

Sun Fire X4470 Server

Service Manual



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Using This Documentation

This service manual explains how to replace parts in Oracle's Sun Fire X4470 Server and how to use and maintain the system.

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

- "Product Downloads" on page xi
- "Documentation and Feedback" on page xii
- "Support and Training" on page xiii

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Sun Fire X4470 Server Service Manual Overview

This chapter provides an overview of the Sun Fire X4470 Server.

It contains the following topics:

- [Section 1.1 “System Overview” on page 1-1](#)
- [Section 1.2 “Server Front Panel Features” on page 1-10](#)
- [Section 1.3 “Server Back Panel Features” on page 1-11](#)
- [Section 1.4 “Performing Service Related Tasks” on page 1-12](#)

1.1 System Overview

Oracle’s Sun Fire X4470 Server is a 3 rack unit (RU) rackmount server that uses the Intel Xeon 7500 platform. This section describes the major features, components, and capabilities of the server.

1.1.1 Intel Xeon 7500 Platform

The Intel Xeon 7500 platform is based on the Intel Xeon Processor 7500 Series and uses the Intel 7500 Chipset I/O hub (IOH) as its primary chipset. The platform uses the Intel QuickPath Interface (QPI), a high-speed, differentially signaled, point-to-point interface that forms a communication fabric among the CPUs and IOHs in the system.

The Sun Fire X4470 Server uses two Intel 7500 Chipset I/O hubs, each connected to two of the four CPUs. One of these I/O hubs is designated the legacy I/O hub and has a connection to the Intel I/O Controller Hub 10 (ICH10) southbridge component.

1.1.2 Block Diagrams

[FIGURE 1-1](#) shows a block diagram for a Sun Fire X4470 Server with four CPUs.

[FIGURE 1-2](#) shows a block diagram for a Sun Fire X4470 Server with two CPUs.

Note – In the diagrams, the PCIe SAS/RAID Controller is shown as installed in Slot 2. If a particular SAS/RAID Controller has specific cooling requirements, it might have to be installed in Slot 4. For information about cooling requirements, refer to the *Sun Fire X4470 Server Product Notes* (820-0704).

FIGURE 1-1 Four CPU Block Diagram

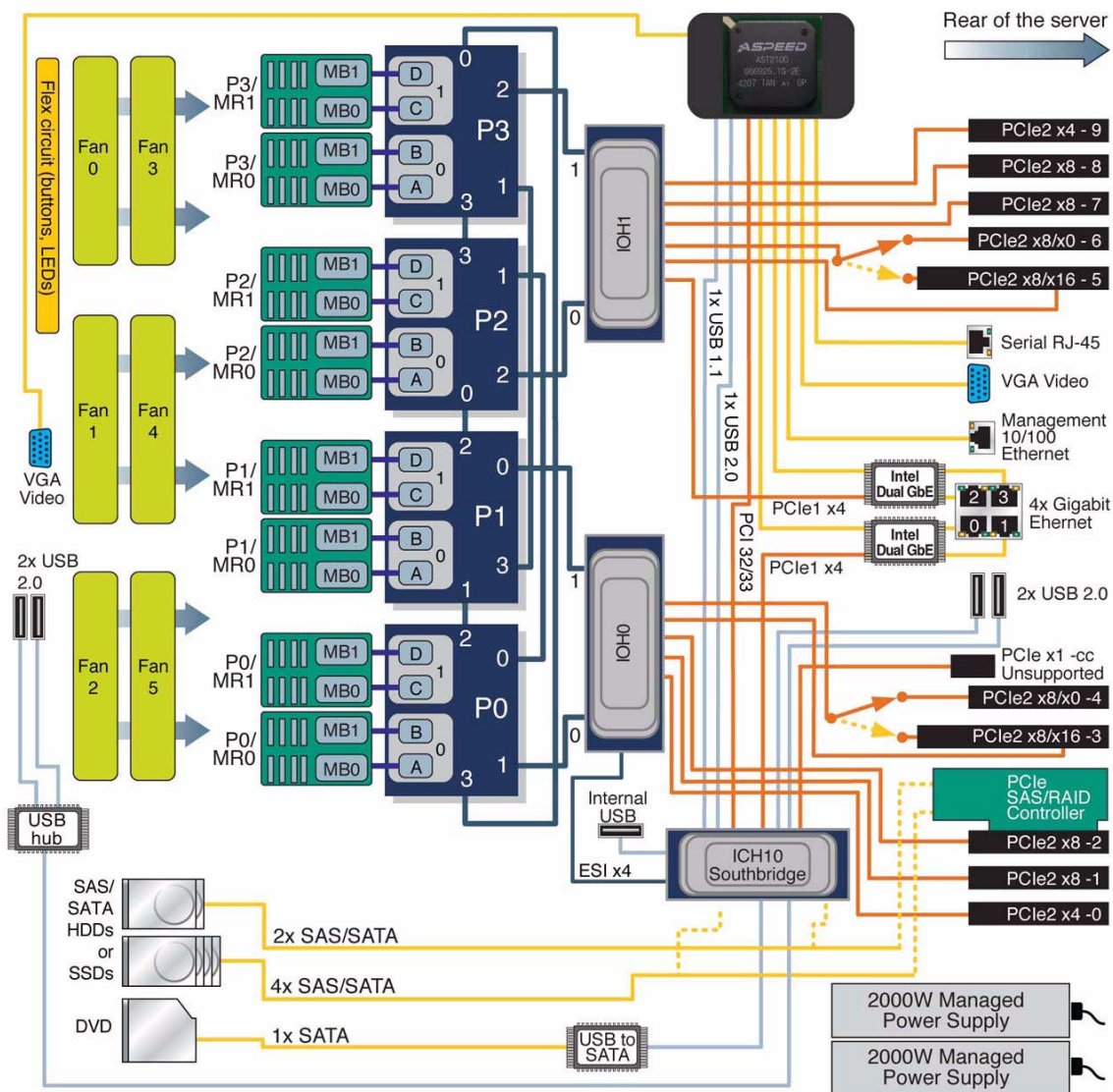
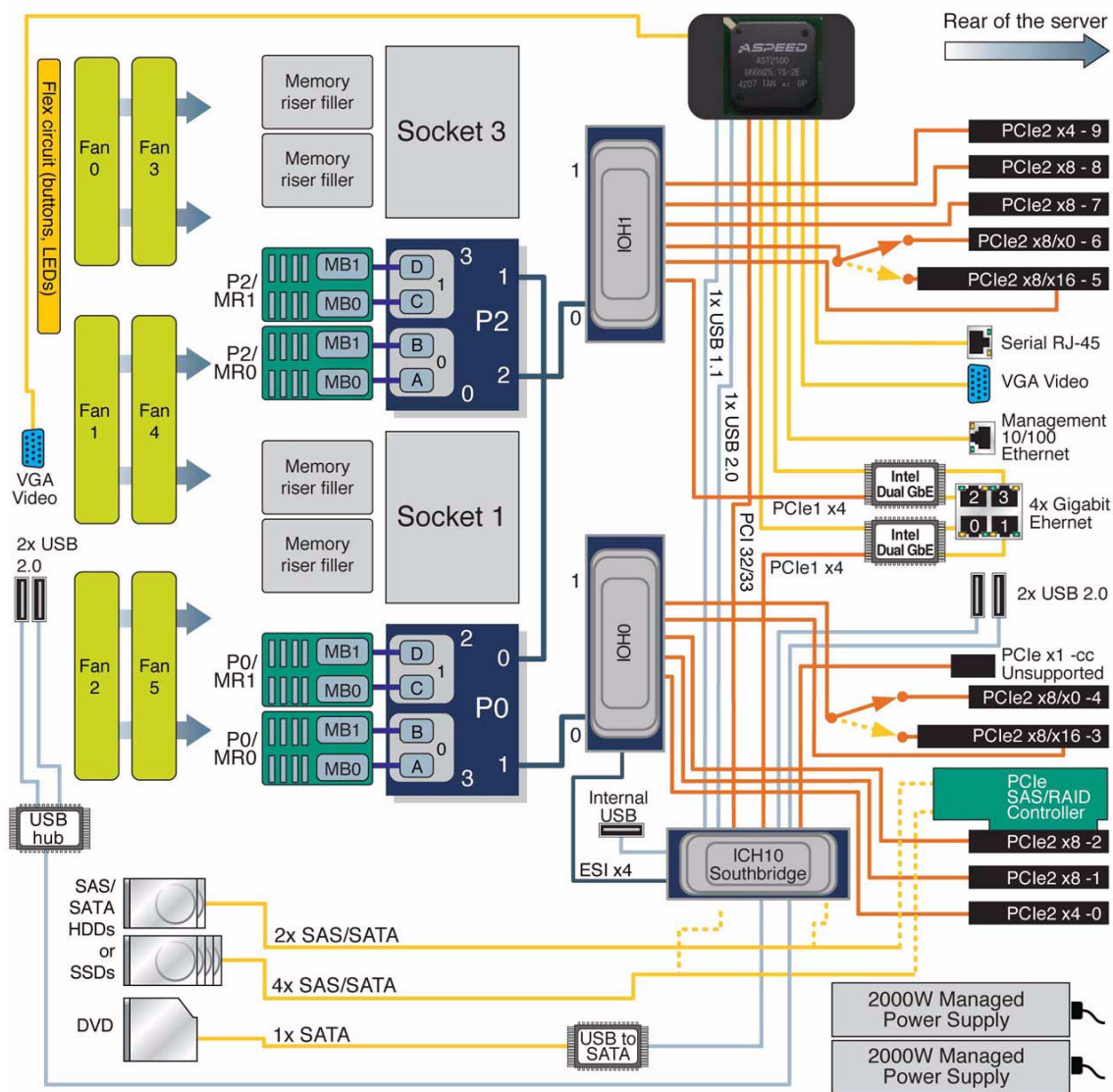


FIGURE 1-2 Two CPU Block Diagram



1.1.3 CPUs

The Sun Fire X4470 Server supports two or four CPUs, as shown in [FIGURE 1-1](#) and [FIGURE 1-2](#). The two-CPU configuration must have CPUs (with heatsinks) in sockets 0 and 2 and heatsink filler panels installed in sockets 1 and 3.

In a two-CPU configuration, all three QPI interconnects and both CPUs must be operational. The four-CPU configuration offers a greater level of resiliency with redundant QPI interconnects that allow working CPUs to route around a disabled CPU as the system starts.

Features of each Intel Xeon Processor 7500 Series include:

- Up to eight cores with Hyper-Threading (two threads/core)
- Up to 24MB shared last level cache
- 45nm process technology
- Two integrated memory controllers with four Intel Scalable Memory Interconnects (SMI channels)
 - Supports speeds of DDR3-800, 978 and 1067 MT/s via an Intel 7500 Scalable Memory Buffer
- Four full-width, bidirectional Intel QuickPath interconnects (QPI links)
 - 4.8, 5.86, or 6.4 GT/s (9.6 to 12.8 GB/s per direction)
 - Automatic self-healing by degrading to half-width or quarter-width link operation
- CPU Thermal Design Power (TDP) of 130W, 105W, or 95W

1.1.4 Memory

Each CPU in the Sun Fire X4470 Server has four SMI channels leading to Intel 7500 Scalable Memory Buffers (located on two memory risers). Each memory buffer has an SMI link to the CPU and two DDR3 interfaces. Each SMI interface can operate at speeds of 4.8, 5.86, and 6.4 GT/s, which correspond to DDR3 operation at 978 or 1067 MT/s. From the CPU to the Intel 7500 Scalable Memory Buffer, the SMI interface supports 11 lanes (9 data + 1 CRC + 1 spare). From the Intel 7500 Scalable Memory Buffer to the CPU, the SMI interface supports 14 lanes (12 data + 1 CRC + 1 spare). The CPU retries memory transactions that incur a CRC error. For persistent errors, the SMI link has spare lanes for automatic self-healing.

The system supports a maximum of eight memory risers (4 CPU configuration) or four memory risers (2 CPU configuration). Each riser houses 8 DIMM slots for the four DDR3 channels. The system can operate with 0, 2, 4, 6 or 8 DIMMs on a given riser. For maximum performance, install at least two ranks of DIMMs on every available DDR3 channel (for example, 4 DIMMs per riser with two risers per CPU).

Each of two memory controllers in a CPU operates its two SMI channels as a lock-step pair. The memory controller treats each pair of DDR3 channels behind the two memory buffers as a 144-bit-wide DRAM interface. As a result, the DIMMs must be installed in pairs, with identical DIMMs in each pair.

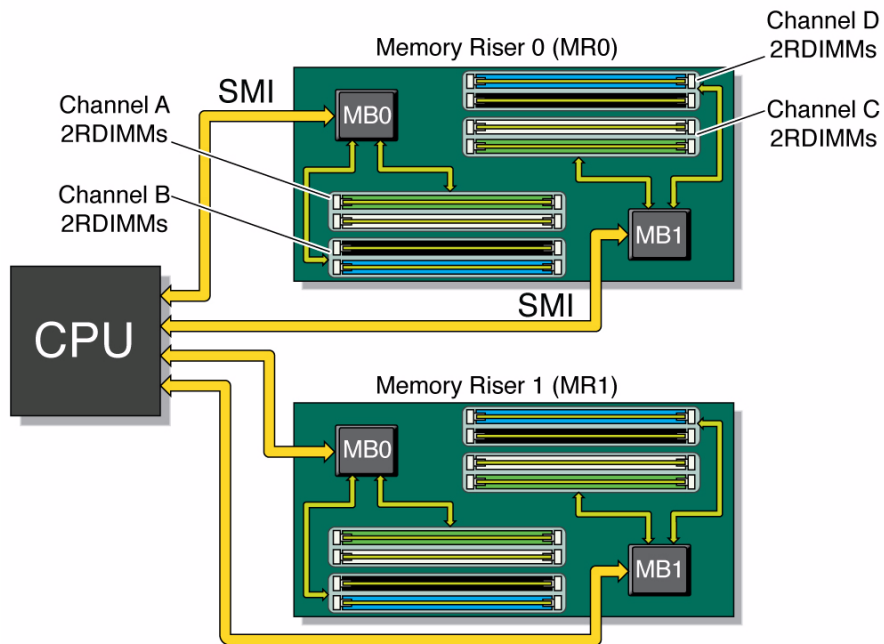
The DDR3 interfaces include the following features:

- Accommodates x4 and x8 Single-Rank, Dual-Rank, Quad-Rank RDIMMs (Single-Rank and Quad-Rank DIMMs are not currently offered with the server.)
- Supports up to 2 RDIMMs per DDR3 channel (8 DIMM slots per memory riser)
- DDR3 speeds: 978 or 1067 MT/s (dictated by SMI speeds of CPUs)
- DRAM Technology: 1 or 2 GB die, 1.5-volt operation
- DIMM Capacity: 2, 4, 8, 16 GB (16 GB with QR DIMMs only)
 - Currently supported DIMMs are dual-rank in 2-, 4-, and 8-GB sizes

For more information about CPUs, memory risers, and memory layout, including guidelines for populating memory risers and DIMMs, see [Section 4.1 “Servicing Memory Risers and DIMMs \(CRU\)”](#) on page 4-1.

FIGURE 1-3 shows the architecture of the server memory.

FIGURE 1-3 Memory Architecture



1.1.5 Cooling

The Sun Fire X4470 Server is cooled from front to back. Cooling occurs in two areas of the chassis, separated by a plastic dividing wall. In the power supply cooling zone, fans at the back of the power supplies cool the drive bays as well as the power

supplies, by drawing air into the depressurized zone at the right of the chassis. In the main cooling zones, six 92-mm high-performance fans, arranged in two rows for redundancy, cool the motherboard, memory risers, and I/O cards. The motherboard is divided into three zones and each pair of fans is separately regulated to cool that zone. Since the main cooling zones are pressurized, it is important to maintain the seal of the dividing wall so that the power supply units can draw air through the drive bay.

The unrestricted airflow over the motherboard minimizes system noise. Dividing the cooling into zones allows for greater use of system resources, since each zone can operate independently at its highest efficiency.

FIGURE 1-4 shows the cooling zones.

FIGURE 1-4 Server Cooling Zones

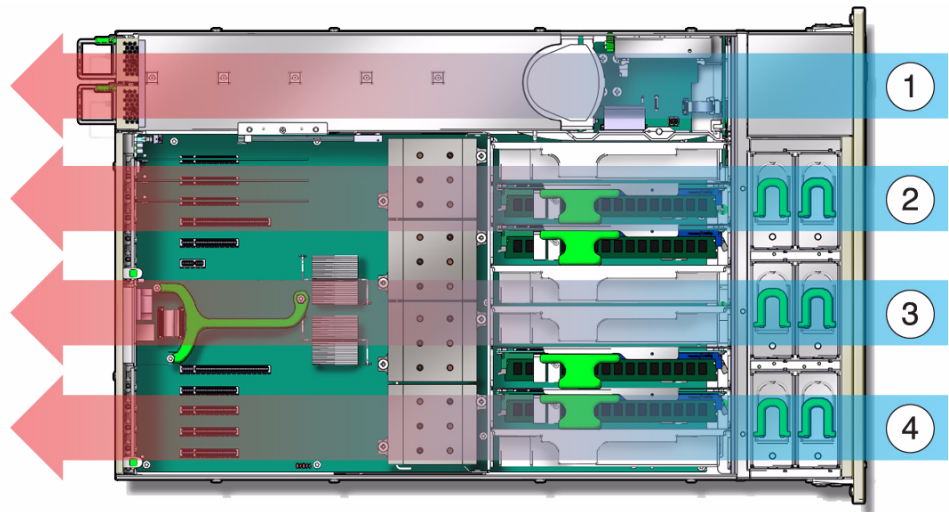


Figure Legend

-
- | | |
|---|---------------------------|
| 1 | Power supply cooling zone |
| 2 | Chassis cooling zone 2 |
| 3 | Chassis cooling zone 1 |
| 4 | Chassis cooling zone 0 |
-

1.1.6 Input/Output (I/O)

For internal storage, the server chassis provides:

- Six 2.5-inch drive bays, accessible through the front panel. The supported drive interfaces for each bay depend on the HBA chosen.
- An optional slot-loading DVD+/-RW drive on front of the server, below the drive bays. This SATA DVD connects to a USB-SATA bridge, so that it appears to the system software as a USB storage device.
- One internal high-speed USB port on the motherboard. This port can hold a USB flash device for system booting.

In addition, the service processor can present virtual USB storage devices to the system.

The ICH10 southbridge on the motherboard provides six built-in SATA2 (3-Gbit/s) ports, accessible through two SAS4I connectors (Port 0-3 and Port 4-5). When configured with any 2.5-inch SAS drives, the system must be equipped with one PCI Express (PCIe) Gen-2 internal HBA card to support the front 2.5-inch drive bays.

Each offered PCIe Gen-2 HBA has 8 SAS2/SATA2 internal ports accessible through two SAS4I connectors (Port 0-3 and Port 4-7). Since the drive cage has only six bays, Port 6-7 of an internal HBA are not used in this system.

With an internal SAS-2 HBA card installed in a PCIe slot, the six bays can handle any combination of supported SAS and SATA hard disk drives (HDDs) and solid-state drives (SSDs). If the disk backplane is connected to the built-in ICH10 SATA-2 controller rather than an HBA card, only SATA storage devices will operate. (When a RAID volume is configured on the HBA card, the drive bays for the RAID members must hold the same type of storage device.)

1.1.7 Summary of Supported Components and Capabilities

The following table summarizes the components and capabilities of the Sun Fire X4470 Server.

TABLE 1-1 Sun Fire X4470 Server Components and Capabilities

Component	X4470 Server
CPU	<p>Supported configurations:</p> <ul style="list-style-type: none"> • Two processors installed in socket 0 and socket 2 • Four processors installed in sockets 0 through 3 <p>For the latest information on CPU specifications, go to http://www.oracle.com/technetwork/server-storage/sun-x86/overview/index.html and navigate to the applicable web site.</p>
Memory	<p>Up to eight memory riser modules are supported (two risers per CPU) in the server chassis. Each riser module supports eight RDIMMs, allowing up to sixteen RDIMMs per processor.</p> <ul style="list-style-type: none"> • A 2-socket system using four riser modules populated with 8-GB RDIMMs supports a maximum of 256 GB of system memory. • A 4-socket system using eight riser modules populated with 8-GB RDIMMs supports a maximum of 512 GB of system memory.
Storage devices	<p>For internal storage, the server chassis provides:</p> <ul style="list-style-type: none"> • Six 2.5-inch drive bays, accessible through the front panel. The supported drive interfaces for each bay depend on the HBA chosen. • An optional slot-loading DVD+/-RW drive on front of the server, below the drive bays. This SATA DVD connects to a USB-SATA bridge, so that it appears to the system software as a USB storage device. • One internal high-speed USB port on the motherboard. This port can hold a USB flash device for system booting.
USB 2.0 ports	Two front, two rear, and one internal
VGA ports	<p>One front and one rear high-density DB-15 video ports.</p> <p>Note - The rear VGA port supports VESA Device Data Channel for monitor identification.</p>
PCI Express 2.0 I/O slots	<p>Ten PCI Express 2.0 slots that accommodate low-profile PCIe cards. All slots support x8 PCIe connectors. Two slots are also capable of supporting x16 PCIe connectors.</p> <ul style="list-style-type: none"> • Slots 0 and 9: x4 electrical interface • Slots 1, 2, 4, 6, 7, and 8: x8 electrical interface • Slots 3 and 5: x8 or x16 electrical interface (x16 connector) <p>Note - PCI Express slots 3 and 5 will operate as x16 interfaces only when an x16 capable card is installed and the adjacent slot (4 or 6) is unpopulated.</p>
Cluster card slot	One specialized slot dedicated for use in storage appliances. The Sun Fire X4470 Server does not support populating this slot with standard PCIe cards.
PCI Express I/O cards	<p>For a list of I/O cards that are customer-orderable options, go to http://www.oracle.com/technetwork/server-storage/sun-x86/overview/index.html and navigate to the applicable web site.</p>

TABLE 1-1 Sun Fire X4470 Server Components and Capabilities *(Continued)*

Component	X4470 Server
Ethernet ports	Four 10/100/1000 RJ-45 GbE ports on rear panel Each Network Interface Controller (NIC) supports Intel QuickData Technology, Intel I/OAT, VMDq, PCI-SIG SR-IOV, IPSec offload, and LinkSec.
Service processor	Integrated Baseboard Management Controller (BMC), which supports the industry-standard IPMI feature set. Supports remote KVM, DVD and floppy over IP (optional license required). Includes serial port. Supports Ethernet access to SP through a dedicated 10/100BaseT management port and optionally through one of the host GbE ports (sideband management).
Power supplies	Two hot-swappable power supplies, each with 2000 Watts capacity (from 200 Volts to 240 Volts), auto-ranging, light load efficiency mode and redundant over-subscription.
Cooling fans	Six hot-swappable, redundant fans at chassis front (top-loading); redundant fans at each power supply.
Management software	Oracle Integrated Lights Out Manager (ILOM)



1.2 Server Front Panel Features

FIGURE 1-5 shows the Sun Fire X4470 Server front panel and describes its components.

FIGURE 1-5 Server Front Panel Features

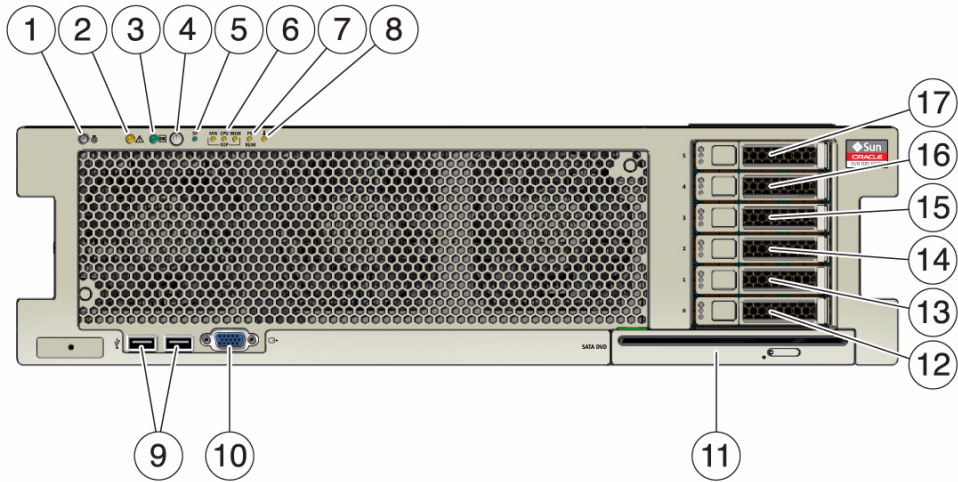


Figure Legend

1	Locate LED/Locate button: white	10	DB-15 video connector
2	Service Action Required LED: amber	11	SATA DVD drive (optional)
3	Power/OK LED: green	12	Hard disk drive 0 (optional)
4	Power button	13	Hard disk drive 1 (optional)
5	SP OK/Fault LED: green/amber	14	Hard disk drive 2 (optional)
6	Service Action Required LEDs (3) for Fan Module (FAN), Processor (CPU) and Memory: amber	15	Hard disk drive 3 (optional)
7	Power Supply (PS) Fault (Service Action Required) LED: amber	16	Hard disk drive 4 (optional)
8	Over Temperature Warning LED: amber	17	Hard disk drive 5 (optional)
9	USB 2.0 connectors (2)		

1.3 Server Back Panel Features

FIGURE 1-6 shows the Sun Fire X4470 Server back panel and describes its components.

FIGURE 1-6 Server Back Panel Features

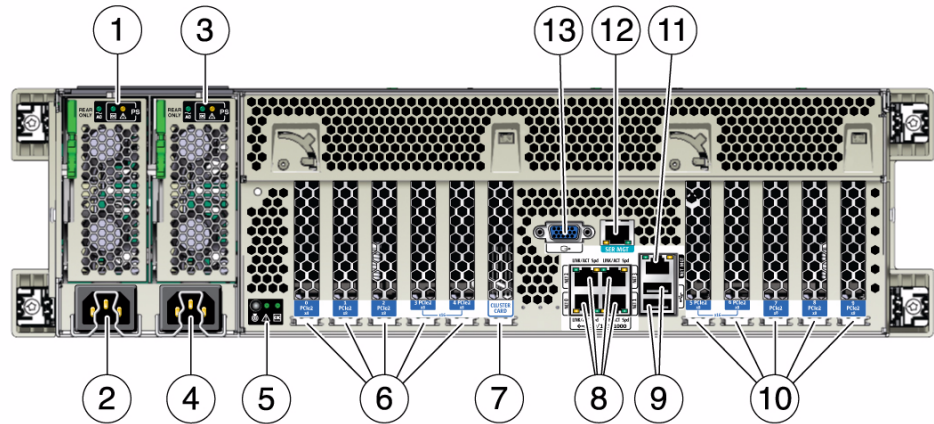


Figure Legend

1 Power supply unit 0 status indicator LEDs: Service action required: amber DC OK: green AC OK: green or amber	8 Network (NET) 10/100/1000 ports: NET0–NET3
2 Power supply unit 0 AC inlet	9 USB 2.0 connectors (2)
3 Power supply unit 1 status indicator LEDs: Service action required: amber DC OK: green AC OK: green or amber	10 PCIe card slots 5–9
4 Power supply unit 1 AC inlet	11 Service processor (SP) network management (NET MGT) port
5 System status LEDs: Power/OK: green Service action required: amber Locate: white	12 Serial management (SER MGT)/RJ-45 serial port
6 PCIe card slots 0–4	13 DB-15 video connector
7 Cluster card slot	

1.4 Performing Service Related Tasks

This guide contains information and procedures for maintaining and servicing your server. [TABLE 1-2](#) identifies the sections in this guide that describe the task you want to perform.

TABLE 1-2 Service Tasks

Service Task	See:
Understand server features and processes	Section 1.1 “System Overview” on page 1-1
Identify server LEDs and buttons	Section 1.2 “Server Front Panel Features” on page 1-10 Section 1.3 “Server Back Panel Features” on page 1-11
Prepare to service your server	Chapter 2
Replace or upgrade a FRU or CRU	Chapter 3 Chapter 4 Chapter 5
Return the server to operation after servicing	Chapter 6
Service your server at boot time	Chapter 7
Troubleshoot your server	Chapter 8
Review server hardware specifications	Appendix A
Review BIOS Setup Utility menus	Appendix B
Review connector pinouts	Appendix C

Preparing to Service the Sun Fire X4470 Server

This chapter includes the information you might need before servicing the Sun Fire X4470 Server.

It contains the following topics:

- Section 2.1 “Location of Replaceable Components” on page 2-1
- Section 2.2 “Tools and Equipment Needed” on page 2-3
- Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3
- Section 2.4 “Positioning the Server for Maintenance” on page 2-4
- Section 2.5 “Releasing the Cable Management Arm” on page 2-5
- Section 2.6 “Powering Off the Server” on page 2-6
- Section 2.7 “Removing the Server Top Cover” on page 2-8
- Section 2.8 “Removing or Installing Filler Panels” on page 2-9
- Section 2.9 “Attaching Devices to the Server” on page 2-10

2.1 Location of Replaceable Components

FIGURE 2-1 identifies the replaceable component locations on the Sun Fire X4470 Server, with the top cover removed.

FIGURE 2-1 Replaceable Component Locations

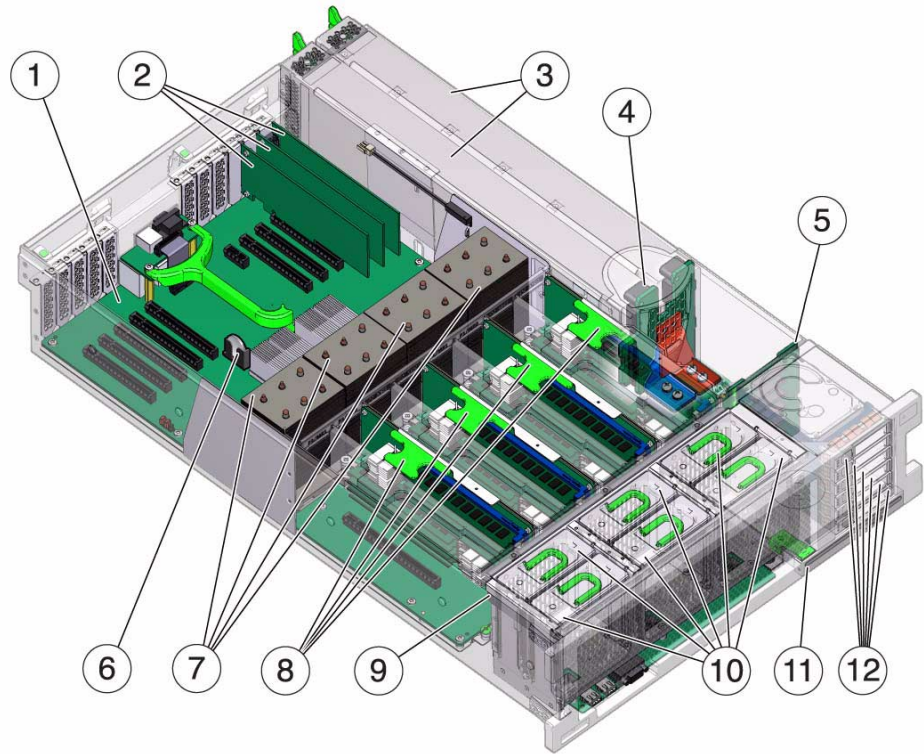


Figure Legend

-
- | | |
|----|------------------------|
| 1 | Motherboard |
| 2 | Low-profile PCIe cards |
| 3 | Power supplies |
| 4 | Power supply backplane |
| 5 | Disk backplane |
| 6 | System lithium battery |
| 7 | CPUs and heatsinks |
| 8 | Memory risers |
| 9 | Fan board |
| 10 | Fan modules |
| 11 | DVD drive |
| 12 | Hard disk drives (HDD) |
-

2.2 Tools and Equipment Needed

To service the system, you need the following tools:

- No. 2 Phillips screwdriver
- ESD mat and grounding strap

You might also need a system console device, such as one of the following:

- PC or workstation with RS-232 serial port
- ASCII terminal
- Terminal server
- Patch panel connected to a terminal server

2.3 Performing Electrostatic Discharge and Static Prevention Measures

Electrostatic discharge (ESD) sensitive devices, such as the PCIe cards, hard drives, CPUs, and memory cards, require special handling.



Caution – Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.



Caution – You must disconnect AC power cords to both power supplies before servicing some of the components documented in this guide.

2.3.1 Using an Antistatic Wrist Strap

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

Note – An antistatic wrist strap is not shipped with the servers. However, antistatic wrist straps are included with customer-replaceable units (CRUs), field-replaceable units (FRUs) and optional components.

2.3.2 Using an Antistatic Mat

Place ESD-sensitive components such as printed circuit boards on an antistatic mat. You can use the following items as antistatic mats:

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

2.4 Positioning the Server for Maintenance

To remove and replace components in the Sun Fire X4470 Server, you must extend the server to the maintenance position.

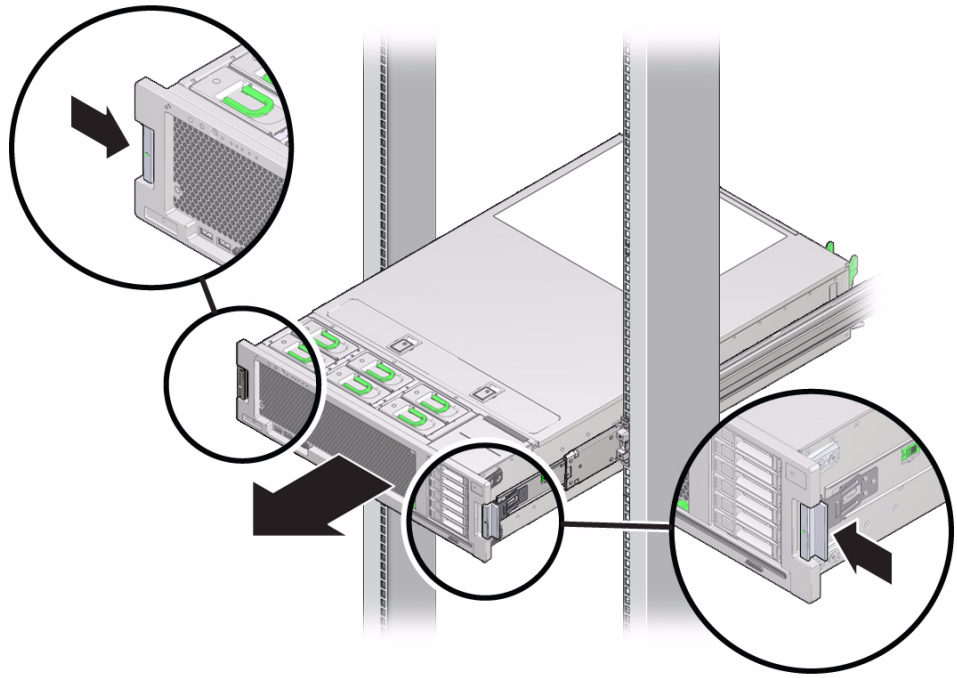
▼ Extend the Server to the Maintenance Position

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

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

2. **From the front of the server, release the two slide release latches (FIGURE 2-2).**
Squeeze the green slide release latches to release the slide rails.

FIGURE 2-2 Slide Release Latch



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

2.5 Releasing the Cable Management Arm

For some service procedures, if you are using a cable management arm (CMA), you might have to release the CMA to gain access to the back of the chassis.

