HBA (2 cables)	4282A

The following cable kits are used for the on-board controller with SSDs:

TABLE 3-2 Cable Kits for HBA Controller

System	Cable Kit	Order Number
Sun Fire X4240 and X4440	SATA On-Board Only (2 cables)	4283A

3.3.2 Removing a Solid-State Drive

The procedure to remove an SSD is the same as removing the hard drive. See [Section 3.2.3, “Removing a Drive” on page 3-4](#).

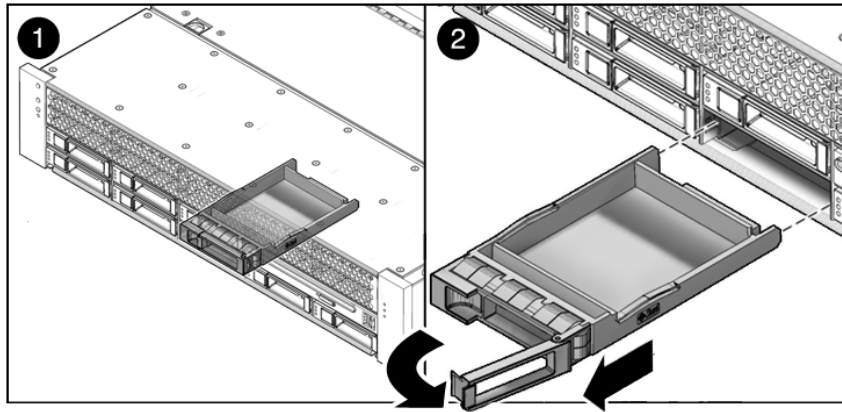
3.3.3 Installing a Solid-State Drive

The procedure to install an SSD is the same as installing the hard drive. See [Section 3.2.4, “Installing a Drive” on page 3-6](#).

3.4 Using Drive Fillers

All drive slots in the Sun Fire X4440 Server must have drive fillers in place during operation to maintain efficient airflow. To remove fillers, pull the ejector and pull the filler out of the chassis. (FIGURE 3-5)

FIGURE 3-5 Drive Filler



3.5 Servicing Fan Modules

The following topics are covered:

- [Section 3.5.1, “About Sun Fire X4440 Fans” on page 3-11](#)
- [Section 3.5.2, “Fan Module LED Reference” on page 3-11](#)
- [Section 3.5.3, “Detecting Fan Module Failure” on page 3-12](#)
- [Section 3.5.4, “Removing a Fan Module” on page 3-13](#)
- [Section 3.5.5, “Installing a Fan Module” on page 3-14](#)

Note – CRU: This customer-replaceable unit can be replaced by anyone.

3.5.1 About Sun Fire X4440 Fans

Six pairs of fan modules are located under the top cover door, providing N+1 cooling redundancy. Each fan module contains two fans mounted in an integrated, hot-swappable CRU.



If a fan module fails, replace the fan as soon as possible to maintain server availability.

Fan modules are hot-swappable and can be removed and installed while the server is running without affecting the rest of the server's capabilities.

3.5.2 Fan Module LED Reference

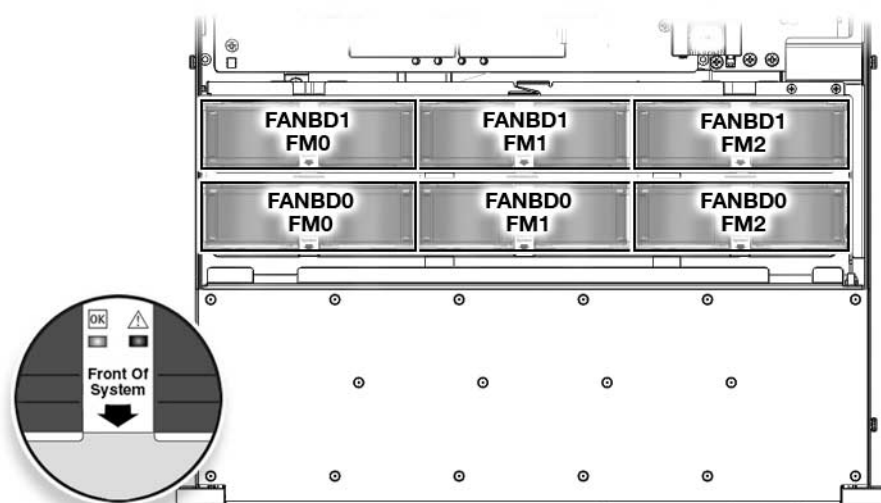
Each fan module contains LEDs that are visible when you open the fan tray access door. [TABLE 3-4](#) describes fan tray module LEDs and their functions.

TABLE 3-3 Fan Module Status LEDs

LED		Color	Lights when...
Power/OK		Green	The system is powered on and the fan module is functioning correctly.
Service Required		Amber	The fan module is faulty. The front and rear panel Service Required LEDs are also lit if the system detects a fan module fault.

[FIGURE 3-6](#) shows the fan module locations.

FIGURE 3-6 Fan Module Locations



3.5.3 Detecting Fan Module Failure

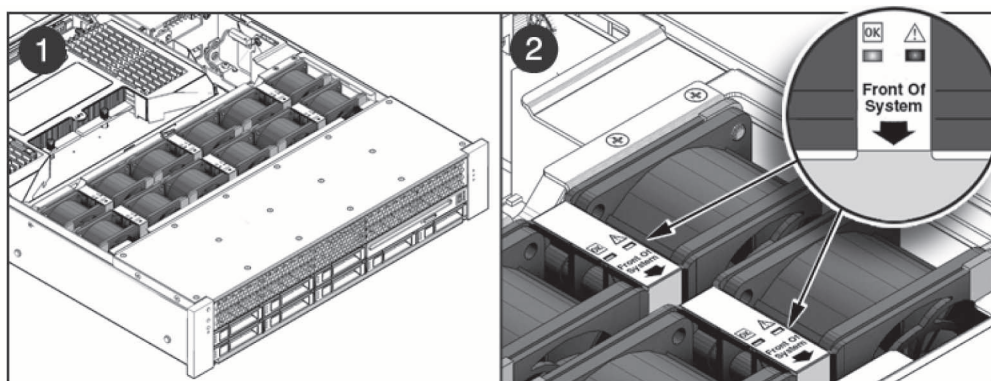
The following LEDs are lit when a fan module fault is detected:

- Service Required LEDs, on the front and rear of the server
- Top Fan LED, on the front of the server
- Fan Fault LED, on or adjacent to the faulty fan module

If an overtemperature condition occurs, the front panel CPU overtemperature LED becomes lit and a message is displayed on the console and logged by the ILOM. Refer to the *Sun Integrated Lights Out Manager User's Guide*.

The system Overtemp LED might be lit if a fan fault causes an increase in system operating temperature. See [Chapter 1, Section 1.3, "Sun Fire X4440 Front Panel Features" on page 1-9](#) for more information about system status LEDs.

FIGURE 3-7 Detecting a Faulty Fan Module



3.5.4 Removing a Fan Module



Caution – Hazardous moving parts. Unless the power to the server is completely shut down, the only service permitted in the fan compartment is the replacement of the fan modules by trained personnel.

1. Extend the server into the maintenance position.

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.

2. Unlatch the fan module door.

Pull the release tabs back to release the door. Open the top cover toward the rear of the server.

Note – Close the top cover door immediately after replacing the fan to maintain airflow in the server. Leaving the door open for more than 60 seconds while the server is running might cause the server to overheat and shut down.

3. Identify the faulty fan module with a corresponding Service Required LED.

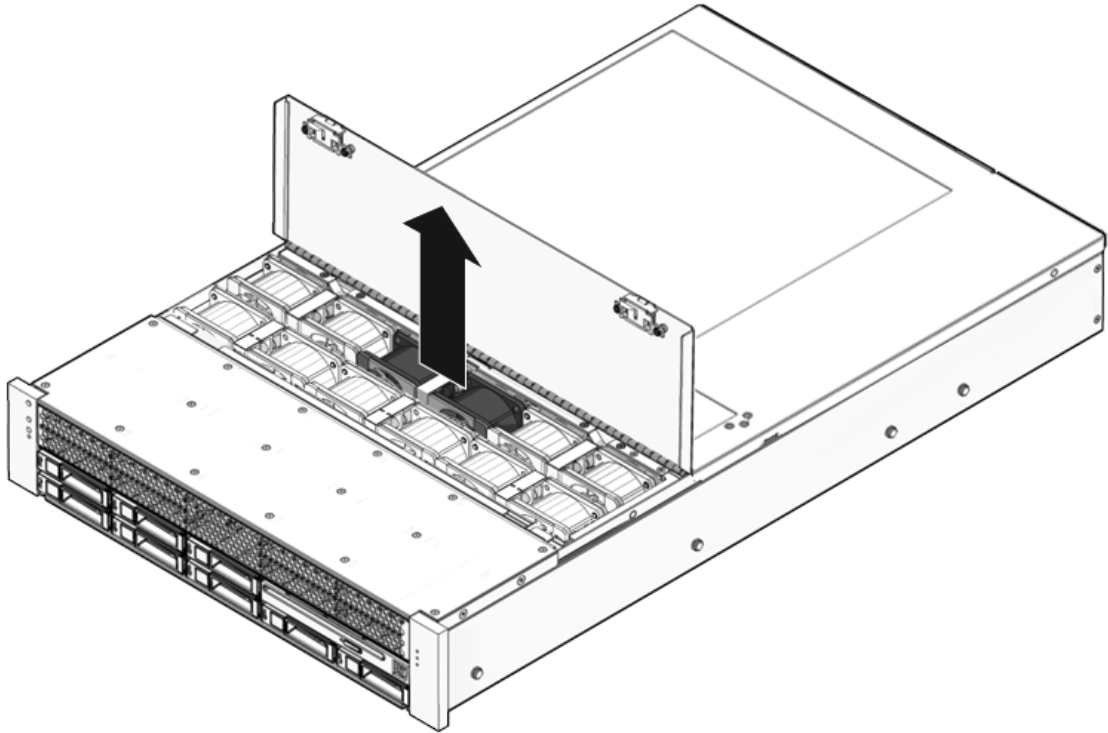
The Fan Fault LEDs are located on the fan board.

4. Using thumb and forefinger in between the two fans, pull the fan module up and out of the connector.



Caution – When changing the fan modules, note that only the fan modules can be removed or replaced. Do not service any other components in the fan compartment unless the system is shut down and the power cords are removed.

FIGURE 3-8 Removing a Fan Module

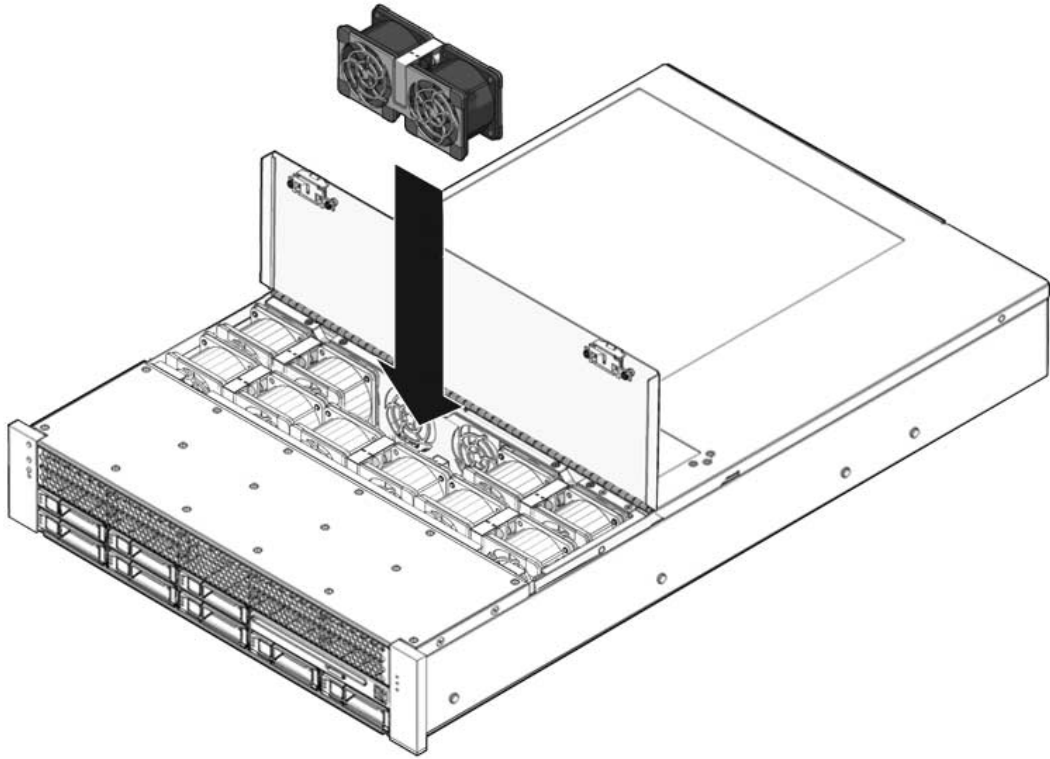


3.5.5 Installing a Fan Module

1. With the top cover door open, install the replacement fan module into the server (FIGURE 3-9).

The fan modules are keyed to ensure that they are installed in the correct orientation.

FIGURE 3-9 Installing a Fan Module



2. Apply firm pressure to fully seat the fan module.
3. Verify that the Fan OK LED is lit, and that the Fan Fault LED on the replaced fan module is not lit.
4. Close the top cover door.
5. Verify that the Top Fan LED, Service Required LEDs, and the Locator LED/Locator button are not lit.

See [Section 1.2, “Sun Fire X4440 Server Chassis Overview”](#) on page 1-3 for more information about identifying and interpreting system LEDs.

3.6 Servicing Power Supplies

Some versions of the Sun Fire X4440 Servers are equipped with redundant hot-swappable power supplies. Redundant power supplies enable you to remove and replace a power supply without shutting the server down, provided that the other power supply is online and working.

FIGURE 3-10 Power Supplies



Caution – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper air flow in the server.

The following topics are covered:

- [Section 3.6.1, “Detecting Power Supply Failure” on page 3-17](#)
- [Section 3.6.2, “Power Supply LED Reference” on page 3-17](#)
 - Includes specific information about power supply status LEDs.
- [Section 3.6.3, “Removing a Power Supply” on page 3-18](#)
- [Section 3.6.4, “Installing a Power Supply” on page 3-20](#)

Note – CRU: This customer-replaceable unit can be replaced by anyone.

3.6.1 Detecting Power Supply Failure

The following LEDs are lit when a power supply fault is detected:

- Front and rear Service Required LEDs
- Rear PS Failure LED on the bezel of the server
- Failure LED on the faulty power supply

See [Section 3.6.2, “Power Supply LED Reference” on page 3-17](#) for power supply LED information.

See [Section 1.3, “Sun Fire X4440 Front Panel Features” on page 1-9](#) and [Section 1.4, “Sun Fire X4440 Rear Panel Features” on page 1-10](#) for more information about identifying and interpreting system LEDs.

3.6.2 Power Supply LED Reference

Each power supply contains a series of LEDs on the rear panel of the system.

FIGURE 3-11 Power Supply Status LEDs

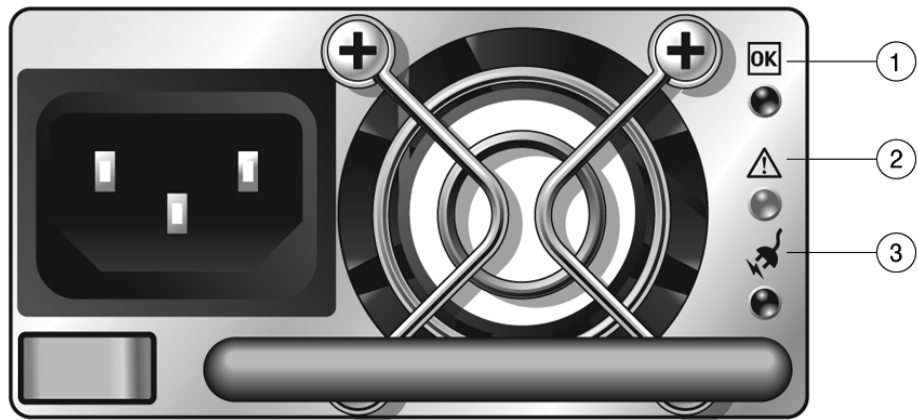





Figure Legend

Legend	LED	Symbol	Color	Lights when
1	AC Present		Green	The power supply is plugged in and AC power is available, regardless of system power state.
2	Service Required		Amber	The power supply is faulty. The front and rear panel Service Required LEDs are also lit if the system detects a power supply fault.
3	OK to Remove		Green	A power supply can be removed safely during a hot-swap operation.

3.6.3 Removing a Power Supply

If space is limited behind the server, you might need to remove the server from the rack. See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.



Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

1. Determine which power supply (0 or 1) requires replacement.

A lit (amber) failure LED on a power supply indicates that a failure was detected.

2. Gain access to the rear of the server where the faulty power supply is located.

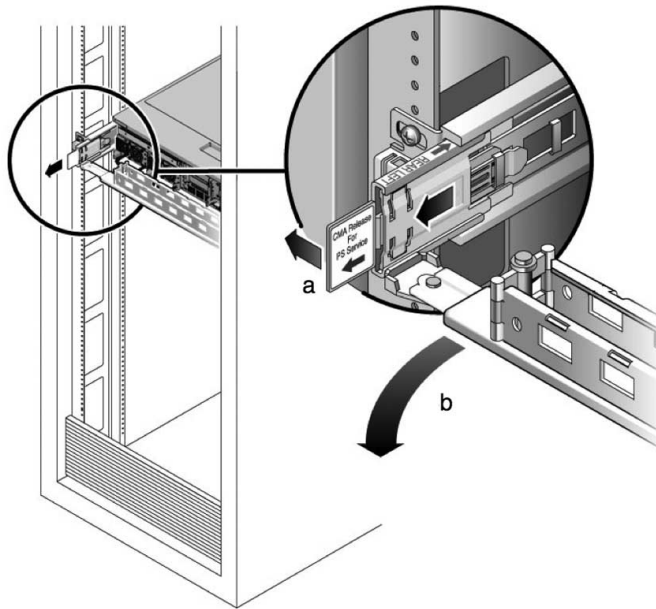
3. Release the cable management arm (CMA). (FIGURE 3-12)

The CMA is located at the rear of the server rack.

a. Press and hold the tab.

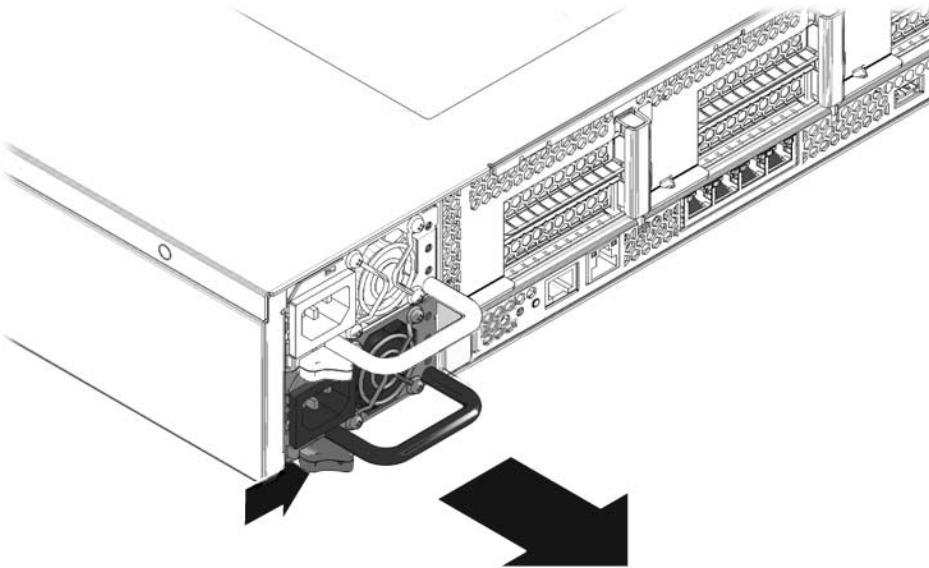
b. Rotate the cable management arm out of the way so that you can access the power supply.

FIGURE 3-12 Releasing the Cable Management Arm



4. Disconnect the power cord from the faulty power supply.
5. Grasp the power supply handle and press the release latch. (FIGURE 3-13)
6. Pull the power supply out of the chassis.

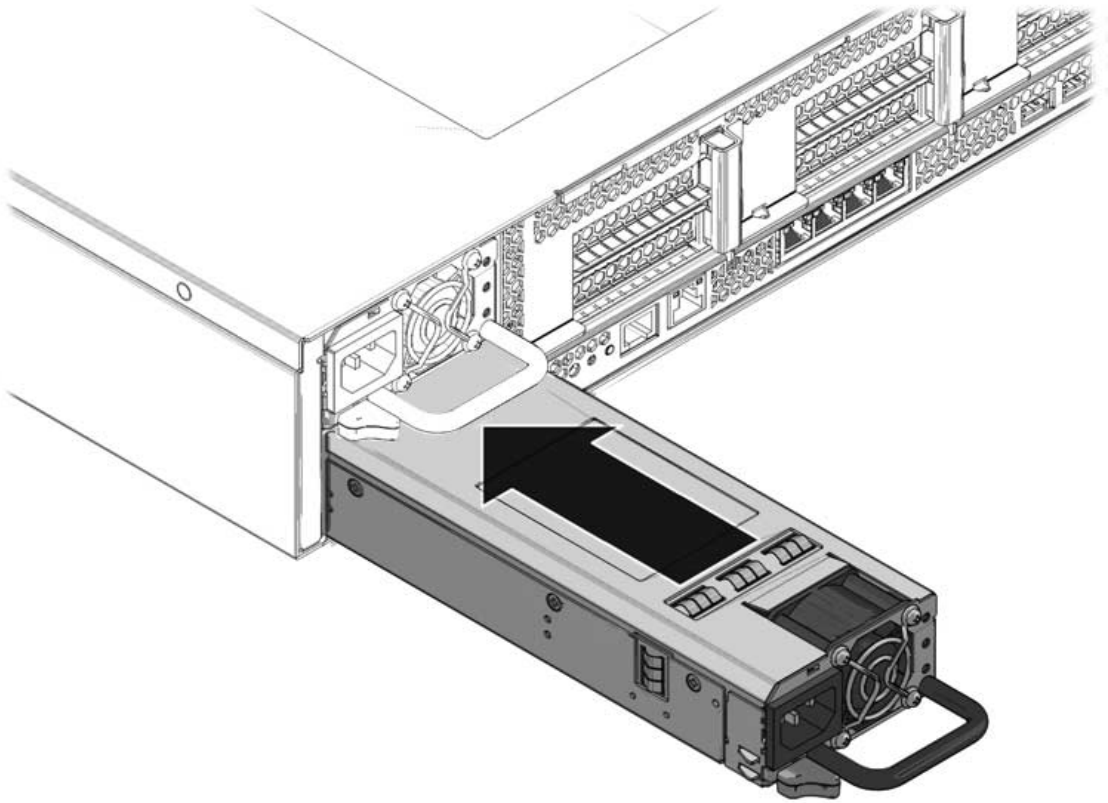
FIGURE 3-13 Power Supply Release Handle



3.6.4 Installing a Power Supply

1. Align the replacement power supply with the empty power supply chassis bay.
2. Slide the power supply into the bay until it is fully seated. (FIGURE 3-14)
3. Reconnect the power cord (or cords) to the power supply (or supplies).
Verify that the AC Present LED is lit.
4. Close the CMA, inserting the end of the CMA into the rear left rail bracket (FIGURE 3-12).

FIGURE 3-14 Installing a Power Supply



5. Verify that the following LEDs are not lit:

- Failure LED on the replaced power supply
- Service Required LED
- Front Service Required LED
- Rear Service Required LED

Note – See [Section 1.3, “Sun Fire X4440 Front Panel Features”](#) on page 1-9 and [Section 1.4, “Sun Fire X4440 Rear Panel Features”](#) on page 1-10 for more information about identifying and interpreting system LEDs.

6. Verify the status of the power supplies.

Solaris OS: At the -> prompt, type the `showenvironment` command.

Linux OS: Refer to the *Sun Integrated Lights Out Manager User's Guide*.

Windows OS: Refer to the *Sun Integrated Lights Out Manager User's Guide*.

3.7 Servicing the DVD/USB Module

The DVD drive and front USB board are mounted in a removable module that is accessible from the front panel of the system. The DVD/USB module must be removed from the drive cage to service the drives backplane.

Note – CRU: This customer-replaceable unit can be replaced by anyone.

3.7.1 Removing the DVD/USB Module

1. **Remove media from the drive.**
2. **Prepare the server for service.**
 - a. **Power off the server.**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Attach an antistatic wrist strap.**

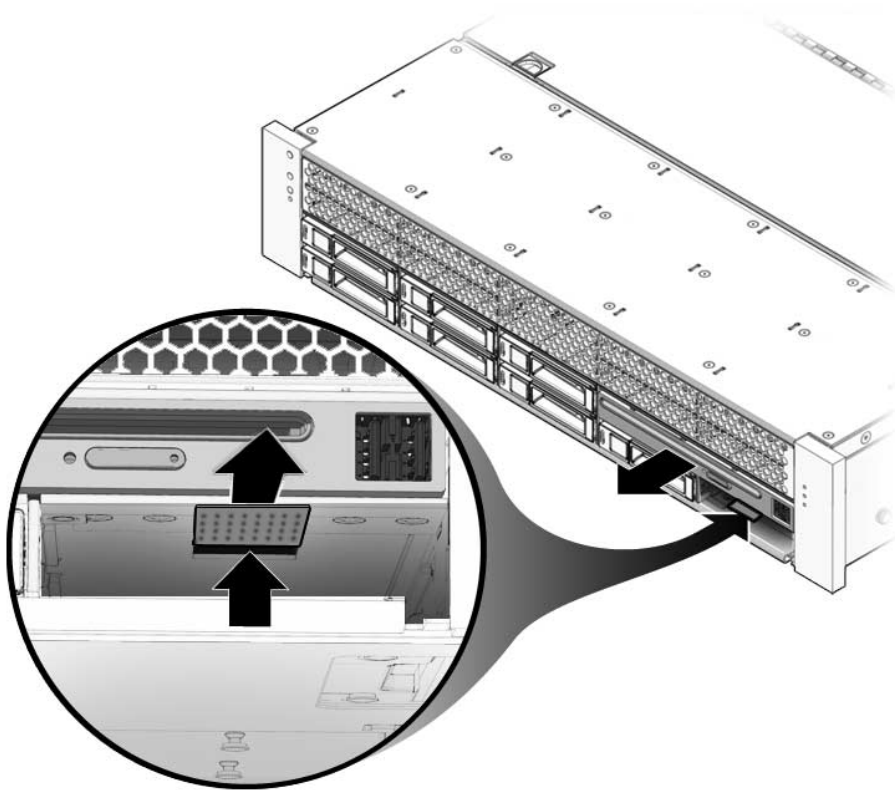
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
3. **Remove the Sun Fire X4440 HDD7 hard drive.**

See [Section 1.2, “Sun Fire X4440 Server Chassis Overview”](#) on page 1-3 for drive locations.
4. **Release the DVD/USB module from the drives backplane. (FIGURE 3-15)**

Use the sliding pull tab in the drive bay below the DVD/USB module to detach the module from the backplane.
5. **Slide the DVD/USB module out of the drive cage.**

6. Place the module on an antistatic mat.

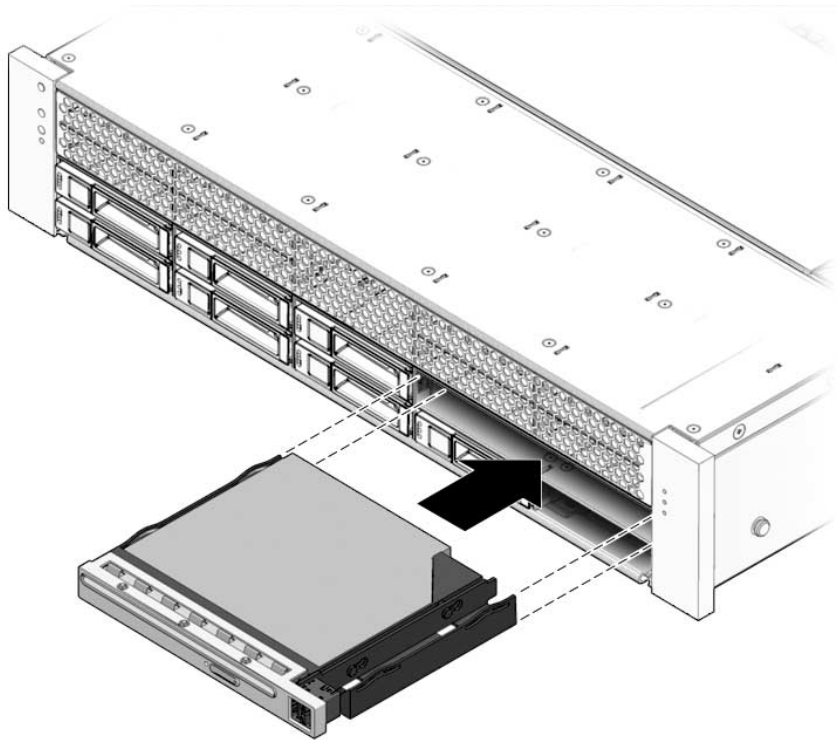
FIGURE 3-15 Removing the DVD/USB Module



3.7.2 Installing the DVD/USB Module

1. Slide the DVD/USB module into the front of the chassis until it seats.
([FIGURE 3-16](#))
2. Install the drive you removed during the DVD/USB module removal procedure.
3. Power on the server.
See [Section 6.4, "Powering On the Server"](#) on page 6-6.

FIGURE 3-16 Installing the DVD/USB Module



Servicing Motherboard Components

This chapter describes how to replace the motherboard and its components in the Sun Fire X4440 server.

Note – Before performing any of the procedures in this chapter, perform the procedures described in [Chapter 2, Preparing to Service the System](#).

Some of the procedures in this chapter are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the list below. FRU components should be replaced only by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

The following topics are covered in this chapter:

- [Section 4.1, “Servicing DDR2 DIMMs” on page 4-2](#) (CRU)
- [Section 4.2, “Servicing the Mezzanine Tray” on page 4-12](#) (CRU)
- [Section 4.3, “Servicing Air Ducts” on page 4-16](#) (CRU)
- [Section 4.4, “Servicing PCIe Risers” on page 4-21](#) (CRU)
- [Section 4.5, “Servicing PCIe Cards” on page 4-24](#) (CRU)
- [Section 4.6, “Servicing the Battery” on page 4-31](#) (CRU)
- [Section 4.7, “Servicing the Motherboard Assembly” on page 4-34](#) (FRU)
- [Section 4.8, “Servicing CPUs” on page 4-42](#) (FRU)
- [Section 4.9, “Resetting Passwords and Clearing CMOS NVRAM” on page 4-49](#)
- [Section 4.10, “Recovering From Corrupt Service Processor Software” on page 4-52](#)
- [Section 4.11, “Using the Reset and NMI Switches” on page 4-55](#)
- [Section 4.12, “Upgrading Two Socket to Four Socket” on page 4-55](#)



Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.



Caution – Equipment damage possible. The covers must be in place for proper air flow.

4.1 Servicing DDR2 DIMMs

This section describes how to diagnose and replace faulty DDR2 (Double-Data Rate) DIMMs. The following topics are covered:

- [“Identifying Faulty DIMMs” on page 4-2](#)
- [“DDR2 DIMM Guidelines” on page 4-5](#)
 - (Includes additional DDR2 DIMM information.)
- [“Removing DDR2 DIMMs” on page 4-7](#)
- [“Installing DDR2 DIMMs” on page 4-9](#)
- [“Installing Additional DDR2 DIMMs” on page 4-11](#)
(How to upgrade the server with additional DDR2 DIMMs)

Refer to the *Sun Fire X4140, X4240, and X4440 Servers Diagnostics Guide* for additional DIMM troubleshooting information.

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.8.1, “Electrostatic Discharge Safety Measures” on page 2-10](#).

4.1.1 Identifying Faulty DIMMs

The system fault LED lights if the system detects a DDR2 DIMM fault.

1. Prepare the server for service.

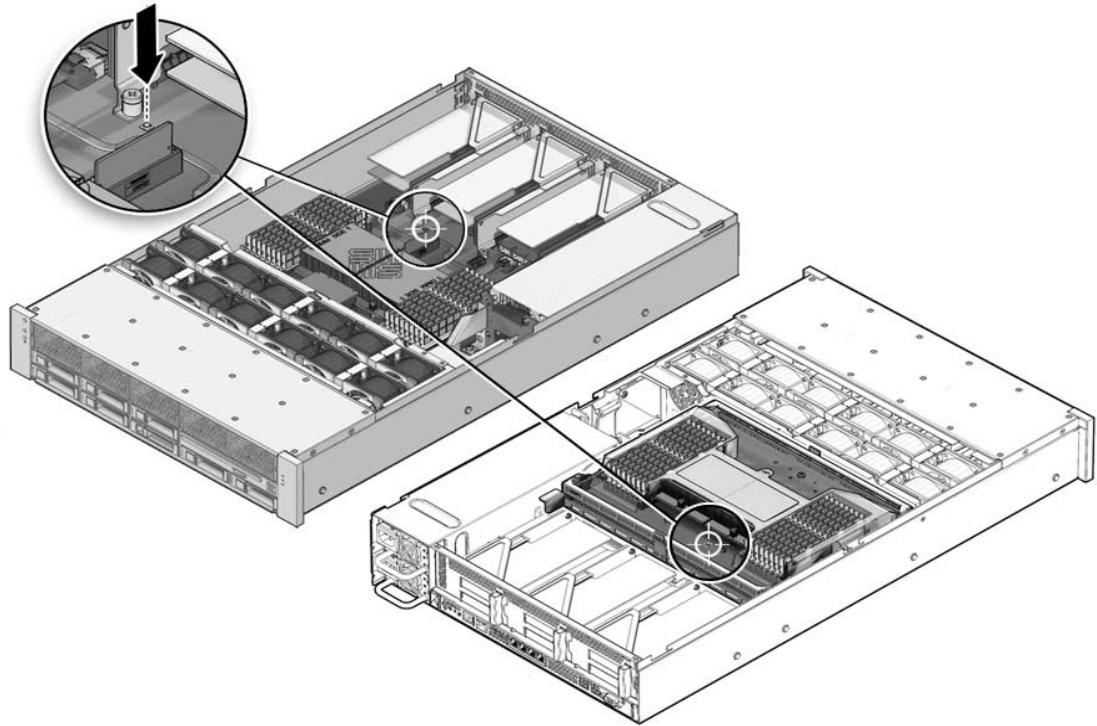
a. Power off the server.

See [Section 2.5, “Powering Off the Server” on page 2-4](#).

