



Sun Fire™ X2200 M2 Server Service Manual

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Contents

Preface ix

- 1. Sun Fire X2200 M2 Server Overview 1-1**
 - 1.1 Features 1-2
 - 1.2 Operating System and Software 1-3
 - 1.2.1 Preinstalled Software 1-3
 - 1.2.2 Supported Operating Systems 1-3
 - 1.2.3 Tools and Drivers CD Software 1-4
 - 1.2.4 System Management 1-4
 - 1.3 Hardware System Overview 1-5
 - 1.3.1 Front and Rear Panels 1-5
 - 1.3.2 Internal Components 1-7
 - 1.4 Powering On and Powering Off the Server 1-8
 - ▼ To Apply Standby Power for Initial SP Configuration 8
 - ▼ To Power On Main Power Mode 8
 - ▼ To Shut Down Main Power Mode 9
 - 1.5 Clearing the CMOS 1-9
 - ▼ To Clear the CMOS 9
 - 1.6 Customer-Orderable Components 1-11

- 2. Troubleshooting 2-1**
 - 2.1 Troubleshooting Overview 2-2
 - 2.2 Performing Visual Inspections 2-2
 - ▼ To Perform an External Visual Inspection 2
 - ▼ To Perform an Internal Visual Inspection 3
 - 2.3 Troubleshooting Procedures 2-4
 - 2.4 Getting Technical Assistance 2-7

- 3. Performing Diagnostics 3-1**
 - 3.1 Pc-Check Diagnostics Overview 3-2
 - ▼ To Access the Pc-Check Diagnostics Software 2
 - 3.2 System Information Menu Options 3-3
 - 3.3 Advanced Diagnostics Tests Menu Options 3-4
 - ▼ To Test the Hard Disk 6
 - 3.4 Immediate Burn-in Testing 3-7
 - ▼ To Load Test Scripts 9
 - 3.5 Deferring Burn-In Testing 3-9
 - ▼ To Defer Burn-In Testing 9
 - 3.6 Creating Diagnostic Partition 3-10
 - 3.6.1 Removing Existing Partitions From a Hard Disk 3-11
 - ▼ To Use the Erase Primary Boot Hard Disk Utility 11
 - ▼ To Use fdisk to Erase Hard Disk Partitions 11
 - 3.6.2 Adding a Diagnostic Partition to the First Bootable Disk 3-12
 - ▼ To Add a Diagnostic Partition to the First Bootable Disk 12
 - 3.6.3 Creating a Log File on the Diagnostic Partition 3-13
 - ▼ To Create a Log File on the Diagnostic Partition 13
 - 3.6.4 Accessing the Diagnostic Partition on a RHEL System 3-14
 - ▼ To Access the Diagnostic Partition on a RHEL System 14

- 3.6.5 Accessing the Diagnostic Partition on the Solaris 10 Operating System 3–15
 - ▼ To Access the Diagnostic Partition on the Solaris 10 OS 15
- 3.6.6 Accessing the Diagnostic Partition on the Windows Server 2003 System 3–16
 - ▼ To Access the Diagnostic Partition on the Windows Server 2003 System 17
- 3.7 Show Results Summary 3–17
- 3.8 Print Results Report 3–18
- 3.9 About Pc-Check 3–19
- 3.10 Exit to DOS 3–19

- 4. Maintaining the Sun Fire X2200 M2 Server 4–1**
 - 4.1 Tools and Supplies Needed 4–2
 - 4.2 Installation Precautions 4–2
 - 4.2.1 ESD Precautions 4–2
 - 4.2.2 Preinstallation Instructions 4–2
 - 4.2.3 Postinstallation Instructions 4–3
 - 4.3 Powering Off the Server and Removing the Cover 4–4
 - ▼ To Power Off the Server and Remove the Cover 4
 - 4.4 Component Replacement Procedures 4–5
 - 4.4.1 Replacing the I/O Board 4–6
 - ▼ To Remove the I/O Board 6
 - ▼ To Install the I/O Board 7
 - 4.4.2 Replacing the PCIe Card and Riser Assembly 4–8
 - ▼ To Remove the Riser Assembly and PCIe Card. 9
 - ▼ To Install the PCIe Card and Riser Card Assembly 10
 - 4.4.3 Replacing a Hard Disk Drive and Carrier 4–12
 - ▼ To Remove an HDD and Carrier 12
 - ▼ To Install the HDD and Carrier 13

- 4.4.4 Installing an LSI PCIe Card and Cables 4–14
 - 4.4.4.1 Installing the LSI Card to Support SAS Hard Drive Installation 4–15
 - ▼ To Install the LSI Card to Support SAS Hard Drive Installation 15
 - 4.4.4.2 Installing the LSI Card to Support SATA RAID 4–18
 - ▼ To Install the LSI Card to Support SATA RAID 18
- 4.4.5 Replcaing an ODD Drive Assembly 4–21
 - ▼ To Remove the ODD Drive Assembly 21
 - ▼ To Install the ODD Drive Assembly 22
- 4.4.6 Replacing an Air Duct 4–23
 - ▼ To Remove the Air Duct 23
 - ▼ To Install the Air Duct 24
- 4.4.7 Replacing the Power Supply 4–25
 - ▼ To Remove the Power Supply 25
 - ▼ To Install the Power Supply 26
- 4.4.8 Replacing Single Fans 4–27
 - ▼ To Remove the Fans 27
 - ▼ To Install a Fan Module 28
- 4.4.9 Replacing the Dual Blower Module 4–29
 - ▼ To Remove a Dual Blower Module 29
 - ▼ To Install a Dual Blower Module 30
- 4.4.10 DIMM Population Rules 4–31
- 4.4.11 Replacing Memory Modules 4–32
 - ▼ To Remove a DIMM 32
 - ▼ To Install a DIMM 34
- 4.4.12 Replacing System Battery 4–36
 - ▼ To Remove the System Battery 36
 - ▼ To Install the System Battery 37

- 4.4.13 Replacing a CPU and Heatsink 4-39
 - ▼ To Remove a CPU and Heatsink 39
 - ▼ To Install a CPU and Heatsink 41
 - ▼ To Install a New CPU and Heatsink 44
- 4.4.14 Replacing Cables 4-47
- 4.4.15 Motherboard 4-50
 - ▼ To Remove the Motherboard 50
 - ▼ To Install the Motherboard 51
- 4.4.16 Replacing the Firmware PROM 4-53
 - 4.4.16.1 Removing the Firmware PROM 4-53
 - ▼ To Remove the Firmware PROM 53
 - 4.4.16.2 Installing a Firmware PROM 4-54
 - ▼ To Install the Firmware PROM 55

A. System Specifications A-1

- A.1 Physical Specifications A-1
- A.2 Power Specifications A-2
- A.3 Environmental Specifications A-3
- A.4 Serial Connector Pin Assignments A-4

B. Using the Tools and Drivers CD B-1

- B.1 Tools and Drivers CD Contents B-1
- B.2 Updating BIOS and BMC Firmware B-2
 - B.2.1 Using a Local Server and DVD Drive to Update the Firmware B-2
 - ▼ To Use a Local Server and DVD Drive to Update the Firmware 2
 - B.2.2 Using tftp and the CLI to Update the Firmware B-3
 - ▼ To Use tftp and the CLI to Update the Firmware 3
 - B.2.3 Using the ELOM Web GUI to Update the Firmware B-4
 - ▼ To Use the ELOM Web GUI to Update the Firmware 4

- B.3 Booting the Tools and Drivers CD from a PXE Server B-5
 - B.3.1 Setting up the Tools and Drivers CD Image on the PXE Server B-5
 - ▼ To Set Up the PXE Server 5
 - B.3.2 Accessing the Tools and Drivers CD From the Target Server B-8
 - ▼ To Access the Tools and Drivers CD From the Target Server 8
- B.4 Broadcom NetXtreme Software B-8

C. Installing the Server Into a Rack With Optional Slide Rails C-1

- C.1 Disassembling the Slide Rails Before Installation C-2
 - ▼ To Disassemble the Slide Rails Before Installation 2
- C.2 Installing the Mounting Brackets Onto the Server C-3
 - ▼ To Install the Mounting Brackets Onto the Server 3
- C.3 Attaching the Slide-Rail Assemblies to the Rack C-4
 - ▼ To Attach the Slide-Rail Assemblies to the Rack 5
- C.4 Installing the Server Into the Slide-Rail Assemblies C-7
 - ▼ To Install the Server Into the Slide-Rail Assemblies 8
- C.5 Installing the Cable Management Assembly C-9
 - ▼ To Install the Cable Management Assembly 9
- C.6 Verifying Operation of the Slide Rails and CMA C-16
 - ▼ To Verify Operation of the Slide Rails and CMA 16

Index Index-1

Preface

The *Sun Fire X2200 M2 Server Service Manual* provides a detailed description of the hardware and software applications that support the Sun Fire™ X2200 M2 server. This book is intended for system administrators, network administrators, and service technicians who have an understanding of server hardware and software.

How This Book Is Organized

[Chapter 1](#) provides an overview of the Sun Fire X2200 M2 Server.

[Chapter 2](#) contains information about troubleshooting the server.

[Chapter 3](#) provides information about diagnostics.

[Chapter 4](#) describes how to replace components.

[Appendix A](#) contains information on system specifications.

[Appendix B](#) provides information on using the Sun Fire X2200 M2 Server Tools and Drivers CD.

[Appendix C](#) describes how to instructions on install the server into a rack with optional slide rails.

Typographic Conventions

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

* The settings on your browser might differ from these settings.

Related Documentation

For the most up-to-date information about the Sun Fire X2200 M2 server, navigate to the Sun Fire X2200 M2 document collection using the High-End Servers and x64 Servers product category links at:

<http://docs.sun.com/>

Translated Documentation

Translated versions of some of these documents might also be available after the product's world-wide release date. From the docs.sun.com main page, select a language from the drop-down list and browse or navigate to the product name x64 document collection using the High-End Servers and x64 Servers product category links. Available translations for the Sun Fire servers include Simplified Chinese, Traditional Chinese, French, Japanese, and Korean.

English documentation is revised more frequently and might be more up-to-date than the translated documentation.

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Please include the title and part number of your document with your feedback. The part number of this *Sun Fire X2200 M2 Server Service Manual* is 819-6597-12.

Sun Fire X2200 M2 Server Overview

This chapter provides an overview of the Sun Fire X2200 M2 server, as well as power-on and power-off procedures and information about installing components.

The following sections are included in this chapter:

- [Section 1.1, “Features” on page 1-2](#)
- [Section 1.2, “Operating System and Software” on page 1-3](#)
- [Section 1.3, “Hardware System Overview” on page 1-5](#)
- [Section 1.4, “Powering On and Powering Off the Server” on page 1-8](#)
- [Section 1.6, “Customer-Orderable Components” on page 1-11](#)

1.1 Features

TABLE 1-1 lists the system's key components.

TABLE 1-1 Sun Fire X2200 M2 Server Features

Component	Description
CPUs	<ul style="list-style-type: none">• Two dual-core or quad-core AMD Opteron CPUs• Processor frequencies: 1.8 GHz and faster• Up to 1 MB level 2 cache
Memory	<ul style="list-style-type: none">• Eight DIMM slots per CPU socket• Each DIMM socket on board supports 1 GB or 2 GB registered buffered DDR2 DIMM modules.• Up to 32 GB total memory supported
Media storage	Optional DVD-ROM or DVD-RW
Hard disk drives	Up to two optional SATA or SAS 3.5-inch optional disk drives with NVIDIA and LSI RAID supported (LSI PCIe card needed)
Power supply	450W PSU
Network I/O	Four 10/100/1000BASE-T Gigabit Ethernet ports
PCI I/O	Optional PCI-Express riser card with two 8-lane slots
Other I/O	<ul style="list-style-type: none">• Four USB 2.0 connectors on the back panel and two on the front panel• Onboard 2D/3D graphics controller with HD15 connector• One serial RS232 port with DB9 connector
System management	Onboard IPMI 2.0 compliant service processor with Embedded Lights Out Manager (LOM)

1.2 Operating System and Software

This section describes the operating system and additional software that is supported for the Sun Fire X2200 M2 server.

1.2.1 Preinstalled Software

If you ordered a hard drive with your Sun Fire X2200 M2 server, the hard drive might have the Solaris™ 10 6/06 Operating System with Java™ Enterprise System (Java ES) installed, as well as Sun™ Studio 11 developer software.

For information on configuring the preinstalled Solaris 10 OS for the Sun Fire X2200 M2 server, refer to the *Sun Fire X2200 M2 Server Installation Guide*.

For further information on the Solaris 10 OS, see the Solaris 10 OS documentation at:

<http://docs.sun.com>

1.2.2 Supported Operating Systems

The following operating systems are supported for the Sun Fire X2200 M2 server:

- Solaris 10 OS
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Windows 2003 Server
- VMware

For an updated list of supported version for each OS, go to:

- <http://www.sun.com/servers/x64/x2200/specs.xml>

For information about installing a supported operating systems, see:

- *Sun Fire X2200 M2 Operating System Installation Guide* (819-6599)

For the OS issues and late-breaking information, see:

- *Sun Fire X2200 M2 Server Product Notes*

For supported versions of Red Hat Enterprise Linux or SUSE Linux Enterprise Server, go to:

- <http://www.sun.com/software/linux/index.html>

1.2.3 Tools and Drivers CD Software

The Sun Fire X2200 M2 Server Tools and Drivers CD, included with the server, contains drivers for operating system installation, LSI and NVIDIA RAID drivers, BIOS/BMC flash utilities, diagnostics software, Windows Remote Installation Service (RIS) files, and Broadcom NetXtreme software.

For more information on using the Tools and Drivers CD software, see [Appendix B](#).

1.2.4 System Management

An IPMI 2.0-compatible service processor with Embedded Lights Out Manager is integrated onto the Sun Fire X2200 M2 motherboard. See the *Embedded Lights Out Manager Administration Guide* for more information on system management.

1.3 Hardware System Overview

The following sections describe the hardware and features of your Sun Fire X2200 M2 server.

1.3.1 Front and Rear Panels

FIGURE 1-1 shows the front panel of the Sun Fire X2200 M2 server.



FIGURE 1-1 Front Panel

TABLE 1-2 Front Panel

Label	Button/LED/Port	Label	Button/LED/port
1	System identification button/LED	5	Optional hard disk drive 0
2	Fault LED	6	USB 2.0 connectors (2)
3	Power LED	7	Optional DVD drive
4	Power button	8	Optional hard disk drive 1

FIGURE 1-1 shows the back panel of the Sun Fire X2200 M2 server.

FIGURE 1-2 Back Panel

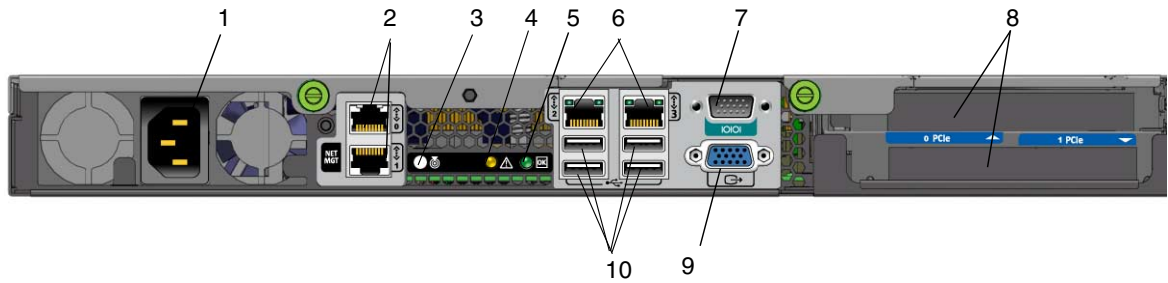


TABLE 1-3 Back Panel

Label	Connector/Slot	Label	Connector/Slot
1	Power connector	6	NVIDIA Ethernet connectors (LAN-2 left, LAN-3 right)
2	Broadcom Ethernet connectors (LAN-0 top, LAN-1 NET MGT bottom)	7	Serial management/DB9 RS-232 serial port
3	System identification button/LED	8	PCI-Express slots
4	Fault LED	9	Onboard HD15 video connector
5	Power LED	10	USB 2.0 connectors (4)

1.3.2 Internal Components

FIGURE 1-3 shows the locations of the components inside the Sun Fire X2200 M2 server.

FIGURE 1-3 Sun Fire X2200 M2 Server System Components

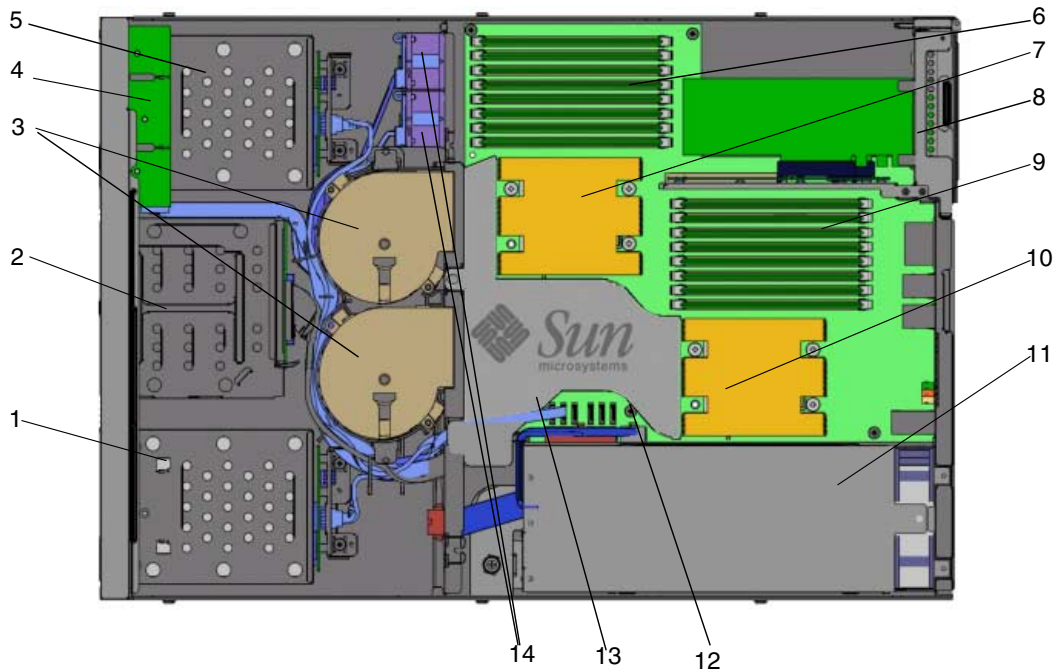


Figure Legend

1	Optional hard drive 1	8	PCI Express riser and card
2	Optional DVD drive	9	DIMM slots for CPU 1
3	Dual blower module	10	CPU 1
4	I/O board	11	Power supply
5	Optional hard drive 0	12	Battery (located under air duct)
6	DIMM slots for CPU 0	13	Air duct
7	CPU 0	14	Single fan modules (2)

1.4 Powering On and Powering Off the Server

This section includes instructions for powering the server on and off and placing the server in standby power mode.



Caution – Do not operate the server without all fans, component heatsinks, air baffles, and the cover installed. Severe damage to server components can occur if operated without adequate cooling mechanisms.

▼ To Apply Standby Power for Initial SP Configuration

1. **Connect grounded AC power cords to the AC power connector on the back panel of the server and to a grounded AC power outlet.**

Note – At this point, standby power is supplied only to the service processor and power supply fans. You can proceed to Chapter 2 of this guide to begin initial configuration. Do not apply main power to the rest of the server until you are ready to install a platform operating system.

2. **Continue with initial software setup tasks, as described in *Sun Fire X2200 M2 Server Installation Guide*.**

▼ To Power On Main Power Mode

- **To power on main power for all server components:**
 - a. **Verify that the power cord has been connected and that standby power is on.**

In standby power mode, the Power/OK LED on the front panel flashes. See [FIGURE 1-1](#).
 - b. **Use a ballpoint pen or stylus to press and release the recessed Power button on the server front panel.**

When main power is applied to the full server, the Power/OK LED next to the Power button lights and remains lit.

▼ To Shut Down Main Power Mode

- **To power off the server from main power mode, use one of the following methods:**
 - **Graceful shutdown:** Use a ballpoint pen or stylus to press and release the Power button on the front panel. This 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.
–or–
 - **Emergency shutdown:** Press and hold the Power button for four seconds to force the main power off and enter standby power mode. When the main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.



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

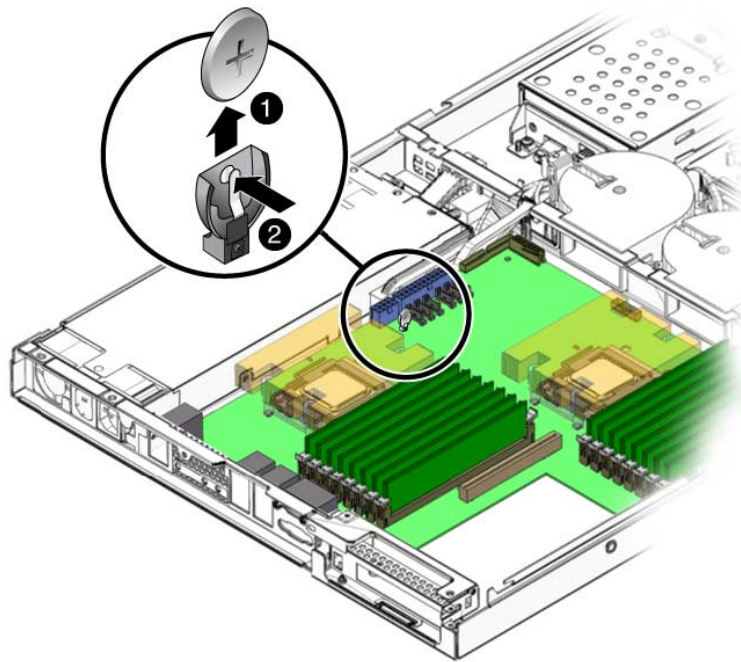
1.5 Clearing the CMOS

Use this procedure to clear the server's CMOS settings in the case of a system hang. For example, if the server hangs because of incorrect settings and will not boot, use this procedure to invalidate the settings and reboot with the default settings.

▼ To Clear the CMOS

1. **Remove the AC power cord.**
See [FIGURE 1-2](#) for the location of the power cord connection.
2. **Remove the server's top cover.**
See [Section 4.3, "Powering Off the Server and Removing the Cover"](#) on page 4-4.
3. **Remove the air duct.**
See [Section 4.4.6, "Replacing an Air Duct"](#) on page 4-23
4. **Remove the system battery by pulling it up and out of the holder (see [FIGURE 1-4](#)).**

FIGURE 1-4 Removal of Battery and Clearing of CMOS



The battery is secured in the battery holder by a metal clip that contacts the positive ('+') side of the battery. To clear CMOS, you must make the metal clip and the contact point in the battery holder touch (short) for a period of 60 seconds.

- 5. Press the metal clip on the battery holder inward until it touches (shorts) the metal contact point in the base of the battery holder (see [FIGURE 1-4](#)).**

You can use your thumb and finger to press (squeeze) the clip against the contact point.

- 6. Continue shorting the clip and the contact point for a period of 60 seconds.**

The two points must touch (short) for 60 seconds.

- 7. After 60 seconds, install the battery, making certain that the positive ('+') side of the battery faces outward (see [FIGURE 1-4](#)) and contacts the metal clip.**

The CMOS is now cleared.

- 8. Install the air duct, and secure it with the air duct retaining screw.**

- 9. Reinsert the AC power cord.**

1.6 Customer-Orderable Components

You can order additional components and replacement parts for the Sun Fire X2200 M2 server.

Contact your local Sun sales representative for more information. For the most up-to-date component information, see the components list on one of the following web sites:

http://sunsolve.sun.com/handbook_pub/Systems/

Troubleshooting

This chapter contains information on troubleshooting procedures and technical support contacts.

The following sections are included in this chapter:

- [Section 2.1, “Troubleshooting Overview” on page 2-2](#)
- [Section 2.2, “Performing Visual Inspections” on page 2-2](#)
- [Section 2.3, “Troubleshooting Procedures” on page 2-4](#)
- [Section 2.4, “Getting Technical Assistance” on page 2-7](#)

2.1 Troubleshooting Overview

Before troubleshooting your specific server problem, answer the following questions:

- What events occurred prior to the failure?
- Was any hardware or software modified or installed?
- Was the server recently installed or moved?
- How long has the server exhibited symptoms?
- What is the duration or frequency of the problem?

After you have assessed the problem and noted your current configuration and environment, you can choose from several ways to troubleshoot your server:

- Visually inspect your system as described in [Section 2.2, “Performing Visual Inspections” on page 2-2](#).
- View the troubleshooting procedures in [Section 2.3, “Troubleshooting Procedures” on page 2-4](#) to see if any of them solve the problem.
- Execute a diagnostics test as described in [Chapter 3](#).
- If you are not able to resolve the problem, contact Sun technical support. Support contact information is provided in [Section 2.4, “Getting Technical Assistance” on page 2-7](#).

2.2 Performing Visual Inspections

Improperly set controls and loose or improperly connected cables are common causes of problems with hardware components. When investigating a system problem, first check all the external switches, controls, and cable connections. See [Section t, “To Perform an External Visual Inspection” on page 2-2](#).

If this does not resolve your problem, then visually inspect the system’s interior hardware for problems, such as a loose card, cable connector, or mounting screw. See [Section t, “To Perform an Internal Visual Inspection” on page 2-3](#).

▼ To Perform an External Visual Inspection

1. Turn off the system and any attached peripherals (if applicable).

2. Verify that all power cables are properly connected to the system, the monitor, and the peripherals, and check their power sources.
3. Inspect connections to any attached devices, including network cables, keyboard, monitor, and mouse, as well as any devices attached to the serial port.

▼ To Perform an Internal Visual Inspection

1. Shut down the operating system, if necessary.
2. Disconnect the power cord from the back of the system.
3. Turn off any attached peripherals.
4. Remove the server cover, following the procedures in [Section 4.2, “Installation Precautions”](#) on page 4-2.



Caution – Some components, such as the heatsink, can become extremely hot during system operations. Allow these components to cool before handling them.

5. Verify that the components are fully seated in their sockets or connectors and that the sockets are clean.
6. Verify that all cables inside the system are firmly attached to their appropriate connectors.
7. Replace the top cover.
8. Reconnect the system and any attached peripherals to their power sources, and then power them on.

2.3 Troubleshooting Procedures

TABLE 2-1 lists problems that might arise as you use your server. Possible solutions are listed for each problem. If the solutions listed here do not fix the problem, run the appropriate diagnostic test (see [Chapter 3](#)).

