Sun Netra X4270 Server

Service Manual

ORACLE®

Sun Netra X4270 Server

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Contents

Using This Documentation

This service manual is for experienced system engineers with training in servicing Oracle Sun Netra X4270 server. The manual contains detailed instructions for troubleshooting, repairing, and upgrading server components. To use the information in this document, you must have experience working with advanced server technology.

Note - All internal components except hard drives must be installed by qualified service technicians only.

Product Documentation Library

Documentation and resources for this product and related products are available at `http://docs.oracle.com/cd/E19874-01/index.html`.

Related Documentation

Documentation	Links
All Oracle products	`http://www.oracle.com/documentation`
Sun Netra X4270 server	`http://www.oracle.com/pls/topic/lookup?ctx=E19417-01&id=homepage`
Integrated Lights Out Manager (ILOM) 3.0	`http://www.oracle.com/pls/topic/lookup?ctx=ilom30`

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Provide feedback on this documentation at:

`http://www.oracle.com/goto/docfeedback`

Understanding the Server

These topics describe the controls, connectors, LEDs, system components, and replaceable components of the server.

Related Information

Locating Controls and Connectors

The following topics describe the controls and connectors located on the front and rear panels.

Related Information

Front Panel Controls On Two-Drive System

Note - Systems with two drives will contain a DVD drive that you can control through the front bezel. Four drive systems will be not contain a DVD drive.

No.	Description	Additional Information
1	User alarm status LEDs	Top to bottom – Critical LED, Major LED, Minor LED, User LED
2	System status LEDs	Left to right – Locator LED button, Service Required LED, System Activity LED, Power button
3	Removable media	Only in two drive configurations

Related Information

- "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15
- "System Status LEDs" on page 19
- "User Alarm LEDs" on page 20

Front Panel Components on Two-Drive Systems With Bezel Removed
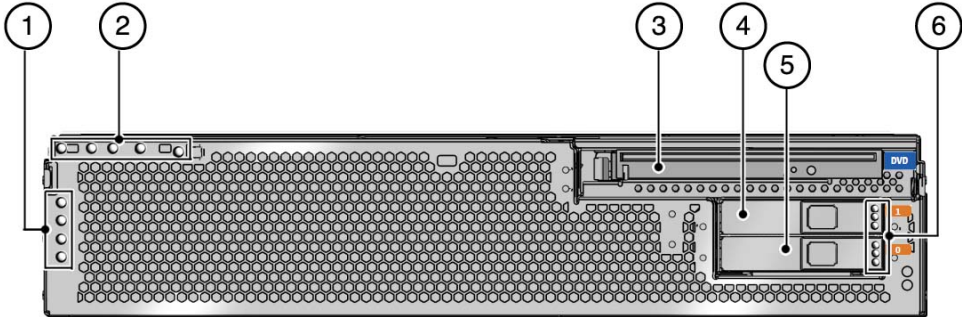
No.	Description	Additional Information
1	User alarm LEDs	Top to bottom – Critical LED, Major LED, Minor LED, User LED **Note -** Also displayed through the front bezel
2	System status LEDs	Left to right – Locator LED button, Service Required LED, System Activity LED, Power button **Note -** Also displayed through the front bezel
3	Optical media drive	Labeled DVD
4	Drive 1	Labeled 1
5	Drive 0	Labeled 0
6	Drive LEDs	Top to bottom – OK to Remove LED, Service Required LED, Power OK LED

Related Information

- "Front Panel Controls On Two-Drive System" on page 14
- "System Status LEDs" on page 19
- "User Alarm LEDs" on page 20
- "Drive LEDs" on page 21

Front Panel Components on Four-Drive Systems With Bezel Removed
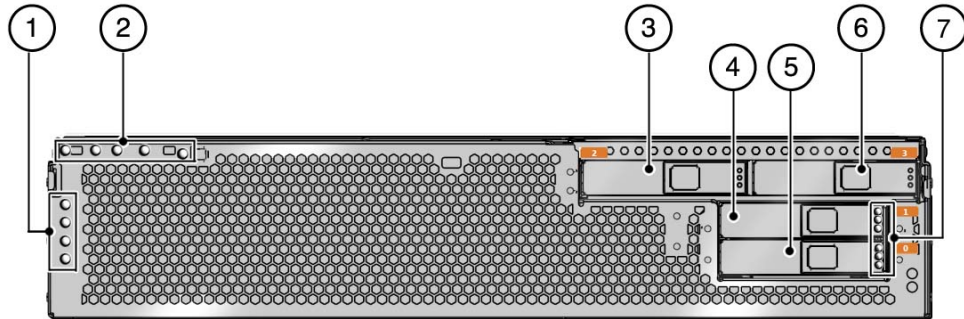
No.	Description	Additional Information
1	Alarm status indicators	Top to bottom – Critical LED, Major LED, Minor LED, User LED **Note -** Also displayed through the front bezel
2	System status indicators	Left to right – Locator LED button, Service Required LED, System Activity LED, Power button **Note -** Also displayed through the front bezel
3	Drive 2	Labeled 2
4	Drive 1	Labeled 1
5	Drive 0	Labeled 0
6	Drive 3	Labeled 3
7	Drive LEDs	Top to bottom – OK to Remove LED, Fault LED, Activity LED

Related Information

- "System Status LEDs" on page 19
- "User Alarm LEDs" on page 20
- "Drive LEDs" on page 21

Rear Panel Cable Connections
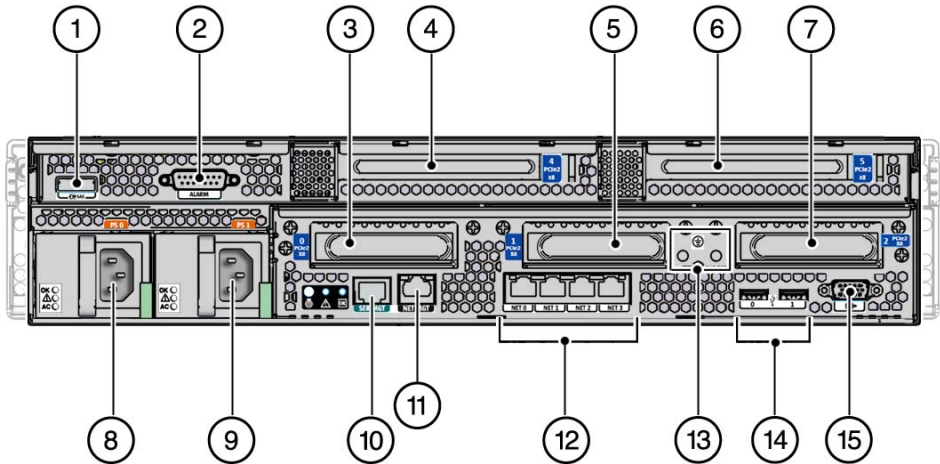
No.	Description	Additional Information
1	SAS port	SAS SFF-8088 connector
2	Alarm port	Telco alarm port
3	PCIe2 slot 0	X8 PCIe2 low-profile
4	PCIe2 slot 4	X8 PCIe2 full-height, full-width
5	PCIe2 slot 1	X8 PCIe2 low-profile
6	PCIe2 slot 5	X8 PCIe2 full-height, full-width
7	PCIe2 slot 2	X8 PCIe2 low-profile
8	Power Supply 0	Labeled PS0
9	Power Supply 1	Labeled PS1
10	SER MGT port	SP serial management port
11	NET MGT port	SP network management port
12	Gigabit Ethernet ports	Left to right – NET0, NET1, NET2, NET3
13	Grounding wire studs	System ships with a grounding lug
14	USB ports	Left to right – USB0, USB1
15	Video port	VGA port

Note - To comply with NEBS lightning requirements, all I/O connections (except the Ethernet and power connections) must be made using shielded cables, and both ends of the shield must be grounded.

Note - All of the PCIe slots comply with the PCI Express 2.0 specification and can accommodate 25 W PCIe2 cards.

Related Information

- "Rear Panel LED Locations" on page 23
- "Power Supply LEDs" on page 23
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213
- "Identifying the Server Ports" on page 215

Locating Server and Component LEDs

These topics describe the LEDs located on the front and rear of the server, including those found on components and ports.

- "System Status LEDs" on page 19
- "User Alarm LEDs" on page 20
- "Drive LEDs" on page 21
- "Rear Panel LED Locations" on page 23
- "Power Supply LEDs" on page 23
- "Ethernet Port LEDs" on page 24

Related Information

- "Locating Controls and Connectors" on page 13
- "Service Troubleshooting Task List" on page 30

System Status LEDs
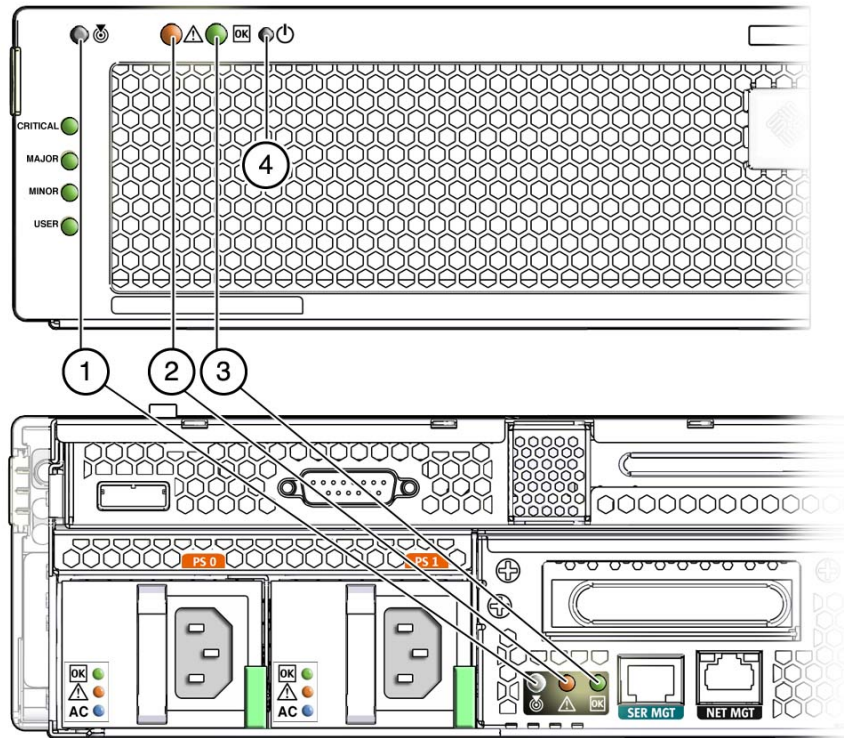
TABLE 1   System Status LEDs and Controls

No.	LED of Button	Symbol	LED Name and Description
1	Locator LED and button		Activate the white Locator LED to find the system in a rack or datacenter. ■ Press the Locator button to toggle the LED on and off. ■ Use this ILOM command: `set /SYS/LOCATE value=Fast_Blink` This LED provides the following indications: ■ Off – Normal operating state. ■ Fast blink – System received a signal as a result of one of the methods previously mentioned, indicating that locating is active.

No.	LED of Button	Symbol	LED Name and Description
2	Service required LED		When the amber Service Required LED is on, service is required. To detect and diagnose faults, use either the POST or ILOM diagnostics tools. The ILOM `show faulty` command provides details about any faults that cause this indicator to light. **Note -** Under some fault conditions, individual component fault LEDs are lit in addition to the system System Required LED.
3	Power OK LED		The green System OK LED provides the following indications: ■ Off – Indicates that the system is not running in its normal state. System power might be on or in standby mode. The service processor might be running. ■ Slow blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The SP is running. ■ Fast blink – Indicates that a normal transitory activity is taking place. Fast blinking could indicate that the system diagnostics are running, or that the system is booting. ■ Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required.
4	Power button		The recessed Power button toggles the system on or off. ■ If the system host is powered off, press once to power on. ■ If the system is powered on, press once to initiate a graceful system shutdown to Standby mode. ■ If the system is powered on, press and hold for 4 seconds to initiate an emergency shutdown.

Related Information

■ "Front Panel Controls On Two-Drive System" on page 14

■ "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15

■ "Front Panel Components on Four-Drive Systems With Bezel Removed" on page 16

■ "Rear Panel LED Locations" on page 23

User Alarm LEDs

The four user dry contact alarm LEDs are reserved for customer applications. With the exception of the Critical alarm LED, no user alarm LED will light unless signalled by a customer application.

Note - The red Critical LED will light when the power cords are connected and the system is not powered on.

FIGURE 1 User Alarm LEDs
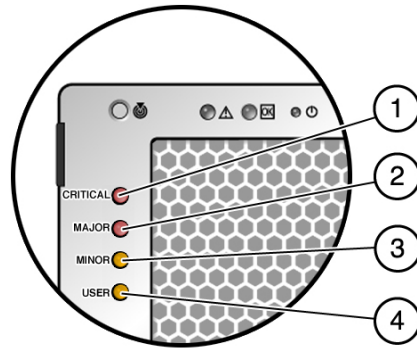
Figure Legend

1 Critical alarm red LED
2 Major alarm red LED
3 Minor alarm amber LED
4 User alarm amber LED

Related Information

- "Front Panel Controls On Two-Drive System" on page 14
- "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15
- "Front Panel Components on Four-Drive Systems With Bezel Removed" on page 16
- "Replacing Power Supplies" on page 184

Drive LEDs

Lower the bezel to see the drive LEDs, which are located on the front of each drive installed in the server.
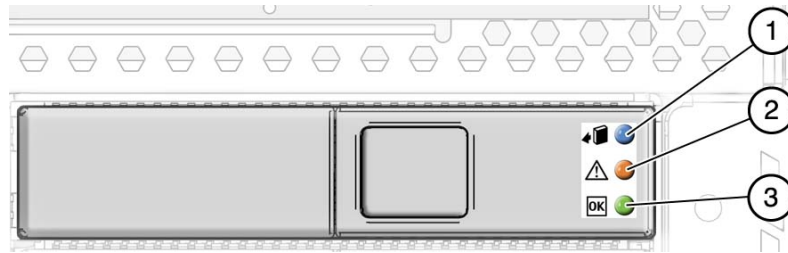
No.	Description	Color	Additional Information
1	OK to Remove	Blue	On – The drive is ready for hot-plug removal.
			Off – Normal operation.
2	Fault	Amber	On – The drive has a fault and requires attention.
			Off – Normal operation.
3	Activity	Green	On – The drive is receiving power. Solidly lit if drive is idle.
			Flashing – The drive is processing a command.
			Off – Power is off.

Related Information

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Rear Panel LED Locations

No.	Description	Additional Information
1	Power Supply 0 LEDs	Top to bottom – Locator LED, Service Required LED, Power OK LED
2	Power Supply 1 LEDs	Top to bottom – Locator LED, Service Required LED, Power OK LED
3	System LEDs	Left to right – Locator LED Button, Service Required LED, Power OK LED
4	Network Management port LEDs	Left to right – Link/Activity LED, Speed LED
5	Gigabit Ethernet port LEDs	Left to right – Link/Activity LED, Speed LED

Related Information

- "Power Supply LEDs" on page 23
- "System Status LEDs" on page 19
- "Ethernet Port LEDs" on page 24

Power Supply LEDs

The power supply LEDs are located on the rear of each power supply.
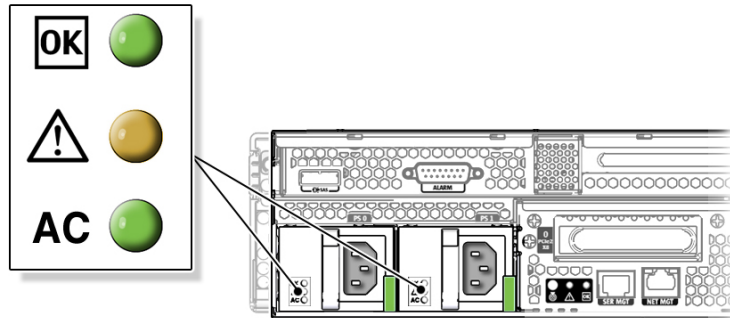
Description	Color	Additional Information
Power OK	Green	On – Normal operation. Output voltage is within normal limits.
		Off – Power is off.
Fault	Amber	On – Failure detected.
		Off – Normal operation.
Source OK	Green	On – Normal operation. Input power is within normal limits.
		Off – No input voltage, or input voltage is below limits.

Related Information

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Ethernet Port LEDs

The ILOM SP NET MGT Ethernet port and the four Gigabit Ethernet ports each have two LEDs.

FIGURE   2   Ethernet Port LEDs
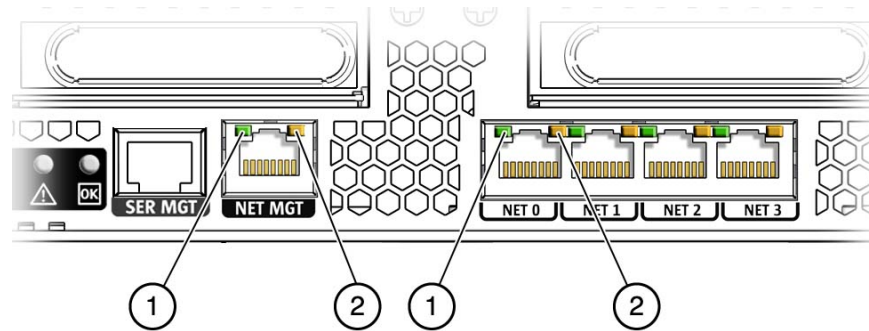
No.	Description	Color	Additional Information
1	Link/Activity LED	Green	Steady On – A link is established.
			Blinking – There is activity on this port.
			Off – No link is established.
2	Speed LED	Amber or green	Amber – The link is operating as a 1000 Mbps connection.
			Green – The link is operating as a 100 Mbps connection.
			Off – The link is operating as a 10/100 Mbps connection.

Note - The NET MGT port operates only in 100-Mbps or 10-Mbps so the speed indicator LED can be green or off (it will never be amber).

Related Information

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System Components

The following figure identifies the major components of the server.

FIGURE 3 System Components
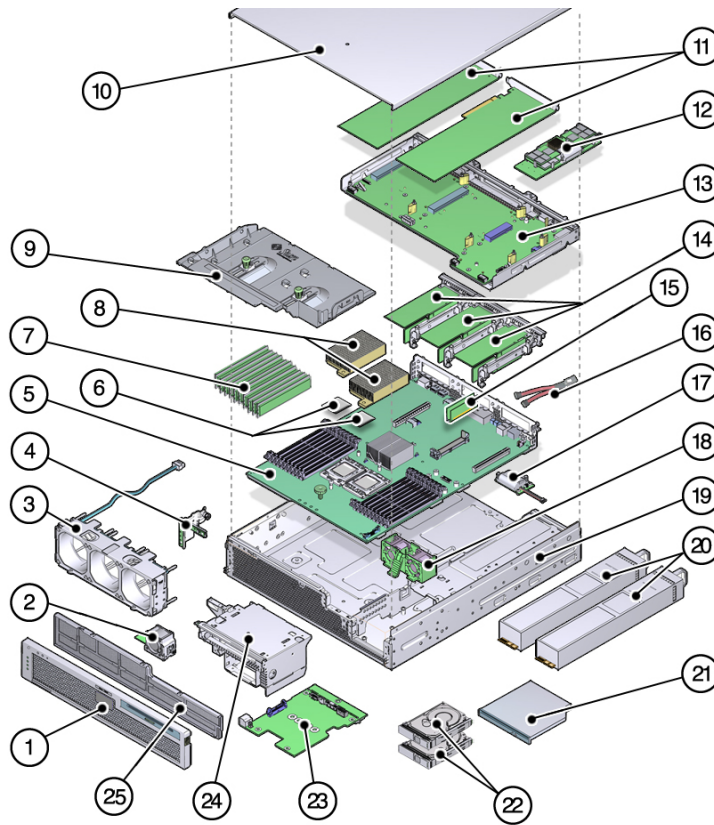
Figure Legend

1	Front bezel
2	Fan tray 2
3	Fan tray 0
4	LED board
5	Motherboard assembly
6	CPUs
7	DIMMs
8	CPU heatsinks
9	Air duct
10	Top cover
11	PCIe2 cards, full-length
12	Internal PCIe2 SAS controller HBA

13	PCI mezzanine
14	PCIe2 cards installed in PCIe2 risers
15	Flash modules
16	Flash module cable
17	ESM module
18	Fan tray 1
19	System chassis
20	Power supplies
21	DVD drive
22	Drives
23	Power distribution board
24	Media bay assembly
25	Air filter

Related Information

- "Field-Replaceable Units" on page 27
- "Replacing Storage Components" on page 83
- "Replacing Motherboard Assembly Components" on page 101
- "Replacing Storage Components" on page 83

Field-Replaceable Units

The table below lists the field-replaceable units in the server and directs you to the replacement instructions. For the locations of these components, see "System Components" on page 25.

FRU	Description	Replacement Instructions
Air duct	Aids in the cooling of the DIMMS and CPUs.	"Replacing the Air Duct" on page 127
Air filter	Cleans air before entering system.	"Replacing the Air Filter" on page 179
Battery	Lithium coin-cell battery that powers the CMOS BIOS and real-time clock.	"Replacing the Battery" on page 157
CPU	The processor that carries out the instructions of the system.	"Replacing CPUs" on page 160
DIMMs	Add or replace memory to the system.	"Replacing DIMMs" on page 132
Drives	2.5-inch SAS solid-state or hard-disk drives ■ Two drive configuration includes a removable DVD drive	"Replacing a Drive" on page 85

FRU	Description	Replacement Instructions
	■ Four drive configuration does not include DVD drive	
Fan tray 0	Contains three fans for cooling the motherboard assembly.	"Replacing Fan Tray 0" on page 189
Fan tray 1	Contains two fans for cooling media bay assembly components.	"Replacing Fan Tray 1" on page 196
Fan tray 2	Single fan for cooling DIMMs.	"Replacing Fan Tray 2" on page 192
LED board	Contains the push-button circuitry and LEDs that are displayed on the bezel of the box.	"Replacing the LED Board" on page 199
Media bay assembly	Bay that houses the drives and optical media drive.	"Replacing the Media Bay Assembly" on page 93
Motherboard assembly	Provides connectors for the DIMMs, CPUs, PCIe2 risers, and other components.	"Replacing the Motherboard Assembly" on page 168
Optical media drive	Optical media drive allows you to read optical media like CDs and DVDs.	"Replacing the Optical Media Drive" on page 91
PCI mezzanine	Houses and connects the top PCIe2 cards.	"Replacing the PCI Mezzanine" on page 101
PCIe2 cards	Optional add-on cards that can expand the functionality of the server.	"Replacing PCIe2 Cards" on page 112
PCIe2 risers	Houses and connects the bottom PCIe2 cards.	"Replacing PCIe2 Risers" on page 107
Power distribution board (PDB)	Provides the main 12V power interconnect between the power supplies and the other boards.	"Replacing the Power Distribution Board" on page 203
Power supply unit (PSU)	Two concurrent maintenance DC or AC powered power supplies.	"Replacing Power Supplies" on page 184
SAS controller HBA	SAS controller HBA manages the internal drives and optional external storage devices.	"Replacing the SAS Controller HBA" on page 118
Top Cover	Covers the top of the server and contains service labels that provide quick reference information for removing components. The top cover requires a pen to remove, and it does not power off the server when removed.	"Remove the Top Cover" on page 81 "Install the Top Cover" on page 211

Related Information

- "System Components" on page 25
- "Replacing Storage Components" on page 83
- "Replacing Motherboard Assembly Components" on page 101
- "Replacing Chassis Components" on page 179

Inspecting the Server

These topics introduce the diagnostic tools and strategies available to help you diagnose problems with the system.

- "Diagnostic Tools" on page 29
- "Service Troubleshooting Task List" on page 30
- "Gather Service Information" on page 31
- "Inspecting the System" on page 32

Related Information

- "Understanding the Server" on page 13
- "Preparing for Service" on page 73
- "Returning Server to Operation" on page 211

Diagnostic Tools

There are a variety of diagnostic tools, commands, and indicators you can use to monitor and troubleshoot the server:

- **LEDs** – These indicators provide a quick visual notification of the status of the server and of some of the FRUs.
- **ILOM firmware** – This system firmware runs on the service processor. In addition to providing the interface between the hardware and OS, ILOM also tracks and reports the health of key server components. ILOM works closely with POST and Oracle Solaris Predictive Self-Healing technology to keep the system up and running even when there is a faulty component.
- **PC-Check** – Accessed through ILOM, the DOS-based PC-Check utility tests all motherboard components (CPU, memory, and I/O), ports, and slots. If enabled through ILOM, this utility will run each time the system powers on. For information about the PC-Check, refer to the *Sun x64 Servers Diagnostics Guide*.

- **POST** – POST performs diagnostics on system components upon system power up and resets to ensure the integrity of those components. POST messages are displayed and logged in the BIOS event logs. POST works with ILOM to take faulty components offline if needed. For information about configuring BIOS, POST testing, POST codes, POST code checkpoints, and console redirection, see "Using the BIOS Setup Utility" on page 37.
- **Oracle Solaris OS Only**
  - **Oracle Solaris OS Predictive Self-Healing** – The PSH technology continuously monitors the health of the CPU and memory, and works with ILOM to take a faulty component offline if needed. The predictive self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they occur.
  - **Log files and console messages** – These items provide the standard Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
  - **SunVTS software** – An application that exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, ILOM, Solaris OS PSH, and many of the log files and console messages are integrated. For example, a fault detected by the Solaris software will display the fault, log it, pass information to ILOM where it is logged, and depending on the fault, might light one or more LEDs.

Related Information

- "Understanding the Server" on page 13
- "Using the BIOS Setup Utility" on page 37
- Solaris OS documentation set
- ILOM 3.0 documentation set
- *Sun x64 Servers Diagnostics Guide*
- SunVTS documentation

Service Troubleshooting Task List

Use the following table as a sequence for using the subjects in this book to troubleshoot the server.

TABLE 2   Troubleshooting Task List

No.	Description	Section or Document
1	Gather initial service information.	"Gather Service Information" on page 31

No.	Description	Section or Document
2	Investigate any power-on problems.	"Troubleshoot Power Problems" on page 32
3	Perform external visual inspection and internal visual inspection.	"Inspect the Server Externally" on page 33
		"Inspect the Server Externally" on page 33
4	View BIOS event logs and POST messages.	"View Event Logs" on page 48
		"Understanding BIOS Booting and Setup" on page 37
5	View service processor logs and sensor information.	ILOM 3.0 documentation set
6	Run PC-Check diagnostics.	*Sun x64 Servers Diagnostics Guide*

Related Information

- "Understanding the Server" on page 13
- "Diagnostic Tools" on page 29

▼ Gather Service Information

The first step in determining the cause of a problem with the server is to gather information from the service call paperwork or the onsite personnel. Follow these general guidelines when you begin troubleshooting.

1. Collect information about the following items:

- Events that occurred prior to the failure
- Whether any hardware or software was modified or installed
- Whether the server was recently installed or moved
- How long the server exhibited symptoms
- The duration or frequency of the problem

2. Document the server settings before you make any changes.

If possible, make one change at a time in order to isolate potential problems. In this way, you can maintain a controlled environment and reduce the scope of troubleshooting.

3. Note the results of any change that you make. Include any errors or informational messages.

4. Check for potential device conflicts before you add a new device.

5. **Check for version dependencies, especially with third-party software.**

   Related Information

   - "Gather Service Information" on page 31
   - "Inspecting the System" on page 32

Inspecting the System

Controls that have been improperly set and cables that are loose or improperly connected are common causes of problems with hardware components. Follow these tasks to locate common problems with the system.

- "Troubleshoot Power Problems" on page 32
- "Inspect the Server Externally" on page 33
- "Inspect Internal Server Components" on page 33

Related Information

- "Understanding the Server" on page 13
- "Preparing for Service" on page 73
- "Preparing for Service" on page 73

▼ Troubleshoot Power Problems

1. **If the system is powered off, power on the server.**

   See "Power On the Server" on page 214.

   - If the server powers on, go to "Inspect the Server Externally" on page 33.
   - If the server does not power on, go to Step 2.

2. **Check that AC or DC power cords are attached firmly to the server???s power supplies and to the AC or DC sources.**

   Related Information

   - "Power On the Server" on page 214

- "Inspect the Server Externally" on page 33
- "Replacing Power Supplies" on page 184

▼ Inspect the Server Externally

1. **Inspect the external status indicator LEDs, which can indicate component malfunction.**

   For the LED locations and descriptions of their behavior, see "Locating Server and Component LEDs" on page 18.

2. **Verify that nothing in the server environment is blocking air flow or making a contact that could short out power.**

3. **If the problem is not evident, continue with the next section, "Inspect Internal Server Components" on page 33.**

   ### Related Information

   - "Understanding the Server" on page 13
   - "Inspect the Server Externally" on page 33
   - "Inspect Internal Server Components" on page 33

▼ Inspect Internal Server Components

1. **Shut down the server from main power mode to standby power mode.**

   Determine how you want to shut down the server:

   - Graceful power down – Notify users and gracefully power down the system.
   - Emergency power down – Power down the system quickly.

   See "Powering Down the Server" on page 76 for instructions.

2. **Disconnect the cables from the server, remove the server from the rack, and remove the server cover.**

   See "Preparing the Server for Component Replacement" on page 75.

3. **Inspect the internal status indicator LEDs. These can indicate component malfunction.**

For the LED locations and descriptions of their behavior, see the service procedures for the motherboard components.

To light these LEDs, hold down the Locator LED button on the server back panel or front panel for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs both inside and outside of the chassis for 15 seconds.

Note - The server must be in standby power mode for viewing the internal LEDs. If necessary, reconnect the power cables to the server. Disconnect the power cables after inspecting these LEDs.

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4. **Verify that there are no loose or improperly seated components.**

5. **Verify that all cable connectors inside the system are firmly and correctly attached to their appropriate connectors.**

6. **Verify that any after-factory components are qualified and supported.**

    Check with your customer representative for information about which PCIe2 cards and DIMMs are supported.

7. **Check that the installed DIMMs comply with the supported DIMM population rules and configurations.**

    For more information, see "DIMM Population Rules" on page 134.

8. **Return the server to operation.**

    See "Returning Server to Operation" on page 211.

9. **Use a pen, or other pointed object, to press and release the recessed power button on the server front panel.**

When the main power is applied to the server, the Power OK LED next to the Power button will blink fast until the OS is ready. When the OS is ready, the Power OK LED remains lit. For more information about the LED, see "System Status LEDs" on page 19.
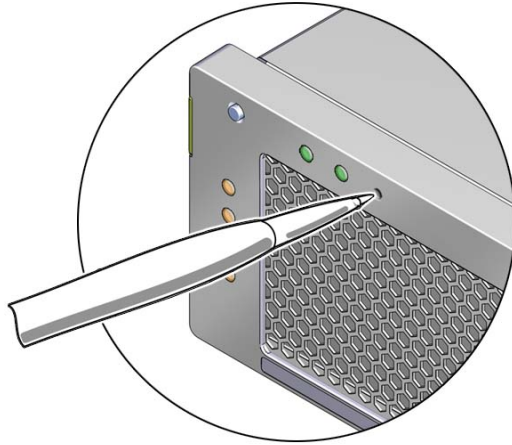
10. **If the problem with the server is not evident, view the POST messages and BIOS event logs during system startup to obtain additional information.**

For instructions, see "View Event Logs" on page 48.

Related Information

- "Preparing for Service" on page 73
- "DIMM Population Rules" on page 134
- "Locating Server and Component LEDs" on page 18
- "Returning Server to Operation" on page 211
- "View Event Logs" on page 48

Using the BIOS Setup Utility

These topics describe the BIOS booting events and the BIOS Setup utility.

Related Information

Understanding BIOS Booting and Setup

The following topics provide POST events and errors during BIOS booting and defines the port device naming and boot priority:

Related Information

- "Understanding BIOS Setup Screens" on page 62

Default BIOS POST Events

At system startup, the BIOS performs a power-on self-test that checks the hardware on your server to ensure that all components are present and functioning properly. The following table identifies the events that can occur during BIOS POST, as well as specifies whether these event can prevent the host from powering-on.

TABLE 3   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	Memory Correctable ECC error detected	Does not apply
Uncorrectable ECC	Memory Uncorrectable ECC error detected	Does not apply
No system memory	No physical memory detected in the system	No
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
System restart	System boot initiated	Yes
Initiated by hard reset	Boot process started by hard reset	Yes
Memory initialization	Memory sizing is occurring	Does not apply
	System firmware progress	
Primary processor initialization	Primary CPU initialization	Does not apply
	System firmware progress	
Initiated by warm reset	Boot process started by warm reset	Does not apply
Embedded controller management	Management controller initialization	Does not apply
Secondary processor(s) initialization	Secondary CPU initialization asserted	Does not apply
	System firmware progress	
Video initialization	When BIOS initializes keyboard	Does not apply
Keyboard controller initialization	When BIOS initializes keyboard	Does not apply

Event	Cause	Boot continues on host?
Option ROM initialization	BIOS initializes Option ROMs	Does not apply
	System firmware progress	
Option ROM space exhausted	BIOS cannot copy an option to the memory	Yes
User initiated system set up	User initiated access to BIOS Setup utility	Does not apply
	System firmware progress	
User initiated boot to OS	System boot initiated	Does not apply
	System firmware progress	
No bootable media	Nothing to boot from	No
PXE server not found	Boot error - PXE server not found	No
	F12 key was pressed but BIOS fails to boot from PXE server	
ACPI Power state	Soft-off power applied	Does not apply

Related Information

BIOS POST F1 and F2 Errors

Each POST diagnostic is a low-level test designed to pinpoint faults in a specific hardware component. If the POST diagnostic 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

The following table 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 4   BIOS POST F1 and F2 Error Messages

BIOS POST Error Message	Error Type	Resolution
Uncorrectable Error Detected on Last Boot:IOH(0) Protocol Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) QPI [x] Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the fault management function and the SP event log in ILOM for more details.

BIOS POST Error Message	Error Type	Resolution
		Note - Where QPI [x] equals 0 for QPI Link 0 or 1 for QPI Link 1.
Uncorrectable Error Detected on Last Boot:IOH(0) PCI-E [x] Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the fault management function and the SP event log in ILOM for more details. **Note -** Where PCI-E [x] port number can range from 1 to 10 depending on the PCI root port on IOH.
Uncorrectable Error Detected on Last Boot:IOH(0) ESI Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the fault management function and the SP event log in ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) Thermal Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the fault management function and the SP event log in ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) DMA Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the SP event log for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) Miscellaneous Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the fault management function and the SP event log in ILOM for more details.
Uncorrectable Error Detected on Last Boot:IOH(0) VT-d Error (Please Check SP Log for more Details)	IOH error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details.
BMC Not Responding	ILOM error	■ Press F1 to continue. **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.
■ Primary Slave Hard Disk Error ■ Primary Master Hard Disk Error ■ Secondary Master Hard Disk Error ■ Secondary Slave Hard Disk Error	IDE/ATAPI error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **Note -** These type of error messages display when the BIOS is attempting to configure IDE/ATAPI devices in POST.
Timer Error	8254 timer error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **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.
RAM R/W test failed	Memory test failure	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **Note -** This type of error typically indicates that the RAM read/write test failed.
KBC BAT Test failed	Keyboard controller basic	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details.

BIOS POST Error Message	Error Type	Resolution
	assurance test error	**Note -** Keyboard controller BAT test failed. This error might indicate a problem with keyboard controller initialization.
Display memory test failed	Video display error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details.
CMOS Battery Low	CMOS battery error	■ Press F2 to enter BIOS Setup utility to load system defaults. ■ Check the SP event log in ILOM for more details. ■ If necessary, replace CMOS battery.
■ CMOS Checksum Bad ■ CMOS Date/Time Not Set	CMOS error	■ Press F2 to enter BIOS Setup utility to load system defaults. ■ Check the SP event log in ILOM for more details.
Password check failed	Password check error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **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.
Keyboard/Interface Error	Keyboard controller error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **Note -** This type of error indicates that the Keyboard Controller failure. This error might indicate a problem with system hardware.
S.M.A.R.T error on the drive	S.M.A.R.T device error	■ Press F1 to continue. ■ Check the SP event log in ILOM for more details. **Note -** Self-Monitoring, Analysis, and Reporting Technology failure messages might indicate the need to replace the storage device.

Related Information

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BIOS POST Memory Testing Process

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 exiting out of 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.

4. The message, BMC Responding, displays at the end of POST.

Related Information

- "Default BIOS POST Events" on page 38
- "BIOS POST F1 and F2 Errors" on page 39

Ethernet Port Device and Driver Naming

The server supports four 10/100/1000BASE-T Gigabit Ethernet ports on the rear of the chassis.

The device naming for the Ethernet interfaces is reported differently by different interfaces and operating systems. See the table below for the logical (operating system) and physical (BIOS) naming conventions used for each interface.

TABLE 5   Logical Port Naming

Interface	NET0	NET1	NET2	NET3
BIOS	slot 108	slot 109	slot 110	slot 111
Solaris 10 10/09	igb0	igb1	igb2	igb3
OpenSolaris 2010.3	igb0	igb1	igb2	igb3
RHEL5.4 (64-bit)	eth0	eth1	eth2	eth3
Oracle Enterprise Linux (OEL) 5.4 (64-bit)	eth0	eth1	eth2	eth3
SLES 10 SP3 (64-bit) and SLES 11 (64-bit)	eth0	eth1	eth2	eth3
Windows 2008	net1	net2	net3	net4

Interface	NET0	NET1	NET2	NET3
VMware ESX 4.0 and ESXi 4.0	vmnic#[†]	vmnic#	vmnic#	vmnic#

[†]For VMware, the Ethernet port that the user assigns to the service console will be vmnic0. Other ports are mapped by ascending order of the PCI bus enumerations.

Related Information

- "Rear Panel Cable Connections" on page 17
- "Ethernet Port LEDs" on page 24
- "Ethernet Port Booting Priority" on page 43
- "Gigabit Ethernet Ports" on page 215

Ethernet Port Booting Priority

The order in which the BIOS detects the Ethernet ports during boot time, and the corresponding drivers that control those ports, are listed below:

1. NET 0 (INTEL NIC 0)
2. NET 1 (INTEL NIC 1)
3. NET 2 (INTEL NIC 2)
4. NET 3 (INTEL NIC 3)

Related Information

- "Ethernet Port LEDs" on page 24
- "Ethernet Port Device and Driver Naming" on page 42
- "Gigabit Ethernet Ports" on page 215

BIOS Setup Utility Menus

The following table provides descriptions for the seven top-level BIOS setup utility menus.

TABLE 6   BIOS Setup Menus Summary

Menu	Description
Main	General product information, including BIOS type, processor, memory, and time/date.

Menu	Description
Advanced	Configuration information for the CPU, memory, IDE, Super IO, trusted computing, USB, PCI, MPS and other information.
PCI	Configure the server to clear NVRAM during system boot.
Boot	Configure the boot device priority (storage drives and the DVD-ROM drive).
Security	Set or change the user and supervisor passwords.
Chipset	View the configuration of server chipsets.
Exit	Save changes and exit, discard changes and exit, discard changes, or load optimal or fail-safe defaults.

See "Understanding BIOS Setup Screens" on page 62 for examples of each of these screens.

To navigate the menus or options listed on a menu, use the 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 following figure identifies the sub-menus that you can access from each of the seven top-level BIOS menus.