- b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
- 2. **Press and hold the Fault Remind button on the mezzanine tray to identify which DDR2 DIMM is faulty. (FIGURE 4-1)**
 - 3. **Note the location of faulty DDR2 DIMMs.**
A faulty DDR2 DIMM is identified with a corresponding flashing amber LED on the motherboard.
 - 4. **Ensure that all DDR2 DIMMs are seated correctly in their slots. If re-seating the memory does not fix the problem, remove and replace the faulty memory.**

Note – Refer to the *Sun Fire X4140, X4240, and X4440 Servers Diagnostics Guide* for more information about DIMM System Event Log (SEL) messages.

FIGURE 4-1 Fault Remind Button Locations

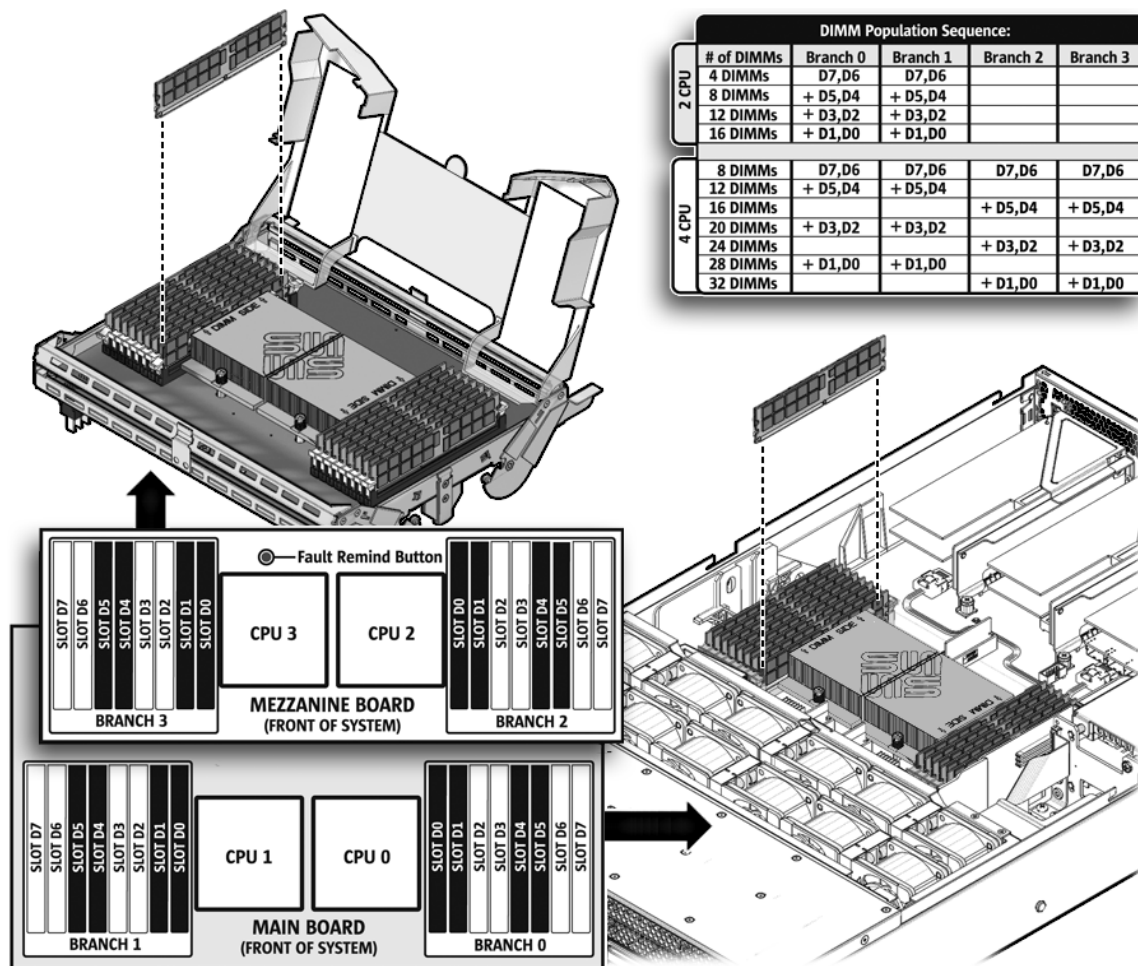


4.1.2 DDR2 DIMM Guidelines

Use the DDR2 DIMM guidelines, and [FIGURE 4-2](#) to help you plan the memory configuration of your server.

- There are 32 slots, 16 on the mezzanine tray, and 16 on the motherboard, in four branches, that hold industry-standard DDR2 DIMM modules.
- All DDR2 DIMMs must be the same density (same type).
- The Sun Fire X4440 supports the following configurations:
 - From: 2 DDR2 DIMMs (minimum configuration)
 - To: 32 DDR2 DIMMs (fully populated configuration)In increments of 2 DDR2 DIMMs.
- At minimum, Branch 0 must be fully populated with two DDR2 DIMMs of the same density (same type).

FIGURE 4-2 DDR2 DIMM Layout



4.1.2.1 DDR2 DIMM Placement

Refer to the service label on the cover for DDR2 DIMM placement information. Refer to the *Sun Fire X4140, X4240, and X4440 Servers Diagnostics Guide* for additional DDR2 DIMM information.

The DIMM population rules for the server are as follows:

- Each CPU can support a maximum of eight DIMMs.
- The DIMM slots are paired and the DIMMs must be installed in pairs (0-1, 2-3, 4-5, and 6-7). The memory sockets are colored black or white to indicate which slots are paired by matching colors.

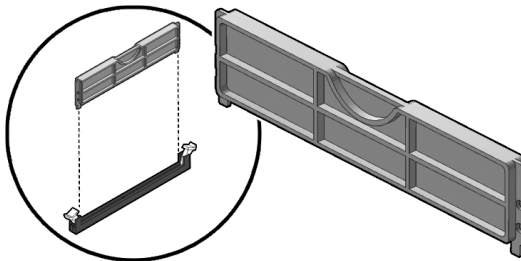
- DIMMs are populated starting from the outside (away from the CPU) and working toward the inside.
- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's outside white DIMM slots (6 and 7).
- Only DDR2 800 Mhz, 667Mhz, and 533Mhz DIMMs are supported.
- Each pair of DIMMs must be identical (same manufacturer, size, and speed).

Note – DDR2 DIMM names in Integrated LOM messages are displayed with the full name, such as /SYS/MB/P0/D7.

4.1.2.2 DDR2 DIMM Fillers

DDR2 DIMM fillers are installed in all unoccupied DIMM sockets. All sockets must be occupied by either a filler or a DDR2 DIMM. When DDR2 DIMMs are added, remove the fillers. When DDR2 DIMM are removed, add extra fillers. Always place fillers in empty sockets.

FIGURE 4-3 Fillers for DDR2 DIMM Slots



4.1.3 Removing DDR2 DIMMs



Caution – Ensure that all power is removed from the server before removing or installing DDR2 DIMMs. You must disconnect the power cables before performing this procedure.

1. Review [Section 4.1.2, “DDR2 DIMM Guidelines”](#) on page 4-5 for memory configuration information.
2. Prepare the server for service.

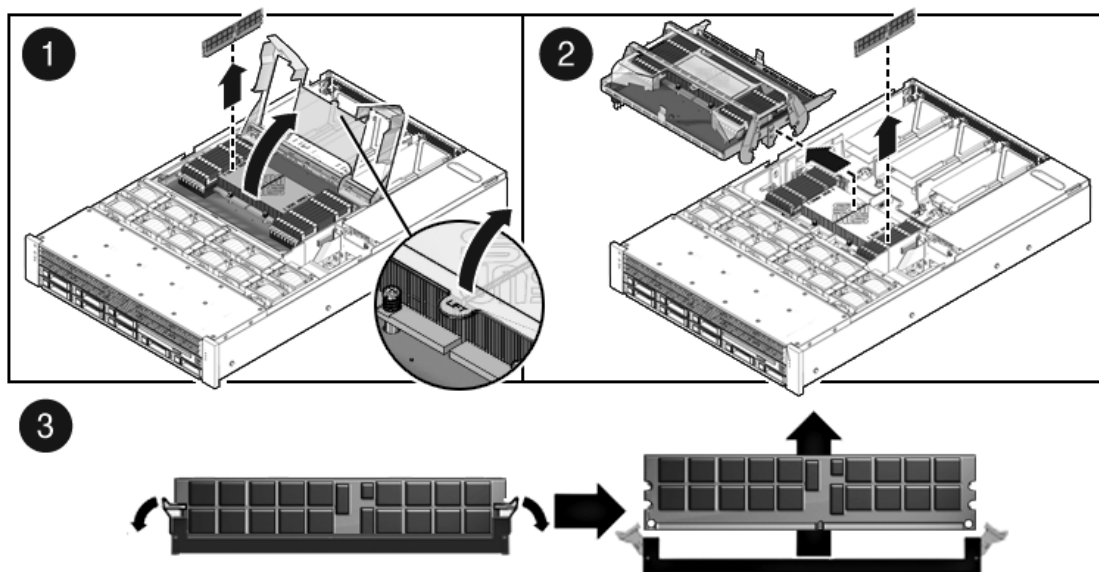
- a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
3. **If you are replacing a faulty DDR2 DIMM, press the Fault Remind button on the motherboard and mezzanine tray to locate the DDR2 DIMM that you want to replace.**

The faulty DDR2 DIMM LED flashes when the Fault Remind button is pressed and held. All faulty DIMMs are indicated with an amber LED, so that you can install the replacement DDR2 DIMM in the same location.
 4. **Do one of the following.**
 - If the faulty DIMM is located on the mezzanine board, then lift up the air duct. ([FIGURE 4-4 \[1\]](#)).
 - If the faulty DIMM is located on the motherboard, then remove the mezzanine tray. See [Section 4.2, “Servicing the Mezzanine Tray”](#) on page 4-12.

Tip – Make a note of the faulty DDR2 DIMM location.

5. **Push down on the ejector tabs on each side of the DDR2 DIMM until the DIMM is released** ([FIGURE 4-4](#)).
6. **Grasp the top corners of the faulty DDR2 DIMM and remove it from the server.**

FIGURE 4-4 Removing DDR2 DIMM



7. Place the DDR2 DIMM on an antistatic mat.
8. Repeat [Step 5](#) through [Step 7](#) to remove any additional DDR2 DIMMs.

4.1.4 Installing DDR2 DIMMs



Caution – Ensure that all power is removed from the server before removing or installing DDR2 DIMMs, or damage to the DDR2 DIMM might occur. You must disconnect all power cables from the system before performing this procedure.

Tip – See [Section 4.1.2, “DDR2 DIMM Guidelines”](#) on page 4-5 for information about configuring the DDR2 DIMMs.

1. Unpack the replacement DDR2 DIMMs and place them on an antistatic mat.
2. Ensure that the ejector tabs are in the open position.
3. Line up the replacement DDR2 DIMM with the connector ([FIGURE 4-5](#)).
Align the DDR2 DIMM notch with the key in the connector. This ensures that the DDR2 DIMM is oriented correctly.

4. **Push the DDR2 DIMM into the connector until the ejector tabs lock the DDR2 DIMM in place.**

If the DDR2 DIMM does not easily seat into the connector, verify that the orientation of the DDR2 DIMM is as shown in [FIGURE 4-5](#). If the orientation is reversed, damage to the DDR2 DIMM might occur.

5. **Repeat [Step 2](#) through [Step 4](#) until all replacement DDR2 DIMM are installed.**
6. **Do one of the following.**
 - If the faulty DIMM was located on the mezzanine board, then lower the air duct. ([FIGURE 4-5 \[1\]](#)).
 - If the faulty DIMM was located on the motherboard, then replace the mezzanine tray. See [Section 4.2, “Servicing the Mezzanine Tray”](#) on page 4-12.

7. **Return the server to operation.**

- a. **Install the top cover.**

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

- b. **Slide the server into the rack.**

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

- c. **Reconnect the power cord (or cords) to the power supply (or supplies).**

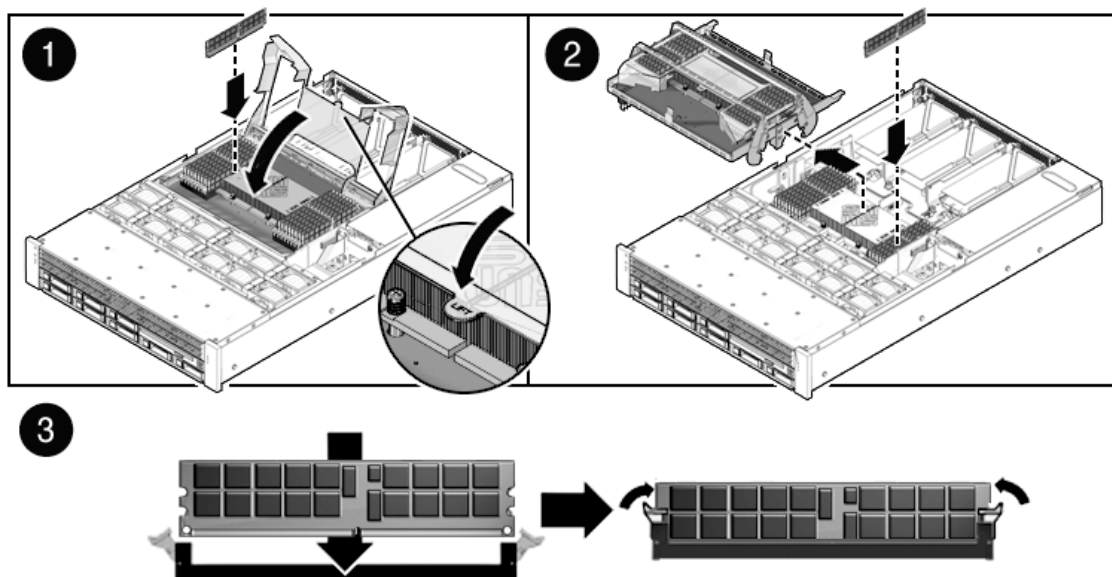
Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

- d. **Power on the server.**

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 4-5 Installing DDR2 DIMMs



4.1.5 Installing Additional DDR2 DIMMs

Before you begin, see [Section 4.1.2, “DDR2 DIMM Guidelines” on page 4-5](#), for information about DDR2 DIMM configuration guidelines.



Caution – Ensure that all power is removed from the server before installing DDR2 DIMMs or damage to the DDR2 DIMMs might occur. You must disconnect all power cables from the system before performing this procedure.

1. Remove the mezzanine tray, to access the DIMMs, if the DIMMs are located on the motherboard.
See [Section 4.2.1, “Removing the Mezzanine Tray” on page 4-13](#).
2. Remove any fillers to be replaced with DIMMs.
Set the fillers aside for future use if needed later.
3. Unpack the replacement DDR2 DIMMs and place them on an antistatic mat.
4. Ensure that the ejector tabs are in the open position.

5. Line up the DDR2 DIMM with the connector (FIGURE 4-5).

Align the DDR2 DIMM notch with the key in the connector. This ensures that the DDR2 DIMM is oriented correctly.

6. Push the DDR2 DIMM into the connector until the ejector tabs lock the DIMM in place.

If the DDR2 DIMM does not easily seat into the connector, verify that the orientation of the DDR2 DIMM is as shown in FIGURE 4-4. If the orientation is reversed, damage to the DDR2 DIMM might occur.

7. Repeat Step 2 through Step 6 until all DDR2 DIMMs are installed.

8. Do one of the following.

- If the faulty DIMM was located on the mezzanine board, then lower the air duct. (FIGURE 4-5 [1]).
- If the faulty DIMM was located on the motherboard, then replace the mezzanine tray. See Section 4.2, “Servicing the Mezzanine Tray” on page 4-12.

9. Return the server to operation.

a. Install the top cover.

See Section 6.1, “Installing the Top Cover” on page 6-2.

b. Slide the server into the rack.

See Section 6.3, “Returning the Server to the Normal Rack Position” on page 6-4.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See Section 6.4, “Powering On the Server” on page 6-6.

d. Power on the server.

See Section 6.4, “Powering On the Server” on page 6-6.

4.2 Servicing the Mezzanine Tray

The following topics are covered:

- “Removing the Mezzanine Tray” on page 4-13
- “Installing the Mezzanine Tray” on page 4-14

You must remove the mezzanine tray when removing and installing the motherboard.

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – Ensure that all power is removed from the server before installing mezzanine tray or damage to system components might occur. You must disconnect all power cables from the system before performing this procedure.

4.2.1 Removing the Mezzanine Tray

1. **Prepare the server for service.**
 - a. **Power off the server.**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**

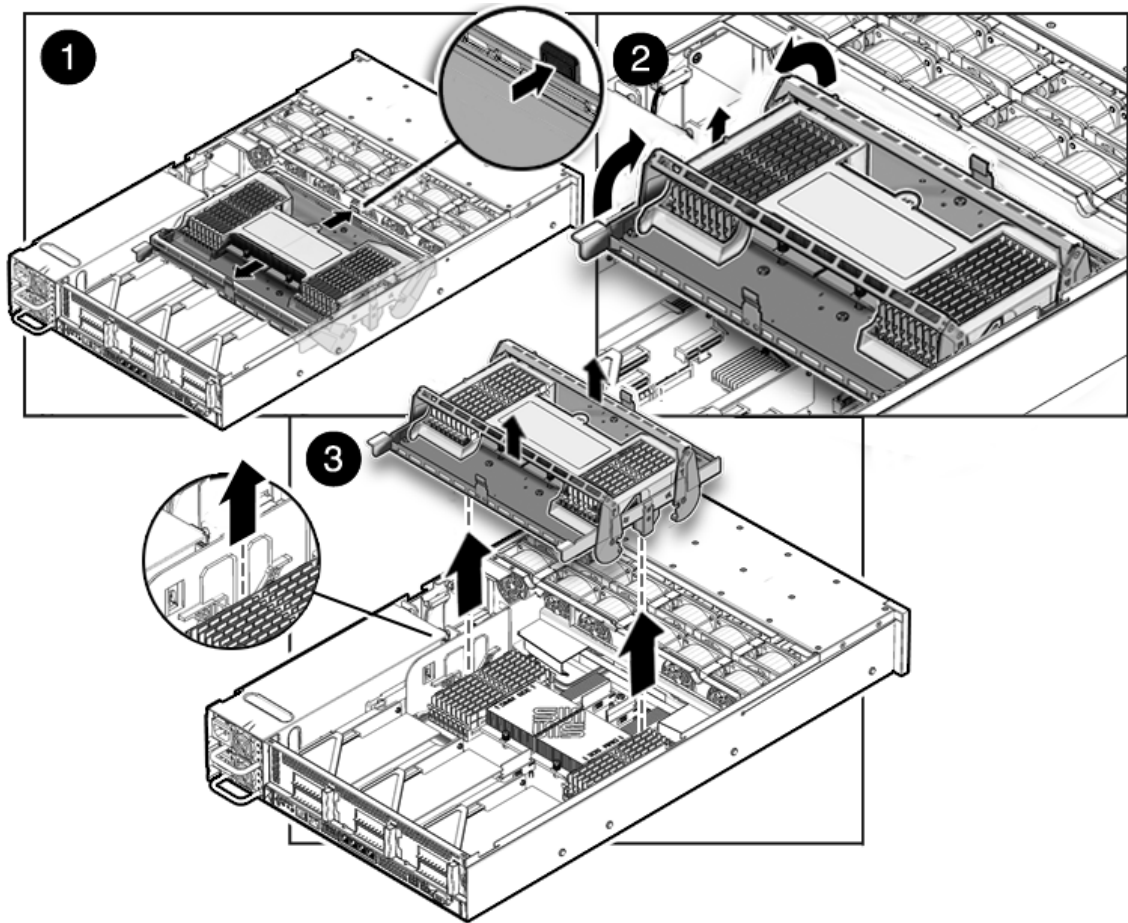
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Unlock the two mezzanine tray tabs by pressing away from the mezzanine tray, as shown in [FIGURE 4-6](#). [1]**
3. **Grab the handles and rotate the handles towards the center of the mezzanine tray [2].**
4. **Lift the mezzanine tray up [3].**
5. **Set the mezzanine tray aside.**

Place the mezzanine tray on an antistatic mat.

FIGURE 4-6 Removing the Mezzanine Tray

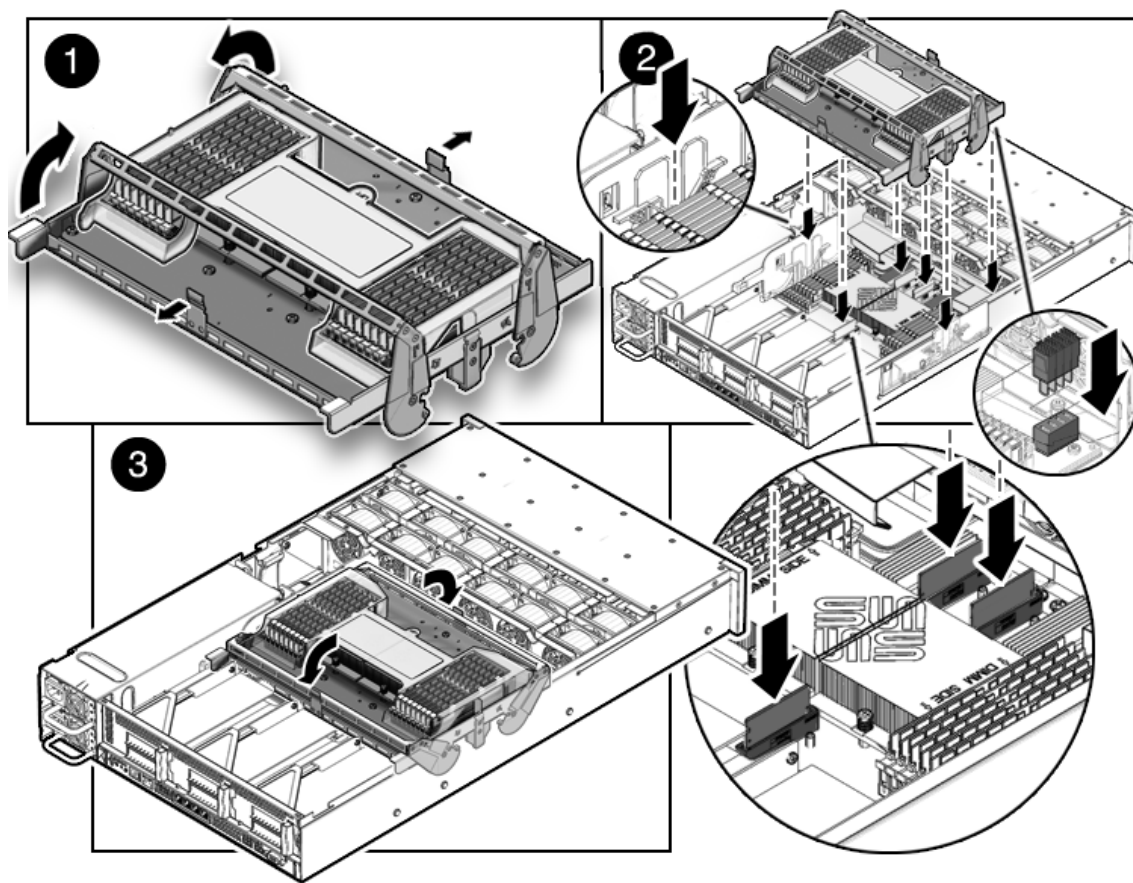


4.2.2 Installing the Mezzanine Tray

1. Hold the two handles and carefully place the mezzanine tray into the motherboard as shown in [FIGURE 4-7](#).

Ensure that the mezzanine tray is aligned and fully seated. The handles should click into the tabs.

FIGURE 4-7 Installing the Mezzanine Tray



2. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Slide the server into the rack.

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

d. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

4.3 Servicing Air Ducts

The following topics are covered:

- [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16
- [Section 4.3.2, “Installing the Air Duct”](#) on page 4-18

The motherboard and mezzanine each have an associated air duct or baffle. You must remove the air duct when removing and installing the following components:

- Power distribution board
- Power supply unit (PSU) PDB
- Paddle card
- Motherboard

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – To prevent the system from overheating, ensure that the air duct is correctly installed before powering on the server.

4.3.1 Removing the Air Duct

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray, to access the air duct.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Lift the air baffle out of the mezzanine tray. (FIGURE 4-8)

4. Slide the motherboard air duct to the right to disengage the pin on the left side. [1]

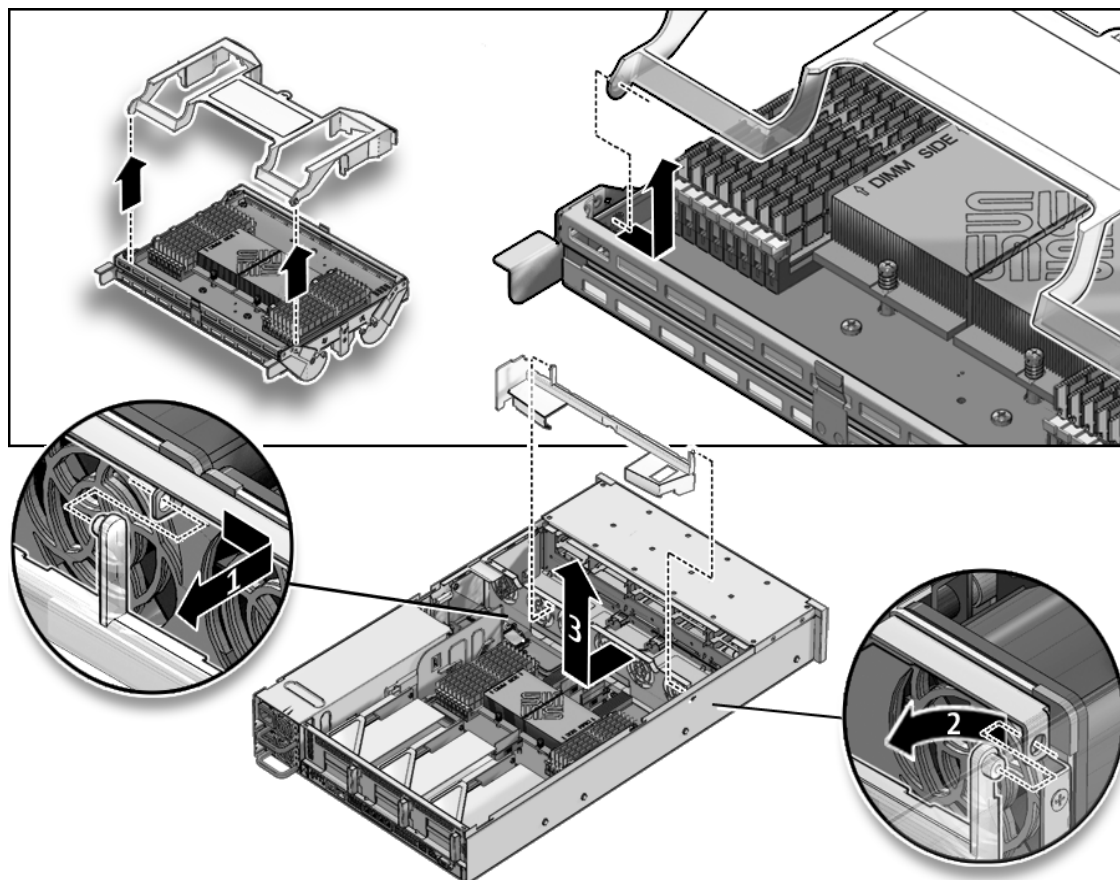
5. Slide the air duct to the left to disengage the pin on the right side. [2]

6. Move the air duct towards the back to clear the lip on the midwall.

7. Lift the air duct out of the server. [3]

8. Set the air duct aside.

FIGURE 4-8 Removing the Air Duct



4.3.2 Installing the Air Duct



Caution – When the server is in operation, ensure that the air duct is correctly installed to prevent the system from overheating.

1. **Install the air duct into the chassis as shown in [FIGURE 4-9](#).**
Ensure that the air duct is aligned and fully seated in the chassis.
2. **Install the mezzanine air baffle as shown in [FIGURE 4-9](#).**
Ensure that the air baffle is aligned and fully seated in the mezzanine tray.

3. Reinstall the mezzanine tray.

See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.

4. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Slide the server into the rack.

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

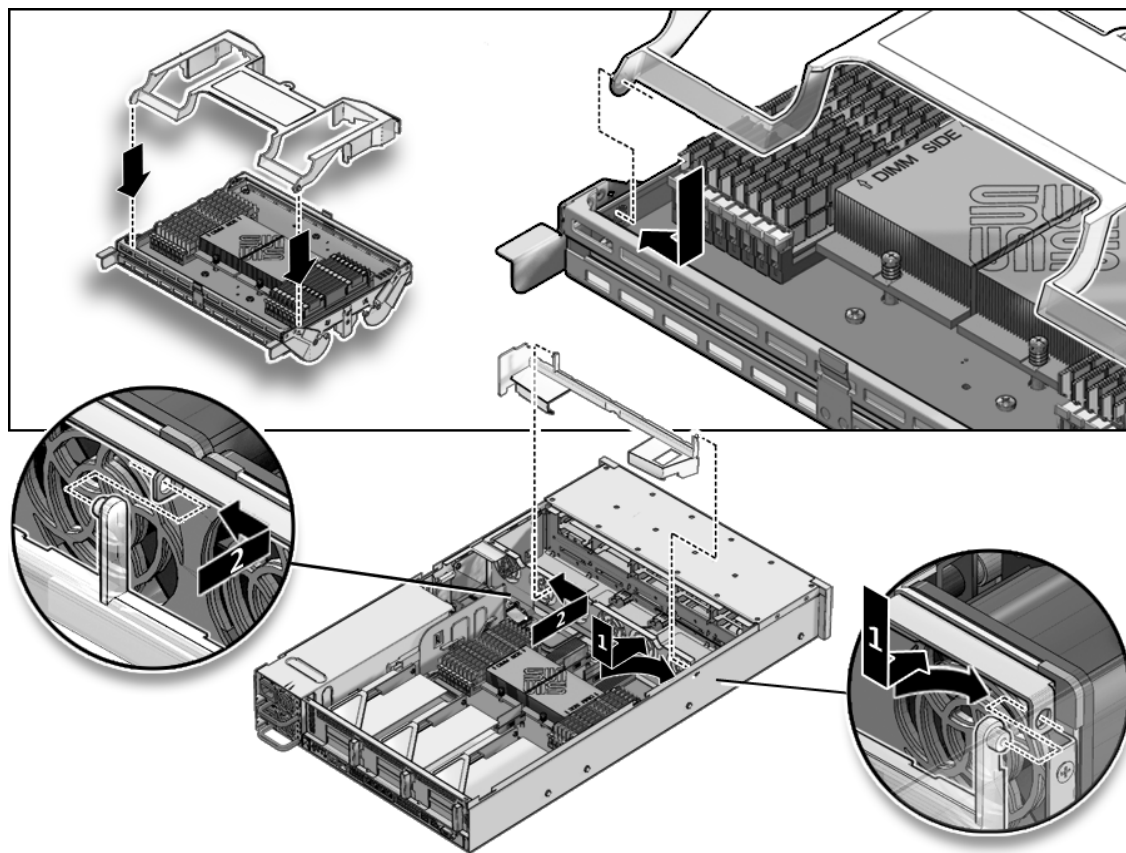
Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

d. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 4-9 Installing the Air Duct



4.4 Servicing PCIe Risers

The following topics are covered:

- [Section 4.4.1, “Removing a PCIe Riser” on page 4-21](#)
- [Section 4.4.2, “Installing a PCIe Riser” on page 4-23](#)

PCIe cards are installed on vertical riser assemblies. You must remove the relevant riser assembly to access a PCIe card. You must remove all three PCIe riser assemblies when replacing the motherboard.

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.8.1, “Electrostatic Discharge Safety Measures” on page 2-10](#).

4.4.1 Removing a PCIe Riser



Caution – Ensure that all power is removed from the server before removing or installing risers. You must disconnect the power cables before performing this procedure.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server” on page 2-4](#).

b. Disconnect the power cord (or cords) from the power supply (or supplies).

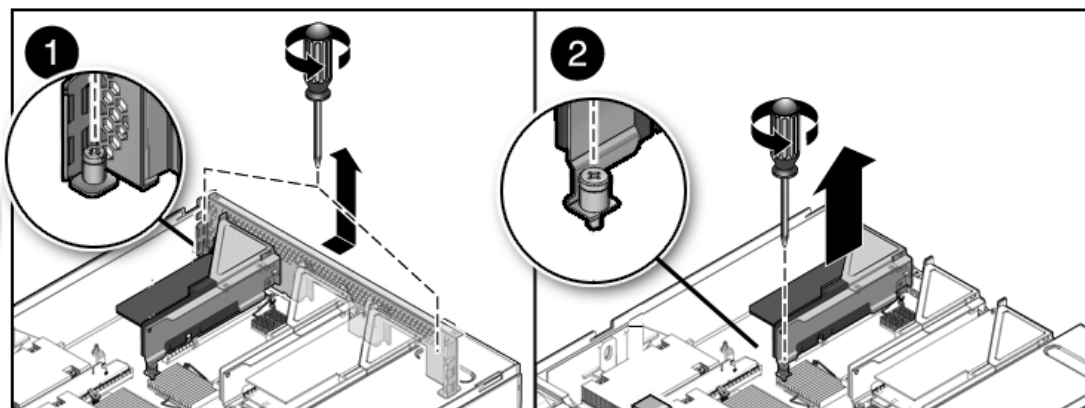
See [Section 2.5, “Powering Off the Server” on page 2-4](#).

c. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures” on page 2-10](#).

- d. **Disconnect any data cables connected to the cards on the PCIe riser being removed.**
Label the cables to ensure proper connection later.
 - e. **Slide the server out of the rack.**
See [Section 2.6, "Extending the Server to the Maintenance Position"](#) on page 2-5.
 - f. **Remove the top cover.**
See [Section 2.9, "Removing the Top Cover"](#) on page 2-12.
- 2. **Remove the mezzanine tray, to access the riser.**
See [Section 4.2.1, "Removing the Mezzanine Tray"](#) on page 4-13.
 - 3. **If you are servicing a PCIe card, locate the PCIe card position in the server.**
 - 4. **Disconnect any data cables connected to the cards on the PCIe riser being removed.**
Label the cables to ensure proper connection later.
 - 5. **Remove the rear panel PCI crossbeam. ([FIGURE 4-10 \[1\]](#))**
 - a. **Loosen the two captive Phillips screws on the end of the PCI crossbeam.**
 - b. **Lift the PCI crossbeam up and back to remove it from the chassis.**
 - 6. **Loosen the captive retaining screw holding the front end of the riser to the motherboard. [2]**
 - 7. **Loosen the Phillips screw on the end of the riser.**
 - 8. **Lift the riser up to remove it from the server.**
Remove the riser and any PCIe cards attached to it as a unit.

FIGURE 4-10 Removing a PCIe Riser



4.4.2 Installing a PCIe Riser



Caution – Ensure that all power is removed from the server before removing or installing risers. You must disconnect the power cables before performing this procedure.