TABLE 2-1 Troubleshooting Procedures

Problem	Possible solution
Server does not power on when you press the front panel power button.	Keep notes on the following situations in case you need to call for service: <ul style="list-style-type: none">• Is the power LED illuminated on the front of the system? (Ensure that the power cord is connected to the system and to a grounded power receptacle.)• Does the wall outlet have power? Test by connecting another device.• Does the monitor sync within 5 minutes after power on? (The green LED on the monitor stops flashing and remains illuminated.)
Server powers on, but the monitor does not.	<ul style="list-style-type: none">• Is the Power button for the monitor turned on?• Is the monitor power cord connected to a wall outlet?• Does the wall outlet have power? Test by connecting another device.
CD or DVD does not eject from the media tray when you press the Eject button.	<ul style="list-style-type: none">• Move the mouse or press any key on the keyboard. The drive might be in the low-power mode.• Use the utility software installed on your server to eject the CD.
Server does not power off when the front panel power button is pressed.	<ul style="list-style-type: none">• Try all of the power-off options shown in Section t, “To Shut Down Main Power Mode” on page 1-9.• If the server still does not power off, disconnect the power cable from the rear of the chassis.
The network status indicator does not light up.	<ul style="list-style-type: none">• Check the cabling and network equipment to make sure that all cables are correctly seated.• Reinstall the network drivers.
An external device connected to a USB connector does not work.	<ul style="list-style-type: none">• Reduce the number of external devices connected to a USB hub.• Refer to the documentation that comes with the device.

TABLE 2-1 Troubleshooting Procedures (Continued)

Problem	Possible solution
System cannot read the hard disk information.	Do the following: <ol style="list-style-type: none">1. Turn off the server by pressing the Power button.2. Remove the top cover.3. Check to make sure that the power and data cables are connected to the disk drive and that the pins in the cable and connector are not bent.4. Check to make sure that the drives are cabled properly for the hard drive format. See Chapter 4 for information on hard drive cabling for SAS and SATA formats.5. Replace the top cover.6. Turn on the server.
System cannot read the CD information.	Check the following: <ul style="list-style-type: none">• Are you using the correct type of CD?• Is the CD properly inserted into the drive?• Is the CD clean and unscratched?• Are the cables connected to the DVD-ROM drive?
Keyboard or mouse does not respond to action.	<ul style="list-style-type: none">• Verify that the mouse and keyboard cables are connected to the on-board USB 2.0 connectors on the server.• Verify that the server is powered on and that the front power LED is illuminated.
Server appears to be in low-power mode, but the Power button LED does not blink.	The power-indicator LED only blinks when all server components are in low-power mode. A tape drive might be connected to your server. Because tape drives do not enter low-power mode, the power-indicator LED does not blink.
Hung or frozen server: No response from mouse or keyboard or any application.	Try to access your system from a different server on the network: <ol style="list-style-type: none">7. On another system, type ping <i>IP_address_of_X2200</i>8. If a response is returned, then try logging in to the Sun Fire X2200 M2 server using either telnet, ssh, or rlogin.9. If you successfully log in, list the running processes using the ps command.10. Stop any processes that look unresponsive or should not be running, by using the kill <i>process_ID</i> command.11. Check the responsiveness of the Sun Fire X2200 M2 server after each process is stopped. If the above procedure does not work, power cycle the server: <ol style="list-style-type: none">1. Press the Power button to power off the server and wait 20-30 seconds.2. Press the Power button again to power the system back on.

TABLE 2-1 Troubleshooting Procedures (*Continued*)

Problem	Possible solution
No video is displayed on the monitor screen.	<p>Check the following:</p> <ul style="list-style-type: none">• Is the cable connected to the video connector?• Does the monitor work when connected to another system?• If you have another monitor, does it work when connected to the original system?• If, after POST and BIOS complete, you no longer see video output on your monitor and only see a flashing cursor, check the configuration of the operating system to determine if it is configured to redirect its output exclusively over the serial line.
External device is not working.	<ul style="list-style-type: none">• Check the documentation that came with the device to see if any device drivers must be installed.• Ensure that the cables for the external device are firmly connected and that the pins in the cable and connector are not bent.• Power off the system, reattach the external device, and power on the system.
Newly installed memory is not detected.	<ul style="list-style-type: none">• Make sure that the memory is properly seated on the DIMM sockets.• Move the memory to the other DIMM socket to determine whether the socket is defective.• Make sure that you are using 1 GB, or 2 GB registered DDR2 modules with 3.05 cm max. height.• Make sure that the memory is installed in pairs.

2.4 Getting Technical Assistance

If the troubleshooting procedures in this chapter fail to solve your problem, see [TABLE 2-2](#), which lists the Sun web sites and telephone numbers for additional technical support.

TABLE 2-2 Sun Web Sites and Telephone Numbers

Server Documents and Support Resources	URL or Telephone Number
PDF files for all the current Sun Fire X2200 M2 server documents.	http://www.sun.com/documentation/
Solaris and other software documents. This web site has full search capabilities.	http://docs.sun.com/documentation/
Discussion and troubleshooting forums.	http://supportforum.sun.com/
Support, diagnostic tools, and alerts for all Sun products.	http://www.sun.com/bigadmin/
SunSolve SM web site. Contains links to software patches. Lists some system specifications, troubleshooting and maintenance information, and other tools.	http://www.sunsolve.sun.com/handbook_pub/
Service support phone numbers.	1-800-872-4786 (1-800-USA-4Sun), Select Option 1.
International telephone numbers for Sun support.	http://www.sun.com/service/contacting/solution.html
Warranty and contract support contacts. Links to other service tools.	http://www.sun.com/service/online/
Warranties for every Sun product.	http://www.sun.com/service/support/warranty

Performing Diagnostics

This chapter assists you with using the Diagnostics application on the Sun Fire X2200 M2 Server Tools and Drivers CD that is packaged with your system.

Diagnostic output is accessible on systems that are running supported Linux or Solaris operating systems. If you are having specific problems with your system, use the Pc-Check Diagnostics software to diagnose and resolve these issues.

The following sections are included in this chapter:

- [Section 3.1, “Pc-Check Diagnostics Overview” on page 3-2](#)
- [Section 3.2, “System Information Menu Options” on page 3-3](#)
- [Section 3.3, “Advanced Diagnostics Tests Menu Options” on page 3-4](#)
- [Section 3.4, “Immediate Burn-in Testing” on page 3-7](#)
- [Section 3.5, “Deferring Burn-In Testing” on page 3-9](#)
- [Section 3.6, “Creating Diagnostic Partition” on page 3-10](#)
- [Section 3.7, “Show Results Summary” on page 3-17](#)
- [Section 3.8, “Print Results Report” on page 3-18](#)
- [Section 3.9, “About Pc-Check” on page 3-19](#)
- [Section 3.10, “Exit to DOS” on page 3-19](#)

3.1 Pc-Check Diagnostics Overview

Sun Fire X2200 M2 server diagnostics are contained in the DOS-based Pc-Check utility. This program can only be accessed and executed only from the Sun Fire X2200 M2 Server Tools and Drivers CD. Pc-Check was designed to detect and test all motherboard components, ports, and slots.

If you encounter any hardware-related error message (such as memory errors or hard disk errors) on your Sun Fire X2200 M2 server, run one of the following:

- Advanced Diagnostics Test: A specific hardware component test
- Immediate Burn-in Test: A Sun Fire X2200 M2 server diagnostic test script

The following procedure describes how to access these test options from the Sun Fire X2200 M2 Server Tools and Drivers CD.

▼ To Access the Pc-Check Diagnostics Software

- 1. Do one of the following, depending on which method you are using to access the Pc-Check diagnostics software:**
 - *If your server has a DVD drive installed:* Insert the Sun Fire X2200 M2 Server Tools and Drivers CD into your DVD drive and reboot the system.
 - *If you are running the Pc-Check software from a PXE server:* Follow the instructions in [Appendix B](#) to set up the PXE server.

The system boots to the Sun Fire X2200 M2 Server Tools and Drivers CD main menu.

- 2. Type 1 to run the hardware diagnostics software.**

The system information loads, the Diagnostics main menu opens, and the following menu options are displayed:

- System Information Menu
- Advanced Diagnostics Tests
- Immediate Burn-in Testing
- Deferred Burn-in Testing
- Create Diagnostic Partition
- Show Results Summary
- Print Results Report
- About PC-CHECK
- Exit to DOS

To run a specific hardware component test, select "Advanced Diagnostics Test." To run one of the test scripts supplied by Sun, select "Immediate Burn-in Testing."

Navigate through the menu items by pressing the arrow keys located on the keyboard to move to a menu selection, the Enter key to select a menu selection, and the ESC key to exit a menu. Navigation instructions are shown at the bottom of each screen.

The following sections in this chapter describe the menu items and tests in detail.

3.2 System Information Menu Options

TABLE 3-1 describes each option in the System Information menu.

TABLE 3-1 System Information Menu Options

Option	Description
System Overview	Includes basic information about your system, motherboard, BIOS, processor, memory cache, drives, video, modem, network, buses, and ports.
Hardware ID Image Menu	Enables you to create a document showing information about your system, including comparisons between the updates and the newest versions of your system. XML is the format used to create and display this information, though you can also choose a text format (.txt) as well.
System Management Information	Provides information obtained from the system about the BIOS type, system, motherboard, enclosure, processors, memory modules, cache, slots, system event log, memory array, memory devices, memory device mapped addresses, and system boot.
PCI Bus Information	Includes details about specific devices from <code>pci-config</code> space within the system, similar to the System Management Information section.
IDE Bus Information	Shows the master/slave devices on the primary and secondary IDE controllers.
PCMCIA/CardBus Info	Not relevant to the Sun Fire X2200 M2 server.
Interrupt Vectors	Lists and details device interrupt vector information.
IRQ Information	Shows hardware interrupt assignments.
Device Drivers	Shows device drivers loaded under Open DOS.

TABLE 3-1 System Information Menu Options *(Continued)*

Option	Description
APM Information	Tests the Advanced Power Management (APM) capabilities of the system. You can choose to change the power state, view the power status, indicate CPU usage, get a PM event, or change the interface mode.
I/O Port Browser	Shows the I/O port assignment for the hardware devices on the system.
Memory Browser	Enables you to view the mapped memory for the entire system.
Sector Browser	Reads sector information from the hard disks and DVD disks sector by sector.
CPU Frequency Monitor	Tests the processor speed.
CMOS RAM Utilities	Shows the CMOS settings of the system.
SCSI Utilities	Not applicable for the Sun Fire X2200 M2 server.
Text File Editor	Opens a file editor.
Start-Up Options	Enables you to set up options for diagnostics testing.

3.3 Advanced Diagnostics Tests Menu Options

[TABLE 3-2](#) gives the name and a brief description of each option in the Advanced Diagnostics Tests menu.

TABLE 3-2 Advanced Diagnostics Tests Menu Options

Option	Description
Processor	Details information about the processor, and includes a Processor Tests menu to test the processor on the system.
Memory	Details information about the memory, and includes a Memory Tests menu to test the memory on the system. Also lists each type of memory in the system, such as system, cache, or video memory.
Motherboard	Details information about the motherboard, and includes a Motherboard Tests menu to test the motherboard on the system.

TABLE 3-2 Advanced Diagnostics Tests Menu Options (*Continued*)

Option	Description
Diskettes	Not relevant to Sun Fire X2200 M2 server.
Hard Disks	Details information about the hard disk, and includes a Hard Disk Tests menu to test hard disks on the system. Refer to Section t, “To Test the Hard Disk” on page 3-6 , for detailed information about testing hard disks and script information.
CD-ROM/DVD	Includes a CD-ROM/DVD menu to test DVD devices on the system.
ATAPI Devices	Details information about devices attached to the IDE controllers on the system other than a DVD or hard disks (for example, zip drives).
Serial Ports	Details information about the serial port, and includes a Serial Ports Tests menu to test serial ports on the system.
Parallel Ports	Not applicable for the Sun Fire X2200 M2 server.
Modems	Not applicable for the Sun Fire X2200 M2 server.
ATA	Includes an ATA test menu.
USB	Details information about the USB devices on the system, and includes a USB Tests menu to test the USB.
FireWire	Not applicable for the Sun Fire X2200 M2 server.
Network	Performs network register controller tests.
Keyboard	Includes a Keyboard Test menu with options for performing different tests on the keyboard.
Mouse	Details information about the mouse, and includes a menu to test the mouse on the system.
Joystick	Not applicable for the Sun Fire X2200 M2 server.
Audio	Not applicable for the Sun Fire X2200 M2 server.
Video	Details information about the video card. Initially, the monitor might flicker, but then it brings up a Video Test Options menu that enables you to perform various video tests.
Printers	Printers are not available for the Sun Fire X2200 M2 server.
Firmware - ACPI	Details information about Advanced Configurable Power Interface (ACPI), and includes an ACPI Tests menu to test ACPI.

▼ To Test the Hard Disk

1. From the main menu, choose **Advanced Diagnostics Tests**.
2. From the **Advanced Diagnostics** menu, choose **Hard Disks**.
3. From the **Select Drive** menu, choose the hard disk you are testing.

The Hard Disk Diagnostics window opens, showing both the information for the hard disk you have selected and the Hard Disk Tests menu.

The Hard Disk Tests menu displays the following options:

- Select Drive
- Test Settings
- Read Test
- Read Verify Test
- Non-Destructive Write Test
- Destructive Write Test
- Mechanics Stress Test
- Internal Cache Test
- View Error Log
- Utilities Menu
- Exit

The Media Test options include the Read Test, the Read Verify Test, the Non-Destructive Write Test, and the Destructive Write Test. These tests are relevant to testing the media associated with the hard drive hardware, such as the physical disk.



Caution – Running the Destructive Write Test destroys any data that is on the disk.

The Device Test options include the Mechanics Stress Test and the Internal Cache Test. These tests are relevant to testing non-media-related devices associated with the hard drive hardware, such as the head and internal cache.

In addition to choosing any of these tests, you can also define several parameters of the test.

You can change the parameters within the Test Settings option. Your options within Test Settings include the following:

- **Media Test Settings**

Enables you to select the test time duration, the percentage of the hard disk to test, and the sectors to be tested on the hard disk.

- **Device Test Settings**
Enables you to select the test time durations of the devices and the test level.
- **Number of Retries**
Enables you to select the number of times to retry testing a device before terminating the test.
- **Maximum Errors**
Enables you to select the number of errors allowed before terminating the test.
- **Check SMART First**
SMART stands for Smart Monitoring Analysis Reporting Test.
- **HPA Protection**
HPA stands for Host Protected Area.
- **Exit**

3.4 Immediate Burn-in Testing

The Immediate Burn-In Testing option enables you to run burn-in test scripts on your server. Three scripts have already been created for testing your system:

- `quick.tst` – This script performs a high level test of all hardware components, including those components that require user input, as well as a more in-depth memory test. The user must interact with the Pc-Check software to progress through these interactive tests. The tests cannot be run unattended and do not contain "timeout" facilities. The interactive tests will wait until the user provides the correct input.
- `noinput.tst` – This script is used to diagnose hardware-related problems or issues from a high-level. The script tests most of the hardware components, excluding those components that require user input (keyboard, mouse, sound, video). This test does not require user input.
- `full.tst` – This script performs the most detailed and comprehensive test on all hardware components, including those components that require user input. This script contains a more in-depth memory test than `quick.tst`, as well as external port tests (which may require loopback connectors). The user must interact with the test utility to progress through these interactive tests.

Tip – Each of these scripts tests the operating status of your entire system. If you want to test only a certain percentage of your system's hard drives, refer to [Section t, "To Test the Hard Disk"](#) on page 3-6 to change the test options.

When you select the Immediate Burn-in Testing menu option, the Continuous Burn-in Testing window is displayed. The screen includes the list of options shown in TABLE 3-3 for running the tests. When a `quick.tst`, `noinput.tst`, or `full.tst` script is loaded, the defaults indicated in the third column are automatically loaded.

TABLE 3-3 Continuous Burn-in Testing Options

Option	Default – General	Default Using quick.tst, noinput.tst, or full.tst Script	All Possible Choices
Pass Control	Overall Time	Overall Passes	Individual Passes, Overall Passes, or Overall Time
Duration	01:00	1	Any number to designates the time duration of the test
Script File	N/A	quick.tst, noinput.tst, or full.tst	quick.tst, noinput.tst, or full.tst
Report File	None	None	User-defined
Journal File	None	D:\noinput.jrl, D:\quick.jrl, or D:\full.jrl	User-defined
Journal Options	Failed Tests	All Tests, Absent Devices, and Test Summary	Failed Tests, All Tests, Absent Devices, and Test Summary
Pause on Error	N	N	Y or N
Screen Display	Control Panel	Control Panel	Control Panel or Running Tests
POST Card	N	N	Y or N
Beep Codes	N	N	Y or N
Maximum Fails	Disabled	Disabled	1-9999

The following procedure describes how to load one of the scripts available to test the devices on your system.

▼ To Load Test Scripts

- From the main menu, choose **Immediate Burn-in Testing**.

The top portion of the window lists the options described in [TABLE 3-3](#), and the bottom portion of the window lists the following Burn-in menu options:

- **Load Burn-in Script**

Enter one of the following:

- **quick.tst**, **noinput.tst**, or **full.tst**

- If you have created and saved your own script, enter **d:\testname.tst**

- Where *testname* is the name of the script that you have created.

- **Save Burn-in Script**

To save a burn-in script that you have created, enter **d:\testname.tst**

Where *testname* is the name of the script that you have created.

- **Change Options**

Opens the Burn-in Options menu, which enables you to modify the various options listed in [TABLE 3-3](#) for the currently loaded test script.

- **Select Tests**

Opens a listing of the tests available for your server configuration and the currently loaded test script.

- **Perform Burn-in Tests**

Runs the currently loaded burn-in test script.

3.5 Deferring Burn-In Testing

You can use the Deferred Burn-in Testing option to create and save your own scripts to run at a later time.

▼ To Defer Burn-In Testing

- From the main menu, choose **Deferred Burn-in Testing**.

The top portion of the window lists the options described in [TABLE 3-3](#), and the bottom portion of the window lists the following Burn-in menu options:

- **Load Burn-in Script**

Enter one of the following:

- **quick.tst, noinput.tst, or full.tst**
- If you have created and saved your own script, enter **d:\testname.tst**
Where *testname* is the name that you have created.
- **Save Burn-in Script**
To save a burn-in script that you have created, enter **d:\testname.tst**
Where *testname* is the name of the script that you have created.
- **Change Options**
Opens the Burn-in Options menu, which enables you to modify the various options listed in [TABLE 3-3](#) for the currently loaded test script.
- **Select Tests**
Opens a listing of all the possible types of tests available for you to run for the currently loaded test script.

3.6 Creating Diagnostic Partition

The diagnostic partition is preinstalled on the Sun Fire X2200 M2 server. You need to reinstall the diagnostic partition only if you have reformatted your hard drive. Using the Erase Primary Boot Hard Disk utility on the Sun Fire X2200 M2 Server Tools and Drivers CD preserves the diagnostic partition.

The Create Diagnostic Partition option installs a diagnostic partition on the first bootable disk seen by the Sun Fire X2200 M2 server. The first bootable disk is on the primary/master SATA device.

Note – If you are running the Pc-Check Diagnostics software from a PXE server, you do not need to follow the instructions in these procedures for inserting the Tools and Drivers CD into the DVD tray. See [Section B.3, “Booting the Tools and Drivers CD from a PXE Server”](#) on page B-5.

The following sections explain how to create and access the diagnostic partition on the Sun Fire X2200 M2 server:

- [Section 3.6.1, “Removing Existing Partitions From a Hard Disk”](#) on page 3-11
- [Section 3.6.2, “Adding a Diagnostic Partition to the First Bootable Disk”](#) on page 3-12
- [Section 3.6.3, “Creating a Log File on the Diagnostic Partition”](#) on page 3-13
- [Section 3.6.4, “Accessing the Diagnostic Partition on a RHEL System”](#) on page 3-14

- Section 3.6.5, “Accessing the Diagnostic Partition on the Solaris 10 Operating System” on page 3-15
- Section 3.6.6, “Accessing the Diagnostic Partition on the Windows Server 2003 System” on page 3-16

3.6.1 Removing Existing Partitions From a Hard Disk

The Create Diagnostic Partition option creates a diagnostic partition on a hard disk only if that hard disk is completely free of any partitions. You need to delete any existing partitions from a hard disk if you plan to use the hard disk to create a diagnostic partition on it.



Caution – Removing all hard disk partitions destroys all data on the disk.

There are two ways to remove existing partitions from the hard disk:

- Use the Erase Primary Boot Hard Disk utility (option 3 on the Tools and Drivers CD main menu).
- Use fdisk (option 4 on the Tools and Drivers CD main menu).

▼ To Use the Erase Primary Boot Hard Disk Utility

1. Insert the Tools and Drivers CD into the DVD tray.
2. Reboot the server.
1. From the Tools and Drivers CD main menu, type 3.

The utility erases existing partitions on the primary boot disk.

▼ To Use fdisk to Erase Hard Disk Partitions

1. Insert the Tools and Drivers CD into the DVD tray.
2. Reboot the server.
3. From the Tools and Drivers CD main menu, type 4 to exit to DOS.
4. Type `fdisk` at the command prompt, and press the Enter key.

5. **Type 4 to select an alternate fixed disk.**

The second hard disk as seen from `fdisk` is the first bootable disk of the system.
The first hard disk as seen from `fdisk` is the bootable Tools and Drivers CD.



Caution – When performing the following tests, be careful not to delete any operating system partitions that you want to keep. Removing hard disk partitions destroys all data on the disk.

6. **Type 2 to delete the DOS partition.**
7. **Type 1 or 2 depending on the type of partition you want to delete.**
8. **Type the number of the partition you want to delete.**
9. **Type Y to erase the data and the partition.**
10. **Repeat [Step 6](#) through [Step 9](#) until all partitions have been deleted.**
11. **Press the Esc key to exit, and press any key to reboot the server.**

3.6.2 Adding a Diagnostic Partition to the First Bootable Disk

Pc-Check can view only the first or second hard disk on the system from the boot loader. The software automatically installs the diagnostic partition on the first bootable disk.

▼ To Add a Diagnostic Partition to the First Bootable Disk

1. **Insert the Tools and Drivers CD into the DVD tray.**
2. **Reboot the server.**
3. **At the Tools and Drivers CD main menu, type 1 to run Hardware Diagnostics.**
4. **From the main menu, choose Create Diagnostic Partition.**
 - If the first bootable disk is clear of partitions, the Sun Microsystems Partitioning Utility window appears. It states: “Your primary hard disk is not partitioned. Would you like to partition it now?”
 - **Select Yes and press Enter.**

- A window appears, stating, “Partitioning complete. Your machine will now be restarted.”
 - If the first bootable disk is not clear of partitions, a window appears stating that the software is unable to create a hardware diagnostic partition because there are already partitions on the disk.
 - **If this happens, go to Section 3.6.1, “Removing Existing Partitions From a Hard Disk” on page 3-11 to remove the partitions from the disk.**
 - **Repeat Step 1 through Step 4 of this procedure.**
5. Press Enter to reboot your server.

3.6.3 Creating a Log File on the Diagnostic Partition

All the scripts that are loadable with the hardware diagnostics software are predefined, with logging to the diagnostic partition enabled. The names of log files correspond to the name of the script. For example, a script named `noinput.tst` creates a log file named `noinput.jr1`.

The following procedure shows an example of how to create and access a log file on the diagnostic partition for the `noinput.tst` script.

▼ To Create a Log File on the Diagnostic Partition

1. Insert the Tools and Drivers CD into the DVD tray.
2. Reboot the server.
3. From the Tools and Drivers CD main menu, choose **1** to run **Hardware Diagnostics**.
4. From the Hardware Diagnostics main menu, choose **Immediate Burn-In Testing**.
5. Select **Load Burn-in Script**.
6. Type **`noinput.tst`** and press Enter.

If you are using a test you have created yourself, you need to enter **`d:\testname.tst`** into the Load Burn-in Script field, where *testname* is the name of the test you have created.
7. Select **Perform Burn-in Tests to run the script**.
8. When the tests are complete, press the Esc key to exit the **Display Results window**.

9. Select Exit to DOS and press Enter.
10. At the DOS prompt, type the following:

```
C:> d:
```

11. Type the following to list the contents of the diagnostic partition.:

```
D:> dir
```

The `noinput.jrl` log is displayed.

3.6.4 Accessing the Diagnostic Partition on a RHEL System

▼ To Access the Diagnostic Partition on a RHEL System

1. Remove the Tools and Drivers CD from the DVD tray.
2. Reboot the server and start the Red Hat Linux operating system.
3. Log in as root (superuser).
4. Determine if your diagnostic partition has been configured to be mounted by typing the following command:

```
# ls /diagpart
```

- If this command fails to list the log files created by the hardware diagnostics software, then the operating system has never been configured to mount the diagnostic partition. Continue to [Step 5](#).
 - If this command succeeds in listing the log files created by the hardware diagnostics software, then the operating system has already been configured to mount the diagnostic partition. All users have read access to this partition. Only the superuser has read/write access to this partition. You do not need to continue this procedure.
5. Insert the Tools and Drivers CD into the DVD tray.
 6. When the CD is mounted, open a terminal window.

7. Type the following command:

```
# cd mountpoint/drivers/linux/linux_version
```

Where *mountpoint* is the CD mountpoint and *linux_version* is the version of Linux that you have installed. For example:

```
# cd /mnt/cdrom/drivers/linux/red_hat
```

8. Type the following to install the diagnostic partition:

```
# ./install.sh
```

9. Press Enter.

The following lines appear if the diagnostic partition is mounted successfully:

```
Mounting Diagnostic Partition  
Installation Successful
```

10. Type the following command:

```
# ls /diagpart
```

The contents of the diagnostic partition are listed.

3.6.5 Accessing the Diagnostic Partition on the Solaris 10 Operating System

▼ To Access the Diagnostic Partition on the Solaris 10 OS

1. Remove the Tools and Drivers CD from the DVD tray.
2. Reboot the machine and start the Solaris 10 Operating System.
3. Log in as root (superuser).
4. Type the following command to determine if your diagnostic partition has been configured to be mounted:

```
# ls /diagpart
```

- If this command fails to list the log files created by the hardware diagnostics software then the operating system has never been configured to mount the diagnostic partition. Continue to [Step 5](#).
- If this command succeeds in listing the log files created by the hardware diagnostics software, then the operating system has already been configured to mount the diagnostic partition. All users have read access to this partition. Only the superuser has read/write access to this partition. You do not need to continue this procedure.

5. Insert the Tools and Drivers CD into the DVD tray.

6. When the CD is mounted, open a terminal window.

7. Type the following:

```
# cd /cdrom/cdrom0/drivers/sx86
```

8. Type the following to install the diagnostic partition:

```
# ./install.sh
```

9. Press the Enter key.

The following lines appear if the diagnostic partition is mounted successfully:

```
Mounting Diagnostic Partition
Installing Successful
```

10. Type the following command to list the contents of the diagnostic partition:

```
# ls /diagpart
```

3.6.6 Accessing the Diagnostic Partition on the Windows Server 2003 System

The Windows 2003 Server operating system does not allow you to mount a diagnostic partition. There is no way to view or gain access to the diagnostic partition if you are running Windows XP on a Sun Fire X2200 M2 server.