FIGURE 4   BIOS Configuration Utility Menu Tree
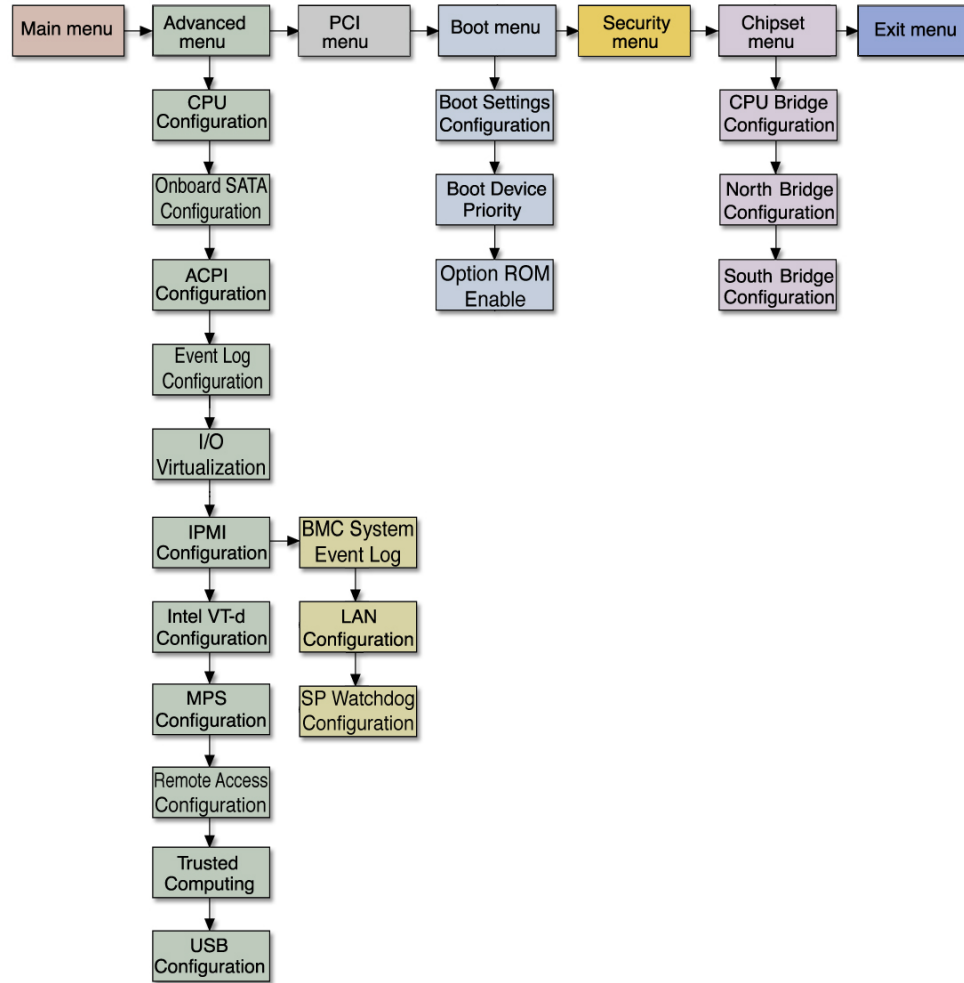
For an example of the options that are available on the BIOS Setup utility menus, see
"Understanding BIOS Setup Screens" on page 62.

Related Information

- "Access the BIOS Setup Utility Menus" on page 46

■ "Understanding BIOS Setup Screens" on page 62

BIOS Setup Utility Hot Keys

The following table provides a description of the BIOS Setup utility hot keys and the corresponding serial connection key combinations.

ILOM Remote Console Keys	Serial Connection Hot Key Combinations	Function
F1	Ctrl+Q (Press and hold the Ctrl key and type Q)	Access the BIOS Setup utility if there is an error during the boot process. Also, access the help menu from any BIOS menu.
F2	Ctrl+E	Enter BIOS Setup utility while the system is performing the power-on self test (POST)
F7	Ctrl+D	Discard changes and exit BIOS Setup utility
F8	Ctrl+P	Selects the BBS Popup menu, which allows you to select a boot device
F9	Ctrl+O	Load optimal BIOS defaults
F10	Ctrl+S	Save changes and exit
F12	Ctrl+N	Boot the server from the network (PXE boot)

Related Information

■ "Access the BIOS Setup Utility Menus" on page 46
■ "Exit the BIOS Setup Utility" on page 70

▼ Access the BIOS Setup Utility Menus

You can access BIOS Setup utility screens from the following interfaces:

■ Use a USB keyboard, mouse, and VGA monitor connected directly to the server.
■ Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.
■ Connect to the server using the ILOM Remote Console.

Note - The BIOS Setup utility data is stored in the system???s battery-backed CMOS RAM. If the data becomes invalid, the BIOS settings will return to their default, optimal values.

The following task describes the steps for accessing the BIOS Setup utility menus.

1. **Power-on or power-cycle the server.**

2. **To enter the BIOS Setup utility, press the F2 key when prompted and while the BIOS is running the power-on self-tests.**

```
Initializing USB Controllers .. Done.
Press F2 to run Setup (CTRL+E on Remote Keyboard)
Press F8 for BBS POPUP  (CTRL+P on Remote Keyboard)
Press F12 to boot from the network (CTRL+N on Remote Keyboard)
```

Note - If there is an error during the boot process, press the F1 key to access the BIOS Setup utility.

The BIOS Setup utility main screen displays.

```
 Main    Advanced    PCI    Boot    Security    Chipset    Exit
*****************************************************************************
* System Overview                                   * Use [ENTER], [TAB]     *
* ************************************************** * or [SHIFT-TAB] to      *
* AMIBIOS                                            * select a field.        *
* Build Date:02/09/10                                *                        *
* ID        :14.01.02.02 (08.01.02.13)              * Use [+] or [-] to      *
*                                                    * configure system Time. *
* Processor                                          *                        *
* Intel(R) Xeon(R) CPU         L5518  @ 2.13GHz     *                        *
* Speed     :2133MHz                                 *                        *
* Count     :16                                      *                        *
*                                                    *                        *
* System Memory                                      *                        *
* Size     :8184MB                                   * **     Select Screen   *
*                                                    * **     Select Item     *
* System Time                    [12:05:01]          * +-     Change Field    *
* System Date                    [Wed 02/17/2010]    * Tab    Select Field    *
*                                                    * F1     General Help    *
* * Serial Number Information                        *(CTRL+Q Serial Console) *
*                                                    * F10    Save and Exit   *
*                                                    *(CTRL+S Serial Console) *
*****************************************************************************
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```

3. **Use the left and right arrow keys to select the different menu options.**

4. **As you select each menu option, the top-level screen for that menu option appears.**

5. **To select an option on a top-level screen, use the up and down arrow keys to scroll up and down the options presented.**

   Only options that can be modified are highlighted when you press the up and down arrow keys.

   - **If a field can be modified, as you select the option, user instructions for modifying the option appear in the right column of the screen.**

   - **If a field is a link to a sub-screen, instructions to press the Enter key to access the sub screen appear in the right column.**

6. **Modify the setup field and press the Esc key to save the changes and exit the screen.**

   Some screens present a confirmation dialog box that enables unwanted changes to be retracted.

7. **On sub-screens that only provide configuration information and cannot be modified, press the Esc key to exit the screen.**

8. **To continue modifying other setup parameters, repeat Step 3 through Step 7. Otherwise, go to Step 9.**

9. **Press and release the right arrow key until the Exit menu screen appears.**

10. **Follow the instructions on the Exit menu screen to save or discard your changes and exit the BIOS Setup utility.**

    Related Information

    - "BIOS Setup Utility Menus" on page 43
    - "BIOS Setup Utility Hot Keys" on page 46
    - "Understanding BIOS Setup Screens" on page 62

▼ View Event Logs

Use this procedure to view the BIOS event log and the BMC system event log.

1. **Access the BIOS Setup utility menus.**

For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

2.   View the BIOS event log.

   a.   From the BIOS Main menu screen, select Advanced.

   b.   From the Advanced Settings screen, select Event Log Configuration.

   c.   From the Event Logging Details screen, select View Event Log.

All *unread* events are displayed.

3.   View the BMC system event log.

   a.   From the BIOS Main menu screen, select IPMI Configuration.

   b.   From the Advanced Setting screen, select IPMI Configuration.

c. From the IPMI Configuration screen, select View BMC System Event Log.

Use the + and - keys to page through the event log.

Related Information

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-
-

▼ Set Watchdog Timers

The watchdog timers allow the SP to reset or power down the system if the BIOS or operating system crashes or hangs. Use this task to set the either the SP BIOS WatchDog Timer or the SP OS WatchDog Timer.

1. **Access the BIOS Setup utility menus.**

   For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

2. **From the BIOS Main menu screen, select Advanced.**

3. **From the Advanced Settings screen, select IPMI Configuration.**

4. **From the IPMI Configuration screen, select Set SP Watchdog Configuration.**

   From this screen, you can enable or disable the SP BIOS and SP OS Watchdog timer action and set the timeout durations. The watchdog timer action options include:

   - No Action – Logs the watchdog event
   - Reset – Halt and reboot the system
   - Power Down – Gracefully power down the system
   - Power Cycle – Gracefully power down and reboot the system

■ Disabled – Watchdog timer disabled

```
   Advanced

 SP BIOS Watchdog Timer Action   [Power Cycle]      Allows the BMC to
 SP BIOS Watchdog Timeout        [02:00]            reset or power down
 SP OS Watchdog Timer Action     [Reset System]     the system if the
 SP OS Watchdog Timeout          [10:00]            operating system
                                                    crashes or hangs
                                                    during BIOS POST.




                                                    ↔    Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    (CTRL+Q Serial Console)
                                                    F10  Save and Exit
                                                    (CTRL+S Serial Console)
                                                    ESC  Exit

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```

5. Set one or both Watchdog timers and set the timeout durations in minutes.

   ■ SP BIOS Watchdog timer – The SP will perform the selected timer action if the BIOS hangs
     or crashes during POST once it reaches the timeout duration.

   ■ SP OS Watchdog timer – The SP will perform the selected timer action if the Watchdog
     timer is not restarted by an OS application before the timer reaches its timeout duration.

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

   Alternately, you can select the Exit screen, then select Save Changes and Exit.

   Related Information

   ■ "Access the BIOS Setup Utility Menus" on page 46
   ■ "Exit the BIOS Setup Utility" on page 70

▼   # Configure TPM Support

If you intend to use the Windows 2008 TPM feature set, you must configure the server to support 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.

1.   **Access the BIOS Setup utility menus.**

For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

2.   **From the BIOS Main menu screen, select Advanced.**

3.   **From the Advanced Settings screen, select Trusted Computing.**

The Trusted Computing screen appears.

```
                    BIOS SETUP UTILITY
      Advanced

  Trusted Computing                            Enable/Disable TPM
                                               TCG (TPM 1.1/1.2) supp
  TCG/TPM SUPPORT              [No]            in BIOS




                                               ←    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

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```
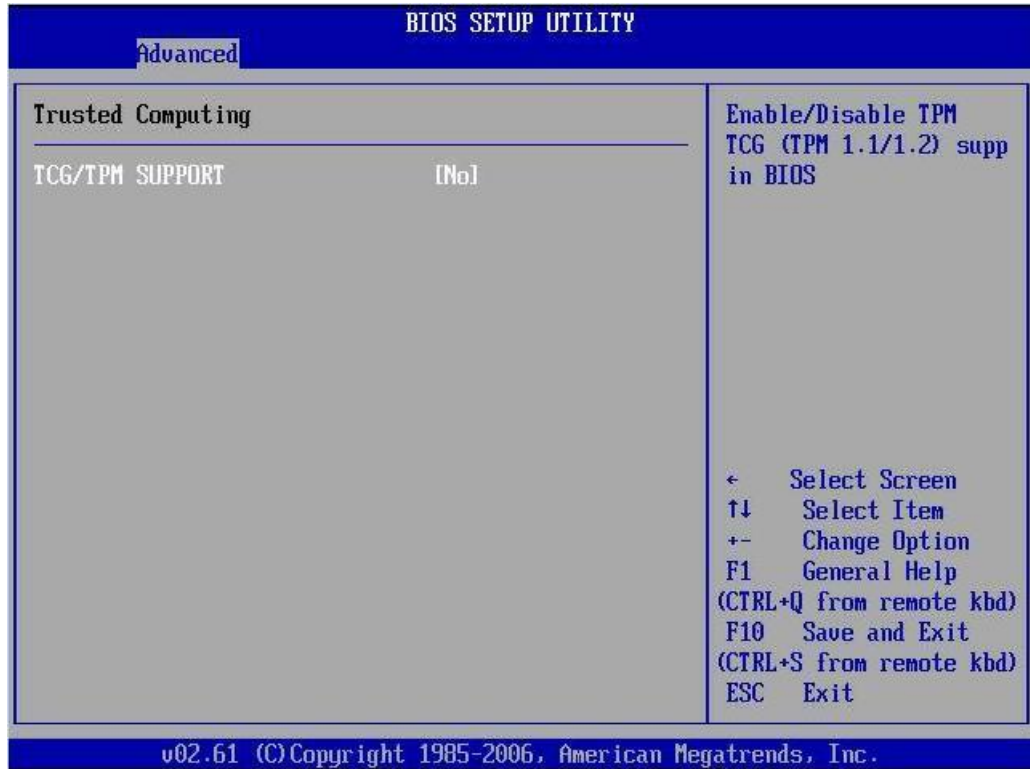
4. In the Trusted Computing screen, select the TCG/TPM Support.

A pop-up dialog box appears.

5. In the pop-up dialog box, set the TCG/TPM Support option to Yes and click Ok.

Note - Even if the TCG/TPM Support was already set to Yes in the screen shown above, continue on and complete the remaining steps of this procedure to ensure that all TPM configuration requirements are satisfied.

The updated Trusted Computing screen appears and shows that the TCG/TPM Support setting has changed to Yes.

```
                        BIOS SETUP UTILITY
         Advanced

Trusted Computing                                    Enable(Activate)/
                                                     Disable(Deactivate)
TCG/TPM SUPPORT            [Yes]                      Command to TPM

Execute TPM Command       [Don't change]
  TPM Enable/Disable Status  [Disabled]
  TPM Owner Status           [UnOwned]


                                                  ←     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

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```

Note - In the above screen, the Execute TPM Command setting shows the default, Don???t Change.

6. **In the Trusted Computing screen, select the Execute TPM Command option setting.**

A pop-up dialog box appears.

7. **In the pop-up tab, set the Execute TPM Command option to Enabled and click Ok.**

The updated Trusted Computing screen appears and shows that the Execute TPM Command setting has changed to `Enabled`.

```
                           BIOS SETUP UTILITY
         Advanced

 Trusted Computing                              Enable(Activate)/
                                                Disable(Deactivate)
 TCG/TPM SUPPORT              [Yes]             Command to TPM

 Execute TPM Command         [Enabled]
   TPM Enable/Disable Status [Disabled]
   TPM Owner Status          [UnOwned]




                                                ←    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

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```

8. **Press the F10 key to save the changes and exit the BIOS Setup utility.**

9. **To verify that TPM support is configured, do the following:**

a. **Reboot the server.**

b. **Access the BIOS Setup utility menus.**

For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

c. **Select Advanced -> Trusted Computing.**

On the Trusted Computing screen, confirm that the TCG/TPM Support setting is set to `Yes` and the TPM Enabled/Disable Status is set to `Enabled`.
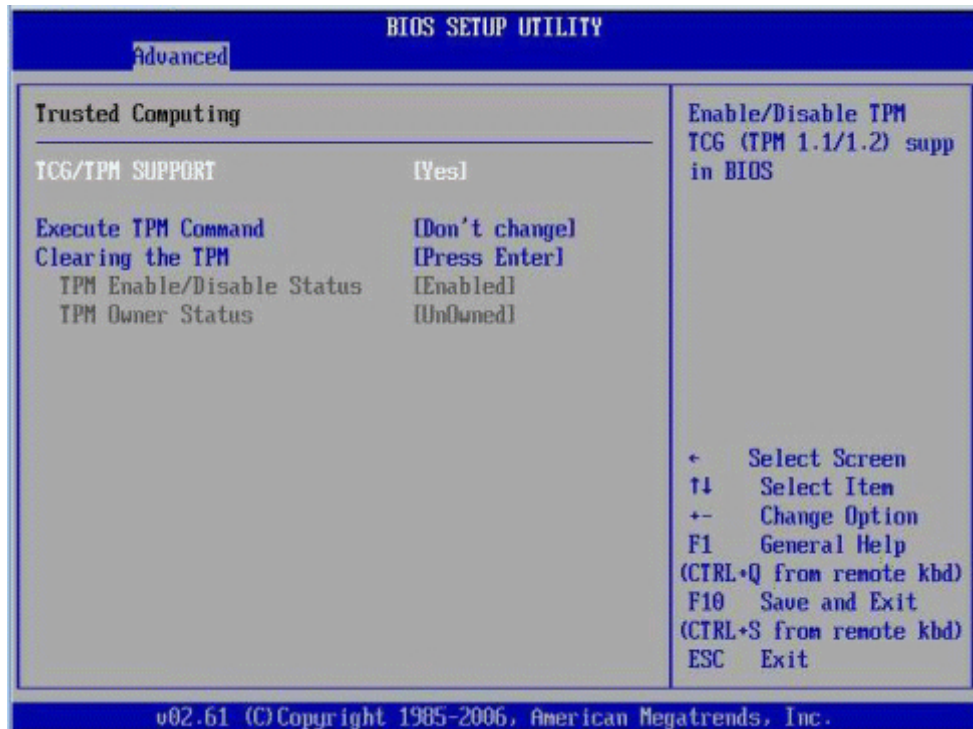
d. Press the F10 key to exit BIOS.

Related Information

- "Access the BIOS Setup Utility Menus" on page 46
- "Exit the BIOS Setup Utility" on page 70
- Microsoft???s Windows Trusted Platform Module Management documentation

▼ Configure SP LAN Settings

You can assign an IP address for the server SP from the BIOS Setup utility on the IPMI LAN configuration menu. Alternatively, you can also specify the LAN settings for the SP using

ILOM. For instructions for setting the IP address in ILOM, see the ILOM 3.0 documentation collection.

To set the IP address in the BIOS Setup utility, use the menus to navigate to the LAN configuration setting as follows: Advanced --> IPMI Configuration --> LAN Configuration. See "BIOS Setup Utility Menus" on page 43 for the menu navigation tree.

1. **Access the BIOS Setup utility menus.**

   For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

2. **In the BIOS Setup utility menus, use the arrow keys (or Tab key) to navigate to the Advanced menu.**

3. **In the Advanced menu, select IPMI Configuration.**

4. **In the IPMI Configuration menu, select LAN Configuration.**

The LAN Configuration screen appears.


```
                          BIOS SETUP UTILITY
         Advanced

   LAN Configuration.                                Enter channel number
   ─────────────────────────────────────────        for SET LAN Config
   Channel Number              [01]                  Command.
   IP Assignment               [Static]              Proper value below 16.

   Current IP address in BMC:    010.008.145.168
   Current MAC address in BMC:   00.14.4F.CA.B2.F4
   Current Subnet Mask in BMC:   255.255.255.000
   Current Gateway in BMC:       010.008.145.254
   Current Active Management Port  NET0

   Refresh
                                                     ←     Select Screen
   IP Address                  [010.008.145.168]     ↑↓    Select Item
   Subnet Mask                 [255.255.255.000]     Enter Update
   Default Gateway             [010.008.145.254]     F1    General Help
                                                     (CTRL+Q from remote kbd)
   Active Management Port      [NET MGT]             F10   Save and Exit
                                                     (CTRL+S from remote kbd)
   Commit                                            ESC   Exit

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```

5. **In the LAN Configuration screen, use the arrow keys to select and specify the appropriate LAN configuration settings.**

6. **Press the F10 key to save the changes and exit the BIOS Setup utility.**

    Related Information

    - "Access the BIOS Setup Utility Menus" on page 46
    - "Exit the BIOS Setup Utility" on page 70

Option ROM Allocation

The system BIOS allocates 128 Kbytes of address space for Option ROMs. This address space is shared between on-board devices and PCIe2 plug-in cards. This fixed address space limitation is imposed by the PC architecture and not by the BIOS itself. It is possible to exhaust the available address space when installing PCIe2 plug-in cards. When the address space is exhausted, the BIOS displays an `Option ROM Space Exhausted` message, which means that one or more devices cannot load Option ROMs.

By default, all on-board Options ROMs are enabled in the BIOS. However, you can disable most of these Option ROMs, unless they are required to support booting from the associated device or to provide some other boot time function (such as a video controller or the hardware RAID supported through the SAS controller HBA installed in PCIe2 slot 3). For example, it is not necessary to load the Option ROM for the on-board network ports unless you mean to boot from one or more network ports (even then, you can disable the Options ROMs for the remaining ports).

To enable or disable Option ROMs, see .

For example, if you install a SCSI PCIe2 card and you encounter the `Option ROM Space Exhausted` message, you can either:

- Disable the Option ROM for the PCIe2 slot you installed the SCSI card in if you will not be booting from that device.
- Disable one or more Option ROMs for on-board devices (or slots populated with other plug-in cards) to ensure there is room to boot from the desired device.

Related Information

-
-
-
-
-

▼ Enable or Disable 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 to be shared by the Option ROMs on all bootable PCIe2 plug-in cards.

1. **Access the BIOS Setup utility menus.**

   For instructions, see "Access the BIOS Setup Utility Menus" on page 46.

2. **In the BIOS Setup utility menus, use the arrow keys (or Tab key) to navigate to the Boot menu.**

3. **In the Boot menu, select Option ROM Enable.**

```
                          Boot

 NET0 Option ROM:           [Enabled]        This Option enables
 NET1 Option ROM:           [Enabled]        execution of the
 NET2 Option ROM:           [Enabled]        onboard network
 NET3 Option ROM:           [Enabled]        controllers' Optional
 PCI-E Slot 0 Option ROM:   [Enabled]        ROMs for legacy
 PCI-E Slot 1 Option ROM:   [Enabled]        support. The onboard
 PCI-E Slot 2 Option ROM:   [Enabled]        network devices are
 PCI-E Slot 3 Option ROM:   [Enabled]        not bootable with this
 PCI-E Slot 4 Option ROM:   [Enabled]        disabled.
 PCI-E Slot 5 Option ROM:   [Enabled]


                                             ↔      Select Screen
                                             ↑↓     Select Item
                                             +-     Change Option
                                             F1     General Help
                                             (CTRL+Q Serial Console)
                                             F10    Save and Exit
                                             (CTRL+S Serial Console)
                                             ESC    Exit

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```

4. **In the Option ROM settings screen, highlight the applicable Option ROM setting to modify, then press the Enter key.**

   A dialog box appears listing the available settings.

5. **In the dialog box, do one of the following:**

   ■ **Select Enabled to enable the Option ROM setting.**

■ **Select Disabled to disable the Option ROM setting.**

6. **Press the F10 key to save the changes and exit the BIOS Setup utility.**

Related Information

- "Access the BIOS Setup Utility Menus" on page 46
- "Option ROM Allocation" on page 60
- "Exit the BIOS Setup Utility" on page 70

BIOS Firmware Updates

Each BIOS firmware version is paired and qualified with a specific ILOM SP firmware version. Whenever you update the ILOM SP firmware, you will update the BIOS firmware. For instructions about updating the ILOM SP firmware, refer to the ILOM 3.0 documentation.

Related Information

- *Oracle Integrated Lights Out Manager (ILOM) 3.0 Web Interface Procedure Guide*
- *Oracle Integrated Lights Out Manager (ILOM) 3.0 CLI Procedures Guide*
- ILOM 3.0 documentation

Understanding BIOS Setup Screens

The BIOS Setup utility reports system information and can be used to configure the server BIOS settings. These topics display examples of the BIOS Setup utility screens.

Note - The BIOS menus shown are examples and reflect the optimal defaults at startup. The BIOS version numbers, menu information, and menu selections are subject to change over the life of the product.

Note - The BIOS Setup utility is stored in the BIOS flash memory. The configured data is provided with context-sensitive help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings default to the original state specified at the factory.

For instructions on accessing the BIOS Setup utility, see "Access the BIOS Setup Utility Menus" on page 46.

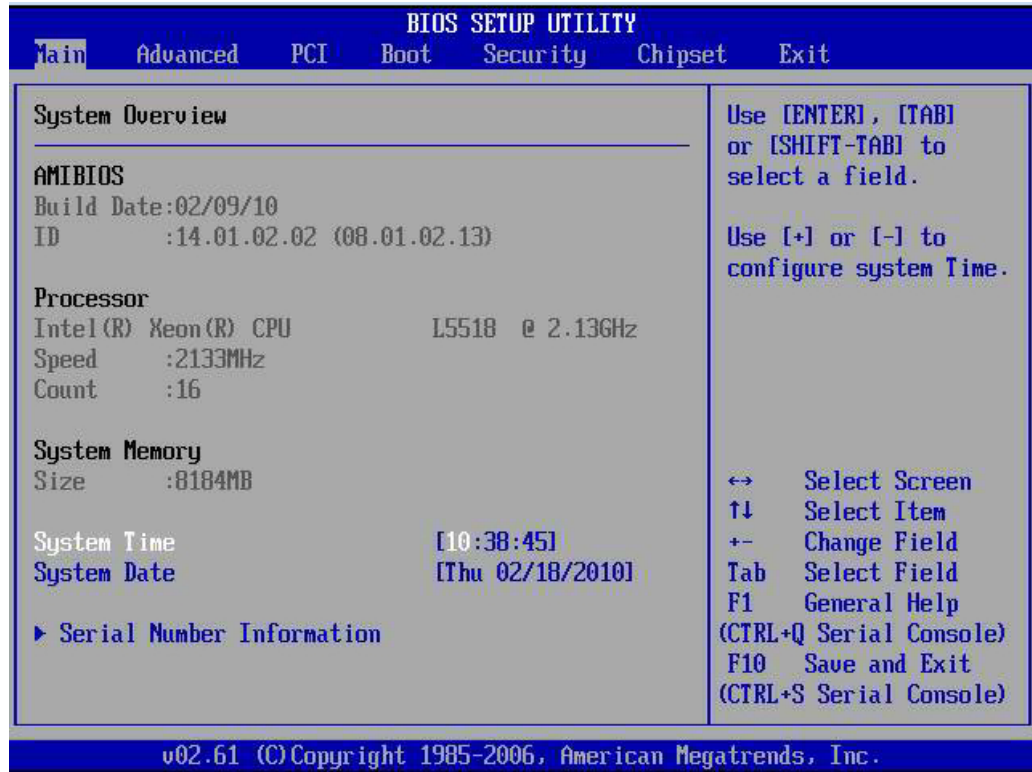The following table contains descriptions of the top-level BIOS setup screens.

Menu	Description	Links
Main	General product information, including BIOS type, processor, memory, and time/date.	"BIOS Main Menu Screens" on page 63
Advanced	Configuration information for the CPU, memory, IDE, Super IO, trusted computing, USB, PCI, MPS and other information.	"BIOS Advanced Menu Screens" on page 64
PCI	Configure the server to clear NVRAM during system boot.	"BIOS PCI Menu Screen" on page 65
Boot	Configure the boot device priority (storage drives and the optical media drive).	"BIOS Boot Menu Screens" on page 66
Security	Set or change the user and supervisor passwords.	"BIOS Security Menu Screen" on page 67
Chipset	View the configuration of server chipsets.	"BIOS Chipset Menu Screens" on page 68
Exit	Save changes and exit, discard changes and exit, discard changes, or load optimal or fail-safe defaults.	"BIOS Exit Menu Screen" on page 69 "Exit the BIOS Setup Utility" on page 70

Related Information

- "Understanding BIOS Booting and Setup" on page 37

BIOS Main Menu Screens

The BIOS Main screens provide general product information, including BIOS, processor, system memory, and system time/date. The following figure shows the BIOS Main top-level screen.

```
                          BIOS SETUP UTILITY
 Main   Advanced   PCI    Boot    Security    Chipset    Exit

 System Overview                              Use [ENTER], [TAB]
 _____ or [SHIFT-TAB] to
                                              select a field.
 AMIBIOS
 Build Date:02/09/10
 ID        :14.01.02.02 (08.01.02.13)        Use [+] or [-] to
                                             configure system Time.
 Processor
 Intel(R) Xeon(R) CPU         L5518  @ 2.13GHz
 Speed     :2133MHz
 Count     :16

 System Memory
 Size      :8184MB                           ↔      Select Screen
                                             ↑↓     Select Item
 System Time              [10:38:45]         +-     Change Field
 System Date              [Thu 02/18/2010]   Tab    Select Field
                                             F1     General Help
 ▶ Serial Number Information                 (CTRL+Q Serial Console)
                                             F10    Save and Exit
                                             (CTRL+S Serial Console)

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```

Related Information

-

BIOS Advanced Menu Screens

The BIOS Advanced screens provide detailed configuration information for the CPU, memory, IDE, Super IO, trusted computing, USB, PCI, MPS and other system information. The following figure shows the BIOS Advanced top-level screen.

```
                         BIOS SETUP UTILITY
Main   Advanced   PCI   Boot   Security   Chipset   Exit

Advanced Settings                              IPMI configuration
                                               including server
WARNING: Setting wrong values in below sections   monitoring and
         may cause system to malfunction.      event log.

 ▶ CPU Configuration
 ▶ On-board SATA Configuration
 ▶ ACPI Configuration
 ▶ Event Log Configuration
 ▶ I/O Virtualization
 ▶ IPMI Configuration
 ▶ Intel VT-d Configuration
 ▶ MPS Configuration                           ↔     Select Screen
 ▶ Remote Access Configuration                  ↑↓    Select Item
 ▶ Trusted Computing                            Enter Go to Sub Screen
 ▶ USB Configuration                            F1    General Help
                                               (CTRL+Q Serial Console)
                                               F10   Save and Exit
                                               (CTRL+S Serial Console)
                                               ESC   Exit

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```

Related Information

■ "BIOS Setup Utility Menus" on page 43

BIOS PCI Menu Screen

The BIOS PCI screen enables you to configure the server to clear NVRAM during system boot. The following figure shows the BIOS PCI Settings screen.

Related Information

-
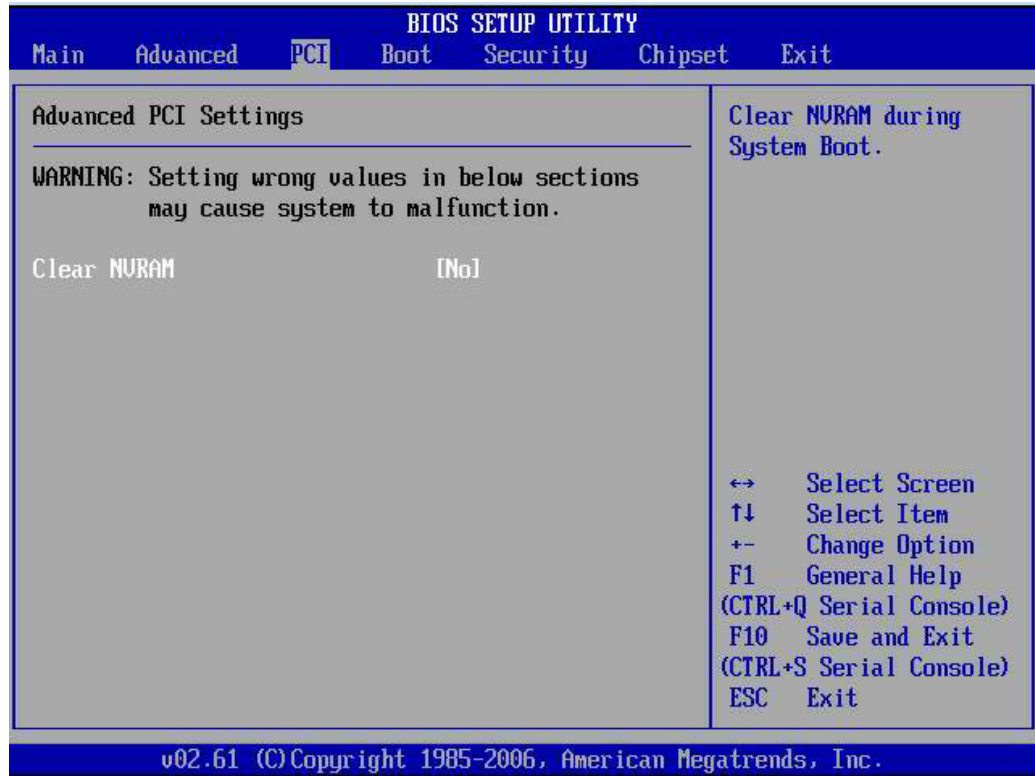
BIOS Boot Menu Screens

The BIOS Boot screens enable you to configure the boot device priority (storage drives and the optical media drive). The following figure shows the BIOS Boot Settings top-level screen.
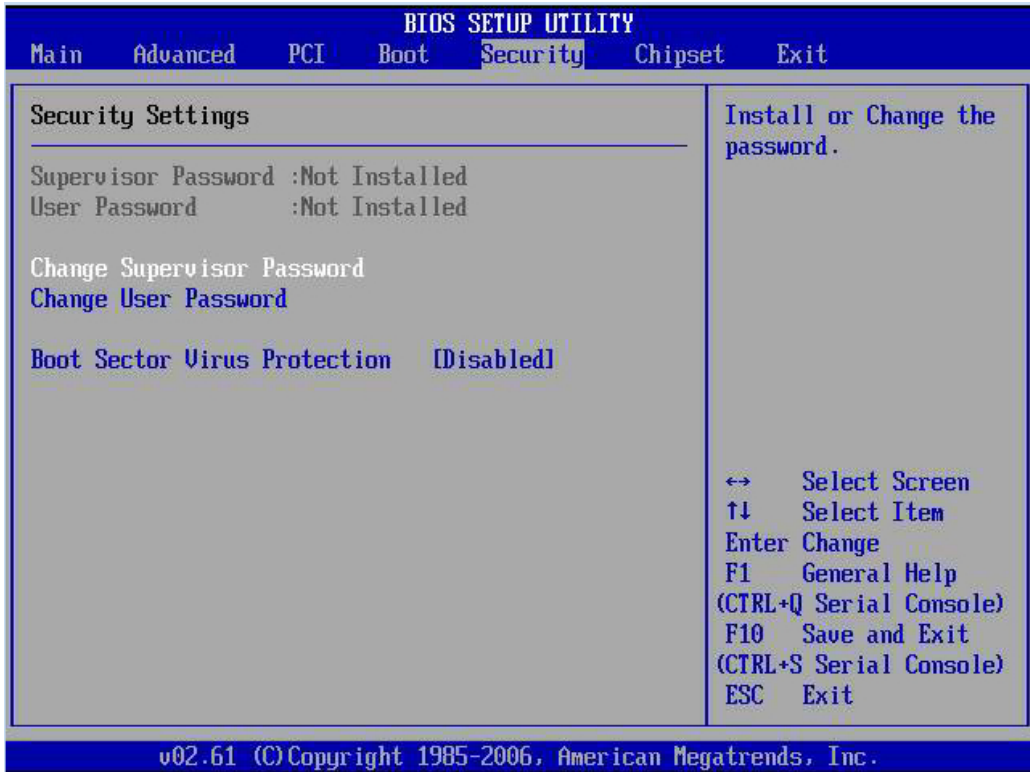
```
                        BIOS SETUP UTILITY
  Main    Advanced    PCI    Boot    Security    Chipset    Exit

  Boot Settings                                    Configure Settings
  ─────────────────────────────────               during System Boot.

  ▶ Boot Settings Configuration

  ▶ Boot Device Priority

  ▶ Option ROM Enable


                                                   ↔    Select Screen
                                                   ↑↓   Select Item
                                                   Enter Go to Sub Screen
                                                   F1    General Help
                                                   (CTRL+Q Serial Console)
                                                   F10   Save and Exit
                                                   (CTRL+S Serial Console)
                                                   ESC   Exit

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```

Related Information

-

BIOS Security Menu Screen

The BIOS Security screen enables you to set or change the supervisor and user passwords. The following figure shows the BIOS Security Settings screen.

```
                          BIOS SETUP UTILITY
  Main    Advanced    PCI    Boot    Security    Chipset    Exit

  Security Settings                              Install or Change the
                                                 password.
  Supervisor Password :Not Installed
  User Password       :Not Installed

  Change Supervisor Password
  Change User Password

  Boot Sector Virus Protection    [Disabled]


                                                 ↔     Select Screen
                                                 ↑↓    Select Item
                                                 Enter Change
                                                 F1    General Help
                                                 (CTRL+Q Serial Console)
                                                 F10   Save and Exit
                                                 (CTRL+S Serial Console)
                                                 ESC   Exit

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```

Related Information

■ "BIOS Setup Utility Menus" on page 43

BIOS Chipset Menu Screens

The BIOS Chipset screens enable you to set the chipset parameters. The following figure shows the BIOS Advanced Chipset Settings top-level screen.

```
                          BIOS SETUP UTILITY
 Main     Advanced    PCI     Boot    Security   Chipset    Exit

 Advanced Chipset Settings                        Configure CPU Bridge
                                                  features.

 ▶ CPU Bridge Configuration
 ▶ North Bridge Configuration
 ▶ South Bridge Configuration




                                                  ↔     Select Screen
                                                  ↑↓    Select Item
                                                  Enter Go to Sub Screen
                                                  F1    General Help
                                                  (CTRL+Q Serial Console)
                                                  F10   Save and Exit
                                                  (CTRL+S Serial Console)
                                                  ESC   Exit

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```
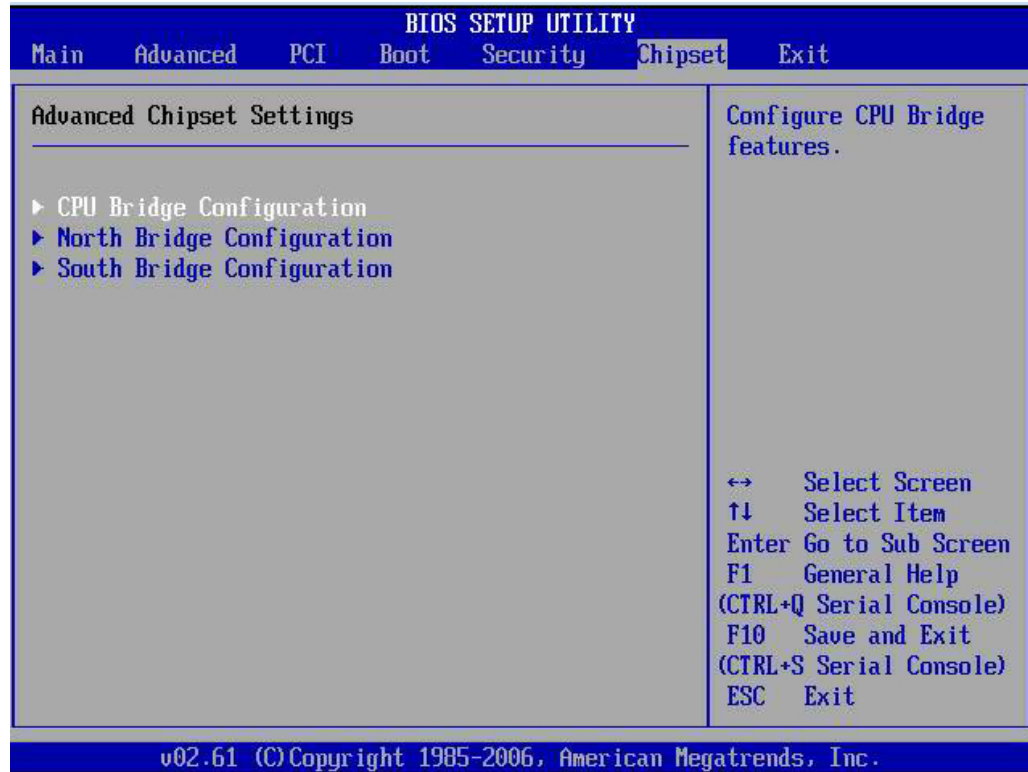
Related Information

■ "BIOS Setup Utility Menus" on page 43

BIOS Exit Menu Screen

The BIOS Exit options enable you to save changes and exit, discard changes and exit, discard changes, or load optimal defaults. The following figure shows the BIOS Exit Options (Save Changes and Exit) screen.

```
                          BIOS SETUP UTILITY
   Main    Advanced    PCI    Boot    Security    Chipset    Exit

   Exit Options                                     Exit system setup
                                                    after saving the
   Save Changes and Exit                            changes.
   Discard Changes and Exit
   Discard Changes                                  F10 key can be used
                                                    for this operation.
   Load Optimal Defaults




                                                    ↔     Select Screen
                                                    ↑↓    Select Item
                                                    Enter Go to Sub Screen
                                                    F1    General Help
                                                    (CTRL+Q Serial Console)
                                                    F10   Save and Exit
                                                    (CTRL+S Serial Console)
                                                    ESC   Exit

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```

Related Information

- "BIOS Setup Utility Menus" on page 43

▼ Exit the BIOS Setup Utility

1. **Use the up and down arrow keys to scroll up and down the BIOS Exit options.**

2. **Press the Enter key to select the option.**

   A confirmation dialog box appears that enables you to save the changes and exit the Setup utility or cancel the exit option.

Note - The confirmation dialog box is only shown in the following figure for the Save Changes and Exit option screen. The other exit confirmation screens work in a similar way.

```
 Main    Advanced    PCI    Boot    Security    Chipset    Exit
*****************************************************************************
* Exit Options                                    * Exit system setup    *
* *********************************************** * after saving the     *
* Save Changes and Exit                           * changes.             *
* Discard Changes and Exit                        *                      *
* Discard Changes                                 * F10 key can be used  *
*                                                 * for this operation.  *
* Load Optimal D*********************************************             *
*              *                                            *            *
*              *   Save configuration changes and exit setup? *          *
*              *                                            *            *
*              ***********************************************            *
*              *          [Ok]              [Cancel]        *            *
*              ***********************************************lect Screen *
*                                                 * **     Select Item   *
*                                                 * Enter Go to Sub Screen *
*                                                 * F1    General Help   *
*                                                 *(CTRL+Q Serial Console) *
*                                                 * F10   Save and Exit  *
*                                                 *(CTRL+S Serial Console) *
*                                                 * ESC   Exit           *
*****************************************************************************
          v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

Related Information

- "Access the BIOS Setup Utility Menus" on page 46
- "BIOS Exit Menu Screen" on page 69

Preparing for Service

These topics describe the safety considerations and provides prerequisite procedures and information to replace components within the server.