1. Lower the PCIe riser and any cards attached to the PCIe riser into the system.
2. Slide the back of the riser into the motherboard rear panel stiffener.
3. Tighten the screw that secures the riser to the motherboard. (FIGURE 4-11 [1])
4. Install the rear panel PCI crossbeam. [2]
 - a. Slide the crossbeam down over the PCIe risers.
 - b. Secure the PCI crossbeam is secured with two captive Phillips screws.
5. Return the server to operation.
 - a. Install the top cover.
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. Connect any data cables to the PCIe card.
Route data cables through the cable management arm.

c. Slide the server into the rack.

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

d. Reconnect the power cord (or cords) to the power supply (or supplies).

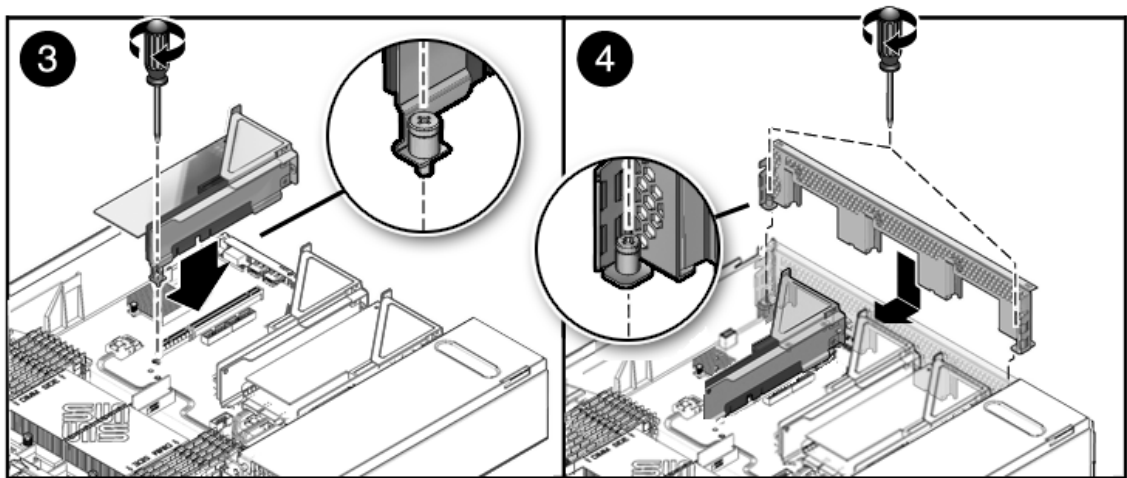
Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

e. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 4-11 Installing a PCIe Riser



4.5 Servicing PCIe Cards

See [Section 4.5.1, “Sun Fire X4440 PCIe Card Guidelines”](#) on page 4-25 for PCIe card configuration guidelines.

The following topics are covered:

- [Section 4.5.1, “Sun Fire X4440 PCIe Card Guidelines”](#) on page 4-25
- [Section 4.5.2, “Removing PCIe Cards”](#) on page 4-26
- [Section 4.5.3, “Installing PCIe Cards”](#) on page 4-28

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.



Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

4.5.1 Sun Fire X4440 PCIe Card Guidelines

The PCI expansion system is configured using two types of riser cards.

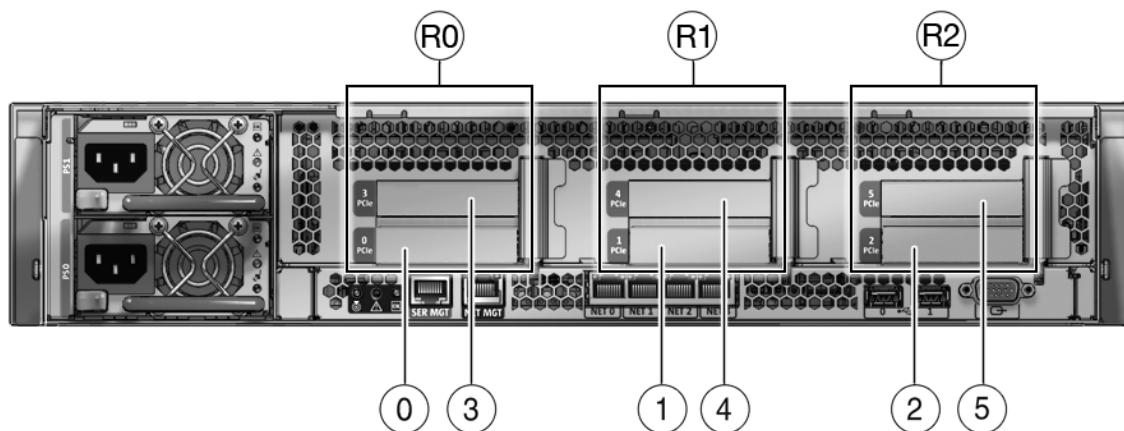
Riser type 1 is used in the Riser 0 and Riser 1 positions and Riser type 2 is used in the slot 2 position as shown in [TABLE 4-1](#). The electrical width is the number of active PCIe lanes and the mechanical width describes the riser PCIe connector size. PCIe cards with x4, x8 or x16 mechanical finger pins will fit in any riser slot but will operate at the electrical lane width of the slot.

TABLE 4-1 Sun Fire X4440 Riser Guidelines

Riser/Slot Numbers	Electrical	Mechanical	Source
Riser 0 - Slot 0	x8	x8	MCP55
Riser 0 - Slot 3	x8	x8	MCP55
Riser 1 - Slot 1	x8	x8	MCP55
Riser 1 - Slot 4	x8	x8	IO55
Riser 2 - Slot 2	x16	x16	IO55
Riser 2 - Slot 5	x4	x8	IO55

Note – The SGXPCIESAS-R-INT-Z HBA should be installed in slot 0 to avoid system overheating. Make sure that the firmware is at SW 3.1 or later when installing the HBA in Slot 0.

FIGURE 4-12 Identifying PCIe Cards



4.5.2 Removing PCIe Cards



Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

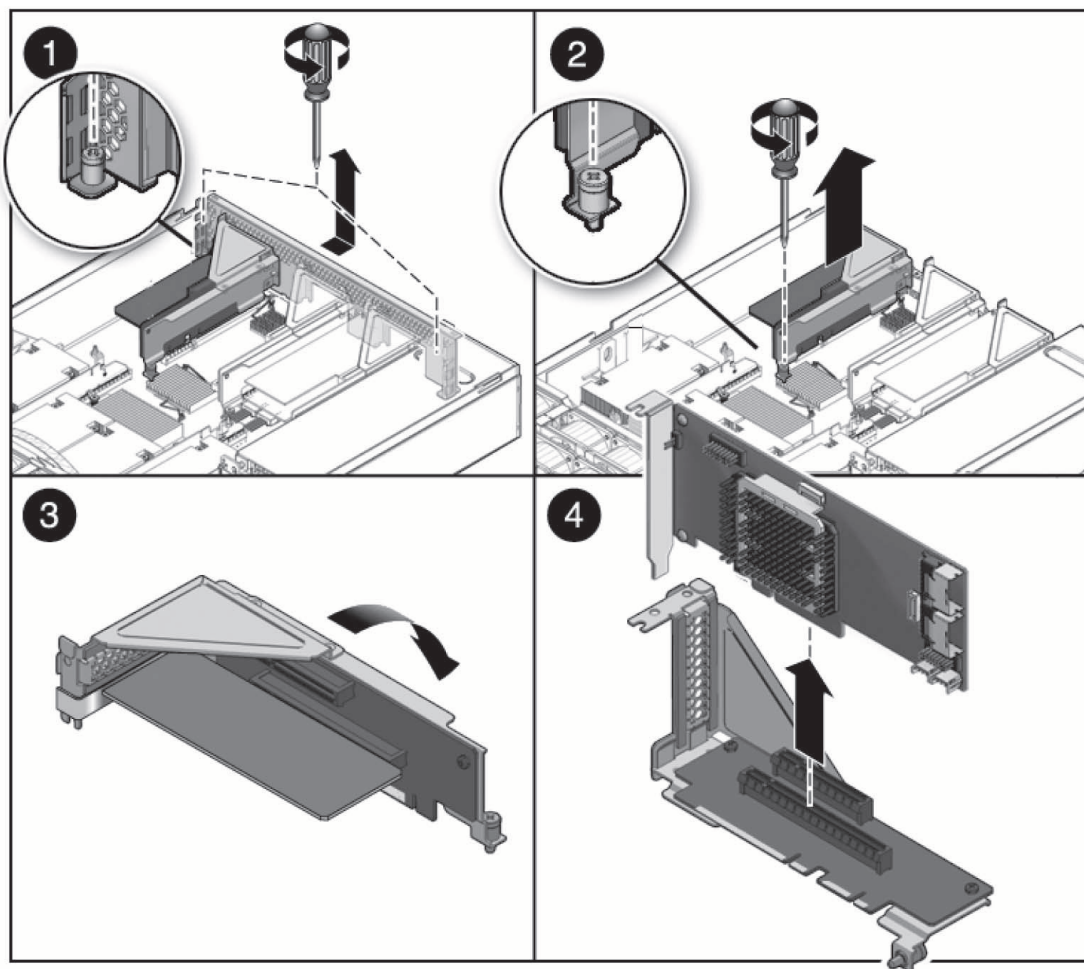
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. **Locate the PCIe card that you want to remove, and note its corresponding riser board.**

See [Section 1.4, “Sun Fire X4440 Rear Panel Features”](#) on page 1-10 for more information about PCIe slots and their locations.

3. **If necessary, make a note of where the PCIe cards are installed.**
4. **Unplug all data cables from the card.**
Note the location of all cables for reinstallation later.
5. **Remove the rear panel crossbeam and then the PCIe riser. (FIGURE 4-13) [1, 2, 3]**
See [Section 4.4.1, “Removing a PCIe Riser”](#) on page 4-21.
6. **Carefully remove the PCIe card from the riser board connector. [4]**
7. **Place the PCIe card on an antistatic mat.**
8. **If you are not replacing the PCIe card, install a PCIe filler panel.**
PCIe filler panels are located in the motherboard rear panel.

FIGURE 4-13 Removing a PCIe Card



4.5.3 Installing PCIe Cards

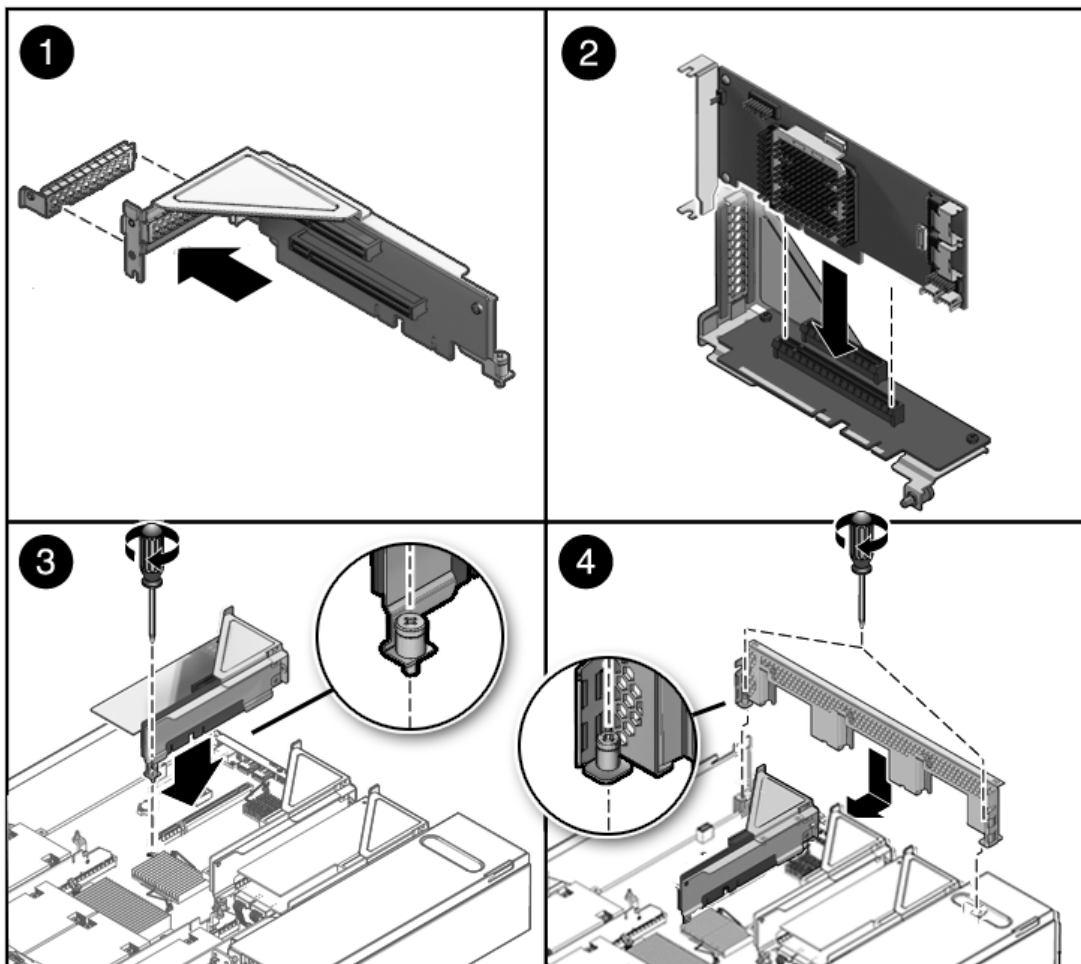


Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

1. Unpack the replacement PCIe card and place it on an antistatic mat.
2. Locate the proper PCIe slot for the card you are replacing.

3. **If necessary, review the PCIe Card Guidelines to plan your installation.**
See [Section 4.5.1, “Sun Fire X4440 PCIe Card Guidelines”](#) on page 4-25 for additional information.
4. **Remove the PCIe riser board.**
See [Section 4.4, “Servicing PCIe Risers”](#) on page 4-21.
5. **If the server has been continuously used for an extended time, inspect the slot for particles.**
Clean the slot with filtered, compressed air, as required.
6. **Remove the PCI filler panel. (FIGURE 4-14 [1])**
PCIe filler panels are located in the motherboard rear panel.
7. **Insert the PCIe card into the correct slot on the PCIe riser board. [2]**
8. **Replace the PCIe riser. [3]**
See [Section 4.4.2, “Installing a PCIe Riser”](#) on page 4-23.
 - a. **Slide the riser back until it seats in its slot in the rear panel.**
 - b. **Tighten the captive No. 2 Phillips screw securing the riser to the motherboard.**
9. **Replace the rear panel PCI crossbeam. [4]**
 - a. **Slide the crossbeam down over the PCIe risers.**
 - b. **Secure the PCI crossbeam is secured with two captive Phillips screws.**
10. **Connect any data cables required to the PCIe card.**
Route data cables through the cable management arm.
11. **Return the server to operation.**
 - a. **Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. **Slide the server into the rack.**
See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.
 - c. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 4-14 Installing a PCIe Card



4.6 Servicing the Battery

The following topics are covered:

- [Section 4.6.1, “Removing the Battery” on page 4-32](#)
- [Section 4.6.2, “Installing the Battery” on page 4-33](#)

The battery maintains system time when the server is powered off and a time server is unavailable. The battery also maintains volatile BIOS CMOS settings. If the server fails to maintain the proper time when the server is powered off and not connected to a network, replace the battery.

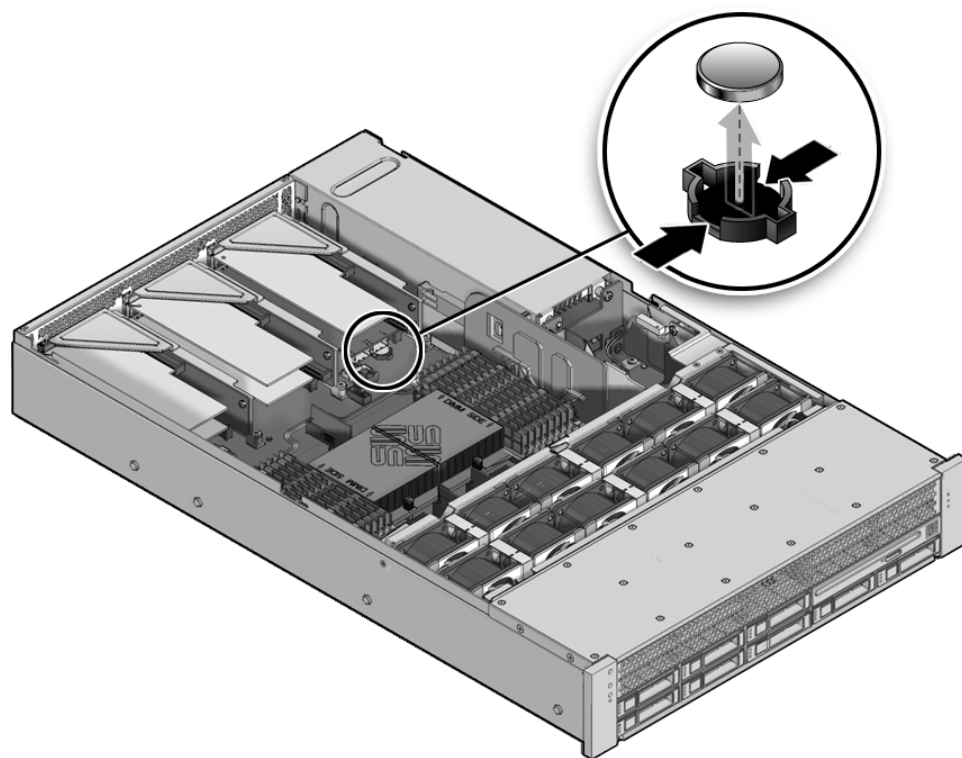
You need a small (No. 1 flat-blade) non-metallic screwdriver or equivalent.

Note – CRU: This customer-replaceable unit can be replaced by anyone.



Caution – Ensure that all power is removed from the server before removing or installing the battery. You must disconnect the power cables from the system before performing this procedure.

FIGURE 4-15 Battery Location



4.6.1 Removing the Battery

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

- e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
- 2. **Remove the PCIe riser closest to the power supply.**
See [Section 4.4.1, “Removing a PCIe Riser”](#) on page 4-21.
See [Section 4.5.1, “Sun Fire X4440 PCIe Card Guidelines”](#) on page 4-25.
- 3. **Press the latch and remove the battery from the motherboard.**
Use a small (No. 1 flat-blade) non-metallic screwdriver or equivalent.

4.6.2 Installing the Battery

- 1. **Unpack the replacement battery.**
- 2. **Press the new battery into the motherboard.**
Install the positive side (+) facing upward, away from the motherboard.
- 3. **Install the PCIe riser 0 with any associated cards.**
See [Section 4.4.2, “Installing a PCIe Riser”](#) on page 4-23.
- 4. **Return the server to operation.**
 - a. **Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. **Slide the server into the rack.**
See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.
 - c. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
- 5. **Use the ILOM `date` command to set the day and time.**
See the *Integrated Lights Out Management Guide*.

4.7 Servicing the Motherboard Assembly

The following topics are covered:

- [Section 4.7.1, “Removing the Motherboard Assembly” on page 4-34](#)
- [Section 4.7.2, “Installing the Motherboard Assembly” on page 4-36](#)
- [Section 4.7.3, “Servicetool FRU Update Procedures” on page 4-38](#)

You must remove the motherboard assembly to access the following components:

- Power distribution board
- Paddle card

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.



Caution – Ensure that all power is removed from the server before removing or installing the motherboard assembly. You must disconnect the power cables from the system before performing this procedure.



Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail. To avoid damage, ensure that you follow the antistatic practices as described in [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.



Caution – This procedure requires removing the server from the rack. The server is heavy. Two people are required to remove it from the rack.



4.7.1 Removing the Motherboard Assembly

You need a No. 2 Phillips screwdriver.

1. **Prepare the server for service.**

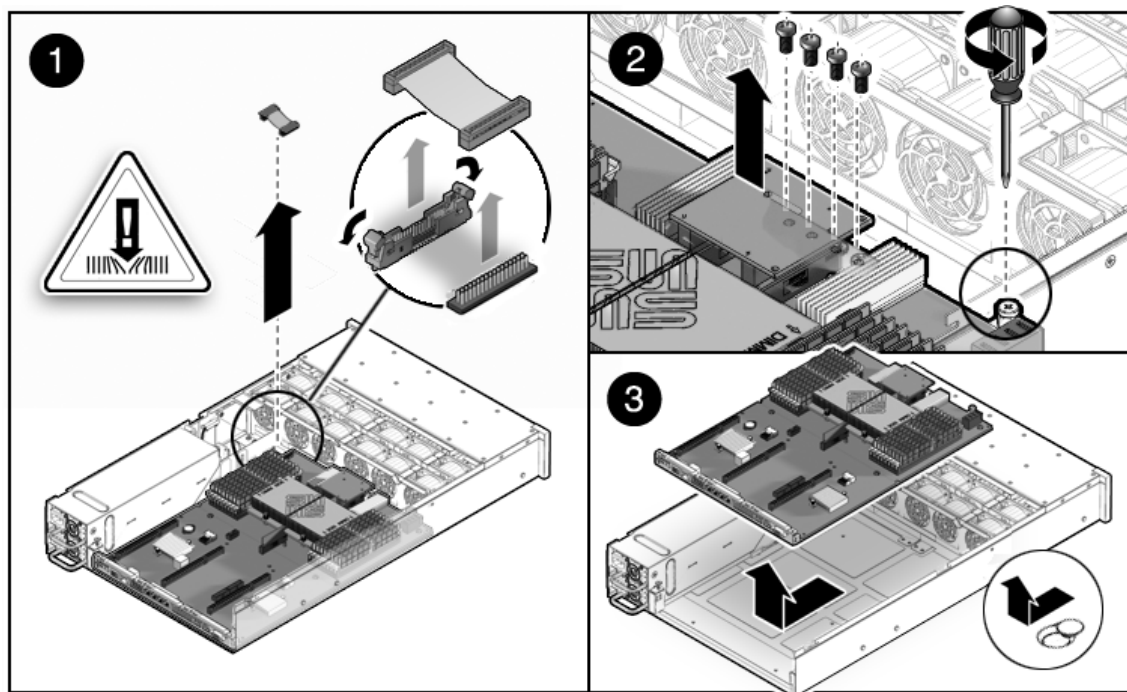
- a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Remove the server from the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Remove the mezzanine tray.**
See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.
 3. **Remove the air duct.**
See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.
 4. **Remove the PCIe cards and risers.**
See [Section 4.4.1, “Removing a PCIe Riser”](#) on page 4-21. Note the location of expansion cards in the PCIe risers.
 5. **If you are replacing the motherboard, remove the mezzanine tray supports.**
Use a No. 2 Phillips screwdriver.
 6. **Disconnect the PDB ribbon cable. (FIGURE 4-16 [1])**
See [Section 5.8.7, “Removing a PDB Cable”](#) on page 5-38.



Caution – The drive data cables are delicate. Ensure that they are safely out of the way when servicing the motherboard.

7. **Remove the 4 screws that secure the motherboard to the bus bar. [2]**
Use a No. 2 Phillips screwdriver.
8. **Loosen the tray attachment screw next to the chassis midwall. [2]**
9. **Gently slide the motherboard to the rear and carefully lift it upward. [3] Lift the motherboard tray out of the chassis.**
Move the motherboard carefully.
10. **Place the motherboard assembly on an antistatic mat.**

FIGURE 4-16 Removing the Motherboard Assembly



4.7.2 Installing the Motherboard Assembly



Caution – This procedure requires that you handle components that are sensitive to static discharge. Static discharge can cause component failures. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

1. If you are replacing the motherboard only, do the following:
 - a. Replace the CPUs, as required.
 - b. Apply thermal grease.
Follow the applicable grease procedure included with the grease.
 - c. Install the CPU heat sinks on the motherboard assembly, as required..
2. Place the motherboard tray into the chassis. ([FIGURE 4-17 \[1\]](#))
 - Move the motherboard tray carefully.

- Gently slide the motherboard to the front and carefully set it down.
 - The blind mushroom standoffs must engage the keyhole slots in the tray - align the tray before moving the tray forward to latch. [2]
3. **Install the 4 screws that secure the motherboard to the bus bar. [3]**

Torque screws to 7 inch-pounds (0.8 newton-meters). Use a manual torque driver settable to 7 inch-pounds (0.8 newton-meters) with a No. 2 Phillip screwdriver.
 4. **Fasten the captive screw at the front of the motherboard. [3]**
 5. **Carefully connect the power distribution board ribbon cable to the motherboard. [3]**

Make sure it is seated properly.
See [Section 5.8.8, “Installing a PDB Cable”](#) on page 5-40.
 6. **Reinstall the PCIe risers.**

See [Section 4.4.2, “Installing a PCIe Riser”](#) on page 4-23.
 7. **Reinstall the PCIe cards.**

See [Section 4.5.3, “Installing PCIe Cards”](#) on page 4-28.
 8. **Connect the two drive data cables.**
 - a. **Route the cables.**

Be careful when routing the drive cables so they are not pinched and are underneath the ribs on the support.
 - b. **Ensure that the two cables are placed behind the plastic shield between the CPU and the power supply housing.**



Caution – The drive data cables are delicate. Carefully connect them and make sure that they are seated properly when servicing the motherboard.

9. **Reinstall the mezzanine tray.**

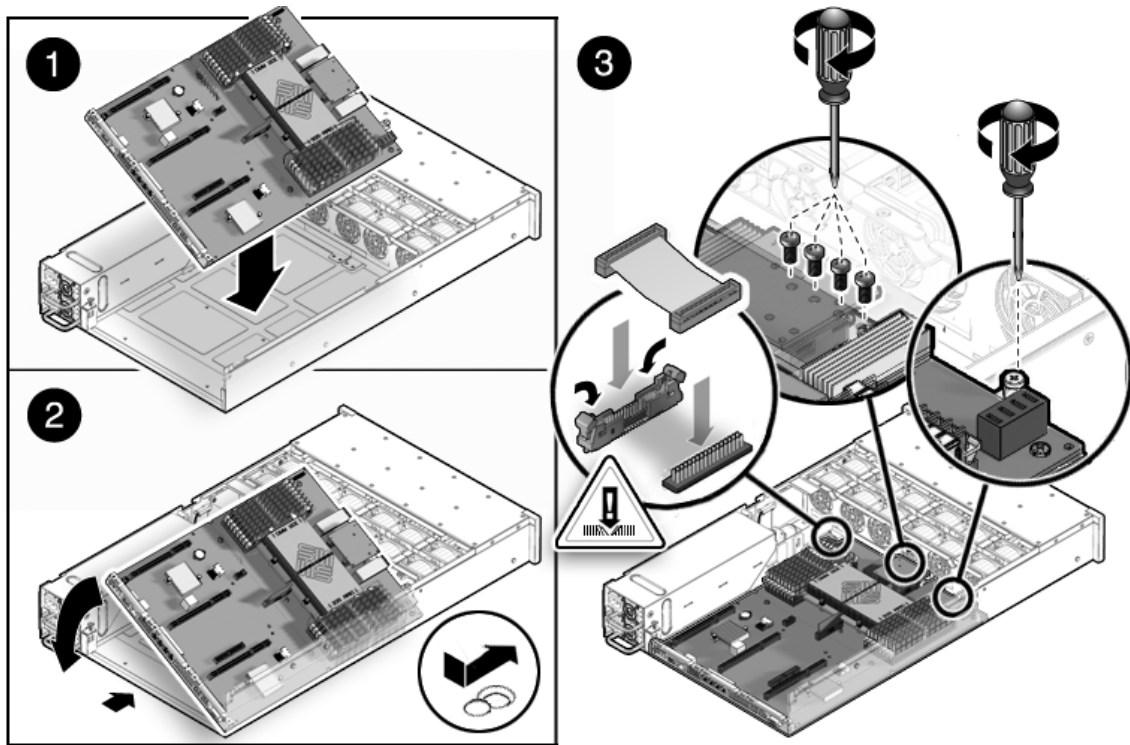
See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.
10. **Return the server to operation.**
 - a. **Install the top cover.**

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. **Install the server into the rack.**

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

- c. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
- d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 4-17 Installing the Motherboard Assembly



4.7.3 Servicetool FRU Update Procedures

The following topics are covered:

- [Section 4.7.3.1, “Updating FRU Product Information Using ServiceTool”](#) on page 4-39
- [Section 4.7.3.2, “To Restore Product Information From the FRUID PROM”](#) on page 4-40

- [Section 4.7.3.3, “Changing Product Information on the Motherboard Using a File” on page 4-41](#)

Caution – The SunService account is for the use of Sun service representatives only. Do not use the SunService account unless you are instructed to do so in a procedure developed by Sun Microsystems.

Note – If your system is running ILOM 3.x, then you must re-enable your SunService account.

Note – Before beginning these procedures, obtain Service/Escalation passwords from the Customer Support Center.

4.7.3.1 Updating FRU Product Information Using ServiceTool

1. Use SSH to log into the SunService account. The default password is `changeme`.

```
# ssh <SP IP address> -l sunservice
# <SP IP Address>'s password: changeme
```

2. At the prompt, enter the `servicetool` command with options. The options are defined in the table below.

```
# servicetool --fru_update=serviceprocessor <OtherOptions>=
<value>
```

Option	Description
<code>--board_replaced=BOARD</code>	Update FRU information for BOARD after it has been replaced. BOARD represents one of the following parameters: <ul style="list-style-type: none">• mainboard• pdb
<code>--fru_product_part_number</code>	Write a new product part number to mainboard and pdb FRUs.
<code>--fru_product_serial_number</code>	Write a new product serial number to mainboard and pdb FRUs.

Option	Description
--fru_chassis_serial_number	Write a new chassis serial number to mainboard and pdb FRUs.
--fru_chassis_part_number	Write a new chassis part number to mainboard and pdb FRUs.
--fru_asset_tag	Write a new asset tag to mainboard and pdb FRUs.

3. Watch the output from the command and respond to the confirmation prompts for continuing the update and rebooting the server:

```

Servicetool is going to collect system information for the service
processor for future part swaps.
The following preconditions must be true for this to work:
    * The new service processor must be installed.
Do you want to continue (y|n)? y
Service processor FRU information ready to be collected.
You MUST reboot the service processor for to complete
this process. Allow the service processor to fully boot.
DO NOT UNPLUG THE SYSTEM WHILE THE SERVICE PROCESSOR IS BOOTING!
Would you like to reboot the service processor now (y|n)? y
The system is going down NOW!!
Sending SIGTERM to all processes.
```

4.7.3.2 To Restore Product Information From the FRUID PROM

1. In Escalation mode in ILOM, view product information on the FRUID PROM that is on the Power Distribution Board (PDB) by issuing this command:

```
# frutool -t pb --read_cmm_product_area
```

```

product part_number 594-5133-03
product serial_number 0829QAS003
product asset_tag NULL:16
chassis serial_number 0226LHF-0822B402YH
chassis part_number 540-7618-XX
```

2. Save the entire motherboard FRUID image, in case it later needs to be restored to its original state:

```
# frutool -r mb > /persist/mb.bin
```

3. Copy the product information from the PDB to a file:

```
# frutool -t pb --read_cmm_product_area > /dev/shm/product.info
```

4. View the file by issuing the following command to verify the previous step was successful:

```
# cat /dev/shm/product.info
```

5. Write the product information to the motherboard by issuing this command:

```
# frutool -t mb --write_cmm_product_area < /dev/shm/product.info
```

6. View the file to ensure that the product data has been updated in the motherboard FRUID PROM:

```
# frutool -r mb | hexdump -C | egrep '^000004'
00000400 00 00 00 00 00 00 00 00 00 00 00 00 a4 70 72 |.....pr|
00000410 6f 64 75 63 74 20 70 61 72 74 5f 6e 75 6d 62 65 |oduct part_numbe|
00000420 72 20 35 39 34 2d 35 31 33 33 2d 30 33 0a 70 72 |r 594-5133-03.pr|
00000430 6f 64 75 63 74 20 73 65 72 69 61 6c 5f 6e 75 6d |oduct serial_num|
00000440 62 65 72 20 30 38 32 39 51 41 53 30 30 33 0a 70 |ber 0829QAS003.p|
00000450 72 6f 64 75 63 74 20 61 73 73 65 74 5f 74 61 67 |roduct asset_tag|
00000460 20 4e 55 4c 4c 3a 31 36 0a 63 68 61 73 73 69 73 | NULL:16.chassis|
00000470 20 73 65 72 69 61 6c 5f 6e 75 6d 62 65 72 20 30 | serial_number 0|
00000480 32 32 36 4c 48 46 2d 30 38 32 32 42 34 30 32 59 |226LHF-0822B402Y|
00000490 48 0a 63 68 61 73 73 69 73 20 70 61 72 74 5f 6e |H.chassis part_n|
000004a0 75 6d 62 65 72 20 35 34 30 2d 37 36 31 38 2d 58 |umber 540-7618-X|
000004b0 58 0a 5d f3 b7 f3 b7 00 00 00 00 00 00 00 00 00 |X.].....|
000004c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |.....|
```

7. Remove the files you created in the previous steps:

```
# rm /persist/mb.bin /dev/shm/product.info
```

8. Reboot the SP.

A reboot enables the SP to re-read the FRUID data.

4.7.3.3 Changing Product Information on the Motherboard Using a File

1. Once in Escalation mode in ILOM, copy the current product information from the motherboard to a file by issuing this command:

```
frutool -t mb --read_cmm_product_area > /dev/shm/product.info
```

2. Edit the /dev/shm/product.info file to contain the correct serial numbers.

3. Write this file back to the motherboard by issuing this command:

```
frutool -t mb --write_cmm_product_area < /dev/shm/product.info
```

4. Read this file to ensure the changes have been made successfully:

```
frutool -t mb --read_cmm_product_area
```

5. Remove the file you created in the first step of this procedure:

```
# rm /dev/shm/product.info
```

6. Reboot the SP.

A reboot enables the SP to re-read the FRUID data.

4.8 Servicing CPUs

The following topics are covered:

- [Section 4.8.1, “Processor Fault Remind Button” on page 4-42](#)
- [Section 4.8.2, “Removing a CPU” on page 4-42](#)
- [Section 4.8.3, “Installing a CPU FRU” on page 4-44](#)
- [Section 4.8.4, “Installing an XOption CPU” on page 4-47](#)

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

A CPU FRU requires trained personnel to apply thermal grease. For Xoption CPUs, the grease is preinstalled.

See [Section 1.5, “Illustrated Parts Breakdown” on page 1-11](#) for illustrations of the server and CPUs.

4.8.1 Processor Fault Remind Button

If you are replacing a faulty processor, press the Remind button on the motherboard to locate the CPU that you want to replace.

The faulty CPU LED flashes when the Fault Remind button is pressed and held. All faulty CPU are indicated with an amber LED, so that you can install the replacement CPU in the same location.