The only way to retrieve the contents (log files) on the diagnostic partition is to attach a USB diskette drive to the Sun Fire X2200 M2 server and complete the following procedure.

▼ To Access the Diagnostic Partition on the Windows Server 2003 System

1. Connect the USB diskette drive to any USB port on the Sun Fire X2200 M2 server.
2. Insert the Tools and Drivers CD into the DVD tray.
3. Reboot the server.
4. At the Tools and Drivers CD main menu, type 3 to exit to DOS.
5. Type the following at the DOS command prompt:

```
C:> d:
```

6. Copy the log file to the diskette.

For example, to copy a file named `noinput.jrl` to the diskette, type:

```
D:> copy d:\noinput.jrl a:\
```

The journal file is now saved to the diskette in the USB diskette drive.

3.7 Show Results Summary

The summary lists the tests run and shows the results. Pass, Fail, or N/A is listed for each option.

The following is a complete listing of all options that are available with the Tools and Drivers CD. If your own system does not have all of these options, they might not be listed when the Show Results Summary is displayed.

■ Processor

This section shows the following tests conducted against the processor: Core Processor Tests, AMD 64-Bit Core Tests, Math Co-Processor Tests – Pentium Class FDIV and Pentium Class FIST, MMX Operation, 3DNow! Operation, SSE Instruction Set, SSE2 Instruction Set, and MP Symmetry.

■ Motherboard

This section shows the following tests conducted against the motherboard: DMA Controller Tests, System Timer Tests, Interrupt Test, Keyboard Controller Tests, PCI Bus Tests, and CMOS RAM/Clock Tests.

- **Memory, Cache Memory, and Video Memory**

This section shows the following tests conducted against the various types of memory: Inversion Test Tree, Progressive Inv. Test, Chaotic Addressing Test, and Block Rotation Test.

- **Input Device**

This section shows the following tests conducted against the input device: Verify Device, Keyboard Repeat, and Keyboard LEDs.

- **Mouse**

This section shows the following tests conducted against the mouse: Buttons, Ballistics, Text Mode Positioning, Text Mode Area Redefine, Graphics Mode Positions, Graphics Area Redefine, and Graphics Cursor Redefine.

- **Video**

This section shows the following tests conducted against the video: Color Purity Test, True Color Test, Alignment Test, LCD Test, and Test Cord Test.

- **Multimedia**

This section shows the following tests conducted against the multimedia components: Internal Speaker Test, FM Synthesizer Test, PCM Sample Test, CD/DVD Drive Read Test, CD/DVD Transfer (KB/Sec), CD/DVD Transfer Rating, CD/DVD Drive Seek Test, CD/DVD Seek Time (ms), CD/DVD Test Disk Read, and CD/DVD Tray Test.

- **ATAPI Devices**

This section shows the following tests conducted against ATAPI devices: Linear Read Test, Non-Destructive Write, and Random Read/Write Test.

- **Hard Disk**

This section shows the following tests conducted against the hard disk: Read Test, Read Verify Test, Non-Destructive Write Test, Destructive Write Test, Mechanics Stress Test, and Internal Cache Test.

- **USB**

This section shows the following tests conducted against the USB: Controller Tests and Functional Tests.

- **Hardware ID**

The compare test is used to determine the machine ID for the system. This test is not available for the Sun Fire X2200 M2 server.

3.8 Print Results Report

The Print Results Report option enables you to print system diagnostic results.

Ensure that your server is connected to a printer, and then enter the required information to print the results.

3.9 About Pc-Check

The About Pc-Check window includes general information about Pc-Check software, including resident and nonresident components, such as mouse devices.

3.10 Exit to DOS

You use the Exit to DOS option to exit Pc-Check and return to the DOS prompt.

Maintaining the Sun Fire X2200 M2 Server

This chapter describes how to add, replace, and configure components in the Sun Fire X2200 M2 Server server after it has been set up.

This chapter contains the following sections:

- [“Tools and Supplies Needed” on page 4-2](#)
- [“Powering Off the Server and Removing the Cover” on page 4-4](#)
- [“Component Replacement Procedures” on page 4-5](#)

To determine and isolate a faulty component, refer to [“Performing Diagnostics” on page 3-1](#).

Note – System cooling might be affected by dust and contaminant build-up. It is recommended that systems be opened and checked approximately every six months or more often in dirty operating environments. Check system heatsinks, fans, and air openings. If necessary, clean systems by brushing or blowing contaminants from the system or by carefully vacuuming contaminants from the system.

4.1 Tools and Supplies Needed

You need the following tools and supplies for performing Sun Fire X2200 M2 server maintenance procedures.

- #2 Phillips screwdriver
- Antistatic wrist strap
- Alcohol pads (for CPU replacement by service personnel only)
- 5 mm nut driver. (for motherboard replacement by service personnel only)

4.2 Installation Precautions

Before removing the system's top cover, read the following sections. These sections contain important electrostatic discharge (ESD) precautions, along with preinstallation and postinstallation instructions.

4.2.1 ESD Precautions

ESD can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

- Do not remove a component from its protective packaging until you are ready to install it.
- Wear a wrist strap and attach it to the system chassis ground, or to any metal part of the system, before handling components.
- Turn off the power button on the front of the chassis before removing or replacing any of the system components.

4.2.2 Preinstallation Instructions

Always perform the following steps before you install any component:

- 1. Turn off the system and all of the peripherals connected to it.**



Caution – Failure to properly turn off the system before you start installing components can cause serious component damage.



Caution – Follow the ESD precautions described in [Section 4.2.1, “ESD Precautions”](#) on page 4-2 when handling a system component.

2. Open the server.

See [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4 for the appropriate procedure for opening the server.

4.2.3 Postinstallation Instructions

Perform the following steps after installing a server component.

1. Ensure that all of the components are installed as described in the step-by-step instructions.

See [Section 4.4, “Component Replacement Procedures”](#) on page 4-5.

2. Reinstall any PCI Express (PCIe) cards or peripherals that you had previously removed.

See [Section 4.4, “Component Replacement Procedures”](#) on page 4-5.

3. Reinstall the system’s cover.

See [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.

4. Connect all external cables to the system.

5. Power on the system.



Caution – If the cover has been removed or hard drive bays do not have a drive or filler panel installed, do not operate the server for more than ten minutes. Improper cooling airflow might damage the system’s components.

4.3 Powering Off the Server and Removing the Cover

For your safety, perform this procedure when you are powering off the system and removing the cover for a maintenance procedure in this chapter.

▼ To Power Off the Server and Remove the Cover

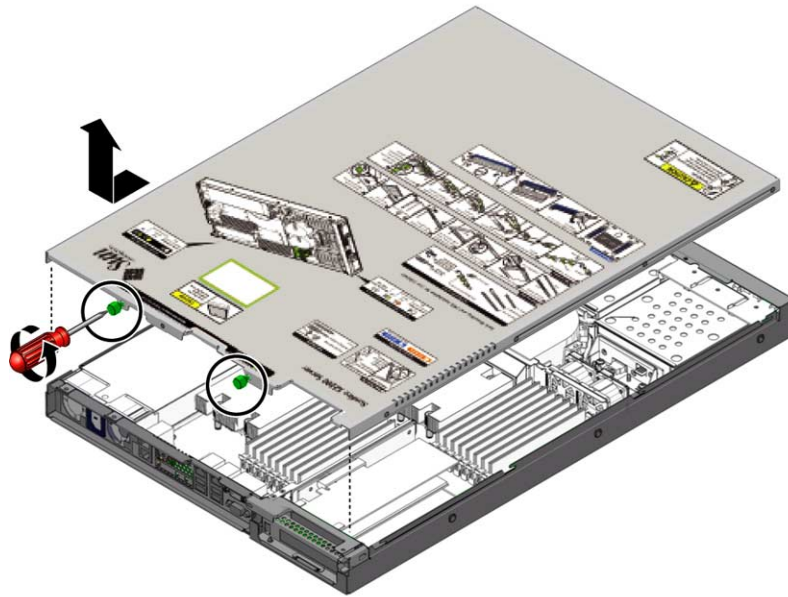
1. If the operating system (OS) is running, perform a shutdown of the OS, and then press and release the platform power button on the front panel.
2. Turn off all peripheral devices connected to the system.
3. Disconnect the AC power on the back panel of the server (see [FIGURE 1-2](#)).
4. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back panel of the system.



Caution – The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

5. Before handling components, attach a wrist strap to a chassis ground (any unpainted metal surface).
6. Loosen the two captive screws securing the cover to the chassis (see [FIGURE 4-1](#)).
7. Pull the cover slightly toward the back of the server and then straight up to remove it.
8. Lift the cover and remove it.

FIGURE 4-1 Removing the Server Cover



4.4 Component Replacement Procedures

For the location of server components referenced in this section, see [Section 1.3.2, “Internal Components”](#) on page 1-7.

The following components are customer-replaceable units (CRUs):

- I/O board (see [Section 4.4.1, “Replacing the I/O Board”](#) on page 4-6)
- PCIe cards and risers (see [Section 4.4.2, “Replacing the PCIe Card and Riser Assembly”](#) on page 4-8)
- Hard disk drives and carriers (see [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12)
- LSI PCIe cards and cables (see [Section 4.4.4, “Installing an LSI PCIe Card and Cables”](#) on page 4-14)
- ODD (DVD or CD) drive (see [Section 4.4.5, “Replcaing an ODD Drive Assembly”](#) on page 4-21)
- Air baffle (see [Section 4.4.6, “Replacing an Air Duct”](#) on page 4-23)
- Power supply (see [Section 4.4.7, “Replacing the Power Supply”](#) on page 4-25)
- Single fan modules (see [Section 4.4.8, “Replacing Single Fans”](#) on page 4-27)

- Dual blower modules (see [Section 4.4.9, “Replacing the Dual Blower Module”](#) on page 4-29)
- Memory DIMMs (see [Section 4.4.11, “Replacing Memory Modules”](#) on page 4-32)
- Battery (see [Section 4.4.12, “Replacing System Battery”](#) on page 4-36)
- CPU - new installation (see [Section 4.4.13, “Replacing a CPU and Heatsink”](#) on page 4-39).
- Cable kit (see [Section 4.4.14, “Replacing Cables”](#) on page 4-47)

The following component should be replaced only by trained field service technicians:

- CPU - replacement (see [Section 4.4.13, “Replacing a CPU and Heatsink”](#) on page 4-39).
- Motherboard (see [Section 4.4.15, “Motherboard”](#) on page 4-50)

Note – Many of the illustrations in this section show multiple PCIe slots on the motherboard. The Sun Fire X2200 M2 server motherboard will only have a single PCI Express slot.

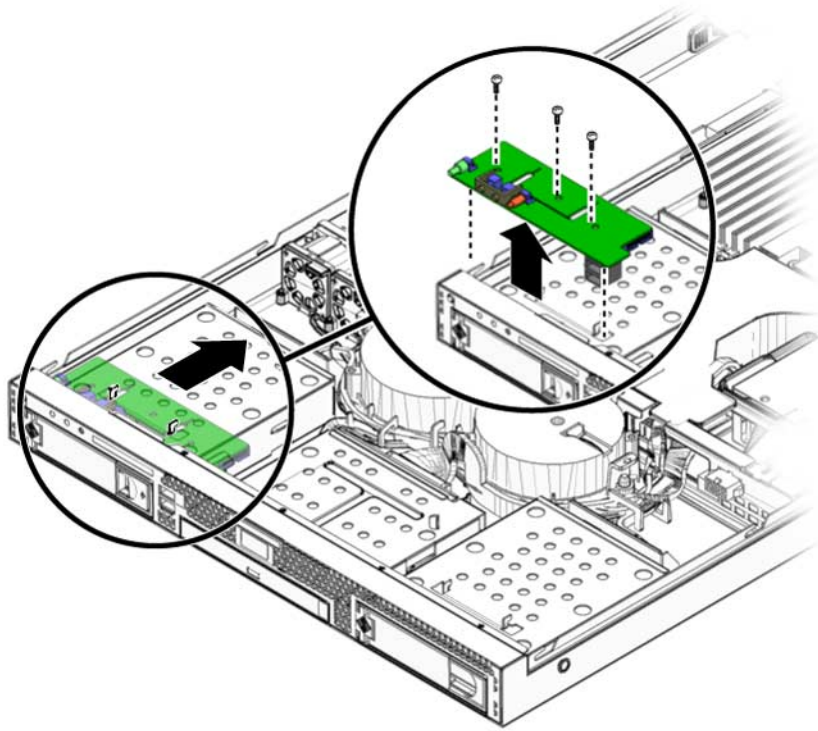
4.4.1 Replacing the I/O Board

The following procedures describe how to remove and install an I/O board.

▼ To Remove the I/O Board

1. **Power off the server, including any attached peripherals, and disconnect the server from the electrical outlet. Refer to [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.**
2. **Remove all cables connected to the I/O board.**
3. **Remove the screws securing the I/O board to the DVD cage.**

FIGURE 4-2 Removing the I/O Board

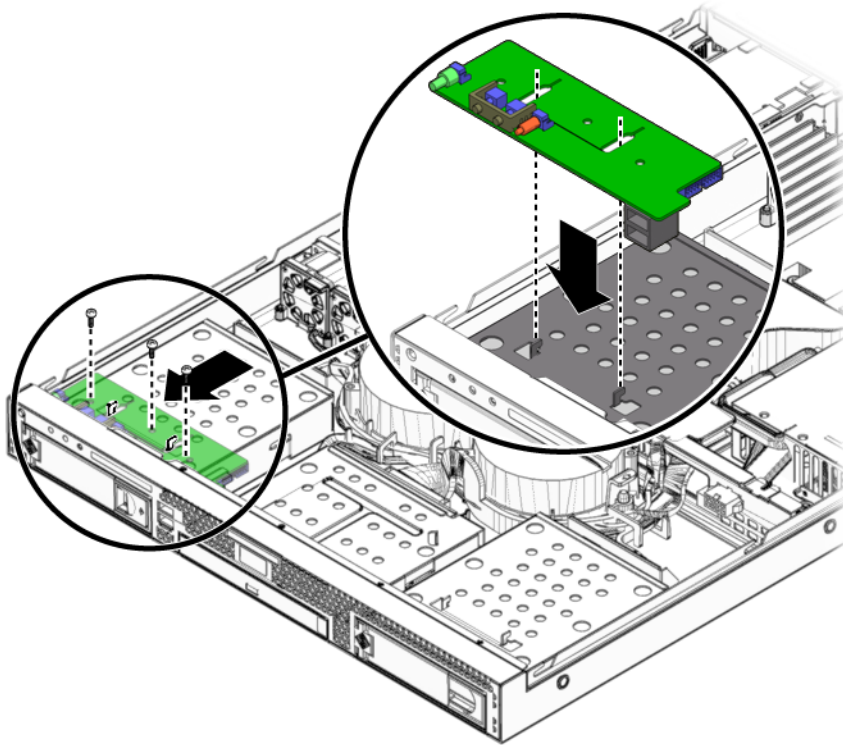


4. Pull the I/O board back slightly, then upwards to disengage the board from the guides on top of the HDD cage.

▼ To Install the I/O Board

1. Position the I/O board on top of the HDD cage so the openings on the board line up with the guides on top of the HDD cage.

FIGURE 4-3 Installing the I/O Board



2. Gently push the I/O board down to engage the guides and push the board forward to secure it.
3. Fasten the screws to secure the I/O board to the mounting bracket.
4. Reconnect the cables.
5. Before reinstalling the cover on the server, check the routing of all cables for obstructions.

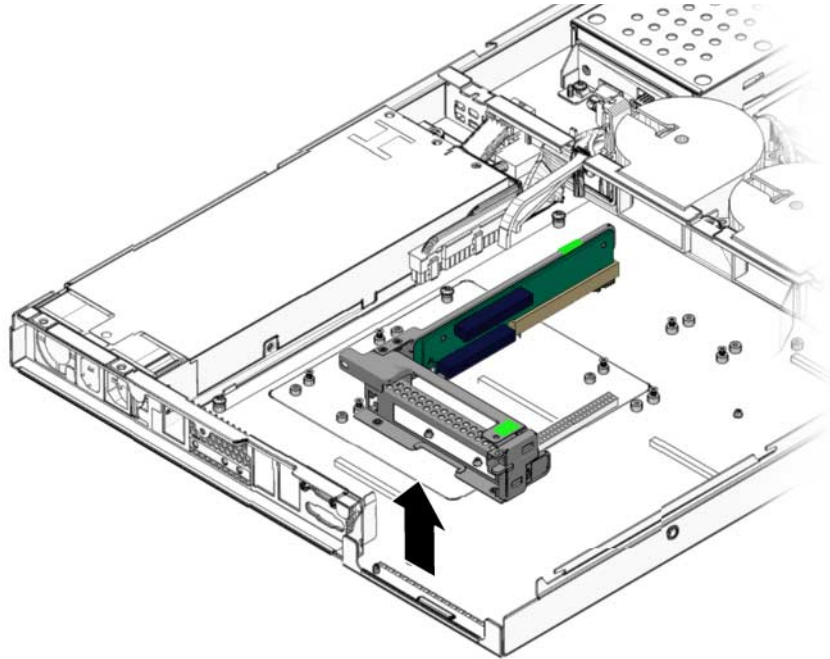
4.4.2 Replacing the PCIe Card and Riser Assembly

This section describes how to remove and install the PCIe card and riser assembly. The X2200 M2 server can accommodate either an x8 or an x16 riser assembly. The x8 is a low-profile, half-length dual connector card that supports up to two 25W cards. The x16 riser assembly is a low-profile half-length single connector card for the Nvidia Quadro Plex graphic cards. See

▼ To Remove the Riser Assembly and PCIe Card.

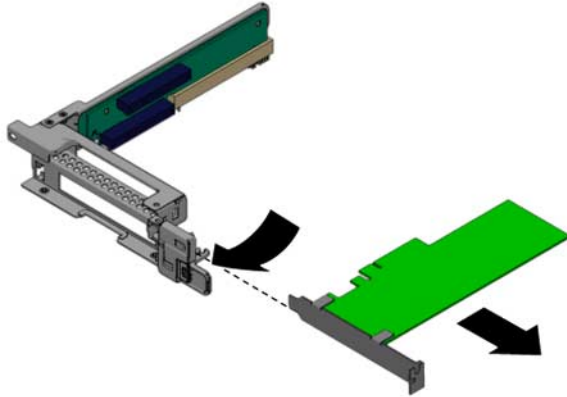
1. Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.
2. Placing your fingers on the two green areas on the riser assembly, pull the assembly upward and out of the chassis.

FIGURE 4-4 Removing the PCIe Card Riser Assembly



3. Unlatch the PCIe card and remove the card from the PCIe card riser assembly connector. See [FIGURE 4-5](#).

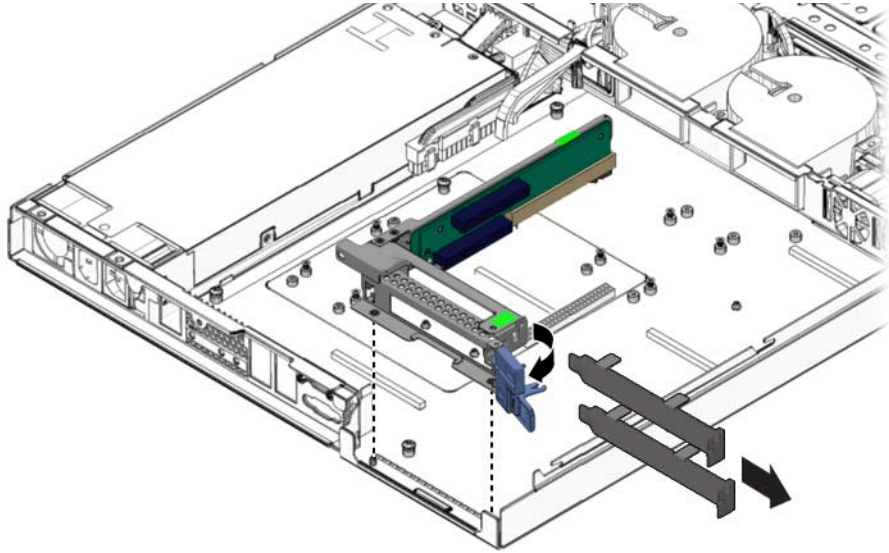
FIGURE 4-5 Removing a PCIe Card



▼ To Install the PCIe Card and Riser Card Assembly

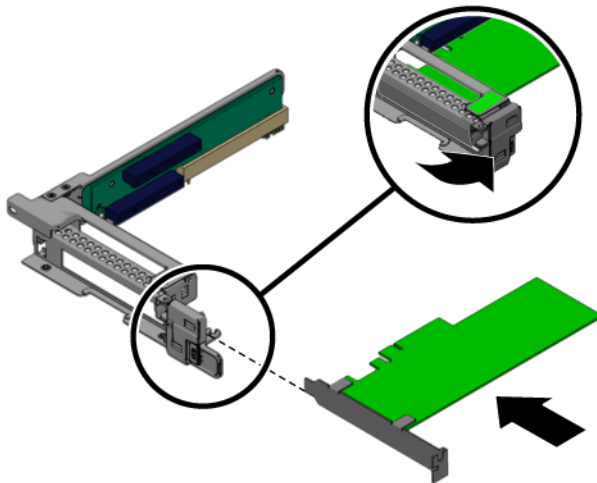
1. If necessary, remove the riser card filler panel. See [FIGURE 4-6](#)

FIGURE 4-6 Removing the PCIe Riser Card Filler Panels



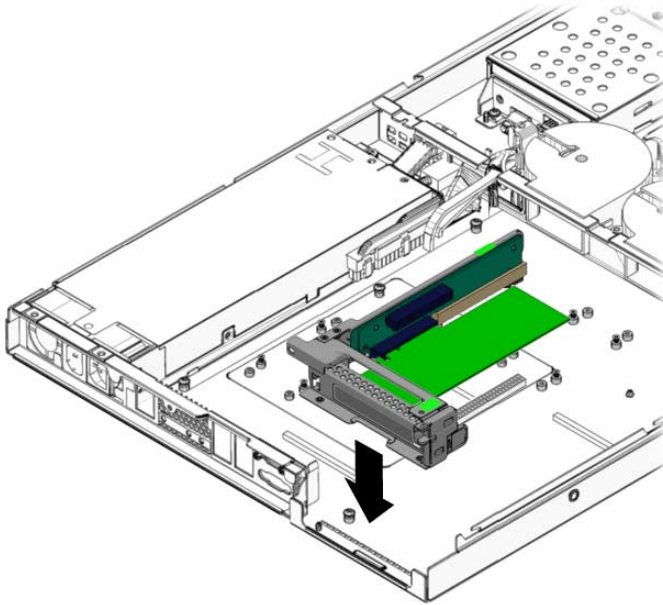
2. Insert the new PCIe card into the riser assembly and fasten the latch to secure it.

FIGURE 4-7 Installing a PCIe Card



3. Reinstall the riser assembly into the connector on the motherboard.

FIGURE 4-8 Installing the PCIe Card Riser Assembly



4. Check the routing of all cables for obstructions, and then reinstall the cover.

4.4.3 Replacing a Hard Disk Drive and Carrier

The following procedures describe how to remove and install a hard disk drive (HDD) and carrier.

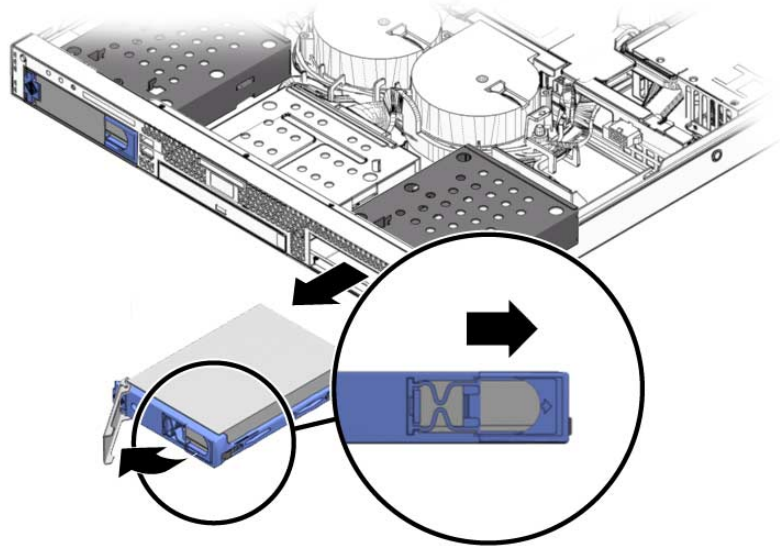
▼ To Remove an HDD and Carrier

1. If you are *not* using an integrated-mirroring (IM) configuration, you must power off the server before removing an HDD; it is not necessary to remove the cover. Power off the system as described in [Section 4.3, "Powering Off the Server and Removing the Cover"](#) on page 4-4.

If you are using an IM configuration, start with [Step 2](#).

2. Squeeze the release latch and carefully swing the arm to the left as far as it will go.

FIGURE 4-9 Removing a Hard Disk Drive



3. Grasp the carrier bezel with both hands and carefully pull the carrier out of the drive bay.

Note – Avoid using the arm to remove the carrier.

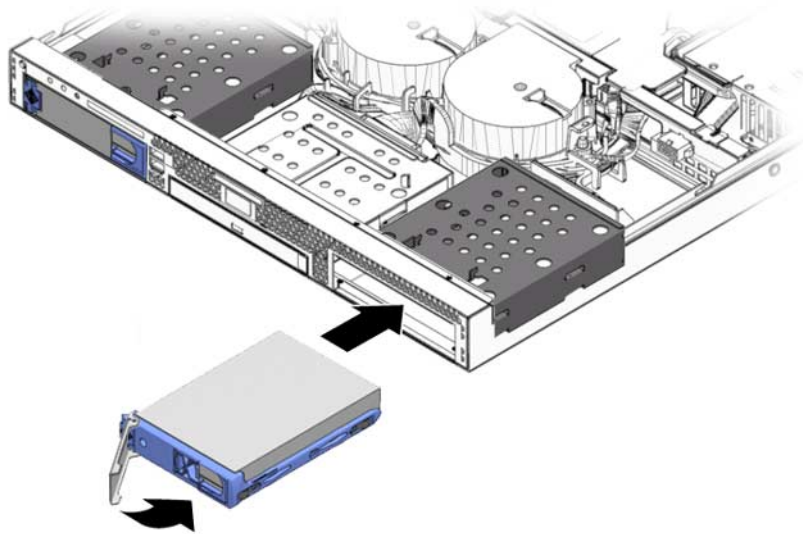
4. Reinsert the HDD and carrier into the server as described in [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12.

Note – If you are installing a new HDD, rather than replacing an already installed HDD, you will need to remove the empty carrier from the drive cage before installing the new HDD. See instructions for Removing an HDD and carrier.

▼ To Install the HDD and Carrier

1. Squeeze the release latch and carefully swing the arm to the left as far as it will go.

FIGURE 4-10 Installing the Hard Disk Drive



2. Grasping the body of the drive in both hands, carefully guide the connector end of the carrier into the drive bay, sliding the carrier into the bay until the arm engages and partially closes itself.
3. Push the arm forward and latch it to lock the carrier in place.