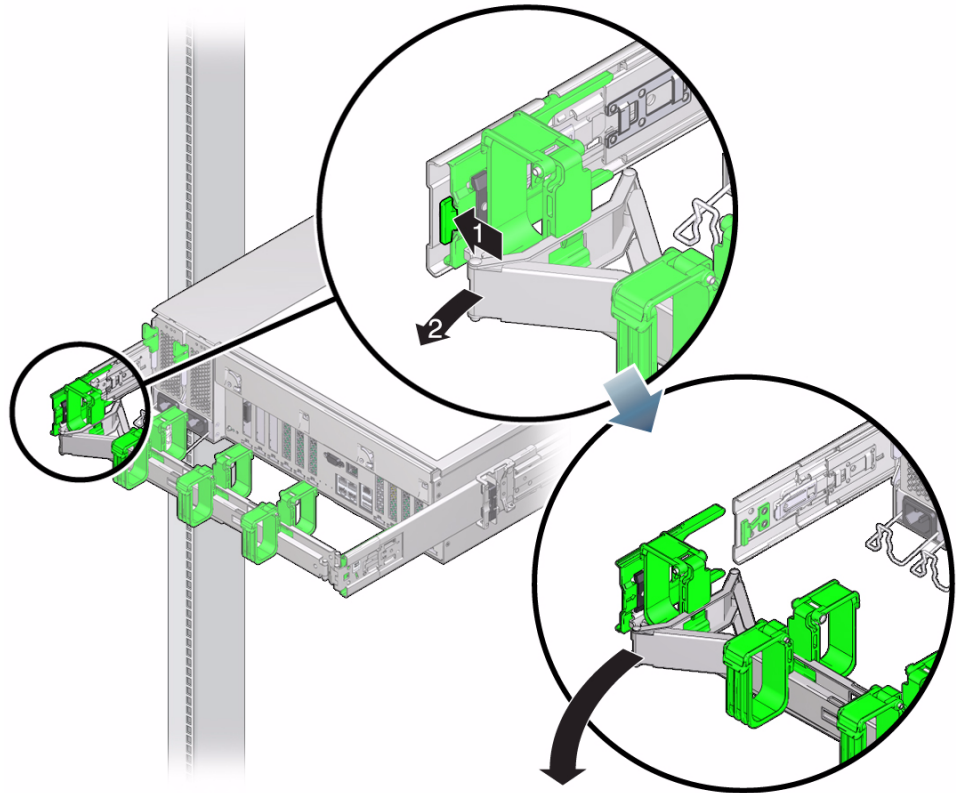
▼ Release the CMA

Refer to [FIGURE 2-3](#) for the following procedure.

1. Press and hold the tab [1].
2. Swing the CMA out of the way [2].

When you have finished with the service procedure, swing the CMA closed and latch it to the left rack rail.

FIGURE 2-3 Releasing the Cable Management Arm



2.6 Powering Off the Server

Many service procedures require you to completely power off the server. Use one of the methods described in the following table.

TABLE 2-1 Shutdown Procedures

Shutdown	Method
Graceful shutdown	<p>Press and release the Power button on the front panel. Pressing the Power button causes Advanced Configuration and Power Interface (ACPI)-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately. When the main power is off, the Power/OK LED on the front panel flashes slowly, indicating that the server is in standby power mode.</p> <p>Note - The Power/OK LED might flash several times at 1 Hz to indicate that power-off is going to occur soon. Main power is still on during this 1-Hz flashing. To complete the power-off procedure, disconnect the AC power cords from the inlets on the power supplies on the back panel of the server.</p>
Emergency shutdown	<p>Press and hold the Power button for at least five seconds until the main power is off and the server enters standby power mode. When the main power is off, the Power/OK LED on the front panel flashes slowly, indicating that the server is in standby power mode.</p> <p>Caution - All applications and the operating system will be closed abruptly without saving changes. Data loss or corruption might occur.</p> <p>To complete the power-of procedure, disconnect the AC power cords from the inlets on the power supplies on the back panel of the server.</p>
Oracle Integrated Lights Out Manager (ILOM) SP CLI shutdown	<p>See “Power Off the Server Using the Service Processor Command-Line Interface” on page 2-7.</p>



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

▼ Power Off the Server Using the Service Processor Command-Line Interface

You can use the Oracle ILOM service processor (SP) to perform a graceful shutdown of the server and ensure that all of your data is saved and the server is ready for restart. For additional information, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection.

1. Log in as root. Type:

```
ssh root@service_processor_ip_address
```

Password: *root_password* (The default password is changeme.)

The Oracle ILOM command-line interface (CLI) prompt appears (->).

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

2. Power down the server. Type:

-> **stop /SYS** (for a Graceful shutdown as defined in [TABLE 2-1](#))

-> **stop -f /SYS** (for an Emergency Shut as defined in [TABLE 2-1](#))

3. Disconnect the AC power cords from the inlets on the power supplies on the back panel of the server.

2.7 Removing the Server Top Cover

Servicing some components requires you to remove the top cover from the server.

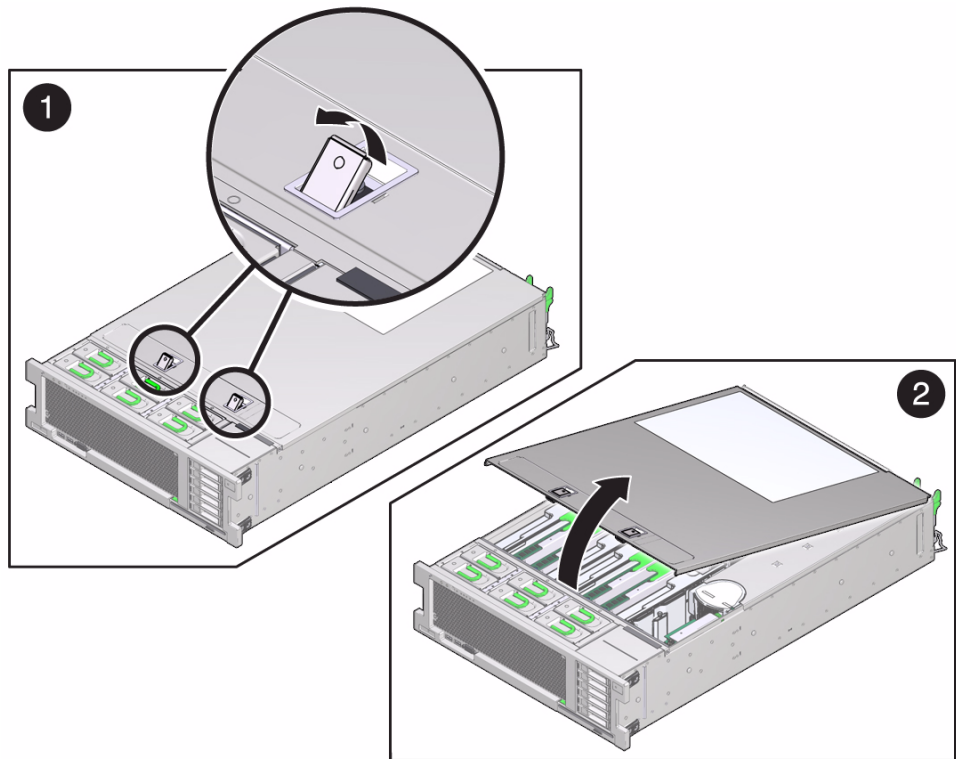


Caution – Removing the top cover without properly powering down the server and disconnecting the AC power cords from the power supplies will result in a chassis intrusion switch failure. This failure causes the server to be immediately powered off. Any changes you make to the memory riser or DIMM configurations will not be properly reflected in the service processor's inventory until you replace the top cover.

▼ Remove the Server Top Cover

1. Ensure that the AC power cords are disconnected from the server power supplies.
2. To unlatch the server top cover, insert your fingers under the two cover latches and simultaneously lift both latches in an upward motion ([FIGURE 2-4](#))[1].

FIGURE 2-4 Removing the Server Top Cover



3. Lift the cover slightly and slide it toward the front of the server chassis about 0.5 inch (12 mm).
4. Lift up and remove the top cover [2].

2.8 Removing or Installing Filler Panels

Each server is shipped with module-replacement filler panels for CPUs, disk drives (HDD or SSD), memory modules (DIMMs), the DVD drive, and the PCIe cards. A filler panel is an empty metal or plastic enclosure that does not contain any functioning system hardware or cable connectors.

The filler panels are installed at the factory and must remain in the server until you replace them with a purchased module to ensure proper airflow through the system. If you remove a filler panel and continue to operate your system with an empty

module slot, the server might overheat due to improper airflow. For instructions on removing or installing a filler panel for a server component, refer to the section in this guide about servicing that component.

2.9 Attaching Devices to the Server

As part of servicing the Sun Fire X4470 Server, you might have to connect devices to the server. The following sections describe the locations of connectors on the server and the order in which you should attach cables and devices to the server.

2.9.1 Connector Locations

FIGURE 2-5 shows and describes the locations of the Sun Fire X4470 Server back panel connectors.

FIGURE 2-5 Server Back Panel Connectors

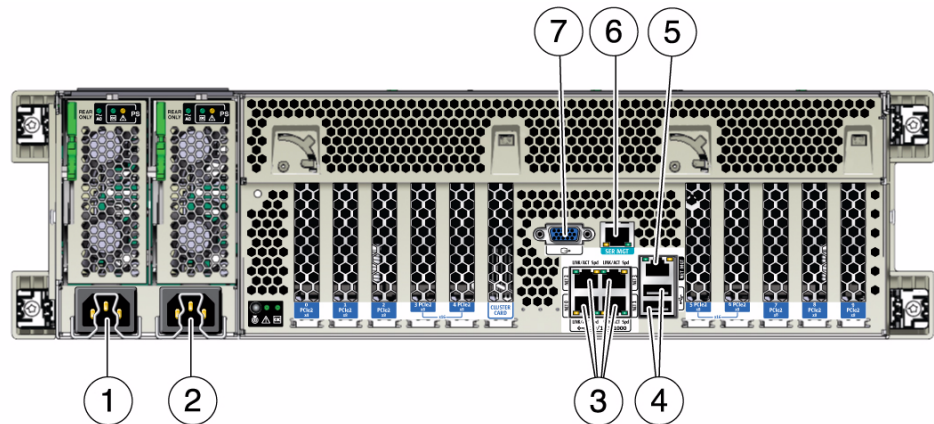


Figure Legend

1	Power supply unit 0 AC inlet	5	Service processor (SP) network management (NET MGT) Ethernet port
2	Power supply unit 1 AC inlet	6	Serial management (SER MGT)/RJ-45 serial port
3	Gigabit Ethernet ports NET-0, 1, 2, 3	7	DB-15 video connector
4	USB 2.0 ports		

2.9.2 Cabling the Server

When connecting cables to the server, connect them in the order described in the following procedure.

▼ Cable the Server

Connect external cables to the server in the following order. Refer to [FIGURE 2-5](#) for the location of connectors on the back of the server.

1. **Connect an Ethernet cable to the Gigabit Ethernet (NET) connectors as needed for OS support.**
2. **(Optional) If you plan to interact with the system console directly, connect any additional external devices, such as a mouse and keyboard, to the server's USB connectors and/or a monitor to the DB-15 video connector.**
3. **If you plan to connect to the Oracle ILOM software over the network, connect an Ethernet cable to the Ethernet port labeled NET MGT.**

Note – The service processor (SP) uses the NET MGT (out-of-band) port by default. You can configure the SP to share one of the server's four 10/100/1000 Ethernet ports instead. The SP uses only the configured Ethernet port.

4. **If you plan to access the Oracle ILOM command-line interface (CLI) using the management port, connect a serial null modem cable to the RJ-45 serial port labeled SER MGT.**

Servicing CRU Components That Do Not Require Server Power Off

This chapter describes how to service customer-replaceable units (CRUs) that do not require you to power off the server.

It contains the following topics:

- [Section 3.1 “Servicing Disk Drives \(CRU\)” on page 3-1](#)
- [Section 3.2 “Servicing Fan Modules \(CRU\)” on page 3-6](#)
- [Section 3.3 “Servicing Power Supplies \(CRU\)” on page 3-11](#)

Note – Depending on your configuration, in some cases you might have to power off the server when removing or replacing the disk drive.

3.1 Servicing Disk Drives (CRU)

This section describes how to remove and install disk drives.

Note – The server provides six 2.5-inch drive bays, accessible through the front panel. The supported drive interfaces for each bay depend on the installed HBA.

3.1.1 Disk Drive Status LED Reference

[FIGURE 3-1](#) shows the disk drive status LEDs. [TABLE 3-1](#) describes the LEDs and their functions.

FIGURE 3-1 Disk Drive Status LEDs

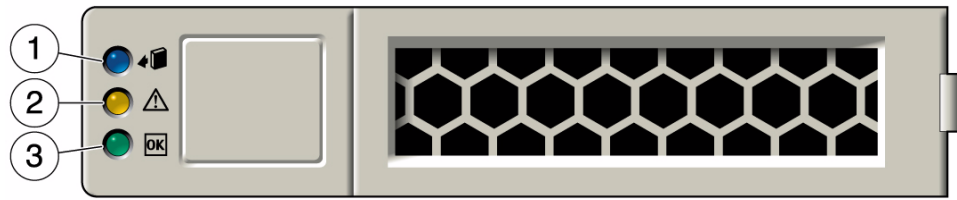





TABLE 3-1 Disk Drive Status LED Descriptions

Legend	LED	Symbol	Color	Lights When...
1	OK to Remove		Blue	A disk drive can be removed safely during a hot-plug operation.
2	Service Action Required		Amber	The system is running and the disk drive is faulty. The front and rear panel Service Action Required LEDs are also lit if the system detects a disk drive fault.
3	OK/Activity		Green	Drive is properly inserted into the system. LED will flash off and on when the drive is being accessed.

3.1.2 Removing and Installing Disk Drives and Disk Drive Filler Panels

Use the following procedures to remove and install disk drives and disk filler panels from the server.

▼ Remove a Disk Drive Filler Panel

1. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

2. Identify the disk drive filler panel you want to remove.

3. On the disk drive filler panel you want to remove, push the release button to open the latch.
4. Grasp the latch and pull the filler panel out of the drive slot.



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



Caution – Whenever you remove a disk drive filler panel, you should replace it with another filler panel or a disk drive; otherwise, the server might overheat due to improper airflow.

▼ Remove a Disk Drive

Refer to [FIGURE 3-2](#) when completing the following procedure.

1. **Attach an antistatic wrist strap.**

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

2. **Identify the disk drive you want to remove.**

The amber Service Action Required LED on the drive might be lit.

See [Section 3.1.1 “Disk Drive Status LED Reference”](#) on page 3-1.

3. **Determine whether you can replace the disk drive using the hot-plug procedure or whether you need to power off the server and use the cold-swap procedure.**

A cold-swap is required if the disk drive:

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

4. **Do one of the following:**

- To cold-swap the drive, power off the server. Complete one of the procedures described in [Section 2.6 “Powering Off the Server”](#) on page 2-6.
- To hot-plug the drive, take the drive offline. This removes the logical software links to the drive and prevents any applications from accessing it. For information on how to take a disk drive offline, refer to the *Sun Disk Management Overview* (820-6350).

5. **On the drive you plan to remove, push the disk drive release button to open the latch.**

6. Grasp the latch and pull the drive out of the drive slot.

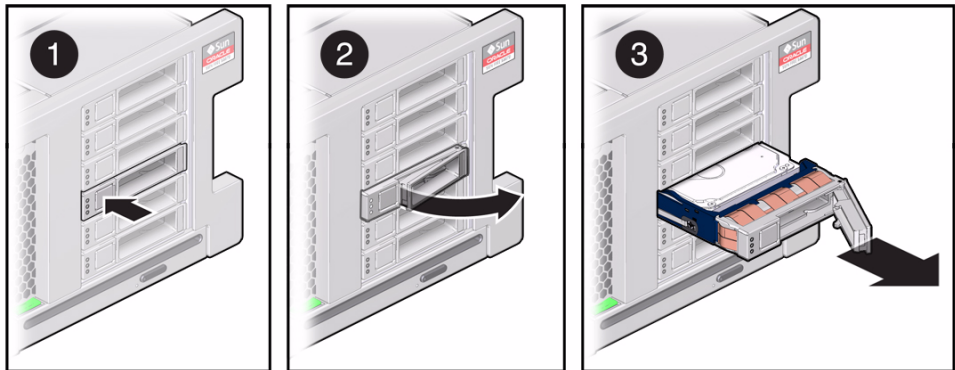


Caution – The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.



Caution – Whenever you remove a disk drive, you should replace it with another disk drive or a filler panel; otherwise, the server might overheat due to improper airflow.

FIGURE 3-2 Removing a Disk Drive



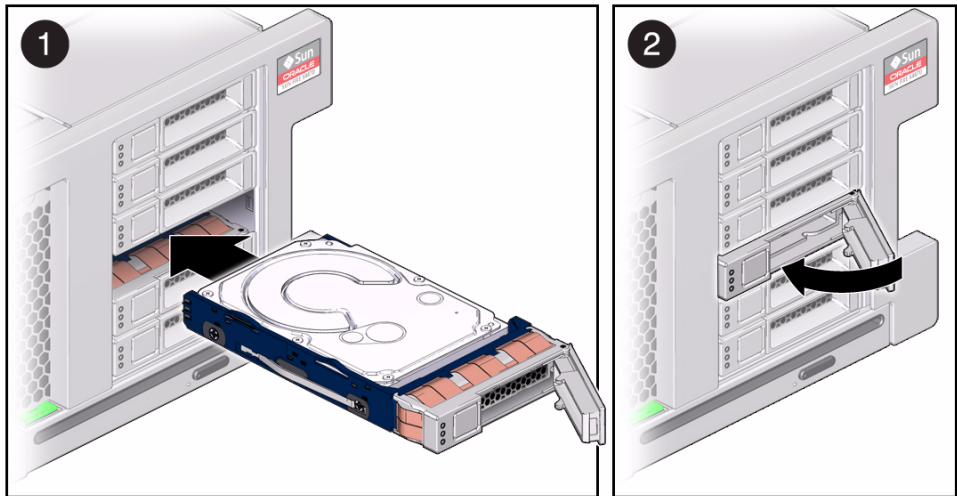
▼ Install a Disk Drive

Installing a disk drive into a server is a two-step process. You must first install the disk drive into the drive slot, and then configure that drive to the server. Refer to [FIGURE 3-3](#) when completing the following procedure.

Note – If you removed an existing disk drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed. Disk drives are physically addressed according to the slot in which they are installed.

1. Unpack the disk drive and place it on an antistatic mat.
2. Verify that the release lever on the disk drive is fully opened.
3. Slide the drive into the drive slot until it is fully seated.

FIGURE 3-3 Installing a Disk Drive



4. Close the latch to lock the drive in place.
5. Do one of the following:
 - If you have cold-swapped the drive, restore power to the server. Complete the procedure described in [Section 6.3 “Powering On the Server”](#) on page 6-3.
 - If you have hot-plugged the drive, configure the disk drive. Refer to the *Sun Disk Management Overview* (820-6350) for information.

▼ Install a Disk Drive Filler Panel

1. Verify that the release lever on the disk drive filler panel is fully opened.
2. Slide the disk drive filler panel into the drive slot until it is fully seated.
3. Close the latch to lock the filler panel in place.

3.2 Servicing Fan Modules (CRU)

This section describes how to remove and install fan modules.

3.2.1 About Server Fans

The six fan modules are located at the front of the chassis; you can access them without removing the server cover.



Caution – While the fan modules do provide some cooling redundancy, if a fan module fails, replace it as soon as possible to maintain server availability. When you remove one of the fans in the back row, you must replace it within 30 seconds to prevent overheating of the server.

3.2.2 Fan Module LED Reference

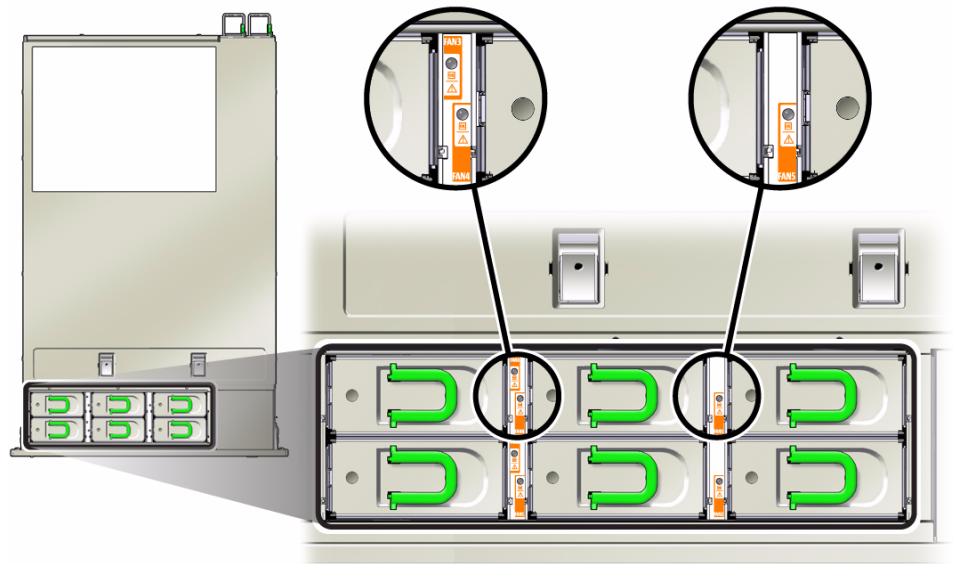
Each fan module contains LEDs that are visible from the top of the server. [TABLE 3-2](#) describes fan module LEDs and their functions.

TABLE 3-2 Fan Module Status LEDs

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

[FIGURE 3-4](#) shows the fan module LED status locations.

FIGURE 3-4 Fan Module Status LEDs



3.2.3 Detecting Fan Module Failure

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

- Front and rear Service Action Required LEDs
- Fan Module Service Action Required (TOP) LED on the front of the server
- Fan Fault LED on or adjacent to the faulty fan module

The system Overtemp LED might light if a fan fault causes an increase in system operating temperature.

See [Section 1.2 “Server Front Panel Features” on page 1-10](#) and [Section 1.3 “Server Back Panel Features” on page 1-11](#) for locations of system LEDs.

3.2.4 Removing and Installing Fan Modules

Use the following procedures to remove and install fan modules from the server.

▼ Remove a Fan Module

Refer to [FIGURE 3-5](#) when completing the following procedure.



Caution – If you remove one of the fans in the back row, replace it within 30 seconds to prevent overheating of the server.



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

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

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

The Service Action Required LEDs are located on the fan module as shown in [FIGURE 3-4](#).

3. Using your thumb and forefinger, grasp the handle on the fan module and lift it out of the server.

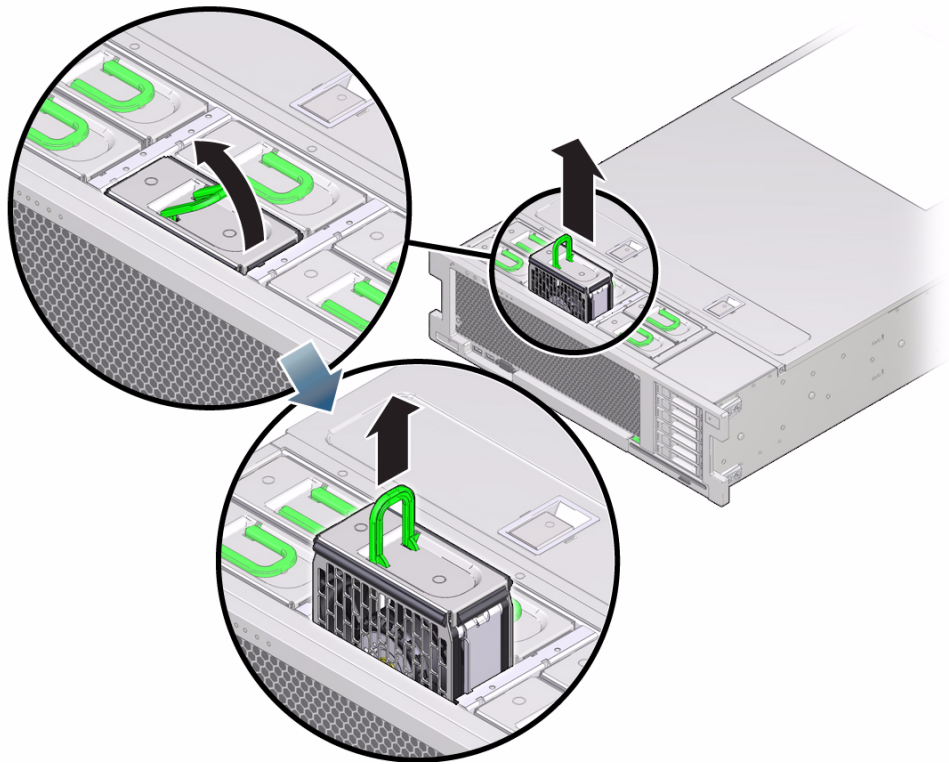


Caution – When removing a fan module, do not rock it back and forth. Rocking the fans modules can cause damage to the fan board connectors.



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

FIGURE 3-5 Removing a Fan Module



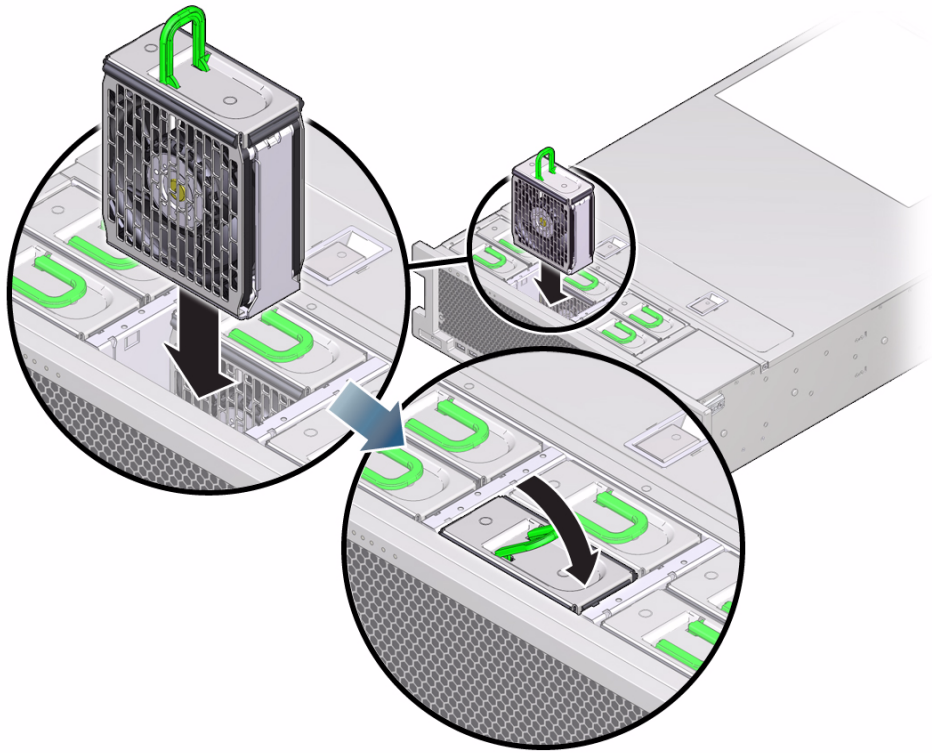
▼ Install a Fan Module

Refer to [FIGURE 3-6](#) when completing the following procedure.

1. **Unpack the replacement fan module and place it on an antistatic mat.**
2. **Install the replacement fan module into the server.**

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

FIGURE 3-6 Installing a Fan Module



3. Apply firm pressure to fully seat the fan module.
4. Verify that the Service Action Required LED on the replaced fan module is not lit.
5. Verify that the Top Fan LED and the Service Action Required LED on the front of the server are not lit.

See [Section 1.2 “Server Front Panel Features” on page 1-10](#) and [Section 1.3 “Server Back Panel Features” on page 1-11](#) for locations of system LEDs.

Note – If you are replacing a fan module when the server is powered down, the LEDs might stay lit until power is restored to the server and the server can determine that the fan module is functioning properly.

6. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position” on page 6-2](#).

3.3 Servicing Power Supplies (CRU)

The power supplies on the Sun Fire X4470 Server are redundant. That is, the server needs only one power supply to operate. Redundant power supplies enable you to remove and replace a power supply without shutting down the server, provided that the other power supply is online and working.

The server offers two redundancy modes for the power supplies. Light load efficiency mode (LLEM) places PS1 in a warm standby condition while PS0 carries the entire load more efficiently by itself. If PS0 loses AC power or is extracted for replacement, PS1 takes over the load automatically. Some rare internal failures of PS0 could cause the server to lose power faster than PS1 can take over.

Disabling the LLEM Policy causes the power supplies to share the load at all times, at the expense of efficiency during light loads. For information about configuring policies, refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server* (821-0702).



Caution – If a power supply fails and you do not have a replacement available, to ensure proper airflow, leave the failed power supply installed in the server until you replace it with a new power supply.

This section describes how to remove and install power supplies.

3.3.1 Power Supply LED Reference

Each power supply contains a series of LEDs on the back panel of the system as shown in [FIGURE 3-7](#).

FIGURE 3-7 Power Supply Status LEDs

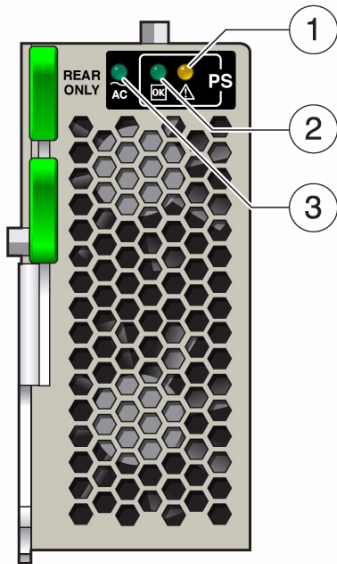


TABLE 3-3 describes the functions of the LEDs.

TABLE 3-3 Power Supply Status LED Descriptions

Legend	LED	Symbol	Color	Lights When...
1	Service Action Required		Amber	The power supply is faulty. Service action is required.
2	DC OK		Green	Both DC outputs (3.3V standby and 12V main) are active and within regulation.
3	AC OK		Green or Amber	<ul style="list-style-type: none">• Green: AC voltage within operating range is applied to the power supply.• Amber: AC range below operating range is applied to the power supply.

3.3.2 Detecting a Power Supply Failure

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

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

See [Section 1.2 “Server Front Panel Features” on page 1-10](#) and [Section 1.3 “Server Back Panel Features” on page 1-11](#) for locations of system LEDs.

3.3.3 Removing and Installing Power Supplies

Use the following procedures to remove and install power supplies.



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

▼ Remove a Power Supply

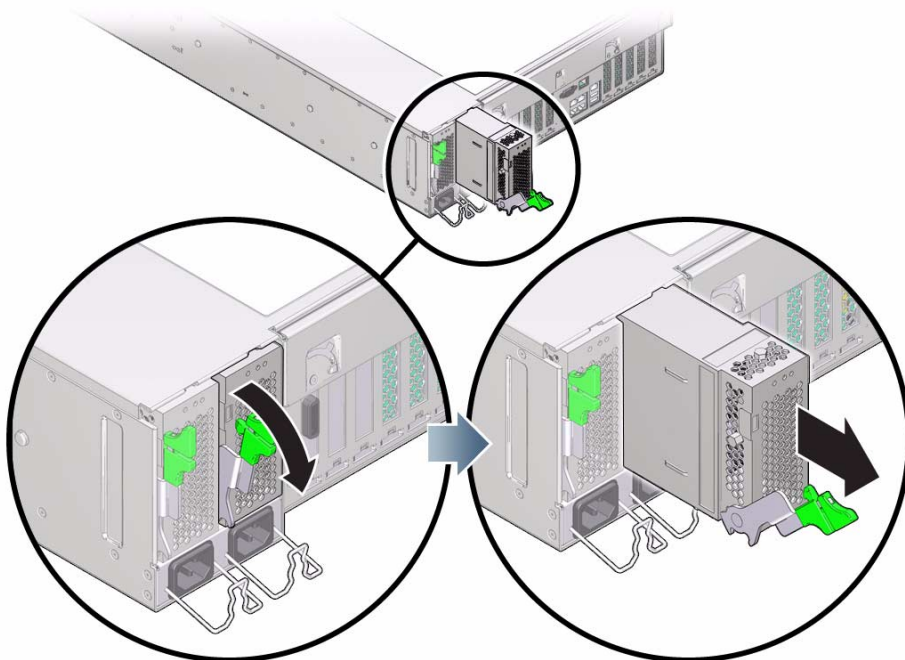
Refer to [FIGURE 3-8](#) when completing the following procedure.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**
See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3](#).
 - b. **If necessary, release the cable management arm to access the power supplies.**
See [Section 2.5 “Releasing the Cable Management Arm” on page 2-5](#).
2. **Identify which power supply (0 or 1) requires replacement.**
A lit Service Action Required LED on a power supply indicates that a failure was detected.
3. **Disconnect the power cord from the faulty power supply.**
4. **Press down on the release latch.**
5. **Slide the power supply out of the chassis.**



Caution – Whenever you remove a power supply, you should replace it with another power supply; otherwise, the server might overheat due to improper airflow. If a new power supply is not available, leave the failed power supply installed until it can be replaced.

FIGURE 3-8 Removing a Power Supply



▼ Install a Power Supply

Refer to [FIGURE 3-9](#) when completing this procedure.

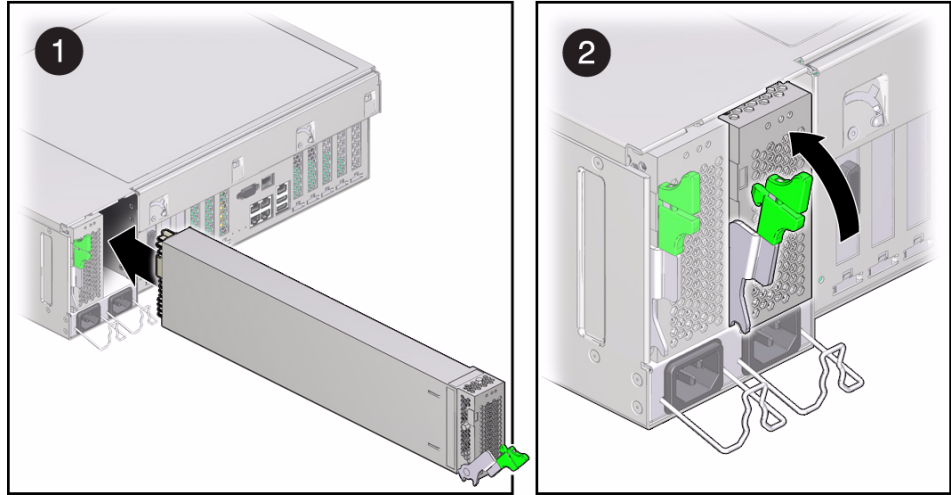


Caution – Install an A239A or A239C power supply, labeled for upright installation, in the Sun Fire X4470 Server. The A239A/A239C power supply correctly exhausts air from the rear of the server. Do not install an A239 or A239B power supply, which might cause the system to overheat and shut down.

1. Align the power supply with the empty power supply chassis bay.

2. Slide the power supply into the bay until it is fully seated.
3. Move the release latch up to secure the power supply in place.

FIGURE 3-9 Installing a Power Supply



4. Reconnect the power cord to the power supply.
5. Verify that the AC Present LED is lit.
See [Section 3.3.1 “Power Supply LED Reference”](#) on page 3-11.

