Sun Netra T5220 Server

Service Manual

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Contents

Preface

This manual describes how to troubleshoot the server and how to remove and install replaceable components. This manual is written for technicians, system administrators, authorized service providers, and users with advanced experience troubleshooting and replacing hardware.

- "Product Notes" on page ix
- "Related Documentation" on page x
- "Feedback" on page x
- "Support and Accessibility" on page x

Product Notes

For late-breaking information and known issues about this product, refer to the products notes at:

http://docs.oracle.com/cd/E19350-01/index.html

Related Documentation

Documentation	Link
All Oracle products	http://www.oracle.com/documentation
Sun Netra T5220 Server	http://docs.oracle.com/cd/E19350-01/index.html
Oracle Solaris OS and systems software library	http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw

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Support and Accessibility

Description	Links
Access electronic support through My Oracle Support	http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info
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	http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs
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Server Diagnostics

This chapter describes the diagnostics that are available for monitoring and troubleshooting the server.

The following topics are covered:

1.1 Fault on Initial Power Up

If you have installed the server, and upon initial power up, you see errors indicating faults with the Fully Buffered DIMMs (FB-DIMMs), PCI cards, or other components, the suspect component might have become loosened or ajar during shipment.

Conduct a visual inspection of the server internals and its components. Remove the top cover and physically reseat the cable connections, the PCI cards, and the FB-DIMMs. See:

- Section 2.3, "Prerequisite Tasks for Component Replacement" on page 2-3
- Section 4.2, "Replacing PCI-X, PCIe/XAUI Cards" on page 4-2
- Section 4.6, "Replacing FB-DIMMs" on page 4-23.

If performing these tasks is not successful, then continue to Section 1.2, "Server Diagnostics Overview" on page 1-2.

1.2 Server Diagnostics Overview

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

- **LEDs** – These indicators provide a quick visual notification of the status of the server and of some of the FRUs.
- **Fault management architecture** – FMA provides simplified fault diagnostics through use of the /var/adm/messages file, the fmdump command, and a Sun Microsystems web site.
- **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 Solaris Predictive Self-Healing technology to keep the system up and running even when there is a faulty component.
- **Power-on self-test (POST)** – POST performs diagnostics on system components upon system reset to ensure the integrity of those components. POST is configurable and works with ILOM to take faulty components offline if needed.
- **Solaris OS Predictive Self-Healing (PSH)** – This 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 Sun systems to accurately predict component failures and mitigate many serious problems before they occur.
- **Log files and console messages** – These provide the standard Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
- **SunVTS™** – 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.

The diagnostic flowchart in FIGURE 1-1 and TABLE 1-1 describes an approach for using the server diagnostics to identify a faulty field-replaceable unit (FRU). The diagnostics you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting. So you might perform some actions and not others.

The flowchart assumes that you have already performed some rudimentary troubleshooting such as verification of proper installation, visual inspection of cables and power, and possibly performed a reset of the server (refer to the server installation guide and server administration guide for details).

Use this flowchart to understand what diagnostics are available to troubleshoot faulty hardware. Use TABLE 1-1 to find more information about each diagnostic in this chapter.

FIGURE 1-1 Diagnostic Flowchart
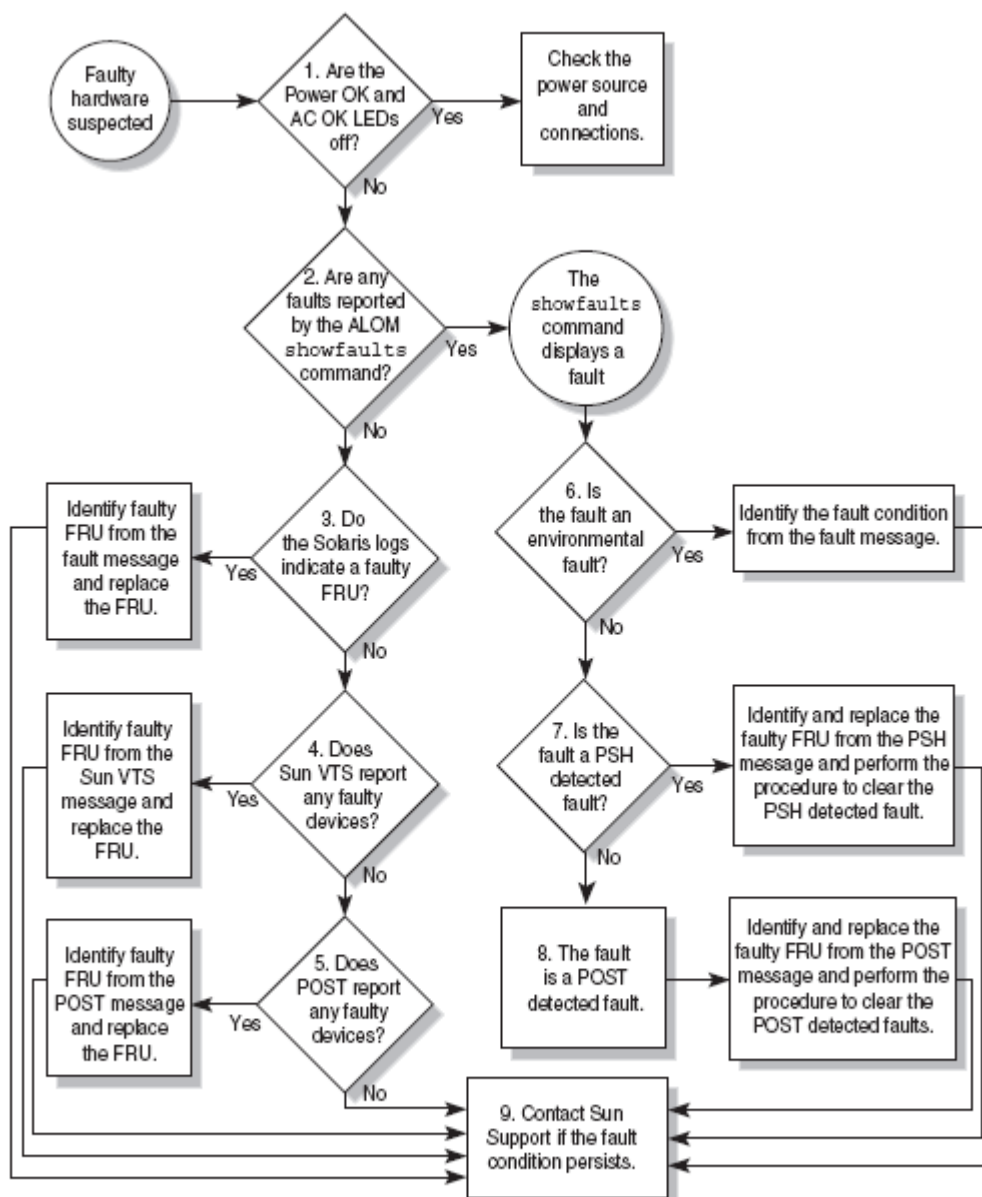
TABLE 1-1   Diagnostic Flowchart Actions

Action No.	Diagnostic Action	Resulting Action	Additional Information
1.	Check Power OK and Input OK LEDs on the server.	The Power OK LED is located on the front and rear of the chassis. The Input OK LED is located on the rear of the server on each power supply. If these LEDs are not on, check the power source and power connections to the server.	Section 1.3, "Using LEDs to Identify the State of Devices" on page 1-8
2.	Run the ALOM CMT CLI showfaults command to check for faults.	The showfaults command displays the following kinds of faults: • Environmental faults • Solaris Predictive Self-Healing (PSH) detected faults • POST detected faults Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see TABLE 2-1.	Section 1.4.4, "Displaying System Faults" on page 1-21
3.	Check the Solaris log files for fault information.	The Solaris message buffer and log files record system events and provide information about faults. • If system messages indicate a faulty device, replace the FRU. • To obtain more diagnostic information, go to Action 4.	Section 1.7, "Collecting Information From Solaris OS Files and Commands" on page 1-42
4.	Run SunVTS.	SunVTS is an application you can run to exercise and diagnose FRUs. To run SunVTS, the server must be running the Solaris OS. • If SunVTS reports a faulty device replace the FRU. • If SunVTS does not report a faulty device, go to Action 5.	Section 1.9, "Exercising the System With SunVTS Software" on page 1-46
5.	Run POST.	POST performs basic tests of the server components and reports faulty FRUs. • If POST indicates a faulty FRU, replace the FRU. • If POST does not indicate a faulty FRU, go to Action 9.	Section 1.5, "Running POST" on page 1-27

TABLE 1-1   Diagnostic Flowchart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	Additional Information
6.	Determine if the fault is an environmental fault.	If the fault listed by the showfaults command displays a temperature or voltage fault, then the fault is an environmental fault. Environmental faults can be caused by faulty FRUs (power supply, fan, or blower), or by environmental conditions such as when computer room ambient temperature is too high, or the server airflow is blocked. When the environmental condition is corrected, the fault will automatically clear.	Section 1.4.4, "Displaying System Faults" on page 1-21
		If the fault indicates that a fan, blower, or power supply is bad, you can perform a hot-swap of the FRU. You can also use the fault LEDs on the server to identify the faulty FRU (fans, blower, and power supplies).	Section 1.3, "Using LEDs to Identify the State of Devices" on page 1-8
7.	Determine if the fault was detected by PSH.	If the fault message displays the following text, the fault was detected by the Solaris Predictive Self-Healing software: Host detected fault	Section 1.6, "Using the Solaris Predictive Self-Healing Feature" on page 1-37
		If the fault is a PSH detected fault, identify the faulty FRU from the fault message and replace the faulty FRU.	Section 1.6.2, "Clearing PSH Detected Faults" on page 1-40
		After replacing the FRU, perform the procedure to clear PSH detected faults.	
8.	Determine if the fault was detected by POST.	POST performs basic tests of the server components and reports faulty FRUs. When POST detects a faulty FRU, it logs the fault and if possible, takes the FRU offline. POST detected FRUs display the following text in the fault message: *FRU-name* deemed faulty and disabled	Section 1.5, "Running POST" on page 1-27
		In this case, replace the FRU and run the procedure to clear POST detected faults.	Section 1.5.5, "Clearing POST Detected Faults" on page 1-35

1.2.1   Memory Configuration and Fault Handling

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems. This section describes how the memory is configured and how the server deals with memory faults.

1.2.1.1 Memory Configuration

In the server memory there are 16 slots that hold DDR-2 memory FB-DIMMs in the following FB-DIMM sizes:

- 1 Gbyte (maximum of 16 Gbyte)
- 2 Gbyte (maximum of 32 Gbyte)
- 4 Gbyte (maximum of 64 Gbyte)

FB-DIMMs are installed in groups of 8, called *ranks* (ranks 0 and 1). At minimum, rank 0 must be fully populated with eight FB-DIMMs of the same capacity. A second rank of FB-DIMMs of the same capacity can be added to fill rank 1.

See Section 4.6, "Replacing FB-DIMMs" on page 4-23 for instructions about adding memory to a server.

1.2.1.2 Memory Fault Handling

The server uses an advanced ECC technology, called *chipkill*, that corrects up to 4 bits in error on nibble boundaries, as long as all of the bits are in the same DRAM. If a DRAM fails, the FB-DIMM continues to function.

The following server features independently manage memory faults:

- **POST** – Based on ILOM configuration variables, POST runs when the server is powered on.

  For correctable memory errors (CEs), POST forwards the error to the Solaris Predictive Self-Healing (PSH) daemon for error handling. If an uncorrectable memory fault is detected or if a "storm" of CEs is detected, POST displays the fault with the device name of the faulty FB-DIMMs, logs the fault, and disables the faulty FB-DIMMs by placing them in the ASR blacklist. Depending on the memory configuration and the location of the faulty FB-DIMM, POST disables half of physical memory in the system, or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty FB-DIMMs based on the fault message. You then must enable the disabled FB-DIMMs with the ALOM CMT CLI `enablecomponent` command.

- **Solaris Predictive Self-Healing (PSH) technology** – A feature of the Solaris OS, uses the fault manager daemon (`fmd`) to watch for various kinds of faults. When a fault occurs, the fault is assigned a unique fault ID (UUID), and logged. PSH reports the fault and provides a recommended proactive replacement for the FB-DIMMs associated with the fault.

1.2.1.3 Troubleshooting Memory Faults

If you suspect that the server has a memory problem, follow the flowchart (FIGURE 1-1). Run the ALOM CMT compatability CLI (in ILOM) `showfaults` command, see Section 1.4.1, "Using the ALOM CMT Compatibility CLI in ILOM" on page 1-16 and Section 1.4.4, "Displaying System Faults" on page 1-21. The `showfaults` command lists memory faults and lists the specific FB-DIMMS that are associated with the fault. Once you identify which FB-DIMMs to replace, see Section 4.6, "Replacing FB-DIMMs" on page 4-23 for FB-DIMM replacement instructions. You must perform the instructions in that chapter to clear the faults and enable the replaced FB-DIMMs.

1.3 Using LEDs to Identify the State of Devices

The server provides the following groups of LEDs:

- Section 1.3.1, "Front and Rear Panel LEDs" on page 1-8
- Section 1.3.2, "Hard Drive LEDs" on page 1-12
- Section 1.3.3, "Power Supply LEDs" on page 1-12
- Section 1.3.4, "Ethernet Port LEDs" on page 1-13

These LEDs provide a quick visual check of the state of the system.

1.3.1 Front and Rear Panel LEDs

The seven front panel LEDs (FIGURE 1-2) are located in the upper left corner of the server chassis. Three of these LEDs are also provided on the rear panel (FIGURE 1-3).

FIGURE 1-2   Location of the Bezel Server Status and Alarm Status Indicators
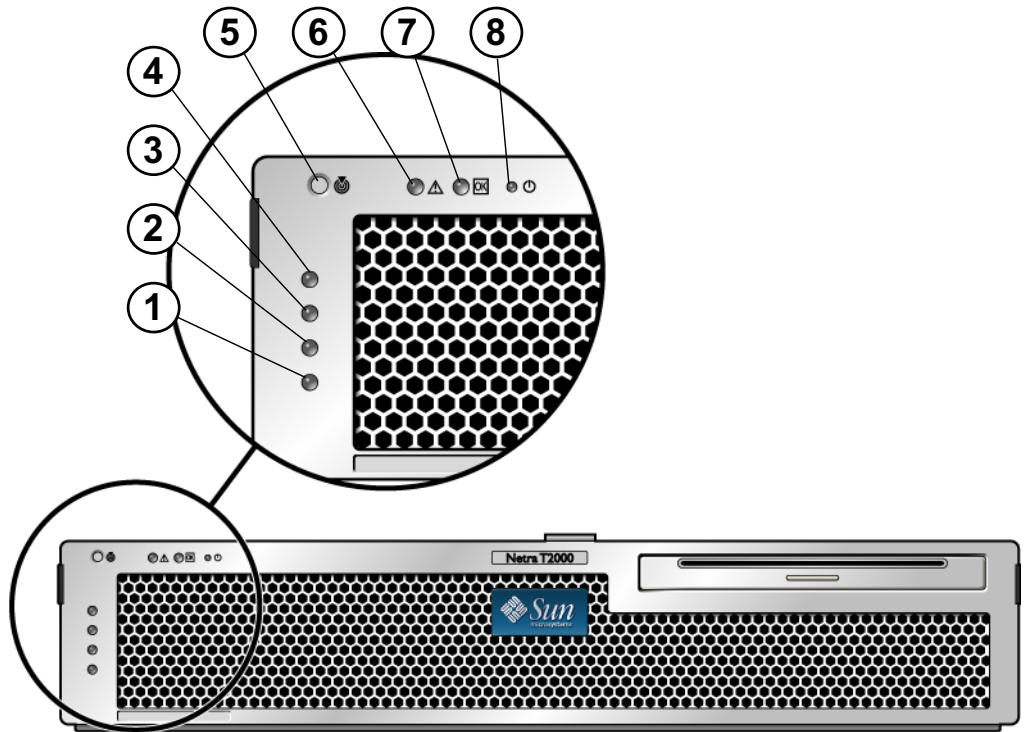
Figure Legend

1	User (amber) Alarm Status Indicator	**5**	Locator LED and Button
2	Minor (amber) Alarm Status Indicator	**6**	Fault LED
3	Major (red) Alarm Status Indicator	**7**	Activity LED
4	Critical (red) Alarm Status Indicator	**8**	Power OK LED

FIGURE 1-3   Rear Panel Connectors, LEDs, and Features on the Sun Netra T5220 Server

Figure Legend
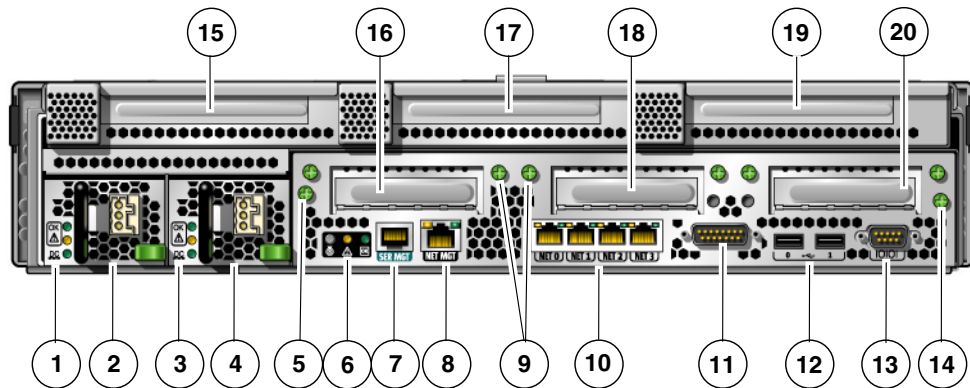
#	Description	#	Description
1	Power Supply 0 LEDs top to bottom: Locator LED and Button, Service Required LED, Power OK LED	11	Alarm Port
2	Power Supply 0	12	USB ports left to right: USB0, USB1
3	Power Supply 1 LEDs top to bottom: Locator LED Button, Service Required LED, Power OK LED	13	TTYA Serial Port
4	Power Supply 1	14	Captive screw for securing motherboard (2 of 2)
5	Captive screw for securing motherboard (1 of 2)	15	PCI-X Slot 3
6	System LEDs left to right: Locator LED Button, Service Required LED, Power OK LED	16	PCIe or XAUI Slot 0
7	Service Processor Serial Management Port	17	PCI-X Slot 4
8	Service Processor Network Management Port	18	PCIe or XAUI Slot 1
9	Captive screws for securing the bottom PCI cards. Note that there are two screws on either side of each bottom PCI card (total 6).	19	PCIe Slot 5
10	Gigabit Ethernet Ports left to right: NET0, NET1, NET2, NET3	20	PCIe Slot 2

TABLE 1-2 lists and describes the front and rear panel LEDs.

TABLE 1-2   Front and Rear Panel LEDs

LED	Location	Color	Description
Locator LED and Button	Front upper left and rear center	White	Enables you to identify a particular server. The LED is activated using one of the following methods: • Issuing the `setlocator on` or `off` command. • Pressing the button to toggle the indicator on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – The server received a signal as a result of one of the preceding methods.
Fault LED	Front upper left and rear center	Amber	If on, indicates that service is required. The ALOM CMT CLI `showfaults` command provides details about any faults that cause this indicator to be lit.
Activity LED	Front upper left	Green	• On – Drives are receiving power. Solidly lit if drive is idle. • Flashing – Drives are processing a command. • Off – Power is off.
Power Button	Front upper left		Turns the host system on and off. This button is recessed to prevent accidental server power-off. Use the tip of a pen to operate this button.
Alarm:Critical LED	Front left	Red	Indicates a critical alarm. Refer to the server administration guide for a description of alarm states.
Alarm:Major LED	Front left	Red	Indicates a major alarm.
Alarm:Minor LED	Front left	Amber	Indicates a minor alarm.
Alarm :User LED	Front left	Amber	Indicates a user alarm.
Power OK LED	Rear center	Green	The LED provides the following indications: • Off – The system is unavailable. Either the system has no power or ILOM is not running. • Steady on – Indicates that the system is powered on and is running it its normal operating state. • Standby blink – Indicates that the service processor is running while the system is running at a minimum level in Standby mode, and is ready to be returned to its normal operating state. • Slow blink – Indicates that a normal transitory activity is taking place. The system diagnostics might be running, or that the system might be booting.

1.3.2 Hard Drive LEDs

The hard drive LEDs (FIGURE 1-4 and TABLE 1-3) are located on the front of each hard drive that is installed in the server chassis.

FIGURE 1-4   Hard Drive LEDs
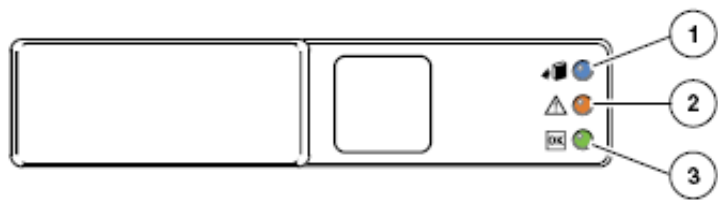
Figure Legend

1	OK to Remove
2	Fault
3	Activity

TABLE 1-3   Hard Drive LEDs

LED	Color	Description
OK to Remove	Blue	• On – The drive is ready for hot-plug removal. • Off – Normal operation.
Fault	Amber	• On – The drive has a fault and requires attention. • Off – Normal operation.
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.

1.3.3 Power Supply LEDs

The power supply LEDs (FIGURE 1-5 and TABLE 1-4) are located on the rear of each power supply.

FIGURE 1-5 Power Supply LEDs
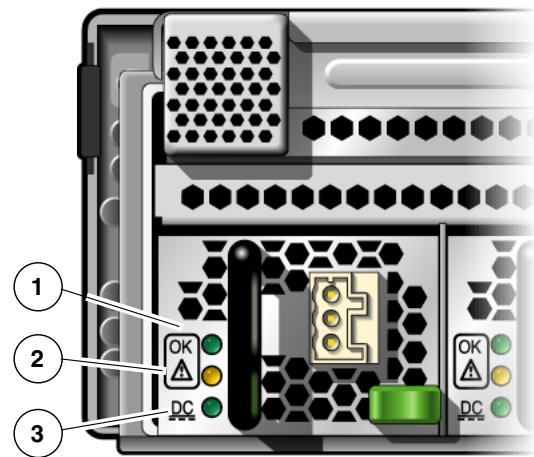
Figure Legend

1	Power OK power supply LED
2	Fault power supply LED
3	Input OK power supply LED

TABLE 1-4 Power Supply LEDs

LED	Color	Description
Power OK	Green	• On – Normal operation. DC output voltage is within normal limits. • Off – Power is off.
Fault	Amber	• On – Power supply has detected a failure. • Off – Normal operation.
Input OK	Green	• On – Normal operation. Input power is within normal limits. • Off – No input voltage, or input voltage is below limits.

1.3.4 Ethernet Port LEDs

The ILOM management Ethernet port and the four 10/100/1000 Mbps Ethernet ports each have two LEDs, as shown in FIGURE 1-6 and described in TABLE 1-5.

FIGURE 1-6 Ethernet Port LEDs
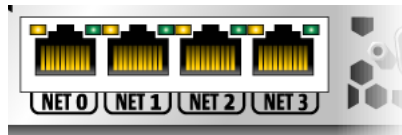
Figure Legend

1	Link/Activity indicator LED (Same location for all Ethernet ports)
2	Speed indicator LED (Same location for all Ethernet ports)

TABLE 1-5 Ethernet Port LEDs

LED	Color	Description
Left LED	Green	Link/Activity indicator: • Steady On – a link is established. • Blinking – there is activity on this port. • Off – No link is established.
Right LED	Amber or Green	Speed indicator: • Amber On – The link is operating as a Gigabit connection (1000-Mbps) • Green On – 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 (never amber).

1.4 Using the Service Processor Firmware for Diagnosis and Repair Verification

The Sun Integrated Lights Out Manager (ILOM) firmware is a service processor in the server that enables you to remotely manage and administer your server.

ILOM enables you to remotely run diagnostics, such as power-on self-test (POST), that would otherwise require physical proximity to the server's serial port. You can also configure ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ILOM.

The service processor runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server operating system goes offline or when the server is powered off.

Note – ILOM provides an ALOM CMT compatibility CLI. Refer to the *Sun Integrated Lights Out Management 2.0 Supplement for the Sun Netra T5220 Server* for comprehensive ILOM and ALOM CMT compatibility information.

Faults detected by ILOM, POST, and the Solaris Predictive Self-Healing (PSH) technology are forwarded to ILOM for fault handling (FIGURE 1-7).

In the event of a system fault, ILOM ensures that the fault LED is lit, FRU ID PROMs are updated, the fault is logged, and alerts are displayed (faulty FRUs are identified in fault messages using the FRU name). For a list of FRU names, see TABLE 2-1.

FIGURE 1-7 ILOM Fault Management
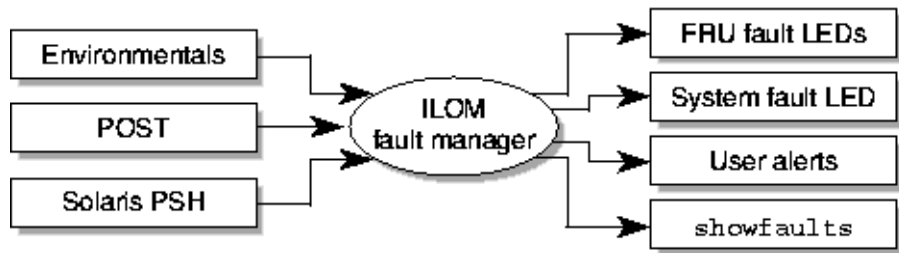
The service processor detects when a fault is no longer present and clears the fault in several ways:

- **Fault recovery** – The system automatically detects that the fault condition is no longer present. ILOM extinguishes the Service Required LED and updates the FRU's PROM, indicating that the fault is no longer present.

- **Fault repair** – The fault has been repaired by human intervention. In most cases, the service processor detects the repair and extinguishes the Service Required LED. If the service processor does not perform these actions, you must perform these tasks manually with the clearfault or enablecomponent commands.

The service processor also detects the removal of a FRU, in many cases even if the FRU is removed while the service processor is powered off (that is, if the system power cables are unplugged during service procedures). This situation enables ILOM to know that a fault, diagnosed to a specific FRU, has been repaired.

Note – ILOM does not automatically detect hard drive replacement.

Many environmental faults can automatically recover. A temperature that is exceeding a threshold might return to normal limits. An unplugged power supply can be plugged in, and so on. Recovery of environmental faults is automatically detected. Recovery events are reported using one of two forms:

- *fru* at *location* is OK.

- *sensor* at *location* is within normal range.

Environmental faults can be repaired through hot-removal of the faulty FRU. FRU removal is automatically detected by the environmental monitoring, and all faults associated with the removed FRU are cleared. The message for that case, and the alert sent for all FRU removals is:

fru at *location* has been removed.

There is no ILOM command to manually repair an environmental fault.

The Solaris Predictive Self-Healing technology does not monitor the hard drive for faults. As a result, the service processor does not recognize hard drive faults, and will not light the fault LEDs on either the chassis or the hard drive itself. Use the Solaris message files to view hard drive faults. See Section 1.7, "Collecting Information From Solaris OS Files and Commands" on page 1-42.

1.4.1   Using the ALOM CMT Compatibility CLI in ILOM

There are three methods of interacting with the service processor:

- ILOM CLI (default)

- ILOM browser interface (BI)

- ALOM CMT compatibility CLI (ALOM CMT CLI in ILOM)

Note – The examples in this section use the ALOM CMT compatibility CLI.

The ALOM CMT CLI emulates the ALOM CMT interface supported on the previous generation of CMT servers. Using the ALOM CMT CLI (with few exceptions) you can use commands that resemble the ALOM CMT commands. The comparisons between the ILOM CLI and The ALOM CMT compatibility CLI are described in the *Sun Integrated Lights Out Management 2.0 Supplement for the Sun Netra T5220 Server*.

The service processor sends alerts to all ALOM CMT CLI users that are logged in, sending the alert through email to a configured email address, and writing the event to the ILOM event log.

1.4.2 Creating an ALOM CMT CLI Shell

To create an ALOM CMT CLI, do the following:

1. **Log in to the service processor with username:** root**.**

   When powered on, the service processor boots to the ILOM login prompt. The factory default password is changeme.

```
SUNSPxxxxxxxxxxxx login: root
Password:
Waiting for daemons to initialize...

Daemons ready

Sun(TM) Integrated Lights Out Manager

Version 2.0.0.0

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Warning: password is set to factory default.
```

2. **Create a new user**, **set the account role to** Administrator **and the CLI mode to** alom**.**

```
-> create /SP/users/admin
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
-> set /SP/users/admin role=Administrator
Set 'role' to 'Administrator'
-> set /SP/users/admin cli_mode=alom
Set 'cli_mode' to 'alom'
```

Note – The asterisks in the example will not appear when you enter your password.

You can combine the create and set commands on a single line:

```
-> create /SP/users/admin role=Administrator cli_mode=alom
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
```

3. Log out of the `root` **account after you have finished creating the new account.**

```
-> exit
```

4. Log in to the ALOM CMT CLI (indicated by the `sc>` **prompt) from the ILOM login prompt.**

```
SUNSPxxxxxxxxxxxx login: admin
Password:
Waiting for daemons to initialize...

Daemons ready

Sun(TM) Integrated Lights Out Manager

Version 2.0.0.0

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sc>
```

Note – Multiple service processor accounts can be active concurrently. A user can be logged in under one account using the ILOM CLI, and another account using the ALOM CMT CLI.

1.4.3 Running ALOM CMT CLI Service-Related Commands

This section describes commands commonly used for service-related activities.

1.4.3.1 Connecting to ALOM CMT CLI

Before you can run ALOM CMT CLI commands, you must connect to the service processor in one of two ways:

- Connect an ASCII terminal directly to the serial management port.
- Use the `ssh` command to connect to the service processor through an Ethernet connection on the network management port.

Note – Refer to the *Sun Integrated Lights Out Management 2.0 Supplement for the Sun Netra T5220 Server* for instructions on configuring and connecting to the service processor.

1.4.3.2   Switching Between the System Console and Service Processor

- To switch from the console output to the ALOM CMT CLI sc> prompt, type **#.** (Hash-Period).
- To switch from the sc> prompt to the console, type **console**.

1.4.3.3   Service-Related ALOM CMT CLI Commands

TABLE 1-6 describes the typical ALOM CMT CLI commands for servicing a server. For descriptions of all ALOM CMT CLI commands, issue the help command or refer to the *Integrated Lights Out Management User's Guide*.

TABLE 1-6   Service-Related ALOM CMT CLI Commands

ALOM CMT Command	Description
help [*command*]	Displays a list of all ALOM CMT CLI commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
break [-y][-c][-D]	Takes the host server from the OS to either kmdb or OpenBoot PROM (equivalent to a Stop-A), depending on the mode Solaris software was booted. • -y skips the confirmation question • -c executes a console command after the break command completes • -D forces a core dump of the Solaris OS
clearfault *UUID*	Manually clears host-detected faults. The UUID is the unique fault ID of the fault to be cleared.
console [-f]	Connects you to the host system. The -f option forces the console to have read and write capabilities.
consolehistory [-b *lines*|-e *lines*|-v] [-g *lines*] [boot|run]	Displays the contents of the system's console buffer. The following options enable you to specify how the output is displayed: • -g *lines* specifies the number of lines to display before pausing. • -e *lines* displays *n* lines from the end of the buffer. • -b *lines* displays *n* lines from beginning of buffer. • -v displays entire buffer. • boot|run specifies the log to display (run is the default log).

TABLE 1-6 Service-Related ALOM CMT CLI Commands *(Continued)*

ALOM CMT Command	Description
bootmode [normal|reset_nvram| bootscript=*string*]	Enables control of the firmware during system initialization with the following options: • normal is the default boot mode. • reset_nvram resets OpenBoot PROM parameters to their default values. • bootscript=*string* enables the passing of a string to the boot command.
powercycle [-f]	Performs a poweroff followed by poweron. The -f option forces an immediate poweroff, otherwise the command attempts a graceful shutdown.
poweroff [-y] [-f]	Powers off the host server. The -y option enables you to skip the confirmation question. The -f option forces an immediate shutdown.
poweron [-c]	Powers on the host server. Using the -c option executes a console command after completion of the poweron command.
removefru PS0|PS1	Indicates if it is okay to perform a hot-swap 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 enabled.
reset [-y] [-c]	Generates a hardware reset on the host server. The -y option enables you to skip the confirmation question. The -c option executes a console command after completion of the reset command.
resetsc [-y]	Reboots the service processor. The -y option enables you to skip the confirmation question.
setkeyswitch [-y] normal | stby | diag | locked	Sets the virtual keyswitch. The -y option enables you to skip the confirmation question when setting the keyswitch to stby.
setlocator [on | off]	Turns the Locator LED on the server on or off.
showenvironment	Displays the environmental status of the host server. This information includes system temperatures, power supply, front panel LED, hard drive, fan, voltage, and current sensor status. See Section 1.4.6, "Displaying the Server's Environmental Status" on page 1-23.
showfaults [-v]	Displays current system faults. See Section 1.4.4, "Displaying System Faults" on page 1-21.
showfru [-g *lines*] [-s | -d] [*FRU*]	Displays information about the FRUs in the server. • -g *lines* specifies the number of lines to display before pausing the output to the screen. • -s displays static information about system FRUs (defaults to all FRUs, unless one is specified). • -d displays dynamic information about system FRUs (defaults to all FRUs, unless one is specified). See Section 1.4.7, "Displaying FRU Information" on page 1-25.

TABLE 1-6   Service-Related ALOM CMT CLI Commands *(Continued)*

ALOM CMT Command	Description
showkeyswitch	Displays the status of the virtual keyswitch.
showlocator	Displays the current state of the Locator LED as either on or off.
showlogs [-b *lines* | -e *lines* | -v] [-g *lines*] [-p logtype[r|p]]]	Displays the history of all events logged in the ALOM CMT event buffers (in RAM or the persistent buffers).
showplatform [-v]	Displays information about the host system's hardware configuration, the system serial number, and whether the hardware is providing service.

Note – See TABLE 1-10 for the ALOM CMT CLI automatic system recover (ASR) commands.