4.4.4 Installing an LSI PCIe Card and Cables

This section contains instructions on installing an LSI PCIe card. This card enables the following added functionality for the Sun Fire X2200 M2 server:

- Standalone SAS hard drive support
- RAID support using SAS hard drives
- RAID support using SATA hard drives

Use the appropriate procedure, depending on the hard drive format that you are using:

- [Section 4.4.4.1, "Installing the LSI Card to Support SAS Hard Drive Installation" on page 4-15](#)
- [Section 4.4.4.2, "Installing the LSI Card to Support SATA RAID" on page 4-18](#)

4.4.4.1 Installing the LSI Card to Support SAS Hard Drive Installation

If your system originally had SATA drives installed or came diskless, and you would like to install SAS drives, use the following procedure.

You will need to order the following components needed for the SAS drive installation:

- A LSI PCIe card
- A hard drive cable kit
- One or two SAS HDDs

The following procedure describes how to remove the current SATA installation and install the SAS components. If you started with a diskless system, you do not need to do Step 2.

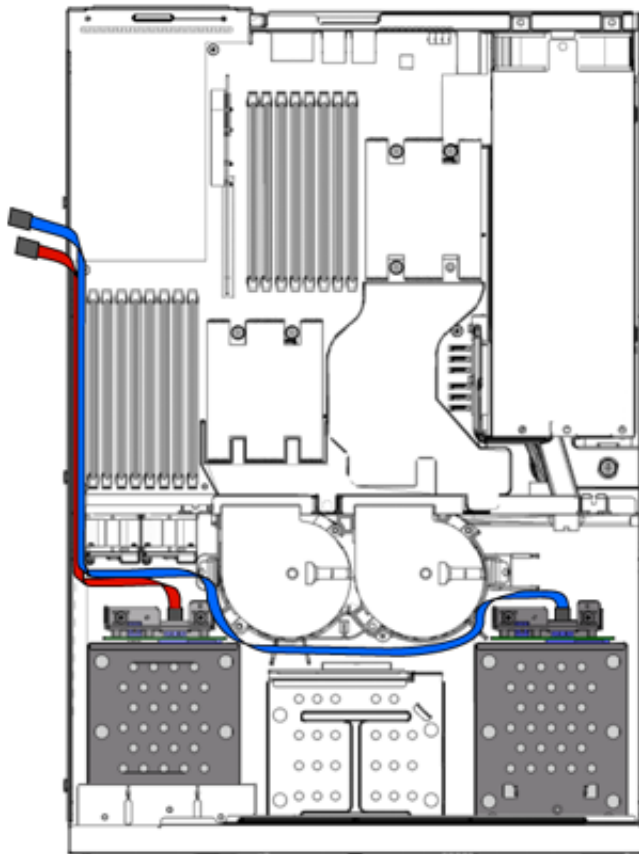
▼ To Install the LSI Card to Support SAS Hard Drive Installation

1. **Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.**
2. **Remove the current SATA hard drive(s) from the server, if necessary.**
See [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12.
3. **Remove the cables currently connected to the HDD backplanes and motherboard connectors. See [FIGURE 4-38](#) for the locations of the cables.**
4. **Install the new cables from the SAS cable kit. See [FIGURE 4-11](#).**

Note the following guidelines for installation:

- Connect the red cable to the HDD 0 backplane.
- Connect the blue cable to the HDD 1 backplane.
- Make sure to route the blue cable through the dual blower routing clips.

FIGURE 4-11 SAS Drive Cable Routing



5. Remove the riser assembly from the server.

See [“To Remove the Riser Assembly and PCIe Card.”](#) on page 4-9.

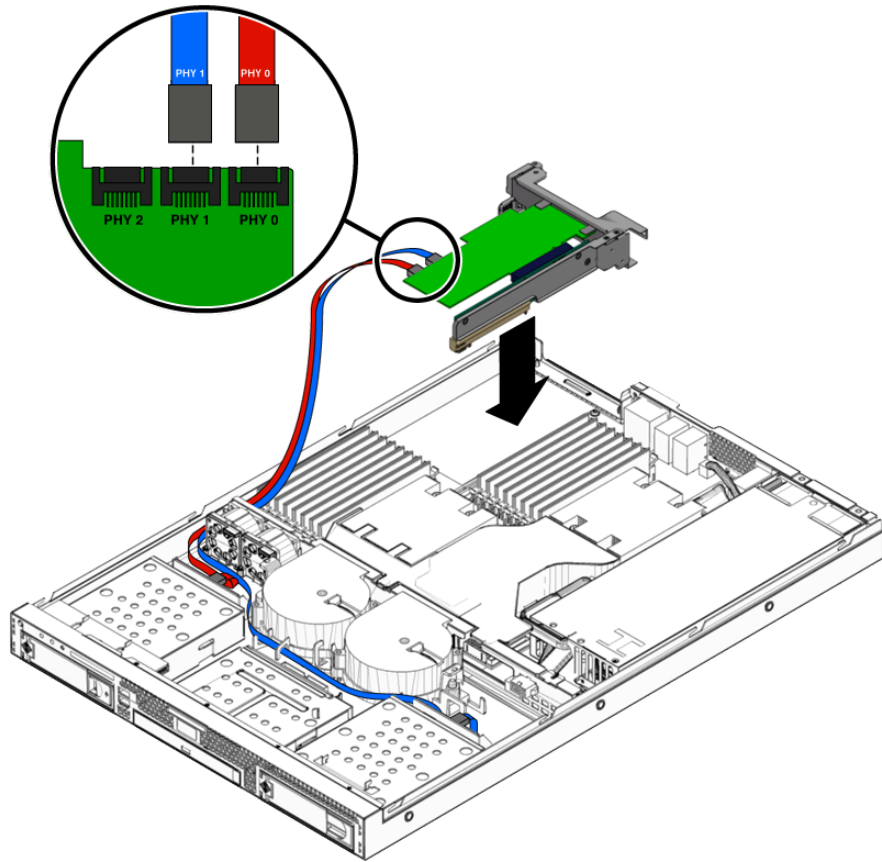
6. Install the LSI PCIe card into the riser assembly.

Do not install the riser card into the server yet. It will be easier to connect the cables with the card outside of the system.

7. Connect the SAS cables to the SAS card connectors. See [FIGURE 4-12](#).

- Connect the red cable to PHY 0.
- Connect the blue cable to PHY 1.

FIGURE 4-12 Installing an LSI PCIe Card



8. Install the riser assembly into the server.

See [“To Install the PCIe Card and Riser Card Assembly”](#) on page 4-10.

9. Replace the system cover.

10. Install the SAS hard drives

See [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12.

4.4.4.2 Installing the LSI Card to Support SATA RAID

This section describes how to add the LSI PCIe card and cables to a system using SATA hard disks. The LSI card will support SATA hard disks attached to it. This configuration will only be used for customers who require a true SATA RAID configuration. You will need to order the following components:

- A LSI PCIe card
- A hard drive cable kit
- Two SATA HDDs (if not already installed)

The following procedure describes how to add the LSI PCIe card and cables to connect to the SATA hard disks.

▼ To Install the LSI Card to Support SATA RAID

1. Power off the system and remove the cover as described in [Section 4.3](#), “Powering Off the Server and Removing the Cover” on page 4-4.

2. Remove the cables currently connected to the HDD backplanes and motherboard connectors.

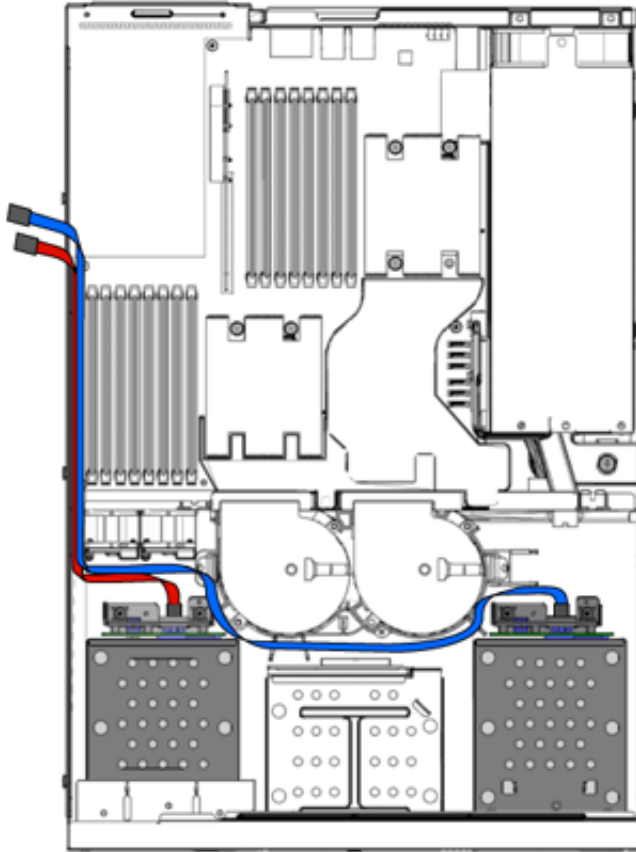
See [FIGURE 4-38](#) for the locations of the cables.

3. Install the new cables from the SAS cable kit. See [FIGURE 4-13](#).

Note the following guidelines for installation:

- Connect the red cable to the HDD 0 backplane.
- Connect the blue cable to the HDD 1 backplane.
- Make sure to route the blue cable through the dual blower routing clips.

FIGURE 4-13 SATA Drive Cable Routing



4. Remove the riser assembly from the server.

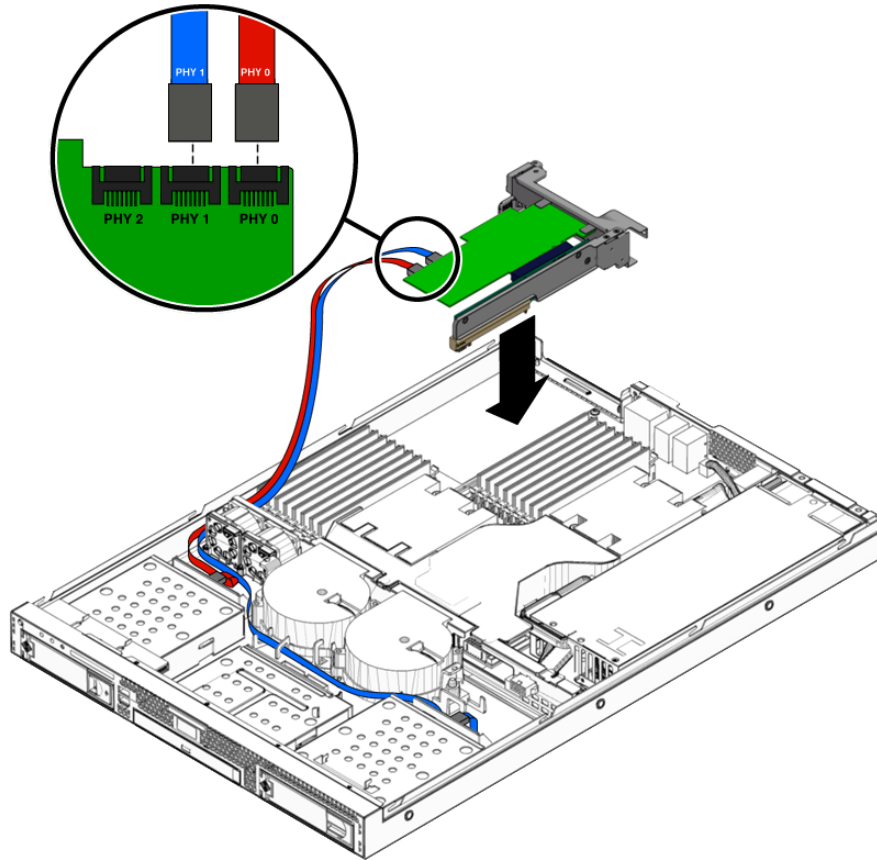
See [“To Remove the Riser Assembly and PCIe Card.”](#) on page 4-9.

5. Install the LSI PCIe card into the riser assembly.

Note – Do not install the riser card into the server yet. It will be easier to connect the cables with the card outside of the system.

6. **Connect the SATA cables to the LSI PCIe card connectors.** See [FIGURE 4-14](#).
 - Connect the red cable to PHY 0.
 - Connect the blue cable to PHY 1.

FIGURE 4-14 Installing an LSI PCIe Card



7. **Install the riser assembly into the server.**
See [“To Install the PCIe Card and Riser Card Assembly”](#) on page 4-10.
8. **Replace the system cover.**
9. **Install the SATA hard drives, if necessary.**
See [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12.

4.4.5 Replcaing an ODD Drive Assembly

The following procedure describes how to remove and install the optical disk drive (ODD) assembly. If you are not replacing a DVD drive, go straight to [Section 4.4.3, “Replacing a Hard Disk Drive and Carrier”](#) on page 4-12.

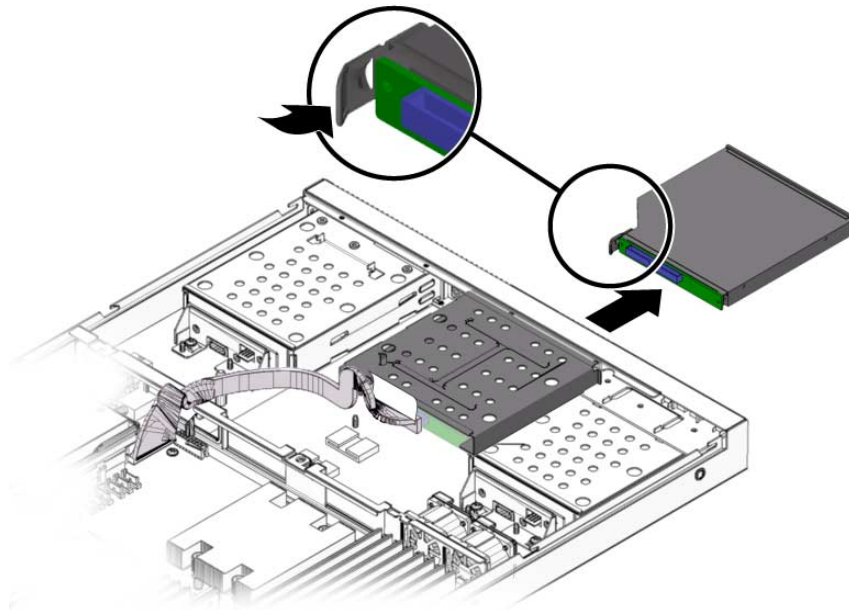
▼ To Remove the ODD Drive Assembly

1. Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.
2. Unfasten the drive ribbon cable from the ODD drive.



Caution – Use care with the small flat cables. They are extremely fragile.

FIGURE 4-15 Removing the DVD Drive Assembly



3. Push the latch on the back of the ODD drive toward the drive until the ODD drive springs forward out of the chassis.
4. Pull the ODD drive out the front of the chassis.



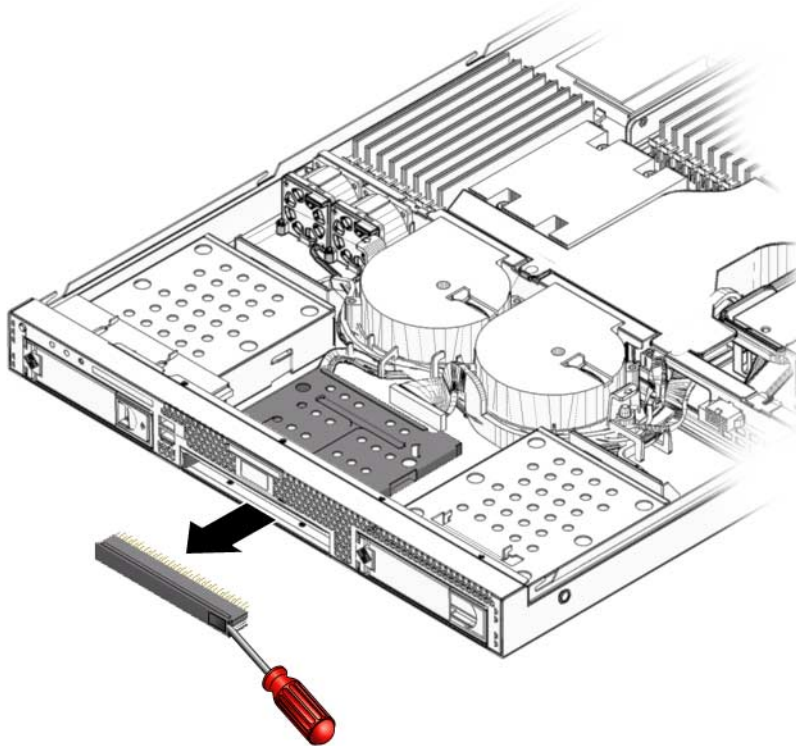
Caution – Move the assembly by grasping it by its sides. Do not push on the DVD-ROM tray.

▼ To Install the ODD Drive Assembly

1. If necessary, remove the filler panel in front of the ODD drive slot on the front panel.

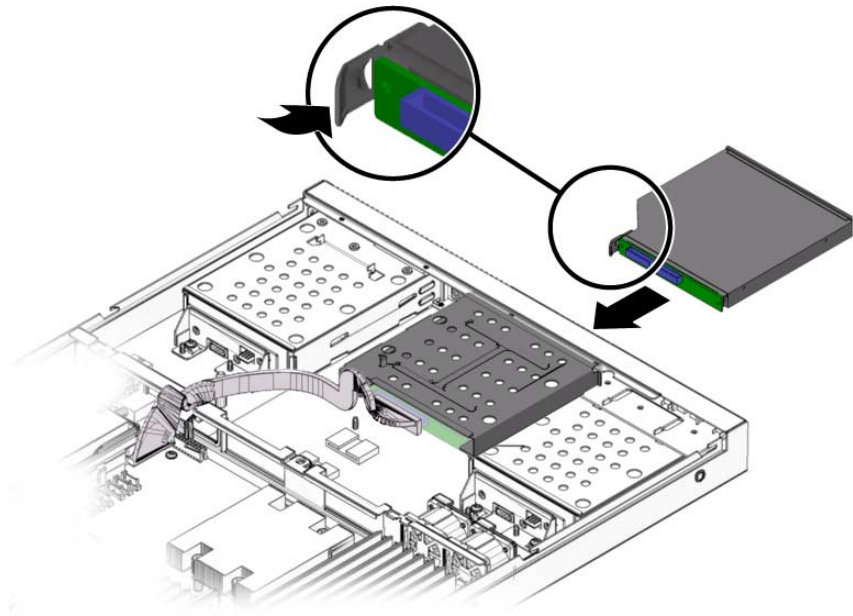
Put your finger or a screw driver behind the slot on the right side of the filler panel and pull the panel outward.

FIGURE 4-16 Removing the DVD Filler Panel



2. Position the ODD drive in front of the ODD drive slot on the front panel.
3. Push the ODD drive into the drive slot until the drive clicks into place.

FIGURE 4-17 Installing the DVD Drive Assembly



4. Reinstall the ODD drive cable.
5. Check the routing of all cables for obstructions, and then reinstall the cover.

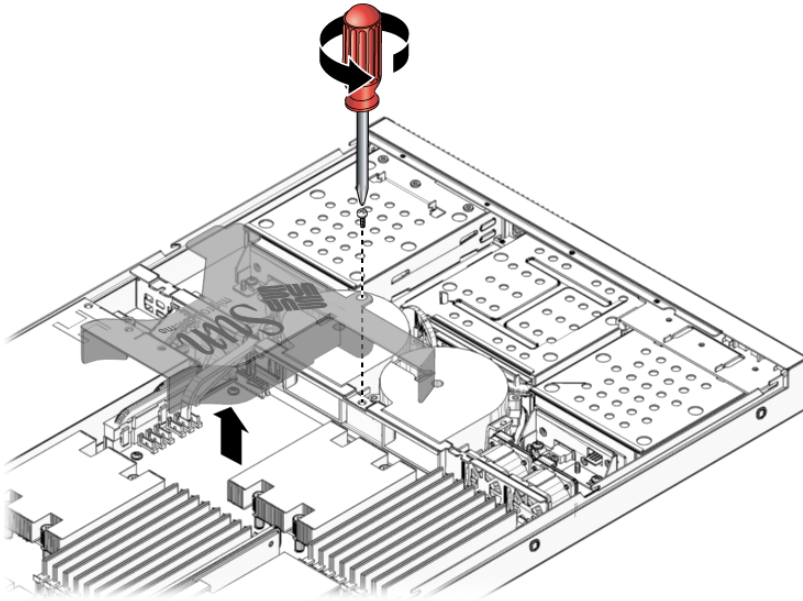
4.4.6 Replacing an Air Duct

The following procedures describe how to remove and install the system air duct.

▼ To Remove the Air Duct

1. Power off the system and remove the cover as described in [Section 4.3, "Powering Off the Server and Removing the Cover"](#) on page 4-4.
2. Remove the screw fastening the air duct to the chassis divider.

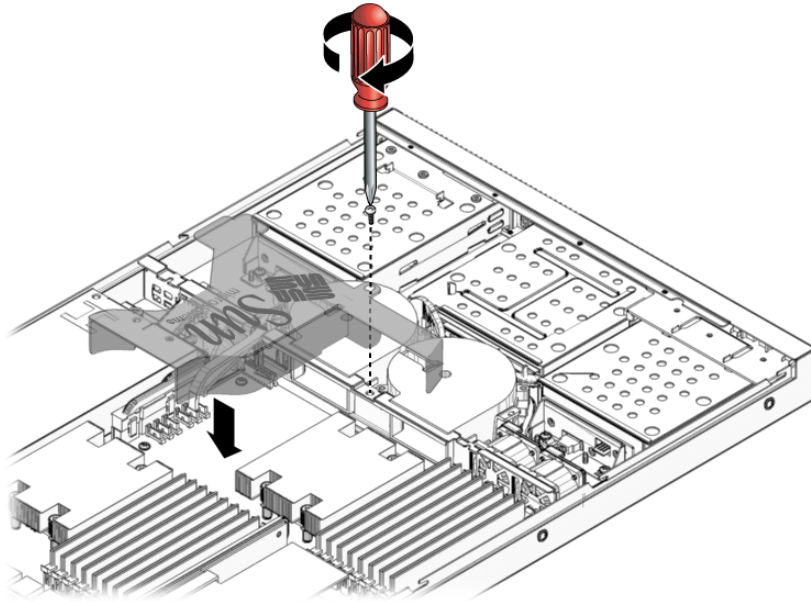
FIGURE 4-18 Air Duct Removal



▼ To Install the Air Duct

1. Position the air duct as shown in [FIGURE 4-19](#), aligning the baffle with the screw hole and opening in chassis divider.
2. Fasten the screw that attaches the air duct to the chassis divider.

FIGURE 4-19 Air Duct Installation



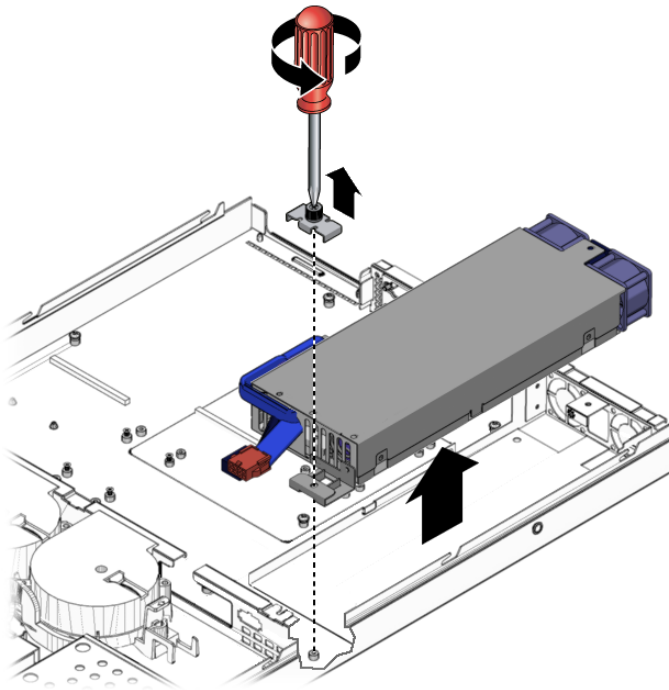
4.4.7 Replacing the Power Supply

The following procedures describe how to remove and install the power supply.

▼ To Remove the Power Supply

1. **Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.**
2. **Remove the air duct. See [Section 4.4.6, “Replacing an Air Duct”](#) on page 4-23.**
3. **Disconnect the two power supply cables from the motherboard and power supply connections to the hard drives.**
4. **Remove the bracket with the captive screw.**
5. **Remove the power supply.**

FIGURE 4-20 Removing the Power Supply

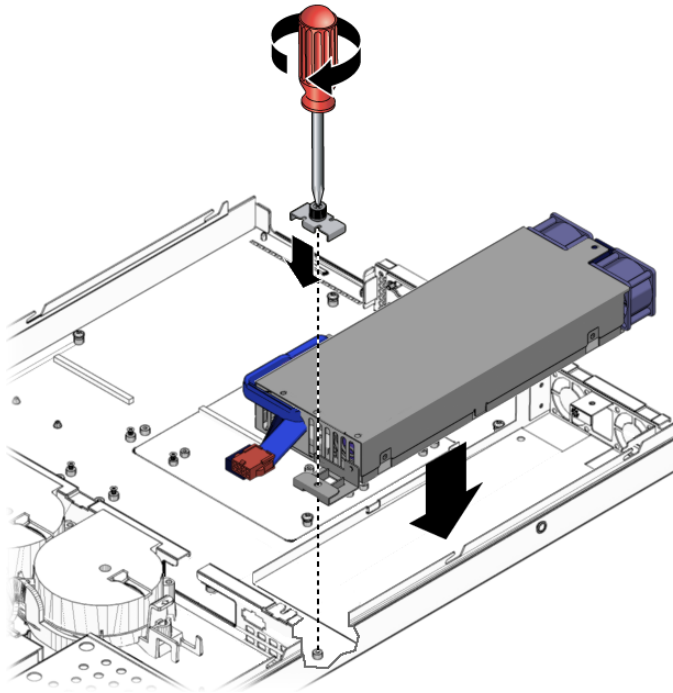


6. Lift the power supply out of the chassis.

▼ To Install the Power Supply

- 1. Position the power supply over the chassis power-supply cage.**
- 2. Insert the power supply into the chassis and push it forward so that it is flush with the back panel.**
- 3. Install the power supply bracket on top of the power supply tab and fasten the captive screw.**

FIGURE 4-21 Installing the Power Supply



4. Connect two of the power supply cables to the motherboard and one cable to the SATA backplanes. See [FIGURE 4-38](#).
5. Replace the air duct. See [Section 4.4.6, “Replacing an Air Duct”](#) on page 4-23.
6. Check the routing of all cables for obstructions, and then reinstall the cover.