- "Safety Precautions" on page 73
- "Safety Symbols" on page 74
- "Electrostatic Discharge Safety" on page 74
- "Required Tools" on page 75
- "Preparing the Server for Component Replacement" on page 75

Related Information

- "Returning Server to Operation" on page 211

Safety Precautions

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

- Follow all standard cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Sun Hardware Systems*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment???s electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.
- Disconnect both power supply cords before servicing.

Related Information

- "Safety Symbols" on page 74
- "Electrostatic Discharge Safety" on page 74

Safety Symbols

The following symbols might appear in this book. Note their meanings:

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

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

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

Related Information

- "Safety Precautions" on page 73
- "Electrostatic Discharge Safety" on page 74

Electrostatic Discharge Safety

ESD sensitive devices, such as the motherboard, PCIe2 cards, drives, and memory cards require special handling.

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

- Use an Antistatic Wrist Strap

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

- Use an Antistatic Mat

  Place ESD-sensitive components such as the motherboard, memory, and other PCB cards on an antistatic mat.

Related Information

Required Tools

The server can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver

Related Information

Preparing the Server for Component Replacement

Before you can remove and install components that are inside the server, you must perform the following tasks:

Note - When replacing the drives or power supplies, not all of these tasks are necessary. See the replacement tasks for those components for more information.

Related Information

- "Returning Server to Operation" on page 211

Powering Down the Server

Determine how you want to power off the server.

Description	Link
Power the server down gracefully to prevent data from being corrupted.	"Power Down Server Gracefully" on page 76
	"Power Down Server Gracefully Using the Power Button" on page 77
If the server is not responding, or you must shut down the server quickly, perform an emergency power down.	"Power Down Server For an Emergency" on page 79

Related Information

- "Power On the Server" on page 214

▼ Power Down Server Gracefully

Performing a graceful shut down ensures that all of your data is saved and the system is ready for restart.

1. **Log in to the server as superuser or equivalent.**

   Depending on the nature of the problem, you might want to view the system status, the log files, or run diagnostics before you shut down the system. See "View Event Logs" on page 48 for log file information.

2. **Notify affected users.**

   Refer to your operating system documentation for specific instructions.

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

   Refer to your application documentation for specific information on these processes.

4. **Log in to the ILOM SP to display the ILOM prompt.**

Refer to the ILOM 3.0 documentation for instructions.

5.   At the ILOM prompt, shut down the operating system:

```
-> stop /SYS
SC Alert: SC Request to Power Off Host.
```

If the system is running the Solaris OS, refer to the Solaris system administration documentation for additional information.

6.   Shut down the chassis power:

```
-> stop /SP
SP Alert: SP Request to Power Off Chassis.
```

Refer to the ILOM 3.0 documentation for more information about the `stop` command.

Note - You can also use the Power button on the front of the server to initiate a graceful system shutdown. This button is recessed to prevent accidental server power off. Use the tip of a pen to operate this button.

---

7.   Disconnect the power and cables from the server.

See "Disconnect Cables From the Server" on page 80.

Related Information

- "Power Down Server Gracefully Using the Power Button" on page 77
- "Power Down Server For an Emergency" on page 79
- "Disconnect Cables From the Server" on page 80
- "Power On the Server" on page 214

▼ Power Down Server Gracefully Using the Power Button

Note - You can use the Power button on the front of the server to initiate a graceful system shut down. This button is recessed to prevent accidental server power off.

---

1.   Use a pen or other pointed object to press and release the power button on the front panel.

This action causes ACPI-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems shut down to standby power mode immediately.
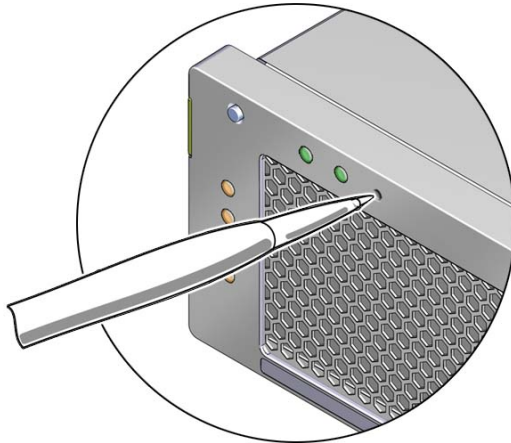
When main power is off, the power OK LED on the front panel will begin flashing, indicating that the server is in standby power mode. See "System Status LEDs" on page 19.

2. **Disconnect the power and data cables from the server.**

   See "Disconnect Cables From the Server" on page 80.

   Caution - When you use the Power button to enter standby power mode, power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the AC or DC power cords from the back of the power supplies.

Related Information

- "System Status LEDs" on page 19
- "Power Down Server Gracefully" on page 76
- "Power Down Server For an Emergency" on page 79
- "Disconnect Cables From the Server" on page 80
- "Power On the Server" on page 214

▼ Power Down Server For an Emergency

![caution icon] **Caution -** This task quickly forces the server???s main power off. You might corrupt your system data during an emergency power down, so only use this task to power down the server after attempting the graceful power down tasks.

1. Press and hold the power button for four seconds to force the main power off and to enter standby power mode.

When main power is off, the power OK LED on the front panel will begin flashing, indicating that the server is in standby power mode. See "System Status LEDs" on page 19.

2. Disconnect the power and data cables from the server.

See "Disconnect Cables From the Server" on page 80.

![caution icon] **Caution -** When you use the Power button to enter standby power mode, power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the AC or DC power cords from the back of the power supplies.

Related Information

- "System Status LEDs" on page 19
- "Power Down Server Gracefully" on page 76

- "Power Down Server Gracefully Using the Power Button" on page 77
- "Disconnect Cables From the Server" on page 80
- "Power On the Server" on page 214

▼ Disconnect Cables From the Server

Caution - The system supplies standby power to the circuit boards even when the system is powered off.

1. **Label all cables connected to the server.**

2. **Disconnect the power cables from the rear of the server.**

3. **Disconnect all data cables from the rear of the server.**

4. **If your rackmount kit includes a cable management device, remove the cables from it.**

5. **Remove the server from the rack.**

   Related Information

   - "Rear Panel Cable Connections" on page 17
   - "Powering Down the Server" on page 76
   - "Remove the Server From the Rack" on page 80
   - "Reconnect Power and Data Cables" on page 213

▼ Remove the Server From the Rack

● **Remove the server from the rack.**

   Remove the server from the rack prior to performing component replacement procedures. Make sure to place the server on a stable work surface.

Caution - The server weighs approximately 41 lbs (18.6 kg). Two people are required to dismount and carry the chassis.

Related Information

-
-
-

▼ Take Antistatic Measures

1. Prepare an antistatic surface on which to set parts during removal and installation.

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

- Antistatic bag used to wrap a replacement part
- An ESD mat, orderable from Oracle
- Disposable ESD mat (shipped with some replacement parts or optional system components)

2. Attach an antistatic wrist strap.

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

Related Information

-
-
-

▼ Remove the Top Cover

All field-replaceable units that are not accessed from the front or rear of the system require the removal of the top cover.

1. **Use a No. 2 Phillips screwdriver to press the top cover release button.**
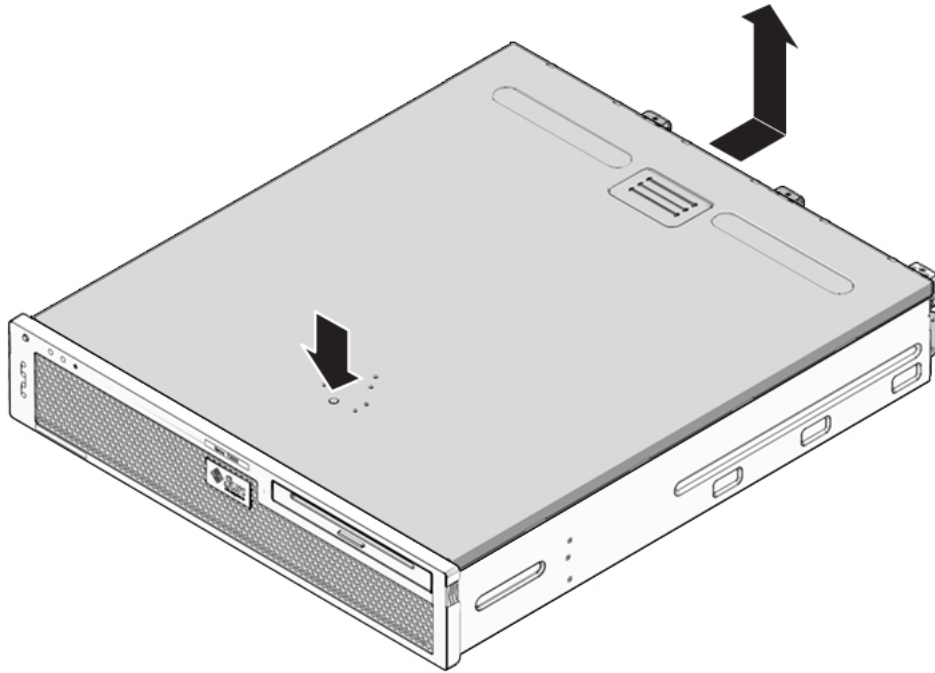
2. **While pressing the top cover release button, slide the cover toward the rear of the server.**

3. **Lift the cover off the chassis and set the cover aside.**

   Related Information

   -
   -

Replacing Storage Components

These topics provide instructions for replacing the following storage components.

-
-
-
-

Related Information

-
-

Opening and Closing the Front Bezel

When replacing components like drives and the air filter from the front of the system, you will be required to open the front bezel.

-
-

Related Information

-
-

▼ Open Front Bezel

● **Hold the green tabs on either side of the bezel, and pull the bezel forward and down.**

Related Information

-
-
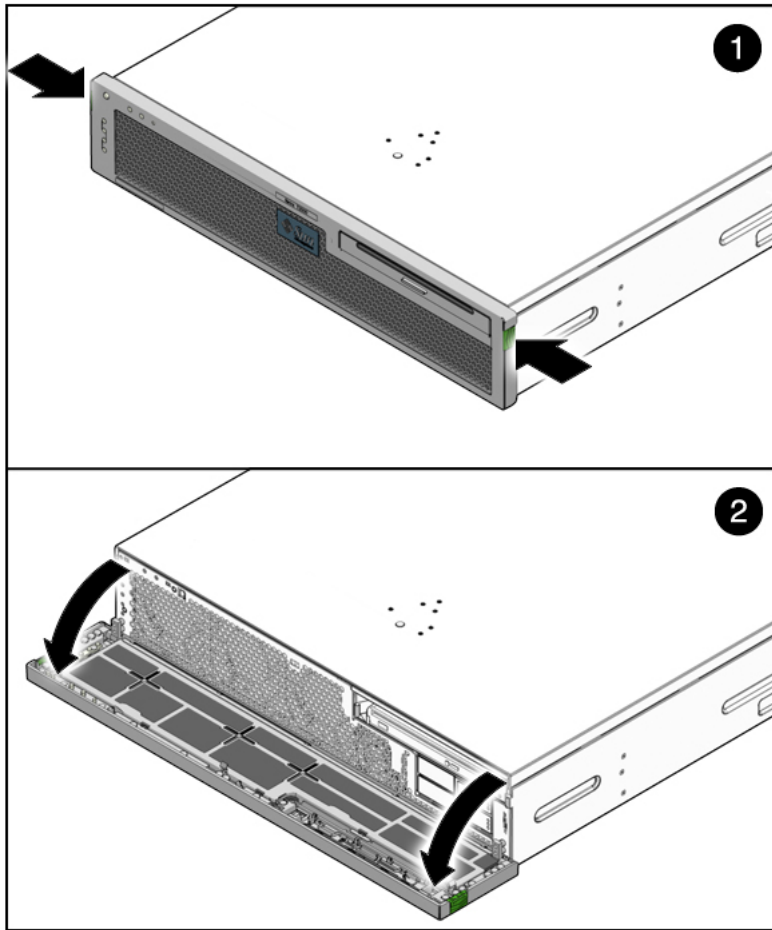
- "Close Front Bezel" on page 85
- "Replacing a Drive" on page 85
- "Replacing the Optical Media Drive" on page 91
- "Replacing the Air Filter" on page 179

▼ Close Front Bezel

● **Hold the green tabs on either side of the bezel, and lift up until the bezel snaps in place.**

Related Information

- "Open Front Bezel" on page 84

Replacing a Drive

Note - To ensure performance and reliability, only use carrier-grade NEBS-certified drives with supported brackets.

- "Drives Hot-Plug Conditions" on page 85
- "Remove a Drive" on page 86
- "Install a Drive" on page 89

Related Information

- "Opening and Closing the Front Bezel" on page 83

Drives Hot-Plug Conditions

The solid-state or hard-disk drives in the server are hot-pluggable, but this capability depends on how the drives are configured. To hot-plug a drive you must be able to take the drive offline before you can remove it. When you take the drive offline, you prevent any application from accessing the drive and remove the logical software links to the drive.

The following situations inhibit the ability to perform hot-plugging of a drive:

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

If your drive falls into one of these conditions, you must shut the system down before you replace the drive. See "Powering Down the Server" on page 76.

Note - Replacing a drive does not require removing the server from a rack.

Related Information

- "Drive LEDs" on page 21
- "Remove a Drive" on page 86
- "Install a Drive" on page 89

▼ Remove a Drive

1. **Prepare the system for the drive removal:**

   - "Take Antistatic Measures" on page 81
   - "Open Front Bezel" on page 84.

2. **Identify the location of the drive that you want to remove.**
   The following illustrations show the location of the drives and how the system numbers them.

   FIGURE 5 Drive Location and Numbering on a Two-Drive Server

FIGURE   6   Drive Location and Numbering on a Four-Drive Server
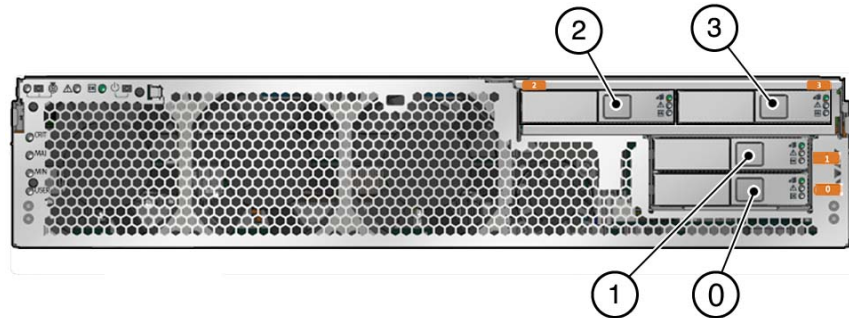
3.   **Type the OS commands required to stop the server from using the drive.**

Exact commands required depend on the configuration of your drives. Unmount file systems or perform RAID commands as needed.

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

FIGURE   7   Opening the Drive Latch
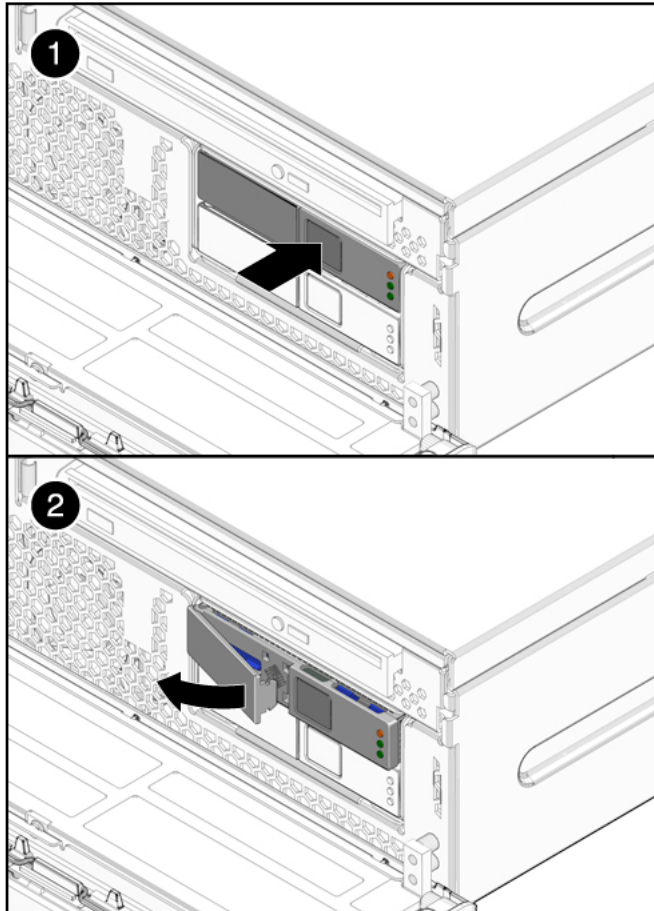
Figure Legend

1   Pressing the latch release button.
2   Opening the latch.

> ⚠ **Caution -** The latch is not an ejector. Do not bend the latch too far to the left. Doing so can damage the latch.

5. **Grasp the latch and pull the drive out of the drive slot.**
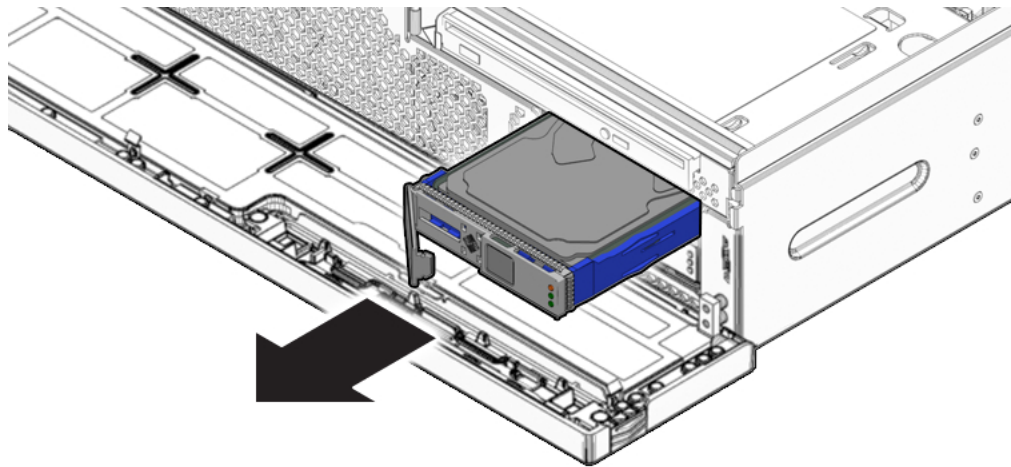
6. **Consider your next steps:**

- If you are replacing the drive, continue to "Install a Drive" on page 89.
- If you are not replacing the drive, perform administrative tasks to configure the server to operate without the drive.

Related Information

- "Drive LEDs" on page 21
- "Drives Hot-Plug Conditions" on page 85
- "Install a Drive" on page 89

▼ Install a Drive

1. **Remove the replacement drive from its packaging and place the drive on an antistatic mat.**

2. Align the replacement drive to the drive slot.

The drive is physically addressed according to the slot in which it is installed. It is important to install a replacement drive in the same slot as the drive that was removed.

3. Slide the drive into the bay until the drive is fully seated.
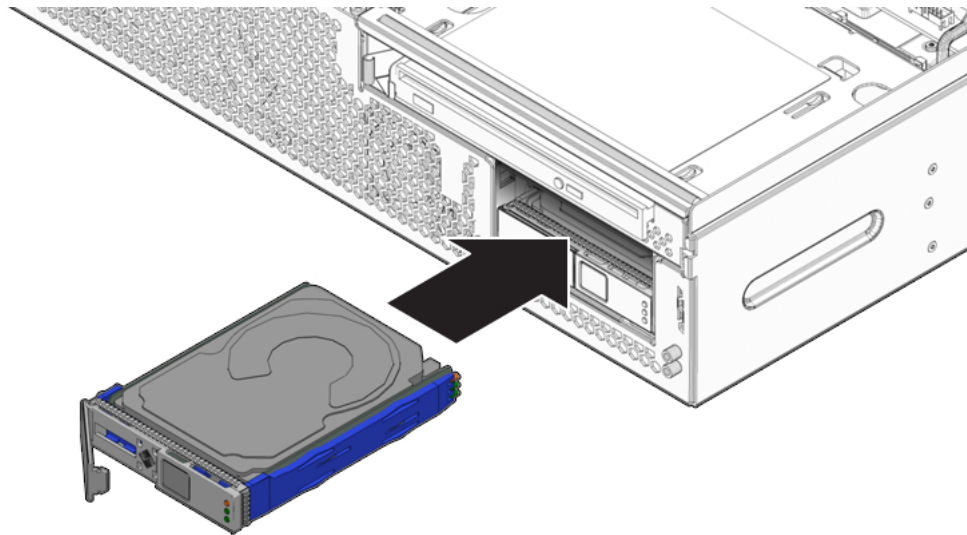
4. Close the latch to lock the drive in place.

5. Close the bezel.

See "Close Front Bezel" on page 85.

6. Perform administrative tasks to reconfigure the drive.

The procedures that you perform at this point depend on how your data is configured. You might need to partition the drive, create file systems, load data from backups, or have the drive updated from a RAID configuration.

Related Information

- "Drive LEDs" on page 21
- "Drives Hot-Plug Conditions" on page 85
- "Remove a Drive" on page 86

Replacing the Optical Media Drive

These topics describe how to remove and replace the optical media drive.

- "Remove the Optical Media Drive" on page 91
- "Install the Optical Media Drive" on page 92

Related Information

- "Opening and Closing the Front Bezel" on page 83

▼ Remove the Optical Media Drive

1. **Prepare the server for optical media drive removal:**

   - "Take Antistatic Measures" on page 81
   - "Open Front Bezel" on page 84

2. **Push the metal release tab to the left and pull the probe forward, freeing the optical media drive.**
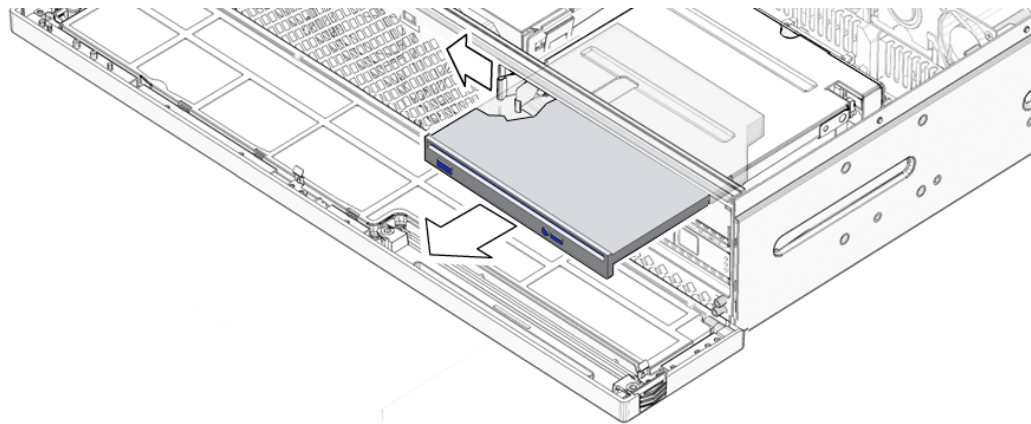
3. **Remove the optical media drive from the media bay assembly and set the drive aside on an antistatic mat.**

4. **Consider your next step:**

   ■ If you removed the optical media drive as part of another procedure, return to that procedure.
   ■ Otherwise, continue to "Install the Optical Media Drive" on page 92.

   Related Information

   ■ "Install the Optical Media Drive" on page 92

▼ Install the Optical Media Drive

1. **Remove the replacement optical media drive from its packaging and place it on an antistatic mat.**

2. **Hold the tab to the left and insert the optical media drive into the media bay assembly.**
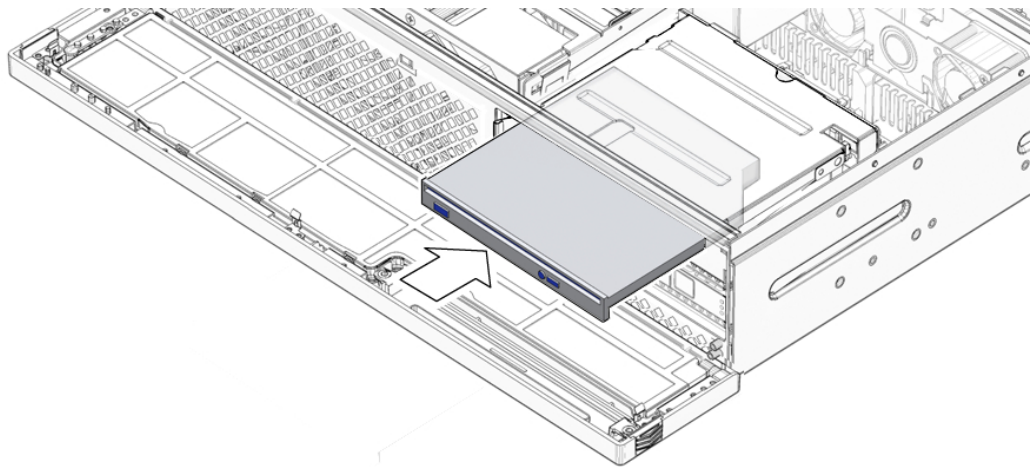
3. **Press the optical media drive in until it seats and release the tab.**

4. **Close the bezel.**

5. **Consider your next step:**

- If you installed the optical media drive as part of another procedure, return to that procedure.
- Otherwise, perform the following tasks to bring the server back online:
  - "Close Front Bezel" on page 85
  - "Remove Antistatic Measures" on page 212

Related Information

- "Remove the Optical Media Drive" on page 91

Replacing the Media Bay Assembly

These tasks describe how to remove and replace the media bay assembly.

Note - Because of EMI compliance requirements, field upgrades between four drive system configurations to two drive and optical media drive configurations are not supported.

- "Remove the Media Bay Assembly" on page 93
- "Install the Media Bay Assembly" on page 97

Related Information

- "Replacing a Drive" on page 85
- "Replacing the Optical Media Drive" on page 91

▼ Remove the Media Bay Assembly

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the air duct.**

   See "Remove the Air Duct" on page 127

3. **Remove all the drives from the system.**

   Make a note of the locations of each drives.

- "Open Front Bezel" on page 84
- "Remove a Drive" on page 86
- "Remove the Optical Media Drive" on page 91

4.   Disconnect the following three cables from the media bay assembly:

FIGURE   8   Disconnecting the Media Bay Assembly Cables
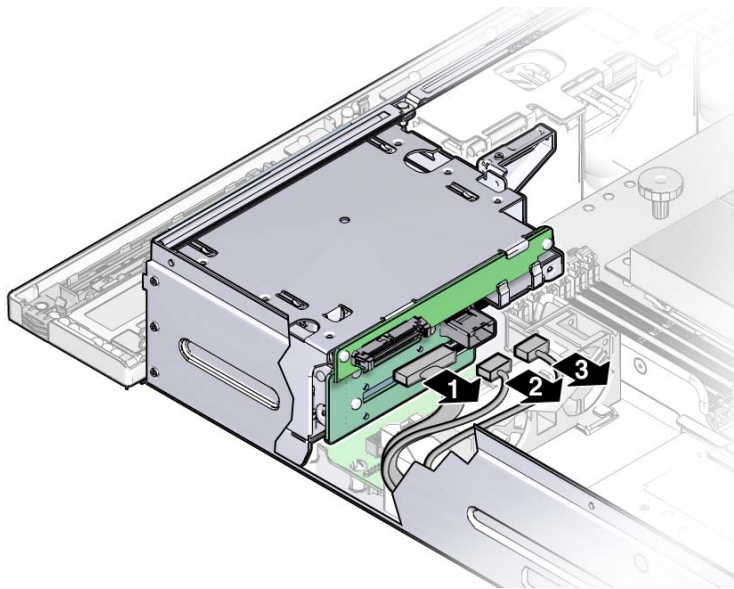
Figure Legend

1   SATA cable from motherboard (connected on optical media drive-equipped servers only)
2   Power/signal cable from the PDB
3   SAS cable from the SAS HBA

Note - You can disconnect power/signal cable from the rear of the media bay assembly or from the PDB itself after loosening the screws and lifting the assembly out of the chassis in the next step.

5.   Loosen captive screws labeled 2 and 3 on the service label, and remove non-captive screw labeled 1 closest to the front of the server.

The following illustration shows how the service label numbers these screws.
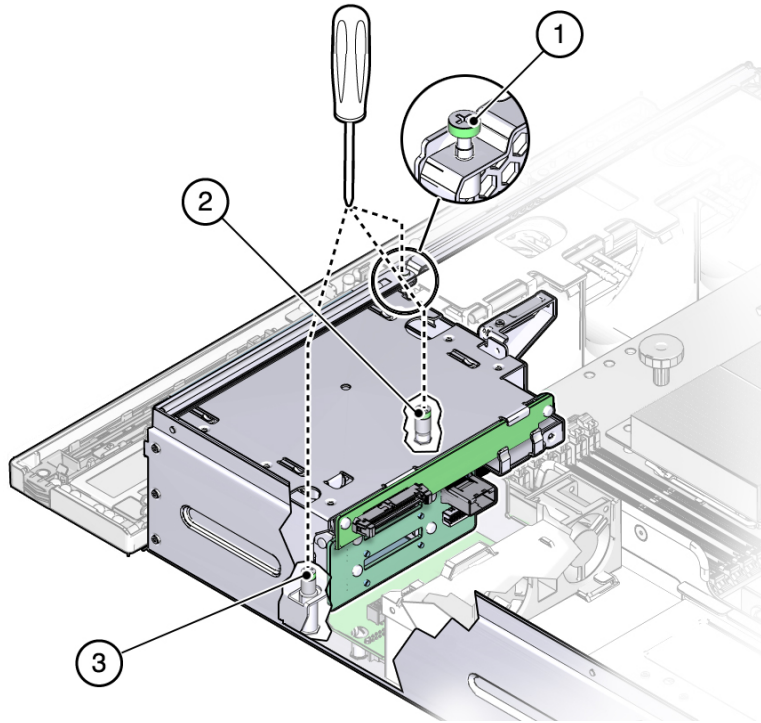
6. Lift the media bay assembly out of the chassis.
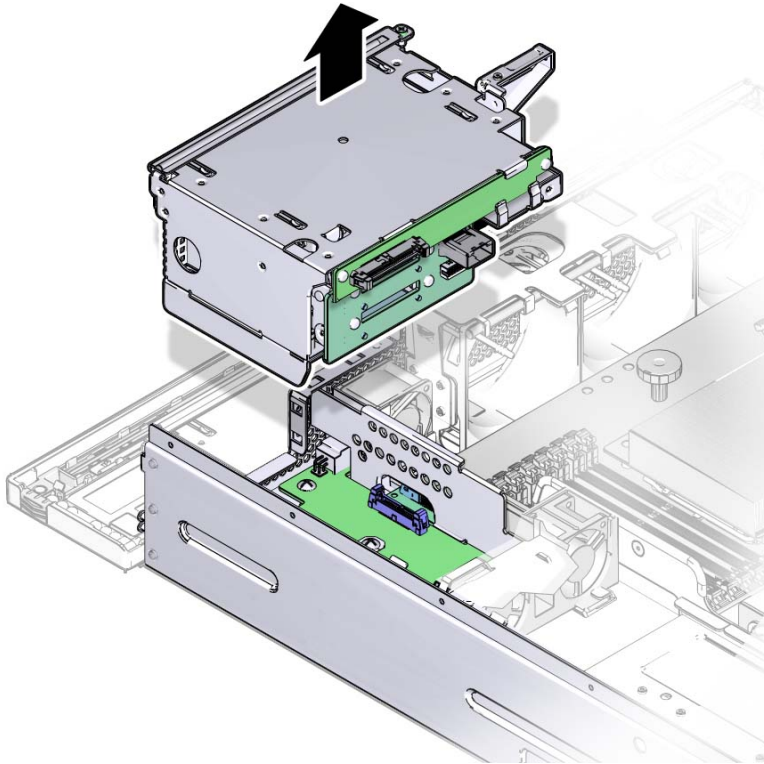
7. Set the media bay assembly aside on an antistatic mat.

8. Consider your next step:

- If you removed the media bay assembly as part of another procedure, return to that procedure.
- Otherwise, continue to "Install the Media Bay Assembly" on page 97.

Related Information

- "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15
- "Front Panel Components on Four-Drive Systems With Bezel Removed" on page 16
- "Install the Optical Media Drive" on page 92

▼ Install the Media Bay Assembly

1. **Remove the replacement media bay assembly from its packaging and place it on an antistatic mat.**

2. **Move the cables as far out of the way as possible.**

3. **Carefully lower the media bay assembly into the chassis until it seats.**

   Ensure that the mylar airflow flap rests on top of the motherboard DIMMs.
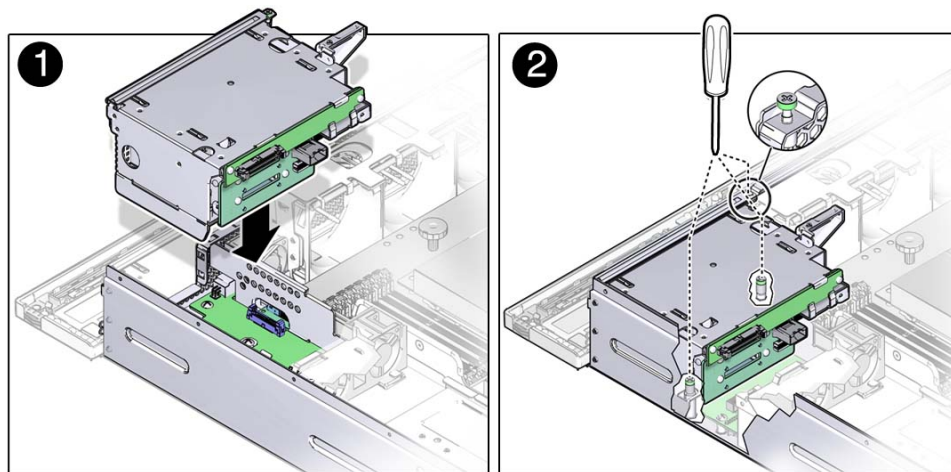
4. **Tighten the media bay assembly screws.**

5. **Connect the following cables to the media bay assembly:**

FIGURE 9   Connecting the Media Bay Assembly Cables
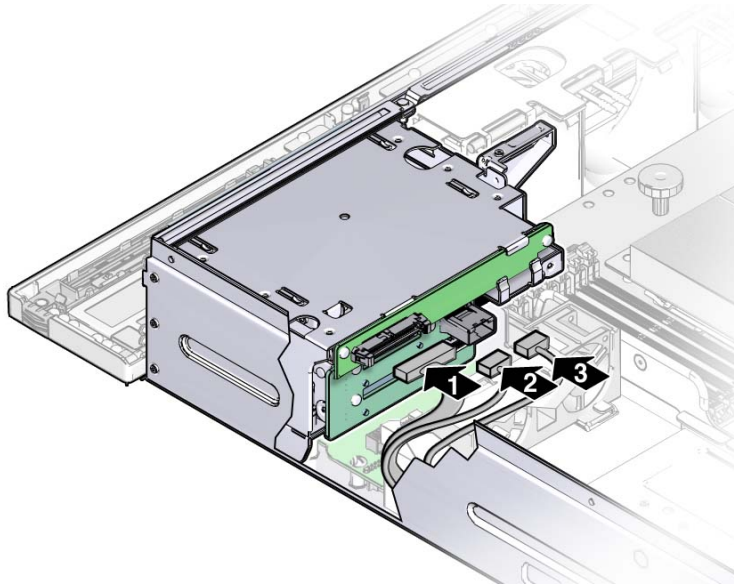
Figure Legend

1   SATA cable from motherboard (connected on optical media drive-equipped servers only)
2   Power/signal cable from the PDB
3   SAS cable from the SAS HBA

6. **Install the optical media drive and the drives into the same slots that you removed them.**

    ■ "Install the Optical Media Drive" on page 92

    ■ "Install a Drive" on page 89

    ■ "Close Front Bezel" on page 85

7. **Consider your next step:**

    ■ If you installed the media bay bracket as part of another procedure, return to that procedure.

    ■ Otherwise, continue to the next step.

8. **Install the air duct.**

See "Install the Air Duct" on page 130.

9. Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15
- "Front Panel Components on Four-Drive Systems With Bezel Removed" on page 16
- "Remove the Media Bay Assembly" on page 93

Replacing Motherboard Assembly Components

The following topics describe how to replace components from the motherboard assembly and how to replace the motherboard assembly itself.

Related Information

Replacing the PCI Mezzanine

The PCI mezzanine is a carrier for the PCIe2 cards in slots 4 and 5 and the SAS controller HBA. Remove the PCI mezzanine to replace the following components:

- PCIe2 cards in slots 0, 1, and 2
- Motherboard assembly

- CPU modules
- Flash modules and Flash module cable
- ESM riser and ESM
- Battery

It is not necessary to remove the PCI mezzanine for other components. However, when you remove the PCI mezzanine, you make additional working space available.

- "Remove the PCI Mezzanine" on page 102
- "Install the PCI Mezzanine" on page 104

Related Information

- "Replacing PCIe2 Cards" on page 112

▼ Remove the PCI Mezzanine

Note - PCIe2 cards installed in slots 4 and 5, as well as the installed SAS controller HBA, can remain in place when removing the PCI Mezzanine.

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

    See "Preparing the Server for Component Replacement" on page 75.

2. **Disconnect all I/O cables from the rear of the PCI mezzanine.**

    These cables should have been removed prior to removing the server from the rack. These cables include the external SAS cable, alarm cable, and any I/O cables connected to installed PCIe cards.

3. **Disconnect the following PCI mezzanine cables:**

    - LED board cable
    - Fan tray 1 power cable
    - Power cable from PDB
    - Internal SAS HBA cable
    - Fan tray 2 power cable

FIGURE   10   Disconnecting the PCI Mezzanine Cables
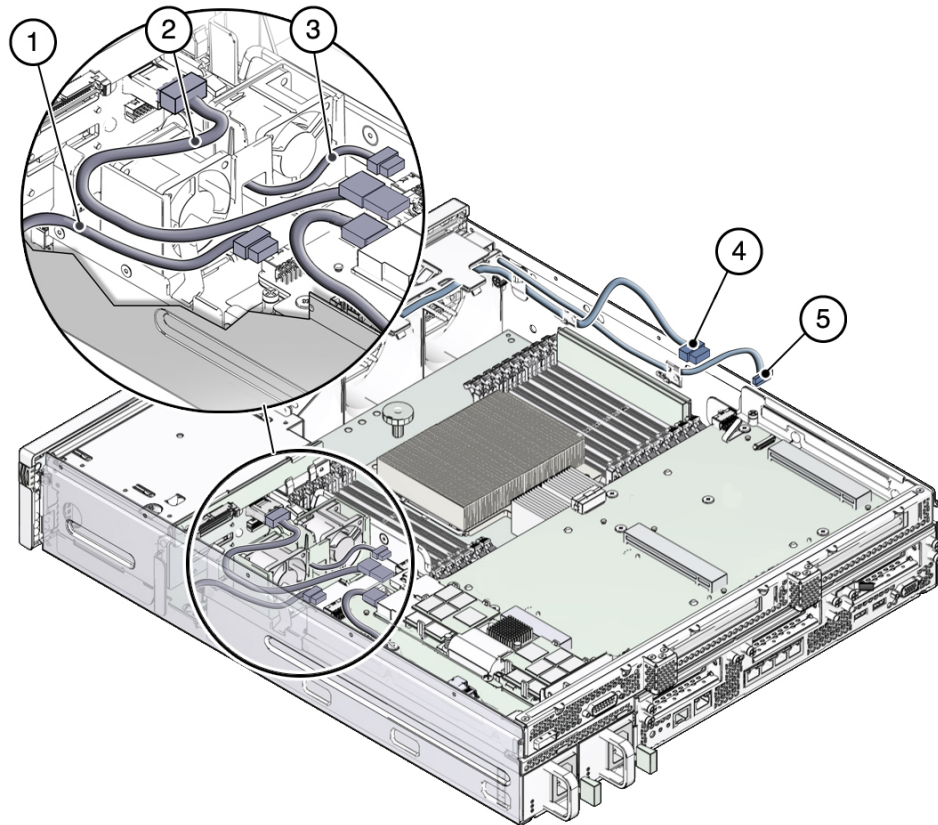
Figure Legend

1   Power cable from the PDB
2   Internal SAS HBA cable
3   Fan tray 1 power cable
4   Fan tray 2 power cable
5   LED board cable

4.   Use a No. 2 Phillips screwdriver to loosen the four green captive screws found at the four corners of the PCI mezzanine.
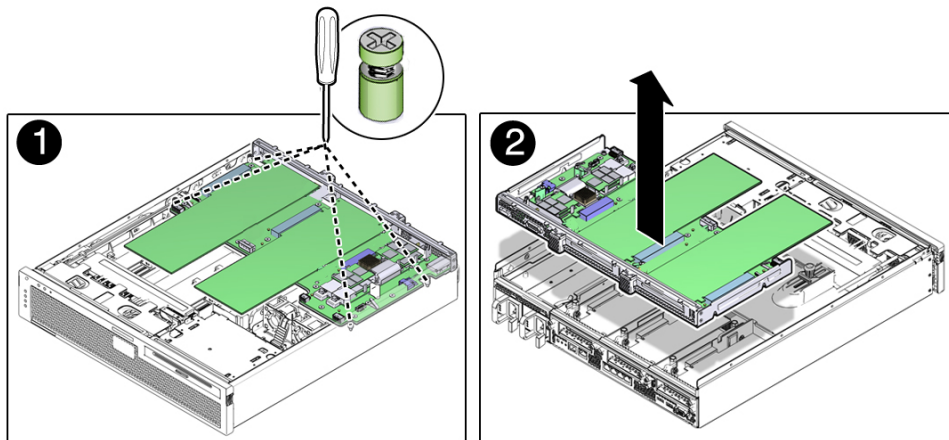
5.   Lift the PCI mezzanine up and out of the system.