1.4.4   Displaying System Faults

The ALOM CMT CLI showfaults command displays the following kinds of faults:

- **Environmental or configuration faults** – System configuration faults, or temperature or voltage problems that might be caused by faulty FRUs (power supplies, fans, or blower), or by room temperature or blocked air flow to the server.

- **POST detected faults** – Faults on devices detected by the power-on self-test diagnostics.

- **PSH detected faults** – Faults detected by the Solaris Predictive Self-healing (PSH) technology

Use the showfaults command for the following reasons:

- To see if any faults have been diagnosed in the system.

- To verify that the replacement of a FRU has cleared the fault and not generated any additional faults.

● **At the** sc> **prompt, type the** showfaults **command.**

The following showfaults command examples show the different kinds of output from the showfaults command:

- Example of the `showfaults` command when no faults are present:

```
sc> showfaults
Last POST run: THU MAR 09 16:52:44 2006
POST status: Passed all devices

No failures found in System
```

- Example of the `showfaults` command displaying an environmental fault:

```
sc> showfaults
Last POST Run: Wed Jul 18 11:44:47 2007

Post Status: Passed all devices
 ID FRU                Fault
  0 /SYS/FANBD0/FM0  SP detected fault: TACH at /SYS/FANBD0/FM0/F1
has exceeded low non-recoverable threshold.
```

- Example showing a fault that was detected by POST. These kinds of faults are identified by the message `Forced fail` *reason* where *reason* is the name of the power-on routine that detected the failure.

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
 ID FRU                       Fault
  0 /SYS/MB/CMP0/BR3/CH1/D1 SP detected fault:
/SYS/MB/CMP0/BR3/CH1/D1 Forced fail (POST)
```

- Example showing a fault that was detected by the PSH technology. These kinds of faults are identified by the text `Host detected fault` and by a UUID.

```
sc> showfaults -v
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
 ID  Time                 FRU         Fault
  0  Jun 30 22:13:02      /SYS/MB     Host detected fault, MSGID:
SUN4V-8000-N3  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

1.4.5 Manually Cleaning PSH Diagnosed Faults

The ALOM CMT CLI clearfault command enables you to manually clear PSH diagnosed faults from the service processor without a FRU replacement or if the service processor was unable to automatically detect the FRU replacement.

● **At the** sc> **prompt, type the** clearfault **command.**

■ Example showing a fault being cleared manually using the clearfault command:

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
```

1.4.6 Displaying the Server's Environmental Status

The showenvironment command displays a snapshot of the server's environmental status. This command displays system temperatures, hard drive status, power supply and fan status, front panel LED status, and voltage and current sensors. The output uses a format similar to the Solaris OS command prtdiag (1m).

● **At the** sc> **prompt, type the** showenvironment **command.**

The output differs according to your system's model and configuration.

EXAMPLE 1-1 shows abridged output of the showenvironment command.

EXAMPLE 1-1   showenvironment Command Output

```
sc> showenvironment

--------------------------------------------------------------------------------
System Temperatures (Temperatures in Celsius):
--------------------------------------------------------------------------------
Sensor                       Status  Temp LowHard LowSoft LowWarn HighWarn
HighSoft HighHard
--------------------------------------------------------------------------------
/SYS/MB/T_AMB                  OK       29  -10    -5      0     50     55     60
/SYS/MB/CMP0/T_TCORE           OK       50  -14    -9     -4     86     96    106
/SYS/MB/CMP0/T_BCORE           OK       51  -14    -9     -4     86     96    106
/SYS/MB/CMP0/BR0/CH0/D0/T_AMB OK        41  -10    -8     -5     95    100    105
...
--------------------------------------------------------------------------------
System Indicator Status:
--------------------------------------------------------------------------------
/SYS/LOCATE          /SYS/SERVICE          /SYS/ACT
OFF                  OFF                   ON
--------------------------------------------------------------------------------
/SYS/PSU_FAULT       /SYS/TEMP_FAULT       /SYS/FAN_FAULT
OFF                  OFF                   OFF


--------------------------------------------------------------------------------
System Disks:
--------------------------------------------------------------------------------
Disk     Status            Service       OK2RM
--------------------------------------------------------------------------------
/SYS/HDD0  OK                OFF           OFF
/SYS/HDD1  NOT PRESENT       OFF           OFF
...
```

EXAMPLE 1-1 showenvironment Command Output *(Continued)*

```
--------------------------------------------------------------------------------
Fan Status:
--------------------------------------------------------------------------------
Fans (Speeds Revolution Per Minute):
Sensor                      Status        Speed     Warn      Low
--------------------------------------------------------------------------------
/SYS/FANBD0/FM0/F0/TACH   OK              7000      4000      2400
...
--------------------------------------------------------------------------------
Voltage sensors (in Volts):
--------------------------------------------------------------------------------
Sensor                Status     Voltage LowSoft LowWarn HighWarn HighSoft
--------------------------------------------------------------------------------
/SYS/MB/V_+3V3_STBY  OK           3.39    3.13    3.17    3.53      3.58
...
--------------------------------------------------------------------------------
Power Supplies:
--------------------------------------------------------------------------------
Supply     Status         Fan_Fault  Temp_Fault  Volt_Fault  Cur_Fault
--------------------------------------------------------------------------------
/SYS/PS0   OK               OFF        OFF          OFF          OFF
...
```

Note – Some environmental information might not be available when the server is in standby mode.

1.4.7 Displaying FRU Information

The showfru command displays information about the FRUs in the server. Use this command to see information about an individual FRU, or for all the FRUs.

Note – By default, the output of the showfru command for all FRUs is very long.

● **At the** sc> **prompt, enter the** showfru **command.**

In the following example, the showfru command is used to get information about the motherboard (MB).

```
sc> showfru /SYS/MB
/SYS/MB (container)
   SEGMENT: FL
      /Configured_LevelR
     /Configured_LevelR/UNIX_Timestamp32: Thu Jun  7 20:12:17 GMT
2007
      /Configured_LevelR/Sun_Part_No: 5412153
      /Configured_LevelR/Configured_Serial_No: BBX053
      /Configured_LevelR/Initial_HW_Dash_Level: 02
   SEGMENT: FD
      /InstallationR (1 iterations)
      /InstallationR[0]
     /InstallationR[0]/UNIX_Timestamp32: Thu Jun 21 19:37:57 GMT
2007
      /InstallationR[0]/Fru_Path: /SYS/MB
      /InstallationR[0]/Parent_Part_Number: 5017813
      /InstallationR[0]/Parent_Serial_Number: 110508
      /InstallationR[0]/Parent_Dash_Level: 01
      /InstallationR[0]/System_Id: 0721BBB050
      /InstallationR[0]/System_Tz: 0
...
```

1.5 Running POST

Power-on self-test (POST) is a group of PROM-based tests that run when the server is powered on or reset. POST checks the basic integrity of the critical hardware components in the server (CPU, memory, and I/O buses).

If POST detects a faulty component, the component is disabled automatically, preventing faulty hardware from potentially harming any software. If the system is capable of running without the disabled component, the system will boot when POST is complete. For example, if one of the processor cores is deemed faulty by POST, the core will be disabled, and the system will boot and run using the remaining cores.

1.5.1 Controlling How POST Runs

The server can be configured for normal, extensive, or no POST execution. You can also control the level of tests that run, the amount of POST output that is displayed, and which reset events trigger POST by using ALOM CMT CLI variables.

TABLE 1-7 lists the ALOM CMT CLI variables used to configure POST. FIGURE 1-8 shows how the variables work together.

Note – Use the ALOM CMT CLI `setsc` command to set all the parameters in TABLE 1-7 except `setkeyswitch`.

TABLE 1-7 ALOM CMT CLI Parameters Used for POST Configuration

Parameter	Values	Description
setkeyswitch	normal	The system can power on and run POST (based on the other parameter settings). For details see FIGURE 1-8. This parameter overrides all other commands.
	diag	The system runs POST based on predetermined settings.
	stby	The system cannot power on.
	locked	The system can power on and run POST, but no flash updates can be made.
diag_mode	off	POST does not run.
	normal	Runs POST according to diag_level value.

TABLE 1-7 ALOM CMT CLI Parameters Used for POST Configuration *(Continued)*

Parameter	Values	Description
	service	Runs POST with preset values for `diag_level` and `diag_verbosity`.
`diag_level`	max	If `diag_mode` = `normal`, runs all the minimum tests plus extensive CPU and memory tests.
	min	If `diag_mode` = `normal`, runs minimum set of tests.
`diag_trigger`	none	Does not run POST on reset.
	user_reset	Runs POST upon user-initiated resets.
	power_on_reset	Only runs POST for the first power on. This option is the default.
	error_reset	Runs POST if fatal errors are detected.
	all_resets	Runs POST after any reset.
`diag_verbosity`	none	No POST output is displayed.
	min	POST output displays functional tests with a banner and pinwheel.
	normal	POST output displays all test and informational messages.
	max	POST displays all test, informational, and some debugging messages.

FIGURE 1-8 Flowchart of ALOM CMT CLI Variables for POST Configuration
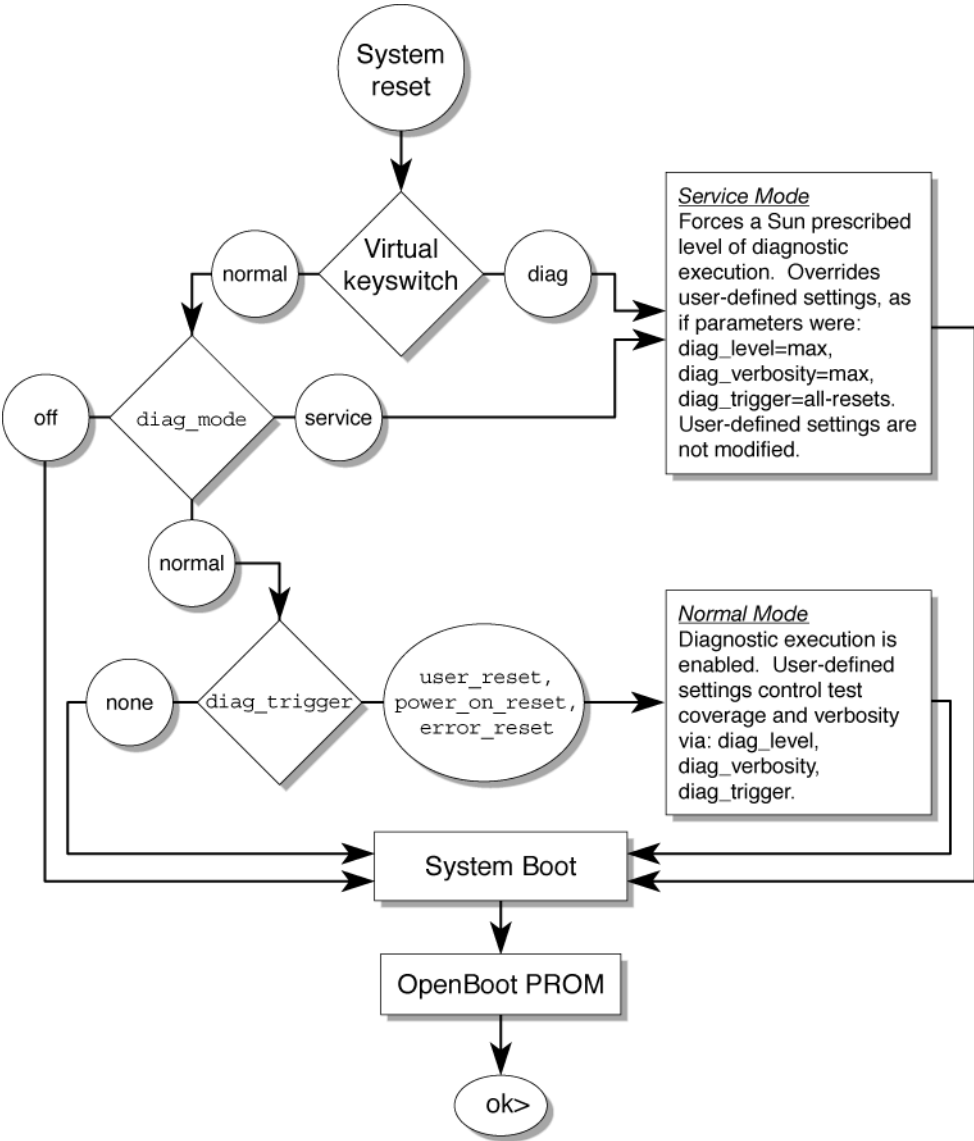
TABLE 1-8 shows typical combinations of ALOM CMT CLI variables and associated POST modes.

TABLE 1-8 ALOM CMT CLI Parameters and POST Modes

Parameter	Normal Diagnostic Mode (Default Settings)	No POST Execution	Diagnostic Service Mode	Keyswitch Diagnostic Preset Values
diag_mode	normal	off	service	normal
setkeyswitch*	normal	normal	normal	diag
diag_level	max	n/a	max	max
diag_trigger	power-on-reset error-reset	none	all-resets	all-resets
diag_verbosity	normal	n/a	max	max
Description of POST execution	This is the default POST configuration. This configuration tests the system thoroughly, and suppresses some of the detailed POST output.	POST does not run, resulting in quick system initialization. This is not a suggested configuration.	POST runs the full spectrum of tests with the maximum output displayed.	POST runs the full spectrum of tests with the maximum output displayed.

* The setkeyswitch parameter, when set to diag, overrides all the other ALOM CMT CLI POST variables.

1.5.2 Changing POST Parameters

1. Access the ALOM CMT CLI sc> **prompt:**

At the console, issue the #. key sequence:

```
#.
```

2. Use the ALOM CMT CLI sc> **prompt to change the POST parameters.**

Refer to TABLE 1-7 for a list of ALOM CMT CLI POST parameters and their values.

The setkeyswitch parameter sets the virtual keyswitch, so this parameter does not use the setsc command. For example, to change the POST parameters using the setkeyswitch command, enter the following:

```
sc> setkeyswitch diag
```

To change the POST parameters using the `setsc` command, you must first set the `setkeyswitch` parameter to normal. Then you can change the POST parameters using the `setsc` command:

```
sc> setkeyswitch normal
sc> setsc value
```

For example:

```
sc> setkeyswitch normal
sc> setsc diag_mode service
```

1.5.3 Reasons to Run POST

You can use POST for basic hardware verification and diagnosis, and for troubleshooting as described in the following sections.

1.5.3.1 Verifying Hardware Functionality

POST tests critical hardware components to verify functionality before the system boots and accesses software. If POST detects an error, the faulty component is disabled automatically, preventing faulty hardware from potentially harming software.

1.5.3.2 Diagnosing the System Hardware

You can use POST as an initial diagnostic tool for the system hardware. In this case, configure POST to run in maximum mode (`diag_mode=service`, `setkeyswitch=diag`, `diag_level=max`) for thorough test coverage and verbose output.

1.5.4 Running POST in Maximum Mode

This procedure describes how to run POST when you want maximum testing, as in the case when you are troubleshooting a server or verifying a hardware upgrade or repair.

1. **Switch from the system console prompt to the** `sc>` **prompt by issuing the #. escape sequence.**

```
ok #.
sc>
```

2. **Set the virtual keyswitch to** `diag` **so that POST will run in service mode.**

```
sc> setkeyswitch diag
```

3. **Reset the system so that POST runs.**

   There are several ways to initiate a reset. EXAMPLE 1-2 shows the `powercycle` command. For other methods, refer to the *Sun Netra T5220 Server Administration Guide*.

EXAMPLE 1-2   Initiating POST Using the `powercycle` Command

```
sc> powercycle
Are you sure you want to powercycle the system (y/n)? y
Powering host off at Fri Jul 27 08:11:52 2007
Waiting for host to Power Off; hit any key to abort.
Audit | minor: admin : Set : object = /SYS/power_state : value =
soft : success
Chassis | critical: Host has been powered off
Powering host on at Fri Jul 27 08:13:08 2007
Audit | minor: admin : Set : object = /SYS/power_state : value =
on : success
Chassis | major: Host has been powered on
```

4. **Switch to the system console to view the POST output:**

```
sc> console
```

EXAMPLE 1-3 depicts abridged POST output.

EXAMPLE 1-3   POST Output (Abridged)

```
sc> console
Enter #. to return to ALOM.
2007-07-03 10:25:12.081 0:0:0>@(#)Sun Netra[TM] T5220 POST 4.x.build_119
2007/06/06 09:48
/export/delivery/delivery/4.x/4.x.build_119/post4.x/UltraSPARC/NetraT5220/inte
grated  (root)
2007-07-03 10:25:12.386 0:0:0>Copyright 2007 Sun Microsystems, Inc. All rights
reserved
2007-07-03 10:25:12.550 0:0:0>VBSC cmp0 arg is: 00ff00ff.ffffffff
2007-07-03 10:25:12.653 0:0:0>POST enabling threads: 00ff00ff.ffffffff
2007-07-03 10:25:12.766 0:0:0>VBSC mode is: 00000000.00000001
2007-07-03 10:25:12.867 0:0:0>VBSC level is: 00000000.00000001
2007-07-03 10:25:12.966 0:0:0>VBSC selecting POST MAX Testing.
2007-07-03 10:25:13.066 0:0:0>VBSC setting verbosity level 3
2007-07-03 10:25:13.161 0:0:0>UltraSPARCT2, Version 2.1
2007-07-03 10:25:13.247 0:0:0>Serial Number: 0fac006b.0e654482
2007-07-03 10:25:13.353 0:0:0>Basic Memory Tests.....
2007-07-03 10:25:13.456 0:0:0>Begin: Branch Sanity Check
2007-07-03 10:25:13.569 0:0:0>End  : Branch Sanity Check
2007-07-03 10:25:13.668 0:0:0>Begin: DRAM Memory BIST
2007-07-03 10:25:13.793
0:0:0>.......................................................................
........................
2007-07-03 10:25:38.399 0:0:0>End  : DRAM Memory BIST
2007-07-03 10:25:39.547 0:0:0>Sys 166 MHz, CPU 1166 MHz, Mem 332 MHz
2007-07-03 10:25:39.658 0:0:0>L2 Bank EFuse = 00000000.000000ff
2007-07-03 10:25:39.760 0:0:0>L2 Bank status = 00000000.00000f0f
2007-07-03 10:25:39.864 0:0:0>Core available Efuse = ffff00ff.ffffffff
2007-07-03 10:25:39.982 0:0:0>Test Memory.....
2007-07-03 10:25:40.070 0:0:0>Begin: Probe and Setup Memory
2007-07-03 10:25:40.181 0:0:0>INFO:  4096MB at Memory Branch 0
...

2007-07-03 10:29:21.683 0:0:0>INFO:
2007-07-03 10:29:21.686 0:0:0>POST Passed all devices.
2007-07-03 10:29:21.692 0:0:0>POST:Return to VBSC.
```

5. **Perform further investigation if needed.**

■ If no faults were detected, the system will boot.

■ If POST detects a faulty device, the fault is displayed and the fault information is passed to ALOM CMT CLI for fault handling. Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see TABLE 2-1.

a. **Interpret the POST messages:**

POST error messages use the following syntax:

> c:s > ERROR: TEST = *failing-tes*t
> c:s > H/W under test = *FRU*
> c:s > Repair Instructions: Replace items in order listed by H/W under test above
> c:s > MSG = *test-error-message*
> c:s > END_ERROR

In this syntax, c = the core number, s = the strand number.

Warning and informational messages use the following syntax:

> INFO or WARNING: *message*

In EXAMPLE 1-4, POST reports a memory error at FB-DIMM location /SYS/MB/CMP0/BR2/CH0/D0. The error was detected by POST running on core 7, strand 2.

EXAMPLE 1-4   POST Error Message

```
7:2>
7:2>ERROR: TEST = Data Bitwalk
7:2>H/W under test = /SYS/MB/CMP0/BR2/CH0/D0
7:2>Repair Instructions: Replace items in order listed by 'H/W
under test' above.
7:2>MSG = Pin 149 failed on /SYS/MB/CMP0/BR2/CH0/D0 (J2001)
7:2>END_ERROR

7:2>Decode of Dram Error Log Reg Channel 2 bits
60000000.0000108c
7:2> 1 MEC 62 R/W1C Multiple corrected
errors, one or more CE not logged
7:2> 1 DAC 61 R/W1C Set to 1 if the error
was a DRAM access CE
7:2> 108c SYND 15:0 RW ECC syndrome.
7:2>
7:2> Dram Error AFAR channel 2 = 00000000.00000000
7:2> L2 AFAR channel 2 = 00000000.00000000
```

b. Run the `showfaults` **command to obtain additional fault information.**

The fault is captured by ALOM CMT CLI, where the fault is logged, the Service Required LED is lit, and the faulty component is disabled.

Example:

EXAMPLE 1-5   `showfaults` Output

```
ok .#
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                    Fault
0 /SYS/MB/CMP0/BR2/CH0/D0 SP detected fault: /SYS/MB/CMP0/BR2/CH0/D0
Forced fail (POST)
```

In this example, `/SYS/MB/CMP0/BR2/CH0/D0` is disabled. The system can boot using memory that was not disabled until the faulty component is replaced.

Note – You can use ASR commands to display and control disabled components. See Section 1.8, "Managing Components With Automatic System Recovery Commands" on page 1-43.

1.5.5   Clearing POST Detected Faults

In most cases, when POST detects a faulty component, POST logs the fault and automatically takes the failed component out of operation by placing the component in the ASR blacklist (see Section 1.8, "Managing Components With Automatic System Recovery Commands" on page 1-43).

In most cases, the replacement of the faulty FRU is detected when the service processor is reset or power cycled. In this case, the fault is automatically cleared from the system. This procedure describes how to identify POST detected faults and, if necessary, manually clear the fault.

1. **After replacing a faulty FRU, at the ALOM CMT CLI prompt use the** `showfaults` **command to identify POST detected faults.**

   POST detected faults are distinguished from other kinds of faults by the text: `Forced fail`, and no UUID number is reported.

   Example:

EXAMPLE 1-6   POST Detected Fault

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                      Fault
0 /SYS/MB/CMP0/BR2/CH0/D0 SP detected fault: /SYS/MB/CMP0/BR2/CH0/D0 Forced
fail (POST)
```

   If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.

2. **Use the** `enablecomponent` **command to clear the fault and remove the component from the ASR blacklist.**

   Use the FRU name that was reported in the fault in Step 1.

EXAMPLE 1-7   Using the `enablecomponent` Command

```
sc> enablecomponent /SYS/MB/CMP0/BR2/CH0/D0
```

   The fault is cleared and should not show up when you run the `showfaults` command. Additionally, the Service Required LED is no longer on.

3. **Power cycle the server.**

   You must reboot the server for the `enablecomponent` command to take effect.

4. **At the ALOM CMT CLI prompt, use the** `showfaults` **command to verify that no faults are reported.**

TABLE 1-9   Verifying Cleared Faults Using the `showfaults` Command

```
sc> showfaults
Last POST run: THU MAR 09 16:52:44 2006
POST status: Passed all devices

No failures found in System
```

1.6 Using the Solaris Predictive Self-Healing Feature

The Solaris Predictive Self-Healing (PSH) technology enables the server to diagnose problems while the Solaris OS is running, and mitigate many problems before they negatively affect operations.

The Solaris OS uses the fault manager daemon, `fmd(1M)`, which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon handles the error by correlating the error with data from previous errors and other related information to diagnose the problem. Once diagnosed, the fault manager daemon assigns the problem a Universal Unique Identifier (UUID) that distinguishes the problem across any set of systems. When possible, the fault manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use the message ID to get additional information about the problem from Sun's knowledge article database.

The Predictive Self-Healing technology covers the following server components:

- UltraSPARC® T2 multicore processor
- Memory
- I/O bus

The PSH console message provides the following information:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action for system administrator

If the Solaris PSH facility detects a faulty component, use the `fmdump` command to identify the fault. Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see TABLE 2-1.

1.6.1 Identifying PSH Detected Faults

When a PSH fault is detected, a Solaris console message similar to EXAMPLE 1-8 is displayed.

EXAMPLE 1-8   Console Message Showing Fault Detected by PSH

```
SUNW-MSG-ID: SUN4V-8000-DX, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Wed Sep 14 10:09:46 EDT 2005
PLATFORM: SUNW,Sun-Netra-T5220, CSN: -, HOSTNAME: hostname
SOURCE: cpumem-diagnosis, REV: 1.5
EVENT-ID: f92e9fbe-735e-c218-cf87-9e1720a28004
DESC: The number of errors associated with this memory module has exceeded
acceptable levels.
AUTO-RESPONSE: Pages of memory associated with this memory module are being
removed from service as errors are reported.
IMPACT: Total system memory capacity will be reduced as pages are retired.
REC-ACTION: Schedule a repair procedure to replace the affected memory module.
Use fmdump -v -u <EVENT_ID> to identify the module.
```

Faults detected by the Solaris PSH facility are also reported through service processor alerts. EXAMPLE 1-9 depicts an ALOM CMT CLI alert of the same fault reported by Solaris PSH in EXAMPLE 1-8.

EXAMPLE 1-9   ALOM CMT CLI Alert of PSH Diagnosed Fault

```
 SC Alert: Host detected fault, MSGID: SUN4V-8000-DX
```

The ALOM CMT CLI `showfaults` command provides summary information about the fault. See Section 1.4.4, "Displaying System Faults" on page 1-21 for more information about the `showfaults` command.

Note – The Service Required LED is also turns on for PSH diagnosed faults.

1.6.1.1 Using the `fmdump` Command to Identify Faults

The `fmdump` command displays the list of faults detected by the Solaris PSH facility and identifies the faulty FRU for a particular EVENT_ID (UUID).

Do not use `fmdump` to verify a FRU replacement has cleared a fault because the output of `fmdump` is the same after the FRU has been replaced. Use the `fmadm faulty` command to verify the fault has cleared.

1. **Check the event log using the** `fmdump` **command with** `-v` **for verbose output:**

EXAMPLE 1-10   Output from the `fmdump` `-v` Command

```
# fmdump -v -u fd940ac2-d21e-c94a-f258-f8a9bb69d05b
TIME                    UUID                                   SUNW-MSG-ID
Jul 31 12:47:42.2007 fd940ac2-d21e-c94a-f258-f8a9bb69d05b SUN4V-8000-JA
  100%  fault.cpu.ultraSPARC-T2.misc_regs

        Problem in: cpu:///cpuid=16/serial=5D67334847
          Affects: cpu:///cpuid=16/serial=5D67334847
               FRU: hc://:serial=101083:part=541215101/motherboard=0
         Location: MB
```

In EXAMPLE 1-10, a fault is displayed, indicating the following details:

- Date and time of the fault (`Jul 31 12:47:42.2007`)
- Universal Unique Identifier (UUID). This is unique for every fault (`fd940ac2-d21e-c94a-f258-f8a9bb69d05b`)
- Sun message identifier, which can be used to obtain additional fault information (`SUN4V-8000-JA`)
- Faulted FRU. The information provided in the example includes the part number of the FRU (`part=541215101`) and the serial number of the FRU (`serial=101083`). The `Location` field provides the name of the FRU. In EXAMPLE 1-10 the FRU name is `MB`, meaning the motherboard.

Note – `fmdump` displays the PSH event log. Entries remain in the log after the fault has been repaired.

---

2. **Use the Sun message ID to obtain more information about this type of fault.**

   a. **Obtain the message ID from the console output or the ALOM CMT CLI** `showfaults` **command.**

b. Enter the message ID in the SUNW-MSG-ID field, and click Lookup.

In , the message ID SUN4V-8000-JA provides information for corrective action:

EXAMPLE 1-11 PSH Message Output

```
CPU errors exceeded acceptable levels

Type
    Fault
Severity
    Major
Description
    The number of errors associated with this CPU has exceeded
acceptable levels.
Automated Response
    The fault manager will attempt to remove the affected CPU from
service.
Impact
    System performance may be affected.

Suggested Action for System Administrator
    Schedule a repair procedure to replace the affected CPU, the
identity of which can be determined using fmdump -v -u <EVENT_ID>.

Details
    The Message ID:  SUN4V-8000-JA indicates diagnosis has
determined that a CPU is faulty. The Solaris fault manager arranged
an automated attempt to disable this CPU. The recommended action
for the system administrator is to contact Sun support so a Sun
service technician can replace the affected component.
```

3. Follow the suggested actions to repair the fault.

1.6.2   Clearing PSH Detected Faults

When the Solaris PSH facility detects faults the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the system and the fault condition is repaired automatically. However, this must be verified and, in cases where the fault condition is not automatically cleared, the fault must be cleared manually.

1. After replacing a faulty FRU, power on the server.

2. **At the ALOM CMT CLI prompt, use the** `showfaults` **command to identify PSH detected faults.**

PSH detected faults are distinguished from other kinds of faults by the text: `Host detected fault.`

Example:

```
sc> showfaults -v
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID   Time                 FRU                        Fault
0  Jun 30 22:13:02   /SYS/MB/CMP0/BR2/CH0/D0  Host detected fault,
MSGID: SUN4V-8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

- If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.
- If a fault is reported, perform Step 3 and Step 4.

3. **Run the ALOM CMT CLI** `clearfault` **command with the UUID provided in the** `showfaults` **output.**

Example:

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
Clearing fault from all indicted FRUs...
Fault cleared.
```

4. **Clear the fault from all persistent fault records.**

In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, perform the following Solaris command:

fmadm repair *UUID*

Example:

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

1.7 Collecting Information From Solaris OS Files and Commands

With the Solaris OS running on the server, you have the full complement of Solaris OS files and commands available for collecting information and for troubleshooting.

If POST, service processor, or the Solaris PSH features do not indicate the source of a fault, check the message buffer and log files for notifications for faults. Hard drive faults are usually captured by the Solaris message files.

Use the `dmesg` command to view the most recent system message. To view the system messages log file, view the contents of the `/var/adm/messages` file.

1.7.1 Checking the Message Buffer

1. **Log in as superuser.**

2. **Type the `dmesg` command:**

```
# dmesg
```

The `dmesg` command displays the most recent messages generated by the system.

1.7.2 Viewing System Message Log Files

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every ten days), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**

2. **Type the following command:**

```
# more /var/adm/messages
```

3. **If you want to view all logged messages, type the following command:**

```
# more /var/adm/messages*
```

1.8 Managing Components With Automatic System Recovery Commands

The Automatic System Recovery (ASR) feature enables the server to automatically configure failed components out of operation until they can be replaced. In the server, theASR feature manages the following components:

- UltraSPARC T2 processor strands
- Memory FB-DIMMs
- I/O bus

The database that contains the list of disabled components is called the ASR blacklist (asr-db).

In most cases, POST automatically disables a faulty component. After the cause of the fault is repaired (FRU replacement, loose connector reseated, and so on), you must remove the component from the ASR blacklist.

The ASR commands (TABLE 1-10) enable you to view, and manually add or remove components from the ASR blacklist. You run these commands from the ALOM CMT CLI sc> prompt.

TABLE 1-10 ASR Commands

Command	Description
showcomponent	Displays system components and their current state.
enablecomponent *asrkey*	Removes a component from the asr-db blacklist, where *asrkey* is the component to enable.
disablecomponent *asrkey*	Adds a component to the asr-db blacklist, where *asrkey* is the component to disable.
clearasrdb	Removes all entries from the asr-db blacklist.

Note – The components (*asrkeys*) vary from system to system, depending on how many cores and memory are present. Use the showcomponent command to see the asrkeys on a given system.

Note – A reset or power cycle is required after disabling or enabling a component. If the status of a component is changed, there is no effect to the system until the next reset or power cycle.

1.8.1 Displaying System Components

The showcomponent command displays the system components (asrkeys) and reports their status.

● **At the** sc> **prompt, enter the** showcomponent **command**

EXAMPLE 1-12 shows partial output with no disabled components.

EXAMPLE 1-12 Output of the showcomponent Command With No Disabled Components

```
sc> showcomponent
Keys:

    /SYS/MB/RISER0/XAUI0
    /SYS/MB/RISER0/PCIE0
    /SYS/MB/RISER0/PCIE3
    /SYS/MB/RISER1/XAUI1
    /SYS/MB/RISER1/PCIE1
    /SYS/MB/RISER1/PCIE4
    /SYS/MB/RISER2/PCIE2
    /SYS/MB/RISER2/PCIE5
    /SYS/MB/GBE0
    /SYS/MB/GBE1
    /SYS/MB/PCIE
    /SYS/MB/PCIE-IO/USB
    /SYS/MB/SASHBA
    /SYS/MB/CMP0/NIU0
    /SYS/MB/CMP0/NIU1
    /SYS/MB/CMP0/MCU0
    /SYS/MB/CMP0/MCU1
    /SYS/MB/CMP0/MCU2
    /SYS/MB/CMP0/MCU3
```

EXAMPLE 1-12   Output of the showcomponent Command With No Disabled Components

```
     /SYS/MB/CMP0/L2_BANK0
     /SYS/MB/CMP0/L2_BANK1
     /SYS/MB/CMP0/L2_BANK2
     /SYS/MB/CMP0/L2_BANK3
     /SYS/MB/CMP0/L2_BANK4
     /SYS/MB/CMP0/L2_BANK5
     /SYS/MB/CMP0/L2_BANK6
     /SYS/MB/CMP0/L2_BANK7
     ...
     /SYS/TTYA
State: Clean
```

EXAMPLE 1-13 shows showcomponent command output with a component disabled:

EXAMPLE 1-13   Output of the showcomponent Command Showing Disabled Components

```
sc> showcomponent
Keys:

     /SYS/MB/RISER0/XAUI0
     /SYS/MB/RISER0/PCIE0
     /SYS/MB/RISER0/PCIE3
     /SYS/MB/RISER1/XAUI1
     /SYS/MB/RISER1/PCIE1
     /SYS/MB/RISER1/PCIE4
     /SYS/MB/RISER2/PCIE2
     /SYS/MB/RISER2/PCIE5
     ...
     /SYS/TTYA
Disabled Devices
   /SYS/MB/CMP0/L2_BANK0Disabled by user
```

1.8.2   Disabling Components

The disablecomponent command disables a component by adding it to the ASR blacklist.