4.4.8 Replacing Single Fans

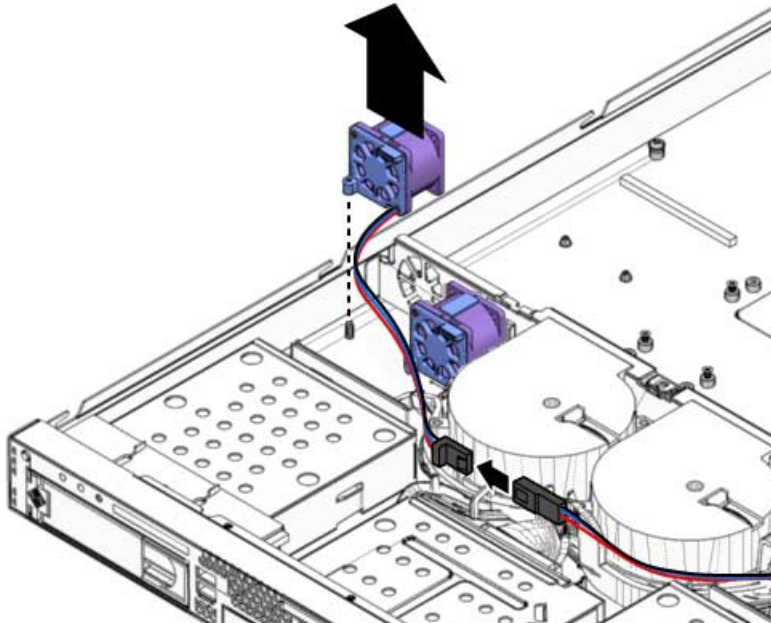
The following procedures describe how to remove and install a single system fan module.

▼ To Remove the Fans

1. Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.
2. Identify the fan to be replaced.

3. Pull the fan upward to remove it.

FIGURE 4-22 Removing a Fan Module



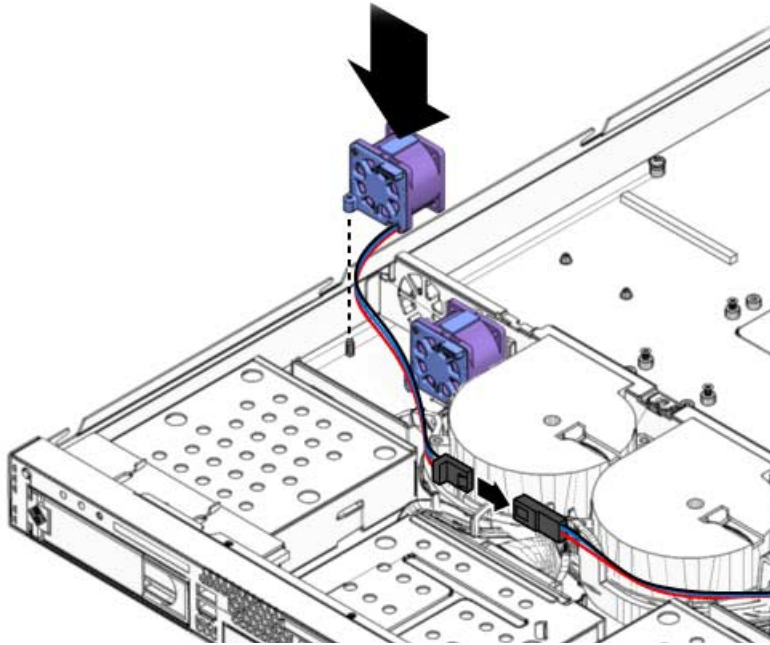
4. Unplug the fan's power connector from the connector on the fan harness.

Note – Note exactly which motherboard connector to which the fan was connected. If you connect a fan to an incorrect connector, the SP cannot correctly identify a fan failure.

▼ To Install a Fan Module

1. Position the fan so that the arrow on top of the fan casing is facing the middle chassis divider.
2. Place the fan in the chassis so that it fits over the small guideposts.

FIGURE 4-23 Installing a Fan Module



3. Gently push the fan down to secure it to the chassis.
4. Connect the fan connector to the appropriate connector on the fan harness.
5. Check the routing of all cables for obstructions, and then reinstall the cover.

4.4.9 Replacing the Dual Blower Module

The following procedures describe how to remove and install a dual blower module.

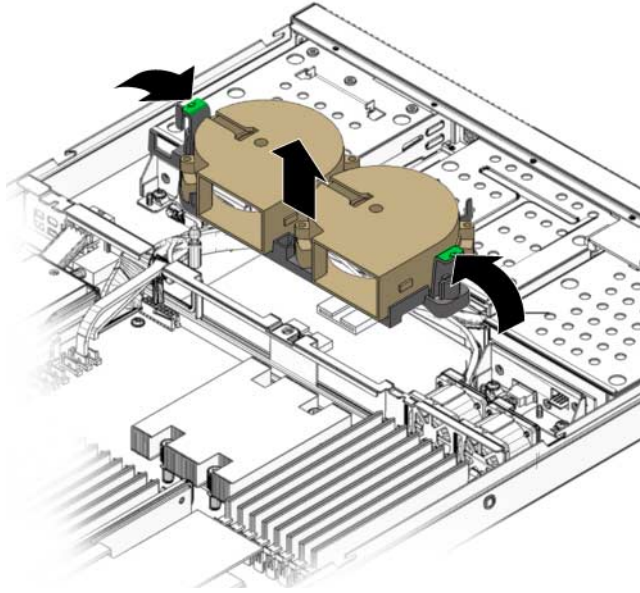
▼ To Remove a Dual Blower Module

1. **Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.**
2. **Remove the single fan connectors from the harness connectors.**

Note exactly which motherboard connector to which the fan was connected. If you connect a fan to an incorrect connector, the SP cannot correctly identify a fan failure.

3. Push in the green tabs on both sides of the dual blower module and simultaneously pull the fan module upward to remove it.

FIGURE 4-24 Removing a Dual Blower Module

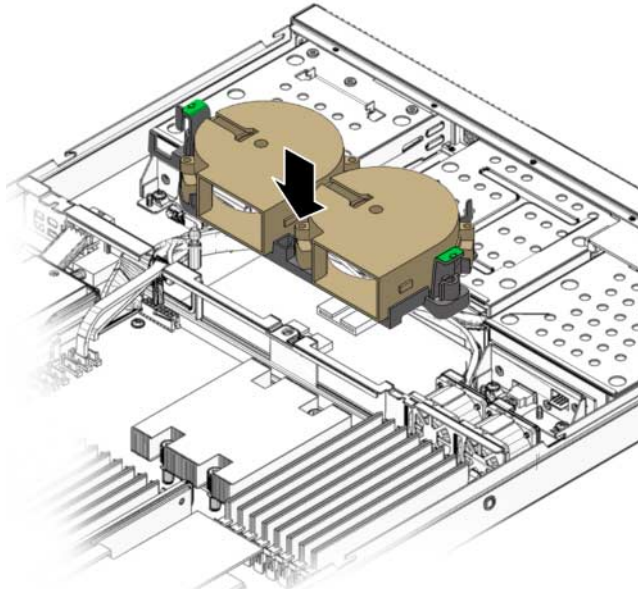


4. Unplug the fan's power connector from the motherboard.

▼ To Install a Dual Blower Module

1. Position the dual fan module so that it fits over the guideposts and the duct opening fits into the cutouts in the chassis divider.

FIGURE 4-25 Installing a Dual Blower Module



2. Gently push the blower module down, until you hear the side tabs click into place.
3. Connect the blower connectors to the appropriate connector on the motherboard.
4. Connect each of the single fan connectors to the corresponding fan harness connector.
5. Route the cables through the wiring retainers on the blower module.
6. Check the routing of all cables for obstructions, and then reinstall the cover.

4.4.10 DIMM Population Rules

Note – Keep in mind the following information and rules when you use the procedures in this section to replace or add DIMMs to the server.

- Eight registered DDR2 DIMMs are supported per CPU.
- DIMMs must be installed in matched pairs (one bank at a time). The two DIMMs in a bank must be of the same size, type, and vendor.

- DIMM 0 is farthest from the CPU.
- Populate the slots in order from slot 0 to slot 7.

4.4.11 Replacing Memory Modules

The following procedure describes how to remove and install dual inline memory modules (DIMMs).

▼ To Remove a DIMM

1. **Power off the system and remove the cover as described in [Section 4.3](#), “Powering Off the Server and Removing the Cover” on page 4-4.**
2. **Locate the DIMM connector in which you will remove and install a memory module.**

If your system has a dual-CPU configuration, it will have two banks of DIMMs. Bank 0 is the bank closest to CPU 0 and Bank 1 is the bank closest to CPU 1. See [FIGURE 4-27](#) and [FIGURE 4-26](#).

FIGURE 4-26 Bank 0 DIMM Slot Locations

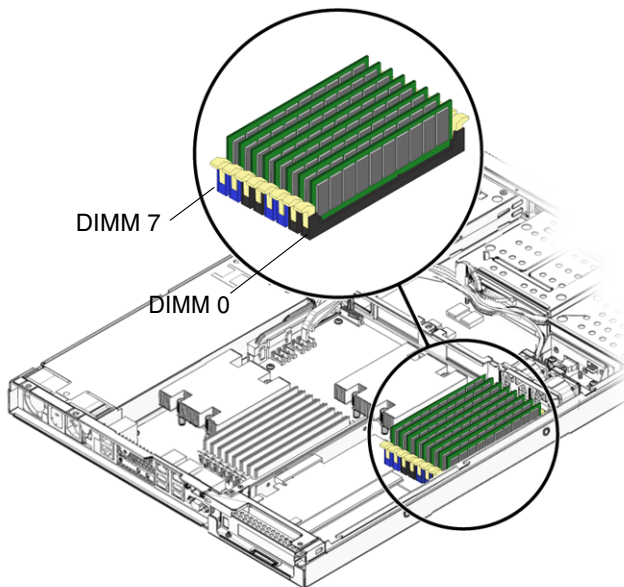
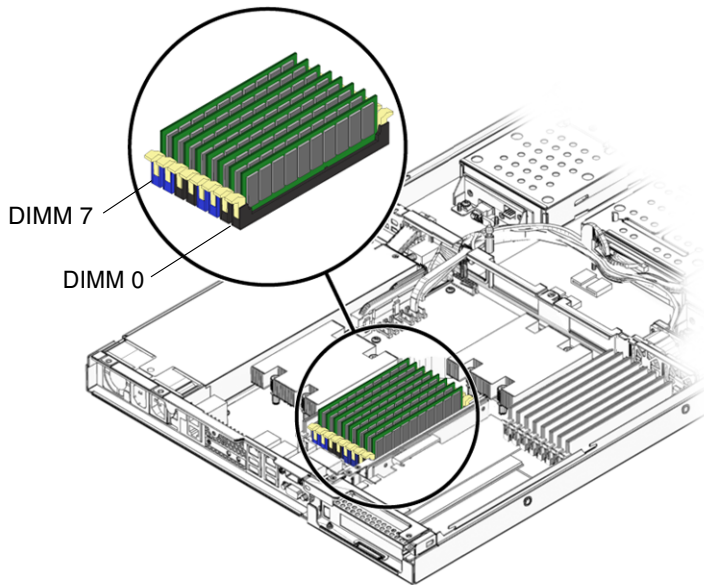
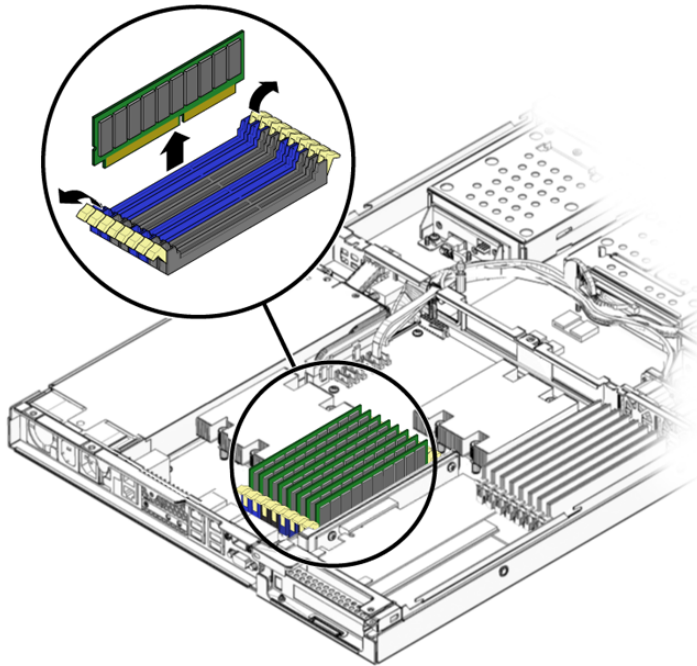


FIGURE 4-27 Bank 1 DIMM Slot Locations



3. Remove a DIMM by pressing down on the ejector bars at both ends of the memory module's socket (see [FIGURE 4-28](#)).

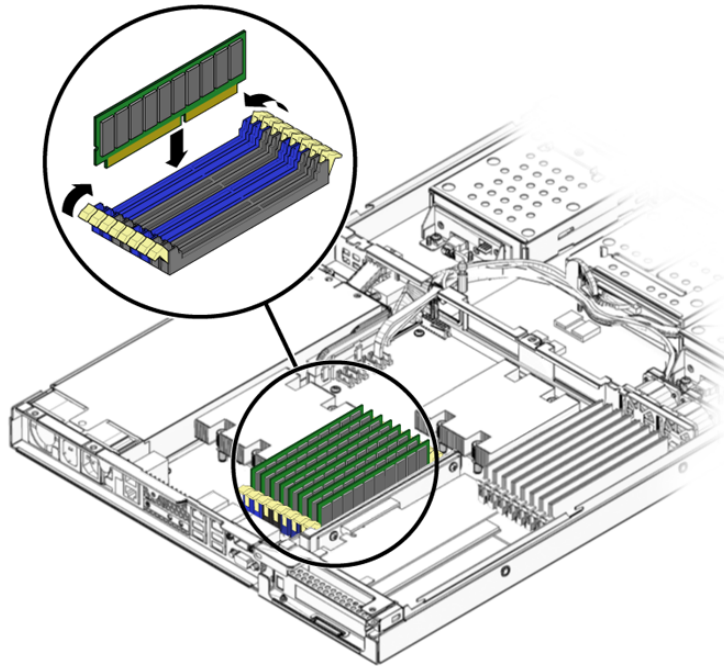
FIGURE 4-28 Removing a DIMM



▼ To Install a DIMM

1. Refer to Section , “The following procedure describes how to remove and install dual inline memory modules (DIMMs).” on page 4-32 before installing DIMMs.
2. Ensure that the DIMM socket ejectors are open (rotated outward) to allow the new module to be inserted.
3. Align the DIMM’s edge connector with the alignment key and insert the memory module into the connector.

FIGURE 4-29 Installing a DIMM



4. Using both thumbs, press the DIMM straight down into the DIMM slot until both ejector levers click, locking the DIMM in the DIMM slot.
 - The DIMMs must be inserted evenly, straight down along the DIMM slot until locked into place.
 - The DIMM is seated when you hear a click and the DIMM ejector levers are in the vertical position.

Note – The manufacturer and capacity of both modules in the same memory bank (Banks 1–4) must be identical.

5. Check the routing of all cables for obstructions, and then reinstall the cover.

4.4.12 Replacing System Battery

The system battery is a common CR2032 calculator battery.

You might need to replace the system battery if you know it is weak or if after any period of AC power loss, the BIOS loses its CMOS settings, or if the time-of-day clock loses time.



Caution – Removing the battery causes the server to revert to the factory default BIOS settings, regardless of how the server boot options have been set up using the System Setup Utility or the BIOS setup.



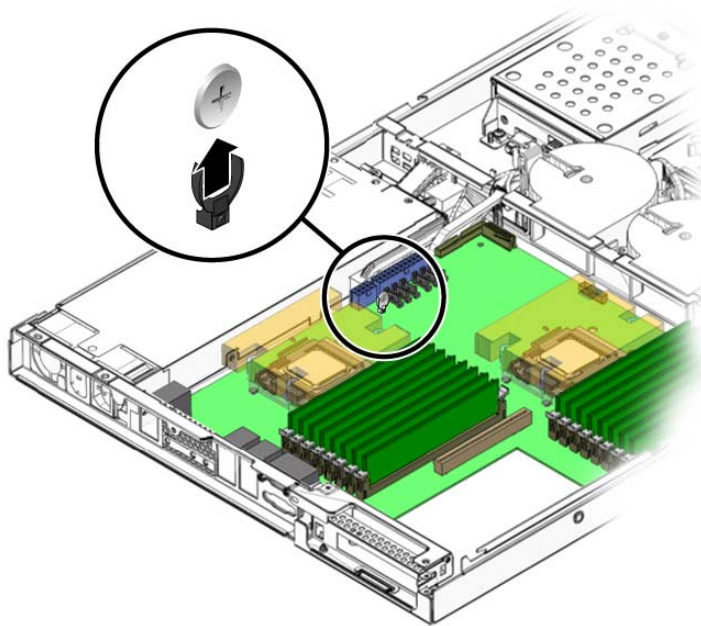
Caution – Do not attempt to open or service batteries. The battery contains lithium and can explode if not properly used, handled, or disposed of.

▼ To Remove the System Battery

1. Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover”](#) on page 4-4.
2. Remove the air duct as shown in [Section 4.4.6, “Replacing an Air Duct”](#) on page 4-23.

3. Remove the system battery by pulling it up and out of the holder (see [FIGURE 4-30](#) for the location).

FIGURE 4-30 Removing the System Battery

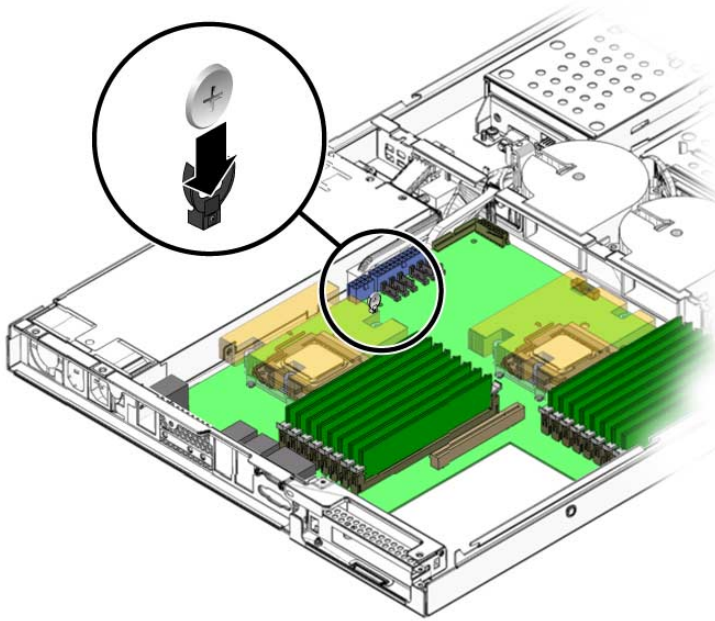


Caution – Do not dispose of the battery with regular waste. Discard used batteries according to the manufacturer’s instructions or contact your local waste-disposal agency for the location of the nearest battery deposit site.

▼ To Install the System Battery

1. Insert the new system battery into the holder with the side labeled “+” facing away from the power supply.

FIGURE 4-31 Installing the System Battery



Note – Replace the battery only with the identical model.

2. Check the routing of all cables for obstructions.
3. Reinstall the air baffle as shown in [Section 4.4.6, “Replacing an Air Duct”](#) on [page 4-23](#).
4. Replace the cover.

4.4.13 Replacing a CPU and Heatsink

The following procedure describes how to remove and install a CPU. The Sun Fire X2200 M2 server supports both single- and dual-CPU configurations.

Note – Replacement of a CPU and heatsink should only be done by trained service personnel. If you are adding a second CPU to a single CPU configuration, see [Section 4.4.13, “Replacing a CPU and Heatsink” on page 4-39](#).

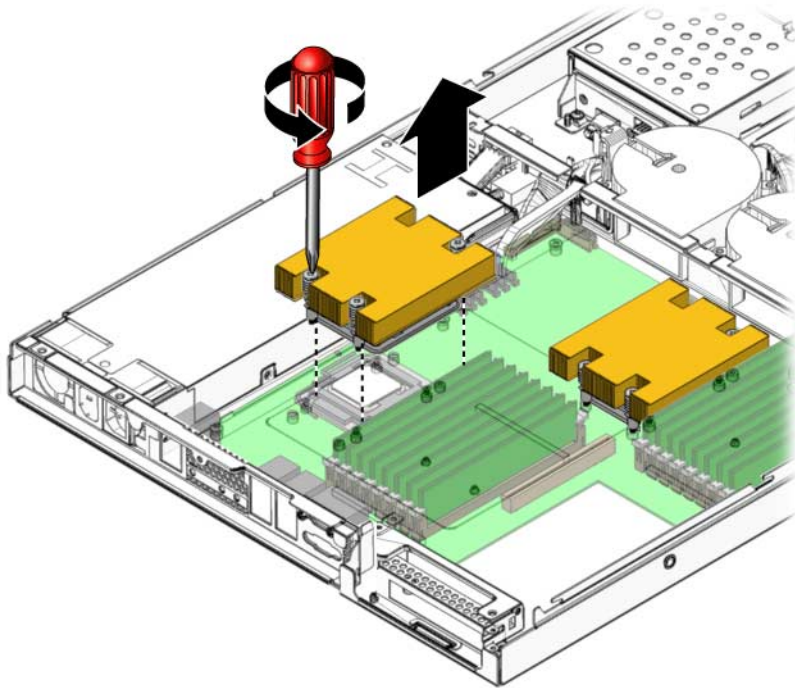


Caution – Observe the appropriate ESD precautions in [Section 4.2.1, “ESD Precautions” on page 4-2](#) when handling the CPU.

▼ To Remove a CPU and Heatsink

1. **Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover” on page 4-4](#).**
2. **Unfasten the four screws securing the heatsink to the board (see [FIGURE 4-32](#)).**

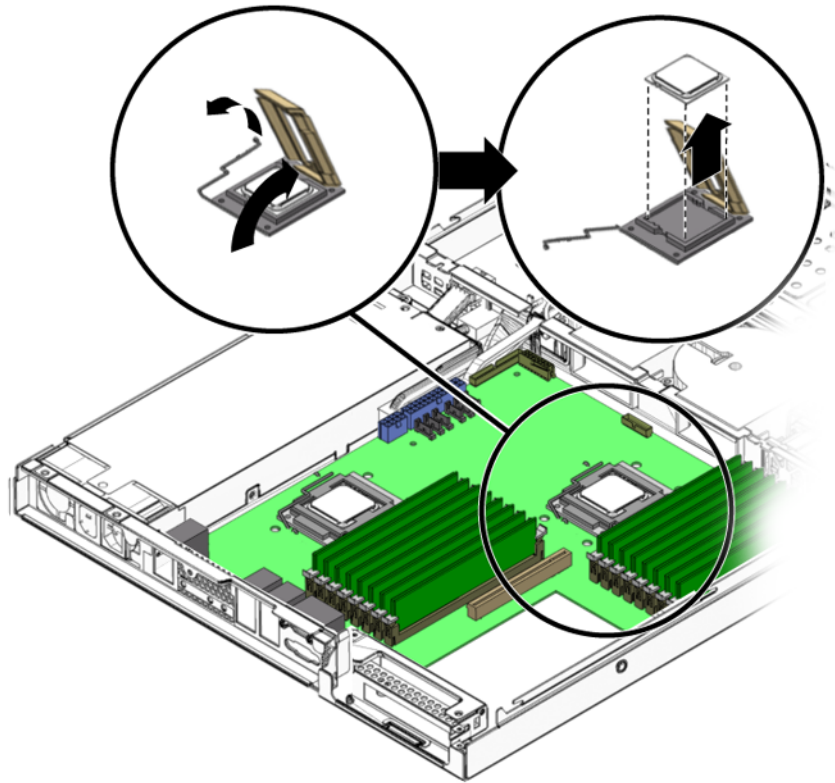
FIGURE 4-32 Removing the Heatsink



Caution – The heatsink can become extremely hot. Be sure it has had sufficient time to cool before handling.

3. Twist the heatsink slightly to the right or left to break the seal with the thermal grease.
4. Lift the heatsink away from the CPU.
5. Place the heatsink upside-down on a flat surface to prevent the thermal grease from contaminating other components.
6. Pull the socket release lever up to the fully open, perpendicular position.
7. Open the CPU cover.

FIGURE 4-33 Removing the CPU



8. Lift the CPU out of the socket, leaving the release lever in the open position.

Note – Ensure that no thermal grease that might be left from the heatsink comes into contact with the CPU socket or underside of the CPU chip.

▼ To Install a CPU and Heatsink

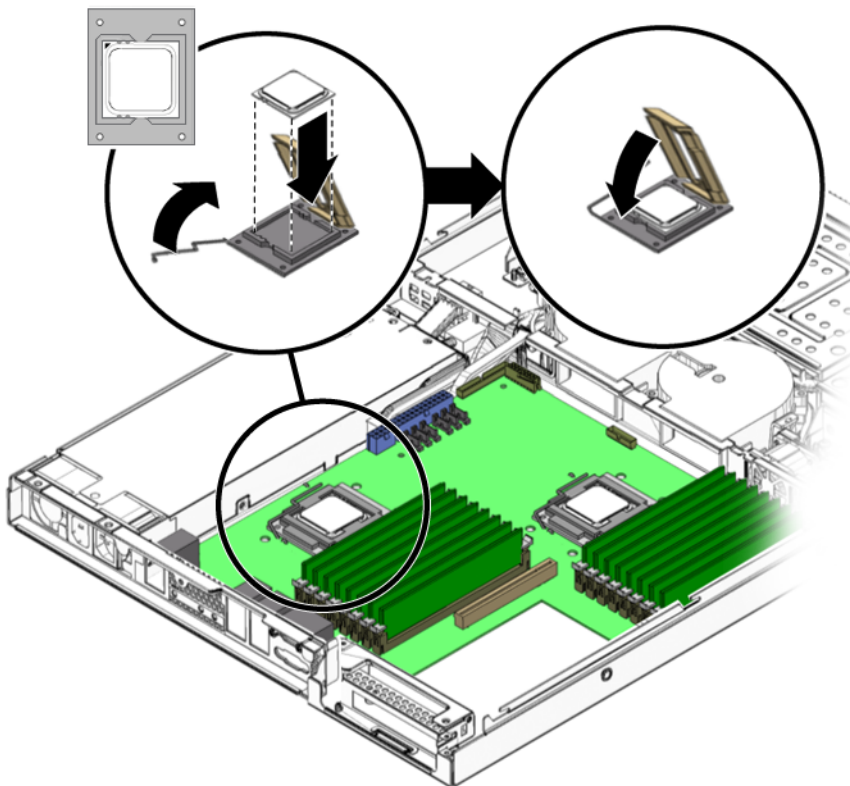
Note – Follow these steps to install a CPU and heatsink if you are replacing a CPU. If you want to install a new CPU, see [Section 4.4.13, “Replacing a CPU and Heatsink”](#) on page 4-39.