6.   Lift the PCI mezzanine away from the chassis and place it on an antistatic mat.

You are now ready to service components under the PCI mezzanine.

Related Information

- "Install the PCI Mezzanine" on page 104
- "Replacing PCIe2 Risers" on page 107
- "Replacing Lower PCIe2 Cards" on page 123

▼ Install the PCI Mezzanine

1.   Position the PCI mezzanine onto the chassis.

2. **Lower the PCI mezzanine and slide it toward the front of server, ensuring that it is fully seated on the PCI risers.**
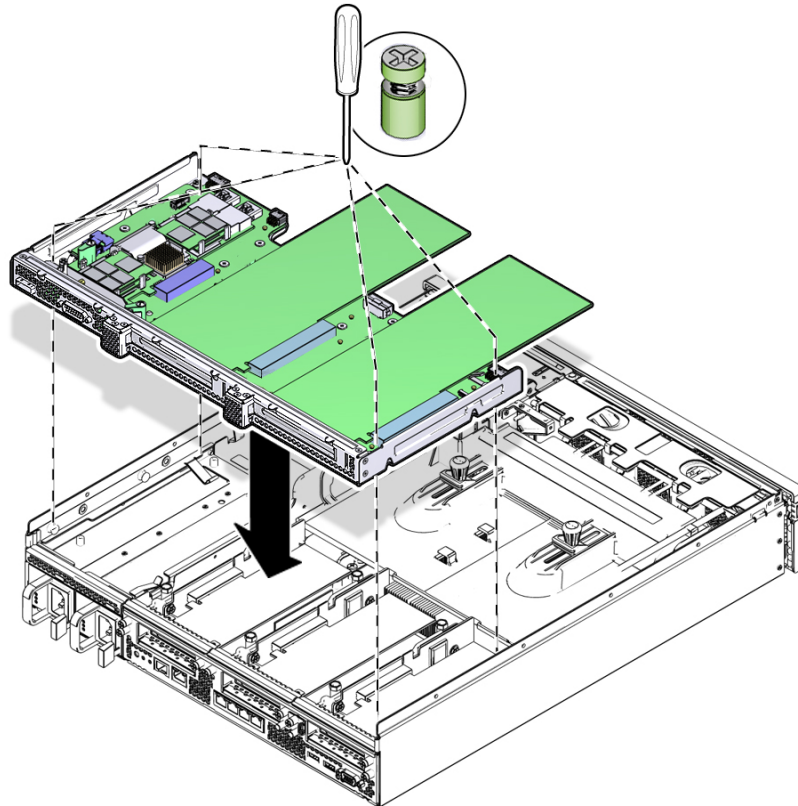
3. **Using a No. 2 Phillips screwdriver, tighten the four PCI mezzanine screws.**

4. **Reconnect the following PCI mezzanine cables.**

- LED board cable
- Fan tray 1 power cable
- Power cable from PDB
- Internal SAS HBA cable
- Fan tray 2 power cable

FIGURE   11   Reconnecting PCI Mezzanine Cables
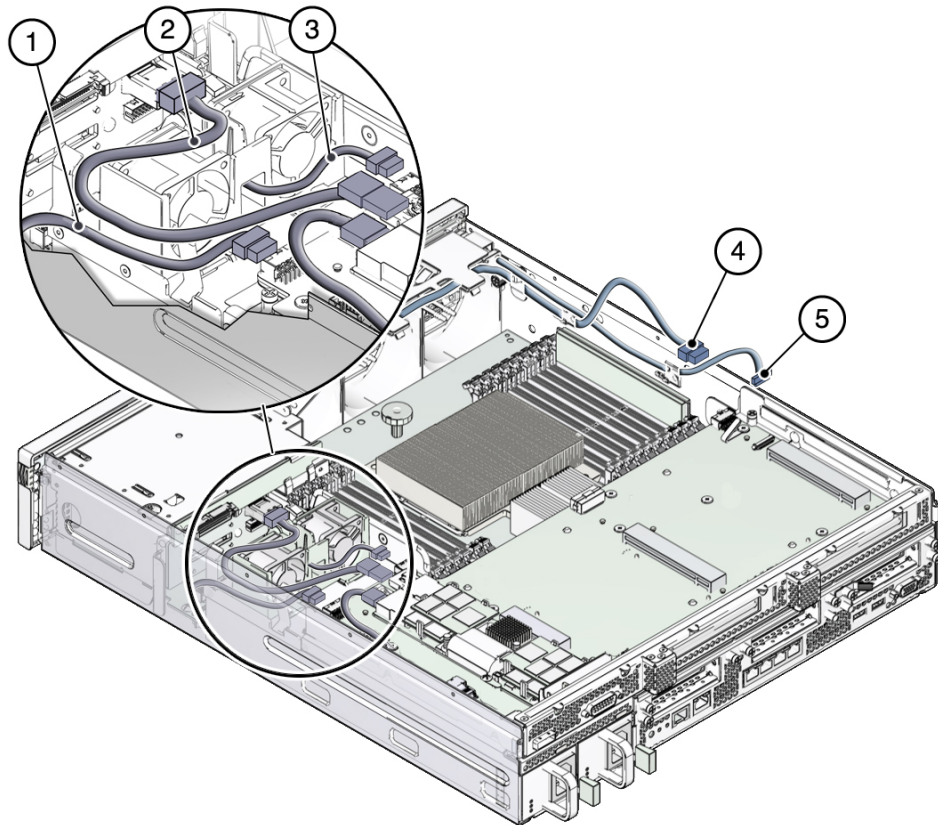
Figure Legend

1   Power cable from the PDB
2   Internal SAS HBA cable
3   Fan tray 1 power cable
4   Fan tray 2 power cable
5   Front indicator board cable

5.   If you removed any internal cables from installed PCIe2 cards prior to removing the PCI mezzanine, reconnect these cables to the cards.

6. **Return the server to operation.**

   See .

   Related Information

   - "Remove the PCI Mezzanine" on page 102
   - "Replacing PCIe2 Risers" on page 107
   - "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

Replacing PCIe2 Risers

PCIe2 cards in slots 0, 1, and 2 are installed on vertical risers. You must remove the relevant riser to remove and replace a PCIe2 card. You must remove all three PCIe risers when replacing the motherboard.

Description	Links
Locate the three PCIe2 risers and understand their differences.	"PCIe2 Riser Location and Differences" on page 107
Remove a PCIe2 riser from the motherboard assembly.	"Remove a PCIe2 Riser" on page 108
Install a PCIe2 riser to the motherboard assembly.	"Install a PCIe2 Riser" on page 110

Related Information

- "Replacing the PCI Mezzanine" on page 101
- "Replacing PCIe2 Cards" on page 112

PCIe2 Riser Location and Differences

The motherboard connector for PCIe2 riser 0 is different than the connector used by PCIe2 risers 1 and 2. Do not attempt to install a PCIe2 riser in a different location on the motherboard.

FIGURE   12   PCIe2 Riser Locations and Connector Detail
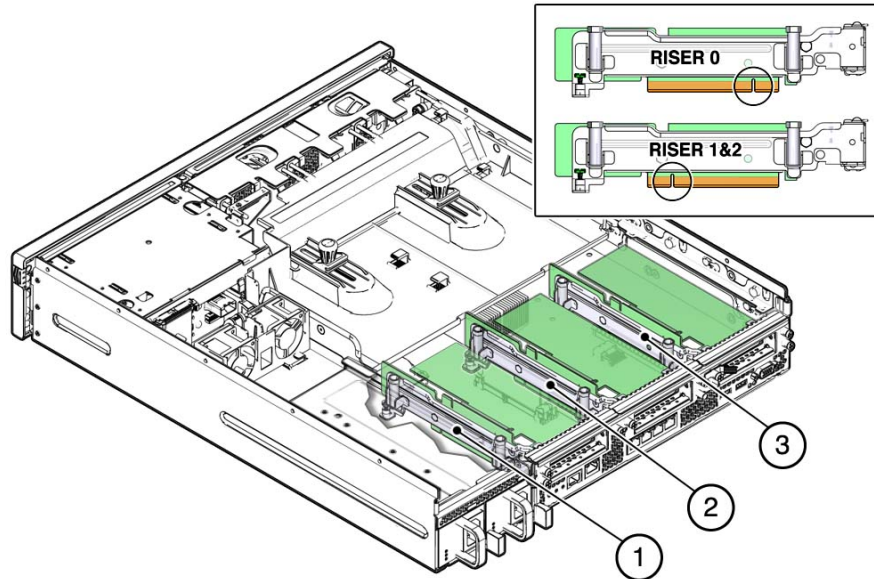
Figure Legend

1   PCIe2 riser 0 – possesses a different motherboard connector than PCIe2 risers 1 and 2
2   PCIe2 riser 1
3   PCIe2 riser 2

Related Information

- "Remove a PCIe2 Riser" on page 108
- "Install a PCIe2 Riser" on page 110
- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

▼ Remove a PCIe2 Riser

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

See "Preparing the Server for Component Replacement" on page 75.

2.   Remove the PCI mezzanine.

See "Remove the PCI Mezzanine" on page 102.

3.   Select the PCIe2 riser that you want to remove.

See "PCIe2 Riser Location and Differences" on page 107.

4.   If there is a PCIe2 card installed in the riser, disconnect any external or internal cables from the card.

5.   Use a No. 2 Phillips screwdriver to loosen the three green captive screws securing the riser to the system.

One internal captive screw secures the riser to the motherboard and two external screws secure the riser to rear panel.
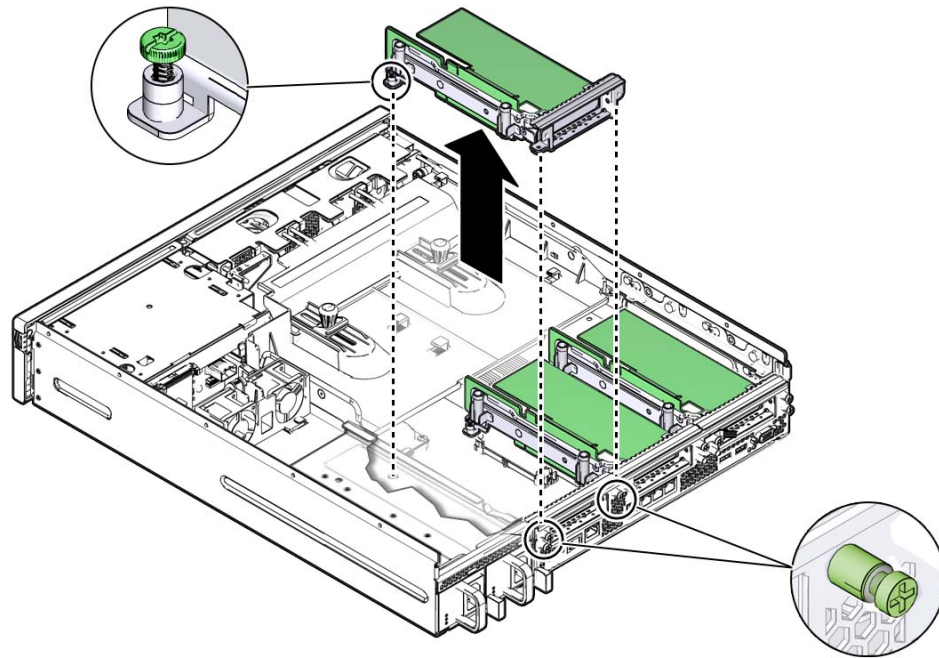
6.   Lift the PCIe2 riser out of the server.

If there is a PCIe2 card installed in the riser, place the riser an antistatic mat. Note in which slot the PCIe riser was originally installed.

Related Information

- "PCIe2 Riser Location and Differences" on page 107
- "Install a PCIe2 Riser" on page 110
- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

▼ Install a PCIe2 Riser

Note - The motherboard connector for PCIe2 riser 0 is different than the connector used by PCIe2 risers 1 and 2. Do not attempt to install a PCIe2 riser in a different location on the motherboard.

1. **Determine into which slot you will install the PCIe2 riser.**

   See "PCIe2 Riser Location and Differences" on page 107.

2. **Retrieve the PCIe2 riser and gently press the riser into the motherboard connector until it seats.**
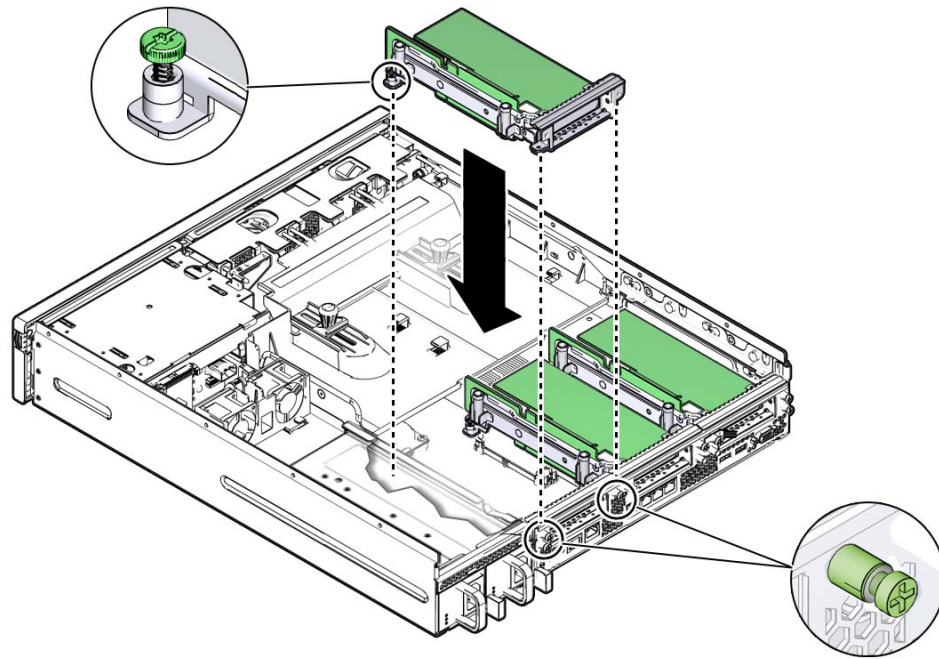
3. **Use a No. 2 Phillips screwdriver to tighten the three green captive screws securing the PCIe riser to the system.**

   One internal captive screw secures the riser to the motherboard, and two external screws secure the riser to rear panel.

4. **If there is a PCIe2 card installed in the riser, reconnect any external or internal cables to the card.**

5. **Return the server to operation.**

   See "Returning Server to Operation" on page 211.

   ### Related Information

   - "PCIe2 Riser Location and Differences" on page 107
   - "Remove a PCIe2 Riser" on page 108
   - "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

Replacing PCIe2 Cards

These topics describe how to service and install PCIe2 cards. Refer to your PCIe2 card documentation for complete software and cabling information about your card.

Description	Links
Locate the available PCIe2 card slots in the system.	"PCIe2 Slot Characteristics" on page 112
Learn how to connect internal power cables from the PCI mezzanine power connector to installed PCIe2 cards.	"PCI Mezzanine Auxiliary Power Connector" on page 114
Remove and install PCIe2 cards in PCIe2 slots 4 and 5.	"Replacing PCIe2 Cards in Slots 4 and 5" on page 115
Remove and install the SAS controller HBA from internal PCIe2 slot 3.	"Replacing the SAS Controller HBA" on page 118
Remove and install PCIe2 cards in PCIe2 slots 0, 1, and 2.	"Replacing Lower PCIe2 Cards" on page 123

Related Information

- "Replacing the PCI Mezzanine" on page 101
- "Replacing PCIe2 Risers" on page 107

PCIe2 Slot Characteristics

There are five PCIe2 slots available for optional PCIe2 cards. The following figure shows the PCIe2 slot numbering.
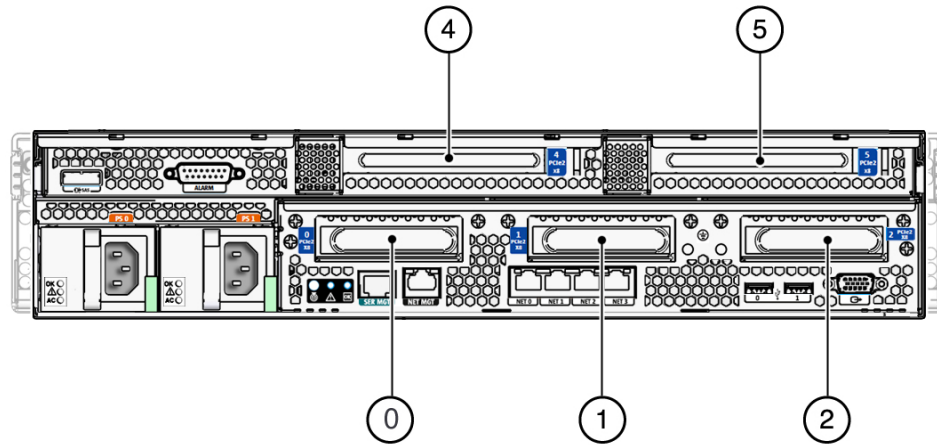
Note - PCIe2 slot 3 is reserved for an internal SAS controller HBA. You cannot install an optional card in slot 3.

Note - All of the PCIe slots comply with the PCI Express 2.0 specification and can accommodate 25 W PCIe2 cards.

Note - Some PCIe cards can only be installed in certain PCIe slots in the server. Check the *Sun Netra X4270 Server Product Notes* or contact your service representantive for the latest information about slot restrictions for supported PCIe cards.

The following table lists the characteristics and requirements of the PCIe2 slots.

Slot No.	Supported PCIe Card Types	Supported PCIe Specifications
0	Low-profile cards only	PCIe 1.0, PCIe 2.0
1	Low-profile cards only	PCIe 1.0, PCIe 2.0
2	Low-profile cards only	PCIe 1.0, PCIe 2.0
4	Standard-height, full-length cards	PCIe 1.0, PCIe 2.0
	Standard-height, half-length cards	
	Low-profile cards	
5	Standard-height, full-length cards	PCIe 1.0, PCIe 2.0
	Standard-height, half-length cards	
	Low-profile cards	

> **Note -** Only PCIe2 slots 4 and 5 accept full-length cards.

Related Information

PCI Mezzanine Auxiliary Power Connector

The PCI mezzanine has an auxiliary 4-pin male 12 volt power connector between PCIe2 slots 4 and 5. You can connect internal power cables from this connector to PCIe2 cards installed in slots 4 and 5. You must supply your own power cables.
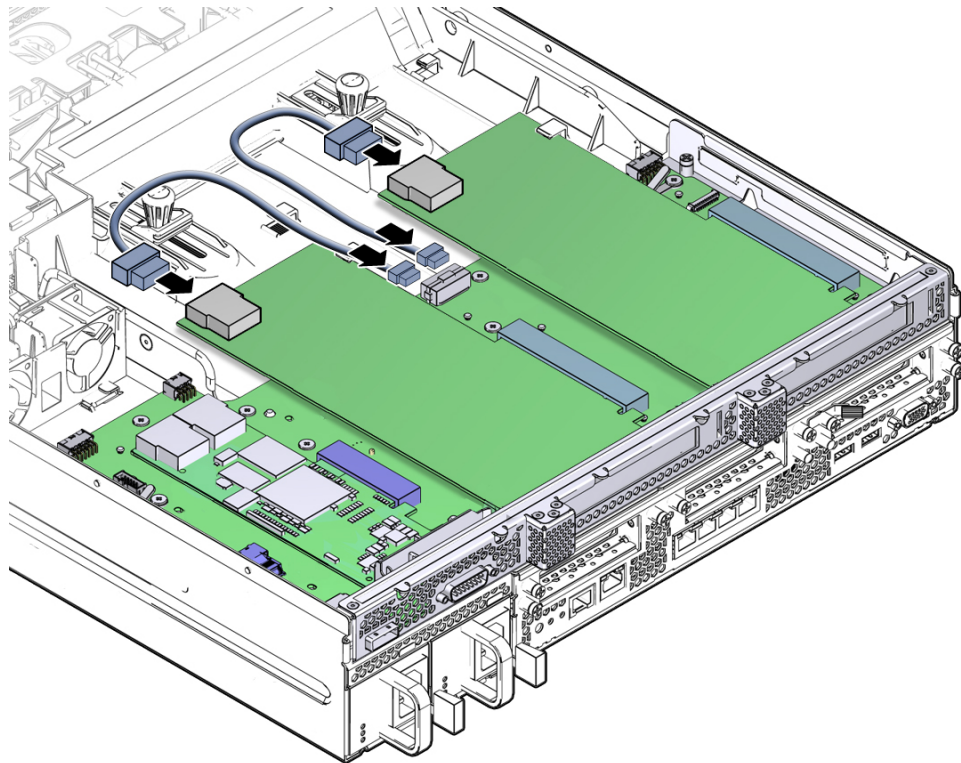
Related Information

- "PCIe2 Slot Characteristics" on page 112
- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

Replacing PCIe2 Cards in Slots 4 and 5

Note - Prior to replacing or installing a PCIe2 card, refer to the card documentation for specific installation and cabling instructions.

- "Remove PCIe2 Cards From Slots 4 and 5" on page 115
- "Install PCIe2 Cards Into Slots 4 and 5" on page 117

Related Information

- "Replacing Lower PCIe2 Cards" on page 123

▼ Remove PCIe2 Cards From Slots 4 and 5

1. **Prepare the server for service**

   See "Preparing the Server for Component Replacement" on page 75.

2. **With the PCI mezzanine installed and cabled, identify which card is to be removed.**

3. **Disconnect any external or internal cables connected to the card.**

4. **Slide the card to the left and lift it out of the PCI mezzanine.**
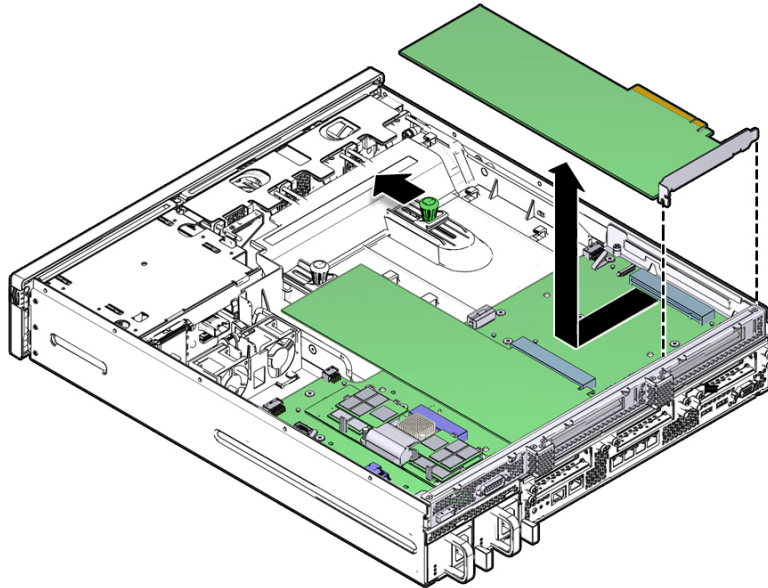
Set the card aside on an antistatic mat.

5. **Consider your next step:**

- If you are replacing the card, continue to "Install PCIe2 Cards Into Slots 4 and 5" on page 117.
- If you are not replacing the card, install a filler panel in the empty rear panel slot.

6. **Return the server to operation.**

See "Returning Server to Operation" on page 211.

Related Information

- "PCIe2 Slot Characteristics" on page 112
- "PCI Mezzanine Auxiliary Power Connector" on page 114
- "Install PCIe2 Cards Into Slots 4 and 5" on page 117

▼ Install PCIe2 Cards Into Slots 4 and 5

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **With the PCI mezzanine installed and cabled, determine which slot to install the card.**

3. **Remove the replacement card from its packaging and place it onto an antistatic mat.**

4. **If a filler panel is installed, remove it by pulling the tab.**

   Note - Save this filler panel in case you ever need to remove the PCIe2 card from the system.

5. **Lower the card into position on the PCI mezzanine, then slide the card to the right to seat it into the connector.**
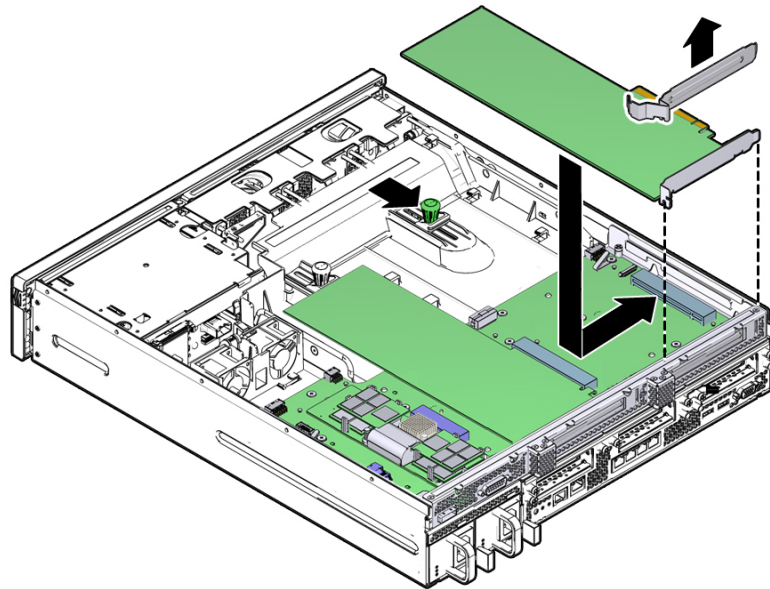
6. **If required by your PCIe2 card, connect any internal cable to the card.**

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

   See "Returning Server to Operation" on page 211.

8. **Connect any external cable to the PCIe2 card.**

   Refer to your PCIe2 card documentation for more information.

   ### Related Information

   - "PCIe2 Slot Characteristics" on page 112
   - "PCI Mezzanine Auxiliary Power Connector" on page 114
   - "Remove PCIe2 Cards From Slots 4 and 5" on page 115

Replacing the SAS Controller HBA

These topics describe how to remove and install the SAS controller HBA. Refer to the SAS controller HBA documentation for complete cabling and software information.

- "Remove the SAS Controller HBA" on page 118
- "Install the SAS Controller HBA" on page 120

Related Information

- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115
- "Replacing Lower PCIe2 Cards" on page 123

▼ Remove the SAS Controller HBA

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Locate the SAS controller HBA on the PCI mezzanine.**

   The HBA is installed in the right-most slot on the PCI mezzanine.

3.   Remove the two SAS cables connected to the HBA.
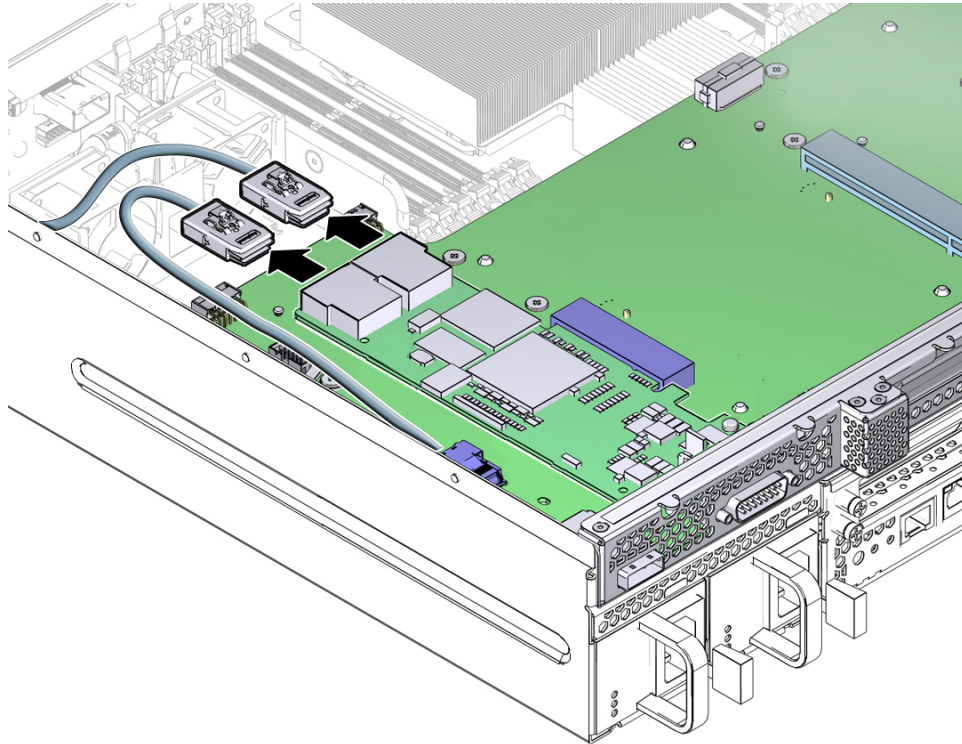
4.   Use a No. 2 Phillips screwdriver to remove the screw securing the HBA to the PCI mezzanine.

Save this screw for when you install a SAS controller HBA in the slot.

5.   Slide the card to the left and lift it out of the PCI mezzanine.

Set the card aside on an antistatic mat.
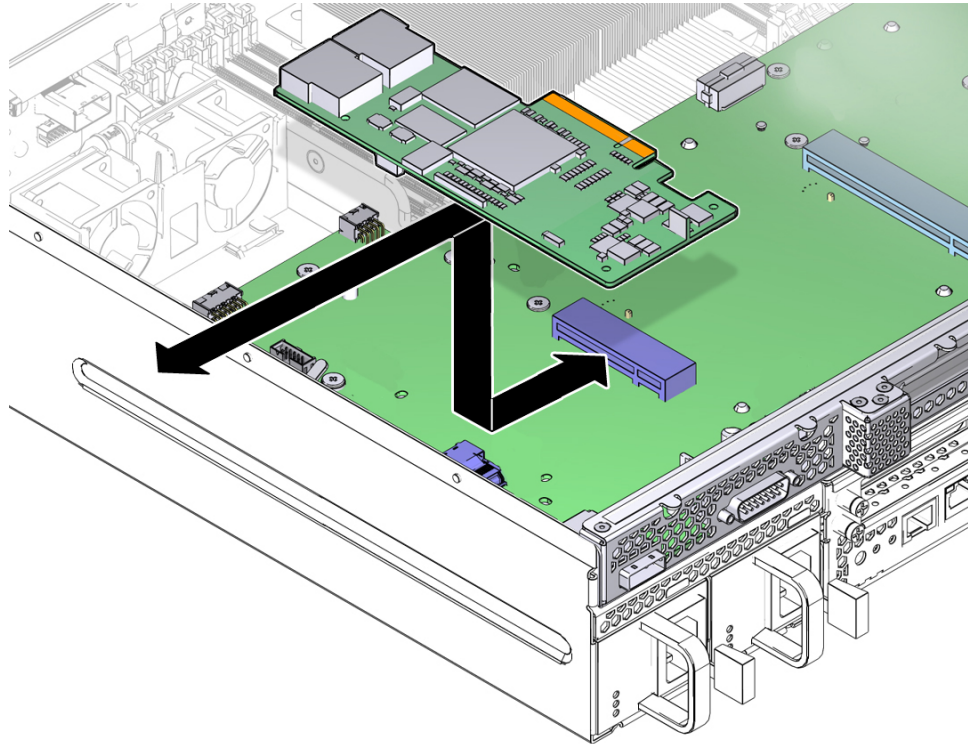
Related Information

- The SAS controller HBA documentation

▼ Install the SAS Controller HBA

1. Remove the replacement SAS controller HBA from its packaging and place it onto an antistatic mat.

2. **Lower the SAS HBA into position on the PCI mezzanine, and then slide the card to the right to seat it into the connector.**
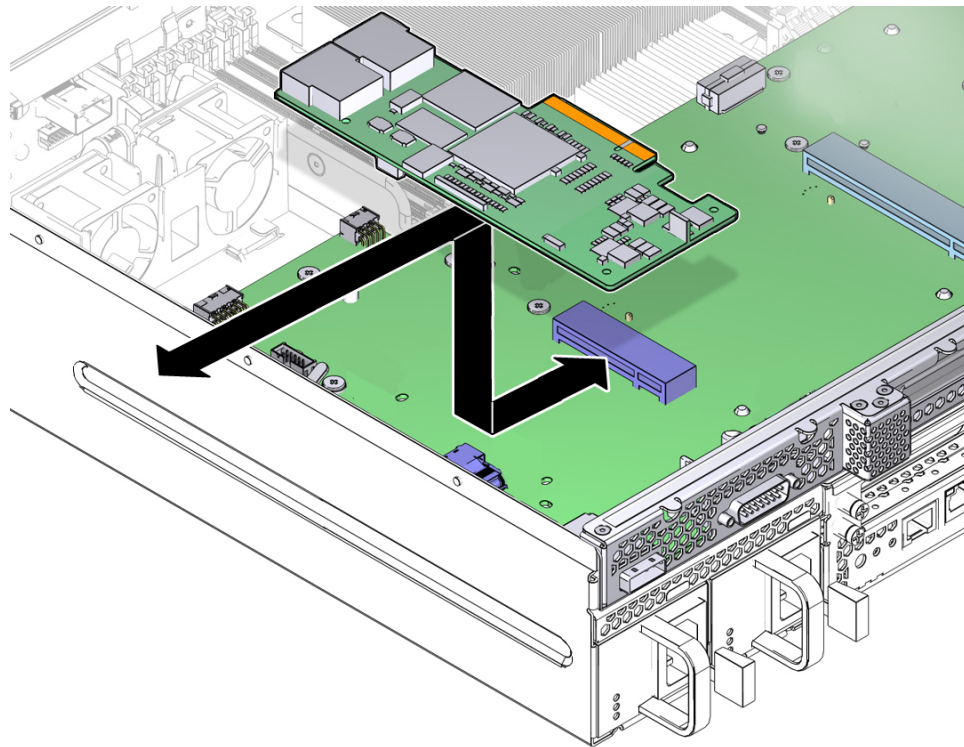
3.   Connect the two SAS cables to the SAS controller HBA.
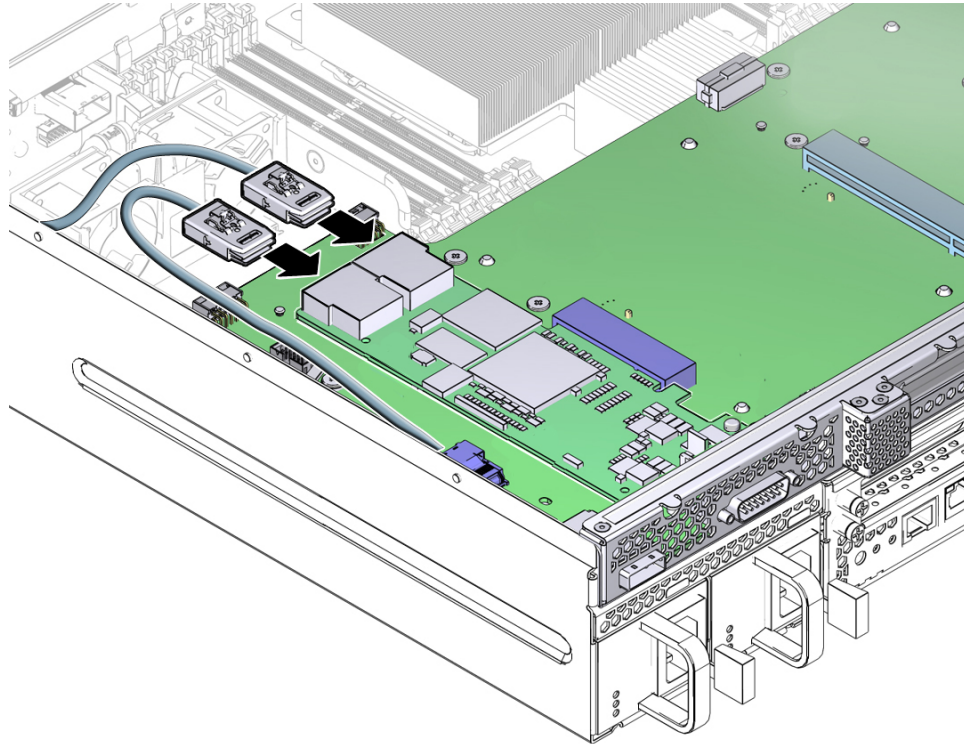
4.   Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- The SAS controller HBA documentation
- "Remove the SAS Controller HBA" on page 118
- "Replacing the Power Distribution Board" on page 203

Replacing Lower PCIe2 Cards

Prior to replacing or installing a PCIe card, refer to the card documentation for specific installation and cabling instructions.

- "Remove the Lower PCIe2 Cards" on page 123
- "Install the Lower PCIe2 Cards" on page 125

Related Information

- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

▼ Remove the Lower PCIe2 Cards

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

3. Loosen the appropriate card securing screws.
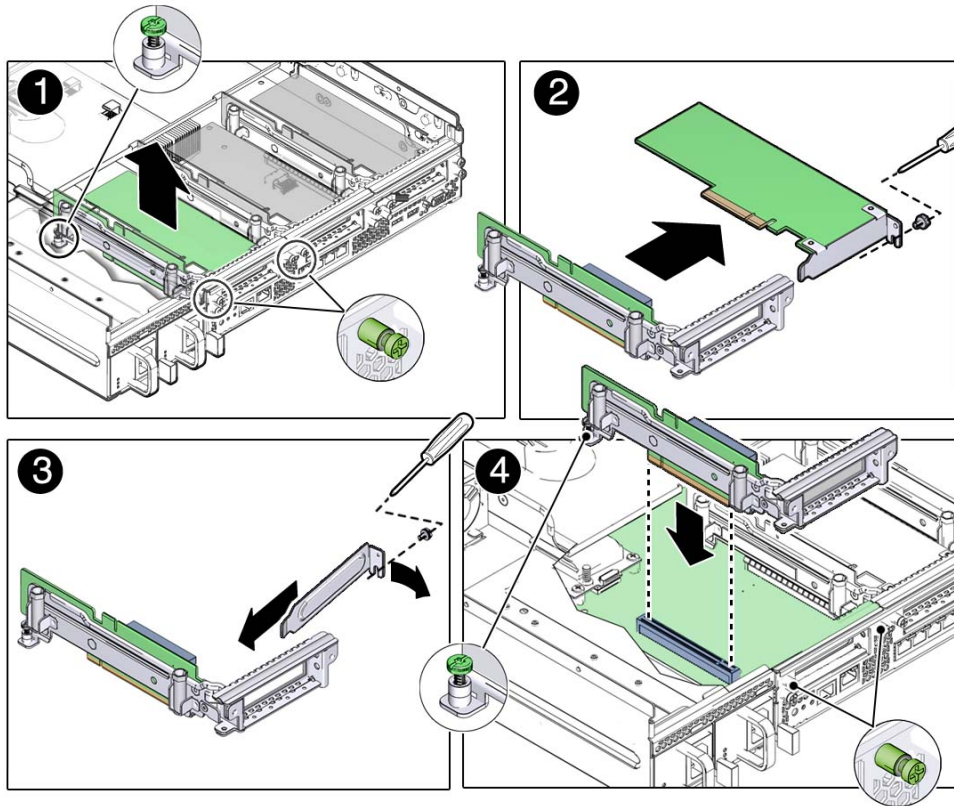
4. Lift the PCIe2 riser assembly (with PCIe2 card attached) from the PCI mezzanine.

5. If installed, remove the card securing screw on the right side of the PCIe2 card faceplate.

6. Remove the PCIe2 card from the PCIe2 riser assembly.

7. Set the card aside on an antistatic mat.

8. Consider your next step:

- If you are replacing the PCIe2 card, continue to "Install the Lower PCIe2 Cards" on page 125.