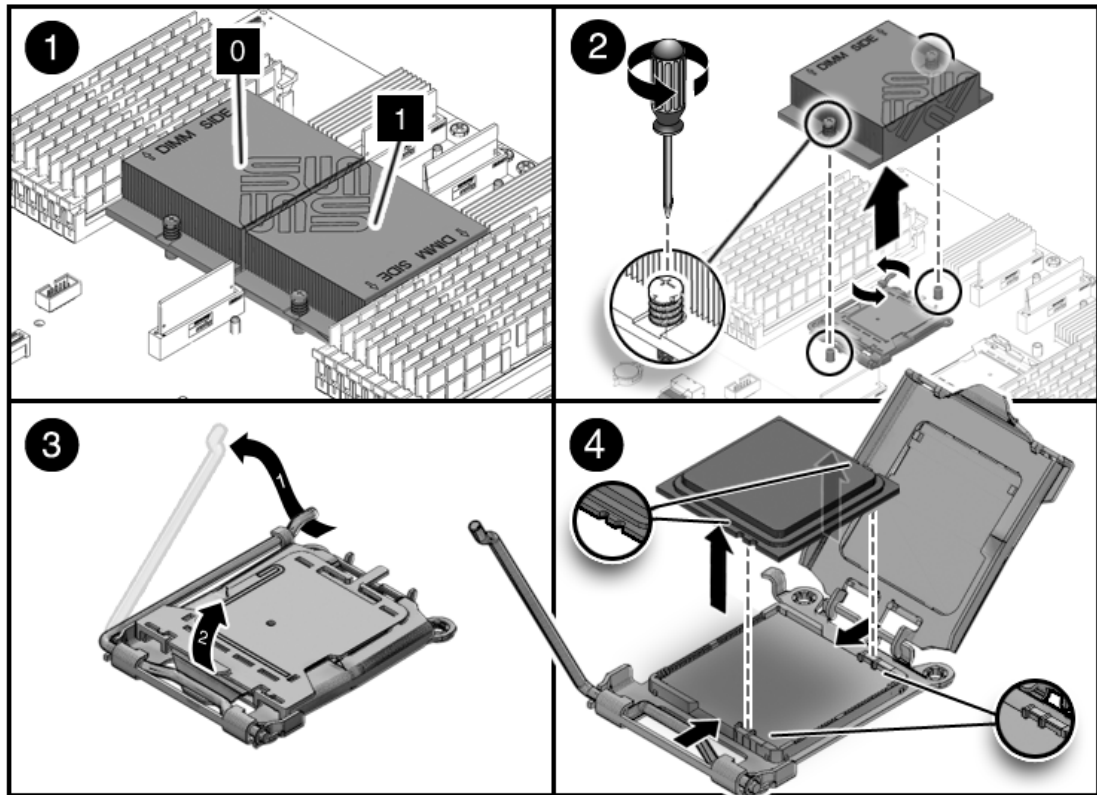
4.8.2 Removing a CPU

To remove a CPU.

1. **Prepare the server for service.**

- a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Remove the mezzanine tray.**
See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.
 3. **Identify which CPU to remove.**
CPU 0 is closest to the PSU bay. CPU 1 is furthest from the PSU bay.
 4. **Unscrew the two heat sink screws. (FIGURE 4-18)**
Each screw **must** be turned no more than one 1/2 turn before moving over to the other screw and doing the same. Continue to turn each screw one 1/2 turn, moving back and forth between the two screws until both screws are removed.
 5. **Twist the heat sink slightly to break the seal with grease, and then lift off the heat sink.**
 6. **Disengage the lever by rotating upward.**
 7. **Remove the CPU.**
Be careful not to contact the gold fingers within the socket.

FIGURE 4-18 Removing the CPU



4.8.3 Installing a CPU FRU

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, "Removing a Server From the Rack"](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the heat sink on top of the failed CPU.

Each screw **must** be turned no more than one 1/2 turn before moving over to the other screw and doing the same. Continue to turn each screw one 1/2 turn, moving back and forth between the two screws until both screws are removed.

4. Remove the failed CPU.

5. Clean off the old thermal interface material from the heat sink and CPU, using the supplied alcohol wipe. (FIGURE 4-19)

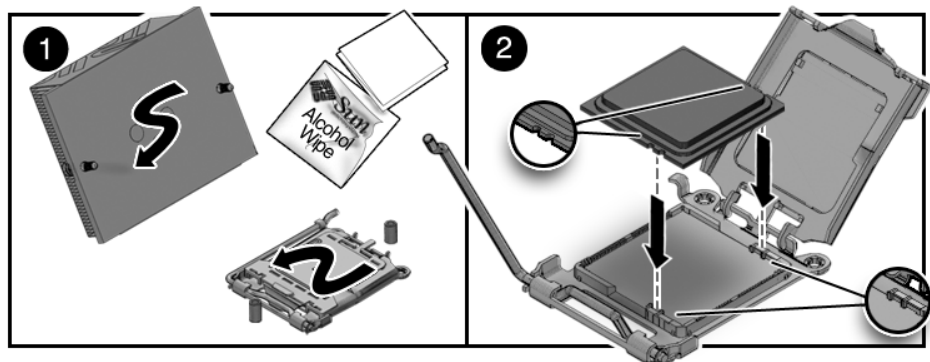
6. Set the heat sink aside.

7. Place the new CPU in the socket.

Make sure the orientation is correct.

Be careful not to contact the gold fingers within the socket.

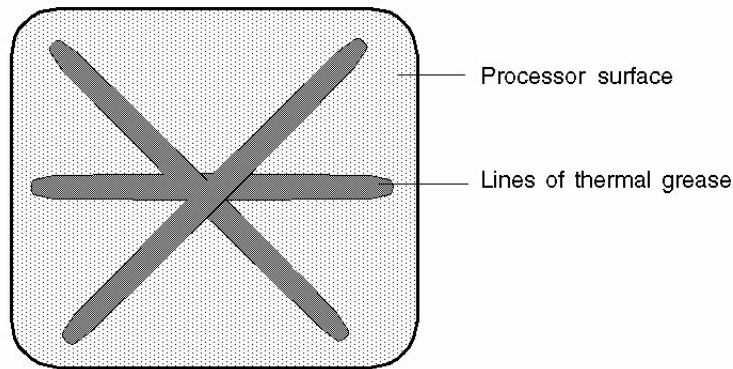
FIGURE 4-19 Installing a CPU



8. Engage the lever by rotating downward and pressing it into the catch.

9. Using the supplied grease syringe, empty the syringe on to the CPU in a star shaped pattern. (FIGURE 4-20)

FIGURE 4-20 Required Pattern for Thermal Grease Application



10. Smooth the grease into a thin even layer on top of the CPU. (FIGURE 4-21)

You can use a piece of plastic bag over your finger.

11. Orient the heat sink so that the two screws line up with the mounting inserts.

Ensure that the heat sink is oriented so that the "DIMM SIDE" label on the heat sink is next to the DIMMs.

12. Tighten the two screws alternately one half turn until fully seated.

Each screw **must** be turned no more than one 1/2 turn before moving over to the other screw and doing the same. Continue to turn each screw one 1/2 turn, moving back and forth between the two screws until both screws are tightened.

13. Reinstall the mezzanine tray.

See [Section 4.2.2, "Installing the Mezzanine Tray"](#) on page 4-14.

14. Return the server to operation.

a. Install the top cover.

See [Section 6.1, "Installing the Top Cover"](#) on page 6-2.

b. Install the server into the rack.

See [Section 6.2, "Reinstalling the Server in the Rack"](#) on page 6-3.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

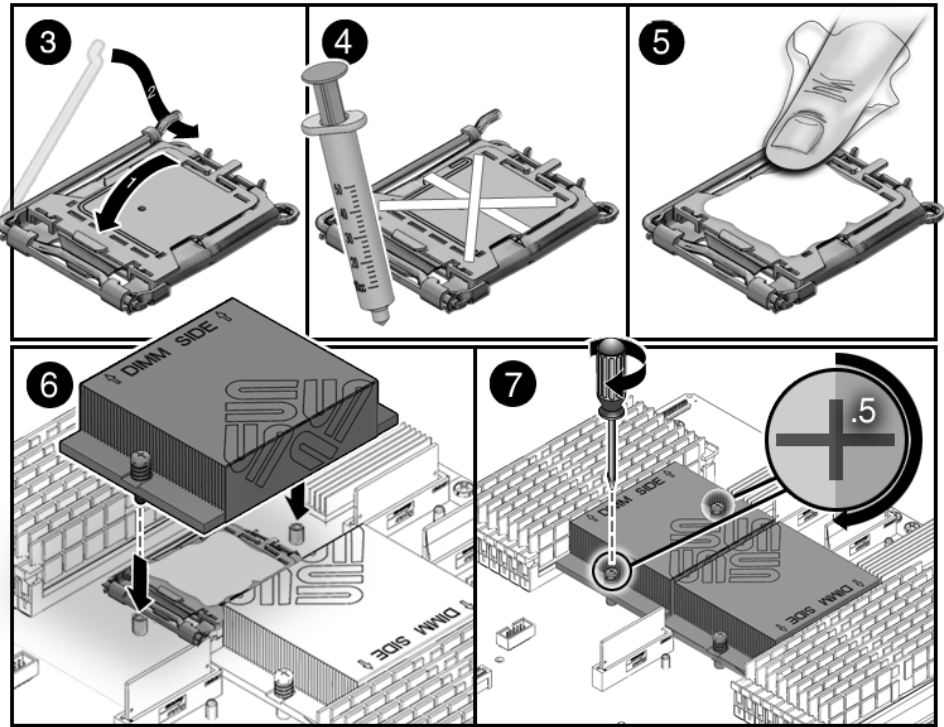
Verify that the AC Present LED is lit.

See [Section 6.4, "Powering On the Server"](#) on page 6-6.

d. Power on the server.

See [Section 6.4, "Powering On the Server"](#) on page 6-6.

FIGURE 4-21 Installing a CPU- part 2



4.8.4 Installing an XOption CPU

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the heatsink from socket 1

Follow the same procedures as CPU replacement.

Each screw **must** be turned no more than one 1/2 turn before moving over to the other screw and doing the same. Continue to turn each screw one 1/2 turn, moving back and forth between the two screws until both screws are removed.

4. Remove the IO bridge jumper from socket-1

Follow the same procedures as CPU replacement.

5. Clean the top of the CPU with the provided alcohol wipe.

6. Place the CPU in the socket with the correct orientation.

7. Engage the lever by rotating downward and pressing into the catch.

8. Remove the plastic protective cover from heat sink.

Be careful not to disturb or touch the preinstalled thermal interface material.

9. Orient the heat sink so the two screws line up with the mounting studs.

10. Tighten the two screws alternately one half turn until fully seated.

Each screw **must** be turned no more than one 1/2 turn before moving over to the other screw and doing the same. Continue to turn each screw one 1/2 turn, moving back and forth between the two screws until both screws are tightened.

11. Reinstall the mezzanine tray.

See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.

12. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Install the server into the rack.

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

- d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

4.9 Resetting Passwords and Clearing CMOS NVRAM

The following topics are covered:

- [Section 4.9.1, “Overview”](#) on page 4-49
- [Section 4.9.2, “Resetting a Service Processor Password From the BIOS Screen”](#) on page 4-49
- [Section 4.9.3, “Resetting the BIOS SP Password Using a Jumper”](#) on page 4-50
- [Section 4.9.4, “Resetting CMOS NVRAM Using a Jumper”](#) on page 4-51

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

4.9.1 Overview

You can reset a password from the BIOS screen, or with a jumper. You can also clear the CMOS NVRAM and BIOS password by changing jumpers as listed in [TABLE 4-2](#).

TABLE 4-2 Sun Fire X4440 Server Server Jumpers

Jumper	Function	Location
J602	Clears the SP password.	Access on the motherboard in the rear next to the SP, below PCIe slot 1, PCIe riser 1.
J1802	Clears the CMOS NVRAM and the BIOS password.	Access on the motherboard in the rear next to the SATA connector, below PCIe slot 0, PCIe riser 0.

4.9.2 Resetting a Service Processor Password From the BIOS Screen

To reset a password for the Service Processor, access the BIOS Security screen.

1. **Boot the server.**
2. **Press F2 at the Sun splash screen to enter Setup.**
3. **At the BIOS screen, move to the Security Screen tab.**
4. **Change the password.**
5. **Save and Exit the BIOS.**

The system restarts.

See [Appendix C](#) for BIOS screen information.

4.9.3 Resetting the BIOS SP Password Using a Jumper

To reset a password for the BIOS by changing a jumper.

1. **Prepare the server for service.**
 - a. **Power off the server.**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.
 - d. **Attach an antistatic wrist strap.**

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Locate the 2 pin header J602.**

Access the J602 jumper on the rear of the motherboard next to the SP, below PCIe slot 1, PCIe riser 1.
3. **Place the jumper across the 2 pins of the header..**
4. **Power on the server and boot until you see a message that the password has been cleared.**
5. **Power off the server, and remove AC power.**

6. **Remove the jumper from J602.**
7. **Return the server to operation.**
 - a. **Install the top cover.**

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. **Install the server into the rack.**

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
 - c. **Reconnect the power cord (or cords) to the power supply (or supplies).**

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. **Power on the server.**

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

4.9.4 Resetting CMOS NVRAM Using a Jumper

To clear the NVRAM using a jumper:

1. **Prepare the server for service.**
 - a. **Power off the server.**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.
 - d. **Attach an antistatic wrist strap.**

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Locate the jumper header J1802.**

Access the J1802 jumper on the rear of the motherboard next to the SATA connector , below PCIe slot 0, PCIe riser 0.
3. **Place the jumper across the 2 pins of the header.**

4. **Power on the server and boot until the message about NVRAM has been cleared.**
5. **Power off the server, and remove AC power cables.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
6. **Remove the jumper from J1802.**
7. **Return the server to operation.**
 - a. **Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. **Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
 - c. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

4.10 Recovering From Corrupt Service Processor Software

If the SP (service processor) software becomes corrupted, you can reinstall the default SP software image from the Tools and Drivers CD.

You need:

- The Tools and Drivers CD.
- A bootable USB flash device.

4.10.1 Reinstalling The Default SP Software Image From The Tools And Drivers CD

This emergency flash recovery procedure returns the SP to a default configuration.

The ILOM SPBIOS <file-name>.pkg file format (for example ilom.X4150-2.0.2.6.pkg) cannot be used for emergency recovery. Use the <file-name>.bin recovery image instead.

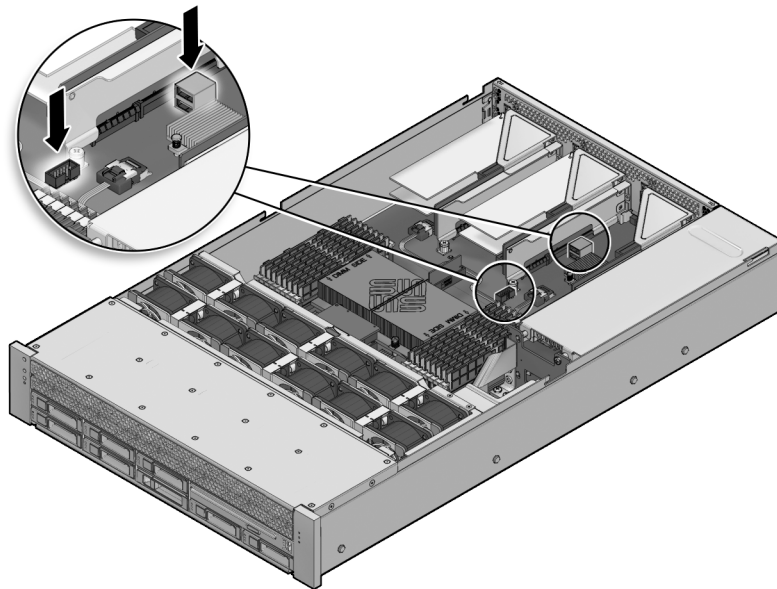
1. Copy the following SP files from the Tools and Drivers CD, located in the recovery directory, to a USB bootable flash device.

- SOCFLASH.EXE
- DOS4GW
- BMC Binary (the SP Binary file)

2. Insert the bootable flash drive into the USB port.

- a. Press F8 to get a list of the boot devices.
 - b. Choose the USB flash boot device.
- or
- a. Press F2 to enter the BIOS setup screen.
 - b. Choose the USB flash device as the first boot device.
 - c. Save and exit.

FIGURE 4-22 Internal USB Port



3. Once the flash device is booted, run the following command:

```
socflash -p 1 -f <sp-binary-file>
```

For Example:

```
socflash -p 1 -f g12n.bin
```

If you want to back up the current flash content, run following command:

```
socflash -p 1 -f <sp-binary-file> -b <backup-binary-file>
```

For example:

```
socflash -p 1 -f g12n.bin -b ilombak.bin
```

Note – If you choose to back up the SP binary (**-b <backup-filename>**), you must ensure there is sufficient free space on the USB flash device to hold the backup file.

Note – Use the command **socflash -h** to get a complete option listing.

4. After a successful flash, perform an AC power cycle or reset the SP using the following command:

```
socflash -r
```

Note – Using **-r** (resetting the SP hardware) can cause the VGA display to become disrupted.

Note – The BIOS is not upgraded by this emergency recovery procedure. Perform a 2nd ILOM-based flash upgrade, to update the BIOS version.

Note – This emergency flash recovery procedure returns the SP to default configuration.

5. Press F2 to enter system BIOS and verify that the flash device is in the boot order.
6. After a successful flash, remove the flash drive from the USB port.
7. AC power cycle the server.
Wait at least 2 minutes to let SP come up first.
8. Power on the server and enter BIOS.
9. Confirm following items are correct in BIOS:

- a. BMC Firmware Revision is correct on the Main page.
 - b. Status of BMC is working in Advanced -> IPMI 2.0 Configuration page.
10. Exit BIOS and start the operating system.

4.11 Using the Reset and NMI Switches



Caution – Do not use the Reset and NMI Dump switches unless you are instructed to do so by a Field Service engineer.

4.11.1 Reset Switch

The Reset switch on the motherboard sends a reset order to the CPUs, resetting the main system, but not the service processor. The button for this switch is one of the 3 hidden (recessed) buttons on the back of the motherboard located between the NET MGT and NET0 connectors and closest to NET0. It can be pushed by sticking a paper clip or similar object through the hole provided on the rear of the chassis.

4.11.2 NMI Dump Switch

The NMI button is the center button of the row of 3 hidden (recessed) buttons on the back of the motherboard located between the NET MGT and NET0 connectors. The button for this switch can be pushed by sticking a paper clip or similar object through the hole provided on the rear of the chassis.

The Non-Maskable Interrupt (NMI) Dump switch sends an NMI order to the CPUs, which is used by Field Service for debugging activities at the request of operating system engineers. NMI can also be asserted by ILOM. Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide*.

4.12 Upgrading Two Socket to Four Socket

To convert the Sun Fire X4440 motherboard from a two socket configuration to a four socket configuration, do the following.

You need:

- Mezzanine kit.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the 2U air duct.

3. Remove the HT (hyper-transport) bridge card and risers.

4. Install the mezzanine risers.

5. Install the guide pins.

6. Install the lower air duct.

7. Install the mezzanine.

8. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Slide the server into the rack.

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

d. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

Servicing Infrastructure Boards and Components

This chapter describes how to replace cold-service, field-replaceable units (FRUs) in the Sun Fire X4440 server.

Some of the procedures in this chapter are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the list below. FRU components should be replaced only by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

The following topics are covered:

- [Section 5.1, “Servicing the Fan Power Boards” on page 5-2 \(FRU\)](#)
- [Section 5.2, “Servicing the Drives Cage” on page 5-5 \(FRU\)](#)
- [Section 5.3, “Servicing the Drives Backplane” on page 5-10 \(FRU\)](#)
- [Section 5.4, “Servicing the Front Control Panel Light Pipe Assembly” on page 5-12 \(FRU\)](#)
- [Section 5.5, “Servicing the Power Distribution Board \(PDB\)” on page 5-14 \(FRU\)](#)
- [Section 5.6, “Servicing the Power Supply Backplane” on page 5-17 \(FRU\)](#)
- [Section 5.7, “Servicing the Paddle Card” on page 5-19 \(FRU\)](#)
- [Section 5.8, “Servicing Cables” on page 5-22 \(FRU\)](#)
- [Section 5.9, “Configuring Disk Controllers” on page 5-42 \(FRU\)](#)



Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.



Caution – Equipment damage possible. The covers must be in place for proper air flow.

5.1 Servicing the Fan Power Boards

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.



Caution – Ensure that all power is removed from the server before removing or installing fan power boards. You must disconnect the power cables before performing this procedure.

5.1.1 Removing a Fan Power Board

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.

Note – If you are removing the fan power boards to access the Paddle card or drives cage, you must remove the server from the rack. See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

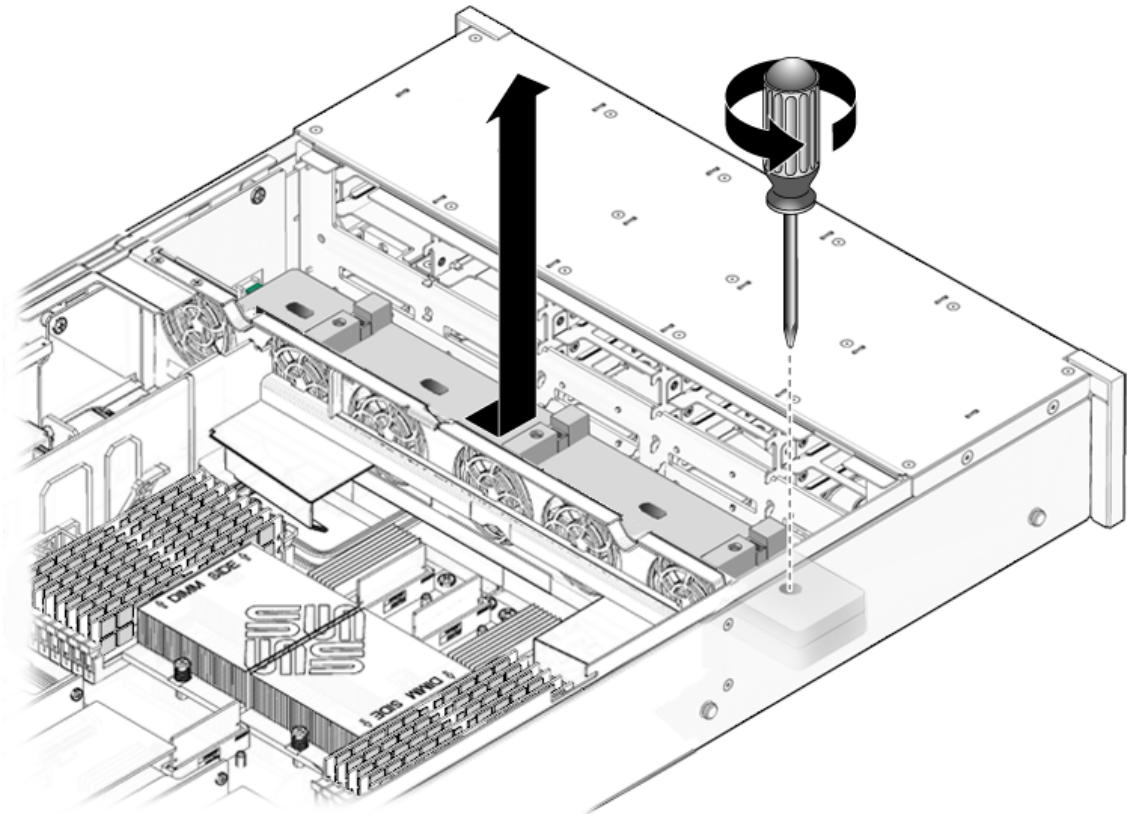
2. Remove the fan modules.

Note – If you are replacing a defective fan power board, remove only the fan modules that are necessary to remove the defective fan power board.

See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.

3. Remove the Phillips screw that secures the fan power board to the chassis ([FIGURE 5-1](#)).
4. Slide the fan power board to the left to disengage it from the Paddle card.
5. Remove the fan power board from the system and place it on an antistatic mat.

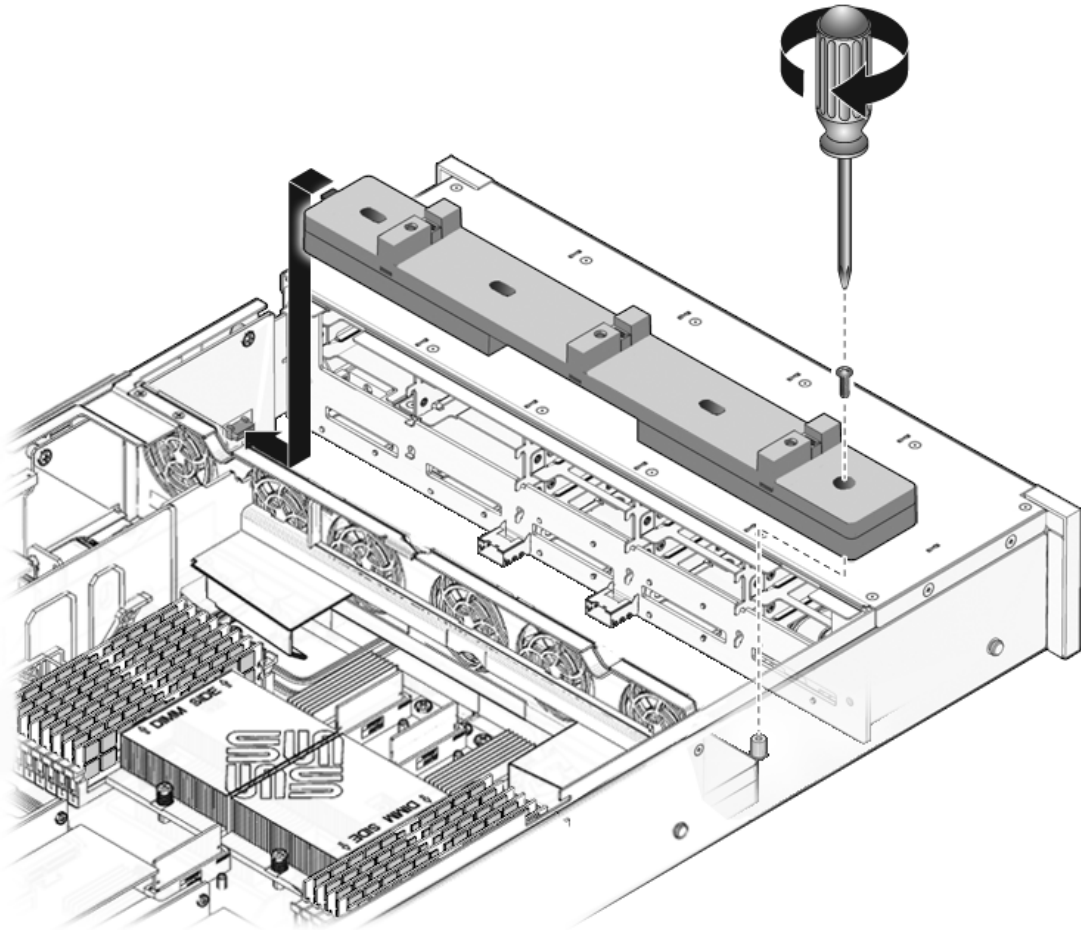
FIGURE 5-1 Removing the Fan Power Board



5.1.2 Installing a Fan Power Board

1. Lower the board into its mushroom standoffs in the chassis floor and slide the board to the right into the Paddle card. (FIGURE 5-2)
2. Secure the board to the chassis with a Phillips screw.
3. Reinstall the fan modules.
See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.

FIGURE 5-2 Installing a Fan Power Board



4. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Slide the server into the rack.

See [Section 6.3, “Returning the Server to the Normal Rack Position”](#) on page 6-4.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

d. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

5.2 Servicing the Drives Cage

You must remove the drives cage to access the following components:

- Drives backplane
- Front control panel light pipe assemblies

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.



Caution – Ensure that all power is removed from the server before removing or installing the drives cage. You must disconnect the power cables before performing this procedure.

5.2.1 Removing the Drives Cage

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Remove the server from the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. If you are servicing the drives backplane, remove all drives.

See [Section 3.2.3, “Removing a Drive”](#) on page 3-4.

Note – Make a note of the drive locations before removing them from the system. You will need to install the drives in the correct locations when reassembling the system.

3. If you are servicing the drives backplane, remove the DVD/USB module.

See [Section 3.7.1, “Removing the DVD/USB Module”](#) on page 3-22.

4. Remove the fan modules.

See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.

5. Remove the No. 2 Phillips screws securing the drives cage to the chassis. (FIGURE 5-3 [1] and [2])

Two screws secure the disk cage to each side of the chassis.

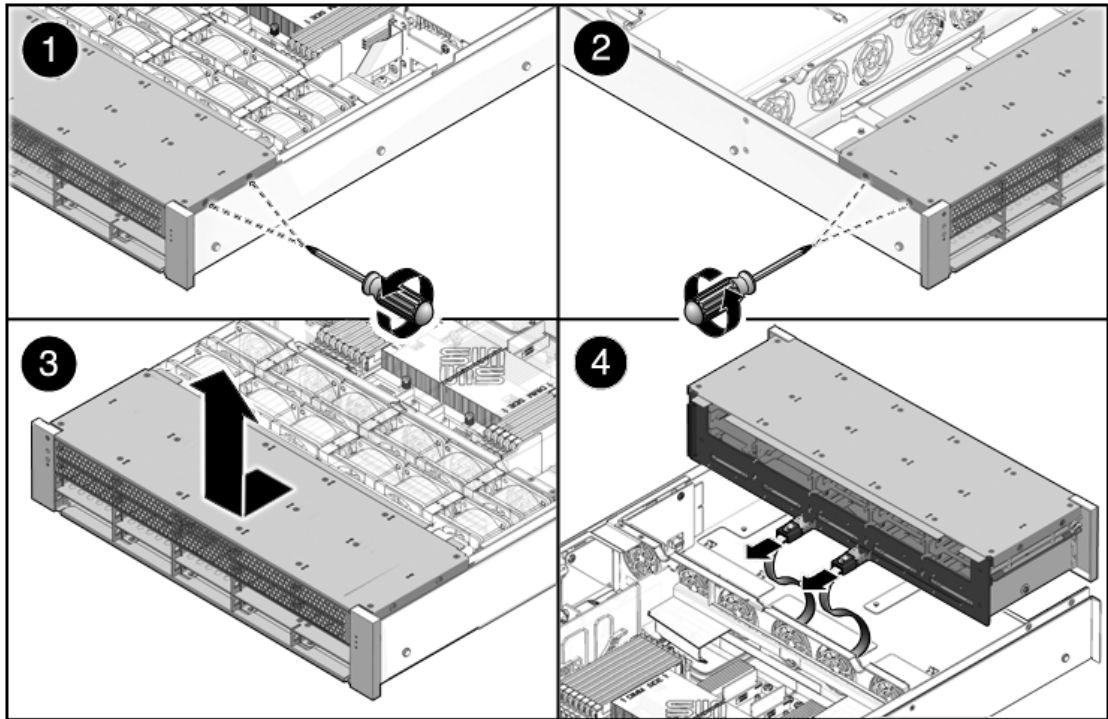
6. Slide the drives cage forward to disengage the backplane from the Paddle cards. (FIGURE 5-3 [3])

7. Lift the drives cage up and disconnect the drives data cables. (FIGURE 5-3 [4])

Press the connector release button to release the cable.

8. Set the drives cage on an antistatic mat.

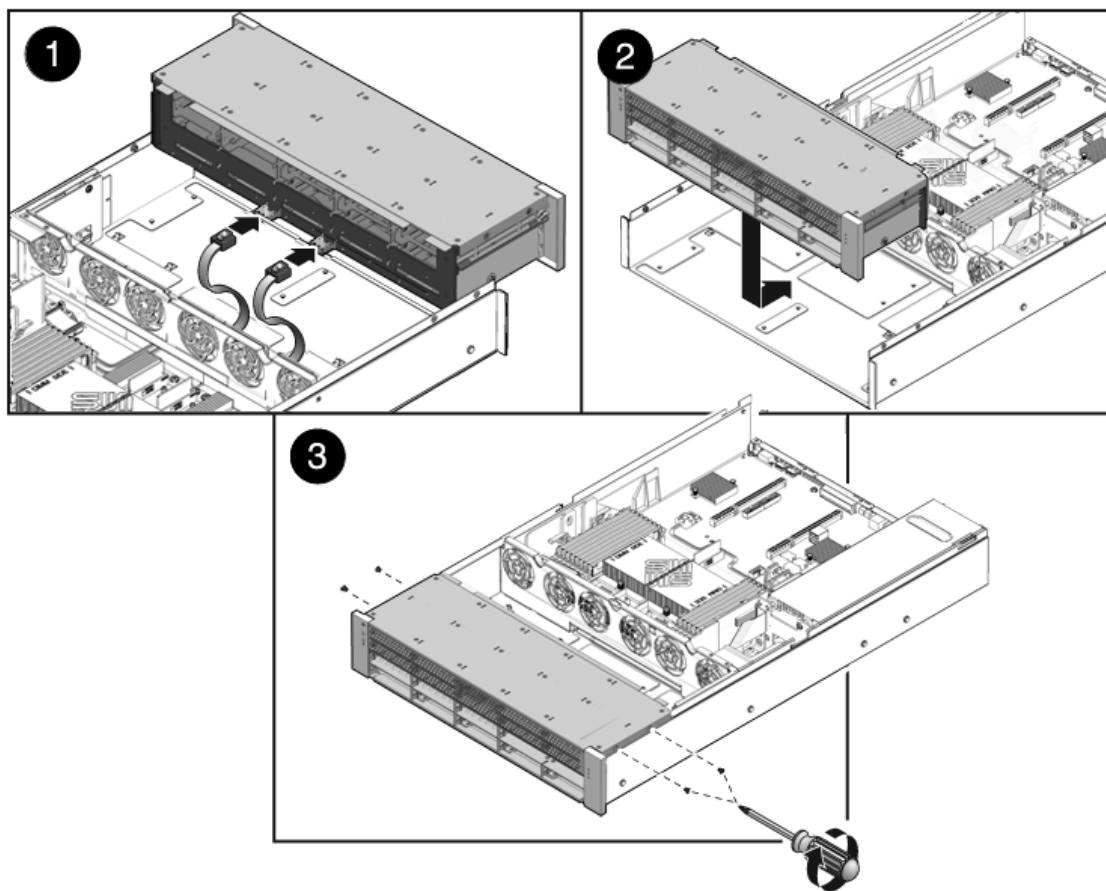
FIGURE 5-3 Removing the Drives Cage



5.2.2 Installing the Drives Cage

1. **Connect the drives data cables.** (FIGURE 5-4 [1])
Press the connector into its socket until it snaps into place.
2. **Position the drives cage in the chassis, over its standoffs.**

FIGURE 5-4 Installing the Drives Cage



3. Slide the drives cage back carefully until the drives backplane engages with the Paddle card connector. (FIGURE 5-4 [2])

Ensure that the drives backplane and Paddle board connectors align and engage. Do not force the cage back and assume connectors are aligned.

4. Replace the No. 2 Phillips screws securing the drives cage to the chassis. (FIGURE 5-4 [3])

Two screws secure the disk cage to each side of the chassis.

5. Install the fan modules.

See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.

6. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

7. Install the server into the rack.

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

8. Install the drives.

Note – Ensure you are installing the drives in the correct drive bays.