Caution – Observe the appropriate ESD precautions in [Section 4.2.1, “ESD Precautions”](#) on [page 4-2](#) when handling the CPU.

1. Unpack the new CPU.
2. If you are installing a second CPU into a formerly single-CPU system, you will need to remove the socket cover before installing the new CPU
3. Ensure that the socket release lever is in the fully open, perpendicular position and the CPU cover is open (see [FIGURE 4-34](#)).
4. Align the small triangle, on the upper left corner of the CPU, with the triangle on the corner of the socket.

FIGURE 4-34 Installing the CPU



5. Insert the CPU into the socket.



Caution – If the CPU is correctly aligned, you should be able to easily insert the CPU into the socket. If you feel more than minimal resistance, stop and recheck the alignment. Forcing a misaligned CPU into the socket can permanently damage the device.

6. When the CPU is fully seated in the socket, close the CPU cover.

Note – The CPU cover might not align correctly with the chip, after it is installed. If this happens open the cover, and push it slightly to the side to better align it with the chip, and reclose the cover.

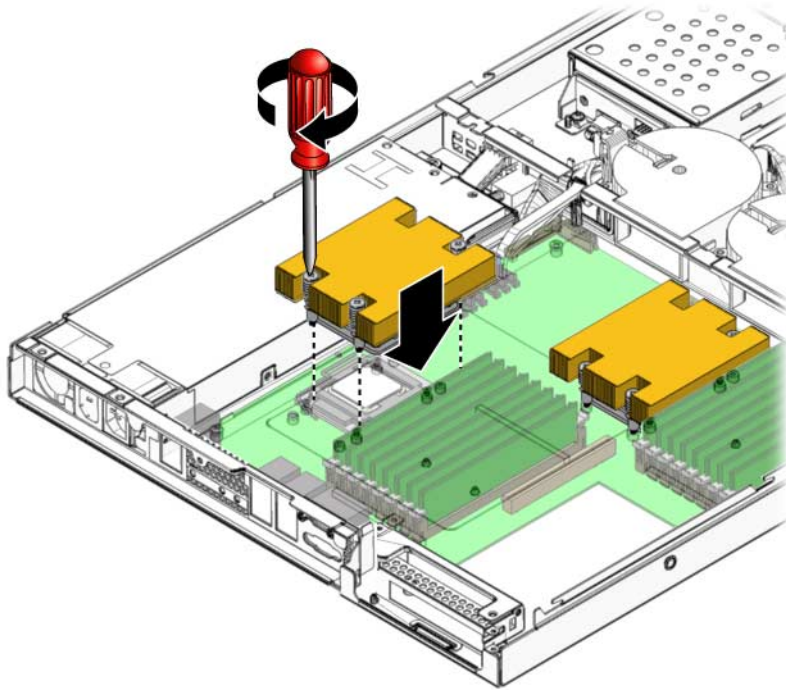
7. Rotate the socket release lever down until it snaps into place, securing the CPU in the socket.
8. Use the syringe to apply approximately 0.1 ML/CC of thermal grease in a circular pattern to the top of the CPU.
9. Gently distribute the thermal grease and remove any excess so that only an extremely thin, uniform layer remains. If any voids or crevices appear that could lead to air pockets, reapply the grease until you achieve a thin but compact consistency.
10. Use an alcohol pad to remove all thermal grease from the bottom of the heatsink.
11. Inspect the heatsink for dust and lint. Clean if necessary.
12. Carefully position the heatsink on the CPU, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease.



Caution – If the heatsink is moved too much during its installation, the layer of thermal grease may become uneven, leading to component damage.

13. Fasten the four screws attaching the heatsink to the motherboard. See [FIGURE 4-35](#).

FIGURE 4-35 Installing the Heatsink



14. Reinstall the cover.

▼ To Install a New CPU and Heatsink

Note – Replacement of a CPU and heatsink should only be done by trained service personnel. If you are replacing an already installed CPU, rather than adding a new one, follow the instructions in [Section 4.4.13, “Replacing a CPU and Heatsink”](#) on [page 4-39](#).

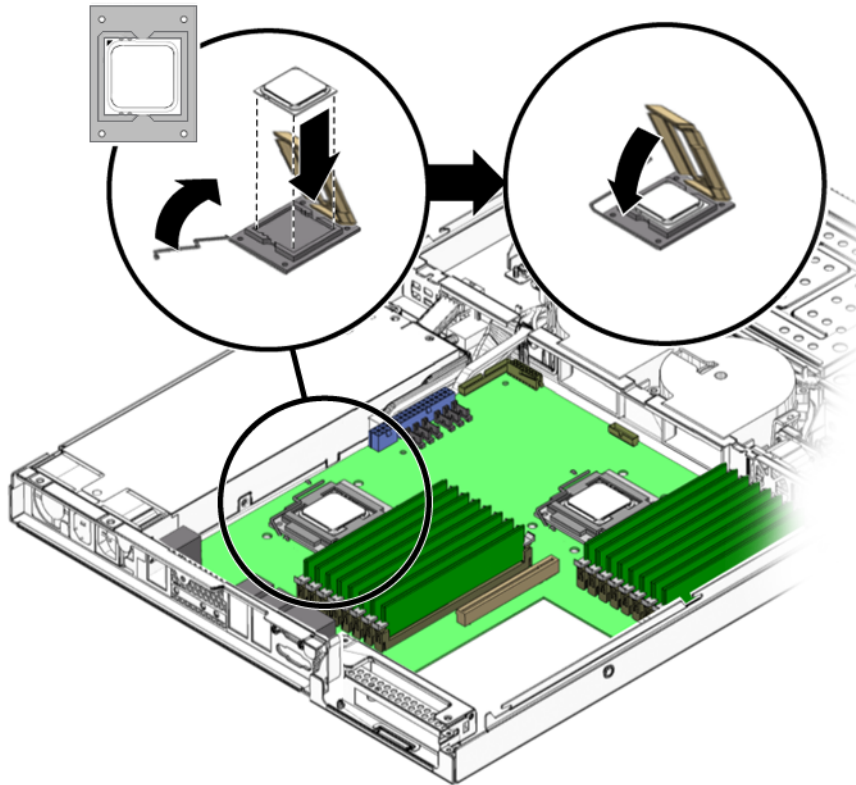


Caution – Observe the appropriate ESD precautions in [Section 4.2.1, “ESD Precautions”](#) on [page 4-2](#) when handling the CPU.

1. Unpack the new CPU.

2. If you are installing a second CPU into a formerly single-CPU system, you will need to remove the socket cover before installing the new CPU.
3. Ensure that the socket release lever is in the fully open, perpendicular position and the CPU cover is open (see [FIGURE 4-34](#)).
4. Align the small triangle, on the top left corner of the CPU, with the triangle on the corner of the socket.

FIGURE 4-36 Installing the CPU



5. Insert the CPU into the socket.



Caution – If the CPU is correctly aligned, the you should be able to easily insert the CPU into the socket. If you feel more than minimal resistance, stop and recheck the alignment. Forcing a misaligned CPU into the socket can permanently damage the device.

6. When the CPU is fully seated in the socket, close the CPU cover.

Note – The CPU cover might not align correctly with the chip, after it is installed. If this happens open the cover, and push it slightly to the side to better align it with the chip, and reclose the cover.

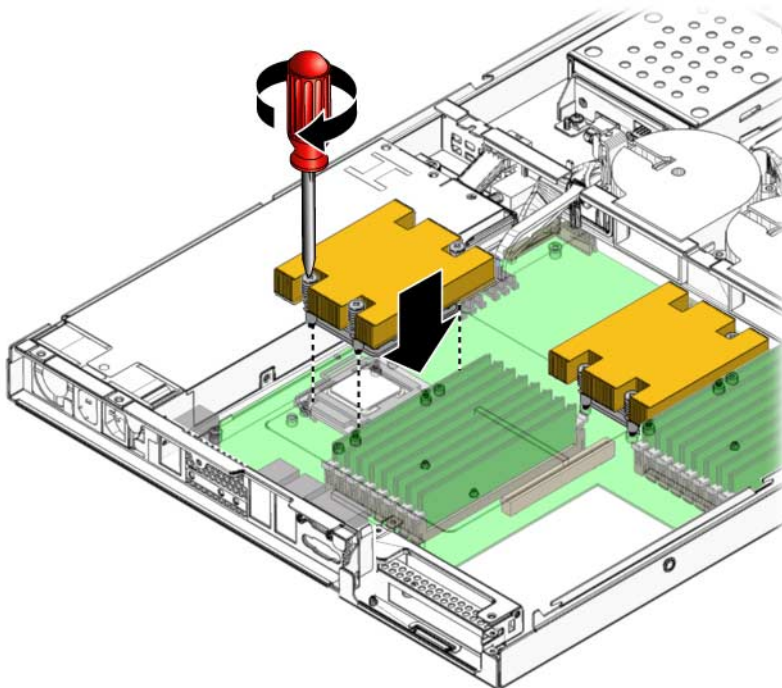
7. Rotate the socket release lever down until it snaps into place, securing the CPU in the socket.
8. Inspect the heatsink for dust and lint. Clean if necessary.
9. Carefully position the heatsink on the CPU, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease.



Caution – If the heatsink is moved too much during its installation, the layer of thermal grease may become uneven, leading to component damage.

10. Fasten the four screws attaching the heatsink to the motherboard. See [FIGURE 4-37](#).

FIGURE 4-37 Installing the Heatsink

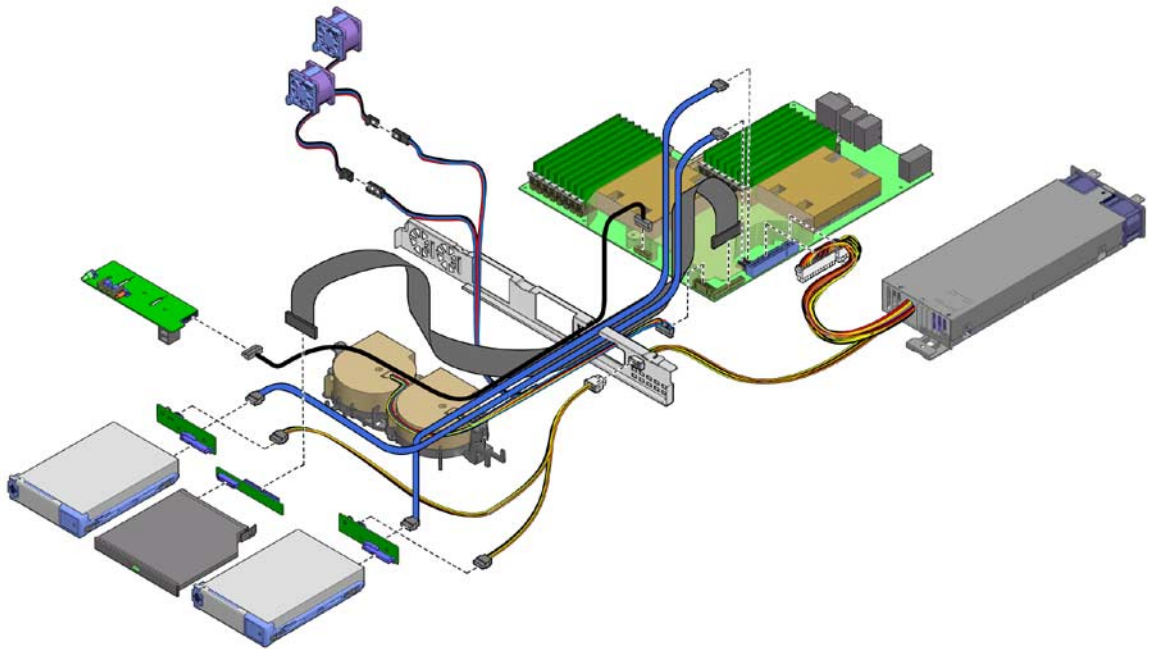


11. Reinstall the cover.

4.4.14 Replacing Cables

FIGURE 4-38 and show the routing of the cables and motherboard connector locations.

FIGURE 4-38 Cable Routing Diagram



The following table describes the cables that are included with the associated component replacement kits.

TABLE 4-1 Component Kit Cables

Component Kit	Cables Included
Cable kit	ODD signal, hard drive power, I/O board signal
Dual blower kit	Fan harness
SATA cable kit	SATA power and signal
Power supply kit	Power supply cable

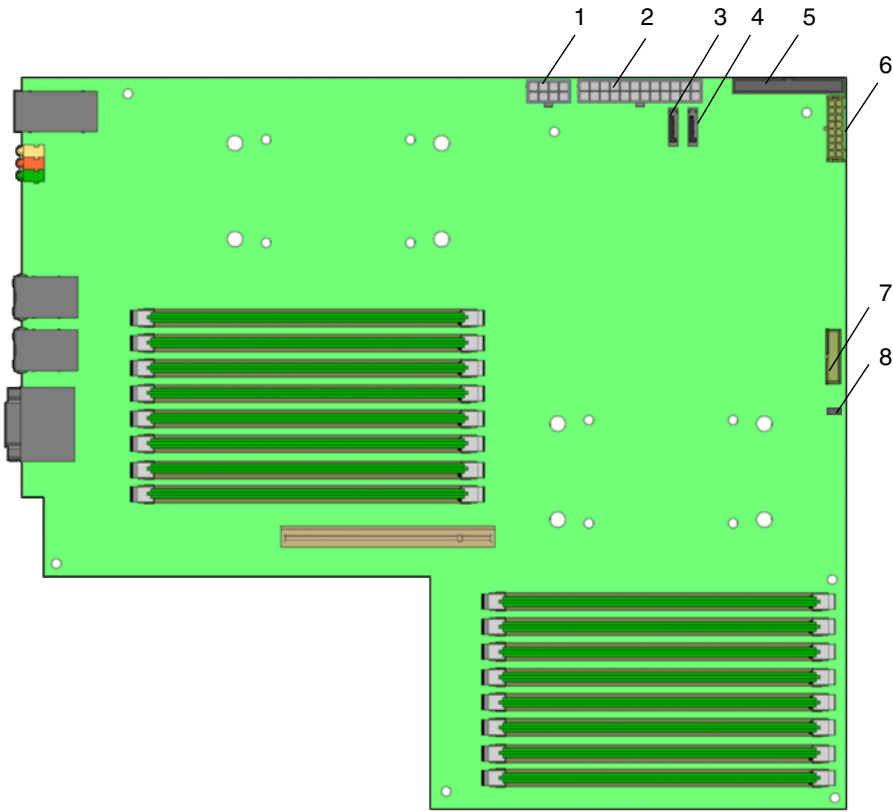


TABLE 4-2 Motherboard Cable Connections

Label		Label	
1	J13 - power supply	5	J29 - ODD connector
2	J17 - power supply	6	JP8 - 16 pin fan connector
3	SATA 1	7	JP5 - I/O board connector
4	SATA 0	8	BMC J34 jumper

4.4.15 Motherboard

The following procedures describe how to remove and install the Sun Fire X2200 M2 server system motherboard.

Note – The motherboard is not a CRU and should be replaced only by trained field service technicians.

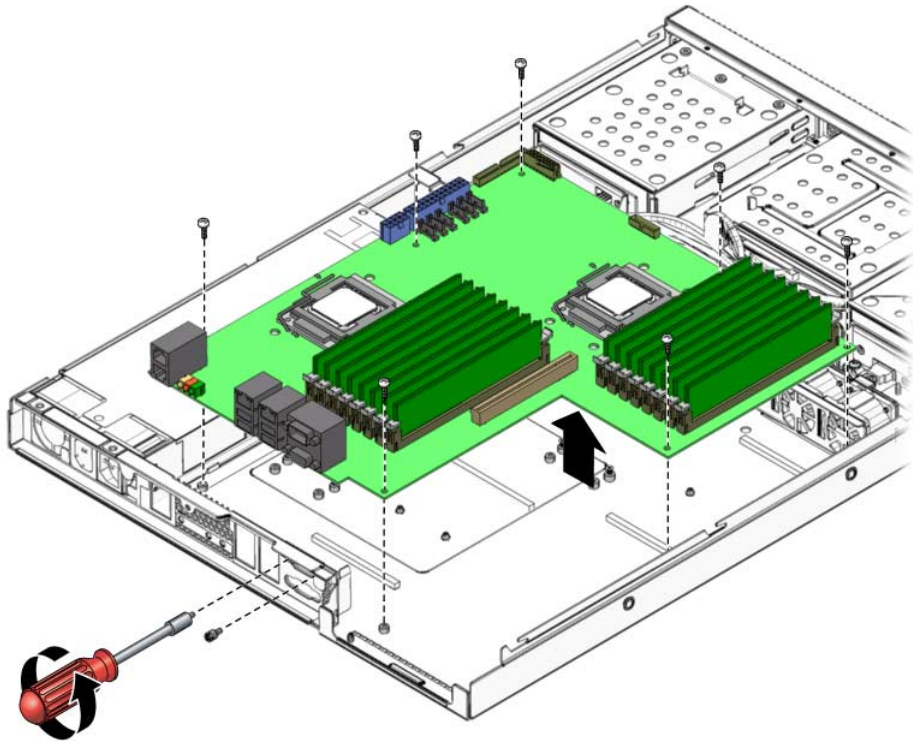
▼ To Remove the Motherboard

1. **Power off the system and remove the cover as described in [Section 4.3](#), “Powering Off the Server and Removing the Cover” on page 4-4.**
2. **Remove the PCIe card riser assembly installed on the motherboard (see [Section 4.4.2](#), “Replacing the PCIe Card and Riser Assembly” on page 4-8) and the air duct (see [Section 4.4.6](#), “Replacing an Air Duct” on page 4-23).**
3. **Disconnect all cables attached to the motherboard.**
4. **Remove the four screws from the heatsink (4 screws per heatsink installed).**

Note – Do not remove the screws that secure the CPU heatsink assemblies mounting to the motherboard.

5. **Remove the seven Phillips screws that fasten the motherboard to the chassis with a Phillips screwdriver.**
6. **Remove the screws attaching the serial connector to the chassis with a 5 mm nut driver.**

FIGURE 4-39 Removing the Motherboard



7. Pull the motherboard away from the chassis.

8. Remove the CPU and memory modules.

Refer to the following sections for information on removing and replacing the CPU and memory:

- [Section 4.4.13, “Replacing a CPU and Heatsink”](#) on page 4-39
- [Section 4.4.11, “Replacing Memory Modules”](#) on page 4-32

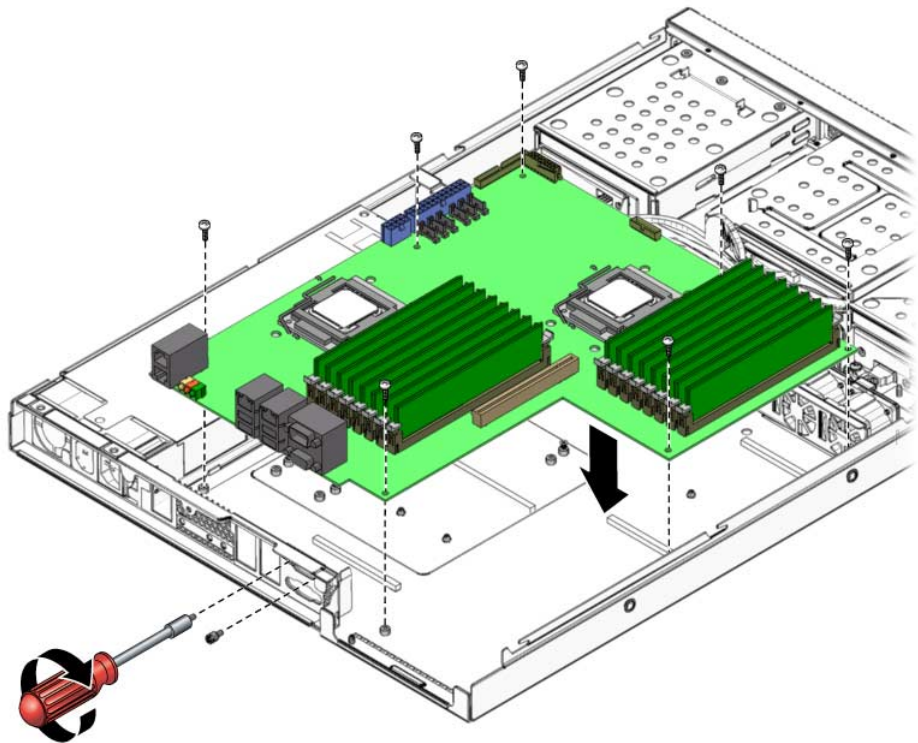
▼ To Install the Motherboard



Caution – Observe proper ESD precautions in [Section 4.2.1, “ESD Precautions”](#) on [page 4-2](#) when handling the new motherboard.

1. Center the motherboard on the chassis so that the screw holes in the motherboard align with the screw holes on the chassis.
2. Secure the seven Phillips screws that fasten the motherboard to the chassis. Torque screws to 8- to 9-inch pounds.
3. Secure the screws attaching the serial connector to the chassis with a 5 mm nut driver.

FIGURE 4-40 Installing the Motherboard



4. Replace the CPU and DIMMs as necessary.
Refer to the following sections for information on removing and replacing the CPU and memory:
 - Section 4.4.13, “Replacing a CPU and Heatsink” on page 4-39
 - Section 4.4.11, “Replacing Memory Modules” on page 4-32
5. Replace the PCIe card riser assembly and air baffle.
 - Section 4.4.2, “Replacing the PCIe Card and Riser Assembly” on page 4-8.
 - Section 4.4.6, “Replacing an Air Duct” on page 4-23

6. Reconnect all internal system cables.
[Section 4.4.14, “Replacing Cables” on page 4-47.](#)
7. Replace the system cover.
8. Replace any external cables and power on the server.

4.4.16 Replacing the Firmware PROM

The following procedure describes how to remove and install the system firmware PROM.

4.4.16.1 Removing the Firmware PROM

The firmware PROM is located at the rear of the server. Access to the firmware PROM is obstructed by the PCI riser assembly. To replace the firmware PROM, you must first remove the PCI riser assembly.

Before You Begin

To perform this procedure, you must have the following:

- PLCC extraction tool

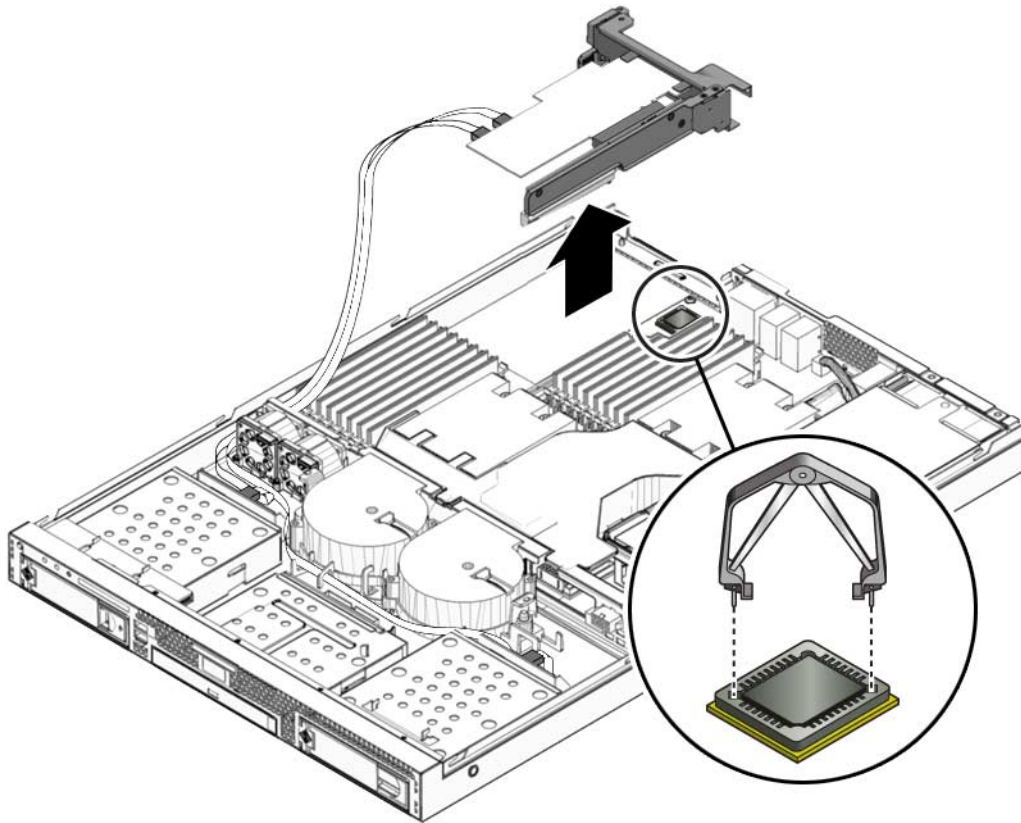
▼ To Remove the Firmware PROM

1. Power off the system and remove the cover as described in [Section 4.3, “Powering Off the Server and Removing the Cover” on page 4-4.](#)

Note – If a PCI card is installed in the riser assembly, you do not need to remove the card first to perform this procedure.

2. Remove the PCIe riser assembly installed on the motherboard (see [Section 4.4.2, “Replacing the PCIe Card and Riser Assembly” on page 4-8](#)) and the air duct (see [Section 4.4.6, “Replacing an Air Duct” on page 4-23](#)).
3. Set the PCI riser assembly next to the server.
4. Insert the ends of the PLCC extraction tool into the elongated corner slots on the firmware PROM socket (see [FIGURE 4-41](#)).

FIGURE 4-41 Location of the Firmware PROM and Use of the PLCC Extractor Tool



5. To remove the firmware PROM, gently squeeze the extraction tool.

This action pulls the PROM from the socket.

6. Remove the PROM from the server.

4.4.16.2 Installing a Firmware PROM

There is only one way to install the firmware PROM chip into the socket. The PROM chip has three right-angle corners. The fourth corner, on the beveled edge side of the firmware PROM chip, is trimmed at 45 degrees. One of the outer-edge corners of the PROM socket on the motherboard is trimmed the same way, and the same interior corner of the PROM socket has a semi-circular protrusion. This is the key to proper

installation (see [FIGURE 4-42](#)). To install the firmware PROM chip properly, the trimmed corner of the chip must align with the corner of the PROM socket with the semi-circular protrusion.



Caution – Irreparable damage to the firmware PROM chip can occur through improper handling. Observe the ESD precautions when handling the firmware PROM chip. Wear a securely grounded ESD wrist strap. Hold the firmware PROM chip by the edges only. Do not touch the metal contacts.

▼ To Install the Firmware PROM

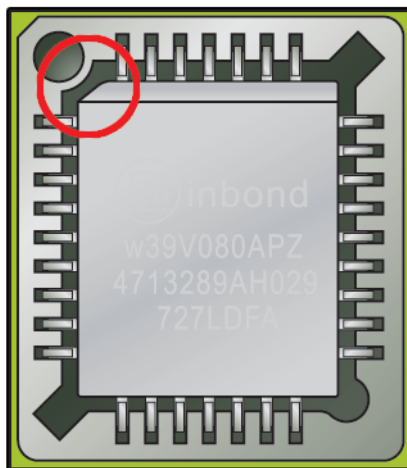
1. Remove the new firmware PROM chip from the anti-static packaging.