1. At the sc> **prompt, enter the** disablecomponent **command.**

```
sc> disablecomponent /SYS/MB/CMP0/BR1/CH0/D0
Chassis | major: /SYS/MB/CMP0/BR1/CH0/D0 has been disabled.
Disabled by user
```

2. After receiving confirmation that the `disablecomponent` **command is complete, reset the server so that the ASR command takes effect.**

```
sc> reset
```

1.8.3 Enabling Disabled Components

The `enablecomponent` command enables a disabled component by removing it from the ASR blacklist.

1. At the `sc>` **prompt, enter the** `enablecomponent` **command.**

```
sc> enablecomponent /SYS/MB/CMP0/BR1/CH0/D0
Chassis | major: /SYS/MB/CMP0/BR1/CH0/D0 has been enabled.
```

2. After receiving confirmation that the `enablecomponent` **command is complete, reset the server for so that the ASR command takes effect.**

```
sc> reset
```

1.9 Exercising the System With SunVTS Software

Sometimes a server exhibits a problem that cannot be isolated definitively to a particular hardware or software component. In such cases, it might be useful to run a diagnostic tool that stresses the system by continuously running a comprehensive battery of tests. Sun provides the SunVTS software for this purpose.

This section describes the tasks necessary to use SunVTS software to exercise your server:

- Section 1.9.1, "Checking Whether SunVTS Software Is Installed" on page 1-46
- Section 1.9.2, "Exercising the System Using SunVTS Software" on page 1-47

1.9.1 Checking Whether SunVTS Software Is Installed

This procedure assumes that the Solaris OS is running on the server, and that you have access to the Solaris command line.

1. **Check for the presence of SunVTS packages using the** `pkginfo` **command.**

```
% pkginfo -l SUNWvts SUNWvtsr SUNWvtsts SUNWvtsmn
```

TABLE 1-11 lists SunVTS packages:

TABLE 1-11   SunVTS Packages

Package	Description
SUNWvts	SunVTS framework
SUNWvtsr	SunVTS framework (root)
SUNWvtsts	SunVTS for tests
SUNWvtsmn	SunVTS man pages

- If SunVTS software is installed, information about the packages is displayed.
- If SunVTS software is not installed, you see an error message for each missing package, as in EXAMPLE 1-14

EXAMPLE 1-14   Missing Package Errors for SunVTS

```
ERROR: information for "SUNWvts" was not found
ERROR: information for "SUNWvtsr" was not found
...
```

The SunVTS 6.0 PS3 software, and future compatible versions, are supported on the server.

SunVTS installation instructions are described in the *SunVTS User's Guide*.

1.9.2   Exercising the System Using SunVTS Software

Before you begin, the Solaris OS must be running. You also must ensure that SunVTS validation test software is installed on your system. See Section 1.9.1, "Checking Whether SunVTS Software Is Installed" on page 1-46.

The SunVTS installation process requires that you specify one of two security schemes to use when running SunVTS. The security scheme you choose must be properly configured in the Solaris OS for you to run SunVTS. For details, refer to the *SunVTS User's Guide*.

SunVTS software features both character-based and graphics-based interfaces. This procedure assumes that you are using the graphical user interface (GUI) on a system running the Common Desktop Environment (CDE). For more information about the character-based SunVTS TTY interface, and specifically for instructions on accessing it by `tip` or `telnet` commands, refer to the *SunVTS User's Guide.*

SunVTS software can be run in several modes. This procedure assumes that you are using the default mode.

This procedure also assumes that the server is *headless*. That is, it is not equipped with a monitor capable of displaying bitmap graphics. In this case, you access the SunVTS GUI by logging in remotely from a machine that has a graphics display.

Finally, this procedure describes how to run SunVTS tests in general. Individual tests might presume the presence of specific hardware, or might require specific drivers, cables, or loopback connectors. For information about test options and prerequisites, refer to the following documentation:

- *SunVTS 6.3 Test Reference Manual for SPARC Platforms*
- *SunVTS 6.3 User's Guide*

1.9.3 Exercising the System With SunVTS Software

1. Log in as superuser to a system with a graphics display.

The display system should be one with a frame buffer and monitor capable of displaying bitmap graphics such as those produced by the SunVTS GUI.

2. Enable the remote display.

On the display system, type:

```
# /usr/openwin/bin/xhost + test-system
```

where *test-system* is the name of the server you plan to test.

3. Remotely log in to the server as superuser.

Use a command such as `rlogin` or `telnet`.

4. **Start** SunVTS **software.**

   If you have installed SunVTS software in a location other than the default `/opt`
   directory, alter the path, as in EXAMPLE 1-15.

EXAMPLE 1-15   Alternate Command for Starting SunVTS Software

```
# /opt/SUNWvts/bin/sunvts -display display-system:0
```

   where *display-system* is the name of the machine through which you are remotely
   logged in to the server.

   The SunVTS GUI is displayed (FIGURE 1-9).

FIGURE 1-9   SunVTS GUI
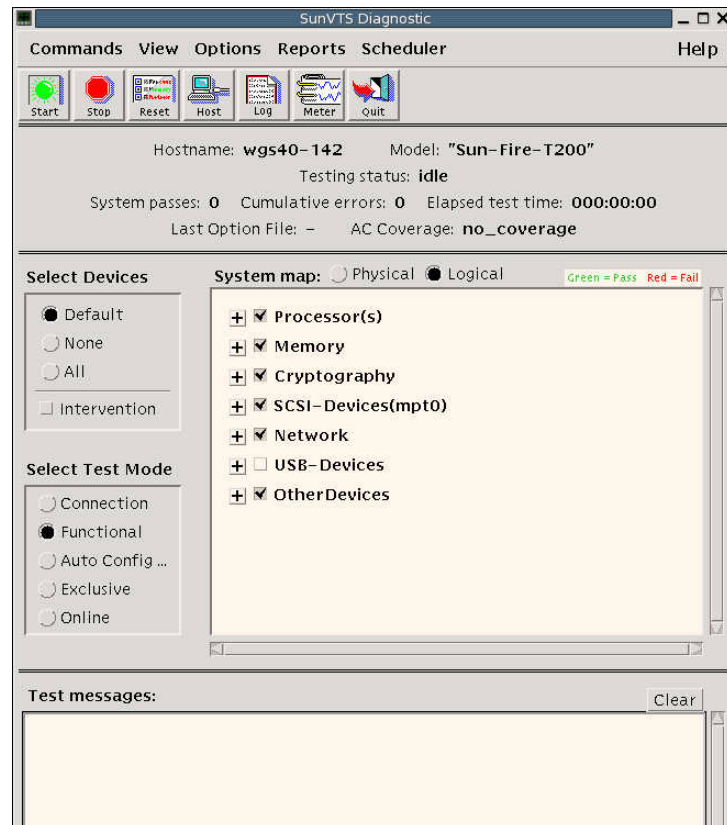
5. **Expand the test lists to see the individual tests.**

   The test selection area lists tests in categories, such as *Network*, as shown in
   FIGURE 1-10. To expand a category, left-click the ⊞ icon (expand category icon) to
   the left of the category name.

FIGURE 1-10 SunVTS Test Selection Panel
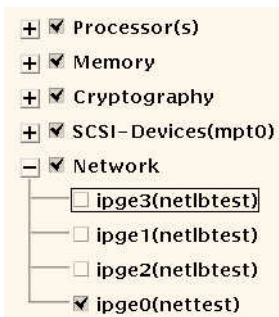
6. **(Optional) Select the tests you want to run.**

   Certain tests are enabled by default, and you can choose to accept these.

   Alternatively, you can enable and disable individual tests or blocks of tests by clicking the checkbox next to the test name or test category name. Tests are enabled when checked, and disabled when not checked.

   TABLE 1-12 lists tests that are especially useful to run on this server.

TABLE 1-12 Useful SunVTS Tests to Run on This Server

| SunVTS Tests	FRUs Exercised by Tests
`cmttest, cputest, fputest, iutest, l1dcachetest, dtlbtest,` and `l2sramtest` – *indirectly*: `mptest,` and `systest`	FB-DIMMS, CPU motherboard
`disktest`	Disks, cables, disk backplane
`cddvdtest`	CD/DVD device, cable, motherboard
`nettest, netlbtest`	Network interface, network cable, CPU motherboard
`pmemtest, vmemtest, ramtest`	FB-DIMMs, motherboard
`serialtest`	I/O (serial port interface)
`usbkbtest, disktest`	USB devices, cable, CPU motherboard (USB controller)
`hsclbtest`	Motherboard, service processor (Host to service processor interface)

7. **(Optional) Customize individual tests.**

   You can customize individual tests by right-clicking on the name of the test. For example, in FIGURE 1-10, right-clicking on the text string ce0(nettest) brings up a menu that enables you to configure this Ethernet test.

8. **Start testing.**

   Click the Start button that is located at the top left of the SunVTS window. Status and error messages appear in the test messages area located across the bottom of the window. You can stop testing at any time by clicking the Stop button.

   During testing, SunVTS software logs all status and error messages. To view these messages, click the Log button or select Log Files from the Reports menu. This action opens a log window from which you can choose to view the following logs:

   - **Information** – Detailed versions of all the status and error messages that appear in the test messages area.

   - **Test Error** – Detailed error messages from individual tests.

   - **VTS Kernel Error** – Error messages pertaining to SunVTS software itself. Look here if SunVTS software appears to be acting strangely, especially when it starts up.

   - **Solaris OS Message**s (`/var/adm/messages`) – A file containing messages generated by the operating system and various applications.

   - **Log Files** (`/var/opt/SUNWvts/logs`) – A directory containing the log files.

1.10 Obtaining the Chassis Serial Number

To obtain support for your system, you need your chassis serial number. The chassis serial number is located on a sticker that is on the front of the server and another sticker on the side of the server. You can also run the ALOM CMT CLI `showplatform` command to obtain the chassis serial number.

For example:

TABLE 1-13 Obtaining the Chassis Serial Number With the `showplatform` Command

```
sc> showplatform
SUNW,Sun-Netra-T5220
Chassis Serial Number: xxxxxxxxxxxx
Domain Status
------ ------
S0 OS Standby
sc>
```

1.11 Additional Service Related Information

In addition to this service manual, the following resources are available to help you keep your server running optimally. These documents are available at:

http://www.oracle.com/technetwork/indexes/documentation/index.html

- **Server Product Notes** – Contain late-breaking information about the system including required software patches, updated hardware and compatibility information, and solutions to know issues.
- **Solaris Release Notes** – Contain important information about the Solaris OS.

Preparing for Service

This chapter describes safety considerations and provides prerequisite procedures and information to replace components within the server.

Topics include:

- Section 2.1, "Safety Information" on page 2-1
- Section 2.2, "Required Tools" on page 2-3
- Section 2.3, "Prerequisite Tasks for Component Replacement" on page 2-3
- Section 2.4, "Field-Replaceable Units" on page 2-11

2.1 Safety Information

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

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

- Follow all Sun standard cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Sun Hardware Systems*, 816-7190.
- 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.

2.1.1 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.

2.1.2 Electrostatic Discharge Safety

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

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

2.1.2.1 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.

2.1.2.2 Use an Antistatic Mat

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

2.2 Required Tools

The server can be serviced with the following tools:

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

2.3 Prerequisite Tasks for Component Replacement

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

    Depending upon the component, you might also need to remove the PCI tray:

Note – When replacing the hard drives or power supplies, not all of these tasks are necessary. The replacement procedures for those components address this fact.

2.3.1 Powering Off the Server

Performing a graceful shutdown makes sure all of your data is saved and the system is ready for restart.

1. **Log in 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. Refer to the server administration guide for log file information.

2. Notify affected users.

Refer to your Solaris system administration documentation for additional information.

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

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

4. Shut down the Solaris OS.

Refer to the Solaris system administration documentation for additional information.

5. Switch from the system console to the ALOM CMT compatibility CLI `sc>` **prompt by typing the** `#.` **(Hash-Period) key sequence.**

6. At the ALOM CMT compatibility CLI `sc>` **prompt, issue the** `poweroff` **command.**

```
sc> poweroff -fy
SC Alert: SC Request to Power Off Host Immediately.
```

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.

Refer to the *Integrated Lights Out Manager (ILOM) Administration Guide* for more information about the ALOM CMT CLI `poweroff` command.

7. Disconnect the cables from the server.

See Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4.

2.3.2   Disconnecting 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 following cables as appropriate:

- PCI-X 3
- PCI-X 4

- PCIe 5
- PCIe 2
- PCIe 1/XAUI 1
- PCIe 0/XAUI 0
- Alarm
- TTYA
- SER MGT
- NET MGT
- USB 0
- USB 1
- NET 0
- NET 1
- NET 2
- NET 3
- Power supply 0
- Power supply 1

3. If you are going to remove the CMA, also remove the cables from it.

4. Remove the server from the rack.

## 2.3.3   Removing the Server From the Rack

Remove the server from the rack prior to performing cold-swappable FRU replacement procedures except the FB-DIMMs, PCI cards, and the service processor.

Caution – The server weighs approximately 40 lb (18 kg). Two people are required to dismount and carry the chassis.

1. Disconnect all the cables and power cords from the server.

2. From the front of the server, release the slide rail latches on each side.

Pinch the green latches as shown in FIGURE 2-1.

FIGURE 2-1 Slide Release Latches
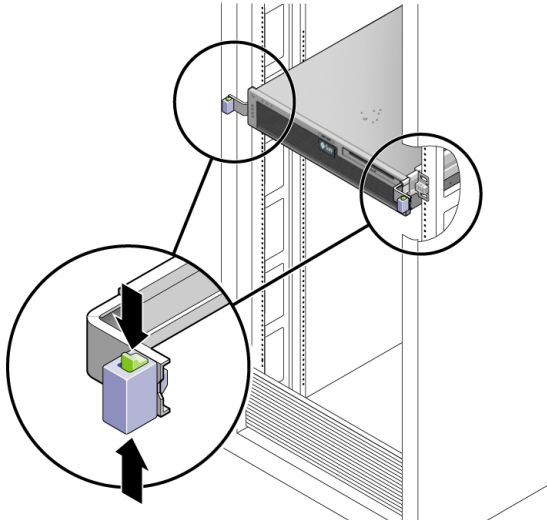
3. **While pinching the release latches, slowly pull the server forward until the slide rails latch.**

4. **Press the metal lever (**FIGURE 2-2**) that is located on the inner side of the rail to disconnect the CMA from the rail assembly (on the right side from the rear of the rack).**

   The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA.

FIGURE 2-2   Locating the Metal Lever
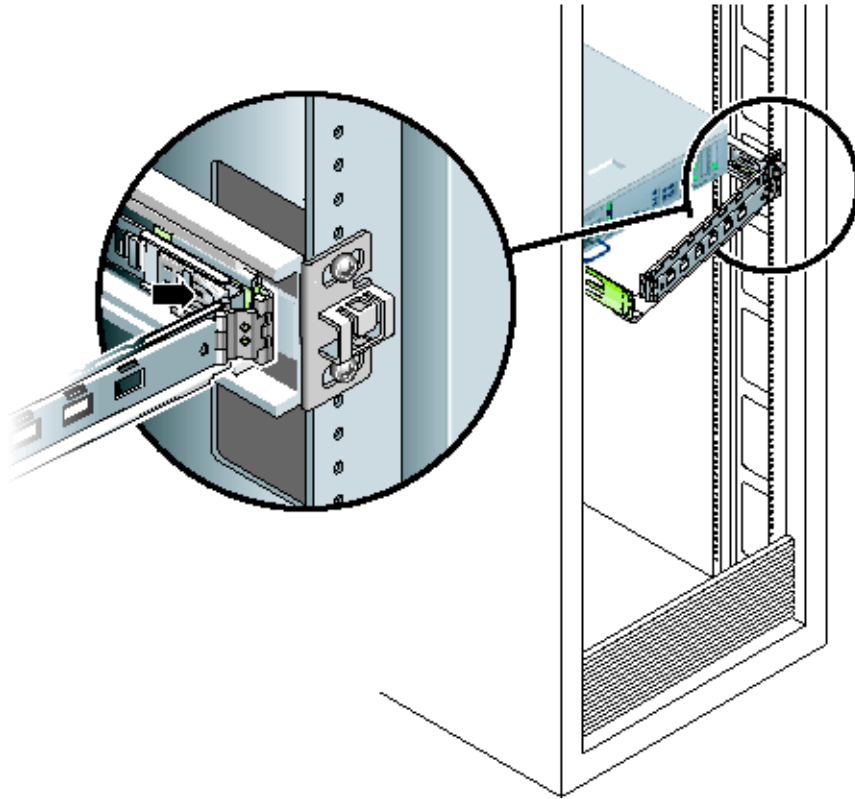
⚠ **Caution –** The server weighs approximately 40 lb (18 kg). The next step requires two people to dismount and carry the chassis.

5. **From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails.**

   The release tabs are located on each rail, about midway on the server.

6. **Set the server on a sturdy work surface.**

7. **Perform antistatic measures.**

   See Section 2.3.4, "Performing Antistatic Measures" on page 2-8.

2.3.4 Performing 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 Sun replacement part
   - Sun ESD mat, part number 250-1088
   - 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.

3. **Remove the top cover.**

   See Section 2.3.5, "Removing the Top Cover" on page 2-8.

2.3.5 Removing the Top Cover

All field-replaceable units (FRUs) that are not hot-swappable require the removal of the top cover.

1. **Use a No. 2 Philips screwdriver to press the top cover release button (**FIGURE 2-3**).**

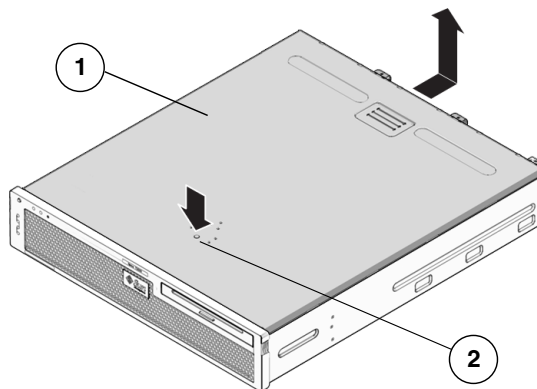**FIGURE 2-3**   Top Cover and Release Button

Figure Legend

1	Top cover
2	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 it aside.**

4. **If necessary, remove the PCI mezzanine.**

    See Section 2.3.6, "Removing the PCI Mezzanine" on page 2-9.

2.3.6   Removing the PCI Mezzanine

The PCI mezzanine is a carrier for the PCI-X and PCIe cards. Remove the PCI mezzanine to replace the following components:

- PCIe card
- LED board
- FB-DIMM/CPU duct
- Alarm board
- FB-DIMMs
- Motherboard assembly
- Power distribution board (PDB)

It is not necessary to remove the **PCI mezzanine** for other components. However, when the **PCI mezzanine** is removed, additional working space is provided.

1. **Disconnect any I/0 cables from the rear of the PCI mezzanine.**

2. **Disconnect the PCI mezzanine cable (**FIGURE 2-5**).**

FIGURE 2-4   Removing the PCI Mezzanine Cable and I/O Cables From PCI Mezzanine
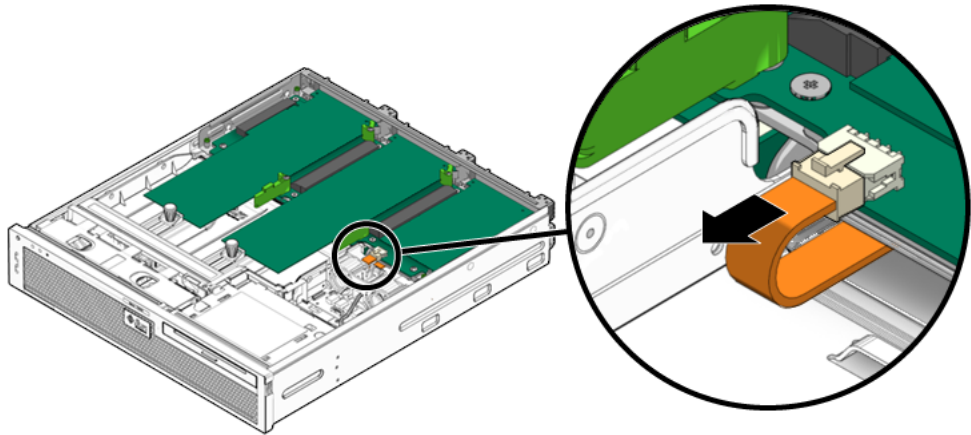
3. **Use a No. 2 Philips Screwdriver to loosen the four green captive screws securing the PCI mezzanine. (**FIGURE 2-5**).**

4. **Lift the PCI mezzanine up and out. (**FIGURE 2-5**).**

FIGURE 2-5   Removing Screws and Lifting the PCI Mezzanine
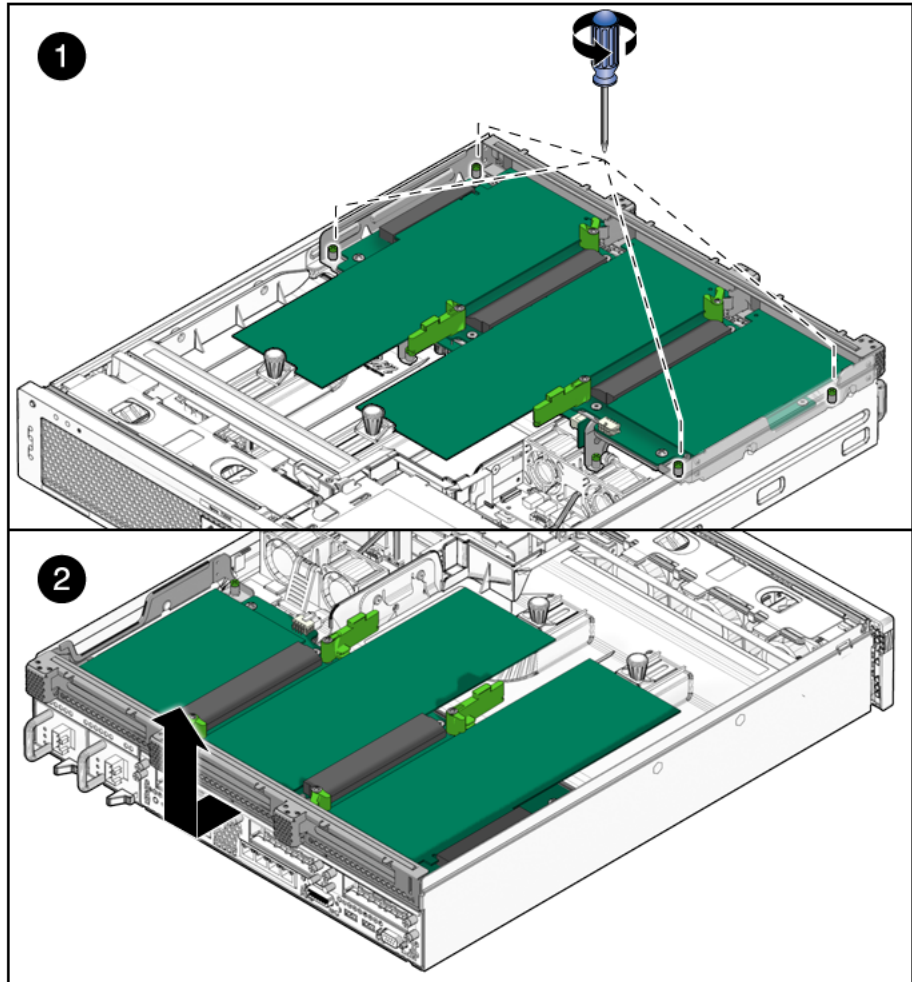
5. **Lift the PCI mezzanine away from the chassis and place it on an antistatic mat.**

   You are now ready to replace components.

2.4   Field-Replaceable Units

and identifies the field-replaceable units (FRUS) in the server.

FIGURE 2-6 Field-Replaceable Units

TABLE 2-1 Server FRU List
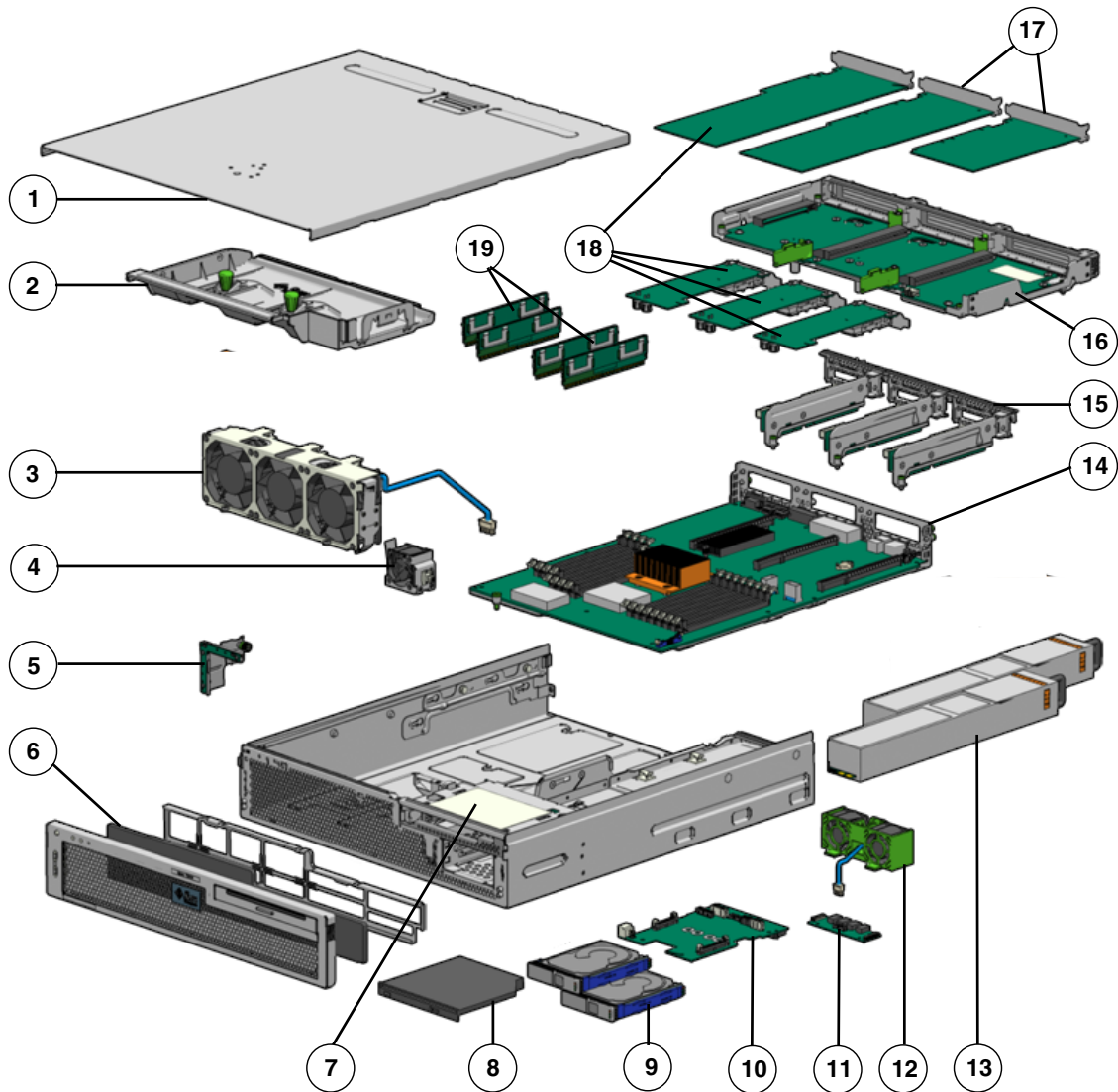
No.	FRU	Replacement Instructions	Description	FRU Name[*]
1	Top Cover	Section 2.3.5, "Removing the Top Cover" on page 2-8	Requires a pen to remove. Does not power off server when removed.	
2	FB-DIMM/CPU duct	Section 4.4, "Replacing the Air Duct" on page 4-17	Aids cooling of FB-DIMMS and CPU.	
3	System Fan Assembly	Section 5.3, "Replacing the System Fan Assembly (FT0)" on page 5-7	Contains three fans for cooling the mother-board assembly.	FT0
4	FB-DIMM Fan	Section 5.5, "Replacing the FB-DIMM Fan Assembly (FT2)" on page 5-15	Single fan for cooling FB-DIMMs	
5	LED board	Section 5.7, "Replacing the LED Board" on page 5-18	Contains the push-button circuitry and LEDs that are displayed on the bezel of the box.	LEDBD
6	Air filter	Section 5.1, "Replacing the Air Filter" on page 5-1	Cleans air before entering system.	
7	Media bay assembly	Section 3.3, "Replacing the Media Bay Assembly" on page 3-8	Bays that house hard drives and optical media drive.	
8	Optical media drive	Section 3.2, "Replacing the Optical Media Drive" on page 3-6	Optical media drive	DVD
9	Hard drives	Section 3.1, "Replacing a Hard Drive" on page 3-1	SAS, 2.5-inch 146 GB hard drives The two HDD configuration includes a removable DVD drive; the four HDD has HDD2 and HDD3 in place of the DVD.	HDD0 HDD1 HDD2 HDD3
10	Power distribution board (PDB)	Section n, "Section 6.1.6, "Powering On the Server" on page 6-8" on page 5-23	Provides the main 12V power interconnect between the power supplies and the other boards.	PDB
11	Alarm board	Section 5.6, "Replacing the Alarm Board" on page 5-16	Provides dry-contact switching according to alarm conditions.	
12	Hard drive fan assembly	Section 5.4, "Replacing the Hard Drive Fan Assembly (FT1)" on page 5-10	Fans that provide supplemental cooling of the hard drives and optical media drive.	
13	Power supplies (PS)	Section 5.2, "Replacing a Power Supply" on page 5-4	The 650W power supplies provide -3.3 Vdc standby power at 3 @ 3 Amps and 12 Vdc at 25 Amps.	PS0 PS1

TABLE 2-1 Server FRU List *(Continued)*

No.	FRU	Replacement Instructions	Description	FRU Name[*]
14	Motherboard assembly	Section 4.10, "Replacing the Motherboard Assembly" on page 4-37	Must be removed before removing the power distribution board.	MB
15	PCI riser assembly	Section 4.2.4, "Replacing the Lower PCIe/XAUI Cards" on page 4-11	Houses and connects the bottom PCI cards	
16	PCI mezzanine	Section 2.3.6, "Removing the PCI Mezzanine" on page 2-9	Houses and connects the top PCI cards	PCI_MEZZ
17	PCI-X cards	Section 4.2.2, "Replacing PCI-X 4 and PCIe 5 Cards" on page 4-5	Optional add-on cards	PCI-X4 PCI-X3
18	PCIe cards	Section 4.2.4, "Replacing the Lower PCIe/XAUI Cards" on page 4-11	Optional add-on cards	PCIE0/XAUI0 PCIE1/XAUI1 PCIE2, PCIE5
19	FB-DIMMs	Section 4.6, "Replacing FB-DIMMs" on page 4-23	Can be ordered in the following sizes: • 1 GB (16 GB maximum) • 2 GB (32 GB maximum) • 4 GB (64 GB maximum)	See FIGURE 4-15 and TABLE 4-1

* The FRU name is used in system messages.

Replacing Storage Components

This chapter provides instructions for replacing nonvolatile data storage components. Topics include:

- Section 3.1, "Replacing a Hard Drive" on page 3-1
- Section 3.2, "Replacing the Optical Media Drive" on page 3-6
- Section 3.3, "Replacing the Media Bay Assembly" on page 3-8

3.1 Replacing a Hard Drive

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

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

- The hard drive provides the operating system, and the operating system is not mirrored on another drive.
- The hard 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 hard drive. See Section 2.3.1, "Powering Off the Server" on page 2-3.

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

3.1.1 Removing a Hard Drive

1. Press the green tabs on either side of the bezel and pull forward and down (FIGURE 3-1**).**

FIGURE 3-1 Opening the Bezel
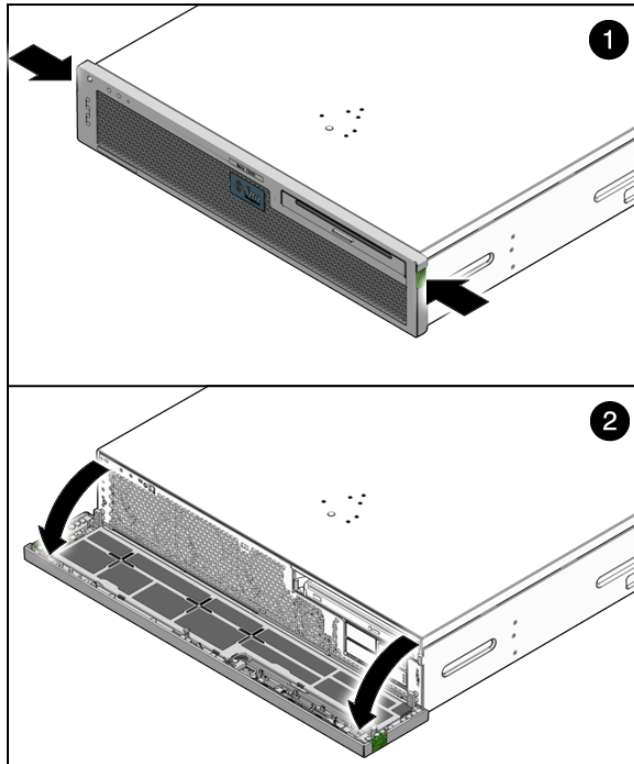
2. Identify the location of the hard drive that you want to remove (FIGURE 3-2 **and** FIGURE 3-3**).**
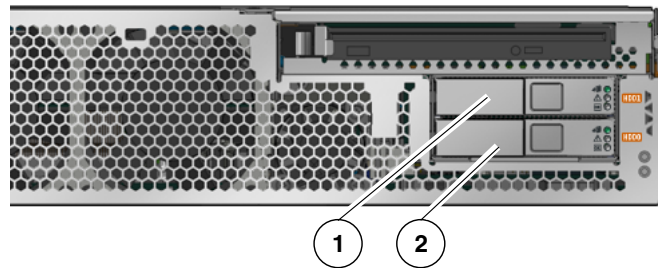
FIGURE 3-2 Locations of HDDs on 2 HDD Server

Figure Legend

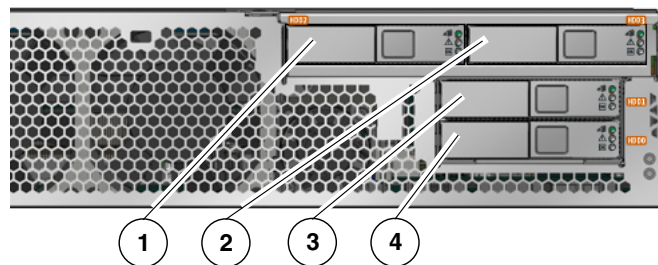|	
1	Hard Drive 1 (HDD1)
2	Hard Drive 0 (HDD0)

FIGURE 3-3 Locations of HDDs on 4 HDD Server

Figure Legend

1	Hard Drive 2 (HDD2)
2	Hard Drive 3 (HDD3)
3	Hard Drive 1 (HDD1)
4	Hard Drive 0 (HDD0)

3. Type the Solaris OS commands required to stop using the hard drive.

Exact commands required depend on the configuration of your hard drives. You might need to unmount file systems or perform RAID commands.