See [Section 3.2.4, “Installing a Drive”](#) on page 3-6.

9. Install the DVD/USB module.

See [Section 3.7.2, “Installing the DVD/USB Module”](#) on page 3-23.

10. Return the server to operation.

a. Reconnect the power cord (or cords) to the power supply (or supplies).

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

b. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

5.3 Servicing the Drives Backplane

You must remove the drives backplane to service the front control panel light pipe assemblies.

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

5.3.1 Removing the Drives Backplane

1. Remove the DVD/USB drive.

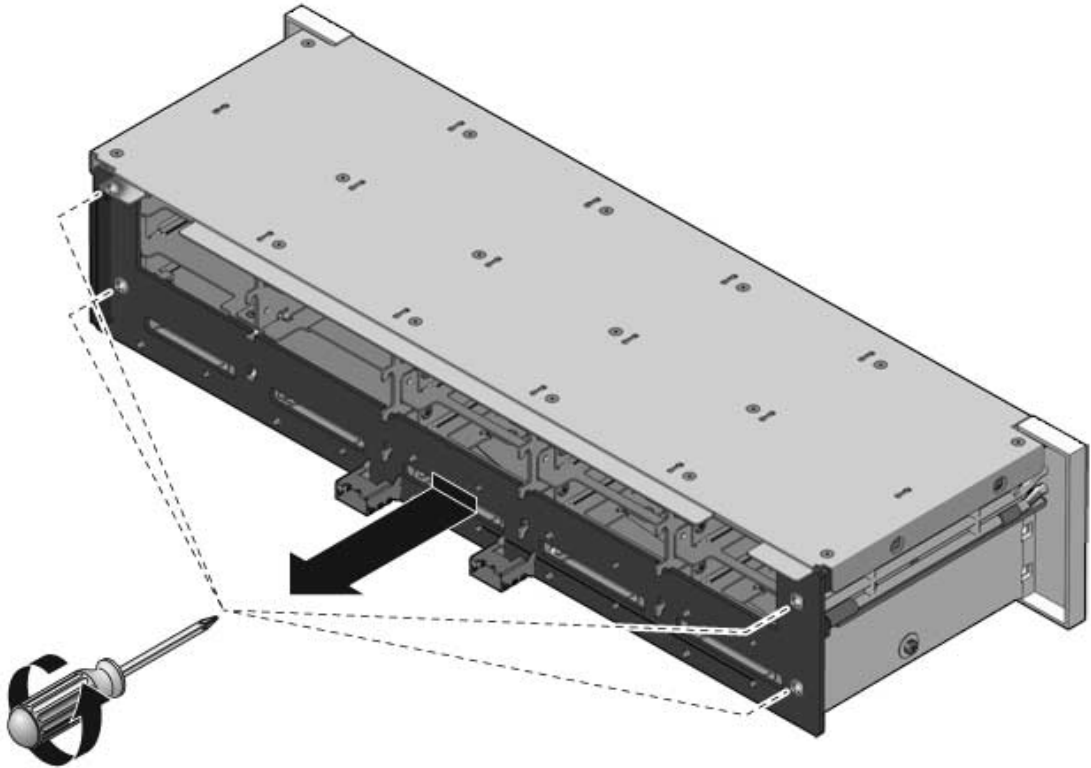
See [Section 3.7.1, “Removing the DVD/USB Module”](#) on page 3-22.

2. Remove the drives cage.

See [Section 5.2.1, “Removing the Drives Cage”](#) on page 5-5.

3. Remove the four No. 2 Phillips screws securing the backplane to the drives cage. (FIGURE 5-5)

FIGURE 5-5 Removing the Drives Backplane



4. Slide the backplane down and off the drives cage retention hooks.
5. Place the drives backplane on an antistatic mat.

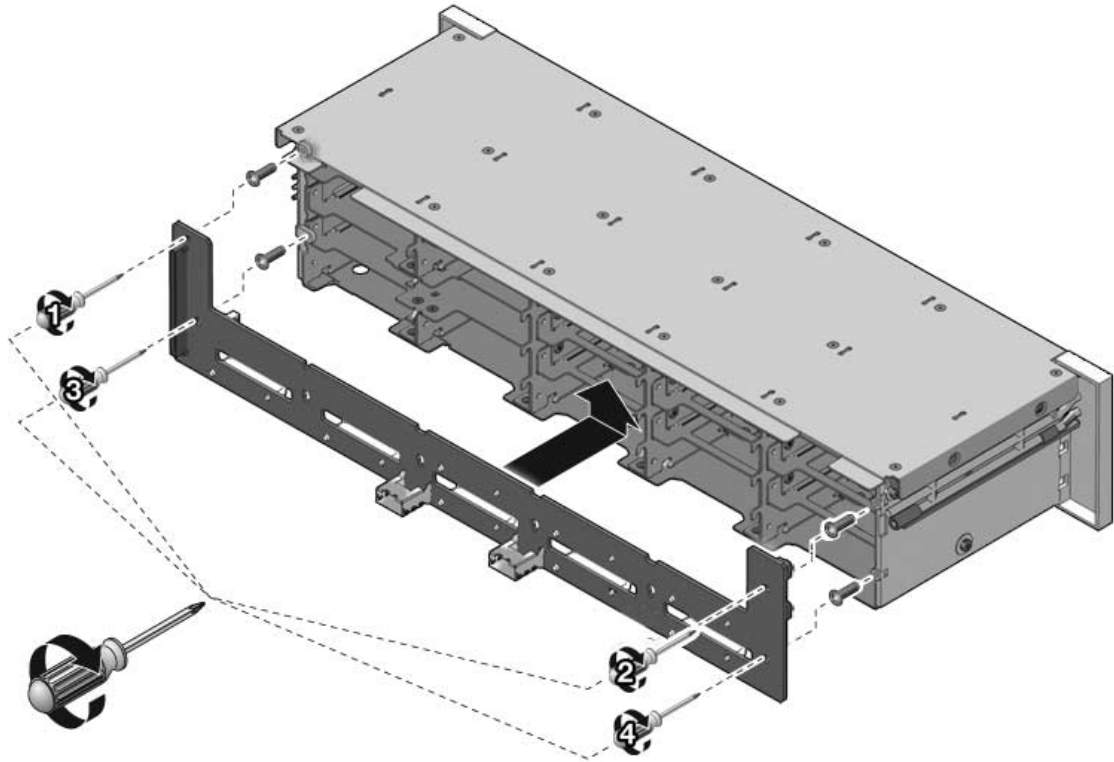
5.3.2 Installing the Drives Backplane

1. Slide the backplane under the retention hooks on the drives cage. ([FIGURE 5-6](#))
2. Install the four No. 2 Phillips screws that secure the backplane to the drives cage.
The sequence is top left, top right, bottom left, bottom right.
3. Install the drives cage.
See [Section 5.2.2, “Installing the Drives Cage”](#) on page 5-7.

4. Install the DVD/USB drive.

See [Section 3.7.2, “Installing the DVD/USB Module”](#) on page 3-23.

FIGURE 5-6 Installing the Drives Backplane



5.4 Servicing the Front Control Panel Light Pipe Assembly

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

5.4.1 Removing the Front Control Panel Light Pipe Assembly

1. Remove the drives cage.

See [Section 5.2.1, “Removing the Drives Cage”](#) on page 5-5.

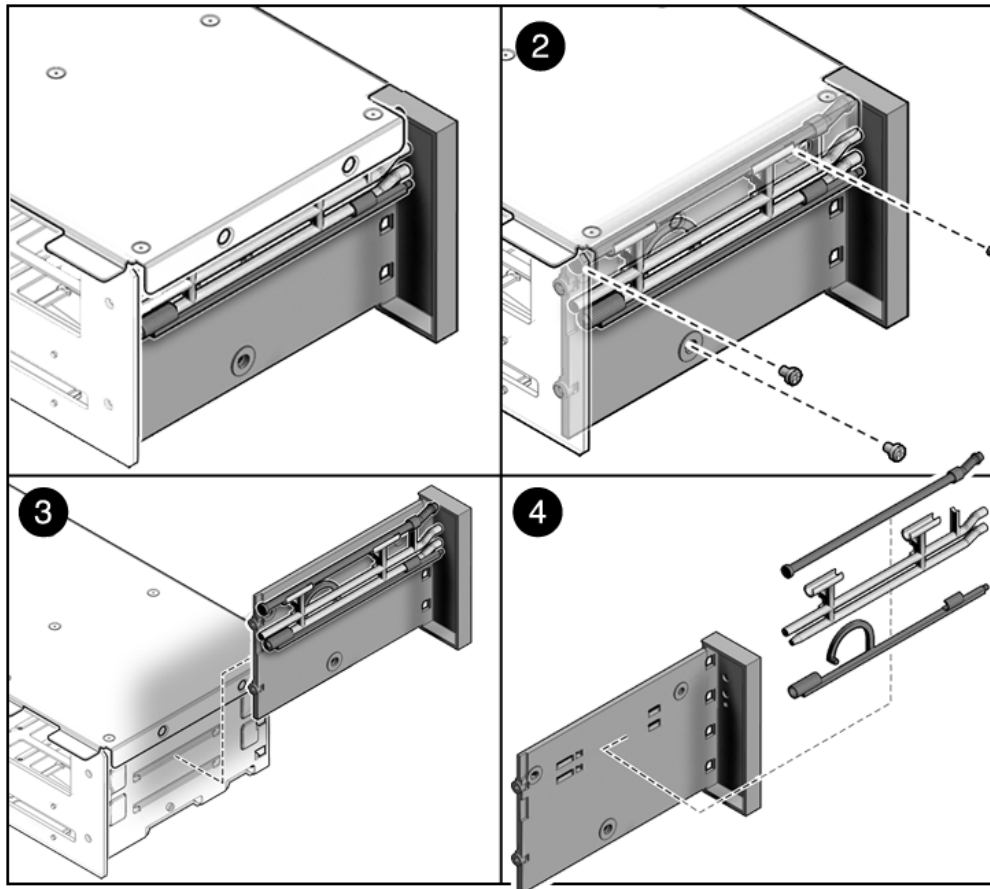
2. Remove the drives backplane.

See [Section 5.3.1, “Removing the Drives Backplane”](#) on page 5-10.

3. Remove the three No. 2 Phillips screws securing the front control panel light pipe assembly to the drives cage. (FIGURE 5-7)

4. Slide the light pipe assembly out of the drives cage.

FIGURE 5-7 Removing the Light Pipe Assembly



5.4.2 Installing the Front Control Panel Light Pipe Assembly

1. Align the light pipe assembly with the mounting holes on the drives cage.
2. Secure the light pipe assembly with three No. 2 Phillips screws.
3. Install the drives backplane.
See [Section 5.3.2, “Installing the Drives Backplane”](#) on page 5-11.
4. Install the drives cage.
See [Section 5.2.2, “Installing the Drives Cage”](#) on page 5-7.

5.5 Servicing the Power Distribution Board (PDB)

It is easier to service the power distribution board (PDB) with the bus bar assembly attached. If you are replacing a faulty PDB, you must remove the bus bar assembly from the old board and attach it to the new PDB.

You must remove the power distribution board to access the Paddle card.

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.



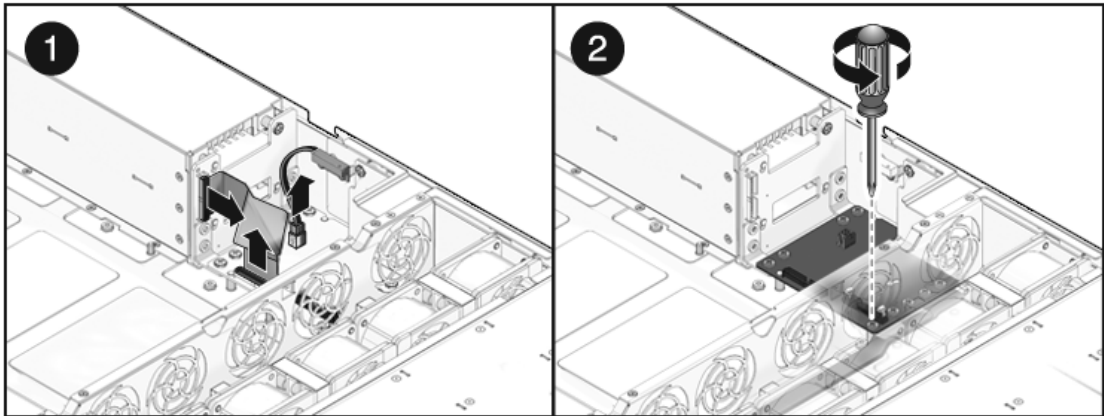
Caution – The system supplies power to the power distribution board even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the power distribution board.

5.5.1 Removing the Power Distribution Board

1. Remove the motherboard assembly.
See [Section 4.7.1, “Removing the Motherboard Assembly”](#) on page 4-34.
2. Remove all power supplies.
 - a. Grasp the power supply handle and press the release latch.

- b. Slide the power supply out of the system.
See [Section 3.6.3, “Removing a Power Supply”](#) on page 3-18.
3. Disconnect the top cover interlock cable from the power distribution board. (FIGURE 5-8 [1])
4. Disconnect the PDB ribbon cable from the power supply backplane.
5. Remove the four screws securing the L shaped bus bars from the PSU backplane to the PDB.
6. Remove the No. 2 Phillips screw securing the PDB to the chassis. [2]
7. Grasp the bus bar and pull the PDB/bus bar assembly to the left, away from the Paddle card.
8. Lift the PDB/bus bar assembly up and out of the system.
9. Place the PDB/bus bar assembly on an antistatic mat.

FIGURE 5-8 Removing the Power Distribution Board



5.5.2 Installing the Power Distribution Board

1. Install the old bus bar onto the new PDB module.

*Do not tighten the screws at this time. All 8 bus bar screws are tightened *only* after the motherboard is installed. The 4 motherboard to bus bar screws are loosely installed initially.*



Caution – Failure to follow this procedure can result in intermittent contacts between the PDB and the Paddle card.

2. Lower the PDB/bus bar assembly into the chassis. (FIGURE 5-9) [1]

The PDB fits over a series of mushroom standoffs in the floor of the chassis.

3. Slide the PDB/bus bar assembly to the right, until it plugs into the Paddle card.

4. Install the four screws that attach the PDB to the PSU backplane.

5. Install the single screw retaining the PDB to the chassis. [2]

6. Install the five No. 2 Phillips screws to secure the PDB to the chassis. [2]

7. Connect the top cover interlock cable to the power distribution board. [3]

8. Connect the ribbon cable to the power distribution board. [3]

9. Install the motherboard assembly.

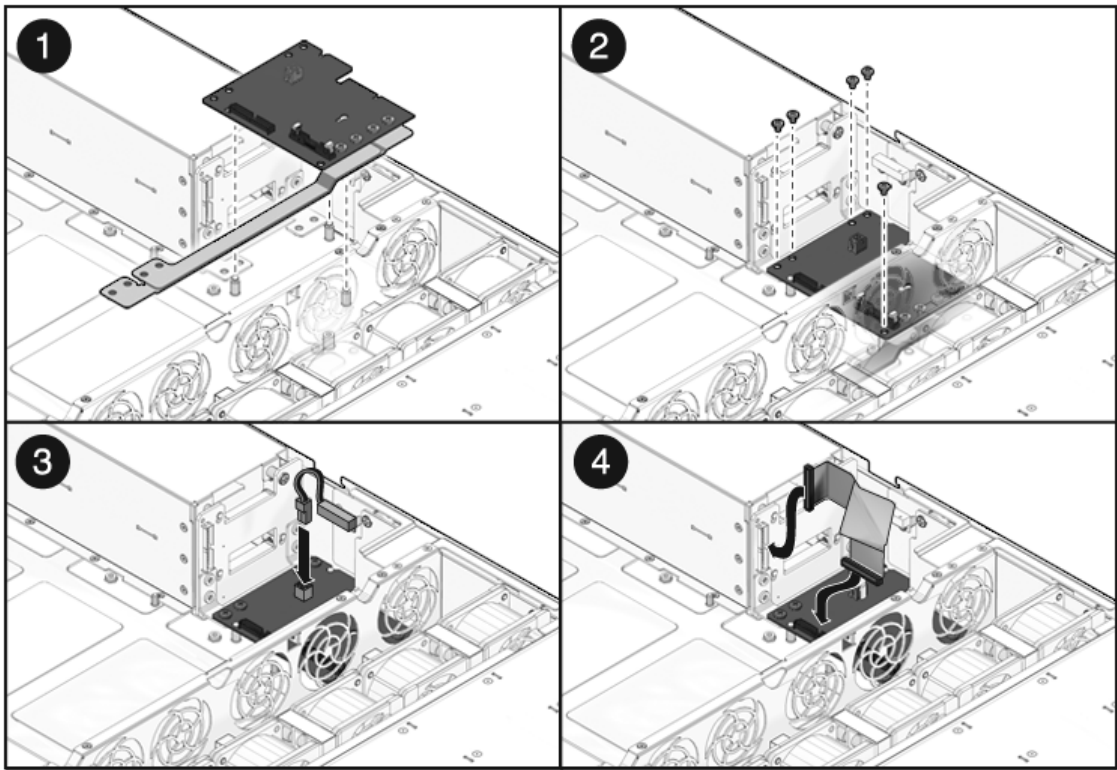
See [Section 4.7.2, “Installing the Motherboard Assembly”](#) on page 4-36.

10. Install the power supplies.

Slide each power supply into its bay until it locks into place.

See [Section 3.6.4, “Installing a Power Supply”](#) on page 3-20.

FIGURE 5-9 Installing the Power Distribution Board



5.6 Servicing the Power Supply Backplane

In the Sun Fire X4440 server, the power supply backplane carries 12V power to the power distribution board.

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

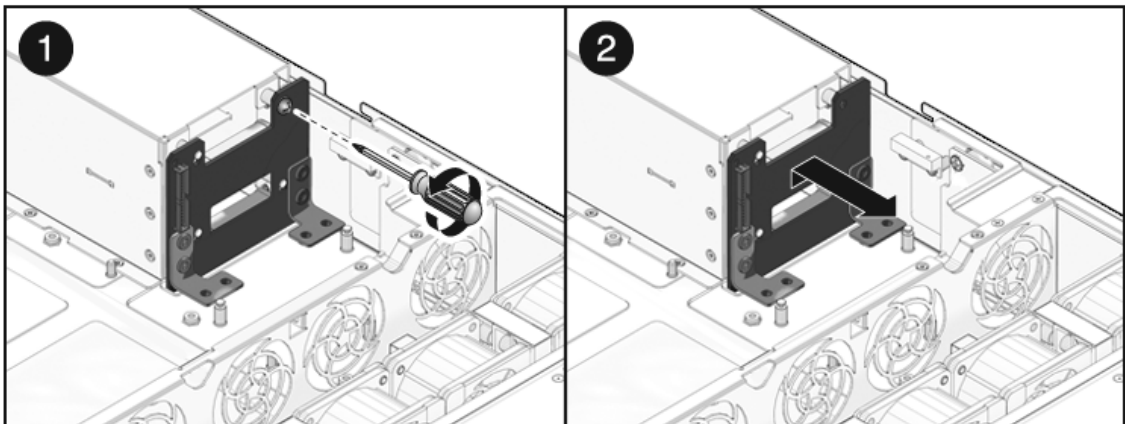


Caution – The system supplies power to the power supply backplane even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the power supply backplane.

5.6.1 Removing the Power Supply Backplane

1. Remove the motherboard assembly.
See [Section 4.7.1, “Removing the Motherboard Assembly”](#) on page 4-34.
2. Remove all power supplies.
 - a. Grasp the power supply handle and press the release latch.
 - b. Slide the power supply out of the system.
See [Section 3.6.3, “Removing a Power Supply”](#) on page 3-18.
3. Remove the power distribution board.
See [Section 5.5.1, “Removing the Power Distribution Board”](#) on page 5-14.
4. Disconnect the PDB ribbon cable from the PSU backplane.
5. Unscrew the 4 screws to remove the L shaped bus bars from the PSU backplane to the PDB.
6. Remove the No. 2 Phillips screw securing the power supply backplane to the power supply bay. ([FIGURE 5-10 \[1\]](#))
7. Lift the power supply backplane up and off its mushroom standoffs, and out of the server. [2]
8. Place the power supply backplane on an antistatic mat.

FIGURE 5-10 Removing the Power Supply Backplane



5.6.2 Installing the Power Supply Backplane

1. **Mount the power supply backplane to the front of the power supply bay.** (FIGURE 5-11 [1])

Place the backplane over its mushroom standoffs and press down toward the floor of the chassis.

2. **Secure the power supply backplane with one No. 2 Phillips screw.** [2]

3. **Install the power distribution board.**

See [Section 5.5.2, “Installing the Power Distribution Board”](#) on page 5-16.

4. **Install all power supplies.**

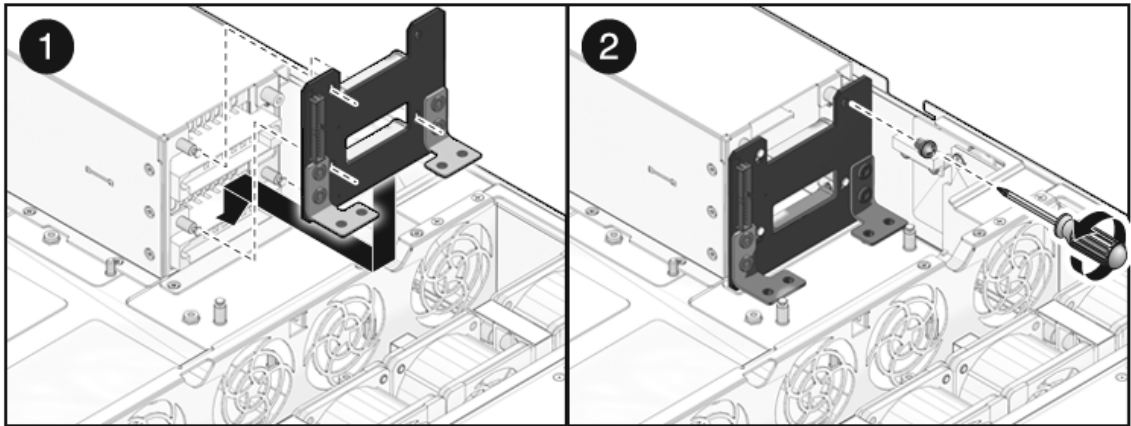
Slide each power supply into its bay until it locks into place.

See [Section 3.6.4, “Installing a Power Supply”](#) on page 3-20.

5. **Install the motherboard assembly.**

See [Section 4.7.2, “Installing the Motherboard Assembly”](#) on page 4-36.

FIGURE 5-11 Installing the Power Supply Backplane



5.7 Servicing the Paddle Card

The Paddle assembly includes the top cover interlock switch.

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

5.7.1 Removing the Paddle Card

1. Remove the motherboard assembly.

See [Section 4.7.1, “Removing the Motherboard Assembly”](#) on page 4-34.

2. Remove the power distribution board.

See [Section 5.5.1, “Removing the Power Distribution Board”](#) on page 5-14.

3. Remove the fan power boards.

See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.

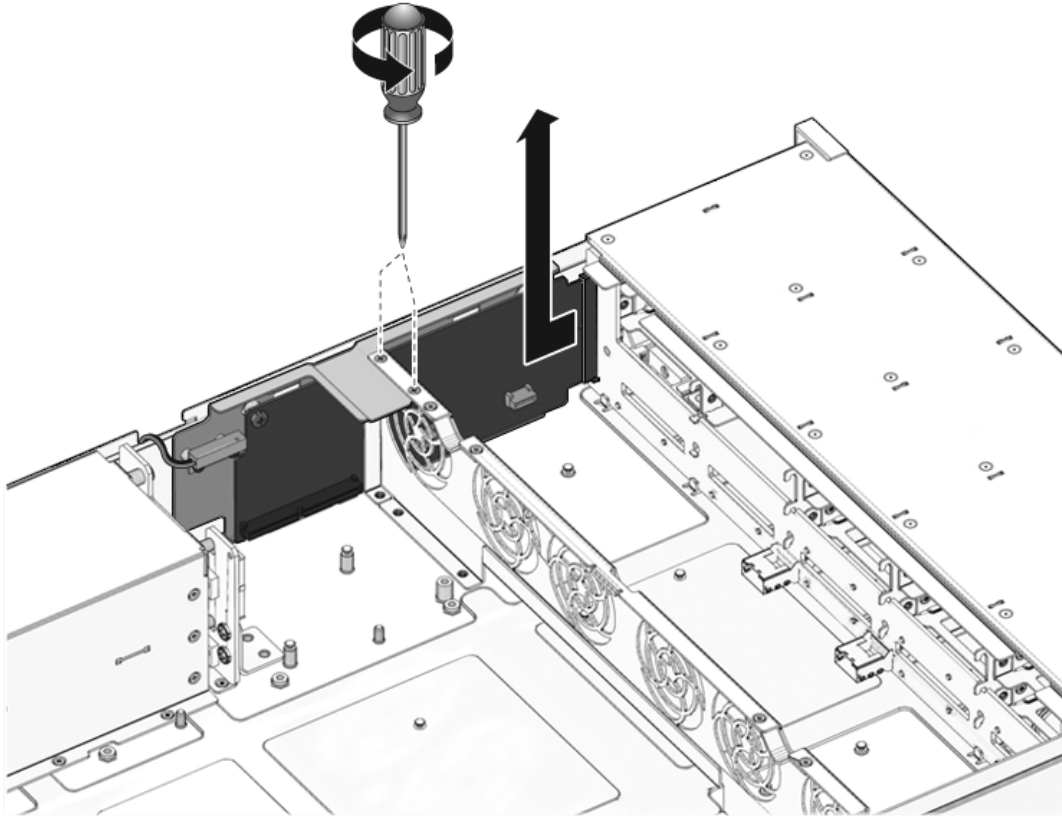
4. Remove the two No. 2 Phillips screws securing the Paddle card to the chassis.
([FIGURE 5-12](#))

5. Slide the Paddle card back, away from its connector on the drives backplane.

6. Lift the Paddle card up and out of the chassis.

7. Place the Paddle card on an antistatic mat.

FIGURE 5-12 Removing the Paddle Card



5.7.2 Installing the Paddle Card

1. Lower the Paddle card into the chassis.

The Paddle card fits over a series of mushroom standoffs in the chassis side wall.

2. Slide the Paddle card forward to plug it into the drives backplane. (FIGURE 5-13)

3. Secure the Paddle card with two No. 2 Phillips screws.

4. Install the fan power boards.

See [Section 5.1.2, “Installing a Fan Power Board”](#) on page 5-4.

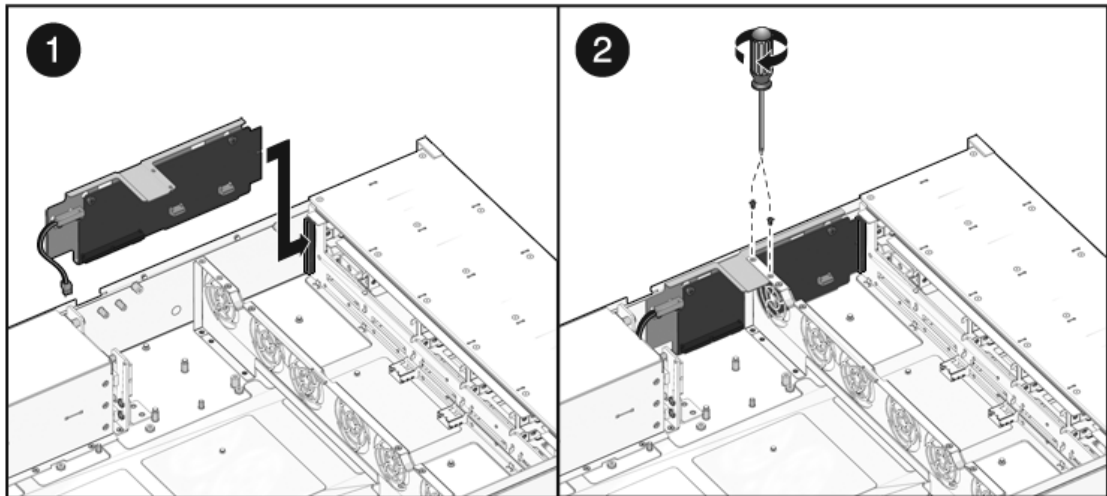
5. Install the power distribution board.

See [Section 5.5.2, “Installing the Power Distribution Board”](#) on page 5-16.

6. Install the motherboard assembly.

See [Section 4.7.2, “Installing the Motherboard Assembly”](#) on page 4-36.

FIGURE 5-13 Installing the Paddle Card



5.8 Servicing Cables

The following topics are covered:

- [Section 5.8.1, “Removing Drive Cables in a SAS Configuration”](#) on page 5-23
- [Section 5.8.2, “Installing Drive Cables into a SAS Configuration”](#) on page 5-25
- [Section 5.8.3, “Removing Drive Cables in a SATA Configuration”](#) on page 5-28
- [Section 5.8.4, “Installing Drive Cables in a SATA Configuration”](#) on page 5-30
- [Section 5.8.5, “Changing Drive Cables From SAS to SATA”](#) on page 5-34
- [Section 5.8.6, “Changing HD Cables From SATA to SAS”](#) on page 5-36
- [Section 5.8.7, “Removing a PDB Cable”](#) on page 5-38
- [Section 5.8.8, “Installing a PDB Cable”](#) on page 5-40

See [Section 1.5, “Illustrated Parts Breakdown”](#) on page 1-11 for illustrations of cables. SAS/SATA cables are different length cables and a cable kit is required.

Note – FRU: This field-replaceable unit should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

5.8.1 Removing Drive Cables in a SAS Configuration

To remove hard drive cables in a SAS configuration.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.6, “Extending the Server to the Maintenance Position”](#) on page 2-5.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the air duct.

See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.

4. Remove the fan modules.

See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.

5. Remove the fan power boards.

See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.

6. Untwist the cable tiedowns to release the cables.

7. Remove the mezzanine tray support bracket from the power supply bay wall.

8. Remove the cables.

- a. Press the latch.
- b. Push the cable in.
- c. While keeping the latch pressed, pull the cable out.



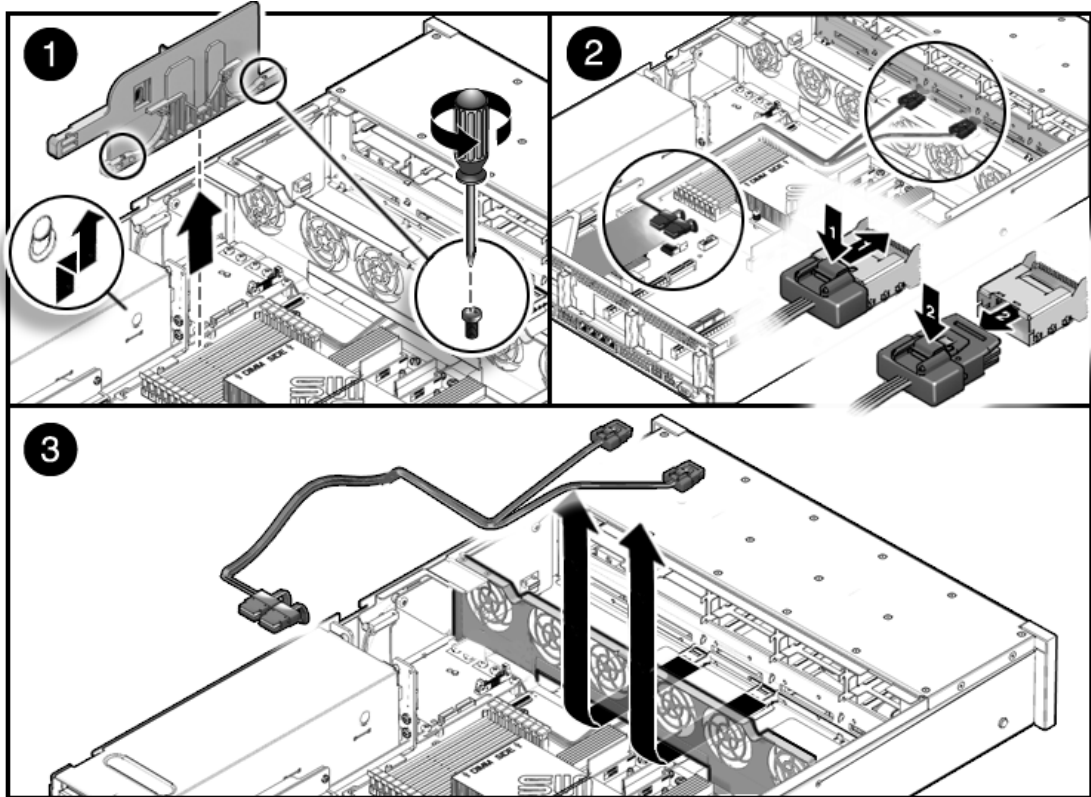
Caution – Failure to follow this step can result in the cables not being removed, or damage to the backplane, HBA adapter, or SATA connectors on the motherboard.

9. Pull the cables through the mid-wall.

Avoid damaging the air blocker.

10. Lift the cables out of the chassis.

FIGURE 5-14 Removing Drive Cables in a SAS Configuration



5.8.2 Installing Drive Cables into a SAS Configuration

To install two hard drive cables, Disk 0-3 and Disk 4-7 in a SAS configuration.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the air duct.

See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.

4. Remove the fan modules.

See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.

5. Remove the fan power boards.

See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.

6. Remove the mezzanine tray support bracket from the power supply bay wall.

7. Thread the PB end of the cables underneath the midwall, towards the drives backplane.

a. Connect the connector labeled PB 0, 1, 2, and 3 to the connector furthest from the power supply.

b. Connect the connector labeled PB 4, 5, 6, and 7 to the connector nearest to the power supply.

8. Reinstall the fan boards, making sure the cable is not pinched.

The cable routes through the slot underneath of the fan boards.

9. **Route the cable towards the power supply bay, and over the notch in the vertical power supply unit backplane.**

The cable then dips slightly to run underneath the ribs on the Mezzanine Tray support bracket.

10. **Reinstall the mezzanine tray support bracket.**

Be careful not to pinch the cable.

11. **Install the SAS HBA card in PCIe slot 0.**

The lower card on the riser is closest to the power supply wall.

12. **Install the connector labeled MB 0, 1, 2, and 3 into port 0 of the SAS HBA card, which is closest to the gold fingers.**

13. **Install the connector labeled MB 4, 5, 6, and 7 into port 1 of the SAS HBA card, which is furthest from the gold fingers.**

14. **Reinstall the fan power boards.**

See [Section 5.1.2, “Installing a Fan Power Board”](#) on page 5-4.

15. **Replace the air duct.**

See [Section 4.3.2, “Installing the Air Duct”](#) on page 4-18.

16. **Reinstall the Mezzanine Tray.**

See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.

17. **Install the fan modules.**

See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.