Handle the chip carefully. Avoid touching the metal contacts.

2. Align the trimmed corner of the PROM chip with the keyed corner of the socket.

The trimmed corner of the chip, when properly seated in the socket, must align with the socket corner that has the semi-circular protrusion (see [FIGURE 4-42](#)).

FIGURE 4-42 PROM Chip Keying



3. When properly aligned, place the PROM chip on top of the socket.

The chip should lie flat.

4. **Using your finger or thumb, gently push the firmware PROM chip downward into the socket until the top of the chip is flush with the top of the socket.**
The new firmware PROM chip is now installed.
5. **Clear the CMOS.** See [Section 1.5, “Clearing the CMOS”](#) on page 1-9.
6. **Update the BIOS and SP firmware.** See [Section B.2, “Updating BIOS and BMC Firmware”](#) on page B-2.

System Specifications

This Appendix contains the following specifications for the Sun Fire X2200 M2 server.

- [Section A.1, “Physical Specifications” on page A-1](#)
- [Section A.2, “Power Specifications” on page A-2](#)
- [Section A.3, “Environmental Specifications” on page A-3](#)
- [Section A.4, “Serial Connector Pin Assignments” on page A-4](#)

A.1 Physical Specifications

[TABLE A-1](#) lists the physical specifications for the Sun Fire X2200 M2 server

TABLE A-1 Sun Fire X2200 M2 Server Physical Specifications

Specification	British	Metric
Width	16.8 inches	425.5 mm
Depth	25 inches	633.7 mm
Height	1.69 inches	43 mm
Weight (max.)	24.64 lbs	11.6 kg

A.2 Power Specifications

Maximum continuous power is 450 W. Other specifications are shown in the following tables

TABLE A-2 Input Voltage Range

Voltage Ranges	Minimum	Nominal	Maximum	Units
Range 1	90	115	132	Vms
Range 2	180	230	264	Vms

TABLE A-3 Input Frequency

Frequency Ranges	Minimum	Nominal	Maximum	Units
Range 1	57	60	63	Hz
Range 2	47	50	53	Hz

TABLE A-4 Input Current

Current Type	Values
Maximum input current	8.0 Amps max @ 90Vac; 4.0 Amps max @ 180 Vac, full load
Maximum measured inrush current	36 Amps

A.3 Environmental Specifications

Environmental specifications for the Sun Fire X2200 M2 server are shown in [TABLE A-5](#).

TABLE A-5 Sun Fire X2200 M2 Server Environmental Specifications

Specification	State	British	Metric
Humidity	Operating	7%–93% RH non-condensing, 80.6° F max wet bulb	7%–93% RH non-condensing, 38° C max wet bulb
	Nonoperating	93% RH, non-condensing, 100.4° F max wet bulb	93% RH, non-condensing, 43° C max wet bulb
Vibration	Operating	0.12 G x-y, 0.17 G z; 5–500 Hz sine	
	Nonoperating	0.3 G x-y, 0.6 G z; 5–500 Hz sine	
Shock	Operating	4.5 G to 3.5 G; 11 msec. half-sine	
Temperature	Operating	36° F to 100° F	2° C to 38° C
	Nonoperating	-40° F to 154° F	-40° C to 68° C
Maximum operating temperature derating		-1.8° F for every 985 ft. in altitude	-1° C for every 300 m in altitude
Altitude	Operating	max 9,843 ft	max 3,000 m

A.4 Serial Connector Pin Assignments

The serial port connector is a DB-9 type connector located on the back panel.

FIGURE A-1 Serial Port Connector Pin Configuration

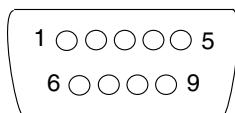


TABLE A-6 Serial Port Connector Pin Assignments

Pin	Signal	Description
1	DCD	Carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

Using the Tools and Drivers CD

This chapter contains information on the Sun Fire X2200 M2 Server Tools and Driver CD. It contains information on the following topics:

- [Section B.1, “Tools and Drivers CD Contents”](#) on page B-1
- [Section B.2, “Updating BIOS and BMC Firmware”](#) on page B-2
- [Section B.3, “Booting the Tools and Drivers CD from a PXE Server”](#) on page B-5
- [Section B.4, “Broadcom NetXtreme Software”](#) on page B-8

B.1 Tools and Drivers CD Contents

The Tools and Drivers CD contains several software applications and utilities for use with your Sun Fire X2200 M2 server. [TABLE B-1](#) lists the contents of the CD and shows where to find more information on the contents.

TABLE B-1 Tools and Drivers CD Contents

Application	Document or Section in this Document
Drivers and installation scripts for supported operating systems	<i>Sun Fire X2200 M2 Server Operating System Installation Guide</i>
BIOS/BMC firmware	Section B.2, “Updating BIOS and BMC Firmware” on page B-2
Diagnostics software	Chapter 3
Windows RIS files	<i>Sun Fire X2200 M2 Server Operating System Installation Guide</i>
Broadcom NetXtreme software	Section B.4, “Broadcom NetXtreme Software” on page B-8

B.2 Updating BIOS and BMC Firmware

You can update the BIOS and BMC firmware from the Tools and Drivers CD using one of the following methods:

- [Using a Local Server and DVD Drive to Update the Firmware](#)
- [Using tftp and the CLI to Update the Firmware](#)
- [Using the ELOM Web GUI to Update the Firmware](#)

To recover a corrupt BMC, refer to the *Embedded Lights Out Manager Administration Guide*.

B.2.1 Using a Local Server and DVD Drive to Update the Firmware

▼ To Use a Local Server and DVD Drive to Update the Firmware

1. **Insert the Tools and Drivers CD into the Sun Fire X2200 M2 server DVD drive.**
2. **Reboot the server.**
3. **When the Tools and Drivers CD menu is displayed, select Upgrade System BIOS and SP firmware from the menu.**

The BIOS and BMC will be updated to the latest versions and the system will automatically reboot. The BIOS will automatically load the optimized defaults.

4. Do the following after the firmware is updated:

- Verify the BIOS settings.
Because the BIOS optimized defaults are automatically loaded when the BIOS is flashed, you might need to reset some of the BIOS settings.
For example, if the BIOS was previously modified to support RAID, you must re-enable RAID support in the BIOS after flashing it.
- Verify the BIOS setting for Installed OS.
The default OS setting is for Solaris and Linux. See the *Sun Fire X2200 M2 Server Operating System Installation Guide* for instructions on changing the BIOS settings.

B.2.2 Using tftp and the CLI to Update the Firmware

▼ To Use tftp and the CLI to Update the Firmware

1. Set up a tftp server to host the BIOS/BMC image.

Instructions for setting up the tftp server can be found in the system administration guides for the appropriate Solaris or Linux version:

- Solaris 10 manual at:

<http://docs.sun.com/app/docs/doc/817-5504>

- Red Hat Enterprise Linux 3 manual at:

<http://www.redhat.com/docs/manuals/enterprise/RHEL-3-Manual/sysadmin-guide/>

- Red Hat Enterprise Linux 4 manual at:

<http://www.redhat.com/docs/manuals/enterprise/RHEL-4-Manual/sysadmin-guide/>

- SUSE Linux Enterprise Server 9 manual at:

http://www.novell.com/documentation/sles9/pdfdoc/sles_9_admin_guide/sles_9_admin_guide.pdf

2. Copy the combined BIOS/BMC image from the `/remoteflash/version/bios_bmc_file` file on the Tools and Drivers CD to your tftp server `/tftpboot` directory.

Where *version* is the version of the Tools and Drivers CD that you are using and *bios_bmc_file* is the name of the BIOS/BMC image.

For example: `/remoteflash/1.0/x2200-191_3B10`

3. Ensure that the OS on the platform is shut down.

4. Log onto the Sun Fire X2200 M2 ELOM CLI and `cd` into the Tftpupdate:

```
/SP -> cd TftpUpdate
```

5. Run the following commands from TftpUpdate:

```
/SP/TftpUpdate -> set ServerIPAddress=IP address of tftp server
```

```
/SP/TftpUpdate -> set FileName=bios_bmc_file
```

```
/SP/TftpUpdate -> set Update=action
```

The BIOS and BMC firmware are updated.

Note – During the upgrade process, the login prompt will appear. Do *not* attempt to log in until the flash update has completed.

6. If an OS is running on the Sun Fire X2200 M2 server that has been updated, reboot the Sun Fire X2200 M2 server in order for the BIOS and BMC updates to take effect.

The tftp download will start and you will see the following output.

B.2.3 Using the ELOM Web GUI to Update the Firmware

This method uses the ELOM SP to flash the BIOS and BMC. See the *Embedded Lights Out Manager Administration Guide* for more information on setting up and using the ELOM software.

▼ To Use the ELOM Web GUI to Update the Firmware

1. Start the ELOM SP web GUI by typing the IP address of the SP into a browser.

See the *Embedded Lights Out Manager Administration Guide* for instructions on using the ELOM web GUI.

2. Copy the file `/remoteflash/version/bios_bmc_file` from the `remoteflash` directory located on the Tools and Drivers CD to the remote system that is running the ELOM Web GUI.

Where *version* is the version of the Tools and Drivers CD that you are using and *bios_bmc_file* is the name of the BIOS/BMC image.

For example: `/remoteflash/1.0/x2200-191_3B10`

3. Log in to the SP.
4. Click on Control and select Firmware Update from the drop-down menu.
The Firmware Update screen is displayed.
5. Click Browse and navigate to the location of the flash file.
6. Click Update.

The BIOS and BMC firmware on the Sun Fire X2200 M2 server will be updated.

B.3 Booting the Tools and Drivers CD from a PXE Server

If you have a Sun Fire X2200 M2 server that does not have a DVD drive, you can run the Pc-Check diagnostics and flash the BIOS from a Preboot Execution Environment (PXE) server.

The following topics are included in this section:

- Section B.3.1, “Setting up the Tools and Drivers CD Image on the PXE Server” on page B-5
- Section B.3.2, “Accessing the Tools and Drivers CD From the Target Server” on page B-8

B.3.1 Setting up the Tools and Drivers CD Image on the PXE Server

You will need the following to set up the PXE server:

- Red Hat kickstart server with a CD or DVD drive

Instructions for setting up the Red Hat kickstart server can be found in the system administration guides for Red Hat Enterprise Linux:

- Red Hat Enterprise Linux 3 manual at
<http://www.redhat.com/docs/manuals/enterprise/RHEL-3-Manual/sysadmin-guide/>
- Red Hat Enterprise Linux 4 manual at
<http://www.redhat.com/docs/manuals/enterprise/RHEL-4-Manual/sysadmin-guide/>
- Sun Fire X2200 M2 Server Tools and Drivers CD
- MEMDISK kernel from the SYSLINUX project. Access this kernel at
<http://www.kernel.org/pub/linux/utils/boot/syslinux/>

▼ To Set Up the PXE Server

1. **Log in to the PXE server as root (superuser).**

2. Determine the directory where the Red Hat image is installed on the PXE server.

The default directory for the PXE image is usually `/tftpboot/linux-install`. The remainder of this procedure assumes that the PXE files have been installed in this directory.

Note – If your PXE files are not installed in the `/tftpboot/linux-install` directory, modify the procedure as necessary.

3. Make a directory for the Sun Fire X2200 M2 Server Tools and Drivers CD contents.

```
# mkdir /tftpboot/linux-install/suppl_tau
```

4. Insert the Sun Fire X2200 M2 Server Tools and Drivers CD into the PXE server, and copy the `boot.img` file located in the root directory of the CD to the new Sun Fire X2200 M2 server supplemental directory created in [Step 3](#).

```
# cp /mnt/cdrom/boot.img /tftpboot/linux-install/suppl_tau
```

5. Download the MEMDISK kernel.

a. Go to the latest SYSLINUX project web site at:

<http://www.kernel.org/pub/linux/utils/boot/syslinux/>

b. Save the latest `syslinux-version.zip` file to your root directory.

Where *version* is the latest SYSLINUX project version.

Note – Version 3.09 was the latest version at the time of this writing.

6. Unzip the zip file.

For example:

```
# unzip syslinux-3.09.zip
```

7. Change to the `memdisk` directory.

For example:

```
# cd /syslinux-3.09/memdisk
```

8. Copy the memdisk kernel to the new Sun Fire X2200 M2 Server Tools and Drivers Directory created in [Step 3](#).

For example:

```
# cp /syslinux-3.09/memdisk/memdisk /tftpboot/linux-install/suppl_tau
```

9. Edit the Boot Message Screen as follows.

- a. Open the `boot.msg` file in a text editor.

```
# vi /tftpboot/linux-install/msgs/boot.msg
```

- b. Type the following line after 0-Local Machine.

```
suppl_tau - Sun Fire X2200 M2 Server Tools and Drivers CD
```

- c. Save and close the `boot.msg` file.

10. Edit the default PXE Configuration file as follows.

- a. Open the `default` file in a text editor.

```
# vi /tftpboot/linux-install/pxelinux.cfg/default
```

- b. Type the following lines after the `label10` section:

```
label suppl_tau
kernel suppl_tau/memdisk
append initrd=suppl_tau/boot.img
```

- c. Save and close the `default` file.

11. Test the installation on the test machine.

B.3.2 Accessing the Tools and Drivers CD From the Target Server

You will need the following to run diagnostics on a target Sun Fire X2200 M2 server:

- PXE server configured as shown in [Section B.3.1, “Setting up the Tools and Drivers CD Image on the PXE Server”](#) on page B-5.
- Sun Fire X2200 M2 server set up on the same network as the PXE server.

▼ To Access the Tools and Drivers CD From the Target Server

1. **Connect the Sun Fire X2200 M2 server to the same network as the PXE server.**
2. **Power on (or reboot) the Sun Fire X2200 M2 server.**
3. **Press the F12 key during POST.**
4. **The Boot Message Screen located on your PXE server at `/tftpboot/linux-install/mgs/boot.msg` displays on the screen.**
5. **Type `suppl_tau` at the prompt and press Return.**

The MEMDISK kernel and the bootable portion of the Tools and Drivers CD are downloaded to the test machine over the network and into memory.

Once downloaded, the bootable portion of the Tools and Drivers CD will be booted.
6. **The main menu of the bootable portion of the Tools and Drivers CD is displayed on the target Sun Fire X2200 M2 server.**
7. **You can now run the hardware diagnostics or update the System BIOS.**

See [Chapter 3](#) in this document for information on running Pc-Check diagnostics software.

B.4 Broadcom NetXtreme Software

Included on the Tools and Drivers CD is software from Broadcom for specific management applications for Windows only.

- Broadcom advanced control suite
- BASP (Intermediate Driver for VLAN and Teaming)

- SNMP sub-agent
- SIM provider
- DMI PCI service provider

To install the software from a Windows Server 2003 Sun Fire X2200 M2 server:

1. Navigate to the following directory on the Tools and Drivers CD:

d:\tools_&_driver_1.0\drivers\windows\broadcomNIC\Launch.exe

2. **Double-click** Launch.exe.
3. **Click Management Applications and follow the install wizard.**
4. **Click the Users Guide button in the Broadcom NetXtreme software for information about the software.**

After the management software is installed you can run it as follows:

5. Start -> Broadcom -> Broadcom Advanced Control Suite 2

Please note the following considerations when using the teaming feature of the Broadcom software:

- Teaming two NVIDIA NICS or one NVIDIA NIC and one Broadcom NIC is not recommended but will work. See [FIGURE 1-2](#) for the location of the NVIDIA and Broadcom NICs.
- One of the broadcom NICs is shared with the SP NET MGT (LAN 1) port. This port is not supported for Broadcom teaming. For more information, refer to the users guide included with the Broadcom software.

Installing the Server Into a Rack With Optional Slide Rails

Perform the procedures in this chapter to install your server into a four-post rack using the orderable slide rail and cable management arm options. These slide rails are compatible with a wide range of equipment racks that meet the following standards:

- Four-post structure (mounting at both front and rear). Two-post racks are not compatible.
- Rack horizontal opening and unit vertical pitch conforming to ANSI/EIA 310-D-1992 or IEC 60927 standards.
- Distance between front and rear mounting planes of 610 mm and 915 mm (24 inches to 36 inches).
- Clearance depth (to front cabinet door) in front of front rack mounting plane at least 25.4 mm (1 inch).
- Clearance depth (to rear cabinet door) behind front rack mounting plane at least 800 mm (31.5 inches) with the cable management arm, or 700 mm (27.5 inches) without the cable management arm.
- Clearance width (between structural supports and cable troughs) between front and rear mounting planes at least 456 mm (18 inches).



Caution – Always load equipment into a rack from the bottom up so that it will not become top-heavy and tip over. Deploy your rack’s anti-tilt bar to prevent the rack from tipping during equipment installation.



Caution – Ensure that the temperature in the rack does not exceed the server’s maximum ambient rated temperatures. Consider the total airflow requirements of all equipment installed in the rack, to ensure that the equipment is operated within its specified temperature range.

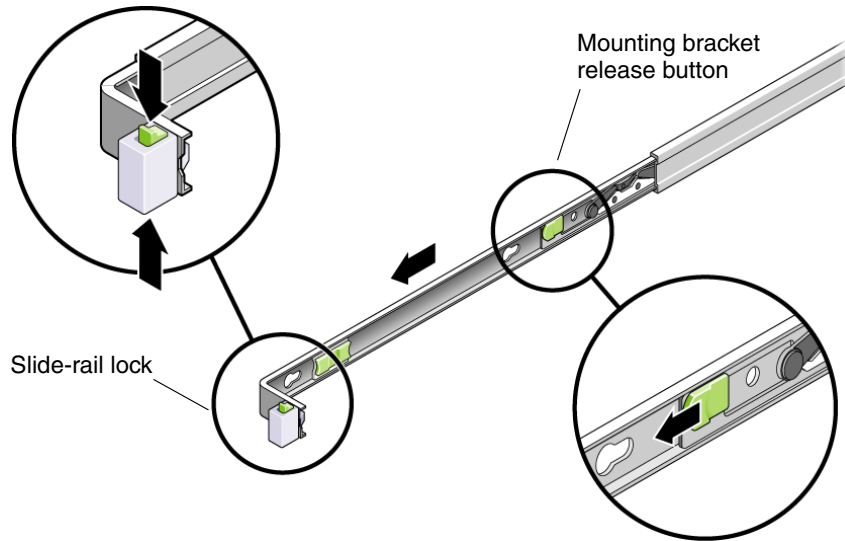
C.1 Disassembling the Slide Rails Before Installation

Use this procedure to remove the mounting brackets from the slide-rail assemblies.

▼ To Disassemble the Slide Rails Before Installation

1. Unpack the slide rails.
2. Locate the slide rail lock at the front of one of the slide rail assemblies, as shown in [FIGURE C-1](#).
3. Squeeze and hold the tabs at the top and bottom of the lock while you pull the mounting bracket out of the slide-rail assembly until it reaches the stop. (See [FIGURE C-1](#)).
4. Push the mounting bracket release button toward the front of the mounting bracket, as shown in [FIGURE C-1](#), and simultaneously withdraw the mounting bracket from the slide-rail assembly.
5. Repeat for the remaining slide-rail assembly.

FIGURE C-1 Disassembling the Slide Rail Before Installation



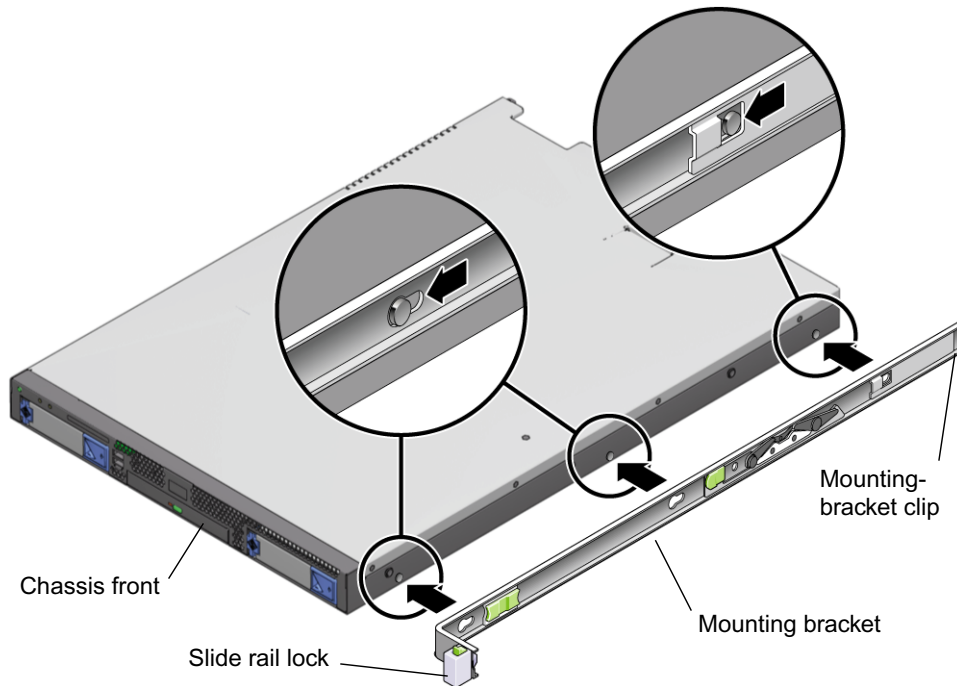
C.2 Installing the Mounting Brackets Onto the Server

Use this procedure to install the mounting brackets onto the sides of the server.

▼ To Install the Mounting Brackets Onto the Server

1. Position a mounting bracket against the chassis so that the slide-rail lock is at the server front, and the three keyed openings on the mounting bracket are aligned with the three locating pins on the side of the chassis.

FIGURE C-2 Aligning the Mounting Bracket With the Server Chassis



2. With the heads of the three chassis locating pins protruding through the three keyed openings in the mounting bracket, pull the mounting bracket toward the front of the chassis until the mounting-bracket clip locks into place with an audible click. (See [FIGURE C-2](#).)
3. Verify that the rear locating pin has engaged the mounting-bracket clip. (See [FIGURE C-2](#).)
4. Repeat to install the remaining mounting bracket on the other side of the server.

C.3 Attaching the Slide-Rail Assemblies to the Rack

Use this procedure to install the slide-rail assemblies to the rack.

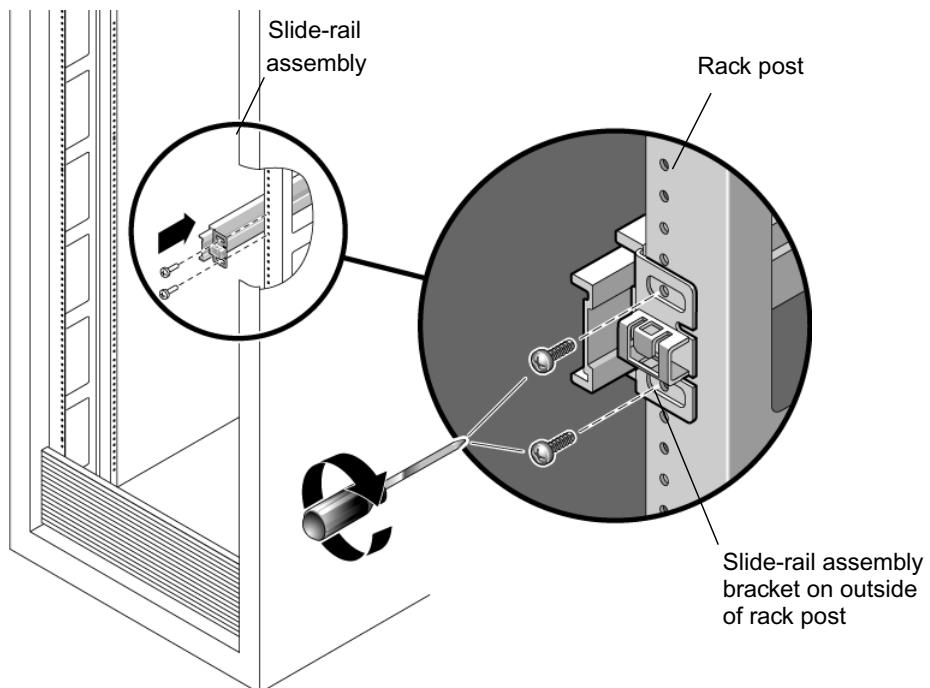
▼ To Attach the Slide-Rail Assemblies to the Rack

1. Position a slide-rail assembly in your rack so that the brackets at each end of the slide-rail assembly are on the outside of the front and rear rack posts. (See [FIGURE C-3](#).)
2. Attach the slide-rail assembly to the rack posts, but do *not* tighten the screws completely.

The method used to attach the slide rails varies, depending on the type of rack:

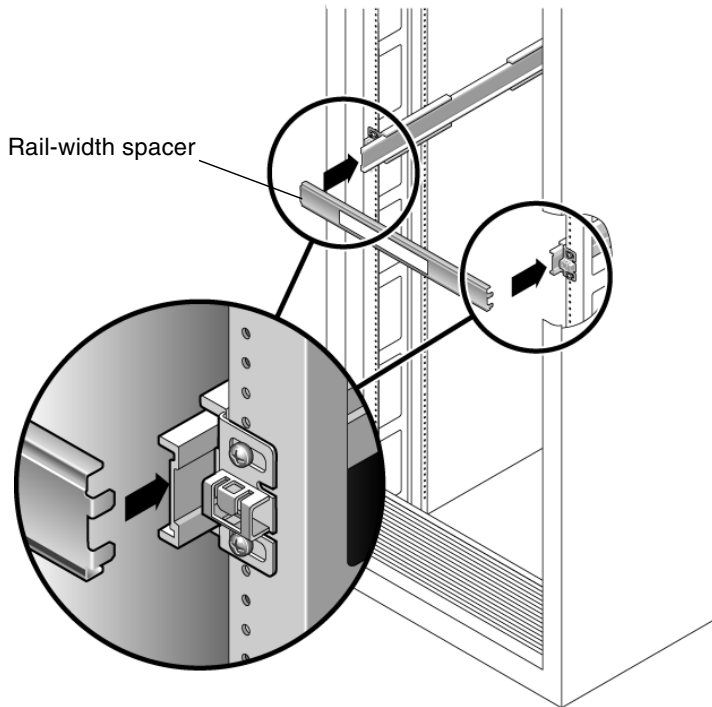
- If your rack has threaded mounting holes in the rack posts, first determine whether the threads are metric or standard, then insert the correct mounting screws through the slide-rail brackets and into the threaded holes.
- If your rack does not have threaded mounting holes, insert the mounting screws through both the slide-rail brackets and rack posts, then secure them with the caged nuts.

FIGURE C-3 Slide-Rail Assembly Mounting to Rack Post



3. Repeat [Step 1](#) and [Step 2](#) for the remaining slide-rail assembly.
4. From the front of the rack, set the proper width of the rails with the spacer. (See [FIGURE C-4](#).)