4. On the drive you plan to remove, push the latch release button (FIGURE 3-4**).**

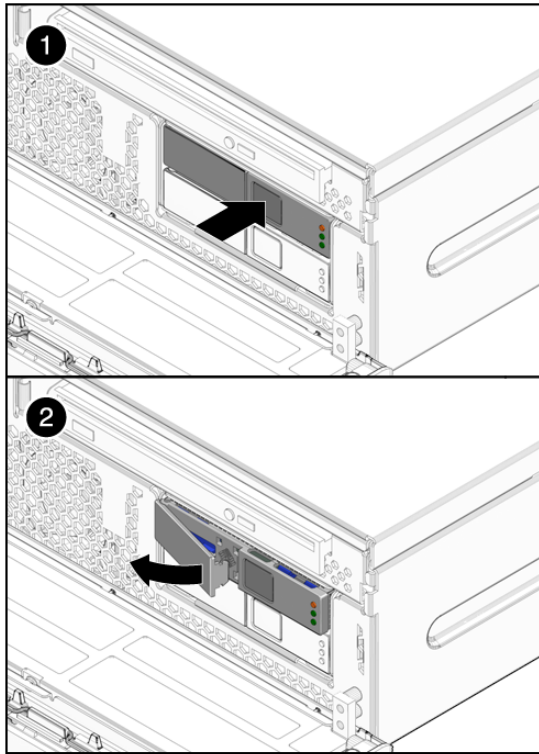The latch opens.

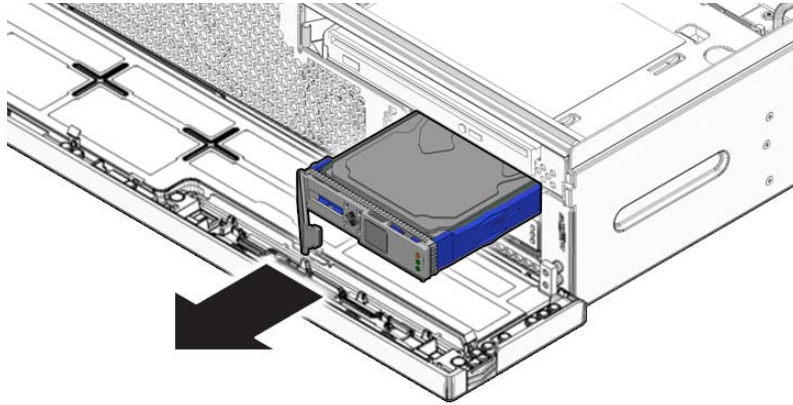**FIGURE 3-4**   Opening Hard Drive Latch

Figure Legend

1	Latch release button
2	Latch

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

5. Grasp the latch and pull the drive out of the drive slot (FIGURE 3-5**).**

FIGURE 3-5   Removing Hard Drive

6. **Consider your next steps:**

   ▪ If you are replacing the hard drive, continue to Section 3.1.2, "Installing a Hard Drive" on page 3-5.

   ▪ If you are not replacing the hard drive, perform administrative tasks to configure the server to operate without the hard drive.

3.1.2   Installing a Hard Drive

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

2. **Align the replacement drive to the drive slot.**

   The hard 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 it is fully seated (**FIGURE 3-6**).**

FIGURE 3-6   Installing the Hard Drive
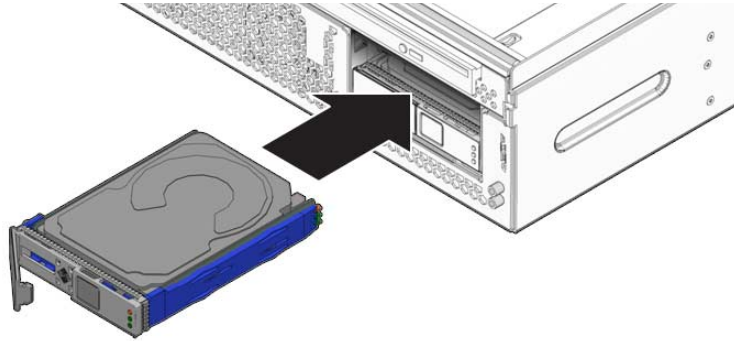
4. Close the latch to lock the drive in place.

5. Close the bezel.

6. Perform administrative tasks to reconfigure the hard 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 it updated from a RAID configuration.
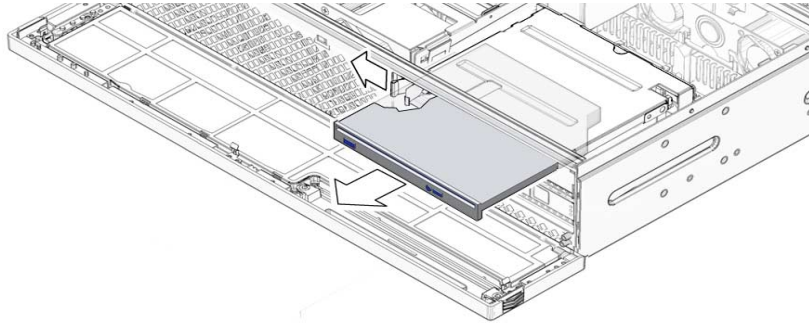
3.2   Replacing the Optical Media Drive

3.2.1   Removing the Optical Media Drive

1. Prepare the server for media bay assembly removal. See:

■ Section 2.3.1, "Powering Off the Server" on page 2-3

■ Section 2.3.4, "Performing Antistatic Measures" on page 2-8

2. Open the bezel.

3. Push the release tab to the left and pull the probe forward, freeing the optical media drive (FIGURE 3-7**).**

Note – You do not need to remove the top cover to remove the optical media drive. The following illustration shows the top cover removed for clarity of placement.

FIGURE 3-7   Releasing the Optical Media Drive
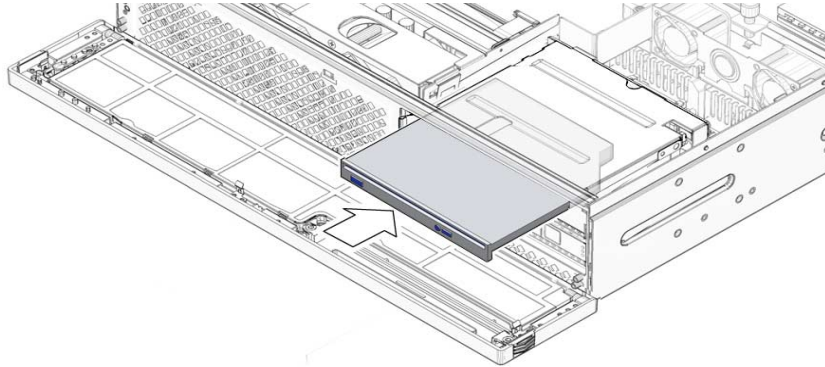

4. **Remove the optical media drive from the media bay assembly and set it aside on an antistatic mat.**

5. **Consider your next step:**

   ■ If you removed the optical media drive as part of another procedure, return to that procedure.

   ■ Otherwise, continue to Section 3.2.2, "Installing the Optical Media Drive" on page 3-7.

3.2.2   Installing 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 (**FIGURE 3-8**).**

Note – You do not need to install the top cover to remove the optical media drive. The following illustration shows the top cover removed for clarity of placement.

FIGURE 3-8 Inserting the Optical Media Drive

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 drive as part of another procedure, return to that procedure.

■ Otherwise, perform the following tasks to bring the server back online:

   ■ Section 6.1.3, "Removing Antistatic Measures" on page 6-4

   ■ Section 6.1.6, "Powering On the Server" on page 6-8

3.3   Replacing the Media Bay Assembly

3.3.1   Removing the Media Bay Assembly

1. **Prepare the server for media bay assembly removal. See:**

■ Section 2.3.1, "Powering Off the Server" on page 2-3

■ Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4

■ Section 2.3.3, "Removing the Server From the Rack" on page 2-5

■ Section 2.3.4, "Performing Antistatic Measures" on page 2-8

■ Section 2.3.5, "Removing the Top Cover" on page 2-8

2. **Remove the optical media drive and the hard drives. See:**

■ Section 3.2.1, "Removing the Optical Media Drive" on page 3-6

■ Section 3.1.1, "Removing a Hard Drive" on page 3-2

3. **Disconnect the following cables from the media bay assembly (**FIGURE 3-9**):**

   a. **(Optional) Disconnect the blue system fan tray assembly cable that connects to the PDB underneath the media bay assembly cables** (FIGURE 3-9).

   This step allows easier access to the media bay assembly cables.

   b. **Disconnect media bay assembly cable (top) that connects to the motherboard (**FIGURE 3-9**).**

   c. **Disconnect media bay assembly cable (bottom) that connects to power distribution board (PDB) (**FIGURE 3-9**).**

   d. **Disonnect media bay assembly ribbon cable that connects to the PDB (**FIGURE 3-9**).**

      You can disconnect this cable from the rear of the media bay assembly or from the PDB after loosening the screws and lifting the assembly out of the chassis.

FIGURE 3-9 Media Bay Assembly Cables
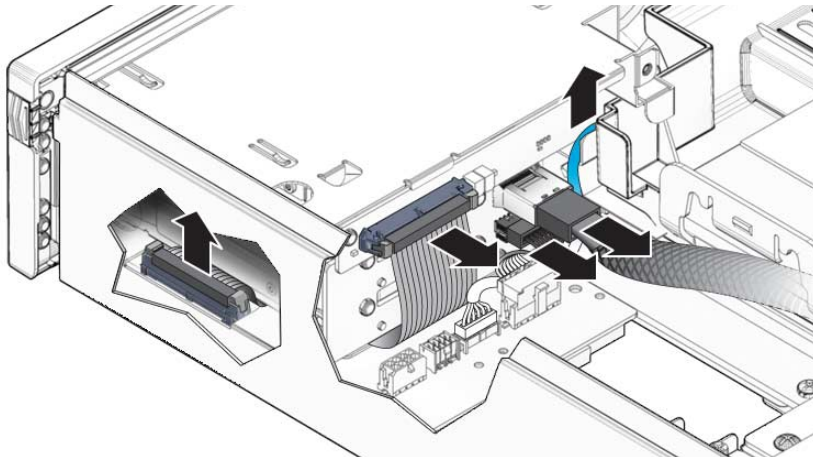
4. **Loosen captive screws labeled 2 and 3, and remove non-captive screw labeled 1 closest to the front of the server (**FIGURE 3-10**).**

5. **Lift the media bay assembly out of the chassis (**FIGURE 3-10**).**

FIGURE 3-10   Loosening the Media Bay Assembly Screws and Lifting From Chassis
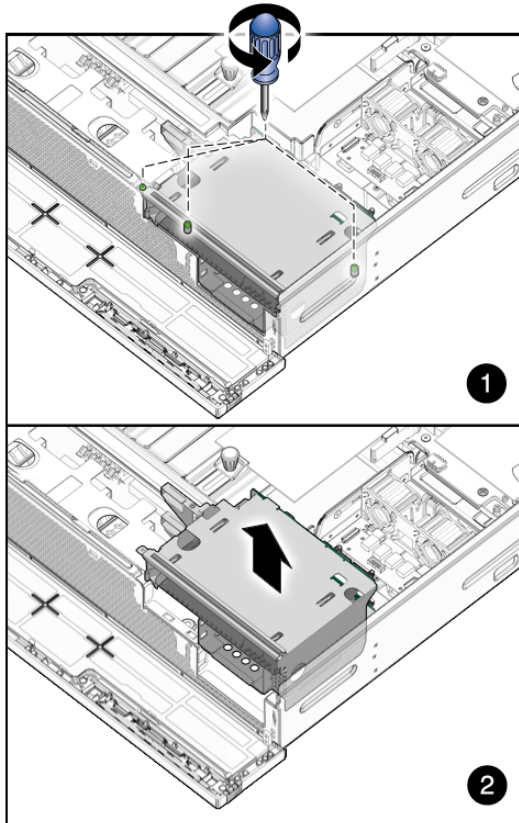

6. **(Optional) Disconnect and remove the ribbon cable from the PDB.**

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 Section 3.3.2, "Installing the Media Bay Assembly" on page 3-11.

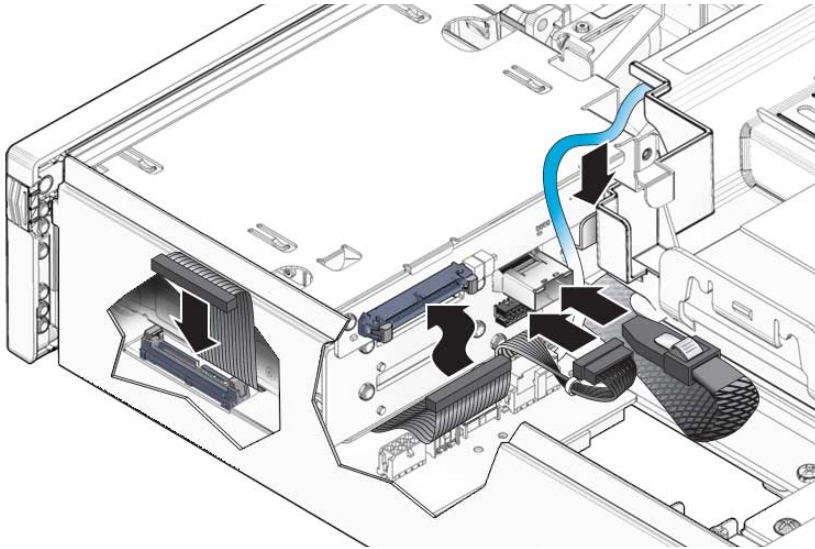## 3.3.2   Installing the Media Bay Assembly

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. **If disconnected, reconnect the media bay assembly ribbon cable to the PDB.**

   Arrange the cable where it can be reconnected to the assembly after it is reseated.

4. **Lower the media bay assembly into the chassis until it seats (**FIGURE 3-11**).**

5. **Tighten the media bay assembly screws (**FIGURE 3-11**).**

FIGURE 3-11 Setting the Media Bay Assembly Into Place and Tightening Screws
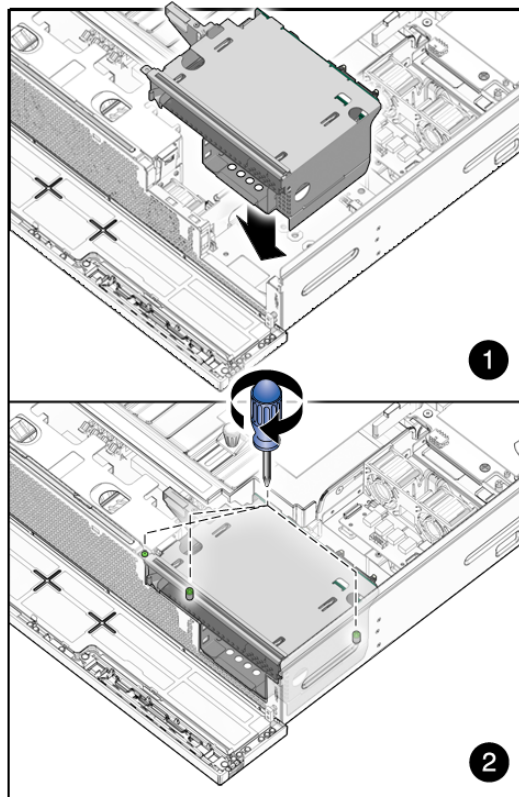
6. Connect the following cables to the media bay assembly (FIGURE 3-12**):**

FIGURE 3-12 Connecting the Media Bay Assembly Cables

7. Install the optical media drive and the hard drives. See:

- Section 3.2.2, "Installing the Optical Media Drive" on page 3-7
- Section 3.1.2, "Installing a Hard Drive" on page 3-5

8. Close the bezel.

9. Consider your next step:

- If you installed the media bay bracket as part of another procedure, return to that procedure.
- Otherwise, perform the following tasks to bring the server back online:
  - Section 6.1.2, "Installing the Top Cover" on page 6-3
  - Section 6.1.3, "Removing Antistatic Measures" on page 6-4
  - Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5
  - Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7
  - Section 6.1.6, "Powering On the Server" on page 6-8

Replacing Motherboard Assembly Components

This chapter describes how to remove components from the motherboard assembly and how to remove the motherboard assembly itself. Topics include:

4.1 Powering Off and Powering On the Server

To prepare the server for servicing parts in this chapter, power off the server by performing the following procedures:

To bring the server back online, perform the following procedures:

4.2 Replacing PCI-X, PCIe/XAUI Cards

4.2.1 PCI Card Retainers

The PCI mezzanine secures the PCIe cards into place with green PCI card retainers and captive (nonremovable) screws. The following figure shows the four PCI card retainers that ship with the server.

FIGURE 4-1   PCI Card Retainers
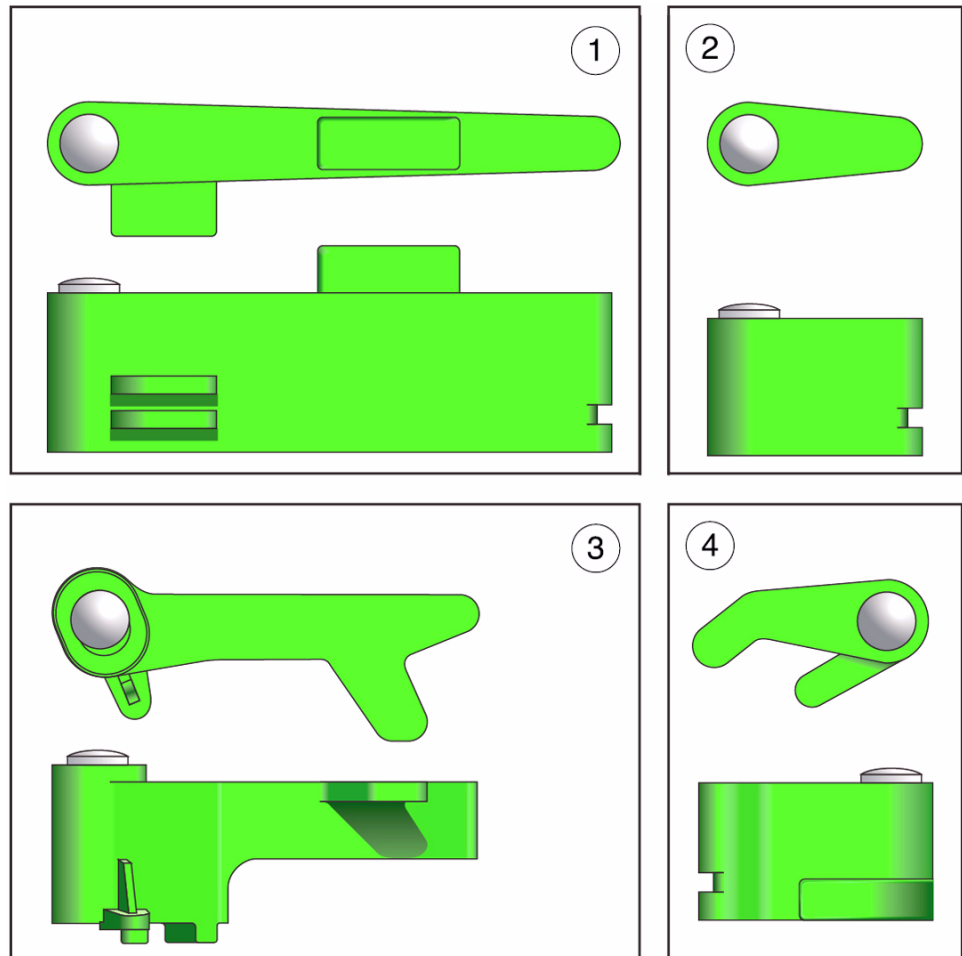
Figure Legend

1	Long retainer; mfg part number: 340747400038, 60mm long
2	Short, straight retainer; mfg part number: 340747400037, 18mm long (Note: This retainer fits the same cards as the short, curved retainer [4].)
3	Low-profile retainer; mfg part number: 340764100068, 48mm long
4	Short, curved retainer; mfg part number: 340747400039, 24mm long (Note: This retainer fits the same cards as the short, straight retainer [2].)

The following figure shows examples of how to use these retainers with differently sized PCI cards.

Note – The short, straight retainers and the short, curved retainers can be used interchangeably to secure the same cards. The short, curved retainer provides more support.

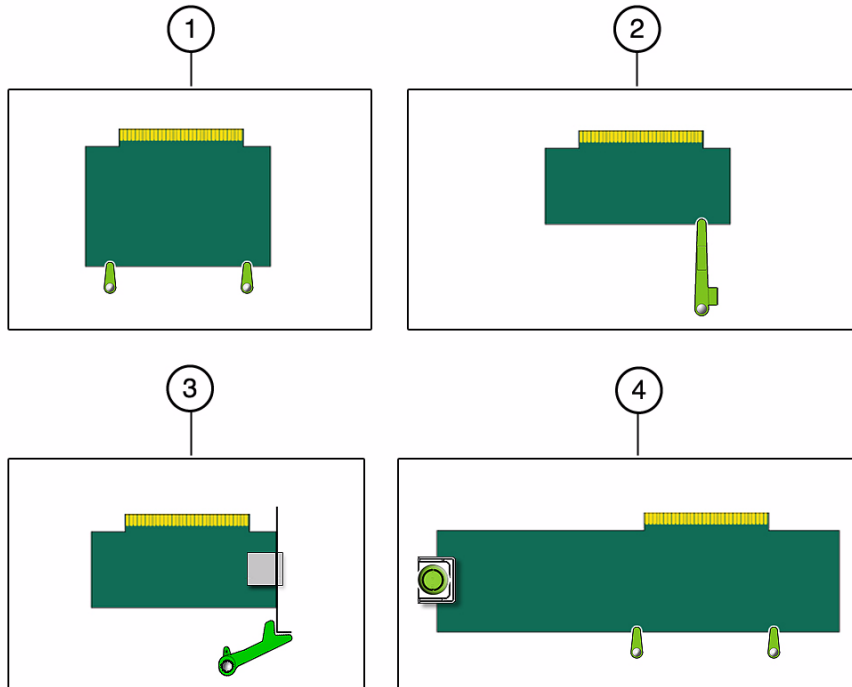**FIGURE 4-2** PCI Card Retainer Examples

Figure Legend

1	Half-length, standard-height card secured with two short retainers
2	Low-profile card secured with one long retainer
3	Low-profile card secured with one low-profile retainer
4	Full-length, standard-height card secured with two short retainers and the retainer on the air duct

4.2.2 Replacing PCI-X 4 and PCIe 5 Cards

Note – The maximum power of any one PCI card is 25 watts. Only PCI-X slot 4 and PCIe slot 5 accept long cards.

▼ To Remove the PCI-X 4 and PCIe 5 Cards

1. **Prepare the server for PCI card removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

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

3. **Loosen the appropriate PCI card retainers and securing screws (**FIGURE 4-3**).**

   The screws are captive and cannot be completely removed from the PCI mezzanine.

FIGURE 4-3   Upper PCI Card Retainers and Securing Screws
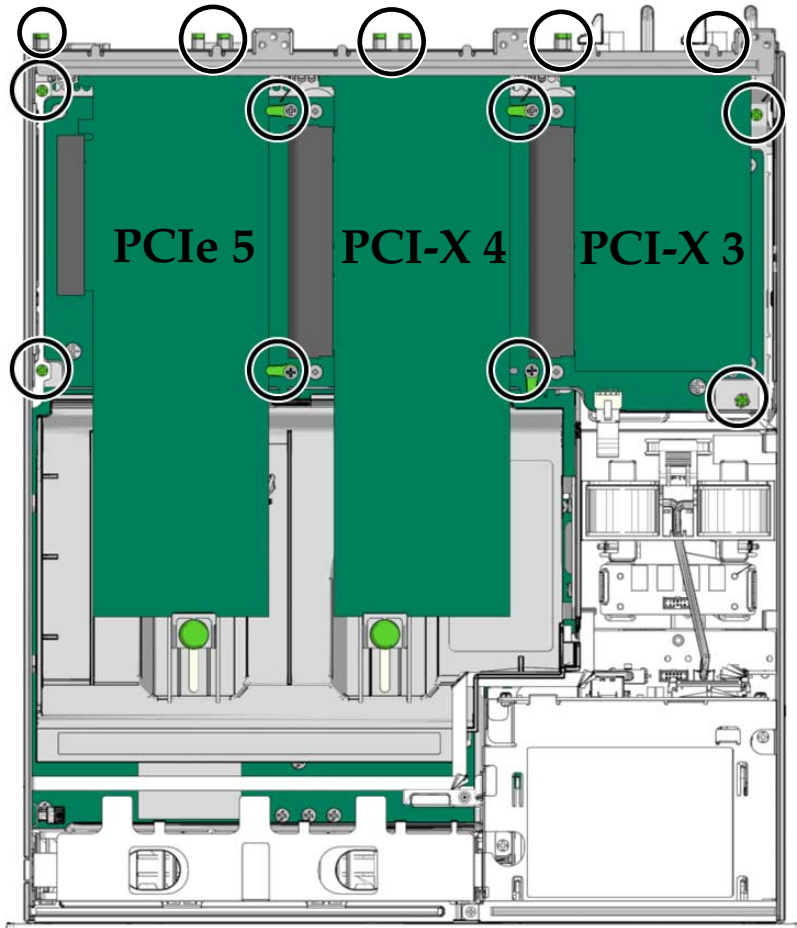
4. **Slide the card to the left and lift it out of the PCI mezzanine (**FIGURE 4-4**).**

FIGURE 4-4   Removing PCI-X 4 and PCIe 5 Cards From the PCI Mezzanine

Set the card aside on an antistatic mat.

5. **Consider your next step:**

- If you are replacing the card, continue to "To Install PCI-X 4 and PCIe 5 Cards" on page 7.

- If you do not replace the card, install a filler panel.

6. **Tighten the card securing screws.**

7. **Bring the server back online. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.
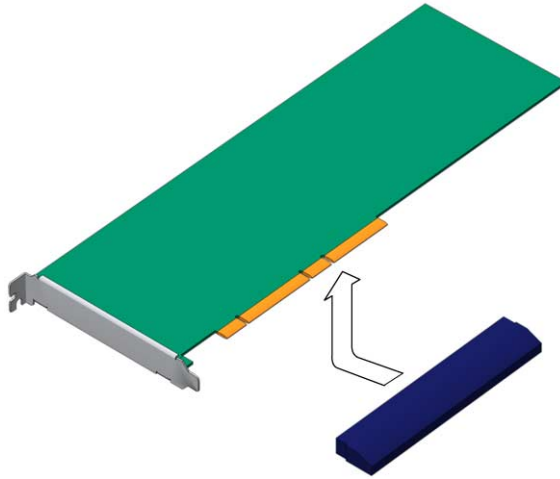
▼ To Install PCI-X 4 and PCIe 5 Cards

1. **Prepare the server for PCI card installation. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

2. **With the PCI mezzanine installed and cabled, determine which slot to install the card and loosen the appropriate card securing screws (**FIGURE 4-3**).**

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.**

5. **Lower the card into position on the PCI mezzanine, then slide it to the right to seat it into the connector (**FIGURE 4-5**).**

   You must secure the right side of the PCI card faceplate into the small slot on the right side of the PCI card slot (facing the rear of the server) before installing the PCI card.

FIGURE 4-5   Installing PCI-X 4 and PCIe 5 Cards in the PCI Mezzanine
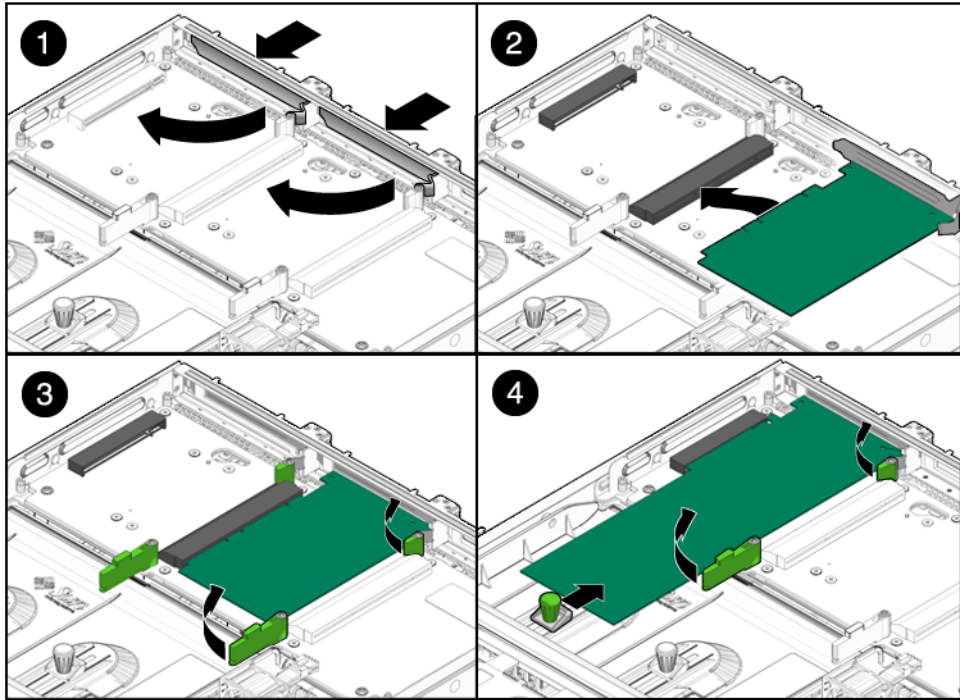
6. **Tighten the card securing screws and appropriate PCI retainers (**FIGURE 4-3**).**

7. **Bring the server back online. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

4.2.3   Replacing the PCI-X 3 Card

**Note –** The maximum power of any one PCI card is 25 watts. Only PCI-X slot 4 and PCIe slot 5 accept long cards.

▼ To Remove the PCI-X 3 Card

1. Prepare the server for PCI card removal. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

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

3. Loosen the appropriate PCI card retainers and securing screws (FIGURE 4-3**).**

The screws are captive and cannot be completely removed from the PCI mezzanine.

4. Slide the card to the left and lift it out of the PCI mezzanine (FIGURE 4-4**).**

FIGURE 4-6 Removing the PCI-X 3 Card From the PCI Mezzanine
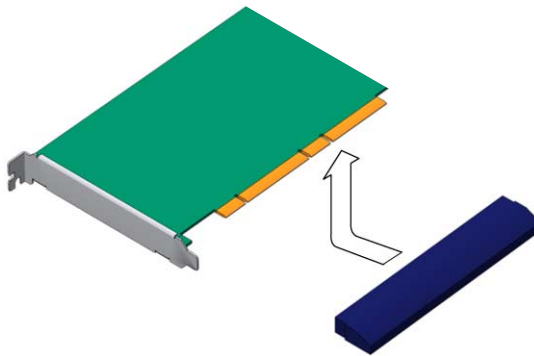
Set the card aside on an antistatic mat.

5. Consider your next step:

- If you are replacing the card, continue to "To Install the PCI-X 3 Card" on page 9.
- If you do not replace the card, install a filler panel.