6. Verify that the following LEDs are not lit:

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

See [Section 1.2 “Server Front Panel Features”](#) on page 1-10 and [Section 1.3 “Server Back Panel Features”](#) on page 1-11 for locations of system LEDs.

Servicing CRU Components That Require Server Power Off

This chapter describes how to service customer-replaceable units (CRUs) that require you to power down the system before servicing.

It contains the following topics:

- [Section 4.1 “Servicing Memory Risers and DIMMs \(CRU\)” on page 4-1](#)
- [Section 4.2 “Servicing PCIe Cards \(CRU\)” on page 4-16](#)
- [Section 4.3 “Servicing the DVD Drive and DVD Driver Filler Panel \(CRU\)” on page 4-23](#)
- [Section 4.4 “Servicing the System Lithium Battery \(CRU\)” on page 4-26](#)

4.1 Servicing Memory Risers and DIMMs (CRU)



Caution – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3](#).

When replacing or upgrading a DIMM on the server you should consider the following:

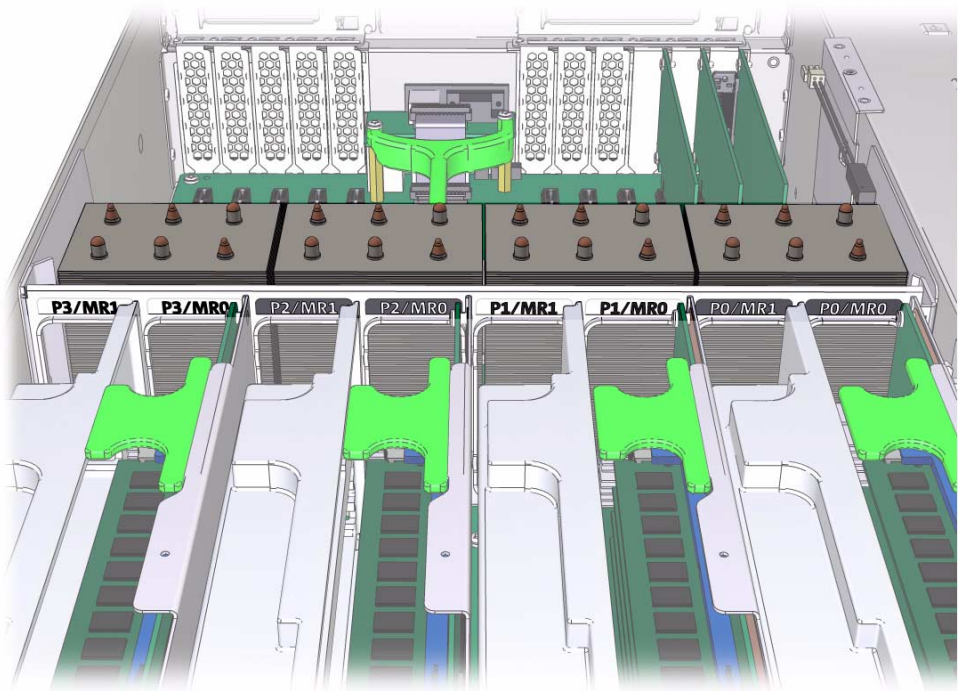
- Physical layout of the CPUs, memory risers, and DIMMs
See [Section 4.1.1 “CPUs, Memory Risers, and DIMMs Physical Layout” on page 4-2](#).

- Memory riser population rules
See [Section 4.1.2 “Memory Riser Population Rules”](#) on page 4-3.
- Memory riser DIMM population rules
See [Section 4.1.3 “Memory Riser DIMM Population Rules”](#) on page 4-4.
- Instructions for installing a DIMM
See [“Install a Memory Riser Filler Panel”](#) on page 4-15.
- DIMM rank classifications labels
See [Section 4.1.6 “Supported DIMMs”](#) on page 4-5.

4.1.1 CPUs, Memory Risers, and DIMMs Physical Layout

The physical layout of the CPUs, memory risers, and DIMMs is shown in [FIGURE 4-1](#) and [FIGURE 4-2](#).

FIGURE 4-1 CPU and Memory Riser Layout



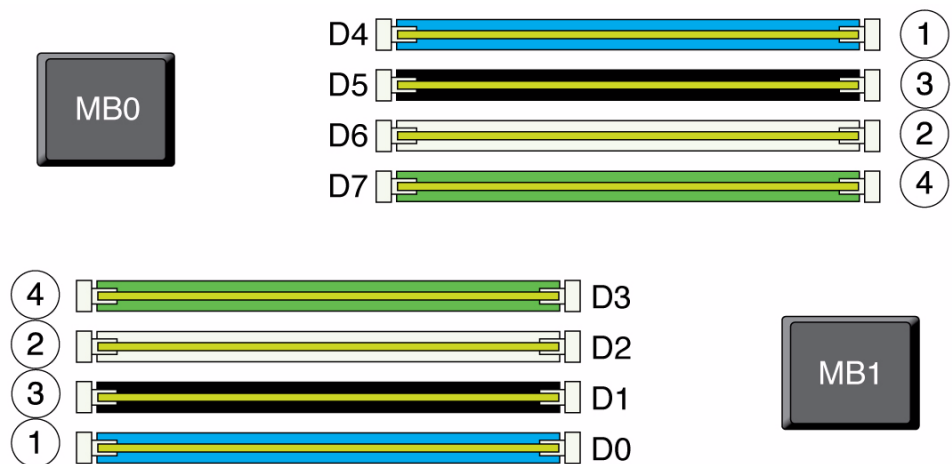
4.1.2 Memory Riser Population Rules

Note – The system firmware checks if the installed CPUs are for the Sun Fire X4470 Server or Sun Fire X4470 M2 Server. The system firmware raises a fault for memory risers whose model belongs with the other family of CPUs.

The memory riser population rules for the Sun Fire X4470 Server are as follows:

1. A maximum of two memory risers (numbered MR0 and MR1) are supported per CPU, thus allowing up to eight memory risers in a 4-CPU system, or up to four memory risers in a 2-CPU system.
2. Each memory riser slot in the server chassis must be filled with either a memory riser or filler panel, and each memory riser must be filled with DIMMs and/or DIMM filler panels. For example, in 2-CPU systems, empty CPU sockets (P1 and P3) must have associated memory riser slots populated with two riser filler panels per CPU.
3. Performance-oriented configurations should be configured with two memory risers per CPU. In configurations that do not require two memory risers per CPU, the following guidelines should be followed:
 - First, populate riser slot MR0 for each CPU, starting with the lowest numbered CPU (P0).
 - Then, populate riser slot MR1 for each CPU, starting with the lowest numbered CPU (P0).

FIGURE 4-2 Memory Riser DIMMs Physical Layout and Population Order



4.1.3 Memory Riser DIMM Population Rules

The memory riser DIMM population rules for the Sun Fire X4470 Server are as follows:

1. On each memory riser, every DIMM slot must be filled with a DIMM or a DIMM filler panel.
2. Each CPU can support a maximum of 16 DIMMs (8 DIMMs per riser).
3. DIMMs must be installed in matched pairs of identical DIMMs ([FIGURE 4-2](#)). Memory slot colors correspond to matched DIMM pairs. DIMMs populated in same-colored slots must have the same vendor part number.
4. Within a single DRAM channel, DIMMs must first be populated in the slots that are farthest from the memory buffer. For example, populate D0/D4 before D1/D5, and D2/D6 before D3/D7.

The recommended DIMM population order, as depicted in [FIGURE 4-2](#) is:

- a. D0/D4 (blue slots)
- b. D2/D6 (white slots)
- c. D1/D5 (black slots)
- d. D3/D7 (green slots)

4.1.4 Memory Performance Guidelines

For best system performance, follow these guidelines, which are listed in decreasing order of importance.

1. Provide some DIMMs on every memory riser.
2. Provide DIMMs on every DRAM channel (at least 4 DIMMs per memory riser).
3. For each CPU, have equal total gigabytes on the MR0 and MR1 risers. Memory bandwidth is five percent higher when all pairs of risers have balanced capacity.
4. Spread the memory capacity evenly across the CPUs so the operating system can distribute large memory tasks better.

4.1.4.1 Recommended Memory Placement

For the Sun Fire X4470 Server, the operating speed of the DIMMs does *not* decrease as more DIMMs are installed. For best memory performance, follow these guidelines to replace or add DIMMs in the server. Use one or more sizes of DIMMs, with an even number of DIMMs of each size.

1. Using the largest-capacity DIMMs, add two DIMMs per riser, starting at P0/MR0, continuing through P3/MR1, and then beginning again at P0/MR0 if necessary, until all of the largest-capacity DIMMs are placed.

For installations with one DIMM size, all DIMMs will be placed in this step. For installations with additional DIMMs of different sizes, continue to the next guideline step.

2. Using DIMMs of the next largest capacity, add two DIMMs per riser, starting with risers with the fewest DIMMs and proceeding from P0/MR0, continuing through P3/MR1, and then beginning again at P0/MR0 if necessary, until there are no more DIMMs of this size, or all risers have four DIMMs.

As long as any riser has fewer than four DIMMs, keep repeating this step with the DIMMs of decreasing capacity. When all risers have four DIMMs, continue to the next guideline step.

3. Using DIMMs of the next largest capacity, add two DIMMs per riser to risers with the least total GB. Start from P0/MR0, continue through P3/MR1, and then begin again at P0/MR0 if necessary.

Repeat guideline step 3 with all remaining DIMMs, in decreasing order of DIMM capacity, until all DIMMs are placed.

4.1.5 DIMM Fault Isolation

The eight DIMMs supported on each memory riser card in the Sun Fire X4470 Server are divided into two logical DDR3 channels. The first logical channel contains DIMMs installed in slots D0, D1, D4 and D5. The second logical channel contains DIMMs installed in slots D2, D4, D6 and D7.

When one or more DIMMs within a logical DDR3 channel are faulted, all four DIMMs within that logical channel will be disabled by BIOS on subsequent boots. This isolates the faulty component from the system to ensure that proper operation is not compromised by the presence of the faulty component.

4.1.6 Supported DIMMs

TABLE 4-1 identifies the supported DIMM sizes.

Note – Single-rank and quad-rank DIMMs are not currently offered with the Sun Fire X4470 Server.

TABLE 4-1 Supported DIMM Size and Organization

DIMM Size	Organization
2 GB	2Rx8 (1-Gb DRAM chips)
4 GB	2Rx4 (1-Gb chips)
4 GB	2Rx8 (2-Gb chips)
8 GB	2Rx4 (2-Gb chips)

4.1.7 Removing and Installing Memory Risers, DIMMs, and Filler Panels

Use the following procedures to remove and install memory risers, DIMMs, and filler panels.

▼ Remove a Memory Riser Filler Panel

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server completely.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.

2. Locate the memory riser filler panel you want to remove.

3. Lift the memory riser filler panel straight up to remove it from the memory module socket.



Caution – Whenever you remove a memory riser filler panel, replace it with another filler panel or a memory riser; otherwise, the server might overheat due to improper airflow.

▼ Remove a DIMM Filler Panel

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server completely.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.

2. Locate the memory riser containing the DIMM filler panel you want to remove.

3. Lift the memory riser straight up to remove it from the memory module socket.

4. Locate the DIMM filler panel you want to remove.

5. To remove the DIMM filler panel, do the following:

a. Rotate both DIMM slot ejectors outward as far as they will go.

The filler panel is partially ejected from the socket.

b. Carefully lift the DIMM filler panel straight up to remove it from the socket (FIGURE 4-6).



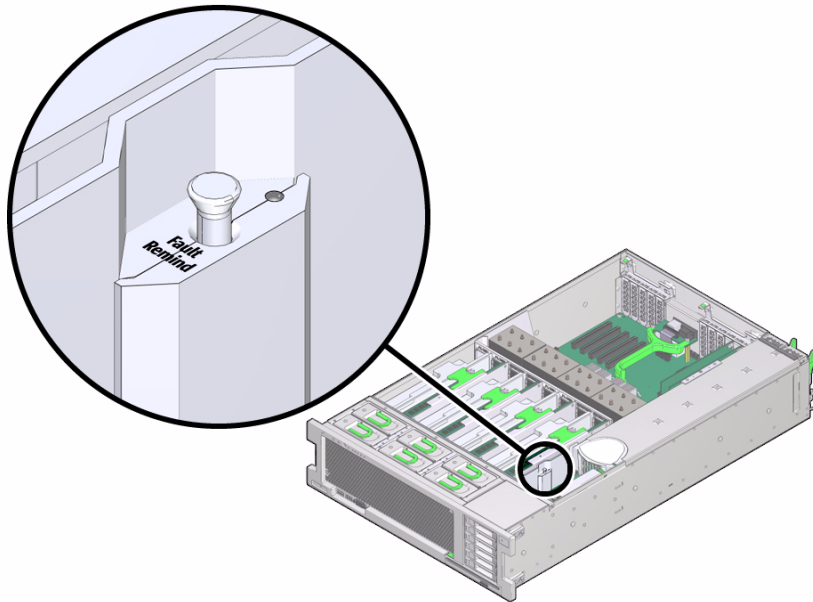
Caution – Whenever you remove a DIMM filler panel, replace it with another filler panel or a DIMM; otherwise, the server might overheat due to improper airflow.

▼ Remove a Memory Riser and DIMM

1. Prepare for servicing:

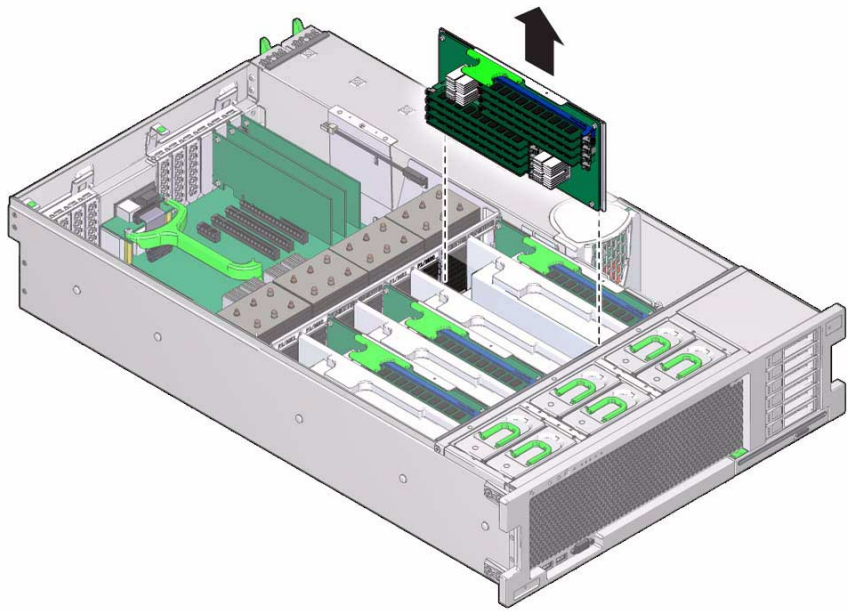
- a. **Attach an antistatic wrist strap.**
See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.
 - b. **Power off the server completely.**
See [Section 2.6 “Powering Off the Server”](#) on page 2-6.
 - c. **Extend the server to the maintenance position.**
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.
 - d. **Remove the top cover.**
See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.
2. **Identify the memory riser with the faulty DIMM by pressing the Fault Remind button on the air divider (FIGURE 4-3).**
 - If the memory riser Service Action Required LED is off: all DIMMs on this riser are operating properly.
 - If the memory riser Service Action Required LED is on (amber): one or more of the DIMMs installed on this riser is faulty or misconfigured.

FIGURE 4-3 Fault Remind Button on the Air Divider



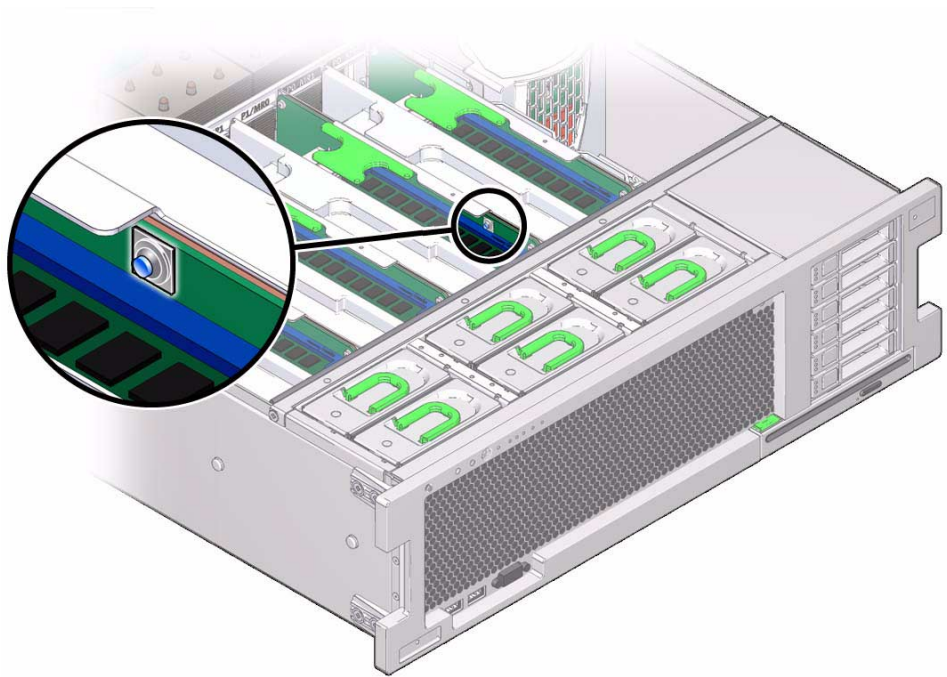
3. **Lift the memory riser that has its Service Action Required LED lit straight up to remove the memory riser from the memory module socket. (FIGURE 4-4).**

FIGURE 4-4 Removing the Memory Riser



4. Identify the faulty or misconfigured DIMM(s) by pressing the Fault Remind button on the memory riser (FIGURE 4-5).
- If the DIMM Service Action Required LED is off: DIMM is operating properly.
 - If the DIMM Service Action Required LED is on (amber): DIMM is faulty or misconfigured and corrective action is required.

FIGURE 4-5 Fault Remind Button on Memory Riser



5. To remove the DIMM do the following (FIGURE 4-6):
 - a. Rotate both DIMM slot ejectors outward as far as they will go.
The DIMM is partially ejected from the socket.
 - b. Carefully lift the DIMM straight up to remove it from the socket.

FIGURE 4-6 DIMM Socket Release and Alignment

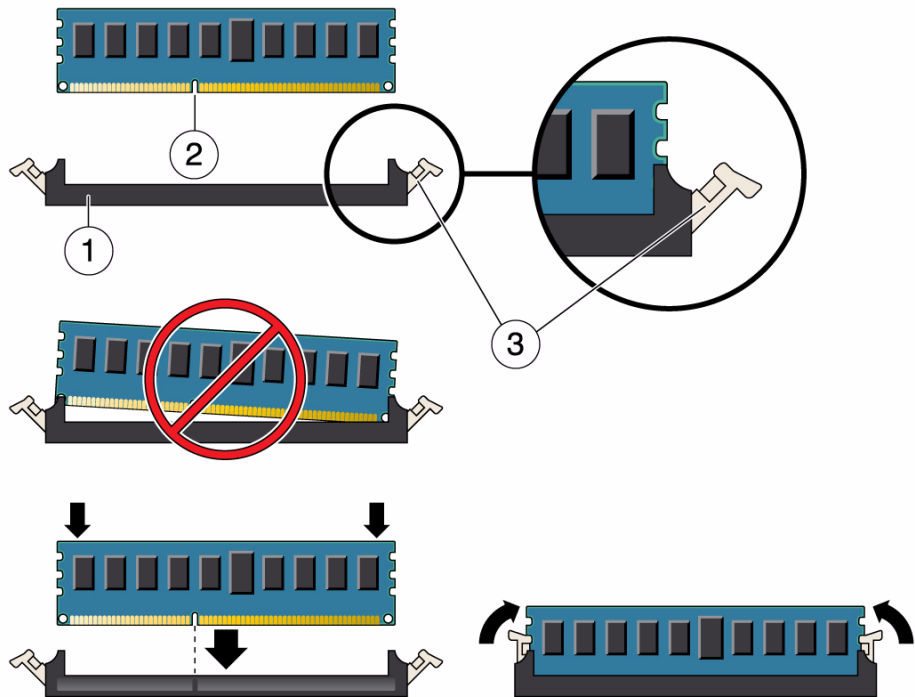


Figure Legend

-
- | | |
|---|---------------------|
| 1 | DIMM connector slot |
| 2 | DIMM connector key |
| 3 | DIMM ejector lever |
-



Caution – Whenever you remove a memory riser or DIMM, you should replace it with another memory riser or a DIMM or a filler panel; otherwise, the server might overheat due to improper airflow.

▼ Install Memory Risers and DIMMs

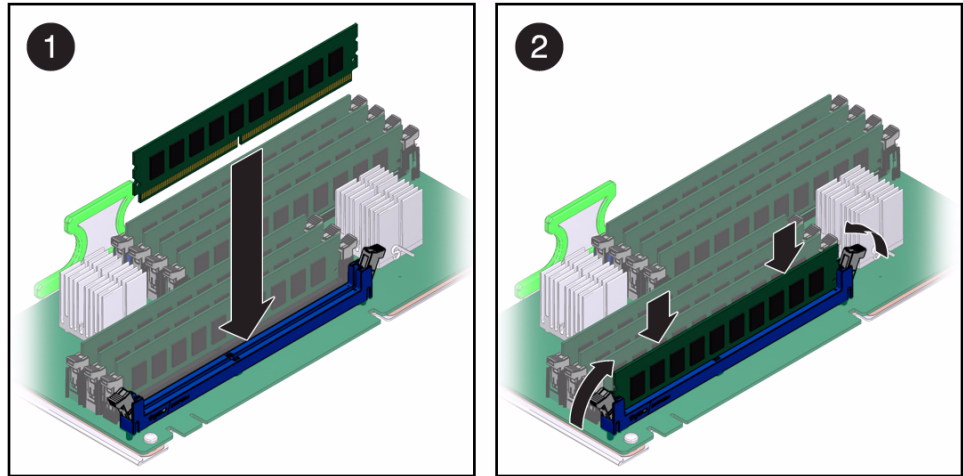
Refer to [FIGURE 4-7](#) and [FIGURE 4-8](#) when completing the following procedure.

1. Unpack the DIMMs and place them on an antistatic mat.
2. Ensure that the ejector levers at both ends of the memory module slot are in a fully open position.

3. Align the DIMM with the empty slot.

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

FIGURE 4-7 Installing DIMMs



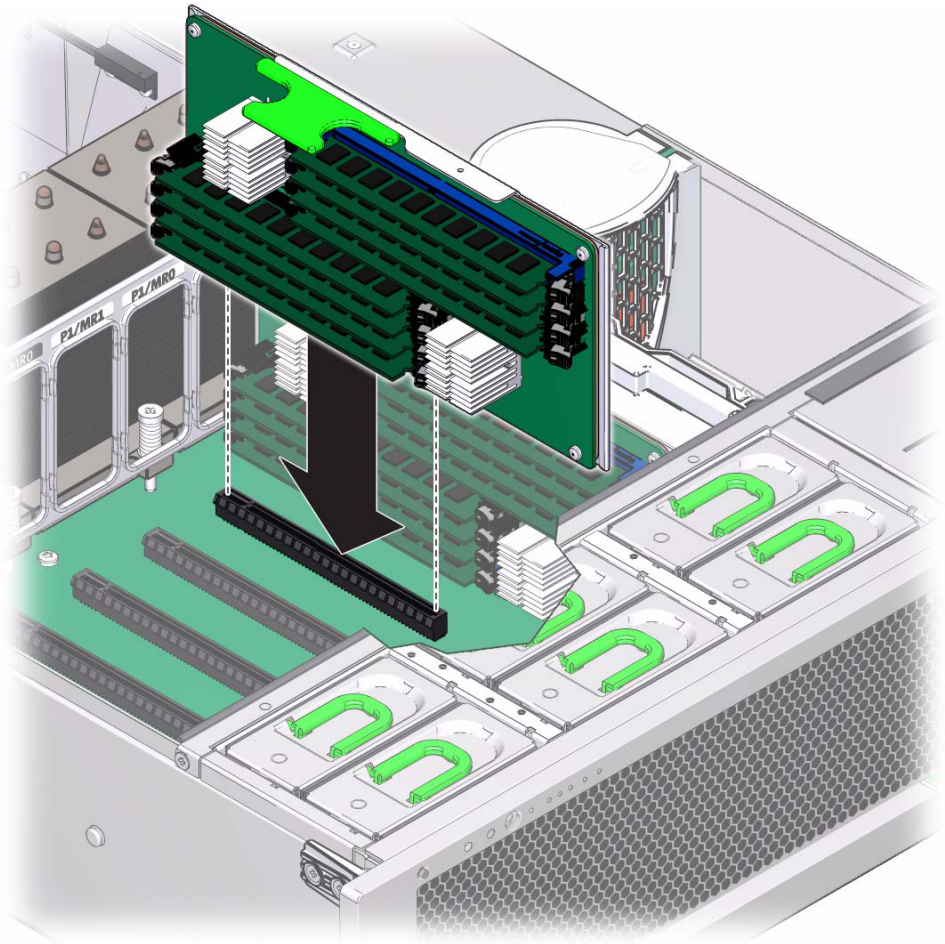
4. Gently press the DIMM into the slot until the ejector tabs lock the DIMM in place.

If the DIMM does not easily seat into the connector, verify that the notch in the DIMM is aligned with the key in the connector as shown in [FIGURE 4-7](#). If the notch is not aligned, damage to the DIMM might occur.

5. Repeat [Step 2](#) through [Step 4](#) until all replacement DIMMs are installed.

6. Push the memory riser module into the associated CPU memory riser slot until the riser module locks in place.

FIGURE 4-8 Installing a Memory Riser Module



7. Return the server to operation:

a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. Power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

▼ Install a Memory Riser Filler Panel

1. **Align the memory riser filler panel with the empty slot.**
2. **Gently press the memory riser filler panel into the slot.**
3. **Return the server to operation:**
 - a. **Install the top cover.**
See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.
 - b. **Return the server to the normal rack position.**
See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.
 - c. **Power on the server.**
See [Section 6.3 “Powering On the Server”](#) on page 6-3.

▼ Install a DIMM Filler Panel

1. **Locate the vacant DIMM slot on the memory riser.**
2. **Ensure that the ejector levers at both ends of the memory module slot are in a fully open position.**
3. **Align the DIMM filler panel with the empty slot.**
4. **Gently press the DIMM filler panel into the slot until the ejector tabs lock the filler panel in place.**
5. **Return the server to operation:**
 - a. **Install the top cover.**
See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.
 - b. **Return the server to the normal rack position.**
See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.
 - c. **Power on the server.**
See [Section 6.3 “Powering On the Server”](#) on page 6-3.

4.2 Servicing PCIe Cards (CRU)

This section describes how to remove and install PCIe cards.

For the location of the PCIe slots, see [Section 1.3 “Server Back Panel Features” on page 1-11](#).

4.2.1 PCIe Card Configuration Rules

The server supports up to ten low-profile PCIe 2.0 cards. Refer to the *Sun Fire X4470 Server Product Notes* (821-0704) for details about supported PCIe cards, along with card quantity and slot restrictions.

The following PCIe card slots are available on the server:

- Slots 0 and 9: x4 electrical interface
- Slots 1, 2, 4, 6, 7, and 8: x8 electrical interface
- Slots 3 and 5: x8 or x16 electrical interface (x16 connector)

Note – Slots 3 and 5 operate as x16 interfaces only when an x16 capable card is installed and the adjacent slot (4 or 6) is unpopulated.

To determine the slot in which to install a PCIe card, follow these guidelines:

- First consider any cooling considerations that require a card to be installed in a certain slot. For information about cooling considerations for PCIe cards, refer to the *Sun Fire X4470 Server Product Notes* (821-0704).
- If your configuration includes an internal SAS/SATA Host Bus Adapter (HBA), check to see if it has an integrated battery pack. Install a battery-backed internal HBA in slot 4, for best cooling; otherwise, put the simpler, battery-less SAS/SATA HBA in slot 2. Slot 2 is convenient for cabling, and using Slots 3 or 4 limits the availability of x16 electrical interfaces.
- For high bandwidth cards, install the cards so that the load on the server is balanced between the server’s two I/O hubs (IOH), each of which connects to five of the available PCIe slots. (IOH0 connects to slots 0–4 and IOH1 to slots 5–9). Avoid slots 9 and 0 for high-bandwidth cards since those are the x4 slots. Balance the load as follows:
 - IOH0 (which connects to slots 0–4), might already be using some bandwidth for the ICH10 southbridge devices, so install the first high-bandwidth card in one of slots 5–8.

- Install the next high-bandwidth card in one of slots 1–4. (If an internal HBA is already installed in slot 0–4, skip this step and install the next card in another of slots 5–8.)
- Continue to alternate the high-bandwidth cards between slots 1–4 and 5–8.
- Install lower-speed cards (for example, 1-Gbit/s Ethernet and 8-Gbit/s Fibre Channel adapters) in any remaining slots, since these cards perform well in any location, including the x4 slots, 0 and 9.

4.2.2 PCIe Cards With Bootable Devices

If the server has several PCIe cards installed that provide bootable devices, disable the Option ROM on the PCIe slots not used for booting so that resources are available for the slots used for booting. By default, the BIOS enables Option ROMs for PCIe slots 2 and 4, and the four Gigabit Ethernet ports. Refer to [“Configure Option ROM Settings” on page 7-21](#) for information about disabling Option ROM.

4.2.3 Avoiding PCI Resource Exhaustion Errors

With several Sun x4 PCI Express Quad Gigabit Ethernet Low Profile Adapter PCIe cards (4446A-Z-N or X4446A-Z-N) installed in server slots 0 through 4, or even one of these cards installed in slots 5 through 9, BIOS might log a "PCI resource exhaustion" event. This error occurs because BIOS allocates 8 Kbytes of I/O space for each of the Quad Gigabit Ethernet cards (and only 4 Kbytes of I/O space for a typical card).

The following is a common form of the error that might be logged:

```
6491      Tue Dec   7 14:19:57 2010   IPMI           Log           minor
ID = a5a9 : 12/07/2010 : 14:19:57 : System Firmware Error :
sensor number

= 0x00 : PCI resource exhaustion: Bus 147 Device 0 Func 0

6490      Tue Dec   7 14:19:57 2010   IPMI           Log           minor
ID = a5a8 : 12/07/2010 : 14:19:57 : System Firmware Error :
sensor number

= 0x00 : PCI resource exhaustion: Bus 147 Device 0 Func 1
```

To eliminate the "PCI resource exhaustion" event, change the BIOS settings to disable I/O allocation for any slot where the Quad Gigabit Ethernet card is installed. Refer to [Section 7.8 “Performing Common BIOS Procedures” on page 7-11](#) for instructions on how to access the BIOS Setup Utility in order to disable I/O allocation from the

PCIPnP menu. The exception to this workaround is that if PXE network booting will use a Quad Gigabit Ethernet card, you should leave I/O allocation enabled for that slot.

Since BIOS does not allocate I/O space for empty slots, maximizing the number of empty PCIe slots in the server might also help to avoid the "PCI resource exhaustion" event.

4.2.4 Removing and Installing PCIe Cards and PCIe Card Filler Panels

Use the following procedures to remove and install PCIe cards and PCIe card filler panels.

▼ Remove a PCIe Card Filler Panel



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.



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

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server and disconnect all power cords from the server power supplies.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8

2. **Locate the PCIe card filler panel that you want to remove.**

See [Section 1.3 “Server Back Panel Features” on page 1-11](#) for information about PCIe slots and their locations.

3. **Disengage the PCIe slot crossbar from its locked position and rotate the crossbar into an upright position (FIGURE 4-9).**

4. **Remove the PCIe card filler panel from the PCIe slot.**



Caution – Whenever you remove a PCIe card filler panel, you should replace it with another filler panel or a PCIe card; otherwise, the server might overheat due to improper airflow.

▼ Remove a PCIe Card



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3](#).



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

1. **Prepare for servicing:**

- a. **Attach an antistatic wrist strap.**

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3](#).

- b. **Power off the server and disconnect all power cords from the server power supplies.**

See [Section 2.6 “Powering Off the Server” on page 2-6](#).

- c. **Extend the server to the maintenance position.**

See [Section 2.4 “Positioning the Server for Maintenance” on page 2-4](#).

- d. **Remove the top cover.**

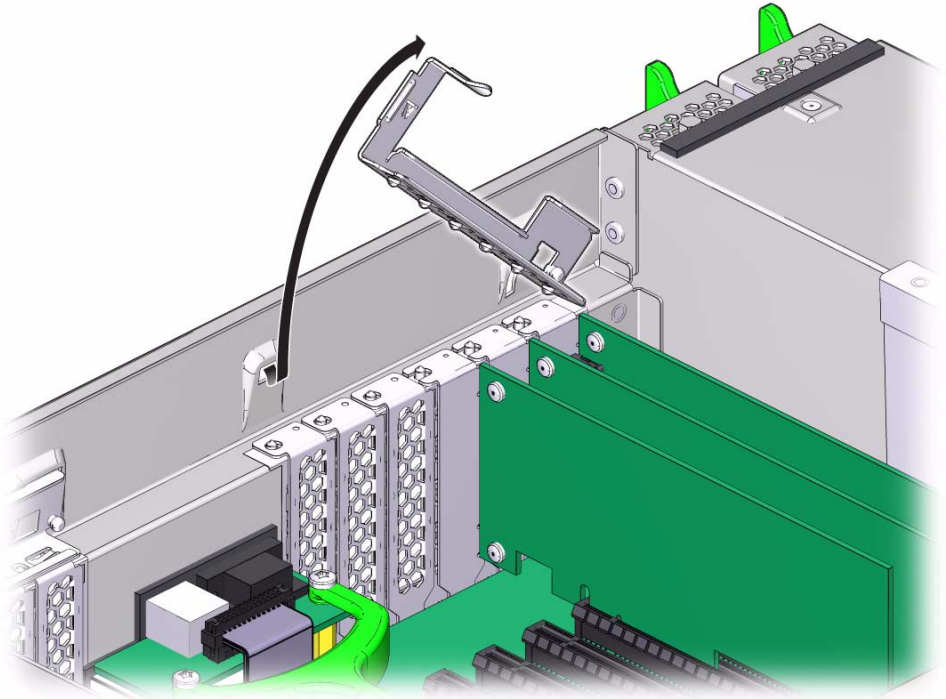
See [Section 2.7 “Removing the Server Top Cover” on page 2-8](#)

2. Locate the PCIe card that you want to remove.

See [Section 1.3 “Server Back Panel Features” on page 1-11](#) for information about PCIe slots and their locations.

3. If necessary, make a note of where the PCIe cards are installed.
4. Unplug all data cables from the PCIe card.
Note the location of all cables for reinstallation later.
5. Disengage the PCIe card slot crossbar from its locked position and rotate the crossbar into an upright position ([FIGURE 4-9](#)).
6. Carefully remove the PCIe card from the PCIe card slot.

FIGURE 4-9 Disengaging the Crossbar



Caution – Whenever you remove a PCIe card, you should replace it with another PCIe card or a filler panel; otherwise, the server might overheat due to improper airflow.

▼ Install a PCIe Card

Refer to [FIGURE 4-10](#) when completing the following procedure.