■ If you are not replacing the PCIe2 card, install a filler panel into the PCIe2 riser.

9. **Gently press the riser into the motherboard connector until it seats.**

10. **Use a No. 2 screwdriver to tighten the three captive screws to secure the PCIe2 riser to the motherboard.**

11. **Install the PCI mezzanine.**

See "Install the PCI Mezzanine" on page 104.

12. **Return the server to operation.**

See "Returning Server to Operation" on page 211.

Related Information

■ "Replacing PCIe2 Risers" on page 107
■ "PCIe2 Riser Location and Differences" on page 107
■ "Install the Lower PCIe2 Cards" on page 125

▼ Install the Lower PCIe2 Cards

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

See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

See "Remove the PCI Mezzanine" on page 102.

3. **Remove the replacement card from its packaging and place it onto an antistatic mat.**

4. **Remove the PCIe2 riser from the system and place it on antistatic mat.**

See "Remove a PCIe2 Riser" on page 108.

5. **If a filler panel is installed in the riser, remove the card securing screw on the right side of the PCIe2 card faceplate.**

Save the filler panel in case you must remove the PCIe2 card for service.
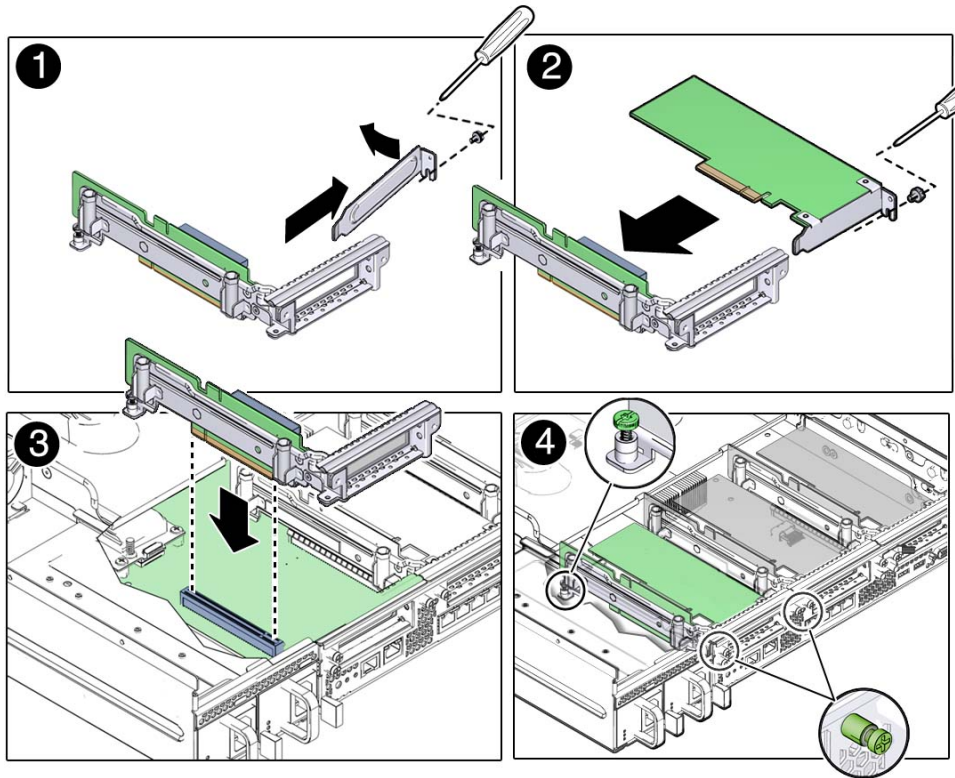
6.   **Slide the PCIe2 card into the PCIe2 riser assembly connector until fully seated.**

7.   **Install the card securing screw on the right side of the PCIe2 card faceplate.**

8.   **Seat the PCIe2 riser assembly into the motherboard.**

Note - The motherboard connector for PCIe2 riser 0 is different than the connector used by PCIe2 risers 1 and 2. Do not attempt to install a PCIe2 riser in a different location on the motherboard.

9.   **Tighten the appropriate PCIe2 riser assembly securing screws.**

10.   **Install the PCI mezzanine.**

See "Install the PCI Mezzanine" on page 104.

11. Return the server to operation.

See "Returning Server to Operation" on page 211.

12. Connect any external cable to the PCIe2 card.

Refer to your PCIe2 card documentation for more information.

Related Information

- "Replacing PCIe2 Risers" on page 107
- "PCIe2 Riser Location and Differences" on page 107
- "Remove the Lower PCIe2 Cards" on page 123

Replacing the Air Duct

You must remove the air duct to access certain motherboard components like the DIMMs and CPUs.

- "Remove the Air Duct" on page 127
- "Install the Air Duct" on page 130

Related Information

- "Replacing DIMMs" on page 132
- "Replacing CPUs" on page 160

▼ Remove the Air Duct

1. Prepare the server for service.

See "Preparing the Server for Component Replacement" on page 75.

2. Disconnect the fan tray 0 power cable from the PCI Mezzanine and remove the cable from the air duct???s retention clips.
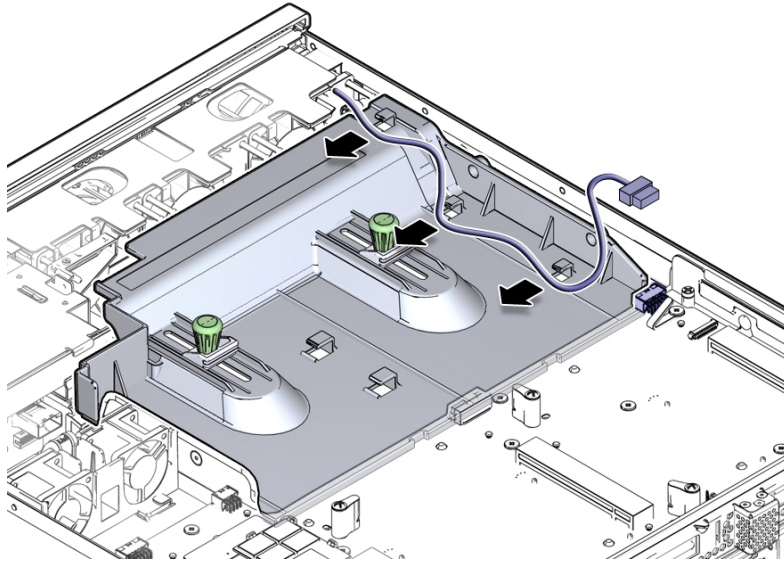
3. Remove any full-length, full-height PCIe2 cards installed on the PCI Mezzanine.

Disconnect any internal cables connected to the cards. See "Remove PCIe2 Cards From Slots 4 and 5" on page 115.

Note - You do not need to remove the PCI mezzanine.

4.   Facing the server, release the tab on the right of the air duct and pull upward.
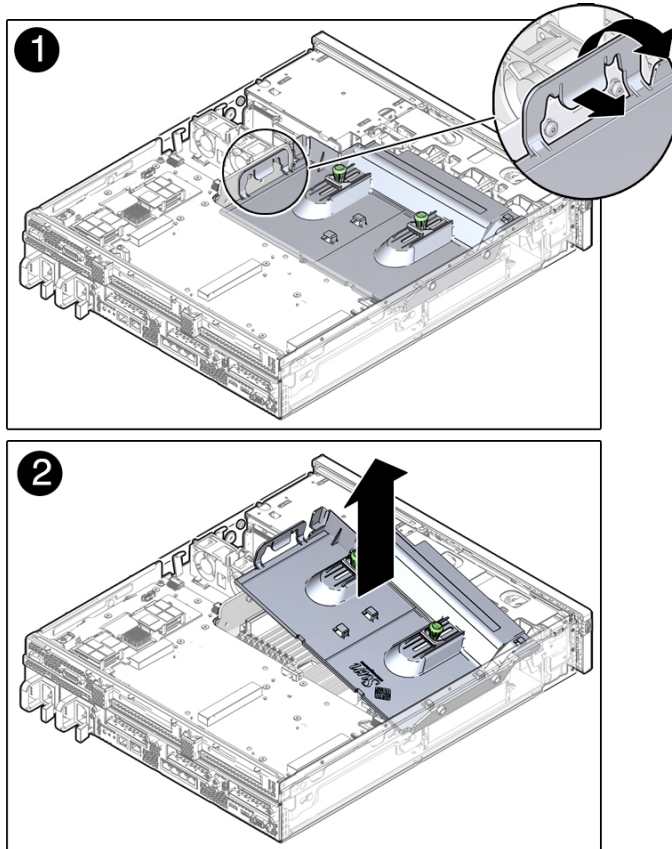
5.   Lift the duct out of the chassis, releasing the duct from the pins on the left side of the chassis, and set the air duct aside on an antistatic mat.

6.   Consider your next step:

- If you removed the air duct as part of another procedure, return to that procedure.
- Otherwise, continue to "Install the Air Duct" on page 130.

Related Information

- "Install the Air Duct" on page 130

▼ Install the Air Duct

1. **Remove the replacement air duct from its packaging.**

2. **With the duct at a 45-degree angle, position the pin holes in the duct to align with the pins of the chassis.**
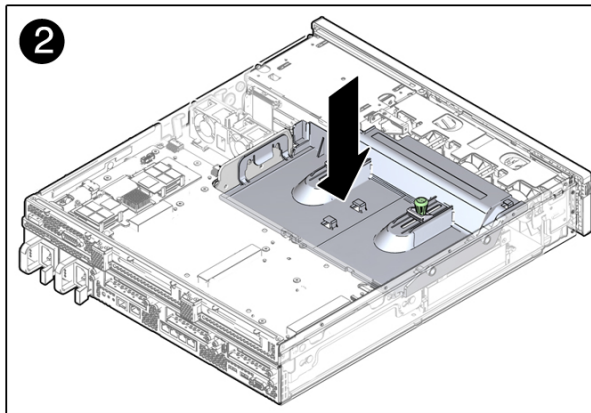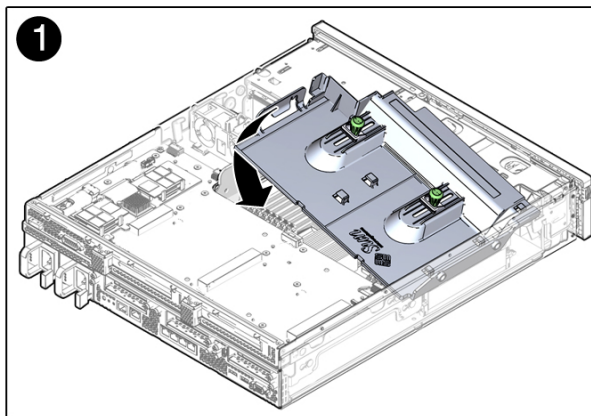
3. **Lower the duct to the horizontal position until the tab secures in place.**

   Ensure that the LED board cable is securely connected to the PCI mezzanine and is routed beneath the air duct.

4. **Reconnect the fan tray 0 power cable to the PCI Mezzanine.**

   Route cable through the retention clips on top of the air duct.
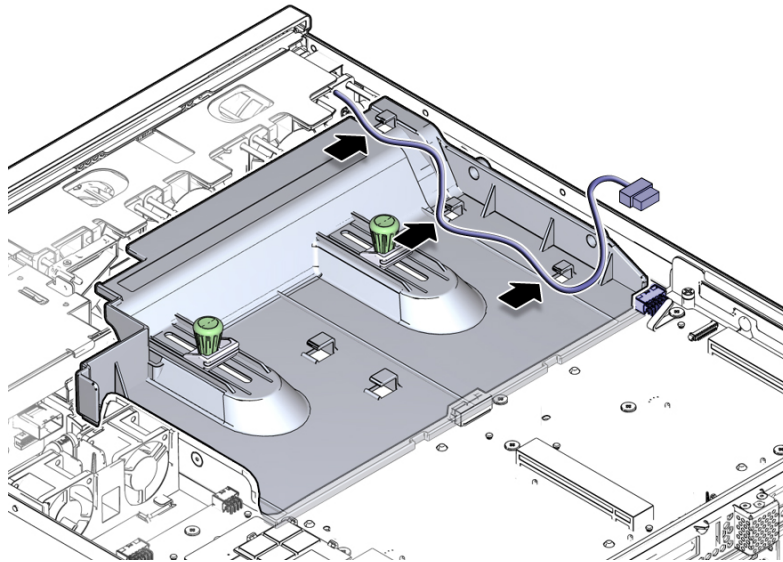
5. **Replace any full-length, full-height PCIe2 cards to the PCI mezzanine.**

   Reconnect any internal cables connected to these PCIe2 cards. See "Install PCIe2 Cards Into Slots 4 and 5" on page 117.

6. **Consider your next step:**

   - If you installed the air duct as part of another procedure, return to that procedure.
   - Otherwise, continue with this task.

7. **Install the PCI mezzanine.**

   See "Install the PCI Mezzanine" on page 104.

8. **Return the server to operation.**

   See "Returning Server to Operation" on page 211.

Related Information

- "Remove the Air Duct" on page 127
- "Replacing Fan Tray 0" on page 189

Replacing DIMMs

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 "Electrostatic Discharge Safety" on page 74.

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

The system supports a variety of DIMM configurations that can include quad-rank DIMMs, dual-rank DIMMs, or single-rank DIMMs. When replacing or upgrading a DIMM on the server, consider the following:

Description	Links
Learn the location of the DIMM slots in relation to the CPUs.	"DIMM and CPU Physical Layout" on page 133
Learn the rules to follow when installing DIMMs in slots.	"DIMM Population Rules" on page 134
	"DIMM Considerations and Limitations" on page 135
Understand the classification rank labels on DIMMs.	"DIMM Rank Classification Labels" on page 136
Review how the system detects and logs ECC fault information.	"Error Correction and Parity" on page 136
Identify and remove the faulty DIMMs from the server.	"Identify and Remove Faulty DIMMs" on page 137
Install replacement or new DIMMs.	"Install DIMMs" on page 141

Related Information

- "Replacing the Air Duct" on page 127
- "Replacing CPUs" on page 160

DIMM and CPU Physical Layout

FIGURE   13   Physical Layout of the DIMMs and CPUs
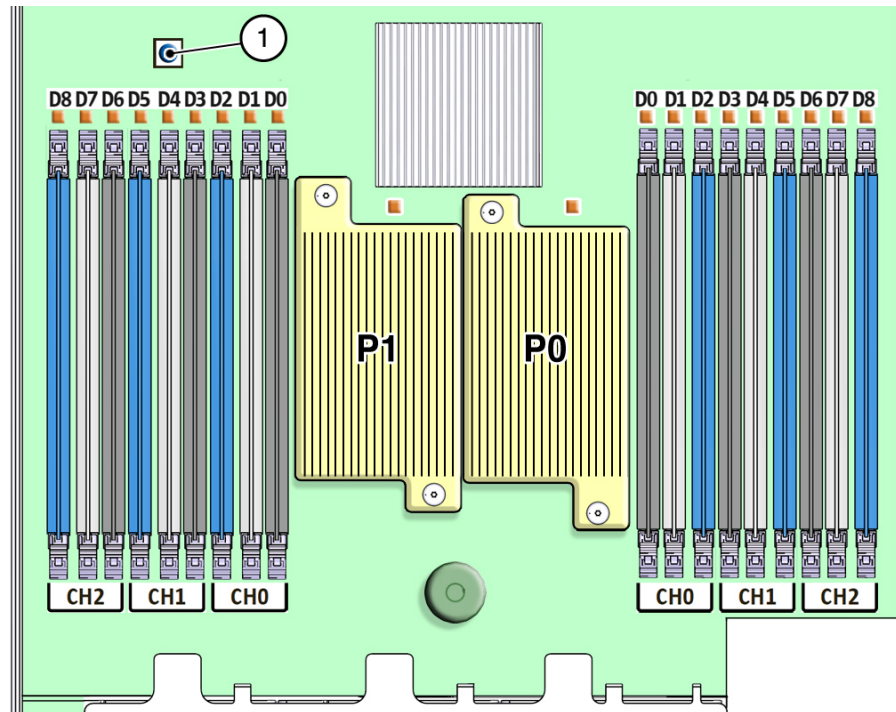
Figure Legend

1   Fault remind button

As shown in the preceding figure, each CPU has a bank of DIMM channels associated with it. There are three channels per CPU with each channel containing three color-coded DIMM slots (black, white, and blue). The nine DIMM slots per CPU are numbered from D0 to D8, where D8 is the slot farthest slot from the CPU.

Use the fault remind button to locate faulty DIMMs.

Note - You must remove the media bay assembly before installing or replacing DIMMs in slots D4 through D8 adjacent to CPU P0.

Related Information

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DIMM Population Rules

The DIMM population rules are as follows:

- Do not populate any DIMM sockets next to an empty CPU socket. Each processor contains a separate memory controller.
- Each CPU can support a maximum of:
  - Nine dual-rank (DR) or single-rank (SR) DIMMs; or
  - Six quad-rank (QR) DIMMs with two per memory channel; or
  - Three QR DIMMs with one per channel and three DR or SR DIMMs.
- Populate DIMMs by location according to the following rules (see "DIMM and CPU Physical Layout" on page 133 for DIMM slot numbering):
  - Populate the DIMM slots for each memory channel that are the farthest from the CPU first.

    For example, populate D8/D5/D2 first; then D7/D4/D1 second; and finally, D6/D3/D0.
  - Populate QR DIMMs first, followed by SR or DR DIMMs.
  - Populate QR DIMMs in blue sockets (D8/D5/D2) first then white sockets (D7/D4/D1).

    Note that QR DIMMs are supported only in white sockets if adjacent blue socket contains a QR DIMM.
  - Populate QR, SR, or DR DIMMs in sets of three for each CPU, one per memory channel.
- For maximum performance, apply the following rules:
  - Preserve DIMM symmetry to ensure the best performance. For example, add 3x of same kind DIMMs, one per memory channel. Also, if the server has two CPUs, ensure that both CPUs have the same size of DIMMs populated in the same manner.
  - In certain configurations, DIMMs will run slower than their individual maximum speed. See "DIMM Considerations and Limitations" on page 135 for more information.

Related Information

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DIMM Considerations and Limitations

When installing DIMMs, consider the following DIMM limitations:

- DIMMs are available in two speeds: 1066 MHz and 1333 MHz.
- DIMM speed rules are as follows:
  - Three of the same kind of DIMMs per channel = 800 MHz
  - Two of the same kind of DIMMs per channel = 1333 MHz (for single-rank and dual-rank DIMMs); = 800 MHz (for quad-rank DIMMs)
  - One of the same kind of DIMMs per channel = 1333 MHz (if using 1333 MHz DIMMs)

    Note - This DIMM configuration requires CPUs supporting 1333MHz.

  - One of the same kind of DIMMs per channel = 1066 MHz (if using 1066 MHz DIMMs)
- The system operates all memory only as fast as the slowest DIMM configuration.

Related Information

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DIMM Rank Classification Labels

DIMMs come in a variety of ranks: single, dual, or quad. Each DIMM is shipped with a label identifying its rank classification. The following table identifies the corresponding rank classification label shipped with each DIMM.

TABLE 7   DIMM Classification Labels

Rank Classification	Label
Quad-rank DIMM	4Rx4
Dual-rank DIMM	2Rx4
Single-rank DIMM	1Rx4

Related Information

- "DIMM and CPU Physical Layout" on page 133
- "DIMM Considerations and Limitations" on page 135
- "Error Correction and Parity" on page 136
- "Identify and Remove Faulty DIMMs" on page 137
- "Install DIMMs" on page 141

Error Correction and Parity

The server???s processor provides parity protection on its internal cache memories and ECC protection of the data. The system can detect and log these types of errors to the ILOM event log:

- Correctable and uncorrectable memory ECC errors
- Uncorrectable CPU internal errors

Advanced ECC corrects up to 4-bits in error on nibble boundaries, as long as al l of these bits are all in the same DRAM. If a DRAM fails, the DIMM continues to function.

For instructions for clearing DIMM faults, see "Install DIMMs" on page 141. For more information about fault management, refer to the ILOM 3.0 documentation.

Related Information

- "DIMM and CPU Physical Layout" on page 133

- "DIMM Population Rules" on page 134
- "DIMM Considerations and Limitations" on page 135
- "DIMM Rank Classification Labels" on page 136
- "Identify and Remove Faulty DIMMs" on page 137
- "Install DIMMs" on page 141

▼ Identify and Remove Faulty DIMMs

1. Prepare the server for service.

See "Preparing the Server for Component Replacement" on page 75.

2. If there are full-length PCIe2 cards installed in PCIe slots 4 and 5, remove the PCI mezzanine, if necessary.

See "Remove the PCI Mezzanine" on page 102.

3. Remove the air duct.

See "Remove the Air Duct" on page 127.

4. When removing DIMMs from slots D4 through D8 next to CPU P0, remove the media bay assembly.

See "Remove the Media Bay Assembly" on page 93.

5.   Press the fault remind button on the motherboard to identify the location of the faulty DIMMs.
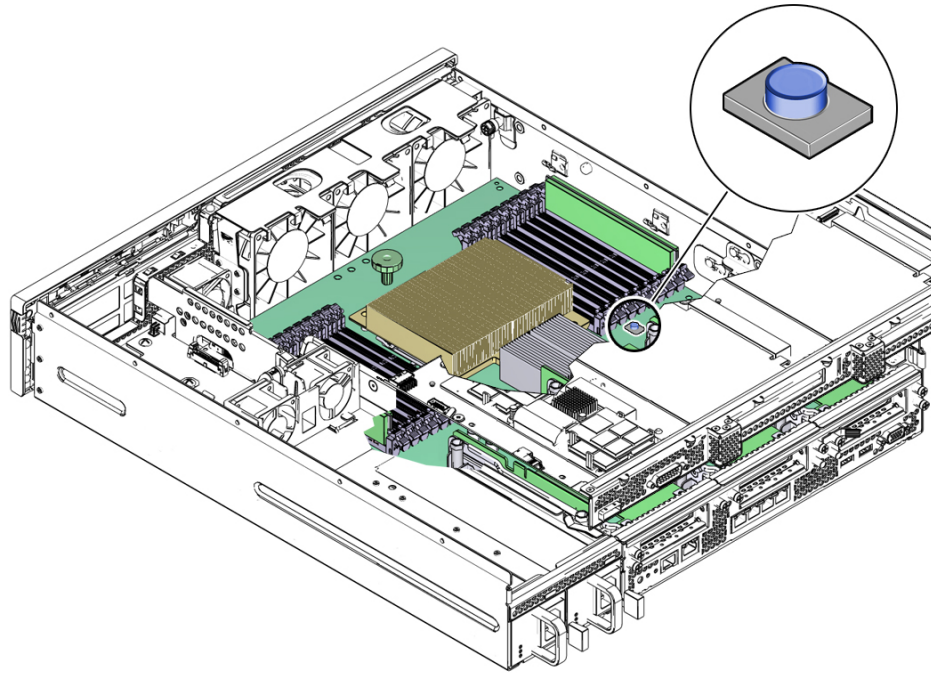
6.   Note the location of faulty DIMMs.

Faulty DIMMs are identified when a corresponding amber service action required LED lights next to the DIMM.

- 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 and should be replaced.

FIGURE 14   DIMM Service Action Required LEDs
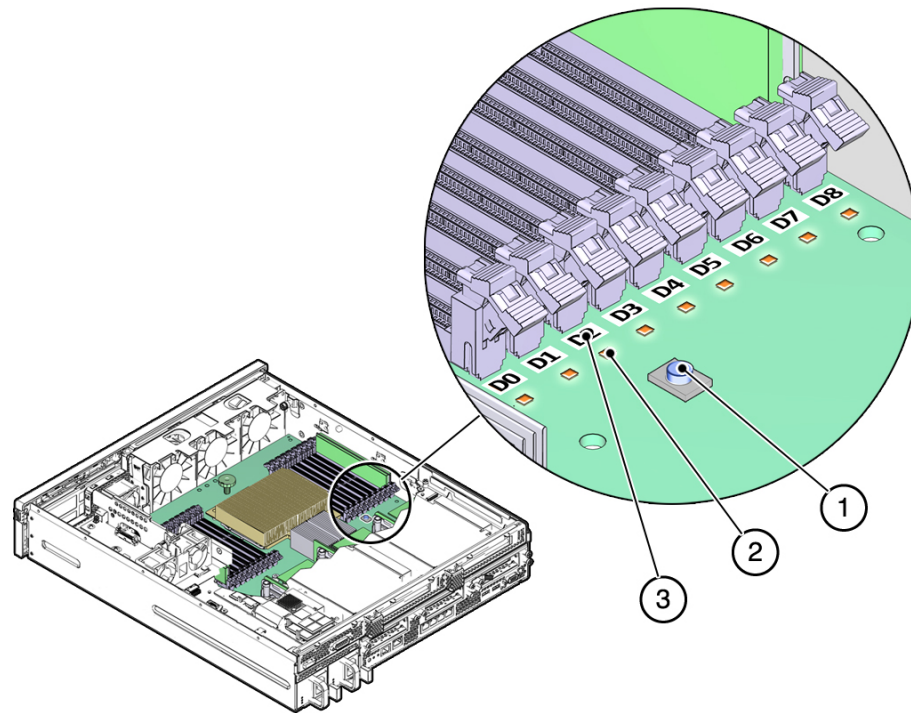
Figure Legend

1   Fault remind button
2   Service action required LED
3   DIMM slot label

7.   Remove the faulty DIMM by rotating both DIMM slot ejectors outward until the DIMM partially ejects from its socket.

Carefully lift the DIMM out of its socket.

FIGURE   15   DIMM Socket Release and Alignment
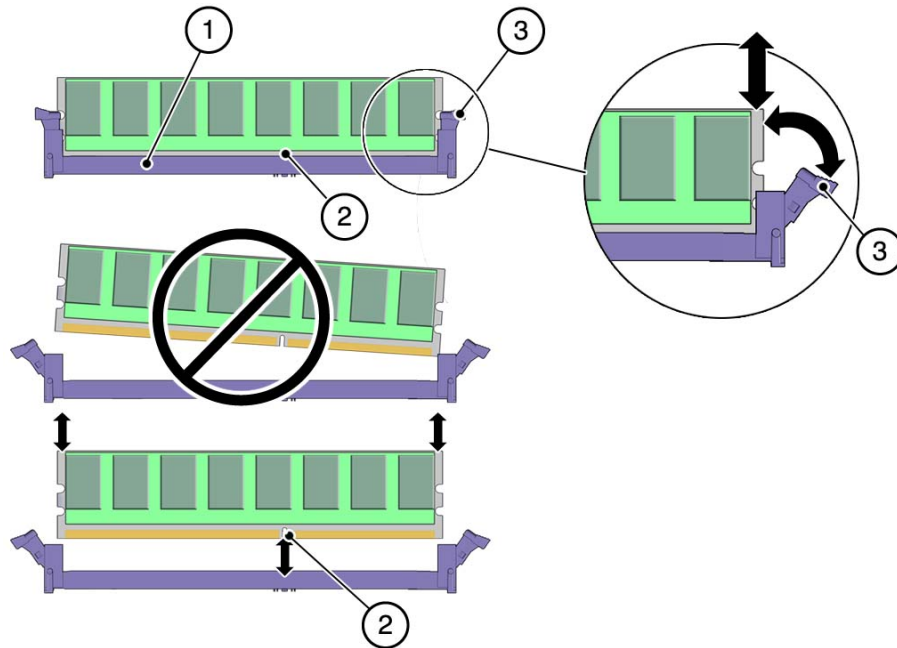
Figure Legend

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

8.   **Replace each faulty DIMM with either another DIMM of the same rank size (quad rank, dual rank, or single rank) or a DIMM filler panel.**

For DIMM replacement instructions, see "Install DIMMs" on page 141.

⚠️ **Caution -** If you are not immediately inserting a replacement DIMM into the empty DIMM socket, you should insert a DIMM filler panel in the socket to ensure adequate cooling and reduce the possibility of a system shutdown.

Related Information

- "DIMM and CPU Physical Layout" on page 133
- "DIMM Population Rules" on page 134
- "DIMM Considerations and Limitations" on page 135
- "DIMM Rank Classification Labels" on page 136
- "Error Correction and Parity" on page 136
- "Install DIMMs" on page 141

▼ Install DIMMs

Before you begin, see "DIMM Population Rules" on page 134 for information about DIMM configuration guidelines.

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

1. **Unpack the new or replacement DIMMs and place them on an antistatic mat.**

2. **If you are replacing faulty DIMMs, ensure that the replacement DIMMs match the sizes of the DIMMs they are replacing.**

    Do not replace a dual-rank DIMM with a quad-rank DIMM and vice versa. If you violate this rule, the performance of the server might be adversely affected. For DIMM population rules, see "DIMM Population Rules" on page 134.

3. **Ensure that the ejector tabs are in the open position.**

4. **Line up the DIMM with the motherboard connector.**

Align the notch in the DIMM with the key in the connector. The notch ensures that the DIMM is oriented correctly.
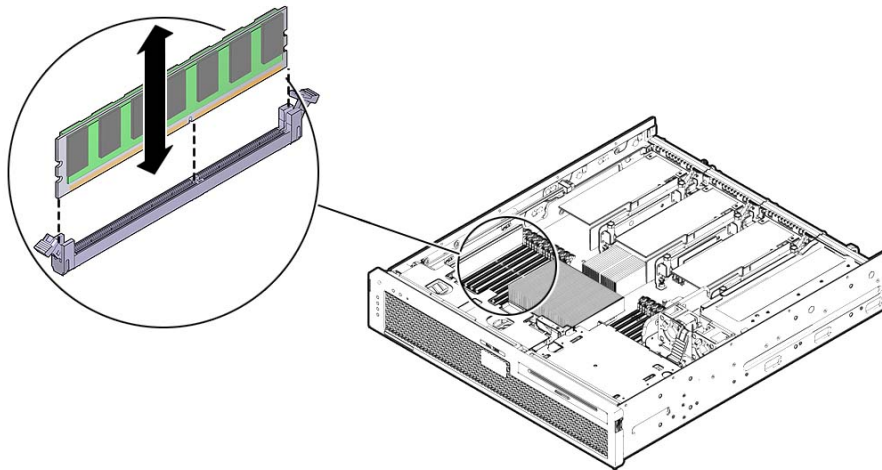
5. **Push the DIMM into the connector until the ejector tabs lock the DIMM in place.**

    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. If the notch is not aligned, damage to the DIMM might occur.

6. **Repeat Step 3 through Step 5 until all replacement DIMMs are installed.**

7. **Consider your next step:**

    *   If you installed DIMMs as part of another procedure, return to that procedure.
    *   If you are only installing new or replacing faulty DIMMs, continue to the next step.

8. **Install the media bay assembly.**

    See "Install the Media Bay Assembly" on page 97.

9. **Install the air duct.**

    See "Install the Air Duct" on page 130.

10. **Return the server to operation.**

    See "Returning Server to Operation" on page 211.

11. **If you replaced faulty DIMMs, clear the server DIMM faults.**

   a. **To see server faults, log in to the ILOM SP as `root` and type the following ILOM CLI command list all known fault on the system:**

   -> **`show /SP/faultmgmt`**

   The server lists all known faults, for example:

   ```
   -> show /SP/faultmgmt
     Targets:
         0 (/SYS/MB/P0/D2)
     Properties:
     Commands:
         cd
         show
   ```

   b. **To clear the fault, type the following command:**

   -> **`set /SYS/MB/P`**n **`clear_fault_action=true`**

   Where Pn is the DIMM number. For example, to clear a fault on the DIMM in location D2 on CPU0:

   ```
   -> set /SYS/MB/P0/D2 clear_fault_action=true
   Are you sure you want to clear /SYS/MB/P0 (y/n)? y
   Set ???clear_fault_action" to ???true???
   ```

   ### Related Information

   - "DIMM and CPU Physical Layout" on page 133
   - "DIMM Population Rules" on page 134
   - "DIMM Considerations and Limitations" on page 135
   - "DIMM Rank Classification Labels" on page 136
   - "Error Correction and Parity" on page 136
   - "Identify and Remove Faulty DIMMs" on page 137

Replacing Flash Modules

The server contains two slots for flash modules. These topics describe how to remove and install these flash modules.

⚡ **Caution -** Disconnect all power cables from the server prior to removing or installing a flash module.

- "Remove a Flash Module" on page 144
- "Install a Flash Module" on page 146

▼ Remove a Flash Module

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

3. **Locate the installed flash modules on the motherboard in PCIe2 slot 0.**

4. **Identify the faulty flash module by pressing the Fault Remind button on the motherboard and viewing the flash module fault and power LEDs.**

When a flash module is faulty, an amber LED on the flash module will light when you press the Fault Remind button.
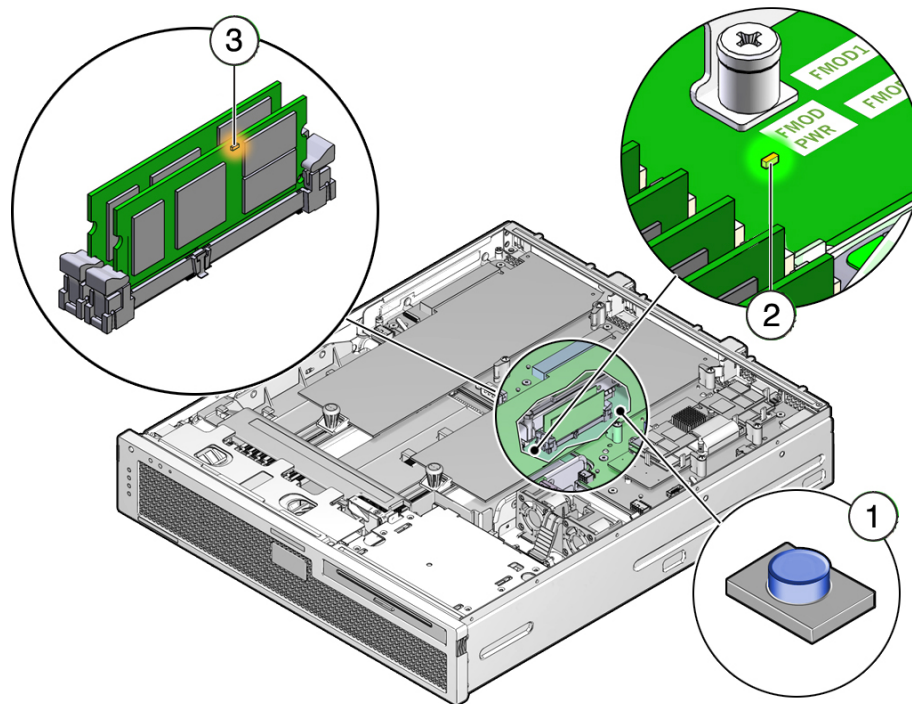
Note - Whenever the Fault Remind button is presses, a LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present to light any fault LEDs on the motherboard assembly. If this Fault Remind LED fails to light when you press the button, the capacitor power the fault remind circuit might have lost its charge. The capacitor can lose its charged if the Fault Remind button is pressed for a long time or if the power cables have been removed for more than 15 minutes.

5. **Verify that the flash module power LED on the motherboard assembly is off.**

Caution - Removing a flash module when the flash module power LED is lit will damage the flash module.

6. **Remove the flash module by pressing down both ejector levers until the flash module partially ejects from its socket.**

   Carefully lift the flash module out of its socket and place it on an antistatic mat.

7. **Consider your next step:**

   - If you removed the flash module as part of another procedure, return to that procedure.
   - Otherwise, continue to "Install a Flash Module" on page 146.

   Related Information

   - "Install a Flash Module" on page 146

▼ Install a Flash Module

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

3. **Unpack the flash module and place it on an antistatic mat.**

4. **Ensure that the flash module socket ejector levers are open (rotated outward).**

5. **Align the notch in the flash module with the key in the motherboard socket.**

   This notch ensures that the flash module is oriented correctly.

6. **Using both thumbs, press the flash module straight down into the socket until both ejector levers click, locking the flash module into the slot.**

   The flash module must be inserted evenly, straight down into the slot until the flash module locks into place.

7. **Consider your next step:**

   - If you installed the flash module as part of another procedure, return to that procedure.
   - Otherwise, continue with this task.

8. **Replace the PCI mezzanine.**

See "Install the PCI Mezzanine" on page 104.

9. **Return the server to operation.**

See "Returning Server to Operation" on page 211.

Related Information

■ "Remove a Flash Module" on page 144

Replacing the Flash Module Cable

Installed to connectors on the motherboard assembly in PCIe2 slot 1, the flash module cable is a mini-SAS 36-pin to dual 7-pin SATA splitter cable. This cable must be installed in order for the system to access the flash modules.

These tasks describe how to remove and install the flash module cable.

■ "Remove the Flash Module Cable" on page 147
■ "Install the Flash Module Cable" on page 148

▼ Remove the Flash Module Cable

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

See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

See "Remove the PCI Mezzanine" on page 102.

3. **If there is a PCIe2 card installed in PCIe2 slot 2, remove the card and place it on an antistatic mat.**

See "Remove the Lower PCIe2 Cards" on page 123.

4. Remove the Flash Module cable from the motherboard assembly.
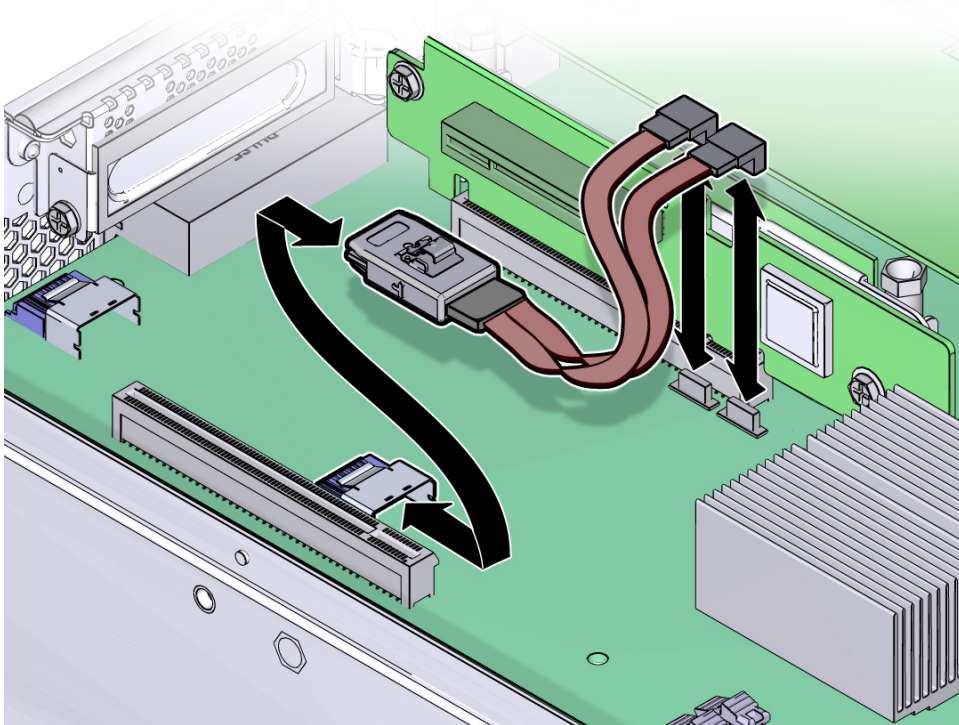
5. Consider your next step:

- If you removed the cable as part of another procedure, return to that procedure.
- Otherwise, continue to "Install the Flash Module Cable" on page 148.

Related Information

- "Install the Flash Module Cable" on page 148

▼ Install the Flash Module Cable

1. Remove the replacement flash module cable from its packaging and place it on an antistatic mat.

2. Install the flash module cable to the motherboard assembly.

Find the cable connections in PCIe2 slot 1 on the motherboard.
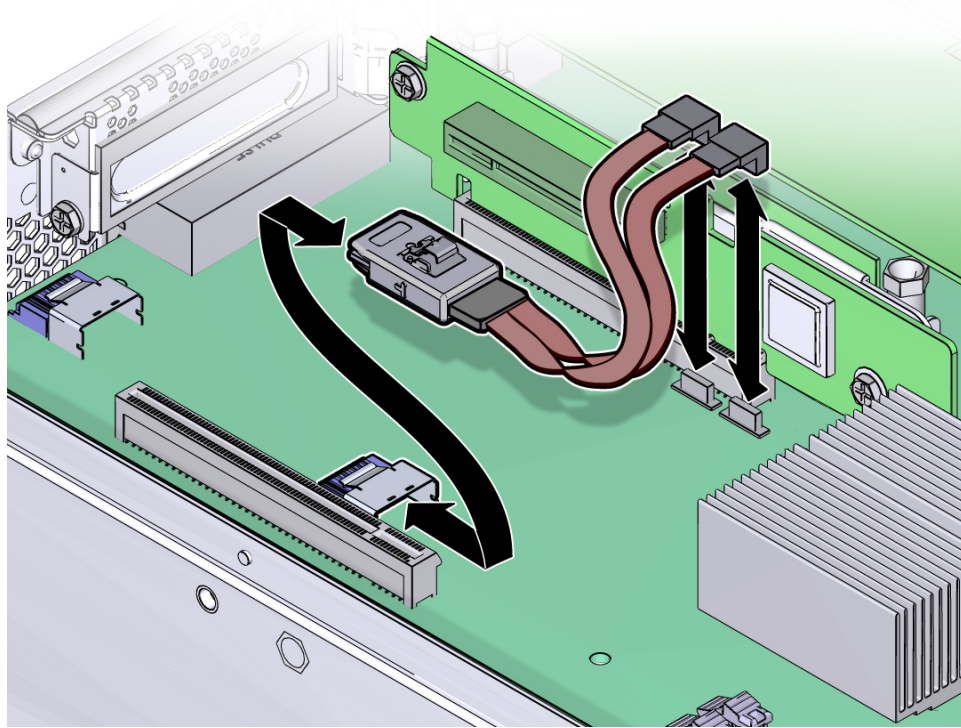
3. Consider your next step:

- If you installed the cable as part of another procedure, return to that procedure.
- Otherwise, continue with this task.