6. Tighten the card securing screws.

7. Bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

▼ To Install the PCI-X 3 Card

1. Prepare the server for PCI card installation. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

2. **With the PCI mezzanine installed and cabled, loosen the appropriate card securing screws (**FIGURE 4-3**).**

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 (**FIGURE 4-7**).**

5. **Lower the card into position on the PCI mezzanine, then slide it to the right to seat it into the connector (**FIGURE 4-7**).**

6. **Tighten the appropriate card securing screws and PCI retainers (**FIGURE 4-7**).**

FIGURE 4-7   Installing the PCI-X 3 Card in the PCI Mezzanine
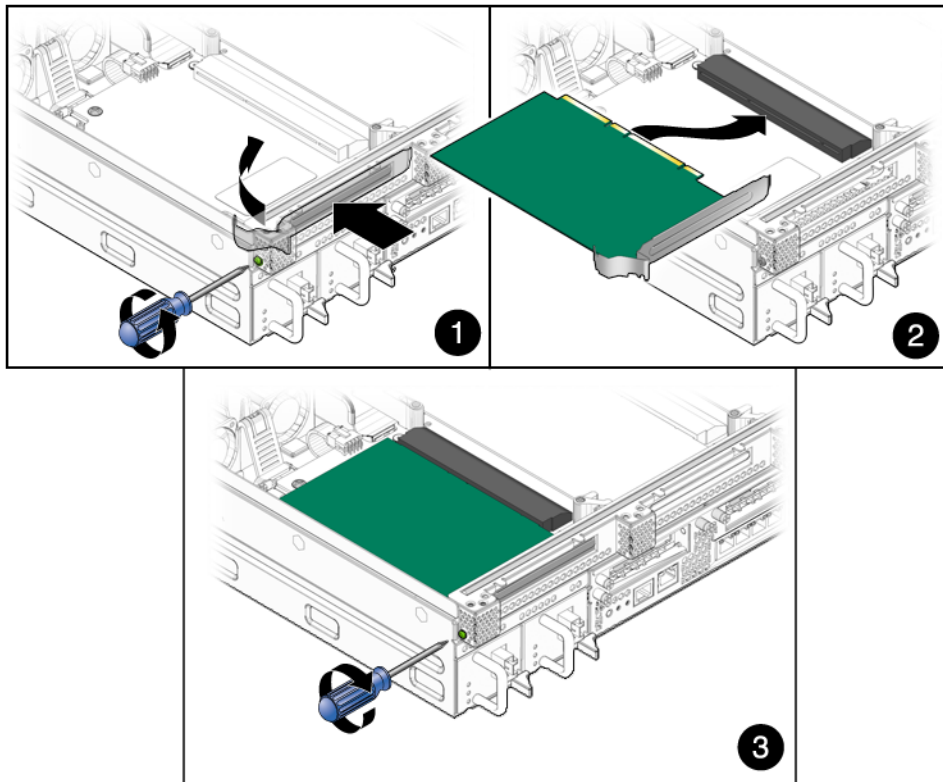
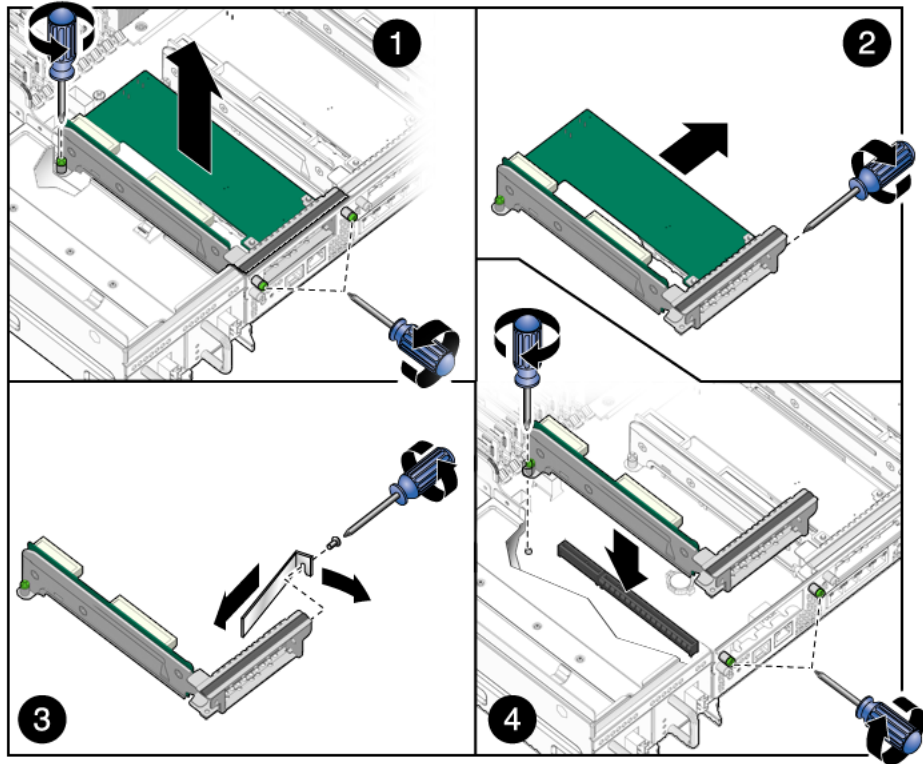7. **Bring the server back online. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

4.2.4 Replacing the Lower PCIe/XAUI Cards

Note – The maximum power of any one PCI card is 25 watts. PCIe/XAUI slots 0 and 1 are the only slots that support XAUI cards.

▼ To Remove the Lower PCIe/XAUI Cards

1. **Prepare the server for card removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

2. **Remove the PCI mezzanine and place it on an anti-static mat.**

3. **Loosen the appropriate card securing screws (**FIGURE 4-8**).**

4. **Lift the PCI riser assembly (with PCI card attached) from the PCI mezzanine (**FIGURE 4-8**).**

5. **If installed, remove the card securing screw on the right side of the PCI card faceplate (**FIGURE 4-8**).**

6. **Remove the PCI card from the PCI riser assembly (**FIGURE 4-8**).**

FIGURE 4-8 Removing Lower PCIe/XAUI Cards From the PCI Mezzanine

7. **Set the card aside on an antistatic mat.**

8. **Consider your next step:**

   ■ If you are replacing the PCIe card, continue to Section 4.2.5, "Installing the Lower PCIe/XAUI Cards" on page 4-12.

   ■ If you do not replace the PCIe card, install a filler panel.

9. **Bring the server back online. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

4.2.5   Installing the Lower PCIe/XAUI Cards

1. **Prepare the server for PCI card installation. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

2. **Remove the PCI mezzanine and place it on an anti-static mat.**

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

4. **Loosen the appropriate PCI riser assembly securing screws (**FIGURE 4-9**).**

5. **Lift the PCI riser assembly from the PCI mezzanine and place it on an antistatic mat.**

6. **If a filler panel is installed, remove it by pulling the tab (**FIGURE 4-9**).**

⚠

Caution – Verify the PCI card you are installing matches the slot. The PCIe 0 and 1 slots are different than the PCIe 2 slot (FIGURE 4-10). The Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card must be installed in PCIe slot 0 only.

7. **Slide the PCI card into the PCI riser assembly connector until fully seated.**

8. **Install the card securing screw on the right side of the PCI card faceplate (**FIGURE 4-9**).**

9. **Seat the PCI riser assembly into the PCI mezzanine (**FIGURE 4-9**).**

10. **Tighten the appropriate PCI riser assembly securing screws (**FIGURE 4-9**).**

Note – If you are installing the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal (slot 0 only), see Section 4.3, "Cabling the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal" on page 4-15 for important cabling instructions.

FIGURE 4-9 Installing Lower PCIe/XAUI Cards in the PCI Mezzanine
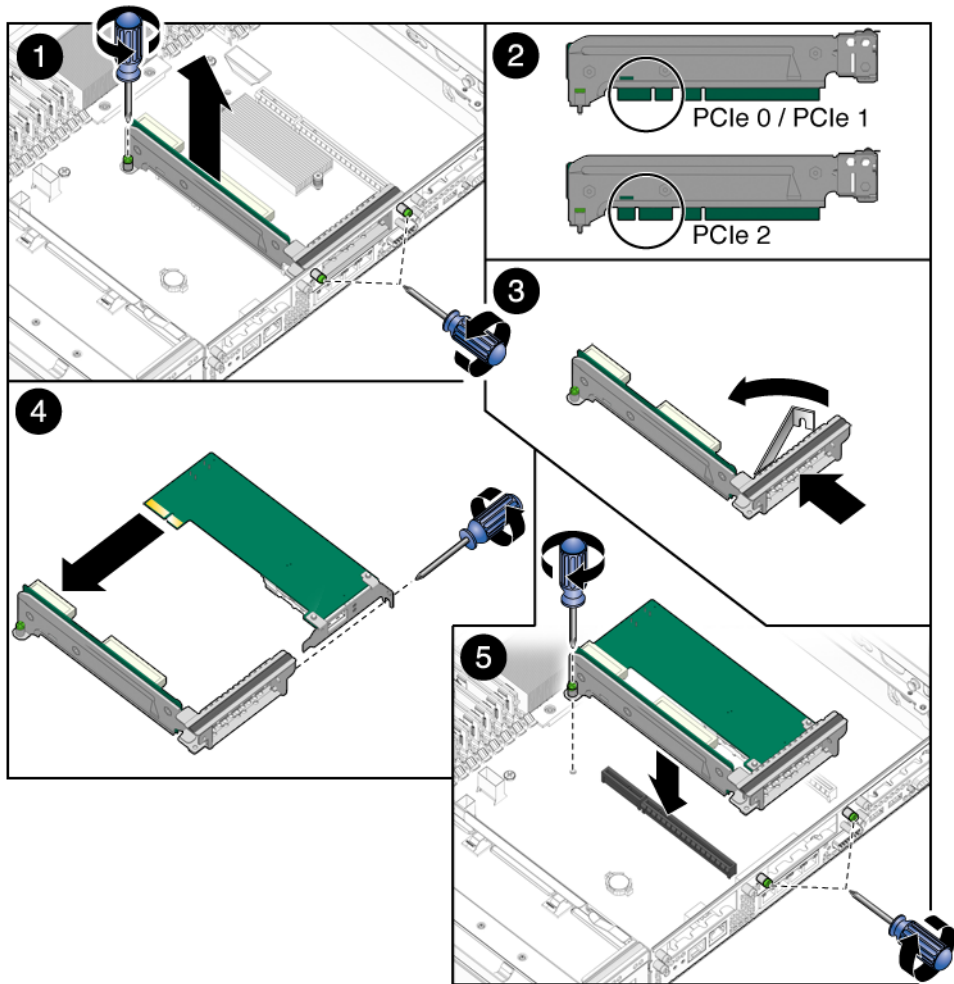
11. **Bring the server back online. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

12. **See** Chapter 6 **to return the server to operation.**

4.3   Cabling the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal

Refer to the *Sun Storage 6 Gb SAS PCIe RAID HBA, Internal Installation Guide* (E22410) for additional details.

This HBA requires a separate SAS cable (530-4088-01) that ships with the card, or can be ordered separately.

▼ Cable the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal

1. **Remove the existing SAS cable connected to the SAS BackPlane (BP) connector and the motherboard near slot 0.**

2. **Install the card in PCIe slot 0, see** Section 4.2.5, "Installing the Lower PCIe/XAUI Cards" on page 4-12**.**

3. **Connect the SAS cable (530-4088-01) to port SAS0 on the card and the SAS BP connector.**

   Route the SAS cable as shown in the following figure.

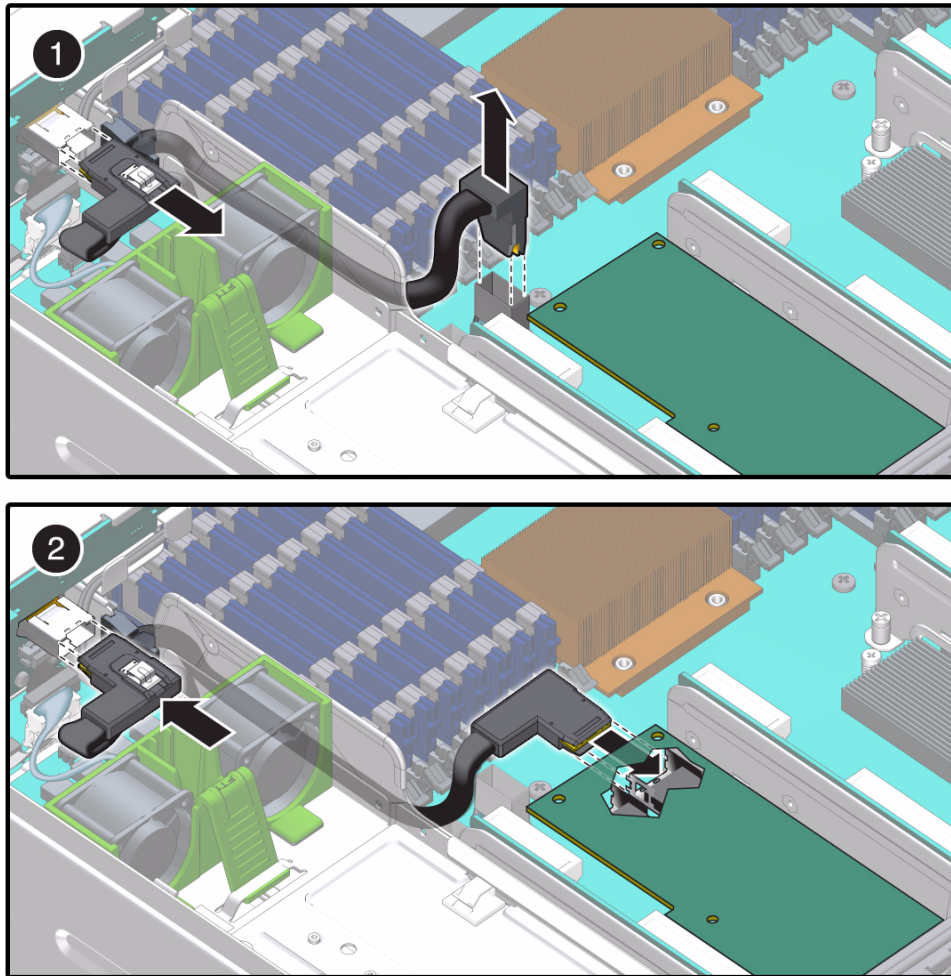**FIGURE 4-10** Cable Connections for the Sun Storage 6 Gb PCIe SAS RAID HBA

Figure Callout	Instruction
1	Unulug existing SAS cable from the SAS BackPlane (BP) connector and from the motherboard near slot 0
2	Plug the new SAS cable into port SAS0 of the HBA and into the SAS BP connector.

4. Bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

5. See Chapter 6 **to return the server to operation.**

4.4 Replacing the Air Duct

4.4.1 Removing the Air Duct

1. **Prepare the server for air duct removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

2. **Facing the server, release the tab on the right of the air duct and pull upward (**FIGURE 4-11**).**

3. **Lift the duct out of the chassis, releasing it from the pins on the left side of the chassis, and set it aside on an antistatic mat (**FIGURE 4-11**).**
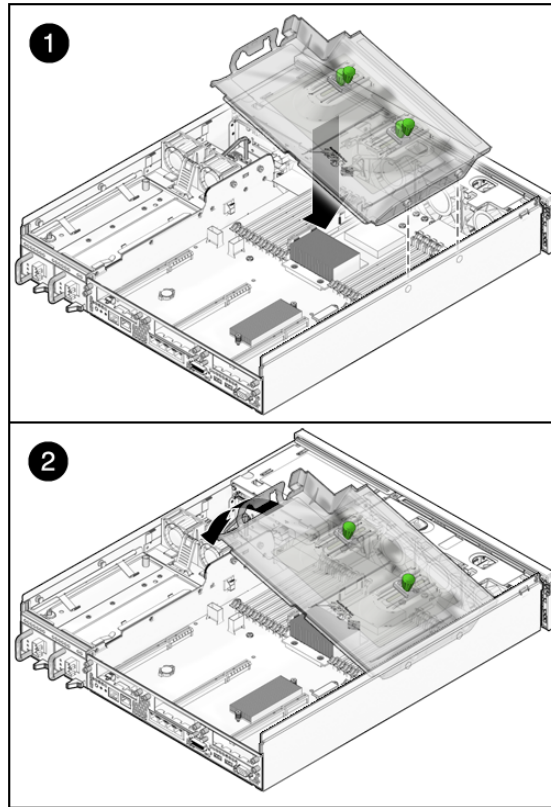
FIGURE 4-11 Removing the Air Duct
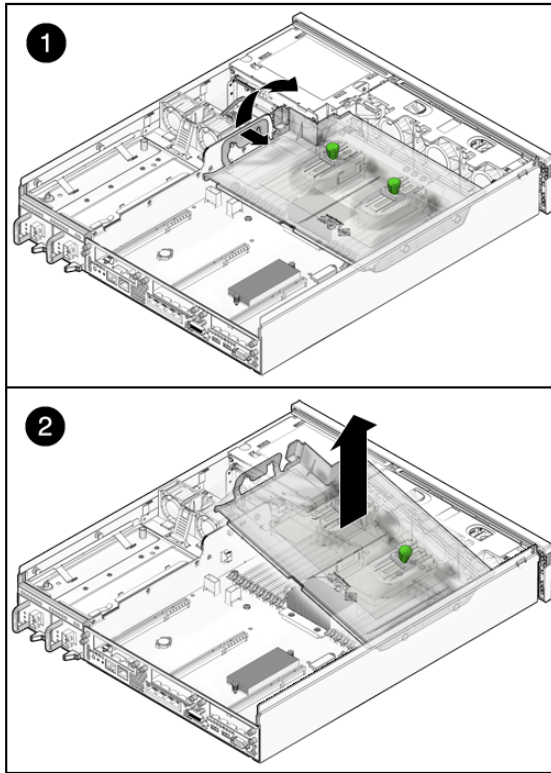
4. **Consider your next step:**

   - If you removed the air duct as part of another procedure, return to that procedure.
   - Otherwise, continue to Section 4.4.2, "Installing the Air Duct" on page 4-18.

4.4.2   Installing 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 (**FIGURE 4-12**).**

3. **Lower the duct to the horizontal position until the tab secures in place (**FIGURE 4-12**).**

FIGURE 4-12 Installing the Air Duct

4. **Consider your next step:**

- If you installed the air duct as part of another procedure, return to that procedure.

- Otherwise, bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

5. **See Chapter 6 to return the server to operation.**

4.5 FB-DIMM Layout

Use these FB-DIMM configuration rules, FIGURE 4-13, and TABLE 4-1 to help you plan the memory configuration of your server.

- There are 16 slots that hold industry-standard FB-DIMM memory modules.

- All FB-DIMMs must be the same density (same type)
- The Sun Netra T5220 server supports the following configurations:
  - 4 FB-DIMMs (Group 1)
  - 8 FB-DIMMs (Groups 1 and 2)
 - 16 FB-DIMMs (Groups 1, 2, and 3) (fully populated configuration)

Note – On each branch, populate CH0/D0 first. Populate CH1/D0 second.

FIGURE 4-13 FB-DIMM Layout
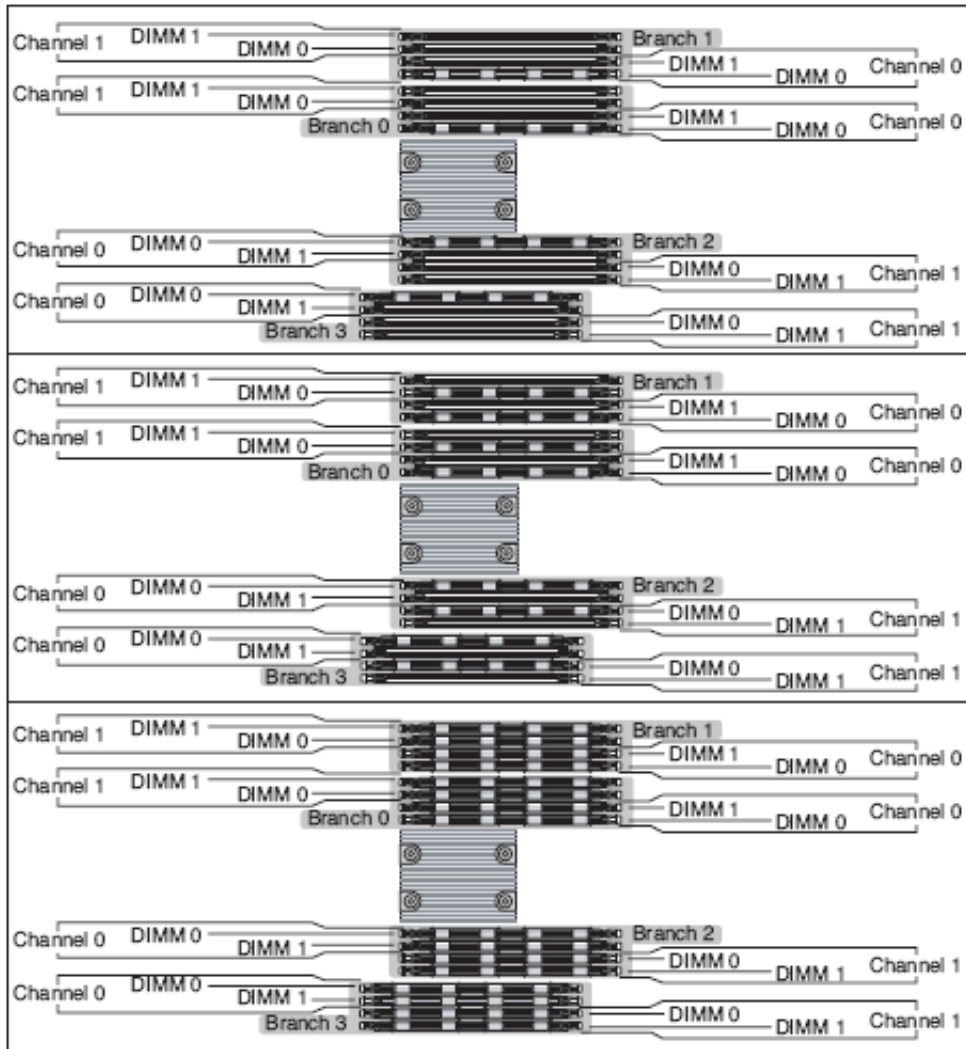
- At minimum, Channel 0, FB-DIMM Slot 0 in all branches must be populated with FB-DIMMS of the same density (same type).
- In branches populated with more than one FB-DIMM (that is, in 8 and 16 FB-DIMM configurations), FB-DIMMs are addressed in pairs. Each pair must be identical (same Sun part number).
- Upgrading from a 4 FB-DIMM configuration requires moving two of the FB-DIMMs to ensure matching pairs in all occupied slots. (See FIGURE 4-14)

FIGURE 4-14 FB-DIMM Upgrade Path
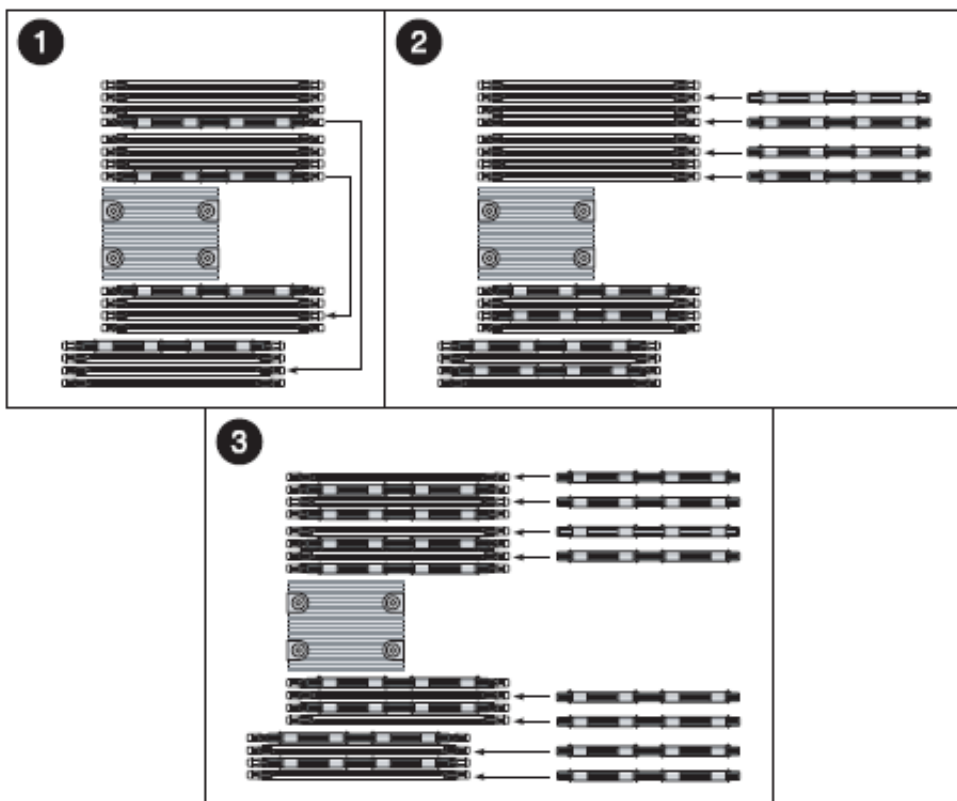
- A replacement FB-DIMM must have the same part number as the other FB-DIMM in its pair. For example, a replacement FB-DIMM in J1201 must have the same Sun part number as the FB-DIMM in J1401, in order to ensure an identical pair.
- If you are unable to obtain a matching FB-DIMM, you must replace both FB-DIMMs in the pair.

TABLE 4-1 FB-DIMM Configuration

Branch Name	Channel Name	FRU Name	Motherboard FB-DIMM Connector	FB-DIMM Installation Order[*]	FB-DIMM Pair[†]
Branch 0	Channel 0	/SYS/MB/CMP0/BR0/CH0/D0	J1001	1	A
		/SYS/MB/CMP0/BR0/CH0/D1	J1101	3	B
	Channel 1	/SYS/MB/CMP0/BR0/CH1/D0	J1201	2	A
		/SYS/MB/CMP0/BR0/CH1/D1	J1301	3	B

TABLE 4-1   FB-DIMM Configuration

Branch Name	Channel Name	FRU Name	Motherboard FB-DIMM Connector	FB-DIMM Installation Order*	FB-DIMM Pair†
Branch 1	Channel 0	/SYS/MB/CMP0/BR1/CH0/D0	J1401	1	C
		/SYS/MB/CMP0/BR1/CH0/D1	J1501	3	D
	Channel 1	/SYS/MB/CMP0/BR1/CH1/D0	J1601	2	C
		/SYS/MB/CMP0/BR1/CH1/D1	J1701	3	D
Branch 2	Channel 0	/SYS/MB/CMP0/BR2/CH0/D0	J2001	1	E
		/SYS/MB/CMP0/BR2/CH0/D1	J2101	3	F
	Channel 1	/SYS/MB/CMP0/BR2/CH1/D0	J2201	2	E
		/SYS/MB/CMP0/BR2/CH1/D1	J2301	3	F
Branch 3	Channel 0	/SYS/MB/CMP0/BR3/CH0/D0	J2401	1	G
		/SYS/MB/CMP0/BR3/CH0/D1	J2501	3	H
	Channel 1	/SYS/MB/CMP0/BR3/CH1/D0	J2601	2	G
		/SYS/MB/CMP0/BR3/CH1/D1	J2701	3	H

* Upgrade path: DIMMs should be added with each group populated in the order shown.

† Fault replacement path: Each pair is addressed as a unit, and each pair must be identical.

> **Note –** FB-DIMM names in ILOM messages are displayed with the full FRU name, such as /SYS/MB/CMP0/BR0/CH0/D0.

4.6   Replacing FB-DIMMs

This section describes how to diagnose and replace faulty FB-DIMMs. For FB-DIMM configuration guidelines, see Section 4.5, "FB-DIMM Layout" on page 4-19.

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

> **Caution –** Always perform antistatic measures by using a wrist strap and an antistatic mat for handling and storing removable components.

> **Note –** To remove and install some of the FB-DIMMs, you might need to remove and reinstall the media bay assembly and cables. If this is necessary, see Section 3.3, "Replacing the Media Bay Assembly" on page 3-8.

4.6.1　Locating a Faulty FB-DIMM

The system Service Required LED lights if the system detects a FB-DIMM fault.

Use the `showfaults` command to identify faulty FB-DIMMs. See Section 1.4.4, "Displaying System Faults" on page 1-21.

Use the FB-DIMM fault locator button on the motherboard to identify faulty FB-DIMMs.

1. **Prepare the server for FB-DIMM removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

2. **Remove the FB-DIMM/CPU duct.**

   See Section 4.4.1, "Removing the Air Duct" on page 4-17.

3. **Press the FB-DIMM fault locator button on the motherboard.**

   The button is located on the left edge of the motherboard, next to `/SYS/MB/CMP0/BR3/CH1/D1` (J1701).

4. **Note the location of faulty FB-DIMMs.**

   Faulty FB-DIMMs are identified with a corresponding amber LED on the motherboard.

> **Note –** The FB-DIMM fault LEDs remain lit only for a few minutes.

5. **Ensure that all FB-DIMMs are seated correctly in their slots.**

4.6.2　Removing FB-DIMMs

1. **Prepare the server for FB-DIMM removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

2. **Remove the FB-DIMM/CPU duct.**

   See Section 4.4.1, "Removing the Air Duct" on page 4-17.

3. **If you are replacing a faulty FB-DIMM, locate the FB-DIMMs that you want to replace.**

   Press the DBDIMM DIAG button on the motherboard to activate the DB-DIMM status LEDs. Any faulty FB-DIMMs will be indicated with a corresponding amber fault LED on the motherboard.


Tip – Make a note of the faulty FB-DIMM location so that you can install the replacement FB-DIMM in the same location.

Note – For memory configuration information see Section 4.5, "FB-DIMM Layout" on page 4-19.

---

4. **Push down on the ejector tabs on each side of the FB-DIMM until the FB-DIMM is released (**FIGURE 4-15**).**

5. **Grasp the top corners of the faulty FB-DIMM and remove it from the server.**

FIGURE 4-15 Removing FB-DIMMs
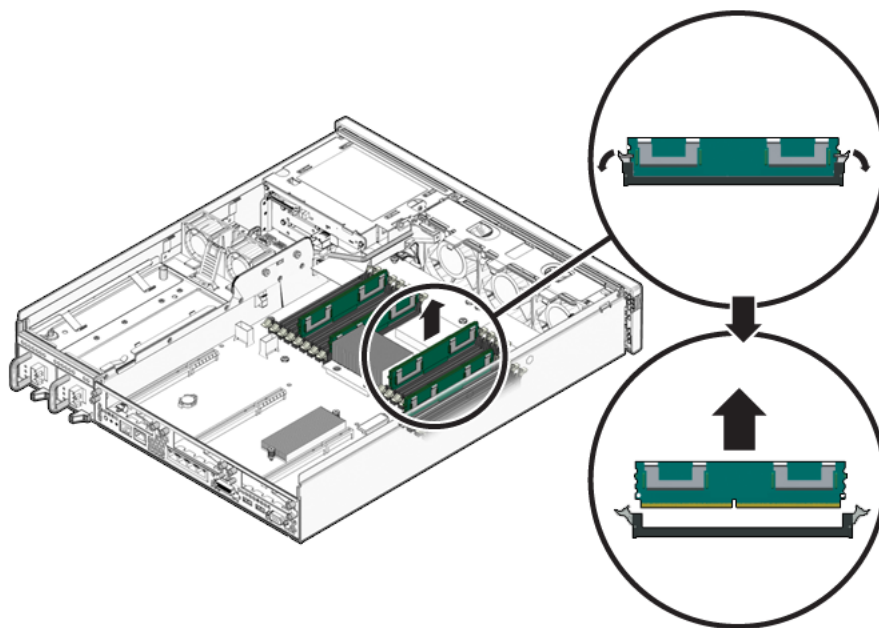
6. **Place the FB-DIMM on an antistatic mat.**

7. **Repeat** Step 4 **through** Step 6 **to remove any additional FB-DIMMs.**

4.6.3   Installing FB-DIMMs

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

1. **Unpackage the replacement FB-DIMMs and place them on an antistatic mat.**

Tip – See Section 4.5, "FB-DIMM Layout" on page 4-19 for information about configuring the FB-DIMMs.

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

3. **Line up the replacement FB-DIMM with the connector (**FIGURE 4-16**).**

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

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

   If the FB-DIMM does not easily seat into the connector, verify that the orientation of the FB-DIMM is as shown in FIGURE 4-16. If the orientation is reversed, damage to the FB-DIMM might occur.

FIGURE 4-16 Inserting the FB-DIMM Into the Slot
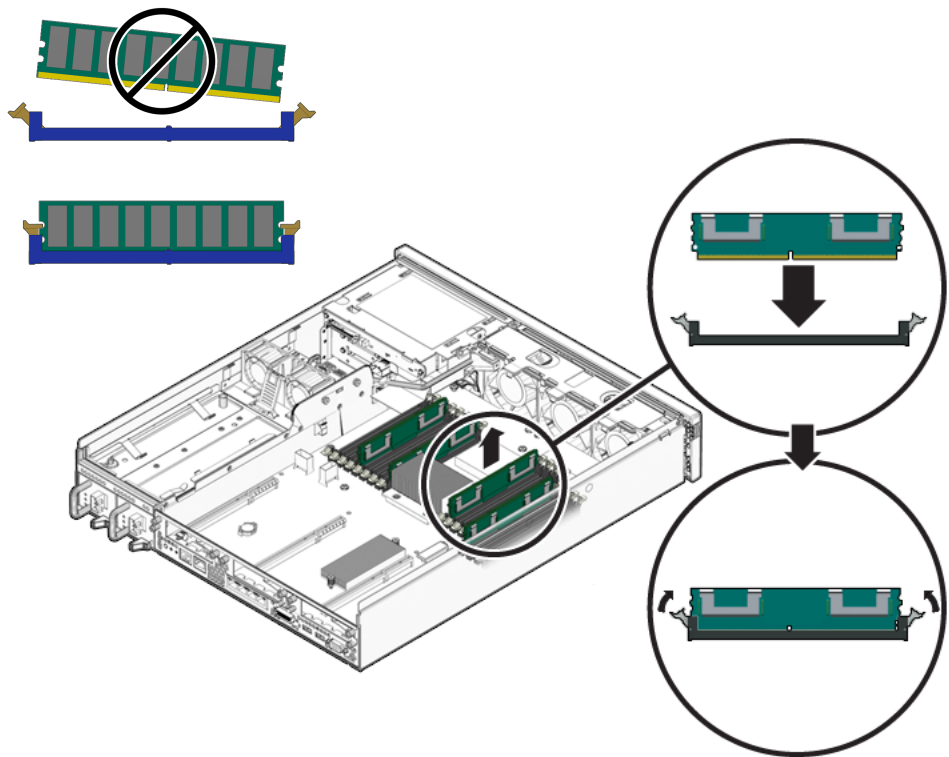
5. **Repeat** Step 2 **through** Step 4 **until all replacement FB-DIMMs are installed.**

6. **Consider your next step:**

- If you installed FB-DIMMs as part of another procedure, return to that procedure.
- If you are to only install FB-DIMMs:

   a. **Install the air duct.**

      See Section 4.4.2, "Installing the Air Duct" on page 4-18.

b. Bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1

4.6.4 Verifying Successful Replacement of a Faulty FB-DIMM

1. Access the ALOM CMT sc> **prompt.**

Refer to the *Sun Integrated Lights Out Management 2.0 Supplement for the Sun Netra T5220 Server* for instructions.

2. Run the showfaults -v **command to determine how to clear the fault.**

The method you use to clear a fault depends on how the fault is identified by the showfaults command.