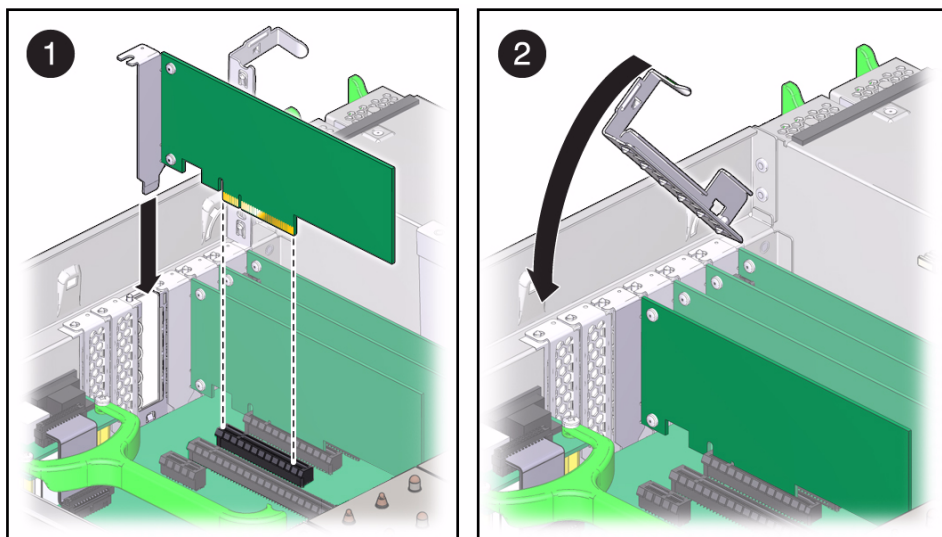
Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.



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

1. Unpack the PCIe card and place it on an antistatic mat.
2. Ensure that the server is powered off and all power cords are disconnected from the server power supplies.
See [Section 2.6 “Powering Off the Server”](#) on page 2-6.
3. Install the PCIe card into the PCIe card slot.

FIGURE 4-10 Installing a PCIe Card



4. Return the PCIe card slot crossbar to its closed and locked position.
5. Return the server to operation:

a. **Install the top cover.**

See Section 6.1 “Replacing the Server Top Cover” on page 6-1.

b. **Return the server to the normal rack position.**

See Section 6.2 “Returning the Server to the Normal Rack Position” on page 6-2.

c. **Reconnect all power cords to the server power supplies and power on the server.**

See Section 6.3 “Powering On the Server” on page 6-3.

6. **If the PCIe card being installed is replacing a faulty PCIe card, manually clear the PCIe card fault using Oracle Integrated Lights Out Manager (ILOM).**

For instructions on clearing server faults, refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server* (821-0702).

7. **Refer to the documentation shipped with the PCIe card for information about configuring the PCIe card, including installing required operating systems.**

To create or recover RAID configurations, refer to the *LSI MegaRAID SAS Software User’s Guide*, which is available at the following location:

<http://www.lsi.com/support/sun>

▼ Install a PCIe Card Filler Panel

Refer to [FIGURE 4-10](#) when completing the following procedure.



Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.



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

1. **Ensure that the server is powered off and all power cords are disconnected from the server power supplies.**

See Section 2.6 “Powering Off the Server” on page 2-6.

2. **Install the PCIe card filler panel into the PCIe card slot.**

3. **Return the PCIe card slot crossbar to its closed and locked position.**

4. Return the server to operation:

a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. Reconnect all power cords to the server power supplies and power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

4.3 Servicing the DVD Drive and DVD Driver Filler Panel (CRU)

Use the following procedures to remove and replace the DVD drive and DVD drive filler panel.

▼ Remove the DVD Drive or DVD Drive Filler Panel

Refer to [FIGURE 4-11](#) when completing the following procedure.

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Remove any media from the drive.

c. Power off the server.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

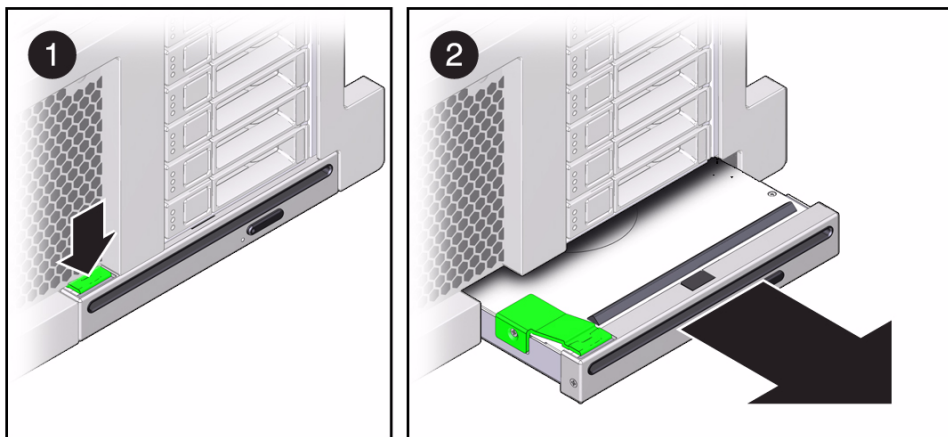
2. Push down on the latch on the top left corner of the DVD drive or filler panel.

3. Slide the DVD drive or filler panel out of the server.



Caution – Whenever you remove the DVD drive or filler panel, you should replace it with another DVD drive or a filler panel; otherwise the server might overheat due to improper airflow.

FIGURE 4-11 Removing the DVD Drive or Filler Panel

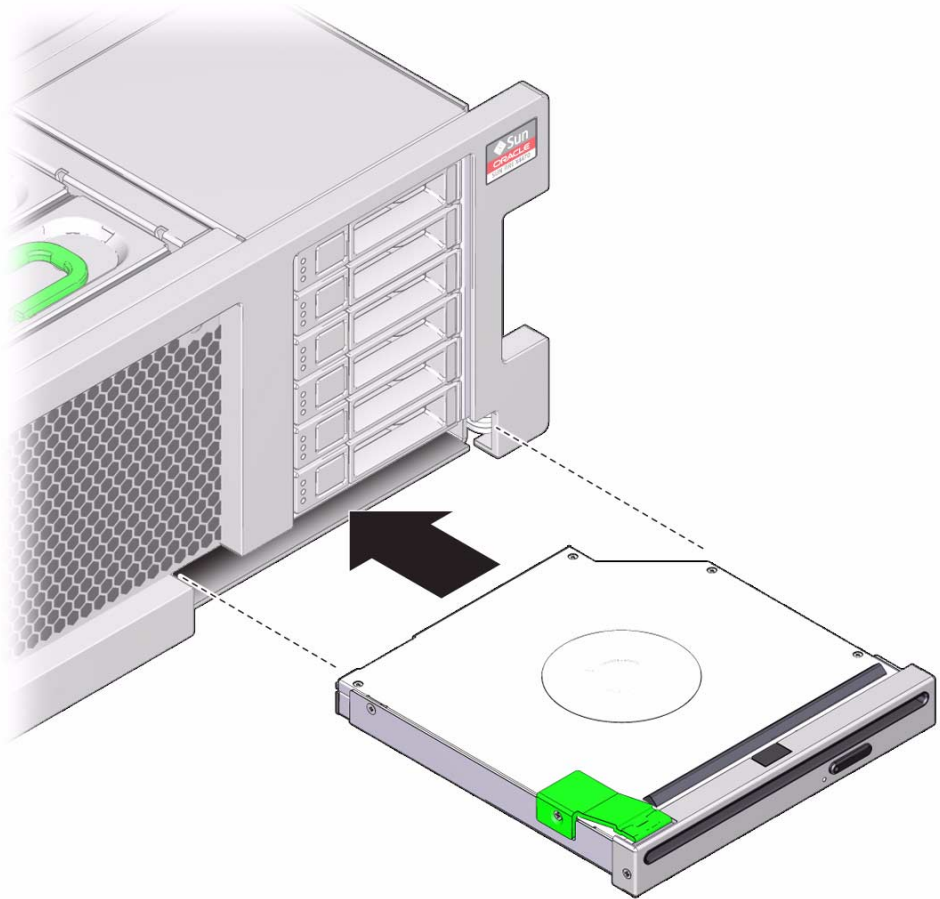


▼ Install the DVD Drive or DVD Drive Filler Panel

Refer to [FIGURE 4-12](#) when completing the following procedure.

1. **Unpack the DVD drive or filler panel.**
If it is a DVD drive, place it on an antistatic mat.
2. **Slide the DVD drive or filler panel into the front of the chassis until it seats.**

FIGURE 4-12 Installing the DVD Drive or Filler Panel



3. Return the server to operation:

a. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

b. Power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

4.4 Servicing the System Lithium Battery (CRU)

The system battery maintains system time when the server is powered off and disconnected from AC power. If the IPMI logs indicate a battery failure, you should replace the system battery. Use the following procedures to remove and replace the system battery.



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

▼ Remove the System Battery

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server and disconnect all power cords from the server power supplies.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

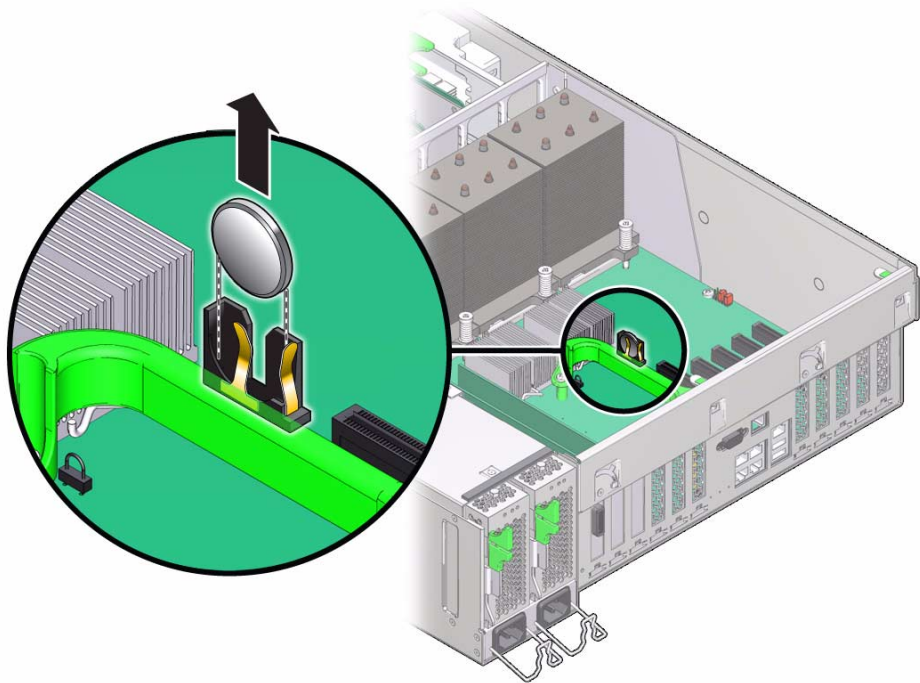
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8

2. Remove the battery from the battery holder by pulling back on the metal tab holding it in place and sliding the battery up and out of the battery holder ([FIGURE 4-13](#)).

FIGURE 4-13 Removing the Battery



▼ Install the System Battery

1. Unpackage the replacement battery.
2. Press the new battery into the battery holder with the positive side (+) facing away from the metal tab that holds it in place.
3. If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM clock will be reset as soon as the server is powered on and connected to the network. Otherwise, proceed to the next step.
4. If the service processor is not configured to use NTP, you must reset the Oracle ILOM clock using the Oracle ILOM CLI or the web interface. For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection.
5. Return the server to operation:

a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. Reconnect all power cords to the server power supplies and power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

6. After the battery is replaced, use the BIOS Setup Utility to update the System Time and System Date.

Refer to [Chapter 7](#) for information about using the BIOS Setup Utility.

Servicing FRU Components

This chapter describes how to service field-replaceable units (FRUs). You must power down the system and remove the AC power cords before servicing all FRU components.

Note – Only authorized service personnel should service FRU components.

This chapter contains the following topics:

- [Section 5.1 “Servicing the CPU and Heatsink \(FRU\)” on page 5-1](#)
- [Section 5.2 “Servicing the Fan Board \(FRU\)” on page 5-8](#)
- [Section 5.3 “Servicing the Power Supply Backplane \(FRU\)” on page 5-12](#)
- [Section 5.4 “Servicing the Disk Drive Backplane \(FRU\)” on page 5-15](#)
- [Section 5.5 “Servicing the Motherboard \(FRU\)” on page 5-19](#)

5.1 Servicing the CPU and Heatsink (FRU)

This section describes how to service the CPU and heatsink.



Caution – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures” on page 2-3](#).

5.1.1 CPU Placement

The server operates with either two or four CPUs. In a two-CPU system, the CPUs must be installed in sockets 0 and 2.

5.1.2 Removing and Installing a Heatsink Filler Panel, CPU Cover Plate, Heatsink, and CPU

Use the following procedures to remove and install a heatsink filler panel, a CPU cover plate, a heatsink, and a CPU.

Note – When installing a CPU, you must also remove the heatsink or heatsink filler panel on the CPU to the left (facing toward the front of the chassis) of the one to be installed so that the CPU release lever has room to properly disengage.

▼ Remove a Heatsink Filler Panel and CPU Cover Plate

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.

2. Loosen the two captive screws holding the heatsink filler panel in place.

3. Lift the heatsink filler panel out of the chassis.



Caution – Whenever you remove a heatsink filler panel, you should replace it with a heatsink or another heatsink filler panel; otherwise, the server might overheat due to improper airflow.

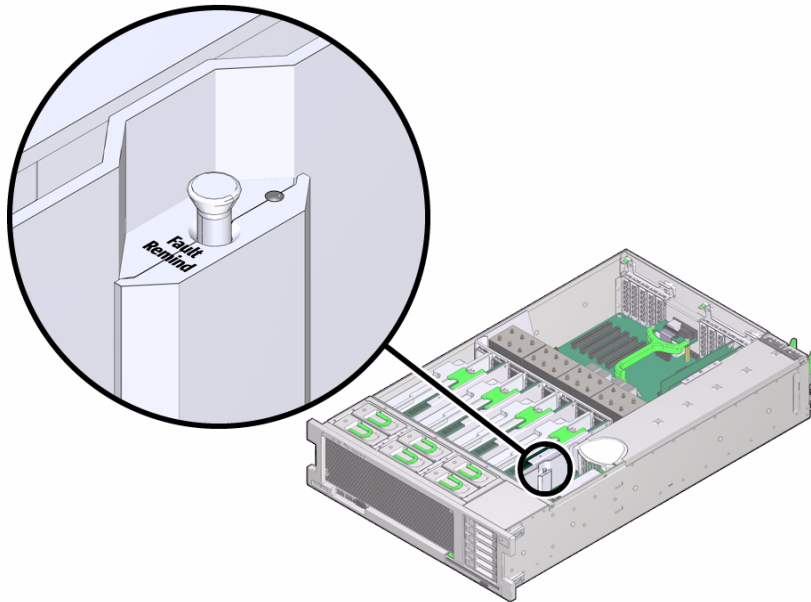
4. If you are installing a CPU into a CPU socket where a CPU has never been installed, remove the CPU cover plate:
 - a. Disengage the CPU release lever by pushing down and moving it to the side away from the CPU socket, and then rotating the lever upward.
 - b. Open the load plate and carefully remove the CPU cover plate.

▼ Remove a Heatsink and CPU

Refer to [FIGURE 5-1](#) and [FIGURE 5-2](#) when completing the following procedure.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**
See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.
 - b. **Power off the server.**
See [Section 2.6 “Powering Off the Server”](#) on page 2-6.
 - c. **Extend the server to the maintenance position.**
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.
 - d. **Remove the top cover.**
See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.
2. **If necessary, identify the location of the faulty CPU by pressing the Fault Remind button on the air divider.**
 - If the CPU LED behind the CPU on the motherboard is off: CPU is operating properly.
 - If the CPU LED behind the CPU on the motherboard is on (amber): CPU is faulty and should be replaced.

FIGURE 5-1 Fault Remind Button on Air Divider



3. Remove the heatsink:

- a. **Unscrew the two Phillips screws from the heatsink.**

Turn the screws alternately one and one half turns until they are fully removed.

- b. **Twist the heatsink slightly to break the grease seal, lift off the heatsink and place it upside down on a flat surface to prevent the thermal grease from contaminating other components.**
- c. **Use an alcohol pad to clean the thermal grease from both the bottom of the heatsink and the top of the CPU.**



Caution – Whenever you remove a heatsink, you should replace it with another heatsink or a filler panel; otherwise, the server might overheat due to improper airflow.

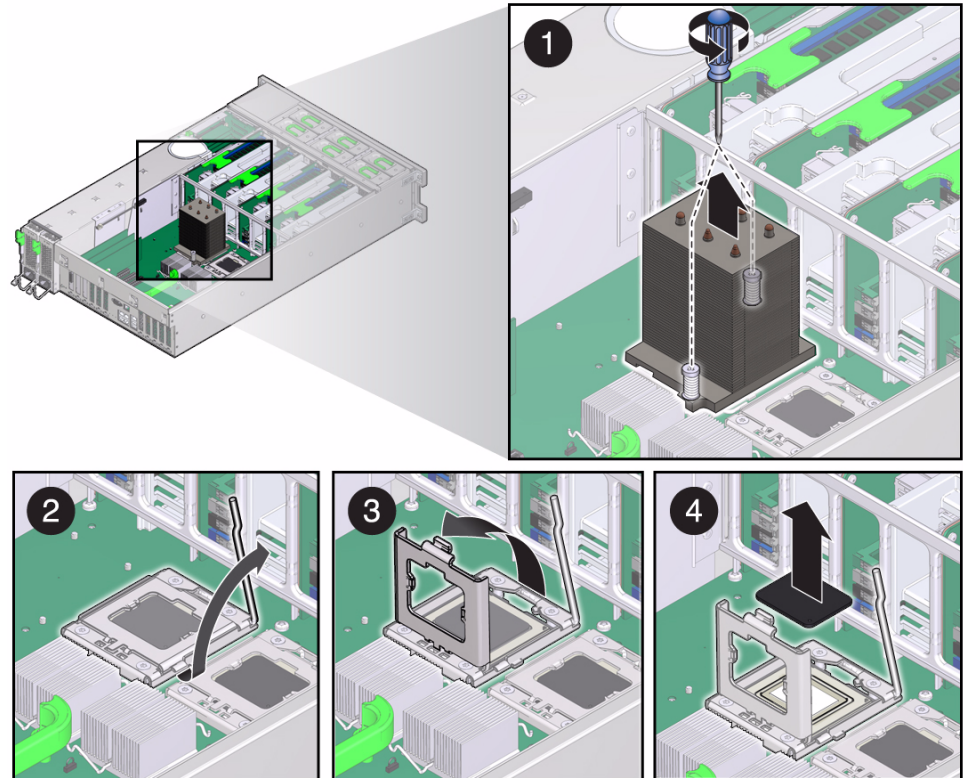


Caution – Failure to clean the heatsink and the CPU prior to removing the CPU could result in accidental contamination of the CPU socket or other components. Also, be careful not to get the grease on your fingers as this could result in contamination of components.

4. If you are replacing the CPU as well as the heatsink, remove the CPU:

- a. Disengage the CPU release lever by pushing down and moving it to the side away from the CPU, and then rotating the lever upward.
- b. Open the load plate and carefully remove the CPU.

FIGURE 5-2 Removing the Heatsink and CPU



▼ Install a Heatsink and CPU

1. Unpack the installation kit.

Depending on whether you are adding a new CPU and heatsink, or replacing one or both of these components because they are damaged, your kit might contain the following:

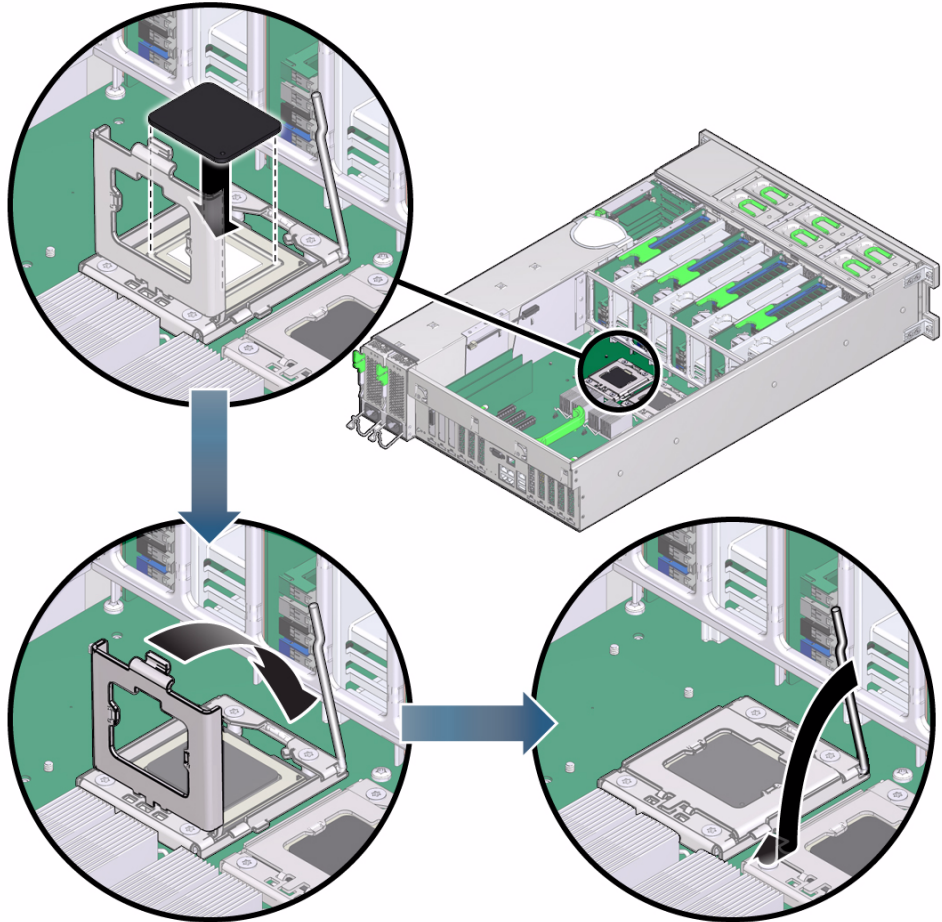
- CPU and pre-greased heatsink
- Pre-greased heatsink only
- CPU only, with syringe to apply thermal grease to existing heatsink

2. If applicable, install the CPU ([FIGURE 5-3](#)).

- a. Properly orient the CPU with the socket alignment tabs and carefully place the CPU into the socket.

Ensure that the orientation is correct as damage might result if the CPU pins are not aligned correctly.

FIGURE 5-3 Installing the CPU



- b. Lower the load plate.

Ensure that the load plate sits flat around the periphery of the CPU.

- c. Engage the release lever by rotating it downward and slipping it under the catch.

3. Install the heatsink.

- a. If you are reusing an existing cleaned heatsink, use the syringe (supplied with the new or replacement CPU) to apply thermal grease on top of the CPU in a star pattern.

Note – You do not need to complete this step if you have a new heatsink since new heatsinks come with thermal grease already applied.

- b. Orient the heatsink so that the two screws line up with the mounting studs.



Caution – When handling the heatsink, be careful not to get the thermal grease on your fingers so as not to transfer the grease to other server components. To do so could cause component contamination and/or damage.

- c. 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 assembly is moved too much during its installation, the layer of thermal grease might not be distributed evenly, leading to component damage.

- d. Tighten the screws alternately one-half turn until fully seated.

4. Return the server to operation:

- a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

- b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2

- c. Power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

5. If the CPU being installed is replacing a faulty CPU, manually clear the CPU fault using Oracle ILOM.

For instructions on clearing server faults, refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server* (821-0702).

▼ Install a Heatsink Filler Panel

1. Orient the heatsink filler panel so that the two captive screws line up with the mounting studs.
2. Carefully position the heatsink filler panel on top of the CPU socket.
3. Tighten the two captive screws to secure the heatsink filler panel.
4. Return the server to operation:
 - a. Install the top cover.
See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.
 - b. Return the server to the normal rack position.
See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.
 - c. Power on the server.
See [Section 6.3 “Powering On the Server”](#) on page 6-3.

5.2 Servicing the Fan Board (FRU)

Use the following procedures to remove and install the fan board.



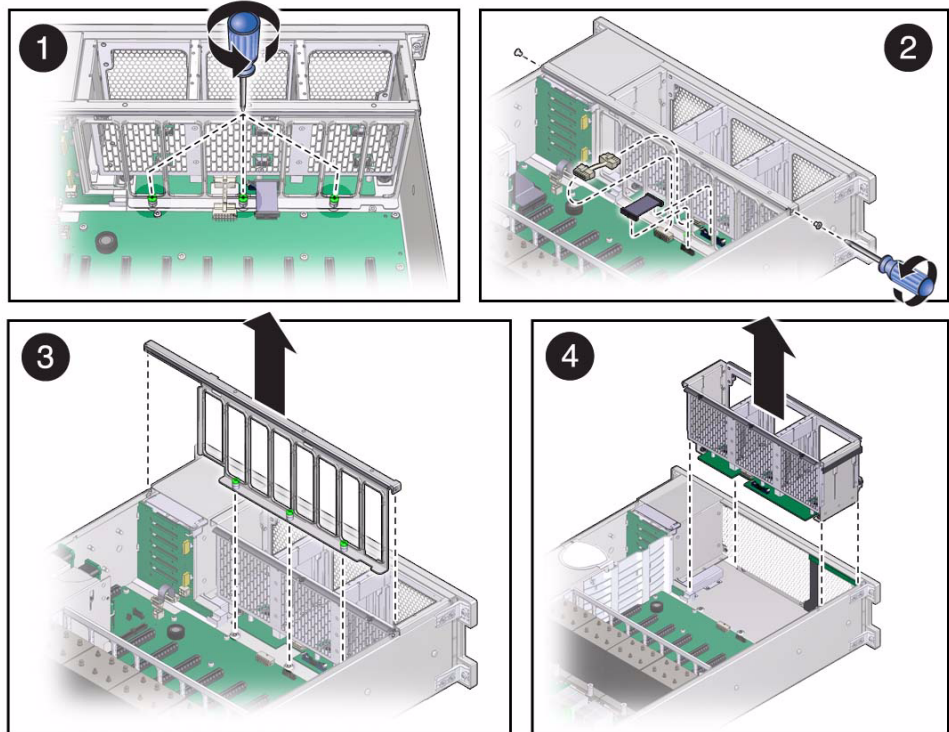
Caution – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

▼ Remove the Fan Board

1. Prepare for servicing:
 - a. Attach an antistatic wrist strap.
See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.
 - b. Power off the server.
See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

- c. **Extend the server to the maintenance position.**
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.
- d. **Remove the top cover.**
See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.
- 2. **Remove all fan modules.**
See [“Remove a Fan Module”](#) on page 3-8.
- 3. **Remove all memory risers.**
See [“Remove a Memory Riser and DIMM”](#) on page 4-8.
- 4. **Disconnect any cables plugged into the USB or video connectors on the front of the server.**
- 5. **Remove the fan board ([FIGURE 5-4](#)):**
 - a. **Loosen the three captive screws connecting the front memory riser guide to the motherboard.**
 - b. **Remove the two screws on each side of the outside of the chassis that hold the fan board unit in place.**
 - c. **Unplug the fan board cable and power cables from motherboard.**
 - d. **Remove the front memory riser guide by pulling it up and out of the chassis.**
 - e. **Pull the fan board back and out of chassis.**

FIGURE 5-4 Removing the Fan Board

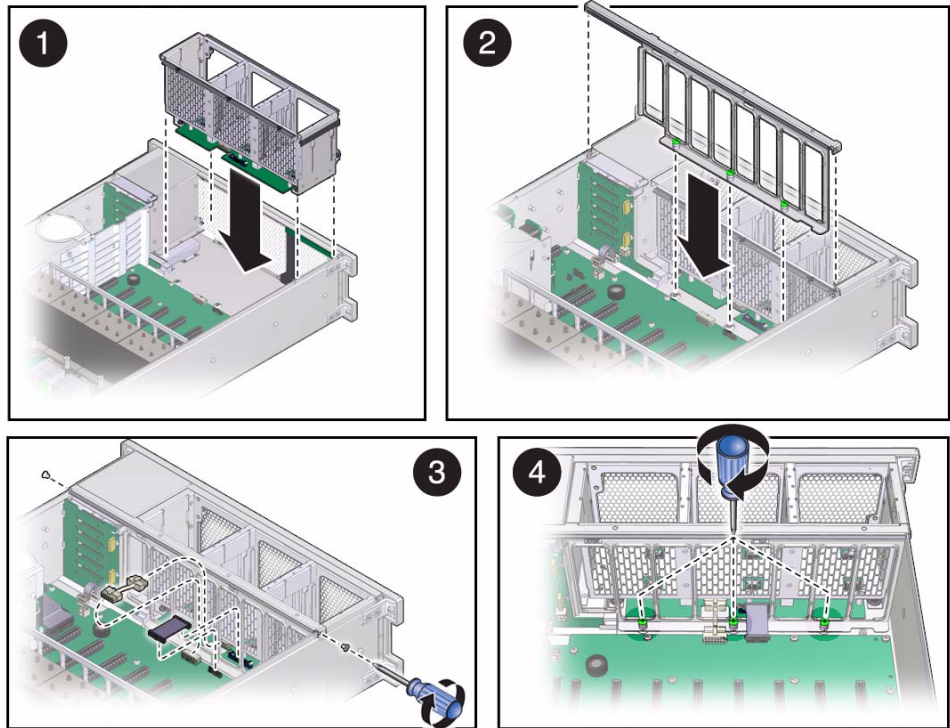


▼ Install the Fan Board

1. Unpack the replacement fan board unit and place it on an antistatic mat.
2. Remove the fan board cable and power cables from the faulty fan board unit and plug them into the fan board on the replacement fan board unit.
3. Reinstall the fan board unit (FIGURE 5-5):
 - a. Insert the fan board unit into the chassis, moving it down and toward the front.
 - b. Reposition the front memory riser guide, routing the fan board and power cable through the riser guide.
 - c. Plug the fan board cable and power cable into the connectors on the motherboard.

- d. Tighten the three captive screws to hold the front memory riser guide in place.
- e. Secure the fan board unit in place by reinserting and tightening the two screws on each side of the outside of the chassis.

FIGURE 5-5 Installing the Fan Board



4. Reinstall all fan modules.
See [“Install a Fan Module”](#) on page 3-9.
5. Reinstall all memory risers.
See [“Install a Memory Riser Filler Panel”](#) on page 4-15.
6. Return the server to operation:
 - a. Install the top cover.
See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.
 - b. Return the server to the normal rack position.
See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. **Power on the server.**

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

Note – The product serial number used for service entitlement and warranty coverage might need to be reprogrammed on the fan board by authorized service personnel with the correct product serial number located on the chassis EZ label.

5.3 Servicing the Power Supply Backplane (FRU)

Use the following procedures to remove and install the power supply backplane.



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

▼ Remove the Power Supply Backplane

Refer to [FIGURE 5-6](#) when completing the following procedure.

1. **Prepare for servicing:**

a. **Attach an antistatic wrist strap.**

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. **Power off the server and disconnect all power cords from the server power supplies.**

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. **Extend the server to the maintenance position.**

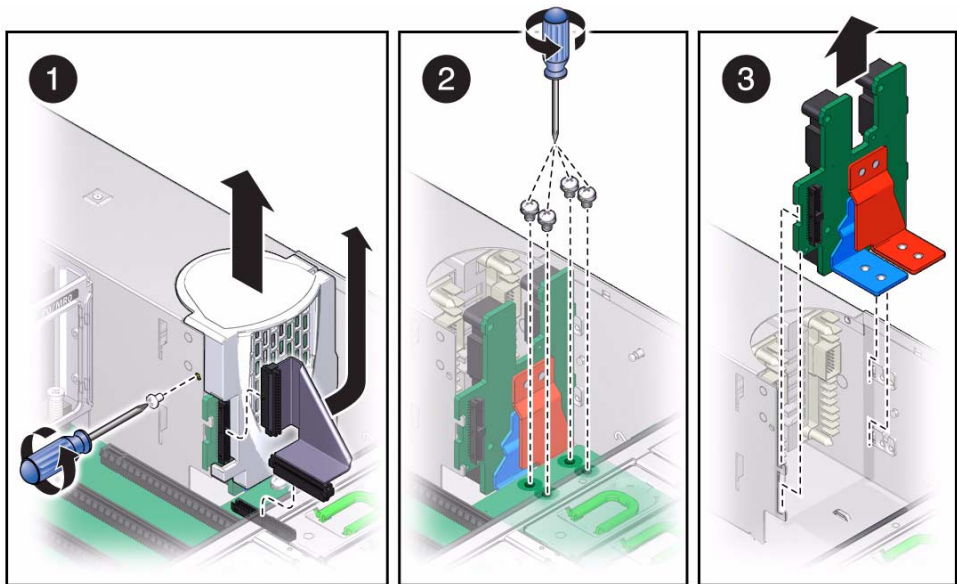
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. **Remove the top cover.**

See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.

2. Pull both power supplies at least part way out of the chassis, to disconnect them from the power supply backplane.
See [“Remove a Power Supply” on page 3-13](#).
3. Remove the memory riser or filler panel closest to the air divider.
See [Section 4.1.7 “Removing and Installing Memory Risers, DIMMs, and Filler Panels” on page 4-6](#).
4. Remove the air divider by pulling it up and out of the chassis.
5. Remove the ribbon cable connecting the power supply backplane to the motherboard.
6. Remove the screw holding the power supply cover in place and remove the power supply cover (Step 1 in [FIGURE 5-6](#)).
7. Remove the motherboard.
See [“Remove the Motherboard” on page 5-19](#). The motherboard removal procedure involves removing the four bus bar screws that secure the motherboard to the power supply backplane, as shown in Step 2 in [FIGURE 5-6](#).
8. Disconnect the AC cables from power supply backplane.
9. Lift the power supply backplane out of the chassis (Step 3 in [FIGURE 5-6](#)).

FIGURE 5-6 Removing Power Supply Backplane



▼ Install the Power Supply Backplane

Refer to [FIGURE 5-7](#) when completing the following procedure.

1. **Unpack the replacement power supply backplane and place it on an antistatic mat.**

2. **Hold the power supply backplane at the end of the power supply cage and connect the AC cables to the AC connectors on the power supply backplane.**

Ensure that each AC cable is connected to the appropriate connector. The AC cable on the right must be connected to the AC connector on the right and the AC cable on the left must be connected to the AC connector on the left.