4. If you removed a card from PCIe2 slot 1, replace the card.

See "Install the Lower PCIe2 Cards" on page 125.

5. Install the PCI mezzanine.

See "Install the PCI Mezzanine" on page 104.

6. Return the server to operation.

See .

Related Information

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Replacing the ESM Riser and ESM

The energy storage module provides backup power to the flash modules when the system power is off or interrupted. The ESM is stored in a ESM riser, which is installed to the motherboard assembly.

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ESM Fault LEDs

The system provides two ESM fault LEDs to help you detect ESM failures:

- Capacitor Charged LED on the ESM riser

  This LED lights green when the ESM is fully charged. In the event of a power failure, the ESM provides power to the flash modules to allow them to store their internal working state and any cached data into the flash array. The Capacitor Charged LED will turn off when the ESM discharges all of its stored power.

- ESM fault LED on the motherboard

  If either the ESM riser or ESM fails, this LED lights amber when you press the Fault Remind button.
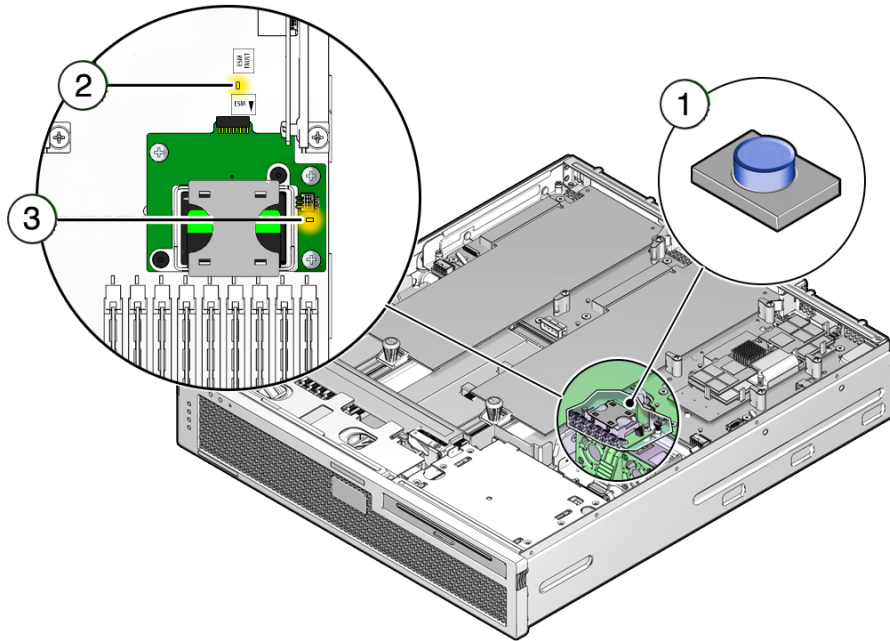
▼ Troubleshoot ESM Faults

An ESM failure can be caused by a faulty ESM riser, the ESM itself, or both. You must use ILOM to determine which components have failed. Refer to the ILOM 3.0 documentation for more information about the following task.

1. **Use the ILOM CLI to log in to the server as `root` and type the following command to display ESM riser faults:**

   `-> show /SYS/ESMR`

2. **Type the following command to display ESM faults:**

   `-> show /SYS/ESMR/ESM`

3. **Depending on the faults, consider your next tasks:**

   - If the ESM riser has failed, replace the ESM riser.

See "Remove ESM Riser" on page 152 and "Install ESM Riser" on page 154.

- If the ESM has failed, replace the ESM.

  See "Replace the ESM" on page 155

- If both components have failed, replace both components.

  See "Remove ESM Riser" on page 152 and "Install ESM Riser" on page 154.

▼ Remove ESM Riser

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

   See "Preparing the Server for Component Replacement" on page 75

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

3. **Remove the air duct and place it on an antistatic mat.**

   See "Remove the Air Duct" on page 127.

4. **Remove the three Phillips screws securing the ESM riser to the motherboard.**
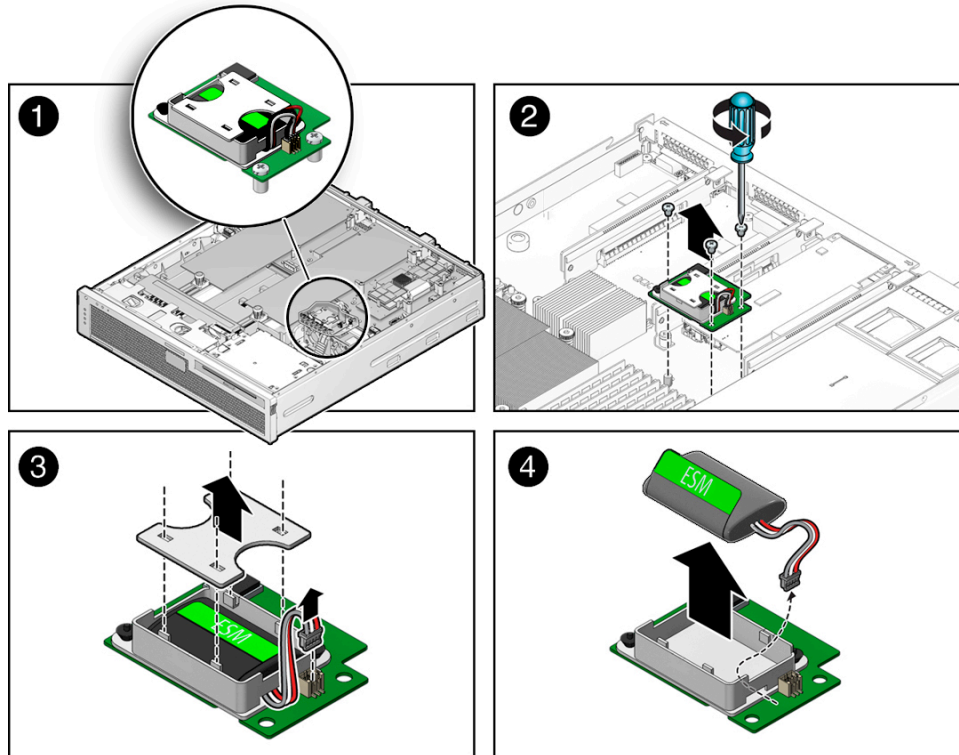
5. **Grasp both sides of the ESM riser and lift it straight up and out of the motherboard.**

6. **Consider your next step:**

- If you removed the ESM riser as part of another procedure, return to that procedure.
- Otherwise, continue with this task.

7. **Disconnect the ESM cable from the ESM riser.**

8. **Remove the ESM cover from the ESM riser.**

9. **Grasp the ESM tab and lift the ESM up and out of the ESM riser.**

Place the ESM on an antistatic mat.

10. **Continue to to replace the ESM riser.**

▼ Install ESM Riser

1. **Consider your first step:**
   - If you removed the ESM riser as part of another procedure, and you will not be installing new components, go to Step 6.
   - Otherwise, continue with the next step.

2. **Unpack the ESM riser from its packaging and place it on an antistatic mat.**

   If you will be replacing the ESM as well, unpack the new ESM and place it on an antistatic mat.

3. **Thread the ESM cable through the opening in the ESM riser.**

4. **Place the ESM into the riser and replace the ESM riser cover.**

5. **Connect the ESM cable to the ESM riser.**

6. **Position the ESM riser over the screw posts on the motherboard and lightly press down on the ESM riser until it seats into the connector.**

   You must position the ESM riser as shown in the following illustration. Otherwise, the ESM riser???s connector will not align properly with the motherboard connector. When installed correctly, you will feel the ESM riser seat into the motherboard connector.
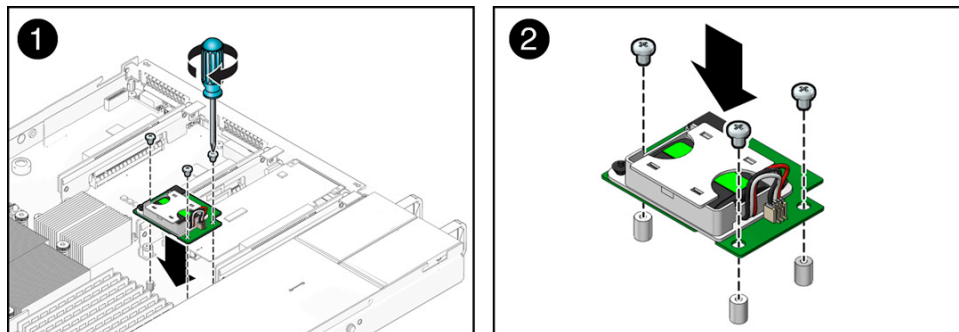
7. **Secure the ESM riser using three Phillips screws.**

8. **Consider your next step:**

- If you installed the ESM riser as part of another procedure, return to that procedure.
- Otherwise, continue with this task.

9. Return the server to operation.

See "Returning Server to Operation" on page 211.

10. After replacing the faulty ESM riser, clear the server fault.

Refer to the ILOM 3.0 documentation for more information about the following steps.

a. Use the ILOM CLI to log in to the server as `root` and type the following command to list all known faults on the server:

```
-> show /SP/faultmgmt
```

The command lists all known faults, for example:

```
-> show /SP/faultmgmt
  Targets:
      0 (/SYS/ESMR)
  Properties:
  Commands:
      cd
      show
```

b. Type the following command to clear the fault.

```
-> set /SYS/ESMR clear_fault_action=true
```

For example:

```
-> set /SYS/ESMR clear_fault_action=true
Are you sure you want to clear /SYS/ESMR (y/n)? y
Set ???clear_fault_action" to ???true???
```

▼ Replace the ESM

1. Prepare the server for service.

See "Preparing the Server for Component Replacement" on page 75.

2. Remove the air duct and place it on an antistatic mat.

See "Remove the Air Duct" on page 127.

3. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

4. **Disconnect the ESM cable from the ESM riser.**

5. **Remove the ESM cover from the ESM riser.**

6. **Grasp the ESM tab and lift the ESM up and out of the ESM riser.**

7. **Unpack the replacement ESM and place it on an antistatic mat.**

8. **Thread the ESM cable through the opening in the ESM riser.**

9. **Place the ESM into the riser and replace the ESM riser cover.**
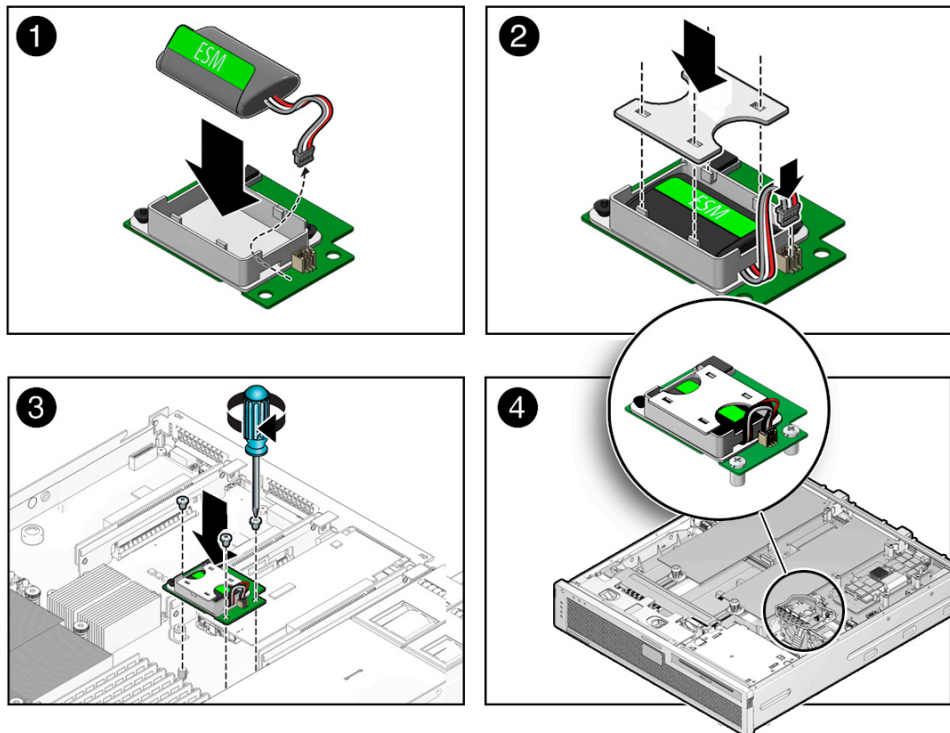
10. **Connect the ESM cable to the ESM riser.**

11. **Install the PCI mezzanine.**

    See "Install the PCI Mezzanine" on page 104.

12. **Install the air duct.**

    See "Install the Air Duct" on page 130.

13. **Return the server to operation.**

    See "Returning Server to Operation" on page 211.

14. **After replacing the faulty ESM, clear the server fault.**

    Refer to the ILOM 3.0 documentation for more information about the following steps.

    a. **Use the ILOM CLI to log in to the server as `root` and type the following command to list all known faults on the server:**

       ```
       -> show /SP/faultmgmt
       ```

       The command lists all known faults, for example:

       ```
       -> show /SP/faultmgmt
         Targets:
             0 (/SYS/ESMR/ESM)
         Properties:
         Commands:
             cd
             show
       ```

    b. **Type the following command to clear the fault.**

       ```
       -> set /SYS/ESMR/ESM clear_fault_action=true
       ```

       For example:

       ```
       -> set /SYS/ESM clear_fault_action=true
       Are you sure you want to clear /SYS/ESMR/ESM (y/n)? y
       Set ???clear_fault_action" to ???true???
       ```

Replacing the Battery

The battery maintains system time when the server is powered off and a time server is unavailable. If the server fails to maintain the proper time when powered off and not connected to a network, replace the 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 this procedure.

- "Remove the Battery" on page 158
- "Install the Battery" on page 159

Related Information

- "Replacing DIMMs" on page 132
- "Reset the BIOS Password and Clear the CMOS NVRAM" on page 177

▼ Remove the Battery

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine and place it on an antistatic mat.**

   See "Remove the PCI Mezzanine" on page 102.

3. **To remove the battery, place your finger between the battery and side wall of the server chassis and push the battery away from the side wall.**

4.   **Twist the battery (either clockwise or counter-clockwise) and lift it out.**
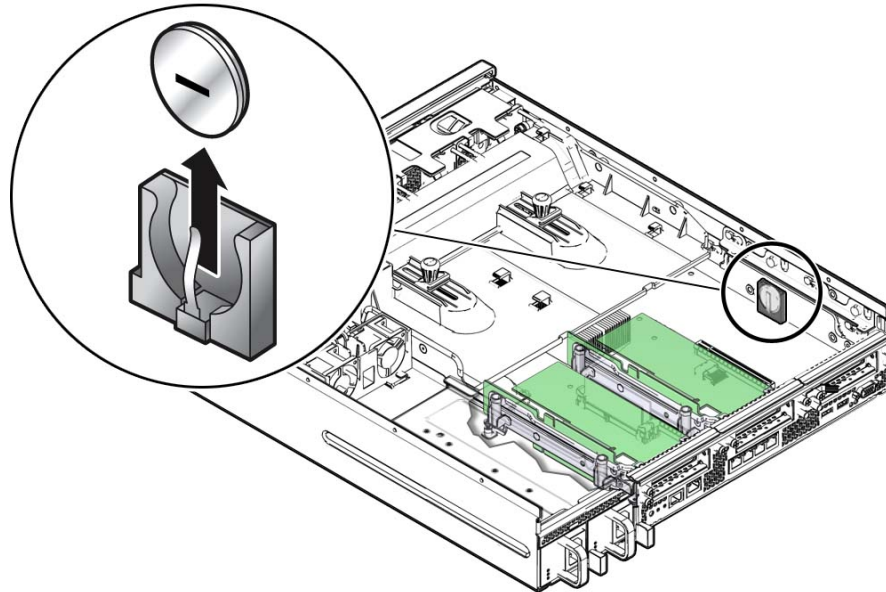
Related Information

- "Install the Battery" on page 159
- "Reset the BIOS Password and Clear the CMOS NVRAM" on page 177

▼ Install the Battery

1.   **Remove the replacement battery from its packaging.**

2.   **Press the new battery into the battery holder with the positive side (+) facing the server chassis side wall.**

3.   **Install the PCI mezzanine.**
See "Install the PCI Mezzanine" on page 104.

4.   **Return the server to operation.**
See "Returning Server to Operation" on page 211.

> **Note -** If the SP is configured to synchronize with a network time server using the Network Time Protocol, the ILOM SP clock will be reset as soon as the server is powered on and connected to the network.

5. **If the SP is not configured to use NTP, you must reset the ILOM service processor clock using the ILOM CLI or the web interface.**

   For instructions, refer to the ILOM 3.0 documentation.

   Related Information

   - "Remove the Battery" on page 158
   - *Oracle Integrated Lights Out Manager (ILOM) 3.0 Web Interface Procedures Guide*
   - *Oracle Integrated Lights Out Manager (ILOM) 3.0 CLI Procedures Guide*

Replacing CPUs

> **Caution -** Ensure that all power is removed from the server before removing or installing a CPU. You must disconnect the power cables from the system before performing these procedures.

> **Note -** When operating the system with one CPU, you must install a CPU filler cover in the empty CPU slot.

The following topics are covered:

- "Remove a CPU" on page 160
- "Install a CPU" on page 163
- "Install a Second CPU" on page 166

Related Information

- "Replacing DIMMs" on page 132

▼ Remove a CPU

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

See "Preparing the Server for Component Replacement" on page 75.

2.   Remove the air duct.

See "Remove the Air Duct" on page 127.

3.   Identify which CPU to remove.

4.   Identify the location of the faulty CPU by pressing the fault remind button on the motherboard.

- If CPU LED is off: CPU is operating properly.
- If CPU LED is on (amber): CPU is faulty and should be replaced.

  CPU0 is labeled P0 and closest to the power supply bay.

FIGURE   16   Identifying Faulty CPUs
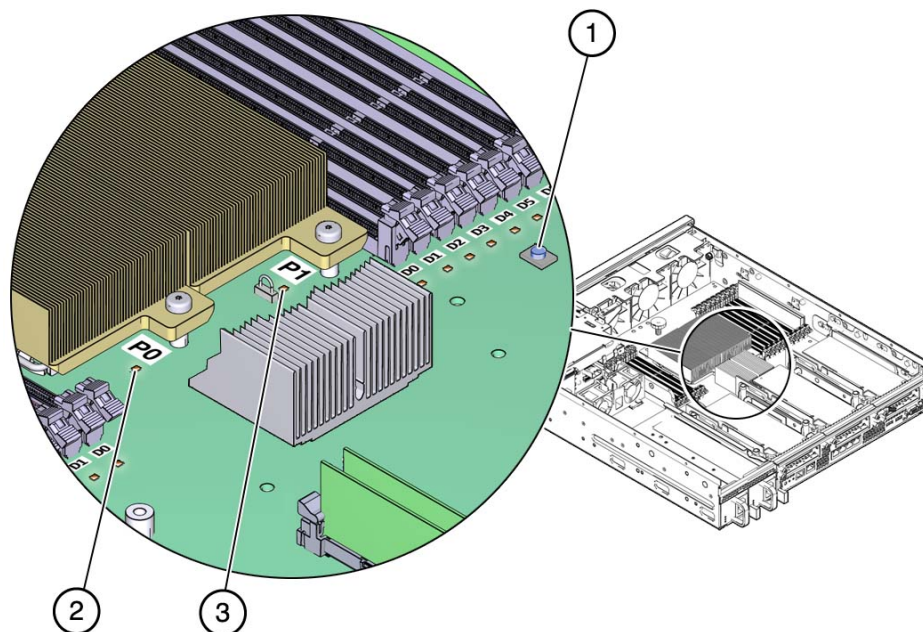
Figure Legend

1   Fault remind button
2   CPU 0 LED

3   CPU 1 LED

5.   **Using an Allen wrench, unscrew the two screws from the heatsink for the faulty CPU [2].**

Turn the screws alternately one and one-half turns until they are fully removed.
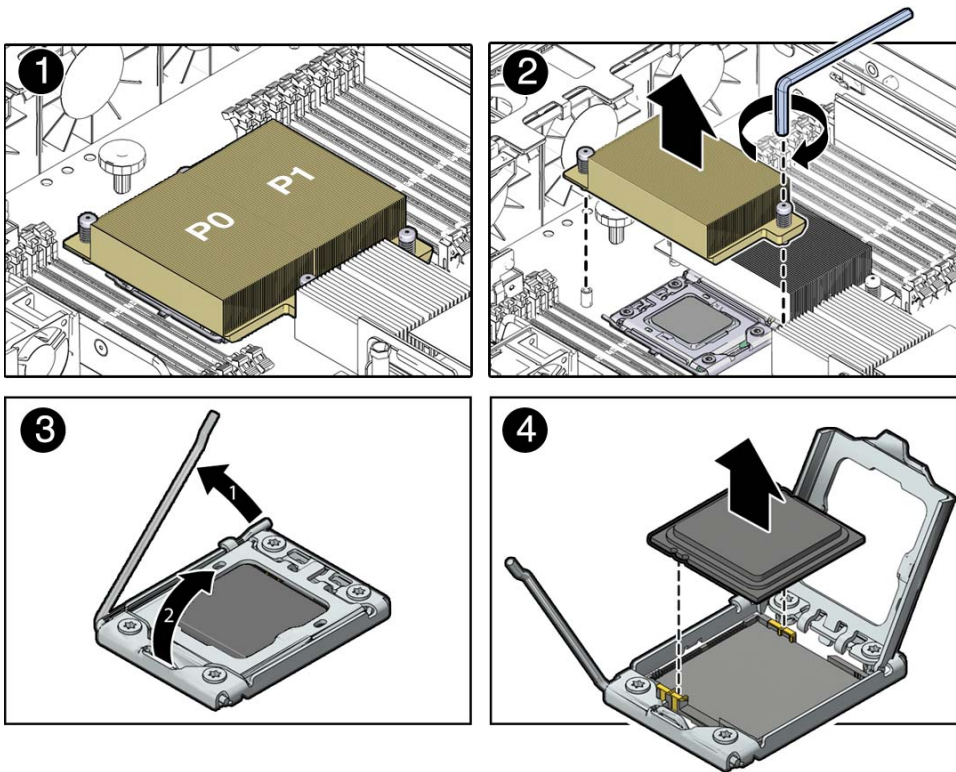
6.   **Twist the heatsink slightly to break the grease seal, lift off the heatsink and place it upside down on a flat surface to prevent the thermal grease from contaminating other components.**

⚠ **Caution -** Failure to clean the heatsink and the CPU prior to removing the CPU could result in the 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.

7. **Use an alcohol pad to clean the thermal grease from both the bottom of the heatsink and the top of the CPU.**

   You will use this heatsink when you install a replacement CPU.

8. **Disengage the CPU release lever by pushing down and moving it to the side away from the CPU, and then rotating the lever upward [3].**

9. **Open the pressure frame, carefully remove the CPU [4], and place the CPU on antistatic mat.**

10. **If you are not replacing the CPU, install a CPU filler cover on the empty slot.**

    ### Related Information

    - "Install a CPU" on page 163
    - "Install a Second CPU" on page 166

▼ Install a CPU

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

2. **Unpack the replacement CPU.**

3. **Properly orient the CPU with the socket alignment tabs and carefully place the CPU into the socket [1].**

Ensure that the orientation is correct as damage might result if the CPU pins are not aligned correctly.
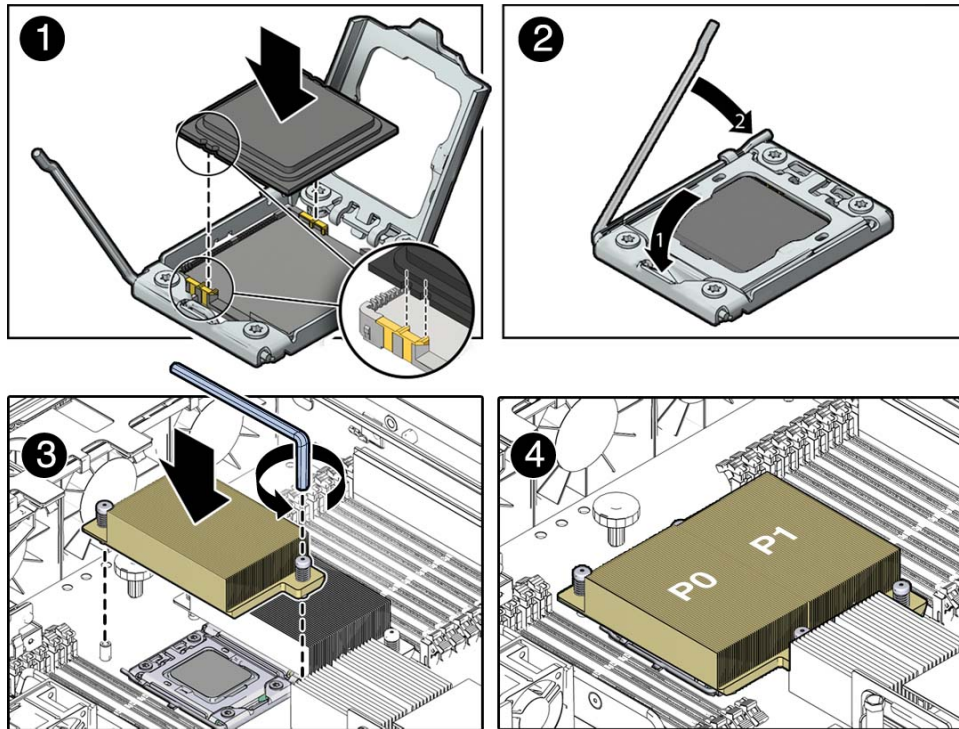
4. **Lower the pressure frame.**

   Ensure that the pressure frame sits flat around the periphery of the CPU.

5. **Engage the release lever by rotating it downward and slipping it under the catch [2].**

6. **Use the syringe (supplied with the new or replacement CPU) to apply approximately 0.1 ml of thermal grease to the center of the top of the CPU.**

   Do not distribute the grease, as the CPU heatsink pressure will do so for you.

7. **Inspect the heatsink for dust and lint.**

   Clean heatsink if necessary.

8. **Orient the heatsink so that the two screws line up with the mounting studs [3].**

    The CPU heatsink is not symmetrical.

⚠️ **Caution -** If the heatsink assembly is moved too much during its installation, the layer of thermal grease may not be distributed evenly, leading to component damage.

9. **Carefully position the heatsink on the CPU, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease [3].**

10. **Use an Allen wrench to tighten the screws alternately one-half turn until fully seated.**

11. **Install the air duct.**

    See "Install the Air Duct" on page 130.

12. **Return the server to operation.**

    See "Returning Server to Operation" on page 211.

13. **Clear server CPU faults.**

    Refer to the ILOM 3.0 documentation for more information about the following steps.

    a. **To show server faults, log in to the server as `root` using the ILOM CLI and type the following command to list all known faults on the system:**

        -> `show /SP/faultmgmt`

        The server lists all known faults, for example:

        ```
        -> show /SP/faultmgmt
          Targets:
              0 (/SYS/MB/P0)
          Properties:
          Commands:
              cd
              show
        ```

    b. **To clear the fault type the following command:**

        -> `set /SYS/MB/P0 clear_fault_action=true`

        For example:

```
-> set /SYS/MB/P0 clear_fault_action=true
Are you sure you want to clear /SYS/MB/P0 9y/n)? y
Set ???clear_fault_action" to ???true???
```

Related Information

-
-

▼ Install a Second CPU

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

   See .

2. **Remove the air duct.**

   See .

3. **Remove the CPU filler cover from the empty CPU socket.**

4. **Clean the top of the CPU with the provided alcohol wipe.**

5. **Place the CPU in the socket with the correct orientation.**

Ensure that the orientation is correct, as damage might result if the CPU pins are not aligned correctly.
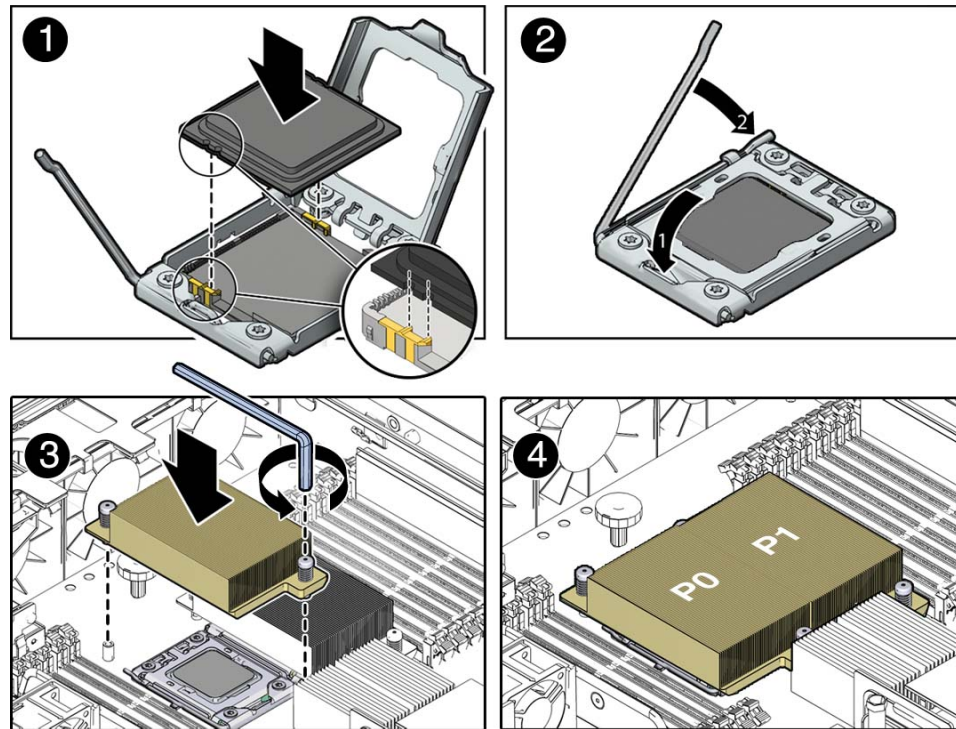
6. **Lower the pressure plate.**

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

7. **Engage the lever by rotating it downward and slipping it under the catch.**

8. **Remove the plastic protective cover from heatsink.**

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

9. **Orient the heatsink so the two screws line up with the mounting studs.**

   The heatsink is not symmetrical.

10. **Use an Allen wrench to tighten the screws alternately one half turn until fully seated.**

11. Replace the air duct.

See "Install the Air Duct" on page 130.

12. Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "Remove a CPU" on page 160
- "Install a Second CPU" on page 166

Replacing the Motherboard Assembly

Prepare a large antistatic mat in a dust-free work area before replacing the motherboard assembly. When replacing the motherboard assembly, you will remove the following components and associated cables:

- Air duct
- PCI Mezzanine
- PCI risers
- Fan tray 0
- DIMMs
- Flash modules and flash module cable
- ESM riser
- CPUs
- Media bay assembly

Place these removed components on an antistatic mat in this dust free work area.

- "Remove the Motherboard Assembly" on page 168
- "Install the Motherboard Assembly" on page 172

Related Information

- "System Components" on page 25

▼ Remove the Motherboard Assembly

1. Prepare the server for service.

See "Preparing the Server for Component Replacement" on page 75.

2. **Follow these instructions to remove the following components and place them on an antistatic mat:**

- "Remove the Air Duct" on page 127
- "Remove the PCI Mezzanine" on page 102
- "Remove a PCIe2 Riser" on page 108
- "Remove the Media Bay Assembly" on page 93
- "Remove Fan Tray 0" on page 189
- "Identify and Remove Faulty DIMMs" on page 137
- "Remove a Flash Module" on page 144
- "Remove the Flash Module Cable" on page 147
- "Remove ESM Riser" on page 152
- "Remove a CPU" on page 160

3. **Remove the short ribbon cable connected to the PDB.**
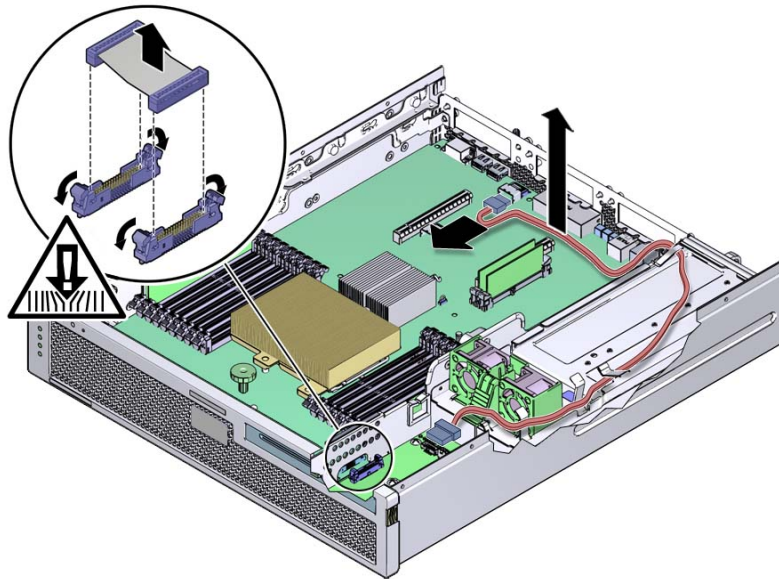
4. **Disconnect the red SATA cable connected to the media bay assembly.**

If your system does not have an optical media drive, there will be one cable to detach.

5. **Loosen or remove the four screws that secure the motherboard assembly to the chassis.**
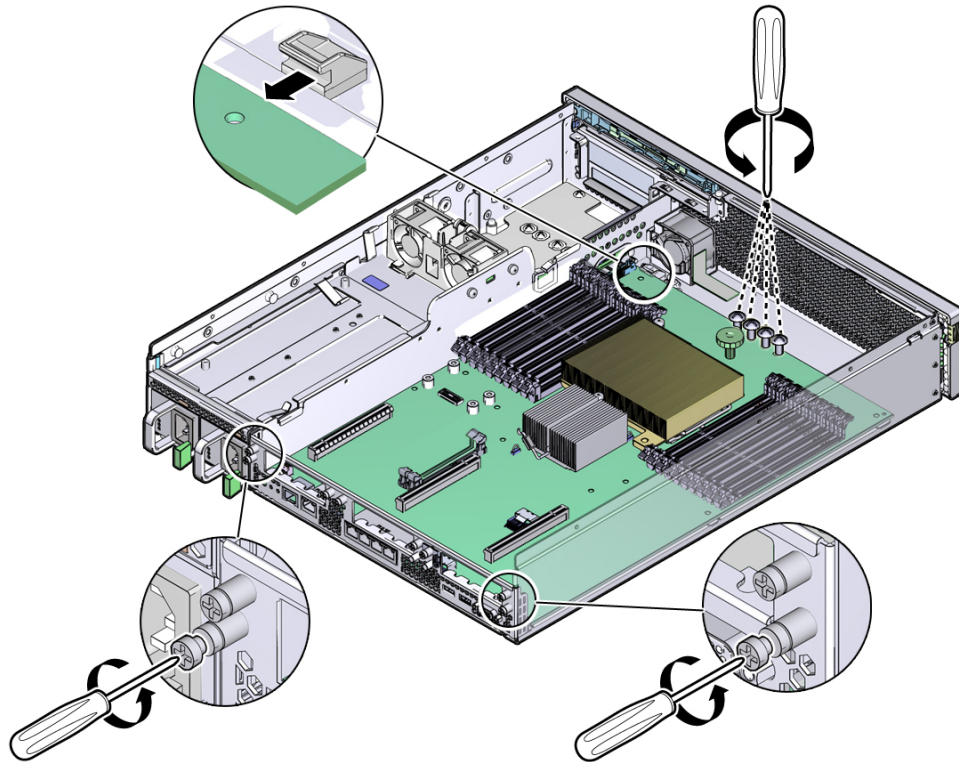
6. **Loosen the two silver captive screws at the rear of the system.**

7. **Remove the bracket from the internal wall of the chassis.**

Slide the bracket toward the front of the chassis, and then pull it out of the chassis.
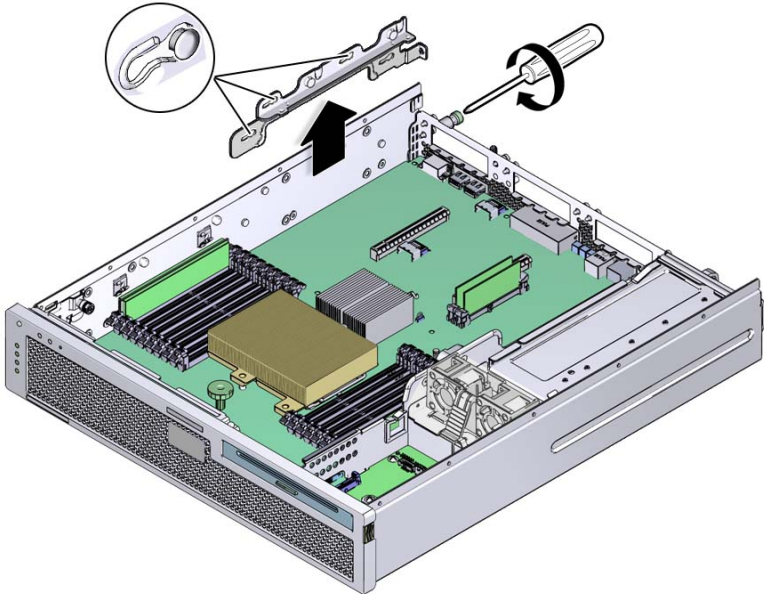
8. **Lift slightly and slide the motherboard assembly forward approximately one inch (25.4 mm).**

9. **Lift up on the right edge to approximately a 45-degree angle.**
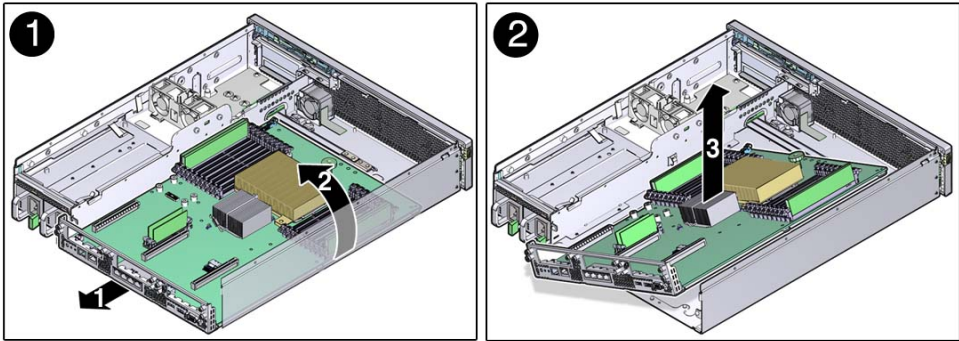
10. **Remove the motherboard assembly from the chassis.**

11. **Place the motherboard assembly aside on an antistatic mat.**

    Related Information

    - "System Components" on page 25
    - "Field-Replaceable Units" on page 27
    - "Install the Motherboard Assembly" on page 172

▼ Install the Motherboard Assembly

1. **Remove the replacement motherboard assembly from its packaging and place it on an antistatic mat.**

2. **Lower the left edge of the motherboard assembly into the chassis, then the entire board, and while slightly elevated, slide the motherboard assembly to the back of the chassis.**