Examples:

- If the fault is a *host-detected fault* (displays a UUID), continue to Step 3. For example:

```
sc> showfaults
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID FRU                          Fault
0  /SYS/MB/CMP0/BR2/CH1/D0    Host detected fault, MSGID:
SUN4V-8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

- If the fault was detected by POST and resulted in the FB-DIMM being disabled, such as the following,

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                    Fault
0 /SYS/MB/CMP0/BR3/CH1/D1 SP detected fault:
/SYS/MB/CMP0/BR3/CH1/D1 Forced fail (POST)
```

In most cases, the replacement of the faulty FB-DIMM(s) is detected when the service processor is power cycled. In this case, the fault is automatically cleared from the system. If the fauilt is still displayed by the showfaults command, then run the enablecomponent command to enable the FB-DIMM and clear the fault.

```
sc> enablecomponent /SYS/MB/CMP0/BR3/CH1/D1
```

3. **Perform the following steps to verify the repair:**

   a. **Set the virtual keyswitch to** diag **so that POST will run in Service mode.**

```
sc> setkeyswitch diag
```

   b. **Issue the** poweron **command.**

```
sc> poweron
```

   c. **Switch to the system console to view POST output.**

```
sc> console
```

Watch the POST output for possible fault messages. The following output is a sign that POST did not detect any faults:

```
.
.
.
0:0:0>INFO:
0:0:0>    POST Passed all devices.
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – Depending on the configuration of ILOM POST variables and whether POST detected faults or not, the system might boot, or the system might remain at the ok prompt. If the system is at the ok prompt, type boot.

d. Return the virtual keyswitch to normal mode.

```
sc> setkeyswitch normal
```

e. Issue the Solaris OS fmadm faulty **command.**

```
# fmadm faulty
```

No memory faults should be displayed.

If faults are reported, refer to the diagnostics flowchart in for an approach to diagnose the fault.

4. **Gain access to the ALOM CMT** sc> **prompt.**

5. **Run the** showfaults **command.**

   ▪ If the fault was detected by the host and the fault information persists, the output will be similar to the following example:

```
sc> showfaults
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID FRU                          Fault
0  /SYS/MB/CMP0/BR2/CH1/D0      Host detected fault, MSGID:
SUN4V-8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

   ▪ If the showfaults command does not report a fault with a UUID, then you do not need to proceed with the following steps because the fault is cleared.

6. **Run the** clearfault **command.**

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
```

7. **Switch to the system console.**