18. **Return the server to operation.**

- a. **Install the top cover.**

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

- b. **Install the server into the rack.**

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

- c. **Reconnect the power cord (or cords) to the power supply (or supplies).**

Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

- d. **Power on the server.**

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-15 Installing Drive Cables in a SAS Configuration (part 1)

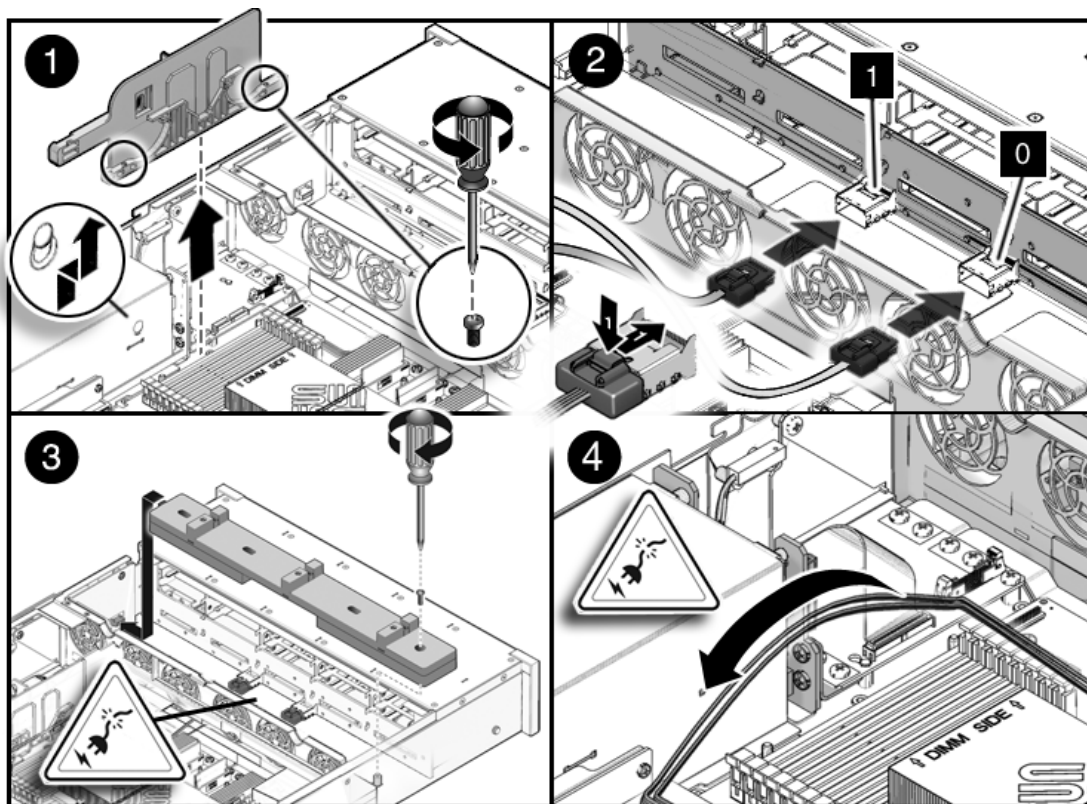
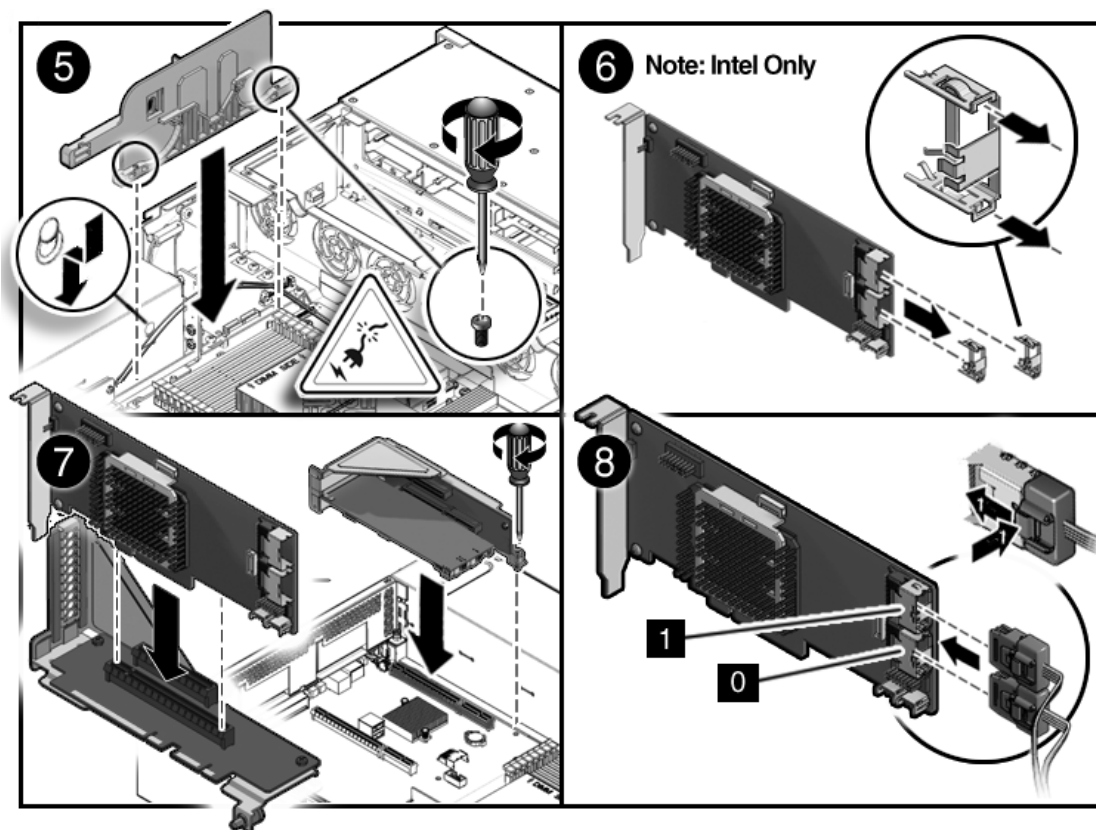


FIGURE 5-16 Installing Drive Cables in a SAS Configuration (part 2)



5.8.3 Removing Drive Cables in a SATA Configuration

To remove drive cables in a SATA configuration.

- 1. Prepare the server for service.**
 - a. Power off the server.**

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.
 - b. Disconnect the power cord (or cords) from the power supply (or supplies).**

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.
 - c. Slide the server out of the rack.**

See [Section 2.6, "Extending the Server to the Maintenance Position"](#) on page 2-5.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the air duct.

See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.

4. Remove the fan modules.

See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.

5. Remove the fan power boards.

See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.

6. Untwist the cable tiedowns to release the cables.

7. Remove the mezzanine tray support bracket from the power supply bay wall.

8. Remove the cables.

a. Press the latch.

b. Push the cable in.

c. While keeping the latch pressed, pull the cable out.



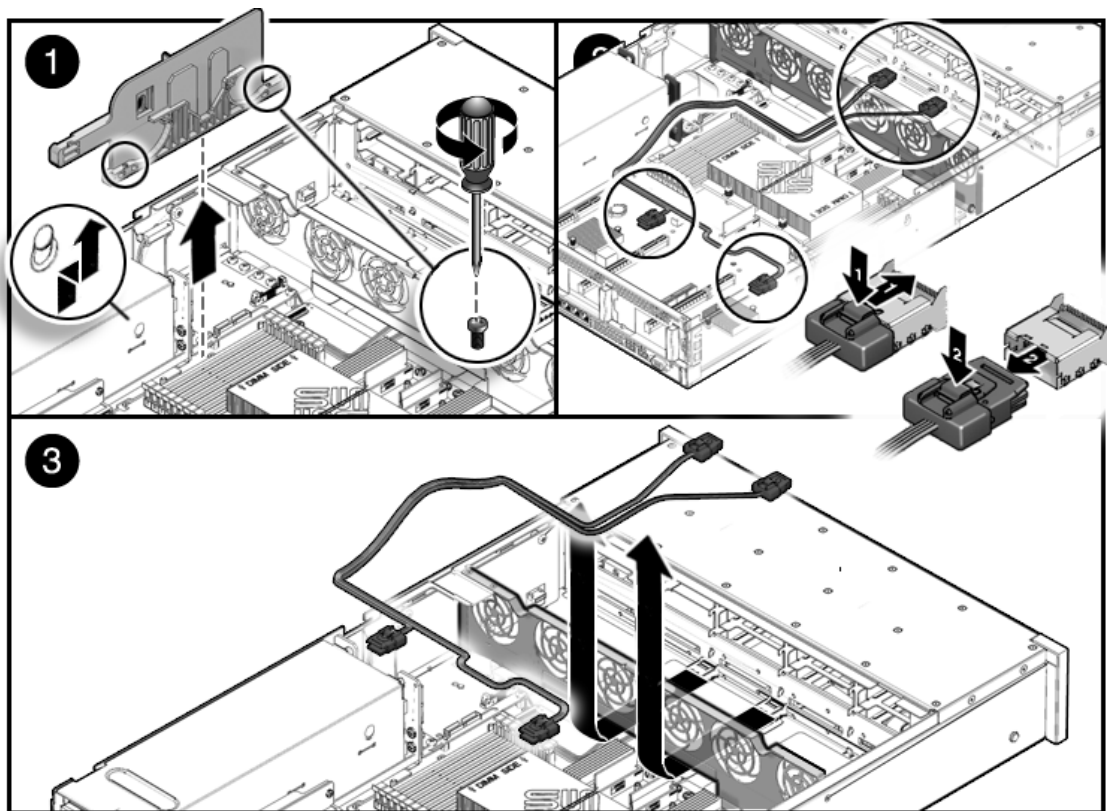
Caution – Failure to follow this step may result in the cables not being removed, or damage to the backplane, HBA adapter or SATA connectors on the motherboard.

9. Pull the cables through the midwall.

Avoid damaging the air blocker.

10. Lift the cables out of the chassis.

FIGURE 5-17 Removing Drive Cables in a SATA Configuration



5.8.4 Installing Drive Cables in a SATA Configuration

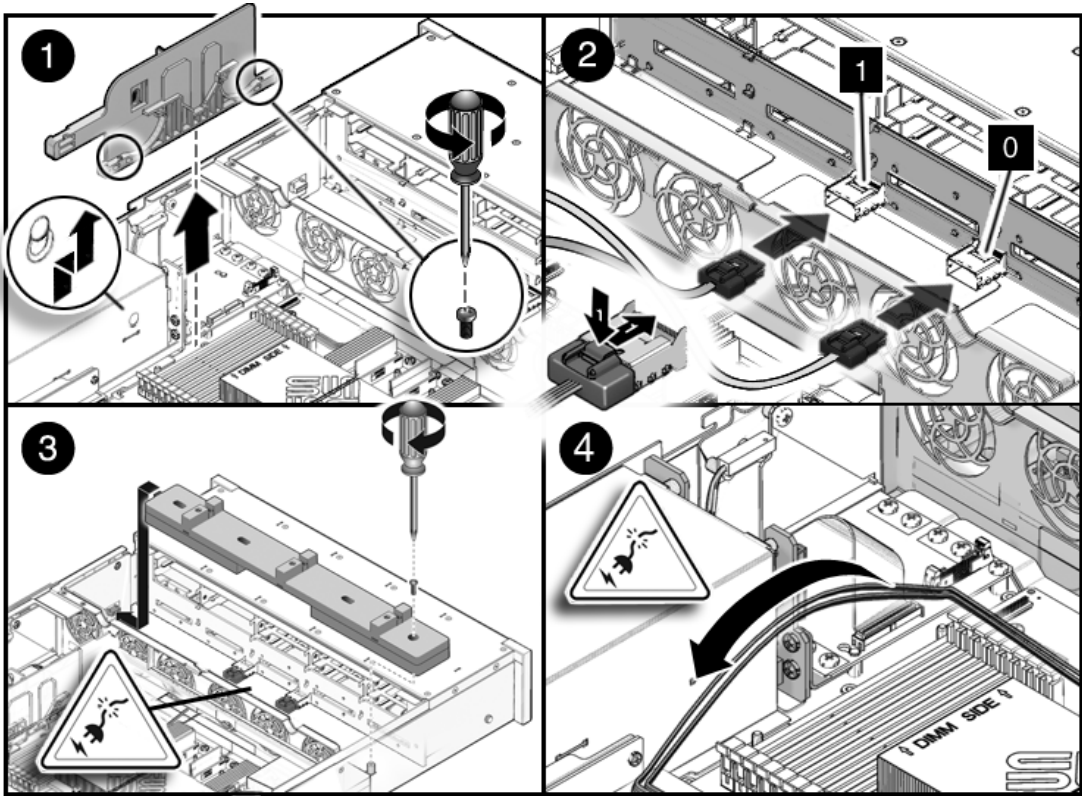
To install two drive cables; Disk 0-3 and Disk 4-5 in SATA configuration, do the following.

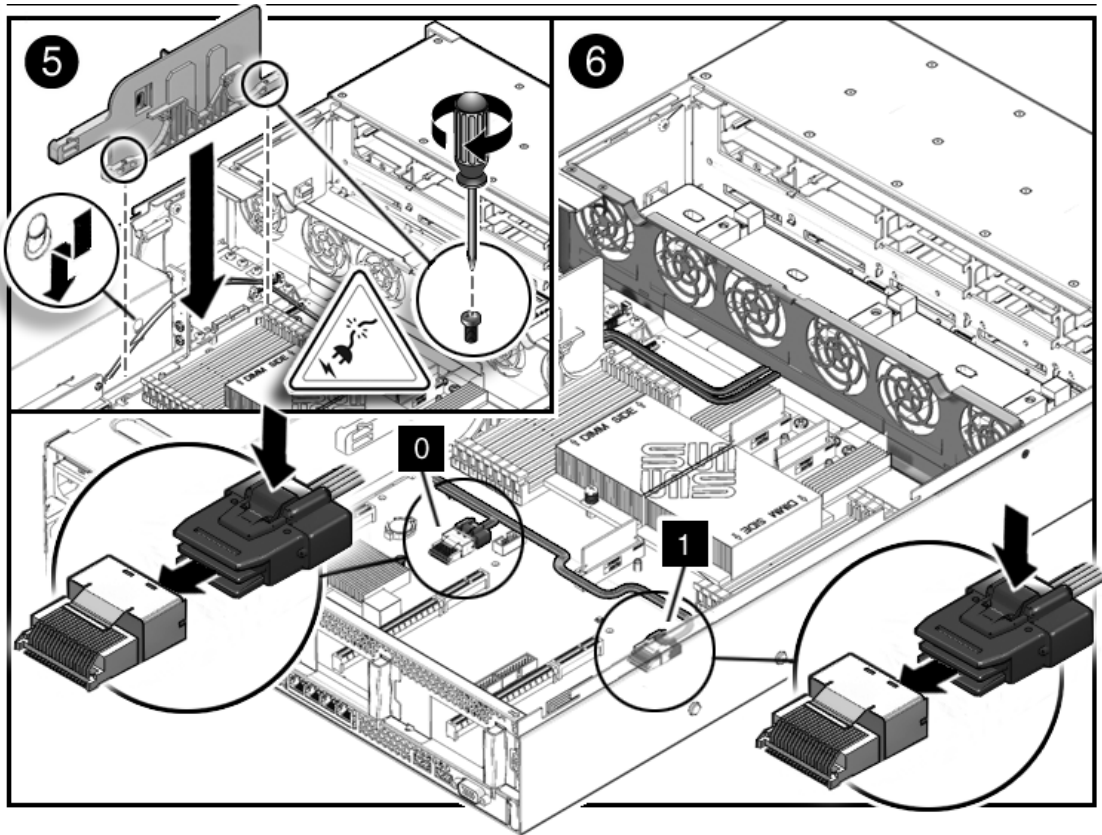
1. **Prepare the server for service.**
 - a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

- d. Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
- 2. Remove the mezzanine tray.**
See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.
- 3. Remove the air duct.**
See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.
- 4. Remove the fan modules.**
See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.
- 5. Remove the fan power boards.**
See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.
- 6. Remove the mezzanine tray support bracket from the power supply bay wall.**
- 7. Thread the PB end of the cables underneath the midwall, towards the drive backplane.**
 - a. Connect the connector labeled PB 0, 1, 2, and 3 to the connector furthest from the power supply.**
 - b. Connect the connector labeled PB 4, 5, 6, and 7 to the connector nearest to the power supply.**
- 8. Reinstall the fan boards, making sure the cable is not pinched.**
The cable routes through the slot underneath of the fan boards.
- 9. Route the cable towards the power supply bay, and over the notch in the vertical power supply unit backplane.**
The cable then dips slightly to run underneath the ribs on the mezzanine tray support bracket.
- 10. Reinstall the mezzanine tray support bracket.**
Be careful not to pinch the cable.
- 11. Install the SAS HBA card in PCIe slot 0.**
The lower card on the riser is closest to the power supply wall.
- 12. Install the connector labeled MB 0, 1, 2, and 3 into the motherboard connector labeled SATA 0.**

- 13. Install the connector labeled MB 4, 5, 6, and 7 into the motherboard connector labeled SATA 1.**
- 14. Reinstall the fan power boards.**
See [Section 5.1.2, “Installing a Fan Power Board”](#) on page 5-4.
- 15. Replace the air duct.**
See [Section 4.3.2, “Installing the Air Duct”](#) on page 4-18.
- 16. Reinstall the mezzanine tray.**
See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.
- 17. Install the fan modules.**
See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14
- 18. Return the server to operation.**
 - a. Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
 - c. Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-18 Installing Drive Cables in a SATA Configuration (part 1)





5.8.5 Changing Drive Cables From SAS to SATA

To change drive cables from SAS to SATA.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, "Powering Off the Server"](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, "Removing a Server From the Rack"](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the cables.

a. Press the latch.

b. Push the cable in.

c. While keeping the latch pressed, pull the cable out.



Caution – Failure to follow this step can result in the cables not being removed, or damage to the backplane, HBA adapter, or SATA connectors on the motherboard.

4. Remove the SAS HBA card and replace it with either PCIe filler or another card.

5. Install the connector labeled MB 0, 1, 2, and 3 into the motherboard connector labeled SATA 0.

6. Install the connector labeled MB 4, 5, 6, and 7 into the motherboard connector labeled SATA 1.

7. Reinstall the mezzanine tray.

See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.

8. Return the server to operation.

a. Install the top cover.

See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Install the server into the rack.

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

c. Reconnect the power cord (or cords) to the power supply (or supplies).

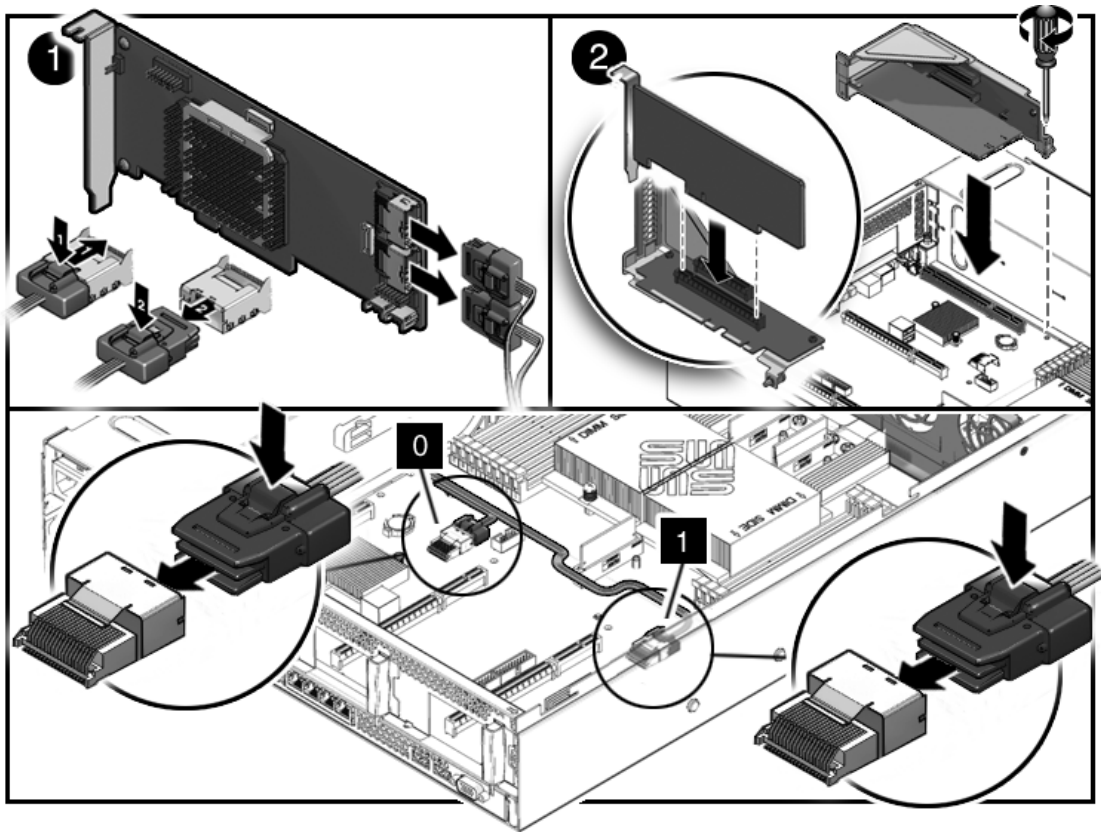
Verify that the AC Present LED is lit.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

d. Power on the server.

See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-19 Changing HD Cables From SAS to SATA



5.8.6 Changing HD Cables From SATA to SAS

To change drive cables from SATA to SAS.

1. Prepare the server for service.

a. Power off the server.

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

b. Disconnect the power cord (or cords) from the power supply (or supplies).

See [Section 2.5, “Powering Off the Server”](#) on page 2-4.

c. Slide the server out of the rack.

See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.

d. Attach an antistatic wrist strap.

See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

e. Remove the top cover.

See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.

2. Remove the mezzanine tray.

See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.

3. Remove the cables.

a. Press the latch.

b. Push the cable in.

c. While keeping the latch pressed, pull the cable out.



Caution – Failure to follow this step can result in the cables not being removed, or damage to the backplane, HBA adapter, or SATA connectors on the motherboard.

4. Install the SAS HBA card in PCIe slot 0.

The lower card on the riser is closest to the power supply wall.

5. Install the connector labeled MB 0, 1, 2, and 3 into the motherboard connector labeled SATA 0.

6. Install the connector labeled MB 4, 5, 6, and 7 into the motherboard connector labeled SATA 1.

7. Reinstall the mezzanine tray.

See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.

8. Install the fan modules.

See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.

9. Return the server to operation.

a. Install the top cover.

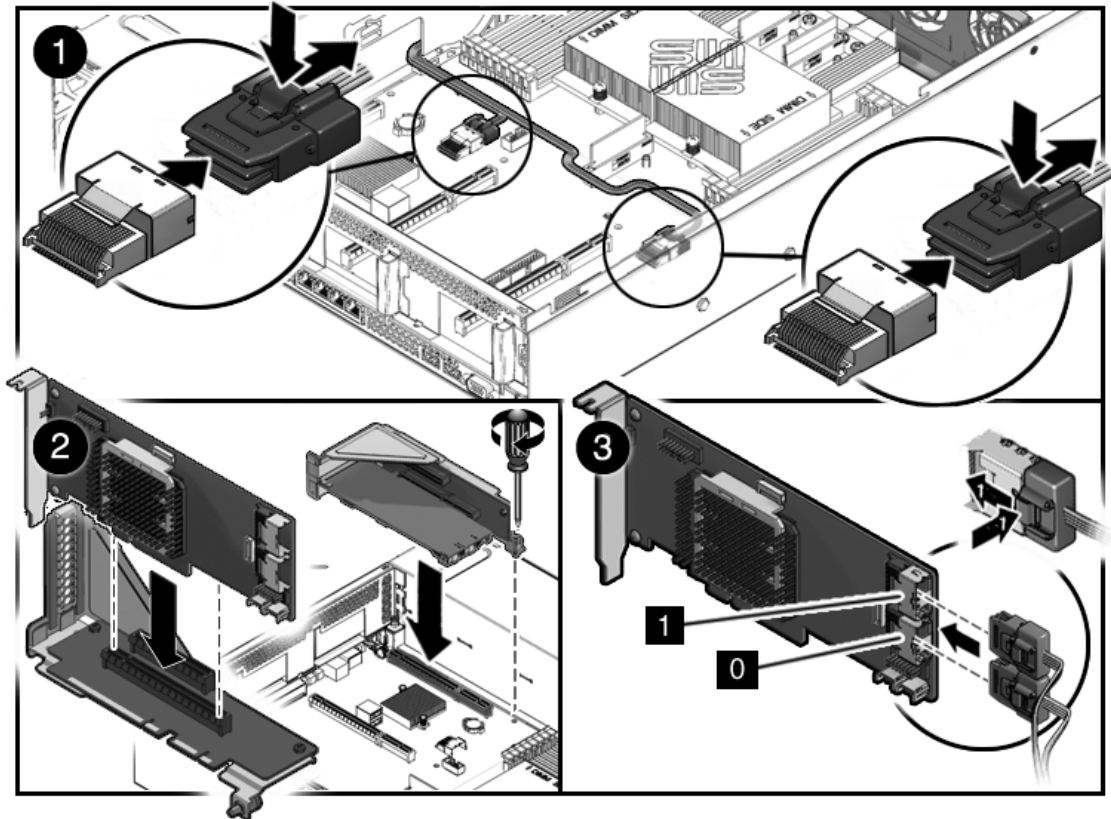
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.

b. Install the server into the rack.

See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.

- c. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
- d. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-20 Changing Drive Cables From SATA to SAS



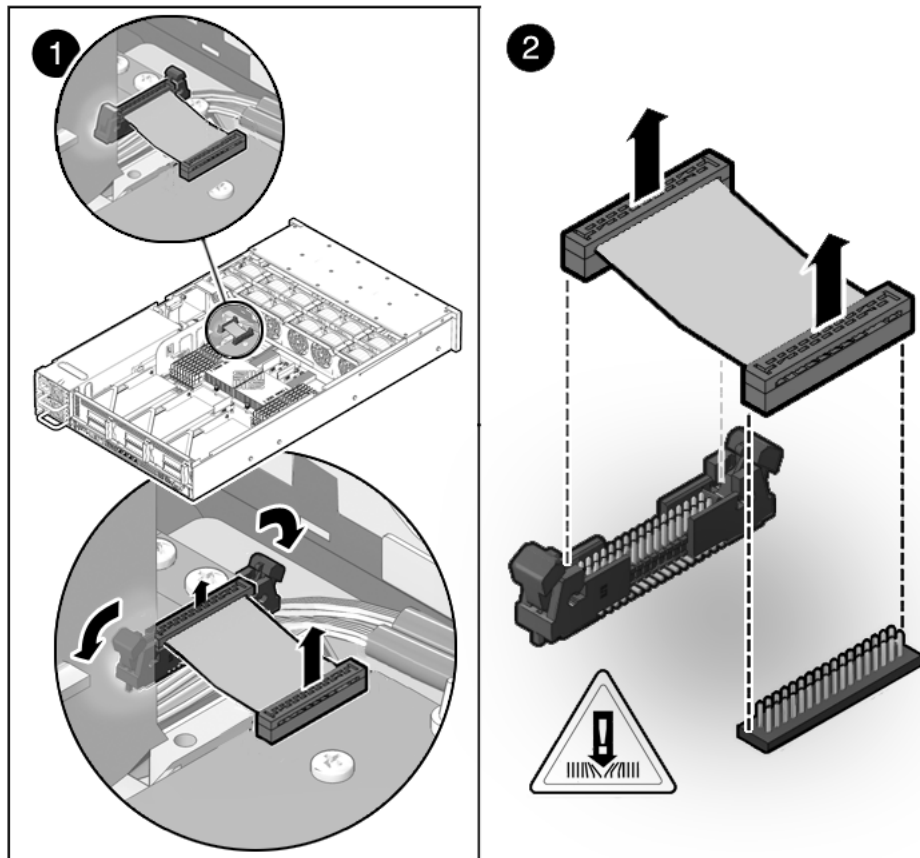
5.8.7 Removing a PDB Cable

To remove a Power Distribution Board cable.

1. **Prepare the server for service.**

- a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
- 2. **Remove the mezzanine tray.**
See [Section 4.2.1, “Removing the Mezzanine Tray”](#) on page 4-13.
 - 3. **Remove the air duct.**
See [Section 4.3.1, “Removing the Air Duct”](#) on page 4-16.
 - 4. **Remove the PDB end of the cable. (FIGURE 5-21 [1])**
 - a. **Release the locking latches on either side and then pull the cable straight up.**
 - b. **Grasp each end of the connector on the motherboard, and then pull straight up to disconnect from the connector. [2]**

FIGURE 5-21 Removing a PDB Cable



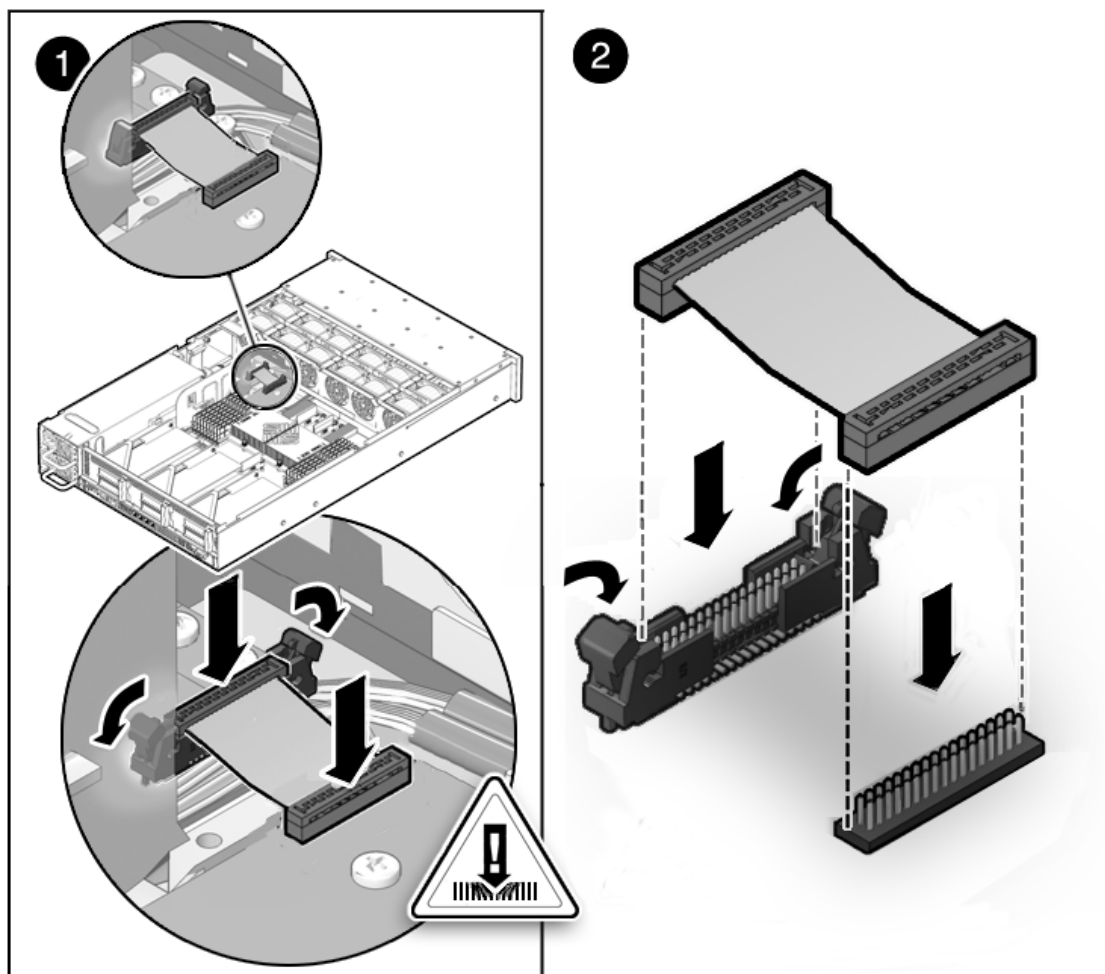
5.8.8 Installing a PDB Cable

To install a Power Distribution Board cable.

- 1. Inspect the motherboard pin field to ensure all pins are straight.**
- 2. Open the locking latches on the PDB connector.**
Ensure that the key of the cable lines up with the slot on the connector.
- 3. Push the cable connector into the PDB connection until it is seated.**
The latches should be above the connector housing.

- 4. Carefully align the motherboard connector to the motherboard pin field.**
Gently press the connector down until it is seated. If you feel significant resistance, stop and check the pin alignment.
- 5. Replace the air duct.**
See [Section 4.3.2, “Installing the Air Duct”](#) on page 4-18.
- 6. Reinstall the mezzanine tray.**
See [Section 4.2.2, “Installing the Mezzanine Tray”](#) on page 4-14.
- 7. Return the server to operation.**
 - a. Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
 - b. Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
 - c. Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - d. Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-22 Installing a PDB Cable



5.9 Configuring Disk Controllers

The following topics are covered:

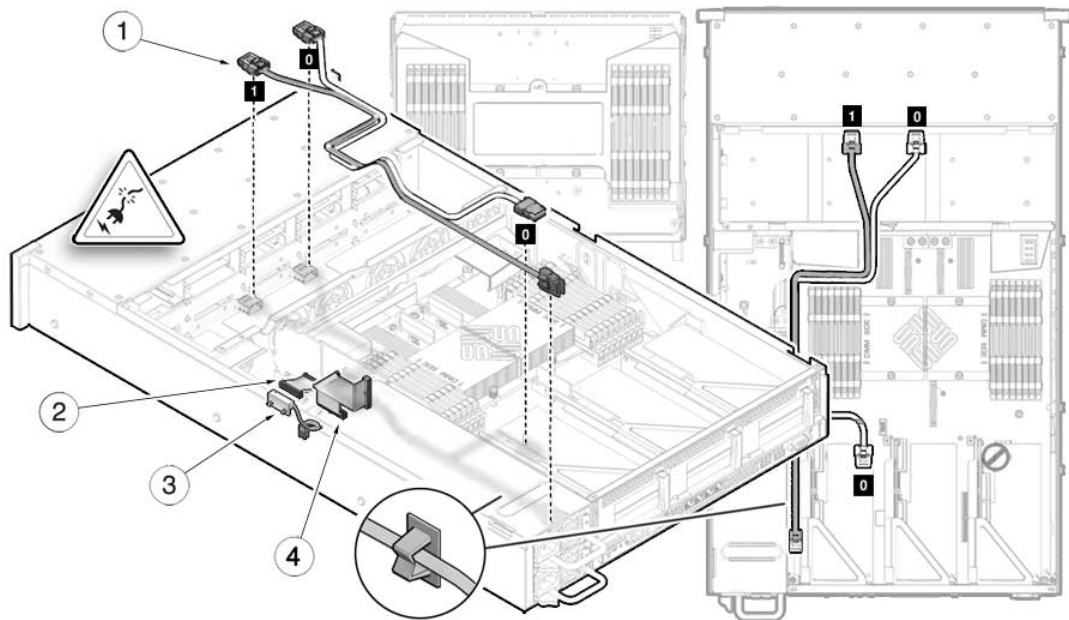
- [Section 5.9.1, “Converting a Diskless Server to HBA” on page 5-43](#)
- [Section 5.9.2, “Converting HBA to Onboard SATA” on page 5-45](#)
- [Section 5.9.3, “Converting Onboard SATA to HBA” on page 5-47](#)

SAS/SATA cables are different length cables and a cable kit is required.