3. **Insert the power supply backplane into position by ensuring that the tabs on the power board slide onto the hooks on the power supply cage (Step 1 in [FIGURE 5-7](#)).**

4. **Install the motherboard.**

See [“Install the Motherboard” on page 5-20](#). The motherboard installation procedure involves reinserting and tightening the four bus bar screws that secure the motherboard to the power supply backplane, as shown in Step 2 in [FIGURE 5-7](#)

5. **Replace the power supply cover and fasten it in place with the screw (Step 3 in [FIGURE 5-7](#)).**

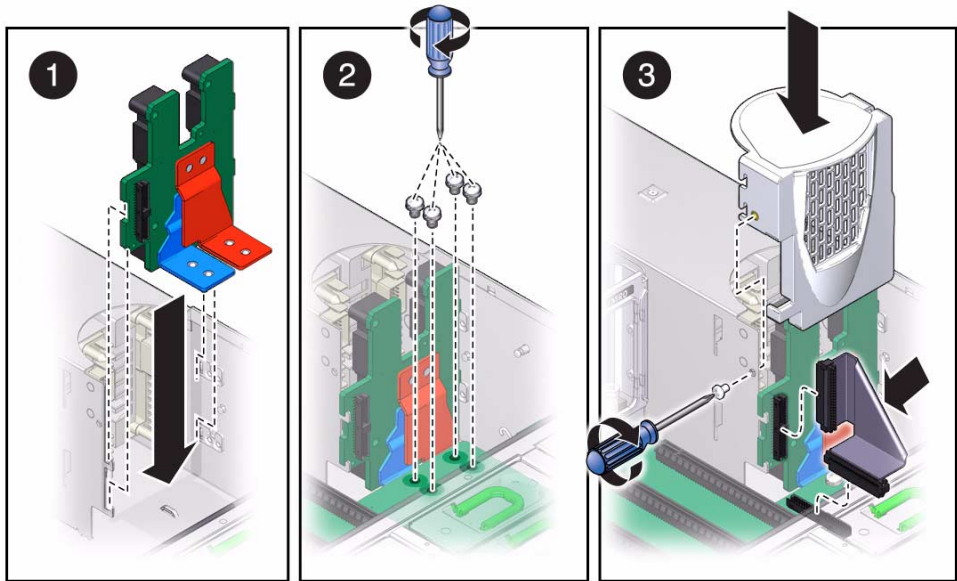
6. **Reconnect the ribbon cable from the motherboard to the power supply backplane.**

7. **Reinstall the air divider by sliding it into the chassis.**

8. **Reinstall the memory riser or filler panel closest to the air divider.**

See [Section 4.1.7 “Removing and Installing Memory Risers, DIMMs, and Filler Panels” on page 4-6](#).

FIGURE 5-7 Installing the Power Supply Backplane



9. Push the power supplies all the way back into the chassis.

See [“Install a Power Supply”](#) on page 3-14.

10. Return the server to operation:

a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. Reconnect all power cords to the server power supplies and power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

5.4 Servicing the Disk Drive Backplane (FRU)

Use the following procedures to remove and install the disk drive backplane.



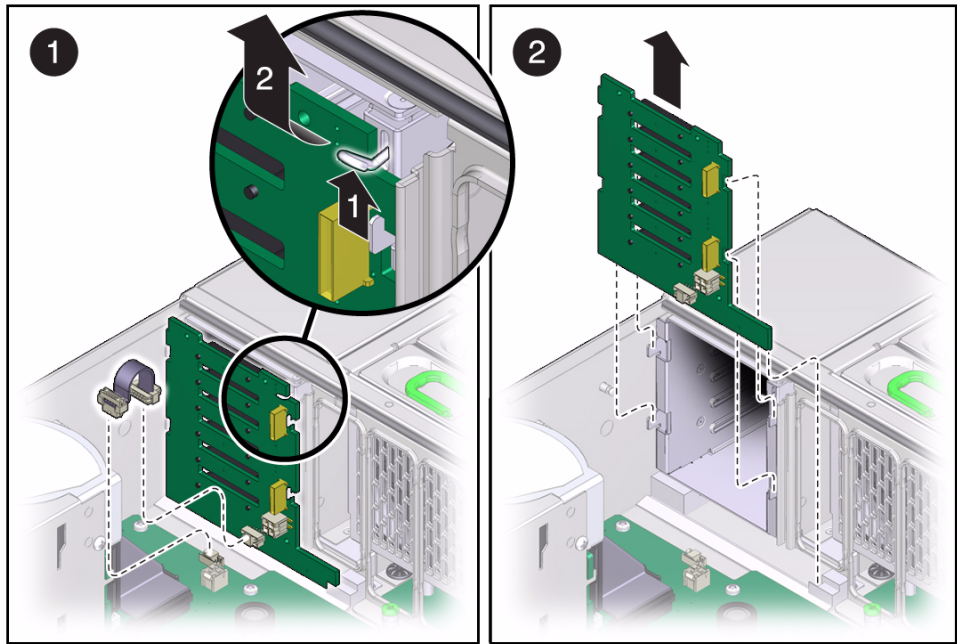
Caution – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

▼ Remove the Disk Drive Backplane

Refer to [FIGURE 5-8](#) when completing the following procedure.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**
See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.
 - b. **Power off the server.**
See [Section 2.6 “Powering Off the Server”](#) on page 2-6.
 - c. **Extend the server to the maintenance position.**
See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.
 - d. **Remove the top cover.**
See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.
2. **Remove all disk drives and fillers.**
See [“Remove a Disk Drive”](#) on page 3-3.
3. **Remove the DVD drive.**
See [“Remove the DVD Drive or DVD Drive Filler Panel”](#) on page 4-24.
4. **Remove power cable, ribbon data cable, and any SAS/SATA cables from the disk drive backplane.**
5. **Push up on the wire tab in the upper corner and pull the disk drive backplane up and out of the chassis.**

FIGURE 5-8 Removing the Disk Drive Backplane



▼ Install the Disk Drive Backplane

Refer to [FIGURE 5-9](#) when completing the following procedure.

1. **Unpack the replacement disk drive backplane and place it on an antistatic mat.**
2. **Insert the disk drive backplane into the chassis.**

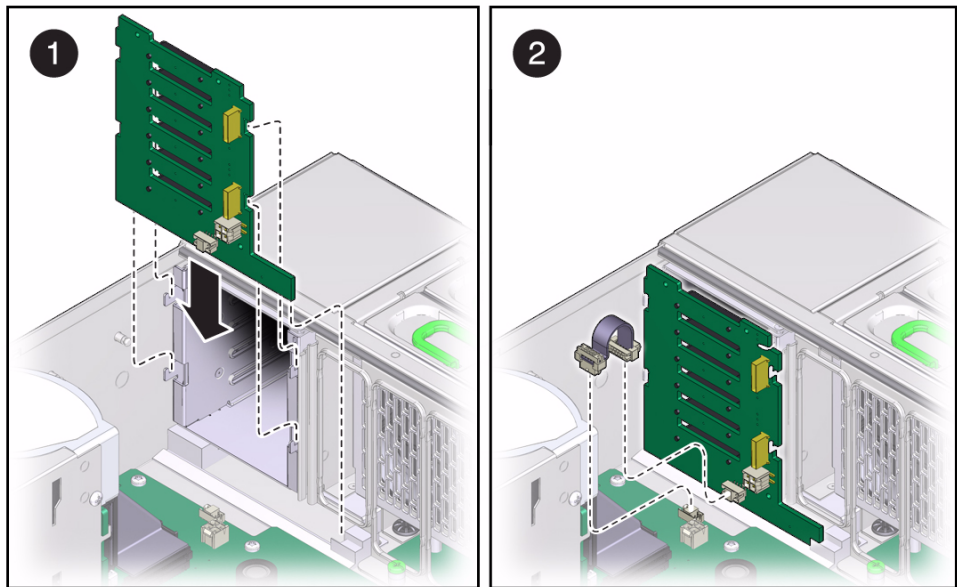
Verify that the disk drive backplane is seated properly at the bottom, in the small slot near the DVD drive.

3. **Lift up the metal hook and press the disk drive backplane to the front until it snaps into place.**

4. **Replace the power cable, ribbon data cable, and any SAS/SATA cables.**

The mini-SAS plug that terminates the short SAS/SATA cable must be inserted into the upper mini-SAS connector on the disk backplane. This short cable connects the SATA DVD to its USB-SATA bridge on the motherboard. The longer SAS/SATA cable connects drive bays 4 and 5 to a storage device in the rear of the system. The lower mini-SAS connector on the disk backplane requires the standard, four-channel mini-SAS cable for drive bays 0 to 3.

FIGURE 5-9 Installing the Disk Drive Backplane



5. Replace all disk drives and filler panels.

See [“Install a Disk Drive”](#) on page 3-4.

6. Replace the DVD drive.

See [“Install the DVD Drive or DVD Drive Filler Panel”](#) on page 4-25.

7. Return the server to operation:

a. Install the top cover.

See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.

b. Return the server to the normal rack position.

See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.

c. Power on the server.

See [Section 6.3 “Powering On the Server”](#) on page 6-3.

Note – The product serial number used for service entitlement and warranty coverage might need to be reprogrammed on the disk backplane by authorized service personnel with the correct product serial number located on the chassis EZ label.

5.5 Servicing the Motherboard (FRU)

Use the following procedures to remove and install the motherboard.



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



Caution – These procedures require that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail. To avoid damage, ensure that you follow the antistatic practices as described in [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

▼ Remove the Motherboard

Refer to [FIGURE 5-10](#) when completing the following procedure.

1. Prepare for servicing:

a. Attach an antistatic wrist strap.

See [Section 2.3 “Performing Electrostatic Discharge and Static Prevention Measures”](#) on page 2-3.

b. Power off the server and disconnect all power cords from the server power supplies.

See [Section 2.6 “Powering Off the Server”](#) on page 2-6.

c. Extend the server to the maintenance position.

See [Section 2.4 “Positioning the Server for Maintenance”](#) on page 2-4.

d. Remove the top cover.

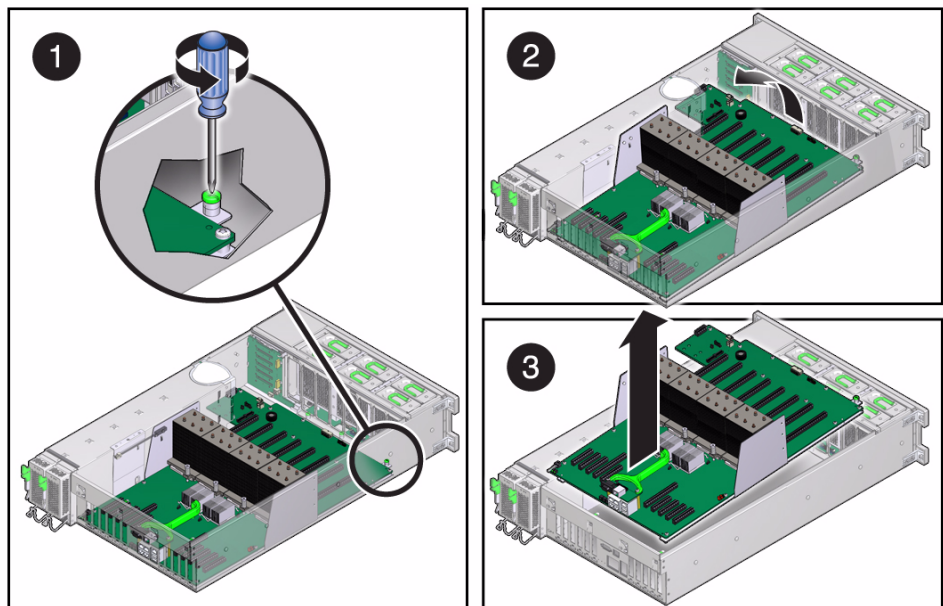
See [Section 2.7 “Removing the Server Top Cover”](#) on page 2-8.

2. Loosen the captive screw in the corner near the fans that secures the motherboard to the chassis.

3. Disconnect all cables that connect the flash riser, power supply backplane, disk drive backplane, and fan board to the motherboard.

4. Remove all memory risers.
See [“Remove a Memory Riser and DIMM” on page 4-8.](#)
5. Remove the air divider by sliding it out of the chassis.
6. Remove the four bus bar screws securing the motherboard to the power supply backplane.
See [“Remove a PCIe Card” on page 4-19.](#)
7. Remove all PCIe cards from the server.
8. Remove the power supply cover plate that secures the SAS cables.
9. Position the cables off to the side, using the tab on the power supply cover.
10. Grasp the handle on the motherboard and slide it toward the front and then out of the chassis.

FIGURE 5-10 Removing the Motherboard



▼ Install the Motherboard

Refer to [FIGURE 5-11](#) when completing the following procedure.

1. Unpack the replacement motherboard and place it on an antistatic mat.

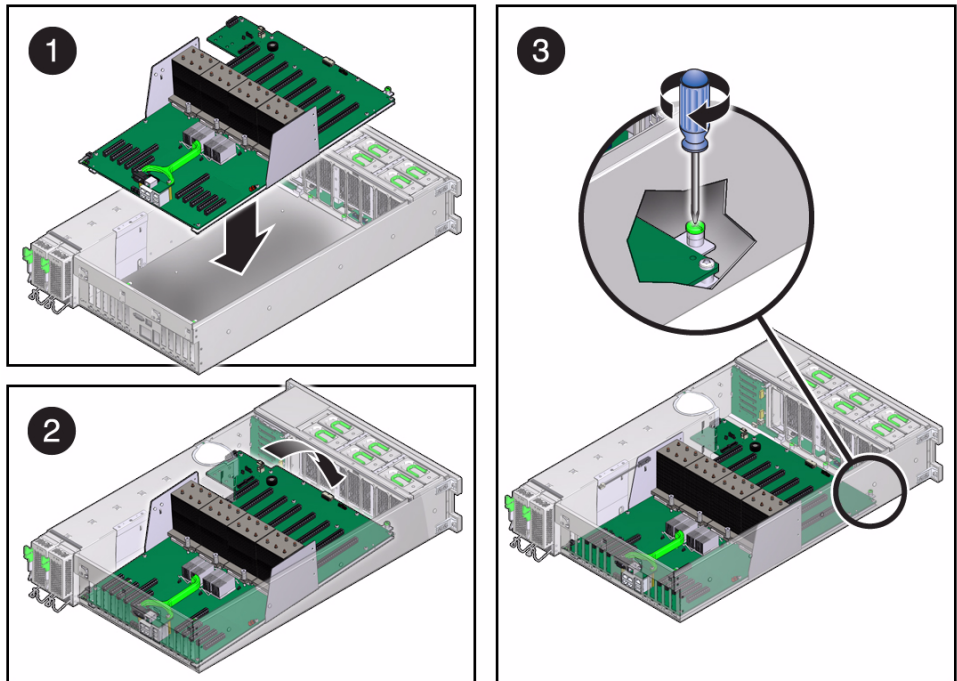
2. Grasp the motherboard by the handle and hold the cables off to the side while sliding the motherboard toward the back of the chassis.

Note – Align the rear Locate button with its corresponding hole in the back of the chassis, and ensure that the Locate button is not jammed in the depressed position.

3. Reinsert and tighten the four bus bar screws that secure the motherboard to the power supply backplane.
4. Reinstall the air divider by sliding it into the chassis.
5. Reinstall all memory risers.
See [“Install a Memory Riser Filler Panel”](#) on page 4-15.
6. Reconnect all cables from the flash riser, power supply backplane, disk drive backplane, and fan board to the motherboard.
7. Reinstall all PCIe cards.
See [“Install a PCIe Card Filler Panel”](#) on page 4-23.
8. Reinstall the power supply cover plate that secures the SAS cables.
9. Tighten the captive screw in the corner near the fans that secures the motherboard to the chassis.
10. Return the server to operation:
 - a. Install the top cover.
See [Section 6.1 “Replacing the Server Top Cover”](#) on page 6-1.
 - b. Return the server to the normal rack position.
See [Section 6.2 “Returning the Server to the Normal Rack Position”](#) on page 6-2.
 - c. Reconnect all power cords to the server power supplies and power on the server.
See [Section 6.3 “Powering On the Server”](#) on page 6-3.

Note – The product serial number used for service entitlement and warranty coverage might need to be reprogrammed on the motherboard by authorized service personnel with the correct product serial number located on the chassis EZ label.

FIGURE 5-11 Installing the Motherboard



Returning the Server to Operation

This chapter describes the procedures you must follow to return the server to operation after servicing components.

It contains the following topics:

- [Section 6.1 “Replacing the Server Top Cover” on page 6-1](#)
- [Section 6.2 “Returning the Server to the Normal Rack Position” on page 6-2](#)
- [Section 6.3 “Powering On the Server” on page 6-3](#)

6.1 Replacing the Server Top Cover

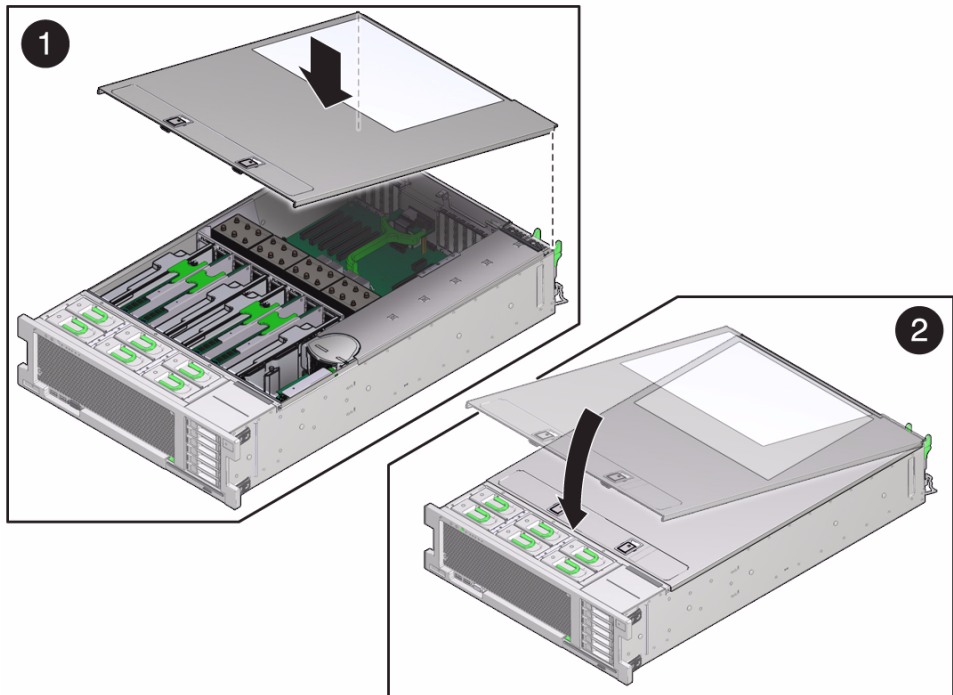
When you have completed a service procedure, replace the server top cover, using the following procedure.

▼ Replace the Server Top Cover

Refer to [FIGURE 6-1](#) when completing the following procedure.

- 1. Place the top cover on the chassis.**
Set the cover down so that it is slightly forward of the rear of the server by about 1 inch (25.4 mm).
- 2. Slide the top cover toward the rear of the chassis until the rear cover lip engages with the rear of the chassis.**
- 3. To close the top cover, press down on the cover with both hands until both latches engage.**

FIGURE 6-1 Installing the Top Cover



6.2 Returning the Server to the Normal Rack Position

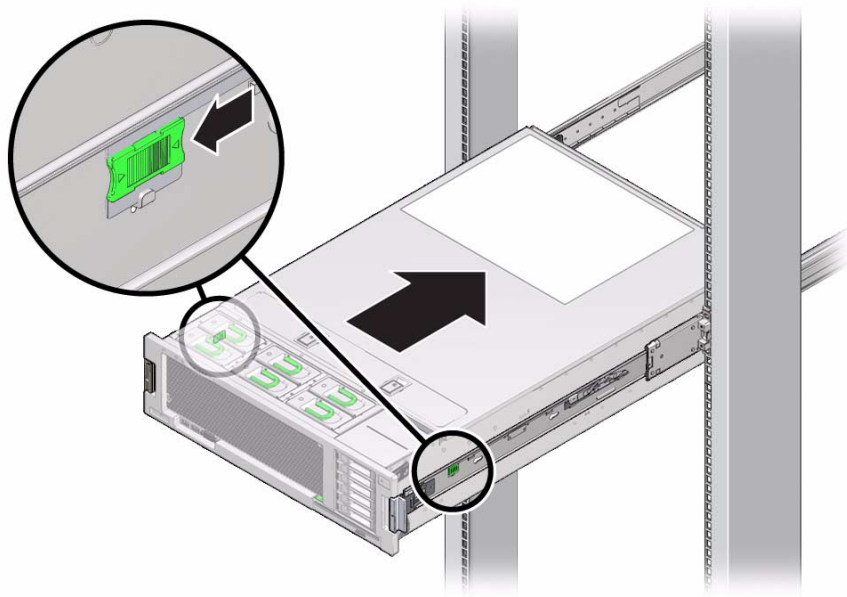
If you extended the server to the maintenance position, use the following procedure to return the server to the normal rack position.

▼ Return the Server to the Normal Rack Position

Refer to [FIGURE 6-2](#) when completing the following procedure.

1. Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail.

FIGURE 6-2 Inserting Server Back Into Rack



2. **While pushing on the release tabs, slowly push the server into the rack.**
Ensure that the cables do not get in the way.
3. **Reconnect the cables to the back of the server.**
If the cable management arm (CMA) is in the way, disconnect the left CMA release and swing the CMA open.
4. **Reconnect the CMA.**
Swing the CMA closed and latch it to the left rack rail.

6.3 Powering On the Server

If you removed power from the server during maintenance, use the following procedure to reapply main power for all server components.

▼ Power On the Server

Refer to [FIGURE 6-3](#) when completing the following procedure.

1. Verify that the power cord has been connected and that standby power is on.

Shortly after power is applied to the server, the SP OK/Fault LED blinks as the service processor boots. The SP OK/Fault LED is illuminated solid green when the service processor has successfully booted. After the service processor has booted, the Power OK/LED on the front panel begins flashing slowly, indicating that the host is in standby power mode.

2. Press and release the recessed Power button on the server front panel.

When main power is applied to the server, the main Power/OK LED begins to blink more quickly while the system boots and lights solidly once the operating system boots.

Each time the server powers on, the power-on self-test (POST) can take several minutes to complete.

FIGURE 6-3 Power Button, Power/OK LED, and SP Fault/OK LED

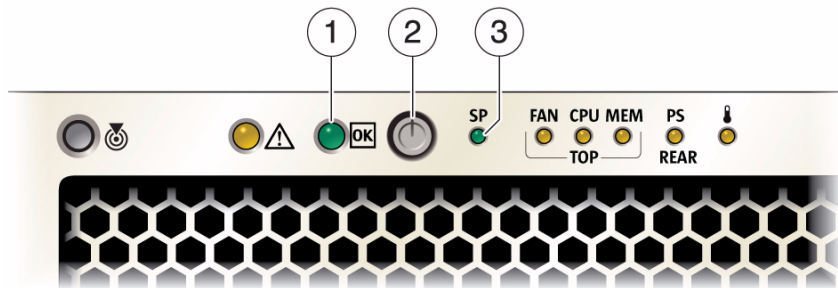


Figure Legend

-
- | | |
|---|-----------------|
| 1 | Power/OK LED |
| 2 | Power Button |
| 3 | SP OK/Fault LED |
-



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 the server is operated without adequate cooling mechanisms.

Servicing the Server at Boot Time

This chapter describes the Basic Input/Output System (BIOS) Setup Utility.

It contains the following topics:

- [Section 7.1 “Powering On the Server” on page 7-1](#)
- [Section 7.2 “About the BIOS” on page 7-2](#)
- [Section 7.3 “Default BIOS Power-On Self-Test \(POST\) Events” on page 7-2](#)
- [Section 7.4 “BIOS POST F1 and F2 Errors” on page 7-4](#)
- [Section 7.5 “How BIOS POST Memory Testing Works” on page 7-7](#)
- [Section 7.6 “Ethernet Port Device and Driver Naming” on page 7-8](#)
- [Section 7.7 “BIOS Setup Utility Menus” on page 7-9](#)
- [Section 7.8 “Performing Common BIOS Procedures” on page 7-11](#)
- [Section 7.9 “BIOS and SP Updates” on page 7-24](#)

7.1 Powering On the Server

For instructions on powering on the server, see [Section 6.3 “Powering On the Server” on page 6-3](#).

7.2 About the BIOS

The Basic Input/Output System (BIOS) has a setup utility stored in the BIOS flash memory. The setup utility reports system information and you can use it to configure the BIOS settings. The configurable data is provided with context-sensitive help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings return to their default optimal values.

There are eight menus in the BIOS Setup Utility, which appear in this order: Main, Advanced, PCIPnP, Boot, Security, RC settings, Chipset, and Exit. To navigate the menus or options listed on the menu, use the keyboard arrow keys. The options or fields that you can configure on a menu appear in color. For further instructions on how to navigate and change settings in the BIOS Setup Utility, refer to the online instructions provided on the menu.

The remaining sections in this chapter provide additional information about the BIOS operations and menu options available on the server.

7.3 Default BIOS Power-On Self-Test (POST) Events

At system startup, the BIOS performs a power-on self-test that checks the hardware on the server to ensure that all components are present and functioning properly.

[TABLE 7-1](#) identifies the events that can occur during BIOS POST, as well as specifies whether these events can prevent the host from powering-on.

TABLE 7-1 BIOS POST Events

Event	Cause	Boot Continues on Host?
User password violation	Attempt to enter password fails three times	No
Setup password violation	Attempt to enter password fails three times	No
Correctable ECC	Correctable ECC (error correction code) error detected	Does not apply
Uncorrectable ECC	Uncorrectable ECC error detected	Does not apply
No system memory	No physical memory detected in the system	No

TABLE 7-1 BIOS POST Events *(Continued)*

Event	Cause	Boot Continues on Host?
No usable system memory	All installed memory has experienced an unrecoverable failure	No
Hard disk controller failure	No disk controller found	Yes
Keyboard failure	Keyboard cannot be initialized	Yes
Boot media failure	No removable boot media is found	Yes
No video device	No video controller is found	No
Firmware (BIOS) ROM corruption	BIOS checksum fails and the boot block is not corrupted	No
CMOS checksum bad	Checksum failure	Yes
CMOS time and data error	Real-time clock (RTC) is invalid	Yes
CMOS battery low	CMOS battery is low	Yes
System restart	System boot initiated	Yes
Initiated by hard reset	Boot process started by hard reset	Yes
Memory initialization	Memory sizing is occurring, system firmware progress	Does not apply
Secondary processor initialization	Secondary CPU initialization, system firmware progress	Does not apply
Initiated by warm reset	Boot process started by warm reset	Does not apply
Embedded controller management	Management controller initialization	Does not apply
Video initialization	When BIOS initializes video	Does not apply
Keyboard controller initialization	When BIOS initializes keyboard	Does not apply
Option ROM initialization	BIOS initializes Option ROMs, system firmware progress	Does not apply
Option ROM space exhausted	BIOS cannot copy an option to the memory	Yes
User initiated system setup	User initiated access to BIOS Setup Utility, system firmware progress	Does not apply
User initiated boot to OS	System boot initiated, system firmware progress	Does not apply
No bootable media	Nothing to boot from	No

TABLE 7-1 BIOS POST Events *(Continued)*

Event	Cause	Boot Continues on Host?
PXE server not found	Boot error - PXE server not found F12 key was pressed but BIOS fails to boot from PXE server	No
ACPI Power state	Soft-off power applied	Does not apply
PCI resources exhausted	BIOS cannot allocate I/O or MMIO address resources requested by a device	Yes

7.4 BIOS POST F1 and F2 Errors

Each power-on-self-test (POST) diagnostic is a low-level test designed to isolate faults in a specific hardware component. If the POST diagnostics discloses an F1 or F2 error, it typically reports the following information about the error:

- Type of error detected
- When or where the error occurred

[TABLE 7-2](#) lists some of the F1 and F2 error messages that could appear during the POST diagnostics along with instructions for how to possibly resolve the error reported.

TABLE 7-2 BIOS POST F1 and F2 Error Messages

BIOS POST Error Message	Error Type	Resolution
Uncorrectable Error Detected on Last Boot:IOH(n) Protocol Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(n) QPI [x] Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the fault management function and the SP event log in Oracle ILOM for more details. <p>Note - Where QPI [x] equals 0 for QPI Link 0 or 1 for QPI Link 1.</p>
Uncorrectable Error Detected on Last Boot:IOH(n) PCI-E [x] Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the fault management function and the SP event log in Oracle ILOM for more details. <p>Note - Where PCI-E [x] port number can range from 0 to 10 depending on the PCI root port on IOH.</p>
Uncorrectable Error Detected on Last Boot:IOH(n) ESI Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(n) Thermal Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(n) Miscellaneous Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the fault management function and the SP event log in Oracle ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(n) VTd Error (Please Check SP Log for more Details)	IOH error	<ul style="list-style-type: none"> • Press F1 to continue. • Check the SP event log in Oracle ILOM for more details.
BMC Not Responding	Oracle ILOM error	<ul style="list-style-type: none"> • Press F1 to continue. <p>Note - This error message might display if during the SP/BIOS communication an internal error occurs. This error might require you to restart the SP.</p>

TABLE 7-2 BIOS POST F1 and F2 Error Messages *(Continued)*

BIOS POST Error Message	Error Type	Resolution
<ul style="list-style-type: none"> Primary Master Hard Disk Error Primary Slave Hard Disk Error Secondary Master Hard Disk Error Secondary Slave Hard Disk Error 	IDE/ATAPI error	<ul style="list-style-type: none"> Press F1 to continue. Check the SP event log in Oracle ILOM for more details. <p>Note - These error messages display when the BIOS is attempting to configure IDE/ATAPI devices in POST.</p>
Timer Error	8254 timer error	<ul style="list-style-type: none"> Press F1 to continue. Check the SP event log in Oracle ILOM for more details. <p>Note - This type of error typically indicates an error while programming the count register of channel 2 of the 8254 timer. This could indicate a problem with system hardware.</p>
RAM R/W test failed	Memory test failure	<ul style="list-style-type: none"> Press F1 to continue. Check the SP event log in Oracle ILOM for more details. <p>Note - This type of error typically indicates that the RAM read/write test failed.</p>
KBC BAT Test failed	Keyboard controller basic assurance test error	<ul style="list-style-type: none"> Press F1 to continue. Check the SP event log in Oracle ILOM for more details. <p>Note - Keyboard controller BAT test failed. This error might indicate a problem with keyboard controller initialization.</p>
Display memory test failed	Video display error	<ul style="list-style-type: none"> Press F1 to continue. Check the SP event log in Oracle ILOM for more details.
CMOS Battery Low	CMOS battery error	<ul style="list-style-type: none"> Press F2 to enter BIOS Setup Utility to load system defaults. Check the SP event log in Oracle ILOM for more details. If necessary, replace CMOS battery.
<ul style="list-style-type: none"> CMOS Checksum Bad CMOS Date/Time Not Set 	CMOS error	<ul style="list-style-type: none"> Press F2 to enter BIOS Setup Utility to load system defaults. Check the SP event log in Oracle ILOM for more details.

TABLE 7-2 BIOS POST F1 and F2 Error Messages (Continued)

BIOS POST Error Message	Error Type	Resolution
Password check failed	Password check error	<ul style="list-style-type: none">• Press F1 to continue.• Check the SP event log in Oracle ILOM for more details. <p>Note - This type of error indicates that the password entered does not match the password specified in the BIOS Setup Utility. This condition might occur for both Supervisor and User password verification.</p>
Keyboard/Interface Error	Keyboard controller error	<ul style="list-style-type: none">• Press F1 to continue.• Check the SP event log in Oracle ILOM for more details. <p>Note - This type of error indicates that the Keyboard Controller failure. This error might indicate a problem with system hardware.</p>
S.M.A.R.T status bad, backup and replace	S.M.A.R.T device error	<ul style="list-style-type: none">• Press F1 to continue.• Check the SP event log in Oracle ILOM for more details. <p>Note - S.M.A.R.T. failure messages might indicate the need to replace the storage device.</p>

7.5 How BIOS POST Memory Testing Works

The BIOS POST memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is copied from ROM to DRAM.
2. After copying ROM to DRAM, the BIOS performs a simple memory test (where a write/read of every location with the pattern 55aa55aa is performed).

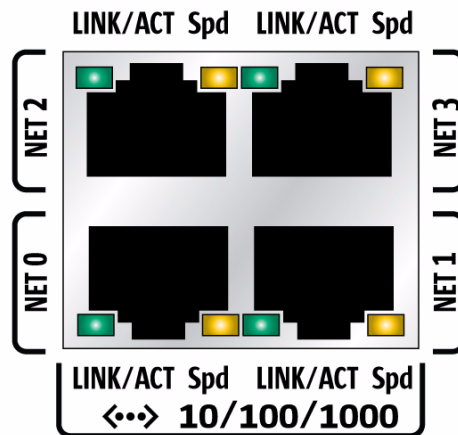
Note – The simple memory test is performed only if Quick Boot is not enabled from the Boot Settings Configuration screen. Enabling Quick Boot causes the BIOS to skip the memory test.

3. The BIOS polls the memory controllers for both correctable and non-correctable memory errors and logs those errors into the SP.

7.6 Ethernet Port Device and Driver Naming

The Sun Fire X4470 Server supports up to four 10/100/1000BASE-T Gigabit Ethernet ports, located on the back of the chassis. The ports are labeled NET 0, NET 1, NET2, and NET 3, as shown in [FIGURE 7-1](#).

FIGURE 7-1 Ethernet Port Labeling Designations



The device naming for the Ethernet interfaces is reported differently by different interfaces and operating systems. See [FIGURE 7-2](#) for a diagram that explains the logical (operating system) and physical (BIOS) naming conventions used for each interface. These naming conventions might vary depending on conventions of your operating system and which devices are installed in the server.

Note – Naming used by the interfaces might vary from that listed in [FIGURE 7-2](#) depending on which devices are installed in the system.

FIGURE 7-2 Ethernet Port Naming

	BIOS	Solaris	Linux	Windows
Net 3	8101	igb 3	eth 3	net4
Net 2	8100	igb 2	eth 2	net3
Net 1	0701	igb 1	eth 1	net2
Net 0	0700	igb 0	eth 0	net

7.6.1 Ethernet Port Booting Priority

The order in which the BIOS detects the Ethernet ports during bootup is listed below.

Note – You can change the boot priority using the Boot Device Priority screen available in the Boot menu of the BIOS Setup Utility.

- 1. NET 0
- 2. NET 1
- 3. NET 2
- 4. NET 3



7.7 BIOS Setup Utility Menus

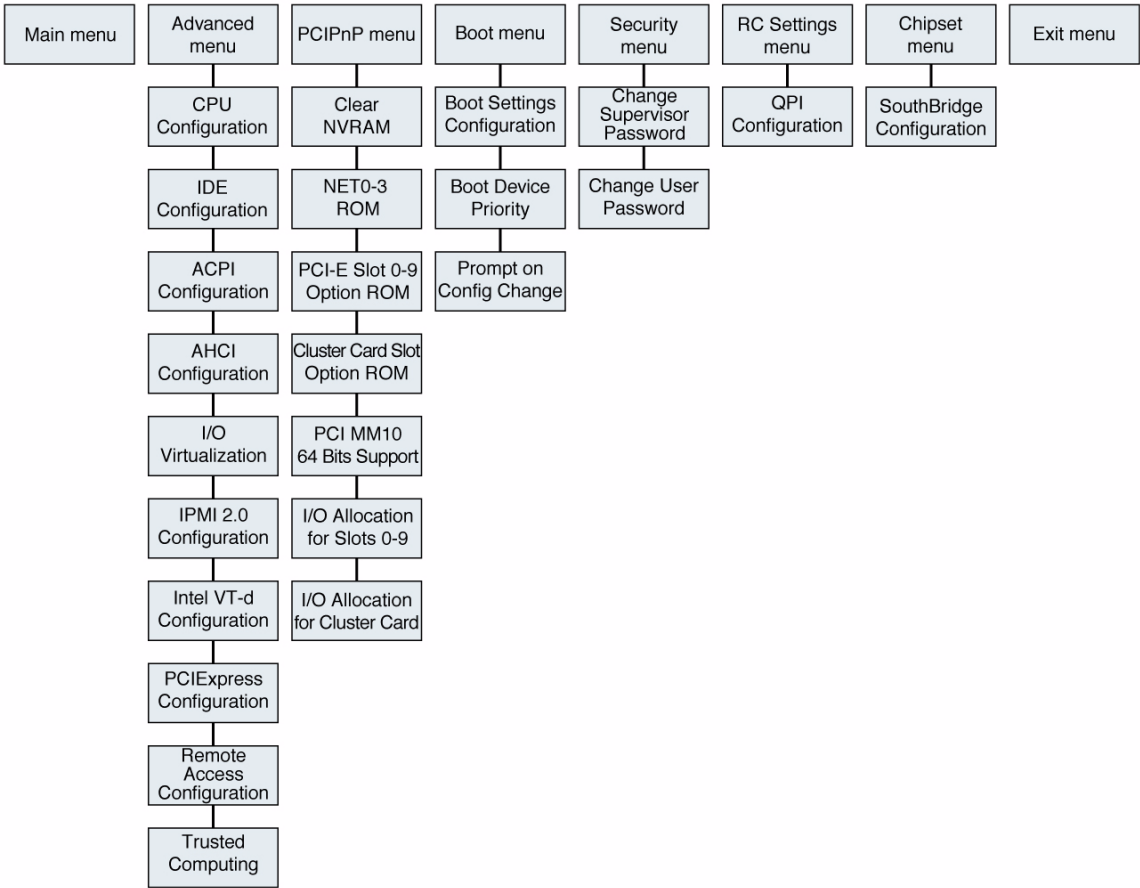
TABLE 7-3 provides descriptions for the eight top-level BIOS setup menus.