Ensure that the motherboard slides under the guide in the front corner of the motherboard.
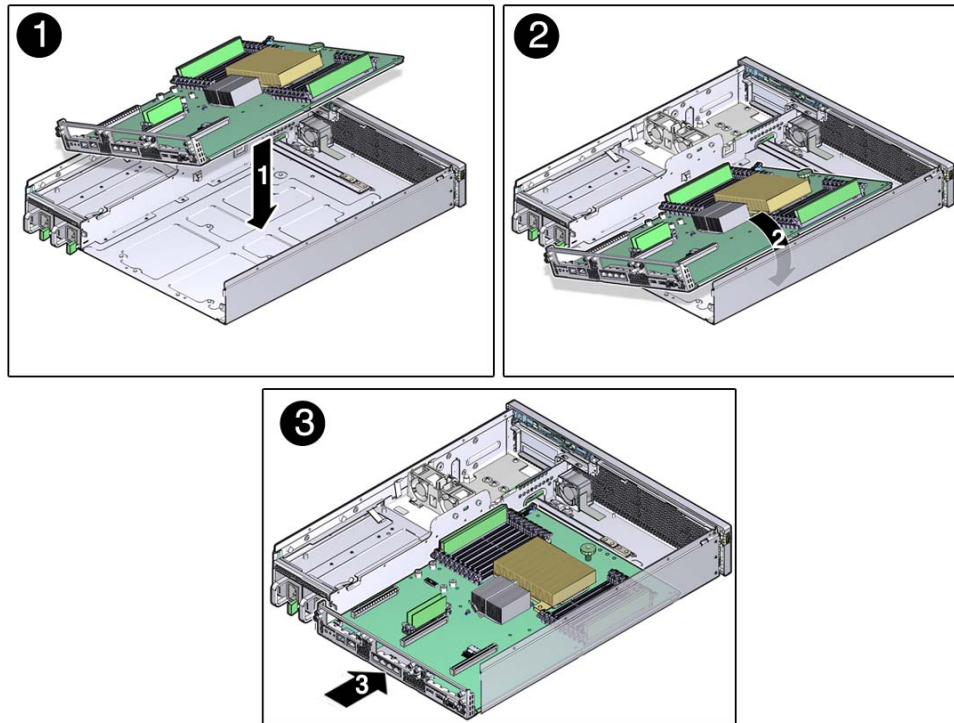
3.   **Align the motherboard assembly screw holes over the chassis standoffs.**

4.   **Install the mechanical bracket on the internal wall of the chassis.**

Insert the bracket into the chassis standoffs, then push the bracket toward the rear of the server to secure it in place. You will secure this side bracket further when you tighten the rear screws in the next step.
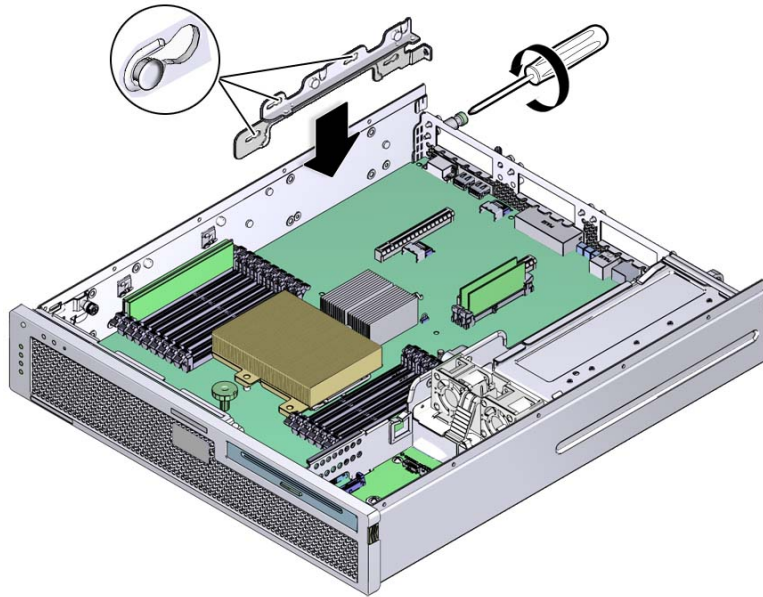
5. **Use a No. 2 Phillips screwdriver to install the four motherboard assembly screws and to tighten the two captive screws located at the rear of the server.**
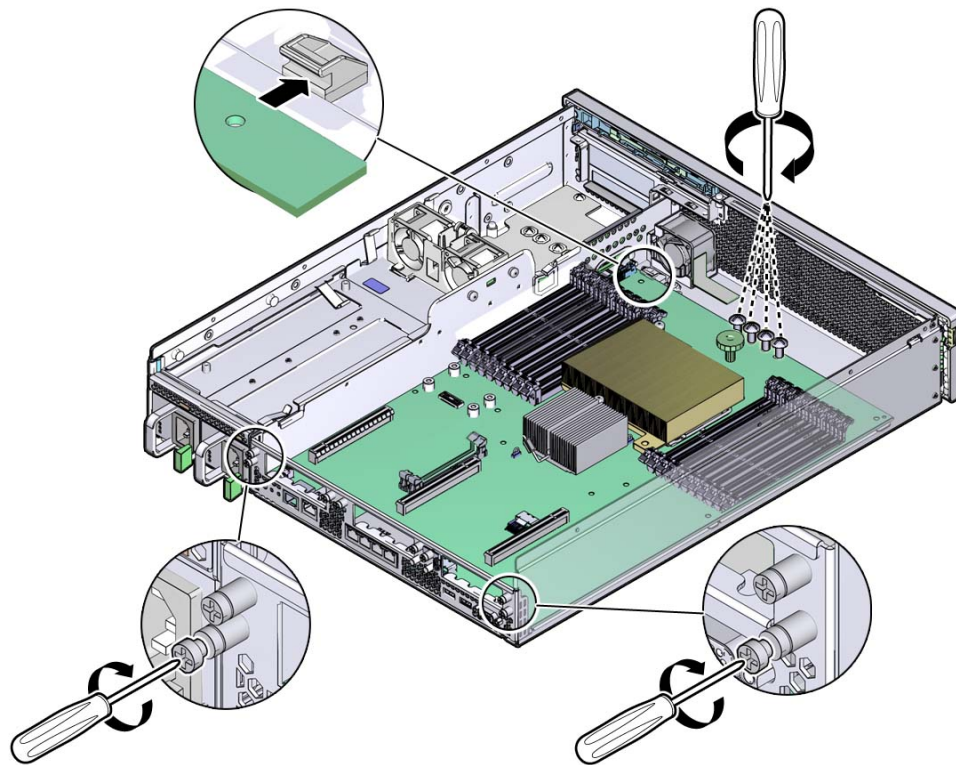
6.   Reconnect the PDB and SATA cables to the following connectors on the motherboard assembly.
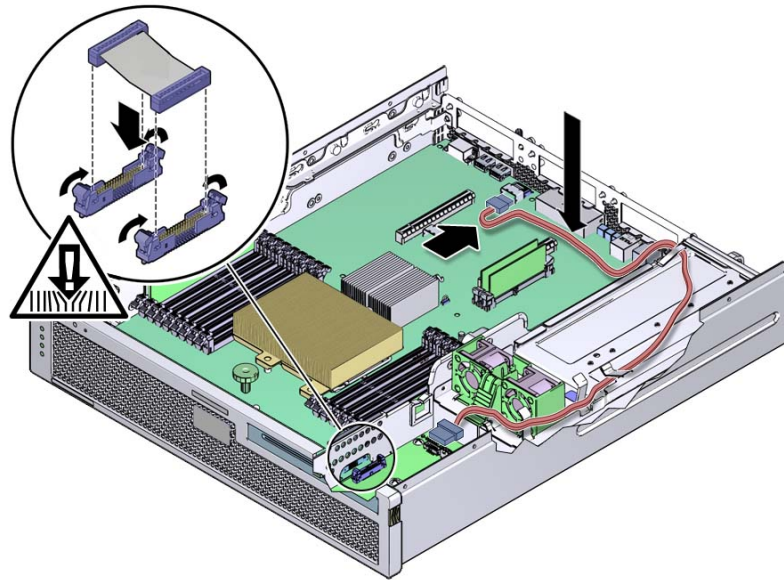
7.   Follow these instructions to install the following components:

- "Install DIMMs" on page 141
- "Install a CPU" on page 163
- "Install ESM Riser" on page 154
- "Install the Flash Module Cable" on page 148
- "Install a Flash Module" on page 146
- "Install Fan Tray 0" on page 190
- "Install the Media Bay Assembly" on page 97
- "Install a PCIe2 Riser" on page 110
- "Install the PCI Mezzanine" on page 104
- "Install the Air Duct" on page 130

8.   Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "System Components" on page 25
- "Field-Replaceable Units" on page 27
- "Remove the Motherboard Assembly" on page 168

▼ **Reset the BIOS Password and Clear the CMOS NVRAM**

You can clear the CMOS NVRAM and BIOS Password by pressing the CLR CMOS button, which is located on the motherboard. You can also reset the BIOS passwords from the BIOS Setup utility.

> **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.

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the PCI mezzanine.**

   See "Remove the PCI Mezzanine" on page 102.

3.   Press and release the CLR CMOS button.
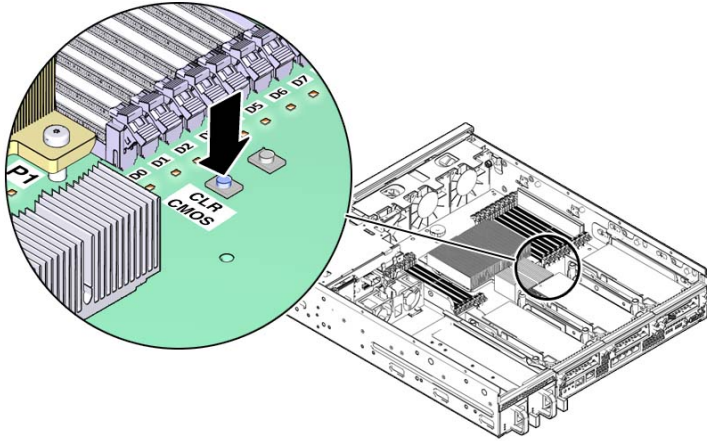
4.   Install the PCI mezzanine.

See "Install the PCI Mezzanine" on page 104.

5.   Return the server to operation.

See "Returning Server to Operation" on page 211.

6.   When powering on the server, watch for a message that indicates that NVRAM has been cleared.

The BIOS password is reset to the default and the CMOS NVRAM is cleared.

Related Information

- "Using the BIOS Setup Utility" on page 37
- "Replacing the Motherboard Assembly" on page 168

Replacing Chassis Components

These topics provide instructions for replacing chassis components.

Related Information

Replacing the Air Filter

Replace the air filter periodically to maximize the amount of air flowing through and cooling the system

Related Information

▼ Remove the Air Filter

1. **Hold the green tabs on either side of the bezel, and pull the bezel forward and down.**

2. **Grasp the green tabs and lift the air filter out of the bezel.**

Take care to not agitate the accumulated dirt out of the air filter.
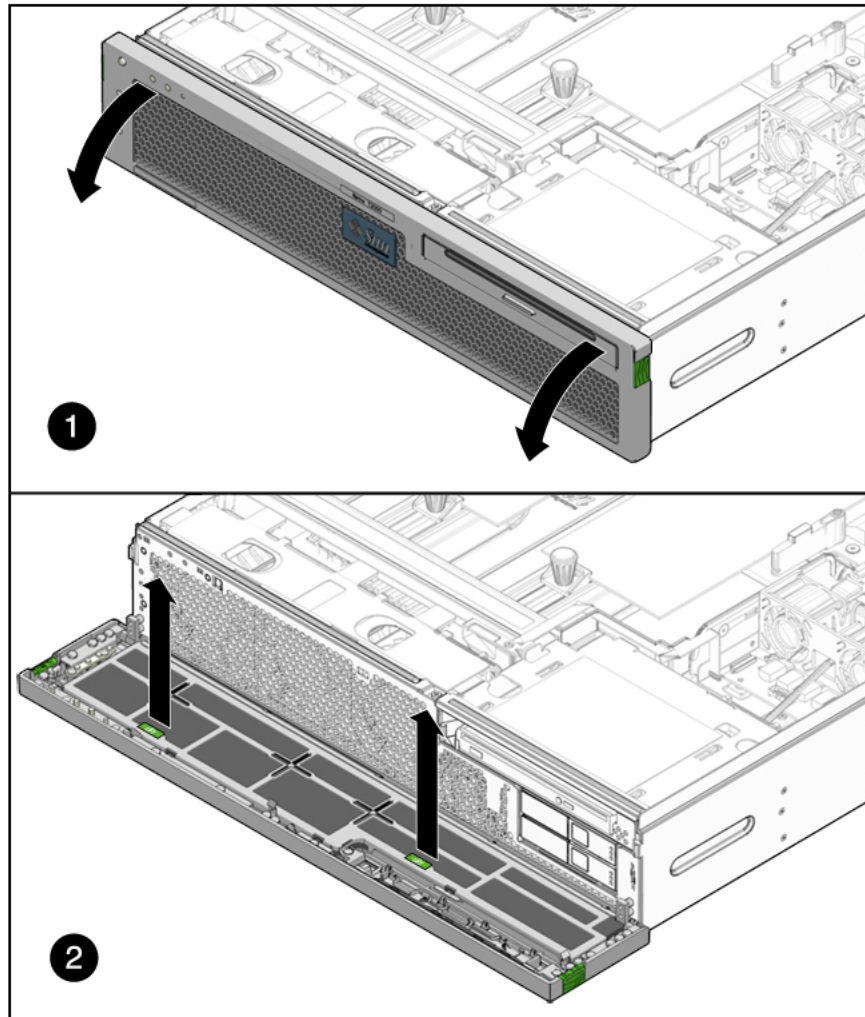
Note - Do not operate the server without an air filter.

3. **Continue to "Install the Air Filter" on page 182.**

Related Information

- "Front Panel Components on Two-Drive Systems With Bezel Removed" on page 15
- "Front Panel Components on Four-Drive Systems With Bezel Removed" on page 16
- "Opening and Closing the Front Bezel" on page 83
- "Install the Air Filter" on page 182

▼ Install the Air Filter

1. **Consider your first steps:**

   - **If you are replacing an air filter, remove the faulty air filter first, then return to Step 2 of this procedure.**

   - **If you are installing the filter tray as part of another component's removal or installation procedure, go to Step 4.**

2. **Remove the replacement air filter from its packaging.**

3. **Feed the edges of the air filter under the restraining hooks of the filter tray.**

4. **Massage the filter in the filter tray so that there are no folds or wrinkles, and so that the air filter lies flat against the filter tray.**

5. **Press the air filter into the bezel until it snaps into place.**

6. Close the bezel.
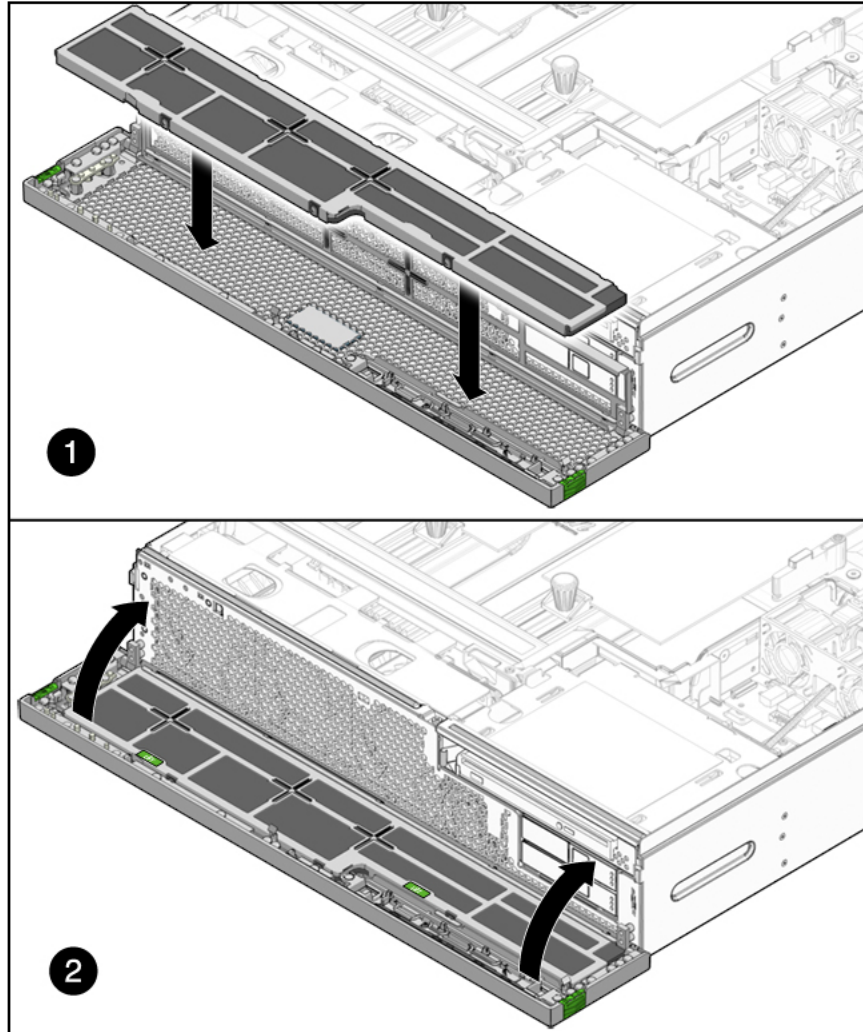
Related Information

- "Opening and Closing the Front Bezel" on page 83
- "Remove the Air Filter" on page 180

Replacing Power Supplies

The server???s redundant power supplies support concurrent maintenance, which enables you to remove and replace a power supply without shutting the server down, provided that the other power supply is online and working.

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

- Front and rear Service Required LEDs
- Amber Fault LED on the faulty power supply

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

Caution - Safety agency requirements prohibit changing a system from AC input to DC input or from DC input to AC input after the product has been removed from the agency approved manufacturing site.

- "Remove a Power Supply" on page 184
- "Install a Power Supply" on page 187

Related Information

- "Replacing the Power Distribution Board" on page 203

▼ Remove a Power Supply

1. **Identify which power supply requires replacement.**

FIGURE   17   Power Supplies and Latches
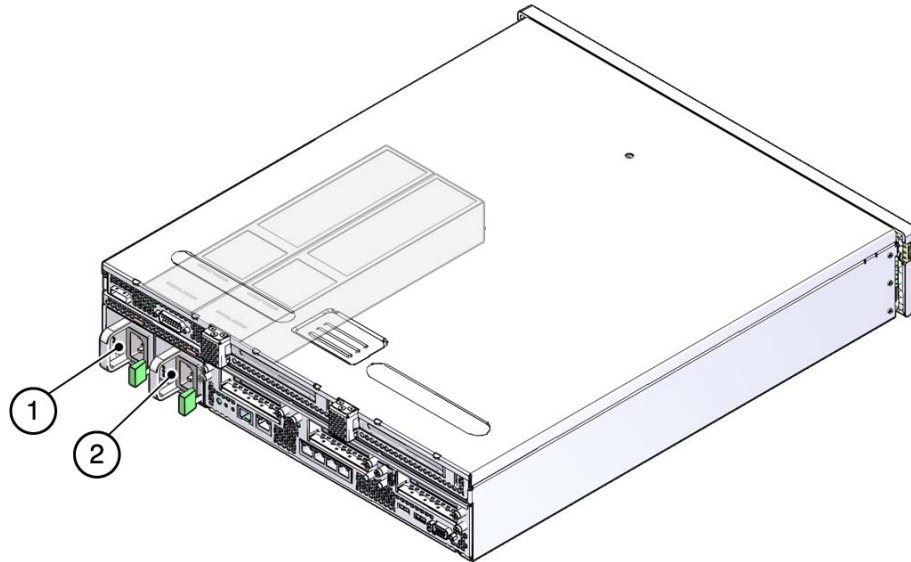
Figure Legend

1   Power Supply 0
2   Power Supply 1

A lighted amber LED on a power supply indicates that a failure was detected. You can also use the ILOM `show faulty` command at the `sc>` prompt.

Note - The fans of a failed power supply may still be spinning when the system is powered on. The failed power supply is still okay to remove.

---

2. **Log in to the ILOM service processor as root.**

   Refer to the ILOM 3.0 documentation for instructions.

3. **At the ILOM prompt (->), type the `stop /SYS/PS`*n* **command.**

   The `stop` command indicates if it is okay to perform a hot removal of a power supply. This command does not perform any action, but it provides a warning if the power supply should not be removed because the other power supply is not providing power to the server.

For example:

```
-> stop /SYS/PSn
Are you sure you want to remove PSn [y/n]? y
<PSn> is safe to remove.
```

In this command, PSn is the identifier for the power supply you plan to remove, either PS0 or PS1.

4. **Disconnect the power cord from the faulty power supply.**

5. **Grasp the power supply handle and push the power supply latch to the right.**
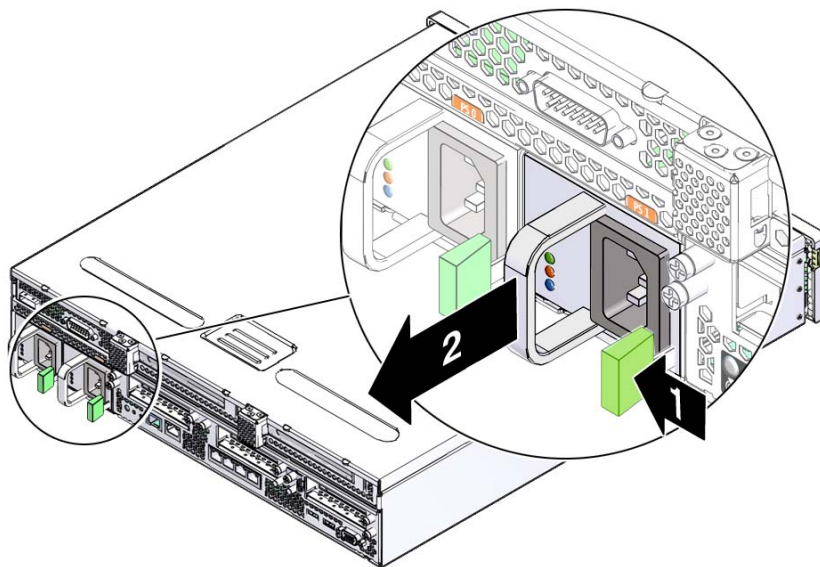
6. **Pull the power supply out of the chassis.**

⚠ **Caution -** To maintain system cooling and EMI requirements, you must replace the power supply immediately.

7. **Continue to "Install a Power Supply" on page 187.**

Related Information

- "Rear Panel Cable Connections" on page 17
- "Power Supply LEDs" on page 23
- "Install a Power Supply" on page 187

▼ Install a Power Supply

Caution - *Never* mix AC and DC power supplies in the same system. Catastrophic system damage will occur. Always replace the failed power supply with the same type of power supply.

Caution - Safety agency requirements prohibit changing a system from AC power supplies to DC power supplies or from DC power supplies to AC power supplies after the product has been removed from the agency approved manufacturing site.

1. **Remove the replacement power supply from its packaging and place it on an antistatic mat.**

2. **Align the replacement power supply with the empty power supply bay.**

3. **Slide the power supply into the bay until it is fully seated.**

Listen for the audible click when the power supply fully seats.
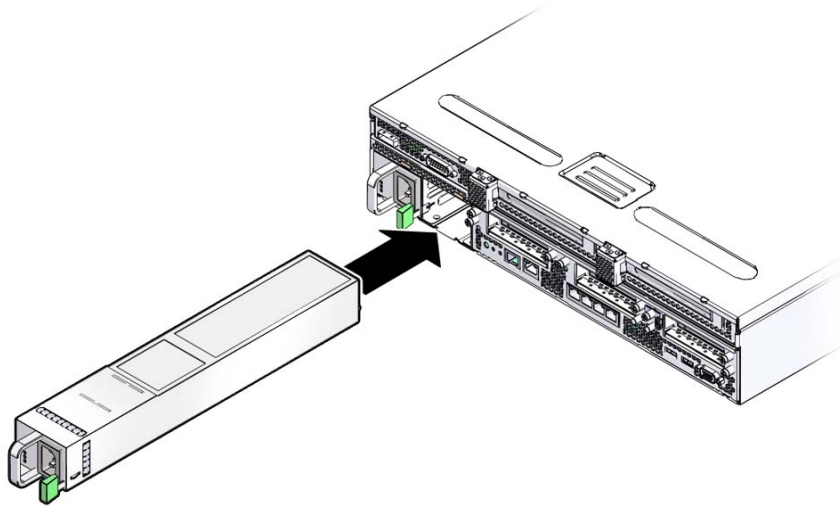
4. **Reconnect the power cord to the power supply.**

5. **Verify that the amber LED on the replaced power supply and the service required LEDs are not lit.**

6. **Log in to the ILOM service processor as root.**

    Refer to the ILOM 3.0 documentation for instructions.

7. **At the ILOM prompt (`->`), type the `show /SYS/PS`_n_ **command to verify the status of the power supplies.**

    In this command, PS_n_ is the identifier for the power supply you plan to remove, either PS0 or PS1.

    Related Information

    - "Rear Panel Cable Connections" on page 17
    - "Power Supply LEDs" on page 23
    - "Remove a Power Supply" on page 184

Replacing Fan Tray 0

Fan tray 0 (labeled FT0) is located in the front of the server.

- "Remove Fan Tray 0" on page 189
- "Install Fan Tray 0" on page 190

Related Information

- "Replacing Fan Tray 2" on page 192
- "Replacing Fan Tray 1" on page 196

▼ Remove Fan Tray 0

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Disconnect the fan tray power cable from the PCI mezzanine.**
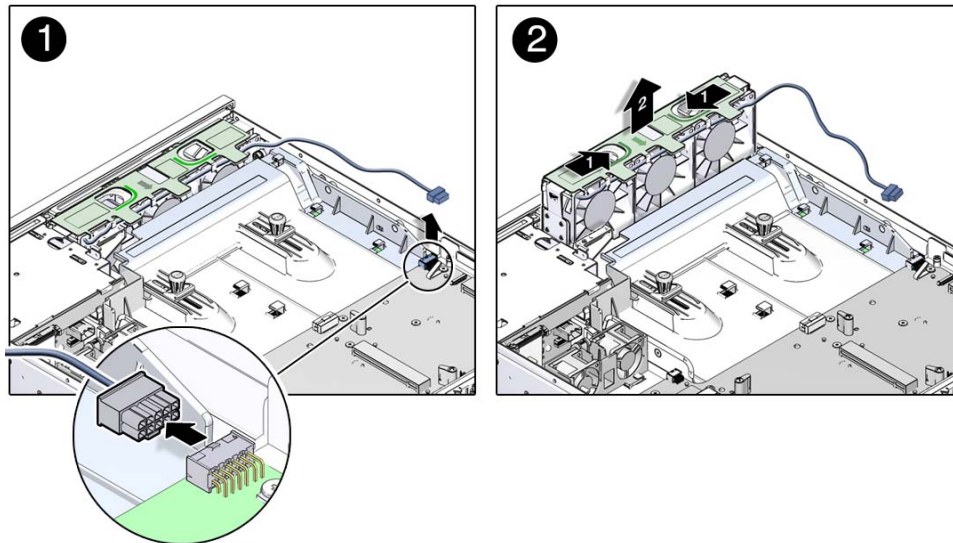
3. **Remove the fan tray cable from the cable guides on the air duct.**

4. **Insert your forefinger and thumb into the holes at the top of the fan tray, squeeze your fingers together, and lift the fan tray from the chassis.**

5. **Set the fan tray on an antistatic mat.**

6. **Consider your next step:**

    ■ If you removed the fan assembly as part of another procedure, return to that procedure.
    ■ Otherwise, continue to "Install Fan Tray 0" on page 190.

    ### Related Information

    ■ "Replacing the Air Duct" on page 127
    ■ "Replacing DIMMs" on page 132
    ■ "Replacing CPUs" on page 160
    ■ "Install Fan Tray 0" on page 190

▼ Install Fan Tray 0

1. **Remove the replacement fan tray from its packaging and place it on an antistatic mat.**

2. **Insert your forefinger and thumb into the holes at the top of the fan tray, squeeze your fingers together, and lower the fan tray into the chassis until you hear it click in place.**
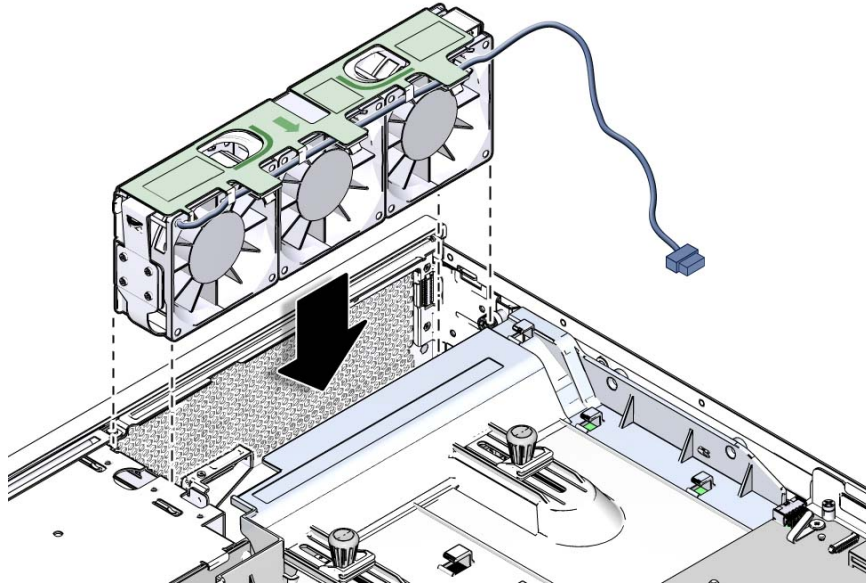
3. **Reconnect the fan tray 0 power cable to the PCI mezzanine.**
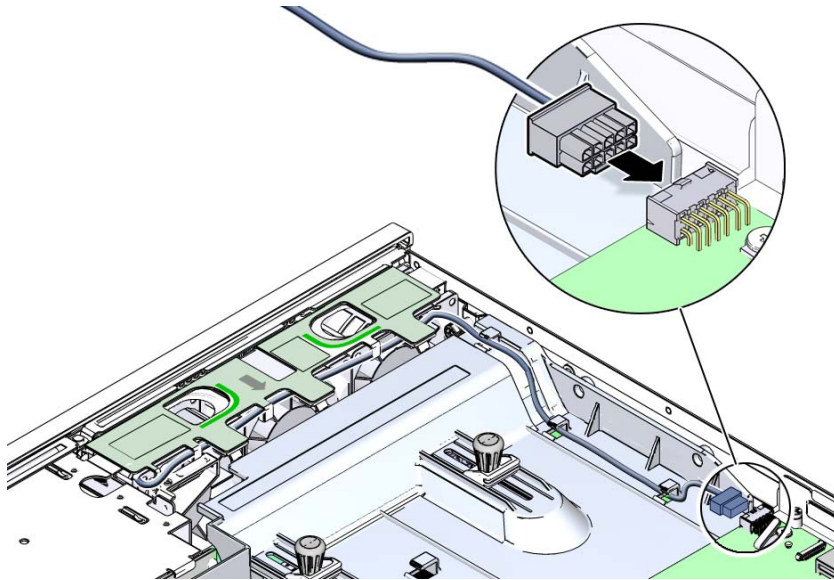
4. **Route the fan tray cable back into the air duct???s cable guides.**

5. **Consider your next step:**

- If you installed the fan assembly as part of another procedure, return to that procedure.
- Otherwise, return the server to operation.

  See "Returning Server to Operation" on page 211.

Related Information

- "Replacing the Air Duct" on page 127
- "Remove Fan Tray 0" on page 189

Replacing Fan Tray 2

Fan tray 2 (labeled FT2) is located under the media bay assembly, next to fan tray 0.

- "Remove Fan Tray 2" on page 193
- "Install Fan Tray 2" on page 194

Related Information

-
-

▼ Remove Fan Tray 2

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

2. **Remove fan tray 0 and place it on an antistatic mat.**
   See .

3. **Pull the tag labeled FT2 to remove fan tray 2 out of the server.**
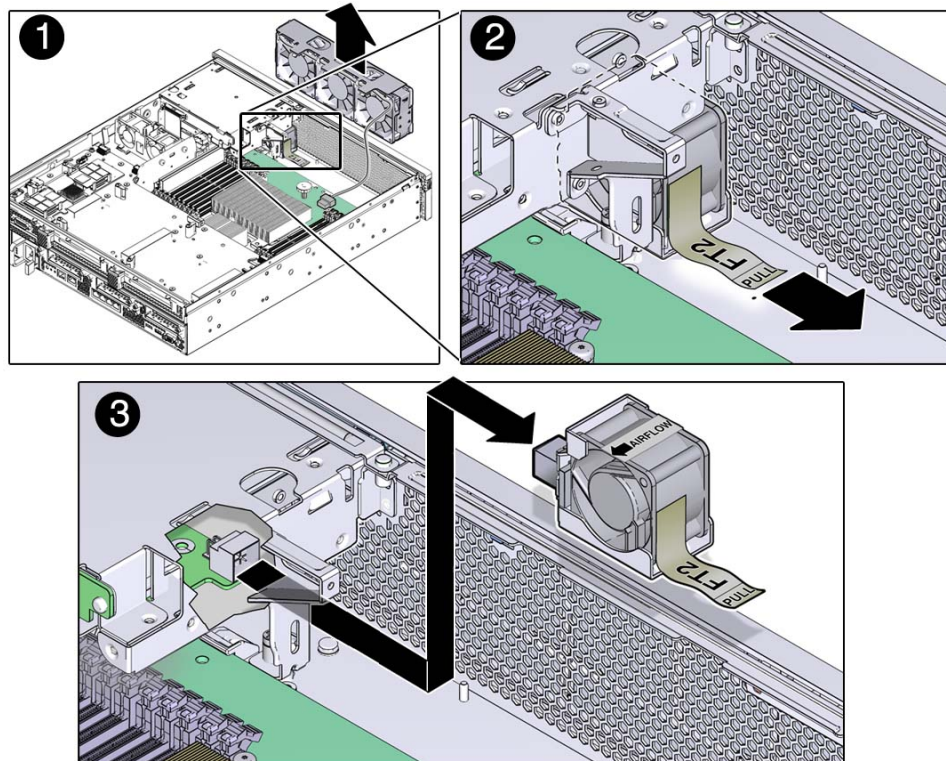
4. **Set fan tray 2 aside on an antistatic mat.**

5. **Consider your next step:**

   ■ If you removed the fan assembly as part of another procedure, return to that procedure.

   ■ Otherwise, continue to "Install Fan Tray 2" on page 194.

   Related Information

   ■ "Replacing the Media Bay Assembly" on page 93
   ■ "Replacing Fan Tray 0" on page 189
   ■ "Install Fan Tray 2" on page 194
   ■ "Replacing the Power Distribution Board" on page 203

▼ Install Fan Tray 2

1. **Remove the replacement fan tray 2 from its packaging and place it on an antistatic mat.**

2. **Insert the replacement fan tray 2 in the slot with the airflow direction arrow facing the rear of server.**

> ⚠ **Caution -** To ensure proper system cooling, make sure the airflow direction arrow on the fan assembly points to the rear of the server.
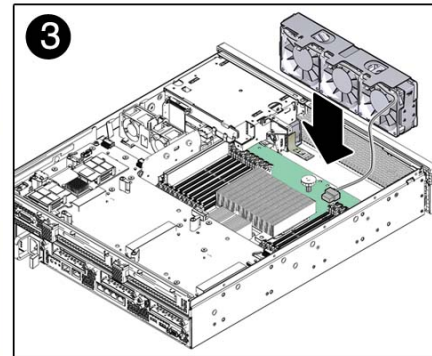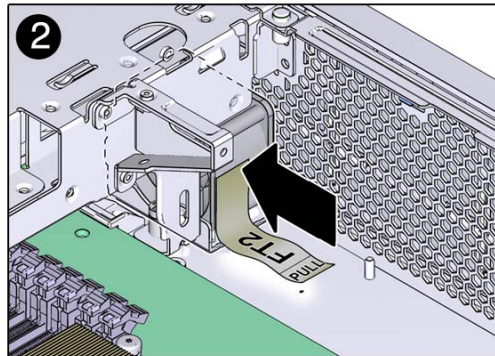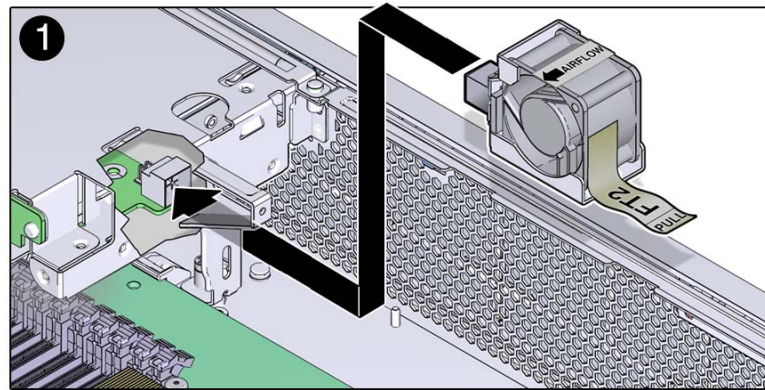
3. **Slide the fan tray into the slot until fully seated.**

4. **Install fan tray 0.**

   See "Install Fan Tray 0" on page 190.

5. **Return the server to operation.**

   See "Returning Server to Operation" on page 211.

   ### Related Information

   - "Replacing the Media Bay Assembly" on page 93

- "Replacing Fan Tray 0" on page 189
- "Remove Fan Tray 2" on page 193
- "Replacing the Power Distribution Board" on page 203

Replacing Fan Tray 1

Fan tray 1 (labeled FT1) is located between the media bay assembly and the PCI mezzanine.

- "Remove Fan Tray 1" on page 196
- "Install Fan Tray 1" on page 198

Related Information

- "Replacing Fan Tray 0" on page 189
- "Replacing Fan Tray 2" on page 192

▼ Remove Fan Tray 1

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

   See "Preparing the Server for Component Replacement" on page 75.

2. **Disconnect the fan tray 1 cable from the PCI mezzanine.**
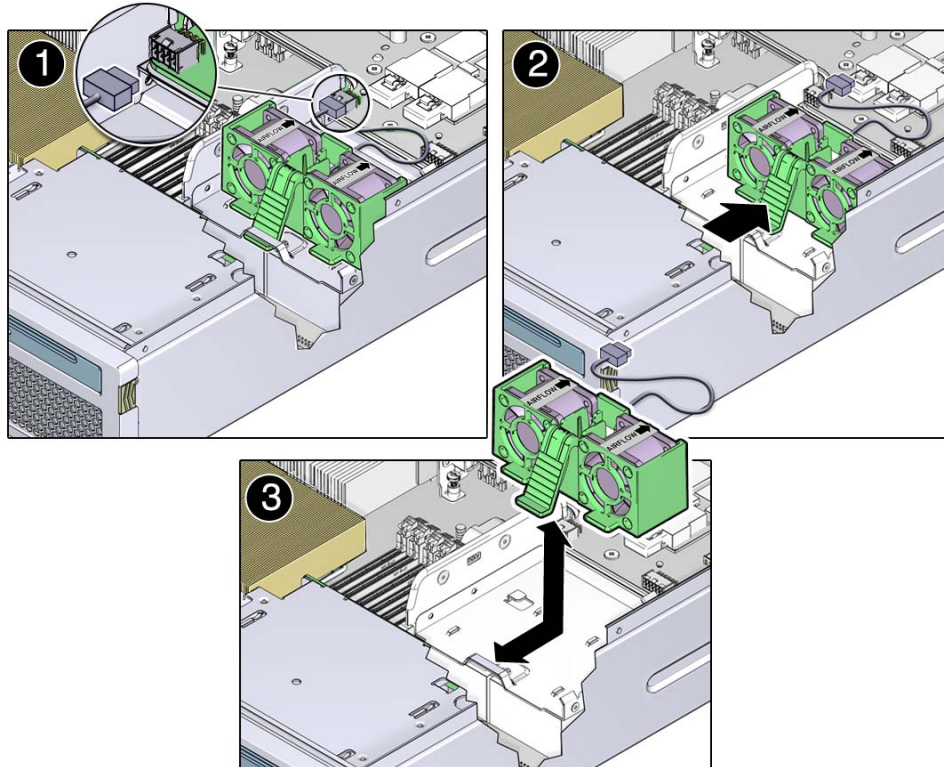
3. **Press and hold the release button on the fan tray 1 bracket, and pivot the fan tray upward.**

4. **Slide the bracket forward and lift the fan tray out of the system and set it on an antistatic mat.**

5. **Continue to "Install Fan Tray 1" on page 198.**

   Related Information

   - "Replacing the PCI Mezzanine" on page 101
   - "Install Fan Tray 1" on page 198

▼ Install Fan Tray 1

1.   Remove the replacement fan tray 1 from its packaging and place it on an antistatic mat.

2.   Lower the fan tray, and slide the fan tray 1 bracket back so that the tabs enter the slots.

⚠ **Caution -** To ensure proper system cooling, make sure the airflow direction arrow on the fan assembly points to the rear of the server.
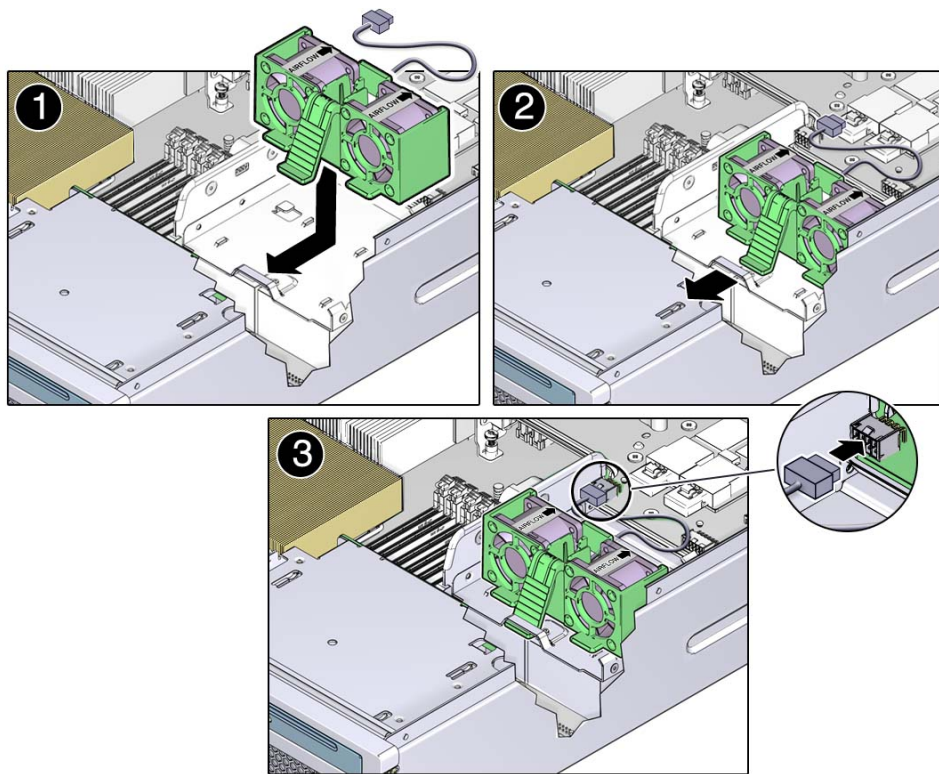
3.   Squeeze the fan tray handle until you can insert the front tab into the front slot.