5.9.1 Converting a Diskless Server to HBA

To convert a diskless Sun Fire X4440 Server server to operate with a Host Bus Adapter (HBA) PCIe card that controls drives.

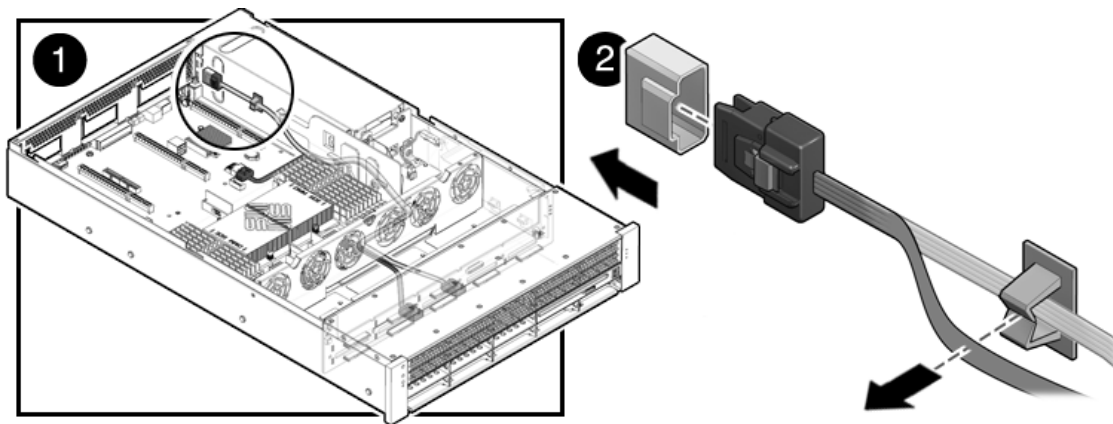
FIGURE 5-23 Diskless Server to HBA Configuration



1. Prepare the server for service.
 - a. Power off the server.
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. Disconnect the power cord (or cords) from the power supply (or supplies).
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. Slide the server out of the rack.
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. Attach an antistatic wrist strap.
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.

- e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
- 2. **Disconnect the cable on the motherboard from the onboard SATA connector #1.**
([FIGURE 5-24](#))
- 3. **Install an HBA card.**
See [Section 4.5.3, “Installing PCIe Cards”](#) on page 4-28.
- 4. **Connect the left cable to connector 0 on the HBA card.**
- 5. **Connect the right cable to connector 1 on the HBA card.**
Align properly. Rout the cables carefully through the server.
See [Section 1.2.2, “System Cables”](#) on page 1-5.
- 6. **Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
- 7. **Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
- 8. **Install the drives, as required.**
See [Section 3.2.4, “Installing a Drive”](#) on page 3-6.
- 9. **Return the server to operation.**
 - a. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - b. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-24 Converting a Diskless Server to HBA



5.9.2 Converting HBA to Onboard SATA

To convert a Sun Fire X4440 Server server from a Host Bus Adapter (HBA) PCIe card to the onboard SATA drive controller.

1. **Prepare the server for service.**
 - a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Remove the cables from the HBA card.**
 - a. **Press the latch.**
 - b. **Push the cable in.**

- c. While keeping the latch pressed, pull the cable out.

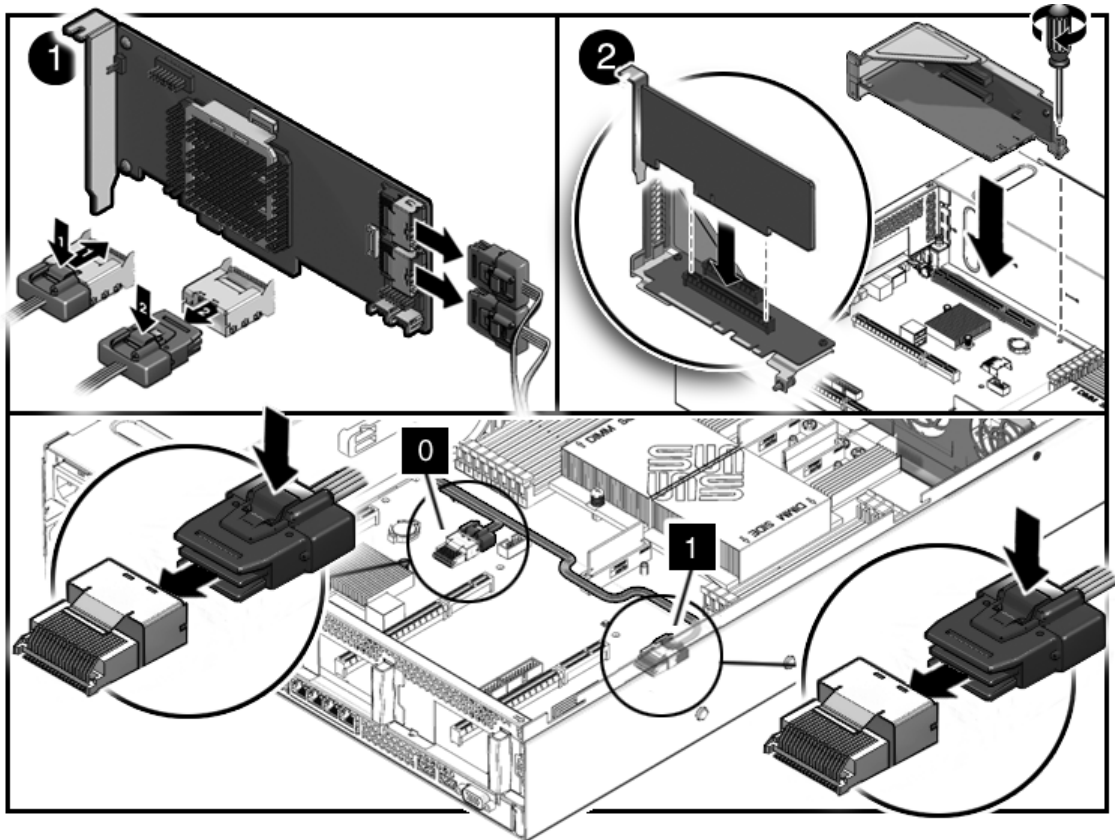


Caution – Failure to follow this step can result in the cables not being removed, or damage to the backplane, HBA adapter, or SATA connectors on the motherboard.

3. **Remove the HBA card from slot 0.** (FIGURE 5-25)
See [Section 4.5.2, “Removing PCIe Cards”](#) on page 4-26.
4. **Remove the PCIe card from slot 2, if present, to access the onboard SATA connector.**
Skip this step if no card is present in slot 2.
5. **Attach the left cable farthest from the power supply into the onboard SATA connector 0~3 (SATA #1)**
6. **Remove all fan modules.**
See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.
7. **Disconnect the right cable from the drives disk backplane connector.**
Remove the cable.
8. **Obtain the long cable (PN 530-3892) from the accessory kit.**
9. **Insert the cable (PN 530-3892) connector fully into the drives disk backplane connector until it clicks.**
Align properly. Rout the cables carefully through the server.
See [Section 1.2.2, “System Cables”](#) on page 1-5.
10. **Place the cable (PN 530-3892) into the on board connector labeled 4-7 (SATA #2).**
11. **Install all fan modules.**
See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.
12. **Reinstall the PCIe card into slot 2, if present.**
See [Section 4.5.3, “Installing PCIe Cards”](#) on page 4-28.
13. **Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
14. **Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
15. **Install the drives, as required.**
See [Section 3.2.4, “Installing a Drive”](#) on page 3-6.
16. **Return the server to operation.**

- a. **Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
- b. **Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-25 Converting HBA to Onboard SATA



5.9.3 Converting Onboard SATA to HBA

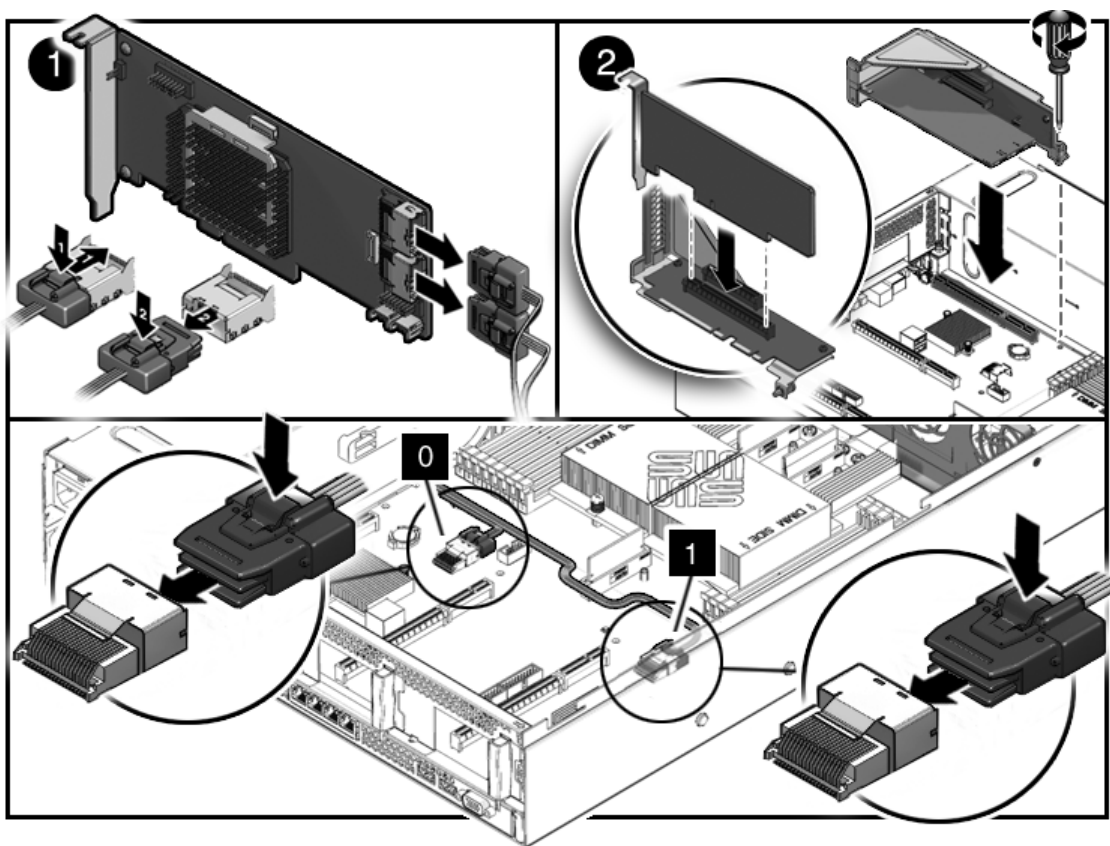
To convert a Sun Fire X4440 Server server from the onboard SATA drive controller to a Host Bus Adapter (HBA) PCIe card.

1. **Prepare the server for service.**

- a. **Power off the server.**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - b. **Disconnect the power cord (or cords) from the power supply (or supplies).**
See [Section 2.5, “Powering Off the Server”](#) on page 2-4.
 - c. **Slide the server out of the rack.**
See [Section 2.7, “Removing a Server From the Rack”](#) on page 2-8.
 - d. **Attach an antistatic wrist strap.**
See [Section 2.8, “Performing Electrostatic Discharge and Antistatic Prevention Measures”](#) on page 2-10.
 - e. **Remove the top cover.**
See [Section 2.9, “Removing the Top Cover”](#) on page 2-12.
2. **Remove the HBA card from slot 0 (FIGURE 5-26)**
See [Section 4.5.2, “Removing PCIe Cards”](#) on page 4-26.
 3. **Remove the PCIe card from slot 2, if present, to access the onboard SATA connector.**
Skip this step if no card is present in slot 2.
 4. **Disconnect the drive cable from the onboard SATA connector (left) (SATA #2).**
 5. **Remove all fan modules.**
See [Section 3.5.4, “Removing a Fan Module”](#) on page 3-13.
 6. **Remove the fan power boards.**
See [Section 5.1.1, “Removing a Fan Power Board”](#) on page 5-2.
 7. **Remove the cable from the drive backplane on the right side.**
 8. **Obtain the short cable (PN 530-3895) from the accessory pack.**
 9. **Attach the short cable to right side drives backplane.**
 10. **Disconnect the drive cable from the 0~3 connector (SATA #1).**
 11. **Install the HBA in slot 0.**
See [Section 4.5.3, “Installing PCIe Cards”](#) on page 4-28.
 12. **Connect the left cable to connector 0 on the HBA card.**
 13. **Connect the right cable to connector 1 on the HBA card.**
Align properly. Rout the cables carefully through the server.
See [Section 1.2.2, “System Cables”](#) on page 1-5.

- 14. Reinstall the fan power boards.**
See [Section 5.1.2, “Installing a Fan Power Board”](#) on page 5-4.
- 15. Install all fan modules.**
See [Section 3.5.5, “Installing a Fan Module”](#) on page 3-14.
- 16. Install the top cover.**
See [Section 6.1, “Installing the Top Cover”](#) on page 6-2.
- 17. Install the server into the rack.**
See [Section 6.2, “Reinstalling the Server in the Rack”](#) on page 6-3.
- 18. Install the drives, as required.**
See [Section 3.2.4, “Installing a Drive”](#) on page 3-6.
- 19. Return the server to operation.**
 - a. Reconnect the power cord (or cords) to the power supply (or supplies).**
Verify that the AC Present LED is lit.
See [Section 6.4, “Powering On the Server”](#) on page 6-6.
 - b. Power on the server.**
See [Section 6.4, “Powering On the Server”](#) on page 6-6.

FIGURE 5-26 Converting Onboard SATA to HBA



Returning the Server to Operation

This chapter describes how to return the Sun Fire X4440 server to operation after you have performed service procedures.

The following topics are covered in this chapter:

- [Section 6.1, “Installing the Top Cover” on page 6-2](#)
- [Section 6.2, “Reinstalling the Server in the Rack” on page 6-3](#)
- [Section 6.3, “Returning the Server to the Normal Rack Position” on page 6-4](#)
- [Section 6.4, “Powering On the Server” on page 6-6](#)



Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.



Caution – Equipment damage possible. Covers must be in place for proper air flow.

6.1 Installing the Top Cover

If you removed the top cover, perform the following steps to replace it:

1. Place the top cover on the chassis.

Set the cover down so that it hangs over the rear of the server by about an inch (25.4 mm).

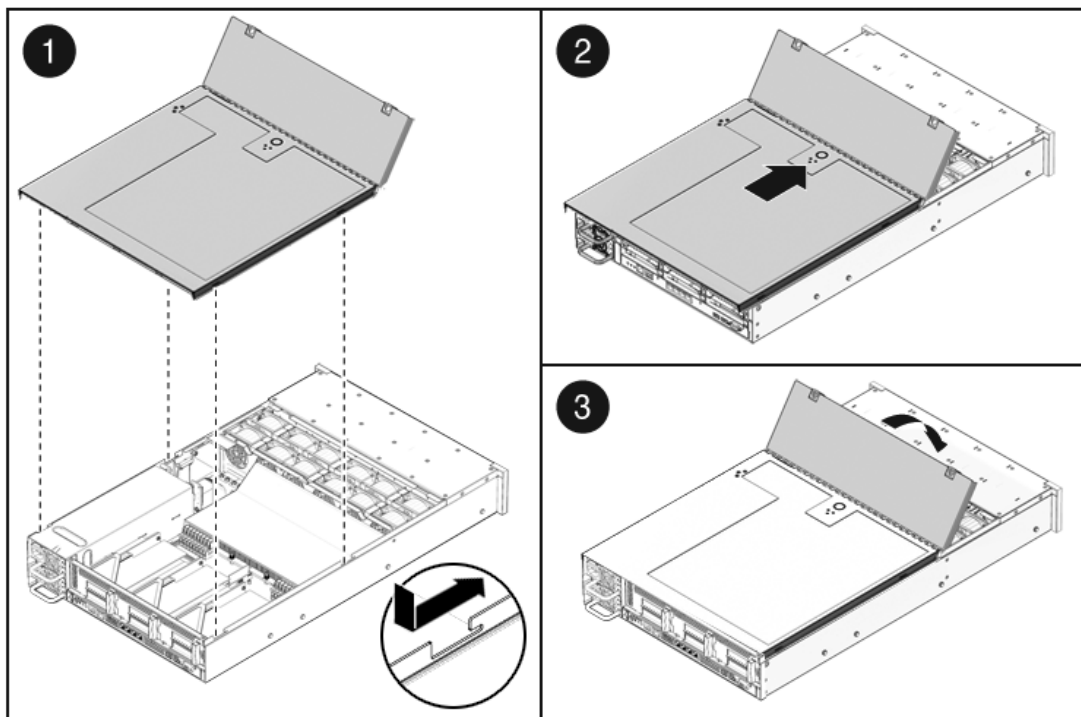
2. Slide the top cover forward until it seats (FIGURE 6-1).

3. Close the fan cover and engage the fan cover latches.



Caution – If the top cover is not installed correctly, and the cover is not completely closed, the server will not power on.

FIGURE 6-1 Installing the Top Cover



6.2 Reinstalling the Server in the Rack

If you removed the server chassis from the rack, perform these steps to replace it.



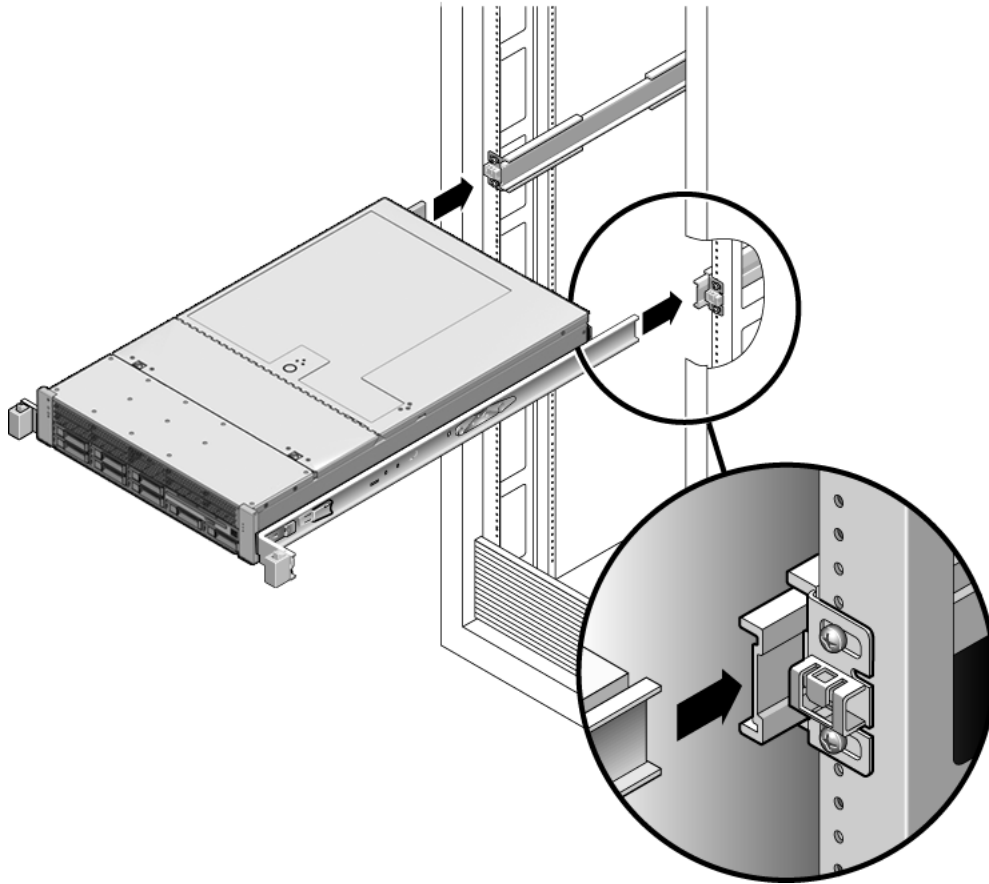
Caution – The servers are heavy. Two people might be required to carry the chassis and install it in the rack.



1. On the rack, ensure that the slide rails are extended.
2. Place the ends of the chassis mounting brackets into the slide rails ([FIGURE 6-2](#)).
3. Slide the server into the rack until the brackets lock into place.

The server is now in the extended maintenance position.

FIGURE 6-2 Returning the Server to the Rack



6.3 Returning the Server to the Normal Rack Position

If you extended the server to the maintenance position, use this procedure to return the server to the normal rack position.

1. Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail ([FIGURE 6-3](#)).
2. While pushing on the release tabs, slowly push the server into the rack. Ensure that the cables do not get in the way.

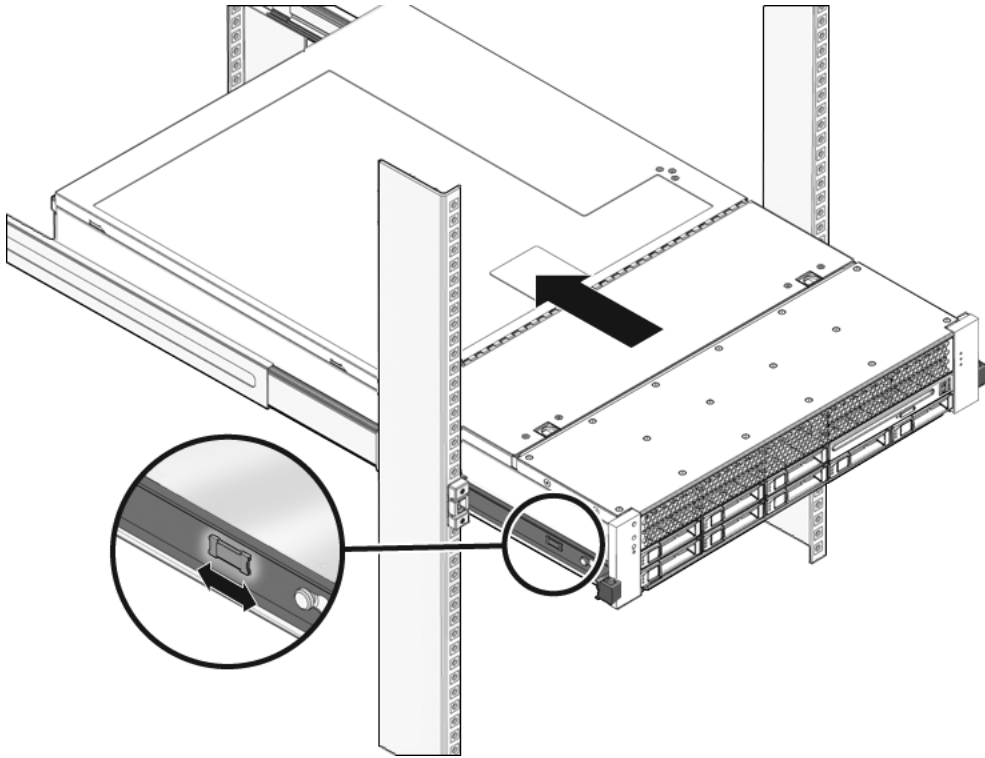
3. Reconnect the cables to the back of the server.

If the CMA is in the way, disconnect the left CMA release and swing the CMA open.

4. Reconnect the CMA.

Swing the CMA closed and latch it to the left rack rail.

FIGURE 6-3 Release Tabs on Rails



6.4 Powering On the Server

Before powering on your server for the first time, follow the installation and cabling instructions provided in the *Sun Fire X4450 Server Installation Guide*, which is shipped with the system and is also available online.

To connect power cords and apply power to the server:

1. Connect the power cord (or cords) to the power supply (or supplies) on the rear panel as shown in [FIGURE 6-4](#).

FIGURE 6-4 Rear Panel Power Supplies



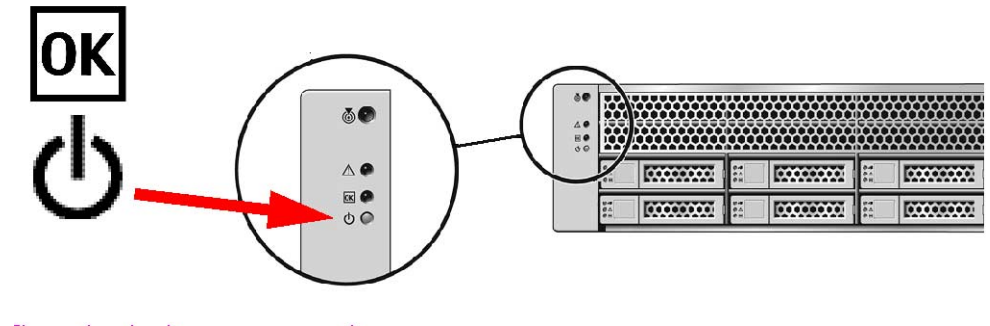
2. Verify that standby power is on.

In standby power mode, the Power/OK LED on the front panel flashes. The front panel Power/OK LED will begin flashing about two minutes after the power cords are plugged in.

3. Use a pen, or other pointed object, to press and release the recessed Power button on the server front panel.

When the main power is applied to the server, the Power/OK LED next to the Power button lights and remains lit, as shown in [FIGURE 6-5](#).

FIGURE 6-5 Front Panel Power/OK LED



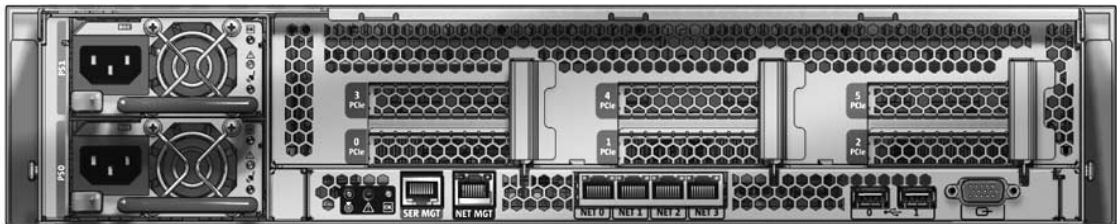
Connector Pinouts

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

Topics covered in this appendix include:

- [Section A.1, “Serial Management Port Connector” on page A-2](#)
- [Section A.2, “Network Management Port Connector” on page A-3](#)
- [Section A.3, “Video Connector” on page A-4](#)
- [Section A.4, “USB Connectors” on page A-5](#)
- [Section A.5, “Gigabit Ethernet Connectors” on page A-6](#)

FIGURE A-1 Sun Fire X4440 Back Panel



A.1 Serial Management Port Connector

The serial management connector (labeled SERIAL MGT) is an RJ-45 connector located on the rear panel. This port is the default connection to the system console.

FIGURE A-2 Serial Management Connector Diagram



TABLE A-1 Serial Management Connector 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

A.2 Network Management Port Connector

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

FIGURE A-3 Network Management Connector Diagram

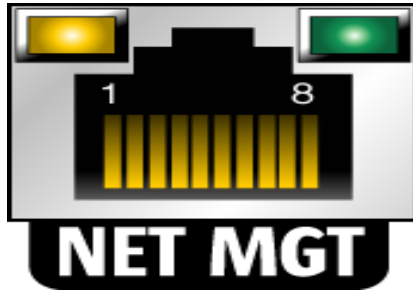


TABLE A-2 Network Management Connector Signals

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

A.3 Video Connector

The video connector (VGA) is an HD-15 connector that can be accessed from the rear panel.

FIGURE A-4 Video Connector Diagram



TABLE A-3 Video Connector Signals

Pin	Signal Description	Pin	Signal Description
1	Red Video	9	VGA VDD(+5V Fused)
2	Green Video	10	Ground
3	Blue Video	11	NC
4	NC	12	VGA ID Data
5	Ground	13	Horizontal Sync
6	Ground	14	Vertical Sync
7	Ground	15	VGA ID Clock
8	Ground		

A.4

USB Connectors

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

FIGURE A-5 USB Connector Diagram

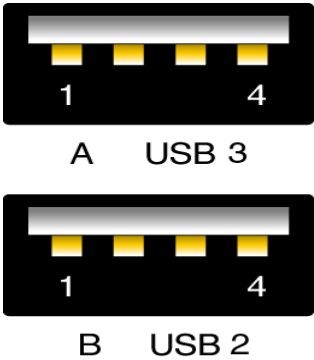


TABLE A-4 USB Connector Signals

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

A.5 Gigabit Ethernet Connectors

Four RJ-45 Gigabit Ethernet connectors (NET0, NET1, NET2, NET3) are located on the system motherboard and can be accessed from the rear panel. The Ethernet interfaces operate at 10 Mbit/sec, 100 Mbit/sec, and 1000 Mbit/sec.

FIGURE A-6 Gigabit Ethernet Connector Diagram

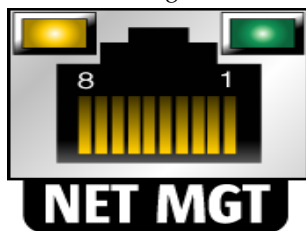


TABLE A-5 Gigabit Ethernet Connector Signals

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 –

BIOS Power-On Self-Test (POST) Codes

The system BIOS provides a basic power-on self-test (POST), during which the BIOS checks the basic devices required for the server to operate. The progress of the self-test is indicated by a series of POST codes. This chapter explains the BIOS POST testing, provides an alternate method for viewing the codes, describes how to change POST options, and lists the POST codes.

This chapter contains the following sections:

- [Section B.1, “Introduction” on page B-1](#)
- [Section B.2, “How BIOS POST Memory Testing Works” on page B-2](#)
- [Section B.3, “Redirecting Console Output” on page B-2](#)
- [Section B.4, “Changing POST Options” on page B-3](#)
- [Section B.5, “POST Codes” on page B-4](#)

B.1 Introduction

The POST is a systematic check of basic system devices. As the testing progresses, the BIOS displays codes that you can use to interpret the status of your server. The codes appear at the bottom right corner of the system’s VGA screen, after the self-test has progressed far enough to initialize the video monitor. Because the codes might scroll off of the screen too quickly to be read, an alternate method of displaying POST codes is to redirect the output of the console to a serial port (see [Section B.3, “Redirecting Console Output” on page B-2](#)).

B.2 How BIOS POST Memory Testing Works

The BIOS POST memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is shadowed (that is, copied from ROM to DRAM).
2. Once executing out of DRAM, the BIOS performs a simple memory test (a write/read of every location with the pattern 55aa55aa).

Note – This memory test is performed only if Quick Boot is *not* enabled from the Boot Settings Configuration screen. Enabling Quick Boot causes the BIOS to skip the memory test. See [Section B.4, “Changing POST Options” on page B-3](#) for more information.

3. The BIOS polls the memory controllers for both correctable and non-correctable memory errors and logs those errors into the SP.
4. The message, BMC Responding appears at the end of POST.

B.3 Redirecting Console Output

To access the SP and redirect the console output so that the BIOS POST codes can be read remotely.

1. **Attach a multi-port dongle cable to the server module UCP connector.**
2. **Attach a monitor to the multi-port dongle cable’s video port and a keyboard to a USB connector.**
3. **Power cycle or power on the server.**
4. **Initialize the BIOS Setup Utility by pressing the F2 key while the system is performing the power-on self-test (POST).**

The BIOS Main Menu screen appears.

5. **Select Server.**

The Server screen appears.

6. **Select AST2000 LAN Configuration.**

The LAN Configuration screen appears.

7. **Select the IP Address menu item.**

The SP's IP address appears

8. **Start a web browser and type the SP's IP address in the browser's address bar.**

9. **Type a user name and password as follows:**

User name: **root**

Password: **changeme**

10. **The ILOM SP web GUI screen appears.**

11. **Click the Remote Control tab.**

12. **Click the Redirection tab.**

13. **Click on the Start Redirection button.**

The javaRConsole window appears and prompts you for your user name and password again.

14. **When you are prompted, type a user name and password with administrator privileges.**

The current POST screen appears.

B.4 Changing POST Options

These instructions are optional, but you can use them to change the operations that the server performs during POST testing.

To Change POST Options

1. **Initialize the BIOS Setup Utility by pressing the F2 key while the system is performing the power-on self-test (POST).**

The BIOS Main Menu screen appears.

2. **Select the Boot menu.**

The Boot Settings screen appears.

3. **Select Boot Settings Configuration.**

The Boot Settings Configuration screen appears.

4. **On the Boot Settings Configuration screen, there are several options that you can enable or disable:**

- **Hit 'F2' Message Display:** Displays "Press F2 to run Setup" in POST. This option is enabled by default.

- **Quick Boot:** This option is enabled by default. The BIOS skips certain tests while booting, such as the extensive memory test. This decreases the time it takes for the system to boot.
- **Quiet Boot:** This option is disabled by default. If you enable this option, the Sun Microsystems logo appears instead of POST codes.
- **Add On ROM Display Mode:** This option is set to Force BIOS by default. This option takes effect only if you have also enabled the Quiet Boot option, but it controls whether output from the Option ROM is displayed. The two settings for this option are as follows:
 - **Force BIOS:** Remove the Sun logo and display Option ROM output.
 - **Keep Current:** Do not remove the Sun logo. The Option ROM output is not displayed.
- **Boot Num-Lock:** This option is On by default (keyboard Num-Lock is turned on during boot). If you set this option off, the keyboard Num-Lock is not turned on during boot.
- **Wait for F1 if Error:** This option is enabled by default. The system pauses if an error is found during POST and only resumes when you press the F1 key.
- **Interrupt 19 Capture:** This option is reserved for future use. Do not change.

B.5 POST Codes

For more information on POST codes, POST checkpoints, and POST error codes, see *Sun Fire™ X4140, X4240, and X4440 Servers Diagnostics Guide*.

BIOS Screens

C.1 Configuring BIOS Settings

This section describes how to view or modify the BIOS Setup Utility screens in the Sun Fire X4440. The BIOS Setup utility reports system information and can be used to configure the server BIOS settings.

The Basic Input/Output System (BIOS) has a Setup utility stored in the BIOS flash memory. The configured data is provided with context-sensitive help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings default to the original state specified at the factory.

C.1.1 Using BIOS Menu Items

You can access BIOS configuration screens from the following interfaces:

- Use a USB keyboard and VGA monitor, connected directly to the server.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the rear panel of the server.

To access BIOS configuration screens and change the system's parameters:

- 1. Enter the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**

When BIOS is started, the main BIOS Setup menu screen is displayed.

Note – Refer to the *Sun Fire X4140, X4240, and X4440 Servers Diagnostics Guide* for more information about POST messages and System Event Log (SEL) messages.

2. Highlight the field to be modified using the arrow and Tab keys.

Use the left and right arrow keys to move sequentially back and forth through the menu screens. Fields that can be reconfigured are displayed in color. All other fields are nonconfigurable.

- Use the up and down arrows, on the keyboard, to scroll through a menu.
- Use the Tab key to move back and forth across columns.

3. Press Enter to select the field.

A dialog box shows the available options.