```
sc> console
```

8. Issue the `fmadm repair` **command with the UUID.**

Use the same UUID that you used with the `clearfault` command.

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

4.7 Replacing the Battery

4.7.1 Removing the Battery

1. Prepare the server for battery removal. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

2. Pry the battery out of the service processor board using a small flat-blade screwdriver (FIGURE 4-17**).**

FIGURE 4-17 Prying the Battery From the Motherboard
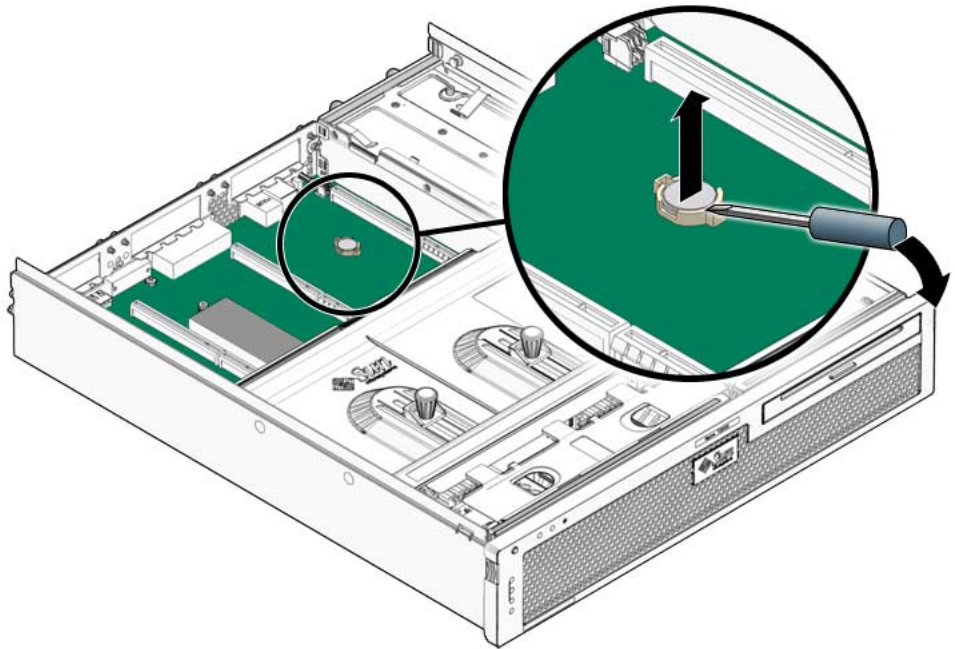
3. Set the battery aside on an antistatic mat.

4. Continue to Section 4.7.2, "Installing the Battery" on page 4-32.

4.7.2   Installing the Battery

Note – The Sun Netra T5220 server uses one of three lithium CR2032 batteries (part number 371-2210-01: Panasonic, Maxell or Renata).

1. Remove the replacement battery from its packaging.

2. Press the new battery in with the "+" side facing up (FIGURE 4-18**).**

FIGURE 4-18 Inserting the Battery Into the Service Processor Board
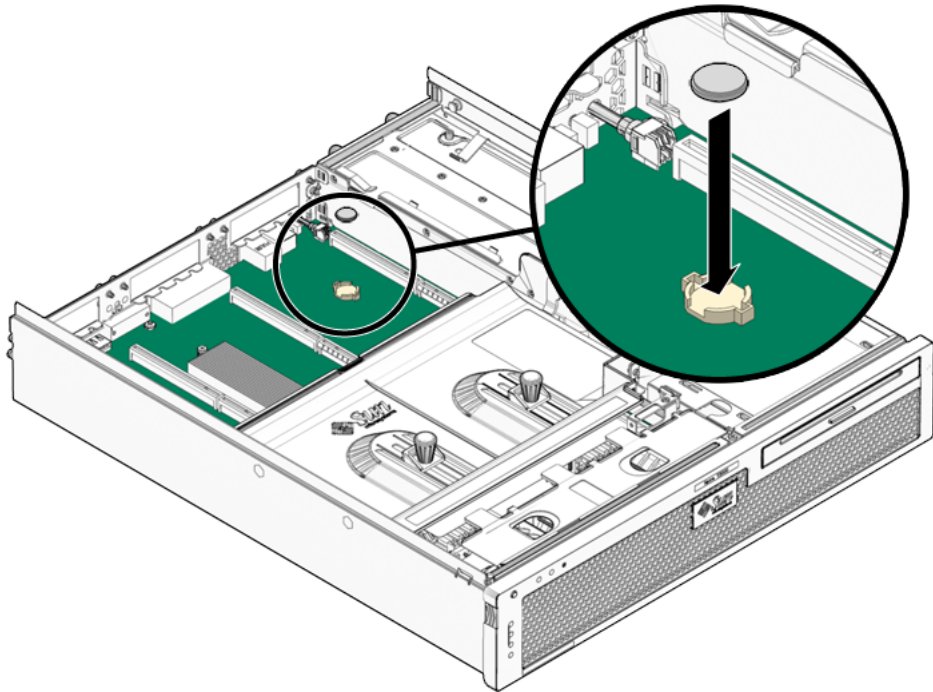
3. Bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

4. See Chapter 6 **to return the server to operation.**

4.8 Replacing the NVRAM

4.8.1 Removing the NVRAM

1. **Prepare the server for NVRAM removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

2. **Carefully pull the NVRAM from the service processor board (**FIGURE 4-19**).**

FIGURE 4-19 Pulling the NVRAM From the Service Processor Board
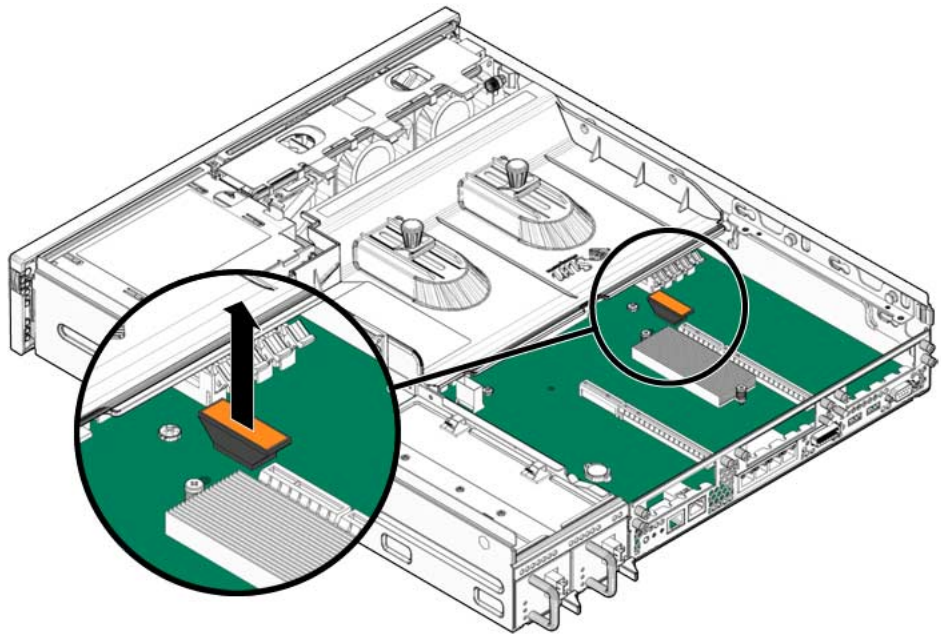
3. **Set the NVRAM aside on an antistatic mat.**

4. **Consider your next step:**

- If you removed the NVRAM as part of another procedure, return to that procedure.
- Otherwise, continue to Section 4.8.2, "Installing the NVRAM" on page 4-34.

4.8.2 Installing the NVRAM

Note – The NVRAM contains the identifiers of the server, such as its MAC address, FRUID, and so on. If you install a new NVRAM, you must reconfigure your applications and services to recognize the new MAC address, FRUID, and so on.

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

2. **Align the notch in the NVRAM socket with the key on the underside of the NVRAM, and press it into place (**FIGURE 4-20**).**

FIGURE 4-20 Pressing the NVRAM Into the Socket
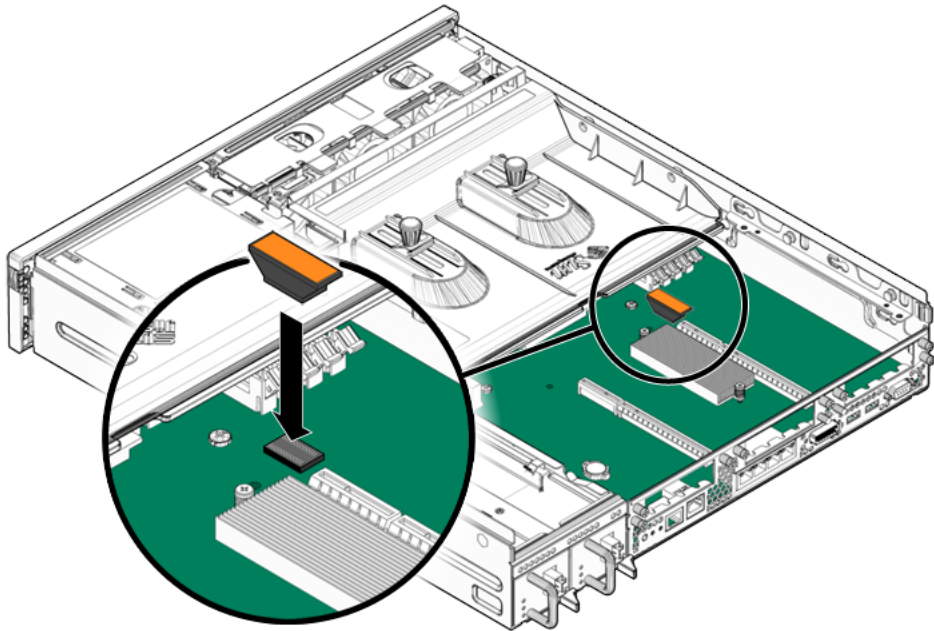
3. **Consider your next step:**

- If you installed the NVRAM as part of another procedure, return to that procedure.

- Otherwise, bring the server back online. See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

4. **See** Chapter 6 **to return the server to operation.**

4.9 Replacing the SCC Module

Note – The SCC module is also known as the IDPROM chip.

Note – The SCC module contains system host ID, MAC addresses, and configuration variable settings for ILOM. If you are replacing a motherboard, you must move the SCC module from the old motherboard to the new one.

Note – If you are replacing a faulty SCC module, you must obtain the host ID, MAC addresses, and ILOM configuration settings stored in the SCC module you are replacing. Configure these settings into the new SCC module.

4.9.1 Removing the SCC Module

1. **Prepare the server for SCC module removal.**

   See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

2. **Remove the air duct.**

   See Section 4.4.1, "Removing the Air Duct" on page 4-17.

3. **Remove the PCI mezzanine.**

   See Section 2.3.6, "Removing the PCI Mezzanine" on page 2-9.

4. **Locate the SCC module.**

5. **Carefully pull the SCC module straight up from its connector.**

4.9.2 Installing the SCC Module

1. **Align the SCC module with its connector on the motherboard.**

Note – The SCC module and its connector are keyed.

---

2. **Press the SCC module down until it seats.**

3. **Install the air duct.**

   See Section 4.4.2, "Installing the Air Duct" on page 4-18.

4. **Install the PCI mezzanine.**

   See Section 6.1.1, "Installing the PCI Mezzanine" on page 6-1.

5. **Bring the server back online.**

   See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

6. **If the previous SCC module had modified ILOM configuration variables and you recorded them, configure the new SCC module with those values.**

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

   See Chapter 6.

4.10 Replacing the Motherboard Assembly

Caution – The SCC module contains system host ID, MAC addresses, and configuration variable settings for ILOM. If you are replacing a motherboard, you must move the SCC module from the old motherboard to the new one. You must also backup OpenBoot PROM variables for restoring after motherboard replacement.

4.10.1 Removing the Motherboard Assembly

1. **Back up OpenBoot PROM variables with one of the following procedures:**

■ **For ILOM 3.0 Web Interface –** Back up per the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Web Interface Procedure Guide* (820-0052). Use a passphrase to backup the OpenBoot PROM variables.

■ **For ILOM 3.0 CLI –** Back up per the *Oracle Integrated Lights Out Manager (ILOM) 3.0 CLI Procedure Guide* (821-1611). Use a passphrase to backup the OpenBoot PROM variables.

■ **For ILOM 2.0 –** The ILOM Back up/Restore feature is absent. Record output from the OpenBoot PROM printenv command or the Oracle Solaris eeprom command for use after motherboard replacement.

2. **Prepare the server for motherboard assembly removal. See** Section 4.1, "Powering Off and Powering On the Server" on page 4-1**.**

3. **Remove the following components:**

- **Air duct** – Section 4.4.1, "Removing the Air Duct" on page 4-17
- System fan assembly – Section 5.3.1, "Removing the System Fan Assembly" on page 5-7
- **FB-DIMMs** – Section 4.6.2, "Removing FB-DIMMs" on page 4-24
- **Alarm board** – Section 5.6.1, "Removing the Alarm Board" on page 5-16
- **SCC module** (also known as IDPROM chip) – Section 4.9.1, "Removing the SCC Module" on page 4-36

4. **Disconnect the cables connected to the motherboard (**FIGURE 4-21**).**

   a. **Disconnect the cable connected to the PDB.**

   b. **Disconnect the two cables connected to the media bay assembly.**

FIGURE 4-21 Removing the Cables Connected to the Motherboard
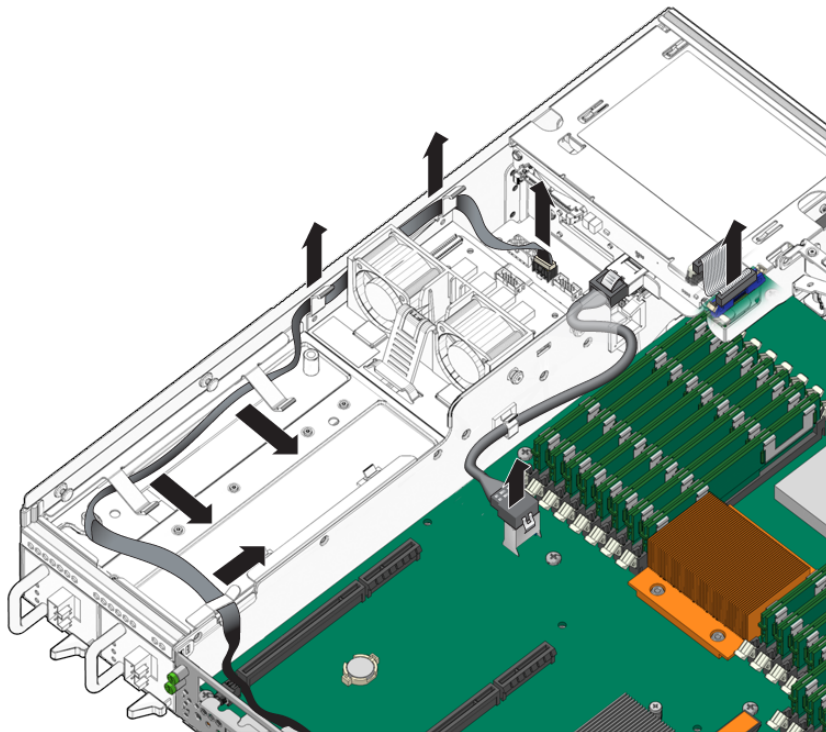
5. **Loosen or remove the screws that secure the motherboard assembly to the chassis (**FIGURE 4-22**).**

FIGURE 4-22 Removing the Motherboard Assembly Screws
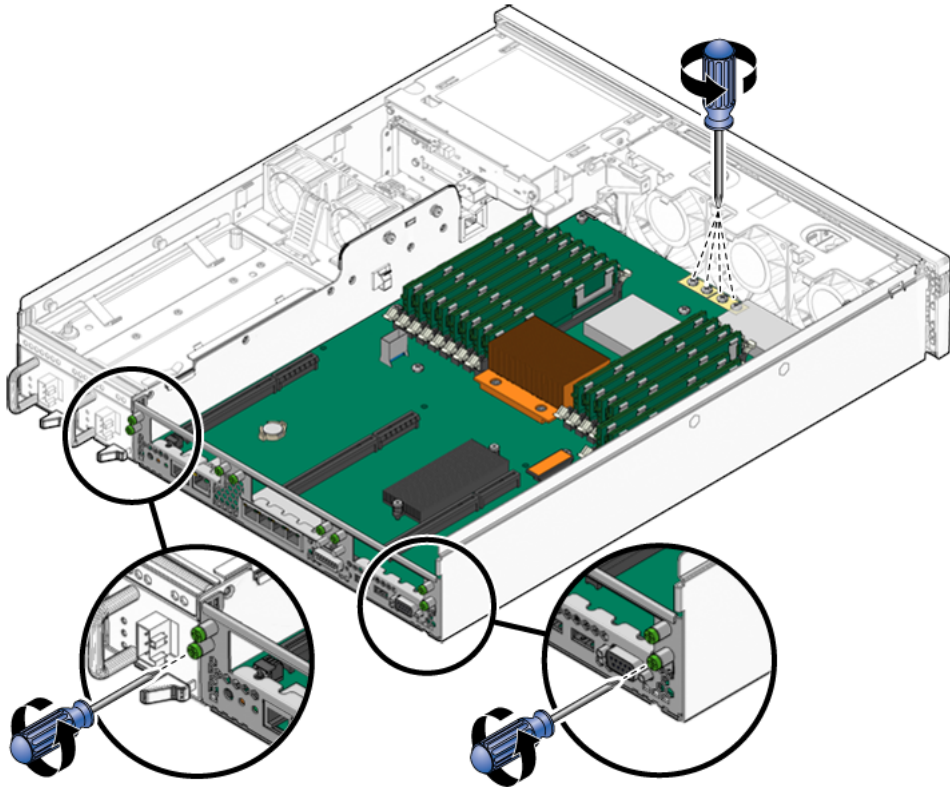
6. **Loosen the two captive screws at the center of the motherboard assembly (**FIGURE 4-22**).**

7. **Lift slighty and slide the motherboard assembly forward approximately one inch (25.4 mm) (**FIGURE 4-23**).**

8. **Lift up on the right edge to approximately a 45 degree angle (**FIGURE 4-23**).**

9. **Remove the motherboard assembly from the chassis (**FIGURE 4-23**).**

FIGURE 4-23 Removing the Motherboard Assembly From the Chassis
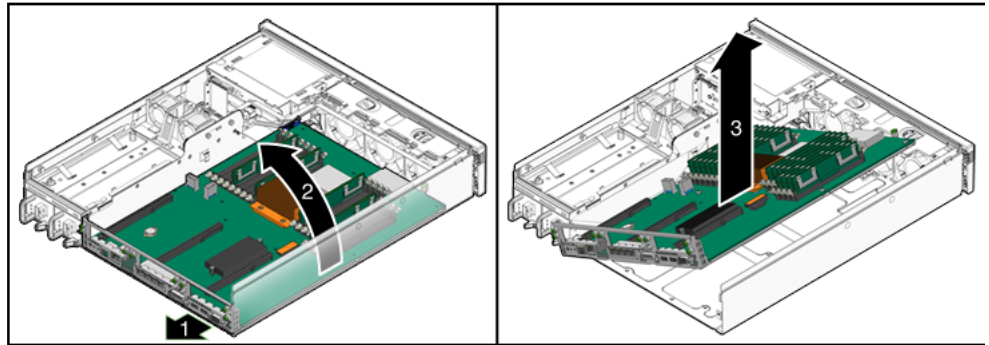
10. **Set the motherboard assembly aside on an antistatic mat.**

11. **Continue to** Section 4.10.2, "Installing the Motherboard Assembly" on page 4-40**.**

4.10.2   Installing 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 (**FIGURE 4-24**).**

FIGURE 4-24 Installing the Motherboard Assembly Into the Chassis
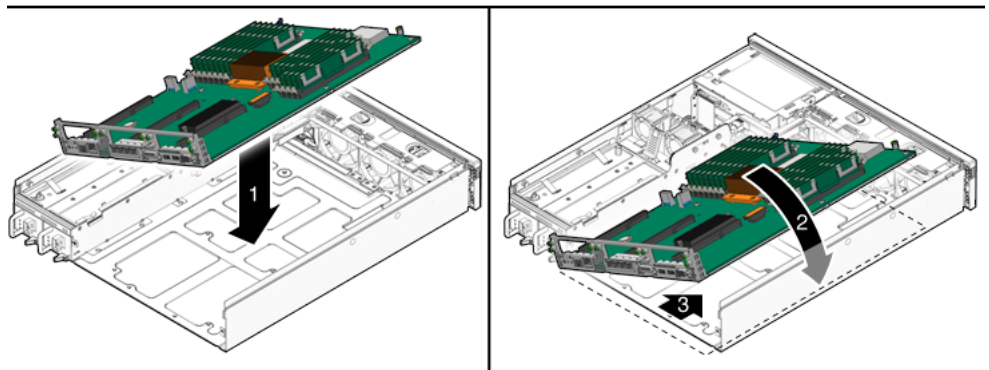
3. **Align the motherboard assembly screw holes over the chassis standoffs.**

4. Tighten the two captive screws at the center of the motherboard assembly (FIGURE 4-25**).**

FIGURE 4-25   Installing the Motherboard Assembly Screws
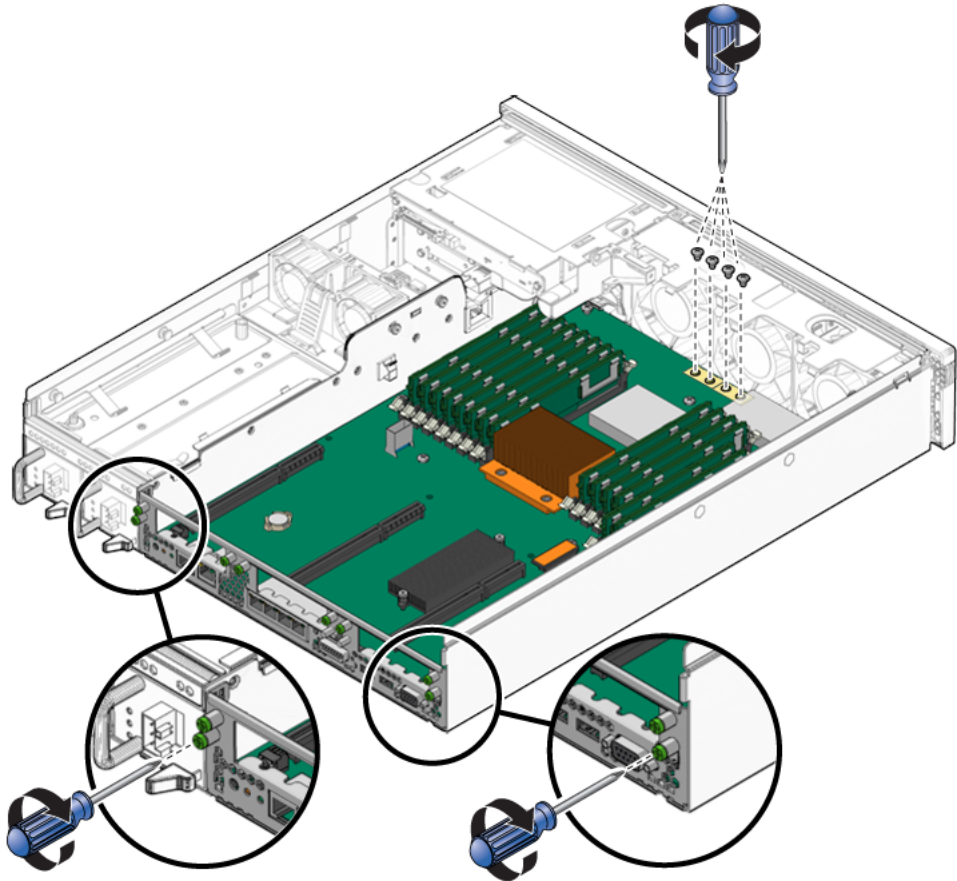
5. Install the two power screws and four other screws that secure the motherboard assembly to the chassis (FIGURE 4-25**).**

6. Reconnect the cables to the following connectors on the motherboard assembly (FIGURE 4-26**):**

FIGURE 4-26 Reconnecting the Cables to the Motherboard Assembly
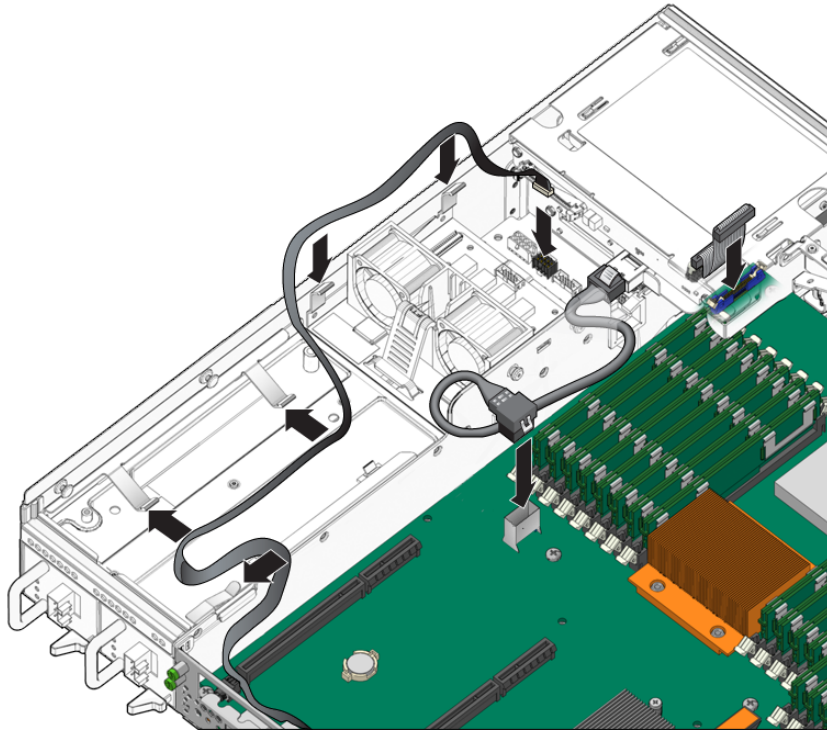
7. **Install the following components:**

- **SCC module (also known as IDPROM chip)** – See Section 4.9.2, "Installing the SCC Module" on page 4-36.
- **Alarm board** – Section 5.6.2, "Installing the Alarm Board" on page 5-17
- **FB-DIMMs** – Section 4.6, "Replacing FB-DIMMs" on page 4-23, "Installing FB-DIMMs" on page 26
- **Fan assembly** – Section 5.3.2, "Installing the System Fan Assembly" on page 5-9
- **FB-DIMM/CPU** duct – Section 4.4.2, "Installing the Air Duct" on page 4-18

8. **Bring the server back online.**

   See Section 4.1, "Powering Off and Powering On the Server" on page 4-1.

9. **Restore OpenBoot PROM variables with one of the following procedures:**

- **For ILOM 3.0 Web Interface –** Restore OpenBoot PROM variables per the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Web Interface Procedure Guide* (820-0052). Use the same passphrase used during the back up to restore the OpenBoot PROM variables.

- **For ILOM 3.0 CLI –** Restore OpenBoot PROM variables per the *Oracle Integrated Lights Out Manager (ILOM) 3.0 CLI Procedure Guide* (821-1611). Use the same passphrase used during the back up to restore the OpenBoot PROM variables.

- **For ILOM 2.0 –** Use the data collected during Step 1 of Section 4.10.1, "Removing the Motherboard Assembly" on page 4-37 to restore the OpenBoot PROM variables with the OpenBoot PROM setenv command.

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

See Chapter 6.

Replacing Chassis Components

This chapter provides instructions for replacing chassis components. Topics include:

- Section 5.1, "Replacing the Air Filter" on page 5-1
- Section 5.2, "Replacing a Power Supply" on page 5-4
- Section 5.3, "Replacing the System Fan Assembly (FT0)" on page 5-7
- Section 5.4, "Replacing the Hard Drive Fan Assembly (FT1)" on page 5-10
- Section 5.5, "Replacing the FB-DIMM Fan Assembly (FT2)" on page 5-15
- Section 5.6, "Replacing the Alarm Board" on page 5-16
- Section 5.7, "Replacing the LED Board" on page 5-18
- Section 5.8, "Replacing the Power Board" on page 5-23

5.1   Replacing the Air Filter

Server filter maintenance is dependent on the environmental air quality in which the server is installed. The filter should be checked, at a minimum, annually and cleaned or replaced if there is evidence of airflow blockage. In environments with high particulate matter, the filter should be checked, cleaned or replaced more often. Should the filter require cleaning, remove the filter from the server. See Section 5.1.1, "Removing the Air Filter" on page 5-1. Take the filter to an open area and blow the particles from the filter using a can of compressed air. Do not use a coarse brush or anything abrasive since they may damage the filter.

5.1.1   Removing the Air Filter

1. **Press the green tabs on both sides of the bezel and pull forward and down (**FIGURE 5-1**).**

2. Grasp the tabs and lift the air filter from the bezel (FIGURE 5-1**).**

FIGURE 5-1   Opening the Bezel and Removing the Air Filter
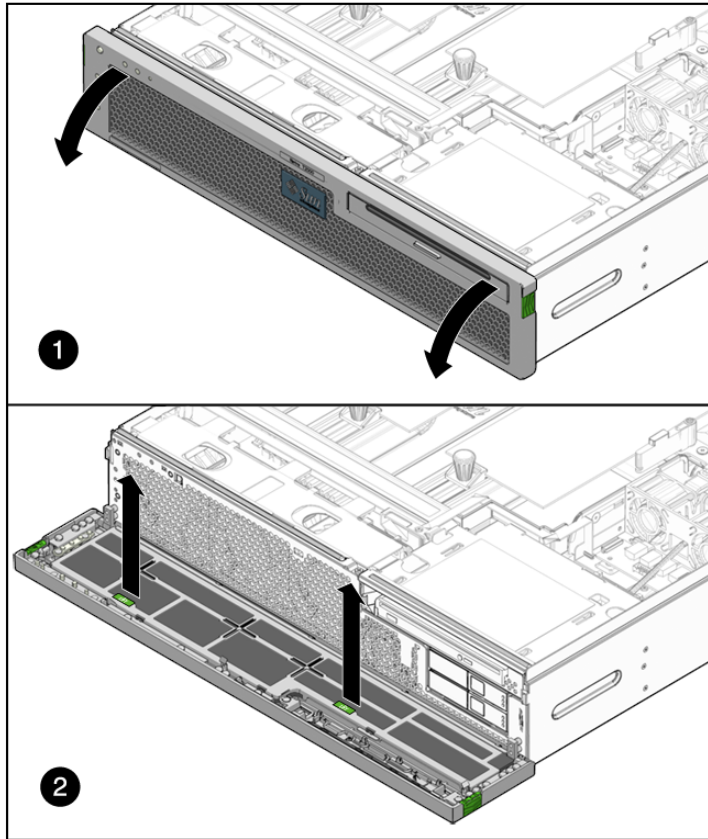
Note – Do not operate the server without an air filter.

**3. Continue to** Section 5.1.2, "Installing the Air Filter" on page 5-2**.**

5.1.2   Installing 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. **Install the filter tray to the server, with the indicators in the upper left corner.**

   The bezel snaps into place.

6. **Close the bezel (**FIGURE 5-2**).**

FIGURE 5-2   Installing the Air Filter and Closing the Bezel
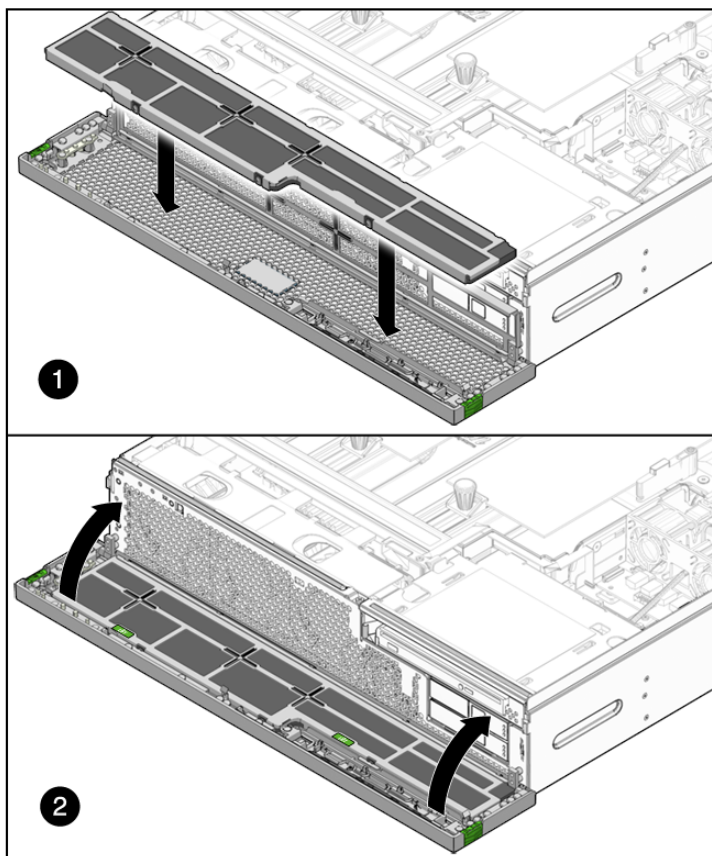
5.2 Replacing a Power Supply

The server's redundant hot-swappable power supplies enable you to remove and replace a power supply without shutting the server down provided that the other power supply is online and working.

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

- Front and rear Service Required LEDs.
- Amber Failure 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.

5.2.1 Removing a Power Supply

1. Identify which power supply requires replacement (FIGURE 5-3**).**

FIGURE 5-3 Locating the Power Supplies and Latches
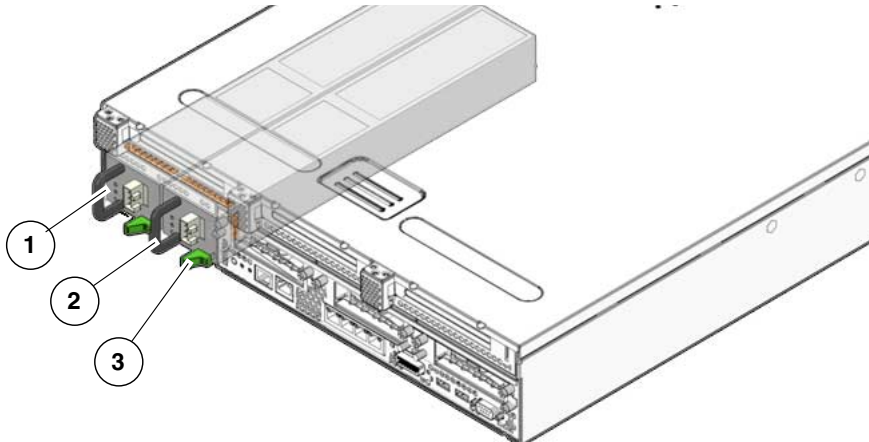
Figure Legend

1	Power Supply 0
2	Power Supply 1
3	Power Supply release latches

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

2. **At the** sc> **prompt, issue the** removefru **command.**

   The removefru command indicates if it is OK to perform a hot-swap 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:

   ```
   sc> removefru PSn
   Are you sure you want to remove PSn [y/n]? y
   <PSn> is safe to remove.
   ```

   In this command, **PS**n is the identifier for the power supply you plan to remove, either PS0 or PS1.

3. **Disconnect the power cord from the faulty power supply.**

4. **Grasp the power supply handle and push the power supply latch to the right (**FIGURE 5-4**).**

5. **Pull the power supply out of the chassis (**FIGURE 5-4**).**

FIGURE 5-4   Removing a Power Supply
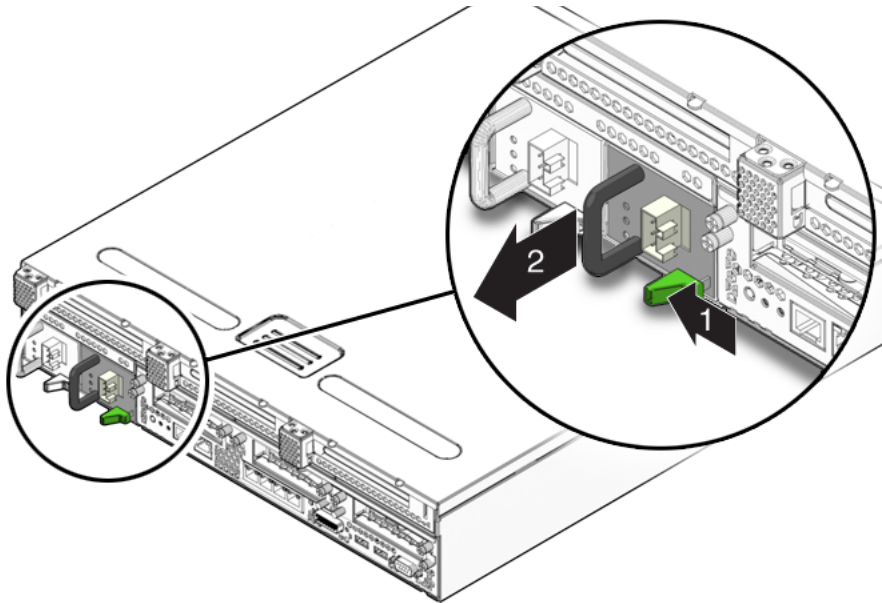
6. **Continue to** Section 5.2.2, "Installing a Power Supply" on page 5-6**.**

5.2.2 Installing a Power Supply

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 bay until it is fully seated (**FIGURE 5-5**).**

FIGURE 5-5   Installing a Power Supply
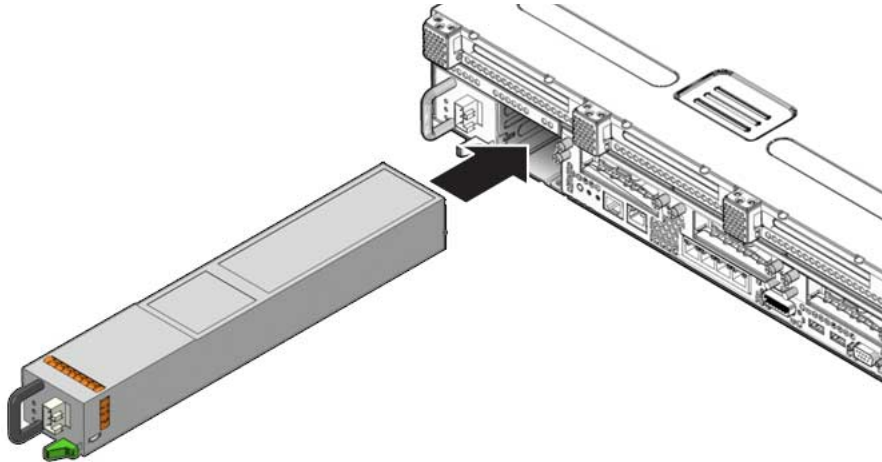
4. **Reconnect the power cord to the power supply.**

5. **Verify that the amber LED on the replaced power supply and the service required LEDs are not lit.**

6. **At the** sc> **prompt, issue the** showenvironment **command to verify the status of the power supplies.**

5.3   Replacing the System Fan Assembly (FT0)

The system fan assembly is labeled FT0.

5.3.1 Removing the System Fan Assembly

1. Prepare the server for fan assembly removal. See:

- Section 2.3.1, "Powering Off the Server" on page 2-3
- Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4
- Section 2.3.3, "Removing the Server From the Rack" on page 2-5
- Section 2.3.4, "Performing Antistatic Measures" on page 2-8
- Section 2.3.5, "Removing the Top Cover" on page 2-8

2. Disconnect the fan assembly cable from the power board (FIGURE 5-6**).**

FIGURE 5-6 Disconnecting the System Fan Assembly Cable
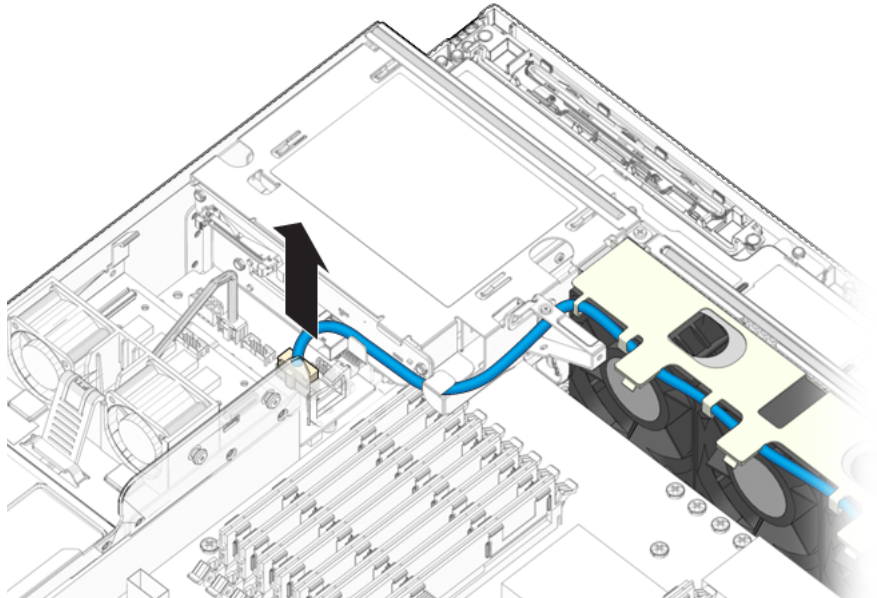
3. Remove the fan assembly cable from the cable guides.

4. Insert your forefinger and thumb into the holes at the top of the fan assembly, squeeze them together, and lift the fan assembly from the chassis (FIGURE 5-7**).**

FIGURE 5-7   Lifting the System Fan Assembly From the Chassis
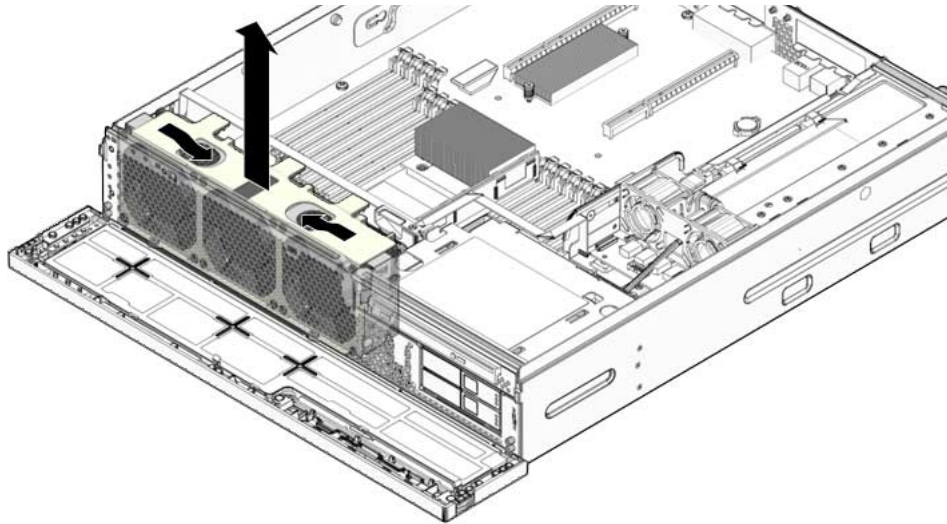
5. **Set the fan assembly aside on an antistatic mat.**

6. **Consider your next step:**

   ■ If you removed the fan assembly as part of another procedure, return to that procedure.

   ■ Otherwise, continue to Section 5.3.2, "Installing the System Fan Assembly" on page 5-9.

5.3.2   Installing the System Fan Assembly

1. **Remove the replacement fan assembly 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 assembly, squeeze them together, and lower the fan assembly into the chassis (**FIGURE 5-8**).**

3. **Reconnect the fan assembly cable to the power board (**FIGURE 5-8**).**

FIGURE 5-8   Installing the System Fan Assembly Into the Chassis
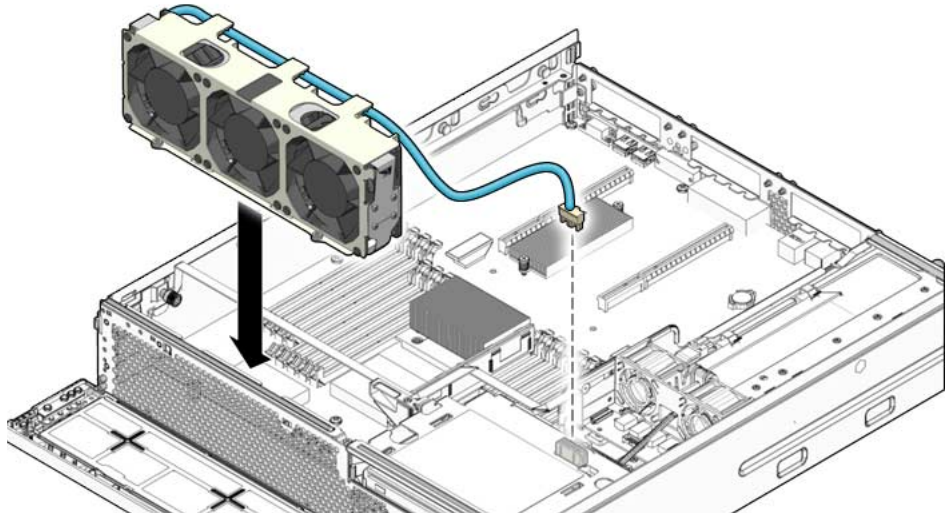
4. **Route the fan assembly cable back into the cable guides.**

5. **Consider your next step:**

- If you installed the fan assembly as part of another procedure, return to that procedure.

- Otherwise, perform the following tasks to bring the server back online:

  - Section 6.1.2, "Installing the Top Cover" on page 6-3

  - Section 6.1.3, "Removing Antistatic Measures" on page 6-4

  - Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5

  - Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7

  - Section 6.1.6, "Powering On the Server" on page 6-8

5.4   Replacing the Hard Drive Fan Assembly (FT1)

The hard drive fan assembly is labeled FT1.

5.4.1 Removing the Hard Drive Fan Assembly

1. Prepare the server for hard drive fan removal. See:

- Section 2.3.1, "Powering Off the Server" on page 2-3
- Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4
- Section 2.3.3, "Removing the Server From the Rack" on page 2-5
- Section 2.3.4, "Performing Antistatic Measures" on page 2-8
- Section 2.3.5, "Removing the Top Cover" on page 2-8

**2. Disconnect the hard drive fan assembly cable from the power board connector (FIGURE 5-9).**

FIGURE 5-9   Disconnecting the Hard Drive Fan Assembly Cable
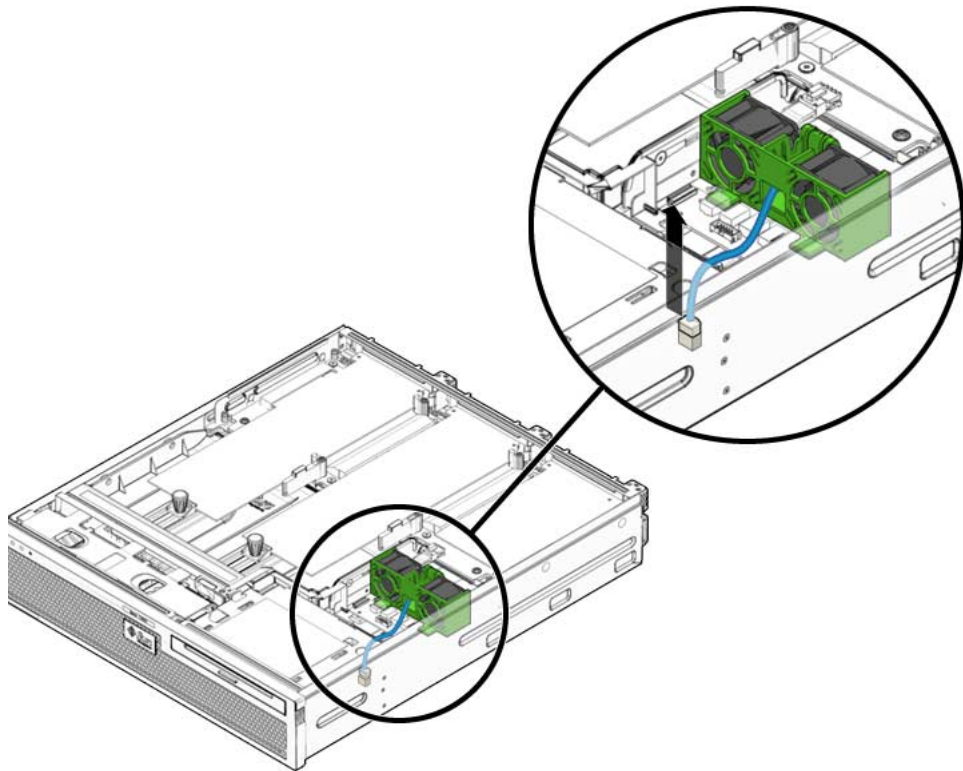
3. Carefully lift the hard drive fan assembly cable from the cable guides.

4. Push the release button on the hard drive fan bracket, and pivot the bracket backwards (FIGURE 5-10).

FIGURE 5-10 Releasing the Hard Drive Fan Bracket
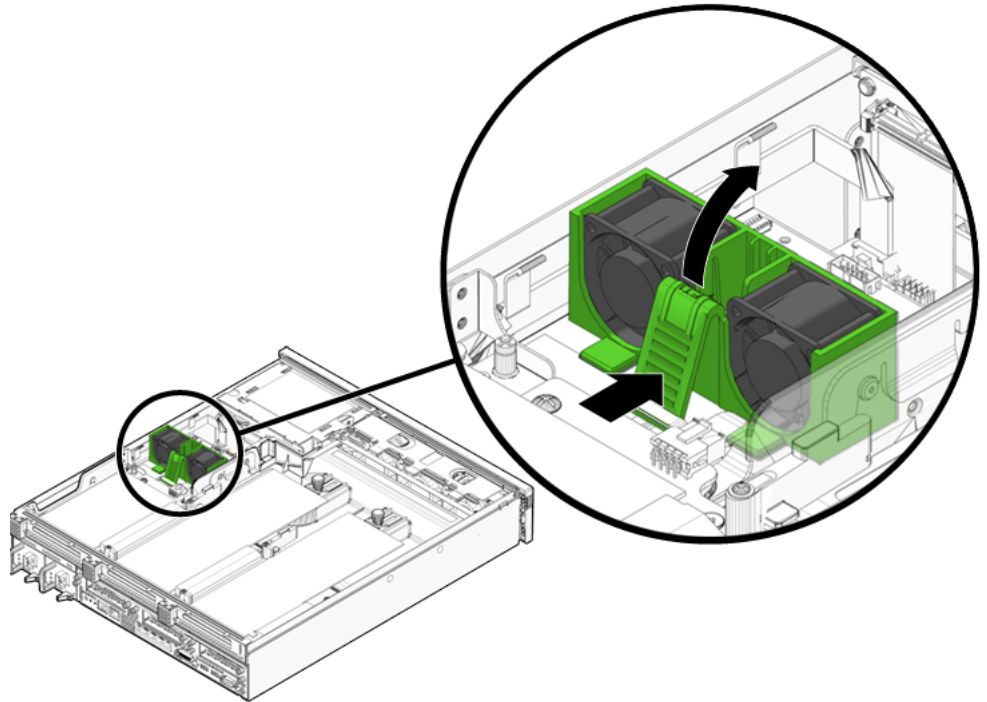
5. Slide the bracket forward and lift the hard drive fan assembly out (FIGURE 5-11**).**

FIGURE 5-11 Lifting Out the Hard Drive Fan Assembly
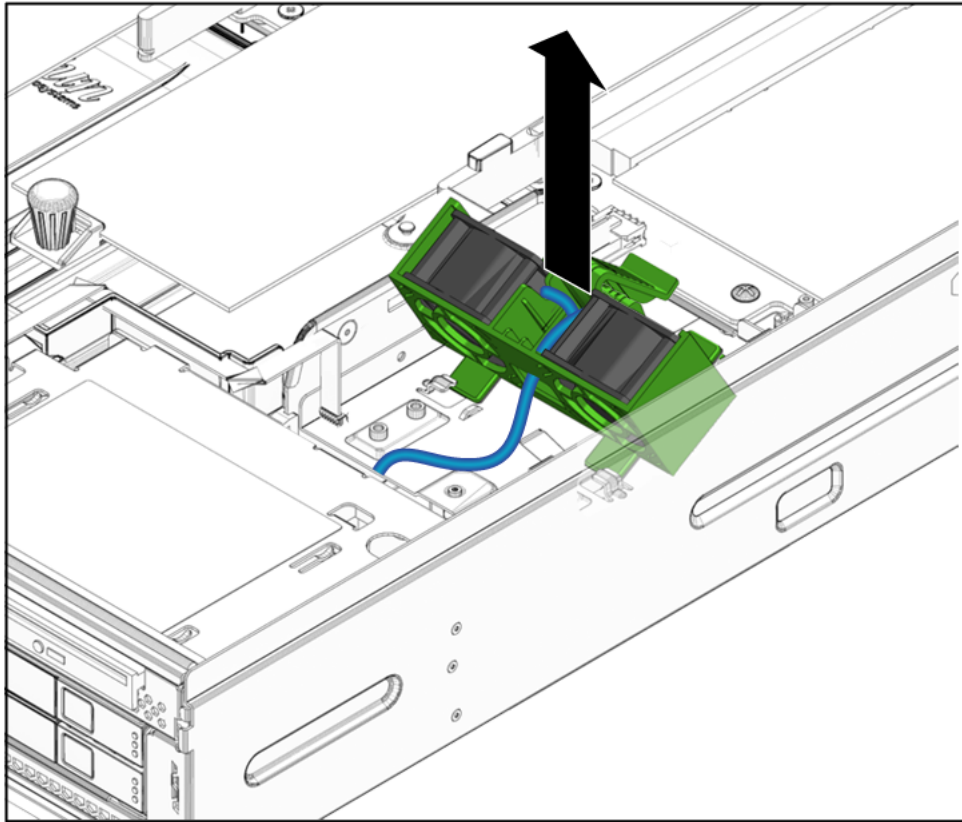
6. **Set the hard drive fan assembly aside on an antistatic mat.**

7. **Continue to** **.**

5.4.2   Installing the Hard Drive Fan Assembly

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

2. **Lower the hard drive fan assembly, and slide the hard drive fan bracket back so that the tabs enter the slots (**FIGURE 5-12**).**

3. **Pivot the hard drive fan bracket toward rear of server until it clicks.**

4. **Connect the hard drive fan assembly cable to the power board (**FIGURE 5-12**).**
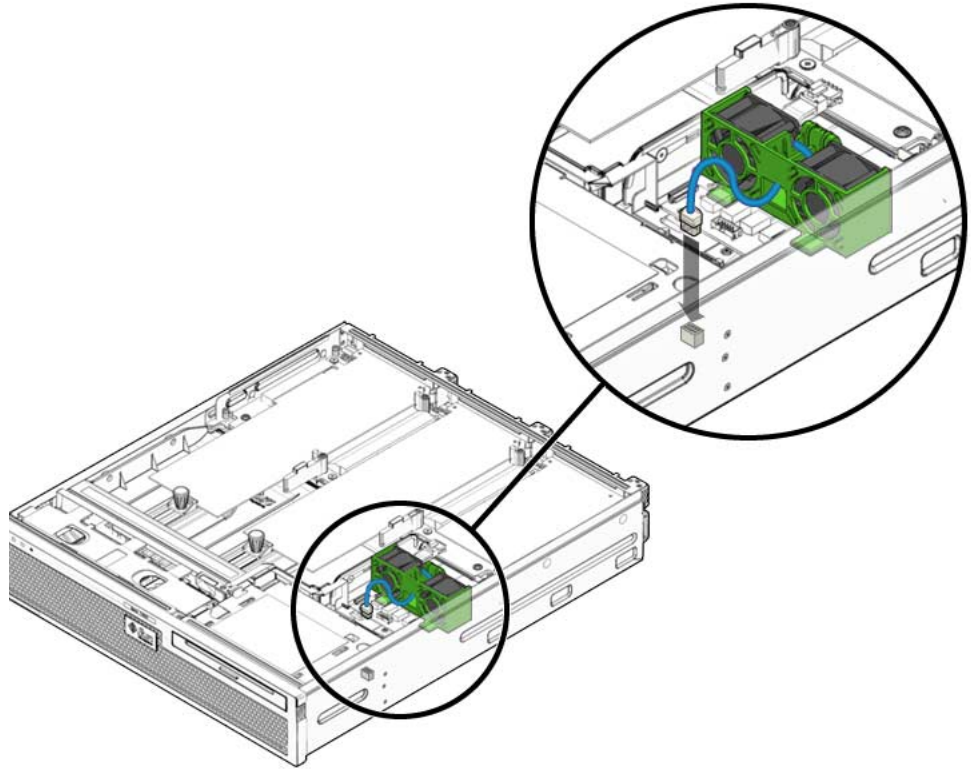
5. **Route the hard drive fan assembly cable back into the cable guides.**

6. **Perform the following tasks to bring the server back online:**

- Section 6.1.2, "Installing the Top Cover" on page 6-3
- Section 6.1.3, "Removing Antistatic Measures" on page 6-4
- Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5
- Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7
- Section 6.1.6, "Powering On the Server" on page 6-8

5.5 Replacing the FB-DIMM Fan Assembly (FT2)

The FB-DIMM fan assembly is labeled FT2.

5.5.1 Removing the FB-DIMM Fan Assembly

1. Prepare the server for FB-DIMM fan removal. See:

- Section 2.3.1, "Powering Off the Server" on page 2-3
- Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4
- Section 2.3.3, "Removing the Server From the Rack" on page 2-5
- Section 2.3.4, "Performing Antistatic Measures" on page 2-8
- Section 2.3.5, "Removing the Top Cover" on page 2-8

2. Pull the tag labeled FT2 and remove the FB-DIMM fan assembly.

3. Set the FB-DIMM fan assembly aside on an antistatic mat.

4. Continue to Section 5.4.2, "Installing the Hard Drive Fan Assembly" on page 5-13**.**

5.5.2 Installing the FB-DIMM Fan Assembly

1. Remove the replacement FB-DIMM fan assembly from its packaging and place it on an antistatic mat.

2. Reinsert the FB-DIMM fan assembly in the slot with the airflow direction arrow facing rear of server.

3. Slide the FB-DIMM fan assembly in the slot until fully seated.

4. Perform the following tasks to bring the server back online:

- Section 6.1.2, "Installing the Top Cover" on page 6-3
- Section 6.1.3, "Removing Antistatic Measures" on page 6-4
- Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5
- Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7
- Section 6.1.6, "Powering On the Server" on page 6-8

5.6 Replacing the Alarm Board

5.6.1 Removing the Alarm Board

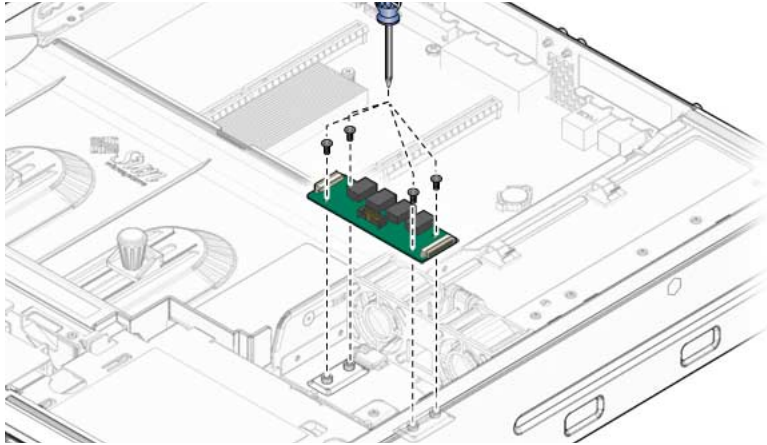**1. Prepare the server for alarm board removal. See:**

2. **Disconnect the cables from the alarm board (**FIGURE 5-13**):**

FIGURE 5-13 Disconnecting the Cables From the Alarm Board
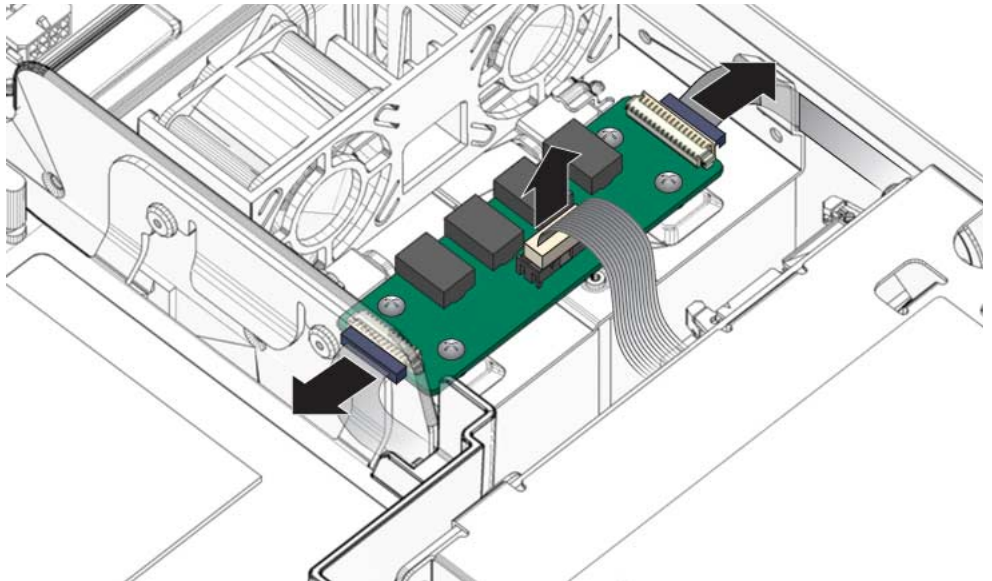
3. **Remove the four alarm board screws and lift it up and out of the chassis (**FIGURE 5-14**).**

**FIGURE 5-14** Removing the Alarm Board Screws and Removing from Chassis

4. **Set the alarm board aside on an antistatic mat.**

5. **Consider your next step:**

■ If you removed the alarm board as part of another procedure, return to that procedure.

■ Otherwise, continue to Section 5.6.2, "Installing the Alarm Board" on page 5-17.

5.6.2 Installing the Alarm Board

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

2. **Seat the alarm board back into the chassis, and tighten the four alarm board screws.**

3. **Reconnect the alarm board cables (**FIGURE 5-15**).**

FIGURE 5-15 Reconnecting the Alarm Board Cables
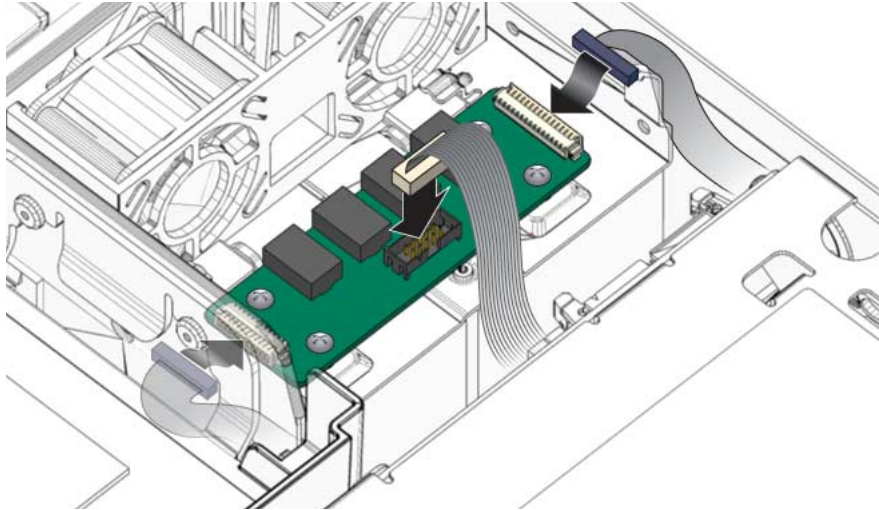
4. **Route the cables into the cable guides.**

5. **Consider your next step:**

- If you installed the alarm board as part of another procedure, return to that procedure.

- Otherwise, perform the following tasks to bring the server back online:

5.7 Replacing the LED Board

5.7.1 Removing the LED Board

1. **Prepare the server for LED board removal. See:**
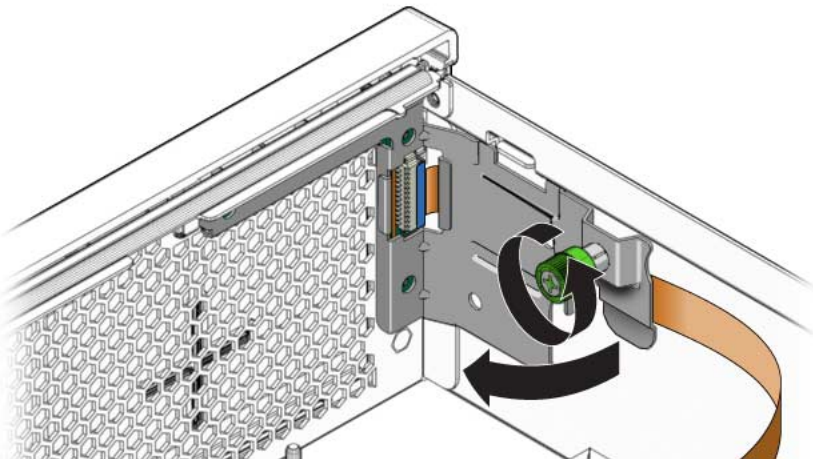
2. **Remove the air duct.**

   See Section 4.4.1, "Removing the Air Duct" on page 4-17.

3. **Remove the system fan assembly.**

   See Section 5.3.1, "Removing the System Fan Assembly" on page 5-7.

4. **Loosen the thumbscrew of the LED board and swing the board out to the left (**FIGURE 5-16**).**
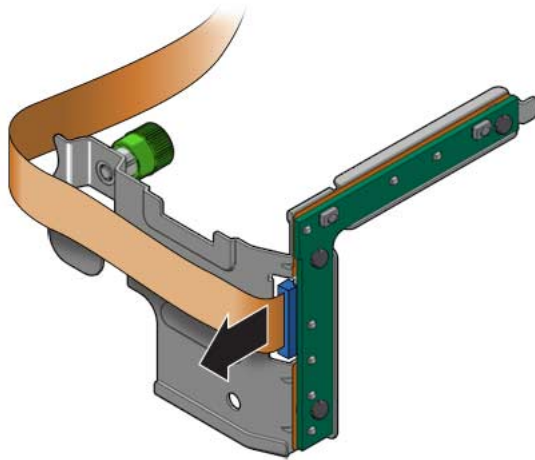
FIGURE 5-16 Removing the LED Board

5. **Carefully lift the LED board and cable from the cable clips.**

6. **Disconnect the cable from the LED board (**FIGURE 5-17**).**

FIGURE 5-17 Disconnecting Cable From the LED Board

7. **Set the LED board aside on an antistatic mat.**

8. **Continue to** Section 5.7.2, "Installing the LED Board" on page 5-20**.**
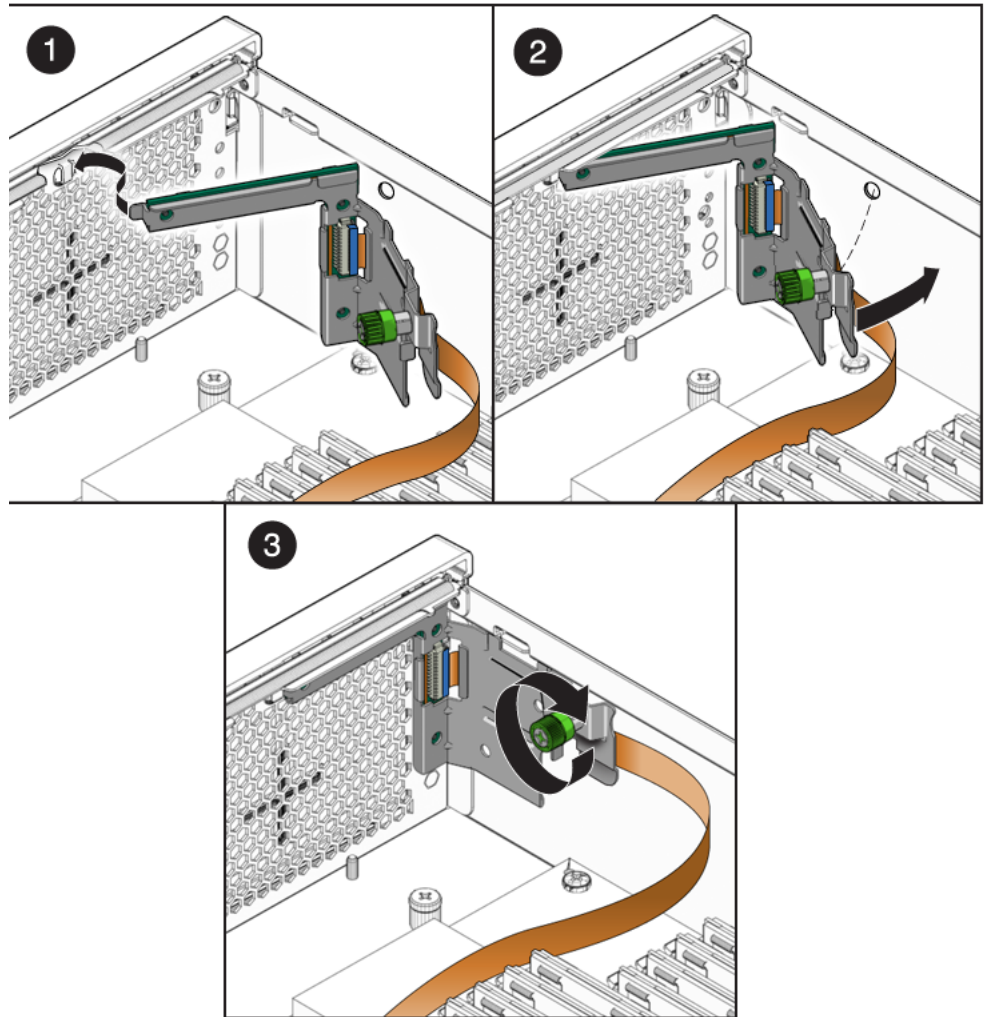
5.7.2 Installing the LED Board

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

2. **Connect the cable to the LED board (**FIGURE 5-18**).**

FIGURE 5-18 Connecting Cable to the LED Board
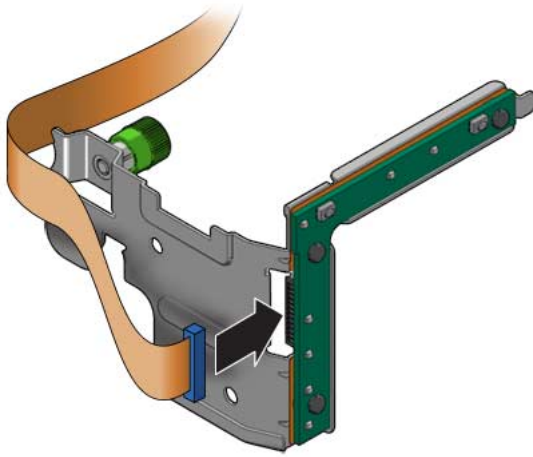
3. **Insert the tab on the LED board into the slot on the chassis (**FIGURE 5-19**).**

4. **Swing the LED board right to the chassis and tighten the thumbscrew (**FIGURE 5-19**).**

FIGURE 5-19 Inserting the LED Board Tab and Tightening Thumbscrew

5. **Route the LED board cable back into the cable guides.**

6. **Install the system fan assembly.**

   See Section 5.3.2, "Installing the System Fan Assembly" on page 5-9.

7. **Install the air duct.**

   See Section 4.4.2, "Installing the Air Duct" on page 4-18.

8. **Perform the following tasks to bring the server back online:**

   ■ Section 6.1.1, "Installing the PCI Mezzanine" on page 6-1

5.8 Replacing the Power Board

5.8.1 Removing the Power Board

1. Prepare the server for power board removal. See:

■ Section 2.3.1, "Powering Off the Server" on page 2-3

■ Section 2.3.2, "Disconnecting Cables From the Server" on page 2-4

■ Section 2.3.3, "Removing the Server From the Rack" on page 2-5

■ Section 2.3.4, "Performing Antistatic Measures" on page 2-8

■ Section 2.3.5, "Removing the Top Cover" on page 2-8

2. Remove the power supplies, the optical media drive, the hard drives, and the mass storage assembly. See:

■ Section 5.2.1, "Removing a Power Supply" on page 5-4

■ Section 3.2.1, "Removing the Optical Media Drive" on page 3-6

■ Section 3.1.1, "Removing a Hard Drive" on page 3-2

■ Section 3.3.1, "Removing the Media Bay Assembly" on page 3-8
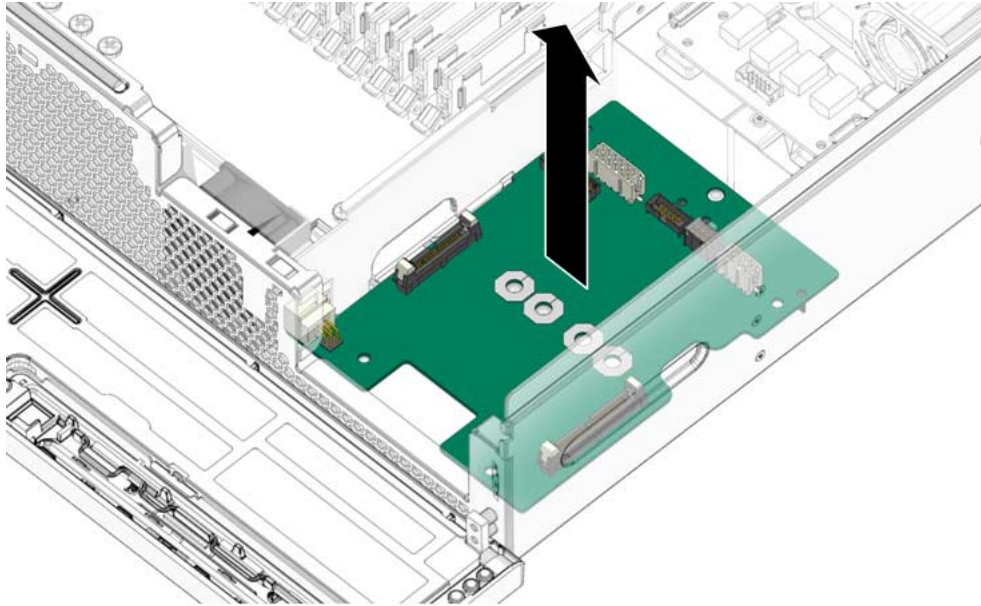
3. Remove the screws that secure the power board to the chassis (FIGURE 5-20**).**

FIGURE 5-20 Removing the Power Board Screws
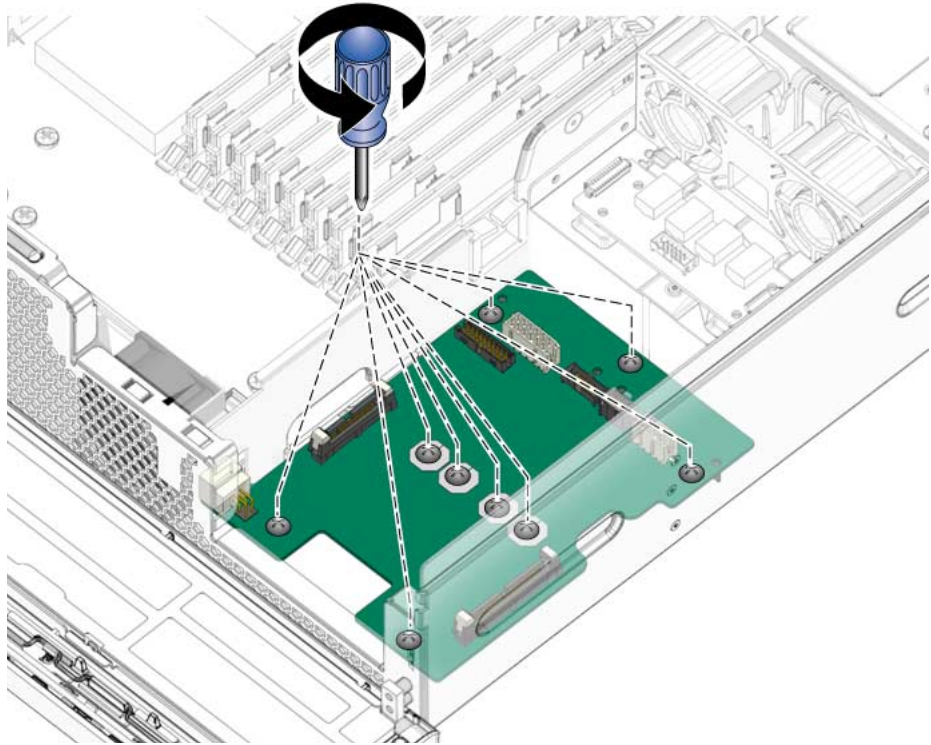
4. **Lift the power board out of the chassis and set it aside on an antistatic mat** (FIGURE 5-21**).**

FIGURE 5-21 Lifting the Power Board From the Chassis

5. **Continue to** Section 5.8.2, "Installing the Power Board" on page 5-25.

5.8.2 Installing the Power Board

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

2. **Lower the power board into the chassis, aligning the board's holes with the standoffs in the chassis.**

3. **Install the screws firmly to secure the power board to the chassis (**FIGURE 5-20**).**

4. **Install the mass storage assembly, the hard drives, the optical media drive, and the power supplies. See:**

- Section 3.3.2, "Installing the Media Bay Assembly" on page 3-11

- Section 3.1.2, "Installing a Hard Drive" on page 3-5

- Section 3.2.2, "Installing the Optical Media Drive" on page 3-7

- Section 5.2.2, "Installing a Power Supply" on page 5-6

5. **Perform the following tasks to bring the server back online:**

- Section 6.1.2, "Installing the Top Cover" on page 6-3

- Section 6.1.3, "Removing Antistatic Measures" on page 6-4

Note – After replacing the power distribution board and powering on the system, you must run the ALOM CMT setcsn and setcpn commands to set the electronically readable chassis serial number and server part number.

6. **At the ALOM CMT command line interface, use the** setcsn **command to set the chassis serial number and the** setcpn **command to set the server part number on the power distribution board.**

The following is an example of the command-line dialog used to set the chassis serial number and server part number for the server.

Caution – When performing the following steps, use special care to enter the correct numbers. Once the power distribution board has been programmed with a chassis serial number or server part number, the number cannot be changed.