TABLE 7-3 BIOS Setup Menus Summary

Menu	Description
Main	Provides general system information.
Advanced	Configuration interface for IDE, ACPI, AHCPI, I/O Virtualization, IPMI, PCI Express, SMBIOS, Remote Access, and Trusted Computing.
PCIPnP	Configuration interface for plug-and-play (PnP) devices and Option ROM.
Boot	Configuration interface for boot settings and boot device priority (CD/DVD, removables, hard disks, solid state disks, networks).
Security	Allows you to install or change the user and supervisor passwords.
RC Settings	Reference Code settings. Configuration interface for QPI.
Chipset	Configuration options for the South Bridge devices.
Exit	Saves or discards changes.

[FIGURE 7-3](#) identifies the sub-menus that you can access from each of the top-level BIOS menus.

FIGURE 7-3 Sun Fire X4470 Server Module BIOS Configuration Utility Menu Tree



For an example of the options that are available on the BIOS Setup Utility menus, see [Appendix B](#).

7.8 Performing Common BIOS Procedures

This section includes instructions for performing some common procedures using the BIOS Setup Utility.

▼ Access the BIOS Setup Utility

To access the BIOS Setup Utility, complete the following steps:

1. **Power-on or power-cycle the server.**
2. **Press the F2 key while the system is performing the power-on self-test (POST).**

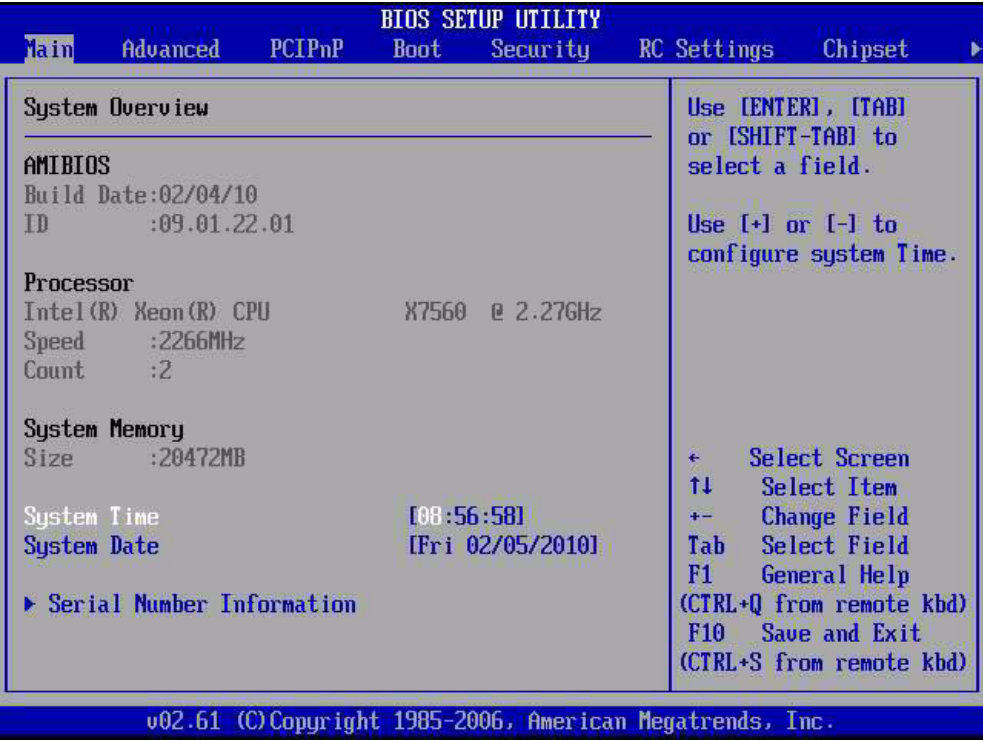
Note – If there is an error during the boot process, you can press F1 to access the BIOS Setup Utility.

Alternatively, you can use the following hot key combinations to access the BIOS Setup Utility from a serial connection:

- F1 Control-Q
- F2 Control-E.
- F7 Control-D
- F8 Control-P
- F9 Control-O
- F10 Control-S
- F12 Control-N

The BIOS Setup Utility Main screen appears ([FIGURE 7-4](#)).

FIGURE 7-4 BIOS Setup Utility Main Screen

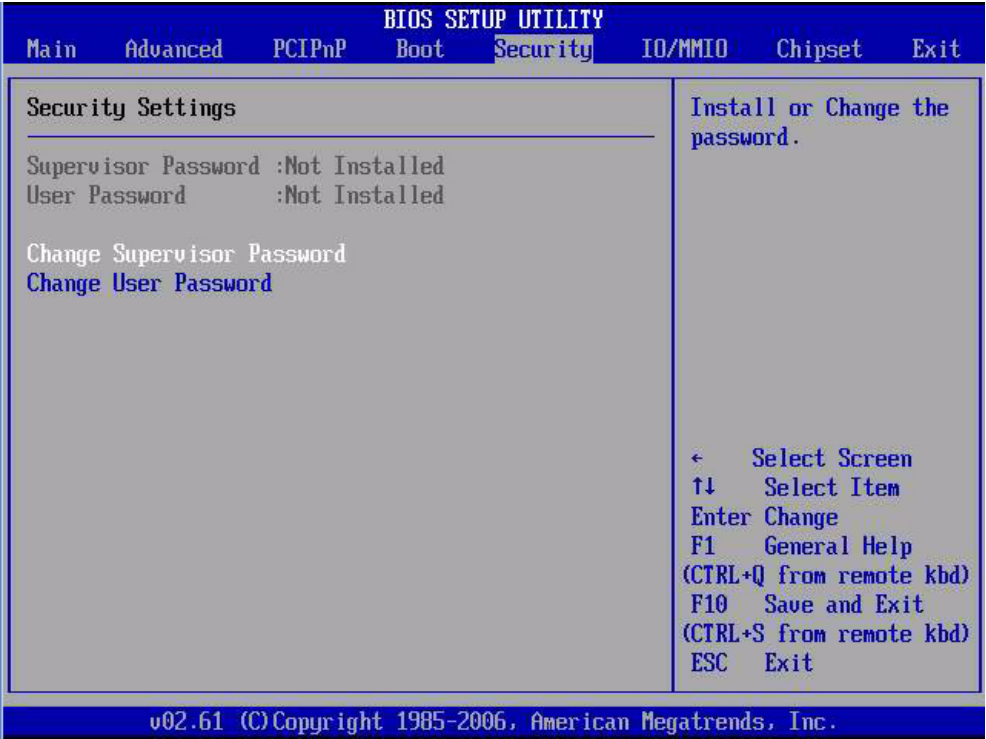


▼ Reset the BIOS Password

To reset the BIOS password, complete the following steps:

1. **Access the BIOS Setup Utility.**
See "Access the BIOS Setup Utility" on page 7-12.
2. **Navigate to the Security menu option.**
The Security screen appears (FIGURE 7-5).

FIGURE 7-5 BIOS Security Screen



3. Select the password (user or supervisor) that you want to change, then press Enter.
- The Enter New Password dialog box appears (FIGURE 7-6).

FIGURE 7-6 Enter New Password Dialog Box



4. Enter the password you want to use.
5. Enter the password again at the system prompt.
6. Press F10 to save the changes and exit BIOS.

▼ Configure Support for TPM

If you intend to use the Trusted Platform Module (TPM) feature set that is provided in Windows Server 2008, you must configure the Sun Fire X4470 Server to enable this feature.

Note – TPM enables you to administer the TPM security hardware in your server. For additional information about implementing this feature, refer to the Windows Trusted Platform Module Management documentation provided by Microsoft.

To configure the server to support TPM, complete the following steps:

1. Access the BIOS Setup Utility.

See “Access the BIOS Setup Utility” on page 7-12.

2. Navigate to the Advanced menu option.

The BIOS Advanced Settings screen appears (FIGURE 7-7).

FIGURE 7-7 BIOS Advanced Settings Screen



3. Select Trusted Computing, then press Enter.

The Trusted Computing screen appears (FIGURE 7-8).

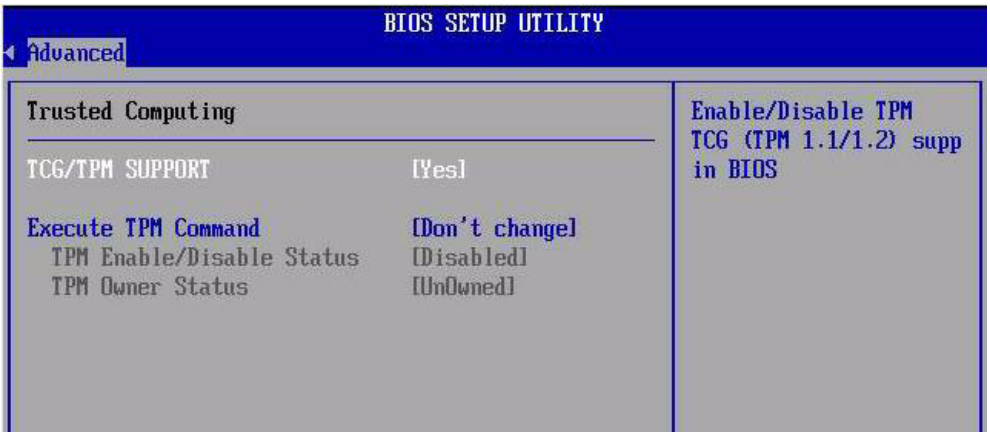
FIGURE 7-8 Trusted Computing Screen



4. Select TCG/TPM Support, then press Enter.

A screen appears listing the available TCG/TPM options (FIGURE 7-9).

FIGURE 7-9 TCG/TPM Support Screen



5. Set the TCG/TPM Support option to Yes.

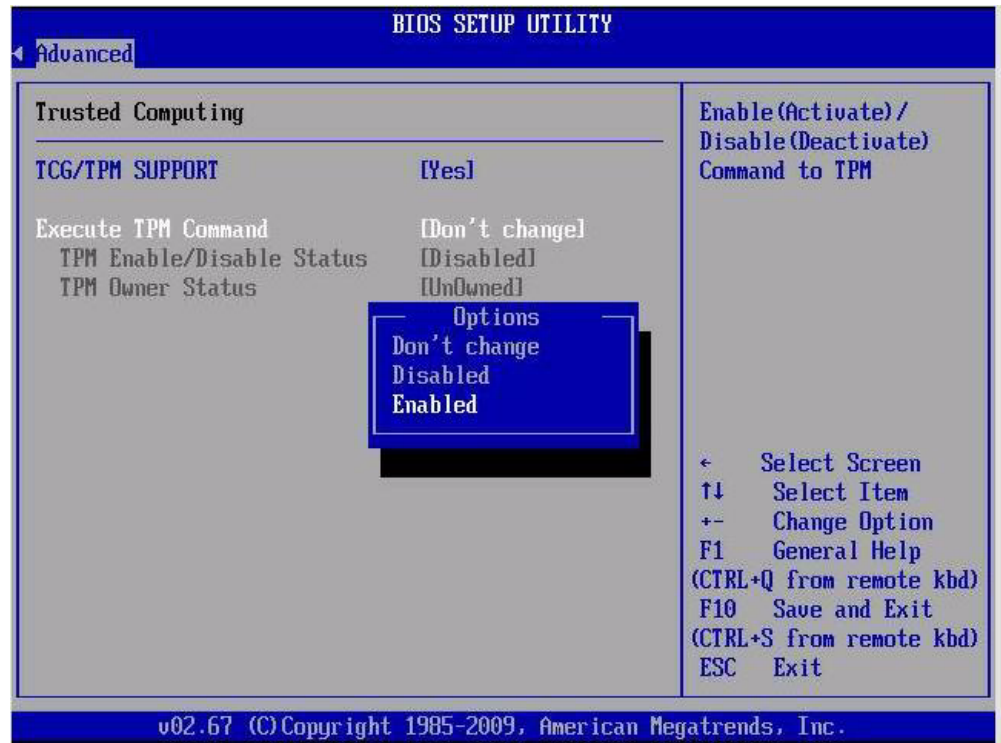
Note – If the TCG/TPM Support option is already set to Yes, you should still complete the remaining steps in this procedure to ensure that all TPM configuration requirements are satisfied.

6. Select the Execute TPM Command.

7. Set the Execute TPM Command option to Enabled (FIGURE 7-10).

Note – The Execute TPM Command setting is set to [Don't Change] by default.

FIGURE 7-10 Setting Execute TPM Command Option to Enabled



8. Press F10 to save the changes and exit BIOS.

9. To verify that TPM support is enabled, complete the following steps:

a. Reboot the server.

b. Access the BIOS Setup Utility.

See "Access the BIOS Setup Utility" on page 7-12.

c. Navigate to the Advanced menu option.

d. Select Trusted Computing.

The updated Trusted Computing screen appears indicating that TPM Support is set to Yes and TPM Enable Status is set to Enabled.

10. Press F10 to exit BIOS.

▼ Configure SP LAN Settings

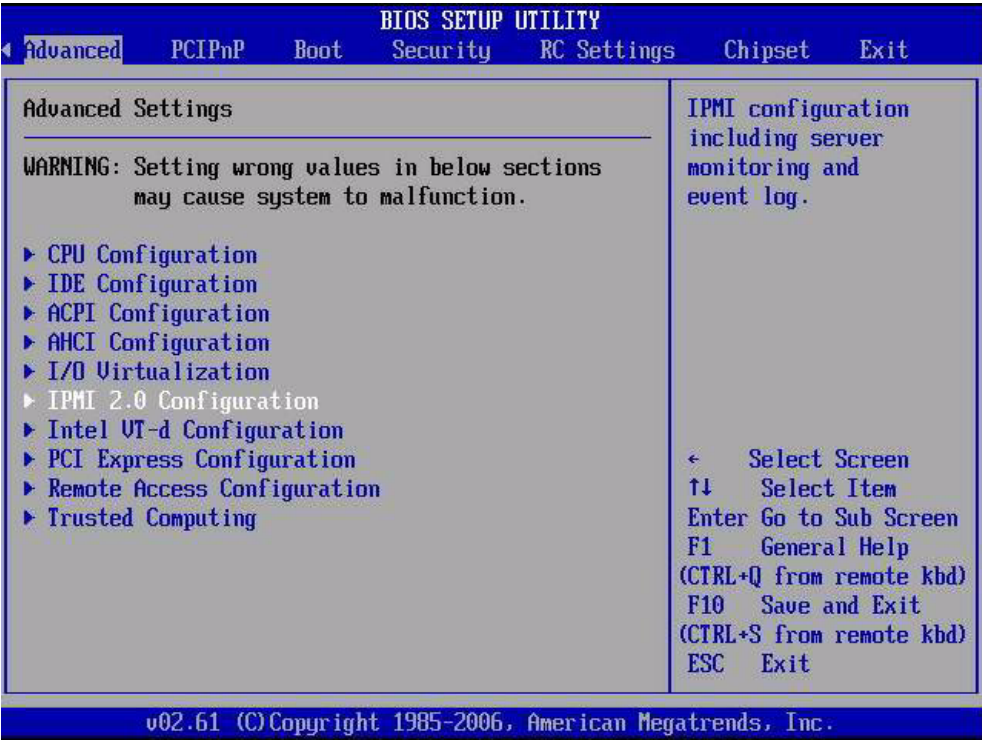
You can assign an IP address for the server SP from the BIOS Setup Utility on the IPMI 2.0 Configuration menu.

Note – You can also specify the LAN settings for the SP using Oracle ILOM. For instructions for setting the IP address in Oracle ILOM, see the Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection.

To set the IP address, complete the following steps:

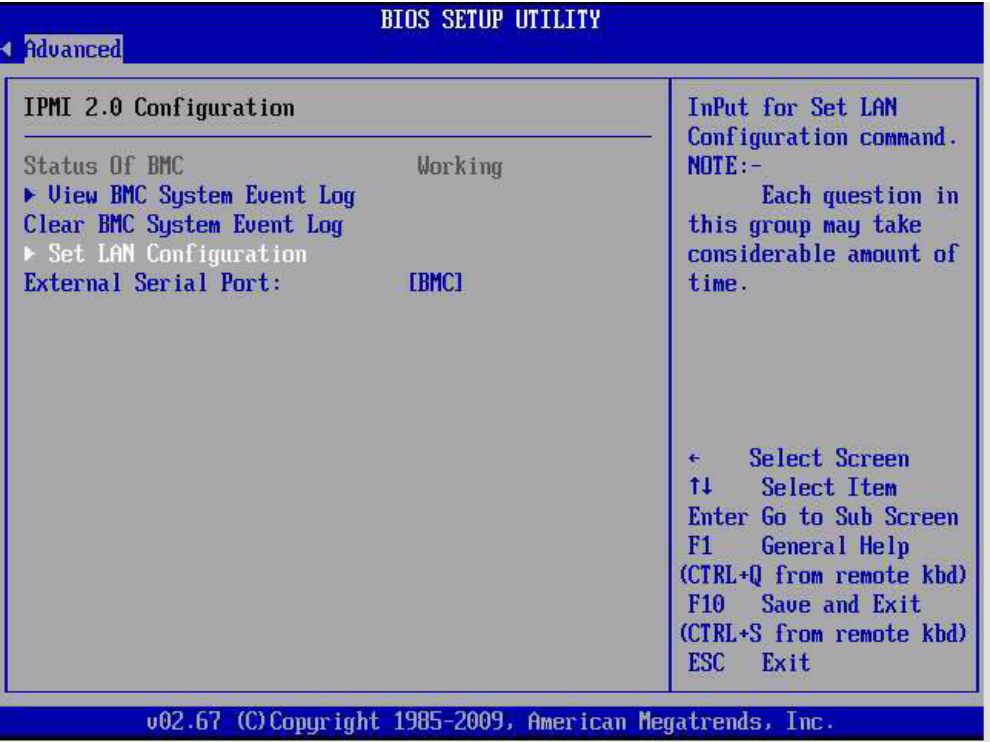
- 1. **Access the BIOS Setup Utility.**
See “Access the BIOS Setup Utility” on page 7-12.
- 2. **Navigate to the Advanced menu.**
- 3. **Select IPMI 2.0 Configuration, then press Enter (FIGURE 7-11).**

FIGURE 7-11 IPMI 2.0 Configuration Selection in Advanced Settings Menu



- 4. **Select Set LAN Configuration, then press Enter (FIGURE 7-12).**

FIGURE 7-12 Set LAN Configuration Option



5. Use the arrow keys to select and specify the appropriate LAN configuration settings (FIGURE 7-13.)

FIGURE 7-13 LAN Configuration Dialog Box

BIOS SETUP UTILITY

Advanced

LAN Configuration.

Channel Number

[01]

IP Assignment

[Static]

Current IP address in BMC:

Current MAC address in BMC:

Current Subnet Mask in BMC:

Current Gateway in BMC:

Current Active Management Port

NET MGT

Refresh

IP Address

[010.008.187.034]

Subnet Mask

[255.255.255.000]

Default Gateway

[010.008.187.254]

Active Management Port

[NET MGT]

Commit

Enter channel number
for SET LAN Config
Command.
Proper value below 16.

← Select Screen

↑↓ Select Item

Enter Update

F1 General Help
(CTRL+Q from remote kbd)

F10 Save and Exit
(CTRL+S from remote kbd)

ESC Exit

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6. Press F10 to save the changes and exit BIOS.

▼ Configure Option ROM Settings

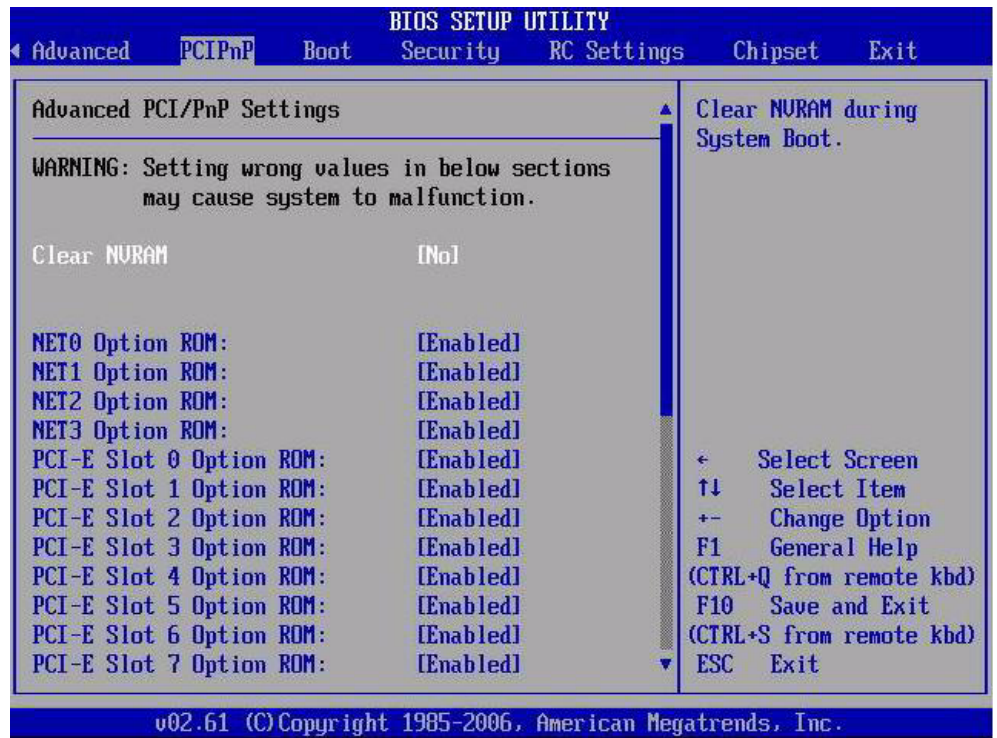
The BIOS Option ROM is 128 Kbytes. Of these 128 Kbytes, approximately 80 Kbytes are used by the VGA controller, the disk controller, and the network interface card. Approximately 48 Kbytes remain for the Option ROM.

To enable or disable Option ROM settings, complete the following steps:

1. **Access the BIOS Setup Utility.**
See “Access the BIOS Setup Utility” on page 7-12.
2. **Navigate to the PCIPnP menu option.**
The BIOS PCIPnP screen appears (FIGURE 7-14).

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FIGURE 7-14 BIOS PCIPnP Screen



3. Navigate to the Option ROM that you want to configure and set the Option ROM to Enabled or Disabled.
4. Press F10 to save the changes and exit BIOS.

7.8.1 Configuring Serial Port Sharing

By default, the SP console (NET MGT) port sends serial port output from the server. Using Oracle ILOM, you can specify that the host console (COMM1) be assigned as owner of the server's serial port output. This feature is useful for Windows kernel debugging, as it enables you to view non-ASCII character traffic from the host console.

You can assign serial port output using either the Oracle ILOM web interface or the Oracle ILOM command-line interface (CLI). For instructions, see the following sections:

- "Assign Serial Port Output Using the CLI" on page 7-23
- "Assign Serial Port Output Using the Web Interface" on page 7-23



Caution – You should set up the network on the SP before attempting to change the serial port owner to the host server. If the network is not set up, and you switch the serial port owner to the host server, you will be unable to connect using the CLI or web interface to change the serial port owner back to the SP. To return the serial port owner setting to the SP, you will need to restore access to the serial port on the server. For more details about restoring access to the server port on your server, see the Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection.

▼ Assign Serial Port Output Using the CLI

1. Log in to the Oracle ILOM CLI.
2. To set the serial port owner, type:
 -> **set /SP/serial/portsharing /owner=host**

Note – The serial port sharing value by default is owner=SP.

3. Connect a serial host to the server.

▼ Assign Serial Port Output Using the Web Interface

1. Log in to the Oracle ILOM web interface.
2. In the Oracle ILOM web interface, select the Configuration --> Serial Port tabs.
 The Serial Port Settings page appears.
3. In the Serial Port Settings page, select Host Server as the serial port owner.

Note – The serial port sharing setting by default is Service Processor.

4. Click Save for the changes to take effect.
5. Connect a serial host to the server.

7.9 BIOS and SP Updates

Periodic updates are released for Oracle ILOM firmware. These updates might contain fixes, patches, drivers, or other enhancements. Oracle ILOM firmware upgrades typically include both an updated BIOS and updated service processor firmware. You cannot upgrade the BIOS independently from the service processor firmware.

Note – BIOS configuration settings are not preserved across Oracle ILOM firmware upgrades. Upgrading Oracle ILOM firmware results in all BIOS configuration settings being restored to the optimal default values on the first host power-cycle following the upgrade process. You can use the BIOSconfig tool described in [Section 7.10 “BIOS Configuration Tool” on page 7-24](#) to save BIOS configuration settings prior to a firmware upgrade and to restore BIOS configuration settings after the Oracle ILOM firmware upgrade has been completed.

- Announcements and information about firmware releases are available in the Product Notes documentation for your server. See *Sun Fire X4470 Server Product Notes* (821-0704).
- Information about how to update firmware is available in the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server* (821-0702).

7.10 BIOS Configuration Tool

The BIOS configuration tool (BIOSconfig) is a utility that is available for each of the supported operating systems. BIOSconfig enables you to save, modify and restore BIOS configuration settings from within a supported operating system. For information about installing and using BIOSconfig, refer to the *Sun Server CLI Tools and IPMITool User's Guide* (821-0997).

Troubleshooting the Server and Oracle ILOM Defaults

This chapter includes information about troubleshooting the Sun Fire X4470 Server.

It contains the following topics:

- [Section 8.1 “Troubleshooting the Server” on page 8-1](#)
- [Section 8.2 “Diagnostic Tools” on page 8-2](#)
- [Section 8.3 “Using the Preboot Menu Utility” on page 8-4](#)
- [Section 8.4 “Contacting Support” on page 8-16](#)
- [Section 8.5 “Locating the Chassis Serial Number” on page 8-16](#)

8.1 Troubleshooting the Server

The Sun Fire X4470 Server and its accompanying software and firmware contain many diagnostic tools and features that can help you complete the following tasks:

- Isolate problems when a failure occurs on a component
- Monitor the status of a functioning system
- Exercise the system to disclose more subtle problems that might be hardware related

There is a suite of diagnostic tools, each of which has its own specific strengths and applications. For more information about which tool might be best to use for your purpose, and where to locate information about these tools, see:

- [Section 8.2 “Diagnostic Tools” on page 8-2](#)
- [Section 8.2.1 “Diagnostic Tool Documentation” on page 8-3](#)

8.2 Diagnostic Tools

There are a wide selection of diagnostic tools available for use with your server. These tools range from the SunVTS software, a comprehensive validation test suite, to log files in Oracle ILOM that might contain clues helpful in identifying the possible sources of a problem, and the fault management function in Oracle ILOM that enables you to identify a faulted component as soon as the fault occurs.

The diagnostic tools also include standalone software packages, firmware-based tests like power-on self-test (POST), U-Boot tests, or Pc-Check tests, and hardware LEDs that tell you when the system components are operating.

[TABLE 8-1](#) summarizes the variety of diagnostic tools that you can use when troubleshooting or monitoring your server.

TABLE 8-1 Summary of Diagnostic Tools

Diagnostic Tool	Type	What It Does	Accessibility	Remote Capability
Oracle ILOM	SP firmware	Monitors environmental conditions, generates alerts, performs fault isolation, and provides remote console access.	Can function on standby power and when the operating system is not running.	Designed for remote and local access.
Preboot Menu	SP firmware	Enables you to restore some of Oracle ILOM defaults (including firmware) when Oracle ILOM is not accessible.	Can function on standby power and when operating system is not running.	Local, but remote serial access is possible if the SP serial port is connected to a network-accessible terminal server.
LEDs	Hardware and SP firmware	Indicates status of overall system and particular components.	Available when system power is available.	Local, but sensor and indicators are accessible from Oracle ILOM web interface or command-line interface (CLI).
POST	Host firmware	Tests core components of system: CPUs, memory, and motherboard I/O bridge integrated circuits.	Runs on startup. Available when the operating system is not running.	Local, but can be accessed through Oracle ILOM Remote Console.

TABLE 8-1 Summary of Diagnostic Tools (*Continued*)

Diagnostic Tool	Type	What It Does	Accessibility	Remote Capability
U-Boot	SP firmware	Initializes and test aspects of the service processor (SP) prior to booting the Oracle ILOM SP and operating system. Tests SP memory, SP, network devices and I/O devices.	Can function on standby power and when operating system is not running.	Local, but remote serial access is possible if the SP serial port is connected to a network-accessible terminal server.
Pc-Check	SP firmware (or on Tools and Driver DVD for systems without SP)	DOS-based utility that tests all motherboard components (CPU, memory, and I/O), ports, and slots.	Runs on startup. Available when the operating system is not running.	Remote access through Oracle ILOM Remote Console.
Solaris commands	Operating system software	Displays various kinds of system information.	Requires operating system.	Local, and over network.
SunVTS	Diagnostic tool standalone software	Exercises and stresses the system, running tests in parallel.	Requires operating system. Install SunVTS software separately.	View and control over network.

8.2.1 Diagnostic Tool Documentation

TABLE 8-2 identifies where you can find more information about diagnostic tools.

TABLE 8-2 Summary of Documentation for Diagnostic Tools

Diagnostic Tool	Information	Location
ILOM	<ul style="list-style-type: none"> Oracle Integrated Lights Out Manager 3.0 Documentation Collection <i>Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server</i> 	<ul style="list-style-type: none"> http://www.oracle.com/pls/to pic/lookup?ctx=E19860-01&id=homepage http://www.oracle.com/pls/to pic/lookup?ctx=E19694-01&id=homepage
Preboot Menu	<ul style="list-style-type: none"> Using the Preboot Menu Utility 	<ul style="list-style-type: none"> Section 8.3 “Using the Preboot Menu Utility” on page 8-4

TABLE 8-2 Summary of Documentation for Diagnostic Tools (Continued)

Diagnostic Tool	Information	Location
LEDs; or system indicators and sensors	<ul style="list-style-type: none"> • <i>Sun Fire X4470 Server Service Manual</i> • <i>Oracle Integrated Lights Out Manager (ILOM) 3.0 Supplement for Sun Fire X4470 Server</i> • Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection 	<ul style="list-style-type: none"> • http://www.oracle.com/pls/topic/lookup?ctx=E19694-01&id=homepage • http://www.oracle.com/pls/topic/lookup?ctx=E19860-01&id=homepage
POST	<ul style="list-style-type: none"> • Servicing the Server at Boot Time 	<ul style="list-style-type: none"> • Section 7.2 “About the BIOS” on page 7-2 • Section 7.3 “Default BIOS Power-On Self-Test (POST) Events” on page 7-2 • Section 7.4 “BIOS POST F1 and F2 Errors” on page 7-4 • Section 7.5 “How BIOS POST Memory Testing Works” on page 7-7
U-Boot or Pc-Check	<ul style="list-style-type: none"> • <i>Oracle x86 Servers Diagnostics Guide</i> 	<ul style="list-style-type: none"> • http://www.oracle.com/pls/topic/lookup?ctx=E20781-01&id=homepage
Solaris commands	<ul style="list-style-type: none"> • Solaris command information for Solaris 10 	<ul style="list-style-type: none"> • http://www.oracle.com/technetwork/server-storage/solaris/documentation/index-jsp-135724.html
Oracle VTS	<ul style="list-style-type: none"> • Oracle VTS software and documentation 	<ul style="list-style-type: none"> • http://www.oracle.com/pls/topic/lookup?ctx=E19719-01&id=homepage

8.3 Using the Preboot Menu Utility

You can use the Preboot Menu utility installed on your server to make changes to some of Oracle ILOM’s settings while Oracle ILOM is not currently running. The Preboot Menu also enables you to reset Oracle ILOM to its default settings, as well as restore the SP firmware image on your system.

For more information about how to use the Preboot Menu Utility, see these sections:

- Section 8.3.1 “Accessing the Preboot Menu” on page 8-5
- Section 8.3.2 “Restoring Oracle ILOM to Default Settings” on page 8-10
- Section 8.3.3 “Restoring Oracle ILOM Access to the Serial Console” on page 8-11
- Section 8.3.4 “Restoring the SP Firmware Image” on page 8-12
- Section 8.3.5 “Preboot Menu Command Summary” on page 8-13

8.3.1 Accessing the Preboot Menu

To access the Preboot Menu, you must reset the SP and interrupt the boot process. You can interrupt the Oracle ILOM boot process by either:

- Using the Locate button on the local server.

For details about the requirements for this local access method, see [Section 8.3.1.1 “Prerequisites for Accessing the Preboot Menu” on page 8-5](#).

Or

- Typing **xyzzy** during a pause in the bootstrap process from a remote serial terminal.

For details about the requirements for this remote serial access method, see [Section 8.3.1.1 “Prerequisites for Accessing the Preboot Menu” on page 8-5](#).

Some Preboot Menu settings must be configured first, and until they are, you must use the Locate button method to access the Preboot Menu.

For detailed instructions for accessing the Preboot Menu from a local or remote connection, see the following sections:

- [Section 8.3.1.1 “Prerequisites for Accessing the Preboot Menu” on page 8-5](#)
- [“Access the Preboot Menu” on page 8-6](#)
- [“Edit Preboot Menu for Remote Serial Access” on page 8-7](#)

8.3.1.1 Prerequisites for Accessing the Preboot Menu

Ensure that the applicable requirements are met prior to accessing the Preboot Menu from either a local or remote connection.

- For local access to the Preboot Menu (using Locate button)

You must connect a terminal or console capable of running terminal emulation software to the serial port on the server using a cable.

For more information about how to attach local devices to the server using a dongle cable, see [Section 2.9 “Attaching Devices to the Server” on page 2-10](#).

For instructions for accessing the Preboot Menu by using the Locate button, see [“Access the Preboot Menu” on page 8-6](#).

- For remote serial access to the Preboot Menu (typing **xyzzy** during bootstrap)

Prior to accessing the Preboot Menu remotely, you must set the `bootdelay` and `check_physical_presence` settings in the Preboot Menu to enable remote serial access. To configure these settings for the first time, you need to:

1. Access the Preboot Menu using the Locate button on the local server as described in [“Access the Preboot Menu” on page 8-6](#).