4. Modify the setup field and close the screen.

5. If you need to modify other setup parameters, use the arrow and Tab keys to navigate to the desired screen and menu item, and then repeat [Step 1](#) through [Step 4](#). Otherwise, go to [Step 6](#).

6. Press and release the right arrow key until the Exit menu screen appears.

7. Follow the instructions on the Exit menu screen to save your changes and exit the Setup utility.

C.1.2 BIOS Setup Screens Overview

TABLE C-1 contains summary descriptions of the top-level BIOS setup screens.

TABLE C-1 BIOS Setup Screens Summary

Screen	Description	See...
Main	General product information, including BIOS type, processor, memory, and time/date.	Section C.2.1, “BIOS Main Menu Screens” on page C-4
Advanced	Configuration information for the CPU, memory, IDE, USB, PCI, MPS and other information.	Section C.2.2, “BIOS Advanced Menu Screens” on page C-5
PCI/PnP	Configuration information for PCI/PnP and other information.	Section C.2.3, “BIOS PCI/PnP Menu Screens” on page C-18
Boot	Configure the boot device priority (hard drives and the DVD-ROM drive).	Section C.2.4, “BIOS Boot Menu Screens” on page C-18
Chipset	Chipset devices can be configured by the BIOS (if applicable).	Section C.2.6, “BIOS Chipset Menu Screens” on page C-22
Security	Set or change the user and supervisor passwords.	Section C.2.5, “BIOS Security Menu Screens” on page C-21
Exit	Save changes and exit, discard changes and exit, discard changes, or load optimal or failsafe defaults.	Section C.2.7, “BIOS Exit Menu Screens” on page C-27

FIGURE C-1 summarizes the BIOS menu tree. See [Section C.2, “BIOS Setup Menu Screens” on page C-4](#) for examples of each of these screens.

FIGURE C-1 BIOS Utility Menu Tree



C.2 BIOS Setup Menu Screens

The following figures show sample Sun Fire X4440 BIOS Setup Utility screens.

Note – The screens shown are examples. The version numbers and the screen items and selections shown are subject to change over the life of the product.

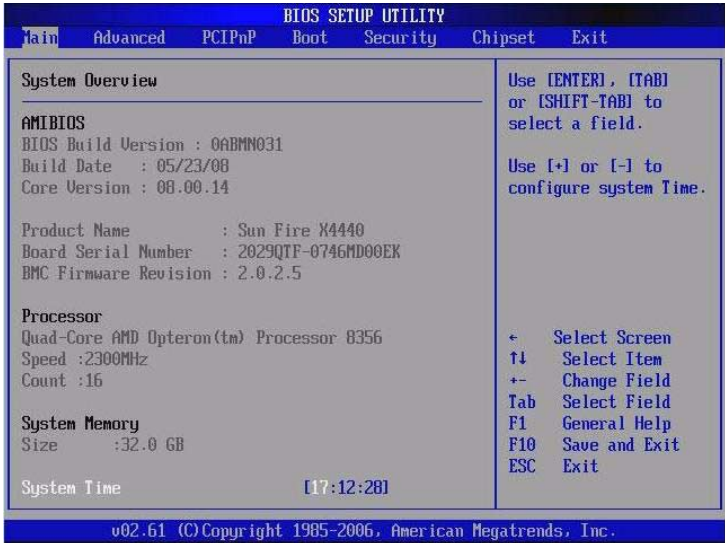
All settings are set to the optimal default at startup.

C.2.1 BIOS Main Menu Screens

The BIOS Main screens provide general product information, including BIOS type, Processor type, memory, and time/date.

The Sun Fire X4440 has the following BIOS Main screens:

FIGURE C-2 BIOS Setup Utility: Main - System Overview



C.2.2 BIOS Advanced Menu Screens

The BIOS Advanced screens provide detailed configuration information for the CPU, memory, IDE, USB, PCI, MPS, and other system information.

Note – The term BMC that can be displayed on some screens refers to the SP (service processor).

Note – Refer to the *Sun Fire X4140, X4240, and X4440 Servers Diagnostics Guide* for more information about POST messages and System Event Log (SEL) messages.

The Sun Fire X4440 has the following BIOS Advanced screens:

FIGURE C-3 BIOS Setup Utility: Advanced

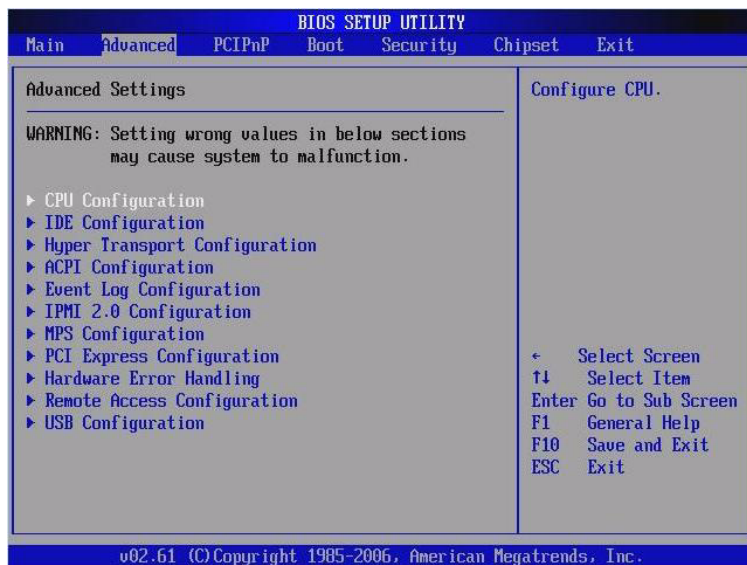


FIGURE C-4 BIOS Setup Utility: Advanced- CPU Configuration



FIGURE C-5 BIOS Setup Utility: Advanced- IDE Configuration



FIGURE C-6 BIOS Setup Utility: Advanced- Hyper Transport Configuration



FIGURE C-7 BIOS Setup Utility: Advanced- APCI Configuration



FIGURE C-8 BIOS Setup Utility: Advanced- APCI Configuration - Advanced ACPI Configuration



FIGURE C-9 BIOS Setup Utility: Advanced- APCI Configuration - Chipset APCI Configuration



FIGURE C-10 BIOS Setup Utility: Advanced- Event Logging Details - View

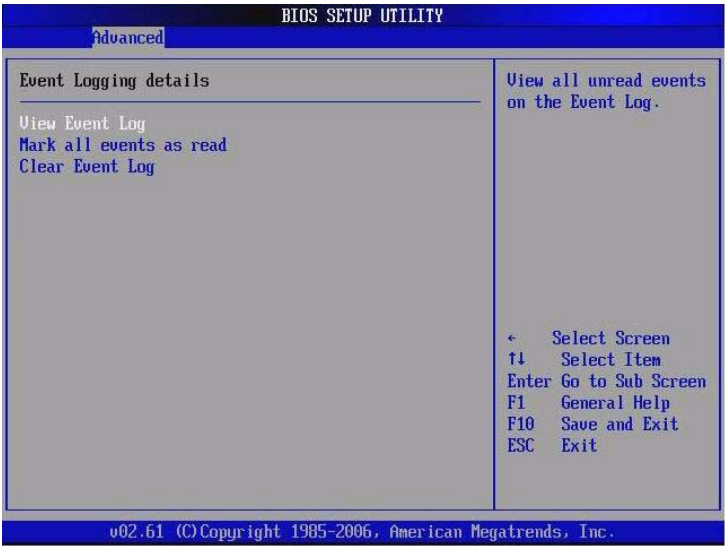


FIGURE C-11 BIOS Setup Utility: Advanced- Event Logging Details - Mark



FIGURE C-12 BIOS Setup Utility: Advanced- Event Logging Details - Clear



FIGURE C-13 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration



FIGURE C-14 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - System Event Logs (SEL)

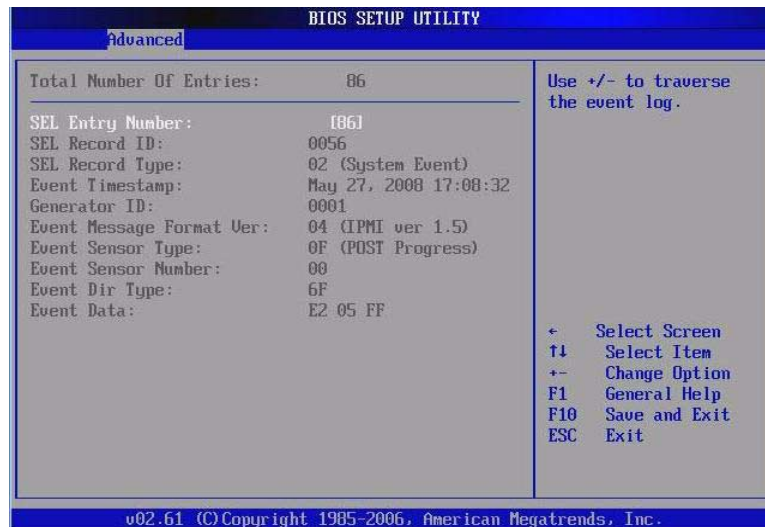


FIGURE C-15 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - Reload SEL



FIGURE C-16 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - Clear BMC SEL



FIGURE C-17 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - LAN Configuration

BIOS SETUP UTILITY		
Advanced		
LAN Configuration.		Commit updates of IP,MAC,Subnet mask, Gateway Address to BMC ← Select Screen ↑↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
Channel Number	[01]	
Channel Number Status:	Channel number is OK	
IP Assignment	[DHCP]	
Current IP address in BMC:	010.006.143.133	
Current MAC address in BMC:	00.14.4F.8D.2F.4E	
Current Subnet Mask in BMC:	255.255.255.000	
Current Gateway in BMC:	010.006.143.001	
Refresh		
IP Address	[010.006.143.133]	
Subnet Mask	[255.255.255.000]	
Default Gateway	[010.006.143.001]	
Commit		
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.		

FIGURE C-18 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - PEF Action Global Control

BIOS SETUP UTILITY		
Advanced		
PEF Action Global Control		Select action for PEF Action Global Control. ← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
Alert Action	[Enabled]	
Power Down Action	[Enabled]	
Reset System Action	[Enabled]	
Power Cycle Action	[Enabled]	
OEM Action	[Enabled]	
Diag.Interrupt Action	[Enabled]	
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.		

FIGURE C-19 BIOS Setup Utility: Advanced- IPMI 2.0 Configuration - BMC Watch Dog Timer Action



FIGURE C-20 BIOS Setup Utility: Advanced- MPS Revision

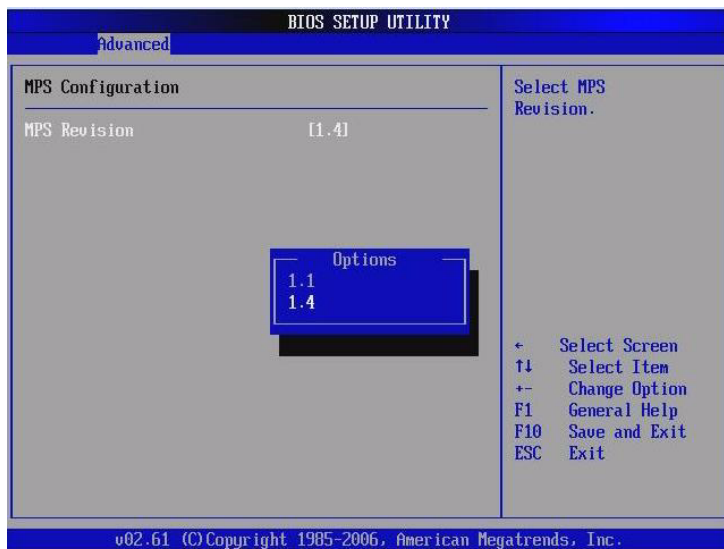


FIGURE C-21 BIOS Setup Utility: Advanced- PCI Express Configuration



FIGURE C-22 BIOS Setup Utility: Advanced- Hardware Error Handling Configuration

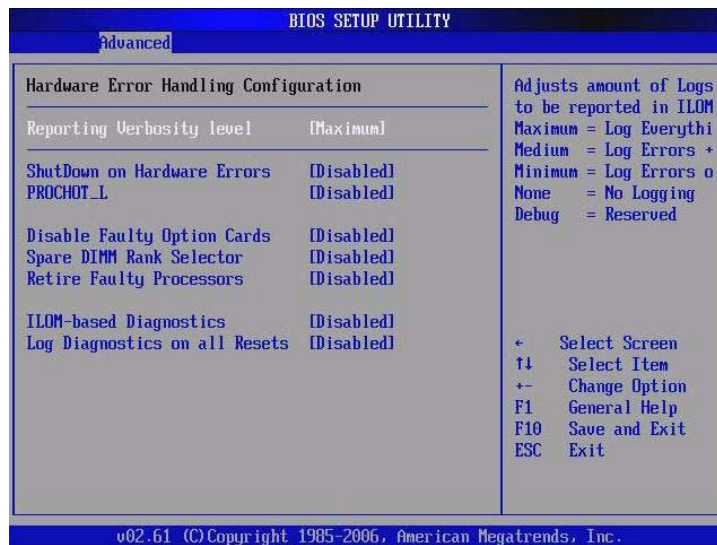


FIGURE C-23 BIOS Setup Utility: Advanced- Remote Access Configuration



FIGURE C-24 BIOS Setup Utility: Advanced- USB Configuration

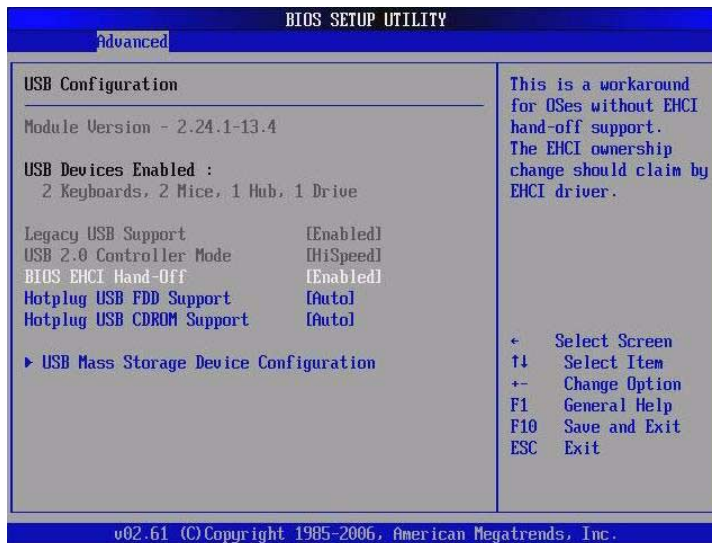
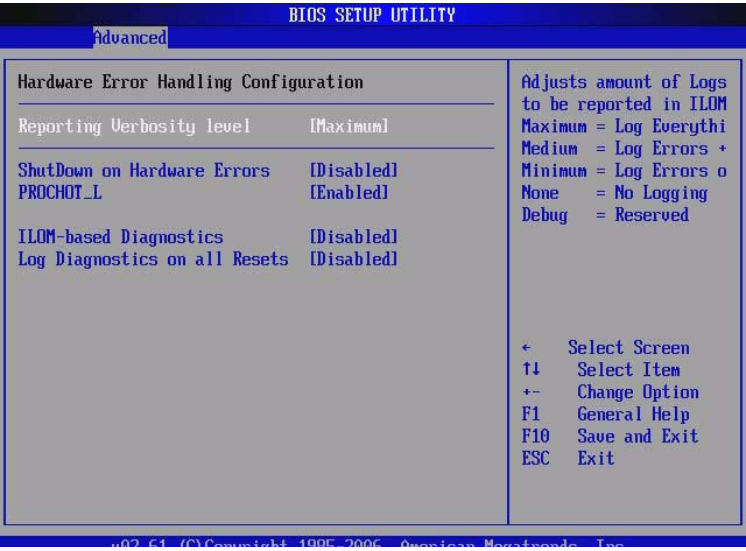


FIGURE C-25 BIOS Setup Utility: Advanced- USB Mass Storage Device Configuration



FIGURE C-26 BIOS Setup Utility: Advanced- Error Handling



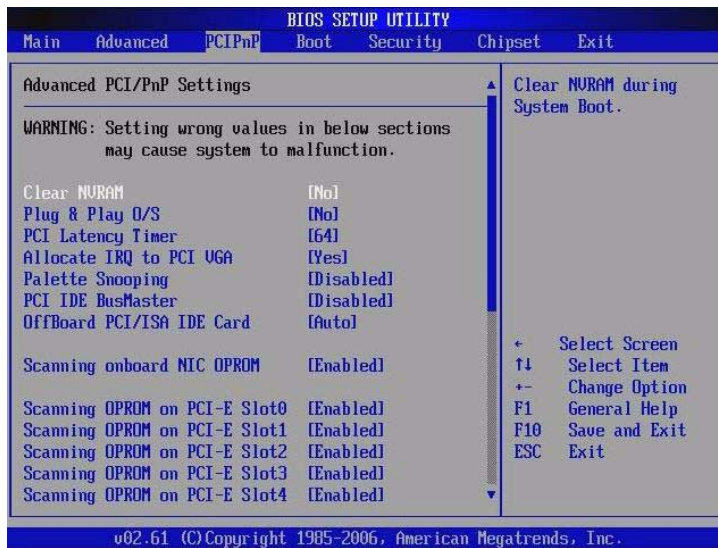


Caution – Hardware Error Handling features hardware-specific diagnostics and adjustments which can be used for detecting inconsistent and faulty hardware. Activating these features on a healthy system can result in an unstable execution, and are strictly for trained service personnel’s use.

C.2.3 BIOS PCI/PnP Menu Screens

The BIOS PCI/PnP screens allow you to set the PCI/PnP configuration. The Sun Fire X4440 has the following BIOS Boot screens:

FIGURE C-27 BIOS Setup Utility: PCI/PnP Configuration



C.2.4 BIOS Boot Menu Screens

The BIOS Boot screens allow you to configure the boot device priority (hard drives and the DVD-ROM drive). The Sun Fire X4440 has the following BIOS Boot screens:

FIGURE C-28 BIOS Setup Utility: Boot Settings

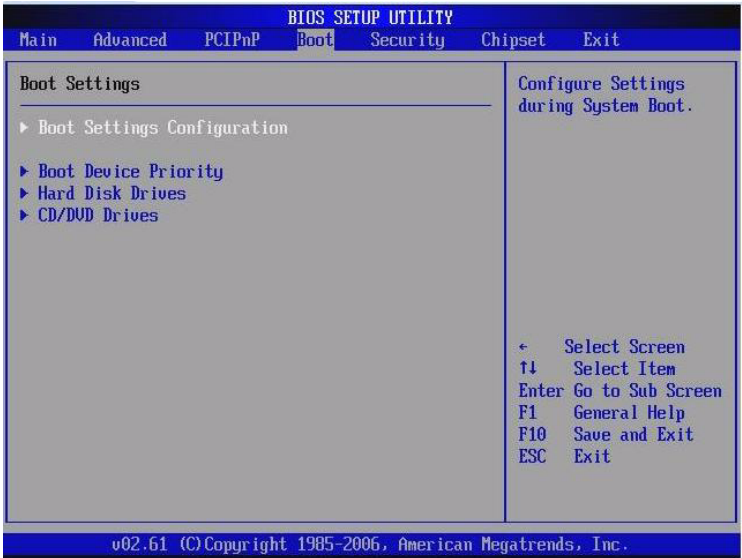


FIGURE C-29 BIOS Setup Utility: Boot Settings Configuration

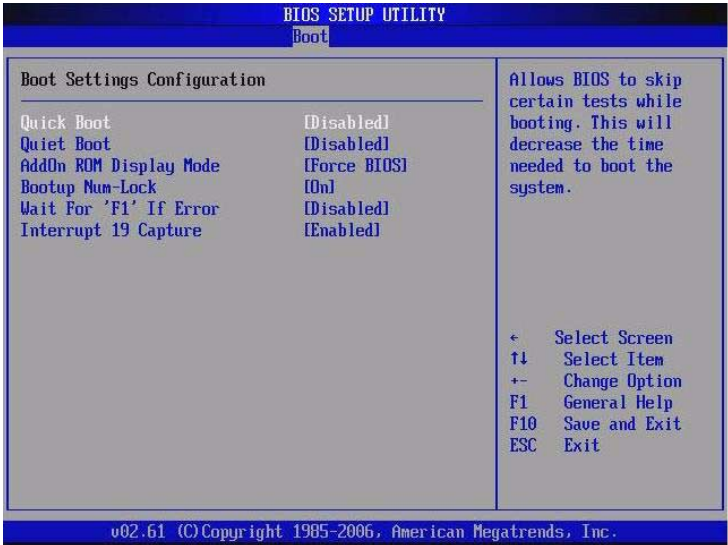


FIGURE C-30 BIOS Setup Utility: Boot: Device Priority

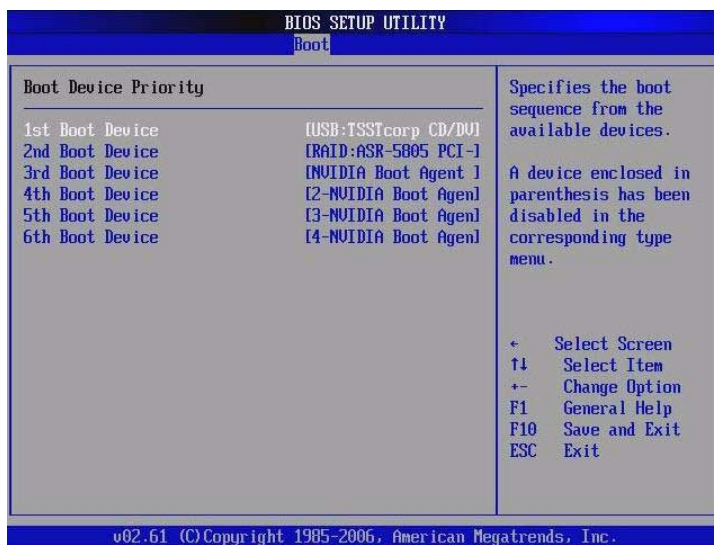


FIGURE C-31 BIOS Setup Utility: Boot: Hard Drives

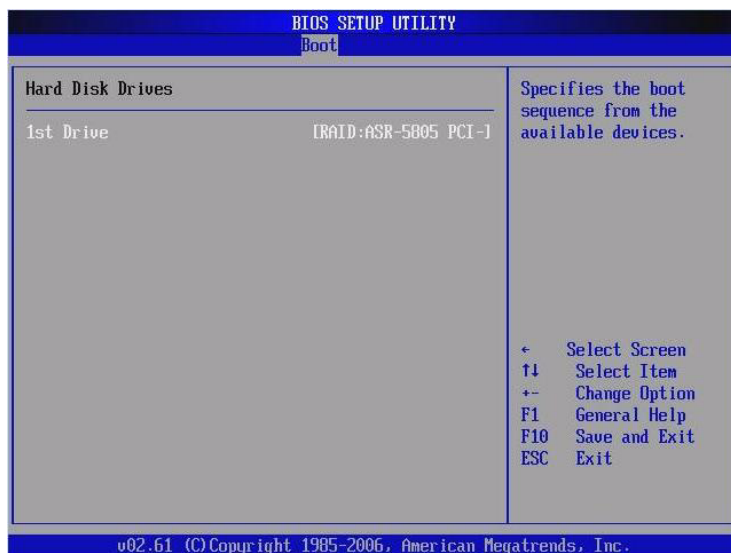
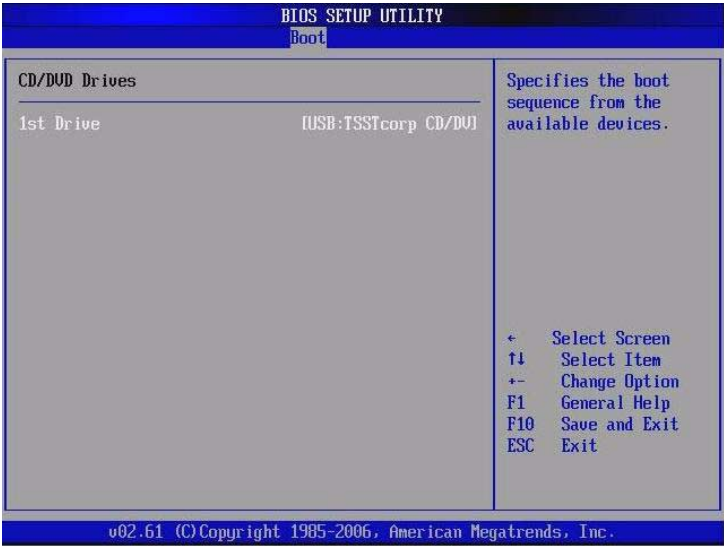


FIGURE C-32 BIOS Setup Utility: Boot: CD/DVD Drives



C.2.5 BIOS Security Menu Screens

The BIOS Security screens allow you to set or change the user and supervisor passwords.

The Sun Fire X4440 has the following BIOS Security screens:

FIGURE C-33 BIOS Setup Utility: Security - Change Supervisor Password



C.2.6 BIOS Chipset Menu Screens

The BIOS Server screens allow you to configure server advanced chipset settings (if applicable).

The Sun Fire X4440 has the following BIOS Chipset screens:

FIGURE C-34 BIOS Setup Utility: Chipset



FIGURE C-35 BIOS Setup Utility: Chipset - Northbridge Configuration

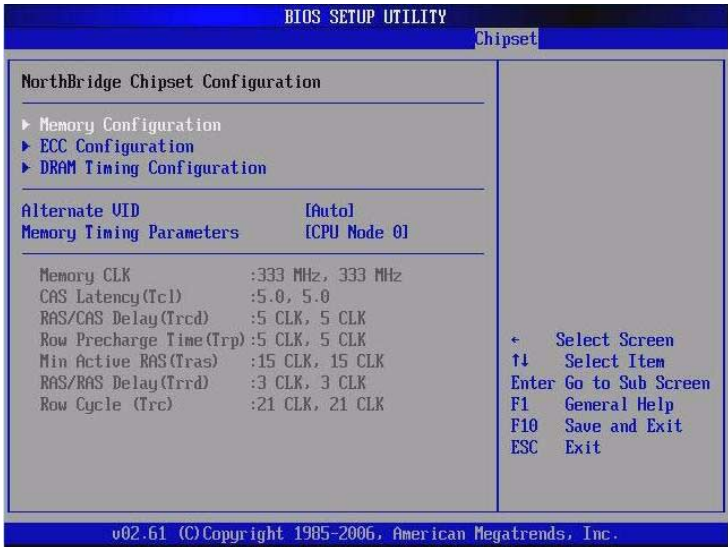


FIGURE C-36 BIOS Setup Utility: Chipset - Northbridge Memory Configuration

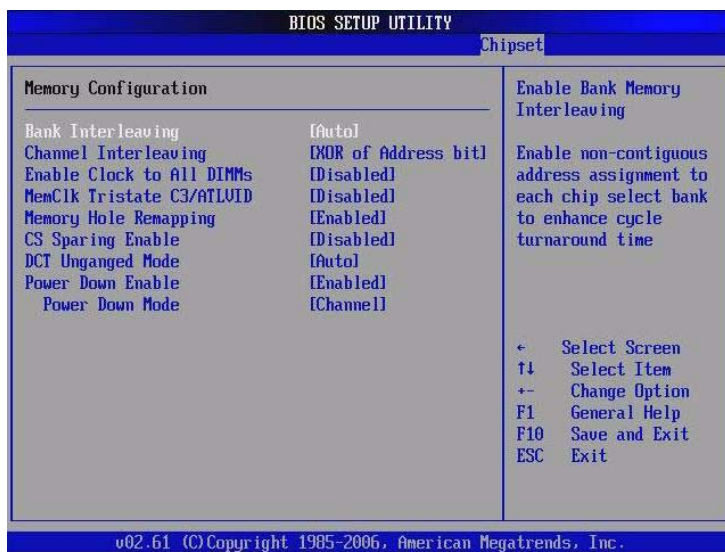


FIGURE C-37 BIOS Setup Utility: Chipset - Northbridge ECC Configuration

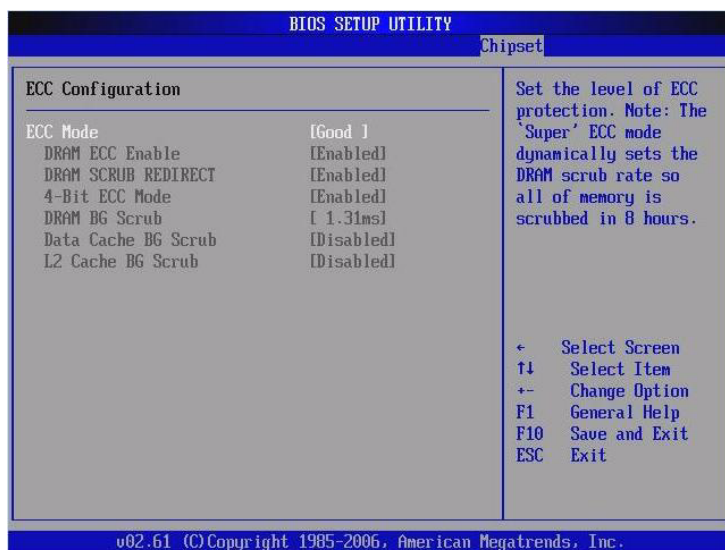


FIGURE C-38 BIOS Setup Utility: Chipset - Northbridge DRAM Timing Configuration



FIGURE C-39 BIOS Setup Utility: Chipset - Northbridge VID Configuration



FIGURE C-40 BIOS Setup Utility: Chipset - Southbridge Configuration

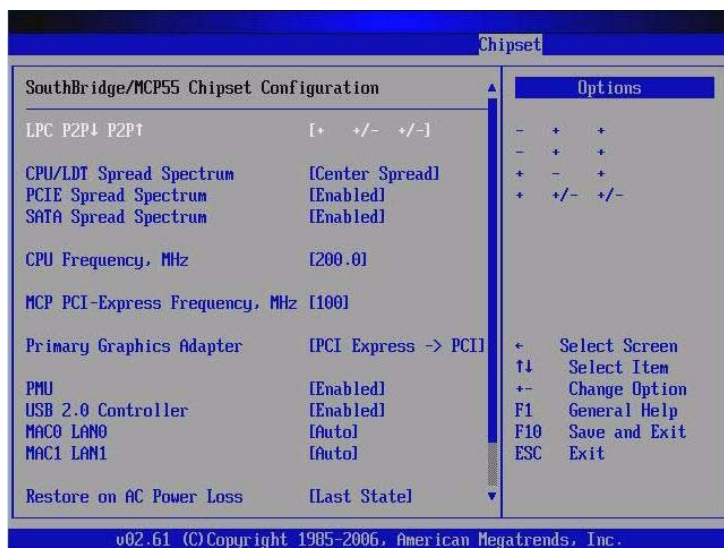
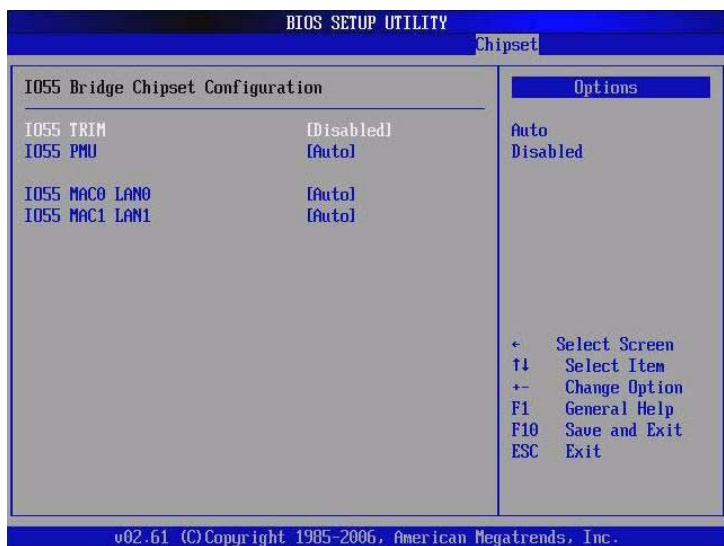


FIGURE C-41 BIOS Setup Utility: Chipset - I055 Bridge Configuration



C.2.7 BIOS Exit Menu Screens

The BIOS Exit screens allow you to save changes and exit, discard changes and exit, discard changes, or load optimal or failsafe defaults.

The Sun Fire X4440 has the following BIOS Exit screens:

FIGURE C-42 BIOS Setup Utility: Exit

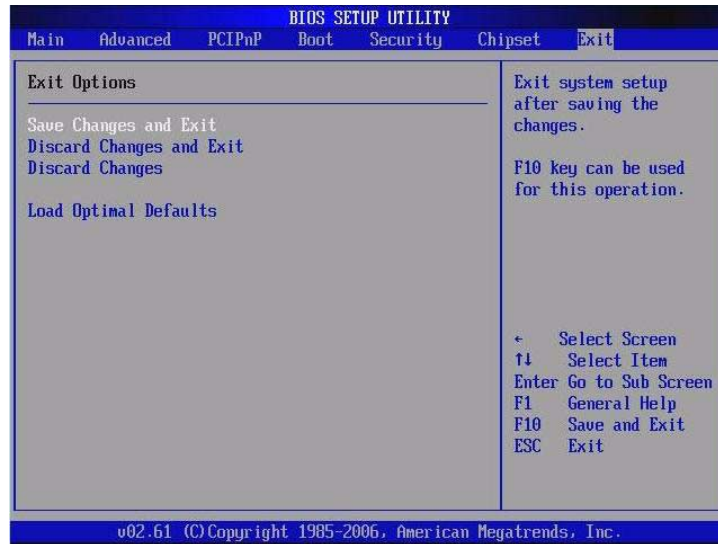
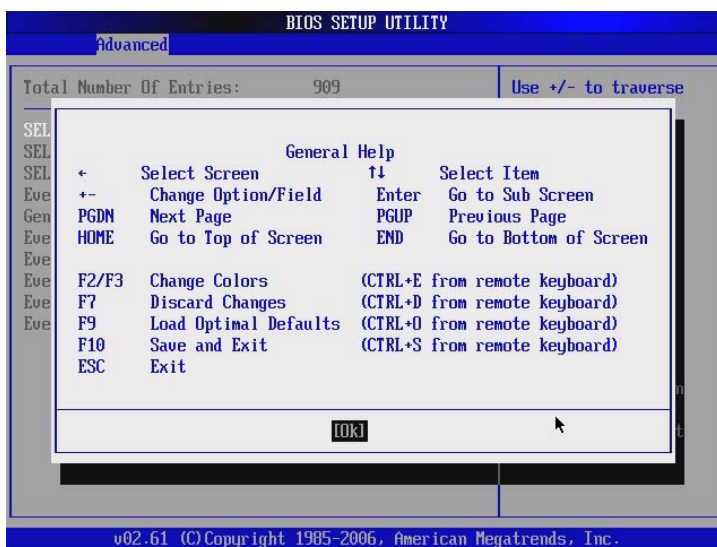


FIGURE C-43 BIOS Setup Utility: Exit - Save Configuration Changes



FIGURE C-44 BIOS Setup Utility: Help



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