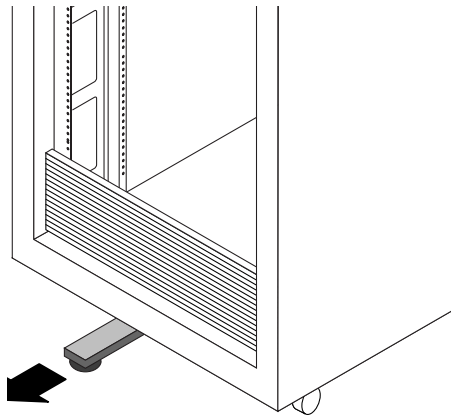
FIGURE C-4 Setting the Rail Width



5. Tighten the screws on the brackets.
6. Remove the spacer and confirm that the rails are attached tightly to the rack.
7. Repeat [Step 4](#) through [Step 6](#) for rear of the rack.

8. If available, extend the anti-tip foot at the bottom of the rack. (See [FIGURE C-5](#).)

FIGURE C-5 Extending the Anti-tip Foot



Caution – If your rack does not have an anti-tip foot, there is some danger of the rack tipping.

C.4 Installing the Server Into the Slide-Rail Assemblies

Use this procedure to install the server chassis, with mounting brackets, into the slide-rail assemblies that are mounted to the rack.



Caution – This procedure requires a minimum of two people because of the weight of the server. Attempting this procedure alone could result in equipment damage or personal injury.

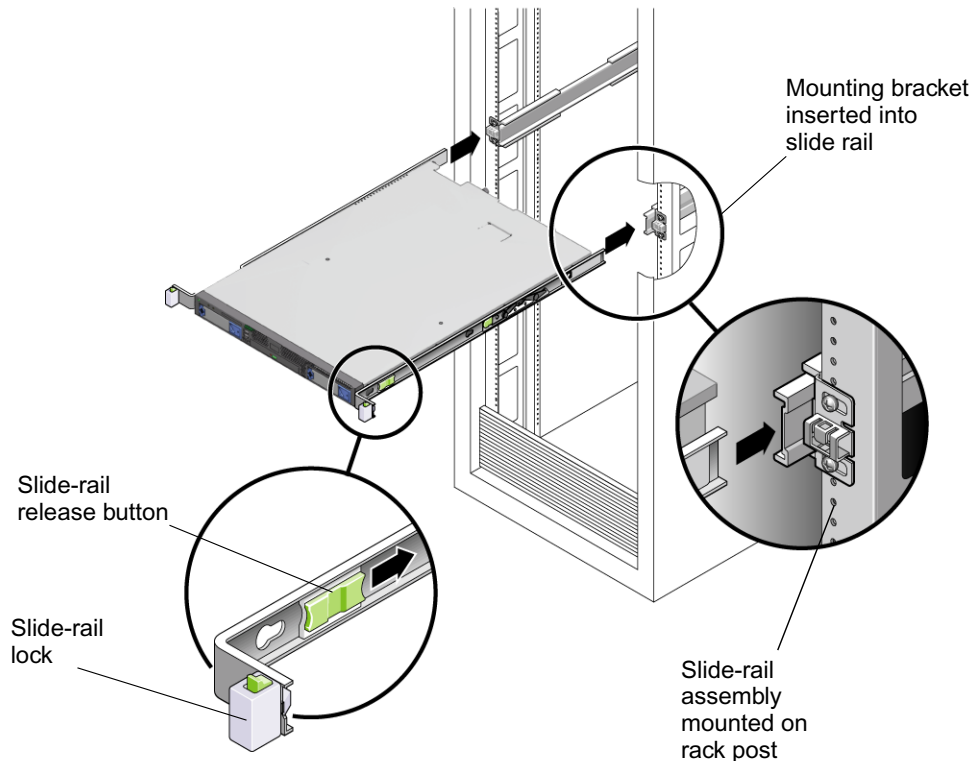


Caution – Always load equipment into a rack from the bottom up so that it will not become top-heavy and tip over. Deploy your rack's anti-tilt bar to prevent the rack from tipping during equipment installation.

▼ To Install the Server Into the Slide-Rail Assemblies

1. Push the slide rails into the slide-rail assemblies in the rack as far as possible.
2. Raise the server so that the rear ends of the mounting brackets are aligned with the slide-rail assemblies that are mounted in the equipment rack. (See [FIGURE C-6](#).)
3. Insert the mounting brackets into the slide rails, then push the server into the rack until the mounting brackets encounter the slide-rail stops (approximately 12 inches, or 30 cm).

FIGURE C-6 Inserting the Server With Mounting Brackets Into the Slide Rails



4. Simultaneously push and hold the slide-rail release buttons on each mounting bracket while you push the server into the rack. (See [FIGURE C-6](#).) Continue pushing until the slide-rail locks on the front of the mounting brackets engage the slide-rail assemblies.

You will hear an audible click.



Caution – Verify that the server is securely mounted in the rack and that the slide-rails locks are engaged with the mounting brackets before continuing.

C.5 Installing the Cable Management Assembly

Use this procedure to install an optional cable management assembly (CMA).

▼ To Install the Cable Management Assembly

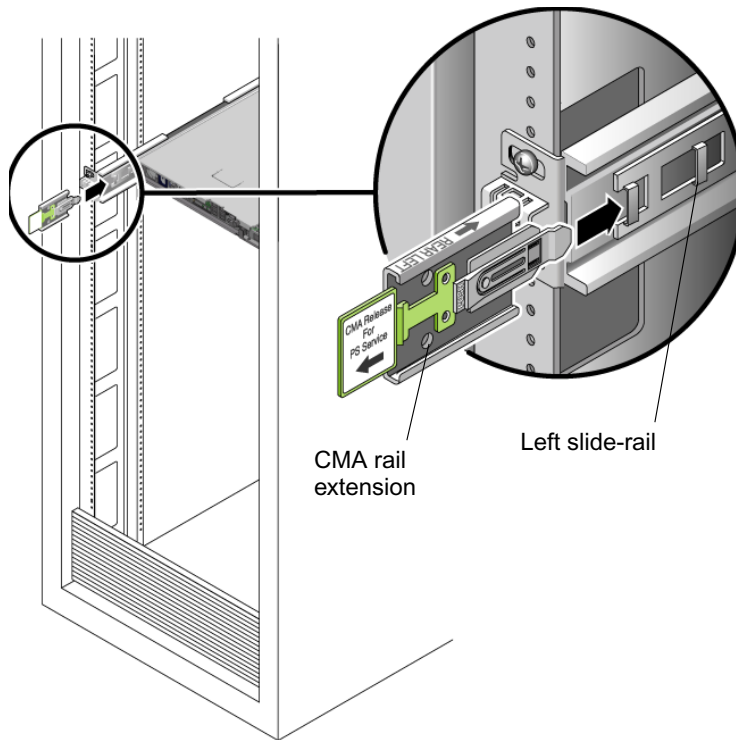
1. **Unpack the CMA parts.**
2. **Take the CMA to the back of the equipment rack and ensure that you have adequate room to work around the back of the server.**

Note – References to “left” or “right” in this procedure assume that you are facing the back of the equipment rack.

3. **Locate the CMA rail extension and insert it into the left slide rail until the extension locks into place with an audible click. (See [FIGURE C-7](#).)**

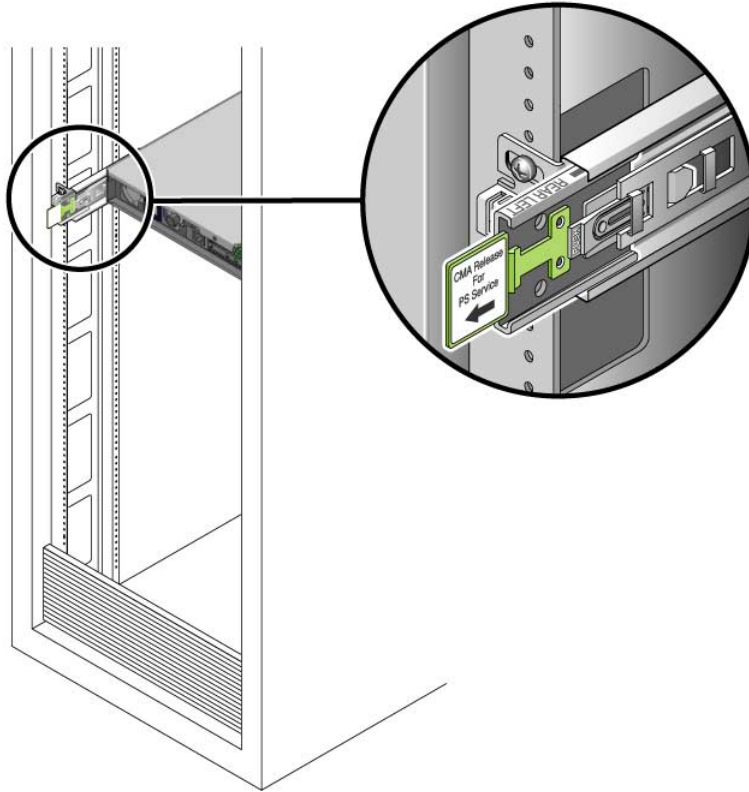
The CMA rail extension might be taped to the CMA assembly.

FIGURE C-7 Inserting the CMA Rail Extension Into the Back of the Left Slide Rail



4. Verify that the CMA rail extension engages the slide rail, as shown in [FIGURE C-8](#).

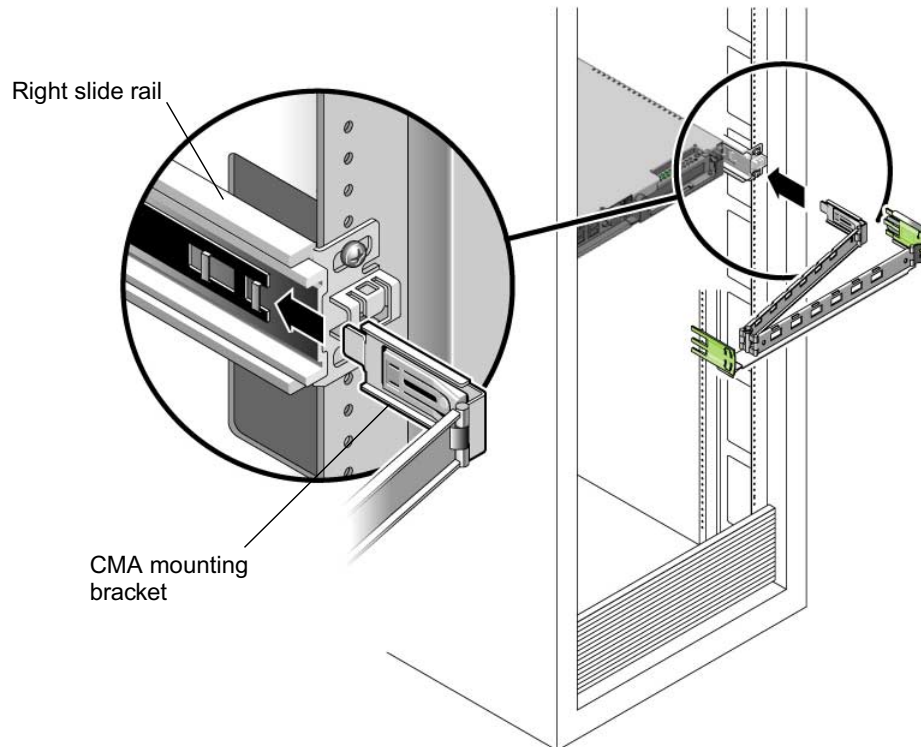
FIGURE C-8 The CMA Rail Extension Engaged with the Slide Rail.



Note – Support the CMA in the remaining installation steps. Do not allow the assembly to hang by its own weight until it is secured by all three of the attachment points.

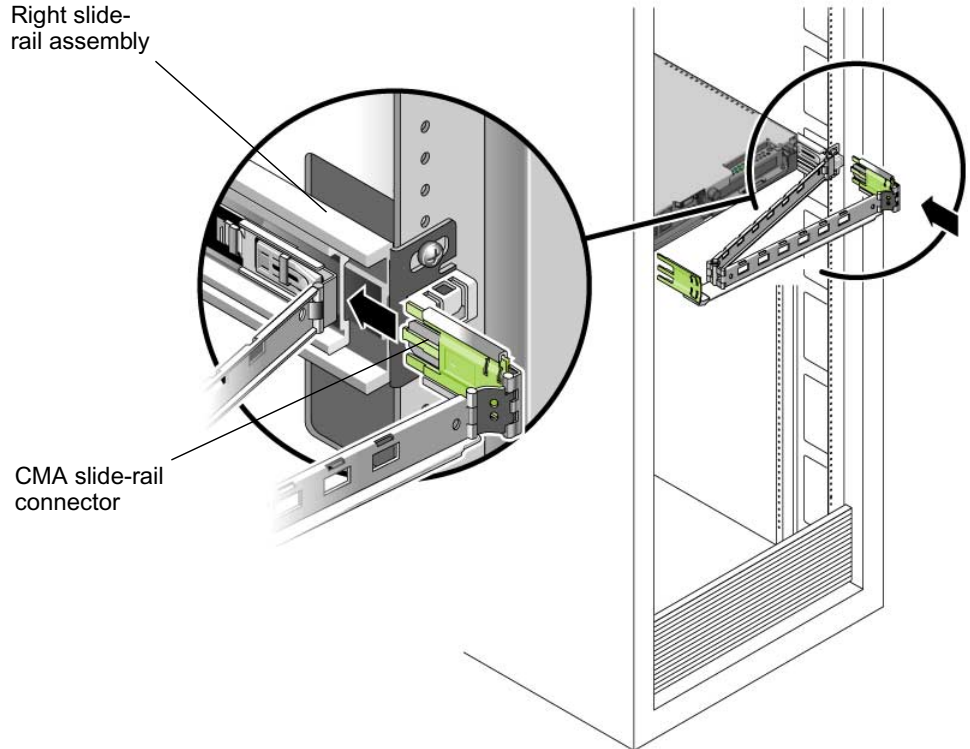
5. Insert the CMA's mounting bracket connector into the right slide rail until the connector locks into place with an audible click. (See [FIGURE C-9](#).)

FIGURE C-9 Inserting the CMA Mounting Bracket Into the Back of the Right Slide Rail



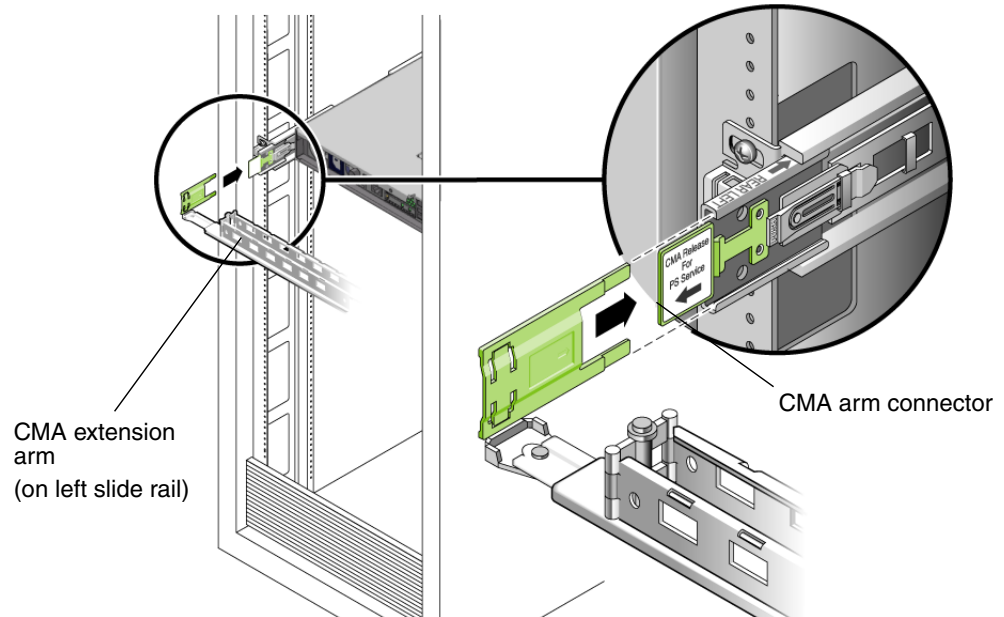
6. Insert the right CMA slide-rail connector into the right slide-rail assembly until the connector locks into place with an audible click. (See [FIGURE C-10](#).)

FIGURE C-10 Inserting CMA Slide-Rail Connector Into Back of Right Slide-Rail Assembly



7. Insert the left CMA slide-rail connector into the rail extension on the left slide-rail assembly until the connector locks into place with an audible click. (See [FIGURE C-11.](#))

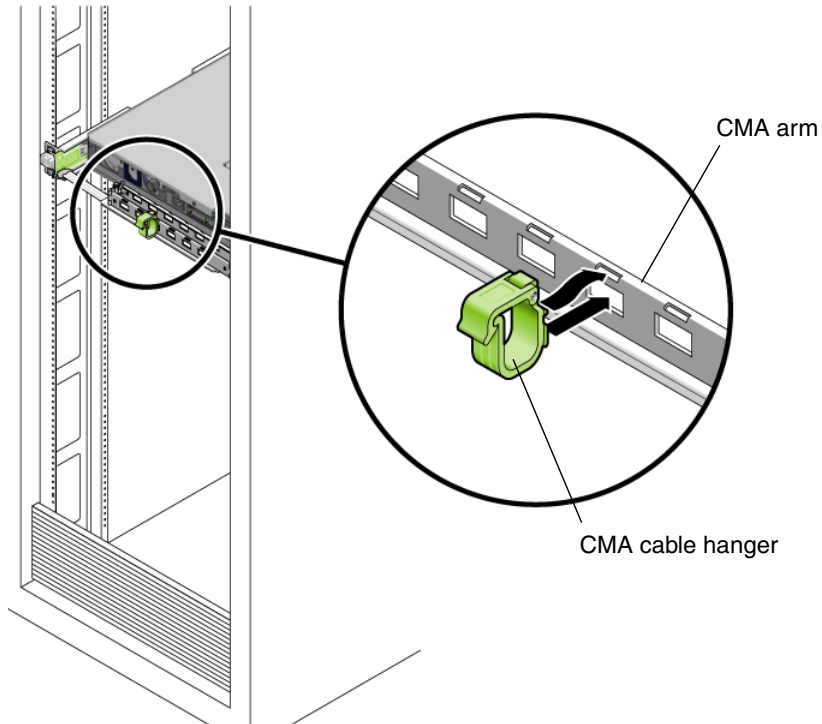
FIGURE C-11 Connecting the CMA Arm to Rail Extension Connector



8. **Position the cable hangers in the appropriate mounting holes in the CMA and snap them into place. (See FIGURE C-12.)**

For best results, place three hangers, evenly spaced, on the rear-facing side of the CMA and three on the side facing the server.

FIGURE C-12 Installing CMA Cable Hangers



9. **Install cables to your server, as required.**
10. **Route the cables through the CMA cable hangers.**

C.6 Verifying Operation of the Slide Rails and CMA

Use this procedure to ensure that the slide rails and CMA are operating correctly.

Note – Two people are recommended for this procedure: one to move the server in and out of the rack, and one to observe the cables and CMA.

▼ To Verify Operation of the Slide Rails and CMA

1. Slowly pull the server out of the rack until the slide rails reach their stops.
2. Inspect the attached cables for any binding or kinks.
3. Verify that the CMA extends fully from the slide rails.
4. Push the server back into the rack, as described below.

When the server is fully extended, you must release two sets of slide-rail stops to return the server to the rack:

- a. The first set of stops are levers, located on the inside of each slide rail, just behind the back panel of the server. These levers are labeled "PUSH." Push in both levers simultaneously and slide the server toward the rack.

The server will slide in approximately 15 inches (38 cm) and stop.

Verify that the cables and the CMA retract without binding before continuing.

- b. The second set of stops are the slide rail release buttons, located near the front of each mounting bracket. See [FIGURE C-6](#). Simultaneously push or pull both of the slide-rail release buttons and push the server completely into the rack until both slide-rail locks engage.

5. Adjust the cable hangers and CMA as required.

Index

A

- air duct
 - replacing, 4-23
- altitude specifications, A-3

B

- battery
 - replacing, 4-36
- BIOS firmware
 - CD, 1-4
 - updating with ELOM web GUI, B-4
 - updating with local DVD drive, B-2
 - updating with tftp using CLI, B-3
- blower module
 - replacing, 4-29
- BMC firmware
 - CD, 1-4
 - updating with ELOM web GUI, B-4
 - updating with local DVD drive, B-2
 - updating with tftp using CLI, B-3
- Broadcom Ethernet connectors, location, 1-6
- Broadcom NetXtreme software
 - CD, 1-4
 - installing, B-8

C

- cable connections, 4-48
- cable management assembly, C-9
- cables
 - motherboard connections, 4-47, 4-48
 - replacing, 4-47
- CMA assembly, C-9

- CMOS, clearing, 1-9
- components
 - orderable, 1-11
 - replacing, 4-5
- cover removal, 4-4
- CPUs
 - features, 1-2
 - replacing, 4-39
- customer orderable components, 1-11
- customer replaceable unit procedures
 - field replaceable unit procedures, 4-5

D

- depth of system, A-1
- diagnostic partition
 - accessing
 - Red Hat Linux, 3-14
 - Solaris 10, 3-15
 - Windows XP, 3-16
 - adding, 3-12
 - log file, 3-13
 - removing, 3-10
- diagnostics
 - advanced diagnostics option, 3-4
 - deferred burn-in testing option, 3-9
 - hard disk testing, 3-6
 - immediate burn-in testing option, 3-7
 - main menu options, 3-2
 - PC-CHECK information, 3-19
 - print results reports option, 3-18
 - running from PXE server, B-5
 - show results summary option, 3-17

- shut down option, 3-19
- system information menu options, 3-3
- Tools and Drivers CD, B-1
- diagnostics CD, 1-4
- DIMMs, see memory modules
- dual blower module
 - replacing, 4-29
- DVD drive
 - location, 1-5
 - replacing, 4-21
 - troubleshooting, 2-5

E

- Embedded Lights Out Manager, 1-4
- environmental specifications, A-3
- ESD precautions, 4-2
- external device, troubleshooting, 2-6

F

- fans
 - blower module replacement, 4-29
 - single fan module replacement, 4-27
- fault LED, 1-5, 1-6
- features, 1-2
- firmware update
 - CD, 1-4
 - methods, B-2
- front panel, 1-5

H

- hard disk drive
 - location, 1-5
 - replacing, 4-12
 - troubleshooting, 2-5
- HDD, see hard disk drive
- height of system, A-1
- hung server, troubleshooting, 2-5

I

- I/O board
 - replacing, 4-6
- input current, A-2
- input frequency, A-2
- input voltage range, A-2
- installation

- ESD precautions, 4-2
- postinstallation instructions, 4-3
- precautions, 4-2
- preinstallation instructions, 4-2
- installing to a rack, C-1
- internal components, 1-7

J

- Java Enterprise System, 1-3

K

- keyboard, troubleshooting, 2-5

M

- main power, applying, 1-8
- maintenance procedures
 - ESD precautions, 4-2
 - postinstallation precautions, 4-3
 - preinstallation instructions, 4-2
- memory
 - specifications, 1-2
 - troubleshooting, 2-6
- memory modules
 - population rules, 4-32
 - replacing, 4-32
- motherboard
 - cable connections, 4-48
- mouse, troubleshooting, 2-5

N

- network I/O, 1-2
- network status indicator, troubleshooting, 2-4
- NVIDIA Ethernet connectors, location, 1-6

O

- operating system software, 1-3
- operating system software supported, 1-3

P

- PCI-Express card
 - replacing, 4-8
- PCI-Express slots, 1-6
- physical specifications, A-1
- postinstallation instructions, 4-3
- power button, 1-5

- power connector, 1-6
- power LED, 1-5, 1-6
- power problems
 - troubleshooting, 2-4, 2-5
- power specifications, A-2
- power supply
 - replacing, 4-25
- powering off server, 1-9
 - for service, 4-4
 - troubleshooting, 2-4
- powering on server
 - main power, 1-8
 - troubleshooting, 2-4
- precautions for installation, 4-2
- preinstallation instructions, 4-2
- PXE server
 - accessing Tools and Drivers CD, B-8
 - diagnostics, B-5
 - setting up Tools and Drivers CD, B-5

R

- rack installation, C-1
- rear panel connectors, 1-6
- rear panel LEDs, 1-6
- Red Hat Enterprise Linux
 - accessing software, 1-3
 - supported versions, 1-3
- removing cover, 4-4
- replacing
 - air duct, 4-23
 - battery, 4-36
 - cables, 4-47
 - CPUs, 4-39
 - dual blower module, 4-29
 - DVD drive, 4-21
 - hard disk drive, 4-12
 - I/O board, 4-6
 - memory modules
 - PCI-Express card, 4-8
 - power supply, 4-25
 - single fan modules, 4-27

S

- serial connector
 - features, 1-2
 - location, 1-6

- serial connector pin assignments, A-4
- serial management port, 1-6
- service support phone number, 2-7
- shock specifications, A-3
- single fan modules
 - replacing, 4-27
- slide-rail installation, C-2
- software
 - preinstalled, 1-3
 - supported operating systems, 1-3
- Solaris 10 operating system, 1-3
- specifications
 - environmental, A-3
 - physical, A-1
 - power, A-2
- Sun Studio 11 software, 1-3
- SunSolve web site, 2-7
- Supplemental CD, 1-4
- support contacts, 2-7
- SUSE Linux Enterprise Server
 - accessing software, 1-3
 - supported versions, 1-3
- system identification button, 1-5, 1-6
- system identification LED, 1-5, 1-6
- system management, 1-4

T

- technical assistance contacts, 2-7
- temperature derating, A-3
- temperature specifications, A-3
- Tools and Drivers CD
 - accessing from PXE server, B-8
 - Broadcom NetXtreme software, B-8
 - contents, B-1
 - description, 1-4
 - diagnostics software, B-1
 - driver installation scripts, B-1
 - setting up on PXE server, B-5
 - updating BIOS and BMC firmware, B-2
- tools for maintenance procedures, 4-2
- troubleshooting, 2-2 to 2-7
 - CD or DVD, 2-5
 - external device, 2-6
 - hard disk drive, 2-5
 - hung or frozen server, 2-5
 - keyboard, 2-5

- memory, 2-6
- mouse, 2-5
- network status indicator, 2-4
- overview, 2-2
- power problems, 2-4, 2-5
- procedures, 2-4 to 2-6
- USB device, 2-4
- video problems, 2-6

U

- USB connectors
 - features, 1-2
 - location, 1-5
 - troubleshooting, 2-4

V

- vibration specifications, A-3
- video problems, troubleshooting, 2-6
- visual inspection
 - external, 2-2
 - internal, 2-3

W

- warranty information, 2-7
- weight of system, A-1
- width of system, A-1
- Windows RIS CD, 1-4
- Windows Server 2003, supported versions, 1-3