```
sc> setsc sc_servicemode true
Warning: misuse of this mode may invalidate your warranty.
sc> setcsn -c chassis_serial_number
Are you sure you want to permanently set the Chassis Serial Number
to chassis_serial_number [y/n]? y
setcsn: Chassis serial number recorded.
sc> setcpn -p chassis_part_number
Are you sure you want to permanently set the Chassis Part Number
to chassis_part_number [y/n]? y
setcpn: Chassis part number recorded.
sc> showplatform
Sun-Netra-T5220
Chassis Serial Number: chassis_serial_number
Domain Status
------ ------
SO Running
sc> setsc sc_servicemode false
```

Finishing Up

This chapter describes tasks to perform after replacing components within the server. Topics include:

- Section 6.1, "Tasks for Finishing Up" on page 6-1

6.1 Tasks for Finishing Up

After replacing components inside of the server, perform the following tasks:

- Section 6.1.1, "Installing the PCI Mezzanine" on page 6-1

   If it was removed for the component replacement procedure.
- Section 6.1.2, "Installing the Top Cover" on page 6-3
- Section 6.1.3, "Removing Antistatic Measures" on page 6-4
- Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5
- Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7
- Section 6.1.6, "Powering On the Server" on page 6-8

Note – When replacing the hard drives or power supplies, not all of these tasks are necessary. The replacement procedures for those components address this fact.

6.1.1 Installing the PCI Mezzanine

1. **Position the PCI mezzanine onto the chassis.**

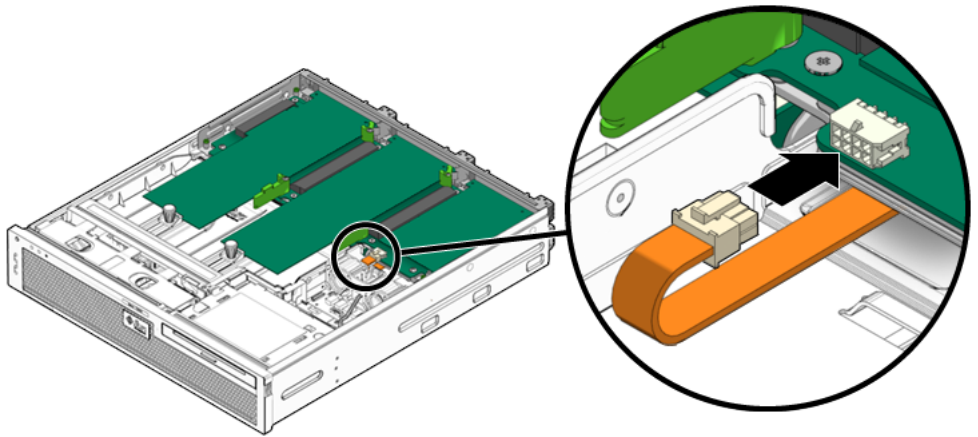2. **Lower the PCI mezzanine and slide it toward fron of server (FIGURE 6-1).**

3. Tighten the PCI mezzanine screws (FIGURE 6-1**).**

FIGURE 6-1 Lowering the PCI Mezzanine and Tightening the Screws
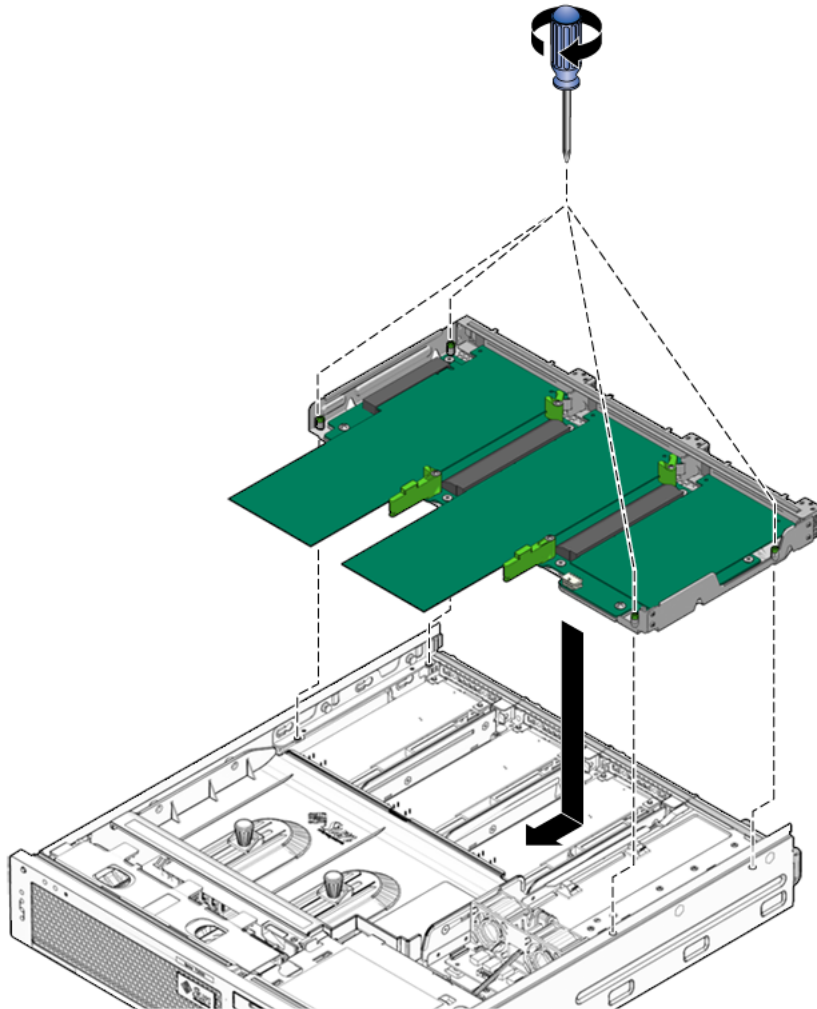
4. Reconnect the PCI mezzanine cable (FIGURE 6-2**).**

FIGURE 6-2   Reconnecting the PCI Mezzanine Cable

5. **Install the top cover.**

   See Section 6.1.2, "Installing the Top Cover" on page 6-3.

6.1.2   Installing 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).

2. **Carefully align the front of the top cover with the black line (with arrows) printed on top of the media bay assembly (**FIGURE 6-3**).**

3. **Slide the cover forward until it latches into place (**FIGURE 6-3**).**

FIGURE 6-3   Installing the Top Cover
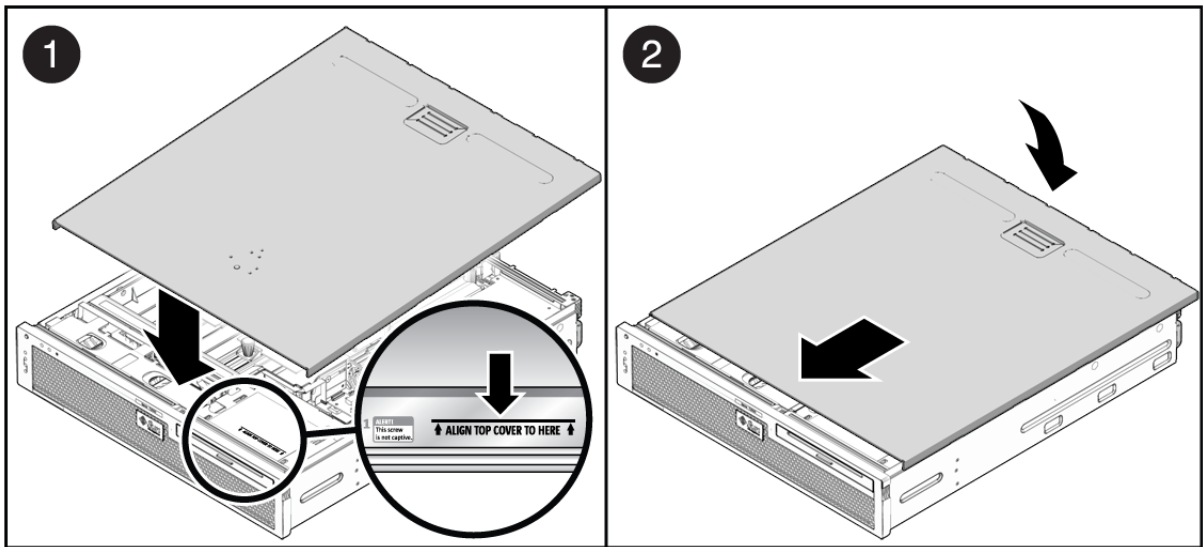
4. Remove the antistatic precautions.

See Section 6.1.3, "Removing Antistatic Measures" on page 6-4.

6.1.3   Removing Antistatic Measures

1. Remove any antistatic straps or conductors from the server chassis.

2. Remove the antistatic wrist strap from yourself.

Note – You will be handling the chassis, which is metal, so the wriststrap is no longer necessary. Additionally, this gives you more freedom of movement for installing the server into the rack.

3. Lift the server from the antistatic mat and reinstall it into the rack.

See Section 6.1.4, "Reinstalling the Server Chassis in the Rack" on page 6-5.

Caution – The server weighs approximately 40 lb (18 kg). Two people are required to carry the chassis and install it in the rack.

6.1.4 Reinstalling the Server Chassis in the Rack

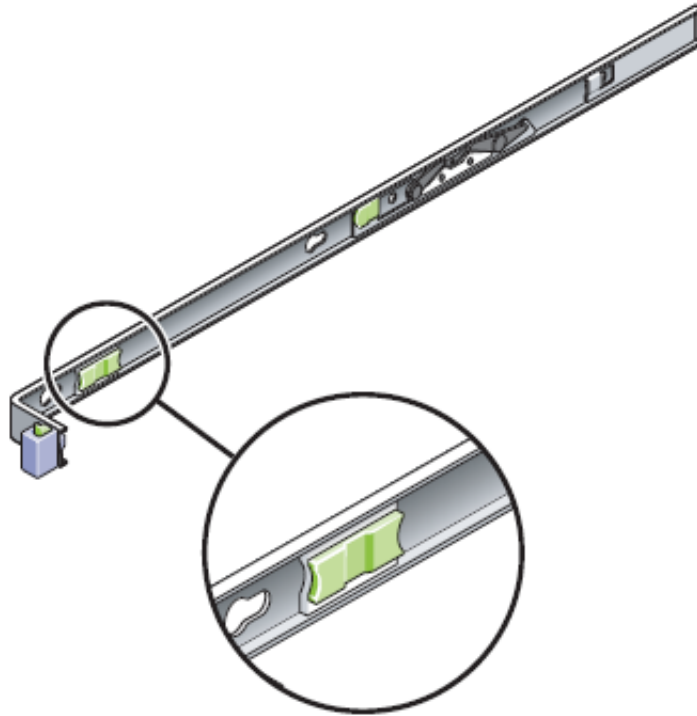**1. On the rack, ensure that the rails are extended.**

2. Place the ends of the chassis mounting brackets into the slide rails.

FIGURE 6-4 Returning the Server to the Rack
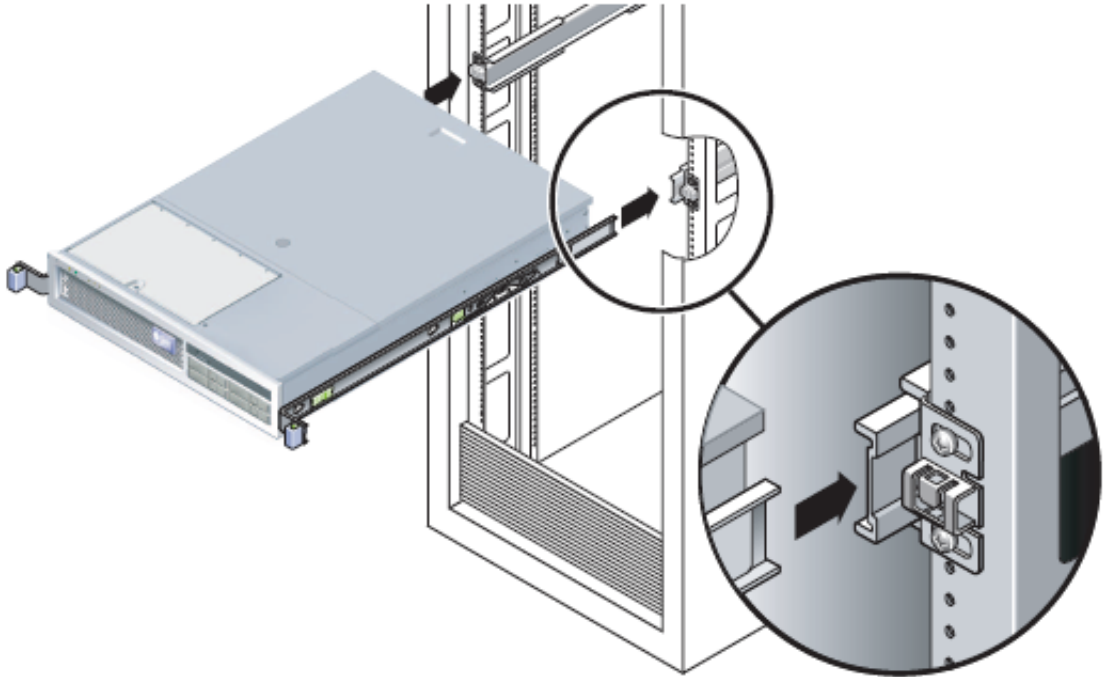
3. Slide the server into the rack until the brackets lock into place.

4. Release the slide rails from the fully extended position by pushing the release levers on the side of each rail (FIGURE 6-5**).**

FIGURE 6-5 Release Levers

5. **While pushing on the release levers, slowly push the server into the rack.**

   Ensure that the cables are not in the way.

6. **Reconnect the CMA into the back of the rail assembly:**

Note – Refer to the server installation guide for detailed CMA installation instructions.

---

   a. **Insert the smaller extension into the clip located at the end of the mounting bracket (**FIGURE 6-6**).**

FIGURE 6-6 Installing the CMA
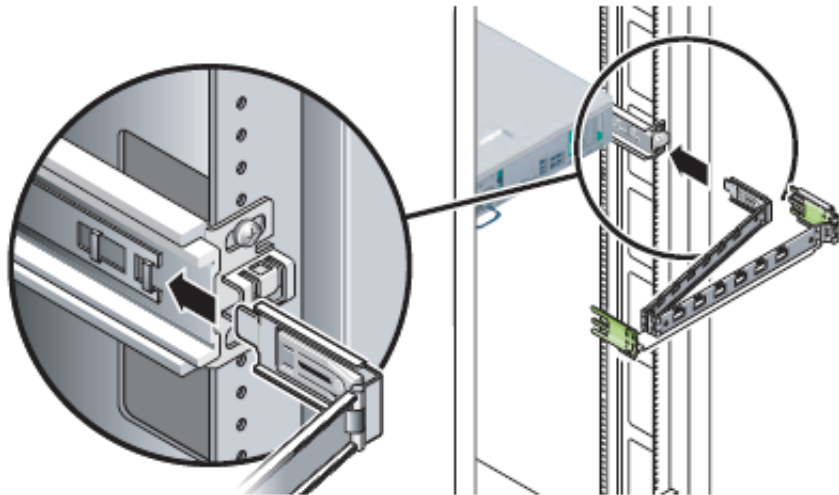
b. Plug the CMA rail extension into the end of the left sliding rail assembly.

The tab at the front of the rail extension clicks into place.

7. Reconnect the cables to the back of the server.

See Section 6.1.5, "Reconnecting Cables to the Server" on page 6-7.

Note – If the CMA is in the way, disconnect the left CMA release and swing the CMA open.

6.1.5 Reconnecting Cables to the Server

1. Reconnect the power, Ethernet, and PCI/XAUI cables as appropriate:

2. If necessary, reinstall the appropriate cables into the CMA.

3. Power on the server.

See Section 6.1.6, "Powering On the Server" on page 6-8.

6.1.6 Powering 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 procedure.

● **If the server does not boot, do one of the following:**

■ Use the tip of a pen to press the power button on the bezel (FIGURE 6-7).

FIGURE 6-7 Powering On the Server
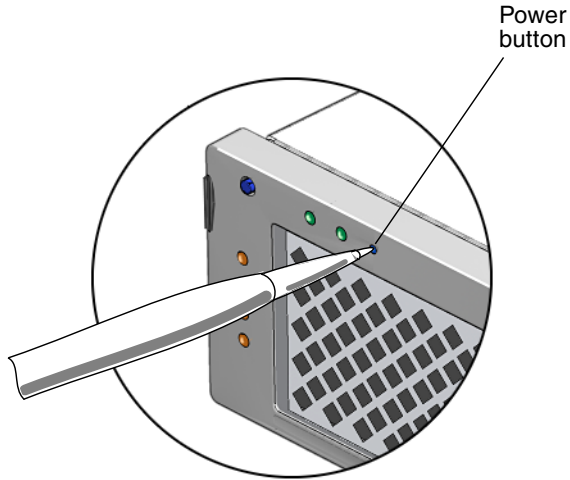
■ Type the poweron command to the system console.

For example:

```
sc> poweron
```

Signal Pinouts

This appendix gives the pinouts for the server rear ports and identifies connectors on various server boards. Topics include:

- Section A.1, "Gigabit Ethernet Ports" on page A-1
- Section A.2, "Network Management Port" on page A-2
- Section A.3, "Serial Ports" on page A-3
- Section A.4, "Alarm Port" on page A-6
- Section A.5, "USB Ports" on page A-7

A.1 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 for which are given in TABLE A-1. FIGURE A-1 shows the pin numbering of the ports. TABLE A-2 describes the pin signals.

TABLE A-1   Ethernet Connection Transfer Rates

Connection Type	IEEE Terminology	Transfer Rate
Ethernet	10BASE-T	10 Mbit/sec
Fast Ethernet	100BASE-TX	100 Mbits/sec
Gigabit Ethernet	1000BASE-T	1000 Mbit/sec
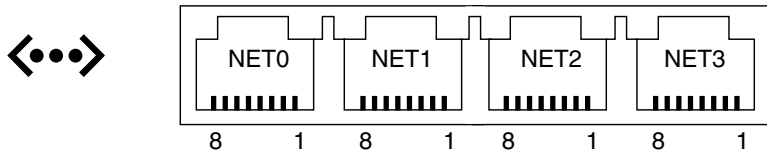
A.2   Network Management Port

The server has one 10BASE-T Ethernet management domain interface, labelled NET MGT. For information on configuring this port for managing the server with ILOM, refer to the *Sun Netra T5220 Server Administration Guide*.

Caution – If you are planning to use the network management (NET MGT) port, you must use a shielded Ethernet cable to maintain your server's NEBS compliance. The cable's shield must be grounded at both ends.

FIGURE A-2   Network Management Port Pin Numbering
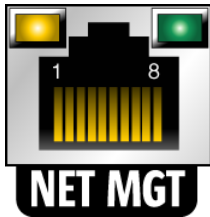
A.3 Serial Ports

The server has two serial ports, labeled SERIAL MGT and TTYA. TABLE A-4 lists the default serial connection settings for both serial ports.

TABLE A-2 Default Serial Connection Settings

Parameter	Setting
Connector	SERIAL MGT or lOlOl
Rate	9600 baud
Parity	None
Stop bits	1
Data bits	8

A.3.1 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 Ethernet cable to maintain your server's NEBS compliance. The cable's shield must be grounded at both ends.

FIGURE A-3 shows the pin numbering of the serial management port. TABLE A-5 describes the pin signals.

FIGURE A-3 Serial Management Port Pin Numbering

If you need to connect to the SERIAL MGT port using a cable with either a DB-9 or a DB-25 connector, use a supplied adapter to perform the crossovers given for each connector. The supplied RJ-45 to DB-9 and RJ-45 to DB-25 adapters are wired as described in TABLE A-6 and TABLE A-7.

A.3.1.1 RJ-45 to DB-9 Adapter Crossovers

TABLE A-3 RJ-45 to DB-9 Adapter Crossovers

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

A.3.1.2 RJ-45 to DB-25 Adapter Crossovers

TABLE A-4 RJ-45 to DB-25 Adapter Crossovers

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
4	Signal Ground	7	Signal Ground
5	Signal Ground	7	Signal Ground
6	RXD	2	TXD
7	DSR	20	DTR
8	CTS	4	RTS

A.3.2 Serial Port TTYA

The port labeled TTYA accepts a DB-9 connector. Use this port for general purpose serial data transfers. FIGURE A-4 shows the pin numbering of the serial port. TABLE A-8 describes the pin signals.

FIGURE A-4   Serial Port (TTYA) Pin Numbering

A.4 Alarm Port

The alarm port on the alarm rear transition module uses a standard DB-15 connector. In a telecommunications environment, use this port to connect to the central office alarming system. FIGURE A-5 shows the pin numbering of the alarm port. TABLE A-9 describes the pin signals.

Note – The alarm port relay contacts are rated for 100 V 0.2 A maximum.

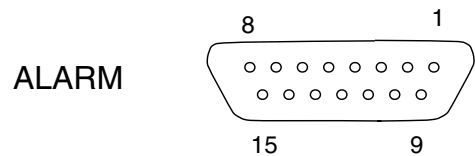**FIGURE A-5**   Alarm Port Pin Numbering

TABLE A-5   Alarm Connector Signals

Pin	Service	Pin	Service
1	NC	9	ALARM1_NC
2	NC	10	ALARM1_COM
3	NC	11	ALARM2_NO
4	NC	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

A.5   USB Ports

The server has two USB ports for attaching supported USB 1.1 compliant devices. FIGURE A-6 shows the pin numbering of the USB ports. TABLE A-10 describes the pin signals.
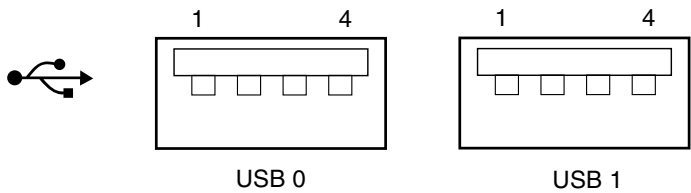
FIGURE A-6   USB Ports Pin Numbering

TABLE A-6   USB Connector Pin Signals

Pin	Signal Description
1	+5 V
2	DAT-
3	DAT+
4	Ground