2. Edit the settings in the Preboot Menu to enable remote access as described in [“Edit Preboot Menu for Remote Serial Access”](#) on page 8-7.
3. Use a remote serial terminal or console running terminal emulation software to access the Preboot Menu remotely.

Note – You cannot use an SSH, or a remote KVMs session to access the Preboot Menu remotely.

▼ Access the Preboot Menu

1. **Ensure that the requirements in Section 8.3.1.1 “Prerequisites for Accessing the Preboot Menu” on page 8-5 are met.**

2. **Reset Oracle ILOM.**

For example:

- From the server SP Oracle ILOM, enter the command:

-> **reset /SP**

Oracle ILOM reboots and messages begin scrolling on the screen.

3. **To interrupt the Oracle ILOM boot process, perform one of the following actions when the SP is resetting:**

- Press and hold the Locate button on the server front panel, until the Preboot Menu appears.

Or

- Type in **xyzzzy** when you see the message:

Booting linux in *n* seconds...

Note – You cannot interrupt the Oracle ILOM boot process by typing **xyzzzy** until you have configured the settings as described in [“Edit Preboot Menu for Remote Serial Access”](#) on page 8-7.

The Oracle ILOM Preboot Menu appears.

```
Booting linux in 10 seconds...
```

```
                ILOM Pre-boot Menu
```

```
                -----
```

```
Type "h" and [Enter] for a list of commands, or "?" [Enter] for
command-line key bindings.  Type "h cmd" for summary of 'cmd'
command.
```


Warning: SP will warm-reset after 300 seconds of idle time.
Set 'bootretry' to -1 to disable the time-out.

Preboot>

4. **You can perform any of the following tasks or type `boot` to exit the Preboot Menu.**
 - Enable remote access to the Preboot Menu.
For instructions, see [“Edit Preboot Menu for Remote Serial Access” on page 8-7](#).
 - Restore Oracle ILOM settings to their defaults.
For instructions, see [“Reset Oracle ILOM Configuration Using the Preboot Menu” on page 8-10](#).
 - Restore the serial connection between Oracle ILOM and a host console.
For instructions, see [“Restore Access to the Serial Console Using the Preboot Menu” on page 8-11](#).
 - Restore the SP firmware image.
For instructions, see [“Restore the SP Firmware Image Using the Preboot Menu” on page 8-13](#).
 - Review the commands supported in the Preboot Menu.
For command details, see [Section 8.3.5 “Preboot Menu Command Summary” on page 8-13](#).

▼ Edit Preboot Menu for Remote Serial Access

1. **Access the Preboot Menu as described in [“Access the Preboot Menu” on page 8-6](#).**
2. **At the `Preboot>` prompt, type `edit`.**

The Preboot Menu enters edit mode.

In edit mode, the Preboot Menu displays its selections one-by-one, offering you a chance to change each one.

 - To change a setting, type the new value, then press Enter.
 - To skip to the next setting, press Enter.
3. **Press Enter to move through the settings until the `bootdelay` setting appears.**

4. To change the `bootdelay` setting, type 3, 10, or 30, then press Enter.

This value (3, 10, or 30) specifies the number of seconds the SP boot process delays while waiting for your input.

The Preboot Menu re-displays the `bootdelay` setting with the new value.

5. Press Enter to return to Preboot Menu selections.

The Preboot Menu selections appear.

6. Press Enter to move through the settings until the `check_physical_presence` setting appears.

To change the `check_physical_presence` setting, type no, then press Enter.

The Preboot Menu displays the `check_physical_presence` setting with the new value.

7. Press Enter for the new value to take effect.

The Preboot Menu asks you to confirm your changes.

Enter 'y[es]' to commit changes: [no]

8. Type y to save your changes and exit the edit session.

If you want to exit the edit session without saving your changes, type n.

9. To exit the Preboot Menu, type boot.

The following example shows an edit session where the `check_physical_presence` setting is changed.

Note – For a list of other settings you can edit in the Preboot Menu, see [Section 8.3.1.2 “Edit Mode Settings in Preboot Menu” on page 8-9](#).

```
Preboot> edit

Press Enter by itself to reach the next question.
Press control-C to discard changes and quit.

Values for baudrate are {[ 9600 ] | 19200 | 38400 | 57600 | 115200}.
Set baudrate?                [9600]
Values for serial_is_host are {[ 0 ] | 1 }.
Set serial_is_host?          [0]
Values for bootdelay are { -1 | 3 | 10 | 30 }.
Set bootdelay?                [3] 10
Set bootdelay?                [10]
Values for bootretry are { -1 | 30 | 300 | 3000 }.
Set bootretry?                [-1]
Values for diags_mode are { Normal | Quick | Extended | Skip }.
Set diags_mode?               [Normal]
```

```

Values for preferred are {[ 0 ]| 1 }.
Set preferred?                [<not set>]
Values for preserve_conf are {[ yes ]| no }.
Set preserve_conf?            [yes]
Values for check_physical_presence are {[ yes ]| no }.
Set check_physical_presence? [yes] no
Set check_physical_presence? [no]
Enter 'y[es]' to commit changes: [no] y
Summary: Changed 2 settings.
Preboot>

```

8.3.1.2 Edit Mode Settings in Preboot Menu

In addition to changing the settings required in the Preboot Menu to enable remote access, you can also change other edit mode settings in the Preboot Menu. For a list of these settings, see [TABLE 8-3](#).

TABLE 8-3 Edit Mode Preboot Menu Command Settings

Setting	Description
baudrate	Sets the baudrate of the serial port. Selections include 9600,19200, 38400, 57600, and 115200.
serial_is_host	If this is set to 0, the serial port connects to the Oracle ILOM. If this is set to 1, the serial port connects to the host. For more details, see Section 8.3.3 “Restoring Oracle ILOM Access to the Serial Console” on page 8-11.
bootdelay	The number of seconds the bootstrap process waits for the user to enter xyzz before booting the SP. Selections include 3, 10, or 30.
bootretry	The number of seconds the Preboot Menu waits for user input before timing out and booting the SP. Set to -1 to disable the time-out.
diags_mode	Sets the diagnostic level executed when the server powers on.
preferred	Unused
preserve_conf	Setting this to no duplicates the function of the <code>unconfig ilom_conf</code> command, which resets many Oracle ILOM configuration settings.
check_physical_presence	If this is set to Yes, you must press and hold the Locate button to interrupt the SP boot process. If it is set to No, the boot process prompts you to interrupt it. See “Edit Preboot Menu for Remote Serial Access” on page 8-7 for details.

8.3.2 Restoring Oracle ILOM to Default Settings

You can use the Preboot Menu to restore Oracle ILOM settings to their defaults.

▼ Reset Oracle ILOM Configuration Using the Preboot Menu

1. **Access the Preboot Menu as described in [Section 8.3.1 “Accessing the Preboot Menu” on page 8-5](#).**

2. **In Preboot Menu, type:**

```
Preboot> unconfig ilom_config
```

Setting 'preserve_conf' to 'no' for the next boot of ILOM.

3. **Reset the SP by typing:**

```
Preboot> boot
```

The Preboot Menu exits and the SP restarts.

After restarting the Oracle ILOM SP, the value for Oracle ILOM settings revert to their defaults.

8.3.3 Restoring Oracle ILOM Access to the Serial Console

In the event that the serial connection between Oracle ILOM and a host becomes unavailable, you can restore access to the serial port connection by reconfiguring the host as the external serial port owner in either the Oracle ILOM web interface or CLI, or in the Preboot Menu.

To determine which interface to use when restoring the serial connection between Oracle ILOM and a host console, consider the following:

- If a network connection is available, you should use the Oracle ILOM web interface or CLI to restore Oracle ILOM's access to the serial console.

For instructions, see [Section 7.8.1 “Configuring Serial Port Sharing” on page 7-22](#).

- If a network connection is unavailable, you should use the procedure in [“Restore Access to the Serial Console Using the Preboot Menu” on page 8-11](#) to restore Oracle ILOM access to the serial console.

▼ Restore Access to the Serial Console Using the Preboot Menu

1. **Access the Preboot Menu as described in [Section 8.3.1 “Accessing the Preboot Menu” on page 8-5](#).**

2. **At the `Preboot>` prompt, type `edit`.**

The Preboot Menu enters edit mode.

In edit mode, the Preboot Menu displays its selections one-by-one, offering you a chance to change each one.

- To change a setting, type the new value, then press Enter.
- To skip to the next setting, press Enter.

3. **Press Enter to move through the settings until the `serial_is_host` setting appears.**

To change the `serial_is_host` setting, type `0`, and then press Enter.

The Preboot Menu appears with the new value for the `serial_is_host` setting.

4. **Press Enter to display the Preboot Menu selections.**

The Preboot Menu settings appear.

5. **Press Enter to scroll through the settings until the Preboot Menu asks you to confirm your changes.**

Enter 'y[es]' to commit changes: [no]

6. **Type `y` to confirm your change and exit the edit session.**

The Preboot Menu displays this message:

Summary: Changed 1 settings

Preboot>

7. **To exit the Preboot Menu, type `boot`.**

8.3.4 Restoring the SP Firmware Image

If Oracle ILOM is available, you should always use the Oracle ILOM web interface or CLI to restore the firmware image. For instructions about how to restore the firmware image, using either the Oracle ILOM web interface or CLI, refer to the Oracle ILOM documentation. If Oracle ILOM is unavailable, you can use the Preboot Menu or IPMIflash to restore the SP firmware image.

Note – If you are unable to access Oracle ILOM to update the SP firmware image using either the Oracle ILOM interfaces or IPMIflash, you should contact a service representative for assistance.



Caution – To restore the SP firmware image using the Preboot Menu, you must be a qualified service technician.

To use the Preboot Menu to restore the SP firmware image on the server, see the following sections:

- [Section 8.3.4.1 “Prerequisites for Restoring SP Firmware Using the Preboot Menu” on page 8-12](#)
- [“Restore the SP Firmware Image Using the Preboot Menu” on page 8-13](#)

8.3.4.1 Prerequisites for Restoring SP Firmware Using the Preboot Menu

The following requirements must be met prior to restoring the SP firmware on your server using the Preboot Menu.

- You must be a qualified service technician to perform this procedure.
- You must have a valid `.flash` firmware image file on a TFTP server.

Note – Restoring the SP firmware using the Preboot Menu requires a `.flash` file instead of a `.pkg` file that is typically used to update the SP using the Oracle ILOM interfaces.

▼ Restore the SP Firmware Image Using the Preboot Menu

To restore the SP firmware image using the Preboot Menu, follow these steps:

1. **Access the Preboot Menu as described in [Section 8.3.1 “Accessing the Preboot Menu” on page 8-5](#).**
2. **At the `Preboot>` prompt, type:**



Caution – The use of the `net flash` command is reserved for use by service personnel only.

net flash *IPaddress path/name.flash*

where:

- *IPaddress* is the IP address of a TFTP server.
- *path* is the path to the file relative to `/tftpboot`.
- *name* is the first part of the `.flash` file name.

For example:

net flash 10.8.173.25 images/system-rom.flash

After a series of messages, the Preboot Menu prompt appears.

Preboot>

3. At the Preboot> prompt, type the `reset` command to restart the SP.

For example:

Preboot> **reset**

The Preboot Menu exits and Oracle ILOM restarts.

8.3.5 Preboot Menu Command Summary

TABLE 8-4 identifies the Preboot Menu commands.

TABLE 8-4 Preboot Menu Commands

Command	Description
<code>boot</code>	Boots Oracle ILOM. The Preboot Menu exits and Oracle ILOM restarts. Note - This command executes a modified boot sequence that does not offer the choice to select the diagnostic level, or to interrupt the boot sequence and return to the Preboot Menu. To execute the normal boot sequence, use the <code>reset warm</code> command instead.
<code>vers</code>	Displays version information including the hardware type, board revision, Oracle ILOM revision, revisions of PBSW and recovery U-Boot. Shows the checksum integrity of the images, and the preference between redundant images.
<code>help</code>	Displays a list of commands and parameters.
<code>show</code>	Displays a list of SP settings.
<code>edit</code>	Starts an interactive dialog that prompts and changes settings one-by-one. See “Edit Preboot Menu for Remote Serial Access” on page 8-7 for details.

TABLE 8-4 Preboot Menu Commands (Continued)

Command	Description
diag	Runs the U-Boot diagnostic tests in manual mode. See the <i>Oracle X86 Servers Diagnostics Guide</i> (820-6750) for more on U-Boot diagnostic tests.
host	<p>Initiates various activities related to the host.</p> <ul style="list-style-type: none">• <code>clearcmos</code> – Clears CMOS and BIOS passwords.• <code>console</code> – Connects SP console to host serial console. <p>Note - Type <code>Ctrl \ q</code> to quit.</p> <ul style="list-style-type: none">• <code>show</code> – Shows information about the host state.• <code>enable-on</code> – Enables the front-panel Power button, which is usually disabled unless Oracle ILOM is running. <p>Caution - If you start the host when Oracle ILOM is off, the BIOS does not send error events, or power messages to the SP. This can cause the server to lose power.</p> <ul style="list-style-type: none">• <code>hard-off</code> – Turns the host off.

TABLE 8-4 Preboot Menu Commands (Continued)

Command	Description
net	<p>{ config dhcp ping flash }</p> <ul style="list-style-type: none">• config – Starts a dialog that enables you to change the Oracle ILOM network settings.• dhcp – Changes the network addressing from static to DHCP. <p>Note - You must set <code>ipdiscovery = dhcp</code> using the <code>net config</code> command first.</p> <ul style="list-style-type: none">• ping – Sends a ping.• flash – Downloads an Oracle ILOM firmware image. See Section 8.3.4 “Restoring the SP Firmware Image” on page 8-12 for details. <p>Type help net <i>command</i> for more details on these commands.</p>
reset	<p>{ warm cold }. Resets the SP and the host.</p> <ul style="list-style-type: none">• warm – Resets the SP without affecting a running host.• cold – Resets the SP and the host. It has the effect of powering off the server.
unconfig	<p>{ ilom_conf most all }</p> <p>Causes Oracle ILOM to erase any configuration information and returns the values to defaults the next time Oracle ILOM boots.</p> <ul style="list-style-type: none">• ilom_conf – Resets configuration settings but preserves SP network and baudrate, preferred, and check_physical_presence.• most – Resets the SP data storage, but preserves network and baud rate, preferred, and check_physical_presence settings.• all – Resets all SP data storage and settings. <p>Booting Oracle ILOM restores other defaults.</p> <p>Note - None of these options erases the dynamic FRU PROMs.</p>



8.4 Contacting Support

If the troubleshooting procedures in this chapter fail to solve your problem, use [TABLE 8-5](#) to collect information that you might need to communicate to support personnel.

TABLE 8-5 System Information Needed for Support

System Configuration Information Needed	Your Information
Service contract number	
System model	
Operating environment	
System serial number	
Peripherals attached to the system	
Email address and phone number for you and a secondary contact	
Street address where the system is located	
Superuser password	
Summary of the problem and the work being done when the problem occurred	
Other Useful Information	
IP address	
Server name (system host name)	
Network or internet domain name	
Proxy server configuration	

8.5 Locating the Chassis Serial Number

You might need to have your server's serial number when you ask for service on your system. Record this number for future use. Use one of the following methods to locate your server's serial number:

- On the front panel of the server, look at the bottom ledge (near the center) to locate the server's serial number. For an illustration of the server front panel, see [Section 1.2 "Server Front Panel Features" on page 1-10](#).
- Locate the yellow Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.
- From Oracle ILOM, enter the `show/SYS` command or go to the System Information tab in the Oracle ILOM browser interface.

Server Specifications

This appendix includes specifications for the Sun Fire X4470 Server.

It contains the following topics:

- [Section A.1 “Physical Specifications” on page A-1](#)
- [Section A.2 “Electrical Specifications” on page A-2](#)
- [Section A.3 “Environmental Requirements” on page A-2](#)

A.1 Physical Specifications

[TABLE A-1](#) lists the physical specifications for the server.

TABLE A-1 Physical Specifications

Parameter	Value
Height	5.25 inches/133 mm
Width	17.19 inches/437 mm
Depth	27.8 inches/706 mm
Weight	96 lbs/16.36 kg

A.2 Electrical Specifications

[TABLE A-2](#) lists the electrical specifications for the server.

TABLE A-2 Electrical Specifications

Parameter	Value
Input:	
Nominal frequencies	50/60 Hz
AC operating voltage range	100-127 VAC for 2 CPUs 200-240 VAC for 2 or 4 CPUs
Maximum current AC RMS	12A @ 100 VAC / 12A @ 200 VAC
Power dissipation:	
Max power consumption	1800 W
Max heat output	6143 BTU/hr
Volt-Ampere rating	1837 VA @ 240 VAC, 0.98 P.F.

A.3 Environmental Requirements

[TABLE A-3](#) lists the environmental requirements for the server.

TABLE A-3 Environmental Requirements

Parameter	Value
Operating temperature (single, non-rack system)	5° C to 35° C (41° F to 95° F)
Nonoperating temperature (single, non-rack system)	-40° C to 70° C (-40° F to 158° F)
Operating humidity (single, non-rack system)	10% to 90% relative humidity, non-condensing
Nonoperating humidity (single, non-rack system)	Up to 93% relative humidity, non-condensing
Altitude (operating) (single, non-rack system)	Up to 3048 m, maximum ambient temperature is derated by 1 degree C per 300 m above 900 m
Altitude (nonoperating) (single, non-rack system)	Up to 12,000 m

BIOS Setup Utility Menus

This appendix shows the menu selections available in the BIOS Setup Utility.

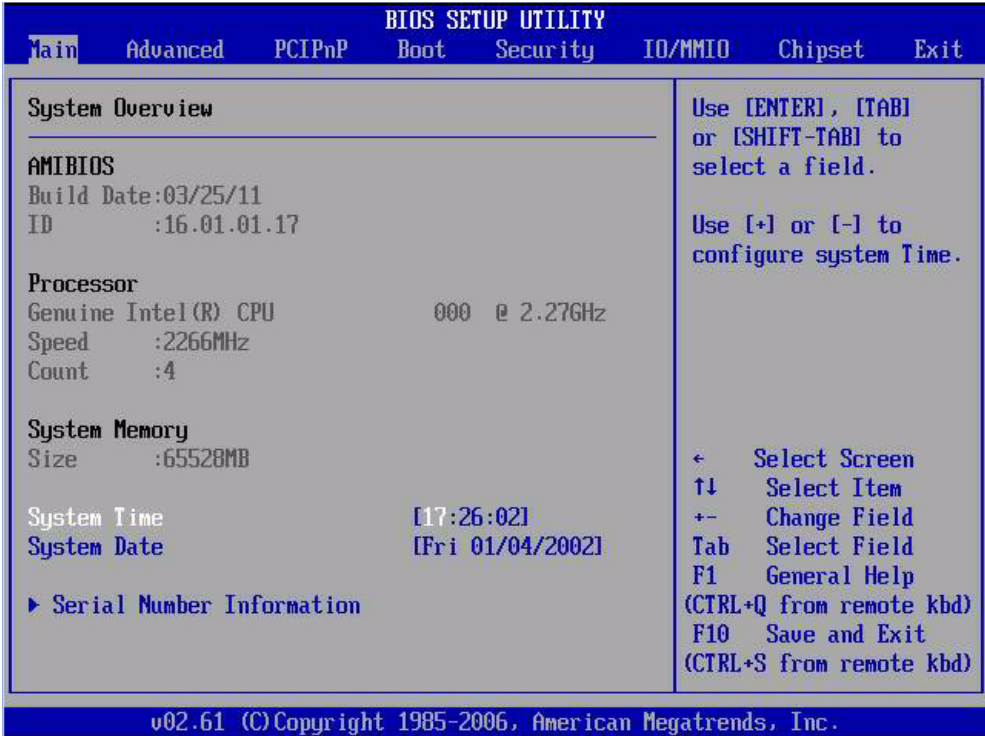
Note – The menus shown in this appendix are examples. The BIOS version numbers, menu information, and menu selections are subject to change over the life of the product.

This appendix contains the following topics:

- [Section B.1 “BIOS Main Menu Selections” on page B-2](#)
- [Section B.2 “BIOS Advanced Menu Selections” on page B-3](#)
- [Section B.3 “BIOS PCIPnP Menu Selections” on page B-16](#)
- [Section B.4 “BIOS Boot Menu Selections” on page B-18](#)
- [Section B.5 “BIOS Security Menu Selections” on page B-21](#)
- [Section B.6 “BIOS I/O MMIO Menu Selections” on page B-22](#)
- [Section B.7 “BIOS Chipset Menu Selections” on page B-24](#)
- [Section B.8 “BIOS Exit Menu Selections” on page B-26](#)

B.1 BIOS Main Menu Selections

FIGURE B-1 BIOS Main Menu



B.2 BIOS Advanced Menu Selections

FIGURE B-2 BIOS Advanced Menu–Advanced Settings Screen

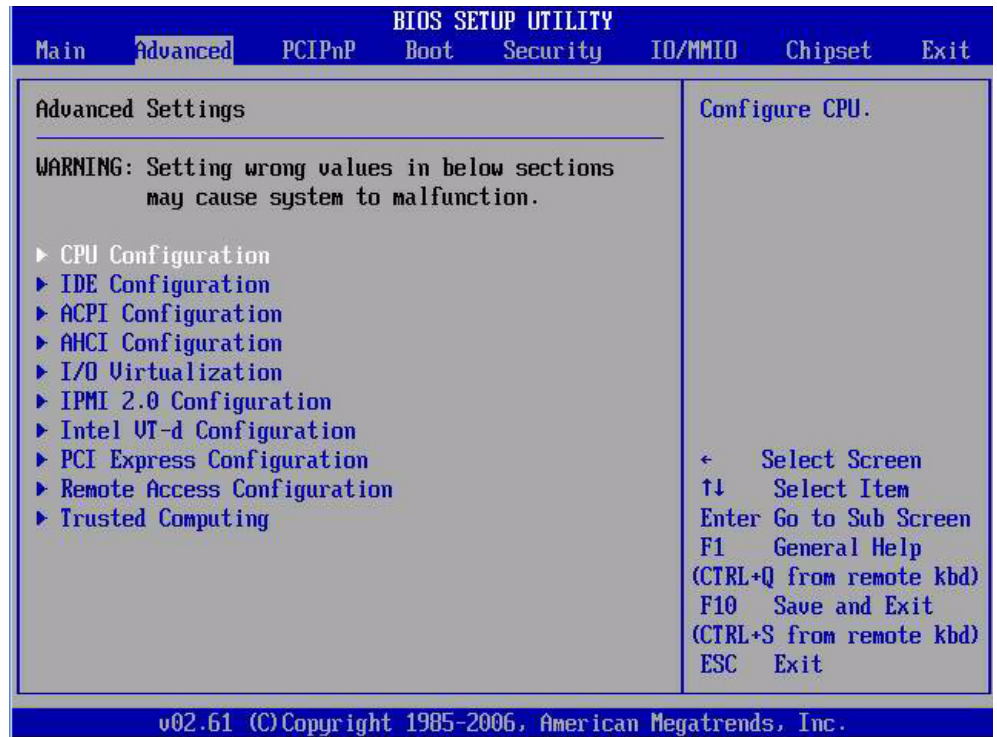


FIGURE B-3 BIOS Advanced Menu–CPU Configuration First Screen

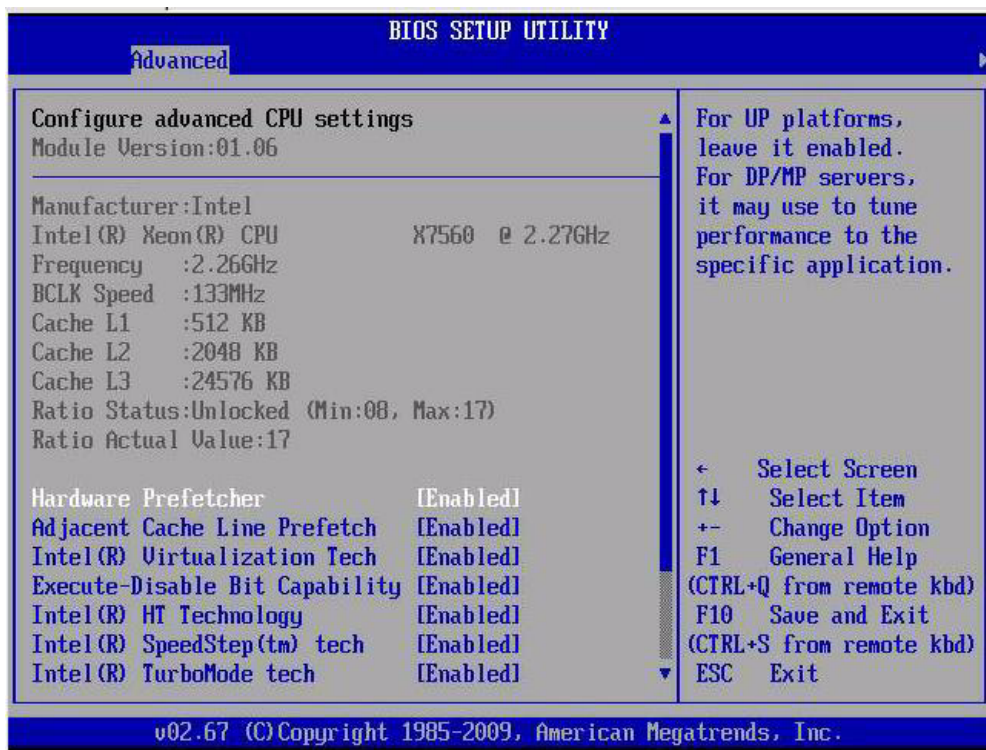


FIGURE B-4 BIOS Advanced Menu—CPU Configuration Second Screen

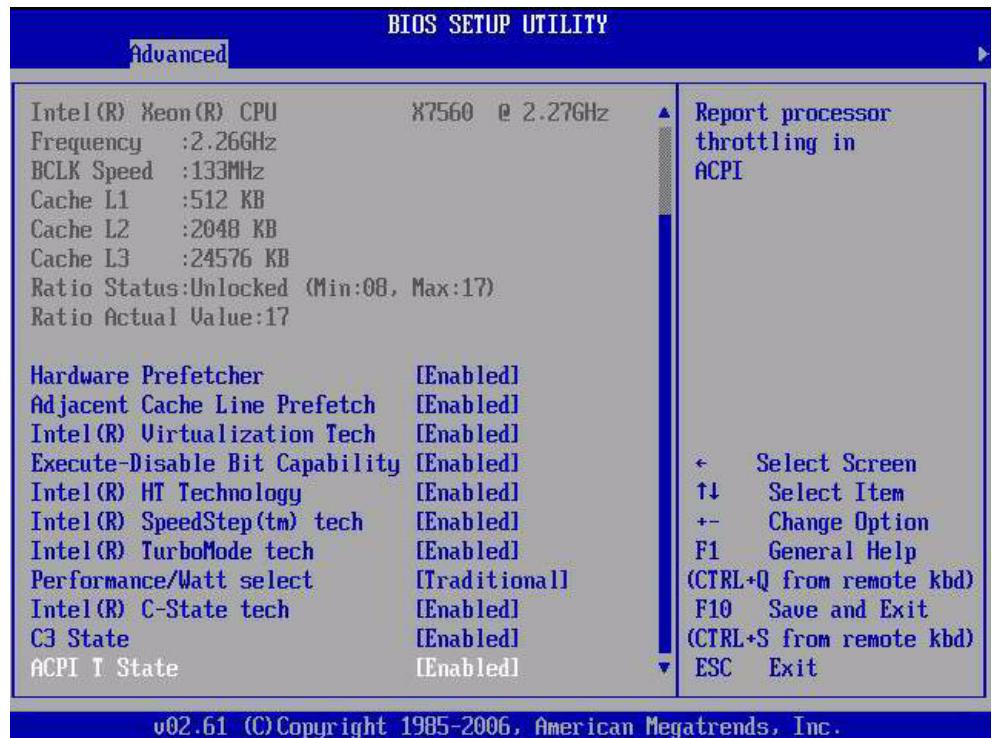


FIGURE B-5 BIOS Advanced Menu–IDE Configuration Screen

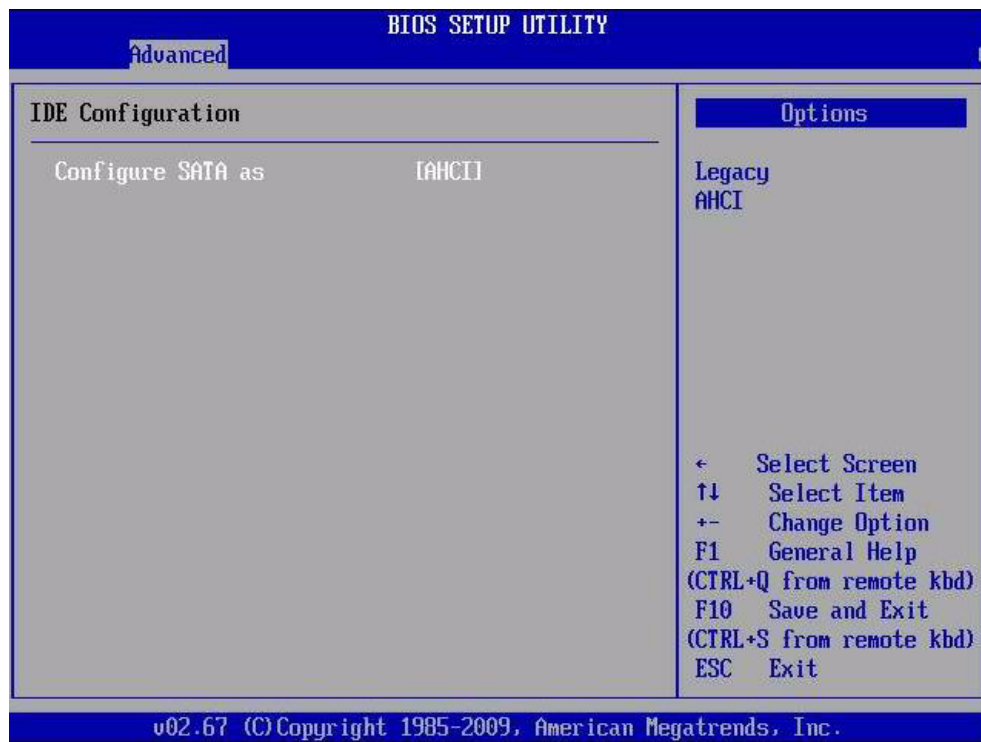


FIGURE B-6 BIOS Advanced Menu–ACPI Configuration Screen

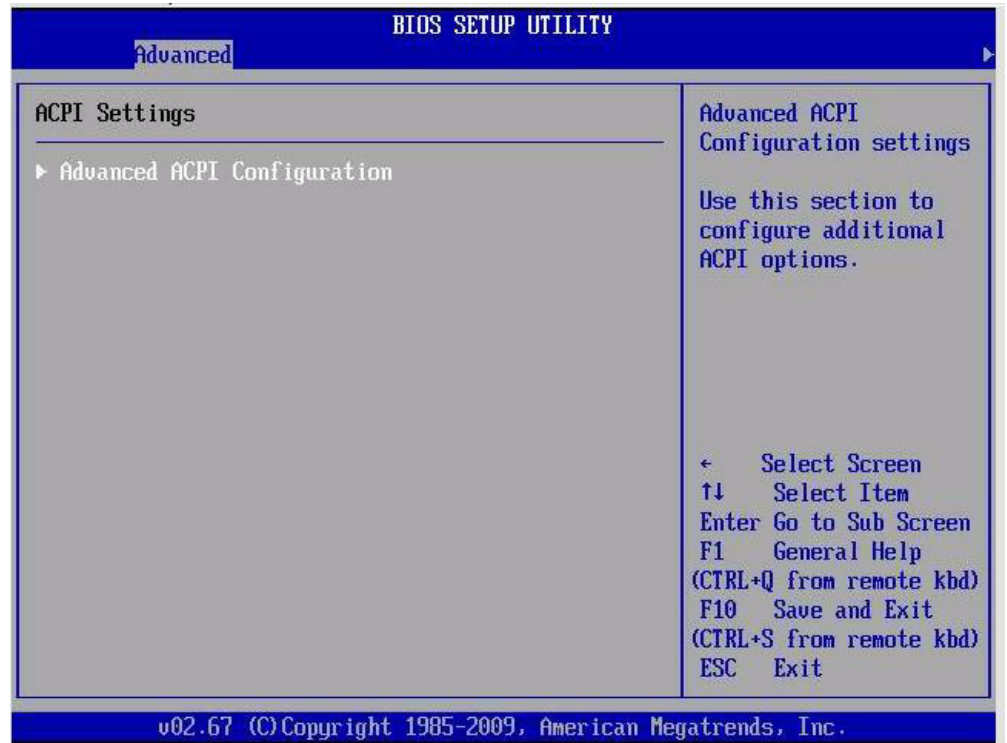


FIGURE B-7 BIOS Advanced Menu–AHCI Configuration Screen

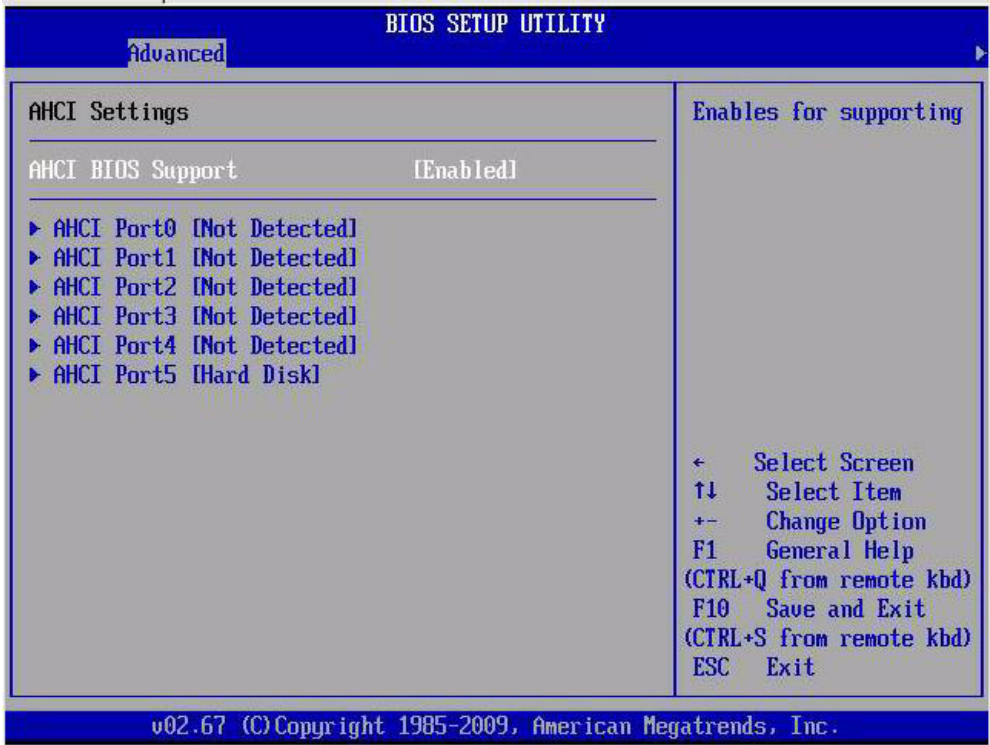


FIGURE B-8 BIOS Advanced Menu–I/O Virtualization Screen

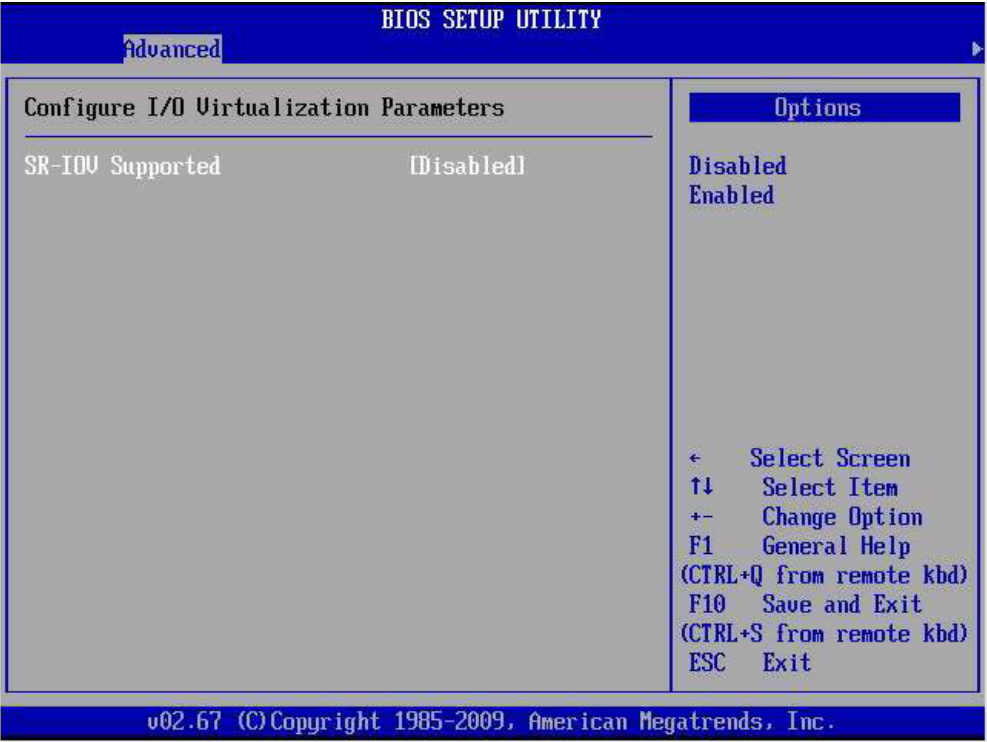


FIGURE B-9 BIOS Advanced Menu–IPMI 2.0 Configuration Screen

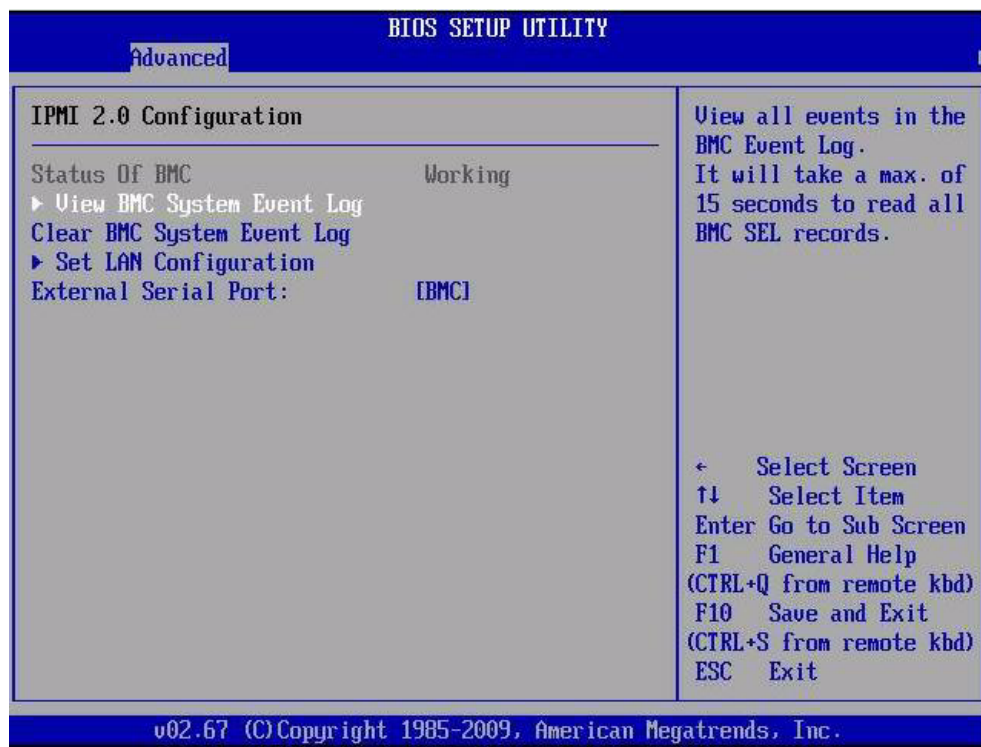


FIGURE B-10 BIOS Advanced Menu–IPMI 2.0 Configuration–Set LAN Configuration Screen