4.   Connect the fan tray 1 cable to the PCI mezzanine.

5.   Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "Replacing the PCI Mezzanine" on page 101
- "Remove Fan Tray 1" on page 196

Replacing the LED Board

Follow these tasks to remove and install the LED board.

- "Remove the LED Board" on page 199
- "Install the LED Board" on page 201

Related Information

- "Replacing the PCI Mezzanine" on page 101

▼ Remove the LED Board

1. **Prepare the server for service**

   See "Preparing the Server for Component Replacement" on page 75.

2. **Remove the air duct.**

   See "Remove the Air Duct" on page 127.

3. **Remove the fan tray 0.**

   See "Remove Fan Tray 0" on page 189.

4. **Loosen the thumbscrew of the LED board and swing the board out to the left.**

> ⚠ **Caution -** Do not tug on the LED board cable. Hold the green thumbscrew when swinging the LED board out of the chassis.
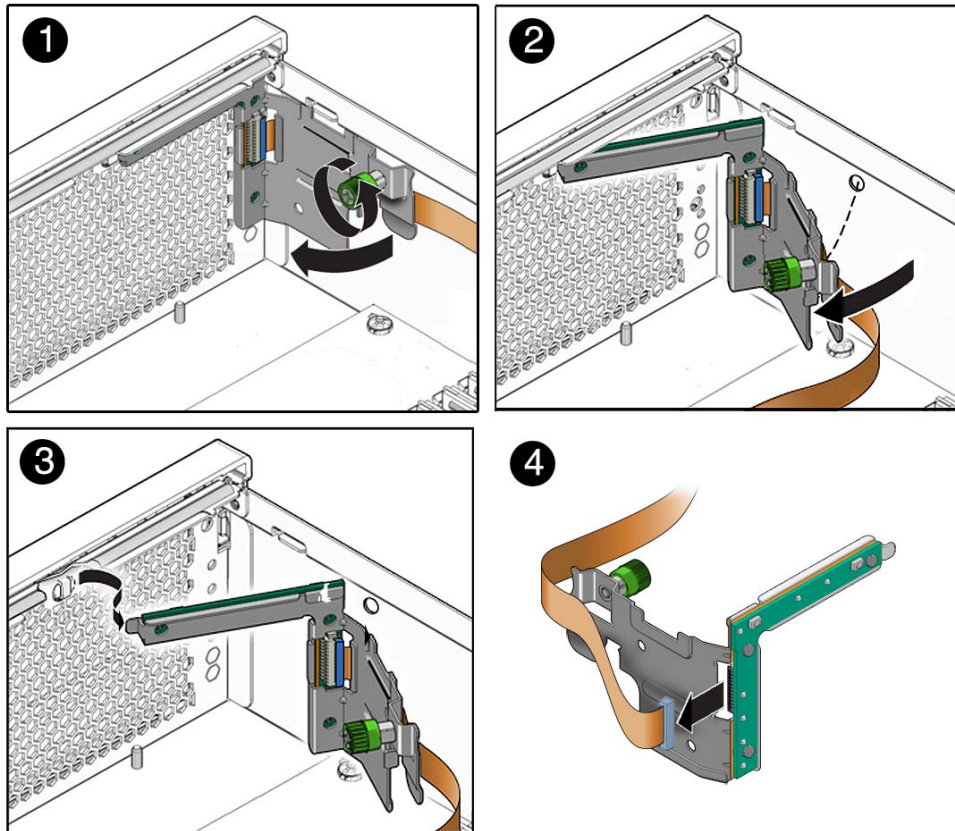
5. **Carefully lift the LED board and cable from the cable clips on the chassis wall.**

   You may need to disconnect the LED board cable from the PCI mezzanine.

6. **Disconnect the cable from the LED board.**

7. **Set the LED board aside on an antistatic mat.**

8. **Continue to "Install the LED Board" on page 201.**

Related Information

-
-
-

▼ Install the LED Board

1. **Remove the replacement LED board from its packaging and place it on an antistatic mat.**

2. **Connect the cable to the LED board.**
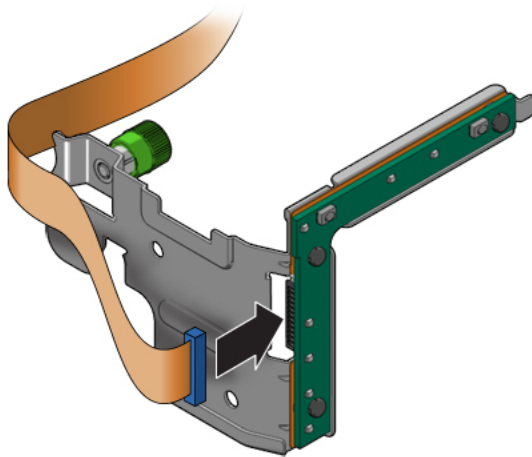
3. Insert the tab on the LED board into the slot on the chassis.
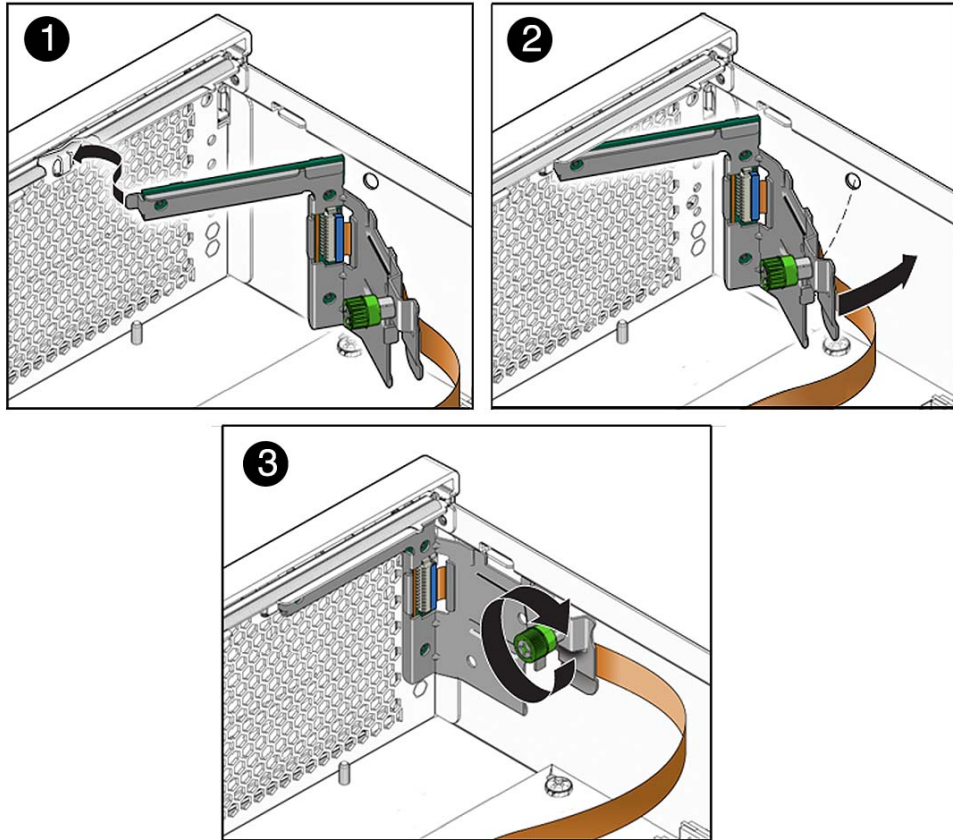
4. Swing the LED board right to the chassis and tighten the thumbscrew.

5. Route the LED board cable back into the cable guides along the chassis wall.

If you disconnected the cable from the PCI mezzanine, reattach the cable now.

6. Install fan tray 0.

See "Install Fan Tray 0" on page 190.

7. Install the air duct.

See "Install the Air Duct" on page 130.

8. Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "System Status LEDs" on page 19
- "User Alarm LEDs" on page 20
- "Remove the LED Board" on page 199

Replacing the Power Distribution Board

Follow these tasks to remove and install the power distribution board.

- "Remove the Power Distribution Board" on page 203
- "Install the Power Distribution Board" on page 206

Related Information

- "Replacing the Motherboard Assembly" on page 168
- "Replacing Power Supplies" on page 184

▼ Remove the Power Distribution Board

1. Prepare the server for service.

See "Preparing the Server for Component Replacement" on page 75.

2. Remove the following components to expose the power distribution board:

- "Remove a Power Supply" on page 184
- "Remove the Optical Media Drive" on page 91
- "Remove a Drive" on page 86
- "Remove Fan Tray 0" on page 189
- "Remove Fan Tray 2" on page 193
- "Remove the Media Bay Assembly" on page 93

3.   Disconnect the four cables from the power distribution board.
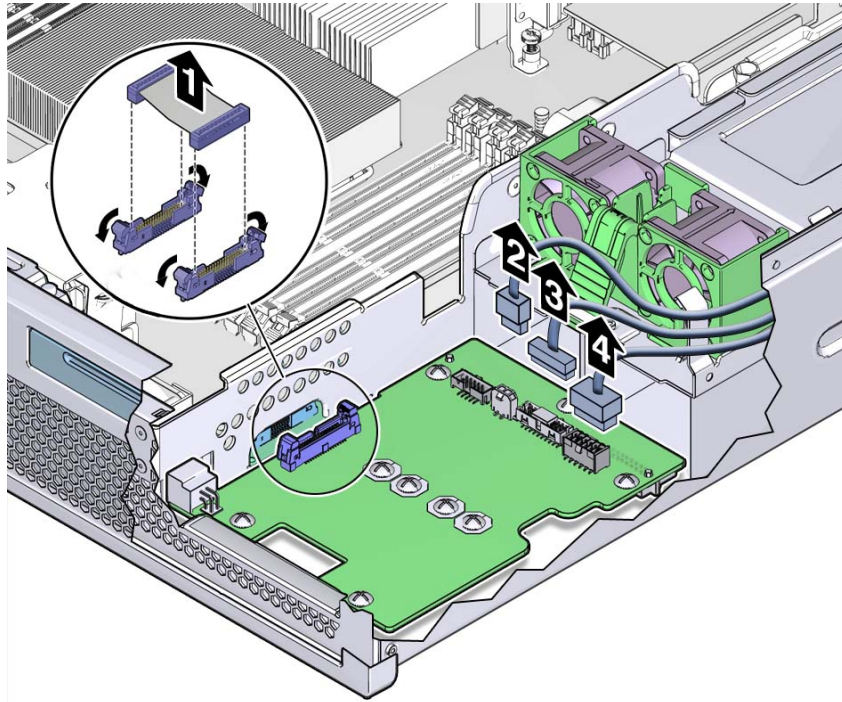
4.   Remove the screws that secure the power distribution board to the chassis.

There are five screws that secure the power distribution board to the chassis, and four screws that connect it to the bus bar.
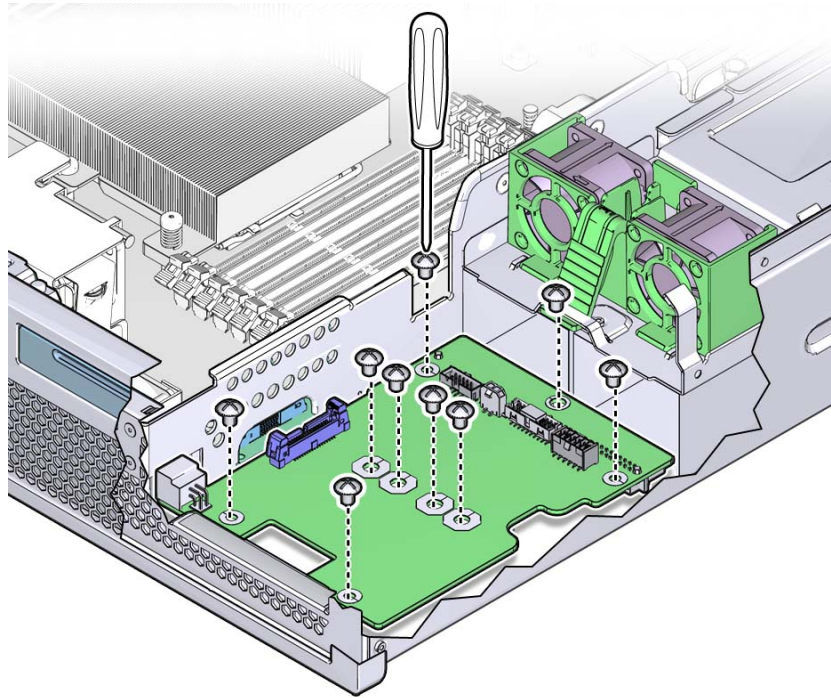
5.   Lift the power distribution board out of the chassis and set it aside on an antistatic mat.
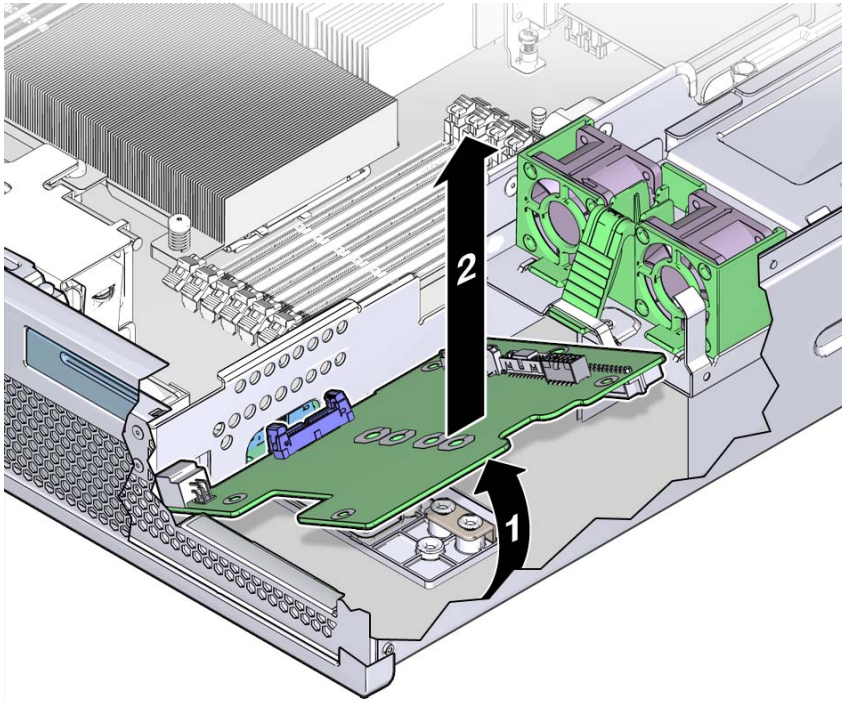
6.   Continue to "Install the Power Distribution Board" on page 206.

Related Information

- "Replacing the Media Bay Assembly" on page 93
- "Replacing Fan Tray 2" on page 192
- "Install the Power Distribution Board" on page 206

▼ Install the Power Distribution Board

1.   Remove the replacement power distribution board from its packaging and place it on an antistatic mat.

2. **Lower the power distribution board into the chassis, aligning the board???s holes with the standoffs in the chassis.**
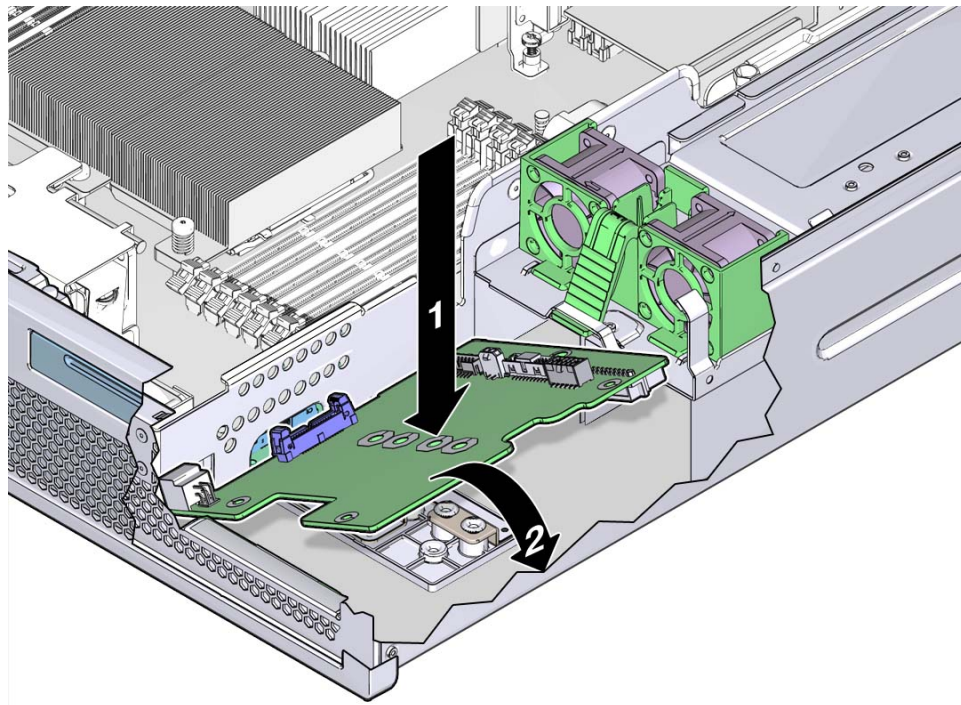
3. **Install the screws firmly to secure the power distribution board to the chassis.**

There are five screws that secure the power distribution board to the chassis, and four screws that connect it to the bus bar.
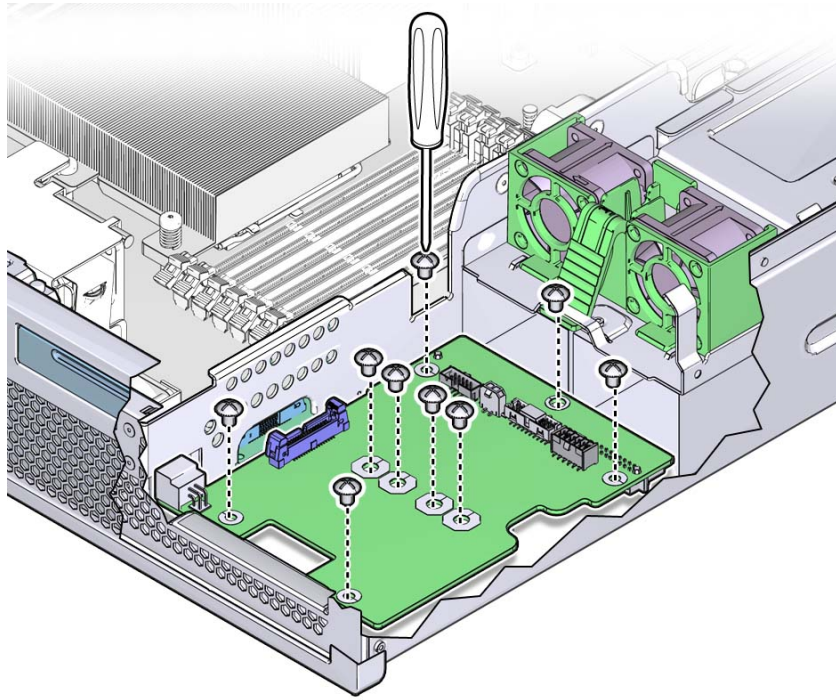
4.   Connect the four cables to the power distribution board.
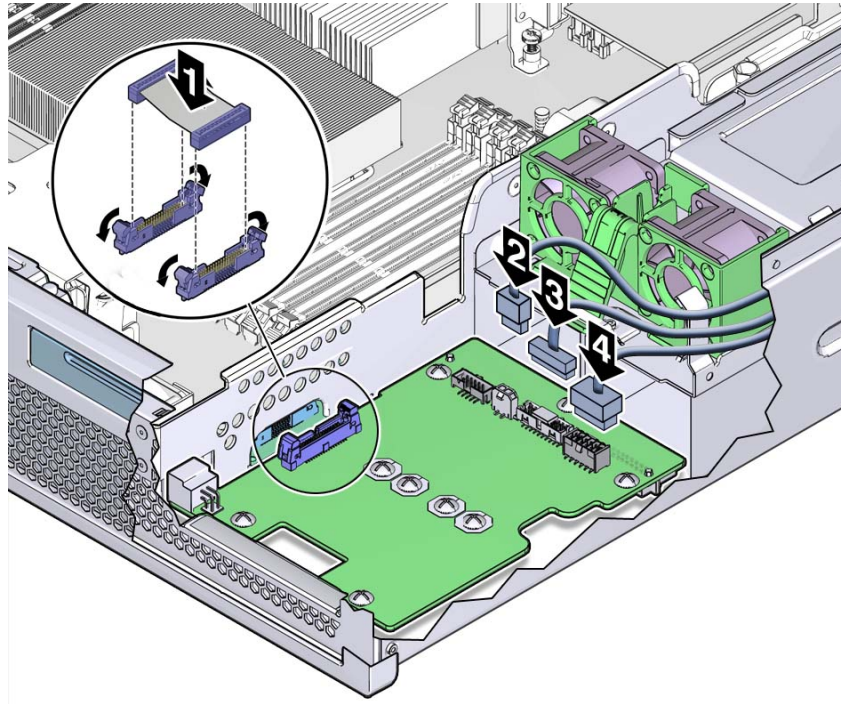
5.   Install the following components:

- "Install the Media Bay Assembly" on page 97
- "Install Fan Tray 2" on page 194
- "Install Fan Tray 0" on page 190
- "Install a Drive" on page 89
- "Install the Optical Media Drive" on page 92
- "Install a Power Supply" on page 187

6.   Return the server to operation.

See "Returning Server to Operation" on page 211.

Related Information

- "Replacing the Media Bay Assembly" on page 93

- "Replacing Fan Tray 2" on page 192
- "Remove the Power Distribution Board" on page 203

Returning Server to Operation

After replacing components inside of the server, perform the following tasks:

Related Information

▼ Install the Top Cover

1. **Place the top cover on the chassis.**

   Set the cover down so that it hangs over the rear of the server by about an inch (25 mm), and aligns with the "ALIGN TOP COVER TO HERE" label on top of the media bay assembly.

2.   Slide the cover forward until it latches into place.
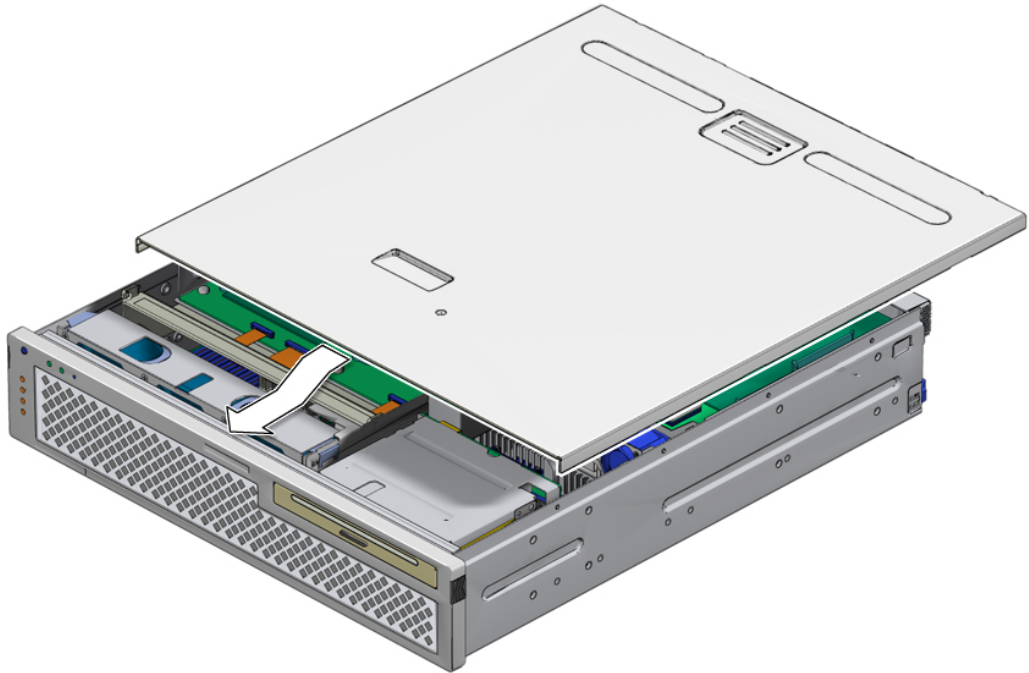
3.   Remove the antistatic precautions.

See "Remove Antistatic Measures" on page 212.

Related Information

- "Remove the Top Cover" on page 81
- "Remove Antistatic Measures" on page 212

▼   Remove Antistatic Measures

1.   Remove any antistatic straps or conductors from the server chassis.

2.   Remove the antistatic wrist strap from yourself.

Related Information

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▼ Reinstall the Server Chassis in the Rack

After servicing the system, reinstall it back into the rack.

⚠️ **Caution -** The server weighs approximately 41 lbs (18.6 kg). Two people are required to carry the chassis and install it in the rack.

- **Lift the server from the antistatic mat and reinstall the server into the rack.**

    Refer to the *Sun Netra X4270 Server Installation Guide* for the installation instructions specific to your rackmount kit.

Related Information

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▼ Reconnect Power and Data Cables

1. **Reconnect the data cables to the rear of the server, as appropriate.**

2. **Reconnect the power cables to the power supplies.**

3. **If necessary, reinstall the appropriate cables in to a cable management device.**

4. **Power on the server.**

    See .

Related Information

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▼ Power On the Server

As soon as the power cords are connected, standby power is applied. Depending on the configuration of the firmware, the system might boot. If not, follow this task.

● **Power on the server by performing one of the following:**

■ Press the Power button on the front bezel.
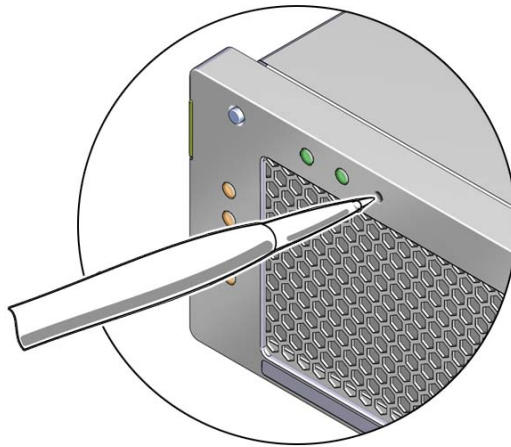
■ Log in to the ILOM SP, and type the following command at the ILOM prompt.

```
-> start /SYS
```

Related Information

■ "Powering Down the Server" on page 76
■ "Reconnect Power and Data Cables" on page 213

Identifying the Server Ports

These topics describe the pinouts of the server connectors.

Related Information

Gigabit Ethernet Ports

The server has four autonegotiating 10/100/1000BASE-T Gigabit Ethernet system domain ports. All four Ethernet ports use a standard RJ-45 connector. The transfer rates are shown in the following table.

Connection Type	IEEE Terminology	Transfer Rate
Ethernet	10BASE-T	10 Mbps
Fast Ethernet	100BASE-TX	100 Mbps
Gigabit Ethernet	1000BASE-T	1000 Mbps

The following figure and table describe the gigabit Ethernet port pin signals.
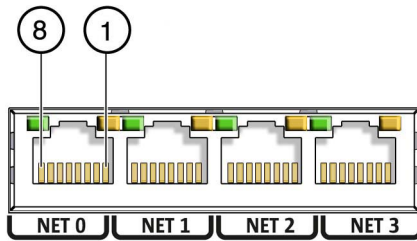
TABLE 8   Gigabit Ethernet Port Signals

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

Related Information

- "Rear Panel Cable Connections" on page 17
- "Ethernet Port LEDs" on page 24
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213

Network Management Port

The server has one 10BASE-T Ethernet management domain interface, labeled NET MGT. For information on configuring this port for managing the server with ILOM, refer to the ILOM 3.0 documentation.
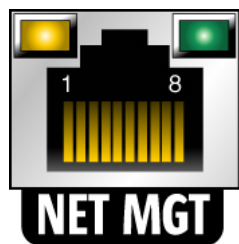
TABLE 9   Network Management Connector Signals

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

Related Information

- "Rear Panel Cable Connections" on page 17
- "Ethernet Port LEDs" on page 24
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213

Serial Management Port

The serial management connector (labeled SER MGT) is an RJ-45 connector that can be accessed from the rear panel. This port is the default connection to the server. Use this port *only* for server management.

Caution - You must use a shielded twisted-pair (STP) Ethernet cable to maintain your server???s NEBS compliance. The cable???s shield must be grounded at both ends.

The default serial connection settings for the serial port are:

Parameter	Setting
Connector	SERIAL MGT or l0l0l
Rate	9600 baud
Parity	None
Stop bits	1
Data bits	8

The following figure and table describe the pin descriptions of the SER MGT port.

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

If you need to connect to the SERIAL MGT port using a cable with either a DB-9 or a DB-25 connector, follow the pin descriptions in the following tables to create a crossover adapter appropriate for your serial connection.

TABLE 10   RJ-45 to DB-9 Adapter Crossovers Wiring Reference

Serial Port (RJ-45 Connector)		DB-9 Adapter	
Pin	Signal Description	Pin	Signal Description
1	RTS	8	CTS
2	DTR	6	DSR
3	TXD	2	RXD
4	Signal Ground	5	Signal Ground
5	Signal Ground	5	Signal Ground
6	RXD	3	TXD
7	DSR	4	DTR
8	CTS	7	RTS

TABLE 11   RJ-45 to DB-25 Adapter Crossovers Wiring Reference

Serial Port (RJ-45 Connector)		DB-25 Adapter	
Pin	Signal Description	Pin	Signal Description
1	RTS	5	CTS
2	DTR	6	DSR
3	TXD	3	RXD

Serial Port (RJ-45 Connector)		DB-25 Adapter	
Pin	Signal Description	Pin	Signal Description
4	Signal Ground	7	Signal Ground
5	Signal Ground	7	Signal Ground
6	RXD	2	TXD
7	DSR	20	DTR
8	CTS	4	RTS

Related Information

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-
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Video Connector

The video connector is an HD-15 connector that can be accessed from the back panel.
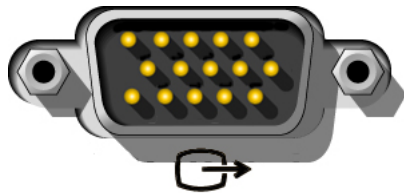
Pin	Signal Description	Pin	Signal Description
1	Red Video	9	[KEY]
2	Green Video	10	Sync Ground
3	Blue Video	11	Monitor ID - Bit 1
4	Monitor ID - Bit 2	12	Monitor ID - Bit 0
5	Ground	13	Horizontal Sync
6	Red Ground	14	Vertical Sync
7	Green Ground	15	N/C (Reserved)
8	Blue Ground		

Related Information

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Alarm Port

The alarm port on the rear panel uses a standard DB-15 connector. In a telecommunications environment, use this port to connect to the central office alarming system. The alarm port relay contacts are rated for 100 V 0.2 A maximum.
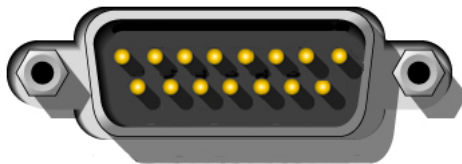
Pin	Signal Description	Pin	Signal Description
1	RESET0+	9	ALARM1_NC
2	RESET0-	10	ALARM1_COM
3	RESET1+	11	ALARM2_NO
4	RESET1-	12	ALARM2_NC
5	ALARM0_NO	13	ALARM2_COM
6	ALARM0_NC	14	ALARM3_NO
7	ALARM0_COM	15	ALARM3_COM
8	ALARM1_NO	CHASSIS	FRAME GND

Each alarm has a corresponding alarm LED on the front panel:

- ALARM0 and the Critical LED
- ALARM1 and the Major LED
- ALARM2 and the Minor LED
- ALARM3 and the User LED

Related Information

- "Rear Panel Cable Connections" on page 17
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213

USB Ports

The server has four USB ports for attaching supported USB 2.0 compliant devices. USB ports 0 and 1 are on the rear panel and USB ports 2 and 3 are on the motherboard.
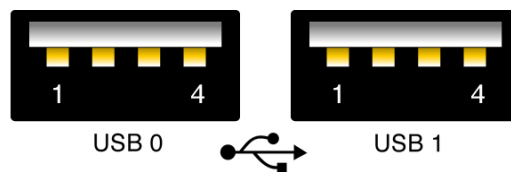
Pin	Signal Description
1	+5 V
2	DAT-
3	DAT+
4	Ground

Related Information

- "Rear Panel Cable Connections" on page 17
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213

External SAS Connector
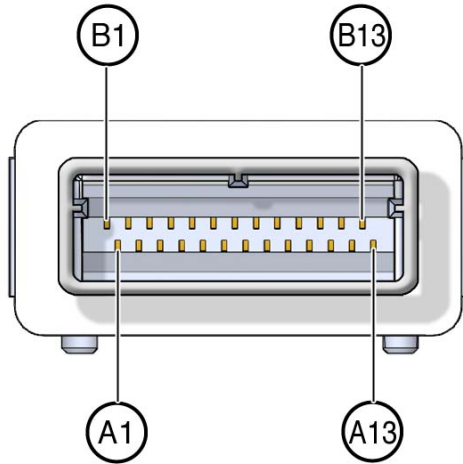
TABLE 12   External SAS SFF-8088 Connector Pin Descriptions

Pin	Description	Pin	Description
A2	RX0+	B12	TX3+
A3	RX0-	B8	TX2-
A5	RX1+	B9	TX2+
A6	RX1-	B5	TX1-
A8	RX2+	B6	TX1+
A9	RX2-	B2	TX0-
A11	RX3+	B3	TX0+
A12	RX3-	A1, A4, A7, A10, A13, B1, B4, B7, B10, B13	Signal Ground
B11	TX3-	Housing	Chassis Ground

Related Information

- "Rear Panel Cable Connections" on page 17
- "Disconnect Cables From the Server" on page 80
- "Reconnect Power and Data Cables" on page 213

PCI Mezzanine Auxiliary Power Connector

The 4-pin 12 volt power connector is located between the PCIe2 slots 4 and 5 on the PCI mezzanine.
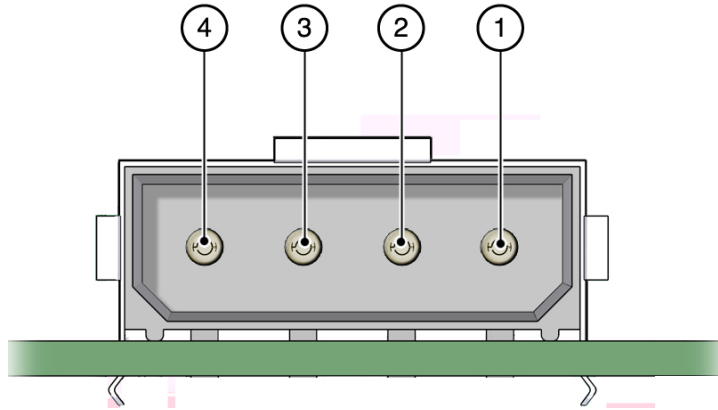
Pin	Description
4	Ground
3	Ground
2	+12 volt
1	+12 volt

Related Information

- "PCI Mezzanine Auxiliary Power Connector" on page 114
- "Replacing the PCI Mezzanine" on page 101
- "Replacing PCIe2 Cards in Slots 4 and 5" on page 115

Glossary

Numerics

2U   two rack units (3.5 in./89 mm).

A

ACPI   advanced configuration and power interface.

AWG   American wire gauge.

B

BIOS   basic input/output system.

BMC   baseboard management controller.

C

CLI   command-line interface.

CMA   cable management arm, used to route and secure cables extending from the rear of the system.

CMOS   complementary metal-oxide semiconductor. Refers to the memory used to store BIOS settings.

CTS   clear to send.

D

DB-15   15-pin d-subminiature connector.

DDR3 SDRAM   double-data rate three synchronous dynamic random access memory.

DHCP   Dynamic Host Configuration Protocol.

DIMM   dual in-line memory module.

DR   dual-rank DIMM.

E

ECC   error correction code.

EMI   electromagnetic interference.

ESD   electrostatic discharge.

ESM   energy storage module.

G

GRUB   GNU grand unified bootloader. An open source boot loader.

H

HBA   host bus adapter.

I

ILOM   Oracle Integrated Lights Out Manager. Firmware that enables you to manage the system even when system is shut down.

IM   integrated mirror.

IME   integrated mirror enhanced array.

IPMI   intelligent platform management interface.

IS   integrated striping array.

J

JBOD   just a bunch of disks.

K

KBC BAT   keyboard controller basic assurance test.

L

LED   light-emitting diode.

LSF   Low smoke fume.

M

MPS   multiprocessor specification.

N

NEBS   Network Equipment-Building Standards. Defined standards for equipment to be installed in a telecommunications central office. Telecordia maintains these standards and tests equipment for NEBS certification.

NET MGT   network management port. After connecting a network cable to this NET MGT port, you can configure the system ILOM SP through this port.

NIC   network interface card.

NTP   network time protocol.

NVRAM   non-volatile random access memory.

O

OS   operating system.

OSP   outside plant.

P

PCIe2   peripheral component interconnect express 2.0. Refers to cards or slots that support the PCI Express 2.0 specification.

PDB   power distribution board.

POST   power-on self-test.

PSH   predictive self-healing.

PSU   power supply unit.

PXE   preboot execution environment.

Q

QR DIMM   quad-rank DIMM.

R

RAID   redundant array of independent disks.

RAS   Reliability, Availability, and Serviceability.

RIS   remote installation services.

RPM   rotations per minute.

RTS   request to send.

S

S.M.A.R.T. self-monitoring, analysis, and reporting technology.

SAS   serial attached SCSI.

SATA	serial advanced technology attachment.
SCSI	small computer system interface.
SER MGT	serial management port. The default port for system management, especially during the initial system configuration.
SFF	small form factor.
SP	service processor.
SR DIMM	single-rank DIMM.
SSH	secure shell.
STP	shielded twisted pair.

T

TCG	Trusted Computing Group.
TPM	trusted platform module. For more information, refer to the Microsoft Windows Trusted Platform Module Management documentation.

U

US NEC	United States National Electrical Code. A United States standard for the installation of electrical wiring and equipment.
USB	universal serial bus.

V

VAC	volts of alternating current.
VDC	volts of direct (continuous) current.
VGA	video graphics array.
VT-d	virtualization technology for directed I/O.

W

WDT   watchdog timers.

Index

V
video port
   location,   17
   pinout,   219
visual notification,   29

W
watchdog timer, setting,   50
weight of server,   80