BIOS SETUP UTILITY		
Advanced		
LAN Configuration.		Enter channel number for SET LAN Config Command. Proper value below 16.
Channel Number	[01]	
IP Assignment	[Static]	
Current IP address in BMC:		
Current MAC address in BMC:		
Current Subnet Mask in BMC:		
Current Gateway in BMC:		
Current Active Management Port		NET MGT
Refresh		
IP Address	[010.008.187.034]	
Subnet Mask	[255.255.255.000]	
Default Gateway	[010.008.187.254]	
Active Management Port	[NET MGT]	
Commit		
		← Select Screen ↑↓ Select Item Enter Update F1 General Help (CTRL+Q from remote kbd) F10 Save and Exit (CTRL+S from remote kbd) ESC Exit
v02.67 (C) Copyright 1985-2009, American Megatrends, Inc.		

FIGURE B-11 BIOS Advanced Menu–Intel VT-d Configuration Screen

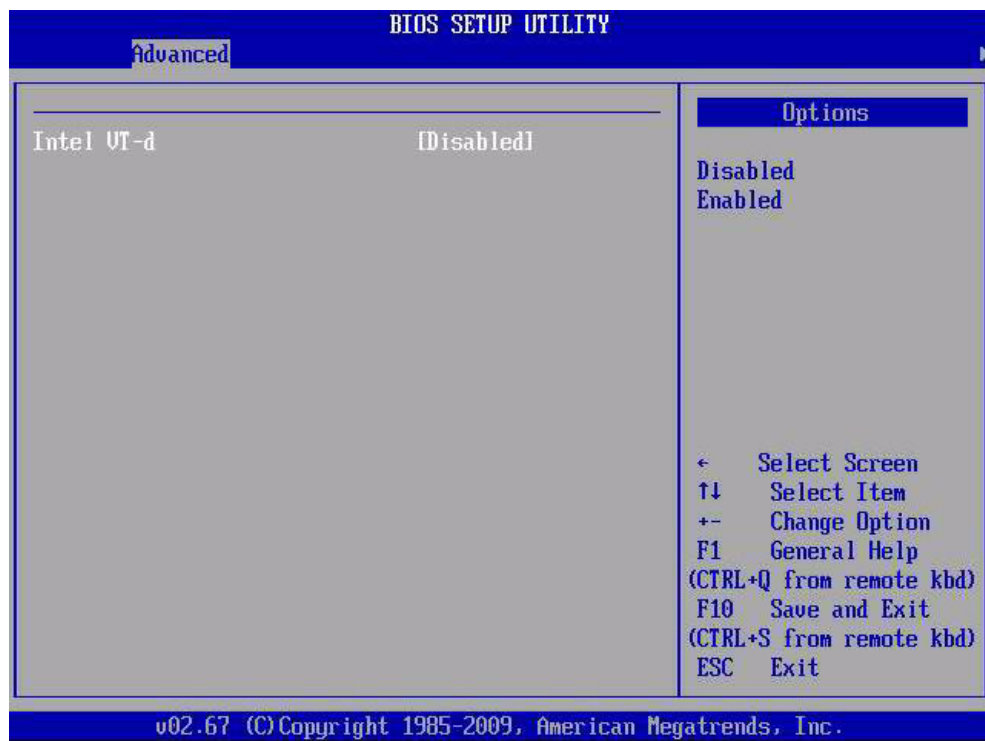


FIGURE B-12 BIOS Advanced Menu–PCI Express Configuration Screen

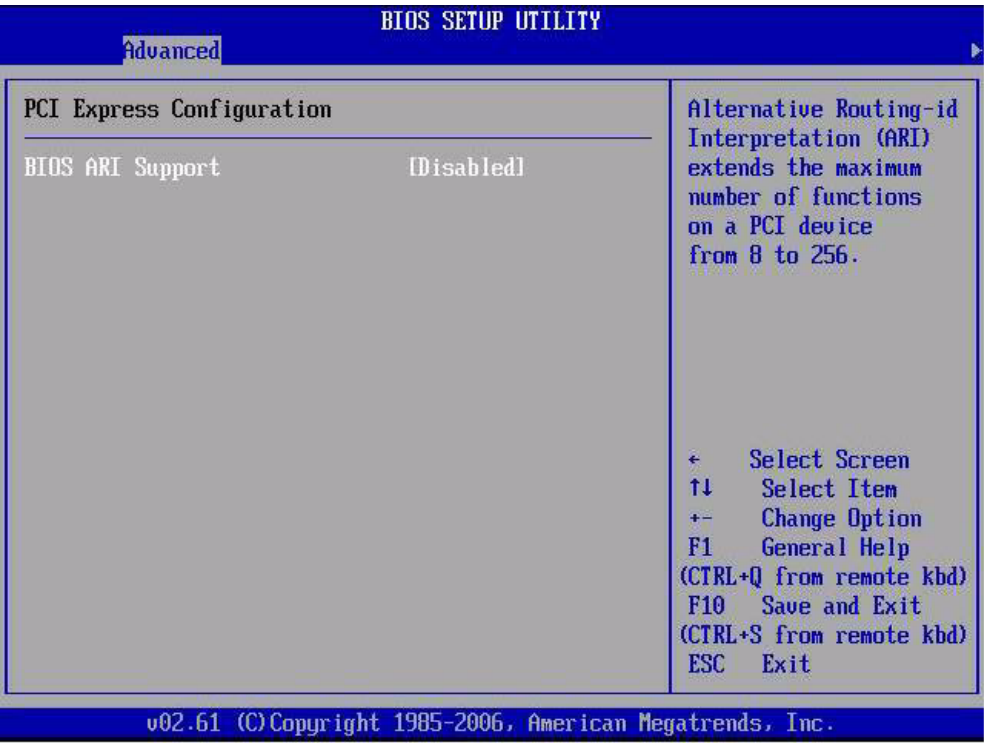
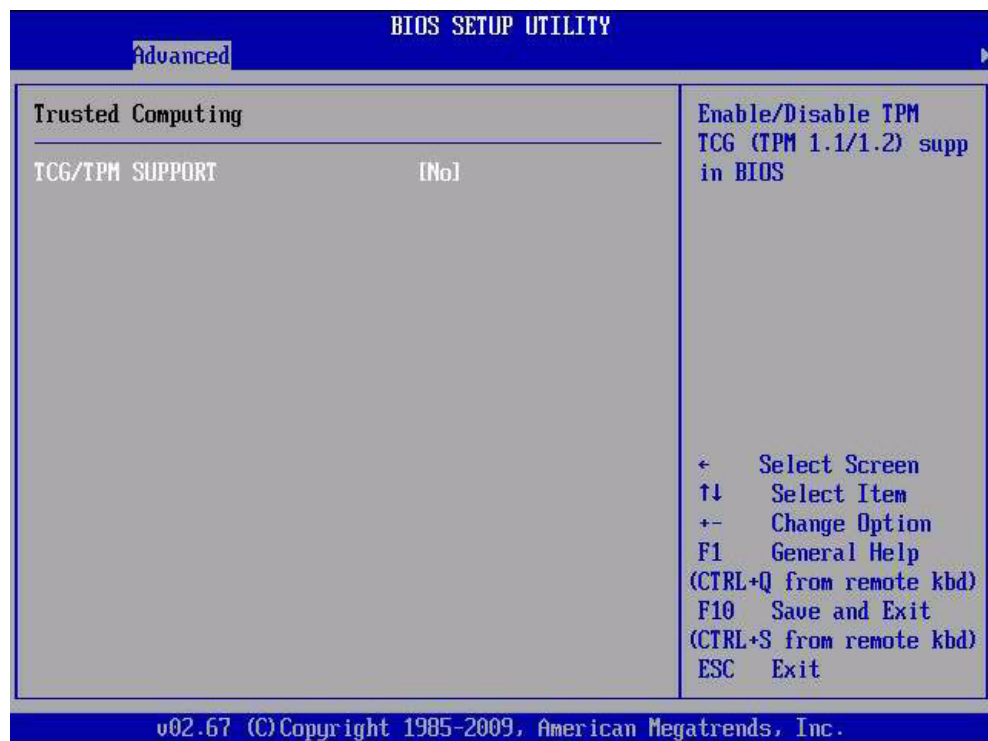


FIGURE B-13 BIOS Advanced Menu—Remote Access Configuration Screen

BIOS SETUP UTILITY	
Advanced	
Configure Remote Access type and parameters	
Remote Access	[Enabled]
Serial port number	[COM1]
Base Address, IRQ	[3F8h, 4]
Serial Port Mode	[09600 8,n,1]
Flow Control	[None]
Redirection After BIOS POST	[Always]
Terminal Type	[ANSI]
VT-UTF8 Combo Key Support	[Enabled]
Sredir Memory Display Delay	[No Delay]
Select Remote Access type.	
← Select Screen ↑↓ Select Item +- Change Option F1 General Help (CTRL+Q from remote kbd) F10 Save and Exit (CTRL+S from remote kbd) ESC Exit	
v02.67 (C) Copyright 1985-2009, American Megatrends, Inc.	

FIGURE B-14 BIOS Advanced Menu–Trusted Computing Screen



B.3 BIOS PCIPnP Menu Selections

FIGURE B-15 BIOS PCIPnP Menu First Screen



FIGURE B-16 BIOS PCIPnP Menu Second Screen

BIOS SETUP UTILITY		
Main	Advanced	PCIPnP
PCI-E Slot 4 Option ROM:	[Enabled]	▲ Enable/Disable allocat of legacy I/O resource to this slot
PCI-E Slot 5 Option ROM:	[Disabled]	
PCI-E Slot 6 Option ROM:	[Disabled]	
PCI-E Slot 7 Option ROM:	[Disabled]	
PCI-E Slot 8 Option ROM:	[Disabled]	
PCI-E Slot 9 Option ROM:	[Disabled]	
Cluster Card Slot Option ROM:	[Disabled]	
PCI MMIO 64 Bits Support	[Disabled]	
I/O Allocation for Slot 0	[Enabled]	
I/O Allocation for Slot 1	[Enabled]	
I/O Allocation for Slot 2	[Enabled]	
I/O Allocation for Slot 3	[Enabled]	← Select Screen
I/O Allocation for Slot 4	[Enabled]	↑↓ Select Item
I/O Allocation for Slot 5	[Enabled]	+~ Change Option
I/O Allocation for Slot 6	[Enabled]	F1 General Help
I/O Allocation for Slot 7	[Enabled]	(CTRL+Q from remote kbd)
I/O Allocation for Slot 8	[Enabled]	F10 Save and Exit
I/O Allocation for Slot 9	[Enabled]	(CTRL+S from remote kbd)
I/O Allocation for Cluster	[Disabled]	▼ ESC Exit

v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.

B.4 BIOS Boot Menu Selections

FIGURE B-17 BIOS Boot Menu

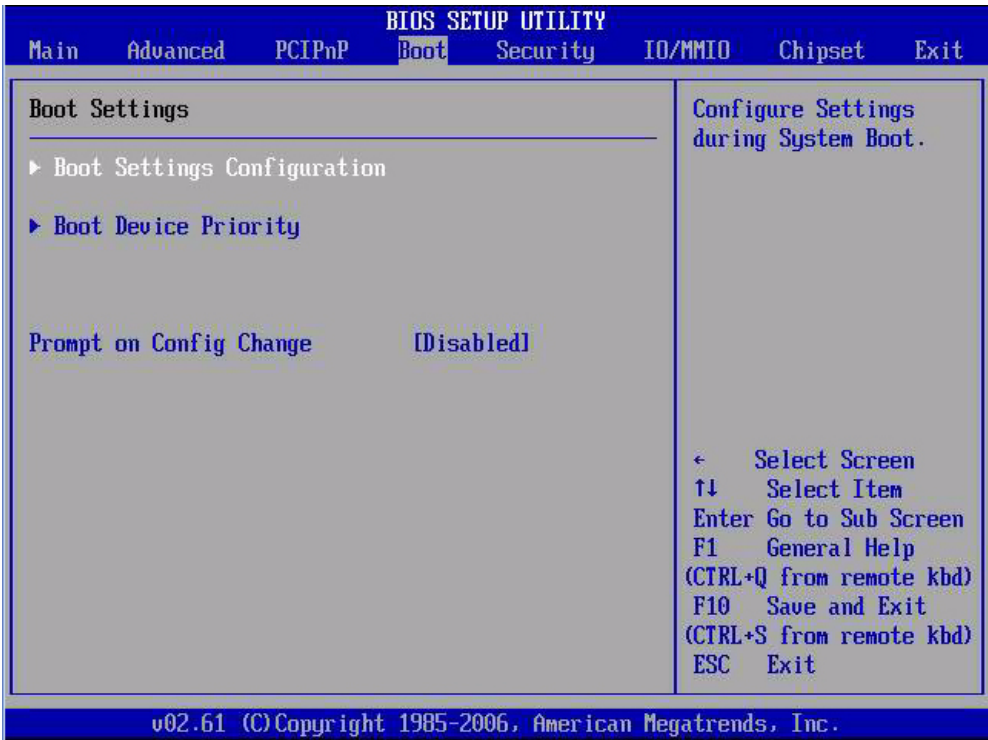


FIGURE B-18 BIOS Boot Menu–Boot Settings Configuration Screen

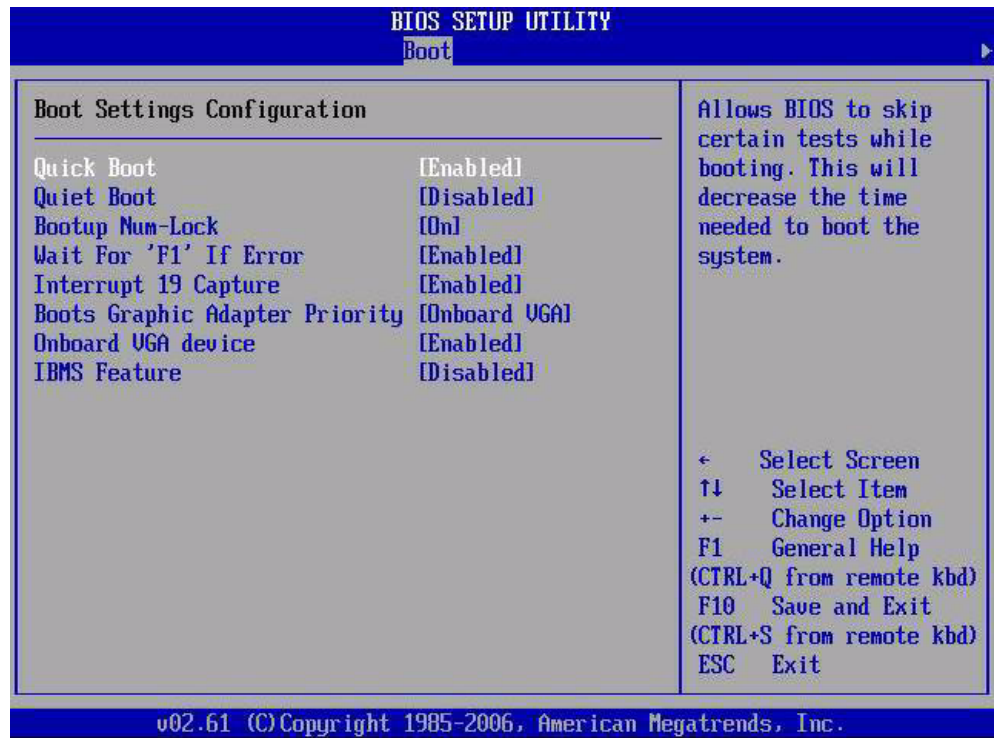
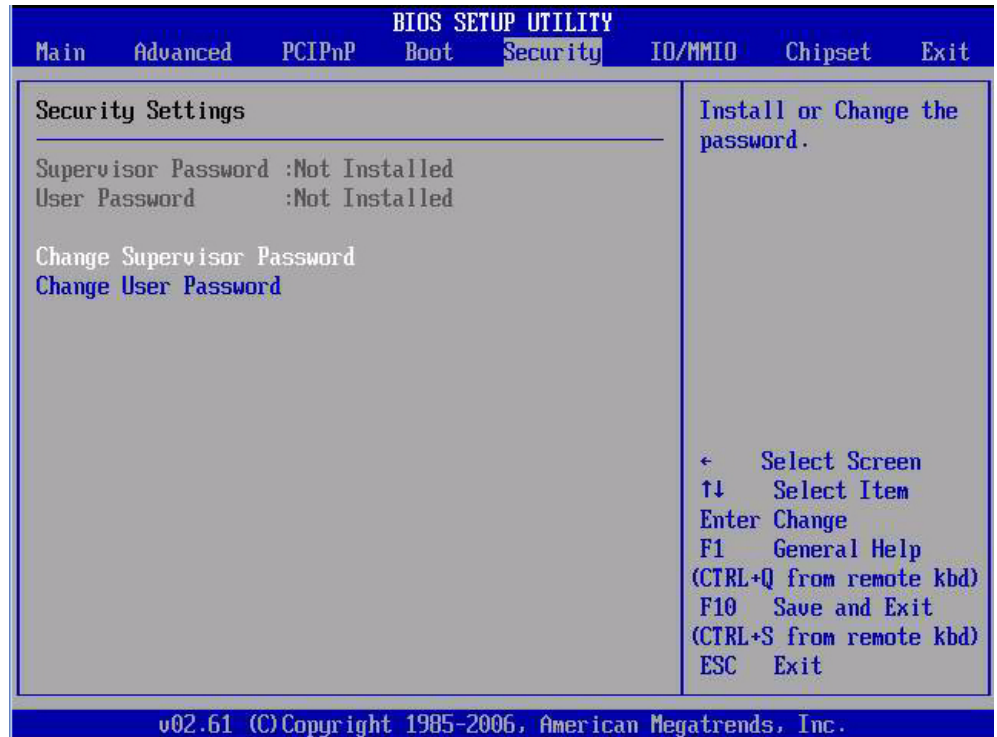


FIGURE B-19 BIOS Boot Menu–Boot Device Priority Screen



B.5 BIOS Security Menu Selections

FIGURE B-20 BIOS Security Menu



B.6 BIOS I/O MMIO Menu Selections

FIGURE B-21 BIOS IO/MMIO Menu

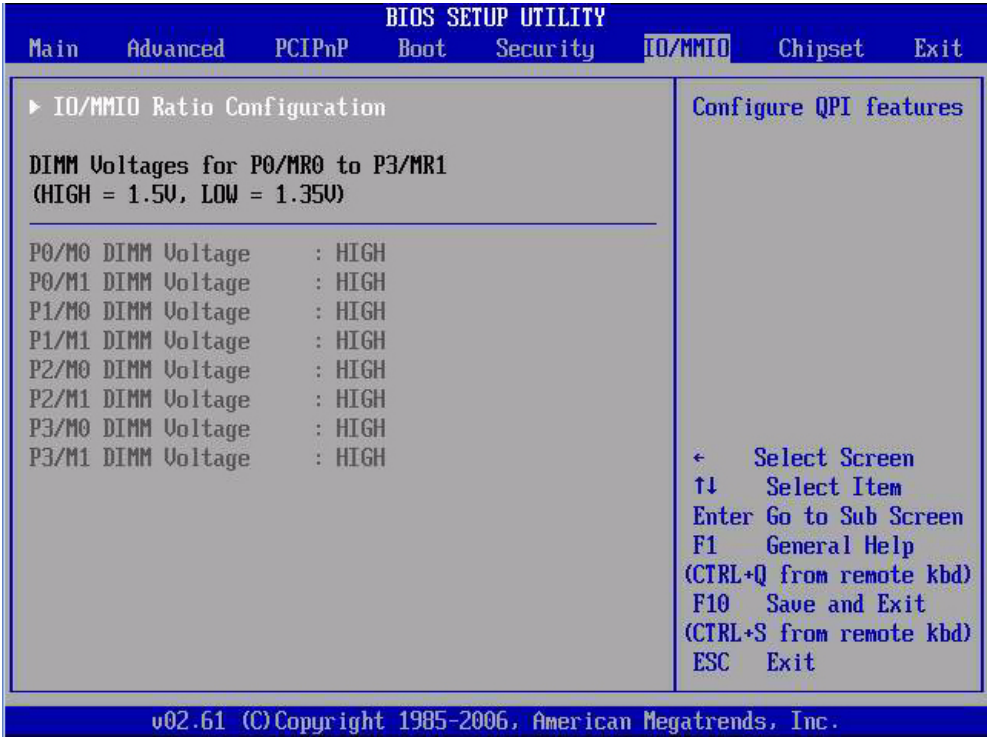


FIGURE B-22 BIOS IO/MMIO Menu–QPI Configuration Screen

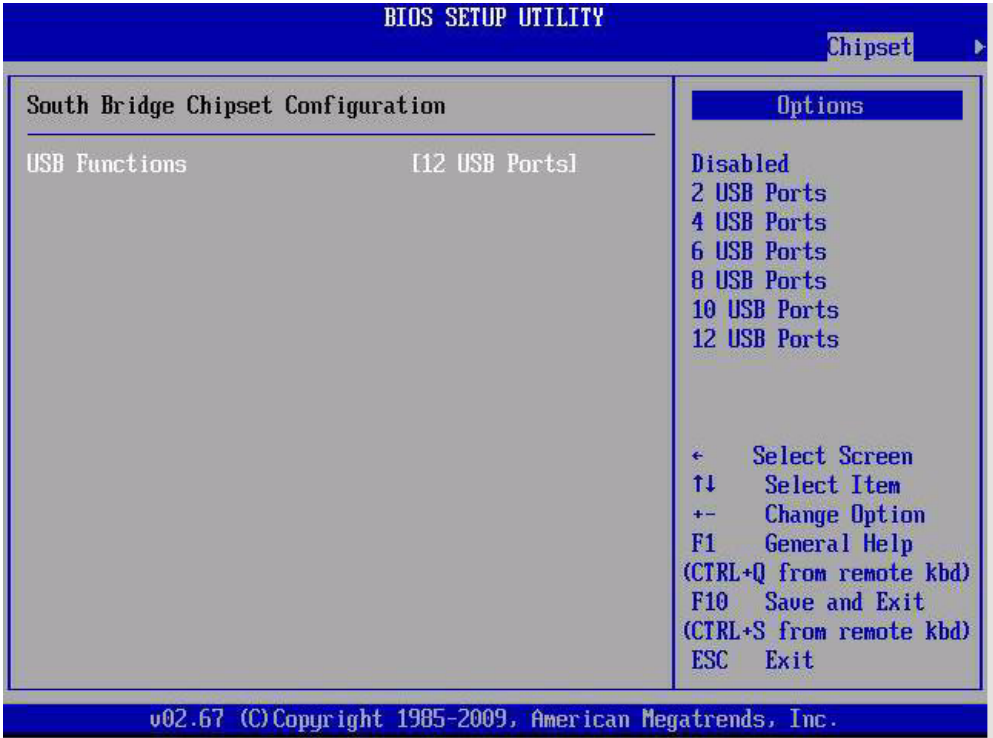
BIOS SETUP UTILITY		IO/MMIO
IO/MMIO Ratio Configuration		Configure the distribution of legacy I/O resources for IOH0 (PCIe 0-4). Total of I/O Ratio values across both IOHs should sum to 8. Allocation granularity is 8KB
Current QPI Frequency	:6.400GT	
IOH0 I/O Ratio	[5]	
IOH1 I/O Ratio	[3]	
IOH0 MMIO Ratio	[4]	
IOH1 MMIO Ratio	[3]	
		← Select Screen ↑↓ Select Item Enter Update F1 General Help (CTRL+Q from remote kbd) F10 Save and Exit (CTRL+S from remote kbd) ESC Exit
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.		

B.7 BIOS Chipset Menu Selections

FIGURE B-23 BIOS Chipset Menu

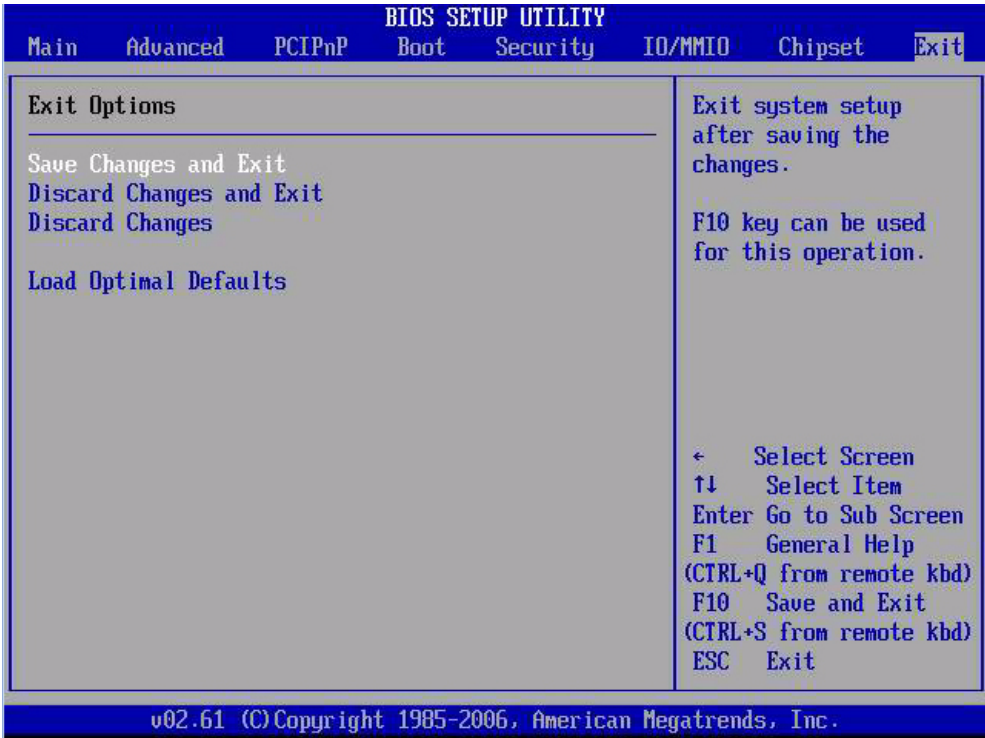


FIGURE B-24 BIOS Chipset Menu–South Bridge Configuration Screen



B.8 BIOS Exit Menu Selections

FIGURE B-25 BIOS Exit Menu



Connector Pinouts

This appendix includes pinout information for all connectors on Oracle’s Sun Fire X4470 Server.

It contains the following topics:

- [Section C.1 “USB Connectors” on page C-1](#)
- [Section C.2 “Serial Connector” on page C-2](#)
- [Section C.3 “Gigabit-Ethernet Connectors” on page C-2](#)
- [Section C.4 “Network Management Port Connector” on page C-3](#)
- [Section C.5 “Video Connectors” on page C-4](#)
- [Section C.6 “Serial Attached SCSI \(SAS\) Connector” on page C-4](#)

C.1 USB Connectors

Two Universal Serial Bus (USB) ports can be accessed from the front of the server and two from the back of the server.

FIGURE C-1 USB Connector



Figure Legend

1	+5V supply	3	Data +
2	Data -	4	Ground

C.2 Serial Connector

The serial management connector (labeled SER MGT) is an RJ-45 connector located on the back panel. This port is the default connection to the system console.

FIGURE C-2 Serial Management Connector



Figure Legend

1	Clear to Send	5	Ground
2	Data Carrier Detect	6	Receive Data
3	Transmit Data	7	Data Terminal Ready
4	Ground	8	Ready to Send

C.3 Gigabit-Ethernet Connectors

Four RJ-45 Gigabit-Ethernet connectors (NET0, NET1, NET2, NET3) can be accessed from the back panel. The Ethernet interfaces operate at 10 Mbit/sec, 100 Mbit/sec, and 1000 Mbit/sec.

FIGURE C-3 Gigabit Ethernet Connector

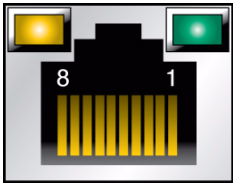


Figure Legend

1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 –
2	Transmit/Receive Data 0 –	6	Transmit/Receive Data 1 –
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 –

C.4 Network Management Port Connector

The network management connector (NET MGT) is an RJ-45 connector located on the motherboard and can be accessed from the back panel.

FIGURE C-4 Network Management Connector

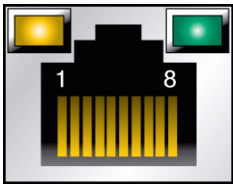


Figure Legend

1	Transmit Data +	5	No Connect
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	No Connect
4	No Connect	8	No Connect

C.5 Video Connectors

There are two video connectors (VGA) one on the front and one on the back of the server.

FIGURE C-5 Video Connector

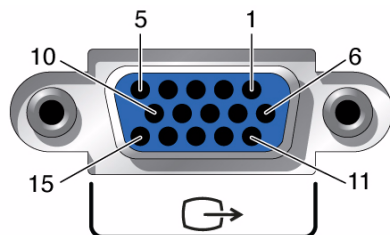


Figure Legend

1	Red Video	9	+5V
2	Green Video	10	Sync Ground
3	Blue Video	11	Monitor ID - Bit 0 (Ground)
4	Monitor ID - Bit 2 (Ground)	12	VGA 12C Serial Data
5	Ground	13	Horizontal Sync
6	Red Ground	14	Vertical Sync
7	Green Ground	15	VGA 12C Serial Clock
8	Blue Ground		

C.6 Serial Attached SCSI (SAS) Connector

The SAS connector is located on the motherboard. It is connected with a SAS cable to the disk drive backplane.

FIGURE C-6 SAS Connector

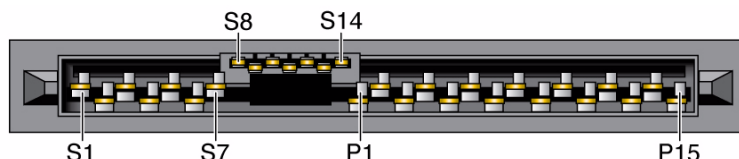


TABLE C-1 lists the pinouts for the SAS connector.

TABLE C-1 SAS Connector Pinouts

Signal Segment	S1	Gnd	Second mate
	S2	TX+	Transmit from PHY to hard drive
	S3	TX-	
	S4	Gnd	Second mate
	S5	RX-	Receive from hard drive to PHY
	S6	RX+	
	S7	Gnd	Second mate
Back-side Signal	S8	Gnd	Second mate
	S9		
	S10		
	S11	Gnd	Second mate
	S12		
	S13		
	S14	Gnd	Second mate
Power Segment	P1	3.3V	Not Supported
	P2	3.3V	Not Supported
	P3	3.3V	Not Supported
	P4	Gnd	First mate
	P5	Gnd	Second mate
	P6	Gnd	Second mate
	P7	5.0V	Pre-charge, second mate
	P8	5.0V	
	P9	5.0V	
	P10	Gnd	Second mate
	P11	Reserved	Should be grounded
	P12	Gnd	First mate
	P13	12.0V	Pre-charge, second mate
	P14	12.0V	
	P15	12.0V	

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